ProfiLux 4

Programming Guide

Valid from firmware -version 7.02

As of 2021-11-22

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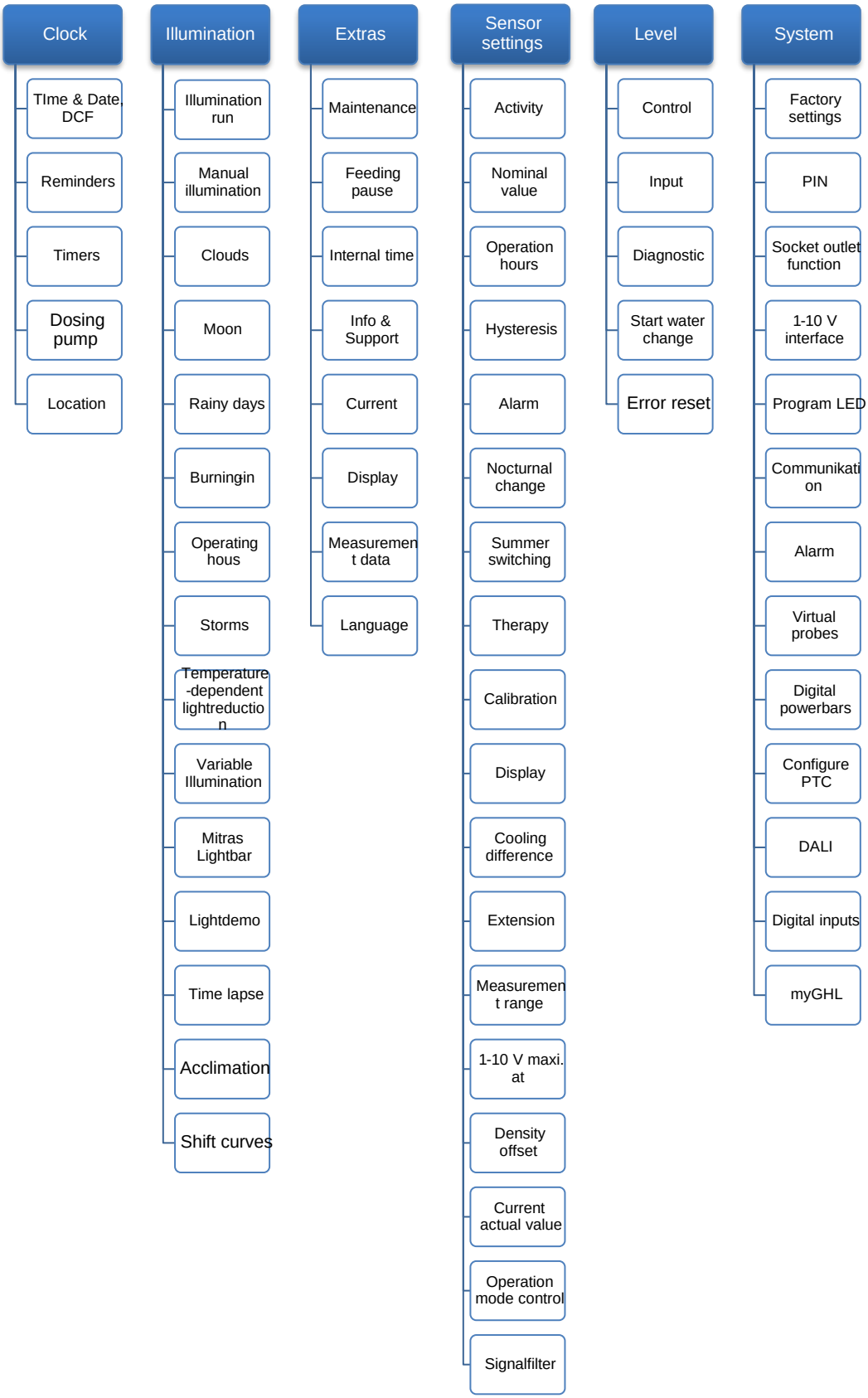
Below is the menu structure of the *ProfiLux 4*. These are the options available to you when you operate the *P4* through the device's *Control Pad*. (This structure is also similar to the layout seen in the PC-Software, *GHL Control Center (GCC)*.


Clock
TIme & Date, DCF
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Measuremen t range
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System
Factory settings
PIN
Socket outlet function
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Program LED
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myGHL

Preface

This manual is a supplement to the *ProfiLux® 4* Instruction manual. This Programming Guide is based on these operating instructions and cannot replace them in any circumstances.

Get the Most out of your GHL Product

GHL products are well-equipped with simple and intuitive features. In order to get the most out of our products, we recommend you read our Programming Guide and Instruction Manual together. Doing so will provide you with the most profound details for using our product. These documents can be downloaded from (*Support->Downloads*). Visit our homepage at www.aquariumcomputer.com, our Support forum or visit us on Facebook to become a GHL-Product expert and fully utilize the full range of functions offered from your device!

About this Programming Guide

The information provided by this guide is primarily based on setup and configuration via the *ProfiLux 4* display. When you configure the *ProfiLux 4* via *GHL Control Center*, setup will slightly differ from the descriptions shown in this guide. Individual settings are however, identically displayed on the device and GHL Control Center.

Please read these instructions carefully before operating the *ProfiLux 4*.

GHL products are built with maximum security and safety in mind. However, product safety for this device can only be guaranteed if you follow these guidelines.

Anyone who uses this device must become familiar with the following safety instructions and the operation of the device.

Failure to follow these instructions will void any warranty claims.

In this manual, the following symbols are used:

TIP

General note, tip or advice.

WARNING

Important note for operation, to avoid damage to the equipment, and for your safety .

DANGER

Warning that non-compliance can result in injury or damage to the device .

Safety Instructions

WARNING

This equipment must not be used:

- By small children and vulnerable persons with limited physical, sensory or mental capabilities.
- By people who are unfamiliar with the functions of this product.

Intended Use

The *ProfiLux 4* is exclusively for use in the domestic area . Only GHL accessories may be connected directly to the *ProfiLux 4* controller .

Make sure to keep the device away from spla shing water, moisture or other liquids.

This controller is for monitoring and contro lling aquarium function s and is exclusively for indoor usage. *ProfiLux 4* must be kept dry at all times.

For your own safety, please read the hazard prevention and safety instructions in the chapters that follow . These precautionary tips are also found in the *ProfiLux 4* Instruction Manual .

1 Functionality and Operating Concept

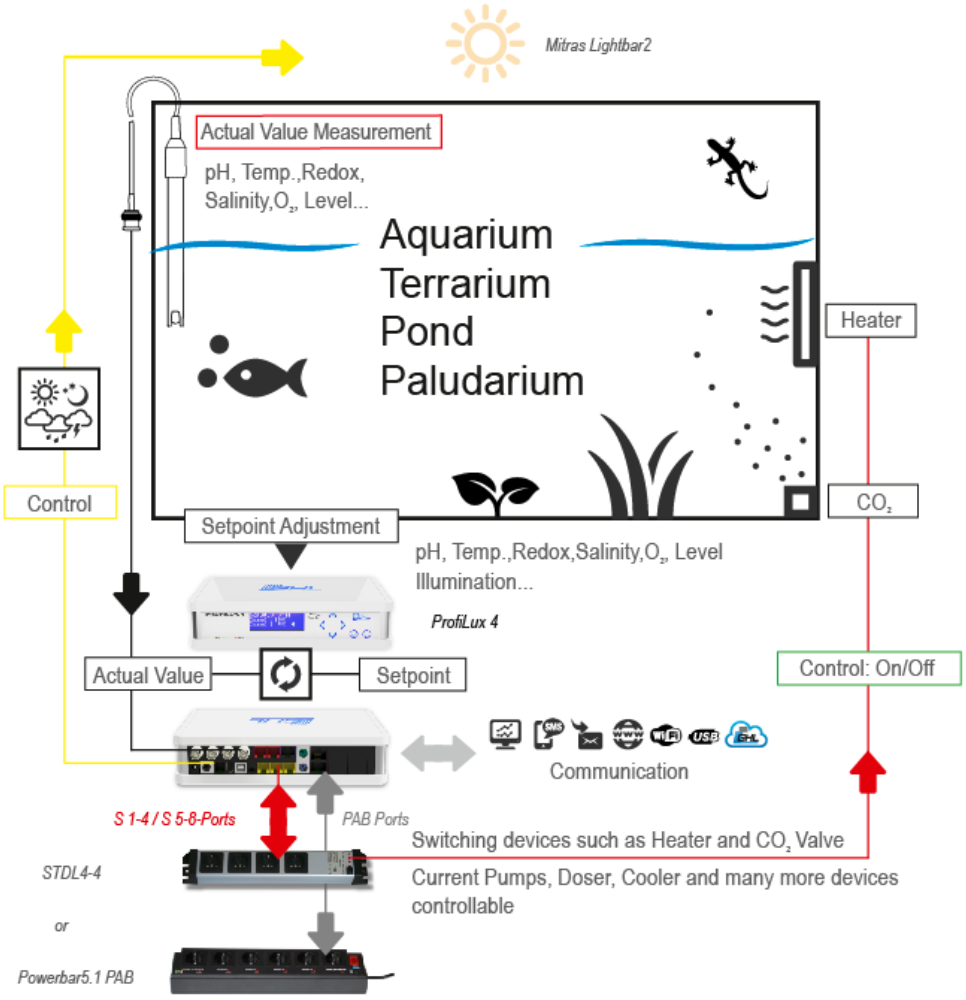
1.1 Functionality of the P4

The following graphic gives you a rough overview of the functionality of the *ProfiLux 4 Aquarium Controller* . It also shows the interaction of the different system components .

DANGER

Please note the following:

- The *ProfiLux 4 Controller* and its components (ProfiLux 4 System) perform measurement, control, and control tasks based on your settings.
- There is no plausibility check of the settings you have made .
- The controller's factory settings must be adapted to the requirements of your aqu arium .
- You are solely responsible for the plausibility of your computer settings and its system components .
- The *ProfiLux 4 Controller* cannot replace the lack of expertise required for the maintenance and maintenance of an aquarium or terrarium .
- Never leave your aquarium unsupervised for an extended amount of time .
- The *ProfiLux System*can help you with a large number of tasks and display error conditions - but it cannot replace regular personal supervision and control .
- The maximum period of time without personal supervision depends on how long your aquarium / terrarium can survive even in the event of a fault without significant damage .
- Always remember that technologies can fail and therefore, malfunctions can never be ruled out!
  Power failures, incorrect settings, damage (For example, by water or overvoltage) or simply an unexpected operating situation can lead to fatal damage.
- The manufacturer disclaims any liability for (consequential) damages or losses which might arise in connection with the use of the *ProfiLux System*as legally permissible .



The diagram shows an example of thefunctionality of the ProfiLux System.

Sensors that are used for measuring various values such as Temperature, humidity, etc., are connected to either the *ProfiLux 4* or to corresponding *ProfiLux Expansion Cards*. Each of these sensors are assigned to a control circuit where parameters such as Set -poin t, hysteresis, nocturnal change, etc., can be set.

With the desired values and settings set, each sensor can then be assigned to control a powerbar socket. For example, assigning a temperature sensor to a powerbar socket will result in that socket switch ing on/off based on the set probe conditions .

1.2 Operating Concept

The operating concept of the ProfiLux computer strictly differs between two sets of settings :

- Settings of *functions* such as e.g. pH set point , illumination run of a luminaire or behavior of pumps
- Settings of *hardware* such as the behavior of a switch socket (if this switching socket is assigned to a lighting, a timer or a temperature s ensor) or the behavior of a 1 -10 V interface (this interface should be assigned to a lighting or a pump)

This concept is extremely flexible because a function can be changed largely independently of the hardware assigned to it and vice versa the hardware can be changed largely independently of the function .

This concept allows you, e.g. to select a di fferent socket for switching your tubular heater, while the corresponding temperature settings can remain unchanged .

1.3 Examples of Settings

For a better understanding, take a look at some setting examples that are commonly used.

TIP

When creating a command, i t is useful to set the *function* first .

1.3.1 How to setup Temperature control

1. Setting the function : Set the desired set-point temperature, see also *Sensor Settings-> Nominal value*.
2. Setting the hardware : Set the switch socket outlet (socket) to switch the heating element, the substrate heater and the cooling system (if present). See also *System-> Socketoutlet function*.

1.3.2 How to set the Illumination ?

1. Setting the function : Set the illumination run as needed, see also *Illumination -> Illumination run .*
2. Setting the hardware : Set which switch s ocket outlet (for non -dimmable luminaires), also see under *System-> Socket outlet function*, or which 1 - 10 V interface (for dimmable luminaires), also see under *System-> 1- 10 V interface*, or whether the Mitras Lightbar interface (when controlling a Mitra s Lightbar) shall respond to this illumination run .

1.3.3 How to set the Level control?

1. Setting the function: Set the operating mode and the behavior of the level sensor, also see under *Level -> Control.*
2. Setting the hardware: Set which switch socket outlet (socket) is to be switched from the level control, see also under *System -> Socket outlet function*.

1.3.4 How to set the Current pump control?

1. Setting the function: Set the pump groups and the current pumps, see also under *Extras -> Current*.
2. Setting the hardware: Set which switch socket outlet (for non-speed-variable pumps), see also *System -> Socket outlet function*, or which 1-10 V interface (for speed-variable pumps), and see also under System -> *1-10 V Interface* should react to the Pump.

1.3.5 How to set Dosing or Timer activities?

1. Setting the function: First set the desired timer or dosing pump (note: only *GHL Dosing Pump Unit* 1st generation, *GHL Doser 2* is controlled via PAB!), see also under *Clock -> Timers* or under *Clock -> Dosing pump*.
2. Setting the hardware: Set which switch socket outlet (socket) is to be controlled by this timer or dosing pump, see also under *System -> Socket outlet function*.

1.4 Features / Resources

The functional range of your *ProfiLux 4* and, if applicable, your *ProfiLux System* is determined by the available *Expansion Cards*, sensors, PAB devices and LED lights.
The total of all available inputs and outputs in the ProfiLux system is referred to as resources.

1.5 Numbering and Display of Resources

All resources of the system are serially numbered by the *ProfiLux Controller* and this is always carried out the same way.

The resources of the *ProfiLux* are numbered firstly, followed by the respective *PAB* devices in order of their assignment such as *Power Bars*, *Expansion Boxes*, etc.

The numbering always starts with the internal resources of the *ProfiLux*, followed by the resources of the module cards in the expansion slots according to their order in the slots of the *ProfiLux*.
Then the resources of the first found and assigned PAB device will follow, after that the resources of the second PAB device, etc.

2 Clock

Use the clock feature to make changes to all time -related settings . *ProfiLux 4* uses the astronomical hour count which divides the day into 24 h .

Two clocks are running the *ProfiLux 4*.

The first clock is a so-called real -time clock (RTC). It shows the actual ("our") time. This is also the time normally seen on the display. In the event of a power failure, this clock runs on a battery -backup .

The second clock runs in the device (i nternal). This internal clock controls the automatic processes such as *dimming*, *nocturnal decrease*, *timers*, etc.

By default, both clocks run in sync with each other , except when the actual time (e.g., automatic or manual winter time / summer time) is adjusted. Then the internal clock is not adjusted immediately, but wit hin the set days. For example, a setting of 10 days results in 60:10 = 6 minutes daily .

2.1 Time & Date, DCF

First you will be asked if you want to use *DCF* (external radio clock receiver, av ailable as an accessory).

If you confirm with *Yes*, the time received by the radio receiver is used. If the reception is sufficient, the setting of the date and time is superfluous, they are updated automatically .

If you are not using *DCF*, you can now opti mize the clock accuracy by entering a *correction per day* (from -59 s to 59 s). At 0 s (default setting) the clock runs without correction, otherwise the adjusted second number is added (or subtracted) once per day .

Then you have the option to determine whe ther the ProfiLux clock should change between the normal time (CET) and the summer time (CEST) .

If this shall not be the case, then in your aquarium only the normal time will be valid (i.e. in summer the clock will go wrong by one hour). This makes possibly sense if you would like to avoid the clock change for your fishes and plants .

If you want a changeover, you can still adjust how many days the changeover is to be made .

If you use DCF, this smooth time adaptation starts beginning from the time of the CET-CEST-change. If you don't use DCF, then the time can

In this case also, the internal clock will be adjusted slowly within the set days. With this, you are given the opportunity to spread this one hour over several days and you will have a smooth time change.

After this you can then set the date and time manually .

When you save the time settings, you will be asked if you want to update the internal time (see above).

If you confirm with *Yes*, the internal time is im mediately set to the new time, otherwise the internal time will be adjusted smoothly as explained above.

For initial time setting you should confirm with *Yes* If you want to change clock due to summer time , confirm with *No*.

Note

The DCF signal for the radio clock is not always present.
Therefore it could happen that sometimes no reception is possible.
The internal clock continues to run and is synchronized again at the next reception (possible minor deviations are corrected). Therefore DCF can also be used with only occasional reception .

2.2 Reminders

ProfiLux 4 can remind you of activities to be performed .

After a certain adjustable time (in days) , the reminder text is displayed on the ProfiLux 4 , alternating with the standard display.

The reminder is displayed until you mark it as done. If you have set a repeated reminder, the reminder will be displayed again after the new expiration time.

For example, a reminder can be set to be displayed every month to indicate a filter must be repla ced.

A single and repeating reminder can be set to display the desired text when requested.

After setting the reminder(s) , *ProfiLux 4* will display as a confirmation when the next reminder will come about .

You can enter up to 16 reminder texts.

- Select the reminder (1 - 16) first.
- Select whether the reminder should be enabled -> RETURN
- If this reminder is currently up-to-date, you can mark it as done, it will not be displayed any further.
- If you have activated this reminder with *Yes*, you can set whether you want to be reminded repeatedly.
- You can then enter how many days you want to be reminded.
- Then enter the reminder text.
  Press the top arrow button on the control panel. The letter *A* appears. Press again to display the letter *B*, press again to display *C*, and so on. The letters appear according to their order in the alphabet. If you want to go back a letter (for example from *C* to *B*), press the lower arrow key.
  Press the left and right arrow keys to move the cursor to the right and left, and enter additional characters or spaces.
  When the text is finished, press RETURN and press *YES* Safe with -> RETURN

After saving, *ProfiLux 4* shows a confirmation when the next reminder is pending.

2.3 Timers

ProfiLux 4 has 32 freely programmable timers whose function you can adjust as described below. The switch socket outlets (hardware), which are to react to the switching operations, can be assigned as described under *System -> Socket outlet function*.

NOTE

You can use a timer for dosing purposes, but for more sophisticated functions, we recommend using the dosing pump control, see *Clock ->Dosing pump*.

After selecting the timer that you want to program, the switching mode (function) needs to be set. The following options can be selected:

Normal

This mode is used to program longer switching times (accuracy 1 minute).

The switching time (Duration) is set by entering the *switch-on time* and the *switch-off time*.

Short time

With this setting, short switching times (1s to 300s, accuracy 1 s) can be realized. The switching time is set by entering the *switch-on time* and *duration*.

Automatic dosing

As many *Dosings per day* will take place as it has been set before under *Switching cycles per day*. The time points of the dosings are calculated auto matically (they are spread evenly throughout the day). The switching duration is calculated automatically on the basis of the Flow rate of the pump and the Rate per dosing (see below) .

Manual dosing

As many *Dosings per day* will take place as it has been se t before under *Switching cycles per day*. The time points of the dosings can be defined explicitly afterwards. The switching duration is calculated automatically on the basis of the *Flow rate of the pump* and the *Rate per dosing* (see below).

Event start

The timer initiates an operation such as e.g. *A water change*; see also under *->Level* Enter the start time only .

Cyclic

This mode allows very special switching sequences. Please note that this mode can only be selected and set via our PC program *GCC (GHL Control Center)!*

In this mode, the timer is switched on and off alternately, always after a certain waiting time has elap sed.

The wait time after which is switched on is determined by random generator within the limits of the *minimum waiting time* and *maximum waiting time* . If the waiting time should always be the same, enter the same value for both times . The waiting time aft er which is switched off is also determined by a *minimum waiting time* and a *maximum waiting time* .

One cycle consists of 1 to 4 pairs of switch -on and switch -off waiting times. After the last switch -off of the cycle, the cycle starts from the beginning. All waiting times are adjustable in the range from 1 s to 65535 s .

Example for a cycle with 2 switch -ons and switch -offs:

	Min. wait time	Max. wait time	Result
Switch on 1	10s	20s	After 10 to 20 seconds is switched on
Switch off 1	60s	60s	After 60 seconds is switched off
Switch on 2	300s	1000s	After 300 to 1000 seconds is switched on
Switch off 2	1s	30s	After 1 to 30 seconds is switched off
Cycle starts from the beginning			

After that, you can enter the number of *Switching cycles per day* (0 up to 8; 0 means that this timer is not active)

After setting the switching cycles, enter the *Day mode*:

Days of week

Here you can set the weekdays to be switched. A marked box means "Switching active on this weekday", an empty box means "inactive ".

Interval of days

Here, the number of days after which the switching cycle is to be repeated is set, 1 day means a daily switching cycle. After that you can set in how many days the switching shall be started.

If you have selected a dosing switching mode, you must also enter the *flow rate in ml / minute*.
Here, the actual pump power is needed. Based on this information, *ProfiLux 4* calculates the switch-on times of the dosing pump.
Changing this setting does not affect the pump performance - this is predefined by the pump mechanism !

For an automatic dosing, you must also adjust the *Rate per dosing*

A timer can activate a feeding pause, see at *Extras -> Feeding pause*

Instructions for Dosing

The dosing amount per day corresponds to the Dosings/day and Rate/Dose. For example, 4 doses per day with 10ml per dose will result in 40ml being dosed per day.

Alternatively, you can also use a timer or a controller (e.g. pH-value or conductivity) to control a dosing pump.

Due to tolerances, a pump's flow rate in the data sheet can deviate from the reality. To achieve the highest possible level of dosing accuracy, we recommend you measure the actual flow rate of a pump (let pump run for 1 minute and measure the quantity of fluid pumped in this time) and set the result of this measurement in *Flow rate*.

2.4 Dosing Pump

ProfiLux 4 has 16 freely programmable dosing pump controllers, whose *function* you can adjust as described below. The switching outputs *(hardware)* which shall react to the switching processes can be assigned as described under *System -> Socket outlet function*.

Select the dosing pump you want to program and then set the *Switching mode*. Choose from the following options:

1. *Automatic dosing*: This mode is suitable if you want to dose a certain amount of the same quantity evenly over a certain time. A maximum of 150 doses per day are possible
2. *Manual dosing*: This mode is suitable if you want to dose a certain amount at fixed times during the day. For example, at 8:00 o'clock, dose 35 ml of XY. A maximum of 8 doses per day are possible.

Furthermore, you can determine whether you want to dose on specific weekdays or daily intervals.

Day modes:

Days of week
Here, you can set the weekdays at which the switching should be carried out. Use the *right arrow key* to select the checkboxes, to move on downwards press *arrow down*. A marked box means "*Switching on this day of week active*", an empty box means "*inactive*". Confirm the selection with ->RETURN.

Interval of days
Here, you can set the number of days by which the switching cycle/ number of dosages are to be repeated. 1 day means daily dosage. The maximum daily interval is 200 days. Be sure to set the number of days until the switching/ dosing shall start.

After that, enter the *Flowrate of the Pump* in ml/ minute. Based on this information, *ProfiLux 4* calculates the switch-on times of the dosing pump.
Changing this setting does not affect the pump performance - this is predefined by the pump mechanism!

Automatic dosing

- Set the number of doses per day. Use the *arrow keys* on the control panel to move the cursor to the right or left. Enter numbers using the upper arrow key (counts up). Use

the lower arrow key to count back . Once you have entered the desired number, confirm with ->RETURN.Up to 150 dosages are possible, 0 = No dosage.

- ¶ Decide on which weekdays the dosages should take place or select the daily interval if a dosing is to take place every day or every 2 days ... etc.
- ¶ Enter the *Flow rate* of the dosing pump ->RETURN
- ¶ Enter the dosing amount *Rate per dosing*->RETURN

The dosing time points are calculated automatically (they are distributed evenly throughout the day). The duration of the dosage is calculated automatically by means of the *Flow rate* of the pump and the *Rate per dosing* (See below).

Manual dosing

- ¶ Set the number of doses per day. A maximum of 8 dosings per day are possible ->RETURN
- ¶ Decide on which *Days of week* the dosages should take place or select the *Interval of days* if a dosing is to take place every day or every 2 days ... etc. The maximum daily interval is 200 days (see below) .
- ¶ Enter the flow rate of the dosing pump ->RETURN
- ¶ Specify the time at which the first switching / dosing should take place
- ¶ Enter the dosing amount *Rate per dosing*->RETURN
- ¶ Proceed with the further desired switching operations as with switching operation 1

There are as many switching cycles per day as was set at dosages per day before . The time points of the dosage can be defined explicitly in the following . The switching time is calculated automatically by means of the *Flow rate* of the pump and the *Rate per dosing* (see below).

If you have selected *Automatic dosing*, the first dosing of the day is usually made at 0:00. With *Always dose at* (this time) you have the possibility to determine the time of the first dosing. All other doses are distributed throughout the day

The following features are only available via *GHL Control Center*, *Web Interface*, *App* and cloud service *myGHL*:

The dosing pump control has a level monitoring. When the pump is active *ProfiLux 4* calculates the new filling level.

For this purpose, the *Capacity of the container* as well as the *minimum amount* must be entered.

If *Alarm when below* is activated *ProfiLux 4* outputs an alarm. Before an alarm is issued *ProfiLux 4* will give a warning.

If the container is refilled, the replenished quantity can be entered, a possible alarm will be reset if there is sufficient refilling.

Instructions for Dosing

The dosing amount per day corresponds to the Dosings/day and Rate/Dose. For example, 4 doses per day with 10 ml per dose will result in 40ml being dosed per day.

Alternatively, you can also use a timer or a controller (e.g. pH-value or conductivity) to control a dosing pump.

Due to tolerances, a pump's flow rate stated in the data sheet can deviate from the reality. To achieve the highest possible level of dosing accuracy, we recommend you measure the actual flow rate of a pump (let pump run for 1 minute and measure the quantity of fluid pumped in this time) and set the result of this measurement in *Flow rate*.

2.5 Location

The coordinates (Longitude and Latitude) of your location can be entered here. This information will be used for further simulations in the future.

From the factory, this is 49.4 ° N and 7.8 ° E - the coordinates of Kaiserslautern in Germany - the production location of your *ProfiLux 4.*

3 Illumination

This menu contains all lighting-related settings and functions.

ProfiLux 4 can control 32 dimmable or non-dimmable lamps independently. Lighting units can be switched via our powerbars. Dimmable lighting units can be also controlled via the 1-10V interfaces. The dimmable LED Mitras Lightbar is controlled via its own digital interface.

Dimmable tubular lightbars are controlled by L1 (or L3, L5, etc.) as standard. It controls both tubes of that lightbar.

You also have the option to simultaneously dim tubular lightbars.

You can set the illumination run for each lighting individually. This makes it possible to achieve effects like sunrise or moonlight.

TIP

If required, you can retrofit additional 1-10 V interfaces with *ProfiLux Expansion Cards*, *PLM-4L* or *PLM 2L4S*.

3.1 Illumination Run

Please select which lighting is to be edited (*Illumination to edit?*). After selecting a lighting, you can set the type of the luminaire, *dimmable* and *non-dimmable*.

It is also necessary to specify whether the automatic is to be switched on (*Automatic on?*). If this is not the case, this lighting is in manual mode. Select whether you want a temperature-dependent light reduction.

Enter the number of *dim-points* (for dimmable luminaires) or the *switch-times* (for non-dimmable luminaires) for which you want to adjust the brightness (up to 24)

If you have selected a *dimmable luminaire*, please set the following for each *dim-point*:

Time ↳At this time, the luminaire shall have the brightness to be set subsequently

Light intensity (0% - 100%) ↳Brightness of the light at this time

NOTE

The brightness curve between the individual dim-points are calculated automatically.

If you have selected a non-dimmable luminaire, please set the following for each dimming time:

Switch on ↳The light is switched on at this time

Switch off ↳The light is switched off at this time

Then select which simulations should affect this lighting process and save the settings with *Yes*->RETURN.

TIP

To create/edit your Illumination run, we recommend using *GCC-Light Composer*. Light Composer provides the quickest solution for creating your own lighting schedule.

The Light Composer calculates the individual lighting channels by means of the desired brightness and color sequence over the day.

You can download that free of charge software on our homepage (*Support->Downloads*) www.aquariumcomputer.com .

The following functions can only be set via *GCC*

3.2 Copy an Illumination Run using GCC

With this function, you can spare yourself the time of having to enter the same illumination run settings again and again, especially if several illumination channels shall do the same.

If you activate *Copy illumination run*, you still have to enter the *illumination channel* from which the run shall be copied. The entry of an illumination run on which you are just working is then not necessary anymore (resp. also not possible anymore). This illumination channel follows exactly the illumination run of the channel from which you would like to copy, potentially time-shifted when you use the following functions.

3.3 Time shift with GGC

This function is used to allow an illumination channel to follow its set course or darkening during clouds in a time-delayed manner. The time shift can be set separately for the illumination run and for clouds. The time shift also has an effect when the illumination run has been copied.

3.3.1 Time shift during clouds

With this function, sliding clouds that pull over several luminaires are possible.

This time, adjustable from 0 s to 3.1 s in steps of 0.1 s, determines with which delay the illumination channel should be darkened during a cloud. The brightening at the end of a cloud is delayed by the same time. If you have several dimmable luminaires that can be separately controlled, you can use this function to create even more realistic clouds.

Example with 3 dimmable lights:

Illumination channel	Time shift during clouds	Effect
1	0s	Light is darkened immediately in case of a cloud
2	0.5s	Light is darkened after a delay of 0.5 s in case of a cloud

3	1s	Light is darkened after a delay of 1 s in case of a cloud

The following graphic illustrates the effect :

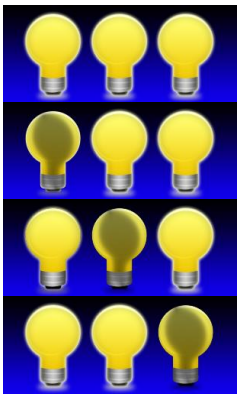
Before the cloud

Cloud starts

Cloud is fully there

Cloud fades away

After the cloud



3.3.2 Time shift for Illumination Run

This time indicates the delay with which this lighting channel should follow its (or copied) lighting curve (adjustable between 0s and 1 h). With this it is possible to distribute it switching on (or dimming up) and switching off (or dimming down) to several luminaires.

If you want your luminaires to have the same illumination run, only a little bit time-delayed, the following procedure is recommended .

Example with 3 dimmable lights :

Illumination channel	Time shift for illumination run	Illumination run	Effect
1	0	Channel has its own illumination run	Follows directly illumination run 1
2	10 Minutes	Copy of 1	Follows illumination run 1 delayed by 10 minutes
3	20 Minutes	Copy of 1	Follows illumination run 1 delayed by 10 minutes

The following graphic illustrates the functional principle :

Before sunrise