aqua computer LEAKSHIELD Standalone Installation Guide

computer
LEAKSHIELD
User and installation manual

LEAKSHIELD Standalone

Contents

Preface

LEAKSHIELD is a unique leakage protection system for liquid cooling systems and has been developed by Aqua Computer. It actively generates an optimally computed negative pressure in the cooling system which actively prevents the escape of coolant in the event of a leak. If a leak occurs, only air is sucked into the cooling system.
For this purpose, an integrated vacuum pump is activated in a fraction of a second in the event of a leak and continues to maintain the required vacuum.
In addition, LEAKSHIELD uses a highly accurate sensor to detect and indicate even minimal leaks. This allows countermeasures to be taken at a very early stage. The system is also able to determine the fill level in the reservoir.
LEAKSHIELD was developed for the ULTITUBE reservoir series. The LEAKSHIELD Standalone version you have purchased also features an adapter with G1/4″ thread and a mounting bracket. This allows it to be operated universally with almost all reservoirs. LEAKSHIELD has an OLED display and a button control which allow the most important functions to be controlled directly on the device.

Safety precautions

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

- Read this manual thoroughly and entirely!
- Save your data onto suitable media before working on your hardware!
- 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!
- Never touch the membrane on the bottom side of LEAKSHIELD. Damage to the membrane can cause moisture to enter LEAKSHIELD and subsequently cause the unit to fail. If you notice any damage to the

membrane, contact the Aqua Computer Technical Support

- Use only DP Ultra as a coolant

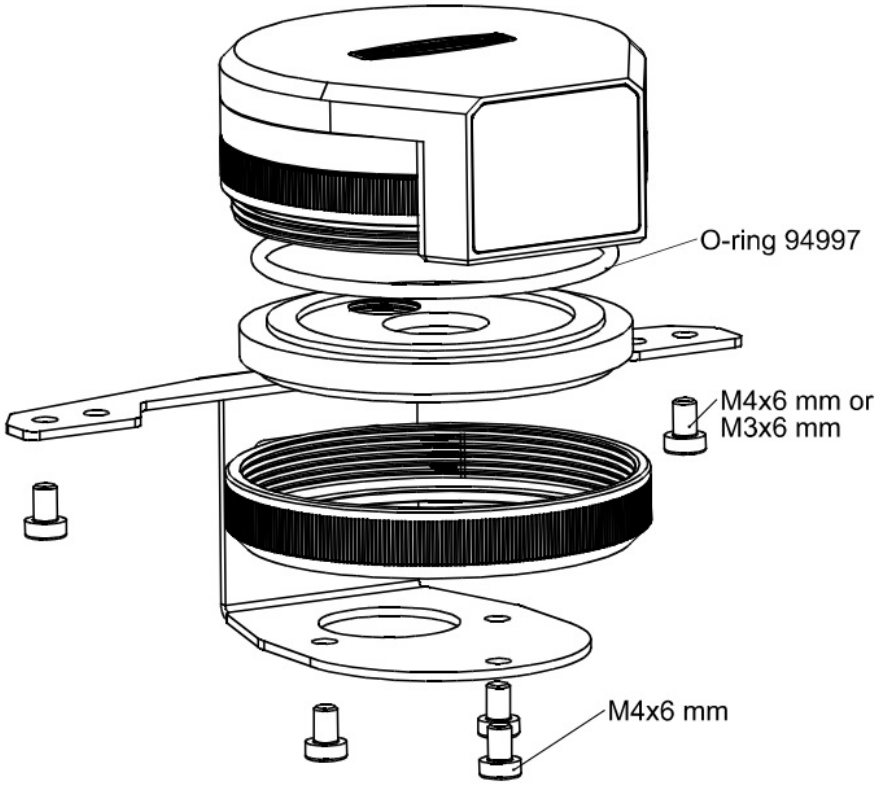
Requirements for the operation of LEAKSHIELD

In order to operate LEAKSHIELD properly, there are some principles to be observed when selecting the cooling system.
LEAKSHIELD can only be used if the maximum pump pressure in the system is lesspressure in the system is lesspressure in the system is lesspressure in the system is less than 450 mbarthan 450 mbarthan 450 mbarthan 450 mbar. This is the case for almost all systems with one pump. For systems with more than one pump, this must be checked accordingly, e. g. by measuring the pressure.
As a broad rule, the outer diameter of PVC tubing should be at least 1.5 times the inner diameter of soft tubing.
For PUR tubing, a factor of 1.2 is usually sufficient. Hardtubes are generally suitable. Without information on compatibility, we recommend testing at slightly increased negative pressure and maximum water temperature before use.
The components of the water cooling system have to be suitable for the operation with LEAKSHIELD as well and have to withstand the necessary negative pressure permanently. For Aqua Computer products this applies without exceptions. For products from other suppliers, you have to check this before starting operation! products from other suppliers, you have to check this before starting operation! products from other suppliers, you have to check this before starting operation! products from other suppliers, you have to check this before starting operation!
For the LEAKSHIELD Standalone version that you have purchased, there is another
requirement that must be met: The connector must be connected to your reservoir The connector must be connected to your reservoir The connector must be connected to your reservoir The connector must be connected to your reservoir
in such a way that water can freely run back from LEAKSHIELD into the air cushionin such a way that water can freely run back from LEAKSHIELD into the air cushionin such a way that water can freely run back from LEAKSHIELD into the air cushionin such a way that water can freely run back from LEAKSHIELD into the air cushion of the reservoirof the reservoirof the reservoirof the reservoir. Optimally, LEAKSHIELD is located vertically above the reservoir.
It is also important that there is sufficient air volume in the reservoirsufficient air volume in the reservoir sufficient air volume in the reservoir sufficient air volume in the reservoir. For safe operation, there should be at least 100 ml of air in the reservoir.
To ensure safe operation, only coolants of the DP Ultra seriesonly coolants of the DP Ultra seriesonly coolants of the DP Ultra seriesonly coolants of the DP Ultra series are approved for use. Even if many other coolants are certainly trouble-free, we cannot guarantee the function with these coolants.
Especially coolants with particles are able to clog or even destroy the membrane of LEAKSHIELD. Under no circumstances should coolants with flammable sub Under no circumstances should coolants with flammable subUnder no circumstances should coolants with flammable subUnder no circumstances should coolants with flammable substances be used!

Installation on ULTITUBE reservoirs

Hold the glass tube of the reservoir and remove the top lid from the reservoir by turning it anti-clockwise. Install LEAKSHIELD by screwing it onto the ULTITUBE. For installation on ULTITUBE reservoirs, neither stainless steel bracket nor adapter parts are used. After installation, the display can still be rotated to a desired position.

Installation of LEAKSHIELD Standalone



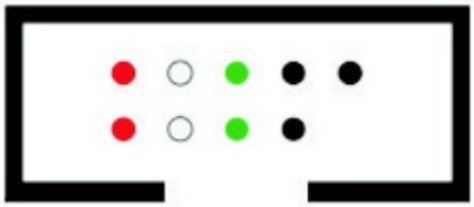
First attach the adapter set to the LEAKSHIELD module. To do this, first place the o-ring (94997) in the groove on the LEAKSHIELD module. Then position the acetal adapter plate and screw it tightly to LEAKSHIELD using the aluminum threaded coupling.
The stainless steel bracket is mounted with three M4x6 screws (see drawing).
LEAKSHIELD Standalone can be mounted to intended mounting holes for fans of size 120 or 140 mm.
Then connect the G1/4″ port of your LEAKSHIELD Standalone to a port on the cover of your reservoir.
There must be an air cushion of at least 100 ml present here. This connection There must be an air cushion of at least 100 ml present here. This connection There must be an air cushion of at least 100 ml present here. This connection There must be an air cushion of at least 100 ml present here. This connection must be designed in such a way that the coolant can freely flow back from the must be designed in such a way that the coolant can freely flow back from the must be designed in such a way that the coolant can freely flow back from the must be designed in such a way that the coolant can freely flow back from the LEAKSHIELD Standalone into the reservoir LEAKSHIELD Standalone into the reservoirLEAKSHIELD Standalone into the reservoirLEAKSHIELD Standalone into the reservoir. Otherwise the function is disturbed by a possibly closed membrane.

Electrical connections

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!

6.1. Connector “USB”

This connector is used tor USB communication with a PC. Connect to an internal USB header of your motherboard. Take special care to make sure the pin align- ment matches your motherboard!
ATTENTION: To be able to operate LEAKSHIELD even when the PC is in standby, you must configure the USB port in the BIOS settings in such a way that the power supply remains activated. Alternatively, you can use external USB power supplies for the power supply. For transportation, you can also use a USB powerbank Pin assignment: Pin 1 GND (black), optional Pin 2 GND (black)
Pin3 D+ (green)
Pin 4 D- (white)
Pin 5 +5 V (red)
The corresponding connector on the motherboard is usually a 9 pin connector with two independent USB ports. Both ° ee rows ot 4/5 pins can be used to connect an USB device. > e
The black wires (GND) are to be connected to the side of the missing pin, see picture with colored pin assignment.



6.2. Connector “signal”
The header can be connected to the power switch header of the motherboard us- ing an additional specialized cable (53216, not included in delivery).
Pin assignment: Pin 1: GND
Pin 2: not connected
Pin 3: open drain max 3.3 V/5 mA
In the event of an alarm, this interface can be used to shut down the computer in the same way as pressing the power button. A short or long press can be contigured.

Operation on the device

The most important functions of LEAKSHIELD can be controlled directly on the device. A button located at the right side of the LEAKSHIELD silicone illuminated ring is used to control the menu. By a short press on the button, it is possible to navigate directly through the display pages. It the button is pressed tor longer than one second, the menu is displayed. At this moment, “MENU” appears briefly in the display, tallowed by the menu items. By shortly pressing the key, you can now select between the following items:
SHIELD (mode selection)
Complete protection and detection of leakages. This function can only be used reliably atter deconfiguration via the aquasuite!
MONITOR (mode selection) The system is monitored tor leaks by using a low negative pressure. There is no protection against leakage in this mode. RELEASE (mode selection) The LEAKSHIELD system is switched off. The vacuum is automatically released, and pressure equalization occurs automatically.
TEST (action) In this action, a leak test of the cooling system is enabled. A contigurable negative pressure is generated as a test pressure and then the pressure loss is displayed.
FILL (action) This action makes it possible to suck coolant into the system. A vacuum of between 250 and 300 mbar is generated tor this purpose. During filling, the water pump must be switched off. Therefore, we recommend filling while the PC is switched oft!
DEAERATION (action) This action supports the venting of the system during filling by cyclically generating and releasing negative pressure.
LEVEL SENSOR (action)LEVEL SENSOR (action)LEVEL SENSOR (action)LEVEL SENSOR (action) The measurement of the level in the reservoir is triggered by this action. This function can only be used appropriately after configuration via the aquasuite!
EXIT
Exit the menu.
The respective function is selected by pressing the key again for a longer than one second.

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.
Please note: Depending on the type of product you are using, some features may not be available for your device.
8.1. Installation of the aquasuite software
For configuration and monitoring of our products with USB interface, the aquasuite software is available for download from our website **www.aqua-computer.de**. You will find the setup program in the support section of the website under Downloads/Software. The setup program checks all connected USB devices for embedded update service periods and offers various aquasuite versions depending on detected devices. If no device with update service for the latest aquasuite version is found, a warning is displayed and older aquasuite versions that do not require an update service purchase can be selected for installation. For installation and update service validation, an internet connection is required. The latest aquasuite version may also be installed if no suitable update service

period has been found in a device. Subsequently, update service may be purchased or an existing key may be entered within the aquasuite. These functions can be accessed in the aquasuite/Updates tab.

8.2 Basic operation

The program window is divided into two main areas. On the left side, a list of “overview pages”, data quick view, data logger, device pages, aquasuite web and aquasuite configuration 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 color of the symbol will change to orange.

Overview page: Clicking the padlock symbol will unlock or lock this overview page for editing. Device: Device can not be used due to update service problems, see “Updates and update service” for details.

Clicking the gear 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 heodline.

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.

Overview pages (aquasvite}

Current sensor readings and diagrams from all supported devices can be displayed in overview poges. 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 made

Each overview page can be displayed directly on your desktop. You can enable desktop mode for an overview page by clicking the monitor symbol in the list of overview poges. 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 poge 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 os background for your convenience.

9.2. Cracting 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 plus symbol is dis- played in the top 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 data is displayed in a tree diagram, click the arrow symbols to access individual items.

Confirm your selection by clicking the check symbol in the bottom right corner. 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.

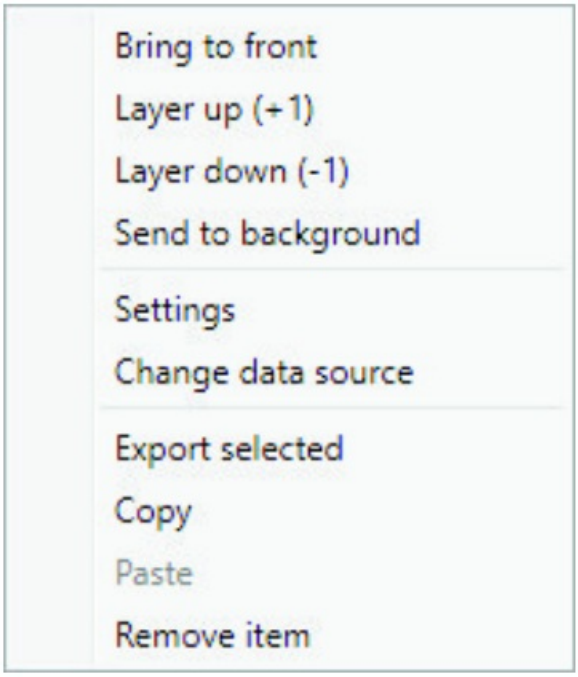
9.4. Editing existing elements

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. Hf 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. Values and names

Hf 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. Detailed data 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 o 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. Log data chart

This element can be used to display charts on overview poges. The charts have to be created using the data log functionality of the aquasuite before they become available for overview poges. 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.

9.8. User defined: images, text, drawing elements

By using user defined 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 an “User defined” element to on 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 clocking the “Ok” Button, the new control is saved to the overview page.

Step-by-step example 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 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.

9.9. Export and import of overview pages

Elements and complete overview poges can exported from the oquasuite and can then be imported either on the same PC or on other PCs. For export as well as im- port, the overview page must be in edit mode.

To export a complete page, right click o 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 odd 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.

Data quick view and data log (aquasuite)

All data currently monitored by the aquasuite can be accessed in the “Data quick view” section. This includes data from connected USB devices as well as hardware data supplied by the Aqua Computer background service. Displayed data may be filtered using the text box next to the magnifier icon, a chart shows the development over a maximum of ten minutes. All data shown here is not stored permanently.
In contrast, the “Data log” may be used to selectively and permanently store data from all connected Aqua Computer devices and hardware data supplied by the background service. Logged data can then be analyzed by creating charts or be exported to files. Data is only logged while the aquasuite software is being executed.

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 chapter “Log settings” 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 horizontal/vertical 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 can be used to reload and update the chart.

 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 chapter “Log settings” 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 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.

Page “LEAKSHIELD”

 Click on the “LEAKSHIELD” device page below the “LEAKSHIELD” entry.
The most important LEAKSHIELD functions are visualized and triggered on this page.
In the right view you see an overview page. In the upper area, the most important information about LEAKSHIELD is displayed. This includes the current vacuum, the required vacuum for protection against leakage, the status, the current fill level of the reservoir and the current volume change in the system.
The “Mode” display informs you about the current operating mode of your LEAKSHIELD. By clicking on this area you can change the modes.
The following modes are available:

- SHIELDSHIELDSHIELDSHIELD (Complete protection by negative pressure and leak detection)
- MONITORMONITORMONITORMONITOR (Low negative pressure, leak detection only)
- RELEASE RELEASE RELEASE RELEASE (System is switched off, automatic pressure compensation)

Below follows the an area „Action“ where you can select important device functions directly by clicking on one of the symbols. The following actions are available:

- Measure fill level: Measure fill level: Measure fill level: Measure fill level: Measure the level in the reservoir.
- Deaerate system: Deaerate system: Deaerate system: Deaerate system: Supports the venting of the system during filling
- Refill system: Refill system: Refill system: Refill system: Suck coolant into the system

Depending on the currently selected action, the further display of the lower area of this page changes. In SHIELD and MONITOR mode, the middle area shows a diagram with the current negative pressure and information on the minimum necessary negative pressure, the current setpoint and the maximum negative pressure.
Below this is a diagram showing the pump running time per day. This serves as a simple indicator for minor

leakages. Tight systems should have a pumping time of less than 15 seconds per day on average.
Upon completion of an action, LEAKSHIELD automatically returns to the previously selected mode.
When starting up, first call up the settings wizard. You activate this by clicking on the gearwheel at the very top right in the title bar.

11.1. The settings wizard

After calling up the wizard, a selection first appears in which you can choose between the wizard for the basic setting and an editing of the current setting. For commissioning, leave the first preselected option selected and use the right arrow to call up the next dialog.
In the reservoir dialog, select the reservoir you are using.
LEAKSHIELD needs this information to be able to determine the fill level correctly and e. g. to be able to calculate the volume change properly.
For Aqua Computer products, you can select the reservoir used directly from the drop-down selection field. For other reservoirs, you can enter user-defined values manually.
Settings for total volume, the remaining air volume at maximum fill level as well as at minimum fill level have to be made.
In addition, there is the option to measure the fill level automatically on a regular basis. If this action is activated, LEAKSHIELD will measure the level regularly when changes are made to the system (e. g. opening the reservoir) and after certain times.
Caution: During the fill level measurement, the vacuum is released for a short time. At this time there is no protection against leakage!
Now switch to the Pump dialog by clicking on the arrow symbol.
The pump used is the most important information for the operation of LEAKSHIELD. The pump type and the speed of the pump are used to calculate the pressure of the pump at the operating point and LEAKSHIELD can adjust the vacuum to your system accordingly.
The aquasuite automatically searches for Aqua Computer pumps in your system in the background. If connected pumps are found via USB or aqua bus, the correct pump is usually preselected.
For Aqua Computer pumps that are not found automatically, you can select the installed pump directly in the drop-down selection.
Other pumps can be configured via the user-defined setting. In this case you need information about the maximum pressure of the pump and the maximum speed. In addition, the aquasuite tries to find a data source for the speed of the pump. If there is no selection in the data source field or if the selection is wrong, you can correct it manually. The pump speed is important to automatically adjust the vacuum to the operating point of the pump.
Now go to the “Flow” section.
A flow sensor is not mandatory for the correct function of LEAKSHIELD. However, it helps to calculate the operating point more precisely and to be able to reduce the vacuum further.
LEAKSHIELD automatically searches for Aqua Computer flow sensors. If sensors are found, the most useful sensor is automatically selected. You can also make a selection manually using the “+” button or perform a new search for sensors using the “Search Flow Sensor” function. The next page “Pressure” allows you to skip the previously calculated values. This function is only useful for experts and is not recommended. The selection “Use adaptive pressure” is preselected and lets LEAKSHIELD adaptively calculate the optimal values at any time. If this selection is deactivated,
LEAKSHIELD works with the maximum possible pressure for the selected pump as the operating point.
By selecting “Time controlled generation of negative pressure” you can select two times at which LEAKSHIELD will build up the negative pressure again. This allows you to schedule the operating noise of LEAKSHIELD at a time that does not disturb you.
After leaving this page, you will reach the “Standby” section.
When booting from standby, no data can be sent to LEAKSHIELD via USB yet.
Therefore LEAKSHIELD needs defaults for the operating point of the pump. You can select this data via speed and flow defaults. In addition, current values can be taken from the assigned data source. If you do not know the data, you should not activate a reduction of the vacuum in standby in the following option In the standby of the PC the negative pressure can be reduced significantly if the pump is switched off with the PC. To enable this, you can activate the corresponding function here. The negative pressure in this condition can also be selected.
Now switch to the LEAKSHIELD “Mode” page. You can now select the operating mode of LEAKSHIELD. As a most common rule, the “SHIELD” mode should be selected. If the vacuum of LEAKSHIELD is not sufficient to protect your system (too strong pump, several pumps), you can use the mode “MONITOR”. This will be indicated by corresponding warnings in the upper part of the page.
The “RELEASE” mode only leads to a pressure equalization to the environment. You will then be taken to a “Summary” of the selected settings and can check them once again. Possible notes and warnings are displayed at the top of the table. To change settings once again, you can navigate through the pages by pressing the arrow

icons. The checkmark symbol on the Summary page transfers the settings to your LEAKSHIELD. If you cancel the wizard by clicking the “X” icon (top right), the previous settings will be saved.

11.2. The “Test” action

In the Test mode, the desired negative pressure is requested first. You can perform a leak test with negative pressures between 80 and 450 mbar.

Then LEAKSHIELD starts to prepare the test and to create the negative pressure. Once this process is complete, LEAKSHIELD will show you a graph of the pressure change over time. You can use the “Reference” button to select the current press sure as a reference. In addition, the data source of the diagram can be changed. The absolute current negative pressure, the pressure difference to the reference value and the current pressure change are available for selection.

With the mouse you can enlarge areas in the diagram. By pressing the “Cancel” field, you leave the test mode again.

sure as a reference. In addition, the data source of the diagram can be changed. The absolute current negative pressure, the pressure difference to the reference value and the current pressure change are available for selection. With the mouse you can enlarge areas in the diagram. By pressing the “Cancel” field, you leave the test mode again.

11.3. The “Measure fill level” action

If you activate the fill level measurement by clicking on the symbol “Measure fill level”, a bar graph appears in the lower area which shows you the progress of the measurement. To do this, LEAKSHIELD first releases the negative pressure and then generates a low negative pressure of approx. 100 mbar. The result of the measurement is then displayed. Note: There is no sufficient leakage protection during the level measurement. If you have reason to believe that your system is not completely tight, you should not activate the level measurement!

11.4. The “Deaerate system” action

After activating the action “Deaerate system”, two progress bars appear. The first shows the progress of the current cycle, the second the overall progress. During this action, negative pressure is cyclically built up and released again. This removes trapped air in the system step by step through expansion and compression.

11.5. The “Refill system” action

During filling, the water pump must be switched off. Therefore, we recommend filling by pressing the button on LEAKSHIELD and while the PC is on standby! If the action “Refill system” is selected, LEAKSHIELD generates a negative pressure between 250 and 300 mbar. Coolant can be sucked into the system by this. Pressing the “Pause” button pauses the pumping action, but the vacuum is not released. This prevents coolant from flowing back into the container.

If the process is terminated by pressing the “Exit” button, LEAKSHIELD switches to the previously selected mode.

12. Sensor configuration

Select “Sensors” from the device list below the “LEAKSHIELD” entry. In the upper area of the window, the 18 usable sensors are displayed with the actual measured value. In the lower area of the window, the configura- tion of the selected sensor can be made.

There are local sensors, sensors with extended configuration and software sensors in this selection.

The local sensors are measured values of the sensors of LEAKSHIELD. For these sensors, only the name and log interval can be selected.

The sensors with extended configuration are sensors for which extended settings can be made and which have influence on the operation of LEAKSHIELD. These settings are also possible via the wizard.

The software sensors (sensor 1-12) on the other hand are placeholders for data to be transferred from your PC to LEAKSHIELD via USB.

Here all data of the aquasuite (incl. hardware monitoring and other Aqua Computer devices) are available. In addition, a scaling factor and an offset can be selected for these sensors.

The data transmitted in this way can later be shown on the display of LEAKSHIELD, for example, or serve as a data source for RGBpx effects.

Please note that this data is only available when the Aqua Computer background service is running and a USB connection to LEAKSHIELD exists. During the boot process, for example, this is not the case!

The most important sensor values of LEAKSHIELD:

12.1. Pressure

The first displayed sensor indicates the current negative pressure in mbar.

In the configuration section you have the possibility to start the fill level measurement and to adjust the settings given in the wizard for this section. You will find more information about the details in chapter 11.1 (Reservoir).

We recommend to make the settings only through the wizard.

12.3. Volume change

The third displayed sensor provides information about the volume change in ml/h.

This value can give you information about smaller leakages. However, this value also changes when the temperature of your system changes.

12.4. Pressure change

The fourth displayed sensor provides similar information as the volume change value, but here the pressure change is given in mbar per minute.

12.5. Pump speed

The fifth displayed sensor shows the current pump speed (if available). This value is transmitted via USB from the Aqua Computer background service to LEAKSHIELD.

You can customize the sensor name and log interval. In the configuration you can also view the settings of the wizard for the “Pump” area and change them directly. You can find more information about the details in chapter 10.1 (Pump). However, we recommend to make the settings only using the wizard.

12.6. Flow

The sixth sensor displayed is the flow measurement value of your system (if avail- able). This value is transmitted via USB from the Aqua Computer background service to LEAKSHIELD. In the configuration, you also have direct access to the settings made in the wizard in the “Flow” area. In addition, you can adjust the sensor name and the log inter- val. You can find more information about the details in chapter 11.1 (Flow). We recommend that you only make the settings using the wizard.

12.7. Software sensors

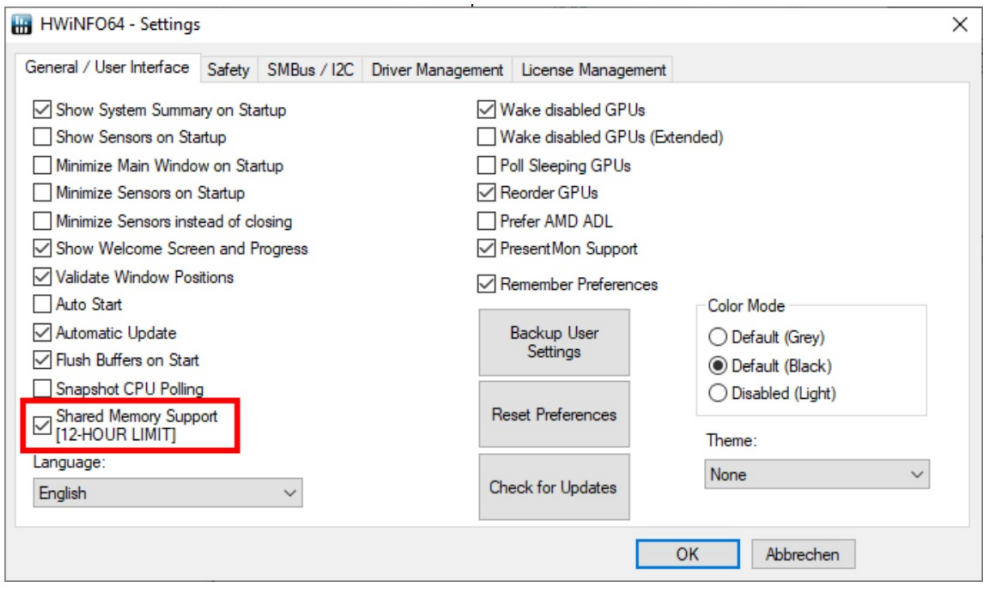
The last twelve sensors in the list are software sensors and can be used to transmit sensor data that is not physically available to LEAKSHIELD from the computer by USB connection.

Select the appropriate unit for each configured data source. For manipulation of the displayed sensor value, a scale factor and an offset may be configured. Data from third party software regularly requires the scale factor to be adjusted.

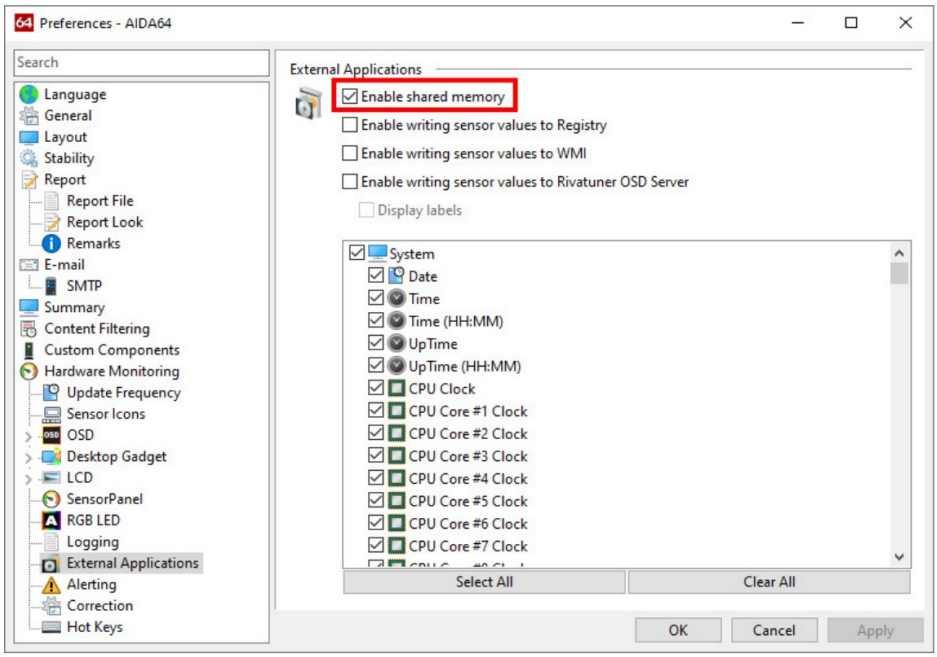
Transmission of sensor data via USB interface

During installation of the aquasuite, the background service “Aqua Computer Service” is also installed. This service supplies various data from PC components and imported data from aquasuite web, additionally sensor data provided by third party software can be accessed. In order to access third party software data, the third party software has to be correctly installed, configured and running. Currently, the “Aqua Computer Service” supports data transfer from “HWiNFO” (REALiX, Freeware, www.hwinfo.com) and “AIDA64” (FinalWire Ltd., subject to license fees, www.aida64.com).

In the HWiNFO settings menu, “Shared Memory Support” must be activated and the “Sensor Status” window has to be open:



In the AIDA64 preferences menu, “Enable shared memory” must be activated in the “External Applications” sub-menu:



By clicking the plus symbol labeled “Data source”, one of the provided sensors can be assigned to the selected software sensor.

Display configuration

Click on the “Display” device page below the “LEAKSHIELD” entry. In the upper part of the window the 10 available display pages of LEAKSHIELD are shown. The content of these pages can be customized in each case.

13.1. Display pages

First select one of the 10 display pages for further configuration. Then you can open the template selection by clicking on the enlarged preview of the display. A dialog opens allowing you to select a template from a gallery. Select a template and you will be taken back to the configuration. Depending on the selected template, one or more sensor values can be configured.

If you want to display data from the hardware monitoring, for example, these must be provided via a software sensor. Then the corresponding software sensor can serve as data source for a template. In some cases, icons can also be selected for the values or your own icons can be loaded. In the template “Logo” you can display your own logo.

For each page you can select whether it should be displayed in standby of the PC and whether it should be displayed in normal operation.

This allows a ditferent selection of pages to be displayed for standby and operation.

13.2. Display settings

The brightness of the display as well as an automatic change of the display pages can be configured.

The brightness can also be set for inactivity (no user interaction) and the display can be switched off completely.

In addition, settings can be made here as to whether and after what time the dis- play pages should change automatically.

The other options allow the display to be rotated by 180° and the display to be inverted.

Automatic inversion is activated at the factory. This significantly reduces the burn-in of permanently activated pixels, which is typical for OLEDs.

As with all OLED displays, the brightness of active pixels decreases over time. For homogeneous wear of all pixels, the display can be operated inverted half the time. To compensate for existing wear, the inverted mode can also be activated permanently.

The last option available here is the automatic shutdown of the display in standby.

This option significantly increases the life span of the display!

RGBpx configuration

Select “RGBpx” from the device list below the “LEAKSHIELD” entry. The integrated RGBpx lighting (6 LEDs)

can be configured.

14.1. Create and configure additional LED controllers

New LED controllers can be added by clicking the plus symbol. Alternatively, use the right mouse button and select “New” from the context menu. Select the desired effect from the superimposed list of available effects. The controller name can be altered from its default as well. Confirm you selection by clicking the check symbol in the lower right corner.
The configuration of the newly added LED controller can be modified in the lower area of the window. Most effects offer extensive customization options such as color selection or speed adjustment. Additionally, many effects can be configured to modify effect parameters depending on current sensor data. In total, up to eight LED controllers (two for integrated lighting, six for external components) can be configured.

14.2. Modify existing LED controllers

Existing LED controllers can be selected by clicking the corresponding color bars, the configuration of the selected controller can then be modified in the lower area of the window.
By clicking the gear symbol, the effect to be displayed can be changed and the controller name can be altered. Confirm you selection by clicking the check symbol in the lower right corner.

14.3. Modify LED assignments

Existing LED controllers can be moved by using “drag&drop”on the corresponding color bars. The horizontal position of the color bar defines the position of the effect on the connected LEDs. The vertical position determines the priority of the LED controllers, if multiple controllers are assigned to a range of LEDs. Controllers positioned further up in the list have higher priority than controllers further below.
The length of the bar (corresponding to the number of LEDs assigned) can be changed by moving the right/left edge of the color bar.

14.4. Duplicate LED controllers

Select the LED controller(s) to be duplicated and click the duplicate symbol to create new LED conirollers using identical configurations. Alternatively, use the right mouse button and select “Duplicate” from the context menu.
In total, up to eight LED controllers (two for integrated lighting, six for external components) can be configured.

14.5. Delete LED controllers

Select the LED controller{s) to be deleted and click the delete symbol to delete the selected controllers. Alternatively, use the right mouse button and select “Delete” from the context menu.

Alarm configuration

Select “Alarms” from the device list below the “LEAKSHIELD” entry.

15.1. Leakage warning and alarms

In the Leakage alarms section, one warning and two leakage alarms can be configured. The threshold for the warning can be set via a slider depending on the volume change. In addition, it is possible to select whether an acoustic alarm is to be emitted in the event of a warning.
For two further alarms for smaller and larger leakages, the action can also be selected here. These alarms are triggered by LEAKSHIELD with a predefined algorithm and cannot be configured further.
The leakage alarms are always visualized acoustically and visually.
An action is also available for each warning and alarm. After pressing the “Edit action” button, you can define a key sequence or an action of the power button via the signal output within a dialog.
This enables the emergency shutdown of the computer when connecting the “signal” connector to the power button connector of the mainboard using a proper connection cable (article 53216). Connect the alarm cable to the mainboard.
Then check the correct function by provoking an alarm. During the emergency shutdown, data may be lost because the operating system and opened programs are not closed properly!

15.2. Fill level warning and alarm

A warning and an alarm are available for the filling level. Both thresholds can be set freely and an acoustic alarm can be activated for the warning.
As already described for the leakage alarms, the corresponding actions are also available here.

The alarm is always visualized acoustically and optically.

15.3. System alarm

The system alarm is triggered in case of errors at LEAKSHIELD or the power supply.
Only the action in case of an alarm can be selected.
System alarms are always evaluated and visualized acoustically and optically.

The Status page

Click on the “Status” device page below the “LEAKSHIELD” entry.
On the Status page, all current operating data of LEAKSHIELD are visualized. For this purpose, the status, the current negative pressure, the volume change in ml/h and the pressure change in mbar per minute are displayed as values in the upper area.
By clicking on one of the radio buttons, the corresponding value can be displayed in a diagram below in the change over time.
The size of the diagram can be changed by using the dividing line below the diagram.
In the middle of the page a symbolic illustration of LEAKSHIELD is shown. This shows the components of the system, such as the vacuum pump, valves, etc., represented by symbols.
Currently active components are displayed in green. All important measured values are shown in the schematic.
In the lower part of the page, the current events are displayed in a list together with the time and further details. In case of malfunctions, this list can be exported and sent to Aqua Computer for further analysis.

Profiles

Select “Profiles” from the device list below the “LEAKSHIELD” entry.
The profile management can be used to to save four configurations as profiles and activate them manually or automatically. Profile management is a software feature of the aquasuite and requires a USB connection to the LEAKSHIELD.

17.1. Manual profile selection

Select the profile to be activated by clicking the corresponding button.

17.2. Automatic profile selection

Profiles can be activated automatically using the global profiles feature of the aquasuite, see chapter 19.4. for details.

17.3. Profile configuration

All configuration changes are automatically stored in the currently active profile.
The current configuration can also be stored in any other profile by clicking the corresponding button.

System settings

Select “System” from the device list below the “LEAKSHIELD” entry.

18.1. Device information

The details displayed here might be required when you contact our service for sup- port. You may enter a “Device description” for easier identification, this text will be displayed in the device list and in the data quick view.
A maintenance indicator is also shown. If this indicator has reached 0%, maintenance by Aqua Computer with replacement of the vacuum pump and valves is necessary.

18.2. Device settings

After pressing the “Reset device to factory settings” button or the corresponding menu item, the default values are loaded. The device must then be completely reconfigured! The settings can also be exported and imported in this section. The Pump runtime diagram can be deleted by clicking on the corresponding item.

18.3. Time settings

For the internal clock in LEAKSHIELD, the time zone can be selected here and the device time can be updated from the PC. In addition, the date and time format can be set.
Note: LEAKSHIELD does not have a clock buffered by a battery. After a power failure, the time must be reset.

18.4. Standby behavior

The settings for the standby behavior determine at which USB operating states the LEAKSHIELD switches to standby mode. Depending on the configuration, the display, the alarm evaluation and the lighting can be

deactivated in standby.

18.5. Firmware update and language selection (aquasuite only)

The most up to date firmware for all supported devices is always included in the current version of the aquasuite software. The button “ Update firmware now” will start the update process for the device firmware.

During the firmware update process, do not disconnect the device from the PC and do not power down the PC! After the firmware is successfully updated, the aquasuite software will be automatically closed.

Playground (aquasuite)

Click the entry “Playground” to configure Virtual Software Sensors, global profile management and hotkeys.

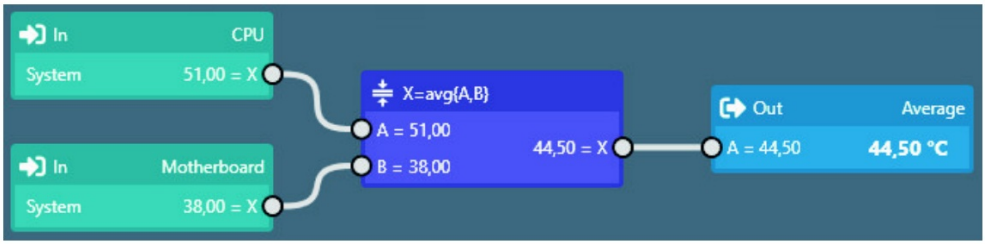
19.1. Input values

Input values defined in this section can be manipulated by individually configured control elements, for example sliders or buttons.

Create a new input value by clicking the plus symbol in the upper right corner of the “Input values” window and configure the properties as desired. A name, an icon, a unit, a range of values as well as a initial value can be assigned to each input value. This new input value will then be available to be displayed on overview pages and in the quick view section and can be used as a data source for software sensors and virtual software sensors. In the lower area of the window, control elements can be created and configured to manipulate the input value. These preconfigured control elements can then be used for overview pages or in the system tray.

19.2. Virtual Software Sensors

Virtual Software Sensors can be used for extensive yet easy to use adaptation and calculation of sensor values using mathematical and logical functions as well as filters. Create a new Virtual Software Sensor by clicking the plus symbol in the upper right corner of the “Virtual Software Sensors” window. Each Virtual Software Sensor always has an “Out” element which will provide the resulting sensor value. In the settings dialog of this element, the name and unit of the sensor can be configured. You can now add data sources and function blocks to the lower area of the sensor window and connect inputs and outputs of the blocks with lines. Connect the output of the last function block with the “Out” element. The resulting virtual sensor can be used within the aquasuite software, for example for overview pages, additionally it may be transmitted via USB connection to connected devices that feature software sensors. The following (very simple) example calculates the average out of two temperate



Virtual software sensors are updated once per second and re-calculated with the numbers valid in that particular moment. When using fast changing input values, extreme values can therefore either be used or ignored for the calculation. No smoothing or averaging is taking place.

19.3. Output actions

While the virtual software sensors are used as a value within the aquasuite, output actions configured in this section are used to trigger events. Various notification events including emails and MQTT messages are available. Additionally, external programs can be started. Create a new output action by clicking the plus symbol in the upper right corner of the “Output actions” window and configure the properties as desired. Each output action always has an “Output” element which represents the event itself. In the settings dialog of this element, the event to be executed can be selected and configured. You can now add data sources and function blocks to the lower area of the window and connect inputs and outputs of the blocks with lines. Connect the output of the last function block with the “Output” element. The event will be executed when the input of the “Output” element reaches a value greater than zero. Output actions are updated once per second and re-calculated with the numbers valid in that particular moment. When using fast changing input values, extreme values can therefore either be used or ignored for the calculation. No smoothing or averaging is taking place. Example: If thresholds are exceeded for very short periods of time lasting less than one second, the action can be executed or not be executed seemingly at random, depending on whether the thresholds is exceeded in the exact moment the calculation is performed.

19.4. Global profiles

The global profile management can be used to conveniently change set- tings in multiple devices simultaneously

and activate desktop pages. Individual actions can be defined for each of the four profiles, switching bet- ween profiles can either be done manually or automatically depending on configurable rules. In order to use this feature, set up profiles within the individual device configurations first. These profiles can then be activated using the global profile management. Not every type of device supports profiles.
Buttons in the upper window area can be used to switch between global profiles. Alternatively, the profile icon in the title bar of the aquasuite window or a profile icon in the system tray may be used. Example use cases: Switching of LED illumination settings depending on current time of day or modification of fan settings when a graphics application is launched.
Notice for profile activation depending on running applications: During configuration of the respective rule in the aquasuite, the application to be configured must already be running. The application selection within the aquasuite will always show currently running applications and processes only.

19.5. Hotkeys

Hotkeys are key combinations that will be processed system-wide and can activate global profiles or desktop pages. The configured key combinations will be registered in the operating system and be processed by the background service. If the configured actions only use the profile management, the aquasuite does not have to be running for hotkeys to be operational; if desktop pages are used, the aquasuite must be running. Do not use key combinations for this function that are required by other applications.

aquasuite web

Click the entry “aquasuite web” to publish data on the internet or import data from the internet. The server for this service is operated by Aqua Computer and provided for use with the aquasuite, without warranty for error free operation or permanent availability. Aqua Computer reserves the right to limit or cancel this service at any time.

20.1. Data export

To publish data, create a new export data set by clicking the plus symbol in the upper right corner of the “Data export” window. The name of the data set may be modified to meet your requirements. You may then add the data sources to export by clicking the plus symbol in the “Data sources” window section. By clicking the gear symbol, the name of the corresponding value can be changed. Up to 30 data sources can be added to each export data set, the total number of export data sets is limited to 10. All selected values will be transmitted to the Aqua Computer server by the Aqua Computer background service approximately every 15 seconds, even after closing the aquasuite. Notice regarding data security: All data contained in the configured export data sets is transmitted to the Aqua Computer server with transport security. The server stores the data set in volatile memory until a new data set is received or until 10 minutes have passed. Data received is not permanently stored, data is also not correlated to IP addresses or other personal data. Data on the server may be accessed by anyone without restrictions, furthermore automatic data collection and recording through third parties is possible. Use the data export feature for data that you want to publish publicly and are allowed to do so only.

20.2. Data access

Published data can be obtained from the Aqua Computer server in various formats. Generally, the “access key” is required to access data.
In addition to access through any internet browser and importing data into the aquasuite, data is also available in JSON format and compatible to Circonus.
Furthermore, the server generates banner images in two different sizes from the transmitted data, suitable to be included in forums signatures. The code required for the Aqua Computer forums is provided for your convenience.

20.3. Data import

To import a data set from the Aqua Computer server, the “access key” of the data set is required. The access key can be found in the aquasuite on the computer providing the data in the “Data access” section.
Create a new import entry by clicking the plus symbol in the upper right corner of the “Data import” window. Enter the access key of the data set to be imported. Up to 10 data sets (each containing up to 30 values) can be configured.
In order to verify that data is being imported, use the “Data quick view” feature in the aquasuite. Navigate to “Data from Aqua Computer service”, then “aquasuite web”. For each imported data set, you should find an entry with the name of the data set containing the individual values. It may take a few seconds before imported data is displayed.

Basic settings (aquasuite)

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

21.1. Language

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

21.2. Create overview pages

After activating the “Generate device overview pages”, new overview pages with default settings will be created for all devices.

21.3. Reorder menu items

The order in which overview pages and devices are displayed in the list can be adjusted to you preference. Activate the reorder mode by clicking the “Edit menu order” button or by clicking and holding one of the elements for a few seconds. Sort the list items by clicking the arrow symbols and exit the reorder mode by clicking the check symbol on the right side of the window when done.

21.4. 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.

21.5. Event log

Events from various parts of the aquasuite can be saved to text files. Use the but- tons to view the files either internally in the aquasuite or with an external program.

21.6. 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.

21.7. Service administration

The background service configures special USB settings for all connected Aqua Computer devices, provides hardware data, software sensors, profile management, aquasuite web and Playground and should therefore always be active. The hardware monitoring features of the background service can be disabled for specific categories if errors occur. Especially when using hardware monitoring software of different manufacturers at the same time, conflicts can occur when accessing data. Deactivate the hardware monitoring feature of the aquasuite or parts of it in this case. When maintenance mode is activated, all optional modules of the background service are deactivated. This is useful in case of erroneous settings in the Playground, in particular if a system shutdown is configured and triggers too often. Therefore, in default configuration maintenance mode is automatically enabled if the computer is shut down three times by this feature (recommended setting).

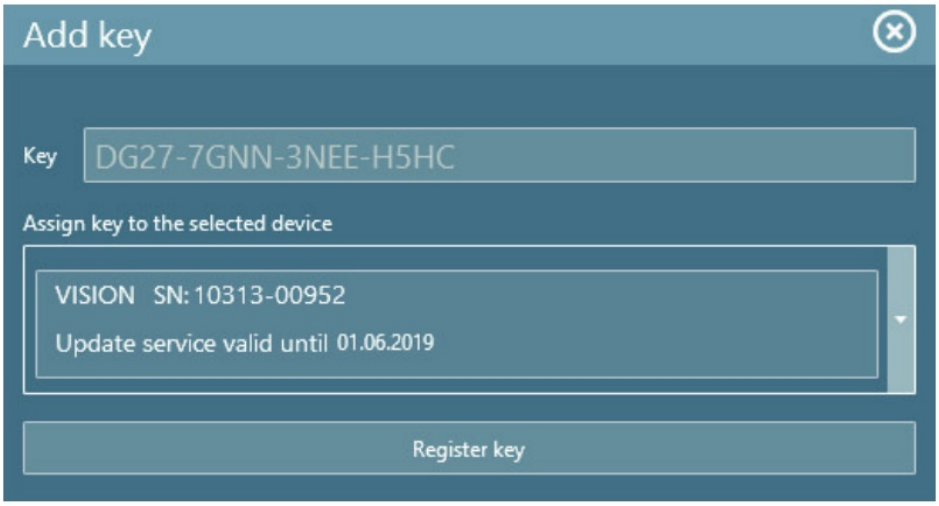
21.8. Audio and video

The background service can analyze audio and video data and provide it a to connected devices. Both functions can be enabled and disabled separately.

Notices for video analysis: Screen content preventing analysis by DRM or similar methods cannot be analyzed. If a graphics card is configured for variable refresh rate or a modified refresh rate, video analysis may fail; please deactivate this function in the graphics settings of the operating system if necessary.

21.9. Updates and update service

For software activation, all aquasuite versions starting with version 2017 require an active update service for the initial release date of the respective version. Update service periods are generally assigned to individual devices, brand-new devices automatically contain update service for a specific period depending on the type of the device. For software activation, at least one device in the computer must contain a corresponding update service period that includes the release date of this software version. If a valid update service period is detected for at least one device, all devices connected to the computer can be used with this version. It is not mandatory that each device has a corresponding update service period. For update service validation, the aquasuite requires an internet connection. After successful validation, a file containing current data is stored on the computer. A re-validation is performed only if a new software version (update) is installed or upon connection of new devices. New devices can not be used prior to re-validation, even if other devices with corresponding update service periods are connected at the same time. To purchase update service, please use the “Buy” button, which will open a website with current prices and payment options.



If you have received a key for update service with a device or bought one separately, you may enter the key after clicking the “Register” button. Select a currently connected USB device from the list for update service assignment. After clicking the “Register key” button, the update service period is permanently assigned to the selected device and stored on the Aqua Computer update server. The key will not have to be re-entered after re-installation of the software or transfer of the device to another computer, but transferring the update service period to an- other device is not possible. During update service validation and software activation, device serial numbers and a calculated computer ID are transmitted to and stored on the update server. No further personal information such as IP addresses are stored.

21.10. E-mail and MQTT accounts

Accounts for sending e-mail or MQTT messages can be configured. The se accounts can then be used to send messages in the “Outputs” section of the Playground.

Technical details and care instructions

22.1. Technical details

Material:	POM, silicone, PMMA, ABS, PTFE, NBR
Dimensions:	Diameter 72 mm, height 36 mm
Weight:	210 g
Supply voltage:	5 V DC +5 %, max. 0.5A
Ambient temperature:	l O to 40 °C (non-condensing)
Negative pressure:	Max. 450 mbar
Valve air eakage rate:	yp. < 2 ml/min at 300 mbar vacuum
Noise:	Max. 60dB, typ. 50dB in pump mode
Acoustic alarm:	Buzzer, approx. 85 dB
Illumination:	6 digitally controlled RGB LEDs
Display:	OLEO, l 28x64px, can be dimmed and switched off
Interfaces:	USB 2.0, signal for power button

22.2. Care instructions

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

22.3. Waste disposal

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

electronic waste.

22.4. 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 web site **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@aqua-computer.de

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Documents / Resources

	aqua computer LEAKSHIELD Standalone [pdf] Installation Guide LEAKSHIELD Standalone, LEAKSHIELD, Standalone

References

- Computer News | Tests | Downloads | Shop | Computer.de
- Home | AIDA64
- Aqua Computer Homepage - Home
- User Manual