Installation and Operation
Guardian Safety Chucks

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CAUTION

- Chucks must be opened/closed manually before operation.
- Auto-closing of chucks is a safety feature. It is not intended to replace manual closing.
- Pinch Hazard - do not place fingers, hands or objects behind finger guard.
- Never contact rotating chucks.
- Winding shaft should load easily.
- Chucks should rotate freely after closing handwheel.
- Handwheel locks are required for chucks installed on turret winders.
- Wear to chuck housing presents extreme risk of accident.
- Never use tools to open or close the handwheel.
- Excessive winding shaft deflection causes excessive wear to chuck housing which creates a safety hazard.
- Safety Locks standard on chucks with A2 journal seats.

OPERATION

To load:

1. Manually open chucks by tilting the handwheels back - use no tools.
2. Load the shaft/roll carefully so that both ends enter the chuck journals at the same time.
3. Manually close the handwheels back into the closed (upright) position.
4. Make sure safety locks are in the closed position.

To unload:

1. Rotate chucks until journals are at 12 o’clock position then manually tilt the handwheels back.
2. Unload the shaft/roll carefully so that both ends exit the chuck journals at the same time.
INSTALLATION

Note the following when installing chucks:

- Make sure winding shaft is designed for minimum deflection under load of full roll. Excessive deflection of the winding shaft causes an upward force on the handwheel with each revolution when it is in the 12 o’clock or loading position. Continuous abuse of this type leads to wear on the chuck housing.

- Mount chucks to within 0.5mm (0.020in) of shaft axial play.

- Align chucks to within 0.3° of each other in both axes, making sure machine frame maintains alignment under load of full roll.

- In cases of advanced wear the chuck housing may force the handwheel to open in the downward position. This may result in the winding shaft pulling out during operation.

- Wear to the chuck housing presents extreme risk of accident! Proper installation of chucks maximizes life while minimizing maintenance and excessive wear. Review TROUBLESHOOTING section to avoid potential problems.

During installation or before start-up, please check the following:

⚠ Always close hand wheels manually! Relying on the safety mechanism to operate the hand wheels will reduce the life of the chuck.

- Make sure there are no loose or missing chuck parts or fasteners.

- Make sure safety locks are functional.

- Does the winding shaft load easily?

- Does the winding shaft have axial play of 0.5 mm (0.020in)?

- Check for proper closing function of the handwheel (it should be possible to open and close the handwheel by hand without using excessive force and without the use of tools).

- Check that the chucks are precisely aligned. Ensure that, with the handwheels closed, the winding shaft can be moved easily in an axial direction when the chuck is in loading position as well as at various rotating positions.

- Make sure there is no excessive wear to the chuck journal, handwheel or housing.
TROUBLESHOOTING

Winding shaft cannot be easily loaded/unloaded or the journals jam when the shaft is being loaded
- Journal tolerance incorrect
- Chuck not properly aligned
- Not enough axial play

Handwheel cannot be opened or closed without using undue force
- Journal tolerance incorrect
- Journal/shaft too long
- Chuck not properly aligned
- Front face bevel missing or too small
- Excessive deflection of roll shaft

Winding shaft cannot be rotated correctly
- Journal tolerance incorrect
- Journal/shaft too long
- Chuck not properly aligned
- Winding shaft journal not in alignment

Handwheel opens slightly during operation, handwheel wobbles, or iron filings or other signs of wear from the housing can be seen
- Ball catch defective or dirty
- Excessive winding shaft deflection
- Load or torque too high
- Journal/shaft too long
- Too much axial play

Premature wear on the journal seat or on the winding shaft journal
- Journal not cut back
- Chuck not properly aligned
- Too much load on chuck
- Excessive winding shaft deflection
- Wrong material used for journal
- Journal hardness not compatible with chuck journal seat

Noise
- Handwheel/journal tolerance too loose
- Chucks misaligned or damaged

Chuck has stiff movement
- Defective bearing
- Improper installation of brake or drive to chuck shaft

Chuck not being closed manually
- For rewinding applications, make sure that the air shaft is properly loaded onto the safety chucks and that the hand wheels are closed manually, instead of allowing the ‘closing mechanism’ to rotate the chucks. In this case the torque cannot be properly transmitted through the air shaft and may result in the air shaft falling out of the open safety chuck. This also a concern for unwinding materials which are excessively light and may not exert sufficient weight downward to force rotation of the hand wheel to close during startup.
WINDING SHAFT JOURNAL

There are min./max. limits for journal seat geometry.

- Within these limits, any diameter & length may be specified.
- The published values for roll weight and torque always refer to the maximum value of the journal seat geometry A3.
- Choose maximum journal size to minimize wear.

Safety Locks are standard on Chucks with A2 journal seats.

In addition to total load and winding speed, deflection of the winding shaft plays an important role in the life expectancy of the journal seat and shaft journal. Therefore, please note the following:

- All safety chucks are provided with secondary safety locks to prevent unintentional deflection due to shaft deflection during operation. Additionally A2 journals are rated to 70% of the A3 weight ratings. For applications requiring the highest torque transmission limits as well as weight and speed the A3 is the preferred choice due to its large surface area and 3 sided design.
- Carefully chamfered edges provide for safe closing function.
- Conical or tapered winding shaft journals offer improved performance and should be used whenever possible.
- Winding shafts designed for minimal deflection should be used.
- The hardness of the shaft journals and the chuck journal seat should be made to suit each other. This means that the least expensive and most easily replaceable part can be designed as the wear part. Expensive winding shafts should always be matched with chucks having journal seats of lower hardness.

With the exception of light applications, low winding speeds, short winding shafts or low bearing loads, winding shaft journals should conform to the specifications given.
**REMOVING / INSTALLING HANDWHEELS**

1. Loosen the socket head cap screws on the journal seat. They are secured with a thread locking compound so it may be necessary to heat the heads of the screws to loosen them. Never heat the complete handwheel.

2. Remove the handwheel (whether defective or worn journal inserts).

4. Replace journal inserts if necessary (see instructions).

3. Clean the socket head cap screws and tapped holes to remove all traces of adhesive. Keep socket head cap screws and tapped holes free of grease.

4. Install a replacement or existing handwheel (with new journal inserts), without canting it, on the pilot stub of the shaft and make sure that the inclined surface on the back of the journal seat is parallel to the incline of the shaft.

5. Coat the socket head cap screws with low strength Loctite 222 Threadlocker (or equivalent).

6. Tighten the socket head cap screws uniformly to specified torque making sure that the handwheel is not canted in the process.

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**Journal Seat**

<table>
<thead>
<tr>
<th>Size</th>
<th>Screw Type</th>
<th>Torque Nm (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1000</td>
<td>SHCS M8 x 30</td>
<td>35 (25.8)</td>
</tr>
<tr>
<td>G1800</td>
<td>SHCS M10 x 40</td>
<td>70 (51.6)</td>
</tr>
<tr>
<td>G3000</td>
<td>SHCS M12 x 45</td>
<td>120 (88.5)</td>
</tr>
</tbody>
</table>
REPLACEMENT HANDWHEEL

Handwheel and journal seat are supplied as an assembly and therefore must not be disassembled! The two pivot pins are secured in place by the manufacturer and cannot be removed without destroying the handwheel!

When removing the assembly, make sure that you do not press the journal seat out of the handwheel, as this would allow the ball catch to spring out, causing it to eject all parts!

A replacement handwheel is supplied as a complete unit including journal inserts.

JOURNAL INSERT REPLACEMENT

1. Remove handwheel (see instructions).
2. Remove lower inserts by sliding out towards back.
3. Remove (4) bolts holding upper inserts.
4. Reinstall new set of inserts making sure to use low strength Loctite 222 Threadlocker (or equivalent) on (4) upper insert bolts.
5. Check upper insert alignment with shaft.
6. Reinstall handwheel (see instructions).
7. Apply white lithium grease around pivot pin during installation and periodically as needed.
HANDWHEEL SAFETY LOCK REPLACEMENT

The handwheel safety lock prevents unintentional opening of the handwheel and is standard on chucks with A2 journal seats. It must be replaced when it becomes inoperable!

Follow the steps below. Replacing the RIGHT SIDE lock is shown. Procedure for LEFT SIDE replacement is identical. Note: The lock position can be moved to LEFT or RIGHT SIDE by swapping with Ball Detent assembly.

Removal:
1. Remove set screw. Caution - parts will eject with sufficient force to cause injury! Make sure to use proper safety measures.
2. Remove spring.
3. Unscrew button.
4. Remove locking pin.

Installation:
1. Grease locking pin and insert into hole. Note position of tapped hole.
2. Align tapped hole in pin with hole for button.
3. Apply a drop of thread locking compound to threads of button.
4. Screw button to pin. Do not over tighten - button should slide freely!
5. Insert spring.
6. Apply thread locking compound to set screw.
7. Screw set screw into handwheel so that it is flush to edge of handwheel.
8. Check free movement of button again. Adjust button as needed before thread locking compound sets up.
9. Apply white lithium grease around pivot pin upon installation and periodically as needed.

Caution - DO NOT press on Journal Seat if handwheel is removed from chuck. Pressing journal seat out of handwheel will allow parts to eject with sufficient force to cause injury!

Caution - Removing the Set Screw will allow parts to eject with sufficient force to cause injury! Make sure to use proper safety measures.
HANDWHEEL BALL DETENT REPLACEMENT

The handwheel ball detent provides a positive clicking action that secures the handwheel into a precise, closed position. The assembly is located on the opposite side of the safety lock and can be swapped with the safety lock assembly to relocate the safety lock to a LEFT or Right position if needed.

Follow the steps below to inspect or replace the Ball Detent Assembly.

Removal:

1. Remove set screw. **Caution - parts will eject with sufficient force to cause injury! Make sure to use proper safety measures.**
2. Remove spring.
3. Remove rivet.
4. Remove ball rearing.

Installation:

1. Apply lithium grease to ball bearing and install.
2. Apply lithium grease to rivet and spring and install them together.
3. Apply thread locking compound to set screw.
4. Screw set screw into handwheel.
5. Adjust set screw to achieve *desired click-locking action.*

*The adjusted click locking action should require a moderate amount of hand force to open or close the handwheel. **To avoid possible operator injury, the set screw should not to protrude from edge of handwheel!**

**Caution - DO NOT press on Journal Seat if handwheel is removed from chuck. Pressing journal seat out of handwheel will allow parts to eject with sufficient force to cause injury!**

Replacement parts available as an assembly only.

**Caution - Removing the Set Screw will allow parts to eject with sufficient force to cause injury! Make sure to use proper safety measures.**
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Guardian Safety Chucks

ROUTINE MAINTENANCE

Guardian standard chucks require no extensive maintenance!

The ball bearings are designed for long service life. Because operating conditions vary, chuck life cannot be easily estimated.

Check the following items at regular intervals:

- ease of rotation
- ease of closing movement
- easy movement of the ball-detent and that it latches correctly in the closed position
- condition of the journal seat and the shaft journals
- play between the shaft journal and the journal seat of the chuck and for true running of the handwheel
- function of the handwheel safety lock
- any unusual wear or damage

If the play between the handwheel and the shaft journal is outside of the limits listed below, replacement of both parts is recommended. This is especially important in the case of high loads and speeds.

Tolerance Range: Min. = 0.15mm. Max. = 0.2mm

Based on a combination of load and web speed, replacement of the handwheel and shaft journals is recommended when the gap between the parts exceeds 0.15 to 0.20 mm.

The following items should be cleaned and/or lubricated (with white lithium grease) at regular intervals:

- all surfaces related to the ball-detent catch
- handwheel pivot pins
- the running surface of the sliding sleeve (on sliding chucks)
- always clean any buildup of material, corrosion, etc.
## SQUARE JOURNALS FOR NORMAL CHUCKS (A2)

**Legend:**
- **A min.** minimum square dimension
- **A max.** maximum square dimension
- **W** minimum total length of the journal
- **V** length of the square part of the journal
- **U** front face bevel
- **Z** side bevel
- **H** angle for journal undercut

**Dimensions in mm (in)**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A min.</th>
<th>A max.</th>
<th>W</th>
<th>V</th>
<th>U</th>
<th>Z</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1000</td>
<td>20 (3/4)</td>
<td>30 (1-1/4)</td>
<td>27 (1.063)</td>
<td>14 (0.551)</td>
<td>4 (0.157)</td>
<td>1 (0.040)</td>
<td>0.3</td>
</tr>
<tr>
<td>G1800</td>
<td>30 (1.25)</td>
<td>40 (1-1/2)</td>
<td>30 (1.181)</td>
<td>15 (0.591)</td>
<td>5 (0.192)</td>
<td>1.5 (0.059)</td>
<td>0.4</td>
</tr>
<tr>
<td>G3000</td>
<td>40 (1-1/2)</td>
<td>50 (2)</td>
<td>32 (1.260)</td>
<td>16 (0.630)</td>
<td>5 (0.192)</td>
<td>2 (0.078)</td>
<td>0.5</td>
</tr>
</tbody>
</table>
SQUARE JOURNALS FOR SLIDING CHUCKS (A2)

Legend:

A min.  minimum square dimension
A max.  maximum square dimension
W      journal length
X      minimum total length of the journal
Y      recess width
D      recess diameter \( D = A - 1 \)
V      length of the square portion of the journal
U      front face bevel
Z      side bevel
H      angle for journal undercut

Dimensions mm (in)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>A min.</th>
<th>A max.</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>V</th>
<th>U</th>
<th>Z</th>
<th>H°</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1000</td>
<td>20 (1)</td>
<td>30 (1-1/4)</td>
<td>22 (0.866)</td>
<td>33 (1.299)</td>
<td>11 (0.433)</td>
<td>14 (0.551)</td>
<td>4 (0.157)</td>
<td>1 (0.039)</td>
<td>0.3</td>
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<tr>
<td>G1800</td>
<td>30 (1-1/4)</td>
<td>40 (1-1/2)</td>
<td>25 (0.984)</td>
<td>38 (1.496)</td>
<td>13 (0.512)</td>
<td>15 (0.591)</td>
<td>5 (0.197)</td>
<td>1.5 (0.059)</td>
<td>0.4</td>
</tr>
<tr>
<td>G3000</td>
<td>40 (1-1/2)</td>
<td>50 (2)</td>
<td>27 (1.063)</td>
<td>42 (1.654)</td>
<td>15 (0.591)</td>
<td>16 (0.630)</td>
<td>5 (0.197)</td>
<td>2 (0.079)</td>
<td>0.5</td>
</tr>
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</table>
Guardian Safety Chucks

**TRIANGULAR JOURNALS FOR NORMAL CHUCKS (A3)**

**Dimensions mm**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>Di (f8)</th>
<th>Tolerance for K</th>
<th>W</th>
<th>V</th>
<th>U</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1000</td>
<td>20</td>
<td>-0.027/-0.036</td>
<td>27</td>
<td>14</td>
<td>4</td>
<td>0.3</td>
</tr>
<tr>
<td>G1000</td>
<td>over 20 to 30</td>
<td>-0.031/-0.039</td>
<td>27</td>
<td>14</td>
<td>4</td>
<td>0.3</td>
</tr>
<tr>
<td>G1800</td>
<td>32 to 33</td>
<td>-0.033/-0.044</td>
<td>30</td>
<td>15</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td>G1800</td>
<td>over 33 to 38</td>
<td>-0.037/-0.047</td>
<td>30</td>
<td>15</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td>G3000</td>
<td>40 to 47</td>
<td>-0.037/-0.047</td>
<td>32</td>
<td>16</td>
<td>5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Legend:**

- **Di**: triangle - inner circle diameter (tolerance f8)
- **Da**: triangle - circumference diameter (tolerance f6) Da = Di x 1.5
- **W**: minimum total length of the journal
- **V**: length of the triangular part of the journal
- **U**: front face bevel
- **K**: control dimension (note tolerances) K = Di/2 + Da/2
- **H**: angle for journal undercut
TRIANGULAR JOURNALS FOR SLIDING CHUCKS (A3)

Legend:

- **Di**: triangle - inner circle diameter (tolerance f8)
- **Da**: triangle - circumference diameter (tolerance f6) \( Da = Di \times 1.5 \)
- **W**: journal length
- **X**: minimum total length of the journal
- **Y**: recess width
- **D**: recess diameter \( D = Di \)
- **Rz**: front recess radius
- **V**: length of the triangular portion of the journal
- **U**: front face bevel
- **K**: control dimension (note tolerances) \( K = Di/2 + Da/2 \)
- **H**: angle for journal undercut

<table>
<thead>
<tr>
<th>SIZE</th>
<th>Di (f8)</th>
<th>Tolerance for K</th>
<th>W</th>
<th>X</th>
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</tr>
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<tr>
<td>G1800</td>
<td>32 to 33</td>
<td>-0.033/-0.044</td>
<td>24</td>
<td>36</td>
<td>12</td>
<td>6</td>
<td>15</td>
<td>5</td>
<td>0.4</td>
</tr>
<tr>
<td>G1800 over</td>
<td>over 33 to 38</td>
<td>-0.037/-0.047</td>
<td>24</td>
<td>36</td>
<td>12</td>
<td>6</td>
<td>15</td>
<td>5</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Dimensions mm
DISMANTLING NORMAL CHUCKS

TYPE OW + BR

1. Remove the handwheel [10].
2. Remove the catch ring [5].
4. Perform necessary repair work.
5. Assembly is carried out in reverse sequence.
DISMANTLING SLIDING CHUCKS

FW-BR

1- Remove the axial carrier 12.

2- Remove the handwheel.

3- Remove the turning safety 2.

4- Pull the sliding sleeve out of the housing.

5- Remove the retaining rings 7 and 8 and the support ring 6.

6- Remove the shaft through the front by pressing or carefully tapping it.

7- Assemble in reverse sequence.

Prior to assembly, keep the sliding sleeve clean and lubricate it carefully with thickened grease containing molybdenum disulfide.
**DISMANTLING SLIDING CHUCKS**

**HR-OW**

1. Remove the axial carrier.

2. Remove the handwheel.

3. Remove the turning safety.

4. By turning the handwheel, you can now push the sliding sleeve out of the housing.

5. Loosen the three threaded pins. They are secured with low strength Loctite 222 Threadlocker. Never heat the entire sliding sleeve!

6. Pull the thread ring out from the rear.

7. Remove the retaining rings and the support ring.

8. The shaft can be removed through the front by pressing or carefully tapping it.

9. If you have to repair the adjustment mechanism, first remove the retaining ring and the support ring.

10. Pull the complete adjustment mechanism out of the housing.

11. The threaded spindle, the spacer ring and the handwheel are bonded together and therefore form a single unit. They can be separate from each other only by heating them.

12. Assembly is performed in reverse sequence.

13. Make sure that low strength Loctite 222 Threadlocker (or equivalent) is applied to the threaded pins before re-assembling.

Keep all sliding parts, such as sliding sleeve and threaded spindle, clean. Carefully lubricate them with thickened grease containing molybdenum disulfide prior to assembly!
ORDERING SPARE PARTS

Parts orders are more readily processed if you refer to the part number of the safety chuck that appears on the following:

- quote
- purchase order
- packing slip

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