

User and installation manual



aquaero 5 aquaero 6

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1. Scope of delivery

1x aquaero 5/6 (ready to install)
4x Temperature sensor 70 cm
1x Internal USB connection cable (5 pins), length ca. 100 cm
1x aquabus / speed signal cable
Mounting material

aquaero 5 XT and aquaero 6 XT only:
1x aquaremote infrared remote control

2. Preface

Dear valued customer,

we congratulate you on the purchase of an aquaero made by Aqua Computer GmbH & Co. KG. We are one of the most renowned manufacturers of PC water cooling systems in Germany. Our production meets highest quality standards.

Should you have questions or suggestions regarding our products, you are invited to visit the forums on our website www.aqua-computer.de or contact our customer support.

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.

We hope you will enjoy your new aquaero.

Your Aqua Computer team

3. Safety precautions

The following safety precautions have to be observed at all times:

1. **Read this manual thoroughly and entirely!**
2. **Save your data onto suitable media before working on your 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! The electronic components and the heat sink (if installed)**

may get very hot during operation! Wait for at least 30 minutes after powering down the device before touching any components!

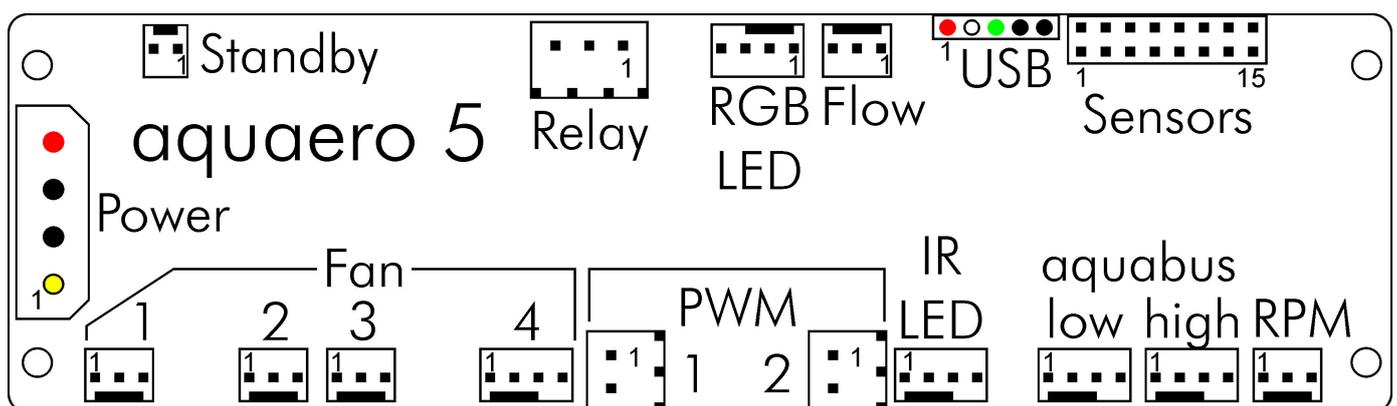
5. Do not turn on your computer unless you are absolutely certain that all cables are securely and correctly connected to the aquaero!
6. The relay output may be powered at a maximum of 12 V! The current must not exceed 1 Ampere!
7. This product is not designed for use in life support appliances, devices, or systems where malfunction of this product can reasonably be expected to result in personal injury. Aqua Computer GmbH & Co. KG customers using or selling this product for use in such application do so at their own risk and agree to fully indemnify Aqua Computer GmbH & Co. KG for any damages resulting from such application.

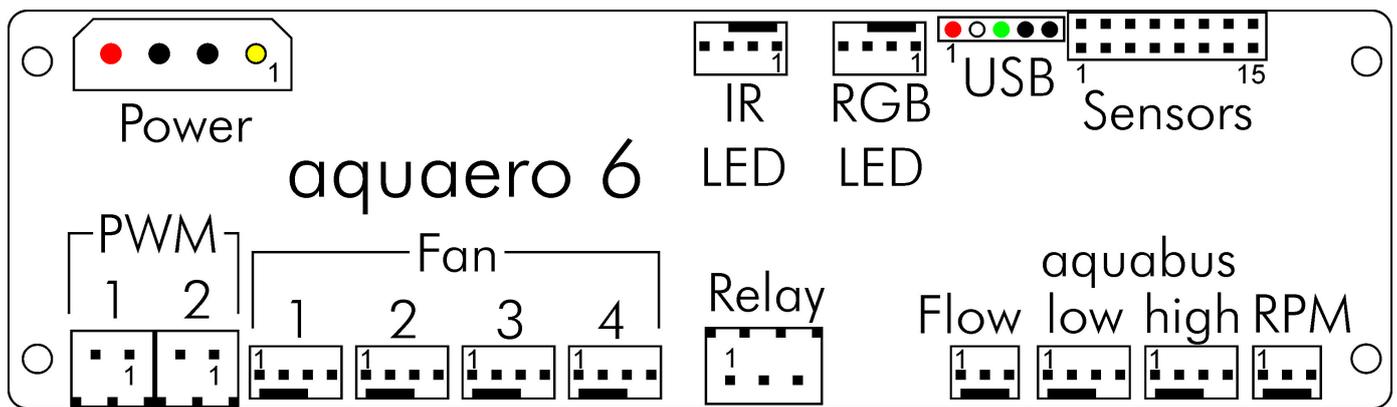
4. Electrical connectors

ATTENTION: Completely turn off your power supply unit or disconnect the mains power cord from the wall outlet before connecting or disconnecting any cables to/from the device! The PCB and components may get very hot during operation! Wait for at least 30 minutes after powering down the device before touching the PCB, heat sink or any components of the device!

4.1. Connector overview

The following schematic shows the connectors of the aquaero 5/6 units:





4.2. Connector "Power"

Please connect a HDD power plug of your PSU to this connector. Do not use excessive force but double check the polarity of the plug if you are having trouble to connect.

Pin assignment:	Pin 1	+12 V
	Pin 2	GND
	Pin 3	GND
	Pin 4	+5 V

4.3. Connector "Fan 1/2/3/4"

Voltage regulated fan outputs with speed signal processing.

aquaero 5:

Maximum output power is 19.8 W (1.65 A at 12 V) for each channel. Maximum power is dynamically limited through temperature monitoring and will decrease considerably at lower output voltages. In case an output amplifier temperature rises to ca. 95 °C, the output is set to 100 % power. After cooling down to ca. 70 °C, normal operation will resume. If the temperature rises to ca. 100 °C, the output will be permanently disabled. To reactivate the output, the aquaero (or the complete PC) has to be disconnected from power for a short period of time. Despite this overload protection, the fan outputs are not short-circuit proof!

Special feature "Fan 4": This connector can be used for conventional fans or PWM controlled fans. For PWM fans, select "Outputs" → "Fans" → "Fan 4" from the menu and set "Control mode" to "PWM controlled".

aquaero 6:

Maximum current is 2.5 A per output independent of output voltage, resulting in a maximum power of 30 W at 12 V. Outputs will be switched off if amplifier temperatures reach a critical level and will automatically be reactivated when cooled down. If an output current of 3 A is exceeded, the output will be permanently disabled. To reactivate the output, the aquaero (or the complete PC) has to be disconnected from power for a short period of time. The fan outputs are short-circuit proof.

All fan connectors can be used for conventional fans or PWM controlled fans. For PWM fans, select "Outputs" → "Fans" → "Fan 1-4" from the menu and set "Control mode" to "PWM controlled".

Special feature "Fan 1": This connector can alternatively be connected to a flow sensor. If connected to a flow sensor, select "Sensors" → "Flow sensors" → "Flow 2" from the menu and set "Mode" to "Fan 1 = Flow sensor".

Pin assignment: Pin 1: GND

Pin 2: 0-12 V

Pin 3: Speed signal

Pin 4: PWM signal (aquaero 5: Fan 4 only)

4.4. Connector "PWM 1/2"

Pulse width modulated 12 V outputs, maximum current load 1 A, carrier frequency 15 kHz. Suitable for example for 12 V LEDs, not compatible with PWM fans or pumps.

Pin assignment: Pin 1: VCC

Pin 2: GND

4.5. Connector „IR LED“

Connector for an infrared transmitter LED. This output is not yet functional with firmware version 2007 and will be activated with an forthcoming firmware update.

Pin assignment: Pin 1: GND

Pin 2: +12 V

Pin 3: Signal

Pin 4: +5 V

4.6. Connector “aquabus low speed/high speed”

Connectors for communication with other devices from Aqua Computer. The aquaero 5/6 features one „low speed“ (aquabus 1) and one „high speed“ (aquabus 2) port.

Products compatible to the “low speed” port:

- Port disabled since firmware version 2000, currently no supported devices.

Products compatible to the “high speed” port:

- aquastream ULTIMATE
- aquastream XT
- Aqua Computer D5 pump motor with aquabus interface
- flow sensor „high flow USB“
- flow sensor mps flow
- poweradjust 2/3 USB (firmware version 1003 or higher)
- farbwerk
- aqualis XT series
- aquainlet XT series
- pump adapter for aqualis with integrated fill level sensor
- pressure sensor mps pressure

Please note: Both aquabus connectors are also compatible with 3 pin aquabus devices. The additional “pin 4” supplies power to compatible 4 pin aquabus devices. For example, a poweradjust 3 unit (3 pin) and a mps flow 200 unit (4 pin) can simultaneously be connected using a 4 pin Y adapter cable (art. 53124).

Pin assignment: Pin 1: GND

Pin 2: SDA

Pin 3: SCL

Pin 4: +5 V

4.7. Connector „RPM/Tacho“

Depending on configuration, the aquaero 5/6 can generate a speed signal which is available for processing through this connector. This speed signal can for example be configured to cease function upon alarm events and thereby relay the alarm status to a fan connector of your motherboard. Functionality of the speed signal can be configured using the menu entries “Alarm” and “Timer”. For details on how to configure your motherboard to process the speed signal, please refer to the manual of your motherboard.

4.8. Connector „Sensors“

Connector for up to 8 temperature sensors. For compatible sensors, please refer to chapter 4.14.

Pin assignment:

- Pin 1/2: Sensor 1
- Pin 3/4: Sensor 2
- Pin 5/6: Sensor 3
- Pin 7/8: Sensor 4
- Pin 9/10: Sensor 5
- Pin 11/12: Sensor 6
- Pin 13/14: Sensor 7
- Pin 15/16: Sensor 8

4.9. Connector „USB“

This connector is used for USB communication to the PC and for standby power supply. Take special care to make sure the pin alignment matches your motherboard!

Pin assignment:

Pin 1	+5 V	(red)
Pin 2	D-	(white)
Pin 3	D+	(green)
Pin 4	GND	(black)
Pin 5	not connected	

4.10. Connector „Flow“

Connector for a flow sensor. Use sensors and cables specified by Aqua Computer only!

Pin assignment:

- Pin 1: GND
- Pin 2: 5 V
- Pin 3: Speed signal

4.11. Connector „RGB LED“

Connector for up to three LEDs or one two-color or RGB illumination module (not included in delivery). High brightness LEDs (2-3.2 V, 20 mA) may be connected without series resistor, a series resistor is built into the aquaero.

Pin assignment:

- Pin 1: VCC LED 1 (red, for 2.1 V forward voltage)
- Pin 2: VCC LED 2 (green, for 3.2 V forward voltage)

Pin 3: GND

Pin 4: VCC LED 3 (blue, for 3.2 V forward voltage)

4.12. Connector „Relay“

Floating contact (changeover contact). May be used for emergency shutdown of the PC which requires additional accessories (art. no. 53047 and 53080, not included in delivery) or for free use. Maximum contact rating 1 A, 12 V.

Pin assignment aquaero 5: Pin 1: normally open
 Pin 2: normally connected
 Pin 3: common connector

Pin assignment aquaero 6: Pin 1: normally connected
 Pin 2: normally open
 Pin 3: common connector

4.13. Connector „Standby“ (aquaero 5 only)

Connector for additional power supply from the 5 Volts standby power line of the power supply unit. If connected to standby power, the aquaero 5 will remain functional while the computer is in soft off state even if no USB standby power is supplied. For use with Aqua Computer article number 53047 only (not included in delivery)!

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

4.14. Compatible optional accessories for the aquaero 5/6

- aquaremote infrared remote control (article no. 53088, not compatible with aquaero 5/6 LT!)
- poweradjust 3 USB (article no. 53166/53167)
- aquastream ULTIMATE (article no. 41108)
- aquastream XT (article no. 41059/41060/41061)
- Aqua Computer D5 pump motor with USB and aquabus interface (article no. 41093)
- Flow sensor (article no. 53061)
- Flow sensor „high flow“ (article no. 53068)
- Flow sensor “high flow USB” (article no. 53129)
- Flow sensor cable (article no. 53027/53100)
- mps flow 100/200/400 (article no. 53130/53131/53132)

- mps pressure $\Delta 40/\Delta 100/\Delta 500/1000/\Delta 1000$ (article no. 53133/53134/53135/53136/53160)
- farbwerk (article no. 53170/53207)
- Real Time Clock module (article no. 53127)
- Temperature sensor (article no. 53026)
- plug&cool temperature sensor (article no. 53025)
- Temperature sensor inline G1/4 (article no. 53066)
- Temperature sensor internal/external thread G1/4 (article no. 53067)
- Temperature sensor G1/4 (article no. 53147)
- RGB illumination module (article no. 34930)
- aquaero power connect - 24 pin ATX standby power / ATX break (article no. 53047)
- Plug for relay connector, 3 contacts (article no. 53080)
- Plug for PWM connector, 2 contacts (article no. 53036)
- aquabus / speed signal cable 3 pin (article no. 93111/53161)
- aquabus Y adapter 3 pin (article no. 53063)
- aquabus cable 4 pin (article no. 53122/53162)
- aquabus Y adapter 4 pin (article no. 53124)
- Water cooler for aquaero 5, G1/4 (article no. 53093, aquaero 5 only)
- Passive heat sink for aquaero 5 (article no. 53094, aquaero 5 only)
- Passive heat sink for aquaero 6 (article no. 53158/53164, aquaero 6 only)
- Acrylic glass display cover for aquaero 5/6 PRO (article no. 53159)

5. Operation of the aquaero 5/6 device

Depending on the variant, the aquaero 5/6 can be operated and configured via USB connection, by using keys and display of the device itself or by using the aquaremote infrared remote control.

5.1. Operation via USB connection

The aquaero 5/6 can be connected to a PC via USB interface and can then be configured using the aquasuite software. Comprehensive visualization and logging options are also available in the aquasuite software. The aquasuite software can be used with any aquaero 5/6 variant (XT, PRO and LT).

Additionally, the aquaero can send keyboard and/or mouse input events to the PC (depending on variant). During USB initialization, the aquaero 5/6

will not only register as an aquaero 5/6 device, but also as a keyboard, a mouse, a multimedia device and as a infrared receiver. For example, the aquaremote infrared remote control can be used as a keyboard and mouse replacement for the PC.

5.2. Operation without USB connection

In general, all aquaero 5/6 variants can be used without USB connection to a PC, all settings are saved in the device itself and all temperature control processes are autonomously run by the micro processor in the device. Solely the aquaero LT variant requires a USB connection during configuration, the USB interface can be disconnected once the aquaero is configured. However, a permanent USB connection to the PC is recommended for power supply during standby of the PC to keep the clock and calendar of the aquaero up to date.

5.3. Operation via keys and display (aquaero 5/6 PRO and XT only)

Both aquaero 5/6 PRO and aquaero 5/6 XT are equipped with a LC display and keys and can be configured using these. Both variants provide three keys to the right of the display, the aquaero 5/6 XT additionally provides four programmable keys below the display.

The upper and lower key on the side of the display will select information pages during display mode and select and alter menu entries. The middle key on the side will open the device menu while in display mode and confirm selected menu entries or values.

The four additional keys below the display of aquaero 5/6 XT units speed up navigation through the menu. In display mode, the keys are pre-configured to select certain information pages. Key functions and labels can be assigned by the user, the keys can be configured to provide quick access to any menu entry or information page.

During configuration via keys and display, the aquasuite software should be closed on a connected PC! Otherwise, the aquasuite will overwrite and thereby cancel any settings made on the device itself.

Notice: The RGB color controllers can not be configured using the device display. Please use an USB connection and the aquasuite software to configure the RGB controllers.

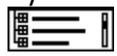
5.4. Operation via aquaremote (aquaero 5/6 PRO and XT only)

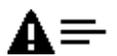
Both aquaero 5/6 PRO and aquaero 5/6 XT are equipped with an infrared receiver and can be operated using the aquaremote infrared remote control. The aquaremote is included in delivery of the aquaero 5/6 XT and can be bought separately for the aquaero 5/6 PRO.

Depending on current aquaero configuration, infrared commands received by the aquaero will either be processed for aquaero operation or forwarded as keyboard and mouse events to the PC via USB. For details, please refer to the next chapter.

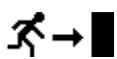
5.5. Configuration menu (aquaero 5/6 PRO and XT only)

In display mode, the configuration menu can be accessed by pressing the middle side key or the “OK” key on the aquaremote remote control. The symbols of the configuration menu will access the following functions:

 Access full menu listing.

 Show event list.

 Jump to sub-menu “Controllers”.

 Exit configuration menu.

 Activate profile 1/2/3/4.

The menu listing is dynamically assembled depending on aquaero variant (LT, PRO or XT) and connected sensors and expansion boards. For instance, the sub-menu “Sensors”/“Temperature sensors” will only show sensors currently connected to the aquaero, while adding a poweradjust expansion board via aquabus will instantly show an addition fan output in the sub-menu “Outputs”/“Fans”.

6. Infrared remote control aquaremote

The infrared remote control aquaremote can be used with any aquaero 5/6 XT or aquaero 5/6 PRO device. The infrared receiver is located left of the display of the aquaero. The aquaero 5 LT is not equipped with an infrared receiver and can therefore not be controlled by aquaremote.

6.1. Modes of operation “aquaero”, “PC keyboard”, “PC media keys”

Processing of infrared commands received by the aquaero depends on current mode of operation. Some keys have different functions assigned in the three modes of operation.



In “aquaero” mode, all keys will be processed by the aquaero and not forwarded to the PC. In “PC keyboard” and “PC media keys” mode, all keys will directly be forwarded to the PC and not be processed by the aquaero.

All modes of operation can be consecutively selected by pressing the “” key, alternatively the “aquaero” mode can be selected by pressing the “” key and the “PC media keys” mode can be selected by pressing the „TV” key. The circular mouse control pad and the three keys for volume control are forwarded to the PC in all modes. Please note that all modes and mouse control pad can be individually activated or deactivated in the aquaero, see chapter 19.1. for details. Deactivated modes can not be selected and corresponding keys of the remote control are not operational!

The currently selected mode is displayed on the aquaero display for approximately two seconds after switching modes. Additionally, in “PC keyboard” mode and in “PC media keys” mode, a “PC” label will be permanently displayed in the lower right corner of the display.

In all modes, the “” key toggles between lower and upper characters and the “Alt” (green) and “Alt” (blue) keys activate and deactivate the numbers and special characters printed in the corresponding colors.

6.2. Special functions in “aquaero” mode



	Exit menu
	One menu level up
	Show event list
	Previous
	Next
	Enter menu/confirm
	No function

During display mode, the keys „QWER” correspond to the four programmable function keys. The remaining keys will display the configured information pages („T” first page, „Y” second page, ...).

In the configuration menu, the keyboard can be used to enter the characters and numbers printed on the keys.

6.3. Special functions in "PC keyboard" mode



- ↩ No function
- ☰ Context menu
- ⬅️ ⬆️ ⬇️ ⬇️ Cursor keys
- OK ▶️ || Enter
- ⬅️ ⬇️ Page up/down

6.4. Special functions in "PC media keys" mode



- ↩ Menu navigation back
- ☰ Menu
- ⬅️ ▶️ Next/previous track
- ⬆️ ⬇️ Menu navigation up/down
- OK ▶️ || Play/Pause
- ⬅️ ⬇️ Menu +/-

7. Operation concept: Sensor, controller, output

The aquaero 5/6 uses an extremely flexible concept for linking sensors to the various outputs.

The device automatically determines which **sensors** are currently connected and will display only these sensors in the configuration menus. For example, after connecting a "poweradjust" unit to the aquaero 5/6 via aquabus connection, the corresponding sensors will appear in the configuration menus of the aquaero and can be used for automatic control.

Linking elements between (temperature) sensors and the outputs are the various **controllers**, which offer comprehensive configuration options. After selecting the appropriate controller model for the particular application, the controller can be configured. The controller will calculate and update an output value, which can then be assigned to an output.

After assigning a controller to an **output** and configuring output specific parameters like minimum power or start boost, the signal chain from sensor via controller to output is completely configured.

7.1. Sensors

The following sensors are available:

- Temperature sensors: All currently connected temperature sensors are automatically displayed.
- Virtual sensors: Can be used to determine maximum, average or minimum value of up to three temperature sensors each. Up to four virtual sensors can be configured.
- Software sensors: These values can be written into the device using third party software. They can for example be used to transmit the current CPU temperature to the aquaero 5/6 and use this value for controlling fan speeds. Up to eight software sensors can be configured.
- Flow sensors (Control processes can not be based on flow sensor values.)
- Power measurement: Allow calculating power dissipation from a temperature difference and corresponding flow rate. Up to four independent power values can be calculated. (Control processes can not be based on power values.)
- Fill level sensors (Control processes can not be based on fill level values.)
- Pressure sensors (Control processes can not be based on pressure values.)

7.2. Controllers

The following controller models are available:

- Curve controllers: Adjustable control curves, defined by 16 temperature values and corresponding output values.
- Set point controllers: Automatic output adjustment to match a predefined target temperature.
- Two point controllers: Simple on/off controller, using a lower and upper temperature limit.
- Preset values: Constant preset values.
- RGB LED controller: Color gradient controller for the RGB LED outputs, including temperature-dependent color gradients. (Use an USB connection and the aquasuite software to configure these controllers.)

7.3. Outputs

The following outputs are available:

- Fans
- Power outputs
- Relay output
- LED outputs
- Pumps

8. aquasuite software

The Windows software aquasuite is an extensive software suite and can be used for configuration and monitoring. The software is not required for operation though. All configuration parameters can be saved into the device's memory, the aquaero 5/6 XT and aquaero 5/6 PRO variants can also be configured using the keys and the device display.

Please note: Depending on the type of product you are using, some features described in the following chapters may not be available for your device.

8.1. Installation of the aquasuite software

For configuration and monitoring of aquaero 5/6 units, the aquasuite software is available for download from our website www.aqua-computer.de. You will find the most up-to-date version in the support section of the website.

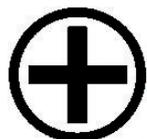
After downloading, install the aquasuite software. Depending on your selection during the installation process, the aquasuite software may start automatically upon restart or may be accessed through a symbol on your desktop or in the start menu.

8.2. Basic operation

The program window is divided into two main areas. On the left side, a list of "overview pages", data logger, device pages and the basic configuration page of the software is displayed, the right side shows the details of the currently selected list element. The list can be hidden or restored by clicking the arrow symbol in the upper left corner.

List elements may be minimized or maximized for easier access by clicking the title bar. The title bars may contain various symbols that will be explained in the following chapter.

8.3. Symbols in the headlines



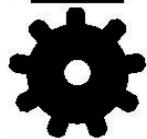
Click the plus symbol in the “Overview pages” headline to create a new overview page.



Clicking the monitor symbol will toggle desktop mode for this overview page. While desktop mode is active, the arrow in the symbol will have an orange color.



Clicking the padlock symbol will unlock or lock this overview page for editing.



Clicking the gear wheel symbol will access the basic configuration page of the selected list element.



In order to save all settings into a device, click the disk symbol in the headline.



This symbol indicates that communication with this device is not possible at the moment. Check USB connection and power supply of the device if necessary.



Clicking this symbol in the lower left corner of the aquasuite window will display the news feed on aquasuite updates.

9. Overview pages (aquasuite)

Current sensor readings and diagrams from all supported devices can be displayed in overview pages. For each device a pre-configured overview page is automatically generated the first time the device is connected to the PC. These pages can be individually modified and new pages can be created. Within one overview page, data from all connected devices can be accessed.

9.1. Desktop mode

Each overview page can be displayed directly on your desktop. You can enable desktop mode for an overview page by clicking the corresponding symbol in the list of overview pages. Desktop mode can only be enabled for one overview page at a time. With desktop mode enabled, elements of the overview page may cover program symbols on your desktop, but mouse clicks are transmitted to underlying desktop symbols.

If a overview page is unlocked for editing while desktop mode is active, the page will be displayed in the aquasuite window for editing and the current desktop will be displayed as background for your convenience.

9.2. Creating new overview pages and activating edit mode

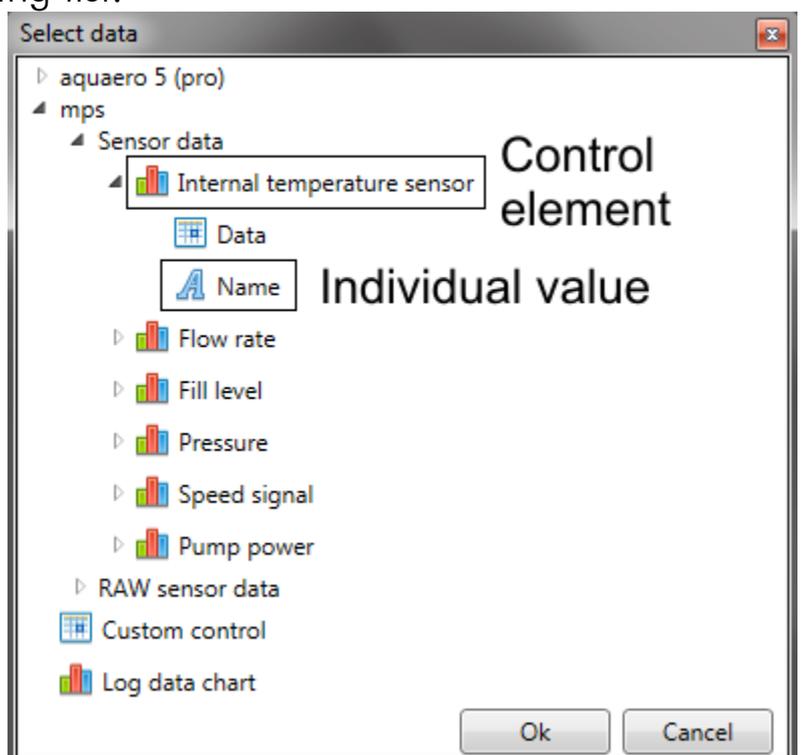
In order to create a new overview page, click the plus symbol in the headline "Overview pages". Existing overview pages can be unlocked for editing by clicking lock symbol in the page listing.

9.3. Adding new elements

If the currently selected overview page is unlocked for editing, a white plus symbol is displayed in the bottom right corner of the screen. Click the symbol to add a new element to the page and select the desired element from the following list.

All available elements are displayed in a tree diagram, click the arrow or plus and minus symbols to access individual items. Please note that individual values can be selected as well as higher-ranking control elements. Custom controls can be selected for example to import image files.

Confirm your selection by clicking "OK". The new element will be displayed in the upper left corner and the configuration window is displayed. Configure the element as described in the next chapters.



9.4. Editing existing elements

If the currently selected overview page is unlocked for editing, right-clicking an element will access a context menu. To access the settings of an element, select "Settings" in the context menu or simply double click the element. If you want to move an element, "drag" this element while holding down the

mouse button. Release the mouse button when the element is at the desired position.

9.5. Settings of individual values

If the currently selected overview page is unlocked for editing, right-click an element and select "Settings". You may also double click the element. Font face, size and color as well as position, decimal places and unit can be configured for individual values.

9.6. Settings of control elements

If the currently selected overview page is unlocked for editing, right-click an element and select "Settings". You may also double click the element. Apart from position, size and color, the style of the element can be selected and configured. The following styles are available:

- **Headline only:** Compact display as a headline.
- **Text:** Displays the numerical value in a box with a headline.
- **Bar graph:** Displays numerical value as well as bar graph.
- **Chart:** Displays the value in chronological sequence as a chart.
- **Gauge:** Displays the value as a analog gauge.

All display styles offer extensive configuration options, additionally statistical data such as minimum, maximum and average can be displayed.

9.7. Custom controls: Images, text, drawing elements

By using custom controls, simple drawing elements such as circles, rectangles and texts as well as images and more sophisticated elements can be added to an overview page. To do so, add a "Custom control" to an overview page. Switch to the "Display" tab in following dialog box, select the type of element to be created from the drop down menu and confirm your selection by clicking the "Load preset" button. Depending on the type of element, an additional dialog may appear before the code (XAML, Extensible Application Markup Language) of the new element is displayed in the lower part of the dialog window. You may want to customize the code. By clicking the "Ok" Button, the new control is saved to the overview page.

Example process to add an image: Select "Image" from the drop down menu and click the "Load preset" button. Select an image file using the following file selection dialog. The code is then displayed in the lower part of the dia-

log window an can be modified. Save the new control by clicking the “Ok” button. The picture will be displayed on the overview page.

More complex controls such as data bindings and animations are also available but will require some programming experience for configuration.

9.8. Log data chart

This element can be used to display charts on overview pages. The charts have to be created using the data log functionality of the aquasuite before they become available for overview pages. Please refer to the next chapter for details. Once a chart has been configured, it can be selected from the “Chart selection” list on the “Display” tab of the settings dialog.

9.9. Export and import of overview pages

Elements and complete overview pages can exported from the aquasuite and can then be imported either on the same PC or on other PCs. For export as well as import, the overview page must be in edit mode.

To export a complete page, right click a free spot of the page and select “Export page” from the context menu. To export individual elements, select the element or elements, perform a right click and select “Export selected” from the context menu.

For import, right click a free spot of the page and select “Import page” or “Import items” from the context menu. Using “Import page”, the current page will be deleted and only the imported page items will be displayed, using “Import items” will add the items from file to the current page without altering the existing items. During import, the elements will be assigned to devices using the following scheme:

- If a device with identical serial number is found on the computer, no changes are made.
- If no device with identical serial number is found on the computer, the element will be assigned to the first device found of identical type.

When importing complex pages with elements referring to more than one device, it is recommended to edit the device assignment in the file using a text editor prior to importing.

10. Data log (aquasuite)

Data from all connected Aqua Computer devices can be logged by the aquasuite. Logged data can then be analyzed by creating charts or be exported to files.

10.1. Log settings

The log settings can be accessed by clicking the “Log settings” element below the “Data log” headline in the listing. To log data, create a new log data set by clicking the plus symbol in the upper right corner of the settings window. Enter name, time interval and configure automatic deletion of old data to meet your requirements. You may then add the data sources to log by clicking the plus symbol in the “Data sources” window section. You may add an unlimited number of data sources to each log data set, the total number of log data sets is also unlimited.

10.2. Analyze data

Logged data can be visually evaluated as charts. To do so, select “Analyze data” below the “Data log” headline in the listing. The chart will initially be empty, directly below the chart are eight buttons to modify the chart. In the lower section of the window, the chart data can be configured.

To add data to the chart, first select the “Data sources” tab in the chart configuration and select a data set to be displayed. If no data sources are available, you will have to configure the log settings as described in the corresponding chapter of this manual. Select the time period to be displayed on the right side of the window and add the data to the chart by clicking the “Add data to chart” button. Repeat this procedure if you want to display more than one data set in the chart.

You may modify the chart using the “Chart setup” and “Data series setup” tabs. Finally, you can use the “Chart manager” tab to save the current chart configuration and to load or delete previously saved configurations. All saved chart configurations will be available on overview pages for the “Log data chart” element.

The currently displayed chart area can be changed using the following methods:

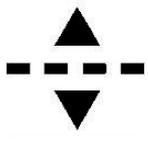
- Mouse wheel movements will zoom in and out.

- A double click on an axis will reset zoom level for this axis, a double click into the diagram will reset both axes.
- Selecting an area on an axis will zoom this axis to this area, selecting an area in the diagram will zoom both axes to this area.
- Mouse movement while right button is pressed will move the displayed area of the diagram.

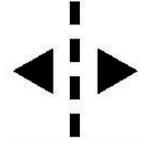
The currently displayed chart can be edited by using the buttons directly below the chart and may also be saved as an image file. The button corresponding to the currently selected function is highlighted by an orange frame. Please refer to the following list for details on each function:



To save the currently displayed chart as an image file, click the floppy disk symbol and select a name and location in the following dialog.



This function can be used to add horizontal lines to the chart. While this function is activated, simply click into the chart to add a line at the current cursor position.



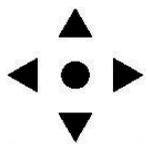
This function can be used to add vertical lines to the chart. While this function is activated, simply click into the chart to add a line at the current cursor position.



This function can be used to add annotations to the chart. While this function is activated, simply click into the chart to add an annotation at the current cursor position. By clicking into the text box, you may edit the text. You may also drag the little circle beside the text box to move the connecting line to the desired position. Use drag and drop to move existing annotations.



This function can be used to remove lines or annotations from the chart. While this function is activated, simply click the element to be removed.



This function can be used to move the visible portion of the chart. Press and hold the mouse button while moving the cursor in the chart to select the position to be displayed, then release the button.



This function can be used to zoom in and out. Use the mouse wheel or select the area to be displayed. You can reset the zoom settings by double-clicking in the chart area.



This function will completely remove the chart.

10.3. Manual data export

Saved data can be exported from the data log into a XML file. To do so, select “Analyze data” below the “Data log” headline in the listing. Select the “Data sources” tab in the chart configuration and select a data set to be exported. If no data sources are available, you will have to configure the log settings as described in the corresponding chapter of this manual. Select the time period to be exported on the right side of the window and start the export process by clicking the “Export data” button. Enter a file name and path in the following dialog window.

10.4. Automatic data export

The automatic data export feature can be used to save data from the aqua-suite into an XML file on the hard disk or in the RAM („memory mapped file“) in a regular time interval. The automatic data export will always overwrite the previously saved data, so the file always contains only the most recent data set. Select “Automatic data export” below the “Data log” headline in the listing to access the settings screen. Create a new export data set by clicking the plus symbol in the upper right corner of the screen. Enter name, path and time interval to meet your requirements. You may then add the data sources to log by clicking the plus symbol in the “Data sources” window section. You may add an unlimited number of data sources to each export data set, the total number of export data sets is also unlimited.

11. Sensor configuration (aquasuite/device menu)

aquasuite: Select “Sensors” from the device list for the device to be configured.

Device menu: Select “Sensors” from the menu list and confirm by pressing the middle side key.

11.1. Temperature sensors

For each temperature sensor, a sensor name can be entered and an offset can be adjusted if necessary. The offset will be added to the current sensor reading, this function can be used if the real temperature differs from the temperature displayed in the aquaero.

Names and offsets can also be entered for virtual sensors and software sensors.

11.2. Virtual temperature sensors

Mode and up to three data sources (temperature sensors) can be selected for each of the four virtual temperature sensors. The selected mode determines, how the virtual temperature is calculated from the data sources:

- Highest/lowest temperature: The virtual temperature sensor always shows the highest/lowest value of all assigned data sources.
- Average temperature: The virtual temperature sensor always shows the average value of all assigned data sources.
- Temperature difference: The virtual sensor reading equals the deviation of the first assigned temperature sensor from the second assigned temperature sensor as a signed value. Exactly two sensors must be assigned. If only one temperature sensor is assigned, the virtual sensor will not show a result, an addition third assigned temperature sensor will be ignored.
- Absolute temperature difference: The virtual sensor reading equals the deviation of the first assigned temperature sensor from the second assigned temperature sensor as an unsigned value. Exactly two sensors must be assigned. If only one temperature sensor is assigned, the virtual sensor will not show a result, an addition third assigned temperature sensor will be ignored.

In the device menu, each data source can be selected from a list of available sensors. In the aquasuite, data sources from the sensor list can be assigned to the corresponding areas labeled "Temperature sensor 1-3" using drag&drop. Existing assignments can be deleted by clicking the red "X" symbol.

11.3. Software temperature sensors

Eight available software temperature sensors can be used to transfer temperature sensor readings from third party software to the aquaero. Two procedures are implemented:

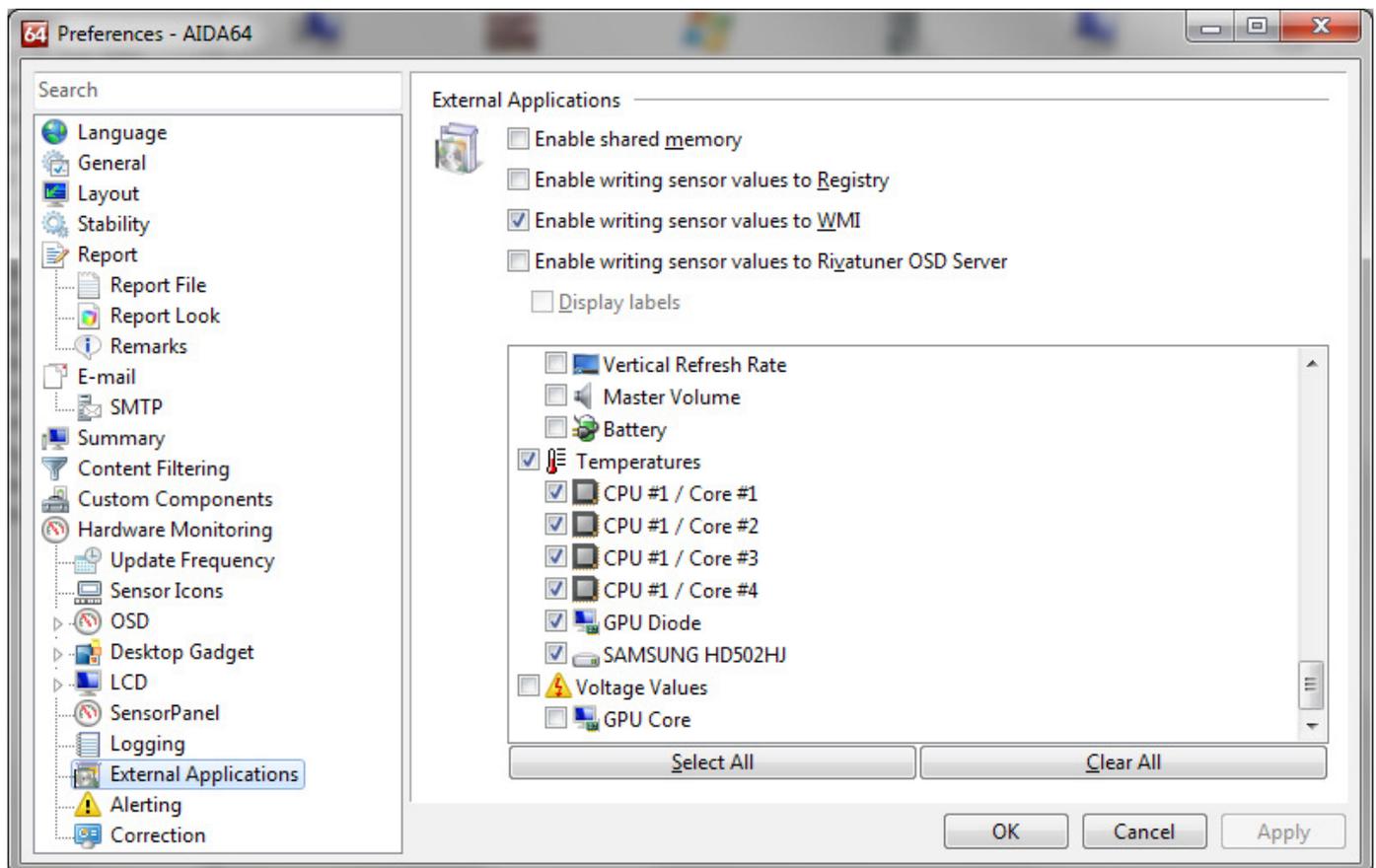
1. A third party software provides data, the "Aqua Computer Service" reads this data and transmits it to the aquaero via USB connection. This requires the third party software to be installed, configured and running as well as the "Aqua Computer Service" to be installed and active.

2. A third party software directly transmits data to the aquaero via USB connection. This requires the third party software to be installed, configured and running.

Currently, the “Aqua Computer Service” supports data transfer from „HWiNFO“ (REALiX, Freeware, www.hwinfo.com), „Open Hardware Monitor“ (Open Hardware Monitor Project, Open Source/MPL 2.0, www.openhardwaremonitor.org) and „AIDA64“ (FinalWire Ltd., subject to license fees, www.aida64.com).

HWiNFO and Open Hardware Monitor automatically export all temperature sensor values and do not need to be configured. When using HWiNFO, the “Sensor Status” Window has to be open.

In the AIDA64 preferences menu, writing to WMI must be activated in the „external applications“ sub-menu:



After activating “Use sensor with Aqua Computer Service” in the aquasuite, click the “Select data source” button to assign the currently selected software sensor to a temperature sensor provided by third party software.

Software sensor values will only be available while all involved programs are running, so no data will be available while the operation system is starting up or shutting down or if an involved program is closed. If no data is available

or the data has not been updated within the time interval defined as “Timeout in s”, the aquaero will use the “Fallback temperature” instead. As soon as data is available again, normal operation of the software sensor will resume automatically.

11.4. Flow sensors

A name can be assigned to each flow sensor and for mechanical flow sensors, a calibration value can be set. Calibration values for sensors sold by Aqua Computer can conveniently be selected from a drop-down list, a user defined value can be set for other flow sensor types.

Flow sensors models mps flow 100/200/400 and “high flow USB” have to be configured using a direct USB connection to the PC before they can be used as aquabus expansion devices with an aquaero. For these types, the “calibration value” defined in the aquaero will be ignored.

“Lower display limit” and “upper display limit” determine scaling of the flow bar graph in the flow information page on the aquaero display only and do not have any effect on sensor readings.

11.5. Power measurement

Up to four independent power measurements can be configured to calculate dissipated or absorbed power in up to for cooling loops. Prerequisites are two water temperature sensors and a flow sensor in the same cooling loop. The water temperature sensors are optimally installed into radiator inlet and outlet port.

The aquaero calculates the current power dissipation using the temperature difference between two temperature sensors and the current flow rate. Water has a thermal capacity of 4187 Ws/(kg * K), meaning an energy of 4187 Ws is required to increase the temperature of 1 kg of water by 1 Kelvin.

Power = thermal capacity * volume flow * temperature difference

Due to inaccuracies of temperature and flow sensors and temperature inertia of the cooling system, power measurement is a bit problematic in general. Especially during system start up, the actual power dissipation will differ significantly from values calculated by the aquaero. Furthermore, any coolant additive alters the thermal capacity, this is factored in in the aquaero. The power measurement functionality should therefore just be seen as an interesting additional information.

In the device menu, each data source can be selected from a list of available sensors. In the aquasuite, data sources from the sensor list can be assigned to the corresponding areas labeled “Flow sensor”, “Temperature sensor 1” and “Temperature sensor 2” using drag&drop. Existing assignments can be deleted by clicking the red “X” symbol.

11.6. Fill level sensors

A name can be assigned to each fill level sensor.

11.7. Pressure sensors

A name can be assigned to each pressure sensor.

12. Controller configuration (aquasuite/device menu)

aquasuite: Select “Controllers” from the device list for the device to be configured. Only currently configured controllers will be displayed. In order to add new controllers, click the plus symbol in the upper right corner of the controller page. 

Device menu: Select “Controllers” from the menu list and confirm by pressing the middle side key.

Notice on differences between aquasuite and device menu: In the aquasuite, outputs are assigned to controllers on the controller page. In the device menu, controllers are assigned in the outputs menu. Furthermore, the aquasuite will only display controllers that have an assigned data source as well as output for better clarity. The device menu always shows all controllers regardless of whether they are configured or used for outputs.

12.1. Curve controllers

Curve controllers are easy and intuitive to set up. Output values can be assigned to 16 temperature values, the aquaero will automatically interpolate between defined temperatures. The controller curves are graphically displayed in the device display as well as in the aquasuite.

The startup temperature will also be factored into the controller output. The output power defined in the curve controller will be ignored and set to 0 % as long as the input temperature has not exceeded the defined startup temperature for the first time. After the startup temperature has been exceeded, the output will strictly be set according to the defined curve until the output value

goes down to 0 % again. This will trigger the startup process again, meaning the temperature has to exceed the defined startup temperature again before the curve will be in effect once more. This behavior is meant to prevent fans assigned to the curve controller to be switched on and off in rapid succession. If the first point on the curve is set to a power greater than 0 %, this behavior is deactivated.

In the aquasuite, controller curves can easily be adjusted using drag & drop and curves can automatically be generated from start and end points. In the graphical curve display, the currently displayed area can be changed using the following methods:

- Mouse wheel movements will zoom in and out.
- A double click on an axis will reset zoom level for this axis, a double click into the diagram will reset both axes.
- Selecting an area on an axis will zoom this axis to this area, selecting an area in the diagram will zoom both axes to this area.
- Mouse movement while right button is pressed will move the displayed area of the diagram.

Up to four independent curve controllers can be configured.

12.2. Set point controllers

Set point controllers will adjust output power to keep the temperature of the assigned data source (temperature sensor) constantly equal to the target value if possible. Controller name, target temperature and controller speed can be set. In total, eight independent target value controllers are available.

12.3. Two point controllers

Two point controllers will switch assigned outputs on and off when the temperature reading of the data source (temperature sensor) rises above/falls below predefined values. Controller name, lower and upper limits can be set. In total, 16 independent two point controllers are available.

12.4. Preset values

Preset values are fixed/constant output values and do not have a data source. Controller name and output power can be set. In total, 32 independent preset values are available.

12.5. RGB LED controller

RGB LED controllers can be used to configure colors, color gradients and assign colors to temperatures. Colors can conveniently be set using the graphical color and brightness selectors, alternatively corresponding values can be set manually.

- **Controlled by sensor:** In temperature controlled mode, two colors can be defined corresponding to two temperature readings. The aquaero calculates a color gradient for temperature sensor values between these limits. Select a temperature sensor as data source as desired.
- **Color preset:** A predefined color is processed.
- **Rotating color change:** All colors are processed consecutively.
- **Rotating color change within sector:** Colors within the selected color range are processed.

For modes with a color range, the rotational direction on the chromatic circle can be alternated by clicking on the currently displayed sector.

Each RGB controller has three outputs for the colors red, green and blue.

For RGB controllers are available.

13. Fan configuration (aquasuite/device menu)

aquasuite: Select "Fans" from the device list for the device to be configured. All available fan outputs will be displayed in the upper region of the page. Click on any element to display and edit the configuration for this fan output.

Device menu: Select "Outputs" from the menu list and confirm by pressing the middle side key. Proceed by selecting "Fans" from the sub-menu.

Notice on differences between aquasuite and device menu: In the aquasuite, outputs are assigned to controllers on the controller page. In the device menu, controllers are assigned in the fan menu.

If no controller is assigned to a fan output, the output is automatically set to 100 % power.

13.1. Minimum and maximum power

For each fan output, the output range can be limited by setting "Minimum power" and "Maximum power" values correspondingly. The check box "Hold minimum power" determines output behavior while the assigned controller value is 0 %: If the box is checked, the output will be set to the minimum power value and remain active. If the box is not checked, the output will

switched off. Set minimum power to a value at which the connected fan or pump reliably starts up.

13.2. Power, speed or PWM controlled mode

In “power controlled” mode, an output value from a controller will be linearly converted to the range between minimum and maximum power of the fan output and the corresponding voltage will be set.

In “speed controlled” mode, an output value from a controller will be linearly converted to the range between configured minimum and maximum speed of the fan output. The aquaero will adjust the output power (voltage) autonomously within the configured range of minimum and maximum power to maintain this fan speed.

In “PWM controlled” mode, an output value from a controller will be directly set as PWM duty cycle within the limits of minimum and maximum power setting. Fan output voltage will be permanently set to 12 V. If the output value is 0 %, the supply voltage is switched off to stop the fan.

13.3. Start boost and output settings

The start boost feature can be used to reliably power up a fan or pump connected to the output. If activated, the aquaero unit will set the output to the configured start boost power for the configured duration before switching to normal operation whenever the output power changes from exactly 0 % setting to a higher value. The aquaero does not additionally check for a speed signal, it is recommended to configure and activate the “hold minimum power” function as well!

Notice for poweradjust expansion boards: For poweradjust units connected to an aquaero via aquabus, the start boost function should be disabled in the poweradjust itself using a direct USB connection to the poweradjust. Otherwise, the poweradjust might perform a start boost on its own. On the other hand, the start boost function of the poweradjust can be configured to perform a start boost if no speed signal is detected, which is not possible in the aquaero configuration.

13.4. Programmable fuses

Programmable fuses can be configured for each fan output in the aquaero configuration to avoid damage to the output circuitry or connected load. The aquaero will permanently disable the output once the configured maximum

current is surpassed. To reactivate the output, the aquaero (or the complete PC) has to be disconnected from power for a short period of time.

For fan outputs of expansion boards connected via aquabus (fan outputs 5-12), the programmable fuses will have a considerable delay before tripping because of the aquabus communication.

Please note: The fan outputs are not short-circuit proof even if programmable fuses are configured!

14. Output configuration (aquasuite/device menu)

aquasuite: Select "Outputs" from the device list for the device to be configured.

Device menu: Select "Outputs" from the menu list and confirm by pressing the middle side key.

Notice on differences between aquasuite and device menu: In the aquasuite, outputs are assigned to controllers on the controller page. In the device menu, controllers are assigned in the output menu.

14.1. LED outputs

For each LED output of the aquaero 5/6, a name can be set and the output range can be limited in both directions ("Minimum power"/"Maximum power"). The check box "Hold minimum power" determines output behavior while the assigned controller value is 0 %: If the box is checked, the output will be set to the minimum power value and remain active. If the box is not checked, the output will be switched off.

If configured as switched output, two switching thresholds can be set. The output will switch between either 0 % or 100 % power.

LED color can be calibrated by adjusting minimum and maximum power of the three individual colors red, green and blue.

Special feature of the RGB LED output of the aquaero controller board: Depending on alarm configuration, a LED connected to this output may flash red during alarm condition. In this case, all settings for this output (red, green and blue component) are ignored. If the alarm condition is deactivated, normal operation is resumed.

14.2. Power outputs

For both power outputs of the aquaero 5/6, a name can be set and the output range can be limited in both directions (“Minimum power”/“Maximum power”). The check box “Hold minimum power” determines output behavior while the assigned controller value is 0 %: If the box is checked, the output will be set to the minimum power value and remain active. If the box is not checked, the output will be switched off.

If configured as switched output, two switching thresholds can be set. The output will switch between either 0 % or 100 % power.

14.3. Relay

For the relay outputs of the aquaero 5/6, a name as well as two switching thresholds can be set. The relay output has only two states (0 % or 100 %) and must be configured as switching output.

If alarm actions or timer actions are configured regarding the relay output, the current relay state is permanently overwritten once a relay action is triggered. From this point on, the relay state can no longer be changed by a controller. A complete power cycle (including USB and standby power) is required to have the relay operated by a controller again.

15. Pump configuration (aquasuite/device menu)

aquasuite: Select “Pumps” from the device list for the device to be configured.

Device menu: Select “Pumps” from the menu list and confirm by pressing the middle side key.

Notice on differences between aquasuite and device menu: In the aquasuite, outputs are assigned to controllers on the controller page. In the device menu, controllers are assigned in the pump menu.

15.1. aquastream ULTIMATE and aquastream XT

For aquastream XT and aquastream ULTIMATE pumps connected to the aquaero by aquabus connection, a name and mode of operation can be set. Additionally, the deaeration mode can be activated and deactivated.

The following modes of operation are available:

- Maximum power: The pump is set to maximum power.
- Manual preset: The pump speed can be set manually.

- Set by controller: Pump speed is automatically adjusted by a controller. Depending on mode of operation, the pump speed range can be limited in both directions (“Minimum power”/“Maximum power”). The check box “Hold minimum power” determines pump behavior while the assigned controller value is 0 %: If the box is checked, the pump will be set to the minimum power value. If the box is not checked, the pump will be set to the lowest possible power setting.

All aquastream pumps can generally not be stopped, a power setting of 0 % corresponds to the minimum pump speed of 3000 rpm. Depending on pump model, a power setting of 100 % corresponds to a speed setting of 4400 rpm (aquastream XT) or 5500 rpm (aquastream ULTIMATE). The pump controller will automatically limit the speed depending on system characteristics, in most cases the realistically attainable pump speed is lower than these values.

Notice: In order to adjust pump speed of aquastream ULTIMATE pumps via aquabus, the pump mode must be set to “aquabus” within the pump configuration! This requires a (temporary) USB connection between PC and pump controller.

Notice: In order to adjust pump speed of aquastream XT pumps via aquabus, “Control pump mode via aquabus” must be selected in the system tab within the pump configuration! This requires a (temporary) USB connection between PC and pump controller.

15.2. D5 pumps connected via aquabus

For D5 pumps connected to the aquaero **by aquabus connection**, a name and mode of operation can be set.

The following modes of operation are available:

- Maximum power: The pump is set to maximum power.
- Manual preset: The pump speed can be set manually.
- Set by controller: Pump speed is automatically adjusted by a controller.

Depending on mode of operation, the pump speed range can be limited in both directions (“Minimum power”/“Maximum power”). The check box “Hold minimum power” determines pump behavior while the assigned controller value is 0 %: If the box is checked, the pump will be set to the minimum power value. If the box is not checked, the pump will be set to the lowest possible power setting.

D5 pumps connected via aquabus can generally not be stopped, a power setting of 0 % corresponds to the minimum pump speed.

Please note: D5 pumps connected to a fan output will be controlled as a “fan” and can be switched off by the aquaero.

16. User interface configuration (aquasuite/device menu, aquaero 5/6 XT/PRO only)

The menu entries “User interface” and “Information pages” are used for language and unit selection as well as configuring display and buttons. In particular, each of the up to 32 available pages displayed in normal operation can be individually configured, some of which have factory presets that can easily be adjusted.

aquasuite: Select “User interface” from the device list for the device to be configured. All settings on this page affect the aquaero display only.

Device menu: Select “User interface” from the menu list and confirm by pressing the middle side key.

16.1. Language setting

In order to change the language for information pages and menus of the aquaero 5/6, simply press the middle side key of the aquaero 5/6 (or the OK button of the aquaremote if available) **four times** while the device is in normal display operation. Select the desired language and confirm your selection by pressing the middle side key again.

In the aquasuite software, a language can be selected from a drop down list. Changing the language does not alter sensor names. After changing the language, the sensor names can be reset to factory defaults (device menu only) to restore default names for the selected language.

16.2. Display settings

Units for temperature, flow and pressure measurement can be selected, brightness and contrast as well as display duration can be adjusted.

16.3. Key settings

Key sound volume of the aquaero 5/6 XT/PRO keys can be adjusted, the keys can also be disabled to prevent user interaction.

Touch key sensitivity can be adjusted for each of the seven aquaero 5/6 XT keys as well as brightness of the key illumination. If one or more of the touch keys constantly report to be pressed due to excessive sensitivity settings, the touch panel will be temporarily disabled. Please adjust key sensitivities using the aquasuite in this case.

16.4. Programmable function keys (device menu of aquaero 5/6 XT only)

Four programmable function keys located below the display simplify menu navigation. In display mode, the keys are pre-configured to access certain information pages. Key functions and labels can be reassigned, the keys can be configured to provide direct access to any menu or information page. While the device menu is displayed, the keys have specific functions that can not be changed.

To program function keys, select "User interface", "Keys" and then "Programmable keys" from the device menu. Select the key to be programmed and select "Learn key function". Navigate to the desired menu or information page and confirm your selection by pressing the left function key, now labeled "Learn".

17. Information page configuration (aquasuite/device menu, aquaero 5/6 XT/PRO only)

aquasuite: Select "Information pages" from the device list for the device to be configured. All settings on this page affect the aquaero display only.

Device menu: Select "User interface" from the menu list and confirm by pressing the middle side key. Proceed by selecting "Information pages" from the sub-menu.

17.1. Screenshot function (aquasuite only)

The currently displayed screen on the aquaero display can be transferred to the aquasuite and also be saved to disk.

17.2. Special pages and logo (aquasuite only)

The logo to be displayed in the information page "User defined logo" can be transferred to the aquaero. Required file format: Portable Network Graphics (".png"), size 256 x 64 pixels, monochrome (1 bit). Deviating sizes and color

depths are automatically converted but will often result in objectionable quality. To restore the factory default logo, the firmware has to be reprogrammed into the aquaero (firmware update).

Two separate information pages can be selected to be permanently shown after prolonged inactivity or during standby. To do so, select an information page from the "Information pages" window area and use drag & drop to assign it to "Page while idle" or "Page during standby". Existing pages can be removed by clicking the red "X" symbol. If no page is assigned, the pages defined in the area "Information pages" will be displayed instead. The time interval after which the aquaero will be considered "idle" can be set in the "User interface" / "Display" menu, idle mode can also be completely deactivated.

17.3. Information pages

The aquasuite displays all available information pages sorted by category on the left side. The right side shows the current display sequence. Pages can be selected and added to the sequence using drag & drop, the order of pages can be altered using drag & drop as well. Existing pages can be removed by clicking the red "X" symbol. Up to 32 information pages can be configured. For each information page in the current display sequence, display duration until the next page is displayed can be adjusted, alternatively each page can also be configured to be displayed permanently.

17.4. USB LCD page

The information page "USB LCD page" can be used to transfer user defined content onto the aquaero display. Currently, the third party software „LCD-Hype“ (author Daniel Frömmel, freeware, lcdhype.condense.de) is supported. The program folder of the aquasuite software contains the file „aquaerolcd-hype.zip“, which is to be unpacked into the „controller“ folder of the LCD-Hype program folder. Subsequently, LCDHype will be able to transfer content to the aquaero. While the information page „USB LCD“ is active in the aquaero, content from LCDHype will be displayed. Additional information can be found in our online forums: forum.aquacomputer.de

18. Alarm actions (aquasuite/device menu)

The aquaero 5/6 features four alarm levels, which can be configured individually. Up to three actions can be configured for each alarm level. For alarm actions, speed signal output, alarm buzzer, relay, profile selection and USB keyboard commands are available.

After configuring alarm levels, alarm limits can be configured for various sensors and corresponding alarm levels can be set.

Higher alarm levels are always processed with higher priority than lower alarm levels. Depending on the severity of the malfunction, graduated alarm actions can be configured. For example, the aquaero could be configured to activate the integrated alarm buzzer when a temperature sensor reads more than 40 °C, and to shut down the PC if the same sensor reads more than 50 °C using the relay output (optional accessories required).

aquasuite: Select “Alarm actions” from the device list for the device to be configured.

Device menu: Select “Alarm” from the menu list and confirm by pressing the middle side key. Proceed by selecting “Alarm and warning levels” from the sub-menu.

18.1. Alarm suppression after power on

Alarm evaluation will be suppressed for the configured time span after power is supplied to prevent false alarms for example due to fans sluggishly speeding up.

18.2. Alarm levels

For each alarm level, three actions can be defined.

Upon changing alarm levels, actions defined for the new alarm level will be executed, but existing settings from the previous level will not be reset. Alarm level zero corresponds to failure-free operation, this level should therefore normally disable the alarm buzzer and enable the generic speed signal.

Additionally, a RGB LED connected to the LED output of the aquaero controller board can be configured to flash red for each alarm level. If activated for the currently active alarm level, all other settings for this LED output (red, green and blue component) are ignored. If the alarm condition is deactivated, normal operation is resumed.

19. Alarm configuration (aquasuite/device menu)

aquasuite: Select “Alarm configuration” from the device list for the device to be configured.

Device menu: Select “Alarm” from the menu list and confirm by pressing the middle side key.

19.1. Configure alarm monitoring

The aquaero can be configured to autonomously monitor various measurement readings. Depending on the data source, varying configuration options are available:

- Temperature alarms: For each temperature monitoring setting, individual alarm levels can be assigned to two temperature limits. An alarm can be raised either if a limit is exceeded or underrun.
- Fan alarms: Alarms can be raised if no speed signal is detected. For each configuration, two alarm levels can be configured.
- Flow alarms: For each flow monitoring setting, individual alarm levels can be assigned to flow limits. An alarm can be raised either if a limit is exceeded or underrun.
- Pump alarms: Alarms can be raised if connected aquastream XT pumps report errors.
- Fill level alarms: For each fill level monitoring setting, individual alarm levels can be assigned to two fill level limits. An alarm can be raised if a limit is underrun.

Make sure only to use readings for alarm evaluation that are functional with your specific setup.

19.2. Example configuration for emergency shutdown with aquaero power connect:

This example requires additional accessories (art. no. 53047 and 53080, not included in delivery). Configuration procedure:

- Add a “Preset value” controller, set to 0 % power, assign output “Relay” to this controller (corresponds to factory defaults).
- Configure output “Relay” as switched output (corresponds to factory defaults).
- Add an alarm action to alarm level 3 (name “Emergency shutdown”):
“Relay: On”

- Add a temperature alarm: Data source "Sensor 1", "Temperature exceeds limits", alarm limit 60 °C, alarm level "Emergency shutdown".
- Cut the green wire of the aquaero power connect (53047) in the middle, strip the insulation and connect to the relay plug (53080). For aquaero 5, connect to relay contacts 2 and 3, for aquaero 6 use contacts 1 and 3.
- Disconnect the PC mains cable from the wall socket and install the aquaero power connect cable between power supply unit and motherboard.

In this example configuration, the PC will be shut down if the temperature at sensor 1 exceeds 60 °C. This may result in data loss as operating system and running programs are not shut down properly!

19.3. Example configuration for emergency shutdown with aquaero power connect:

This example requires additional accessories (art. no. 53217 and 53080, not included in delivery). Configuration procedure:

- Add a "Preset value" controller, set to 0 % power, assign output "Relay" to this controller (corresponds to factory defaults).
- Configure output "Relay" as switched output (corresponds to factory defaults).
- Add an alarm action to alarm level 3 (name "Emergency shutdown"): "Relay: On"
- Add a temperature alarm: Data source "Sensor 1", "Temperature exceeds limits", alarm limit 60 °C, alarm level "Emergency shutdown".
- Cut the 3 pin connector from the alarm cable (53217), strip the insulation and connect to the relay plug (53080). For aquaero 5, connect to relay contacts 1 and 3, for aquaero 6 use contacts 2 and 3.
- Disconnect the PC mains cable from the wall socket and install the 2 pin connectors of the alarm cable between motherboard and power switch connector.

In this example configuration, the PC will be shut down if the temperature at sensor 1 exceeds 60 °C. This may result in data loss as operating system and running programs are not shut down properly!

20. Timer configuration (aquasuite/device menu)

The aquaero 5/6 features a clock timer to perform various actions on predefined times and days of the week. For timer actions, speed signal output, alarm buzzer, relay, profile selection and USB keyboard commands are available.

aquasuite: Select "Timer" from the device list for the device to be configured.

Device menu: Select "Timer" from the menu list and confirm by pressing the middle side key.

20.1. Configure timer events

For each timer setting, time of day, day of the week and action to be executed can be set. Up to 16 timer events can be configured.

21. Infrared configuration (device menu aquaero 5/6 XT/PRO)

The menu entry "Infrared" is used to configure the infrared receiver of the aquaero 5/6.

Device menu: Select "Infrared" from the menu list and confirm by pressing the middle side key.

21.1. Enable/disable infrared functions

The different tiers of the aquaremote remote control (aquaero, PC mouse, PC keyboard, USB forwarding) can be individually enabled or disabled.

21.2. Keyboard layout aquaremote

Keyboard events forwarded to the PC will be processed by the PC according to the currently selected keyboard layout in the operating system. The aquaero supports two different keyboard layouts for QWERTY and QWERTZ layouts.

21.3. Trained infrared commands

The aquaero can "learn" up to 16 infrared commands from a multitude of commercially available remote controls. For trained commands, resulting

aquaero actions can be configured. All actions available for alarm and timer events are available for infrared commands as well.

21.4. PC wake up and shut down by infrared remote control

By default configuration, powering the PC up or down by remote control is deactivated for safety reasons. The aquaremote has a red power button that can be used for this function, the aquaero 5/6 can be trained to accept the corresponding infrared command. Select the actions to be performed to power the PC up and down as well, usually USB keyboard commands are used.

22. Data log (aquasuite/device menu)

The aquaero 5/6 unit can be configured to record measured values over an extended period of time. The menu "Log data" can be used to configure up to 16 measured values to be recorded at adjustable time intervals. The recorded information can then be displayed as charts on the aquaero display itself (menu "User interface" → "Information pages") or be transmitted to the Windows software aquasuite via USB connection.

aquasuite: Select "Data log" from the device list for the device to be configured.

Device menu: Select "Data log" from the menu list and confirm by pressing the middle side key.

22.1. Configure log data sets

Data source and time interval can be configured for each log data set. The aquaero has a limited memory capacity for log data, approximately 100,000 data sets can be stored in total. Once the available memory is exhausted, the aquaero will start overwriting the oldest data in memory. Up to 16 log data sets can be configured independently.

The information pages "Diagrams" can be used to plot a chart from log data on the aquaero device display (see information pages, aquaero 5/6 XT/PRO only).

22.2. Transfer log data into aquasuite (aquasuite only)

In order to transfer log data from the aquaero, a corresponding log has to be configured in the global "Data log" of the aquasuite for each data set to be

transferred. Data can then be transferred by clicking “Synchronize log data with aquasuite” the “Data log” window of the corresponding aquaero in the device listing of the aquasuite. During the synchronization process, data will be transferred from the aquaero memory into the aquasuite data base adhering to the log interval configured in the aquasuite. If data is logged with a ten second time interval in the aquaero for example, a one minute time interval setting in the aquasuite will result in every sixth aquaero data set being saved in the aquasuite data base.

22.3. Save log data as XML (aquasuite only)

All log data currently stored in the aquaero memory can be saved to a XML file. Click the “Export log data as XML” and select file name and path in the following dialog. The resulting file can be processed by most spreadsheet programs.

22.4. Delete log data from aquaero memory

All log data currently stored in the aquaero can be deleted manually.

23. Functional upgrades by aquabus devices

Additional functionality, outputs and sensor inputs can be added to the aquaero by connecting aquabus expansion devices.

23.1. Compatible aquabus devices

The following table provides information on expansion options:

aquabus device (Article number)	Outputs	Inputs	Note	Max. number (Bus address)
aquastream XT (41059, 41060, 41061)	1x Pump speed	1x Temperature	❶	2 (10-11)
compact 600/12 V USB (41098, 41099, 41100, 41101)	1x Pump speed	1x Temperature	❶	2 (10-11)
D5-Pump with aquabus (41093)	1x Pump speed	1x Temperature (ext.)	❶	4 (12-15)
aquastream ULTIMATE (41108)	1x Pump speed 1x Fan ❶	1x Temperature (ext.) 1x Flow ❶	❶	2 (10/17/54, 11/18/55)
Flow sensor high flow USB (53129)		1x Flow 1x Temperature (ext.)	❶	4 (12-15)

aquabus device (Article number)	Outputs	Inputs	Note	Max. number (Bus address)
Flow sensor mps flow (53130, 53131, 53132)		1x Flow 1x Water temperature 1x Temperature (ext.)	❶	4 (12-15)
poweradjust 2/3 (53082, 53083, 53166, 53167)	1x Fan	1x Temperature (ext.) 1x Flow (ext.)	❶❸	8 (50-57)
aquaero LT as expansion device (53095)	4x Fan	4x Temperature (ext.)	❷	1 (50-53 fixed)
farbwerk (53170, 53207)	12x LED (4x RGB)		❹	2 (20-21)
Pressure sensor mps pressure (53133, 53134, 53135, 53136, 53160)		1x Fill level / Pressure 1x Temperature (ext.)	❶	4 (12-15)
aqualis XT (34041, 34042, 34050, 34058, 34059, 34060, 34061, 34072)		1x Fill level 1x Temperature (ext.)	❶	4 (12-15)
aquainlet XT (34066, 34067, 34068, 34069)		1x Fill level 1x Temperature (ext.)	❶	4 (12-15)
Pump adapters and modules with fill level sensor (41095, 41097, 41099, 41101)		1x Fill level 1x Temperature (ext.)	❶	4 (12-15)
Real Time Clock (53127)		Date/time		1 (111)

- ❶ Overlapping bus addresses, only on device per address!
- ❷ Uses bus addresses 50, 51, 52 and 53 simultaneously. A maximum of four (instead of eight) additional poweradjust expansion boards with bus addresses 54-57 can be connected!
- ❸ poweradjust firmware version 1003 or higher required!
- ❹ All farbwerk outputs to be controlled by the aquaero must be configured to use an “External controller source (aquabus, Bluetooth, USB)” within the farbwerk controller configuration. This requires a (temporary) USB connection between PC and farbwerk controller.
- ❺ Transmission of fan and flow sensor data via aquabus can be disabled, in this case aquabus address 54 or 55 respectively is available for poweradjust devices.

Multiswitch (53050/53051) and tubemeter (93265) devices are no longer supported by aquaero 5/6 devices with firmware version 2000 and higher!

23.2. Electrical connection of aquabus devices

All aquabus devices are to be connected to the “aquabus high speed” connector of the aquaero. The “aquabus low speed” connector has been disabled since firmware version 2000.

In order to connect multiple aquabus devices to an aquaero, suitable splitters (53124, 53063) are required. Some aquabus devices (poweradjust, farbw-erk, Real Time Clock) feature additional aquabus connectors to connect further devices.

In general, devices with a four pin aquabus header must be connected to the aquaero using four pin cables (53122, 53124, 53162). Devices with a three pin aquabus header are to be connected using three pin cables (53063, 53161, 93111). Three pin and four pin devices may be connected to the aquaero concurrently, provided that all four pin devices have a four pin connection to the aquaero as described above.

In order to avoid aquabus data corruption by electrical interference, aquabus cable length should be kept as low as possible.

23.3. Listing of currently connected aquabus devices and configuration

aquasuite: Select “aquabus” from the device list for a list of all currently connected aquabus devices and aquabus device configuration.

By selecting a device from the list, details on aquabus address and transmitted inputs and outputs will be displayed. Additional configuration options are available for some device types.

23.4. Additional information for aquastream ULTIMATE

- In order to adjust pump speed via aquabus, the pump mode must be set to “aquabus” within the pump configuration! This requires a (temporary) USB connection between PC and pump controller.
- In order to control the fan output of the pump via aquabus, the fan mode must be set to “aquabus” within the pump configuration! This requires a (temporary) USB connection between PC and pump controller.
- Transmission of fan and flow sensor data via aquabus can be disabled, in this case aquabus address 54 or 55 respectively is available for poweradjust devices.
- Two temperature sensor values can be transmitted from the aquaero to the pump, these sensors are then available as “software sensors” in the

pump controller. The “Advanced controller package” must be activated in the pump to process software sensors.

23.5. Additional information for aquastream XT

In order to adjust pump speed via aquabus, “Control pump mode via aquabus” must be selected in the system tab within the pump configuration! This requires a (temporary) USB connection between PC and pump controller.

23.6. Additional information for farbwerk

All farbwerk outputs to be controlled by the aquaero must be configured to use an “External controller source (aquabus, Bluetooth, USB)” within the farbwerk controller configuration. This requires a (temporary) USB connection between PC and farbwerk controller.

24. System settings (aquasuite/device menu)

aquasuite: Select “System” from the device list for the device to be configured.

Device menu: Select “System” from the menu list and confirm by pressing the middle side key.

24.1. Device information

The details displayed here might be required when you contact our service for support.

24.2. Profiles and factory defaults

The profile management can be used to save up to four individual configuration sets in the aquaero, which then can be activated as desired. All names (sensor names, output names, controller names etc.) are stored globally and are not affected by profile selection.

Device menu: Factory defaults can be restored using the profile management, either selectively for a profile, selectively for all sensor names or globally for the whole aquaero.

aquasuite: Click the button “Reset device to factory defaults” for a complete reset of all settings (including all profiles and names). You will have to completely reconfigure the device after resetting it to factory defaults!

24.3. System event log

Various system events such as system startup, alarms and timer events are logged with date and time by the aquaero. Events can be filtered by type in the aquasuite event listing for better clarity.

 In the aquaero 5/6 XT/PRO device menu, the event log can be accessed by selecting the corresponding symbol or menu entry “Event log”. Newly added events/alarms will be marked by a plus symbol in the event list, events/alarms no longer in effect will be marked by a minus symbol.

24.4. Firmware update (aquasuite only)

The button “ Update firmware now” will start the update process for the device firmware. The most up to date firmware for all supported devices is always included in the download version of the aquasuite software, the current version can be found on our web site www.aqua-computer.de in the “Support” section. During the update process, the aquaero will be reset to factory defaults automatically. Depending on the scope of changes in the firmware, it might not be possible to load previously saved configurations into the aquaero and the device might have to be completely reconfigured manually.

24.5. aquaero 5 LT expansion device firmware

As a special feature, aquaero 5/6 LT devices can be programmed with an expansion device firmware to be controlled as an aquabus expansion board by another aquaero 5 or aquaero 6 device. Programming the expansion device firmware will completely replace the original firmware and the device can not be used individually any more, all controlling and monitoring functions must be managed by the aquabus master device. The USB interface will be completely disabled and the device will not be recognized by the aquasuite after programming the expansion device firmware. Only the following connectors will be operational as an expansion device:

- Fan output 1-4
- Temperature sensor input 1-4

Devices programmed as an expansion device can be reset to the full aquaero 5/6 LT functionality by performing the procedure described in chapter 26.1. only.

24.6. Overwrite outputs directly

The “Overwrite outputs directly” functionality can be used to set output values of the aquaero by the PC via USB connection. After installing the aquasuite software, the command line tool “AquaComputerCmd.exe” can be found in the aquasuite program folder. Execute the program without options to display syntax and examples.

Precondition to overwriting an output value is that the output has to be assigned to a controller. Only values exceeding the controller output will be accepted from the command line tool. In order to be able to use the full output range of 0 % to 100 %, the controller assigned to the output should be a “Preset value” set to 0 %. Output values set by the command line tools will remain active until the aquaero is restarted.

25. Basic settings (aquasuite)

Click the entry „Settings“ below the headline „aquasuite“ to access basic settings for language, units and start-up of the software.

25.1. Language

Select a language from the drop down menu. After changing the language setting, the software will have to be restarted.

25.2. Units

Select the units to be used for temperature and flow values from the drop down menus. After changing these settings, the software will have to be restarted.

25.3. Application start-up

You may customize start-up behavior to suit your preferences. You may also select to hide the task bar symbol of the software when minimized.

25.4. Service administration

The service (background service) synchronizes date and time of all aquaero 5/6 devices connected to the PC and provides software sensors to the aquaero. Additionally, special USB settings are configured for all connected Aqua Computer devices, the service should therefore be active at all times.

26. Trouble shooting

26.1. Device firmware deletion and recovery

There are a few exceptional situations which require the device firmware to be deleted before it can be reprogrammed using the aquasuite:

- The aquaero is programmed with the expansion device firmware.
- A previous firmware update failed, power loss during firmware update.
- Device firmware is corrupt.

Delete the device firmware using the following procedure:

1. Shut down the PC and disconnect all cables from the aquaero except the power supply.
2. Place jumpers on temperature sensor input 5, 6, 7 and 8.
3. Supply power to the aquaero and wait for approximately 60 seconds. The device display will show information on the deletion process.
4. Shut down the power supply and remove the jumpers from the temperature sensor inputs.
5. Connect the USB port of the aquaero to the PC's motherboard and turn the power supply on.
6. Start the aquasuite software and perform a firmware update.
7. Shut down the PC, reconnect all cables, then reboot the PC.

26.2. No USB connection to the device

Possible cause	Action
USB cable not or not correctly connected	Check USB cable, compare pin assignment of aquaero and motherboard
aquaero LT programmed as expansion device	Delete and reprogram device firmware
Corrupt firmware	Delete and reprogram device firmware
Hardware failure	Contact Aqua Computer Support

26.3. Outputs do not perform as expected

Possible cause	Action
No 12 Volts power supply	Check Power supply
No controller assigned to output	Check controller assignment
Minimum power set too low	Check minimum power setting for this output
Fan output 1 is configured as flow sensor input	Check "Flow sensor 2" configuration
Incompatible fan for speed/PWM controlled mode	Activate voltage controlled mode
Programmable fuse has tripped	Check event log

26.4. Controllers/Alarms/Log data is not updated

Possible cause	Action
No 12 Volts power supply	Check Power supply

26.5. Malfunction of device keys (XT/PRO only)

Possible cause	Action
Keys disabled	Check key configuration (aquasuite/aquaremote)
Incorrect key sensitivity setting (XT only)	Adjust key sensitivity (aquasuite/aquaremote)
Defective touch controller board (XT only)	Contact Aqua Computer or replace with spare part no. 53128.

26.6. Device does not respond to aquaremote

Possible cause	Action
Infrared functions disabled in aquaero	Check configuration
Defective batteries	Exchange batteries in remote (2 pcs. size AAA)

26.7. Expansion board connected to aquabus is not discovered

Possible cause	Action
Wrong aquabus port (low speed/high speed)	Check aquabus connections
Address conflict	Assign an unique address to each aquabus device (USB connection/aquasuite)
Communication error due to signal levels differences	Connect all aquabus devices to the same power cable of the PSU
poweradjust 2 with firmware 1000/1001/1002	Use USB connection to update poweradjust firmware (aquasuite)

27. Technical details and care instructions

27.1. Technical details

Dimensions W x H x D: 148 mm x 43 mm x 59 mm (aquaero 5/6 XT/PRO)
144 mm x 42 mm x 22 mm (aquaero 5/6 LT)

Power supply voltage: 12 V DC $\pm 5\%$, 5 V DC $\pm 5\%$

Power supply current: 7 A / 12 V, 0.5 A / 5 V (aquaero 5)
10 A / 12 V, 0.5 A / 5 V (aquaero 6)

Ambient temperature: 10 to 40 °C (noncondensing)

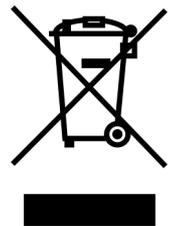
Outputs are described in chapter 4.

27.2. Care instructions

Use a dry and soft cloth for cleaning. All electronic components and headers must not get in contact with coolant or water!

27.3. Waste disposal

This device has to be disposed of as electronic waste. Please check your local regulations for disposal of electronic waste.



27.4. Contact Aqua Computer

We are always happy to answer questions regarding our products and to receive feedback. For answers on frequently asked questions, please also check our website www.aqua-computer.de. You might also want to visit our forums and discuss our products with experienced moderators and thousands of members – available 24/7. To get in direct contact with our customer support team, we offer several options:

Email: support@aquacomputer.de

Address: Aqua Computer GmbH & Co. KG
Gelliehäuser Str. 1
37130 Gleichen
Germany

Tel: +49 (0) 5508 9749290 (9-16 h Central European Time)

Fax: +49 (0) 5508 9749291