Nabertherm

MORE THAN HEAT 30-3000 °C

Operating Manual

Controltherm Software MV 3

Read this operating manual before putting the software into operation.

Table of contents

Introduction

The Controltherm MV x.3 software is for monitoring and operating furnaces that are equipped with the Nabertherm Controllers C 6D, S 27, C 30, S 30, C 40, C 42, B 130, B 150, B 170, C 250, C 280, C 290, C 295, P 320 or the Eurotherm 2400 (starting from version 3.06) and 2408.

The software is supplied in the following versions:

Controltherm MV 1.3	- for one furnace
Controltherm MV 4.3	- for four furnaces
Controltherm MV 8.3	- for eight furnaces
Controltherm MV 16.3	- for 16 furnaces

The data of previous software versions up to version MV x.1-34 are not compatible with the Controltherm MV x.3 version and higher.
For this reason, available data can only be processed with the old version. An old software version remains fully functionable even after installing the new version.

Scope of delivery

The Controltherm software's scope of delivery includes the following components:

- CD-ROM with the following content:
  - Controltherm software installation files
  - Application for reading pdf files (Acrobat Reader)
  - User manual as pdf file
- Interface converter
- Connection cables 3 m, 9-pole, serial RS 232 and RS 422, depending on software version
- Terminator

System requirements

Minimum requirements:

- Operating system: Microsoft Windows 98, ME, NT 4.0, 2000 or XP
- Processor: Pentium® 800 MHz or compatible
- Memory: 64 MB RAM
- Harddrive: 300 MB free storage space
- Connections: 1 free COM port (RS 232, 9-pole)
- Display: Minimum resolution 800 x 600 pixels (minimum 16 MB graphics card storage)

For operating the software, a graphical resolution of 800 x 600 pixels and small font (System font 95 dpi) are required.
The Windows taskbar must be set to „Always on top" and „Auto hide" under „Taskbar Properties".

The following description refers to the Controltherm software MV 16.3. In this example a C 40 Controller with C 6Z zone controller and a C 42 Controller were used.

Before starting the software, it is important that each Controller gets its own address (for setting the address, see user manual of the respective Controller).
The addresses of possibly connected zone controllers must start with 1 and be continuous.

Installation

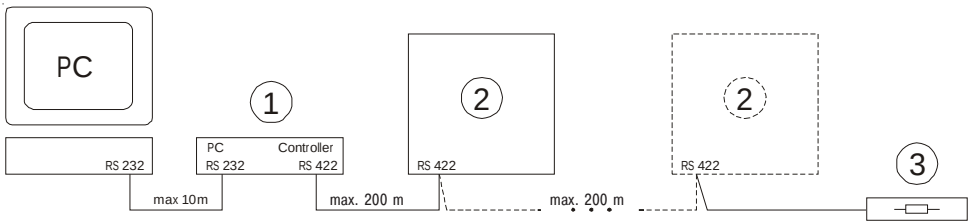
Installing the hard- and software

The following section describes the connection of the interface converter and installation of the software.

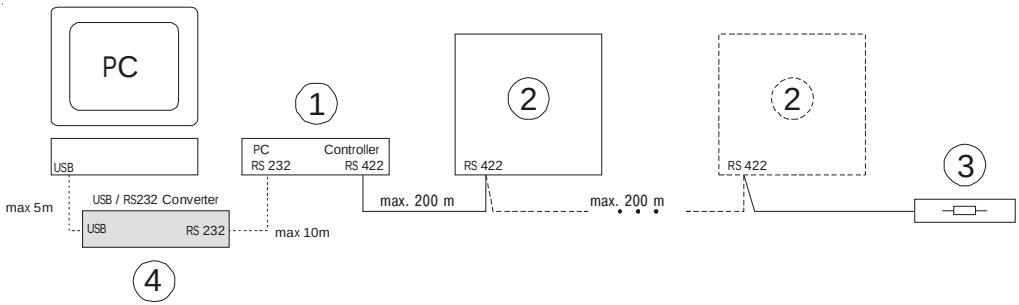
Connecting the converter

The software only works together with the interface converter included in the scope of delivery. This is connected to a free COM port of the computer.
Then the Controllers are connected to the second socket of the converter with the supplied cable.
At the end of the chain, the plug which is still unused is connected to a terminator, see illustration.

Connection via the RS 232 interface



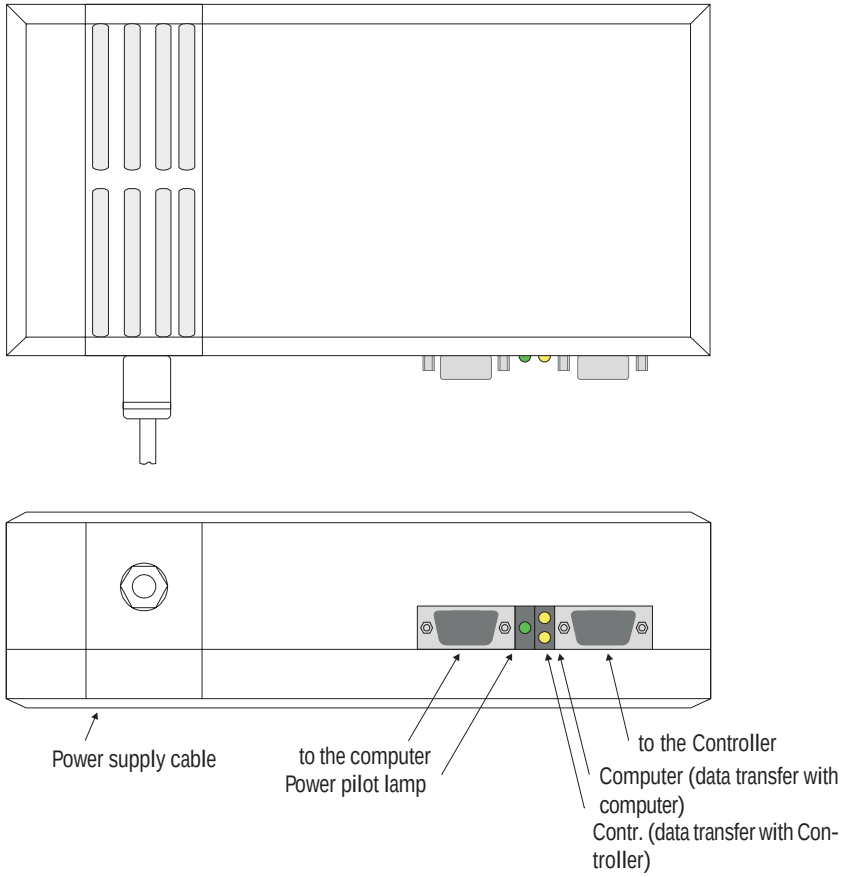
Connection via the USB interface with USB RS232 adapter cable, available as option



1 „RS 232/RS 422 converter“
2 „Controller“
3 „Terminating resistor“ AW2
4 „USB/RS 232 adapter cable (optional)“ Part number 544300054

The USB/RS 232 adapter cable, which is available as option, is not suitable for being used under Windows NT.

View of the interface converter



After the computer and Controllers have been connected, connect the converter to the power supply. When the green LED is on, the device is ready.
The two yellow LEDs indicate through respective flashing if there is data transfer on the bus line. The upper one represents computer data, the lower one Controller data.

Installing the software

To install the software, insert the supplied CD into your CD ROM drive and start the program „Setup.exe“ that can be found in the ‘\Program\’ directory from the Windows Explorer.

The program is then automatically installed in the directory „C:\Nabertherm\Controltherm\“.

The link **„Controltherm“** is automatically added to the desktop.

The program can now be started.

Before starting the software you must make sure that each Controller was allocated its own address, starting with number 1. For setting the Controller address, see operating instructions of the respective Controller.

The US software version differs from the GB software version through its date format.

Deinstalling the software

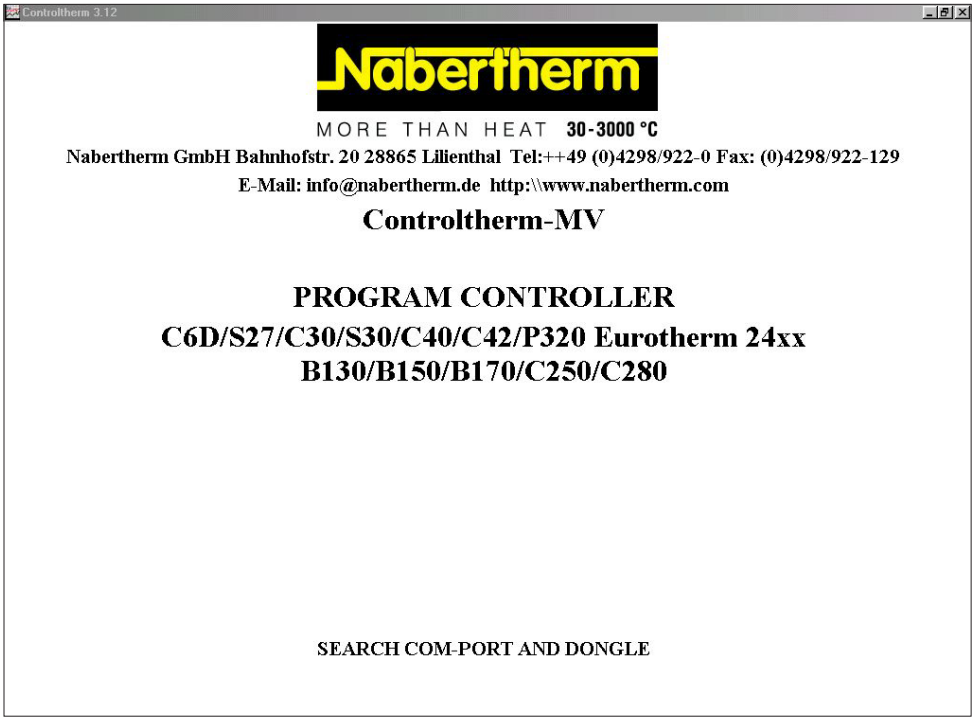
If it should be required to deinstall the software, the following steps need to be carried out:

- Open the Windows Control Panel
- Open the „Spftware“ function
- Select the „Controltherm“ program
- The program is deinstalled with the „Add/Remove“ program

If the program is reinstalled, the same directory is used as long as it is the same software version.

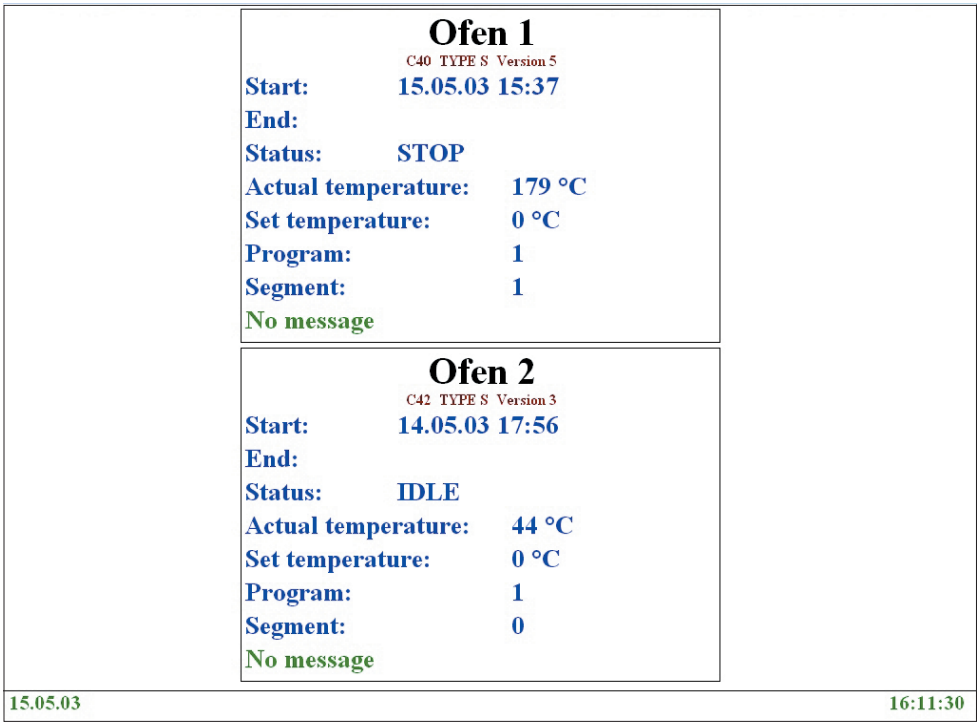
The furnace data already obtained are not affected by this and remain unchanged.

Starting the program



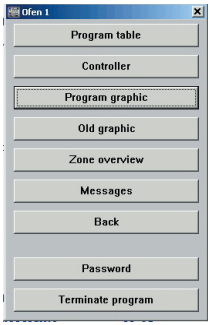
After starting, the program runs a self-test first of all. If this is successful, the connected Controllers are requested. This can take a few minutes. If the interface converter is not detected during this test, the program is closed. If no Controllers are found, a new search can be carried out or the program can be closed.

The software only works with the supplied interface converter.



The main screen shows an overview of the Controllers (furnaces) detected upon program start.
In this example two furnaces are monitored. A window area is allocated to each furnace which contains the furnace name entered during Setup (see program configuration). Furthermore, current values and messages are displayed.

Selecting the functions



For selecting the various functions, a left mouse click must be carried out in the window of the desired furnace. In this example furnace 1 was selected.

„Program table“ function

After selecting the „Program table“ function, the following screen appears:

SG	Ta	Tb	Time		Rate	HB	R1	R2	R3	R4	LTU	LTO	Lti
	[°C]	[°C]	HH	MM	°C/h	[°C]	1/0	1/0	1/0	1/0	[°C]	[°C]	MM
1	45	300	0	30	510	*	1	1	0	0	0	0	0
2	300	300	0	30	0	*	0	0	0	0	0	0	0
3	300	400	0	30	200	*	0	0	0	0	0	0	0
4	400	400	0	30	0	*	0	0	0	0	0	0	0
5	400	200	0	30	400	*	0	0	0	0	0	0	0
6	200	200	0	30	0	*	0	0	0	0	0	0	0
7	200	300	0	30	200	*	0	0	0	0	0	0	0
8	300	300	0	30	0	*	0	0	0	0	0	0	0
9	300	400	0	30	200	*	0	0	0	0	0	0	0
10	400	400	0	30	0	*	0	0	0	0	0	0	0
11	400	200	0	30	400	*	0	0	0	0	0	0	0
12	200	200	0	30	0	*	0	0	0	0	0	0	0
13	200	300	0	30	200	*	0	0	0	0	0	0	0
14	300	300	0	30	0	*	0	0	0	0	0	0	0
15	300	400	0	30	200	*	0	0	0	0	0	0	0
16	400	400	0	30	0	*	0	0	0	0	0	0	0
17	400	200	0	30	400	*	0	0	0	0	0	0	0
18	200	200	0	30	0	*	0	0	0	0	0	0	0

Program P11 Nabertherm Testprogramm created on: 15.05.03 14:11

Edit | Delete | Copy | Paste | Print

Save | Open | Send table | Load table | Controller | Graphics | Back

Status: STOP Start: 15.05.03 15:37 Segm.time: 00:12 Set temp.: 0 °C Prog. 1

Segm.: 1 End: Total time: 00:00 Actual temp.: 174 °C

No message Ofen 1 C40 TYPE S Version 5

15.05.03 16:12:49

In the upper part of the screen the program table last edited is displayed. After restarting the program, the program table of the Controller is displayed here.

If a program is entered or a saved one is opened, the line „Program name“ displays the name of the program and the creation date.

The current status of the Controller is displayed **in the lower part**.

The table colums have the following meaning:

SG Segment number
- The number of segments depends on the Controller used.

Ta Start temperature in the segment.
The temperature is indicated in °C (in °F in USA).

Tb End temperature in the segment
The temperature is indicated in °C (in °F in USA).

R1 - R4 Programmable relays
The number of programmable relays depends on the Controllers used.

LTU Here a low temperature band alarm can be entered. If the actual temperature falls below the nominal temperature value - LTU, a message is issued.

LTO Here an excess temperature band alarm can be entered. If the actual temperature climbs above the nominal temperature value + LTO, a message is issued.

Lti Here a timeout alarm can be entered. If the segment time is exceeded by the entered time, a message is displayed.

Below the program table there is a **button bar:**

Edit
The table is released for editing. The button changes to „OK". The table values can now be changed. If a value is changed involuntarily, the change can be undone by pressing the „ESC" button. Finally the program should be uniquely named in the „Program name" field. The input is completed with the „OK" button.

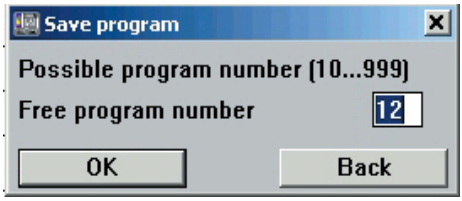
Copy
With the „Copy" button the data of the table can be copied for later entry for another Controller.

Paste
Adds the data copied with „Copy" to the table.

Delete
Deletes the content of the table. However, the changes made in the table do not affect the program in the Controller.

Print
The program table can be printed with the „Print“ function. Also see „Print window“, page 16.

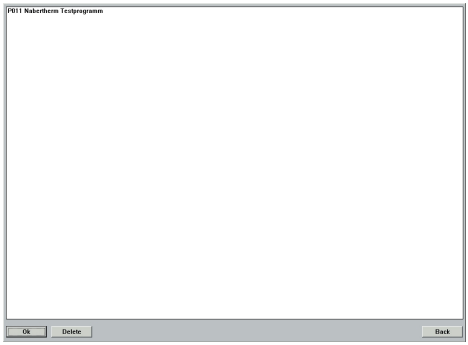
Store
With the „Store“ function the program contained in the table can be stored on the harddrive of the computer.



For unique marking of the program a free program number is suggested.
If the program is to be saved with a different number, this can be entered manually. If the number has already been allocated, a warning message is issued.

The Controltherm program can manage a maximum of 400 programs. All connected Controllers share this program storage. The programs can only be read from one Controller type each. The same Controllers can access the same programs respectively. If for example two different Controllers are connected and the first already seizes 150 program places, the second still has 250 at its disposal.

The region of program numbers that can be entered starts with 10 and ends with 999. The first numbers are reserved for the programs of the Controller.



Open
With the „Open“ function a program stored on the computer's harddrive can be added to the table.

The list displays all programs allocated to the respective Controller type.

The desired program is added by selecting it with the mouse and confirming with „OK“.

With the „Delete“ function the selected program is removed from the list.

Send table
If a program has been rewritten, changed or removed from the harddrive, it can be transferred to the Controller with the **„Send“** function.

A program can only be transferred if the Controller is not in „RUN Mode“.

Load table
With the „Load table“ function the current program table is read from the Controller and displayed.

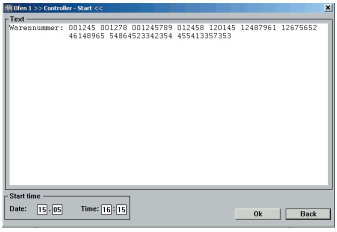
Controller
See section 6, „Controller“ function

Graphics
The „Graphics“ function enables switching to the current graphics.

„Controller“ function

The Controller can be operated with the „Controller“ function.

The functions contained there have the following effects:



Start
When actuating „Start“ the right window is displayed.

Here a start date and a start time can be entered. This makes it possible for example to only start the Controller the following day. The current time is preset. If no change is made here, the Controller starts immediately.

When starting the Controller, the Controller clock is synchronised with the computer clock. For this reason it is important to make sure that the computer clock is set correctly.

„Text" window
Any text can be entered in the „Text" field which is allocated to the temperature/time program which starts after entering the text. For example an order number, test results or special information on the charge can be entered here. This way a unique allocation to the respective work piece can be guaranteed.

When the Controller program is started, this text is permanently allocated to the current charge.

When restarting the Controller, the text is also allocated to the new charge. If the text needs to be changed, this should be done before the restart. A later change after the start is only possible via the „Old graphics" function.

Hold (not available for all Controllers)
Pauses a running program without closing it. The Controller maintains the current nominal temperature (Tp, according to Controller display).

Stop
Closes a current program.

Back
Opens the previous screen.

The functions Start, Pause and Stop correspond to those of the Controller.

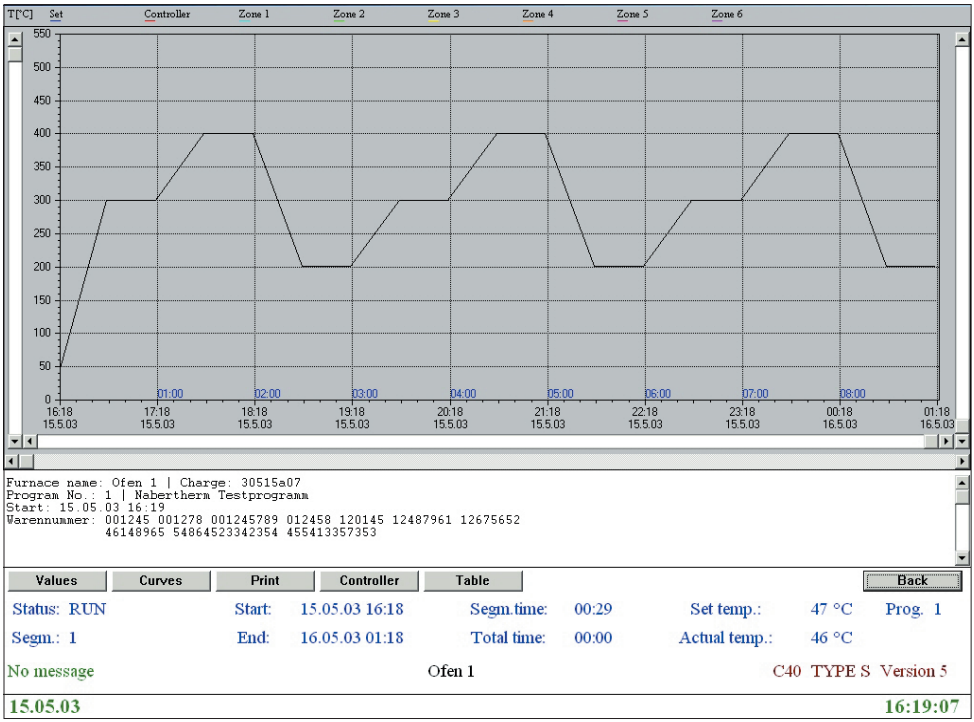
The button „Pause" is only enabled, if the Controller supports this function.

If the Controller is used directly at the unit, the temporal minimum interval between stop and the next start must not fall short, as otherwise this would lead to a faulty graphics display.
The minimum interval depends on the number of connected Controllers and is calculated as follows:

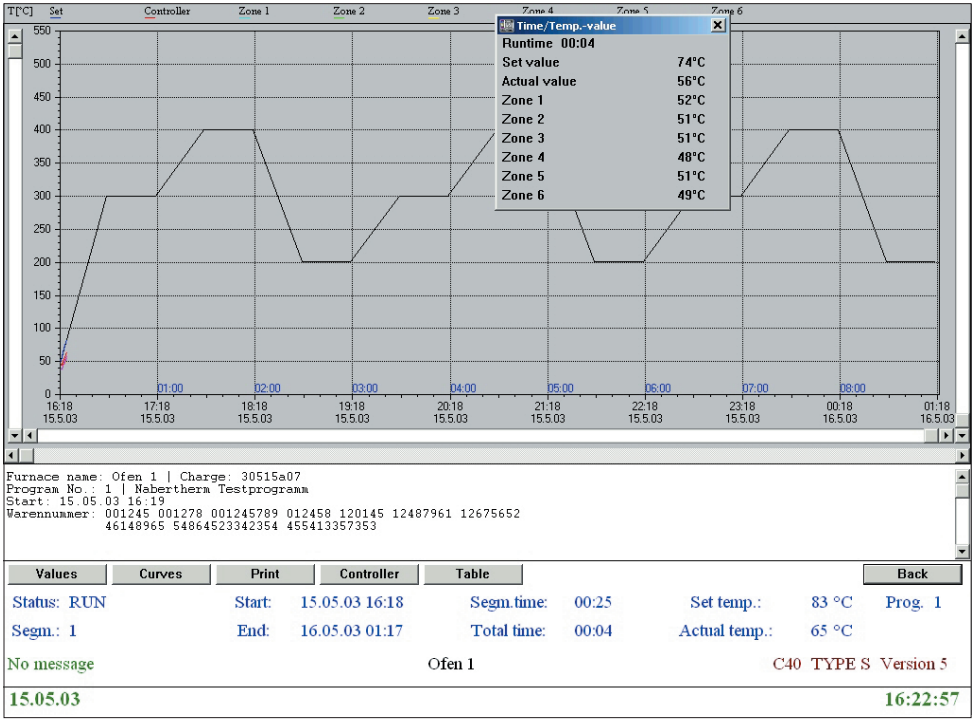
Number of Controllers x 4 seconds

If using two Controllers, an interval of 8 seconds is required (2 Controllers x 4 = 8).

„Program graphics“ function



The upper part of the screen displays the programmed nominal value. Below information like furnace name, charge number, program number, start and end time as well as entered texts are displayed.
In the lower part of the screen the current data of the Controller is always displayed.



The visible area of the graphics can be moved with the grey scrollbar. With the white scrollbars the graphics can be zoomed, i.e. the temperature and time axis can be extended or compressed. This makes it possible to display an area of the curve in detail.

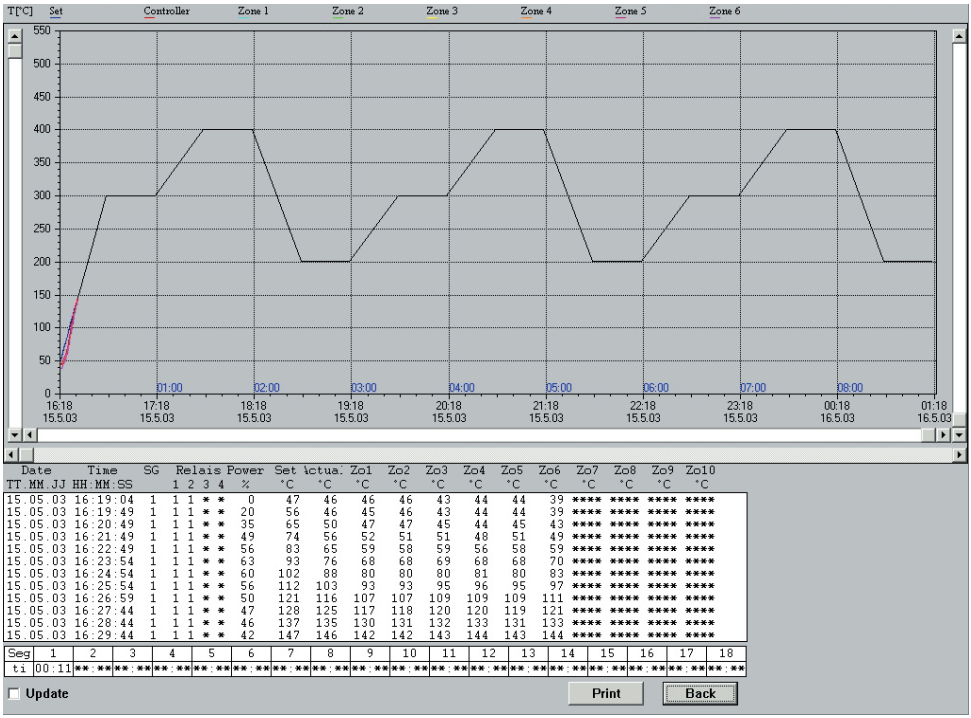
In order to display the temperature and runtime of the program (small window, on left side in graphics), the desired position in the graphics is clicked on with the mouse.

If there should be a failure in the data transfer between Controller and PC during a program run, the temperature curve of the corresponding period is set to zero.

The charge number in the text field below the graphics serves as unique identification of the heat treatment and is a continuous number which is increased by one counter upon each start of the Controller.

The number „10718A03“ for example has the following meaning:

3 represents the year (2003)
07 represents the month (July)
18 represents the day (18th)
A represents the furnace with the Controller address 1, or the first furnace (B is the second furnace)
03 is the running number within a day (here the third heat treatment). The following day the number starts again with 1.



Values

By selecting the „Values“ function the list of added values is displayed in the lower part of the screen.

The nominal and actual values as well as elapsed segment times are displayed in the table.

If the „Update“ function is switched on, the values are updated in the table every minute.

Print
The recorded measured values can be printed with the „Print“ function. Areas or individual entries can be selected and printed at the same time.

Areas are printed as follows:
- select the first entry
- hold down the Shift key
- select the last entry
- release the Shift key

Several entries are now marked blue. If you press the Ctrl key during this process, only the first and last entry are selected.

If no entries are selected, the complete list is printed with the „Print“ function.

Printing all entries may require several pages.

Curves
With the „Curves“ function it can be selected which curves are to be displayed in the graphics.

Nominal curve computer
If the field is selected, the programmed nominal curve of the computer is displayed.

Nominal curve Controller
If the field is selected, the nominal curve of the Controller is displayed.

Controllers and zones
The actual curve of the Controller follows. Depending on the version of the unit the curves of the connected zone controllers follow.

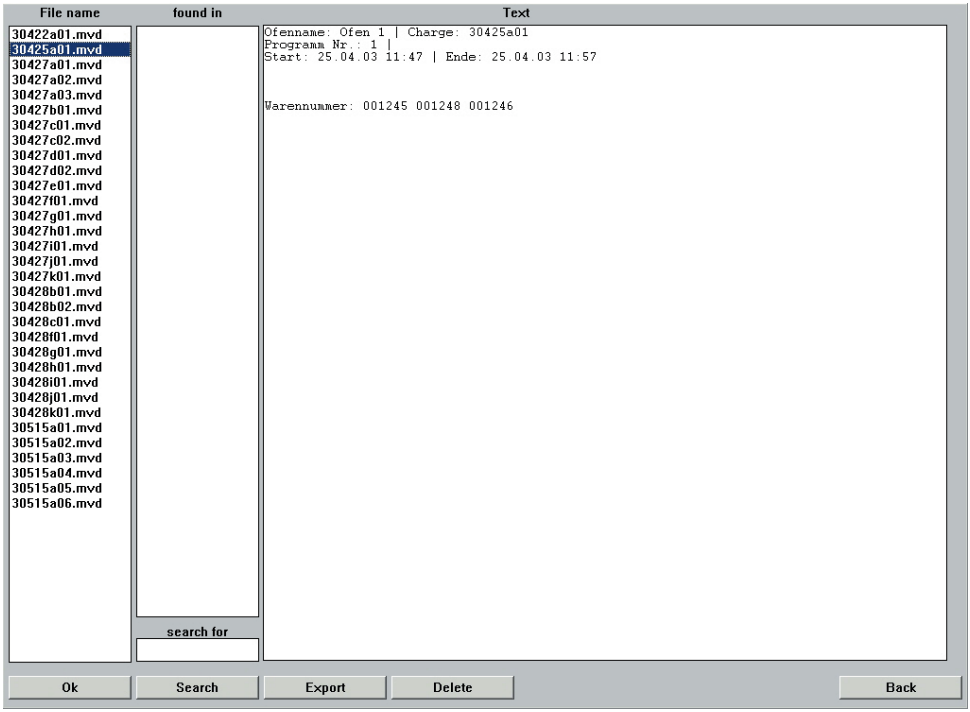
Print
With the „Print“ function the print window is opened, also see „Print window“, page 16.

Controller
See page 8, „Controller“ function

„Old graphics“ function

Search

With the „Search“ function a process documentation can be searched.



Export

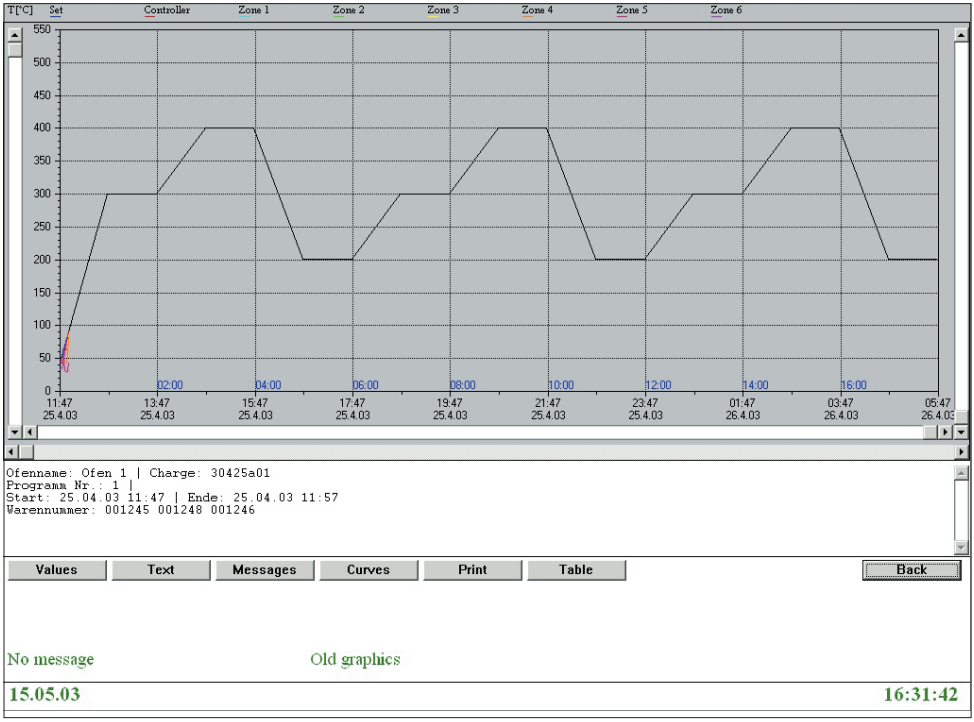
With the „Export“ function the data of one or several heat treatments can be saved in Microsoft Excel format. The selected charges are saved in Excel format in the directory „C:\Nabertherm\Controltherm\Excel“.

Delete

The heat treatments selected in the left column can be deleted with the „Delete“ function.

Calling an old graphic

If a graphic was selected from the list and confirmed with „OK“, it is displayed.

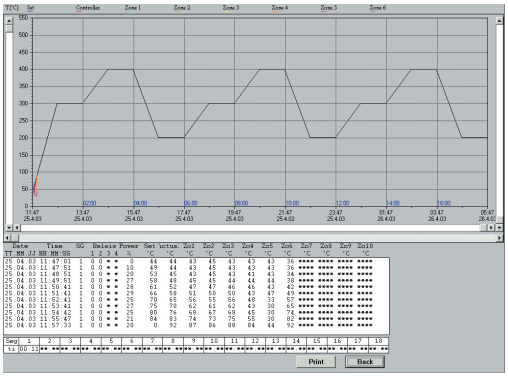


Old graphics

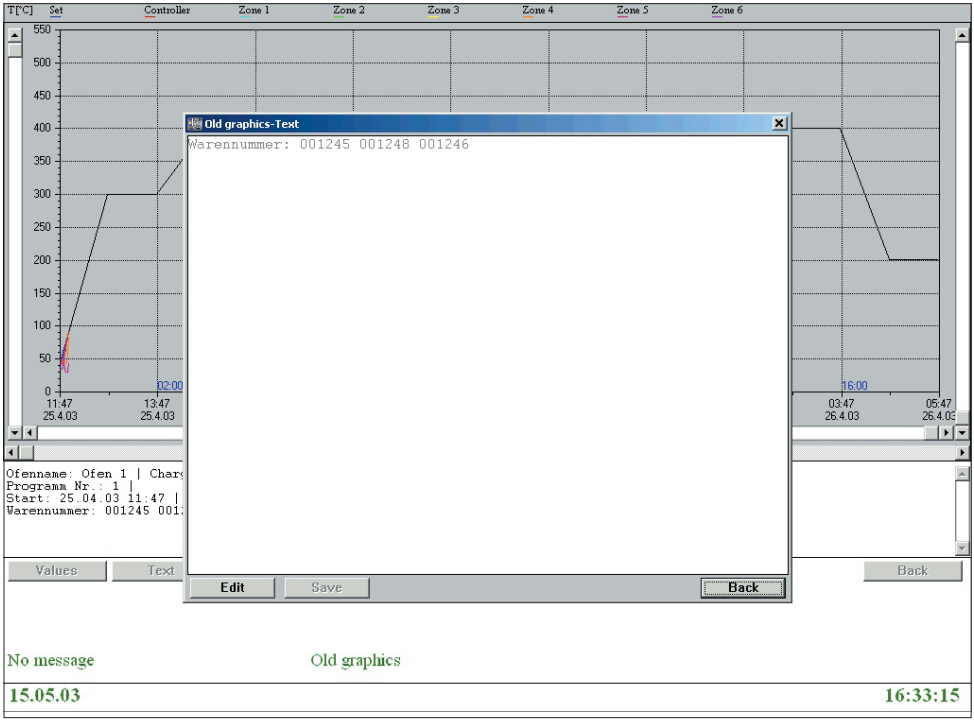
Values

The display on the left is similar to the description under „Program graphics“ function on page 14.

In addition the messages can be displayed here that occurred during this heat treatment and printed.



Old values



Text

With the „Text“ function the text entered for the graphics can be displayed. The text background is grey, i.e. it cannot currently be changed.

Change text

If the text needs to be changed later, this can be done with the „Edit“ function and by entering the password.

After entering the password, the text is released and can be changed.
A text change must be confirmed with „OK“.

Cange passwortd

The password can be changed via the setup, see section „Configuring the software“, page 16.

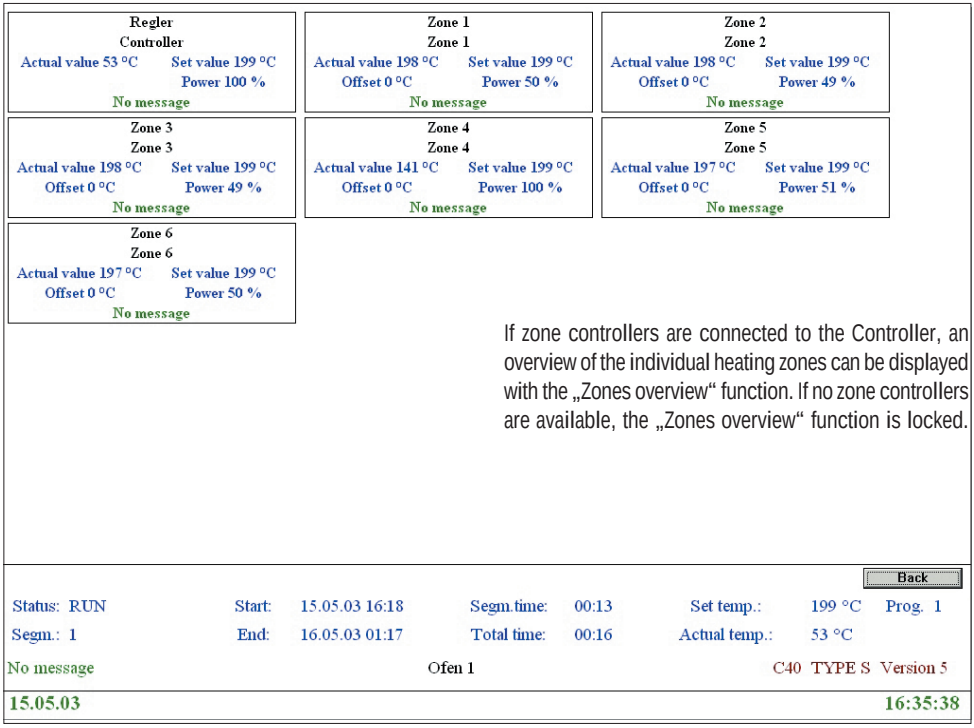
Curves

More information on the „Curves“ function can be found on page 12, „Program graphics“ function.

Print

With the „Print“ function the print window is opened, see „Print window“, page 23.

„Zones overview“ function

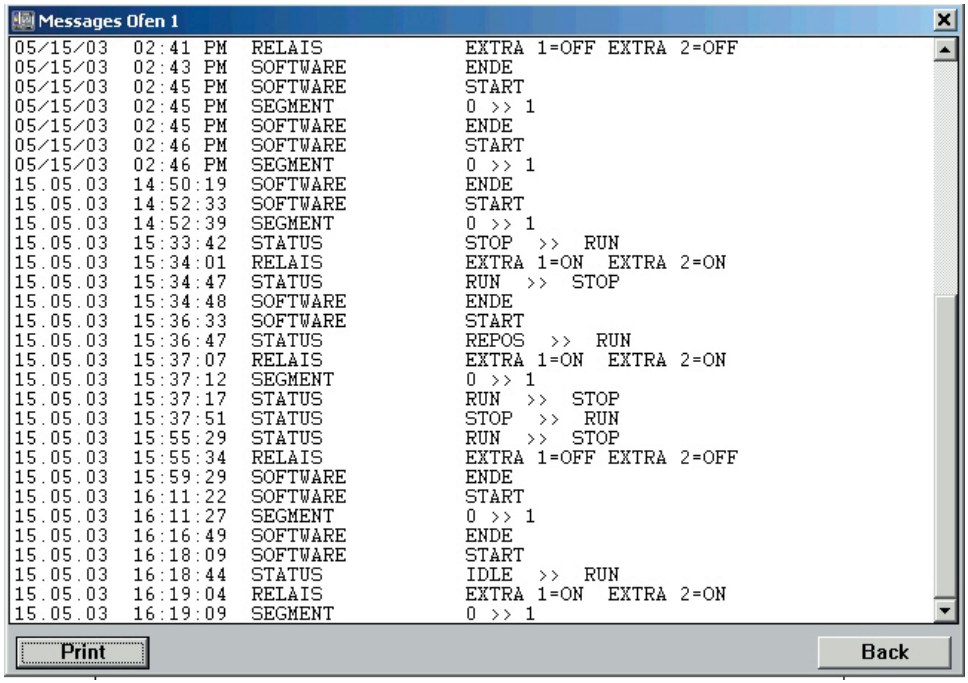


If zone controllers are connected to the Controller, an overview of the individual heating zones can be displayed with the „Zones overview“ function. If no zone controllers are available, the „Zones overview“ function is locked.

The first zone (upper left) is always the Controller. The following possible zones 1 to 10 then follow one after the other. In this example six zone controllers were connected.

In addition to the actual temperature, the value of the set offset (LSP = Local-Set-Point) is displayed on the zone controller.

„Messages“ function



In this window the last 1000 status messages and status changes of the respective Controller are displayed. The following information is displayed: dates, time stamps, status (Controller, software) as well as messages from the Controller.

The messages can be printed with the „Print“ function. Areas or individual entries can be selected and printed at the same time.
Areas are printed as follows:

- select the first entry
- hold down the Shift key
- select the last entry
- release the Shift key

Several entries are now marked blue. If you press the Ctrl key during this process, only the first and last entry are selected.

If no entries are selected, the complete list is printed with the „Print“ function.

„Back“ function

The ‘Bck’ button always causes the previous screen to be displayed.

„Password“ function

max. 31 digits

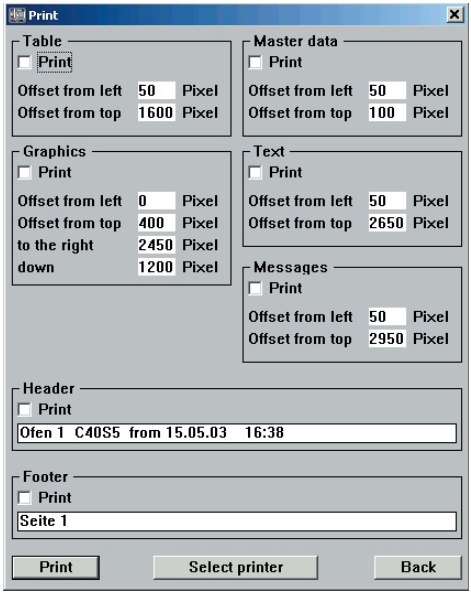
The „Password“ function is for locking the main menu to prevent unauthorized program use. After installation, the program first starts without requesting the password. If a password is to be requested upon program start, this can be done via program setup, see „Configuring the software“.

If a password has been set, the main menu is locked after entry of the correct password. Only the „Back“ and „Password“ functions are possible in that case.
If the password is re-entered, all main menu functions are unlocked again.

„Terminate program“ function

The „Terminate program“ button is for closing the program.

Print window

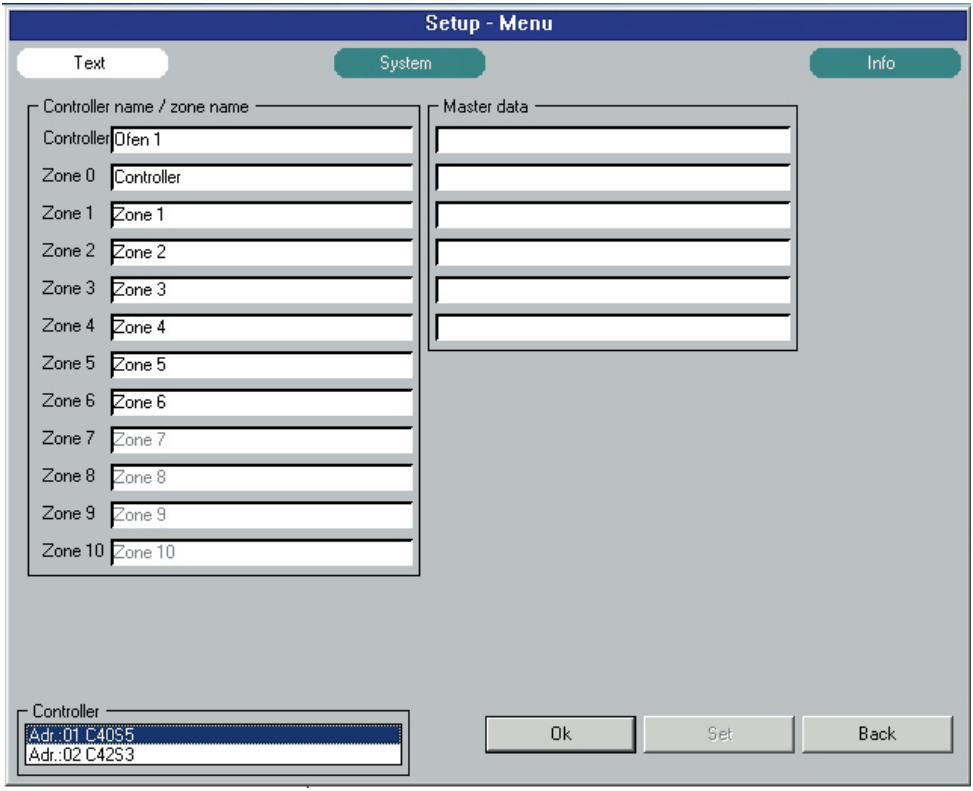


In this window it is possible to decide which data is to be printed before te actual printing process. This is carried out by ticking the respective fields. Depending from which screen this function was requested, various data could be locked.
The Windows default printer is used automatically, unless a specific printer is set with the „Select printer“ function.

The printer setting is not saved and is lost when exiting the program. For this reason, it is recommended to use the Windows default printer.

The values in the „Offset from...“ fields indicate the upper left corner and the area of the data to be printed. This makes formatting of the print possible, so that a pre-printed letterhead can be taken into account if necessary.
The possible adjustable values depend on the printer used and must be adjusted if required.

Configuring the software



For configuring the software, the „Password“ function must be selected in the main menu. The Setup menu is then opened by entering „Setup“.

The Controllers are displayed in the lower left corner of the window. After selecting the desired Controller, the respective texts are displayed.
All information or changes carried out in this window then refer to the selected Controller and are saved with „Accept“.

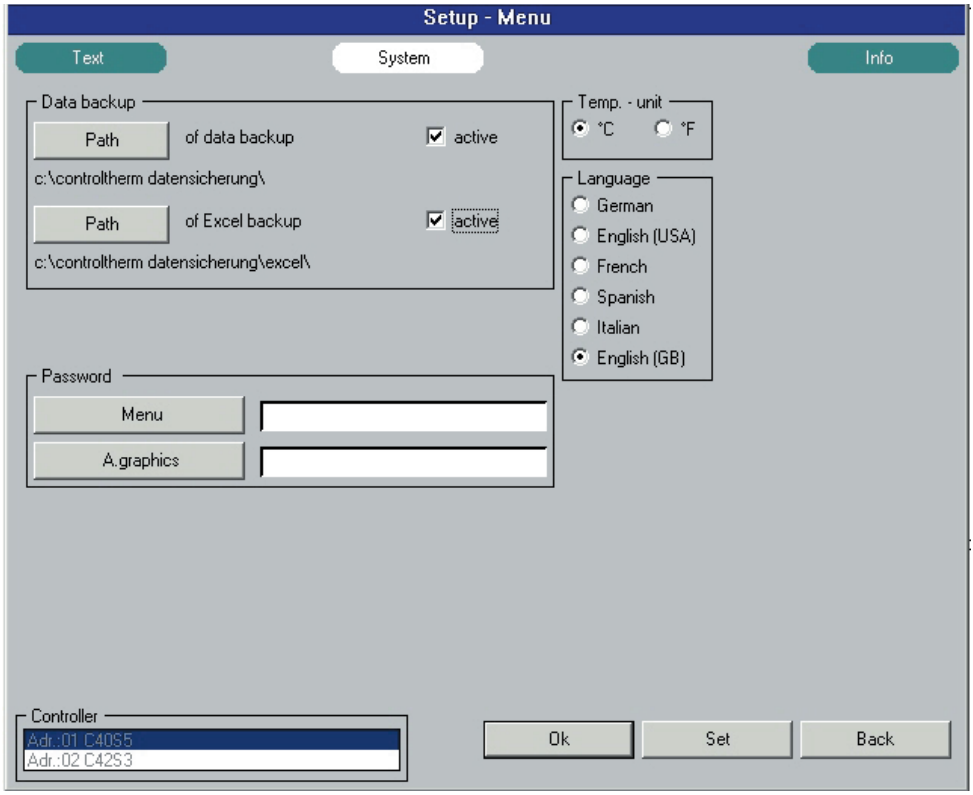
Controller/zone name

In the „Controlle“ field, the respective furnace being displayed in the different program screens can be named.

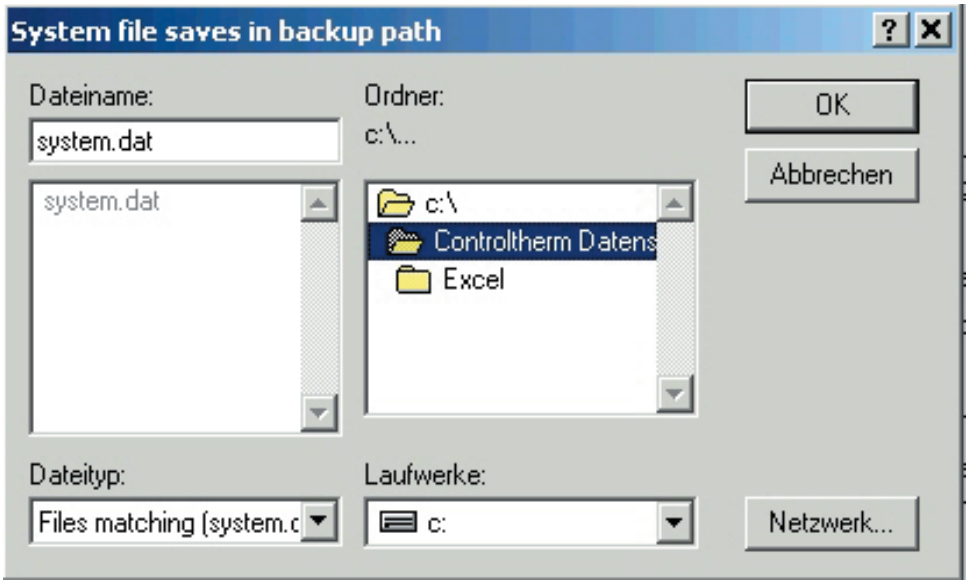
In the „Zone 0..10“ fields the respective heating zones can be named. This is then also displayed in the „Zones overview“ and the graphics screens. The Controller is always zone 0.

In the „Master data“ fields the company name and address can be entered. This information is also displayed in the text fields and printed. The master data is always allocated to each heat treatment.

System



Now, general system data can be preset in this window.



Path
With the **„Path“** function the paths can be set in which the respective data is to be additionally stored.

Path of datastorage
Path in which the recorded data is stored.

Path of Excel storage

Path in which the export function data is stored.

The desired path can now be selected here.

Password menu
With the „Password menu“ function the password is set for locking the main menu.
If the function is selected, the password (if available) is displayed in the field below. It can now be changed. If no password has been entered before, the field remains empty.
The entry must be confirmed with „OK“. Then the password is active. This means that upon program start, the main menu is locked and can only be unlocked again with the password. Setup can also no longer be opened then.

Remember your password! Without the right password you cannot use the program any longer!

If you have forgotten your password, contact the Nabertherm Service.

If an entered password is no longer required, it can be deleted. For this purpose, the „Password“ function is to be selected and the password subsequently displayed is to be deleted. If the entry is confirmed with „OK“, the password is deleted.

Password A. graphics
With the „Password A. graphics“ function the password for changing the text in the old graphics can be adjusted. If an entered password is no longer required, it can be deleted. For this purpose, the „Password A. graphics“ function is to be selected to delete the displayed password. If the entry is confirmed with „OK“, the password is deleted.

Temperature unit
Use the function „temperature unit“ to set the temperature to °C or °F.

Important: At the Controllers B130, B150, B170, C250, C280, and P320 the temperature must be set to the same unit (°C / °F) when the Controller is configured so that a correct display of the temperature is guaranteed (see Controller instructions).

Language
With the „Language“ function the program language can be set.

Troubleshooting

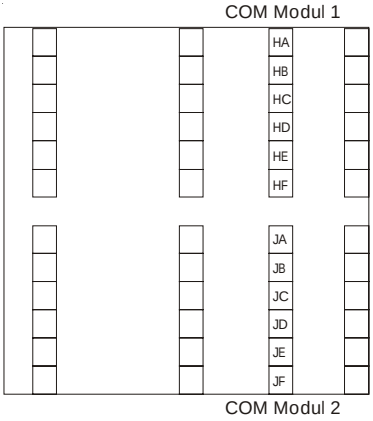
Error display	Possible cause	Measures
„No converter“	The converter has no voltage.	Check whether mains plugs is plugged in and socket supplies voltage.
	The connection to the computer is faulty.	Check whether the connecting cable from computer to converter is plugged in properly.
„No COM port“	The COM port to which the converter is connected is seized by another application.	Close the application that seizes the COM port or use another COM port.
No Controller can be found.	The connection to the Controller is faulty.	Check whether the connecting cables to the Controllers are connected properly or whether the terminator is connected to the end of the cable.
	The address set on the Controller is faulty or missing.	Check the Controller address (see Controller instruction manual). The first Controller must always have the address 1.
One Controller cannot be found.	The connection between converter and this Controller is interrupted.	Check the connection and plug-in connectors.
	The set Controller address is identical to that of a different Controller or no address was entered.	Check the Controller addresses (see Controller instruction manual). The first Controller must always have the address 1.
	The Controller has no voltage supply.	Check whether the Controller is supplied with voltage.
When starting the software, the display shows a wrong Controller to be connected.	The set Controller address is identical to that of a different Controller.	Check the individual Controller addresses (see controller instruction manual). The first Controller must always have the address 1.
	A Controller was exchanged with one having a more recent version number.	Inform Nabertherm Service.
The first part of the graphics is missing in the current charge.	The program was started while the Controller was in operation.	The first part of baking is in the last but one charge, provided the software was operating at the time and was closed properly.
There are gaps in the current graphics.	The program was closed in-between and restarted, i.e. by the operator or due to power failure.	No measures required. The missing data cannot be restored.
A graphics display is faulty.	The Controller was operated directly (on the Controller). Between stop and start a period shorter than 4 sec. x number Controllers was waited.	Between stop and start on the Controller, a period of at least 4 sec. x number of Controllers must be waited so that the computer software can register this change.

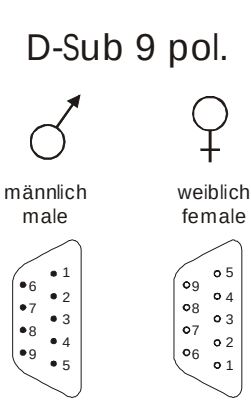
Operation of Eurotherm 2404 and 2408 Controllers with MV software

To connect the Eurotherm Controller the Controller must be provided with an RS 422 interface. If the interface is not installed it can be retrofitted as module.
If the furnace housing is not equipped with an interface connection, proceed as follows:

Connection when retrofitting an interface plug:

HA	---
HB	Pin 8
HC	Pin 9
HD	Pin 5
HE	Pin 7
HF	Pin 6





Setting the interface address

Opening the „Full“ level

- press 5 times ▤ to select „ACCS“
- set „Code 1“ by actuating ↻ and ▼ ▲, and wait for a short moment – „PASS“ is displayed
- confirm with ↻, „Goto OPEr“ appears on the screen
- input „FULL“ by pressing ▼ ▲, wait for a short moment, actuate ↻ – „ACCS List“ is displayed
- actuate ▤ (11x) to select „CMS“, open menu with ↻ and input address with ▼ ▲.

Exiting the „Full“ level (must be noted by all means!)

- press 3 times ▤ to select „ACCS“
- actuate ↻ to display „Code PASS“
- actuate ↻, „Goto FuLL“ appears on the screen
- set „OPER“ with ▼ ▲
- press ▤ twice to return to the temperature display.

Setting the interface protocol

The interface protocol must be set at the configuration level.

At the configuration level important settings are carried out that affect the process; improper changes may result in malfunctions.

For safety reasons the Controller output is deactivated in the configuration mode. Terminate active processes, if necessary, before starting to configure the Controller.

If you should lose bearings during setup, please continue immediately with „Exiting the configuration level".

Opening the configuration level

- press ▤ to select „ACCS"
- set „Code 1" by actuating ↻ and ▼ ▲, and wait for a short moment – „PASS" is displayed
- input „CONF" by pressing ← and ▼ ▲, wait for a short moment, actuate ↻ – „CONF 0" appears
- input „1106" by pressing ▼ ▲, wait for a short moment – „CONF PASS" is displayed

In general the interface is plugged in in module 1 „HA". If this module is not available „id no" is displayed. Select module 2 with „JA".

- select „HA Conf" with ▤ - hardware configuration of interface module 1
- or actuate ▤ to select „JA Conf" - hardware configuration of interface module 2
- open menu by actuating ↻ - „id CmS" is displayed
- select „Func ??" with ↻
- set „EL.Bi" by pressing ▼ ▲ (if not already done)
- scroll with ↻ - „bAud xx" is displayed
- set „9600" by actuating ▼ ▲ (if not already done)
- scroll with ↻ - „dELY xx" is displayed
- set „no" by actuating ▼ ▲ (if not already done)

Exiting the configuration level (must be noted by all means!)

- press ▤ to select „Exit"
- set „Yes" with ▼ ▲ - and wait

The Controller is restarted and the interface is ready to operate.

Special conditions during operation of Eurotherm Controllers

- The segment times are transferred in minutes to achieve a resolution of minimum one minute. The segment time in the Eurotherm Controller is limited by Eurotherm to maximum 960 minutes (16h). If longer segment times are required, you have to program e.g. several holding time segments one after the other.
  Example: holding time 30 h
  –> programming of holding time segment 1 = 16h
  + holding time segment 2 = 14h
- If the Eurotherm Controllers have more than one program memory location the program of a heating profile is always transferred on program 1.
- Start/Hold/End commands also affect only program 1.
- Further programs – if they exist - do not respond to the software and can be used independently of the software.

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