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)*.


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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 our website's download area (*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 splashing water, moisture or other liquids.

This controller is for monitoring and controlling aquarium functions 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

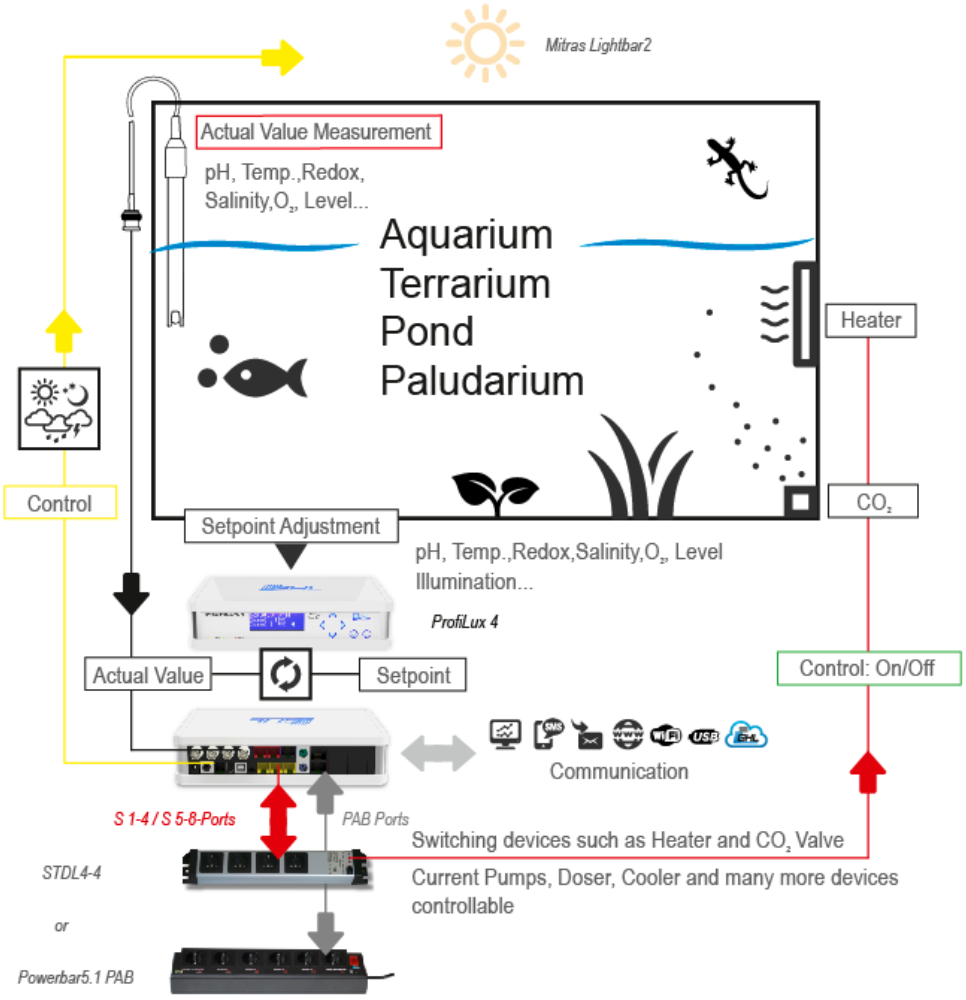
1.1 Functionality of the P4

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 aquarium.
- 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 the functionality 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-point, 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 switching 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 sensor) 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 different 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, it 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-> Socket outlet 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 socket 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 Mitras 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 (internal). 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 within 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, available 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 optimize 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 whether 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 be changed manually by one hour.

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 immediately 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 replaced.

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 1s) 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 automatically (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 set 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 elapsed.

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 after 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 on 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 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 on 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:

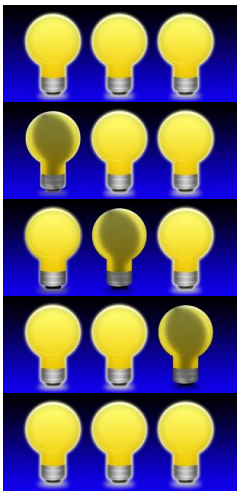
Before the cloud

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 1h). With this function, it's possible to distribute 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

Sunrise starts

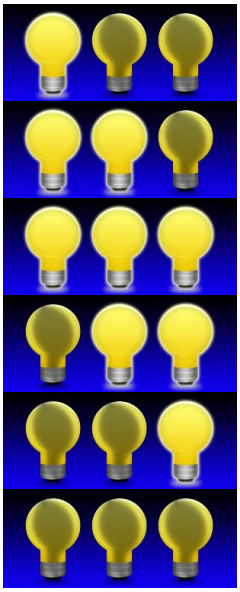
Sunrise is advanced

Sunrise is complete

Sunset starts

Sunset is advanced

The sun has completely set



3.4 Manual Illumination

This menu is mainly used for testing and diagnostic purposes. With the arrow keys left right, you can select the lighting channel whose brightness you want to adjust, 4 channels are displayed simultaneously. Use the up and down arrows to make the channel brighter or darker.

The symbols displayed to the left and right of the selected channel have the following meanings:

Symbol	Meaning
↑	Dimmable only upwards (at 0%)
↓	Dimmable only downwards (at 100%)
↑↓	Dimmable in both directions

Save your settings and exit the manual brightness setting by selecting *Esc*.

3.5 Clouds

ProfiLux 4 can simulate passing clouds by using a random generator. When a cloud passes, all of the involved luminaires temporarily become darker as the simulation goes through its effect.

The *maximal waiting time* (0s - 100s) determines how long the time intervals between two clouds should be (with 0s the cloud simulation is switched off). The random number generator waits between 1s and the *maximal waiting time* until a new cloud is generated.

Furthermore, the *minimal and maximal cloud duration* as well as the *maximal darkening* (10% - 95%) are to be set. The random generator generates new clouds, taking these values into account.

The cloud simulation also works with simultaneous lunar phase simulations and during a dimming process.

Note that the cloud simulation must be active for the desired illumination channels, see also -> *Illumination run*.

3.6 Moon

ProfiLux 4 simulates the moon phases depending on the date.

In reality, the lunar cycle is a very complex matter:

- Thus the distances vary from new moon to new moon. On average it is about 29.5 days.
- Likewise, the moonrise time as well as the distance to the earth differ respectively.
- It is not the fact that at half-moon the moon has 50% of its brightness. We consider on average about 25%.

Our lunar phase simulation does not aim to replicate these complex sequences in every detail. For us, it was important to produce a repeating moonlight sequence which would illuminate the aquarium somewhat differently day-to-day. We've implemented such features to provide a certain rhythm which would largely be in harmony with nature.

Lunar phases created by the *ProfiLux 4* are based on the calendar date so that full moon and new moon phases always correspond to the actual (real) lunar phase with a deviation of one day or less.

You can set the time when the lunar phase simulation is active. In order for the lunar phase simulation to function, it must first be activated in the desired lighting channels.

With the lunar phase simulation enabled on the selected lighting channels, the following happens within the set time: The brightness (given by the set illumination run) is multiplied by the calculated moon phase brightness. The illumination run is therefore still taken into account.
The result is for example, at half-moon (= 50% lunar phase, 25% lunar brightness) and a

brightness of 30% (given by the illumination run). A luminaire brightness of 25% * 30% = 7.5%.

Illumination channels, without activated moon phase are not affected and follow their lighting curves as normal.

Outside of the set simulation time, no illumination is influenced by the lunar phase simulation.

With this method, it is possible to normally operate a lighting channel during the day (outside the set simulation time/no influence of the lunar phase) and in the evening with the moon phase (within the set simulation time).

The start and end-time of the lunar phase simulation should be created so that the night illumination interval of the assigning lighting is included.

If the illumination of a luminaire is for example, programmed to illuminate as moonlight from 19:00 (7:00pm) to 7:00 (7:00am), moon phase simulations should also be set from 19:00 (7:00pm) to 7:00 (7:00am).

The lunar phase simulation can also be tied-in with other simulations.

3.7 Rainy Days

ProfiLux 4 allows the programming of "Rainy days". On a rainy day, the lighting intensity is reduced by an adjustable value.

With this feature, you have the option to set the weekdays for which *Rainy Days* should be enabled. Once the days have been selected, the darkening of the day has to be set (0% - 100%).

The Rainy days simulation also takes other simulations into account.

3.8 Burning-in

Fluorescent tubes must be burned in before they can be used for dimming. *ProfiLux 4* provides a convenient way to automate the burn-in process.

After selecting the *Illumination* to which the tube to be burnt-in is connected, the *burning in period* can be set between 0h and 100h.

This lighting is then only operated with 0% or 100% until the operating hours meter (see also -> *Operating hours*) has reached the burn-in period for this lighting (all dim-settings from 1% are automatically output as 100%).

At 0% the lamp will be still switched off - the burn-in is done step by step.

By default, the burn-in time is set to 0 h, so the burn-in is deactivated.

3.9 Operating hours

Each lighting channel includes its own operating hours meter, which continues to run when the corresponding lighting is active (brightness greater than 0%).

This feature continuously tracks the length of time a light is in operation so you always know how when it should be exchanged. It is especially useful for preventing performance decreases due to bulbs aging.

The operating hours counter is also used by the burn-in program. The operating hours are written cyclically every 1h into the non-volatile memory. This ensures that the operating hours are maintained even in the event of a power failure.

After selecting the menu item *Operating hours*, please select the *Illumination* option. The operating hours for this Illumination are then displayed.

After a few seconds or by pressing a key, you will be asked if you want to "*reset the operating hours meter?*" A confirmation with *Yes* resets the operating hours counter to 0 h. Of course, this should only be done when changing the light source.

3.10 Thunderstorms

ProfiLux 4 can simulate an authentic thunderstorm.

When a thunderstorm simulation is in-effect, a slow reduction of all illumination channels will occur. As these channels become darker, the number of flashes will increase. After the thunderstorm has reached its climax, the lighting is slowly brought back to normal strength, the flashes become less frequent until finally the thunderstorm is over.

A thunderstorm can be started manually any number of times or automatically up to 4 times per day. There is also an option to start a thunderstorm at random.

Set the thunderstorm parameters in the *Storm* menu:

Darkening (0% - 100%) during a thunderstorm

Intensity (1 – 20) of the thunderstorm – Higher numbers, the more flashes are generated

Flash brightness (10% - 100%) – Determines the LED output power during a flash

Thunderstorm/Day – Number of automatically generated thunderstorms in a day (max. 4)

Weekdays – Only on these weekdays there is a thunderstorm

Start 1...4 – A thunderstorm begins at this time

Duration 1...4 – Duration of a thunderstorm (1 to 60 minutes)

Random thunderstorm duration – If you want random thunderstorms, enter a duration (max. 60 minutes) for the random thunderstorm (If you enter 0, randomly generated thunderstorms are disabled).

Waiting time minimal and *maximal* – the random generator determines a waiting time within these limits (maximum 240 hours) until the next random storm is started.

In the *Thunderstorm menu*, a thunderstorm could be manually started by selecting *Manual Start*. The duration (1 to 60 minutes) must then be entered here. When a manual thunderstorm is triggered, the stored thunderstorm intensity and darkening *Settings* are used.

NOTE

The signals necessary for a thunderstorm can only be generated from the onboard 1-10 V interfaces (L1 to L6) or from the Mitras Lightbar connector.

A "thunderstorm illumination" should therefore not be connected to possibly existing additional 1-10 V interfaces (for example expansion card PLM_2L4S)!

3.11 Temperature-dependent light reduction

With this function, it is possible to gradually reduce the lighting (in the case of dimmable luminaires) or switch it off (in the case of non-dimmable luminaires), depending on whether the nominal temperature is exceeded.

When calculating the reduced light intensity of dimmable luminaires, the current illumination run as well as possible simulations are included.

With the temperature-dependent light reduction, it is possible to prevent your aquarium from being further heated by the illumination on hot summer days. This feature is especially useful when an existing cooling system cannot provide sufficient temperature reduction.

The following parameters can be set:

- The determining *Temperature sensor* (for example, temperature 1 if you have connected one temperature sensor. If you connected more than one, select the sensor to be used for the measurement).

- The *Temperature excess minimal* – If the nominal temperature is exceeded by this value, then the reduction of the illumination intensity of the affected lamps begins, adjustable from 1 °C up to 5 °C - this setting is only relevant for dimmable lamps!!
- The *Temperature excess maximal* – If the nominal temperature is exceeded by this amount, the lighting concerned is switched off completely, adjustable from 2 °C to 10 °C, must be at least 1 °C higher than the minimum temperature limit - this setting is only relevant for dimmable luminaires!
- The *Shut off limit* – If the nominal temperature is exceeded by this amount, non-dimmable luminaires are switched off. A value between 1 °C and 10 °C is adjustable. These lights are not switched on again until the programming of the corresponding illumination run defines again a switch on (luminaire has been switched off according to the programming, for example at night - and is switched on again, for example in the morning). A drop in the temperature alone does not lead to a new switch-on, which is particularly useful with gas discharge lamps, since these should not be switched on and off continuously. This setting is only relevant for non-dimmable luminaires!

Example for Dimmable Lamps

Nominal temperature = 26.0 °C, min. temperature excess = 2.0 °C, max. temperature excess = 4.0 °C, this results in the following table

Actual temperature	Light reduction by	Actual temperature	Light reduction by
28.5 °C	25 %	29.5 °C	75 %
29.0 °C	50 %	29.0 °C	100 %(Off)

3.12 Variable Illumination

This function allows you to use different illumination runs for a luminaire on different weekdays.
Up to 16 variable lighting programs can be defined. After selecting the program (1 to 16), you can set for Monday to Sunday, which lighting sequence (1 to 16, *Illumination run*) should be used on the respective day.

Example

You would like to have for the illumination from Monday to Friday other settings than for Saturday and Sunday, so you need 2 different illumination runs.
First you set both illumination runs (e.g. illumination run 1 for Monday to Friday and illumination run 5 for Saturday and Sunday) according to your wishes.
Afterwards you set e.g. *Variable Illumination 1* accordingly (Monday: 1, Tuesday: 1, ..., Friday: 1 and Saturday: 5 and Sunday: 5).

Finally you choose the function *Variable Illumination 1* as function for the corresponding 1-10 V-interface (see also *System ->1-10 V interface*) resp. for the corresponding switchable socket (see also *System ->Socket outlet function*.

3.13 Mitras Lightbar

Activate this setting when you have connected our Highpower LED Illumination *Mitras® Lightbar*. You can also specify which of the available serial interfaces (usually COM1) are to be used to control the Mitras Lightbar.

Here you can change the output power of the *Mitras Lightbar*.

3.14 Light demo

The *Lightdemo* serves for demonstration purposes. After activation, the LEDs are alternately dimmed up and down.

With the keyboard the *Lightdemo* can be varied:

Arrow up and down – Color change faster or slower

Arrows left and right - Change the color pattern

Return - Freeze the current color pattern, press Return again restarts the automatic sequence

Esc finishes the light demo.

3.15 Time lapse

The *Time lapse* can be used for test and demonstration purposes. With this function you can view the adjusted illumination run in *time lapse*.

There is a *manual time lapse* (indicated by an M in the upper right) and an *automatic time lapse* (indicated by A). You switch between both modes by pressing Return.

In *manual time-lapse*, you can set the time to be simulated, at which the appropriate lighting is to be displayed.

During the *automatic time-lapse*, the time to be simulated is constantly incremented, you can set the speed of the *time-lapse*. Set the duration, in seconds, to be used for 24-hour simulation.

Esc finishes the *time-lapse*.

3.16 Acclimation

The acclimation function provides a simple and comfortable way to automatically change the brightness of the light over a span of several days. We recommend using this simulation for acclimating corals/plants to a new lighting program or when corals have been newly brought in.

After activating, the following settings can be made:

Start date – The acclimation period begins on this day

Start percent- With this value, all dimmable lights are multiplied at the beginning of the acclimation

End date - The acclimation period ends on this day

End percent - With this value, all dimmable lights are multiplied at the beginning of the acclimation

During acclimatization, a dimming factor is calculated daily. The individual illumination runs are converted according to this factor.

Example: Start on 01.12.2016 (12-01-2016) with 50%, end on 03.12.2016 (12-03-2016) with 100%

Then the lighting channels are operated with 50% of the normally set brightness on the 01.12.2016 (and also before), on the second day with 75%, and on the last day with 100% (and also thereafter).

Starting and ending percentages can be adjusted as needed; thus an increase as well as a lowering over a certain period of time is possible..

3.17 Shift Curves

This function allows you to move complete illumination runs.

- Select the illumination(s) whose illumination run(s) you want to move.
- Then determine the time offset and confirm with ->RETURN

4 Extras

Special functions and settings are summarized here. The following submenus are provided.

4.1 Maintenance

During the maintenance and care of the aquarium, it can be helpful to set the switch state of some switch sockets or the brightness of luminaires explicitly.

An example would be switching the heaters off, setting the flow to minimum and setting a dimmable lightbar to 80%.

Note

In order to achieve maximum flexibility, the settings of the maintenance function refer directly to the hardware (switch sockets and 1-10 V interfaces) ...

...and not on control and regulation functions (e.g., temperature control or illumination channels).

ProfiLux 4 offers 4 separately adjustable M*aintenance programs*.

In the Maintenance menu, you can set the maintenance parameters under S*ettings*. For quick access, the maintenance programs are positioned on top, one after the other. The menu item *Settings* will show up afterwards. Scroll down the menu until you reach *Settings*. Then select the *Maintenance program* you want to edit.

Set affected 1-10V interfaces

Here you can select the 1-10V interfaces to be affected during maintenance. All non-selected interfaces continue to operate normally and program-controlled during maintenance.

Adjust affected 1-10V interfaces

For the previously selected 1-10V interfaces, you can set here which voltage in percentage they shall output during the maintenance.

Select affected socket outlets

Here, you can set which sockets should be influenced during maintenance. All unselected sockets continue to operate normally and program-controlled during maintenance.

Adjust affected socket outlets

The switch state (on or off) can be set for the previously selected sockets during maintenance.

The following two settings are available only if a *Mitras Lightbar* is connected.

Select affected Mitras Lightbar LEDs

Here it is possible to adjust which LEDs of Mitras Lightbar are to be influenced during maintenance. All non-selected LEDs continue to operate normally and as programmed during maintenance.

Adjust affected Mitras Lightbar LEDs

For the previously selected LEDs, the brightness can be adjusted as a percentage during maintenance.

Maximum length maintenance

This time (up to 240 minutes) determines the length of time the maintenance is automatically switched off.
The automatic shutdown after a certain period of time prevents maintenance from remaining permanently active if you forget to switch it off again. If maintenance is allowed for an indefinite period, enter 0 here.

Activate the *Maintenance program* in the *Maintenance* menu with *Start*.

While the maintenance program is active, the selected sockets have the set switching states and the selected 1-10 V interfaces output the set voltages.

ProfiLux 4 signals an active maintenance program with a blinking hammer symbol in the display.

End the *Maintenance program* from the *Maintenance* menu by selecting *Stop*.

Note

During maintenance, the alarm monitoring of all sensors is switched off!

4.2 Feeding Pause

ProfiLux 4 offers 4 independent feed pauses, which can be started and set in the feed pause menu.

Scroll down in the *Feed Pause* menu until you get to *Settings*.
Select the feed pause (1 to 4) whose settings you want to adjust.

Set the duration of the feed pause (*length feeding pause*). This determines how long the activated feed pause takes, which has been started manually with the *Esc* key or automatically by a timer. It can be set between 0 and 120 minutes (0 means that this feed pause is not used).

Note

To avoid damage to the microbiological climate of your filter, do not select this time longer than absolutely necessary (approx. 5 to 10 minutes)!

Furthermore you can set which effect the feeding pause shall have:

Stop filter? – with the selection of *Yes* the switchable socket with the function Filter (1 to 4, depending on the feeding pause you are editing here) will be switched off during the feeding pause.

Finally, you have to set whether a timer can activate the feed pause, if *Yes* is selected, choose which timer should start this feeding pause.

If a timer should activate this feeding pause then the feeding pause is activated as long as this timer is active. The feeding pause remains furthermore active for the time set under *Length feeding pause*. This makes sense, if this timer controls an automatic feeder or a dosing pump.

The behavior of the current pumps during the feeding pause can be defined in the settings of the current pumps (*Extras->Current->Pump settings*).

You start a feed pause by pressing the *Esc* key. If more than one feed pause is used, then the appropriate feed pause has to be selected. The food pause can be interrupted by pressing *Esc* again.

4.3 Internal Time

This function is used to display the internal clock (see also *->Clock)*. This function is only for diagnostic purposes, settings cannot be made here.

4.4 Info & Support

After selecting this menu item, information about the software version, model and our homepage is displayed one after the other (automatically after the lapse of a certain time or by pushing a key).

4.5 Current

ProfiLux can control (current) pumps in a variety of ways; subsequent pumps are suitable for control:

- Pumps with an analog control signal input (mostly 1-10V-interface), such as those from Tunze®, Royal Exclusiv® or Abyzz®, are connected to a 1-10V interface port of the ProfiLux (for the connection to ProfiLux you need the corresponding accessory)
- Pumps whose speed is adjustable via phase controlled modulation (therefore our dimmable powerbar *Powerbar2Dim* is necessary)
- *EcoTech*®-pumps of *VorTech*® (with our module *VorTech-Controller*)
- Some low-voltage pumps, e.g. *Koralia*® from *Hydor*® (with our module *PumpControl1*)

Furthermore, non-controllable pumps can be switched via switchable sockets, see also *System-> Socket outlet function*. These can then of course only be switched on or off but not regulated.

The *current control* is organized in groups, one group consists of one or several pumps. The settings can be made separately for each group and for each pump. The group settings define the pumps belonging to the group, the operational mode and the time settings (depending on the operational mode).

For each pump, settings such minimal or maximal speed or the behavior during the feed pause can be set individually.

Note

"*Pump active*" means that the pump is running continuously between min. and max. current speed and thus generates waves.
A socket assigned to the flow pump is then switched on.

"*Pump inactive*" does not necessarily mean that the pump is off, but that it runs at its minimum power.
A socket assigned to the flow pump is then switched off.

The group settings determine when and for how long which pump is active in this group, the pump settings determine the behavior of the pump during activity and inactivity.

4 independent groups can be programmed. A group consists of up to 4 (or up to 16) pumps which can be independently controlled.

4.5.1 Nocturnal Change

For the current simulation, a *Nocturnal change* of the pump power can be adjusted. If the *Nocturnal change* is activated, the start and end times must also be entered. Within these times, the pumps are operated with the power set for the night. The night change affects all pumps in all groups.

4.5.2 Group Settings

The following parameters can be set for each group:

4.5.2.1 Operational Mode

Here you can set the operating mode for a group. The individual groups may have different operating modes.

Off – The pumps of this group are permanently off.

Permanent – The pumps are permanently active and run synchronously.

Permanent alternating – The pumps are permanently active and operate alternating, i.e. if pump 1 runs at maximum speed, pump 2 runs at minimum speed and vice versa.

Sequence 1 – Here, always exactly one current pump of this group is switched on alternating. The duration for the change from one pump to the next one can be set, see below. When the last pump of this group was active, the cycle starts again with the first pump of this group. If this group consists of 2 pumps, then the ebb-tide-simulation is generated. If only one pump belongs to this group, it is switched on and off alternating.

For a group with 3 pumps, the following switch-on pattern is obtained:

Step	Pump 1	Pump 2	Pump 3
1	on	off	off
2	off	on	off
3	off	off	on
4	on	off	off
5	off	on	off
6	on	off	on
7	on	off	off

etc.

Sequence 2 – Similar to *Sequence 1*, but the pumps are not switched one after the other, instead of that, they are activated in an alternating order.

For a group with 3 pumps, the following switch-on pattern is obtained:

Step	Pump 1	Pump 2	Pump 3
1	on	off	off

2	off	on	off
3	off	off	on
4	off	on	off
5	on	off	off
6	off	on	off
7	off	off	on

etc.

Surge 1 – The pumps of this group are switched on one after the other until all pumps are active, then the pumps are switched off again in the same order until all are off. The time until the switching state changes again can be set (see beneath).

For a group with 3 pumps, the following switch-on pattern is obtained:

Step	Pump 1	Pump 2	Pump 3
1	on	off	off
2	on	on	off
3	on	on	on
4	off	on	on
5	off	off	on
6	off	off	off
7	on	off	off

etc.

Surge 2 – Similar to Surge 1. This setting allows all pumps to be switches off in the reverse order as they were previously switching on.

Step	Pump 1	Pump 2	Pump 3
1	on	off	off
2	on	on	off
3	on	on	on
4	on	on	off
5	on	off	off
6	off	off	off
7	on	off	off

etc.

Random – Using a random generator, all, some or none of the pumps belonging to this group are activated in a continuous random variation. The time until the switching state changes again can be set (see beneath).

4.5.2.2 Assign Pumps

Here you can define which pumps belong to this group. A pump must not be assigned to several groups.

4.5.2.3 Tide Duration

In the modes *Sequence*, *Surge* or *Random* you can set the time after which the switch on state of the pumps shall change again. Enter a *Minimal* and a *Maximal tide duration*.

The time after a new switch-on state is to be assumed is determined by random-number generator in the range of these two times.
Shall the time be always the same, the same value must be entered for *Minimal* and *Maximal tide duration*.

The *Minimal* and a *Maximal tide duration* is adjustable between 1 second and 8 hours.

WARNING

If a switching socket is to control the corresponding flow pump, the time period must not be too small - otherwise too frequent switching can lead to damage to the socket or the pump!

4.5.2.4 Wave

The type of wave generation can be set individually for each group:

- ***Sinus waves*** – Gentle acceleration and slowing down of the pump
- ***Right-angled waves*** – abrupt changes

Then set the *Minimal* and *Maximal wave duration* in a range of 0.4 and 60 seconds.
The random number generator determines a duration within these limits for each wave.

If all waves should have the same duration, enter the same values for *Minimal* and *Maximal wave duration*.
The technical possibilities of the pump must, of course, also be taken into consideration for the wave duration.

Note

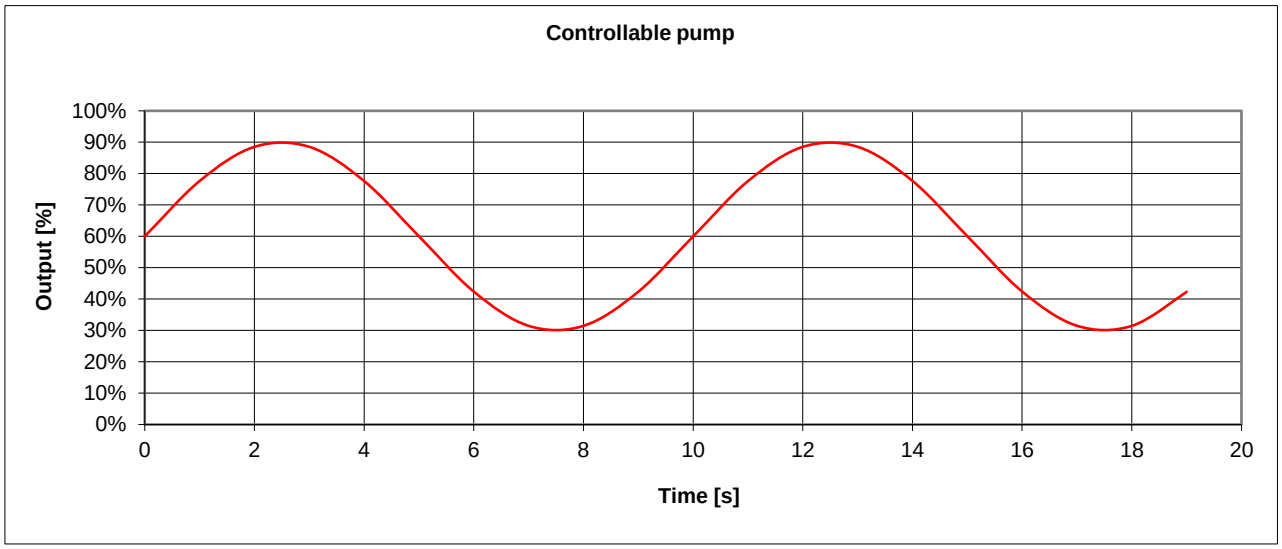
Waves have no effect on non-controllable pumps, which are connected via switchable sockets.

Finally, the random wave reduction can be set from 0% to 100%.

The bigger the value, the more different the single wave crests become.

- At 0%, each wave peak reaches the maximum (wave crests are always equal),
- At 100%, the wave waves fluctuate randomly between minimum and maximum.

In the following, the flow pattern can be seen on a controllable pump (settings: *Minimal* = 30%, *Maximal* = 90%, *Wave duration* = 10 s, *Wave form* = *Sinus*):



4.5.3 Pump Settings

The following settings can be made individually for each pump:

- ***Minimal*** - minimal power (during a wave trough or if pump inactive)
- ***Maximal*** – maximal power (during a wave crest)
- ***Night*** – maximal performance during *nocturnal change*
- ***Storms*** – maximal performance during a storm
- ***Behavior while feeding pause*** – adjustable is
  - ***uninvolved*** (Feeding pause does not affect this pump),
  - ***at minimum*** (pump is operated only with minimum power during the feeding pause)
  - or ***off*** (pump is switched off during the feeding pause).

4.6 Display

Here, you can set which current values should be displayed on the display during normal operation.

If several elements are selected, they are displayed alternately. These settings also affect the display on a possibly connected *ProfiLux Touch.*

The following setting options are available in this menu:

- ***Display duration***– Time the display remains constant until the next value is displayed
- ***Select illumination***– Here you can select which lighting channels are to be displayed
- ***Select controller*** (only if measurement inputs are available) – Select the controllers whose values and states are to be displayed (e.g. pH and temperature)
- ***Select miscellaneous*** – Selection of other elements that can be displayed (e.g., moon phase, level, or flow sensor)
- ***Time & Date*** – It can be set whether the current time and the date are displayed never always or rotating.

4.7 Measurement Data

ProfiLux 4 can record measurement data.

- *Storage size* – Max- 8192
- *Memory type* – FRAM (nonvolatile memory), in case of a voltage supply failure the measured values keep stored

If the measurement value storage is full, then the oldest data is overwritten.

For a detailed analysis and further processing of the measurement data, a PC with our program *GHL Control Center* is necessary. It can read out measurement data and store it as text file. A simplified measurement data analysis can also be made directly at the device, see menu item *Analysis* beneath.

Per sensor and measurement time point, one storage space in the measurement data storage is allocated.

Under the menu item *Measurement data* the following sub-menus are available:

- ***Settings*** – First, set the max. storage size which is reserved for the measurement data recording. The reduction of the max. Memory size is only useful, if you want to restrict the time period for data collection. See also the example shown below.
  After that set the measuring period between 1 minute and 12 hours (after this time the current values are stored). Finally, it is possible to select which of the available sensors are to be taken into account when measuring the measured values.
  A change in the settings may lead to the deletion of existing measurement data. Before you save the new settings, you are first asked if you want to "*Clear data?*"
- ***Erase measurements*** – All currently stored measurement values are deleted.

- ***Status*** – Shows first when the last measured values were recorded, afterwards the memory status and how many of the measured data have not yet been collected from the PC.
- ***Analysis*** - After the sensor whose measurement data is to be evaluated has been selected, the upper line displays the average value and the lower line the minimum and maximum values. The three values are determined based on all the data currently stored in the memory.

Example calculation max. measurement recording duration

Size of the measurement data storage 500 storage elements, measurement data of 2 sensors shall be stored, recording every hour

-> Recording period = 1 h * 500 / 2 = 250 h = 10.4 days

Example setting of max. storage size

You want to store the measured data of 3 sensors (for example, temperature, pH and redox) half-hourly, but the values in the memory should be a maximum of two days old, so that the minimum, maximum and average values refer always to the last two days.

-> Max. storage size = 24h / 0.5h * 3 = 144

4.8 Language

The language in which *ProfiLux 4* displays texts can be set here.

Tip

If *ProfiLux 4* is set to German, this menu appears under *Extras-> Sprache*. Select this option to change the language.

5 Sensor Settings

With the exception of the level sensors, you can make all sensor-related settings under this menu item. The settings for level sensors can be found in the following menu item *Level of the ProfiLux 4* menu.

ProfiLux 4 automatically shows you all the sensors already installed at the factory.

These are:

- Temperature 1
- pH-value 1
- Redox 1
- Conductivity 1

If you have connected several sensors of the same type, then the numbering by the *ProfiLux 4* is accomplished as follows: The permanently installed connections in the *ProfiLux 4* have the smallest number, the numbering of additional connections on *ProfiLux Expansion Cards* increases with the slot number in which the cards are plugged.

ATTENTION

The sensors for pH, conductivity, redox and oxygen must be calibrated before the first use and thereafter regularly (all 2 – 4 weeks)!

Check in any case if all sensors show plausible values!!

First select the sensor whose settings you want to change and confirm with RETURN.

For the sensor settings of each individual sensor, you can select the following options:

5.1 Activity

Please make sure that the selected sensor and the associated measurement recording and control are active (standard: *Yes*).

If this is set to *No*, the control and sensor monitoring for this sensor will turn off and all switch sockets connected to this sensor will be deactivated.

If this input is not to be used, please deactivate it. Otherwise, *ProfiLux 4* may assume a sensor defect and display an alarm.

A deactivated sensor is displayed with --- in the display.

5.2 Nominal Value

The nominal value (the value to be controlled) can be set here. The nominal value and the current value (actual value) determine whether it is regulated upwards or downwards.

Note

Down-regulation: When the nominal value is undershot, the down-regulation is switched off, the down-regulation is switched on again when the nominal value is exceeded by more than half the hysteresis (see also *Sensor settings-> Hysteresis*).

Up-regulation: If the actual measured value exceeds the nominal value, the up-regulation is switched off, the up-regulation is switched on again if the nominal value is undershot by more than half hysteresis.

Overview of setting options for the nominal value

Sensor type	Minimum	Maximum	Standard	Resolution
pH	4.5	9.5	7.0	0.1
Temperature	1.0 °C	36.0 °C	26.0 °C	0.1 °C
Redox	-300 mV	+ 600 mV	200 mV	1 mV
Conductivity fresh water	10 µS	1900 µS	500 µS	1 µS
Conductivity salt water	0.5 mS	99.5 mS	50.0 mS	0.1 mS
Oxygen	0.0 %	130.0 %	100.0 %	0.1 %
Humidity	2.0 %	98.0 %	60.0 %	0.1 %
Air temperature	0.0 °C	50.0 °C	28.0 °C	0.1 °C
Voltage	0.00 V	10.00 V	5.00 V	0.01 V

WARNING

For safety reasons, a possibly set nocturnal change (own menu item nocturnal change) is deactivated during the processing of the nominal value!

If you need to make a nocturnal change, you must reactivate it after the nominal value processing.

Note

Please note the following in the temperature control:

The heat radiation of the lighting and the outside temperature can affect the water temperature. If there is no cooling, it is possible that the set-point temperature is exceeded.

Depending on the difference between the desired and the current temperature, the heaters or the cooling are switched. The following states can occur:

Tubular heater and substrate heating on / Only substrate heating on / All off / Cooling only

ProfiLux 4 is programmed in such a way that the substrate heating takes precedence over the tubular heater. This makes an optimal heating of the substrate possible. The tubular heater is then switched on when the substrate heater alone is no longer sufficient.

5.3 Operation Hours

In order to always know how long the sensor is already in operation, *ProfiLux 4* provides an associated operation hour counter for sensors.

The operation hours are written cyclically every 1 h into the non-volatile memory. This ensures that operating hours are maintained even in the event of a power failure.

After selecting the menu item *Operation hours*, the operation hours of the sensor are displayed. After a few seconds or by pressing a key, you will be asked *"Reset?"* A confirmation with *Yes* resets the operating hours counter to 0 h.

5.4 Hysteresis

The so-called hysteresis comprises the distance from switching-on the socket outlet *down regulation* to switching-on the socket *up-regulation* of the respective sensor.

The hysteresis that can be adjusted here determines the distance between these switching points and is necessary in order to reduce the switching frequency.

In the case of temperature sensors, the hysteresis that can be adjusted here comprises the distance from switching on substrate heating to switch-off (main) heating.

The switching on of the cooling lies out of the hysteresis, so that a simultaneous operation of substrate heating, heating and cooling is possible (see also note for temperature sensors below).

The factory hysteresis setting does not normally need to be changed. A reduction in the hysteresis is useful if the control accuracy is to be increased. This also increases the switching frequency.

Example using a pH sensor

Nominal value = 7.0 and Hysteresis = 0.4

The *down-regulation-socket* switches on at 7.2 and off again at 7.0, the *up-regulation-socket* switches on at 6.8 and off again at 7.0.

It can be seen that the control oscillates by 7.1 or 6.9 and not exactly by the adjusted nominal value (7.0). This is necessary to allow simultaneous use of *up*- and *down-regul*ation.

Overview of the possible settings for the hysteresis:

Sensor type	Minimum	Maximum	Standard	Resolution
pH	0.05	1.00	0.30	0.01
Temperature	0.15 °C	2.00 °C	0.20 °C	0.01 °C
Redox	10 mV	100 mV	20 mV	1 mV
Conductivity freshwater	8 µS	200 µS	20 µS	1 µS
Conductivity salt water	0.3 mS	10.0 mS	0.5 mS	0.1 mS
Oxygen	2.0 %	10.0 %	5.0 %	0.1 %
Humidity	0.2 %	15.0 %	2.0 %	0.1 %
Air temperature	0.2 °C	3.0 °C	0.5 °C	0.1 °C
Voltage	0.05 V	3.00 V	0.50 V	0.01 V

Note for temperature sensors

The adjusted hysteresis also depends on when the cooling is active. The switching-on point of the cooling also depends on the cooling difference (see also *Sensors-> Cooling difference*) and can be calculated as follows:

T = nominal temperature + 5/6 * hysteresis + cooling difference

With a hysteresis of 0.2 °C, this results: T = Nominal temperature + 0.167 °C + cooling difference.

5.5 Alarm

ProfiLux 4 can monitor the currently measured value of a sensor and react in various ways in the event of an excessive deviation.

Please first set whether the alarm should be active. If you selected *Yes*, please proceed as follows:

- Determine the *Maximum deviation* of the *actual value* from the *nominal value*.
- Select whether you want to disable this control in the event of an alarm (*Shut-off control?*).
- Select whether the alarm should be inactive during water changes *(Disabled at AWC?)* If you have chosen inactive during water changes, the alarm monitoring is temporarily switched off during an *automatic water change (AWC)*.

Note

If you are setting a V*irtual sensor* of the type A*verage*, then you can additionally set a *Comparative alarm*.

After activation of the alarm, the corresponding actual value is constantly compared with the nominal value by *ProfiLux 4*. If the deviation (overshoot or undershoot) is greater than set under *Maximum deviation*, an alarm is triggered. The hysteresis and a possible nocturnal change are automatically taken into account during the nominal / actual value comparison; in the case of temperature sensors, the *Cooling difference* is also taken into account.

In the case of a V*irtual sensor* of the type average, the measured values of the two sensors from which the average value is formed are compared. If the difference of the measured values is larger than the *Comparative alarm*, an alarm is also triggered.

During an alarm, the red alarm LED will light up and the buzzer will be activated depending on the mode selected (see also under *System ->Alarm*). In addition, a switch socket can be programmed so that it is switched on in case of an alarm.

If the controller shut-off has been set for the alarm, all sockets which are involved in the control of this sensor are deactivated immediately in the event of an alarm!

The alarm settings should be set with the utmost care. It is imperative that alarm limits are not exceeded during normal operation!

DANGER

- Set the alarm settings with utmost caution and care.
- Be absolutely sure that the alarm limits are not exceeded in normal operation.
- The manufacturer declines any responsibility or liability for damage!

Overview of possible settings for alarm limits:

Sensortype	Minimum	Maximum	Resolution
pH	0.5	3.0	0.1
Temperature	0.5 °C	5.0 °C	0.1 °C
Redox	40 mV	400 mV	1 mV
Conductivity freshwater	50 µS	500 µS	1 µS
Conductivity saltwater	2.5 mS	25.0 mS	0.1 mS
Oxygen	2.0 %	20.0 %	0.1 %
Humidity	1.0 %	20.0 %	0.1 %
Air temperature	1.0 °C	15.0 °C	0.1 °C
Voltage	0.10 V	6.00 V	0.01 V

Example for the calculation of the lower and upper temperature alarm limit

- Nominal value 26.0 °C
- Nocturnal change by -2 °C active
- Overall hysteresis 0.2 °C
- Maximum devitation 1.5 °C
- Cooling difference 2.0 °C

Thus resulting :

Lower limit = 26.0 °C – 2.0 °C – ½ * 0.2 °C – 1.5 °C = 22.4 °C

Upper limit = 26.0 °C + 5/6 * 0.2 °C + 1.5 °C + 2.0 °C = 27.7 °C (5/6 because of the upper switching point of the cooling, see also *Sensor settings ->Hysteresis*)

5.6 Nocturnal Change

With this setting, you can determine whether the value to be controlled is to be changed at night.

By default, the night change is disabled. If you have activated the nocturnal change with *Yes*, you can set how much the value is to be changed at night and set the start and end times.

Overview of the settings for the nocturnal change:

Sensortyp	Minimum	Maximum	Resolution
pH	-1.0	1.0	0.1
Temperature	-6.0 °C	-0.1 °C	0.1 °C
Redox	---	---	---
Conductivity freshwater	---	---	---
Conductivity saltwater	---	---	---
Oxygen	---	---	---
Humidity	1.0 %	50.0 %	0.1 %
Air temperature	-30.0 °C	-0.5 °C	0.1 °C
Voltage	-3.00 V	3.00 V	0.01 V

Note

Noctural set-point = Set-point + Noctural change

5.7 Summer Switching

(Only for temperature sensor)

With this feature you can activate the summer switching and adjust it to your needs. As mentioned before, it is possible that the water temperature exceeds the nominal temperature. In this case the substrate heater would remain switched off and there would be no circulation in the substrate.

By activating the summer switching feature, the floor heating is operated in such a way that the water temperature is not significantly increased. The summer circuit is switched off by default.

After you have activated the summer switching with *Yes*, you can adjust the *Intensity* of the summer switching (5-30).

This number corresponds to the operating time of the substrate heater in minutes at a temperature exceeding of 1 °C. The operating time is calculated by the controller depending on the temperature exceeded.

If the temperature is below the set temperature, the operating time is increased. If the temperature is exceeded by more than 3 °C, the substrate heater will be turned off in any case.

The settings for the nocturnal change are taken into account.

This intelligent and elaborate process has the advantage that you always achieve the best possible substrate circulation on your aquarium!

5.8 Therapy

(Only for temperature sensor)

If a fish disease occurs, it may be useful to change the water temperature for some time.

When the *Therapy* function is activated, the temperature is changed by the desired value (reduction by 5 °C to increase by 5 °C) for the set time (3 - 21 days).

The temperature change at the beginning and end of the therapy is done gently (within one day).

ATTENTION

If you have set an upper temperature limit on the heating element for safety reasons, you must change it if the temperature rises.

5.9 Calibration

This function is used to calibrate a sensor and the associated electronics. Please allow some time for this. The calibration with *ProfiLux 4* is simple and is menu driven. Please follow the instructions in the display carefully.

Not all sensors can or must be calibrated (see table *Calibration values* below).

For all sensors that can be calibrated, the following principle applies:

Only if *ProfiLux 4* has been calibrated with the connected sensor, correct values can be determined.

Note

Depending on the application area of the *ProfiLux 4*, it may be useful to set the measuring range before calibration of the sensors.

Please refer to the following menu item *Measurement range.*

The calibration procedure is different for each sensor type.

The differences between the individual sensors are discussed in the following chapters.

5.9.1 General

Calibration is always necessary with new sensors. Also, the calibration should be repeated from time to time (every 2-4 weeks) because of the aging process of the sensor. Please observe the instructions of the sensor manufacturer. Before immersing the sensor in a calibration solution, the sensor must be carefully dried with a dry, lint-free paper towel.

For all subsequent calibrations:

DANGER

- Please observe the information on the display.
- When prompted (RETURN arrow appears in the display), press the RETURN key after each step

- During calibration, wait for the signal sound before proceeding!
- Take the time to calibrate
- Check the calibration as explained below ->*Control of sensor calibration*

Do not use the sensor until the correct function and calibration are free of doubt!

5.9.2 Calibration Tolerance

At the beginning of a calibration, you are requested to enter the *Calibration tolerance* for the respective sensor (between 1 and 3), which is to be taken as the basis for the calibration.

In principle, calibration procedures should be carried out with the smallest possible calibration tolerance, which is usually 1.

With old sensors, the measured value may not be sufficiently stabilized and calibration is not possible. In some cases, it is possible to calibrate this sensor by increasing the calibration tolerance, but this has a negative effect on the measuring accuracy.

In some sensors, you have the option of changing the values to be calibrated.

5.9.3 Overview of the Calibration values

(If the minimum and maximum are the same, then the calibration value cannot be changed)

Sensor type	Calibration possible	Calibration values adjustable	Min. calibration value 1	Max. calibration value 1	Min. calibration value 2	Max. calibration value 2
pH	yes	Yes	3.5	7.5	5.5	10.0
Temperature	yes	No	20.0 °C	20.0 °C	30.0 °C	30.0 °C
Redox	yes	Yes	0.0 mV	0.0 mV	200 mV	250 mV
Conductivity saltwater	yes	Yes	0 µS	0 µS	1000 µS	2000 µS
Conductivity freshwater	yes	Yes	0.0 mS	0.0 mS	40.0 mS	80.0 mS
Oxygen	yes	No	0.0 %	0.0 %	10.0 %	102.0 %
Humidity	no	No	0.0 %	0.0 %	100.0 %	100 %
Air temperature	no	no	0.0 °C	0.0 °C	100.0 °C	100.0 °C

Voltage	no	no	0.0 V	0.0 V	10.0 V	10.0 V

5.9.4 Temperature Sensor (Analog)

This applies exclusively to external analog temperature sensor inputs (for example, from *PLM Temp*)

The already installed sensor input for the digital temperature sensor of the *ProfiLux 4* can and must not be calibrated.

Additional external analog temperature sensor inputs (for example, of additional expansion cards *PLM-Temp*) must be calibrated!

Each *ProfiLux Expansion Card* with temperature sensor input is accompanied by a calibration document.

Please enter the two values listed under *Calibration ADC1* and *Calibration ADC2* during calibration. After entering these two values, the temperature sensor input is calibrated.

5.9.5 pH Sensor

- Connect the pH sensor
- Set the calibration tolerance
- Determine the *Calibration value 1* and then the *Calibration value 2* and confirm with RETURN
- To calibrate the *Calibration value 1*: Immerse the sensor in the calibration liquid suitable for your specified calibration value and press RETURN
- Leave the sensor in the calibration liquid until the signal tone
- The sensor is now calibrated to *Calibration value 1*
- Dry the sensor and continue with the calibration of the *Calibration value 2*
- If no errors have occurred, save the calibrated values by selecting *Yes* and confirm with RETURN
- Check the calibration as described below

The pH sensor is now ready for use. Based on your calibration, *ProfiLux 4* can now determine the pH value.

5.9.6 Redox-Sensor

For the redox sensor calibration, you need a so-called *Null-plug*, which is supplied with *ProfiLux 4* as well as our redox expansion cards (*PLM Redox*). The plug must be plugged onto

the sensor connection of the *ProfiLux 4* (corresponding white BNC socket on the back of the housing).

- Set the calibration tolerance
- Determine the *Calibration value 2* and confirm with RETURN
- Plug the *Null- plug* ->RETURN
- Wait for the signal sound
- Disconnect the *Null- plug* and then connect the *Redox sensor* ->RETURN
- Immerse the sensor in the Calibration liquid to suit your specified *Calibration value* ->RETURN
- Wait for the signal sound
- If no errors have occurred, save the calibrated values by selecting *Yes* and confirm with RETURN
- Check the calibration as described below

The *Redox sensor* is now ready for use. Based on your calibration, *ProfiLux 4* can determine the *Redox value*.

5.9.7 Conductivity

The conductivity of a liquid is strongly temperature-dependent. For the exact determination of the conductivity by *ProfiLux 4*, this results in a so-called *Temperature compensation* for each measurement.

During calibration, you will be asked how *ProfiLux 4* is to perform the temperature compensation. *ProfiLux 4* offers you two options:

- Aquarium temperature manual: The temperature compensation is carried out by means of a fixed set temperature (*Aquarium temperature manual*). Then enter the temperature.
- Aquarium temperature by using a continuously measured value: Select the desired *Temperature sensor* for temperature determination.

Tip

The most accurate values for the conductivity value determination are obtained by means of a continuously measured value.

You will be prompted to enter the temperature of the calibration liquid (*Calibration liquid temperature*).

Tip

The easiest and fastest way is to equalize the fluid temp is to place the closed container of the calibration liquid in the aquarium until the temperature has adjusted. This is only useful if the aquarium temperature is known.

The actual calibration is then started.

Please note the information on the display. After each step, press the RETURN button and wait for the signal tone before you continue.

- Connect the *Conductivity sensor*.
- Set the *Calibration tolerance* ->RETURN
- Determine the *Calibration value 2* and confirm with RETURN
- Select *Temperature sensor* or *Aquarium temperature manual* for temperature compensation ->RETURN.
- If you selected the *Aquarium temperature manual* enter the basin temperature ->RETURN
- Specify the temperature of the calibration liquid ->RETURN
- Hold the sensor in the air (*Hold the sensor in the air!*) until a signal sounds
- Then immerse the electrode in the calibration liquid corresponding to the *Measuring range* ->RETURN
- Wait for the signal sound
- If no errors have occurred, save the calibrated values by selecting *Yes* and confirm with RETURN
- Check the calibration as described below

The *Conductivity sensor* is now ready for use. Based on your calibration, *ProfiLux 4* can determine the *Conductivity.*

5.9.8 Oxygen Sensor

In contrast to all other sensors, the oxygen sensor is calibrated in 2 steps. The first calibration is the so-called *Null-calibration*. The second calibration is the so-called *Air calibration*.
There must be a time interval of at least 30 minutes between both calibrations, as otherwise sensible values cannot be determined.

This means that the calibration process must be started two times:

During the calibration, you will be asked for how ProfiLux 4 is to perform the *Temperature compensation* and the *Salinity compensation*. ProfiLux 4 offers you two options:

- *Aquarium temperature manual*: The temperature compensation is carried out by means of a fixed set temperature (*Aquarium temperature manual*). Then enter the temperature.
- *Aquarium temperature by using a continuously measured value*: Select the desired temperature sensor for temperature determination.
- *Salinity manual*: The salinity compensation is carried out by means of a fixed set salinity (*Salinity manual*). Then enter the salinity. For freshwater, please enter 0.0
- *Salinity by using a continuously measured value*: Select the desired *Conductivity sensor* (only sea water possible) for the determination of the measured value

The temperature of the air at the calibration site (above the water surface) is also required.

Then the calibration starts.

First step: NULL CALIBRATION

- Disconnect the sensor from the BNC connector ->RETURN
- The NULL CALIBRATION is started
- If no errors have occurred, save the calibrated values by selecting *Yes* and confirm with RETURN
- Reconnect the oxygen sensor to the running *ProfiLux 4*.
- Wait at least 30 minutes to continue with step two

Second step: AIR CALIBRATION

The *Air calibration* is only possible if a *Null calibration* has been performed successfully at least once. Before the *Air calibration*, the sensor must be connected to the *ProfiLux 4* for at least 30 minutes!

- Select *Air calibration* ->RETURN
- Select the *Temperature compensation* and proceed accordingly
- Select the *Salinity compensation* and proceed accordingly
- Enter the temperature of the air at the calibration location ->RETURN
- Keep the sensor about 1 cm (0.39”) above the water and do not touch the surface of the water with the sensor
- Start the measurement with ->RETURN
- If no errors have occurred, save the calibrated values by selecting *Yes* and confirm with RETURN
- Check the calibration as described below

The *Oxygen sensor* is now ready for use. Based on your calibration, *ProfiLux 4* can now determine the dissolved o*xygen.*

Note

During the calibration measurement, 2 numbers can be seen in the lower line. The left number indicates the maximum remaining time in seconds.

If the measured value has not stabilized sufficiently after this time has elapsed, a faulty sensor is emitted and the calibration is interrupted.

The right number shows the measured value in an internal representation. ProfiLux 4 detects automatically if this value has stabilized and then terminates the measuring process.

5.9.9 Control of Sensor calibration

Please check at all calibration points whether the correct value is displayed:

Sensor-type	Procedure for checking the calibration
pH	Immerse sensor in both calibration liquids
Redox	Connect the Null- plug (= 0 mV), then reconnect the sensor and dip into the calibration liquid
Conductivity	Place sensor in air (0 mS), then immerse sensor in calibration liquid
Oxygen	Disconnect the sensor plug (0%), then reconnect the sensor and hold it just above the water surface (102%)

If the calibration fluids have different temperatures than the water measured for the temperature compensation, the displayed values may deviate from the actual values.

Use the sensor for controlling tasks only when the correct function and calibration have been proved without any doubts!

5.10 Display

For certain sensors, you can set how the measured value is to be displayed:

Overview of display options:

Sensortype	Standard display	Display 2	Display 3

pH	pH	---	---
Temperature	°C (Celsius)	°F (Fahrenheit)	---
Redox	mV	---	---
Conductivity freshwater	µS	---	---
Conductivity saltwater	mS (Conductivity)	Salinity	Density
Oxygen	% Sättigung	mg/Liter	---
Humidity	% rel. Luftfeuchte	---	---
Air temperature	°C (Celsius)	°F (Fahrenheit)	---
Voltage	V	---	---

ATTENTION

Please note that you can only make settings in the default setting (for example, °C)!

5.11 Cooling Difference

(Only with temperature sensor)

If the cooling is not to be active within the usual control (observing the nominal temperature with regard to the hysteresis), but only delayed, the *Cooling difference* can be used to determine how far the temperature must exceed the set temperature until the cooling becomes active.

Values can be set between 0.0 °C (no delay, cooling is active immediately when the nominal temperature is exceeded) and 5.0 °C (maximum delay, cooling is active when the nominal temperature is exceeded by 5.0 °C). The cooling difference also affects the alarm monitoring.

5.12 Extension

(Only with temperature sensor)

If the cable to the temperature sensor is extended (or shortened by removing an extension), *ProfiLux 4* must compensate for the measuring errors resulting from the changed cable length. Changing the cable without compensation can result in a significant measurement deviation.

For *ProfiLux 4* to calculate the compensation correctly, proceed as follows:

The sensor must be connected and in the water during the entire process. The water must not be subject to major temperature fluctuations in the next few minutes.

- Select this menu (*Temperature-> Extension*).
- Wait for the wait.
- Change the extension cable (insert or remove), confirm with RETURN.
- ProfiLux now calculates the compensation values
- Then you can save these values
- If no errors have occurred, save the calibrated values by selecting *Yes* and confirm with RETURN
- Check the calibration as described below

Based on your execution, *ProfiLux 4* displays now the correct (compensated) temperature value.

5.13 Measurement Range

For some measuring inputs for sensors, it may be necessary to first set the *Measuring range* before calibration.

- Select the respective sensor under *Sensor setting*s and confirm with RETURN.
- *ProfiLux 4* offers you the possible measuring ranges for selection

Temperature

Here the measuring range can be selected for the connected temperature sensor. There are 2 types of water temperature sensors:

Aquarium – Measuring range approx. 11.5 °C (52.7°F) to 38 °C (100,4°F)

Pond - Measuring range approx. 0 °C (32°F) to 40 °C (104°F)

At default, the measuring range is set for the aquarium. Change the measuring range when you connect a pond sensor! If the measuring range and sensor used do not match, incorrect temperatures are measured!

Conductivity

If the relevant input is an onboard input of ProfiLux 4, the measuring range can be changed here - for seawater or freshwater. Please note that when the measuring range is changed, all settings for this input are lost and set to the factory setting.

5.14 Density Offset

(Only with conductivity sensor saltwater)

For the density display of seawater, an offset between -0.005 and +0.005 can be set here if the displayed density value deviates from the actual value.

5.15 1-10 V max. at...

(Only with temperature sensor)

This setting allows you to define at which temperature the assigned 1-10 V interface (for example, for *PTC* or *PropellerBreeze*) should have the maximum output voltage.
The connected device then has the maximum power with this temperature deviation.

Adjustable are values between 0.2 °C und 10 °C.

5.16 Current Actual value

The current actual value is displayed here. Press any key to stop the display.

5.17 Operation Mode controller

Here you can set how the control should work.

For most cases, the default *Two-position controller* is perfectly adequate and does not need to be changed. For some special conditions, the other operating modes are suitable for optimizing the control behavior. The following operating modes are available:

- ***Two-position controller***
  This is the most common mode. At two switching points, which are determined by nominal value and hysteresis, an associated socket is switched on or off. See also *Sensor Settings-> Hysteresis*.
- ***Pulse/Pause fixed***
  If the actual value deviates from the nominal value by a half hysteresis, the corresponding switch socket is switched on for an adjustable time (*Pulse duration*). After the pulse has elapsed, the socket is switched off again and remains switched off for at least the set *Pause duration*. After the *Pause duration* has elapsed, the socket can be switched on again by the controller if the actual value deviates from the nominal value (or still) by half a hysteresis. The switching cycle (*Pulse and Pause*) starts again.
- ***Pulse variable***
  Operates in principle like *Pulse/Pause fixed*. The difference is, that the actual switch-on time is calculated depending on the difference between nominal value and actual

value.
The bigger the deviation, the longer the turn-on time will be, but at maximum as long as the set *Pulse duration*.

- ***Pause variable***
  Operates in principle like *Pulse/Pause fixed*. The difference is, that the actual switch-off time is calculated depending on the difference between nominal value and actual value.
  The bigger the deviation, the shorter the turn-off time will be, but at maximum as long as the set *Pause duration*.

For these operation modes you need to set additionally:

- ***Pulse duration***
  For this duration the corresponding socket is switched on (at the maximum). You can set a pulse duration between 1 s and 1 h.
- ***Pause duration***
  This is the (maximum) time until the control can switch on the corresponding socket again. It is adjustable between 1 s and 1 h.

The operating modes *Pulse/Pause fixed*, *Pulse variable* and *Pause variable* are useful when the measured value responds slowly or time-delayed to the control action or substances are to be supplied only in small doses.

Examples

- *pH-control:* Pass acid into a pond to lower the pH-value
- *Temperature-control:* Heating of the technical basin (temperature in the main basin is delayed)
- *Conductivity-control:* Passing of osmotic-water

5.18 Signal Filter

Here you can adjust how much the measurement signals are to be filtered.

Permissible values range from 1 (maximum filtering) to 10 (minimum filtering), standard is 5 (average filtering).

The stronger the filtering is, the slower the display of the value will be. If the display of the measured value fluctuates greatly (e.g., because there is an electromagnetic disturbance or because the measured value actually changes rapidly), a stronger filtering is useful.

6 Level

ProfiLux 4 can regulate the water level (= level) in various ways.

ProfiLux has 4 inputs for level and leakage detectors and can optionally control 12 inputs. In addition to level sensors, you need additional accessories (for example, Expansion cards with level inputs or an Expansion Box 2) for full use of the 12 independent level controls.

	ProfiLux 4
Independent level controls	12
Max. amount of level sensors	16
Permanently installed level sensor inputs in the device	Standard: 2 + 2

Level sensors for the determination of the water level can be connected to the level connections (mini DIN sockets: Level 1 & 2 purple, 3 & 4 green). Since these are double-allocated sockets, you can connect two level sensors per socket using a splitter cable (Y-cable *PL-LY*; not included).

Expansion cards can be used to increase the number of level inputs in *ProfiLux 4* or *Expansion Box 2.*

The numbering of the sensor inputs is continuous and begins with the sensors permanently installed in the ProfiLux, followed by the sensor inputs of expansion cards (if available). The fixed inputs of the first expansion box are then counted, then the sensor inputs of expansion cards in the first Expansion box. The numbering of sensor inputs of further expansion boxes is continued according to the same system.

Since the level control is a sensitive matter, various safety precautions have been taken. Our sensors and the evaluation electronics are designed in such a way that a withdrawal of the sensor plug or a cable break is interpreted as reaching the desired level and the corresponding socket is switched off.

In addition to the more cost-effective mechanical float operated sensors, we also offer optical or contact-less sensors (without mechanical parts). These cannot get stuck in a position due to contamination. Furthermore, time limits are adjustable which limits the switching duration of the sockets. Thereby, overflow due to a defect can be prevented in most cases.

Note

After setting the level control (***function***), please assign the sockets (***hardware***) to be switched by the level control, see also under *System-> Socket outlet function.*

After you have selected a level control, you can edit its settings.

Note

Please note that you can assign any level sensor inputs to any control, this assignment is described below.

6.1 Control

Select which control you want to edit.

There are different operating modes, which are operated with 1 or 2 sensors.

6.1.1 Operation Mode

6.1.1.1 Operation Modes with 1 Sensor:

- ***Not enabled*** – This control is not used.
- ***Auto top off (ATO) -***

  As soon as the sensor registers a low water level, the switch box with the function *Fill water* is switched on. When the nominal level is reached, it is switched off again. Then you can set if the auto top off shall be always active: *ATO always*? If not, then you can afterwards select a timer. In this case the selected timer defines when the ATO may be active for this sensor.

- ***Leakage detection***

  If the sensor is activated, *ProfiLux 4* assumes a leakage and triggers an alarm. As long as there is no alarm, the switchable socket with function *Fill water* is switched on, in case of an alarm switched off.

- ***Return pump***

  As soon as the sensor registers a high level, the switchable socket with the function Water fill is switched on. When the level falls below, it is switched off again.

6.1.1.2 Operation Modes with 2 Sensors:

- ***Water change***

For adjustable times the water is drained off (switchable socket with function *Water drain* is then switched on) until sensor 2 signals the minimum water level. After this, *Water drain* is switched off and the socket *Fill water* is switched on until the water reaches sensor 1.
-> Sensor 1 signals, that the tank is full again, sensor 2 indicates when enough water has drained off. Switchable socket *Fill water* switches fresh water supply, *Drain water* switches the outflow.
After the selection of this operational mode, the timer has to be selected which shall define the time of the water change. Please don't forget to program the selected timer accordingly afterwards (set here switching period to *Event start*, see also *Clock ->Timers*). The water change is then started at the times set there.

- ***Water change and ATO***

  Like *Water change,* additionally socket *Fill water* and level sensor 1 serve as ATO if there is no water change running at that time.

- ***Min/Max-control***

  Two sensors work together to control a water level. Sensor 1 works as a maximum-switch, sensor 2 as a minimum-switch. As soon as sensor 2 registers a too low level, the switchable socket with function *Fill water* is switched on. When the water level reaches then sensor 1, the switchable socket is switched off again.

- ***ATO 2 sensors***

  Like *ATO,* but 2 sensors are used to register the same level. Only if both sensors register at the same time a too low level, the switchable socket with function *Fill water* is activated. So this function offers an additional safety.

6.1.2 Maximum on-time

Due to safety reasons you can set how long the switchable sockets with the functions *Fill water* and *Drain water* may be active at maximum. 8 hours can be set at maximum. Through this, you can avoid that a defective sensor leads to a (too big) flooding. In case the time is exceeded, the level control and the related switchable sockets are immediately deactivated and an alarm is triggered! The level control remains deactivated as long as the error is reset or the *ProfiLux 4* is restarted. If here 0 is set as duration, then the time monitoring is deactivated.

Note

For a switchable socket which is assigned to a control with the function *Leakage detection* there is no monitoring of the maximum switching time.

For an automatic water change this *Maximum on-time* is valid for both sockets (drain and fill).

A restart of the *ProfiLux 4* (also after a power-cut) resets the error and the time monitoring will be restarted.

6.1.3 Automatic Error reset

If you confirm "*Reset Error?*" with *Yes* then errors for this control will be reset automatically as soon as the sensor signals no (or again) water contact (depends on the operation mode).

This function offers a higher degree of convenience because in case of the Automatic Top Off, an error is automatically reset as soon as the missing water is re-filled manually). It does however, carry a higher risk since the cause of error could persist further on. Therefore we recommend full consideration if this function is to be used.

6.1.4 Sensor select

Here, you can determine which level sensor inputs are to be used by this level control.

2 sensors are to be selected for operating modes with 2 sensors.

6.2 Input

After selecting a level sensor input, you can set its behavior. Normally these settings need not be changed.

6.2.1 Reaction Time

Set here the *Reaction time* of the level sensor input. It can be set between 0s and 60s (Standard is 1s).

This feature is useful in instances where you may want to set a level sensor reaction delay. In areas where there is frequent water surface agitation in the same area as the sensor, the assigned switchable socket may turn on/off too often. *ProfiLux 4* monitors if the signal (= water there/not there) transmitted by the sensor is stable. Stable means in this case that a change of the level has to remain constant at least for the set reaction time. Only if the level is stable, the level control reacts.

The *Reaction time* should be set high enough so that waves do not cause a response of the control, but also small enough so that an attained level is not detected too late!

6.2.2 Input Inverse

Under certain circumstances it may be useful to invert the switching behavior of the sensor (for example, if the sensor can only be installed upside down). Confirm *Input invert?* with *Yes* then the sensor input is inverted.

6.3 Error Reset

If there is a timeout/overrun (socket with function *Water* switched on too long, see also under *Maximum switching duration*) or the leakage monitoring system triggers an alarm, the error status in the device must be reset. This also resets the alarm. As long as the error has not been reset, the level control remains inactive!

6.4 Diagnostic

To facilitate the implementing of the level sensors, the menu item *Diagnostic* is available. The current state of all level sensor inputs is displayed here. On contact with water (= sensor active) the corresponding number of the sensor input is displayed.

The display of "1 4 8" means that sensor inputs 1, 4 and 8 signal contact with water.

Please note that a "contact with water" is also displayed when no sensor is connected. The diagnosis is terminated with *Esc*.

6.5 Start Water Change

For all level sensor controls with the operating mode *Water change* or *Water change & ATO*, you can start the automatic water change manually here. After you have answered safety question with *Yes*, the water change starts.

7 Flow

ProfiLux 4 allows you to connect *Flow sensors* to our controller. These can be connected to the permanently installed level inputs 1 or 2 and to *ProfiLux Expansion cards* with level inputs.

Up to 4 flow sensors can be connected.

Flow sensor settings cannot be edited via the *ProfiLux 4* keypad, these settings can only be made using the *GCC* PC software.

Note

The flow sensor settings cannot be made via the *ProfiLux 4* keypad, these settings can only be made using the *GCC* PC software.

The following settings are available for each sensor:

7.1 Alarm Threshold

Here, you can enter a threshold of up to 65000 l/h. If the current flow exceeds this value, an alarm is output. A threshold of 0 l/h switches off the alarm monitoring.

7.2 Calibration

Based on this value in ml/pulse, *ProfiLux 4* calculates the current flow. The flow sensor used determines this value:

Flow-Sensor model	Calibration value without bypass
2000 l/h	1.40 ml/Puls
5000 l/h	6.22 ml/Puls
9000 l/h	12.40 ml/Puls

If the flow sensor is operated in a bypass, the calibration value must be corrected accordingly. Here is an example:

A 5000 l / h sensor is used in a bypass and only half of the water flows through the bypass. Then enter a calibration value of 12.44 ml/pulse (double value of the standard calibration value, a total of twice the amount of water flows).

GHL Control Center offers a tool to help you determine the correct calibration value.

7.3 Nominal Value

ProfiLux 4 can control a pump controlled via a 1-10V interface based on the measured flow (= actual value) and a desired flow (= nominal value) so that the flow remains constant - if technically possible.

A nominal value of up to 65000 l/h can be set.

Select a 1-10V interface which is to be used for the control of the pump (see also under *System -> 1-10 V interface*). Depending on the difference between nominal value and actual flow, the output voltage is increased or decreased.

7.4 Connected at Level-sensor

ProfiLux 4 needs to know at which level sensor input the flow sensor is connected. With *Not-enabled* this flow sensor is inactive.

8 System

8.1 Factory Settings

After selection of this function you are asked if the factory settings shall be restored: *Factory settings now?* If this is accepted, all settings are reset to their delivery status! The operating hour meters are not reset.

8.2 PIN

A personal identification number (PIN) is used to protect the device against unauthorized changes. Factory default is set to 0000. If the PIN is set to 0000, all changes can be made without entering a PIN. As soon as the PIN is unequal to 0000, this PIN must be entered before each setting. This also applies to the PIN change.

TIP

If you forgot your PIN

Switch off the device (disconnect the voltage supply), switch it on again (plug in the voltage supply again). Immediately, while the status and greetings screen is displayed, press the left arrow.

You will be asked: *Are you going to delete the PIN?*

After confirmation with *Yes*, the PIN is reset to factory default (0000 - deactivated).

8.3 Socket Outlet Function

Here, the previously adjusted ***functions*** for connected powerbars or dosing pumps of the first generation of GHL (hardware) are here assigned to the switch sockets/outlets (***hardware***).

First, select the socket to which you want to assign a function. *ProfiLux 4* can control a maximum of 64 sockets.

You can assign the following functions:

Timer	Then select the *Number* of the timer. This switching output is controlled by the corresponding timer.
Dosing pump	Then select the *Number* of the dosing pump. This switching output is controlled by the corresponding dosing pump control.
Illumination	Then select the *Number* of the illumination. With this you can assign a switching output to an illumination. For a dim setting of the corresponding illumination of 0% it is switched off. For 1% to 100% it is switched on. This function is intended to switch off dimmable light bars which do not have an internal voltage cut-off at 0% or to switch dimmable luminaires via the mains cable. Dimmable light bars from GHL do not need an external switch-off and are directly connected to a permanent power supply as they are internally equipped with a shutdown. No switching sockets are required for the operation of dimmable GHL light bars!
Water fill (A+L)	Then select the *Number* respective level control. The level control uses this switching output for switching solenoid valves or pumps when water is to be replenished. This socket is used during automatic water change (AWC) **and** during auto top off (ATO). With the following socket functions it is possible to switch different sockets for AWC and ATO (e.g. for osmosis- and salt-water).
Water fill (AWC/Water change only)	Then select the *Number* respective level control. The level control uses this switching output for switching solenoid valves or pumps when water is to be replenished. This socket is **only used for AWC** and not for ATO.
Water fill (ATO only)	Then select the *Number* of the respective level control. The level control uses this switching output for switching solenoid valves or pumps when water is to be replenished. This socket is **only used for ATO** and not for AWC.
Water drain	Then select the *Number* of the respective level control. The level regulation uses this switching output to switch magnetic valves or pumps when water has to be drained.

Current pump	Then select the *Number* of the respective pump. The current simulation switches this switching output on if the corresponding current pump is active. **Important hint: Each switching process means stress for the socket as well as for the pump. Because of this, the times in the current-modes *Sequence, Surge* or *Random* may not be set too short!** According to the connected load the sockets have a life cycle of up to 10,000,000 switching cycles!
Programmable logic	Then select the *Number* of the programmable logic. The result of the corresponding programmable logic is output at this switching output. See also point *Programmable logic*.
Sum alarm	In case of any alarm this switching output is switched on.
Filter	Then select the *Number* of the respective feeding pause (1-4). This switching output is generally permanently switched on, except during the feeding pause.
Always on	This switching output is always switched on.
Always off	This switching output is always switched off.
Thunder	This switching output is switched on for a short time (ca. 800ms) when the storm simulation generates a flash.
Thunderstorm	This switching output is switched on during a thunderstorm and can be used for instance to switch on a raining device in a terrarium.
Maintenance	Then select the *Number* of the respective maintenance (1-4). This switching output is switched on during maintenance.
Water change	Then select the *Number* of the respective level control. This switching output is switched on during the whole water change (during draining and refilling).
Variable Illumination	Then select the *Number* of the respective variable illumination. Herewith you can assign a *Variable illumination* (see also *Illumination ->Variable Illumination)* to a switching output.
Digital input	Then select the *Number* of the digital input. This switching output is switched on when the corresponding digital input is active.

In addition, a switching output can be assigned to a control loop. For this purpose, one of the available controllers (sensors) is to be selected, e.g. *Temperature 1* or *pH 1*.

After the selection of the controller, which is to influence this switching output, the function must be further specified.

For temperature controllers, these options can be selected:

Cooler	The temperature control uses this switching output to switch the cooler.
Heater	The temperature control uses this switching output to switch a heater.
Bottom heater	The temperature control uses this switching output to switch a bottom heater.
PTC	This switching output is on when the temperature control wants to heat or cool (in both cases). With this, you can make a here connected PTC which is already operated via a 1-10 V-interface, completely powerless if it shall neither be heated nor cooled. In principle you can supply a PTC permanently with power and therefore it doesn't need to be connected to a switchable socket, but you can save the standby-energy through the shut-off.
Alarm	In case of an alarm of this controller, the socket is switched on.

All other controllers can be selected under these options:

Control downwards	The control uses this switching output for the downwards-regulation e.g. to decrease the pH-value.
Control upwards	The control uses this switching output for the upwards-regulation to e.g. increase the pH-value.
Alarm	In case of an alarm of this controller, the socket is switched on.

After selecting a function, the following settings can be made additionally:

- ***Blackout delay***– for the time set here (0 to 60 minutes) the switching output remains switched off in any case after the switch-on of the *ProfiLux 4*. This setting is useful if this switching output switches a device which must first cool down before it is switched on again, e.g. if the re-switching of a MH-lamp shall be delayed after a power failure.
- ***Invert switching behavior*** – if this option is activated, then the switching output behaves exactly inversely: if it shall be switched on, it is switched off and the other way around. The inversion of the switching behavior is e.g. then useful if pumps or magnetic valves shall be switched off instead of on through the level regulation.

8.4 1-10 V Interface

Each 1-10 V interface can be configured separately. ProfiLux 4 has six permanently installed 1-10 V interfaces L1 to L6 (two combined in one connection). With the *PLM-2L4S* or *PLM-4L expansion cards*, the number of 1-10 V interfaces can be increased.

Once the interface has been selected, you can assign the desired and previously set ***function*** to it.

Illumination	Then select the *Number* of the illumination. Here the dimmable lamps are then connected – e.g. with dimmable ballasts or *ProfiLux Moon*. This makes it possible to assign any 1-10 V interface to any lighting.
Current pump	Then select the *Number* of the pump. This interface is then used by the current simulation.
Always off	This interface has no function.
Variable Illumination	Then select the *Number* of the variable illumination. Herewith you can assign a *Variable Illumination* (see also *Illumination ->Variable Illumination*) to this interface.
Constant flow	Then select the *Number* of a flow sensor. With this function this interface is able to control a variable-speed pump in order to obtain a constant flow, see also *Flow.*

Furthermore, you can assign a 1-10 V-interface to a control loop. For this you have to select first one of the available controllers, e.g. *Temperature 1* or *pH-value 1*.

The selected controller outputs then a voltage that is proportional to the control deviation (= deviation from nominal value to actual value) at this interface.

Example: Temperature control

If the temperature of the water exceeds the set temperature, a voltage proportional to the temperature control difference is output.

To put it simply: the warmer, the more voltage.

This makes it possible to control an adjustable cooler - e.g. our PropellerBreeze with control electronics PropellerControl - and to operate it as quietly as possible.

After that you can set the *Minimal* and *Maximal voltage* of this interface. As a rule, the voltage range is 1 V to 10 V.

It may be necessary to set the minimum voltage (at 1%) (Possible range: 0 V to 4 V). This may be due to the following reasons:

- Not all fluorescent tubes are equally suitable for dimming. Further information concerning the dimming suitability can be obtained from the tube manufacturer. Most of the problems occur in the lower dimming range (up to ca. 10%). Here it can happen

that the fluorescent tube simply switches off after a certain time (mostly few minutes). Solution: Increase of the *Minimal voltage*.

- Not all dimmable ballasts behave in the same way. The lower dim setting should normally be reached at a voltage supply of 1V, full light intensity at 10V. We have noticed that the light intensity doesn't change anymore for some ballasts for a voltage supply under 1.5V, for other ballasts the dimmable range goes to ca. 0.8V.
- The current pump stops although the set current speed is >= 1%.

The maximal voltage (at 100%) has to be set between 4.5V and 10V, to solve for example the following problems:

- For certain dimmable ballasts there is no further light intensity change visible between 9.5 V and 10 V.
- The current pump operates with full power already at 8 V.
- The moonlight is too bright at 10 V

Tip

To achieve an optimal brightness curve, the control voltages should be adapted to the connected lamp, i.e. minimal light intensity and lower voltage supply as well as maximal light intensity and upper voltage supply should match exactly.

To achieve an optimal course of the dimming you can test in the menu *Manual Illumination*, if for the lower dimming values the light intensity changes or if the lamp shuts off and for the upper dimming values if there are still differences in the light intensity that can be seen. If necessary, the *Minimal and Maximal voltage* have to be changed and tested again.

8.5 Program LED

These functions are used to reprogram a connected LED light from GHL (*Mitras-Simu-Stick*). During programming, only the lamp to be programmed must be connected! The setting is stored in the LED light (even in the event of a power failure).

Swap channels – the channel assignment in the lamp is swapped. As a default setting *ProfiLux Moon* reacts to illumination 1 (resp. 3) and *ProfiLux Sunrise* to 2 (resp. 4). After the channel swap the lamp behaves exactly inversely. This makes e.g. then sense, if a moon light and a commonly dimmable light bar shall be connected via a Y-plug at the same port of the *ProfiLux*.

Lightning mode – here you can set if the flash light (only for ProfiLux Simu) shall react to *All flashes*, to *Flash 1* or to *Flash 2*. If only one *ProfiLux Simu* is connected, you should choose *All*

*flashe*s. If 2 *ProfiLux Simu* are connected, then one should react to *Flash 1*, the other one to *Flash 2*. This produces a nice effect, since for a flash generated by a *ProfiLux 4* not always both flash lights react but it is determined at random where the flash is generated.

Moon-Color - this setting defines if your moonlight shines *Deep blue*, *Light blue* or *Blue white*. This programming is only possible for the LED-lamps *ProfiLux-Simu* and *ProfiLux-Moon*. This is NOT possible for: *Mitras-Simu-Stick*, *ProfiLux-Simu-DB*, *ProfiLux-Simu-BW*, *ProfiLux-Moon-DB*, *ProfiLux-Moon-BW* and *ProfiLux-Sunrise*!

8.6 Communication

Here you can make all communication-related settings.

Note

The following settings can only be made directly on *ProfiLux 4*!

- ***Device address*** – The computer can be accessed from the PC-program GHL *Control Center* under this address.
  If multiple computers are networked, they must have different addresses!

  Otherwise there is no need to change this setting.
  If there are more communication interfaces, select one of them. All subsequent settings refer exclusively to the selected interface!
- ***Baud rate*** – The connection speed of the previously selected interface is set here (standard 9600 baud).
  The connection speed must match the connection speed of the receiver (e.g., PC with GHL Control Center). If the external display unit *ProfiLux View* or the *SMS module* is connected, then 9600 Baud must be set!

Increasing the connection speed is useful when the connection is short and interference-free. For transmission problems, e.g. for long and interference susceptible lines, it may be useful to reduce the baud rate.

8.7 Alarm

The operating mode of the alarm buzzer can be set here.

- *Buzzer off* – even in the event of an alarm the buzzer remains off
- *Buzzer on* – buzzer gets active in the event of an alarm, regardless of the clock time

- *Buzzer at set time* – buzzer gets active only to a determined time. Set the time range in which the buzzer is allowed to be active in the event of an alarm.

8.8 Virtual Probes

Under this menu item, you can manage so-called *Virtual probes*.

What are *Virtual probes*?

Sensors for detecting different values (for example, temperature, humidity) can be connected to *ProfiLux 4* or to corresponding *Expansion Cards*. To each of these sensors a control loop is assigned whose parameters (nominal value, hysteresis, nocturnal change, etc.) can be set. The control of a sensor switches the related switchable sockets (e.g. *pH upwards* and *pH downwards* for the pH-value-control or *Heater*, *Bottom heater* and *Cooler* for the temperature control).

It may be necessary to assign several, differently set control loops to the same sensor. One example would be a temperature control where bottom heater and heater shall be operated considering a nocturnal change, but the cooling shall not be influenced by the nocturnal change (since you don't like to have an active nocturnal change)

The solution is to create a "copy" (= virtual probe) of the actually existing sensor. This virtual probe and its associated control loop can be used just like a "normal" sensor. The actual measured value of the virtual probe is, of course, always equal to the measured value of the "original sensor". In addition, a virtual sensor cannot be calibrated.

Apart from the simple copy of a sensor, a virtual probe can also be generated from 2 original sensors. An average value from the current values of the two original sensors is then calculated.
This has two advantages: Firstly, it can be useful for a large amount of water (for example, a pond) to be measured at two different locations and form an average value; on the other hand, both original sensors can be monitored for too great a deviation. A too large deviation could indicate a fault, and the display of an alarm is then possible.

Note

Overall 32 sensors (sum of actual and virtual probes).

In the *Virtual probes* menu, you have the following selection options:

8.8.1.1 New Virtual Probe

A new virtual sensor can be created here. First select the type of the virtual sensor:

- ***Copy*** - Now select the original sensor from which a "copy" is to be generated. The current value of the virtual probe always corresponds to the current value of the original sensor.
- ***Average*** - Now select sensor 1 and sensor 2. The current value of the virtual sensor always corresponds to the current mean value from both original sensors. The alarm settings can also be used to specify a comparison alarm (see *Sensor settings ->Alarm*).

After storage, a virtual sensor (e.g., TEMPERATURE 2) is available. The corresponding settings (nominal value, hysteresis, etc.) are copied from the original sensor.

8.8.1.2 Delete Virtual Probe

A virtual probe can be deleted here.

Note

After creating a virtual probe, the sensors of the corresponding type are renumbered.

In the *ProfiLux 4* menus, you can distinguish virtual sensors from actually existing sensors by fully writing the name of virtual sensors (e.g., PH-VALUE 1).

8.9 Digital Powerbars

Here, our digital sockets or dosing units can be managed.

Firstly you will be asked *Use digital powerbars at S1-S4*? (This also applies to dosing units that you want to connect digitally). If you have selected Yes , then the socket control output *S1-S4* is set to digital data transfer so that at this socket, a communication with digital powerbars and dosing units is possible.

If digital sockets are to be used, the following options can be selected:

- ***No action*** – No further action is performed in the following.
- ***Set initial state*** - (for dosing pump units this function is not available) With this, you can set the states of the single sockets of a digital powerbar immediately after supply voltage has appeared. These states are also restored if the communication between *ProfiLux* and the powerbar is – due to any reasons – missing longer than 60 s, e.g. in case of a removed control cable or a defect of the *ProfiLux 4*. The digital powerbar monitors permanently if it still receives commands from the *ProfiLux 4*. It is for

example possible that you set your digital powerbar in a way that in case of a malfunction, the socket for the filter will be on and the socket for the heater will be off. So the water circulation is furthermore guaranteed, an overheating is at the same time impossible.

- ***Set numbering*** - With this, you assign numbers to the sockets of the digital powerbar (resp. the pumps of the dosing unit). The first socket of the powerbar (resp. pump of the dosing unit) receives the set start number, the next socket (resp. pump) this number + 1, etc. If e.g. 10 is set as first number, then the sockets of the powerbar have the numbers 10, 11, 12, 13, 14 and 15. The pumps of a dosing unit would have in this case the numbers 10, 11, 12 and 13. Then the set powerbar functions refer to these numbers, see also *System->Socket outlet function*. Start numbers between 1 and 19 can be assigned.

Note

The setting Use digital sockets only affects S1-S4!

All other connections for switch sockets (for example, S5-S8) are also suitable only for conventional switch sockets, and these connections cannot be changed.

If the option *Use digital sockets* was activated, no conventional switch socket can be controlled with S1-S4.

Mixed operation of digital sockets (on S1-S4) and conventional sockets (on the other switch sockets, for example S5-S8) is possible.

If the switching state or the numbering is to be set, only one single digital powerbar resp. dosing pump unit may be connected. If several devices would be connected during the programming, then all would overtake the new programming!

The numbering of powerbars and dosing pump units is freely selectable (see above *Set numbering*).

In contrast, the numbering of conventional powerbars is determined by the port at which they are connected.

Sockets of a bar connected to S5-S8 have, e.g. always the numbering 5 to 8. In this case, care must be taken that no duplicate number assignments result!

The set numbering and output states are permanently stored in the digital power bar and are thus retained even if they are not connected to mains voltage.

8.10 Configure PTC

If you use our *ProfiLux Temperature Control* (*PTC*) cooling and heating unit, you can perform one of the following actions:

- ***Swap channels*** – If PTC reacts to an odd channel (L1, L3, etc.), it will react to a straight channel (L2, L4, etc.) after the channel change and vice versa.
- ***Silent Mode on*** – The fans are throttled and therefore quieter, the efficiency drops somewhat.
- ***Silent Mode off*** – The fans are operated normally.

8.11 DALI

DALI (*Digital Addressable Lighting Interface*) is a standardized digital interface for the connection of corresponding devices (e.g., DALI-balasts) via a data bus. Via only one control line, up to 64 devices can be accessed individually, the devices are distinguished by their address.

Note

This menu item appears only if you have installed a DALI interface.

ProfiLux 4 numbers the DALI devices on command fully automatic. You only need to set which device is to respond to which lighting.

If a DALI interface is available, you can select the following functions in the DALI menu:

- ***Minimal dim-level DALI*** – DALI devices have a minimum physical dimming setting which is specified by the manufacturer. In order to achieve an optimum dimming sequence, you should set this value according to the devices used. Factory setting is 85, which corresponds to the value of Osram DALI-ballasts. Values between 0 and 254 can be set.
- ***New numbering*** – Here, all connected DALI devices are assigned a new long address (between 0 and 16777215) firstly. Then ProfiLux searches for all connected DALI devices and assigns short addresses between 0 and 63. When ProfiLux has finished numbering, the number of devices found is displayed. If not all devices have been found, even though the cabling is correct, then start *New numbering* again.

The *New numbering* must only be carried out if you have connected new devices to the DALI bus.

- ***Assign illumination*** – This allows you to assign illumination to each connected DALI device. This means that the brightness is set in the corresponding DALI device, depending on the assigned illumination. After selecting this function, you can use *arrow up/ down* to select which device you want to assign a illumination to. The currently selected device is then operated with a brightness of 100%, all other devices (or its associated lamps) are switched off. Confirm the selection with RETURN, then you can *Assign illumination?* (*arrow up/down*, then RETURN again). After a short wait, you can make another illumination assignment. When finished, press *ESC*.

8.12 Digital Input

If an Expansion card *PLM-ADIN* is available, there are 4 digital inputs as well as 2 analog inputs. The state of a digital input can be used to directly switch a switch socket (see also under *System ->Socket outlet function*) or to start or terminate a special function.

After selecting the digital input, its function can be set.

No action	This digital input does not have any special function.
Water change	This digital input starts the automatic water change. A second switching impulse interrupts the automatic water change.
Maintenance	This digital input starts the maintenance mode. A second switching impulse terminates the maintenance mode.
Feeding pause	This digital input starts the feeding pause. A second switching impulse terminates the feed pause.
Storms	This digital input starts a thunderstorm.

8.13 myGHL

With the cloud-based service *myGHL*, we offer you an additional option for comfortably using GHL products. To do so, you need a user account at www.myghl.com.

Before you create the account, please check whether the following prerequisites are met:

- The latest firmware is installed on your *ProfiLux 4*. If not, perform a firmware update (see the operating instructions).
- Your *ProfiLux 4* is assigned to your home network.

Connect your *ProfiLux 4* to *GCC*. Under the menu item System -> Communication you will find your *myGHL ID*, which you need to use *myGHL*.

- There, please set the operating mode of *myGHL to full read and write*.
- Create your user account on *myGHL* and enter and copy your *myGHL ID* into *myGHL* using copy-and-paste.
- A security key appears in the *GCC*, which you please also copy into the relevant window of *myGHL*.
- Press *Connect*

A detailed video tutorial on how to connect your *ProfiLux 4* to the myGHL cloud service can be found on our homepage www.aquariumcomputer.com -/Support /Videos.

On the device itself, you can see and change the operating mode also.

You have the choice between

- *Inactive*
- *Read only*
- *Read & write*

9 Programmable Logic

ProfiLux 4 offers a wide range of settings for almost every application. However, there may be situations where the user needs specific functions that are not covered by the standard functions of the *ProfiLux 4*. An example: During the feed pause, the heating should always be off, otherwise it should be temperature-dependent.

With the help of the programmable logic, the user can create a function for switching the corresponding socket.

Compared to the other functions of the *ProfiLux 4*, Programmable Logic requires basic knowledge of Boolean logic. Therefore, the corresponding settings cannot be changed on the *ProfiLux 4* itself, but only via the PC operating program *GHL Control Center*.

For more information about *Programmable logic*, please visit our website.

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