

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. 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. 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 | NRA 17/06 - NRA 1000/11 | NR, NRA .. H ₂ | NR, NRA .. IDB | SRA | (S/LB) VHT | (S/LB) SVHT ..H ₂ | NRA 40/02 CDB | NRA 150/02 CDB | NA 30/45 - N 675/85 HA | N ..26 HA - N ..85 HA | KTR | TR | TR .. LS | SAL | SAH | W .. A | W | WB | NB | N 7/H - N 87 ..H ../HR | N 81(..) - N 641(..) | N 731 - N 2401 | NB .. CL | N(B) .. BO | H | TS | QS | DH | D .. S |
|--|-------------------------|---------------------------|----------------|-----|----------------|------------------------------|---------------|----------------|------------------------|-----------------------|-----|----|----------|-----|-----|--------|----|----------------|----|------------------------|----------------------|----------------|----------|------------|----|----|----|----|--------|
| Catalog page | 12 | 14 | 14 | 15 | 16-21 | 20 | 22 | 22 | 24 | 26 | 32 | 36 | 36 | 39 | 40 | 42 | 44 | 47 | 48 | 49 | 49 | 50 | 52 | 53 | 54 | 60 | 61 | 62 | 68 |
| Controller | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R7 | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | |
| B400 | | | | | | | | | ● | ● | ● | | | ● | ○ | ● | | | ● | ● | ● | ● | | | | | ● | | |
| B410 | | | | | | | | | | | | ○ | | | | | | | | | | | | | | | | | |
| C440 | | | | | | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | | ○ | ○ | ○ | ○ | | | | | ○ | | |
| C450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P470 | ● | | | ● | ● ³ | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ● | | ○ | ○ | ○ | ○ | | | ● | | | | |
| P480 | | | | | | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | | | | | | | | |
| 3208/C6 | | | | | | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | | | | | | | ● | ● |
| 3504 | ○ | | | ○ | | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | ● ³ | | | | | | | | ● | | | |
| H500/SPS | | | | | | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | | | | | | | | |
| H700/SPS | | | | | ● ³ | | | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | | | | | | | | | | | | |
| H1700/SPS | | | ● | ○ | | | ● | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | ● ³ | | | | | ● | ● | ○ | ○ | ○ | ○ | ○ |
| H3700/SPS | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | | | | | ○ | ○ | ○ | ○ | ○ |
| NCC | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | | ○ | | | | | | | ○ | ○ | ○ | ○ | ○ |

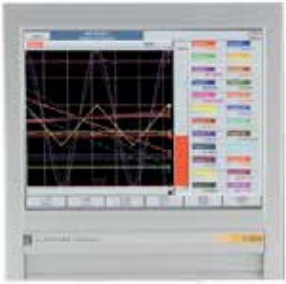
| Functionality of the Standard Controllers | R7 | C6 | 3216 | 3208 | B400/ B410 | C440/ C450 | P470/ P480 | 3504 | H500 | H700 | H1700 | H3700 | NCC |
|---|----|----|------|------|---------------|---------------|---------------|------------------|------------------|-------------------|------------------|------------------|-------------------|
| Number of programs | 1 | 1 | 1 | | 5 | 10 | 50 | 25 | 20 | 1/10 ³ | 10 | 10 | 50 |
| Segments | 1 | 2 | 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 | 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" | 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 | ○ | | ○ | ○ | ● | ● | ● | ○ | ● | ● 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 | | | | | ● | ● | ● | | ● | ● | ● | ● | ● |

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

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 data manipulation the generated data records contain checksums.



NTLog Comfort for data recording of a Siemens PLC

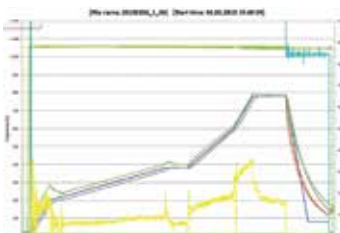
Data storing of HiProSystems with NTLog Comfort

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

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 a 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

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 charg 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.



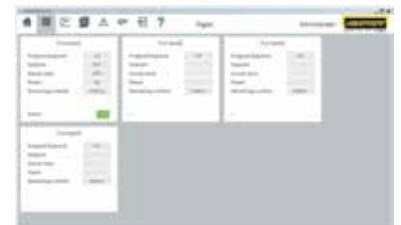
VCD Software for Control, Visualisation and Documentation



Example lay-out with 3 furnaces

Features

- Available for controllers B400/B410/C440/C450/P470/P480
- Suitable for operating systems Microsoft Windows 7 (32/64 Bit) or 8/8.1 (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



Graphic display of main overview (version with 4 furnaces)



Graphic display of process curve