

## Process Control and Documentation



B400/C440/P470



B410/C450/P480



H1700 with colored, tabular depiction



H3700 with colored graphic presentation

Nabertherm has many years of experience in the design and construction of both standard and custom control alternatives. All controls are remarkable for their ease of use and even in the basic version have a wide variety of functions.

### Standard Controllers

Our extensive line of standard controllers satisfies most customer requirements. D60Based on the specific furnace model, the controller regulates the furnace temperature reliably and is equipped with an integrated USB-interface for documentation of process data (NTLog/NTGraph).

The standard controllers are developed and fabricated within the Nabertherm group. When developing controllers, our focus is on ease of use. The user can choose between 17 languages. From a technical standpoint, these devices are custom-fit for each furnace model or the associated application. From the simple controller with an adjustable temperature to the control unit with freely configurable control parameters, stored programs and PID microprocessor control with self-diagnosis system, we have a solution to meet your requirements.

### HiProSystems Control and Documentation

This professional process control with PLC controls for single and multi-zone furnaces is based on Siemens hardware and can be adapted and upgraded extensively. HiProSystems control is used when more than two process-dependent functions, such as exhaust air flaps, cooling fans, automatic movements, etc., have to be handled during a cycle, when furnaces with more than one zone have to be controlled, when special documentation of each batch is required and when remote service is required. It is flexible and is easily tailored to your process or documentation needs.

### Alternative User Interfaces for HiProSystems

#### Process control H500/H700

This basic panel accommodates most basic needs and is very easy to use. Firing cycle data and the extra functions activated are clearly displayed in a table. Messages appear as text. Data can be stored on a USB stick using the „NTLog Comfort“ option (not available for all H700).

#### Process control H1700

Customized versions can be realized in addition to the scope of services of the H500/H700

#### Process control H3700

Display of functions on a large 12" display. Display of basic data as online trend or as a graphical system overview. Scope as H1700

### Control, Visualisation and Documentation with Nabertherm Control Center NCC

Upgrading the HiProSystems-Control individually into a PC-based NCC provides for additional interfaces, operating documentation, and service benefits in particular for controlling furnace groups including charge beyond the furnace itself (quenching tank, cooling station etc.):

- Recommended for heat treatment processes with extensive requirements in respect to documentation e.g. for metals, technical ceramics or in the medicine field
- Software extension can be used also in accordance with the AMS 2750 E (NADCAP)
- Documentation according to the requirements of Food and Drug Administration (FDA), Part 11, EGV 1642/03 possible
- Charge data can be read in via barcodes
- Interface for connection to overriding systems
- Connection to mobile phone or stationary network for malfunction message transmission via SMS
- Control from various locations over the network
- Measurement range calibration up to 18 temperatures per measuring point for use at different temperatures. For norm-relevant applications a multilevel calibration is possible.

## Assignment of Standard Controllers to Furnace Families

	NR(A) 17/06 - NR(A) 1000/11	NR, NRA .. H <sub>2</sub>	NR, NRA .. IDB	NR, NRA 40/02 CDB	NR, NRA 150/02 CDB	SR(A) 17/06 - SR(A) 1500/11	VHT	VHT .. H <sub>2</sub>	LBVHT	SVHT	D 20/S - D 320/S	TS, TSB	QS	N 7/H - N 87/H	N 81(/..) - N 641(/..)	LH 15/12 - LF 120/14	NW	NA 15/65	NA 30/45 - N 500/85 HA	NA-I, NA-SI	SAL 30/45 - SAL 500/85	Q	Q .. D
Catalog page	16	18	18	21	21	22	26	30	31	32	36	39	41	43	43	54	58	61	61	65	66	80	80
Controller																							
C6/3208											●				○				○		○		○
3216																							
3504	○					○						●											○
B400													●	●									
B410																		●					
C440													○	○	○	○	○		○	○	○	○	○
C450																							
P470	●					●	● <sup>3</sup>		● <sup>3</sup>	● <sup>3</sup>				○	○	○	○	○	○	○	○	○	○
P480														○	○	○	○	○	○	○	○	○	○
H500/PLC																							
H700/PLC							● <sup>3</sup>		● <sup>3</sup>	● <sup>3</sup>													
H1700/PLC						○					○	○											
H3700/PLC	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
NCC	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

## Functionality of the Standard Controllers

	R7	C6	3216	3208	B400/ B410	C440/ C450	P470/ P480	3504	H500	H700	H1700	H3700	NCC
Number of programs	1	1	1		5	10	50	25	20	1/10 <sup>3</sup>	10	10	50
Segments	1	2	8		4	20	40	500 <sup>3</sup>	20	20	20	20	20
Extra functions (e.g. fan or autom. flaps) maximum					2	2	2-6	2-8 <sup>3</sup>	3 <sup>3</sup>	○ <sup>3</sup>	6/2 <sup>3</sup>	8/2 <sup>3</sup>	16/4 <sup>3</sup>
Maximum number of control zones	1	1	1	1	1	1	3	2 <sup>1,2</sup>	1-3 <sup>3</sup>	○ <sup>3</sup>	8	8	8
Drive of manual zone regulation					●	●	●		○	○	○	○	○
Charge control/bath control							●	○	○	○	○	○	○
Auto tune			●	●	●	●	●	●	○	○	○	○	○
Real-time clock					●	●	●		●	●	●	●	●
Plain, blue-white LC-display					●	●	●						
Graphic color display									4" 7"	7"	7"	12"	19"
Status messages in clear text				●	●	●	●	●	●	●	●	●	●
Data entry via touchpanel									●	●	●	●	●
Data input via jog dial and buttons					●	●	●	●	●	●	●	●	●
Entering program names (i.e. "Sintering")					●	●	●	●	●	●	●	●	●
Keypad lock					●	●	●	●	●	●	●	●	●
User administration					●	●	●	●	○	○	○	○	●
Skip-button for segment jump					●	●	●	●	●	●	●	●	●
Program entry in steps of 1 °C or 1 min.	●		●	●	●	●	●	●	●	●	●	●	●
Start time configurable (e.g. to use night power rates)					●	●	●	●	●	●	●	●	●
Switch-over °C/F	○		○	○	●	●	●	○	●	● <sup>3</sup>	● <sup>3</sup>	● <sup>3</sup>	● <sup>3</sup>
kWh meter					●	●	●	○	●	●	●	●	●
Operating hour counter					●	●	●	○	●	●	●	●	●
Set point output				○	●	●	●	○	○	○	○	○	○
NTLog Comfort for HiProSystems: recording of process data on an external storage medium					●	●	●		○	○	○	○	
NTLog Basic for Nabertherm controller: recording of process data with USB-flash drive					○	○	○						
Interface for VCD software					●	●	●		●	●	●	●	●
Malfunction memory					●	●	●		●	●	●	●	●
Number of selectable languages					17	17	17						

<sup>1</sup> Not for melt bath control

<sup>2</sup> Control of additional separate slave regulators possible

<sup>3</sup> Depending on the design

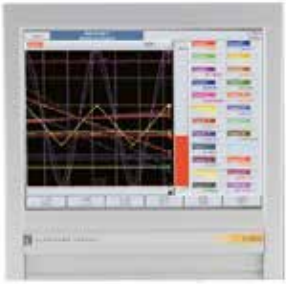
● Standard  
○ Option

## Mains Voltages for Nabertherm Furnaces

1-phase: all furnaces are available for mains voltages from 110 V - 240 V at 50 or 60 Hz.

3-phase: all furnaces are available for mains voltages from 200 V - 240 V or 380 V - 480 V, at 50 or 60 Hz.

The connecting rates in the catalog refer to the standard furnace with 400 V (3/N/PE) respectively 230 V (1/N/PE).



Temperature recorder

### Temperature Recorder

Besides the documentation via the software which is connected to the controls, Nabertherm offers different temperature recorders which can be used with respect to the application.

	Model 6100e	Model 6100a	Model 6180a
Data input using touch panel	X	X	X
Size of colour display in inch	5.5	5.5	12.1
Number of thermocouple inputs	3	18	48
Data read-out via USB-stick	X	X	X
Input of charge data		X	X
Evaluation software included	X	X	X
Applicable for TUS-measurements acc. to AMS 2750 E			X



### Data storing of Nabertherm controllers with NTLog Basic

NTLog Basic allows for recording of process data of the connected Nabertherm controller (B400, B410, C440, C450, P470, P480) on a USB stick.

The process documentation with NTLog Basic requires no additional thermocouples or sensors. Only data recorded which are available in the controller.

The data stored on the USB stick (up to 80,000 data records, format CSV) can afterwards be evaluated on the PC either via NTGraph or a spreadsheet software used by the customer (e.g. MS Excel).

For protection against accidental data manipulation the generated data records contain checksums.



### Data storing of HiProSystems with NTLog Comfort

The extension module NTLog Comfort offers the same functionality of NTLog Basic module. Process data from a HiProSystems control are read out and stored in real time on a USB stick (not available for all H700 systems). The extension module NTLog Comfort can also be connected using an Ethernet connection to a computer in the same local network so that data can be written directly onto this computer.



NTLog Comfort for data recording of a Siemens PLC

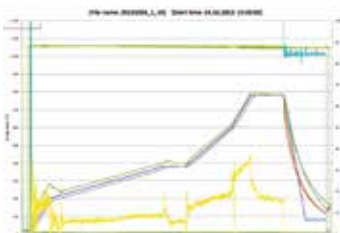
### Software NTEdit for Entering Programs on the PC

Entering programs is simplified considerably by using the software NTEdit (Freeware). The program can be entered on the PC and then be imported into the controller with a USB stick. The display is tabular or graphical. The program import in NTEdit is also possible. With NTEdit Nabertherm provides a user-friendly free tool. A prerequisite for the use is the client installation of MS-Excel for Windows (2007/2010/2013). NTEdit is available in German and English.



### Visualization with NTGraph

The process data from NTLog can be visualized either using the customer's own spreadsheet program (e.g. MS-Excel) or NTGraph (Freeware). With NTGraph Nabertherm provides for an additional user-friendly tool free of charge for the visualization of the data generated by NTLog. Prerequisite for its use is the installation of the program MS-Excel for Windows (version 2003/2010/2013). After data import presentation as diagram, table or report can be chosen. The design (color, scaling, reference labels) can be adapted by using prepared sets.



NTGraph, a freeware for the easy-to-read analysis of recorded data using MS Excel

NTGraph is available in seven languages (DE/EN/FR/SP/IT/CH/RU). In addition, selected texts can be generated in other languages.

**VCD-Software for Visualization, Control and Documentation**

Documentation and reproducibility are more and more important for quality assurance. The powerful VCD software represents an optimal solution for single multi furnace systems as well as charge documentation on the basis of Nabertherm controllers.

The VCD software is used to record process data from the controllers B400/B410, C440/C450 and P470/P480. Up to 400 different heat treatment programs can be stored. The controllers are started and stopped via the software. The process is documented and archived accordingly. The data display can be carried-out in a diagram or as data table. Even a transfer of process data to MS Excel (.csv format \*) or the generation of reports in PDF format is possible.

**Features**

- Available for controllers B400/B410/C440/C450/P470/P480
- Suitable for operating systems Microsoft Windows 7 or 8/8.1 or 10 (32/64 Bit)
- Simple installation
- Setting, Archiving and print of programs and graphics
- Operation of controllers via PC
- Archiving of process curves from up to 16 furnaces (also multi-zone controlled)
- Redundant saving of archives on a server drive
- Higher security level due to binary data storage
- Free input of charge date with comfortable search function
- Possibility to evaluate data, files can be converted to Excel
- Generation of a PDF-report
- 17 languages selectable

**Extension package 1 for display of an additional temperature measuring point, independant of the furnace controls**

- Connection of an independant thermocouple, type S, N or K with temperature display on controller C6D, e. g. for documentation of charge temperature
- Conversion and transmission of measured values to the VCD software
- For data evaluation, please see VCD-software features
- Display of measured temperature directly on the extension package

**Extension package 2 for the connection of up to three, six or nine measuring point, independant of the furnace controls**

- Connection of three thermocouples, tpye K, S, N or B to the included connecting box
- Possible extension of up to two or three connecting boxes with up to nine measuring points
- Conversion and transmission of measured values to the VCD software
- Data evaluation, see VCD features



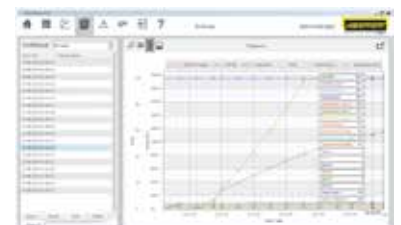
Example lay-out with 3 furnaces



VCD Software for Control, Visualisation and Documentation



Graphic display of main overview (version with 4 furnaces)



Graphic display of process curve