TM
INDUCTION HEATING

SURETHERM 5X User Manual

Note

Check delivery for possible damage caused by transport without delay. Should damage be detected, please inform carriers immediately.

As our products are subject to continuous improvement, we reserve the right to make changes.

CONTENTS

INDUCTION HEATING 1

SURE**THERM** induction heaters are used to heat rolling bearings. Other metal components forming a closed circuit such as bushings, shrink rings, pulleys and gears can also be heated. This will facilitate mounting where an interference fit is required.

Our range of standard heaters are designed to heat the workpiece to a maximum temperature of 240ºC (464°F). The heaters can be used on a continuous basis. Always place the temperature sensor on the workpiece to check the heating cycle. When heating an object using Time Mode, the heating cycle must be checked using an external temperature meter.

Bearings generally should only be heated to a maximum temperature of 120ºC (248ºF). Do not use induction heaters for bearings or workpieces with dimensions outside the ranges specified in this manual. Do not switch off the heater with the main switch while heating cycle is running.

OPERATING CONDITIONS

The heater is designed to be used in an industrial environment with an ambient temperature of 0°C to 40°C (32°F to 104°F) and an atmospheric humidity between 5% and 90%, non-condensing. The induction heater is intended for indoor use only.

SAFETY GUIDELINES 2

The operating instructions should always be followed when using an induction heater.

TM Induction Heating shall not be held liable for damages caused by improper handling or by use which does not comply with the designated purpose. Prerequisites for the operator: He/she must be authorised for use of the heater and must be familiar with the safety precautions.

In order to prevent danger or damage to the induction heater or workpiece, follow these guidelines:

- All repairs must be carried out by an official TM Induction Heating distributor.
- Use original spare parts only.
- Protect the heater from water and/or high humidity.
- Protect the heater core and yokes against corrosion, damage and deformation.
- Only preheat bearings to max. 120°C (248°F).
- To ensure proper operation of the device, it is important to provide the device with the latest software updates. A description can be found in chapter 5 - OPERATION, page 20 - USER MENU.

SAFETY PRECAUTIONS

- Since a magnetic field [4&5] is generated by the induction heater, people with a pace-maker [1] or other implant(s) [2] should not work or be in the immediate vicinity of the device. Other sensitive equipment such as wrist watches, magnetic carriers, electronic circuits, etcetera [3] might also be affected. The safety distance is 0.5 meters (19”).
- Use protective gloves as protection against burns to hands. The gloves delivered are suitable for use up to temperatures of 150°C (302°F).
- Hot surface, avoid contact [6].
- Do not operate an induction heater in areas where there is risk of explosion.
- Wear safety shoes [8].

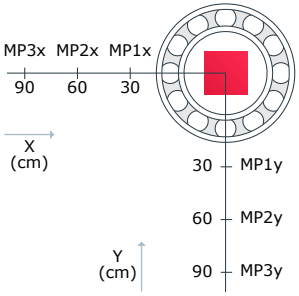
SAFETY INSTRUCTIONS

- The user should have an appreciation of the contents of this user manual, and be familiar with safe workshop practices.
- Follow the user manual at all times.
- Ensure that the induction heater operates at the correct supply voltage. If the heater is not supplied with a plug, changes should only be made by a qualified electrician.
- Do not use or store the heater in humid environments. The heater is designed for indoor use only.
- Use proper handling equipment, appropriate for the weight of the workpiece and/or yoke. Never support components with a metal cable or have any hanging in the proximity of the magnetic field. High currents can flow through the cable causing it to heat up quickly, resulting in a risk of burning.
- Do not place any metal objects near the yokes and poles.
- Place heater on a stable, horizontal surface.
- Keep a minimum distance of 1 metre (38”) to surrounding objects.
- Use only in well ventilated areas.
- Do not heat objects containing oil, grease or similar substances. Prevent possible generation of fumes and smoke.
- Do not inhale fumes or smoke from heated parts.
- Do not move or lift heater when warm after heating cycle.
- Do not touch the heater core during heating cycle.

SAFETY FEATURES

Should an error occur during the heating process, the induction heater will automatically stop. The corresponding error will be displayed on screen. In the case of user error, the display indicates what steps are to be taken to correct the problem. More information about the types of errors can be found in chapter 7 - MALFUNCTION.

An induction heater produces an electromagnetic field within a coil to transfer energy to a workpiece. The table below shows values of the flux density in microTesla (µT). These measurements can be used as a guide conforming to local regulations regarding the maximum time exposure to magnetic fields. Different configurations may give different values. It is impossible to provide values for all combinations as the variety of bearing types in combination with the different yokes is large.



Measurement position (cm)	B-field$_{total}$ (µT)
MP1x	81
MP2x	16
MP3x	1
MP1y	156
MP2y	27
MP3y	9

Total 50Hz RMS field for magnetic measurement results. Max. magnetic flux in safe exposure area, according to the German BG 11 Regulations is 423 µT.

SCOPE OF DELIVERY

1. SURETHERM 5X
2. Yoke(s)
3. Temperature probe
4. Heat-resistant gloves
5. Grease
6. User Manual
7. Voucher code extended warranty

INSTALLATION PROCESS

Ensure that supply voltage and current meet the specifications. These can be found on the type plate at the back of the induction heater.

Each induction heater is provided with a plug, but there are a large number of plug types. Should the plug not fit your power supply, a suitable plug must be affixed by a qualified electrician. Voltages may differ for customized heaters.

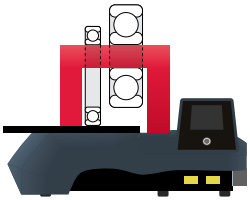
Voltage	Phase	Neutral	Ground
110-230V EU	Brown	Blue	Green/Yellow
110-230V US	Black	White	Green

Insert the plug into a shockproof wall socket and then connect the heater to mains electricity.

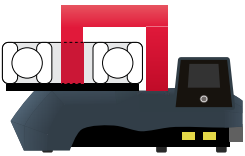
Turn main switch from 0 to 1. The heater will emit a short beep and the touchscreen displays the main menu. The induction heater is now ready for use.

SETTING UP THE WORKPIECE 4

The workpiece can be set up in two different ways and must never touch the housing. Small objects are to be heated in a vertical position.



VERTICAL

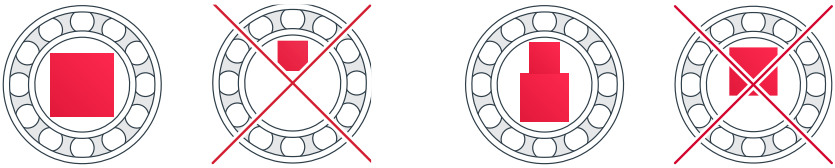


HORIZONTAL

- Use appropriate hoisting equipment for heavy components and yokes. Manual lifting of heavy objects is a common cause of injury.
- Wear safety shoes during these procedures.
- The weight of the work-piece should not exceed the maximum weight as shown in chapter 8. Exceeding these limits may result in catastrophic equipment failure and may also lead to personal injury.
- Ensure there is no contact between the mains cable and the workpiece. Damage to the cable may result in electrocution.
- Never support components with a metal cable and avoid metal cables hanging in the proximity of the magnetic field. Extremely high currents can flow through the cable causing it to heat quickly, resulting in risk of burning.

CHOOSING THE YOKE

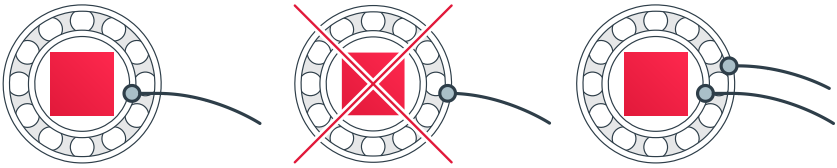
- Choose largest possible yoke which fits the diameter of the workpiece. Position the workpiece onto the yoke and place the yoke with the machine milled surface on the poles of the heater core.
- Always make sure that the workpiece avoids direct contact with the housing of the heater.



- When a heating cycle is completed, always wear heat-resistant gloves. The maximum temperature of the workpiece on a standard induction heater is 240°C (464°F).
- Always treat yokes carefully. Falling, bumping, etc. can damage the yoke and/or cause personal injury. Always store the yoke safely immediately after use.

POSITIONING THE MAGNETIC TEMPERATURE SENSOR(S)

- Always use the magnetic temperature probe (hereafter referred to as the 'probe') for heating in Temperature Mode or Ramp Mode.
- Place the probe on the workpiece, close to the bore. Make sure that the surface used for the probe is free of grease and/or oil.
- If the induction heater has two probes: place one close to the bore and the other on the outer ring.



- Our standard probes are suitable for operation up to a maximum temperature of 240°C (464°F). The connection between magnet and probe will break above the maximum temperature. If this occurs when operating in Temperature Mode, the heater will turn itself off as the probe will fail to register any increase in the temperature over a set period of time. Probes for higher temperatures are optional.
- Connect the probe by inserting the plug into the socket at the front of the heater, with the red dot facing upwards.

Treat the probe with care. It is a valuable part of the heater and can easily be damaged through careless handling. After use, we suggest that it be placed on the side of the vertical pole.

When the induction heater is turned on, the homescreen can show up to four buttons with different modes; Time Mode is always available. Temperature Mode (with 1 sensor) and Ramp Mode will be enabled when one sensor is inserted. An extra Temperature Mode (with 2 sensors) will be enabled when a second sensor (sold separately) is inserted.

The start/stop button is used for starting heating cycles in one of the modes, or to stop a heating cycle at any time.

When a heating cycle is complete, or stopped prematurely, the program will return to the main screen of the heating mode.

Every mode has three stages:

1. Preparation - The user can change the temperature and/or time.
2. Heating process - The induction heater starts the heating cycle.
3. Completion - The heating cycle has ended.

FOR MORE INFORMATION REGARDING HEATING MODES, VISIT OUR WEBSITE

USER MENU

The user menu can be accessed by pressing the start/stop button for 8 seconds. Within this menu the user can view and/or change the following settings:

U0 Reset to Factory Settings
Each user setting will be reset to its original factory values.

U1 Languages
The languages of the heater can be changed to English, Spanish, German, French, and Italian. More languages can be added later.

U2 Default Temperature (110°C)
The default temperature can be set. The factory set temperature is 110°C (230°F).

U3 Temp. Hold (On)
Temperature hold can be turned on or off. During pendulation the heater will heat to the set temperature and cools down by 3°C, then heats again to the set temperature, etc.

U4 Temp. Hold Duration (5:00)
The duration of the temperature hold can be set. With the factory set duration of 5:00 min the heater pendulates indefinitely.

U5 Completion Signal (On)
The buzzer can be turned on or off. When on the heater will buzz when it reaches the set temperature. The factory set value is 'on'.

U6 Temperature Unit (°C)
The temperature unit can be changed to Celsius or Fahrenheit. The factory set temperature unit is Celsius, Fahrenheit in the USA.

U7 Maximum Temp. Delta (50°C)
The max. temperature difference between the two sensors can be set. The factory set temperature difference is 35°C (122°F).

U8 Remote Control (Off)
The remote control function can be turned on or off. This setting is shown only when the remote has been included.

U9 Calibration Sensor 1
The temperature of sensor 1 can be set if it is calibrated incorrectly.

U10 Calibration Sensor 2
The temperature of sensor 2 can be set if it is calibrated incorrectly.

U12 Start Delay (5)
When the user starts the heating process there will be able to get to a safe distance. The factory set delay is 5 seconds.

U13 Date Format (DD/MM)
The Date Format can be set to Day/Month or Month/Day.

U14 Screensaver (0)
The settings for the screen saver can be set here, ranging from off (0) to a certain number of minutes.

U15 Time (HH:MM)
The current time can be set here. This information will be used when datalogging the heating cycle.

U16 Date (DD/MM)
The current date can be set here. This information will be used when datalogging the heating cycle.

U17 Year (YYYY)
The current year can be set here. This information will be used when datalogging the heating cycle.

U18 Time Format (24:00)
The Time Format can be set to 24:00 or AM/PM.

U19 Temp. Hold Hysteresis (3°C)
The max. temperature difference before the heater starts heating again can be set here.

U20 Auto Sensor Select (On)
When this setting is turned on the heater can recognize the difference between Sensor 1 and Sensor 2 and assign the order automatically.

U22 Time Range (MM:SS)
The Time Range can be switched between MM:SS (minutes and seconds) and HH:MM (hours and minutes). This Time Range setting will be applied to the available range when using Time Mode.

U24 Exit (Discard Changes)
Any recent adjustments will be discarded and the user returns to the homescreen.

U26 Update Firmware GUI
When a USB drive (containing an update for the User Interface) is inserted this option will show. Press and follow the on-screen instructions to update the heater.

U27 Update Firmware PWR
When a USB drive (containing an update for the Powerboard) is inserted this option will show. Press and follow the on-screen instructions to update the heater.

U28 Update Languages
When a USB drive (containing an update for texts) is inserted this option will show. Press and follow the on-screen instructions to update the Fonts and Texts.

U29 Cur. Version GUI
The current version of the User Interface is shown here.

U30 Cur. Version PWR
The current version of the Powerboard is shown here.

U31 Number of Cycles
The Number of Cycles shows the amount of heating cycles for the induction heater.

U32 Heating Timer
The Service Counter shows the total time (all heating cycles added together) for the induction heater.

MAINTENANCE 6

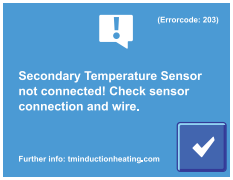
- Store in a dry, frost-proof area, free from humidity.
- Keep clean with a soft, dry cloth.
- Keep the display clean for optimal responsiveness and to avoid any scratches.
- Keep the contact parts of the heater core poles greased. Grease regularly with an acid-free grease for optimal contact and to avoid corrosion (in the case of heaters with a pivoting yoke, also grease the vertical pin regularly).
- CRITICAL SPARE PART - Magnetic probe. Always use original spare parts, we can not guarantee a proper functioning using other parts.

Proper maintenance and handling practices are critical. Failure to follow installation and maintenance instructions can result in equipment failure, creating a risk of serious bodily harm.

If in any doubt, isolate the induction heater and contact your local distributor. You can find the contact details for your nearest distributor on our website www.tminductionheating.com/distributors.

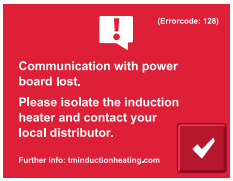
ERRORS

The induction heater can display two different kinds of errors: User errors (recognized by blue background) and Fatal errors (recognized by red background). The type of error message determines the difficulty of the action needed to make the induction heater function properly.



Most of the User errors are easy to solve, as the user interface will provide a suggestion for troubleshooting. The user should always end the troubleshooting by restarting the heater. If the error persists after troubleshooting the user can contact the local distributor. Contact details for the nearest distributor on www.tminductionheating.com/distributors.

Code	Error Message
E063	Operating temperature too high! Wait while heater cools down...
E082	Coil overheated. Wait until the heater has cooled down.
E200 / E203	Temperature Sensor not connected!
E200 / E203	Sudden temperature drop detected. Check if the Temperature Sensor is still attached to workpiece.
E202 / E205	No temperature increase detected. Check if the Temperature Sensor is still attached to workpiece.



Fatal errors cannot be resolved without contacting the local distributor, as the problem is caused by an internal hardware or software error. When encountering a Fatal error the user must note the Error-code (found in the top righthand corner) and the operating conditions. Operating conditions may contain a description of the part that has been heated, the heating mode that has been used, and any other relevant information.

Code	Error Message
E054	Internal protection against overcurrent. Contact distributor.
E235/ E236	Critical hardware defect. Circuit board(s) must be replaced. Contact distributor.
E242	Communication issue between circuit boards. Check flatcables.

SPECIFICATIONS 8

TECHNICAL DATA

Electricity	**Power rating**	2.3 kVA
	Voltage	110 - 230 V
	Current max.	10 A
	Frequency	50 / 60 Hz
Weight		12.5 kg (excl. yokes)
Max. weight workpiece		25 kg

CONTROLS

	Setting 1	**Setting 2**
1 Sensor Mode	0 - 240°C	Power 5 - 100%
Ramp Mode	5 - 240°C	0:00 - 99:59 (mm:ss / hh:mm)
2 Sensor Mode	0 - 240°C	ΔT 20 - 50°C
Time Mode	0:00 - 30:00 (mm:ss)	Power 5 - 100%

YOKES

Min. Bore	Yoke Size
ø10	7 x 7 x 200
ø15	10 x 10 x 200
ø20	14 x 14 x 200 *
ø35	25 x 24 x 200
ø40	30 x 26 x 200 *
ø55	40 x 38 x 200

* = Default

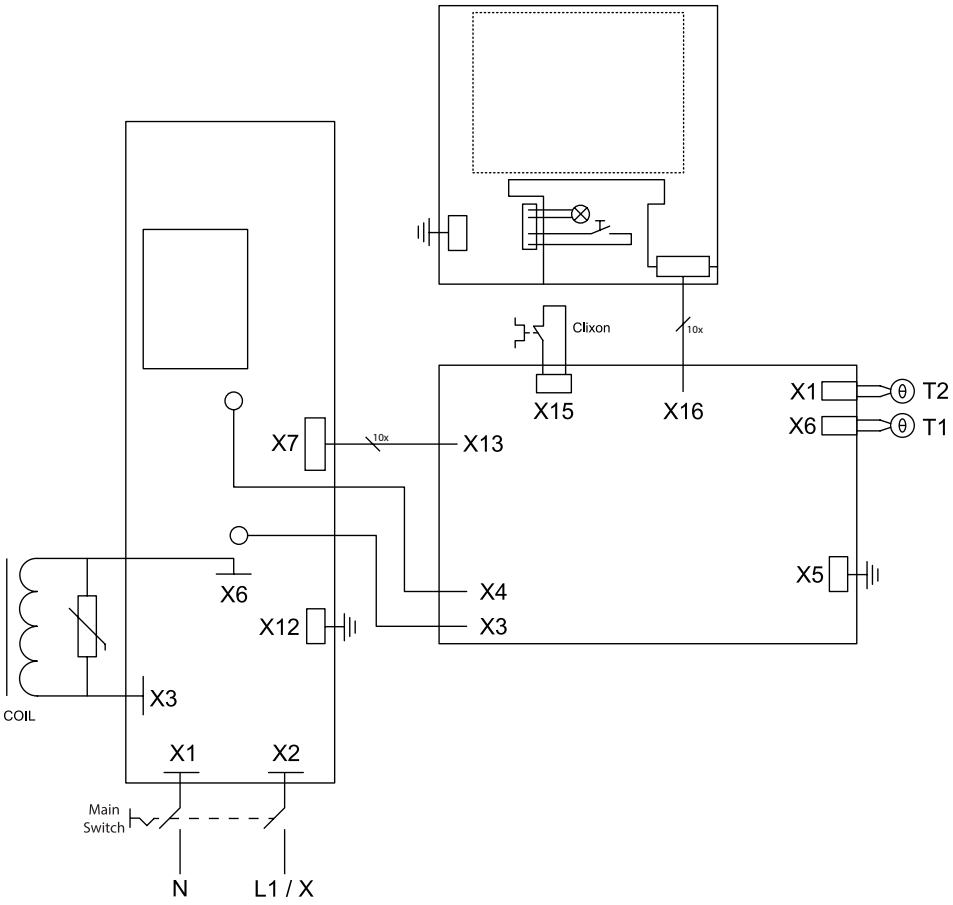
Ext. yokes (lxwxh)	40 x 50 x 75

ADDITIONAL INFORMATION

External interface	USB 2.0 Port
Sound signal	Buzzer
Demagnetizing	<2A/cm
Temperature hold	Yes
Thermal safety guard coil	Yes
Magnetic probe	2 sensors

Warranty	24 months
Extended Warranty	+ 12 months

ELECTRICAL DRAWING



STATEMENT OF CONFORMITY 9

TM Induction Heating consistently provides products that meets customer and applicable statutory and regulatory requirements. ISO 9001:2015 specifies the requirements for a quality management system.

ISO 9001:2015
ID 9000001589
www.tuv.com

A properly issued Declaration of Conformity has been established in order to ensure the quality of SURETHERM induction heaters. This declaration indicates that the product meets the requirements of the directives which are applicable. The SURETHERM induction heaters are manufactured in accordance with European regulations; CE compliant. As CE marking is a mandatory conformity marking for products sold within the European Economic Area these declarations do not cover any regions outside Europe. However, these declarations do ensure the quality of TM Induction Heating products.

DECLARATION OF CONFORMITY

Manufacturer	TM Induction Heating
Address	Nobelstraat 14
	3846 CG Harderwijk
	The Netherlands

We hereby declare that the supplied version of

Product	Induction heater
Type	**SURETHERM 5X**

This product complies with technical standards specifications as defined by MACHINE DIRECTIVE 2006/42/EC, LOW VOLTAGE DIRECTIVE 2014/35/EU and EMC DIRECTIVE 2014/30/EU.

In conjunction with the following harmonized standards and where appropriate other technical standards and specifications:

Risk Assessment	EN-ISO 12100:2010
Design & Manufacture	EN-IEC 61000-4-6:2007/A1:2011
	EN-IEC 60204-1:2006/C11:2010
	NEN 3140/A1:2015

Name	Mr. E. van Dijk
Function	General Manager
Signature	

NOTES

WEB tminductionheating.com

MAIL info@tminductionheating.com

TEL +31 (0) 341 434454

FAX +31 (0) 341 434464