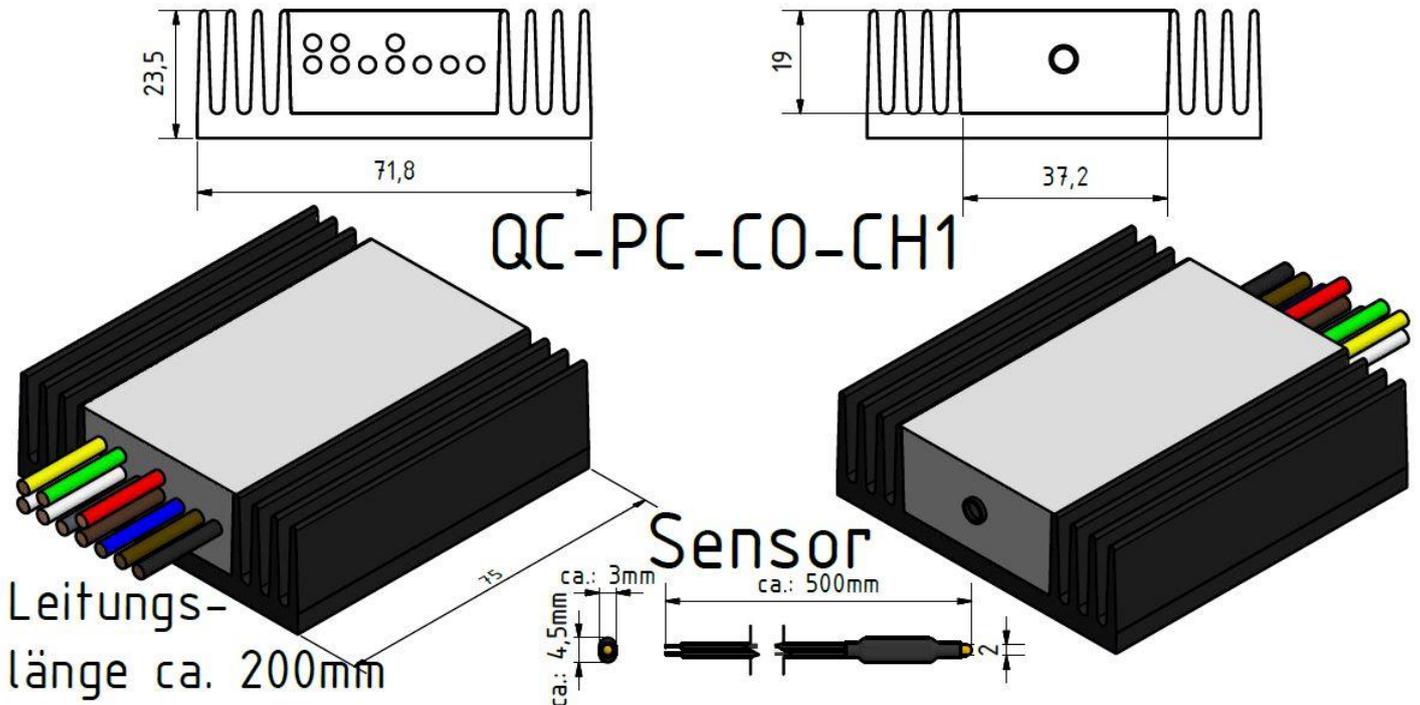


## Peltier Controller QC-PC-CO-CH1

### User Manual

## Temperature Controller for Automatic Heating and Cooling

### Applications



#### Technical specifications:

- Voltage supply: 12...24VDC/<45mA
- Separate driver supply: 3...48VDC
- Maximal Peltier current: 20A
- Interface Display connect: 3,5mm Stereo-Klinke
- Temperature range: -40°C - +100°C
- Sensitivity: 0,1 °C
- Accuracy +/- 1 K
- P-control characteristic
- Control parameter for heating and cooling range separately adjustable
- Maximal nominal value limit adjustable
- Minimal nominal value limit adjustable
- Maximal output voltage adjustable
- Minimal output voltage adjustable
- Detection of sensorial burst and short circuit

#### Delivery content:

- 1 Peltier controller QC-PC-CO-CH1
- 1 Temperature sensor NTC 10KΩ (β=3977K)
- 1 Potentiometer 10KΩ
- 1 User manual

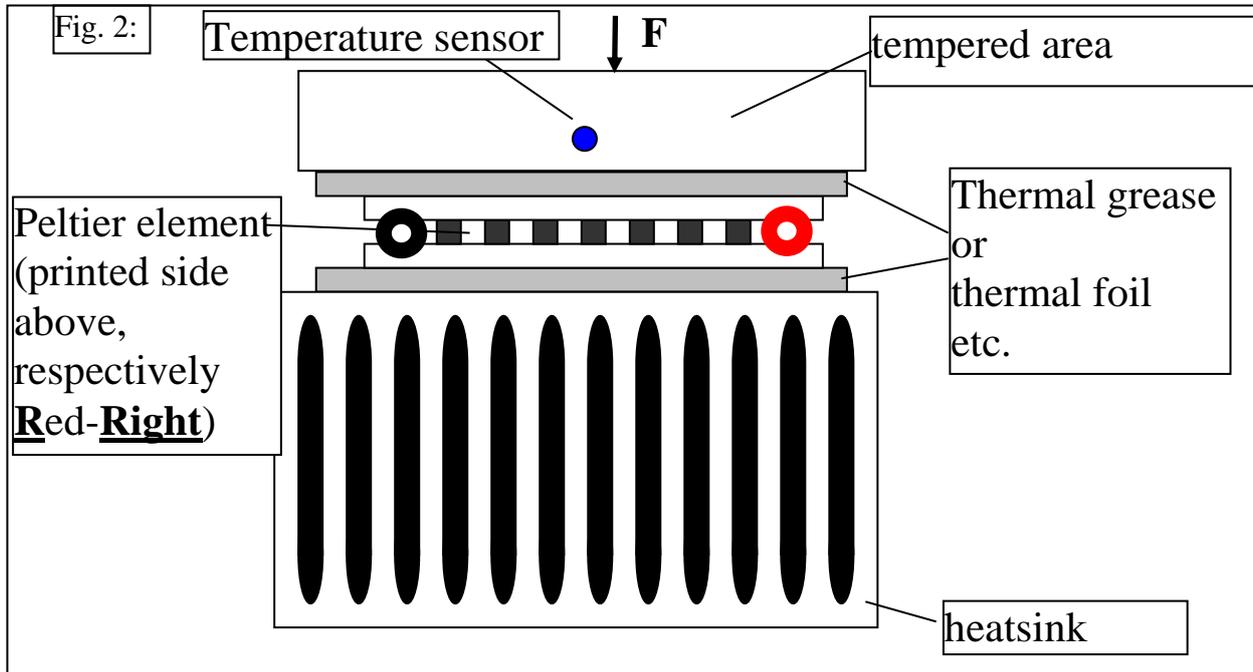
## 1 Proper application of the controller QC-PC-CO-CH1

The Peltier controller QC-PC-CO-CH1 has been developed to actuate Peltier elements. The controller undertakes the control of the temperature in a tempering setup. The temperature range of the controller serves from -40°C to +100°C, while the controller triggers the Peltier element automatically for a suitable heating or cooling. The control parameters are programmable by the display QC-PC-D-CH1. The compact construction of the QC-PC-CO-CH1 enables the integration of the controller into a controlling setup, without a significant disturbance of the overall design. The temperature specification either has to be implemented by an external connectable potentiometer or a programmable fixed value. The user has the ability to determine the supply voltage of the controller

and the driver supply of the Peltier element separately. Thereby it is possible to trigger optimally nearby all Peltier elements that are available on the market. Furthermore the output supply can be dedicated a minimal and maximal value, while these values can be set for heating and cooling applications differently. Hence with the properties of the Peltier elements is taken into account, that the generable heating power is a multiple of the cooling power. The compact controller QC-PC-CO-CH1 is delivered with preconfigured parameters, which allows an immediate installation into the control without any programming. Please read the user manual thoroughly. If you follow the advice and descriptions, a Peltier controller will stand by your side, which diverse deployability, compactness and enormous performance capability is unreached by any other controller.

## 2 The principle of the Peltier tempering:

The directed current flow through a Peltier element causes plenty of physical processes, which recognizable effect is the spatial displacement of heat energy. The temperature on one side decreases while the temperature on the opposite side increases. This allows the planar attachment of a solid component to heat it up or cool it down purposefully. Compared to conventional gas compressors (e.g. refrigerators) the Peltier element has many advantages. E.g. a noiseless tempering without any hazardous materials, without any movable components and freedom from maintenance is possible. Additionally these devices can be miniaturized in a way that would be unimaginable without the Peltier element. Fig. 2 shows the setup of such a tempering application that should basically always be constructed like that.

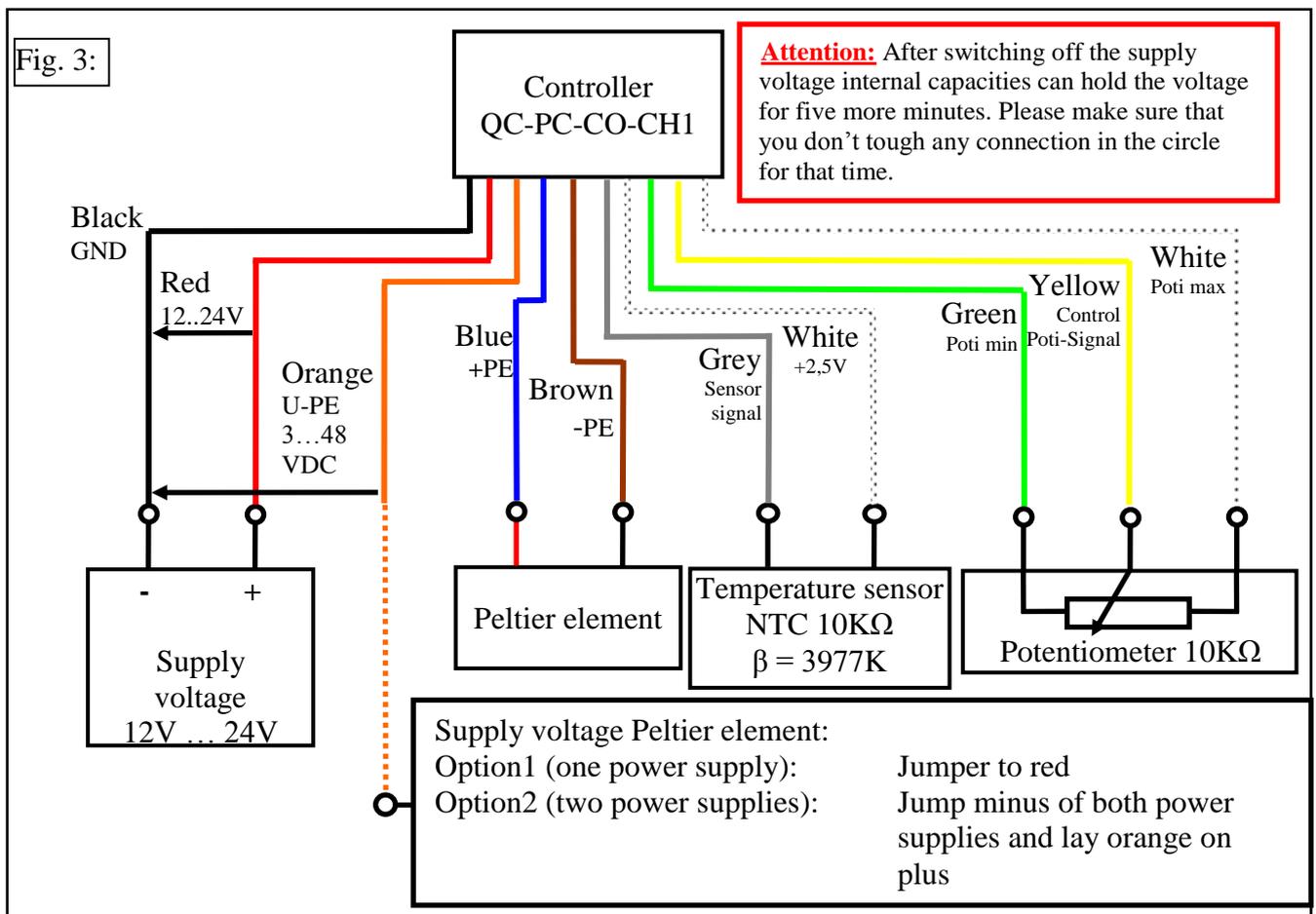


Here the basic composition, which is indispensable for the work with Peltier elements, is recognizable. There is an area that should be brought to a certain temperature. This area is equipped with a temperature sensor. On the other side the area is located where the heat gets extracted from or the redundant heat energy is led to in case of a heating and cooling application, respectively. In this second area the temperature is usually not surveilled. To prevent a collapse of the application induced by an excessive removal or feeding of heat, this

area is contacted with the environment intensively. That implies that by the usage of a heatsink the surface gets enlarged multiply to establish the needed contact with the ambience. The size of this heatsink and the impeccable bonding between Peltier element and heatsink on the one side and between Peltier element and heating and cooling plate, respectively, on the other are the basic conditions for the determination of the performance of their setup. If you always focus on that basic structure, your results will be successful. Please visit the category **Know how** in the section of the heat management on our website indicated below to deepen your knowledge. Here you find tips and information in a comprehensible and visualized layout.

### 3. The electrical setup:

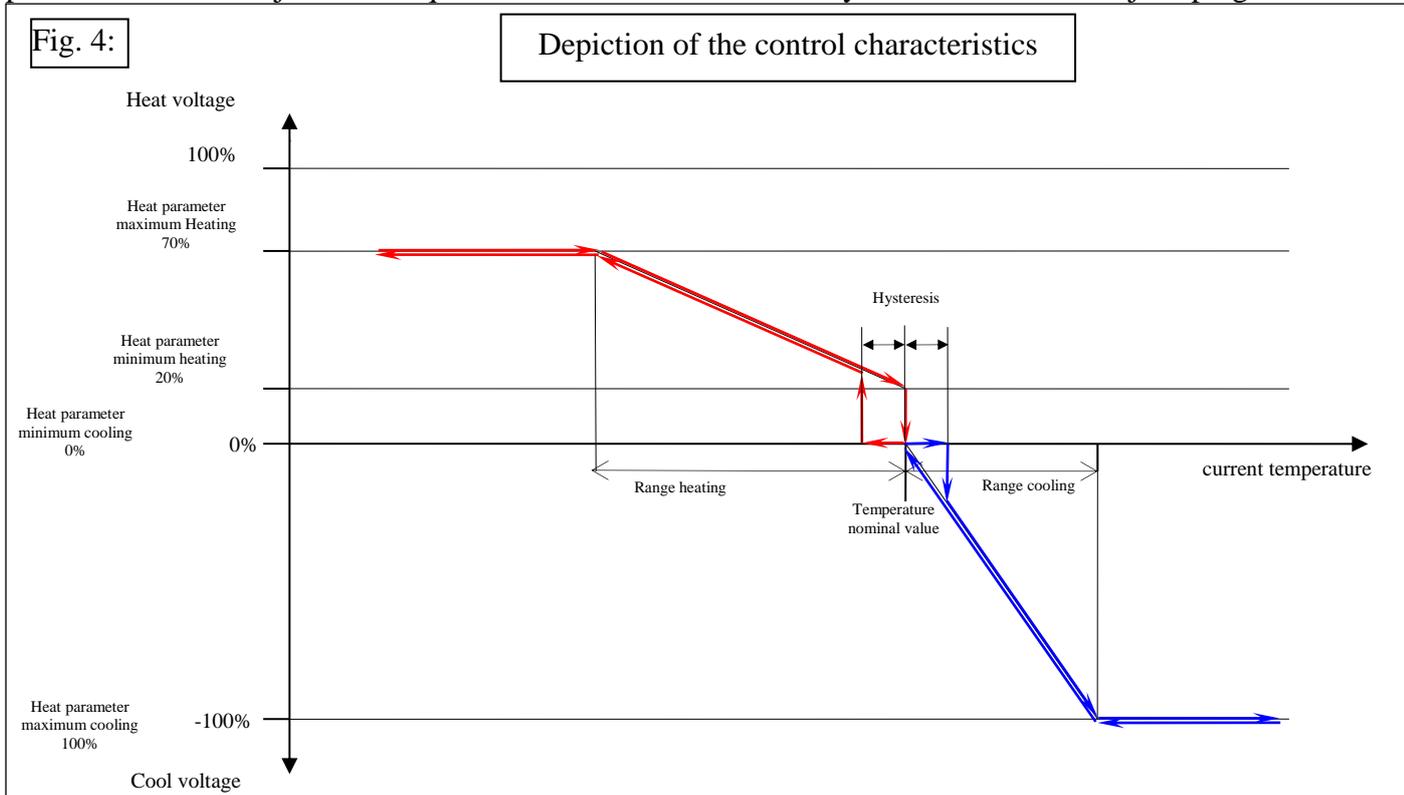
The wiring of the single components with the controller requires basic knowledge of electrical engineering and has to be conducted by a qualified person.



To run the controller, a source of direct current voltage is necessary. Sources in the range of 12VDC to 24VDC are usable. The controller has a separate power input for the supply of the Peltier element available. The zero potential of both voltage sources is merged on the black wire. Thus, the control supply and the Peltier supply can either be separated or alternatively connected.

### 4. Adjusting the control parameter:

The controller QC-PC-CO-CH1 already holds the default parameters in delivery condition which allows the usage without any programming. But it is also possible to change the control parameters to optimize the response characteristics. To adjust these parameters, the controller either has to be connected with the control unit QC-PC-D-CH1 or a computer. The control unit QC-PC-D-CH1 has a display, where the control process can be traced at first sight. By an easily understandable menu all parameters can be adjusted as required. The connection is done by a wire and a 3.5mm jack plug



**Important:**

**The voltage connected at the orange wire** must not be above the maximum voltage of the TEC. This value you can get from our homepage.