Power Lathe Chuck
ROTA NCE
Assembly and Operating Manual
Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

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1 General

1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under (  1.1.2, Page 6) are applicable.

1.1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.

<table>
<thead>
<tr>
<th>![Danger Icon]</th>
<th><strong>DANGER</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Danger for persons! Non-observance will inevitably cause irreversible injury or death.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>![Warning Icon]</th>
<th><strong>WARNING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangers for persons! Non-observance can lead to irreversible injury and even death.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>![Caution Icon]</th>
<th><strong>CAUTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangers for persons! Non-observance can cause minor injuries.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>![Notice Icon]</th>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Material damage! Information about avoiding material damage.</td>
<td></td>
</tr>
</tbody>
</table>
1.1.2 Applicable documents

- General terms of business*
- Catalog data sheet of the purchased product *
- Calculation of the jaw centrifugal forces, "Technology" chapter in the lathe chuck catalog *

The documents marked with an asterisk (*) can be downloaded on our homepage [schunk.com](http://schunk.com).

1.1.3 Sizes

This operating manual applies to the following sizes:
- ROTA NCE 130-38
- ROTA NCE 165-53
- ROTA NCE 210-66
- ROTA NCE 260-81
- ROTA NCE 315-106

1.2 Warranty

The warranty period is 24 months after delivery date from factory or 500,000 cycles*, if it is used as intended, under the following conditions:

- Observe the applicable documents ([1.1.2, Page 6](#))
- Observe the ambient conditions and operating conditions, ([2.6, Page 9](#))
- Observe the specified maintenance and lubrication intervals, ([7, Page 39](#))

Parts touching the workpiece and wear parts are not included in the warranty.

* A cycle consists of a complete clamping process ("Open" and "Close").

1.3 Scope of delivery

- 1 Power chucks in ordered version
- 6 Mounting screws (NCE 130-38 3 pieces)
- 6 T-nuts with screws or 3 combination T-nuts (for variant with pointed tooth)
- 1 Assembly key
- 1 Eye bolt, starting from size 210
2 Basic safety notes

2.1 Intended use

This product is intended for clamping workpieces on machine tools and other suitable technical devices.

- The product may only be used within the scope of its technical data, (☞ 3, Page 17).
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.
- The maximum RPM of the chuck and the required clamping force must be determined by the user for the respective clamping task based on the applicable standards and technical specifications of the manufacturer. (See also “Calculations for clamping force and RPM” in the chapter “Technical data”). (☞ 3, Page 17)

2.2 Not intended use

A not intended use of the product is for example:

- It is used as a press, a punch, a toolholder, a load-handling device or as lifting equipment.
- The product is used for unintended machines or workpieces.
- The technical data is exceeded when using the product. (☞ 3, Page 17)
- if workpieces are not clamped properly, paying particular attention to the clamping forces specified by the manufacturer.
- if it is used in working environments that are not permissible.
- if the product is operated without a protective cover.

2.3 Constructional changes

Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.
2.4 Spare parts

Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts or spares authorized by SCHUNK.

2.5 Chuck jaws

Requirements of the chuck jaws

Stored energy can make the product unsafe and risk the danger of serious injuries and considerable material damage.

- Only replace chuck jaws if no residual energy can be released.
- Do not use welded jaws.
- The jaws should be designed as light and as low as possible. The clamping point must be as close as possible to the chuck face (clamping points at a greater distance lead to greater surface pressure in the jaw guidance and can significantly reduce the clamping force).
- If for constructional reasons the special chuck jaws are heavier than the top jaws assigned to the lathe chuck, greater centrifugal forces must be accounted for when defining the required clamping force and the recommended speed.
- The maximum recommended speed may only be operated in conjunction with maximum actuating force and only with the lathe chuck in optimal, fully functioning condition.
- After a collision, the lathe chuck and the chuck jaws must be subjected to a crack test before being used again. Damaged parts must be replaced with original SCHUNK spare parts.
- Screw the jaw mounting screws into the bore holes furthest apart.
- The jaw fastening screws must be replaced if they show any signs of wear or damage. Only use screws with a quality of 12.9.
2.6 Environmental and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, ([☞ 3, Page 17]).
- Make sure that the product is a sufficient size for the application.
- Only use high-quality cooling emulsions with anti-corrosive additives during processing.

Clamping force tester

Depending on the operating conditions, the function and clamping force must be checked after a certain period of operation ([☞ 7.2, Page 39]). Only use a calibrated clamping force tester for measuring during the clamping force test.

With the smallest possible actuating pressure (clamping cylinder), the base jaws should move evenly. This method only provides a limited indication and is not a substitute for measuring the clamping force.

If the clamping force has dropped too much or if the base jaws and pistons no longer move properly, the chuck must be disassembled, cleaned, and relubricated ([☞ 7, Page 39]).

2.7 Personnel qualification

Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:
### Basic safety notes

<table>
<thead>
<tr>
<th>Trained electrician</th>
<th>Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified personnel</td>
<td>Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.</td>
</tr>
<tr>
<td>Instructed person</td>
<td>Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.</td>
</tr>
<tr>
<td>Service personnel of the manufacturer</td>
<td>Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.</td>
</tr>
</tbody>
</table>

### 2.8 Personal protective equipment

#### Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

### 2.9 Notes on safe operation

#### Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
• Observe the safety notes and assembly instructions.
• Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
• Eliminate any malfunction immediately.
• Observe the care and maintenance instructions.
• Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

2.10 Transport

Handling during transport
Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.
• When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
• Secure the product against falling during transportation and handling.
• Stand clear of suspended loads.

2.11 Malfunctions

Behavior in case of malfunctions
• Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
• Order appropriately trained personnel to rectify the malfunction.
• Do not recommission the product until the malfunction has been rectified.
• Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.12 Disposal

Handling of disposal
The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.
• Follow local regulations on dispatching product components for recycling or proper disposal.
2.13 Fundamental dangers

General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

2.13.1 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

2.13.2 Protection during commissioning and operation

Falling or violently ejected components

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
Basic safety notes

2.13.3 Protection against dangerous movements

Unexpected movements

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

2.13.4 Notes on particular risks

![DANGER]

Risk of fatal injury from suspended loads!
Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.
Basic safety notes

DANGER
Risk of fatal injury to operating personnel due to the workpiece falling down or being flung out in the event of a power failure

In the event of a power failure, the lathe chuck's clamping force may fail immediately and the workpiece may be released in an uncontrolled manner. This poses a risk of death or injury to the operating personnel and can result in serious damage to the automated system.

- The machine manufacturer and the operator of the machine must carry out and document a hazard assessment and risk analysis to ensure that suitable measures are taken to maintain the lathe chuck's clamping force until the machine comes to a standstill and the workpiece can be secured (e.g. using a crane or suitable lifting equipment).
- The machines and equipment must fulfill the minimum requirements of the EC Machinery Directive; specifically, they must have effective technical measures to protect against potential mechanical hazards.

DANGER
Possible risk of fatal injury to operating personnel if a jaw breaks or if the lathe chuck fails because the technical data have been exceeded and a workpiece is released or parts fly off

- The technical data specified by the manufacturer for using the lathe chuck must never be exceeded.
- The lathe chuck may only be used on machines and facilities that fulfill the minimum requirements of the EC Machinery Directive; specifically, they must have effective technical measures to protect against possible mechanical hazards.
DANGER
Possible risk of fatal injury to operating personnel from clothing or hair being caught on the lathe chuck and being dragged into the machine
Loose clothing or long hair may become caught on projecting parts of the lathe chuck and be drawn into the machine.
- The machines and equipment must fulfill the minimum requirements of the EC Machinery Directive; specifically, they must have effective technical measures to protect against potential mechanical hazards.
- Always wear tight-fitting clothing and a hairnet when working on the machine and the lathe chuck.

CAUTION
Danger of slipping and falling in case of dirty environment where the chuck is used (e.g. by cooling lubricants or oil).
- Ensure that the working environment is clean before starting assembly and installation work.
- Wear suitable safety shoes.
- Follow the safety and accident-prevention regulations when operating the chuck, especially when working with machine tools and other technical equipment.

CAUTION
Danger of limbs being crushed by opening and closing of the chuck jaws during manual loading and unloading or when replacing moving parts.
- Do not reach between the jaws.
- Wear safety gloves.
- Observe the safety and accident prevention regulations during operation of the chuck, especially in connection with machining centers and other technical equipment.

CAUTION
Risk of burns due to workpieces with high temperatures.
- Wear protective gloves when removing the workpieces.
- Automatic loading is preferred.
### Risk of damage due to incorrect choice of clamping position for chuck jaws on workpiece.

If an incorrect clamping position is chosen for the chuck jaws on workpiece, the base and top jaws may become damaged.

- The T-nuts for connecting the top jaws to the base jaws must not protrude beyond the base jaws in the radial direction.
- The diameter of the workpiece may not be bigger than the chuck diameter.

### Hazard from vibration due to imbalanced rotating parts and noise generation.

Physical and mental strains due to imbalanced workpieces and noise during the machining process on the clamped and rotating workpiece.

- Ensure the chuck's axial and concentric runout.
- Check options for remedying imbalances on special top jaws and workpieces.
- Reduce the speed.
- Wear hearing protection.
## 3 Technical data

### 3.1 Chuck data

<table>
<thead>
<tr>
<th>ROTA NCE</th>
<th>130-38</th>
<th>165-53</th>
<th>210-66</th>
<th>260-81</th>
<th>315-106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. actuating force [kN] *</td>
<td>19</td>
<td>26.5</td>
<td>38</td>
<td>45</td>
<td>58</td>
</tr>
<tr>
<td>Max. clamping force [kN]</td>
<td>45</td>
<td>65</td>
<td>100</td>
<td>130</td>
<td>155</td>
</tr>
<tr>
<td>Max. speed [RPM]</td>
<td>7500</td>
<td>6000</td>
<td>5000</td>
<td>4500</td>
<td>3500</td>
</tr>
<tr>
<td>Stroke per jaw [mm]</td>
<td>3.2</td>
<td>3.3</td>
<td>4.2</td>
<td>4.9</td>
<td>5.8</td>
</tr>
<tr>
<td>Piston stroke [mm]</td>
<td>14</td>
<td>14</td>
<td>18</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>Chuck through-bore [mm]</td>
<td>38</td>
<td>53</td>
<td>66</td>
<td>81</td>
<td>106</td>
</tr>
</tbody>
</table>

**Centrifugal torque of base jaw [kgm] McGB**

| with cross offset | 0.013 | 0.028 | 0.059 | 0.105 | 0.184 |
| with pointed tootthing | - | 0.024 | 0.048 | 0.083 | 0.144 |

Operating temperature + 15 °C to + 60 °C

<table>
<thead>
<tr>
<th>Weight with base jaw in kg</th>
<th>130-38</th>
<th>165-53</th>
<th>210-66</th>
<th>260-81</th>
<th>315-106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z 100</td>
<td>4.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-4-Nr. 5</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A5</td>
<td>9.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-4-Nr. 6</td>
<td></td>
<td>15.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A6</td>
<td></td>
<td>16.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-4-Nr. 8</td>
<td></td>
<td></td>
<td>24.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A6</td>
<td></td>
<td></td>
<td>28.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A8 a</td>
<td></td>
<td></td>
<td>26.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 702-4-Nr. 8</td>
<td></td>
<td></td>
<td></td>
<td>37.7</td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A6</td>
<td></td>
<td></td>
<td></td>
<td>43.0</td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A8</td>
<td></td>
<td></td>
<td></td>
<td>40.3</td>
<td></td>
</tr>
<tr>
<td>ISO 702-1-A11</td>
<td></td>
<td></td>
<td></td>
<td>49.8</td>
<td></td>
</tr>
</tbody>
</table>

* For I.D. clamping, the maximum actuating force must be reduced by 30%.

The maximum RPM stated is only valid with the maximum clamping force and when using the hard standard chuck jaws that go with the chuck.

The maximum permissible RPM for the specific machining has to be defined by the user on the basis of the required clamping forces. This speed must not exceed the maximum speed of the lathe chuck.
Ensure minimal weight for all jaws. For unhardened top jaws or special chuck jaws, the permissible RPM according to VDI 3106 must be calculated for the respective machining job, whereby the maximum recommended speed must not be exceeded. The calculations must be checked using dynamic measurement.

### 3.2 Clamping force / speed diagrams

Clamping force/RPM curves have been calculated using the corresponding standard top jaws (stepped jaws and monoblock jaws). In the determination process, the maximum actuating force was applied and the jaws were set flush with the outer diameter of the chuck.

The chuck is in perfect condition and lubricated with SCHUNK LINOMAX plus special grease.

If one or more of these prerequisites is modified, the diagrams will no longer be valid.

#### Chuck setup for clamping force/RPM diagram

<table>
<thead>
<tr>
<th>F/3</th>
<th>Clamping force per jaw</th>
<th>F&lt;sub&gt;max&lt;/sub&gt;</th>
<th>Max. actuating force</th>
</tr>
</thead>
<tbody>
<tr>
<td>r&lt;sub&gt;s&lt;/sub&gt;</td>
<td>Center of gravity radius</td>
<td>S</td>
<td>Center of gravity</td>
</tr>
</tbody>
</table>
ROTA NCE 130-38 clamping force-RPM diagram with cross offset

ROTA NCE 165-53 clamping force-RPM diagram with pointed toothing

ROTA NCE 165-53 clamping force-RPM diagram with cross offset
Technical data

ROTA NCE 210-66 clamping force-RPM diagram with pointed toothing

ROTA NCE 210-66 clamping force-RPM diagram with cross offset

ROTA NCE 260-81 clamping force-RPM diagram with pointed toothing
ROTA NCE 260-81 clamping force-RPM diagram with cross offset

ROTA NCE 315-106 clamping force-RPM diagram with pointed toothing

ROTA NCE 315-106 clamping force-RPM diagram with cross offset
3.3 Calculations for clamping force and speed

Missing information or specifications can be requested from the manufacturer.

<table>
<thead>
<tr>
<th>Legend</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_c$</td>
<td>Total centrifugal force [N]</td>
</tr>
<tr>
<td>$F_{sp}$</td>
<td>Effective clamping force [N]</td>
</tr>
<tr>
<td>$F_{sp\text{min}}$</td>
<td>Min. required clamping force [N]</td>
</tr>
<tr>
<td>$F_{sp0}$</td>
<td>Initial clamping force [N]</td>
</tr>
<tr>
<td>$F_{spz}$</td>
<td>Cutting force [N]</td>
</tr>
<tr>
<td>$m_{AB}$</td>
<td>Mass of one top jaw [kg]</td>
</tr>
<tr>
<td>$m_B$</td>
<td>Mass of chuck jaw set [kg]</td>
</tr>
<tr>
<td>$M_c$</td>
<td>Centrifugal force torque [Nm]</td>
</tr>
<tr>
<td>$M_{c\text{AB}}$</td>
<td>Centrifugal torque of top jaws [Nm]</td>
</tr>
<tr>
<td>$M_{c\text{GB}}$</td>
<td>Centrifugal torque of base jaws [Nm]</td>
</tr>
<tr>
<td>$n$</td>
<td>Speed [rpm]</td>
</tr>
<tr>
<td>$r_s$</td>
<td>Center of gravity radius [mm]</td>
</tr>
<tr>
<td>$s_{sp}$</td>
<td>Safety factor for clamping force</td>
</tr>
<tr>
<td>$s_z$</td>
<td>Safety factor for machining</td>
</tr>
<tr>
<td>$\Sigma_s$</td>
<td>Max. clamping force of chuck [N]</td>
</tr>
<tr>
<td>$\Sigma$</td>
<td>Max. clamping force of chuck [N]</td>
</tr>
<tr>
<td>$\Sigma s$</td>
<td>Max. clamping force of chuck [N]</td>
</tr>
<tr>
<td>$kgm \times 9.81$</td>
<td>Nm</td>
</tr>
</tbody>
</table>

3.3.1 Calculation of the required clamping force in case of a given rpm

The initial clamping force $F_{sp0}$ is the total force impacting radially on the workpiece via the jaws due to actuation of the lathe chuck during shutdown. Under the influence of rotation, the jaw mass generates an additional centrifugal force. The centrifugal force reduces or increases the initial clamping force depending on whether gripping is from the outside inwards or from the inside outwards. The sum of the initial clamping force $F_{sp0}$ and the total centrifugal force $F_c$ is the effective clamping force $F_{sp}$.

$$F_{sp} = F_{sp0} \mp F_c \ [N]$$

(–) for gripping from the outside inwards
(+) for gripping from the inside outwards
Risk to life and limb of the operating personnel and significant property damage when the RPM limit is exceeded! With gripping from the outside inwards, and with increasing RPM, the effective clamping force is reduced by the magnitude of the increasing centrifugal force (the forces are opposed). When the RPM limit is exceeded, the clamping force drops below the required minimum clamping force $F_{sp\text{min}}$. Consequently, the workpiece is released spontaneously.

- Do not exceed the calculated RPM.
- Do not fall below the necessary minimum clamping force.

The required effective clamping force for machining $F_{sp}$ is calculated from the product of the machining force $F_{sp\text{Z}}$ and the safety factor $S_z$. This factor takes into account uncertainties in the calculation of the machining force. According to VDI 3106: $S_z \geq 1.5$.

$$F_{sp} = F_{sp\text{Z}} \cdot S_z \ [N]$$

From this we can derive the calculation of the initial clamping force during shutdown:

$$F_{sp0} = S_{sp} \cdot (F_{sp} \pm F_c) \ [N]$$

(+) for gripping from the outside inwards

(−) for gripping from the inside outwards
From the above formula it is evident that the sum of the effective clamping force $F_{sp}$ and the total centrifugal force $F_c$ is multiplied by the safety factor for the clamping force $S_{sp}$. According to VDI 3106, the following also applies here: $S_{sp} \geq 1.5$.

The total centrifugal force $F_c$ is dependent on both the sum of the masses of all jaws and on the center of gravity radius and the rpm.

For safety reasons, in accordance with DIN EN 1550, the centrifugal force may be a maximum of 67% of the initial clamping force.

The formula for the calculation of the total centrifugal force $F_c$ is:

$$F_c = \sum (m_B \cdot r_s) \cdot \left(\frac{\pi \cdot n}{30}\right)^2 = \sum M_c \cdot \left(\frac{\pi \cdot n}{30}\right)^2 \quad [N]$$

For this, $n$ is the given speed of rotation in RPM. The product $m_B \cdot r_s$ is referred to as the centrifugal force torque $M_c$.

$$M_c = m_B \cdot r_s \quad [kgm]$$

In case of toolholders with split chuck jaws, i.e., with base jaws and top jaws, for which the base jaws change their radial position only by the stroke amount, the centrifugal torque of the base jaws $M_{cGB}$ and the centrifugal torque of the top jaws $M_{cAB}$ need to be added:

$$M_c = M_{cGB} + M_{cAB} \quad [kgm]$$

The centrifugal torque of the base jaws $M_{cGB}$ can be found in the table "Chuck data"(☞ 3.1, Page 17). The centrifugal torque of the top jaws $M_{cAB}$ is calculated as per:

$$M_{cAB} = m_{AB} \cdot r_{SAB} \quad [kgm]$$

### 3.3.2 Calculation example: required initial clamping force for a given speed

**Required initial clamping force $F_{sp0}$ for a given speed $n$**

The following data is known for the machining job:

- Gripping from the outside in (application-specific)
- Machining force $F_{spz} = 3000 \text{ N}$ (application-specific)
• max. speed of rotation $n_{\text{max}} = 3200$ rpm ("Chuck data" table)
• RPM $n = 1200$ rpm (application-specific)
• Mass of one (!) top jaw $m_{AB} = 5.33$ kg (application-specific)
• Center of gravity radius of top jaw $r_{SAB} = 0.107$ m (application-specific)
• Safety factor $S_z = 1.5$ (according to VDI 3106)
• Safety factor $S_{sp} = 1.5$ (according to VDI 3106)

**Note:** Masses of the jaw mounting screws and T-nuts are not taken into account.

First the required effective clamping force $F_{sp}$ is calculated using the machining force stated:

$$F_{sp} = F_{spz} \cdot S_z = 3000 \cdot 1.5 \Rightarrow F_{sp} = 4500 \text{ N}$$

Initial clamping force during shutdown:

$$F_{sp0} = S_{sp} \cdot (F_{sp} + F_c)$$

Calculation of total centrifugal force:

$$F_c = \sum M_c \cdot \left(\frac{\pi \cdot n}{30}\right)^2$$

For two-part chuck jaws, the following applies:

$$M_c = M_{cGB} + M_{cAB}$$

Centrifugal torque of base jaw and top jaw specified in "Chuck data" table:

$$M_{cGB} = 0.319 \text{ kgm}$$

For the centrifugal torque of the top jaw, the following applies:

$$M_{cAB} = m_{AB} \cdot r_{SAB} = 5.33 \cdot 0.107 \Rightarrow M_{cAB} = 0.57 \text{ kgm}$$

Centrifugal torque for one jaw:

$$M_c = 0.319 + 0.571 \Rightarrow M_c = 0.89 \text{ kgm}$$

The chuck has 3 jaws, the total centrifugal torque is:

$$\sum M_c = 3 \cdot M_c = 3 \cdot 0.889 \Rightarrow \sum M_c = 2.667 \text{ kgm}$$

The total centrifugal force can now be calculated:

$$F_c = \sum M_c \cdot \left(\frac{\pi \cdot n}{30}\right)^2 = 2.668 \cdot \left(\frac{\pi \cdot 1200}{30}\right)^2 \Rightarrow F_c = 42131 \text{ N}$$

Initial clamping force during shutdown that was sought:

$$F_{sp0} = S_{sp} \cdot (F_{sp} + F_c) = 1.5 \cdot (4500 + 42131) \Rightarrow F_{sp0} = 69947 \text{ N}$$
3.3.3 Calculation of the permissible speed \( n_{\text{perm}} \) in case of a given initial clamping force \( F_{\text{sp0}} \)

The following formula can be used to calculate the permissible RPM for a given initial clamping force during shutdown:

\[
  n_{\text{zul}} = \frac{30}{\pi} \sqrt{\frac{F_{\text{sp0}} - (F_{\text{spz}} \cdot S_z)}{\sum M_c}} \quad \text{[min}^{-1}] \]

**NOTICE**

The calculated permissible RPM may not exceed the maximum RPM inscribed on the chuck for safety reasons!

Example of calculation: Permissible RPM for a given effective clamping force

The following data is known from previous calculations:

- Initial clamping force during shutdown \( F_{\text{sp0}} = 17723 \) N
- Machining force for machining job \( F_{\text{spz}} = 3000 \) N (application-specific)
- Total centrifugal torque of all jaws \( \sum M_c = 2.668 \text{ kgm} \)
- Safety factor \( S_z = 1.5 \) (according to VDI 3106)
- Safety factor \( S_{sp} = 1.5 \) (according to VDI 3106)

**NOTE:**

Masses of the jaw mounting screws and T-nuts are not taken into account.

Identifying the permissible RPM:

\[
  n_{\text{zul}} = \frac{30}{\pi} \sqrt{\frac{17723 - (3000 \cdot 1.5)}{2.668}} \quad \Rightarrow n_{\text{zul}} = 1495 \text{ min}^{-1}
\]

The calculated RPM \( n_{\text{zul}} = 1495 \text{ rpm} \) is smaller than the maximum permissible RPM of the chuck \( n_{\text{max}} = 3200 \text{ rpm} \) (see "Chuck data" table (\textit{Page 17})).

This calculated RPM may be used.

3.4 Grades of Accuracy

Tolerances for run-out accuracy and axial run-out accuracy correspond to the Technical Supply Terms for lathe chucks as per DIN ISO 3089.
### 3.5 Permissible imbalance

The ROTA NCE in ungreased state without T-nuts and top jaws corresponds to the balancing quality class 6.3 (according to DIN ISO 21940-1). Residual imbalance risks may arise due to insufficient rotation compensation being achieved (see DIN EN 1550 6.2 e). This applies particularly to high RPM, asymmetrical workpieces or the use of various top jaws, as well as uneven lubrication. In order to prevent damage resulting from these residual risks, the entire rotor must be dynamically balanced in accordance with DIN ISO 21940-1.

### 4 Torques per screw

**Tightening torques for mounting screws used to clamp the chuck on lathes or other suitable technical equipment** (screw quality 10.9)

<table>
<thead>
<tr>
<th>Screw size</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
<th>M14</th>
<th>M16</th>
<th>M18</th>
<th>M20</th>
<th>M22</th>
<th>M24</th>
<th>M27</th>
<th>M30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissible torque Mₐ (Nm)</td>
<td>13</td>
<td>28</td>
<td>50</td>
<td>88</td>
<td>120</td>
<td>160</td>
<td>200</td>
<td>290</td>
<td>400</td>
<td>500</td>
<td>1050</td>
<td>1500</td>
</tr>
</tbody>
</table>

**Tightening torques for mounting screws used to attach top jaws onto the chuck** (screw quality 12.9)

<table>
<thead>
<tr>
<th>Screw size</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
<th>M14</th>
<th>M16</th>
<th>M20</th>
<th>M24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. admissible torque Mₐ (Nm)</td>
<td>16</td>
<td>30</td>
<td>50</td>
<td>70</td>
<td>130</td>
<td>150</td>
<td>220</td>
<td>450</td>
</tr>
</tbody>
</table>

**Tightening torques for the protection sleeve mounting screws** (screw quality 8.8)

<table>
<thead>
<tr>
<th>Screw size</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>M6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torques Mₐ (Nm)</td>
<td>1.3</td>
<td>3.0</td>
<td>5.5</td>
<td>9.0</td>
</tr>
</tbody>
</table>
5 Assembly

5.1 Installing and connecting

⚠️ WARNING

Risk of injury due to unexpected movements!
If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Ensure that no residual energy remains in the system.

⚠️ CAUTION

Danger of injury due to sharp edges and rough or slippery surfaces
- Wear personal protective equipment, particularly protective gloves.

1. Checking the spindle nose for mounting the chuck flange
   (☞ 5.2, Page 28)
2. Finish turning the center sleeve blank (☞ 5.3, Page 29)
3. Chuck assembly
   - Chuck assembly (with cylindrical recess) (☞ 5.4.1, Page 31)
     If required:
   - Assembly preparation for chuck with reduction or extension flange (☞ 5.4.2, Page 35) or
   - Assembly preparation for chuck with direct mount (☞ 5.4.3, Page 35)
4. Performing a functional check
   (☞ 6.2, Page 36)

5.2 Checking the chuck mount

The machine side must be aligned prior to the flange being installed in order to achieve high concentricity of the chuck. To do this, check the contact surfaces on the spindle for concentricity and axial run-out accuracy using a dial indicator.
There should be a maximum concentricity error in the centering of the mount of 0.005 mm and a maximum axial run-out error in the contact surfaces of 0.005 mm. The flat surface of the spindle must also be checked for flatness using a straightedge.

Make sure that the surface area of the flat surface is deburred at the bore holes and is clean.

Make sure that the surface area of the flat surface is deburred at the bore holes and is clean.

Here, it must be ensured that the center sleeve protrudes from the rear of the chuck in line with its size. There must be sufficient free space for the full piston stroke.

<table>
<thead>
<tr>
<th>Chuck size</th>
<th>Ø d</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>min.</td>
<td>max.</td>
</tr>
<tr>
<td>NCE 130</td>
<td>-</td>
<td>60</td>
</tr>
<tr>
<td>NCE 165</td>
<td>68</td>
<td>93</td>
</tr>
<tr>
<td>NCE 210</td>
<td>83</td>
<td>115</td>
</tr>
<tr>
<td>NCE 260</td>
<td>99</td>
<td>139</td>
</tr>
<tr>
<td>NCE 315</td>
<td>126</td>
<td>161</td>
</tr>
</tbody>
</table>

5.3 Finish turning the center sleeve blank

In its original condition, the center sleeve blank only has one bore hole. In order to affix the chuck, a thread must be engraved into the center sleeve blank.

1. Undo the mounting screws and remove the center sleeve blank from the chuck.

2. Cut the same thread into the center sleeve as on the draw tube.
3 Reinsert the center sleeve into the chuck and tighten.

<table>
<thead>
<tr>
<th>1</th>
<th>Chuck body</th>
<th>6</th>
<th>Center sleeve blank</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Retainer ring</td>
<td>9</td>
<td>Screw</td>
</tr>
</tbody>
</table>

**NOTICE**

Tighten the screws of the protection sleeve to the specified torque (4, Page 27). If the specified torque is not reached or is exceeded, the screws might break. Only use the screws provided.

**NOTICE**

In order to achieve the full stroke of the chuck, sufficient freedom of movement of the center sleeve in the spindle must be ensured; the center sleeve blank protrudes from the rear of the chuck. The piston or the retainer ring needs an end stop on the spindle.
5.4 Assembly

1. Chuck assembly (with cylindrical recess) (5.4.1, Page 31)
   ⇨ Assembly preparation for chuck with reduction or extension flange (5.4.2, Page 35)
   ⇨ Assembly preparation for chuck with direct mount (5.4.3, Page 35)

5.4.1 Chuck assembly (with cylindrical recess)

NOTE
If the mount of the machine spindle and the lathe chuck are identical, chuck assembly takes place without assembly preparation. If the mount of the machine spindle deviates from the mount of the lathe chuck, a connecting flange must be affixed before the chuck is assembled. See (5.4.2, Page 35) or (5.4.3, Page 35)
**NOTICE**

Use a crane to install the lathe chuck. The chuck can be fastened to the eye bolt provided (see Fig. "Lathe chuck assembly" ([5.4, Page 31]).

The eye bolt must be removed prior to starting up. The eye bolt is included in the scope of delivery from size 210.

**NOTICE**

When mounting on machines with a vertically suspended spindle, the screws (item 12) serve as a back stop for the chuck piston. Before beginning assembly, it must be ensured that the screws (item 12) are tight and not damaged.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chuck body</td>
</tr>
<tr>
<td>2</td>
<td>Base jaw</td>
</tr>
<tr>
<td>3</td>
<td>Chuck piston</td>
</tr>
<tr>
<td>5</td>
<td>Retainer ring</td>
</tr>
<tr>
<td>6</td>
<td>Center sleeve blank</td>
</tr>
<tr>
<td>8</td>
<td>Screw</td>
</tr>
<tr>
<td>20</td>
<td>T-nut</td>
</tr>
<tr>
<td>B</td>
<td>Retainer ring</td>
</tr>
</tbody>
</table>
Chuck assembly

1. Remove the cylindrical screws for the top jaws together with the T-nuts (item 20).
2. Unscrew the cylindrical screws (item 9) and remove the protection sleeve (item 4). In order to press the protection sleeve off the chuck body, screw the cylindrical screws (item 9) into the additional threads of the protection sleeve.
3. Move the draw tube to the frontmost position.
4. Push the chuck piston (item 3) to the frontmost position (chuck open).
5. Lift the lathe chuck flush to the center of the spindle.
6. Screw the rotating center sleeve (item 6) in the chuck onto the draw tube using the enclosed assembly key as far as this will go.
7. Insert and slightly tighten the mounting screws.
8. Check the chuck for concentricity and axial run-out accuracy (see Fig. "Lathe chuck assembly" - E (☞ 5.4, Page 31)) and, if necessary, align at the outer diameter with gentle taps using a hammer.

<table>
<thead>
<tr>
<th>4</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

Tightening sequence for the mounting screws

9. Tighten the mounting screws (item 9) in the prescribed order with a torque wrench. Observe the tightening torques (☞ 4, Page 27).
10. Check the chuck again for concentricity and axial run-out accuracy (see Fig. "Lathe chuck assembly" - E (☞ 5.4, Page 31)). The "Concentricity and axial run-out tolerances" table shows the concentricities and axial run-out accuracies to be achieved.
11. Slide in the protection sleeve (item 4) and secure it using the cylindrical screws (item 9).
12. Check that the actuating force is functioning and is sufficient.
13. Check the jaw stroke of the base jaws and that these can move easily.
14 Fasten the top jaws marked 1, 2 and 3 to the base jaws using T-nuts (item 20) and screws.

The spindle is disassembled in the same way but in reverse order.

**Concentricity and axial run-out tolerances**

<table>
<thead>
<tr>
<th>Chuck size [mm]</th>
<th>Max. concentricity error [mm]</th>
<th>Max. axial run-out error [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>210</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>0.03</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**NOTICE**

Tighten the screws of the protection sleeve to the specified torque (☞ 4, Page 27). If the specified torque is not reached or is exceeded, the screws might break. Only use the screws provided.

**NOTICE**

Tighten the screws of the protection sleeve to the specified torque. If the specified torque is not reached or is exceeded, the screws might break. Only use the screws provided.

**CAUTION**

Danger of crushing of limbs when the mechanical system of the chuck is open.

The mechanical system of the chuck is opened when the protection sleeve is changed.

- Do not reach into the open mechanical system of the chuck.
- The lathe chuck must not be actuated and the chuck piston must not be moved.
5.4.2  Assembly preparation for chuck with reduction or extension flange

If the bolt pitch circle of the machine spindle does not correspond to the bolt pitch circle of the lathe chuck, a reduction or extension flange must be used. Affix this flange to the spindle nose prior to chuck assembly.

1 Before assembly of the chuck flange, remove any dirt or chips from the machine spindle and from the centering mount and contact surface of the flange.
2 A chuck flange produced by the user must be fully machined on the machine spindle and balanced before assembly of the chuck.
3 After assembly, ensure that the flange is in contact with the entire surface.
4 Check the concentricity and axial run-out accuracy of the flange (see Fig. "Lathe chuck assembly" - B (☞ 5.4, Page 31)).
5 Then the chuck is assembled (☞ 5.4.1, Page 31).

5.4.3  Assembly preparation for chuck with direct mount

If the bolt pitch circle of the short taper machine spindle is identical to that of the lathe chuck, a direct mount must be used. Affix the direct mount to the lathe chuck prior to chuck assembly.

1 Before mounting the chuck flange on the cylindrical recess of the chuck, remove any dirt or chips from the centering mount and contact surface of the flange.
2 Slightly tighten the flange onto the chuck with the supplied mounting screws.
3 Then the chuck is assembled (☞ 5.4.1, Page 31).
6 Function

6.1 Function and handling

Wedge-hook chucks are actuated using rotating closed-center or open-center hydraulic cylinders or via a static hydraulic cylinder. The axial tensile and pressure forces are converted to the radial jaw clamping force by the wedge hook angle in the piston and base jaws.

The clamping and opening path of the chuck jaws is determined by the hydraulic cylinder. The fine serration of the base jaws can be used to mount standard jaws as well as special jaws for complicated workpiece shapes. The top jaws are moved or changed in the open clamping position.

![WARNING]

Clamping further above the chuck surface results in lower clamping force.
If the workpiece is released in an uncontrolled manner, there is a risk of personal injury and damage to the system.
- Refer to the "Technical data" chapter!

6.2 Functional testing

Functional test
After installation of the chuck, its function must be checked prior to start-up.

Two important points are:
- **Clamping Force!** The clamping force of the chuck must be achieved at max. operating force/pressure.
- **Stroke control!** The stroke of the clamping piston must allow a safety zone at the front and rear end position. The machine spindle may only be started when the clamping piston has passed through the safety zone. Only limit switches that meet the requirements for safety limit switches specified in DIN EN 60204-1 may be used.

When determining the necessary clamping force to machine a workpiece, take the centrifugal force acting on the chuck jaws into account (according to VDI 3106).
If the chuck jaws are changed, adjust the stroke control to the new situation.
**Function**

**Speed**

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
</table>
| Risk of fatal injury to operating personnel if the top speed is exceeded, resulting in workpiece loss and parts flying off!  
- A reliable speed limiter must be installed in the machine tool or technical equipment and proof must be provided that the speed limiter is effective! |

### 6.3 Replacement or renewal of jaws

For maximum clamping repeat accuracy, the chuck jaws must be turned or ground in the lathe chuck under clamping pressure.

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>When turning or grinding, ensure that the turning ring or turning pin is clamped by the top jaws and not by the base jaws.</td>
</tr>
</tbody>
</table>

Tighten the jaw mounting screws (screw grade 12.9) to the specified torque (*cf.* 4, Page 27).

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
</table>
| Tighten the mounting screws of the top jaws with a torque wrench.  
Never tighten the Allen key with an extension pipe or by hitting it with a hammer! |
**NOTICE**

Make sure that the workpiece is clamped halfway up the base jaw stroke. The workpiece must not be clamped at the end of the base jaw stroke. This can lead to the workpiece becoming loose.

**WARNING**

Risk of personal injury and property damage due to parts flying off in the event of a screw breakage on unhardened top jaws! Soft standard top jaws must be hardened in the countersink region. They should only be depth-hardened, not surface-hardened.

**Changing the top jaws**

When changing the top jaws, the serration has to be cleaned and greased with SCHUNK LINOMAX plus special grease.
7 Maintenance

7.1 Lubrication

To maintain the safe function and high quality of the lathe chuck, it has to be regularly lubricated at the lubrication nipples in the chuck body.

The chuck must be lubricated in the open position.

For optimum grease distribution, the chuck piston must travel the entire clamping stroke several times after lubrication.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergic reactions due to grease in contact with skin!</td>
</tr>
<tr>
<td>Wear gloves.</td>
</tr>
</tbody>
</table>

7.2 Maintenance intervals

Lubrication of the grease areas:

<table>
<thead>
<tr>
<th>Lubrication interval</th>
<th>Strain</th>
</tr>
</thead>
<tbody>
<tr>
<td>every 25 hours</td>
<td>normal / coolant utilization</td>
</tr>
<tr>
<td>every 8 hours</td>
<td>high / coolant utilization</td>
</tr>
<tr>
<td>after 1200 hours or as needed</td>
<td>Total cleaning with disassembly of the chuck, depending on type and degree of contamination</td>
</tr>
</tbody>
</table>

7.3 Disassembling and assembling the chuck

The item numbers specified for the corresponding individual components relate to chapter drawings. (☞ 9, Page 41)

The lathe chuck can only be disassembled once it has been removed. (☞ 5, Page 28)

1 Unscrew the screws (item 9) and remove the protection sleeve (item 4).
2 Pull the chuck piston (item 3) out of the chuck body (item 1).
3 Push the base jaws (item 2) inwards out of the base jaw guide.

Degrease and clean all parts and check them for damage. Before assembly, grease well with LINOMAX plus.

Only use genuine SCHUNK spare parts when replacing damaged parts.
The lathe chuck is assembled in the same way but in reverse order.

**NOTICE**
When assembling the base jaws, make sure that the numbers on the base jaws match the numbers on the jaw guides.

8 **Spare parts**

When ordering spare parts, it is imperative to specify the type, size and above all the serial no. of the chuck.

Seals, sealing elements, screw connections, springs, bearings, screws and wiper bars plus parts coming into contact with the workpiece are not covered by the warranty.

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Quantity*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chuck body</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Base jaws</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Chuck piston</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Protection sleeve</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Retainer ring</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Center sleeve blank</td>
<td>1 (-)</td>
</tr>
<tr>
<td>7</td>
<td>Lubrication nipple</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Screws</td>
<td>6 (3)</td>
</tr>
<tr>
<td>9</td>
<td>Screws</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Screws</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>Emblem</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Screws</td>
<td>3 (-)</td>
</tr>
<tr>
<td>20</td>
<td>T-nuts (for chucks with pointed toothing)</td>
<td>3 (-)</td>
</tr>
<tr>
<td>30</td>
<td>Assembly key</td>
<td>1 (-)</td>
</tr>
<tr>
<td>31</td>
<td>Locking bolt</td>
<td>1 (-)</td>
</tr>
<tr>
<td>32</td>
<td>Eye bolt</td>
<td>1</td>
</tr>
</tbody>
</table>

* parentheses correspond to ROTA NCE 130-38
10 Declaration of Incorporation


Manufacturer/ Distributor
H.-D. SCHUNK GmbH & Co. Spanntechnik KG
Lothringuer Str. 23
D-88512 Mengen

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

The product also complies with the regulations found in directive 2014/30/EU from the European Parliament and the Council on electromagnetic compatibility.

Product designation: Power Lathe Chuck with Through-hole ROTA NCE

Type designation: size 130 up to 315

ID number: 1334152; 0808010; 0808011; 0808012; 0808013; 1374448; 1374449; 0808020; 0808021; 0808022; 0808023; 1374450; 1374445; 0808030; 0808031; 0808032; 0808033; 0808034; 0808035; 1374458; 1374459; 0808040; 0808041; 0808042; 0808043; 0808044; 0808045; 0808046; 0808047; 1374472; 1374473; 1374474; 1374475

The incomplete machine may not be put into operation until conformity of the machine into which the incomplete machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

DIN EN ISO 12100:2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN 1550:2008-11 Machine-tools safety - Safety requirements for the design and construction of work holding chucks

Other related technical standards and specifications:

DIN ISO 702-3:2010-04 Machine tools - Connecting dimensions of spindle noses an work holding chucks – Part 4: Cylindrical connection

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery in electronic form to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:
Philipp Schräder, Address: see manufacturer's address

Mengen, October 18 2018 p.p. Philipp Schräder; Head of Engineering Design
11 Appendix on Declaration of Incorporation, as per 2006/42/EC, annex II, No. 1 B

1. Description of the basic safety and health protection requirements, as per 2006/42/EC, annex I, that apply to and are fulfilled for the scope of the partly completed machine:

<table>
<thead>
<tr>
<th>Product designation</th>
<th>Power Lathe Chuck with Through-hole ROTA NCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type designation</td>
<td>size 130 up to 315</td>
</tr>
<tr>
<td>ID number</td>
<td>1334152; 0808010; 0808011; 0808012; 0808013; 1374448; 1374449; 0808020; 0808021; 0808022; 0808023; 1374450; 137445; 0808030; 0808031; 0808032; 0808033; 0808034; 0808035; 1374458; 1374459; 1374460; 0808040; 0808041; 0808042; 0808043; 0808044; 0808045; 0808046; 0808047; 1374472; 1374473; 1374474; 1374475</td>
</tr>
</tbody>
</table>

To be provided by the System Integrator for the overall machine:

<table>
<thead>
<tr>
<th>Fulfilled for the scope of the partly completed machine</th>
<th>Not relevant</th>
</tr>
</thead>
</table>

1.1 Essential Requirements

<table>
<thead>
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<td>1.1.3 Materials and products</td>
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<td>1.1.4 Lighting</td>
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<tr>
<td>1.1.5 Design of machinery to facilitate its handling</td>
<td>X</td>
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<tr>
<td>1.1.6 Ergonomics</td>
<td>X</td>
</tr>
<tr>
<td>1.1.7 Operating positions</td>
<td>X</td>
</tr>
<tr>
<td>1.1.8 Seating</td>
<td>X</td>
</tr>
</tbody>
</table>

1.2 Control Systems

| 1.2.1 Safety and reliability of control systems | X |
| 1.2.2 Control devices | X |
| 1.2.3 Starting | X |
| 1.2.4 Stopping | X |
| 1.2.4.1 Normal stop | X |
| 1.2.4.2 Operational stop | X |
| 1.2.4.3 Emergency stop | X |
| 1.2.4.4 Assembly of machinery | X |
| 1.2.5 Selection of control or operating modes | X |
| 1.2.6 Failure of the power supply | X |

1.3 Protection against mechanical hazards

| 1.3.1 Risk of loss of stability | X |
| 1.3.2 Risk of break-up during operation | X |
| 1.3.3 Risks due to falling or ejected objects | X |
| 1.3.4 Risks due to surfaces, edges or angles | X |
| 1.3.5 Risks related to combined machinery | X |
| 1.3.6 Risks related to variations in operating conditions | X |
| 1.3.7 Risks related to moving parts | X |
| 1.3.8 Choice of protection against risks arising from moving parts | X |
| 1.3.8.1 Moving transmission parts | X |
| 1.3.8.2 Moving parts involved in the process | X |
| 1.3.9 Risks of uncontrolled movements | X |

1.4 Required characteristics of guards and protective devices

| 1.4.1 General requirements | X |
| 1.4.2 Special requirements for guards | X |
| 1.4.2.1 Fixed guards | X |
### Appendix on Declaration of Incorporation, as per 2006/42/EC, annex II, No. 1 B

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<th>Section</th>
<th>Description</th>
<th>Requirement</th>
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<td>X</td>
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<td>1.4.2.3</td>
<td>Adjustable guards restricting access</td>
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<td>1.4.3</td>
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<td>X</td>
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<td>1.5</td>
<td><strong>Risks due to other hazards</strong></td>
<td></td>
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<tr>
<td>1.5.1</td>
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<td>1.5.2</td>
<td>Static electricity</td>
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<tr>
<td>1.5.3</td>
<td>Energy supply other than electricity</td>
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<td>1.5.5</td>
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<td>1.5.6</td>
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<td>1.5.7</td>
<td>Explosion</td>
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<td>1.5.8</td>
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<td>1.5.9</td>
<td>Vibrations</td>
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<td>1.5.10</td>
<td>Radiation</td>
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<td>1.5.11</td>
<td>External radiation</td>
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<td>1.5.12</td>
<td>Laser radiation</td>
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<td>1.5.13</td>
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<td>1.5.14</td>
<td>Risk of being trapped in a machine</td>
<td>X</td>
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<td>1.5.15</td>
<td>Risk of slipping, tripping or falling</td>
<td>X</td>
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<tr>
<td>1.5.16</td>
<td>Lightning</td>
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<tr>
<td>1.6</td>
<td><strong>Maintenance</strong></td>
<td></td>
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<td>1.6.1</td>
<td>Machinery maintenance</td>
<td>X</td>
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<tr>
<td>1.6.2</td>
<td>Access to operating positions and servicing points</td>
<td>X</td>
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<tr>
<td>1.6.3</td>
<td>Isolation of energy sources</td>
<td>X</td>
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<td>1.6.4</td>
<td>Operator intervention</td>
<td>X</td>
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<td>1.6.5</td>
<td>Cleaning of internal parts</td>
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<tr>
<td>1.7</td>
<td><strong>Information</strong></td>
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<tr>
<td>1.7.1</td>
<td>Information and warnings on the machinery</td>
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<tr>
<td>1.7.1.1</td>
<td>Information and information devices</td>
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<td>1.7.1.2</td>
<td>Warning devices</td>
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<tr>
<td>1.7.2</td>
<td>Warning of residual risks</td>
<td>X</td>
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<tr>
<td>1.7.3</td>
<td>Marking of machinery</td>
<td>X</td>
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<tr>
<td>1.7.4</td>
<td>Instructions</td>
<td>X</td>
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<tr>
<td>1.7.4.1</td>
<td>General principles for the drafting of instructions</td>
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<td>1.7.4.2</td>
<td>Contents of the instructions</td>
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<td>1.7.4.3</td>
<td>Sales literature</td>
<td>X</td>
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</table>

The classification from Annex 1 is to be supplemented from here forward.

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Supplementary essential health and safety requirements for certain categories of machinery</td>
<td>X</td>
</tr>
<tr>
<td>2.1</td>
<td>Foodstuffs machinery and machinery for cosmetics or pharmaceutical products</td>
<td>X</td>
</tr>
<tr>
<td>2.2</td>
<td>Portable hand-held and/or guided machinery</td>
<td>X</td>
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<tr>
<td>2.2.1</td>
<td>Portable fixing and other impact machinery</td>
<td>X</td>
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<tr>
<td>2.3</td>
<td>Machinery for working wood and material with similar physical characteristics</td>
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<tr>
<td>3</td>
<td>Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>Supplementary essential health and safety requirements to offset hazards due to lifting operations</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Supplementary essential health and safety requirements for machinery intended for underground work</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons</td>
<td>X</td>
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</tbody>
</table>