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1 Introduction

Congratulations for purchasing your new *iks aquastar midi* aquarium computer! You now have at your fingertips an advanced system, of modular construction, that will fulfil all your requirements for the automatic supervision and control of significant water- and lighting values for both for fresh- and sea-water aquariums. This system enables you to monitor and control the lighting, temperature, and pH-value (or redox value) in your tank cheaply. But as well as this, the *iks aquastar midi* provides you with a whole range of addtional functions to relieve you of some of the pressure of routine jobs, thus giving you more time for a more enjoyable activity – enhancing the beauty of your aquarium.

Remarkable features are:

- logical and **easy operation**.

- **Two displays:** A two-line LCD and a large LED display. So you can even see your readings easily from a distance and in the dark.

- You can connect up to two socket panels, with 4 sockets each, to the *iks aquastar midi*. That means **8 controlled sockets**. These are also available in a variable-output version for extremely realistic simulations.

- With the *iks aquastar midi* you can programme up to 32 **timer functions.** The shortest switch interval is only 1 second long. This enables you, for example, to add minimal amounts of trace elements evenly and automatically with the help of a proportioning pump (such as the *iks Vario ND*). The proportioning pump *iks Vario MP 045* feeds an amount of only 0,075 ml per second at its lowest setting.

- The **interval functions** can be individually adjusted to suit your own requirements. The active and passive phases of the interval duration can be set separately from each other.

- The **night/day simulation** makes child's play of your aquarium's lighting and optimises it too. You can use it to set a wide variety of lighting on- and off times. If the lighting you use can be dimmed, you can simulate **sunrise and sunset**. This function even makes the **fall in nocturnal values** possible (pH-value, temperature, current etc.).

- The integrated **lunar-phase simulation** gives you everything you want. It involves the **real** simulation of moonlight, taking into account the duration as well as the intensity of the light. It even allows you to simulate the lunar phase of a particular region, the tropics for example!

- There is also a very wide spectrum of possibilities for **current simulation** such as **pulsating waves** or **high tide/low tide.** No matter how large your aquarium is and regardless of the shape it may have, this simulation function, thought out right down to the last detail, makes it possible for you to create the optimum current for any tank. **You can control up to 8 pumps!**

- With a measure and control module, you can carry out **up to eight different control processes** in the "**Profi**" programming level. An example: a socket, No. 1, is connected to a tank-floor heating system that is activated at 25° C . if the temperature continues to fall to, let's say, $24,5^{\circ}$ C, then the heating element connected to Socket No. 2 is switched on. If the temperature in your tank becomes too hot then a ventilator / cooling unit on Socket No. 3 can be activated at 27°C. In addition, different values for **day/night** and **summer/winter** can be set for all these functions.

- **Upper and / or lower alarm settings** can be allocated to **every control process**

- Acoustic, visual and external **Alarm**

- **Automatic calibration** with **sensor testing** (for pH-value, redox).

- With the *iks aquastar midi* any of the measured values can be **stored and transferred to a PC** at any intervals you decide upon. Thus, 4000 chains of measurements (one chain comprises date, time and the values of all the connected sensors) can be stored in the memory. The lead required to do this is readily available in your local high street or you can make one yourself, or you can get one from *iks*. The **software** necessary for transferring the data to your PC (*iks-datastar*) is available **free-of-charge** in the Internet on the *iks homepage* (http://www.iks-aqua.com). With the help of your PC you can recognise and identify long-term trends and interdependencies between the most diverse factors in your aquarium. A PC programme for comfortable evaluation of data (graphs, database, tables, online display etc.) is currently being developed.

- **Dependable for the future, too, with the update function:** As the whole system is constantly undergoing **further development** you have the opportunity of installing the latest programmes (functions) from the Internet with a PC. **That means:** You are always **up-to-date!**

As you can see, the *iks aquastar midi* provides you with valuable support in every respect and meets the highest demands of modern aquarium enthusiasts.

So you no longer have to depend on coincidence, luck or the renowned "salty fingers" for the optimal maintenance and care of you favourites. Please consider the following for the benefit of your animals:

Your *iks aquastar midi* can help you in every aspect with the supervision of your aquarium and reduce your workload with routine tasks. It can give you early warning of a potential drop in the quality of the water and then take the steps that you have programmed to remedy the problem. However, you must decide what is operated via the socket in particular cases. Although (or just for that reason) you have a vast array of adjustment- and regulation possibilities you are still *wholly responsible* for the organisms in your care!

If the water values are less than optimal and you can't find the cause then please ask your local specialist dealer for advice. If you have transferred the measurement data to your PC, you can take the print-out to your dealer to help him find the source of the problem.

If you have any questions about the programming or about certain functions, please don't hesitate to contact our customer service desk. Here's how you can reach us:

iks ComputerSysteme GmbH
Mozartstraße 93
76307 Karlsbad
Germany

Telephone:	**0049 (0) 72 02 / 94 11 40**
Telefax:	**0049 (0) 72 02 / 94 11 41**
E-mail:	**info@iks-aqua.com**
Internet:	**http://www.iks-aqua.com**

So, all that remains is to wish you hours of enjoyment with your *iks aquastar midi*!

2 Basic information

First of all we'd like to make you more familiar with the structure of our operating instructions. The introduction has already given you a brief glimpse of the wide variety of the system's possibilities.

With the help of a picture (Fig.1), **Section 3** introduces the *iks aquastar midi* and explains what's included in the package. Once you've read this, you will know where to connect the sensor modules, the switch-socket panel, the power supply and the PC.

Section 4 explains how to connect the various modules to your *iks aquastar* and what you must observe in the process.

In **Section 5** you've got there at last. This is the point where you put the *iks aquastar* into operation!

Section 6 clarifies the principal behind the structure of the menu control.

Section 7 gives you information about the menu structure and how you can move between the different menus. The various functions are explained to you in detail so that after working through the section you are in a position to programme your particular settings yourself.

If you set the programming level to "professional" in Section 7.1.5, various dialogs will appear while programming which do not appear in the programming level "standard". The presentation of the display (dark- or light grey background) in this manual or an additional note draw your attention to this.

| Progr. level 60 |
| Standard   <> |

| Progr. level 60 |
| Professional   <> |

Standard   **Professional**

You will find an extensive Help Index in **Section 8**.

Under **Section 9** you can find the *iks aquastar midi's* technical data.

Information regarding the guarantee, registration, and the declaration of conformity is set out in **Section's 10, 11,** and **12**.

Section 13 contains a number of tips and tricks concerning the use of the *iks aquastar midi*.

Additionally, we have included a **quick reference guide (you will find an additional Help Index on the reverse of this)** and a form for entering the programmed data. The quick reference guide provides both the experienced *iks aquastar midi* user as well as the newcomer with a rapid overview of the menu structure. It is important that you use the form for the programme data. It's best to fill this in with a pencil and even better to make a few extra copies.

3 Overview: Keys, operating elements, sockets

3.1 Operating elements (Fig. 1)
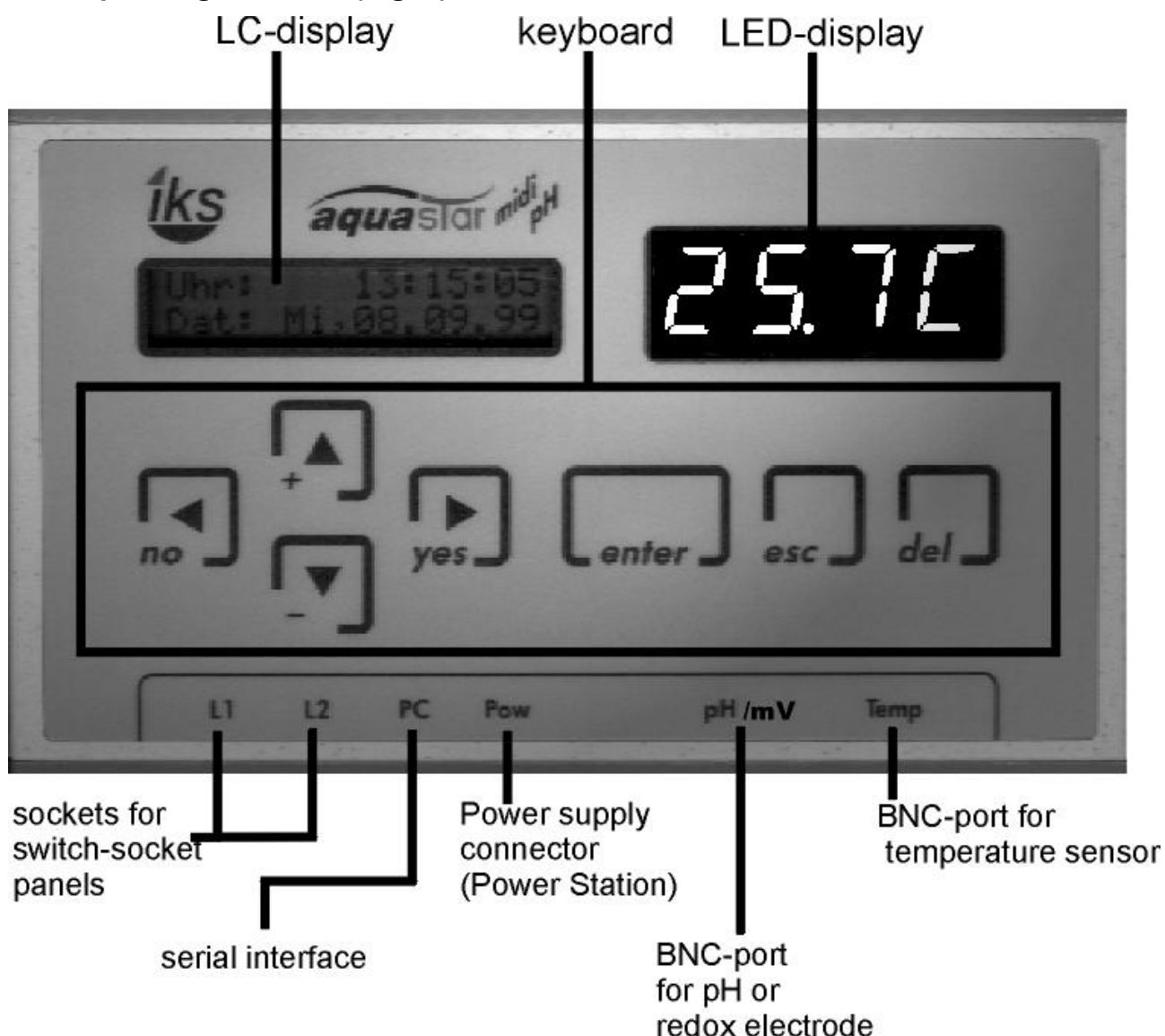
Fig. 1

3.2 Displays and special keys:

The display's function is self explanatory. It is a small screen via which you are informed about important parameters and assists you with programming. The LED display enables you to read the measurement values. Similarly, a flashing *–AL-* will alert you to an activated alarm and makes you aware that the system is not in the control mode by showing *Pro* (=*Pro*gramming mode).

When the *iks aquastar midi* is in the control mode (**Standard mode of operation**) the readings from the connected sensors are monitored *and the commands carried out that you have programmed*. Additionally, the system values (date, time, measurement readings, socket panels – see below) are displayed on the LCD (scrolling, if desired). The readings from each of the connected sensors are presented alternately in the LED display.

⚠ **Make sure that you activate the control mode when you operating automatic monitoring and control** (see below)!

In addition, the system values are shown (rolling, when desired) on the display (date, time, measurements, socket panel - see below). This is your *iks aquastar's* **standard operational mode. Ensure that you activate its automatic monitoring and control** (see below)!

Several keys have special functions depending on the menu you are in at a particular moment:

esc (abbreviation of "escape") - normally used to interrupt or cut off a sub-menu or an input. It is useful for when you have lost track of where you are or if you have entered incorrect data.

◁,▷ You can move around on a menu level by using these "arrow keys" (left/no, right/yes). Arrow symbols in the lower right-hand corner of the display indicate that you can make another selection with the arrow keys. You can also get to a particular position on the data-input mask when entering multidigit numerical values.

△,▽ These "arrow keys" (up/+, down/-) enable you to enter numbers. You can increase a number with △ and reduce it with ▽ . These keys are also for entering prefixes (+/-).

del This key enables variable-output sockets to be activated directly with the set output when testing. This key is also required for resetting. You can find out more about this in the appropriate sections.

△,▽, **del** By pressing these keys simultaneously, you can adjust the contrast to the maximum at any time.

enter- the most familiar computer key. It is also referred to as the "return key". You use this to make a selection or confirm your entry.

In future you will often be asked to which socket you would like to allocate a certain function (Which socket?). The image "**(--)**" on the display shows you that the selected socket has not yet had a function allocated to it.

⚠ The Power Station switch socket has the number "0"(L0)!

The following abbreviations show which functions are to be found in an already **occupied socket** or which appear on the display when setting the appropriate sensor:

EA	=	External alarm
IF	=	Interval function
Ti	=	Timer
Li	=	Light (Day/night simulation: **please don't connect HQI or HQL lamps to variable output sockets**!)
Cu	=	Current simulation
Mo	=	Lunar phase simulation (**please <u>don't connect</u> HQI or HQL lamps to <u>variable output</u> sockets**!)!)
Sol	=	(Calibration-) solution
mV	=	Millivolts
pH	=	pH-value

rH	=	rH value
Rx	=	Redox
Te	=	Temperature

3.3   What's included

Before commencing operation, please check that nothing is missing. If something does appear to be missing, please contact your dealer immediately.

3.3.1   The basic system

- *iks aquastar midi* computer
- a short-circuit plug (Fig. 2)- only as *iks aquastar midi redox*   Fig.2
- a mains receiver with a switch socket (Power Station)
- this manual
- a quick reference guide
- a registration form
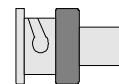
4   How do I install the *iks aquastar midi*?

4.1   Installing the *iks aquastar midi*

On the back of the *iks aquastar midi* you will find 2 holes 14,5 cms apart. Using 2 screws you can attach it to any vertical surface that is protected from water.

4.2   Connecting the sensors

As you can see in the picture (Fig. 1), the *iks aquastar midi* has two BNC ports for sensors. Now connect the sensors to the appropriately labelled port, depending on the model you have. **Please ensure that the sensors are not inadvertently connected to the wrong port as otherwise damage to both the sensor and the *iks aquastar midi* may result!**

4.2.1   Fitting the sensors to the aquarium

Where possible, these sensors are to be located in the aquarium in a place where **water continually flows around** them. To prevent the risk of becoming covered in algae this place should be **as dark as possible**. An open external filter, for example, is a good position. The lead connection, however**, is under no circumstances to be allowed to reach into the water** (außer Temperaturfühler)..

The pH- and Redox sensors must **never be stored dry**. Please only use the supplied protective cap, which must be filled with a **KCL solution**, for storage and transport. The guarantee is void in cases of dry storage or dry transport (e.g. by post).

4.3   Connecting the switch-socket panel

As shown in Fig. 1, you can connect up to two switch-socket panels to the *iks aquastar midi* on L1 to L2 (thereby giving you a total of 8 sockets that can be activated individually). These sockets are labelled L1 to L2. The sockets on L1 have been given the numbers 1 to 4, on L2 the numbers 5 to 8. If you only have one socket panel in your possession then we recommend that you connect it to the socket L1. Of course, you can connect it to L2, if you wish but then please note that the numbers assigned to the sockets change accordingly (see above).

☞ If you have connected a socket panel then it is a good idea to number the individual sockets appropriately with a waterproof pen or adhesive labels.
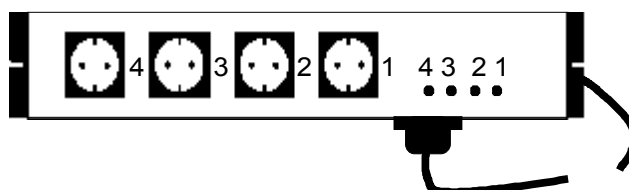
Fig. 3: The switch-socket panel

The switch-socket panels must be located **protected from water**. Under no circumstances whatsoever are they to be allowed to come into contact with water. Therefore the best place for them is above the water-line.

4.3.1 The switch-socket panel

The total power output of a switch-socket panel must **not exceed 2300W.** However, this output can be drawn from a single socket.

⚡ **Under no circumstances whatsoever are more than one HQI and/or HQL lamps to be run on a single socket as otherwise the socket's electronics may be severely damaged.**

4.3.2 The variable-output switch-socket panel

Please observe that this panel has been developed for light- and current simulation. **Generally**, appliances that can be operated with phase angle control (thyristor) can be connected to this panel. The output is **limited to 250 W per socket.** If you are not certain if you can run a particular appliance on this panel please contact your dealer or appliance manufacturer for advice. If you require a simple on/off function (e. g. for solenoid-operated valve, heating, HQI lighting etc.) than you should use a non-controllable panel as described in 4.3.1.

⚡ **If you attempt to control the output of a non-variable appliance you run the risk of destroying the appliance as well as the panel!**

The following can be "dimmed" without any problems:

- Lightbulbs
- Asynchronous current pumps such as the *iks aquastar turbo*
- Halogen lamps which have a thyristor-controllable transformer
- Fluorescent tubes with special ballast units whose output can be varied with phase angle control (thyristor).

The following are unsuitable:

- HQI/HQL lamps (these are not to be connected under any circumstances)
- Normal fluorescent tubes
- Solenoid-operated valves
- iks dosing pumps Vario LP180 and Vario MP045
- pumps with synchronous motors

4.4   Connecting the power supply

Connect the mini-DIN-plug from the mains receiver to the port labelled **Pow** ("Power") on the lower right-hand side of your *iks aquastar midi*. Please pay attention to the marking on the plug (upward pointing arrow). Now connect the mains receiver to the mains supply. It must be located in a position that is **protected from water** (as generally applies for all electrical connections). So the best location for the mains receiver is somewhere above the water-line.

When putting the instrument into operation for the first time, you should perform a **Reset** (see Point 5.1).

4.5   Connection to the PC

With the serial interface lead that's available as an optional extra, the *iks aquastar* can be connected to a PC for transferring the stored measurements. To do this, the mini-DIN plug is connected to the mini-DIN- port **labelled PC** on *aquastar*. The 25-pin SUB-D plug is connected to the PC's **serial interface**. The chain of measurements can then be transferred to the PC with *iks datastar* software for further processing.

4.6   Connecting the external display

The optional external display is connected to the *iks aquastar's* mini-DIN-port labelled PC with the mini-DIN-plug. Once the mains receiver, supplied and permanently connected to the display, has been connected to the mains, the display will commence operation without further adjustments.

The external display can be fitted either inset or mounted on a surface.

For inset installation a hole measuring 19.5 cm x 5 cm must be made at a suitable location. Please note that the display must be fitted into the hole from **the inside to the outside** (The mains receiver is too large to fit through the hole). The included short screws are for securing the display.

For surface mounting, please use the long screws, plastic dowels and spacers.

5   Before you start

Please read the following section of the directions for use very carefully. Pay particular attention to the areas where functions you want to use are described.

5.1   The reset function

As a general principal you should always carry out a so-called **Reset**. This erases **all former programming** and returns the system to its **original condition**. Please proceed as follows:

- Disconnect the aquastar from the power supply

- Now press the key labelled **del** and **keep it pressed.**

- Reconnect the power supply (continue to keep del pressed)

   The following message appears on the display shortly afterwards:

> aquamidi V1.0
> Reset yes/no

- Press the **yes** key again (or press *no* to abort and return to the main menu)

```
aquamidi V1.0
 *Please wait*
```

- After a few seconds a successful Reset will be confirmed with the message below:

```
aquamidi V1.0
Memory      OK !
```

- You will then be returned to the main menu.

6 The menu

All the settings in you system are shown clearly in the display and are selected via the keypad.

You are in
the main menu

Help-Index number
in the manual (Section 8)

```
Main menü        15
System           <>
```

Sub-menu
(e. g. System)

Sub-menu selection
(select by pressing
 arrow key left or right),
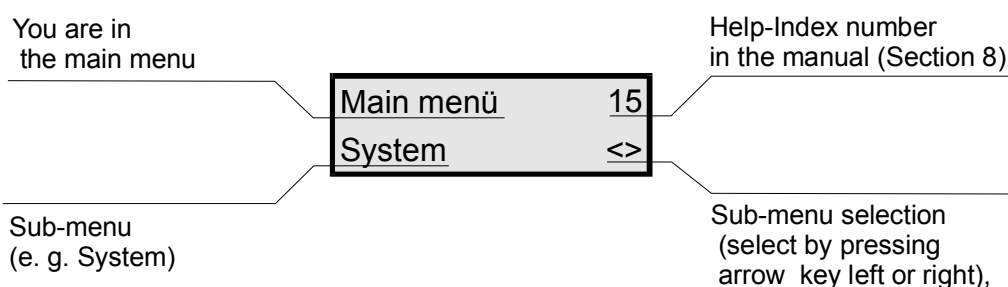
In this example you find yourself in the **main menu**. You can find a few words of assistance under the number 15 in the Help-Index (Section 8) of the manual. By pressing the Enter key you will reach the sub-menu "System". You can select other sub-menus by pressing the right or left arrow keys. You can exit a **sub-menu** and return to the next higher menu by pressing the *esc key*.

You will only be shown the functions in a menu that can be that can be carried out.

The programming level also has an effect on the available options. Only in the **professional (Pro) level do you have all options** at your disposal. The following section describes all of the functions. If a particular is only available in the professional level your attention is drawn to this in the text.

7 Programming

This quite extensive section introduces and explains all of the system's programmable functions. Despite the wide range of possibilities that the *iks aquastar midi* offers, its operation is designed logically and, after a little practice, becomes self-explanatory. Take a look at the individual menus and the variety of possible settings. You can't break anything by doing so. You can use the *esc key* at any time to interrupt an input and/or go to the next higher menu.

The diagram below (Fig.4) illustrates the highest level of the menu structure (main menu). Using the arrow keys "right" (key 6) or "left" (key 4), you can select a sub-menu from the **main menu.** When the desired sub-menu appears on the display confirm your choice by pressing *enter.*

Main menu 12	Main menu 13	Main menu 14
Control <>	TimeFunctions <>	SetMeasurement <>

Main menu 11	Main menu 16	Main menu 15
Run <>	Calibrate <>	System <>
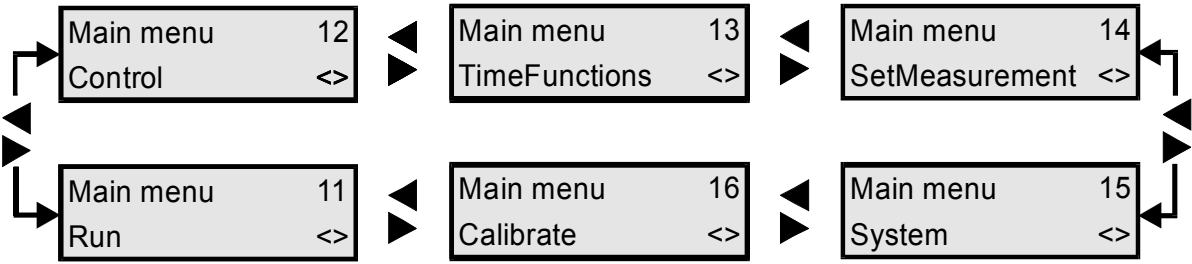
Fig. 2

The **first steps** to programming should always start in the **System menu** .

7.1   The menu "System"
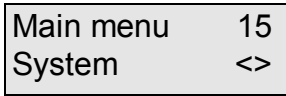
Main menu 15
System <>

With the arrow keys select the menu "**System**" from the **main menu** and confirm your choice with the *enter key*. The diagram below (Fig. 6) illustrates the sub-menu of the menu "System".

System 51	System 52	System 53
Time <>	Date <>	Acoust. alarm. <>

System 60	System 55	System 54
Progr. level <>	contrast <>	External Alarm <>
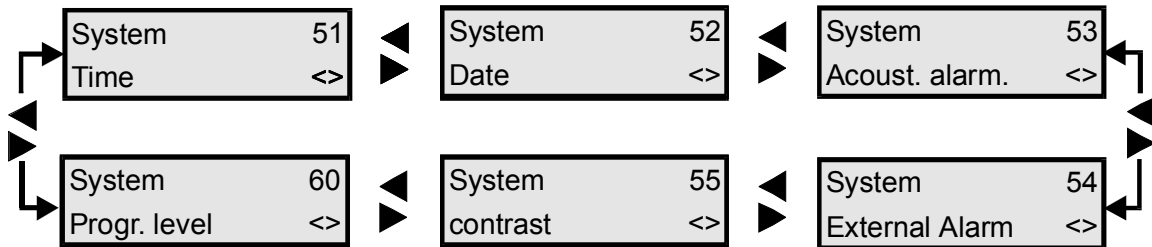
Fig. 3: The menu "System"

The sub-menus, with their arrow control (here "arrow right" and "arrow left") their selection of options, are structured in the same way as the main menu. This applies to all menus with several selections to choose from. It is quite easy to become confused at first by the sheer quantity of options but, with a little experience you will soon be operating your *iks aquastar* "with your eyes closed". It's likely that the quick reference section will be of great help at the outset.

Now let's go through the **sub-menu "Time"** together. The procedure with the other menus is identical so we will be able to deal with those a little more rapidly.

7.1.1   The time
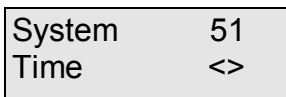
System 51
Time <>

Using the arrow keys ◁ or ▷ we can look for the menu "Time" in the menu "System" and confirm it by pressing the *enter key*.

Time 51
20:15:30
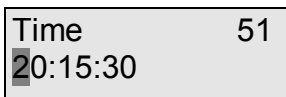
Now you can use the "arrow up" or the "arrow down" key to enter the value at any point as you require. Select the postion where you want to change the value with the ◁,▷ keys. If you make a mistake, you can correct it simply by selecting the appropriate position withn the ◁,▷ keys and changing the value with ⋏,⋎. Using the same procedure you can quickly check all the parameters and programmed data in the *iks aquastar's* menus and sub-menus (if everything is correct simply return by pressing the *Esc-key* or confirm with the *enter key*) or if necessary replace them with new input.

7.1.2 The date

```
System          52
Date            <>
```

Now select the menu "Date" with the arrow keys (Don't forget the *enter key*).

```
Date            52
08:02:1999
```

Now you can enter the date. Confirm the input by pressing *enter*.

7.1.3 The acoustic alarm

```
System          53
Acoust. alarm   <>
```

Select the menu "Acoust.Alarm" with the arrow keys and confirm it with the *enter key*.

```
Acoust. alarm   53
on              <>
```

Now you can turn the acoustic alarm on or off with the arrow keys (the right-hand lower corner of the display shows you if they are active). Don't forget to confirm with the *enter key*.

That's all there is to set in this particular sub-menu. You determine under which circumstances the alarm is activated later on in the menu "Control".

7.1.4 The external alarm

```
System          54
ExternalAlarm <>
```

Select the menu "ExternalAlarm" with the arrow keys and confirm it with the *enter key*.

```
Ext.Al. socket  54
Nr: -- (--)     <>
```

If you have not previously programmed an external alarm, the adjacent display will appear. Select the desired socket with the arrow keys.

```
Ext.Al. socket  54
Nr: 02  (--)    <>
```

In this example the socket 02 has been selected. The symbol "(--)" shows you that a function has not yet been allocated to this socket. Confirm your selection with *enter*.

You can allocate a further alarm function to a switch socket or just have the one on a switch socket. This enables you to activate an external alarm system (e.g. a siren or a light signal). Here too you decide under which circumstances the alarm is activated later on in the menu "Control".

☞Before allocating a function to a socket that isn't shown to be vacant with the symbols "(--)", please make sure that the two occupant, programmed functions don't cancel each other out.

```
Ext.Al. socket  54
Nr: 02  (EA)    <>
```

You can now select this point in the menu again in order to check the settings you have entered. The information on the display has now changed. Instead of the symbols "(--)" you now see the symbols "(EA)" which show you that the relevant socket has been occupied by an external alarm.

7.1.5 Contrast

```
System          55
contrast        <>
```

Use the arrow keys to select the menu "Contrast" and confirm you entry by pressing the *Enter key*.

```
contrast         55
[████████████]
```
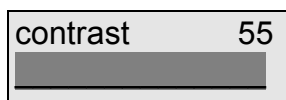
The maximum LCD contrast was set during manufacture. If you wish, you can change the setting by pressing the – or the + key. Confirm by pressing *enter.*

7.1.6 The programming level

```
System           60
Progr. level    <>
```
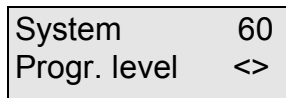
Select the programming level by using the arrow keys and then confirm your input by pressing the *enter key*.

```
Progr. level     60
Standard        <>
```
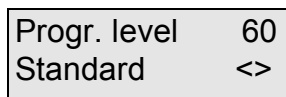
The arrow keys allow you to select either "Standard" or "Professional".

A lot of functions have already been **pre-defined** in the "**Standard**" level. This simplifies operation and makes it easier to understand. This level is recommended for most aquarium enthusiasts.

To fully exploit the system's capabilities you should select the "**Professional**" level. This gives you **access to all functions.**

7.2 The menu "Run"

No settings or adjustments are made in this menu. By selecting this menu and then pressing the *enter key* you find yourself in the **measurement- and control mode. This means that all programmed measurement- and control processes are now active. This is the standard mode of operation that takes over control of your aquarium! Please make sure that it is activated as soon as you have finished programming or checking the settings. Use the *esc* key to return to the main menu.**

```
Time:      15:16:10
Date: Sa,20.06.98
```
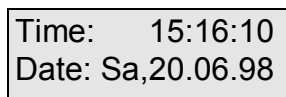
In normal operation the following information is shown in alternation on the display: Time and date, all connected measurement modules (2 at a time) and the switch-socket panel switch positions. If the information is **not displayed in alternation** please press the *enter* key (see below).

```
1 (pH-)   8,25  pH
2 (Te+)   26,2 °C
```
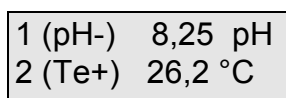
The pH-value in the example on the left is 8,25, the temperature 26,2 °C. The "–" (Minus symbol) next to "pH" (pH-value) means that a downward control is currently active. Accordingly, the "+" (Plus) next to "Te" (Temperature) shows that an upward control is active. A "∗" in this position shows that an alarm value has been reached.

```
L0: on
L1: *-*-   L2: 6**-
```
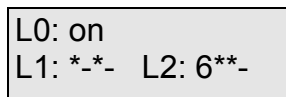
The following switch-sockets are currently active: Socket ''0'' of the Power Station and on panel 1 (L1) the sockets 1 and 3 at 100% (non-variable output socket panels are obviously either 100% active or off). On panel 2 (L2) the first socket (equivalent to socket number 5) is at 60% (and therefore a variable-output socket). The sockets 6 and 7 are switched at full power. Unfortunately it's not possible to show exact level of variable output as only one figure is available on the display for each one.

As already mentioned above, this information is displayed in alternation. The factory-set interval between two displays is two seconds. Section 7.4.1 shows you how you can change this interval.

ℹ️ The following alternatives are available for the **uninterrupted display of information** or directly, without a delay (however, this only applies to the LC display): By pressing the **del key the sensor readings are displayed directly**. By pressing the "≫" key, **time and date** are displayed. The **switch positions of the sockets** are displayed by pressing the "≪" key. Press the *enter key* to return to the **rolling (alternating) display**.

7.3   The menu "Calibrate"

Bitte beachten Sie, daß pH- und Redoxelektroden kalibriert werden müssen, damit eine korrekte Messung erfolgt. Diese Sensoren sollten auch von Zeit zu Zeit nachkalibriert werden (siehe Punkt 13.3 Tips zum Kalibrieren)!

ℹ️ A sensor test is carried out once the calibration process has been completed and for automatic recognition of the calibration solutions. At the end of this you will **normally** receive the message "**Sensor o.k.**". However, if you get the message "**Buffer not recognised**" there are 2 possible reasons: either you are using an old or incorrect calibration solution or your sensor is defective or wrongly connected. This can also be the cause of the error message "**Sensor error**" but in this case a defective sensor is more likely. Please contact your specialist dealer.

Main menu	16
Calibrate	<>

Select the menu **"Calibrate"** from the **main menu** and confirm your choice with *enter*.

7.3.1   Calibrating the pH-sensor

Calibrate	61
pH-Sensor	<>

If you have an *iks aquastar midi pH,* the display will appear as shown on the left. If you have an *iks aquastar midi Redox*, you can jump straight to Section 7.3.2. Confirm your choice with *enter*. Several general settings for the relevant sensor will be requested before the actual calibration process starts. The system requires a few details to compensate for the pH-sensor's dependence on temperature.

Tank temp.?	63
25.0 °C	

If **no temperature sensor** is connected to your system you will be requested to enter the tank temperature manually. Confirm by pressing the *enter key*.

Tank temp.?	63
Input	<>

If a **temperature sensor** is connected to your system then the tank temperature **doesn't have to be entered manually** but can be included automatically.

Tank temp.?	63
Sensor 1	<>

To do this, **don't** select the function "Input" but select the appropriate temperature sensor (sensor 1) with the help of the arrow keys. The selection must be confirmed with the *enter key*.

Buffer temp.?	65
25.0 °C	

Now you have to enter the temperature of the buffer solution. If you can't measure the temperature the easiest thing to do is to let the bottle of calibration solution float in the aquarium water for a few minutes. The temperatures of the aquarium water and those of the calibration solutions will then align themselves enabling you to enter the temperature of the aquarium or let the temperature sensor do it for you. Of course it's also possible to use the temperature sensor to take a very precise measurement

ShortCircPlug 6E *Bitte warten*	of the calibration solution. But don't forget to rinse it well with distilled water before and after doing so in order to prevent any contamination of the calibration solution and the aquarium water! The input is to be confirmed with the *enter key.*

Sensor in 66 Buffer 1 E	Place the sensor in one of the supplied buffer solutions with the values 4,0, 7,0 or 12,45. We recommend that you use the **lower solution first**. Please press the *enter key.*

Buffer 1 67 *Please wait*	You will see "Please wait" flashing on the display. After ca. 2 - 3 minutes the value of the buffer solution you have used should appear on the display.

Buffer 1 67 Buffer: 4.00	In the adjacent example, the sensor was in the pH4 calibration solution. Please note that you can only calibrate with pH solutions of pH4, pH7 or pH12.45!

Sensor in 68 Buffer 2 E	Press the *enter key* again. The message "Sensor in Buffer 2" appears. Now the sensor is to be rinsed (in distilled water for best results), placed in another buffer solution and the *enter key* pressed once more.

Buffer 2 69 *Please wait*	"Please wait" appears and flashes on the display. After ca. 2 - 3 minutes the value of the buffer solution you have used should appear on the display.

Buffer 2 69 Buffer: 7.00	In this example, the sensor was in the calibration solution pH7. If this calibration solution is recognised correctly and the appropriate value displayed correctly then the calibration process for the pH-sensor has been completed. The automatic sensor test is simultaneously completed too.

pH-Sensor 6A Sensor OK !	Now press any key. The display shown here will appear. If it doesn't, please refer to Section 7.3 to find the cause.

Calibrate 61 pH-Sensor <>	Press the *esc-key* to return to the menu "Calibrate". You can now select another sensor to be calibrated with the arrow keys or return to the main menu level with the *esc* key.

7.3.2 Calibrating the Redox-sensor (only *aquastar midi redox*)

Calibrate 61 Redox-Sensor <>	Confirm your choice with *enter*. Several general settings for the relevant sensor will be requested before the actual calibration process starts. The system requires a few details to display rH-value correctly.

Tank pH val.? 6B 07.00 pH	Please input the pH value and confirm by pressing the *enter key*.

Sensor in 6D ShortCircPlug E	Now attach the supplied **short-circuit plug** (see Fig.2 page 8) to the module and confirm with the *enter* key.

ShortCircPlug 6E *Please wait*	"Please wait" starts to flash on the display.

ShortCircPlug 6E Buffer: 0.00	After a brief interval the message "Buffer: 0.00" will appear. Press the *enter-key*.
Sensor in 6F Sol. 230mV E	Please now remove the short-circuit plug and connect the sensor. Place the sensor in the 230mV calibration solution and press the *enter* key.
Sol. 230mV 6G *please wait*	"Please wait" starts to flash on the display.
Sol. 230mV 6G Buffer: 230.00	After ca. 1 - 3 minutes the value of the buffer solution you have used should appear on the display. The automatic sensor test is simultaneously completed too.
Rx-Sensor 6A Sensor OK !	Now press any key. The display shown here will appear. If it doesn't, please refer to Section 7.3 to find the cause.
Calibrate 61 Redox-Sensor <>	Press the *esc-key* to return to the menu "Calibrate". Return to the main menu by pressing the *esc* key again.

7.4 The menu "Measurement settings"

The settings for the display and the memory interval are determined in this menu.

Main menu 14 SetMeasurement<>	Select the menu "SetMeasurement" in the main menu level with the help of the arrow keys. Confirm your selection with the arrow key.

As you can see from the diagram below, the menu "SetMeasurement" comprises the sub-menus "Trend period", "Memory" and "Display". You can jump from menu to menu with the arrow keys.
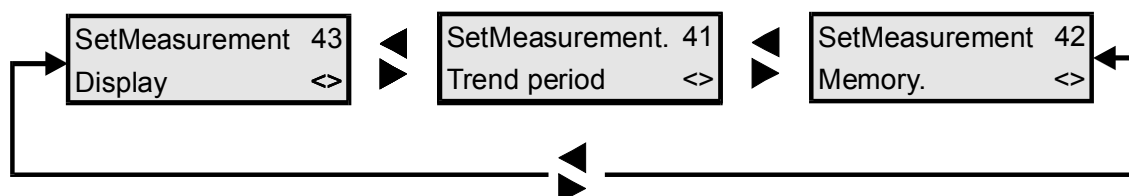
Fig. 6: The menu "Measurement settings"

7.4.1 Display

In this menu you can, for example, state whether you want to have the redox-value or the rH-value displayed. It is a good idea at this point to go through this menu on your *iks aquastar midi*.

SetMeasurement 43 Display <>	Select the menu "Display" with the arrow keys and confirm with *enter*. Now you can make a few settings or adjustments.
Redox value 4A mV <>	If you have a *iks aquastar redox* you can choose between having the redox-value displayed directly in mV or the rH-value.

Redox value 4P	
RH-value <>	

For long-term observations it is better to choose the rH-value as it compensates for fluctuations that a changing pH-value causes. Select the desired display with the arrow keys and confirm it with the *enter key*.

Int. display 4B	
2 Seconds <>	

Afterwards, set the length of time that the information is shown on the internal LC-display. You have a choice between 1, 2, 3 or 4 seconds. 2 seconds, for example, signify that the internal display shows the date and time for 2 seconds, then the values from sensor 1 and sensor 2 for two seconds, then the switch mode of the sockets for 2 seconds etc.. Select with the arrow keys and confirm by pressing the *enter key*.

Ext. display 50	
4 Seconds <>	

Now set the length of time that the display is shown on an external display panel. It is only of relevance if you have connected an external display. Here too you can choose between 1, 2, 3, or 4 seconds. 2 seconds, for example, signify that the information on the external display is held visible for 2 seconds until the next details appear. The selection is confirmed by pressing the *enter key.*

SetMeasurement 43	
Display <>	

You now find yourself back in the menu "SetMeasurement". From here you can now select the menu "Memory" or "Trend period". You can return to the main menu level with the *esc* key.

7.4.2 The menu "Memory"

The *iks aquastar midi* internal memory can store **4000 chains of measurements**. A chain of measurements comprises date, time and the values of the connected modules. These stored values can be transferred later on to a PC where they can be processed more comfortably.

SetMeasurement 42	
Memory <>	

Select the menu "Memory" with the arrow keys and confirm with *enter*. Now you can make a few settings or adjustments.

StoreInterval 45	
00:15:00	

The time interval at which the values are stored is set here. In the example on the left, the values are stored every 15 minutes. The input is confirmed by pressing the *enter key.*

Mem.Capacity 46	
1038	

Here, the memory capacity still available is **displayed** (not changed!). In this case there is still space available for 1038 chains of measurements (maximum 4000). If the figure is getting close to zero then you should consider if it might be better for you to transfer the data to a PC to prevent the oldest chains of measurement from being over-written. Press the *enter key.*

Erase memory 47	
No <>	

Now you are asked if you want to erase the memory. If you select "Yes" then you have space for 4000 chains of measurement again. However, the old measurements are then **irrevocably** erased.

7.4.3 Trend period (future version)

```
SetMeasurement 41
Trend period    <>
```

Please note that this function has not yet been defined. If you send us the registration form included with this instrument, we will inform you about the final content and completion of this function. We will make the appropriate software available to you for downloading free-of-charge on our website. You need the *aquastar* PC connection lead for this.

7.5 The menu "Control"

In this menu you can enter the values (set values) for the various control processes and allocate them to switch sockets. To make operation easier you can only select from sensors that are actually connected (and calibrated) to your system. Section 13.1 explains how this menu functions.

```
Main menu       12
Control         <>
```

First of all, select the menu "Control" from the main menu level with the arrow keys and confirm with *enter*.

```
Control         20
pH-value        <>
```

Now you can select the appropriate parameters (pH-value/ redox value, temperature) with the arrow keys and then confirm with the *enter key*.

```
Te ProcessNo. 22
No.: 02 D(05)  <>
```

You can only allocate a **process number** to the selected module when in the **professional programming level** (can be set in the menu "System). With the help of this process number you can allocate **several different control processes** to one module. For example, with Process 1 you can stipulate that your underfloor heating switches on at 25°C. In Process 2 you can add another source of heating that switches on at e.g. 24.5°C, if the underfloor heating alone is not sufficient. Via a Process No. 3, you could activate a ventilator or cooling unit when, for example, 28°C is reached. In the diagram on the left you can see that the example concerns a process involving a **Te**mperature module "Te". It is this module's second process "No.: 02". The **S**ocket No. 5 "S(05) (i.e. socket panel "L2" which has the socket numbers 05 to 08) has been allocated to this process. You can use the arrow keys to allocate or work on an additional process as you wish. The characteristics of the additional process can be defined by pressing the *enter key*.

Take great care when going through the following description of how to set the alarm points. **The purpose of the alarm function is to recognise a possible error in a chain of measurements or extremely critical measurements**. The system assumes that there is a defect when an alarm point is reached and **deactivates a socket that may have been switched on**. The alarm points should therefore be selected in such a way that they are **not reached during normal operation**.

Please enter your settings/input in the enclosed form because this will enable you to reproduce your previous settings if you should ever carry out a reset.

7.5.1 pH-value control

Main menu	12
Control	<>

First of all, select the menu "Control" from the main menu level with the arrow keys and confirm with *enter*.

Control	20
pH-value	<>

Now select "pH-value" with the arrow keys and confirm with *enter*. Handelt es sich um ein *iks aquastar midi* Redox-System, können Sie direkt zu Punkt 7.5.2 springen.

pH ProcessNo.? 22
No: 01 S(--)   <>

This display **only** appears in the **professional** level. Confirm with *enter*.

Control type?	23
CO2 supply	<>

In the case of pH-value you can use the arrow keys to select between "Off", "CO2 supply" and "Increase pH". Confirm your selection with *enter*.

Control in the	2K
pond	<>

Now you can set the timing control of the pH value to suit the scale of your fish-keeping set-up. Using the arrow keys, you can select either "pond" or "aquarium" . Your choice is confirmed by pressing the *Enter-key*. If "aquarium" is selected, the control process functions as described in section 13.1. If "pond" is selected, the control process is carried out using a time lag, i.e. if the set value is exceeded or not reached, the control process becomes active for a maximum of 30 seconds, after which the relevant switchable socket is switched off for 300 seconds. After that, the pH value is measured again and, if necessary, the control process activated again for another maximum 30 seconds, and so on. The aim of this method of control using a time lag is, for example, that when a dose of carbon dioxide (CO_2) is added to the filter tank within a maximum of 30 seconds, 300 seconds have to pass, giving the water in the filter time to absorb the CO_2, flow into the pond and disperse. The control system is not reactivated until thereafter.

Value (Day)?	24
07.00 (pH)	

You can now enter the set value for "Day". You determine when it is day or night (nite!) in your aquarium in the day/night simulation (Section 7.6.3). Confirm with *enter*.

Value (Nite)?	25
07.50 (pH)	

Now enter the set value for "Nite" and confirm with *enter*.

Upper alarm?	27
08.00 (pH)	

Now enter the upper alarm value. Please note that **when the alarm points are reached not only is an acoustic and/or visual alarm set off but the relevant control is turned off too (see above)!** The values are to be confirmed with the *enter key*.

Lower alarm? 28
06.00 (pH)

Now enter the lower alarm value and confirm with *enter*.

Which socket? 29
Nr:01 (--)   <>

Now you can use the arrow keys to look for a vacant socket that can then be allocated to this function. In the adjacent example you can see that , for example, Socket No.1 is still vacant"(--)". Select a socket (**not one of variable output!**) and confirm with the *enter key*. If you mistakenly select a variable-output socket, you should go through this menu again and allocate a non-variable output socket.

Control   20
pH-value   <>

Now you can programme a further contol process or return to the main menu level with the *esc* key.

When one of the values you have defined has been reached you can now, for example, add CO2, or switch on a lime-reactor etc. via the switch socket. Please remember once again that the action taken depends on **the settings you have installed**.

The switch hysteresis is pH 0.05 (please refer to Section 13.1)

☞If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.5.2   Redox-value control

Main menu   12
Control   <>

First of all, select the menu "Control" from the main menu level with the arrow keys and confirm with *enter*.

Control   20
Redox-value   <>

Now select "Redox-value" with the arrow keys and confirm with *enter*.

Rx ProcessNo?22
Nr: 01 S(--)   <>

This display **only** appears in the **professional** level. Confirm with *enter.*

Controle type? 23
Increase Rx   <>

In the case of redox-value you can use the arrow keys to select between "Off", "Reduce Rx" and "Increase Rx". Confirm your selection with *enter.*

Value?   26
+200 mV

Then enter the set value that is to be reached. Use the +/- key to change the symbol + to – and vice versa.

Upper alarm? 27
+400 mV

Now enter the upper alarm value. Please note that **when the alarm points are reached not only is an acoustic and/or**

visual alarm set off but the relevant control is turned off too (see above)! The values are to be confirmed with the *enter key*.

```
Lower alarm?  28
+100 mV
```

Now enter the lower alarm value and confirm with *enter*.

```
Which socket? 29
No:02 (--)      <>
```

Now you can use the arrow keys to look for a vacant socket that can then be allocated to this function. In the adjacent example you can see that , for example, Socket No.2 is still vacant"(--)". Select a socket (**not one of variable output!**) and confirm with the *enter key*. If you mistakenly select a variable-output socket, you should go through this menu again and allocate a non-variable output socket.

```
Control       20
Redox-value    <>
```

Now you can programme a further contol process or return to the main menu level with the *esc* key.

When one of the values you have defined has been reached you can now, for example, switch an ozone reactor or a nitrate filter on or off via the switch socket. Please remember once again that the action taken depends on **the settings you have installed**.

The switch hysteresis is 10mV (please refer to Section 13.1)

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.5.3 Temperature control

```
Main menu     12
Control         <>
```

First of all, select the menu "Control" from the main menu level with the arrow keys and confirm with *enter*.

```
Control       20
Temperature    <>
```

Now select "Temperature" with the arrow keys and confirm with *enter*.

```
Te ProcessNo?22
No: 01 S(--)    <>
```

This display **only** appears in the **professional** level. Confirm with *enter.*

```
Control type? 23
Heat           <>
```

In the case of redox-value you can use the arrow keys to select between "Off", "Cool" and "Heat". Confirm your selection with *enter.*

The four following displays only appear in the professional programming level! If the programming level "Standard" is set you can jump over this.

Value(Su,Day)?2C
25.00 °C

Now you can enter the set value for "Summer-Day". This means that the system will regulate the daytime temperature in summer to the set value. **The summer period is set from 01.April to 31.October**. You determine when it is day or night (nite!) in your aquarium in the day/night simulation (Section 7.6.3). Confirm with *enter.*

Val(Su,Nite)   2D
24.50 °C

Now enter the set value for "Summer-Nite" in the same way as above and confirm with *enter*.

Val(Win,Day)?   2E
24.50 °C

Now you can enter the set value for "Winter-Day". **The winter period is set from 01.November to 31.March**. Confirm with *enter*.

Val(Win,Nite)   2F
24.00 °C

Now enter the set value for "Winter-Nite" and confirm with *enter*.

If you have set the programming level "Standard", the dialog continues as follows:

Value (Day)?   24
25.0 °C

Now you can enter the set value for "Day". You determine when it is day or night (nite!) in your aquarium in the day/night simulation (Section 7.6.3). Confirm with *enter*

Value (Nite)?   25
24.5 °C)

Now enter the set value for "Nite" and confirm with *enter*.

Upper alarm?   27
30.0 °C

Now enter the upper alarm value. Please note that **when the alarm points are reached not only is an acoustic and/or visual alarm set off but the relevant control is turned off too (see above)!** The values are to be confirmed with the *enter key*.

Lower alarm?   28
20.0 °C

Now enter the lower alarm value and confirm with *enter*.

Which socket? 29
No:05 (--)   <>

Now you can use the arrow keys to look for a vacant socket that can then be allocated to this function. In the adjacent example you can see that , for example, Socket No.2 is still vacant"(--)". Select a socket (**not one of variable output!**) and confirm with the *enter key*. If you mistakenly select a variable-output socket, you should go through this menu again and allocate a non-variable output socket.

Control   20
temperature   <>

Now you can programme a further contol process or return to the main menu level with the *esc* key.

When one of the values you have defined has been reached you can now, for example, switch a heater or a cooling unit on or off via the switch socket. Please remember once again that the action taken depends on **the settings you have installed**.

ⓘ The switch hysteresis is 0.15°C (please refer to Section 13.1)

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

Notes

Notes

7.6 The menu "Time functions"

All of the time functions are defined in this particular menu. These include the timers, the interval functions, the day/night simulation, the lunar-phase simulation, and the current simulations (see Page 8). Please note that this menu only appears when you have connected at least 1 switch socket.

```
Main menu        13
Time functions  <>
```
Select the menu "Time functions" from the main menu with the arrow keys and confirm with *enter*.

```
Time functions   31
CurrentSimul.   <>
```
Using the arrow keys again, you can select a function (see Page 8). Confirm with *enter* and programme accordingly.

All times are to be entered in the **24-hour format**! You can allocate sockets to programmed functions in this menu too. As soon as you allocate a variable-output switch-socket to a function you will be asked for the output of that socket. To do this you can use the helpful "**F2-key**": by pressing the key **F2** the system **switches to the socket with the set output**. This enables you to check your setting immediately (for example current created by controllable pumps such as the iks aquastar turbo) and correct it if necessary. Please observe the restrictions regarding connectable systems (see 4.3.2 **e.g. no HQI- or HQL lighting!**).

```
Time functions    31        Time functions    31        Time functions    31
CurrentSimul.     <>        Day/Nite Simu     <>        Lunar phase.      <>

                            Time functions    31        Time functions    31
                            Interval          <>        Timer             <>
```
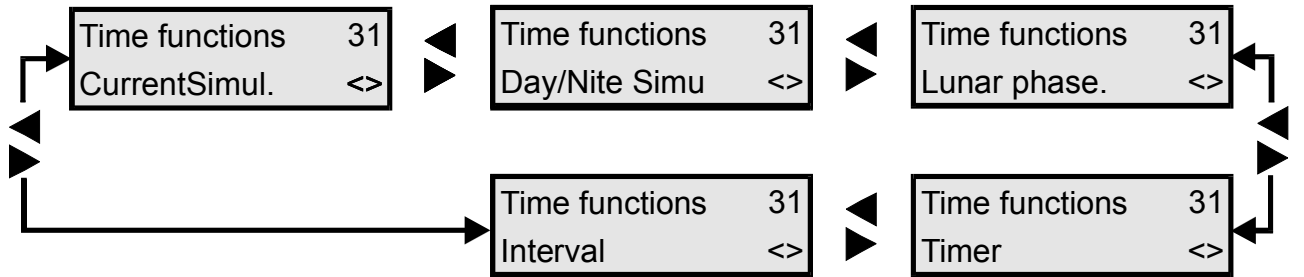
Fig 4: Menu structure "Time functions"

7.6.1 Timer(s)

Up to **32 timers** (in the 24-hour format) can be programmed and allocated to **any** sockets. So, it's possible, for example to allocate three 'on' and 'off' times to Socket 1, two 'on' and 'off' times to Socket 3 etc.!You can decide if a timer is activated every day (from Monday to Sunday) or only on a particular day of the week.

```
Main menu        13
Time functions  <>
```
Select the menu "Time functions" from the main menu level with the arrow keys and confirm with *enter*.

```
Time functions   31
Timer           <>
```
Again with the arrow keys you can select the function "Timer". Confirm with *enter*.

```
Timer          3K
No: 01 S(--)   <>
```

First of all the number of the **timer** is selected (**not the number of the socket**!).

```
Timer          3L
1x / week      <>
```

If a timer hasn't been programmed yet, your display will appear as shown here. Please press the *enter key*.
After that you can use the arrow keys to select whether the timer is active on a weekly or on a daily basis. If you want to delete a timer, select "Off". Confirm with *enter*.

```
Day of week    30
Sunday         <>
```

If you have selected "1x/week" then the appropriate day of the week can be selected with arrow keys. Bestätigen Sie wieder mit der *enter-Taste*.

```
Begin          3M
10:00:00
```

Now enter the start time "Begin" (e.g. 10 am) and confirm with *enter*.

```
End            3N
11:00:00
```

And now the "off" time "End" (e.g. 11 am) and confirm with *enter*.

```
Which socket?  29
No: 05 (--)    <>
```

Now another socket is to be allocated to this function. This is selected with the arrow keys. In the adjacent example it's the socket 05. The display "(--)" shows that no further function has been allocated to this socket. The socket can then be selected by pressing *enter*. If a **non-variable-output socket** is concerned, you can jump the following two paragraphs.

```
CntrlblSocket  2A
080% (on)     del
```

If a **variable-output** socket is involved you can enter the desired socket output for the period the timer is active. Please observe the restrictions regarding the systems that can be connected (see 4.3.2, e.g **no HQI- or HQL-lighting**!). It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '80%' by entering *zero, eight, zero* (not *eight, zero*, as this would mean 800%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del* . Repeat this procedure as often as you want until the setting suits you requirements. Confirm your input with *enter*.

```
CntrlblSocket 2A
050% (off)    del
```

Now you can enter the output of the socket in its switched-off state. The procedure for this is the same as before with "(On)". Make sure you make use of the *del* key's special function. Confirm your input with *enter*.

Using the values in the above example, the socket number 10 would operate at 80% from 10 am to 11 am and for the rest of the time, i.e. from 11:00:01 (1 Second past 11 am) to 09:59:59 (1 Second to 10 am), at 50% power

```
┌─────────────────────────┐
│ Time functions    31    │
│ Timer             <>    │
└─────────────────────────┘
```

Next, you can use the arrow keys to select other time functions or programme another timer with *enter*. Press the *esc key* to return to the main menu.

🛈 **The briefest switch period is 1 second. If you want a socket to be active for 24 hours a day you can do this by entering "00:00:00" in both "Begin" and "End".**

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.6.2   The interval function(s)

You can programme up to **32 interval functions**. Using the interval function you can programme **constantly reccuring** on/off switching processes to a single socket.. In the "**Professional" mode** (Section 7.1.5) the set times can have a **random factor** added to them. Here an **example:** If you have determined that the interval is to be "on" for 2 minutes (i.e programmed socket 'live') and fix 1 minute in "random factor", this means that this interval (and socket) will always be active (socket 'live') for between 2 and 3 minutes (2 minutes fixed interval plus 0 to 1 minute chosen at random by the computer. The same applies for the "off" period (socket without current). Fig. 8 illustrates an interval without a random factor (2 min. "on", 1 min. "off"). Fig. 9 shows an interval that has additionally been programmed with a random factor (1 min.) for "on". Fig. 10 represents a random factor for "on" (1 min.) and "off" (1 min.). The grey-shaded areas are the "random" periods.
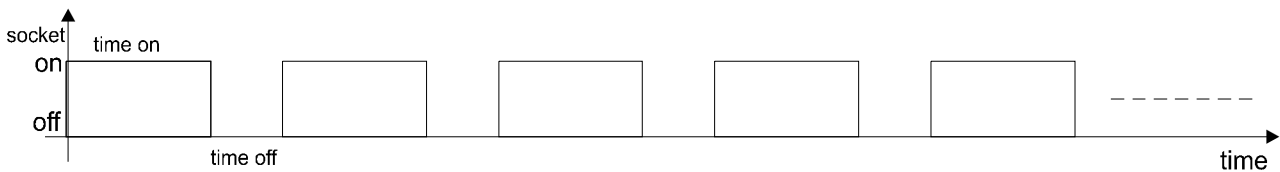
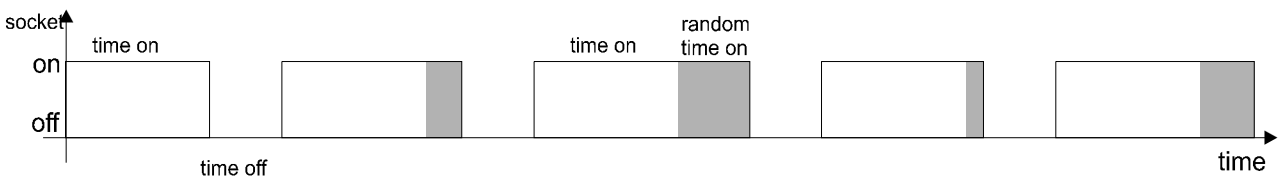**Fig. 5: Interval without a random period**

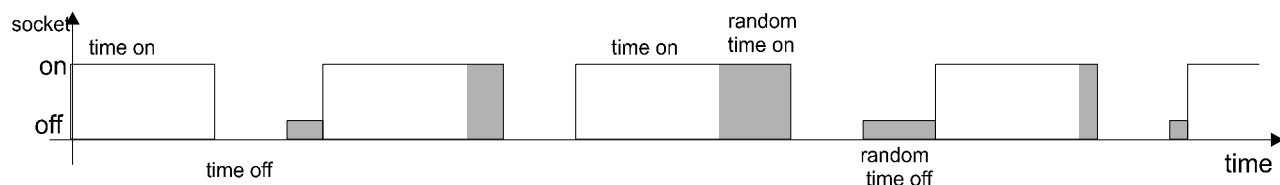**Fig 6: Interval with a random period for "On"**

Fig. 7: Interval with a random period for "On" and "Off".

☞ A possible application for the interval function with a random factor could, for example, be the creation of currents and eddies. You could, for example, allocate an interval with different times to each one of two sockets (pumps). Then, sometimes both pumps would be on (active), sometimes only Pump 1, sometimes only Pump 2, and sometimes both would be off (inactive). A further application could be the control of a dosing pump (e.g. *iks Vario*). You could operate this pump, for example, for 1 second in every hour and thus feed liquid fertiliser or trace elements into the water.

Programming:

Main menu　　　13 Time functions　<>	Select the menu "Time functions" from the main menu and confirm with *enter*.
Time functions　31 Interval　　　　<>	Again with the arrow keys, you can select the funtion "Interval". Confirm with *enter*.
Interval　　　　3P No: 01 S(--)　　<>	First select the number of the **interval function** (**not the socket number!**). If an interval function hasn't 'been programmed yet then your display will appear as on the left here. Please press *enter*.
Interval　　　　3Q On　　　　　　<>	You can now select "**On**" or "**Off**" with the arrow keys. If you want to delete an interval function, select "**Off**". If you want ot programme an interval, select "**On**". Confirm with *enter*.
Begin　　　　　3R 10:00:00　　　<>	Now you can determine the period in which the interval function is to be active. Firstly, enter the time you want this function to start. Confirm with *enter*.
End　　　　　　3S 12:00:00	Now enter the time the interval function is to cease and confirm with *enter*. In the adjacent example, the interval is active from 10 am to 12:00 noon.
How long on?　3U 00:02:00	Now enter how long the interval is to be on for (socket 'live') and confirm with *enter*.
RandomFacOn?3V 00:01:00	This display only appears in the "**Professional**" programming mode. You can add a random factor to the previously entered "On"-time (socket 'live'). Confirm with *enter*.
How long off?　3W 00:02:00	Now enter how long the interval is to be off for (socket without current) and confirm with *enter*.
RandomFacOff?　3X 00:01:00	This display only appears in the "**Professional**" programming mode. You can add a random factor to the previously entered "Off"-time (socket without current). Confirm with *enter*.

```
Which socket?  29
No: 04 (--)      <>
```

Now another socket is to be allocated to this function. This is selected with the arrow keys. In the example on the left it's Socket 04. The display "(--)" shows that no other functions have yet been allocated to this socket. This socket can be selected with *enter.* If it's a **non-variable-output** socket, you can skip the following two paragraphs.

```
CntrlblSocket 2A
080% (On)    del
```

If you're dealing with a **variable-output** socket you can first of all enter the output of the socket for the period the interval function is active. Please observe the restrictions regarding the systems that can be connected (Section 4.3.2 e.g. **no HQI- or HQL lighting**!) It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '80%' by entering *zero, eight, zero* (not *eight, zero,* as this would mean 800%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del* . Repeat this procedure as often as you want until the setting suits you requirements. Confirm your input with *enter*.

```
CntrlblSocket 2A
050% (Off)    del
```

Now you can enter the output of the socket in its switched-off state. The procedure for this is the same as before with "(On)". Make sure you make use of the *del* key's special function. Confirm your input with *enter*.

```
Time functions  31
Interval         <>
```

Next, you can use the arrow keys to select other time functions or programme another timer with *enter*. Press the *esc key* to return to the main menu.

The briefest switch period is 1 second. If you want a socket to be active for 24 hours a day you can do this by entering "00:00:00" in both "Begin" and "End".

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.6.3 Day/Night simulation (Lighting control)

You can use this function to simulate sunrise and sunset. To make use of the **nocturnal fall facility (e.g. for CO_2 supply, temperature control, current) sunrise and sunset must be defined herer! The lunar-phase simulation uses this data too.**

```
Main menu     13
Time functions <>
```

Select the menu "Time functions" from the main menu and confirm with *enter*.

```
Time functions  31
Day/Nite Simu <>
```

Using the arrow keys again, you can now select the Day/Nite Simu(lation) funktion. Confirm with *enter*.

```
Li ProcessNo? 3C
No: 01 S(--)    <>
```

This display **only** appears in the **professional** programming level! In this setting you can programme several "lighting processes" to operate different light sources at different times. In the example on the left , it's the first lighting process, No: 01 (**not the number of the socket!**). If you have already programmed a light process then you can use the arrow keys to select between No: 01 und No: 02. Depending on your choice you can either modify the existing process or set a new one. Confirm with *enter*.

```
Day/Nite ?      3D
On              <>
```

Subsequently, you can use the arrow keys to select between "**On**", "**Off**" and "**Simulation**". If you want to erase a process then select "**Off**". The difference between "**On**" and "**Simulation**" is that with "**On**" you can enter the times of sunrise and sunset whereas they are calculated with "Simulation" (see □on the next page). Confirm with *enter*.

```
Sunrise         3E
08:00:00
```

If you have selected "**On**" you can now enter the point in time that the sun is to rise. Again, confirm this with *enter*.

```
Sunset          3F
20:00:00
```

Now enter the time at which the sun should set.

Confirm with der *enter-Taste*.

If you do not need the day/night simulation for light control but for the "**Nocturnal fall**" of various parameters, you can now end the programming process by pressing the *ESC* key.

```
Which socket?  29
No: 03 (--)     <>
```

Now another socket is to be allocated to this function. This is selected with the arrow keys. In the adjacent example it's the socket 03. The display "(--)" shows that no further function has been allocated to this socket. The socket can then be selected by pressing *enter*. If a **non-variable-output socket** is concerned, you can jump the following two paragraphs.

```
CntrlblSocket  2A
080% (On)      del
```

If you're dealing with a **variable-output** socket you can first of all enter the output of the socket for the period the interval function is active. Please observe the restrictions regarding the systems that can be connected (Section 4.3.2 e.g. **no HQI- or HQL lighting**!) It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '80%' by entering *zero, eight, zero* (not *eight, zero*, as this would mean 800%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del*. Repeat this procedure as often as you want until the setting suits you requirements. Confirm your input with *enter*.

```
CntrlblSocket  2A
050% (Off)     del
```

Now you can enter the output of the socket in its nighttime (switched-off) state. The procedure for this is the same as before with "(On)". Make sure you make use of the *del* key's special function. You would normally enter '0%' here. Confirm

```
Time functions  31
Day/Nite Simu <>
```

your input with *enter*

Next, you can use the arrow keys to select other time functions or programme another Day/Night simulation with *enter*. Press the *esc key* to return to the main menu.

⚡ **Do not connect any HQl or HQL-lamps to a variable-output socket under any circumstances whatsoever.**

ℹ️ The duration of the sunrise, and the sunset too, has been automatically set at 30 minutes in the "**On**" position. If you have selected Day/Nite? 3D "**Simulation**" , you can almost perfectly recreate and simulate the times of sunrise and sunset of any region of the world by entering a latitude and longitude. A "+" in front of the coordinates indicates western longitude or .northern latitude. A "-", accordingly, indicates eastern longitude or southern latitude. The prefix symbol can be changed by pressing the +/- key.

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.6.4 The lunar-phase simulation

You can choose between two different forms of the lunar-phase simulation ("**On**" ,"**Simulation**). You will find out how to do this lower down under "Programming". The difference between the two are explained there. In order for the lunar-phase to operate correctly in "**On**", you must programme a day/night simulation beforehand (Section 7.5.9). If you selected "**On**" at that stage, the lunar phase takes place as follows: The function calculates an "artificial midnight" from the times entered for sunrise/sunset. On the basis of this, the times are calculated for moonrise and moonset as well as the moon's brightness. This is the most used option in practice. The option "**Simulation**" simulates the moon at a postion on Earth defined by you.

Programming:

```
Main menu      13
Time functions <>
```

Select the menu "Time functions" from the main menu and confirm with *enter*.

```
Time functions  31
Lunar phase    <>
```

Using the arrow keys again, you can now select the lunar phase. Confirm with *enter*.

```
Mo ProcessNo?3H
No: 01 S(--)    <>
```

This display **only** appears in the **professional** programming level! In this setting you can programme several "moon processes" to operate different light sources at different times. In the example on the left , it's the first moon process, No: 01 (**not the number of the socket!**). If you have already programmed a moon process then you can use the arrow keys to select between No: 01 and No: 02. Depending on your choice you can either modify the existing process or set a new one. Confirm with *enter*.

```
Lunar phase      3I
On               <>
```

When you have done this you can use the arrow keys to select "**Off**", "**On**" or "**Simulation**". If you want to cancel a process, select "**Off**". You would normally select "**On**" here. Confirm with *enter* (if you have chosen "**On**", you can skip the next three steps).

```
Latitude?        3Y
+49,03
```

If you have selected "**Simulation**", you can now enter the latitude. Use the *F1 key* to change the prefix. Confirm with *enter*.

```
Longitude?       3Z
-8,24
```

Now enter the longitude. You can change the prefix with the *F1* key here too. Confirm with the *enter key*.

```
Time Zone?       40
+01
```

Now you can specify the time zones as well(e.g.. Beispiel +01 for Germany). You can change the prefix as required with the *+/-* key and then confirm with *enter*.

```
Which socket?  29
No: 07 (--)     <>
```

Now another socket is to be allocated to this function. This is selected with the arrow keys. In the adjacent example it's the socket 07. The display "(--)" shows that no further function has been allocated to this socket. The socket can then be selected by pressing *enter*. If a **non-variable-output socket** is concerned, you can jump the following two paragraphs.

```
CntrlblSocket   2A
080% (On)       del
```

If you're dealing with a **variable-output** socket you can first of all enter the output of the socket for the period the interval function is active. Please observe the restrictions regarding the systems that can be connected (Section 4.3.2 e.g. **no HQI- or HQL lighting**!) It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '80%' by entering *zero, eight, zero* (not *eight, zero*, as this would mean 800%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del* . Repeat this procedure as often as you want until the setting suits you requirements. Confirm your input with *enter*.

```
CntrlblSocket 2A
020% (Off)      del
```

Now you can enter the socket output for "new moon" (the lowest brightness of the moon). The procedure for this is the same as before with "(On)". Make sure you use the *del* key's special function then confirm with *enter*.

```
Time functions  31
Lunar phase     <>
```

Now use the arrow keys to select another time function or use *enter* to programme a further day/night simulation. Press the *Esc-key* to return to the main menu level.

⚡ **Do not connect any HQI or HQL-lamps to a variable-output socket under any circumstances whatsoever.**

ℹ️ If you haven't got a variable-output socket panel, you can also allocate the lunar-phase simulation to a normal (non-variable-output) socket. The moon will then rise or set at the correct times, but of course the brightness will then always remain constant (at 100%= full brightness)!

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.6.5 The current simulation

For **a lot of functions** incorporated into the current simulation, **at least one variable-output socket panel** and **at least one thyristor-controlled, variable-output current pump with an asynchrous motor** is required. The *iks aquastar turbo* current pumps are ideal for such applications and operate even with the shortest impulse intervals (e.g. to create waves) highly reliably for many years. **Synchronous pumps can not be regulated.** These pumps can only be turned on or off. Theoretically, you can control up to 16 pumps with the *iks aquastar*. It is then possible to create optimum current conditions even in very large tanks.

Programming:

Main menu 13 Time functions <>

Select the menu "Time functions" from the main menu and confirm with *enter*.

Time functions 31 Current simul. <>

Using the arrow keys again, you can now select the current simul(ation). Confirm with *enter*.

Cu ProcessNo? 32 No: 01 S(--) <>

This display **only** appears in the **professional** programming level! In this setting you can programme several "current processes" to operate different pumps. In the example on the left , it's the first current process, No: 01 (**not the number of the socket!**). If you have already programmed a current-flow process then you can use the arrow keys to select between No: 01 and No: 02. Depending on your choice you can either modify the existing process or set a new one. Confirm with *enter*.

Current simul. 33 Current <>

You can now use the arrow keys to select between ''Off'', "Current" and ''Hi/Lo tide''. If you want to cancel a process then select ''Off''. If you want to control/activate two pumps alternately, you can do so with the high/low tide simulation. Confirm with *enter*.

7.6.5.1 Current

If you have selected ''Current'', the following dialogue will appear:

```
Waves          34
yes            <>
```

Now you can specify whether you want to create waves (''Yes'') or not (''No''). If you have selected ''No'', you can skip the next step (wave duration). Confirm with *enter*.

```
Wave duration  35
00:00:05
```

Now you can enter the wave duration. In the adjacent example this is 5 seconds. Confirm with *enter*.

```
NocturnalFall  36
Ja             <>
```

This and the next display **only** appear in the **professional** programming level! Now you can specify whether you want to produce a nocturnal fall in values (''Yes'') or not (''No''). If you have selected ''No'', you can skip the next step (Fall of). Confirm with *enter*. If you have selected ''Yes'', you can now specify by what percentage you want to lower the values.

```
Fall of        37
010 %          <>
```

Now enter the desired value. Please observe that, for example, you enter 010 for 10%. Confirm with *enter*.

```
Which socket?  29
No: 07 (--)    <>
```

Now another socket is to be allocated to this function. This is selected with the arrow keys. In the adjacent example it's the socket 07. The display ''(--)'' shows that no further function has been allocated to this socket. The socket can then be selected by pressing *enter.*

```
CntrlblSocket  2A
080% (On)     del
```

If you're dealing with a **variable-output** socket you can first of all enter the output of the socket for the period the interval function is active. Please observe the restrictions regarding the systems that can be connected (Section 4.3.2 e.g. **no HQI- or HQL lighting**!) It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '80%' by entering *zero, eight, zero* (not *eight, zero*, as this would mean 800%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del* . Repeat this procedure as often as you want until the setting suits you requirements. You would normally enter 100% here. Confirm your input with *enter*.

```
CntrlblSocket  2A
050% (Off)    del
```

Now you can enter the socket output for "off" state. The procedure for this is the same as before with ''(On)''. Make sure you use the *del* key's special function then confirm with *enter*.

```
Time functions 31
Current simul. <>
```

Now use the arrow keys to select another time function or use *enter* to programme a further day/night simulation. Press the *Esc-key* to return to the main menu level.

Example:

On the basis of the values programmed above, the pump on Socket 07 would operate alternately at 80% for 2 seconds and at 50% for 2 seconds (pulsating). The transition between the two levels does of course not occur abruptly but gently. At night, this process

would then alternate between 70% and 50%. The nocturnal fall is then only applicable to the "On" value. If no waves had been set, the pumps would then operate constantly at 80% during the day and at 70% at night.

7.6.5.2 High/Low tide simulation

This function enables you to operate **current pumps reciprocally**. This means alternately one pump is active while another remains turned "off" (but not necessarily at 0% or 100%!). **Wave simulation** (pulsation) and **random factor functions** are possible here too (similar to 7.6.2). Here, **for example**, it is possible to produce the current conditions found in a **reef channel** (in which the current usually comes from one direction for 6 hours and then for 6 hours from the other). It is just as easy to simulate the current conditions in a **small section of reef**. In this case there is usually **no** constant and continuous current from one particular direction. The current conditions change all the time, are stronger for a few seconds and then weaker. In such locations the current can even come to a complete standstill.

If you have selcted "Hi/Lo tide" the following dialogue appears:

```
Tide duration   38
00:02:00        <>
```

You can now specify how long the high tide or low tide phases are to last. Enter the desired periods and confirm with *enter*.

```
RandomFactor   39
00:01:00
```

This display only appears in the **professional** programming mode. You can extend the previously specified time by a radom factor (see also Section 7.6.2). Confirm your selection with *enter*.

```
Waves          34
yes            <>
```

Now you can state whether you want to create waves ("Yes") n or not ("No"). If you have selected "No", you can skip the next stage (wave duration). Confirm with *enter*.

```
Wave duration  35
00:00:02
```

Sie können jetzt die Wellendauer eingeben. Im Beispiel links sind dies 2 Sekunden. Bestätigen Sie Ihre Eingabe mit *enter*.

```
NocturnalFall  36
yes            <>
```

This and the next display **only** appear in the **professional** programming level! Now you can specify whether you want to produce a nocturnal fall in values ("Yes") or not ("No"). If you have selected "No", you can skip the next step (Fall of). Confirm with *enter*. If you have selected "Yes", you can now specify by what percentage you want to lower the values.

```
Fall of        37
010 %          <>
```

Now enter the desired value. Please observe that, for example, you enter 010 for 10%. Confirm with *enter*.

```
SocketLoTide  3A
no.: 03 (--)    <>
```

Now "low tide" is allocated to a variable-output socket. Select this by using the arrow keys. In the adjacent example, it's Socket No. 03. The display "(--)" shows that no further function has been allocated to this socket. The socket can then be selected by pressing *enter.*

```
CntrlblSocket  2A
080% (On)      del
```

If you're dealing with a **variable-output** socket you can first of all enter the output of the socket for the period the interval function is active. Please observe the restrictions regarding the systems that can be connected (Section 4.3.2 e.g. **no HQI- or** können Sie nun mit den Pfeiltasten eine andere Zeitfunktion auswählen oder mit *enter* eine weitere Strömungssimulation programmieren. Mit der *esc-Taste* kommen Sie zurück zur Haupmenüebene **HQL lighting**!) It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '80%' by entering *zero, eight, zero* (not *eight, zero*, as this would mean 800%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del* . Repeat this procedure as often as you want until the setting suits you requirements. You would normally enter 100% here. Confirm your input with *enter*.

```
CntrlblSocket  2A
050% (Off)     del
```

Now you can enter the socket output for "off" state. The procedure for this is the same as before with "(On)". Make sure you use the *del* key's special function then confirm with *enter*.

```
SocketHiTide  3B
no.: 04 (--)    <>
```

Now allocate "high tide" to a variable-output socket. Select with the arrow keys. In the adjacent example, it's Socket No. 04. The symbol "(--)" indicates that no other function has yet been allocated to this particular socket. Confirm the socket selection by pressing *enter*. The dialogue that now appears is identical with the one before for "low tide". After you have entered the appropriate data for the sockets,

```
Time functions  31
Current simul.  <>
```

you can now use the arrow keys to select another time function use *enter* to programme another current simulation. Press the *Esc-key* to return to the main menu level.

The values as entered above will produce the **following effect**. Pump 1 will be activated for between 2 and 3 minutes and during this period produce pulsating waves every 2 seconds at 80% or 50% output. At the end of this period, Pump 1 will be turned "off" and Pump 2 will become active in the same way as Pump 1 did. This process will repeat itself continuously. Thus, **only one pump is ever active at a time**.

If you had selected "No" for waves, the two pumps would have been activated alternately at the output entered in "CntrlblSocket (Off)". The output entered in "CntrlblSocket (On)" and a nocturnal fall that you may have programmed are of no relevance in this case!

In the above example one pump is always active and one turned "off" (or the output restricted), However, it is often a good idea not to activate the pumps in alternation but randomly. So, for example, at one point both pumps are active, then at random, either Pump 1 or Pump 2 or both deactivated somewhere along the line. This behaviour is theoretically possible for up to 16 pumps.

This can be done in the programming level "**Professional"**. A **process must be programmed for each pump** for this to be achieved. Everything else corresponds with the above examples with one exception: **not 2 sockets** (one for low tide and one for high tide) but **only one** (for low tide) is allocated. In other words, nothing is entered under "Socket Hi tide". Exactly the opposite applies for the next pump, and the next one and the next one etc...

[i] **The shortest wave duration is 1 second.**

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point with the *enter* key.

7.6.6 The feeding break (version 2.00 and higher)

The purpose of the feeding break is, for example, to reduce the power of the current and circulation pumps or turn them off completely whilst the aquarium's inhabitants are being fed. You have the option of setting an automatic, a semi-automatic and/or a manual feeding break. The automatic feeding break is only worthwhile if, for example, you are using an automatic feed dispenser to operate at a specified time. If you tend to feed your fish etc. at rather more irregular intervals then the semi-automatic feeding break setting is more appropriate. This can be activated manually whenever you like by pressing the key "Λ"(with aquastar midi in the "control" mode) and automatically deactivated after expiry of a period preset by you. The manual feeding break function is very useful when carrying out maintenance work. This can be activated manually at any time by pressing the "Λ" key and then deactivated by pressing "Λ" again. Please note that key during the **automatic** or **semi-automatic** feeding break you can **deactivate** this feeding break again by pressing the "Λ".

Please note, too, that devices connected to a switchable socket panel can only be switched **off** by using the feeding break function (ON) during their normal operation (e.g. interval function or current-flow simulation). Devices connected to a dimmable socket panel can be set to any level of operation (0 to 100 %).

In contrast to other timing functions, the number of feeding breaks that can be set is limited to only one. However, up to **16** sockets can be operated simultaneously (switching at the same moment, for the same period of time) using this one feeding break function.

Programming:

Main menu 13
Time functions <>

Select the menu "Time functions" from the main menu level with the arrow keys and confirm with *Enter*.

Time functions 31
Feeding break <>

Again with the arrow keys you can select the function "Feeding break". Confirm with *Enter*.

```
┌─────────────────────────┐
│ Feeding break    3i     │
│ No: 01 S(--)      <>    │
└─────────────────────────┘
```

The first step is to select a number (**not the number of the socket!**) which will be allocated to a socket later on. This number does not refer to the number of the feeding breaks because you can only programme one. If the feeding break function has not yet been programmed to operate at a particular time the display panel will show the reading shown opposite. To apply the feeding break function to a further socket, repeat the programming procedure and use the arrow keys to select another number that has not yet been allocated to any other socket. Then confirm by pressing the *Enter* key.

```
┌─────────────────────────┐
│ Feeding break    3j     │
│ Inactive          <>    │
└─────────────────────────┘
```

You can now select ''**Active**'' or ''**Inactive**'' with the arrow keys. If you want to deactivate either the manual or the automatic feeding break function, simply select "**Inactive**". If you want to programme the feeding break, select ''**Active**''. Confirm with *Enter*.

```
┌─────────────────────────┐
│ Begin            3k     │
│ 10:00:00          <>    │
└─────────────────────────┘
```

Now you can determine the period in which the feeding break function is to be active. Firstly, enter the time you want this function to start. Please note that the automatic feeding break is inactive at the setting "00:00:00". Confirm by pressing *Enter*.

```
┌─────────────────────────┐
│ How long active 3l      │
│ 00:02:00                │
└─────────────────────────┘
```

Now specify how long you want the automatic feeding break to be operative (switchable socket without current) and confirm by pressing *Enter*. In the example shown opposite, the automatic feeding break is on for 2 minutes starting at 10 a.m.. If all you want to do is switch the manual feeding break on or off manually using the "Ａ" key whilst in the "control" mode, simply enter "00:00:00" when "How long active?" appears. Please note that the semi-automatic feeding break is inactive at the setting "00:00:00" (The feeding break must be switched off manually).

```
┌─────────────────────────┐
│ Which socket?   29      │
│ No: 01 (Ti)       <>    │
└─────────────────────────┘
```

Now a socket is to be allocated to the feeding break function. This is selected with the arrow keys. In the example on the left it's socket 1. The display "(Ti)" shows that a timer function have been allocated to this socket. This socket can be selected with *Enter.* If it's a **non-variable-output** socket, you can skip the following paragraph.

```
┌─────────────────────────┐
│ CntrblSocket    2A      │
│ 040% (FB)        del    │
└─────────────────────────┘
```

If you happen to applying this procedure to a **dimmable** socket, you can start off by entering the socket's power output (0–100%) for the period the feeding break function is active (FB). Please observe the restrictions regarding the systems that can be connected (Section 4.3.2 e.g. **no HQI- or HQL lighting**!) It's best to connect the appliances now (e.g. pump, lamp) to the appropriate socket. Enter, for example, '40%' by pressing the keys *zero, four, zero* (not four*, zero*, as this would mean 400%!). Now press the *del* key. The socket or the appliance will now be supplied with the appropriate current. If the results are not quite what you wanted then you can enter another value and test it with *del* . Repeat this procedure as often as you want until the setting suits your requirements. Confirm your input with *Enter*.

```
Time functions  31
Feeding break  <>
```

Now, by means of the arrow keys, you can select another timing function or press *Enter* and programme the feeding break function to another socket. Press the *esc key* to return to the main menu.

🛈 If you want to allocate the feeding function to a further socket, the times for "Begin" and "How long active?" are copied and applied automatically. Please note that these times are identical for all sockets.

☞ If you haven't made a note of your settings, please repeat the above process, making the appropriate notes. This can be done relatively quickly as you can jump from point to point using the *Enter* key.

8 Help Index

8.1 Main menu

From here you branch out to **all** the *iks aquastar's* possible settings.

11 Check (Sensors or socket panels)

Stars the *iks aquastar midi*'s **operation mode**. The instrument takes over measurement and control. This is the actual work mode that should only be left for carrying out checks and/or programming. You exit "Check" with ESC.

12 Control (Sensor and socket panel)

This is where settings are made that are used to **control the water values**.

13 Time functions (Socket panel)

Functions that control **time-governed** sockets (timers, day/night simulation, lunar phase, interval, current simulations, high-/low tide simulation).

14 Measurement settings (Sensor)

General settings connected with **the display and storage of measurements.** Press *enter* here when you want to change the storage interval, the display type (e.g. Redox/rH) or the display of the trend value.

15 System

General system settings such as time and date, acoustic and external alarm as well as determining the programming level.

16 Calibration (Sensors)

Calibration of the various sensors.

8.2 Control

20 Sensor type (e.g. pH)

Depending on the connected sensors this is the area where a **control process type** can be selected **for programming** with the <>-keys (arrow keys). The desired dialogue is started by pressing *enter*.

21 Sensor No.?

If **several sensors of the same kind** are connected then you can enter here the sensor for which you would like to enter the control values. The number corresponds with sensor-port number of the appropriate sensor.

22 e.g. Te ProcessNo.?

Only appears in the **professional version**. You can allocate up to 8 processes to every sensor connection. This, for example, enables you to activate the heating system connected to Socket 1 if the temperature drops below 25°C. If the temperature falls further, e.g. below 23°C, you can use the **same sensor** to activate a second heating source, e.g. in Socket 2. The display shows the number of the process and, in brackets, the socket for that particular process.

23 Control type

Depending on the **sensor type**, three corresponding control types appear here. The control type **Off** is always available. This is used to deactivate a control process. You can select the desired control type with the <> keys (arrow keys).

24 Value(Day)?

Appears for **pH and temperature**. Here you state the value at which the control process is to become active. This value applies for the **Day**. The control behaviour is then defined by the entered control type and control value.

*Example 1: If, under pH-control, you enter CO2-supply as control type and pH 6.5 as control value, the control process is **activated** as soon as the pH-value **exceeds** pH 6.5. It remains active until the value falls again below pH 6.45 (Note: The switch hysteresis of pH 0.05 is designed to prevent the solenoid valve clicking).*

Example 2: In the 'temperature control' mode enter 'heat' as the control type and 24°C as the value. If the temperature in the tank falls below 24°C, the hating system is activated. When the temperature rises again to over 24°C the heating switches off again.

25 Value(Night)?

Appears for **pH and temperature**. As in Point 23. Here, however, you enter the value that is to apply as control value during the **night**.

26 Value?

Enter the **control value** here. It applies to day and night!

27 Upper alarm?

If the value that you have entered here is **exceeded**, an alarm is activated and the **control process stopped**.

28 Lower alarm?

As in 25 except that the alarm is activated when the value **falls below** the entered value.

A hint regarding the alarm settings: *The function of the alarms is to warn the user about a possible malfunction. Please leave sufficient leeway between the programmed control processes and the alarm points as a living system, such as an aquarium, is governed by a wide variety of factors and is always subject to natural fluctuations!*

29 Which socket?

Here you can state the **number of the socket** to which your controllable appliance (e.g. heater) is connected. On the socket panel L1 are the sockets 1-4, on L2 → 5 –8. The switch socket from thePower Station (L0) has the number ''0''.

2A CntrlblSocket?

If the socket selected in [29] is one with variable-output (dimmable) then this menu will follow. Here the output can be entered as a percentage, first for the switched on phase and then for the switched off phase. You can check straightaway that the set values are the ones you really want by pressing the **del** key.

Example: You want to run a <u>controllable pump</u> *that operates at full power (100%) when switched on and still produces a slight "base current" when switched off. To do this you set the desired percentage when entering the "Off" value. You can use [del] to check immediately if the current is as you want it.*

2C Value(Su, Day)? *(only in the "Professional" level)*

Daytime temperature in summer.

2D Value(Su, Nite)? *(only in the " Professional " level)*

Night-time temperature in summer

2E Value(Wi, Day)? *(only in the " Professional " level)*

Daytime temperature in winter.

2F Value(Wi, Nite)? *(only in the " Professional " level)*

Nite-time temperature in winter.

2G Alarm time?

For the water level control, as an alarm you can enter a time after which your control is automatically switched off **for safety**.

2K Control in the

If "aquarium" is selected, the control process functions as described in section 13.1. . If "pond" is selected, the control process is carried out using a time lag.

8.3   Time functions

31 Time control type

Here you can select which type of time control process you want to programme. You can select between: **current simulation (current and high-/ low tide), day/night simulation, lunar phase, timer and interval**

32 CuProcessNo.? *(only in the "Pro" level)*

You can allocate a current function to each one of up to 16 independent pumps. Here you select the appropriate process with the number you enter. The number in brackets states which socket the selected process is connected to. "(--)" means that the process has not yet had a process allocated to it.

33 Current simulation

Select whether you want to deactivate the current simulation "(Off)" or whether you want to produce a simulation of current or high-/ low tide. The **current simulation** activates **one pump**, the **high-/ low tide simulation** activates **two pumps** alternately.

34 Waves

If you enter "Yes" your **controllable pump** will pulsate (simulate a wave).

35 Wave duration

Here you can enter how long the pulse duration should be for a wave.

36 Nocturnal fall

By entering "Yes" the current can be **reduced at nite**.

37 Fall of

At night the output of the relevant socket (On- and Off value) is **reduced by this amount.** For example: a night-time value of 60% is produced with "Fall of 20%" from a daytime value of 80%. A daytime 10% becomes 0% at night. You can enter the duration of the night under →Time functions →Day/ night simulation.

38 Tide duration

In the high-/ low tide simulation **two pumps** work in constant alternation. This is where you programme how long each pump is on.

Example: 06:00:00 Pump 1 runs for 6 hours then Pump 2 for 6 hours, Pump 1 is off. Afterwards, Pump 1 restarts.

39 Random factor

Here you enter a **range of random operation.** The system then prolongs the interval by a random period that is somewhere between 0 seconds and the random factor that you have entered.

3A SocketLoTide?

As in 29. Here you state the **socket** that is to be active during **low tide**.

3B SocketHiTide?

As in 29. Here you state the **socket** that is to be active during **high tide**.

3C Li ProcessNo.? *(only in the "Pro" mode)*

You can programme eight different processes for **light simulation** too. This is where you enter the desired process number. The number in the brackets states with which socket the selected process is connected to. "(--)" means that the process has not yet had a socket allocated to it.

3D Day/night

You can switch of the control process by selecting "Off". "On" enables you to set the **times of sunrise and sunset**. The point "Simulation" allows you to produce an astronomic simulation. The sun rises and sets in your tank as it does in the real world.

3E Sunrise?

This is where you enter when the **sun is to rise**.

3F Sunset?

The **time** the sun sets.

3G Latitude?

For the purposes of simulating sunrise and sunset you can determine **whereabouts on Earth** your tank is located. The prefixes "+" or "-" can be changed with the *DEL* key ("+" = western longitude or northern latitude). Please **observe**: This dialogue is to be found in several places in the input menu but you can only allocate **one simulation at a time** to your system.

3H Lu ProcessNo.?

Four different lunar phases can be simulated. Here you enter the desired number. The number in the brackets states which socket the selected process is linked to. (--) means that the process has not yet had a socket allocated to it.

3I Lunar phase?

By selecting "Off" you can switch off the lunar phase. By selecting "On" the moonrise and- moonset times are calculated from your entered sunrise and sunset data. "Simulation" allows you to produce an astronomic simulation. The moon rises and sets in your tank as it does in the real world. The intensity of light changes too.

3K Timer No.

You can programme **32 time periods**. Each period of time is allocated a number that you can select here. Please observe that **not all numbers are displayed** but only the maximum **number required.** The number in brackets states which socket has been allocated to this process. Here it's possible to **allocate several processes to one socket**.

3L Timer

Here you can define a **period of time**. In the menu point "Daily" you specify that a process is concerned that is repeated every day. "Weekly" enables you to switch a socket on once a week for a certain amount of time.

3M Begin

Specifies at which time the **timer** is to be **switched on**.

3N End

Specifies at which time the **timer** is to be **switched off**.

3O Weekday

This is where you can **select the day** on which your timer is **active** for a timer that has been programmed with "weekly".

3P Interval

You can programme **32 interval functions**. Each interval is allocated a number that you can select here. Please observe that **not all numbers are displayed** but only the maximum number required. The number in brackets shows which socket has been allocated to this process. It is possible to **allocate several processes to one socket**.

3Q Interval

You can **switch the interval on and off** here.

3R Begin

Specifies when your **interval** is to be **active**. For example, you can specify that your socket is switched on and off every 5 minutes in the morning between 10:00 and 12:00. To programme this you have to enter 10:00:00 here.

3S End

Specifies the **end of the interval**. This is where you have to enter 12:00:00 for the example in 3Q.

3T How long on?

For an interval function your socket remains switched on for a certain period of time 'A', then it is switched off for a period 'B' and then switched on again for the period 'A' etc. This is where you enter the **time** period 'A'.

3U RandomFactor.On

Time 'A' (socket on) can be prolonged by a **random period**. This period constantly changes within a range between 0 and the time you enter here.

3V How long off?

This is where you enter the length of time 'B'(socket off).

3W RandomFactor.Off

Here you can produce a random **variation of time period 'B'**(socket off) (also refer to 3U).

3Y Latitude

Enter the desired latitude here.

3Z Longitude

Enter the desired longitude here.

40 Time zone

Enter the time zone here.

8.4   Measurement settings

41 Trend period *(only in the "Professional" level)*

The *iks aquastar midi* determines the **development of your water values** over a certain period of time. You specify that period here.

42 Memory store

Input of the settings for storing measurement data in the memory (e.g. **Storage interval**).

43 Display

With an *iks aquastar midi Redox* you can decide here whether the redox potential is to be shown in mV or whether the rH value should be displayed. This is also where you can set the duration of the display for both the internal LCD and the external display.

45 Mem.Intval

The *iks aquastar midi* stores at regular intervals the **measurements received** from the connected **sensors**. You specify these intervals here.

46 Mem. capacity

This point shows you for how many chains of measurements you still have space available in the memory. A chain of measurements comprises all measurement values transmitted by sensors (maximum 2).

47 Erase mem.

By selecting "Yes" you can erase the measurement-chain memory. Please note that all previously stored **measurement chains are then lost irrevocably** (transfer these to a PC beforehand where necessary).

4A Redox value

The Redox value can be displayedin **millivolts** or as **rH-value.**

4B Internal display

Specifies the length of time a value appears on the internal display.

50 External display

Specifies the length of time a value appears on the external display if one is connected.

8.5   System
51 Time

This is where you enter the **system time** (24-hour format!).

52 Date

Input of the current date.

53 Acoustic alarm

Here the internal acoustic alarm is switched on and off.

54 External alarm

If a **socket is to be activated** in case of an alarm, this is where this can be specified.

60 Programming level

By selecting "Professional" **additonal functions** become available

8.6   Calibration
61 Calibration

Select the **sensor** that you want to calibrate.

63 Tank temperature?

Here you specify at which temperature compensation is to be carried out. You can either select a **temperature sensor** or specify a **temperature** via the **menu point 'input'**.

65 Buffer temperature?

You require the temperature of the buffer solution in order to carry out **temperature compensation.** A good result is achieved if you first place the bottle of buffer solution in the tank water for a while. The buffer temperature will the correspond with that of the tank.

66 Sensor in Buffer 1

Place the sensor in the appropriate **first buffer solution** and press the *enter* key.

67 Buffer 1

The system shows you on the display which buffer it has recognised. **If this does not correspond with the buffer you have used then you have to repeat the process** or there is the possibility of a sensor malfunction.

68 Sensor in Buffer 2

Place the sensor in an appropriate **second buffer solution** (**Important**: The value of the buffer solution must not be the same as in 'Sensor in Buffer 1) and press the *enter* key.

69 Buffer 2

The system shows you on the display which buffer it has recognised. **If this does not correspond with the buffer you have used then you have to repeat the process** or there is the possibility of a sensor malfunction

6A pH Sensor

An **evaluation** of the calibration process takes place here. If an error arises here then please repeat the calibration process for this sensor.

6B Tank pH-value?

For the rH-value to be displayed the **pH-value in the tank** is required. Here you can either specify the pH-value by selecting a pH sensor or by entering a value in the menu point "input". Confirm your selection with the *enter* key.

6D Sensor in short-circuit plug

Connect the supplied short-circuit plug (it looks like a measurement module without an attached sensor lead) to the measurement module **instead of the sensor**. Press the *enter* key.

6E Short-circuit plug

"Please wait" appears on the display. If this does not disappear after a few minutes then there is an error.

6F Sensor in Sol. 230 mV

The sensor must be re-connected to the measurement module. Then place the sensor in the 230V buffer solution and press the *enter* key.

6G Sol. 230mV

"Please wait" appears on the display. If this does not disappear after a few minutes then there is an error. If "**OK**" appears, please press the *enter* key.

6H Rx-Sensor

An **evaluation** of the calibration process takes place here. If an error arises here then please repeat the calibration process. Press the *enter* key.

6K Sensor in Sol.2

Place the sensor in the **second buffer solution**.

6L Sol. 2

"Please wait" appears on the display. If this does not disappear after a few minutes then there is an error. If "**OK**" appears, please press the *enter* key.

6Q Zero measurement

After two to three minutes "**Buffer 0.00**" should appear on the display. If this is not the case then the measurement module may be defective.

6T Sensor OK

This display shows you that the **sensor is in working order**.

9 Technical data

Intput power:	max. 5W
Processor:	INTEL 80C535
Data memory:	64 KB RAM
Programme memory:	64 KB Flash

Inputs:

2 BNC-ports for the sensors
1 connection for mains receiver/power supply

pH :

Measuring range:	pH 3 to pH 13
Resolution:	pH 0.01
Temperature compensation:	manual/automatic
Switch hysteresis:	pH 0.05

Redox :

Measuring range:	-300mV to +600mV
Resolution:	1mV
Switch hysteresis:	5 mV

Temperature :

Measuring range:	5°C to 50°C
Resolution:	0.05°C
Switch hysteresis:	0.15 °C

Interface:

RS232 serial interface

Display:

1 LC-Display (2x16 characters)
1 LED-Display

Outputs:

8 TTL switching outputs for connecting the iks switch-socket panel
1 switch socket with max. switch power: 230V~/5A

10 Guarantee

The product is guaranteed for 5 years from the invoice date. It covers defects in materials and manufacturing faults. Chemical sensors are subject to natural wear and, where legally permitted, are not covered by this guarantee.

We guarantee the supplied product corresponds with the specifications and that the product has no apparent faults in materials or construction. We accept no liability for the correctness of the operating instructions. Neither do we accept any liability for damage of any kind caused by incorrect operation or location or environment unsuitable for the instrument. Furthermore, where legally permitted, we accept no liability for direct damage, indirect damage, subsequent damage nor damage to third parties. We do not guarantee that the product package meets the purchaser's demands. The guarantee is void if the supplied original product is damaged or altered in any way.

11 Registration

Please complete the enclosed registration form and send it to us. Only when we have received this can we keep you up-to-date with new developments and additions. Your details will be treated confidentially and under no circumstances whatsoever passed on to third parties.

12 Declaration of conformity

The company iks ComputerSysteme GmbH hereby declares that the type of construction of the following device in the model sold by us complies with the these relevant EEC-Directives:

- *iks aquastar midi*

Relevant EEC-Directives:

73/23/EEC (Low Voltage Directive)
as changed by 93/68/EEC
89/336/EEC (Elektromagnetic Compatibility)
as changed by 91/263/EEC; 92/31/EEC; 93/68/EEC

Applied harmonized standards:

EN 60950 (VDE 0805/ 11.97, IEC 950)
EN 50081-1 together with EN 55022
EN 50082-1 together with EN 55024

This device has been tested in a typical situation.

Karlsbad, August 30, 2000

Gerhard Kugel   Jürgen Walch

13 Tips and tricks

At this point we would like to provide you with a few helpful hints that will enable you to make the most of your *iks aquastar midi* or clarify any points that are still unclear. We are of course very grateful for any suggestions and ideas you can give us that we can pass on to fellow enthusiasts. This section is not arranged by themes but is rather more a "loose-leaf" compilation intended to give you some ideas for your own experiments. In some places we assume that you have a certain degree of experience regarding aquaristics or that you are familiar with operating the *iks aquastar* to a certain extent.

13.1 The control principle

The *iks aquastar midi* operates under the principle of a "two-point controller". This means that the control system activates a socket when a "set point" is reached. This then remains switched on until a second "switching point" is reached. The difference between these two points is known as "switch hysteresis". If you want to programme a control process then you only have to enter the set point. The switch hysteresis (the second switching point) is automatically set by the system. This hysteresis is dependent on the module being used. The values can be found under "Technical data", Section 9.

Example: The graph on the left below shows a temperature control process (heat). On the right is another temperature control process (cool).
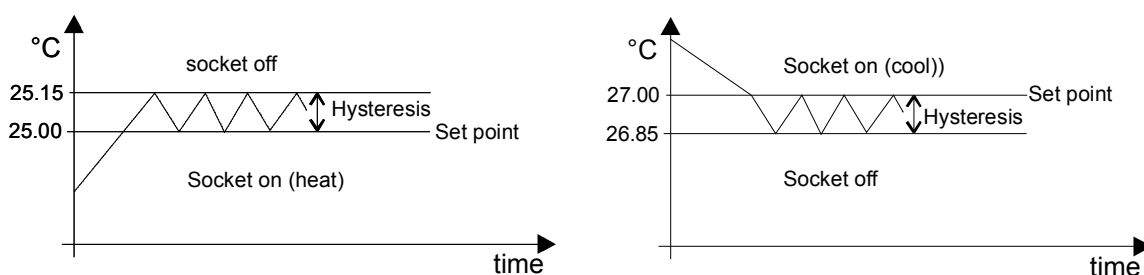

Fig. 8: The control principle

13.2 Salt content (Salinity) and density in seawater aquariums

The salinity expresses the sum of the concentrations of all salts contained in a sample of seawater. A differentiation is made between the "absolute salinity" and the "practical salinity" whereby the "absolute salinity" is the real total salt content of the water in question. As this value is found by the individual determination of the concentration of every single substance, and thus normally impossible to ascertain, the "practical salinity" is generally accepted in practice. This is defined on the basis of a standard seawater (the so-called "Copenhagen water"). The basis of the "practical salinity" used here and the calculated density derived from it comes from the arithmetical conversion of conductivity into salinity (relative to a reference temperature of 25°C) as carried out by the National Institute of Oceanography of Great Britain and UNESCO" in 1971. This conversion is based on Copenhagen water (standard seawater) in a salinity range of 20 to 40. Copenhagen water has a salinity of 35 from a calculated average composition from 135 seawater samples

As tables and graphs can be found in various specialist publications that refer to a variety of **reference temperatures** (but do not draw your attention to them explicitly), varying degrees of confusion resulted among considerable numbers of aquarium enthusiasts. To prevent you becoming a member of the group mentioned above, we have produced the following table:

Conductivity 20°	Conductivity 25°	Salinity	Density	Conductivity 20°	Conductivity 25°	Salinity	Density
36,2	40,0	25,6	1,0162	45,6	50,5	33,2	1,0219
36,6	40,5	25,9	1,0164	46,1	51,0	33,5	1,0222
37,1	41,0	26,3	1,0168	46,6	51,5	33,9	1,0225
37,5	41,5	26,7	1,0170	47,0	52,0	34,3	1,0228
38,0	42,0	27,0	1,0173	47,5	52,5	34,6	1,0230
38,4	42,5	27,4	1,0175	47,9	53,0	35,0	1,0234
38,9	43,0	27,7	1,0179	48,4	53,5	35,4	1,0236
39,3	43,5	28,1	1,0181	48,8	54,0	35,8	1,0239
39,8	44,0	28,4	1,0184	49,3	54,5	36,1	1,0241
40,2	44,5	28,8	1,0186	49,7	55,0	36,5	1,0245
40,7	45,0	29,2	1,0189	50,2	55,5	36,9	1,0247
41,1	45,5	29,5	1,0192	50,6	56,0	37,3	1,0250
41,6	46,0	29,9	1,0195	51,1	56,5	37,6	1,0253
42,0	46,5	30,3	1,0197	51,5	57,0	38,0	1,0256
42,5	47,0	30,6	1,0200	52,0	57,5	38,4	1,0258
42,9	47,5	31,0	1,0202	52,4	58,0	38,8	1,0262
43,4	48,0	31,3	1,0206	52,9	58,5	39,1	1,0264
43,8	48,5	31,7	1,0208	53,3	59,0	39,5	1,0268
44,3	49,0	32,1	1,0211	53,8	59,5	39,9	1,0270
44,7	49,5	32,4	1,0213	54,2	60,0	40,3	1,0273
45,2	50,0	32,8	1,0217				

See also the new revised table with conductivity, salinity and density on the internet: http://www.iks-aqua.com/html/d/aquastarsoftware.htm

13.3 Hints on calibration

For the purpose of calibration, many measurement electrodes require the most precise value possible of water temperature in the aquarium and of buffer solution temperature. It has already been mentioned in this manual that the bottles of calibration solutions can be left to float in the tank for a while until the temperatures have aligned themselves. There are, however, other methods for particularly cautious people.

To prevent the (tank-) water being contaminated by calibration solutions, a bowl of water can be suspended in the tank (instead of placing the bottles in the tank). The calibration solutions are then placed in this until their temperatures have aligned with that of the tank. This, after a certain amount of time, leads to identical temperatures of the tank and the calibration solutions, and direct contact with the aquarium water is effectively avoided.

The water temperature of the tank itself is usually held constant by heating or cooling and only changes very slowly (due to the relatively large quantity of water). The second method of determining the temperature involves the following procedure: Read the temperature of the aquarium water from the display and make a note of it. It will remain constant long enough for the purposes of calibration. Now (as in the previous example) place the bottles of calibration solution in a bowl that you have filled with water from the aquarium. Now wait until the temperatures have aligned themselves. Lay the temperature sensor in the bowl. The temperature of the aquarium water can now be entered manually and that of the calibration solutions automatically, via the temperature sensor. This prevents contact of even the smallest quantity of calibration solution with the aquarium water. Nevertheless, please don't forget to rinse and clean the sensor before putting it back in the tank.

13.4 Sensor care

The sensors are extremely sensitive instruments that do their job almost unnoticed. Nevertheless, it is still a good idea to check them from time to time to ensure that they continue to provide reliable measurement results.

A first step towards increasing their lifespan and reliability is to locate them in a position that is as dark as possible and where there is a lot of water movement. This minimises the appearance of algae. Redox sensors in particular are very allergic to contamination. They should be cleaned every few months VERY CAREFULLY with a soft paper tissue. The other sensors (depending on the type) can be rinsed carefully in (distilled) water or wiped clean (e.g. the temperature sensor).

Maintenance obviously also includes re-calibration at certain intervals as sensors age and cleansing involves mechanical wear.

Please also pay particular attention to affixing the electrodes with only their tips in the water (the depth of immersion is given in the appropriate installation instructions). Many electrodes (e.g. pH) operate with differences in potentials between water and reference electrolyte. The excess pressure of the electrolyte against the glass membrane prevents foreign material entering and then destroying the electrode.

Some people remove the silicon sealant over the aperture for filling the sensors in order to allow compensation of pressure caused by temperature (This supposedly prolongs the lifespan). This would appear to be nonsense for several reasons (those described in the previous paragraph, amongst others). Firstly, the water temperature is quite constant. Consequently, it's very unlikely that pressure differences caused by changes in temperature will occur. Secondly, by doing this there is a danger that liquid will escape from the sensors and poison the water if ever they accidentally fall into the tank.

ℹ️ A special care/maintenance set for pH- and redox electrodes is available fron iks. Please ask your dealer for details.

And finally, please consider the comparison with a lightbulb: Sensors don't last forever either.

13.5 Measuring the water values

There is hardly any aquarium enthusiast who isn't convinced about the comprehensive measurement- and control possibilities that the *iks aquastar* provides. Nevertheless, at his point we would like draw attention to the fact that computers are "stupid" (this of course doesn't refer to the human know-how that's behind their development!) and can only do what they have been programmed to do. It is quite possible to cause an aquarium to "crash" with deliberately contradictory control functions. This can, however, also be achieved with more simple means and your *iks aquastar* is quite capable of making life with your aquarium a great deal easier. To use it sensibly, however, it's a good idea to think through what you want to do.

Please remember that every tank is different and presents different water values. It is therefore not possible to make direct comparisons nor necessary if a few values do not correspond 100% with the "standard" values. Not even in nature is (sea-) water identical everywhere - neither the period of illumination nor temperature nor water values. Just consider for a moment the difference between the North Sea and the Caribbean. It is unavoidable (at least to start with) that you will regularly have to measure your water values with tests available on the market. When you (and the inhabitants of your aquarium, in particular) are satisfied with your water values, make a note of the displayed data from the relevant measurement electrode of your *iks aquastar*. Then, in future, you will have the

means to see "at a glance" when changes (both positive and negative) occur. Because of the complex interaction of all factors, there is no point in trying to achieve "dream values" in one area when those in another have to suffer. It's labour, for example, to try to lower the pH-value to "8.2-Standard" from one of 8.27 in a stable tank by constantly "over-dosing" with CO_2. By doing so you will just force other values to change - and not necessarily positively.

In such instances human instinctive feeling and experience is necessary.

13.6 Labelling the socket panels

It is obviously clearer if you number your socket panels. However, if you are quite certain about what has been allocated to each one, it is a good idea to note on a sticker or something similar which appliance has been connected (lamp, heating, CO_2 supply etc.). Affix these labels to the plugs of the appliances too. Then, if you ever want to disconnect a particular appliance from the mains power, you can see at a glance which plug belongs to which socket. This is also useful if you are absent and want to explain to a friend on the telephone where something is to be plugged in or unplugged.

It's also not a bad idea to make a few notes, especially when several identical sensors are being used in different tanks.

13.7 Lunar-phase simulation

It's by all means possible to create a lunar-phase simulation (that has to be calculated on the basis of the day/night simulation) even though the main source of lighting comes from non-dimmable HQI- or HQL lamps. To do this, proceed as follows:

Connect a **dimmable** lamp that represents the moon (e.g. a yellow 25 to 40 Watt spotlamp) to a vacant **variable-output** socket. **Activate** the day/night simulation. **Do not**, however, **allocate a socket** "(--)" to it.

Activate this simulation in the lunar-phase simulation menu too and allocate a **variable-output** socket to it. Set the intensity of light at full moon (from the lamp) as you require (% of output when "on") and check with the **del key**. Now, when you pass control back over to the *iks aquastar* the main lighting will continue to be switched "only" on or off but the lunar phase will be realistically calculated and produced.

We hope you have many years of enjoyment with your *iks aquastar midi* and the aquariums you measure and control with it! We are always glad to hear suggestions, tips and tricks. Please write to us or simply send us an e-mail.

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Thank you!

14 Notes