

SKF Induction Heaters

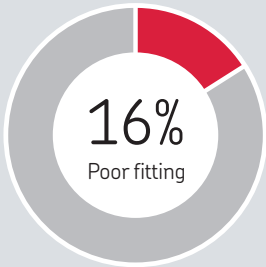
A comprehensive range for bearings and other workpieces



It's a fact.

Incorrect mounting methods account for up to 16% of premature bearing failures

Main causes of premature bearing failures



To reduce the risk of incorrect mounting, SKF helped pioneer the use of portable induction heaters for bearing mounting applications in the 1970's. Since that time, there have been many advances in technology and SKF has been at the forefront in developing safer, more efficient and user-friendly bearing induction heaters.

SKF Induction Heaters utilise advanced power electronics with application specific designs for high performance.

As a result, by using an SKF induction heater, the total cost of ownership is often significantly lower. Ergonomics and safety are also an important consideration for operators. SKF induction heaters are equipped with design features that make them easy to use and safe. Bearing support arms reduce the risk of the bearing toppling during heating, and ergonomically designed yokes help reduce operator fatigue. In addition, the unique remote control enables the operator to control the heater at a safe distance from the hot bearing, enhancing operator safety.

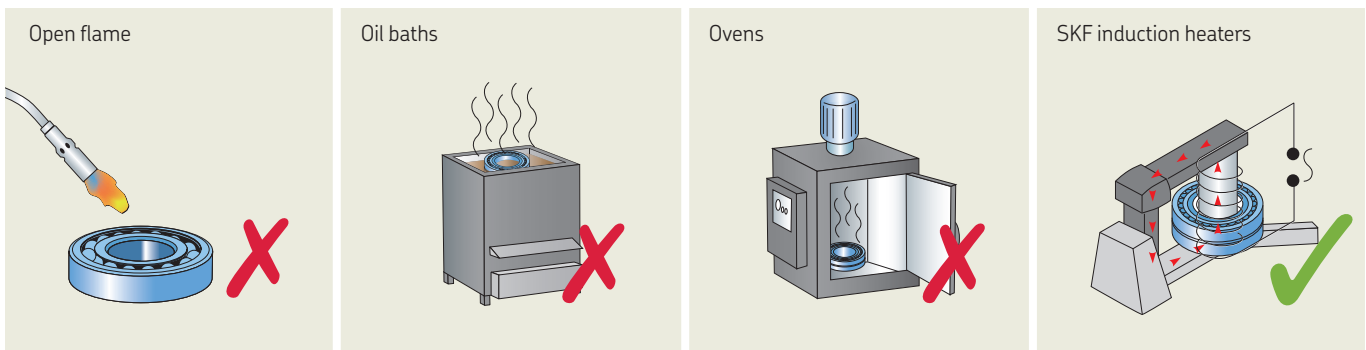
Induction heating has many advantages over other bearing heating methods

The use of an open flame to heat a bearing is not only inefficient and uncontrolled, but often leads to bearing damage. This method should not be used.

Oil baths are sometimes used to heat bearings. Oil baths often take a long time to reach the required temperature and can be difficult to control the actual bearing temperature. The energy consumption of an oil bath is also significantly greater than using an induction heater. The risk of contaminating the bearing due to dirty oil is significant and can lead to premature bearing failure. Handling hot, oily and slippery bearings present significant hazards to the operator and great care must be taken to avoid potential injuries.

Ovens and hot plates are often used for batch heating of small bearings and this is an acceptable technique. However, for larger bearings, the use of ovens and hotplates is generally quite inefficient and time consuming and can present the operator with significant handling hazards.

Induction heaters are the modern, efficient and safe way to heat bearings. In operation, they are generally faster, cleaner, more controllable, and easier to use than other heating methods.





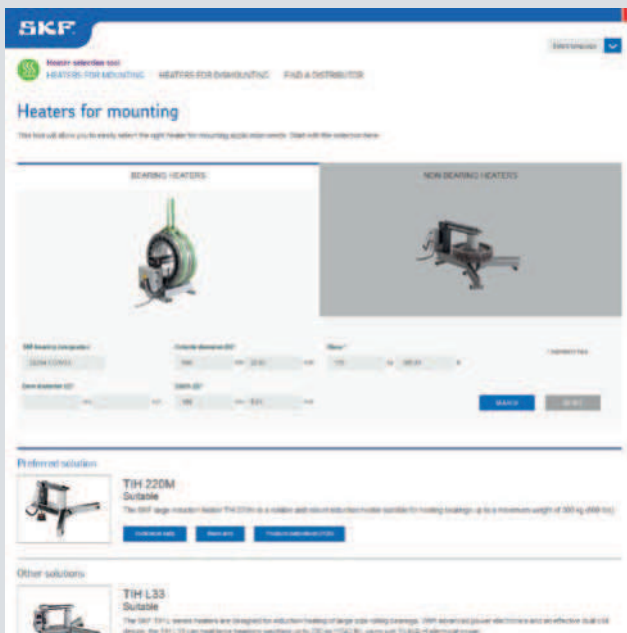
Thermostat controlled bearing heating

SKF Electric Hot Plate 729659 C

The SKF 729659 C is a heating device especially designed for pre-heating batches of small bearings prior to mounting. The temperature of the plate can be adjusted to provide temperatures between 50 and 200 °C (120 and 390 °F). The flat heating surface ensures even bearing heating and the cover helps retain heat and keep contaminants out.

Technical data

| | | | |
|--------------------------|--------------------------------|---|--|
| Designation | 729659 C 729659 C/110V | | |
| Voltage | 729659 C | 230 V (50/60 Hz) | |
| | 729659 C/110V | 115 V (50/60 Hz) | |
| Power | 1 000 W | | |
| Temperature range | 50–200 °C (120–390 °F) | | |
| Plate dimensions (l × w) | 380 × 178 mm (15 × 7 in.) | | |
| | Height of cover | 50 mm (2 in.) | |
| | Overall dimensions (l × w × h) | 390 × 240 × 140 mm (15.4 × 9.5 × 5.5 in.) | |
| | Weight | 4,7 kg (10 lb) | |



www.mapro.skf.com/heatersselect

Heater selection tool

The online heater selection tool helps to select the most appropriate SKF heater for a given hot mounting or dismantling application of bearings or annular workpieces.

In just three easy steps, you can define your heating application and receive a list of all suitable heaters for that application, including a recommendation of the heater that offers the best price-performance ratio.

The online heater selection tool is available free of charge, just scan the QR code or visit us on www.mapro.skf.com/heatersselect

The heater selection tool supports all mounting and fixed size EAZ dismantling heaters and offers additional information such as the product data sheet, technical data and product websites for each heater. If you cannot find the right heater for your application or you need more information, please don't hesitate to contact SKF.

The online heater selection tool is available in 8 languages: English, French, German, Spanish, Italian, Portuguese, Russian and Chinese.

A portable solution for bearing heating

Portable induction heater TWIM 15

The SKF portable induction heater TWIM 15 is designed to heat up roller bearings that are mounted with an interference fit onto a shaft. Heating the bearing causes it to expand, which eliminates the need to use force during installation. Generally, using the TWIM 15 to generate a 90 °C (162 °F) temperature difference between the bearing and shaft is sufficient to enable installation. In addition, the TWIM 15 can be used to heat other ring-shaped, metallic components, providing flexibility of use.



Utilizing electrical power, the TWIM 15 features glass-fiber, high-temperature-resistant plastic construction that allows a low temperature difference between the inner and outer rings of the bearing. This helps to reduce internal tensions that are generated due to excessive thermal expansion of the inner ring compared to the outer ring.

The unit has a user-friendly LED control panel that requires no special training and is simple to understand. The panel is used to regulate temperature and also indicates that the TWIM 15 is operational.

TWIM 15 advantages:

- Innovative heating of bearings
- Portable, compact and lightweight
- No support yokes required
- Automatic temperature monitoring
- Detects bearing size and heats appropriately
- Different power levels
- User-friendly LED control panel
- Quiet operation



TWIM 15-BAG

Carry your TWIM 15 induction heater in a convenient way

Features:

- Excellent fit for the TWIM 15
- Made of sturdy materials
- Inner pockets for accessory storage
- Shoulder strap for easy carrying
- Compact design

Versatile

Because of the induction plate's flat shape, a support yoke is not needed. This increases the type of components that can be heated on the plate and also reduces the number of required accessories.

Portable

Due to the medium-frequency technology used and choice of materials, the heater is lightweight. Also, the built-in handle makes it convenient to transport, and it can be stored easily.

Innovative heating

Utilizing smart construction and operating software, the heater produces a low temperature difference between the inner and outer ring of the bearing. This reduces the internal tensions generated due to excessive thermal expansion of the inner ring compared to the outer ring.



Power regulation

Featuring different power settings, the TWIM 15 can heat sensitive components at a slower pace. Also, a non-bearing power configuration is possible where most of the power is focused on the bore of the component.

Quiet

Using medium-frequency technology to heat components does not generate noise. An LED indicates when the TWIM 15 is heating, even if you cannot hear it! In parallel, a cooling fan might be heard to help the heater's electronics to stay cool.

Technical data

| | | | |
|---|--|--------------------------|--|
| Designation | TWIM 15 | | |
| Application ¹⁾ | | Max. current consumption | TWIM 15/230 V: 10 A TWIM 15/110 V: 16 A |
| Bearing weight range ²⁾ | 0,5 kg (1,1 lb) - 20 kg (44 lb) | Temperature control | 20-200 °C (68-392 °F) |
| Min. bearing bore diameter | 30 mm (1.18 in.) | Demagnetisation | The heater does not magnetise |
| Max. bearing outer diameter | 320 mm (12.6 in.) | Dimensions (w x d x h) | 450 x 500 x 100 mm (17.7 x 19.7 x 3.9 in.) |
| Max. bearing width | 85 mm (3.35 in.) | Total weight | 6,6 kg (14.6 lb) |
| Performance examples (bearing, weight, temperature, time) | 6320: 7,1 kg (15.7 lb), 110 °C (230 °F), 5 min 20 s 22320 CC/W33: 12,8 kg (28.2 lb), 110 °C (230 °F), 12 min 35 s | | |
| Maximum power | TWIM 15/230 V: 2,3 kVA TWIM 15/110 V: 1,8 kVA | | |
| Voltage and frequency | TWIM 15/230 V: 230 V, 50/60 Hz TWIM 15/110 V: 110 V, 50/60 Hz | | |

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.

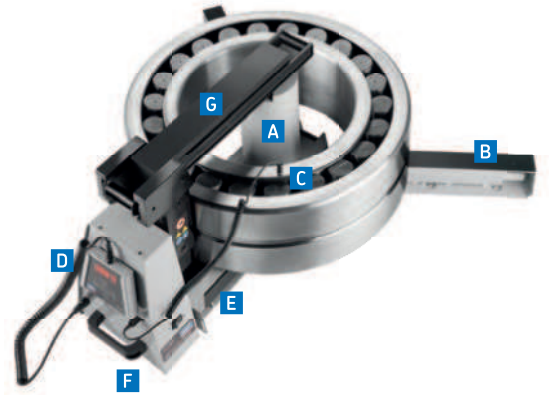
²⁾ Depending on the geometry of the bearing, maximum heating temperature and power availability.

TIH series

Features and benefits

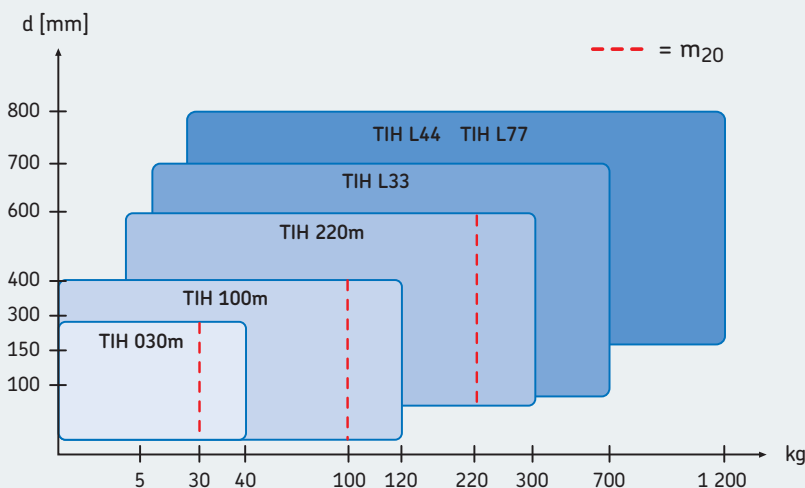
The comprehensive SKF induction heater range can be used for efficiently heating bearings and workpieces, both large and small. Their innovative design offers significant advantages to both owners and operators:

- Advanced power electronics, with accurate electric current control, help control the temperature rate increase
- Two step power setting option (50% / 100%), enables small bearings to be heated safely and at a lower power consumption
- For heating components other than bearings, all heaters are equipped with a heating time mode and for large components, optimized TIH MB heaters for solid workpieces are available
- Thermal overheating protection reduces the risk of damage to the induction coil and electronics, enhancing reliability and safety
- Automatic demagnetisation reduces the risk of ferrous debris contamination after heating
- Available in different voltage variants, to suit most operating voltages worldwide
- Supplied with heat-resistant gloves for improved operator safety



- A** Induction coil located outside the heater's housing enables a shorter heating time and lower energy consumption
- B** Foldable bearing support arms allow larger diameter bearings to be heated, and reduce the risk of the bearing toppling during heating
- C** Magnetic temperature probe, combined with a temperature mode pre-set at 110 °C (230 °F), helps prevent bearing overheating
- D** Unique SKF remote control, with operating display and control panel, makes the heater easy and safe to use
- E** Internal yoke storage, for smaller yoke(s), reduces the risk of yoke damage or loss
- F** Integrated carrying handles allow for easy movement of the heater in the workshop
- G** Sliding or swivel arm allows for easy and quick bearing replacement, reducing operator fatigue (not for TIH 030m)

SKF induction heater range



The comprehensive range of SKF induction heaters is suitable for most bearing heating applications. The chart gives general information on choosing an induction heater for bearing heating applications¹⁾.

The SKF m₂₀ concept represents the weight (kg) of the heaviest SKF spherical roller bearing of series 231 which can be heated from 20 to 110 °C (68 to 230 °F) in 20 minutes. This defines the heater's power output instead of its power consumption. Unlike other bearing heaters, there is a clear indication of how long it takes to heat a bearing, rather than just the maximum bearing weight possible.

¹⁾ For heating components other than bearings, SKF recommends consideration of TIH L MB series heater. Contact SKF to help you select a suitable induction heater for your application.



Small induction heater with a 40 kg bearing heating capacity

TIH 030m

- Compact lightweight design; just 21 kg (46 lb), facilitating portability
- Capable of heating a 28 kg (62 lb) bearing in just 20 minutes
- Supplied standard with three yokes, allowing bearings with a bore diameter from 20 mm (0.8 in.) up to a maximum weight of 40 kg (90 lb) to be heated



Medium induction heater with a 120 kg bearing heating capacity

TIH 100m

- Capable of heating a 97 kg (213 lb) bearing in less than 20 minutes
- Supplied standard with three yokes, allowing bearings with a bore diameter from 20 mm (0.8 in.) up to a maximum weight of 120 kg (264 lb) to be heated
- Swivel arm for large size yoke



Large induction heater with a 300 kg bearing heating capacity

TIH 220m

- Capable of heating a 220 kg (480 lb) bearing in just 20 minutes
- Supplied standard with two yokes, allowing bearings with a bore diameter from 60 mm (2.3 in.) up to a maximum weight of 300 kg (660 lb) to be heated
- Sliding arm for large size yoke

| Technical data | TIH 030m | TIH 100m | TIH 220m |
|---|---|---|--|
| Designation | TIH 030m | TIH 100m | TIH 220m |
| Max. bearing weight | 40 kg (88 lb) | 120 kg (264 lb) | 300 kg (662 lb) |
| Bore diameter range | 20–300 mm (0.8–11.8 in.) | 20–400 mm (0.8–15.7 in.) | 60–600 mm (2.3–23.6 in.) |
| Operating area (w × h) | 100 × 135 mm (3.9 × 5.3 in.) | 155 × 205 mm (6.1 × 8 in.) | 250 × 255 mm (9.8 × 10 in.) |
| Coil diameter | 95 mm (3.7 in.) | 110 mm (4.3 in.) | 140 mm (5.5 in.) |
| Standard yokes (included) to suit bearing/workpiece minimum bore diameter | 65 mm (2.6 in.) 40 mm (1.6 in.) 20 mm (0.8 in.) | 80 mm (3.1 in.) 40 mm (1.6 in.) 20 mm (0.8 in.) | 100 mm (3.9 in.) 60 mm (2.3 in.) |
| Performance example (bearing, weight, temperature, time) | 23136 CC/W33, 28 kg, 110 °C, 20m | 23156 CC/W33, 97 kg, 110 °C, 20m | 23172 CC/W33, 220 kg, 110 °C, 20m |
| Max. power consumption | 2,0 kVA | 3,6 kVA (230 V) 4,0–4,6 kVA (400–460 V) | 10,0–11,5 kVA (400–460 V) |
| Voltage ¹⁾ | TIH 030m/110 V TIH 030m/230 V – | – TIH 100m/230 V TIH 100m/MV | – TIH 220m/LV TIH 220m/MV |
| Temperature control ²⁾ | 20 to 250 °C (68 to 482 °F) | 20 to 250 °C (68 to 482 °F) | 20 to 250 °C (68 to 482 °F) |
| Demagnetisation according to SKF norms | <2 A/cm | <2 A/cm | <2 A/cm |
| Dimensions (w × d × h) | 460 × 200 × 260 mm (18.1 × 7.9 × 10.2 in.) | 570 × 230 × 350 mm (22.4 × 9 × 13.7 in.) | 750 × 290 × 440 mm (29.5 × 11.4 × 17.3 in.) |
| Total weight (incl. yokes) | 20,9 kg (46 lb) | 42 kg (92 lb) | 86 kg (189 lb) |

¹⁾ Some special voltage versions (e.g. 575V, 60 Hz CSA ready) are available for specific countries. For additional information, please contact your local SKF authorised distributor.

²⁾ Maximum heating temperature capacity depends on the weight and geometry of the bearing or workpiece. The heaters can achieve higher temperatures, please contact SKF for advice.

TIH L series

The SKF TIH L series heaters are characterized by a high heating power and large size. They are the continuation of the TIH series for heating large size bearings. All heaters are equipped with sliding yokes, dual coil design and advanced power electronics. The frame of the heater allows easy transportation by fork lift. The key differences between heaters in the TIH L range are heating power and operating area.



Large induction heater with a 700 kg bearing heating capacity

TIH L33

- Using just 15 kVA of electrical power, the TIH L33 can heat large bearings up to 700 kg (1 543 lb)
- Two optional yokes available for smaller bearing diameters.
- Available in 230 and 400V executions.

Extra-large induction heater with a 1 200 kg bearing heating capacity

TIH L44

- Using 20 kVA of electrical power, the TIH L44 can heat large bearings up to 1 200 kg (2 600 lb)
- One optional yoke available for smaller bearing diameters.
- Available in 230 and 400V executions.

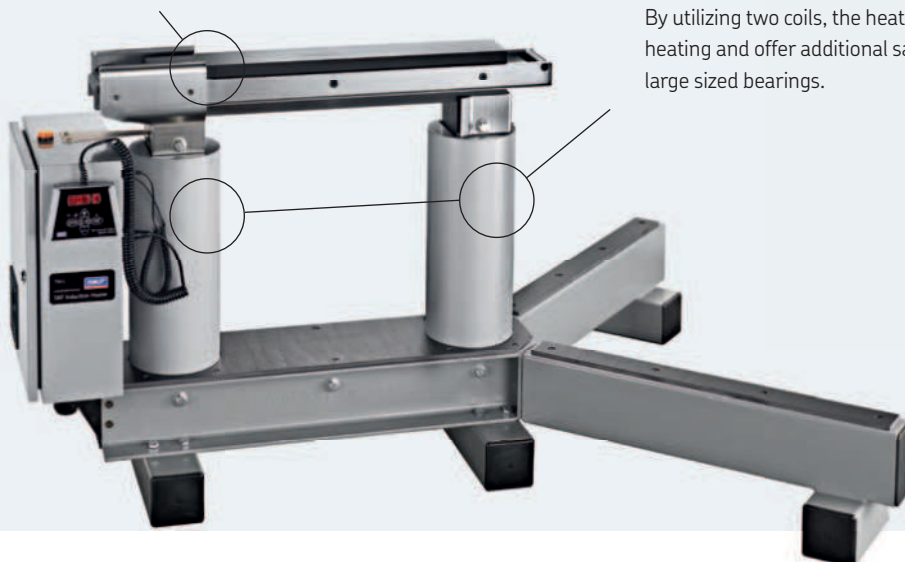
Extra-large induction heater with expanded operating area

TIH L77

- Extra-large induction heater with expanded operating area
- Using 20 kVA of electrical power, the TIH L77 can heat large bearings up to 1 200 kg (2 600 lb)
- Extra-large operating area for special bearing and component sizes

The sliding yoke is a robust mechanism to easily and safely move the yoke. The sliding rails are very durable and prevent the yoke from accidentally falling. The sliding yoke can easily be replaced by a smaller optional yoke.

The dual coil design offers high performance for heating bearings in either the horizontal or vertical orientation and gives you the flexibility to heat the bearing in the same orientation as the shaft for fast and convenient mounting. By utilizing two coils, the heaters allow more homogeneous heating and offer additional safety for the hot mounting of large sized bearings.



Technical data - TIH L series

| Designation | TIH L33 | TIH L44 | TIH L77 |
|---|--|--|--|
| Max. bearing weight | 700 kg (1 543 lb) | 1 200 kg (2 600 lb) | 1 200 kg (2 600 lb) |
| Bore diameter range | 115–700 mm (4.5–27.6 in.) | 150–800 mm (5.9–31.5 in.) | 150–800 mm (5.9–31.5 in.) |
| Operating area (w × h) | 300 × 320 mm (11.8 × 12.6 in.) | 425 × 492 mm (16.7 × 19.4 in.) | 725 × 792 mm (28.5 × 31.2 in.) |
| Coil diameter | 150 mm (5.9 in.) | 175 mm (6.9 in.) | 175 mm (6.9 in.) |
| Standard yokes (included) to suit bearing minimum bore diameter | 115 mm (4.5 in.) | 150 mm (5.9 in.) | 150 mm (5.9 in.) |
| Optional yokes to suit bearing minimum bore diameter | 80 mm (3.1 in.) 60 mm (2.4 in.) | 100 mm (3.9 in.) | – |
| Performance example (bearing, weight, temperature, time) | 24188ECA/W33, 455 kg, 110 °C, 28m | 24188ECA/W33, 455 kg, 110 °C, 13m | – |
| Max. power consumption | TIH L33/LV: 15 kVA TIH L33/MV: 15 kVA | TIH L44/MV: 20–23 kVA TIH L44/LV: 20–24 kVA | TIH L77/MV: 20–23 kVA TIH L77/LV: 20–24 kVA |
| Voltage ¹⁾ 200–240 V/50–60 Hz 400–460 V/50–60 Hz | TIH L33/LV TIH L33/MV | TIH L44/LV TIH L44/MV | TIH L77/LV TIH L77/MV |
| Temperature control ²⁾ | 0 to 250 °C (32 to 482 °F) | 20 to 250 °C (68 to 482 °F) | 20 to 250 °C (68 to 482 °F) |
| Demagnetisation according to SKF norms | <2 A/cm | <2 A/cm | <2 A/cm |
| Dimensions (w × d × h) | 400 × 743 × 550 mm (15.8 × 29.3 × 21.7 in.) | 1 200 × 600 × 850 mm (47.3 × 23.6 × 33.5 in.) | 1 320 × 600 × 1 150 mm (52 × 23.6 × 45.3 in.) |
| Total weight (incl. yokes) | 140 kg (309 lb) | 324 kg (714 lb) | 415 kg (915 lb) |

¹⁾ Some special voltage versions (e.g. 575V, 60 Hz CSA ready) are available for specific countries. For additional information, please contact your local SKF authorised distributor.

²⁾ Maximum heating temperature capacity depends on the weight and geometry of the bearing or workpiece. The heaters can achieve higher temperatures, please contact SKF for advice.

The TIH L series of SKF Induction Heaters is designed for fast and safe mounting of large bearings in the workshop or in the field. The heaters offer great versatility and are suitable for a large variety of bearing types and sizes. TIH L series heaters can be found in almost all industries with large sized bearings.



Solid workpiece heaters

The SKFTIH L MB series is specially designed to heat solid workpieces, such as rings, sleeves, gears, couplings, bushings and pulleys, as well as train wheels, tires or similar components. Featuring one magnetic coil in the center, these powerful and durable heaters localize the heating in the workpiece bore for superior performance on solid components.



The TIH L MB heats non-bearing workpieces up to 600 kg (1 323 lb), depending on the model.



The TIH L MB induction heater is equipped with a remote control panel for operator safety.

Advice: The SKFTIH L MB series heaters are designed for induction heating of solid, non-bearing components. For bearing-heating applications, we recommend the use of equivalent SKF TIH L series heaters.

Induction heaters for non-bearing applications

TIH L MB series

The TIH L MB series provides the following advantages for quick and effective heating of solid workpieces:

- Simple and safe operation with remote-control and power level selection
- Superior heating performance for solid workpieces with low energy consumption
- Quick and easy placement of solid components with sliding yoke
- Automatic demagnetization reduces risk of ferrous debris contamination
- Easy to transport using standard forklift
- Available in three voltage variants to suit most operating voltages worldwide
- Available with three different operating areas



Technical data

| Designation | TIH L33MB | TIH L44MB | TIH L77MB |
|---|--|--|--|
| Maximum workpiece weight | 350 kg (772 lb) | 600 kg (1 323 lb) | 600 kg (1 323 lb) |
| Bore diameter range | 115–700 mm (4.5–27.6 in.) | 150–800 mm (5.9–31.5 in.) | 150–800 mm (5.9–31.5 in.) |
| Operating area (w × h) | 330 × 320 mm (13.0 × 12.6 in.) | 465 × 492mm (18.3 × 19.4 in.) | 765 × 792mm (30.1 × 31.2 in.) |
| Coil diameter | 150 mm (5.9 in.) | 175 mm (6.9 in.) | 175 mm (6.9 in.) |
| Standard yokes (included) to suit workpiece minimum bore diameter | 115 mm (4.5 in.) | 150 mm (5.9 in.) | 150 mm (5.9 in.) |
| Max. power consumption | TIH L33MB/MV: 15 kVA TIH L33MB/LV: 15 kVA | TIH L44MB/LV: 20–24 kVA TIH L44MB/MV: 20–23 kVA | TIH L77MB/LV: 20–24 kVA TIH L77MB/MV: 20–23 kVA |
| Voltage ¹⁾ | | | |
| 200–240 V/50–60 Hz | TIH L33MB/LV | TIH L44MB/LV | - |
| 400–460 V/50–60 Hz | TIH L33MB/MV | TIH L44MB/MV | TIH L77MB/MV |
| Temperature control | 0–250 °C (32–482 °F); in steps of 1° | 0–250 °C (32–482 °F); in steps of 1° | 0–250 °C (32–482 °F); in steps of 1° |
| Time control | 0–120 minutes; in steps of 0,1 minute | 0–120 minutes; in steps of 0,1 minute | 0–120 minutes; in steps of 0,1 minute |
| Demagnetisation according to SKF norms | <2A/cm | <2A/cm | <2A/cm |
| Maximum heating temperature ²⁾ | 250 °C (482 °F) | 250 °C (482 °F) | 250 °C (482 °F) |
| Dimensions (w × d × h) | 400 × 743 × 550 mm (15.8 × 29.3 × 21.7 in.) | 1 200 × 600 × 850 mm (47.3 × 23.6 × 33.5 in.) | 1 320 × 600 × 1 150 mm (52 × 23.6 × 45.3 in.) |
| Weight | 140 kg (309 lb) | 324 kg (714 lb) | 415 kg (915 lb) |

¹⁾ Some special voltage versions (e.g. 575V, 60Hz CSA ready) are available for specific countries. For additional information, please contact your local SKF authorised distributor.

²⁾ Depending on bearing or workpiece weight. For higher temperatures, please contact SKF.

A unique and flexible heating solution for very large bearings and workpieces

Multi-core induction heaters, TIH MC series

The SKF multi-core induction heaters are energy efficient, custom-made heating solutions. Compared to other heating methods, they often can significantly save heating time. The TIH MC series are similar to the standard TIH range, with a few key differences and additional features:

- Flexible design, consisting of a number of induction heating cores and coils controlled by a single control and power cabinet
- Suitable for heating large thin section workpieces, such as slewing rings and railway wheel tyres
- Heating capacities of several tonnes are possible, depending on application
- Enables a more even temperature gradient across the whole circumference. This is especially important for components sensitive to uneven induction heating
- Unique design allows for custom-made solutions to be quickly and economically produced



SKF can configure the type of TIH MC series heater required, depending on the application. For additional information, contact your SKF authorised distributor

Accessories



Technical data

| | |
|---------------------|-----------------|
| Designation | TMBA G11 |
| Material | Hytex |
| Inner lining | Cotton |
| Size | 9 |
| Colour | White |
| Maximum temperature | 150 °C (302 °F) |
| Pack size | 1 pair |



Technical data

| | |
|---------------------|------------------|
| Designation | TMBA G11ET |
| Material | Kevlar |
| Inner lining | Cotton |
| Size | 10 (EN 420 size) |
| Colour | Yellow |
| Maximum temperature | 500 °C (932 °F) |
| Pack size | 1 pair |



Technical data

| | |
|---------------------|-----------------|
| Designation | TMBA G11H |
| Material | Polyaramid |
| Inner lining | Nitrile |
| Size | 10 |
| Colour | Black |
| Maximum temperature | 250 °C (482 °F) |
| Pack size | 1 pair |

SKF Heat Resistant Gloves TMBA G11

The SKF TMBA G11 are specially designed for the handling of heated bearings.

- Lint free
- Heat resistant up to 150 °C (302 °F)
- Cut resistant
- Tested and certified for mechanical risks (EN 388) and thermal risks (EN 407)

SKF Extreme Temperature Gloves TMBA G11ET

The SKF TMBA G11ET are especially designed for the safe handling of heated bearings or other components for prolonged periods.

- Withstands extreme temperatures of up to 500 °C (932 °F) unless in the presence of hot liquid or steam
- Allows the safe handling of heated components
- High-degree of non-flammability reduces the risk of burning
- Extremely tough Kevlar gloves with high cut, abrasion, puncture and tear resistance for increased safety
- Lint free
- Tested and certified for mechanical risks (EN 388) and thermal risks (EN 407)

SKF Heat and Oil Resistant Gloves TMBA G11H

The SKF TMBA G11H are specially designed for the handling of hot and oily bearings.

- Offers a high degree of heat, cut, oil and water resistance
- Melt and burn resistant
- Maximum temperature: 250 °C (482 °F)
- Cut resistant
- Lint free
- Suitable for submerging in liquids with a temperature up to 120 °C (248 °F) (e.g. hot oil bath)
- Remains heat resistant when wet
- Tested and certified for mechanical risks (EN 388) and thermal risks (EN 407)

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