

Alkatronic



User manual
English
v 7.5

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**Product Registration – Warranty**

Each unit of Alkatronic carries a limited factory warranty for 12 months* from purchase date with official invoice from shop. Damages result from user error will not be included in the warranty. Online registration must be done within 14 days after purchase in order to be deemed valid. In the case of any disputes, FOCUSTRONIC has the right to make the final decision. FOCUSTRONIC will also send update information such as firmware updates or new features information via the registered email account. Product warranty is not transferrable. Please register via our website www.focustronic.net/produc-registration.

*pH probe carries a 6 month warranty.



Alkatronic is a standalone machine and needs no other equipments. But it requires besides what is included:

- **Reagent.** Is offered in a 4 liters very economical package, so called "concentrated" and have to be diluted, [see here](#). We offer also ready to use solutions, that you do not need to dilute. Read on bottle carefully what sort you have!
- Single use packages of **calibration fluids** of 4.00 and 7.00 for a pH electrode.



Alkatronic may not be exposed directly to water and not to be placed in humid area so that visible condensation is present to the machine. Failed to prevent the Alkatronic to expose to humidity may void the factory warranty.

Introduction

Congratulations on your choice of this highly advanced device, which automatically measures alkalinity in your aquarium-system, and also within your own settled reference intervals, performs actions to prevent alkalinity from going above or below your desired reference values.

Please read the whole manual very carefully before setting up and using the device. There may be slight differences (of no importance) between what is on the screen of the device and the pictures within this manual.

Basic Philosophy

The basic principal of Alkatronic is to act like a safety belt, intervening when your alkalinity falls outside of the reference values you choose. The aquarist's primary technique for maintaining alkalinity, such as pH-computers for Ca-reactor or dosing-stations for Balling, will still act as the primary means of alkalinity control. The safety and stability provided by Alkatronic is more reliable when acting in that capacity. It is like the "lane-assist" feature of a car, when you occasionally drift out of the lane, the machine will correct it for you. Alkatronic will dose carbonate-solution from a separate pump when alkalinity falls below your low reference value, and shut off a socket (socket sold separately) when alkalinity rises above your high reference value.

When Alkatronic interacts, you will be able to track these actions through an on screen graph or list, in our app. This contains information when Alkatronic had to interact, and exactly what it did. Based on that, you can then fine-tune your primary equipment.

The main purpose of the Alkatronic is thus to prevent a rapid drop (or increase) in dKH due to some failure, which can cause the death of all of your corals, and the second purpose is to achieve a very stable dKH value by helping you fine-tuning your ordinary equipment.

Set-up-procedure



When setting up this device for first time, follow every points below very carefully until page 15.

Placement

Make sure you place the Alkatronic in a location that allows you to easily manage regular maintenance. The machine must be placed in a horizontal position. **Actually, some very very small tilting to the left is no harm, and actually some benefit (but is not needed), but never tilting to the right!**

It is possible to mount the device directly on a wall with our included wall mount, or just let it stand on a flat surface. **The height difference between the Alkatronic and the water surface level from where the machine will take the water for testing, should ideally not exceed ~50-70 cm.**

The reagent bottle should be placed as close as possible to the machine and at almost the same level as the machine (maximum of ~10-20 cm height difference, but preferably same level).

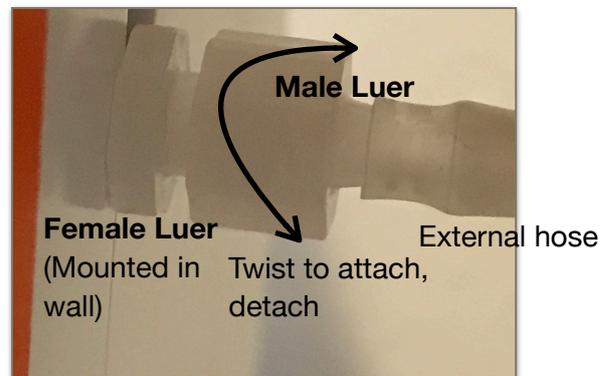
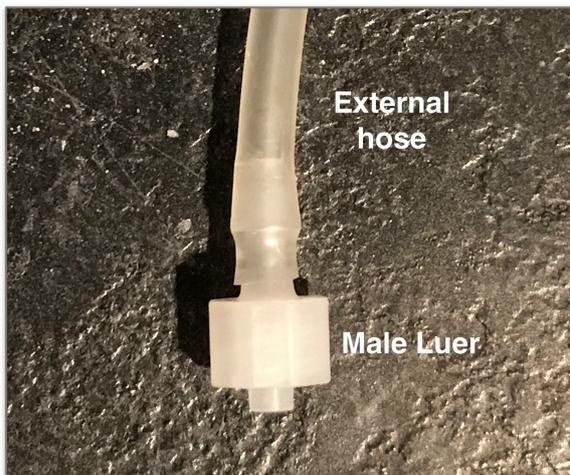
Make sure that if you adjust any of these positions (the reagent bottle or the machine itself), you recalibrate the pumps, as the delivery amount of fluids can vary based on the suction heights.

Feel free to use the included wall-mount for easy installation on wall, se picture.



Connecting hoses and prepare the measuring-beaker

All connections are made of **Luer-connections**. The female part of the Luer is factory-mounted in the walls of the machine, and the external hoses described below (1-5) should be installed tightly on the male part of the Luer, which should then be twisted on the female part. See pictures below. This makes it very easy to detach the external hoses when moving the machine.



In the package we include:

- Silicon hose, ID=1.6mm (For connection 1)
- Silicon hose, ID=3.2mm (For connections 2-5)
- Silicon hose, ID=4.0 mm (For safety drain connection)

Please note:

- You have to cut the proper length yourself, as that will vary between different set-ups.
- The hose for the connections 3,4 and 5, you can use an ordinary 4/6 (mm) hose of any kind, as these hoses are not crucial concerning function or accuracy.
- **But never use other hoses than included concerning connection 1 and 2.**
- **It is recommended to have as short length as possible concerning connection 1 (maximum 0.5m) and connection 2 (maximum 2.0m).**



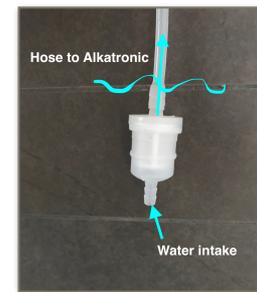
1) Cut the **hose 1.6 mm** in a proper length (if needed). Connect one end to the inlet "**Reagent In (1)**" and the other end to the included long plastic pipe. Put this plastic pipe down into a bottle (not included) which you later will fill up with reagent.

2) Cut the **hose 3.2mm** in a proper length. **Make it as short**



as possible, and ideally not longer than 2.0 meter.

Connect one end of hose to the inlet **"Water In (2)"** and the other end to the included microfilter (look at picture for correct orientation of the filter). Place the microfilter in a sump area (or other area where you want to take the water sample to measure) where it will never be exposed above the water's surface. **Never use this hose without the microfilter, and make sure the microfilter never can float up!**

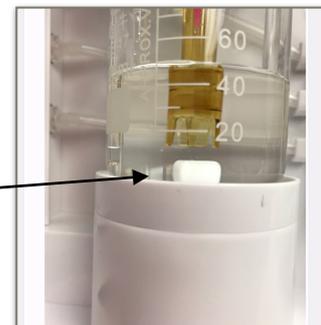


3) Cut the **3.2 mm** (or similar hose, like an ordinary 4/6 hose of any kind) in a proper length. Connect one end of this hose to the outlet **"Waste out(3)"**, and place the other end in a container which will collect the wastewater from the measuring procedure. If you measure every 6 hours, the waste volume is around 1.5 liter/week. Every measurement produces around 55 ml of waste water. **NOTE: It is actually possible to let the waste water go back to the tank, and for more information about that see here.**

4) Cut the hose **3.2mm** in a proper length. Connect one end of this hose to the inlet **"Alk In (4)"** and place the other end in a container of carbonate-solution, made according to our recipe (see [Appendix](#)), or another sort of alkalinity solution.

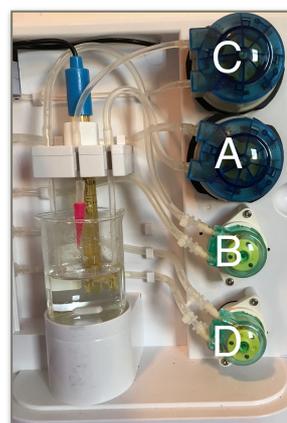
5) Cut the **hose 3.2mm** in a proper length. Connect one end of this hose to the outlet **"Alk Out (5)"**, and lead that hose to a sump area with ample circulation.

6) Put the included small white magnetic rod into the measuring beaker, and place the beaker inside the machine in its fitting.



7) **Wait to install the pH-probe until it is calibrated, let it be in the transport cup until then**

8) **Make sure the pipes inside the machine are in proper position!! The premounted silicon hoses on the pipes should be in contact with the pipeholder, and in that way guarantee correct positions. Ensure the following pipe-positions (fig 2a,2b):**



For all 3 pipes, Silicon hose in close contact with pipeholder

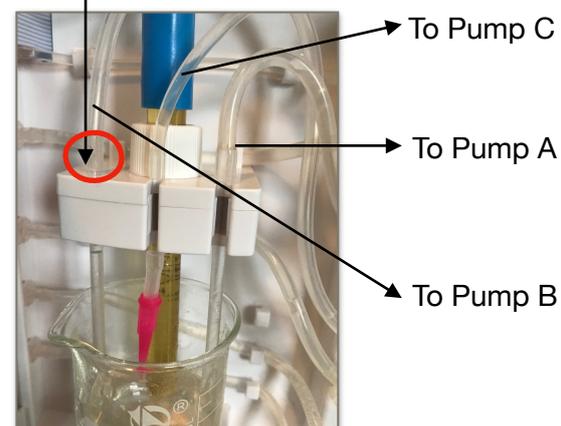


Figure 2a

- **Pipe from Pump C should be a few cm above surface of the water.**
- **Pipe from pump B must be in contact with the bottom. Very important!!**
- **Pipe from pump A must be around 2 mm above bottom. Very important!!**

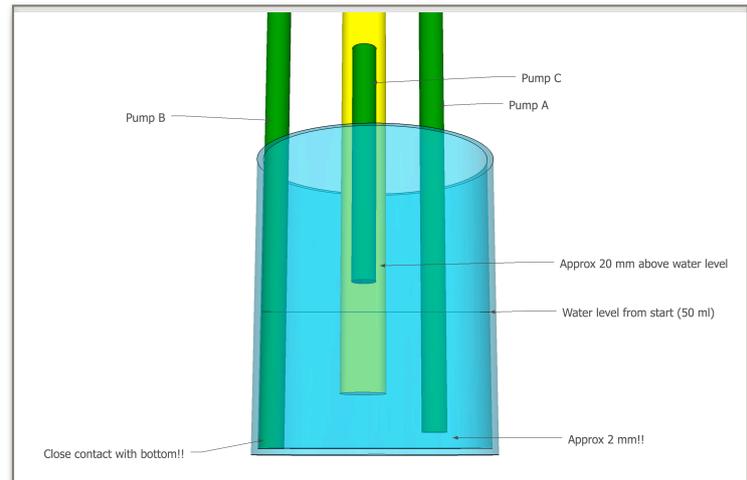


Figure 2b

Safety Drain

From Batch 3 and onwards Alkatronic have a safety drain. Use an ordinary 4/6 hose to connect to this Luer, if you wants to add this extra security.



Figure 2b

Establish software connection

The next step is to establish a connection between the App in the phone/tablet and the machine.

The connection between **Alkatronic and iOS-app** is based on **Bluetooth**-connection, and the connection between **Alkatronic and Android app** is based on **internet**-connection (thus require router connection, see below).

When wifi connection is established with router **it is also possible to do all settings and operations through our web-based cloud interface.**

The App links:

For iOS users:

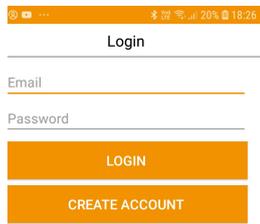
[Alkatronic iOS](#)

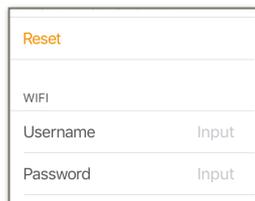
For Android users:

[Alkatronic Android](#)

For iOS user follow this instructions:

Do not open the app yet.

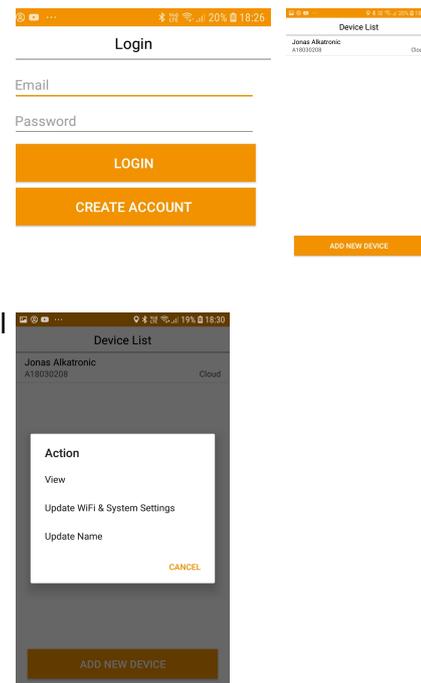
1. Make sure you have Bluetooth enabled on your Phone/tablet.
2. Power up the *Alkatronic* with the AC-adaptor. Never use any other adapter than the one provided!
3. Open the Alkatronic app. "**Create an account**" and then "**Log in**". After that "**Add new device**" and enter the serial number. Now click on the device serial number and press "**Connect**" and app will connect to Alkatronic. Connection is confirmed by a green dot at the Alkatronic logotype. It can take 5-10 sec to get connection.


4. In the app on the Main-screen, click on settings, scroll down to wi-fi, and type the SSID and password of your home-router. After entering the data, press **save**. Wait some so its really saved. Kill app. Reboot unit (power off, wait 30 sec, power on) after saved the router credentials. Wait approx 5 minutes and Alkatronic will connect automatically to the router. From fw V03.01.16 and later you don't have to reboot the unit to get router connection.


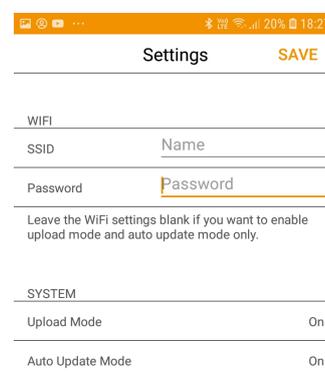
For Android user follow this instructions:

Do not open the app yet.

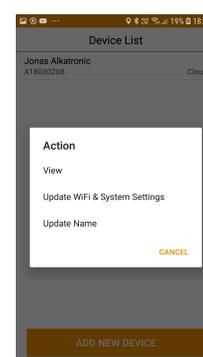
- a) Make sure you have Bluetooth enabled on your Phone/ tablet.
- b) Power up the *Alkatronic* with the AC-adapter. Never use any other adapter than the one provided!
- c) Open the Alkatronic app. **"Create an account"** and then **"Log in"**. After that **"Add new device"** and enter the serial number.
- d) Now click on the device serial number and this screen will appear:



- e) Now enter **"Update Wifi and System Settings"** and enter the SSID and password of the router and press **save**.
- f) Bluetooth connection is now established and the SSID and password data is transfered to Alkatronic.
7. Reboot unit (power off, wait 30 sec, power on) after saved the router credentials. Wait approx 5 minutes and Alkatronic will connect automatically to the router. From fw V03.01.16 and later you don't have to reboot the unit to get router connection.
- h) open app again, click on the device serial number, and choose **"View"**, and now app is up and running through internet communication to Alkatronic.



Note that first command sent from the app can take up to 1 minute before Alkatronic respond, but after that every



command will respond within seconds!

Mixing reagent

If you have purchased the "ready to use reagent", you shall not dilute this, but use it directly. **Most user have the "concentrated" reagent, and that must be diluted with RO water in a ratio of 1:4.** Please check [here](#) to get instructions and tip how to perform this. When you have the reagent ready, fill up the reagent bottle (not included) where you have the plastic pipe positioned.



Prime hoses and Calibrate pumps/electrode

Prime hoses

Now you must prime the hoses from **Pump A, C and D.**

- 1) Go to the main menu and select "Test Pump Accuracy", and begin with Pump A.
- 2) Press "Test", and make sure the water is moving upwards in the hose from the tank water. Follow it carefully until it is delivered into the test vial and you are sure there are no air bubbles anywhere in the hose. **The pump will stop by itself**, and if need just press once more to restart the priming.
- 3) Now do the same for Pump C (reagent fluid) , and Pump D (carbonate solution).

Do not worry if there is now some water/reagent in the test vial, there should be.

Calibrate Pumps

Now you shall calibrate pump A, C and D. Its the same procedure for each pump, with only one difference: **For the pump A use the large calibration cylinder, for pump C and D, use the small one!**

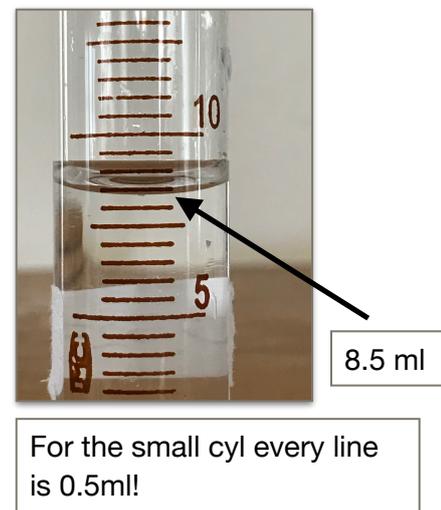
- 1) Take out the pipe from that pump you shall calibrate, by moving the pipe forward from the probe holder, and place it in the **test cylinder.**
- 2) In main menu, press "Calibrate" and then select proper



Read the meniscus at lower edge

pump.

- 3) Make sure the pipe is placed down in the test-cylinder, and press Calibrate.
- 4) Pump now starts, and stops automatically.
- 5) When it stops, take the pipe out of the cylinder, place the cylinder on a horizontal surface, and read the water line. Make sure to read it correctly, see Fig. **Observe that in 100 ml cylinder every line corresponds to 1 ml, and in the small cylinder every line corresponds to 0.5ml. See fig.**
- 6) Note the value in the number fields with one decimal, then press save. **Make sure the command is taken by looking at the LCD, where the entered value will be shown.** If it is not shown, press save again. Now return the pipe to its proper position in the holder.



Now when all 3 pumps are calibrated, the beaker must be filled up, as it is almost empty at this stage (If this is the first time. Otherwise the beaker is already filled). So now press **"Test Pump Accuracy"** and choose **"Pump A"**, then it will automatically fill the test-beaker with exactly 50 ml.

NOTE: The first 1-2 weeks a brand new machine (or after newly replaced hoses) require recalibration once a week, due to some short run in period of a new hose. After these 2 weeks, the hose is run in, and you can go back to recalibration of pumps every 8 weeks (which is default and machine will give you an alert.).

Calibrate the pH-electrode

When calibrate the pH electrode we strongly recommend single-use calibration fluids (they are more accurate).

Brand new electrode

- 1) The pH electrode's BNC connection is already pre-mounted so you do not have to unscrew the back panel until you need to replace the electrode (every 2 years).
- 2) Take off the transport-cup on the pH electrode.
- 3) Make sure there are no air-bubbles in then tip after transport by shaking it gently and very carefully, to allow bubbles to escape upwards in the electrode.
- 4) Rinse the electrode carefully in tap water to eliminate crystals from transporting fluid, and then rinse with some RO water also. Immediately proceed to the calibration procedure, and if you do not do that, make sure the electrode does not dry in the meantime. **Never** keep the electrode tip (the last 3 cm of the electrode) dry for more than 5 minutes.

Calibration procedure

1. Go to main menu and select "Calibrate", then select "pH electrode".
2. Rinse the electrode **carefully in RO or distilled water**, and then wipe the electrode carefully **without touching the glass tip**.
3. Place the electrode in pH 7.00 solution, then press the "pH 7"-button.
4. On the LCD you will now see "Stabilizing XX s". This is a count down of 2 minutes to let the electrode stabilize.
5. After the 2 minutes has passed, the calibration starts automatically, and also show you the pH value before and after the calibration, and is finalized with the message "pH 7.0 Cal, Done".
6. Now rinse the electrode **very carefully in RO or distilled water**, and wipe off carefully with water, but do not touch the glass bulb.
7. Place the electrode in pH 4.00 calibration fluid, and press the "pH 4" button.
8. Now same procedure and messages is repeated as for step 4-5, and is finished with "pH 4.0 Cal, Done"
9. Now the electrode is calibrated! Do not forget to rinse it again. Now proceed immediately to last step, **as the electrode must not be left dry for more than approx 5 minutes**.



Last step

1. Now immediately place the electrode in its proper position in the holder and make sure it is located correctly in the test-beaker. Use the rubber ring (is from factory placed on the electrode shaft), to make the electrode to be still in its proper position, **which is around 2 cm above the bottom of the measuring**



beaker. Do not place it too close to the bottom, it must never touch the rotating magnetic rod and not touch the glass bottom! If you of some reasons do not find the rubber ring, use an ordinary rubber band to get the electrode stay in proper position/height.

2. If you have followed instructions correct and finished the calibration part by fill up the beaker, you are now done. If you of some reason still have an empty beaker, now immediately press **"Test Pump Accuracy"** and choose **"Pump A"**, then it will automatically fill the test-beaker with exactly 50 ml.

It is extremely important that the pH electrode is never dry, so secure that beaker is filled with its "standby volume" of around 50 ml.

NOW, the machine is installed, calibrated, and ready to start measuring!

NOTE, the first 1-2 measurements after installing a brand new unit, may not measure correct values. It will normally take 2 measurements to get correct values after the very first set-up



The electrode in Alkatronic is a high-end electrode of lab grade quality, perfectly adapted for our purpose. In some situations, but not all, a brand new electrode needs to be adapted to the biological water. In that case you can see a small raise in pH the first 1-2 days. If you see that just recalibrate the electrode once more after around 2-3 days. After that the normal calibration interval is around every 8 months.

Functions and Graph Screens

Measurement interval

The machine automatically measures dKH according to an hour interval you decide. You can set measurement intervals between 1h-12h. Go to the home screen, select settings, and then set your desired interval with the +/- buttons. This value is the time between 2 measurements.



HOME-screen

Home-screen is the first view you see when opening the app. At the top you always see:

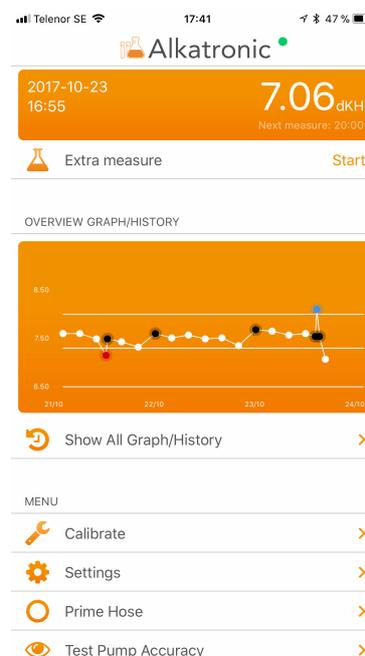
- Latest measured value
- When it was measured
- When the next measurement will be

Below this you will see a graphic history of the last 3 days. *"Overview graph/history"*.

This graph has two lines showing the settled reference value (see below). The white dots are measurements. If the dKH is **above** or **below** the settled reference value, the dots will be **blue** or **red** respectively, telling us that here the machine has also performed an action to correct a deviating dKH. Click on the *"Show All Graph/History"* to see what type of actions the machine performed, and also get more values in list form.

If a dot is **black**, the value was preceded by a wash out of a suspected error measurement. The black dot and that value is the correct and settled value. For more info see *"Wash out mode"*.

If a dot is **purple** it means that this was the first test after a restart of the machine.



Extra measurement

On the home-screen there is a button called "Extra measurement". When pressed, the *Alkatronic* will immediately perform an extra measurement independently of the settled measurement interval. **The time for coming scheduled measure will not be affected of an extra measurement.**

Table/history

On the home-page below the graph, there is a button called Table/history.

When pressed, you will get additional data in table form. If you want older history, go to "cloud-functions". From fw version V03.01.16 and later, you will besides the dKH value also see the pH value in the tank at same time as the dKh value was measured!



DATE	TIME	DKH
2017-09-27	20:23	8.23
2017-09-27	16:23	8.13
2017-09-27	12:23	7.70
Closed 59 ml HCO3-solution.		
2017-09-27	08:23	8.23
2017-09-27	04:23	8.23
2017-09-27	00:23	8.23
2017-09-26	20:23	8.23
2017-09-26	16:23	8.23
2017-09-26	12:23	8.23
2017-09-26	08:23	8.23

Aquarium volume

In settings you can enter the total volume of your aquarium system. The machine uses this value to calculate the proper amount of carbonate to dose if your dKH gets below your low reference value. In settings, you also can choose the unit between liter and gallon.

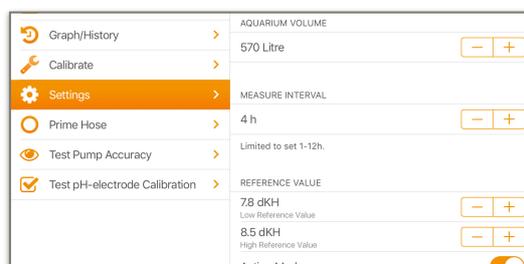


NOTE: If you are running an alkalinity solution of a different strength than a so called standard strength (Balling classic recipe), follow this table to adapt to that situation to get correct doses from Alkatronic!

Correction table for different KH recipes/brands

Reference values/actions

This is where you set your low and high dKH reference values for when you want the machine to intervene if the measured dKH is outside these values.



Low reference value

In settings, choose this value with one decimal.

When the measured dKH is below *Low reference value*, and "action mode" is enabled, *Alkatronic* will dose carbonate from its inbuilt pump D, or make extra doses from Dosetronic in those channels that are in Alkatronic mode.

Algorithm for dosing carbonates

When Alkatronic calculates the proper dose of carbonates, it uses the aquarium volume you have set, and the difference between the measured dKH and the value of "low reference value".

Alkatronic is using intelligent algorithms to dose the lacking dKH in a smooth and safe way, **and also deliberately aiming 0.1dKH higher than the "low reference value"**, to get the target dKH some above the low reference line. We recommend all users to start with normal mode, see algorithms below. Fast mode is for tanks with a very high coral growth rate, and the dosing algorithms in fast mode are some more aggressive.

Normal Mode (=Fast Mode Disabled):

- If the difference of dKH and low reference value > 0.14 , then the half dose of lacking alkalinity is dosed.
- If the difference of dKH and low reference value ≤ 0.14 , then the whole dose of lacking alkalinity is dosed.
- If the difference of dKH and low reference value ≥ 0.6 , then Alkatronic will never dose more than 0.35 dKH at same time.

Fast Mode:

- In "Fast Mode" it will always dose the whole amount of lacking alkalinity.
- If the difference of dKH and low reference value ≥ 0.6 , then Alkatronic will never dose more than 0.7dKH at same time.

Remember that when machine is doing an action, it will do next measure (and if needed an action again) **every 2 hours**. When the dKH value are back within the reference intervals, the measurement frequency is back according to the settings.

High reference value

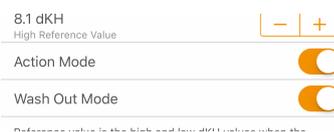
When the measured dKH is above *High reference value*, and "action mode" is enabled, *Alkatronic* will shut off the socket (socket sold separately) and also block pumps in *Dosetronic* that are in *Alkatronic* mode.

When dKH is below your settled *High reference value*, *Alkatronic* will keep the socket open and unblock the dosing schedule in *Dosetronic*.

As long as the dKH is outside these reference values, *Alkatronic* will measure at an interval of 2 hours, independently of the measurement interval you have selected in settings. When the dKH is back again within the settled reference values, the machine will continue to measure according to your settings in "measurement interval".

Action mode

When action mode is set to off (white), no actions like dosing carbonates and/or closing the socket, will be taken. When action mode is set to on (orange), the machine will interact according to the explanations above. **Factory settings for security reasons is "off", but machine will remember and keep the settled status, so if machine for instance is restarted and you before restart had action mode enabled, the action mode will automatically remain enabled **BUT first after the first measure after a restart**, of security reasons.**



Normal Mode/Fast Mode

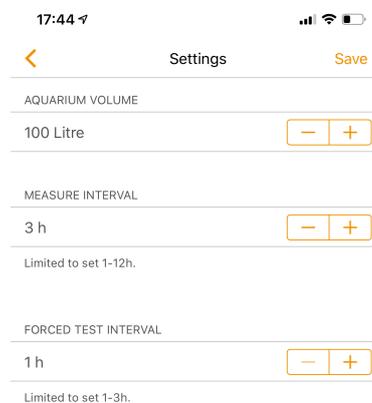
When action mode is enabled, you can also customize the dosing algorithms based on your systems demand. We recommend all users to start with "Normal Mode" (Which is same as Fast Mode Disabled), and that is default. *Fast Mode* is sometimes suitable for heavily stocked sps tanks, if you notice that the dosing actions in normal mode is not enough to bring the dKH back to levels above the low reference line. For the differences between these modes see [page 14](#) (algorithms for dosing carbonates).

Forced Test Interval

When machine measure a dKH value outside the settled reference values, Alkatronic use a measure interval of 2 hours as default, thus deliberately not following the scheduled interval. In extreme situations this 2 hours interval can have to be adjusted, and that can be done by changing "Forced Test Interval".

Our recommendations are these:

- Normal dKH consumption: use the default settings of 2 hour
- Extreme dKH consumption (like 0.2dKH/h or more): Set it to 1 hour
- Very low dKH consumption: Set it to 3 hour



Wash out mode

Even though the machine measures with very high precision, rarely an error measurement may occur. One example would be due to temporary air in the hoses. To avoid actions as a result of these potential error measurements, the machine will always compare a new measurement with the previous measurement. If the difference is more than 0.20 dKH, the machine will redo the measurement for safety reasons. It could ofcourse be a true deviation from the previous measurement, for example if your measurement interval is very long and you could have actually had that big of a deviation. In that case, the machine will re-measure and accept that value as true. **The main principal of the wash out mode is that the machine will redo a measurement if the difference in alkalinity is more than 0.20 dKH from the previous measurement, and when the difference is ≤ 0.20 , accept that value and set it for true.**

The washed out value/s will not be shown in either the graph or the history as we interpret them as false. But, as an indication that a value was proceeded by a wash out sequence, that value will be marked with a black dot. Thus, this "black value" is correct, but gives you info that 1-2 values before that have been washed out.

There are 2 reasons that the wash out sequence will kick in. One is, and that is the main goal of this algorithm, when the machine performs an error measurement. The other reason could be that the value is actually correct, but the time between 2 measurements is so big that the alkalinity has actually changed that much.

If you notice that there are many black dots on the graph you should increase the measurement frequency.

If you notice many black dots despite having a high measure frequency, you should check the physical installation to ensure everything is correct. If that still does not resolve the issue, look over the Ca-Reactor/Balling Station to make sure there are no issues with them that are causing the large variations between measurements.

Sometimes you do not want this wash out function. Maybe you deliberately measure with very low frequency, and therefore almost all of the time get more than 0.20 dKH in difference between the measurements, Maybe you know in advance that the next measurement will deviate significantly from the last measurement (after a water change, the first measurements of a newly installed machine, set up of a new new aquarium). In these cases it could be convenient to disable this function, which is done in the settings, by choosing "Wash out mode", "off"(white). Orange button=On. **Default mode is "on", so please do not forget to actively set this button to what you desire.**

We encourage a measure frequency of at least every 6 hours, and strongly advice to have wash out mode always enabled. Notice that the first measured value after a restart of Alkatronic will never be washed out, as Alkatronic need at least one measured value in history since restart, to compare with, AND this is also the reason why Alkatronic never do corrective actions based on the first measurement after a restart.

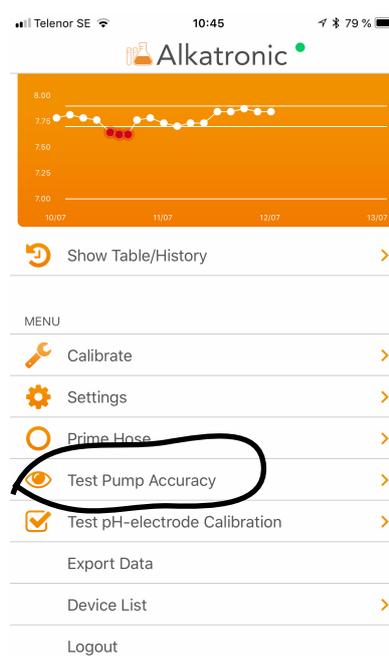
Test Pump Accuracy

This function allows you to control the calibration status of the pump, for instance to help decide if there is a need to recalibrate the pump, and also a helpful tool if you of some reason have an inaccuracy issue.

When you press this button, **Test Pump Accuracy**, you test the accuracy of the latest calibration of pump A, C or D.

Before pressing the button to start the test, take out the pipe from the probe holder from the pump you want to check, and place that pipe in the included calibration cylinder. For pump A use the large cylinder, and for pump C and D use the small one.

Then choose the pump to test and press "Test", and the pump will start and stop after a certain time. Read the delivered volume in the cylinder (see calibration chapter how to read the calibration



cylinders correct). Ideally, the delivered fluid volume should be the following:

- Pump A:49.5-50.5 ml
- Pump C:9.9-10.1 ml
- Pump D:9-11 ml

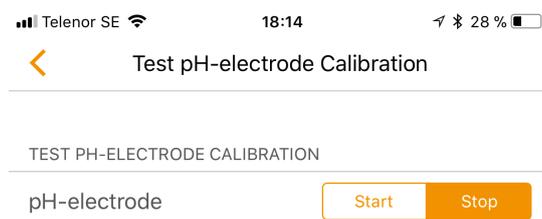
If the delivered volume deviates from the above intervals, go to *calibrate* and recalibrate that pump!

Test pH-electrode Calibration

If you correctly calibrate the electrode every 8 months, you should rarely need this function.

When you press this button, *test pH-electrode Calibration*, and then push start, you will see a continuous pH reading on the LCD screen.

You can now easily check if the pH electrode is accurate or needs recalibration. Carefully rinse the electrode in RO or distilled water, wipe it off, and place it in a solution with a known pH. Then compare the expected value with the reading on the LCD.



This function will help you decide if there is a need to recalibrate the pH electrode. **If you correctly calibrate the electrode every 8 months, you should rarely need this function.**

LCD-Screen

On the LCD-screen there is some basic info. Between measurements the machine is in standby mode and will always show the last measured dKH-value, when the next measurement is going to be performed, and on the second line, if any actions were taken based on the last measured value (Socket off, Dosed xx.xx ml, dKH OK).

- Last measured value
- When next measurement will be
- If any actions were taken based on the last measured value.
 - dKH OK
 - Dosed xx.xx ml
 - Socket off



When making changes in settings, LCD screen will shortly show these settings. **You will of course always see the settings in the App, as the App and Alkatronic remembers all settings, even after a power-off.**

- Low reference value
- High reference value
- Aquarium Volume
- Baseline calibration factor
- Measurement interval (in hour)



Concomitant pH measurement of the tank water

Alkatronic uses a lab grade pH-electrode to titrate the alkalinity. That's a reference method to establish the true alkalinity with very high precision, so this is one of all benefits with our method. One very good bonus effect using a pH electrode, is that we of course take the opportunity to measure, record and store also the pH value of the tank water. This is done by Alkatronic exactly before the alkalinity titration starts, giving you a 100% true pH value of the tank, at same time as you get the dKH value. So you will get as many pH values during a day as you get dKH values, making it possible to get a very representative pH visualization as well.



Export Data

In the main menu, you have a button called "Export Data". When clicking on this, your mail-client will be opened and include the measurements from the history, in that mail.

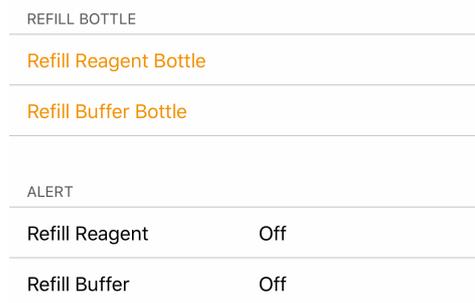
Auto Update Mode

When this button is enabled the firmware updates from Focustronic is automatically received and installed in the Alkatronic.



Alert Reagent/Buffer Bottle

In the settings you have the possibilities to reset the reagent and buffer(carbonate) bottles, in order to get an alarm/alert when they are needed to be refilled. If you for instance refill the reagent bottle up to 1000 ml reagent fluid, then click at "*Refill Reagent Bottle*" and in popup window enter "1000ml". After that, click at "*Refill Reagent*" in the submenu "*Alert*" and enter (in ml) the remaining volume when you wants receive the alarm/alert.



Connection to an aquariumcomputer/pH-computer

Our included socket is mandatory for users with no aquariumcomputer, and also for users with no free pH-port on an existing aquariumcomputer. However, users with a free BNC-pH port on their aquariumcomputer can connect *Alkatronic* to that port through an ordinary BNC-cable, and send the latest dKH value to your aquariumcomputer (like an Apex or similar). Then in your aquariumcomputer you can handle that information anyway you want, like control the outlet to your CO₂-solenoid, feed pump for your calcium reactor, or Balling-station. Basically you can do the same things you would do with our own included socket, however you have the option to use the latest dKH measurement anyway you desire.

Setup connection between Alkatronic and Aquariumcomputer

- 3) Connect a BNC cable between the Alkatronic **upper** BNC output (BNC 1) and a pH input on the aquariumcomputer
- 4) In the aquariumcomputer, select the correct pH-port and go to that computer's pH calibration process
- 5) In the Alkatronic app, select "*Calibrate*", then select "BNC"
- 6) Go to the aquariumcomputer's pH calibration menu (for reference see manual), and select **pH 7.00 calibration**.

- 7) In the Alkatronic app now click the **7.0 button**.

Now the Alkatronic will send a signal to your aquarium-

computer that simulates a "pH 7.00 signal".

When you are sure that your aquariumcomputer has received the signal, and it has stabilized (2-3 minutes), press calibrate on the

aquariumcomputer. Please refer to your

aquariumcomputer's manual if you do not know

how to perform it's ph calibration process. If you

need any support, contact the

aquariumcomputer's manufacturer.

- 8) Go to the aquariumcomputer's pH calibration menu (for reference see manual), and select **pH 10.00 calibration**.

- 9) In the *Alkatronic* app, click the **10.0 button**. Now the Alkatronic will send a signal to your aquariumcomputer that simulates a "pH 10.00 signal". When you are sure that your aquariumcomputer has received this signal, and it is stabilized (for sure, wait 3-5 minutes), press calibrate on the aquariumcomputer. Again, reference your aquariumcomputer's manual if you need any help with it's ph calibration process.



Now, your aquariumcomputer will understand the dKH values that *Alkatronic* will be sending.

OBS: As the signal from *Alkatronic* is analogue, and the signal to the third party aquariumcomputer is rounded to nearest tenth (In *Alkatronic* we have the resolution of hundredths) , there could be a small difference between the true value from *Alkatronic* and the shown value on the aquariumcomputer by $\pm 0.05\text{dKH}$ (**but mostly within $\pm 0.02\text{dKH}$**) . Of same reason, that the signal is analogue, you can sometimes see in the third party aquariumcomputer a small fluctuation of the signal by 1-2 hundredths. **This is normal** and depends on how the receiving aquariumcomputer handles the signal. Anyway, this is not a problem, as you never make actions based on difference of only hundredths. Please also read chapter below and using the "defer" command in for instance the Apex to avoid actions based on a small sudden fluctuation of these hundredths. Also remember that the aquariumcomputer can only receive dKH values from 7.00 and upwards, and the upper limit depends on the aquarium computer's limit to show high pH values. So if your aquariumcomputer is showing a dKH value very close to 7.00dKH, the true value could be that or lower. The correct values will of course always be displayed on the *Alkatronic* LCD screen and in the *Alkatronic* app and at our cloud. The measure range of *Alkatronic* is between 4.48dKH-15.4dKH. *Alkatronic* will also of course perform all of the actions you want it to, independent of what value you have on your aquariumcomputer.

We can not take any responsibility for whether or not the aquariumcomputer interprets the value as correct, we can only control our signal from *Alkatronic* and guarantee that is correct.

Programming tip to Apex/aquariumcomputer-user

As the signal to Apex/Profilux/other "third party aquarium-computer"=(TAQ), is analogue, it will fluctuate some 1/100ths up and down. This is the case for all analogue signals, like temp, pH, ORP etc. In the TAQ you will probably want to set reference levels when you want different things to happen if your value is below, or above a certain level. **Remember to always use the command "Defer", to prevent bouncing between on and off if the values are very near your settled reference value.**

Ex:

In your Apex you want to shut off the CO₂-solenoid if dKH is above 8.50 dKH. If Alkatronic measures for instance 8.45 dKH, the value in your Apex from time to time could go above 8.50 due to the small instability of the analogue signal. You do not want your Apex to react to these minor and temporary fluctuations above your reference values. You need to add a function in your Apex code that tells your apex to **only react if the value have been outside your reference values for a certain amount of time**. In Apex you call this Defer.

In the example below, you want Apex to shut off an outlet if dKH is above 8.50 dKH, but only if it is above that level for more than 10 minutes. **This will prevent the Apex from bouncing between on and off, if you are very close to the settled reference level.**

Fallback ON

Set ON

If dKH > 8.50 Then OFF

Defer 010:00 Then OFF

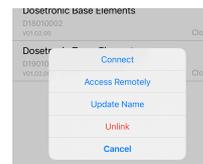
Cloud-functions

From our server/cloud, you can reach Alkatronic and control all functions from all places in the world as long as you are connected to internet and Alkatronic to your home-router.

There is 3 different way to access the cloud and all are actually the same.

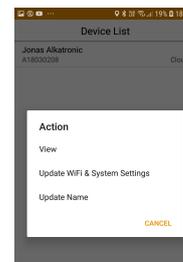
From iOS app

Use the shortcut in iOS app "Access Remotely".



From Android app

For the Android app, as that's running on internet you just have to click "view".



From Web browser

<https://alkatronic.focustronic.com/login>

As some functions must never be started by mistake, specially those functions including that pumps are running, we both have an ordinary screen lock, but also for the motor and calibration functions **a number-code to unlock this area. This code is always the 4 last digits in the serial number of your machine.**

Baseline calibration

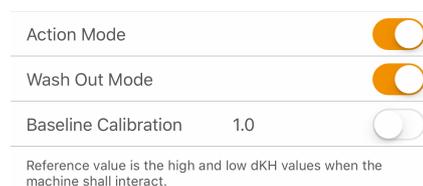
This function should **not** replace a calibration of the pumps and pH-electrode, but is **ideally used if you of some reason have a reagent concentration that is not correct**, thus leading to a significant inaccuracy. The typical situation you would need this function is if you mix the reagent yourself, and do some failure in that process, thus leading to a reagent with not perfect concentration. Thus this function will save you, and you can still use the reagent. **But there is actually one more situation you could use this function:** If you have calibrated the pumps perfect, but the measure cylinders have some inbuilt inaccuracy, then this function can compensate for that as long as you have a reference KH test to compare with.

Correct calibrated pump A and C, and correct calibrated pH-electrode, but still a dKH measurement from Alkatronic which is deviating more than 0.2dKH from the true dKH measured by a high quality reference test.

Following condition must be true, if this function should be used:

If you decide to use this function, and all conditions is fulfilled for that (see orange box), then go to "Baseline calibration" in settings.

Slide the button to "ON/Enable(Orange)", to make it possible to enter data. If you have the button in OFF-position, it will not be possible to enter any data, **and** the Baseline calibration is not active(and that is equal to that baseline factor is 1.00).



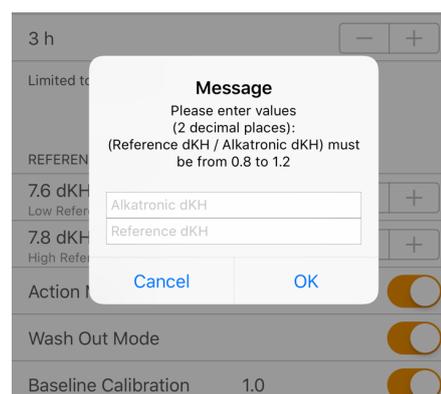
In the data-field enter following dKH values:

Field 1: *"dKH value from Alkatronic"*

Field 2: *"dKH value from a reference test"*

Make sure you really have correct values when you enter these in the data-fields.

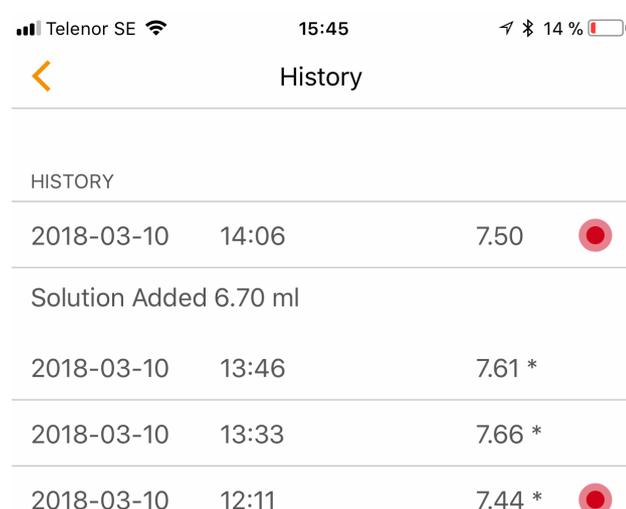
Thus, concerning the Alkatronic dKH-value, let Alkatronic measure at least twice and be sure these 2 values are very near each other as an indication that the measurement is correct performed. And concerning the dKH from the reference test, make it twice of same reason, and be absolutely positive that the reference test is showing the true dKH value.



Press save. From now, all values measured by Alkatronic will be recalculated with a factor which compensate for the not perfect mixed reagent.

All values in the app and LCD-display will be marked with a "*", if this function is enabled.

Do not forget to disable the function again when you refill with reagent with correct concentration!



Socket setup and connection (socket sold separately)

To let Alkatronic also control dKH in the upper direction, you can use the included wireless socket/smart-plug. By using this, Alkatronic can close/open the alkalinity addition from both a calcium-reactor or a third party dosing station.

Physical set-up

For Calciumreactor-user with pH-probe controlled CO₂-dosing

1) Plug the Alkatronic-socket into a power plug from wall.

- 2) Put the cord from the pump that feeds the calcium reactor with aquarium water into the Alkatronic socket. See Figure 4.

Now, as long as the Alkatronic socket is "open", which is indicated by a red light on the socket, the Alkatronic socket gives power to your pump that feeds your Ca-reactor (which usually is a peristaltic pump for continuously use). Only when a measured dKH is above your settled high reference value (and *action mode* is enabled), will the Alkatronic plug shut off, and thus shut off the feeding pump, so that no alkalinity is added to the aquarium.

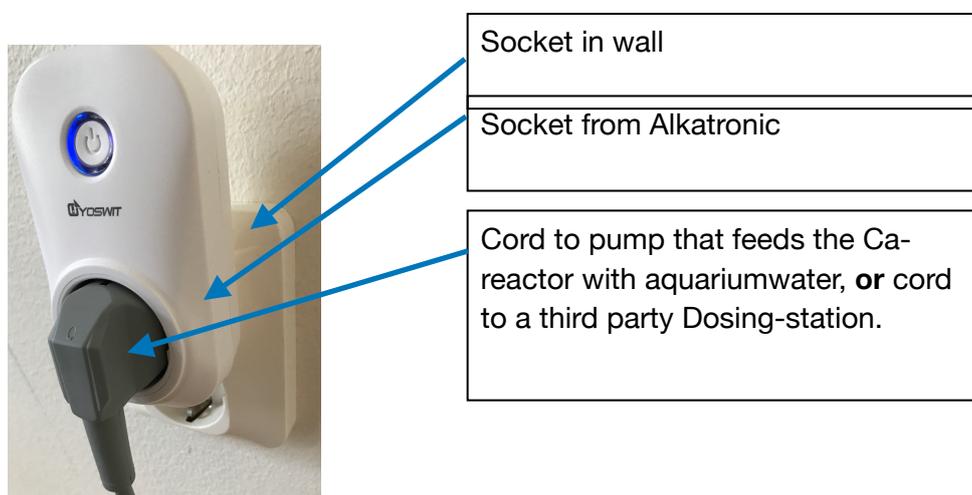


Figure 4

For Calciumreactor-user with timer-controlled CO₂-dosing

- 1) Plug the Alkatronic-socket into a power plug from wall.
- 2) Plug the timer that controls the CO₂-solenoid into the Alkatronic socket. See Figure 5.

Now, as long as the Alkatronic socket is "open", which is indicated by a red light on the socket, the Alkatronic socket gives power to your ordinary timer that controls the solenoid to the CO₂-supply. Only when a measured dKH is above your settled high reference value (and *action mode* is enabled), will the Alkatronic plug shut off, and thus shut off the CO₂, independently of what your ordinary timer wants to do. See figure 5.

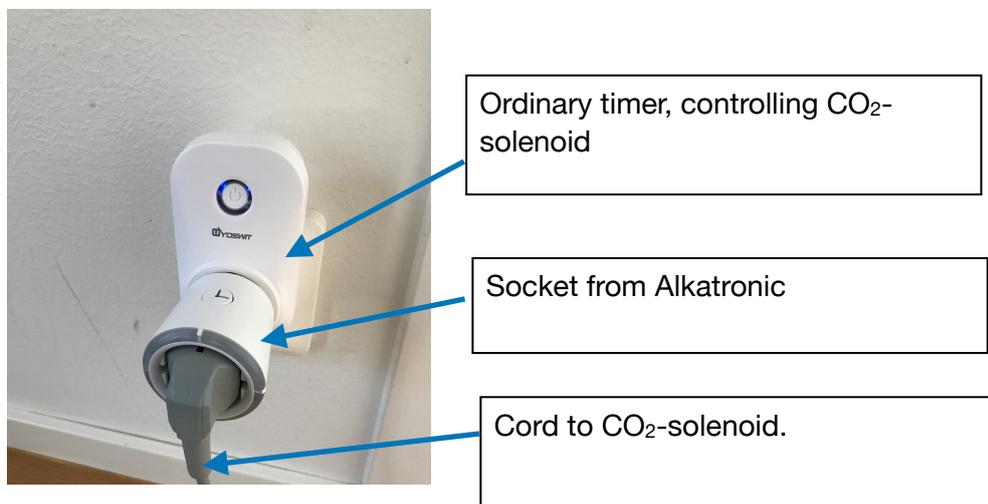


Figure 5

For Balling-user

- 1) Plug the Alkatronic-socket into a main power plug from wall,
- 2) Plug the cord from the dosing station of Balling solutions into the Alkatronic socket. See Figure 4

Now, as long as the Alkatronic socket is "open", which is indicated by a red light on the socket, the Alkatronic socket gives power to your Balling-station, and therefore your dosing station is controlled by its internal schedule. Only when a measured dKH is above your settled high reference value (and *action mode* is enabled), will the Alkatronic socket shut off, and thus independently of what your dosing station "wants to do", it will shut down until dKH is back again within the reference values.

For Calciumreactor and/or Balling users with an aquariumcomputer with a BNC-port for pH electrode

These users can, instead of or in addition to our own Alkatronic socket, connect Alkatronic to an ordinary pH input of an aquarium computer (or pH computer) through an ordinary BNC-cable. The aquarium computer will then receive the dKH values from Alkatronic on its pH-input, and you can use this dKH-information to implement any actions you desire through your aquarium computer's programs.

Establish Bluetooth-connection

- Go to settings and enter the MAC-address (see attached info in package) of the included socket at "Plug 1"-field, slide the button to orange, and press save. **If you are not able to slide the button to orange (shadowed), then go to settings and switch "action mode" to enable, then try again.**

PLUG MAC ADDRESS		
Plug 1	20:91:48:5B:01:BB	<input checked="" type="checkbox"/>
Plug 2	00:00:00:00:00:00	<input type="checkbox"/>

Now that you have a BT-connection between *Alkatronic* and the socket, the socket should have turned on. Try to toggle the Plug 1 button and make sure the socket reacts. Do not forget to leave it on enable (orange). **If for some reason it is not turning on, check that you have BT-connection**

(green dot on home-screen), and action mode enabled. If "action mode" is disabled, the control of BT-socket is deliberately locked.

As long as the measured dKH is below the "High reference value" the socket will be left on. If the machine measures a dKH above the settled High reference value, and action mode is enabled, the socket will be turned off, **and the machine will measure again after 2 hours.** When a subsequent dKH measurement is below the *High reference value*, the socket will go back to "on".

If action mode is disabled, the socket will not react to the dKH values, but will be left in it's last position. For safety reasons, the socket is always in ON-mode (orange) after a power up of the machine. Remember that if you want to be able to change the socket both manually with the toggle-button, or let the machine do so by automatic actions, you must have "action mode" enabled.

Dosetronic mode

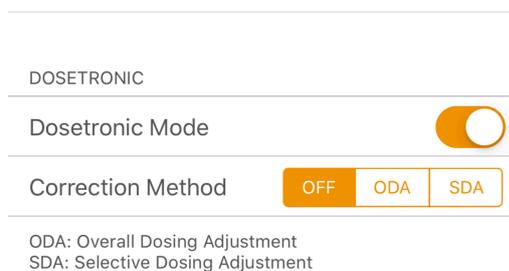
When you set "*Dosetronic Mode*" to enable, the pump D in Alkatronic will be disabled, and **all** dosing and autocorrection instructions from Alkatronic will be performed by **Dosetronic**. The wireless socket still responds as normal also in Dosetronic mode. For more info refer to user manual of *Dosetronic*.

Automatic Correction Modes of the dosing schedule

One of the unique and game changing features of Dosetronic, is that it can in combination with an Alkatronic, autoadjust the scheduled doses based on the KH-measurements from Alkatronic.

We have 2 different autocorrection functions, with slightly different purposes. **Overall Dosing Adjustment**, and **Selective Dosing Adjustment**. You shall not use both at same time, and to prevent that, the software only allows one to be enabled each time. You find the buttons to enable/disable these in the Alkatronic app.

These autocorrection functions will apply to all channels in Dosetronic that are in Alkatronic mode. For more information about this, refer to user manual of Dosetronic. Users that don't have a Dosetronic just leave this button in "Off" position, (and Dosetronic mode in disabled position)

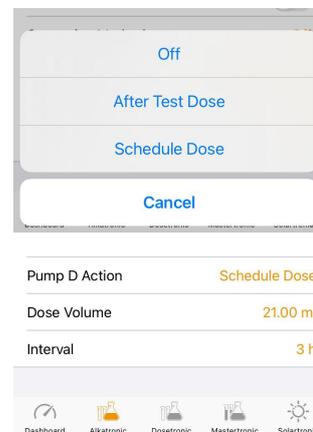


Pump D options in Dosetronic mode

When Alkatronic is in *Dosetronic Mode*, all dosing and regulations based on the values from Alkatronic, is performed by Dosetronic (in the channels that are in Alkatronic mode), and thus *pump D* in AT is automatically disabled for that purpose.

But, in Dosetronic Mode, its actually possible to use pump D as an isolated dosing pump, with 2 options:

- Dosing X ml after a finished measurement from Alkatronic. Typical use of this is to pump back x ml salt water to compensate for what consumes during a test.
- Dose x ml according to a fixed interval, where doses will be performed xx:30.



This function needs following software and app versions:

- Alkatronic software: V 03.03.00 or later
- App versions: "All in one app":
 - iOS : V 1.1.3 or later
 - Android: V 114 or later

Maintenance

Change hoses inside the pumps

Pump A and C

Every 6 months (based on a mean-measure frequency of 6 measurements a day). In app there is a hose counter that reminds you when time to change.

Pump B and D

Every 6 months (based on a mean-measure frequency of 6 measurements a day). In app there is a hose counter that reminds you when time to change.

OBS: Always use original hoses from FOCUSTRONIC for this purpose. We will not guarantee precision/accuracy, nor safety, if you use other hoses than our replacement hoses. It is of the utmost importance that these hoses are of correct quality, diameter, length, with correctly positioned stops, and are specialized for this machine and it's pumps.

Change microfilter and external hoses

From time to time depending on how much deditus and light the external parts is exposed to, you have to exchange the microfilter, and the external hoses as well. Concerning the external hoses to pump A ("Water in") and C ("Reagent in"), and the microfilter, only use those from Focustronic. The replacement interval can vary quite much, but as a guideline we recommend to exchange the filter as well as the external hoses every 6 months. **We strongly recommend to follow these replacement guidelines, and your local dealer or distributor have the spare kit for you. Its specially important to change the external hose between reagent bottle and machine on a regular basis.**

Change internal hoses

Besides the hoses inside the pumps and the hoses outside machine, there is also a few hoses internal mounted in chassi. These last very long, **but that hose that carry the reagent fluid should be replaced at same time as you replace the pump C hose (and external part of reagent line).**



This is the internal hose that carry the reagent. Do not forget to change this when change hose inside C pump, or if you have issues with many black dots.

Changing the pH-electrode

The included pH electrode is of high quality and is specially chosen for this purpose. If properly handled, it will last for 2-2.5 years. After these 2+ years it will need to be replaced. You can purchase the electrode at Focustronic, or at the local dealer where you bought the machine. When you replace the electrode you have to unscrew the back-lid and in the upper right corner of the circuit board connect the BNC cable to the BNC-contact. Be very careful not to touch the electronics on the circuit board. If you are concerned about performing this task, please contact Focustronics support and we will guide you through it. After that, follow the instructions on [here](#), from point 2 and onwards.

Recalibration

pH-electrode

The electrode in Alkatronic is a high-end electrode of lab grade quality, perfectly adapted for our purpose. In some situations, but not all, a brand new electrode needs to be adapted to the biological water. In that case you can see a small raise in pH the first 1-2 days after installed a new electrode. If you see that just recalibrate the electrode once more after around 2-3 days. After that the normal calibration interval is around every 8 months, due to its very high quality and precision. The electrode will last around 2.5 years if handled properly.

Pumps

Pump A, C and D

Every ~8 weeks. You can always run the function "Test Pump Accuracy" to check if calibration is needed, as the interval could differ depending on the age of the hose inside the pump. Thus every 8 weeks is only a guideline, and could vary. The machine will give you an alert when time to calibrate, as a reminder.

NOTE: The first 1-2 weeks a brand new machine (or after newly replaced hoses) require recalibration once a week, due to some short run in period of a new hose. After these 2 weeks, the hose is run in, and you can go back to recalibration of pumps every 8 weeks (which is default and machine will give you an alert.)

Pump B

Pump B never needs to be calibrated

Trouble shooting

Bad accuracy

Defines as more than 0.2-0.3dKH difference from the **known** dKH.

Lets start with the summary, as that contains all details below:

Summary: If Alkatronic is correct calibrated and reagent is correct, and despite this is inaccurate, it **always** depends on some inbuilt inaccuracy in the measure calibration cylinders. Just use the "Baseline calibration" to compensate. Done.

First of all:

- Make sure that you really know the "correct" dKH. That is not easy, as **even a brand new manual KH test from the market, mostly have an inbuilt inaccuracy of around 0.3dKH.**
- Make sure that the pipes are in correct positions! **The pipe from pump B must be in contact with bottom and the pipe from pump A must be around 2 mm above bottom.**

Inaccuracy is **always** a matter of calibration and there is 3 different areas where the calibration could have been not perfect:

1. The A and C pumps

Check pump calibration status for Pump A and C, by using the "**Test Pump Accuracy**" function. If the volume of the delivered fluid isn't within the ranges below, redo the calibration of that pump.

- Pump A:49.5-50.5 ml
- Pump C:9.9-10.1 ml

Make sure you are reading the measure cylinders correct when you calibrated! Read the lowest line in the water surface, and observe that in the 25 ml cylinder (the small one) every line corresponds to 0.5 ml!!!. See figure!



Fig. The value here is 8.5 ml.

2. pH electrode

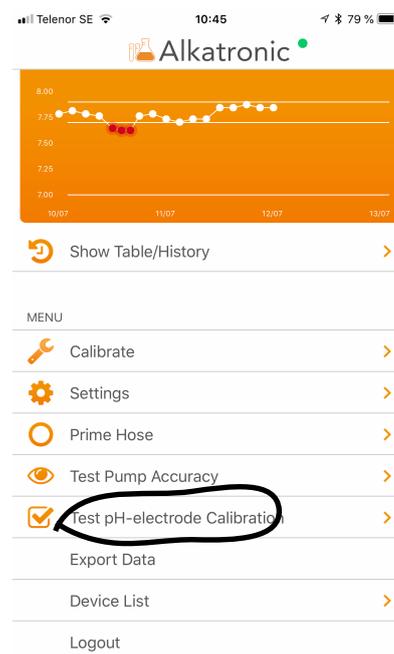
Check pH electrode in this way:

1) Use a new, not opened, bottle of mineral water, NO gas, with labeled pH on it. Here is a few brands that have labeled pH (with good accuracy as water is with high alkalinity):

Evian, Aqua d'Or, Gerolsteiner, Volvic, Fiji etc.

2) Rinse electrode in tap water, wipe off carefully, do not touch glass bulb, and then rinse in some of the mineral water you shall use.

- 3) Pour up the mineral water in a completely cleaned and rinsed bucket (rinse that in RO), and place electrode there, and shake a few times carefully.
- 4) Now press "test pH-electrode Calibration" from app.
- 5) If value is within 0.2pH from the labeled pH your electrode is good and you don't have to recalibrate. If its outside 0.2pH from labeled value, then recalibrate the electrode.
- 6) After that recalibration (if any) redo the "mineral water" test, and if still outside 0.2pH from labeled value, consider change electrode.



3. Reagent

Do not forget to dilute the reagent if it is the so called "concentrated"!

Follow instructions [here](#) how to dilute.

The "ready to use reagent" from Focustronic, you do not have to test, this test below is to check if you have diluted the so called "concentrated reagent" in an accurate way.

Check the accuracy of the Alkatronic reagent you use in the machine, in this way:

- Perform an ordinary salifert test (use 4 ml of tank-water as usual, 4 drips of color dye etc) , BUT use the Alkatronic reagent (diluted/ready to use) instead. Now do this math:

$$(\text{1-syringe reading}) \times 250 \times 0.056 = \text{dKH}$$

Example:

If syringe when color is change to violet is showing 0.45ml, then:

$$(\text{1-syringe reading}) = 1 - 0.45 = 0.55\text{ml}$$

So the formula will in this case be:

$$0.55 \times 250 \times 0.056 = 7.70\text{dKH}$$

If this calculated dKH value (7.70dKH in the example above) is within 0.3dKh from a reliable manual test, then you know that the Alkatronic reagent is correct! But if it deviates more there is slight inaccuracy of the reagent caused by not perfect dilution of the so called "concentrated" reagent. To correct this use the "Baseline calibration".

If you have gone through all 3 steps above, thus confirmed that Alkatronic is correct calibrated and correct mixed reagent, and still experience inaccuracy, then the inaccuracy is depending of small **inaccuracy of the measure calibration cylinders**. You solve this in same way as when not perfect diluted reagent: "Baseline calibration".

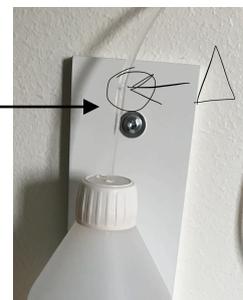
Bad precision

Defines as more than 0.1dKH variance between 2 measurements immediately after each other.

1. Check the microfilter for obstructions and make sure it is not too dirty (do you need to wash it or replace it?) , **and make sure it can never float up.**
2. Check for large amounts of visible air in the hoses concerning the **reagent line (C line)**. A small amount of air is normal and will not influence the results. Best place to check is at the hose section between pump C and pipette. In the beginning of the titration cycle, there should be very little air traveling in that part. Around 1-2 cm air totally is normal. If there is much air check these things:
 - A lot of air bubbles in the reagent canister? Use your fingertip or something similar to tap the outside of the container in order to let any air bubbles dissipate and escape from the reagent vial wall.
 - Make sure the reagent vessel is not lower than 20 cm below the machine.
 - Check that the pipe in the reagent bottle is below the surface.
 - Check so all luer-connections and hoses are tight.
 - Check the plastic connectors in pump C, so there is no crack on that.



- **Check all parts of C-hose**, outside and inside machine so there is no sharp bend or knick, or air leakage due to cracks. Very small crack can be difficult to see but will have an impact, so check very carefully. One weak point can be if you have to sharp angle in junction between pipe and hose. See fig. Also very old C-hoses (more than 8 months), can be more vulnerable to cracks. Follow our guidelines concerning replacing interval **and if still issues replace both external and internal hoses in reagent line and pump C hose.** Check [here](#).



3. Check the magnetic stirrer, ensure the magnetic rod is in place, and moves during the titration phase.
4. Check that the placement of the machine and reagent bottle is according to our guidelines.
5. Make sure that the pipes are in correct positions! **The pipe from pump B must be in contact with the bottom and the pipe from pump A must be around 2 mm above the bottom**, and the pipe from pump C should be around 20 mm above surface level when the measurement vial is in standby mode (containing 50.0 ml).
6. Check so the pH electrode is not in contact with glass bottom, but is around 2-3 cm above. Use the rubber ring included to hold it in place. If you lost the rubber ring just use an ordinary rubber band.
7. Brand new hoses in the pumps, could need some run in time, so after installing new hoses in pump, the first 1-2 days could be with slight lower precision (but probably not). That will very fast disappear, and need no actions.

Machine is giving a "4.48 dKH" value or very close to that

1. You really have this low value
2. Of some reason, no water is delivered to the machine for a test cycle
3. You have forgot to dilute the "concentrated" reagent!

If the reason is none of the above and still these 4.48 values or at least very low values, go to chapter "[Bad accuracy](#)".

Machine is giving a "0.00* dKH" value

This can sometimes be seen in a brand new machine. During some circumstances in the very first set up, and very first time you start the unit from factory settings, the so called Baseline calibration-factor can be a N/A-value, leading to this "0.00" results. Of course the value is not 0.00, so to correct this do this:

- Go to settings in the app, and toggle the Baseline calibration button to disable, so you see the factor 1.00. Then press save, and check LCD screen and confirm that you in LCD see "F1.00".

A lot of "black dots" in graph

Read above about [wash out mode](#).

Some "black" dots is normal, as that can be due to true alkalinity fluctuations in the tank, especially if you measure quite seldom (every 6 hours or less). And also, machine can as a very very seldom event, do a temporary error, and that is also detected and washed out, and in that case also normal with a black dot in the graph. But if you have very many black dots, like several every day, you can go through this check list:

- If the **time-tag** after a washed out measure ends with something close to **XX:10**, that means that the value was correctly measured by Alkatronic but that the difference compared to previous measured value was $>0.2\text{dKH}$, and therefore Alkatronic only redo the measure once and then settle the value. In this case, everything is correct in all aspects, but consider to increase measure frequency.
- If the **time-tag** after a washed out measure ends with something close to **XX:20 or more**, that means that the first value was incorrectly measured by Alkatronic and therefore Alkatronic redo the measure twice or more, and then settle the correct value. If this "XX:20-measurements", happens only 1-2 times a week, you do not have to do anything, but if it happens more often:
 - Go through the check point in "[Bad precision](#)".
 - Check so you do not dose any carbonates in time and place very close to the water intake to Alkatronic. In best case try to dose all Balling solutions downstream from the water-intake to Alkatronic.

Machine is not dosing

Toggle the action mode button and confirm that you in LCD see "Action mode enabled", AND immediately after that **press save in app. Do not leave the screen before pressed save button in app.** Also check so Dosetronic mode is disabled.

No connection between App and machine

- For iOS,
 - Make sure you have BT connection enabled at phone/table.
 - Make sure you always close app after a session. Having app open longer than 30 minutes can cause connection issues.
- For Android
 - Android app runs with internet communication, so if not respond you most likely have failed in get Alkatronic connected to the router. Go back to [page 9](#), and redo the steps from point d. Make sure you really enter the correct SSID and password for the router, and that router is running at 2.4 GHZ.

No wifi-connection

iOS user:

If issues with connecting to your home router, thus connection issue to the web cloud page try this:

If you have had connection to router before and just lost it then start with just restart the Alkatronic, and make sure the app is closed.

And a restart is performed by just power off Alkatronic, wait 30 sec, then power on.

Only If restart doesn't solve it, or you never have had connection with router from start, proceed to below:

1. Restart the Alkatronic
2. Wait for BT connection
3. Clear the wifi credentials and press save
4. Enter the wifi credentials and press save
5. Enable alerts for "dKH high" and "dKH low", and press save
6. Kill app
7. Restart Alkatronic again. DO **NOT** OPEN THE APP NOW.

8. Wait for a few minutes (still do not connect with app)
9. Check in router to see if you can see Alkatronic serial nr, if you do, Alkatronic now communicates with your router.

If this still do not solve the problem, the problem is very likely on the router-side. In that case refer to the router settings and user manual. Sometimes it is sufficient with restart the router and sometimes it is a security setting in router, where for instance "guest-mode" can solve the problem in some routers. Also note that Alkatronic communicate at 2.4GHZ, so that must be the option in the router settings.

Once you have got this connection to the router, you will normally not have to do these actions anymore (and mostly not at all, as also the first connection is automatically).

Android user:

If issues with connecting to your home router, thus connection issue with the Android lite app and the web cloud page, try this:

If you have had connection to router before and just lost it, then start with just restart the Alkatronic. And a restart is performed by just power off Alkatronic, wait 30 sec, then power on.

Only If restart doesn't solve it, or you never have had connection with router from start, proceed to below:

- Go back to page 11, and redo the steps from point d. Make sure you really enter the correct SSID and password for the router, and that router is running at 2.4 GHZ.

Fail-safe message "Code 01"

If you got this error message, it depends on that machine have done **2** measurements after each other where both values ≤ 4.48 dKH. This indicates that it can be either

1. You really have this low value
2. Of some reason, no water is delivered to the machine for a test cycle
3. You have forgot to dilute the "concentrated" reagent!
4. Issue with the electrode

Machine will close down, and do no more measurements, until you have checked the reasons, and will need a restart to start over again.

Start the trouble shooting with following chapter "Bad accuracy".

Failsafe message "Code 02"

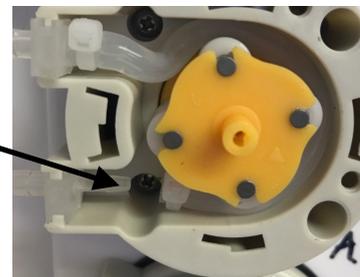
If machine is doing more than 4 retests in one session (see *wash out algorithm*), there is some installation issue outside machine, like air leakage in C-line, micro-filter float up, not correct pipe-positions, damaged electrode, or something else giving constantly variable readings. That reason must be fixed, so if that happens machine says **Code 02**, and will stop measure, until you have restarted the machine and located the reason. To troubleshoot that part, follow same points as during "Bad precision" and "A lot of black dots in graph".

Failsafe message "Code 03"

If LCD shows "Code 03", this is a fail-safe action from Alkatronic due to that the measured value of some reason was higher than 15.4dKH.

The reason can be one of these (The most common reason is 2 and 3):

1. The true dKh value is really above 15.4 dKH
2. No reagent
3. Incorrect mixed reagent, in this special case, far too diluted.
4. You have reagent, with correct concentration, but its not correct delivered:
 - I. Hose inside pump C got loose. This is of course not normal, and very very uncommon, so in this case, contact support for a replacement of hose and also emergency help.
 - II. Check "points 2-6" under chapter "Bad precision"



If the reason is none of the above, go to chapter "Bad accuracy".

Failsafe message "Out of Range/Re-Calibrate"

When you calibrate the pump/s, and enter an invalid data, thus a volume that is out of allowed range, this message appear. The allowed calibration ranges are:

- Pump A: $35 < X < 80$
- Pump C: $5 < X < 20$
- Pump D: $5 < X < 20$

pH readings increase the first day/s after installment of a brand new probe

The electrode in Alkatronic is a high-end electrode of lab grade quality, perfectly adapted for our purpose. In some situations, but not all, a brand new electrode needs to be adapted to the biological water. In that case you can see a small raise in pH the first 1-2 days after installed a new electrode. If you see that just recalibrate the electrode once more after around 2-3 days. After that the normal calibration interval is around every 8 months, due to its very high quality and precision. The electrode will last around 2.5 years if handled properly.

Appendix

Recipe for carbonate-solution

The machine's dosing algorithms are based on the carbonate-concentration from an ordinary classic Balling recipe or similar.

Here is such a standard recipe:

- **Recipe based on NaHCO_3**
1 liter RO-water
81 g NaHCO_3
- **Recipe based on $\text{NaHCO}_3/\text{Na}_2\text{CO}_3$**
1 liter RO-water
66 g NaHCO_3
10 g Na_2CO_3
- **Recipe based on Na_2CO_3**
1 liter RO-water
52 g Na_2CO_3



Many new brands today are using recipes with higher concentrations. So if your carbonate strength/recipe is X times stronger than a Balling classic recipe above, just divide you aquarium volume by X , and type that value in settings under Aquarium volume.

Here is an helpful guide with many common brands today:
Correction table for different KH recipes/brands

Mixing reagent solution

The reagent solution comes in two versions:

- Ready to use solution
- Economic concentrated solution

The "ready to use solution" does not need any preparation, and can be used from scratch.

The economic "concentrated solution" is an extremely favorable solution in regards to the running cost, and is mixed with **4 times more RO/distilled water than the reagent volume**. This 4/1 relation is also correct if you choose to weight the reagent and water, as the reagent have same specific gravity as the RO-water. (Theoretically the reagent have slight higher specific gravity but the difference is extremely small so we can without losing accuracy, neglect that).

Thus, depending on your equipment at home, you can choose between either using the "*weight method*" or the "*volume method*".

The volume method, with a volumetric flask, can give an accuracy of the ready to use solution by 0.1%, so we recommend user to sooner or later purchase a volumetric flask to make this mixing both accurate, fast and easy. Most user may not have this volumetric flask to start with, then its perfect to use the weight method meantime.

Weight method

Use a kitchen scale of reasonable quality with a resolution by 1g, and preferably a maximum weight capacity of at least 2500-3000g.

It is advisable to not mix too much at each occasion. **We recommend mixing a maximum of 2500-4000 g each time. Remember: If the concentration of the final reagent is not perfect, NO problem, just compensate that by using "*Baseline calibration*".**

The advantage with this method is that you perform the whole procedure by **one single weighting**, and in that way reduce errors.

As the specific gravity of our reagent is 1.00g/ml we can still use the 1/4 relationship between the weight of the reagent and RO water.

Practical procedure:

In this **example** you wants to make **2000ml of a ready to use solution**:

- Place a canister (please make sure it is **completely clean** and only are used for this purpose from start) on the scale.
- Press "tare" on the scale to make the readings to 0.00 g

- Now carefully fill up with reagent to the readings of **exact** 400g.
- DO NOT remove the canister from the scale, let it be, still reading 400 g of course, and now add RO-water until you read **exact** 2000 g at the scale. Done!



Advice:! It is maybe not easy to hit the weight targets exact, so when you are quite near the target value, use a pipett or syringe (never used before) or similar to add the last reagent/water very precise! Plastic pipette or syringe (use it only ones, and use new and completely clean) are easy to get from pharmaceutical shop or aquarium shop.

There is of course very easy maths behind this, but for your convenience look at this table as a help:

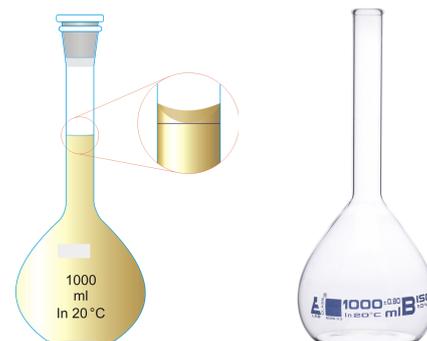
Weight of reagent	Final weight after adding RO-water
200 g	1000 g
300 g	1500 g
400 g	2000 g
500 g	2500 g
600 g	3000 g
800 g	4000 g

Volume method

If you choose this method you should have a 500ml or 1000ml volumetric flask. We also recommend using a funnel to avoid spilling any reagent or water. **The volume relation between reagent/RO water should be exact 1/4.**

Remember: If the concentration of the final reagent is not perfect, NO problem, just compensate that by using "Baseline calibration".

If you for instance wants to have 5000ml of a ready to use



Volumetric flask

solution, then use a 1000 ml volumetric flask and pour up reagent to the line of the neck (1000ml). Then pour that into a completely clean container. Now fill up with same volumetric flask 1000 ml RO water, and pour that into the container, and repeat that so you totally have added 4000 ml RO water.

There is of course very easy maths, but for your convenience look at this table as a help:

Volumetric flask of 1000 ml

Volume of reagent	Volume of RO-water	Final Volume of ready to use solution
1000 ml	4000ml (1000ml x4)	5000 ml

Volumetric flask of 500 ml

Volume of reagent	Volume of RO-water	Final Volume of ready to use solution
500 ml	2000ml (500 ml x4)	2500 ml

Changing hoses in Pumps

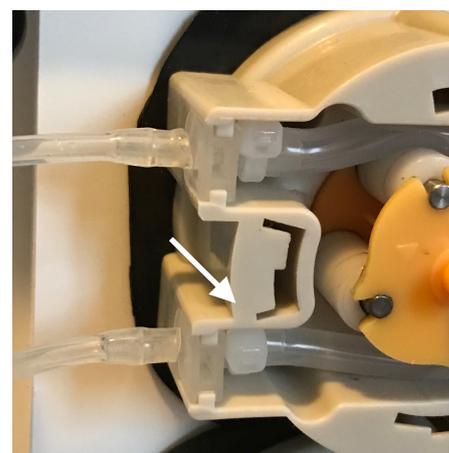
Change hoses in pumps according to our recommendations.

Please refer to following text and pictures how to perform this changing procedure.

1. Turn the plastic housing a few degrees counterclockwise. Then it should be very easy to lift off the plastic housing.

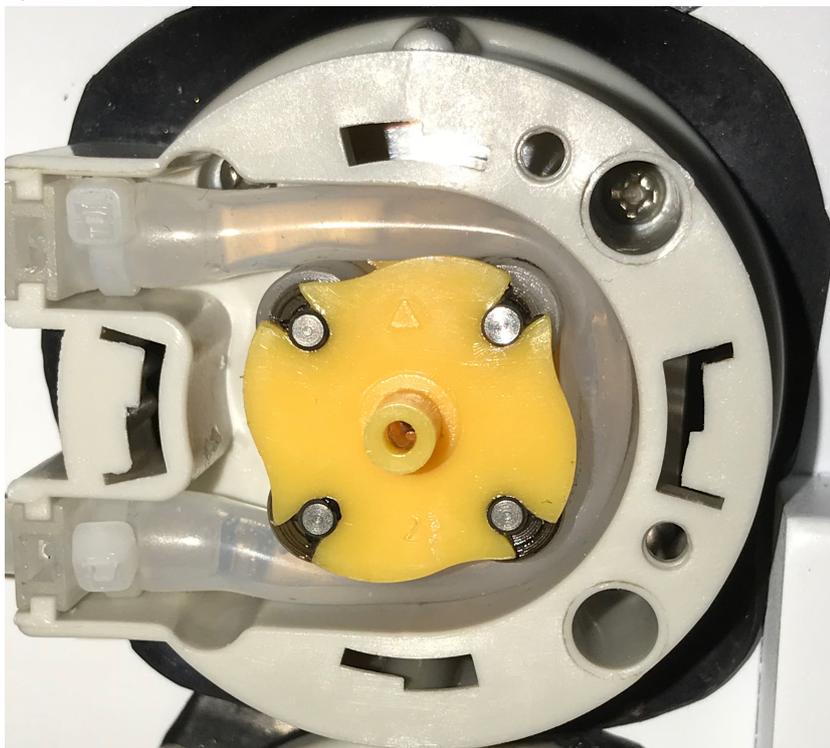


2. Now you have to carefully pull out the hose, and start with pushing the attachment towards you. It should be with no significant resistance, so take



care to not break the plastic part.

3. Carefully pulling out the hose and at same time with your fingers rotate the wheel some degrees. Now it should be quite easy to remove the hose.
4. Take the new hose and start with push down the attachments, and make sure it is pushed down all the way.
5. Now push down the hose between the inside wall and wheel. This is more easy if you simultaneously with your finger rotate the wheel.
6. Now make sure that the hose is pressed down enough so there is some space between the rim and hose.



With the larger hose (Pump A,B and D) this could be a little tricky part. Then use the following method to fine adjust the position of the hose:

- When the hose is in position but just have to be pressed down a few more mm, start the pump with "prime hose". At same time as the pump now is running, take the the plastic housing and carefully replace it. If you feel that the plastic housing is touching the hose, then just use the plastic housing to press down the hose some more, **until you feel that the plastic housing is not touching the hose anymore.** Then the hose is in proper position. If you find this difficult, contact our support and we will guide you.



Important:

1. **When a new hose is installed it requires a short time of run-in**, so after the hose is correctly installed, run the pump with "prime hose" for around 5 minutes.
2. Then wait 5 minutes (the hose properties is different if it is warmed up by long time running), and then calibrate the pump.
3. If the pump, after newly installed hose, is stalling, then that depends on that the hose is to close to the plastic housing. Then try to push it further down so it is not attaching the plastic housing at all, AND also run in the hose further some minutes.
4. **Sometimes a newly installed hose, even if it is in perfect position, may stall a few seconds.** This is **very soon** disappearing after only a few minutes of running time, and depends on that a completely new hoses is some rigid.
5. Even if our hoses is of very high consistent, they may have some slight variability the first days after newly installed. Therefore we advice user to check the calibration status with "*test pump accuracy*" and if necessary recalibrate a few times the first days. After that, a calibration frequency of every 8 weeks, should be sufficient.

How to restore a pH-electrode



Guidelines how to restore a dry damaged pH electrode

Introduction

pH electrodes must stay wet. If they of some reason are left dry too long, they will not work correct. But in many cases there is a good chance to restore a damaged electrode with this procedure. **This procedure can also be performed if you suspect any issue with the electrode of other reasons, like impossible to calibrate correct or despite good calibration, odd readings afterwards.**

Method

1. Soak the electrode for 20 minutes in "electrode cleaning solution", typically 0.1Molar HCl (Hydrogen Chloride).
2. Rinse the electrode in tap water and let it soak in "probe storage solution" for approx 12 hours. The solution is typically a 3.5 Molar KCl (PotassiumChloride) solution.
3. Rinse again and soak the electrode in a "ph cal 4 solution" for 2 hours (don't use this cal solution for subsequent calibration!).
4. Rinse carefully in RO water and recalibrate the electrode as usual (7 and 4 solution)

Options of dispose the waste water

It is absolutely no harm to dispose the waste water back in the tank. **The reagent is biological harmless and only contains a beneficial and natural substance already existing in huge amounts in a natural sea water.** The theoretical impact of the water will only be a totally insignificant decrease in alkalinity, which in any way, Alkatronic will autocorrect. But in small tanks combined with high measure frequency, the impact will be some higher, but still very very small.

As an guideline following table can be used showing the theoretical effect of alkalinity if you dispose the waste water back to tank: The table shows how much the alkalinity in ONE day will be decreased if you dispose the waste water back to tank.

Tank volume	Measurements/day, 12	Measurements/day, 6	Measurements/day, 4
200 l	0.03dKH	0.01dKH	0.009dKH
500 l	0.01dKH	0.005dKH	0.003dKH
1000 l	0.005dKH	0.003dKH	0.002dKH

Contents in the Box

- Main unit, pH probe included
- Measure beaker
- Magnetic rod (to be placed in measure beaker)
- Hoses (3.2mm and 1.6 mm)
- Plastic pipe for reagent bottle
- USB cable
- 12 VDC Adapter
- Microfilter
- Luer connections
- Measure cylinders for calibrating (25ml, 100ml)

- Wall mount

NOT included:

- Ph cal fluids. You need 1-2 packages of 4.00 and 7.00 of any kind/brand, **but we strongly recommend single-use package!**
- Reagent. We recommend strongly to purchase our "concentrated 4 l", as that is very economical. If measure every 4 hour, it last for 15 months, giving a very low month running cost. Purchase at same retailer you purchased the Alkatronic.
- Wireless socket

Specifications

Accuracy and precision	+ - 0.05dKH
Measure range	4.48dKH-15.4dKH
Water amount/measure	50 ml
Reagent amount/measure	~8 ml
Dimensions	22x14x27 cm
Connectivity	Wifi/Bluetooth, USB(fw update)
Update procedure	Wifi or USB
Software	iOS app, Android app, URL through cloud
On board-LCD	Yes
Pumps	2 steppers, 2 DC-motors
Basic technology	pH-electrode-based titration
Measure intervals	1-12 hours
Regulating dKH	Doses carbonate, and controls a socket (BT)
BNC output I	yes, to any third party aquarium computer/pH controller
Other connectivity	Prepared for <i>Dosetronic and Mastertronic</i> (wireless)
Need of other equipments	No, standalone
Cloud feature	yes
Energy consumption (as max during a measure cycle)	12W

