NORD-LOCK GROUP

Superbolt® Multi-Jackbolt Tensioners (MJTs)

USER MANUAL

V10_2025_11

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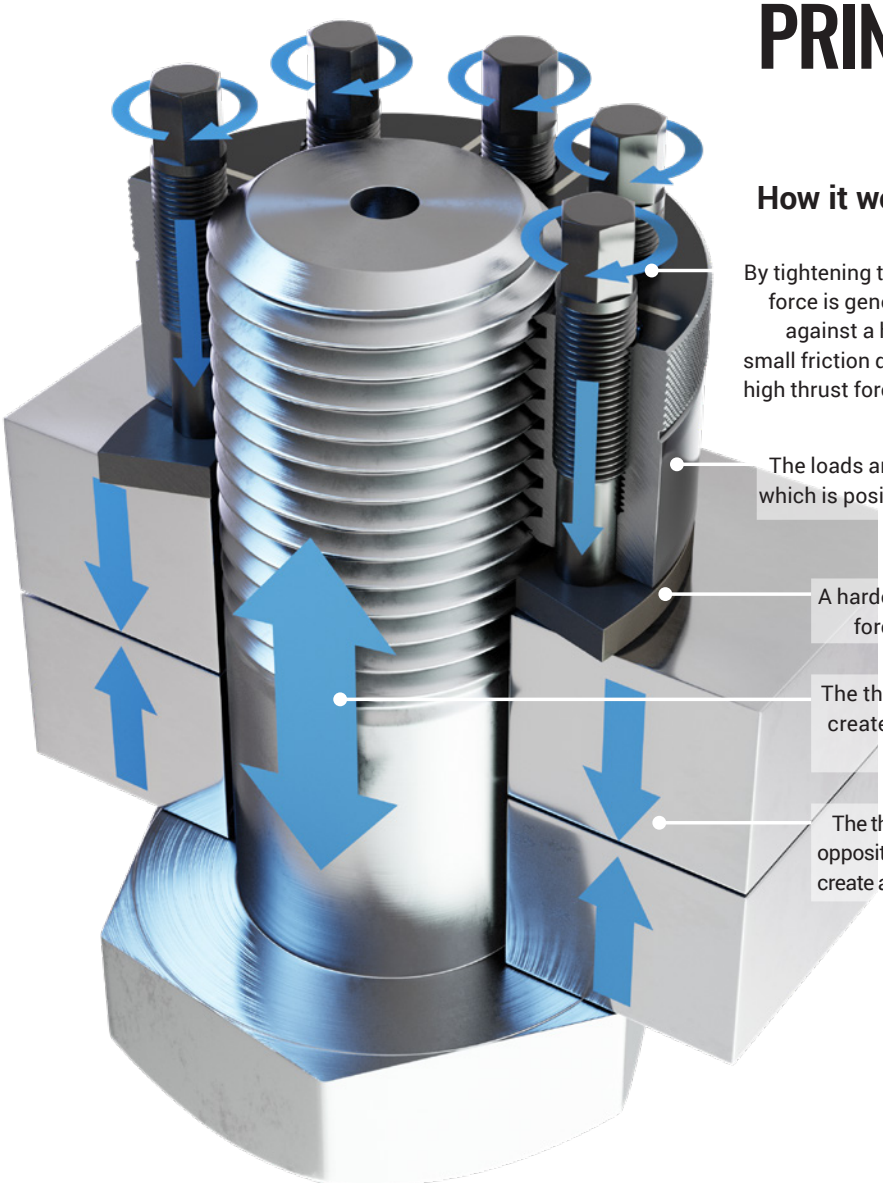
SUPERBOLT®

CONGRATULATIONS!

With Superbolt Tensioners you have chosen a technologically superior product. It is purely mechanical and, therefore, very safe.

The following simple steps will help you with your application. Thereby you increase safety, speed and service life.

THE SUPERBOLT PRINCIPLE



How it works

By tightening the jackbolts, a strong thrust (axial) force is generated. This thrust force is directed against a hardened washer. Jackbolts have a small friction diameter and can therefore create a high thrust force with relatively little torque input.

The loads are transferred through the nut body which is positioned on the main thread by hand.

A hardened washer is used to transfer the force while protecting the flange face.

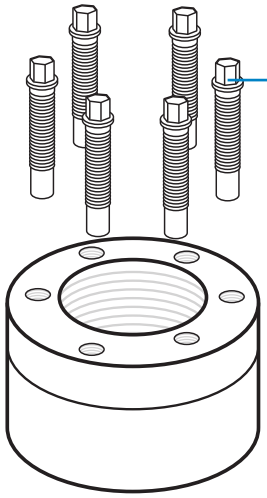
The thrust (axial) force from the jackbolt creates an equally strong reaction force in the main bolt.

The thrust (axial) force of jackbolts and the opposite reaction force of the main bolt head create a strong clamping force on the flange.

CONTENTS

1. LUBRICATION AND TOOLS

NOTE Nord-Lock Group can supply the tools and lubricants referenced in this section. Please contact Nord-Lock Group for more information.



1.1 Lubricants

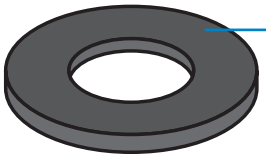
Lubricants play a vital role in the proper performance of Superbolt products. Only use the correct Superbolt-specificed lubricant. Refer to the Superbolt data sheet or certificate for the correct lubricant. Please contact Nord-Lock Group if there are any doubts or questions.

Jackbolts

These are pre-lubricated from the factory with the correct Superbolt-specified lubricant. For the main stud, any standard anti-seize lubricant can be used.

NOTE

For reuse, the jackbolts should be removed, cleaned and relubricated with the correct Superbolt-specified lubricant.

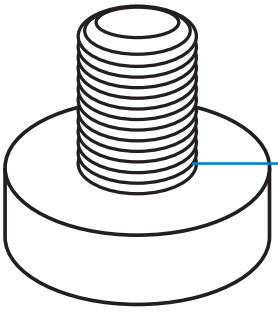


Hardened washer

Apply the correct Superbolt-specified lubricant to the washer face or the tips of the jackbolts at the bottom side of the tensioner body.

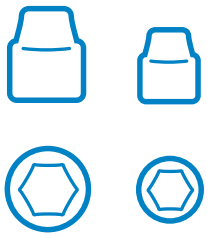
NOTE

Depending on tensioner model & size, this may be done already from the factory. On reuse, however, the lubricant will need to be reapplied.



Main thread

Any suitable anti-seize lubricant may be used. Apply with brush or spray.



1.2 Sockets

For tightening the jackbolts, only high-quality tools in good working order should be used. Heavy-duty 6-pt. impact-grade sockets for use with impact tools are best suited.

Worn sockets are dangerous and should be disposed of.

Have spares available for each job, including both standard and deep well sockets.

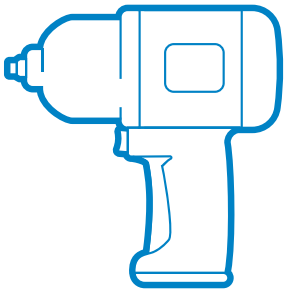
In some cases, special sockets may be required. These can be made available.

1.3 Manual tools

Good quality calibrated torque wrenches are the basic tools needed for most Superbolt jobs. Click-type versions are widely available in various sizes depending on the target torque.

RECOMMENDED TORQUE WRENCH SIZE GUIDELINE:

– 1/4" Drive	5 Nm (40 lbf-in) to 22 Nm (200 lbf-in)
– 3/8" Drive	14 Nm (10 lbf-ft) to 108 Nm (80 lbf-ft)
– 1/2" Drive	68 Nm (50 lbf-ft) to 340 Nm (250 lbf-ft)
– 3/4" Drive	122Nm (90 lbf-ft) to 810 Nm (600 lbf-ft)



1.4 Power tools

Air impact tools have proven to be most suitable; however, with Superbolt jackbolts **they reach only 30-50% of their rated output** (lack of displacement). Therefore, the largest possible air lines and couplers should be used. Because of the high forces and for repeated usages, **only heavy-duty products should be chosen**. Verifying the torque output of an air impact tool is easy: tighten until tool stalls, then measure the torque with a torque wrench (preferably with electronic gauge).

For regulating the air-impact (tightening torque), simply install a service unit directly in front of the air impact tool (filter, controller, oiler). Adjust the pressure at the controller and, thereby, the power of the air impact tool. Tighten a jackbolt to the desired torque with torque wrench. Then, apply the air impact tool and increase the pressure until the jackbolt starts turning again. Check the controller to see if the pressure decreases when starting the air impact. This indicates an unwanted pressure drop in the air supply. Therefore, use generously sized air lines & hoses!

When tightening, air impact tools are especially suited for **Steps 2 through 4 in Section 2.4** of the main installation procedure and should be adjusted to approx. 90 to 100% of the rated torque.

For regular usage of air or battery impact tools for tightening Superbolt jackbolts, the use of torque limiting extensions bars becomes extremely attractive. See below for further information. See below for further information.

NOTE

Because of the lower accuracy of power tools, the last tightening round should always be manually performed with a precision torque wrench.

NOTE

Worker safety and proper PPE (personal protective equipment) are paramount. Superbolt recommends specific tools and products to facilitate the proper installation of its products. Please consult your tool manufacturer instructions for the safe operation of the specific tools recommended. Superbolt does not hold any liability for the use or misuse of the tools listed in this document.

NOTE

Unlike tightening, power tools are not suitable for loosening jackbolts during **Steps 1 through 3** because jackbolts must be unloaded gradually.

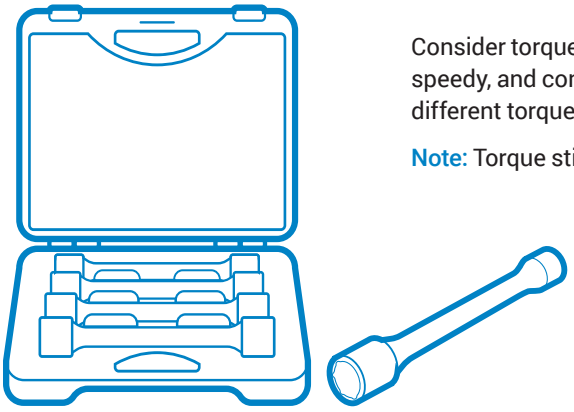
A power tool can be used only at **Step 4** to completely extract jackbolts.

NOTES FOR THE USE OF AIR IMPACT TOOLS

Network pressure min. **6,5 bar** (90 psi)

– up to 70 Nm (50 lbf-ft)	3/8" impact tool or air ratchet
– 70-130 Nm (50-100 lbf-ft)	1/2" impact tool, derated (**Attention: do not overshoot!**)
– 130-200 Nm (100-150 lbf-ft)	1/2" impact tool, or other tightening tool, with reaction arm
– 200-270 Nm (150-200 lbf-ft)	1/2" impact tool (heavy duty) or 3/4" impact tool, or other tightening tool, with reaction arm
– 270-400 Nm (200-300 lbf-ft)	3/4" impact tool or 1" impact tool, or other tightening tool, with reaction arm
– over 400 Nm (300 lbf-ft)	3/4" or 1" air impact tool, or other tightening tool, with reaction arm

Only use impact tools for installing and never for removal.



Consider torque limiting extension bars (aka torque sticks) for a precise, speedy, and convenient way to reach a torque. Torque sticks come in different torque ratings that are color-coded for easy identification.

Note: Torque sticks only function with impacting type tightening tools.

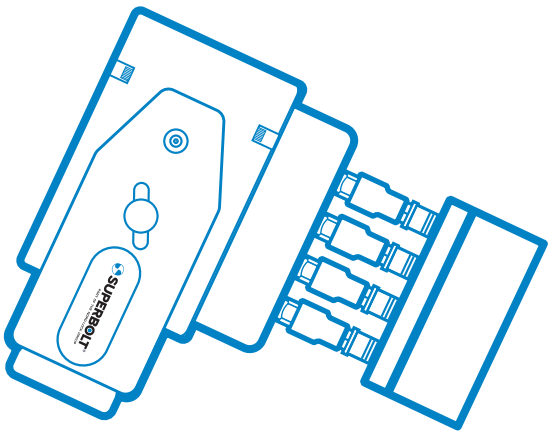
NOTE

Suitable cordless electric impact wrenches can be used alternatively to air-powered.

Also available: the time-saving Superbolt Tool!

The added speed of the **Superbolt Tool** can benefit those who use a high number of MJTs and/or those who have frequent maintenance schedules, as the Superbolt Tool reduces installation and removal times considerably.

Contact us for details!



2. TIGHTENING PROCEDURE

2.1 Torque check

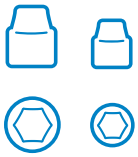
Recommended torque values can be found on:

- Your internal directives.
- Superbolt certificate.
- Superbolt data sheet.
- Superbolt drawing.

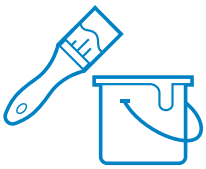
NOTE
The jackbolt torque marked on the MJT body is the maximum value, which may be unsuitable for your application. The indicated torques are theoretical values. The achieved elongations of the studs are relevant.

2.2 Required tools

Suitable calibrated torque wrench

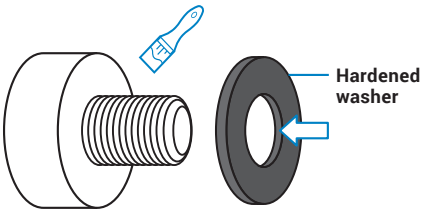


Matching 6-pt. impact-grade socket (Deep well recommended)



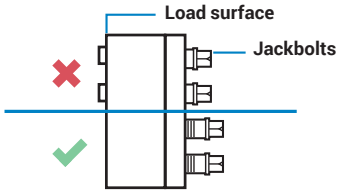
Lubricant

2.3 Preparation



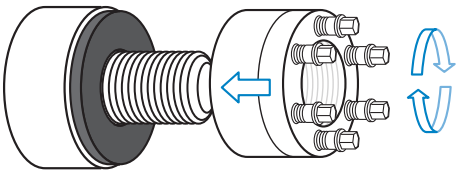
STEP 1

Clean main thread and contact areas and lubricate well with suitable anti-seize lubricant. Put on the hardened washer.
Note: This can be different than what is called for on the Superbolt.



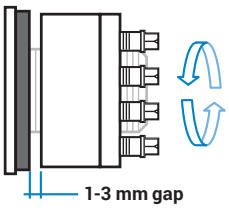
STEP 2

Ensure jackbolt tips are even (or recessed) with bottom of the nut body as shown above. Check for lubricant on the bottoms (tips of the jackbolts). The jackbolt tips should be lubricated from the factory for first use. For any-reuse, re-lubricate the jackbolt threads and tips with the recommended lubricant (see product installation sheet and/or certificate).



STEP 3

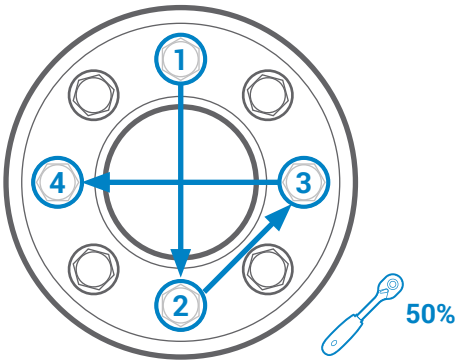
Tighten the tensioner by hand until it seats against the washer.



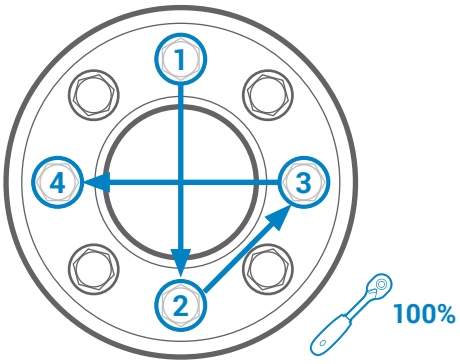
STEP 4

Afterwards, turn back approx. 1/8- to 1/4-turn. Depending on size, the gap will be approx. 1 to 3 mm wide.

2.4 Tightening

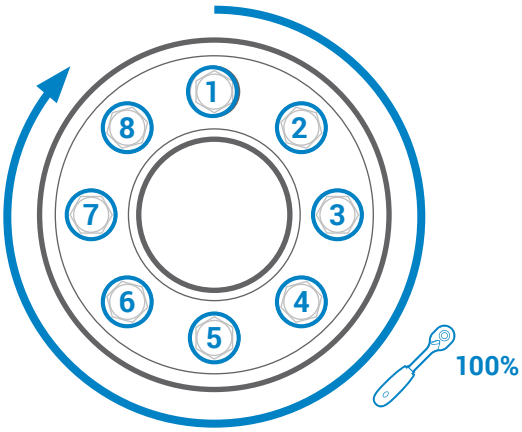


STEP 1
Tighten these 4 jackbolts crosswise with **50% of the recommended jackbolt torque**.

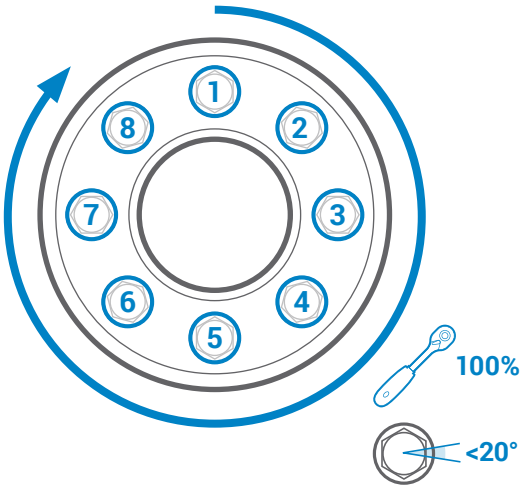


STEP 2
Tighten the same 4 jackbolts crosswise with **100% of the recommended torque.**

NOTE
Should several tensioners be tightened, i.e. on a flange, **perform Step 1 on all tensioners before moving to Step 2.** The same should apply to the remaining steps.



STEP 3
Change to circular tightening and tighten all jackbolts with **100% of the recommended jackbolt torque.**



STEP 4
Repeat **Step 3** until all jackbolts are equally tightened (**less than 20° remaining movement**). Normally 2 to 3 passes are sufficient, with longer bolts requiring additional passes.

NOTE
Power tools can save time, see **Section 1.4.**

NOTE
For tensioners with only 4 or 6 jackbolts see **Section 5.1.**
For tensioners with odd numbers of jackbolts see **Section 5.2.**

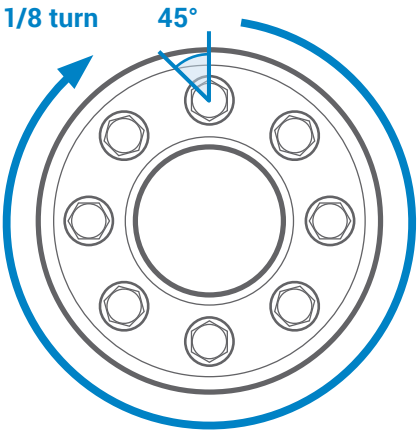
3. LOOSENING PROCEDURE

ATTENTION
Loosening requires an exact procedure. The jackbolts must be unloaded stepwise! **Under no circumstances should single jackbolts be unloaded completely**. The remaining jackbolts would have to carry the entire load and, therefore, would be difficult to loosen. In extreme cases the jackbolts could mushroom and make loosening impossible!

3.1 Usage at normal temperatures (<100°C or 212°F)

PREPARATION

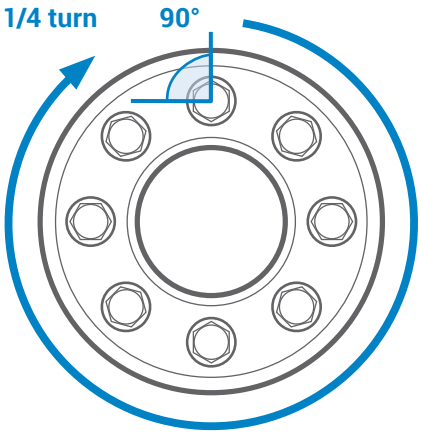
Before loosening, apply penetrating oil (being sure to follow the oil manufacturer's safety instructions) – especially with any rust formation, soil, or for operation under elevated temperatures.



STEP 1

Starting with the first jackbolt, **loosen every jackbolt in a circular pattern approx. 1/8th turn (45°)** (breaking loose is sufficient). After the first round, the first jackbolt will be tightened again, however, on a lower level of loading.

NOTE
Should several tensioners be loosened, i.e. on a flange, **perform Step 1 on all tensioners before moving to Step 2**.



STEP 2

Repeat this procedure on the jackbolts on all tensioners for a **2nd and 3rd round.** For this step, the turn can usually be increased to a 1/4 turn (90°).

STEP 3

Continue successive rounds loosening jackbolts using 1/4 turns until all jackbolts are loose.

STEP 4

Relieve all jackbolts completely. Now the tensioner can be removed by hand.

NOTE
Long bolts or studs expand more and, therefore, the MJTs may require additional passes.

ATTENTION
Before reusing, please follow the maintenance instructions in **Section 4**.

3.2 Usage at high temperatures (>100°C or 212°F)

PREPARATION

At higher temperatures, the petroleum base of the lubricant evaporates, thereby increasing the effort for loosening. Therefore strict adherence to these steps is essential for success. As always, be sure to follow the lubricant manufacturer's safety instructions.

STEP 1

If possible, apply penetrating oil to the jackbolts and washer during cooling of the installation (at approx. 150°C/300°F) and let sit for several hours. Thoroughly 'wet-down' all components.

Use of synthetic oil can be done at higher cool-down temperatures (at approx. 250°C/480°F).

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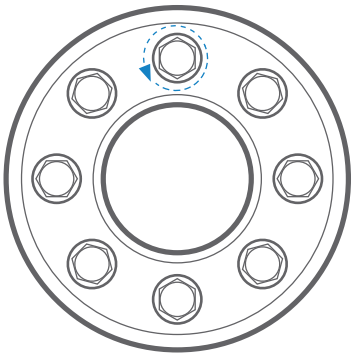
break loose



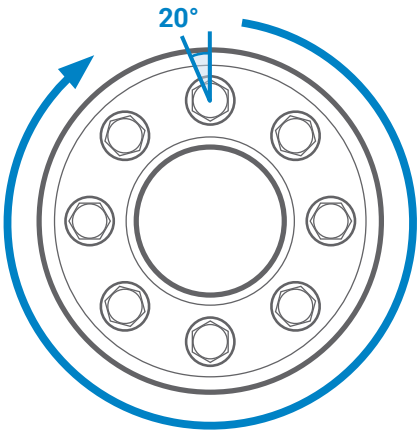
STEP 2

Starting with the first jackbolt, break loose each jackbolt of one tensioner in a circular pattern.

> **NOTE**
> Do not loosen beyond break-loose point. Break loose all jackbolts of all tensioners first.

STEP 3

Repeat a **2nd round** as above for all studs, now loosening each jackbolt **1/8th turn (20°)** in a circular pattern.



STEP 4

The remaining loosening steps can now follow the procedure as described in **Section 3.1** (normal case) beginning with **Step 2**.

> **NOTE**
> For high-temperature applications, bolts with center holes are often used. Through the use of heating rods, the loosening of Superbolt tensioners can be substantially facilitated.
> Five minutes of heating should be sufficient to accelerate loosening.

4. MAINTENANCE

4.1 Regular checks

Superbolt tensioners do not lose their preload force even after several years in service, provided that they are correctly tightened. During inspections the preload force should be checked nevertheless. Use a torque wrench adjusted to 100% of the permitted jackbolt torque according to the certificate or your installation procedure.

Should some jackbolts unexpectedly have lost some of the preload force, the following procedure is recommended:

- Loosen and remove a single jackbolt. Clean and lubricate with the anti-seize lubricant which is specified in the Superbolt certificate. Then reinstall the jackbolt and retighten. Repeat for every jackbolt. Thus, the nut remains tensioned.
- Now retension according to tightening procedure from **Step 5**: tighten in circular pattern with full jackbolt torque, until all jackbolts are tightened.

4.2 Preventive maintenance

I.E., Removal for maintenance purposes:

- Remove according to loosening procedure.
- Clean thread and end of the jackbolts and treat with lubricant according to product installation sheet or certificate. **Do not use molybdenum sulfide (MoS_2) unless expressly specified in the certificate.**
- Hardened washer may be reused despite indentations simply by rotating or turning over. Depressions of a few 1/100 mm are normal.
- Retighten according to tightening procedure.

4.3 Troubleshooting

Jackbolts cannot be loosened

- Try to find a jackbolt that will turn loose.
- Completely remove, lubricate well and retighten with 110% of the recommended jackbolt torque.
- The two neighboring jackbolts should become free. Remove these also, lubricate and tighten with 110%.
- Again, the next two jackbolts should become free, and so on.
- Afterwards, relieve all jackbolts according to the standard loosening procedure.

Hardened washers are damaged, i.e., after a long time in service

- Washers should be repaired or replaced.

Jackbolts are damaged or missing

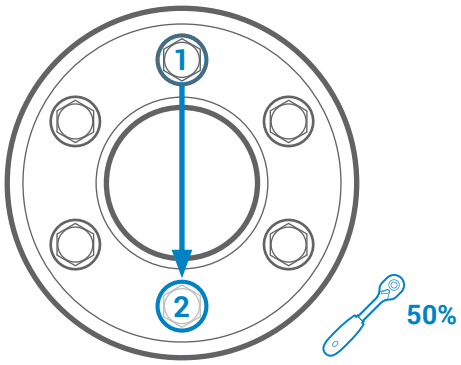
- Jackbolts should be repaired or replaced. **Do not use commercially available bolts because they are not suitable for such high loads.**

Other problems

- Please contact Nord-Lock Group or your supplier directly.

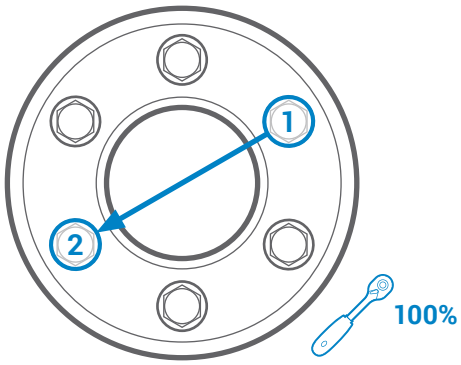
5. GENERAL NOTES

5.1 Tightening tensioners with only 4 or 6 jackbolts



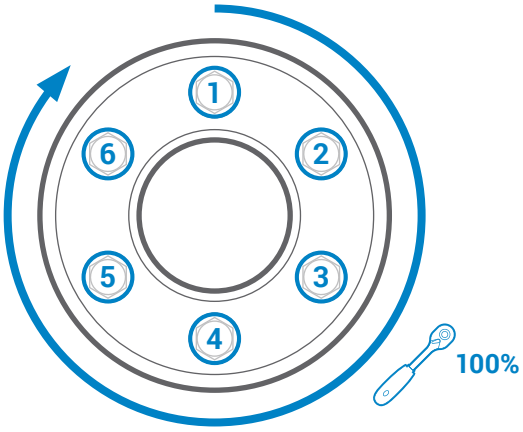
STEP 1

Tighten 2 opposite jackbolts with **50% of recommended torque.**



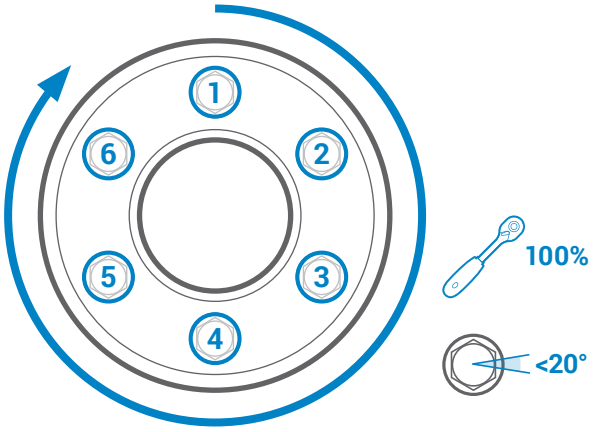
STEP 2

Tighten 2 other opposite jackbolts with **100% of recommended torque.**



STEP 3

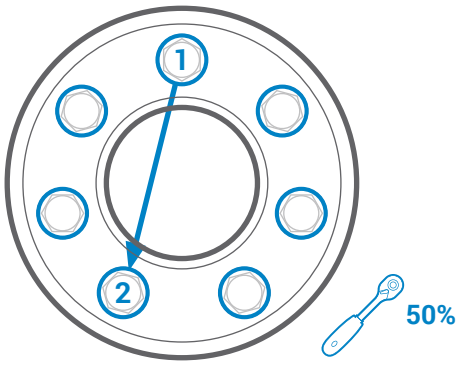
Change to circular tightening and tighten all jackbolts with **100% of the recommended jackbolt torque.**



STEP 4

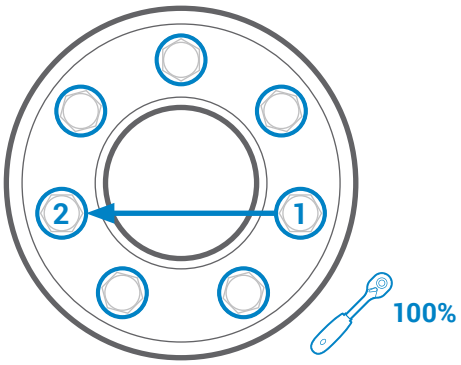
Repeat **Step 3** until all jackbolts are equally tightened **(less than 20° remaining movement)**. Normally 2 to 3 passes are sufficient, with longer bolts requiring additional passes.

5.2 Tightening tensioners with odd numbers of jackbolts (i.e., 7, 9, 11)



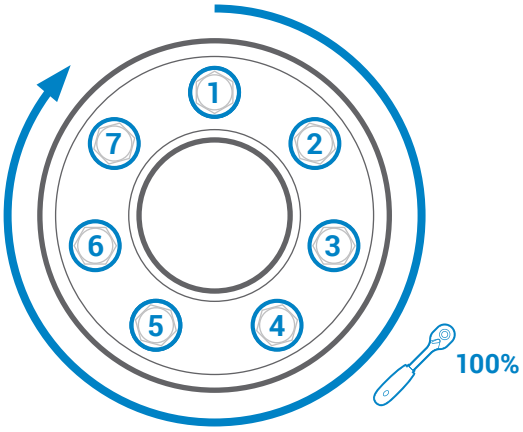
STEP 1

Tighten 2 nearly opposite jackbolts with **50% of recommended torque.**



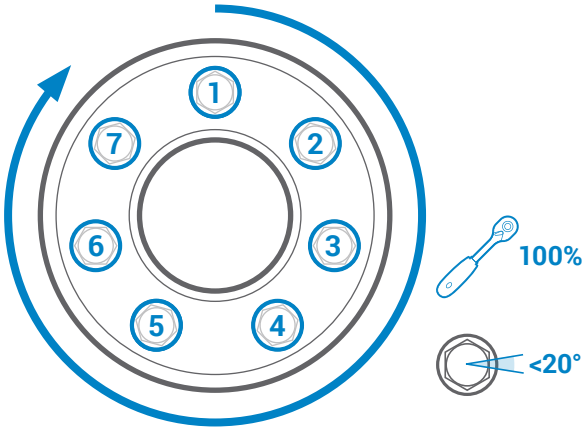
STEP 2

Tighten 2 other nearly opposite jackbolts with **100% of recommended torque.**



STEP 3

Change to circular tightening and tighten all jackbolts with **100% of the recommended jackbolt torque.**



STEP 4

Repeat **Step 3** until all jackbolts are equally tightened **(less than 20° remaining movement)**. Normally 2 to 3 passes are sufficient, with longer bolts requiring additional passes.

5.3 Tightening of long tie rods

To accelerate tightening of long tie rods, it pays off to perform step 4 with increased jackbolt torque (**approx. 110–125%**). **Attention: In final rounds, always check jackbolt torque by hand with 100% to prevent overloading.**

5.4 Tensioning large flanges or joints

For tensioning large flanges/joints, preferably work with two workers 180° apart, or four workers 90° apart.

5.5 Gaskets with large elastic displacements

It is normal that some jackbolts (or tensioners in a multi tensioner application) become loose during flange tightening. Only those bolts being tightened carry loads. Do not spin down loose tensioners as this will cause problems later.

5.6 Usage of spacers

Tensioners should be positioned on the outer end of a bolt. This protects the main thread and makes fast and easier access for tooling (i.e. no socket interference). The MJT can be tightened easier (no extensions necessary) and the expansion is improved. Place suitable spacer or several heavy washers under the hardened washer; thereby you can bridge over areas that have been damaged by other tightening techniques. Superbolt tensioners require full thread engagements.

5.7 Re-tensioning for high-temperature applications

If tensioned properly, it should not be necessary to re-tension Superbolt tensioners. If regular re-tensioning should become necessary, please inform us so that we can re-examine the joint.

5.8 Repairing of the bolt threads

Repairing of the bolt threads, or full bolt replacement, can become necessary on bolts that have deformed during years of service, especially at higher temperatures. The same can be true for bolts of earlier manufacture that were manufactured with other tolerances. The Nord-Lock Group can also supply mating studs and bolts for our tensioners. Please contact your local Nord-Lock Group representative/office for more information.

5.9 Installation tools

Apart from a variety of standard tools for tensioning, simple special tools are available, which facilitate the installation of large nuts or bolts. **See Section 1.**

5.10 Protective caps

Vinyl, steel or stainless steel caps are available to protect the tensioners for different applications. Filled with grease, they can offer enhanced protection against rust at normal temperatures.

CONSULTANCY

For further information on possible uses, applications and maintenance of Superbolt tensioners, please contact Nord-Lock Group or your supplier directly.

Exclusion of liability

Nord-Lock Group excludes all liability for unsuitable product selection, improper use as well as damage resulting from disregarding our instructions and directives.

Changes due to technical progress are reserved.

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