

OPERATION AND MAINTENANCE MANUAL

Read the instructions, warnings, and cautions thoroughly before using the tools and keep it well for future referring.



TheGAW
industries

OPERATION AND MAINTENANCE MANUAL FOR ASRT SERIES BOLT TENSIONERS



It is an operating manual for the ASRT Spring Return Bolt Tensioner, please read carefully, follow instructions, warnings, and cautions before using the tools.

SAFETY GUIDE

The TheGAW Bolt Tensioner's safe usage requires correct operation and regular inspection. The user is requested to follow always and carefully.

- ▲ Precaution to avoid direct loss of economic or property.
 - ▲ Warning to avoid personal injury.

Please follow herein before!

When using, if something abnormal happens, please shut off the power immediately, and then consult AmallGam Service Team.

Operating Manual

Please read carefully following instructions, warnings, cautions. Please observe the safety prescriptions so that you can avoid personal injury and equipment damage when operating the Bolt Tensioner. Any information not mentioned in the operating manual should be directed to AmallGam. AmallGam is not responsible for any damage or injury caused by the operation.

Attention of Receiving

Carefully inspect the hydraulic bolt tensioner upon arrival. If any shipping damage is found, please notify the carrier at once. Shipping damage is not covered by warranty. The carrier is responsible for all repair or replacement cost resulting from damage in shipment.

Caution:



This is a dangerous sign, if you ignore this sign, it may have serious risks and cause a person's injury.

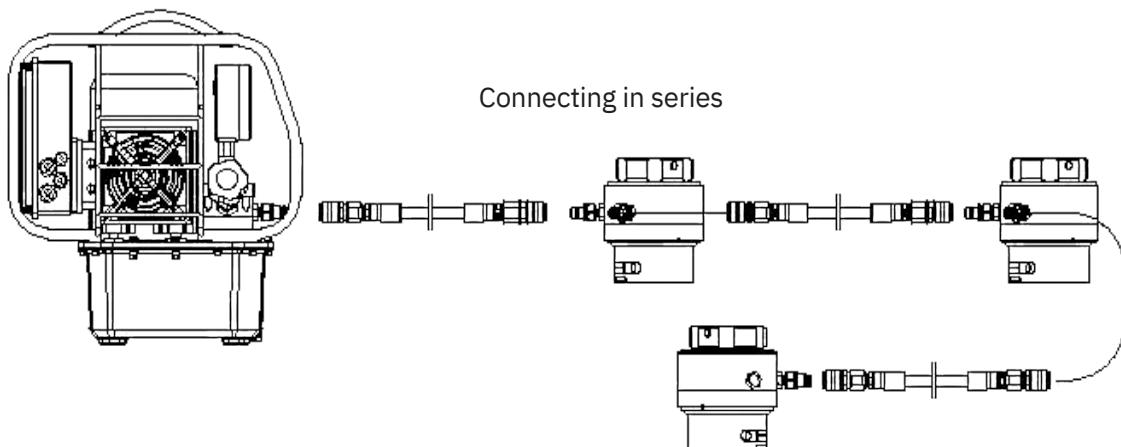
2. Summarize

Bolt tensioner (hydraulic bolt tensioner), which has the function of bolt fastening and disassembly, and can be widely applied to metallurgical mines, the Oil & gas industry, the shipbuilding industry, engineering trucks, wind power, and other industries. It uses the power provided by the high-pressure pump to stretch and deform the bolt within the allowable elastic deformation to achieve the purpose of tightening and loosening the bolt. When the bolt tensioner works, it can accurately control the pre-tightening force, does not damage the thread, is easy to operate, reduces the labor intensity, shortens the production maintenance period, effectively increases the reliability of the joint and the fatigue strength of the bolt, and improves the assembly precision and safety factor. The hydraulic tension device consists of a bolt tensioner and a high pressure pump (manual, electric or air operated).

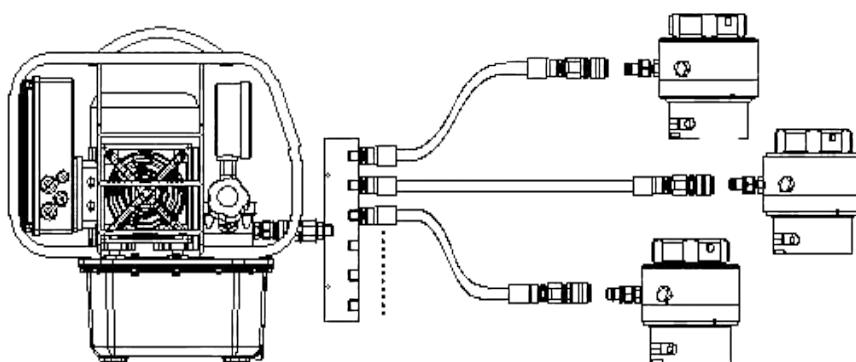
3. Main structure and working principle

The hydraulic tension device is mainly composed of a high-pressure oil pump and a tensioner and is connected by a high-pressure hose to become a complete device. A set of tension devices can be combined with single or multiple tensioners from a high-pressure pump. As shown below.

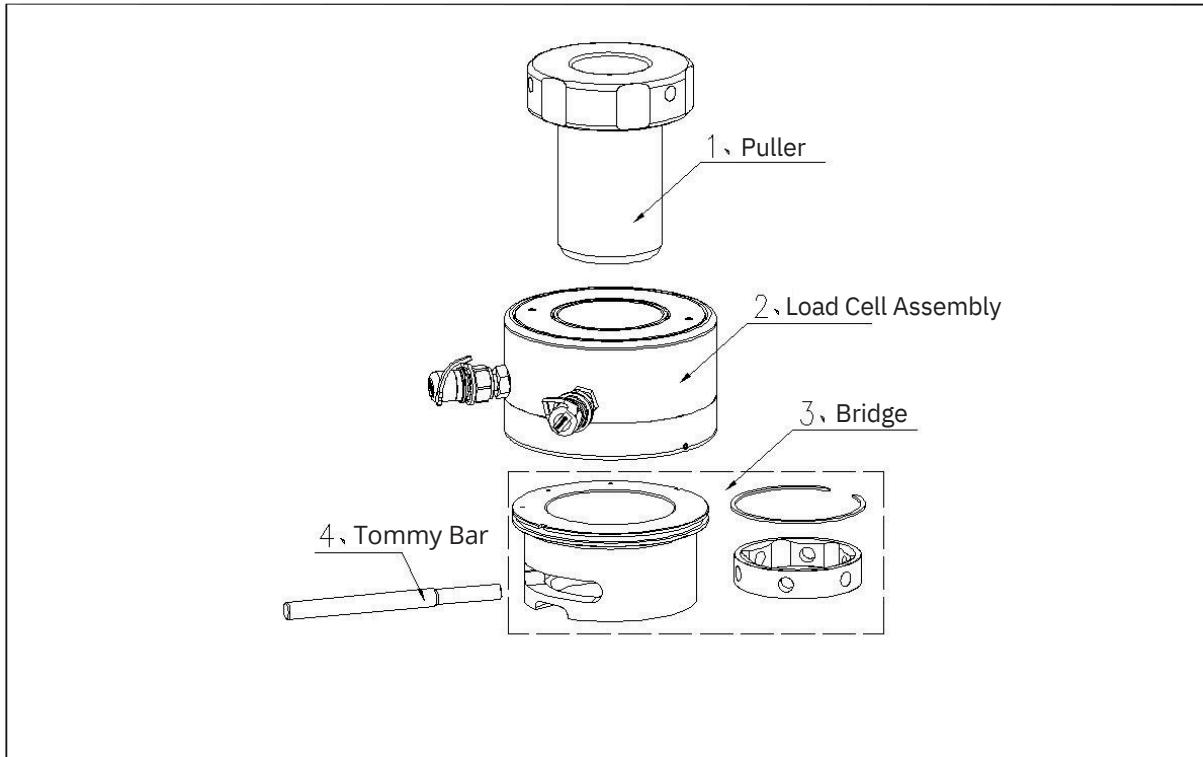
Connecting drawing for tension device



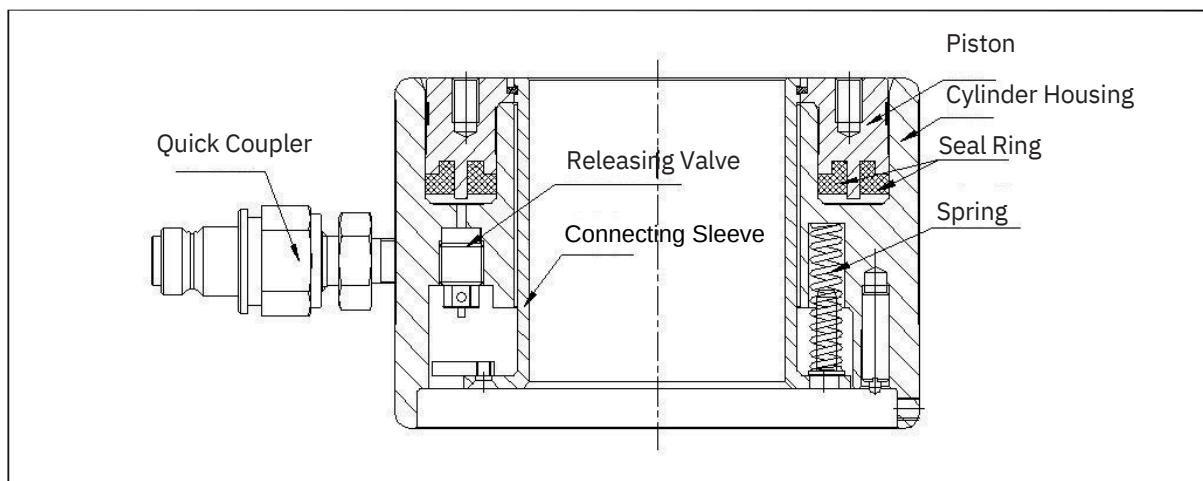
Connecting in parallel



The ASRT bolt tensioner consists of a Load Cell Assembly and a set of Adaptor Kits, the Adaptor Kits including the Puller, the Bridge and Rotation Socket kit, and the Tommy Bar.



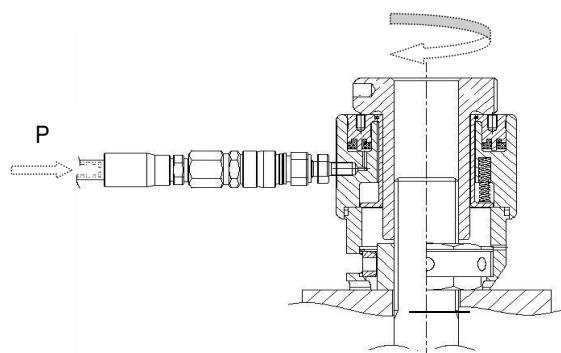
The tension cylinder includes piston, cylinder housing, connecting sleeve, sealing rings, releasing valves, automatic retraction mechanisms, quick couplings and other spare parts.



Remind:

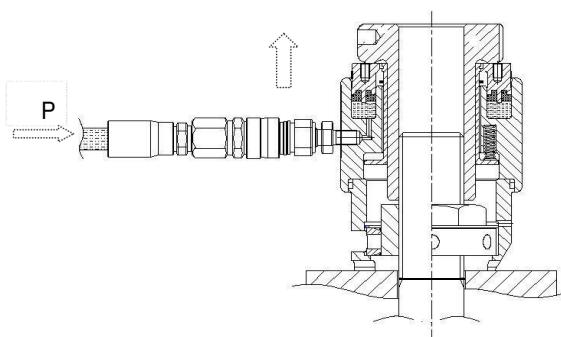
1. There are differences in the appearance parameters of the products. The above figure is for reference only, and the actual ones shall prevail.
2. If the product has improvements, it will be compiled into the new manual without prior notice.

The bolt tensioner is used in conjunction with the high pressure pump, and the work process is divided into four steps:



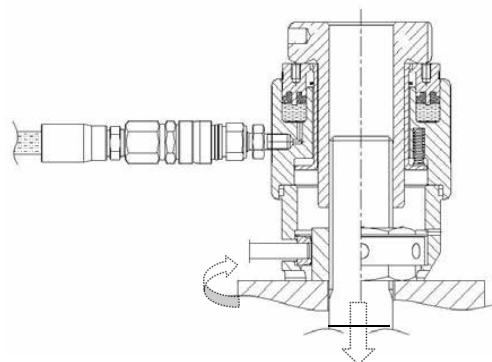
Filling oil:

Screw the ASRT bolt tensioner into the bolt, the pump starts to work, the low pressure, the large flow is filled with oil, the piston in the cylinder housing starts to rise, push the tension adapter upwards, and start to tension the bolt.



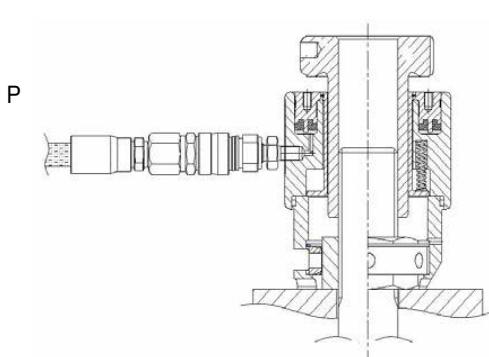
Rise Pressure:

The pump continues to pressurize, and the axial tension force will lengthen the bolt. At this time, the nut rises due to the elongation of the bolt and is separated from the flange contact surface. When the required pretighten force is reached, the pressurization is stopped.



Operation:

After the required pre-tightening force is reached, the Tommy bar can be used to turn sleeve through the window of the bridge, to lock or loosen the nut.



Release Load:

After the work is completed, the Releasing valve is opened and the oil comes back to the tank.

4. Operating Method

4.1. Operating Preparation

4.1.1. Carefully read the operating manual of the High-Pressure Pump and Bolt Tensioner before starting work, and pay attention to the prevention points that may cause property damage and accidents.

4.1.2. Carefully check the appearance of the pump, hose, and bolt tensioner for damage caused by improper transportation or storage. If it is damaged, please use it after confirmation from AmallGam.

4.1.3. Check the bolt tensioner operating data (pre-tighten force, operating pressure) and bolts (grade, thread length on the nut). It is the responsibility of the user to confirm the characteristics, pre-tighten and connection of the bolts used.



Max pressure, pre-tighten force: marked on AmallGam Tensioner.

Please check that the effective thread length of the bolt protrusion above the nut to ensure enough thread length (Figure 3) Normally, the thread length of protrusion above the nut is (minimum) $1 \times M$ ($M = \text{min. } 100 \text{ mm}$)

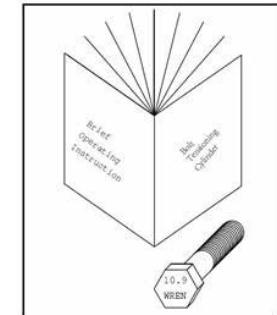


Figure 1: Operating instruction

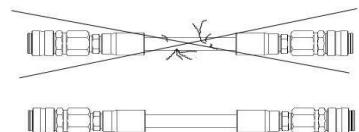
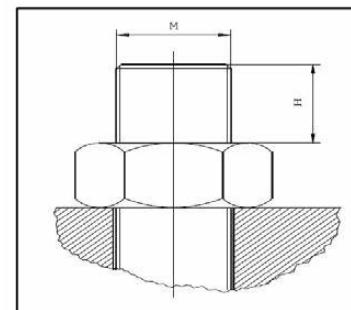


Figure 2: Hose is damaged, do not use please



Consult with AmallGam Professional Engineers if needed; Figure 3: Bolt protrusion above nut

4.1.4. Cleaning and drying: The inner and outer surfaces of the bolt tensioner and the high pressure pump, especially the exposed movable surface, must be kept clean. It should be cleaned with a special cleaning material and then wiped clean with a clean towel.

4.1.5. Determine if the oil is used correctly and enough. The pump is filled with 32# anti-wear hydraulic oil before leaving the factory. After use, when the oil level is insufficient, it needs to be replenished in time.

4.1.6. Check the angle α of the bolt on the support surface and correct if necessary. (Figure 4) 4.1.7. Before using the bolt tensioner, apply grease to the bolt threads. The grease type is user-defined. (Figure 5)

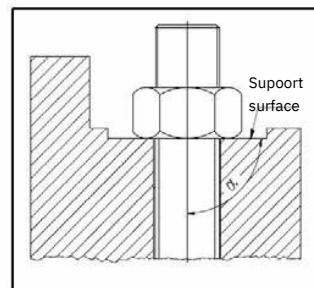


Figure 4: Angle accuracy

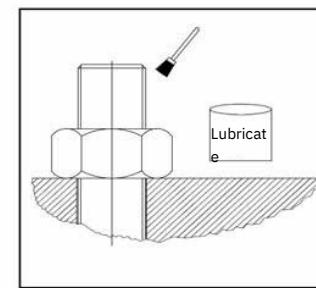
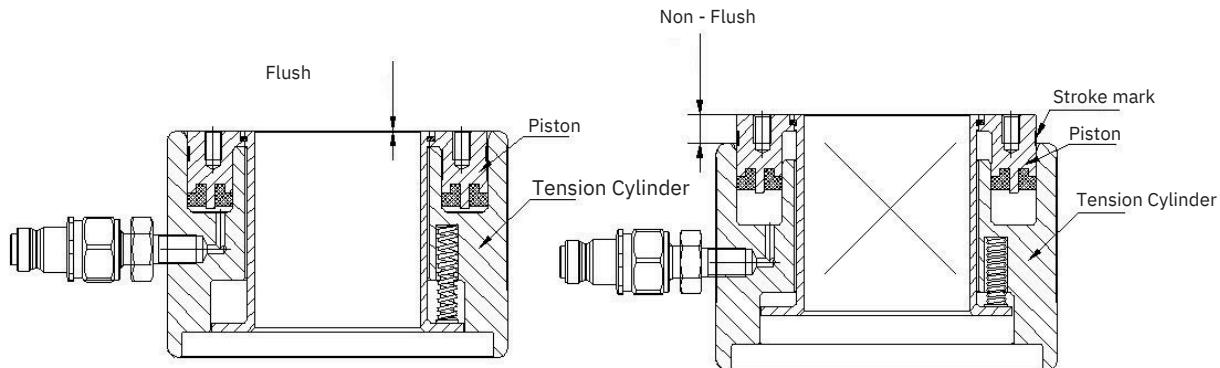


Figure 5: Lubricate

4.1.8. Before using the tensioner, make sure the piston is at its end position (for example, if the top of the piston is flush with the end face of the tension cylinder).

Consult with AmallGam Professional Engineers if needed



4.1.9. In operation, please pay attention to the distance between the tensioner and the pump, and always observe the position of the pressure gauge and the bolt.

4.1.10. After cleaning the outlet joint of the high-pressure pump, the inlet of the bolt tensioner, and the joints of the high-pressure hose, plug them in and tighten them to enter the working state. (The bending radius of the high-pressure hose should be ≥ 200 mm.)

▲Warning: No pressure should be applied to the bolt tensioner until it is correctly placed Tensioner on the bolt.

▲Caution: Avoid severe bending and entanglement of hydraulic hose during operation.

- (A)Using a bent or entangled tubing will create excessive back pressure;
- (B)Severe bending and entanglement damage the inside of the hose and prematurely scrapped;
- (C)Prevent heavy objects from falling or pressing onto the hose;
- (D)Severe impact may cause damage to the internal metal wire of the hose. The damaged hose may be broken during pressurization; it is not possible to haul and lift other hydraulic components with a hydraulic hose;

4.2.Connection and operation

▲Note: Use AmallGam original high-performance hydraulic components.

▲Note: The pressure value of the bolt tensioner is read by the pressure gauge on the pump.

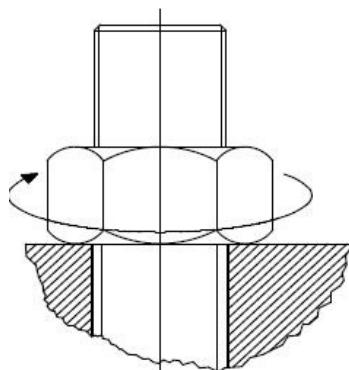
Note: This pressure gauge can be selected according to the user's needs for accuracy and calibration requirements.

▲Warning: To avoid personal injury, the maximum working pressure must not exceed 1500 bar.

▲Warning: No-load pressure test is prohibited.

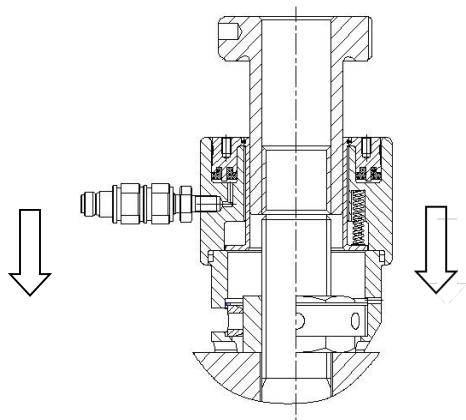
▲Warning: Over-stroke is prohibited, the maximum stroke must not exceed 10mm.

▲WARNING: The piston of the tensioner should be flush with the cylinder.



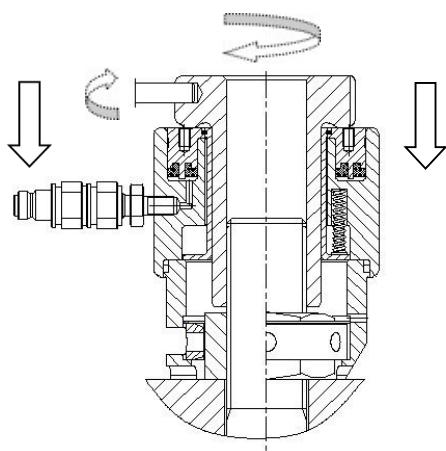
Step 1

Once the bolt protrusion above nut is confirmed, turn the nut onto the support surface and tighten. This is to prevent the bolt from rotating inward when the bolt tensioner is rotated to the set position.



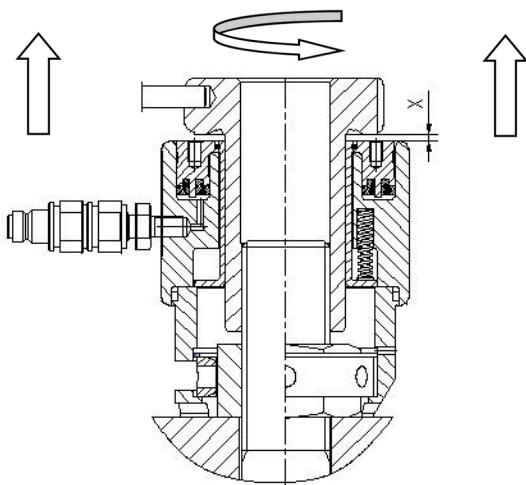
Step 2:

Place the hydraulic bolt tensioner over the outer ring of the nut and place the tension nut on the bolt that you want to tension. For rigid flat contact sealing bolts, single operation is possible; for gasketed sealing bolts, multiple joint operations are recommended.



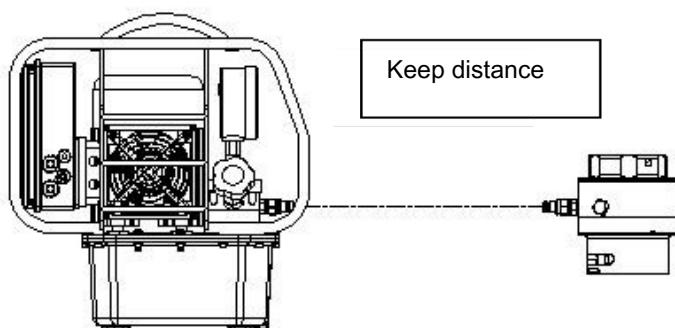
Step 3:

Rotate the bolt tensioner through the Tommy bar or manually onto the bolt to be tensioned and continue to rotate until the tension nut contacts the support surface of the Tension Cylinder.



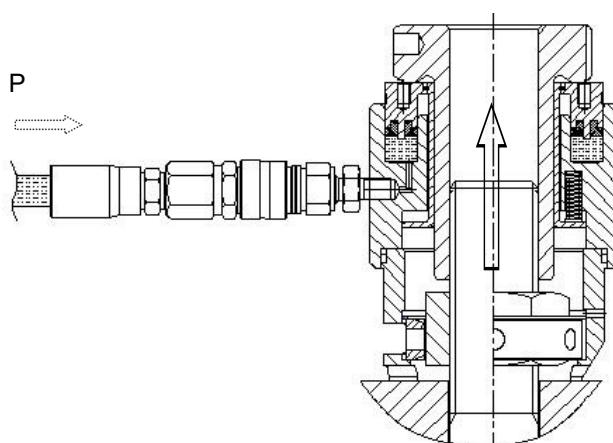
Step 4:

Use a Tommy bar or manual reverse rotation of the tension nut. For bolts up to 1000 mm in length, reserve a clearance of 2 - 3 mm between the support surface of the tension cylinder and the tension nut. For bolts with a length of 1000 mm or more, the clearance can be appropriately increased.



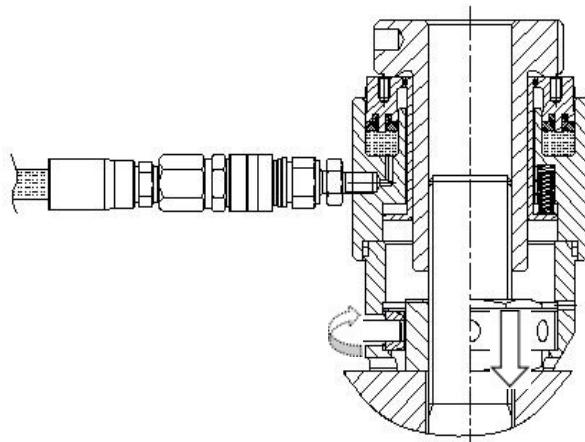
Step 5:

The bolt tensioner is connected to the pump with a high pressure hose. Keep the distance between the tensioner and pump during pressure rise so that the position of the gauge and bolt can always be observed.



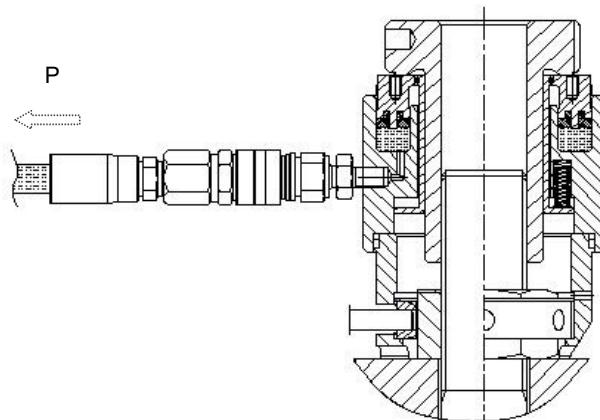
Step 6:

After the hydraulic connection, the tensioner piston is pressed, and the axial tensile force will lengthen the bolt. At this time, the nut rises due to the elongation of the bolt and is separated from the flange contact surface. According to the principle of force and reaction, the same reverse force will compress the flange. When the required tension force is reached, the pressurization is stopped.



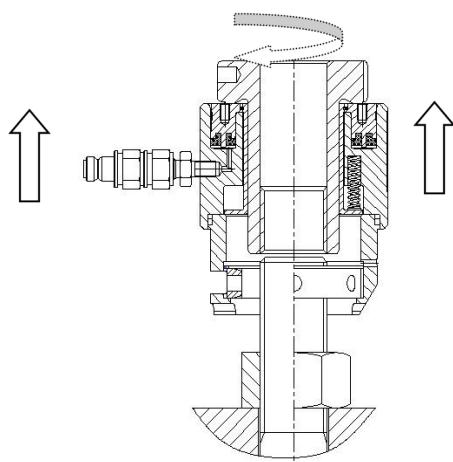
Step 7:

After the required tension force is reached, under the pressure holding status, the tommy bar can be used to pass through the window of the briage, and the dial nut sleeve is pushed to tighten or loosen the nut on the support surface.



Step 8:

Tighten or loosen the nut to complete the work and unload the pump. Release the pressure, the tensioner automatically returns to the position, and the hydraulic oil flows back to the oil tank.



Step 9:

When the piston returns to the initial position, remove the hose. Remove the bolt tensioner by tommy bar or manually loosen the tension adapter. Prepare for the next job

- ▲ **WARNING:** Before removing the tensioner, make the stroke of the tensioner "0" before tension again.
- ▲ **Note:** After the device is used, it should be wiped clean and sealed after rust prevention. After the hose is coiled, insert the handle of the pump to avoid shaking.

Note:

1. Users should not disassemble the hydraulic tension device to avoid damage.
2. The bolt tensioner cannot exceed its maximum stroke. For the stroke parameters, see the main data sheet of the ASRT series bolt tensioner. A mark that can be seen on the piston when the maximum stroke is reached. If the tensioner operates beyond its maximum stroke, it will automatically unload and relieve pressure and will not function at all.
3. This product is constantly undergoing technological innovation. If the contents of this manual are updated, we will not notify individually. Please understand.

5. Safety and Caution

- 5.1. Make sure the high pressure hose is not broken or kinked before using the bolt tensioner. Do not use damaged or unqualified high pressure hose. Do not use kinking hose. The bending radius of the high pressure hose should be ≥ 200 mm.
- 5.2. After the hydraulic tension device is finished, the pump pressure should be reduced to zero, otherwise the hydraulic oil will be sprayed out, polluting the clothes, and may cause harm to the human body.

6. Maintenance

- 6.1. When uses, it should be handled lightly. The mating surface of the bolt tensioner is very precise. It should be protected during installation and disassembly, and the relevant mating surface should not be damaged.
- 6.2. When installs and replaces the seal ring, clean the surface of the seal ring and the matching surface of the tension cylinder and piston with a special cleanser.
- 6.3. Store the tool in a dry place after use.
- 6.4. The high pressure pump can be found in the instruction manual.

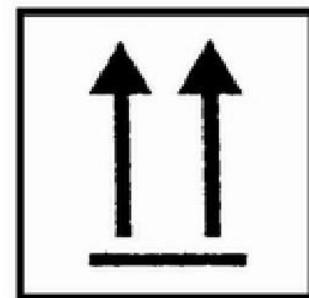
7. Trouble Shooting

The bolt tensioner itself generally does not malfunction. During work, the hydraulic oil leaks out at the joint between the hole and the shaft of the tension cylinder. It may be that the seal is poorly sealed. It should be disassembled to check whether the seal is installed correctly and the shape is complete. If the shape of the seal is deformed or broken, the seal must be replaced.

8.Noise and transportation of Bolt Tensioner

8.1. Hydraulic tensioner noise / vibration statement

Hydraulic tensioner using noise value: ≤ 70 db



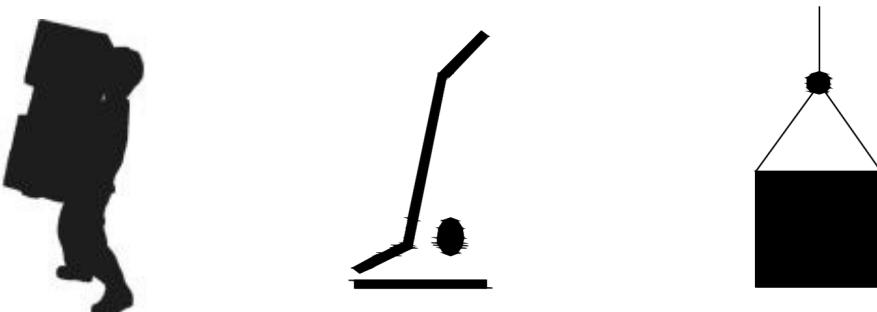
8.2. Hydraulic tensioner transport information

8.2.1. Pay attention to handle when moves tools.

(Figure 9)

8.2.2. The product should be lifted upright as shown in Figure 9.

8.2.3. Product handling is generally carried by hand or trolley to move, hoist and move, as shown in Figure 10.



(Figure 10)

9.Data sheet for ASRT series bolt tensioner

The bolt tensioner tensile force (F) is directly related to the pressure (P). The pressure unit, indicated by the pressure gauge on the pump, is calculated using the following formula:

$$P \text{ (bar)} = 10000 \times \frac{F(kN)}{A(mm^2)}$$

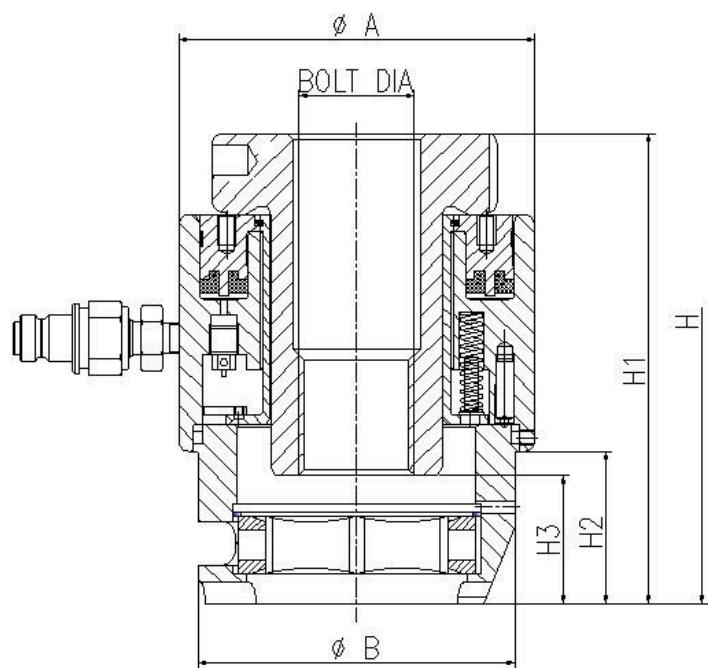
$$F(kN) = \frac{P \text{ (bar)} \times A(mm^2)}{10000}$$

P = Bolt tensioner operating pressure ^ bar

F = Pre-tighten force ^ kN

A = Effective area of bolt tensioner

Dimension drawing



NOTES:

All TheGAW products are guaranteed against defects in workmanship and materials for as long as you own them. Under this guarantee, free repair or replacement will be made to your satisfaction.

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