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SUPERBOLT[®]

Installation Procedure

(excludes piston end, crosshead, mill motor, & bearing lock nuts)

Before Tightening:

Determine the target jackbolt torque from the installation sheet shipped with the product, or by calling Superbolt.

Note: *The jackbolt torque value stamped on the tensioner is a standard value for that part and may not be correct for your application.*

If using air impacts: Select a tool with output of about 100% - 110% of the target torque. See "Air Impact Tool Selection" on back.

Preparation: 1) Confirm jackbolts are lubricated with correct Superbolt lubricant (JL-G or JL-M). New product is pre-lubricated at the factory. 2) Make sure the jackbolt tips are flush (or recessed) with bottom of nut body. 3) Lubricate thread of main stud. 4) Slide hardened washer onto the stud, 5) Lubricate the washer face or jackbolt tips with correct Superbolt lubricant (JL-G or JL-M).

For flanges: To speed up installation, use two workers at 180° apart, following the OEM pattern for tightening.

Tightening Sequence:

STEP 1: Spin the tensioner onto the main thread until it seats against the washer. You may want to back off the tensioner slightly as mentioned in Helpful Tip #3.

STEP 2: Tighten (4) jackbolts at 90° apart (12:00, 6:00, 9:00, and 3:00) on all studs with a partial torque (30 - 70%). This serves to seat the flange. If using an impact, use a reduced setting or lightly pulse the trigger at the full setting.

STEP 3: At 100% target torque, tighten the same (4) jackbolts on all studs.

STEP 4: At 100% target torque, tighten all jackbolts in a circular pattern. Do this for all studs (1 round only). See Helpful Tip #7 about using up to 120% torque.

STEP 5: Repeat "STEP 4" until all jackbolts are "stabilized" (less than 10° rotation). This usually requires 2-4 additional passes. If using air tools, switch to a torque wrench when socket rotation is small. Use the torque wrench to stabilize at the target torque.

Note: *Product with 4 or 6 jackbolts - use a star pattern for all steps.*

Lubricants

Main Stud: Any standard anti-seize lubricant can be used.

Jackbolts: Jackbolts are pre-lubricated from the factory with either moly (JL-M) or graphite (JL-G) lubricant. JL-M product is stamped with "JL-M". For reuse after high temperature service, remove, clean, and re-lubricate the jackbolts with the correct Superbolt lubricant. Also, apply JL-M or JL-G lubricant to the washer face (or jackbolt tips). Again, it is important to use the correct lubricant.

Removal Procedure [note: for stubborn removal, please call for alternate procedure]

CAUTION! Removal requires strict procedures! Jackbolts must be unloaded gradually. If some jackbolts are fully unloaded prematurely, the remaining jackbolts will carry the entire load and may be hard to turn. With extreme abuse, a jackbolt tip can deform making removal difficult.

Service Under 250° F

Preparation: Spray jackbolts with penetrating oil or hydraulic oil prior to start (especially if product is in corrosive environment).

STEP 1: Loosen each jackbolt 1/8 turn following a circular pattern around the tensioner (1 round only). Do this for all studs on the joint prior to the next step.

Note: As you move around and get back to the 1st jackbolt, it will be tight again.

STEP 2: Repeat a 2nd round as above for all studs, loosening each jackbolt 1/4 turn in a circular pattern.

STEP 3: Continue loosening 1/4 turn for 3rd and successive rounds until all jackbolts are loose.

Note: Usually after the 3rd or 4th round, an impact can be used to completely extract the jackbolts, one by one. For long bolts or tie rods, additional rounds may be required before removing the jackbolts with an impact tool.

STEP 4: Remove, clean, and relubricate the jackbolts prior to next use with correct Superbolt lubricant (JL-G or JL-M).

Service Over 250° F

Preparation: Above 300°F the petroleum base of the lubricant burns off. Oil per "STEP 1" below to reduce the removal torque.

STEP 1: As the equipment is cooling down (around 300°F), apply hydraulic oil to the jackbolts and washer and let sit for several hours. Thoroughly "wet-down" all components and re-apply during equipment cool down period. If the tensioner is inverted, squirt oil in the gap between the nut body and the washer. **Note:** Synthetic oil can be used for oiling above 300°F.

STEP 2: Wait for tensioners to cool below 200°F. Using a circular pattern, "crack" each jackbolt only enough to ensure movement. Do not turn beyond the break loose point. Do this for all studs.

STEP 3: Now begin with "STEP 1" of the procedure for service under 250°F.

Note: Heating Rods can be used to reduce the removal torque required.

Air Impact Tool Selection - 90psi air pressure [call Precision Boltting for additional help with tool selection]

Note: The jackbolt torque actually achieved by an air impact wrench is usually only 30 - 50% of its rated output. For minimum hand work, use an impact with an output of 110% - 120% target torque. For maximum power, use the largest air line and fitting.

Up to 70 ft-lbs: For 15-35 ft-lbs use a right angle ratchet or light duty 3/8" impact. For 35-70 ft-lbs use a heavy-duty 3/8" impact.

70 - 100 ft-lbs: Use a light duty 1/2" impact at a reduced pressure or setting. (Be careful not to overtighten! Calibrate the impact before starting)

100 - 170 ft-lbs: For 100-130 ft-lbs use a light duty 1/2" impact. For 130-170 ft-lbs use a heavy-duty 1/2" impact.

170 - 200 ft-lbs: Use a light duty 3/4" impact on low setting. Heavy-duty 1/2" impacts will also reach this range.

Over 200 ft-lbs: For 200-300 ft-lbs, use a light to medium duty 3/4" impact. Over 300 ft-lbs, use a heavy duty 3/4" impact.

Calibrating an air impact wrench: Tighten one jackbolt until the socket rotation stops and check the jackbolt with a torque wrench. The torque required to move the jackbolt further is the output of the impact as measured on Superbolt tensioners.

Helpful Tips

Prior To Tightening:

- 1) **Check threads of main stud:** If possible, verify that the tensioners spin on prior to the installation date. If a tensioner is tight or will not thread on, try using lapping compound on the main thread and work the tensioner in a back and forth motion making small advances when the thread loosens up. If necessary, chase the studs with a die.
- 2) **Use of spacers:** Tensioners should be positioned at the ends of the studs to minimize exposed threads and facilitate easy access to the jackbolts. A spacer (or stacked washers) can be used beneath the special hardened washer to accomplish this. A spacer will also “step over” a damaged area on a stud where years of bolting have deformed the first few threads.
- 3) **Back the tensioner off before tightening to provide 1/16” to 1/8” gap:** The additional jackbolt extension provides easy access for oiling the jackbolt tips prior to removal and for the execution of Tip #11. This is especially beneficial for oiling when the tensioners are inverted. Note: There may be insufficient jackbolt stroke to allow this step when tensioning exceptionally long bolts or tie rods, or when closing a gap between flanges.
- 4) **Sockets:** High hex stresses require the use of quality six-point sockets. Have several spares handy for each job and replace them at the first sign of wear. Special Superbolt sockets are required when using a 3/4” impact or torque wrench due to close jackbolt spacing.
- 5) **For spinning the tensioner on and off the stud:** Custom “sockets” which grip the tensioner are available. Also, two deep well sockets inserted over two jackbolt hex’s at 180° apart can serve as handles for spinning the tensioners on and off the studs.

For Tightening:

- 6) **To improve efficiency when using impacts:** Don’t wait for the socket to stall completely on a specific jackbolt before advancing to the next jackbolt. It is faster, overall, to move quickly between jackbolts.
- 7) **Overshooting the target torque:** You may want to use 110 - 120% of the target torque for “Step 3”, “Step 4”, and for 1-2 rounds of “Step 5”. This may eliminate a tightening round. Be careful not to stabilize all of the jackbolts at this torque however. For long bolts or tie rods, you may want to experiment using even higher torque values. Call Superbolt before using more than 120% target torque.
- 8) **For gasketed joints:** During gasket compression, the load is transferred to the jackbolts (i.e. stud) being tightened. Don’t be concerned if some jackbolts (or tensioners) become loose during the procedure. Continue following the procedure. Don’t spin down tensioners that become loose during gasket compression.

For Removal:

- 9) **1/4 turn or less!:** Removing the jackbolts more than a 1/4 turn will increase the removal torque of the remaining jackbolts and you may get stuck. If this happens, you will have to retighten and start again.
- 10) **Stuck Jackbolt Removal:** If a jackbolt will not turn, remove, relube, and retighten a neighboring jackbolt and then try to turn it.
- 11) **Damaged Jackbolt Removal:** Should a jackbolt tip “mushroom” from extreme overloading caused by improper removal, the jackbolt tip can be cut with a cutting disk.