

Quick Start Guide

Laboratory Furnaces (Muffle Furnaces)

L .../..., LT .../..., LE .../...

M01.1060K ENGLISCH

Original instructions

■ Made
■ in
■ Germany

www.nabertherm.com

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Bahnhofstrasse 20
28865 Lilienthal
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1 Foreword

Congratulations on choosing a Nabertherm laboratory furnace. First-class workmanship and the use of high-quality materials combined with ease of operation make these furnaces reliable all-rounders for everyday laboratory work. This quick guide will help you get to know your Nabertherm furnace. Remember that it is a short version of the operating instructions to give you an initial idea of the functions and features. Please read the operating instructions carefully before using your Nabertherm furnace for the first time.

You can obtain the operating instructions for the furnace via the following link or by scanning this QR code: Apps to scan QR codes can be downloaded from the corresponding sources (app stores).



<https://nabertherm.com/en/downloads/instructions>

Keep a printed or stored version for later use. You may also request a printed version of the operating instructions. Contact us, stating the furnace model and serial number (see type plate).

2 More information and tutorials



<https://nabertherm.com/de/downloads/video-tutorials>

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3 Defined Application








Laboratory furnaces are ideal for many different applications in materials research and heat treatment. Furnaces in this series can be used to burn out dental wax. When using, observe the wax manufacturer's safety data sheets.

The system must not be operated with explosive gases or mixtures and it must be ensured that explosive gases or mixtures do not form during the process.

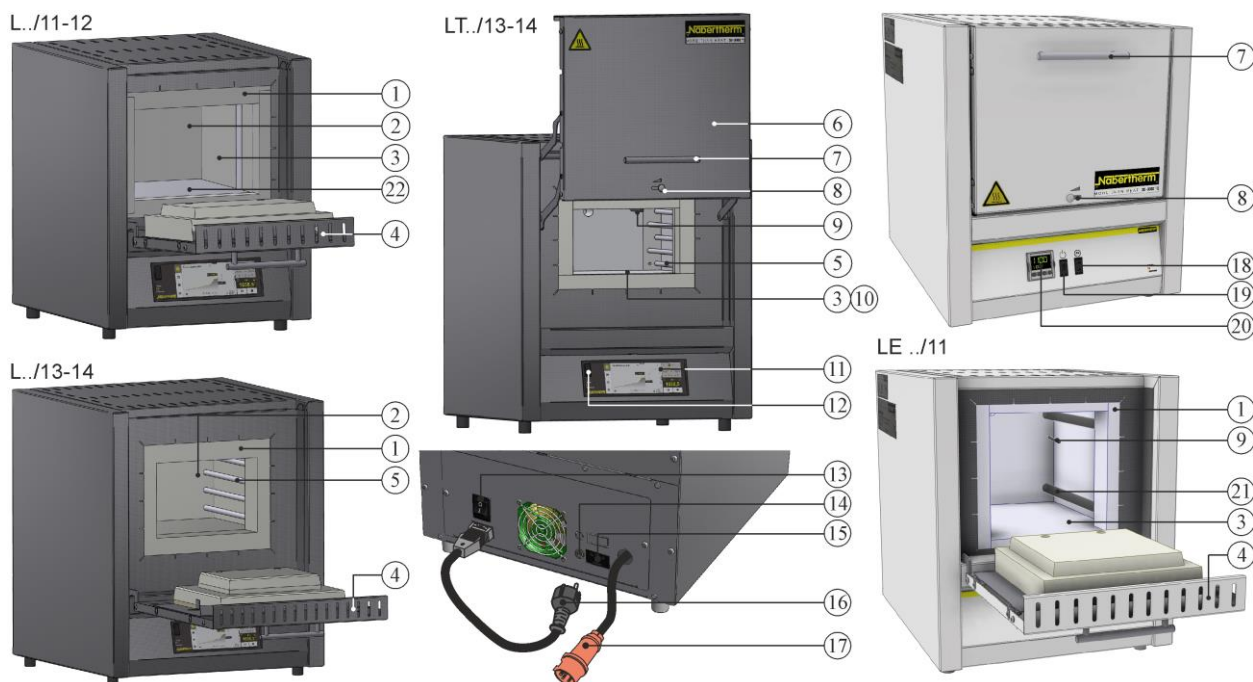
If substances are introduced to the furnace that form health-endangering compounds as a result of thermal decomposition, the operator must take special measures including precautions to detect hazards at the installation location, protective equipment for operators, measures to reduce exhaust emissions.

4 Safety precautions

Below is a list of safety precautions in the highest danger level, which, if not observed, may result in serious personal injury. A complete overview of all safety precautions can be found in the furnace operating instructions. It is important that you read the operating instructions before initial start-up and use.

	<p>Danger of electric shock Risk of fatal injury</p> <p>Work on the electrical equipment may be performed only by qualified electricians or by specialists authorized by Nabertherm.</p> <p>Before starting work, disconnect the plug</p> <p>The device must not get wet.</p> <p>Do not insert objects into openings in the furnace housing, exhaust holes or cooling slits of the switchgear or furnace.</p> <p>If the furnace or furnace chamber is obviously damaged, have a qualified electrician check that it is electrically safe before operating the furnace again.</p>
	<p>Warning – Electrical voltage!</p> <p>Warning of dangerous electric voltage.</p>
	<p>Risk of fire, danger to health Risk of fatal injury</p> <p>Observe the installation conditions.</p> <p>Adequate ventilation must be ensured at the installation location to remove exhaust heat and exhaust gases.</p>
	<p>Do not open when hot</p> <p>Opening the furnace when it is hot above 200 °C (392 °F) can cause burns.</p> <p>No liability is assumed for damage to ware or furnace.</p>
	<p>Exhaust duct, lid and furnace housing are hot when the furnace is in operation. Risk of burning.</p> <p>Do NOT touch the exhaust duct, lid or housing during operation.</p>
	<p>Risk of fire if using an extension cable. Risk of fatal injury</p> <p>For all furnace models with a plug-in connection, ensure that the distance between the circuit breaker and the power socket to which the furnace is connected is as short as possible.</p> <p>NO power board or extension cable is used between the power socket and the furnace.</p>
	<p>For all furnace systems</p> <p>This furnace system has no safety technology for processes in which flammable mixtures can form. Operation with explosive gases or mixtures or the formation of explosive gases or mixtures during the process is not permitted.</p> <p>Do NOT place any potentially explosive dusts or solvent mixtures inside the device.</p> <p>Do NOT operate the device in areas where there is a risk of explosion.</p>

5 Components of the laboratory furnace



No.	Name	No.	Name
1	Collar insulation	12	USB interface
2	Furnace chamber	13	Power switch with integrated fuse (for switching furnace on/off)
3	Insulation made from non-classified fiber material	14	Fuse for additional power connection (for accessories)
4	Flap door	15	Additional power connection (for accessories)
5	Heating elements on support tubes	16	Power plug (to 3600 watts) with snap-in coupling
6	Lift door	17	CEE plug (from 3600 watts, max. 32 A)
7	Handle	18	Heating (ON/OFF)
8	Fresh-air flap to control fresh air	19	Power switch (to switch the furnace on and off)
9	Thermocouple	20	Controller R7
10	Multi-layer, sturdy refractory insulation (only models L(T) ../14)	21	Heating elements in quartz glass tubes
11	Controller series B510/C550/P580	22	Heating plates L 1 – L(T) 3: left/right L(T) 5 – L(T) 15: top/bottom L(T) 24 – L(T) 60: left/right/bottom

6 Transporting the furnace



Note

Wear protective gloves when installing the furnace.
The furnace should be transported by at least two people.

- When the furnace is delivered, check the transport packaging for possible damage. Remove straps from the transportation packaging.
- Compare the delivered items with the delivery note and the purchase order documents.
- Carefully lift the cardboard box. On the pallet, you will find a packaging unit for accessories (e.g., exhaust air duct, tile, power cable).
- To carry the furnace, place your hands at the sides beneath it and make sure that you have a firm grip. Lift the furnace from the pallet and carefully lower it at the location where it is to be installed.
- The packaging material inside and around the furnace must be removed completely. All packaging material can be recycled.

7 Requirements for the installation location

Install the furnace only in a dry room. Temperatures should be between +5 °C and +40 °C, with maximum 80% humidity. The surface (floor or bench) where the furnace is to be installed must be level so that the furnace stands upright. Place the furnace on a non-flammable surface. The load-bearing capacity of the bench must be suitable to take the weight of the furnace plus accessories.

Flammable materials must be kept at least 0.5 m from the furnace on all sides. In some cases, the distance must be greater due to local conditions. The minimum distance between the furnace and non-flammable materials may be reduced to 0.2 m at the sides. If the charge emits gases or vapors, ensure adequate ventilation at the installation site and/or a suitable exhaust gas venting system. If required, the customer must provide a suitable extraction system for exhaust air.

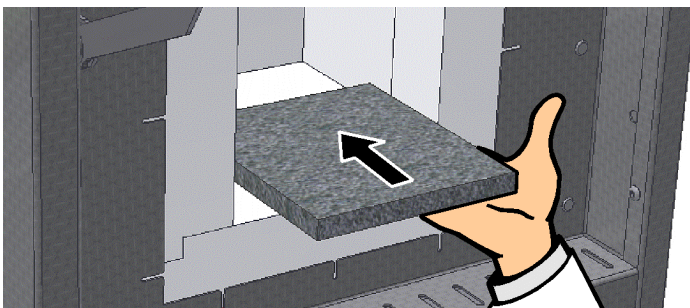
8 Assembly, Installation, and Connection

Inserting the base plate/pan

A base plate or pan should be used at all times when the furnace is being operated. Carefully place the base plate/pan in the center of the furnace floor. When inserting these, ensure that the door collar and heating elements are not damaged. Avoid contact with the heating elements, as they could be damaged.

Position the charge as close to the center of the furnace floor as possible. This ensures even heating. Once the furnace has been charged, carefully close the furnace door.

Do not exceed the maximum load of the furnace floor of 2 kg/dm² and do not use more than one base plate as standard.



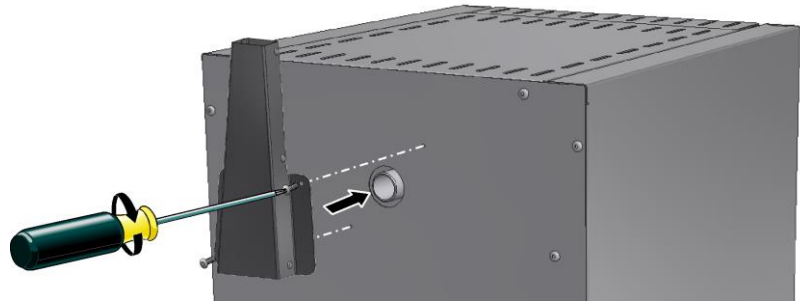
Note

Due to the soft furnace floor, models L(T) 3/11 and L(T) 3/12 have a base plate. Nabertherm accepts no liability for damage to the furnace floor if these base plates are not used.

Installing the extraction flue

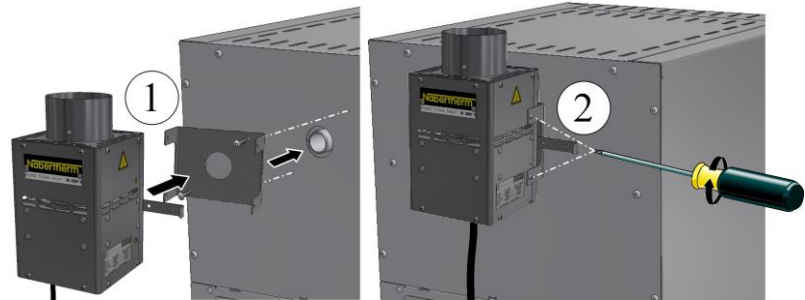
(A) Extraction flue

(exhaust cross section 40 x 30 mm)



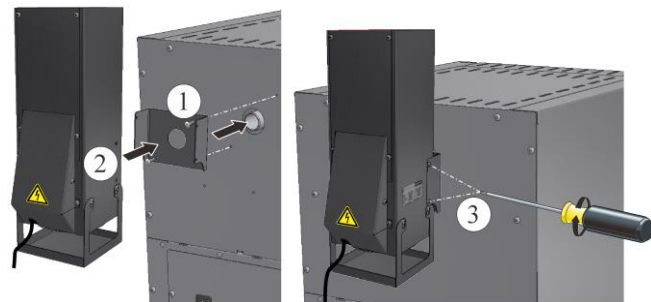
(B) Extraction flue with fan

(exhaust cross section Ø 80 mm)



(C) Extraction flue with ventilator and catalytic converter

(exhaust cross section 120 x 120 mm)



To install option (A), attach the exhaust connection to the gas outlet on the back of the furnace and fix it in place with the supplied screws.

If using options (B) and (C), first position the U-shaped metal sheet above the gas outlet on the back of the furnace and screw it in place. Then attach the extraction flue and screw it in place. Either insert the connection plug into the socket at the back of the switchgear or into an external socket.

With option (C), make sure that the catalytic converter is operating from the start of the program to about 600 °C. The cleaning performance of the catalytic converter is largely dependent on the substances/casting materials used and their composition. It is not possible to make a statement regarding the residual components that are emitted to the surroundings.



Notice

Even small quantities of inorganic substances, such as heavy metals, halogens, silicones and fine dusts destroy the catalytic converter.

9 Venting Exhaust Fumes

We recommend that you connect an exhaust air pipe to the furnace or place it beneath an extractor hood to remove the exhaust air.

A suitable metal exhaust gas pipe of NW 80 to NW 120 can be used to vent the gases. It must be attached facing upwards and be fixed to the wall or ceiling. Position the pipe in the middle above the exhaust flue of the furnace. The exhaust gas pipe must not be fitted tightly to the flue pipe, otherwise there will be no bypass effect. This is necessary so that not too much fresh air is drawn through the furnace.

Furnace with extraction flue and fan: Position exhaust piping at least 50 mm above the extraction flue.

Furnace without exhaust pipe or with catalytic converter: Use an exhaust pipe with at least NW 120. We recommend that you remove the exhaust air with a flue.

10 Connecting the furnace to the power supply



The customer must provide the electrical power supply.

- The furnace must be installed according to its intended use. The power connection must correspond to the values on the furnace type plate.
- The power socket must be close to the furnace and be easily accessible.
- Do not use extension cables or power strips.
- The power cable must not be damaged. Do not place any objects on the power cable. Lay the cable in such a way that no one can stand on it or trip over it.
- Power cables may be replaced only with similar, approved cables.
- Ensure that the connection cable of the furnace is protected.

Plug the supplied power cable with snap-in coupling into the rear wall or side of the furnace. Then connect the power cable to the power supply. Use only an electric socket with suitable protective ground contact. Connect the power cable to the power supply. Testing of ground resistance (compliant with VDE 0100); also refer to the accident prevention regulations.

11 Initial Start-Up and Initial Heating

Before starting the furnace for the first time, allow it to acclimatize at its installation location for 24 hours.

When the furnace is put into operation, the following safety information must also be observed to prevent injuries and damage to property.

- Make sure that the instructions and information in the operating manual and the controller instructions are observed and followed.
- Before starting the furnace for the first time, make sure that all tools, parts that do not belong in the furnace and transportation securing equipment have been removed.
- Before you switch on the furnace, make sure that you know what to do in case of faults or emergencies.

Before placing materials in the furnace, check whether they could harm or destroy the insulation or the heating elements. Materials that could damage the insulation include: alkalis, alkaline earths, metal vapors, metal oxides, chlorine compounds, phosphorous compounds, and halogens. **If applicable, read the labels and instructions on the packaging of materials that you use.**

Heat the furnace to dry out the insulation and to get a protective oxide coating on the heating elements. **The life of the heating elements is dependent on obtaining a good oxide coating.** There may be some unpleasant odors while the

furnace is heating. This is due to binder being emitted from the insulation material. It is advisable to ventilate the room in which the furnace is located well during the first heating phase.

Heat empty furnaces in the L product line **to 1050 °C in approx. 6 hours** and empty furnaces in the LE product line **to 1050 °C without heating ramp** and maintain this temperature for approximately **one hour**. After the first heating phase allow the furnace to cool to room temperature. The furnace is now ready for operation.

12 Operation

Switch on the controller		
Procedure	Display	Comments
Switch on the power switch		Set the power switch to “I”. L product line: on the back of the furnace LE product line: on the front of the furnace
Furnaces in the L product line		Furnaces in the LE product line
		<p>The furnace status is displayed. After a few seconds, the temperature is displayed. The first time you switch on the furnace, a wizard is displayed that enables you to enter some basic settings, such as language. Once the temperature is shown on the controller, the controller is ready for operation.</p> <p>The current value is shown at the top and the setpoint is shown below this. Use ▲ ▼ to increase or decrease the setpoint. The device applies the new setpoint as soon as you release the button.</p> <p>If the process requires a slower temperature increase, you can also set a ramp function.</p>



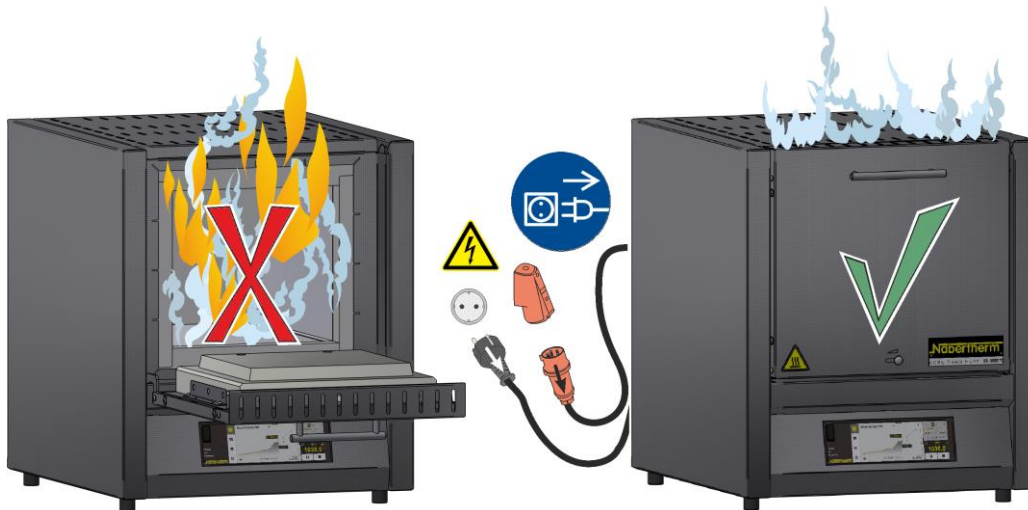
Note

See the separate operating instructions for a description of how to enter temperatures and times and to “start” the furnace.

13 What to do in case of an emergency

In case of unexpected events in the furnace (e.g., a lot of smoke, odors or fire), switch the furnace off immediately by disconnecting the power plug and keep the door and fresh air lever closed. Wait until the furnace has cooled naturally to room temperature.

The electric socket must be accessible at all times when the furnace is operating.



14 General Operation and Loading the Furnace

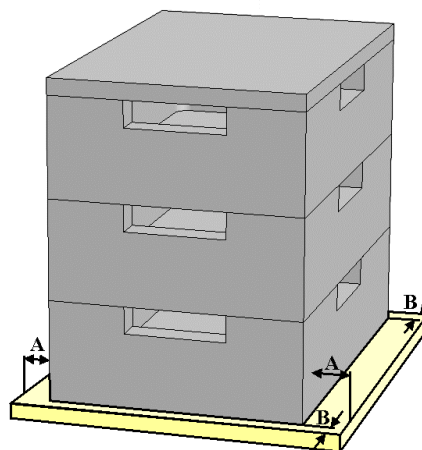
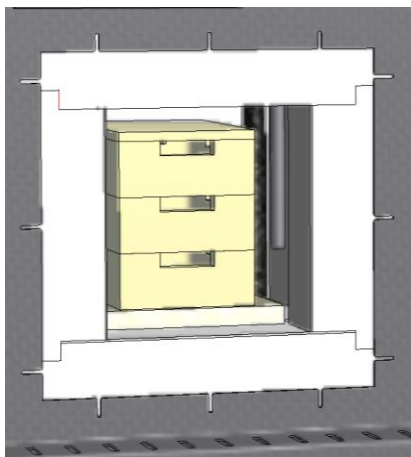
Open and close the furnace door carefully. When loading the furnace, make sure that the door collar, the furnace insulation and the heating elements are not damaged. When the furnace has been loaded, close the door carefully so as not to damage the insulation. Make sure that the door is closed properly. To ensure even temperature distribution, leave space between the ware in the furnace and to the side walls.

Opening a hot furnace at temperatures above 200 °C (392 °F) will lead to increased wear of the following components: insulation, door seal, heating elements, and furnace housing.

Discoloration of stainless steel and cracks in the insulation/tiles caused by heat expansion have no effect whatsoever with regard to the functioning or quality of the furnace.

Stackable saggars (accessory)

Place the bottom sagger in the center of the base plate. Place other saggars and lids on top of this in the middle. When closing the furnace door, make sure that the door insulation does not push the sagger into the furnace chamber.



15 Cleaning products

To clean the furnace, it is important that the power plug is pulled out and that the furnace has cooled completely. Pay attention to the labeling and information on the cleaning product packaging.

Use commercial cleaning products that are either water-based or non-flammable and free of any solvents to clean the housing. Use a vacuum cleaner for the interior.

Wipe the surface with a damp, lint-free cloth. You may also use the following cleaning products:

Component and position	Cleaning product
Outer surfaces (frame)*	Use commercial cleaning products that are either water-based or non-flammable and free of any solvent*
Outer surfaces (stainless steel)	Stainless steel cleaner
Interior	Carefully clean with a vacuum cleaner (pay attention to the heating elements)
Insulation materials	Carefully clean with a vacuum cleaner (pay attention to the heating elements)
Instrument panel	Wipe the surface with a damp, lint-free cloth (e.g., glass cleaner)
*You must ensure that the cleaning product does not damage the water-soluble, environmentally safe paint (test the product on an interior, concealed area).	

Clean quickly to protect the surfaces. Remove the cleaning product completely from the surfaces by wiping them with a damp, lint-free cloth.



MORE THAN HEAT 30-3000 °C

Headquarters:

Nabertherm GmbH · Bahnhofstr. 20 · 28865 Lilienthal/Bremen, Germany · Tel +49 (4298) 922-0, Fax -129 · contact@nabertherm.de · www.nabertherm.com

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