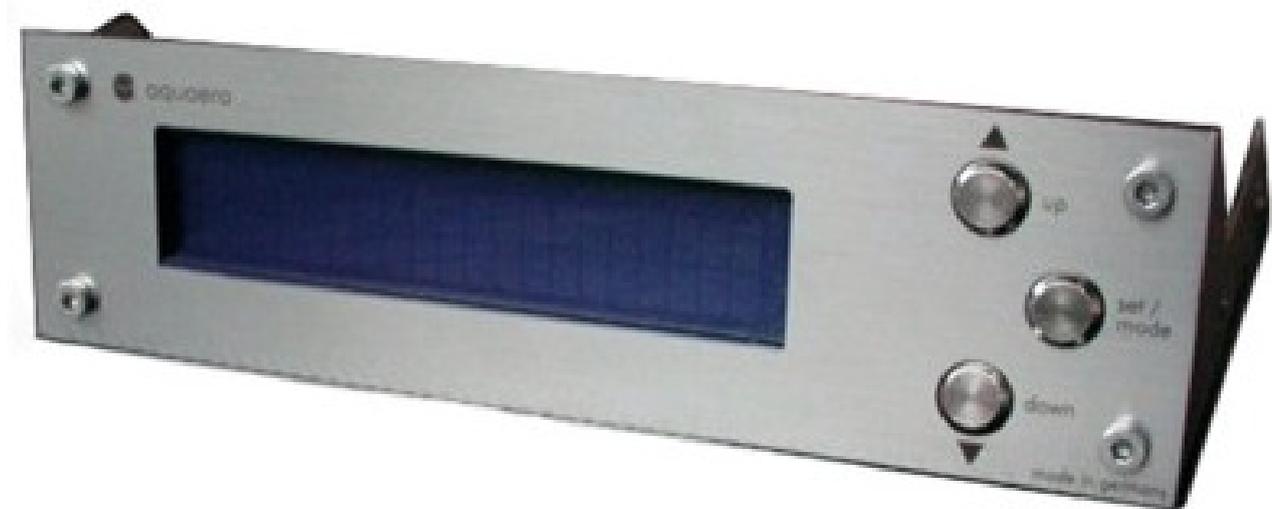


Owner's Manual



aquaero™ 4.00

Firmware-Version 4.22a
OS- Version 2.03

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Current as of: June 26th 2009

Table of Contents

1. Contents of the package	6
2. Preface	6
3. Safety precautions	7
4. Connecting external components	8
4.1. Overview.....	8
4.2. Power	8
4.3. Fan1-Fan4	8
4.4. Sensor.....	8
4.5. Flow	9
4.6. USB	9
4.7. LED	10
4.8. Relay	10
4.9. aquastream-bridge	10
4.10. Standby-Power	11
4.11. JP1 Power Supply Jumper.....	11
4.12. aquabus (I ² C-bus)	11
4.13. Expansion.....	11
4.14. Power-LED.....	12
4.15. Aquaero Power Connect (optional accessory)	12
5. Initial operation.....	13
6. Display and operation	14
6.1. Function of the Buttons	14
6.2. Display Mode	14
7. Device Settings.....	17
7.1. Basic operation	17
7.1.1. Definition of Names	17
7.1.2. Principle of assigning sensors to fans.....	17
7.2. Menu Settings	18
7.2.1. → Sensor-Parameters.....	18
7.2.2. → Flow Sensor.....	18
7.2.3. → Fan-Parameters	18
7.2.4. → Display-Parameters	18
7.2.5. → Relay-Parameters	18
7.2.6. → LED-Parameters	18
7.2.7. → Clock and Timer.....	19
7.2.8. → Periph.-Parameters	19
7.2.9. Power measurement	19
7.2.10. Profile settings.....	19

7.3.11. Return to Display	19
8. Menu „Sensor-Parameters“	20
8.1. Sensor Name	20
8.2. Start-up temp.	20
8.3. Maximum temp.	20
8.4. Alarm Temp.	20
8.5. Hysteresis	20
8.6. Target Temp.	21
8.7. Calibration Offset	21
8.8. Calibration Factor	21
8.9. Controller delay	22
8.10. Controller factor	22
8.11. Back	22
9. Menu „Flow Sensor“	23
9.1. Sensor name	23
9.2. Alarm Level 1	23
9.3. Alarm Level 2	23
9.4. Display Unit	23
9.5. Calibration Factor	23
9.6. Sensor 2 Connection	23
9.7. Back	24
10. Menu "Fan Parameters"	25
10.1. Fan Name	25
10.2. Sensor 1 (auto)	25
10.3. Sensor 2 (auto)	25
10.4. Set Rpm	25
10.5. Manual	26
10.6. Get max. rpm	26
10.7. Calibration Factor	26
10.8. Minimum Power	26
10.9. Control Options	27
10.10. Use rpm signal	27
10.11. Hold min. power	28
10.12. Back	28
11. Menu "Display Parameters"	29
11.1. Brightness	29
11.2. Contrast	29
11.3. Turn-off Time	29
11.4. Switch Time	29
11.5. LCD switch-off	29
11.6. USBLCD-Mode	29

11.7. USBLCD after Boot.....	29
11.8. Aquaero-Name.....	30
11.9. Page Setup.....	30
11.10. Back.....	31
12. Menu "Relay Parameters".....	32
12.1. Alarm On/Off.....	32
12.2. Alarm-Off-Timeout.....	32
12.3. Alarm-Events.....	32
12.4. Relay On/Off.....	33
12.5. Relay Usage.....	33
12.6. Alarm Time.....	33
12.7. Back.....	33
13. Menu "LED Parameters".....	34
13.1. Sensor 1 (auto).....	34
13.2. Sensor 2 (auto).....	34
13.3. Brighter/Darker.....	34
13.4. Brightness.....	34
13.5. Flash when Alarm.....	35
13.6. Back.....	35
14. Menu "Clock and Timer".....	36
14.1. Setting the Clock.....	36
14.2. Turn-On Time 1.....	36
14.3. On-Time 1.....	36
14.4. Turn-On Time 2.....	36
14.5. On-Time 2.....	36
14.6. Turn-Off Time 1.....	36
14.7. Off-Time 1.....	37
14.8. Turn-Off Time 2.....	37
14.9. Off-Time 2.....	37
14.10. Back.....	37
15. Menu "Periph.-Parameters".....	38
15.1. aquastream 1/2.....	38
15.2. Multiswitch 1/2.....	38
15.3. tubemeter.....	39
15.4. Back.....	39
16.1. Power Measurement 1 Sensor 1 (cold side).....	40
16.2. Power Measurement 1 Sensor 2 (warm side).....	40
16.3. Power Measurement 1 Flow Sensor Selection.....	40
16.4. Power Measurement 2 Sensor 1 (cold side).....	41
16.5. Power Measurement 2 Sensor 2 (warm side).....	41
16.6. Power Measurement 1 Flow Sensor Selection.....	41

16.7. Back	41
Leaves the submenu and returns to "Settings"	41
17. Menu „Profile Settings“	42
17.1. Load Profile 1	42
17.2. Load Profile 2	42
17.3. Copy Profile.....	42
17.4. Default Setting	42
18. Example configurations	43
18.1. Progressive Regulation of a Fan via a Temperature Sensor	43
18.2. Regulation of a constant water temperature in a water-cooling system	43
18.3. Temperature-dependent Illumination	44
18.4. Emergency Shutdown of the PC on Temperature Alarm	45
19. Special Notices	45
19.1. Usage of the Relay as a Power Button on the mainboard	45
19.2. Usage of the Relay to Interrupt the ATX-control-line.....	46
19.3. Starting of the PC when using the Standby-Power-Supply	46
19.4. Restrictions of the Emergency Shutdown.....	46
19.5. Flow Alarm and the aquastream-pump.....	46
19.6. Regulation of Contrast when Switching On	47
19.7. Changing the front plate	47
20. Troubleshooting	48
20.1. Deletion of all Settings (EEPROM-Reset).....	48
21. Technical Data.....	48

1. Contents of the package

1x aquaero (ready to install)
4x Temperature sensor 70 cm
1x internal USB-connection cable 5pin 70 cm
Mounting material

1x Software CD aquaero
1x this manual

2. Preface

Dear customer,

We congratulate you on the purchase of an aquaero from May & Wille, Aqua Computer Systeme GbR. We are one of the oldest manufacturers in Germany of PC water-cooling systems. Our products are made from materials of the highest quality. We hope you enjoy your new cooling system. Should you have any questions, we would like to ask you to first look at the "FAQ" area and "forum" on our homepage www.aqua-computer.de. If you should not find an answer to your question there, please email to support@aquacomputer.de. Considering the fast technical development, we reserve the right to be able to perform alterations to the products at any time. It therefore is possible that your product does not correspond precisely to the descriptions or especially the illustrations in this manual.

Your aqua-computer Team

3. Safety precautions

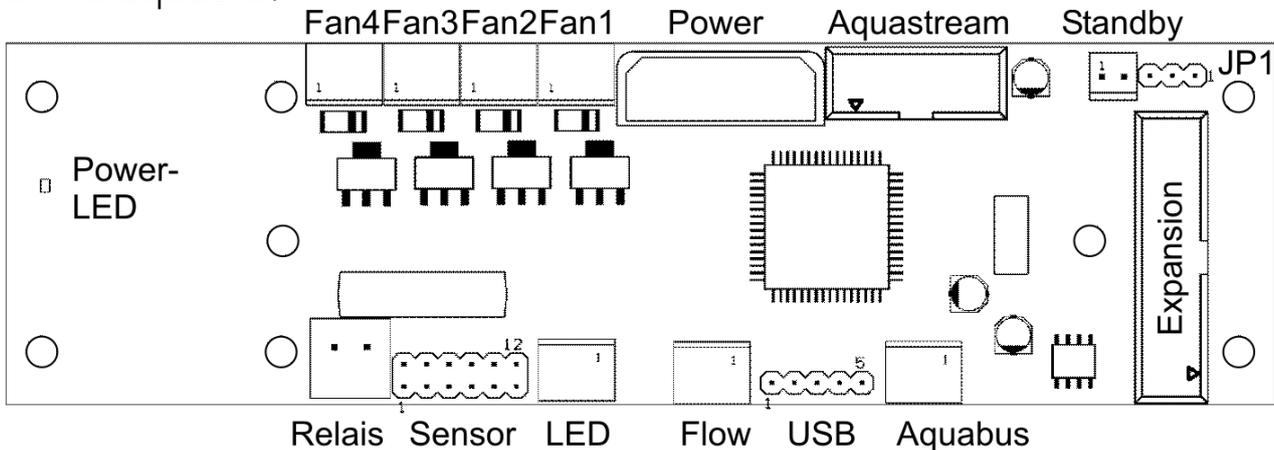
Before we get into the specifics of the system, we would like you to follow these basic precautions which should be obeyed at all times.

- ! • 1. Read this manual thoroughly and completely!
- ! • 2. Backup your data before working on the hardware!
- ! • 3. The aquaero may only be used completely assembled in a computer case!
- ! • 4. Never touch, connect or separate cables or electronic components while in use!
- ! • 5. Do not turn on your computer unless you are absolutely certain that all cables are securely and correctly connected to the aquaero!
- ! • 6. Maintenance notes: Use only soft, damp cloths to wipe the device. Do not use benzene, paint thinner, detergents, or chemically treated wiped cloths, and do not place vinyl, plastic, or rubber objects on the device to avoid the risk of malfunction or damage to surface of the device!
- ! • 7. The relay-output may be powered at max. 12 V! The current must not exceed 1 Ampere!
- ! • 8. All statements in this manual are subject to the fast technological development. Our products are constantly enhanced. Technical changes, misprints and errors are reserved!
- ! • 9. This product is not designed for use in life support appliances, devices, or systems where malfunction of this product can reasonably be expected to result in personal injury. May & Wille GbR customers using or selling this product for use in such application do so at their own risk and agree to fully indemnify May & Wille GbR for any damages resulting from such application.
- ! • 10. Do not rest your weight on or place heavy objects on the device, and do not apply excessive force to the buttons, switches, or connectors to avoid the risk of damage to the device or personal injury.

4. Connecting external components

4.1. Overview

The following schematic shows the multitude of connection possibilities of the aquaero:



4.2. Power

Power connector. Attach a vacant power connector of your PSU. Due to the form of the plug the polarity can not be misinterpreted. Do not use force when connecting the plug but double check if the plug is lined-up correctly (i.e. not upside down)

4.3. Fan1-Fan4

Connection possibility for four fans with rpm-signals.

Attention: Max. load 5 Watts per channel!

Pin assignment:

- Pin 1: GND
- Pin 2: 0-12 V
- Pin 3: rpm

4.4. Sensor

Connection possibility for six temperature sensors (10 k Ω NTC).

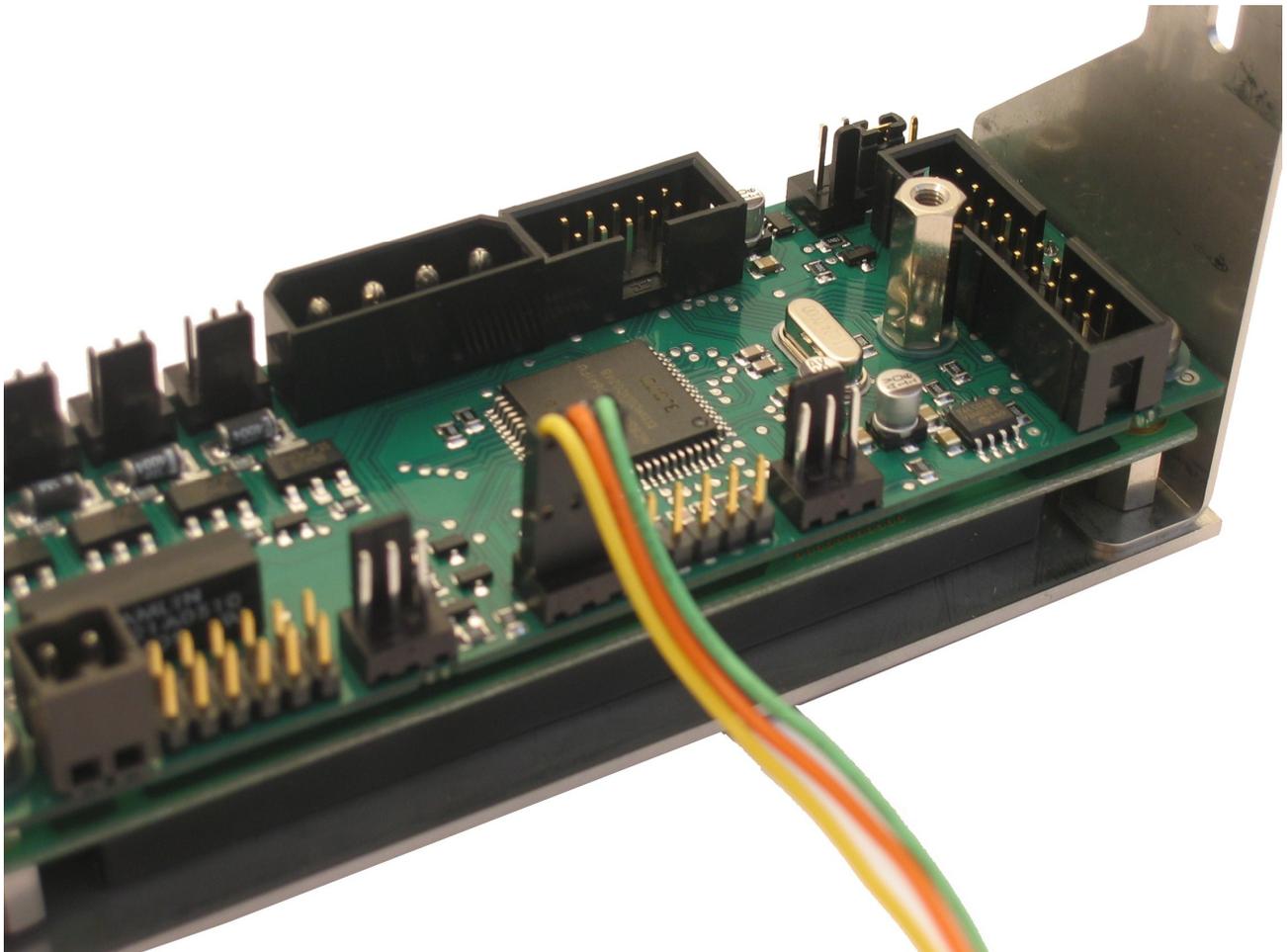
Pin assignment:

- Pin 11-12: Sensor 1
- Pin 9-10: Sensor 2
- Pin 7-8: Sensor 3
- Pin 5-6: Sensor 4
- Pin 3-4: Sensor 5
- Pin 1-2: Sensor 6

4.5. Flow

Connection possibility for a flow sensor. Only use flow sensors and cables specified by aqua-computer!

Pin assignment: Pin 1: GND (green cable, marked ▼)
 Pin 2: 5 V
 Pin 3: Rpm



4.6. USB

Connection possibility for an internal USB-connector on the mainboard. Use the included USB-cable and pay close attention to the polarity (colored wires) of the cable. **Incorrect use may result in the destruction of the aquaero and/or the mainboard and further components!** Therefore pay close attention to the pin assignment of the connectors on the mainboard. Please consult the manual of your mainboard for help.

Pin assignment:	Pin 1: GND	black wire
	Pin 2: GND	black wire
	Pin 3: D+	green wire
	Pin 4: D-	white wire
	Pin 5: VCC	red wire

4.7. LED

Connection possibility for two LEDs or one dual-colored LED (not included in delivery) respectively. Standard-LEDs (I max 20 mA) may be used without a series resistance, which is already integrated in the aquaero.

Pin assignment:	Pin 1: VCC LED 1
	Pin 2: VCC LED 2
	Pin 3: GND

4.8. Relay

Floating output. Useable for the emergency shutdown of the PSU (additional cables required, not included in delivery). Alternatively freely useable, maximum breaking capacity 1 A at max. 12 V.

Pin assignment:	Pin 1-2: breaking contact
-----------------	---------------------------

4.9. aquastream-bridge

Connection possibility to the controller of the aquastream. **Not compatible to aquastream XT pumps, use the "aquabus" header for connecting aquastream XT** – for details see 4.12. aquabus (I²C-bus). A maximum of two controllers may be connected. Only use cables specified by aqua-computer (not included in delivery)! The following table shows the connection possibilities depending on the hardware revision of the aquastream controller in use:

Revision Controller 1	Revision Controller 2
1.0 or higher	Not possible
1.5 or higher	3.0 or higher

4.10. Standby-Power

Connection possibility for a additional power supply via the 5 V standby strand of the PSU. In this case the aquaero stays active even when the computer has been shut down (Soft-Off). See also JP1. Only use cables specified by aqua-computer (not included in delivery)! See also 4.9.

Pin assignment: Pin 1: GND
 Pin 2: +5V Standby

4.11. JP1 Power Supply Jumper

With this Jumper you can decide whether you would like the power supply coming from the power supply connector (see 4.2. Power) or the standby-power supply (see 4.10. Standby-Power). By default the Jumper is set for the power supply connector.

NOTICE: The supply of the fans and the display illumination are always supplied via the power supply connector!

Jumper setting: Pin 1-2: Standard-power-supply
 Pin 2-3: Standby-power-supply

4.12. aquabus (I²C-bus)

3-pin add-on connector for optional add-on components by aqua-computer such as **aquastream XT**, **tubemeter** or **multiswitch**. Only use cables specified by aqua-computer (not included in delivery)! If multiple components are to be connected, an „aquabus Y adaptor cable“ (art. no. 53063) is required for each addition device.

Pin assignment: Pin 1: GND
 Pin 2: SDA
 Pin 3: SCL

4.13. Expansion

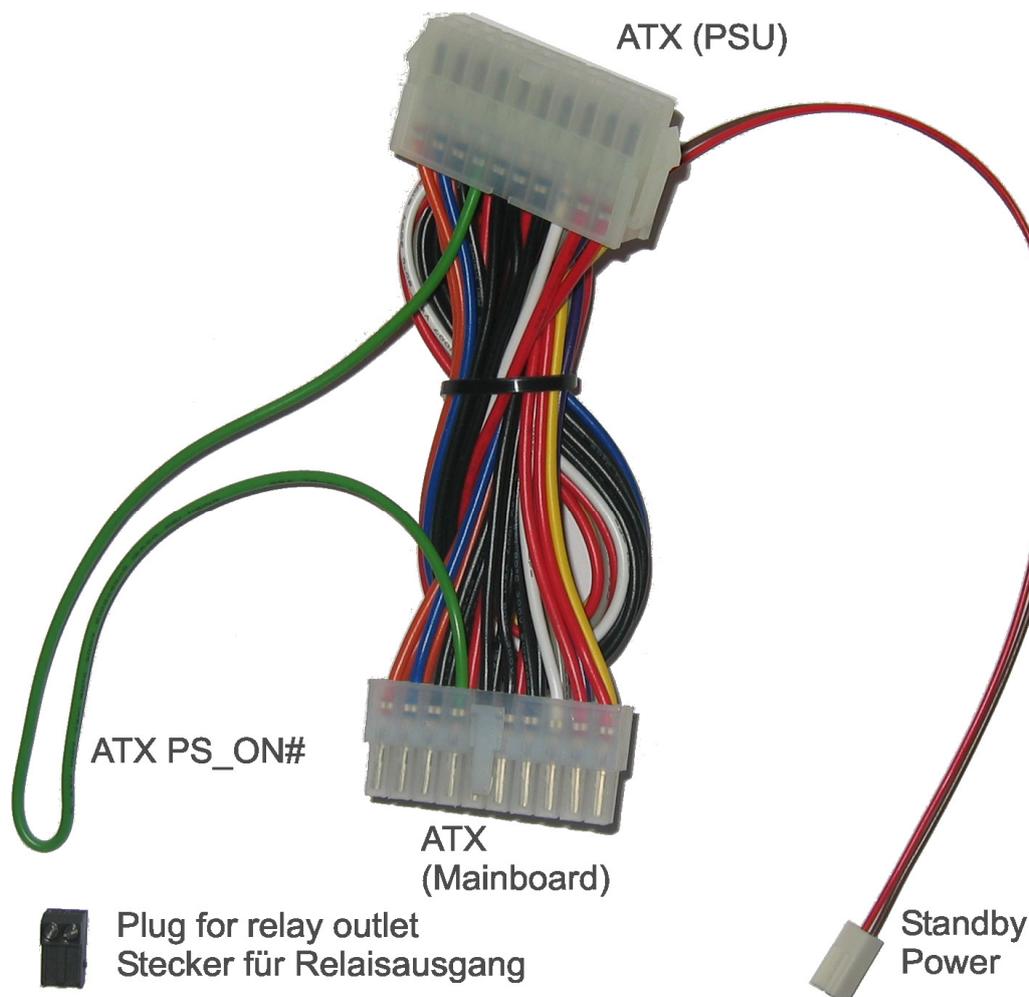
20-pin expansion port for optional accessories from aqua-computer. Only use cables and components specified by aqua-computer (not included in delivery)!

4.14. Power-LED

This green LED shows the correct power supply to the microprocessor of the aquaero. Should the LED not light up although the PSU is correctly connected, please check the position of the jumper JP1. See 4.11. JP1 Power Supply Jumper.

4.15. Aquaero Power Connect (optional accessory)

The following picture shows the possible connections of the Aquaero Power Connect cable. The standby power supply is to be connected to the appropriate connector of the aquaero. The green ATX PS_ON# line can be cut through and connected with a plug for the relay outlet. If you want to use the relay outlet for connection to the power switch line of the mainboard, the ATX PS_ON# line must remain intact!



5. Initial operation

After all connections to the aquaero have been made as described in chapter 4 and the aquaero is installed in the computer case, you can now operate it by switching on the computer.

After switching on of the computer, the aquaero will show a greeting screen with a statement of the firmware revision before it continues on to the status of the fans and sensors.

You should now familiarize yourself with the functions and operating of the device before you perform the setup of the basic settings in the aquaero.

6. Display and operation

6.1. Function of the Buttons

The aquaero uses three buttons to control the functions of the device. The usage of the USB-connector and the included software is not necessary but simplifies the operation.

Depending on the active display the buttons have the following functions:

Button „up“: previous menu option/screen
 increase chosen value

Button „down“: next menu option/screen
 decrease chosen value

Button „set/mode“: Call menu
 select menu

6.2. Display Mode

In the normal operation the time, fan, flow sensor and temperature sensor screens are shown one after the other. The screen switches forward or backward with each key press or, when the switch-time is active, after the chosen interval.

You can add or remove single screens as well as define sensor names freely, which is the reason why your screens may vary from the illustrations in this manual.

Following screens will be shown one after the other:

aquaero v4.09d So. 15:50:50 down ↓ ↑ up
Firmware: 4.09 Os: 2.03 LCD down ↓ ↑ up

Hw. Rev.: 4.00 Serial: 999
down ↓ ↑ up
20,0C 20,0C 20,0C 20,0C 20,0C 20,0C
down ↓ ↑ up
Sensor 1 : 20,0C Sensor 2 : 20,0C
down ↓ ↑ up
Sensor 3 : 20,0C Sensor 4 : 20,0C
down ↓ ↑ up
Sensor 5 : 20,0C Sensor 6 : 20,0C
down ↓ ↑ up
FAN1 100% FAN2 100% FAN3 100% FAN4 100%
down ↓ ↑ up
Fan 1 0 rpm
down ↓ ↑ up
Fan 2 0 rpm
down ↓ ↑ up
Fan 3 0 rpm
down ↓ ↑ up
Fan 4 0 rpm
down ↓ ↑ up
Fan 1 12,0V Fan 2 12,0V
down ↓ ↑ up
Fan 3 12,0V Fan 4 12,0V

down ↓ ↑ up

Pump 1 v1.31 12,0V
Pump active

down ↓ ↑ up

AS1: I: 400mA P: 4,8W
locked freq.: 47Hz

down ↓ ↑ up

Pump 2 v1.31 12,0V
Pump active

down ↓ ↑ up

AS2: I: 400mA P: 4,8W
locked freq.: 47Hz

down ↓ ↑ up

Flow
30,00 liter/hour

down ↓ ↑ up

Flow 2
0,00 liter/hour

down ↓ ↑ up

Fill level:
Invalid value

down ↓ ↑ up

Power Measurement 1
Power : 0W

down ↓ ↑ up

Power Measurement 2
Power : 0W

down ↓ ↑ up

(back to the top)

7. Device Settings

7.1. Basic operation

In the normal display operation, you can enter the configuration menu by pressing the button "set/mode" once. In the configuration menu, you can select individual entries by pressing the "up" and "down" buttons and then pressing the "set/mode" button. Basically the menu contains two different entry types:

- Submenus are marked with a small arrow „→“ in front of the name of the entry.
- Adjustable parameters are marked by a diamond „◆“ in front of the name of the entry.

7.1.1. Definition of Names

The aquaero allows you to define all sensors and fans with user-defined names. After selecting a corresponding menu entry, the current sensor name is shown and the cursor blinks on the first letter. By pressing the buttons "up" and "down" you can now choose the first character, the characters appear in the following sequence: Capital letters, lower case letters, space, numbers. When selecting the sign "←", the cursor jumps back one character in the line.

By pressing the button "set/mode" you confirm the chosen character and the cursor jumps forward one character in the line. Repeat this process for all indicated spaces. After the input of the last character in the line the device will return to the menu.

The sensor names have a predefined length. If you would like to use shorter names, you must fill the free signs with spaces.

7.1.2. Principle of assigning sensors to fans

In principle with the aquaero, the start-up and max. revolution thresholds for the fan control are assigned to the temperature sensors, not the fans. This means that these values are adjusted for the corresponding sensor in the menu and then this completely configured sensor serves as the guideline for one or two fan/s.

One or two temperature sensors can be assigned to each fan, alternatively each fan can individually also be controlled manually.

7.2. Menu Settings

In the display mode the menu is reached by pressing the button „set/mode“ once. Following submenus can be called:

7.2.1. → Sensor-Parameters

Calls the submenu to configure the six temperature sensors. Details see 8. Menu „Sensor-Parameters“

7.3.2. → Flow Sensor

Calls the submenu to configure the (optional) flow sensor. Details see 9. Menu „Flow Sensor“

7.3.3. → Fan-Parameters

Calls the submenu to configure the four fan connectors. Details see 10. Menu "Fan Parameters"

7.3.4. → Display-Parameters

Calls the submenu to configure the LCD-display. Details see 11. Menu "Display Parameters"

7.3.5. → Relay-Parameters

Calls the submenu to configure the emergency shutdown of the PC. This function requires further components (connecting cable for the relay output, where applicable a standby power supply) as well as the correct integration of the relay output into the ATX-control line of the PSU or into the connector of the power-Button on the mainboard. Details see 12. Menu "Relay Parameters"

7.3.6. → LED-Parameters

Calls the submenu to configure the two LED-connectors. Details see 13. Menu "LED Parameters"

7.3.7. → Clock and Timer

Calls the submenu to set the clock and the timer. Details see 14. Menu "Clock and Timer"

7.3.8. → Periph.-Parameters

Calls the submenu to configure connected optional peripheral devices. At the time of printing the control of the aquastream-pump as well as up to four aquaero 8-port supplemental boards are supported. Details see 15. Menu "Periph.-Parameters"

7.3.9. Power measurement

Calls the submenu to configure the power measurement. Details see 16. Menu „Power Measurement“

7.3.10. Profile settings

Calls the submenu to manage the profile settings. Details see 17. Menu „Profile Settings“

7.3.11. Return to Display

Leaves the menu and returns to the normal display mode.

8. Menu „Sensor-Parameters“

Select one of the six temperature sensors from the list by pressing the "up" and "down" buttons and confirm your selection by pressing the button "set/mode".

To leave the menu "sensor parameters" choose the entry "back" and confirm the selection by pressing "set/mode".

8.1. Sensor Name

Enter the name of the sensor that should be shown on the display. After the selection of this menu entry, the current sensor name is shown and can be changed. See also 7.1.1. Definition of Names.

8.2. Start-up temp.

Enter the temperature in °C here, at which an assigned fan should start. Below this temperature, an assigned fan is turned off.

If the option "Minimum Power" is activated, the fan will not be shut down when the temperature drops below the start-up temp. In this case the minimum power is held constantly.

8.3. Maximum temp.

Enter the temperature in °C here, at which the assigned fan should run on max. power. Above this temperature, the assigned fan continues to run at maximum speed.

8.4. Alarm Temp.

Enter the temperature in °C here, at which the PC-emergency shutdown should be activated. Works only with additional components,

If you use the relay connector for other functions, you enter the switch temperature here.

8.5. Hysteresis

Depending on the set regulator option this parameter has the following effect on the regulated fan:

Regulator option „linear“ or „progressive“:

Simply put, the hysteresis is the difference between the start-up and shutdown temperature for the fans. A frequent start-up and shutdown of the fans is therefore prevented if the current temperature fluctuates around the start-up temperature. Should the fans be turned on and off in short intervals you should increase this value.

Regulator option „target value“:

If the fan is regulated via the target temperature, the hysteresis is the value which is in the tolerable area in which the fan is not adjusted, an approved regulator error close to the target value if you will.

If for instance a target value of 35°C and a hysteresis of 1°C is set, then the rpm of the fan is only adjusted when the temperature rises above 36°C or drops below 34°C.

Adjustable in 0,5°C steps from 0,0°C to 25,0°C. Default setting is 0,0°C.

8.6. Target Temp.

Enter the temperature in °C here, at which the fan should become active. The assigned fan will be switched on and, if technically possible, will regulate a constant target temperature. If the temperature drops below the target temperature, the fan is slowed down.

Adjustable in 0,5°C - steps from 0,0°C to 100,0°C. Default setting is 30,0°C.

8.7. Calibration Offset

Professional function to calibrate the temperature sensors. Standard value is zero and should not be altered in the normal case. An adjustment may become necessary if sensors of other manufacturers are used. Internal formula for the temperature calculation, see 8.8. Calibration Factor.

8.8. Calibration Factor

Professional function to calibrate the temperature sensors. Standard value is zero and should not be altered in the normal case. An adjust-

ment may become necessary if sensors of other manufacturers are used. The internally used formula to calculate the temperature is:
 $237 + \text{Offset} - (44,15 - \text{Factor}) * \ln(\text{measured value})$ (Output is value in °C)

8.9. Controller delay

This value is only needed if the corresponding fan is in the target-value mode.

The controller delay sets the minimum time in seconds after which the controller is recalculated.

The higher this time, the slower the temperature regulator reacts to changes in temperature which means that the corresponding fan adjusts the rpm slowly. For instance when regulating an inert system like the water temperature in a cooling system, it would be useful to set this value to approx. 20 seconds.

This value mainly determines the regulatorial behavior at small temperature differences, at larger temperature differences the effect from the regulator factor becomes ostensible.

Default value is 3 seconds.

8.10. Controller factor

This value is only needed if the corresponding fan is in the target-value mode.

The regulator factor is a multiplier for the temperature difference of the target-value and causes an immediate adjustment of the rpm of the corresponding fan.

The higher this value, the stronger the temperature regulator reacts to differences in the target value.

Default value is 2.

8.11. Back

Leaves the submenu and returns to "Sensor Parameters".

9. Menu „Flow Sensor“

9.1. Sensor name

Enter the name of the sensor that should be shown on the display. After the selection of this menu entry, the current sensor name is shown and can be changed. See also 7.1.1 Definition of Names.

9.2. Alarm Level 1

Enter the flow in l/min for the flow sensor 1 here, at which the PC-emergency shutdown should be activated. Works only with additional components, If you use the relay connector for other functions, you enter the switch temperature here.

9.3. Alarm Level 2

Enter the flow in l/min for the flow sensor 2 here, at which the PC-emergency shutdown should be activated. Works only with additional components, If you use the relay connector for other functions, you enter the switch temperature here.

Further remarks for the usage of a second flow sensor may be found in chapter 9.6. Sensor 2 .

9.4. Display Unit

Here you can adjust the units displayed on the screen. Possible units are liter/minute (default) or liter/hour.

9.5. Calibration Factor

Enter the impulses generated by the sensor per liter depending on the used flow sensor here. Default value is 550 imp/l

9.6. Sensor 2 Connection

The aquaero offers the possibility of connecting a second flow sensor instead of a fan to the fan-output 4

The setting „Fan4= Fan4“ configures the fan-output 4 as a normal fan connector.

The setting „Fan4= FlowSensor2“ configures the fan-output 4 to be used with a second flow sensor. In the “Fan Parameters” menu the setting for fan 4 must be set to manual and adjusted to 100% output. (see also **10. Menu "Fan Parameters"**). The name for fan 4 will be used for the flow sensor. If preferred you can change the name to “FlowSens.2” for instance. Also the calibration factor for fan 4 must be adjusted to the number of impulses per liter. Sensors distributed by us therefore have to be set to 509 Imp/U.

9.7. Back

Leaves the submenu and returns to "Settings".

10. Menu "Fan Parameters"

Select one of the four fan channels from the list by pressing the "up" and "down" buttons and confirm your selection by pressing the button "set/mode".

To leave the menu "Fan Parameters" choose the entry "Back" and confirm the selection by pressing the button "set/mode".

Generally, the last used control mode is always used, either control via temperature sensors, revolution speed or manual control. The entered values are not lost when the operating mode is switched but are saved for the next call.

10.1. Fan Name

Enter the name of the fan that should be shown on the display. After the selection of this menu entry, the current fan name is shown and can be changed. See also 7.1.1. Definition of Names.

10.2. Sensor 1 (auto)

Activates the control by temperature sensors and assigns the selected fan one of the temperature sensors one to six or no sensor at all. If two different sensors are assigned, the sensor that causes a higher fan speed is used.

10.3. Sensor 2 (auto)

Activates the control by temperature sensors and assigns the selected fan one of the temperature sensors one to six or no sensor at all. If two different sensors are assigned, the sensor that causes a higher fan speed is used.

10.4. Set Rpm

Activates the fan control via revolution speed and allows to define the fan speed. The fan can either be turned off (0 revolutions) or regulated in the area from approximately $\frac{1}{4}$ of the maximum speed to the maximum speed in steps of 50 rpm/s. The maximum speed for each connected fan is determined automatically when the system is started. If the

connected fan does not generate any speedometer signal, the selection is deactivated. If you connect fans during operation, you can let the aquaero determine the parameters again, see **10.6. Get max. rpm.**

With this function the aquaero regulates the fan after the speedometer signal has been reported back and adjusts the power output load-dependently. Only when the entered speed can not be reached even at max power, the fan will slow down.

10.5. Manual

Activates the manual fan control and allows the adjustment of a constant pwm-ratio accordant to a constant power output. The entered value is represented by a graphical bar.

10.6. Get max. rpm

Reinitializes the aquaero and determines the maximum speed of the connected fan for the selected fan canal if the fan generates a speedometer signal.

10.7. Calibration Factor

Depending on the fans used, you can enter the impulses generated by the fan per revolution. For most fans used in a PC, the value should be two impulses per revolution. Default value is 2 imp/rev. and in most cases should not be changed.

10.8. Minimum Power

Here, you can define the minimal output performance of the temperature-controlled operation. This value is processed differently depending on the implemented fan. If the fan generates a speedometer-signal this value represents the minimum rpm (percentage-value) of the determined maximum rpm. To adjust this value you should first set it to 1% and then determine the lowest start-up value (revolutions per minute) of the fan as well as the maximum rpm via the "Revolution Speed". Now calculate the ratio (minimum rpm / maximum rpm) and use this value as the percentage of the minimal output of the fan channel.

If the connected fan does not generate a speedometer signal this value represents the minimum PWM-ratio (percentage value). If you use a fan

without a speedometer signal you should determine the minimum value, via the "manual regulation", at which the fan is guaranteed to start and use this value as the "minimal output" for the fan. Default value is 25%.

10.9. Control Options

Allows the switching between a linear and a progressive speed-curve in the temperature-controlled operation or activates regulation via a target-temperature.

"Linear" and "progressive": linear means that the fan is regulated proportionally between the start-up temperature and the full load temperature, while at progressive regulation the speed-curve is dependent on the temperature. With climbing temperatures the speed-curve begins shallow but climbs steeper as the full load temperature is reached.

Opposite to the linear regulation, the fan performance in progressive regulation is mobilized only in the upper temperature area and a quieter operating sound is made possible at a lower heat load. However at higher temperatures the full load of the fans is still reached rather quickly.

Sensor parameters used: "start-up threshold", "full load threshold" and "start-up-hysteresis"

"Fixed": the fan is regulated so that the target temperature is held constant if possible. For this purpose the sensor parameter "target temperature" is used.

10.10. Use rpm signal

Here you can adjust whether the fan is regulated via the rpm-signal („active“) or via the output power („inactive“). With some fans the speedometer signal degenerates at a low power output and thus might not be processable by the aquaero. In this case you should deactivate this function to regulate the fan independently of the quality of the speedometer signal.

10.11. Hold min. power

By activating this function the fan output is operated at at least the minimum power in the modes „linear“, „progressive“ and „target value“ even if the temperature is below the minimum or target value.

10.12. Back

Leaves the submenu and returns to the fan selection.

11. Menu "Display Parameters"

11.1. Brightness

Here you can adjust the brightness of the background illumination of the LCD-display. The entered value is represented by a graphical bar.

11.2. Contrast

Here you can adjust the contrast of the LCD-display. The entered value is represented by a graphical bar.

11.3. Turn-off Time

Enter the time span after which the display illumination should be turned off after a button of the aquaero has been pressed. Adjustable in 30-second-steps from 30 to 300 seconds, alternatively always on (value > 300).

11.4. Switch Time

Enter the time span after which the display should automatically switch to the next screen. Adjustable in 1-30-second-steps from 1 to 240 seconds, alternatively no automatic switches (value > 240).

11.5. LCD switch-off

If active, the display is completely shut off after the turn-off time and no text is visible.

11.6. USBLCD-Mode

Starts the USBLCD-Mode to output text via PC-software on the Display. To exit the USBLCD-Mode, push the button "set/mode."

11.7. USBLCD after Boot

Here you can choose if the device should directly activate the USBLCD-Mode when booting. To leave the USBLCD-Mode press the button "set/mode".

11.8. Aquaero-Name

Here, you can enter a user-defined name for the device which is shown in the display mode. See 7.1.1. Definition of Names.

11.9. Page Setup

Here, you can en- or disable single screens shown in the display mode. These screens are:

Sensor overview

Sensors 1 and 2

Sensors 3 and 4

Sensors 5 and 6

Fan overview

Details Fan 1

Details Fan 2

Details Fan 3

Details Fan 4

Fan 1+2 voltage

Fan 3+4 voltage

aquastream 1 page 1 of 2

aquastream 1 page 2 of 2

aquastream 2 page 1 of 2

aquastream 2 page 2 of 2

Flow sensor 1

Flow sensor 2

tubemeter

Power measurement 1

Power measurement 2

Clock

aquaero-Info 1

aquaero-Info 2

By selecting the entry "Back" you exit this menu entry. For details about the individual screens see 6.2. If all screens are deactivated, the start screen is shown permanently as is the case when the aquaero is turned on.

11.10. Back

Leaves the submenu and returns to the menu "Settings".

12. Menu "Relay Parameters"

This menu is used for the configuration of the emergency shutdown function. This function requires further components (connecting cable for the relay output, where applicable a standby power supply) as well as the correct integration of the relay output into the ATX-control line of the PSU or into the connector of the power-button on the mainboard. Optimally configured, this function can effectively prevent hardware damages when one or more components fail even if the PC already crashed a long time ago and software solutions failed.

12.1. Alarm On/Off

Here you can activate and deactivate respectively the entire emergency shutdown function. If you choose "Emergency shutdown off", all further settings remain deactivated and the PC will not be shut down under any circumstances.

12.2. Alarm-Off-Timeout

Enter the time span for the advance warning between crossing an alarm threshold and turning off of the PC. Adjustable in 5-second-steps from 0 (immediate shutdown) to 180 seconds.

12.3. Alarm-Events

Here, you can the en- or disable individual events that lead to the emergency shutdown. The events are:

- Alarm fan 1
- Alarm fan 2
- Alarm fan 3
- Alarm fan 4
- Temp.-Alarm
- Flow Alarm 1
- Flow Alarm 2
- Alarm Level
- Water Wave
- Pump 1 Error
- Pump 2 Error

By selecting the entry "Back" you will exit this menu.

12.4. Relay On/Off

By selecting this menu point, the relay is manually switched on. The status of the relay may change again for instance when an alarm is triggered or when the timer-function is used. If the relay is integrated into the ATX-control line of the PSU this function might need to be executed to start the PC. You can leave the screen by pressing the button "set/mode" again.

12.5. Relay Usage

Here you can setup the relay according to how you want to use it. Depending on the setting the relay is addressed differently to shutdown the PC in case of an alarm-event. A correct setup in this menu is crucial for the emergency shutdown function of the PC! If the relay is connected to the power button connection on the mainboard please select "Power Button", with the integration into the ATX-control-line of the PSU please select "ATX-Break-Line".

12.6. Alarm Time

Here you can select how long the relay should be switched in the case of an alarm. A correct setup in this menu is crucial for the emergency shutdown function of the PC! If the relay is connected to the power button connection on the mainboard please select a value of at least four seconds (default setting is 8 seconds).

12.7. Back

Leaves the submenu and returns to "Settings".

13. Menu "LED Parameters"

Select one of the two LEDs from the list by pressing the buttons "up" and "down" and confirm your selection by pressing the button "set/mode". To exit the menu "LED Parameters" select the entry "Back" and confirm your selection by pressing the button "set/mode".

13.1. Sensor 1 (auto)

Select a temperature sensor after which the brightness of the LED should be regulated. Selectable sensors are sensors 1 to 6 as well as "All Sensors" and "No Sensor". The brightness of the LED is determined by the start-up and full load thresholds of the sensors. If more than one sensor is selected per LED, the sensors are first analyzed individually and the highest result (i.e. the highest brightness) is used to control the LED.

If the brightness of the LED was manually adjusted, this call deactivates the manual regulation and activates the temperature-dependent regulation.

13.2. Sensor 2 (auto)

see also 13.1. Sensor 1 (auto).

Allows the selection of an additional sensor to regulate the brightness of the LED.

13.3. Brighter/Darker

Select here whether the LED should become brighter or darker with increasing temperature at the assigned sensors.

13.4. Brightness

Activate the manual regulation of the brightness for the LED and allows the setting of a constant brightness. The entered value is represented by a graphical bar.

If the brightness of the LED was regulated temperature-dependent, this call deactivates the temperature-dependent regulation and activates the manual regulation.

13.5. Flash when Alarm

By activating this function the connected LED flashes when an alarm is triggered.

13.6. Back

Leaves the submenu and returns to "LED Selection".

14. Menu "Clock and Timer"

14.1. Setting the Clock

Enter the current day of the week as well as the time (24 hour format). As long as the device is supplied with power the weekday and time remain current. If the aquaero is connected to the standby-power supply of the PSU the time stays current even when the PC is turned off (soft-off).

14.2. Turn-On Time 1

Enter a time at which the relay should switch on. All individual weekdays as well as "Every Day", "Mo to Fr" as well as "Weekend" are selectable. By selecting "Never" the switch time is deactivated. Furthermore you can set the exact time (24 hour format) at which the process should be executed.

14.3. On-Time 1

Determines how long the relay should remain on after "Turn On Time 1". Adjustable in 1-30-second-steps from 1 to 240 seconds, alternatively "Permanently on" (value > 240).

14.4. Turn-On Time 2

Enter a second time as described in 14.2. Turn On Time 1.

14.5. On-Time 2

Enter a second time as described in 14.3. On-Time 1.

14.6. Turn-Off Time 1

Enter a time at which the relay should switch off. All individual weekdays as well as "Every Day", "Mo to Fr" as well as "Weekend" are selectable. By selecting "Never" the switch time is deactivated. Furthermore you can set the exact time (24 hour format) at which the process should be executed.

14.7. Off-Time 1

Determines how long the relay should remain off after "Turn Off Time 1". Adjustable in 1-30-second-steps from 1 to 240 seconds, alternatively "Permanently off" (value > 240).

14.8. Turn-Off Time 2

Enter a second time as described in 14.6. Turn Off Time 1.

14.9. Off-Time 2

Enter a second time as described in 14.7. Off-Time 1

14.10. Back

Leaves the submenu and returns to the menu "Settings".

15. Menu "Periph.-Parameters"

15.1. aquastream 1/2

With application of aquastream-pump(s) with a firmware-revision 1.05 or higher a connection between the aquastream controller(s) and the aquaero is possible via a separately available cable. This allows the setup of the functionality of the pump(s). Besides the standard settings, the deaeration program can be activated and the pump frequency can be changed between 42 and 74 Hz.

Warning: Please monitor the correct function of the pump after changing the pump frequency! The use of a flow sensor and an properly activated flow alarm is recommended.

When simultaneously connecting two aquastream controllers at least one of these controllers must be a revision 3 or higher. Two separate addresses must be activated. Details may be found in the manual for the aquastream.

15.2. Multiswitch 1/2

Here you can configure up to two multiswitch boards connected via the aquabus to the aquaero (accessory, not included in delivery). The following settings are available:

Load outputs / LED-outputs:

Here you may determine whether the 8 load- and LED-outputs should be used as a bargraph and choose the data to be displayed. Possible settings:

- No bargraph
- Fan 1-4 rpm
- Fan 1-4 Percent
- Sensor 1-6 Temperature

Switch relay:

Here you can manually switch the relay.

back:

Leaves the submenu.

15.3. tubemeter

Here you can configure a tubemeter (liquid level sensor, optional accessory, not included in delivery) that is connected via the aquabus to the aquaero. The following settings are available:

Fill level alarm

Set the fill level in % below which the PC-emergency-shutdown is activated. (Only works with additional components.)

Should you be using the relay output for other uses, you can enter the switch value here.

Wave alarm

Adjust the minimum fill level in % of the maximum value below which the PC-emergency-shutdown is activated. (Only works with additional components.)

Should you be using the relay output for other uses, you can enter the switch value here.

Display unit

Here you may choose if the current fill level should be displayed in % or mm.

LED blinking

Here you can de/activate the blinking of the LED at the tip of the sensor. This setting only has an optical effect and has no influence on the measurement.

back:

Leaves the submenu.

15.4. Back

Leaves the submenu and returns to "Settings".

16. Menu „Power Measurement“

This function allows the calculation of the absorbed and emitted power of up to two cooling circulations. A measurement of the water tempera-

ture at two points and the flow-measurement are required for the usage of this function. Optimally these measurements should be in one circulation and the temperature points should be at the supply and return lines of the radiator.

From the difference in temperature and the flow-speed the emitted heat-energy is calculated.

To calculate the power, the heat capacity of water is needed, which is 4187 Ws/(kg * K). Therefore an energy of 4187 Ws is needed to heat up 1 kg of water by 1 Kelvin.

Power= heat capacity * volumetric current („flow“) * difference in the temperature

The power measurement is generally somewhat problematic due to the inertia of the system, especially shortly after the start up of the system the power measurement will show values that deviate from the real power. Also every additive to the water will change the heat capacity of the cooling liquid, which can not be taken into consideration in the calculation of the aquaero. You should therefore regard the calculated value only as interesting additional information.

16.1. Power Measurement 1 Sensor 1 (cold side)

Choose the temperature sensor with the lower temperature for the power measurement 1. This for instance could be the supply line of a water cooler or the return line of the radiator.

16.2. Power Measurement 1 Sensor 2 (warm side)

Choose the temperature sensor with the higher temperature for the power measurement 1. This for instance could be the return line of a water cooler or the supply line of the radiator.

16.3. Power Measurement 1 Flow Sensor Selection

Select the appropriate flow sensor for the power measurement 1.

16.4. Power Measurement 2 Sensor 1 (cold side)

Choose the temperature sensor with the lower temperature for the power measurement 2. This for instance could be the supply line of a water cooler or the return line of the radiator.

16.5. Power Measurement 2 Sensor 2 (warm side)

Choose the temperature sensor with the higher temperature for the power measurement 2. This for instance could be the return line of a water cooler or the supply line of the radiator.

16.6. Power Measurement 1 Flow Sensor Selection

Select the appropriate flow sensor for the power measurement 2.

16.7. Back

Leaves the submenu and returns to "Settings".

17. Menu „Profile Settings“

The aquaero can save 2 different profiles including its settings internally. With a profile, all fan and sensor settings are saved but not names and hardware specific data like sensor offsets and calibration values. This data is saved independently from the profile.

The usage of these profiles allows you for instance to set up the system for maximum cooling performance and for a low-noise operation and to switch between these profiles quickly..

17.1. Load Profile 1

Loads the saved profile-settings from profile 1.

17.2. Load Profile 2

Loads the saved profile-settings from profile 2.

17.3. Copy Profile

Copies the data from the currently active profile to the inactive profile. If for instance profile 1 is loaded, the data from profile 1 is copied to profile 2. All previous data from profile 2 will be overwritten.

17.4. Default Setting

Overwrites the data of the current profile with the default values of the aquaero.

NOTE: If the relay is used to switch the ATX-break-line, the computer will be shut down immediately because also the data of the relay is returned to the default setting. In order to avoid data loss, you should therefore disconnect all devices except the aquaero from the PSU prior to loading the default settings!

18. Example configurations

In the following chapters, some configurations are explained in an exemplary way. The sensors and fan canals used can easily be changed to meet your actual needs.

18.1. Progressive Regulation of a Fan via a Temperature Sensor

Example configuration:

Sensor 1 measures the CPU-temperature

The CPU-fan is connected to the fan canal 1 of the aquaero

Solution:

Enter the following values in the sensor parameters for sensor 1:

Start-up threshold: 30 °C

Full load threshold: 50 °C

Now enter the following values in the fan parameters for fan 1:

Sensor 1 (Auto): sensor 1

Regulation options: Progressive

Result:

When a temperature of 30 °C is measured at sensor 1, the fan 1 is switched on at a low speed and is progressively regulated in the temperature area up to 50 °C. Above 50 °C the fan permanently runs at full speed.

18.2. Regulation of a constant water temperature in a water-cooling system

Example configuration:

Sensor 1 measures the water temperature

Two radiator fans are connected to the fan canals 1 and 2 of the aquaero

Solution:

Enter the following values in the sensor parameters for sensor 1:

Target temperature: 35,0 °C

Now enter the following values in the fan parameters for fans 1 and 2:

Sensor 1 (Auto): Sensor 1

Regulation options: Fixed

Result:

When a temperature of 35 °C is measured at sensor 1, the fans 1 and 2 are switched on at a low speed. The fan speed is regulated so that the temperature is held steadily at 35 °C if possible. If the temperature rises further, the fans are regulated up to their maximum performance. If the temperature drops, the fans are slowed down.

18.3. Temperature-dependent Illumination

Example configuration:

Sensor 1 measures a temperature

A red LED is connected to the LED-connector 1 of the aquaero

A green LED is connected to the LED-connector 2 of the aquaero

Solution:

Enter the following values in the sensor parameters for sensor 1:

Start-up threshold: 30 °C

Full load threshold: 50 °C

Now enter the following values in the LED parameters:

LED 1:

Sensor 1 (Auto): Sensor 1

Lighter/Darker: Brighter if warmer

LED 2:

Sensor 1 (Auto): Sensor 1

Lighter/Darker: Darker if warmer

Result:

With climbing temperatures at the sensor 1 the red LED will get brighter while the green LED gets darker. Below 30 °C at sensor 1 only the green LED and above 50 °C only the red LED will be lit. Suitable to illuminate the reservoir container of a water-cooling system, which changes the color temperature-dependently from green to yellow to red.

18.4. Emergency Shutdown of the PC on Temperature Alarm

Example configuration:

Sensor 1 measures a temperature

The relay output is integrated into the ATX-control-line (special accessories needed)

The standby power supply is connected (special accessories needed)

Solution:

Enter the following values in the sensor parameters for sensor 1:

Alarm threshold: 65 °C

(all other sensors at very high values respectively)

Now enter the following values in the relay parameters:

Alarm-Off: Emergency shutdown on

Alarm-Off Timeout: 10 seconds

Alarm-Events: Temperature alarm: on

Relay-Type: "Make-Contact"

Relay-Usage: ATX-Break-Line

Alarm Switch Length: Switch permanently

Result:

When the temperature climbs to 65 °C and above at sensor 1, a warning is shown in the display for 10 seconds (Alarm-Off-Timeout). If the temperature remains at or above 65 °C the PSU is turned off by the relay.

19. Special Notices

19.1. Usage of the Relay as a Power Button on the mainboard

If the relay output of the aquaero is connected to the power button of the mainboard and is correctly configured, the computer can be switched on via the buttons of the aquaero. This requires a connected standby-power-supply (special accessories).

19.2. Usage of the Relay to Interrupt the ATX-control-line

If the relay output of the aquaero is integrated into the ATX-control-line of the PSU, the standby-power-supply must be connected. Suitable cables for both functions are available as special accessories.

To start the computer for the first time, the relay must be switched on manually once. This is done in the menu "Relay Parameters".

19.3. Starting of the PC when using the Standby-Power-Supply

When using the standby power supply on the aquaero, a menu shows up when the PSU is switched on. In this menu you can choose the usage of the relay. Depending on the configuration you need to select the „ATX-Break-Line“ or „Power-Switch“ and confirm the selection by pressing the „set/mode“ button. When using the ATX-Break-Line, the PC may now be switched on via the main power button. When the relay is used as a power switch, you can start your PC by pressing the „set/mode“ button. This menu shows up after every cut in the power supply.

Please note: If the PC starts up immediately after pressing the “set/mode” button when using the ATX-Break-Line, „Restart after AC power loss“ (or similar) is most likely activated in the computer bios.

19.4. Restrictions of the Emergency Shutdown

The emergency shutdown function, if connected and configured properly, can prevent damages to your hardware. However no protection can be a hundred percent. **We therefore deny any liability for damages that are created by or in spite of using this function.** Especially with the connection as a power button on the mainboard the emergency shutdown may remain unsuccessful!

19.5. Flow Alarm and the aquastream-pump

If an aquastream-pump with a firmware-revision 1.04 or higher is connected to the aquaero via the separately available 10-pin cable and an alarm is triggered by the flow sensor, the pump is automatically switched to the standard mode and the user-frequency is reset to the default value. This change is stored permanently in the pump controller. The pump frequency can be readjusted again manually in the periphery

menu of the aquaero and once again the new user-frequency will be stored permanently in the pump controller.

19.6. Regulation of Contrast when Switching On

When switching on the device, the contrast of the display can be regulated by pressing the arrow buttons "up" and "down." By doing this the start process is extended and the the normal operation is temporarily suspended. After the last press of a button it will take a moment before the operation starts!

19.7. Changing the front plate

The front plate of the aquaero can be exchanged for different colored plates (not included in delivery). To do this, simply unscrew the four mounting screws in the corners, change the front plate and carefully re-tighten the screws.

20. Troubleshooting

20.1. Deletion of all Settings (EEPROM-Reset)

In individual cases it can occur that the settings stored in the device are destroyed for example if the power supply to the device is interrupted during a writing process. In this case, all default settings can be reinitialized. To do this, hold the button "set/mode" when switching on the device. The Display will read "Warning EEPROM-Reset, please hold 3 seconds". After a successful deletion, "EEPROM resetted" will appear in the lower line of the display. Please let go of the button, the device will restart automatically.

21. Technical Data

Current consumption 5 V Standby:	typ. 50 mA
Current consumption 5 V with Display:	typ. 320 mA
Load capacity per fan channel:	max. 5 W
Load capacity of the switch output:	max. 12 V, max. 1 A
Operating ambient temperature:	15 to 35 °C

Now that you have completely read the instructions, we wish you much joy with our products. For further questions please do not hesitate to contact us via e-mail or also in our support forum.

