

# TMBH 5



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## Safety recommendations

- Because the TMBH 5 generates a magnetic field, people wearing a pacemaker or implants must not be within 5 m (16 ft) of the TMBH 5 during operation.
  - During the heating process observe a safety distance of 30 cm (1 ft) with the workpiece or the heater. Electronic equipment, such as wristwatches, cellphones, etc. may also be affected.
  - Always follow the operating instructions.
  - Make sure that the power supply voltage does not deviate from the acceptable range of 100 - 240V, 50 - 60Hz.
  - Use the right power level, especially with shielded or sealed with metallic inserts bearings. SKF does not recommend heating bearings capped with seals or shields above 80 °C (175 °F). However, if higher temperatures are necessary, please contact SKF. Small bearings to be heated using low power mode, 25% or 10% to avoid risking overheating the bearing.
  - Do not expose the TMBH 5 to high humidity, outdoors or to flammable atmospheres.
  - Do not modify the TMBH 5. All repairs should be taken care by SKF repair shops. Do not touch a damaged heater if plugged to the mains.
  - The TMBH 5 is solely intended to heat up bearings, gears, couplings and other industrial annular components.
  - The heater needs to be operated by professionally trained people. Do not leave the heater unattended especially when using time mode.
  - Avoid contact with hot surfaces. Always wear protective gloves. In case of burnings ask for first aid help if necessary.
  - Never heat to temperatures above 200 °C (392 °F).
- The heater is designed for maintenance operations where some cooling in between jobs is allowed.
  - In case of fire, do not use water nor powder-based extinguisher. This will damage the electronics. A CO2 based extinguisher is recommended, if available.
  - Be aware that fumes coming from the heated element might occur.
  - Make sure that the component does not heat up above any desired limit by properly measuring temperature. If so, adjust the power level accordingly.

## EU Declaration of Conformity TMBH 5

We, SKF MPT, Meidoornkade 14, 3992 AE Houten, The Netherlands herewith declare under our sole responsibility that the products described in these instructions for use, are in accordance with the conditions of the following Directive(s):  
EMC DIRECTIVE 2014/30/EU  
EUROPEAN LOW VOLTAGE DIRECTIVE 2014/35/EU  
and are in and are in conformity with the following standards:

EN 61000-6-2 (2005) + AC (2005)  
Industrial (Immunity)  
CISPR16-2-3: 2010 + A1:2010 +A2:2014  
Class A equipment (Emission)  
EN 61000-3-2 (2014), A (Emission)  
EN 61000-3-3 (2013) (Emission)  
EN 61000-6-4 (2007), A1(2011),  
Class A equipment (Emission)  
EN 60335-1 (2012): Safety of household and similar electrical appliances  
EN 60519-1: 2020: Safety in installations for electroheating and electromagnetic processing

RoHS DIRECTIVE (EU) 2015/863 and the harmonized standard: EN IEC 63000:2018:  
EN 50581:2012: Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Houten, The Netherlands, April 2023



Guillaume Dubois  
Manager Quality and Compliance



## UK Declaration of Conformity TMBH 5

We, SKF MPT, Meidoornkade 14, 3992 AE Houten, The Netherlands herewith declare under our sole responsibility that the products described in these instructions for use, are in accordance with the conditions of the following Directive(s):  
Electromagnetic Compatibility Regulations 2016 (2016 No. 1091)  
Electrical Equipment (Safety) Regulations 2016 (2016 No. 1101)  
and are in and are in conformity with the following standards:

EN 61000-6-2 (2005) + AC (2005)  
Industrial (Immunity)  
CISPR16-2-3: 2010 + A1:2010 +A2:2014  
Class A equipment (Emission)  
EN 61000-3-2 (2014), A (Emission)  
EN 61000-3-3 (2013) (Emission)  
EN 61000-6-4 (2007), A1(2011),  
Class A equipment (Emission)  
EN 60335-1 (2012): Safety of household and similar electrical appliances  
EN 60519-1: 2020: Safety in installations for electroheating and electromagnetic processing

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (2012 No. 3032) and the harmonized standard: EN IEC 63000:2018:  
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

The person authorised to compile the technical documentation on behalf of the manufacturer is SKF (U.K.) Limited, 2 Canada Close, Banbury, Oxfordshire, OX16 2RT, GBR.

Houten, The Netherlands, April 2023



Guillaume Dubois  
Manager Quality and Compliance



## 1. Scope of delivery

The TMBH 5 portable induction heater contains the following:

- Induction heater TMBH5 and clamp.
- Magnetic K-type 600 mm (23.6 in) temperature probe TMBH 5-3.
- Temperature resistant gloves TMBA G11.
- Schuko earthing contact plug black (not mounted) in the TMBH 5/230V version.
- Molded plug with cable in the TMBH 5/120V version.
- Bearing holder for positioning workpiece.

## 2. Introduction

The TMBH 5 portable induction heater is designed to heat up roller bearings that are mounted with an interference fit onto a shaft.

Other ring-shaped metallic components can also be heated.

The heat causes the bearing to expand, which eliminates the need to use force during installation. A 90 °C (162 °F) temperature difference between the bearing and shaft is generally sufficient to enable the installation.

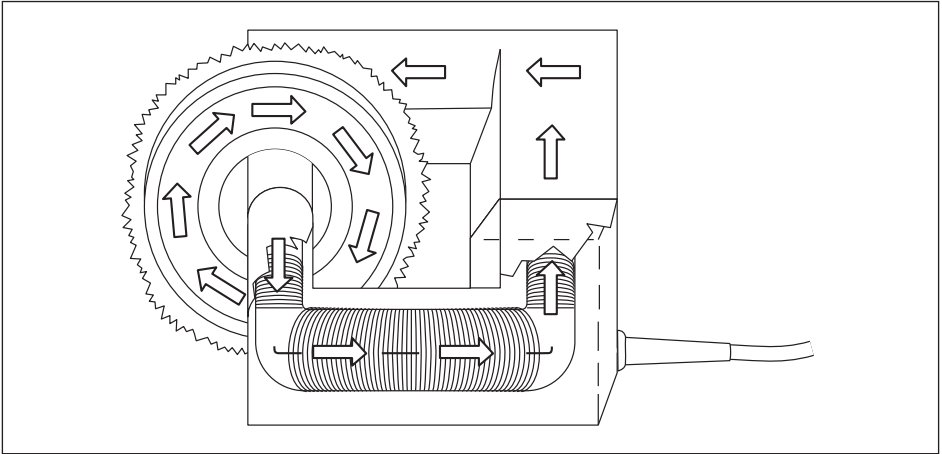
At ambient temperature of 20 °C (68 °F) the bearing must be heated to 110 °C (230 °F).

Shielded bearings or sealed bearings with metallic insertions must be controlled as the shield or the metallic insert might heat much faster than the bearing itself. A reduced power setting is recommended in these cases.



## 2.1 Principle of operation

The TMBH 5 portable induction heater consists of a small graphite clamp embedded in a polymer housing with electromagnetic coils beneath it. When the heater is switched on, electric current runs through these coils, generating a fluctuating magnetic field, but no heat on the clamp itself. However, once you set an iron or stainless-steel component inside the clamp, the magnetic field induces many smaller electric currents (Eddy currents) in the component's metal.



**Fig. 1** – *Magnetic field around bearing*

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. Thus, around an induction heating clamp, the heat is not coming from the clamp, but it is generated in the component itself. This makes heating a lot more efficient than other heating methods.

The drawback is that only components made from iron will work with induction. Components made of only copper or aluminum conduct electricity too good to generate significant heat. Cast-iron and stainless-steel work fine. A rule of thumb is: if a magnet sticks to the component, the induction heater will heat it up. Nonetheless, small brass or copper rings (such as shields or bearing cages), due to its small mass, might heat much faster than the rest of the bearing and a low power setting must be always chosen.

## 2.2 Distinguishing features

- **Portable:**  
Thanks to the medium frequency technology used and the right choice of materials, the heater is light weight. This, together with the built-in handle, makes it portable to use it in different locations or to easily store it in a locked place.
- **Versatile:**  
Thanks to the thin fingers of the induction clamp, the user doesn't need to choose which yoke is needed for every component. This increases the number of different components that you can heat up and at the same time reduces the number of accessories needed.
- **Quiet:**  
Due to the medium frequency technology the heating of components does not make noise. An LED indicates when the heater is heating, even if you cannot hear it.
- **Power regulation:**  
Thanks to the different power settings, the heater can heat up sensitive components at a slower pace other than bearings.

## 2.3 Storage

- **Gloves:**  
The gloves could be stored in the attached compartment.
- **Clamp:**  
The clamp could be stored in the attached compartment.



- **Bearing stand:**  
The bearing stand could be pushed and clicked into the compartment.  
To take it out, pull the bearing stand with your fingers out of the compartment.



### 3. Description

The operation of the heater is controlled by the internal electronics in two modes.

The operator can either select the desired temperature of the bearing in Temperature Mode or set the length of time that the bearing or component will be heated in Time Mode. The power level can be adjusted to Low Power Mode for slower heating of sensitive workpieces (for example, bearings with shields or metallic inserts in the seals).

#### 3.1 Technical data

Designation	TMBH 5
Application <sup>1)</sup>	
Bearing weight <sup>2)</sup>	up to 5 kg (11 lb)
Min. bearing bore diameter	20 mm (0.8 in)
Max. bearing bore diameter	100 mm (4 in)
Max. bearing width	50 mm (2 in)
Maximum Power	TMBH 5/230V: 350W TMBH 5/120V: 350W
Voltage and frequency	TMBH 5/230V: 230V, 50/60Hz TMBH 5/120V: 120V, 50/60Hz
Max. current consumption	TMBH 5/230V: 2A TMBH 5/120V: 4A
Temperature Control	40 - 200 °C (104 - 392 °F)
Time Control	5 seconds – 60 minutes
Demagnetization	The heater does not magnetize
Dimensions	275 × 270 × 180 mm (10.8 × 10.6 × 7.09 in)
Total weight	3 kg (6.6 lb)
1) SKF does not recommend heating bearings capped with seals or shields above 80 °C (175 °F). However, if higher temperatures are necessary, please contact SKF. The heater is designed for maintenance operations where some cooling in between jobs is allowed.	
2) Depending on the geometry of the bearing, maximum heating temperature.	

### 4. Installation

Make sure that the line voltage is within the specified range depending on the heater type.

#### IMPORTANT:

The main switch in the heater is not a safety switch. The heater needs to be unplugged from the mains to perform any repair. If the mains cable is damaged, it must be replaced.

#### NOTE:

The heater does not need to be connected to ground since it is a double insulated device with a plastic housing.

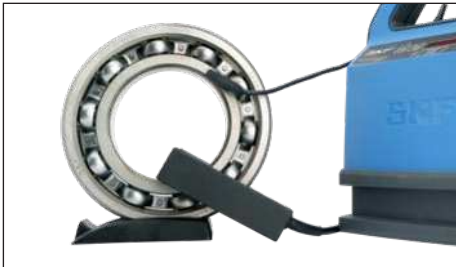


## 5. Preparation for use

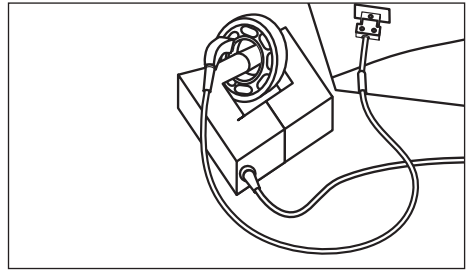
- Place the TMBH 5 on a workbench or similar (stable base)
- Make sure the line voltage is within the specified range of 100–240 V, 50–60 Hz. Connect the mains plug to a suitable power supply.
- Carefully place the workpiece to be heated at the top of the bearing stand.



- Then open the clamp and place it around the workpiece.  
Connect the heating clamp to the heater.  
Never connect or disconnect the heating clamp during operation



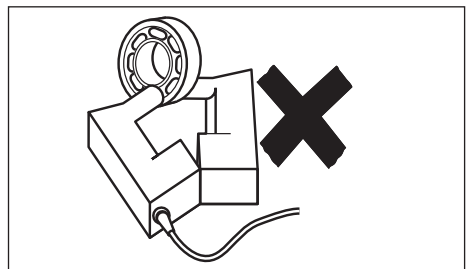
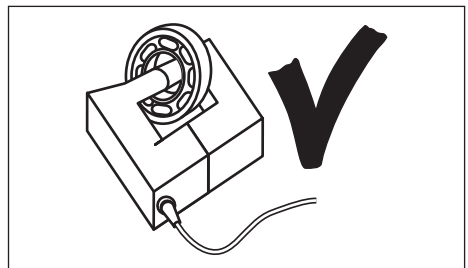
- The heater is designed to heat up one component at a time.
- If used in Temperature Mode, plug the temperature probe into the connector. Place the magnetic tip of the probe on the flat surface of the bearing inner ring or on the innermost surface of the workpiece. It is then recommended to attach the probe to the hottest part of the component which in general is the part closest to the clamp.



- Switch on the heater from the main switch, which is located at the left side of the heater. The power LED will be lit for few seconds until the entire display and heater will be ready.



- Select the right heating mode and settings.
- Once you have finished heating the component, attach the magnetic probe tip to the metallic sheet on the heater's housing. This is the temperature probe's parking spot, located at the upper right of the heater.



## 6. Operation

### 6.1 User interface



Fig. 2 – User interface

#### From left to right:

- The LOW POWER button and LED. This button reduces the power of the heater. If low power mode is selected, then the red LED is switched on.
- The temperature/time symbols button is the MODE button. This button shifts in between Temperature Mode and Time Mode.
- LED display. The process information is displayed here: goal temperature, actual temperature, error codes, time, etc.
- MINUS and PLUS buttons. These buttons decrease or increase the value shown on the LED display.
- START/STOP button and heating LED. Press to start or stop the heater. The LED button is permanently ON when the heater is heating.

### 6.2 Temperature mode

In this mode components can be heated to a given temperature.

- If the LED screen shows °C or °F, Temperature Mode is selected.
- The selected temperature is shown on the display. The default temperature for bearings is 110 °C (230 °F). If a different temperature is desired, press + or – to adjust the temperature in steps of 1°. Keep the + or – buttons pressed for a faster adjustment.
- It may be desirable to heat up bearings or other components to temperatures above 110 °C (230 °F) for an increased mounting time or a tighter interference fit. Consult the bearing specifications to determine the maximum permitted temperature. Always ensure that the bearing does not lock due to an excessive expansion of the inner ring compared to the outer ring.
- Make sure that the temperature probe is mounted on the bearing inner ring flange.
- Press START/STOP to start the heater. The heating LED will switch on. Even if you cannot hear it, the component is being heated.
- The user interface displays the temperature detected by the temperature probe.
- During heating, when pressing the MODE button, the heating time is shown.
- When the selected temperature has been reached, the bearing is then ready to be taken out. An acoustic signal will be generated for 4 seconds.
- If the component is not removed nor the process stopped, the temperature holding feature will maintain the component at temperature for 5 minutes.
- By removing the temperature probe or the workpiece, the heating process will automatically stop. It can also be stopped by pressing the START/STOP button.
- Remove the workpiece with proper heat resistant gloves, supplied with the unit.
- The heater is now ready to heat up another workpiece with the same settings.
- Depending on the size of the bearing, the temperature probe might take some time to register the first temperature increase.

### **IMPORTANT:**

The TMBH 5 can heat up components up to 200 °C (392 °F). Heating above this temperature (for example using Time Mode) can damage the heater.

#### **6.2.1 Temperature measurement**

- When the heater is not operating, the temperature of the workpiece can be measured by pressing MODE and START/STOP at the same time. Press any button to cancel the temperature measurement.
- The temperature probe is a valuable part of the heater. Treat it with care and after use we suggest that it is placed on the probe's parking spot front right side to avoid damages on it.
- The surface of the workpiece where the temperature probe is located should be clean, dry and flat. Measuring on dirty, wet or curved surfaces will give wrong temperature readings and may result in overheating the workpiece or even damaging the heater.
- When heating one component after another in warm environments or with very high temperature settings, the temperature probe might need some extra time to cool down before starting a new heating job. Error code E06 might be triggered then. If this happens, simply allow some cooling time on a cold surface.

#### **6.2.2 Change of temperature unit**

Press MODE and "+" at the same time to change in between °C to °F.

Once a heating cycle is completed, the temperature unit setting remains the same even after disconnecting the heater from the mains power.

## **6.3 Time mode**

This mode is suitable for batch production, when the time required to heat a workpiece to a given temperature is already known. It is also used in emergency cases when the temperature probe is missing or defective. The temperature of the workpiece must be then checked using an external thermometer, like a TKDT 10.

- If the user interface display shows °C or °F, press the MODE button to select Time Mode.
- Press + or – to adjust the time.
- Press the START/STOP button to start the heater. The display will show the remaining time.
- Whilst heating, the temperature measured by the probe (if attached) can be displayed by pressing the MODE button. When pressed again it displays the remaining time again.
- When the time has elapsed, the heating stops, and an acoustic signal is generated for 4 seconds.
- Remove the workpiece with proper handling equipment.
- The TMBH 5 is now ready to heat another workpiece with the same settings.

### **IMPORTANT:**

The TMBH 5 can heat up components up to 200 °C (392 °F). Do not use Time Mode to go above 200 °C (392 °F). Heating above these temperatures might damage the heater.

Do not leave the heater unattended in Time Mode.

## 6.4 Power level selection

The shape, weight, size and internal clearances, all affect to the time required to heat up a bearing. The large variety of bearings precludes the possibility of providing a specific power level setting for each type. Instead, the following guidelines are provided:

- In the case of shielded or sealed bearings with metallic inserts, a LOW POWER mode must be always selected. Light metallic rings can heat up much faster than the rest of the component. This might damage the bearing or the heater itself due to too high temperatures.
- In case of very small bearings a LOW POWER mode must be selected, otherwise the component heats up faster than what can be read by the temperature probe, the component might reach temperatures above the desired level.
- Select a low power setting when heating bearings with a tight internal clearance (C1 or C2) or preloaded bearings. Slow heating ensures that the bearing expands evenly, thereby preventing damage to the bearing. The low power modes can be selected by pressing the LOW POWER button. The display will indicate the power level selected.

## 7. Safety features

The TMBH 5 is equipped with the following safety features:

- Automatic overheating protection of the heater. The heater has a couple of temperature sensors to protect itself. In case that the temperature measured by them is too high, measures are automatically taken to stop this. For example, the heater might lower the power or stop. In any case, the user must monitor the process since too fast temperature increases might not be detected on time.
- Over current protection. The heater has a built-in fuse.
- Faulty temperature probe detection. In Temperature Mode, the heater will give an error and stop if no temperature increase is detected.

## 8. Troubleshooting

It might happen that you encounter a failure in the heater. If this happens, have a look to the following options:

- A system fault will be indicated by an acoustic signal and one of the following fault codes on the user interface display will be shown:

Error code	Fault	Action to fix it
E00	<b>Empty Clamp</b> - Clamp is open - Non ferromagnetic workpiece like aluminium or copper	- Close the clamp properly - Put the right workpiece in the clamp
E01	<b>Human Interface Failure</b> - Internal electronics or communication problem	- Return to reseller
E04	<b>Power electronics overheated</b> - Too intense use without time to cool down	- Remove workpiece - Switch off the heater to allow it to cool down. The error will be automatically cleared - Otherwise, return to reseller
E05	<b>Too slow temperature increase</b> - Temperature probe not attached to the component - Workpiece out of range (too big or heavy for heating capacity)	- Make sure that the thermocouple is mounted correctly (to a flat, clean surface)
E06	<b>Missing or Invalid Thermocouple</b> - Temperature probe not connected or damaged - Temperature probe removed during operation - Temperature probe still cooling down from a previous heating job.	- Check Thermocouple connection and wire damage - If damaged, use Time Mode and use an external thermometer - Do not remove the probe during operation - Allow some cooling time until temperature probe reading stabilization.
E07	<b>Power electronics failure</b> - Temperature sensor (power switches) failed. - Open/short circuit	- Reset the heater - Replace power print (send to reseller)
E08	<b>Mains supply voltage out of range</b> - Eventual voltage peak - Power supply out of tolerance (10%)	- Reset the heater - Check mains supply for correct level
E09	<b>Clamp Removed/disconnected</b> - Clamp cable, connector etc. damaged - Clamp not connected properly	- Connect the clamp properly - Replace the clamp
E010	<b>Environment temperature too high</b>	- Let the heater cool down - Use the heater in low power mode - Place the heater in right working conditions (0-40°C)
E013	<b>Config write failure</b> - Electronics problem	- Try to reset the heater, turn OFF and ON
E014	<b>Config read failure</b> - Electronics problem	- Try to reset the heater, turn OFF and ON

## 9. Warning labels and safety

Warning label	Meaning
	<b>Use heat protection gloves</b> In case of burning your fingers, get first aid help if necessary.
	<b>Risk of pinching your fingers</b> Special care needs to be taken into account when positioning components on the heater or transporting them.
	<b>Always read the instructions for use</b>
	<b>Electro-magnetic field radiation</b> The heater emits a magnetic field and a distance of 30cm (1ft) needs to be kept in between the user and the heater when heating.
	<b>Risk if metallic implants in the user's body</b> Due to the magnetic field, people with implants should take extra safety distance.
	<b>Hot surfaces</b> There are hot surfaces on the heater such as the heated element, but also the heater itself might get hot. Take the right preventive measurements.
	<b>Risk for people wearing pacemakers</b> Due to the magnetic field, people wearing pacemakers should take extra safety distance.

## 10. Spare parts

Designation	Description
TMBH 5-3	Temperature probe, magnetic K-type incl. cable 600 mm (23.6 in) and plug
TMBH 5-4	Heating clamp (incl. cable and plug)
TMBH 5-5	Bearing Stand
TMBA G11	Heat resistant gloves, one pair

## 11. Maintenance and disposal

- Store the heater in a dry area, with low humidity (0-95% non-condensing).
- Store and transport the heater within a temperature range of 0- 50 °C (32 - 122 °F).
- Keep the heater clean with a soft dry cloth. Remove all oil drippings that might remain after use.
- The heater does not require any specific maintenance nor regular calibration.
- Do not try to fix the heater yourself. Approach your SKF contact person or distributor if there is any malfunctioning or preventive repair needed.
- The heater is calibrated during production. If some repairs are performed, the heater needs to be recalibrated.
- In case of disposal of the heater, take the necessary measurements to recycle it. Do not dispose it in a general waste bin.



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