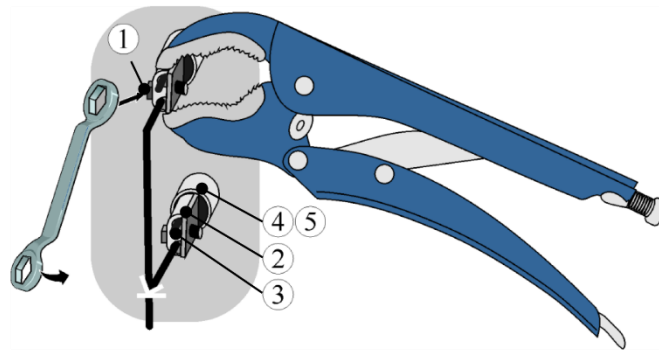


Tip: Because we build many different furnace models, we recommend that you take several photos of the installed heating elements and the switchgear. That simplifies subsequent installation and wiring of new heating elements.

Removing the heating elements

Unscrew the screws (1) of the connection terminals (2). 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 (5).

Warning: The wire have pointed ends that can cause injuries.



1 Hexagonal screw / 2 Connectional terminal / 3 Heating element end
4 Ceramic feedthrough tube / 5 Fiber wadding

Fig. 43: Unscrew the screws on the ends of the heating elements (similar to picture)

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).

Carefully pull out the ends of the heating elements (3) from inside the furnace.

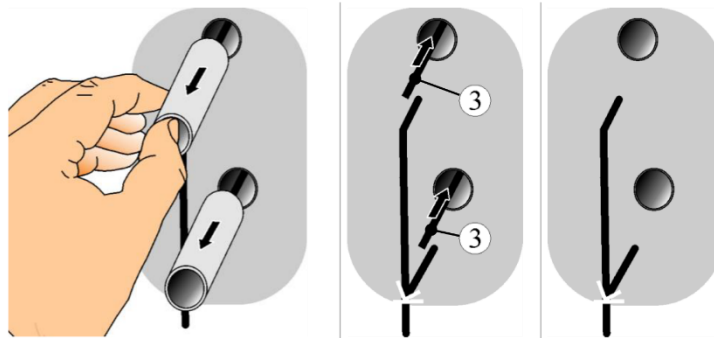


Fig. 44: Carefully remove the ceramic feedthrough tube (similar to picture)

Before you pull the heating element out from inside or carefully and slowly unwind it, remove all fasteners (1) with long-nose pliers (example). When unwinding the heating element, make sure that the insulation brick is not damaged. Caution: Old heating elements are very brittle.

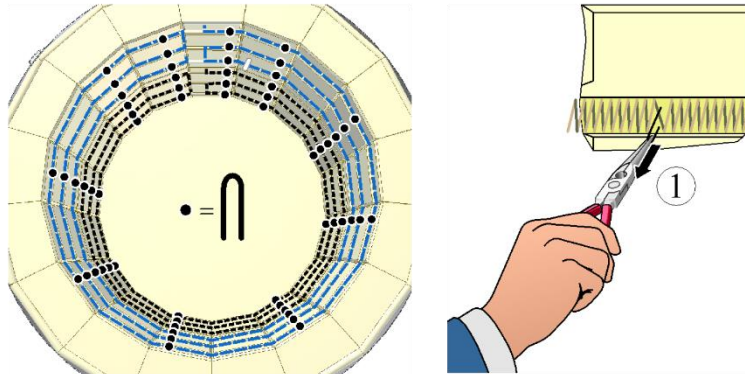


Fig. 45: Carefully remove the fasteners (similar to picture)

Installing the Heating Elements

Before installing heating elements, we recommend that you clean the furnace chamber thoroughly, with a vacuum cleaner, for example.

The (twisted) ends of the heating elements have a loop as protection. Pinch off the loop with a suitable tool (pincers, for example) before installation.

Warning: The wire have pointed ends that can cause injuries.

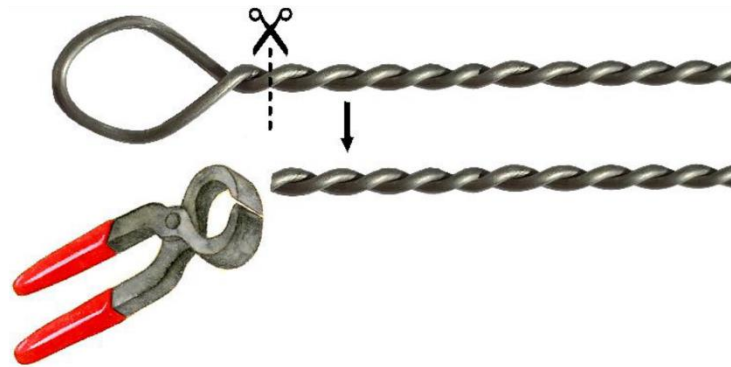


Fig. 46: Pinch off the loop on the end of the heating element (similar to picture)

Check the supplied heating elements 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.

Carefully place heating elements on a soft surface, as shown below, and, if possible, compare them with the dismantled heating elements. The length and coiling of some furnace models differ.

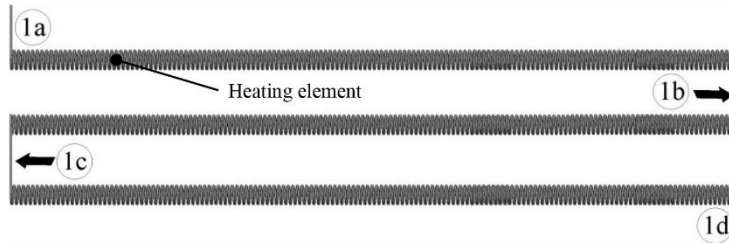


Fig. 47: Heating element (similar to picture)

Example:

First, insert the end of the heating element (1a) into the intended opening from inside (this is the opening that you pulled the previous heating element end out of).

Place the heating coil carefully into the intended groove/s. Carefully press the heating element connections (1b and 1c) into the intended slit. Insert the end of the heating element (1d) into the intended opening from inside to outside.

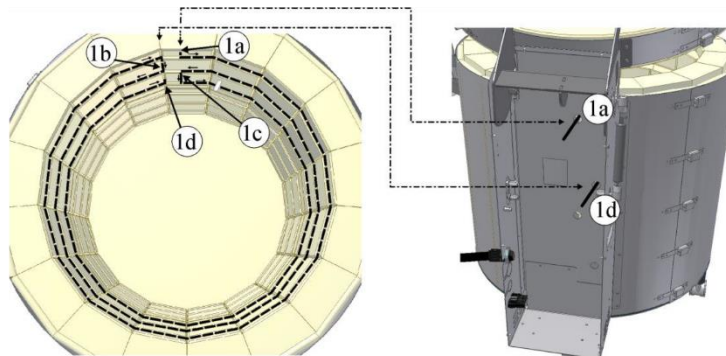


Fig. 48: Place the heating coil in the groove/s (similar to picture)

If available, assemble and place more heating elements in the intended grooves (depending on furnace model).

Example:

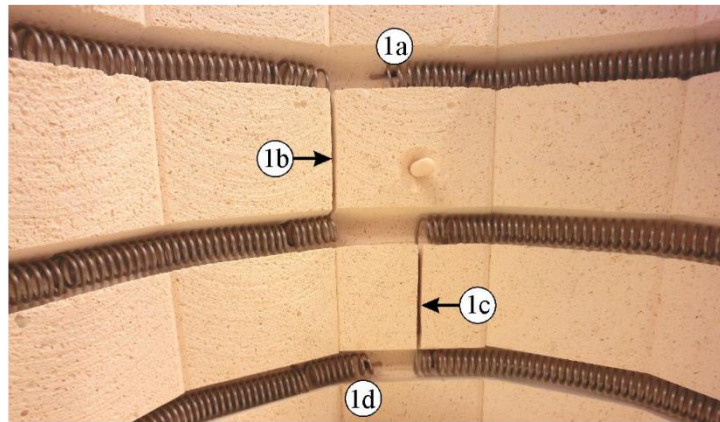


Fig. 49: Place the heating element in the groove/s (similar to picture)

Insert the supplied fasteners into the wall brickwork. They are needed to prevent the heating elements lifting out of the groove when they get hot.

Notice: Do not insert fasteners in holes of previous fasteners. We recommend that new fasteners are inserted 2 to 3 cm from existing holes.

Expand the heating element a little (1) at the position where a cramp will be inserted using a suitable slot screwdriver.

We recommend that you press the fasteners into the soft brickwork firmly (but carefully) with the help of long-nose pliers (2) until the heating element sits completely on the brickwork (see figure below).

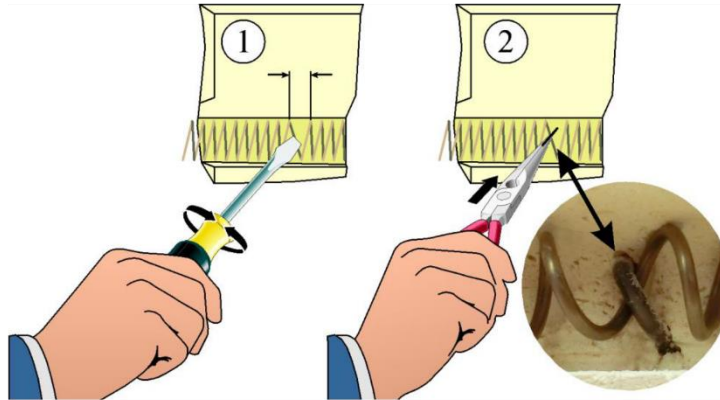


Fig. 50: Installing the fasteners (similar to picture)

Position the fasteners in the straight wall (3) of the groove to ensure that the heating element sits properly and functions as intended. After assembly, check that heating element and fastener are positioned correctly

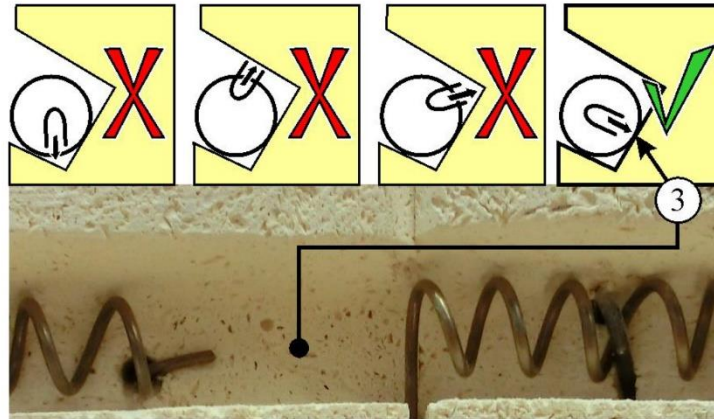


Fig. 51: Correct positioning of the fasteners (similar to picture)

Seal the gaps in the ceramic feedthrough tube with a small amount of fiber wadding (included with delivery). To do this, spread the fiber wadding around the end of the heating element with a small screwdriver (1) and press this to the back of the small feedthrough hole. Do not use too much fiber wadding so that the ceramic feedthrough tube (2) can still be inserted until it engages.

Slide the ceramic feedthrough tube (2) on to the ends of the heating elements until they engage.

Slide the connection terminals (3) until they touch the ceramic feedthrough tube.

Use the terminals to create technically correct electrical connections (4).

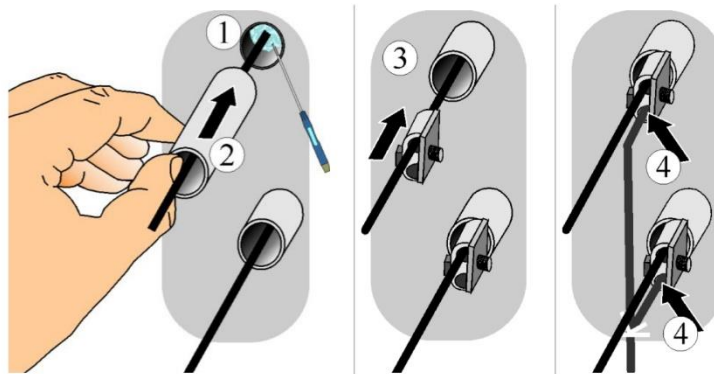


Fig. 52: Seal and insert the ceramic feedthrough tube (similar to picture)

Tighten the screws (5) of the connection terminals (the correct tightening torque can be found in the table below). 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 tightening the screws of the connection terminal (5).

Note: 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 element. If this advice is not followed, the heating elements may be damaged.

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.

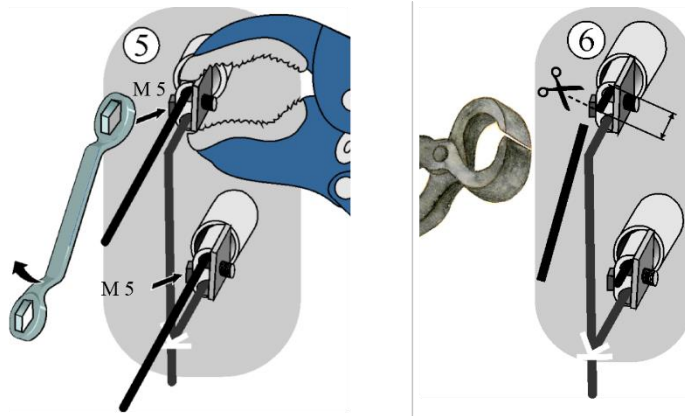

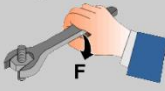


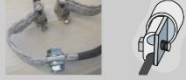


Fig. 53: Tighten the bolts and shorten the projecting heating element ends (similar to picture)

Screw tightening torque		
Tighten power cable clamps and screws on the heating elements with a defined torque. If this advice is not followed, the heating elements may be damaged.		
Thread diameter Metric thread (M)	Torque in Nm	Comment/Example
		
M 4	2,0	Tubular heating element 
M 5	6,0	SiC 
M 6	8,0	MoSi ₂ Heating coils 
M 7	14,0	
M 8	20,0	
M 10	39,0	



Note

Make sure that all screwed and plugged connections are in working order.

We recommend that you clean the switchgear and furnace chamber thoroughly, with a vacuum cleaner, for example.

The switchgear cover is assembled in the reverse order.

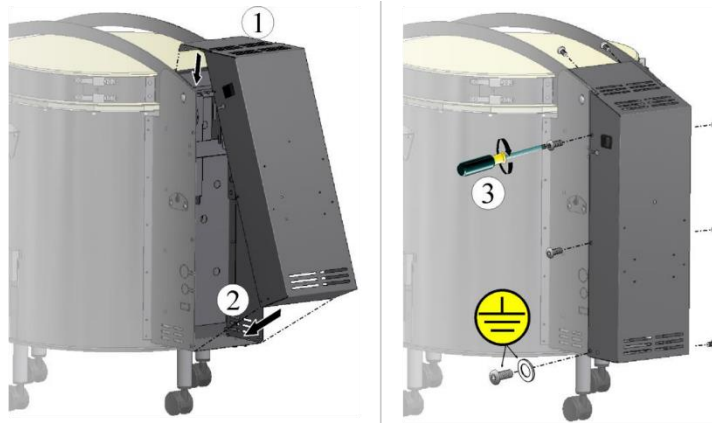


Fig. 54: Assembling the switchgear cover (similar to picture)

Commissioning

Insert the mains power connector (see chapter "Connection to the Mains Electricity"), then switch on the power switch and check the function of the furnace (see chapter "Operation").

9.2 Replacing a Thermocouple



Warning - Danger of Electric Shock!

Work on the electrical equipment may be done only by qualified, authorized electricians. During work it must be ensured that the furnace and the switching equipment cannot be activated by mistake (pull out the power plug) and that all moving parts in the furnace are secured. Observe BGV A3 or the corresponding national regulations in the country where the furnace is installed. Wait until the furnace and the connected parts have cooled to room temperature.



Warning! General hazards!

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