Nabertherm
MORE THAN HEAT 30-3000 °C

# Installation Instructions

## Replacement of Heating Elements Embedded in Grooved Bricks

## Chamber Furnace NE 40 – NE 280

M06.0020 ENGLISCH

Made
in
Germany

www.nabertherm.com

Reg: M06.0020 ENGLISCH
Rev: 2025-10

# 1 Introduction

These instructions apply to the replacement of heating elements embedded in the grooved refractory bricks of chamber furnaces in the NE 40 to NE 280 model range.

These instructions contain all the information you need to replace the heating elements and start up the furnace.

The figures illustrate all key steps of the assembly process. However, you should read the complete installation instructions before commencing assembly. Pay close attention to the safety instructions provided in the installation manual and the furnace operating instructions.

**Note**

The pictures contained in the instruction manual may differ in terms of the function, design and furnace model.

## 1.1 Key to the Symbols and Terminology Used in Warnings

| | |
|---|---|
| **SAFETY INFORMATION** | Draws attention to certain safety-relevant instructions or procedures. |
| ***NOTICE*** | Indicates a hazard that could damage the equipment. |
| **CAUTION** | Indicates a hazardous situation that could result in minor or moderate injury. |
| **WARNING** | Indicates a hazardous situation that could result in death or serious or irreversible injury. |
| **DANGER** | Indicates a hazardous situation that will result in death or serious injury. |

### Information Symbols in the instructions

**General**

This symbol draws attention to important rules that must be observed. Mandatory action signs protect people against injury and show what needs to be done in certain situations.

**Important information for operators**

This symbol draws the operator's attention to important information in the operating instructions that must be observed.

**Pull the plug to disconnect the furnace from the power supply**

This symbol tells the operator to pull the plug to disconnect the furnace from the power supply (depends on the model – no circuit breaker installed).

**Disconnect the furnace from the power supply by using the circuit breaker**

This symbol tells the operator to disconnect the furnace from the power supply by using the circuit breaker (depends on the model – no plug installed).

**General hazards**

This symbol draws the operator's attention to a general hazard.

**Warning – electric shock**

This symbol warns the operator that there is a risk of an electric shock if the following warnings are ignored.

**Warning about sharp objects**
This symbol warns the operator about the risks of cutting injuries due to sharp or pointed objects to prevent minor or serious injuries.

**Do not clean with water**
This symbol warns the operator that water or cleaning products must not be poured over the furnace. A high-pressure cleaning device must also not be used.

## 2 Safety

The safety advisories in the repair instructions and in the furnace operating instructions must be observed.

**⚠ DANGER**

Work on the electrical equipment may be carried out only by a licensed electrician.

Danger of electric shock.

Pull out the plug or disconnect the furnace from the power supply via the circuit breaker (depends on the model)

**⚠ CAUTION**

The pointed ends of the wires are a potential injury hazard.

Cuts.

Wear appropriate protective gloves.

**SAFETY INFORMATION**

Make sure that no cables are protruding or trapped. Pay attention to sharp surfaces. Tighten all screws on the connection terminals after one week of operation and then once each year. Avoid all stress or twisting of the heating wire. If this advice is not followed, the heating wire may be damaged.

**Caution – Damage to components!**

Heating elements are extremely fragile. Avoid all stress or twisting of the heating elements. If you do not follow this advice, you may damage the sensitive heating elements.

## 2.1 Personal Safety Equipment (PSA)

Wear protective clothing.

Sharp edges – Wear suitable gloves to prevent cuts on sharp edges.

Wear goggles to protect your eyes.

Wear a filter mask (P2 or higher) to protect your airways when working with fiber insulation, for example.

## 2.2 General Information for Servicing and Maintenance

- All maintenance work should be carried out in a clean environment.
- Caution: Protect your eyes and hands during cleaning.
- Always handle the product with care.
- Do not use in environments containing corrosive gases, chemicals, saltwater or steam.
- Operate only within the specified operating limits when used in areas where explosion hazards exist.
- Do not use in locations subject to vibration or shock loads. Check the product's technical specifications before use.
- Do not operate the product in areas exposed to radiant heat.
- Use a soft, clean, lint-free cloth on surfaces that require cleaning. Many household and industrial detergents contain abrasive substances or chemical concentrates and must not be used for cleaning.

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|---|---|
|  | **Warning – General hazards!**<br>If installed improperly, the functioning and safety of the system can no longer be guaranteed. The connection must be properly installed and put into operation by qualified personnel. |

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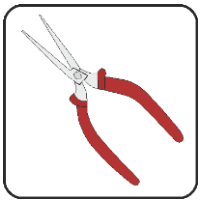
|---|---|
|  | **Note**<br>Nabertherm accepts no liability for damage resulting from improper installation. |

## 2.3 Tools Required for Assembly:



Small needle-nose pliers (for removing the clamps)

Small hammer (for gently driving in the clamps)

Flathead screwdriver (to assist in driving in the clamps)

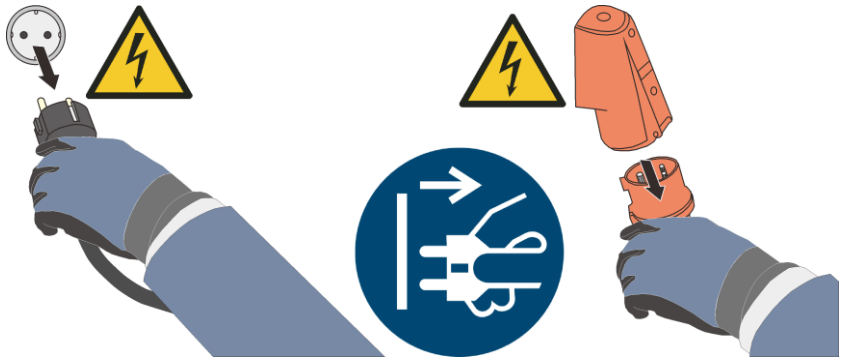
# 3 Turning off the Controller/Furnace

When the furnace is switched off, wait until the furnace and the attachments have cooled to room temperature.

| **Turn off the controller** | | |
|---|---|---|
| **Steps** | **Display** | **Comments** |
| Turn off the power switch |  | Turn off the power switch by setting it to "**O**"<br>(power switch type differs depending on features/furnace model) |

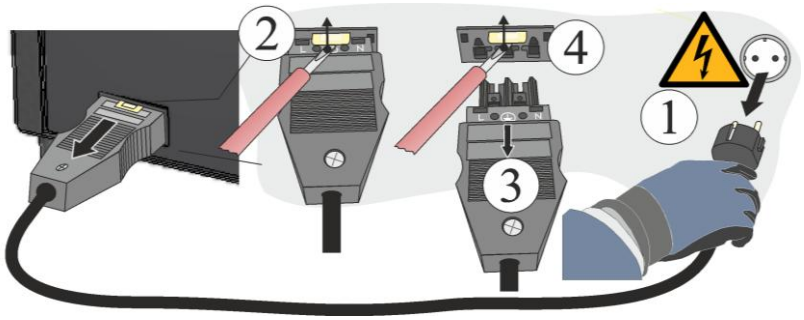
## 3.1 Disconnecting the Power Supply Cable from the Furnace

Before you perform any service work, disconnect the furnace from the power source. Disconnect the power plug from the power outlet.



Disconnecting the mains plug (similar to picture)

## 3.2 Separate the Snap-In Coupling (Plug) from the Furnace Housing



Disconnecting the snap-in coupling (plug) from the furnace housing (similar to picture)

## 4 Dismantling the Rear Panels on the Furnace

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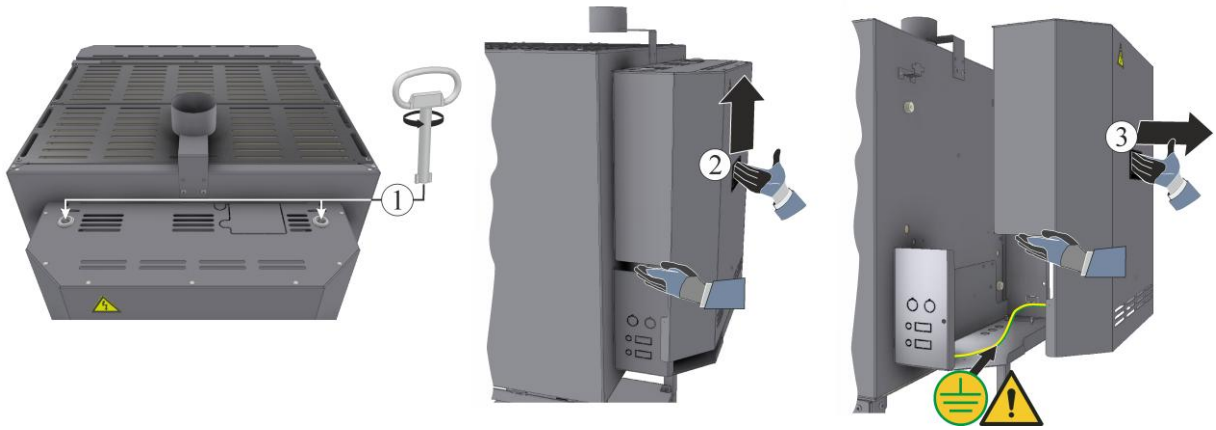
| | **Note**<br>Because of the many different furnace models, we recommend that you take several photos of the initial condition, the installed heating elements and the switchgear. This will simplify subsequent installation and wiring of new heating elements. |

Loosen the cover using the key supplied. Keep the cover in a safe place for later reuse. Place the cover on a soft surface (such as foam rubber). The illustration may differ depending on the furnace model and equipment.

If present, pay attention to the protective ground cable between the rear wall and the terminal. If necessary, disconnect the cable from the terminal.

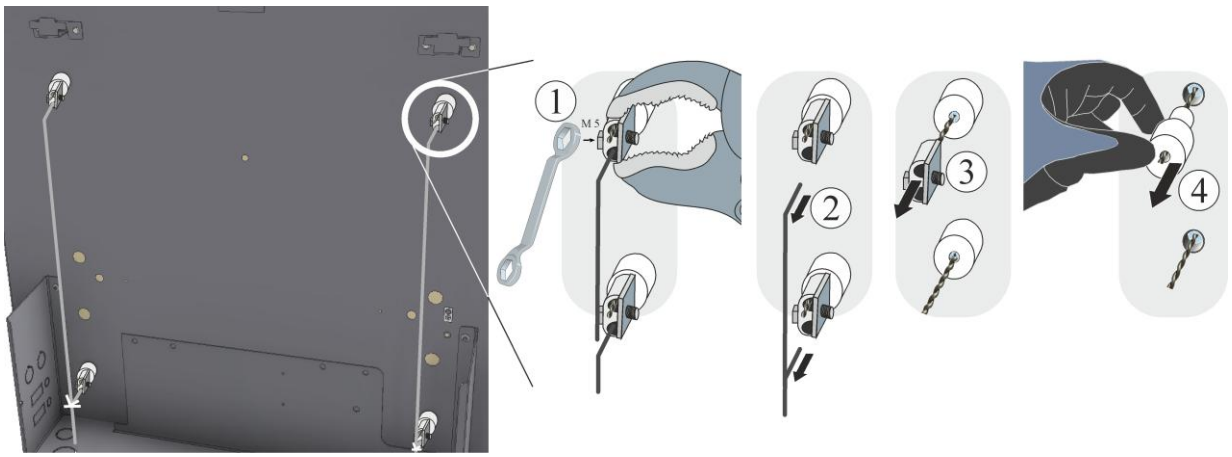



## 5 Undoing the Electrical Connections

Unscrew the screws (1) of the connection terminals (3). Place the screws and the connection terminal in a safe place so that they can be reused. So as not to damage the connection terminal or the ceramic feedthrough tube we recommend the use of a suitable pipe wrench (example) as a brace when unscrewing the screws of the connection terminal.

**Caution**: The pointed ends of the wires are a potential injury hazard.

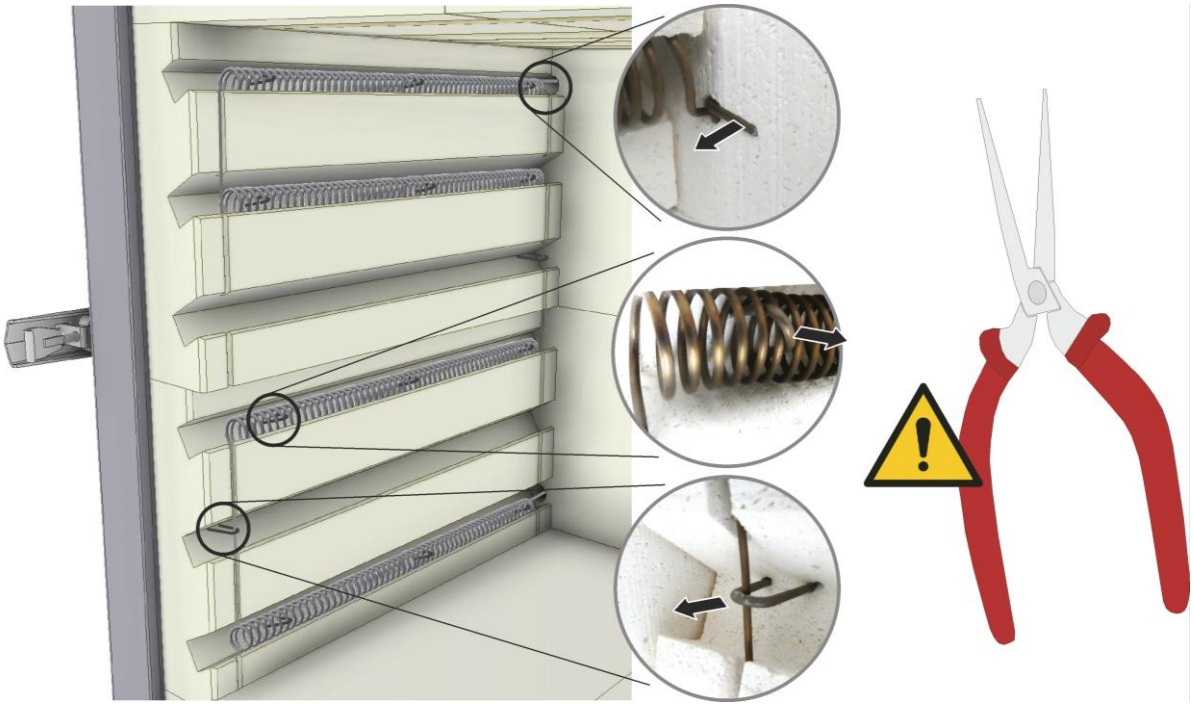
Pull the ceramic feedthrough tube out and keep it in a safe place so that it can be used again (replace if included in the spare parts delivery).




**1** Hexagonal screw / **2** Cable / **3** Connecting terminal / **4** Ceramic duct

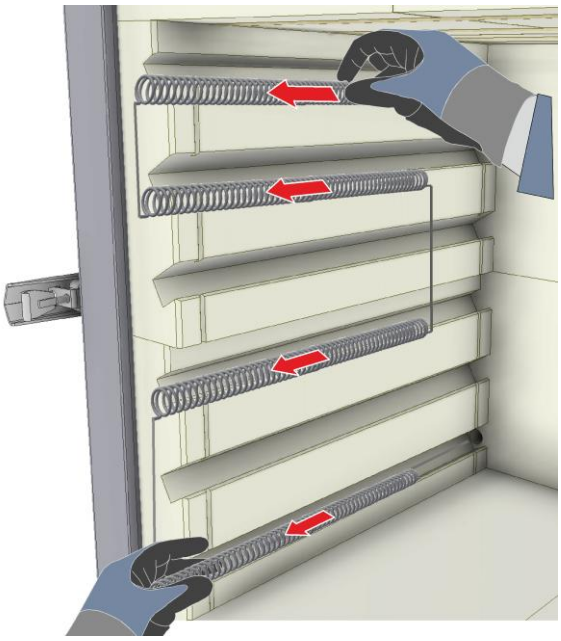
## 6 Removing the heating elements

Carefully remove the clamps securing the heating wire from the side wall or the furnace floor using suitable needle-nose pliers. Ensure that you do not damage the insulation. Always use the new clamps supplied with the unit when installing a new heating wire. Do not reuse old clamps.



Gently move the heating elements toward the center of the furnace chamber, then slowly pull them out of the chamber. When shifting the heating elements sideways, take care not to damage the surrounding furnace collar (insulation), as it is particularly fragile.

Carefully pull the heating elements toward the center of the furnace chamber



Carefully remove the heating element from the furnace chamber

## 6.1 Cleaning – vacuuming the furnace

We recommend cleaning the inside of the furnace regularly and after any repairs using a vacuum cleaner. Use the soft brush nozzle of the vacuum cleaner. Take care when vacuuming and avoid touching the insulation with hard objects.

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|  | ***CAUTION*** |
| | Do not use water or other liquid cleaning products to clean the insulation.<br>Cleaning with water or other liquid cleaning products will destroy the insulation. |

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|  | **Notice**<br>Use a vacuum cleaner with a HEPA filter to prevent dust getting into the surroundings. |

| | |
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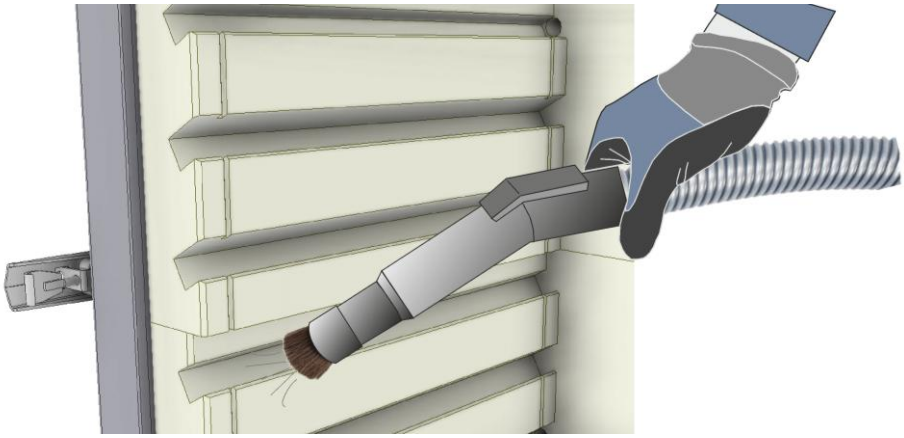
|  | **Note**<br>Deposits in the grooves and at the heating element connections, as well as contaminated feedthrough tubes, can significantly reduce the service life of the new heating elements. Therefore, stubborn contamination must be removed, if necessary by mechanical cleaning, and any damaged feedthrough tubes must be replaced. |



# 7 Installing the New Heating Elements

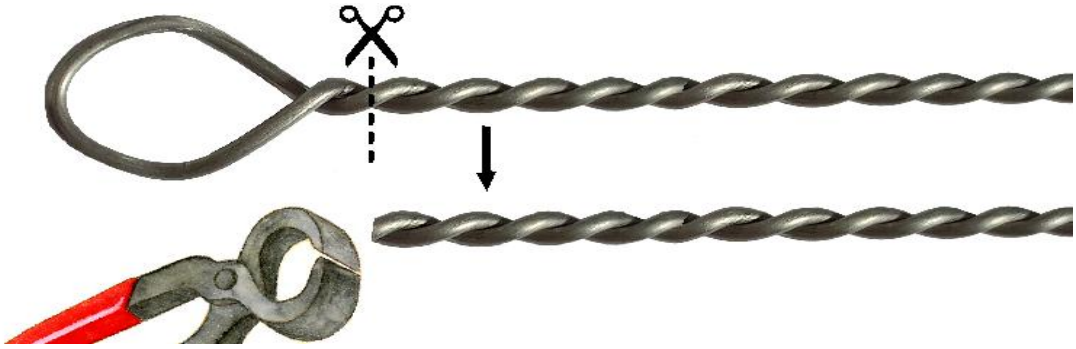
We recommend that two people replace heating elements.

The new heating elements are installed in reverse order. When installing the elements into the furnace chamber, pay attention to the “bend” located on the existing upper and lower heating elements. With the utmost care, insert each element until it reaches the edge of the insulation.

Check the supplied heating wires for damage before installation.

Compare the delivered items with the delivery note and the purchase order documents. Immediately notify the carrier and Nabertherm GmbH of any missing or damaged parts, as complaints received at a later date cannot be acknowledged.

**Caution**: The pointed ends of the wires are a potential injury hazard.

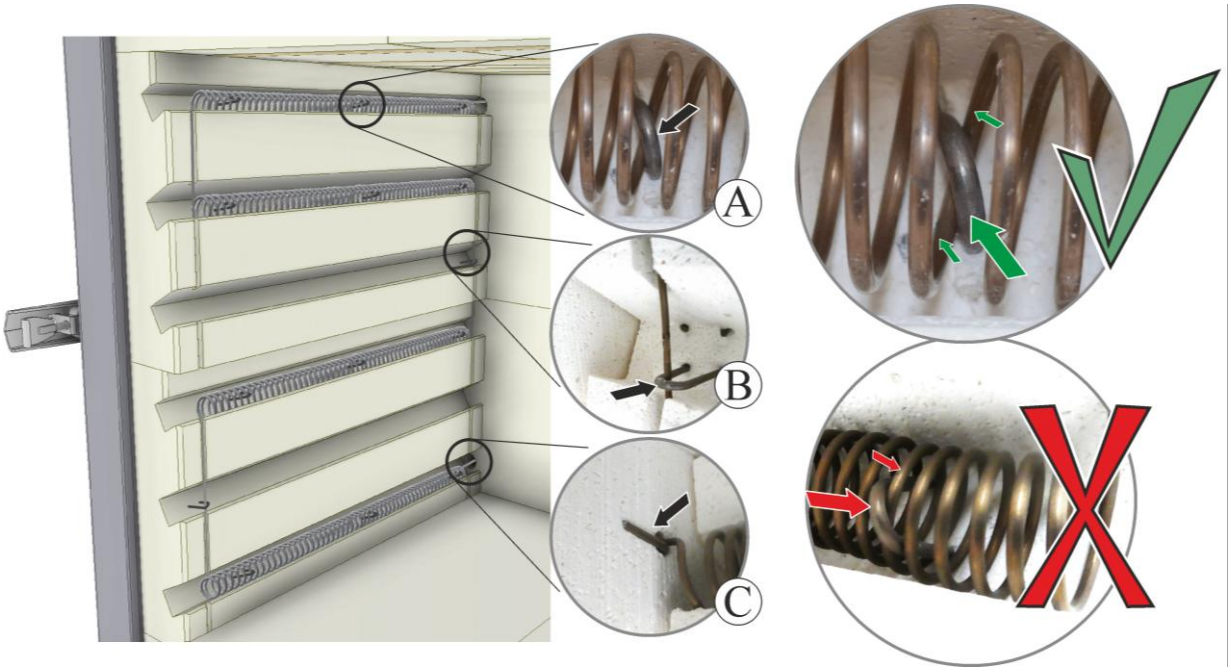


Cut off the eyes at the ends of the heating elements (similar to picture).

Carefully insert the ends of the heating elements from the inside through the existing holes. Then gently place the heating element into the groove of the insulating brick. Because furnace models differ in the type and number of heating elements, some details may vary from those shown here.

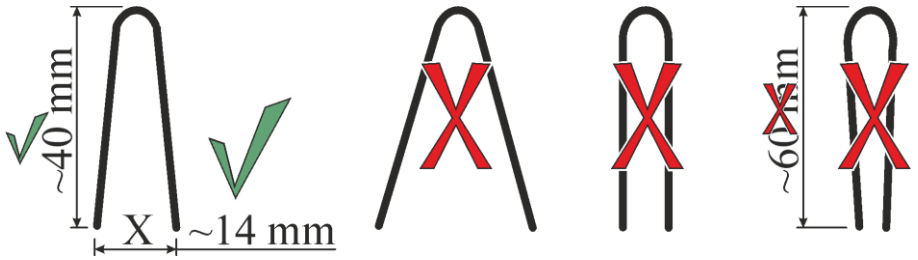
Place the heating wire into the grooves of the insulating brick (similar to picture)

The supplied clamps can be pressed in by hand, as the insulation material is relatively soft. They are needed to prevent the heating elements lifting out of the grooves when they get hot.



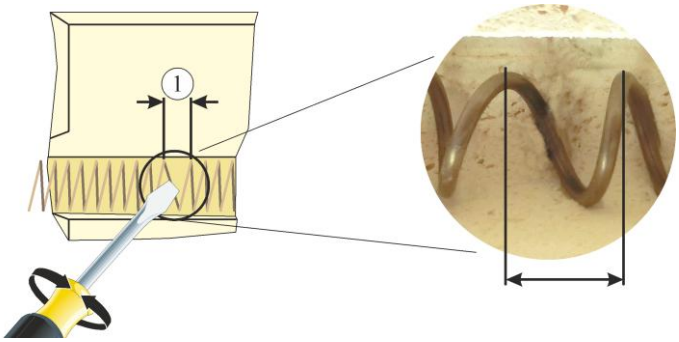

Place the heating wire into the groove(s) and secure it with clamps (similar to picture)

Do not insert the clamps into the holes of the previous clamps. We recommend offsetting the new clamps by approx. 2 cm.



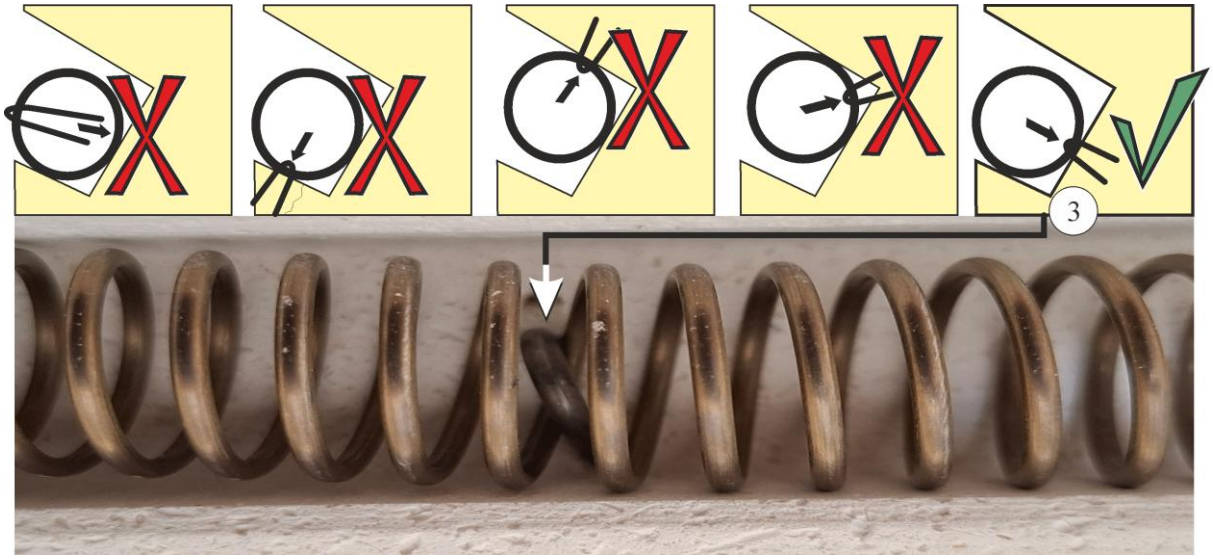

| | |
|---|---|
| | **Notice**<br>Distance X of the supplied fasteners must not be changed. X ~ 14 mm |

1. Where a clamp is to be installed, carefully widen the heating coil (heating spiral) slightly using an appropriate flat-blade screwdriver (1).

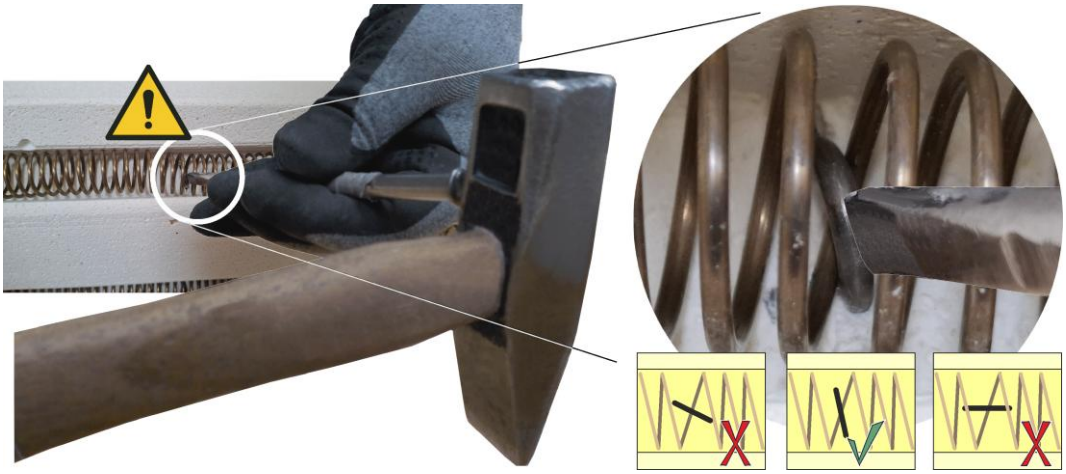



2. Position the fasteners in the straight wall (3) of the groove to ensure that the heating wire sits properly and functions as intended.

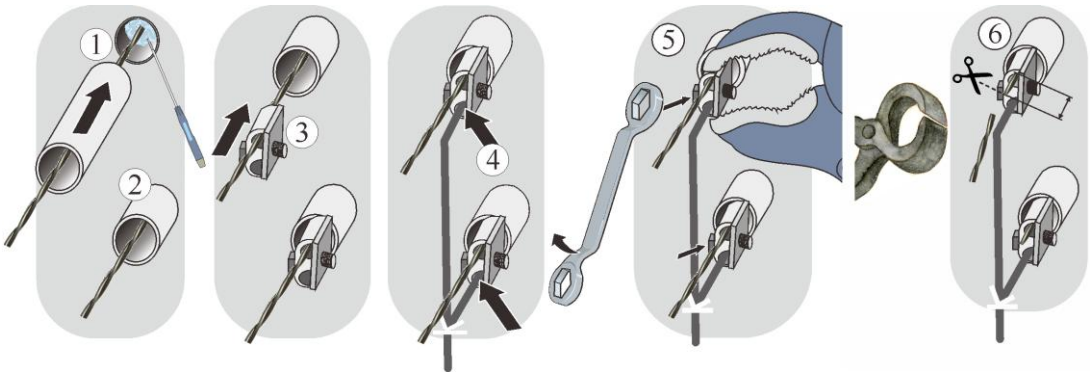
3. After installation, check that the heating wire and fasteners are positioned correctly.




4. As illustrated, use a suitable tool to tap the supplied fasteners carefully into the insulating brick until the heating wire sits completely on the brickwork. Make sure that the insulation brick is not damaged.



5. Seal the bore of the ceramic feedthrough tubes at the connection end with a small amount of fiber wadding (included in the scope of delivery). This should be done from the rear side of the furnace. To do this, distribute the fiber wadding around the end of the heating element with a small screwdriver (1) and push this from outside to the back of the small feedthrough hole. Do not use too much fiber wadding so that the ceramic feedthrough tubes (2) can still be inserted until they engage.
6. Slide the ceramic feedthrough tube (2) on to the ends of the heating elements until they engage.
7. Slide the connection terminals (3) up to the ceramic feedthrough tube.
8. Use the terminals to create technically correct electrical connections (4).
9. Tighten the connection terminal screws (5) to a torque of 6 Nm. To prevent damage to the connection terminal and ceramic feedthrough tube, hold the terminal in place while tightening, e.g., using a suitable adjustable pipe wrench.
10. Shorten the projecting twisted heating element ends with suitable pincers (6). We recommend that you leave approx. 0.5 cm between the edge and the connection terminal.




11. Thoroughly clean the furnace chamber, grooves and heating elements by vacuuming.
12. The switchgear cover is assembled in the reverse order.

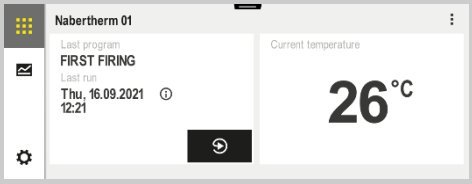
| SAFETY INFORMATION |
| --- |
| If installed improperly, the functioning and safety of the system can no longer be guaranteed. The connection must be properly installed and put into operation by qualified personnel. |

| SAFETY INFORMATION |
| --- |
| Make sure that no cables are protruding or trapped. Pay attention to sharp surfaces. Tighten all screws on the connection terminals after one week of operation and then once each year. Avoid all stress or twisting of the heating wire. If this advice is not followed, the heating wire may be damaged. |

# 8 Operation

Insert the power plug, then switch on the mains power and check the furnace for proper operation. Measure the current draw while performing a fast heating ramp, then compare the results with the wiring diagram values.

## 8.1 Turning on the Controller/Furnace

| **Turning on the controller** | | |
| --- | --- | --- |
| **Procedure** | **Display** | **Comments** |
| Turn on the power switch |  | Set power switch to “**I**”.<br>(Power switch type varies according to design/furnace model) |
| The furnace status is displayed.<br>After a few seconds, the temperature is displayed. |  | When the temperature is shown on the controller, the controller is ready for operation. |

An oxide coating must form for the heating elements to function properly. To regenerate the heating elements, we recommend a **monthly** oxidation firing in an oxidizing atmosphere to create a protective oxide coating

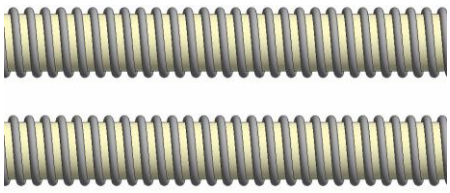
For the duration of the oxidation firing, please refer to “Recommendations for Heating the Furnace for the First Time” in the furnace operating instructions.

Carry out this procedure when using the furnace for the first time and repeat **every time** a heating element is replaced.

**The oxidation firing is carried out without any furnace accessories or charge. Non-flammable protective gases prevent oxidation. Gas supply equipment must be blocked during the oxidation firing.**

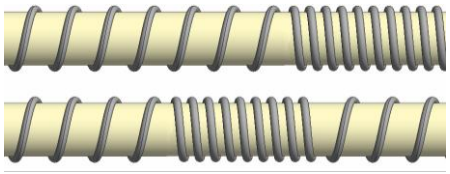
Oxidizing atmospheres (e.g. air or oxygen) help oxidize the heating elements.

Non-flammable protective gases (reducing atmosphere, e.g. argon, helium) prevent oxidation.



Before

Uneven spacing is a natural process and no correction is required. However, if this is too pronounced, it may have an effect on temperature distribution.



After (uneven spacing)

| | |
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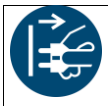
|  | **Note**<br>**In an emergency, furnace operation is stopped by unplugging the power plug.**<br>Therefore, the power plug must be accessible at all times when the furnace is operating so that it can be pulled out quickly in an emergency. |

## 9 Environmental Regulations

When it is delivered, the kiln contains no substances that require a hazardous waste classification. However, residues of process materials may accumulate in the kiln insulation during operation. These may be hazardous to health and/or the environment.

- Dismantle the electronic components and dispose of them as electric scrap.
- Remove the insulation and dispose of it as hazardous waste/hazardous material
- Dispose of the housing as scrap metal.
- Contact the responsible disposal company to dispose of the materials listed above.

| | |
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|  | Electric and electronic equipment marked with a crossed-out garbage can should not be deposited in household waste and should be separated for appropriate management and recycling.<br>A bar below the garbage can indicates that the product was launched onto the market after August 13, 2005. |

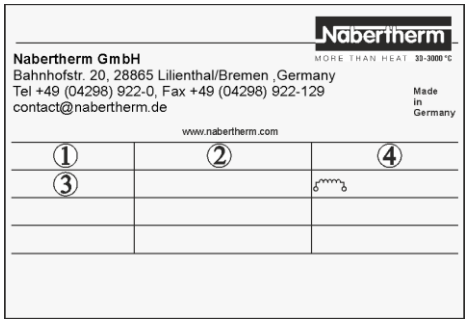
| | |
|---|---|
|  | **Notice**<br>The regulations applicable in the country where the equipment is installed must be observed. |

## 10 Nabertherm Service

Nabertherm Service is available at all times for maintenance and repair of the system. If you have any questions, problems or requests, please contact Nabertherm GmbH – by mail, phone or e-mail.

| **Mail** | **Phone or fax** | **Website and e-mail** |
|---|---|---|
| Nabertherm GmbH<br>Bahnhofstrasse 20<br>28865 Lilienthal<br>Germany | Phone: +49 (4298) 922-333<br>Fax: +49 (4298) 922-129 | www.nabertherm.com<br>contact@nabertherm.de |

When contacting us, please have the details on the type plate of the kiln ready.




① Kiln model

② Serial number

③ Article number

④ Year or month and year of manufacture

# 11 For Your Notes

## For Your Notes

## For Your Notes

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