Nabertherm

MORE THAN HEAT 30-3000 °C

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SCIENTIFIC EQUIPMENT
FOR LABORATORY & INDUSTRY

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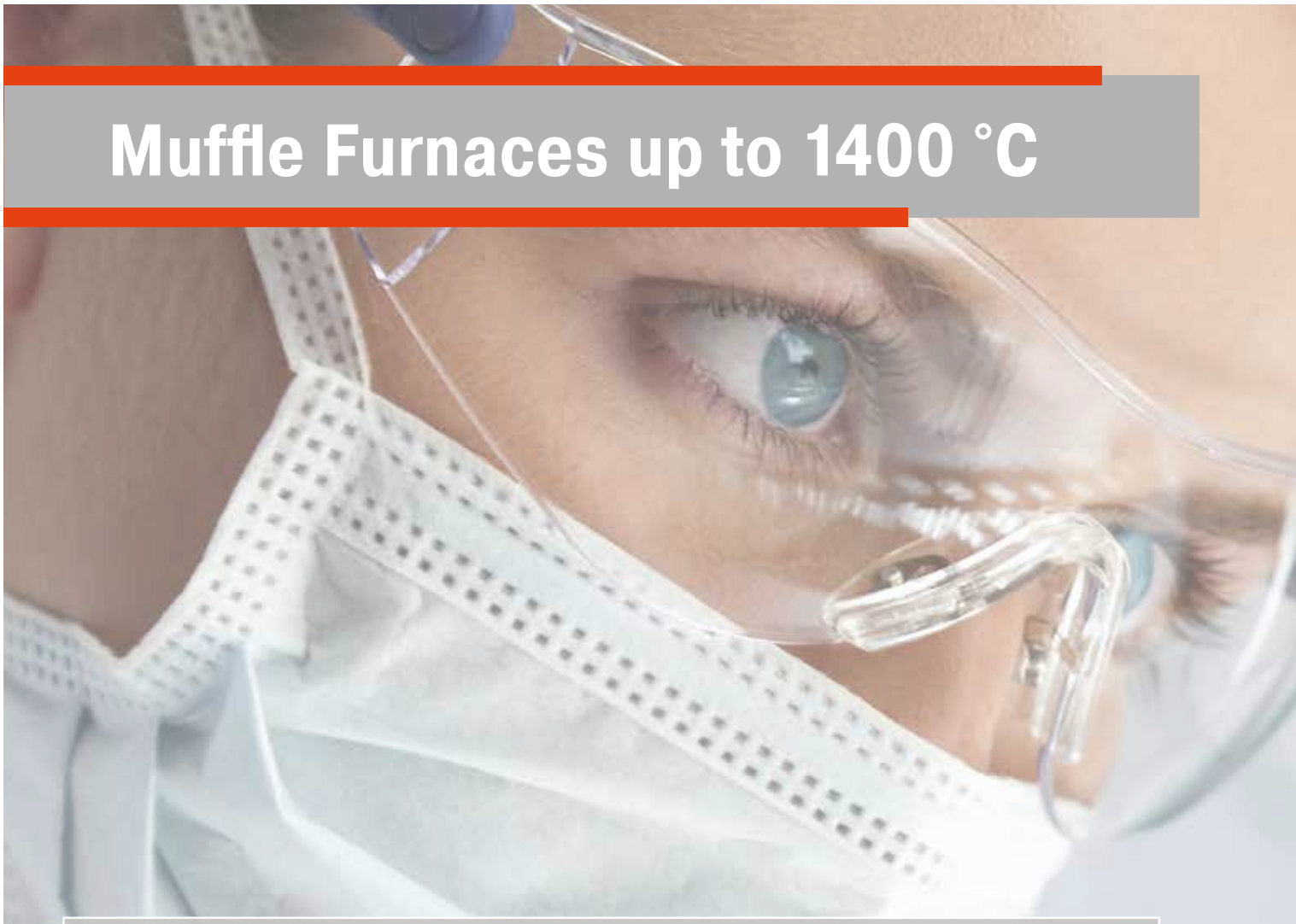
LABORATORY FURNACES

Made
in
Germany

Muffle Furnaces up to 1400 °C



Muffle furnaces are the reliable and long-lasting all-rounders in the laboratory and are ideally suited for a large number of processes in the field of material research and heat treatment.

- Dual shell housing made of textured stainless steel sheets with additional fan cooling for low surface temperature
- Solid state relays provide for lownoise operation
- Only fiber materials are used which are not classified as carcinogenic according to TRGS 905, class 1 or 2
- NTLog Basic for Nabertherm controller: recording of process data with USB-flash drive
- Defined application within the constraints of the operating instructions
- As additional equipment: Process control and documentation via VCD software package for monitoring, documentation and control

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Muffle Furnaces up to 1100 °C or 1200 °C

The muffle furnaces L 1/12 - LT 40/12 have been proven for daily laboratory use. These models stand out for their excellent workmanship, advanced and attractive design, and high level of reliability. The muffle furnaces come equipped with either a flap door or lift door at no extra charge.

Muffle furnace LT 5/12 with lift door

Standard Equipment

- Tmax 1100 °C or 1200 °C
- Heating from two sides by ceramic heating plates (heating from three sides for muffle furnaces L 24/11 - LT 40/12) for an optimal temperature uniformity
- Temperature uniformity of +/– 5 K with closed fresh-air inlet in empty work space according to DIN 17052-1 at working temperatures above 800 °C see page 71
- Thermocouple type N (1100 °C) or type S (1200 °C)
- Ceramic heating plates with integral heating element which is safeguarded and easy to replace
- Optional flap door (L) which can be used as work platform or lift door (LT) with hot surface facing away from the operator
- Adjustable air inlet integrated in door (see illustration)
- Exhaust air outlet in rear wall of furnace
- Controller B410 resp. R7 for L 1/12 (5 programs with each 4 segments), alternative controllers see page 75

Muffle furnace L 3/11 with flap door

Additional Equipment

- Chimney, chimney with fan or catalytic converter (not for L 1 and L 15) see page 24
- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Protective gas connection to purge with non-flammable protective or reaction gases (not available in combination with chimney, chimney with fan or catalytic converter) not gas tight
- Manual or automatic gas supply system
- Port for thermocouple in the rear wall or in the furnace door
- Please see page 25 for more accessories

Muffle furnace L 3/12

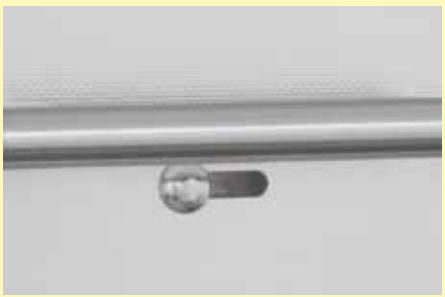
Muffle furnace L 3/11 with flap door

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Temperature uniformity of +/− 5K in the empty workspace			Connected load	Electrical	Weight	Heating time
	in °C[1]	w	d	h	in l	W	D	H[3]	w	d	h	in kW	connection*	in kg	in min[4]
L(T) 3/11	1100	160	140	100	3	385	330	405+155	110	50	50	1.2	1-phase	20	40
L(T) 5/11	1100	200	170	130	5	385	390	460+205	150	80	80	2.4	1-phase	30	50
L(T) 9/11	1100	230	240	170	9	415	455	515+240	180	150	120	3.0	1-phase	35	65
L(T) 15/11	1100	230	340	170	15	415	555	515+240	180	250	120	3.5	1-phase	40	75
L(T) 24/11	1100	280	340	250	24	490	555	580+320	230	250	200	4.5	3-phase	55	70
L(T) 40/11	1100	320	490	250	40	530	705	580+320	270	400	200	6.0	3-phase	65	75
L 1/12	1200	90	115	110	1	290	280	430	40	45	60	1.5	1-phase	10	25
L(T) 3/12	1200	160	140	100	3	385	330	405+155	110	50	50	1.2	1-phase	20	45
L(T) 5/12	1200	200	170	130	5	385	390	460+205	150	80	90	2.4	1-phase	30	60
L(T) 9/12	1200	230	240	170	9	415	455	515+240	180	150	120	3.0	1-phase	35	75
L(T) 15/12	1200	230	340	170	15	415	555	515+240	180	250	120	3.5	1-phase	40	85
L(T) 24/12	1200	280	340	250	24	490	555	580+320	230	250	200	4.5	3-phase	55	80
L(T) 40/12	1200	320	490	250	40	530	705	580+320	270	400	200	6.0	3-phase	65	85

[1]Recommended working temperature for processes with longer dwell times is 1000 °C (L../11) rsp. 1100 °C (L../12)
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including opened lift door (LT models)
[4]Heating time of the empty and closed furnace up to Tmax −100 K (connected to 230 V 1/N/PE rsp. 400 V 3/N/PE)

*Please see page 75 for more information about supply voltage

Chimney with fan



Adjustable air inlet integrated in the door

Gas supply system for non-flammable protective or reactive gas

Economy Muffle Furnaces up to 1100 °C

With their convincing price/performance ratio and the fast heat-up rates, these compact muffle furnaces are perfect for many applications in the laboratory. Quality features like the dual shell furnace housing of rust-free stainless steel, their compact, lightweight constructions, or the heating elements encased in quartz glass tubes make these models reliable partners for your application.

Muffle furnace LE 6/11

Standard Equipment

- Tmax 1100 °C
- Heating from two sides from heating elements protected in quartz glass tubes
- Fast heating times (see table)
- Maintenance-friendly replacement of heating elements and insulation
- Housing powder-coated in industrial qualtiy
- Flap door which can also be used as a work platform
- Exhaust air outlet in rear wall
- Compact dimensions and light weight
- Controller mounted under the door to save space
- Controller R7, controls description see page 75

Additional Equipment

- Chimney, chimney with fan or catalytic converter (not for LE 1) see page 24
- Please see page 25 for more accessories

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Temperature uniformity of +/– 5K in the empty workspace			Connected	Electrical	Weight	Heating time
	in °C[1]	w	d	h	in l	W	D	H	w	d	h	load in kW	connection*	in kg	in min[3]
LE 1/11	1100	90	115	110	1	290	280	410	40	45	60	1.5	1-phase	10	10
LE 2/11	1100	110	180	110	2	330	390	410	60	110	60	1.8	1-phase	10	25
LE 6/11	1100	170	200	170	6	390	440	470	120	130	120	1.8	1-phase	18	30
LE 14/11	1100	220	300	220	14	440	540	520	170	230	170	2.9	1-phase	25	35

[1]Recommended working temperature for processes with longer dwell times is 1050 °C
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Heating time of the empty and closed furnace up to Tmax –100 K (connected to 230 V 1/N/PE)

*Please see page 75 for more information about supply voltage

Muffle furnace LE 1/11

Muffle furnace LE 14/11

Heating elements protected in quartz glass tubes

Muffle Furnaces with Brick Insulation up to 1300 °C

Heating elements on support tubes radiating freely into the furnace chamber provide for particularly short heating times for these muffle furnaces. Thanks to their robust lightweight refractory brick insulation, they can reach a maximum working temperature of 1300 °C. These muffle furnaces thus represent an interesting alternative to the familiar L(T) ../12 models, when you need a higher application temperature.

Muffle furnace L 9/13 with flap door

Standard Equipment

- Tmax 1300 °C
- Heating from two sides
- Heating elements on support tubes ensure free heat radiation and a long service life
- Multi-layer insulation with robust lightweight refractory bricks in the furnace chamber
- Optional flap door (L) which can be used as work platform or lift door (LT) with hot surface facing away from the operator
- Adjustable air inlet in the furnace door
- Exhaust air outlet in rear wall of furnace
- Controller B410 (5 programs with each 4 segments), alternative controllers see page 75

Additional Equipment

- Chimney, chimney with fan or catalytic converter see page 24
- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Protective gas connection to purge with non-flammable protective or reaction gases (not available in combination with chimney, chimney with fan or catalytic converter) not gas tight
- Manual or automatic gas supply system
- Port for thermocouple in the rear wall or in the furnace door
- Please see page 25 for more accessories

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Temperature uniformity of +/− 5K in the empty workspace			Connected load	Electrical	Weight	Heating time
	in °C[1]	w	d	h	in l	W	D	H[3]	w	d	h	in kW	connection*	in kg	in min[4]
L, LT 5/13	1300	200	170	130	5	490	450	580+320	150	150	80	2.4	1-phase	42	60
L, LT 9/13	1300	230	240	170	9	530	525	630+350	180	220	120	3.0	1-phase	60	60
L, LT 15/13	1300	230	340	170	15	530	625	630+350	180	320	120	3.5	1-phase	70	70

[1]Recommended working temperature for processes with longer dwell times is 1200 °C
*Please see page 75 for more information about supply voltage
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including opened lift door (LT models)
[4]Heating time of the empty and closed furnace up to Tmax −100 K (connected to 230 V 1/N/PE)

Muffle furnace LT 5/13 with lift door

Furnace lining with high-quality lightweight refractory brick insulation

Example of an over-temperature limiter

Muffle Furnaces up to 1400 °C

These models stand out for their excellent workmanship, advanced and attractive design, and high level of reliability. Heating elements on support tubes radiating freely into the furnace chamber provide for particularly short heating times and a maximum temperature of 1400 °C. These muffle furnaces are a good alternative to the familiar L(T) ../12 series when higher application temperatures are needed.

Muffle furnace LT 9/14 with lift door

Standard Equipment

- Tmax 1400 °C
- Heating from two sides
- Heating elements on support tubes ensure free heat radiation and a long service life
- Adjustable air inlet integrated in door
- Exhaust air outlet in rear wall of furnace
- Controller B410 (5 programs with each 4 segments), alternative controllers see page 75

Additional Equipment

- Chimney, chimney with fan or catalytic converter see page 24
- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Protective gas connection to purge with non-flammable protective or reaction gases (not available in combination with chimney, chimney with fan or catalytic converter), not gas tight
- Manual or automatic gas supply system
- Please see page 25 for more accessories

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Temperature uniformity of +/– 5K in the empty workspace			Connected load	Electrical	Weight	Heating time
	in °C[1]	w	d	h	in l	W	D	H[3]	w	d	h	in kW	connection*	in kg	in min[4]
L, LT 5/14	1400	200	170	130	5	490	450	580+320	150	170	80	2.6	1-phase	42	50
L, LT 9/14	1400	250	250	170	9	530	525	630+350	200	250	120	3.5	1-phase	55	50
L, LT 15/14	1400	250	350	170	15	530	625	630+350	200	350	120	3.5	1-phase	63	70

[1]Recommended working temperature for processes with longer dwell times is 1300 °C
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including opened lift door
[4]Heating time of the empty and closed furnace up to Tmax –100 K (connected to 230 V 1/N/PE)

*Please see page 75 for more information about supply voltage

Muffle furnace L 9/14 with flap door

Chimney with fan

Example of an over-temperature limiter

Muffle Furnaces with Embedded Heating Elements in the Ceramic Muffle up to 1100 °C

We particularly recommend the muffle furnace L 9/11/SKM for heat treatment of aggressive substances. The furnace has a ceramic muffle with embedded heating from four sides. The muffle furnace thus combines a very good temperature uniformity with excellent protection of the heating elements from aggressive atmospheres. Another aspect is the smooth, nearly particle free muffle (furnace door made of fiber insulation), an important quality feature.

Muffle furnace L 9/11/SKM with flap door

Standard Equipment

- Tmax 1100 °C
- Muffle heated from four sides
- Furnace chamber with embedded ceramic muffle, high resistance to aggressive gasses and vapours
- Optional flap door (L) which can be used as work platform or lift door (LT) with hot surface facing away from the operator
- Adjustable working air inlet in the door
- Exhaust air outlet in rear wall of furnace
- Controller B410 (5 programs with each 4 segments), alternative controllers see page 75

Additional Equipment

- Chimney, chimney with fan or catalytic converter see page 24
- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Protective gas connection to purge with non-flammable protective or reaction gases (not available in combination with chimney, chimney with fan or catalytic converter) not gas tight
- Manual or automation gas supply system
- Port for thermocouple in the rear wall or in the furnace door
- Please see page 25 for more accessories

Modell	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Connected	Electrical	Weight	Heating time
	in °C[1]	w	d	h	in l	W	D	H	load in kW	connection*	in kg	in min[4]
L 9/11/SKM	1100	230	240	170	9	490	505	580	3.4	1-phase	50	75
LT 9/11/SKM	1100	230	240	170	9	490	505	580+320[3]	3.4	1-phase	50	75

[1]Recommended working temperature for processes with longer dwell times is 1000 °C
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including opened lift door
[4]Heating time of the empty and closed furnace up to Tmax −100 K (connected to 230 V 1/N/PE)

*Please see page 75 for more information about supply voltage

Muffle furnace L 9/11/SKM

Gas supply system for non-flammable protective or reactive gas

Muffle heated from four sides

Ashing Furnaces up to 1100 °C

Ashing furnace LV ../11 is designed especially for ashing processes to 1050 °C in the laboratory. Applications include determining loss on ignition, ashing food and plastics for subsequent substance analysis. A special fresh-air and exhaust air system ensures that the air is replaced 6 times per minute so that there is always sufficient oxygen for the ashing process. Incoming air passes the furnace heating and is pre-heated to ensure good temperature uniformity.

Ashing furnace LV 3/11

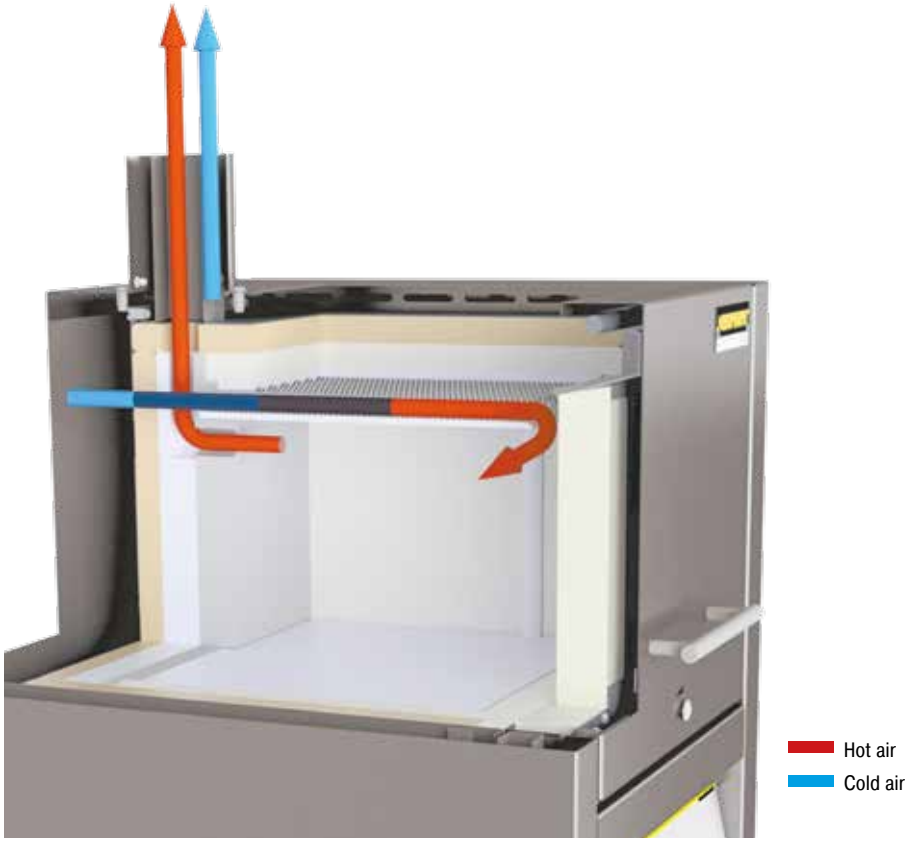
Standard Equipment

- Tmax 1100 °C
- Heating from two sides
- Ceramic heating plates with integral heating element which is safeguarded, and easy to replace
- Air exchange of more than 6 times per minute
- Good temperature uniformity due to preheating of incoming air, temperature uniformity according to DIN 17052-1 to +/– 10 °C in the defined empty work area (from 550 °C) see page 71
- Suitable for many standardized ashing processes according to ISO, ASTM, EN, and DIN
- Optional flap door (LV) which can be used as work platform or lift door (LVT) with hot surface facing away from the operator
- Controller B410 (5 programs with each 4 segments), alternative controllers see page 75

Ashing furnace LVT 5/11

Additional Equipment

- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Port for thermocouple in the rear wall or in the furnace door
- Charging trolley with solid or perforated trays to load the furnace in different levels, including holders to insert/remove the trays
- Please see page 25 for more accessories



Air inlet and exhaust flow principle in ashing furnaces

Model Flap door	Tmax in °C[1]	Inner dimensions in mm w	d	h	Volume in l	Outer dimensions[2] in mm W	D	H[3]	Max. weight of hydrocarbons in g	Max. evapo-ration rate g/min	Connected load in kW	Electrical connection*	Weight in kg	Heating time in min[4]
LV 3/11	1100	160	140	100	3	385	360	735	5	0.1	1.2	1-phase	20	45
LV 5/11	1100	200	170	130	5	385	420	790	10	0.2	2.4	1-phase	35	55
LV 9/11	1100	230	240	170	9	415	485	845	15	0.3	3.0	1-phase	45	70
LV 15/11	1100	230	340	170	15	415	585	845	25	0.3	3.5	1-phase	55	80

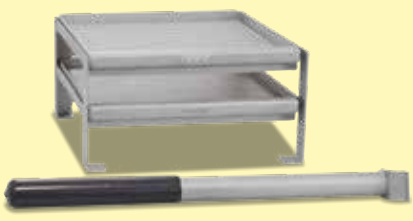
Model Lift door	Tmax in °C[1]	Inner dimensions in mm w	d	h	Volume in l	Outer dimensions[2] in mm W	D	H[3]	Max. weight of hydrocarbons in g	Max. evapo-ration rate g/min	Connected load in kW	Electrical connection*	Weight in kg	Heating time in min[4]
LVT 3/11	1100	160	140	100	3	385	360	735	5	0.1	1.2	1-phase	20	45
LVT 5/11	1100	200	170	130	5	385	420	790	10	0.2	2.4	1-phase	35	55
LVT 9/11	1100	230	240	170	9	415	485	845	15	0.3	3.0	1-phase	45	70
LVT 15/11	1100	230	340	170	15	415	585	845	25	0.3	3.5	1-phase	55	80

[1]Recommended working temperature for processes with longer dwell times is 1000 °C
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including exhaust tube (Ø 80 mm)
[4]Approx. heating time of the empty and closed furnace up to Tmax −100 K (connected to 230 V 1/N/PE)

*Please see page 75 for more information about supply voltage

Ceramic collecting pan

Ashing furnace LV 5/11 with port for thermocouple in the rear wall of furnace



Charging trolley to load the furnace in different levels

Ashing Furnaces with Integrated Exhaust Gas Cleaning up to 1100 °C

The ashing furnace L ../11 BO is specially designed for processes in which larger sample quantities have to be incinerated. Fields of application are e.g. the ashing of food, thermal cleaning of injection molding tools or the determination of annealing loss. Another application is the debinding of ceramic products, e.g. after additive production.

The ashing furnaces have a passive safety system and integrated exhaust gas post combustion. An exhaust gas fan extracts flue gases from the furnace and simultaneously supplies fresh air to the furnace atmosphere with the result that sufficient oxygen is always available for the incineration process. The incoming air is guided behind the furnace heating and preheated to ensure good temperature uniformity. Exhaust gases are led from the furnace chamber to the integrated post combustion system, where they are postburned and catalytically cleaned. Directly after the incineration process (up to max. 600 °C) a subsequent process up to max. 1100 °C can take place.

Ashing furnace L 40/11 BO

Standard Equipment

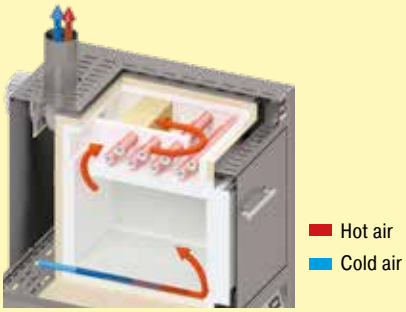
- Tmax 600 °C for the incineration process
- Tmax 1100 °C for the subsequent process
- Three-side heating (both sides and bottom)
- Ceramic heating plates with embedded heating wire
- Steel collecting pan protects the bottom insulation
- Spring-assisted closing of the furnace door (flap door) with mechanical locking against unintentional opening
- Thermal/catalytic post combustion, integrated in the exhaust channel, up to 600 °C in function
- Temperature control of post combustion can be set up to 850 °C
- Monitored exhaust air
- Inlet-air preheated through the bottom heating plate
- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Controller C450 (10 programs with each 20 segments), alternative controllers see page 75

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Max. weight of hydrocarbons	Max. evaporation rate	Connected load	Electrical	Weight
	in °C[1]	w	d	h	in l	W	D	H[3]	in g	g/min	in kW	connection*	in kg
L 9/11 BO	1100	230	240	170	9	415	575	750	75	1.0	7.0	3-phase	60
L 24/11 BO	1100	280	340	250	24	490	675	800	150	2.0	9.0	3-phase	90
L 40/11 BO	1100	320	490	250	40	530	825	800	200	2.1	11.5	3-phase	110

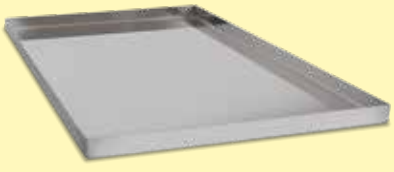
[1]Recommended working temperature for processes with longer dwell times is 1000 °C
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including exhaust tube (Ø 80 mm)

*Please see page 75 for more information about supply voltage

Ashing furnace L 9/11 BO



Schematic presentation of air circulation in ashing furnace L 24/11 BO



Steel collecting pan protects the bottom insulation

Muffle Furnace incl. Scale and Software for Determination of Combustion Loss

This weighing furnace with integrated precision scale and software, was designed especially for combustion loss determination in the laboratory. The determination of combustion loss is necessary, for instance, when analyzing sludges and household garbage, and is also used in a variety of other processes for the evaluation of results. The difference between the charged total mass and the combustion residue is the combustion loss. During the process, the software included records both the temperature and the weight loss.

Weighing furnace L 9/11/SW with flap door

Standard Equipment

Like muffle furnaces L(T), except:

- Delivery includes base, ceramic plunger with base plate in the furnace lining, precision scale and software package
- 4 scales available for different maximum weights and scaling ranges
- Process control and documentation for temperature and combustion loss via VCD software package for monitoring, documentation and control see page 74
- Controller B410 (5 programs with each 4 segments), alternative controllers see page 75

Additional Equipment

- Chimney, chimney with fan or catalytic converter
- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Port for thermocouple in the rear wall or in the furnace door
- Please see page 24 for more accessories

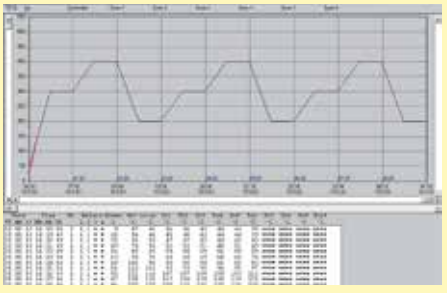
Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Connected	Electrical	Weight	Heating time
	in °C[1]	w	d	h	in l	W	D	H	load in kW	connection*	in kg	in min[4]
L(T) 9/11/SW	1100	230	240	170	9	415	455	740+240[3]	3.0	1-phase	50	65
L(T) 9/12/SW	1200	230	240	170	9	415	455	740+240[3]	3.0	1-phase	50	75

[1]Recommended working temperature for processes with longer dwell times is 1000 °C (L 9/11) rsp. 1100 °C (L 9/12)
*Please see page 75 for more information about supply voltage
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[3]Including opened lift door (Model LT ..)
[4]Heating time of the empty and closed furnace up to Tmax – 100 K (connected to 230 V 1/N/PE)

Scale type	Readability in g	Maximum weighing range in g	Weight of plunger in g	Calibration value in g	Minimum load in g
EW-2200	0.01	2200 incl. plunger	850	0.1	0.5
EW-4200	0.01	4200 incl. plunger	850	0.1	0.5
EW-6200	0.01	6200 incl. plunger	850	-	1.0
EW-12000	0.10	12000 incl. plunger	850	1.0	5.0

4 scales available for different maximum weights and scaling ranges

Example of an over-temperature limiter



Software for documentation of the temperature curve and combustion loss using a PC

Exhaust Systems/Accessories

Article No.: 631000140

Exhaust Vent

Exhaust vent for collection and upstream direction of escaping gases

Article No.: 631000812

Chimney with Fan

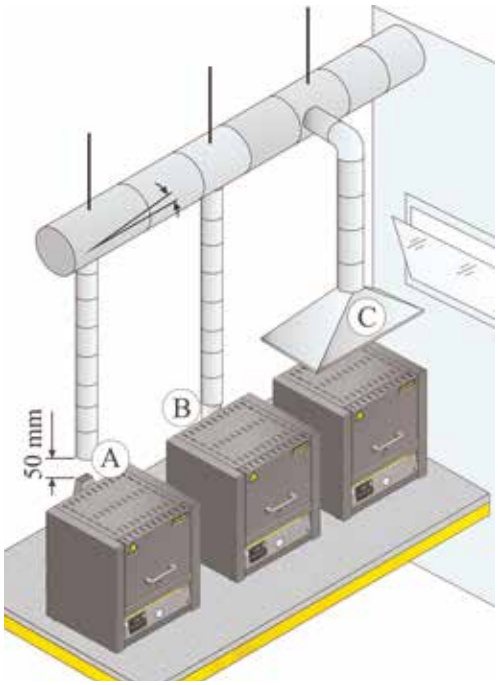
Exhaust gases are better removed from the furnace and discharged. The B400 - P480 controllers can be used to activate the fan automatically (not for models L(T) 15.., L 1/12, LE 1/11, LE 2/11).*

Article No.: 631000166

Catalytic Converter with Fan

Organic components are catalytically cleaned at about 600 °C, broken into carbon dioxide and water vapour. Irritating odors are thus largely eliminated. The B400 - P480 controllers can be used to switch the catalytic converter automatically (not for models L(T) 15.., L 1/12, LE 1/11, LE 2/11).*

* Note: If other controller types are used an adapter cable for connection to mains supply has to be ordered separately. The device will be activated by plugging in the socket.



Various ways of removing the exhaust air

Exhaust Air Extraction

When exhaust gases are generated during the process it is mandatory to guide them outside in an adequate way. The relevant operating instructions must be always taken into consideration. When exhaust gas pipings are installed it is always necessary that a local ventilation technician lays out the system in accordance to the real environment.

There are different possibilities to guide the exhaust gases out. In many cases the furnace is positioned under a laboratory extraction provided by the customer. In these cases the use of an exhaust vent is recommended just to guide the gases upwards.

For this purpose metal exhaust gas pipes with NW 80 to NW 120 can be used. They must be installed continuously rising and fastened to the wall or ceiling. Center the pipe over the furnace vent (for models with vent fan or catalytic converter, NW 120 is necessary. The exhaust gas pipe must not be installed with a tight fit to the furnace vent pipe since this would prevent any bypass effect. This is necessary so that not too much fresh air is sucked in by the furnace. An exception are models LV(T) and L ../11 BOs: Here the exhaust gas pipe NW 80 will be connected directly onto the furnace vent pipe.

Article No.:
699000279: saggar
110 x 75 x 30 mm
699000985: lid
110 x 75 x 5 mm

Square Saggar for Furnaces LHTC and LHT, Tmax 1600 °C

The load is placed in ceramic saggars for optimal utilization of the furnace space. Up to three saggars can be stacked on top of each other in the furnace. In models LHT 01/17 D and LHTCT 01/16 up to two saggars can be stacked. Each saggar has cut-outs for better ventilation. The top saggar should be closed with a lid made of ceramic.

Article No.:
699001054: sintering dish
Ø 115 x 15 mm
699001055: spacer ring
Ø 115 x 20 mm

Round Saggar (Ø 115 mm) for Furnaces LHT/LB, Tmax 1650 °C

These saggars are perfectly suited for furnaces LHT/LB. The load is placed in the saggars. Up to three saggars can be stacked on top of each other in order to use the overall furnace chamber.

Select between different bottom plates and collecting pans for protection of the furnace and easy loading (for models L, LT, LE, LV and LVT on pages 14 - 23).

Ceramic Ribbed Plate, Tmax 1200 °C

Ceramic Collecting Pan, Tmax 1300 °C

Stainless Steel Collecting Pan, Tmax 1100 °C

For models	Ceramic ribbed plate		Ceramic collecting pan		Stainless steel collecting pan (Material 1.4828)	
	Articel No.	Dimensions in mm	Articel No.	Dimensions in mm	Articel No.	Dimensions in mm
L 1, LE 1	691601835	110 x 90 x 12.7	-	-	691404623	85 x 100 x 20
LE 2	691601097	170 x 110 x 12.7	691601099	100 x 160 x 10	691402096	110 x 170 x 20
L 3, LT 3, LV 3, LVT 3	691600507	150 x 140 x 12.7	691600510	150 x 140 x 20	691400145	150 x 140 x 20
LE 6, L 5, LT 5, LV 5, LVT 5	691600508	190 x 170 x 12.7	691600511	190 x 170 x 20	691400146	190 x 170 x 20
L 9, LT 9, LV 9, LVT 9, N 7	691600509	240 x 220 x 12.7	691600512	240 x 220 x 20	691400147	240 x 220 x 20
LE 14	691601098	210 x 290 x 12.7	-	-	691402097	210 x 290 x 20
L 15, LT 15, LV 15, LVT 15, N 11	691600506	340 x 220 x 12.7	-	-	691400149	230 x 330 x 20
L 24, LT 24	691600874	340 x 270 x 12.7	-	-	691400626	270 x 340 x 20
L 40, LT 40	691600875	490 x 310 x 12.7	-	-	691400627	310 x 490 x 20

Article No.:
493000004

Gloves, Tmax 650 °C

For protection of the operator when loading or removing hot materials

Article No.:
491041101

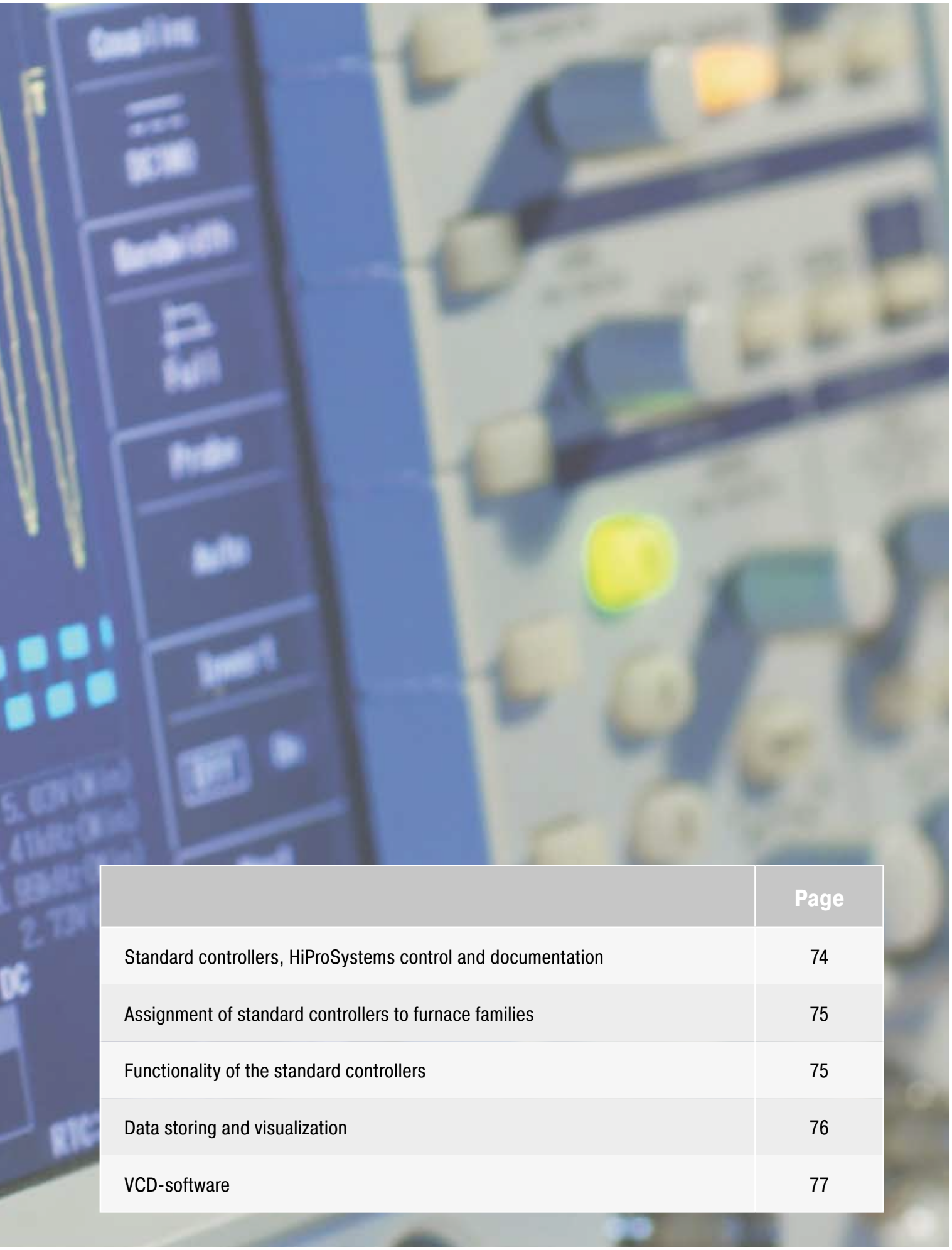
Gloves, Tmax 700 °C

For protection of the operator when loading or removing hot materials

Article No.:
493000002 (300 mm)
493000003 (500 mm)

Charing Tongs

For easy loading and unloading of the furnace



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					○								○						●[3]	●[3]			○	○			○			○			
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

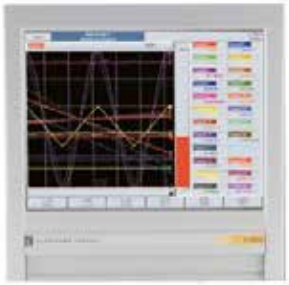
● Standard
○ Option

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).

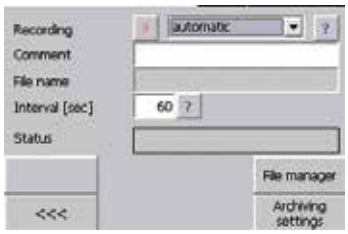


Temperature recorder

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



NTLog Comfort

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.

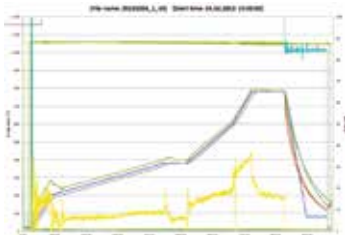
The process documentation with NTLog Basic requires no additional thermocouples or sensors. Only data recorded which are available in the controller. The data stored on the USB stick (up to 80,000 data records, format CSV) can afterwards be evaluated on the PC either via NTGraph or a spreadsheet software 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 HiProSytems 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



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

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 enttered 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 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 at a PC. The process is documented and archived accordingly. The data display can 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.

Example lay-out with 3 furnaces

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

VCD Software for Control, Visualisation and Documentation

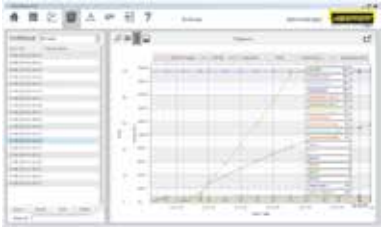
Extension Package 1 for Display of an Additional Temperature Measuring Point, Independant of the Furnace Controls

- 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

Graphic display of main overview (version with 4 furnaces)

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



Graphic display of process curve