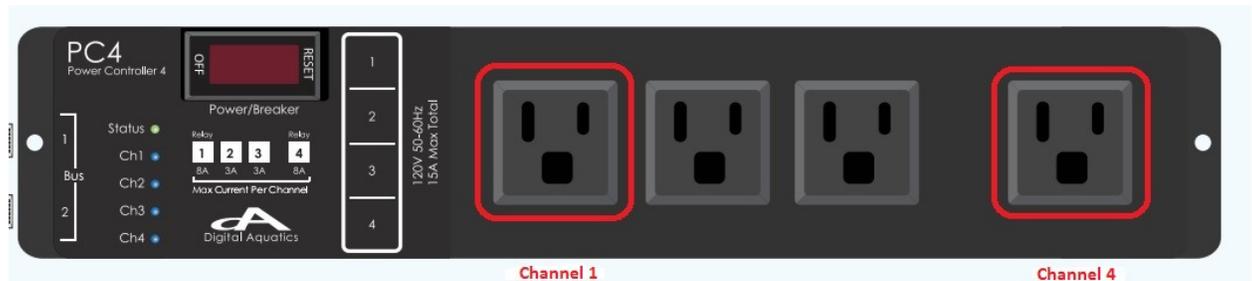


Digital Aquatics Reef Keeper Setup Guide (for Shlobster dosing pumps dosing 2 part)

Physical Connection:

The DA Reef Keeper – Power Controller 4 has two mechanical relays and two solid state relays. Channel #1 and Channel #4 on the powerbar are the mechanical relays, pictured in the red squares here:



Mechanical relays perform better when switching low power devices such as the Shlobster dosing pumps, so it's important to use them for best performance.

A word about 2 part dosing:

Before we proceed to programming, a word about what we are trying to accomplish. When using 2-part in most cases our goal is to add the same amount of part A as part B. Part A is typically Calcium, and Part B is typically Carbonate (alkalinity). The amount of each that a given aquarium needs will depend on many factors, and you must make a decision about how much you want to add to your specific aquarium before you continue. Each brand has a different recommendation of where to start printed on the bottle. Also, it must be decided how we want to dose these amounts to the aquarium. Generally, we add Alkalinity starting at the beginning of our photoperiod ("lights on") and Calcium starting at the end of our photoperiod. We dose in this way primarily to avoid an interaction between the two, and to avoid the creation of a very high pH condition resulting from adding carbonate alkalinity near the end of the photoperiod, a time when pH is generally highest in the aquarium. While in some cases we could dump in the entire allotment of part B right at the beginning of the photoperiod, and Part A right at the end, it is best to spread the additions out. Doing so is needed to ensure the life of the dosing pump, and it's better for the chemistry in the aquarium.

- Summary of relevant points:
 - Goal 1: We want to dose the same amount of A as B.
 - Goal 2: We need to figure out how much of A & B our system needs. (see bottle)
 - Goal 3: We want to dose A & B separately from each other.
 - Goal 4: We want to dose A & B in many small increments.

So, before we program the DA Reefkeeper we need to get our numbers in order (Goal 2). To do that, let's figure out how much we want to dose each day. For example, let's say the total dose we need is 50ml of Part A & B. Since we will be running the pump by time, we need to figure out how much they pump in a given time period.

Assuming the 1.1ml/min model, the easy way is to run the pump 1 minute for every ml desired. With that assumption made, we need to run our pump for 50 minutes. But, we want to split this up in to many small doses (say 10, as per goal 4). So, we will run the pump for 5 minutes, 10 times in a row.

Shlobster dosing pumps are available in two models: 1.1ml/min & 50ml/min. We recommend using the 1.1ml/min model for the purpose of dosing two part and other additives.

Note: This will put us within 10% of where we ultimately need to be, because we assumed 1 ml/min when in fact the pumps move 10% more than that at 1.1 ml/min. For further explanation, see the advanced section at the end of this guide.

Example:

Let's assume a photoperiod from 11AM to 7PM – 8 hours. We will dose B (carbonate alkalinity) during the photoperiod, and part A afterwards (calcium, as per Goal 3).

Starting at 11AM, we will dose 50ml of part B, spread out in 10 increments. We will put a break of 30 min between each dose. (Goal 4)

Starting at 7PM, we will dose 50ml of part A (same amount as part B as per Goal 1), spread out in 10 increments. We will put a break of 30 min between each dose.

Because we are dosing A & B at different times of the day, we will need to program two different timers in to the DA ReefKeeper.

All that is left to do now is to program the Reef Keeper to carry out our plan...

Programming:

The two settings that we will use to control the operation of the pumps are named "Timer" and "Multi-Timer" in the DA software. We will program the two timers we need, and then we will assign them via the "Multi-Timer" function to the outlets the pumps are connected to.

The ReefKeeper Lite has 16 timers that can be used. Timers have a number of settings that allow them to be used in powerful ways. Timers are used to run on/off cycles that can be linked to a variety of functions. They can be set to turn on for specific days of the week, have their durations be set to random and have added repeat cycles.

Step 1: Define the timers that we need the ReefKeeper to follow. As per our example, the settings would be as follows:

Select Timer 1

Configuring a Timer

This is an example of a timer that will start at 11am, then alternate between on for 5 min / off for 30 min, a total of 10 times.

- Navigate to: Menu > Timers > Timer 1

Setting	Value
DOW	SMTWTFS
Start Time	11:00:00
On Duration	00:05:00
Off Duration	00:30:00
Repeat Count	9
Oscillate	Off
Random	No

Days of Week – SMTWTFS

*we want to dose every day.

Start Time: Enter the beginning of the photoperiod. In our example, 11AM.

On Duration: Enter the “on” interval. In our example, 5 minutes.

Off Duration: Enter the “off” interval. In our example, 30 minutes.

Repeat Count: This is the number of times the timer is to alternate between on & off before stopping. Important: if set to zero, the timer will operate only once. If set to one, it will repeat one time, for a total of two operations etc. In our example, set this to 9. (as in, it will repeat 9 times after the first time it runs)

Oscillate: Off (If oscillate is turned on the timer will alternate between the on & off time indefinitely, ignoring the other settings – we definitely don’t want that for 2 part application!)

Random: No (If random is turned on the Reefkeeper will treat the On duration and Off duration as maximum times, and randomize a time equal to or below that – we definitely don’t want that.)

Save

Repeat this process for our second timer (Part A). Remember, it is not exactly the same timer because it will run when lights are out, which is a different time of the day:

Select Timer 2

Configuring a Timer

This is an example of a timer starting at 7pm, alternating on for 5 minutes / off for 30 minutes, repeating 10 times.

- Navigate to: Menu > Timers > Timer 2

Setting	Value
DOW	SMTWTFS
Start Time	19:00:00
On Duration	00:05:00
Off Duration	00:30:00
Repeat Count	9
Oscillate	Off
Random	No

Days of Week – SMTWTFS

Start Time: In our example, 7PM.

On Duration: In our example, 5 minutes.

Off Duration: In our example, 30 minutes.

Repeat Count: In our example, 9.

Oscillate: Off

Random: No

Save

Step 2: Assign the Multi-Timers to the channels (the only way to assign our timers to the channels the pumps are attached to).

As a feature, the “Multi-Timer” function allows you to assign one or two timers to a given channel. Don’t get confused though, for our purposes we will be using the Multi-Timer

function to assign only one timer per channel. Timer 1 to our Part B pump (on channel #1) and timer 2 to our Part A pump (on channel #4).

Navigate to Channel #1 to begin the programming of the Multi-Timer:

Menu >> Modules >> PC4 >> CH1 >> Function >> Multi-Timer

Timer A with 00 flashes. – Enter the timer # you previously programmed that you would like CH1 to follow. (Timer 1 in our example)

Timer B with 00 flashes – skip this.

In Standby – set to ignore

Standby Delay – leave at 00:00:00

Default State – set to off.

Save.

Now we want to set our second pump to our second timer:

Menu >> Modules >> PC4 >> CH4 >> Function >> Multi-Timer

Timer A with 00 flashes. – Enter the timer # you previously programmed that you would like CH4 to follow. (Timer 2 in our example)

Timer B with 00 flashes – skip this.

In Standby – set to ignore

Standby Delay – leave at 00:00:00

Default State – set to off.

Save.

Done! The only thing left to do now is to check in on the pumps to ensure they are running properly, and to keep an eye on your water parameters to see if they are increasing or decreasing. If you need more, you simply go back and edit Timer 1 and Timer 2. In general, we recommend making adjustments of only 5% at a time. *Keep in mind: a) the timer repeats any changes you make 10 times, so for example, adding 5 seconds of extra time to the timer will add 50 seconds total dosing time each day. b) adding 5% to the timer will increase the total dose for that channel by 5% as well.*

Advanced Section

Many people will want to dose as accurately as possible and for that a couple of facts must be realized:

- A) In order to determine the exact amount of fluid the pumps actually move per unit time, it is necessary to time how long it takes the pumps to move a given amount of fluid – *after being mounted and intake/outtake lines are run*. We find the best way to do this is to get a couple of old test vials. Use a test syringe to add 5ml to one of them, and put the output of the pump in the second one. Run the pump until the level of fluid in the second vial is the same as the first, and keep track of the time it takes. If it took 4:35 minutes to pump 5ml, the pump actually moves 1 ml every 55 seconds. How did we figure that out?

4:35 is equivalent to 275 seconds.

$275 \text{ seconds} / 5 \text{ ml} = 55 \text{ seconds per ml}$

- B) Many people will try to determine the length of time they need to run the pump by dividing the amount they want to dose by the pumps specification of 1.1 ml/min. If that is done, remember that the result of that is not in minutes and seconds!

For example:

$75 \text{ ml divided by } 1.1 \text{ ml/min} = 68.18.$

68.18 is not 68 minutes and 18 seconds. It is 68 minutes and 10.8 seconds.