MOTION & CONTROL™
NSK

USER MANUAL
INDUCTION HEATER IHN010

aip
NSK experts

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Safety Recommendations

- The operating instructions must be followed and kept in a safe place at all times.
- The IHN010 device generates a magnetic field. People wearing a pacemaker, especially if it is an older model, should consult their doctor before operating the device as it could impair the functioning of the pacemaker. Electronic equipment such as wrist watches, memory cards, monitors and displays, magnetic tapes, etc. may also be affected.
- Always place the device on a non-metallic surface that is stable and dry.
- Ensure that the ventilation slots are free at all times and the device can draw in cold air through its base.
- The device must always be connected to an AC power network with the correct voltage as indicated on the type plate.
- Ensure that the device does not get wet and do not expose it to high humidity levels.
- The device must not be immersed in water or any other liquid.
- Do not operate the device in the vicinity of heat sources and ensure that it is placed a sufficient distance away from walls and flammable objects.
- The device must not be used in areas where there is a risk of explosion.
- Do not activate the heating process if no rolling bearing or other workpiece is in place.
- Avoid contact with hot workpieces. Wear the supplied protective gloves when handling hot workpieces.
- Please ensure that you always use a power and temperature level that is appropriate for the workpiece in question to ensure that it is heated carefully and not damaged.
- The device is intended for heating rolling bearings. The manufacturer accepts no liability in the event of inappropriate or incorrect usage.
- Regularly check the plug, connecting cable and heating cone for wear and tear or damage. If you discover any damage, send the device to your NSK partner for inspection.
- Do not modify the device.

1 Introduction

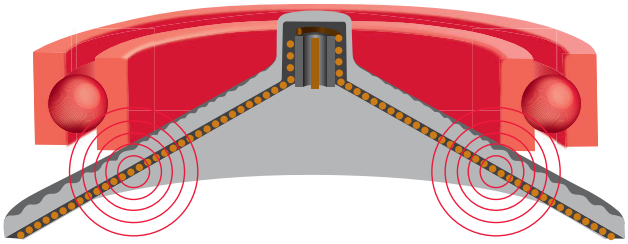
The IHN010 induction heater is designed for heating rolling bearings and other ferritic, circular workpieces. The heat causes the workpiece to expand, which eliminates the need to use force during installation. A 90°C (194°F) temperature difference between the bearing and shaft is sufficient to enable easy installation. At an ambient temperature of 20°C (68°F), the bearing must therefore be heated to 110°C (230°F).

1.1 Intended Use

The IHN010 portable induction heater has been designed to heat rolling bearings. Examples of acceptable workpieces include bushings, shrink rings, pulleys, rings, etc. The IHN010 portable induction heater is primarily intended for on-site repairs and rolling bearing replacements by service and maintenance staff.

1.2 Principle of Operation

The IHN010 generates a magnetic field in the medium frequency range (approx. 25kHz), similar to an inductive hot plate. The magnetic field induces a voltage targeted on the inner ring of the workpiece. This creates eddy currents, which efficiently heat the workpiece. As the heat in the workpiece is generated by the current flow, all other parts of the induction heater remain cold. The heating process is based on the principle of eddy currents, so the workpieces to be heated should be composed of ferritic (magnetic) metals. In case of doubt, simply check the workpiece using the magnet of the temperature probe. This patented heating method enables fast, easy and energy efficient heating of workpieces.



1.3 Distinguishing Feature

The distinguishing feature of the IHN010 induction heater is the fact that the workpiece can only be placed on the cone-shaped workpiece support for heating. The energy transfer is contact-free, and is generated via the medium-frequency coil situated below. The cone-shaped workpiece support creates an optimal magnetic field distribution in the rings of the rolling bearing, thereby ensuring that heat is distributed homogenously. This design improves efficiency, resulting in lower power consumption and faster heating, which significantly reduces the costs of heating the bearings. This special technology allows the device to be very light weight and portable. In addition, the device is fitted with predictive temperature control (PTC). For every heating process, the temperature increase curve of the workpiece/rolling bearing is measured constantly, thereby optimising the heating performance. This ensures that the target temperature is achieved quickly without overheating the rolling bearing.

2 Description

The operation of the heater is controlled by the internal electronics in either of two modes. The operator can either select the desired temperature of the bearing in TEMP MODE or set the length of time that the bearing will be heated in TIME MODE. The power level can be adjusted in steps of 20% for slower heating of sensitive workpieces (for example, bearings with C1 or C2 clearance).

2.1 Components

The IHN010 induction heater is comprised of a portable housing with integrated operating electronics and cone-shaped workpiece support. A temperature probe can be attached for measuring and monitoring the temperature of the workpiece. The mains cable is enclosed separately, as are protective gloves for safe handling of hot workpieces. All of the equipment can be stored in the practical carrying case.

2.2 Technical Data

IHN010	
Voltage (± 9%):	1 ~ 110 – 240V / 50 – 60Hz*
Recommended circuit protection	10.5A circuit breaker (240V) 6.5A circuit breaker (110 – 115V)
Power consumption (maximum)	1.5kVA
Temperature control	20 – 180°C, in steps of 1°C 68 – 356°F, in steps of 2°F
Temperature probe	K-type thermocouple with magnetic bracket
Power range	20 – 100%, in steps of 20%
Time mode	0 – 10 minutes, in steps of 0.1 minutes
Operating modes	Automatic temperature or time mode
Demagnetisation, automatic	Residual magnetism < 2A/cm
Overall dimensions	340 x 250 x 64mm (over cone 121mm)
Weight	3.5kg
Workpiece: Inner diameter Width External diameter	 20mm and above Up to 60mm Up to 160mm
Workpiece maximum weight	Up to 10kg
Workpiece materials	Ferritic metals (magnetic)
Maximum heating temperature	< 180°C / 356°F
Authorisations, inspections	CE

* Each bearing heater family has several voltage options. Please refer to the type plate on the heater body to determine the actual operating voltage.

3 Preparation for Use

› Place the device horizontally on a stable, non-metallic surface.

› Ensure that the device's ventilation slots are free at all times and that it can draw in cold air through its base.

› Connect the mains plug to a suitable power supply.

› The rolling bearing to be heated is placed horizontally in the centre of the IHN010 induction heater's step-shaped support cone.

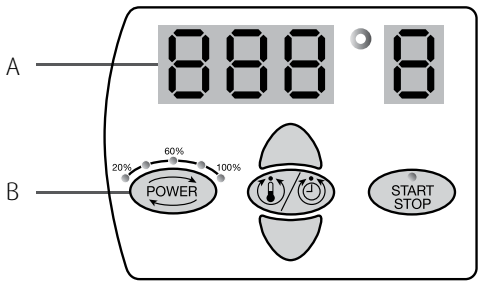
› If you are going to operate the device in TEMP MODE, connect the temperature probe with the helix cable to the left side of the device. Make sure the polarity of the plug is correct.

› Use the holding magnets in the measuring head of the temperature probe as a quick and easy way of checking whether the workpiece is made of ferritic metal (magnetic) and therefore can be heated optimally using the IHN010 induction heater.

› The magnetic measuring head of the temperature probe is placed on the inner ring of the rolling bearing or the innermost point of the ring. The temperature probe is only used in TEMP MODE. When heating a workpiece in TIME MODE, the probe is not required and does not need to be connected.

4 Operation

4.1 Function of Displays



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

Display	Indication
t	Time in minutes
°C	Temperature in degrees Celsuis
°F	Temperature in degrees Fahrenheit

B) The power display shows the selected power setting:

Display	Indication
●	20% power
●●	40% power
●●●	60% power
●●●●	80% power
●●●●●	100% power

4.2 Function of Buttons

Button	Function
POWER	Press to adjust the power in steps of 20%. The selected power is indicated on the power display.
MODE	Press to switch between TIME MODE and TEMP MODE.
UP (+)	Press to increase the value shown on the main display.
DOWN (-)	Press to decrease the value shown on the main display.
START/STOP	Press to start or stop the heater. The LED on the START/STOP button is lit when the heater is heating and flashes during temperature measurement.

4.3 Temp Mode

› If the main display shows “t”, press MODE to select TEMP 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, press UP or DOWN to adjust the temperature in steps of 1°C (2°F).

› It may be desirable to heat bearings to temperatures above 110°C (230°F) for increased mounting time. To determine the maximum permitted temperature, consult the specifications of the bearing manufacturer. Always ensure the bearing does not lock due to an excessive expansion of the inner ring compared to the outer ring. See section 4.8.

› All Spherical Rolling Bearings (SRBs) are subjected to a special heat treatment. These bearings can be operated at temperatures as high as 200°C (392°F). Heating these bearings above 110°C (230°F) will not cause any damage as long as the bearing is still able to rotate. For other bearings, a temperature of 125°C (257°F) must not be exceeded unless otherwise specified.

› Press POWER to select the power level. Use the guidelines in section 4.8 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.

› Always wear protective gloves and other appropriate protective equipment when removing the hot workpiece. NB: Risk of burning. The workpiece may also be removed using suitable 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 device is now ready to heat another workpiece with the same settings.

4.4 Time Mode

› If the main display shows °C or °F, press MODE to select TIME MODE. The main display shows “t” in TIME MODE.

› Press UP or DOWN to adjust the time in steps of 0.1 minute.

› Press POWER to select the power level. Use the guidelines in section 4.8 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 turn the induction heater off.

› Always wear protective gloves and other appropriate protective equipment when removing the hot workpiece. NB: Risk of burning. The workpiece may also be removed using suitable handling equipment.

› Remove the workpiece using proper handling equipment.

› The device is now ready to heat the next workpiece with the same settings.

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

4.6 Change of Temperature Units

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

4.7 Demagnetisation

According to the eddy current principle, the work piece is automatically demagnetised at the end of the heating cycle.

4.8 Power Level Selection

When heating bearings with the IHN010, it is important that bearings with small internal clearance or slight preload are heated slowly. Slow heating ensures that the bearing expands slowly, thereby preventing damage to the bearing. In addition, it is possible that the ferrite cage and seals could be heated more quickly than the inner-ring, due to their low mass.

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 (little internal clearance) the power must be reduced.

- Max. 20% for small bearings (positioned around the tip of the cone)
- Max. 40% for medium-sized bearings (positioned in the centre of the cone)
- Max. 60% for large bearings (positioned at the bottom of the cone)

For bearings with a steel cage or with seals, the power must be reduced.
The following table shows what power level to be selected.

Bearing	Cage	Shield	Power	Max.Temp.
Deep groove ball bearings	Steel	Steel	20%	110°C / 230°F
	Steel	Plastic	20%	100°C / 212°F
	Steel	None	100%	110°C / 230°F
Other bearings	Steel	Steel	20%	110°C / 230°F
	Brass	Steel	20%	110°C / 230°F
	Plastic	Steel	20%	110°C / 230°F
	Steel	Plastic	20%	100°C / 212°F
	Brass	Plastic	20%	100°C / 212°F
	Plastic	Plastic	20%	100°C / 212°F
	Steel	None	100%	110°C / 230°F
	Brass	None	100%	110°C / 230°F
	Plastic	None	100%	110°C / 230°F

If the bearings are sealed on one side only, they must be placed on the device with the seal facing upwards.
In this arrangement, the power level of 100% can be selected.

5 Safety Features

The IHN010 device is equipped with the following safety features:

› Power switch.

› Internal safety fuse for power electronics.

› Automatic overheating protection for the circuit breaker.

› Automatic current control for intermediate circuit and coil electricity.

› Automatic detection and power reduction if no workpiece is in place for heating.

› In the TEMP MODE the heater will switch off if the temperature probe does not register a temperature increase of 1°C (2°F) every 15 seconds. To increase the interval to 30 seconds, press MODE and DOWN at the same time.

6 Electromagnetic Field and Personal Safety

During the heating function, the IHN010 unit generates a maximum magnetic flux density of less than 5.7µT at a distance of half a meter away. The device is therefore within the range that applies to the household sector for induction cooktops. Modern pacemakers are protected from such interference. Nevertheless, the manufacturers recommend that those using pacemakers remain a minimum distance of 40cm from the induction heater. People with cardiac pacemakers should check with their doctor about possible disrupting effects.

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
E01 E	General system failure	Return heater for repair
E02 E	Memory failure	Return heater for repair
E03 E	Overheated coil	Wait until the inductive coil cools
E04 E	No workpiece in place	Place workpiece on device
E05 E	Temperature increase of less than 1°C (2°F) every 15 seconds (or 1°C (2°F) every 30 seconds)	Check the temperature probe connection. If the connection is OK, select the 30 second interval as described in section 5 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
E08 E	Failure during communication with power printed circuit board	Return heater for repair
E09 E	Overheated printed circuit board	Wait until the printed circuit board cools. Alternatively, the PCB temperature will be displayed. The device can be re-started at a temperature below 40°C (displayed as <40).
E10 E	Grid undervoltage detected	Connect the device to another socket or shorten the extension cord.

8 Spare Parts

Description	Part Number
Spare temperature probe	IHNP2SENSOR
Spare protective gloves	IHNGLOVES
Spare portable soft case for IHN010	IHN025-B

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