ZENOTEC Fire Cube
Instructions for use
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1 Introduction

Dear Customer,

Thank you for the trust which you have shown by selecting a product made by WIELAND Dental + Technik.

The concept and design of the ZENOTEC Fire Cube sintering furnace are state of the art.

To take advantage of the device's full performance potential and to ensure continuous operational readiness operating personnel must participate in an extensive training program run by our technical experts. This also ensures the device's constant availability.

This operating instruction manual is both a textbook for the training program and a reference book. It should be kept available for operating personnel at all times. For this reason you should keep the manual in an easily accessible place near the system.

On Our Own Behalf

We welcome all your suggestions and constructive ideas. We appreciate your cooperation as a contribution to the optimum design of the ZENOTEC Fire Cube sintering furnace and its documentation. If you have any questions please use the following information to contact WIELAND Dental + Technik GmbH & Co. KG:

Wieland Dental + Technik GmbH & Co. KG
Schwenninger Straße 13
75179 Pforzheim
Germany

ZENOTEC-Support
Phone national: 08 00 / 93 66 823
Phone international: +49 72 31 / 37 05 400
Fax: 0 72 31 / 35 79 59
E-Mail: info@wieland-dental.de
www.wieland-dental.de
1.1 Product Identification

System Designation
High-temperature furnace for dental applications: ZENOTEC Fire Cube

Distributor
WIELAND Dental + Technik GmbH & Co. KG Schwenninger Straße 13
75179 Pforzheim
Germany

Proof of origin
The ZENOTEC Fire Cube high-temperature furnace was designed and built in Germany.

Document
Operating Instructions for the ZENOTEC Fire Cube Sintering Furnace.
Publication: March 2012
Documentation and design:
WIELAND Dental + Technik GmbH & Co. KG

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Note
All the figures in the instructions have a descriptive character; in other words, they do not represent the exact details of the oven.
1.2 Product Description

This high-temperature laboratory furnace is a high-quality product which will give you many years of reliable service if they are properly cared for and maintained. One basic prerequisite is that the furnace is used the way it was designed to be used. During development and production a high priority was placed on safety, functionality and economy.

Designed as a **table-top model**, these compact high-temperature furnaces have numerous advantages. These furnaces are all-rounders for research and laboratory applications. They are made from expertly finished, high-quality materials and are easy to operate. They are especially suitable for sintering technical ceramics, for example dental restorations made of zirconium oxide. The very best insulation materials permit energy-saving operation and fast heating times thanks to low heat retention and thermal conductivity. ZENOTEC Fire Cube high-temperature tube furnaces achieve a furnace chamber temperature of max. 1550°C. (2825°F.).

**Other characteristics of this product are:**
- High-quality silicon carbide (SiC) heating elements
- Heating elements are easy to replace
- High-quality fiber material designed for the furnace temperatures
- Stainless steel structured housing
- Double-wall housing with additional fan cooling for low external temperatures
- Exhaust air vent in the top
- Lift door, with the hot side facing away from the operator
- Type S thermocouples
- Switchgear with semi-conductor relays calibrated for the heating elements

**Additional Equipment**
- Rectangular sintering supports and covers for the charge
1.3 Overview of the Complete Furnace

Fig. 1: Overview: The example here is a high-temperature furnace, ZENOTEC Fire Cube with accessories.
1.4 Key to the Model Names

![Example model designation (type plate)](image)

Fig. 2: Example model designation (type plate)
## 1.5 Scope of Delivery

The scope of supply includes:

<table>
<thead>
<tr>
<th>System component</th>
<th>Quantity</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZENOTEC Fire Cube high-temperature furnace (tabletop model)</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Allen key</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Exhaust air pipe</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Insert plate</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Fuse *)</td>
<td>1 x *)</td>
<td></td>
</tr>
<tr>
<td>Mains power cable *)</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Transformer *)</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Other components depending on variant</td>
<td>- - -</td>
<td>See delivery documents</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of document</th>
<th>Quantity</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating instructions, ZENOTEC Fire Cube high-temperature furnace (tabletop model)</td>
<td>1 x</td>
<td></td>
</tr>
<tr>
<td>Other documents depending on variant</td>
<td>- - -</td>
<td></td>
</tr>
</tbody>
</table>

*) = in scope of delivery depending on variant

**Note**

Please carefully retain all documents. During fabrication and before delivery, all the functions of this furnace system have been tested.
2 Specifications

Electrical specifications are on the type plate located on the side of the oven.

<table>
<thead>
<tr>
<th>Tmax °C</th>
<th>Dimensions, interior in mm</th>
<th>Dimensions, exterior in mm</th>
<th>Volume in L</th>
<th>Output kW</th>
<th>Weight kg</th>
<th>Minutes to Tmax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>w d h</td>
<td>W D H+c</td>
<td>1</td>
<td>max. 3.5</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>1550</td>
<td>110 120 120</td>
<td>340 300 500+185</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 3: Dimensions of high-temperature furnace

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>1-phase: (1/N/PE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>HTCT 01/14 – HTCT 01/16</td>
</tr>
<tr>
<td>Voltage:</td>
<td>220 V – 240 V</td>
</tr>
<tr>
<td>Frequency:</td>
<td>50 or 60 Hz</td>
</tr>
<tr>
<td>Power plug</td>
<td>Protective contact plug (with snap-in socket)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thermal protection class</th>
<th>Furnaces: As per DIN EN 60519-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without safety controller:</td>
<td>Class 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protection class</th>
<th>Furnaces</th>
<th>IP20</th>
</tr>
</thead>
</table>

| Ambient conditions for electrical equipment | Temperature: Humidity: | +5°C to + 40°C, max. 80% non-condensing |

<table>
<thead>
<tr>
<th>Emissions</th>
<th>Continuous sound pressure level:</th>
<th>&lt; 80 dB(A)</th>
</tr>
</thead>
</table>

All information is non-binding; errors expected
2.1 Warranty and Liability

Warranty and liability are governed by the contractually specified conditions. All the contractually specified warranty terms and conditions must be stored together with the operating instructions. Moreover, the following terms also apply:

Warranty and liability claims for personal injury or damage to property shall be excluded if they are attributable to one or more of the following causes:

- Everyone involved in operation, installation, maintenance, or repair of the oven must have read and understood the operating instructions. No liability will be accepted for damage or disruptions to operation resulting from non-compliance with the operating instructions.
- Not using the oven as intended,
- Improper installation, start-up, operation, or maintenance of the oven,
- Operation of the oven with defective safety equipment or improperly installed or non-functioning safety and protective equipment,
- Not observing the references in the operating instructions to transportation, storage, installation, start-up, operation, maintenance, or equipping the oven,
- Making unauthorized changes to the oven,
- Making unauthorized changes to the operating parameters,
- Making unauthorized changes to the parameterization, the settings, or the program,
- Original parts and accessories are designed especially ZENOTEC Fire Cube sintering furnace. Replace parts only with original parts. Otherwise the warranty will be void. Accepts absolutely no liability for damage caused by using parts that are not original Wieland parts.
- Catastrophes due to third-party causes and force majeure.
2.2 Disposal

The disposal in compliance with the Electrical and Electronic Equipment Act shall be performed according to the contractually specified conditions.

3 Safety

3.1 Intended Use

The ZENOTEC Fire Cube sintering furnace was designed and manufactured after careful selection of the harmonized standards to be observed as well as other technical specifications. It therefore corresponds to the state of the art, ensuring the highest possible degree of safety.

Only materials with known characteristics and melting temperatures may be used. Check the material safety data sheets if necessary.

Use of the furnace for any other purpose whatsoever such as processing products other than those intended or handling hazardous substances or substances posing a health hazard constitutes improper use and must be agreed upon with Wieland in writing.

Whether or not the materials used in the furnace can potentially corrode or destroy the insulation or heating elements must be ascertained.

Modifications to system equipment must be agreed upon with Wieland in writing. It is not permitted to remove, bypass, or shut down safety devices.

The installation instructions and safety guidelines must be observed. Otherwise, the furnace will not be considered as being used as designated, and all claims against Wieland Dental + Technik GmbH & Co. KG will be void.

Opening the furnace when hot (temperature greater than 200/392 °C/°F) can lead to accelerated wear of the following components: insulation, heating elements, and furnace housing.

Operating with power sources, products, operating equipment, additives, etc. that are subject to the Ordinance on Hazardous Substances or cause risks to the health of operating personnel in any way is not permitted.

- This furnace is designed for commercial use. The furnace must not be used for heating food, animals, wood, grain, etc.
- The furnace must not be used as a workplace heater.
- Do not use the furnace to melt ice or similar materials.
- Do not use the furnace as a clothes dryer.

Note
See safety instructions in the individual sections.

Caution
Operating the furnace with explosive gases or mixtures, including explosive gases or mixtures created as a result of heating/drying, is prohibited.

This furnace features no safety technology for processes which produce combustible mixtures, for example debinding.
If the furnace is still used for such processes despite this fact, the concentration of organic gas mixtures in the furnace must never exceed 3% of the lower explosion limit (LEL). This pre-requisite applies not only to normal operation but, in particular, to exceptional situations such as process disruptions (caused, for example, by the failure of a power unit). You must ensure that the furnace is adequately ventilated and vented.

Note
This product does not comply with the ATEX Directive and may not be used in ignitable atmospheres. It must not be operated with explosive gases or mixtures or during processes where explosive gases or mixtures are produced.
3.2 Requirements for the Oven Operator

The set-up instructions and safety regulations must be followed, otherwise the oven will be deemed to have been used improperly, effectively cancelling any claims against Wieland Dental + Technik GmbH & Co. KG.

This level of safety when operating the oven can be achieved only if all the necessary measures have been taken. It depends on the oven operator's diligence in planning these measures and controlling how they are carried out.

The operator must ensure that

- all harmful gases are removed from the workplace, for example by an extraction system,
- the extraction system is switched on,
- the workplace is properly ventilated,
- the oven is operated only in a perfect operating condition and, in particular, that the functions of the safety components are checked regularly.
- the required personal protective equipment is available for and used by the operating, maintenance, and repair personnel.
- these operating instructions, including the supplier documentation, are kept near the oven. These instructions must be available at all times for anyone working with or on the oven;
- all the safety and operating instruction signs on the oven can be read properly. Damaged or unreadable signs must be replaced immediately,
- oven personnel are informed regularly about all issues involving occupational safety and environmental protection and are familiar with all the operating instructions, especially those involving safety,
- a risk assessment is carried out (in Germany, covered by Section 5 of the Occupational Safety Act) to determine any other hazards that may result from the working conditions particular to the oven's location,
- all other instructions and safety guidelines that have been determined in a risk assessment for the workplace are compiled in an operation manual (in Germany, covered by Section 6 of the Ordinance Regulating the Use of Operating Equipment).
- operating personnel still in training initially perform their work at the oven under the supervision of an experienced person. Successful completion of the training period must be confirmed in writing.

Note
In Germany, the VBG and BGZ accident prevention regulations must be followed. The accident prevention regulations applicable in the country where the oven is installed must be followed.
3.3 Requirements for the Operating Personnel

The oven may be operated only by persons who are trained, instructed, and authorized to do so. These persons must know the operating instructions and act accordingly. The authorizations of the operating personnel must be clearly defined. Only adequately qualified and authorized persons may operate, maintain, or repair the oven.

Operating personnel are instructed regularly in all aspects of occupational safety and environmental protection and are familiar with all the operating instructions, in particular, safety instructions. Only trained personnel may operate the control and safety equipment.

The operator should complete these details:

- Operator
- The oven may only be transported by
- The oven may only be installed by
- The oven may only be commissioned by
- Initial instructions may only be given by
- Faults may only be rectified by
- The oven may only be maintained by
- The oven may only be cleaned by
- The oven may only be serviced by
- The oven may only be repaired by
- The oven may only be shut down by

3.4 Protective Clothing

Wear heat-resistant gloves to protect your hands.
3.5 Basic Measures During Normal Operation

**Risks during Normal Operation!**
Before switching the oven on, check and ensure that only authorized persons are in the working area of the oven and that no one can be injured as a result of operating the oven.

Before starting production each time, check and ensure that all the safety equipment works properly.
Before starting production each time, check the oven for obvious damage and ensure that it is operated only in a perfect condition. Report any defects to a supervisor immediately.
Before starting production each time, remove all materials and objects that are not needed for production from the working area.
**At least once every day (see also Servicing and Maintenance) check the following:**
- Check the oven for obvious external damage,
- Check that the fan works properly (if applicable)

3.6 Basic Measures in Case of Emergency

3.6.1 What to do in an Emergency

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

Fig. 4: Pulling the power plug
Risks during Normal Operation!
Switch the oven off immediately in case of unexpected occurrences in the oven (e.g. a lot of smoke or unusual smells). Wait until the oven has cooled naturally to room temperature.

DANGER
• 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 Wieland.
• Before starting work, pull out the power plug

3.7 Basic Measures for Servicing and Maintenance

Maintenance work must be performed by authorized persons following the maintenance instructions and the accident prevention regulations. We recommend that the maintenance and repair work be carried out by the service team of Wieland GmbH. Non-compliance may cause injuries, death, or considerable damage to property.

Switch off the oven and make sure it cannot be switched on again inadvertently (lock the main switch and secure it with a padlock), or pull out the power plug.

Clear an adequate area around the oven to facilitate the repair work.

Suspended loads are dangerous. Working beneath a suspended load is prohibited. There is a risk of fatal injury.

When cleaning ovens, control cabinets, or electrical equipment housings, never spray them with water.

When maintenance or repair work has been completed, before recommencing production ensure the following:
• Check that loosened screw connections have been re-tightened,
• Remove all material, tools, and other equipment used for the maintenance or repair work from the working area of the oven,
• Remove any liquids that have leaked,
• Check that all safety functions work properly.

Power cables may be replaced only with similar, approved cables.
3.8 Environmental Regulations

All statutory duties regarding waste avoidance, proper recycling, and disposal must be observed when work is carried out on and with the oven.

Problem materials that are no longer needed, such as lubricants or batteries, must not be placed in normal waste disposal systems or allowed to enter the sewage system.

During installation, repair, and maintenance work, substances that are hazardous to water, such as
- lubricating grease and oils
- hydraulic oils
- refrigerants
- solvent-based cleaning fluids must not be allowed to contaminate the soil or enter the sewage system.

These substances must be stored, transported, collected, and disposed of in suitable containers.

---

**Note**
The operator must ensure that national environmental regulations are observed.

When it is delivered, this oven contains no substances that make a hazardous waste classification necessary. However, residues of process materials may accumulate in the oven 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 (See Servicing, Cleaning, and Maintenance with Ceramic Fiber Material)
- Dispose of the housing as scrap metal.
3.9 Explanation of the Symbols and Warnings

Note
In the following operating instructions, specific warnings are given to draw attention to residual risks that cannot be avoided when the oven is operating. These residual risks include dangers for humans/products/ the oven, and the environment.
The symbols used in the operating instructions are especially intended to draw attention to safety information.
The symbols used cannot replace the text of the safety information. Therefore, always read the entire text.
Graphic symbols correspond to ISO 3864. In accordance with the American National Standard Institute (ANSI) Z535.6 the following warning information and words are used in this document:

The general hazard symbol, in combination with the words CAUTION, WARNING and DANGER warns about the risk of serious injury. Observe the following information to prevent injury or death.

**NOTICE**
Refers to a hazard that could damage or destroy the equipment.

**CAUTION**
Refers to a hazard with a minor or medium risk of injury.

**WARNING**
Refers to a hazard that could cause death, serious or irreversible injury.

**DANGER**
Refers to a hazard that could directly cause death, serious or irreversible injury.

Structure of the warning: All warnings are structured as follows

<table>
<thead>
<tr>
<th>Hazard symbol</th>
<th>Signal word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates the risk of injury</td>
<td>Classifies the danger</td>
</tr>
</tbody>
</table>

**WARNING**
- Type and source of the danger
- Consequences of non-compliance
- Action to prevent danger

Graphical symbols (optional) according to ISO 3864:
Consequences, measures, and prohibitions

Reference texts:
- Type and source of the danger
- Possible consequences of non-compliance
- Measures/Prohibitions
or

Hazard symbol
Indicates the risk of injury

Signal word
Classifies the danger

DANGER
• Type and source of the danger
• Consequences of non-compliance
• Action to prevent danger

Graphical symbols (optional) according to ISO 3864:
Consequences, measures, and prohibitions

Graphical symbols (optional) according to ISO 3864:
Instructions or prohibitions

Reference texts:
• Type and source of the danger
• Possible consequences of non-compliance
• Measures/prohibitions

Information Symbols in the Instructions

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

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

Rule - Important Information for Operators
This symbol draws the operator's attention to important information and operating instructions that must be followed.

Rule - Important Information for Maintenance Personnel
This symbol draws the maintenance personnel's attention to important operating and maintenance instructions (service) that must be followed.

Rule - Pull Out the Power Plug
This symbol tells the operator to pull out the power plug.

Rule - Lift only with Several People
This symbol draws the personnel's attention to the fact that this device may only be lifted and moved to its final destination by several people.

Warning - Hot Surface, Do Not Touch
This symbol warns the operator that the surface is hot and should not be touched.
<table>
<thead>
<tr>
<th>Warning - Danger of Electric Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol warns the operator that there is a risk of an electric shock if the following warnings are not heeded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning – Risk of Device Toppling Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol tells the operator that there is a risk of the device toppling over if the following warnings are not heeded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning – Suspended Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol warns the operator of potential dangers of suspended loads. Working below a suspended load is strictly forbidden. Ignoring this can lead to fatal injury.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning – Danger if Heavy Loads Are Lifted</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol warns the operator of the potential dangers of lifting heavy loads. Ignoring this can lead to injury.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning – Risk to the Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol warns the operator of the risk to the environment if the following information is not heeded. The operator must ensure that national environmental regulations are observed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning - Fire Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol warns operators of the danger of fire if the following information is not followed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning – Risk of Explosive Substances or Explosive Atmosphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>These symbols warn the operator of explosive substances or an explosive atmosphere</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prohibited - Important Information for Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>This symbol warns the operator that water or cleaning products must NOT be poured over the objects. A high-pressure cleaning device must also not be used.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning Signs on the Oven:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warning - Hot Surface, Danger of Burning – Do Not Touch</strong></td>
</tr>
<tr>
<td>You may not always realize that surfaces, such as oven components, oven walls, doors and materials, and even liquids are hot. Do not touch the surface.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warning - Danger of Electric Shock!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning, dangerous electric voltage</td>
</tr>
</tbody>
</table>
### 3.10 General Risks with the Oven

**Warning! General hazards!**
- Risk of burning on the furnace housing and on the tube
- The door handle/grip can become very hot during operation; wear gloves.
- Risk of crushing on moving parts (door hinge, rotary tube drive, lifting table, etc.)
- The switchgear cabinet (if present) and the terminal boxes on the system contain dangerous electrical voltages.
- Do not insert any objects into the openings on the furnace housing, exhaust air holes, or cooling slots on the switchgear or furnace (if present). This poses a risk of electric shock.

**Warning! General hazards!**
No objects may be placed or set down on the furnace or switchgear. Doing so creates a fire or explosion hazard.

![Image of oven with warnings and prohibited objects]
4 Transportation, Installation, and Commissioning

4.1 Delivery

Check that Everything is Complete
Compare the delivered items with the delivery note and the purchase order documents. **Immediately** notify the carrier and Wieland Dental + Technik GmbH & Co. KG of any missing or damaged parts, as complaints at a later date cannot be acknowledged.

Danger of Injury
When the oven is being lifted, parts of the oven or the oven itself could topple over, slip, or fall. Before the oven is lifted, make sure no one is in the working area. Wear safety footwear and a hard hat.

Safety Instructions
- Forklifts must be operated only by authorized personnel. The operator bears sole responsibility for safe operation and the load.
- When the oven is being lifted, make sure that the ends of the forks or the load do not catch on neighboring goods. Use a crane to move tall parts, such as control cabinets.
- Use only lifting equipment with sufficient load-bearing capacity.
- Lifting gear must be attached only to positions that have been designated for this purpose.
- Attachments, piping, or cable conduits must never be used to affix lifting gear.
- Unpackaged parts should only be lifted with ropes or straps.
- Attach transportation equipment only to positions intended for this purpose.
- Lifting and securing equipment must conform to the provisions contained in accident prevention regulations.
- Consider the weight of the oven when choosing lifting and securing equipment. (see Specifications)
- Stainless steel parts (including mounting elements) must always be kept separate from unalloyed steel parts.
- Do not remove corrosion protection until immediately prior to assembly.

Risks during Normal Operation!
Suspended loads are dangerous. Working beneath a suspended load is prohibited. There is a risk of fatal injury.

Note
Safety and accident prevention guidelines applicable for forklift trucks must be followed.
Transportation with a Pallet Truck

Observe the maximum permitted capacity of the pallet truck.

1. Our ovens are delivered ex works on wooden frames to facilitate unloading. Transport the oven in its original packaging and with suitable equipment to prevent any damage. Remove the packaging only when the oven is in its final location. When transporting the oven, make sure it is secured against sliding, toppling over, and damage. The oven should be transported and installed by at least two persons. **Do not store the oven in damp rooms or outdoors.**

2. Push the pallet truck underneath the transportation frame. Make sure that the pallet truck is completely beneath the frame. Pay attention to neighboring goods.

![Fig. 5: Pallet truck is pushed completely beneath the transportation frame](image)

3. Lift the oven carefully and pay attention to its center of gravity. When the oven is being lifted, make sure that the ends of the forks or the load do not catch on neighboring goods.

4. Make sure that the oven is balanced safely; if not, attach securing equipment. Push the oven carefully, slowly and with the pallet truck at its lowest position. Do not transport the oven on inclines.

5. Carefully lower the oven at its final position. Pay attention to neighboring goods. Try not to set it down too abruptly.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Device may slip or topple over.</td>
</tr>
<tr>
<td>• Damage to the device.</td>
</tr>
<tr>
<td>• Risk of injury from lifting heavy loads.</td>
</tr>
<tr>
<td>• Transport device only in original packaging.</td>
</tr>
<tr>
<td>• Several people must carry the device.</td>
</tr>
</tbody>
</table>
Symbols:
The international standard symbols for handling packaging are defined in ISO R/780 (International Organization for Standardization) and in DIN 55 402 (German Institute for Standardization).

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragile</td>
<td>![Fragile Symbol]</td>
<td>This symbol is to be attached to fragile goods. Goods marked like this are to be handled carefully and must not be thrown or tied up.</td>
</tr>
<tr>
<td>This side up</td>
<td>![This Side Up Symbol]</td>
<td>The freight must be transported, transshipped, and stored in such a way that the arrows point upward. The freight must not be rolled, folded, or stored on edge. However, the package does not have to be packed on top of other freight.</td>
</tr>
<tr>
<td>Keep dry</td>
<td>![Keep Dry Symbol]</td>
<td>Products with this symbol must be protected against high air moisture, hence, they must be stored under cover. If particularly heavy or bulky packages cannot be stored in halls or sheds, they must be covered carefully with a tarpaulin or similar.</td>
</tr>
<tr>
<td>Sling here</td>
<td>![Sling Here Symbol]</td>
<td>The symbol shows only where the sling should be attached, not the method of slinging. If the symbols are at an equal distance from the middle or center of gravity of the package, the package hangs straight if the slings are the same length. If this is not the case, the sling on one side has to be shortened.</td>
</tr>
</tbody>
</table>
4.2 Unpacking

**Note**
The oven packaging prevents damage during transportation. Make sure that you remove all packaging material (also inside the oven chamber). Keep the packaging and transportation securing equipment in case it is needed for future transportation or storage.

At least two people are needed to carry/transport the oven, more for larger ovens.

1. Check the transportation packaging for possible damage.
2. Remove tensioning straps from the transportation packaging.
3. Slacken screws and remove wooden casing from the covering box (if available).
4. Carefully lift the cardboard box and remove it from the pallet.
5. Remove the foam insert in the box. The box contains a packaging unit for accessories (Example: exhaust air tube, insert plate, power cable). Compare the delivered items with the delivery note and the order documents, see "Delivery".
6. Carefully lift the furnace out of the packaging unit.
7. To carry, grip furnace from below at the sides and make sure you have a firm grip.
8. For furnaces weighing more than 25 kg, transport work must be carried out by at least 2 people. If transport straps are used, they must be attached crosswise only. Ensure that they are secure.

**Note**
In Germany, the general accident protection guidelines of VBG or BGZ must be observed. The national accident prevention regulations of the country of operation apply.

**Note**
Save the packaging for possible shipping or for storing the furnace.
4.3 Transportation Securing Equipment/Packaging

The oven packaging prevents damage during transportation. Make sure that you remove all packaging material (also inside the oven chamber). All packaging material can be recycled. The packaging was designed so that no special description is necessary.

Dismantling the Furnace Lid

The furnace has been equipped with protective edging to protect it against damage during transportation. This edging must be removed before you operate the furnace.

Fig. 6: Slacken screws
Unscrew the screws from the lid using the tool that is provided.

Fig. 7: Removing the transportation fittings
Lift off the lid and remove the foam rubber (The foam rubber is only for transportation and must not be put back into the furnace chamber.).
Installing the Heating Elements

Fig. 8: Installing the Heating Elements
Cautiously and gently remove the heating elements from the package and slowly insert them from above through the opening in the furnace top. The head of the heating element must rest on the furnace top.
Caution - the heating elements are extremely fragile.

Fig. 9: Screwing on the connection contacts
Remove the connection contacts A from the package and screw them carefully onto the contacts B of the heating elements. Tighten the screws/nuts C included in the delivery with a suitable tool to a tightness of approx. 4 Nm (torque). Caution! If you place any strain or twisting force on the fragile heating elements they will break.
Installing the Furnace Lid
Install the lid in the reverse order. Fix the lid using the screws that you previously unscrewed. Make sure that you place a tooth lock washer between the screw and the lid. This position is marked by a ground sticker on the housing/lid.

![Fig. 10: Installing the furnace lid](image)

Assembling the exhaust air pipe
Carefully push the exhaust air pipe (A) into the intended opening. The head of the exhaust air pipe must lie on the furnace lid. Reassemble the exhaust air pipe guard plate (B) using the previously slackened screws (C).

![Fig. 11: Assembling the exhaust air pipe](image)

4.4 Constructional and Connection Requirements

4.4.1 Installation (Oven Location)

When setting up the furnace, the following safety instructions must be followed:

- The furnace must be installed in a dry room in accordance with the safety instructions.
- The table/supporting surface must be flat to enable the furnace to be installed straight. The furnace must be placed on a noncombustible base (stone, metal, etc.).
- The carrying capacity of the table must be designed to bear the weight of the furnace incl. accessories.
- The floor covering must be made of nonflammable material so that hot material falling out of the furnace will not cause the floor covering to ignite.
Despite good insulation, the furnace radiates heat from its external surfaces. If necessary, this heat must be conducted away (a ventilation engineer must be consulted if required). In addition, the furnace must be positioned a minimum safety distance (S) of 0.5 m on each side and 1 m at the top away from combustible materials. In individual cases, more space must be chosen in order to match the local conditions. The minimum distance away from noncombustible materials may be reduced to 0.2 m at the sides.

Should gases or vapors escape from the charge, then sufficient air supply and ventilation at the installation location or an appropriate exhaust gas line must be provided.

A suitable exhaust for the burner exhaust must be provided by the customer.

![Fig. 12: Installation (Oven Location)](image)

**DANGER**

- Fire- danger to health.
- Risk of fatal injury.
- Adequate ventilation must be ensured at the installation location to conduct waste heat and any exhaust gases away.

**Note**

Before starting the oven for the first time, allow it to acclimatize at its installation location for 24 hours.
4.5 Assembly, Installation, and Connection

4.5.1 Venting Exhaust Fumes

We recommend that an exhaust air pipe be connected to the furnace and that the exhaust gases be conducted away accordingly.

A commercially available metal exhaust gas pipe with NW80 to NW120 may be used as a flue. It must be routed in constantly ascending form and must be secured to the wall or ceiling.

Position the pipe centrally above the furnace’s flue outlet. The exhaust gas pipe’s connection to the exhaust air pipe must not be airtight, as no bypass effect is otherwise achieved. This is necessary to prevent an excessive amount of fresh air from being sucked through the furnace.

Fig. 13: Assembly of a flue (example)

Note
The exhaust gases can only be conducted away if the room is ventilated via a corresponding air inlet.

Note
The exhaust gas pipe necessitates roofing and bricklaying work on the part of the customer. The size and variant of the exhaust gas pipe should be determined by a ventilation engineer. The national regulations of the relevant country apply.
4.5.2 Connecting the Oven to the Power Supply

On the building side, the required services must be provided, i.e. the carrying capacity of the installation surface, provision of power (electricity), etc.

- The furnace must be installed in accordance with its intended use. The power connection values must correspond to the values on the furnace type plate.
- The power socket must be located close to the furnace and must be easily accessible. The safety requirements are not met if the furnace is not connected to a socket with grounding contact.
- On use of an extension cable or a multipoint socket, the maximum electrical rating must not be exceeded. Do not use the furnace with an extension cable if you are uncertain whether grounding is guaranteed.
- The power cable must not be damaged. Do not place any objects on the power cable. Route the cable so that nobody can tread on or stumble over it.
- A damaged power cable must be replaced immediately.
- Ensure that the furnace's connection cable is routed so that it is protected.

**Note**
Before connecting the voltage supply, make sure that the power switch is in the “Off” or “0” position.

![Type plate](image)

**Fig. 14:** Illustrated power cable enclosed in the scope of delivery

1. First connect the enclosed power cable to the intended mains power connector on the furnace.
2. Now connect the enclosed power cable to the power connection. Only use a socket with grounding contact to supply power.
For wiring and electrical connections, see the attached circuit diagram. The electrical equipment of the machine can also be seen in the circuit diagram.

\[ \begin{array}{|c|c|c|} \hline & & \tabular{c}{\textbf{NOTICE}} \\ \hline & \textbullet \textbf{Danger from incorrect voltage} & \textbullet \textbf{Damage to the oven}. \\ & \textbullet \textbf{Check voltage before connecting and} & \textbullet \textbf{Check voltage before connecting and} \\ & \textbf{commissioning the oven.} & \textbf{commissioning the oven.} \\ & \textbullet \textbf{Compare the voltage with the details} & \textbullet \textbf{Compare the voltage with the details} \\ & \textbf{on the type plate.} & \textbf{on the type plate.} \\ \hline \end{array} \]

4.5.3 Installation/Connection if a Transformer is Used

When you are installing a transformer, these safety instructions must be followed:

- **The transformer is intended for use only with the model of furnace that is delivered (see delivery note). If the transformer is used for any other purpose, this is deemed to be inappropriate use.**
- Check the device for damage regularly and before using it for the first time. If it is damaged (cable, plug or housing), it must not be used. Power cables may be replaced only with similar, approved cables.
- Operate only in dry, clean rooms at maximum 40 °C (104 °F).
- The bench/surface must be level to permit the transformer and the furnace to stand upright. Place the transformer on a **non-flammable** surface (stone, metal, etc.).
- For the surrounding safety distance, see "Installation (Oven Location)".
- The load-bearing capacity of the bench must be suitable to take the weight of the transformer/furnace plus accessories.
- Isolate the device from the power supply when it is being cleaned or maintained. Do not open the device while it is operating.
Technical Specification for Transformer

<table>
<thead>
<tr>
<th></th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>200 V – 208 V AC</td>
<td>230 V ~ AC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 or 60 Hz</td>
<td>50 or 60 Hz</td>
</tr>
<tr>
<td>Max. output</td>
<td>3.5 kW</td>
<td>3.5 kW</td>
</tr>
<tr>
<td>Power plug</td>
<td>Country-specific</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>EN 61558-1, Protection type I / IP 20 UL + CSA E300981</td>
<td></td>
</tr>
<tr>
<td>Dimensions in mm</td>
<td>120 x 140 x 145 (W x D x H)</td>
<td></td>
</tr>
</tbody>
</table>

The transformer is packaged carefully to prevent damage during transportation. Make sure that you remove all the packaging material. Then carefully place the furnace A on to the transformer housing B (see figure below).

Connect the furnace and the transformer with the power cable that is supplied 1 (cable with snap-in coupling). Connect the power cable from the transformer to the power supply. 2. Use only a grounded socket.

![Fig. 16: Installing/connecting a transformer](image-url)

**DANGER**

- Fire- danger to health.
- Risk of fatal injury.
- Adequate ventilation must be ensured at the installation location to conduct waste heat and any exhaust gases away.
4.5.4 Insertion of the Base Plate

Legen Sie die Einlegeplatte/n *) (Menge der Einlegeplatte vom Ofenmodell abhängig) vorsichtig mittig verteilt auf den Boden des Ofens. Beim Einlegen der Einlegeplatte/n, ist darauf zu achten, dass der Türkragen sowie die Heizelemente nicht beschädigt werden. Vermeiden Sie unbedingt das Berühren der Heizelemente beim Einlegen der Einlegeplatte/n, dies kann zur Zerstörung der Heizelemente führen.

Der Ofenboden besteht aus hochwertigem Feuerfestmaterial, jedoch ist dieses Material extrem stoß- bzw. druckempfindlich.

Einige Modelle werden, um einer Beschädigung des weichen Ofenbodens vorzubeugen, standardmäßig mit einer Einlegeplatte geliefert. Wieland haftet nicht für Schäden (z.B. Abdrücke) am Ofenboden bei Nichtverwendung dieser Einlegeplatten. *). Beschädigte Einlegeplatte/n ist/sind sofort gegen neue zu ersetzen (siehe Kapitel „Ersatz-/Verschleißteile“).

Die Beschickung ist möglichst mittig im Ofenraum auf den Boden zu positionieren. Dies gewährleistet eine gleichmäßige Erwärmung.

Nach der Beschickung ist die Ofentür vorsichtig zu schließen.

*) Im Lieferumfang je nach Ausführung/Ofenmodell

Note
It must be ensured that the load on the furnace base does not exceed 2 kg/dm².

Fig. 17: Inserting the ceramic insert plate

4.6 Commissioning

The oven may be put into operation only by qualified persons and in compliance with the safety instructions.

Read the section on "Safety". When the oven is put into operation, the following safety information must also be observed to prevent serious injury, damage to the oven, and damage to other property.

Make sure that the instructions and information in the controller instructions are observed and followed.
The oven may be used only for its intended purpose.
Ensure that only authorized persons remain in the working area of the oven and that no other persons are put at risk when the oven is put into operation.
Before starting the oven for the first time, make sure that all tools, foreign parts, and transportation securing equipment have been removed.
Activate all safety equipment (power switch, emergency stop button if applicable) before putting the oven into operation.
Incorrectly wired connections may destroy electric/electronic components.
Observe the special protective measures (e.g. grounding, ...) for components that are at risk.
Faulty connections can cause the oven to start unexpectedly.
Before you switch on the oven, make sure that you know what to do in case of faults or emergencies.
Before starting the oven for the first time, check the electrical connections and control displays.
Before placing materials in the oven, 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.

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

### 4.7 Recommendations for Heating the Oven for the First Time

A special initial heating phase is not necessary for these heating elements installed in the furnace. You can begin immediately with the desired heating program.

During the heating, there may be a disturbing odor, due to the binding agent given off by the insulating material. We recommend ventilating the furnace location well during the first heating phase.

**Cracks in the insulation**

The insulation of the furnace consists of a very high-quality refractory material. Heat expansion may cause cracks in the insulation even after a few heating cycles. However, these have no effect on the functioning or quality of the furnace.

**Note**
During manufacturing residues of Silicium remain existant. At higher temperatures these result in fine glass bubbles at the surface of the heating element. The formation of these bubbles begins at tempera-tures above 1550 °C (2822 °F). Remove any existing bubbles carefully (with a brush or similar) before heating up the next time. This appearance is no background for a complaint.
5 Operation

5.1 Power Switch/Control Current Switch

The power switch/control current switch is located below or next to the keyboard block. Stop running heating programs before turning off the furnace with the power switch.

5.2 Turning on the Controller/Furnace

Switch power switch to "I" position. The controller first displays the controller type and version number and then the temperature display. If the temperature is displayed, the controller is ready to operate.

<table>
<thead>
<tr>
<th>Turning on the controller</th>
<th>P 330</th>
<th>U 04:04</th>
<th>20°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display (example)</td>
<td>Version number</td>
<td>Temperature display</td>
<td></td>
</tr>
</tbody>
</table>

All necessary settings for proper function have already been done at the factory.

Note

Some new functions depend on the version number. Turn the controller off and on again briefly to be able to read the version number.

5.3 Turning off the Controller/Furnace

Turn off main switch at position "O".

Note

Stop running heating programs before turning the furnace off at the main switch, since the controller will otherwise generate a fault message when it is turned back on. See Faults/fault messages
6  Control Fields and Display

![Control Fields and Display](image)

Fig. 19: control panel

6.1 Display

![Display](image)

Fig. 20: Display

- 1 = Furnace temperature
- 2 = Temperature unit °C/°F
- 3 = Heating on
- 4 = Extra relay 1 ON
- 5 = Extra relay 2 ON (or ventilation motor ON)
- 6 = Key lock (B 130/C 280/P 300 only)
- 7 = Error message
- 8 = Program end
- 9 = PC communication (optional)

6.2 Keyboard Blocks

**P 330**

![Keyboard Blocks](image)

Fig. 21: P 330 keyboard block

- 1 = Program selection
- 2 = Numerical block
- 3 = Extra functions
- 4 = Page
- 5 = Program start/stop
- 6 = Info menu
- 7 = Segment skip
- 8 = Save
- 9 = Pause
- 10 = Time
7 Features of the Controller

7.1 Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>P 330</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-temperature protection 1)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Extra relay function</td>
<td>2 4)</td>
<td></td>
</tr>
<tr>
<td>Manual configuration of the heating circuits</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Air circulation motor control 2)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Number of programs</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Number of segments</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Auto tune</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>kW/hr counter 3)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Operating hours counter</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Operating hours counter</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Real-time clock</td>
<td>√ 5)</td>
<td></td>
</tr>
<tr>
<td>Acoustic signal</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>RS-422 data interface</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Constant heat output</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

1) When the program starts, the highest temperature in the program is calculated. If the furnace is 30°C warmer than the highest program temperature for 3 minutes during the program sequence, the controller turns off the heating and the safety relay, and a fault message appears.

2) Preconfigured function for circulation furnaces: Once a program has been started on the controller, the air circulation motor starts. It remains in operation until the program terminates or is interrupted, and the furnace temperature falls back below 80/176 °C/°F. Extra function 2 is no longer available with this function.

3) The kW/hr counter calculates the power theoretically consumed over the time the heater is turned on for a heating program at nominal voltage. However, there may actually be deviations: If the voltage is low, the power consumption displayed will be too high, and for a higher voltage the power consumption displayed will be too low.

4) In furnaces with an air circulation motor, only one extra function is usually available (see furnace operating instructions).

5) Preset function, therefore no 2nd extra function (see Chapter 7.7 "Programming Extra Functions")
7.2 Program Entry with/without Gradient

As of controller version 3.xx you can enter ramps either as gradients (e.g. 120°C/h) or using the "time and target temperature" combination.

Turn the controller off and on again briefly to be able to read the version number.

The input mode can be changed on a user-specific basis in the configuration in support of the process specification. To change the input mode, see "Configuration".

The mode configured can be seen during program input in a segment, e.g. "time 1", as follows:

For "time and set temperature" input, only °C/°F or the time h is displayed as the input unit. For gradient input, °C/°F and h appear together in the display as the unit. The maximum gradient is 6000°C (fast heating).

---

Note

The unit of time for the gradient input is preset to hours (h) and cannot be changed to minutes.

Example: 100°C/h

---

7.3 Program Starting Behavior for warm Furnaces

If the furnace temperature ① at program start is higher than the set temperature ② of the first segment "T 1", the program start is delayed until the furnace chamber temperature cools to a value of T1 + 10 °C ③. That is, segment "Time 1" is skipped and the program start occurs in the following segment "Time 2".

Fig. 22: Program start behavior

This program start behavior is permanently programmed into all controllers as of version number 3.xx and cannot be changed. Turn the controller off and on again briefly to be able to read the version number.

7.4 Power Failure Behavior

As of controller version 3.xx the power failure behavior can be configured.

Turn the controller off and on again briefly to be able to read the version number.

To change the power failure behavior, see chapter "Configuration/customer-specific settings".
7.5 Setting and Displaying the Date/Time

The P 330 has a real time clock that is set at the factory. The time of day can be displayed by pressing the key. If the time of day is displayed incorrectly, the clock can be set as follows: The clock is set using a numerical combination of the day of the week and the time. The setting of the day of the week corresponds to the first digit of the numerical combination. Each day of the week has its own number.

1=Mon, 2=Tue, 3=Wed, 4=Thu, 5=Fri, 6=Sat, 7=Sun.

Entry of the time of day must then be carried out with the last four digits of the combination using a 24-hour clock:

E.g. 0735 for 7:35 AM, 1700 for 5:00 PM, etc.

Example: Setting the time "Wednesday (day 3), 7:35 AM"

Fig. 23: Example of setting the clock

The day and time are saved by pressing the key. They can be queried at any time with the symbol key.

This clock is a real-time clock, that is, even when the controller is turned off, the time is retained using a built-in battery. The lifetime of the battery is about 3 years. When the battery is replaced, the saved data (set time) is lost. For the battery type, see the chapter "Technical data".

The time can only be entered and displayed in 24-hour mode, that is, a display of 12:00 AM/PM is not possible. After the time is set, the controller is fully ready for operation.

7.6 Setting or changing the Start Time

Start time

To start a heating program automatically at a later point in time, e.g. after a drying time, a waiting time can be programmed via the 7-day timer.

To select the waiting time, press the key.

The "wait" LED flashes.

The timer is set using a numerical combination consisting of the day of the week and the time. The setting of the day of the week corresponds to the first digit of the numerical combination. Each day of the week has its own number.

1=Mon, 2=Tue, 3=Wed, 4=Thu, 5=Fri, 6=Sat, 7=Sun.

Entry of the time of day must then be carried out with the last four digits of the combination using a 24-hour clock:

E.g. 0800 for 8:00 a.m., 1800 for 6:00 p.m., etc.

Also see "Setting and displaying the date/time"

Example: Program start on Thursday at 08:00.
Fig. 24: Waiting time input

Note
Incorrect input:
Exit Wait function by pressing the \key. Press \key again to select or correct the wait time.
7.7 Operating Instructions Summary

Turning on the controller

Display → P 330 → U 04:04 → 20°C

Enter waiting time

Enter program

Display

Enter time segment 1

Enter time segment 2

Enter temperature

Confirm input with

Start program

Note

Press for approx. 2 seconds.
Each of the 9 heating programs has 20 ramps and 20 hold times (40 segments in all) which are connected together with the segment blocks A – I.

Fig. 25: Program graph

If the value displayed should not be changed, use the page key to page to the next temperature or time value.

The display also shows the unit of the value expected:
- set temperature values with °C/°F
- set time specifications with hr:min
- set gradient specifications with °C/hr:min or °F/hr:min

If a value should be changed, you can set it with the numerical block.

Times are entered in hours and minutes, e.g. 6 hr and 30 min as 06:30.

For holding times, an entry of 99:59 means program execution will continue forever.

When input is complete, the program can be started (see Starting the program).

If ramps contain the time entry 00:00, the controller attempts to reach the temperature value stored in "T" as quickly as possible.

If no key is pressed for 60 seconds, the display automatically returns to the display of temperature. Changed settings are initially only buffered. If a changed or new program should be permanently stored in the controller for more frequent use, see "Saving Programs".

Note

Not all segments have to be programmed. For segments which are not needed, the temperature and time values must be set to "0". The controller then automatically ends the program after the last segment programmed.
7.8 Saving Programs

Changed settings are initially only buffered. That is, buffered programs are overwritten once a different program is started. If a changed or new program should be permanently saved in the controller for more frequent use, it can be saved to a permanent program slot as follows:

Press the save key \( \text{保存} \) – a program number appears in the display.

The number can be changed to the desired program number using the numerical block \( \text{数字} \).

Pressing the save key \( \text{保存} \) again finally saves to the selected program slot.

Fig. 26: Saving a program to program slot no. 9

Start saved programs with the \( \text{开始} \) key. Use the numerical block \( \text{数字} \) to select the desired program number and monitor the program using the \( \text{监视} \) key.

Fig. 27: Starting heating program no. 9

7.9 Changing Programs during Operation

While the program is running, changes can be made as follows:

Use the scroll key \( \text{滚动} \) to access input mode.

Each time you touch the scroll key \( \text{滚动} \) you select the following segment or time value. The selected value is shown by the flashing LED "T" or "time".

The temperature value "T" or the time value "time" corresponding to the flashing LED is shown in the display. Hold times can be changed in increments of 1 min and temperatures by +/- 1°C/°F. If the displayed value is not to be changed, scroll \( \text{滚动} \) to the next segment or time value. All temperature and time values and the extra functions can be changed, with the exception of the segment time of the ramp that is currently active.
You must confirm each changed value in the program with the key, otherwise the change will not be saved.

After you release the keyboard with the key, you can deactivate extra functions for the active segment during a program that has been started, or with the corresponding "Extra" key after the program has finished.

### Caution

Press key for approx. 4 seconds until "key" disappears from the display. The keyboard lock is released. In input mode, if no entry or change is made within approx. 30 seconds, the mode is exited automatically. "Key" appears in the display and the keyboard lock is reactivated.

### 7.10 Brief Program Interruption

To interrupt program execution only temporarily, for instance to open the furnace door for removal or addition of material, press the "pause" key. Unlike the "start/stop" key, the heating is still turned off, but the program is not reset (regulation data is retained). The program is continued with the "start/stop" key in the last active segment, taking the elapsed time in that segment into account.

If the furnace door is opened without the pause function, the controller immediately reacts to the temperature drop and starts to heat immediately after the door is shut – the result can be an overcompensation in the furnace chamber temperature (see also "Safety" in the furnace operating instructions).

### 7.11 Segment Skip Key

Using the key, the current segment can be shortened or accelerated as follows:

#### Segment skip in a ramp

If the program is in a ramp, the key sets the corresponding ramp time (e.g. "time 1" or "time 3") to zero, so that the controller attempts to reach segment temperature "T" as quickly as possible using maximum power and maximum gradients. After the segment temperature is reached, the segment advances.

#### Segment skip in the holding time

If the "Segment skip" key is pressed during a holding time (e.g. "time 2" or "time 4"), then the holding time is ended immediately and the controller jumps directly into the next segment.

### Caution

Press key for approx. 4 seconds until "key" disappears from the display. The keyboard lock is released. In input mode, if no entry or change is made within approx. 30 seconds, the mode is exited automatically. "Key" appears in the display and the keyboard lock is reactivated.
7.12 Power Failure Behavior in the Different Segments

wait: Program stop with fault message F90
time1/time3: Continuation of the program from actual value
time2/time4: Continuation of the program

8 Configuration/Customer-Specific Settings

8.1 Configuration

Particular settings which influence the operating behavior of the controller are performed in the configuration. The configuration is divided into two access levels which can be opened with different passwords.

Level 1 = Password 0
Level 2 = Password 2

8.2 Opening the Configuration

Press the key and briefly press the key. "Co 0" appears in the display, and the system waits for the entry of the password. Use the keyboard block to enter the password for the configuration level desired and confirm with the key.

Page with the key to show the parameters one after another. Changed settings must be saved with the key! During the save process, the value flashes briefly in the display.

Note

By changing regulation parameters, the function of the control unit can be significantly influenced.

8.3 Configuration Options in Configuration Level 1 (Password = "0")

8.3.1 Converting °C/°F

On the configuration level, enter the password "0" and select the parameter "°F", use or the to set it to "1" and confirm with the save key .

The safety shutoff in the controller is automatically converted, but all other temperature specifications must be changed to °F.

The preset and subsequent heating programs are always programmed in °C and must be manually adapted after the conversion.

8.3.2 Settings for kW/h Counter

For the calculation of electrical power consumption in kW/h in the info menu, you must enter the furnace power from the type plate. The setting is generally already made by Wieland.

If this is not the case, select the parameter "PF" in the configuration level and enter the type plate power x 10 with or the key block and confirm with the save key .

Example: furnace power 3.6 kW * 10 = "36" should be entered.
8.3.3 Setting the Interface Address

When operating multiple controllers in a data network, different addresses must be configured for the controllers.
On the configuration level, select parameter "Ad", enter the new address (1...99) with + or key block, and confirm with the save key .

Note
When operating the controller with furnace monitor software "MV Controltherm", the interface address may not be set higher than 16.

8.3.4 Program Entry with/without Gradient

Select the parameter "rA" in the configuration level, use + or the key block to set the desired input mode, and use the save key to confirm.

0 = input of ramps without gradient over time and set temperature
1 = input of ramps with gradient and set temperature

Note
The unit of time for the gradient input is preset to hours (h) and cannot be changed to minutes.
Example: 100°C/h

8.3.5 Setting/Control of Power Failure Behavior

In the configuration level, select parameter "Ur", set the desired power failure behavior with + or the key block, and confirm with the save key .

0 = e.g. ceramic/glass applications
Interrupt in wait segment
Interrupt in all segments,
continuation from actual value in ramps at T > 100°C
1 = e.g. metal/laboratory applications
Program continuation in any program state.
Hold times are not repeated, but are continued from the time of the power failure with the remaining time.

8.4 Configuration Options in Configuration Level 2 (Password = "2")

PA active parameter set
Configuration range 0 to 4 (see also auto tune)
TU Auto tune
Configuration range 1 (start)
P1 Proportional range XP of the 1st parameter set
Configuration range from 0 to 100 %
I1 Settle time Tn for the 1st parameter set
Configuration range from 0 to 5000 sec
D1 Hold-back time $T_v$ for the 1st parameter set
Configuration range from 0 to 250 sec
following parameters sets $P_2$, $i_2$, $d_2$ ... $P_4$, $i_4$, $d_4$

### 8.5 Auto Tune

The regulation parameters of the controller are already set at the factory for the optimum regulation of the furnace. If the regulation behavior is still not sufficient for your process, the regulation behavior can be improved using auto tune.

The controller has four different parameter sets which are already configured for different furnace models. The configured parameter set can be seen in parameter "PA" (see also Configuration). When performing auto tune, the regulation parameters of the selected parameter set are determined and stored using a special measurement procedure.

Start the auto tune process only with a cooled furnace ($T < 60^\circ$C), since otherwise incorrect parameters will be determined for the regulation segment. On the program input level first enter a value for "$T_1" at which the temperature is to be optimized. Set all times "time" to "00:00".

In configuration level 2, select parameter "$t_u$", set it to "1", and confirm with the key. This will start the auto tune and "$tune" will alternate with the furnace temperature in the display. Once the optimization is complete, the status field "end" will show in the display. The parameters determined are stored by the controller into the parameter set for the corresponding temperature range.

Auto tune is always performed at about 70% of the value set in "$T_1" in any case, to avoid destruction of the furnace, for instance when optimizing the maximum temperature. Auto tune may take more than 3 hours for some models, depending on the furnace type and temperature range. The regulation behavior may be degraded in other temperature ranges after an auto tune! Wieland assumes no liability for damage caused by manual or automatic changes to the regulation parameters (see also Temperature-dependent parameter sets).

**Note**
Perform an auto tune, if necessary, for all temperature ranges.
8.6 Loading/charging

**Furnace loading**
Swivel the furnace door carefully away upwards.
Only materials with known characteristics and melting temperatures may be used. Observe the material safety data sheets if necessary.
When loading the furnace, ensure that the door collar and the heating elements are not damaged. Under all circumstances, avoid coming into contact with the heating elements when loading the furnace; this may lead to the immediate destruction of the heating elements.
If possible, the load must be positioned centrally in the working chamber on the ceramic insert plate. This guarantees even heating.
If a large quantity of material is placed into the furnace chamber, the heating time may increase significantly.
If a crucible is used, make sure that the material to be melted is inserted carefully into the crucible. Crucibles are sensitive to shocks and impact. Metals expand more quickly and strongly than the crucible when heated. Be sure that the recommendations of the crucible manufacturer for maintenance and handling are carefully observed.
After loading, the furnace door must be closed carefully. The furnace door should be closed gently in order not to damage the insulation. Make sure that the door is closed correctly.
If possible, the furnace must **not** be opened when hot. If it has to be opened at a high temperature, this should take place as briefly as possible. Attention must be paid to adequate protective clothing and room ventilation, see chapter "Safety". The stainless steel sheet may become discolored (particularly on opening when hot), but this does not impair the function of the furnace.

**Additional care measures**
Ensure that objects like teapots, bottles, and similar items are kept away from the furnace.

**Warning - danger due to electrical current!**
To protect the operator and the furnace, the heating program must always be stopped when the furnace is being loaded. There is a risk of electric shock on noncompliance.
9 Servicing, Cleaning, and Maintenance

**Warning! General hazards!**
Cleaning, lubrication, and maintenance tasks may only be performed by authorized experts following the maintenance instructions and accident protection guidelines. We recommend that maintenance and repair be performed by Wieland GmbH Service. Failure to comply runs the risk of bodily injury, death, or significant property damage!

**Warning - danger due to electrical current!**
Work on the electrical equipment may only be performed by qualified, authorized electricians!

During maintenance work, the voltage supply to the furnace and/or switching system must be switched off to prevent unintentional commissioning. Disconnect the mains power connector due to reasons of safety.

Operators may only correct malfunctions which are obviously due to operational error!
Wait until the furnace chamber and attaching parts have cooled to room temperature.
The furnace must be visually inspected at regular intervals for damage. The interior of the furnace must also be cleaned as required (e.g. vacuuming out) **Attention:** Do not bang against the heating elements to avoid breaking them.
While work is being performed on the furnace, the furnace and work room must additionally be ventilated with fresh air.
Safety systems removed during maintenance tasks must be replaced after the work.
Warning of swinging loads in the workshop (e.g. crane systems). Work under a lifted load (e.g. a lifted furnace or switching system) is not permitted.
Safety switches and any limit switches present must be checked for function periodically (BGV A3) or according to the national guidelines of the country of operation.
To ensure proper temperature regulation of the furnace, the thermocouple must be checked for damage before every process.
If necessary, retighten the element holders (see chapter "Replacing the Heating Element"). Before carrying out this work, the voltage supply to the furnace and/or switching system must be switched off (disconnect mains power connector). The regulations (BGV A3) or corresponding national regulations in the relevant country of operation must be observed.
There are one or more contactors in the control system. The contacts of these circuit breakers are wearing parts and must therefore be serviced and/or replaced regularly (BGV A3) or according to the national guidelines of the country of operation.
The switching system cabinet (if available) contains vent grilles with integrated filter mats. These must be cleaned and/or replaced at regular intervals in order to ensure sufficient intake and outflow of air from the switching system. During melting operation, the switching cabinet door must always be firmly closed.
This furnace contains ceramic fiber material in the insulation. Active handling of these fibers (e.g., exchange of the insulation) in the Federal Republic of Germany is subject to the conditions of the Ordinance on Hazardous Substances, Annex V, No. 7 ("Artificial mineral fibers") of June 12, 1998. In the rest of the European Union, ceramic fibers are categorized as follows by Directive 97/69/EC of the Commission of December 5, 1997 CARC. Cat. 2; R 49; Xi R 38. Work with the fiber insulation must therefore be done in such a way that as little fiber dust as possible is released.

The following points must be noted when handling ceramic fiber:

- Dust development during processing should be minimized.
- Contact with skin and eyes should be avoided. The effects caused by fibers on the skin or in the eyes may cause mechanical irritation, as a result of which reddening and itching may occur.
- When processing large quantities of ceramic fibers, loose work clothing with long sleeves, gloves and safety glasses should be worn.
- When working with ceramic fiber insulation inside furnaces, a half/quarter mask with P2 filter should additionally be worn.

The furnace and its operating equipment must be regularly checked in accordance with the regulations of the employer's liability insurance association (BGV A3) or the corresponding national regulations in the relevant country of use!
9.1 Shutting the system down for maintenance

**Warning! General hazards!**
Cleaning, lubrication, and maintenance tasks may only be performed by authorized experts following the maintenance instructions and accident protection guidelines. We recommend that maintenance and repair be performed by Wieland GmbH Service. Failure to comply runs the risk of bodily injury, death, or significant property damage!

**Wait until the furnace chamber and attached parts have cooled to room temperature**

- The furnace must be completely emptied.
- Notify operating personnel and specify a supervisor.
- Switch off the main switch and disconnect the mains power connector.
- Attach a warning sign on the main switch.
- Seal off a large area around the servicing area.
- Check for disconnection of power.
- Ground and short-circuit the working area.
- Cover any nearby parts still under power.

**Warning! General hazards!**
Do not touch any object without first checking its temperature.

**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 oven and the switching equipment cannot be activated by mistake (pull out the power plug) and that all moving parts in the oven are secured. Observe BGV A3 or the corresponding national regulations in the country where the oven is installed. Wait until the oven and the connected parts have cooled to room temperature.
### 9.2 Regular Maintenance of the Oven

<table>
<thead>
<tr>
<th>Position/Maintenance Point</th>
<th>Measure</th>
<th>Maintenance Interval</th>
<th>Operating</th>
<th>Qualified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Day  Week Month Quarter Year Personnel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety test in accordance with BGV A3 or corresponding national regulations</td>
<td>According to regulations</td>
<td>According to regulations</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Safety and limit switches (if available)</td>
<td>Function test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furnace chamber, flue outlets and flue</td>
<td>Clean and check for damage, vacuum out carefully</td>
<td>■</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Seal surfaces: door lining/furnace lining</td>
<td>Visual check</td>
<td>●</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Heating elements</td>
<td>Visual check (visible part of the heating element in the furnace chamber)</td>
<td>●</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Check for even power consumption of heating</td>
<td>Function test</td>
<td>●</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Thermocouple</td>
<td>Visual check (visible part of the thermocouple in the furnace chamber)</td>
<td>●</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Set setpoint</td>
<td>Test according to work schedules</td>
<td>●</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

**Key:** ■ = clean ● = check, replace x = performance by

---

**Fig. 28: Maintenance table**

**Warning - Danger of Electric Shock!**

Work on the electrical equipment may be done only by qualified, authorized electricians.

**Note**

Maintenance work must be performed by authorized personnel following the maintenance instructions and the accident prevention regulations. We recommend that the maintenance and repair work be carried out by the service team of Wieland GmbH.
9.3 Operating and Auxiliary Materials

9.4 Cleaning Products

Follow the procedure for shutting down the furnace system (in the "Operation" section). Then the power plug must be pulled out of the socket. Wait until the furnace cools down naturally.

Use commercially available detergent which is either water-based or non-combustible and free of any solvents to clean the housing of any deposits; use a vacuum cleaner for the interior.

**Follow the labeling and the instructions on the packaging of the detergent.** Wipe the surface with a damp, lint-free cloth. The following detergents can also be used:

<table>
<thead>
<tr>
<th>Component and location</th>
<th>Detergent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer surfaces (frames *)</td>
<td>Use commercially available detergent which is either water- or non-combustible and free of any solvents for cleaning *)</td>
</tr>
<tr>
<td>Outer surface (stainless steel)</td>
<td>Stainless still cleaner</td>
</tr>
<tr>
<td>Interior</td>
<td>Carefully clean with a vacuum cleaner (avoid the heating elements)</td>
</tr>
<tr>
<td>Insulation materials</td>
<td>Carefully clean with a vacuum cleaner (avoid the heating elements)</td>
</tr>
<tr>
<td>Door seal (if included)</td>
<td>Use commercially available detergent which is either water- or non-combustible and free of any solvents for cleaning</td>
</tr>
<tr>
<td>Instrument panel</td>
<td>Wipe the surface with a damp, lint-free cloth. (e.g. glass cleaner)</td>
</tr>
</tbody>
</table>

*) You must be sure that the cleaner does not damage the water-soluble and, hence, environmentally safe paint (the clear should be tried first on an interior, normally unseen location).

Fig. 29: Detergent

Do the cleaning from beginning to end without breaks to protect the surfaces. Remove the detergent completely from the surfaces by wiping them with a damp, lint-free cloth.

After cleaning all the supply lines, check all the connections for leaks, loose connections, abrasion and damage; report any shortcomings found immediately! **Please follow the section entitled "Environmental Protection Rules and Regulations"**

Caution

The furnace, the furnace chamber and attached components must NOT be cleaned using a high-pressure cleaner.
DANGER

- Danger of electric shock.
- Risk of fatal injury
- Before cleaning, pull out the power plug.
- Do NOT pour water or cleaning products over the inside or outside surfaces
- Allow oven to dry completely before operating it again
10 Faults

Work on the electrical system may be done only by qualified, authorized electricians. Operators may only rectify faults that are obviously due to operating errors. Call the local electrician for faults that you cannot localize. If you have any questions, problems, or requirements, contact Wieland GmbH. By mail, phone, or e-mail → See "Wieland Service".

<table>
<thead>
<tr>
<th>Type of fault</th>
<th>Possible causes</th>
<th>Fault rectification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller does not switch on.</td>
<td>-No voltage available.</td>
<td>-Check connection fuse(s), renew if necessary.</td>
</tr>
<tr>
<td></td>
<td>-Controller defective.</td>
<td>-Check controller fuses (if available), renew if necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Check plug connector.</td>
</tr>
<tr>
<td>Controller indicates fault.</td>
<td>-See separate instructions for controller.</td>
<td>-See separate instructions for controller.</td>
</tr>
<tr>
<td>No heating chamber heating after starting program.</td>
<td>-Error in program input.</td>
<td>-Check heating program (see separate instructions for controller)</td>
</tr>
<tr>
<td></td>
<td>-Connection fuse(s) defective.</td>
<td>-Check connection fuse(s), renew if necessary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Notify Wieland Service if the new fuse trips on screwing in.</td>
</tr>
<tr>
<td></td>
<td>-Heating element defective</td>
<td>-Have checking carried out by Wieland Service.</td>
</tr>
<tr>
<td>Very slow heating chamber heating.</td>
<td>-Connection fuse(s) defective.</td>
<td>-Check connection fuse(s), renew if necessary.</td>
</tr>
<tr>
<td>Selected end temperature is not reached.</td>
<td>-Lack of heater output due to undervoltage.</td>
<td>-Have checking carried out by Wieland Service.</td>
</tr>
<tr>
<td>-Heating element defective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass bubbles on the surface of the heating element</td>
<td>-At temperatures above 1550°C (2822°F) fine</td>
<td>- Before heating the furnace again remove the glass bubbles carefully (with a paintbrush or brush).</td>
</tr>
<tr>
<td></td>
<td>glass bubbles can settle on the surface of the heating elements due to residual silicon during the production process.</td>
<td></td>
</tr>
</tbody>
</table>
10.1 Fault Messages

If a fault message occurs, one of the following fault messages (fault codes) is displayed:

<table>
<thead>
<tr>
<th>Fault code</th>
<th>Meaning</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 10</td>
<td>The furnace is not reaching the configured temperature</td>
<td>E.g. heater defective, door not closed, or door contact switch incorrectly adjusted</td>
</tr>
<tr>
<td>F 30 – 32</td>
<td>Fault in thermocouple or measurement circuit</td>
<td>Thermocouple defective</td>
</tr>
<tr>
<td>F 40</td>
<td>Thermocouple polarity reversed</td>
<td>E.g. after replacement of thermocouple – switch polarity</td>
</tr>
<tr>
<td>F 50</td>
<td>Specification of temperature or time incorrect</td>
<td>Correct entry</td>
</tr>
<tr>
<td>F 60 – 61</td>
<td>Controller system fault</td>
<td>Controller defective</td>
</tr>
<tr>
<td>F 62</td>
<td>Ambient temperature too low &lt;-10°C (-50 °F)</td>
<td>Heat room if necessary</td>
</tr>
<tr>
<td>F 63</td>
<td>Ambient temperature too high &gt;70 °C (158 °F)</td>
<td>Ventilate room if necessary</td>
</tr>
<tr>
<td>F 64 – 69</td>
<td>Controller system fault</td>
<td>Controller defective</td>
</tr>
<tr>
<td>F 70</td>
<td>Furnace temperature has exceeded the permitted value &quot;Tmax&quot;</td>
<td>Switching system or controller defective</td>
</tr>
<tr>
<td>F 85</td>
<td>External fault</td>
<td>See furnace operating instructions</td>
</tr>
<tr>
<td>F 90</td>
<td>Power failure</td>
<td>Appears after power restored</td>
</tr>
</tbody>
</table>

Fault messages can be reset by turning the power switch off and back on. Leave the unit switched off for at least 5 seconds. If the fault message no longer occurs within a minute after power is turned on, the controller is ready to operate. If there is another fault message, contact Wieland service. Ventilation motors (if present) remain on even in case of a fault. The heater is always turned off.

11 Fault Diagnosis

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller does not light up</td>
<td>Controller turned off</td>
<td>Power switch to &quot;I&quot;</td>
</tr>
<tr>
<td></td>
<td>No power available</td>
<td>Power plug in outlet? Check building circuit breaker/fuse</td>
</tr>
<tr>
<td>Furnace not heating</td>
<td>Door/lid open</td>
<td>Close door/lid</td>
</tr>
<tr>
<td></td>
<td>Door contact switch actuated</td>
<td>Check door contact switch</td>
</tr>
<tr>
<td></td>
<td>&quot;wait&quot; displayed</td>
<td>Set waiting time to &quot;00:00&quot;</td>
</tr>
<tr>
<td></td>
<td>No temperature input</td>
<td>Check temperatures T1/T2</td>
</tr>
<tr>
<td>Program doesn't go to next segment</td>
<td>In one time segment, the holding time is set to infinity</td>
<td>Set a holding time less than 99:59</td>
</tr>
<tr>
<td>Regulator doesn't heat during optimization</td>
<td>No temperature set in &quot;T1&quot;</td>
<td>The temperature to optimize must be entered in &quot;T1&quot;</td>
</tr>
</tbody>
</table>
### 11.1 Controller Check List

**Customer:**

---

**Furnace type:**

---

**Controller type:**

---

**Controller version:**

---

(appears in the display after system switched on)

<table>
<thead>
<tr>
<th>Fault code in the display:</th>
<th>F 62 Ambient temperature too low: &lt;-10 °C (-50 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F 63 Ambient temperature too high: &gt; 70 °C (158 °F)</td>
</tr>
<tr>
<td></td>
<td>F 90 Power failure/running program switched off at power switch</td>
</tr>
</tbody>
</table>

**Exact description of fault:**

<table>
<thead>
<tr>
<th>Info menu Parameter Pr</th>
<th>Info menu Parameter OP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info menu Parameter SP</th>
<th>Info menu Parameter F1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info menu Parameter Pt</th>
<th>Info menu Parameter F2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info menu Parameter E</th>
<th>Info menu Parameter Ht</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info menu Parameter tt</th>
<th>Info menu Parameter tA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Programmed firing curve; please record all values (such as: T1, time 1, etc.):**

**When does the fault occur?**

At certain places in the program or at certain times of the day:

At certain temperatures:

**Since when has the fault existed?**

- ☐ The fault occurred for the first time
- ☐ The fault has been occurring for some time
- ☐ Unknown

**Fault frequency:**

- ☐ Fault occurs frequently
- ☐ Fault occurs regularly
- ☐ Fault occurs rarely
- ☐ Unknown

**Replacement controller:**

- Has a replacement controller already been used? ☐ yes ☐ no
- Does the fault persist with the replacement controller? ☐ yes ☐ no
- Checked according to troubleshooting list (see furnace operating instructions)? ☐ yes ☐ no

Please enter the following test program so that the furnace heats at full capacity:
<table>
<thead>
<tr>
<th>Program point</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>time 1</td>
<td>0</td>
</tr>
<tr>
<td>T1</td>
<td>500</td>
</tr>
<tr>
<td>T2</td>
<td>500</td>
</tr>
<tr>
<td>time 2</td>
<td>30</td>
</tr>
<tr>
<td>time 3</td>
<td>0</td>
</tr>
</tbody>
</table>

(all other values set to "0")

Close door/lid and start example program

Please check the following items:

- Is the furnace heating (temperature increase)?
- Does the display show "heat"?
- Does the green LED go on for time 1 or time 2?

During the heating phase open the Info menu for further detailed information.

The following data from the Info menu are important

<table>
<thead>
<tr>
<th>Menu item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td></td>
</tr>
</tbody>
</table>

Scroll through the menu by repeatedly pressing the Info button. To exit the menu, press the button again until the furnace temperature is displayed.

___________________  ___________________________  ____________________
Date           Name      Signature
12 Spare Parts/Wearing Parts

Fig. 30: Spare parts
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Furnace</td>
</tr>
<tr>
<td>1.1</td>
<td>Exhaust air tube (collar pipe)</td>
</tr>
<tr>
<td>1.2</td>
<td>Complete door insulation</td>
</tr>
<tr>
<td>1.3</td>
<td>Fiber wool *)</td>
</tr>
<tr>
<td>2</td>
<td>Electric/Controller</td>
</tr>
<tr>
<td>2.1</td>
<td>Heating element</td>
</tr>
<tr>
<td>2.2</td>
<td>Controller</td>
</tr>
<tr>
<td>2.3</td>
<td>Rocker switch</td>
</tr>
<tr>
<td>2.4</td>
<td>Door lock</td>
</tr>
<tr>
<td>2.5</td>
<td>Thermocouple</td>
</tr>
<tr>
<td>2.6</td>
<td>Axial-flow fan</td>
</tr>
<tr>
<td>2.7</td>
<td>Papst-screen</td>
</tr>
<tr>
<td>2.8</td>
<td>T4A electronic fuse</td>
</tr>
<tr>
<td>2.9</td>
<td>T2A electronic fuse</td>
</tr>
<tr>
<td>2.10</td>
<td>Power cable (state country where it will be used)</td>
</tr>
<tr>
<td></td>
<td>Transformer</td>
</tr>
<tr>
<td>3</td>
<td>Tools</td>
</tr>
<tr>
<td></td>
<td>Allen key</td>
</tr>
</tbody>
</table>

*) = According to requirements

**Ordering Spare Parts:**
Our Wieland Service team is available to you all around the world. Due to our considerable production depth we deliver most spare parts from the warehouse overnight or can make them ready for delivery within short deadlines. You can order Wieland spare parts easily and simply directly from the factory. If you cannot find the spare part you want we will be glad to help you. Spare parts can be ordered in writing, by phone or on the Internet -> see the section entitled "Wieland Service".

**Availability of Spare Parts and Wearing Parts:**
Although Wieland has many spare parts and wearing parts on stock, we cannot guaranty the short-term availability of all of them. We recommend that certain parts be ordered in advance. If you need any assistance when selecting spare parts and wearing parts, the staff at Wieland will be glad to set aside time for you.

**Note**
Original parts are designed especially for Wieland furnaces. Replace parts only with original Wieland parts. Otherwise the warranty will be void. Wieland accepts absolutely no liability for damage caused by using parts that are not original Wieland parts.
Note
Contact our Wieland Service for removing and installing replacement and wear parts. See section on "Wieland Service". Work on the electrical equipment may only be performed by qualified and authorized specialist electricians. This applies also to repairs not described below.

### 12.1 Replacing a Heating Element

#### 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 oven and the switching equipment cannot be activated by mistake (pull out the power plug) and that all moving parts in the oven are secured. Observe BGV A3 or the corresponding national regulations in the country where the oven is installed. Wait until the oven and the connected parts have cooled to room temperature.

#### Caution - damage to components!

Heating elements are extremely sensitive to breaking. Any strain on or rotation of the heating elements must be avoided. Failure to observe this rule will lead to the immediate destruction of the sensitive heating elements.

### Exhaust air pipe

First slacken the screws (A) from the exhaust air pipe guard plate using the enclosed Allen key. Lift the guard plate (B) from the exhaust air pipe and then carefully pull the exhaust air pipe (C) out straight upwards. Store the exhaust air pipe in a safe place, as its material is very sensitive.

![Fig. 31: Removing the exhaust air pipe](image)

### Dismantling the Furnace Lid

Unscrew the screws from the lid using the hex key that is provided. Lift the lid.
Repeating a Heating Element

Loosen the electrical contact/s (A) with a suitable tool. Carefully remove the heating element (B) in an upward direction.

Carefully slide a new heating element (B) into the opening from above. Openings that are not sealed properly cause the contacts to overheat, which in turn causes new heating elements to fail prematurely. Tighten the electrical contact/s (A) in reverse order. Avoid all stress or twisting of the thermocouple.
Installing the Furnace Lid
Install the lid in the reverse order. Fix the lid using the screws that you previously unscrewed. Make sure that you place a tooth lock washer between the screw and the lid. This position is marked by a ground sticker on the housing/lid.

Fig. 35: Installing the furnace lid

Assembling the exhaust air pipe
Carefully push the exhaust air pipe (A) into the intended opening. The head of the exhaust air pipe must lie on the furnace lid. Reassemble the exhaust air pipe guard plate (B) using the previously slackened screws (C).

Fig. 36: Assembling the exhaust air pipe

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").

Note
*) = Enclosed with spare part delivery.
12.2 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 oven and the switching equipment cannot be activated by mistake (pull out the power plug) and that all moving parts in the oven are secured. Observe BGV A3 or the corresponding national regulations in the country where the oven is installed. Wait until the oven and the connected parts have cooled to room temperature.

**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.

**Exhaust air pipe**
First slacken the screws (A) from the exhaust air pipe guard plate using the enclosed Allen key. Lift the guard plate (B) from the exhaust air pipe and then carefully pull the exhaust air pipe (C) out straight upwards. Store the exhaust air pipe in a safe place, as its material is very sensitive.

Fig. 37: Removing the exhaust air pipe

**Dismantling the Furnace Lid**
Unscrew the screws from the lid using the hex key that is provided. Lift the lid

Fig. 38: Dismantling the furnace lid
Replacing the thermocouple
First slacken the two screws (A) from the thermocouple connection. Slacken screw (B) from thermocouple retaining plate and pull thermocouple out upwards. Push a new thermocouple carefully into the thermocouple channel (C) and assemble and connect in reverse order. Attention must be paid to the correct polarity of the electrical connections (D) (*)..

Fig. 39: Replacing the thermocouple

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

+ to + - to -

Installing the Furnace Lid
Install the lid in the reverse order. Fix the lid using the screws that you previously unscrewed. Make sure that you place a tooth lock washer between the screw and the lid. This position is marked by a ground sticker on the housing/lid.

Fig. 40: Installing the furnace lid
Assembling the exhaust air pipe
Carefully push the exhaust air pipe (A) into the intended opening. The head of the exhaust air pipe must lie on the furnace lid. Reassemble the exhaust air pipe guard plate (B) using the previously slackened screws (C).

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").
12.3 Replacement/Readjustment of the Door Insulation Structure

**Warning! General hazards!**
Work on the equipment may only be performed by qualified, authorized specialists. During work, the voltage supply to the furnace/switching system must be switched off to prevent unintentional commissioning (disconnect mains power connector) and all moving parts of the furnace must be secured. Observe BGV A3 or corresponding national guidelines of the country of use. Wait until the furnace chamber and attaching parts have cooled to room temperature.

Carefully swing the lift door upward. Unscrew the screws from the door cladding A using the hex key that is provided and remove the cladding from the frame. Unscrew the door insulation B. Pull and lift the the door insulation upward from the furnace to remove it. Tip: Swing the lift door a little downward, as this allows you to remove the door insulation easier.

![Fig. 42: Dismantling the door cladding/insulation](image)

Install the new door insulation in the reverse order. The bevel of the C door insulation faces upward. Screw the screws of the door insulation in loosely so that you can adjust the door insulation. Insulation is very sensitive, watch out for adjacent components. The door collar insulation D must sit properly on the furnace collar insulation all around. Follow the instructions below to adjust the door insulation.

Carefully close the lift door. Press lightly against the door insulation ①. While doing so, tighten all the screws ②.

Install the door cladding in the reverse order.

![Fig. 43: Adjusting the door insulation](image)
12.4 Replacing a Fuse

A fuse is located on the back of the oven beside the power cable connection. The fuse is an important component of the power supply system and protects the oven and its components against damage and fire. When you insert a new fuse, make sure that the fuse rating is suitable for the voltage used by your oven.

**NOTICE**

- Damage to the oven and its components
- Use of a fuse that is NOT suitable for the respective voltage may damage the oven and its components and is a fire hazard.
- Use only a suitable fuse type. Check that the fuse type has the correct nominal current value.

Carry out the procedure to switch off the oven (see "Operation"). Then pull the power plug out of the socket. Allow the oven to cool naturally.

![Fuse holder](image)

**Fig. 44:** The fuse is located in the back wall of the furnace.

- Turn the fuse holder 1/4 of a revolution in an anti-clockwise direction, and then carefully remove the fuse holder with your fingertips.

![Fuse holder release](image)

**Fig. 45:** Release and pull out the fuse holder

- Remove the fuse from the fuse holder.
- Replace the defective fuse with a similar fuse.
- Before you replace the fuse, make sure that it has the correct nominal current. For the correct fuse (fuse link), see "Spare Parts/Wearing Parts".

![Fuse](image)

**Fig. 46:** Remove fuse
Note
The nominal current is engraved into the metal cap of the fuse or can be found imprinted directly on the fuse.

- Insert the new fuse into the fuse holder. Make sure that the fuse is pushed fully into the holder.
- Replace the fuse holder in the reverse order.

Fig. 47: Insert fuse

- Check that the power cable is not damaged. The power cable must not be damaged. Power cables may be replaced only with similar, approved cables.
- Reconnect the power cable (see "Connecting the Oven to the Power Supply")
- Switch on the furnace's power switch (see "Operation")

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

With a small flat blade screwdriver carefully push the locking latch \(^1\) upward while pulling the plug \(^2\) out of the coupling \(^3\).

Fig. 48: Separate the snap-in coupling (plug) from the furnace housing

12.6 Repairing the Insulation

The insulation of the furnace consists of a very high-quality refractory material. Heat expansion may cause tears in the insulation even after a few heating cycles. However, these have no affect on the function or quality of the furnace. However, if entire "sections" of the insulation come loose, Wieland Service must be notified.
13 Electrical Connections (Circuit Diagram)

Fig. 49: 1/N/PE – AC 220-240V/50-60Hz

- B66 Thermocouple
- F36 Fuse control current
- F56 Temperature Switch
- Q56 Safety contactor
- S36 Power switch
- B56 Door switch
- Q42 Semiconductor relay
- K60 Controller
- K70 Over-temperature limit controller
- E45 Heating
- X61 Snap-in socket
- Power supply see ratings sign

All information is non-binding; errors expected
14 Wieland Service

Contact Wieland Service at any time for maintenance and repair.
If you have any questions, problems, or requirements, contact Wieland Dental + Technik GmbH & Co. KG. By mail, phone or e-mail.

Mail
Wieland Dental + Technik GmbH & Co. KG
Schwenninger Straße 13
75179 Pforzheim
Germany

Phone or Fax
Phone national: 08 00 / 93 66 823
Phone international: +49 72 31 / 37 05 400
Fax: 0 72 31 / 35 79 59

Web or e-mail
www.wieland-dental.de
info@wieland-dental.de

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

Provide the following details from the type plate:

Fig. 50: Example (type plate)
15 Shut-Down, Dismantling, and Storage

To be Completed by the Operator

When the oven is shut down, the following safety information must be observed to prevent serious injury, damage to property, and damage to the environment.

The oven may only be shut down by authorized, trained personnel.

The following operating materials/parts are to be disposed of by:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Oils and other substances that are hazardous to water must be completely removed before the oven is dismantled for reuse or scrap.

Ensure that operating materials, lubricants, and consumables are disposed of in an environmentally compliant manner. Regulations relating to proper waste recycling and disposal must be observed.

The oven may be lifted only at the intended points.

Use only the stated lifting and securing equipment to lift the oven/parts.

Consider a total weight of _________ kg when choosing suitable lifting equipment.

For transportation, consider a permitted floor weight of at least _________ kg/m².

Before transporting the oven, attach the following securing equipment:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Note

Read the sections on "Safety" and "Transportation"
15.1 Transportation/Return Transportation

If you still have the original packaging, this is the safest way to send an oven.

Otherwise:
Choose suitable, adequately sturdy packaging. During transportation, packages are often stacked, bumped, or dropped; the packaging acts as external protection for your oven.

- Drain all piping and containers before transportation/return transportation (e.g. cooling water). Pump off operating materials and dispose of properly.
- Do not subject the oven to extreme cold or hot temperatures (direct sunlight).
  Storage temperature -5°C to 45 ° (-23°F to 113°F)
  Humidity 5% to 80%, non condensing
- Place the oven on a level floor to prevent distortion.
- Packaging and transportation may be carried out only by qualified and authorized persons

If your oven has transportation securing equipment (see "Transportation Securing Equipment"), use this.
Otherwise, in general:
"Fix" and "secure" (adhesive tape) all moving parts and cushion and protect any projecting parts against breakage.
Protect your electronic equipment against moisture and make sure that no loose packaging material can get inside it.
Fill gaps in your packaging with soft but adequately firm material (e.g. foam mats) and make sure that the equipment cannot slide around in the packaging.

If the goods are damaged during return transportation due to inadequate packaging or some other breach of duty, the costs will be borne by the customer.

As a rule:
The oven is sent without accessories, unless the technician expressly requests them.
Enclose a detailed description of the fault along with the oven – this saves the technician time and costs.
Don't forget to enclose the name and phone number of a contact in case there are any questions.

Note
Return transportation may only be carried out according to the information given on the packaging or in the transportation documents.

Note
Transportation and return transportation not covered by a warranty claim are paid for by the customer.
16 Declaration of Conformity

EC Declaration of Conformity
Compliant with EC Directive 2006/42/EC on machinery, Annex II A

We,

Nabertherm GmbH
Bahnhofstr. 20, 28865 Lilienthal, Germany

hereby declare that the following product:

<table>
<thead>
<tr>
<th>Product</th>
<th>High-Temperature Furnace (Tabletop Model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>ZENOTEC Fire Cube</td>
</tr>
</tbody>
</table>

fulfills all the pertinent provisions contained in Directive 2006/42/EC.
The product named is also compliant with all the provisions of the following directives:

- Directive 2006/95/EC for electrical equipment designed for use within certain voltage limits
- Directive 2004/108/EC on electromagnetic compatibility

The signatories are authorized to compile the relevant technical documents. The address is the stated manufacturer's address.

Any change in the product not approved by the manufacturer invalidates this declaration.

- DIN EN 746-1 (02.2010)
- DIN EN 60204-1 (06.2007)
- DIN EN 60519-1 (10.2011), DIN EN 60519-2 (05.2007)
- DIN EN 61000-6-2 (03.2006), DIN EN 61000-6-4 (09.2011)

The following harmonized standards were applied:

Lilienthal, 05.06.2012

________________________    _______________________
Thomas Adamek     Wolfgang Bartilla
Quality Management     Research and Development
As a major supplier of dental system solutions, WIELAND embodies both tradition and progress in matters of dental products and technology. Since our company was founded in 1871, we have stayed true to our corporate philosophy of combining tradition, innovation and quality with the best in customer care. Today, our core competencies and key strengths lie in the forward-looking integration of technologies and materials for dental prosthetics. This ensures that patients can trust in the quality of their restorations, and our partners in dental practices and laboratories can continue with confidence on the path to digitalisation and greater competitiveness.

WIELAND offers a wide range of products and services from CAD/CAM technologies and dental alloys to veneering ceramics and electroforming. Thanks to our worldwide presence and international network, WIELAND is never far away, and your contact person can always be located via the Internet.