Contents

Warranty

We warrant your product against any defect in material and workmanship, under normal use. In the event a product is found to be defective within the warranty period of **one year**, we will, at our option, repair or replace the defective product. The warranty period starts at the day of purchase. For warranty validation, a proof of purchase must be furnished.

The followings are excluded from the warranty:

1   Improper use of the device causing malfunction;

2   The device is repaired or modified by an unauthorized person;

3   Use of non-produced material by our company i.e. pump tube;

4   Damage by disaster;

5   Improper maintenance causing damage;

6   Use of reagent or sample causing corrosion;

7   Damage by accident or over load;

8   Consumables, such as silicone tube and fuse etc.

To obtain warranty support, you may contact our local technical support. Our technical support will attempt to diagnose and correct the problem. If the problem cannot be rectified, our technical support will ask you to return the product. You will be asked to furnish proof of purchase to confirm that the product is still under warranty.

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2   Notice

We have considered user safety in the design process. Please read this manual carefully. Any improper operation may cause damage or danger.

1. Safety

The product belongs to Active Products. To avoid danger, you should observe the following rules.

● If you find any visible damage, please do not switch on;

● Be sure not to add any acid, alkali, or volatile solvents;

● Be sure not to use in humid environment, avoid damage by short circuit;

● Temperature change or mechanical wear may increase the volume error.

2. Defect and anomalous situation

You must stop any operation immediately if the equipment is damaged. The equipment may be damaged when the following situations occur:

1） There is visual damage.

2） The product suddenly does not work.

3 The product is located in an inappropriate position.
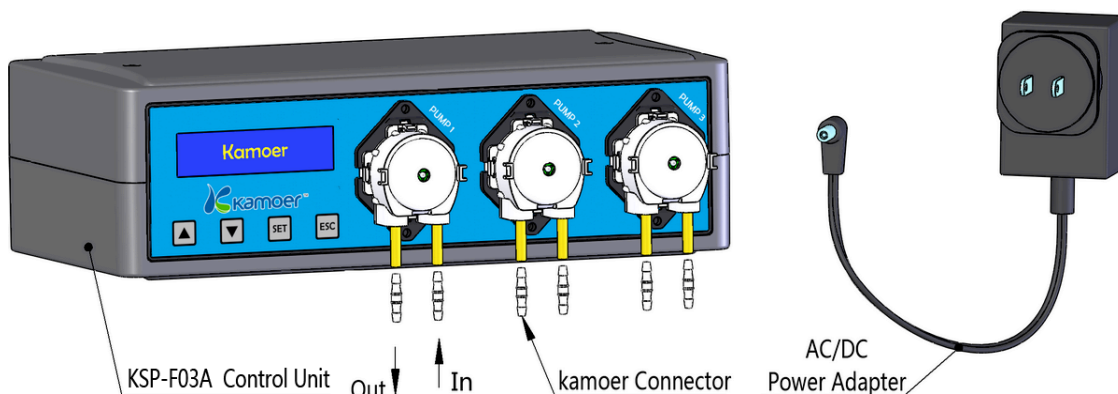
1 Introduction

1.1 About

This dosing pump is mainly used to quantitatively add aquarium additives, such as Ca, Mg and kH supplements. It easily maintains water quality, greatly reduces the user workload. The followings are main features:

- Individual calibration for each channel ensuring dosing accuracy.
- Fully waterproof panel, LCD backlit display, key operation, real time clock. All settings are stored in a non-volatile storage and never lost even during power failures.
- Provide 3 or 4 dosing channels and can be easily extended up to 15 channels. Use high torque, long life and quiet motors, with long life pump tube which can work continuously for up to 2000 hours. The pump shell uses automotive instrument-level high-strength self-lubricating plastic POM.
- 3 dosing modes: auto, custom and manual.
- **Auto Dose** – Supports dosing in Interval of days or at specific days of week. Allow user to set a time span (i.e. from 8:00 to 16:00), the daily total volume, and number of doses (max 24 i.e. 1 dose per hour), the pump will then dose equal volume for each time in the specified time span. The design of anti-chemical interference allows user to set a delay time which prevents any two channels dosing at the same time.
- **Custom Dose** – Supports dosing in Interval of days or at specific days of week. Allow user to specify dosing times (max 12) and volume of each dose (max 9,999ml) and support additions at the same time (up to 3 channels). **Manual Dose** - Allow user to manually dose.

1.2 Unpacking

- Before unpacking, please check for damage by delivery.
- Upon opening the package, please check that you have received all parts before using. The parts list is shown in *Appendix B - Packing List*. Please check whether the product has visible damage. If any defects are found when unpacking, please contact us immediately.

1.3 Included Items

KSP-F03A Control Unit   Out↓ ↑In   kamoer Connector   AC/DC Power Adapter

⚠️ **Placement**

*The pumps are self-priming and always should be located **ABOVE** the container with the liquid which has to be dosed. This avoids an emptying of the container in the case of a leakage. The tube on the intake side should be short. To avoid a backflow the tube must not hang in the aquarium water. The intake side and out take side of the pump should not be reversed.*

The pump heads can be turned 180°. Press both locking tabs on the side of the pump head at the same time and pull the pump off. Turn the pump head around 180° and place it again carefully onto the motor shaft – do not use force! Check that locking tabs on the side of the pump head have snapped in place.

Important: The dosing pump unit must be protected against splashes of water and high humidity! Salt water and/or high humidity (e.g. as can occur placing near to a sump) can damage the device – this will voids any warranty claims.

1.4 Components

● **Dosing pump unit**

3 models are available:

KSP-F03A and **KSP-F04A** are master units – a master unit can be used stand alone or can be connected to one of more slave units (max 3). The master unit is able to control up to 15 channels independently.

KSP-F04 is a slave unit, which must be controlled by master control unit.

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KSP-F03A is a 3-channel master unit.

KSP-F03A

KSP-F04A is a 4-channel master unit.

KSP-F04A

KSP-F04 is a 4-channel slave unit.

KSP-F04

KSP-F04 IS NOT CAPABLE OF INDEPENDANT OPERATION.

The master control unit has a backlit LCD screen for display and membrane keys for operation. The control panel has four keys, from left to right, these are: **Up** key, **Down** key, **Set** key and **Esc** key. The key functions are as follow.

- **Up** key: Navigate the menu upward or increase the number.
- **Down** key: Navigate the menu downward or decrease the number.
- **Set** key: Confirmation of an input or a choice
- **Esc** key: Back to menu or cancel action with saving.

Up   Down   Set   Esc

If you require no more than 4 channels to dose, you can choose from the **KSP-F03A** or the **KSP-F04A**. If more than 4 channels are required, you will use a combination of a master control unit controlling one or more slave units.

Note: *If you want to extend the number of channels, please read Section 2.2.7 carefully.*

Channels	Combination	Connection
7	1 KSP-F03A 1 KSP-F04	**Group B** of KSP-F03A connects to **Group B** of KSP-F04
8	1 KSP-F04A 1 KSP-F04	**Group B** of KSP-F04A connects to **Group B** of KSP-F04
11	1 KSP-F03A 2 KSP-F04	**Group B** of KSP-F03A connects to **Group B** of the 1st KSP-F04; **Group C** of KSP-F03A connects to **Group B** of the 2nd KSP-F04
12	1 KSP-F04A 2 KSP-F04	**Group B** of KSP-F04A connects to **Group B** of the 1st KSP-F04; **Group C** of KSP-F04A connects to **Group B** of the 2nd KSP-F04
15	1 KSP-F03A 3 KSP-F04	**Group B** of KSP-F03A connects to **Group B** of the 1st KSP-F04; **Group C** of KSP-F03A connects to **Group B** of the 2nd KSP-F04; **Group D** of KSP-F03A connects to **Group B** of the 3rd KSP-F04

The above 5 combinations only require 1 power supply i.e. the master **KSP-F03A or KSp-F04A** distributes power to the slave **KSP-F04** units.

- **AC/DC adapter**

The supplied AC/DC power adapter will support: China standard, European standard, American standard, Australia standard and other standards.

- **Pump tube**

Pump tube is installed in pump head. We provide PharMed BPT hose as standard, which provides a long continuous working life of up to 2000 hours.

- **Connecting pipe**

3mm x 5mm PVC transparent tube connected to the input or the output of pump.

- **Kamoer connector**

Tubing connectors connect the input or output of pump to the PVC connecting pipe. See *Included items* in **1.3**.

- **Check valve**

One-way valve, it is used to prevent the possibility of any backflow. Please note the direction in installation. The correct orientation is with the black face of the check valve closet to the output side of the pump. If you reverse the direction, the pump will not draw fluid, you can check in manual mode if valve is reversed or not.

We recommend placing the check valve at **THE END** of the dispense line for each pump – this way, the pump tube will be kept airtight and prevent any evaporation or growth of bacteria.

- **Cable for extended channels** – cable provided with slave unit for connection to master unit

2 Use

2.1　Power On

First place the pump on a smooth horizontal surface, then plug the jack of the *AC/DC Adapter* into the DC-connector of the dosing pump unit (12 VDC, polarity: Inside +, outside -) and connect the adapter to the main power supply. After the pump initializes, you will see the startup display. See figure on right .The 1st line shows the model and the 2nd line shows the version of product.

> **KSP-F Series**
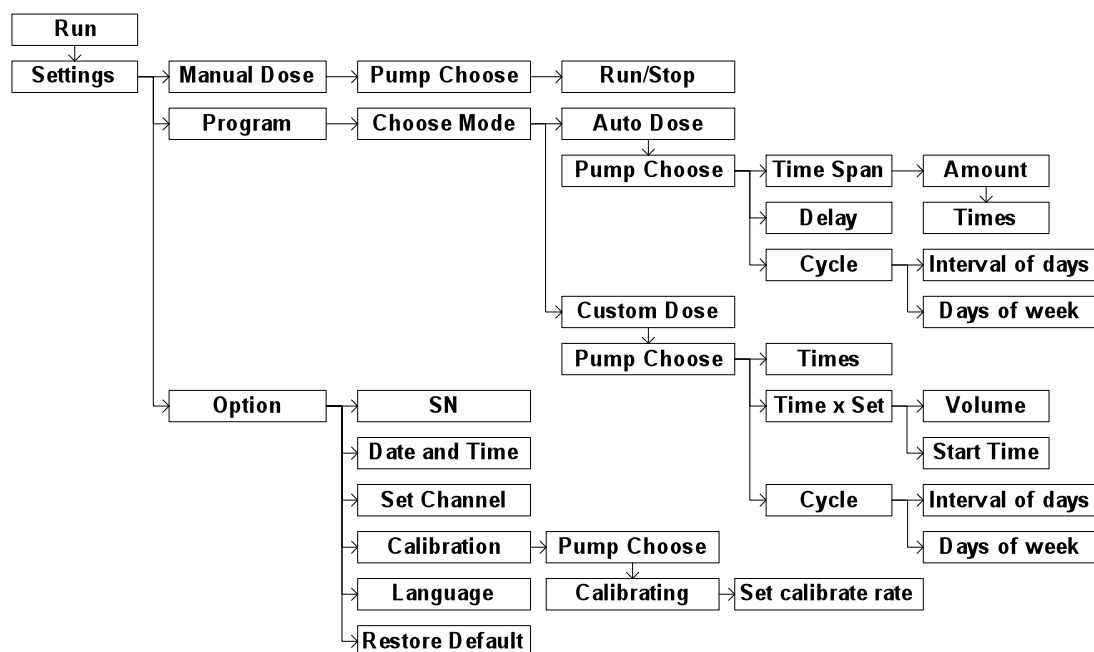>
> **Ver2.4**

After initialization, the pump enters the run page. See figure as follow.
The first line from left to right: dosing mode (**A**uto or **C**ustom), current time.
The second line from left to right: channel, start time and dosing time of the next pump.
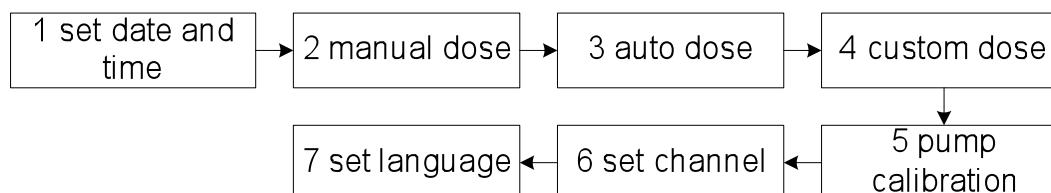
> **A　　10:30:00**
>
> **P1　　11:00　10s**

In order to understand the menus, please see menu flowchart below.

Menu Structure

2.2 Settings

2.2.1 Setup Wizard

```
┌──────────────┐    ┌───────────────┐   ┌──────────────┐   ┌──────────────┐
│ 1 set date and│ → │ 2 manual dose │ → │ 3 auto dose  │ → │ 4 custom dose│
│     time     │    └───────────────┘   └──────────────┘   └──────────────┘
└──────────────┘                                                  │
                    ┌───────────────┐   ┌──────────────┐   ┌──────────────┐
                    │ 7 set language│ ← │ 6 set channel│ ← │   5 pump     │
                    └───────────────┘   └──────────────┘   │ calibration  │
                                                           └──────────────┘
```

All set operation begins with the run page.

2.2.2 Set Date and Time

Step	Operation	Display
1	press **Set** key to enter *Settings* menu	**Settings** **1 Manual Dose**
2	press **Up** or **Down** key to choose *Option*	**2 Program** **3 Option**
3	press **Set** key to enter	**Option** **1 SN: 001001**
4	press **Up** or **Down** key to choose *Date and Time*	**2 Date and Time** **3 Channel: 3**
5	press **Set** key to enter	**2011-05-07** **10:30:00**
6	press **Up** or **Down** key to modify year, month, day, hour, minute, second , press **Set** key to confirm, press **Esc** key to cancel	End

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2.2.3 Manual Dose

This mode is usually used for manually dosing, priming, cleaning and emptying pipeline.

Step	Operation	Display
1	press **Set** key to enter *Settings* menu	**Settings** **1 Manual Dose**
2	press **Set** key to enter *Manual Dose*	**Manual Dose** **Pump1**
3	press **Up** or **Down** key to choose pump, hold **Set** key to run, release **Set** key to stop	End

2.2.4 Auto Dose

Auto Dose is used to add small equal volume doses periodically. It will automatically calculate the dosing volume required for each dosing period, based on the daily total volume and dosing times in specified time span (such as from 8:00 to 16:00, max 24 hours, maximum, 1 dose per hour). The design of anti-chemical interference allows user to set a delay time which prevents any two channels dosing at the same time.

The following table shows the relationship between total volume and dosing times per day. Actual total volume and dosing times are related to the time span user sets.

mL/Day	Times/Day	mL/Day	Times/Day
1	1 2	2	1 2 3 4
3	1 2 3 4 6	4-5	1 2 3 4 6 8
6-11	1 2 3 4 6 8 12	12-120	1 2 3 4 6 8 12 24
121-240	2 3 4 6 8 12 24	241-360	3 4 6 8 12 24
361-480	4 6 8 12 24	481-720	6 8 12 24
721-960	8 12 24	961-1440	12 24
1441-2880	24		

For example, for channel 1, user sets time span from 12:00 to 24:00, amount 120ml, dosing times 12, and these results in the addition of 10 ml every hour from 12:00.

The design feature of *Delay* between adjacent pumps is mainly to prevent chemical

interferences. Adding a variety of solutions may cause interference with each other, so the system utilizes the time delay after current pump starts before next pump starts. The default minimum delay is 4 minutes; user can change the delay time according to their requirements. The maximum delay minutes available to set is dependant upon the number of channels – if you divide 60 by the number of channels you have operating, this will determine your maximum delay setting.   For example with 3 channels max delay is 20 minutes, whereas with 15 channels maximum delay is 4 minutes.

Taking a three-channel pump as an example, assuming the start time of channel 1 is 8:00, the delay minutes is 4 minutes, the start time of channel 2 will be 8:04; assuming the delay minutes of channel 2 is 10 minutes, the start time of channel 3 is 8:14.

After finishing the settings of one day, user needs to set day cycle. User can dose in *Interval of days* or at specific *Days of week*. The default day cycle is activation any 1 day.

● If you selected *Interval of days* you have to set *Activation any … days*. If *1* was set the dosing will be daily, *2* means every 2 days, etc. Subsequent you have to set in how many days to start.

● If you selected *Days of week* the days at which the dosing should be proceeded can be assigned.

   When setting, 1 = Monday, 2 = Tuesday, 3 = Wednesday, 4 = Thursday, 5 = Friday, 6 = Saturday and 7 = Sunday. When setting, if the number is displayed, dosing for that day is enabled, is an X is set, dosing for that day is disabled.

Step	Operation	Display
1	press **Set** key to enter *Setting* menu	**Settings** 1 Manual Dose
2	press **Up** or **Down** key to choose *Program*	2 Program 3 Option
3	press **Set** key to enter	**Program** 1 Mode Auto

4	press **Set** key to enter **Mode**, press **Up** or **Down** key to choose **Auto Dose**	Auto Dose Custom Dose
5	press **Set** key to enter	Auto Dose Pump1
6	press **Up** or **Down** key to choose pump, press **Set** key to enter, press **Set** key to enter **TimeSpan**	Auto Dose 1 TimeSpan0-24
7	press **Up** or **Down** key to modify start hour and end hour, press **Esc** key to cancel	From 10:00 P1　　To 24:00
8	press **Set** key to enter **Amount**, press **Up** or **Down** key to modify total volume, press **Esc** key to cancel	Amount P1　　240mL
9	press **Set** key to enter **Times**, press **Up** or **Down** key to modify dosing times, press **Set** key to confirm, press **Esc** key to cancel	Times P1　　14
10	press **Up** or **Down** key to choose **Delay**	4 Delay:4mins 5 Cycle:any 2d
11	press **Set** key to enter, press **Up** or **Down** key to modify, press **Set** key to confirm, press **Esc** key to cancel	Delay P1　　4mins
12	press **Up** or **Down** key to choose **Cycle**	4 Delay:4mins 5 Cycle:any 2d
13	press **Set** key to enter, press **Up** or **Down** key to choose cycle mode, press **Set** key to confirm, press **Esc** key to cancel	Interval of days Days of week
14	if choose **Interval of days**, press **Up** or **Down** key to modify days, press **Set** key to	Activation any 2 days

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	confirm, press **Esc** key to cancel	
	if choose *Days of week*, press **Up** or **Down** key to enable or disable, press **Set** key to confirm, press **Esc** key to cancel	Days of week 12345XX
15	press **Esc** key to back, all pumps set over?	No, go to step 6
		Yes, end

2.2.5 Custom Dose

Custom Dose is used to add small doses or large doses at exact time periods. It supports additions at the same time (Up to 3 channels). The maximum add times for each channel in custom dose is 12 times per day. User can freely set the volume and start time of each dosing period individually. Cycle setting please refers to cycle setting in Auto Dose (see 2.2.6).

⚠️ *Custom Dose does not offer the time delay feature of Auto dose, so it is possible that additions can be set to occur at the same time, which may lead to chemical interference.*

★ *Notes: In the setting of custom dose, if the volume set is too small i.e. the running time of the pump is less than 1 second, the system will display the message "The xth volume too small", and you will need to increase the volume. If the setting leads to the result that the running time is longer than interval, i.e. current running is not finished but next scheduled running starts, the system will display the message "xth too late or xth too early", and you need to decrease current start time or increase next start time.*

Step	Operation	Display
1	press **Set** key to enter *Settings* menu	Settings 1 Manual Dose
2	press **Up** or **Down** key to choose *Program*	2 Program 3 Option
3	press **Set** key to enter	Program 1 Mode Auto

4	press **Set** key to enter *Mode,* press **Up** or **Down** key to choose *Custom Dose*	Auto Dose Custom Dose
5	press **Set** key to enter	Custom Dose Pump1
6	press **Up** or **Down** key to choose pump, press **Set** key to enter	1 Times:3 2 Cycle: W12345XX
7	press **Set** key to enter *Times* , press **Up** or **Down** key to modify, press **Set** key to confirm, press **Esc** key to cancel	Times P1 12
8	press **Up** or **Down** key to choose *Time x Set*	3 Time1 Set 4 Time2 Set
9	press **Set** key to enter, press **Set** key to enter *Vol.(ml)*	1 Vol (ml): 1000 2 Start : 10:30
10	press **Up** or **Down** key to modify, press **Set** key to confirm, press **Esc** key to cancel	Vol (ml) P1 1000
11	press **Up** or **Down** key to choose *Start*	1 Vol (ml): 1000 2 Start : 10:30
12	press **Set** key to enter, press **Up** or **Down** key to modify, press **Set** key to confirm, press **Esc** key to cancel	Start P1 10:30
13	All times set over?	No, Back to step 8 Yes, go to step 14
14	press **Up** or **Down** key to choose *Cycle*	1 Times:3 2 Cycle: W12345XX
15	press **Set** key to enter, press **Up** or **Down** key to choose cycle mode, press **Set** key	Interval of days Days of week

16	to confirm, press **Esc** key to cancel	
	If choose *Interval of days*, press **Up** or **Down** key to modify days, press **Set** key to confirm, press **Esc** key to cancel	**Activation any 2 days**
	If choose *Days of week,* press **Up** or **Down** key to enable or disable, press **Set** key to confirm, press **Esc** key to cancel	**Days of week 12345XX**
17	press **Esc** key to back, all pumps set over?	No, go to step 6
		Yes, end

2.2.6 Calibration

Calibration is the process of measuring and setting an accurate dosing volume. The calibration time is 1 minute. You should calibrate the pump before using, and periodically check. Failure to do this can result in inaccurate dosing. The dosing pump has been calibrated in the production process.

Preparations before calibration: Have ready a suitable water container. Put the inlet and outlet of the dosing tube into the container. Fill the tube with water by **Manual Dose** (see 2.2.3), and then have ready an appropriate measuring cylinder to measure the dosing volume. Put the inlet of tube into the water container, and put the outlet of tube into the empty measuring cylinder.

Step	Operation	Display
1	press **Set** key to enter *Settings* menu	**Settings** **1 Manual Dose**
2	press **Up** or **Down** key to choose *Option*	**2 Program** **3 Option**
3	press **Set** key to enter	**Option** **1 SN: 001001**
4	press **Up** or **Down** key to choose *Calibration*	**4 Calibration** **5 Language**

5	press **Set** key to enter	Calibration Pump1
6	press **Up** or **Down** key to choose the pump, press **Set** key to start calibration	Calibrating.. 15s
7	wait for calibration ends or press **Esc** to stop calibration	Calibrate Vol 0050ml
8	press **Up** or **Down** key to modify i.e. set to volume obtained in measuring cylinder, press **Set** key to confirm, press **Esc** key to cancel	End

★ ***Note The pump tube will inflate after a period of time, and the dosing rate will change, so you should periodically check the calibration. The supplied tube life is stated as up to 2000 hours of continuous running. Please change the tube before it reaches this figure.***

2.2.7 Set Channel

Note: This setting is only used for extending channel when connecting to KSP-F04 units. Set channel will erase user dosing settings, so user should make a note of the dosing settings before using it.

Step	Operation	Display
1	press **Set** key to enter *Settings* menu	Settings 1 Manual Dose
2	press **Up** or **Down** key to choose *Option*	2 Program 3 Option
3	press **Set** key to enter	Option 1 SN: 001001
4	press **Up** or **Down** key to choose *Channel*	2 Date and Time 3 Channel: 3

Step	Operation	Display
5	press **Set** key to enter	Channel 3
6	press **Up** or **Down** key to modify number of channels, press **Set** key to confirm, press **Esc** key to cancel	End

2.2.8 Set Language

The dosing pump supports English, Simplified Chinese and Traditional Chinese at present.

Step	Operation	Display
1	press **Set** key to enter **Settings** menu	Settings 1 Manual Dose
2	press **Up** or **Down** key to choose **Option**	2 Program 3 Option
3	press **Set** key to enter	Option 1 SN: 001001
4	press **Up** or **Down** key to choose **Language**	4 Calibration 5 Language
5	press **Set** key to enter	English CHS
6	press **Up** or **Down** key to choose language, press **Set** key to confirm, press **Esc** key to cancel	End

2.3 Option

In **Settings** menu, press **Up** or **Down** key to select **3 Option** to enter **Option** page. See follow figure.

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Option **1 SN: 001001**	**4 Calibration** **5 Language**
2 Date and Time **3 Channel: 3**	**6 Restore Default**

1 SN shows the serial number of the dose pump, each dosing pump has its own unique serial number.

Press **Up** or **Down** key to select *6 Restore Default* and press **Set** key to resets all settings to defaults.

★ *Note: Restore Default will erase user settings, so user should make a note of the dosing settings before using it. After restoring default, all pumps are set to Auto Dose with 0 times per day. All pumps are deactivated until user setting to make it work.*

3 Maintenance

The pumps don't need much maintenance. It is recommended to clean the inside of the pumps sometimes from dust or other contamination. **The pump must never be lubricated in any way!**

We have provided Pharmed BPT tube as the standard pump tube and it is suitable for use with most chemicals used with aquariums. If you require an application-specific liquid, please contact us to confirm chemical compatibility.

Appendixes

Appendix A Technical Specifications

Drive	DC motor	
Display	132x32 LCD	
Key	membrane key	
Accuracy	less than ±5%	
Power Requirements	Input	AC 100-240V 50-60Hz 1.0A max
	Output	DC 12V 1A
Power Rating	12W	
Dimensions	257x155x79 mm	
Ambient temperature	0 to 50	
Humidity Range	10%–90%, non-condensing	
Minimum volume dosed	0.5ml	

Appendix B Packing List

Master Unit: KSP-F03A / KSP-F04A

Item	Quantity	Description
Dosing pump unit	1 pcs	With 3(4) dosing pumps
AC/DC adapter	1 pcs	CE FCC UL CCC
Connecting pipe	3(4) meters	PVC transparent tube
Kamoer connector	3(4) pcs	Connect pump tube and PVC connecting pipe
Check valve	3(4) pcs	prevent possibility of backflow
User manual	1 pcs	English

Slave Unit: KSP-F04

Item	Quantity	Description
Slave unit	1 pcs	With 4 dosing pumps
Connecting pipe	4 meters	PVC transparent tube
Kamoer connector	4 pcs	Connect pump tube and PVC connecting pipe
Check valve	4 pcs	prevent possibility of backflow