SKF EAZ
SKF EAZ CC

Instructions for use

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Original instructions

Safety recommendations

- There is a risk of electric hazard. Only qualified and adequately trained personnel must be allowed to operate the equipment.
- Due to the magnetic field, during the heating process observe a safety distance of 1,5 m *(4.9 ft)* with the induction heater. People wearing cardiac pacemakers or having implants must observe a safety distance of at least 5 meters *(16 ft)* from the induction heater during operation. Electronic equipment, such as wristwatches, mobile phones; but also magnetic cards or industrial electrical equipment may also be affected.
- Use proper handling equipment when lifting heavy workpieces. Secure the workpiece with appropriate lifting and handling equipment while heating.
- Avoid contact with hot surfaces. Always use heat resistant gloves.
- Never modify the heater. All repair work should be carried out by an SKF repair shop.
- Make sure the supply voltage is correct. Connecting the induction heater to the wrong voltage supply will void the warranty and probably damage the heater.
- Always make sure the heater is securely connected to earth.
- Do not expose electronic components to high humidity or water.
- Never introduce body parts into the bore of the heater during operation.
- Do not use the equipment in case of damage or heavy wear is detected on the heating coil. Also, cracked rings must not be heated with the electrical induction heater.
- The heater should not be used in areas where there is a risk for explosion.
- Follow the operating instructions at all times.
- The EAZ and EAZ CC are solely intended to heat up bearing rings, mill rolls and labyrinth rings. It is not intended to heat up any other component.
- The heater needs to be operated by professionally trained people. Do not leave the heater unattended. Especially when using time mode.
- In case of fire, do not use water nor powder-based extinguisher. This will damage the electronics. A CO_2 based extinguisher is recommended, if available.
- Be aware that fumes coming from the heated element might occur.

EC Declaration of conformity

We, SKF Maintenance Products, Meidoornkade 14, 3992 AE Houten, The Netherlands herewith declare that the products described in these instructions for use, are in accordance with the conditions of the following directive:
EMC DIRECTIVE 2014/30/EU and are in conformity with the following standards:

EN61000-6-1:2007
EN61000-6-3:2007 / A1:2011 / AC:2012

EN61000-3-2:2014
EN61000-3-2:2013

EN61000-4-2
EN61000-4-3
EN61000-4-4
EN61000-4-5
EN61000-4-6
EN61000-4-8
EN61000-4-11

EUROPEAN LOW VOLTAGE DIRECTIVE 2014/35/EU
EUROPEAN ROHS DIRECTIVE 2011/65/EU

Houten, The Netherlands, February 2019

CE

Sébastien David
Manager Product Development and Quality

1. Scope of delivery

The EAZ coil is delivered with:

- EAZ coil
- Heat resistant gloves TMBA G11H

The EAZ Control Cabinet is delivered with:

- EAZ control cabinet
- Support legs
- Grounding cable with magnetic clamp EAZ CC-GRC
- Control cable EAZ CC-LC
- Temperature probe cable EAZ CC-TPC
- Temperature probe TMBH 1-3

2. Introduction

The fixed induction heaters are used for mounting and dismounting of:

- Inner rings of cylindrical roller bearings,
- Roll groove rings of cold reducing machines and
- Roll body side labyrinth rings of bearing arrangements.

They are used where large number of bearings of the same design are used or where large bearings with tight fit are frequently mounted and dismounted. They are intended for one particular bearing and one particular application.

Fig.1 – *EAZ control cabinet*

Fig.2 – *Support legs*

Fig.3 – *Grounding cable with magnetic clamp* EAZ CC-GRC

Fig.4 – *Control cable* EAZ CC-LC *and temperature probe cable* EAZ CC-TPC

Fig.5 – *Temperature probe TMBH 1-3*

2.1 Principle of operation

The fixed induction heaters consist of a cylindrical induction coil made of copper wire permanently mounted in a housing serving as mechanical extractor. Depending on the size of the heater, two different executions exist as per → **fig. 6** and → **fig. 7**.

Fig.6 – *Standard execution for rings up to 380 mm*

Fig.7 – *Special execution for odd and large component*

When the heater is switched on, electric current runs through the coil, generating a fluctuating magnetic field, but no heat on the EAZ coil itself. However, once you set an iron or stainless-steel component on inside of the EAZ coil, the magnetic field induces many smaller electric currents (Eddy currents) in the component metal. Because iron is a poor conductor of electricity, when all these small currents run through the iron, much of the energy is converted into heat. This heat will cause the ring to expand.

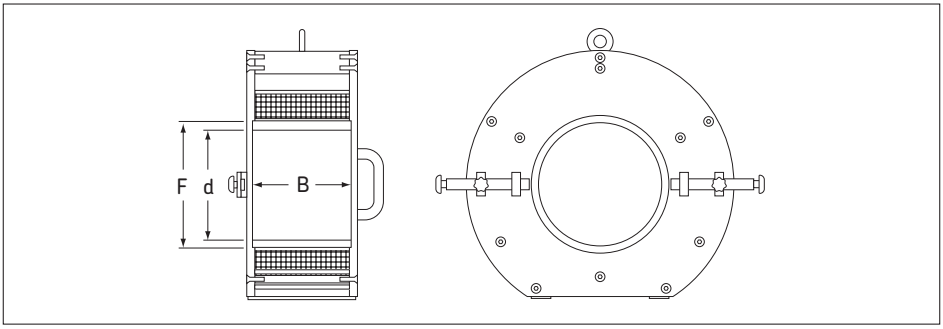
After a pre-determined heating time or temperature, the ring can be withdrawn from the shaft or mounted into it.

3. Technical data

Because every heater is a custom-made unit, the user can fill in the following fields by himself looking at the specifications and drawings delivered with the unit.

Product designation :

Recommended control cabinet :



Heater dimensions

- Width :
- Housing height :
- Inner diameter :
- Housing width :
- Cable length :
- Weight :

Component dimensions

- Bearing designation or drawing number :
- Inner diameter (d) :
- Outer diameter (F) :
- Width (B) :

Application

- Drawing number :

- Neck diameter :

- Interference fit :

4. Installation

The EAZ coil is meant to work only with SKF EAZ control cabinet and vice versa. This is the only way we can ensure the right performance of the tool.

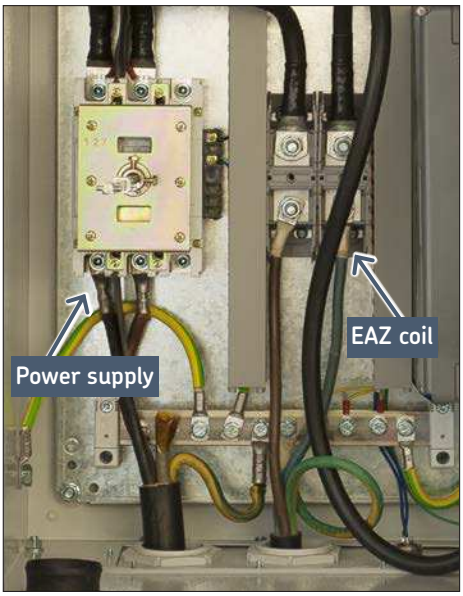
The power supply needs to be 3 phases+ neutral + ground. We will only use 2 phases out of the 3 of them and the ground. We won't use the neutral.

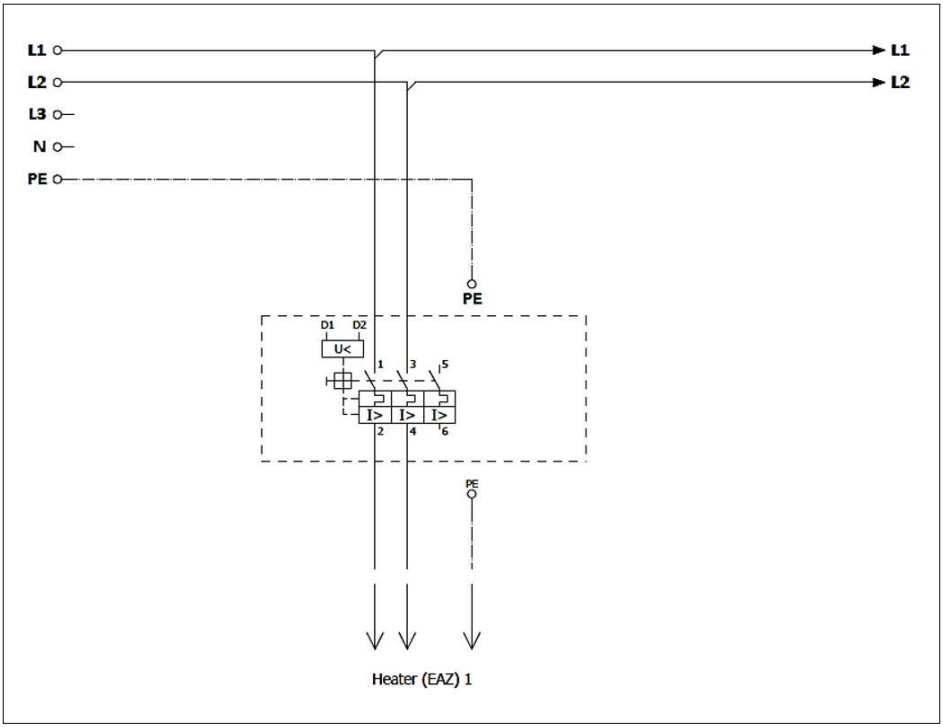
The cable to connect the mains and the control cabinet is not delivered with the product. It is for the user to arrange the right cable. A qualified electrician should install this.

⚠ IMPORTANT:

The EAZ Control Cabinet and EAZ coil might create some disturbance in other electrical equipment connected to the same power supply line. To avoid this, the EAZ Control Cabinet and EAZ coil need to be connected to a dedicated power line.

4.1 Single output cabinet (EAZ CC...)





4.2 Double output cabinet (EAZ CCD...)

4.3 Transformer adjustment to power supply voltage

The cabinets include a transformer for generate 230V for the inside electronics. This must be adjusted properly to make sure that the output of this transformer is well within the acceptable range for the parts connected to it. This operation must be done by an electrician.

⚠ IMPORTANT:

Be aware that this adjustment is not changing the specifications range of the cabinet.
A cabinet meant to work at 400V/50Hz can only be set at 380 or 420V/50Hz.
A cabinet meant to work at 440-480V/60Hz can only work at 440, 460 and 480V/60Hz, but not at 400V (for example).

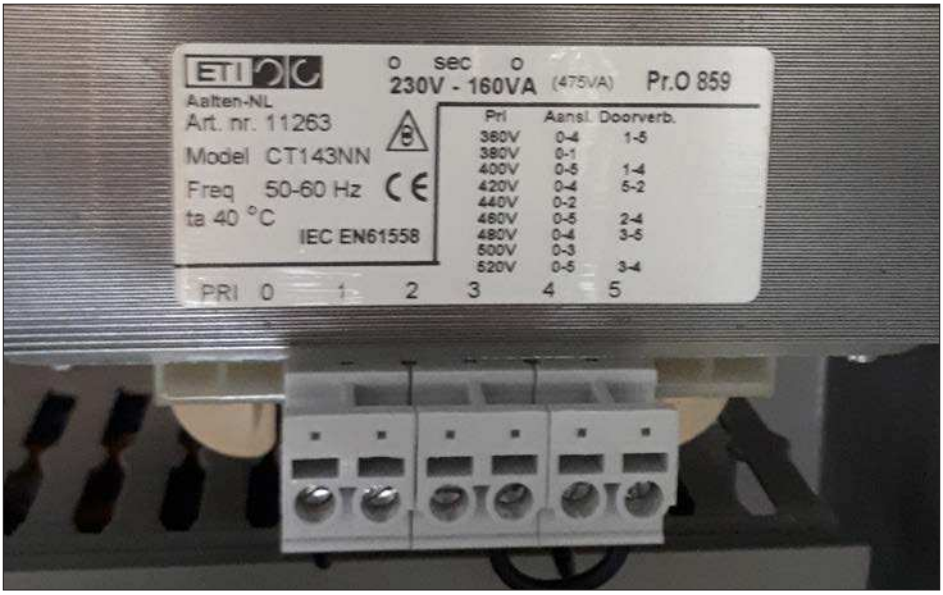
As we can see in the below picture, the transformer has 6 connection points at the bottom. We must read the connections table on the transformer:

NOTE:

In this case the table is as per below, *but this can be different in the one you have, so always follow the transformer table and not the table in this manual:*

Voltage	Independent connections	Short circuited connections
380V	0-1	
400V	0-5	1-4
420V	0-4	5-2
440V	0-2	
460V	0-5	2-4
480V	0-4	3-5

In the picture below, for 480V we can see that connections 0 and 4 are connected.
Also 3 and 5 are connected through a cable which short circuits them.



5. Instructions before use

A. Make sure the control panel type EAZ CC is connected to the three-phase mains by an authorized electrician. Use only SKF control cabinets to avoid damage in the EAZ induction heater.

B. Make sure that the cabinet is placed on a solid base and it is stable.

C. To obtain the full heating capacity of the coil assure that the cable is connected without loops.

D. Check for damages before use, specially the sleeve and the power cables. The cables may get damaged due to the compression or to the high temperatures.

E. Connect the cable for the overheating protection of the heater to the control cabinet. Do the same with the temperature probe extension cable and the temperature probe itself.

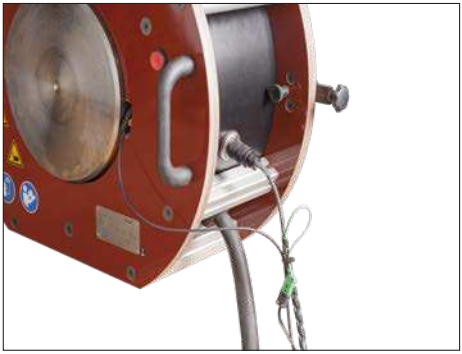


Fig.8 – *Adjust the length of the temperature probe cable to the minimum possible to avoid damages on the probe itself*

F. With the door of the control panel closed, the safety locks can now be pushed in with the key.

G. The device is ready for use. The main switch can now be turned to the on position. This will start the Graphic User Interface, but it won't power the EAZ coil.

H. In case that the door of the panel is open, the main switch cannot be turned on and therefore no current can pass by. Do not force the main switch stud with the door open.

I. Let the EAZ acclimate when there is a temperature change. Use only inside of buildings.

6. Operating instructions

Before proceeding with mounting or dismount rings, please take the following into consideration:

- Cracked rings must not be heated with the electrical induction heater.
- The tool must not be switched on without the steel ring in the bore! Otherwise the current consumption increases considerably, and the coil is heated too rapidly.
- Additional safety is provided by an automatic cutoff interrupting the current as soon as the temperature of the induction coil winding exceeds 120 °C *(248 °F)*. This situation may also occur after several operations in a row. In this case, it is recommended to cool down the device with compressed air or a fan. To prevent this from happening, remove the hot rings as quick as possible from the inside of the heater. This will significantly increase the duty cycle of the heater.
- During dismounting, the roll neck must be connected to earth, for example by means of a single core cable with magnetic clamp or via de support.
- Do not leave the heater unattended, especially in Time Mode. The temperature needs to be monitored to avoid damages.

6.1 Dismounting

A. Place the electrical induction heater over the ring to be withdrawn. The transportation can be done just by crane or hoist and with hemp ropes. Do not use steel ropes!

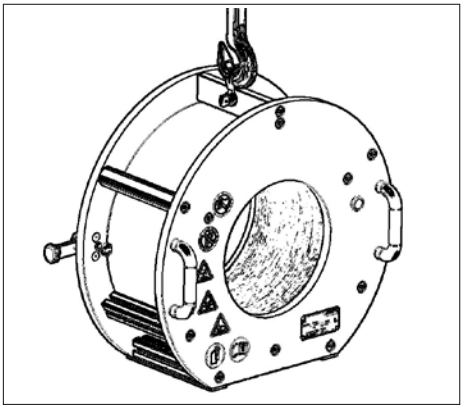


Fig.9 – *Do not use steel rope to lift the heater*

B. Connect the roll neck to earth with the magnetic grounding cable supplied or by other authorized means.

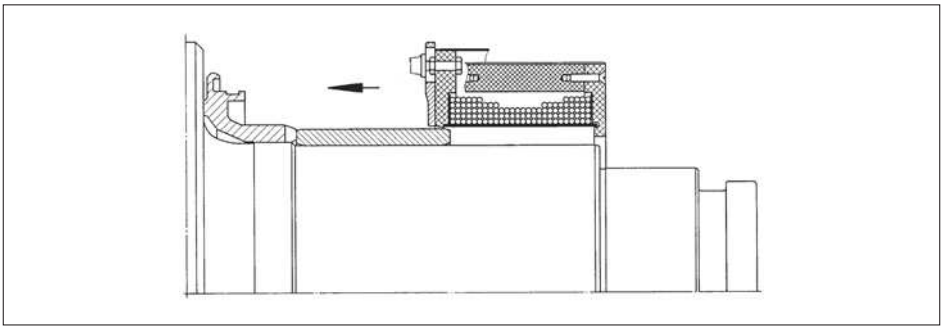


Fig.10 – *The heater is being positioned over the ring*

C. If the abutting parts are provided with recesses, push the withdrawal bars towards the inside by loosening the locking screws and hence positively engaging the ring. If there are no recesses behind the ring, slightly displace the inner ring axially after the heating process by means of crowbars until the withdrawing bars can enter in the gap resulting from the displacement.

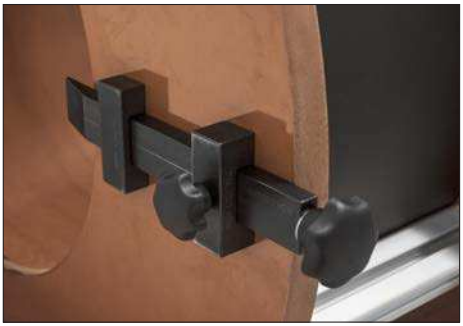


Fig.11 – *Withdrawal bar behind the coil*

D. If using the two coils cabinet, first choose which coil is going to be used. This is very important to avoid powering the wrong coil.

E. Choose the Dismounting Mode in the GUI (Graphic User Interface).

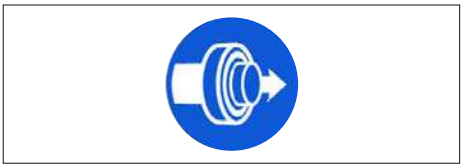


Fig.12 – *Dismounting Mode symbol*

F. Choose the right Mode. Choose in between time and temperature.

Fig.13 – *Time and Temperature Mode symbols*

Use the Temperature Mode if the magnetic temperature probe is available and connected to the cabinet properly. Used the Time Mode if no temperature probe is available, deffect or the heating time is known.

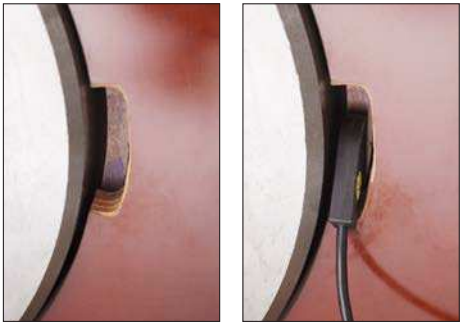


Fig.14 – *Use the gap on the coil to place the temperature probe*

G. Select the right heating time or temperature.

H. Once the heating of the ring is finished, the control cabinet will automatically demagnetize the ring and an audio signal will alert the user.

I. Now the ring can be withdrawn. Remove the temperature probe and place it somewhere safe on the EAZ coil. Then evenly pull the handles of the induction heater.

Fig.15 – *Place the magnetic probe on a metallic surface, such as a bolt on the EAZ*

⚠ IMPORTANT:

Remove the EAZ coil and ring as soon as the heating is finished so that as little heat as possible will flow from the hot inner ring into the roll neck. Directly remove the inner ring from the EAZ coil to

avoid damages in the inner surface of the EAZ coil. Be aware of the hot surfaces and use the supplied protection gloves.

J. Once the ring is withdrawn from the roll neck, the heated ring must be immediately removed from the induction heater. By doing this, the risk of damaging the coil sleeve is reduced and the duty cycle of the heater is significantly increased.

K. If for any reason the circuit is to be interrupted before the pre-determined heating setting is over, press the STOP button on the GUI screen or the OFF button on the induction heater. Only in case of emergency you can switch off the cabinet by using the main switch handle. Be aware that in the last case the ring won't be demagnetized.

L. If the ring cannot be withdrawn due to tilting during the withdrawal, remove the EAZ coil from over the ring and use a soft hammer to correct the ring position and try to pull the ring out again. Do not use metallic hammers or bars as this might damage the bearing!

M. If the dismounting is anyhow unsuccessful, remove the EAZ coil from over the ring and wait until the ring and the roll neck has cooled down before making another attempt. This will ensure that the temperature difference between neck and ring needed for dismounting can be obtained. Compressed air or a fan may be used to speed up the cooling process.

6.2 Mounting

A. Electrical induction heaters can also be used for heating the rings during mounting. For this purpose, place the ring in the bore of the heater.

B. Select the Mounting Mode on the User Interface screen of the control cabinet.

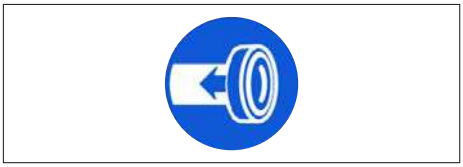


Fig.16 – *Mounting mode symbol*

C. Place the temperature probe on the ring. Set the right temperature on the cabinet settings if Temperature Mode is to be used or the right heating time if Time Mode is to be used.

D. Once the right settings have been selected, push the START button.

E. The ring and the EAZ coil should be at a close distance from the roll neck where the ring will be mounted. A short distance means a short time to mount and therefore less time for the hot ring to cool down.

F. Once the cabinet has reached the heating settings, the ring will be automatically demagnetized.
An audible signal will indicate that the user can collect the hot ring to mount it.

G. Remove the temperature probe if used and locate it on a safe surface on the EAZ coil. It is very important to use heat resistant gloves for this.

H. Mounting the hot ring on a cold roll neck requires some practice. It is very important that the hot ring is perfectly aligned with the roll neck shaft, so it does not get stuck halfway. If this happens, correcting the ring position with a plastic hammer is a good option. Do not use a steel hammer as this might damage the bearing ring.

7. Determination of heating settings

Prior to any heating operation, the correct heating time or temperature must be established. In case that this is not already specified or known, please proceed as follows:

A. Push the heater over the ring to be withdrawn or mounted and proceed according to chapter 6.1 or 6.2 to start the heating process.

B. Measure the temperature of the ring. For this you can use the temperature probe of the cabinet or a fast responding contact thermometer such as the TKTL 30 or a TKDT 10.

C. For a first attempt you can record the time required to reach 120 °C *(248 °F)*. If you use the Temperature Mode of the SKF control cabinet, this time will be displayed at the end of the heating cycle.

D. Dismount or mount the ring. If it is successful, you can keep this temperature and time as the right settings for future jobs of the same workpiece. If it is not successful, increase the temperature by 10 °C *(50 °F)*, and try again.

8. Safety features

The heater is equipped with the following safety features:

- **Automatic demagnetization:**
  Having been heated with an EAZ heater and an EAZ control cabinet, the rings will be automatically demagnetized. Demagnetization of the rings is important to avoid that for example steel particles will stick to the bearing during operation.
- **Automatic overheating protection:**
  This protects the copper windings inside of the coil to get permanently damaged due to overheating.

Fig.17 – *Too hot coil warning symbol*

Fig.18 – *Emergency STOP button at the front of the coil*

⚠ IMPORTANT:

The overheating protection is only to avoid damages of the copper coils, not of the protecting sleeve. Make sure that the temperature of the rings do not exceed 200 °C *(392 °F)* to avoid damages on the sleeve.

- **Overcurrent protection:**
  The control cabinet is equipped with a circuit breaker to prevent a too high current withdrawal from the power supply.
- **Emergency stop button:**
  Located on the front of the coil, it is intended to be used in case that something goes wrong. If pushed, the heater will automatically demagnetize the ring and STOP. It is not intended to be used as a normal stop button.
- **Too slow heating prevention:**
  If a too slow heating is detected by the temperature probe, error E05 will be displayed and the cabinet will stop the heating process. This is important in the case that the temperature probe falls down during heating to avoid permanent damages of the bearing ring and heater.
- **Faulty temperature probe:**
  If the temperature probe is damaged, the error E06 will be displayed and the cabinet will stop the heating process.
  Replace temperature probe or use time mode.

9. Maintenance

We advise you to follow some steps for preventive maintenance and to avoid some risks:

- Keep the heater always clean. Removing all kind of dust, grease, oil, etc. that is deposited on the coil and cabinet is the first step to avoid damages. It can be cleaned by clean dry cloth.
- Do not expose the heater inner sleeve to high temperatures. The sleeve is 200°C *(392 °F)* temperature resistant for a short time. If exposed to higher temperatures or for a long time, the sleeve will be damaged.
- If the sleeve is damaged (burnt parts, bubbles or even cracks) the user must replace it. If there is a crack in the sleeve, there is a high risk of short circuit and due to the high current going through the coil, it is very important to avoid this.
- Keep the User Interface screen clean from grease and treat it with care. It is a sensitive part of the product and it must be treated carefully. Do not use sharp components nor apply high forces to operate it.
- Make sure that the temperature probe is in good shape and clean. If not, it could give wrong temperature readings and lead to damages in both the heater and the bearing ring. If damaged, please replace it.

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