

# KH MANAGER

## EXPANSION INSTRUCTIONS



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## INTRODUCTION

The E1 Connection box allows up to two D-D P4/P4 PRO dosing pumps to be linked with the KH Manager or a single Kamoer FX-STP peristaltic pump. If connecting P4/P4 PRO pump(s) an additional ethernet connection cable(s), available separately, will be needed.

**Only Cloud versions of the D-D P4 Pump(s) using the Kamoer Remote App can be linked to the KH Manager. Both the KH Manager and the D-D P4 dosing pump(s) will need to be connected through a router to the same cloud account for the control function to be used.**

Connection to the D-D P4 and P4 PRO pumps allows independent automatic adjustments to be made to one or more of the dosing pump heads after each KH test avoiding the over or under dosing issues commonly found with traditional dosing methods. If controlling a single head for KH your programmed liquid buffer additions are automatically increased or decreased depending on the test result and the parameters you have set within the KH Manager maintaining a stable KH. Any dosing heads on the P4 or P4 PRO pumps that you do not want to be automatically adjusted can be set to run an independent dosing schedule as normal with no adjustments from the KH Manager.

This control can also allow multi part dosing systems to be controlled by the KH Manager or the dosing of other elements such as Calcium and Magnesium to be increased or decreased with the KH usage of your aquarium.

If connecting a Kamoer FX-STP the link will allow the KH Manager to switch the FX-STP on/off and to adjust its speed, depending on the test results.

## FEATURES

- Secure 'Click Lock' data port connection to the KH Manager
- Two output data communication ports
- Power input and output connections for Kamoer FX-STP
- Status indicator lights

## UNPACKING

Please check for delivery damage before unpacking.

Once opened, please inspect the product for any visible damage and check all parts are included. If any defects are found when unpacking, please contact your retailer immediately.

## Box Contents

- E1 Connection box

## E1 LAYOUT



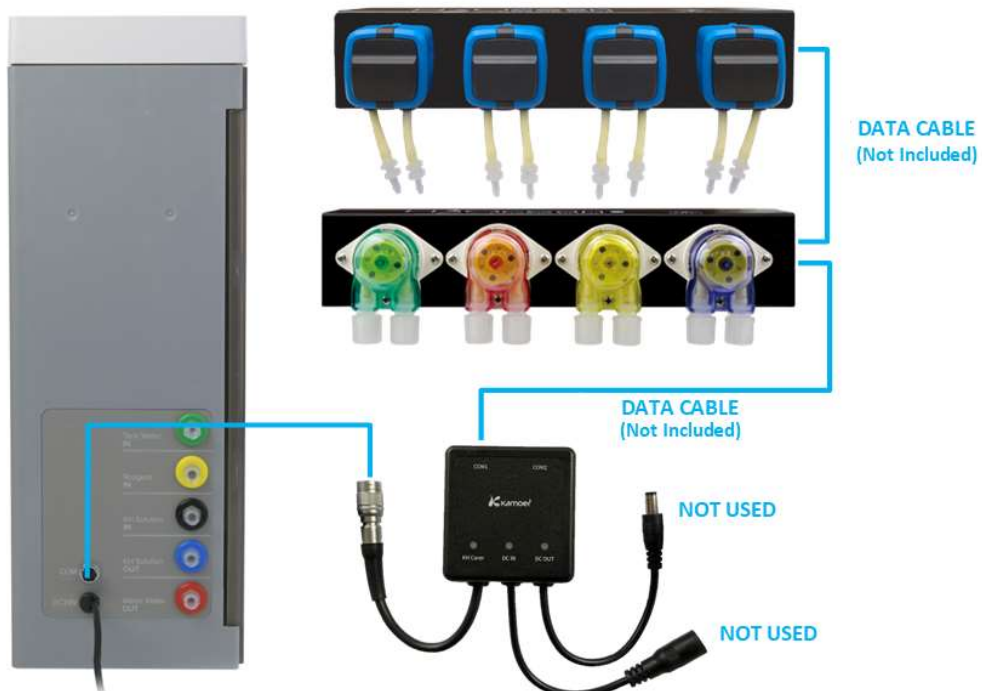
## INSTALLATION

### POSITIONING THE UNIT

The unit should be positioned away from areas of open water, splashing or high humidity.

### CONNECTING THE E1

Connection for D-D P4 or P4 PRO dosing pumps.



The E1 Connection Box can be used to link one or two D-D P4 or P4PRO dosing pumps to the KH manager, if two pumps are used they can be of the same type or one P4 and one P4PRO.

**Only Cloud versions of the D-D P4 Pump(s) using the Kamoer Remote App can be linked to the KH Manager.**

Connect the 'Click Lock' connector to the back of the KH Manager by aligning the locating ribs and pushing into place. **Excessive force must not be used when making the connection as it may damage the terminals.** To remove the connector at any time, pull back on the outer metal cover of the connector and it will slide back and release the connection.

Link the D-D P4 or P4PRO with a data cable (available separately) by inserting the connector on one end the cable into 'COM1' port on the E1 Connection Box so that it clicks into position, then repeat the process with the other end of the cable into one of the 'CAN' ports on the side of the dosing pump, 'CAN1' or 'CAN2' can be used. Any rubber covers should be left in position for data connection ports that are not in use on the P4/P4PRO.

Once the data connections have been made the P4 or P4PRO dosing pump(s) can be powered by plugging them in to a mains power socket using the 12V adapter plug supplied with the P4/P4PRO dosing pump(s).

The 'KH Manager', 'DC IN' and 'DC OUT' indicator lights on the E1 Connection Box will remain off.

The pumps will now be ready to connect to your cloud account on the Kamoer Remote App, if not already connected. Please see the instruction manual for your dosing pump on how to perform this. **The dosing pumps will need to be connected to the same account as your KH Manager to allow the control function to work and have the firmware version 1.0.6 or higher installed.**

When the D-D KH Manager and the D-D P4 or P4PRO have been connected to your cloud account and are showing as online on the devices home page in the Kamoer Remote app the data link can be activated. To perform this, select the tile for the KH Manager, the status page should be displayed, if not tap on the 'Status' icon in the bottom left corner and then follow the steps below.

- Tap on 'Keep KH' at the top of the screen to enter the 'KH Status' page. If the toggle to the right of 'Keep KH' is in the off position in this page it will need to be turned **ON** to proceed, choose 'Add KH Settings' from the list followed by 'Use other pumps to add'.
- Select the tile marked '+ Add Connected Pumps', a list of available pumps will be displayed.
- Choose the pump you want to connect and then assign it a numerical identification between 1 and 255 by tapping in the white box near the top of the screen and entering it on the keypad pop up, choose 'Done' and then 'Save' in the top right corner.

The connected pump will now be shown in the 'Use Other Pumps' page. To remove a pump, tap the three dots to the right of the tile associated with that pump and then select 'Delete' from the menu that appears at the bottom of the screen, to escape without removing the pump tap on 'Cancel'.

To add a second D-D P4 or P4PRO pump repeat the steps above after connecting the additional unit to the spare data port on the first P4/P4PRO pump using a data cable, available separately.

When done tap on the back arrow in the top left corner to return to the 'Add KH Settings' page, turn the toggle in the 'Use other pumps to add' tile to the on position to activate the function, if left in the off position the KH Manager will have no effect on the DDP4/P4PRO dosing.

## Connection for Kamoer FX-STP.



Connect the 'Click Lock' connector to the back of the KH Manager by aligning the locating ribs and pushing into place. **Excessive force must not be used when making the connection as it may damage the terminals.** To remove the connector at any time, pull back on the outer metal cover of the connector and it will slide back and release the connection.

If you have a Kamoer FX-STP Wi-Fi then you can use the KH Manager to automatically change the speed of the dependent on the test result. To do this you will need to connect the FX-STP to the same network and same Kamoer Remote account as the KH Manager. Please see the instructions for the Kamoer FX-STP to connect it to your Wi-Fi network. Once done disconnect the pump from its power supply and continue with the next steps.

Plug the 'DC OUT' male connector cable from the E1 Connection Box into the power input of the Kamoer FX-STP, then plug the 24V power supply provided with the FX-STP into the female 'DC IN' connector on the E1 Connection Box. Once done plug the 24V adapter plug into a mains power outlet.

The 'DC IN' indicator light on the E1 Connection Box will illuminate to show that it is being powered, the 'KH Carer' and 'DC OUT' indicator lights will remain off.

The two data ports on top of the E1 are not used.

## PROGRAMMING THE DOSING USING A D-D P4 OR P4PRO

When linked to the D-D KH Manager the D-D P4 or P4PRO will still need to be programmed with a basic dosing schedule based on the estimated needs for your aquarium. It is then possible to choose

which of the pump heads you want the KH manager to automatically adjust and how much it affects them as a result of the KH test result. Each of the four heads on the pump can be set differently if required. The stepper motor driven dosing pump built into the side of the D-D KH Manager will remain active and can be set to run in auto or custom mode, as described in the main instruction manual. If this pump is not needed and all dosing is to be done with the D-D P4/P4PRO then go to 'Keep KH', 'Add KH Settings, and then turn the toggle for the KH Manager to the off position. The automatic recording of dosing amounts shown in the data tab will only be relevant to the stepper motor pump head on the KH Manager itself.

## SETTING THE BASIC DOSING SCHEDULE

To set the basic dosing schedule on our D-D P4/P4 Pro pump you can enter its settings pages directly by logging into your Kamoer Remote app account and tapping on the tile for the P4 pump, then choose the 'Plan' tab from the bottom left corner. Alternatively, you can select the tile for the KH Manager, the status page should be displayed, if not tap on the 'Status' icon in the bottom left corner and then follow the steps below.

- Tap on 'Keep KH' shown at the top of the screen to enter the 'KH Status' page. If the toggle to the right of 'Keep KH' is in the off position it will need to be turned ON to proceed.
- Select 'Add KH Settings' from the list followed by 'Use other pumps to add'.
- Choose the P4/P4PRO unit you want to program by tapping on the tile relating to it followed by 'Go to this device for plans'.

Select the pump head you want to program by tapping on its tile, as standard the pump heads will be labelled Pump 1 to Pump 4 but a custom name can be assigned, please see the instruction manual for the P4 pumps on how to perform this. When you are in the settings for the individual pump head follow the steps below to program the dosing plan(s).

- Start by adding a group, this lets you name the group of programs and the time period that the group is active. Tap on '+' icon in the top right to start, create a name by selecting the white box labelled 'Name', enter the chosen group name followed by 'Ok'. After this tap on 'Time' and use the scroll wheel that appears to set a start and end time for the program group, to confirm tap 'Done'. When completed select 'Save' in the top right corner. The app will return to the custom plans page.
- A tile showing the plan group you have just set up will be displayed on the screen, tap on the blue arrow in the bottom right corner of your plan group tile to expand it and show the options 'Add a Plan' and 'Quick Add'. Multiple plan groups can be set, for example you could set a day time plan group and a night time plan group, but it is best to make sure the plan start and end times do not overlap each other.

**Add a plan:** This option will allow you to add single plans at a time without adjusting others that are already set. Tap on the 'Add a Plan' tab and then enter a time for the plan to start by selecting 'Start Time', use the scroll wheel to set the time and then save by selecting 'Done', next tap on 'Add' to enter the amount of solution you would like to add at the time you have just set, tap on the white box at the top of the page that appears, enter the volume in ml, select done and then save in the top right corner. Check the time and dosing volume are correct, then save in the top right corner. The plan you have created will now show in the group, these steps can be repeated to add more individual dosing plans to the group if needed.

**Quick add:** If you are adding multiple plans this is the quickest option, please note using this will overwrite any existing plans in the group. Tap on the 'Quick Add' tab to begin, a prompt will appear on the screen to warn that proceeding will replace any existing plans, choose 'Ok' to continue.

- Tap on 'Add times' and then set the number of doses you would like to have in the group on the scroll wheel that appears at the bottom of the screen, select done to set.
- To enter the total amount you would like to dose select 'Total Add', enter the volume in ml and then 'Ok'.
- Set the anti-chemical interference, if needed, by selecting the heading 'Anti-chemical Interference' and choosing a time on the scroll wheel that appears at the bottom of the screen, then select 'Done' to set.
- A plan preview is available by tapping on the eye symbol in the top right of the screen next to 'Save'.
- When the settings are complete tap 'Save' in the top right corner to save and return to the individual pump head page.

For each group the individual plans can be viewed or hidden by tapping on the blue arrow in the bottom right of the group tile. Swiping the individual plan or group to the left will delete it, and tapping on them will allow you to make amendments.

- Dosing bottle tracking is shown at the top of the page, this can be set to show how much solution is left in your dosing container. If alerts are turned on in the Kamoer Remote app, and alert permissions are active on your mobile device for the app, push notifications can let you know when it is getting low. To set the amount of liquid available tap on the 'Set' button in the dosing bottle tile, enter the amount in ml and then save by selecting 'Ok'.

When you have finished setting the dosing programs for the pump head tap on the blue back arrow in the top right corner to return to the main 'Plan' page.

A toggle switch is shown in each of the pump head tiles, when highlighted in blue the pump head is active and will follow any plans set, if it is greyed out the pump head is off and will be inactive. Tap on the toggle switch to turn the pump head on or off. If the pump head is switched off any plans that have been set will remain saved. If a pump head is not going to be used it is best to leave the toggle in the off position.

Repeat the above steps for the other pump heads if needed. When finished tap the blue back arrow in the top left corner to return to the main devices screen in the Kamoer Remote app.

## **SETTING THE D-D KH MANAGER ADJUSTMENT PERAMETERS**

Each pump head is set individually so the amount that the D-D KH Manager adjusts each head can be different.

To set the adjustment parameters for the pump head log into your Kamoer Remote app account and select the tile for the KH Manager, the status page should be displayed, if not tap on the 'Status' icon in the bottom left corner and then follow the steps below.



- Tap on 'Keep KH' shown at the top of the screen to enter the 'KH Status' page. If the toggle to the right of 'Keep KH' is in the off position it will need to be turned ON to proceed, choose 'Add KH Settings' from the list followed by 'Use other pumps to add'.
- Choose the P4/P4PRO you want to program by tapping on the tile relating to it.
- The 4 pump heads will be displayed in the page, the order these are in will match the order on the P4/P4PRO unit. Choose the pump head you would like to set by tapping on it.

**Note: Automatic adjustments to the dosing plan will not be active until a test is performed, triggering the function. If the pump head on the D-D P4 or P4PRO unit is switched off it will not dose and the D-D KH Manager will make no adjustments on that head. The data cable must be connected for any automatic adjustments to be made.**

- **Range:** The KH Manager will only make automatic changes to the dosing if the dKH result from the test is within a certain range of your KH set point (KH Balance Value), this range can be programmed to be +/- 0.1 to 1dKH. For example, if your KH set point on the KH Manager is 7.5 you can set the machine so that automatic adjustments are made if the dKH tested by the machine is between 6.5 and 8.5dKH. To modify the range, select 'Range' in the adjust KH settings page, tap on the lower and upper parameters to make adjustments, enter the figure then select 'Done' and 'Save' in the top right corner to save and exit.
- **Method:** This is used to determine if you would like the KH Manager to use an amount or percentage proportion when making the adjustments to the dosing schedule, this adjustment can be made to affect a single dose on the schedule or multiple doses to spread and reduce the change in each dose. The method currently in use is shown below the method heading. To change the settings on this or swap between percentage proportion and amount tap on the 'Method' heading and then select either 'Proportion' or 'Amount' from the pop-up that appears at the bottom of the screen, if you want to exit without making a change select 'Cancel'.
  - **Proportion** is expressed as a percentage per dKH.
  - **Amount** is expressed as an amount in ml per dKH.
- **Adjust Times:** Use this to set how many of the plans in the group are adjusted using the 'Proportion' or 'Amount' methods. If only one plan is adjusted the single adjustment is greater than if multiple plans are adjusted.
- **Stop Adjusting:** If you want to stop the KH Manager making adjustments to the plans until the next KH test is completed, tap on 'Stop Adjusting' followed by 'Stop' in the pop-up that appears at the bottom of the screen, to exit without stopping the adjustments select 'Cancel'. After the next test the machine will resume making adjustments as programmed.

When finished tap the blue arrow in the top left corner to exit. Repeat the above steps for the other pump heads if needed. If you do not want the D-D KH Manager to make adjustments to a particular pump head set the 'Adjust Times' for that head to zero.

## PROGRAMMING THE DOSING USING A KAMOER FX-STP

To control the water supply through a calcium reactor a Kamoer FX-STP can be connected to the D-D KH Manager. After each test the FX-STP can be set to run for a set amount of time at a constant speed, it is also possible to set parameters to automatically change the speed of the pump dependant on the pH or KH test result if using the Wi-Fi version FX-STP.

If the KH is below the 'KH Balance Value' set point after a test the pump will be set to run or will be stopped if it is already on and the KH has reached the 'KH Balance Value' set point. The stepper motor driven dosing pump built into the side of the D-D KH Manager will still remain active and can be set to run in auto or custom mode, as described in the main instruction manual. If this pump is not needed then go to 'Keep KH', 'Add KH Settings, and then turn the toggle for the KH Manager to the off position. The automatic recording of dosing amounts shown in the data tab will only be relevant to the stepper motor pump head on the KH Manager itself.

### SETTING THE KAMOER FX-STP

Log into your Kamoer Remote account and select the tile for the KH Manager, the status page should be displayed, if not choose the 'Status' icon in the bottom left corner. Tap 'Keep KH' shown at the top of the screen, to enter the 'KH Status' page. If the toggle to the right of 'Keep KH' is in the off position it will need to be turned **ON** to proceed. Choose 'Add KH Settings' from the list followed by 'Use "FX-STP" to add' and then tap on the 'Run for Period' tile.

In this settings page you can set the maximum run period for the pump in hours, for times that are not complete hours the time will need to be set as a decimal, for example 30 minutes would be 0.5 hours or 15 minutes would be 0.25 hours. To input the maximum run time tap on "'FX-STP" runs for up to' then select the white box at the top of the page, enter the number on the pop up keypad followed by 'Done' and then save to exit. If you want to test that the connection to the FX-STP is ok then you can tap on 'Running Test' to activate the pump for a few seconds.

If using the non Wi-Fi version the speed that the Kamoer FX-STP runs is determined on the pump itself, to set this temporarily power the pump by directly plugging it into the 24V power supply that came with it and adjust the running speed by turning the control dial. For more detailed information on setting the speed of the Kamoer FX-STP and how to calibrate please use the main instruction manual for the pump. When finished re-connect the pump to the E1 Connection Box as per the above diagram.

When using the Kamoer FX-STP Wi-Fi version that has been connected to the same network and Kamoer remote account as the KH Manager you can set up automatic speed controls based on the KH test result or pH level. To set this log into your Kamoer Remote account and select the tile for the KH Manager, the status page should be displayed, if not choose the 'Status' icon in the bottom left corner. Tap 'Keep KH' shown at the top of the screen, to enter the 'KH Status' page. If the toggle to the right of 'Keep KH' is in the off position it will need to be turned ON to proceed. Choose 'Add KH Settings' from the list followed by 'Use "FX-STP" to add' and then tap on the 'Change speed in "Scenes"' tile.

In these settings you can add one or more conditions that tell the FX-STP what speed to run, this can be set as an action if the KH and/or pH are below or above a set value or between two values.

- Tap on the plus symbol.

- Select 'Add Condition' then choose KH or pH depending on what factor you want to trigger the change in speed of the pump.
- Then select,
  - 'Lower than a value' if you want to set a speed when the KH or pH is below a set value after a test.
  - 'Between two values' to set the speed to operate between two set values after a test.
  - 'Higher than a value' for setting a running speed if the KH or pH reading is above a certain level.
- Enter the KH or pH value(s) you want to trigger the speed change and tap 'Save' in the top right corner.
- If you want the speed to be determined by a set KH and pH reading repeat the steps again from the second point.
- After this select 'Add Action' and tap on the icon for your FX-STP, enter a running speed and then tap 'Save' in the top right corner.
- Enter a name for the program in the box at the top of the page and save.

The 'Scenes' Page will show the programs you have set, these can be turned on or off by tapping on the blue toggle switch next to them or deleted by swiping them to the right. More than one program can be set by repeating the steps above. Care should be taken that active plans do not conflict with each other. A suitable default speed should also be set on the pump so it can operate correctly if the test result falls outside the parameters for any programs, to do this disconnect the FX-STP and its power supply from the E1 box and directly plug it in, the pump can then be set in the Kamoer remote app to manual mode and a default speed. When finished re-connect the pump to the E1 Connection Box as per the above diagram.

After the KH manager completes a test it will send a signal to the E1 Connection Box to switch the power on or off to the Kamoer FX-STP. If the test result is lower than your chosen 'KH Balance Value' the FX-STP will be powered on and run at the speed you set for the amount of time you programmed in the previous steps. If during this on period another test is performed and the result is above your set 'KH Balance Value' it will switch off.

If using to run a calcium reactor it is advisable to have a pH probe and solenoid valve to control the reactors Co2 input preventing excess gas being used if the Kamoer FX-STP is off. In this method of control it is also advisable to have the D-D KH Manager testing regularly and the calcium reactor set to a level that allows the Kamoer FX-STP to be on most of the time. If the pump is off for long periods it may cause water to stagnate inside the calcium reactor and this should be avoided.

## CHECKING THE CONNECTION OF THE E1 BOX

Communication between the KH Manager to the connected D-D P4/P4PRO or Kamoer FX-STP can be checked in the Kamoer Remote App.

To perform a check, log into the Kamoer Remote app and tap on the device icon for your KH Manager. Select the settings icon in the bottom right, when the settings page is displayed tap on 'Maintain' followed by 'KH Carer E1 Check'.

- For confirming the link to a D-D P4/P4PRO choose 'Check Communication', enter the number you assigned to the pump you want to check and then select 'Check'. A popup will appear to confirm the connection status.

- If you want to check the connection to a Kamoer FX-STP choose the 'Check Running Option' tap the button in the middle of the screen and the pump should power on and start running after a few seconds, tap the button in the middle of the screen again to finish the check and stop the pump.

When finished use the blue arrow in the top left of the screen to exit back to the settings page.

## LIMITED WARRANTY

Warranty is only valid for units correctly installed and maintained, all faults caused by improper use or water damage are not covered.

Should any defect in material or workmanship be found within 12 months of the date of purchase D-D The Aquarium Solution Ltd undertakes to repair, or at our discretion replace the defective part free of charge.

Our policy is one of continual technical improvement and we reserve the right to modify and adjust the specification of our products without prior notice.

Any warranty claim without valid proof of purchase will not be accepted.