Programming guide

for

Aquarium computer, Pond computer and Terrarium computer

Valid from firmware version 5.00
As of 02/04/2010

Contents

This programming guide is valid for these *ProfiLux*-controllers:

ProfiLux II
ProfiLux Plus II
ProfiLux II eX
ProfiLux Plus II eX
ProfiLux II Terra
ProfiLux II Light
ProfiLux II Outdoor
ProfiLux 3
ProfiLux 3 eX

The availability of certain functions and setting options described below depends on the type and the existing extension cards.

Below an overview of the menu structure in *ProfiLux*:


Sensor settings
Nominal vaule
Nocturnal change
Calibration
Activity
Operation hours
Hysteresis
Alarm
Current actual value
Operation mode controller
Signal filter
Display
Measurement range
Density offset
Summer switching
Therapy
Cooling difference
Extension
1-10 V maxi. at
Level
Sensor settings
Error reset
Diagnostic
Start water change
Clock
Time & Date
Reminders
Timers
Location
Illumination
Illumination run
Manual illumination
Clouds
Moon
Rainy days
Storms
Burning-in
Operating hours
Temperature-dependent light reduction
Special lamp
Variable illumination
Extras
Maintenance
Internal time
Info & Support
Feeding pause
Current
Display
Measurement data
Language
System
Factory settings
PIN
Socket outlet function
1-10 V interface
Program LED
Configuring View II
Communi-cation
Alarm
Virtual probes
Digital powerbars
Configure PTC
DALI
Digital inputs

1 Sensor settings

Here you can make the settings which affect the sensors (except level sensors – their settings can be found beneath).

First select the sensor whose settings you would like to change. If you have connected several sensors of the same type, then the numbering is as follows: The firmly built-in connections in *ProfiLux* have the lowest number, the numbering of additional connections on extension cards increases with the number of the slot in which the cards are plugged in.

Afterwards you can choose among the following options:

1.1 Nominal value

Here you can set the nominal value (the value to which it shall be regulated). The nominal value and the current value (actual value) determine if it is regulated upwards or downwards.

Hint	Control downwards: If the nominal value is under-run, then the control downwards is switched off, if the nominal value is exceeded by more as a half hysteresis (see *3.5.6 Hysteresis*), the control downwards is switched on again. Control upwards: If the current value exceeds the nominal value, then the control upwards is switched off, if the nominal value is under-run by more as a half hysteresis, then the control upwards is switched on again.

Overview of the 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

Hint	When the nominal value is adapted, then, due to safety reasons, a possibly set nocturnal change is deactivated! This must be activated again afterwards, if necessary!

Hints for the temperature control	The heat dissipation of the illumination and the temperature outside can have an effect on the water temperature. If there is no possibility of cooling available, then it is possible that the nominal temperature is exceeded. Depending on the difference of the desired and the current temperature, the heaters resp. the cooling are switched. Here, the following states can occur: Heater and bottom heater on / Only bottom heater on / Everything off / Only cooling on *ProfiLux* is programmed in a way that the bottom heater takes precedence over the heater. This enables an optimal heating of the substrate. The heater is then switched additionally if the bottom heater alone is not sufficient anymore.

1.2 Nocturnal change

With this setting, you can determine if the value to which it shall be regulated shall be changed at night, as default setting, the nocturnal change is switched off. If you have activated the nocturnal change with `Yes`, then you can set afterwards the value by which the value shall be changed at night.

Overview of setting options for the *nocturnal change*:

Sensor type	Minimum	Maximum	Resolution
pH	-1.0	1.0	0.1
Temperature	-3.0 °C	-0.1 °C	0.1 °C
Redox	---	---	---
Conductivity fresh water	---	---	---
Conductivity salt water	---	---	---
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

Hint	Nocturnal nominal value = nominal value + nocturnal change

1.3 Calibration

This function serves for the calibration of a sensor. The calibration process is different for each sensor type. Not all sensors can or must be calibrated.

For all sensors that can be calibrated, it is basically valid:

Only if *ProfiLux* has been calibrated with the connected sensor, correct values can be determined. The calibration is always necessary for new sensors. Also due to the aging process of a sensor, the calibration should be repeated from time to time. Please pay attention to the instructions of the sensor manufacturer. Before the sensor is dipped into a calibration fluid, the sensor has to be always dried carefully (blow out, shake, dry tissue)!

First the `Calibration tolerance` has to be entered (between 1 and 3) which is taken as a basis for the calibration. For old sensors it can occur that the measured value doesn't sufficiently stabilize and a calibration is not possible. Under certain circumstances, through an increase of the calibration tolerance it is possible to adjust this sensor although, of course at the cost of the accuracy of measurement. In principle, calibration processes should be carried out with the smallest possible calibration tolerance.

Afterwards, for certain sensors you have the possibility to change the values to which it shall be calibrated.

Overview of the calibration values:

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 fresh water	yes	yes	0 µS	0 µS	1000 µS	2000 µS
Conductivity salt water	yes	yes	0.0 mS	0.0 mS	40.0 mS	80.0 mS
Oxygen	yes	no	0.0%	0.0%	102.0%	102.0%
Humidity	no	no	0.0%	0.0%	100.0%	100.0%
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

(if minimum and maximum are equal, then the calibration value cannot be changed)

Now the calibration process itself follows, it depends on the type of the sensor.

pH-Sensor

First of all you are asked to dip the pH-sensor into a calibration fluid with the first calibration value. A subsequent pressing of ***RETURN*** starts the measurement process. After completion of the measurement you are asked to repeat the same procedure with a calibration fluid with the second calibration value. Also here the measurement process has to be started with ***RETURN***.

Temperature sensor

This calibration function depends on the fact if it is an internal (onboard) temperature sensor input.

Internal (onboard) temperature sensor input

The factory calibration is restored and a possibly existing compensation for a cable extension (see *1.17 Extension*) is reset – *ProfiLux* then assumes that there is *no* extension cable.

External temperature sensor input (*PLM-*...)

Additional temperature sensor inputs (of extension cards, e.g. *PLM-Temp*) have to be calibrated!

Each extension card with temperature sensor input is delivered with a calibration document. The two values listed in the document have to be entered under `CalibrateADC1` and `CalibrateADC2`. After having entered these two values, the temperature sensor input is calibrated.

Redox sensor

First of all you are asked to insert the null-plug (is delivered together with our Redox-cards). A subsequent pressing of ***RETURN*** starts the measurement process. After the end of the measurement you are asked to dip the sensor into the calibration fluid (with the before set calibration value). Now of course you have to remove the null-plug and connect the sensor! Start the measurement process here also with ***RETURN***.

Conductivity sensor

You have to set if the temperature compensation shall be effected through a fixed set temperature (`Aquarium temperature manual`) or a measured value (then you have to select here the corresponding temperature sensor). If `Aquarium temperature manual` is selected, then afterwards you have to enter the `Temperature`.

Then the `Temperature of calibration fluid` has to be entered.

Hint	The easiest way is to put the closed container of the calibration fluid for a certain time inside the tank until the temperature has assimilated. This makes of course only sense if the temperature of the tank is known.

Afterwards the calibration itself begins. First of all you are asked to hold the sensor in the air (it is then not in a calibration fluid). Here, you already have to connect the sensor! A subsequent pressing of ***RETURN*** starts the measurement process. After the end of the measurement you are asked to dip the sensor into the calibration fluid (with the before set calibration value). Start also here again the measurement process with ***RETURN***.

Oxygen sensor

Opposite to all other sensors, the oxygen sensor is calibrated in 2 steps (since there is a minimum time interval of 30 minutes necessary), this means that the calibration process has to be started twice:

Zero calibration

The zero calibration has to be done only once. You are asked to remove the sensor plug. After you have removed the plug (so that the BNC-socket of the oxygen measurement input is unoccupied) you have to confirm with ***RETURN***. Afterwards the zero calibration starts. After the calibration you are asked if the calibration data shall be stored, confirm here with *Yes*. Now connect again the oxygen sensor.

Air calibration

The air calibration is only possible if at least once a zero calibration has been successfully effected before. Before the air calibration, the sensor has to be connected at least 30 minutes at the running *ProfiLux*! Only then the calibration will provide reasonable values!

After having selected the air calibration, you have to set if the temperature compensation shall be effected through a fixed set temperature (*Aquarium temperature manual*) or a measured value (then you have to select here the corresponding temperature sensor). If *Aquarium temperature manual* has been selected, then afterwards the *Temperature* has to be entered. Afterwards you have to set if the salinity compensation shall be effected through a fixed set salinity (*Salinity manual*) or a measured value (here you have then to select the corresponding conductivity sensor – only salt water-sensor possible). If *Salinity manual* has been selected then you have to enter afterwards the salinity, for fresh water, here you have to enter 0.0! Now the air *Temperature* of the calibration location (above the water surface) has to be entered. Afterwards, the calibration itself begins. You are asked to hold the sensor above the water. Now hold the sensor during the calibration process tight above the water (max. 1 cm) – but don't touch the water surface with the sensor! A subsequent pressing of ***RETURN*** starts the measurement process.

Hint	During the calibration measurement you can see 2 numbers in the lower line. The left number displays the maximum still remaining time in seconds. After expiry of this time, without the measured value having sufficiently stabilized, it is assumed that the sensor is defective and the calibration is stopped. The right number displays the measured value in an internal code. *ProfiLux* recognizes automatically, as soon as the value has stabilized and terminates then the measurement process.

When the calibration processes have been terminated, you are asked if the data shall be stored. If no errors have occurred, you have to confirm here with *Yes*.

Afterwards it is recommended to control the calibration. Put the sensor afterwards into the just used calibration fluids and check if the device shows the right values.

1.4 Activity

Here you can set if the sensor and the herewith related measurement recording and regulation shall be active (standard: *Yes*). If you set *No* here, then the regulation and sensor monitoring switches off and all switchable sockets connected with this sensor are deactivated. If this input is not used you should deactivate it, otherwise *ProfiLux* may assume a sensor defect and indicate an alarm. A deactivated sensor is displayed with - - - in the display.

1.5 Operation hours

In order to know how long a sensor has already been in use, there is a belonging operation hour meter. The operation hours are recorded cyclically every 1 h in the non-volatile storage. Through this, it is guaranteed that also in case of a power failure the operation hours are kept.

After the selection of the menu item *Operation hours* the operation hours of the sensor are displayed. After a few seconds have elapsed or a key has been pressed you are asked if the operation hour meter shall be *Reset?* A confirmation with *Yes* resets the operation hour meter to 0 h. This should of course only be done if the sensor is changed.

1.6 Hysteresis

The so-called hysteresis defines the interval between the switching points and is necessary to reduce the switching frequency. The here adjustable hysteresis covers the interval from the switch-on of the socket *Control downward* to the switch-on of the socket *Control upward* of the corresponding sensor.

For temperature sensors the here adjustable hysteresis covers the interval from the switch-on of the bottom heater up to the switch-off of the (main) heater, the switch-on of the cooler lies outside of the hysteresis so that the operation of bottom heater, heater and cooler at the same time is possible (see hint below).

The factory-provided hysteresis setting has normally not to be changed. A reduction of the hysteresis makes then sense if the regulation accuracy shall be increased. But through this, also the switching frequency is increased.

Example with a pH-sensor	Nominal value = 7.0 and hysteresis = 0.4 The downwards-socket switches on at 7.2 and off again at 7.0, the upwards-socket switches on at 6.8 and off again at 7.0. You can recognize that the regulation oscillates around 7.1 resp. 6.9 and not exactly around the set nominal value (7.0). This is necessary to enable a use of the upwards- and downwards-regulation at the same time.

Overview of the setting options for the hysteresis:

Sensor type	Minimum	Maximum	Standard	Resolution
pH	0.10	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 fresh water	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

Hint for temperature sensors	It depends also on the set hysteresis, when the cooling gets active. The switch-on point of the cooling depends furthermore on the cooling difference (see *1.16 Cooling difference)* and can be calculated as follows: T = Nominal temperature + 5/6 * hysteresis + cooling difference for a hysteresis of 0.2 °C results this: T = Nominal temperature + 0.167 °C + cooling difference.

1.7 Alarm

ProfiLux can monitor the current measured value of a sensor and in case of a too big deviation can react in different ways.

First you have to set if the alarm shall be enabled. If you have selected `Enabled, except during AWC (resp. Disabled at AWC)` then the alarm monitoring is temporarily shut off during an automatic water change.

If the alarm has been activated then the `Maximum deviation` of the actual value from the nominal value has to be entered.

Furthermore it can be set if in case of an alarm, the control shall be shut off: `Shut-off control?`

If it is a *virtual sensor* of the type *average* then you can additionally set a `Comparative alarm`.

After the activation of the alarm, the corresponding actual value is compared permanently with the nominal value. If the deviation (exceeding or undercut) is bigger than set under `Maximum deviation`, an alarm is triggered. During the comparison of nominal with actual value, the *hysteresis* as well as the possible *nocturnal change* are automatically considered, for temperature sensors furthermore the *cooling difference* is considered.

In case of a *virtual sensor* of the type *average,* the measured values of both sensors from which the average is built are compared. If the difference of the measured values is bigger than the *comparative alarm,* then also an alarm is triggered.

During an alarm the red alarm-LED lights and the buzzer is activated depending on the set mode (see *6.8 Alarm*). Furthermore a switchable socket can be programmed in a way that it is switched on in case of an alarm.

If the controller shut-off has been set for the alarm case, then in case of an alarm immediately all sockets are deactivated which are involved in the regulation of this sensor! The alarm settings should be made with highest caution. It has to be absolutely avoided that the alarm limits are exceeded during the normal operation!

Overview of the setting options for alarm limits:

Sensor type	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 fresh water	50 µS	500 µS	1 µS
Conductivity salt water	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 deviation 1.5 °C, cooling difference 2.0 °C, the outcome of this is:

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 *1.6 Hysteresis*)

Hint

In the case *ProfiLux* is indicating an indefinable alarm, then you should check if all unused sensor inputs are deactivated, see *1.4 Activity.*

1.8 Current actual value

Here the current actual value is displayed. The display is terminated with pressing any key.

1.9 Operation mode controller

You can set how the regulation shall work. For most of the cases the standard setting *Twoposition controller* is absolutely sufficient and therefore doesn't have to be changed. For some special cases the other operation modes suit to optimize the controlling behavior. The following operation modes can be chosen:

Twoposition controller
This is the common operation mode. At two switching points which are defined through nominal value and hysteresis, a belonging socket is switched on resp. off. See here also *1.6 Hysteresis*.

Pulse/Pause fixed
If the actual value differs from the nominal value by a half hysteresis, then the belonging switchable socket is switched on for an adjustable time (*Pulse duration*). After expiry of the *pulse duration* the socket is switched off again and remains off for at least the set *Pause duration*. After expiry of the *Pause duration,* the socket can be switched on again by the regulation if the actual value differs again (or still) from the nominal value by a half hysteresis, the switching cycle (pulse and pause) starts again.

Pulse variable
Works in principle just like *Pulse/Pause fixed*. The difference is that the actual turn-on time is calculated depending on the difference of nominal and actual value. The bigger the deviation, the longer is also the turn-on time, but at maximum as long as set under *Pulse duration*.

Pause variable
Works in principle just like *Pulse/Pause fixed*. The difference is that the actual turn-off time is calculated depending on the difference of nominal and actual value. The bigger the deviation, the shorter is also the turn-off time, but at maximum as long as set under *Pause duration*.

For these operation modes you have to set then 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 regulation can switch on again the belonging socket. You can set a pause duration between 1 s and 1 h.

The operation modes *Pulse/Pause fixed, Pulse variable* and *Pause variable* make then sense if the measured value reacts only slow and time-delayed to the regulation measures or if substances shall be added only in little doses.

Examples	pH-control: Feeding of acid into a pond to lower the pH-value Temperature control: Heating of the technical tank (temperature in the main tank follows time-delayed) Conductivity control: Feeding of osmotic water

1.10 Signal filter

Here you can set how intensely the measuring signals shall be filtered.

Permitted values are in the range from 1 (maximum filtering) to 10 (minimum filtering), standard is 5 (average filtering). The stronger the filtering the more the display of the value is delayed. If the display of the measured value fluctuates a lot (e.g. because of an electromagnetic interference or because the measured value changes indeed very quickly), a stronger filtering makes sense.

1.11 Display

You can set for certain sensors how the measured value is displayed.

Overview of the display options:

Sensor type	Standard display	Display 2	Display 3
pH	pH	---	---
Temperature	°C (Celsius)	°F (Fahrenheit)	---
Redox	mV	---	---
Conductivity fresh water	µS	---	---
Conductivity salt water	mS (Conductivity)	Salinity	Density
Oxygen	% Saturation	mg/liter	---
Humidity	% Rel. humidity	---	---
Air temperature	°C (Celsius)	°F (Fahrenheit)	---
Voltage	V	---	---

Hint

Settings have to be made always independently from this in the standard display (e.g. in °C).

1.12 Measurement range

For certain measurement inputs the measurement range can be set.

Temperature

Here, the measurement range can be selected according to the connected temperature sensor. There are 2 types of water temperature sensors:

Aquarium – Measurement range ca. 11.5 °C up to 38 °C

Pond – Measurement range ca. 0 °C up to 40 °C

As default setting the measurement range is set to *Aquarium*. Change the measurement range only if you connect a sensor for ponds! If measurement range and the used sensor are not conform, then false temperatures are measured!

Conductivity

If the concerned input is an onboard-input of *ProfiLux Plus II eX*, then the measurement range can be changed here – for *Sea water* or *Fresh water*. Please keep in mind that with the change of the measurement range all settings for this input get lost and are reset to the default settings.

Hint

A change of the conductivity measurement range is NOT possible for expansion cards!

1.13 Density offset

(only for conductivity sensor sea water)

For the density display of sea water you can set here an offset between -0.005 and +0.005 if the displayed density value differs from the real value.

1.14 Summer switching

(only for temperature sensor)

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

Through the activation of the summer switching, the bottom heater is operated in a way that the water temperature is not substantially additionally increased. The summer switching is switched off as default setting.

After you have activated the summer switching with *Yes,* you can set the *Intensity* of the summer switching (5-30). This number corresponds to the turn-on time of the bottom heater in minutes for a temperature exceeding of 1 °C. The turn-on time is calculated by the computer depending on the temperature exceeding. For a lower temperature undercut, the turn-on time is increased. For an exceeding by more than 3 °C, the bottom heater will remain off in any case. The settings of the nocturnal change are considered. This intelligent and elaborate process has the advantage that you always achieve an optimal substrate circulation adapted exactly to your tank!

1.15 Therapy

(only for temperature sensor)

In case of a fish disease it can be useful to change the water temperature for a certain time. With the activation of the function *Therapy* for the set time (3 - 21 days) the temperature is changed by the requested value (decrease by 5 °C up to increase by 5 °C adjustable). The temperature change at the beginning and at the end of the therapy is effected gently (each within a day). If you have set an upper temperature limit for the heater due to safety reasons, you have to adjust this if necessary for the temperature increase.

1.16 Cooling difference

(only for temperature sensor)

If the cooling shall not get active within the usual regulation (adherence of the nominal temperature considering the hysteresis), but only delayed, then you can set with the *Cooling difference* to which extend the temperature has to exceed the nominal temperature until the cooling gets active. Adjustable are values between 0.0 °C (no delay, cooling gets active immediately in case of a nominal temperature exceeding) and 5.0 °C (max. delay, cooling gets only active in case of an exceeding of the nominal temperature by 5.0 °C). The *Cooling difference* has also an effect on the alarm monitoring.

1.17 Extension

(only for temperature sensor)

If the cable to the temperature sensor is extended (or made shorter through removing an extension) then *ProfiLux* has to compensate the measurement error caused by the change of the cable length. A change of the cable without compensation can have a significant measurement deviation as a consequence.

In order that *ProfiLux* can calculate the compensation correctly, you have to proceed as follows:

The sensor has to be connected and has to be inside the water (and has to remain there also during this process – the water should not vary a lot concerning the temperature during the next minutes).

Select this menu (*Temperature->Extension*).

Wait for the given time.

Change the extension cable (add resp. remove), confirm with ***RETURN***.

Now *ProfiLux* calculates the compensation values, afterwards you can store these values. From now on *ProfiLux* displays the correct (compensated) temperature value.

1.18 1-10 V maxi. at …

(only for temperature sensor)

With this setting you can define for which temperature deviation an assigned 1-10 V-interface (e.g. for *PTC* or *PropellerBreeze*) shall have the maximum output voltage. The connected device has then the maximum power for this temperature deviation. Adjustable are values between 0.2 °C and 10 °C.

2 Level

ProfiLux can regulate the water level (= level) in different ways. Up to three of our level sensors can be connected. At the port *Level* (resp. *Level 1 & 2* at *eX*-version) 2 level sensors can be connected with a splitter (accessory *PL-LY)*. The *eX*-version disposes furthermore of the port *Level 3* – here a third level sensor can be connected.

At the moment 2 level sensors can be connected to *each Expansion Box* (*ProfiLux 3* only). The numbering is as follows:

- *ProfiLux 3 (eX)*: Sensors 1 - 2 (3 at *eX*)
- *Expansion Box* 1: Sensors 4 - 5
- *Expansion Box* 2: Sensors 7 - 8
- *Expansion Box* 3: Sensors 10 – 11

(Sensors 6, 9 and 12 are not used at present)

Since the level regulation is a very sensitive issue, several safety precautions have been taken. Our sensors and computational electronics are designed in a way that a removing of the sensor plug or a cable break is interpreted as a reaching of the requested level and the corresponding socket is switched off. Furthermore we offer besides the more low-priced mechanical float-operated sensors also optical or contactless sensors (without mechanical parts). These cannot get stuck due to soiling in one position. Furthermore you can set time limits which restrict the switching time of the sockets. Through this, an overflow due to a defect can be avoided in most of the cases.

Below are the settings for the level control.

2.1 Sensor settings

2.1.1 Operational mode

After selection of a sensor, you can choose its operational mode:

`Not enabled`
This sensor is not used.

`Auto top off (ATO)`
As soon as sensor 1 (resp. 2 or 3) registers a too low level, the switchable socket with the function *Water 1* (resp. *Water 2* or *Water 3*) 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 sensor 1 (resp. 2 or 3) is activated, *ProfiLux* assumes a leakage and triggers an alarm. As long as there is no alarm, the switchable socket with function *Water 1* (resp. *Water 2* or *Water 3*) is switched on, in case of an alarm switched off.

`Return pump`
As soon as sensor 1 (resp. 2 or 3) registers a high level, the switchable socket with the function *Water 1* (resp. *Water 2* or *Water 3*) is switched on. When the level falls below, it is switched off again.

For sensor 1, additionally the following operational modes are possible. Since in these operational modes sensor 1 and sensor 2 work together, for sensor 2 the operational mode `Not enabled` is automatically set.

`Min/Max control`
The sensors 1 and 2 work together to control a water level. Sensor 1 serves as maximum-switch, sensor 2 as minimum-switch. As soon as sensor 2 registers a too low level, the switchable socket with function *Water 1* is switched on. When the water level reaches then sensor 1, the switchable socket is switched off again.

`Water change`
For adjustable times the water is drained off (switchable socket with function *Water 2* is then switched on) until sensor 2 signals the minimum water level. After this, *Water 2* is switched off and the socket *Water 1* 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 *Water 1* switches fresh water supply, *Water 2* switches the outflow.
After 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 *3.3 Timer*). The water change is then started at the here pre-set times.

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

ATO 2 sensors
Like *ATO*, but sensor 1 and 2 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 *Water 1* is activated. So this function offers an additional safety.

Hint	If for sensor 1 an operational mode is set which needs also sensor 2 (Min/Max control or water change) then an operational mode setting of sensor 2 has the effect that sensor 1 is deactivated!

2.1.2 Reaction time

Here the *Reaction time* of each used level sensor can be set between 0 s and 240 s. To prevent that movements of the water surface lead permanently to an activation of a sensor and through this a belonging switchable socket is switched on and off all the time, *ProfiLux* 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 constantly at least for the set reaction time. Only if the level is stable, the level control reacts. The reaction time shall be set sufficiently so that waves don't cause an activation of the regulation, but small enough that a reached level is not recognized too late!

2.1.3 Maximum on-time

Due to safety reasons you can set how long the switchable sockets with the functions *Water 1, Water 2* and *Water 3* may be active at maximum. The time can be set separately for all three switchable sockets, at maximum 8 hours can be set. Through this, you can avoid that a defective sensor leads to a (too big) flooding. In case the time is exceeded, the level regulation and the related switchable sockets are immediately deactivated and an alarm is triggered! The level regulation remains deactivated as long as the error is reset. If here 0 is set as duration, then the time monitoring is deactivated.

Hint	For a switchable socket which is assigned to a sensor with the function leakage detection there is no monitoring of the maximum switching time.

2.2 Error reset

In case of an exceeding of time (socket with function *Water* switched on too long, see *2.1.3 Maximum on-time)* or if the leakage detection has triggered an alarm, the error status in the device has to be reset. With this, also the alarm is reset. As long as the error has not been reset, the level regulation remains inactive!

2.3 Diagnostic

To facilitate the implementing of the level sensors there is the menu item *Diagnostic*. Here the current state of the connected sensor is indicated. An "X" means "Contact with water – sensor active", a "-" means "No contact with water – sensor not active". Please keep in mind that an "X" is also displayed if there is no sensor connected. With the key ***Esc*** the diagnostic is terminated.

2.4 Start water change

If the operational mode *Water change* or *Water change & ATO* is set for sensor 1, then you can start here the automatic water change manually. After you have answered the savety question with *Yes*, the water change starts.

3 Clock

Here all settings are made that are related to the time.

3.1 Time & Date

For the understanding it is important to know that there are two clocks running in the computer. One of these clocks reflects the actual ("our") clock time. This is also the time which can normally be seen on the display. Furthermore there is a second (internal) clock running in the device which controls the automatic processes like dimming, nocturnal decrease, timers etc. Both clocks are running usually identically, except in case of an alteration of the actual time (e.g. in case of the automatic or manual change winter time/summer time). Then the internal clock is not changed immediately but over the course of the set days. For a setting of e.g. 10 days, it will be 60:10 = 6 minutes per day.

First of all you are asked *Use DCF?* (resp. if you like to use the externally connected radio-controlled clock receiver).

If you confirm here with *Yes* then the time received by the radio-controlled clock receiver is used. If the reception is sufficient, there is no more setting of date and time necessary, they are automatically updated.

If DCF is not used you can now optimize the accuracy of the clock by entering a *correction per day* (from -59s to 59s). With 0 s (default setting) the clock runs without correction, otherwise once per day the adjusted seconds are added (resp. subtracted).

Afterwards you have the possibility to define if the *ProfiLux* – clock shall change between normal time (MEZ) and summer time (MESZ). 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 would like a change, then you can set furthermore the number of days over which the time change is to be spread. If you use DCF, this smooth time adaptation starts beginning from the time of the MEZ-MESZ-change. If you don't use DCF, then the time can be changed manually by one hour. Also in this case the internal clock will be adjusted slowly within the set days. With this, you have the possibility to spread this one hour over several days and you will have a smooth clock change.

After this, you can set *Date* and *Time* manually. When storing the time you will also be asked if you would like 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 the first setting of the time you should answer here with *Yes*, for a change of the clock due to summer time with *No*.

Hint	The DCF-signal for the radio-controlled clock is not always available. Therefore it can be the case that sometimes there is no reception possible. Nevertheless, the internal clock continues running and is synchronized with the next reception (possible little deviations are corrected). This is why also a from time to time reception DCF can be used.

3.2 Reminder

The computer can remind you of activities that still have to be done. After expiry of a certain adjustable time (in days) you are reminded by a text that is indicated on the display, 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 a new expiry of the time. An example for a reminder to be displayed repeatedly is the monthly change of the filter. A reminder that shall only be displayed once would for example be the time to let your fish breeding into your tank.

First the reminder memory has to be selected (1 - 4). If this reminder is currently ongoing, you can mark it as done, it will then no longer be displayed. Otherwise you will be asked next if this reminder shall be active. If you have activated this reminder with *Yes,* you have to set if you would like to be reminded repeatedly. Afterwards you have to enter in how many days you would like to be reminded. After setting the days please enter the text which shall remind you. After storing, *ProfiLux* displays as a confirmation when the next reminder will come about.

3.3 Timer

ProfiLux disposes of several (number depends on the model) freely programmable timers. The sockets which shall react to the switching processes can be assigned as described under *6.3 6.3*.

After the selection of the timer which you would like to program, you can first enter the number of *Switching cycles per day* (0 up to 8; 0 means that this timer is not active).

Then set the *Switching mode*. You can choose among the following options:

Normal
This operational mode is used to program longer switching times (accuracy 1 minute).
The switching time is determined by entering the *Switch-on time* and the *Switch-off time*.

Short time
With this setting you can achieve short switching periods (1 s up to 300 s, accuracy 1 s). The switching time is defined through entering the *Switch-on time* and the *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 explicitely 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 starts a process like e.g. a water change, see *2 Level*. Here only the *Start time* has to be entered.

Furthermore you have to enter the *Day mode*:

Days of week
Here you have to set on which days of week the switching shall take place. A marked box means "Switching on this day of week active", a blank box means "inactive".

Interval of days
Here the number of days is set after which the switching cycle shall be repeated, 1 day means daily switching cycle. After this it has to be set in how many days the switching shall be started.

If you have selected a dosing switching mode you also have to enter the *Flow rate* in ml/minute. Here the actual pump performance is meant, based on this indication, *ProfiLux* calculates the switch-on times of the dosing pump. A change of this setting does not influence the pump performance – this is firmly predefined by the pump mechanics! In case of an automatic dosing you have to set furthermore the *Rate per dosing*.

Finally you have to set if this timer shall make the *Feeding pause active* (except for the selection of *Event start*). If you confirm here with *Yes*, then the feeding pause is activated as long as this timer is active. The feeding pause remains furthermore active for the time set under *Feeding pause duration*. This makes for example then sense, if with this timer an automatic feeder or a dosing pump is controlled. Please pay attention that the feeding pause should not last too long – see also *5.4 Feeding pause*.

Hints for dosing	The dosing amount per day corresponds to the product of Dosings/day and Rate/ Dosing e.g. 4 dosings per day à 10 ml result in a dosing per day of 40 ml. As an alternative you can also use a timer or a controller (e.g. pH-value or conductivity) to control a dosing pump. Due to tolerances, the flow rate of a pump given on the data sheet can possibly deviate from the reality. To achieve the highest dosing accuracy as possible, we recommend to 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 to set the result of this measurement under *Flow rate*.

3.4 Location

Here you can set the coordinates (longitude and latitude) of your location. This information is used for further simulations.

As default setting 49.4°N and 7.8°E is set here – the coordinates of *Kaiserslautern* in Germany – where your *ProfiLux* has been produced!

4 Illumination

Under this menu item you will find all settings related to the illumination. *ProfiLux* can control several (number depends on the *ProfiLux* model) dimmable or non-dimmable lamps independently from each other. Lamps can be switched with our powerbar, dimmable lamps are furthermore controlled via the 1-10 V-interfaces.

Dimmable lamps

You can connect up to 2 (or 3 for eX-models) dimmable light bars of *GHL* directly at the *ProfiLux* (using one of our splitters it can also be more than that). As an alternative, you can also connect our dimmable LED-Lamps, hanging lamps or other manufacturer's products and home-constructed units (connection via accessory *EVG-AP* or *LF-ABOX*). In total, they can have at maximum 4 (resp. 6) independently dimmable lamps (lamp groups).

Dimmable lamps are connected at the L-ports (e.g. *L1L2*). These ports dispose each of 2 1-10 V-interfaces and the belonging shut-off signals. The interfaces *L1* up to *L4* are by default assigned to illuminations 1 to 4, see here also *6.4 1-10 V* interface.

Hints	Further 1-10 V-interfaces can be retrofitted. In case of commonly dimmable light bars, *L1* (resp. *L3*, *L5*, etc.) controls by default both tubes of a light bar. Optionally, also commonly dimmable light bars are available which react to *L2* resp. *L4*. So it is possible to connect 4 commonly dimmable light bars with our splitters, which then react to all four 1-10 V-interfaces. You can program the run for each illumination separately. Through this, it is possible to achieve effects like sunrise or moonlight.

4.1 Illumination run

Here you have to select first which illumination shall be set. After selection of one of the eight illuminations you can set the type of the lamp, you can select `Dimmable` and `Non dimmable.`

Furthermore you are asked `Automatic on?`. If this shall not be the case, then this illumination is in the manual mode.

Then you have to enter the *Number* of the `dimm-points` (for dimmable lamps) resp. of the `switch-times` (for non-dimmable lamps), for which you would like to set the light intensity (up to 12).

If it is a *dimmable* lamp then you have to set for each point of time:

`Start` – at this time the dimming process starts

`Duration` – the dimming process lasts as long as this, 5 to 480 minutes

`Light intensity` (0% - 100%) – Light intensity of the lamp at the end of the dimming process

Hint	The light intensity run between the single `dimm-points` is calculated automatically.

For a *non-dimmable* illumination you have to set for each point of time:

Switch on – at this time the lamp is switched on

Switch off – at this time the lamp is switched off

Finally you can also set which of the *Simulations* shall be active for this illumination. Mark *Rainy days*, *Clouds*, *Storms* and *Moon* correspondingly.

4.2 Manual illumination

This menu serves predominantly for test and diagnostic purposes. With the keys ***Left arrow*** and ***Right arrow*** you can select the illumination whose light intensity you would like to set, always 4 illuminations are displayed at the same time. With the keys ***Up arrow*** and ***Down arrow*** you can make the connected lamp brighter or darker, for non-dimmable lamps of course only 0% or 100% is possible.

With the key ***Sun*** the light intensity toggles between 0% and 100%.

On the left and the right next to the name of the selected illumination a symbol is displayed. The symbol has the following meaning:

Symbol	Meaning
↑	Only an upwards-dimming is possible, this is the case at 0%
↓	Only a downwards-dimming is possible, this is the case at 100%
↑↓	A dimming in both directions is possible.

You can end the manual setting with ***Esc***.

4.3 Clouds

ProfiLux can simulate passing clouds using a random generator. If a cloud passes, then all affected lamps become darker for a short moment. You can set the *Cloud probability* (0% - 100%) and the *maximal darkening* (10% - 90%) as well as the *minimal* and *maximal cloud duration*. A *Cloud probability* of 0% deactivates the cloud simulation. The cloud simulation works also during an activated moon phase simulation and during a dimming process.

Please keep in mind that the cloud simulation has to be active for the requested illuminations, see *4.1 Illumination run*.

4.4 Moon

ProfiLux simulates the moon phases depending on the date. In reality the moon cycle is a very complicated issue. The periods from new moon to new moon vary, it is around 29.5 days on an average. Furthermore, the moon rising time, the distance to the earth and several other details are different every time. Also it is not the case that in case of half moon, the moon has 50% of its brightness. We reckon on 25%. The aim of our moon phase simulation is not to replicate these complicated processes in every detail. For us it was important to create a repeating succession of moon light intensities which illuminate the aquarium each evening a bit differently and which provides a certain rhythm which is to a large extent in accordance with nature. The moon phases are calculated in *ProfiLux* on the basis of the date and in a way that full moon and new moon always correspond to the actual (real) moon phase with a deviation of max. one day. We have also put emphasis on a simple operation that is easy to understand.

You can set from which point of time to which point the moon phase simulation is active. Please keep in mind that the moon phase simulation has to be active for the requested illuminations, see *4.1 Illumination run*.

For the selected illumination the following will happen during the set time period: the light intensity that a connected lamp has (defined by the set illumination run) is multiplied with the calculated moon phase brightness. The illumination run is though furthermore considered. For example at half moon (= 50% moon phase, results in 25% moon brightness) and a light intensity of 30% (defined by the illumination run) there will be a light intensity of 25% * 30% = 7.5%.

All illuminations, for which the moon phase simulation has not been activated, are not influenced and follow their usual illumination cycles. Outside the set simulation time no illumination is influenced by the moon phase simulation.

Through this method it is possible to operate a lamp during the day (outside the set simulation time) normally (no influence of the moon phase) and to link it in the evening (within the set simulation time) with the moon phase.

The *Start* and *End time* of the moon phase simulation should be selected in way that they include the nocturnal illumination interval of the affected illumination. If the illumination run of a lamp is e.g. programmed in a way that from 19:00 o'clock till 7:00 o'clock it shines as moon light, then also the moon light simulation shall be set from 19:00 o'clock till 7:00 o'clock.

The moon phase simulation works also during an activated cloud simulation and during a dimming process.

4.5 Rainy days

ProfiLux enables the programming of "rainy days". On a rainy day the light intensity is reduced by an adjustable value which can be helpful for avoiding algae.

You can set on which days of the week rainy days shall be simulated. Finally you can set the *Darkening* on a rainy day (0% - 100%).

The rainy day program considers also possible moon phase and cloud simulations as well as the corresponding illumination runs.

Please keep in mind that rainy day simulations must be active for the requested illuminations, see *4.1 Illumination run*.

4.6 Storms

ProfiLux can simulate a thunderstorm using special lamps with flash of *GHL* (e.g. *ProfiLux Simu*).

A storm leads to a slow reduction of light intensity. While it becomes more and more dark, the number of flashes increases. After the storm has reached its peak, the illumination is slowly increased up to normal light intensity, the flashes get less until the storm is finally over.

A storm can be started manually as often as requested or automatically up to 4 times a day. Furthermore there is the possibility to start storms at random.

In the menu Storms the storm parameters can be defined under *Settings*:

Darkening (0% - 100%) during a storm

Intensity (1 – 10) of the storm

Storms/day – so often there will be an automatic storm on one day (max. 4)

Days of week – only on these days of week there will be a storm

Start 1...4 – at this time the storm starts

Duration 1...4 – the storm lasts for this duration

Random thunderstorm duration – if you would like to have storms at random then set here a duration in minutes for the random storm (if you enter here 0, then there will be no random storms).

Waiting time minimal and *maximal* – the random generator defines a waiting time within these limits until the next random storm is started.

In the menu Storms you can start a storm with *Manual start*. You have to enter here also the *Duration*. For the manually started storm, *Intensity* and *Darkening* out of *Settings* are used.

Please keep in mind that the storm simulation must be active for the requested illuminations, see *4.1 Illumination run*.

Hint	The signals necessary for a storm can only be produced by the onboard-1-10 V-interfaces (*L1* to *L4*). A „Storm lamp" should therefore not be connected at possibly existing additional 1-10 V-interfaces (e.g. extension card *PLM_2L4S*)!

4.7 Burning-in

Fluorescent tubes need to be burned in before they can be used for dimming. *ProfiLux* offers a comfortable possibility to automate the burning-in. After the selection of the *Illumination*, at which the tube that has to be burned in is connected, the *Burning-in period* can be set between 0 h and 100 h. This illumination is operated then only with 0% or 100% until the operation hour meter (see also *4.8 Operating hours*) has reached the burning-in duration for this illumination (all dim settings from 1% are automatically output as 100%).

At 0%, it will furthermore be switched off again – the burning-in is made in stages. As default setting, the burning-in duration is set to 0 h, so the burning-in is deactivated.

4.8 Operating hours

Each illumination disposes of its own operation hour meter which keeps on running if the corresponding illumination is active (Light intensity higher than 0%). So you know at any time for how long the lamp is already in operation and can exchange it in time before the performance due to aging will be too low. The operation hour meter is also used by the burning-in program. The operating hours are every 1 h cyclically written into the non-volatile memory. So it is guaranteed that also in case of a power failure the operating hours are kept.

After selection of the menu item *Operating hours* the *Illumination* has to be selected. Afterwards the operating hours are displayed for this illumination. After expiry of some seconds or the pressing of a key you are asked with *Reset?* if the operation hour meter shall be reset. A confirmation with *Yes* resets the operating hour meter back to 0 h. This should of course only be made when the lamps are exchanged.

4.9 Temperature-dependent light reduction

With this, it is possible to reduce the illumination slowly (for dimmable lamps) or to switch it off (for non-dimmable lamps) depending on the exceeding of the nominal temperature.

When the reduced light intensity of dimmable lamps is calculated, then the current dimming run as well as possible simulations are considered. With the temperature-dependent light reduction you can avoid that a tank is additionally heated through the illumination - e.g. on hot summer days when also a possibly existing cooling is not able to provide a sufficient lowering of the temperature any more.

The following parameters can be set:

the determining *Temperature sensor*

the *Illuminations*, on which the temperature-dependent light reduction shall have an effect; e.g. LED-lamps can be omitted here since they emit nearly no heat at all

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!

Temperature excess maximal – if the nominal temperature is exceeded by this value, then the affected illumination is completely switched off, adjustable from 2 °C to 10 °C, has to be at least 1 °C higher than the *Temperature excess minimal* – this setting is only relevant for dimmable lamps!

Shut off limit – if the nominal temperature is exceeded by this value, then the non-dimmable lamps are switched off. You can adjust a value between 1 °C and 10 °C. These lamps are only switched on again if the programming of the corresponding illumination run defines again a switch –on (lamp was switched off according to the programming, e.g. at night – and is switched on again, e.g. in the morning). A decrease of temperature itself doesn't lead to a new switch-on, this makes especially sense for gas discharge lamps, since they shouldn't be switched on and off again all the time. This setting is only relevant for non-dimmable lamps!

Example for dimmable lamp

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%	30.0 °C	100% (off)

4.10 Special lamp

Here you can change settings for special lamps. At the moment, only lamps of *Aqua Illumination (AI)* are supported.

First you have to set if *AI lamp present?*. After confirmation with *Yes* you can select to which illumination the white resp. blue LEDs shall be assigned, then you can select if the connected *AI* lamp is an *old model* (ProfiLux needs this information for choosing the correct data protocol). Furthermore another action can be performed:

Baseline temperature – has the effect that the lamp determines the baseline temperature (see manual of *AI*)

Flash intensity – sets the intensity of flashes during a storm (0 = moderate … 9 = heavy)

After activation of the *AI*-support, *ProfiLux* sends permanently commands via the built-in serial RS232-interface to the *AI*-lamp. A corresponding cable for the connection of *ProfiLux* and *AI* can be obtained from us.

Hint	If a PC is connected to the serial interface although the *AI*-support is active, then *ProfiLux* stops the sending of *AI*-commands to enable a communication with the PC. *AI*-commands are only sent again if *ProfiLux* is rebooted or if *AI lamp present?* is again confirmed with *Yes*.

4.11 Variable illumination

This function enables the using of different illumination runs for one lamp on different days of the week.

You can define 4 variable illumination programs. After selection of the program (1 to 4), for each day of the week (Monday to Sunday) you have to set which *illumination run* (1 to 8, see *4.1 Illumination run*) shall be used on *Monday* to *Sunday*.

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 *6.4 1-10 V* interface) resp. for the corresponding switchable socket (*see* **Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden.**).

5 Extras

Here special functions and settings are summarized. You can choose the following sub-menus.

5.1 Maintenance

During maintenance of the aquarium it can be preferred to set explicitly the switching state of certain switchable sockets or the light intensity of lamps. An example would be the switch-off of heaters, setting the current to a minimum and setting a dimmable light bar to 80%. To achieve a maximum of flexibility, the settings of the maintenance function refer directly to the hardware (switchable sockets and 1-10 V-interfaces) and not to the control and regulating functions (e.g. temperature control or illumination).

In the menu *Maintenance* you can set the maintenance parameters under *Settings*:

Select affected 1-10V…
Here the 1-10 V-interfaces can be selected, which shall be affected during the maintenance. All non- selected interfaces will continue working as usual and program-controlled.

Select percentage during maintenance
For the 1-10 V-interfaces selected before you can set here which voltage (in percentage) they shall output during the maintenance.

Select affected socket outlets
Here you can set which sockets (1 – 8, 9 – 16 and 17 - 24) shall be affected during maintenance. All non-selected sockets will continue working as usual and program-controlled.

Adjust affected socket outlets
For the sockets selected before the switching state (on or off) during the maintenance can be set.

The maintenance program is activated in the menu *Maintenance* with *Start*. While the maintenance program is active, the selected sockets have the set switching states, the selected 1-10 V-interfaces output the set voltages. *ProfiLux* signals an active maintenance program with a blinking display of the text *Operational mode: Maintenance*. The maintenance program is stopped with pressing any key.

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

5.2 Internal time

This function serves to display the internal clock time (see *3 Clock*). This function serves only for diagnostic purposes, settings cannot be made here.

5.3 Info & Support

After selection of this menu item, then information concerning the software version, type and our webpage are displayed successively (automatically after expiry of a certain time or after a key is pressed).

5.4 Feeding pause

Here you can set the *Length feeding pause*; as long as this, the feeding pause will last which was started manually with the key ***Esc*** or automatically by a timer. To avoid a disturbance of the microbiological climate of your filter, you should not choose this time longer than absolutely necessary (ca. 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* will be switched off during the feeding pause

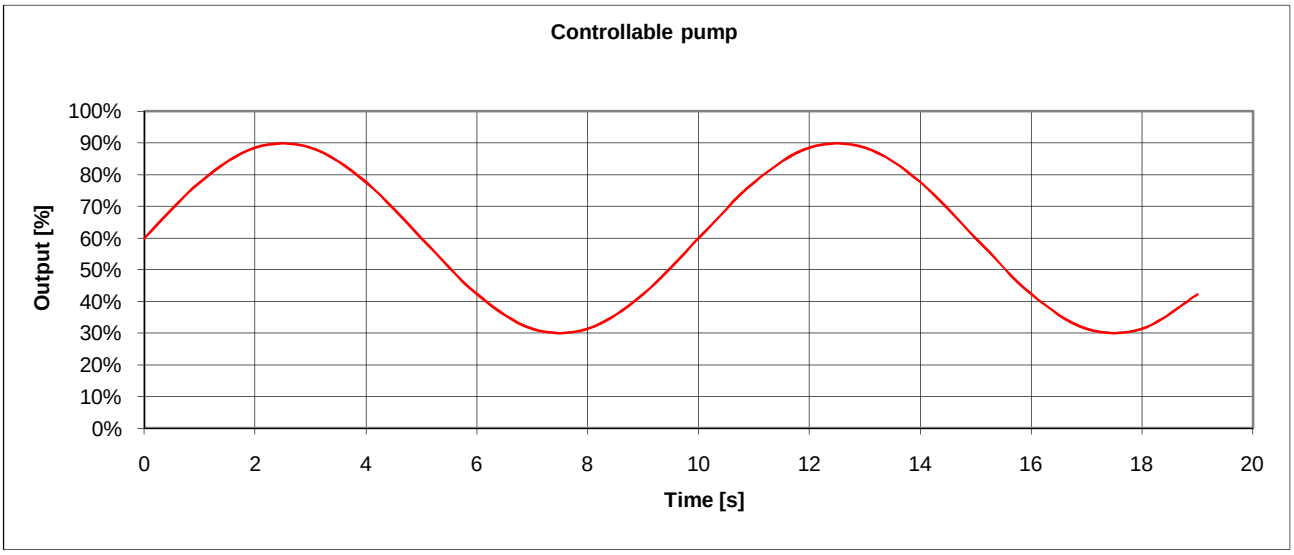
The behavior of the current pumps during the feeding pause can be defined in the settings of the current pumps (see *5.5.6 Pump settings*).

5.5 Current

ProfiLux can control current pumps in many different ways. If you use controllable pumps (they must either have a control cable or have to be suited for a dimming with phase controlled modulation, therefore our dimmable socket is necessary) it is toggled smoothly between minimal and maximal current speed. The course of the control signal can be set to sinus form – firstly, this is the most gentle method to accelerate resp. slow down a motor, secondly this is most conform to the course in nature. The control signal can be output at the 1-10 V-interfaces, see also *6.4 1-10 V* interface. Furthermore, non-controllable pumps can be switched through switchable sockets, see here **Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden.**. They can of course only be switched on or off, but cannot be controlled.

Hint	With "pump active" it is meant that the pump fluctuates continuously between min. and max. current speed and through this produces waves, a socket assigned to the current pump is then switched on. "Pump inactive" doesn't explicitly mean that the pump is off, but that it runs with minimal power, a socket assigned to the current pump is then switched off.

The graph below shows as an example the flow pattern of a controllable pump (settings: *Minimal* = 30%, *Maximal* = 90%, *Wave duration* = 10 s, *Wave form* = *Sinus*):



Additionally to the wave generation, an alternate switching of the pumps (e.g. *Sequence* or *Random*) can be set. The currently active pumps generate the set waves, the inactive pumps run with the set minimal power.

You can program 2 independent groups. One group consists of 0 to 4 pumps which can be controlled independently from each other.

If several pumps shall be operated synchronously, then you achieve this by connecting them to the same control signal. The pumps are then treated like a single pump.

5.5.1 Nocturnal change

For the current simulation you can set a *Nocturnal change* of the pump power. If the *Nocturnal change* is activated, then afterwards *Start* and *End* time have to be entered. Within these times the pumps are operated with the power that has been set for the night.

For each group you can set the following parameters:

5.5.2 Number of pumps

Here the number of pumps in a group is to be set. In one group 0 to 4 pumps can be controlled (0 pumps means that this group is inactive). The number of pumps per group defines also which pumps belong to a group (a free assignment of pumps to groups is not possible). In total, 4 pumps are available and the following combinations are possible:

Number of pumps in group 1	Pumps belonging to group 1	Number of pumps in group 2	Pumps belonging to group 2
4	1, 2, 3 and 4	0	none
3	1, 2 and 3	0	none
3	1, 2 and 3	1	4
2	1 and 2	0	none
2	1 and 2	1	3
2	1 and 2	2	3 and 4
1	1	0	none
1	1	1	2
1	1	2	2 and 3
1	1	3	2, 3 and 4

0	none	0	none
0	none	1	1
0	none	2	1 and 2
0	none	3	1, 2 and 3
0	none	4	1, 2, 3 and 4

5.5.3 Mode

Here the operational mode is to be set for one group. The groups may have different operational modes.

Off – the pumps of this group are permanently off.

Permanent – the pumps are permanently active and operate synchronously.

Permanently alternating – The pumps are permanently active and operate alternating, i.e. if pump 1 runs with max. speed, pump 2 runs with min. speed and the other way round.

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.

Example

For a group of 3 pumps the following switch-on pattern results:

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	off	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.

Example

For a group of 3 pumps the following switch-on pattern results:

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).

Example

For a group of 3 pumps the following switch-on pattern results:

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,* but the pumps are switched off in the inversed order in which they had been switched on before.

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).

5.5.4 Tide duration

In the modes *Sequence*, *Surge* or *Random* you can set the time after which the switching state of the pumps shall change again. Here you have to set a *Minimal* and a *Maximal tide duration*. The time after which there shall be a new switching state, is determined by the random generator in the range of these two times. If the time shall be always the same for *Minimal* and *Maximal tide duration* then the same value has to be entered.

The *Minimal* and *Maximal tide duration* is to be set between 1 second and 6 hours. If a switchable socket shall control the corresponding current pump, then the tide duration may not be chosen too small – otherwise a too often switching can lead to damages of the socket or the pump!

5.5.5 Wave

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

Sinus waves – gentle accelerating and slowing down of the pump

Right-angled waves – abrupt changes

Then the *Minimal* and *Maximal wave duration* in the range of 0.4 and 60 seconds is to be set. The random generator determines for each wave a duration within these limits. If all waves shall have the same duration, then you have to enter the same values for *Minimal* and *Maximal wave duration*. For the wave duration of course also the technical possibilities have to be considered. Waves don't have an effect on non-controllable pumps which are connected via switchable sockets.

Finally you can set the *Random wave reduction* from 0% to 100%. The bigger the value, the more different the single wave crests become. For 0% each wave crest reaches the maximum (wave crests are always the same), for 100% the wave crests fluctuate at random between minimum and maximum.

5.5.6 Pump settings

For each pump the following settings can be made individually:

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 *Pump uninvolved* (Feeding pause don't affect this pump), *Pump at minimum* (pump is operated during the feeding pause only with minimal power) or *Pump off* (pump is switched off during the feeding pause).

5.6 Display

Here you have the possibility to set which current values shall be displayed during normal operation on the display. If several elements are selected, then these are displayed alternating. These settings influence also the display on a possibly connected *ProfiLux View*.

In this menu the following setting options are available:

Display duration – for this time the display remains constant until the next value is displayed

Select simulation – here you can select which of the simulation elements shall be displayed

Select controller (only if measurement inputs are available) – selection of controller whose values and states shall be displayed (e.g. pH-value and temperature)

Time & Date – you can set how the current time and date shall be displayed: *Never*, *Always* or *Rotate*.

5.7 Measurement data

ProfiLux can record measurement data.

Model series	Storage size	Memory type
ProfiLux II	Max. 600	RAM (volatile memory), in case of a voltage supply failure the measured values get lost.
ProfiLux 3	Max. 8192	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 *ProfiLuxControl II* is necessary. From version 1.04 upwards 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 – Here first the max. storage size which is reserved for the measurement data recording is set. The reduction of the max. storage size makes only then sense, if you would like to limit the time period of the measurement data recording. Look here at the example beneath.
Afterwards the measurement period between 1 minute and 12 hours is to be set (after expiry of this time the current values are stored). Finally you can select which of the available sensors shall be considered for the measurement value recording.
A change of the settings has the effect that possibly existing measurement data is deleted. Because of this, before the storing of new settings you are asked *Clear data?*.

Erase measurements – all currently stored measurement values are erased.

Status – displays first when the last measurement values have been recorded, after this the storage status and how much of the measurement data has not been transmitted to the PC yet.

Analysis – After the sensor whose measurement data shall be analyzed has been selected, in the upper line the average value and in the lower line the minimal and maximal values are displayed. The three indicated values are based on all the data currently stored in the storage.

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 would like to store the measurement data of 3 sensors (e.g. temperature, pH-value and Redox) every half hour, but the values in the storage shall be maximal 2 days old, so that minimum, maximum and average refer always to the last two days. -> Max. storage size = 24h / 0.5h * 3 = 144

5.8 Language

Here the language in which *ProfiLux* outputs texts can be set.

Attention	If *ProfiLux* is set to German language, this menu is displayed under *Extras*, *Sprache* (German expression for *Language*)!

6 System

Here all system functions and settings like e.g. the hardware configuration are summarized. The following sub-menus can be selected.

6.1 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.

6.2 PIN

A personal identification number (PIN) serves to protect the device from setting changes through unauthorized people. As default setting, the PIN is set to 0000. If the PIN is set to 0000, all changes can be made without entering

the PIN. As soon as the PIN differs from 0000, for each setting this PIN has to be entered. This is also the case if the PIN is changed.

If you have forgotten your PIN	Switch off the device (remove voltage supply), switch it on again (connect voltage supply again). Directly after that, still while the status and greetings display can be seen, press ***Esc*** and ***RETURN*** at the same time. Afterwards you are asked `Clear PIN?`. After confirmation with `Yes` the PIN is again in the delivery status (0000 – deactivated).

6.3 Switching output

At switching outputs switchable devices, e.g. powerbars or dosing pumps are connected.

The function of each switching output can be set individually. The switching outputs 1 to 8 for *ProfiLux Plus II (eX)* resp. 1 to 4 for *ProfiLux II (eX/Terra)* are already firmly built-in in the computers. The number of switching output can be extended with the additional card *PLM-2L4S*.

Furthermore the connection of digital powerbars is possible at *S1-S4*, see here *6.10 Digital powerbars*. With digital powerbars, up to 24 sockets can be switched separately. Not all of the below mentioned functions are available for all *ProfiLux*-types.

After selection of the socket, the function is to be set first.

`Timer`	afterwards the `Number` of the timer is to be selected (1 to 8) This switching output is controlled by the corresponding timer.
`Illumination`	afterwards select the `Number` of the illumination (1 to 8) 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 serves to switch off light bars which don't provide an internal voltage shut-off at 0% or to switch non-dimmable lamps via the power cable. Dimmable light bars of *GHL* don't need an external shut-off and are directly connected to a permanent power supply, since they are provided with a internal shut-off. For the operation of dimmable *GHL*-light bars there is no switchable socket necessary!
`Water`	afterwards select the `Number` (1 and 2 resp. 3 for *ProfiLux Plus II eX*) The level regulation uses these switching outputs to switch magnetic valves or pumps.
`Current pump`	afterwards select the `Number` of the pump (1 to 4) 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`	afterwards select the `Number` of the programmable logic (1 to 8) The result of the corresponding programmable logic is output at this switching output. See also *7 Programmable logic*.
`Sum alarm`	In case of any alarm this switching output is switched on.
`Filter`	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. 800 ms) 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	This switching output is switched on during maintenance.
Water change	This switching output is switched on during the whole water change (during draining and refilling).
Variable illumination	afterwards select the *Number* of the variable illumination (1 to 4) Herewith you can assign a *Variable Illumination* (see *4.11 Variable illumination*) to a switching output.
Digital input	afterwards select the *Number* of the digital input (1 to 4) This switching output is switched on when the corresponding digital input is active.

Furthermore a switching output can be assigned to a control loop. For this, you have to select first one of the available controllers (sensors), e.g. *Temperature 1* or *pH-value 1*.

After selecting the controller which shall influence this switching output, the function has to be concretized furthermore.

For temperature controllers you can select among these options:

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 likes to heat or cool (so 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.

For all other controllers, you can select among 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 switching output is switched on.

After selection of a function you can make furthermore the following settings:

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*. 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 round. 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.

6.4 1-10 V interface

Each 1-10 V-interface can be configured separately. *ProfiLux* disposes of four firmly built-in 1-10 V-interfaces *L1* to *L4* (always two combined in one port). With the extension card *PLM-2L4S* or *PLM-4L* the number of 1-10 V-interfaces can be increased.

After selection of the interface first the function has to be set.

`Illumination`	afterwards select the `Number` of the illumination (1 to 8) Here the dimmable lamps are then connected – e.g. with dimmable ballasts or *ProfiLux Moon*. So it is possible to assign each illumination one arbitrary 1-10 V-interface.
`Current pump`	afterwards select the `Number` of the pump (1 to 4) This interface is then used by the current simulation.
`Always off`	This interface has no function.
`Variable Illumination`	afterwards select the `Number` of the variable illumination (1 to 4) Herewith you can assign a *Variable Illumination* (see *4.11 Variable* illumination) to this interface.

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 water temperature exceeds the set temperature, then a voltage is output that is proportional to the temperature control deviation. Simply expressed: the warmer the more voltage. With this it is possible to control a controllable cooler – e.g. our *PropellerBreeze* with the control electronics *PropellerControl* – and so to operate it as energy-saving and as low-noised as possible.

Afterwards you can set the `Minimal` and `Maximal voltage` of this interface. Usually the voltage range is 1 V to 10 V, as the name of the interface already indicates.

Possibly it can be necessary to set the minimal voltage (at 1%) (possible range: 0 V to 4 V). This can have the following reasons:

Not all 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 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 1 V, full light intensity at 10 V. We have noticed that the light intensity doesn't change anymore for some ballasts for a voltage supply under 1.5 V, for other ballasts the dimmable range goes to ca. 0.8 V.

The current pump stops although the set current speed is >= 1%.

The maximal voltage (at 100%) has to be set between 4.5 V and 10 V, 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.

Hint	To achieve an optimal light intensity course, 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 fit exactly together.

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 have to be tested again.

6.5 Program LED

These functions serve to reprogram a connected LED-lamp of *GHL* (*ProfiLux Simu, Moon or Sunrise*). During the programming only the lamp to be programmed may be connected! The setting is stored in the LED-lamp (also in case 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 flashes`. 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* 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: *ProfiLux-Simu-DB*, *ProfiLux-Simu-BW*, *ProfiLux-Moon-DB*, *ProfiLux-Moon-BW a*nd *ProfiLux-Sunrise*!

6.6 Configuring View II

If you choose this function, you can set the contrast of a connected *ProfiLux View II*. This function cannot be used for *ProfiLux View* (the older model).

6.7 Communication

Here you can make all settings which refer to the communication.

Hint	These settings can only be made directly at the *ProfiLux* itself!

`Device address` – Under this address, the computer can be reached by the PC-operating program *ProfiLuxControl II*. **If several computers are networked with each other, then they must have different addresses!** Otherwise there is no necessity to change this setting.

If several communication interfaces are available, then you have to select now one of them. All following settings refer exclusively to the selected interface!

`Baud rate` – here the connection speed of the before selected interface is set (standard 9600 Baud). The connection speed has to be conform with the connection speed of the receiver (e.g. PC with *ProfiLuxControl II*). If the external display unit *ProfiLuxView* or the *SMS-Module* is connected, then 9600 Baud has to be set!
The increase of the connection speed makes then sense, if the connection is short and free of interference. In case of transmission problems, e.g. if long and interference-prone lines are used, then it can make sense to reduce the Baud rate.

If the before selected interface is a *LAN*- or *WLAN*-card, you can additionally carry out one of the following actions:

`Defaults LAN/WLAN` – The default settings (IP, Security, etc.) of the *LAN*- or *WLAN*-card are restored. This is for example necessary, if settings or passwords have been forgotten and the card can't be configured anymore.

`IP of LAN/WLAN` – After selection of this option, the required `IP-Address` can be set. If it is a *WLAN*-card, you can additionally set the `SSID` of your radio network and if the connection shall be made `Ad-hoc` . If this shall not be the case, then the connection mode `Infrastructure` is set. All other settings (except IP-address, SSID and connection mode) are reset to the default settings.

6.8 Alarm

Here the operation mode of the alarm-buzzer can be set (only models with built-in buzzer):

Buzzer off – also in case of an alarm the buzzer remains off

Buzzer on – in case of an alarm the buzzer gets active, independent from the clock time

Buzzer at set time – in case of an alarm, the buzzer gets only active for a certain time. Here the time range is to be set in which the buzzer is active for an alarm.

Additionally, you have to make the corresponding alarm settings for each sensor, see also *1.7 Alarm.*

6.9 Virtual sensors

Under this menu item you can administrate the so-called *virtual sensors*.

What are virtual sensors?

At the *ProfiLux* resp. at the corresponding expansion cards, you can connect sensors for the measurement of certain values (e.g. temperature, humidity). 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-regulation or *Heater*, *Bottom heater* and *Cooler* for the temperature control).

Possibly it is necessary to assign several differently set control loops to one and 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 here a "copy" (= virtual sensor) of the actually existing sensor. This virtual sensor and its belonging control loop can exactly be used the same way like a "normal" sensor. The currently measured value of the virtual sensor is of course always the same as the measured value of the "original sensor". Furthermore you also can't calibrate a virtual sensor.

Besides the simple copy of a sensor, a virtual sensor can also be generated from 2 original sensors, then an average value from the current values of both original sensors is calculated. This has 2 advantages: Firstly it can make sense to measure at two different places in a bigger water volume (e.g. pond) and to average a value from that, secondly both original sensors can be monitored concerning a too big deviation. A too big deviation could point to a disturbance, the display of an alarm is then possible.

Hint	In total, 8 sensors can be administrated (sum of actually existing and virtual sensors).

In the menu *Virtual sensors* there are the following selection options:

6.9.1 New virtual sensor

Here you can generate a new virtual sensor. First you select the type of the virtual sensor:

Copy – now you select furthermore the original sensor from which a „copy" shall be generated. The current value of the virtual sensor corresponds always to the current value of the original sensor.

Average – now select furthermore sensor 1 and sensor 2. The current value of the virtual sensor corresponds always to the current average of both original sensors. For the alarm-settings you can additionally indicate a comparative alarm (see *1.7 Alarm*).

After storing a virtual sensor (e.g. *TEMPERATURE 2*) is available. The related settings (nominal value, hysteresis, etc.) are taken over (copied) from the original sensor.

6.9.2 Delete virtual sensor

Herewith you can delete again a virtual sensor.

Hints

After the generation of a virtual sensor, the sensors of the corresponding type are numbered newly.

In the menus of *ProfiLux,* you can differentiate virtual sensors from the actually existing sensors through the fact that the name of virtual sensors is completely written in capitals (e.g. *PH-WERT 1*).

6.10 Digital powerbars

Here you can administrate our digital powerbars resp. dosing units.

First you are asked `Use digital powerbars?` (this refers also to dosing units that you would like 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 you have set that digital powerbars shall be used, you can afterwards select among the following options:

`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 *6.3 Switching output*. You can set start numbers between 1 and 19.

`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*. The digital powerbar monitors permanently if it still receives commands from the *ProfiLux*. 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.

`No action` – Afterwards no further action is carried out.

Hints

The setting `Use digital powerbars` has only an effect on *S1-S4*! All other connections for powerbars (e.g. *S5* - *S8*) are furthermore only suited for common powerbars, these connections also can't be set to digital.

If the option `Use digital powerbars` has been activated, then with *S1-S4* you can't control a common powerbar.

A mixed operation of digital sockets (at *S1-S4*) and common sockets (at the other powerbar sockets, e.g. *S5* - *S8*) is possible.

If the switching state or the numbering shall 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 digital powerbars and dosing pump units is freely selectable (see `Set numbering`). In contrast to that, the numbering of common powerbars is predefined by the fact at which socket they are connected. Sockets of one powerbar connected to *S5* - *S8* have e.g. always the numbering 5 to 8. Here you have to keep in mind that no double assignment of numbers occurs!

The set numbering and output states are permanently stored in the digital powerbar and so are also kept when it is not connected to the power supply voltage.

6.11 Configure PTC

If you use our cooling and heating device *ProfiLux Temperature Control (PTC)* you can carry out one of the below-mentioned actions:

`Swap channels` – if *PTC* reacts to an odd channel (*L1*, *L3*, etc.), it will react after the channel swap to an even channel (*L2*, *L4*, etc.) and the other way round

`Silent Mode on` – the fan speed will be reduced and therefore operated low-noised, the efficiency will be a bit lower

`Silent Mode off` – the fans are operated normally

Hints	*PTC* can only be operated at the internal 1-10 V-interfaces. During the configuration of a *PTC* no other devices may be connected at the internal 1-10 V-interfaces. The configuration is stored in the *PTC* and remains also without power supply.

6.12 DALI

DALI (Digital Addressable Lighting Interface) is a standardized digital interface to connect corresponding devices (e.g. DALI-ballasts) by a data bus. Via only one control line, up to 64 devices can be accessed individually, the devices are differentiated by their address.

The numbering of the DALI-devices is made automatically at command by *ProfiLux*. You then only have to set which device shall react to which illumination.

If a DALI-interface is available then you can select among the following functions in the menu *DALI*:

Minimal dimlevel DALI – DALI-devices have a minimal physical dim level which is predefined by the manufacturer. To get an optimal dimming course, you should set this value here corresponding to the used devices. As a default setting 85 is set, this corresponds to the value of *Osram* DALI-ballasts. You can set values between 0 and 254

New numbering – Herewith all connected DALI-devices receive first a new long address (between 0 and 16777215), afterwards *ProfiLux* searches for all connected DALI-devices and gives them short addresses between 0 and 63. When *ProfiLux* has finished the numbering, then the number of the found devices is displayed. If not all devices have been found, in spite of a proper wiring, then carry out once again *New numbering*.
You have to carry out the function *New numbering* only if you have connected new devices to the DALI-bus.

Assign illumination – With this you assign to each connected DALI-device an illumination, this means that depending on the assigned illumination, the light intensity in the corresponding DALI-device is set. After selection of this function, you can set with ***Up/down arrow*** to which device you would like to assign an illumination. The then just selected device is then operated with a light intensity of 100%, all other devices (resp. their belonging lamps) are switched off. If you confirm the selection with ***RETURN***, then you are asked for *illumination assign?* (***Up/down arrow***, then again ***RETURN***). After a short waiting time, you can make a further channel assignment. If you have finished, press ***ESC***.

6.13 Digital input

If an expansion card *PLM-ADIN* is present then besides 2 analog inputs 4 digital inputs are available. The state of a digital input can be used to switch a socket directly (see **Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden.**) or to start (resp. end) a special function.

After selection of the digital input the function has to be set.

no action	This digital input doesn't trigger any special function.
Water change	This digital input starts the automatic water change. A second switch impulse aborts the automatic water change.
Maintenance	This digital input starts the maintenance mode. A second switch impulse ends the maintenance mode.
Feeding pause	This digital input starts the feeding pause. A second switch impulse ends the feeding pause.
Storms	This digital input starts a thunderstorm.

7 Programmable logic

ProfiLux offers a lot of setting possibilities for almost every application. But there can although occur situations, in which the user needs special functions which are not covered by the standard functions of *ProfiLux*. One example: During the feeding pause, the heating shall always be switched off, otherwise it shall be switched depending on the temperature.

In this case, the user can create a function for the switching of the corresponding socket with the help of the programmable logic.

Since the use of the programmable logic is a bit more complex compared to the other functions of the *ProfiLux* and can only be used efficiently if the user disposes of a basic knowledge of Boolean logic, the corresponding settings are adjustable not at the *ProfiLux* itself, but only via the PC-operating program *ProfiLuxControl II* from version 4.00 upwards. The program as well as further information regarding the topic *programmable logic* you will find on our website.