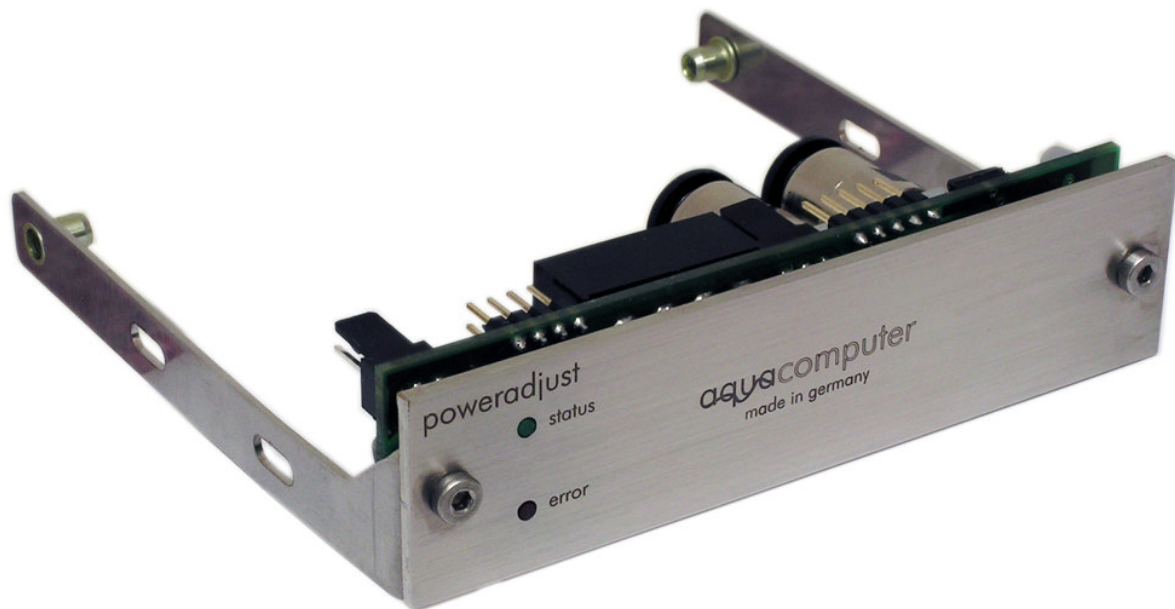


# Operating and assembly manual



## poweradjust USB

Reserved for changes, misprint and mistake!  
Current as of: March 23th, 2007

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## 1. Contents of the package

- 1x poweradjust USB (ready to install; version „poweradjust USB It“ **without** installation framework and bezel)
- 1x Adapter cable for Laing DDC pump
- 1x internal USB connection cable (5-pin), length of approx. 70 cm
- 1x speed signal cable

Fixing material

- 1x Software CD aquasuite
- 1x this manual

## 2. Optional accessory

The following accessories can be used with the device and are **not** in the scope of supply:

- Water cooling block for poweradjust USB (item No. 26003)
- aquaero flow sensor (item No. 53024)
- Connection cable for flow sensor (item No. 53027)
- External-internal USB connection kit (item No. 53039)

## 3. Introduction

Dear customer,

We congratulate you on the purchase of a poweradjust USB from Aqua Computer GmbH & Co. KG. We are one of the oldest manufacturers of PC water-cooling systems in Germany. Our products are made from materials of the highest quality. We hope you enjoy your new cooling system.

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](http://www.aqua-computer.de). If you should not find an answer to your question there, please email to [support@aqua-computer.de](mailto:support@aqua-computer.de).

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

Your Aqua Computer Team

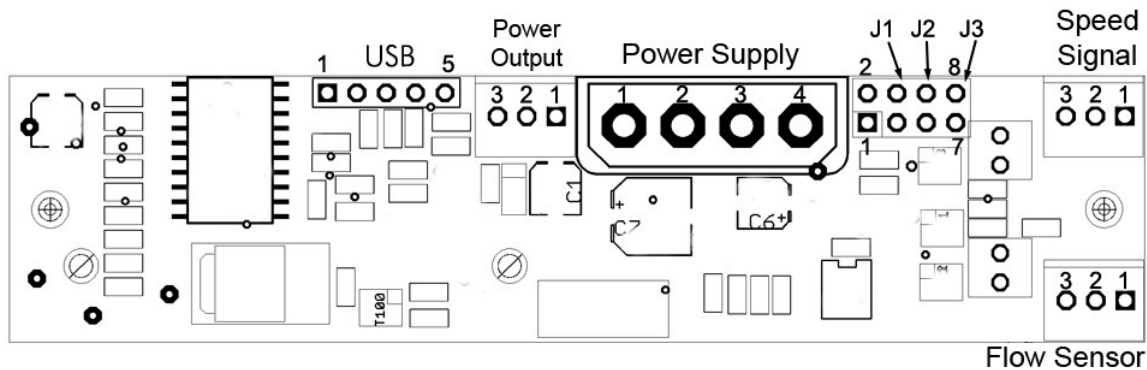
## 4. Safety precautions

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

1. Read this manual thoroughly and completely!
2. Backup your data before working on the hardware!
3. The poweradjust may only be used completely assembled in a computer case!
4. Never touch, connect or separate cables or electronic components while in use! The components can get hot while in operation. After turning off, let the device cool down for at least 30 minutes before touching it!
5. Do not turn on your computer unless you are absolutely certain that all cables are securely and correctly connected to the poweradjust USB!
6. Maintenance notes: Clean the bezel of the device only in the turned off condition with a soft, damp cloth.
7. All statements in this manual are subject to the fast technological development. Our products are constantly enhanced. Technical changes, misprints and errors are reserved!
8. 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.

## 5. Connectivities and plug connections

### 5.1. Circuit board overview



### 5.2. Power supply

Attach a vacant power connector of your PSU. Due to the form of the plug the polarity can not be misinterpreted. Do not use force when connecting the plug but double check if the plug is lined-up correctly (i.e. not upside down)

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

### 5.3. Speed signal output

Speed signal output for the connection to a free fan connector of the mainboard or aquaero USB (not contained in the scope of supply). A suitable interconnecting cable is enclosed in the poweradjust USB. Depending on used mainboard and BIOS of the mainboard a monitoring of the function of the poweradjust USB and an emergency shutdown of the system may be possible at malfunctions.

|                 |       |                             |
|-----------------|-------|-----------------------------|
| Pin assignment: | Pin 1 | GND                         |
|                 | Pin 2 | NC                          |
|                 | Pin 3 | rpm signal (open collector) |

## 5.4 USB connection

Connection possibility for an internal USB-connector on the mainboard. Use the included USB-cable and pay close attention to the polarity (colored wires) of the cable. **Incorrect use may result in the destruction of the poweradjust USB and/or the mainboard and further components!** Therefore pay close attention to the pin assignment of the connectors on the mainboard. Please consult the manual of your mainboard for help.

|                 |       |     |            |
|-----------------|-------|-----|------------|
| Pin assignment: | Pin 1 | NC  | black wire |
|                 | Pin 2 | GND | black wire |
|                 | Pin 3 | D+  | green wire |
|                 | Pin 4 | D-  | white wire |
|                 | Pin 5 | NC  | red wire   |

## 5.5. Flow connection

Connection possibility for a flow sensor. Only use flow sensors and cables specified by aqua-computer!

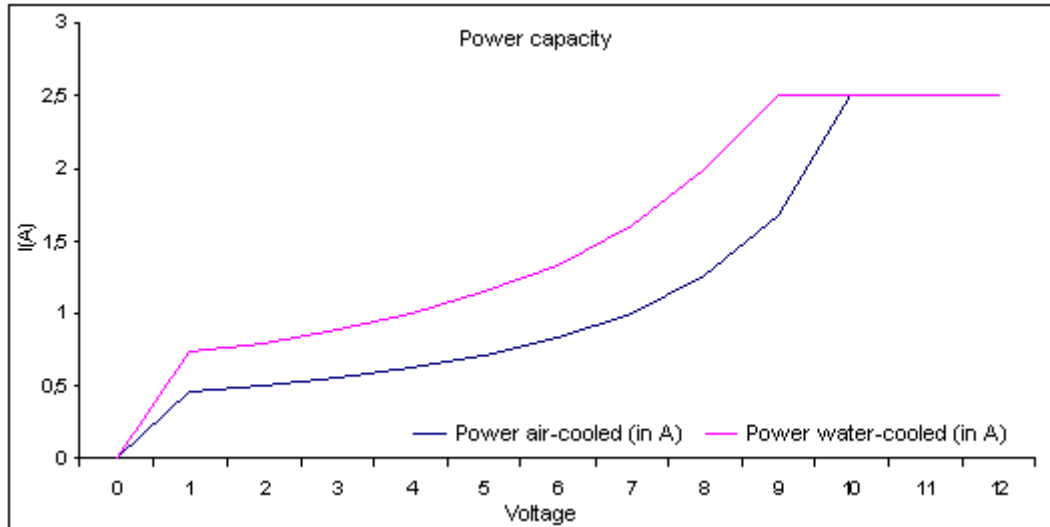
|                 |       |      |             |
|-----------------|-------|------|-------------|
| Pin assignment: | Pin 1 | GND  | green wire  |
|                 | Pin 2 | +5 V | orange wire |
|                 | Pin 3 | RPM  | yellow wire |

## 5.6. Power output (fans and pump)

Connectivity for a fan or a pump with speed signal monitoring.

Maximum current output capacity at 12 V is 2.5 A (30 W total power). The maximum current output capacity also is reduced at lower output voltages!

Please refer to the following performance characteristic for maximum current output at different output voltages:



Pin assignment:

|       |              |
|-------|--------------|
| Pin 1 | GND          |
| Pin 2 | 0-12 V       |
| Pin 3 | Speed signal |

## 5.7. Jumpers

With the jumpers configurable presets can be load for the output power. These presets can be configured by USB and are stored permanently in the poweradjust USB. In addition, the deaeration mode can be turned on and off by jumper if this function was not deactivated by USB (see below).

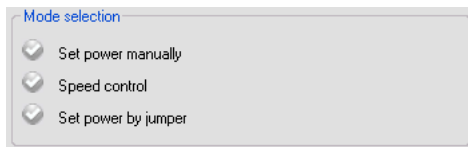
Pin assignment:g

|         |                             |
|---------|-----------------------------|
| Pin 1   | (reserved)                  |
| Pin 2   | (reserved)                  |
| Pin 3/4 | Jumper J1 (deaeration mode) |
| Pin 5/6 | Jumper J2 (power setting)   |
| Pin 7/8 | Jumper J3 (power setting)   |

## 6. Configuration

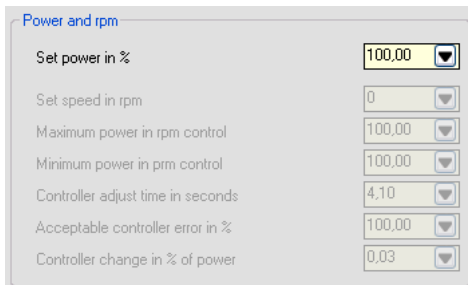
The configuration of the poweradjust USB, including the configuration of the jumper functions, is made by the bundled software via USB communication. Therefore install the software "aquasuite" from the included CD-ROM after assembly and connection of the poweradjust USB on your computer. After starting the software you can configure the various functions of the poweradjust.

### 6.1. Mode selection



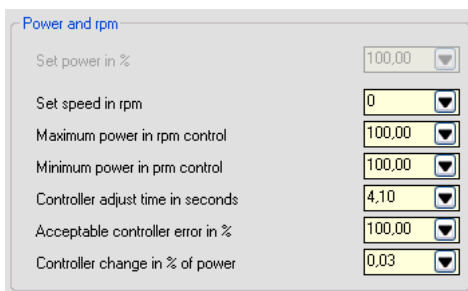
The poweradjust circuit board supports several operation modes: set power manually, speed control and set power by jumper.

#### 6.1.1 Manual power output setting



When using the manual power setting, the power (0-100 %) is set in the aquasuite software. The poweradjust USB will use this setting for the power output.

#### 6.1.2. Speed controlled power output



When using the speed control, a you are able to preset the desired rotation speed in the aquasuite software. The poweradjust will regulate the power output in order to maintain the preset rotation speed using the rotation speed signal from the connected fan or pump as far as it is possible within the regulation range of the power output.



In order to use this feature, the attached fan or pump must provide a speed signal. The speed regulation can be adapted with different parameters to the respective needs of different connected devices since for example a pump reacts differently to a fan. The parameters in particular:

### **Set speed in rpm**

Here you can adjust the speed which will be load into the poweradjust and will be kept constant if possible.

### **Maximum power in rpm control**

By using this parameter you can limit the maximum output power. The power output will not exceed this value even if the predefined speed is not reached at this power.

### **Minimum power in rpm control**

By using this parameter you can define a minimal output power. The power output will not fall below this value even if the predefined speed at this power is exceeded. The speed control only works within the power range between minimum and maximum power.

### **Controller adjust time in seconds**

Cycle time of the regulator. This time defines how often the power output is adjusted in order to keep the speed constant. The higher this value, the slower the speed control works. The lower this value is, the faster the speed controller works but also tends to swing.

### **Acceptable controller error in %**

Controller error in % with respect to the adjusted speed which is permitted without changing output power. Example: If the speed is set to 1000 rpm and the permitted controller error is 2.5%, then the regulator does not change the output power if the rpm value is between 975 and 1025. Is the speed is higher or lower, the regulator corrects the output power until the speed is between 975 and 1025 rpm again.

## Controller change in % of power

If the speed controller corrects the power at the output, then the output power is increased or reduced by this value. This value is related to 100% output power.

### 6.1.3. Power presets for jumpers



The performance of the output can be set through the jumpers. For every jumper combination an associated output power can be defined through the aquasuite

software. So it is possible to configure different presets for different intended purposes.

## 6.2. Calibration

The calibrating values serve to adapt the measuring routines in the poweradjust USB to fans and sensors of different manufacturers. The function of the parameters in detail:

### 6.2.1. Speed signal power output

#### Fan: impulses/revolution

Number of impulses which the attached fan or pump delivers per turn. This value can be adjusted depending on the fan or pump type. The default value is 2.

#### Count ... Impulses

This value is responsible for the quality of the speed and flow-rate measurement. The higher this value is, the more exact and slower the measuring is. The smaller the update interval of the speed is, the shorter but also more inaccurate the measurement is. The default value is 10. This value can be changed according to your needs.

### Maximum speed of the fan

This value defines to which maximum value the indication of the speed the overview window is scaled. This value does not have influence on the regulation merely on the graphical presentation in the software.

## 6.2.2. Flow sensor settings

### Flow impulses/liter

Here you can adjust the impulses per liter caused by the flow sensor depending on the used flow sensor. The default value is 509 Imp/l.

### Maximum flow rate in l/h

The value by which the maximum value of the diagram is scaled for the flow. This value does not have influence on the regulation merely on the graphical presentation in the software.

### Flow alarm in l/h

Here you can define the flow in l/hour below which the alarm function shall be activated.

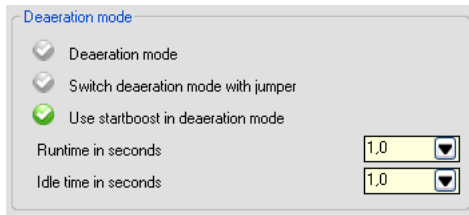
### Enable flow alarm

Activates the evaluation of the flow rate in the poweradjust. If the flow falls below the adjusted alarm value, then a flashing code is shown (see below) through the status LEDs.

### Deactivate speed signal on error

If the option "relay speed signal" is turned off, the speed signal generated by the poweradjust USB is switched off in the case of a flow fault.

## 6.3. Deaeration mode



If a pump is attached to the circuit board, the deaeration mode can be activated through this function. The attached load (pump) will be alternately turned on and off for an adjustable time.

### Deaeration mode

Activates or deactivates the deaeration mode if the function „switch deaeration mode with jumper“ is turned off.

### Switch deaeration mode with jumper

This function activates and deactivates the deaeration jumper. If this function is activated, the deaeration mode can only be activated and deactivated through the jumper. If the deaeration mode is to be controlled by software, this option must be deactivated.

### Use startboost in deaeration mode

When activated the startboost is executed every time the pump is switched on while in deaeration mode.

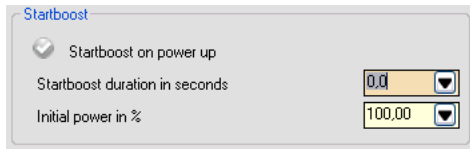
### Runtime in seconds

Period of time the pump remains switched on when in deaeration mode.

### Idle time in seconds

Period of time the pump remains switched off when in deaeration mode.

## 6.4. Startboost



The function startboost configures an adjustable start power output for a defined period of time to ensure a clean startup of the fan or pump even if no speed signal is used. Define power output value and duration which ensures that the attached fan or pump will start under all possible conditions.

the fan or pump even if no speed signal is used. Define power output value and duration which ensures that the attached fan or pump will start under all possible conditions.

### Startboost on power up

This function determines if the startboost is executed every time the circuit board is switch on.

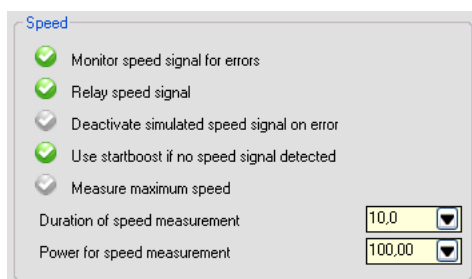
### Startboost duration in seconds

Duration of the startboost.

### Initial power in %

Output power which is distributed constantly during the startboost. This setting overrides all other regulation values, manual power and jumper settings during the startboost.

## 6.5. Speed



Options for the evaluation and processing of the speed signal at the power output.

### Monitor speed signal for errors

Activates the error evaluation for the measured speed signal of the power output. If a power above 0% is set for the output and no speed signal is measured, then an error is distributed through the status LEDs and depending on configuration the artificial speed signal of the speed signal output may be deactivated.

### **Relay speed signal**

When activated, the measured speed signal of the power output is passed 1:1 to the speed signal output. In this case it is not possible to use the flow sensor signal for deactivating the speed signal output.

When deactivated, an artificial speed signal with approx. 3800 rpm is generated. If the error evaluation is activated for flow sensor and/or power output, then this speed signal is switched off at faults. Through this feature for example an emergency shutdown of the computer is possible depending on the used mainboard and BIOS.

### **Deactivate simulated speed signal on error**

If "relay speed signal" is inactive, the artificial speed signal is switched off in the case of a speed signal fault (no measurable speed signal at the power output at a power value above 0%). Through this an emergency shutdown of the computer is for example possible depending on used mainboard and BIOS.

### **Use startboost if no speed signal is detected**

When activated, the startboost is executed if no speed signal is detected.

### **Measure maximum speed**

Activates the measuring of the maximum speed when switching on the poweradjust USB.

### **Duration of speed measurement**

Duration of the maximum speed detection.

### **Power for speed measurement**

Defines the output power which is provided for the maximum speed detection.

## 7. Status LEDs

The two LEDs of the poweradjust constntly provide information on the operating state of the poweradjust USB. The following operating states are distributed:

| <i>Green LED</i>   | <i>Red LED</i> | <i>Operating Status</i> |
|--------------------|----------------|-------------------------|
| Permanent on       | Off            | Normal operating        |
| 2 flashes per sec. | Off            | Startboost is active    |
| 1 flash per 2 sec. | Off            | Deaeration is active    |
| Off                | flashing       | Error                   |

## 8. Technical Data

|                               |  |
|-------------------------------|--|
| Dimensions circuit board      | 98 mm x 23 mm  |
| Power supply                  | +12 V, +5 V  |
| max. current consumption 12 V | 2,5 A  |
| max. current consumption 5 V  | 100 mA   |
| USB Standard                  | USB1.1, self powered   |
| Speed signal output           | open collector (similar to fans)   |
| Power output voltage          | 0-12 V (load-dependent)  |
| Power output current          | 2,5 A maximum (at 12 V)  |
| Compatible flow sensors       | 5 V VDD maximum 50 mA<br>open collector signal output<br>Flow signal duty cycle 1:1<br>100-3000 Impulses/Liter |
| Ambient temperature           | 10°C – 40° C   |
| Temperature cooling block     | max. 90° C   |

