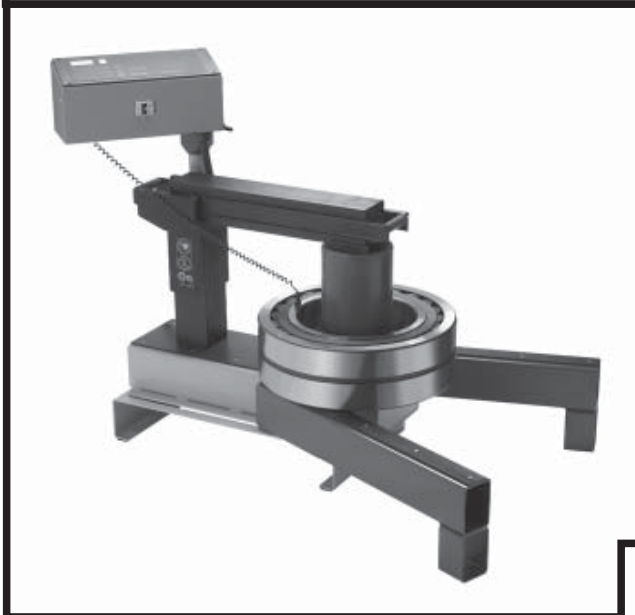




# Induction Heater **IH 240**

**Bedienungsanleitung**  
**Instruction for use**  
**Mode d'emploi**  
**Manuale d'istruzioni**  
**Manual de instrucciones**



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# EU-Declaration of Conformity

We, simatec ag  
Stadthof 2  
CH-3380 Wangen a. Aare

declare that the

## **Induction Heater simatherm IH 240**

is designed and manufactured in accordance with  
EUROPEAN LOW VOLTAGE DIRECTIVE 73/23/EEC  
EMC NORM 89/336/EEC

The following norms are used:

Harmonized Norms:

EN 60519-3 :1996  
EN 55011  
EN 61000-6-2  
EN 61000-3-3/3

National Norms:

VDE 0721

Wangen a. Aare, 2005-02-01

Mischa Wyssmann  
Managing Direktor / CEO

## Safety recommendations

- Because the IH 240 generates a magnetic field, people wearing a pacemaker must not be within five meters of the IH 240 during operation. Electronic equipment, such as wristwatches, may also be affected.
- Follow the operating instructions at all times.
- Be certain that the voltage supply is correct.
- Electrical arcing may occur when a potential difference exists between the IH 240 and the workpiece. This is not dangerous to human beings and will not cause damage to the IH 240 or the workpiece. However, the IH 240 must never be used in areas where there is a risk of explosion.
- Do not expose the heater to high humidity.
- Never operate the IH 240 without a yoke in position.
- Do not modify the IH 240.
- Use proper handling equipment when lifting heavy workpieces.
- Avoid contact with hot workpieces. Wear the supplied heat resistant gloves to handle hot workpieces.

# 1 Introduction

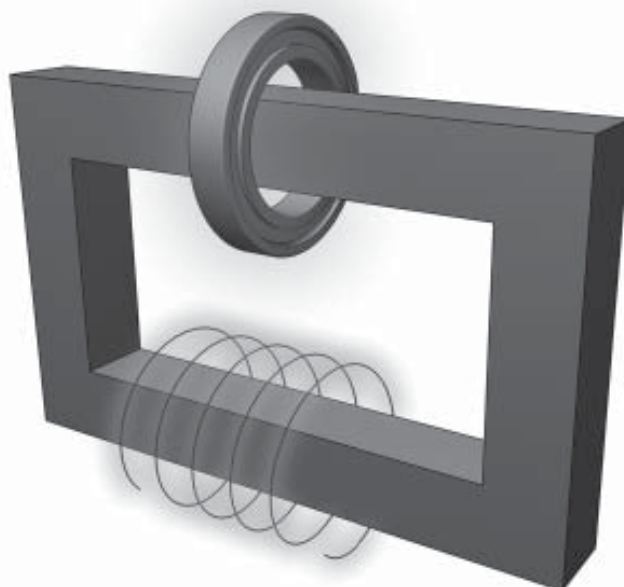
The simatec IH 240 induction heater is designed to heat bearings that are mounted with an interference fit onto a shaft. The heat causes the bearing to expand, which eliminates the need to use force during installation. A 90 °C temperature difference between the bearing and shaft is generally sufficient to enable installation. At an ambient temperature of 20 °C, the bearing must therefore be heated to 110 °C.

## 1.1 Intended use

The IH 240 has been designed to heat rolling bearings. However, other metal workpieces that form a closed circuit can also be heated. Examples of acceptable workpieces include bushings, shrink rings, pulleys, and gears. All bearings that fit over the inductive coil and between the vertical supports with the sliding yoke in place can be heated using the IH240. In addition, smaller bearings can be placed over the sliding yoke. See the illustration at the beginning of this manual for example.

## 1.2 Principle of operation

The IH 240 generates heat by means of a large electrical current that is magnetically induced in the workpiece by a coil within the heater. The high voltage, low current electricity flowing through the large number of windings in the inductive coil induces low voltage, high current electricity in the workpiece. Because the workpiece has the electrical characteristics of a coil with a single, short-circuited winding, the high current generates heat within the workpiece. Because the heat is generated within the workpiece, all of the heater components remain cool.



## 2 Description

The heating cycle is electronically controlled either in a TIME MODE, where the heating time is selected, or in a TEMP MODE where the desired temperature is selected.

The heater can further be run on 50% capacity when small yokes are used or when there is a risk for too quick heating of sensitive workpieces (e.g. bearings with C1 or C2 clearance).

### 2.1 Components

The induction heater consists of a U-shaped iron core with a large induction coil on one of its legs. The control electronics sits in a separate control box on top of the heater.

The temperature is controlled by means of a magnetic probe.

## 2.2 Technical data

Voltage ( $\pm 9\%$ )	400 V / 50 Hz 460 V / 60 Hz 575 V / 60 Hz
Recommended circuit protection	63 A circuit breaker
Power consumption (maximum)	24 kVA (400 V / 50 Hz) 24 kVA (460 V / 60 Hz) 24 kVA (575 V / 60 Hz)
Temperature control	0–250 °C, in steps of 1°
Probe maximum temperature	250 °C
Time mode	0–60 minutes, in steps of 0.1 minute
Power reduction	50%
Demagnetisation, automatic	Residual magnetism < 2 A/cm
Overall dimensions	750 x 400 x 935 mm
Area between supports	330 x 355 mm
Coil diameter	186 mm
Weight (with yokes)	300 kg
Workpiece maximum weight	1200 kg
Maximum heating temperature	ca. 400 °C
Standard yoke dimensions	100 x 100 x 570 mm (for $\varnothing$ of 142 mm)

## 3 Installation of main plug

Due to the many types of mains plugs, no mains plug is supplied with the IH 240. A qualified electrician must install a suitable mains plug. The correct supply voltage is shown in section 2.2. The wires should be connected as follows:

Colour of IH 240 wire	Mains supply terminal
yellow / green	ground
brown	phase 1
blue	phase 2

Connect the IH 240 to only two of the three phases. Verify that the correct circuit breaker is installed. See section 2.2 for circuit breaker specifications.

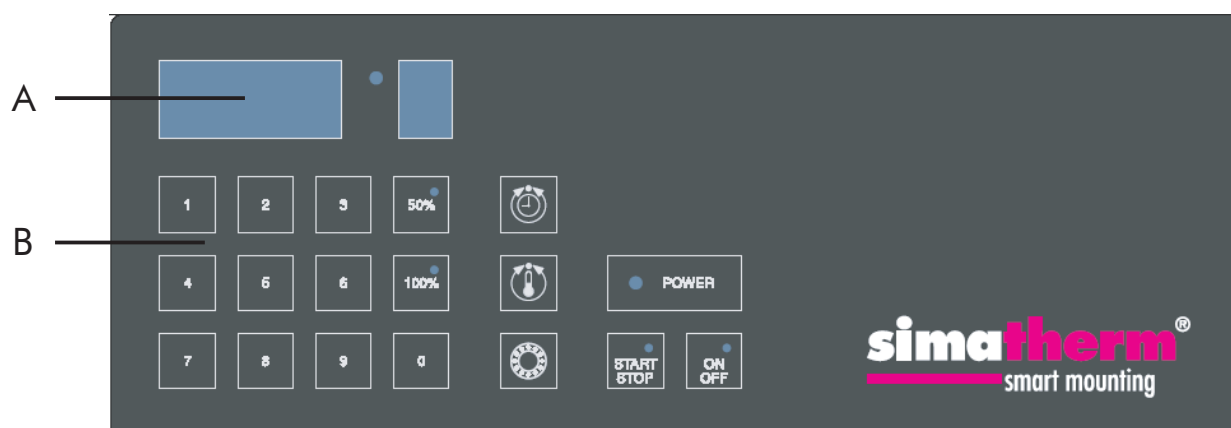


## 4 Preparation for use

- Place the IH 240 in the horizontal position on a stable surface.
- Connect the mains plug to a suitable mains supply.
- For workpieces with an internal diameter large ( $> 186\text{mm}$ ) enough to fit over the inductive coil, follow these steps:
  - Place the workpiece over the inductive coil using appropriate lifting equipment.
  - For best performance, adjust the position of the workpiece so that the inductive coil is in the centre.
  - If the sliding yoke is not installed on the IH 240, follow the steps shown in the illustrations at the beginning of this manual. Remove the protective film from the bright underside of the sliding yoke before the first use.
  - Slide the sliding yoke to the right so that it completely covers the top of both vertical supports.
- For workpieces that do not fit over the inductive coil, should be heated on the horizontal yoke.
- If you will use TEMP MODE, plug the temperature probe into the connector on the left side of the heater. Place the magnetic end of the probe on the inner ring of the bearing or on the innermost surface of the workpiece.
- Switch the IH 240 on using the power switch on the left side.

## 5 Operation

### 5.1 Function of displays



A) The main display shows the selected time or temperature for heating.

Display	Indication
t	time in minutes
°C	temperature in degrees Celsius
°F	temperature in degrees Fahrenheit

B) The power display shows the selected power setting.

### 5.2 Function of buttons

Button	Function
POWER	control lamp for main switch on
TIME	TIME MODE
TEMP	TEMP MODE
BEARING	BEARING MODE - recommended heating temperature for bearings of 110°C (230°F) is automatically selected.
START/STOP	To start and stop heating.
ON/OFF	Press to start or stop the heater.
50%	Power reduced to 50%.
100%	Full capacity.

### 5.3 Temp mode

- Select TIME MODE. The main display shows °C or °F in TEMP MODE.
- The selected temperature is shown on the main display. The default temperature for bearings is 110 °C (230 °F). If a different temperature is desired, adjust the temperature on the main display.
- It may be desirable to heat bearings to temperatures above 110 °C for increased mounting time. Consult the bearing specifications to determine the maximum permitted temperature. Always ensure the bearing doesn't lock due to an excessive expansion of the inner ring compared to outer ring. See section 5.8.
- Spherical Roller Bearings (SRBs) are subjected to a special heat treatment. These bearings can be operated at temperatures as high as 200 °C. Heating these bearings above 110 °C will not cause any damage as long as the bearing is still able to rotate. For other bearings, a temperature of 125 °C must not be exceeded unless otherwise specified.
- Press the 50% key to reduce the POWER to 50%. Use the guidelines in section 5.8 to determine the correct power setting.
- Press START/STOP to start the heater. The main display shows the current temperature of the workpiece.
- When the selected temperature has been reached, the heater demagnetises the workpiece, switches off, and generates an acoustic signal for 10 seconds or until START/STOP is pressed.
- Press START/STOP to stop the heater.
- Remove the workpiece with proper handling equipment.
- If the workpiece remains on the heater, the heater will start again when the temperature of the workpiece drops 10 °C (18 °F). Press START/STOP to stop the heater and demagnetise the workpiece.
- The IH 240 is now ready to heat another workpiece with the same settings.

## 5.4 Time mode

- Select TIME MODE. The main display shows 't' in TIME MODE.
- Set desired heating time by adjusting on the main display.
- Press 50% to reduce the POWER to 50%. Use the guidelines in section 5.8 to determine the correct power setting.
- Press START/STOP to start the heater. The main display shows the time that remains.
- When the time has elapsed, the heater demagnetises the workpiece, switches off, and generates an acoustic signal for 10 seconds.
- Press START/STOP to cancel the acoustic signal and stop the heater.
- Remove the workpiece with proper handling equipment.
- The IH 240 is now ready to heat another workpiece with the same settings.

## 5.5 Temperature measurement

When the heater is not operating, the temperature of the workpiece can be measured by pressing 0 and TEMP at the same time.

The LED on the START/STOP button flashes during temperature measurement. Press START/STOP to cancel temperature measurement.

## 5.6 Change of temperature unit

Press 0 and BEARING at the same time to switch between °C and °F. The temperature unit setting remains the same even after disconnection from mains power.

## 5.7 Demagnetisation

The workpiece is automatically demagnetised when heating is complete. Demagnetisation will not occur if the power is interrupted or the main switch is switched off. To use the IH 240 for demagnetisation only, select TIME MODE and set the time to 0.1 minute (6 seconds).

## 5.8 Power level selection

When heating bearings with an induction heater, most of the heat will be generated in the inner bearing race. The heat will then be transferred through the bearing. It is therefore important that bearings with small internal clearance or slight preload are heated slowly. Slow heating ensures that the bearing expands evenly, thereby preventing damage to the bearing.

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

- For sensitive bearings (including bearings with C1 or C2 internal clearance) or bearings with brass cages and when using the small yoke, reduce the power to 50%.

## 6 Safety features

The IH 240 is equipped with the following safety features:

- Main switch with overcurrent circuit breaker
- Automatic overheating protection
- Automatic current control
- In the TEMP MODE the heater will switch off if the temperature probe does not register a temperature increase of 1° every 30 seconds. To increase the interval to 60 seconds, press MODE and DOWN at the same time.

## 7 Troubleshooting

A system fault will be indicated by an acoustic signal and one of the following fault codes on the main display:

Display	Fault	Action
E00 E	Electronic failure	Return heater for repair
E01 E	Electronic failure	Return heater for repair
E02 E	Electronic failure	
E03 E	Overheated coil	Wait until the inductive coil cools
E04 E	Selected time/temperature out of range	Re-program
E05 E	Temperature increases of less than 1° every 30 seconds (or 1° every 60 seconds)	Check the temperature probe connection. If the connection is OK, select the 60 second interval as described in section 6 or operate the heater in TIME MODE.
E06 E	Temperature probe not connected (or defective)	Check the temperature probe
E07 E	Failure during current measurement	Return heater for repair

## 8 Spare parts

IH 240-1	Printed circuit board
IH 240-2	Yoke 100 x 100 x 570 mm
IH 240-3	Yoke 65 x 65 x 570 mm
IH 240-5	Thyristor
IH 240-6	Thyristor protection board IH 240
IH 240-7	Main switch IH 240
IH 240-10	Set support yoke 100 x 100 x 150 mm
IH 240-11	Set support yoke 100 x 100 x 370 mm
IH P1	Temperature probe