

## Production Furnaces for Debinding and Presintering or for Sintering



Chamber furnace N 300/14 DB200 for debinding and pre-sintering of zirconia blanks in the production



Hot-wall retort furnace NRA 150/09 for debinding and pre-sintering of cobalt-chromium blanks under inert and reactive gas atmosphere

In addition to the furnaces shown in the laboratory scale, Nabertherm also offers numerous solutions for production. For the production of zirconia blanks there are e.g. production plants that initially provide for the debinding followed by the presintering of the product. In these plants, highest precision with regard to temperature uniformity and reproducibility is of utmost importance in order to satisfy the requirements on the blank with respect to shrinkage and compliance with the later sintering temperature.

For the full sintering of milled crowns and bridges in production scale, Nabertherm offers high-temperature furnaces having a considerably larger capacity than the laboratory furnaces shown here. Nabertherm also offers retort furnaces for the production of blanks made of cobalt-chromium under inert and reactive gases. In this connection, please ask for our special "Advanced Materials" catalog.



Production furnace HT 160/17 DB200 for sintering zirconia

# Process Control and Documentation

## Controller

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. Based 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.



B400



C440



P470



B410/C450/P480

### Allocation of the Standard Controller to the Furnace Groups

	LHT ... LB Speed	LHT 01/17 D	LHT 03/17 D	LHTCT .. /16	LT 02/13 CR	LH .. /12	N 7/H - N 41/H	L 1/12 - LT 15/12	LE 1/11 - LE 14/11	N 7/H - N 17/HR
Catalog page	4	6	6	8	10	12	13	16	18	19
<b>Controller</b>										
R7									●	
3216								○		
B400							●			●
C440							○			○
P470	●		●			●				
B410								●		
C450				●	●			○		
P480		●								

### Functionality of the Standard Controllers

	R7	3216	B400/ B410	C440/ C450	P470/ P480
Number of programs	1	1	5	10	50
Segments	1	8	4	20	40
Extra functions (e.g. fan or autom. flaps) maximum			2	2	2-6
Maximum number of control zones	1	1	1	1	3
Drive of manual zone regulation			●	●	●
Auto tune		●	●	●	●
Real-time clock			●	●	●
Status messages in clear text			●	●	●
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	○	○	●	●	●
kWh meter			●	●	●
Operating hour counter			●	●	●
Set point output			●	●	●
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

- Standard
- Option

### Supply Voltages for Nabertherm Furnaces

1-phase: All furnaces are available for 110 V - 240 V, 50 or 60 Hz.

3-phase: All furnaces are available for 200 V - 240 V and/or 380 V - 480 V, 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).

## Processdocumentation

### Data Storing of Nabertherm Controllers with NTLog Basic

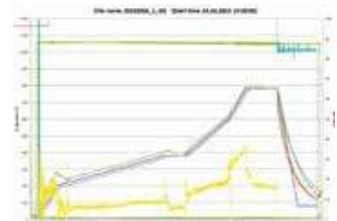
The Controller B400/B410, C440/C450 and P470/P480 are equipped with a USB interface as standard, which allows data recording via the NTLog Basic. The process data is recorded with a client-side USB-stick which is inserted during the process.

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 data manipulation the generated data records contain checksums.



### Visualization with NTGraph for Single-Furnace Control

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



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

### 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 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 (2007/2010/2013). NTEdit is available in eight languages (DE/EN/FR/SP/IT/CH/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 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 data with comfortable search function
- Possibility to evaluate data, files can be converted to Excel
- Generation of a PDF-report
- 17 languages selectable



VCD Software for Control, Visualisation and Documentation

## The whole World of Nabertherm: [www.nabertherm.com](http://www.nabertherm.com)

Please visit our website

[www.nabertherm.com](http://www.nabertherm.com) and find out all you want to know about us - and especially about our products.

Besides news and our current calendar of trade fairs, there is also the opportunity to get in touch directly with your local sales office or nearest dealer worldwide.

### Professional Solutions for:

- Arts & Crafts
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