BEARING MAINTENANCE TOOLS
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Bearing Puller Tool Kit

Easy dismounting of ball bearings in blind housings

The toolkit BPN62 enables in many cases easy dismounting of ball bearings without dismantling the shaft. It consists of 6 puller arm sets and 2 supporting spindles and is suitable for deep groove ball bearings from 10 to 100 mm shaft diameter.

› 6 puller arm sets and 2 spindles in a display case weighing only 3.2 kg
› Hinged puller arms for power transmission to the bearing
› User-friendly because of the elastic locking ring, which keeps the puller arms in the right position
› Puller arms made of high quality steel
› Selection chart for deep groove ball bearings inside the case

### Selection Chart BPN62

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Bearing NSK # OF PULLER ARMS # OF SPINDLES
FITTING TOOL FTN333

Bearing Fitting Tool FTN333
Minimize the danger of damaging the bearing

The NSK bearing fitting tools are designed for the fast, precise and secure mounting of bearings with bore diameters from 10 to 50 mm. The right combination of impact rings and impact sleeves makes sure that the mounting forces never go through the rolling elements of a bearing.

› Impact rings are made of extremely shock-resistant material
› Even power transmission to the bearing rings due to the special construction of the impact rings
› Nylon double-sided hammer head prevents damage of the bearings effectively
› Also suitable for the fitting of bushings, seals, pulleys, etc.
› Suitable for a wide range of bearing sizes
› Impact rings and impact sleeves are also available individually
› Blow-back proof hammer FTN333-H included
› No mechanical damage of the bearing during the cold mounting process

Cold Mounting of Bearings
Incorrect mounting can lead to damages and to an early breakdown of the bearing. Reasons for this can be:

› Damages caused during the mounting process
› Wrong tolerances of the bearing carrier on the shaft or inside the housing
› Loosening of the locknut during operation
› Burrs and damages on the shaft and the housing seats and shoulders

Interference Fits - Cylindrical Bearing Shaft
For most bearings either the inner or the outer ring (in certain cases even both) are mounted onto the shaft or into the housing with an interference fit. Please review NSK recommended interference fits (Bearing and Linear Replacement Guide).

Improper Mounting
During cold mounting of a roller bearing, it must be made sure that the mounting forces are always applied to the ring with the interference fit. Mounting forces should never go through the rolling elements.

The raceway can be damaged by application of force on the wrong bearing ring.

Proper Mounting
The danger of damaging raceways can be minimized by the use of the specifically designed NSK fitting tools (FTN333, NMK 10-30).

Raceway damages can be prevented with the correct tools.
### SELECTION TABLE FITTING TOOL FTN333

#### Impact Sleeves

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*outer ring fitting only

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**FTN333-A**

**FTN333-B**

**FTN333-C**
The NSK Bearing Handling Tool is ideally suited to professional, safe handling and lifting of heavy bearings.

Handling large and heavy bearings with the Bearing Handling Tool prevents the risk of damage to the bearing.

The Bearing Handling Tool encompasses the outer ring of the bearing with a steel strip. Two opposite handles and two carrying belts allow easy handling with a lifting crane.

**Advantages:**
- Safe handling
- Prevents damage to bearings
- 50% time-saving compared to conventional mounting methods
- Can be used for heated bearings with a temperature up to 320°F /160°C
- Easy mounting aid for large bearings

With the Bearing Handling Tool bearings can be fitted onto a horizontal or vertical shaft. It is even possible to safely handle spherical ball bearings without damaging them thanks to two opposite anti-rotation bars that are positioned against the bearing’s inner race.

**The Bearing Handling Tool consists of:**
- 2 carrying belts
- 2 high-quality handles
- 2 turning handles for safe handling
- 2 inner ring holders
- 1 clamping strip made of steel
- 1 pair of protective gloves
Spanner wrenches are a simple and inexpensive means of installing small size tapered bore bearings onto shafts and adapter sleeves. Because they clamp onto the slot in the locknut, they do not cause damage to the locknut which frequently occurs when using a hammer and keystock.

NSK standard spanner wrenches are made from 1/4" (7mm) thick plates. The heads of impact spanner wrenches are made of forged steel, which is welded to a strong alloyed steel handle covered by easy grip rubber.

NSK impact-spanner wrenches are heavy duty and can withstand the impact force of a hammer. All wrenches come with a convenient hole for ease of storage or hanging.

**Spans of other sizes:**

23-30: fits AN 23-30 locknuts
30-40: fits AN 30 - 40 locknuts
40 -52: fits AN 40 - 52 locknuts

* The largest standard spanner wrench is HN22.

**Note:**

- Locknut of that size does not exist in this series.
- All Locknut Series have letter and number part numbers (i.e. AN-24).
Pullers and tri-section press plates are useful in the quick, easy and safe installation and removal of bearings, rings, pulleys and gears. The use of these tools is helpful in protecting the shaft, bearings and surrounding equipment from damage. They also help reduce the potential for bodily harm to the operator.

NSK’s family of pullers and tri-section press plates come in a full range of sizes and come individually or in kits specifically matched to customer needs.

NSK offers a hydraulic puller and tri-section press plate in a single heavy duty case making transportation and storage more convenient as well as reducing the possibility of lost parts. Pullers are available in non-interchangeable standard and high capacity designs. The high capacity design includes a high pressure cylinder and cobra jaw. Hydraulic pullers from NSK incorporate coarse threads which make it easier and quicker to assemble than competitive bearing removal products.
Tri-Section Press Plates

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# Pullers and Tri-section Press Plates (Cont)

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---

\(^a\) Min Reach = Max Reach - E

\(^b\) S = short, L = long

Note: Spread of puller must be wider than OD of bearing.

---

"Pullers and Tri-section Press Plates (Cont)"

---

![Diagram of Puller](image)
## Puller Dimensions

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<th>D</th>
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<th>G</th>
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† CB = cardboard, M = metal, PE = plastic enclosure, W = wood box
†† B = PVC bag, M = PVC mesh
Accurate fit between a tapered bore bearing and its journal is critical if a bearing is to reach maximum life. Certified NSK Sine Bar Gages are designed to provide an accurate and easy method to measure a journal’s taper, size, contact area and out of roundness.

A complete sine bar gage set for measurement of either 1:12 or 1:30 shaft tapered journals consists of:

- 3, 4, 5.5, 7, 10 and 14 inch long sine bar gages
- 2 sine bar blocks
- a strap
- calibration reports
- wooden box for transportation
- 2 clamps
- journal detail charts
- instructions for use

NSK sine bars are coated with a special anti-rusting treatment, come with easy to read laminated instructions and are available individually, in combination or as complete sets. They are lightweight, easy to handle and a cost effective way to ensure maximum bearing life.

NOTE: If ordering a single sine bar not in a set, the sinebar block, strap, and clamps do not come with that sine bar. Those components can be ordered separately if you do not already have them.
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<th>Bore - Inches</th>
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NSK offers hydraulic pumps that inject oil into hydraulic nuts during bearing installation and simplify the bearing removal process by pumping oil between the inner ring and journal. NSK heavy duty pumps are offered in two sizes, are lightweight and come in a specially designed protective carrying case.

### Pump Specifications

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<th>Pump Type</th>
<th>Base Number</th>
<th>Tank Capacity</th>
<th>Description</th>
<th>Max. Working Pressure*</th>
<th>Usable Oil Capacity</th>
<th>Oil Displacement Per Stroke</th>
<th>Max Handle Effort</th>
<th>Piston Stroke</th>
<th>Oil Outlet Port</th>
<th>Weight</th>
<th>Pump Dimensions inch (mm)</th>
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<td>22.05 (560) 5.51 (140) 5.51 (140)</td>
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<td>LARGE</td>
<td>Hand Pump</td>
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<td>3/8&quot;-18</td>
<td>13.44</td>
<td>15.16 (385) 5.51 (140) 5.32 (135)</td>
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</table>

*All pumps include a relief valve set at 10,000 psi.

** All pumps come in kits which include a pump, hose, quick disconnect, coupler (nipple), gage, tee and a metal case.
Hydraulic nuts from NSK aid in the mounting of tapered bore bearings onto tapered or cylindrical shafts when using an appropriate bearing adapter. Used in conjunction with a dial indicator and a manually operated hydraulic pump, a NSK hydraulic nut can make the bearing installation process safe, easy and reliable. The hydraulic pressure provides the installation force so there is no need to hammer on a spanner wrench. In addition to mounting bearings, the hydraulic nut can also be used to dismount a tapered bore bearing installed using a withdrawal sleeve mounting arrangement.

The hydraulic nut kit includes the instruction manual, pin wrench (tommy bar) and a replacement O-ring seal set. Dial indicator, hydraulic pump and hydraulic fittings are supplied separately. The hydraulic nut is manufactured from durable SAE 1045 steel and is available in a wide range of sizes covering all the standard adapters. Special sizes and threads may be available upon request.

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## HYDRAULIC NUTS - METRIC

### HMV 10E THROUGH HMV 26E

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<th>Piston Flange OD ( \varnothing ) 2 mm</th>
<th>Outer Diameter ( D_m ) mm</th>
<th>Thickness B mm</th>
<th>Piston Thickness B1 mm</th>
<th>Max. Axial Displacement mm</th>
<th>Injection Hole Thread H</th>
<th>( \varnothing ) F mm</th>
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HYDRAULIC NUTS - METRIC
HMV 28E THROUGH HMV 96E

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## HYDRAULIC NUTS - METRIC

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## HYDRAULIC NUTS - METRIC

**HMV150E THROUGH HMV212E**

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**Diagram:**

- PN: PN Nominal Thread Ø mm
- Piston ID Ø1 mm
- Piston Flange OD Ø2 mm
- Outer Diameter Dm mm
- Thickness B mm
- Piston Thickness B1 mm
- Max. Axial Displacement mm
- Injection Hole Thread H
- ØF mm
- Sleeve Option 1
- Bearing Option 1

**Notes:**

- ØF x 4
- HMV150E THROUGH HMV212E

**Additional Information:**

- HYDRAULIC NUTS - METRIC
- HMV150E THROUGH HMV212E

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## HYDRAULIC NUTS - INCH
### HMVC 10E THROUGH HMVC 16E

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<th>Piston Thickness B1 mm</th>
<th>Max. Axial Displacement mm</th>
<th>Injection Hole Thread H</th>
<th>ØF mm</th>
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## HYDRAULIC NUTS - INCH

HMVC 17E THROUGH HMVC 22E

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## HYDRAULIC NUTS - INCH

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## HYDRAULIC NUTS - INCH

HMVC 48E THROUGH HMVC 100E

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<td>3/8&quot;-18NPTF</td>
<td>14.3</td>
<td>SNP3048</td>
<td>23048K</td>
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<tr>
<td>HMVC 52E</td>
<td>10.192&quot;×6F</td>
<td>262</td>
<td>341</td>
<td>356</td>
<td>47</td>
<td>9</td>
<td>11</td>
<td>3/8&quot;-18NPTF</td>
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<td>HMVC 56E</td>
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<td>282</td>
<td>363</td>
<td>380</td>
<td>49</td>
<td>9</td>
<td>12</td>
<td>3/8&quot;-18NPTF</td>
<td>15.9</td>
<td>SNP3056</td>
<td>23056K</td>
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<td>HMVC 60E</td>
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<td>302</td>
<td>386</td>
<td>404</td>
<td>50</td>
<td>10</td>
<td>14</td>
<td>3/8&quot;-18NPTF</td>
<td>15.9</td>
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<td>HMVC 64E</td>
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<td>409</td>
<td>428</td>
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<td>3/8&quot;-18NPTF</td>
<td>15.9</td>
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<td>23068K</td>
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<td>HMVC 72E</td>
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<td>455</td>
<td>472</td>
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<td>15</td>
<td>3/8&quot;-18NPTF</td>
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<td>382</td>
<td>476</td>
<td>498</td>
<td>58</td>
<td>11</td>
<td>16</td>
<td>3/8&quot;-18NPTF</td>
<td>19.1</td>
<td>SNP3076</td>
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<td>HMVC 80E</td>
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<td>402</td>
<td>499</td>
<td>522</td>
<td>60</td>
<td>11</td>
<td>17</td>
<td>3/8&quot;-18NPTF</td>
<td>19.1</td>
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<tr>
<td>HMVC 84E</td>
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<td>422</td>
<td>522</td>
<td>546</td>
<td>61</td>
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<td>17</td>
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<td>19.1</td>
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<td>HMVC 88E</td>
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<td>442</td>
<td>543</td>
<td>566</td>
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<td>17</td>
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<td>19.1</td>
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<td>HMVC 92E</td>
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<td>565</td>
<td>590</td>
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<td>3/8&quot;-18NPTF</td>
<td>19.1</td>
<td>SNP3092</td>
<td>23092K</td>
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<tr>
<td>HMVC 96E</td>
<td>18.894&quot;×6F</td>
<td>482</td>
<td>578</td>
<td>612</td>
<td>65</td>
<td>12</td>
<td>19</td>
<td>3/8&quot;-18NPTF</td>
<td>19.1</td>
<td>SNP3096</td>
<td>23096K</td>
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<td>HMVC 100E</td>
<td>19.682&quot;×6F</td>
<td>502</td>
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<td>636</td>
<td>67</td>
<td>12</td>
<td>19</td>
<td>3/8&quot;-18NPTF</td>
<td>19.1</td>
<td>SNP3500</td>
<td>230/500K</td>
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</table>
The force needed to mount a bearing increases considerably with the size of the bearing. If the heat expansion of metals is made use of, bearings or other ring-shaped parts can easily be mounted onto a shaft or into a housing. For the fast warm-up of bearings, you can use an induction heater where a hot oil bath was often used in the past.

**Induction Heater**

Its function equals that of an electric transformer. With an induction coil, a very high amperage with a low voltage is induced into a ring-shaped work-piece. Thereby, it is heated consistently within minutes. Heat is only induced to the workpiece whereas the heater itself remains at ambient temperature and can be touched without risk at any time. The inductive heating is very efficient, as the workpiece is being heated directly with the inductive flow. Non-metallic parts such as sealings, lubricant and cages are not heated. The advantage is that the cold bearings can be lubricated before mounting. Since inductively heated bearings become magnetized, the NSK induction heaters are always equipped with a demagnetization unit. It prevents the bearings from attracting metal particles which could cause long-term damage to the bearing.

**Mounting of the Heated Workpiece**

In order to mount a bearing to its seat, a heating temperature of 230 °F (110 °C) is recommended. Higher temperatures are not necessary and must be prohibited. Temperatures higher than 257 °F (125 °C) can cause structural changes of the bearing material. The bearing temperature must therefore be observed with a temperature probe. Shrink collars or other ring-shaped parts, however, can be heated up to a temperature of about 752 °F (400 °C) with an induction heater.

During mounting hot bearings, clean protective gloves must be worn. The mounted bearing must be pushed along the shaft up to the abutment and held in this position until a tight fit is obtained. For heating of bearings and other ring-shaped workpieces, NSK supplies a wide range of induction heaters for almost all mounting requirements.

**The suitable heater for your application**

The choice of a NSK induction heater depends largely on the geometrical dimensions and the weight of the workpiece you want to heat. The graphic serves as a selection guide.
Heating bearings can cost a lot of time and energy, however, with the latest induction heaters from NSK you can save both. A workpiece of 460 lb (210 kg) can be heated up to a temperature of 230 °F (110 °C) in less than 20 minutes. The new generation of induction heaters includes three different sizes. To obtain maximum heating efficiency, the induction coil was transferred to the outside of the heaters housing allowing the bearing to be placed around it. This improvement results in a reduction of the heating time and the power consumption by up to 80%, ultimately saving up to 70% on heating cost. All heaters are provided with the following technical characteristics:

Characteristics:
- Four-step power reduction in the range of 20 - 80%. In combination with smaller yokes, smaller bearings can be heated securely at lower power consumption.
- Thermal overheating protection of the induction coil and electronics.
- Automatic time and temperature control for the heating of bearings and other ring-shaped metal parts.
- Automatic demagnetization.
- Compact construction, modern design.
- Light weight.
- A range of standard yoke sizes is included with every induction heater.

Induction Heater IHN010 HotSpot
The lightweight portable device with convincing performance.

The NSK IHN010 HotSpot marks the start of a new era in the field of portable induction heaters. The patented technology enables outstanding heating performance from an extremely light structure. You can use it to heat roller bearings with an inner diameter as small as 20 mm (0.79 in) up to an outer diameter of 160 mm (6.30 in) with a width up to 60 mm (2.3 in) and a weight of up to 22 lbs (10 kg). To do this, simply place the workpiece onto the HotSpot’s cone shaped heating surface.

- Portable, compact and very light (7.7 lbs).
- A bearing weighing 11 lbs can be heated to 230°F in under four minutes.
- Silent operation.
- No support yoke required – simply place the workpiece on the device.
- Predictive temperature control (PTC) software for automatic temperature monitoring.
NSK IHN080

For heating small and medium size bearings with a weight up to 176 lb (80 kg), the IHN080 is the perfect choice.

› Available in two power versions: 230 V/50 Hz and 110 V/60 Hz
› Three yokes are included
› Very compact design, 77 lb (35 kg) overall weight including three yokes
› Swivel arm is available as an option
› Other power versions are available on request

NSK IHN120

For heating small and medium size bearings with a weight up to 260 lb (120 kg) and for permanent operation, the IHN120 is the best solution.

› Available in the power versions 400 V/50 Hz and 460 V/60 Hz
› Three yokes are included
› Very compact design, 84 lb (38 kg) overall weight including three yokes
› Swivel arm is included
› Fan radiator for permanent operation is included
› Other power versions are available on request
› This model needs to be hard wired by a qualified electrician
INDUCTION HEATERS IHN300 AND IHN800

INDUCTION HEATER IHN300

The IHN300 is a large and exceptionally powerful high end induction heater

Suitable for workpieces up to 660 lb (300 kg) of weight.

› Available in the power versions 400 V/50Hz or 460 V/60 Hz
› A sliding arm permits easy placement and removal of the bearing
› Two yokes are included
› Compact design, 165 lb (75 kg) overall weight including two yokes
› A fan version IHN300F for permanent operation is available
› Other power versions are available on request
› This model needs to be hard wired by a qualified electrician

INDUCTION HEATER IHN800

Fast and safe heating of large workpieces

The NSK induction heater IHN800 is designed for the heating of large size bearings up to 1777 lb (800 kg) or other large metal components with a weight up to 660 lb (300 kg) (depending on bearing and workpiece geometry and material). The control system is equipped with all operational functions of the smaller heaters.

› Fast heating of extremely large size components, e.g. a bearing of 980 lb (445 kg) weight can be heated up to 230 °F (110 °C) in only 10 minutes (temperature at the inner ring)
› Designed for easy transport using a fork lift truck
› Automatic demagnetization of the workpiece
› This model needs to be hard wired by a qualified electrician

Special Heaters for Large Components

NSK can also offer custom-made special heaters for large size components. In order to provide a quotation we would need the following information from you:

› Dimensions of the component to be heated (d x D x H)
› Sketch or drawing of the workpiece to be heated
› Weight and material of the workpiece
› Desired heating time
› Available mains voltage
› Stationary or mobile use
The IHN300 is a large and exceptionally powerful high end induction heater suitable for workpieces up to 660 lb (300 kg) of weight.

- Available in the power versions 400 V/50Hz or 460 V/60Hz
- A sliding arm permits easy placement and removal of the bearing
- Two yokes are included
- Compact design, 165 lb (75 kg) overall weight including two yokes
- A fan version IHN300F for permanent operation is available
- Other power versions are available on request
- This model needs to be hard wired by a qualified electrician

NSK MF Quick Heater
The smart and eco-friendly way of heating - for dismounting and mounting of all sorts of transmission components

- Safe, energy efficient operation (no oil or gas)
- Compact design with digital 3.5" display
- Smart electronics ensure optimal operating frequency
- Adjustable power control
- Dual temperature sensing (monitoring ΔT)
- Temperature or time controlled heating: demand is constantly monitored. Once the preset temperature or time has been reached, the device will switch off automatically.

Inductor Choices
For tension-free heating, we offer fixed or flexible inductors. This depends on work piece application.

- Fixed inductors for repeat jobs on the same size work piece: installing/removing bearings, labyrinth rings, sleeves, etc.
- Flexible inductors for a large size range of work pieces: can be placed around or in the work piece or both.

Application Examples
- Mounting and dismounting of bearings, sleeves, bearing houses and power transmission components
- Dismounting of bearings, inner rings (NU, NJ), labyrinth rings and seals (i.e. railway, steel mills)
- Mounting of machine parts such as large gears, bearing houses, couplings (i.e. steel plants, wind power, paper mills)
# Technical Data of the Induction Heaters

<table>
<thead>
<tr>
<th>Designation</th>
<th>IHN010 HotSpot</th>
<th>IHN080</th>
<th>IHN120*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- maximum weight</td>
<td>10kg</td>
<td>80kg</td>
<td>120kg</td>
</tr>
<tr>
<td>- minimum bore</td>
<td>20 mm</td>
<td>20 mm</td>
<td>20 mm</td>
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<tr>
<td>- maximum outside diameter</td>
<td>160 mm</td>
<td>600 mm</td>
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<tr>
<td>- maximum thickness</td>
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<td>145 mm</td>
<td>145 mm</td>
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<tr>
<td>Voltage V/Hz °</td>
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<td></td>
<td></td>
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<tr>
<td>- 100V 10.5A</td>
<td>10.5kVA (special order)</td>
<td>110V/60Hz (standard)</td>
<td>400V/50Hz – 460V/60Hz (standard)</td>
</tr>
<tr>
<td>- 115V 10.5A</td>
<td>1.2kVA (standard)</td>
<td>230V/50Hz (special order)</td>
<td>500V/50Hz – 575V/60Hz (special order)</td>
</tr>
<tr>
<td>- 230V 6.5A</td>
<td>1.5kVA (special order)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- range</td>
<td>68 - 356°F (20 - 180°C)</td>
<td>32 - 482°F (0 - 250°C)</td>
<td>32 - 482°F (0 - 250°C)</td>
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<td>- magnetic probe</td>
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<td>yes, type K</td>
<td>yes, type K</td>
</tr>
<tr>
<td>Time control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- range</td>
<td>0 - 10 minutes</td>
<td>0 - 60 minutes</td>
<td>0 - 60 minutes</td>
</tr>
<tr>
<td>- accuracy</td>
<td>± 0.1 minutes</td>
<td>± 0.01 seconds</td>
<td>± 0.01 seconds</td>
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<td>Maximum temperature (approx.)</td>
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<td>752°F (400°C)</td>
<td>752°F (400°C)</td>
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<tr>
<td>Thermometer mode</td>
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<tr>
<td>Bearing temperature mode</td>
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<tr>
<td>Automatic demagnetization</td>
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<td>yes</td>
<td>yes</td>
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<tr>
<td>Can heat sealed bearings</td>
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<td>yes</td>
<td>yes</td>
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<tr>
<td>Can heat pre-greased bearings</td>
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<td>yes</td>
<td>yes</td>
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<tr>
<td>Thermal overload protection</td>
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<td>Size of the operating area (WxH)</td>
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<td>145 x 205mm</td>
<td>145 x 205mm</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Coil diameter</td>
<td>–</td>
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<td>115mm</td>
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<tr>
<td>Dimensions (WxDxH)</td>
<td>340 x 250 x 64mm (over cone 121mm)</td>
<td>420 x 280 x 345mm</td>
<td>420 x 280 x 420mm</td>
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<tr>
<td>Overall weight including yokes</td>
<td>7.7 lb (3.5kg)</td>
<td>77 lb (35kg)</td>
<td>84 lb (38kg)</td>
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<td>Maximum power consumption</td>
<td>1.4/1.5 kVA</td>
<td>3.7/2.2kVA</td>
<td>6.4/7.4kVA</td>
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<td>Number of standard yokes</td>
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<td>3</td>
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<tr>
<td>Standard yokes</td>
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<td>55 X 55 X 275mm for bearings with bore diameters of 78mm</td>
<td>55 X 55 X 275mm for bearings with bore diameters of 78mm</td>
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<td>–</td>
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<td>28 x 28 x 275mm for bearings with bore diameters of 40mm</td>
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<tr>
<td>–</td>
<td>14 x 14 x 275mm for bearings with bore diameters of 20mm</td>
<td>14 x 14 x 275mm for bearings with bore diameters of 20mm</td>
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<tr>
<td>Core cross section</td>
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<td>55 x 55mm</td>
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<tr>
<td>Housing material</td>
<td>Plastic</td>
<td>Aluminum</td>
<td>Aluminum</td>
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*Other power versions are available upon request.
<table>
<thead>
<tr>
<th>Designation</th>
<th>IHN800**</th>
<th>MF Quick Heaters</th>
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<tbody>
<tr>
<td>IHN010 HotSpot</td>
<td>IHN080</td>
<td>IHN120**</td>
</tr>
<tr>
<td>IHN300**</td>
<td>IHN800**</td>
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<tr>
<td>300kg</td>
<td>up to 1200kg</td>
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<td>850 mm</td>
<td>1200 mm</td>
<td>NA - no limitations</td>
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<td>250 mm</td>
<td>330 mm</td>
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<tr>
<td>400V/50Hz - 460V/60Hz (standard)</td>
<td>500V/50Hz - 575V/60Hz (special order)</td>
<td>400, 450, 500, 600V 50/60 Hz</td>
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<td>500V/50Hz - 575V/60Hz (special order)</td>
<td>500V/50Hz - 575V/60Hz (special order)</td>
<td>500V/50Hz - 575V/60Hz (special order)</td>
</tr>
<tr>
<td>32 - 482°F (0 - 250°C)</td>
<td>752°F (400°C)</td>
<td>572°F (300°C)</td>
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<td>yes, type K</td>
<td>yes, type J</td>
<td>yes, type K</td>
</tr>
<tr>
<td>0 - 60 minutes</td>
<td>0 - 60 minutes</td>
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</tr>
<tr>
<td>± 0.01 seconds</td>
<td>± 0.01 seconds</td>
<td>± 0.01 seconds</td>
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<tr>
<td>752°F (400°C)</td>
<td>752°F (400°C)</td>
<td>572°F (300°C)</td>
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<td>yes</td>
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</tr>
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<td>250 x 250mm</td>
<td>330 x 355mm</td>
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<td>135mm</td>
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<td>600 x 350 x 420mm</td>
<td>750 x 400 x 935mm</td>
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<td>165 lb (75kg)</td>
<td>660 lb (300kg)</td>
<td>172 lb (78kg)</td>
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<tr>
<td>10/11.5kVA</td>
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</tr>
<tr>
<td>2</td>
<td>1</td>
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<tr>
<td>70 x 70 mm</td>
<td>100 x 100mm</td>
<td>NA - no limitations</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Steel</td>
<td>Steel</td>
</tr>
</tbody>
</table>

**This model needs to be hard wired by a qualified electrician.
LASER ALIGNMENT TOOLS
SHAFT-SET AND BELT-SET
Accurate alignment is difficult to achieve using traditional methods. In today’s challenging world, fast and precise set up of machinery is a prerequisite and this is where laser alignment tools comes into play.

Alignment of rotating machinery components is extremely important for correct operation and optimum power usage. However, this is not often appreciated and over half of all installations are not aligned correctly. This results in machines that don’t perform to their potential causing early wear and failure of components such as bearings, gears, seals and couplings. But not only this, higher energy usage and larger maintenance costs are encountered.

**BENEFITS OF LASER ALIGNMENT**

- Increased bearing lifetime
- Increased machinery uptime, efficiency and productivity
- Reduced wear on machine components
- Reduced energy usage
- Smooth running with reduced vibration and noise
- Quick operation, measurement and adjustment

NSK’s Laser alignment equipment includes devices for both shaft and belt drive systems:

- **LAS-Set: Shaft**
- **LAB-Set: Belt**
Laser alignment systems use the repeatability of accurate industrial lasers to take measurements. This gives a great advantage as there are no factors such as bar sag which has to be compensated for in traditional methods. The laser transmitter and sensors are mounted directly on the shaft of the machinery removing the inaccuracies associated with using the coupling. The measurement process is fast and efficient and allows for live updates as adjustments are made. Due to the easy instructions provided, all trained maintenance team members can perform accurate shaft alignment.

TRADITIONAL SHAFT ALIGNMENT METHODS

Accurate measurement and adjustment of drive systems is a highly skilled job when using traditional methods such as Rim and Face or Reversed Dial. They rely heavily on the accuracy of the coupling components and have to be performed many times as alignment adjustments are made. It is a complex three dimensional challenge, not to mention further calculations for bar sag and thermal expansion, and at best does not achieve truly accurate results.

LAS-SET: THE SOLUTION TO YOUR SHAFT ALIGNMENT NEEDS

With the LAS-Set it is easy to use and setup with the intuitive display unit which takes you through the shaft alignment process stage by stage. This allows you to efficiently make alignment measurements and to make the necessary adjustments with live feedback. A simple red / green indicator tells you when you are in tolerance.

BENEFITS OF LAS-SET

› Easy to mount and set up with dual line laser/sensor combination
› Easy operation with step by step instructions given by the display unit
› Built in tolerance limits depending on operating speed
› Results stored in display unit and easily downloaded to PC
TWO SENSOR UNITS WITH TWO LASER BEAMS

The LAS-Set tool has two sensor units with integrated sensor technology and line lasers allowing quick set up without the need for rough adjustment and laser targeting even for larger angular misalignments. The sensor units feature wireless communication paired to the display unit. This gives more freedom when moving around the machine, particularly when using the live results for adjusting the motor. The sensors are positively mounted to the shaft using the precision V-brackets and chain clamp allowing for a large range of shaft sizes.

THE ALIGNMENT PROCESS WITH LAS-SET

The easy to use software guides you through each stage of the alignment process
› Softfoot - Checking the motor mounting is stable and not causing deflection
› Tolerance Selection - Inbuilt recommended alignment tolerances based on speed or enter your own
› Dimensional Input - Input of the sensor positions relative to the coupling and motor feet
› Initial Measurement - Shaft Alignment in 3 positions 90° apart
› Adjustment - Guided adjustment of the motor with live feedback
› Final Measurement - Recorded alignment condition after adjustment

ALL IN ONE BOX

The LAS-Set is supplied in a durable case and contains all of the parts needed for your shaft alignment tasks. The system uses rechargeable batteries for up to 8 hours of continuous use. The system also includes a power management and resume function to save battery life. Each of the parts is charged using a standard mini USB port and included charger.
Using the LAS-Set is so easy – the software is icon based and intuitive, guiding you from one step to the next.

**FEATURES**

- Both shaft positions are monitored simultaneously
- Live values during adjustment
- Measures once, adjustment control in two directions
- Adaptive and icon based user interface
- Color screen
- Color coded measurement results
- All digital system
- 2nd generation sensor – allows for high repeatability
- Unparalleled digital signal control
- Integrated wireless units
- Compact sensor units
- Compatible with all standard 5V mini USB chargers, battery life extenders and 12V car adapter

**HORIZONTAL SHAFT ALIGNMENT**

Determine and correct the relative position of two horizontally mounted machines that are connected, such as a motor and a pump, so that the rotational centers of the shafts are collinear.

**SOFTFOOT CHECK**

This function checks if there is a soft foot condition, i.e. when the motor is not positioned firmly on all its feet.

**MEMORY MANAGER**

Measurements can be organized in folders and subfolders. Single measurements and/or complete data structures can be copied to a PC via USB connector.

**POWER MANAGEMENT SYSTEM**

The LAS-Set has exceptional power management with an integrated resume function. This function automatically saves all critical data if and when it goes into energy saving mode or if the battery goes flat. Once the system is switched on again, the program restarts from where you left off.
# TECHNICAL DATA: LAS-SET

## Display Unit

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>328 g</td>
</tr>
<tr>
<td>Dimensions</td>
<td>184 x 100 x 33 mm</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>IP54</td>
</tr>
<tr>
<td>Flash storage memory</td>
<td>500MB</td>
</tr>
<tr>
<td>Display</td>
<td>Color TFT-LCD backlit</td>
</tr>
<tr>
<td>Display size</td>
<td>4” diagonal (84 x 56 mm)</td>
</tr>
<tr>
<td>Power supply</td>
<td>Rechargeable Li-Ion battery or external power supply</td>
</tr>
<tr>
<td>Operating time</td>
<td>8 hours continuous use</td>
</tr>
</tbody>
</table>

## Sensor Units

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>222 g</td>
</tr>
<tr>
<td>Dimensions</td>
<td>94 x 87 x 37 mm</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>IP54</td>
</tr>
<tr>
<td>Laser</td>
<td>650 nm class II diode laser</td>
</tr>
<tr>
<td>Measurement distance</td>
<td>Up to 2 m</td>
</tr>
<tr>
<td>Detector</td>
<td>Digital line sensor</td>
</tr>
<tr>
<td>Power supply</td>
<td>Li-Ion battery or external power</td>
</tr>
<tr>
<td>Operating time</td>
<td>12 hours continuous use (measuring)</td>
</tr>
</tbody>
</table>

## Shaft Brackets

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft diameter</td>
<td>Ø 30-150 mm</td>
</tr>
<tr>
<td></td>
<td>Ø 30-500 mm (with optional extension chains)</td>
</tr>
<tr>
<td>Rods</td>
<td>2 pcs 150 mm</td>
</tr>
</tbody>
</table>

## Complete System

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (incl. all standard parts)</td>
<td>3.95 kg</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20 to 70° C</td>
</tr>
</tbody>
</table>

## Case

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Double Walled Polypropylene</td>
</tr>
<tr>
<td>Dimensions</td>
<td>390 x 310 x 192 mm</td>
</tr>
</tbody>
</table>
Correct alignment of belt drives is increasingly important in an environment where machine performance and maintenance costs are key considerations. Pulley misalignment can result in unnecessary forces being applied to the machinery leading to increased wear and vibration causing premature bearing failure and costly machine downtime.

TRADITIONAL BELT ALIGNMENT METHODS

Typically this involves the use of a straight edge or even string placed on the pulley side. However, this is limited by the length of the straight edge and assumes that the pulley side is clean, rust free and parallel to the pulley V-grooves. This method usually does not result in an accurate alignment.

TYPES OF MISALIGNMENT

- Angular vertical
- Angular horizontal
- Parallel
- Correct alignment
LAB-SET: THE SOLUTION TO ALL YOUR BELT ALIGNMENT NEEDS

NSK’s Laser alignment tool for belts (LAB-Set) enables truly accurate alignment as the laser heads are fitted directly into the pulley V-grooves. The LAB-Set is very easy to use and allows adjustment with the belt in place. With the LAB-Set, you are never in doubt whether your belt transmissions are aligned or not. By using the V-grooves as reference, you will achieve precise alignment which reduces belt wear, bearing failures and vibration.

BENEFITS OF LAB-SET

› Increased bearing lifetime
› Increased machinery uptime, efficiency and productivity
› Reduced wear of pulleys and belts
› Reduced unplanned downtime
› Reduced costs for component replacement
› Reduced friction and energy consumption
› Reduced vibration and noise
TWO TRANSMITTERS WITH VISIBLE RED LASER LINE

The LAB-Set comes with two line laser transmitters, each equipped with two spring loaded guides which fit into the pulley grooves. The use of two laser transmitters with integrated targets makes it very easy to find out what kind of alignment is required. Parallel offset, angular error and twist are instantly visible to the operator. Within a few minutes the operator can determine if the machine requires alignment or not. This is far more accurate than single laser head types.

MOUNTING OF THE TRANSMITTERS

The LAB-Set units are very easily mounted on the pulleys, regardless of the condition of the pulley side faces. The spring action probe finds the center of the belt groove. The built-in industrial magnets snap the units to the pulley with a perfect fit. The LAB-Set is equipped with various sized removable guides to fit standard groove profiles sizes A-E (6 – 40 mm). Additional guides for alignment of timing belts are available as accessories.

THE ALIGNMENT PROCESS WITH THE LAB-SET

The visible red laser line makes it easy to determine the position of your belt driven machines. The alignment process is as easy as the mounting. Just turn on the lasers and look at the opposite mounted unit. The laser shows as a line on the target label as in the illustration to the right. If necessary, adjust your machine position until the laser lines are aligned with the center mark. This is done for both units which ensures accurate alignment at a distance up to 6m.
<table>
<thead>
<tr>
<th><strong>Measuring Units</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing material</td>
<td>Extruded aluminum (molded ABS cover)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 to 40°C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>10 – 90%</td>
</tr>
<tr>
<td>Weight</td>
<td>300g</td>
</tr>
<tr>
<td>Dimensions</td>
<td>61 x 77 x 61mm</td>
</tr>
<tr>
<td>Laser</td>
<td>600 – 650 nm class II diode laser</td>
</tr>
<tr>
<td>Laser line fan angle</td>
<td>90°</td>
</tr>
<tr>
<td>Laser power</td>
<td>&lt; 1mW</td>
</tr>
<tr>
<td>Measurement distance</td>
<td>50 – 6000mm</td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>Better than 0.5mm or 0.2 degrees</td>
</tr>
<tr>
<td>Pulley diameter range</td>
<td>From 75mm and larger (standard)</td>
</tr>
<tr>
<td>Pulley belt groove width</td>
<td>6 – 40mm (standard)</td>
</tr>
<tr>
<td>Power supply (battery)</td>
<td>2 pcs of LR03 (AAA) 1.5V per unit</td>
</tr>
<tr>
<td>Operating time</td>
<td>20 hours of continuous operation</td>
</tr>
<tr>
<td>Laser safety</td>
<td>See yellow label on unit</td>
</tr>
</tbody>
</table>

| **Complete System**                     |                                                     |
| Weight (incl. all standard parts)       | 1.6 kg                                              |
| Storage temperature                     | -20 to 70°C                                         |

| **Case**                                |                                                     |
| Material                                | Double Walled Polypropylene                         |
| Dimensions                              | 300 x 275 x 110 mm                                  |
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