

Operating and assembly manual




aquaduct
eco series

240 eco and 360 eco/eco+ mark II

January 2016

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1. Preface

Dear Customer,

We congratulate you on the purchase of a water cooling system made by Aqua Computer GmbH & Co. KG. We are one of the most renowned manufacturers of PC water cooling systems in Germany. Our production meets highest quality standards. During the development we especially took into account that our cooling system is dependable and leak proof.

Should you have any questions, we would like to ask you to first look at the "FAQ" area and "forum" on our homepage www.aqua-computer.de. If you should not find an answer to your question there, please email to support@aquacomputer.de.

We hope you will enjoy your new cooling system.

Your Aqua Computer Team

1.1. Overview about the aquaduct

The aquaduct is an uncompromising solution. It has convincing design and a cooling performance which sets standards at a minimum noise level. Furthermore it is foolproof to handle, secure and compact. It got the name, since the water runs over a kind of bridge at the top and falls down then on the other side.

The combination of a passive and an active radiator result in a very good overall cooling performance under changing conditions.

Although being the entry model of the aquaduct eco product range, the aquaduct 240 eco AC 230 V offers an impressive cooling capacity due to the integrated dual radiator equipped with two 120 mm fans. All other models are equipped with a microprocessor controlled 12 V pump and feature extensive configuration and control functions. The top model, the aquaduct 360 eco+, is able to control the speed of the integrated fans according to water temperature and can be connected to a flow sensor for extended monitoring functions. Both aquaduct 360 eco models feature outstanding cooling capacity due to the integrated triple radiator.

To keep the maintenance frequency of the aquaduct as low as possible, large water tanks were integrated into the cooling profiles. Through this the refill of water is minimized to an annual maintenance.

The aquaduct comes with a small circuit board for a free PCI slot. It supplies the aquaduct with current and offers various connections for PC communication and additional components.

1.2. Information on the assembly of a water cooling system

To enable cooling by water in sensible electronic devices, one basic requirement has to be fulfilled: the entire system has to be completely watertight and long lasting. This has always been our priority in developing water cooling equipment. Therefore high-quality plug-connectors are used for our plug&cool-system. These rather expensive, but by the industry almost exclusively used push-in connectors possess a pressure resistance of more than 10 bar, when using suitable hoses, guaranteed by the manufacturer. This pressure in water cooling systems is far lower than this value.

In addition to the aquaduct cooling system you merely need the water coolers matching your PC's components. As a general rule, all water blocks produced by Aqua Computer can easily be disassembled to allow for cleaning after long use. No part is glued or soldered, therefore replacement of individual parts is possible as well as for example changing mounting plates of a CPU water block when changing the type of CPU in your system.

The high-quality rubber gaskets are long lasting. Should one ever wear out, it can easily be replaced. Replacement parts can be obtained from Aqua Computer. Generally the gaskets should be replaced after 5 years or earlier if the cooler is frequently dismantled. The threaded hose-connections of the plug&cool-system are made watertight with real rubber gaskets. They can be replaced later the same way as the main gaskets of the coolers. The optionally available barb connectors and 10/8 connectors are also made watertight with a rubber gasket.

The pump is one of the most important parts of the system. If it stops working, the components to be cooled will soon overheat. Equivalent to a failure of the fan in air-cooled computers, this can result in the destruction of the computer (or even a fire). Therefore a powerful and dependable pump is essential.

The pump manufactured by the company Eheim used in the aquaduct stands out due to a silent operation and a high reliability.

In the course of further technical development our products can be subject to change any time. Therefore it is possible that the product you purchased doesn't answer exactly the descriptions or the pictures in this manual.

2. Safety precautions

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

1. Read this manual thoroughly and entirely!
2. Save your data before working on your hardware in any case!
3. Be careful when removing existing conventional cooling devices. Especially when removing cooling devices that are glued on, there is a risk of damaging the hardware!
4. To connect the water blocks for the PC hardware, it is normally necessary to pass hoses inside the case. The holes in the bracket of the pc interface board feature suitable holes, equipped with rubber protectors to prevent damaging the hoses. If using hoses with bigger outer diameters, suitable protective lead-throughs must be used!
5. Do not start your computer before you are absolutely sure that no water leaks from the system!

6. Pay attention to the care instructions at the end of this manual. Specially avoid any contact of the acrylic glass ("Plexiglas") components with solvents!
7. Make sure that your wall socket is protected by an FI-fuse!
8. Maintain a minimum distance of 0.5 m between the aquaduct and devices that could react in a sensible way to magnetic or electromagnetic fields!
9. Make sure that the computer can not be operated when the aquaduct is switched off. Use a multiple socket with a switch for example, via which you connect the aquaduct AND the computer to the power outlet! (230 V and 115 V versions)
10. During operation of the computer constantly observe the temperature of the processor. Use software or hardware with a warning- or switch-off-feature for this purpose, since a failure of the cooling system is not audible. Should the temperature of the processor exceed 65°C (149°F) turn off the computer immediately!
11. Use only the coolant we specify. Other coolants can damage the system and cause leaking or decreased cooling performance.
12. Regularly check the whole system for leaks and replace all seals with signs of wear, every five years at the latest. Suitable spare parts can be purchased from us.
13. 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.

14. Secure the aquaduct against overturning, particularly if children or domestic animals have access to the device! When overturning there is a risk of injury! In the overturned condition the function of the pump and with that the complete cooling function can fail!

15. Depending on the configuration of the aquaduct it is possible that the surfaces on the outside get very hot! Take measures to protect the device from touching, particularly if children or domestic animals have access to the device!

3. Scope of delivery

3.1. aquaduct 240 eco mark II AC 230 V

- aquaduct 240 eco mark II AC 230 V
- 2 pcs. straight connector plug&cool G1/4"
- hexagon socket wrench
- dual PUR tube blue/black approx. 2,5 m
- PC circuit board
- 15-pin aquaduct connection cable approx. 2 m
- 3-pin fan connection cable
- fan controller
- 1000 ml Double Protect Ultra coolant
- this manual

3.2. aquaduct 240 eco mark II

- aquaduct 240 eco mark II
- 2 pcs. straight connector plug&cool G1/4"
- hexagon socket wrench
- dual PUR tube blue/black approx. 2,5 m
- PC circuit board
- USB cable approx. 2 m
- 15-pin aquaduct connection cable approx. 2 m
- ATX starter
- cable for rpm signal
- 1000 ml Double Protect Ultra coolant

- this manual

3.3. aquaduct 360 eco mark II/aquaduct 360 eco+ mark II

- aquaduct 360 eco mark II/aquaduct 360 eco+ mark II
- 2 pcs. straight connector plug&cool G1/4"
- hexagon socket wrench
- dual PUR tube blue/black approx. 2,5 m
- PC circuit board
- USB cable approx. 2 m
- 15-pin aquaduct connection cable approx. 2 m
- ATX starter
- cable for rpm signal
- 1000 ml Double Protect Ultra coolant
- this manual

3.4. Optional accessory for aquaduct 360 eco+ mark II

- connection cable for flow sensor (order code 53027)
- flow sensor (order code 53061)
- flow sensor "high flow" (order code 53068)

4. Arranging the elements of the cooling system

On arranging the elements of the cooling system you should observe the following essential points:

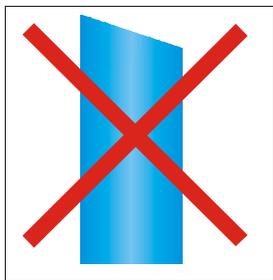
- All elements have to be flown through sequentially one after the other. A parallel assembly must not be carried out, since the allocation of the water in the different hoses can hardly be predicted and single components could possibly not sufficiently be cooled or even not at all.
- The components can be in any order you like. This has (almost) no influence on the cooling performance. Additionally it is worth mentioning, that the difference in temperature of the coolant between the in- and outgoing line of the radiator is about 1-2 °C in an average system, meaning that the water just heats up about 1-2 °C while flowing through all the coolers.

- A complete cooling circle consists of the aquaduct and one water cooler at the minimum.

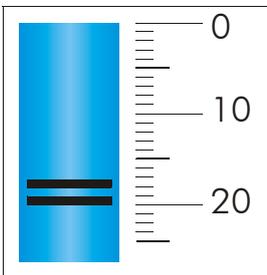
5. Use of the plug&cool connectors



Our plug&cool connection system makes a secure fitting of the hoses possible without any tools. It is pressure and temperature resistant. Please observe the following instructions for the fitting:

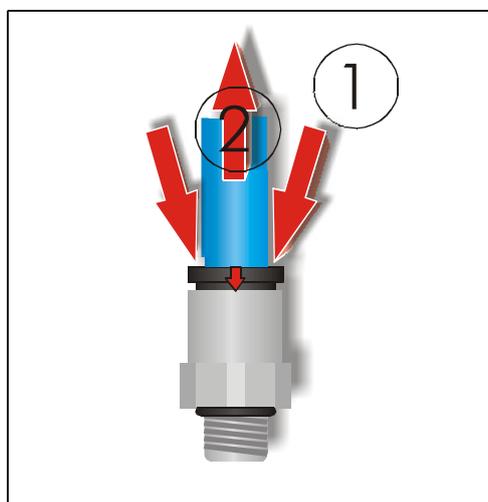


1. Cleanly cut the hose to the desired length. The hose should be cut **evenly** and cleanly **avoiding burs** with a sharp knife or a hose cutter (available in our shop). After each detachment of the hose from a connector the first two centimeters have to be cut off to guarantee a secure operation.



2. Insert the hose into the connector up to the limit stop.

When inserting the hose, a first limit stop will be felt which has to be overcome with some effort. If you want to be on the safer side, you can mark the hose with a felt tip pen up to where you have to insert it. Depending on the connector it will be between 18 and 20 mm.



If the hose has to be detached, please do the following:

1. Push down the black or blue plastic ring on the connector. For this purpose you can also use the separately available AC Multi-Tool. Slip it over the hose with the middle opening.
2. **While pushing down** pull the hose from the connector.

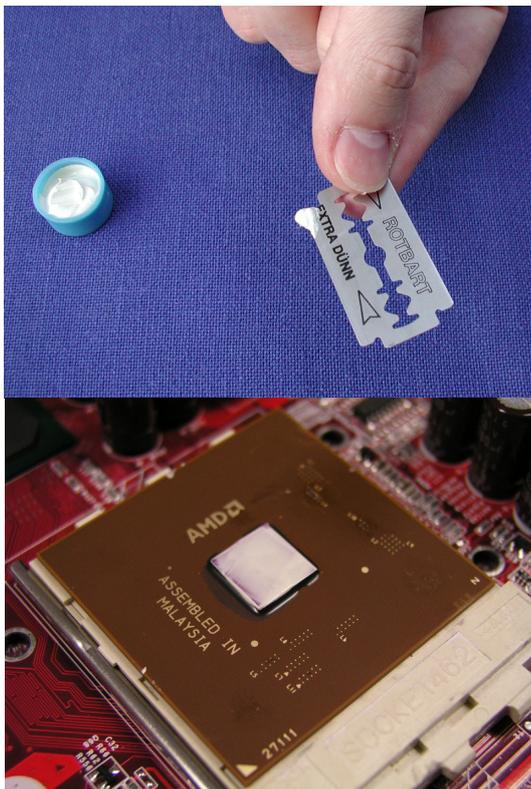
It is important to remove the length of hose which had been inserted into a connector before connecting the hose again. It must not be scratched to secure a perfect sealing of the connector.

Now a few remarks about our hose. The hose we use is made of polyurethane. It has an outer diameter of 8 mm and an inner diameter of 6 mm. It makes a bending radius of less than 10 cm possible and is resistant against many chemicals. A great advantage of the system is that it seals the hose on the outside. This allows the use of the complete diameter, unlike the use of hose barbs which are inserted into the hose and therefore have to have a smaller inner diameter than the hose. With a cross-section area of about 30 mm² the system allows a sufficient flow even in larger lengths of hose.

6. Installation of the CPU water block (cuplex™ series)

6.1. Preparing the installation of the CPU cooler

Now that you understand how the connection system works, you can begin installing the CPU cooler.



As mentioned earlier, with any work you do on your computer, you should always **save your data** beforehand. Disconnect your computer from the power supply. To protect the sensible hardware you should ground yourself before installation to avoid electrostatic destruction of the component parts. For that purpose you can use a non-isolated water pipe for example.

If you are upgrading an existing system you have to remove the old cooler from the processor first. For that purpose please read the manual of your cooler or your motherboard. After removing the cooler you have to clean the die of the processor of any residue of old heat-

conductive paste. Then take a razor blade or a plastic spatula and apply a **thin** layer of our supplied heat-conductive paste. The core of the processor, also called “die”, should now be coated by a homogeneous white layer. **Make sure that no heat-conductive paste will get on any other place and remove it if necessary!**

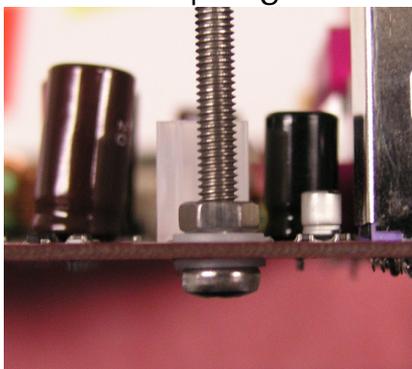
WARNING: If the cooler gets stuck on the surface of the die it can cause an edge of the die to break off. This results in an unrecoverable destruction of the processor. Avoid the cooler to get stuck under any condition. Even so-called spacers do not offer absolute protection. If you are not confident in doing this yourself, please ask a dealer to do it for you.

The principle of installation depends entirely on the kind of fastening of the cooler. That is why we confine the illustration of the installation instructions mainly on description of a classic cuplex on a socket A motherboard. From this description the procedure for any combination of cooler and fastening version can be derived.

6.2. Installation of “4-hole-mounting kits” - Socket, 775, 1366, AM2

Should be more than four feathers included in the screw set, please use the four „softer“ feathers.

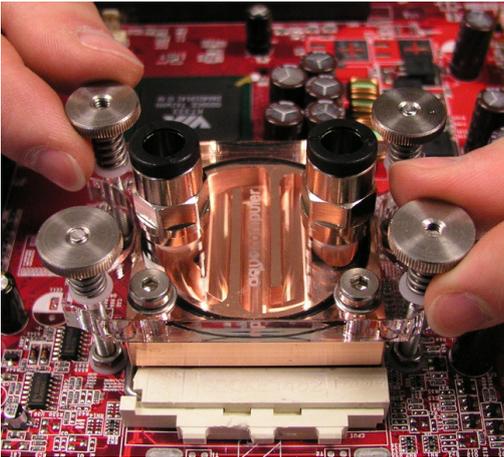
With the so-called four-hole-mounting kit the cuplex is fixed directly on the motherboard with four screws and pressure springs which are used as screw springs. Therefore you have to fasten the four screws first. For



that purpose detach your motherboard from the computer case. In P4- and Xeon-systems the mostly black plastic mounting for air-coolers has to be removed from the motherboard to reveal the necessary drill holes on it. Next slide a plastic washer over one of the supplied stainless steel M4 screws which you then put through the holes adjacent to the socket from below. Slide

another plastic washer over the screw from above the motherboard and then screw on one of the supplied stainless steel M4 nuts up to the limit

by hand. The screw should now be fixed to the board like a standing bolt. Do the same with the three other screws. Now the cuplex can carefully and slowly be put onto the standing bolts. Slowly slide it down until it rests on the prepared core of the processor, without getting it stuck. To protect the acrylic glass of the cuplex from getting scratched slide another washer over each screw. Now put one of the supplied springs over each of the standing bolts.



Screw one of the supplied knurled nuts on each screw about 2 turns, so it just grips. For fastening the springs, take turns in fastening two knurled nuts at a time placed opposite of each other diagonally. During this process make sure that the **spring coils do not touch each other**, since this can cause inadmissible high forces to build up. The spring has to

be fastened to the extent, that a slight but visible slit is left between the coils. You can check this by sliding a piece of paper between the coils, as illustrated on the photo. If this is not possible, you fastened the knurled bolts too much and you have to loosen them. Also make sure that the cuplex does not rest on the cover of the barring mechanism of the socket, but on the core of the processor.



6.3. Installation of „2-hole-mounting kits“ - Socket 754, 939, F

Should be more than two feathers included in the screw set, please use the two „harder“ feathers.

For the installation on Athlon64 boards the cooler is put together in analogy to the four-hole-mounting kit but this time only two screws will be used here since only two fastening holes are available on the board. Before the assembly of the screws an existent plastic framework must be removed if necessary. The two bigger feathers of the mounting kit are used as feathers. Please gather the further procedure from chapter 6.3.

6.4. Examination and connection to the cooling system

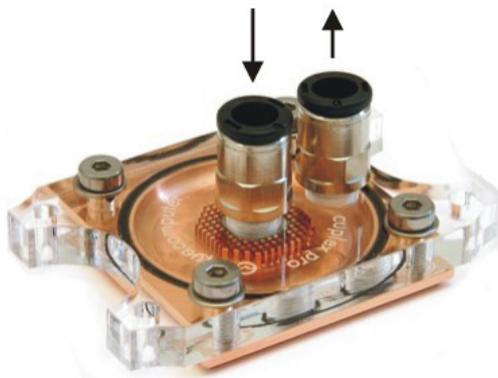
Finally check again if the cooler rests plane on the core of the processor and does not touch the part of the socket in which the detachment mechanism is integrated.

WARNING: A cooler which does not rest plane on the core of the processor can cause destruction of the processor in seconds when the processor is switched on, since the heat-capacity of the core is too small. Even TCS, BIOS or software shutdown tools can not prevent destruction in this case!

Now cut the hoses evenly to the needed length with a hose cutter or a sharp knife and put them onto the connections of the cuplex. The procedure is described in chapter 4. Use of the plug&cool connectors.

The special tubes of the aquaducts must get separated before the use. It can be helpful to separate the first millimeters with a knife. This area must then be divided off.

6.5. Proper connection of cuplex kryos and cuplex PRO



Unlike channel coolers, the microstructure coolers cuplex kryos and cuplex PRO have a predefined flow direction. The coolant must be led in through the central connection directly onto the microstructure, the coolant is then led out through the lateral connection. In order to attain the full performance of the waterblock, correct connection of inlet and outlet is crucial.

When operated with reversed flow direction, the cooling performance is significantly reduced.

7. Installation of the PC interface circuit board

Install the circuit board in a free slot of your case. The slot does not have to have any connection on the motherboard.

The two holes in the bracket are equipped with rubber protectors for safe lead-through of the coolant hoses.

7.1. Connector „power“

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

7.2. Connector „pump rpm signal“ (not for aquaduct 240 eco mark II AC 230 V)

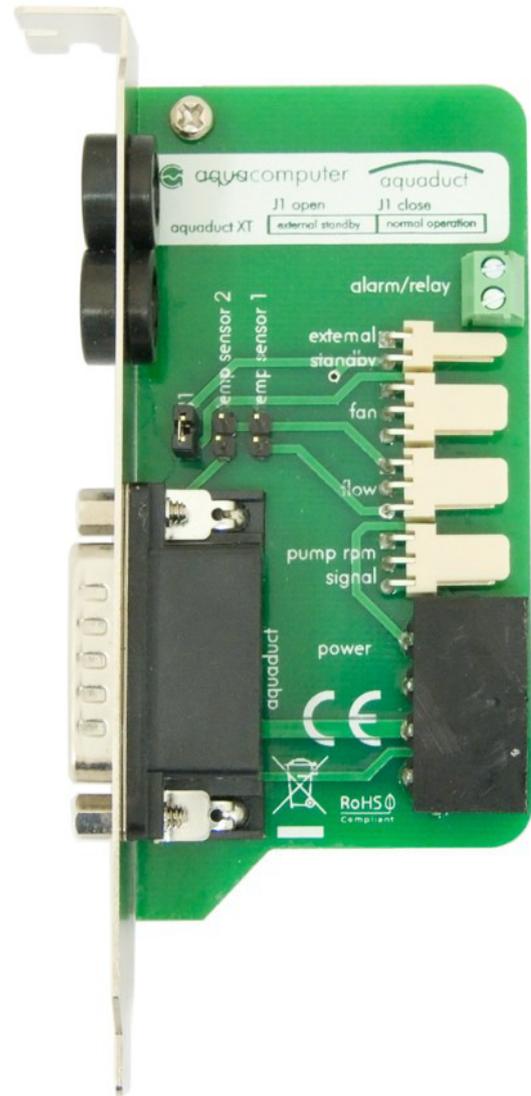
This connector supplies a artificial rpm signal that is generated by the controlling unit of the aquaduct. This rpm signal can for instance be configured to be switched off in case of an alarm and thereby can be used for status monitoring of the aquaduct. If connected to a fan connector of the motherboard, depending on BIOS functionality and configuration, an alarm power-off can be realised. For details on BIOS configuration, please consult the manual for your motherboard,

7.3. Connector „flow“ (aquaduct 360 eco+ mark II only)

Usable for connecting an optional flow sensor. Do only use aqua computer sensors and cables!

Pin assignment Pin 1: GND

Pin 2: 5 V



Pin 3: rpm signal

7.4. Connector „fan“ (aquaduct 240 eco mark II AC 230 V only)

The integrated fans of the aquaduct 240 eco mark II AC 230 V must be powered through this connector. Therefore connect this terminal to a suitable fan power connector of your motherboard or a fan controller using the supplied connection cable. For details please refer to the manual of motherboard or fan controller. Definitely check the fans for correct operation! Without active fans, the aquaduct and any connected component can overheat and be permanently damaged!

Pin assignment Pin 1: GND

Pin 2: 0-12 V

Pin 3: rpm signal

7.5. Connector „external standby“

Without function for the aquaduct eco model series.

7.6. Connector „alarm/relay“

Without function for the aquaduct eco model series.

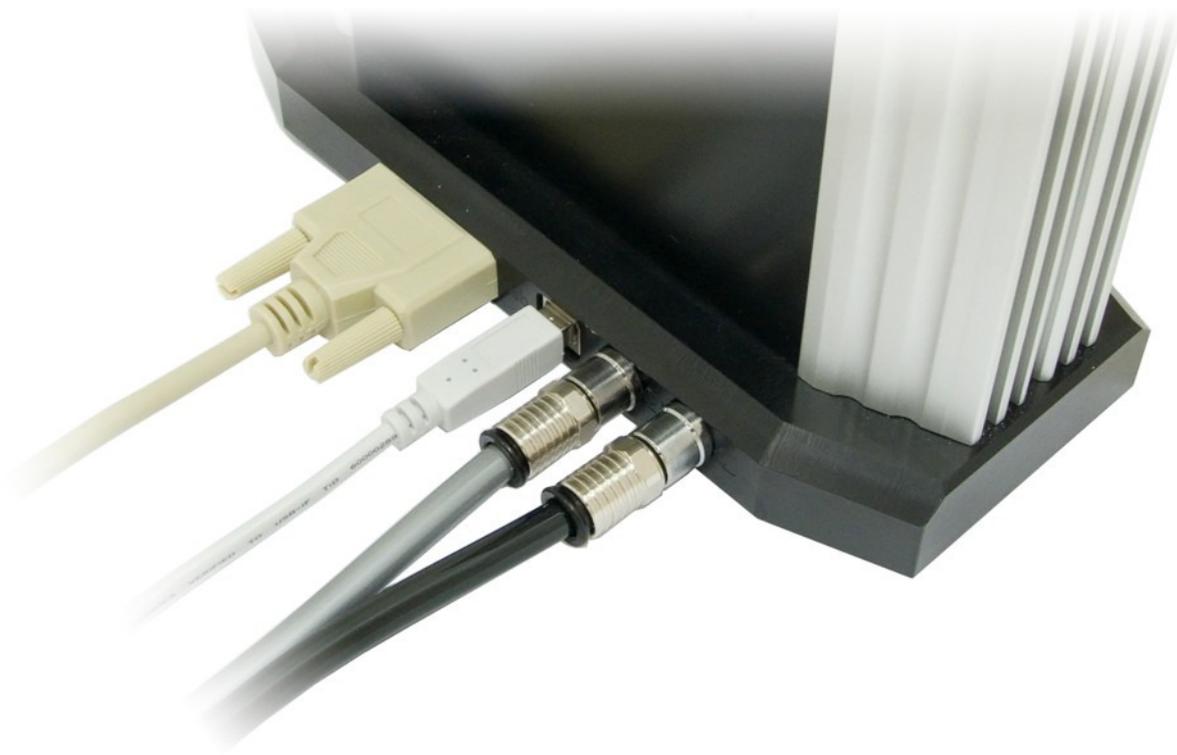
7.7. Jumper „J1“

Without function for the aquaduct eco model series.

7.8. Connectors „temp sensor 1/2“

Without function for the aquaduct eco model series.

8. Connecting the aquaduct



All aquaduct variants have two electrical and two hose connections. The left 15-pin connection serves for the power supply of the aquaduct and always has to be connected with the PC interface circuit board. **Important:** Attach this plug only to the enclosed interface! It is **not** a PC standard connection!

The USB interface of the aquaduct can be connected with the PC to configure the integrated control unit of the aquaduct using the aqua-suite software. For the aquaduct 240 eco mark II AC 230 V, this connector is not operational!

Adjacent to the electrical connectors, the hoses for coolant supply and return have to be connected. Supply and return connector are marked by icons next to the connector. To connect the hoses, at first the fittings included in delivery have to be screwed in. If alternatively special hoses are to be used, fittings with G1/4 thread can be used.

9. Initial operation

As the last step, fill your aquaduct with the supplied Double Protect Ultra coolant.

Caution: Disconnect all PC components from the power supply during the whole filling process! Do not start the PC until you have made sure that there are no water leakages! If you do not feel capable of doing this work yourself, charge an expert with the assembly and initial operation!

Caution: Make sure once again that your electrical outlet is protected with a FI circuit breaker!

If this is the case, you may proceed to put the aquaduct into operation.

After you have connected your water cooling blocks (not contained in the scope of delivery) with the aquaduct, you can fill the aquaduct.

For filling the aquaduct, open filling screw in the top of the device. Fill the right profile of the aquaduct with the Double Protect Ultra coolant supplied with the aquaduct.

If the profile is filled almost up to the upper edge, you can start the aquaduct by establishing the power supply. **The computer must be turned off during the complete filling process since no sufficient cooling function is guaranteed yet!**

To power the pump of the aquaduct 240 eco AC 230 V, plug in the mains plug to an empty wall outlet.

With all models with an integrated 12 V pump, an adapter is included which enables you to start the power supply unit of your PC without connecting the motherboard.

First turn off your PC power supply or remove the main PSU cable if no power switch is present. Remove all cables of the PSU (e.g. from non removable disks, optical storage drives or graphic cards). Take special care to disconnect the 4-pin or 8-pin ATX12V power supply connector from the motherboard as well. Connect the aquaduct using the fif-

teen-pin power supply cable to the PC interface card and plug a connector of your PSU into the designated jack of the PC interface card.

To start the PC without having it connected to the motherboard you will now have to attach the supplied ATX start plug to the 20pin or 24 pin ATX power supply connector of the PSU. After you have attached the plug to the PSU and turned on the mains switch of the PSU, the aquaduct and its pump will power up.



Please note: Some high-power PSUs will not be able to power the aquaduct without further electrical load due to power regulation problems. In this case, use a second (complete) PC or a separately sold PSU for single components for the filling process. Alternatively, connect further load like hard disk drives and optical drives to the PSU.

The pump of the aquaduct will now pump the coolant from the right profile through all connected water cooling equipment and the level in the right profile will fall. You will have to refill coolant according to the level. After a short while, water will appear in the left profile and the level will rise slowly until water flows back into the right profile via the bridge. Refill coolant until the left profile is completely filled and only 2-3 cm (about 1 inch) of air remains in the right profile, then reinsert the sealing screw.

Important: If you hear rattling noises from the pump, they are most likely caused by air inside the pump. You can accelerate the deaeration process by carefully tilting the aquaduct. It is absolutely important that there is always enough water in the right profile. Otherwise the pump will draw in air. Since the used radial pump will stop working in this case, the system then must be deaerated completely. To do this, it is necessary to empty the system completely and refill it again.

ATTENTION: Before you put the PC hardware into operation, for safety reasons the complete system must be checked for possible leakages. Do not put the PC hardware into operation before you have made sure that there are no water leakages! If components have come into contact with water, do not put these into operation before they are completely dry again!

The aquaduct is ready to use now. Turn off the PSU, remove the ATX start plug from the power supply and attach all hardware components of the PC to the power supply unit again.

After a running time of about 10 hours or at visible pollutions, it is advisable to change the coolant once again to remove pollutions and possible production delays (e.g. oils and swarf) from the system.

10. Electronic fill level and flow indicator (aquaduct 360+ mark II with additional flow sensor only)

The electronic flow measurement measures precisely the flow of the system. This is shown in the display and in the aquasuite software.

Since the used pumps produce a corresponding flow depending on the fill level of the aquaduct and their control curve, it is possible with a special measurement to draw conclusions on the filling level of the aquaduct. After filling the aquaduct and after changes at the cooling system a calibration of this measuring is necessary. After that the fill level is measured at every start of the aquaduct and is shown in the software.

To ensure a reliable fill level detection, the reference value must be determined first! Due to the principle of measurement, the reference value must be reset after any change to the water cooling circuit, for example after integrating an additional water block to the system.

Calibration of the fill level detection:

1. Check the fill level of the aquaduct and add coolant until the coolant level is approximately 1 cm below the upper rim if necessary.
2. Activate the calibration using the PC Software.

During calibration, the pump frequency is temporarily set to a (low) reference value. After completion, the originally set frequency is restored.

11. Maintenance and care instructions

Regularly check the system on possible leaks and observe the water level. If you use the coolant we specified, it is sufficient to exchange it once a year. Since our sets are exclusively closed cooling circuits, an intrusion of air oxygen is not to be expected. This is why the possibility of a biological pollution is very small.

You can check the condition of the coolant through the acrylic lids of the coolers and in the profiles of the aquaduct. If there is any pollution you should exchange the cooling medium.

In operation, the pump is maintenance free. All the gaskets in the system have to be exchanged if they are visibly worn out, after 5 years at the latest. You can get spare gaskets from us or let us do the exchange. Also check the hoses for changes in material regularly. Should they get brittle or have scratches you should exchange them.

Care instructions for all acrylic glass ("Plexiglas") components:

Never use solvents (e.g. alcohol, methylated spirit) to clean the acrylic parts! Solvents damage the acrylic glass and can cause tears or breaks in the acrylic glass. If an acrylic component should get into contact with a solvent, you should exchange it to keep the operation safety of the cooler. Damages caused by solvents may become visible some time after the contact. Suitable spare parts are available from us.

After you read this manual completely, we wish you a successful installation of your water cooling system and hope you will enjoy our products. If you do have any more questions we will be happy to help you per e-mail or in our support-forum.