

ProfiLux 4 / 4e

Instruction Manual

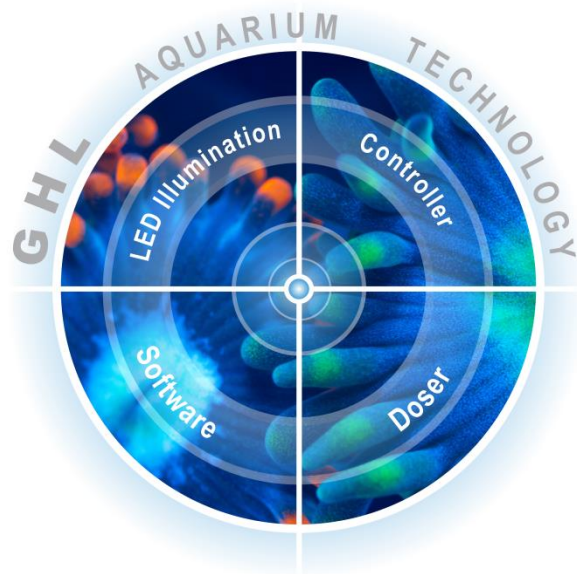


As of 2019-02-01

Table of Contents

GET THE MOST OUT OF YOUR GHL PRODUCT	5
1 SAFETY INSTRUCTIONS	5
1.1 SAFETY OF CHILDREN AND VULNERABLE PERSONS.....	6
1.2 INTENDED USE	6
2 GENERAL	7
2.1 ABOUT THIS MANUAL	7
2.2 FEATURES	7
2.3 SCOPE OF DELIVERY	8
2.4 IMPORTANT OPERATING INSTRUCTIONS	8
3 CONNECTIONS OF THE PROFILUX 4 / 4E	8
3.1 GENERAL	8
3.2 3.2 CONNECTION OVERVIEW	9
3.2.1 <i>Sensor Inputs</i>	10
3.2.2 <i>Powerbar Connection (ProfiLux 4 only)</i>	11
3.2.3 <i>Interface for Mitras Lightbar/Slimline or RS232</i>	11
3.2.4 <i>Expansion Slots</i>	11
3.2.5 <i>PAB Ports</i>	11
3.2.6 <i>Level Sensor Connections</i>	12
3.2.7 <i>1-10V Interfaces</i>	12
3.2.8 <i>Power Failure Monitor/ Line Monitor Port</i>	12
3.2.9 <i>USB Connection</i>	12
3.2.10 <i>GHL Control Pad Connection</i>	12
3.2.11 <i>DCF Receiver Connection</i>	12
3.2.12 <i>AUX Connection</i>	13
3.2.13 <i>Power Supply Input</i>	13
4 FUNCTIONS OF THE PROFILUX 4 / 4E	13
4.1 FUNCTIONALITY OF THE PROFILUX 4 / 4E	13
4.2 FUNCTIONS	14
5 ACTIVATION	16
5.1 INSTALLING THE PROFILUX 4 / 4E	16
5.2 IMPORTANT OPERATING INSTRUCTIONS	16
5.3 CONNECTING THE SENSORS	18
5.4 CONNECTING POWERBARS TO PROFILUX 4 / 4E	19
5.4.1 <i>STD4-4 (ProfiLux 4 only)</i>	19
5.4.2 <i>Powerbar 6D</i>	20
5.4.3 <i>Powerbar5.1-PAB</i>	21
5.5 CONNECTION OF LUMINAIRES	21
5.5.1 <i>Connection of Dimmable Luminaires or Lightbars</i>	21
5.5.2 <i>Connecting the Mitras Lightbar or the Mitras Slimline</i>	22
5.6 CONNECTION OF STREAM PUMPS OR FANS	22
5.7 CONNECTION OF PAB-DEVICES	23
5.7.1 <i>What is the PAB</i>	23
5.7.2 <i>How does the ProfiLux Aquatic Bus work</i>	23
5.7.3 <i>Exemplary Connection of ProfiLux 4 / 4e with PAB Devices</i>	24
5.8 CONNECTION TO THE POWER SUPPLY	24
5.9 STATUS INDICATORS OF THE PROFILUX 4 / 4E	25
5.9.1 <i>System-Status- LED on the housing cover</i>	25

5.9.2	WiFi Status LEDs on the Front Panel.....	26
6	OPERATION	28
6.1	OPERATION ON THE DEVICE.....	28
6.1.1	Menu Structure.....	30
6.1.2	Display Indications.....	31
6.1.3	Standard Display	32
6.1.4	Feeding Pause.....	33
6.2	OPERATING THE DEVICE VIA THE APP GHL CONNECT	33
6.2.1	Requirements	33
6.2.2	General Settings Setup	34
6.2.3	Hotspot Setup.....	35
6.2.4	Assign PAB-Devices.....	36
6.2.5	WI-FI Setup – Adding the P4/4e to your network.....	37
6.3	OPERATING THE DEVICE VIA THE SOFTWARE GCC.....	38
6.3.1	Requirements	38
6.3.2	GCC General Information	38
6.3.3	What can be set via GCC	38
6.4	CONNECTION BETWEEN THE PROFILUX 4 / 4E AND PC	39
6.5	SAVE AND LOAD SETTINGS	42
6.5.1	Saving Settings	42
6.5.2	Loading Settings	42
6.6	MEASUREMENT DATA.....	43
7	EXPANSION MODULES.....	43
7.1	GENERAL INFORMATION	43
7.2	INSTALLATION.....	45
7.2.1	How to Open the Housing	45
7.2.2	How to Insert Modules	46
7.2.3	How to Close the Housing.....	46
7.2.4	Restart.....	47
8	WARRANTY/LIABILITY	47
9	ADDITIONAL INFORMATION	48
9.1	HELP AND INFORMATION	48
9.2	FIRMWARE-UPDATE	48
10	TECHNICAL DATA.....	48



- ✓ Maximum Quality
- ✓ Maximum Performance
- ✓ Maximum Safety

FOCUSSED ON SUCCESSFUL FISHKEEPING

Congratulations on your Purchase

Thank you for purchasing our product and allowing us to help support your path to successful fishkeeping!

With a GHL *ProfiLux 4 / 4e*, you now own a highly professional piece of equipment that is more than capable of assisting you in your daily monitoring and maintenance routines.

We are confident that our product will help make your hobby more efficient, safe, and ultimately help you spend more time enjoying your aquarium or terrarium.

Enjoy Your Passion!

GHL Takes Care of the Rest

Get the Most out of your GHL Product

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

1 Safety Instructions

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

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

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

Failure to follow these instructions will void any warranty claims.

Be sure to read over the safety instructions provided by this ProfiLux manual; including the respective manuals of other equipment manufacturers.

In this manual, the following symbols are used:



TIP

General note, tip or advice.



WARNING

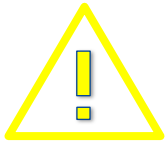
Important note for operation, to avoid damage to the equipment, and for your safety.



DANGER

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

1.1 Safety of Children and Vulnerable Persons



WARNING

This equipment must not be used:

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

1.2 Intended Use

The *ProfiLux 4 / 4e* is intended exclusively for use in the domestic area. *ProfiLux 4 / 4e* may only be operated with GHL accessories.

Make sure to place the device away from splashing water, moisture or other liquids.



WARNING

Moisture indicators are placed inside the unit and will change color when exposed to excessive moisture.

Removing these indicators will void all warranty claims.



DANGER

- Make sure that the power cord is plugged into a grounded outlet; otherwise you could get an electric shock or cause a fire.
- Protect the power cable from damage (For example, twisting, kinking, clamping). Please also pay attention to the joints and connections to the device.
- Disconnect the power plug by pulling the plug, not the cable.
- Never attempt to disassemble, repair or alter the equipment by yourself.
- Do not insert sharp objects into the electrical contacts and ports.



DANGER

- If the unit falls into the aquarium or has been exposed to moisture or humidity, first turn off the power to the device via the fuse or circuit breaker, then pull the power cord.
- Never touch the power plug with wet hands.

- If the device has become wet or dirty, thoroughly clean and dry it with a dry cloth.



DANGER

- The device may not be operated if it has been damaged in any way (e.g. damaged power cord or plug, liquids or objects have gotten into the interior, device has been exposed to excessive moisture, the normal operation is disturbed, or the device has been dropped.)

For your own safety, please look at the hazard prevention and safety instructions in the chapters that follow.

2 General

2.1 About this Manual

These instructions apply to the Controller *ProfiLux 4 / 4e*.

2.2 Features

- Illuminated blue graphical display
- Control panel with capacitive buttons
- LED Status indicator
- 2x Connections for Powerbar (Red Western socket), *ProfiLux 4* only
- 1x Digital light control interface for *Mitras Lightbar* and compatible devices (Black Western socket, on the right next to power supply inputs) or RS232
- 3x Expansion slots (2x external, 1x internally accessible)
- 2x PAB Ports (Black Western sockets)
- 2x Level sensor ports (Double allocation)
- 3x 1-10V-interfaces (Yellow Western sockets, double allocation)
- 1x Power failure monitor port
- 1x USB Connection
- 1x GHL Control Pad Connection
- 1x DCF Receiver Connection
- 1x AUX Connection
- 1x Connection for power supply unit (12V DC hollow socket)
- 4x Sensor Connections for *Temperature*, *pH/Redox*, *Redox/pH*, *Conductivity* (White BNC-connectors) (*ProfiLux 4*)

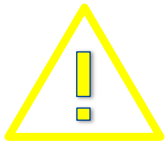
- 2x Sensor Connections for *Temperature, pH/Redox* (White BNC-connectors), (*ProfiLux 4e*)

2.3 Scope of Delivery

Please check the contents of this box. The following items should be included:

- Controller *ProfiLux 4* or *ProfiLux 4e*
- Digital Temperature Sensor
- USB-cable
- Power supply
- Null-plug
- Supplementary sheet

Please check to make sure all items are in perfect condition. In case of damage, immediately contact the dealer from whom you purchased the *ProfiLux 4 / 4e*.



WARNING

Damaged *ProfiLux 4 4e controllers* or components may not be put into operation under any circumstances.

2.4 Important Operating Instructions



WARNING

To ensure safe operation, the following guidelines must be followed. Disregarding these safety guidelines, will result in voiding your warranty. In which case, the manufacturer rejects any responsibility or liability for damage!

3 Connections of the ProfiLux 4 / 4e

3.1 General

Applies to all connections:



WARNING

- Connect only original accessories from GHL.
- Do not use force when plugging connectors. If a plug contact does not fit, it is imperative to check that you have chosen the correct socket.



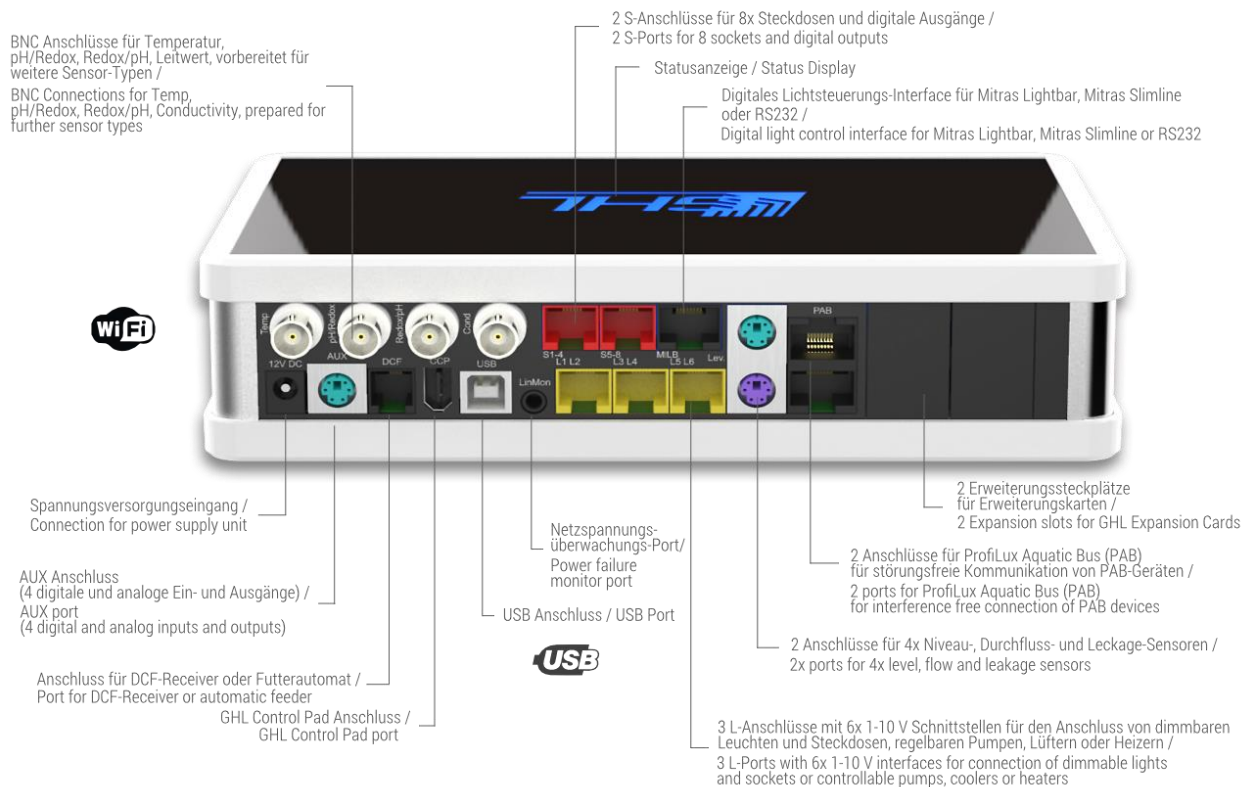
DANGER

- Incorrect connection (For example, plugging a lighting unit plug into a PAB connection) can lead to damaging the *ProfiLux 4* and/or the light bar!
- A repair caused by this, is not covered under warranty and will therefore incur repair charges.

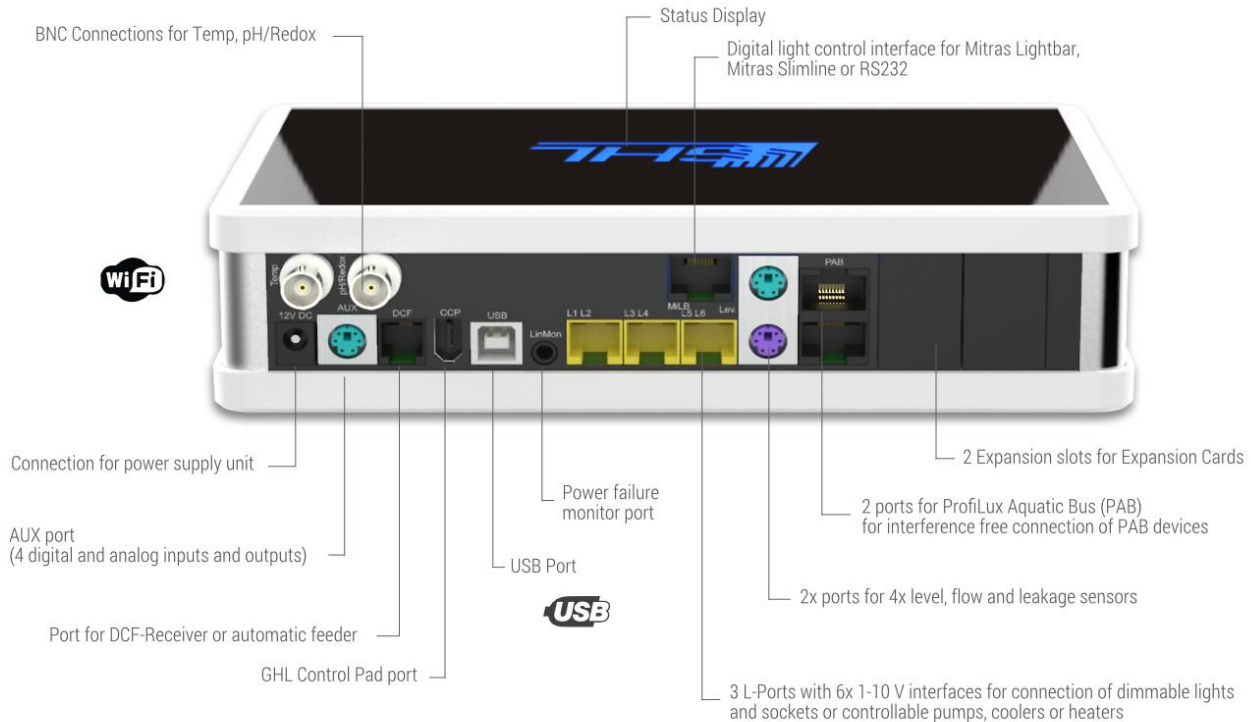
3.2 Connection Overview

The total of all available inputs and outputs in the *ProfiLux 4 / 4e* is referred to as resources.

The *ProfiLux 4* controller includes the following connection ports:



The *ProfiLux 4e* controller includes the following connection ports:



3.2.1 Sensor Inputs

The following sensors can be connected to the white BNC sockets of the *ProfiLux 4* (Left to right):

- Digital Temperature Sensor, only (Left BNC connector)
- pH/Redox
- Redox/pH (*ProfiLux 4* only)
- Conductivity (Right BNC connector) (*ProfiLux 4* only)

The inputs for pH, Conductivity and ORP can be switched and adapted to the desired measurement range. The default function of each sensor input corresponds to the first-mentioned sensor input label at the back of the *ProfiLux 4 / 4e*. For example, if an input is labeled, pH / redox, the sensor input is by default, adjusted to pH. If it is labeled, Redox / pH, the sensor input is set to Redox, etc.

3.2.2 Powerbar Connection (ProfiLux 4 only)

The control cable of the powerbars (STD4-4, Powerbar 6D) is connected to the **Red** RJ12 Western sockets S1-S4 and S5-S8 (from left to right). Our first generation GHL Dosing pump unit (Doser with black housing and blue clips) can also be connected to this socket.

The function of each socket can be freely programmed to best fit your needs.

By default, for safety reasons, all sockets are deactivated!

If a digital powerbar is to be connected, the ProfiLux controller must be programmed and set accordingly.

3.2.3 Interface for Mitras Lightbar/Slimline or RS232

The **Black** RJ45 Western socket can either be used to connect one or more *Mitras Lightbar* or to connect to a PC using an additional special GHL RS232 cable.

3.2.4 Expansion Slots

The *ProfiLux 4 / 4e* allows you to modularly expand upon the existing system by using the 3 on-board Expansion Card slots. If you wish to add additional sensors, powerbars, dimmable lamps, etc, you can install up to 2 *ProfiLux Expansion Cards*. Two of the slots are accessible externally and used for connecting external accessories. The third expansion slot inside the housing is solely for *Expansion Cards* which require no access from the outside. (E.g. *PLM PWC*).

When these slots are full, you can further expand the *ProfiLux 4* by connecting our *Expansion Box 2* to it. Doing so will grant you even more resources such as sensor connections, 1-10 V interfaces and switching outputs.

3.2.5 PAB Ports

The two RJ45 Western sockets are PAB ports for *PAB*-devices such as

- *Powerbar PAB*
- *ProfiLux Touch*
- *GHL Doser Slave*
- *Expansion Box 2*
- *SMS Module-PAB*

Any PAB-device can be connected to this port. For more information, please refer to the "*Connection to PAB*" section.

3.2.6 Level Sensor Connections

Level sensors are used for monitoring and maintaining set water levels and is also used for leakage detection purposes. These sensors can be connected to the Level ports (Mini DIN sockets: Level 1 & 2 **Purple**, 3 & 4 **Green**). Since these are sockets with double allocation, you can also use a splitter cable (Y-cable PL-LY; not included) to connect two level sensors to a single Level sensor port and control them independently.

3.2.7 1-10V Interfaces

Devices that use 1-10V interfaces are connected to the three **Yellow** RJ12 Western sockets L1/L2, L3/L4, L5/L6 (Right to left).

1-10V interface devices include:

- Dimmable tubular GHL *Lightbars ALB*
- Dimmable Effect-LED-Light *Mitras-Simu-Stick*
- Dimmable sockets
- Controllable heating or cooling (e.g. *Propeller Breeze*)
- Controllable stream pumps

Each of these ports include two independent 1-10V interfaces and associated relay control outputs. If necessary, each port can be extended with the splitter cable -YL2, available in different lengths.

3.2.8 Power Failure Monitor/ Line Monitor Port

A mains voltage monitor (12V plug-in power supply with jack plug) can be connected to this connection.

3.2.9 USB Connection

The *ProfiLux 4* Controller can be connected to a PC via USB cable. This means that all settings can be configured comfortably using *GHL Control Center*. *GCC* software can be downloaded free of charge from our website's download area.

3.2.10 GHL Control Pad Connection

A GHL Control Pad can be connected here.

3.2.11 DCF Receiver Connection

A *DCF77 Receiver* from GHL can be connected to this RJ10 Western socket. The DCF Receiver must be activated so that *ProfiLux 4 / 4e* is able to decode and use the time transferred from the receiver.

The DCF receiver receives radio signals from a DCF77 station at Frankfurt. As with any device that works with radio, interference may result from electrical equipment, poor reception, or the like. In most cases it helps to place the receiver at a more favorable place.

3.2.12 AUX Connection

This Mini-DIN socket can be used to connect devices with AUX plugs.

3.2.13 Power Supply Input

12V DC hollow socket for connection to the power supply. Use only the original power supply for supplying power to the *ProfiLux 4* Controller.



DANGER

- Connecting a non-GHL branded power supply may lead to the destruction of the *ProfiLux 4 / 4e*!
- A repair caused by this is not a guarantee and is therefore subject to a charge.

4 Functions of the ProfiLux 4 / 4e

4.1 Functionality of the ProfiLux 4 / 4e

ProfiLux 4 / 4e can reliably and accurately measure and control all the important parameters and thus help you in obtaining the sensitive biological balance in your aquarium, terrarium or pond.

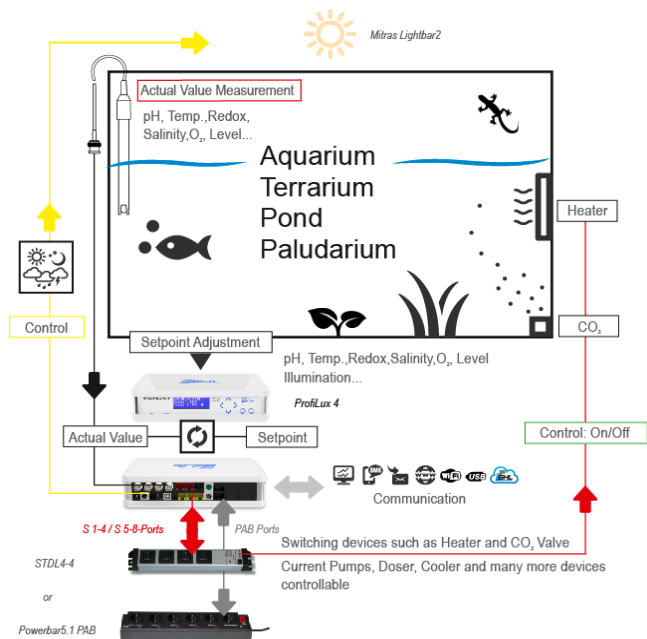
Depending on the model and application, examples are: Water temperature, pH, Conductivity, Redox potential, Level, Flow, Oxygen content, Air temperature or humidity.

The controller monitors and controls heater, ground heater and cooling operations. The sequence control with intelligent and self-learning intermittent wipers always ensures optimal heating with pinpoint accuracy. If desired, a nightly temperature decrease can be programmed.

The highly accurate pH control electronics can down regulate (e.g. CO₂ supply) or up regulate (Alkalization) based on the programming that is made. Disabling pH control during the night can also be programmed.

For measuring and controlling, you will need the following items in addition to the controller:

- GHL Powerbar *STD4-4* or Powerbar 5.1/ 6E PAB: For switching on and switching off consumers such as Solenoid valves, heating, cooling and pumps, nebulizers.
- GHL Sensors: To measure various water values.
- Possibly Expansion Cards or additional equipment: Depends on the desired application.



How ProfiLux 4 works

The diagram shows an example of how the ProfiLux Controller systematically controls the interaction of individual components and ways it can assist you.

4.2 Functions

- Up to 32 independent channels of dimmable and non-dimmable lamps, freely adjustable
- Sunrise and sunset
- True calendar moon phase simulation
- Cloud simulation with adjustable random generator, cloud cover, rainy days, seasonal lighting, Thunderstorm simulation
- Acclimation program
- Feed pause (4 different customizable preferences for pump behavior possible)
- Measurement and control of Temperature, pH Values, Redox, Conductivity
- Sequential temperature control for tubular heater, substrate heater and cooling, programmable nightly decrease, speed regulated fans controllable
- Menu guided sensor calibration
- Data log

- Operation hour meter for all sensors
- Universal analog and digital inputs
- Level (level, leakage, automatic water change etc.)
- Flow (stream)
- Versatile Pump Controlling (up to 16 stream pumps independently controllable, several modes: High/low tide, surge, random and much more; different wave modes)
- Operation hour meter for lamps
- Burning-in mode for fluorescent tubes
- Battery buffered real-time clock (RTC)
- Digital *Mitras Lightbar* interface or RS232
- Integrated webserver: Display of values and states, change of important settings, email client, DHCP
- USB and WiFi
- Cloud service *myGHL®*
- Connection options for GHL Control Pad, Power-Failure-Monitor, AUX
- Connectivity for radio-controlled clock receiver (DCF)
- Programmable reminders
- Control of 64 switchable sockets and dosing pumps
- 32 timers and dosing programs
- Child protection via PIN code
- No coding required
- Settings are stored during power loss in nonvolatile memory (FRAM)
- Computer is expandable with 3 add-on modules (2x external, 1x internal), with our *Expansion Box 2* added, there are virtually no limits
- Flexible extensions on the *ProfiLux Aquatic Bus* (*Expansion Box 2* for example)
- Multiple aquarium controllers can be networked
- Alarm function, output of the alarm optical, acoustical or via switchable socket
- Therapy Program for sick fishes
- Maintenance programs
- Notifications per email or SMS
- Operation via convenient PC software (Free of charge)
- Virus proof
- GHL-developed operating system for aquatics, ProfiLuxOS

Additional features (with corresponding expansion card):

- Measurement and control of oxygen, humidity and air temperature
- Use of external signals (such as buttons) to control the *ProfiLux*
- Lighting control via DALI

5 Activation

5.1 Installing the ProfiLux 4 / 4e

The device must be protected from water at all times!

Mount the controller in a water-protected area. When selecting the mounting material, make sure that you have adequate sizing and stability. Make sure that the unit cannot fall into the water during assembly or normal use.

If the device is placed inside an aquarium cabinet, make sure that it is placed in an area free from splashing water; moisture or liquids that can penetrate.

5.2 Important Operating Instructions

***ProfiLux 4 / 4e* as well as its accessories (e.g. *Powerbar*) are destroyed by excess moisture or too high atmospheric humidity - Please observe the technical data and notes below!**

To ensure safety and safe operation, the following regulations must be followed! In the case of non-compliance, warranty claims expire, the manufacturer also rejects any responsibility or liability for damage!



DANGER

- Never leave your aquarium or terrarium unsupervised for an extended amount of time.
- The *ProfiLux* can assist you with many tasks and inform you about error conditions (For example, via email or SMS) - it can in no-way, replace regular personal supervision and on-site checks-ins.
- The maximum amount of time without personal view depends on how long your aquarium, terrarium, or pond can survive without significant damage, even when errors occur.
- Always remember that each technology can fail and malfunctions can never be ruled out!
Power failures, incorrect settings, damage (For example, by water or overvoltage) or simply an unexpected operating situation can lead to fatal damage.
- The manufacturer disclaims any liability for (consequential) damages or losses which might arise in connection with the use of the *ProfiLux System* extent legally permissible.

Powered equipment and water can become a dangerous combination if precautions are not taken. It is therefore essential to supply power to all mains-operated devices which are operated in the aquarium or in the vicinity of the device via a residual current circuit breaker!

The Powerbar is operated with mains voltage and is not waterproof. This means that the socket strip must be protected against moisture and splashing water! Please take note of this when choosing the installation location.

In order to avoid any danger, all mains-operated devices must be disconnected from the mains; all plugs must be disconnected! When working in the basin. It can never be ruled out that a heating element, a pump, or a luminaire is defective.

For safety reasons, the use of a controlled heater is recommended. This should be adjusted that it switches off slightly above the desired temperature. Thus, the temperature can be controlled further, but a possible malfunction of the control does not lead to an overheating of the aquarium.



DANGER

On all cables and lines leading out of the aquarium water can run downwards. Therefore, they must be routed in a way that no water can enter electrical or electronic parts! This could be accomplished by arranging so called drip loops at all cables and lines.



TIP

- Please ensure good access to the connections of the device
- Please consider the maximum cable lengths of the connected *PAB* cables, sensors, *Light Bar* etc. when selecting the installation site
- Additional sensor cable extensions (*BNC2* or *VTN cables*) and *PAB* cables are available in different lengths to fit your needs. They are available online in our *GHL Store* (For US customers, *GHL USA Store*).



WARNING

- To ensure proper operation, the connection cables should never be kinked, crimped, or positioned in an unsuitable way.



DANGER

Products that are already powered should never be pulled by the cable. This may cause malfunction or damage the connected products and the *ProfiLux 4 / 4e*.

They should only be pulled by the plug connected to the power socket.

ProfiLux 4 / 4e and its accessories are destroyed by moisture or excessive humidity.

5.3 Connecting the Sensors

Connect the sensor connection cables into the corresponding connector sockets provided for the specific purpose.



DANGER

- Sensor plugs must not be wet or damp when connecting to the socket.
- Do not use force.
- Only connect *Digital Temperature Sensors* from GHL to the temperature sensor socket of *ProfiLux 4 / 4e*.
- Always connect the sensors to the respective jacks, as this could damage the device or the sensors.
- A repair caused by this is not a guarantee and is therefore subject to a charge.



TIP

- Place the sensors in an area where water can constantly circulate around them.
- To prevent algae growth, it is best to place the sensors in a dark spot. For mounting, an open external filter would be a good place.
- To ensure proper sensor measurement, attach the sensors perpendicular to the water surface.
- Make sure that the cable connection of the sensor is not immersed in water under any circumstances.
- Many sensors are very susceptible to interference due to their low level signals. To provide the most accurate measurements, please have enough distance between the sensors/cables and sources of interference. These can include: Electronic ballasts, power lines,

pumps, consumer electronics, etc. False readings can be avoided by following these precautions.

- Please also refer to the instruction manual for the individual sensors.

5.4 Connecting Powerbars to ProfiLux 4 / 4e

For switching electrical loads with the *ProfiLux 4 / 4e*, you need a *Powerbar*, which is not included in the scope of delivery of the controller.

The following Powerbar options are available:

- STDL4-4
- Powerbar 6D (Digital Powerbar)
- Powerbar 5.1 PAB
- Powerbar 6E PAB

All sockets are freely programmable in their function. The exact procedure can be found in the supplementary "*Programming manual ProfiLux 4*" for download in the download area of our homepage www.aquariumcomputer.com.



DANGER

- *ProfiLux 4 / 4e* cannot be connected to any of the older *Powerbars* of ProfiLux or ProfiLux Plus (the previous models, until 2005)! This would destroy the electronics.
- *Powerbars* are operated with mains voltage and are not waterproof. This means that the socket strips must be protected against moisture and splashing water!

5.4.1 STDL4-4 (ProfiLux 4 only)

Plug the connecting cable of the *STDL4-4*, into the red connector sockets (S-Ports).



TIP

- If you have connected a Powerbar, you should label the sockets with a water-proof pen or sticker with the corresponding numbers and their function.

At ports S1-S4 and S5-S8, two STDL4-4 (each with four sockets) can be connected. If a corresponding expansion card is used, two additional STDL4-4 can be controlled.



5.4.2 Powerbar 6D

Alternatively, you can also connect a Digital Powerbar (Powerbar 6D with 6 sockets) to the S-Ports.



The Digital Powerbar *Powerbar 6D* has its own microprocessor and is bus-compatible (up to 4 *Powerbar 6D* can be daisy-chained).

The microprocessor control offers additional security features.



WARNING

- If you want to use a Digital Powerbar (Non-PAB) with the *ProfiLux 4*, the corresponding S-socket in the *ProfiLux 4* must be activated before any programming takes place.

5.4.3 Powerbar5.1-PAB

This Powerbar is connected to a PAB port of the *ProfiLux 4*.

The ProfiLux Aquatic Bus enables secure and reliable communication with *ProfiLux 4*.

Features:

- 5 independent switchable sockets, one of these can also be dimmed
- 1 additional socket with permanent power (e.g. for *ProfiLux*, pumps or lamps)
- Loads with up to 15 Ampere can be switched (depending on the country version)
- Built-in overvoltage protection
- Illuminated switch with circuit breaker function (UK-model without circuit breaker function)
- Freely programmable initial state of the sockets after 30 seconds without communication



(1)		Permanently supplied socket
(2) – (5)	S1 – S4	Switching sockets 1 – 4
(6)	S5	Switching socket 5 with dimming function
(7),(8)	PAB	Connections for <i>ProfiLux Aquatic Bus</i> (PAB)
(9)		Power cable

Please also refer to the section "*Establishing the PAB connection*".

5.5 Connection of Luminaires

5.5.1 Connection of Dimmable Luminaires or Lightbars

The control cables of dimmable luminaires (*GHL ALB tubular light bar*, *Mitras-Simu-Stick*) are plugged into the **Yellow** Western sockets of the *ProfiLux 4*.

GHL luminaires do not need to be connected to the *STD4-4 Powerbar*, they are instead connected to a permanently live socket since the on/off switching of GHL luminaires takes place via the control cable.

The L1L2, L3L4 and L5L6 sockets include two 1-10 V interfaces each and transmit shut-off signals when appropriate. The function of these interfaces can be fully programmed. As default setting, the 1-10 V interface L1 is assigned to the illumination channel 1, L2 to illumination channel 2, L3 to illumination channel 3, L4 to illumination channel 4. If the 1-10 V interfaces are used for dimming control purposes, a change of the assignment is in most cases, not necessary.

When using the GHL ALB tubular light bar, please consider the following:

- Before a tube can be dimmed correctly, it has to be “burnt-in”! Burning in means that the tube may be operated for ca. 100h only at full power (i.e. without dimming). The exact requirements for the burn-in can give you the tube manufacturer. If a tube is dimmed without being burnt-in before, it can result in a flickering or in a shorter lifetime. The burn-in can be done automatically.
- Our ALB must never be opened!

The light bar is waterproof, if the following is taken into account:



WARNING

- Close the tube screwing always thoroughly, consider the position of the sealing.
- Never open the cable connections
- Never pull at the cables
- Don't expose the lamp sockets to mechanical pressure.

5.5.2 Connecting the Mitras Lightbar or the Mitras Slimline

The control cable of the Mitras Lightbar is plugged directly into the **Black** Mitras Lightbar RJ 12 socket provided for this purpose.

Illumination Runs as well as lighting projects can be conveniently programmed via the *GHL Connect* platform (iOS & Android App, Cloud myGHL, Webserver) or PC-software *GHL-Control-Center (GCC)*. The software is free of charge and can be downloaded from our homepage in the download area.

5.6 Connection of Stream Pumps or Fans

The control lines of adjustable flow pumps and/or variable fans (e.g., *Propeller Breeze*) are plugged into the **Yellow** RJ12 Western sockets.

For this purpose, you must set the function of the corresponding 1-10 V interface accordingly.

The exact procedure can be found in the "*Programming manual ProfiLux 4*" for download in the download area of our homepage www.aquariencomputer.com.

5.7 Connection of PAB-Devices

The *ProfiLux 4 / 4e* includes two PAB-ports for connecting additional *ProfiLux Aquatic Bus* compatible devices.

5.7.1 What is the PAB

PAB is a CAN-Bus-System which allows for extremely secure data transfer between all *PAB* devices such as *ProfiLux Controllers*, or additional *Expansion Boxes 2*. The range can be up to 100 m (300 FT).

PAB cables are not included and must be purchased.



TIP

- Be sure to obtain suitable *PAB* cables in the appropriate lengths to meet your needs.
- *PAB*-cables are available online at *GHL Store (EU)* and *GHL USA Shop (US)* in different lengths from 0.5 m up to 50 m.

5.7.2 How does the ProfiLux Aquatic Bus work

The system works according to the master-slave principle. The master unit is always a *ProfiLux Controller* (starting from model *ProfiLux 3*), to which all other bus participants can be subordinated as a slave unit.

PAB devices are always connected in series. This means that all *PAB* devices must be connected to the *PAB* cables linearly with each other. The first *PAB* device is connected via a *PAB* connection cable with one of the *PAB* ports of the next party. The *PAB* works bi-directional; this means every *PAB* jack can be used for input or output. The next participant is connected again at the free *PAB* port of the previous participant, and so on.

The last device of the *PAB* therefore always has an unoccupied *PAB* connection.

The order of the devices can be freely selected. Also several *ProfiLux Controllers* can be connected to the bus.

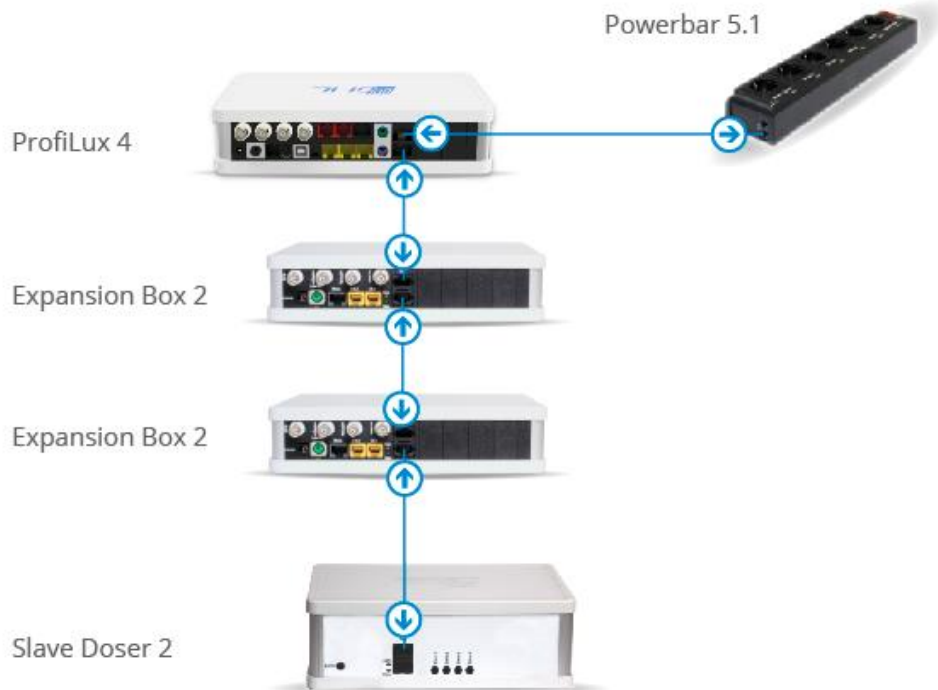
The *PAB* provides a line connection via the single *PAB* participants from one end to the other. A ring or star topology of the *PAB* bus is not allowed.



DANGER

- *PAB* devices must always be linearly connected to each other.
- The last device on the *PAB* must always provide a free *PAB* port.
- Never connect the last two *PAB* devices through an additional *PAB* connection cable.
- Such a ring connection leads to malfunctioning and is not allowed.

5.7.3 Exemplary Connection of ProfiLux 4 / 4e with PAB Devices



5.8 Connection to the Power Supply

Connect the *ProfiLux 4 / 4e* using the supplied power adapter to the power supply. Insert the DC plug into the designated 12 V DC hollow socket on the rear panel and connect the power connection cable with the plug to the power outlet.



DANGER

- Ensure that the mains voltage matches the voltage specified on the identification plate located on the bottom of the device.
- Connect the device only to a properly installed and grounded outlet with a minimum rating of 10A.
- Never use a different voltage supply. Incorrect polarity or voltage can destroy the device.
- **Use only the supplied AC adapter.**



DANGER

- The connection of a power supply that is not part of the *ProfiLux 4* leads to the destruction of the *ProfiLux 4*!
- A repair caused by this is not a guarantee and is therefore subject to a charge.

5.9 Status Indicators of the ProfiLux 4 / 4e

The *ProfiLux 4* includes two status indicator lights which are located on the housing cover and the front of the device.

5.9.1 System-Status- LED on the housing cover

The LED-backlit GHL Logo in the housing cover of the *ProfiLux 4 / 4e* lights up in different colors.

The various colors can show you at a glance, the condition of your aquarium.

The color and blink codes shown depend on the particular *ProfiLux* Firmware.

For the meaning of the blink codes, please refer to the Support-> FAQ section of our homepage www.aquariumcomputer.com
www.aquariumcomputer.com.



5.9.2 WiFi Status LEDs on the Front Panel



Located on the front panel of the *ProfiLux 4 / 4e* next to the red Alarm LED are another two LEDs that provide information about WiFi connection and communication.

Status	Meaning
Yellow LED is ON	<i>ProfiLux</i> has WiFi connection as Access Point (AP)
Yellow LED flashes	<i>ProfiLux</i> has active WiFi communication as Access Point
Green LED is ON	<i>ProfiLux</i> has WiFi connection in the network infrastructure
Green LED flashes	<i>ProfiLux</i> has active WiFi communication in the network infrastructure
Both LEDs are OFF	<i>ProfiLux</i> has no WiFi connection



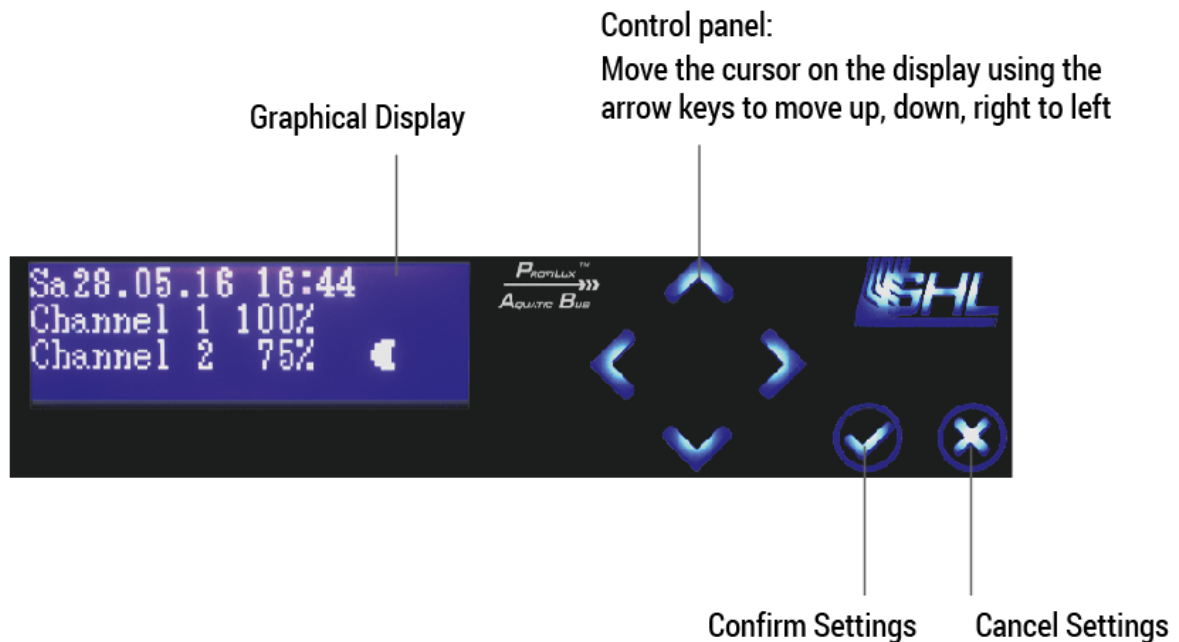
DANGER

- Never leave your aquarium or terrarium unsupervised for an extended amount of time.
- The *ProfiLux-System* can assist you with many tasks and inform you about error conditions (For example, via email or SMS) - it can in no way, replace regular personal supervision and on-site checks-ins.
- The maximum amount of time without personal view depends on how long your aquarium, terrarium, or pond can survive without significant damage, even when errors occur.
- Always remember that each technology can fail and malfunctions can never be ruled out!
Power failures, incorrect settings, damage (For example, by water or overvoltage) or simply an unexpected operating situation can lead to fatal damage.
- The manufacturer disclaims any liability for (consequential) damages or losses which might arise in connection with the use of the *ProfiLux System* extent legally permissible.

6 Operation

6.1 Operation on the Device

Use the navigation buttons (arrow keys) on the device to make settings or desired changes to your settings.



Set the time and date first.

If you have connected the optional DCF module (radio clock receiver), "Use DCF" is activated and the DCF signal can be received, the time and date are set automatically after the power supply is connected.

Press any arrow key to enter. You can move up and down from the right to the left with the arrow keys in the menu.

The operation of the device is very simple. Use the up and down arrow keys to navigate through the menus and make a selection.

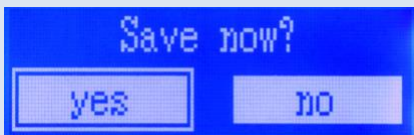
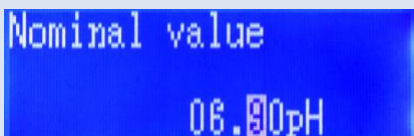
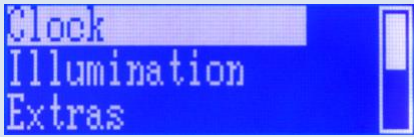
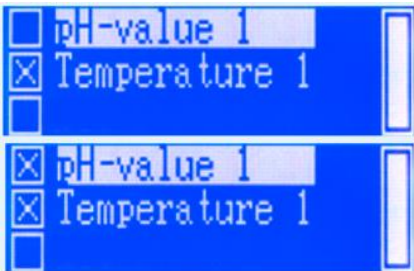
To confirm the selection of a menu item, press the confirmation key (Check mark button: Confirm input = **Return**). This will take you to the submenus.

Make the desired changes and save them with the confirmation key. Press the Cancel key (Cross mark button: Cancel input = **Escape**) to abort entries.

After each setting process, you are asked if you want to save the changed settings. Only after confirmation with Yes, the new settings are accepted and saved. These settings are also

stored in the nonvolatile memory (FRAM, independent of the mains voltage) and are restored after voltage interruption.

The following types of dialogs are used when operating the device::

Dialog type	Display*	Operation
Select Yes / No		Use the left-arrow key to select Yes, use the right-arrow key to select No. The current selection is marked with a frame. Confirm with <i>RETURN</i> .
Enter a number (0-9)		Use the up-arrow to increase the number, decrease with down-arrow. Confirm with <i>RETURN</i> .
Enter a value, date or time		Use left and right arrow keys to select the digit of the number you want to change. The cursor shows the currently selected location. Use arrow up to increase the position, decrease with arrow down. Confirm the set number with <i>RETURN</i> .
Text input, e.g. Memory text		Use left-arrow and right-arrow to select the location in the text you want to change. Use up and down-arrow to change the character. Confirm the set text with <i>RETURN</i> .
Simple selection- Selection of an option or a menu point		Use the up and down-arrow to select an entry, confirm with <i>RETURN</i> .
Multiple selection - Several options can be selected at the same time		Use up and down-arrow to select an entry. Use right arrow key to select the entry (then the box is displayed checked). Deselect the entry with the left arrow key (empty box is displayed). Confirm with <i>RETURN</i> .

* Above illustrations are exemplary.

6.1.1 Menu Structure

The operating menu is structured as follows:

Menu Structure*

Clock:	Date & Time Reminder Timer Dosing pump Location
Illumination:	Illumination run Shift curves Manual illumination Clouds Moon Rainy days Burning in Operating hours Storms Temperature-dependent light reduction Variable illumination Mitras Lightbar Light-demo Time lapse Acclimation Shift curves
Extras:	Maintenance Feeding pause Internal time Info and Support Current Eheim Display Data Language
Sensoreinstellungen:	Temperature pH value Redox Conductivity
System:	Factory settings PIN Socket outlet functions 1-10 V interface

Program LED
 Communication
 Alarm
 Virtual probes
 Digital powerbars
 Configure PAB
 Configure PTC
 DALI
 Digital input
 myGHL

* Menu structure may slightly differ from the one shown above. Exact details depend on the firmware version of the *ProfiLux 4*.

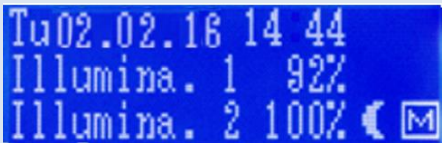
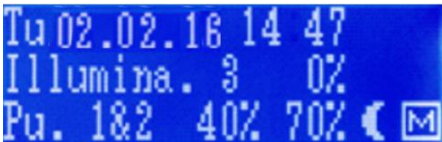
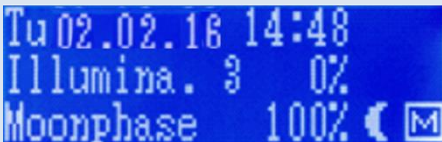
6.1.2 Display Indications

If there is no alarm, the display shows the day, date and time in the upper line. On the right side of the display, different symbols are displayed depending on the operating state:

Display	Meaning
	<i>ProfiLux 4</i> displays an alarm. Check immediately the system!
	Maintenance mode active
	Feeding pause active
	Current lunar phase
	Reminder
	Manual operation for lighting or sockets active
	Message or email received

The lower lines display current values, e.g. brightness of an illumination channel or lunar phase, state of stream pumps or temperature.

The viewable data can be freely adjusted as needed. The basic setting does not display all the values described below. However, you can adjust the display settings accordingly.

Display*	Meaning
	Displays the current <i>brightness of a lighting channel</i> in percent.
	Displays the current power of two <i>current pumps</i> in percent.
	Display the current <i>moon phase</i> in percent (0% = New moon, 100% = Full moon).
	Display of the current <i>sensor values (-)</i> : When the minus symbol is displayed, the control has activated the corresponding switching socket (if present) to reduce the pH value.
	Display of the current <i>sensor values(+)</i> : When the plus symbol is displayed, the corresponding switching socket (if present) has activated the control to increase the pH value.
	When the <i>cooling symbol (*)</i> is displayed, the control has activated the corresponding switching socket (if present) to lower the temperature.
	When the <i>substrate heater</i> and <i>tubular heater</i> symbols are displayed, the control has activated the corresponding switch sockets (if present) to increase the temperature.

* Above illustrations are exemplary.

6.1.3 Standard Display

During normal operation, the following information is displayed on the display:

Upper line: Date with weekday and time.

Right side: Current moon phase

Lower lines depending on the setting, e.g. Light intensity of the individual channels or current water temperature and pH as well as activity of the controllers.

When the default display is shown, the device is in the main menu.

If you are in a submenu without setting anything the device automatically returns to the main menu after a certain period of time.

6.1.4 Feeding Pause

Feed Pauses can be activated by using the **Esc** key at the standard display.

You can have a total of 4 feeding pauses with different durations. By pressing the **Esc** key during the standard display, you automatically jump to the Feed pause menu and can select a previously set feeding pause. The pumps (or the powerbar sockets whose function is set to the filter) are deactivated. Once the set time has elapsed, the pumps are automatically reactivated. During the feed pause, the *FP* symbol flashes and the display shows *FP* as well as the remaining pause time.

The feeding pause can be interrupted by pressing the **Esc** key again.

6.2 Operating the Device via the App GHL Connect

6.2.1 Requirements

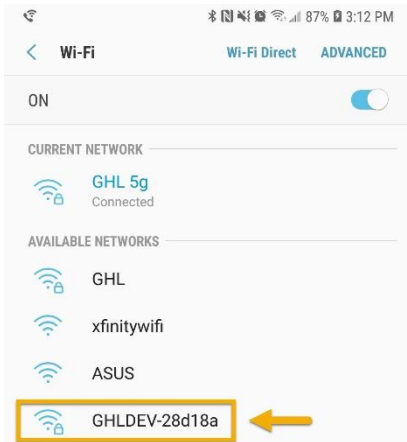
Step 1: Download the GHL Connect app on your smartphone or tablet.



GHL Connect is a free app available for download on the Google Play Store (Android) or Apple iTunes (iOS). Search: GHL CONNECT

Download the app, but do not open it just yet.

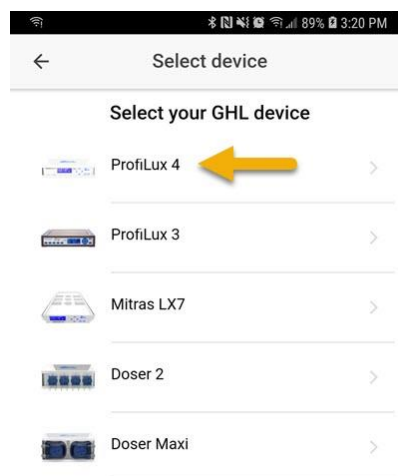
Step 2: Power ON controller, wait for controller to fully boot up, then use your device to search for nearby Wi-Fi networks. Select **GHLDEV**, enter password **Starfish** and wait for your device to connect to this network.



NOTE: GHLDEV network should show within a few seconds of powering ON the *ProfiLux 4 / 4e*. If not, power cycle the controller, wait 15-30 seconds and try again.

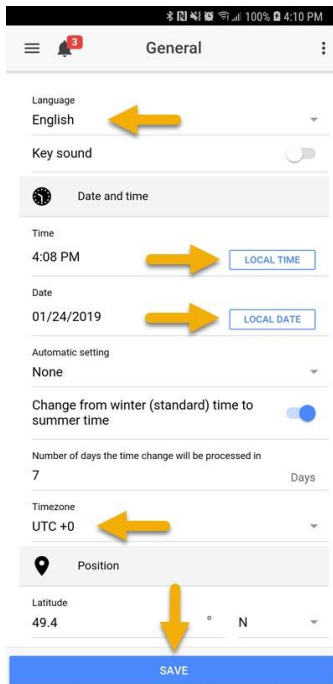
TIP: Every time you connect to the *ProfiLux 4 / 4e*'s hotspot, the **YELLOW** Wi-Fi light on the *P4 / P4e* itself will turn ON. This indicates that a device has connected to its hotspot signal. Some flashing of this LED is normal.

Step 3: Open GHL Connect app, select **Add device**, select the *ProfiLux 4 / 4e*, give this connection any name (*P4 hotspot*), leave other fields as-is, press **Add**, select the newly made connection.



6.2.2 General Settings Setup

Step 4: Press the menu icon (top left), select **General**. Change language to **English**, set date and time, set time zone, press **Save**.



NOTE: When setting time zone, be sure to choose the correct option for accurate probe measurement data logging. Example, EST -> **UTC is (-5)**

OPTIONAL: If you wish to have an audible alarm only at certain times of the day, you can activate that feature in the Alarm section.

The brightness of the GHL -logo can also be adjusted.

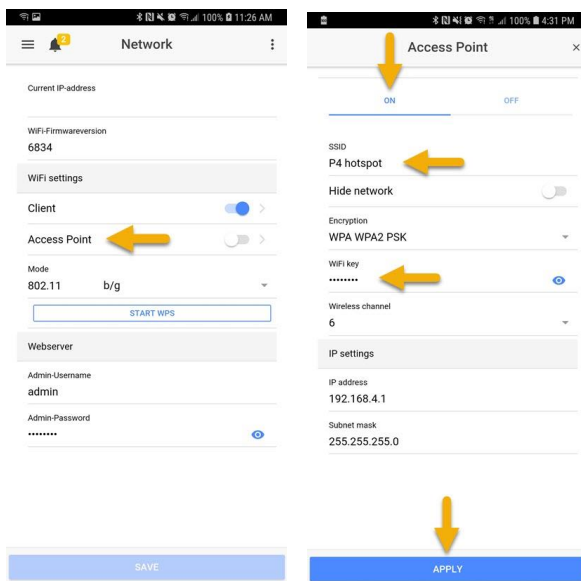
If you wish to set a custom PIN to prevent unauthorized access, you can do so in the Security section.

6.2.3 Hotspot Setup

Step 5: Press menu icon (top left), select **Network**, select **Access Point**, select **ON** to enable. In the SSID field, type-in any name you wish to give to your *P4 / P4e's* hotspot (this will be the new name of your hotspot signal, *no longer GHLDEV*).

Type-in the password you wish to give to this hotspot network; minimum 8 characters or digits.

Press **Apply**, press **Save**, then confirm by pressing **YES**.



NOTE: After saving your settings and confirming, you will be disconnected from the default P4 hotspot signal (GHLDEV). This is normal as the Wi-Fi module must reset itself in order to display the **new** name of the hotspot network.

Step 5: Use your device to search again for nearby networks, select the NEW name of the hotspot network and connect to it. Enter the password you assigned when prompted. Once connected, open the GHL Connect app and connect to your device.



NOTE: When searching for nearby Wi-Fi networks, you should now see the new name of your *P4 / P4e*'s hotspot network. In step 4, we called the new name of this network, *P4 hotspot*. See illustration (Left).

TIP: Now that you've setup your *P4 / P4e*'s hotspot, anytime you wish to connect via the app, you can do so by connecting directly to the hotspot signal.

6.2.4 Assign PAB-Devices

Step 6: Connect PAB devices to *P4 / P4 e*. This can be *Powerbar(s)*, *Touch display*, *Doser 2.1* etc. *Powerbars* **must** be connected to **either** the *P4 / P4e* PAB port or an existing *Powerbar*. All other devices can be chained off of other PAB devices. For more information please refer to 5.7 CONNECTION OF PAB-DEVICES. Make sure the PAB-devices are powered ON.

Step 7: On the *P4 / P4e* itself, press the up or down arrow key, select **System** -> **Configure PAB** -> **Assign devices**. Detected devices will be listed. Press the **right** arrow key to select each device, then press the check-mark key to confirm.

6.2.5 WI-FI Setup – Adding the P4/4e to your network

Step 1: Connect to your *P4 / P4e*'s hotspot signal, press menu icon (top left), select **Network**, and select **Client**. In the SSID field, type-in the EXACT name of your Wi-Fi network (case sensitive).

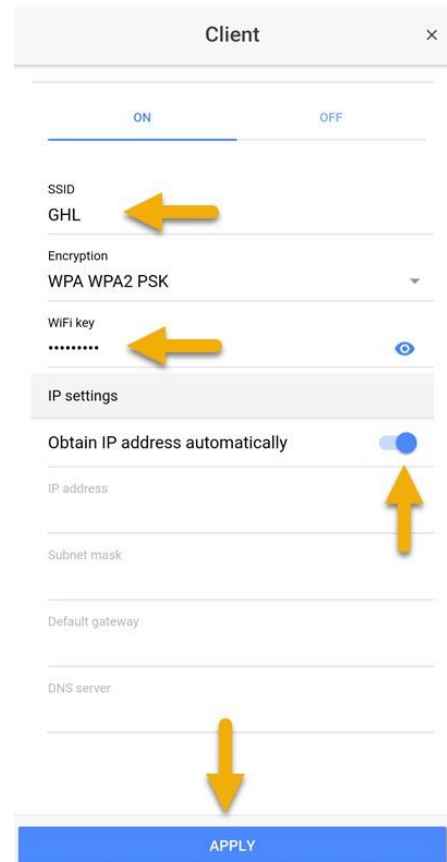
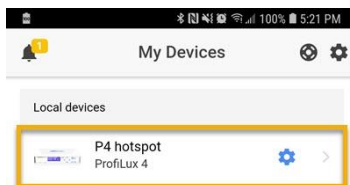
Step 2: Type-in the EXACT password to your Wi-Fi network (case sensitive).

Step 3: Select **Obtain IP address automatically**

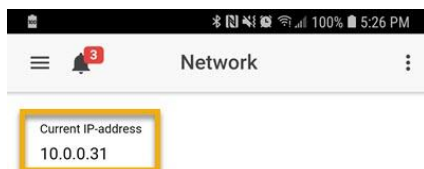
Step 4: Press **Apply**, press **Save**, then confirm by pressing **YES**.

NOTE: If Wi-Fi settings were entered correctly, the **GREEN** Wi-Fi light on the *P4 / P4e* itself will turn ON. This indicates that your *P4 / P4e* is now on your Wi-Fi network. Some flashing of this LED is normal.

Step 5: Reconnect to your *P4 / P4e* by selecting the dedicated hotspot connection.



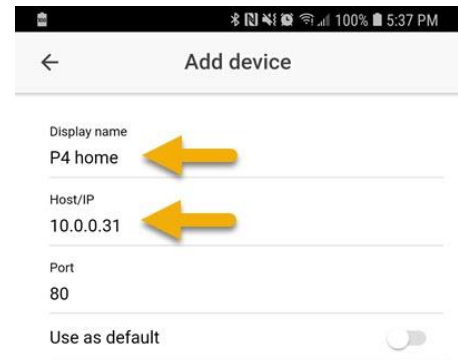
Step 6: Press menu icon, select **Network**, and see the displayed *Current IP address*. This number is the assigned IP address of your *P4 / P4e* within your network. **Write it down.**



NOTE: IP address shown is for illustration purposely only. Please write down the IP address you see on **your smartphone or tablet**.

Step 7: Disconnect from your *P4 / P4e*, press the icon with the 3 dots (top right), then use your device to connect to your home network.

Step 8: In the My Devices page, press **Add device**, select the *ProfiLux P4 / P4e*, and give this connection any name (*P4 home*). In the *Host/IP* field, type-in the assigned IP address of your *P4 / P4e* (Refer to step 6 for example), press **Add**, and then select the newly made connection to connect.



6.3 Operating the Device via the Software GCC

Full device settings and functions are accessible via the software *GH Control Center (GCC)*, which is available for download free of charge in the download area (support-> downloads) of our homepage www.aquariumcomputer.com.

6.3.1 Requirements

You need the appropriate *GH Control Center* for the firmware of the respective *ProfiLux*.

It runs on the operating systems Microsoft Windows Vista® and Windows 7®, Windows 8®, Windows 10®.

The connection to the *ProfiLux* can be established via USB:

After successful installation, connect *ProfiLux 4* to your PC using the USB cable. The driver is installed automatically.

6.3.2 GCC General Information

With the *Load* button, the settings of the *ProfiLux 4* are read out and the program displays are updated. With *Save*, the settings you have made in the program are transferred to the device.

6.3.3 What can be set via GCC

With the PC program you can make almost all settings via mouse and keyboard, which otherwise are carried out directly on the device.

There are the following exceptions:

- Therapy program
- Sensor calibration

6.4 Connection between the ProfiLux 4 / 4e and PC

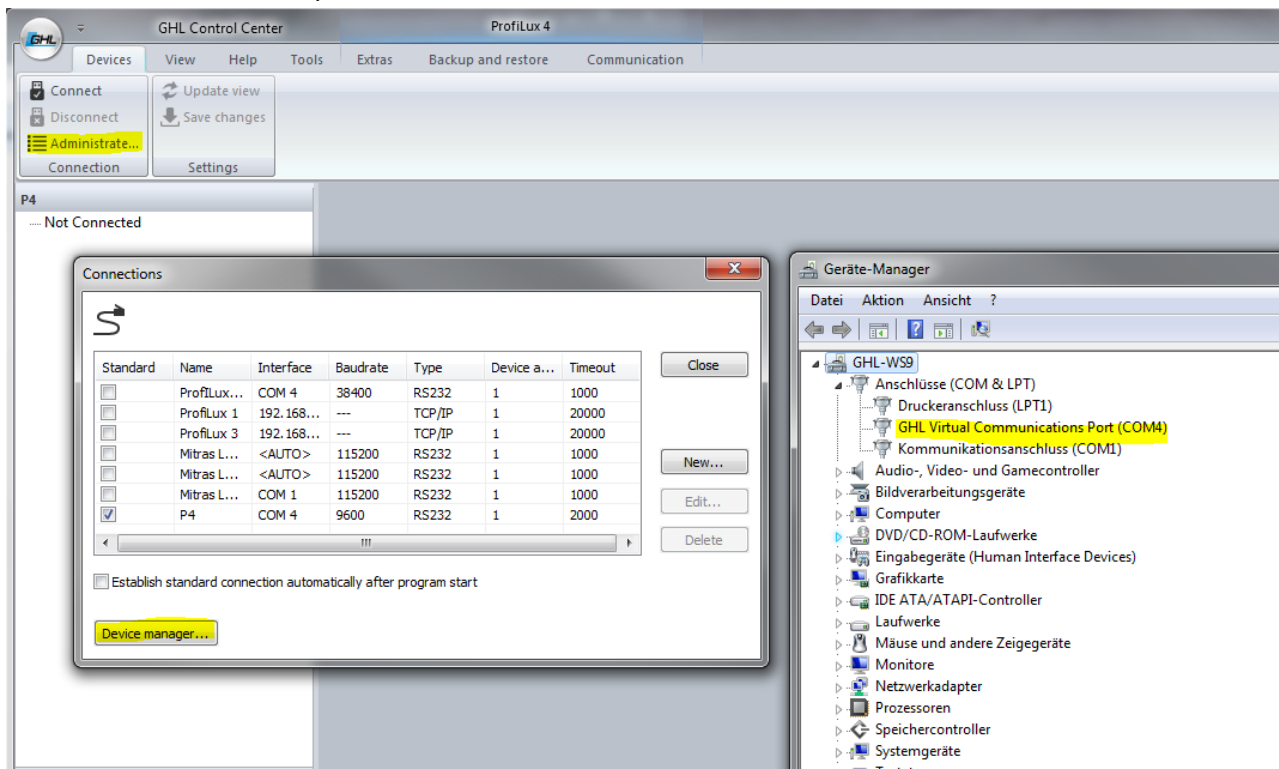
Two steps must be taken before your ProfiLux device can be operated with a PC:

- PC and ProfiLux must be connected with a cable via USB
- The PC program *GCC* must be set up

Open the application and connect to your device.

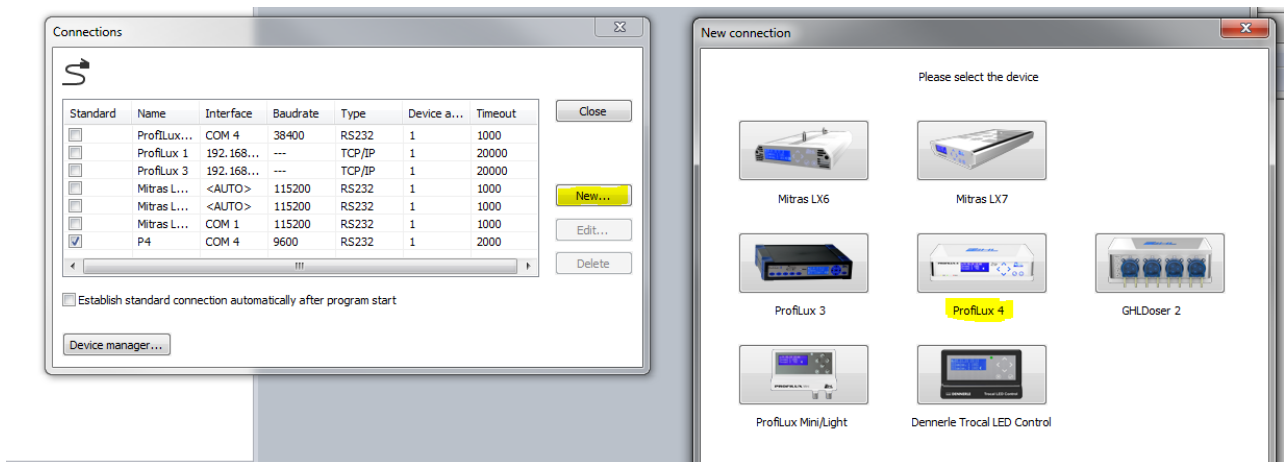
Via "Administration" -> "Connections" -> "Device Manager" you first get the "GHL Virtual Communications Port" for your device.

In the illustrated example, this is "COM4".

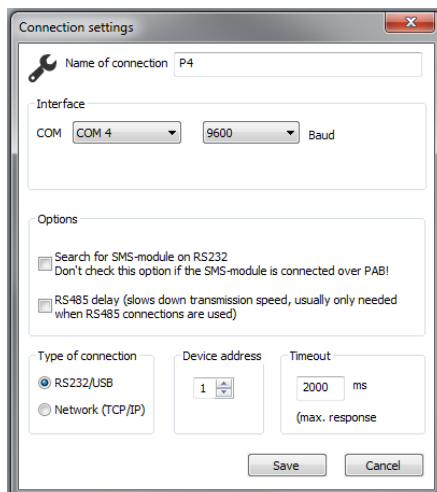


Close the "Device Manager window" and click "New".

Then select your device.



The "Connection settings" window pops up automatically.



Now enter any connection name (For example, "ProfiLux 4") and set the previously determined port (COM4) via the selection window (<Auto>). Press "Save".

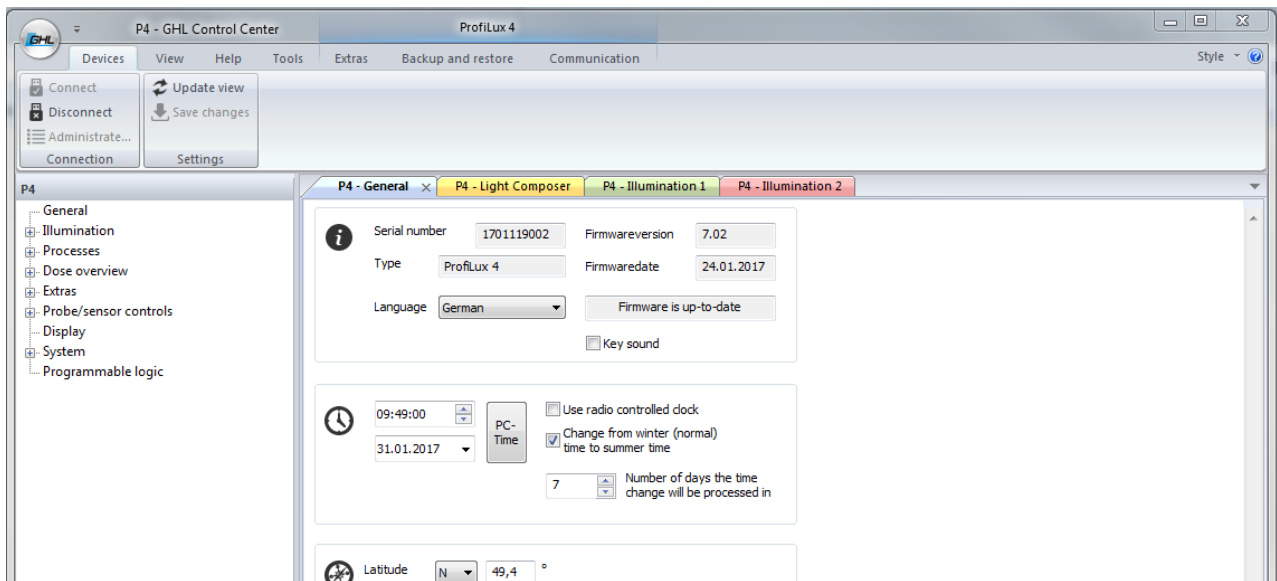
ProfiLux 4 is now visible in the sidebar. By double-clicking the device or by pressing the "Connect" button in the upper ribbon bar, the connection between the device and your PC is established.

Once connected, you can view the menus of the *ProfiLux 4*, in which you can make all desired settings.

For further settings and programming, e.g. of the *Powerbar*, please refer to the "Programming manual for aquarium computers model *ProfiLux 4*" which you can download in the download area (Support-> Downloads) of our homepage www.aquariumcomputer.com.

Once successfully established, *GHL Control Center* examines the connected Controller and displays the start screen.

The available setting options are displayed in a tree structure in the sidebar.

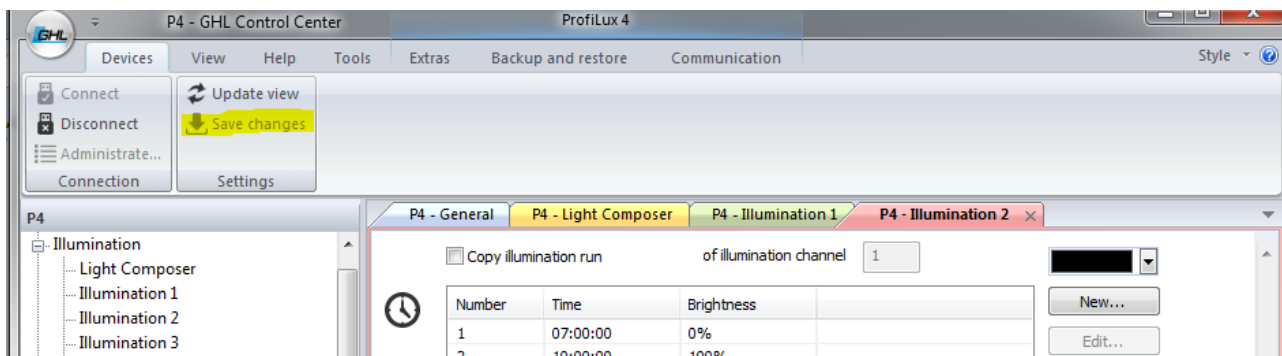


The connection can be disconnected by pressing the "*Disconnect*" button in the upper ribbon bar.

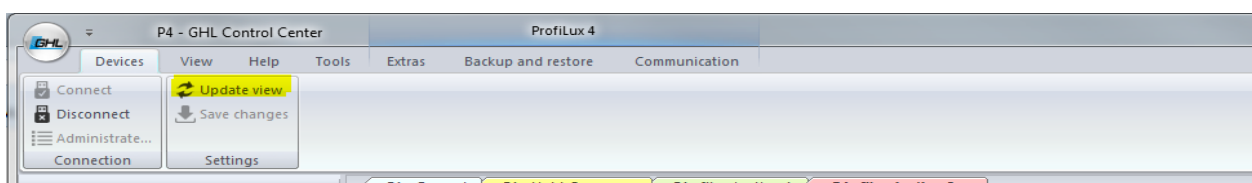


DANGER

- If you have made or changed settings for your device via the GCC, you have to save them using the "*Save changes*" button, **before you disconnect your device**. Otherwise your changes will not be transferred to the device.



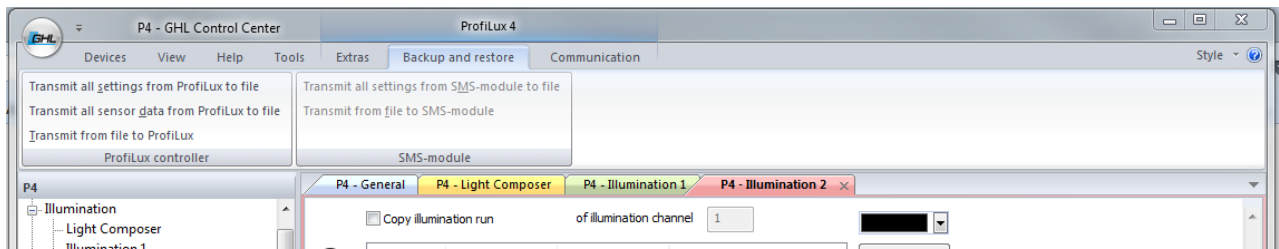
If your ProfiLux is connected to GCC and you make settings directly on your *ProfiLux 4* at the same time, you have to transfer these to the GCC by pressing the "*Update view*" button.



6.5 Save and Load Settings

If you want to back up your settings to restore them after a firmware update for example, there are the following functions provided under "*Backup and restore*" in the ribbon bar.

The option to load and save settings is also interesting for retailers who make the initial startup for their customers. So the once found settings can be replicated quickly and safely for a certain tank type.



6.5.1 Saving Settings

Settings of the connected *ProfiLux 4 / 4e* or sensor data (= settings of the controllers and calibration data) of *ProfiLux 4 / 4e* are stored in a file (File name .par).

- How to read the settings or sensor data from the ProfiLux?

The PC program uses parameter definition files (file extension .def) to know which settings should be available or read out in the connected ProfiLux Controller. These files are located in the *GH Control Center* program directory.

The appropriate parameter definition file must exist for the firmware version of the respective device. For the firmware version 7.00 of the *ProfiLux 4*, for example, the file is called *ParaList_V702_Profilux4.def*

6.5.2 Loading Settings

Settings or sensor data are loaded from a file (file extension .par) and transferred to the respective device. If the file comes from a ProfiLux with a different firmware version as the target device, a warning is issued.

Settings that originate from a device with a firmware version older than the firmware version of the target device can be loaded without problems. Conversely, problems can occur.

If a problem occurs during the transfer of the settings to the respective device, a message is displayed. If the message is ignored, the transmission of the remaining settings is continued.

If the device type does not fit, the operation is aborted completely.

When loading sensor data, the serial number is also checked. If these are not identical, only the controller settings, but not the calibration data, can be loaded. This prevents accidental calibration data from another device being loaded. The remaining sensor data can be loaded.

Basically, all settings found in the file are transferred to the connected aquarium computer.

If only some of the settings should be transferred, the file can be edited accordingly. The lines in the file containing entries with settings that are not to be transferred may be deleted via a text editor for example.

6.6 Measurement Data

ProfiLux 4 / 4e is able to record measurement data.

With Read & Save, all new existing measurement data is read out of the ProfiLux and is written into a text-file. *ProfiLux 4* stores the time of the recording so that the same data is not collected several times. Before saving you have the possibility to set some formats for the data export. The standard settings are well suited to import the file later easily in Microsoft Excel®.

If you select an already existing file for saving, the new data will be attached to the already existing data, as far as the existing file contains suitable information. This text file can then be used with e.g. Microsoft Excel® to process the data.

7 Expansion Modules

7.1 General Information

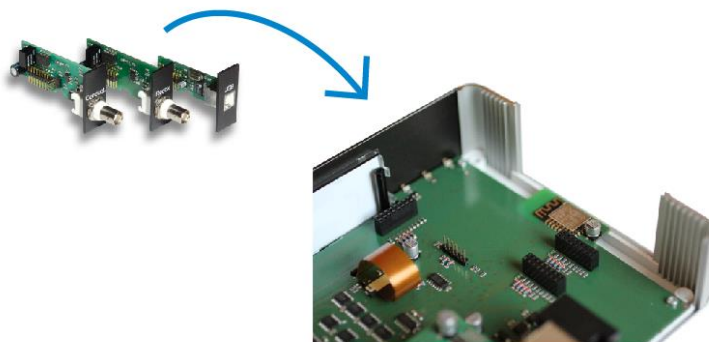
ProfiLux4 / 4e is modular and can be expanded as such. In order to use additional sensors, power strips, dimmable lamps etc., you must first install the appropriate *ProfiLux Expansion Card*; up to 3 additional *ProfiLux Expansion Cards* can be added.

Before adding *ProfiLux Expansion Cards* to the *ProfiLux 4 / 4e*, a firmware update may be required. Please follow the accompanying notes of the *Expansion Cards* to check if an update is required.

Firmware 7.02 supports the following expansion cards:

Interfaces		Sensor Inputs	
<i>PLM-4L</i>	<i>PLM-CondF</i>	<i>PLM-pH-Redox</i>	<i>PLM-CondF-Redox</i>

<i>PLM-2L4S</i>	<i>PLM-Oxygen</i>	<i>PLM-pH/Redox-Cond</i>	<i>PLM-pH-Redox-2Level</i>
<i>PLM-ADIN</i>	<i>PLM-Humidity-Temp</i>	<i>PLM-CondS-pH</i>	<i>PLM-4Level</i>
<i>PLM-DALI</i>	<i>PLM-pH/Redox</i>	<i>PLM-CondF-pH</i>	<i>PLM-pH-Redox-DigTemp</i>



ProfiLux Expansion Cards can be inserted easily into the provided expansion slots. They are automatically detected by the *ProfiLux 4* and can be combined with other *Expansion Cards* as desired.

If you wish to add an *Expansion*

Card, please read the following instructions before you start:



WARNING

- If *ProfiLux 4 / 4e* is already in operation, pull the power plug and remove all sensors and *PAB* cables.
- Please prevent damage to internal electronics by avoiding static charges.
- Please do not wear clothing or shoes that may quickly become electrostatically charged.
- Please do not walk or stand on a carpet while working on electronic components.
- If possible, work on a grounded place.
- Before touching sensitive electronic components of the *Expansion cards* or the *ProfiLux 4 / 4e*, please discharge yourself from static charges by touching unpainted metal or a grounded surface.

7.2 Installation

7.2.1 How to Open the Housing

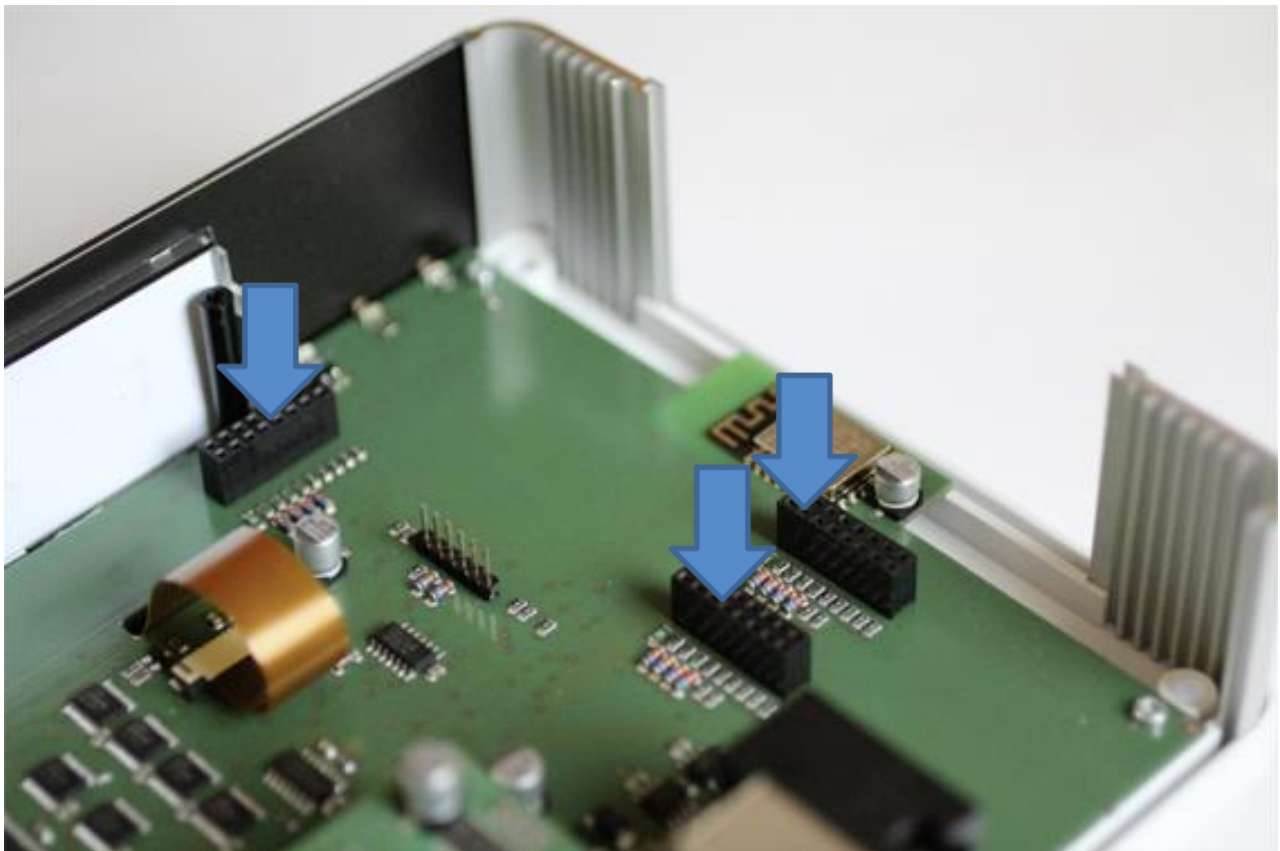


Turn *ProfiLux 4 / 4e* upside down and carefully loosen the 4 Allen screws in the 4 corners of the housing bottom plate. Pull the screws out and reverse the housing together with the bottom plate again.

Best grip bottom plate and housing cover on the right and left housing edge simultaneously and exert slight pressure while turning. Set the housing down again and lift the cover carefully.

Side panels, housing front as well as the black module cover plates on the rear panel are now loose.

The expansion slots of *ProfiLux4 / 4e*:



Two of the slots are accessible externally. At the third expansion slot inside the housing, solely *Expansion Cards* which require no access from the outside can be connected. (E.g. *PLM PWC*).

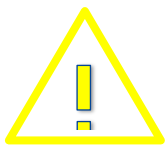
You can further extend *ProfiLux 4 / 4e* with an additional *Expansion Box 2* and include even more resources such as sensor connections, 1-10 V interfaces and switching outputs



On the right, the empty slots for plugging in the modules are seen in the illustration above. On the left, you see the ex-works built-in connections.

7.2.2 How to Insert Modules

Remove unneeded module cover plates and plug in a new module in any slot.



WARNING

- Never insert modules by using excessive force!
- All *Expansion Cards* are designed to fit with their pins right into the sockets of the slots.
- Insert the card into the slot. All of the *Expansion Card* contact pins must be seated in a socket.
- The front side of the *Expansion Card* must– as the factory pre-built modules - fit exactly in the housing rear wall.

7.2.3 How to Close the Housing

Now the housing can be closed again.

First, carefully attach the housing cover. Make sure the front panel, side panels, and the module plates as well as module cover plates slide exactly into the grooves of the lid. If necessary, slightly correct their position. Please do not use excessive force!

Thereafter, turn the box with gentle pressure and drive the screws back in again.

Restart the *ProfiLux 4 / 4e* in compliance with the following instructions.

7.2.4 Restart

Connect the sensors as well as the *PAB* cables to the *ProfiLux 4 / 4e* and restore the power supply again.

Before restarting please observe the following precautions:



DANGER

- If you change resources (add, remove, or exchange of modules) you always must newly assign them to the *ProfiLux Computer*, so that all sensor inputs and interfaces can be recognized and accepted by the *ProfiLux*.
- The previously allocated resources may have been shifted through the newly added modules. To avoid damage you must control the assignments of the interfaces (i.e. level sensors, pumps and valves for water change or dosing pumps) before recommissioning and adjust them if necessary.

8 Warranty/Liability

You have a 2-year warranty beginning from invoice date. This applies to material and manufacturing defects.

We guarantee that the supplied products correspond to the specifications and that the products do not have material resp. manufacturing defects. For the accuracy of the manuals, we do not guarantee damages of any kind which result from improper operation or from an unsuitable environment. Furthermore, we do not take over warranty for damages that are caused by a false connection or excessive humidity. We assume no liability for direct damages, indirect damages, consequential damages and third party damages as far as it is legally permitted. We do not take over guarantee that our product package corresponds to the requirements of the buyer. Our warranty expires if the delivered original product is damaged or modified.

9 Additional Information

9.1 Help and Information

For help or further information, please visit our *Support Forum* or our *Knowledge Base* at www.aquariumcomputer.com or contact your retailer.

9.2 Firmware-Update

The firmware of your *ProfiLux 4* controller is constantly being further developed. If you want to use new features that are not supported by your current firmware, you can update your controller.



DANGER

- Be sure to back up your data **before** updating!

You can use the menu item "Backup and Restore" -> "Transfer all settings from ProfiLux to file" and load them again after the successful update via "Transfer from file to ProfiLux".

For the update, you need the latest firmware and the PC program *GHL Control Center*, both of which can be downloaded free of charge from our homepage www.aquariumcomputer.com in the download area (*Support-> Downloads*), as well as our USB cable.

Instructions for updating firmware can be found from our homepage.

10 Technical Data

The device and its accessories may only be used indoors. Moisture or excessive humidity can lead to malfunctions or damage.

Power supply	Wide range power supply 100 – 240 VAC (50 – 60 Hz), < 0,6 A RMS
Input voltage	12 VDC
Environmental conditions	Operating temperature: 0°C - 40°C / 32°F – 104°F Humidity: Max 80% rel. Humidity <u>non-condensing</u>
Current consumption	1.2 A max.

pH measurement	BNC input for pH sensor, accuracy 0.1 pH, pH range 3.0 to 10.5 pH
Temperature measurement	BNC input for the supplied digital temperature sensor, accuracy 0.1°C (33.8°F), Measuring range 0.0°C to 40°C (32°F – 104°F)
Conductivity measurement	BNC-input for Conductivity sensor, , in fresh water accuracy 1 µS, measurement range 0 µS to 2000 µS, in salt water accuracy 0.1 mS, 0 mS to 100 mS (<i>ProfiLux 4</i> only)
Redox measurement	BNC input for Redox sensor, accuracy 1 mV, measurement range -1000 mV to 1000 mV
Oxygen measurement	BNC input for oxygen sensor, accuracy 0.1%, measurement range 0% to 150%; optional
Humidity-Temp measurement	RJ12 socket to connect a combined sensor, accuracy 0.1%, measurement range 1% to 99%, optional
Mitras Lightbar/Slimline port or RS232	RJ45 socket
PC connection	USB Port
L ports	3 RJ12 sockets with 2x 1-10 V interfaces each and 2 relay signals
Powerbar control	2 RJ12 sockets with 4 channels each (<i>ProfiLux 4</i> only)
PAB ports	2
Dimensions	220 mm (8.66") x 150 mm (5.9") x 55 mm (2.17")

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