Pacific Sun

Kore 7th

Ultimate dosing station

User Manual

ver. 3.2

Windows, iOS, Android interface

www.Pacific-Sun.eu

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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 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 and #2 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
- 12V/2A Power supply (USA/EU/AUS)
- High Quality Lab Grade pH Probe
- Wi-Fi antenna for Kore 7th dosing station
- Connection tubings for kHLab
- 4.0pH and 7.0pH Calibration Fluids
- 2x500ml Concentrated Reagent for Alkalinity tests. (1 liter allows to prepare 5 liters ready for use reagent solution and 1 liter allows for about 100 tests).
- kHLab module with control connection cable
- Precise Digital Scale with calibration holder/stand for very precise fluids calibration
- Dedicated calibration/measuring cylinder
- Syringes and precise dosing applicator tips
- 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:
  1. Monitoring mode
  2. Control mode
- kHLab module dimensions: L105 x D95 x H172 mm (L4-1/8 x D3-3/4 x H6-3/4 in) – w/out pH probe
- Kore 7th dimensions: L510 x D120 x H50 mm (L20-1/8 x D4-3/4 x H2 in)

Monitoring (passive) and **Control** (active) modes:

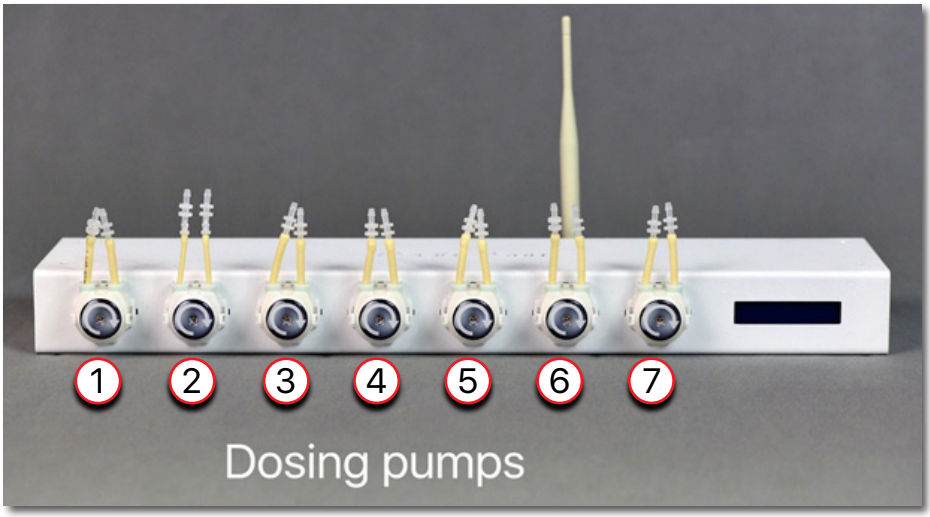
1. **Monitoring mode**
   During this Monitoring mode the device measures Alkalinity level and registers all the values in memory and displays them on doser LCD screen. It makes no adjustments to Alkalinity level.
2. **Control mode**
   During Control mode device **automatically adjusts and maintain** 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 (20-24″) and connection tubing length between kHLab module and Kore 7th doser should NOT exceed 100cm (59″).

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

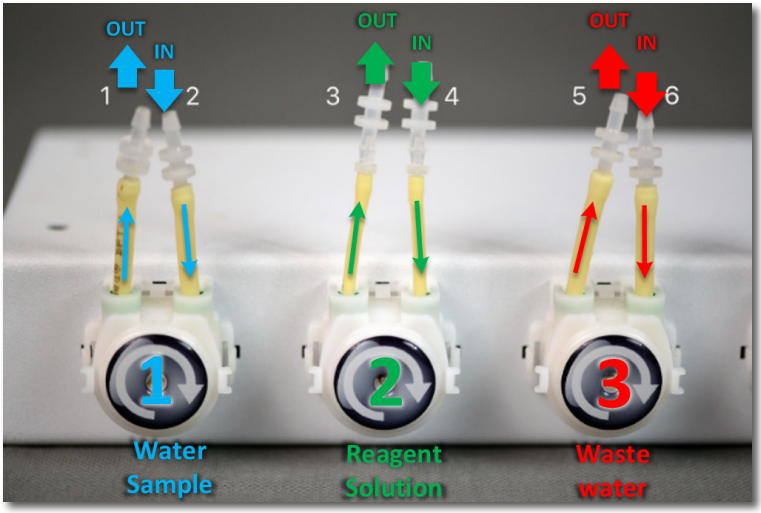
USB	Port for Firmware upgrade.
DC pump	Port for DC pump (ATO refill pump).
Optical sensor	Connection port for optical sensor (used for ATO/AWC).
Temp sensor	Digital temperature sensor port.
Floating sensors port	Not used in newest version of software/firmware and designed for future applications.
Antenna port	External Wi-Fi antenna port. Required for proper work!
Reset button	Hardware reset switch (short push generate reset signal to main CPU).
Power supply port	Required 12V 1A/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 a 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 (39") 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 to 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 (59").

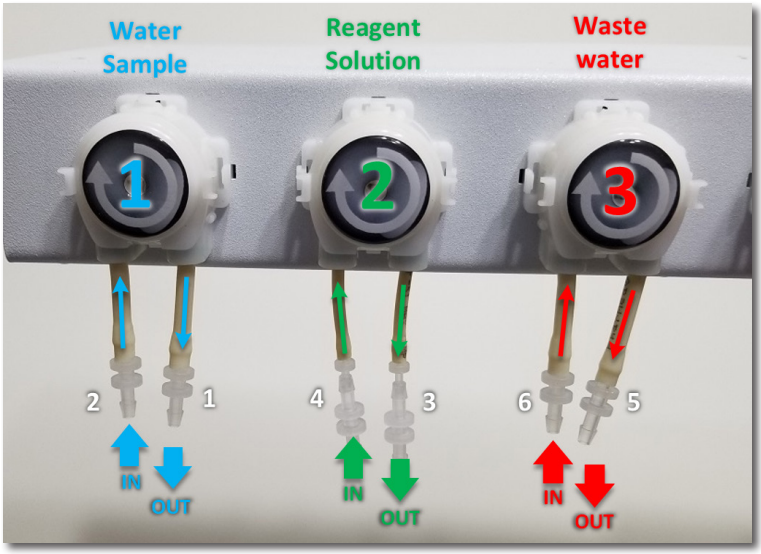
3. Make sure to connect the control cable between the kHLab device and the Kore 7th dosing station.



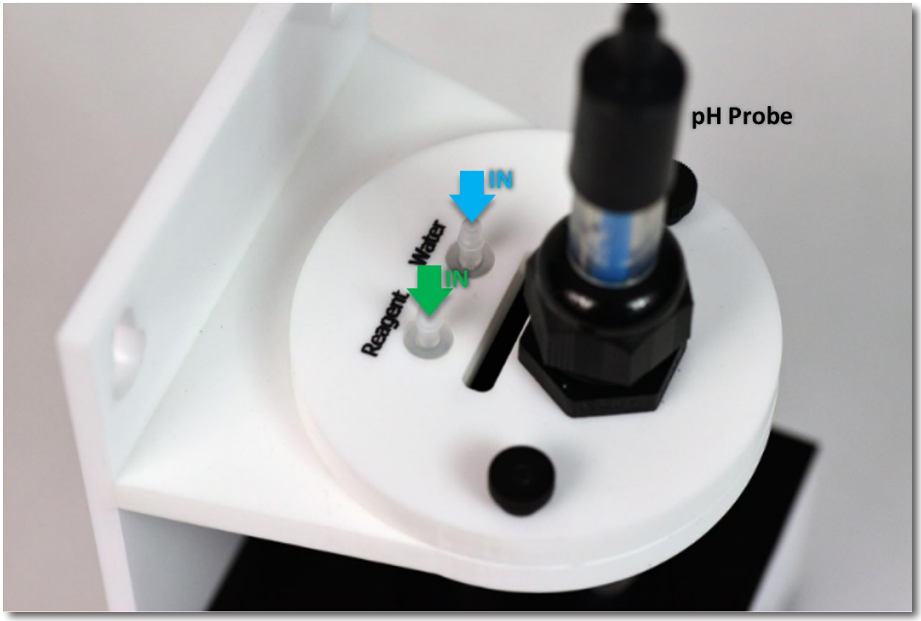
Pumps with connectors facing UP

Note:

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



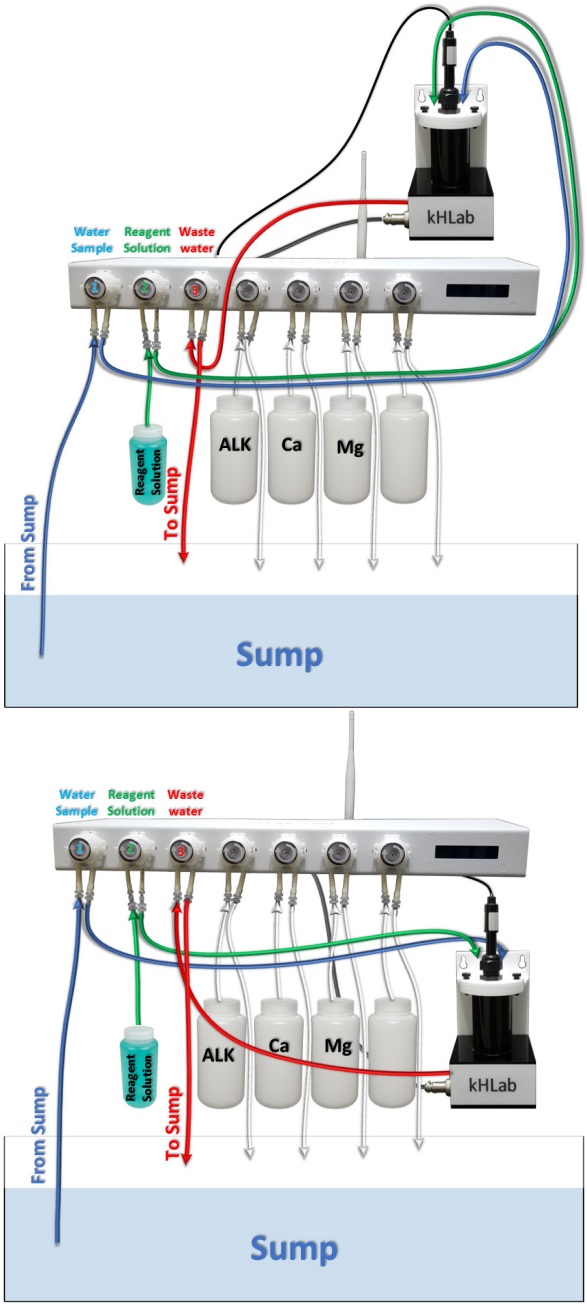
Pumps with connectors facing DOWN



kHLab module – top view

kHLab module – side view

2.3. Tubing and cables connection



Kore 7th and kHLab connection setup examples

Connector 1 OUT – Test Water sample outlet to the kHLab module - using a 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.

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.

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 - connects the kHLab module to connector with label "**Waste**".

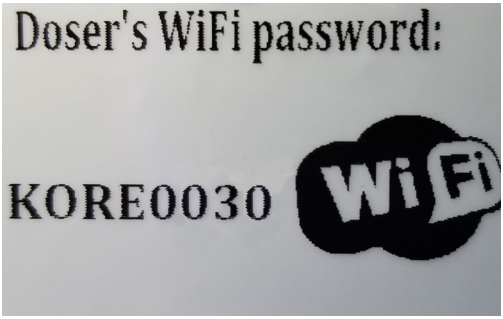
3. Kore 7th Wi-Fi Communication Network Setup

3.1. Direct Wi-Fi connection with Kore 7th

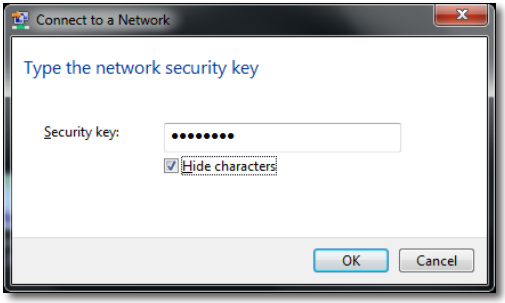
1. Connect power to your **Kore 7th**.

For example, on you Windows computer, find your doser on your Wi-Fi network list devices.

Click **Connect** to the **Kore 7th** Wi-Fi Network.

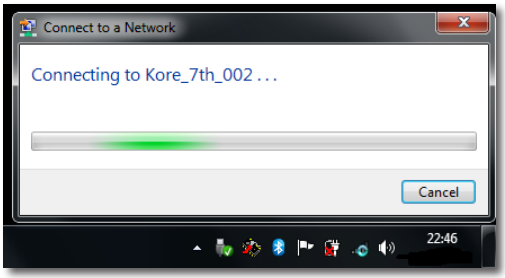


2. Find sticker on your Kore 7th with Wi-Fi network password similar to this, but not the same.

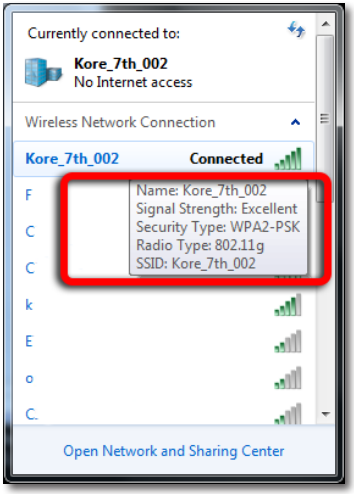


3. Type in your **Kore 7th doser Wi-Fi network password** in the **Security key** field.

Next Click **OK**



4. Connecting to the **Kore 7th Wi-Fi Network**.



5. Now you are **Connected** to your **Secure** Kore 7th Doser WiFi network.

Important!
The Kore7th Wi-Fi network default IP address is **192.168.4.1**

Note:

If you would like to use your smartphone (iPhone or Android phone) to configure and control your Kore 7th you can:

Connect with your smartphone to Kore 7th by repeating the above steps.

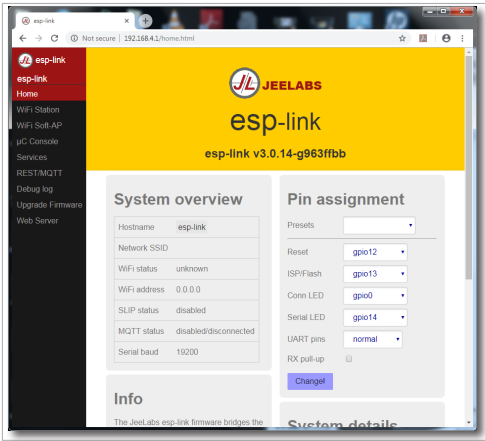
Skip the next steps and go to chapter:

"6. Kore 7th Smart Phone Application Installation"

All you need is the Kore7th Wi-Fi network default IP address:
192.168.4.1

But, if you need **all functionality and flexibility** then follow all the below/next steps.

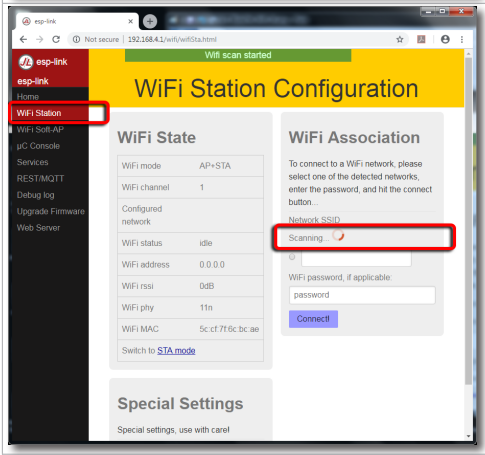
3.2. Connect Kore 7th to your Internal Wi-Fi Home Network



1. Open **the Kore 7th Wi-Fi network setup.**

Open your Internet Browser (Chrome, Firefox, Safari, IE or other) and type the **Kore7th doser WiFi network IP address 192.168.4.1** into the address field.
If you are using IE, you might want to add **http://** to the address else IE may show an error.

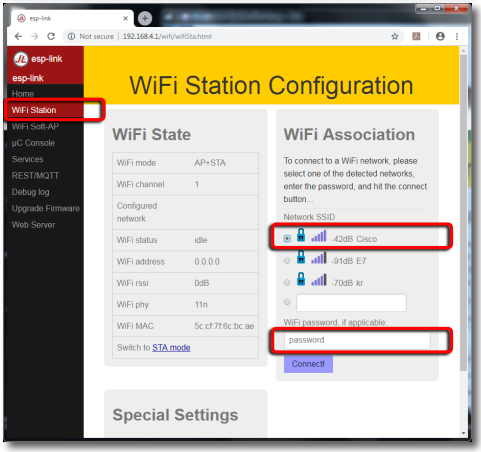
You should enter and see **the Kore 7th Wi-Fi network setup** page like on this picture.



2. Go to **WiFi Station** settings.

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

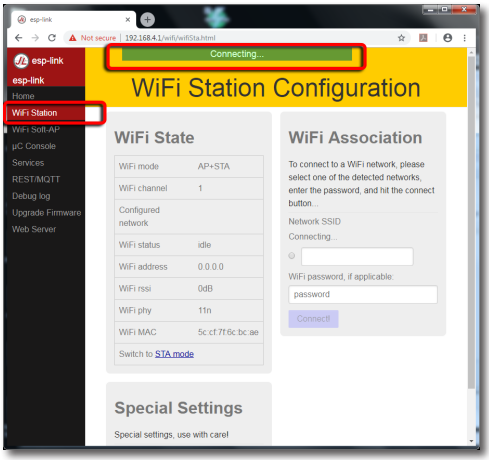
Start **Scanning** if didn't start.



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

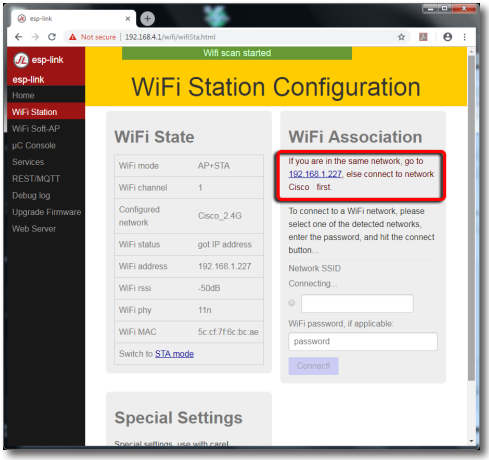
Type in your **Home WiFi network** in the **password** field under the **WiFi password, if applicable**.

Next Click **Connect!**



4. Wait until is Connected.

You should notice **Connecting ...** on the top of the window.

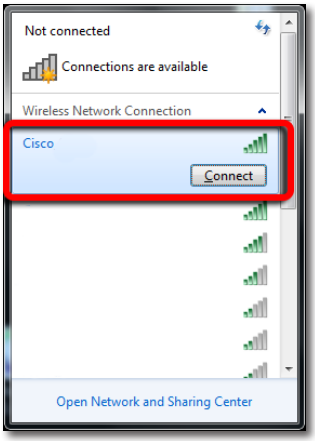


5. The Connection is completed.

Now your Kore 7th doser is **connecter** to your **Home WiFi network on a new IP address, for example: 192.168.1.227.**

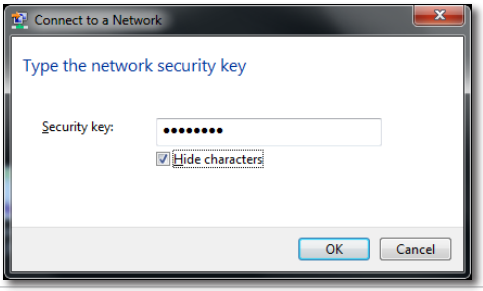
Note:
Your IP address **can be different**. This is just an example.
Most likely each network setup will give a different IP address.

Take a note of this **NEW** IP address (your Kore7th dising stattion IP).



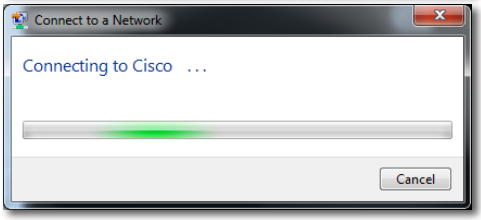
6. Now connect to your **Home WiFi network.**

Find your **Home WiFi network** on your WiFi network list devices and click **Connect** to this network.

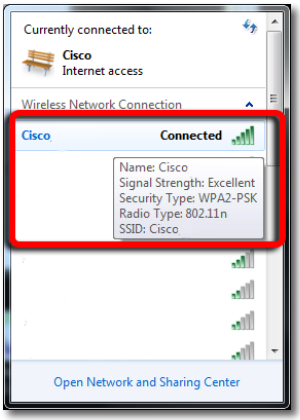


7. If necessary, type in your **Home WiFi network** password in the **Security key** field.

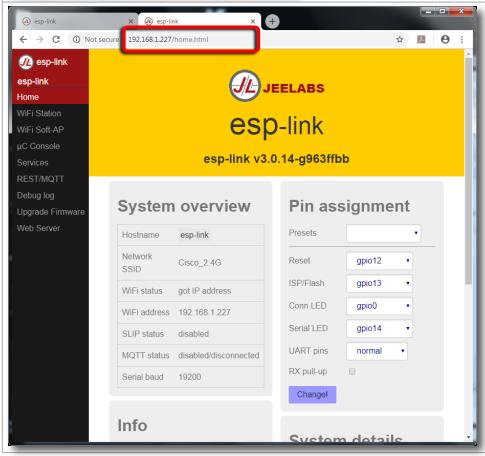
Next Click **OK**



8. Connecting to your **Home WiFi network ....**

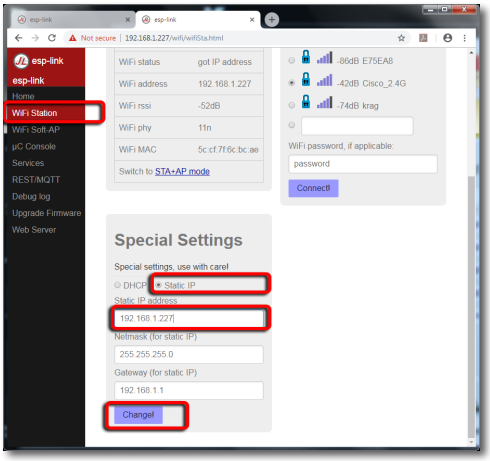


9. Now you are **Connected** to your **Secure Home WiFi network**.



10. Open **again** your Internet Browser (Chrome, Firefox, Safari, IE or other) and type the **Kore7th doser NEW IP address e.g. 192.168.1.227** into the address field.
If you are using IE, you might want to add **http://** to the address else IE may show an error.

You should enter and see **Kore 7th Wi-Fi network setup** page like on this picture.



11. Make sure that the DHCP option is Turned OFF on the Kore 7th dosing station. This will make your Kore 7th doser current network settings permanent. They won't change after reboot, power OFF/ON.

Go to **WiFi Station** settings and scroll down to **Special Settings**.

Select option: **Static IP**

Under **Static IP address** specify your **NEW Kore 7th IP address e.g: 192.168.1.227**

Click **Change!**

Important!
When using **Static IP** your Kore7t IP address will **NOT** change after doser or home router restart.

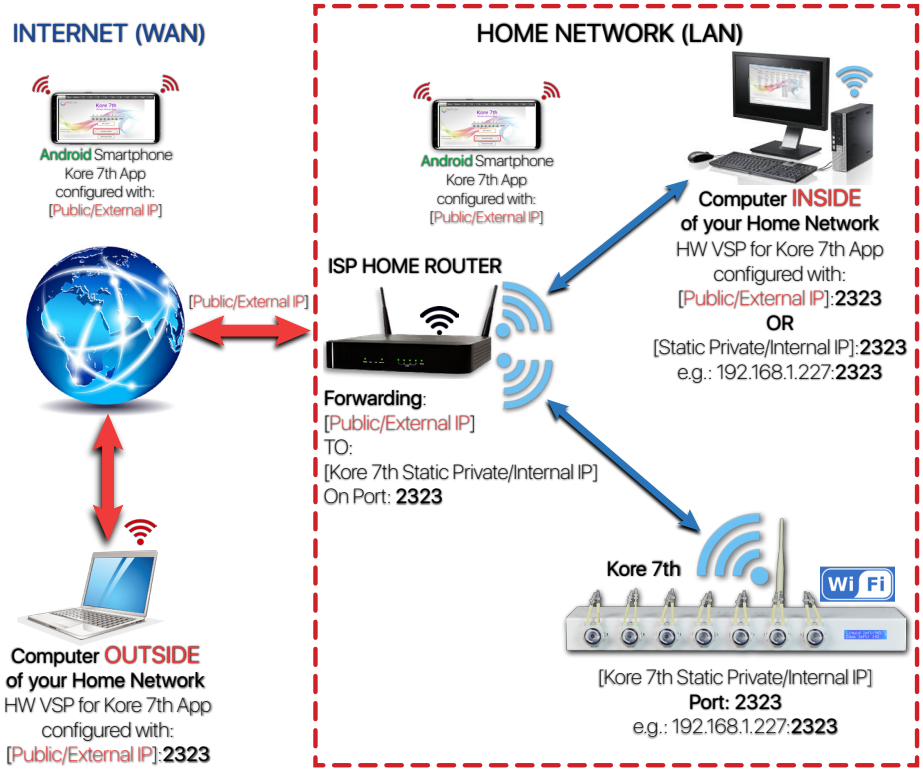
Important!

Take a note of your Kore 7th doser's IP address. It's necessary for later router configuration. This is how your Kore 7th is identified on your home network.
In this example Kore 7th home **[Private/Internal IP]** address is **192.168.1.227**

3.3. Kore 7th IP Address Forwarding Setup

You have got now your Kore 7th doser accessible via your Home WiFi network, and after that, you can configure your Internet Service Provider (ISP) home Router and have outside remote access from anywhere in the world to your Kore 7th dosing station through the application from computer or your smart phone.

The below diagram and following steps are showing the whole concept of this setup and IP address Forwarding configuration for Kore 7th.

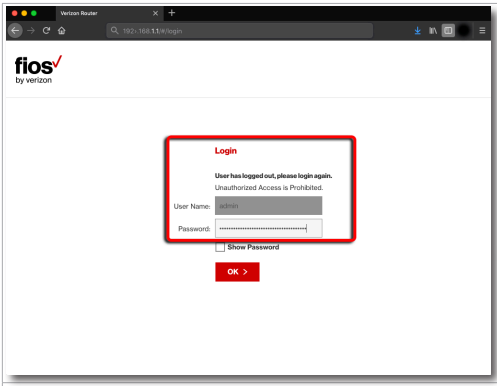


Warning!

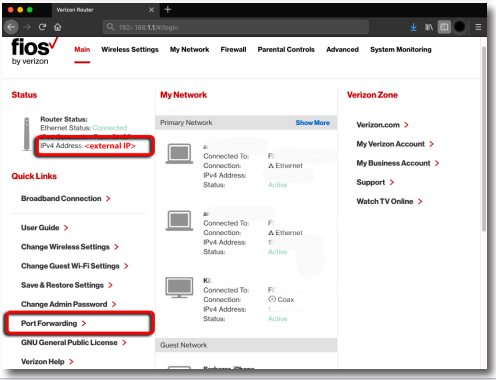
DO NOT attempt IP address Forwarding (remote access) configuration until you have local network access to your Kore7th station from your home WiFi network working correctly.

The following IP forwarding procedure and steps are just a reference examples based on: Verizon FIOS - G1100 router configuration.

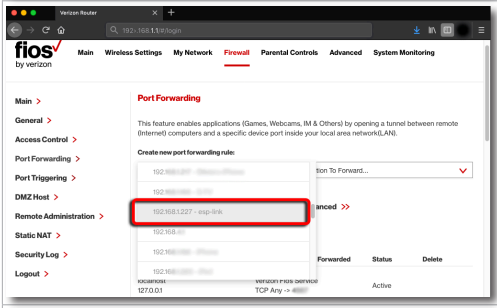
If you have a different home ISP router, then at https://portforward.com can be found tutorials and screen shots for popular router models. You can also refer to this page as a good explanation and list of different models.



1. Log in to the router dashboard by opening a new Internet browser tab or window and type in: **http://"IP Address of your Router"**. Usually by default is **http://192.168.1.1** but could be different for your specific router. After receiving a login prompt, login with default **User Name** and **Password** if you did not change it. Usually the default login informations can be found on the router package or on the router bottom/back sticker. Next Click **OK**

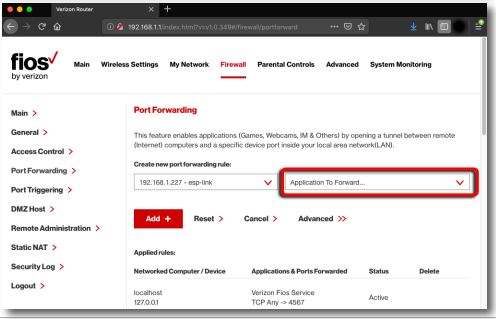


2. After login to your home router locate the **Port Forwarding** section. This is different for every router brand e.g.:
- Verizon: Firewall ▶ Port Forwarding,
- D-link: Advance ▶ Port Forwarding,
- Netgear: Advanced ▶ Port Forwarding,
- Linksys: Application and Gaming,
- Belkin: Advance ▶ Virtual Servers.

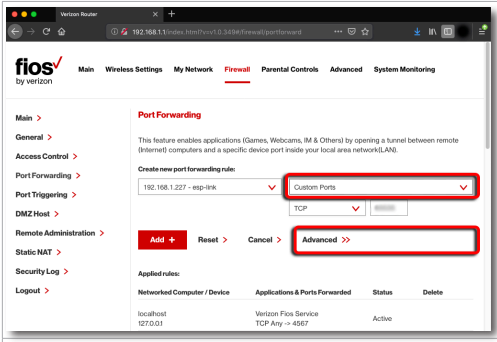


3. Now forward the web traffic to the Kore 7th internal IP address.

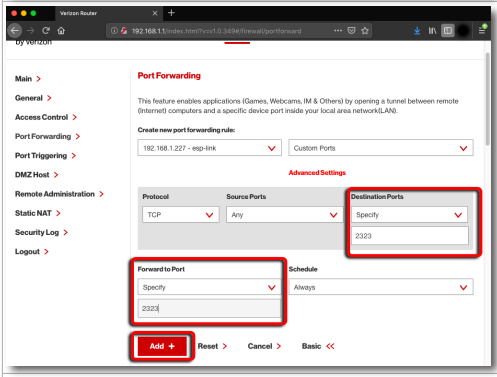
In this example **IP address** e.g.: **192.168.1.227** is configured before.



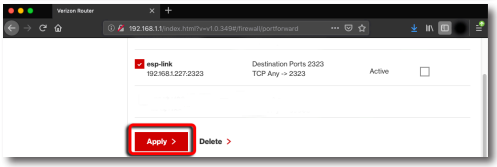
4. Select **Application to Forward** and change to **Custom Ports.**



5. Select **Advanced** settings.
Now let's tell the incoming 2323 connections to go to the Kore 7th:2323 by setting the "Forward to" port to specify and TCP 2323.

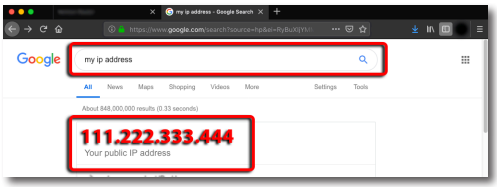


6. For your forwarding rule you must use port number **2323**. The internal Kore 7th port is **2323**. Inbound traffic coming in on **2323** will be forwarded to port TCP **2323**.
The protocol should be TCP or BOTH (not UDP only), and the LAN IP/ internal IP to be forwarded should be the Kore 7th IP address e.g.: **192.168.1.227**.
Under **Advanced** settings select:
Protocol: **TCP**
Source Ports: **Any**
Destination Ports ◘ Specify: **2323**.



7. Many routers have a check-box to "**enable**" or button **Apply** the rule. Look for that and make sure it's checked or click **Apply**

In some different routers make sure to "**save**" and update the new router configuration settings for your Kore 7th remote Internet access.



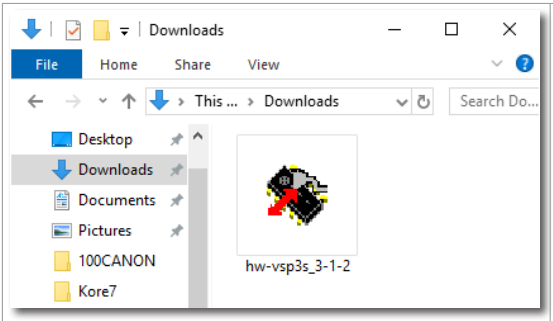
8. Identify your **[Public/External IP]** address.
The easy way to identify this IP is just to open a **new tab** or Internet Browser and type in the Google search or other search engine "**my ip address**".
After that you should see your **[Public/External IP]** address.

Important!

Take a note of your **[Public/External IP]** address. It's necessary for the next Kore 7th application Installation and setup. This is how your Kore 7th will be identified outside of your home network. You will be able to communicate with Kore 7th anywhere in the world with Internet access.

3.4. Kore 7th Virtual Serial Port Installation and Setup

In order to communicate with Kore 7th dosing station is require Virtual Serial Port (VSP) installation and setup. VSP will bridge your WiFi network and Kore 7th application.

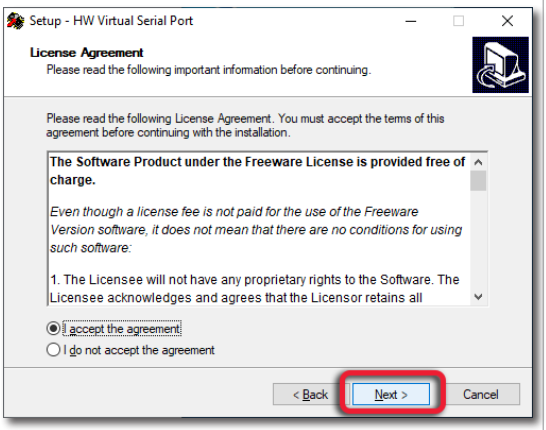


1. Download HW VSP software: SW version: HW VSP3 Single **Free Virtual Serial Port** to connect any TCP/IP Terminal server to your Windows 7 or 10 as a Virtual Serial Port (e.g. COM 7).

Produced by www.HW-group.com

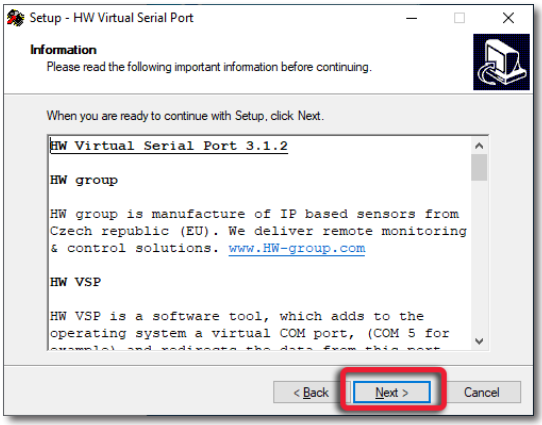
2. Run the "**hw-vsp3s_3-1-2.exe**" installation program.
The welcome screen is displayed.

Click **Next** to proceed to the next step of the installation.



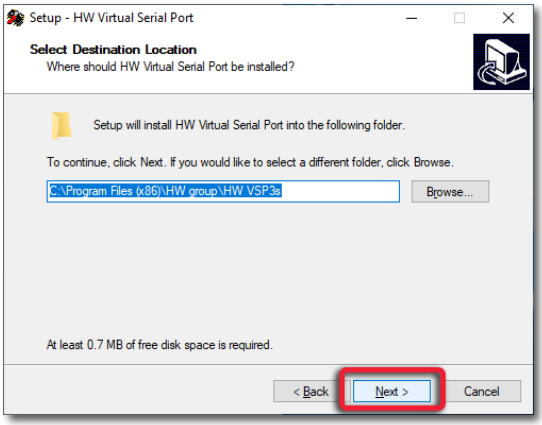
3. Select "I accept the agreement".

Click **Next**



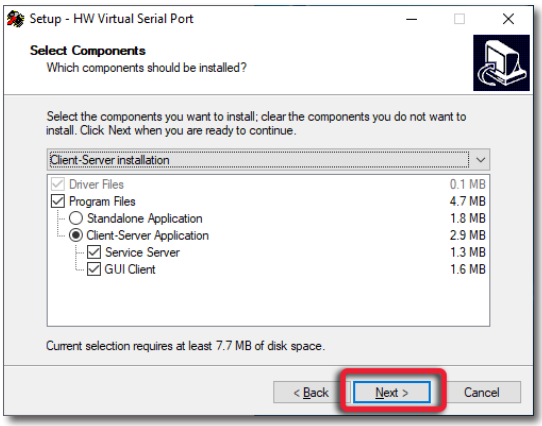
4. See the basic product information.

Click **Next**



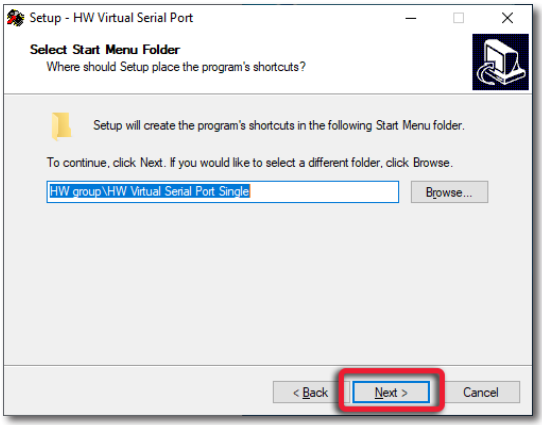
5. You can leave the default installation destination location folder or specify preferred.

Click **Next**



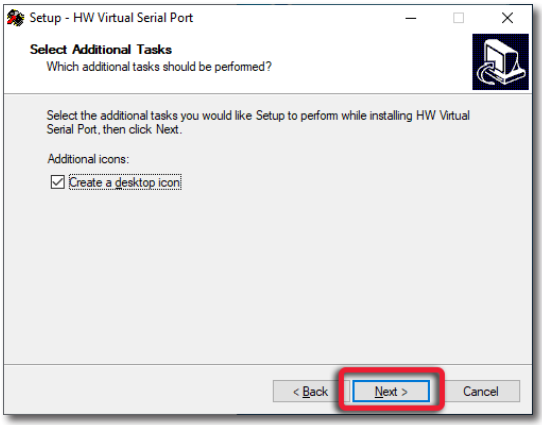
6. You can leave the default installation components.

Click **Next**



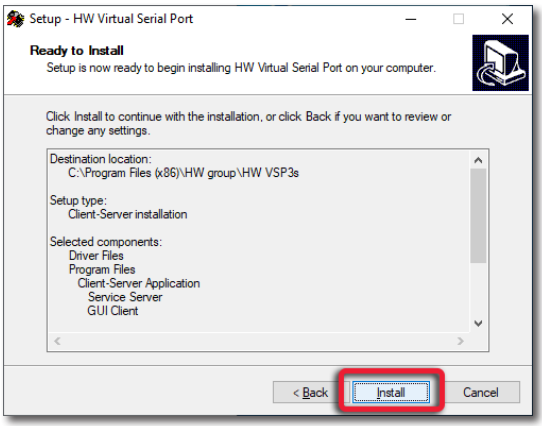
7. Specify Start Menu Folder. You can leave the default location.

Click **Next**



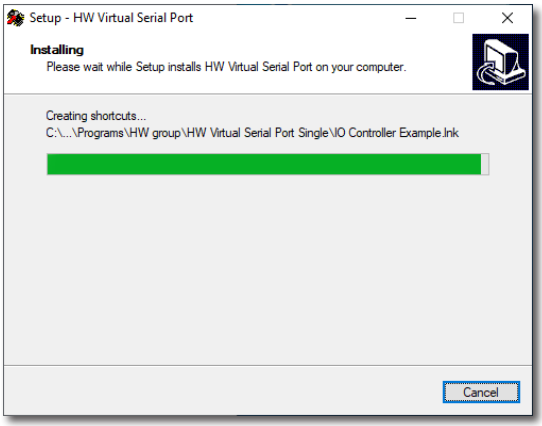
8. Select "Create a desktop icon".

Click **Next**



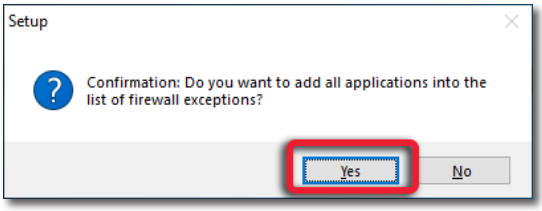
9. See the summary before installation.

Click **Install**



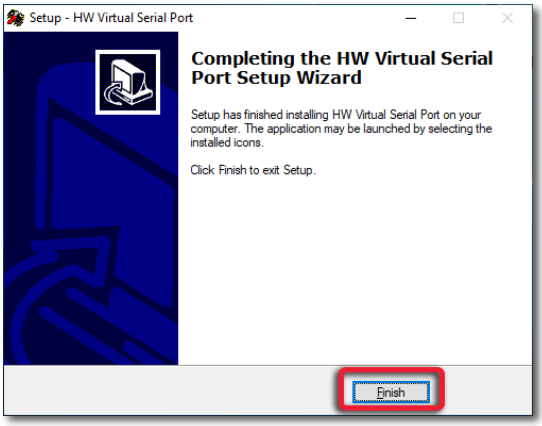
10. Wait until the installation process is completed.

It's not necessary to restart the computer after installation.



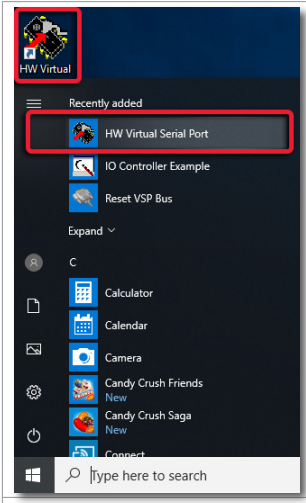
11. Under Windows 10 confirm adding to the list of firewall exceptions.

Click **Yes**

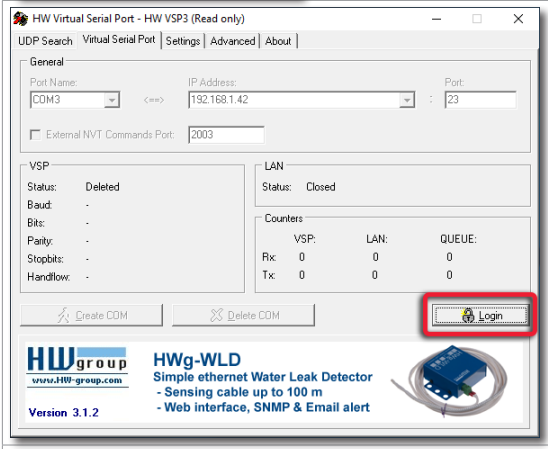


12. Completing the HW Virtual Serial Port Setup Wizard.

Click **Finish**

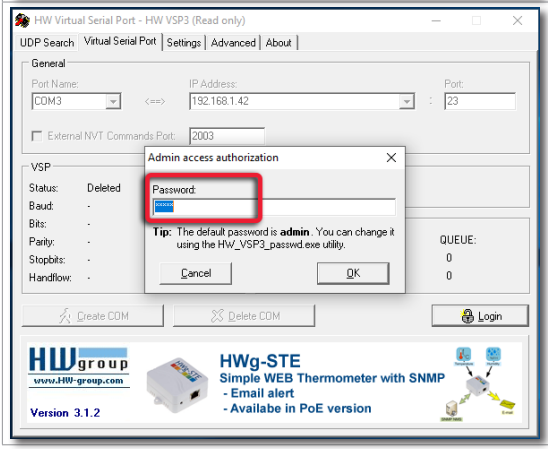


13. Go to Windows "**START**", select and start the "**HW Virtual Serial Port**" or start **HW VSP** software by clicking the "**HW Virtual**" icon on your Desktop.



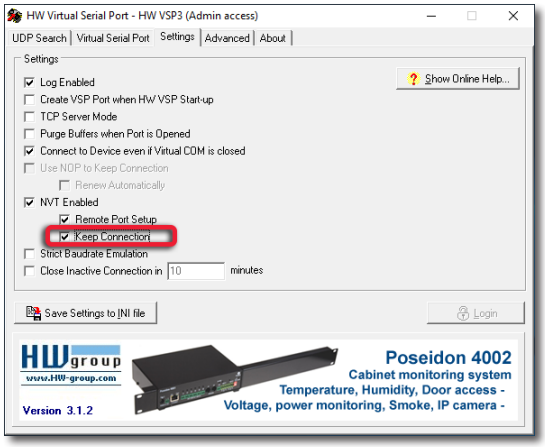
14. The "**HW Virtual Serial Port**" application will open.
All configuration settings in **HW VSP3** are password - protected.

Click **Login**

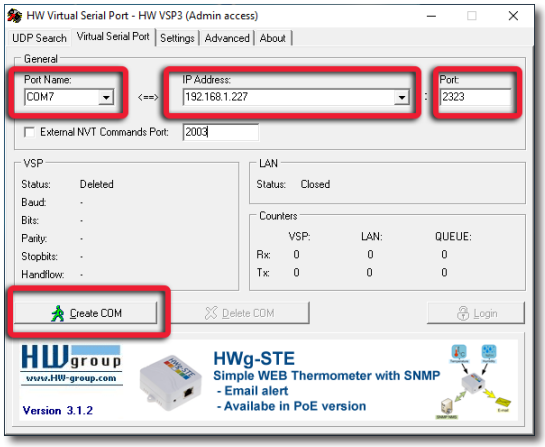


15. The default password is "**admin**".

Click **OK**



16. Go to **Settings** Tab and select: "**Keep Connection**". Under **Port Name** Select, **NOT** used by any other device, **COM** port number.



17. Go to **Virtual Serial Port** Tab

- Under "**Port Name**" select from the list, available COM port number (**NOT** used one by any other device),
- Under **IP Address** type the **Kore7th** "**IP Address**" e.g. **192.168.1.227**.
- Port: **2323**

Click **Create COM**

Note:

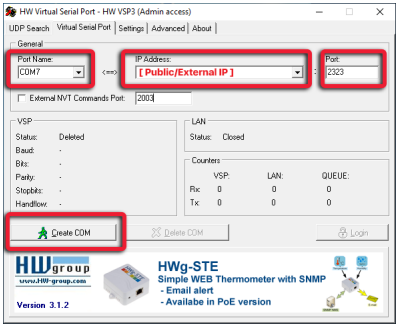
After completing all the above steps, the **HW VSP** application can be configured:
- When you're attempting connection inside your Home network (at home), you can use your [**Public/External IP**] or [**Static Private/ Internal IP**] e.g. **192.168.1.227** address.
- When you're attempting connection outside your Home network (public location), you **have to use** your [**Public/External IP**].

The port **2323** has to be always specified.

See the next diagram with high level configuration.

INTERNET (WAN)

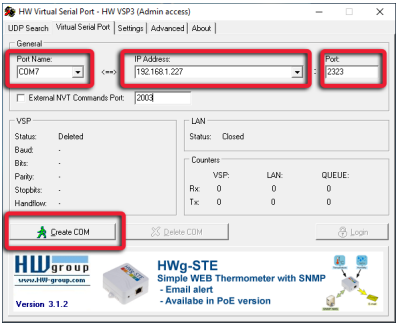
Computer OUTSIDE
of your Home Network



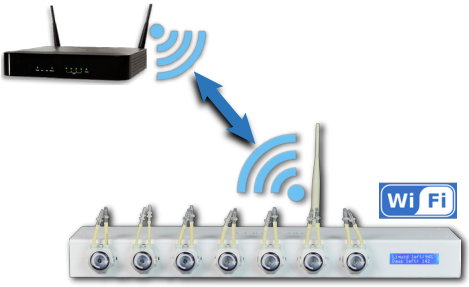
HW VSP for Kore 7th App
configured with:
[Public/External IP]:**2323**

HOME NETWORK (LAN)

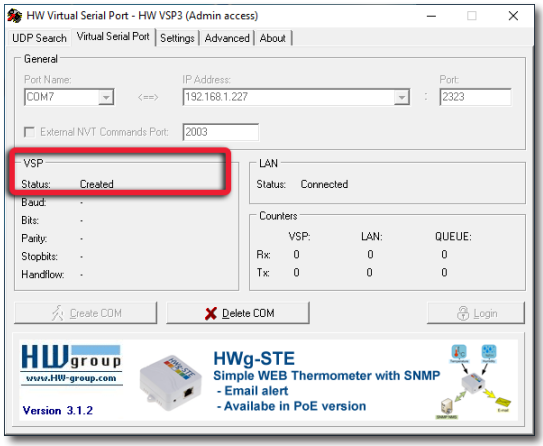
Computer INSIDE
of your Home Network



HW VSP for Kore 7th App
configured with:
[Public/External IP]:**2323**
OR
[Static Private/Internal IP]:**2323**
e.g.: 192.168.1.227:**2323**



[Kore 7th Static Private/Internal IP]
Port: 2323
e.g.: 192.168.1.227:**2323**



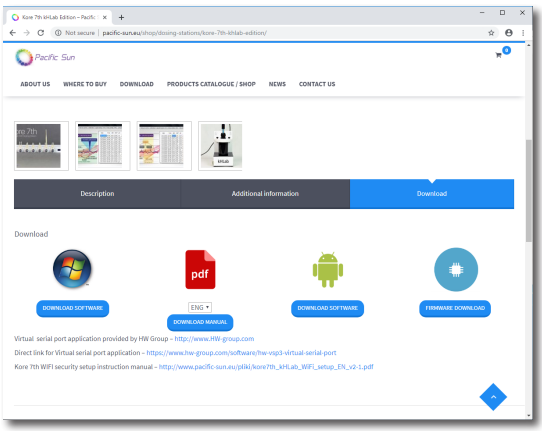
18. The HW VSP application status will change to VSP: "**Created**".

The HW VSP application installation and setup is completed and ready for the next configuration steps.

4. Kore 7th Desktop/Laptop Application Installation

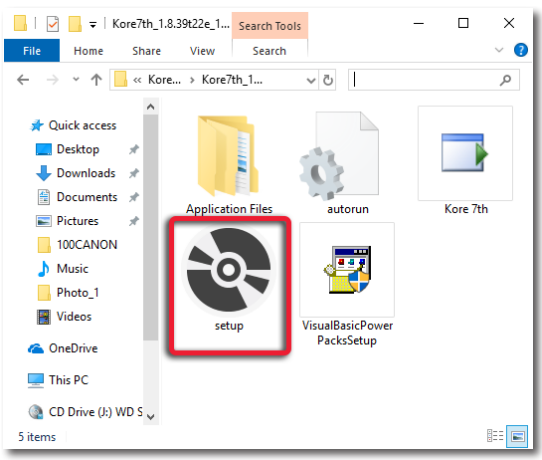
4.1. MS Windows Application Installation

The installation software creates a shortcut to Pacific Sun Kore 7th application in your Start menu and on your desktop. As an example the following steps are for a new computer with Windows 10 operating system when the application has been installed first time. The Kore 7th application is also fully compatible and supported under with Widows 7 operating system.

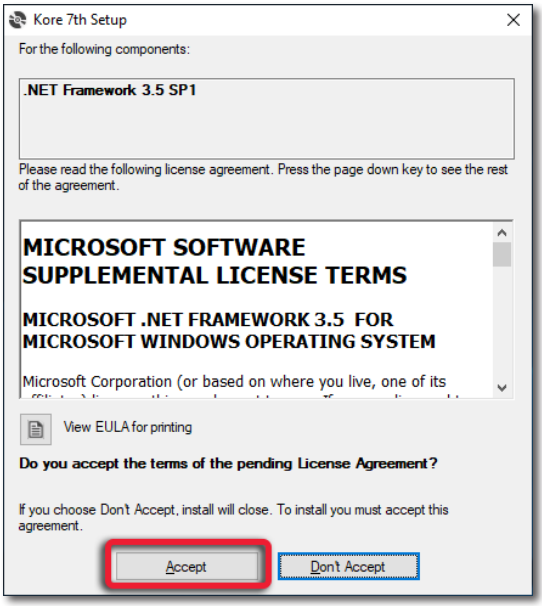


1. To download Kore 7th application go to http://pacific-sun.eu/shop/dosing-stations/kore-7th-khlab-edition/
Select **Download** ▶ **Download Software** for MS Windows OS. Downloaded file will be "**rar**" compressed file.

Important:
You need to decompress this file before starting the installation process.



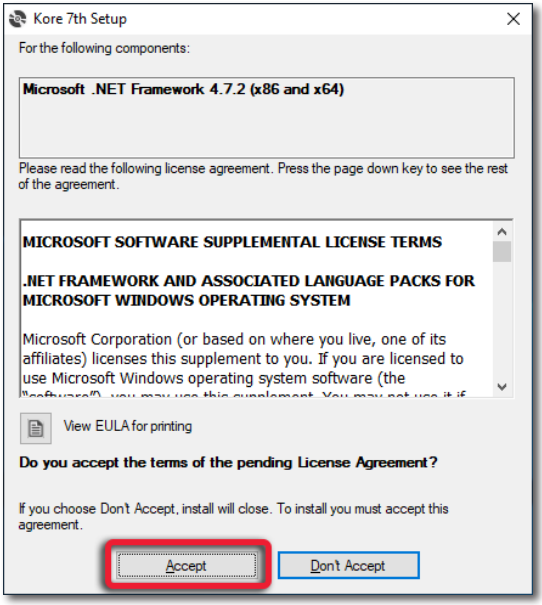
2. After decompressing the installation file run installation program by clicking "**setup**".



3. Installer will detect and install additional, necessary tools (if they not installed) and will automatically download and install them, e.g. .NET Framework 3.5 SP1.

Click **Accept**

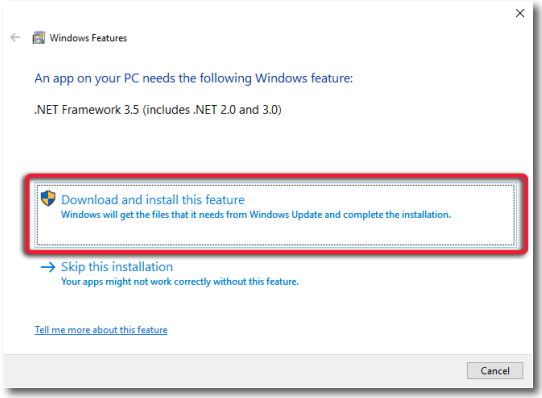
NOTE:
If .NET Framework 3.5 SP1 is already installed under your Windows OS you will not see this step.



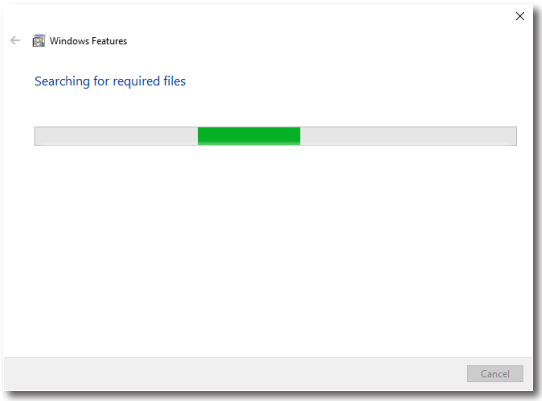
4. Installer will also detect and install additional, necessary tool (if not installed), automatically download and install .NET Framework 4.7.2.

Click **Accept**

NOTE:
If .NET Framework 4.7.2 is already installed under your Windows OS you will not see this step.

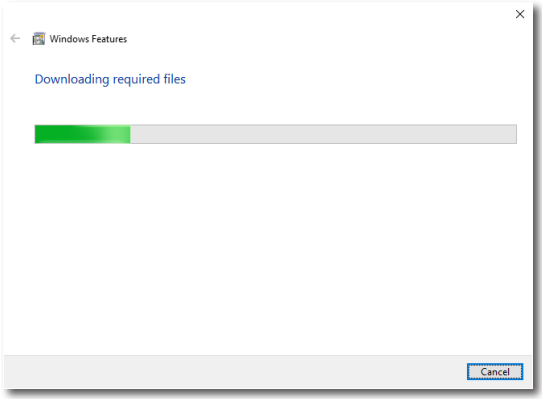


5. Click "**Download and install this feature**".



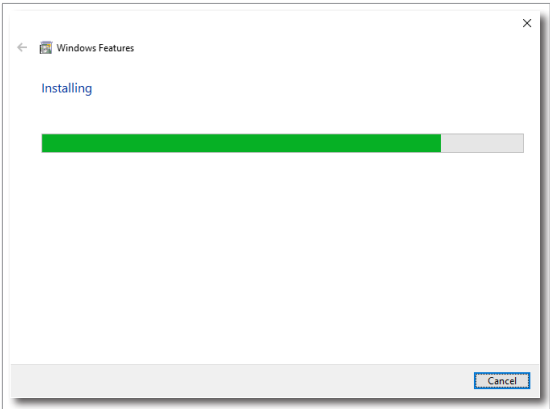
6. Windows will automatically search for required files.

Wait!

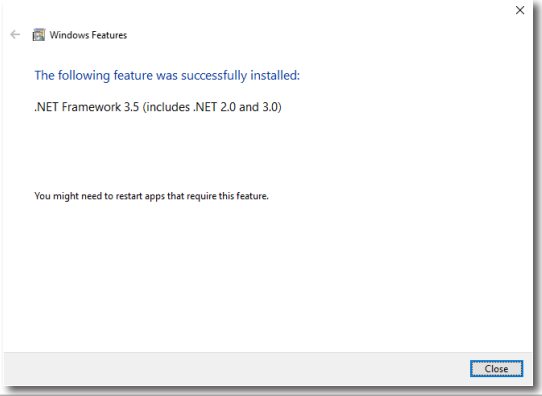


7. Windows will automatically download required files.

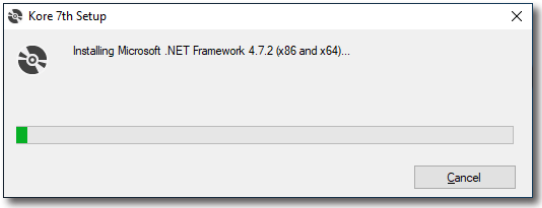
Wait!



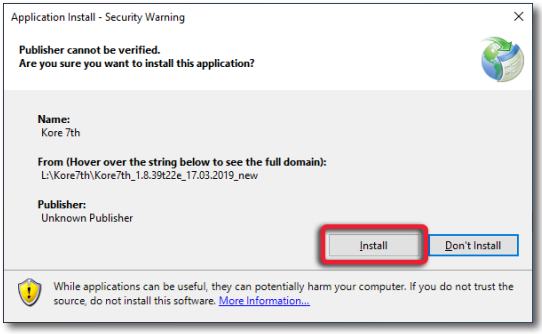
8. Installing tools progress.



9. .NET Framework 3.5 SP1 was successfully installed.

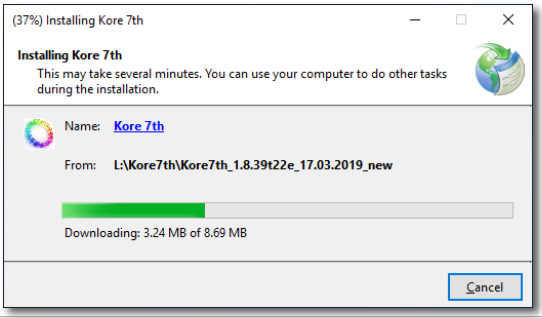


10. .NET Framework 4.7.2. Installation progress.



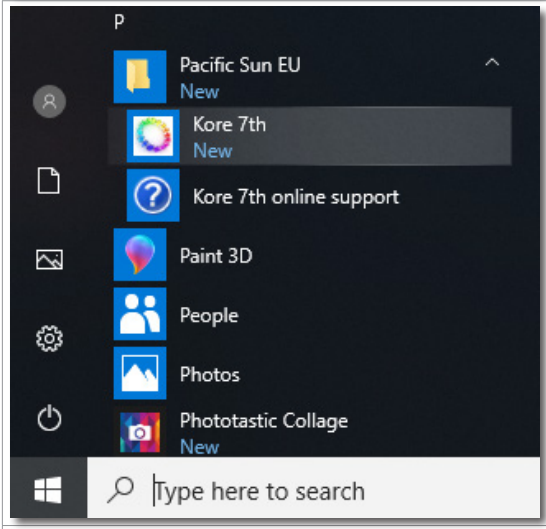
11. The Kore 7th main application installation process will begin.

Click **Install**



12. Installation Kore 7th application process.

Wait!



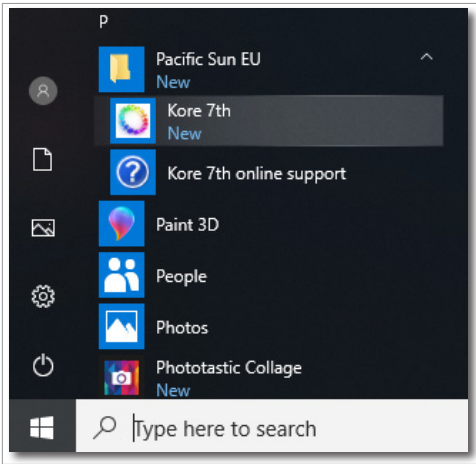
13. The installation process will create Kore 7th Application tab in you Windows Start menu.

14. The installation process will also create Kore 7th Application Icon on your Windows **Desktop**.

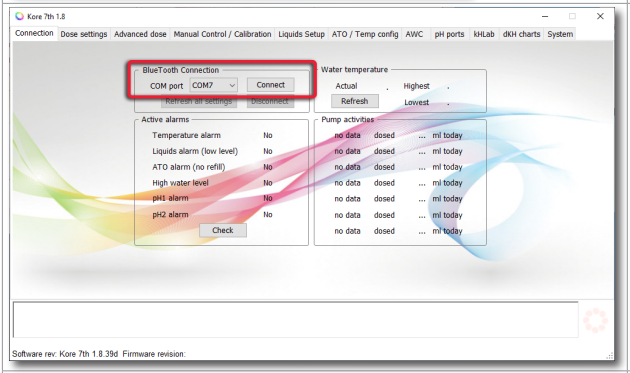
5. Starting the Kore 7th Windows Application

5.1. Open and Start Windows Application

After completing all Wi-Fi Network configuration and software installation steps you can start the Kore 7th application, program and control you doser.

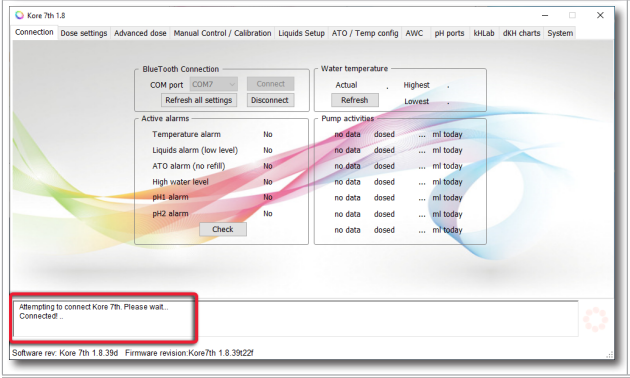


1. Start the Pacific Sun Kore 7th Application by going to Windows Start menu and clicking Kore 7th or double clicking **desktop icon**.



2. After opening the Pacific Sun Kore 7th Application, select correct **COM** port **number** for your Kore 7th from the drop down menu (number from the **HW VSP application**) and click **Connect**

Note:
You can also type the COM port nr manually in the drop down menu.

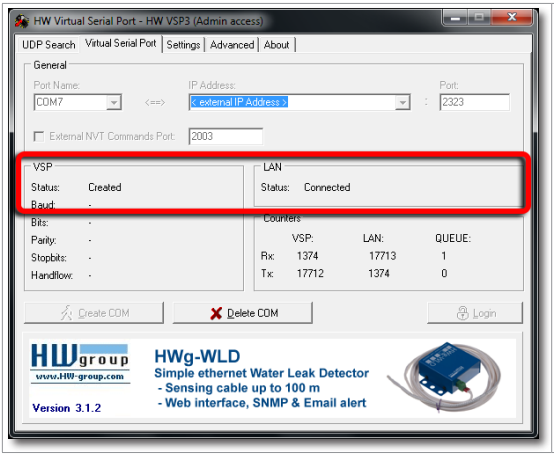


3. Kore 7th application will indicate "**Attempting to connect Kore 7th. Please wait ... Connected!"**.

Now you can begin the Kore 7th dosing station normal setup and configuration process.

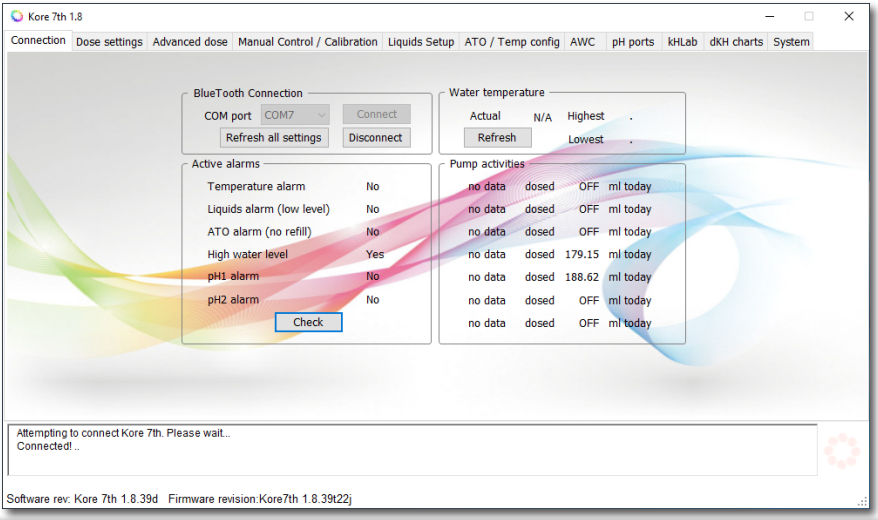
Important!

If the software is unable to connect to the doser at first, close the application and try one more time.



4. Note that after connecting to your doser the "**HW Virtual Serial Port**" application changed the LAN Status to "**Connected**".

5.2. Connection



BlueTooth Connection group box

Connect	Allows establishing the connection with doser on the choose COM port nr (this port is assigned to doser during the installation process).
Disconnect	Close connection/communication with doser.
Refresh all settings	By pressing this button you can **refresh/load** all important doser settings. It can take up to two-three minutes.

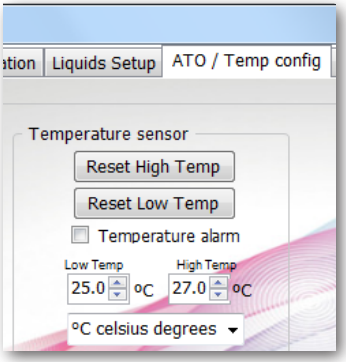
Active Alarms group box

This group box shows all active doser alarms:

Temperature alarm	If that alarm is active it mean that your water temperature is above or below maximum/minimum settings (check this on **ATO/Temp config**).
Liquids alarm (low level)	If active – liquid level (in any container) reached minimum level (configured in **ATO/Temp config**).
ATO alarm (no refill)	Active when ATO tried refill four times without success. Check that your DC pump is working or refill container isn't empty.
High water level	Your sump water level is too high(above top floating level switch). It can be also activated by optical sensor working as a safety sensor (you can set working mode for the optical sensor in the last **Service** TAB).
pH1 alarm	Active when pH is Lower than **pH#1** set in "pH ports / kHLab config" TAB.
pH2 alarm	Active when pH is Lower than **pH#2** set in "pH ports / kHLab config" TAB.

Water temperature group box

If your temperature sensor is connected properly, you will see your: **Actual**, **Lowest** and **Highest** temperature measured by the sensor. By using **Refresh** button you can read actual temperature settings set in "**ATO Temp config**" TAB.



Pump activities group box

You can see there information about pumps activities in actual day (from 00:01 time to now).

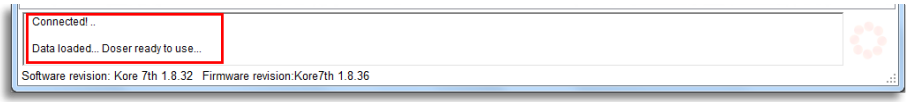
Important!

To initialize connection with doser you should choose proper COM port and push Connect button. Within a few seconds your computer should establish connection with your doser. In the Status window you will see:

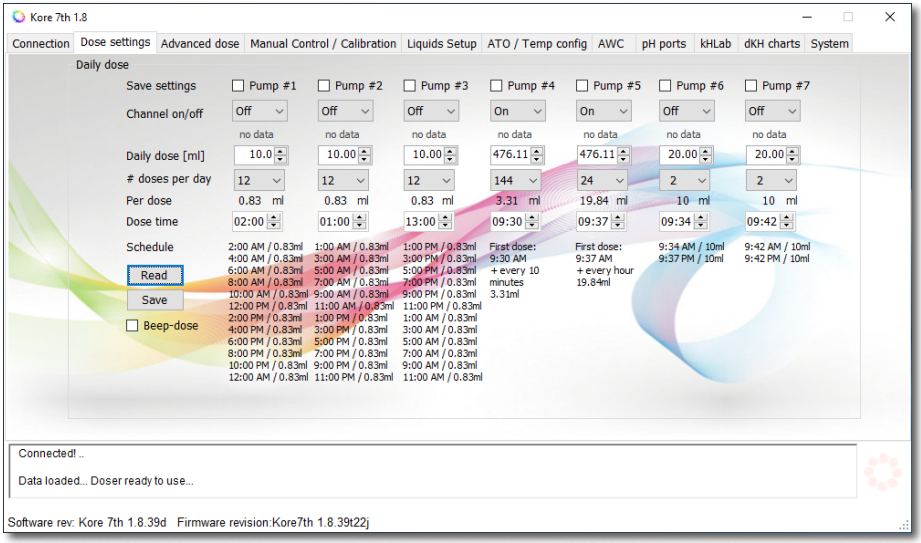
"Connected! and settings refreshed.

Data loaded... Doser ready to use... "

Now you are connected to the doser and can program and modify settings.



5.3. Dose settings

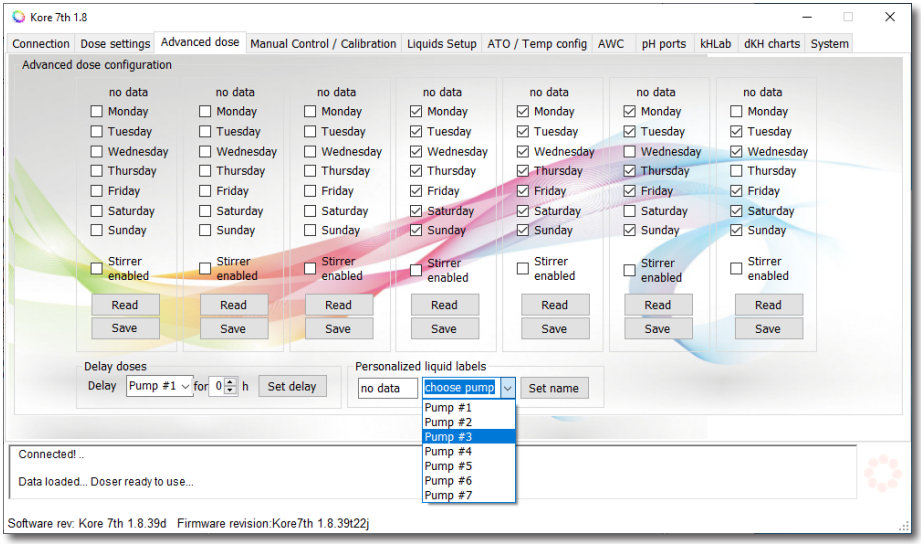


Daily dose group box

Here you can set a daily amount of dosed liquid for each dosing pump.

Channel on/off	Turns off/on the corresponding channel.
Daily dose	Determine the appropriate daily dose which will be divided into a number of dosing (depending on the doses per day). Minimum single dose – 0.01ml (for channel #1 – 0.1ml).
# doses per day	You can set 1,2,4,6,12, or 24 doses per day. Additional special dosing programs: - **C5** – 5 doses hour by hour etc... - **144** – only pump **#1** and **#4** – 144 doses during the day (each dose every 10 minutes).
Per dose	Single dose of fluid [in ml].
Dose time	Initial dosing time for each pump. Pacific Sun software will automatically calculate the following times to dose the liquids.
Read	Read pump setting from doser memory.
Save	Save pump settings (daily dose, doses per day, time schedule) to doser internal memory for each pump where check-box in "**Save settings**" row is **checked**. Save one pump/channel at a time. Example: Checked Pump #1 check-box only will overwrite Pump #1 settings.
Beep-dose	If checked - doser will generate short "beep" signal (sound type configured in "**ATO/Temp config**" TAB) after each single dose.

5.4. Advanced Dose



Advanced Dose configuration group box

Allows you to set which days of the week each pump have to work.

Read	You can read schedule from doser memory.
Save	You can save schedule to doser memory. It should be done for each channel separately.

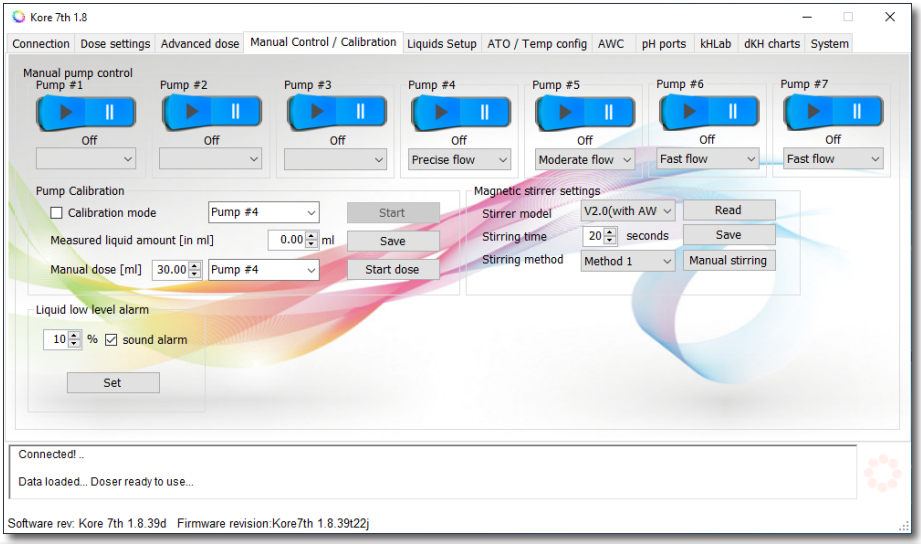
Delay doses group box

You can set delay time (in hours) how long pumps (exact channels) will be turned off. After this time doser will start scheduled doses automatically.

Personalized liquid labels group box

You can give your own name for the dispensed fluids. This names are written in doser RAM memory so after power failure they will be lost. Maximum length is **16** characters.

5.5. Manual Control / Calibration



Manual pump control group box

Allows you to manually control the various pumps and their calibration.

Pump flow	There are three modes to choose from: 1. Fast flow 2. Moderate flow 3. Precise flow

Depending on the tubing used, you have the option to achieve the following performance:

a) high flow Pharmed/Viton/Santoprene

- Fast flow - maximum average flow 110ml/min
- Moderate flow - maximum average flow 60ml/min
- Precise flow - not suggested (in-regular flow depending from material hardness. The best for precise dose is silicone tubing.

b) high flow special silicone tube (thick)

- Fast flow - maximum average flow 140ml/min
- Moderate flow - maximum average flow 110ml/min
- Precise flow - maximum average flow 50ml/min

c) precise flow special silicone tube (thin)

- Fast flow - maximum average flow 60ml/min
- Moderate flow - maximum average flow 26ml/min
- Precise flow - maximum average flow 10ml/min (!)

Pump Calibration group box

Pump Calibration Using the Calibration/Measuring Cylinder

1) Connect tubes to the pump entrance and pump exit and then place the pump entrance tube in the proportioned liquid.
2) Remove air from the tubes by manual activation of the pump.
3) Set up proportioning velocity (it is recommended to use **Fast Flow** for tubing typically embedded in the pump heads).
4) Select the **calibration mode**.
5) **Select a number of the pump** that is to be calibrated.
6) Arrange a proportioning vessel, preferably a measuring cylinder.
7) Press **Start** button.
8) Upon completion, read accurate amount of the liquid in the measuring cylinder and then enter it's amount to the **Measured liquid amount field [in ml]**.
9) Save the calibration by pressing **Save** button.
10) Use **Manual dose** option to check the calibration correctness.
11) Should the amount of proportioned liquid differ from the value that has been saved during the calibration check, it will be necessary to repeat calibration paying attention to air bubbles in the tubes. The entire tubing shall be filled in with the liquid.
12) Calibration shall be carried out for all the pumps individually and the results shall be entered upon it's completion.

Manual dose [ml]	Allows manual dispensing of a specified quantity of fluid.

Liquid low level alarm group box

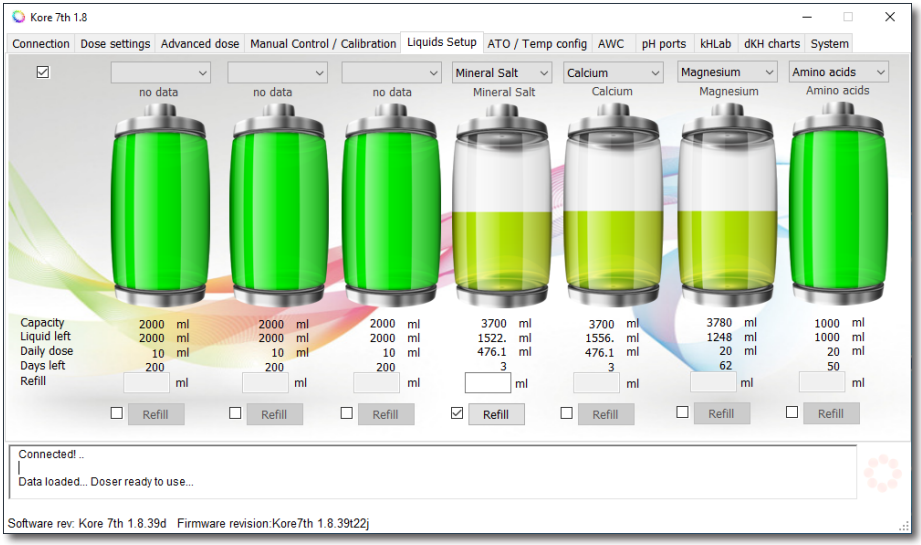
Allows you to set an alarm for a minimum level of dispensed liquids. You can also turn on/off sound alarm for low level of liquid in bottles.

Magnetic Stirrer settings group box

Allows for configure proper version of **Magnetic Stirrer** and set stirring time before doses.

Stirrer model	V1.0 – it's the first generation of stirrers without external power supply (power taken from Kore 7th dosing station). V2.0 – it's the new, next generation stirrer, with own power supply.
Stirring time	Stirring time before starting dose. Minimum 5s – maximum 60s. We suggest between 30 and 40 seconds (depend from liquid density/type).
Stirring method	7 different stirring programs. Different speed and variable „pulsations" mode. Help choose the best one for used bottle type and liquid density. Test before the **save**. Magnetic pellet should spin without any obstacles or bouncing.
Manual stirring	Allows to run manual stirring.

5.6. Liquid Setup



By clicking on each of the **bottles**, you can check the current level of the fluid. Below you will find information about:

Capacity	Initial bottle capacity.
Liquid left	Calculated actual liquid level (in ml).
Daily dose	Information about daily dose from each bottle (for each pump).
Days left	Approximate time left to empty bottle (in days).
Refill	Refill each bottle/container by placing the amount of liquid in the **text box** (below each bottle). **EXAMPLE:** If you have 3 liters container – place there 3000 (in ml) The setting is saved by pressing **Refill** button

5.7. ATO / Temp config

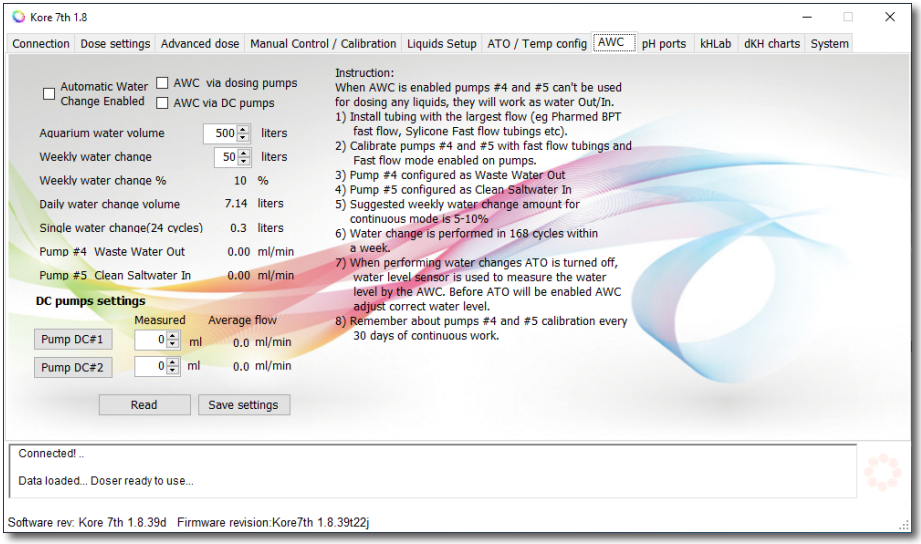
DC pump group box

Refill time (in seconds)	Time in seconds defining how long the DC pump will work when water low level sensor is activated. After four unsuccessful attempts the pump will be turned off (to prevent damage). It's highly advised to select „Unsuccessful water refill Alarm check-box so you can be notified upon failure.
Manual turn on/off	Allows selecting the flow rate manually (flow adjust in 40-100% range).
Short beep after proper refill	Enabling this option will cause a beep after each refill of water.
Sound alarm	Turn on/off sound alarm when high level sensor is activated.
Choose alarm type	Allows you to select sound signal generated by the doser.
Test alarm	Test sound alarm
Reset ATO alarm	Allows resetting the ATO after four unsuccessful refills.

Temperature group box

Reset High/Low temp	Erase highest/lowest temperature record from doser memory.
Temperature alarm	Turn on/off sound alarm for temperature settings

5.8. AWC



AWC allows you to program automatic water changes. To configure AWC enter the following data:

Aquarium water volume – your aquarium water volume together with sump

Weekly water change – we suggest 5-7% changes

AWC will perform 24 water changes daily(168 weekly). AWC allows maintaining stable water parameters due to constant swapping on fresh saltwater.

Pumps connection:

pump #4 – waste water out

pump #5 – fresh water in

When AWC is enabled pumps #4 and #5 can't be used as dosing pumps (will be disabled).

Use **Save** button to write settings in doser memory and **Read** when you want load it from memory to application.

When the water change procedure start (waste water out) ATO will be disabled. After successful fresh water refill ATO will be enabled again.

You can also configure AWC using additional AWC DC pump set. It allows for much faster water change (up to 250l/h) and with that set your pumps from channel #4 and #5 can still be used as dosing pumps.

Connect DC Pumps to output port on back side of doser. Using two attached tubings connect pump #1 to drain (waste water out) and pump #2 as „fresh" water refill.

DC Pump #1 – Waste water out

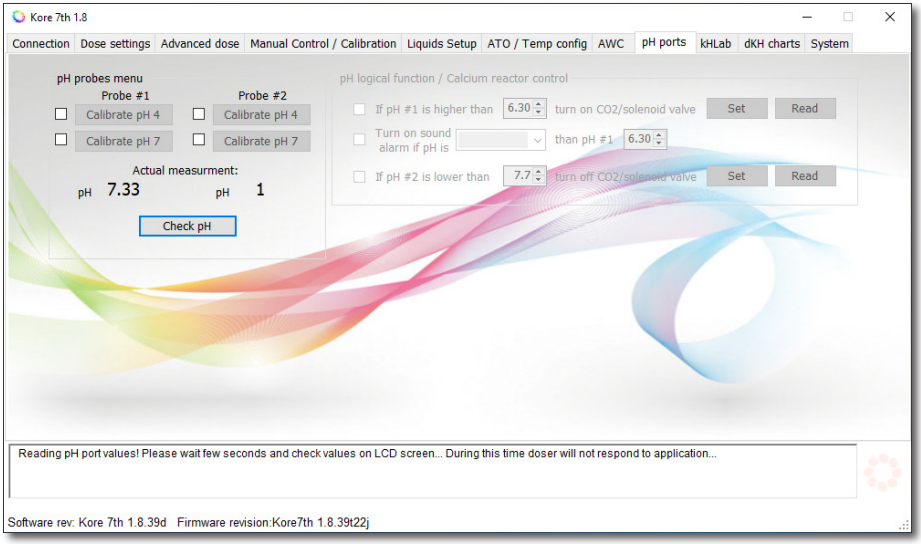
DC Pump #2 – Fresh water in

You can test/recognize them using test buttons (Test DC#1/Test DC#2).

DC AWC pump calibration procedure

1) Connect tubes to AWC pump set.
2) Immerse both pumps into water.
3) Activate the pump by pressing DC#1 and DC#2 to remove air from the pumps and tubes.
4) Arrange an accurate measuring vessel and then insert the exit tube from DC 1 pump into it.
5) Press DC#1 again, wait until proportioning is complete and then read amount of measured water.
6) Amount of water shall be entered into Measured upper field [ml].
7) Evacuate the measuring vessel and place the tube from the other pump into it.
8) Press DC#2 again, wait until proportioning is complete, and read amount of measured water.
9) Amount of measured water shall be entered into Measured lower field [ml].
10) Save the calibration by pressing **Save** settings

5.9. pH ports



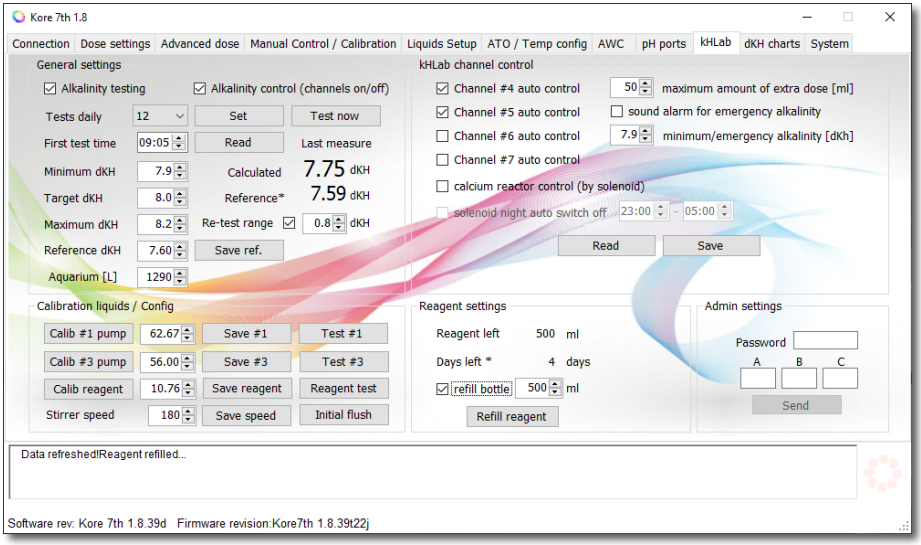
pH probes menu group box	
Probe #1	Allows you to calibrate pH probe #1 with pH 4.0 and 7.0 calibration solutions.
Probe #2	Allows you to calibrate pH probe #1 with pH 4.0 and 7.0 calibration solutions.
Check pH	Allows you to check pH

Note:

pH = 1 when the pH probe will be disconnected form dosing station.

pH logical function / Calcium reactor group box	
Set / Read	If pH #1 is higher than for example 6.3, turn ON CO2/ solenoid valve.
Set / Read	If pH #2 is lower than for example 7.7, turn OFF CO2/ solenoid valve.

5.10. kHLab



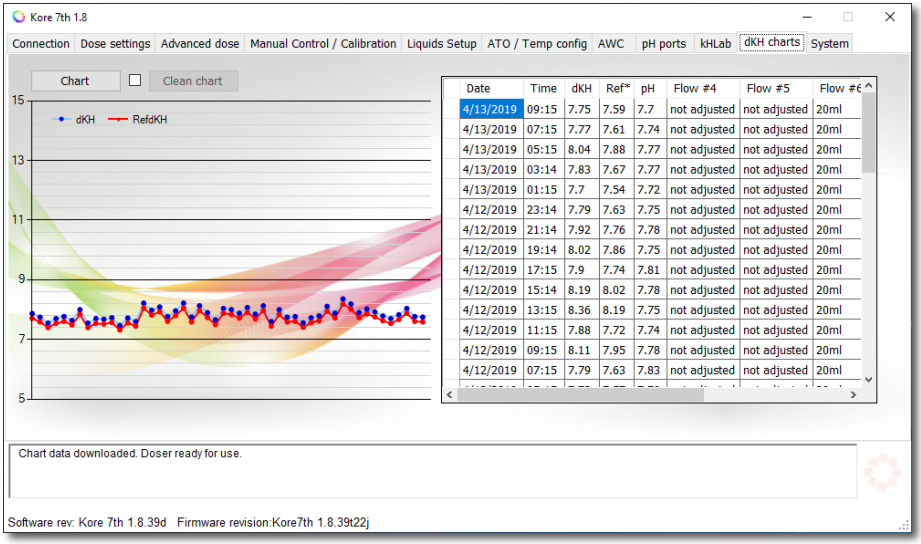
General Settings group box

Alkalinity testings	Enabling Alkalinity testing with kHLab Module.
Alkalinity control (channels on/off)	Enabling Alkalinity control in your aquarium.
Tests daily	Allows to **Set** Alkalinity tests in different time intervals: **x1, x2, x8, x12** times per day.
First test time	Allows to Set Alkalinity **First test time**.
Minimum kH	Allows to Set **Minimum** kH value for Alkalinity control.
Maximum kH	Allows to Set **Maximum** kH value for Alkalinity control.
Reference kH	Allows to Set **Reference kH** value.
Aquarium [L]	Allows to Set aquarium water volume.
Test now	Allows to Start Alkalinity test manually.

kHLab channel control group box

Channel #4 auto control Channel #5 auto control Channel #6 auto control Channel #7 auto control	You can select which channel can be control when doser is switched to alkalinity control mode.

5.11. dKH chart



dKH chart

After each alkalinity test you will see new point on the chart.

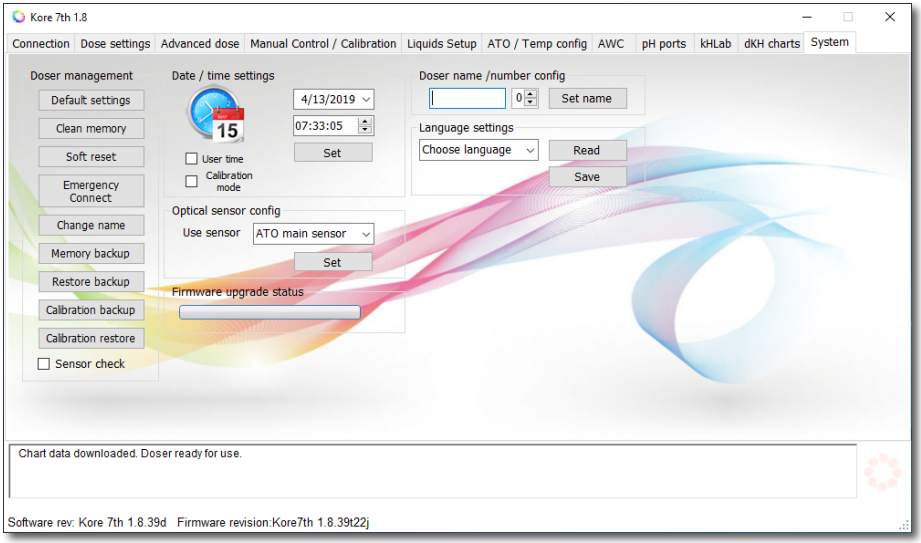
The **blue** line with points is representing actual alkalinity results from Kore 7th/kHLab performed tests.

The **red** line with points is representing reference alkalinity results adequate to your titration alkalinity test kit.

Table with Data

Each alkalinity test is registered in this table with Date, Time (finished test), dKH value, reference dKH value, pH result, Flow for each Channel #4, #5, #6, #7 and emergency dose fro controlled channels.

5.12. System



Doser management group box	
Default settings	Program doser with default settings. We suggest use this button if your doser after firmware upgrade not work properly.
Clean memory	Erase doser memory. Should be only performed after Pacific Sun Service request.
Soft reset	Generate reset signal for doser.
Emergency connect	Should be performed if software can't connect with doser due firmware incompatibility. After connection firmware update (with proper corresponding to software firmware) should be performed.
Memory backup	Generate .mbf file(memory backup file). This file can be send to our service for diagnose (if something not work properly).
Restore backup	Allow import .mbf file to doser memory.
Calibration backup	Generate file with pump calibration config.
Restore calibration	Allow import calibration backup file to doser memory.
Sensor check	When enabled (check-box) on LCD screen show floating level sensor status. Can be used for diagnose proper switch connection/ readings.

Date/time settings group box

Once software is connected to the doser:

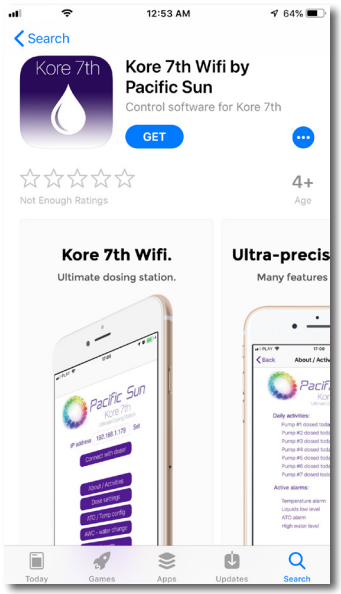
1) By default, the system date and time is displayed. Click on **Set** date/time to set the same date and time on your doser.
2) To select a date and time other than system date and time, check the box next to **User time**, and type the date and time you would like to set. Click on **Set** date/time to save these settings to your doser.

Calibration mode – show actual time (hours/hh:mm:ss format). To back for normal dose mode – unchecked box.

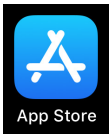
6. Kore 7th Smart Phone Application Installation

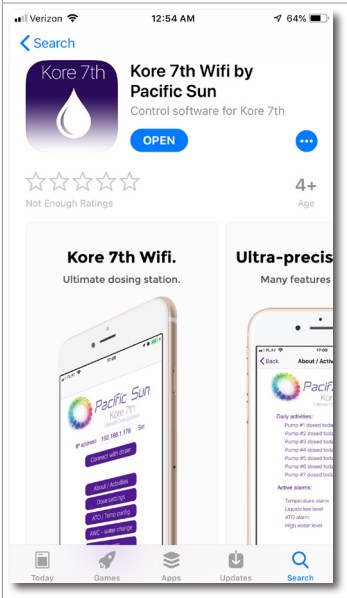
6.1. iOS Application Installation and start

Kore 7th/kHLab can be configured and control from iPhone. In order to enable this functionality you have to install Pacific Sun Kore 7th application on your iPhone.



1. To install Kore 7th WiFi application go on your iPhone to **App Store**, search for "**Kore 7th WiFi by Pacific Sun**" and click GET

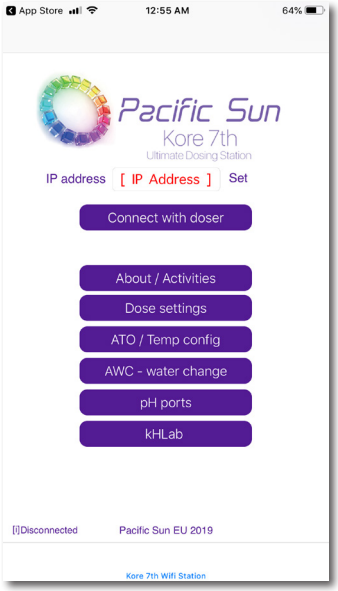




2. OPEN the **Pacific Sun Kore 7th WiFi application** on your iPhone.

6.2. Starting the iOS Application

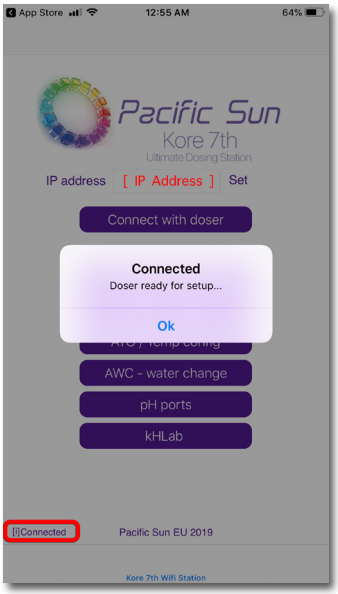
After completing all Wi-Fi Network configuration and software installation steps, you can start the Kore 7th WiFi application, program and control you doser from your iPhone.



1. Type in your [**Kore 7th IP Address**].

Click Set

Click **Connect with doser**

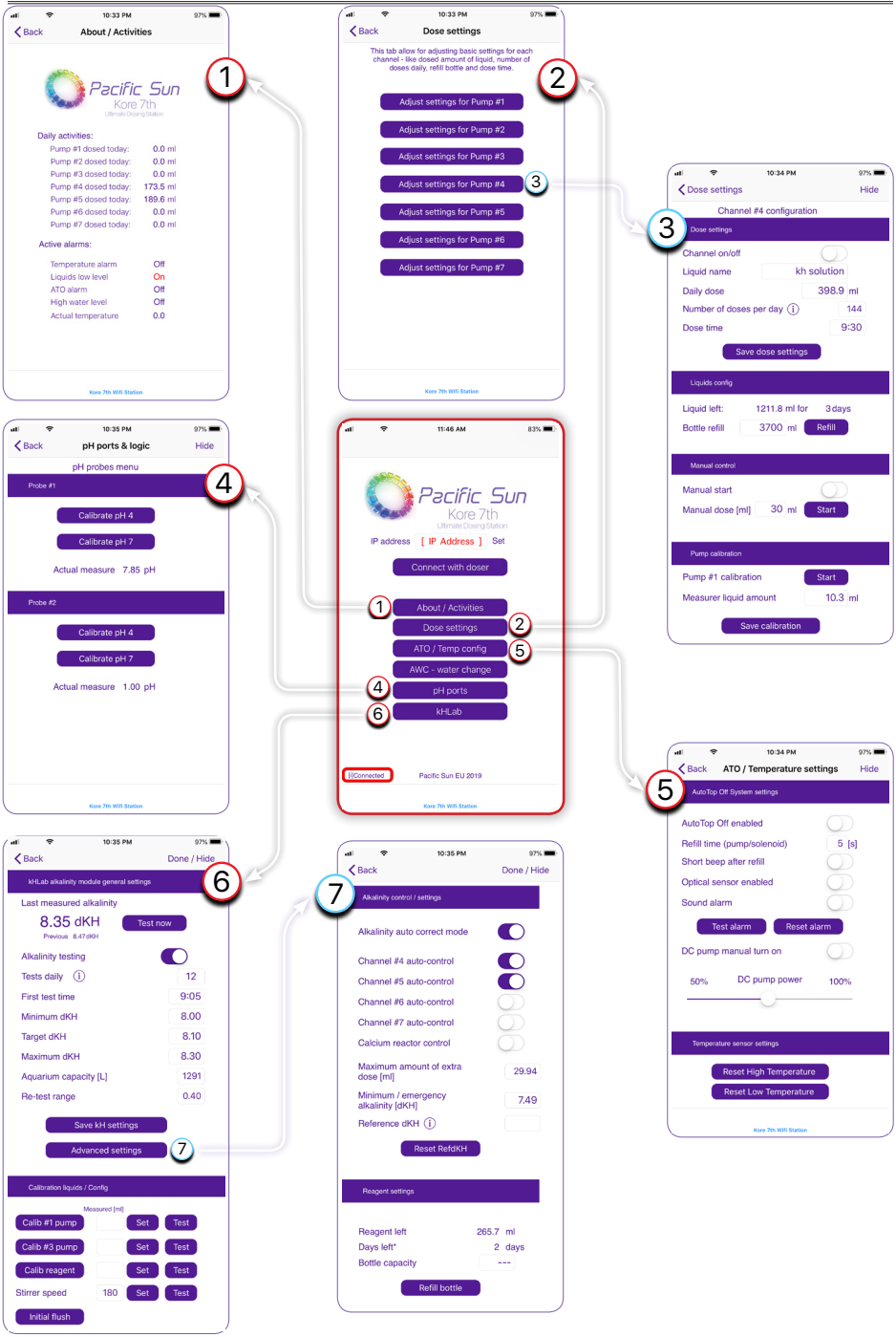


2. Now you should see:

Connected
Doser ready for setup...

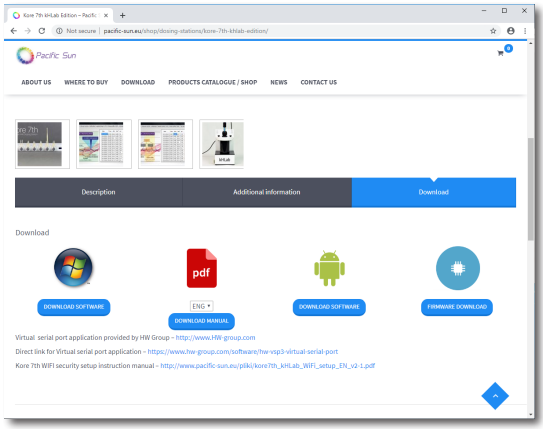
Click Ok

On the next page, you can see all the **Kore 7th WiFi application available options**.

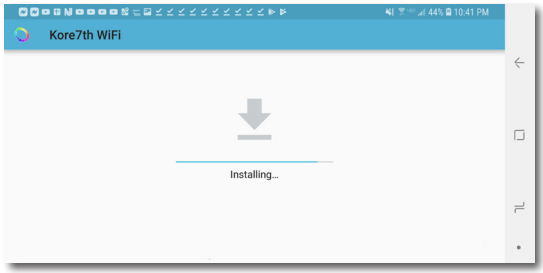

10:33 PM
97%
Back
About / Activities
Pacific Sun
Kore 7th
Ultimate Dosing Station
Daily activities:
Pump #1 dosed today: 0.0 ml
Pump #2 dosed today: 0.0 ml
Pump #3 dosed today: 0.0 ml
Pump #4 dosed today: 173.5 ml
Pump #5 dosed today: 189.6 ml
Pump #6 dosed today: 0.0 ml
Pump #7 dosed today: 0.0 ml
Active alarms:
Temperature alarm Off
Liquids low level On
ATO alarm Off
High water level Off
Actual temperature 0.0
Kore 7th WiFi Station
1
10:33 PM
97%
Back
Dose settings
This tab allow for adjusting basic settings for each channel - like dosed amount of liquid, number of doses daily, refill bottle and dose time.
Adjust settings for Pump #1
Adjust settings for Pump #2
Adjust settings for Pump #3
Adjust settings for Pump #4
Adjust settings for Pump #5
Adjust settings for Pump #6
Adjust settings for Pump #7
Kore 7th WiFi Station
2
3
10:34 PM
97%
Dose settings
Hide
Channel #4 configuration
Dose settings
Channel on/off
Liquid name kh solution
Daily dose 398.9 ml
Number of doses per day 144
Dose time 9:30
Save dose settings
Liquids config
Liquid left: 1211.8 ml for 3 days
Bottle refill 3700 ml Refill
Manual control
Manual start
Manual dose [ml] 30 ml Start
Pump calibration
Pump #1 calibration Start
Measurer liquid amount 10.3 ml
Save calibration
10:35 PM
97%
Back
pH ports & logic
Hide
pH probes menu
Probe #1
Calibrate pH 4
Calibrate pH 7
Actual measure 7.85 pH
Probe #2
Calibrate pH 4
Calibrate pH 7
Actual measure 1.00 pH
Kore 7th WiFi Station
4
11:46 AM
83%
Pacific Sun
Kore 7th
Ultimate Dosing Station
IP address [IP Address] Set
Connect with doser
1 About / Activities
2 Dose settings
5 ATO / Temp config
AWC - water change
4 pH ports
6 kHLab
Connected
Pacific Sun EU 2019
Kore 7th WiFi Station
5
10:34 PM
97%
Back
ATO / Temperature settings
Hide
AutoTop Off System settings
AutoTop Off enabled
Refill time (pump/solenoid) 5 [s]
Short beep after refill
Optical sensor enabled
Sound alarm
Test alarm
Reset alarm
DC pump manual turn on
50%
DC pump power
100%
Temperature sensor settings
Reset High Temperature
Reset Low Temperature
Kore 7th WiFi Station
10:35 PM
97%
Back
Done / Hide
kHLab alkalinity module general settings
Last measured alkalinity
8.35 dKH
Previous 8.47 dKH
Test now
Alkalinity testing
Tests daily 12
First test time 9:05
Minimum dKH 8.00
Target dKH 8.10
Maximum dKH 8.30
Aquarium capacity [L] 1291
Re-test range 0.40
Save kH settings
Advanced settings
7
Calibration liquids / Config
Measured [ml]
Calib #1 pump Set Test
Calib #3 pump Set Test
Calib reagent Set Test
Stirrer speed 180 Set Test
Initial flush
6
10:35 PM
97%
Back
Done / Hide
Alkalinity control / settings
Alkalinity auto correct mode
Channel #4 auto-control
Channel #5 auto-control
Channel #6 auto-control
Channel #7 auto-control
Calcium reactor control
Maximum amount of extra dose [ml] 29.94
Minimum / emergency alkalinity [dKH] 7.49
Reference dKH
Reset RefdKH
Reagent settings
Reagent left 265.7 ml
Days left* 2 days
Bottle capacity ---
Refill bottle
7

6.3. Android Application Installation and start

Kore 7th/kHLab can be configured and control from Smart Phone. In order to enable this functionality you have to install Pacific Sun Kore 7th application on the Android based Smart Phone.

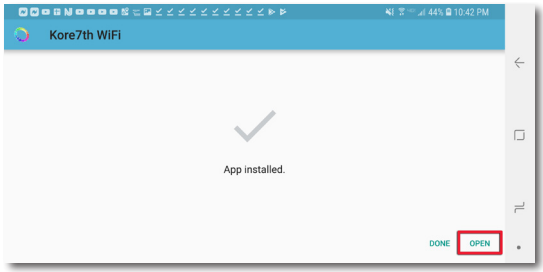


1. To download Kore 7th application go on your Smart Phone to http://pacific-sun.eu/shop/dosing-stations/kore-7th-khlab-edition/
Select **Download** ➧ **Download Software** for Android.



2. Open the Pacific Sun Kore 7th application on your Android device and run the installation process.

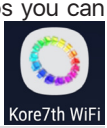
NOTE: You may be prompted to install additional system software necessary for the application to work properly. You will need to agree to Terms of Use to install those packages.



3. Wait until the application will installed and you can click **OPEN** or **DONE**

6.4. Starting the Android Application

After completing all Wi-Fi Network configuration and software installation steps you can start the Kore 7th application, program and control you doser.

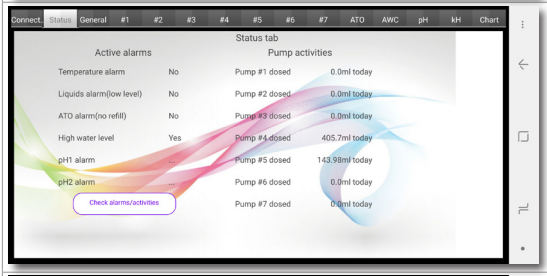


Note:

Installed Android Kore 7th/kHLab application on your Smart Phone should be configured just with your [**Public/External IP**].

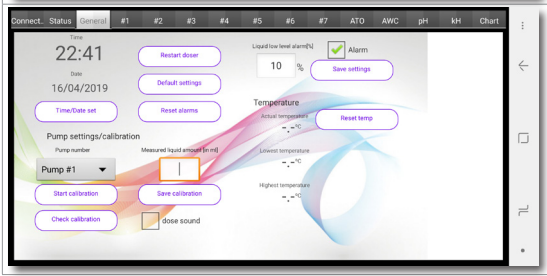
1. Type your [**Public/External IP**]. Click **Connect to doser** and wait a few moments to connect to the device.

2. Click **Synchronize data**



3. Now you can start setup and configuration from you Smart Phone Android application.

Status configuration window.



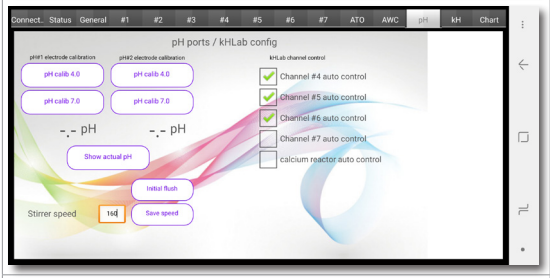
4. General configuration window

5. Channel #1 window.

You can select all the channels one by one like this Tab configure (from #1 to #7).

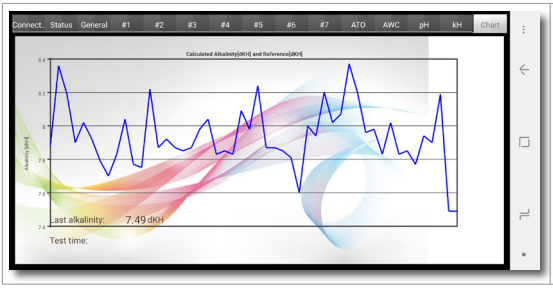
6. ATO configuration window.

7. AWC configuration window.



8. pH configuration window.

9. kH configuration window.



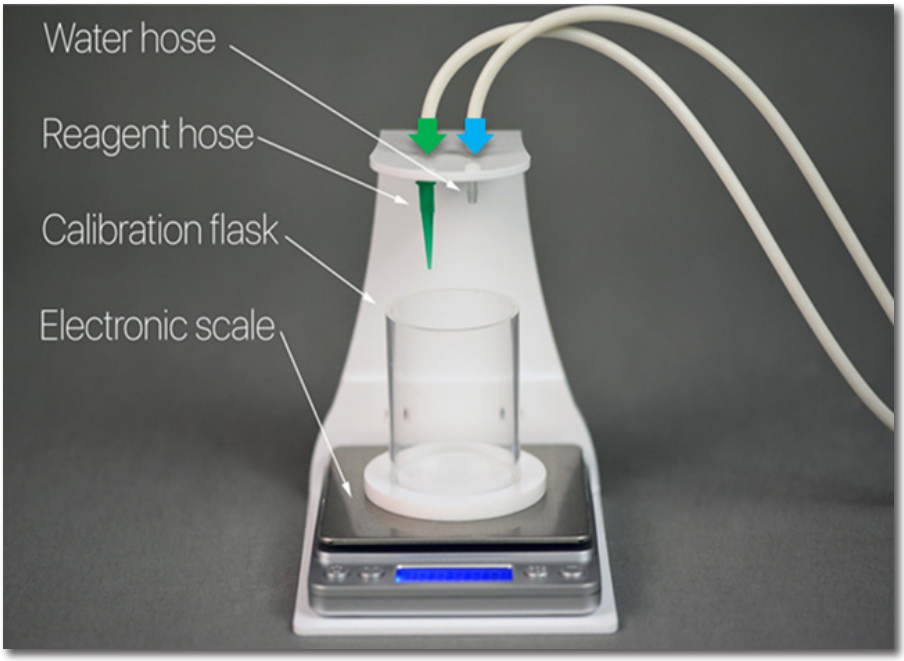
10. KH Chart window.

7. kHLab Pumps Calibration and Accuracy Check

7.1. Calibration Using the Calibration/Measuring Cylinder

This calibration method has been described in the Kore 7th application: **Manual Control / Calibration** Tab.

7.2. Calibration With Precise Digital Scale and Stand/Holder



Calibration station setup

Important!

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

Preparation for the calibration procedure by using a precise digital scale:

1) Connect the silicone tubing coming out from the pump #1 (test water sample outlet coming from Connector 1 OUT) to the calibration stand connector (NO green tip).
2) Connect the second silicone tubing coming out from the pump #2 (reagent solution outlet coming from Connector 3 OUT) to the calibration stand connector with the green tip.

Initial Preparation Calibration steps:

1) Place the digital scale on the calibration stand.
2) Place a dedicated calibration cylinder (vial) on the digital scale.
3) Start **Channel #1** pump (Manual Control / Calibration Tab in the application). The pump will start to pump the test water sample into the calibration vial. When you see that the test water sample is coming out uniformly, stop the pump by clicking the "**Manual button**" in the application.
4) Dispose of the fluid from the calibration cylinder (vial), and repeat, exactly the same initial preparation calibration procedure for the reagent solution. Remember to run, in this case **Channel #2** pump until the reagent solution is coming out from the green tip uniformly.

Important!

Do NOT add back tested reagent solution from the calibration cylinder (vial) to the reagent solution bottle/container!

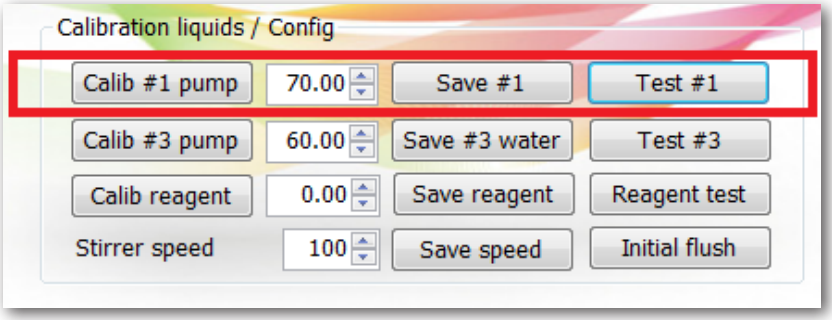
Make sure that the calibration cylinder (vial) is empty, dry it with a clean paper towel and place it again on digital scale.

Digital Scale

7.3. Starting the Channel #1 Calibration Process (Water Sample)

Channel #1 is dedicated for **Water Samples**. To calibrate the pump#1 in this channel follow the steps below. Refer to the picture above for using the digital scale.

1) Turn ON the digital scale.
2) Wait a few seconds and next then zero-out the digital scale by clicking the **T (Tare)** button. Before starting measurements, the digital scale has to display 0.00g on the LCD screen.
3) Make sure that digital scale is displaying [**g**] as the weight unit. If not then press the **M (Units)** button until you see [**g**] gram unit on the LCD screen.
4) From the Application, under the "kHLab" TAB, click the **Calib #1 pump** button. The pump will start adding **water** to the calibration cylinder (vial).



5) After few dozen seconds **pump #1** will stop automatically. Write down the value displayed on the digital scale LCD screen.
6) Dispose of the fluid from calibration cylinder (vial) and repeat above calibration steps few times (recommended **five** times). Sort the results from highest to lowest, ignore the highest and lowest and use the middle three results to determine the average pump performance value.

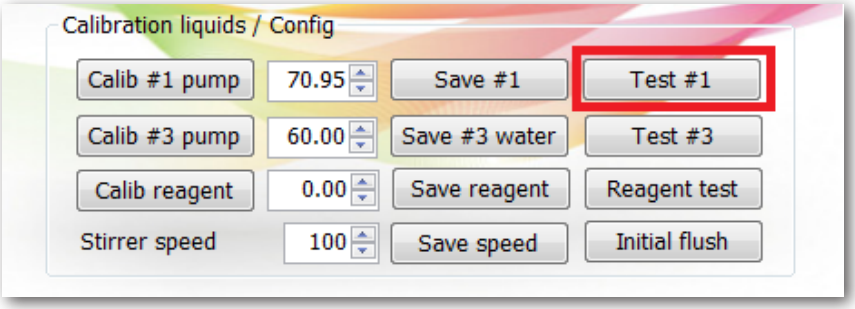
EXAMPLE:

If after eliminating the highest and lowest recorded results you're left with results of: 70.98g, 70.61g, 71.39g, add them and divide by 3 and calculate arithmetic average.
This would be calculated as: (70.98g + 70.81g + 71.05g) / 3 = 212.84g / 3 = **70.95g**

7) **Save** the calculated value by placing the final number in the field next to **Calib #1 pump** button in the application window and click **Save #1**
8) **Channel #1** calibration process has been completed.

7.4. Checking Water Sample (Channel #1) Accuracy

1) Place digital scale on the **calibration stand**.
2) Dispose of any water from calibration cylinder (vial) and place the cylinder 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 any measurements, the digital scale LCD display must read 0.00g.
5) Make sure that 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) From the application, under the "kHLab" TAB, click **Test #1** – **pump #1** will start adding **70ml** of water from **Channel #1** to the calibration cylinder (vial).



7) Read the result in grams [**g**] from the digital scale LCD display. **This is the dosed amount of water in ml by dosing station in channel #1.**

Important!

The number from the **Test #1** process should be in the range of **69.20 - 70.80 ml** (at ±1% measurement accuracy). If the calculated number is out of this range than the calibration procedure must be repeated.

The minimum allowed measurement accuracy is ±2ml (which gives a 3% accuracy of the alkalinity measurement/reading).

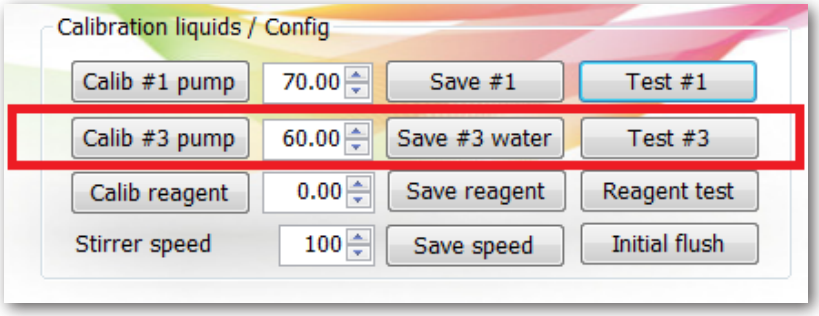
7.5. Starting the Channel #3 Calibration Process (Waste Water)

Channel #3 is dedicated for **Waste Water**. Preparation for the Channel #3 calibration procedure by using a precise digital scale:

1) Disconnect the silicone tubing connected to the calibration stand/holder connector (NO **green** tip) and connect back to the "**Water**" port at the top of the kHLab module.
2) Connect the silicone tubing coming out from the **pump #3** (Waste Water outlet from kHLab mode from **Connector 5** OUT) to the calibration stand connector (NO **green** tip).
3) If the kHLab module test/mixing cylindrical chamber is empty then add aquarium water sample to the chamber (about 3/4 capacity).

To calibrate the **pump #3** in this channel follow the steps below. Refer to the picture in "**Calibration With Precise Digital Scale and Stand/Holder**" for using the digital scale.

1) Turn ON the digital scale.
2) Wait a few seconds and next then zero-out the digital scale by clicking the **T (Tare)** button. Before starting measurements, the digital scale has to display 0.00g on the LCD screen.
3) Make sure that digital scale is displaying [**g**] as the weight unit. If not then press the **M (Units)** button until you see [**g**] gram unit on the LCD screen.
4) From the Application, under the "**kHLab**" TAB, click the **Calib #3 pump** button. The pump will start adding water to the calibration cylinder (vial).



5) After few dozen seconds **pump #3** will stop automatically. Write down the value displayed on the digital scale LCD screen.
6) Add aquarium water sample to the kHLab module test/mixing cylindrical chamber (about 3/4 capacity).
7) Dispose of the fluid from calibration cylinder (vial) and repeat above calibration steps few times (recommended five times). Sort the results from highest to lowest, ignore the highest and lowest and use the middle three results to determine the average pump performance value.

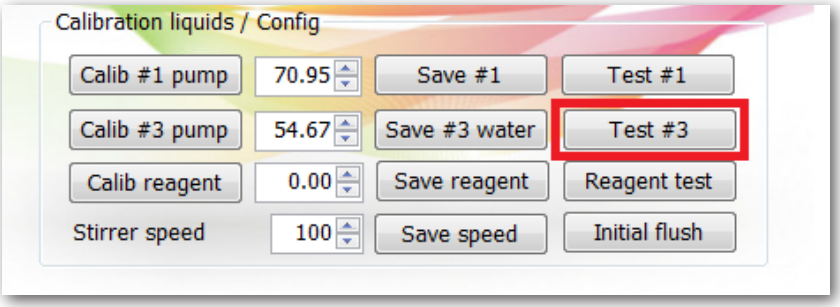
EXAMPLE:

If after eliminating the highest and lowest recorded results you're left with results of: 54.46g, 54.67, 54.37g, add them and divide by 3 and calculate arithmetic average.
This would be calculated as: (54.46g + 54.67g + 54.37g) / 3 = 163.5g / 3 = 54.5g

8) Save the calculated value by placing the final number in the field next to **Calib #3 pump** button in the application window and click **Save #3 water**
9) **Channel #3** calibration process has been completed.

7.6. Checking Waste Water (Channel #3) Accuracy

1) Place digital scale on the **calibration stand**.
2) Dispose of any water from calibration cylinder (vial) and place the cylinder 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 any measurements, the digital scale LCD display must read 0.00g.
5) Make sure that 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) If the kHLab module test/mixing cylindrical chamber is empty then add aquarium water sample to the chamber.
7) From the application, under the "**kHLab**" TAB, click **Test #3** – **pump #3** will start adding **70ml** of water from **Channel #3** to the calibration cylinder (vial).

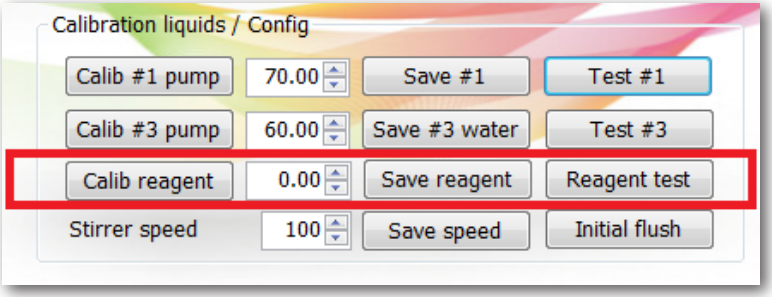


8) Read the result in grams [g] from the digital scale display. **This is the dosed amount of water in ml by dosing station in channel #3**.

7.7. Starting the Channel #2 Calibration Process (Reagent)

Channel #2 is dedicated for the **Reagent** solution. To calibrate the pump #2 in this channel follow the steps below. Refer to the picture in "Calibration with precise digital scale and stand/holder" for using the digital scale.

1) Turn ON the digital scale.
2) Wait a few seconds and then zero-out the digital scale by clicking the **T (Tare)** button. Before starting measurements, the digital scale has to display 0.00g on the LCD screen.
3) Make sure that digital scale is displaying [**g**] as the weight unit. If not then press the **M (Units)** button until you see [**g**] gram unit on the LCD screen.
4) From the Application, under the "**kHLab**" TAB, click the **Calib reagent** button. The pump will start adding **reagent solution** to the calibration cylinder (vial).



5) After 500 cycles pump #2 will stop automatically. **The number of cycles will be displayed on the dosers LCD screen:**

Write down the value displayed on the digital scale LCD screen e.g. 8.98g.

6) Dispose of the fluid from the calibration cylinder (vial) and repeat the above calibration steps 5 times. Sort the results from highest to lowest, ignore the highest and lowest and use the middle three results to determine average performance value.

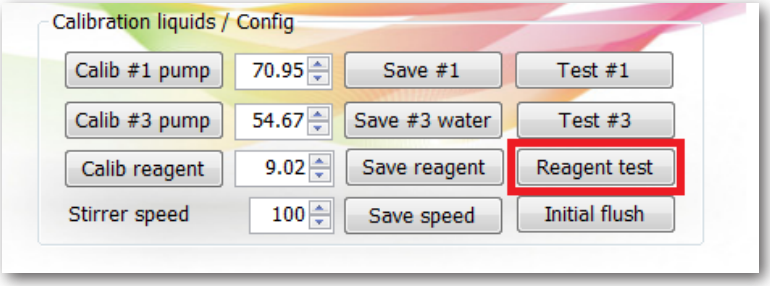
EXAMPLE:

If after eliminating the highest and lowest recorded results you're left with results of: 8.94g, 9.12g, 9.01g, add them and divide by the count of that series of values, which is 3 and calculate **arithmetic average**.
This would be calculated as: (8.94g + 9.12g + 9.01g) / 3 = 27.07g / 3 = **9.02g**

7) **Save** the calculated value by placing the final number in the field next to **Calib reagent** button in the application window and clicking **Save reagent**
8) **Channel #2** calibration process has been completed.

7.8. Checking Reagent Solution (Channel #2) Accuracy

1) Place digital scale on the **calibration stand**.
2) Dispose of water from calibration cylinder (vial) and place the cylinder on the digital scale.
3) Turn ON the digital scale.
4) Wait a few seconds then zero-out the digital scale by clicking (**T**) **Tare** button. Before starting any measurements, the digital scale LCD display must read 0.00g.
5) Make sure that 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) From the application, under the "**kHLab**" TAB, click **Reagent test** – **pump #2** will start adding reagent solution from **Channel #2** to the calibration cylinder (vial).



7) Read the result in grams [g] from the **digital scale** display and compare with the number from **dosing station LCD screen**.

Allowed measurement error (between the values read from digital scale and dosing station LCD screen) CANNOT be more than ±2%.

8. pH Probe Setup, Maintenance and Calibration

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. 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.

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 using. Remove the clear cap (small container) from the pH probe before starting the calibration process and before use of the pH probe.

8.1. Initial pH Probe Calibration Procedure - 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.

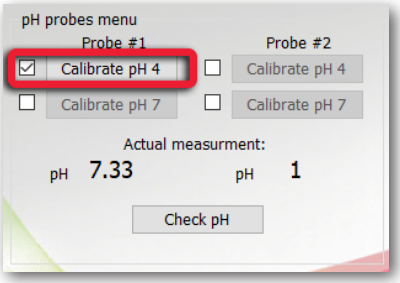
Preparation steps for the calibration process:

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 top 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 pH probe from top 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 paper towel.

pH 4.0 and pH 7.0 calibration solutions

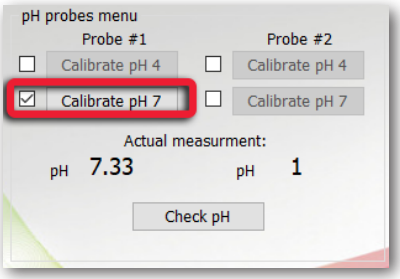
8.2. Calibration Procedure With pH 4.0 Solution

1) Immerse the pH probe in the calibration fluid **pH 4.0** to a minimum 3 cm (~1 inch) depth.
2) The pH probe should be in the solution for about 4-5 minutes. During this period gently move and rotate the probe every few seconds, keeping the pH probe immersed in the calibration solution.
3) After about 4-5 minutes, in the application, under the "**pH ports / kHLab config**" TAB, select the check box next to the **Calibrate pH 4** to activate this function and click **Calibrate pH 4**
4) The calibration process for the first point with **pH 4.0 solution** has been completed.
5) Remove the pH probe from the **pH 4.0** solution, and rinse it in RO water (or tap water) for at least 2-3 minutes and dry the probe the same way as described above.



8.3. Calibration Procedure With pH 7.0 Solution

1) Immerse the pH probe in the calibration fluid **pH 7.0** to a minimum 3cm (~1in) depth.
2) The pH probe should be in the solution for about 4-5 minutes. During this period gently move and rotate the probe every few seconds, keeping the pH probe immersed in the calibration solution.
3) After about 4-5 minutes, in the application, under the "**pH ports / kHLab config**" TAB, click **Calibrate pH 7**



4) The calibration process for the second point with **pH 7.0** solution has been completed.
5) Remove the pH probe from the **pH 7.0** solution, and rinse it in RO water (or top water) for at least 2-3 minutes and dry the probe the same way as described above.

In the case when obtained Alkalinity values are not as expected (e.g. confirmed by a precise laboratory test), make sure that the pH probe is properly calibrated by running the calibration procedure again.

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.

9. 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.

10. 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 (2x500ml) of Concentrated Reagent included in the package has to be diluted with RO/DI water (**TDS=0**) before use in **1:4** ratio.
EXAMPLE: 100ml of concentrated reagent has to be added to 400ml of RO/DI water (**TDS=0**).

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**).

Warning!

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

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

1) Prepare empty **Measuring Container**.
2) Place the **Measuring Container** on the digital scale.
3) Turn ON 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 0.00 g on the LCD display.
5) Make sure that 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 100g of reagent (from 1000ml bottle with 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 100g of RO/DI water into the **Measuring Container**, then add that measured RO/DI water into the **Target Reagent Solution Container**.
11) Repeat the procedure three times (add up to 400g of RO/DI water together to the **Target Reagent Solution Container**.
12) After adding the whole (100ml of concentrated reagent and 400ml 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 1000ml of ready to use reagent solution. This amount of solution can last for up to 25-30 days of performed Alkalinity tests.

11. Device Working Modes

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

11.1. 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.

11.2. 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 **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 desired level.

Note:

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

12. Alkalinity Test Intervals

The Kore 7th dosing station can perform Alkalinity tests in different time intervals: **one, two, four, eight** and **twelve** times per day (**x1, x2,x4, x8, x12**). Keep it 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.

13. Device Working Stages

The device works through the following stages:

a) Initial Flush

The purpose of this stage is to initially fill a kHLab device test chamber and prepare the device to work in continuous stage. In this stage the kHLab module is filling and emptying a chamber with aquarium test water multiple times.

b) 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.

c) Microflush

In this stage, the kHLab test chamber is rinsed several times with aquarium water and prepared for alkalinity testing.

d) EMV Stabilize

During this stage, the device reads the pH probe measurement and waits for the reading to stabilize before starting the actual test.

e) Preparing for Standby

This mode prevents pH probe damage between tests by filling in the kHLab module test chamber with aquarium water.

14. 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

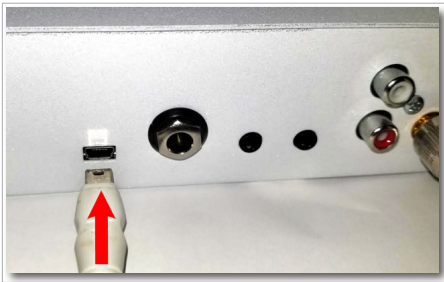
15. Parallel Calibration

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.

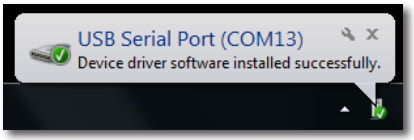
16. Kore 7th Software and Firmware Upgrade

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 **Download** section.



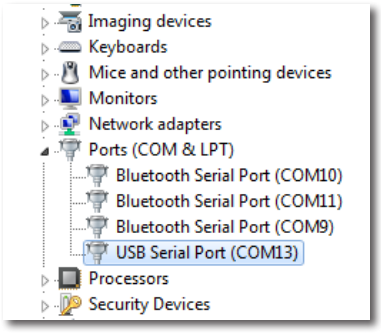
1. Connect your Laptop/PC to the Kore 7th dosing station via USB port.



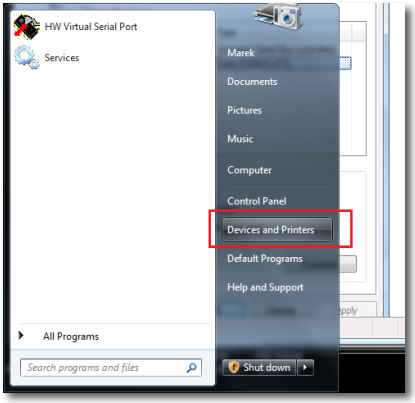
2. Windows Operating System should be able to discover and install the new Kore 7th USB device and show the communication COM port number.
NOTE:
If for the first time, Windows will not be able to install the new Kore 7th device (especially under Window 7) then download from the Internet and install the 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**:

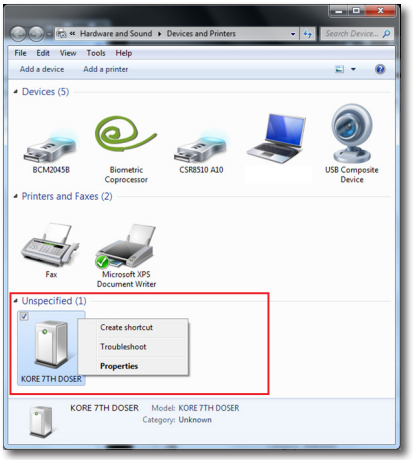
1. "**Device Manager**"
2. "**Devices and Printers**"



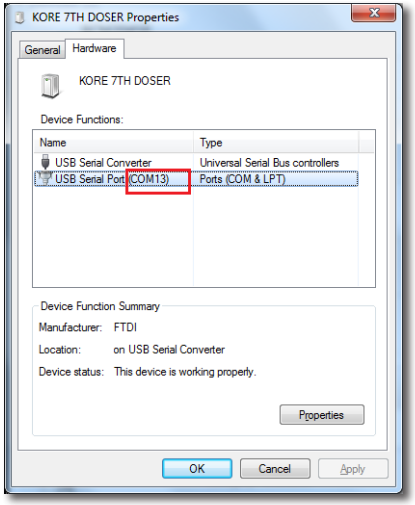
Option 1:
Verify the USB Serial Port COM **number** under "**Device Manager**".



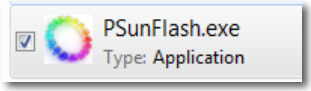
Option 2:
Verify the USB Serial Port COM **number** from "**Devices and Printers**".



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

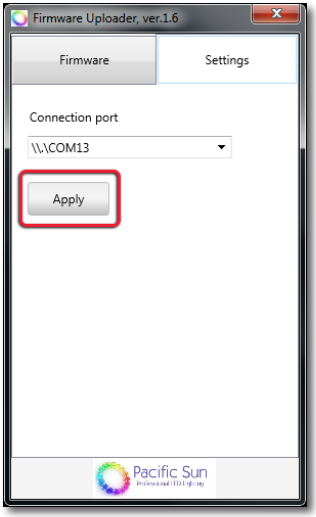


5. The USB Serial Port COM **number** will be visible under Kore 7th Doser Properties.



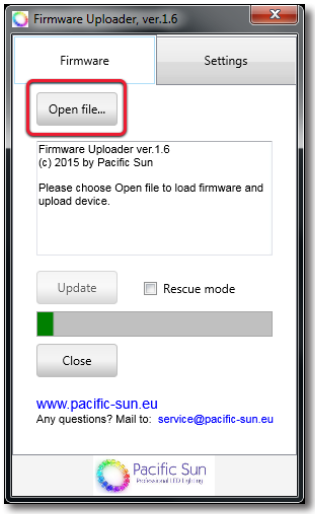
6. Download the "**Firmware Updater**" application form Pacific Sun website: http://www.pacific-sun.eu/pliki/PSunFlash32.zip
Unpack the ZIP file and run the "**Firmware Uploader**".

Note:
For the Mac OS version download from: http://www.pacific-sun.eu/pliki/PSunFlash%202.zip

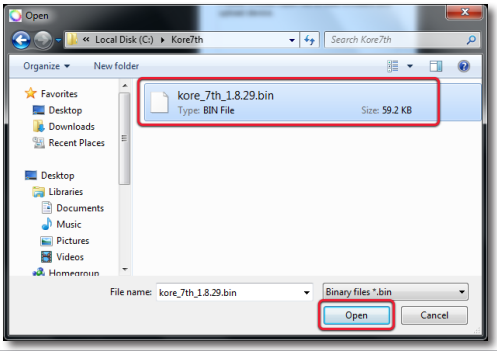


7. In the "**Settings**" tab, choose the port COM **number** the Kore 7th is installed on the computer and click **Apply**

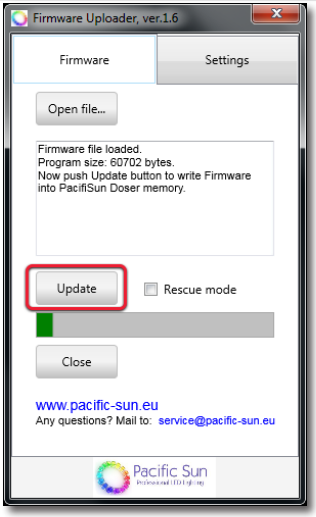
Note:
For the Mac OS version, select the device you want to update from the list.



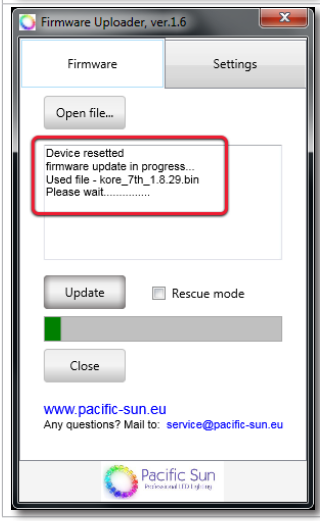
8. Go to the "**Firmware**" tab and click **Open file...**



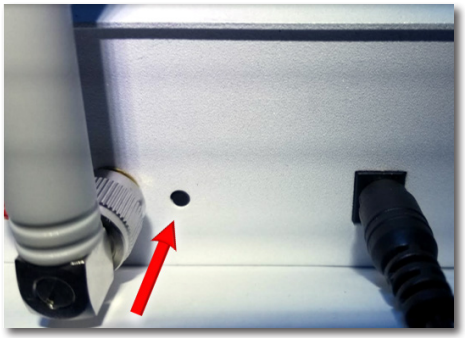
9. Select the previously downloaded Firmware file and click **Open**



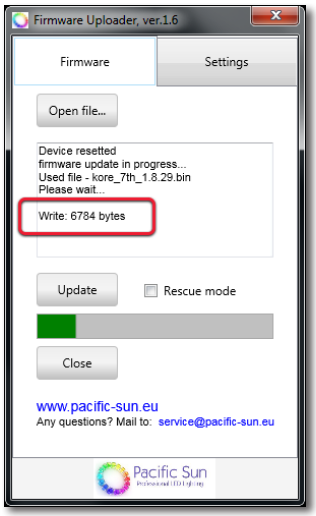
10. Click **Update**



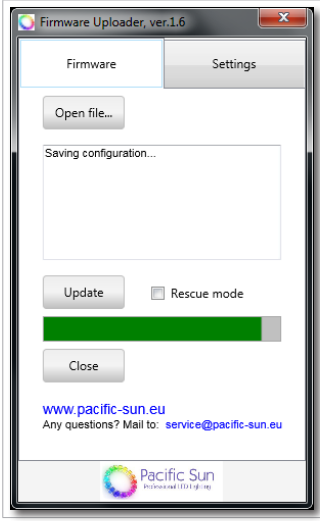
11. Firmware upgrade will be in progress with massage "**Please wait.....**"



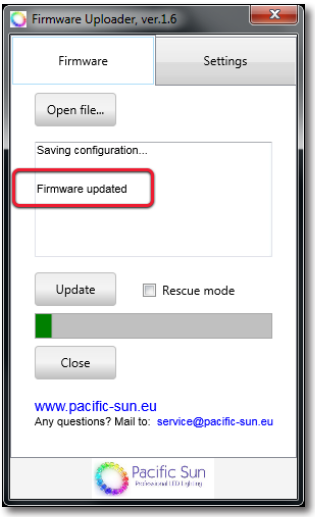
12. Now, press the **RESET** push button on the Kore 7th dosing station back panel.



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

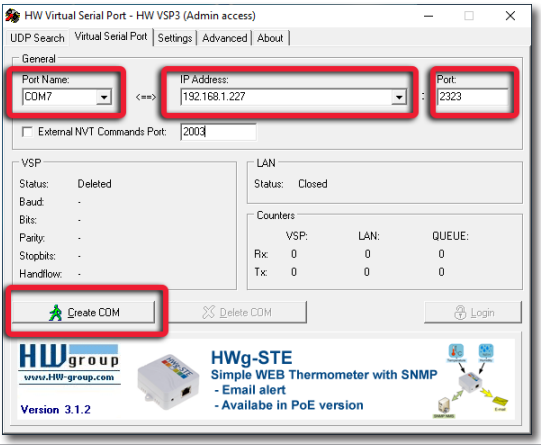


14. The Firmware upgrade status will be indicated with the green progress bar.



Final Firmware Upload steps:

1. At the end of the Firmware writing process program will show "**Firmware updated**".
2. Disconnect 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.

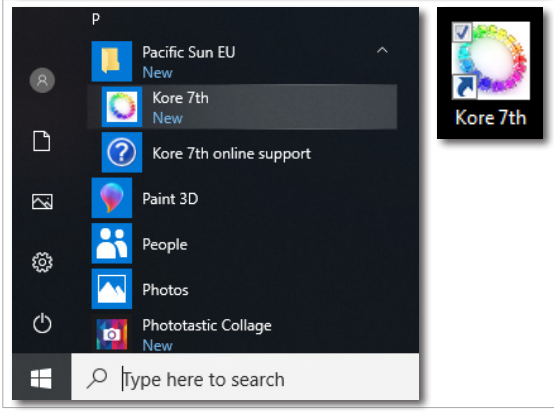


16. Open "**HW Virtual Serial Port**" application (VSP number).

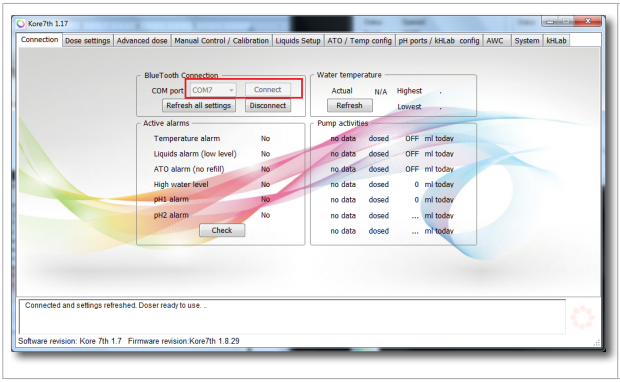
Go to **Virtual Serial Port** Tab

- Under "**Port Name**" select from the list your COM port number (**NOT** used one by any other device),
- Under **IP Address** type the **Kore7th** "**IP Address**" if not specified e.g. **192.168.1.227**.
- Port: **2323**

Click **Create COM**



17. Start the Pacific Sun Kore 7th Application by going to Windows Start menu and clicking Kore 7th or double clicking **desktop icon**.

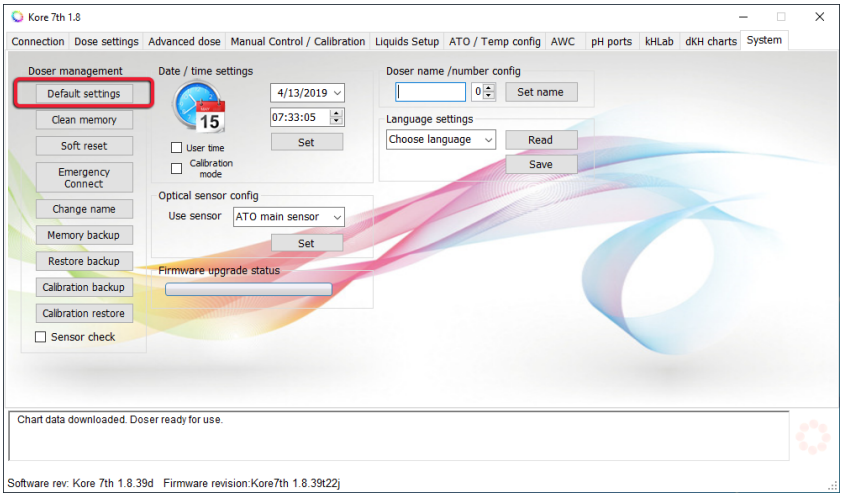


18. In the application, select correct port **COM number** (VSP number) and **Connect** to the doser.

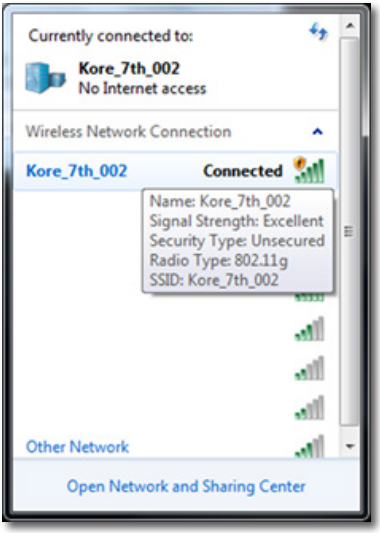
Start normal Kore 7th setup and configuration.

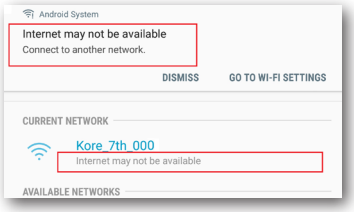
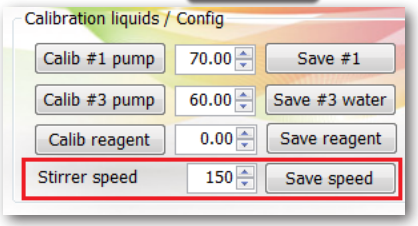
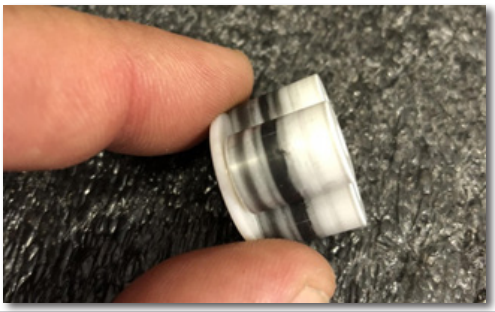
Important!

Only for **major** Firmware releases announced by Pacific Sun, you have to load device default settings by clicking the **Default settings** from the "**System**" Tab. Pacific Sun will notify users about this change.



17. 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 test water level when 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 different diameter than previous, original one or has different nominal flow, i.e. tubing from a manufacturer other than Pacific Sun. Predicted tubing lifetime is about 3-6 months depending from number of tests daily. pH Probe should be replaced every 6-9 months.
Problem with communication between the dosing station and application	Make sure that the dosing station is connected to your PC/ Laptop through Wi-Fi network: 

	Make sure that correct communication COM port number is selected in the application on your PC. Note that after connecting mobile device to Kore 7th will be no Internet access on your mobile device through Wi-Fi network (communication only between mobile device and Kore 7th): 
Spinning problem with the magnetic stirrer bar/ pellet	If the water mixing magnetic stirrer bar/pellet is not spinning then in the Application, under the "**kHLab**" TAB, increase the "Stirrer speed" from the default 100 to e.g. 150 or higher, save it by Save speed 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", save it by Save 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 different solvent solution. 

Pacific Sun

If you need technical support - please contact with *service@pacific-sun.eu*

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