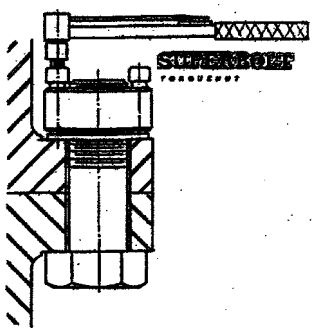
Superbolt® Torquenuts
Used with Rowan Anchor Bolt Assemblies R-193 Series

Revised September 03

The Torquenut is the most widely used, multi-jackbolt mechanical tensioner. The Torquenut is a bolt or stud tensioner that can fit into the space requirements of a heavy hex nut. The standard Torquenut, suitable for use at temperatures up to 600˚F (315˚C), can generate pre-loads compatible with Grade 8 or Grade 5 bolts or A193-B7 studs and is available in thread sizes from ¾" to 6". Special Torquenuts have been supplied to pre-stress precipitation hardening steels up to a 160,000psi level. Other specials have been made for 12" press columns.

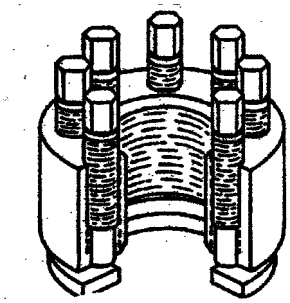


Holding Power

When properly torqued, Superbolt® Torquenuts will not come loose. Pre-stressed nuts and bolts remain tight on vibrating or pulsating equipment and on constantly reversing loads. Our products lose only 3% of their initial pre-load after 1,000,000 cycles when stressed to 98% of the initial pre-load. Even less is lost when loaded to a lesser degree. Tests are available upon request.

Simple Concept

A Superbolt® Torquenut is threaded on to a mating member bolt, a long anchor bolt or the end of a threaded shaft. The main thread is used for positioning only. Once the Superbolt® Torquenut is properly positioned, actual tensioning is accomplished by tightening the jackbolts located around the main thread.



Superbolt® Torquenuts fit in the same space that standard nuts normally occupy. Pre-loads are obtained by torquing individual jackbolts to the allowable torque.

Economical

Superbolt® Torquenut is a simple, relatively low cost mechanical tensioning device. By comparison, hydraulic tensioning devices are very expensive and can generate only a fraction of the pre-load produced by our product.

Time Savings

The relative ease of mounting and removal can reduce application time and simplify maintenance procedures. Superbolt® reduces downtime caused by fasteners that vibrate loose.

No Special Tools Needed

Superbolt® Torquenuts require only a small automobile-size torque wrench to properly tension hard-to-reach nuts, such as the 2" nuts found on some gas compressors between the cylinders (in steeples). They also are ideal where you can't fit a pipe cheater.

Robt. L. Rowan & Assoc., Inc. · 3816 Dacoma · P.O. Box 920760 · Houston, Texas 77292-0760
Tel (713) 681-5811 · Toll Free (800) 231-2908 · Fax (713) 681-5815
Visit our website at www.rlrowan.com

Superbolt®
General Tensioner Installation Sheet

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The following information is for Superbolt® multi-jackbolt tensioners listed in the tables below. Please contact Robt. L. Rowan & Assoc., Inc. for information on sizes or preload values not listed. **1-800-231-2908**

Lubrication: The jackbolts of every tensioner have been lubricated at the factory. Lubrication of the main bolt or stud is recommended, but not necessary for the proper function of the Superbolt® tensioner.

Hardened Washer: Every tensioner is shipped with a special hardened washer to prevent the hardened jackbolts from penetrating and damaging the part to be clamped.

Tools: A torque wrench (preferably the "click" type) and socket are the only tools required. Air or electric wrenches may be used for runup, but a torque wrench is necessary for final tightening.

Tables: The tables below give the estimated jackbolt torque values needed to achieve the preload values listed for the bolt diameter. These values are calculated for bolts with 8 threads per inch.

part#/bolt dia	socket size
MT-100-8	¼ in.
MT-112-8	¼ in.
MT-125-8	¼ in.
MT-137-8	5/16 in.
MT-150-8	5/16 in.
MT-162-8	5/16 in.
MT-175-8	3/8 in.
MT-187-8	7/16 in.
MT-200-8	7/16 in.

part#/bolt diameter	jackbolt torque (ft lbs)	preload (lbs)
MT-100-8	27	48,600
MT-100-8	24	44,080
MT-100-8	21	38,570
MT-100-8	18	33,060
=======	=======	======
MT-112-8	27	48,600
MT-112-8	24	43,680
MT-112-8	20	36,400
MT-112-8	16	29,120
=======	=======	======
MT-125-8	27	64,800
MT-125-8	23	55,740
MT-125-8	19	46,450
MT-125-8	15	37,160
=======	=======	======
MT-137-8	49	73,800
MT-137-8	46	69,300
MT-137-8	38	57,750
MT-137-8	31	46,200

part#/bolt diameter	jackbolt torque (ft lbs)	preload (lbs)
MT-150-8	42	84,300
MT-150-8	35	70,250
MT-150-8	28	56,200
MT-150-8	21	42,150
=======	=======	======
MT-162-8	49	98,400
MT-162-8	46	92,400
MT-162-8	42	84,000
MT-162-8	38	75,600
=======	=======	======
MT-175-8	57	99,000
MT-175-8	46	79,200
MT-175-8	34	59,400
MT-175-8	23	39,600

part#/bolt diameter	jackbolt torque (ft lbs)	preload (lbs)
MT-187-8	90	138,000
MT-187-8	75	115,000
MT-187-8	60	92,000
MT-187-8	45	69,000
=======	=======	=======
MT-200-8	86	132,500
MT-200-8	69	106,000
MT-200-8	52	79,500
MT-200-8	34	53,000

When using Superbolt® tensioners with RotaBolt™ load monitors, leave three threads exposed above the tensioner collar.

Please contact Robt. L. Rowan & Assoc., Inc. if you need a preload or a jackbolt torque value other than those listed. 1-800-237-2908

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LUBRICANTS

Main Stud - Any standard anti-seize lubricant can be used. A thin brush-on or an aerosol lubricant is easiest to work with.

Jackbolt – Jackbolts are pre-lubricated from the factory with either moly (JL-M) or graphite (JL-G) lubricant depending on the product series. For high temperature applications, remove and re-lubricate the jackbolts with the correct Superbolt lubricant.

Washer – Lubricate the washer with the same lubricant as used on the jackbolts (some substitutes allowed).

AIR IMPACT TOOL SELECTION (90psi air pressure)

Up to 50 ft-lbs: A high quality $^{3}/_{8}$" impact or right angle air ratchet

50 – 100 ft-lbs: A ½" impact at a reduced pressure or setting. (Be careful not to over tighten!).

100 – 160 ft-lbs: A high quality ½" impact should achieve near 160 ft-lbs.

160 – 200 ft-lbs: Use ½" impacts for most of the work since they are easier to use. Move to the ¾" impact if necessary.

Over 200 ft-lbs: For these high torques, a ¾" impact is required.

Note: *The jackbolt torque actually achieved by an air impact wrench is usually much less (30%-50%) than its rated output. Also, for maximum power, use the largest air line and fitting. An impact can have 10-25% more output with a $^{3}/_{8}$" vs. ¼" air fitting.*

To verify the torque output of air impact: *tighten one jackbolt until the socket stops and check the jackbolt with a torque wrench (a torque wrench with a direct reading dial is easiest to use).*

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HELPFUL TIPS

1) **Tensioners with only 4 or 6 jackbolts:** **Step 1:** Tighten two jackbolts at 50% torque, **Step 2:** Tighten all jackbolts in a star pattern at 100% torque, **Step 3:** Continue star pattern at 100% torque until finished.

2) **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. As the tensioner is tightened, the first jackbolt tightened in that pass will loosen somewhat. It is faster to make a second pass moving quickly between jackbolts.

3) **Overshooting the target torque:** You may want to experiment using 110-125% of the target torque for "Step 4" and possibly for 1-2 rounds for "Step 5". Doing this may eliminate a tightening round. Be careful not to stabilize at this torque however.

4) **For gasketed joints:** don't be concerned if some jackbolts (or tensioners) become loose during the procedure. During gasket compression, the load is transferred to the stud being tightened. Don't spin down tensioners that become loose. Let the air tools do the work.

5) **Use of spacers:** Tensioners should be positioned at the end of the studs to minimize exposed threads and facilitate easier access to the jackbolts without the use of thin-walled sockets. A spacer can be used beneath the hardened washer to accomplish this. The spacer will also "step over" a damaged area on a stud where years of bolting have deformed the first few threads. Standard washers can also be stacked beneath the Superbolt washer.

6) **Back the tensioner off to provide 1/16"-1/8" gap:** This provides additional jackbolt extension which access to the jackbolt tips for oiling before removal. For most applications, the tensioners have plenty of jackbolt stroke to allow the extra extension. However, if you have an exceptionally long bolt or tie rod or are closing a gap between flanges, there may be insufficient stroke to allow this step.

For 8 tpi threads: Gasketed joints – ½ turn usually works well Hard joints – 1 turn usually works well

(Depending on the thread pitch, more or less rotation will be required to get the 1/16" to 1/8" gap.)

7) **Damaged jackbolt removal:** Should a jackbolt tip get damaged from extreme overloading caused by improper removal, the extra jackbolt extension mentioned above allows easy access to cut the damaged jackbolt tip with a cutting disk.

8) **Retightening after equipment is in service at elevated temperature:** You should not have to re-tighten after equipment is brought up to temperature unless the bolt and flange material have incompatible thermal expansion coefficients. If you normally have to re-tighten after the equipment is heated, please call Superbolt to discuss your specific application.

9) **Sockets:** Use only quality impact sockets in good condition. Worn sockets can eventually round the corners of the jackbolts. The rounded corners, in turn, add stress to the socket, which can result in breakage. Keep a half dozen (standard and deep-well) impact sockets on hand for any job and throw them away at the first sign of wear.

10) **Custom tools:** Simple drive tools are available for spinning the tensioner on and off the stud.

11) **Chase the threads:** The threads on old studs can deform after many years of service especially in high temperature applications where material creep may be a factor. It is recommended to purchase a new die for this as old dies may be worn.

12) **Caps:** Plastic, aluminum, and steel caps are available to help protect the tensioners from contaminants. For low temperature applications, the plastic caps can be filled with grease to help protect against rust. Platings and coatings are also available.

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BEFORE TIGHTENING

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

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

If using air impacts: Select a tool with output or 90-100% of the target torque. See "Air Impact Tool Selection" on back.

For flanges: Use two workers at 180˚ apart, tightening the flange in a star pattern (Superbolt can provide a flange star pattern diagram for your number of studs)>

Preparation: 1) Make sure the jackbolt tips are flush (or recessed) with bottom of nut body, 2) Lubricate main thread of stud, 3) Slide hardened washer onto the stud, 4) Lubricate the washer with correct Superbolt lubricant (Either JL-G or JL-M depending on tensioner series).

TIGHTENING SEQUENCE

STEP 1 Spin the tensioner down on the main thread until it seats against the washer. Back off the tensioner to create about 1/16" to 1/8" gap between nut body and washer as mentioned in Helpful Tip #5

STEP 2 At about 50% target torque, tighten (4) jackbolts at 12:00, 6:00, 9:00, and 3:00 on all studs. *See Helpful Tip #1 for products with 4 or 6 jackbolts.*

STEP 3 At 100% target torque, tighten the same (4) jackbolts at 12:00, 6:00, 9:00, and 3:00 on all studs.

STEP 4 At the target torque, tighten all jackbolts in a circular pattern on all studs (1 round only). *See also Helpful Tip #3 about using 110-125% torque.*

STEP 5 Repeat "Step 4" until all jackbolt are "stabilized" (less than 20˚ rotation). This usually requires 2-4 additional passes.

Air Impacts: If using air tools, switch to a calibrated hand torque wrench when socket rotation is small. Use the hand wrench to stabilize and confirm target torque.

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

Service Under 250˚F

STEP 1 Loosen each jackbolt ¼ turn following a circular pattern around the tensioner (1 round only). As you move around and get back to the first jackbolt, it will be tight again. Do this for all studs on the joint prior to the next step.

Note if time permits, spray jackbolts with a penetrating oil or hydraulic oil prior to start (especially if product is rusted).

STEP 2 Repeat a 2nd round the same as above for all studs.

STEP 3 Repeat a 3rd round the same as above for all studs

STEP 4 Continue until jackbolts are loose. Remove, clean and relubricate jackbolts with correct lubricant (either JL-G or JL-M depending on tensioner series).

Note: Usually after the 3rd round, an air impact can be used to remove the jackbolts. Do not use an air impact for the first three rounds! For long studs or tie rods, more than three rounds may be required before using the impact tools.

Service Over 250˚F

Above 300˚F the petroleum base of the lubricant burns off. Oil the tensioner to reduce removal effort.

STEP 1 As the equipment is cooling down (around 300˚F), apply hydraulic oil to jackbolts, washer, and main thread. Synthetic oil can be used for removal at higher temperatures.

STEP 2 Using a circular pattern, "crack" each jackbolt only enough to ensure movement. Do not turn beyond break loose point. Do not begin to unload any given stud before all jackbolts on all studs have been "cracked".

STEP 3 Follow removal procedures for service under 250˚F

Note: For high temperature applications above 750˚F, a heating rod can be used to facilitate removal. Some customers report that only 5 minutes of heating per stud is required to greatly reduce the removal torque required. The stud needs only to expand slightly to reduce the removal effort.

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