

User and installation manual



poweradjust 2 USB

Firmware version 1006
aquasuite version 2013

Current as of May 2013

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1. Preface

The poweradjust 2 USB unit is a high power fan or pump controller for PCs. The output features speed signal detection, additionally the poweradjust 2 USB unit has a temperature sensor input, a flow sensor input, a speed signal output as well as USB and aquabus interfaces.

Considering the fast technical development, we reserve the right to perform alterations to the products at any time. It therefore is possible that your product does not correspond precisely to the descriptions or illustrations in this manual.

2. Safety precautions

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

- Save your data onto suitable media before working on your hardware!
- The poweradjust 2 USB unit may only be used inside a PC case!
- Never touch electronic components during operation! Do not connect or disconnect cables to/from the device while the device is powered! Components may get very hot during operation. After power off, let the device cool down for at least 30 minutes before touching it!
- Do not turn the PC on unless you are sure that all cable connections to/from the poweradjust 2 USB unit are correctly attached!
- 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!

3. Scope of delivery

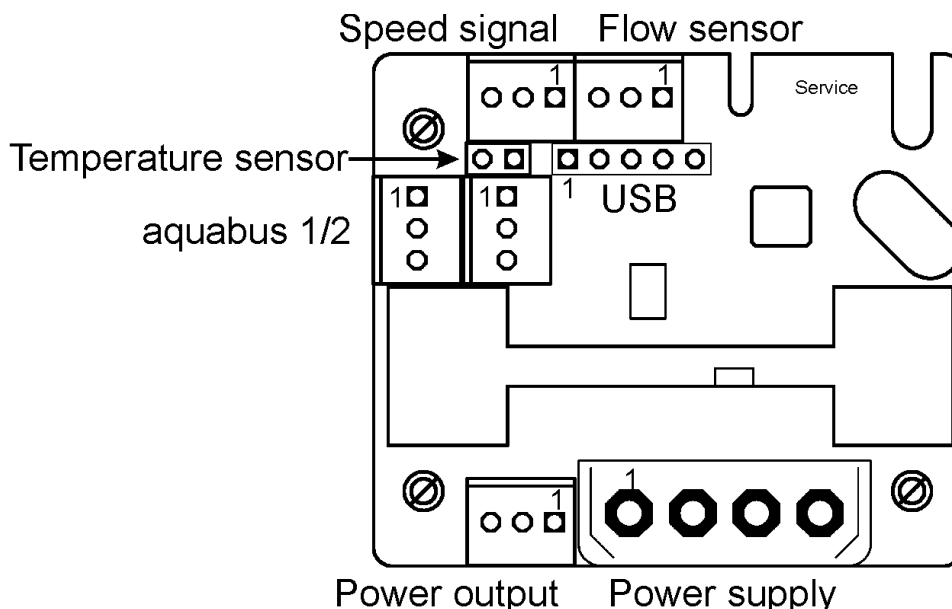
- One poweradjust 2 USB controller
- One internal USB cable
- One aquabus/speed signal cable (3 contacts)
- One connection cable for a Laing DDC pump
- Mounting materials
- This manual

4. Assembly instructions

Use the supplied screws to install the poweradjust 2 USB controller inside your PC case. Make sure that the PCB and electronic components do not have contact to metal parts or other electronic devices inside the PC case, otherwise malfunctions or destruction of the poweradjust 2 USB unit or other devices may occur!

5. Electrical connections

5.1. Connector overview



ATTENTION: Completely turn off your power supply or disconnect the mains power cord from the wall outlet before connecting or disconnecting any cables to/from the device!

Please refer to the following chapters for details on the individual connectors.

5.2. Power supply

Connect a power plug of your PC's power supply unit 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: not connected

5.3. Power output (fan or pump connector)

Regulated fan/pump output with speed signal processing. Maximum current at 12 V is 2 A (25 Watts total power). At lower voltages, the maximum current rating will be reduced! Maximum power is dynamically limited through temperature monitoring to prevent damage to the poweradjust 2 controller board. If the internal electronics temperature sensor reading exceeds approximately 80 °C, the power output is set to 100 % power to minimize power dissipation. If the sensor reading rises further to approximately 100 °C, the power output is set to 0 % power and effectively switched off. In both cases, the poweradjust 2 controller activates the manual control option for the power output. This setting remains active until it is manually reset through the aquasuite software or until the device is restarted.

Despite this over temperature protection, the power output is not short-circuit proof!

Pin assignment: Pin 1: GND
Pin 2: 0-12 V
Pin 3: Speed signal

5.4. USB

This connector is used for USB communication to the PC and for power supply. Connect to an internal USB header of your motherboard. 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

5.5. aquabus 1/2

Connector for communication with other Aqua Computer devices. You can use the aquabus/speed signal cable included in delivery to connect the poweradjust 2 controller board to a suitable connector of a compatible device, for example an aquaero. USB and aquabus interface can be used at the same time, aquabus data is processed with higher priority.

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

Compatible aquabus devices:

- aquaero 5 XT (art. 53125 and 53089)
- aquaero 5 PRO (art. 53090)
- aquaero 5 LT (art. 53095)

5.6. Flow sensor

Flow sensor and special interconnecting cable are not included in delivery.

Pin assignment: Pin 1: GND
Pin 2: +5 V
Pin 3: Signal

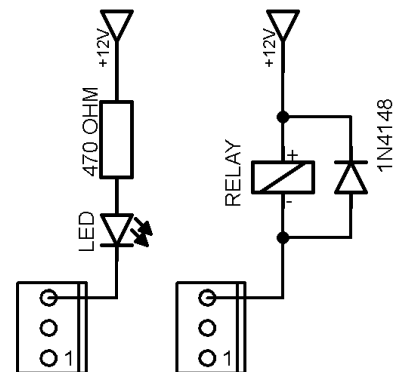
Compatible flow sensors:

- Flow sensor with 5.6 mm nozzle (art. 53061)
- Flow sensor "high flow" (art. 53068)
- Connection cable for flow sensor (art. 53027)

5.7. Speed signal

Depending on configuration, this header can either be used as a generic speed signal or as a "open collector" switching signal.

The speed signal or the switching signal can be configured to be deactivated or activated in case of an alarm condition for monitoring purposes using the aquasuite software. For example, the supplied speed signal cable can be used to connect this header to the CPU fan header of your motherboard. Depending on on the type of motherboard and BIOS settings, emergency shutdown of the PC upon alarm condition or an acoustic alarm may be initiated. Please refer to the motherboard manual for details on functionality and BIOS settings.



Pin assignment: Pin 1: GND
Pin 2: not connected
Pin 3: speed signal/open collector max. 30 V / 100 mA

5.8. Temperature sensor

Connector for a temperature sensor.

Compatible sensors:

- Temperature sensor inline G1/4 (art. 53066)
- Temperature sensor inner/outer thread G1/4 (art. 53067)
- Temperature sensor plug&cool (art. 53025)
- Temperature sensor 70 cm (art. 53026)

6. 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, so after initial configuration, the speed signal connector can be used independently from an USB or aquabus connection (providing that power is supplied to the device).

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

6.1. Installation of the aquasuite software

For configuration and monitoring of poweradjust 2 USB 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.

6.2. 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.

6.3. 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.

7. 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.

7.1. 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.

7.2. 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.

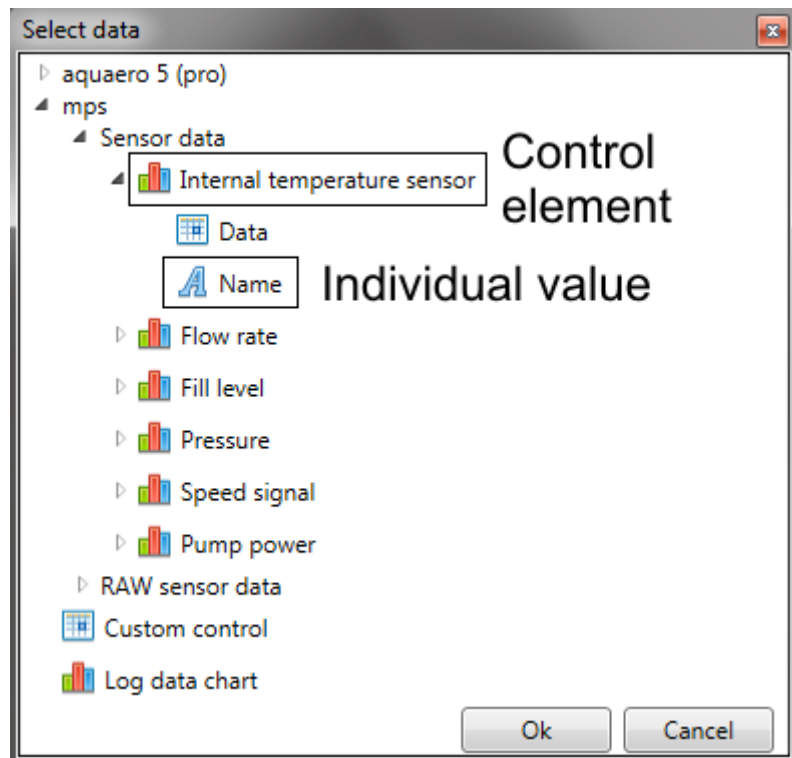
7.3. Adding new elements

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.



7.4. 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.

7.5. 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.

7.6. 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.

7.7. 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 dialog window and 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.

7.8. 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.

7.9. Export and import of overview pages

Elements and complete overview pages can be 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.

8. 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.

8.1. 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.

8.2. 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.

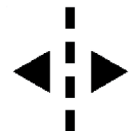
You may modify the chart using the “Chart setup” and “Data series setup” tabs. Finally, you can use the “Chart manager” tab to save the current chart configuration and to load or delete previously saved configurations. All saved chart configurations will be available on overview pages for the “Log data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


The currently displayed chart 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:

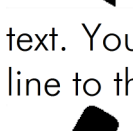



To save the currently displayed chart as an image file, click the floppy disk symbol and select a name and location in the following dialog.


- 


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.

8.3. 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.

8.4. Automatic data export

The automatic data export feature can be used to save data from the aquasuite 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.

9. Fan configuration (aquasuite)

Select "Fan" from the device list for the device to be configured.

9.1. Fan mode

In the upper area, current fan data (speed, power output, voltage) is displayed as plain text as well as in a diagram.

Select the desired mode of operation for the fan output below the diagram. If "Manual fan settings" is selected, the fan output can be set to a fixed value. In "Speed controlled" mode, you can set the desired rotation speed, the poweradjust 2 controller will regulate output power to keep the speed constant if technically possible. In "Automatic temperature control" mode (Ultra version only), the fan power will be dynamically adjusted depending on the current temperature sensor reading.

9.2. Manual fan settings

When using manual mode, set the desired output power here.

9.3. Speed settings

When using the speed controlled mode, set the desired speed here. The controller speed setting should not be changed in normal setups.

9.4. Automatic temperature control

When using the automatic temperature control mode, set the desired target temperature. The controller speed setting should not be changed in normal setups.

9.5. Start boost and output settings

The start boost feature can be used to reliably power up a fan or pump connected to the power output. If activated, the poweradjust 2 unit will set the output to the configured power for the configured duration before switching to normal operation. Exception: If the power output is set to 0 % (either by manual setting or by automatic control), the start boost will not be activated even if speed signal and/or flow signal should be missing. If this behavior is not suitable for your application, make sure to use the "Hold minimum power" feature described in the next paragraph!

When using the speed controlled mode or the automatic temperature control mode, the output range can be limited in both directions ("Minimum power"/"Maximum power"). The check box "Hold minimum power" determines whether the power output will be switched off for low temperature sensor readings

(box not checked) or remain active at the set minimum speed (box checked). Set minimum power to a value at which the connected fan or pump reliably starts up.

10. Alarm configuration(aquasuite)

Select "Alarm configuration" from the device list for the device to be configured.

10.1. Speed signal/Output

Select the signal to be provided through the speed signal output. Available options are the speed signal of a connected fan/pump or flow sensor or an artificial speed signal. Alternatively, the speed signal output can be configured as a switching output. The check boxes "Switch off speed signal in case of alarm condition" and "Invert output behavior" determine output behavior during alarm conditions.

10.2. Alarm reporting and alarm limits

Select the data sources to be monitored and set appropriate alarm limits. If the current reading is below the lower limit or higher than the upper limit, an alarm will be raised if the check box "Activate alarm evaluation" is set for this value. All sources that currently raise an alarm are highlighted with a red background color in the software. Make sure only to use readings for alarm evaluation that are functional with your specific setup.

11. System settings poweradjust 2 (aquasuite)

Select "System" from the device list for the device to be configured.

11.1. Device information

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

11.2. Factory defaults

Click the button "Reset device to factory defaults" for a complete reset of all settings. You will have to completely reconfigure the device after resetting it to factory defaults!

11.3. Key management

In order to upgrade your poweradjust 2 unit to a higher version, you will need the serial number and the device key from the "Device information" section of this page. Order the desired upgrade from the Aqua Computer web shop and enter serial number and device key into the "Annotations" field during the checkout process. For your convenience, you can also click the button "Buy upgrade key" to display a help page with all necessary information.

After receiving your activation key from Aqua Computer, enter the key to the box labeled "Enter upgrade key" and click the "Apply" button. The poweradjust 2 unit needs to be restarted after entering the activation key. To do so, save all settings into the poweradjust 2 unit (by clicking the disk symbol in the device list) and shut down your PC. Wait for a few seconds before turning the PC on again.

11.4. Current measurement calibration

Due to tolerances in electronic components, the current measurement may differ from actual current consumption. For calibration, disconnect all fans or pumps from the power output and click the "Calibrate current measurement" button to start the calibration process. The current measurement is a purely informative value and not relevant for control functions.

11.5. aquabus configuration

Before connecting poweradjust 2 devices to an aquaero 5 controller, each poweradjust 2 device has to be configured to an individual aquabus address. You may skip this step if only one poweradjust 2 device is connected to an aquaero 5. Addresses 50 through 57 are available for poweradjust 2 devices.

11.6. External temperature sensor

If you detect inaccuracies in the temperature sensor readings, you can make corrections here. In general, this should not be necessary.

11.7. Flow sensor

If a flow sensor is connected to the poweradjust 2 unit, set up the flow sensor input in the lower region of the screen. The current sensor reading is displayed as well.

12. Basic settings (aquasuite)

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

12.1. Language

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

12.2. 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.

12.3. 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.

12.4. Service administration

The service (background service) has no functionality for poweradjust 2 units.

13. Technical details and care instructions

13.1. Technical details

Dimensions W x H x D:	47 mm x 41 mm x 36 mm
Power supply voltage:	12 V DC $\pm 5\%$
Power supply current:	max 4.0 A
Power output voltage:	0-12 V
Power output current:	max. 2 A at 12 V, short-term load 4 A
Power output continuous power:	max. 25 W at 12 V
Speed signal connector:	"open collector" max. 30 V / 100 mA
Ambient temperature range:	10 to 40 °C (noncondensing)

13.2. Care instructions

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

13.3. Waste disposal

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



13.4. 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:

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