

Alphacool International GmbH

# **Heatmaster 2**

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## **Operating Manual**

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**Errors, emissions and printing errors excepted**

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## Introduction

Dear customer,

we congratulate you on having purchased one of the most innovative and powerful controller units currently available on the PC water cooling market. The Alphacool Heatmaster 2 was developed in Germany over multiple years and constantly improved. Now, after a development and testing period of almost 3 years, we introduce this unique product. The manufacturing process is completely done in Germany, hence ensuring the highest possible quality and excellent quality control.

We have made this operating manual as extensive as possible, but with the many possibilities the Alphacool Heatmaster 2 offers, we cannot exclude the possibility of questions still remaining unanswered. If you have any questions, please contact us via the manufacturer homepage at [www.Alphacool.com](http://www.Alphacool.com) or via E-Mail at [support@alphacool.com](mailto:support@alphacool.com).

A multitude of expansion possibilities is implemented into the hardware. Changes in the layout cannot be excluded. Hence it is possible that the images in the manual may differ from the product, please excuse this in advance.

## Extent of delivery

The following items are included:

**1x Alphacool Heatmaster 2**  
**4x Temperature sensors with approx. 50 cm cable**  
**1x Internal 4-Pin USB connection cable**  
**1x Jumper**  
**1x Mounting material**  
**1x Short manual**

## Warranty

Data, drawings, images, technical data, weight, dimensions and feature descriptions provided in brochures, catalogues, newsletters, advertisements or price lists, have only informative character. We take no responsibility for the correctness of this data. Regarding the type and extent of the order only the information provided with the order and order confirmation are determining.

1. If a defect covered by the warranty occurs, you have the right to demand supplementary performance in the extent of the provisions of the law, to withdraw from the contract or to reduce the purchase price. The statute of limitations on the warranty claims on the delivered items is two years from receipt of the product if you are end user consumer (§ 13 BGB). If you are an entrepreneur (§ 14 BGB), this period is reduced to one year.
2. The warrant claim is only valid in combination with the invoice, sales slip or a confirmation of your warranty claim by ALPHACOOOL INTERNATIONAL GMBH.
3. It lies solemnly in the discretion of ALPHACOOOL INTERNATIONAL GMBH to repair or replace the defective product or components. The replaced product or component becomes property of the ALPHACOOOL INTERNATIONAL GMBH.
4. All warranty claims are handled by ALPHACOOOL INTERNATIONAL GMBH or an authorized specialized dealer. If the repair is not done by an authorized dealer or commissioned person, ALPHACOOOL INTERNATIONAL GMBH will cover neither cost nor liability, except if the repair was coordinated with ALPHACOOOL INTERNATIONAL GMBH in advance.
5. Any cost resulting from rebuilding or upgrading of the product will not be covered by ALPHACOOOL INTERNATIONAL GMBH.
6. The warranty by ALPHACOOOL INTERNATIONAL GMBH does not include the following points:
  - I. Regular checks, maintenance or repairs or the replacement of wearing parts.
  - II. Operating errors or defects resulting from improper installation.
  - III. Damages caused by storm, water, fire overvoltage, act of nature beyond control or war improper

connection to the mains, insufficient or improper ventilation or other reasons which cannot be influenced by ALPHACOOOL INTERNATIONAL GMBH.

- IV. Damages caused by transport or improper packaging.
7. The applicable national laws in the country of the end user customer, such as claims towards the seller, as articulated in the contract, remain unaffected by this warranty agreement. ALPHACOOOL INTERNATIONAL GMBH, its branches and distributors, do not take any liability for direct or indirect damages or losses, if no mandatory legal provisions contradict this.
8. ALPHACOOOL INTERNATIONAL GMBH does not take over the warranty of the manufacturer on the electronic components. The installation of the heatsink takes place at the customer's own risk.

## **Safety notice**

Please thoroughly read this safety notice to prevent possible errors which may lead to problems or damage to your hardware.

Not suitable for children under 12 years (contains swallowable small components). Some components on the Alphacool Heatmaster 2 may become very hot. Please be aware of the danger of burning and be extremely cautious when touching the device.

Read this operating manual thoroughly before installation.

Before beginning working on your system please back up your data.

The Alphacool Heatmaster 2 must be installed solidly in a free space in the enclosure.

Please make sure that the USB connector is connected with the correct polarity. If the USB cable is connected with wrong polarity, both the Mainboard as well as the Alphacool Heatmaster 2 can be damaged.

Never plug the power connector in or out whilst the PC is switched on. This can destroy the hardware of your PC (PSU, USB connector, mainboard etc.) or even the Alphacool Heatmaster 2.

Never connect or disconnect fans, flow rate sensors, temperature sensors, relays, LEDs or other sensors or devices whilst the system is running. This may damage the Alphacool Heatmaster 2 or even the PC hardware.

Never interrupt a Firmware update. This may irreparably damage the controller software of the Alphacool Heatmaster 2, resulting in the controller needing re-programming with a special programming device.

Never interrupt the software start-up of the PC software.

Do not shut down your PC suddenly by e.g. cutting the power or switching off the PSU whilst the system is running.

Never touch the Alphacool Heatmaster 2 or one of the connected devices whilst switched on.

## **Intended use**

The Alphacool International Gmbh cooling components are approved by Alphacool International Gmbh for cooling of computer components. If they are used for any other purpose the warranty is voided.

## **System requirements**

Minimum system requirements:

CPU: 500Mhz or better, recommended 1000Mhz  
RAM 512 MB  
50 - 100 MB HDD space  
USB 1.1

Windows XP Service Pack 3, Windows Vista, Windows 7.

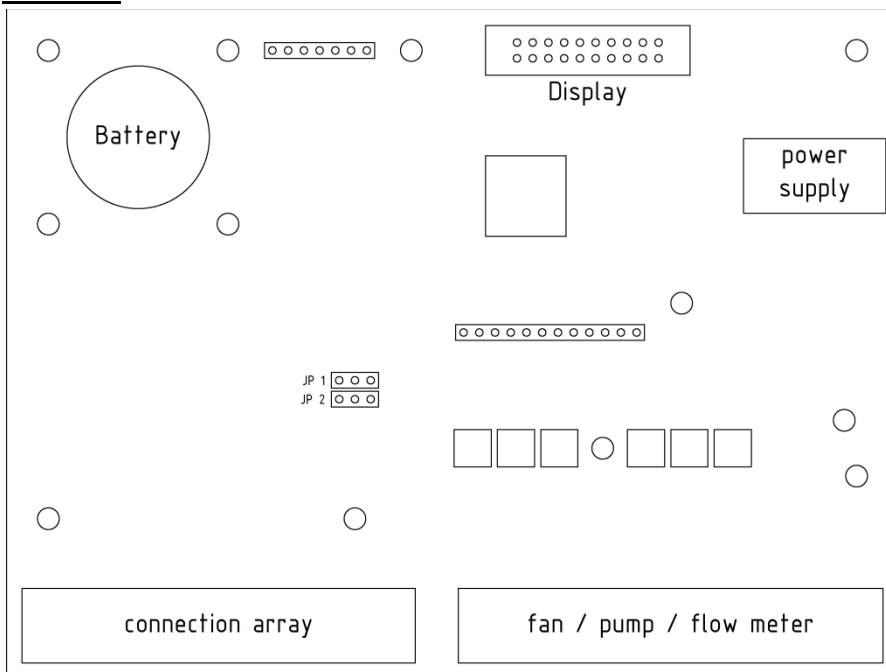
Windows 98 SE, Windows 2000 Service Pack 4 with limitations.

Depending on the operation being processed the software requires some of the CPU computing power. If you have transferred the settings to the Alphacool Heatmaster 2 and the software has been shut down, no more CPU time is needed. The Alphacool Heatmaster 2 then runs autonomously and fulfills its purpose of controlling and monitoring your cooling system. The Alphacool Heatmaster 2 is even network- and internet capable with the optionally available LAN adaptor. This allows the Alphacool Heatmaster to be configured from another PC, meaning that no software needs to be installed on the monitored system, hence not requiring any CPU time on the system.

More information on possible expansions can be found at the manufacturer homepage [www.Alphacool.com](http://www.Alphacool.com)

## Socket assignment

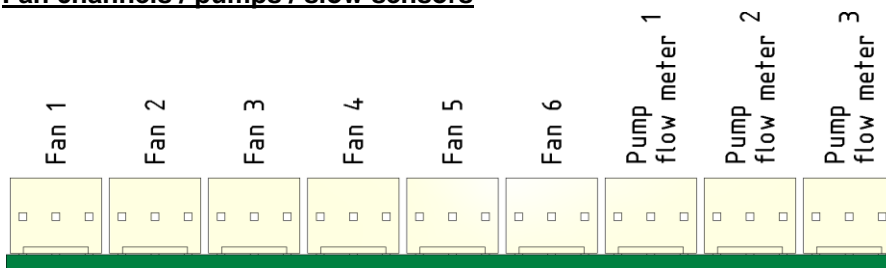
### Overview



### Power supply

The Alphacool Heatmaster 2 is connected to the power supply via a 4-Pin Molex plug, just like a HDD or optical drive. Both voltage (12V and 5V) are needed, the 5V for the micro controller and 12V for the power connectors, supplying fans and pumps. Should you intend to connect the Alphacool Heatmaster 2 to another power source than a PC PSU (e.g. in an external enclosure or via a laboratory power supply), please note that not only a 12V rail is needed, the 5V power rail is also required. If you intend to run the unit in stand-by (e.g. to allow booting of the system to be triggered by the Alphacool Heatmaster 2), a 5V standby power supply must be connected via the connection array (see overview).

### Fan channels / pumps / slow sensors



Up to 6 fans can be connected to and individually controlled by the Alphacool Heatmaster 2. Additionally it is possible to connect multiple fans to one channel via a Y-cable or similar adaptor. In such a configuration the



fan speed signal from only one fan can be monitored, but the other fans run at the same voltage. Such a configuration is especially useful if many fans need to be connected to a cooling array. For example, three radiator fans can be connected to one channel. Bundling of radiator fans also comes in very handy if large radiators such as the Mora or Phobya Nova (9 fans each). The maximum permissible number of connected fans depends on the power consumption of the fans. Up to 18W of power may be drawn from an individual channel passiv cooled..We propose to use an aktiv fan. The power consumption of a standard 120mm fan is approximately 2.5 to 3.6W. Before connecting multiple fans please check the maximum power draw of the fans. Should the 10W per channel not suffice, an active cooling system of the driver components can increase the maximum power output up to 38W. Regarding this please consult the appendix.

The last three channels (3-Pin) are unregulated for the pumps / flow sensors, as these are controlled separately by the software. Theoretically it is also possible to connect a fan, but the channels are unable to detect it as such, resulting in constant 12V operation of the connected fan. The 3 channels for pumps / flow sensors aren't necessarily compatible with the according components. This means that in some cases it is e.g. necessary to connect a 3-Pin plug to the pump / flow sensor. Please check in advance if the pump is suitable for the limitations of the Alphacool Heatmaster 2 (18W per channel). On the 3 channels the 12V DC voltage from the PSU is simply passed through, hence additional voltage adjustments are not possible. If you wish to control the speed of your pump, this is possible with an analogue adaptor which is connected parallel to the 6 fan channels. This allows a pump to be connected and controlled in speed e.g. according to a measured temperature. Such analogue adaptors will be available soon. The following products can be connected to the pump / flow sensor channels:

### **Pumps**

- EK-DCP 2,2 /4,0
- Laing DDC-1T / Laing DDC-1T Plus ( requires active cooling) (as well as the RT models)
- Laing DDC-1T Plus (RT-Models) (Active Air cooling needed)
- Laing D4/ Laing D5 (Active cooling needed)
- Alphacool TPP644 / VPP655 ((Active cooling needed)
- Phobya DC12-220/260/400

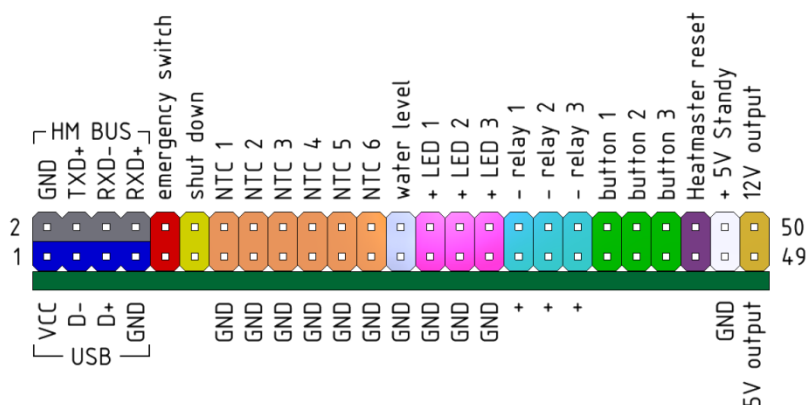
**Please note that the Alphacool pump adaptor may be needed for some models!**

### **Flow rate sensors**

- Bach DFS 1/25io
- Some Digimesa DF sensors
- GMR DF Sensor including electronics
- Innovatek FlowMeter

Regarding different pumps respectively the precise connection possibilities please consult our website [www.alphacool.com](http://www.alphacool.com).

### **Connection array**



### **USB**

Connector for the USB cable.

**ALWAYS ensure correct connection to the pins! If incorrect connections are made or pins are shorted out, damage may be caused to the Alphacool Heatmaster and / or the connected hardware. Pay special attention to the correct connection of the USB cable. If the cable is connected improperly damage may be caused to the Alphacool Heatmaster 2 or the connected hardware. Never remove the USB connection cable when the system is switched on. The Heatmaster 2 is not hot-plug capable.**

### ***HM BUS***

Heatmaster 2 BUS-utilization inquiry.

### ***Emergency shutdown***

Output for switching of a relay. Via this feature the hardware can be switched off immediately in case of an emergency. The switching current must not exceed 100mA. **Data corruption cannot be ruled out if the emergency shutdown is activated.**

### ***PC shut down***

This output can be connected to the Mainboard. When the shut-down signal is sent, the output works like the power switch of the system.

### ***NTC 1 -6 temperature sensors***

Here the temperature sensors can be connected. Use only sensors with a resistance of 5k Ohm or 10k Oh. The Heatmaster 2 detects these after a reset. The setting can also be made manually.

### ***Water level***

To this input an analogue coolant level sensor can be connected. With this sensor the Heatmaster is able to give a warning if the coolant level is too low.

### ***LED 1 silent alarm***

Status LED. This connector is active when the silent alarm is activated. The switching current must not exceed 2mA.

### ***LED 2 alarm***

Status LED. Is active when the alarm is activated. The switching current must not exceed 2mA.

### ***LED 3 warning***

Status LED. Is active when a warning is activated. The switching current must not exceed 2mA.

### ***Relay 1-3***

With the outputs relays can be controlled, the switching current must not exceed 80mA.

### ***Button 1-3***

Inputs for 3 buttons. The buttons must be equipped with a make contact to allow the Heatmaster 2 to interpret the signal correctly.

### ***Heatmaster reset***

With the Jumper the Heatmaster can be restarted. To restart remove the jumper for a short period of time and plug it in again.

**When conducting a hardware reset it is necessary to disconnect the Heatmaster 2 in the software if the software is started.**

**IMPORTANT: A reset switches off all outputs!**

### ***5V Standby***

Power supply for stand-by operation. The PSU must be able to supply at least 1A of current at 5V.

### ***12V and 5V output***

Power supply for external devices.

## Installation

### Hardware installation

Shut down your PC and separate the system from the mains.

Ensure that there is no remaining static charge in your body or the enclosure. We recommend using anti-static gloves and touching the Alphacool Heatmaster 2 only with anti-static gloves. Avoid any direct contact with the components on the PCB.

Take the Alphacool Heatmaster 2 from the packaging and mount the unit in a suitable spot in the enclosure.

Connect the USB connection cable first.

**Make sure that the USB connectors are connected with the correct polarity both on Mainboard and Alphacool Heatmaster 2!**

**Please note that connection with wrong polarity may lead to destruction of the Mainboard and / or the Alphacool Heatmaster 2.**

Now connect the power cable (4-Pin plug). Be very careful not to damage the other components on the board.

Now connect the components which are to be controlled or monitored (e.g. fans, sensors, relays, buttons, pumps or LEDs).

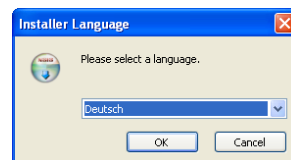
It is possible to automatically boot and shut down the PC via the Alphacool Heatmaster. For this feature the Power-Connect cable (not included) is needed. Should you already have ordered this cable it can now be installed.

Shut the enclosure of your PC, reconnect it to the mains and start up your PC.

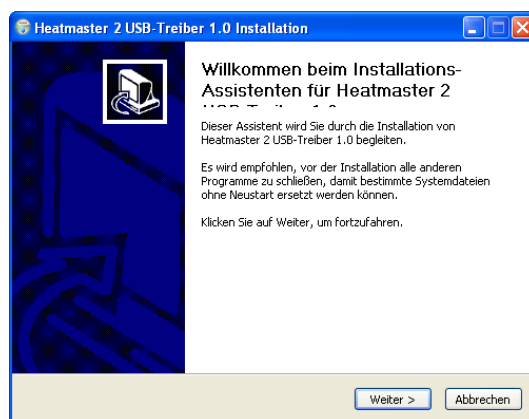
### Software installation

Download the software from <http://www.alphacool.com/download/hm2.zip>. Unzip the file. The unzipped folder contains two setup files. Start the Setup\_USB file.

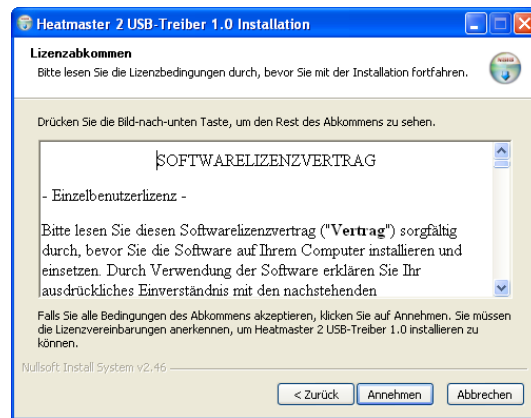
First choose the desired language.



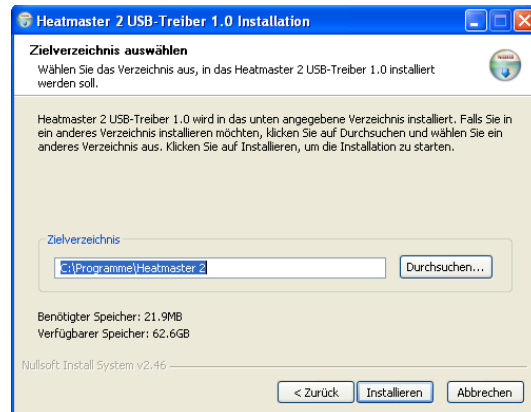
The installation assistant starts. Click on „Next“ to begin.



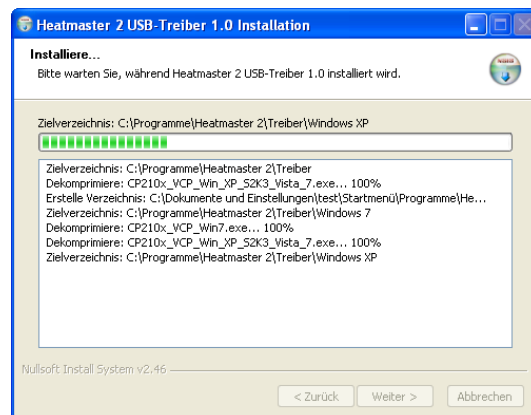
Accept the terms and conditions to proceed with the installation.



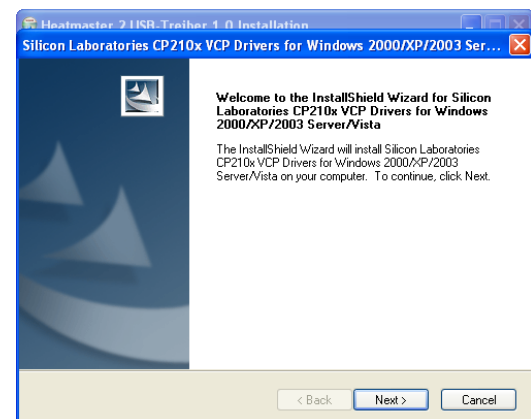
Choose the target folder for the installation. Click on „Install“ to proceed.



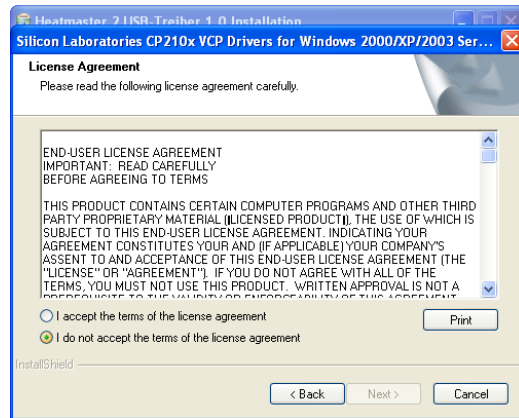
Setup\_USB will copy the required files.



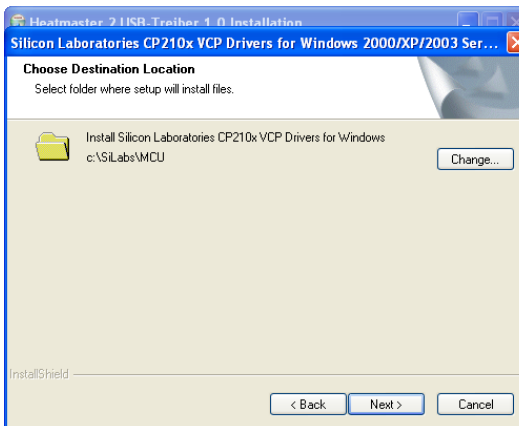
For the connection between PC and Alphacool Heatmaster 2 a special USB driver is used. This driver is now being installed.



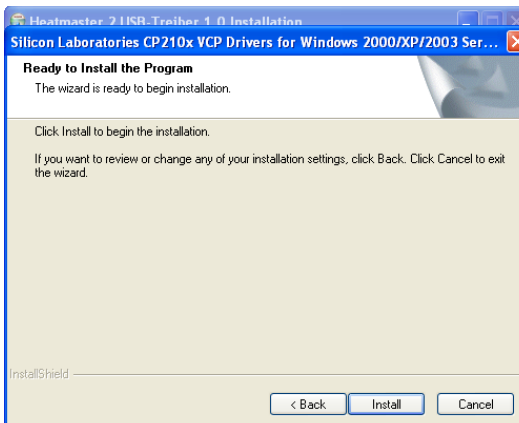
Accept the terms and conditions to proceed with the installation. Click on „Next“ to proceed.



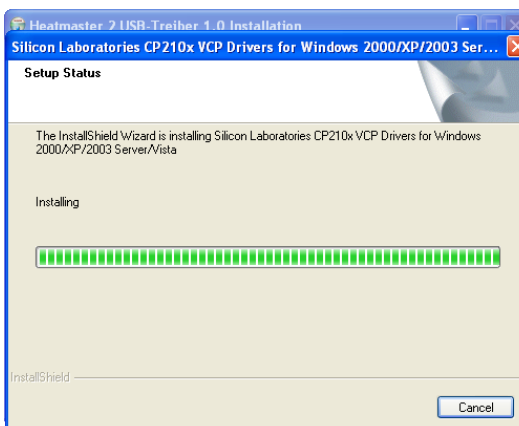
Choose the target folder for the installation of the USB driver. Click on „Next“ to proceed.



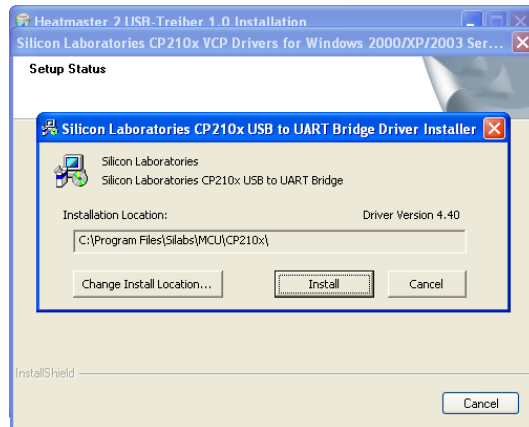
Click on “Install” to proceed with the installation.



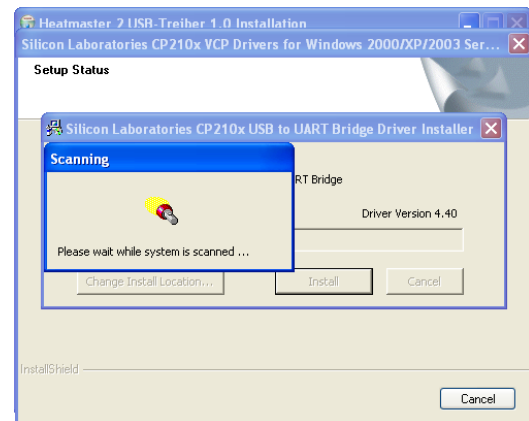
The required files are being copied.



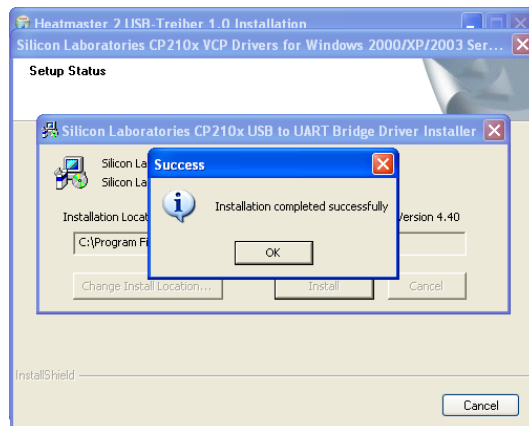
Click on “Install” to implement the hardware.



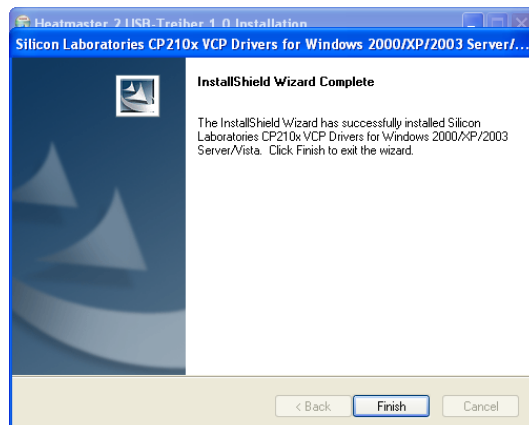
The setup will search for connected devices.



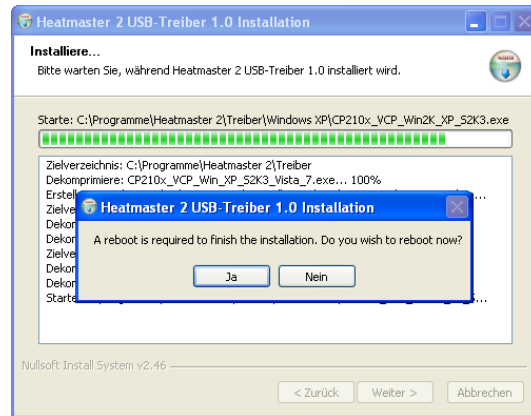
Confirm by clicking “OK” to complete the installation.



The driver installation is now complete. Click on “Finish” to close the setup software.



Reboot your system.

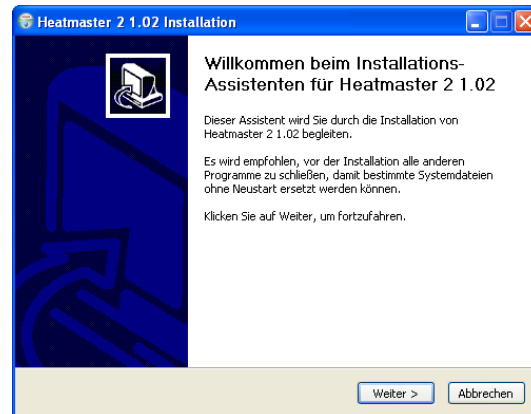


After the driver has been installed the software can be installed. To start the software setup, open the file "Setup\_HM2".

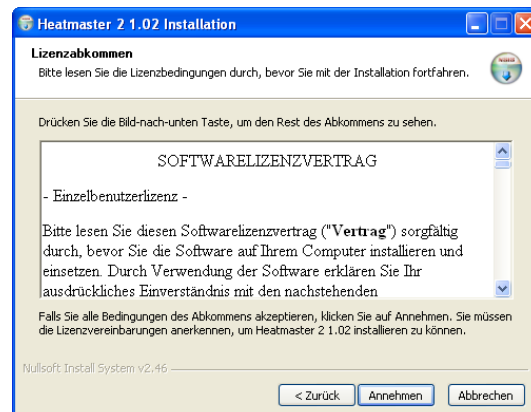
Choose the desired language.



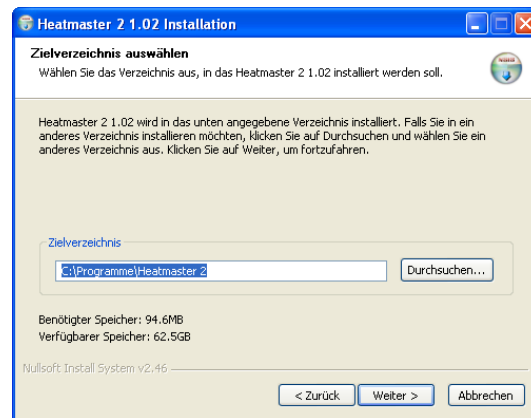
The installation assistant will start. Click on "Next" to proceed.



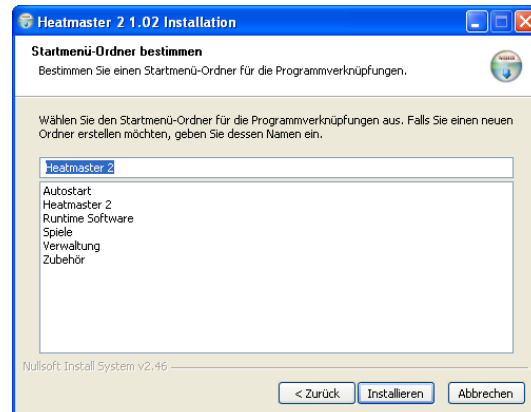
Accept the terms and conditions to proceed with the installation.



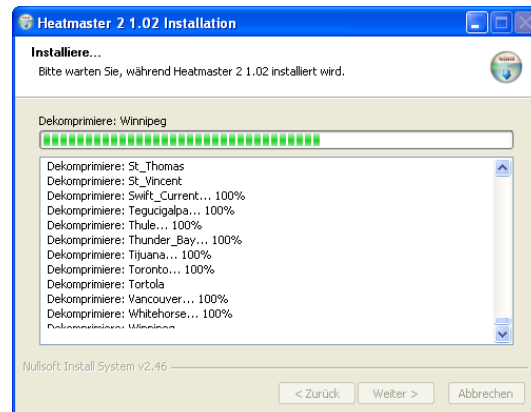
Choose the folder for installation of the Heatmaster 2 software. Click on „Next“ to proceed.



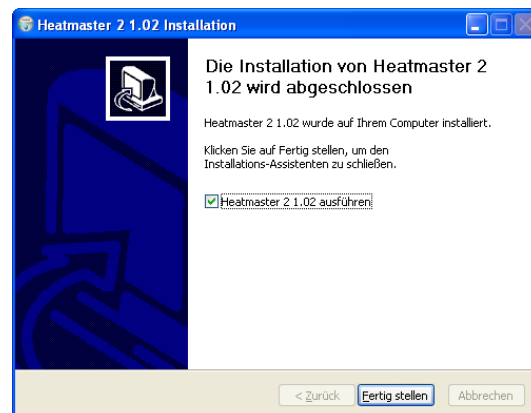
Choose a start menu folder. Click on “Install” to proceed.



The Heatmaster 2 software is now being installed.



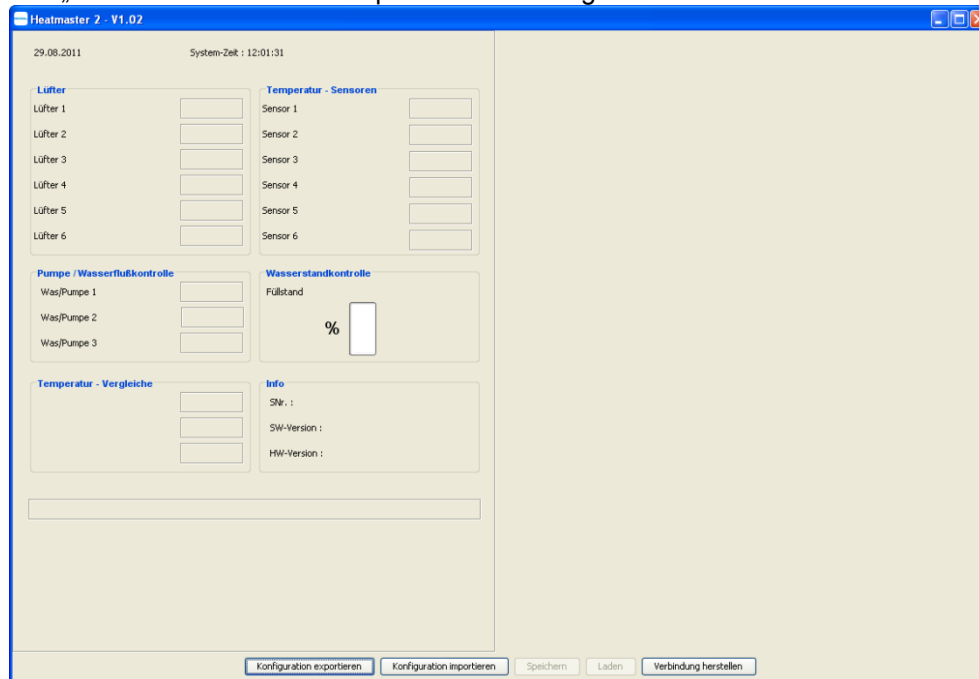
All settings are now made and the Heatmaster 2 software has been installed. Click on “Finish” to start the Heatmaster 2 software.



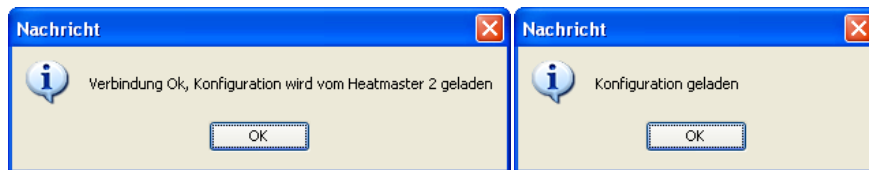


## Use of the software

Click on the Icon „Establish connection“ to open the monitoring and control window of the Heatmaster 2.

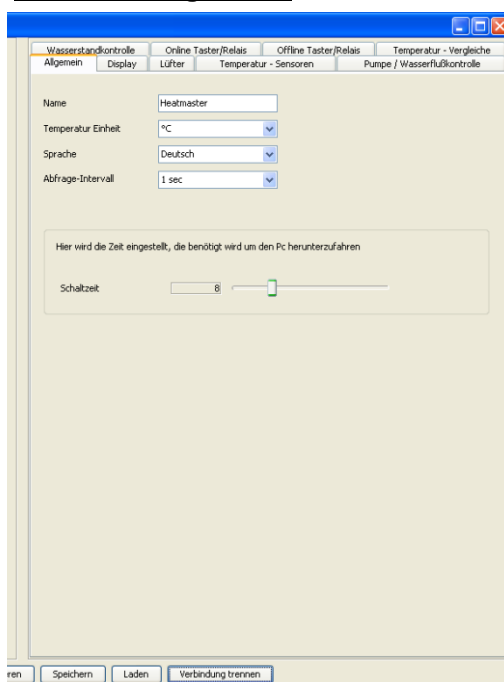


Two windows will pop up, indicating that the Heatmaster has been detected and that the configuration has been opened. If everything has started correctly, this will be displayed again.



The general overview of the Heatmaster 2 opens and the connected components are listed.

### General configuration



#### Name

Here you can set the device name of your Heatmaster 2. This is especially important if multiple devices are connected e.g. in a server or network.

#### Temperature unit

The temperature can be displayed in °C or °K. The setting made here will be automatically transferred to all settings which are related to the temperature.

#### Language

Choose between multiple languages. The basic version already has language files for: German, English, French, Spanish and Italian

#### Data request interval

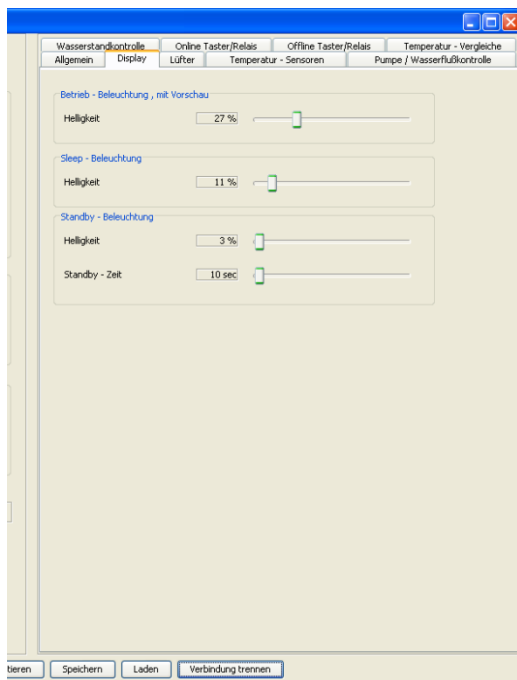
Here the intervals at which the PC-Software synchronizes data with the hardware can be set. The longer the intervals, the less traffic between PC and Heatmaster is created. 2.

#### Switching time

Here the period can be set for which the relay will switch in

hardware to allow the Mainboard to recognize this as a switching contact. Normally the pre-set 8 seconds should be plenty. The setting should only be changes if there are problems with the Mainboard.

## Display configuration



Important note in advance:

To use this feature a display must be connected to the data cable. The display must also allow brightness adjustments. Multiple displays will be able soon, for more information go to [www.Alphacool.com](http://www.Alphacool.com)

Brightness during operation:

Here the brightness of the display lighting during operation can be set.

### **Brightness in sleep mode**

Here the display brightness in sleep mode can be set (recommended setting: 0%)

### **Brightness of stand-by lighting**

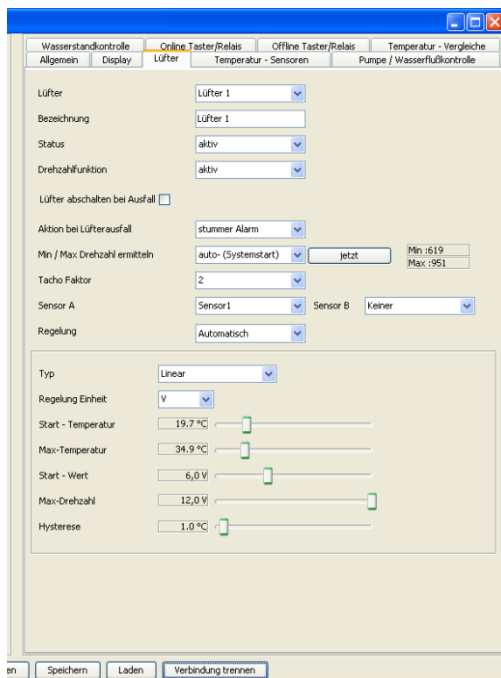
If no activity is detected, the display can be switched to stand-by mode. We recommend reducing the brightness ion stand-by mode.

### **Standby time**

Here the period of time of inactivity after which the display will go into stand-by mode can be set.

## Fan configuration

Here the fan channel for which the settings will be made can be



### **Name**

It is possible to name every fan channel individually. The name may contain up to 255 characters made up of letters and numbers.

### **Status**

Sets the mode of the fan between: Inactive, not connected and active

### **Speed monitoring**

Here it can be set if the fan is equipped with a speed monitoring feature. This is usually only the case if it is equipped with a rpm lead.

### **Fan switch-off in case of failure**

If the fan is controlled by the Heatmaster to a target speed or voltage, but does not send a signal back, this feature will prevent the Heatmaster from trying to spin up the fan until the next system start-up.

### **Action in case of fan failure**

here different alarm levels can be set. If the fan is a system-critical fan it is often useful to set an alarm or even system shut-down here.

### **Determine Min. / Max. speed**

We recommend determining the minimum and maximum speed once per each fan to allow the Heatmaster 2 to determine the relevant data. If fluctuating values for maximum and minimum speed are to be expected, a check after every start-up can also be set.

### Speed factor

This factor represents how many signals per revolution are sent by the fan. Normal PC fans have a value of 2 impulses per revolution. In rare cases or with unusual fans this value may also be higher or lower. Some fans have reduced signal quality at low speeds, hence not allowing a speed signal to be registered. If the fan is operated outside of the "clean signal range" it is also possible to set the voltage as the control unit instead of the rpm signal. If the voltage is set as control unit the Heatmaster is unable to monitor the functionality of the fan.

### Manual temperature control

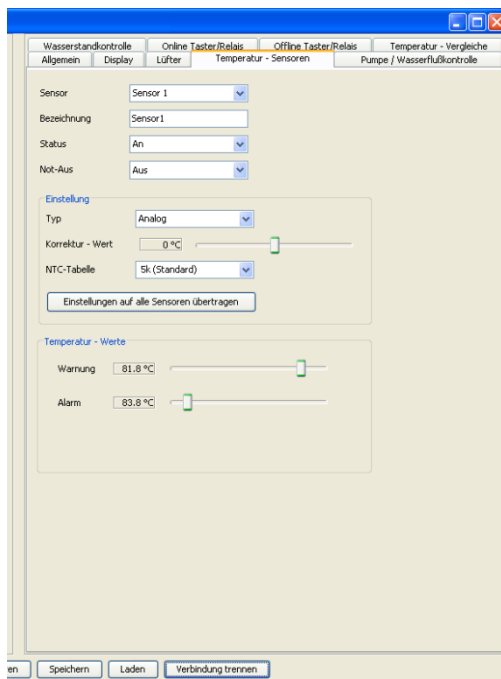
Voltage and fan speed can be set manually by setting the target value on the sliding bar

### Automatic temperature control

One or even two sensors can be assigned to each fan, allowing automatic speed control of the fan depending on the temperature. If two sensors are assigned, the one with the higher monitored temperature will automatically be used for determination of the fan's target speed. Now the following options can be used:

- **Linear:** A linear speed curve between starting temperature and maximum temperature will be used for determination of the fan target speed.
- **Progressive:** The control curve begins with a flat slope and becomes steeper the closer the monitored temperature is to the maximum.
- **Target value:** The fan will start to spin below the set target temperature and the automatic fan speed control will try to hold the target temperature as constantly as possible. Due to many factors coming into account when trying to maintain a certain temperature, such as heat dissipation, pump performance, room temperature etc. or contradicting control factors, it is not always possible for the Alphacool Heatmaster 2 to maintain the set target temperature. This is not an error or reason for reclamation, but rather caused by the many possible settings of the Heatmaster 2 as well as the complexity of a water cooling system.
- **Switch-off hysteresis:** Temperature difference value which prevents pointless start-up and switch-off of the fan near the starting temperature. The more directly the system reacts, the higher this value should be set. Alternatively the starting speed of the fan can be decreased. In systems with slow temperature changes, e.g. due to high thermal capacity, a low hysteresis value is of advantage.

### Temperature sensors configuration



Here the sensor channel for which the settings will be made can be chosen

**IMPORTANT:** Only set the status to ON if a sensor is actually connected. Otherwise false values will be displayed.

#### Name:

It is possible to set a name for every sensor channel individually. The name may contain up to 255 characters made up of letters and numbers.

#### Status

Sets the status of the sensor to: Off, not connected or On.

#### Emergency shutdown

If this feature is set to ON, the system will initiate an emergency shutdown of your PC system if set temperature is reached

#### Settings

Here sensor-specific settings can be made. The Heatmaster software has two NTC tables which are set for the currently sold 5kOhm respectively 10kOhm temperature sensors. With the correction value "rough" measuring errors can be significantly

reduced. Should the included NTC table cause major deviations, it is possible to save another NTC table which can be used. This feature is also very useful when completely different sensors are being used. Hence the Heatmaster 2 is compatible with virtually all currently available and future resistance-based temperature sensors. The Heatmaster 2 allows only one NTC table to be used at a time, which will be used for all connected sensors.

### Temperature values

The values for “warning”, “alarm” and “emergency shutdown” can only be set with ascending temperature values in this order. Hence it is not possible to monitor the system for undercutting of a certain bottom temperature with this feature. Setting of an alarm or setting when undercutting a certain temperature is possible with the “Online button / relay” feature though.

### Pump / flow rate sensor configuration

Here the pump / flow rate sensor channel for which the settings are going to be made can be chosen.

#### Name

It is possible to set a name for every channel individually. The name may contain up to 255 characters made up of letters and numbers.

#### Status

Sets the status of the channel to: Off, not connected or On.

#### Type

Here the channel can be set to pump or flow rate sensor mode

#### Factor

This factor represents how many signals the pump / flow rate sensor sends per revolution. Normal flow rate sensors have a value of two. In rare cases or with different components this factor may also be lower or higher. For pumps this value must be determined by the user.

#### Pump settings

If a pump is connected, it can be monitored. Should the speed of the pump undercut a certain value an “action in case of pump failure” can be set. The choices are: No warning, alarm or emergency shutdown

### Flow rate sensor settings

If the conversion factor “Signals per liter” for the sensor is known, the unit can be set to “liters per hour” or “Gallons per hour”. Similar to the temperature monitoring it is possible to set an action if a certain value is undercut. Different values for warning, alarm and emergency shutdown can be set.

## Coolant level control configuration

### Name

It is possible to set a name for the coolant level sensor. The name may contain up to 255 characters made up of letters and numbers.

### Status

Sets the status of the channel to: Off, not connected or On.

### Type

Here you can choose whether the connected sensor is an analogue sensor (which actually determines the coolant level) or a float switch which will only give a signal when a certain level is exceeded or undercut.

### Action in case of critical coolant level

Here an action can be set for the case of a critical coolant level. Choose from: No action, warning, alarm or emergency shutdown.

### Orientation

Set the orientation of the sensor in the reservoir here. When a float switch is used, it is also possible to set whether the sensor is "closing" or "opening"

### Alarm settings

With a float switch the alarm is activated when the switch activates. For an analogue sensor it is possible to set a "critical level". If this level is undercut the alarm will be activated.

### Calibrate analogue sensor now

Push this button and follow the instructions. The sensor must be removed completely from the coolant and then re-installed during the process. This allows the software to determine the conversion factor for the water level in percent.

## Online button / relay configuration

The online relay and button control allows highly complex adjustments to be made whilst the system is running. To use these features it is necessary to connect one or multiple relays as well as one or multiple buttons to the Heatmaster 2. These items will be available soon as accessories. Please check the Alphacool product page for further information regarding accessories. Please note that we have refrained from disabling settings which are contradictory. Hence it is possible to make contradicting switching procedures. The software is programmed that in the worst case the procedures will not be executed or will be executed with a delay in between. Please inform yourself very thoroughly about the options and possibilities before configuring a switching procedure.

### Switching of a relay via a button

Set the relay to "manual". At the "button" option you can now choose a button by choosing the option "switch relay" and marking the according relay next to it.

### Switching of a relay for a limited period of time

If a relay is intended not switch permanently when the button is pushed, it is also possible to set a delayed switch-back of the relay. The option "switchable via software" can be deactivated.

If the option is not active, the relay can only be controlled via a button. If the option is activated, the software

can switch the relay again after a certain period of time.

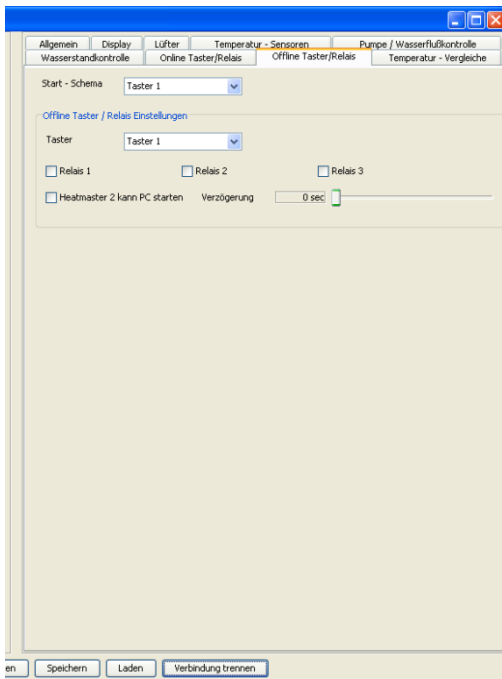
### **Action via button**

Independent from the relays it is possible to trigger a set action with the push of a button. Choose the button and then from the options “boost mode”, “stand-by”, “emergency shutdown” and “switch off all relays”.

### **Temperature-triggered relay switching**

Choose “temperature switch” and then the according sensors. With the setting “exceed” the relay is switched when the temperature exceeds the set temperature. Only when both sensors undercut the set temperature the relay will be switched back. Similarly it is also possible to switch the relay when a set temperature is undercut. It switches back as soon as both sensors exceed the set temperature. This feature is very useful for compressor-cooled systems as well as systems endangered by freezing.

### **Offline button / relay configuration**



The offline relay / button control allows highly complex settings to be made whilst the computer is switched off. The purpose of this is, to allow the system to be booted via the Heatmaster 2 with a special booting procedure. This is especially useful when using a compressor cooling system. The only requirement is an active stand-by power supply as well as buttons and relays, which will be available as accessories soon. Please note that we have refrained from disabling settings which are contradictory. Hence it is possible to make contradicting switching procedures. The software is programmed that in the worst case the procedures will not be executed or will be executed with a delay in between. Please inform yourself very thoroughly about the options and possibilities before configuring a switching procedure.

### **Starting schedule**

Here a schedule can be set for each button. If the button is pushed while the system is in stand-by, the allocated starting schedule will be initiated. After the schedule has been started it is possible to initiate further actions by pushing further buttons or the original button again.

### **Button / relay settings**

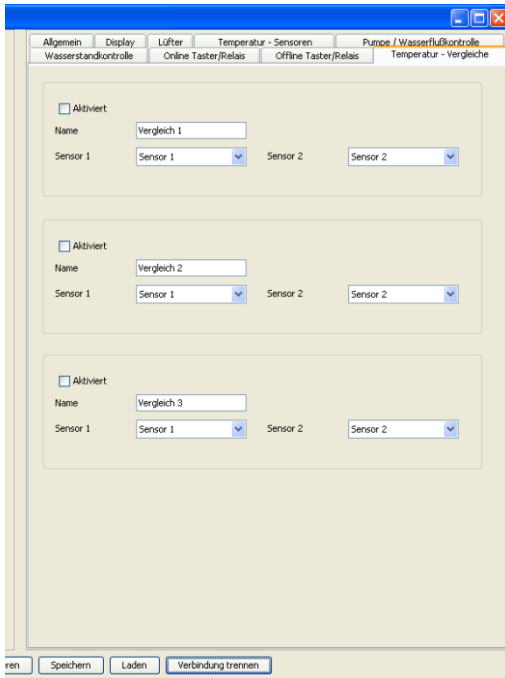
Every button can have one or multiple relays assigned. The relays can be switched immediately after the button is pushed or with a delay. After the button is pushed again, the set timed action is executed again. Of other direct (without timed actions) relay activations are triggered e.g. by the push of another button, they do not influence the timed actions.

Heatmaster 2 can boot PC:

Use this feature to e.g. boot the system automatically with a delay after the compressor cooling has started.

## **Temperature comparison configuration**

This feature allows the measuring of a temperature difference between two temperature sensors. This feature comes in handy when trying to measure the temperature drop of the coolant whilst passing through the radiator or temperature increase over a water block. This feature also makes it easy to determine the temperature difference between room temperature and coolant temperature.



### **Active**

Activate this box only if you would like to use this feature.

### **Name**

It is possible to set a name for every temperature difference value individually. The name may contain up to 255 characters made up of letters and numbers. Example: (Coolant to air) (CPU in and out). To allow proper display of the name, we recommend using short names.

### **Sensor 1 / Sensor 2**

Choose the two sensors which are to be compared. The computation of the difference value is as follows: Temperature difference = Sensor 1 – Sensor 2. If Sensor 2 measures a higher temperature, the temperature difference will be displayed as negative.

## **Special note**

### **Note regarding emergency shutdown**

The emergency shutdown feature can (if the hardware is installed correctly) effectively prevent damage to your system in many cases. Despite the well-designed concept of the feature, it cannot be guaranteed that your system will always be protected. Especially the automatic reboot feature on some Mainboards may lead to complications with the relay/ button configuration. This greatly depends on the Mainboard and if it is able to correctly interpret the signals from the Heatmaster 2.

### **Standard settings in the software**

The Heatmaster's software settings when shipped are made in such a way, that it must be configured by the user before use. The settings can be saved as a profile to allow quick change of settings by loading pre-configured profiles. Hence it is possible for the user to create different profiles (e.g. office, silent, maximum power) and to save them. At [www.alphacool.com](http://www.alphacool.com) we also offer pre-configured profiles for different modes of operation and system configurations for download.

### **FAQ – Frequently asked questions**

A current list of the FAQ (frequently asked questions) can be found online at our homepage respectively in the online forum. We will add the FAQ here with the next update of this operating manual.

## **Expandability**

The Heatmaster 2 comes prepared for a multitude of expansion. Currently more than 20 follow-up projects, applications and products are being developed. We expect the first expansions to be available in late 2011 and most of the planned expansion in 2011. Current information regarding new expansions and features can be found at [www.alphacool.com](http://www.alphacool.com) respectively in the online forum. An excerpt from the planned expansion can be found in the appendix.

## Troubleshooting

So far no problems have been reported. Hence please contact us via our homepage respectively the online forum if problems should occur. There we will post the problems and applicable solutions for discussion. The most common problems and according solutions will be implemented here with the next update of this operating manual.

## Technical data

Dimensions:	110mm x 145mm
Current draw:	max. 6.3A
Fan channel output power:	max. 18W/38w aktiv cooled per channel
Overall maximum output power:	max. 75W overall
Maximum relay channel power consumption:	max. 5W per relay

## Disposal



All items sold within the EU are already WEEE registered. The share for disposal according to the ElektroG (German electronics law) has already been paid for in agreement with the EAR. The disposal of this unit must take place via a local collection point for electronic waste. The Heatmaster 2 must not be disposed of via household garbage. The unit complies with RoHS and CE regulations.



## Appendix

### **Expansion for Internet / LAN upgrade**

The Alphacool Heatmaster 2 already has an interface reserved for a LAN adaptor. This adaptor will be available as an accessory soon and allows direct connection of a LAN cable to the Heatmaster 2. This gives the Heatmaster 2 its own address in the network, making it accessible from other PCs. This allows, amongst others, the following features to be used:

### ***Master software control***

The Alphacool Heatmaster 2 can be controlled from a central system, even if the Alphacool Heatmaster 2 is installed in another PC or another location in the network. The communication is established via the local intranet. Hence the software does not have to be installed on the PC with the Heatmaster 2 itself. This allows applications e.g. in a server which can be controlled and monitored via the Heatmaster. Possible alarms will be shown on the Master PC, allowing the administrator to react quicker.

### ***E-Mail notifications***

The Alphacool Heatmaster 2 is able to send status reports via E-Mail if an internet connection is configured. This allows the expansion of the alarm features, allowing detailed reports about the state of the fans, pump and much more such as temperature or flow rates. The great advantage is that the Alphacool Heatmaster runs autonomously, hence allowing it to communicate e.g. an emergency shutdown of the system via Internet independent from the system it is monitoring.

### ***Remote servicing via Internet***

The Heatmaster can be controlled from a remote system, even if the Alphacool Heatmaster is connected to another network. The contact is established via an Internet connection. Hence it is possible to quickly access the Heatmaster 2 for maintenance from practically any PC with an internet connection in the world.

### **Expansion for analogue adaptor**

For special fans, e.g. in the laboratory sector, it is possible to connect an analogue expansion strip parallel to the existing fan channels. This expansion will be available soon as an accessory and allow connection of fans or pumps which would otherwise have problems with PWM (Pulse width modulation). With the analogue adaptor it is hence also possible to connect 12V DC pumps to the Alphacool Heatmaster 2 and to set the pump voltage e.g. according to a measured temperature.

### **Battery mount**

Here the battery of the type CR2032 3V can be installed. The battery is not required with the current software version of the Alphacool Heatmaster 2. At the moment some added software is in development which will allow the real-time clock in the Alphacool Heatmaster to be implemented into some features. This will e.g. allow the Heatmaster to be used for timed booting and shutdown of the system as well as an alarm clock and for timer notifications. Regarding the upgrade possibilities to Version 2 we will inform you on the product homepage as well as on the forums.

### **Mounting holes for the water block (optional expansion)**

The maximum power output of the fan channels is limited to 18W. This limit results from the thermal load on the voltage converters and load on the board. Of sufficient cooling is ensured, it is possible to increase the power output to 38W. Regarding the maximum power output with active cooling we are unable to give any information, as such operation lies outside of the manufacturer specifications. In our tests it was possible to draw a permanent power output of 74W with active cooling.

**IMPORTANT: By exceeding a power output of 18W per channel you are operating this unit outside of the manufacturer's limits. Damages to the hardware are not covered by the warranty if the power output limit is exceeded.**

A compatible water block is the water block alphacool Heatmaster 2 cooler (Item No. 11045)