

High-Temperature Ovens, Forced Convection Chamber Furnaces up to 850 °C

These chamber furnaces with air circulation are characterized by their extremely high temperature uniformity. Hence, they are especially suitable for processes such as annealing, crystalizing, preheating, curing, but also for numerous processes in tool making. Due to the modular concept, the forced convection furnaces can be adjusted to the process requirements by adding suitable equipment.



Forced convection chamber furnace NAT 15/65 as table-top model

Standard Equipment

- Tmax 450 °C, 650 °C, or 850 °C
- Horizontal air circulation with optimum distribution through stainless steel baffles
- Swing door hinged on the right
- Temperature uniformity up to ± 4 °C according to DIN 17052-1 (NAT 15/65 and NAT 30/85 up to ± 5 °C) in the empty work space see page 71
- One frame sheet and rails for two additional trays included in the scope of delivery (NAT 15/65 and NAT 30/85 without frame sheet)
- Base frame included in the delivery, NAT 15/65 and NAT 30/85 designed as table-top model
- Controller B400/B410 (5 programs with each 4 segments), alternative controllers see page 75



Forced convection chamber furnace NA 30/65 with manual lift door and protective gas box

Additional Equipment (not for Model NAT 15/65 and NAT 30/85)

- Optimization of the temperature uniformity up to ± 3 °C according to DIN 17052-1 in the empty work space see page 71
- Air inlet and exhaust air flaps when used for drying
- Controlled fan assisted cooling
- Manual lift door (up to model NA 120/..)
- Pneumatic lift door
- Air circulation with speed control, recommendable for processes with light or sensitive charge
- Additional frame sheet
- Gas supply boxes different charging methods
- Feed and charging aids
- Charge control with documentation of the charge thermocouple



Forced convection chamber furnace NA 120/45



Forced convection chamber furnace NA 250/85

Model	Tmax in °C	Inner dimensions in mm			Volume in l	Outer dimensions ³ in mm			Connected load in kW	Electrical connection*	Weight in kg
		w	d	h		W	D	H			
NA 30/45	450	290	420	260	30	1040	1290	1385	3.6	1-phase	285
NA 60/45	450	350	500	350	60	1100	1370	1475	6.6	3-phase	350
NA 120/45	450	450	600	450	120	1250	1550	1550	9.8	3-phase	460
NA 250/45	450	600	750	600	250	1350	1650	1725	12.8	3-phase	590
NA 500/45	450	750	1000	750	500	1550	1900	1820	18.8	3-phase	750
NA 675/45	450	750	1200	750	675	1550	2100	1820	25.0	3-phase	900
NAT 15/65 ¹	650	295	340	170	15	470	790	460	3.3	1-phase	60
NA 30/65	650	290	420	260	30	870	1290	1385	7.0	3-phase ²	285
NA 60/65	650	350	500	350	60	910	1390	1475	9.0	3-phase	350
NA 120/65	650	450	600	450	120	990	1470	1550	13.0	3-phase	460
NA 250/65	650	600	750	600	250	1170	1650	1680	21.0	3-phase	590
NA 500/65	650	750	1000	750	500	1290	1890	1825	28.0	3-phase	750
NA 675/65	650	750	1200	750	675	1290	2100	1825	28.0	3-phase	900
NAT 30/85 ¹	850	320	320	300	30	800	800	590	6.0	1-phase	90
NA 60/85	850	350	500	350	60	790	1330	1440	11.0	3-phase	315
NA 120/85	850	450	600	450	120	890	1420	1540	14.0	3-phase	390
NA 250/85	850	600	750	600	250	1120	1690	1810	23.0	3-phase	840
NA 500/85	850	750	1000	750	500	1270	1940	1960	34.0	3-phase	1150
NA 675/85	850	750	1200	750	675	1270	2190	1960	34.0	3-phase	1300

¹Table-top model

²Heating only between two phases

³External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.

*Please see page 75 for more information about supply voltage



Port for thermocouple



Tray



Roller conveyor in furnace chamber

Process Control and Documentation

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



B400/C440/P470



B410/C450/P480



H1700 with colored, tabular depiction



H3700 with colored graphic presentation

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 23 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.

Optionally available: Communication module with Ethernet connection for Series 400 controllers with the following functions: Connection to higher-level systems with setpoint setting and display via a web server

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 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. Display of basic data as online trend.

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

Which controller for which furnaces	TR	TR .. LS	KTR	NAT 15/65	NA 30/45 - NA 675/85	L 1/12	L 3 - LT 40	LE	L(T) 9/11/SKM	LV(T)	L ../11 BO	L(T) 9../SW	LH, LF	N ../H	LHTC(T)	LHT ../(D)	LHT ../17 LB Speed, LHT 16/17 LB	LHT 04../SW	HT, HFL	HTC	RD	R	RSH/RSV	RSRB, RSRC	RT	RHTC	RHTH/RHTV	N .. CUP	GR	LS	K	KC		
Catalog page	6	6	8	10	10	14	14,17,18	16	19	20	22	23	28	30	34	35	36	37	38,41	39	44	45	46	48	52	53	54	66	68	69	70	70		
Controller																																		
R7	●					●		●													●										●			
3216						○															○													
3504	○		○		○																	○		○		○	○					○		
3508																																	●	
B400			●		●								●	●										●				●						
B410	○			●			●		●	●		●										●	●		●	●								
C440			○		○								○	○										○		○								
C450	○	●		○			○		○	○	●	○			●								○	○	○	○								
P470			○		○								○	○		●	●	●	● ³	● ³				○		○	●				● ³			
P480	○			○		○		○	○	○	○	○			○							○	○	○	○	○								
H500/PLC					○								○																				○	
H700/PLC																																		
H1700/PLC			○		○																													●
H3700/PLC			○		○																													○
NCC			○		○																													

Functions of the standard controllers	R7	3216	3208	B400/ B410	C440/ C450	P470/ P480	3504	H500	H700	H1700	H3700	NCC
Number of programs	1	1		5	10	50	25	20	1/10 ³	20	20	100
Segments	1	8		4	20	40	500 ³	20	20	20	20	20
Extra functions (e.g. fan or autom. flaps) maximum				2	2	2-6	2-8 ³	3 ³	○ ³	6/2 ³	8/2 ³	16/4 ³
Maximum number of control zones	1	1	1	1	1	3	2 ^{1,2}	1-3 ³	○ ³	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"	22"
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 levels				●	●	●		○	○	○	○	●
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	○	○	○	●	●	●	○	●	● ³	● ³	● ³	● ³
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				23	23	23						

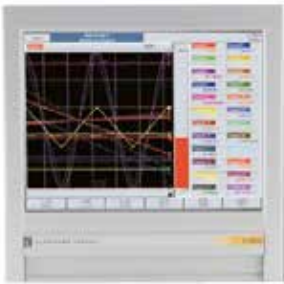
¹ Not for melt bath control
² Control of additional separate slave regulators possible
³ Depending on the design
 ● Standard
 ○ Option

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).



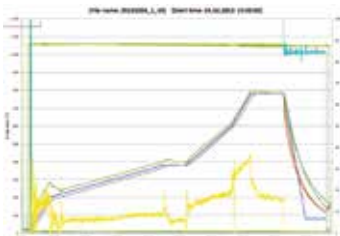
Temperature recorder



NTLog Comfort



NTLog Comfort for data recording of a Siemens PLC



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



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.

Visualization with NTGraph for Single-Zone Controlled Furnaces

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 (from version 2003). 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 is available in seven languages (DE/EN/FR/ES/IT/CN/RU). In addition, selected texts can be generated in other languages.

Software NTEdit for Entering Programs on the PC

By using the software NTEdit (Freeware) the input of the programs becomes clearer and thus easier. The program can be entered on customers PC and then be imported into the controller (B400, B410, C440, C450, P470, P480) with a USB stick. The display of the set curve 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 (from version 2007). NTEdit is available in eight languages (DE/EN/FR/ES/IT/CN/RU/PT).

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 at a PC. 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 system Microsoft Windows 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



Example lay-out with 3 furnaces



VCD Software for Control, Visualisation and Documentation

Extension Package 1 for Display of an Additional Temperature Measuring Point, Independent of the Furnace Controls

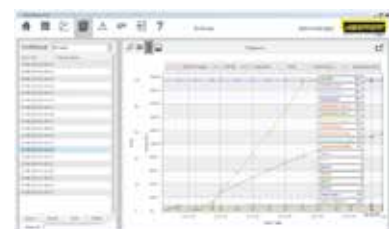
- Connection of an independent thermocouple, type S, N or K with temperature display on controller C6D, e.g. for documentation of charge temperature
- Conversion and transmission of measured values to the VCD software
- For data evaluation, please see VCD-software features
- Display of measured temperature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

Extension Package 2 for the Connection of up to Three, Six or Nine Measuring Point, Independent of the Furnace Controls

- Connection of three thermocouples, type 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



Graphic display of main overview (version with 4 furnaces)



Graphic display of process curve