Operating Instructions

for

Aquarium- and Terrarium Computer

G-Tron

GIESEMANN aquaristic

Valid for firmware 4.04
Date: 20.11.2008

Contents

1 GENERAL ... 5

1.1 ABOUT THIS MANUAL ... 5
1.2 OPERATIONAL FEATURES ... 5
1.3 ITEMS SUPPLIED ... 6
1.4 IMPORTANT OPERATING INSTRUCTIONS ... 6
1.5 CONNECTIONS ... 7
1.5.1 12VDC ... 7
1.5.2 Level ... 7
1.5.3 Temp ... 7
1.5.4 pH ... 7
1.5.5 L1L2 (L3L4) ... 7
1.5.6 S1-S4 (S5-S8) ... 7
1.5.7 RS232 ... 8
1.5.8 Redox and Conductance ... 8

2 INSTALLATION ... 8

2.1 SETTING UP THE AQUARIUM COMPUTER ... 8
2.2 CONNECTING THE SENSORS ... 8
2.3 CONNECTING SWITCHABLE POWERBAR ... 9
2.4 CONNECTING LIGHTING ... 9
2.5 CONNECTING CURRENT PUMPS ... 9
2.6 CONNECTING THE LINE VOLTAGE SUPPLY ... 9
2.7 CONNECTING TO A PC ... 10
2.8 SAFETY CONSIDERATIONS ... 10

3 OPERATION ... 10

3.1 OPERATIONAL ELEMENTS ... 10
3.2 DISPLAY ... 11
3.2.1 Illumination channel display ... 11
3.2.2 Current display ... 11
3.2.3 Moon phase display ... 11
3.2.4 Level sensor display ... 11
3.2.5 pH display ... 11
3.2.6 Temperature display ... 12
3.3 GENERAL ... 12
3.4 STANDARD DISPLAY ... 13
3.4.1 Feeding pause ... 13
3.5 STANDARD SETTINGS ... 13
3.6 PH ... 14
3.6.1 Nominal value ... 14
3.6.2 Nocturnal change ... 15
3.6.3 Calibration ... 15
3.6.4 Activity ... 15
3.6.5 Operation hours ... 15
3.6.6 Hysteresis ... 16
3.6.7 Alarm ... 16
3.6.8 Current actual value ... 16
3.6.9 Operation mode controller ... 16
3.6.10 Signal filter ... 17
3.7 TEMPERATURE ... 17
3.7.1 Nominal value ... 17
3.7.2 Summer switching ... 17
3.7.3 Nocturnal change ... 18
3.7.4 Therapy ... 18
3.7.5 Calibration ... 18
3.7.6 Activity ... 18
3.7.7 Operation hours ... 18
3.7.8 Hysteresis ... 18

3.7.9 Alarm ... *19*
3.7.10 Current actual value ... *19*
3.7.11 Display ... *19*
3.7.12 Cooling difference ... *19*
3.7.13 Operation mode controller ... *19*
3.7.14 Extension ... *20*
3.7.15 Measurement range ... *20*
3.8 REDOX ... 20
3.8.1 Nominal value ... *21*
3.8.2 Calibration ... *21*
3.8.3 Activity ... *21*
3.8.4 Operation hours ... *21*
3.8.5 Hysteresis ... *22*
3.8.6 Alarm ... *22*
3.8.7 Current actual value ... *22*
3.8.8 Operation mode controller ... *22*
3.9 CONDUCTIVITY ... 23
3.9.1 Nominal value ... *23*
3.9.2 Calibration ... *23*
3.9.3 Activity ... *24*
3.9.4 Operation hours ... *24*
3.9.5 Hysteresis ... *24*
3.9.6 Alarm ... *24*
3.9.7 Current actual value ... *25*
3.9.8 Display ... *25*
3.9.9 Operation mode controller ... *25*
3.10 LEVEL ... 25
3.10.1 Operational mode ... *26*
3.10.2 Sensor settings ... *26*
3.10.3 Maximum on-time ... *27*
3.10.4 Error reset ... *27*
3.10.5 Diagnostic ... *27*
3.10.6 Start water change ... *27*
3.11 CLOCK ... 27
3.11.1 Time & date ... *27*
3.11.2 Reminder ... *27*
3.11.3 Timer ... *28*
3.12 ILLUMINATION ... 28
3.12.1 Illumination run ... *29*
3.12.2 Manual light intensity ... *30*
3.12.3 Clouds ... *30*
3.12.4 Moon ... *30*
3.12.5 Rainy days ... *31*
3.12.6 Burning-in ... *31*
3.12.7 Operation hours ... *31*
3.12.8 Temperature-dependent light reduction ... *31*
3.13 EXTRAS ... 32
3.13.1 Maintenance ... *32*
3.13.2 Internal time ... *32*
3.13.3 Info & support ... *32*
3.13.4 Feeding pause ... *33*
3.13.5 Current ... *33*
3.13.6 Display ... *36*
3.13.7 Measurement data ... *36*
3.13.8 Language ... *37*
3.13.9 Dosing pumps ... *37*
3.14 SYSTEM ... 37
3.14.1 Factory settings ... *37*
3.14.2 PIN ... *37*
3.14.3 Socket function ... *38*
3.14.4 1-10V interface ... *39*
3.14.5 Configuring external display ... *40*

3.14.6 Communication *40*
3.14.7 Alarm *41*
3.14.8 Virtual probes *41*
3.14.9 Digital powerbars *41*

4 ADDITIONAL HARDWARE **42**

4.1 EXTERNAL DISPLAY 42

5 GUARANTEE **43**

6 ADDITIONAL INFORMATION **43**

6.1 HELP AND INFORMATION 43

7 TECHNICAL DATA **43**

1 General

1.1 About this manual

This manual is valid for GIESEMANN aquarium- and terrarium computers:

- GIESEMANN G-tron
- GIESEMANN G-tron Professional

The availability of some functions depends on the model of **GIESEMANN G-tron.**

1.2 Operational features

Thank you for your confidence in our Giesemann products! You have purchased an aquarium computer outstanding in its efficiency, ease of use, and value for money.

Summary of operational features:

- Dimming of up to 4 separate lights
- Simulation of the phases of the moon, calculated according to calendar date
- Cloud simulation by random generation
- Programmable rainy days
- Feeding pause for pumps
- Control of variable current pumps (simulation of tides and waves)
- Operating hour meter for lamps
- “Burning-in“ mode for fluorescent tubes
- Real-time clock with battery back-up
- PC-interfacing possible using free Windows™-compatible software
- Connectivity for external display
- Reminder display (e.g. "Clean filter!")
- Control of up to 8 switchable sockets
- 8 programmable timed operations (including medication function)
- Child-proofing via PIN code
- Simple, intuitive operation; all settings established via interactive dialogue
- All settings permanently stored in non-volatile memory (EEPROM) to avoid loss during power Outages
- Regulation of pH via addition of CO_2 (downward adjustment) or alkalisation (upward adjustment),
- programmable night-time switch-off
- Sequential temperature regulation for immersion heaters, bottom heaters, and cooling, programmable night-time decrease, regulation of variable-speed aerators.
- Alarm function: alarm operation optical, acoustic, and via switchable socket
- Operation hour meters for all sensors
- Therapy program for sick fishes
- Connectivity for level sensors
- Automatic calibration of all sensors

- Recording of data measured

Additional operational features **GIESEMANN G-tron Professional**:
- Redox level measured/regulated
- Conductivity level measured/regulated

In order to obtain maximum benefit from our products, please take the time to read through this manual. In particular please note the safety instructions and the guarantee conditions.

1.3 Items supplied

Before proceeding any further, please check that all the items comprising the package are present.
The following items are supplied as standard:
- Aquarium computer
- AC/DC adaptor
- This instruction manual
- Switchable powerbar
- PH-Elektrode
- Temperature sensor
- Conductivity sensor (G-tron Professional)
- Redox sensor (G-tron Professional)

Additional switchable powerbars and sensors do not form part of the aquarium computer package and must be ordered separately.

1.4 Important operating instructions

The following instructions must be followed without fail in order to ensure correct and safe operation! Failure to follow these instructions will invalidate the guarantee and/or exonerate the manufacturer from any liability and/or responsibility for injury or damage!

- Line voltage-operated electrical equipment and water can be a dangerous combination. Hence it is essential that all line voltage-operated devices to be used in or near the aquarium should be connected to the line voltage via a Residual Current Device (RCD) or other appropriate circuitbreaker!
- The powerbar is operated by dangerous voltages and is not watertight. This means that the powerbar must be protected from moisture (including splashes)! This should be borne in mind when choosing a position for mounting
- To avoid danger of electric shock, when working on the tank all line voltage powered devices must be disconnected from the main supply (all unplugged). There is always the possibility that a heater, a pump, or a light may be defective or be damaged during work on the aquarium. This can lead to life-threatening electric shock! The aquarium computer can remain on, it does not use dangerous voltages.
- Despite every care during the development and manufacture of our products it is impossible completely to exclude the possibility of defects. In addition external agencies such as lightning strikes, cable breaks, mechanical damage, etc. can lead to malfunctions! For this reason you should never leave an aquarium, especially one operated electronically, unsupervised for too long. We hereby disclaim any liability for consequential loss (including fish deaths) resulting from malfunction, insofar as the law allows!
- Our aquarium computers should never be opened!
- Only the leads provided and their respective connectors should be used. Connection of other components will invalidate the guarantee.
- Use only the original AC/DC adaptor!
- We strongly recommend the use of a thermostatically-controlled heater. This should be set such that it switches off if the temperature exceeds that required by more than around 1.5 °C. This is a safety measure (so that malfunction of a switchable socket won’t lead to overheating) and also guarantees temperature control. We disclaim all responsibility for any loss resulting from the use of a heater without thermostat and from any malfunction of our products!
- Before a fluorescent tube can be dimmed it must first be “burned-in“! “Burning-in” means that the tube must be run for around 100 hours at full output (ie without dimming). The manufacturer of the

tube can provide precise requirements for burning-in. If a tube is dimmed prematurely, without previously being burned in, the result may be flickering or shortened effective life. Burning in can be performed automatically.

1.5 Connections

The computer has various labelled connection ports at the rear. The photo below shows the rear of a **GIESEMANN G-tron Professional**. The following applies to all connections:

- With the exception of the pH electrode connection, only original accessories for the **GIESEMANN G-tron** aquarium computer!
- Treat the ports with care – do not use force when plugging in!
- **Important: Incorrect connections (e.g. plugging a lighting unit plug into a connector for powerbars) can result in serious damage to the GIESEMANN G-tron! This is not a warranty case and may cause a repair with costs! So please always make connections with care.**

1.5.1 12VDC

The DC power plug of the AC/DC adaptor is plugged in here. Use only the adaptor provided!

1.5.2 Level

The plug of the optionally available level sensor plugs into this (upper) mini DIN socket. If two sensors are to be connected simultaneously this can be achieved using a *PL-LY* splitter.

1.5.3 Temp

The plug of the temperature sensor provided plugs into this (lower) mini DIN socket. See also *2.2 Connecting the sensors*
. The temperature sensor does not need to be calibrated – this has already been done at the factory.

1.5.4 pH

The pH electrode is connected to this BNC connector. Follow the electrode manufacturer's instructions. Don't forget to calibrate it! See also *2.2 Connecting the sensors*
.

1.5.5 L1L2 (L3L4)

The interface cable for a dimmable fluorescent unit or a dimmable hanging lamp is plugged into this Western socket. Single- or twin- lamp lighting units, not separately dimmable, can be controlled via dimming channel 1 (/3). Twin-lamp, separately dimmable, lighting units are controlled via dimming channels 1 (3) and 2 (4). This connection can also be used to control variable current pumps, dimmable lights from other manufacturers, and rotation-speed-regulated aquarium fans. See our accessories list for further details.

1.5.6 S1-S4 (S5-S8)

These Western sockets are used for connecting a switchable powerbar or a dosing unit. The functions of all the sockets are free programmable.

Important note:
On S1-S4 also a digital powerbar could be connected. In this case it is absolutely necessary to do the appropriate settings under *Digital powerbars***!**

1.5.7 RS232

This 9-pin SUB-D port is required for connecting a PC or an external display unit. **A special *RS232* interface cable (not supplied as standard) should be used for the connection of a PC. The use of a different cable can result in malfunctions or even complete failure. The RS232 connectivity of the GIESE-MANN G-tron is not the PC norm, as additional signals are transmitted for diagnostic purposes and the external display unit!**
Connection to a PC is not absolutely necessary, as all settings can be made via the associated control panel of the unit.

1.5.8 Redox and Conductance

The sensors for redox and conductance are connected to these BNC connectors. Please connect the redox-sensor with the ***upper*** connector, the conductance sensor with the ***under*** connector.

2 Installation

2.1 Setting up the aquarium computer

Site the unit away from any possible contact with water.
In principle any installation site is permissible, but ease of use and readability should be taken into consideration.
When selecting the site for installation, it is also important to bear in mind the maximum cable lengths for the sensors, lighting units, and interfaces.

2.2 Connecting the sensors

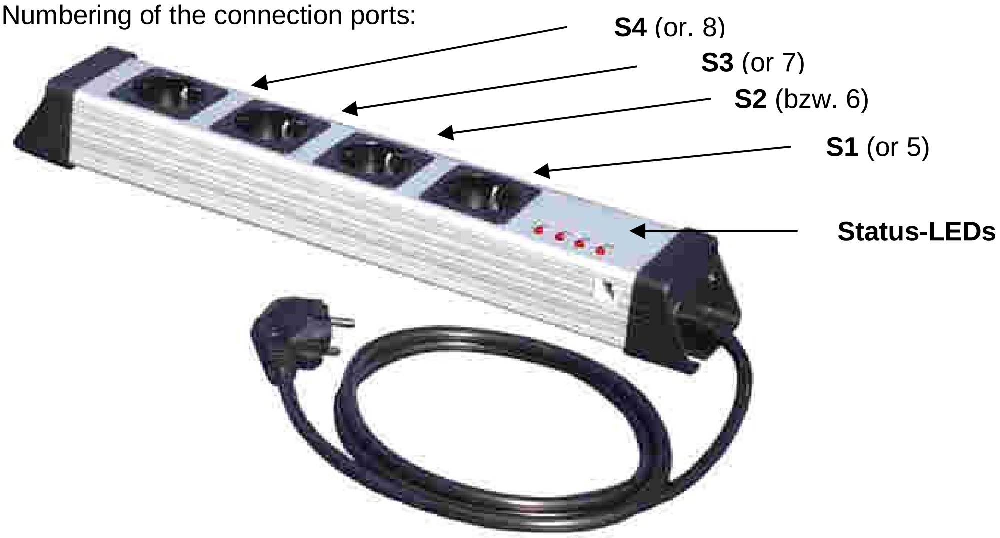
Connect the temperature sensor and pH electrode (if relevant) to the appropriate connections provided.
The sensors should be sited in the aquarium such that water constantly circulates around them. Please ensure that the pH electrode is positioned as near vertical as possible relative to the water's surface (otherwise it won't work properly!). To avoid the danger of it becoming coated with algae it should be placed in as dark a spot as possible. An open-topped hang-on external filter is a good place, for example. Under no circumstances should the connection between the electrode and its cable be immersed in water. In order to record the mean temperature the temperature sensor should be positioned halfway between the bottom and the water's surface. It may be immersed completely.

Important note:
The signal output of a pH electrode is very small. This can increase the degree of interference from electronic devices affecting the electrode or the cable. Interference results in incorrect measurements. For this reason there should always be a sufficient distance between the electrode and the cables of possible sources of interference (e.g. lighting ballast units, line voltage leads, pumps, TV/radio, etc)! In addition there are qualitative differences in these electrodes, such that some are more prone to interference than others because of a weak signal strength or poor shielding.

2.3 Connecting switchable powerbar

Up to two conventional or digital switchable powerbars can be connected to the aquarium computer, producing up to 12 switchable sockets that are numbered sequentially from 1 to 12.
The functions of all the connection ports are free programmable. Once you have connected a switchable powerbar, you should label its sockets with the appropriate numbers and their functions using a waterproof pen or an adhesive label. The aquarium computer is connected to the switchable powerbar using the provided Western cable.

Numbering of the connection ports:



The switchable powerbar must be sited where they are protected from water. Under no circumstances should they come into contact with water. The best place is thus above water level, provided they are securely fixed so that they cannot fall into the tank!
The powerbar can be screwed firmly to a wall or cabinet using the two black mountings provided.

Attention: It is not allowed to connect GIESEMANN G-tron with older powerbars. This would cause damage of the electronics.

2.4 Connecting lighting

The interface cables for dimmable lights (fluorescent units, hanging lamps etc.) are connected to the Western sockets *L1L2 or L3L4*. The line voltage supply for these lights should be plugged into the corresponding socket of a switchable powerbar.

The ports *L1L2 and L3L4* offer two 1-10V interfaces each and their relevant switching signals. The function of these interfaces can be set (see below). As default the 1-10V interface L1 is configured as dimming channel 1, L2 as dimming channel 2, L3 as dimming channel L3, L4 as dimming channel 4. In most cases it is not necessary to alter this configuration when using the 1-10V interfaces for dimming control.

2.5 Connecting current pumps

The interface cables for variable current pumps are connected to L1L2 or L3L4. The function of the corresponding 1-10V interface should be set appropriately, see below.

2.6 Connecting the line voltage supply

Plug the DC power plug of the line voltage supply lead into the socket labeled 12VDC.
Never use any other power supply lead as incorrect polarity or voltage could irreparably damage the computer! The line voltage supply lead has a nominal voltage of 12V; the positive is situated inside the socket.

2.7 Connecting to a PC

The aquarium computer can be connected to a PC using the optionally available serial interface cable. All settings can be readily and easily affected using our PC operating program. Of course all settings can also be set without using a PC, via the **GIESEMANN G-tron** control panel.

Note: Our interface employs not only the usual RS232 signals but also additional signals, for example for diagnostic purposes and for the external display – **hence only our cable can be used!**

2.8 Safety considerations

Water can run down any cables leading out of the aquarium. Hence the cables should be arranged such that water does not come into contact with any electrical or electronic items!
Before the fluorescent unit(s) or the switchable powerbar(s) are plugged into a line voltage socket it is absolutely essential to check that the device has not been damaged in any way (e.g. during transport).
In particular please check that

- the housings and leads are undamaged and no parts that conduct electricity are accessible
- the fluorescent-tube fittings are firmly and securely inserted in the fluorescent unit(s)
- the cable grips are tight

In the event of any subsequent damage, disconnect from the line voltage supply immediately!

3 Operation

3.1 Operational elements

The control panel of the **GIESEMANN G-tron** aquarium computer:

- Quick key for setting lighting (sun icon)
- Quick key for setting the clock (clock icon)
- Quick key for setting temperature (°C)
- Quick key for setting pH
- Function key for extras (f)
- Navigation keys (up and down, left and right arrows)
- Confirmation key (RETURN, ¿)
- Escape key (Esc)

Displays:

- Main display
- Alarm LED, illuminated red in the event of an alarm.

3.2 Display

The upper line of the display shows the day of the week, date, and time of day. The lower line shows the current status of the various parameters, e.g. the dimming status of a dimming channel, the status of the level sensor or the temperature.
The parameters to be displayed can be set, see also *3.13.6 Display*.
The parameters described below are **not** all set in the basic ex-works configuration, so the display settings should be appropriately adjusted if required.

3.2.1 Illumination channel display

Displays the current brightness as a percentage. Example:

3.2.2 Current display

Displays the current output of the two current pumps as a percentage. Example:

3.2.3 Moon phase display

Displays the current phase of the moon as a percentage (0% = new, 100% = full moon). Example:

3.2.4 Level sensor display

Displays the current status of the two level sensors. An active (or absent) sensor is represented by a "X", an inactive one by an "-". Example:

3.2.5 pH display

Displays the current pH value and the status of the relevant outputs. Examples:

The minus symbol is displayed, indicating that the

The plus symbol is displayed, indicating that the controller has activated the relevant switchable sockets (if present) to lower the pH.

controller has activated the relevant switchable sockets (if present) to raise the pH.

3.2.6 Temperature display

Displays the current temperature and the status of the relevant outputs. Examples:

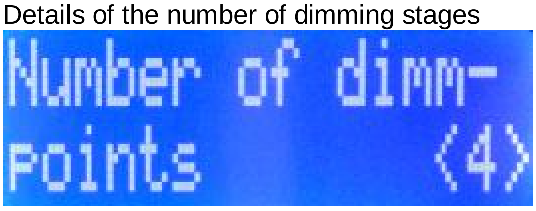
The cooling symbol (*) is displayed, indicating that the controller has activated the relevant switchable socket (if present) to lower the temperature.

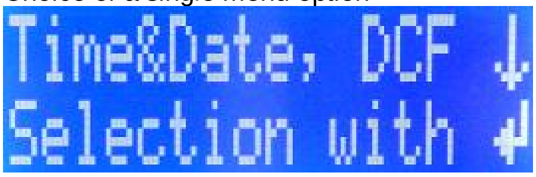
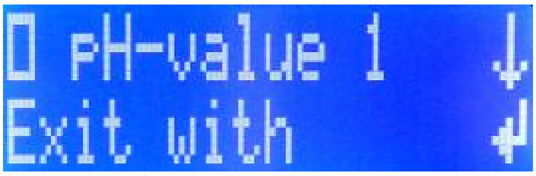
The symbols for the bottom heater and immersion heater are displayed, indicating that the controller has activated the relevant switchable sockets (if present) to raise the temperature.

3.3 General

It is wise to set the time of day and the date before making any additional settings. All the settings you make will be stored permanently and will remain valid even after any interruption in the power supply. The clock has battery back-up and will run for several weeks in the event of any interruption in the power supply.
The operation of the device is very simple. The ***up arrow*** and ***down arrow*** keys can be used to navigate the menus and make a choice. When you enter a menu a symbol in the upper right-hand corner of the display will indicate whether additional menu items are available using the up and down arrows. The buttons ***pH***, ***°C***, ***sun***, and ***clock*** take you directly into the appropriate configuration menu. The ***f*** key takes you to *extras*. A choice or setting can be confirmed using the ***RETURN*** key, and the ***Esc*** key exits the current process.
After every configuration procedure you will be asked whether you wish to store the new setting(s). Only after you confirm with *Yes* will the new setting(s) be accepted and stored. These settings will also be stored in the nonvolatile memory (EEPROM, which is not line voltage-reliant) and reloaded from there after any interruption in the line voltage supply.

The following types of dialogue will be encountered in the operation of the device:

Dialogue type	Actual example	Implementation
Choice of Yes / No	Before storing a setting 	Use the ***left arrow*** *key* to select *Yes* or the ***right arrow*** *key* to select *No*. The chevron brackets indicate the choice made. The choice is then confirmed using the ***RETURN*** key.
Enter a number (0-9)	Details of the number of dimming stages 	The number can be increased using the ***up arrow***, and decreased using the ***down arrow***. The number, once set, is confirmed by ***RETURN***.
Enter a word, a date, or a time	Set a specific value 	Use the ***left arrow*** and ***right arrow*** to locate the figure you wish to change. The ***up arrow*** can be used to increase the number, the ***down arrow*** to decrease it. The number, once set, is confirmed by ***RETURN***.
Enter text	Reminder text	Use the ***left arrow*** and ***right arrow*** to

		locate the text you wish to change. Use the ***up arrow*** and ***down arrow*** to alter the characters. The text, once set, is confirmed by ***RETURN***.
Simple choice – Choice of a single option	Choice of a single menu option 	Use the ***up arrow*** and ***down arrow*** to choose a menu option, then confirm it using ***RETURN***.
Multiple choice - several options can be selected simulta-neously	Choice of values to be stored not selected selected	Use the ***up arrow*** and ***down arrow*** to choose a menu option, use the ***right arrow*** to select the option (a box with a dot in the middle will then be dis-played), use the ***left arrow*** to cancel the choice of option (an empty box will then be displayed). Use ***RETURN*** to confirm your choice.

3.4 Standard display

During normal operation the following information will be shown on the display:

- Upper line: Date with day of week and time of day
- Lower line according to configuration, e.g. light intensity of individual dimming channels or current water temperature and pH as well as controller activity.

When the standard display is displayed the device will be in main menu mode, and the navigation keys, ***RE-TURN***, and the quick keys will all be active. If the device is left in a sub-menu then after a fixed period of time with no user activity it will automatically revert to the main menu.

3.4.1 Feeding pause

When the standard display is displayed the ***Esc*** key has an additional feeding-pause function. Pressing the ***Esc*** key when the standard display is displayed will deactivate the pumps (and/or any switchable sockets whose function is set to *Filter*). After the elapse of a pre-set period of time the pumps will be automatically reactivated. Pressing the ***Esc*** key a second time aborts the feeding-pause.

3.5 Standard settings

As supplied, the device is configured such that in many cases little or no additional configuration will be nec-essary. The following is a list of the ex-works settings (some of the settings are not relevant to the **GIESE-MANN G-tron** model).

Function	Standard setting
Device address	1
Nominal temperature	26.0 °C
Temperature - night-time decrease enabled	no
Temperature - night-time decrease	2.0°C
Start time for night-time decrease	19:00 hours

End time for night-time decrease	05:00 hours
Summer switching	no
Intensity of summer switching	20
Temperature hysteresis	0.2 °C (equivalent to +/-0.1 °C)
Nominal pH	7.0
pH night-time switch-off	no
Start time for pH night-time switch-off	19:00 hours
End time for pH night-time switch-off	05:00 hours
Change from winter to summer time (MEZ-MESZ)	off
Duration of change from winter to summer time (MEZ-MESZ)	7 days
Probability of a cloud	0% (deactivated)
Minimum duration of a cloud	3s
Maximum duration of a cloud	30s
Maximum light reduction via a cloud	70%
Lights that affect moon-phase simulation	none
Start time for moon-phase simulation	19:00 hours
End time for moon-phase simulation	09:00 hours
Temperature alarm enabled	no
Maximum deviation for temperature alarm	2 °C
pH alarm enabled	no
Maximum deviation for pH alarm	1
“Burning-in“ duration of all dimming channels	0h
Feeding pause	5 min
Rainy day	all off
Function of 1-10V interface 1	dimming channel 1
Function of 1-10V interface 2	dimming channel 2
Function of 1-10V interface 3	dimming channel 3
Function of 1-10V interface 4	dimming channel 4
Lower voltage limit of all 1-10V interfaces	1V
Upper voltage limit of all 1-10V interfaces	10V
Operation of both current pumps	deactivated
Wave form of both current pumps	sinus waves
Night-time decrease of both current pumps	off
Minimum current speed of both current pumps	60%
Maximum current speed of both current pumps	100%
Duration of ebb/flow/random of both current pumps	30 min

- The dimming curves are configured as in the example *3.12.1Illumination run* shown.
- All reminder texts and timers are deactivated.

3.6 pH

This allows you to configure the functions relating to the pH value. The pH can be adjusted downwards (e.g. addition of CO_2) and upwards (e.g. by alkalisation), or both together. For this the relevant switchable socket functions must be configured.

3.6.1 Nominal value

The nominal pH value can be set in steps of 0.1 within the range 4.5 to 9.5.

Downward adjustment:
If the pH falls below the nominal value then the pH downward adjustment will be switched off, if it rises above the nominal value by more than half the hysteresis (see *3.6.6 Hysteresis*) the pH downward adjustment will be switched on again.

Upward adjustment:
If the pH rises above the nominal value the pH upward adjustment will be switched off, if it falls below the nominal value by more than half the hysteresis then the pH upward adjustment will be switched on again.

Note: For security reasons altering the nominal value deactivates a nocturnal change (if set)! If applicable these settings should be set again.

3.6.2 Nocturnal change

This allows you to choose whether the pH value is to altered at night. Once you have enabled the nocturnal alteration with *Yes*, you can set the amount by which the pH value will alter: The value can be set between -1.0 and 1.0° C in 0.1 steps. Thereafter you should input when the nocturnal alteration is to take effect.
Start of nocturnal alteration: a time between 14:00 and 23:59 hours
End of nocturnal alteration: a time between 00:00 and 10:00 hours

Note: Nocturnal nominal value = nominal value + nocturnal alteration

3.6.3 Calibration

This function permits the calibration of the pH electrode. Only when the **GIESEMANN G-tron** aquarium computer has been calibrated for the relevant pH electrode can the correct pH value be recorded. Calibration is necessary whenever a new electrode is connected. In addition calibration should be repeated from time to time because of possible changes in the actual functioning of the electrode. Please follow the instructions provided by the electrode manufacturer. The electrode should always be carefully dried (with air, by shaking, or with a dry tissue) before immersion in a buffering solution!
First enter the *calibration tolerance* (between 1 and 3), which forms the basis of the calibration. In the case of old or disturbance-sensitive pH electrodes it may happen that the measurement may not be adequately stabilised and calibration is not possible. Depending on the circumstances it may nevertheless be possible to stabilise such electrodes by increasing the calibration tolerance, but naturally at the expense of accuracy of measurement. In principle the calibration process should be performed using the smallest possible calibration tolerance.
Thereafter you will have the option of altering the two values at which calibration is to be performed. The standard values (calibration at pH 4.0 and 7.0) should be altered if measurement is to take place predominantly in the alkaline zone (> 7.0).
First of all you will be required to immerse the probe of the electrode in a buffering solution with the first calibration value. Thereafter pressing ***RETURN*** will start the measurement process, during which two numbers will be seen in the lower line of the display. The left-hand number gives the maximum time remaining in seconds. If this time expires without the measurement stabilising sufficiently then the electrode will be deemed defective and the calibration aborted. The right-hand number shows the measurement in an internal code. **GIESEMANN G-tron** recognises automatically when this value has stabilised and then terminates the measurement process. After this measurement you will next be required to perform the same procedure using a buffering solution with the second calibration value. Again the measurement process is started by ***RETURN***. When this measurement too is completed, you will be asked whether the data are to be stored. If no errors have occurred, confirm with *Yes*. Finally, it is advisable to check the calibration. Place the electrode in the each of the two buffering solutions in turn and check whether the aquarium computer shows the correct values.

3.6.4 Activity

This allows you to determine whether the sensor and the associated recording of measurements and adjustment should be active (standard: *Yes*). If *No* is selected the adjustment and sensor monitoring will be switched off and all switchable sockets associated with the sensor will be deactivated. This is advisable only when this input is not required. A deactivated sensor is indicated by “---“ in the display.

3.6.5 Operation hours

***An associated operation hour meter is provided to record how long the pH electrode has been in service. The operation hours are recorded cyclically every hour in the permanent storage, ensuring that the operation hours are still recorded in the event of any interruption in line voltage power.
After the menu option *Operation hours* is selected the operation hours of the pH electrode are displayed. After a few seconds have elapsed or if any button is pressed you will be asked *Reset operation hour meter*? Confirmation with *Yes* will reset the operation hour meter to 0h. Obviously this should be done whenever the pH electrode is changed.

3.6.6 Hysteresis

The so-called hysteresis determines the interval between the switching points and is necessary in order to reduce the switching frequency. The hysteresis set here encompasses the interval between the switching on of the CO_2 socket and the switching on of the alkalisation socket. The nominal pH value lies precisely at the centre of the interval between these two switching points. The setting for the hysteresis can be a value between 0.1 and 1.0.
The ex-works hysteresis setting of 0.3 should not normally be altered. A reduction in the hysteresis is advisable only when the adjustment precision is to be increased. This will, however, also increase switching frequency.

Example: nominal pH value = 7.0, hysteresis = 0.4
-> The CO_2 socket switches on at 7.2 and off again at 7.0.
-> The alkalisation socket switches on at 6.8 and off again at 7.0.

Be aware that the pH adjustment will use 7.1 and/or 6.9 as the pivotal point rather than the precise nominal value set, in this case 7.0. This is necessary in order to make possible simultaneous upward and downward adjustment. If adjustment is to be only via CO_2 or alkalisation then the nominal value can be adjusted accordingly or the hysteresis reduced.

3.6.7 Alarm

First of all configure whether the pH alarm is to be enabled. If the alarm is enabled then the *Maximum deviation* of the actual pH value from the nominal value must be entered. The deviation for the pH alarm can be set between 0.5 and 3.0. Then can be set if in the case of an alarm the *controller* should be *shut-off*. After the enabling of an alarm the relevant actual value will be constantly compared with the nominal value.
In the event that the deviation (above or below nominal) is larger than that set under *Maximum deviation* then an alarm will be activated. The adjustment hysteresis is taken into account during comparison of nominal and actual values.
In the event of an alarm the red alarm LED will be illuminated and the buzzer will be activated dependent on the mode set. In addition, a switchable socket can be programmed such that it will be activated in the event of an alarm. If *controller shut-off* has been set then the alarm function will immediately deactivate all sockets involved in pH regulation with this sensor! The configuration of the alarm should be performed with the greatest care. It is essential to avoid the alarm parameters being exceeded during normal operation!

3.6.8 Current actual value

This displays the current actual pH value. The display can be ended by pressing any key.

3.6.9 Operation mode controller

You can set how the controller should work. For most cases, the standard setting *Twoposition controller* is completely sufficient and so it needs not be changed. For some special cases, the other operation modes are necessary to optimize the controlling behaviour. The following operating modes can be selected:

- *Twoposition controller*
  This is the common operation mode. At two switchpoints, which are determined through nominal value and hysteresis, a belonging socket is switched on or off. See here also *3.6.6 Hysteresis*.
- *Pulse/Pause fixed*
  If the actual value differs from the nominal value by a half hysteresis, the belonging switchable socket is switched on for an adjustable time (*Pulse duration*). After expiration of the pulse duration, the socket is switched off again and reline voltage so at least for the set *Pause duration*. After expiration of the pause duration, the socket can be switched on again by the control when the actual value differs from the nominal value again (or still) by a half hysteresis, the switching circle (pulse and pause) starts again.
- *Pulse variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the actual turn on time depends on the difference of nominal value and actual value. The bigger the deviation , the longer is also the turn on time, but at the maximum it is as long as set under *Pulse duration*.
- *Pause variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the turn-off time depends on the difference of nominal value and actual value. The bigger the deviation, the shorter is also the turn-off time, but at the maximum it is as long as set under *Pause duration*.

The operation modes *Pulse/Pause fixed, Pulse variable* and *Pause variable* make sense, when the measured size (pH value) reacts only slowly and delayed to the controller activities (e.g. Switching on CO_2) or only small amounts of substances should be added. An example is introducing an acid into a pond.
For these operation modes, you have to make the following settings:

- *Pulse duration*
  The corresponding socket is switched on for this duration (at the maximum). A pulse duration between 1s and 1h can be set.
- *Pause duration*
  This is the (maximum) time until the control can switch on the corresponding socket again. A pause duration between 1s and 1h can be set.

3.6.10 Signal filter

Here you can adjust the strength of the measurement signal filter. Valid values are 1 (strong filter) to 10 (weak filter), default is 5 (medium filter). Strong filtering will delay the readings and make them more constant. If a reading has a large fluctuation (e.g. caused by electromagnetic noise or this value varies fast in reality) a stronger filter may make sense. If the calibration takes too long and can't be completed successfully it may be wise to reduce the filter strength.

3.7 Temperature

This allows you to configure the temperature functions. In the event that several temperature sensors with the appropriate electronic metering are present you should first of all select the sensor to be configured. The water temperature is measured using the temperature sensor supplied. **GIESEMANN G-tron** constantly monitors this sensor for cable fracture or short-circuit. In the event that such a failure occurs the display shows the sign "***" instead of the temperature, and the associated heating or cooling systems are immediately deactivated!
The intelligent temperature regulation of the **GIESEMANN G-tron** permits optimal control of bottom heater and heater using only a single temperature sensor, and also control of a cooling system.
Please note: All *settings* have to be done in °*Celsius*. But nevertheless the current actual value can be *displayed* either in °*Celsius* or °*Fahrenheit*. The conversion can be made with this formula:
$T_{Celsius} = (T_{Fahrenheit} - 32°F) * 5/9$; for example 80°F = (80°F-32°F) * 5/9 = 26.7°C

The following sub-menus can be accessed.

3.7.1 Nominal value

The nominal water temperature can be set in steps of 0.1°C within the range 15.0°C and 35.0°C. Depending on the difference between the desired (nominal) and the actual temperature the heating or cooling will be switched on.
The following combinations of activities may take place:

- Heater and bottom heater on
- Bottom circulator only on
- All off
- Cooling only on

GIESEMANN G-tron is programmed such that the bottom heating takes precedence over the heater. This permits optimal heating of the substrate. The heater is switched on only when the bottom heating alone is no longer adequate.
Note: The heat from the lighting and the ambient temperature can have an effect on the water temperature. If no cooling is installed it is possible that the nominal temperature may be exceeded.

Note: For security reasons altering the nominal value deactivates a nocturnal change (if set)! If applicable these settings should be set again.

3.7.2 Summer switching

This permits you to enable summer switching and adapt it to your personal requirements. As already mentioned, it is possible that the water temperature may exceed the nominal temperature. In this case the bottom heating will be switched off and there will be no circulation in the substrate. The Activation of summer switch-

ing results in the bottom heating being regulated such that the water temperature is not increased appreciably.
After you have enabled the bottom heating with *Yes*, you can set the intensity of the bottom heating (5-30). This value represents the time in minutes for which the bottom heating will be switched on given a temperature excess of 1°C. The on-period will be calculated by the aquarium computer depending on the actual temperature excess. If the temperature excess is lower the on-period will be increased. If the excess is more than 3°C the bottom heating will remain off regardless. The settings for the nocturnal decrease and the cooling are taken into account. This intelligent process has the advantage that optimal substrate circulation, precisely tailored to your aquarium, is achieved!

3.7.3 Nocturnal change

This allows you to choose whether the water temperature is altered at night. Once you have enabled the nocturnal alteration with *Yes*, you can set the amount by which the temperature will alter: The value can be set between -0.1° C and -3.0° C in 0.1°C steps. Thereafter you should input when the nocturnal alteration is to take effect.
Start of nocturnal alteration: a time between 14:00 and 23:59 hours
End of nocturnal alteration: a time between 00:00 and 10:00 hours

Note: Nocturnal nominal value = nominal value + nocturnal alteration

3.7.4 Therapy

In the event of fish disease it may be useful to be able to vary the water temperature for a period of time. Activation of the Therapy function will alter the temperature to the desired level (anywhere from a reduction of 5°C to an increase of 5°C) for the time specified (3 - 21 days). The changes in temperature at the beginning and end of the treatment will be made gently (over the space of a day). In the event that for safety reasons you have set a maximum temperature limit using the associated thermostat of the heater then you will have to alter this in order to permit a rise in temperature.

3.7.5 Calibration

This function calibrates the temperature probe input. This function recovers the factory calibration and resets a potentially given extension cord compensation (see *3.7.14 Extension*) – after that **GIESEMANN G-tron** assumes that no extension cable is present.

3.7.6 Activity

This allows you to determine whether the sensor and the associated recording of measurements and adjustment should be enabled (standard: *Yes*). If *No* is selected the adjustment and sensor monitoring will be switched off and all switchable sockets associated with the sensor will be deactivated. This is advisable only when this input is not required. A deactivated sensor is indicated by "---" in the display.

3.7.7 Operation hours

An associated operation hour meter is provided to record how long the temperature sensor has been in service. The operation hours are recorded cyclically every hour in the permanent storage, ensuring that the operation hours are still recorded in the event of any interruption in line voltage power.
After the menu option *Operation hours* is selected the operation hours of the temperature sensor are displayed. After a few seconds have elapsed or if any button is pressed you will be asked *Reset operation hour meter?* Confirmation with *Yes* will reset the operation hour meter to 0h. Obviously this should be done whenever the temperature sensor is changed.

3.7.8 Hysteresis

The so-called hysteresis determines the interval between the switching points and is necessary in order to reduce the switching frequency. The hysteresis set here encompasses the interval between the switching on of the normal heating and the switching off of the bottom heating. The nominal temperature lies precisely at the centre of the interval between these two switching points. The setting for the hysteresis can be a value between 0.15°C and 2.0°C.
With the hysteresis set at 0.2°C this means that:

- If the actual temperature drops below the nominal by more than 0.1°C -> the heater will be switched on (the bottom heating will already be on)
- If the nominal temperature is exceeded by more than 0.1°C -> the bottom heating will be switched off (the heater will already be off)

The hysteresis set also affects when the cooling will be active. The point at which the cooling is switched on also depends on the cooling difference (see *3.7.10 Cooling difference*) and can be calculated as follows:
T = nominal temperature + 5/6 * hysteresis + cooling difference; in the above example: T = nominal temperature + 0.167°C + cooling difference.
The default hysteresis setting of 0.2 °C should not normally be altered. A reduction in the hysteresis is advisable only when the adjustment precision is to be increased. This will, however, also increase switching frequency. The hysteresis should be increased when, for example, the cooling comes on shortly after heater activity. This is particularly likely where there is a large volume of water and only low current.

3.7.9 Alarm

First of all configure whether the temperature alarm is to be enabled. If you choose *Enabled, except during AWC* the alarm monitoring will be disabled temporarily during an automatic water change. If the alarm is enabled then the *maximum deviation* of the actual temperature value from the nominal value must be entered.
The deviation for the temperature alarm can be set between 0.5°C and 5.0°C. Then can be set if in the case of an alarm the *controller* should be *shut-off*.
After the enabling of an alarm the relevant actual value will be constantly compared with the nominal value. In the event that the deviation (above or below nominal) is larger than that set under *Maximum deviation* then an alarm will be activated. During temperature monitoring the adjustment hysteresis is taken into account during comparison of nominal and actual values, as is the nocturnal change and any cooling difference that has been set (see *3.7.12 Cooling difference*).
In the event of an alarm the red alarm LED will be illuminated and the buzzer will be activated dependent on the mode set. In addition, a switchable socket can be programmed such that it will be activated in the event of an alarm. If *controller shut-off* has been set then the alarm function will immediately deactivate all sockets involved in temperature regulation with this sensor! The configuration of the alarm should be performed with the greatest care. It is essential to avoid the alarm parameters being exceeded during normal operation!

Example of calculation of the upper and lower temperature alarm limits:
Nominal value 26.0°C, nocturnal decrease of 2°C enabled, overall hysteresis 0.2°C, maximum deviation 1.5°C, cooling difference 2.0°C
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 for the cooling, see also *3.7.8 Hysteresis)*

3.7.10 Current actual value

This displays the current actual temperature. The display can be ended by pressing any key.

3.7.11 Display

It can be selected if the current actual value should be *displayed* as *°Celsius* (°C) or *°Fahrenheit* (°F). Independent from this *settings* have always to be done in *°Celsius*!

3.7.12 Cooling difference

If the cooling is not to be enabled within the normal temperature regulation (maintenance of the nominal temperature with regard to the hysteresis), but delayed, then the c*ooling difference* can be set to determine how far the actual temperature must exceed the nominal temperature before the cooling is enabled. Values between 0.0°C (no delay, cooling is enabled as soon as the nominal temperature is exceeded) and 5.0°C (maximum delay, cooling does is not enabled until the nominal temperature is exceeded by 5.0°C). The c*ooling difference* also has an effect on the alarm monitoring.

3.7.13 Operation mode controller

You can set how the controller should work. For most cases, the standard setting *Twoposition controller* is completely sufficient and so it needs not be changed. For some special cases, the other operation modes are necessary to optimize the controlling behaviour. The following operating modes can be selected:

- *Twoposition controller*
  This is the common operation mode. At two switch points, which are determined through nominal value and hysteresis, a belonging socket is switched on or off. See here also *3.7.8 Hysteresis*.
- *Pulse/Pause fixed*
  If the actual value differs from the nominal value by a half hysteresis, the belonging switchable socket is switched on for an adjustable time (*Pulse duration*). After expiration of the pulse duration, the socket is switched off again and reline voltage so at least for the set *Pause duration*. After expiration of the pause duration, the socket can be switched on again by the control when the actual value differs from the nominal value again (or still) by a half hysteresis, the switching circle (pulse and pause) starts again.
- *Pulse variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the actual turn on time depends on the difference of nominal value and actual value. The <u>bigger</u> the deviation , the <u>longer</u> is also the turn on time, but at the maximum it is as long as set under *Pulse duration*.
- *Pause variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the turn-off time depends on the difference of nominal value and actual value. The <u>bigger</u> the deviation, the <u>shorter</u> is also the turn-off time, but at the maximum it is as long as set under *Pause duration*.

The operation modes *Pulse/Pause fixed, Pulse variable* and *Pause variable* make sense, when the measured size (temperature) reacts only slowly and delayed to the controller activities (e.g. Switching on the heater). An example is heating the sump.
For these operation modes, you have to make the following settings:

- *Pulse duration*
  The corresponding socket is switched on for this duration (at the maximum). A pulse duration between 1s and 1h can be set.
- *Pause duration*
  This is the (maximum) time until the control can switch on the corresponding socket again. A pause duration between 1s and 1h can be set.

3.7.14 Extension

In the case of adding (or removing) an extension cable to the temperature probe **GIESEMANN G-tron** must compensate a measuring error which is caused by the changed cable length. Changing the cable length without compensation can cause a significant deviation of the measured value.

To make **GIESEMANN G-tron** calculate the correct compensation you have to proceed as below:
The probe must be connected and it should be placed in water (and remain there while this procedure – the water temperature should not change in the next minutes).

- Invoke this menu (*Temperature->extension*).
- Wait for the given time.
- Change the extension (add or replace), confirm with ***RETURN***.

Now **GIESEMANN G-tron** calculates the compensation values, then you can save these values.
From here on **GIESEMANN G-tron** displays the correct (compensated) temperature value.

3.7.15 Measurement range

Here you can adjust the measurement range suitable for the connected temperature probe. There are 2 types of temperature probes available:

- *Aquarium* – measurement range app. 11.5°C to 38°C
- *Pond* – measurement range app. 0°C to 40°C

The default setting is *Aquarium*. Change the measurement range only when you are connecting a pond-probe! If measurement range and used probe don't fit the reading will be wrong!

3.8 Redox

This allows you to configure the functions relating to the redox value. The redox can be adjusted downwards and upwards, or both together. For this the relevant switchable socket function must be configured.

3.8.1 Nominal value

The nominal redox value can be set in steps of 1mV within the range –300mV to +600mV.

Downward adjustment:
If the redox falls below the nominal value then the redox downward adjustment will be switched off, if it rises above the nominal value by more than half the hysteresis (see *3.8.5 Hysteresis*) the redox downward adjustment will be switched on again.

Upward adjustment:
If the redox rises above the nominal value the redox upward adjustment will be switched off, if it falls below the nominal value by more than half the hysteresis then the redox upward adjustment will be switched on again.

3.8.2 Calibration

This function permits the calibration of the redox electrode. Only when the **GIESEMANN G-tron** aquarium computer has been calibrated for the relevant redox electrode can correct redox values be recorded. Calibration is necessary whenever a new electrode is connected. In addition calibration should be repeated from time to time because of possible changes in the actual functioning of the electrode. Please follow the instructions provided by the electrode manufacturer. The electrode should always be carefully dried (with air, by shaking, or with a dry tissue) before immersion in a buffering solution!
First enter the calibration tolerance (between 1 and 3), which forms the basis of the calibration. In the case of old or disturbance-sensitive redox electrodes it may happen that the measurement may not be adequately stabilised and calibration is not possible. Depending on the circumstances it may nevertheless be possible to stabilise such electrodes by increasing the calibration tolerance, but naturally at the expense of accuracy of measurement. In principle the calibration process should be performed using the smallest possible calibration tolerance.
Thereafter you will have the option of setting the second calibration value within in the range 200mV to 250mV (depending on the standard calibration fluid available).
First of all you will be required to insert the null plug (supplied with our redox cards). Thereafter pressing ***RETURN*** will start the measurement process, during which two numbers will be seen in the lower line of the display. The left-hand number gives the maximum time remaining in seconds. If this time expires without the measurement stabilising sufficiently then the electrode will be deemed defective and the calibration aborted. The right-hand number shows the measurement in an internal code. **GIESEMANN G-tron** recognises automatically when this value has stabilised and then terminates the measurement process. After this measurement you will next be required to immerse the electrode in the calibration solution (with the previously set standard value). Obviously the null plug should now be removed and the electrode connected! Again the measurement process is started by ***RETURN***.
When this measurement too is completed, you will be asked whether the data are to be stored. If no errors have occurred, confirm with *Yes*.
Finally, it is advisable to check the calibration. First plug in the null plug – is the reading around 0mV? Then connect the electrode and immerse it in the calibration solution. Is a figure approximating to the upper calibration value now displayed?

3.8.3 Activity

This allows you to determine whether the sensor and the associated recording of measurements and adjustment should be enabled (standard: *Yes*). If *No* is selected the adjustment and sensor monitoring will be switched off and all switchable sockets associated with the sensor will be deactivated. This is advisable only when this input is not required. A deactivated sensor is indicated by “---“ in the display.

3.8.4 Operation hours

An associated operation hour meter is provided to record how long the redox electrode has been in service. The operation hours are recorded cyclically every hour in the non-volatile memory, ensuring that the operation hours are still recorded in the event of any interruption in line voltage power.
After the menu option *Operation hours* is selected the operation hours of the redox electrode is displayed. After a few seconds have elapsed or if any button is pressed you will be asked *Reset operation hour meter?* Confirmation with *Yes* will reset the operation hour meter to 0h. Obviously this should be done whenever the redox electrode is changed.

3.8.5 Hysteresis

The so-called hysteresis determines the interval between the switching points and is necessary in order to reduce the switching frequency. The hysteresis set here encompasses the interval between the switching on of the *Redox upwards* socket and the switching on of the *Redox downwards* socket. The nominal redox value lies precisely at the centre of the interval between these two switching points.
The setting for the hysteresis can be a value between 10mV and 100mV. The default hysteresis setting of 20mV should not normally be altered. A reduction in the hysteresis is advisable only when the adjustment precision is to be increased. This will, however, also increase switching frequency.

Example: nominal redox value = 100mV, hysteresis = 20mV
-> The *Redox downwards* socket switches on at 110mV and off again at 100mV.
-> The *Redox upwards* socket switches on at 90mV and off again at 100mV.

Be aware that the redox adjustment will use 105mV and/or 95mV as the pivotal point rather than the precise nominal value set, in this case 100mV. This is necessary in order to make possible simultaneous upward and downward adjustment. If adjustment is to be only upwards or downwards then the nominal value can be adjusted accordingly or the hysteresis reduced.

3.8.6 Alarm

First of all configure whether the redox alarm is to be enabled. If you choose *Enabled, except during AWC* the alarm monitoring will be disabled temporarily during an automatic water change. If the alarm is enabled then the *Maximum deviation* of the actual redox value from the nominal value must be entered. The deviation for the redox alarm can be set between 40mV and 400mV. Then can be set if in the case of an alarm the *controller* should be *shut-off*.
After the enabling of an alarm the relevant actual value will be constantly compared with the nominal value. In the event that the deviation (above or below nominal) is larger than that set under *Maximum deviation* then an alarm will be activated. The adjustment hysteresis is taken into account during comparison of nominal and actual values.
In the event of an alarm the red alarm LED will be illuminated and the buzzer will be activated dependent on the mode set. In addition, a switchable socket can be programmed such that it will be activated in the event of an alarm.
If *controller shut-off* has been set then the alarm function will immediately deactivate all sockets involved in redox regulation with this sensor! The configuration of the alarm should be performed with the greatest care. It is essential to avoid the alarm parameters being exceeded during normal operation!

3.8.7 Current actual value

This displays the current actual redox value. The display can be ended by pressing any key.

3.8.8 Operation mode controller

You can set how the controller should work. For most cases, the standard setting *Twoposition controller* is completely sufficient and so it needs not be changed. For some special cases, the other operation modes are necessary to optimize the controlling behaviour. The following operating modes can be selected:

- *Twoposition controller*
  This is the common operation mode. At two switch points, which are determined through nominal value and hysteresis, a belonging socket is switched on or off. See here also *3.8.5 Hysteresis*.
- *Pulse/Pause fixed*
  If the actual value differs from the nominal value by a half hysteresis, the belonging switchable socket is switched on for an adjustable time (*Pulse duration*). After expiration of the pulse duration, the socket is switched off again and reline voltage so at least for the set *Pause duration*. After expiration of the pause duration, the socket can be switched on again by the control when the actual value differs from the nominal value again (or still) by a half hysteresis, the switching circle (pulse and pause) starts again.
- *Pulse variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the actual turn on time depends on the difference of nominal value and actual value. The <u>bigger</u> the deviation , the <u>longer</u> is also the turn on time, but at the maximum it is as long as set under *Pulse duration*.
- *Pause variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the turn-off time

depends on the difference of nominal value and actual value. The bigger the deviation, the shorter is also the turn-off time, but at the maximum it is as long as set under *Pause duration*.

The operation modes *Pulse/Pause fixed, Pulse variable* and *Pause variable* make sense, when the measured size (redox value) reacts only slowly and delayed to the controller activities or only small amounts of substances should be added.
For these operation modes, you have to make the following settings:

- *Pulse duration*
  The corresponding socket is switched on for this duration (at the maximum). A pulse duration between 1s and 1h can be set.
- *Pause duration*
  This is the (maximum) time until the control can switch on the corresponding socket again. A pause duration between 1s and 1h can be set.

3.9 Conductivity

This allows you to configure the functions relating to the conductivity (or the salinity/density in the marine aquarium). In the event that several conductivity electrodes with the appropriate electronic metering are present you should first of all select the sensor to be configured (the inputs are numbered sequentially from left to right, viewed from the rear). The conductivity can be adjusted downwards and upwards, or both together. For this the relevant switchable socket functions must be configured.
There are 2 different types of conductivity measurement cards with different ranges available: 0 to 2000µS (for freshwater aquaria), 0 to 100mS (for marine aquaria). Depending on the range chosen, the following parameters can be set as described.

3.9.1 Nominal value

Fresh water: The nominal conductivity value can be set in steps of 1µS within the range 10µS to 1900µS.
Salt water: The nominal conductivity value can be set in steps of 0.1mS within the range 0.5mS to 99.5mS.

Downward adjustment:
If the conductivity falls below the nominal value then the conductivity downward adjustment will be switched off, if it rises above the nominal value by more than half the hysteresis (see *3.9.5 Hysteresis*) the conductivity downward adjustment will be switched on again.

Upward adjustment:
If the conductivity rises above the nominal value the conductivity upward adjustment will be switched off, if it falls below the nominal value by more than half the hysteresis then the conductivity upward adjustment will be switched on again.

3.9.2 Calibration

This function permits the calibration of the conductivity electrode. Only when the **GIESEMANN G-tron** aquarium computer has been calibrated for the relevant conductivity electrode can the correct conductivity value be recorded. Calibration is necessary whenever a new electrode is connected. In addition calibration should be repeated from time to time because of possible changes in the actual functioning of the electrode. Please follow the instructions provided by the electrode manufacturer. The electrode should always be carefully dried (with air, by shaking, or with a dry tissue) before immersion in a calibrating solution!
First enter the calibration tolerance (between 1 and 3), which forms the basis of the calibration. In the case of old or disturbance-sensitive conductivity electrodes it may happen that the measurement may not be adequately stabilised and calibration is not possible. Depending on the circumstances it may nevertheless be possible to stabilise such electrodes by increasing the calibration tolerance, but naturally at the expense of accuracy of measurement. In principle the calibration process should be performed using the smallest possible calibration tolerance.
Thereafter you will have the option of setting the second calibration value within the range 1000 µS to 2000µS (fresh water) or 40mS to 80mS (salt water) (depending on the standard calibration fluid available).
Next you must configure whether temperature compensation is to be effected using a fixed temperature setting (*Aquarium temp. manual*) or a measured value (in which case select the relevant temperature sensor). In the event that *Aquarium temp. manual* is selected then next enter the relevant temperature.
Next enter the temperature of the calibration liquid.

Note: The simplest method is to place the (firmly closed) container of calibration liquid in the tank for a while until the temperatures have equalised. Obviously this is feasible only if the aquarium temperature is known.
The actual calibration follows next. First you will be asked to hold the electrode in the air (i.e. it shouldn't be placed in the calibration liquid at this stage). The electrode should already be plugged in! Thereafter pressing ***RETURN*** will start the measurement process, during which two numbers will be seen in the lower line of the display. The left-hand number gives the maximum time remaining in seconds. If this time expires without the measurement stabilising sufficiently then the electrode will be deemed defective and the calibration aborted. The right-hand number shows the measurement in an internal code. **GIESEMANN G-tron** recognises automatically when this value has stabilised and then terminates the measurement process. After this measurement you will next be asked to immerse the electrode in the calibration solution (with the previously set calibration value). Again the measurement process is started by ***RETURN***.
When this measurement too is completed, you will be asked whether the data are to be stored. If no errors have occurred, confirm with *Yes*.
Finally, it is advisable to check the calibration. First hold the electrode in the air – is the reading around 0µS (fresh water) or 0mS (salt water)? Then connect the electrode and immerse it in the calibration solution. Is a figure approximating to the upper calibration value now displayed?

3.9.3 Activity

This allows you to determine whether the sensor and the associated recording of measurements and adjustment should be enabled (standard: *Yes*). If *No* is selected the adjustment and sensor monitoring will be switched off and all switchable sockets associated with the sensor will be deactivated. This is advisable only when this input is not required. A deactivated sensor is indicated by "---" in the display.

3.9.4 Operation hours

An associated operation hour meter is provided to record how long the conductivity electrode has been in service. The operation hours are recorded cyclically every hour in the non-volatile memory, ensuring that the operation hours are still recorded in the event of any interruption in line voltage power.
After the menu option *Operation hours* is selected the operation hours of the conductivity electrode are displayed. After a few seconds have elapsed or if any button is pressed you will be asked *Reset operation hour meter*? Confirmation with *Yes* will reset the operation hour meter to 0h. Obviously this should be done only when the conductivity electrode is changed.

3.9.5 Hysteresis

The so-called hysteresis determines the interval between the switching points and is necessary in order to reduce the switching frequency. The hysteresis set here encompasses the interval between the switching on of the *Conductivity upwards* port and the switching on of the *Conductivity downwards* port. The nominal conductivity value lies precisely at the centre of the interval between these two switching points. The setting for the hysteresis can be a value between 8µS and200 µS (fresh water) or 0.3mS and 10.0mS (salt water).
The default hysteresis setting of 20µS (fresh water) or 0.5mS (salt water) should not normally be altered. A reduction in the hysteresis is advisable only when the adjustment precision is to be increased. This will, however, also increase switching frequency.

Example: salt water, nominal value = 50.0mS, hysteresis = 0.4mS
-> The *Conductivity downwards* socket switches on at 50.2mS and off again at 50.0mS.
-> The *Conductivity upwards* socket switches on at 49.8mS and off again at 50.0mS.

Be aware that the conductivity adjustment will use 50.1mS and/or 49.9mS as the pivotal point rather than the precise nominal value set, in this case 50.0mS. This is necessary in order to make possible simultaneous upward and downward adjustment. If adjustment is to be only upwards or downwards then the nominal value can be adjusted accordingly or the hysteresis reduced.

3.9.6 Alarm

First of all configure whether the conductivity alarm is to be enabled. If the alarm is enabled then the *Maximum deviation* of the actual conductivity value from the nominal value must be entered. The deviation for the conductivity alarm can be set between 50µS and 500µS (fresh water) or 2.5mS and 25.0mS (salt water).
Then can be set if in the case of an alarm the *controller* should be *shut-off*.
After the enabling of an alarm the relevant actual value will be constantly compared with the nominal value. In the event that the deviation (above or below nominal) is larger than that set under *Maximum deviation*

then an alarm will be activated. The adjustment hysteresis is taken into account during comparison of nominal and actual values.
In the event of an alarm the red alarm LED will be illuminated and the buzzer will be activated dependent on the mode set. In addition, a switchable socket can be programmed such that it will be activated in the event of an alarm.
If *controller shut-off* has been set then the alarm function will immediately deactivate all sockets involved in conductivity regulation with this sensor!
The configuration of the alarm should be performed with the greatest care. It is essential to avoid the alarm parameters being exceeded during normal operation!

3.9.7 Current actual value
This displays the current actual conductivity value. The display can be ended by pressing any key.

3.9.8 Display
In the event that the conductivity is measured in the range up to 100mS (salt water) it is possible to configure whether the value measured is displayed as conductivity, salinity, or density. **GIESEMANN G-tron** calculates the relevant values internally.

3.9.9 Operation mode controller
You can set how the controller should work. For most cases, the standard setting *Twoposition controller* is completely sufficient and so it needs not be changed. For some special cases, the other operation modes are necessary to optimize the controlling behaviour. The following operating modes can be selected:

- *Twoposition controller*
  This is the common operation mode. At two switch points, which are determined through nominal value and hysteresis, a belonging socket is switched on or off. See here also *3.9.5 Hysteresis*.
- *Pulse/Pause fixed*
  If the actual value differs from the nominal value by a half hysteresis, the belonging switchable socket is switched on for an adjustable time (*Pulse duration*). After expiration of the pulse duration, the socket is switched off again and reline voltage so at least for the set *Pause duration*. After expiration of the pause duration, the socket can be switched on again by the control when the actual value differs from the nominal value again (or still) by a half hysteresis, the switching circle (pulse and pause) starts again.
- *Pulse variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the actual turn on time depends on the difference of nominal value and actual value. The <u>bigger</u> the deviation , the <u>longer</u> is also the turn on time, but at the maximum it is as long as set under *Pulse duration*.
- *Pause variable*
  Works in principle like *Pulse/Pause fixed*. The difference is that the calculation of the turn-off time depends on the difference of nominal value and actual value. The <u>bigger</u> the deviation, the <u>shorter</u> is also the turn-off time, but at the maximum it is as long as set under *Pause duration*.

The operation modes *Pulse/Pause fixed, Pulse variable* and *Pause variable* make sense, when the measured size (conductivity) reacts only slowly and delayed to the controller activities (e.g. introducing osmosis water) or only small amounts of substances should be added.
For these operation modes, you have to make the following settings:

- *Pulse duration*
  The corresponding socket is switched on for this duration (at the maximum). A pulse duration between 1s and 1h can be set.
- *Pause duration*
  This is the (maximum) time until the control can switch on the corresponding socket again. A pause duration between 1s and 1h can be set.

3.10 Level
GIESEMANN G-tron can regulate the water level in various ways. Up to two of our level sensors can be connected. On the port *Level* two level sensors can be connected by using a splitter (available as an accessory component).

Because water-level control is a delicate matter (because of the risk of flooding) various safety precautions are applied. Our sensors and computational electronics are designed such that the removal of the sensor plug or a cable fracture is interpreted as the desired level being achieved and the relevant socket is switched off. In addition we offer not only fairly low-priced mechanical float-operated sensors but also optical sensors (no mechanical components). The latter cannot become stuck in a single position due to clogging with debris. Moreover time limits can be set to restrict the on-time of the socket. As a result overflow due to a defect is not possible.

The water-level regulation is configured via the following settings.

3.10.1 Operational mode

After selection of a level sensor the operational mode can be altered:

- *Not enabled*
- This sensor is not used.
- *Auto Top Off*
  As soon as sensor 1 (respectively 2) registers too low a level the switchable socket with the function *Water 1* (respectively *Water 2*) is switched on. When the nominal level is attained the socket is switched off again.
- *Leakage detection*
  If sensor 1 (respectively 2) is activated **GIESEMANN G-tron** assumes a leakage and causes an alarm. While there is no alarm the socket with the function *Water 1* (respectively *Water 2*) is switched on, otherwise switched off.

Sensor 1 provides additional operation modes. Since sensor 1 and sensor 2 are working together in these modes for sensor 2 automatically the operation mode *Not enabled* will be selected.

- *Min/Max adjustment*
  The two sensors work together to regulate a single water level. Sensor 1 functions as the maximum switch, sensor 2 as the minimum switch. As soon as sensor 2 registers too low a level the switchable socket with the function *Water 1* is switched on. Then when the water level reaches the setting for sensor 1 the switchable socket is switched off again.
- *Water change*
  At pre-set times water is drained off (the switchable socket with the function *Water 2* is then switched on) until sensor 2 signals the minimum water level has been reached. Thereafter *Water 2* is switched off and the switchable socket *Water 1* is switched on until the water reaches the level set for sensor 1.
  -> Sensor 1 signals that the tank is full again; sensor 2 indicates when sufficient water has been drained off. The switchable socket *Water 1* turns on the fresh water supply, *Water 2* turns on the outflow.
  After selecting this operational mode the timer that is to determine the timing of the water change must be selected. Don't forget to program the chosen timer accordingly in the appropriate menu (set the *switching period* to *Event start* there, see *3.11.3 Timer*). The water change will then be started at the time set there.
- *Water change and ATO*
  Same as Water change, additionally sensor 1 and socket *Water 1* work as Auto Top Off when no water change is in progress.

Hint: If an operation mode is selected for sensor 1 which uses sensor 2 as well (*Min/Max adjustment* or *Water change*) then a change of the operation mode of sensor 2 causes a disabling of sensor 1!

3.10.2 Sensor settings

After selecting the sensor its reaction time can be set between 0s and 240s. To prevent movement of the water's surface from constantly activating a sensor and thus causing the associated switchable socket to switch on and off continuously, **GIESEMANN G-tron** monitors whether the signal transmitted by the sensor (= water present/not present) is stable. In this case "stable" signifies that the signal must remain constant for at least the reaction time set. Only if the signal is stable does the water-level regulation come into play. The reaction time should be sufficiently great that water movement does not result in activation of the regulation system, but sufficiently small that the attaining of a specified level is recognised not too late!

3.10.3 Maximum on-time

For safety reasons it is possible to configure the maximum time for which the switchable socket s with the functions *Water 1 and Water 2* can be active. The time can be set separately for each of the three switchable sockets, with a maximum setting of 8 hours. This is intended to prevent a defective sensor resulting in (excessive) flooding. In the event that the on-time limit is exceeded then water-level regulation and the associated switchable sockets will be immediately deactivated! Water-level regulation will remain deactivated until the error status is reset. If the on-time limit is set to 0 here then on-time monitoring will be deactivated.
After this you can configure whether exceeding an on-time limit should activate an alarm.
Hint: There is no monitoring of the maximum on-time for a switchable socket which is assigned to a sensor with the function *Leakage detection*.

3.10.4 Error reset

In the event that an on-time limit is exceeded (a socket with the function *Water* is switched on too long *on-time*) or the leakage detection reports an error the error status of the device must be reset. This will also reset the alarm. Water-level regulation will remain disabled for as long as the error status isn't reset!

3.10.5 Diagnostic

In order to facilitate the implementation of the level sensors there is a menu option *Diagnostics*.
This displays the current status of any sensors connected. A "X" signifies "Contact with water – sensor active", a "-" signifies "No contact with water – sensor not active". Please note that a "X" will be displayed if no sensor is connected. The diagnostic can be ended by pressing the ***Esc*** key.

3.10.6 Start water change

In the event that operation mode *Water change* or *Water change and ATO* is selected for sensor 1 you can start an automatic water change manually. After confirming the security request with *Yes* the water change will start.

3.11 Clock

This allows you to configure the functions relating to time.

3.11.1 Time & date

It is important to understand that two clocks operate in the aquarium computer. One of these clocks registers the actual ("our") time of day. This is also the time normally shown by the display. But the computer also contains a second (internal) clock, which controls all the automatic functions such as dimming, nocturnal decrease, timers, etc. The two clocks normally operate in parallel, except when the actual time is altered (e.g. automatic or manual change to summer time), when the internal clock is changed not immediately but over the course of a set period of days. For example, a setting of 10 days will mean a daily adjustment of 60/10 = 6 minutes.
First you are given the opportunity of configuring whether the **GIESEMANN G-tron** clock should change between normal (winter) time (MEZ) and summer time (MESZ). If you reply in the negative then only normal time will operate in your aquarium (ie in summer the clock will be an hour wrong, which may be desirable if you don't want to subject your fishes and plants to the change-over). But if you prefer to make the seasonal change then you can also set the number of days over which the time change is to be spread. The time can be altered manually by an hour. In this case too the internal clock will be slowly adjusted over the set period of days. You thus have the opportunity to divide the hour over several days and make the change gently.

Following this you can set the date and clock time manually. When storing the time you will be asked whether you would like to make the internal time (see above) the same as the actual time. If you answer *Yes* the internal time will immediately be set to the newly entered time, otherwise the internal time will be slowly adjusted as described above. When first setting the time you should answer *Yes* here, but when re-setting the clock to summer time you should answer *No*.

3.11.2 Reminder

The aquarium computer can remind you of activities to be performed. You will be reminded via a text, which will appear on the display, alternating with the standard display, after the period of time (in days) set. The

reminder will be displayed until you mark it as done. In the event that a repeating reminder is set then it will be displayed again after the set time has elapsed. Monthly filter maintenance is a possible example of a repeating reminder. The time for removing the young fish you have bred from the tank is an example of a reminder that would be displayed only once.
First select the reminder memory (1 - 4). In the event that the reminder has already been activated you can now mark it as done, and it will not be displayed again thereafter. Otherwise you will next be asked whether the reminder is to be enabled. Once you have enabled the reminder by answering *Yes*, you must set whether it is to be repeated more than once. Then you must enter after how many days you would like to be reminded. After the number of days has been set the text of the reminder should be entered. After storing the reminder details **GIESEMANN G-tron** will confirm by displaying when the next reminder is to take place.

3.11.3 Timer

GIESEMANN G-tron provides 8 completely programmable clock timers. The sockets to be controlled by the switching processes can be assigned as described. After selecting the timer you wish to program, the operational mode must be set. The following options are available:

- *Days of week*
  If you select days of the week then first you must set the number of switching cycles per day (0 to 4; 0 indicates that the clock timer in question is not active). Next you must set the day(s) of the week on which switching is to take place. A box with a dot in the middle indicates "Switching enabled on this day of the week", an empty box indicates "not enabled".
- *Interval of days*
  If you wish to switch at intervals of a set number of days then first you must set the number of switching cycles per day (0 – 4; 0 indicates that the timer in question is not enabled). Next you must set the number of days after which the switching cycle is to be repeated, 1 day denotes a daily switching cycle. Then set after how many days the switching is to begin.

After selecting *Days of week* or *Interval of days* the switching period can be set. The available options are:

- *Dosing*
  Using this setting short switching periods (1s to 300s, accuracy 1s) can be achieved, and it is usually used for the control of dosing pumps. The switching period is defined by the *Switch-on time* and the *Duration*.
- *Normal*
  This type of operation is used for programming longer switching periods (accuracy 1 minute). The switching period is established via the *Switch-on time* and the *Switch-off time*.
- *Event start*
  The timer starts a procedure such as a water change, see *3.10 Level.* Only the start time is input here.

Finally you must configure whether the timer in question should affect the feeding pause (except when *Event start* is selected). If the answer here is *Yes* then the feeding pause will be activated for as long as the timer in question is enabled. In addition the feeding pause will operate for the period set as feeding pause duration. This can be useful when, for example, the timer in question controls automatic feeder or a dosing pump. Bear in mind that the feeding pause should not last too long – see also *3.13.4 Feeding pause*.

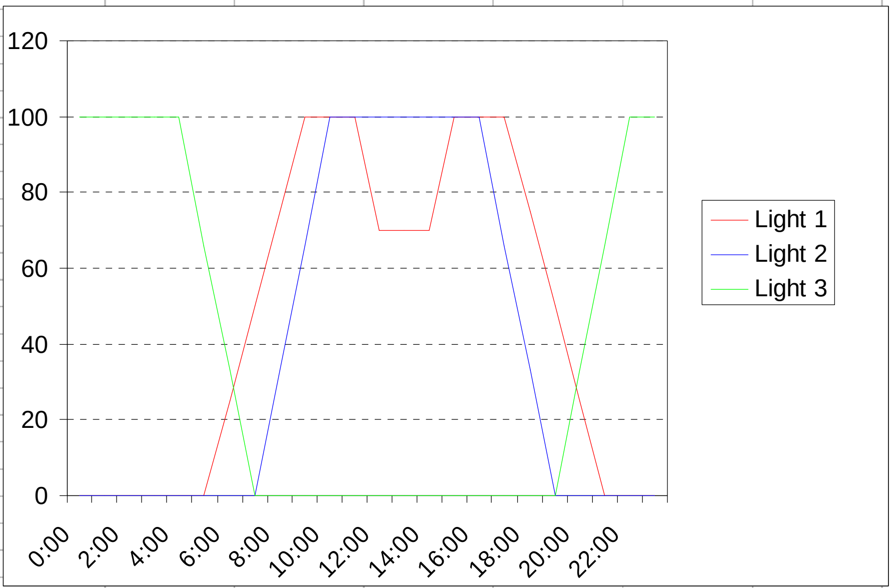
3.12 Illumination

Under this menu option you will find all the settings associated with the illumination. **GIESEMANN G-tron** is able to control up to 8 dimmable or non dimmable lamps independently. Lamps can be switched by our switchable powerbars. Dimmable lamps are controlled by the 1-10V interfaces.

Dimmable lamps
Dimmable lights are connected to the ports L1L2 or L3L4. These ports provide a total of four 1-10V interfaces and appropriate switching signals. The interfaces L1 to L4 are assigned ex works to the dimming channels 1 to 4.

You can set the lighting cycle separately for each illumination channel. It is thus possible to achieve effects such as sunrise or moonlight. The following graphic may be helpful in understanding the remaining settings and the combined interplay of the various lights.

Time	Light 1	Light 2	Light 3
0:00	0	0	100
1:00	0	0	100
2:00	0	0	100
3:00	0	0	100
4:00	0	0	100
5:00	0	0	66
6:00	25	0	33
7:00	50	0	0
8:00	75	33	0
9:00	100	66	0
10:00	100	100	0
11:00	100	100	0
12:00	70	100	0
13:00	70	100	0
14:00	70	100	0
15:00	100	100	0
16:00	100	100	0
17:00	100	66	0
18:00	75	33	0
19:00	50	0	0
20:00	25	0	33
21:00	0	0	66
22:00	0	0	100
23:00	0	0	100



The light-intensity cycle of three lights is shown. Light 1 is fitted with a reddish, colour-intensifying tube, Light 2 with a white tube, and Light 3 with a moonlight tube. Light 4 is not used in this example.
Light 1 is switched on at 05:00 hours, and reaches 100% strength at 09:00 hours (after 240 min).
Light 2 starts later, at 07:00 hours, and reaches full strength at 10:00 hours. By virtue of the offset timing the reddish light dominates initially, but by late morning both lights are at full power. At midday the red light is dimmed for a time, such that there is a higher white component in the light spectrum and a reduction in the overall light intensity ("tropical half-light", algae limitation). In the afternoon through evening the entire procedure is carried out in reverse. Light 3, the moonlight, is switched on at 20:00 hours and attains full intensity by 22:00. Next morning it is switched off again.
In order to define a light-intensity cycle *Dimming points* must be set. These are marked in yellow in the above example. Using each such starting point the light will be dimmed over a configurable time period to a configurable light intensity.
In the above example this means that there are the following 4 *dimming points* for Light 1:

- (dimming) *start*: 05:00 hours, (dimming) *duration* 240 min, (final) *light intensity* 100%
- (dimming) *start*: 11:00 hours, (dimming) *duration* 60 min, (final) *light intensity* 70%
- (dimming) *start*: 14:00 hours, (dimming) *duration* 60 min, (final) *light intensity* 100%
- (dimming) *start*: 17:00 hours, (dimming) *duration* 240 min, (final) *light intensity* 0%

3.12.1 Illumination run

Here you must first of all select the illumination channel to be set. After choosing one of the eight illumination channels the lamp type has to be adjusted:

- dimmable
- non dimmable

Then you can decide whether the associated lights are to be controlled automatically. If you answer in the negative then the light in question will operate on manual mode. This means that the light intensity of the light can be set manually.
If you have activated automatic operation then you can input the number(up to 8) of dimming points (dimmable) or switching times (non dimmable). In the example above for dimmable lamps there were 4 dimming points for the first light.

In the case of a dimmable lamp the dimming points have to be defined. For each dimming point the following parameters need to be set:

- *Start* – the dimming process starts at this time
- *Duration* – the dimming process lasts this long, up to 480 minutes
- *Light intensity* (0% - 100%) – light intensity of the light at the end of the dimming process

Warning: The individual dimming phases of a light may not overlap!

For a non dimmable lamp have these settings to be done:

- *Switch on* – the lamp is switched on at this time
- *Switch off* – the lamp is switched off at this time

3.12.2 Manual light intensity

This menu is intended predominantly for testing and diagnostic purposes. If automatic operation is enabled for at least one dimming channel (which is the case as standard) then you will be asked whether you want to switch off the automatic operation. If you reply *Yes* then all automatic operation will be switched off temporarily. On quitting the menu the previous settings will be re-instated.
Using the ***left arrow*** and ***right arrow*** keys you can select the dimming channel whose light intensity you want to set. The choice of either I1 to I4 or I5 to I8 will be displayed simultaneously. Using the ***up arrow*** and ***down arrow*** keys you can make the relevant light brighter or darker (only possible for dimming channels whose automatic operation is switched off) – for non dimmable lamps only 0% and 100% can be set. The key ***sun*** toggles the light intensity between 0% and 100%.
A symbol will be displayed to left and right of the number of the chosen dimming channel (D1 ... D8).
The symbol can be variable in form:

Symbol	Meaning
*	This light cannot be dimmed as it is in automatic operation, turn off the automatic operation if necessary
↑	Only increased light intensity possible (occurs at 0%)
↓	Only decreased light intensity possible, (occurs at 100%)
↑↓	Light intensity can be adjusted in either direction.

Manual setting can be ended by pressing the ***Esc*** key.

3.12.3 Clouds

GIESEMANN G-tron can simulate passing clouds using a random generator. When a cloud passes all the lights are dimmed for a short time. You can set the cloud probability (0% - 100%) and the maximum dimming (10% - 90%) as well as the minimum and maximum cloud duration. A cloud probability of 0% deactivates the cloud simulation. Cloud simulation also operates simultaneously with moon-phase simulation and during a dimming process.

3.12.4 Moon

GIESEMANN G-tron simulates the phases of the moon dependant on the date. The lunar cycle is actually a very complicated affair. The period from new moon to new moon varies, but on average is around 29.5 days. Equally complicated are the time when the moon rises, its distance from the Earth, and several other details. In addition it is not the case that the moon shines with 50% of its light intensity at half moon. We reckon on 25%. Our moonlight simulation doesn't aim to replicate all these complex processes in precise detail. For our purposes it is sufficient to create a repeating succession of degrees of moonlight which will provide the aquarium with slightly different illumination every evening and supply a degree of rhythm that is largely in accord with that in nature. The phases of the moon are calculated by the aquarium computer on the basis of the date such that full moon and new moon always correspond to the relevant actual (real-time) phases of the moon with an error of at most a day. At the same time we have placed the emphasis on simple and easy-to-understand operation.

First of all you can select the *Dimming channels* (D1 to D8) that are to be involved in the moonphase simulation. A box with a dot in the middle signifies "this dimming channel is to be subject to the phase of the moon", an empty box signifies "this dimming channel has nothing to do with the phase of the moon". Once you have selected at least one dimming channel you can then set from what time (earliest 14:00 hours) to what time (latest 10:00 hours) the moon-phase simulation is to be activated.
Note: The automatic dimming for the selected dimming channel(s) must be enabled!
The following will now occur for the selected dimming channels within the time set: the light intensity of an associated light (determined by the dimming curve set) will be multiplied by the calculated moon-phase light intensity (= moon phase^2). The dimming curve will thus also be taken into consideration. For example at half moon (=50% phase of the moon) and a light intensity of 30% (determined by the dimming curve) this will produce a light intensity of $50^2\%^2 * 30\% = 7.5\%$.

All dimming channels that are not selected for moon-phase simulation will be unaffected and follow their dimming curves exactly as usual. Outside the set simulation period no dimming channels will be affected, all dimming channels will work just as normal.
Using this method, during the day (outside the set simulation period) it is possible to run a light as usual (no moon-phase influence), but during the evening (within the set simulation period) to link it to the phases of the moon.
The start and end times of the moon-phase simulation should be chosen such that they encompass the night-time dimming interval of the relevant dimming channel(s). For example, if the dimming curve of a light is programmed such that it produces moonlight from 19:00 to 07:00 hours, the moon-phase simulation should also be set from 19:00 to 07:00 hours. The moon-phase simulation can work simultaneously with cloud simulation and during a dimming process.

3.12.5 Rainy days

GIESEMANN G-tron allows the programming of "rainy days". On a rainy day the light intensity is reduced to a configurable value, and this can be helpful in avoiding algae.
First you must configure which *Dimming channels* (D1 to D8) are to be used by the rainy-day program. Then on which *Days of week* rainy days are to be created. Finally the degree of *Darkening* on a rainy day must be set (0% - 100%). The rainy-day program takes into account any moon-phase and cloud simulation as well as the relevant dimming curves.

3.12.6 Burning-in

Fluorescent tubes need to be burned-in before they can be used for dimming. **GIESEMANN G-tron** provides a quick and easy way of automating burning-in.
After selecting the dimming channel to which the tube to be burned-in is connected, the burning-in period can be set between 0h and 100h. The dimming channel in question will then operate at only 0% or 100% until such time as the operation hour meter (see also *3.12.7 Operation hours*) for the dimming channel reaches the burning-in duration (all dimming settings greater than 0% will automatically be treated as 100%). At 0% the light will be switched off again – the burning-in is performed in stages. The burning-in period is set to 0h as standard, ie with burning-in disabled.

3.12.7 Operation hours

Each dimming channel is provided with its own operation hour meter to record how long the dimming channel in question is active (light intensity greater than 0%). In this way you can tell in each case how long the light has been in operation and can replace it in good time, before its performance deteriorates too much through age. The operation hour meter is also used by the burning-in program. The operation hours are recorded cyclically every hour in the non-volatile memory, ensuring that the operation hours are still recorded in the event of any interruption in line voltage power.
After the menu option *Operation hours* is selected the relevant *Dimming channel* must be input, after which the operation hours for the dimming channel in question will be displayed. After a few seconds have elapsed or if any button is pressed you will be asked *Reset operation hour meter*? Confirmation with *Yes* will reset the operation hour meter to 0h. Obviously this should be done only when the light is changed.

3.12.8 Temperature-dependent light reduction

Using temperature-dependent light reduction it is possible to reduce the lighting intensity smoothly (for dimmable lamps) or to shut off lights (for non dimmable lamps), depending on the amount by which the nominal temperature is exceeded. In calculating the reduction any existing dimming sequence as well as any simulation will be taken into account. Temperature-dependent light reduction can be used to prevent further overheating, caused by the lighting, in a tank that on hot summer days becomes so warm that any cooling system present is no longer able to achieve an adequate decrease in the temperature.
The following parameters can be set:

- the determining *temperature sensor*
- the *Illumination channels* to which the temperature-dependent light reduction is to be applied.
- *Min. temperature excess* – if the nominal temperature is exceeded by this amount then the reduction in the lighting intensity of the relevant lights will be triggered; can be set between 1°C and 5°C – this setting is relevant for *dimmable* lamps only!
- *Max. temperature excess* – if the nominal temperature is exceeded by this amount then the relevant light(s) will be switched off completely; can be set between 2°C and 10°C, but must be at least 1°C higher than the *Min. temperature excess* - this setting is relevant for *dimmable* lamps only!

- *Shut off limit* – exceeding the nominal temperature by this amount causes a shut off of the non dimmable lamps. A value between 1°C and 10°C can be adjusted. These lamps will be switched on again not until the programming of the corresponding illumination run schedules a re-start (lamp was off – e.g. at night – and should be switched on again - e.g. in the morning). A reduction of the temperature only does not cause a re-start. This is important especially for gas discharge lamps since they should not be switched on/off frequently.
  This setting is relevant for *non dimmable* lamps only!

Example for dimmable lamp:
Nominal temperature = 26.0°C, Min. temperature excess = 2.0°C, Max. temperature excess = 4.0°C, this results in:

Current temperature	Light reduction	Current temperature	Light reduction
28.5°C	25%	29.5°C	75%
29.0°C	50%	30.0°C	100% (off)

3.13 Extras

Special functions and settings are summarized here. The following sub-menus can be accessed when required.

3.13.1 Maintenance

During maintenance and servicing the aquarium it could be handy to change the activation state of some sockets or the brightness of lamps. For example: Disable the heaters, reduce the current to minimum and adjust the brightness of a dimmable lighting unit to 80%. To reach a maximum of flexibility the settings take affect directly on hardware (sockets and 1-10V interfaces) and not on the controlling functions (e.g. temperature control or dimming channel).

In the menu *maintenance* the maintenance parameters can be altered under *settings*:

- *Select affected 1-10V-interfaces*
  Select the 1-10V interfaces (1 - 4) to be affected during an maintenance. All non-selected interfaces will continue working normally and program controlled.
- *Select percentage during maintenance*
  Here it is possible to adjust the voltage (in percent) of the 1-10V interfaces selected in the previous step during maintenance.
- *Select affected sockets*
  Select the socket-outlets (1 - 8) to be affected during maintenance. All non-selected socket-outlets will continue working normally and program controlled.
- *Adjust selected sockets*
  Here it is possible to adjust the activation state (on or off) of the socket-outlets selected in the previous step during maintenance.

The maintenance program is activated in the menu *maintenance* by selecting *start*. While the maintenance program is active the status of the selected socket-outlets will be set to the configured maintenance-settings, the voltage of the selected 1-10V-interfaces will be set according to the given configuration. **GIESEMANN G-tron** will show that a maintenance program is active by signaling a flashing announcement with the text *Operational mode: Maintenance*. The maintenance program is terminated by pressing any key.
Hint: During maintenance the alarm monitoring of all sensors will be disabled!

3.13.2 Internal time

This function causes the internal clock time (see *3.11 Clock*) to be displayed. This function is for diagnostic purposes only; no settings can be configured here.

3.13.3 Info & support

When this menu option is selected then information will be displayed sequentially (automatically after a period of time or if a key is pressed) regarding the software version, model, and our website.

3.13.4 Feeding pause

Here you can configure the length of the feeding pause, which can be started manually using the ***Esc*** key or automatically via a timer. In order to avoid compromising the microbiological environment of your filter, you should select this time to be no longer than absolutely necessary (around 5 to 10 minutes).

In addition you can configure which pumps are to be affected by the feeding pause:

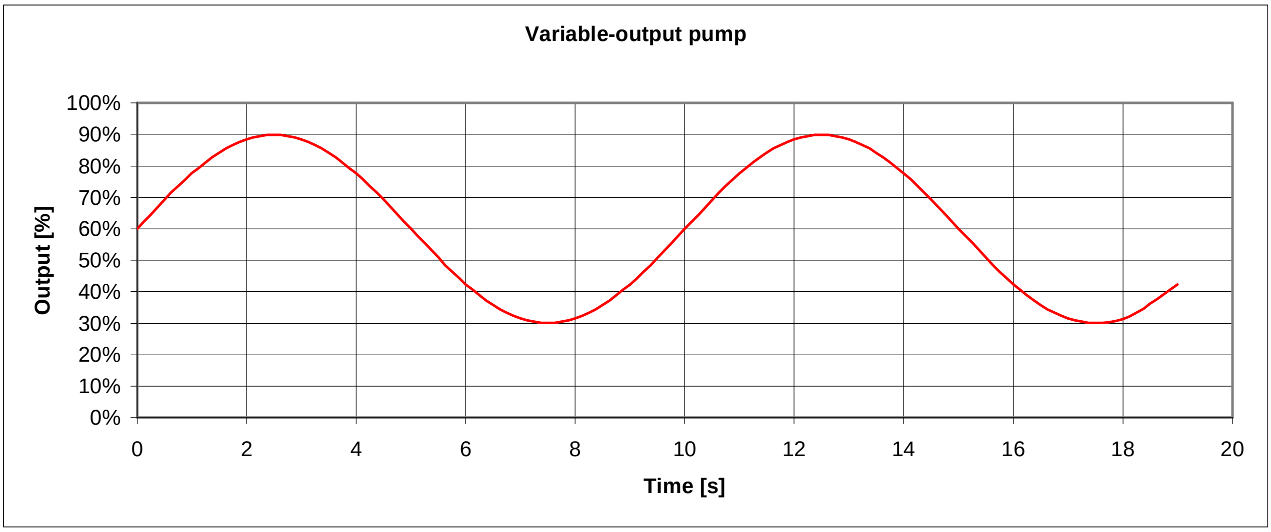
- *Stop filter* – after selection of *Yes* there will be no power to the switchable socket with the function f*il-ter* during the feeding pause
- *Current pumps at minimum* - during the feeding pause the current pumps will run at the minimum speed set
- *Current pumps off* - during the feeding pause the current pumps will be halted
- *Current pumps uninvolved* – the feeding pause has no effect on the current pumps

3.13.5 Current

GIESEMANN G-tron can regulate current pumps in numerous ways. If variable-output pumps are used (these must either have an interface cable or be suitable for control via phased voltage, for which a dimmable socket is required) then the current will be gently alternated between minimum and maximum flow rates. The pattern of the control signal can be set to sinus form – on the one hand this is the gentlest method of increasing and/or decreasing the speed of a motor, on the other it is the closest to what occurs in nature. The control signal can be output via a 1-10V interface. In addition non-variable pumps can be switched via switchable ports, though obviously such pumps can only be switched on or off, their flow rate cannot be varied.

Note: "Pump active" signifies that the pump continuously fluctuates between minimum and maximum flow rate (= creates "waves"), and a port assigned to the current pump is then switched on. "Pump inactive " doesn't necessarily signify that the pump is off, but that it is running at its minimum flow rate, and a port assigned to the current pump is then switched off.

The graph below shows the flow pattern of a variable-output pump (settings: *Minimum flow rate* = 30%, *Maximum flow rate* = 90%, *Wave duration* = 10s, *Wave form* = sinus):



In addition the pumps can be set for variable switching for wave creation (*Sequence* or *Random*). The pumps active at any one time create the waves configured, the inactive pumps run at the minimum flow rate set.

Two independent groups can be programmed. A group consists of 0 to 4 pumps which can be controlled independently. The 2 groups can not be synchronized.

If several pumps should be operated synchronously it is wise to connect them all to the same control signal. These pumps will then be handled like one single pump.

3.13.5.1 Nocturnal change

A *nocturnal change* of the pump power can be adjusted for the current control. If the nocturnal change has been activated a *start*- and *end-time* can be entered. During these times the pumps will be operated with the power which has been set for night.

For each group these parameters can be set:

3.13.5.2 Count of pumps

Here you can set the count of pumps in this group. In one group 0 to 4 pumps can be controlled (0 pumps means that this group is not enabled). The count of pumps in a group defines what pumps belong to this group (a free assignment pumps to groups is not possible). In sum 4 pumps are available; these combinations are possible:

Count of pumps in group 1	Pumps belonging to group 1	Count of pumps in group 2	Pumps belonging to group 2
4	1, 2, 3 or 4	0	none
3	1, 2 or 3	0	none
3	1, 2 or 3	1	4
2	1 or 2	0	none
2	1 or 2	1	3
2	1 or 2	2	3 or 4
1	1	0	none
1	1	1	2
1	1	2	2 or 3
1	1	3	2, 3 or 4
0	none	0	none
0	none	1	1
0	none	2	1 or 2
0	none	3	1, 2 or 3
0	none	4	1, 2, 3 or 4

3.13.5.3 Mode

The operational mode for a group can be adjusted her. Both groups may have different modes.

- *No current* – The pumps of this group are permanently off.
- *Permanent* – The pumps are permanently active and run synchronously.
- *Permanent opposite* – The pumps are permanently active and run reciprocally, i.e. when pump 1 is running at maximum flow rate, pump 2 will be running at minimum flow rate, and vice versa.
- *Sequence 1* – The pumps of this group will be activated alternately. The duration for the change from one pump to next one can be set (see below). When the last pump of this group was active the sequence starts again with the first pump of this group. If this group has 2 pumps an ebb-tide-simulation will be created. If this group has only one pump this pump will be switched on and off in turns.
  Example: A group with 3 pumps will result in this switch-on pattern:

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 will be activated in an alternating order.
  Example: A group with 3 pumps will result in this switch-on pattern:

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 will be activated one after the other until all pumps are on. Thereafter the pumps will be switched off in the same order until all pumps are off. The duration for changing the switch-on-state can be adjusted (see below).
  Example: A group with 3 pumps will result in this switch-on pattern:

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 will be switched off inversely.
  Example: A group with 3 pumps will result in this switch-on pattern:

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 of this group are activated in continuous random variation. The duration of the activation can be set (see below).

3.13.5.4 Duration

In the modes *Sequence*, *Surge* or *Random* the duration for changing the on-states can be adjusted. The *minimum duration* and *maximum duration* can be entered. The duration will be calculated by a random generator between the set minimum and maximum. In the case the duration should always be constant then for the *minimum* and *maximum duration* the same value has to be entered.
The minimum and maximum permissible duration of activation can be set between 1 second and 6 hours. In the event that a switchable socket is to control the relevant current pump then the duration chosen should not be too small – otherwise damage may occur to the switchable socket or the pump!

3.13.5.5 Wave

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

- *Sinus waves* (gentle increase and decrease in the flow rate of the pump)
- *Right-angled waves* (abrupt changes)
- *Right-angled waves short* (abrupt changes at high frequency)

Then the wave duration must be set in the range between 1 and 60 seconds (or 0.4s and 6s at *Right-angled waves short*). Naturally the technical capacity of the pump must be taken into consideration here. Waves cannot be created using non-variable pumps connected via switchable sockets.
Finally the *Random wave reduction* can be set between 0% and 100%. The larger the value the greater the variation in the size of the individual waves. At 0% each wave will attain the previously set maximum (wave size always the same), at 100% the size of the waves will fluctuate randomly between minimum and maximum.

3.13.5.6 Pump settings

For each pump these settings can be made:

- *Minimum* – minimum power (while wave trough or pump is inactive)
- *Maximum* – maximum power (while wave crest)
- *Night* – maximum power while nocturnal change
- *Thunderstorm* – maximum power while thunderstorm
- *Behavior while feeding pause* – options are: *uninvolved* (feeding pause doesn't affect this pump), *at minimum* (pump is operated with minimum power while feeding pause) and *off* (pump is shut off while feeding pause).

3.13.6 Display

Here you have the opportunity to configure the current values that are to be shown by the display during normal operation. If several different elements are selected then these will be displayed in succession. These settings will also affect the display of any external display currently connected.

The following settings can be made via this menu:

- *Display duration* – the period for which the display will remain constant before the next value is displayed
- *Select simulation* – here you can select which of the simulation elements are to be displayed
- *Select controller* – selects the controllers whose values and status are to be displayed (e.g. pH and temperature)
- *Time & date* – it can be selected if the current time and date will be displayed *never*, *always* or *rotating*.

3.13.7 Measurement data

GIESEMANN G-tron can record measurement data. For this purpose it offers a storage system which can record up to a maximum of 600 measurements (configurable). The measurements are stored in the RAM (volatile memory) – the data will be lost in the event of an interruption in the line voltage supply!
In the event that the measurement storage is full then the oldest data will be overwritten. A PC with our operating program is required for detailed analysis and additional processing of the measurement data. It can extract measurement data and store them as text files. A simplified analysis of measurement data can also be performed directly by the aquarium computer, see the menu option *Analysis* below.
For each metered value and sensor one memory space will be occupied in the measurement storage.

The following sub-menus will be found under the menu option *Measurement data*:

- *Settings* – First of all input the maximum storage size (between 8 and 600) to be reserved for recording the measurement data. Reducing the maximum storage size, which is set ex-works at 600, is advisable only if you wish to limit the period of time for which measurement data will be recorded. See also the example below.
  Next set the measurement period between 1 minute and 12 hours (after the expiry of this time the current values will be stored). And finally you can select which of the sensors present are to be involved in the measurement recording.
  Any alteration in the settings may result in measurement data already stored being erased. Hence before any alteration in the settings you will first be asked whether the data are to be erased.
- *Erase measurements* – All measurements currently stored will be erased.
- *Status* – Displays first of all when the last measurements were recorded, then the storage status and how many measurement data have not yet been transmitted to the PC.
- *Analysis* – After you have selected the sensor whose measurement data are to be analysed the upper line of the display will show the average value and the lower line the minimum and maximum values. These three values will be based on all the data currently stored.

Example of calculation of the maximum duration of measurement data recording:
Size of the measurement storage 500 storage elements, measurement data from 2 sensors to be stored, storage to take place once every hour
-> Measurement period = 1h * 500 / 2 = 250h = 10.4 days

Example of calculation of the setting for maximum storage size:
You would like to store the measurement data from 3 sensors (e.g. temperature, pH, and redox) every half hour, but the values in the storage should be a maximum of 2 days old so that minimum, maximum, and average values relate only to the past two days.
-> Maximum storage size = 24h / 0.5h * 3 = 144

3.13.8 Language

The language **GIESEMANN G-tron** uses to print texts can be set here.
Please note: If **GIESEMANN G-tron** is set to German language this menu appears under "Sprache" (German expression for language)!

3.13.9 Dosing pumps

Settings for the dosing pump control can be done here. **GIESEMANN G-tron** calculates the on-time of a dosing pump based on the flow rate of the used pump and the desired rate per dosing. The pump can be activated with an adequate programmed switchable socket.
A dosing pump unit is connected directly to a switchable socket output of the **GIESEMANN G-tron** (e.g. *S1-S4*) and behaves like a conventional or digital powerbar, depending on the used output. If more than one dosing per day is set **GIESEMANN G-tron** splits these dosing operations evenly over the day. If more than one dosing pump is used **GIESEMANN G-tron** tries to avoid that the pumps are activated in parallel.

First you have to select which of the 8 dosing pumps has to be set.
These settings are possible:

- *Flow rate* – The flow rate in ml/min of the given pump (see datasheet) has to be set here.
- *Dosings/day* – This defines how often the pump should be activated per day. Adjustable are values between 0 and 24, 0 deactivates this dosing pump.
- *Rate/dosing* – The amount for one dosing.

Hints:

- The dosing amount in one day is equal to the product of *Dosings/day* and *Rate/dosing*. E.g. 4 dosings per day with a rate per dosing of 10ml result in a dosing of 40ml in one day.
- Alternatively you can use a timer or a controller (e.g. pH-value or conductivity) to control a dosing pump.
- Because of tolerances the actual flow rate of a pump can be different to the specification in the datasheet. To obtain most precision we recommend to measure the actual flow rate (let the pump run for 1 minute and measure the liquid pumped in this time), then enter the result of this measurement under flow rate.

3.14 System

Special functions and settings are summarized here. The following sub-menus can be accessed when required.

3.14.1 Factory settings

After selecting this function you will be asked whether the default settings should be reinstated. If you answer *Yes* then all settings will be returned to their original status, as supplied! The operation hour meters will not be reset.

3.14.2 PIN

A Personal Identification Number (PIN) allows you to protect the device from changes to the settings by unauthorized persons (for example, children). As supplied, the PIN is set to 0000. If the PIN is set to 0000 then all settings can be changed without entering a PIN. As soon as the PIN is changed from 0000 then the PIN must be input before any alterations to settings. This also applies to changing the PIN.

In the event that you have forgotten the PIN, proceed as follows:
Switch off the device (unplug the line voltage supply), switch on again (reconnect the line voltage supply) and at the same time, while the status and welcome display is visible, press ***Esc*** and ***RETURN*** **simultaneously**. You will then be asked whether the PIN should be deactivated. When you answer *Yes* the PIN will be returned to the original default status as supplied (0000 – deactivated).

3.14.3 Socket function

The function of each switchable socket can be set individually. The sockets 1 to 8 in the **GIESEMANN G-tron** are an associated part of the computer. Furthermore the connection of digital powerbars is possible. Not all the functions listed below are available in all **GIESEMANN G-tron** models.

After selecting the socket to be programmed the following settings are possible.
The individual functions are:

- *Timer*, subsequently the *number* of the timer has to be set (1 to 8)
- *Illumination*, subsequently the *number* of the illumination has to be set (1 to 8)
  Here a socket can be assigned to an illumination channel. If the channel in question has a dimming setting of 0% then the socket will carry no voltage. With a setting of 1% to 100% it will carry voltage. This function is intended to interrupt the line voltage supply to dimmable fluorescent unit(s) which do not have an internal voltage cut-out at 0% or to switch non dimmable lamps on and off.
- *Water*, subsequently the *number* has to be set (1 and 2)
  The water-level regulation uses this sockets for switching magnetic valves or pumps.
- *Current pump*, subsequently the *number* of the pump has to be set (1 to 4)
  The current simulation switches this socket on when the current pump is active. Important note: Every switching operation inflicts wear on both socket and pump. For this reason the time periods set for the current modes *Ebb/Flood* or *Random* should not be too short! Depending on the actual loading the socket should have a life of up to 10,000,000 switching cycles.
- *Dosing pump*, subsequently the *number* of the pump has to be set (1 to 8)
  The dosing pump control activates this socket during a dosing operation.
- *Programmable logic*, subsequently the *number* of the programmable logic has to be set (1 to 8)
  The result of the programmable logic in question will be output at this socket.
- *Sum Alarm*
  In the event of an alarm this socket is switched on.
- *Filter*
  This port is effectively permanently switched on, except during the feeding pause.
- *Always on*
  This socket is always switched on.
- *Always off*
  This socket is always switched off.

Furthermore a socket can be assigned to a control loop. First one of the given controllers (sensors) has to be selected, e.g.

- *Temperature 1*
- *pH-value 1*

After selecting the controller that should switch this socket the function has to be more concretized.

In case of temperature controllers these options are given:

- *Cooler*
  The temperature regulation uses this socket to switch the cooler.
- *Heater*
  The temperature regulation uses this socket to switch a heater.
- *Bottom heater*
  The temperature uses this socket to switch a bottom heater.
- *Alarm*
  In the event of an alarm of this control loop this socket is switched on.

For all other controllers these options are given:

- *Control downward*
  The controller uses this socket for downward adjustment, e.g. to switch a CO_2 injector (pH controlling).

- *Control upward*
  The controller uses this socket for upward adjustment, alkalization (pH controlling).
- *Alarm*
  In the event of an alarm of this control loop this socket is switched on.

After selecting a function these settings can be adjusted:

- *Blackout delay* – the time here set (0 to 60 minutes) determines how long this socket will be switched off in any case after starting the **GIESEMANN G-tron**. This setting is useful if a device should be switched on again after it has cooled down, e.g. the switching on of an MH-lamp should be delayed after a power blackout.
- *Invert switching behavior* – after enabling this option the socket behaves the other way around: the socket is off when it should be on and vice versa. The inversion of the switching behavior is useful for example if a pump or solenoid should been switched off instead of been switched on.

3.14.4 1-10V interface

Each 1-10V interface can be configured individually. **GIESEMANN G-tron** provides four associated 1-10V interfaces, L1 to L4 (in each case two to a port). After selecting the interface to be configured, first of all the function of the interface in question must be set. The following settings are possible:

- *Illumination,* subsequently the *number* of the illumination (= illumination channel, 1 to 8) has to be set.
  This option is for connection of dimmable lights – e.g. with dimmable electronic ballasts. It is possible to assign any of the 1-10V interfaces to each illumination channel. This can be useful when, for example, the dimming cycle of two lights is to be changed, avoiding the need to reprogram the dimming curves.
- *Current pumps,* subsequently the *number* of the pump has to be set (1 to 4).
- *Not used,* this interface has no function

Moreover a 1-10V interface can be assigned to a control loop. First one of the available controllers (sensors) has to be selected, e.g.

- *Temperature 1*
- *pH-value 1*

The selected controller outputs a voltage that is proportional to the deviation from the desired value (= difference of nominal value to current value).
Example temperature control:
*W*hen the temperature of the water exceeds the nominal temperature set, a voltage proportionate to the temperature discrepancy is output. The warmer the water is the greater is the voltage. Using this setting it is possible to regulate a controllable cooling system - e.g. our PropellerBreeze with electronic control *PropellerControl* – and thus operate it as economically and quietly as possible.

Next the control voltage of the interface in question can be set. As a rule the voltage range will be 1V to 10V, as the name of the interface suggests.
In practice it may be necessary to set the minimum control voltage (at 1%) (possible range: 0V to 4V). This can be for the following reasons:

- Not all tubes are equally suitable for dimming. The tube manufacturer can provide you with more information on suitability for dimming. The majority of problems occur in the lower part of the dimming range (up to around 10%), where it may happen that after a certain time (usually a few minutes) the tube simply switches off.
- Not all dimmable electronic ballasts behave in the same way. The lower dimming setting should normally be achieved at a control voltage of 1V, full light intensity at 10V. We have noticed that in the case of some electronic ballasts the light intensity doesn't alter further at a control voltage of less than 1.5V, while in other electronic ballasts the dimmable range extends to around 0.8V.
- The current pump reline voltage inactive although the current speed set is >= 1%.

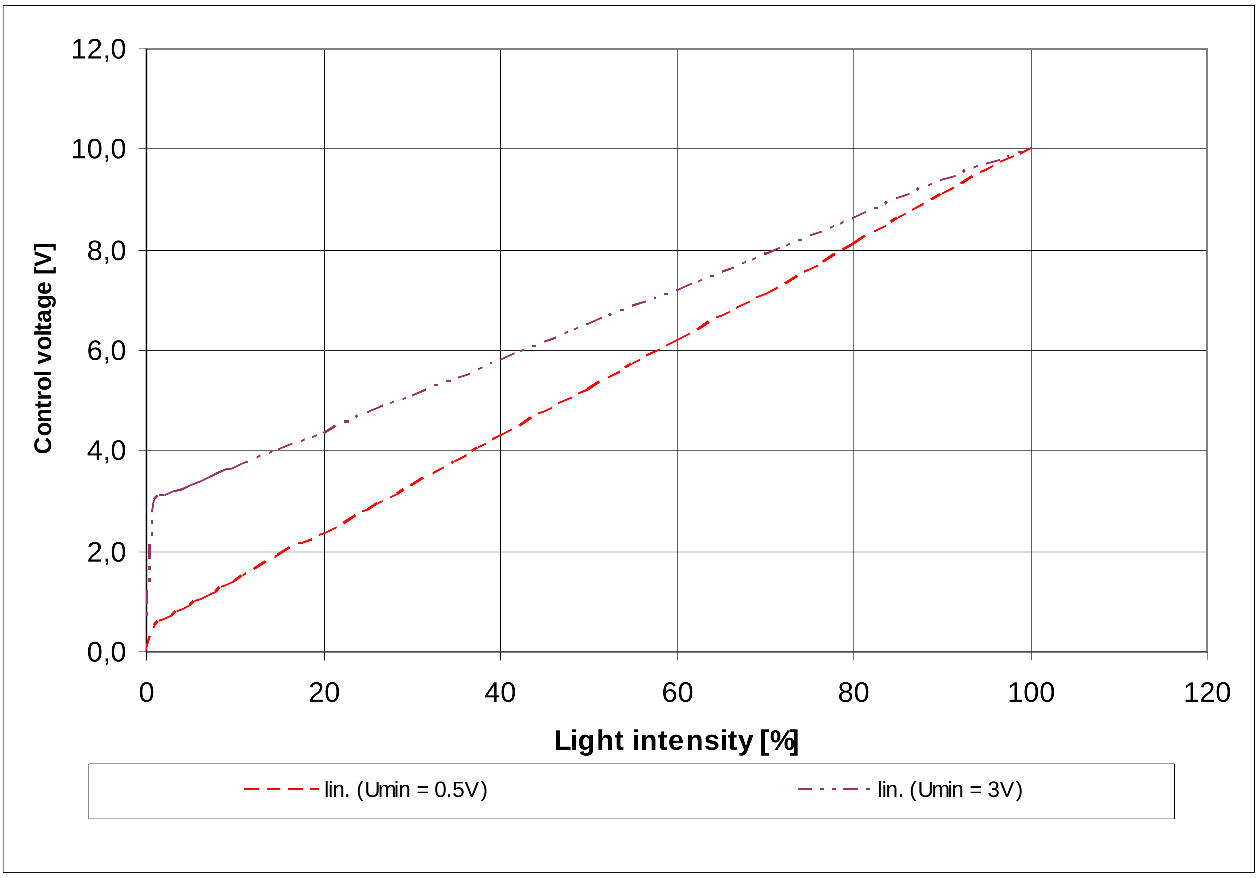
The maximum control voltage (at 100%) can be set between 4.5V and 10V, in order to solve the following problems, for example:

- With some dimmable electronic ballasts nothing more happens between 9.5V and 10V.
- The current pump is already operating at full rate at 8V.
- Moon light is too bright at 10V.

Notes:

- In order to achieve an optimal light intensity cycle the control voltage should be matched to the associated light, ie minimum light intensity and lower control voltage as well as maximum light intensity and upper control voltage should be precisely matched.
- When using our dimmable moonlight LEDs the voltage should be set at 0.8V.

The following graph shows various plots of control voltage relative to light intensity (logarithmic or linear at low control voltages of 0.5V or 3V):



In order to achieve an optimal dimming sequence the menu option *Manual light intensity* can be used to test whether the light intensity changes at the lower dimming values or the light switches off, and whether changes in the light intensity are still apparent at the upper dimming values. If necessary alter the control voltage and repeat the test.

3.14.5 Configuring external display

Using this function the contrast of a connected external display can be configured.

3.14.6 Communication

This menu is used to configure all the settings that relate to communication. **Most of these settings can only be altered on GIESEMANN G-tron directly!**

- *Device address* – this is the address by which the aquarium computer is to be accessed by the PC operating program. Normally there is no need to change this setting.

- *Baud rate* – This sets the connection speed of the interface (default 9600 baud). If several interfaces are present you must first specify for which one the baud rate is to be set**. The baud rate must match that of the device with which communication is to take place (e.g. a PC) If the external display unit is to be connected then the setting must be 9600 baud!**
  Increasing the baud rate can be helpful if the link is short and free of interference. The link between PC and **GIESEMANN G-tron** using our serial interface cable functions without problem even at 115200 baud. In the event of transmission problems, e.g. when using long and interference-prone leads, it may be helpful to reduce the baud rate.

3.14.7 Alarm

The operational mode of the alarm buzzer can be set here:

- *Buzzer off* – even in the event of an alarm the buzzer will remain off
- *Buzzer on* – in the event of an alarm the buzzer will be activated, independent of the time of day
- *Buzzer at set time* – in the event of an alarm the buzzer will be activated only during a particular period of time. The time period during which the buzzer is to be activated in the event of an alarm is set here.

In addition it is necessary to activate the monitoring process and set the permissible deviation for the individual water parameters.

3.14.8 Virtual probes

Here so called virtual probes can be administrated. But what are virtual probes?

At the **GIESEMANN G-tron** sensors for the registration of several values (e.g. temperature) can be connected to. To each of these sensors, a control circuit is related whose parameter (nominal value, hysteresis, nocturnal change, and so on) can be set. The controller of a sensor switches the corresponding sockets (e.g. pH upward and pH downward for the pH-value control or the heater, bottom heater and cooler for the temperature control).
Maybe it is necessary to relate several, different set control circuits to one and the same sensor. An example is the temperature control, where the bottom heater and heater shall be operated in consideration of a nocturnal change, though the cooling shall not be affected by the nocturnal change (since you do not like to have an active nocturnal decrease).
The solution here is to create a "copy" (= virtual sensor) of the actual existing sensor. This virtual sensor and its belonging control circuit may be used just as a "normal" sensor. The measured value of the virtual sensor is of course always equal to the measured value of the "original sensor”. Furthermore, a virtual sensor can not be calibrated.
Hint: At total, 8 sensors can be managed (Sum of the actually existing and virtual sensors).

In the menu virtual sensors, there are the following options:

- *New virtual probe*
  Here, you can create a new virtual sensor. You have to chose a sensor from which a copy shall be created (e.g. Temp.-Sensor 1). After the storing, a virtual sensor (e.g. Temp.-Sensor 2) is available. The related settings (nominal value, hysteresis, and so on) are taken over (copied) from the original sensor
- *Delete virtual probe*
  With this option, a virtual sensor can be deleted again.

Hints:

- After creation of a new virtual probe all probes will be newly numerated.
- In the menus of **GIESEMANN G-tron** you can differentiate a virtual probe from an actual existing probe: The names of virtual probes are completely written in capital letters (e.g. "PH-VALUE 1").

3.14.9 Digital powerbars

Here digital powerbars and dosing units can be administrated.
First, you have to indicate if you like to use digital powerbars (or dosing units). If this is the case (in **GIESEMANN G-tron** chose *yes*), the socket control output S1-S4 is set to digital data transfer, so that at this connection, a communication with digital powerbars and dosing units is possible.
If it has been set that digital powerbars shall be used, you can afterwards also chose between the following options:

- *Set numbering* - With this option, you relate numbers to the sockets of the digital powerbar (respectively to the pumps of the dosing unit). The first socket of the powerbar (respectively the first pump of the dosing unit) obtains the set start number, the next socket (or pump) this number + 1, and so on. If e.g. 5 is set as first number, then the sockets of an digital powerbar have the numbers 5, 6, 7, 8, 9 and 10. For this case the pumps of a dosing unit would have numbers 5, 6, 7 and 8. The set switch socket functions will then relate to these numbers. You can set start numbers between 1 and 19.
- *Set initial state* – (for dosing pump units is this function not available) With this option, the initial states (after line voltage voltage appears) of the separate sockets can be set. These states are also restored when the communication between **GIESEMANN G-tron** and the powerbar is - due to any reasons -missing longer than 60 s, e.g. if the control line is removed or if the **GIESEMANN G-tron** is

defective. The digital powerbar controls permanently, if it is still getting commands from the **GIESEMANN G-tron**. It could for example be reasonable, that you set your digital powerbar in a way that in case of a fault, the socket for the filter is on and the socket for the heater is off. So the water purification is guaranteed further on and an overheating is excluded.

- *no action*

Important 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 standard powerbars, these connections can also not be altered.
- If the option *Use digital powerbars* has been activated, then with S1-S4 no standard powerbar can be actuated.
- A mixed operation of digital powerbars (at S1-S4) and standard powerbars (at the other powerbar connections, e.g. S5 - S8) is possible.
- When the *initial state* or the *numbering* shall be set, only one digital powerbar respectively dosing pump unit may be connected. If several devices would be connected during the programming, 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 standard powerbars is determined by the fact to which output they are connected. Sockets of one powerbar which is connected to S5-8, have for example always the numbering 5 to 8. Here, you have to keep in mind that no double assignment of numbers arises!
- The set numbering and initial states are stored permanently in the digital powerbar and therefore also remain when they are not connected to the line voltage.

4 Additional Hardware

4.1 External display

The compact external display unit for **GIESEMANN G-tron** can be used to display all the data from the **GIESEMANN G-tron** in an additional place. This can be useful when, for example, the aquarium computer is installed in a cabinet and its display is not readily visible. A further advantage over the associated display of the **GIESEMANN G-tron** is that more data can be displayed simultaneously.
GIESEMANN G-tron is connected via the serial interface of the **GIESEMANN G-tron** and also receives its power supply from the computer – an additional power supply is not required.

The day of the week, date, and time of day are displayed on the top line. The remaining three lines show the sets of data selected under *3.13.6 Display*. If more than three sets of data are selected for display then they will be displayed in succession.
The switching status of the switchable ports 1 to 8 is shown at the right-hand side of the display. If a number is shown this denotes that the switchable socket in question is currently active. The absence of a number indicates that the relevant switchable socket is not active.

Note: An external display should be connected only when **GIESEMANN G-tron** is disconnected from the main supply! Hence first unplug the main supply lead of the **GIESEMANN G-tron**, then connect tzeh external display, and finally reconnect the main supply lead.

5 Guarantee

The device is guaranteed for two years from the date of purchase. The guarantee applies to defects both in the materials used and arising from errors during manufacture.
We guarantee that the products supplied conform to the specifications cited and that the products are free of material and/or manufacturing defects. The accuracy of the operating instructions is not guaranteed. No liability is accepted for injury, loss, or damage of any type resulting from incorrect operation or from unsuitable siting of the aquarium computer and/or accessories. In addition the guarantee does not cover injury, loss, or damage arising from incorrect connection. All liability for direct or indirect injury, loss, or damage, consequential loss, and third party liability is excluded insofar as the law allows. There is no guarantee that our product package will meet the requirements of the purchaser. The guarantee will be invalidated in the event that the original product is damaged or modified.

6 Additional information

6.1 Help and information

Help and information is available in the first instance from your dealer.

7 Technical Data

Input voltage	12V DC
Current	400 mA
pH metering	BNC input for pH electrode, accuracy pH 0.1, metering range pH 3 to pH 11
Temperature metering	Mini DIN socket for the temperature sensor supplied, accuracy 0.1 °C, metering range 15 °C to 38 °C
Control of powerbar	2 x 4 switchable channels

Control of dimmable lamps	2 x 2 dimming channels, each with a 1V-10V analogue output for light intensity regulation and switching
Dimensions	Height x Width x Depth = 58mm x 240mm x 198mm
PC interface	RS232, with additional signals