

Refitting Instructions

Replacing the Furnace Insulation (Fiber Muffle) on Furnace Models

L1/11-12

L(T) 3/11-12 - L(T) 40/11-12

LT 60/11-12

manufactured from 2015 onwards

M06.0010 ENGLISCH

■ Made
■ in
■ Germany

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1 Introduction

These Refitting Instructions are intended for use when replacing existing furnace interior insulation (fiber muffle) with new insulation.

The instructions contain all the information you need to replace the insulation and start up the furnace.

These Refitting Instructions are intended for converting laboratory furnaces L 1/... - LT 60/.. 1100 °C to 1200 °C manufactured from 2015 onwards.

The following assembly instructions explain the handling of this system in a few steps. The figures show all the basic steps of assembly. Nevertheless, before starting the assembly you should read the entire assembly instructions. Follow the safety instructions in the assembly instructions and in the furnace operating instructions.



Note

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

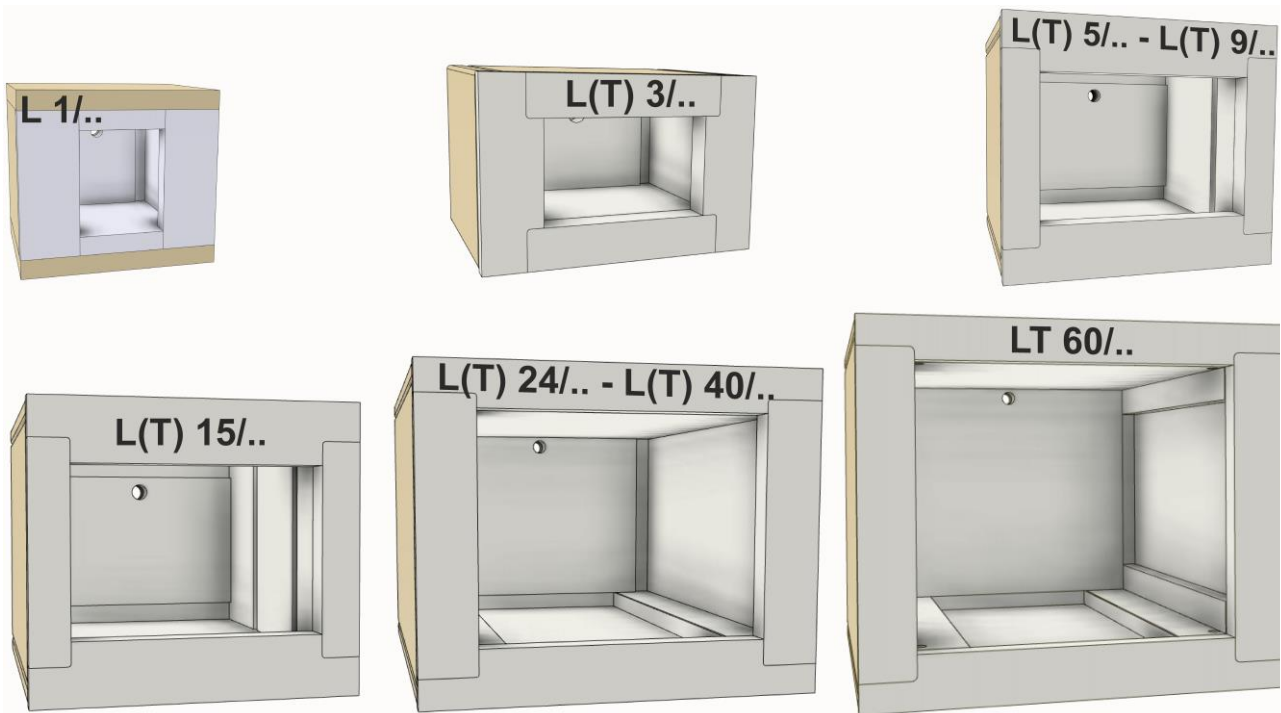


Fig. 1: Insulation (fiber muffle) for models L 1/.. – LT 60/.. (similar to picture)

1.1 Scope of Delivery

Insulation for the respective furnace model				
Part number	Quantity	Name	Furnace model	Comment
601605442	1	Insulation	L 1/12	Overall insulation
601604940	1	Insulation	L(T) 3/11-12	Overall insulation
601604942	1	Insulation	L(T) 5/11-12	Overall insulation
601604993	1	Insulation	L(T) 9/11-12	Overall insulation
601605078	1	Insulation	L(T) 15/11-12	Overall insulation
601605101	1	Insulation	L(T) 24/11-12	Overall insulation
601605221	1	Insulation	L(T) 40/11-12	Overall insulation
6000113080	1	Insulation	LT 60/11-12	Overall insulation

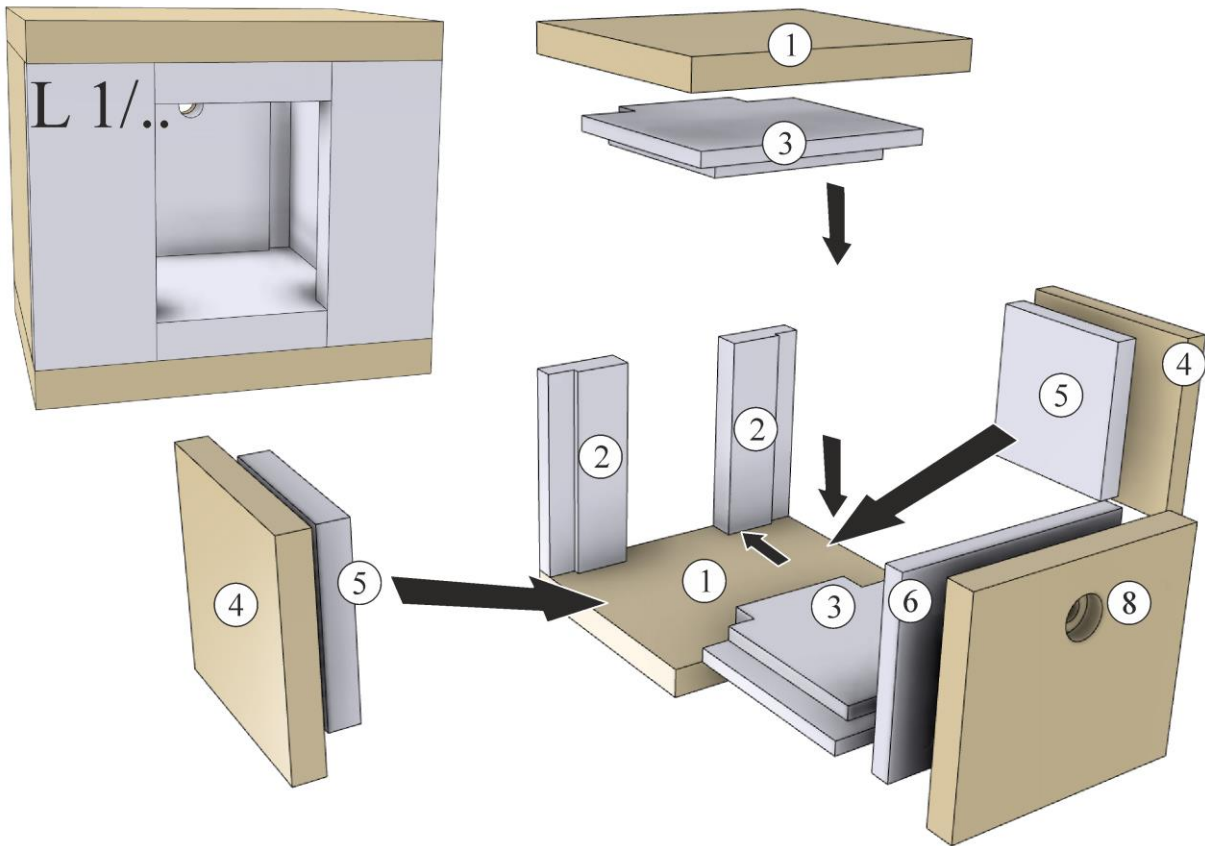


Fig. 2: Scope of delivery of the insulation (fiber muffle) for the model L 1/.. (similar to picture)

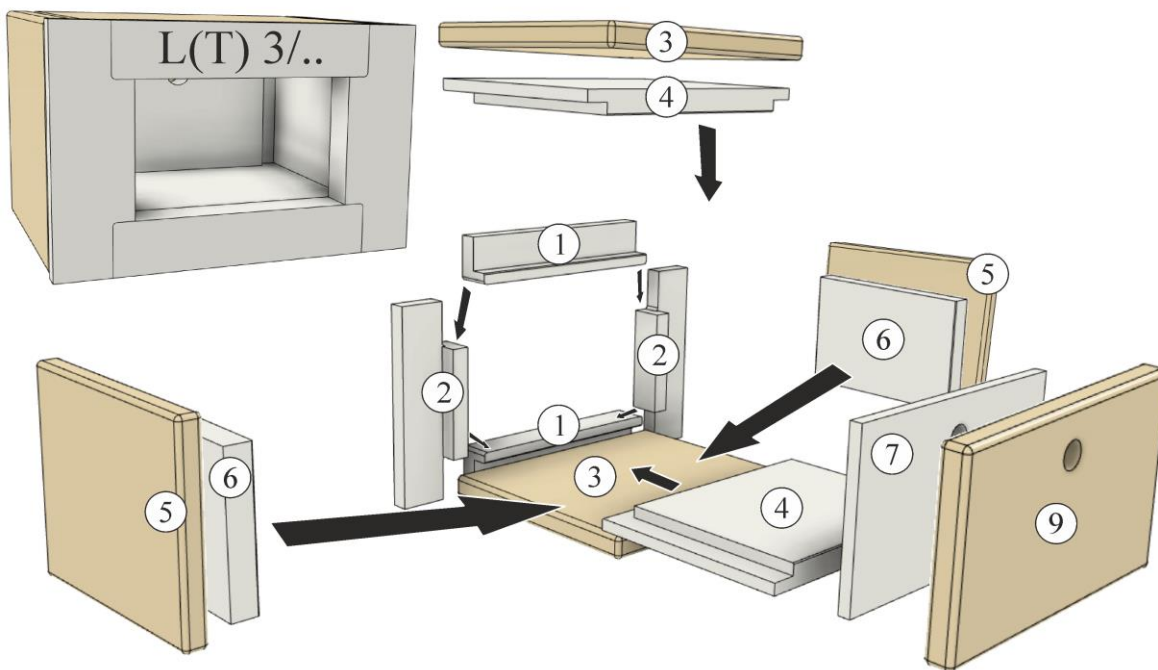


Fig. 3: Scope of delivery of the insulation (fiber muffle) for the model **L(T) 3/..** (similar to picture)

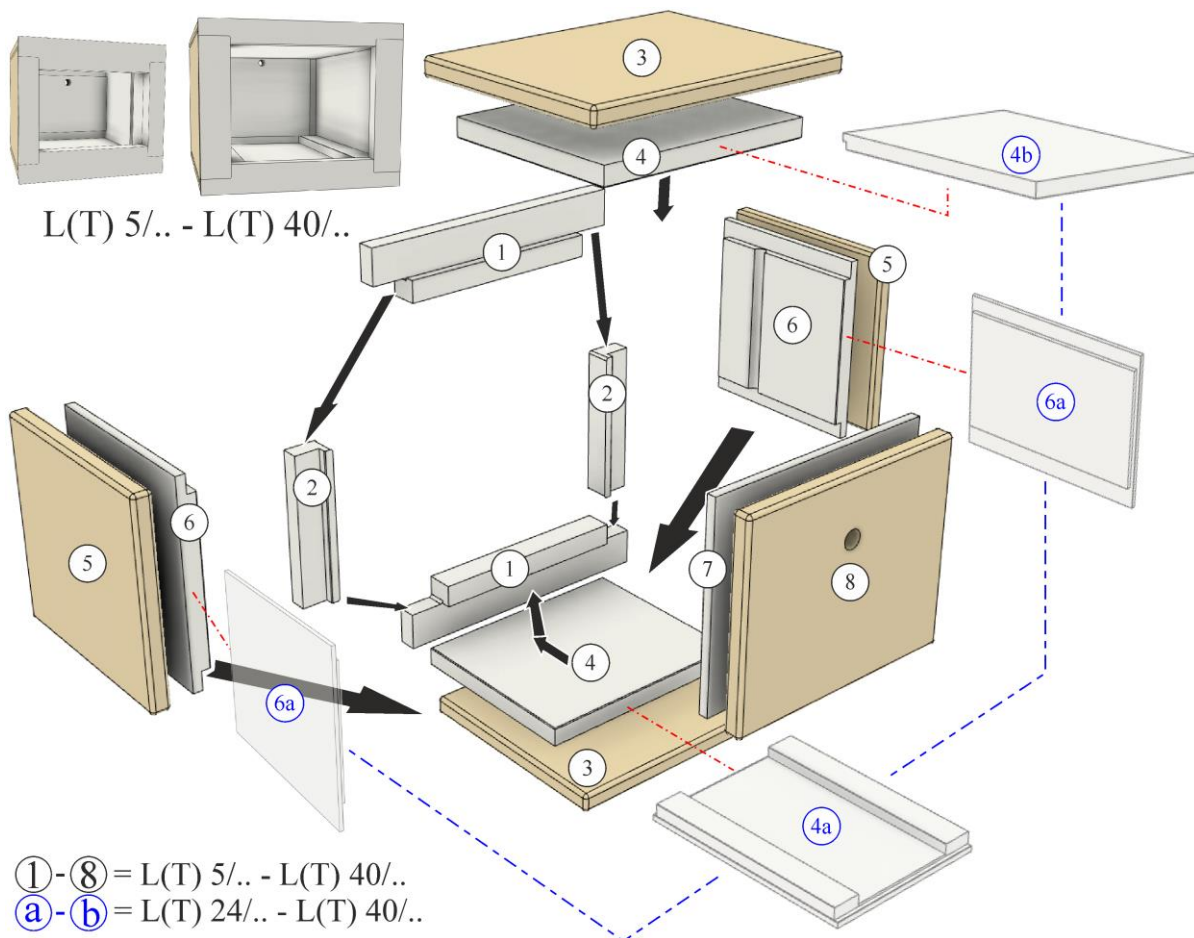


Fig. 4: Scope of delivery of the insulation (fiber muffle) for models **L(T) 5/.. - L(T) 40/..** (similar to picture)

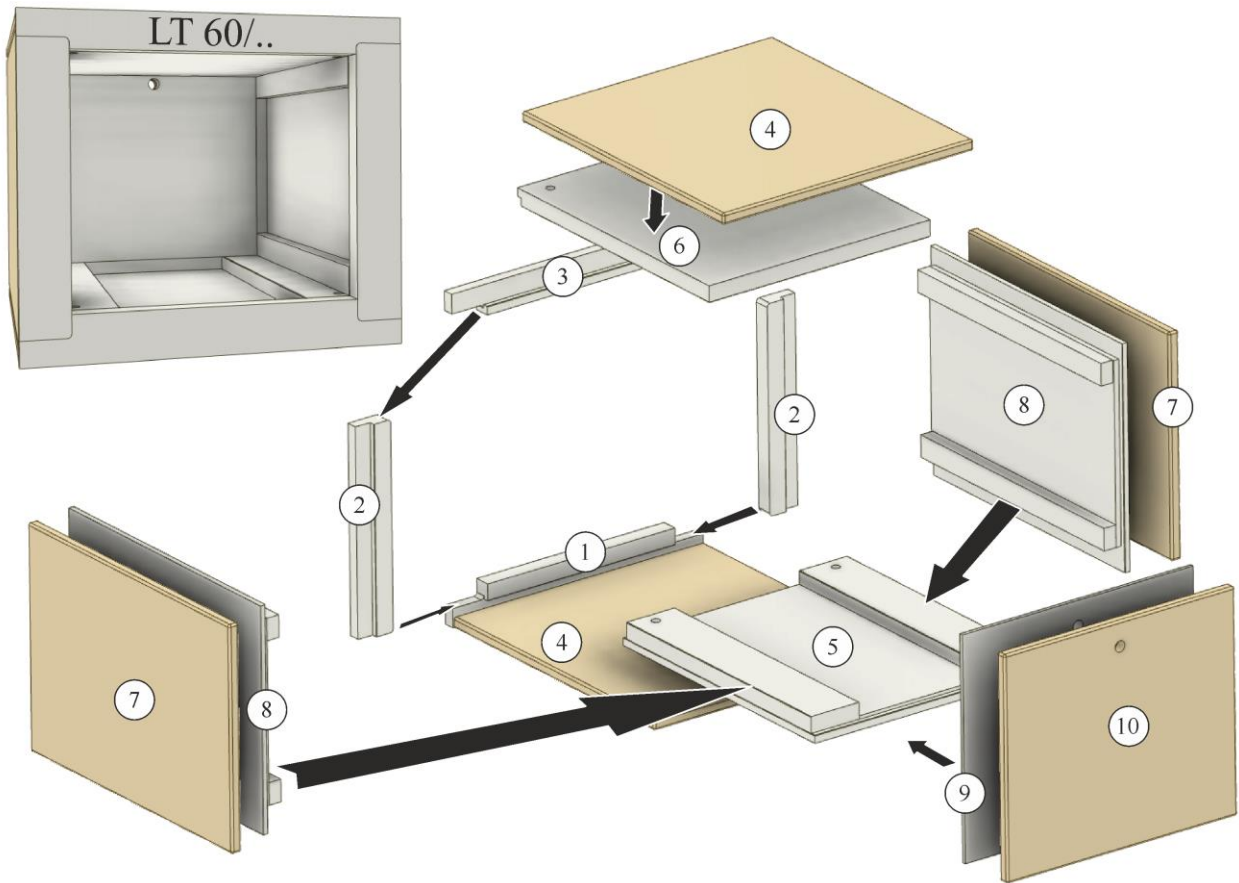


Fig. 5: Scope of delivery of the insulation (fiber muffle) for models **LT 60/..** (similar to picture)



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.



Note

The documents included do not always contain the electrical schematics. If you need the respective schematics they can be ordered from Nabertherm Service.

2 Safety

⚠ DANGER		
	<ul style="list-style-type: none"> • Danger of electric shock. • Risk of fatal injury. • Work on electrical equipment may be carried out only by qualified electricians or by trained personnel authorized by Nabertherm. • Before starting work, pull out the power plug 	



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 DGUV V3 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.

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

2.1 Personal Safety Equipment (PSA)



Wear protective clothing



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



Wear class S1 safety boots to protect your feet.



Wear goggles to protect your eyes.



Wear a respirator (P2 or higher) to protect your respiratory tract e.g. when working on the fiber insulation.

Information Symbols in the Instructions:



Note

Below this symbol you will find instructions and particularly useful information.



Rule – Pull Out the Power Plug

This symbol tells the operator to pull out the power plug.



Warning – Danger of Electric Shock

This symbol warns the operator that there is a risk of an electric shock if the following warnings are not heeded.



Rule - Rule Sign

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

2.2 General Information for Servicing and Maintenance

- All maintenance work should be carried out in a clean environment.
- Note: Protect your eyes and hands while cleaning.
- Always handle the product with care.
- Do not use in environments where corrosive gases, chemicals, saltwater or vapors are present.
- In explosive environments, use only within the specified operating values.
- Do not use at locations that are subject to vibrations or impacts. Check the technical specifications of the product.
- Do not use the product at locations where it is subject to radiant heat.
- The surfaces to be cleaned may be cleaned with a soft, clean, lint-free cloth. Many household and industrial cleaning products contain abrasive substances and chemical concentrates and may not be used for cleaning.



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.



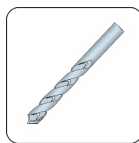
Caution

Nabertherm assumes no liability for damages caused by improper installation.

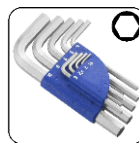
2.3 Tools Required for Assembly:



Electric drill



Steel drill bit Ø4 mm
 Steel drill bit Ø11 mm
 Steel drill bit Ø15 mm



Allen keys in various sizes




Combination or long-nose pliers



Pipe wrench

Fig. 6: Tools

2.4 Turning off the Controller/Furnace

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

2.4.1 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.

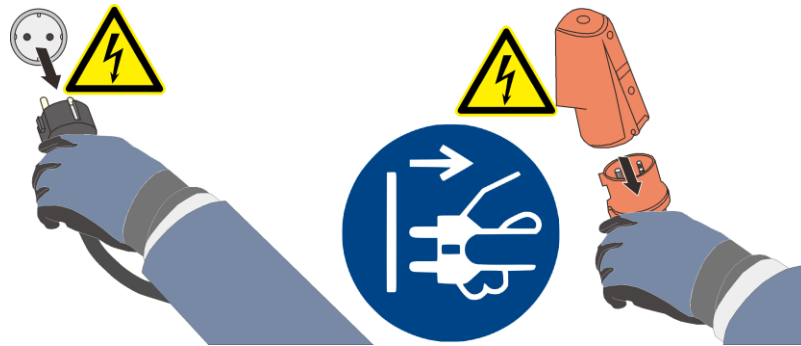


Fig. 7: Pull the power plug (similar to picture)

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

With a small flat blade screwdriver carefully push the locking latch (2) upward while pulling the plug (3) out of the coupling (4).

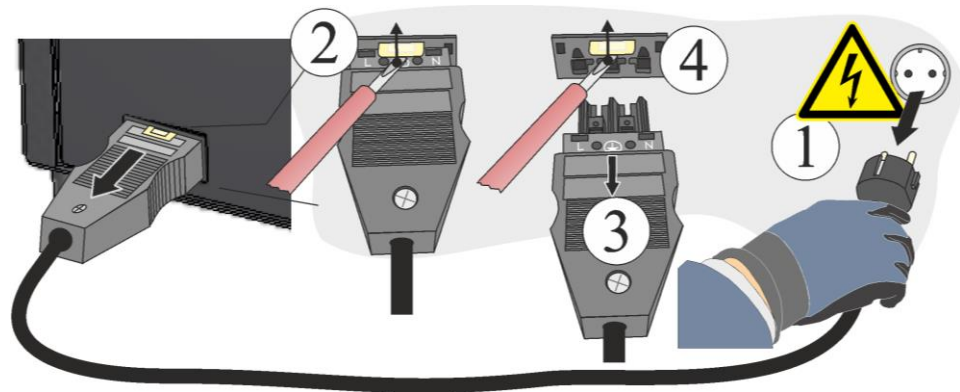


Fig. 8: Separate the snap-in coupling (plug) from the furnace housing (similar to picture)

3 Dismantling the Furnace Lining, Heating Plates and Insulation

Tip: 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.

Use an appropriate tool to remove the screws all around the cover and keep them in a secure place for later use. The cover must be lowered onto a soft material (such as foam rubber). The number and position of the screws may differ from one furnace model to the next. The furnace may look different than the picture depending on the furnace model and additional equipment.

If present, pay attention to the protective ground cable of the back wall to the clamp. If necessary, disconnect the cable from the clamp.

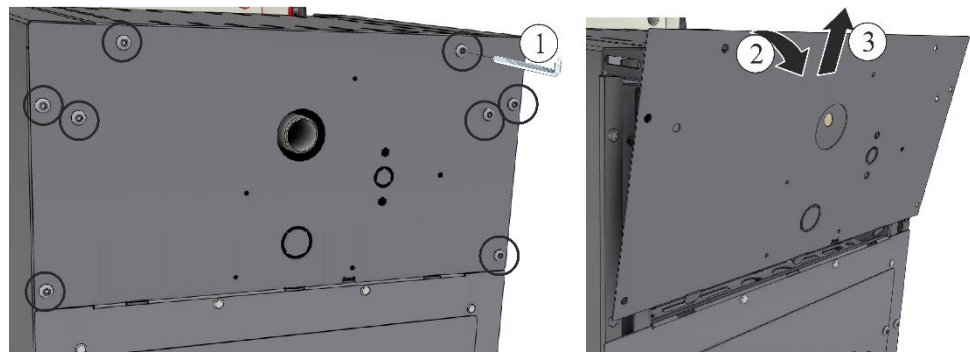


Fig. 9: Dismantling the rear panel (similar to picture)

Once the rear wall has been loosened, remove the top cover from the furnace housing by pulling it towards the door (5). For models fitted with a lift door, open the door completely and close it by a few cm to facilitate the removal of the top cover (4).

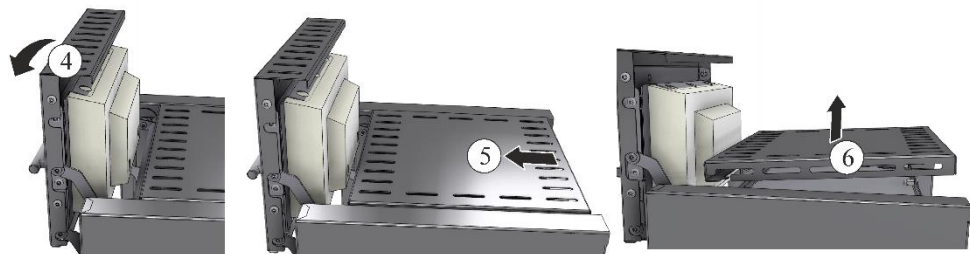


Fig. 10: Dismantling the top cover (similar to picture)

Unscrew the side panel screws (7). First push the panel towards the door (8) and pull it approx. 2 cm from the housing (9) from below and hold it. The panel can then be removed by lifting it upwards (10).

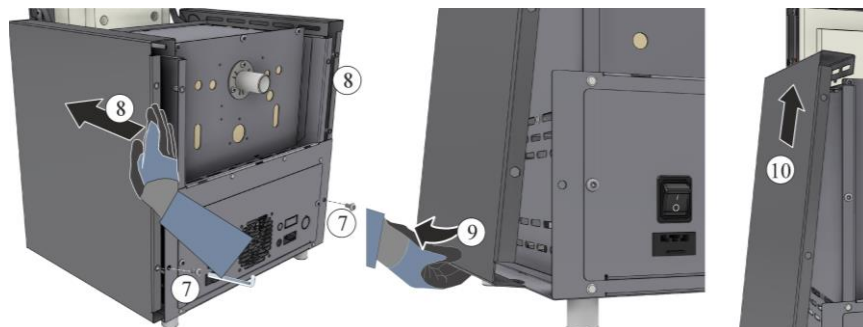


Fig. 11: Dismantling the side panel (similar to picture)

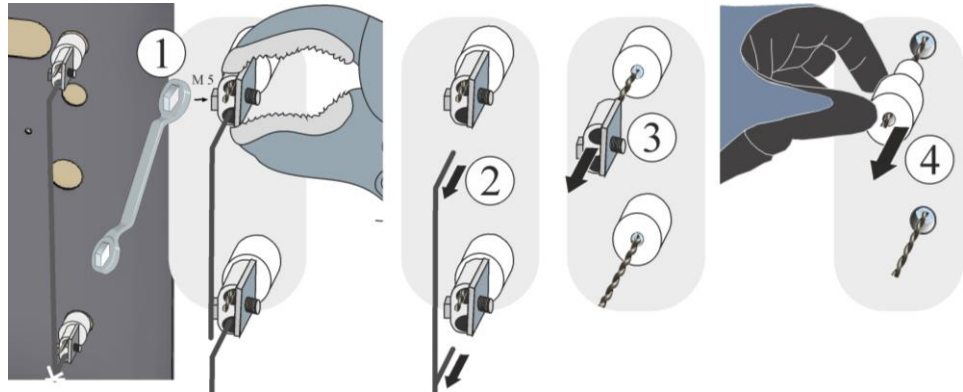
3.1 Undoing the Electrical Connections

Disconnecting the heating plate electrical connection

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.

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

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

Fig. 12: Undoing the electrical connections (similar to picture)

Dismantling the Thermocouple

First loosen the two screws (1) from the thermocouple connection, then the bracket screw (2). Then carefully pull out the thermocouple (3).

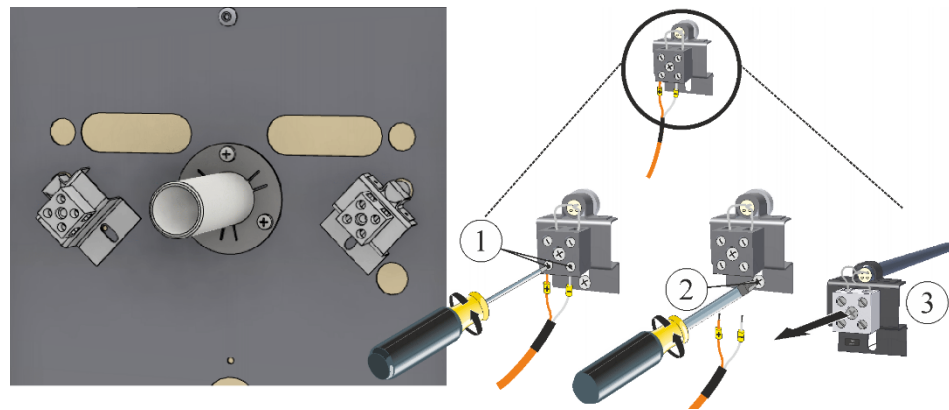


Fig. 13: Dismantling the thermocouple(s) for the furnace chamber (similar to picture)

Once all of the heating plates have been removed, the top cover screws and rear cover screws can be loosened. Push the top cover and rear wall in the direction of the arrow or remove them.

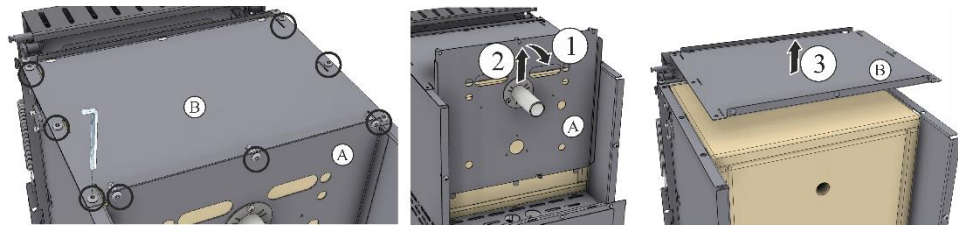


Fig. 14: Dismantling the rear panel (similar to picture)

3.2 Dismantling the Top and Bottom Heating Plate

Heating plates			
Furnace model	Arrangement	Quantity	Item
L 1/..		2	right/left
L(T) 3/..			
L(T) 5/..		2	top/bottom
L(T) 9/..			
L(T) 15/..			
L(T) 24/..		3	right/left/bottom
L(T) 40/..			
LT 60/..			

To remove the upper and lower ceramic heating plate, both cramps must be pulled out upwards at an angle using needle-nosed pliers, for example, in order to remove the heating plate supports. Hold the upper heating plate from below to prevent it from dropping and being damaged.



Fig. 15: Dismantling the heating plate supports (similar to picture)

Tilt the upper heating plate downwards, then carefully pull it out of the furnace chamber.



Fig. 16: Dismantling the upper heating plate (similar to picture)

Tilt the lower ceramic heating plate upwards (if necessary using a small flat-blade screwdriver) and then carefully pull it out of the furnace chamber.

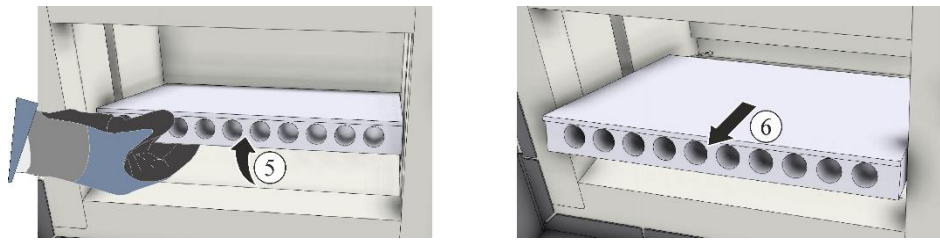


Fig. 17: Dismantling the lower heating plate (similar to picture)

Check dismantled heating plates for visible damage and store them in a safe place. Damaged heating plates must not be reused.

3.3 Dismantling the Lower and Side Heating Plates

Heating plates			
Furnace model	Arrangement	Quantity	Item
L 1/..		2	right/left
L(T) 3/..			
L(T) 5/..		2	top/bottom
L(T) 9/..			
L(T) 15/..			
L(T) 24/..		3	right/left/bottom
L(T) 40/..			
LT 60/..			

Tilt the lower ceramic heating plate upwards (if necessary using a small flat-blade screwdriver) and then carefully pull it out of the furnace chamber.

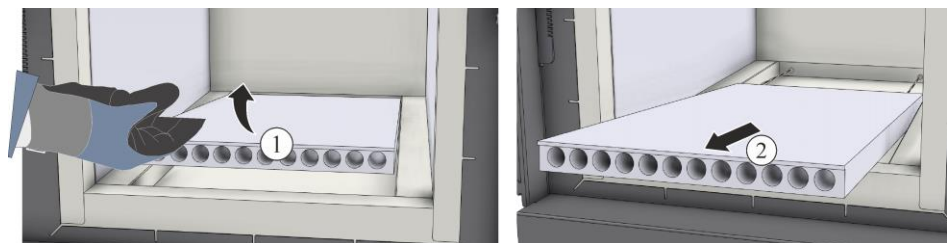


Fig. 18: Dismantling the lower heating plate (similar to picture)

To remove the side heating plates, the bottom and top cramps must be pulled out using needle-nosed pliers, for example.

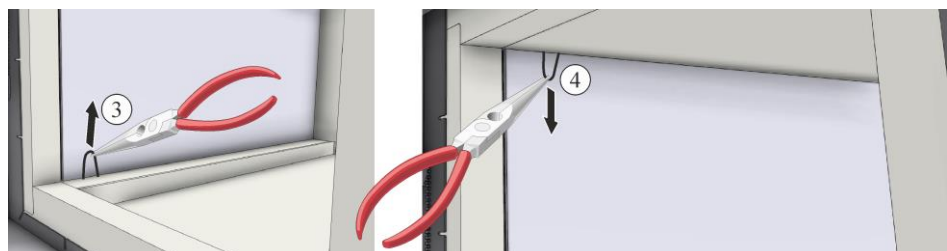


Fig. 19: Pulling the cramps from the insulation (similar to picture)

In order to be able to remove the side heating plates of the **LT 60/..** model, the upper roof insulation must be raised until the support tubes can be pulled out upwards from the floor insulation.

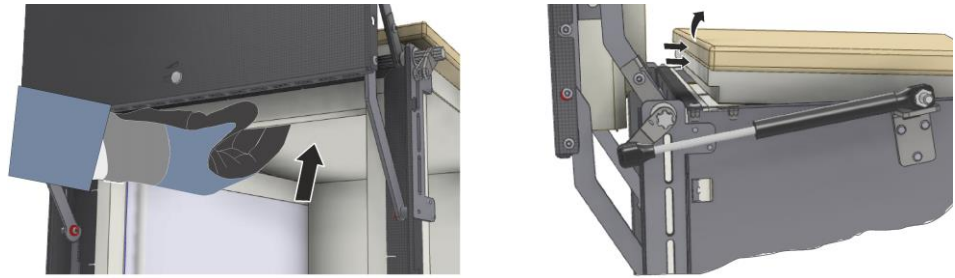


Fig. 20: Carefully push the roof insulation upwards (LT 60/..) (similar to picture)

Carefully pull out the support tubes (LT 60/..) upwards in order to remove the side heating plates.

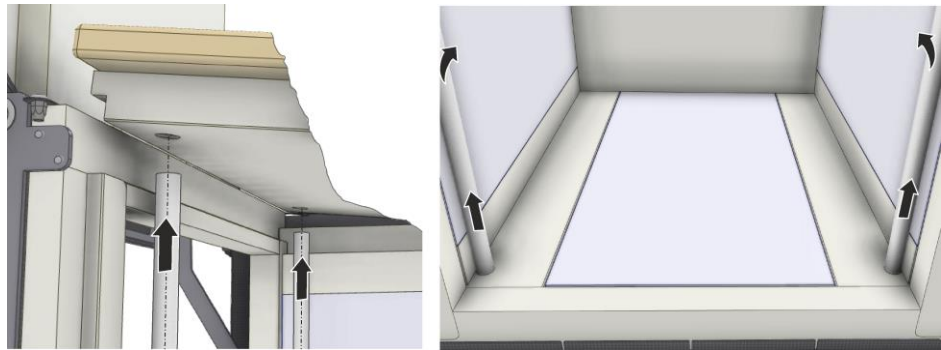


Fig. 21: Dismantling the support tubes (LT 60/..) (similar to picture)

Rotate the side heating plate towards the inside of the furnace (5), then carefully pull it out of the furnace chamber.

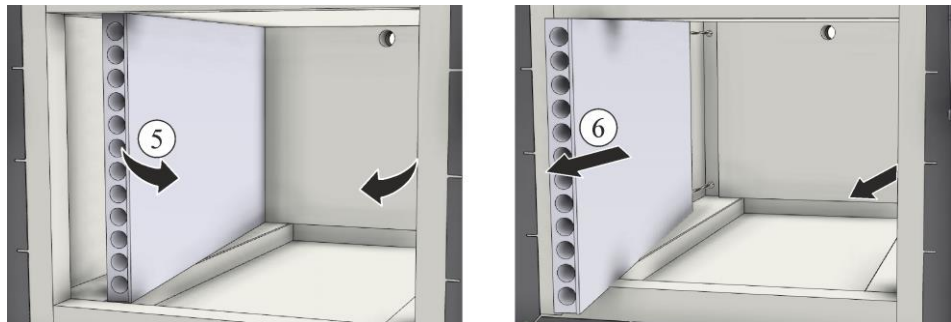


Fig. 22: Dismantling the side heating plates (similar to picture)

3.4 Dismantling the Insulation (Fiber Muffle)

Remove the upper (1) and rear insulation panel (2). The rear insulation (3) and the roof insulation (4) can then be removed.

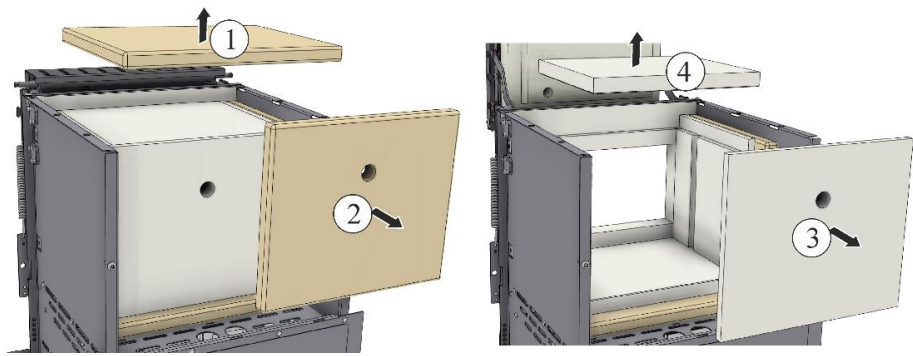


Fig. 23: Dismantling the roof and rear insulation panels (similar to picture)

Pull out the side insulation (5-6) and insulation panel (7-8) towards the top.

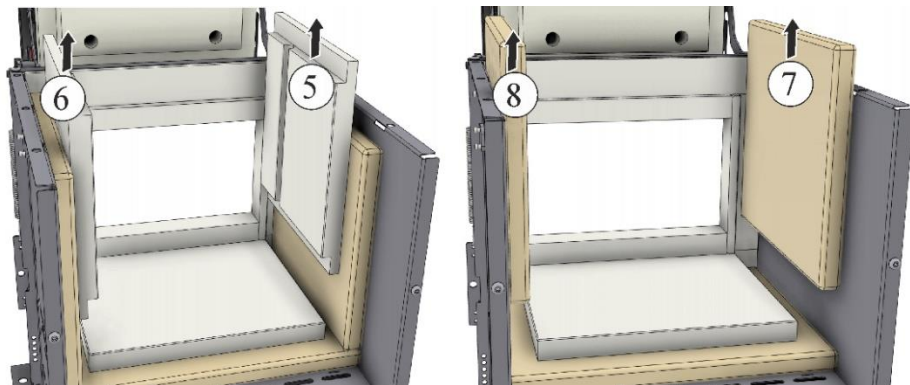


Fig. 24: Dismantling the side insulation panels (similar to picture)

Pull out the floor insulation (9) at a slight angle in the direction of the arrow. This is followed by the upper collar insulation (10).

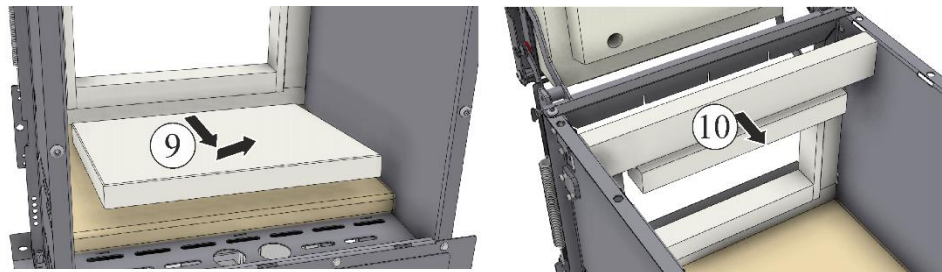


Fig. 25: Dismantling the floor insulation and the upper collar insulation (similar to picture).

Remove the side collar insulation (11-12) in the direction of the arrow. This is followed by the lower collar insulation (14) and the floor insulation panel (13).

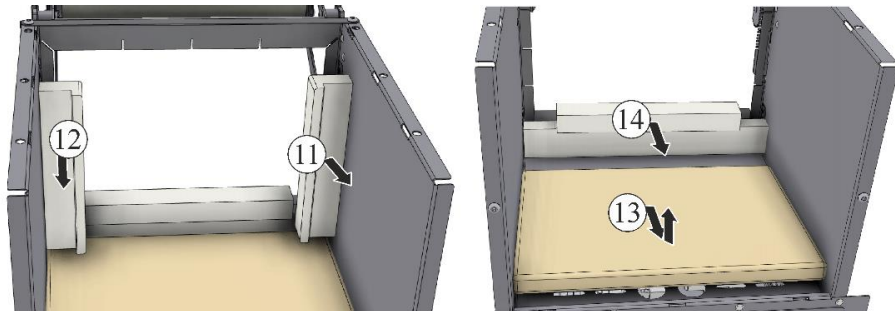


Fig. 26: Dismantling the collar insulation and floor insulation panels (similar to picture)

Once the insulation and insulating panels have been dismantled, we recommend that you thoroughly clean the furnace interior and switchgear by vacuuming, for example.

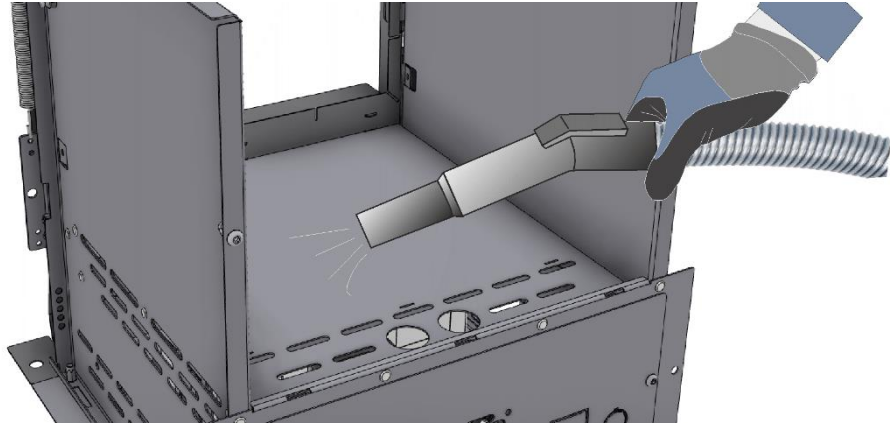


Fig. 27: Cleaning inside the furnace (similar to picture)

3.4.1 Environmental Regulations

- The removal of electronic components and their disposal as electronic junk.
- Disposal of the metals that are neither hazardous to health nor the environment as recyclable metal.
- Please contact the responsible waste disposal company to have the above listed materials properly disposed of.



Note

Observe the national regulations of the country in which the furnace will be used.

4 Fitting the Insulation, Heating Plates and Furnace Lining

4.1 Installing the New Insulation (Fiber Muffle)

The scope of delivery depends on the respective furnace model. Take care when handling the materials as they are very brittle.

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.

4.1.1 Assembly Sequence for the Insulation of Model L 1/..

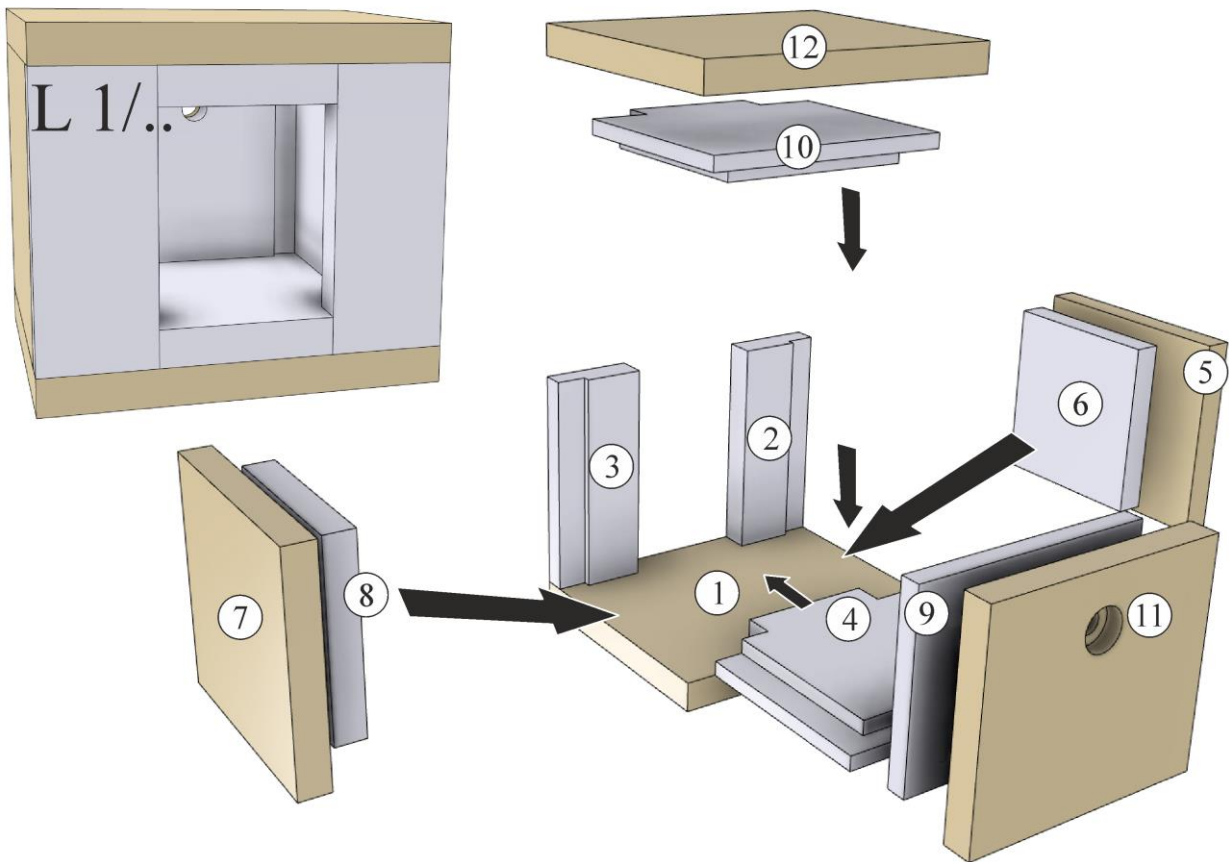


Fig. 28: Order of assembly - model L 1/.. (similar to picture)

In order to correctly assemble the insulation, follow the sequence as shown in the following figures.

First place the lower insulation panel (1) on the bottom of the furnace. The insulation panel (1) and (12) is of identical design and can be used interchangeably on the top or bottom.

Place the side collar insulation (2 and 3) onto the lower insulation panel from the inside. The side (2 and 3) collar insulation is of identical design and are interchangeable on the left/right.

Place the floor insulation (4) on the center of the insulation panel and carefully push it against the collar insulation. The insulation panel (4 and 10) is of identical design and can be used interchangeably as roof or floor insulation.

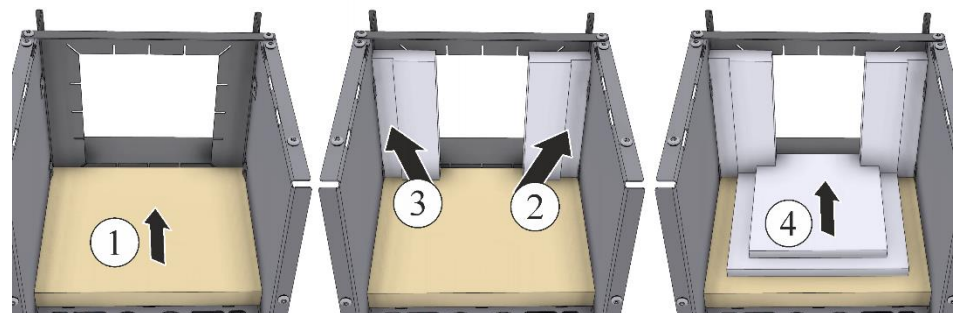


Fig. 29: Installing the bottom and collar insulation (similar to picture)

The side insulation (5 to 8) is of identical design and can be used interchangeably on the left or right sides of the furnace. Fit the side insulating panel (5 and 7) and the internal insulation (6 and 8).

Carefully place the insulation panels against the furnace walls from the inside and place them onto the floor insulation panel (1). Then carefully place the interior insulation onto the floor insulation (4) and press it lightly against the collar insulation.

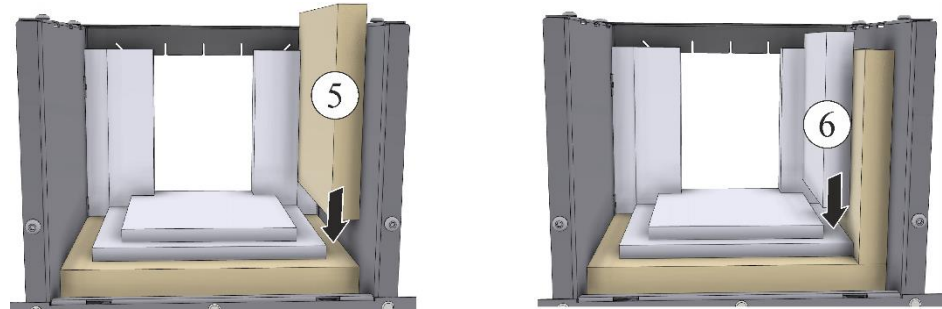


Fig. 30: Installing the side insulating panel and insulation (similar to picture)

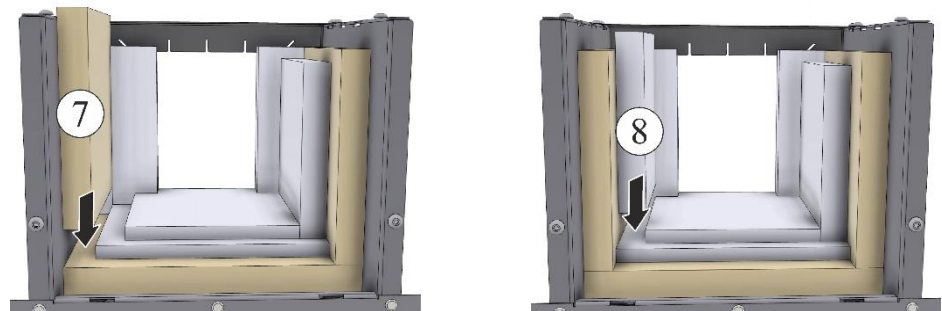


Fig. 31: Installing the side insulating panel and insulation (similar to picture)

Following successful installation of the side insulation, place the rear wall insulation (9) onto the floor insulation panel with the exhaust air aperture facing upwards. Then place the roof insulation (10) onto the previously fitted insulation.

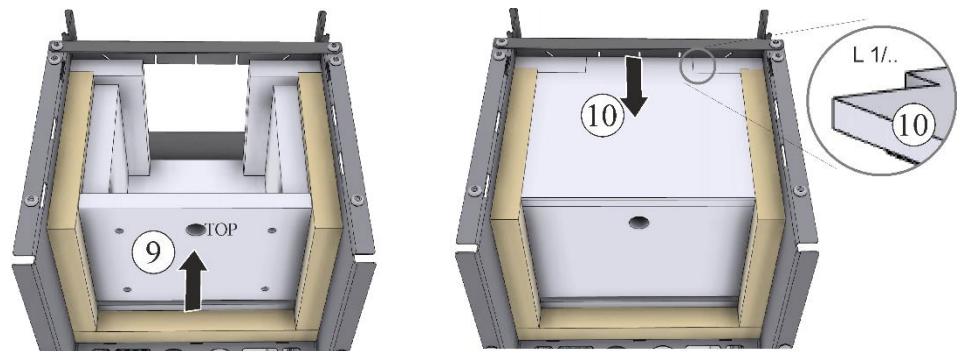


Fig. 32: Installing the rear wall and roof insulation (similar to picture)

First fit the rear (11) then the upper insulation panel (12) against the previously fitted insulation. Pay attention to the orientation of the exhaust air aperture as for the previously fitted rear wall insulation

It may be necessary to slightly loosen the two screws (6a); this makes it easier to fit the upper collar insulation. Re-tighten both screws following successful assembly.

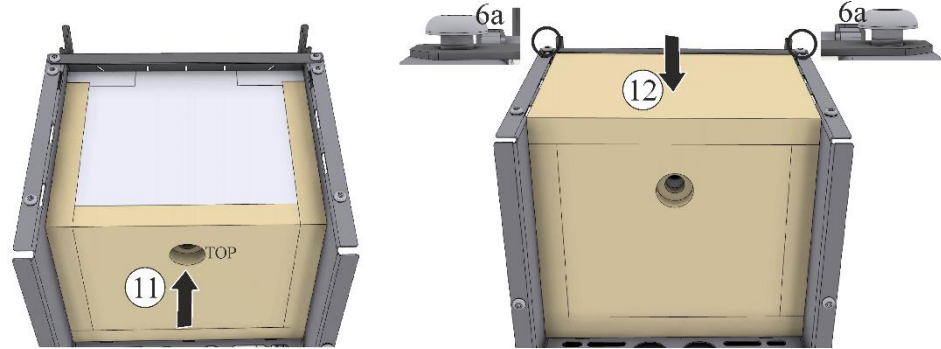


Fig. 33: Fitting the rear and upper insulation panel (similar to picture)

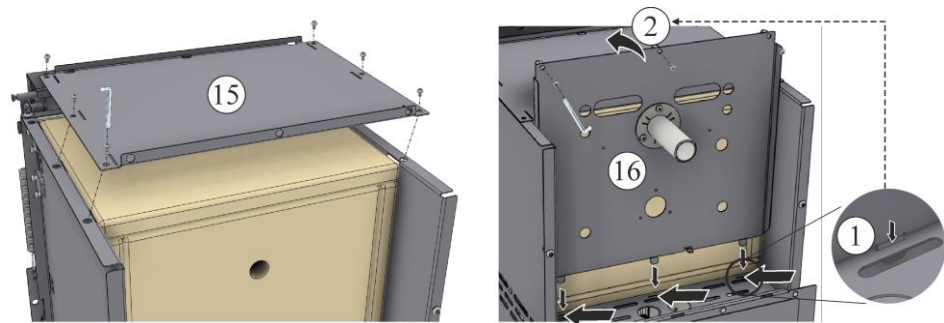


Fig. 34: Fitting the furnace ceiling and rear wall (similar to picture)

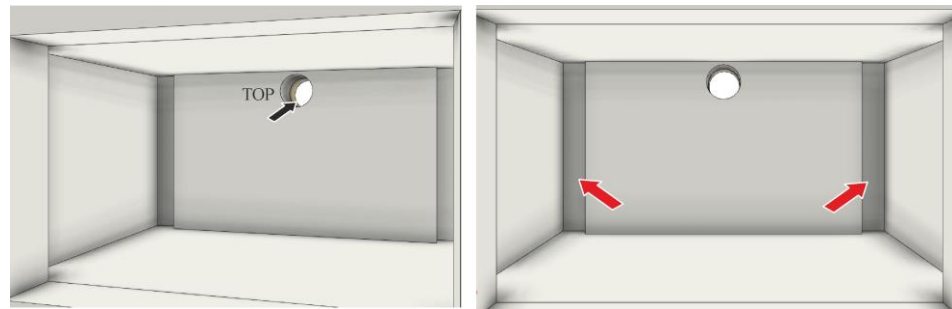


Fig. 35: Internal view of the furnace of the L 1/.. model range (similar to picture)

4.1.2 Assembly Sequence for the Insulation of Model L(T) 3/..

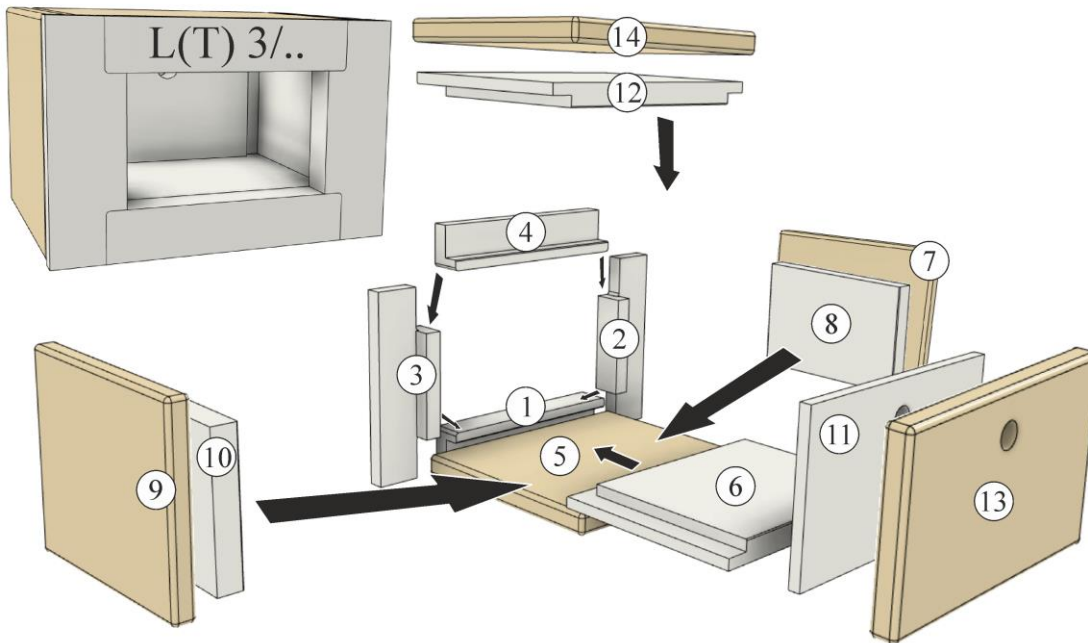


Fig. 36: Order of assembly - model L(T) 3/.. (similar to picture)

In order to correctly assembly the insulation, follow the sequence as shown in the following figures.

The lower (1) and upper (4) collar insulation are of identical design and are interchangeable. First place the lower collar insulation (1) on the bottom of the furnace.

The side (2 and 3) collar insulation is of identical design and are interchangeable on the left/right. Place the side collar insulation (2 and 3) onto the lower collar insulation from the inside. Then place the upper collar insulation onto the side collar insulation.

It may be necessary to slightly loosen the two screws (6a); this makes it easier to fit the side and upper collar insulation. Re-tighten both screws following successful assembly.

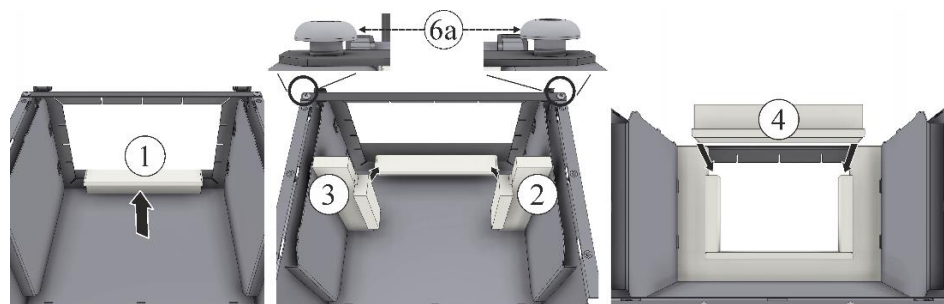


Fig. 37: Installing the circumferential collar insulation (similar to picture)

Then place the lower insulating panel (5) on the bottom of the furnace. The insulation panel (5) and (14) is of identical design and can be used interchangeably on the top or bottom.

Place the insulating panel (6) on the center of the insulation panel and carefully push it against the collar insulation. Here too, the insulating panel (6) and (12) is of identical design and can be used interchangeably on the top or bottom.

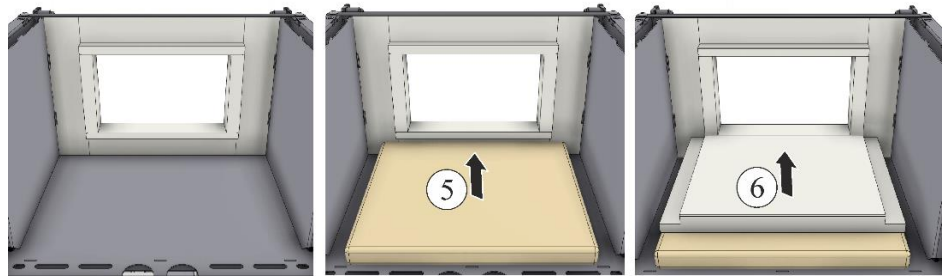


Fig. 38: Installing the lower insulation and insulating panel (similar to picture)

The side insulation (7 to 10) is of identical design and can be used interchangeably on the left or right sides of the furnace.

Fit the side insulating panel (7 and 9) and the internal insulation (8 and 10). Carefully place the insulating panels and insulation against the furnace walls from the inside and place them onto the floor insulation (6).

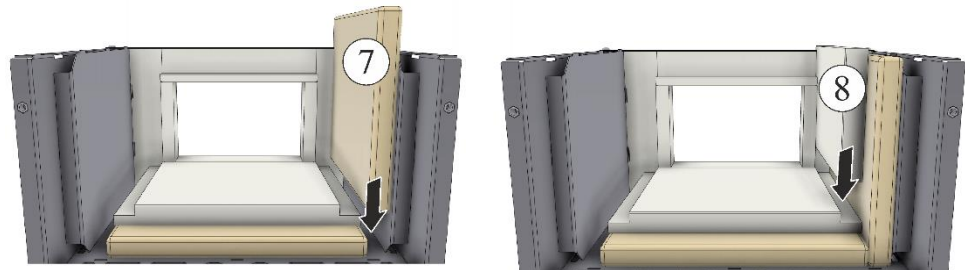


Fig. 39: Installing the side insulating panel and insulation (similar to picture)

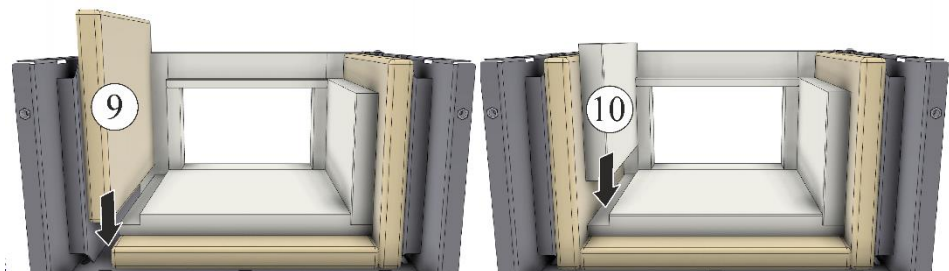


Fig. 40: Installing the side insulating panel and insulation (similar to picture)

Following successful installation of the side insulation, place the rear wall insulation (11) onto the floor insulation panel with the exhaust air aperture facing upwards. Then place the roof insulation (12) onto the previously fitted insulation.

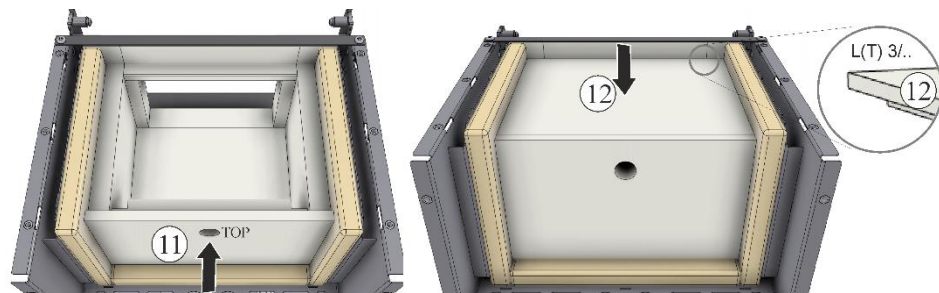


Fig. 41: Installing the rear wall and roof insulation (similar to picture)

First fit the rear (13) then the upper insulation panel (14) against the previously fitted insulation. Pay attention to the orientation of the exhaust air aperture as for the previously fitted rear wall insulation

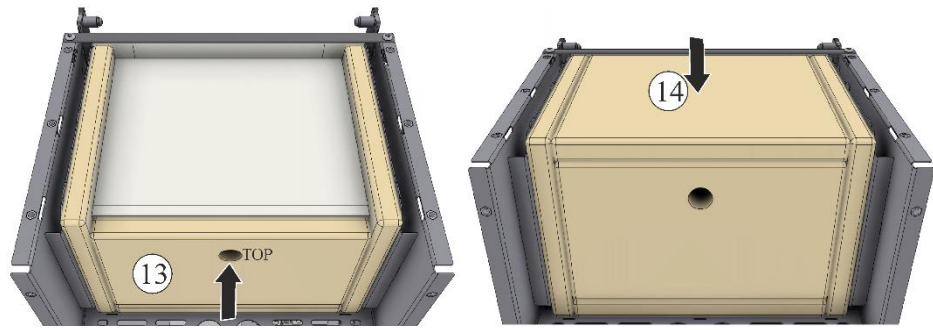


Fig. 42: Fitting the rear and upper insulation panel (similar to picture)

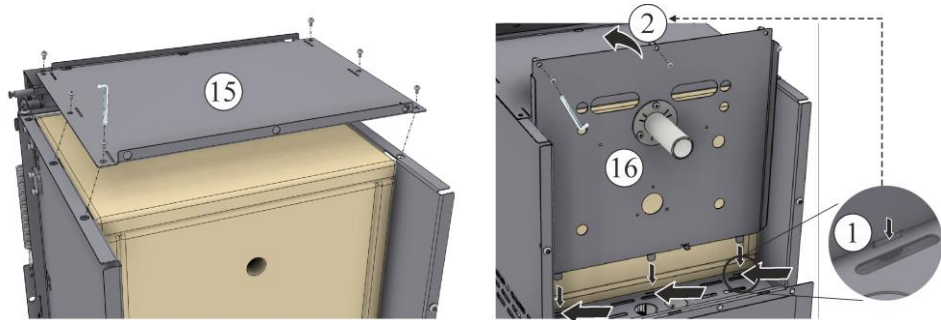


Fig. 43: Fitting the furnace ceiling and rear wall (similar to picture)

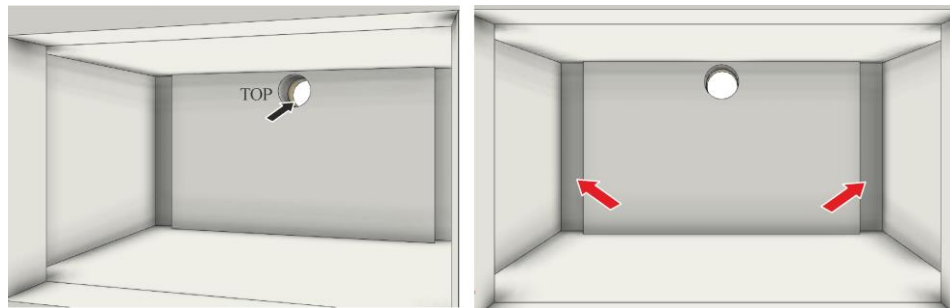


Fig. 44: Internal view of the furnace of the **L(T) 3/..** model range (similar to picture)

4.1.3 Assembly Sequence for the Insulation of Model L(T) 5/.. - L(T) 40/..

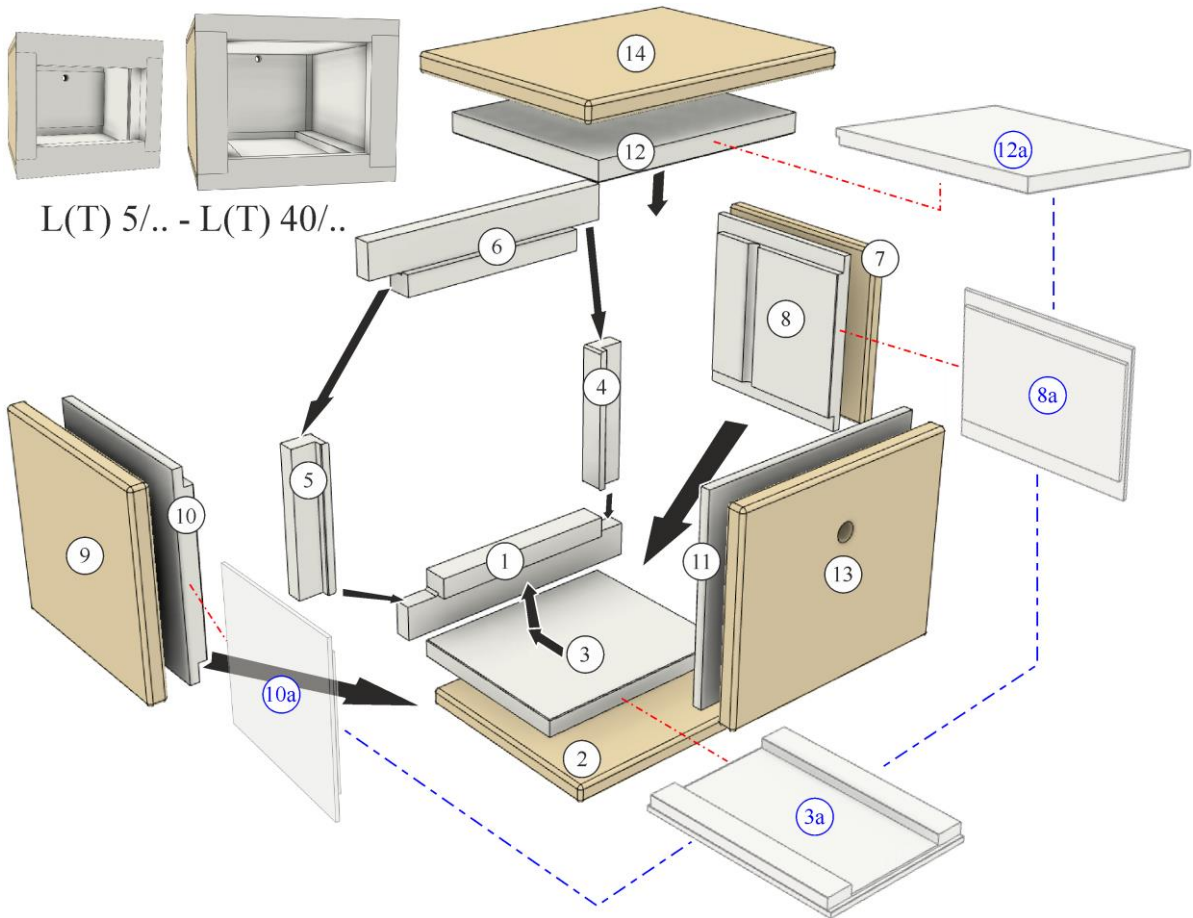


Fig. 45: Order of assembly - model L(T) 5/.. – L(T) 40/.. (similar to picture)

In order to correctly assembly the insulation, follow the sequence as shown in the following figures.

The lower (1) and upper (6) collar insulation are of identical design and are interchangeable.

First place the lower collar insulation (1) on the bottom of the furnace. Then lay the floor insulation panel (2) in place. Place the floor insulation (3/3a) on the center of the floor insulation panel and carefully push it against the collar insulation. The floor insulation is not required for models L(T) 5/.. - L(T) 40/.., slide it beneath the collar insulation at a slight angle.

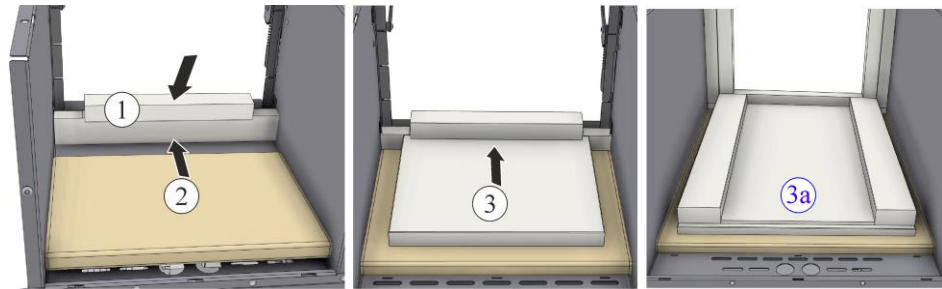


Fig. 46: Installing the collar and floor insulation (similar to picture)

The side (4 and 5) collar insulation is of identical design and are interchangeable on the left/right.

Place the side collar insulation (4 and 5) onto the lower collar insulation from the inside. Then place the upper collar insulation onto the side collar insulation. It may be necessary to slightly loosen the two screws (6a); this makes it easier to fit the upper collar insulation. Re-tighten both screws following successful assembly.

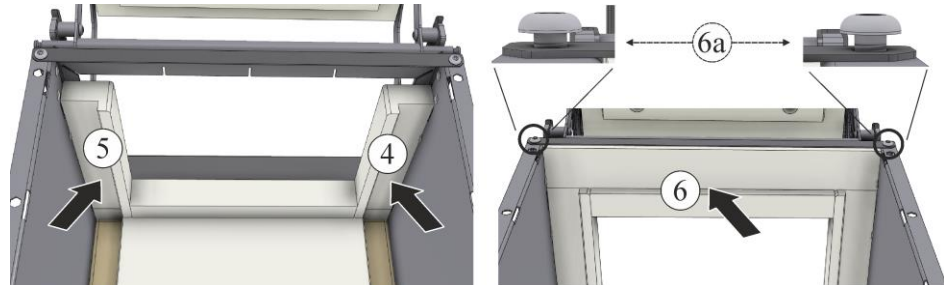


Fig. 47: Installing the side and upper collar insulation (similar to picture)

The side insulation (7 to 10/10a) is of identical design and can be used interchangeably on the left or right sides of the furnace.

Fit the side insulating panel (7 and 9) and the internal insulation (8/8a and 10/10a). Carefully place the insulation panels against the furnace walls from the inside and place them onto the floor insulation panel. Then carefully place the interior insulation onto the floor insulation panel and press it lightly against the collar insulation.



Fig. 48: Installing the side insulating panel and insulation (similar to picture)



Fig. 49: Installing the side insulating panel and insulation (similar to picture)

Following successful installation of the side insulation, place the rear wall insulation (11) onto the floor insulation panel with the exhaust air aperture facing upwards. Then place the roof insulation (12) onto the previously fitted insulation.

The roof insulation panels for model range L(T) 24/.. - L(T) 40/.. have a shoulder which is placed facing downwards towards the door when mounted.

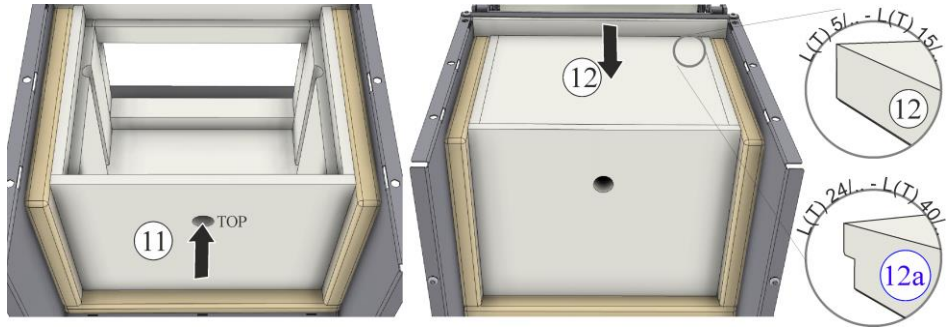


Fig. 50: Installing the rear wall and roof insulation (similar to picture)

First fit the rear (13) then the upper insulation panel (14) against the previously fitted insulation. Pay attention to the orientation of the exhaust air aperture as for the previously fitted rear wall insulation

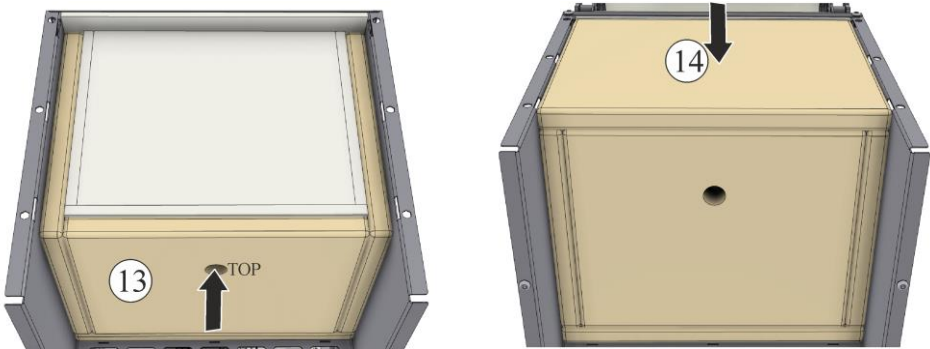


Fig. 51: Fitting the rear and upper insulation panel (similar to picture)

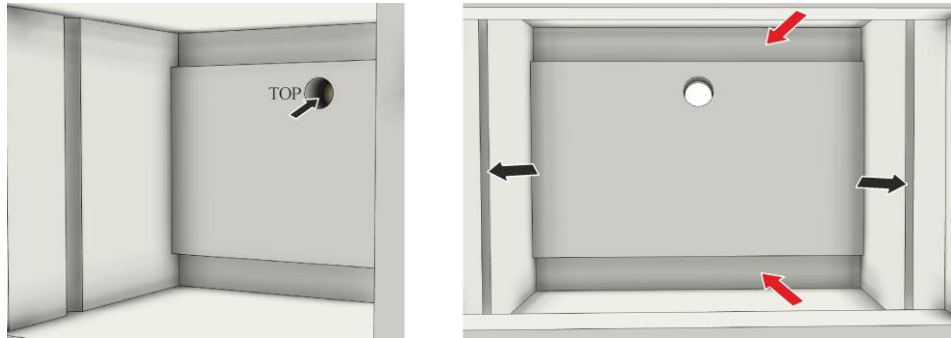


Fig. 52: Internal view of the furnace of the L(T) 5/.. model range – L(T) 15/.. (similar to picture)



Fig. 53: Internal view of the furnace of the **L(T) 24/..** model range – **L(T) 40/..** (similar to picture)

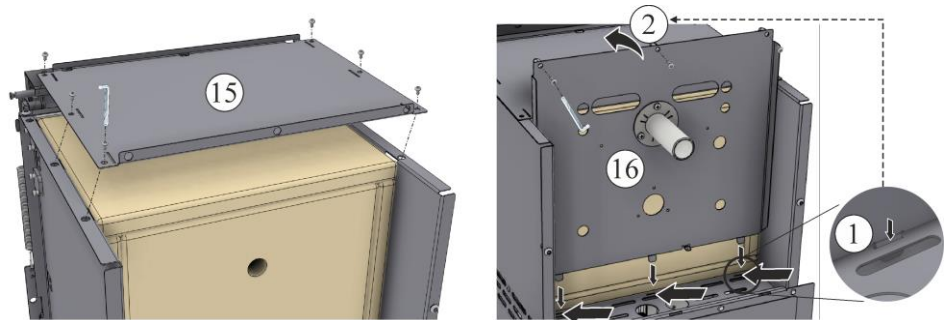


Fig. 54: Fitting the furnace ceiling and rear wall (similar to picture)

4.1.4 Assembly Sequence for the Insulation of Model **LT 60/..**

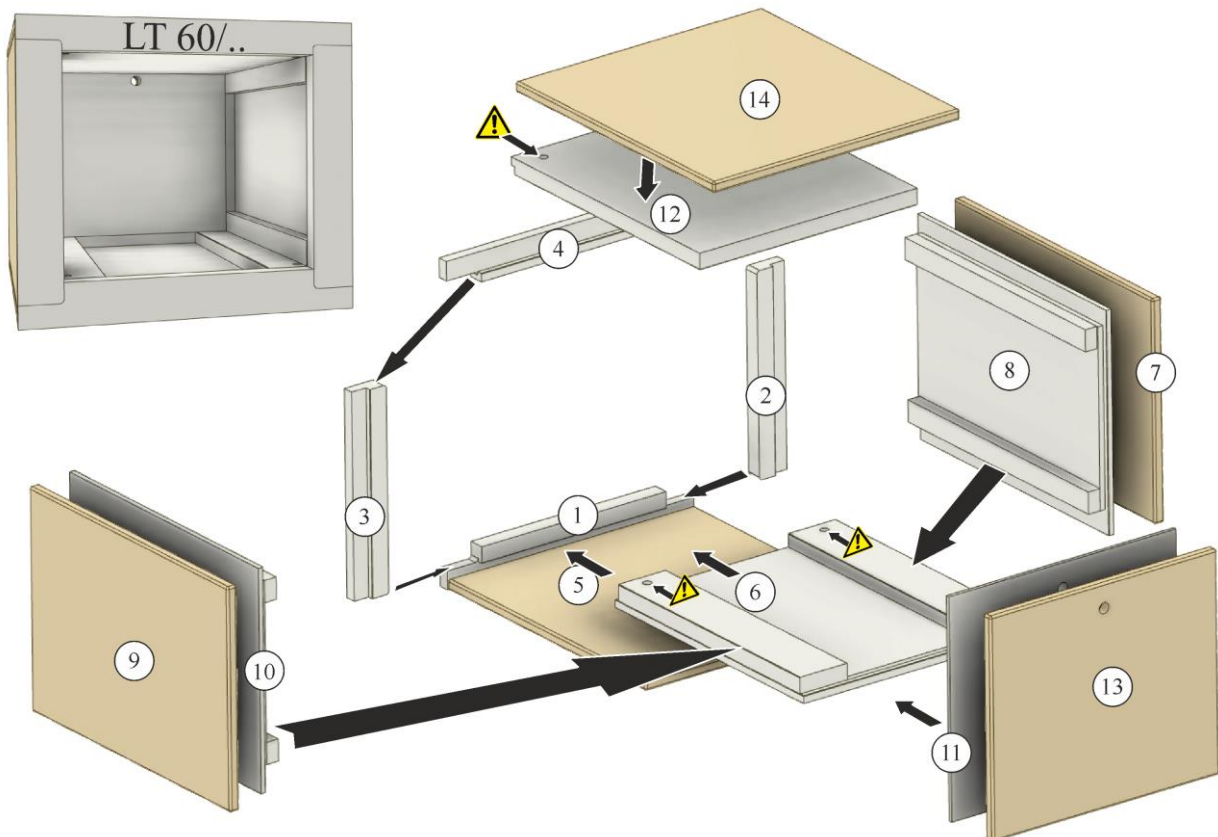


Fig. 55: Order of assembly - model **LT 60/..** (similar to picture)

In order to correctly assembly the insulation, follow the sequence as shown in the following figures.

First, carefully place the lower collar insulation (1) on the bottom of the furnace.

The side (2 and 3) collar insulation is of identical design and are interchangeable on the left/right. Place the side collar insulation (2 and 3) onto the lower collar insulation from the inside.

Then place the upper collar insulation (4) onto the side collar insulation.

It may be necessary to slightly loosen the two screws (6a); this makes it easier to fit the side and upper collar insulation. Re-tighten both screws following successful assembly.

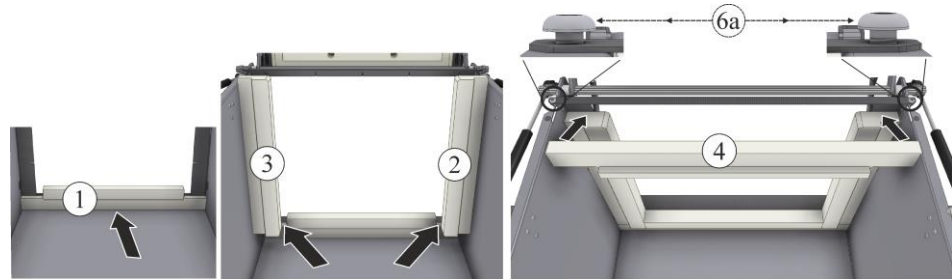


Fig. 56: Installing the circumferential collar insulation (similar to picture)

Then place the lower insulation panel (5) on the bottom of the furnace. The insulation panel (5) and (14) is of identical design and can be used interchangeably on the top or bottom.

Place the insulating panel (6) on the center of the insulation panel and carefully push it against the collar insulation.



Fig. 57: Installing the lower insulation and insulating panel (similar to picture)

The side insulation (7 to 10) is of identical design and can be used interchangeably on the left or right sides of the furnace.

Fit the side insulating panel (7 and 9) and the internal insulation (8 and 10). Carefully place the insulating panels and insulation against the furnace walls from the inside and place them onto the floor insulation (6).

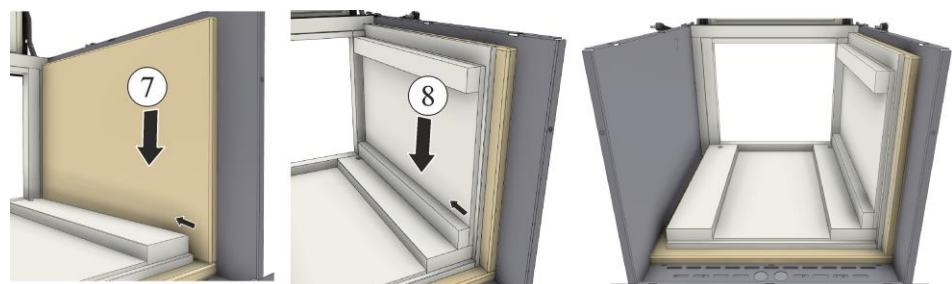


Fig. 58: Installing the side insulating panel and insulation (similar to picture)



Fig. 59: Installing the side insulating panel and insulation (similar to picture)

Following successful installation of the side insulation, place the rear wall insulation (11) onto the floor insulation panel with the exhaust air aperture facing upwards. Then place the roof insulation (12) onto the previously fitted insulation.

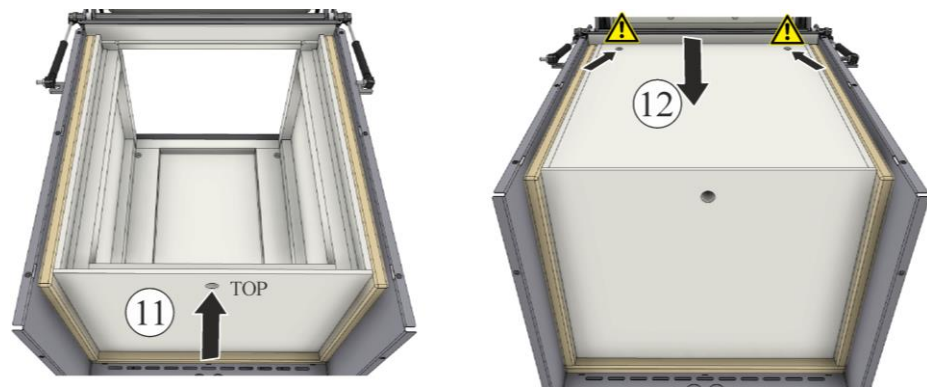


Fig. 60: Installing the rear wall and roof insulation (similar to picture)

First fit the rear (13) then the upper insulation panel (14) against the previously fitted insulation. Pay attention to the orientation of the exhaust air aperture as for the previously fitted rear wall insulation

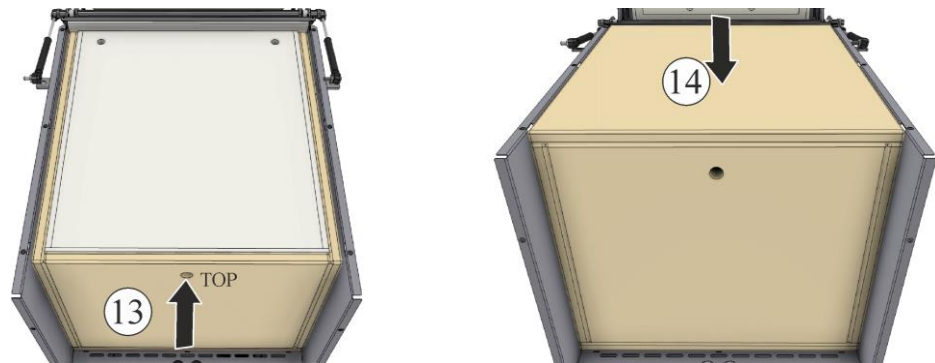


Fig. 61: Fitting the rear and upper insulating panel (similar to picture)

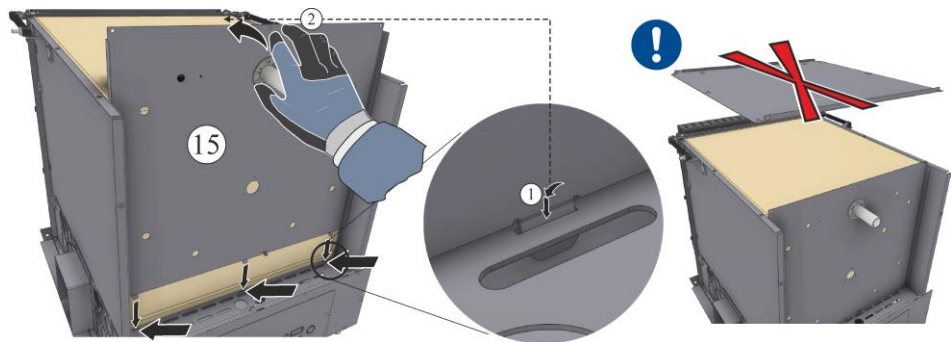


Fig. 62: Fitting the rear wall (installation of the furnace ceiling takes place following installation of the heating plates) (similar to picture).

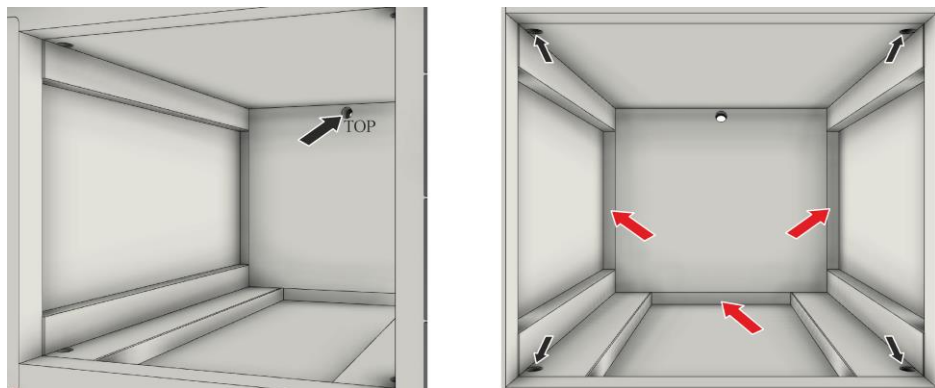
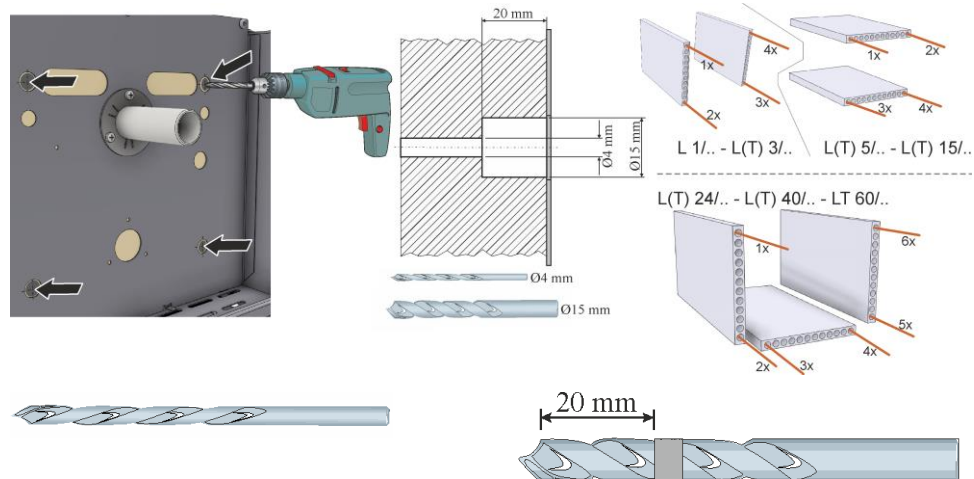


Fig. 63: Internal view of the furnace of the **LT 60/..** model range (similar to picture)

4.2 Re-installing the Heating Plates

First drill a through hole in the furnace insulation using a $\varnothing 4$ mm steel drill bit.

Drill holes for the heating element ends (drilled) of the upper/lateral/lower heating plate(s) (depending on the furnace model) using a $\varnothing 15$ mm drill bit and countersink approx. **20 mm deep** into the previously drilled $\varnothing 4$ mm through holes.

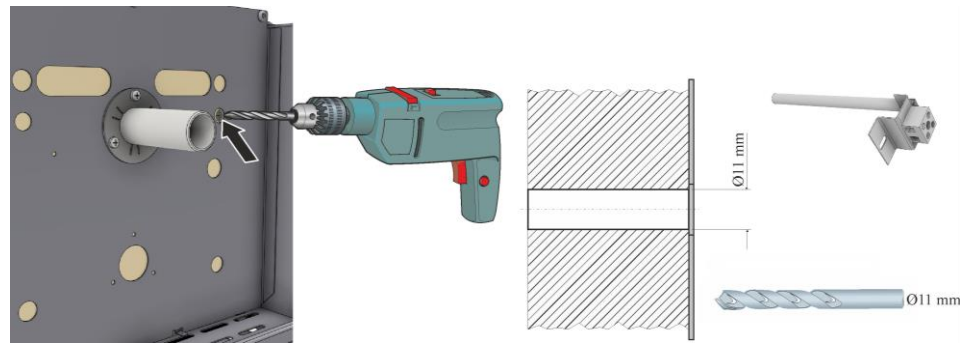


Through hole $\varnothing 4$ mm (for the upper, lower and side heating plates)

Countersink 20 mm deep / $\varnothing 15$ mm (for the upper, lower and side heating plates)

Fig. 64: Drilling and countersinking the furnace insulation (similar to picture)).

Drilled holes $\varnothing 11$ mm for the previously dismantled thermocouple.



1x drilled hole Ø 11 mm for the thermocouple

Fig. 65: Drilled hole Ø 11 mm (similar to picture)



Note

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

4.2.1 Installing the Bottom Heating Plate

Heating plates			
Furnace model	Arrangement	Quantity	Item
L 1/..		2	right/left
L(T) 3/..			
L(T) 5/..		2	top/bottom
L(T) 9/..			
L(T) 15/..			
L(T) 24/..		3	right/left/bottom
L(T) 40/..			
LT 60/..			

Ceramic heating plates are identical in construction and can be used as top or bottom heating plates when spare parts are supplied. We recommend that you replace the heating plates in the same position. Depending on the wear and tear on the heating plate, the wire may be brittle and break during installation. In this case, replace the heating plates with new ones.

First install the heating plate for floor heating. Carefully insert the ends of the heating elements (twisted) into the drilled holes. Insert the heating plate at a slight angle so that it touches the rear wall of the fiber muffle. After the heating plate has been positioned, the front heating elements of the ceramic heating plate should not be visible.

The edge marked in the figure (arrow – UPPER EDGE) must face upwards.

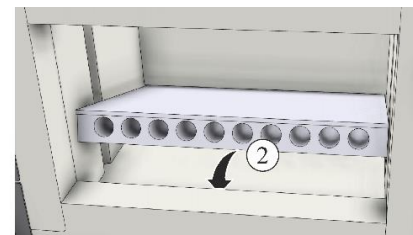
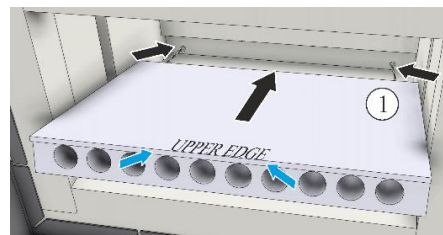


Fig. 66: Installation of floor heating L(T) 5/.. – L(T) 15/.. (pay attention to upper edge) (similar to picture)

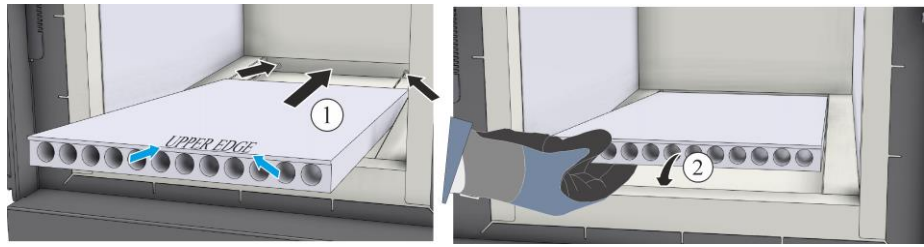


Fig. 67: Installation of floor heating L(T) 24/.. – L(T) 40/.. (pay attention to upper edge) (similar to picture)

4.2.2 Installing the Top Heating Plate

Carefully insert the ends of the heating elements (twisted) into the drilled holes. Insert the heating plate at a slight angle so that it touches the rear wall of the fiber muffle.

We recommend positioning the two ceramic supports (Z) within reach before installing the top heating plate.

Hold the upper heating plate from below to prevent it from dropping and being damaged.



Fig. 68: Installing the overhead heating (pay attention to the lower edge) (similar to picture).

Position the ceramic supports centrally on both sides as shown. To guarantee the secure hold of the top heating plate, press each clamp centrally but slightly obliquely from top to bottom into the wall of the fiber muffle.

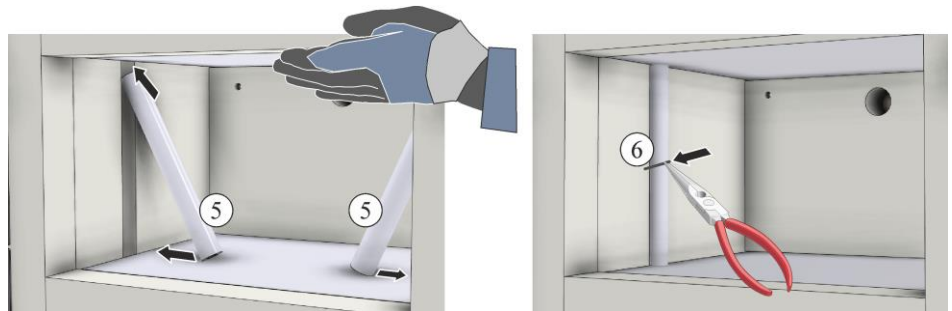
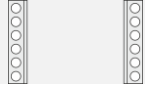

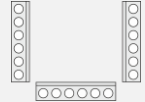


Fig. 69: Installing the ceramic supports (similar to picture)

4.2.3 Installing the Side Heating Plates

Heating plates			
Furnace model	Arrangement	Quantity	Item
L 1/..		2	right/left
L(T) 3/..			
L(T) 5/..		2	top/bottom
L(T) 9/..			
L(T) 15/..			
L(T) 24/..		3	right/left/bottom
L(T) 40/..			
LT 60/..			

Ceramic heating plates are of identical design and can be used as left or right heating plates if they are supplied as spare parts. We recommend that you replace the heating plates in the same position. Depending on the wear and tear on the heating plate, the wire may be brittle and break during installation. In this case, replace the heating plates with new ones.

Carefully insert the ends of the heating elements (twisted) into the drilled holes. Insert the heating plate at a slight angle so that it touches the rear wall of the fiber muffle. After the heating plate has been positioned, the front heating elements of the ceramic heating plate should not be visible.

The edge marked in the figure (arrow – EDGE) must face the inside of the furnace.



Fig. 70: Fitting the side heating plates (similar to picture)

The side heating plates are secured by the cramps that were previously pulled out. We recommend inserting the cramps approx. 4 cm behind the collar insulation. This prevents the insulation from breaking. The cramps can be carefully pressed into the soft insulation using needle-nose pliers.

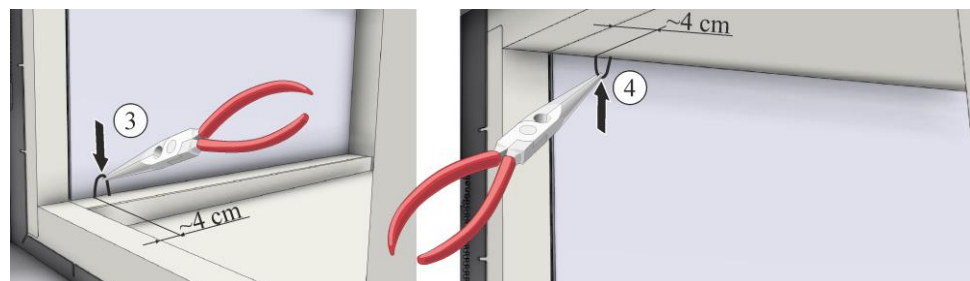
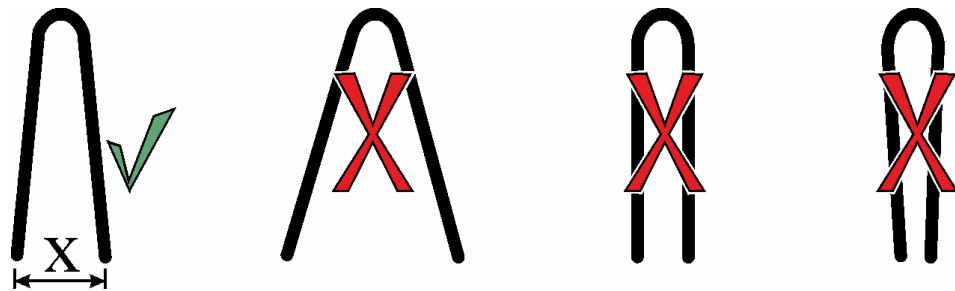


Fig. 71: Inserting the cramps (similar to picture)

Note: The cramp spacing **X** may not be changed.

X ~ 14 mm



Once the side heating plates have been fitted (model LT 60/..), the upper roof insulation must be lifted carefully until the support tubes can be inserted into the holes in the floor insulation.



Fig. 72: Carefully push the roof insulation upwards (LT 60/..) (similar to picture)

Carefully insert the support tubes (LT 60/..) into the holes in the floor insulation. By carefully lowering the roof insulation, the support tubes can be inserted into the holes in the roof insulation.

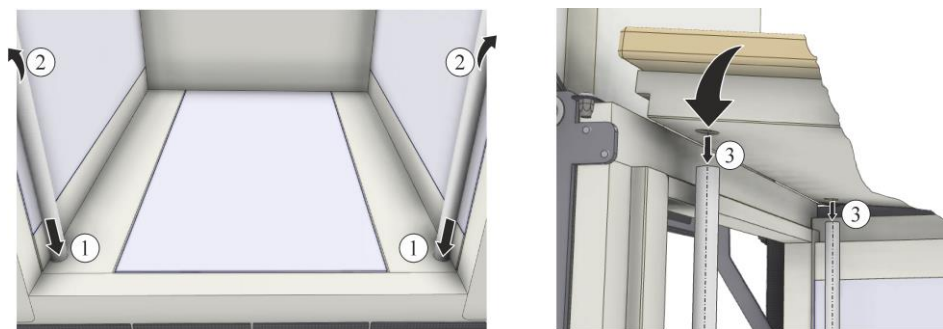


Fig. 73: Fit the support tubes – carefully lower the furnace ceiling (LT 60/..) (similar to picture)



Fig. 74: Installing the furnace ceiling (similar to picture)

4.3 Preparing the Electrical Connection of the Heating Plates

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.

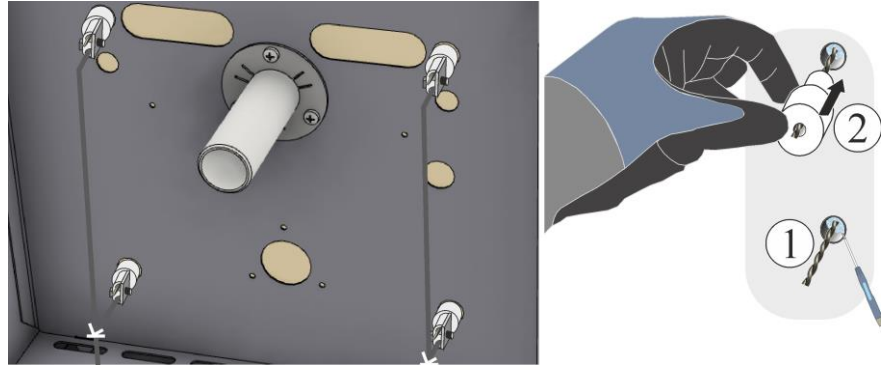


Fig. 75: Sliding on the ceramic ducts and connecting the electricity (similar to picture)

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

Slide the connection terminals (4) until they touch the ceramic feedthrough tube.

Tighten the screws (6) 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.

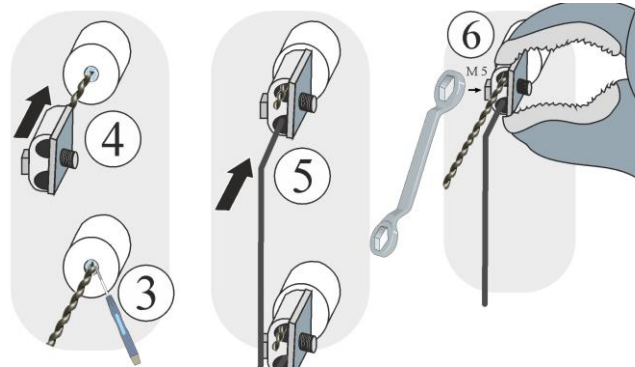


Fig. 76: Sliding on the ceramic ducts and connecting the electricity (similar to picture)

For the correct tightening torque, please refer to the table in these operating instructions in the “Tightening Torque for Screws on the Heating Elements” section.



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.



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.

This step is only necessary if new heating plates are included in the scope of delivery.

Shorten the projecting twisted heating element ends with suitable pincers (7). We recommend that you leave approx. 0.5 cm between the edge and the connection terminal.

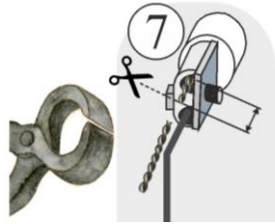


Fig. 77: Shortening twisted heating element ends (similar to picture)

4.4 Installing the Thermocouple



Caution - damage to components!

Thermocouples are extremely sensitive to breakage. Any strain on or rotation of the thermocouples must be avoided. Failure to observe this rule will lead to the immediate destruction of the sensitive thermocouples.

Carefully insert the thermocouple (1) into the thermal channel. Attach the thermocouple firmly to the furnace housing, using the screw that was removed previously (2). Insert both cables from the thermocouple into the connection and fix in place with the screws (3). Ensure correct polarity of the electrical connections.

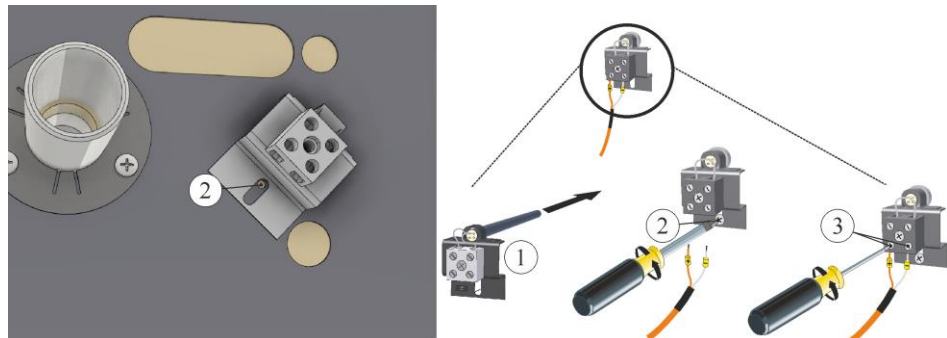


Fig. 78: Installing the thermocouple(s) (similar to picture)

Note

*) The connections of the connecting lines from the thermocouple to the controller are labeled with \oplus and \ominus . It is absolutely essential to observe the correct polarity.

\oplus to \oplus \ominus to \ominus

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

The covers are replaced in reverse order. The previously disconnected grounding cable between the terminal and cover must be properly reconnected. The cables behind the cover must be routed freely and must not be laid over components that are subjected to heat or that come into contact with them.

Note

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



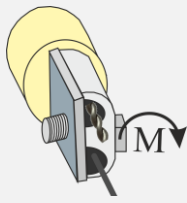
Caution

Make sure that no cables poke out or are caught. Beware of sharp edges.

5 Tightening Torque for Screw Connections on Heating Elements

Screw tightening torque

Tighten screws on the heating elements with a defined torque. If this advice is not followed, the heating elements may be damaged.

Figure	Screw/type of fixing	Thread diameter of metric thread	Torque (M) in Nm
	Fastening power cable clamp	M5	6 Nm
		M6	8 Nm
		M7	8 Nm
		M8	14 Nm
		M10	20 Nm

6 Operation

6.1 Turning on the Controller/Furnace



Note

The power plug is to be pulled out to stop the furnace in case of an emergency.
 Therefore, the power plug must be accessible at all times when the furnace is operating so that it can be pulled out quickly in case of an emergency.

Insert the mains power connector, then switch on the power switch and check the function of the furnace.



Note

For operation and instructions consult the operating instructions for your controller.

7 Nabertherm Service

The Nabertherm Service team is available at all times for furnace maintenance and repair. If you have any questions, problems, or requirements, contact Nabertherm GmbH. By mail, phone, or the Internet.

Mail	Phone or fax	Web or e-mail
Nabertherm GmbH Bahnhofstrasse 20 28865 Lilienthal Germany	Phone: +49 (4298) 922-333 Fax: +49 (4298) 922-129	www.nabertherm.com contact@nabertherm.de

When you contact us, please have the type plate details of the furnace or controller at hand.

Provide the following details from the type plate:

		
Nabertherm GmbH Bahnhofstr. 20, 28865 Lilienthal/Bremen, Germany Tel +49 (04298) 922-0, Fax +49 (04298) 922-129 contact@nabertherm.de www.nabertherm.com		
①	②	④
③		

- ① Furnace model
- ② Serial number
- ③ Article number
- ④ Year of construction

Fig. 79: Example (type plate)

8 For Your Notes



MORE THAN HEAT 30-3000 °C

Headquarters:

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