SERVICE INSTRUCTIONS

AUSTROMAT® 664
iSiC®

DEKEMA
DENTAL-KERAMIKÖFEN

Version 05/2014
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1. Usage, data

1.1. Introduction

NOTE:
These Service Instructions are an integral part of the documentation for the AUSTROMAT® firing furnace. Also read the related Operating Instructions.

- In chapter 1, you find the description of the proper usage of the firing furnace, the technical data, and the ambient conditions.

- It is essential that you read chapter 2 to prevent harm to individuals and properties.

- Chapter 3 describes design and equipment of the firing furnace. The various components of the firing furnace located on the front, rear, and inside are named.

- The procedures to perform service tasks are described in detail in chapter 4. In addition, notes for measures are given when error messages occur.

- Chapter 5 describes the service software of the user interface. If required, remote access on the firing furnace control via FTP or Internet is possible.

- The safety tests in chapter 6 must be performed after every service task.

- The index enables you to quickly find relevant items.

NOTE:
Certain components of firing furnaces of the AUSTROMAT® series are available as an option. These Service Instructions uses the maximum equipment of a firing furnace. Therefore, please keep in mind: Perhaps some features mentioned in these instructions are not installed in your firing furnace.
1.2. Proper use

The AUSTROMAT® firing furnace is designed for firing dental ceramic objects. In every task that you perform with the firing furnace, observe the safety instructions in chapter 2.

Every use that goes beyond these instructions is held to be improper and can cause serious personal or property damage. We assume no guarantee when the device is improperly used handled or not used according to instructions. DEKEMA assumes no liability for damages that are thereby incurred.

In particular, materials may not be heated that may trigger explosions, implosions and hazardous or hazardous or flammable gases.

Proper use also includes the following:

- Reading and following these instructions for use,
- Observing the technical data (see chapter 1.4),
- Performing service tasks in a timely manner.
1.3. Rating plate

The information on the rating plate describes the firing furnace and also offers potential customer-specific adaptations. In all correspondence with DEKEMA, please indicate all of the data that is on the rating plate.

The rating plate is on the back of the firing furnace.

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Fig. 1-1 Example of rating plate
1.4. Technical Specifications

The technical data of the firing furnace are summarized in the following table. The cited connection values and tolerances must be maintained for the firing furnace to operate properly and for the warranty to take effect.

**Dimensions and weight**

- **Dimensions:** 383 x 780 x 343 mm (width x height x depth)
  see Fig. 1-2

- **Firing chamber useful dimensions:** Firing function: 60 mm x 50 mm (diameter x height)

- **Weight:** 21 kg
1. Usage, data

**Electrical supply data**

**NOTE:**
Only use fuses with the indicated lag and nominal current.

- **Supply voltage:** See rating plate on the rear:
  - ~ 230 V AC, 50…60 Hz
- **Fuses:** See rating plate on the rear:
  - ~230 V: 2 x 16 A
  - 250 V

**Performance data**

- **Power consumption:** max. 2000 W for 230 V
- **Firing temperature:** max. 1,530°C

**Interfaces**

- USB interface
- Option: Network interface
1.5. Ambient conditions

**NOTE:**
The firing furnace should not be operated for some time after sudden change of ambient temperature as otherwise condensation may occur in the electronic components, thus causing damage.

The data for the ambient temperature and humidity are designed for conditions at sea level.

- During operation:
  - Temperature: +15°C … +35°C
  - Humidity: max. 60 %, non-condensing

- When not operating, and during storage:
  - Temperature: +10°C … +50°C
  - Humidity: max. 80 %, non-condensing

- During transport:
  - Temperature: -10°C … +55°C
  - Humidity: max. 80 %, non-condensing
2. Safety

2.1. This section must be read!

Read this entire section before you start working with the firing furnace! It contains important instructions for your personal safety. This section must be read and understood by all persons who work with this firing furnace in any phase of the product life of the AUSTROMAT® to prevent damage to persons and/or material.
### 2.2. Organization of the safety instructions

The following safety instructions refer to various hazard levels.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DANGER</strong></td>
<td>DANGER identifies a direct, high risk hazard that can cause death or serious bodily injury if it is not avoided.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>WARNING identifies a potential, medium-level hazard that can cause death or serious bodily injury if it is not avoided.</td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>CAUTION identifies a low-risk hazard that can cause slight or moderate bodily injury or property damage if it is not avoided.</td>
</tr>
</tbody>
</table>

**NOTE:**
A note such as this refers to particularly important information that, however, does not concern safety.
2.3. General safety regulations

2.3.1. Personnel qualification

Only personnel with special qualification or corresponding training are permitted to execute service work on the AUSTROMAT® firing furnace.

2.3.2. Operating and Service Instructions

Read and understand
Anyone who works on or with the AUSTROMAT® firing furnace in any phase of the product life must read the related Operating and Service Instructions and understand them. This concerns in particular chapter 2 "Safety".

Completeness
Always use the complete original version of these service instructions. The instructions in the service instructions contain cross-references to other sections containing important information. Incomplete copies or copies of individual pages can not provide all the necessary information of the service instructions.

WARNING

Incomplete service instructions.
A lack of safety instructions due to incomplete service instructions can cause serious injury and property damage.
Always perform work with a complete copy of the service instructions. Do not copy individual pages.
2.3.3. Operation

**Condition**
The firing furnace may only be operated when it is functioning properly. Observe the technical data in section 1.4.
If the firing furnace can no longer be operated safely, immediately unplug it and prevent it from being unintentionally operated. Reasons for assuming that the equipment cannot be used safely:

- The error message "TEMPERATURE THRESHOLD EXCEEDED!"
- Visible damage to the housing or power cable,
- Malfunctions,
- Frequently required fuse changes,
- Long storage in a problematic environment (humidity, see chapter 1.5).

**Safety stickers**
Safety stickers are affixed to the firing furnace and provide notification of residual dangers. The safety stickers may not be removed. They must be replaced if they are lost or are no longer clearly legible.

**Workplace**
The operator must provide corresponding instructions and inspections to ensure order and cleanliness of the workplace and the surroundings of the AUSTROMAT® firing furnace.

**Waste**
If polluting waste arises from use, the operator is responsible for the proper disposal.
2.3.4. Maintenance and Service

Replacement parts

⚠️ WARNING

Third-party replacement parts.
Malfunctions can arise if third-party parts are used. In certain circumstances, this can cause serious injury and substantial property damage.
Always use original replacement parts from DEKEMA.

Retrofitting
Independent retrofitting and changes that affect the safety of the firing furnace are forbidden.

Safety test
After maintenance and service work, technical changes, disassembly or exchange of parts, a thorough safety test must be performed according to the checklist in chapter 6.
2.4. Dangers

Observe the following hazard instructions in all of your jobs with the firing furnace.

**DANGER**

Electrical shock from voltage-conducting parts.

The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:

- Never contact voltage-conducting parts,
- Do not use your hands or any objects to grasp things in the firing chamber,
- Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,
- The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.

**WARNING**

Fire hazard.

The firing chamber can reach temperatures above 1,000°C during operation. Heat-sensitive materials close to the firing furnace can easily ignite and cause a fire.

Observe the following instructions:

- Never operate the firing furnace without the insulation table being mounted,
- The vent holes in the cover of the firing chamber must be unobstructed,
- Make sure that flammable materials (such as cleaning alcohol, wiping cloths, etc.) or objects that can be damaged by heat are sufficiently distance from the firing furnace,
- Never operate the firing furnace without supervision.

**NOTE:**

Only personnel with electrotechnical training and experience in handling devices that operate on mains voltage may perform work on the electrical components.
WARNING

Hot surfaces.
The firing chamber can reach temperatures above 1,000°C during operation. There is an extreme burning hazard from touching hot surfaces after the firing chamber is opened.

Never directly contact hot parts of the firing furnace. The firing furnace requires several hours to cool after it is turned off. Observe the following instructions:

- Do not use your hands or any objects to grasp things in the firing chamber,
- Do not grasp the lift seat, firing table or firing objects with your bare hands,
- Use suitable tools (tweezers) to remove the firing objects, or wear safety gloves.

WARNING

Heavy firing furnace.
When the firing furnace is transported, there exists the danger of crushing, and the device may become damaged.

At least two persons must transport the firing furnace. Wear safety gloves.

CAUTION

Ceramic dust from insulating materials.
The firing chamber and firing table consist of ceramic insulating material. Inhaling ceramic dust can be hazardous to your health.

Do not inhale the dust. To remove ceramic dust, use a suitable vacuum cleaner.
2.5. Access authorizations

Three levels are defined for accessing the user interface of the AUSTROMAT® ceramic. Access levels 1 and 2 (see following table) are password-protected. The passwords are defined in the “Service” menu using the "Password" function.

The access authorizations should be issued to the users of the firing furnace based on their knowledge, experience and responsibility.

The firing furnace normally starts in the Operation menu. When General Code is used, it starts one level higher (level 0).

<table>
<thead>
<tr>
<th>Access levels</th>
<th>Description</th>
</tr>
</thead>
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<td>General code (level 0)</td>
<td>• Restricted access to the &quot;Setup&quot; menu,&lt;br&gt;• Selecting blocked programs and starting them,&lt;br&gt;• Edit and create unblocked programs,&lt;br&gt;• Unlocking the General Codes.</td>
</tr>
<tr>
<td>Operation (level 1)</td>
<td>• Select all programs and start them,&lt;br&gt;• Edit and create all programs,&lt;br&gt;• Access to the &quot;Setup&quot; menu.</td>
</tr>
<tr>
<td>Service (level 2)</td>
<td>• Access to the &quot;Service&quot; menu.</td>
</tr>
</tbody>
</table>

Tab. 2-1 Access levels

2.6. Stop function

Press the [ON/OFF] key on the graphical user terminal. All the commands that the firing oven is executing in standby mode, i.e. no program is running, are immediately interrupted without a query.
3. Construction and function

3.1. Front of the device

The following figure shows the front of the AUSTROMAT® firing furnace and identifies the most important components.

The top of the firing furnace contains the firing chamber. The firing chamber cover contains ventilation slots for cooling the firing furnace. The area in the bottom of the housing contains the electronic and mechanical furnace components. used to move the lift system comprising the lift rod, lift seat with sealing ring (O-ring), and the insulation table on which the objects to be fired are placed. The firing furnace is operated using a touchscreen and function keys.
3.2. Back of the unit

The following figure shows the back of the bottom part of AUSTROMAT® firing furnace and identifies the most important components.

![Rear view of the firing furnace (example)](image)

Fig. 3-2 Rear view of the firing furnace (example)

1. Rating plate with serial number
2. Main switch
3. Fuse holder with fuses
4. Connection socket for the power cable
5. USB interface
6. Network interface (optional)

The standard equipment on the back of the device comprises:

- The main switch for turning the device on and off,
- Two fuse holders with integrated fuses (see chapter 1.4),
- Connection socket for the power cable,
- Interface:
  - USB interface for connecting a USB device such as a USB stick, USB keyboard or USB mouse,
  - Option: A network interface for connecting an Ethernet cable (connecting the firing furnace to a network) or a crossed network cable (for connecting the firing to an individual computer).
4. Maintenance and service tasks

4.1. Introduction

NOTE:
Certain components of firing furnaces of the AUSTROMAT® series are available as an option. These Service Instructions uses the maximum equipment of a firing furnace. Therefore, please keep in mind: Perhaps some features mentioned in these instructions are not installed in your firing furnace.

4.1.1. Safety

NOTE:
When performing maintenance and service tasks, observe chapter 2, "Safety".

If technical servicing is necessary, it should only be performed by authorized qualifies personnel.

NOTE:
After the ceramic furnace has been serviced, check for safety:
- Federal Republic of Germany: VDE 0701 / 0702,
- International: According to the legal requirements of your own country.

4.1.2. Replacement parts

WARNING

Third-party replacement parts.
Malfunctions can arise if third-party parts are used. In certain circumstances, this can cause serious injury and substantial property damage.
Always use original replacement parts from DEKEMA.
4.1.3. **Required tools and auxiliaries**

**Standard tools**
- Hexagon nut driver, sizes 7 mm and 5.5 mm,
- Open-end wrench, sizes 7 mm, 14 mm and 17 mm,
- Hexagon socket screw driver, sizes 3 mm and 2 mm,
- Standard and crosstip screwdrivers,
- Basin wrench.

**Auxiliary materials**
- Cotton gloves,
- Brush.
4.2. Opening and closing the firing furnace

NOTE:
When performing maintenance and service tasks, observe chapter 2, "Safety".

Maintenance and service work requires that the inside of the firing furnace is accessible.

- Access to the electronics: Opening/closing the bottom part of the furnace (see chapter 4.2.1).
- Access to the firing chamber: Opening/closing the top part of the firing furnace (see chapter 4.2.2).

Fig. 4-1  Opening and closing of the firing furnace (example)

1  Front frame with touchscreen  
2  Cross-head screws  
3  Pot cover
4.2.1. Bottom of the firing furnace

Opening
1. Turn off the firing furnace. Pull off the power plug and allow the firing furnace to cool down.
2. Loosen the two cross-head screws at the bottom side (Pos. 2 in Fig. 4-1) of the front frame by turning them counter-clockwise.
3. Tilt the front frame (Pos. 1) outwards and place it on a soft support in front of the furnace. Take care that the cables remain free of tension.
4. Protect the bottom edges of the furnace from scratching during service work.

Closing
1. Make sure that the front frame seats the bottom of the furnace housing.
2. Tilt the front frame up into its final position.
3. Evenly turn the cross-head screws clockwise until the frame is fixed. Do not tighten the screws.
4. Make sure that the front frame is fixed.

4.2.2. Top of the firing furnace

Opening
1. Turn off the firing furnace. Pull off the power plug and allow the firing furnace to cool down.
2. Remove the four screws (Pos. 3 in Fig. 4-1) and the pot cover (Pos. 3).
3. Protect the top edges of the furnace from scratching during service work.

Closing
1. Place the pot cover. Screw in slightly and evenly the screws crosswise until the screw heads fit the pot cover.
4.3. Replacing the control panel

The control panel comprises the front frame, and the touchscreen and the function keys (see chapter 4.2.1).

NOTE:
When performing maintenance and service tasks, observe chapter 2, "Safety". In particular, make you familiar with the danger notes in chapter 2.4.

NOTE:
Do not scratch the surface of the touchscreen.

---

**DANGER**

Electrical shock from voltage-conducting parts.

The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:
- Never contact voltage-conducting parts,
- Do not use your hands or any objects to grasp things in the firing chamber,
- Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,
- The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.
4.3.1. Removing the control panel

1. Turn off the firing furnace. Pull off the power plug and allow the firing furnace to cool down.

2. Open the bottom of the firing furnace (see chapter 4.2.1).

3. Disconnect the plug-in connections X22 and X18 from the CPU board (see chapter 4.4.1).

4. Unplug the ground connection from the control panel.

5. Remove the control panel.

6. Place the control panel on a soft support.

You have removed the control panel.
4.3.2. **Installing the control panel**

Installing the control panel: in reverse order of removing.

1. Loosen the CPU board (see chapter 4.4.2) and turn it slightly forward. Do not unplug any connections.

2. Plug the two flat conductors in the contacts X22 and X18 of the CPU board.

3. Remount the CPU board (see chapter 4.4.3).

4. Tighten the grounding cable (green/yellow) to the ground connection.

5. Close the bottom of the furnace, (see chapter 4.2.1).

You have installed the control panel. Further settings are not necessary. Finally perform a safety test (see chapter 6).
4.4. Replacing the CPU board

The CPU board is located in the bottom part of the furnace, behind the control panel. The board is screwed on the bottom plate.

**NOTE:**
When performing maintenance and service tasks, observe chapter 2, "Safety". In particular, make you familiar with the danger notes in chapter 2.4.

---

**DANGER**

Electrical shock from voltage-conducting parts.

The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:
- Never contact voltage-conducting parts,
- Do not use your hands or any objects to grasp things in the firing chamber,
- Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,
- The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.

**NOTE:**
When the CPU board is replaced, all of the firing programs and most settings will be lost:
- Backup the firing programs before you replace the CPU board:
  - Function "Backup / Recovery" in the "Setup" menu, see "Operating Instructions AUSTROMAT®."
- Write down the network settings, the current CCF value, and the heater settings.
4.4.1. Plug connections on the CPU circuit board

The following figure shows schematically the CPU board of the firing furnace AUSTROMAT® and identifies the positions of the plug connectors and electrical contacts. The CPU board is located in the bottom part of the furnace, behind the control panel.

![CPU board: plug connectors and contacts](image)

X18  Touchscreen  G2  Battery socket
X19  USB/Ethernet  F1  Micro fuse
X22  Touchscreen  X11  Limit switch for lift
X5   Thermocouples type S  X17  Heating relay
X10  Hall sensor  X14  Motor
X4   24V DC  X1  Mains voltage detector
4.4.2. Removing the CPU board

**NOTE:**
Touch the CPU board only at the edges. Do not touch any parts or contacts with your fingers. Take measures to avoid electrostatic discharges.

1. Turn off the firing furnace. Pull off the power plug and allow the firing furnace to cool down.
2. Open the bottom of the firing furnace (see chapter 4.2.1).
3. Remove the three fixing screws (Pos. 2).

![CPU board](image)

**Fig. 4-4**

1. **Fixing screws**

4. Turn the CPU board forward.

**NOTE:**
Write down the following positions for remounting the CPU board:
- All plug-in connections.
- Alignment of connections without polarity protection.

5. Remove all plug-in connections (see chapter 4.4.1).
6. Remove the CPU board out of the furnace.

You have removed the CPU board.
4.4.3. Installing the CPU board

Installing the CPU board: in reverse order of removing.

1. Place the CPU board in the furnace. Do not yet mount it!

**NOTE:**
Check the ducting of the vacuum hose and the cabling:
- The lift system must not be restricted.
- Make sure that the connecting cables are not pinched below the CPU board.

2. Remount the CPU board (three mounting screws).

3. Close the bottom part of the furnace (see chapter 4.2.1)

You have installed the CPU board. Finally perform the following tasks and inspections:

- Function check (see chapter 6).
- Lift calibration (see chapter 5.2.1.1),
- Re-enter CCF value,
- Temperature calibration, (see Operating Instructions AUSTROMAT® chapter "Maintenance and Service"),
- Connecting the firing oven with the network (see Operating Instructions AUSTROMAT® chapter "First startup"),
- Restoring data (saved firing programs and sets) (see Operating Instructions AUSTROMAT® chapter "Use").

**NOTE:**
Factory-set default values by DEKEMA are used for the remaining settings.
4.5. Replacing the power supply

The multi range power supply provides a 24 VDC output voltage. It is located in the bottom part of the furnace, behind the control panel. The power supply is screwed on the bottom plate.

**NOTE:**
When performing maintenance and service tasks, observe chapter 2, "Safety". In particular, make you familiar with the danger notes in chapter 2.4.

---

**DANGER**

Electrical shock from voltage-conducting parts.

The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:
- Never contact voltage-conducting parts,
- Do not use your hands or any objects to grasp things in the firing chamber,
- Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,
- The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.
4.5.1. Removing the power supply

**Preparation:**

1. Let the firing furnace cool down.
2. Remove the firing table.
3. Close the lift.
4. Turn off the firing furnace and remove the power plug.

**Removing:**

1. Remove the control panel out from the housing (see chapter 4.3.1).

---

**WARNING**

Heavy firing furnace.

When the firing furnace is moved, there exists the danger of crushing, and the device may become damaged.

At least two persons must move the firing furnace. Wear safety gloves.

**NOTE:**

The main switch exceeds the rear side of the furnace. When placing the furnace upside down its weight may damage the main switch. Support the furnace around the main switch.

2. Place the firing furnace upside down onto a soft support.

---

**Fig. 4-5**  
Bottom plate of the firing furnace

1. Screws for the power supply
3. Unplug the 24 V power supply output (black/red, Pos. 3 in Fig. 4-6).
4. Remove the four screws for the power supply from the bottom plate (Pos. 1 in Fig. 4-5).
5. Pull the power supply (Pos. 2 in Fig. 4-6) carefully out to the front.

![Removing the power supply](image)

6. Disconnect the three-pole power supply cable (Pos. 1 in Fig. 4-6).

You have removed the power supply.

**4.5.2. Installing the power supply**

Installing the power supply: in reverse order of removing.

1. Connect the three-pole power supply cable with the power supply.
2. Fasten the power supply (four fastening screws) to the bottom plate.
3. Plug in the 24 V power supply output (black/red).
4. Near the lift system, run the cables accurately.
5. Bring the firing furnace in the vertical position.
6. Install the control panel (see chapter 4.3.2).

Finally perform a safety test (see chapter 6).
4.6. Replacing the lift seat

**WARNING**

Hot surface.
The firing table is very hot. The hot firing table can cause severe burns.

Observe the following instructions to avoid burns:

- Let the firing furnace cool down for several hours.
- Do not touch the lift seat, the firing table or firing objects with your bare hands,
- Use suitable tools (tweezers) to remove the firing objects, or wear safety gloves,
- Touch the firing table at the bottom only.

4.6.1. Removing the lift seat

1. Move the lift into position L1.

2. Turn off the firing furnace. Unplug the power plug and let the firing furnace cool down.

3. Remove the firing table.
4. Pull the lift seat (Pos. 4) slightly upwards.

5. Use pliers to fix the telescopic piston (Pos. 6).

6. Use a 17 mm hexagon nut driver to remove the cover nut (Pos. 1).

7. Remove the lift seat.

You have removed the lift seat.

4.6.2. Installing the lift seat

**NOTE:**
The new lift seat must be clean and dust-free.

Installing the lift seat: in reverse order of removing, see also Fig. 4-7.

1. Coat the new O-ring with talcum powder.

2. Insert the O-ring into the groove in the lift seat.

3. Mount the following components in the given sequence onto the telescopic piston:
   a. washer
   b. lift seat
   c. washer

4. Use pliers to fix the telescopic piston.

5. Use a 17 mm hexagon nut driver to tighten the cover nut.

6. Place the lift seat. Use the pin-type face wrench to tighten it.

7. Place the firing table.

Finally perform the following tasks and inspections (firing furnace switched on):

- Check the lift run while moving the lift into the top and bottom position.
4.7. Changing the heating element

⚠️ DANGER

Electrical shock from voltage-conducting parts.
The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:
- Never contact voltage-conducting parts,
- Do not use your hands or any objects to grasp things in the firing chamber,
- Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,
- The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.

⚠️ CAUTION

Ceramic dust from insulating materials.
The firing chamber and insulation table consist of ceramic insulating material. Inhaling ceramic dust can be hazardous to your health.

Do not inhale the dust. To remove ceramic dust, use a suitable vacuum cleaner. Read the material safety data sheets for the insulation materials, see operating instructions.
NOTE:
After maintenance and service work, technical changes, disassembly or exchange of parts, perform a thorough safety test of the firing furnace. Checklist see Chapter 6.

The heating elements are supplied as a complete assembly with a holder and electrical connection.

Proceed as follows to change a heating element:

1. Before servicing: Switch off the firing furnace and pull the power plug! The AUSTROMAT® iSiC® must be without power!

Removing the heating element

2. Open the cover of the firing furnace, see chapter 4.2.2.

3. Remove the screws that connect the connection lines to the heating elements. See also Fig. 4-8.

4. Remove the hexagon nut with an Allen wrench (WAF8)

5. Exchange one heating element after the other to prevent confusing in the connections. Use an Allen wrench (WAF 5) and an open end wrench (WAF 10).

Mounting the heating element

1. Take the new heating element and insert it as straight as possible without tilting into the corresponding hole.

2. Fasten the new heating element again with the hexagon nut.

3. Screw tight the electrical connections as shown in the following figure.

![Fig. 4-8 Screwing the heating element connections tight](image)

1. Hexagon nut
2. Washer
3. Inner clamping plate
4. Terminal wire
5. Heating element wire
6. Outer clamping plate
7. Washer
8. Socket head screw
NOTE:
The distance between the bottom of the heating element and the insulation material must be larger than 5 mm.

Fig. 4-9 Distance between heating element and insulation

4. Check the position of the heating element by looking into the firing chamber.

5. Run the heating element terminal wires as far as possible from the heating elements.

You have changed the heating elements.

Finally, perform a safety test for the firing furnace (see chapter 6).
4.8. Replacing the thermocouple

**DANGER**

Electrical shock from voltage-conducting parts.

The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:

- Never contact voltage-conducting parts,
- Do not use your hands or any objects to grasp things in the firing chamber,
- Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,
- The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.

**NOTE:**

After maintenance and service work, technical changes, disassembly or exchange of parts, perform a thorough safety test of the firing furnace. Checklist see chapter 6.

![Fig. 4-10 Thermocouples type S](image)

Proceed as follows to change a thermocouple.

1. Before servicing: Switch off the firing furnace and pull the power plug! The AUSTROMAT® iSiC® must be without power!
Removing the thermocouples

2. Open the cover of the firing furnace, see chapter 4.2.2.

3. Pull back the red silicone hoses and disconnect the plug-in connections.

4. Use a circuit tester to check the thermocouples for continuity. For that purpose, connect the circuit tester with the blank ends of the plugs of the thermocouples. Replace the respective thermocouple if there is no continuity (e.g. when the sensor is broken).

Mounting the thermocouples

1. Insert the new thermocouples into the firing chamber insulation. Thermocouple type S, labeled with R/S, into the lower bore hole. The plug should be horizontally directed to the left.
2. Connect the sockets of the compensation wires with the respective plugs of the thermocouples: Coupling R/S with plug R/S.

![Plug-in connection of the thermocouples](image)

3. Push the red silicone hoses over the plug-in connection.

![Plug-in connection with silicone hose](image)


You have changed the thermocouples.
4.9. Error messages

The following table lists the error messages of the AUSTROMAT®, the reason for the respective message, and provides tips for trouble-shooting.

<table>
<thead>
<tr>
<th>Error message</th>
<th>Possible reason</th>
<th>Measures</th>
</tr>
</thead>
</table>
| No function and the main switch does not lit | • Ceramic furnace not supplied with power  
• Defective fuses  
• Defective main switch | • Check power connection  
• Replace fuses  
• Replace main switch |
| No function, but main switch is lit | • Defective power supply | • Replace power supply (chapter 4.3) |
| Heating error | • Defective heating element, heating coil broken  
• Defective heating relay | • Check / replace heating element (chapter 4.6)  
• Check / replace heating relay |
| Sensor broken | • Thermocouples broken | • Check / replace thermocouples (chapter 4.8) |

Tab. 4-1 Error messages
5. Service software

5.1. Setup menu

The "Setup" menu is used to edit less frequently required firing furnace settings, and to launch maintenance programs. It is accessible to laboratory users if not blocked by the supplier for a specific customer. More detailed information on the set menu and the Web server can be found in the instructions for use.
5.2. Service menu

NOTE:
The "Service" menu is only available when you are authorized for level "2" (see chapter 2.5). The service functions may only be used by trained service personnel.

The "Service" menu is for setting the firing furnace, for running function tests, and for specifying access authorization to the controls of the firing furnace. The "Service" menu can be opened by clicking on the [Service] function key in the "Setup" menu.

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>See section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting the firing furnace</td>
<td>[Calibrate lift]</td>
<td>5.2.1.1</td>
</tr>
<tr>
<td></td>
<td>Calibrating the lift positions.</td>
<td></td>
</tr>
</tbody>
</table>
### Function tests and preparation

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>See section</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Drying]</td>
<td>Drying the insulation of the firing chamber.</td>
<td>5.2.2.1</td>
</tr>
<tr>
<td>[Oxidation]</td>
<td>Oxidizing a new heating element.</td>
<td>5.2.2.2</td>
</tr>
<tr>
<td>[Continuous test program 1]</td>
<td>Program for testing the functions of the firing furnace.</td>
<td>5.2.2.3</td>
</tr>
</tbody>
</table>

### Additional functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>See section</th>
</tr>
</thead>
<tbody>
<tr>
<td>[First startup]</td>
<td>Activates the installation assistant. See also Operating Instructions.</td>
<td>5.2.3.1</td>
</tr>
<tr>
<td>[Operating hour counter]</td>
<td>Shows the operating hours of the firing furnace.</td>
<td>5.2.3.2</td>
</tr>
<tr>
<td>[Serial no]</td>
<td>Shows the serial number of the firing furnace.</td>
<td>5.2.3.3</td>
</tr>
<tr>
<td>[Alarms]</td>
<td>Lists the alarm messages (alarm history).</td>
<td>5.2.3.4</td>
</tr>
<tr>
<td>[Events]</td>
<td>Lists the event messages (data logger).</td>
<td>5.2.3.5</td>
</tr>
</tbody>
</table>

### Access rights

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>See section</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Passwords]</td>
<td>Specifies the passwords for the authorizations to the firing furnace. See also chapter 2.5.</td>
<td>5.2.4.1</td>
</tr>
<tr>
<td>[FTP Passwords]</td>
<td>Specifies the passwords for the FTP access to the firing furnace.</td>
<td>5.2.4.2</td>
</tr>
<tr>
<td>[Login data]</td>
<td>Defines the authorizations to use the firing furnace via the web interface.</td>
<td>5.2.4.3</td>
</tr>
<tr>
<td>[DEKEMA-FTP Server Settings]</td>
<td>Defines the settings to access the DEKEMA FTP-Server.</td>
<td>5.2.4.4</td>
</tr>
</tbody>
</table>

Tab. 5-1 Functions in the "Service" menu
5.2.1. Adjusting the firing furnace

5.2.1.1. Calibrating the lift

The lift has already been calibrated in the plant by DEKEMA. After extensive service, the lift may need to be recalibrated. The lift moves upward until it reaches the top position switch. Then it approaches the bottom position switch.

In the "Service" menu, click the [Calibrate lift] button. The following lift calibration window appears.

![Lift calibration window](image)

**Fig. 5-2 Service > Lift calibration**

**Buttons**
- [Start]: Starts the lift calibration.
- [ESC]: Closes the window and switches back to the "Service" menu.

**Increments**
Indicates the number of increments, which the rotary encoder requires for the distance between the both limit switches.
5.2.2. Function tests and preparation

5.2.2.1. Drying

The "Drying" function dries the ceramic insulating material in the firing chamber. The drying has already been performed in the plant by DEKEMA. You should run the drying program after the firing furnace has stood for a long time or has been stored in a humid environment.

In the "Service" menu, click the [Drying] button. The following window appears for drying the firing chamber insulation.

![Drying window](image)

**Buttons**
- [Start]: Starts the drying program.
- [ESC]: Closes the window and switches back to the "Service" menu.

**Drying the firing chamber**

Start the drying program with the required final temperature. Make sure that the lift does not close the firing chamber. A gap of approx. 2 cm has to stay between the lift seat and the firing pot to ensure that moisture can escape from the firing chamber.
### 5.2.2.2. Oxidation

The "Oxidation" function conditions the heating elements. The conditioning has already been performed in the plant by DEKEMA. The heating elements only have to be oxidized after installing new ones.

In the "Service" menu, click the [Oxidation] button. The following window appears for oxidizing the heating element.

![Oxidation Window](image)

**Buttons**
- **[Start]**: Starts the oxidation program.
- **[ESC]**: Closes the window and switches back to the "Service" menu.

**Changing the final temperature**
- Click the displayed final temperature. The numeric keyboard window opens.
- Enter the desired temperature.

**Starting the program**
Click [Start]. The "Oxidation" window is displayed as long as the program is running. You may stop the program at any time by clicking the [Stop] button. You will be asked to confirm that you really want to stop the program:
- **[OK]**: Confirm the request and stop the program,
- **[ESC]**: Cancel the request and continue the program.
5.2.2.3. Continuous test program

A continuous test program is available for the AUSTROMAT® iSiC®. These programs can be used to check the functions of the firing furnace, for example after extensive service.

In the "Service" menu, click the [Continuous test program] button. The continuous test program is displayed on the screen.

![Continuous test program](image)

**Fig. 5-5**  Service > Continuous test program (example)

**Buttons**
- [Edit program]: Switches to the Program Editor.
- [Start program]: Starts the continuous test program.
- [ESC]: Closes the window and switches back to the "Service" menu.
- [Graphic]: Visualizes the program. See Operating Instructions.

The continuous test programs are edited, started and displayed like normal firing programs.
5.2.3. Additional functions

5.2.3.1. First startup

When the “Start up routine” is turned on, the installation assistant is started after the firing furnace is turned on. The installation assistant asks you to mount the insulation table, and runs an installation routine after you confirm by pressing the [CONTINUE] key. The firing chamber is dried, and the firing furnace is checked. The installation routine takes approximately 45 minutes and can be terminated at any time with the [ABORT] button. The installation assistant is started each time the furnace is turned on until the entire installation routine has run once.

Click on the button to activate and deactivate the “Start up routine”. An LED within the button indicates that the function is active.

5.2.3.2. Operating hour meter

In the “Service” menu, click the [Operating hour meter] button. The following window displays the total operating hours of the firing furnace. The operating hours counter cannot be edited.

Buttons

- [OK]: Closes the window and switches back to the “Service” menu.
5.2.3.3. Serial number

In the "Service" menu, click the [Serial no] button. The following window displays the serial number of the firing furnace. The serial number cannot be edited.

![Serial no window]

**Fig. 5-8 Service > Serial no**

**Buttons**

- [OK]: Closes the window and switches back to the "Service" menu.
5.2.3.4. Alarms

The furnace control system generates an alarm message when a serious problem or an error occurs. Usually, further operation of the furnace is not possible before you have corrected the failure that has caused the alarm message.

In the "Service" menu, click the [Alarms] button. The alarm messages (alarm history) are listed.

![Fig. 5-9 Service > Alarms]

**Buttons**
- [ESC]: Closes the window and switches back to the "Service" menu.
- [Delete]: Delete the selected alarm messages.

**Message list**
The alarm messages are listed row by row. They inform on:
- "No.:", Display the number of the alarm message.
- "Time of change", Display the time when the alarm has occurred.
- "Alarm", Display brief information on the alarm. Additionally, a way is recommended how to eliminate the error that has caused the alarm.
5.2.3.5. Events

The furnace control system generates an event message when the status of the furnace has changed, e.g. when starting or aborting a program, or changing a parameter. The messages are intended mainly as information, and to log the actions of the furnace control system.

In the "Service" menu, click the [Events] button. The events window appears and lists the event messages of the control (datalogger).

![Event Window]

**Buttons**
- [ESC]: Closes the window and switches back to the "Service" menu.
- [Delete]: Delete the selected event messages.

**Message list**
The event messages are listed row by row. They inform on:
- "Time of change" Display the time when the event has occurred.
- "Change" Describe the event, i.e. the status change of the furnace.
- "Old value" Status before the change.
- "New value" Status after the change.
5. Service software

5.2.4. Access rights

5.2.4.1. Passwords

**NOTE:**
If the password is lost, contact your service partner or directly contact DEKEMA, see p. 2.
Alternatively, you can recover the data: [Backup / Recovery] function in the "Setup" menu, see Operating Instructions AUSTROMAT®.

Two levels are defined for accessing the control of the AUSTROMAT® firing furnace. Each of these access levels is protected by a password (see also chapter 2.5).

In the "Service" menu, click the [Passwords] button. The following window appears for specifying the passwords for the different authorization levels for the firing furnace.

```
Passwords

General code: ******
Service: ******

OK
```

**Fig. 5-11 Service > Passwords**

**Buttons**  
- [OK]: Closes the window and switches back to the "Service" menu.

**Change password**  
- Click on the password for the desired access level. The alphanumeric keyboard window opens. Enter the new password.
5.2.4.2. FTP passwords (option)

**NOTE:**
If the FTP password is lost, contact your service partner or directly contact DEKEMA, see page 2.

Two levels are defined for accessing the control of the AUSTROMAT® firing furnace via FTP. Each of these access levels is protected by a password.

- Level 1 with user name "customer": FTP access to sets, i.e. the "DDS" files that are stored in the furnace.
- Level 2 with user name "service": FTP access to QM files that are stored in the furnace.

In the "Service" menu, click the [FTP Passwords] button. The following window appears for specifying the FTP passwords for the different authorization levels of the firing furnace.

![FTP Passwords](image)

**Fig. 5-12** Service > FTP passwords

**Buttons**
- **[OK]:** Closes the window and switches back to the "Service" menu.

**Change FTP password**
- Click on the password for the desired access level. The alphanumeric keyboard window opens. Enter the new password.
5.2.4.3. Login data (option)

**NOTE:**
If username or password are lost, contact your service partner or directly contact DEKEMA, see page 2.

The HTML access authorizes users to access the firing furnace via remote control. The password is defined in the "HTML access" window. This password must be entered in the browser on the computer to obtain access to the firing furnace. The "HTML access" window provides extended functionality in the "Service" menu compared to the "Setup" menu.

In the "Service" menu, click the [Login data] button. The following HTML access window appears.

![HTML access window](image)

Fig. 5-13 Service > Login data

**Buttons**

- [OK]: Accepts the settings and switches back to the "Service" menu.
- [Default]: Resets the password to the preset string by DEKEMA.

**Keyword**

Specify the password as follows:

- Click on the "Keyword" entry field. The alphanumeric keyboard window appears.
- Enter the password.

**Default**

Reset the password: The default password as set by DEKEMA is used.

**Activate start/stop keys via webserver**

In order for you to use the firing furnace via the user interface on the computer (start firing programs, move lift, etc.), the start/stop function must be released.

Click the button to release or block the start/stop function via the webserver. An LED within the button indicates that the function is active.

**Activate function keys via webserver for furnace commands**

In order for you to execute the hard-key functions via the Web server, the function keys of the PC keyboard must be released.

Click the button to release or block the function keys for the furnace commands. An LED within the button indicates that the function is active.
5.2.4.4. DEKEMA-FTP server settings (option)

**NOTE:**
The settings in the "DEKEMA FTP-Server Settings" window are used by default when establishing a FTP connection (menu Setup > FTP Server Login).

In the "Service" menu, click the [DEKEMA-FTP Server Settings ] button. The following window appears for setting the access to the DEKEMA FTP-server.

![DEKEMA-FTP Server Settings](image)

**Fig. 5-14**  Service > DEKEMA-FTP Server Settings

**Buttons**
- **[ESC]:**
  Closes the window and switches back to the "Service" menu.
- **[DNS active]:**
  The domain name system (DNS) connects an Internet computer name with the corresponding IP address.
  Click on the button to activate and deactivate the DNS function. An LED within the button indicates that the function is active.

**User name**
Your user name for accessing the DEKEMA FTP server.
- Click on the "User name" entry field. The alphanumeric keyboard window
- Enter your user name.

**Keyword**
Password for your access to the DEKEMA FTP server.
- Click on the "Password" entry field. The alphanumeric keyboard window appears.
- Enter the password.

**IP address**
Only available when the [DNS] function is not active.
IP address of the FTP server.
- Click on the corresponding "IP address" entry field. The numeric keyboard window appears.
- Enter the IP address of the DEKEMA FTP server.
<table>
<thead>
<tr>
<th>Port</th>
<th>Only available when the [DNS] function is not active. Port of the FTP server.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Click on the “Port” entry field. The numeric keyboard window appears.</td>
</tr>
<tr>
<td></td>
<td>• Enter the port of the DEKEMA FTP server.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DNS</th>
<th>Only available when the [DNS] function is active. DNS name of the FTP server.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Click on the “DNS” entry field. The alphanumeric keyboard window appears.</td>
</tr>
<tr>
<td></td>
<td>• Enter the name of the DEKEMA FTP server.</td>
</tr>
<tr>
<td></td>
<td>Alternatively, you can enter the IP address of the FTP server.</td>
</tr>
</tbody>
</table>
5.3. Accessing the firing furnace via FTP

**NOTE:**
Consult your network administrator if you are uncertain.

**NOTE:**
Several programs are suited to enable FTP access, e.g. web browsers like Internet Explorer.
The following procedure describes just one method how to establish an FTP connection between PC and firing furnace.

Note that the PC has to be connected via Ethernet to the firing furnace.

1. Open the Windows Explorer on the PC.

2. Enter the IP address of the firing furnace into the address bar of the Windows Explorer (in the following example "ftp://192.168.2.109"). Then press the Enter key.

   ![Fig. 5-15 Enter the IP address in Windows Explorer (example)](image)

**NOTE:**
For an immediate access to the firing furnace enter its complete FTP address. An FTP address "ftp://ftp_username:ftp_PWD@IP_address" contains the following parts (observe the separators of the individual parts!):
- Used network protocol "ftp",
- User name "ftp_username" and password "ftp_PWD" for FTP access to the firing furnace,
- IP address "IP_address" of the firing furnace in the network.

3. An error message appears (FTP folder error) because the firing furnace is password protected. Click [OK], to confirm the error message.

4. Open the context menu (right mouse click) in the empty window of the Windows Explorer. Select "Login As...".

   ![Fig. 5-16 Log on at the firing furnace](image)
5. The window "Log On As..." appears.
   - Enter your user name for FTP access to the firing furnace,
   - Enter your FTP password.

![Log On As](image)

**Fig. 5-17** Enter user name and password

6. Click on [Log On].

7. The Windows Explorer displays the stored data of the firing furnace after successfully log-in.

![Windows Explorer](image)

**Fig. 5-18** Windows Explorer: stored data of the firing furnace

8. You can copy, move, delete etc. files as known in Windows Explorer.

Close the Windows Explorer when the FTP access to the firing furnace is no longer required.
### 6. Safety tests

After maintenance and service work, technical changes, disassembly or replacement of parts, a thorough safety test must be performed according to the checklist below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Check</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do the notes made before servicing (site plan, marks, sequences, contact layout, etc.) correspond with the performed maintenance?</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Can the relationships be reconstructed?</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Are all the plug-in connections correctly seated and the strain reliefs attached?</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Are all screwed connections, holders, washers and attachments satisfactory?</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Is there sufficient distance between the power cables and lower voltage cables?</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Do the cable runs ensure unrestricted lift movement?</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Are all contact pins present in their original positions?</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Are cables correctly plugged when polarity protection is missing?</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Do the firing chamber connection wires run free (despite the temperature-resistant insulation) without touching the aluminum firing chamber?</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Are the protective conductors correctly plugged in or screwed in?</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Have all tools been removed from the furnace?</td>
<td></td>
</tr>
</tbody>
</table>

Only turn on the AUSTROMAT® /SiC® after performing these checks!

After the ceramic furnace has been restored to operation, check for safety:

- Germany: according to VDE 0701 / 0702
- International: according to the respective national guidelines
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