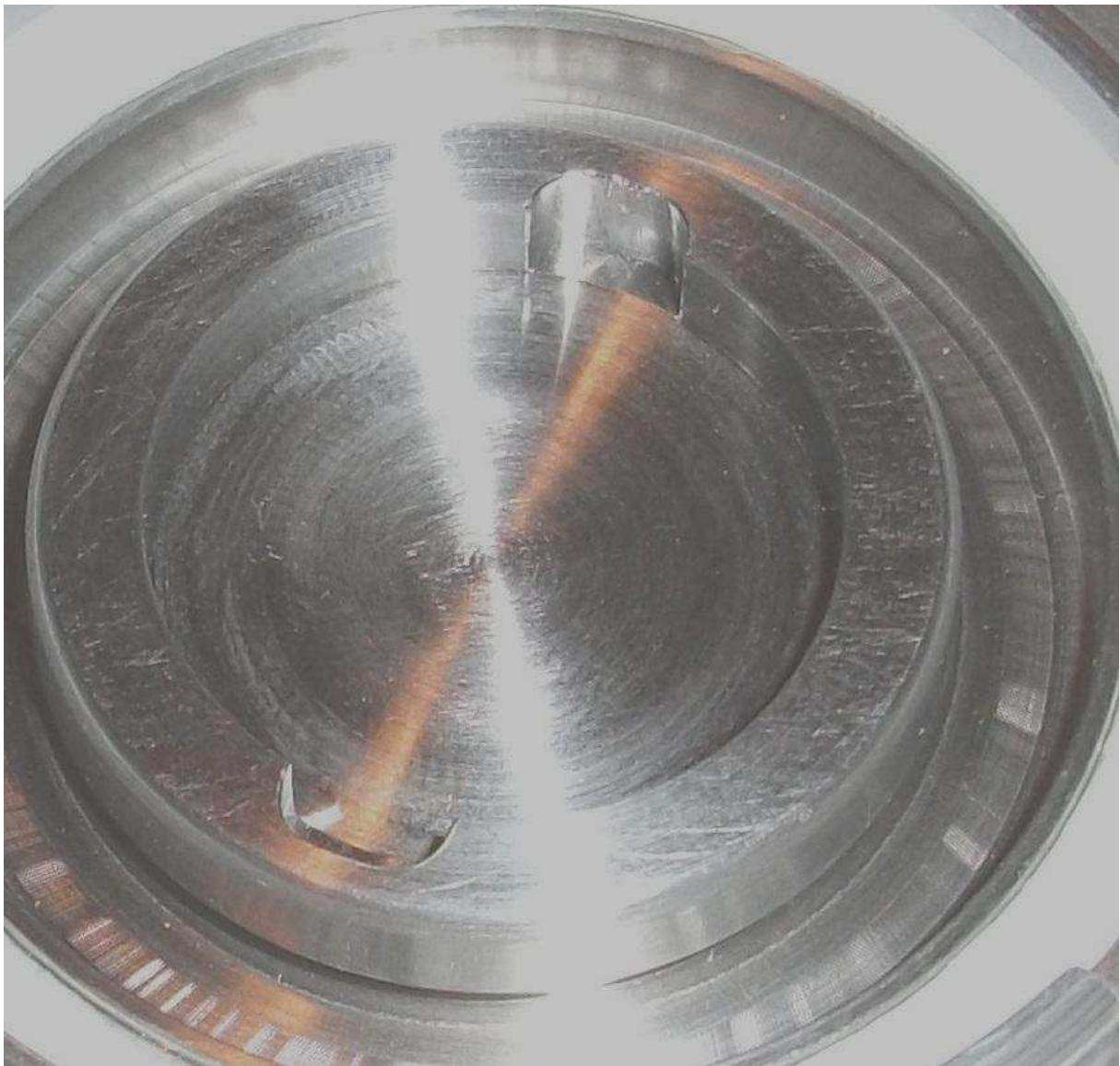


MESICON advanced temperature control



USER MANUAL



Description

The temperature control unit for x-ray sample holder consists of

- 1 a sample holder with a peltier element and 2 Pt 100 temperature sensors
- 2 a controller unit with power supply, ambient temperature measurement and communication interfaces
- 3 a computer with the software for controlling and displaying the temperature of the sample holder.

The connection between the sample holder and the controller unit is done by a 7-conductor cable and screw clamps.

The controller unit is connected with the computer via RS 485 interface through an isolated RS 232 to RS 485 converter to the RS 232 computer interface.

Technical data

Temperature range	-3 to 75 °C
Resolution	0,1 °C
power supply	230 V, 50 Hz
power consumption	max. 30 W
ambient Temperature	10 °C to 30 °C

Technical data of the peltier element

type	TEC2L-23-23-13/73
dimensions	23 x 23 mm
cooling power	12.8 W
max. voltage	9.2 V
max. current	2.8 A
max. temperature difference	73.4 K
max. temperature	125 °C

Connecting strip

No	description	group
1	PE	power supply
2	N	power supply
3	L1	power supply, fuse
4	N	power supply switched on
5	L1	power supply switched on
6	+ 12 V	power supply
7	+ 12 V	power supply
8	+ 12 V	power supply
9	- 12 V	power supply
10	- 12 V	power supply
11	- 12 V	power supply
12	PE	
13	PE	
14	+ 12 V cooler	cooler
15	+ yellow LED	cooler
16	- 12V cooler	cooler
17	+ RTD1	sample temperature
18	- RTD1	sample temperature
19	COM1	sample temperature
20	+ RTD1	ambient temperature
21	- RTD1	ambient temperature
22	COM1	ambient temperature
23	+ RTD2	cooler temperature, pink cable sample holder
24	- RTD2,	cooler temperature, blue cable sample holder
25	COM2	cooler temperature - - -
26	+ RTD0	actual temperature, brown cable sample holder
27	- RTD0	actual temperature, yellow cable sample holder
28	COM0	actual temperature, grey cable sample holder
29	+ - 0 – 12 V	power supply peltier element, green cable sample holder
30	+ - 0 – 12 V	power supply peltier element
31	+ - 0 – 12 V	power supply peltier element, white cable sample holder
32	+ - 0 – 12 V	power supply peltier element
33	+ Data	green cable ADAM Modules
34	- Data	yellow cable ADAM Modules
35	+ power supply	white cable ADAM modules
36	- power supply	brown cable ADAM modules

Installation

- 1 install the software MAETRE on your computer
- 2 connect the controller unit with the RS 232 to RS 485 converter as follows
- 3 connect the converter via 232 interface cable to a com port on your computer
- 4 connect the controller unit with the sample holder
- 5 connect the ambient temperature sensor with the controller unit
- 6 connect the controller unit with your power supply (230 V, 50 Hz)

Safety instructions

Do not open the controller unit before separating it from the power supply!

Cooling the sample always heats the metal at the bottom of the sample holder. Cooling the sample to lower temperatures may effect strong heating to temperatures above 40 °C!

The sample temperature is limited to 9 °C above the maximum temperature, then the controller stops heating.

The cooler temperature is limited to 60 °C, then the controller stops.

Operation instructions

Starting

Be sure that all connections are right.

Switch on the controller unit. *The green LED shows "power on".*

Start the program MAETRE on your computer.

Com port

Select the com port to which the controller is connected using the com port label on the top-right of the screen.

Select target temperature

Click on the temperature stripe to enable temperature selection. *The colour of the temperature display changes from yellow to white.*

Change coarse temperature by moving the mouse to the right or to the left.

Select coarse temperature by mouse click.

Change fine temperature by moving the mouse to the right or to the left.

Select fine temperature by mouse click. *The colour of the temperature display changes from white to yellow.*

Ambient Temperature

The ambient temperature is measured by a Pt 100 temperature sensor. It is only an additional information and has no influence on the controller.

Sample Temperature

The sample temperature is measured by a Pt 100 temperature sensor. It is only an additional information and has no influence on the controller. Displaying and recording of the sample temperature is switched on/off by a mouse click on the sample holder on the screen.

Controller settings

Right controller settings are very important for the function of the temperature control unit.

Wrong controller settings may cause:

- 1 a very slow temperature adjustment
- 2 a unstable system
- 3 in the worst case destruction of the peltier element in the sample holder

Please change the settings only if you are familiar with temperature controllers.

Go to the settings as follows:

- 1 Write into the text field at the right side of the button “controller settings” the password.
- 2 Click on the button “controller settings”
- 3 The value display has to be opened for this action (see value display options).

slope (0 – 1 °C/t const.):

a large value allows fast heating or cooling, but overriding of the target temperature is possible.

amp (controller amplification 0 – 1.5):

a larger value allows fast reaction of the controller, but may cause instability

t const (time constant 3 – 90 s):

a small value allows fast reaction of the controller, but may cause instability

p range (proportional range 0.5 – 5 °C):

a small value allows a fast reaching of the target temperature, but overriding of the target temperature is possible.

T min, T max (-15 – 90 °C):

temperature limits

Saving options

filename

Please choose a filename to write in the actual measured temperature values. Values are saved only if the difference between actual temperature and target temperature exceeds 0.1 °C.

The Values for heating or cooling power are saved in a file named *filename*p.txt. These values are saved only if the difference between 2 following points exceeds 0.3 W.

Starting/stopping the controller

Be sure that all settings are right.

Click on the button “START”.

First the interface modules will be tested. Three green LEDs in the target temperature frame show you “*anything all right*”. Otherwise, there may be a fault in the connection or in the power supply

Depending on the action, the blue LED at the controller unit will show you “*cooling*” or the red LED will show you “*heating*”.

The temperature of the sample holder will decrease or increase to the value of the target temperature.

The display in the actual temperature frame will show you the actual measured temperature and the actual measured temperature slope.

The bar will show you the power rate of heating or cooling. A red bar means “*heating*”, a blue bar means “*cooling*”.

The temperature at the bottom of the sample holder will be shown in the graph field.

A mouse click on the button “*STOP*” will stop the controller.

Cooler options

The opposite of the peltier element is cooled by a water cooler. There are three options for running the cooler:

ON	the cooler is always on if the controller works
OFF	the controller is always off
AUTO	the cooler works only if the sample is cooled

Please do not use the AUTO function for target temperatures near the ambient temperature. It is strongly recommended to use the cooler for cooling the sample more than 3 ° below ambient temperature. Otherwise the bottom of the sample holder may be heated to high temperatures. Exceeding a temperature of 60 °C stops the controller.

Value display options

Click on the button “*GRAPH*” to see the actual measured temperature values as red line graph. The heating or cooling power is displayed as blue line graph. If selected, the additional sample temperature is shown as yellow line graph.

Hold the left mouse button and drag the mouse to the right lower side will zoom the selected part of the graph.

Click on the right mouse button to make a zoom reset.

Click on the button “*GRAPH*” again and the value display disappears.

Temperature profile options

The program MAETRE allows to perform a temperature profile. A mouse click on the temperature profile field opens a frame where you can choose whether you want to load a profile or you want to create a new profile.

Loading a profile

The profile data are saved in your MAETRE directory /profiles. If you click on the load button, this directory is opened and all files with the extension .prof are shown. Please choose a profile and click on the button "load profile" to open it. A new frame will open to show you the data in a table and in a line graph. Heating and cooling times are calculated using the actual values for slope and time constant in your controller settings.

Loading a profile

If you click on the new button, a new frame will open. Please insert the data for temperature and time into the table. The program will calculate the total time by adding the heating and cooling times using the actual values for slope and time constant in your controller settings. The maximum number of temperature levels is 60.

Saving a profile

The profile data are saved in your MAETRE directory /profiles with the extension .prof.

Selecting a profile

Please select your loaded or new created profile with the select button. The profile frame will disappear and the profile is shown in the temperature profile field. The START button is renamed to PROFILE.

You can cancel the profile by clicking on the profile field and then on the cancel button.

Starting the profile

Please start the selected profile with a mouse click on the PROFILE button. A mouse click on the temperature profile field while a temperature profile is running will show you the profile data. A yellow point in the diagram will show you the actual time and temperature.

Ending

Click on the button "EXIT" to exit the MAETRE program.
Switch off the controller unit.

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