

TRS 240 according to EN 1539

with controller C450 with integrated process documentation

Electrically heated oven



TRS 240 with controller C450

1. Description

- Electrically heated oven TR 240 LS according to EN 1539
 - Controller C450
 - Integrated process documentation
 - EN 1539 safety system

2. Defined application

- The drying furnace is suitable for drying and heat-treating solid materials, powders, and bulk materials.
- Only materials with known characteristics and melting temperatures may be used. Check the material safety data sheets if necessary.
- Furnace equipped for the vaporization / drying of solvent containing substances (according to EN 1539).
- Use of the furnace for any other purpose whatsoever such as processing products other than those intended or handling hazardous substances or substances posing a health hazard constitutes improper use and must be agreed upon with Nabertherm.
- Opening a hot oven (above 200 °C) can cause increased wear of the door seal.
- Processes, in which according to EN 1539 flammable substances are released by the charge. The maximum allowed amounts of organic solvents per charge are indicated in chapter "Safety equipment to comply with EN 1539".
- This oven is not designed for:
 - Heating food, animals, wood, grains etc.
 - To heat the workplace.
 - To melt ice or for similar purposes.
 - As clothes dryer.

3. Applied norms and specifications

3.1. General Norms

- EN 61010-1
- EN 61000-6-1, EN 61000-6-3

3.2. Customer's specifications

- Not considered

4. Technical specification

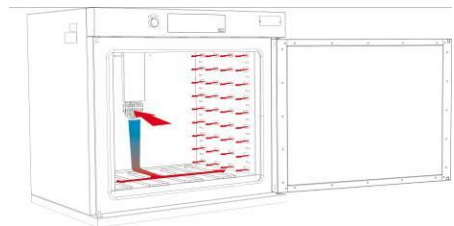
Inner dimensions (wxdxh):	750 x 550 x 600 mm
Outer dimensions (WxDxH):	1000 x 820 x 940 mm
Volume:	approx. 235 liter
Total steam room:	300 liter
Weight:	122 kg
Power rating:	6,3 kW
Supply voltage:	400 V 3/N/PE 50/60Hz
Tmax*:	260°C
Grid incl. delivery:	2 pc.
Max. number of grids:	8 pc.
Max. charging weight per grid:	30 kg
Max. charging weight complete:	150 kg

*Note:

Continuous operation at maximum temperature can lead to increased wear of the heating elements, thermocouples or isolation. We recommend operation at approx. 50 °C below the maximum temperature.

5. Furnace design

- Designed as tabletop model
- Inner chamber silicone sealed
- Operating temperatures above room temperature + 5°C to 260°C
- Temperature uniformity of +/-8°C at 200°C of useful space
- Eurotherm overtemperature limit controller 32h8i with manual reset for thermal protection class 2. EN 60519-2 to protect the furnace and the load
- Differential pressure monitoring of air circulation and exhaust
- Optical and acoustic signal in case of system failure
- Stainless steel chamber, alloy 304 (AISI)/(DIN material no. 1.4301), rust-resistant and easy to clean
- Dual shell housing for a high stability and low outside case temperatures
- Large handle to open and close the door easily
- Charging in multiple layers possible using removable stainless steel grids
- Integrated mechanical temperature limiter provides safety against overshooting
- Solid state relays provide for low noise operation
- Large, wide opening swing door, hinged on the right side with quick release



Principle of air-flow

6. Safety equipment to comply with EN 1539

For certain processes, solvents or other flammable substances are released and evaporated. These vapors must not be ignited in oven. The execution of the required safety equipment of the furnaces for these processes is regulated in the European EN 1539 and NFPA 86 in the U.S. For this application, all TRS ovens are capable of preventing inflammation in the furnace chamber.

The following maximum amounts of organic solvents per charge are allowed:

Drying temperature in °C	Max. amount of liquid solvents in g/charge
100 °C	14,2
150 °C	8,5
200 °C	5,8
250 °C	4,6

The EN 1539 describes security requirements for drying ovens and furnaces, in which flammable substances are released (eg drying of coatings, volatile organic substances and impregnating resins) The standard provides exceptions in which the amounts of solvent per charge are allowed to be increased due to low evaporation rates of the solvent containing substances. The solvents indicated above relate to rapid evaporation. The customer shall analyze the process details of his parts. If the max. permissible evaporation rate will not be exceeded, he is allowed to increase the amounts of solvent per charge. In case of mould varnish drying, the values can therefore be increased by a factor of 10. If customer is using impregnating resins (e.g. for applications for transformers, motor windings) the above mentioned values may be increased up to a factor of 20.

Fresh air supply

The directed and guided air flow into the inner chamber ensures a preheated air supply. The fresh intake air will be pre-heated avoiding any local 'cold' spots inside the oven.

The air ventilation fan is equipped with a monitoring system for the differential pressure in order to ensure that in case of a failure of the fan the heating of the oven will also shut down and an acoustical as well as optical alarm will give signal. Operation of the oven within the limits indicated above will avoid dangers to the operator as well as the oven itself. A fresh air filter is optional available.

Exhaust System

Exhaust fumes must be removed via a pipe. The customer is responsible for the masonry and roofing work necessary for venting the exhaust gases. The size and design of the exhaust system must be defined by a ventilation engineer.

7. Additional equipment in the scope of supply

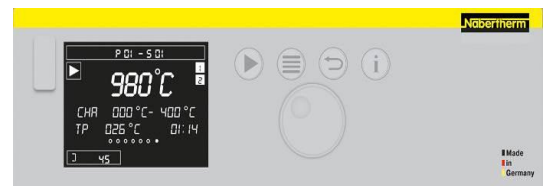
- Optional equipment and accessories are mentioned under point 10

8. Controls, switchgear and process documentation

8.1. Controller C 450

- Easy and individual programming
- Bright, high-contrast, black-white LC display
- Status messages in clear text display (2 text lines and a ticker)

- Data input by jog dial and 4 buttons
(start/stop/pause, menu, back, info)
- User administration
- 10 programs storable with 20 adjustable segments each
- Skip function to bypass a segment while the program is running
- Input of ramps, optionally
 - by gradient and temperature (e.g. 100 K/h until 600 °C)
 - or by time and temperature (e.g. in 6 hours to 600 °C)
- Input of set points in increments of 1 °C resp. 1 min
- 2 segmental switchable functions (e. g. relays for flaps, gas systems, cooling etc., depending on furnace equipment)
- Start time adjustable via real time clock
- Detailed information menu with
 - Operating hours counter
 - kWh counter
 - Error message history
 - Output of control values
- Input of control parameters in freely selectable temperature steps
- Measurement range calibration with up to 10 selectable supporting points
- Measurement accuracy ± 1 °C
- Self-optimizing
- Language selection of either German or English, FR/IT/SP/RU possible on request
- °C/°F selection
- NTLog USB interface for recording of process data, visualization possible with NTGraph
- Environmental conditions for electrical equipment:
 - temperature +5°C up to +40°C
 - humidity < 80%, not precipitating



Controller C 450

8.2. NTLog/NTGraph for Nabertherm controllers

Process documentation by means of data recording on customer's USB flash drive

- Data stored in CSV format, evaluation via spreadsheet program (e. g. MS Excel for Windows) possible
- Recorded data: time difference, segment number, temperature set points, actual temperatures, power outputs, control functions
- Checksums to protect against accidental data manipulation. For enhanced requirements with respect to unforgeable documentation according to ISO 9000 et seqq. as well as for long time documentation Nabertherm offers other professional solutions.
- Easily accessible USB port
- Storage volume, depending on controller type:

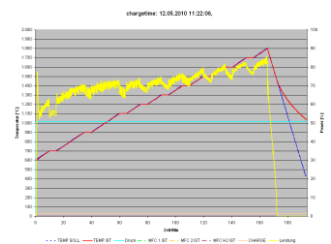
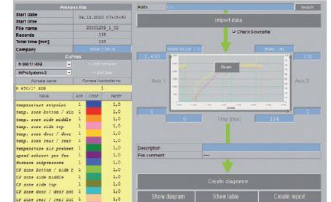
- P300 / 310/330 B130 / 150/180 C280, all from version 3.0:
Up to 16,000 sets of data in up to 8 files
- B400 / 410, C440 / 450, P470 / 480:
Up to 80,000 sets of data in up to 16 files

When saving further sets of data, the eldest file is overwritten.

- Simultaneous use of NTLog and Controltherm MV is not possible. With the 400 series controllers, the use of VCD software and NTLog is possible.

Visualization of Process Data with NTGraph (freeware)

- Software tool NTGraph to visualize the data in MS Excel for Windows (versions 2003/2010/2013) available free of charge
- Data displayed as a diagram, in a table or a simple report
- 8 different pre-set designs for the curve design available (color, scaling or naming), individually adaptable
- Prepared in 8 languages (DE/EN/FR/IT/SP/IT/CH/RU), adaptation of texts in another languages possible. Excel reports of the Russian and Chinese version in English, description of the data sets in English or German
- This charge-free tool is excluded from warranty; there is no entitlement to support. In case NTGraph is not compatible to your PC system another spreadsheet program can be used for data evaluation.



9. Supplied documents

- Operating instructions for controller and furnace including:
 - Installation
 - First-time operation
 - Operating instructions, maintenance and cleaning description
 - CE- declaration of conformity according to Low voltage regulation
 - All documents in English

10. To be provided by customer

- Despite good insulation, the furnace radiates heat from its external surfaces. The operator must ensure that this heat is conducted away.
- The size and design of the exhaust air system must be laid out by a ventilation expert. The accident prevention regulations applicable in the country where the furnace is installed must be considered.

11. Additional equipment and accessories

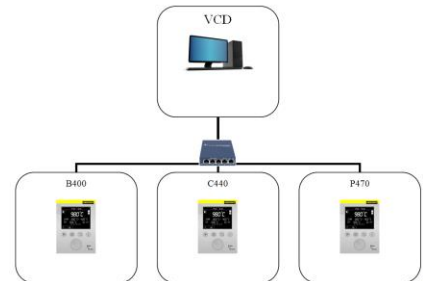
When ordering additional equipment the delivery time may vary.

■ VCD Software

Software for visualization, controls and documentation of one or more furnace(s), equipped with one of the following controllers:

Nabertherm B400, B410, C440, C450, P470, P480 (compatibility to former controller generation coming soon)

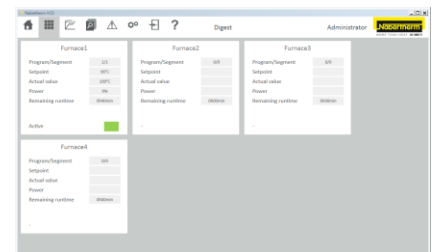
The price is valid for one furnace. The furnace will be connected to a standard PC. Access from several PCs to one furnace is not possible.



Example structure with 3 furnaces

Performance

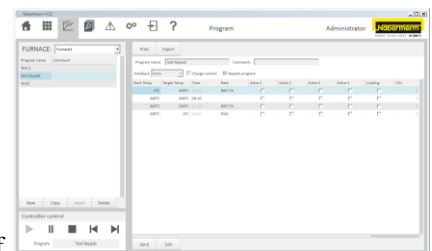
- Archiving, graphical and numerical presentation of process data
- Programming of heat treatment curve incl. all functions directly on the computer
- Remote start of a furnace run via the VCD software
- Export of archived data as a report (PDF) or text file (CSV)
- Free input of additional texts with search function
- Language selection: German, English, French, Italian, Spanish, Russian, Dutch, Polish, Chinese, others possible on request
- °C/°F selection
- 400 programs storable in total



Graphics furnace overview (version with 4 furnaces)

Minimum PC requirements

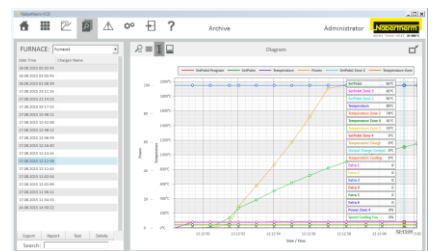
- Operating system: Microsoft Windows 7, 8, 8.1, 10 in preparation, (32/64 Bit)
- Software .Net-Framework 4.5
- Processor: Pentium 800 MHz PC
- Main memory: min. 2 GB
- Hard disk: min. 10 GB free memory (for software and data)
- Ethernet interface. We recommend to use a spare Ethernet card for connection of other networks
- Display: Resolution of 1280 x 720 (16:9) pixel or better
Recommendation: 1920x1080 pixel



Tabular process overview

Scope of delivery

- Software on CD-ROM
- Acrobat Reader software for reading of operation manual
- Software .Net-Framework 4.5
- Operating instructions in German/English in PDF format on CD
- Ethernet interface module for connection to the control unit in the switchgear cabinet
- Network cable (5 m) for connection of one furnace to the PC
- Jack for switchgear cabinet wall, as feedthrough for network cable



Graphical display of heat treatment curve

- Lockable door
- Reinforced stainless steel tray incl. holders (max. 80kg charge load)
- Additional stainless steel grid incl. holders
- Set of slip resistant feet
- Stacking Frame
 - Frame for safe stacking of two ovens with same size
- Gloves, Tmax 650°C
 - To protect the operator when loading or removing hot materials
 - Article number 493000004
- Crucible tong, 300 mm length
 - For easier loading of the furnace
 - Article number 493000002
- Crucible tong, 500 mm length
 - For easier loading of the furnace
 - Article number 493000003

