WARNING: THIS MANUAL IS ONLY FOR HYDRAULIC TENSIONERS WITH THE **ORANGE** SAFETY GUARD. DO NOT USE IF THE GUARD IS A DIFFERENT COLOR.

INSTRUCTION MANUAL IM-257
For Hydraulically Tensioned Studs and Nuts

Applicable Bolting Connections

Fr. 7FA Gas Turbine to Load Coupling
Fr. 7FB Gas Turbine to Load Coupling
Load Coupling to 7FH2 Generator
Steam Turbine to 7FH2 Generator

Applicable GE Ordering Sheet Part Numbers

101T3628P001	377A9477P001	358A7202P001
101T3628P002	377A9477P002	358A7202P002
101T3628P003	377A9477P003	358A7202P012
101T3628P004		358A7202P018
101T3628P005	361A5218P001	358A7202P020
101T3628P0006		358A7202P031
101T3628P0007		358A7202P032

CUSTOMER'S INFORMATION BOX

CONTENTS ARE INDEPENDENT OF RIVERHAWK DOCUMENT CONTROL

GE Power & Water — GENERAL ELECTRIC COMPANY

VENDOR SUPPLIED

GE NOT TO REVISE. GE REVISION LEVEL IS SHOWN ON THIS APPLIQUE.
THIS DOCUMENT IS FILED UNDER THE GE DRAWING NUMBER.

THIS DOCUMENT SHALL BE REVISED IN ITS ENTIRETY. ALL SHEETS OF THIS DOCUMENT ARE THE SAME REVISION LEVEL AS INDICATED IN THIS VENDOR SUPPLIED DRAWING APPLIQUE.

MLI: ___ OF ___

GE SIGNATURES	DATE	GE DRAWING NUMBER	REV
CHECKED:		373A4035	
ISSUED:			

The Riverhawk Company reserves the right to make changes updating this document without dissemination or notice. The latest revision level may be obtained by contacting Riverhawk Company directly or at our website www.riverhawk.com.

Repairs – Rentals
Field Service

215 Clinton Road
New Hartford, NY 13413
Tel: +1 315 768 4855
Fax: +1 315 768 4941
Email: info@riverhawk.com

Table of Contents

CUSTOMER'S INFORMATION BOX

CONTENTS ARE INDEPENDENT OF RIVERHAWK DOCUMENT CONTROL

GE DRAWING NUMBER	REV
373A4035	

Riverhawk Company

215 Clinton Road
New Hartford, NY 13413
Tel: +1 315 768 4855
Fax: +1 315 768 4941
Email: info@riverhawk.com

1.0 Cautions and Safety Warnings

NOTICE

As of summer 2011, this manual is to be used in relation to the interlocking style tensioner. This new tensioner can be identified buy its ORANGE safety guard. Note: yellow guarded tensioner requires the use of different set of instructions, consult Riverhawk for assistance

TO AVOID FAILURE, ENSURE SAFETY AND PROPER OPERATION THE TENSIONER AND INERLOCK SAFETY GUARD MUST INSTALLED ON THE FLANGE BEFORE TENSIONING BEGINS. DO NOT USE THE TENSIONER ASSEMBLY AT ANY PRESSURE UNLESS THE TOOL IS INSTALLED ON THE FLANGE.

WARNING

Improper tool use and the failure to follow the correct procedures are the primary root causes of tool failures and personal injuries. A lack of training or experience can lead to incorrect hardware installation or incorrect tool use. Only trained operators with careful, deliberate actions should use hydraulic tensioners. Contact Riverhawk Company with any training needs.

WARNING

Risk of high pressure fluid injection. Riverhawk tools operate under high pressure. Thoroughly inspect all hoses and connections for damage or leaks prior to using this equipment.

CAUTION

Personal injury and equipment damage can occur if the puller screw is not securely engaged with the conical thread of the stud. Proper engagement is achieved when the puller screw is tight in the stud and is not cross-threaded into the conical thread.

WARNING

The proper personal protective equipment must be worn at all times. Riverhawk recommends at a minimum, safety glasses, long sleeve shirt, hard hat, heavy work gloves, and steel toe shoes.

WARNING

The safety guard MUST be in place and hands kept out of designated areas at all times when the tensioner is pressurized otherwise personal injury can occur.

CAUTION

DO NOT EXCEED THE MAXIMUM PRESSURE MARKED ON THE TENSIONER. Excessive pressure can damage the stud and the puller screw.

WARNING:

Keep hands clear of the tool while the pressure is building up. This includes the pin wrench for tightening the spanner ring (nut). Once the tool is stabilized at pressure then and only then can the nut be tightened. This reduces the potential of personal injury.

Note: Before threading the puller screw into the stud, carefully check the cleanliness of both the stud's and the puller screw's conical threads. Apply a light coat of clean turbine oil or a spray lubricant to the puller screw. Do not use “Never Seize” on the conical threads. This procedure will ease assembly and assure positive mating of the threads before tightening.

2.0 Scope

This document describes the steps to install a set of hardware containing the studs and nuts supplied by Riverhawk Company at the turbine/coupling and coupling/generator connections. This hardware is depicted on the following drawings. These drawings as well as tooling drawings form part of this manual.

Riverhawk Hardware Set Part Number	GE Drawing Number for Hardware Set	GE Ordering Sheet Part Number	Hardware Set Description
HF-0771	359B2514	101T3628P001 101T3628P002#	2-1/4" hardware for the turbine end and 2-3/4" hardware for the generator end for the 7FA/7FB load coupling.
HF-2447	359B2539	101T3628P004	2-1/4" hardware for the turbine end for the 7FA/7FB load coupling.

HF-0803	359B2520	101T3628P005 101T3628P0006 101T3628P0007#	2-3/4" hardware for the generator end of the 7FA/7FB load coupling and for the steam turbine to 7FH2 generator connection.

# denotes GE part numbers that include hydraulic tooling

Hydraulic tensioners with safety interlock (see section 4.5) can also be used with other tensioned hardware sets.

Riverhawk Hardware Set Part Number	GE Drawing Number for Hardware Set	GE Ordering Sheet Part Number	Hardware Set Description
HF-0771	359B2514	358A7202P001 358A7202P012# 361A5218P001 377A9477P001 377A9477P002#	2-1/4" hardware for the turbine end and 2-3/4" hardware for the generator end for the 7FA/7FB load coupling.
HF-2447	359B2539	358A7202P031# 358A7202P032	2-1/4" hardware for the turbine end for the 7FA/7FB load coupling.
HF-0803	359B2520	358A7202P018 358A7202P020# 377A9477P003#	2-3/4" hardware for the generator end of the 7FA/7FB load coupling and for the steam turbine to 7FH2 generator connection.
HF-0769 (OBSOLETE)	359B2501	358A7202P002	2-1/4" hardware for the turbine end and 2-3/4" hardware for the generator end for the 7FA/7FB load coupling. The set includes windage covers.
HF-0338 (OBSOLETE)		358A7202P001	2-1/4" hardware for the turbine end and 2-3/4" hardware for the generator end for the 7FA load coupling.

HF-0372 (OBSOLETE)		358A7202P002	2-1/4" hardware for the turbine end and 2-3/4" hardware for the generator end for the 7FA load coupling. The set includes windage covers.

[#] denotes GE part numbers that include older installation tooling that do not include a built-in safety interlock.

3.0 Quick Checklist

The following checklist is intended as a summary of the steps needed to use the Riverhawk-supplied equipment. New personnel or those experienced personnel who have not used the Riverhawk equipment recently are encouraged to read the entire manual.

EQUIPMENT INSPECTION

☐ Check oil level in hydraulic pump.

☐ Check air pressure at 80 psi [5.5 bar] minimum. (For air-driven pumps)

☐ Check hydraulic hose for any damage.

☐ Test pump.

☐ Inspect tensioner for any damage.

NUT AND STUD PREPARATION

☐ Inspect studs and nuts for any damage.

☐ Clean the studs and nuts.

☐ Measure stud lengths. **(VERY IMPORTANT)**

☐ Install studs and nuts into the flange.

☐ Set stick-out dimension on the coupling side of the flange.

☐ Hand tighten nuts on turbine / generator side of flange.

☐ Verify stick-out measurement **(VERY IMPORTANT)**

Tensioning (Stud Installation)

☐ Check tensioner's drawing for correct parts and part numbers.

☐ Apply a light coat of clean turbine oil or spray lubricant to the puller screw. **DO NOT USE "NEVER SEIZE" ON THE CONICAL THREADS.**

☐ Install spanner ring onto the nut.

☐ Install one puller screw release tape strip into stud. (Appendix B2)

☐ Thread puller screw onto the stud.

☐ Insert Allen wrench into the back side of the stud to stop the stud from rotating when installing the puller screw.

☐ Using an Allen wrench, tighten the puller screw. Then back off puller screw 1/2 a turn.

☐ Retighten puller screw by hand until it is fully inserted. **DO NOT BACK OFF PULLER SCREW**.

☐ Slide foot over the puller screw and orientate into position.

☐ Thread the tensioner onto puller screw. Lightly turn the tensioner onto the puller screw until it stops. The gap between the foot and tensioner is about 1/16" to 3/16"

☐ Place guard over tensioner and position guide pin into the hole in the backside of the stud.

- ☐ Tighten knurled interlock fitting by hand until it presses firmly against tensioner. (no gap)
- ☐ Slide and engage customer connector from rear of guard to lock tensioner into place.
- ☐ Tension to 50%. Consult manual for correct pressure.
- ☐ Use the pin wrench in the spanner ring to tighten nut.
- ☐ Release pressure and allow the tensioner to fully retract.
- ☐ Disconnect the hose from the tensioner.
- ☐ Loosen the knurled fitting and remove the safety guard.
- ☐ Unscrew the tensioner from the puller screw. Use **caution** to ensure that hands are not between the tensioner and the coupling when the tensioner becomes disengaged from the puller screw.
- ☐ Remove the foot.
- ☐ Remove the puller screw from the stud.
- ☐ Remove the spanner ring from the nut and move to the next stud in the pattern.
- ☐ Tension all studs to 50% before proceeding to final pressure.
- ☐ Repeat the above steps at the final pressure.
- ☐ Measure the final stud length and record on the stretch datasheets. Calculate the stretch and verify per section 9.2
- ☐ Torque the nuts' set screws per section 10

CUSTOMER'S INFORMATION BOX

CONTENTS ARE INDEPENDENT OF RIVERHAWK DOCUMENT CONTROL

GE DRAWING NUMBER	REV
373A4035	

Riverhawk Company

215 Clinton Road
New Hartford, NY 13413
Tel: +1 315 768 4855
Fax: +1 315 768 4941
Email: info@riverhawk.com

Detensioning (Stud Removal)

- ☐ Loosen the nuts' set screws
- ☐ Inspect and clean studs' conical threads. **Do not continue until ALL debris is removed from the threads!** Refer to instruction manual IM-220. **Do not try to use the tensioner to remove a damaged stud!**
- ☐ Apply a light coat of clean turbine oil or spray lubricant to the puller screw. **DO NOT USE "NEVER SEIZE" ON THE CONICAL THREADS.**
- ☐ Install the spanner ring onto the nut.
- ☐ Thread the puller screw onto the stud.
- ☐ Using an Allen wrench, tighten the puller screw. Then back off the puller screw 1/2 a turn.
- ☐ Lightly retighten the puller screw by hand until it is fully inserted. **DO NOT BACK OFF THE PULLER SCREW.**
- ☐ Slide the foot over the puller screw and orientate into position.
- ☐ Thread the tensioner onto the puller screw. Lightly turn the tensioner onto the puller screw until it stops. The gap between the foot and tensioner is about 1/16" to 3/16".
- ☐ Place the safety guard over the tensioner and position the guide pin into the hole in the backside of the stud.
- ☐ Tighten the knurled interlock fitting by hand until it firmly presses against the tensioner. (no gap).
- ☐ Slide and engage the custom connector from the rear of the safety guard to lock the tensioner into place.
- ☐ Apply the final pressure.
- ☐ Loosen the nut with the spanner ring and pin wrench.

- ☐ Release the hydraulic pressure and allow the tensioner to fully retract.
- ☐ Disconnect the hose from the tensioner.
- ☐ Loosen the knurled fitting and remove the safety guard.
- ☐ Unscrew the tensioner from the puller screw. Use **caution** to ensure that hands are not between the tensioner and coupling when tensioner becomes disengaged from the puller screw
- ☐ Remove the foot
- ☐ Remove the puller screw from the stud. It may be necessary to insert and an Allen wrench into the backside of the stud to remove the puller screw.
- ☐ Remove the spanner ring from the nut.
- ☐ Move to the next stud in the pattern.

4.0 General Preparations

Read and understand all instructions before installing and tensioning studs

This equipment produces very high hydraulic pressures and very high forces. Operators must exercise caution, wear safety glasses and hard hats when using this equipment.

High-pressure fluid from the Hydraulic Pressure Kit system pressurizes the tensioner which generates a stretching force that actually stretches the stud. As the stud is stretched the nut lifts off the flange. The nut is then reseated into position on the flange by turning spanner ring with the pin wrench. When the nut is tight against the flange, the pressure in the tensioner is released leaving the stud loaded to its predetermined value.

4.1 Machine Preparation

The flange to be tensioned must be fully closed prior to positioning of studs in the flanges. Turning the shafts of the turbine and the generator are not required, but may be useful. Also, it will be

advantageous to remove as many obstructions as possible from the flange area, such as speed probes, shipping plates, and conduit.

4.2 Hardware – Balance

Hardware is supplied as weight balanced sets. Studs and Nuts are interchangeable within a set. Do not mix stud and nuts from multiple sets.

Save the weight certification that is supplied with each set. It will be needed for the purchase of replacement hardware

4.3 Tensioner – Care and Handling

When not in use, the tensioner shall be maintained in a clean environment with all caps and plugs for hydraulic openings and fittings in place.

Use ISO 32 grade oil.

When in use, the tensioner shall be protected from sand and grit.

4.4 Hand Tools

Several hand wrenches and micrometers may be required to perform installation and measurement of the studs:

5/8” wrench
A set of Allen Wrenches
3’ – 4’ Breaker Bar
9” to 10” micrometer or caliper
10” to 11” micrometer or caliper

4.5 Special Tools

Hydraulic Tensioner Kit:	HT-5222 Hydraulic Tensioner (for counterbore flanges) (reference GE 269B8697)

HT-7591 Hydraulic Tensioner
(for counterbore flanges)

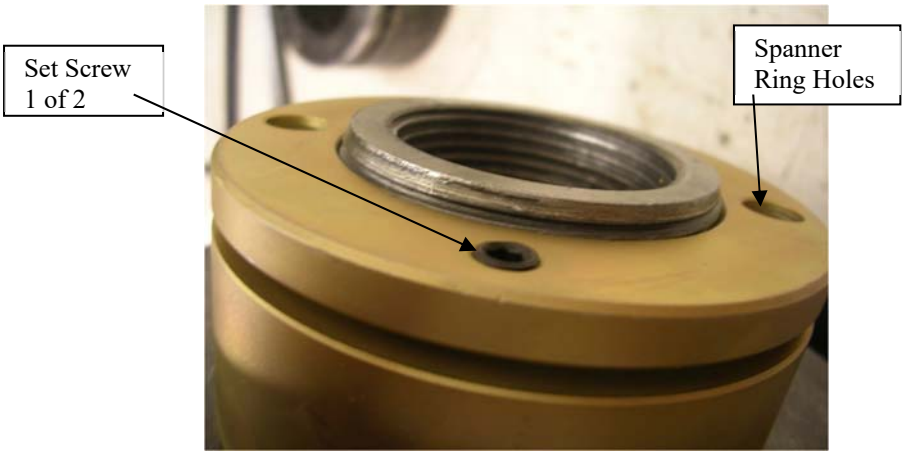
Hydraulic Pump Kit:

AP-0532 Air-Operated Hydraulic Pump
(recommended)
(reference GE 359B2502)

MP-0130 Manual Hand-Operated
Hydraulic Pump
(reference GE 359B2506)

5.0 Preparation of Hardware

5.1 Nut Preparation



Sample Picture of a Riverhawk Locknut

If there is any visible damage on a nut, do not use the nut and contact the Riverhawk Company for a replacement nut. Please be prepared to supply the turbine number, weight certification, and digital photographs for evaluation.

5.1.1 Nut Cleaning - New Installations

For new installations, the nuts should come sealed from the factory and will need no cleaning.

5.1.2 Nut Cleaning - Old Installations

Previously installed nuts require cleaning as follows:
Wire brush using a petroleum based solvent to remove any foreign material on the external surfaces and threads.

5.1.3 Nut Cleaning - Very Old Installations

Obsolete hardware sets employed a thread-locking compound which is visible as a grayish-green residue.

Riverhawk Company strongly recommends replacing this type with the current nut that has a re-useable mechanical locking feature.

Special instructions are available from Riverhawk if it has been decided to continue to use the obsolete hardware.

5.2 Stud Preparation

Check the stud for any visible damage. If there is any visible damage, do not use the stud and contact the Riverhawk Company for a replacement stud. Please be prepared to supply the turbine number, weight certification, and digital photographs for evaluation.

The conical threads of each stud must be clean before installation or removal. This ensures the proper seating of the puller screw.

5.2.1 Stud Cleaning - New Installations

For new installations, the studs should come sealed from the factory and will need no cleaning.

5.2.2 Stud Cleaning - Old Installations

Previously installed studs will require cleaning. Clean conical threads should have a bright and shiny appearance.

Notice:

Failure to properly clean the studs could result in improper mating of threads. Personal injury and equipment damage can occur if the puller screw is not securely engaged with the tapered thread of the stud.

If cleaning is required, follow these steps:

1. Blow out the threads with compressed air to remove loose debris and dry conical threads. Reference instruction manual IM-220 for more detailed instructions. Do not apply a solvent or other cleaning solution to the threads as this may chemically attack the stud.

2. Use Stud Cleaning Kit, GT-4253 or a similar 1" diameter Brass power brush.

Picture of Brass Power Brush

3. Insert the brush into an electric drill and set drill to run in a counterclockwise direction at high speed.

4. Work the drill in a circular motion while moving the brush in and out to clean all of the threads. Try not to hold the brush in one place too long, so as not to remove the stud's protective coating.

5. Blow out the threads with compressed air to remove loosened debris.

6. Visually inspect threads for cleanliness. Threads should be bright and shiny.

7. Repeat if any dirt can be seen in the threads.

8. Inspect threads for any damage that may have been caused by previous installation.

Do not apply thread lubricants to the threads.

Finish the cleaning process by rinsing in a volatile solvent such as acetone and allow to dry.

5.2.3 Very Old Installations

Obsolete hardware sets employed a thread-locking compound which is visible as a grayish-green residue.

Riverhawk Company strongly recommends replacing this type with the current hardware that has a re-useable mechanical locking feature.

Special instructions are available from Riverhawk if it has been decided to continue to use the obsolete hardware.

5.3 Stud Length Measurement

Measure and record the initial lengths of the studs on the supplied stretch datasheet in Appendix C of this manual.

The following recommendations will improve your results.

- Plan to start and finish any flange in the same day.
- Studs and flange must be at the same temperature.
- Keep the measuring instruments out of the sunlight.
- Number each stud with a marker for later stretch measurement tracking.
- Mark the location of measurement on stud end with a permanent marker.
- The same person should make all measurements.
- Measure each stud to nearest 0.001 inch (.01 mm).
- Record each measurement on the stretch record sheets in this manual's appendix.

6.0 Stud and Nut Assembly

Refer to Hardware Set Part Number drawing listed in Section 2.0 of this manual. If you don't have a hardware set drawing, it can be found in the GE drawing system or contact Riverhawk Company.

Assemble the nut to the conical tensioning thread end (front side) of the stud.

Slide the assembly into the flange from the coupling side as shown in Figures 1 & 2 then install the other nut on the backside.

Ensure that backside's nut orientation is correct with thread locking screws facing outward of the flange.

The nuts are the same on the Turbine end (2.25"). The nuts are different on the Generator end (2.75"); the shorter nut goes on the back side or the side closest to the Generator.

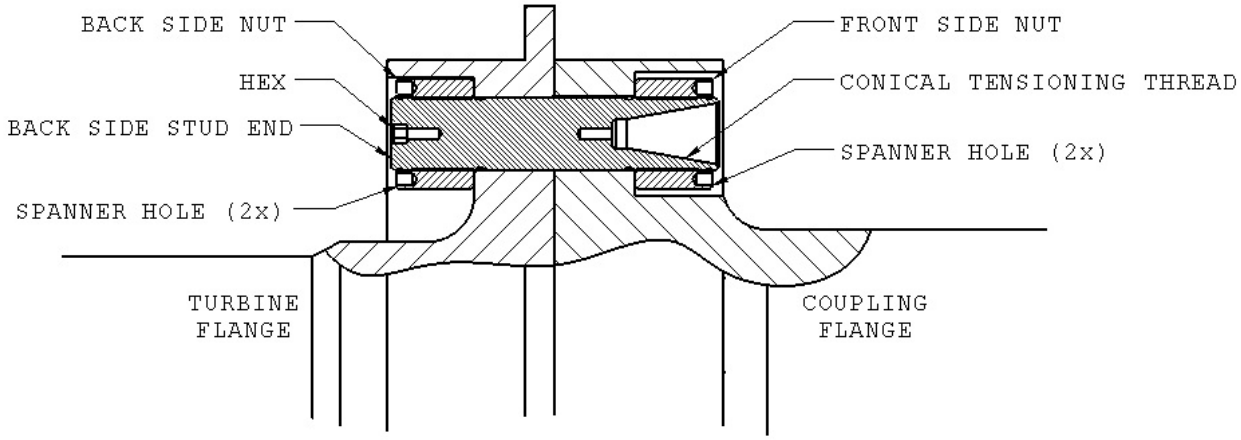


Figure 1 – Cutaway View of Turbine Flange and Coupling Flange Bolted Joint

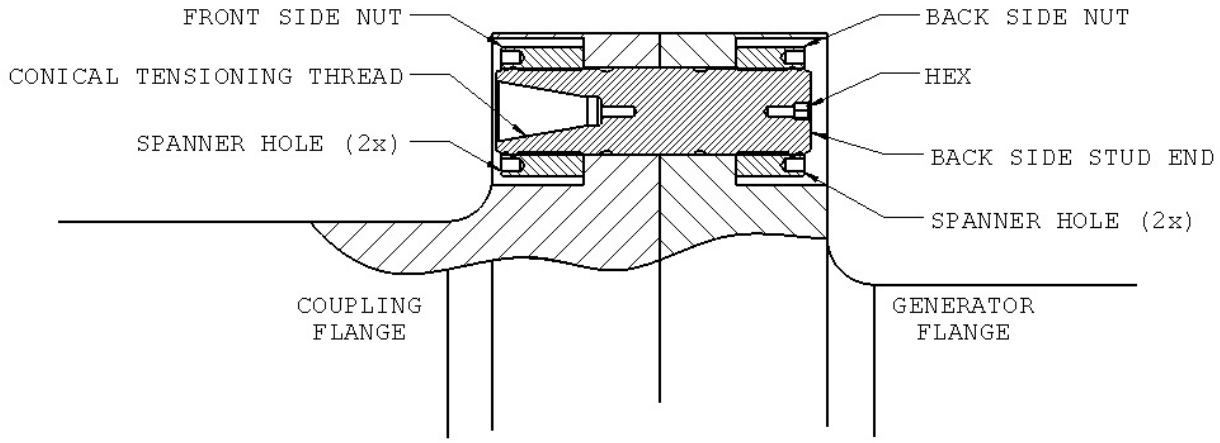


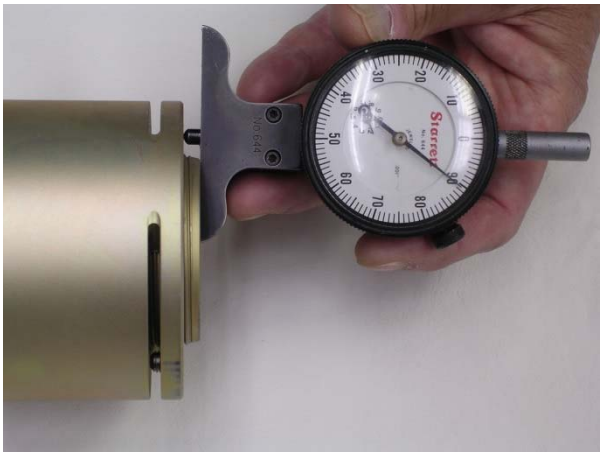
Figure 2 – Cutaway View of Generator Flange and Coupling Flange Bolted Joint

Adjust the front side stud/nut assembly so that the stud sticks out from the face of the nut the amount shown on the hardware set drawing. If you don't have a hardware set drawing, it can be found in the GE drawing system or contact Riverhawk Company. (See section 2**)**

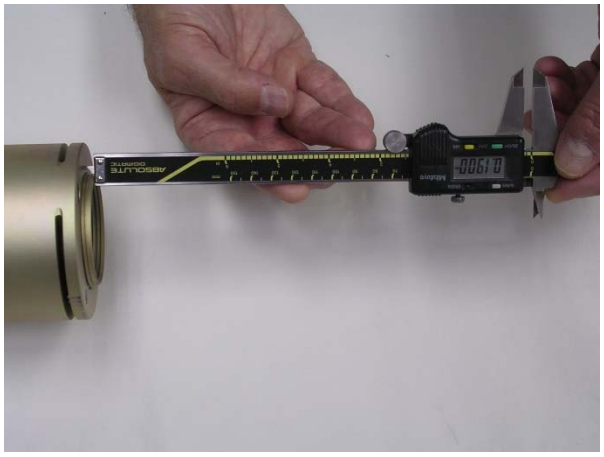
SETTING THE STICK-OUT LENGTH IS CRITICAL FOR THE HYDRAULIC TENSIONER TO WORK CORRECTLY. THE STICK-OUT LENGTH IS ALWAYS SET FROM THE COUPLING SIDE OF THE FLANGE.

The stick-out length can be checked three different ways.

Stick-Out Gage



Drop Gage



Digital Calipers

Sample Pictures of a Stick-Out Measurement

Hand tighten the assembly to a snug fit. See Figures 1 & 2 for a view of the assembly of studs and nuts in the flange prior to tensioning.

7.0 Hydraulic Equipment Preparations

7.1 Hydraulic Equipment Inspection

7.1.1 Hydraulic Tensioner Inspection

CAUTION

Riverhawk recommends that the tensioner be returned to Riverhawk for periodic inspections. Replacement of obsolete tensioners is recommended. Functional upgrades are also recommended. The Riverhawk Service Returns Coordinator should be notified 3-6 months prior to a planned outage to schedule an inspection service.

This tensioner does not require the air to be removed (or bled) from its hydraulics. This has been done at the factory.

WARNING

To avoid failure, ensure safety, and proper operation, the tensioner assembly must be installed on a stud in the flange before pressurizing the tensioner. Do not use the tensioner at any pressure unless the tool is installed on a stud in a flange.

Clean puller screw and check for any debris and dents.

Inspect the tensioner guard for any signs of damage including cracked welds. Any guards modified in the field should be replaced. Bent guards should be replaced. If the guard has rubber parts, they should be in good condition. Any missing rubber parts needed to be replaced.

Inspect the outside of the tensioner for discoloration patterns that may indicate submersion and internal damage.

Perform an inventory of the loose equipment supplied with the tensioner. An inventory list is provided on the tensioner's technical drawing (Riverhawk HT-xxxx listed in section 2.0 and 4.5). Replacement parts are available from Riverhawk.

7.1.1.1 Hydraulic Tensioner's Burst Disc Replacement

The hydraulic tensioner's burst disc is a key element in the overall safe use of the hydraulic tensioner. The burst disc's location is shown on the tensioner's technical drawing (Riverhawk HT-xxxx listed in section 2.0 and 4.5).

Burst disc replacement instructions are shown in Appendix B3 or refer to Riverhawk Instruction Manual IM-363 (GE VENDOC 373A4077) for more information.

Warning

A damaged burst disc must be replaced with a burst disc of the same design and pressure rating. Do not substitute a damaged burst disc with a different disc type, a different pressure rating, or a foreign object.

7.1.2 Hydraulic Pump Kit Inspection

Refer to the Hydraulic Pump Kit Instruction Manual, IM-293 (GE VENDOC 373A4058). The latest revision may be obtained by contacting Riverhawk Company or thru www.riverhawk.com.

7.1.3 Hydraulic Hose Inspection

Check the hydraulic hose for any damage including bent hose ends and split outer lining. If any damaged is found, replace the hose immediately by contacting the Riverhawk Company.

7.2 Hydraulic Fittings

Information on the correct assembly of the hydraulic pump's and hydraulic hose's hydraulic fittings can be found in Appendix B1.

7.3 Bleeding Hydraulic System

Bleeding of the hydraulic system is not necessary with this tensioner design.

8.0 Assembly of Tensioner on Stud

This tensioner kit is most readily identified by the safety ORANGE cages (guard assembly) they employ.

NOTICE

As of summer 2011, this manual is to be used in relation to the interlocking style tensioner. This new tensioner can be identified buy its **ORANGE** safety guard. Note: yellow guarded tensioner requires the use of different set of instructions, consult Riverhawk for assistance.

All tensioning will be performed from the conical tensioning thread end of the stud with orientation of the stud to the flange as shown in Figures 1 & 2.

8.1 Assembly of Tensioner Kit with ORANGE Safety Guard

Refer to Tensioner drawing and Figure 4 for tensioner to flange mounting. Assembly sequence is as follows:

1. Carefully check the cleanliness of both the stud's and the puller screw's conical threads.
2. Ensure stud length measurement is documented.
3. Verify stick out length of stud to nut.
4. Apply a light coat of clean turbine oil or a spray lubricant to the puller screw. Do not use “Never Seize” on the conical threads.
5. Place the spanner ring onto the nut
6. Install one puller screw release tape strip into end of stud. (Appendix B2)
7. Insert the puller screw into the tapered thread of the stud and hand tighten. Be sure not to cross-thread the assembly
8. Using an Allen wrench tighten puller screw, then back off puller screw 1/2 a turn.
9. Retighten puller screw by hand until it is fully inserted. **DO NOT BACK OFF PULLER SCREW**.
10. Place the foot over puller screw, orientate into position.
11. Thread tensioner onto puller screw. Note: Internal stop in tensioner will result in gap with foot. **DO NOT TIGHTEN TENSIONER AGAINST FOOT. (GAP SHOULD BE 1/16” to 3/16”)**
12. Place guard over tensioner and position guide pin into hex end of stud.
13. Tighten knurled interlock fitting by hand until it firmly presses against tensioner. (no gap)
14. Activate custom connector from rear of guard by pushing on the center with your thumb and pulling the tabs with your fore finger and middle finger. Push the assembly forward until it locks onto the tensioner. Release fingers from tabs and then remove thumb. Ensure connection is firmly engaged or else the tensioner will not be connected to pump.

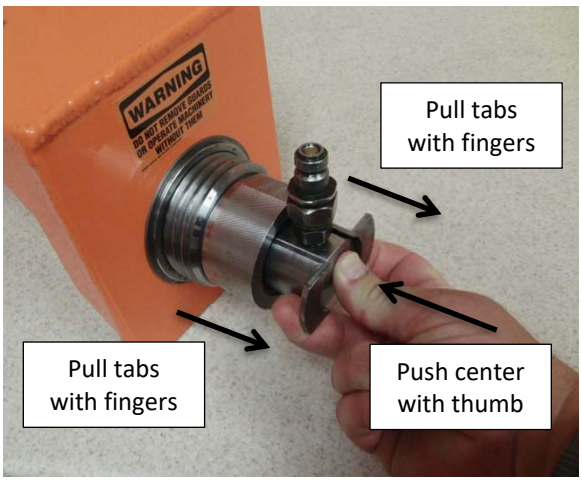


Figure 3 – Activation of the custom connector

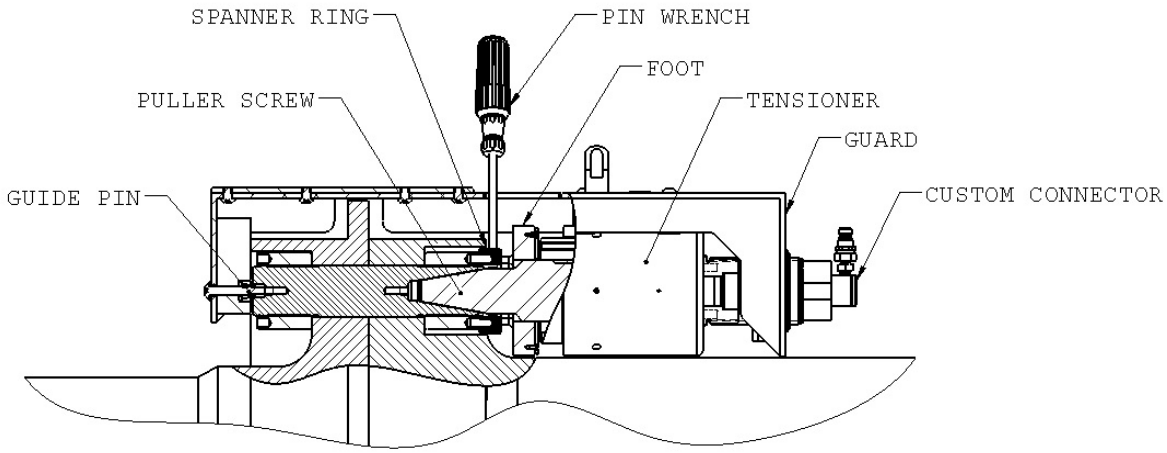


Figure 4 – Cutaway View of Tensioner Installed on Flange

CAUTION

Personal injury and equipment damage can occur if the puller screw is not securely engaged with the conical threads of the stud. Proper engagement is achieved when the puller screw is tight in the stud and is not cross-threaded into the conical thread.

8.2 Removing Air from the Hydraulic System (Bleeding the air)

Removing the air from the tensioner's and pump's hydraulics is not required. This has been done at the Riverhawk factory.

9.0 Stud Pulling and Tensioning

The studs will be tensioned in two steps, at 50% pressure and at final pressure. Follow the tensioning sequence for each flange joint as defined on the data sheets found at the end of this manual**.**

Note: Before threading the puller screw into the stud, carefully check the cleanliness of both the stud's and the puller screw's conical threads. Apply a light coat of clean turbine oil or a spray lubricant to the puller screw. Do not use "Never Seize" on the conical threads. This procedure will ease assembly and assure positive mating of the threads before tightening.

WARNING

The safety guard MUST be in place and hands kept out of designated areas at all times when the tensioner is pressurized otherwise personal injury can occur.

9.1 Tensioning at 50% pressure

After the tensioner is properly installed apply hydraulic pressure to the tool. Bring the pressure to the 50% level in accordance with the following table.

Flange Position	Stud Size	50% Pressure	50% Stretch
Turbine to Coupling	2-1/4" [58 mm]	9000 psi [620 bar]	Do not measure Do not use
Coupling to Generator	2-3/4" [71 mm]	10000 psi [690 bar]	Do not measure Do not use

9.1.1 Tightening of Nuts

Tighten the cylindrical nuts hand tight using the pin wrench and spanner ring, as depicted in Figure 4. Turn the nut until it bottoms on the flange. Then apply torque to turn the nut an additional 10 degrees. This will aid in achieving the desired stretch.

WARNING:

Keep hands clear of the tool while the pressure is building up. This includes the pin wrench for tightening the spanner ring (nut). Once the tool is stabilized at pressure then and only then can the nut be tightened. This reduces the potential of personal injury.

9.2 Removing the Tensioner from an Installed Stud

The tensioner removal is to be accomplished by the follows steps:

1. Release the tensioner tool pressure by opening the valve on the pump. Leave valve open. (This is automatic on the air-operated hydraulic pump) Allow approximately 20 seconds for tensioner to fully retract, then remove hose from tensioner.
2. Unscrew knurled fitting at the end of the guard and remove guard.
3. Unscrew tensioner from puller screw. Use caution to ensure that hands are not between tensioner and coupling when tensioner becomes disengaged from puller screw.
4. Remove the foot.
5. Unscrew the puller screw using an Allen wrench.
6. Tapping the Allen wrench with a hammer or the use of a 3-4’ breaker bar may be necessary to loosen the puller screw.
7. Remove the spanner ring from nut.
8. Move the tool to the next stud/nut assembly to be tensioned, following the sequence/pattern as defined on the supplied data sheets.

9.3 Tensioning at Final Pressure

Repeat the pulling and tightening procedure stated above at full pressure. Measure the stud length after all of the studs have been tensioned. The final pressure and required stretch values are listed in the following table.

WARNING

The safety guard must be in place at all times. Keep hands out of designated areas at all times when the tensioner is pressurized otherwise personal injury can occur.

CAUTION

Before threading the puller screw into the stud, carefully check the cleanliness of both the stud's and the puller screw's conical threads. Apply a light coat of clean turbine oil or a spray lubricant

to the puller screw. This procedure will ease assembly and assure positive mating of the threads before tightening. Do not use "Never Seize" on the conical threads.

CAUTION

Do not exceed the maximum pressure marked on the tensioner. Excessive pressure can damage the stud and puller screw.

CAUTION

Do not tighten the nut while the tool is coming up to pressure; wait until pressure is achieved before attempting to tighten the nut with the spanner ring. If the tool is not properly installed, the tool could jump off the stud while coming up to pressure.

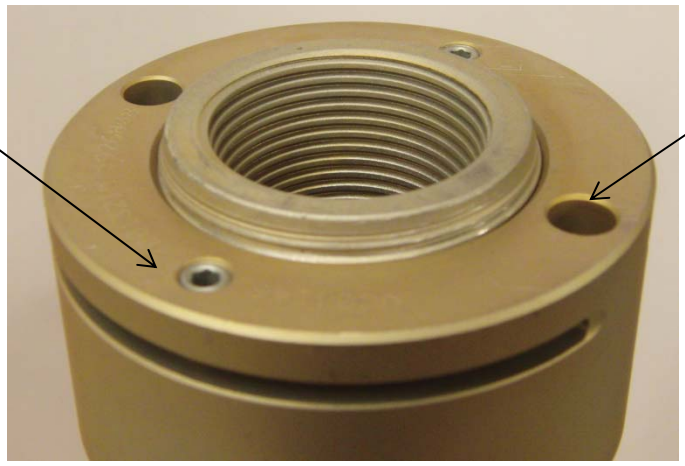
Flange Position	Stud Size	Final Pressure	Final Stretch
Turbine to Coupling	2-1/4" [58 mm]	17000 psi [1170 bar]	0.017" - 0.020" [0.43 mm - 0.51 mm]
Coupling to Generator	2-3/4" [71 mm]	18000 psi [1240 bar]	0.012" - 0.014" [0.31 mm - 0.36 mm]

Incorrect stretch values can be corrected by uninstalling some or all of the selected studs. Re-measure the initial length of the studs and repeat the installation instructions studs. Excessive stretch variations can also be corrected by the same method.

Have final stretch values approved by the supervisor responsible for the installation.

10.0 Thread Locking

Once pulling and tensioning is completed all stud nuts must be locked in position.



Sample Picture of a Riverhawk Locknut

Mechanical Locknuts have two set screws located in the top face, see picture. Before threading the nut onto the stud check to be certain that the set screws are free to turn. Once the nut is seated, torque the set screws to the values specified in the following table. When seated and torqued to the values specified the load created by the set screw displaces the thread of the nut in the area of the web creating the desired locking action.

Stud Size	Set Screw Size	Torque
2-1/4" [58 mm]	1/4"-28 UN	70 in·lbs - 80 in·lbs [7.9 N·m - 9.0 N·m]
2-3/4" [71 mm]	3/8"-24 UN	200 in·lbs - 250 in·lbs [22.6 N·m - 28.2 N·m]

11.0 Stud/Nut removal

Begin by checking the stick-out dimension of the installed studs. If the stick-dimensions are wrong, contact Riverhawk for assistance.

Sections 11.1 and 11.2 respectively describe the procedures to be followed in removing nuts with the mechanical locking feature and those that have been locked with liquid locking compound.

11.1 Removal of Assemblies with Mechanical Locknuts

For those assemblies which have been locked using mechanical locknuts, removal is accomplished as follows:

- Using a wire brush, GT-4253, and shop air clean the conical thread of the stud to remove any debris/deposits which may have accumulated during service as described in section 5.2.
- With an Allen-wrench loosen the two locking set screws but do not remove from the nut.

Sample Picture of the loosening of a nut's set screws

- Install the appropriate tensioner onto the stud as described in Section 8.0.
- Apply the appropriate hydraulic pressure per the Table of Section 9.3.
- Using the spanner ring and spanner/pin wrenches, loosen the nut 3/4 turn. Then release the pressure and remove the tensioner.

11.2.1 Removal of Assemblies with Liquid Locking Compound

Obsolete hardware sets employed a thread-locking compound which is visible as a grayish-green residue.

Riverhawk Company strongly recommends replacing this type with the current hardware that has a re-useable mechanical locking feature.

Special instructions are available from Riverhawk to remove this obsolete hardware.

12.0 Storage Instructions

Follow these directions to properly store your hydraulic tensioner and hydraulic pump kit for long term storage and shipment.

If any damage is observed, contact the Riverhawk Company to schedule a maintenance inspection.

12.1 Hydraulic Pump Kit Storage

Refer to the Hydraulic Pump Kit Instruction Manual, IM-293 (GE VENDOC 373A4058). The latest revision may be obtained by contacting Riverhawk Company or thru www.riverhawk.com.

12.2 Hydraulic Tensioner Storage

Check the tensioner for any damage

1. Clean puller screw and check for any debris and dents.
2. Knurled interlock fitting should be clean and free to rotate.
3. Inspect tensioner guard for any signs of damage. Bent guards must be replaced.
4. If any damage is observed, contact the Riverhawk Company to schedule a maintenance inspection.

If any damage is observed, contact the Riverhawk Company to schedule a maintenance inspection.

Place protective plastic cap into the hydraulic port.

Coat the hydraulic tensioner and foot with a light coat of oil and place the tensioner into the original shipping container.

12.3 Store shipping container

Secure the hydraulic pump and hydraulic tensioner into the original shipping containers using the supplied wood braces.

Seal the original shipping container and store under shelter and protected from moisture, sand, and grit.

13.0 Frequently Asked Questions

This section contains some frequently asked questions and problems. If the steps listed here do not solve your problem, contact the Riverhawk Company thru our website, email, or phone call.

Q: A tensioner has pulled itself out of the stud's conical threads. Can I continue using a tensioner on this stud?

A: No. Both the tensioner and the stud may have been damaged and must be removed from the work area. If the stud is tensioned, a Nut Buster repair kit, from Riverhawk, must be used to remove the damaged stud by drilling out the nut. Leaving a damaged stud in place will lead to a safety hazard on future outages.

Riverhawk can supply a replacement stud and nut based on the initial weight certification supplied with the hardware set (see section 4.2). The damaged tensioner should also be returned to Riverhawk for inspection and repair.

If a stud must be left in place, paint the damaged stud with a generous amount of indelible, bright-colored paint. Notify the appropriate GE Safety and Service personnel. Note the location of the damaged stud in the services notes for the machine.

Q: The hydraulic tensioner has been taken up to its final pressure. The final stretch length is short of the final stretch target. What is the next step?

A: Do not increase the hydraulic pressure. Check if the hydraulic pump is set to the right pressure. Install the tensioner and re-pressurize the tensioner to the final pressure then recheck the stretch measurement. If the stretch value is still short, remove the stud from the hole and re-measure the stud's initial length then try to install the stud again.

Q: The hydraulic tensioner has been taken up to its final pressure. The final stretch length is larger than the final stretch target. What is the next step?

A: Remove the stud from the bolt hole. Check if the hydraulic pump is set to the right pressure. Re-measure the stud's initial length then try to install the stud again.

Q: The tensioner is at its final pressure, but the nut cannot be loosened.

A: If the nuts cannot be loosened at the final pressure, continually increasing the pressure will not help and can be dangerous and in some cases make it harder to remove the nut. Check the nut to see if its set screws have been loosened. Check for and remove any corrosion around the nut's threads.

Q: How do I clean the conical threads on a stud?

A: The conical threads are best cleaned using a spiral wound brass brush in a drill as described in section 5.2. For detailed description refer to Instruction Manual IM-220.

Q: During the initial steps of removing a tensioned stud, the stick-out length is found to be wrong.

A: Do not proceed. Refer to Instruction Manual IM-226 or contact Riverhawk for assistance. With the wrong stick-out length, the hydraulic tensioner has a limited stroke and may not work properly and can be damaged.

Q: The hydraulic pump appears to be leaking.

A: Check the hose connection to the hydraulic pump. If the 1/4" high pressure fitting is not assembled correctly as shown in section 7.2, it may look like the pump is leaking. If the problem continues, it may be necessary to open the pump kit. Contact Riverhawk for guidance.

Q: The hydraulic hose has a collar on it that can't be moved by hand

A: The hydraulic fitting is shown in section 7.2. The collar is sometimes held in place with a thread locking compound. This prevents the collar from moving too easily. It may be necessary to adjust this collar with a set of vise-grip pliers. Be careful to not strip the threads off the tube or hose end.

14.0 Revision History

Revision Letter	Effective Date	Description
H	Apr 29, 2022	Inserted Appendix B1 thru B3
G	Apr 7, 2022	Revised sections 7.1.1; Added section 8.2
F	Jan 26, 2022	Updated EC Declaration of Conformity; Added UKCA Declaration of Conformity; previous Appendix A becomes section 14
E	Sep 26, 2016	Added HT-7591 to section 4.5
D	Jan 15, 2015	Updated sections 1.0 and 4.3.
C	Mar 17, 2012	Revised section 2.0 tables, Updated title page to reflect all parts that can be used with installation tooling.
B	Feb 15, 2012	Misc. updates including spelling and terminology clarifications
A	Dec 14, 2011	Added GE 101T3628 references to title page and to section 2.0
-	Jul 19, 2011	Released

Appendix A1

EC Declaration of Conformity

Manufacturer: Riverhawk Company
Address: 215 Clinton Road
New Hartford, NY 13413, USA

The hydraulic pump and bolt tensioning tool described in this manual are used for installing and applying tension to large bolts that are specifically designed by Riverhawk Company to be tensioned hydraulically.

All applicable sections of European Directive 2006/42/EC for machinery have been applied and fulfilled in the design and manufacture of the hydraulic pump and bolt tensioning tool described in this manual. Reference also ISO 12100:2010, ISO 4413:2010, and ISO 4414:2010.

Furthermore, this equipment has been manufactured under the Riverhawk quality system per EN ISO 9001:2015

Consult the Declaration of Conformance included with the shipment of this equipment that identifies the authorized Riverhawk representative, applicable serial numbers, and appropriate signature.

Appendix A2

UKCA Declaration of Conformity

Manufacturer: Riverhawk Company
Address: 215 Clinton Road
New Hartford, NY 13413, USA

The hydraulic pump and bolt tensioning tool described in this manual are used for installing and applying tension to large bolts that are specifically designed by Riverhawk Company to be tensioned hydraulically.

All applicable sections of Supply of Machinery (Safety) 2008 have been applied and fulfilled in the design and manufacture of the hydraulic pump and bolt tensioning tool described in this manual. Reference also ISO 12100:2010, ISO 4413:2010, and ISO 4414:2010.

Furthermore, this equipment has been manufactured under the Riverhawk quality system per EN ISO 9001:2015

Consult the Declaration of Conformance included with the shipment of this equipment that identifies the authorized Riverhawk representative, applicable serial numbers, and appropriate signature.

CUSTOMER'S INFORMATION BOX
CONTENTS ARE INDEPENDENT OF RIVERHAWK DOCUMENT CONTROL

GE DRAWING NUMBER	REV
373A4035	

215 Clinton Road
New Hartford, NY 13413
Tel: +1 315 768 4855
Fax: +1 315 768 4941
Email: info@riverhawk.com

Appendix B1 - Hydraulic Fittings

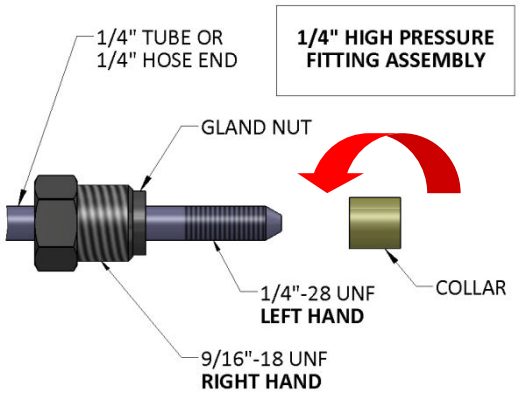


Illustration 1

Riverhawk tensioners use a 1/4” High Pressure port to connect its hydraulic hoses. The hose connector is made from a three piece assembly: a gland nut, a collar, and a 1/4” tube or 1/4” hose end. (See Illustration 1)

To assembly the fitting, slide the gland nut over the 1/4” tube or 1/4” hose end. Turn the collar counter-clockwise (**left hand** thread) on to the tube or hose end as shown in Illustration 1.

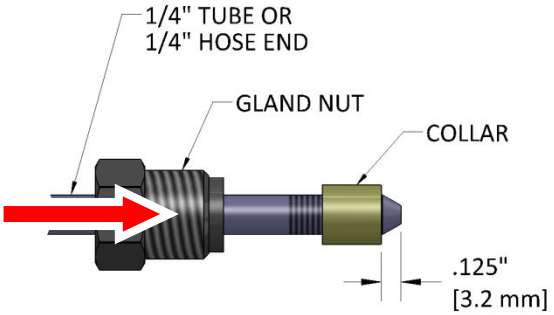


Illustration 2

The collar should be placed .125” (3.2 mm) from the tip of the cone. (See Illustration 2) It may be necessary to adjust this collar with a set of vise-grip pliers. Be careful to not strip the threads off the tube or hose end.

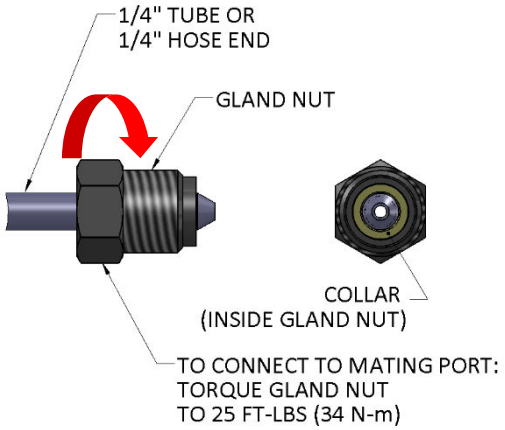


Illustration 3

Slide the gland nut down over the collar. (See Illustration 3) Insert the 1/4” tube or 1/4” hose end into tensioner or hydraulic pump. While firmly holding the tube or hose end to stop it from rotating, turn the gland nut clockwise (**right hand** thread) and torque the gland nut to 25 FT-LBS (34 N-m).

Tips:

- Make sure all parts are clean and free from debris.
- Protect the cone on the end of the 1/4” tube or 1/4” hose end from scratches as this is the sealing surface.
- Replace red plastic caps when finished to protect the threads and cone.

CUSTOMER'S INFORMATION BOX
CONTENTS ARE INDEPENDENT OF RIVERHAWK DOCUMENT CONTROL

GE DRAWING NUMBER	REV
373A4035	

Riverhawk Company
215 Clinton Road
New Hartford, NY 13413
Tel: +1 315 768 4855
Fax: +1 315 768 4941
Email: info@riverhawk.com

Appendix B2 – Puller Screw Release Tape Installation

Reference: GT-6516 (GE 373A4080)

Caution

Apply a light coat of clean turbine oil or a spray lubricant to the puller screw. This procedure will ease assembly and assure positive mating of the threads before tightening. Do not use "Never Seize" on the conical threads.

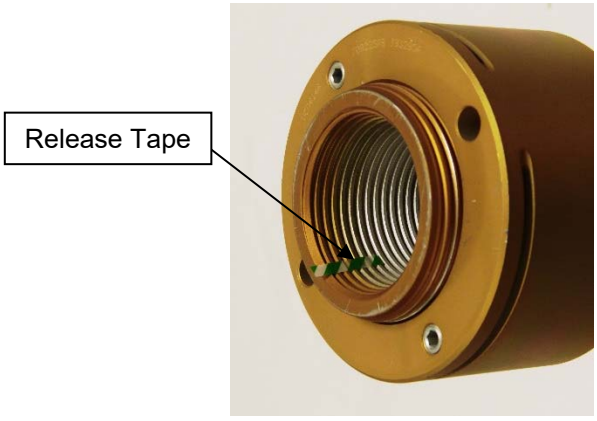
To use puller screw release tape

-During tensioner assembly

1. Following steps in the tensioner installation manual, before inserting the puller screw into the stud.
2. Insert a single puller screw release tape onto the internal thread of the stud leaving approximately 1/8" [3mm] sticking out of the end of the stud. (see picture below)
3. Insert puller screw into stud, per instruction manual and continue assembly of the tensioner.

-After tensioning and removal of tensioner from stud

1. Follow appropriate tensioner installation manual for disassembly of the tensioner.
2. Once tensioner is removed, clean studs internal thread and puller screw external thread to remove all debris left behind by puller screw release tape using brass power brush (GT-4253)



-**Release tape should only be used for stud installation**; puller screw engagement does not require the use of release tape during de-tensioning of the studs.

-**Do not substitute for Riverhawk release tape**, contact Riverhawk for support (+1) 315-768-4855 or www.Riverhawk.com

CUSTOMER'S INFORMATION BOX

CONTENTS ARE INDEPENDENT OF RIVERHAWK DOCUMENT CONTROL

GE DRAWING NUMBER	REV
373A4035	

Riverhawk Company

215 Clinton Road
New Hartford, NY 13413
Tel: +1 315 768 4855
Fax: +1 315 768 4941
Email: info@riverhawk.com

Appendix B3 - Hydraulic Tensioner's Burst Disc Replacement

The hydraulic tensioner's burst disc is a key element in the overall safe use of the hydraulic tensioner.

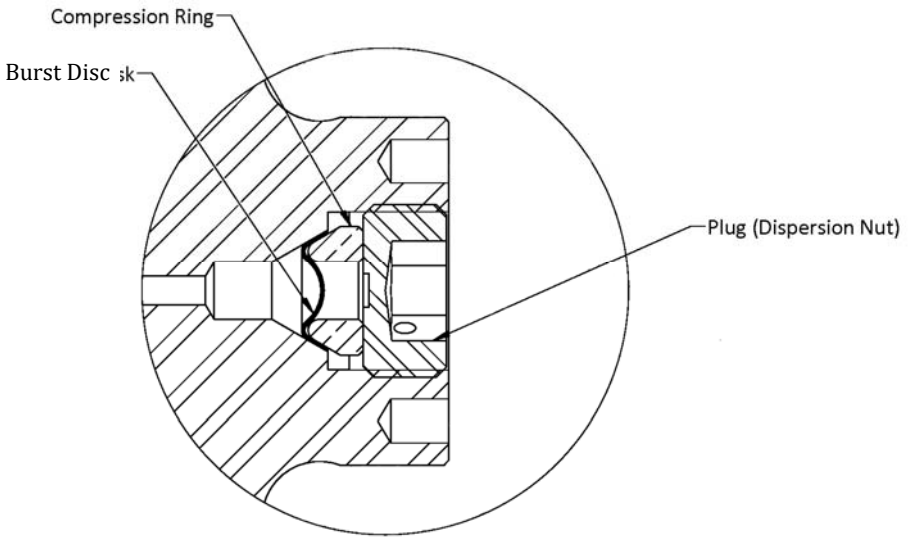
Each tensioner is shipped from our factory with one burst disc already installed in the tensioner and with another spare disc for field replacement. Extra burst discs are available from Riverhawk for replacement purposes.

To replace a damaged burst disc:

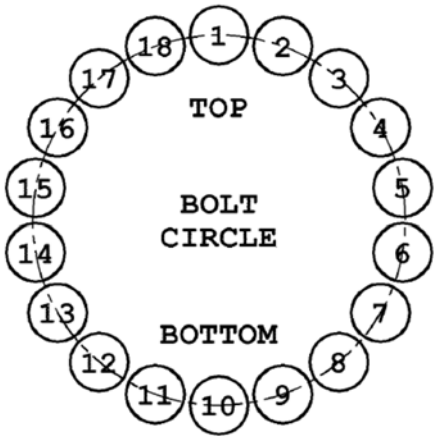
1. Remove the hydraulic port's dispersion nut, compression ring, and damaged burst disc.
2. Discard the damaged burst disc.
3. Clean the dispersion nut, compression ring, new burst disc, and the hydraulic port with a solvent to ensure a dirt-free installation.
4. Reassemble new burst disc, compression ring, and dispersion nut into the same hydraulic port.

Warning

A damaged burst disc must be replaced with a with a burst disc of the same design and pressure rating. Do not substitute a damaged burst disc with a different disc type, a different pressure rating, or a foreign object.



Appendix C1



STRETCH RECORD SHEET <u>FOR THE TURBINE END</u>

TURBINE NUMBER:

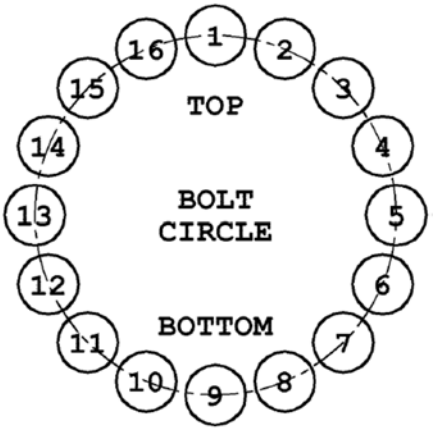
DATE:

TECHNICIAN:

SUPERVISOR:

HOLE NUMBER	STARTING LENGTH	FINAL LENGTH	FINAL STRETCH
1			
10			
2			
11			
3			
12			
4			
13			
5			
14			
6			
15			
7			
16			
8			
17			
9			
18			

Appendix C2



STRETCH RECORD SHEET FOR THE GENERATOR END

TURBINE NUMBER:

DATE:

TECHNICIAN:

SUPERVISOR:

HOLE NUMBER	STARTING LENGTH	FINAL LENGTH	FINAL STRETCH
1			
9			
2			
10			
3			
11			
4			
12			
5			
13			
6			
14			
7			
15			
8			
16			