

# ***SUPERIOR*** BOLTING SOLUTIONS



## ***HYDRAULIC*** TENSIONING NUTS



**TITAN**<sup>®</sup>  
SUPERIOR BOLTING SOLUTIONS



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# Chapter 1

## HYDRAULIC NUT SPECIFICATION AND TECHNICAL DATA

**Hydraulic Nut Specification 4 ½" X 8 BSW**

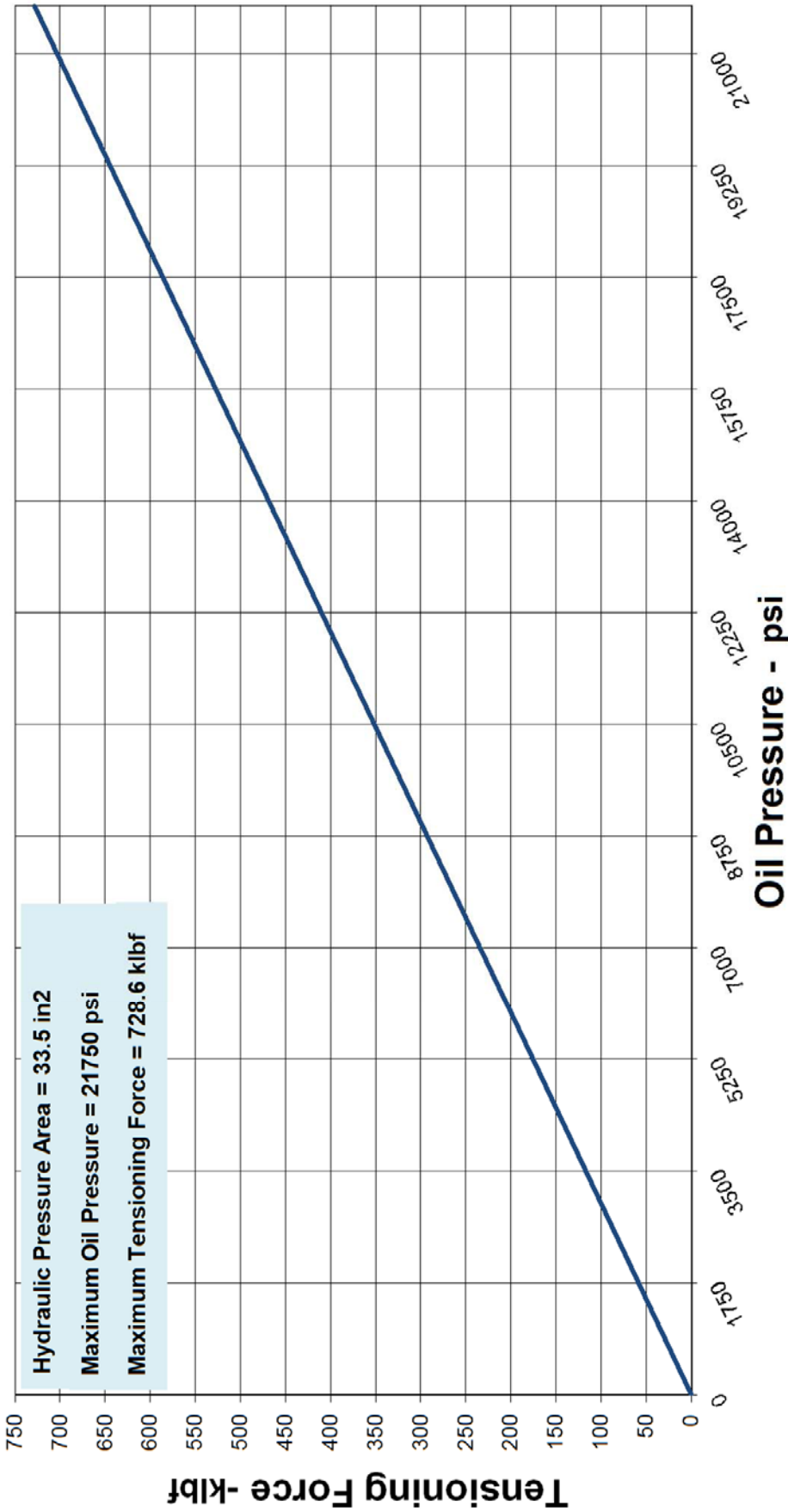
Part Number	TNTC-4500-01-00
Bolt Diameter	4 ½" x 8 BSW
Hydraulic Area	33.5 sq inch
Maximum Pressure	21,750 psi
Maximum Load	728.625 klbf
Maximum Piston Stroke	0.63 inch

Working Fluid	Hydraulic Oil SO 10 OR 32
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**Bolt Tensioning Tool TNTC-4500-01-00**  
**Oil Pressure vs Theoretical Tensioning Force**





## Photograph

### TYPICAL TITAN HYDRAULIC NUT UPPER COLLAR TYPE



**Maximum Operating Pressure is 21,750 psi**  
**Maximum Piston Stroke is 0.63 inch**  
**Note: Images may be different from tools supplied**



## PARTS LIST FOR HYDRAULIC NUTS TNTC-4500-01-00

Part No	Description	Quantity
<b>FOR TNTC-4500-01-00</b>		
TNTC-4500-01-01	Body	1
TNTC-4500-01-02	Piston (internally and externally threaded)	1
TNTC-4500-01-03	Collar	1
T-1503	1/4" BSP to 1/4" BSP Male/male adaptor	1
T-1502	Quick connect nipple	1
T-1510	Plastic dust cap for nipple	1
T-1512	End Plug	1
T-EB12-COL	Eye Bolt M12	3



**Typical Nut Body**



**Typical Piston**



**Typical Collar**



**Typical Seal Kit**



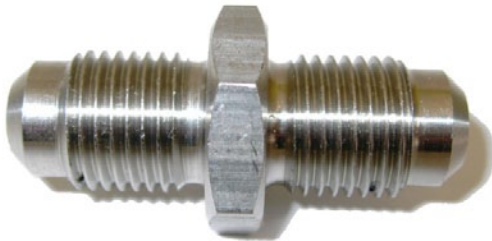
## PARTS FOR HYDRAULIC NUT



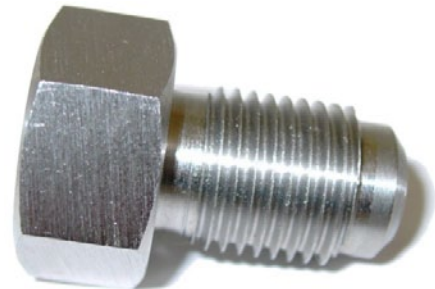
Quick Connect Nipple  
T-1502



Plastic Dust Cap for Nipple  
T-1510



1/4" BSP to 1/4" BSP Male/male adaptor  
T-1503



1/4" BSP Blanking Plug  
T-1512

## Chapter 2:

### HEALTH & SAFETY INSTRUCTIONS





THINK SAFETY

## HEALTH & SAFETY INSTRUCTIONS

### IMPORTANT NOTICE

Thank you for purchasing your hydraulic nuts from **TITAN**. Hydraulic Nuts are very powerful and capable of inducing high bolt stresses. This equipment has been designed to give many years of safe tightening of large diameter bolts when used in accordance with these instructions.

Persons using hydraulic nuts must be properly trained in the correct use of the equipment and must take adequate steps to ensure their own safety, and the Health and Safety of others working in the area where the bolt tightening operations are being performed. **TITAN** will be pleased to quote for the provision of training courses either at its UK base or on site anywhere in the world.

Operators must read all of this instruction and maintenance manual before attempting to use the equipment. Do not use the equipment if you are not already an experienced user of high pressure hydraulic nuts or if you have not already received proper training. Your attention is particularly drawn to the section on Health and Safety and to the note below :-

Tightening a bolt with a hydraulic nut is like lifting a heavy weight with a crane or lifting a car with a hydraulic jack. Everyone knows it is not safe to stand underneath a load on a crane or to work under a car supported only by a jack. However, not everyone will immediately know that standing in line with the long axis of a bolt, during the bolt tightening operation, is the same as standing under a weight during a lifting operation or working under a car supported only by the jack.

When using hydraulic nuts, loads of many hundreds of tonnes and even thousands of tonnes can be induced. If the bolt material is incorrect or faulty or the nut is incorrectly installed, a broken bolt, could be launched at high speed along the axis of the bolt. This is a very rare occurrence. In thirty years of tightening many thousands of bolts the managing director of TITAN has only seen one bolt fail during tensioning and knows of no more than a hand full. However if there is a failure, anyone standing in line with the axis of a bolt during the tensioning operation will suffer critical injury or even be killed. It is therefore essential that anyone operating this equipment is properly trained in its safe use and takes every precaution to ensure that nobody is allowed to stand, work or stray into line with the axis of any bolt during the tensioning operation.

Hydraulic Nuts are powerful and use high pressure hydraulics it is essential that you are trained in the correct use of the equipment and adhere fully with the Health and Safety Instructions.

## HEALTH & SAFETY INSTRUCTIONS

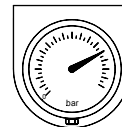
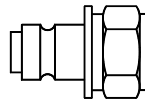
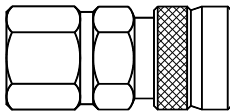
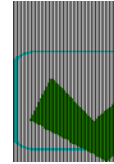
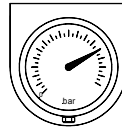
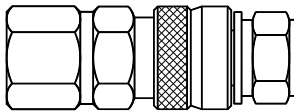
### Quick Connectors



**DO NOT pressurise the connectors when they are disconnected**



**Check there is no pressure in the system before attempting to connect or disconnect the couplings.**



### Hoses

The flexible hydraulic hoses supplied by **TITAN** have a small plastic core tube surrounded by multiple high tensile steel spiral windings. The outside of the hose is moulded with a coloured plastic coating. Most hoses are also given a clear plastic cover to provide additional protection against damage when in use. Each hose is identified with a serial number. All hoses are pressure tested when manufactured and test certificates can be issued.

**TITAN** supplies three types of high pressure flexible hydraulic hose and they are easily identified by the colour of the moulded plastic coating beneath the clear plastic cover. The maximum working pressure for the hose is sometimes marked on the outside of the coloured plastic coating, however this is the working pressure of the hose **ONLY** and not the hose **ASSEMBLY**. The maximum working pressure of a hose assembly is often limited by the pressure rating of the quick connect couplings and/or the fittings on the end of the hose. Although the hose may be capable of operating at higher pressures the limit you must observe is shown below along with the minimum bend radius.

Colour Max Working Pressure		Min Bend Radius	
GREEN 1000 bar		95 mm	
BLUE	1500 bar	130 mm	
RED	2000 bar	200 mm	

Each type of hose is fitted with self sealing quick connect couplings at one or both ends.



## HEALTH & SAFETY INSTRUCTIONS



**You must observe the following Health & Safety instructions when using hydraulic hoses.**

- Discard and do not use any hose that does not have an identifying serial number
- Discard and do not use any hose that shows any sign of damage either :-
  - a) to the coloured moulded plastic coating
  - b) where the spiral windings are exposed
  - c) where the spiral windings are damaged or broken
  - d) where there is damage to the swaged metal ends
- Do not allow any hose to be kinked or knotted. Hoses which have been kinked or knotted will have suffered damage to the windings and must be discarded.
- Do not allow heavy objects to fall on, rest on, or roll over the hoses.
- Do not allow hoses to be subjected to temperatures higher than 60 deg C.
- Discard and do not use any hose which has been subjected to heat or fire.
- Do not bend the hose tighter than the minimum bend radius of the hose or it will be kinked.
- Do not exceed the maximum working pressure of 1000 bar for the GREEN colour hose, 1500 bar for BLUE colour hose, and 2000 bar for RED colour hose.
- Only use the hoses for their intended purpose – for use with **TITAN** hydraulic equipment.
- After use check the hoses for damage, wipe to remove dirt and oil, refit dust caps and prepare for storage.
- When not in use store the hoses in a safe place where they cannot easily be damaged.
- Do not mix the GREEN, BLUE, RED colour coded hoses. The end fittings and quick disconnect couplings on these hoses have different pressure ratings.
- Never move hose end connectors or quick disconnects from BLUE hoses to any other colour hose.
- Never move hose end connectors or quick disconnects from RED hoses to any other colour hose.
- Never move hose end connectors or quick disconnects from GREEN hoses to any other colour hose.
- Use GREEN colour coded hoses for 1000 bar System Tools and Equipment.
- Use BLUE colour coded hoses for 1500 bar System Tools and Equipment.
- Use RED colour coded hoses for 2000 bar System Tools and Equipment.
- Check the bolt tensioning tools you are using are compatible with the hoses you are using. All **TITAN** tools are marked with the maximum operating pressure.
- Never pressurise a quick disconnect coupling or nipple when disconnected.
- Do not take apart any ring main harness component or hose assembly. These are filled with oil and pressure tested after assembly. When taken apart the integrity of the assembly is lost and the pressure test invalidated. Return any parts that need attention to TITAN where the correct specification parts will be used to effect repairs, followed by pressure testing and certification before return.

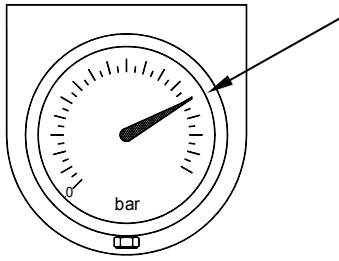


## HEALTH & SAFETY INSTRUCTIONS

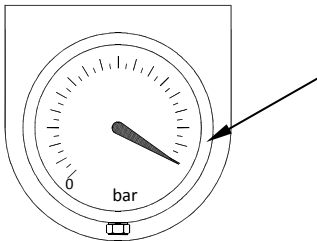
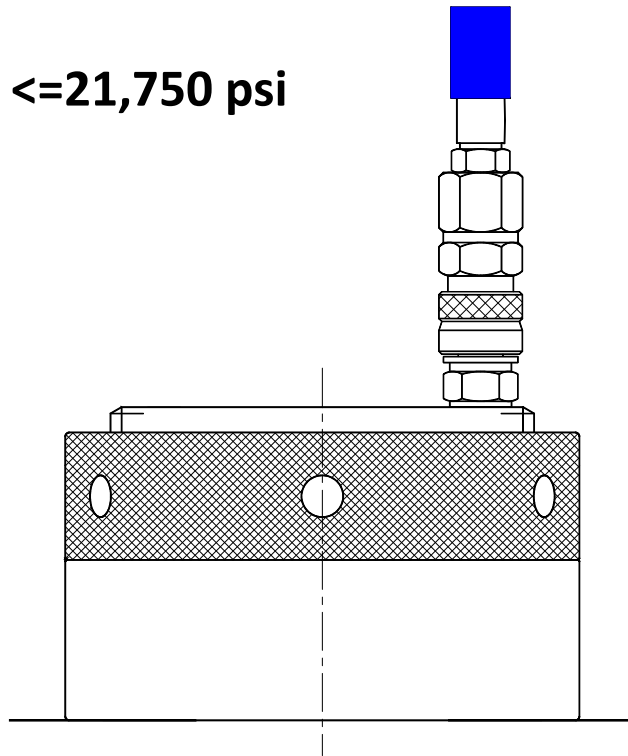
### Hydraulic Nuts



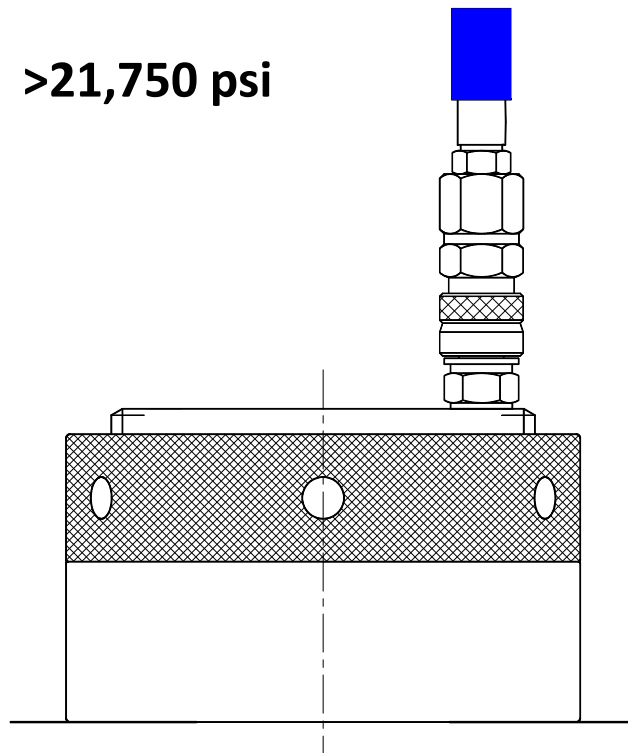
DO NOT exceed the 21,750 psi Maximum Working Pressure



**$\leq 21,750$  psi**



**$> 21,750$  psi**



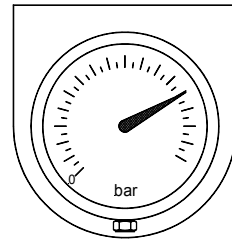


## HEALTH & SAFETY INSTRUCTIONS

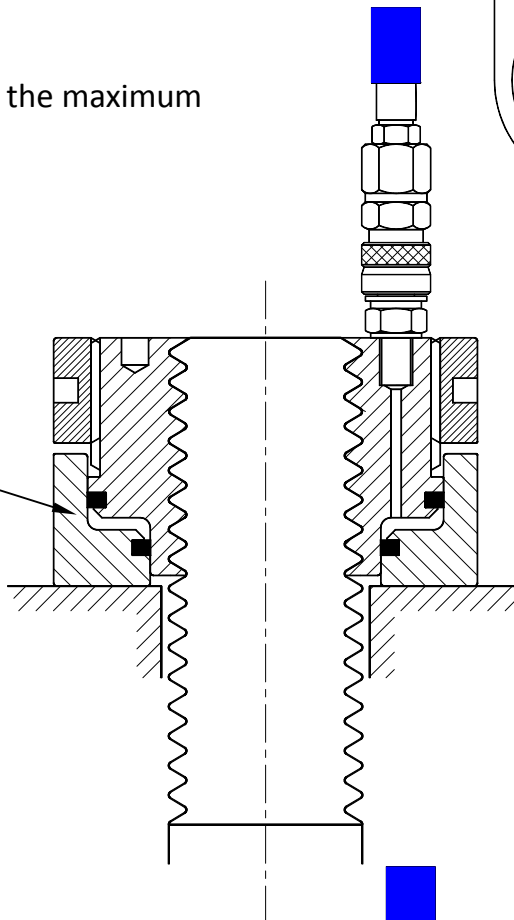
### Hydraulic Nuts



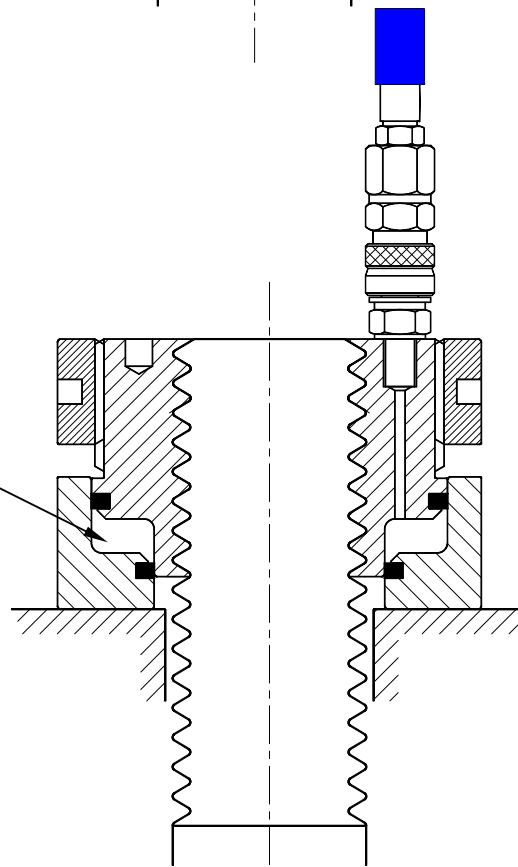
DO NOT exceed the maximum piston stroke



**Piston Stroke  
< 0.63 inch**



**Piston Stroke  
> 0.63 inch**



## HEALTH & SAFETY INSTRUCTIONS

### Hydraulic Nuts



Hydraulic Nuts MUST always be used with a hydraulic pump which has a pressure limiting device. Check that the pressure limit device is set at, or below, the maximum working pressure for the nuts.



Clear all personnel from the area where the bolt tightening operation is to be performed. Position the pump a safe distance away from the hydraulic nuts. Set up barriers and warning signs, or make other adequate arrangements to prevent unauthorised personnel from accidentally straying into the bolt tightening area.



Make certain that nobody is allowed to stand near to a hydraulic nut during the pressurisation process. At no time should anyone allow any part of their body to be positioned over the hydraulic nut, whilst the pressure is rising or when it is pressurised. Do not allow anyone to stand anywhere near a direct line with the long axis of a bolt during the tightening operation. In the case of studbolts with nuts at each end it is important that nobody stands in line with the long axis of the bolt at either end during the tightening operation.



Do not approach a hydraulic nut whilst it is being pressurised. Remember that a damaged bolt is most likely to fail at this critical time. When the operating pressure has been reached, approach a pressurised nut only for as long as it takes to turn the load retaining collar always keeping away from the axis of the bolt.





## HEALTH & SAFETY INSTRUCTIONS

### Hydraulic Nuts



Never leave a pressurised hydraulic nut unattended. Keep the nuts under pressure for the minimum time necessary to complete the bolt tightening job.



Wear SAFETY GLASSES and GLOVES when using hydraulic nuts.



The nuts should only be used for the purpose of tightening bolts. DO NOT use the nuts as hydraulic jacks or for any other purpose.



Take care when handling large nuts. Large tools may be heavy and require the use of lifting equipment.



Do not pick up or carry a hydraulic nut around using a flexible hydraulic hoses as a handle.



Do not try to tighten a leaking hydraulic connection when it is under pressure. First release the pressure then repair the leak.



The nuts should be pressurised with the correct high pressure fittings and hoses which have been designed for the purpose. These are available from TITAN.

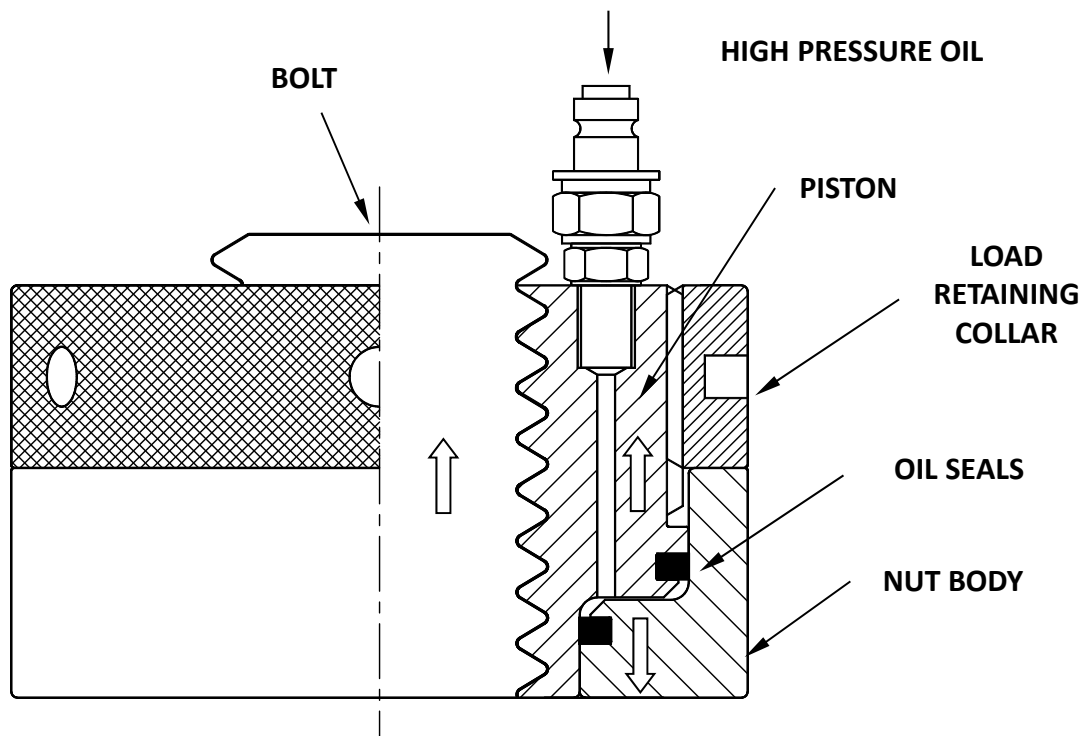
## Chapter 3:

### OPERATING INSTRUCTIONS



## Introduction

A hydraulic nut provides a quick and easy method for tightening large diameter bolts to high and accurate pre-loads. Unlike conventional methods it does not use torque and does not require any forceful turning of the nut or bolt, like impact wrenches, flogging spanners or hydraulic torque wrenches. All of these methods have one common enemy, FRICTION. Overcoming thread friction and friction between the nut and the washer uses up over 80% of the torque energy applied to the nut or bolt, leaving less than 20% of the energy to produce useful tension in the shank of the bolt. Variations in this friction loss, from bolt to bolt causes non uniform tension in bolts that have been tightened to the same torque or impact wrench setting.



A hydraulic nut is an internally threaded annular jack which screws onto the bolt to be tightened. The jack pushes against the bolted joint and pulls on the bolt. The bolt must be fully engaged into the hydraulic nut. Because the force produced, by the nut, is applied directly to the bolt, a tension equal to the load generated by the nut, is developed in the shank of the bolt. With the nut applying the tension, the bolted joint is compressed and the bolt is stretched. A gap appears between the nut body and the load retaining collar. The collar is turned to take up the piston travel and the oil pressure is released. The load is transferred from the hydraulics to the load retaining collar. Some load is lost as the previously unloaded threads of the collar deflect. Depending on the length of the bolt a high load can be retained in the bolt.

Hydraulic Nuts may be tightened individually or they can be ganged together to enable multiple bolts to be tightened simultaneously, to the same high and accurate pre-load. This is particularly useful when compressing gaskets in pipeline or pressure vessel flanged connections or where even tightening of a group of bolts is important. The high load developed by the multiple nuts, is evenly distributed around the joint causing the gasket to flow into the surface irregularities of the flange giving a much better seal. Flexible hoses with self sealing quick connect couplings are used to gang the nuts together to form a hydraulic ring main. The ring main and hydraulic nuts are pressurised using an air driven pump working from a compressed air supply.

## Main component parts

The diagrams below show the component parts of a typical Hydraulic Nut Upper Collar Type A.



### NUT BODY

The nut body is not threaded. It is the outer wall of the hydraulic jack. The body has an internal bore into which the piston and bolt will fit. The body has internally fitted high pressure oil seals which effect a seal between the internal bore of the Nut Body and the Piston.



### PISTON

The Piston is internally threaded to suit the bolt and externally threaded to accept the load retaining collar. A hydraulic connection is machined into the piston to accept the quick connect nipple through which high pressure oil will be injected into the nut. The top face of the Piston is drilled with tommy bar holes to assist with the installation of the nut. Special high pressure seals clip into the outer edge of the piston to effect a seal with the outer wall of the Nut Body.



### LOAD RETAINING COLLAR

The Load retaining Collar is threaded to suit the outside of the Piston. The Collar is screwed down to retain load when the nut has been pressurised. The Collar has six tommy bar holes to enable it to be turned easily when the oil pressure is applied.



### SEALS

The very high pressure plastic composite and synthetic rubber seals snap into the Piston and the Nut Body. They provide a high pressure seal between the nut body and the piston.



## STEP 1 TIGHTENING A BOLT

Assemble the joint with the bolts to be tightened. Washers may be used under the nut if desired but they are normally not necessary. The surface of the joint onto which the nut is to be fitted is ideally machined or spot faced to ensure the nut is fully supported by the joint and sits square in relation to the bolt axis.

Make sure a minimum thread length equal to the thickness of the hydraulic nut is protruding from the surface of the joint on the side the hydraulic nut is to be fitted. Whilst the nut is designed to cope with thread lengths in excess of the nut thickness it may be found that excessive length will interfere with the quick connector supplying oil to the nut.

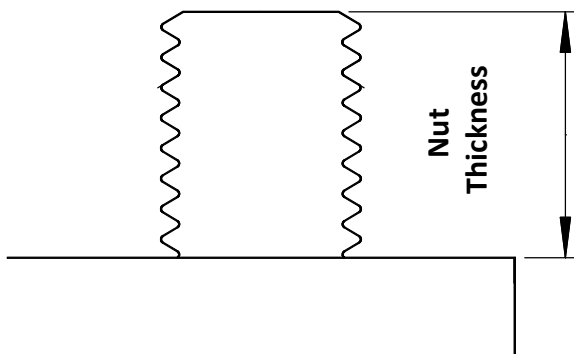
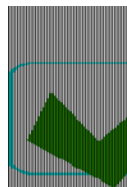
Also make sure the nut at the other end of the bolt is fully engaged with the bolt or where a tapped hole is used, that the bolt is fully engaged with the hole threads.

It is very important this operation is performed properly otherwise the thread engagement between the nut and the bolt, or the bolt and the nut or threaded hole at the other end, will be too short, which could cause the bolt and/or nut threads to be stripped.

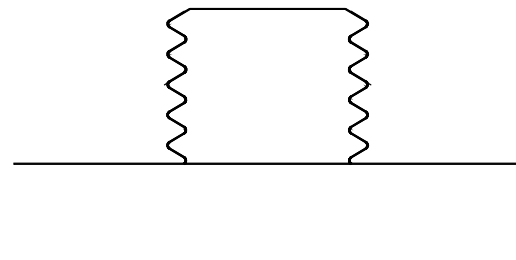
### HEALTH & SAFETY WARNING



**! Insufficient threads are engaged at either end of the bolt, and an attempt is made to apply tension with the hydraulic nut, the bolt or nut threads may strip and components of the nut and or the bolt, could be launched with the possibility of serious injury.**



**CORRECT and SAFE**



**WRONG and DANGEROUS**

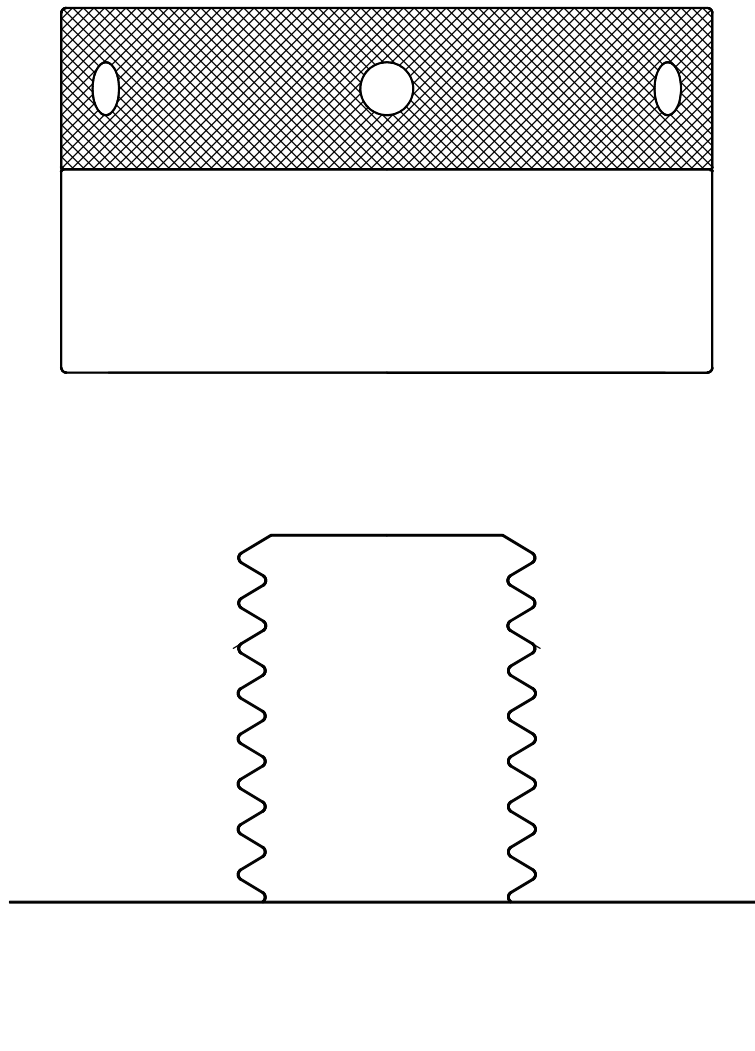


## STEP 2 TIGHTENING A BOLT

Place the Hydraulic Nut over the bolt.

Lower the nut onto the bolt. Take care that the Piston is not allowed to move out of the Nut Body during this operation.

Make sure the Load Retaining Collar is screwed back a little.





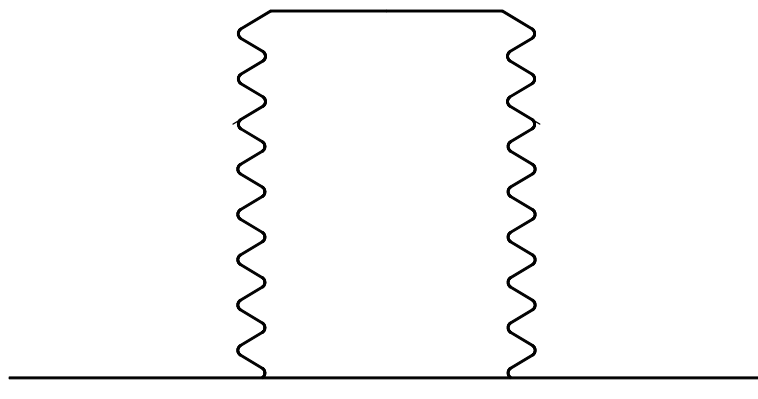
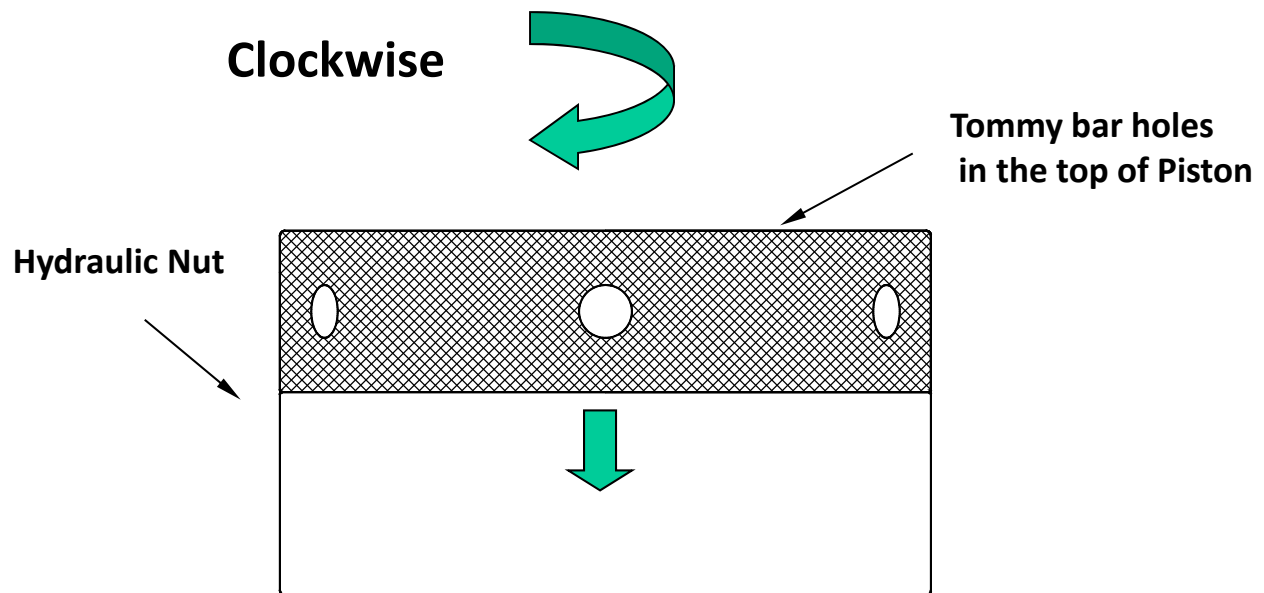
## STEP 3 TIGHTENING A BOLT

Screw the nut onto the bolt.

Take care that the nut threads properly engage the bolt and do not become cross threaded.

Screw the nut fully onto the bolt threads. The nut should run freely on the bolt.

Tommy bar holes are provided in the top of the piston to assist with this operation.

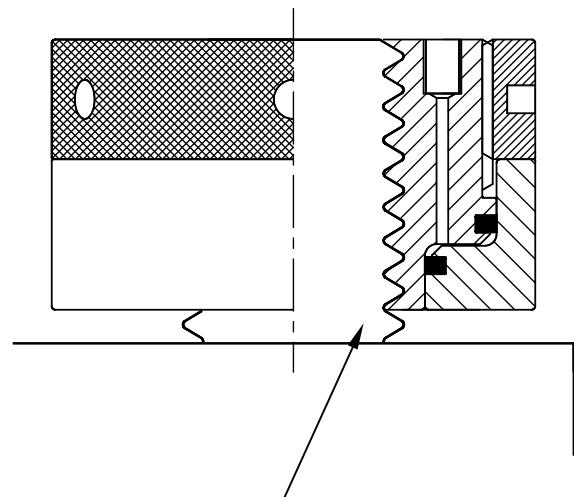
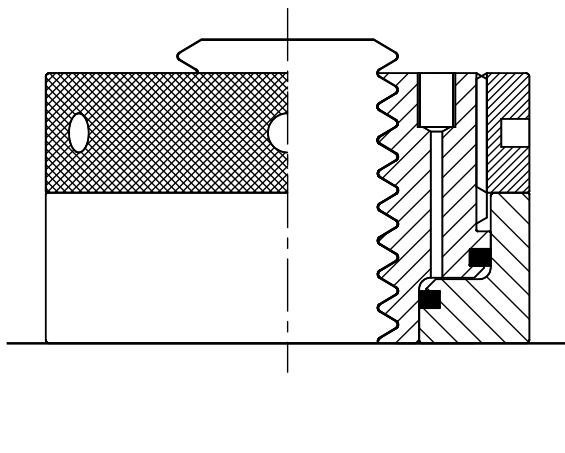
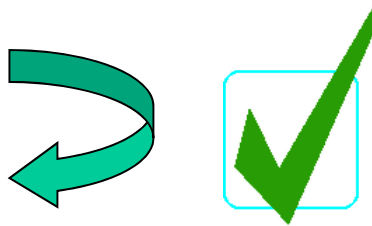


## STEP 4 TIGHTENING A BOLT

Screw the HYDRAULIC NUT fully down onto the top surface of the joint. This will normally be turned by hand but the final tightening should be assisted with the help of a tommy bar.

Take extra care to stop the bolt turning with the HYDRAULIC NUT which would reduce the thread engagement on the bolt. In the worst case the NUT could be left with only a few threads engaged even though sufficient thread was initially protruding through the bolted joint.

**Clockwise**



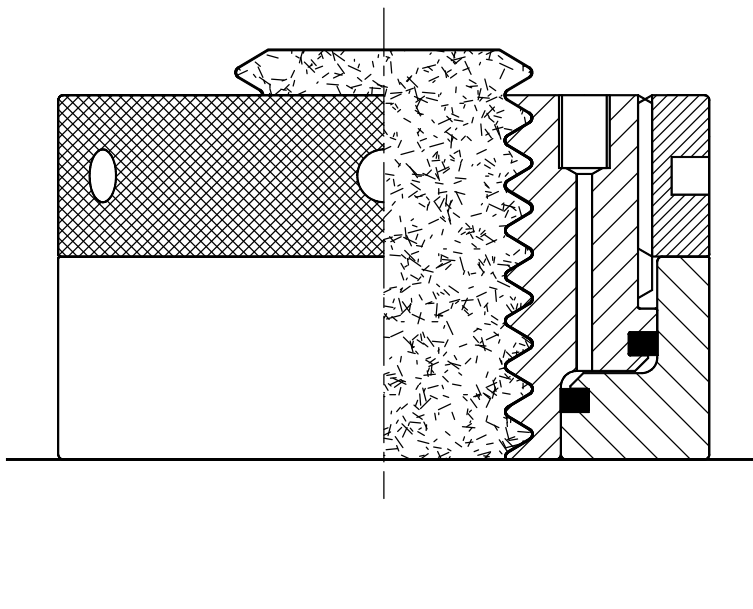
The HYDRAULIC NUT is NOT fully down onto the top surface of the joint.



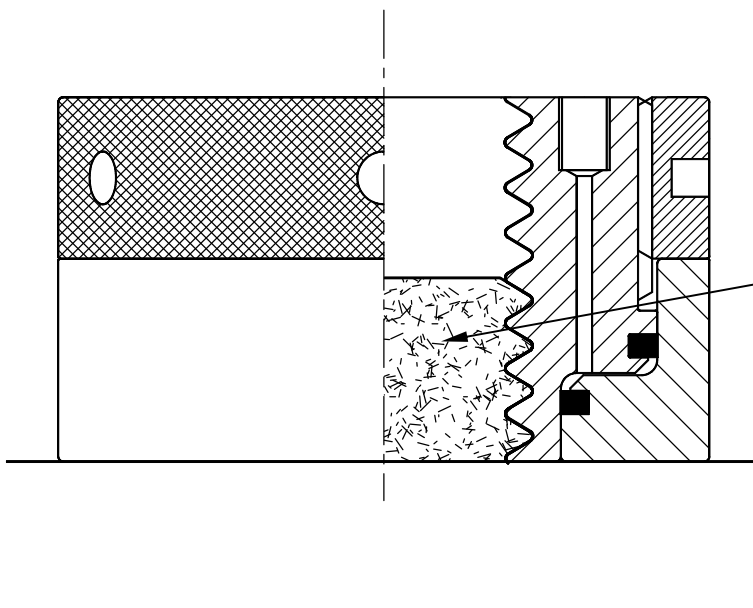
## STEP 5 TIGHTENING A BOLT

Once the NUT has been screwed down, double check the thread engagement with the bolt is still correct.

The hydraulic nut is now locked in place and cannot fall off. The nut is now ready for the hydraulic connection to be fitted.



**CORRECT**



**WRONG and DANGEROUS**

The BOLT has turned with the NUT and the thread engagement between the BOLT and the NUT has been reduced.

If pressure is applied the threads might strip and cause injury.

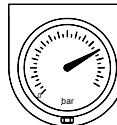
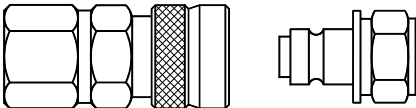
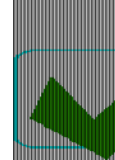
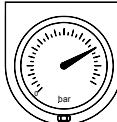
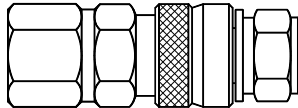
## Using the Quick Connect Couplings



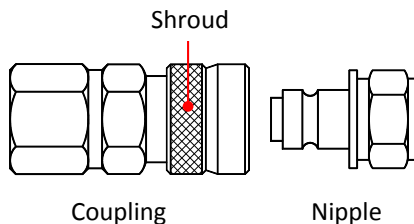
**DO NOT pressurise the connectors when they are disconnected**



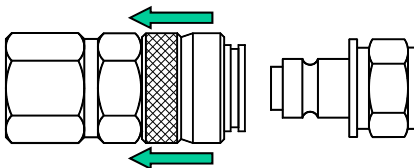
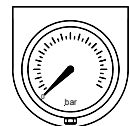
**Check there is no pressure in the system before attempting to connect or disconnect the couplings.**



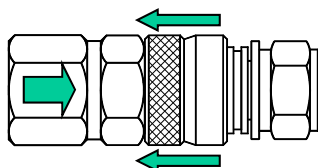
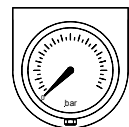
To connect the Quick Connect Coupling and Nipple, first check there is no pressure in the system. Then pull back the shroud by hand and push the coupling onto the nipple. When together, release the shroud which will spring back to lock the Coupling and Nipple together. To disconnect, first check there is no pressure in the system. Pull back the shroud, by hand, and pull the coupling and nipple apart. Release the shroud when apart.



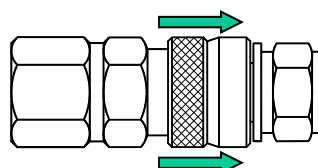
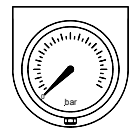
Pull the shroud back to retract



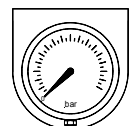
Coupling and Nipple with the shroud retracted



Coupling and nipple pushed together with the shroud still retracted

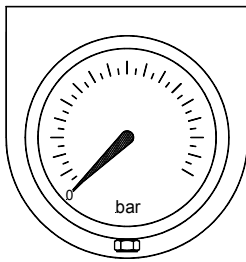


Shroud released - Coupling and Nipple are now locked together and safe to use.

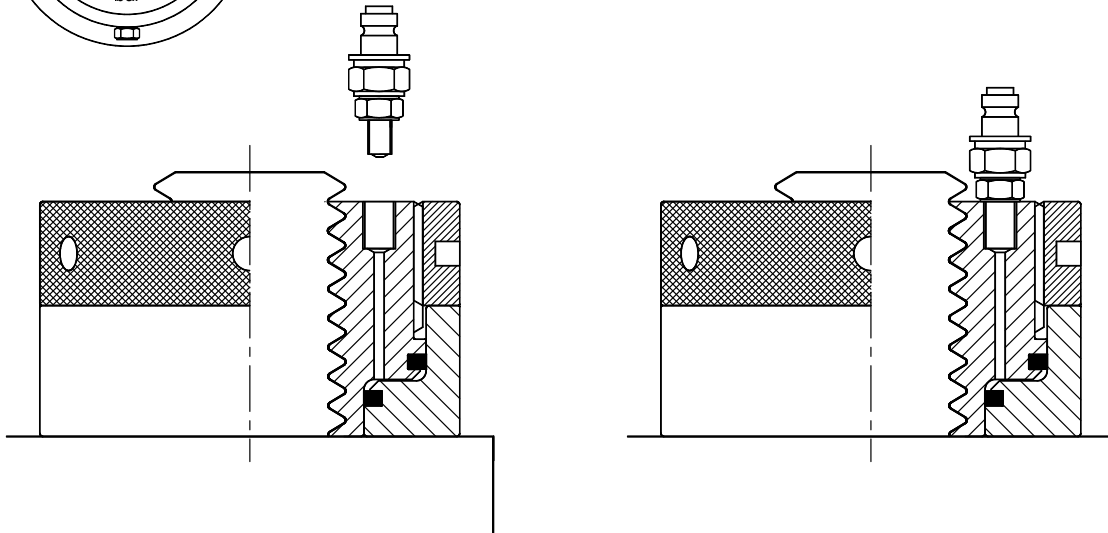




## STEP 6 TIGHTENING A BOLT



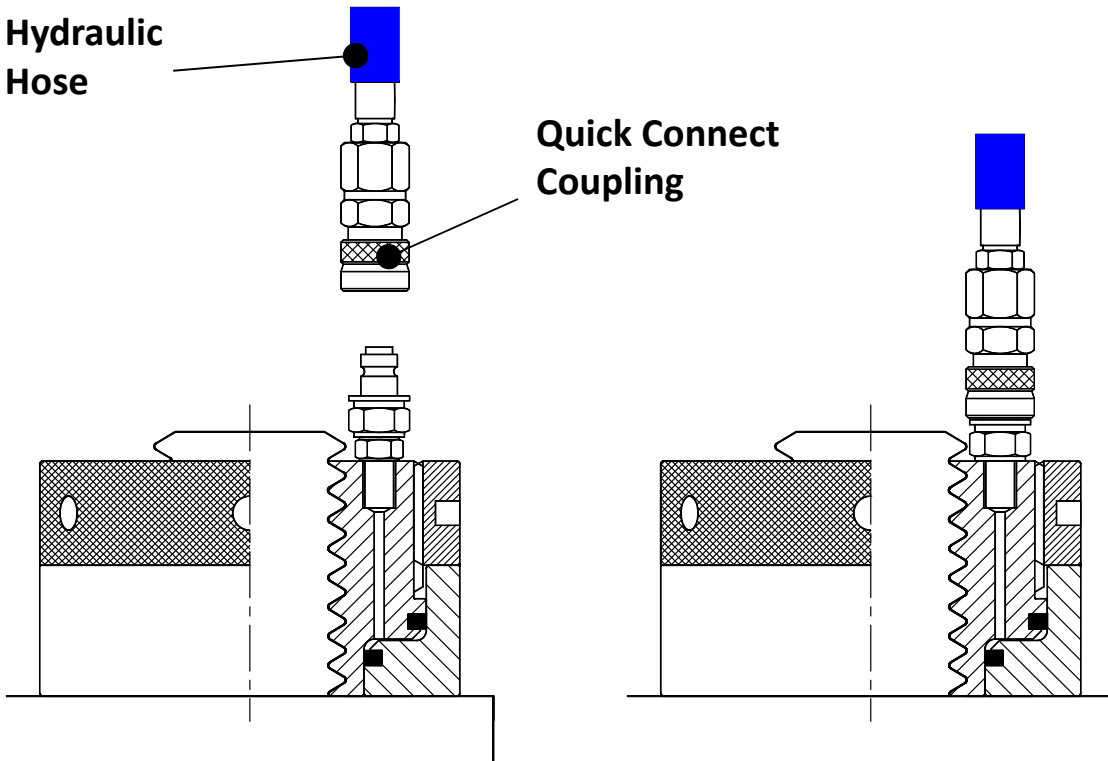
Fit the male/male adaptor and the quick connect nipple. **DO NOT OVERTIGHTEN** the adaptor into the nut.



Connect the hydraulic hose. Make sure the quick connect coupling is fully engaged.

Hydraulic  
Hose

Quick Connect  
Coupling





**MOST IMPORTANT - HEALTH & SAFETY**

The hydraulic nut is now ready to be pressurised. Before proceeding read the Health & Safety Instructions given in this manual then proceed as follows:-

Clear all personnel from the area where the bolt tensioning operation is to be performed.

Set up temporary barriers and warning signs, or make other adequate arrangements to prevent unauthorised personnel from accidentally straying into the bolt tensioning area.

Make certain that nobody is allowed to stand or put any part of their body over the HYDRAULIC NUT when it is pressurised, or in a direct line with the long axis of the bolt during the tensioning operation. In the case of studbolts with nuts at each end it is important that nobody stands in line with the long axis of the bolt at either end during the tensioning operation.

Wear eye protection, gloves overalls and a hard hat.

Never leave a pressurised hydraulic nut unattended.

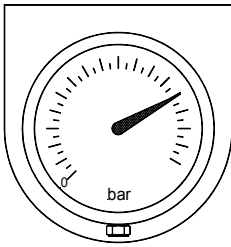
Release the oil pressure immediately if any unauthorised person moves into the bolt tensioning area. Immediately shout an audible warning to move, if anyone stands in front of the HYDRAULIC NUT when it is under pressure or stands in line with the long axis of a bolt being tensioned.

Determine the correct working pressure for the bolts to be tightened.

Proceed with the following operations keeping the hydraulic nut under pressure for the minimum time necessary to turn the Load Retaining Collar.



## STEP 7 TIGHTENING A BOLT



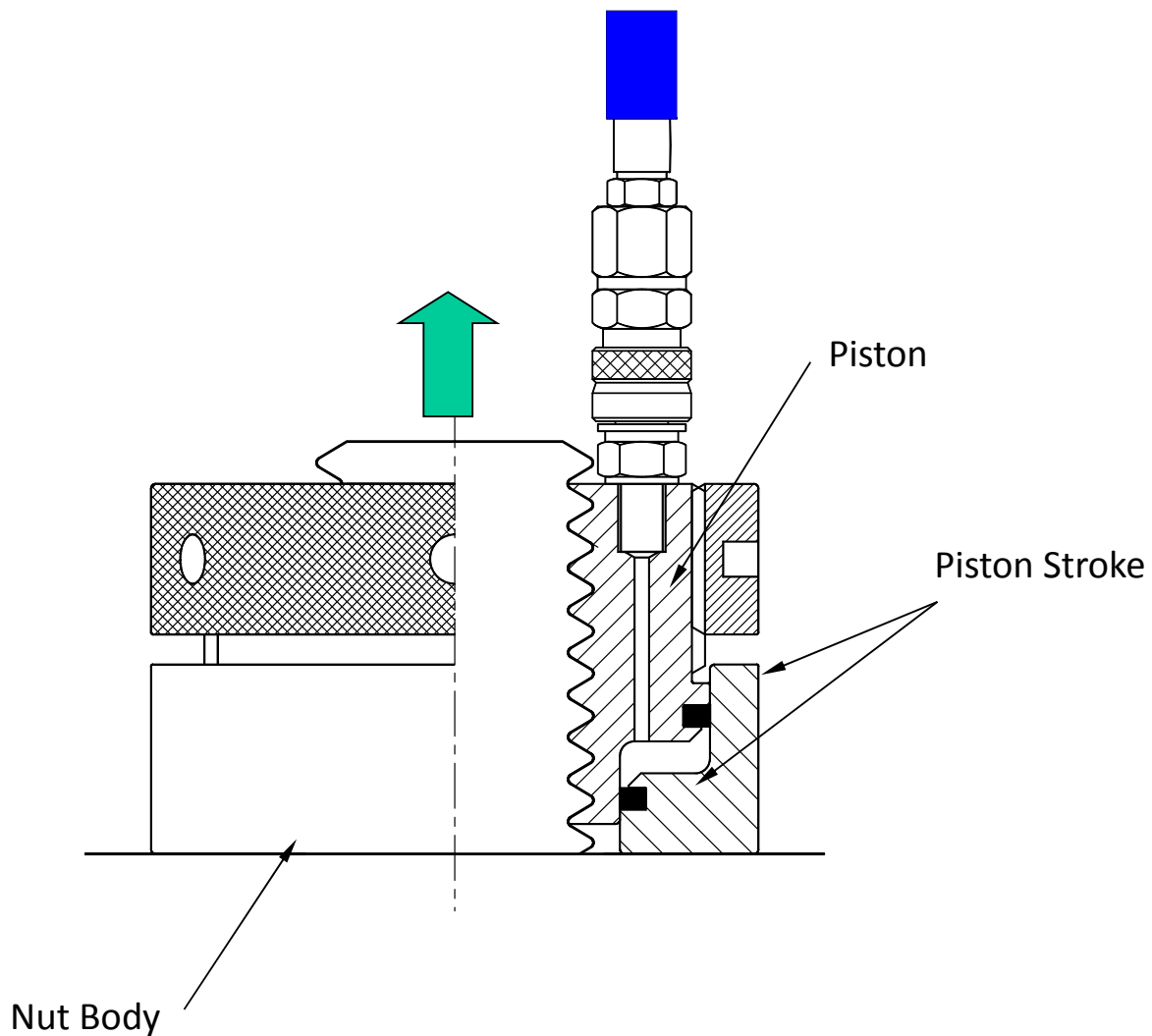
Apply the correct hydraulic pressure. The Piston will move out of the Nut Body as the bolt is stretched and the bolted joint is compressed.



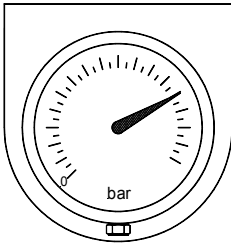
**DO NOT** exceed the maximum piston stroke.



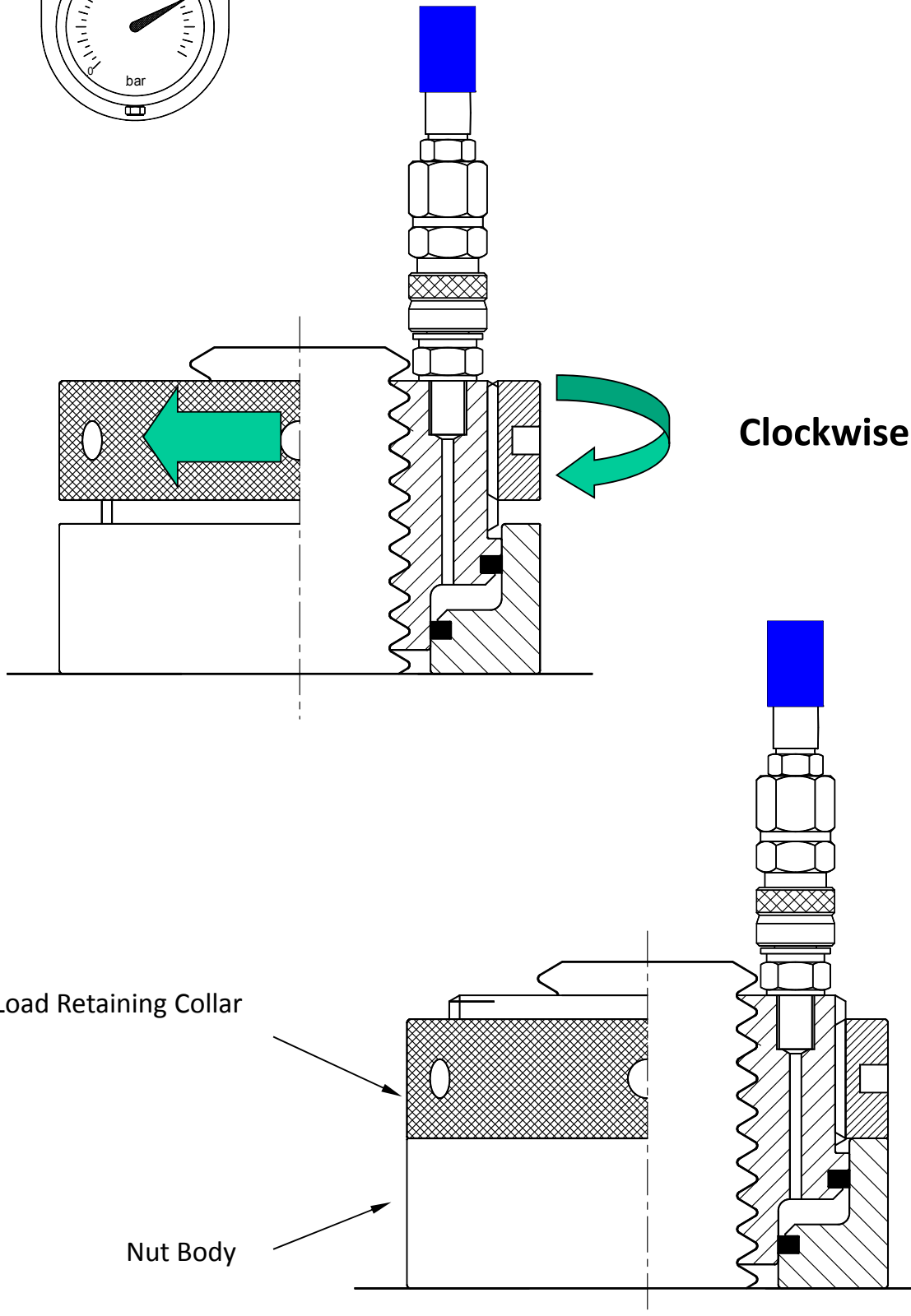
**DO NOT** exceed the maximum pressure.



## STEP 8 TIGHTENING A BOLT

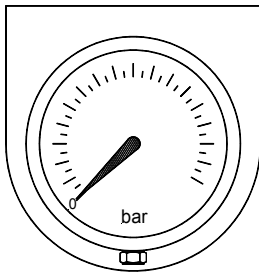


Turn the **LOAD RETAINING COLLAR** clockwise until it comes back into contact with the **NUT BODY**.



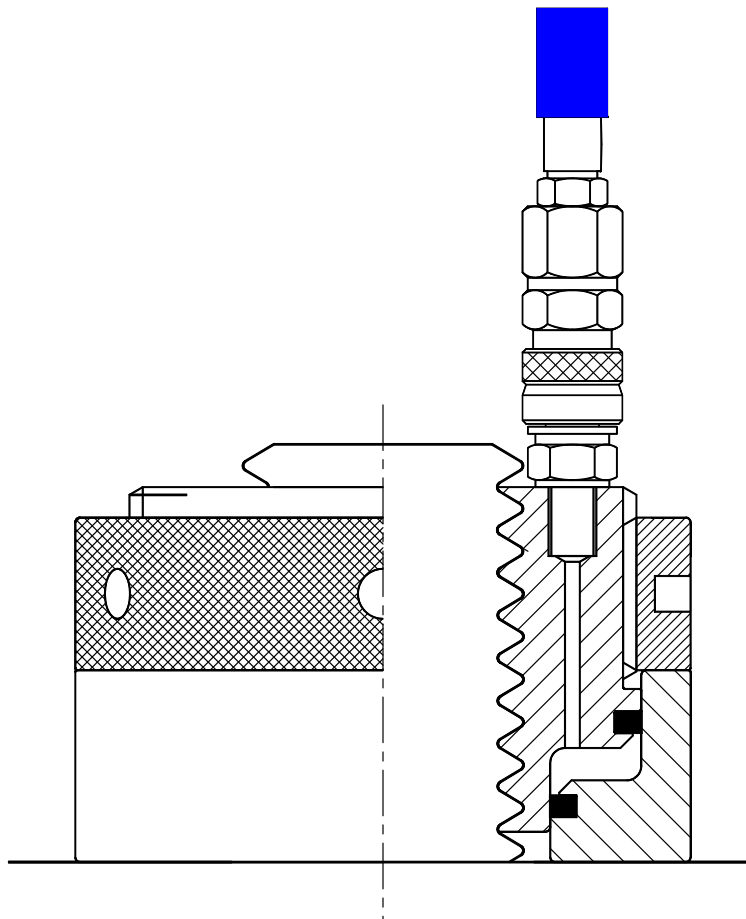


## STEP 9 TIGHTENING A BOLT

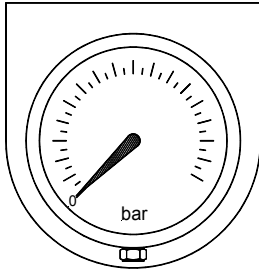


Release the pressure slowly.

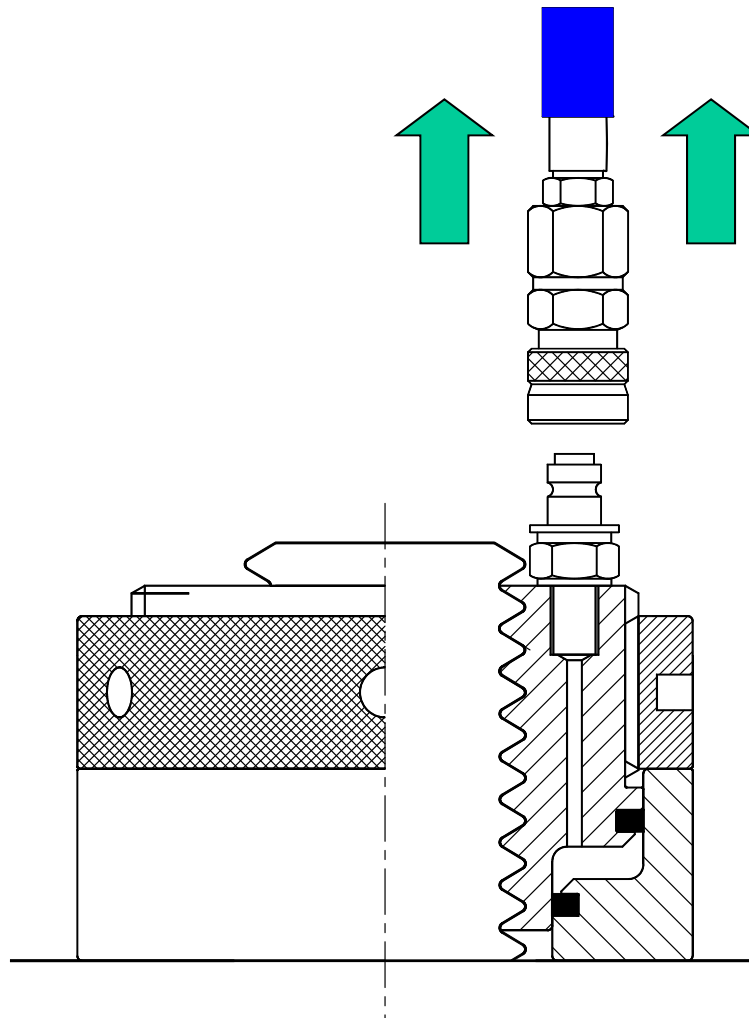
Steps 7, 8 and 9 may now be repeated to bed in the threads of the load retaining collar which will help to increase the retained load.



## STEP 10 TIGHTENING A BOLT



Remove the Hydraulic Hose

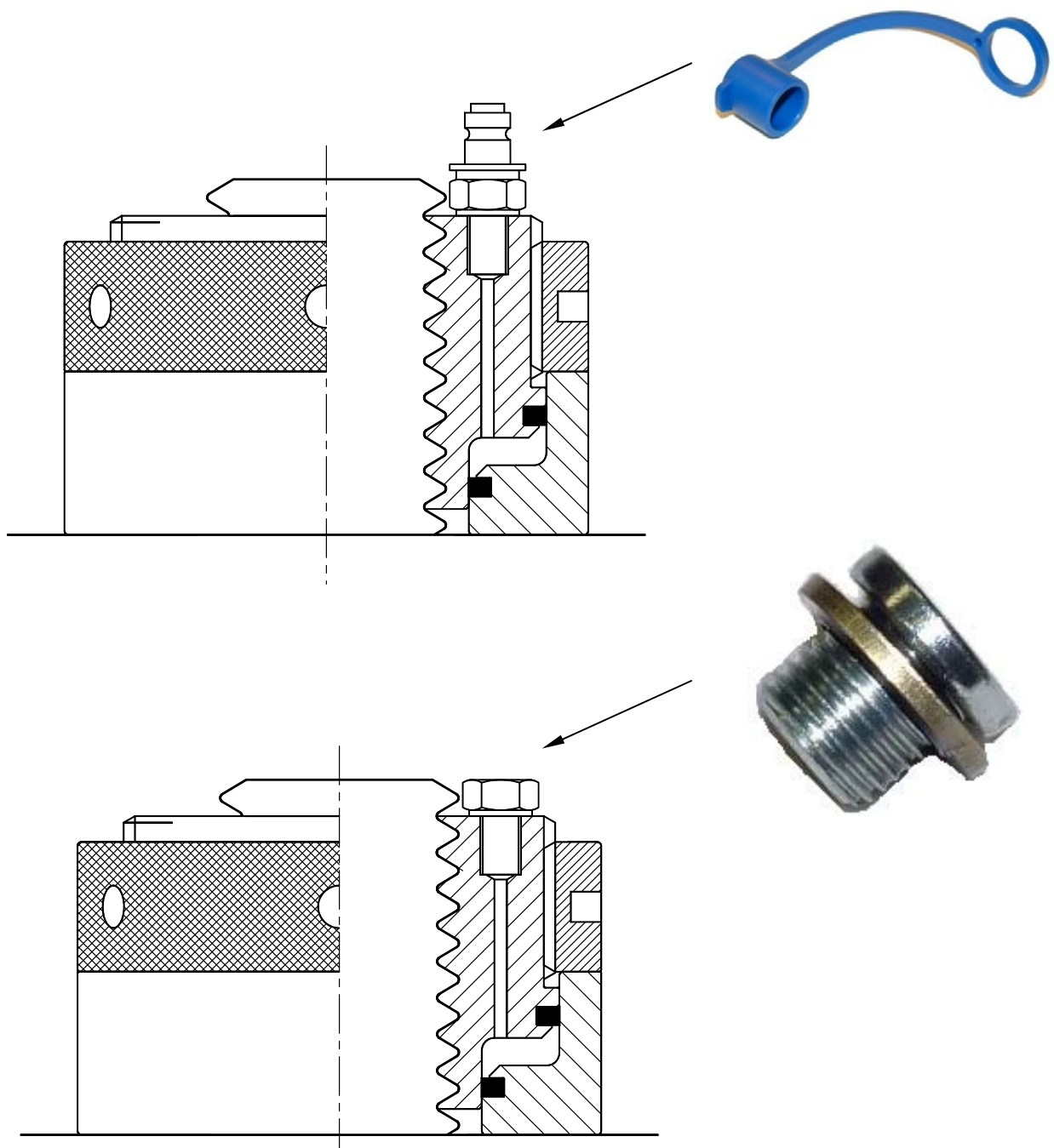




## STEP 11 TIGHTENING A BOLT

If the self sealing quick connector is to remain in place, fit the dust cap.

If the quick connector and adaptor are to be used elsewhere, remove the connector and the adaptor and fit a blanking plug.

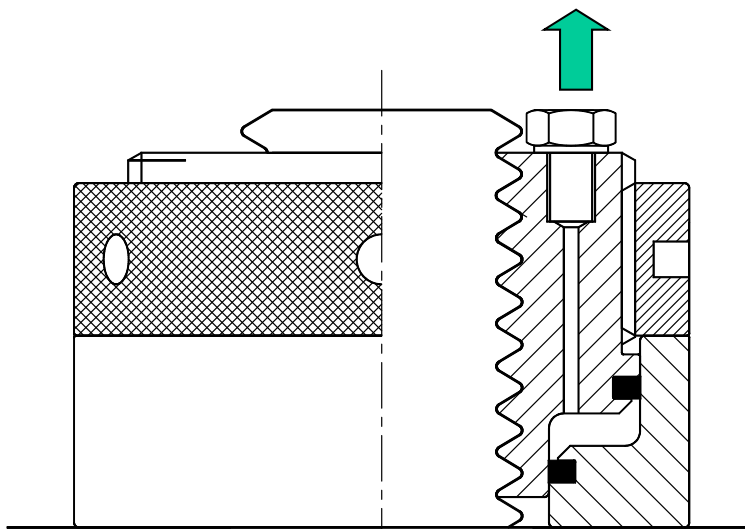




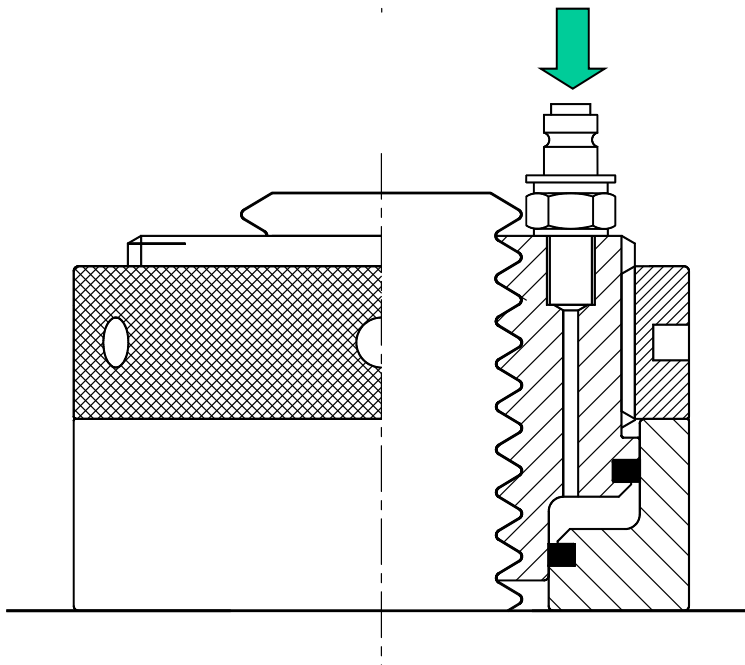
## STEP 1 LOOSENING A BOLT

Loosening bolts which have been tightened with a hydraulic nut is simply a reverse of the tightening operation.

Check the hydraulic nut to be loosened. If the hydraulic connection has been fitted with a blank plug, remove it and fit a quick connector as described in section 5 of this manual.



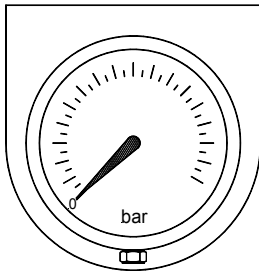
If the hydraulic connection has been fitted with a blank plug, remove it.



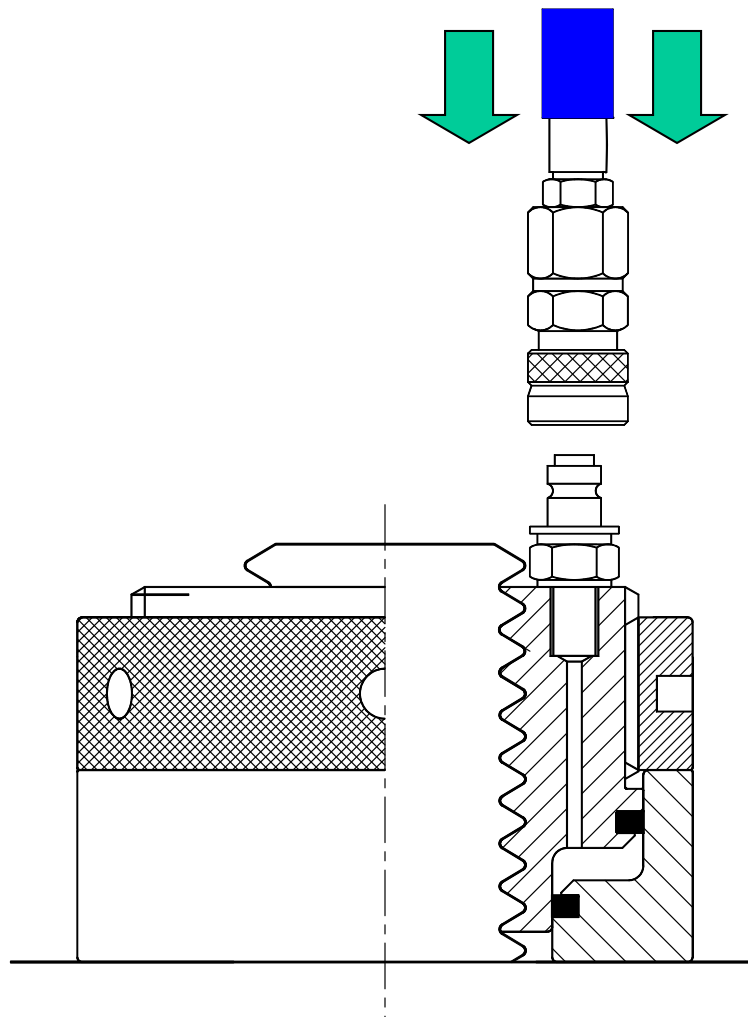
Fit the male/male adaptor and the quick connect nipple. **DO NOT OVERTIGHTEN** the adaptor into the nut.



## STEP 2 LOOSENING A BOLT



Connect the hydraulic hose.



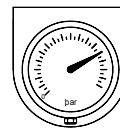
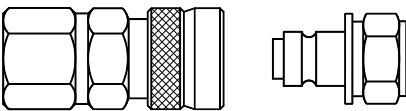
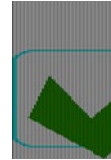
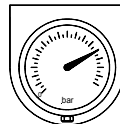
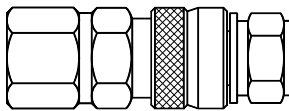
## Using the Quick Connect Couplings



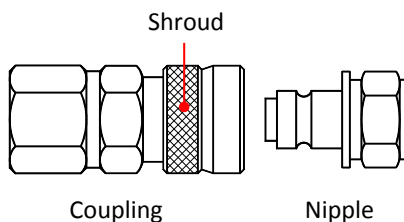
**DO NOT pressurise the connectors when they are disconnected**



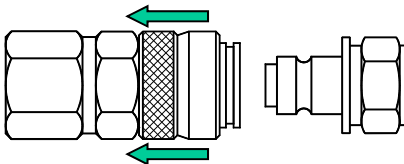
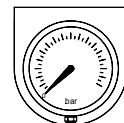
**Check there is no pressure in the system before attempting to connect or disconnect the couplings.**



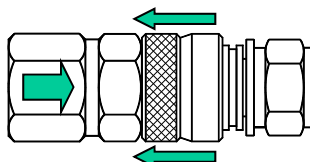
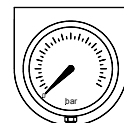
To connect the Quick Connect Coupling and Nipple, first check there is no pressure in the system. Then pull back the shroud by hand and push the coupling onto the nipple. When together, release the shroud which will spring back to lock the Coupling and Nipple together. To disconnect, first check there is no pressure in the system. Pull back the shroud, by hand, and pull the coupling and nipple apart. Release the shroud when apart.



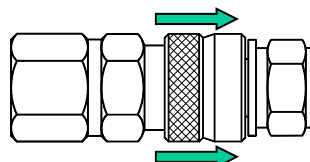
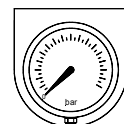
Pull the shroud back to retract



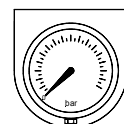
Coupling and Nipple with the shroud retracted



Coupling and nipple pushed together with the shroud still retracted

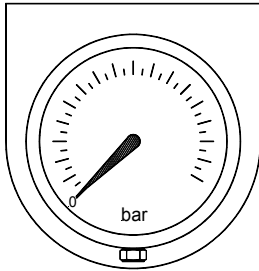


Shroud released - Coupling and Nipple are now locked together and safe to use.

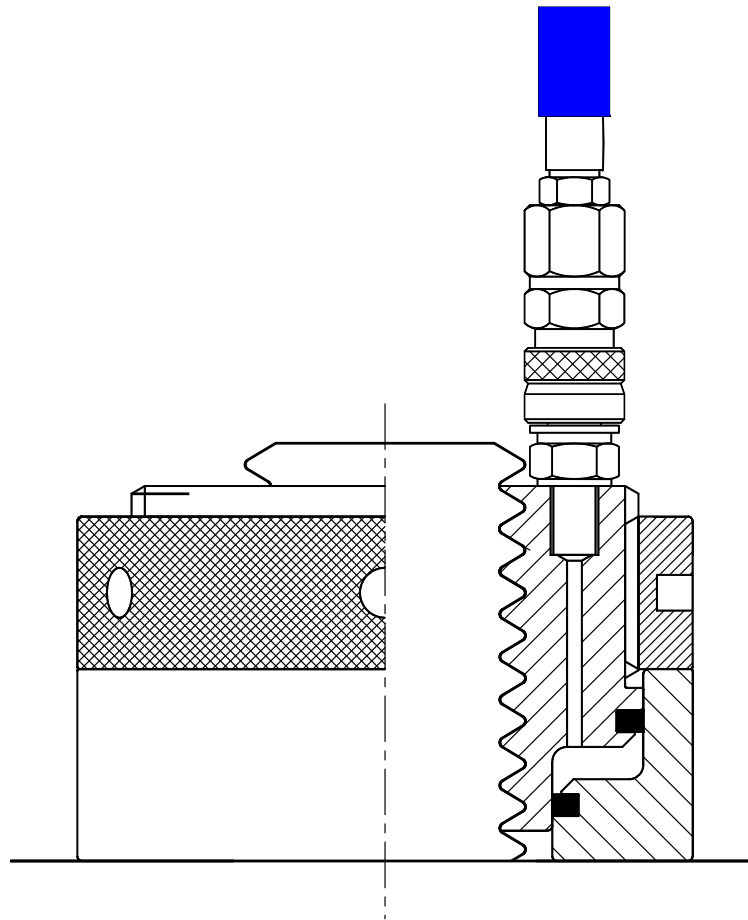




## STEP 3 LOOSENING A BOLT



Make sure the quick connect coupling is fully engaged.



**MOST IMPORTANT - HEALTH & SAFETY**

The hydraulic nut is now ready to be pressurised. Before proceeding read the Health & Safety Instructions given in this manual then proceed as follows:-

Clear all personnel from the area where the bolt tensioning operation is to be performed.

Set up temporary barriers and warning signs, or make other adequate arrangements to prevent unauthorised personnel from accidentally straying into the bolt tensioning area.

Make certain that nobody is allowed to stand or put any part of their body over the HYDRAULIC NUT when it is pressurised, or in a direct line with the long axis of the bolt during the tensioning operation. In the case of studbolts with nuts at each end it is important that nobody stands in line with the long axis of the bolt at either end during the tensioning operation.

Wear eye protection, gloves overalls and a hard hat.

Never leave a pressurised hydraulic nut unattended.

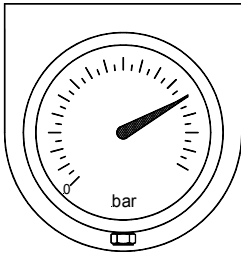
Release the oil pressure immediately if any unauthorised person moves into the bolt tensioning area. Immediately shout an audible warning to move, if anyone stands in front of the HYDRAULIC NUT when it is under pressure or stands in line with the long axis of a bolt being tensioned.

Determine the correct working pressure for the bolts to be tightened.

Proceed with the following operations keeping the hydraulic nut under pressure for the minimum time necessary to turn the Load Retaining Collar.



## STEP 4 LOOSENING A BOLT



Slowly increase the hydraulic pressure.

Check the Load Retaining Collar to see if it is free to turn anticlockwise.

When the Collar is free to turn STOP the pump.



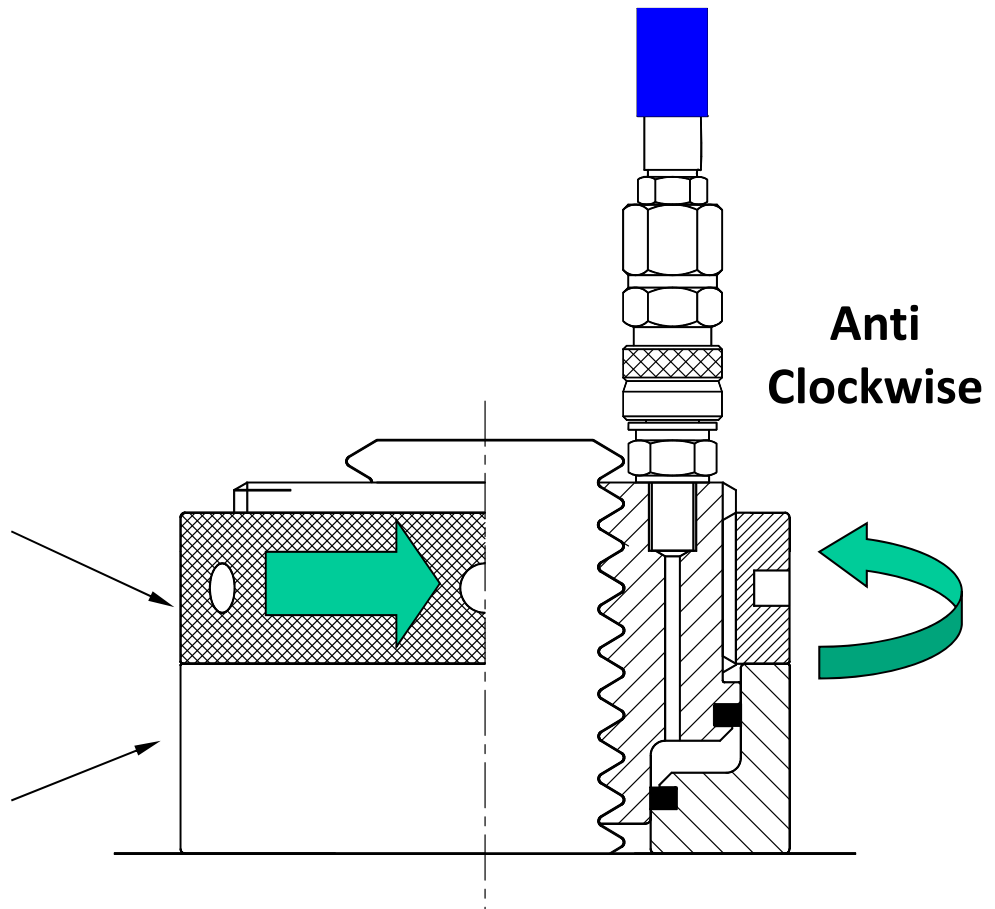
DO NOT exceed the maximum piston stroke.



DO NOT exceed the maximum pressure.

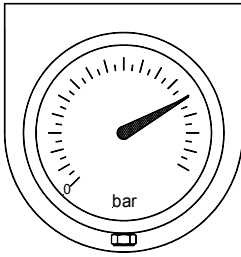
Load Retaining Collar

Nut Body



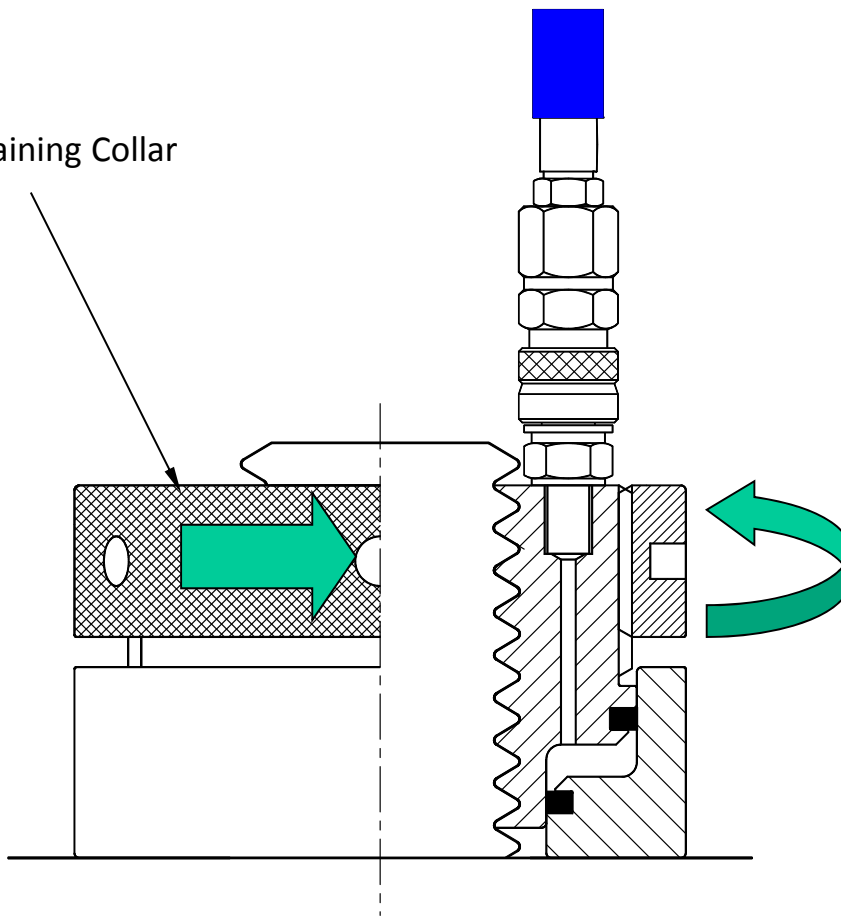


## STEP 5 LOOSENING A BOLT



Wind back the Load Retaining Collar one full turn

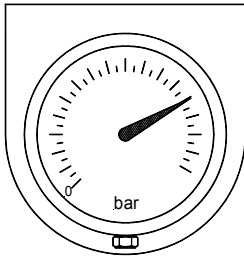
Load Retaining Collar



**Anti  
Clockwise  
one full turn**



## STEP 6 LOOSENING A BOLT



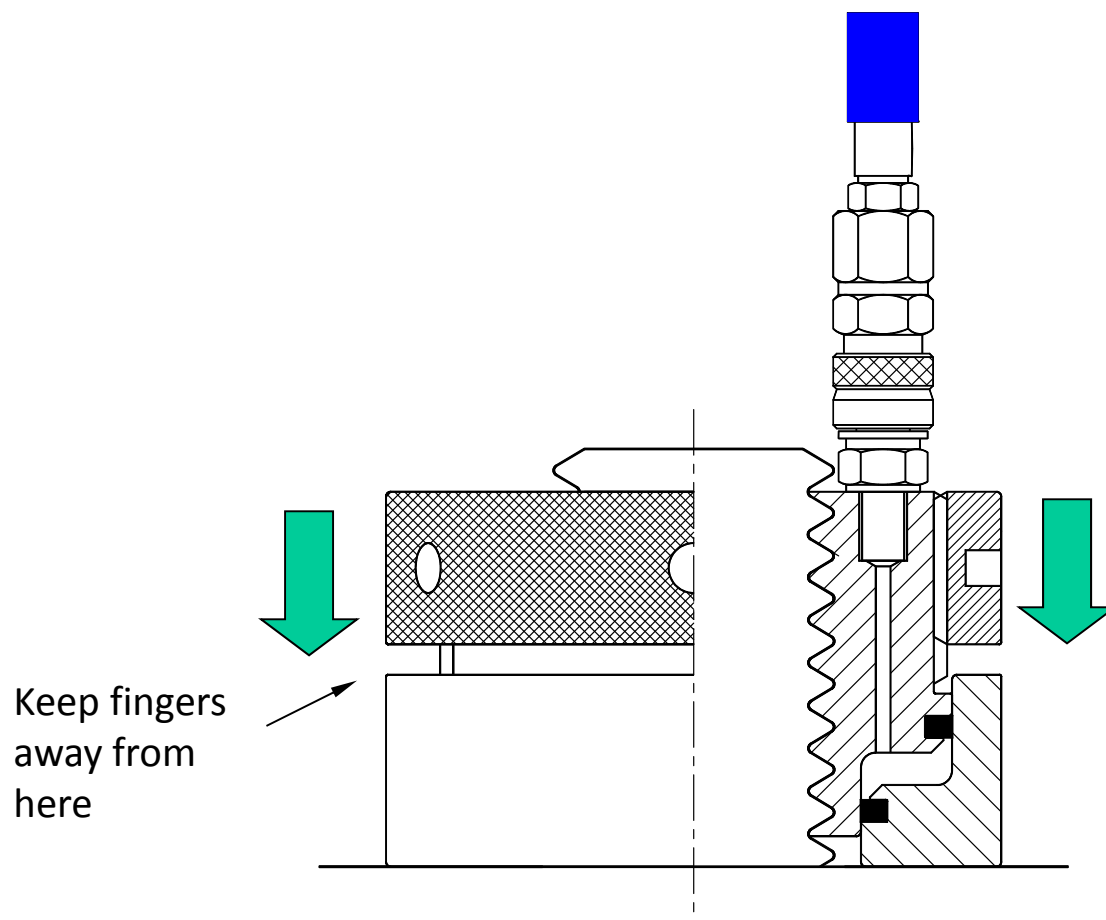
Slowly release the pressure.

As the pressure falls the PISTON will be pushed back into the NUT BODY.

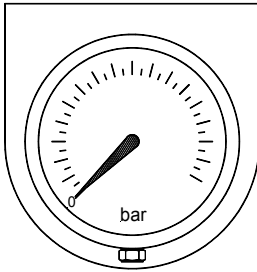
Make sure there is nothing that can be trapped between the COLLAR and the NUT BODY.



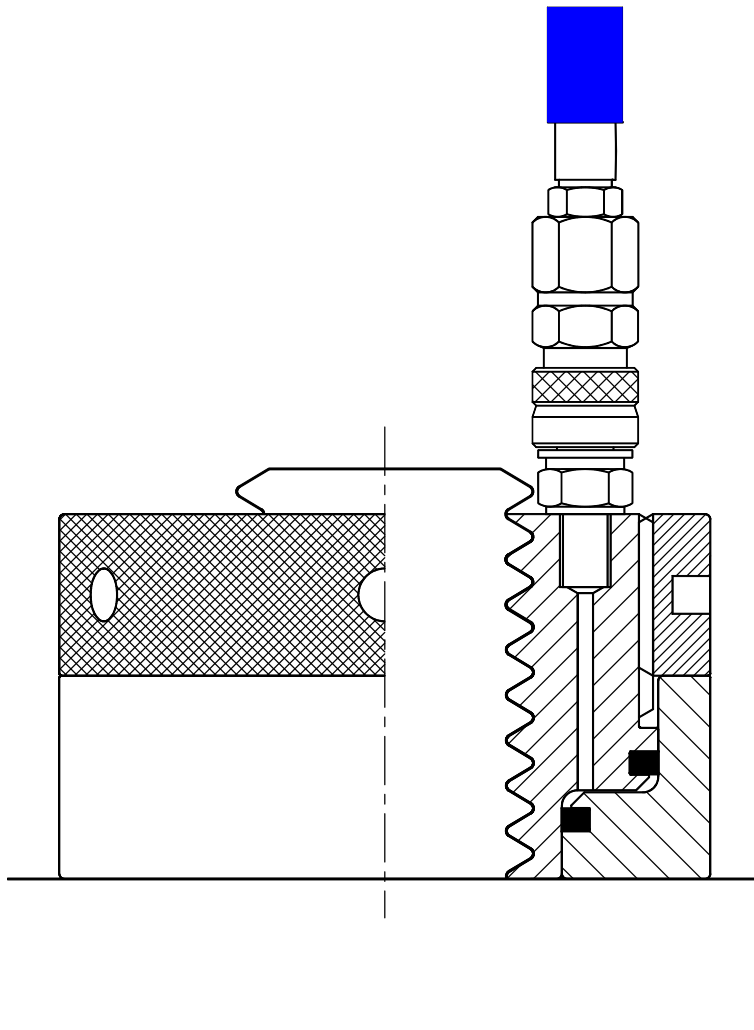
**KEEP your FINGERS away from the COLLAR and the NUT BODY during this operation otherwise they could be trapped and crushed.**



## STEP 7 LOOSENING A BOLT

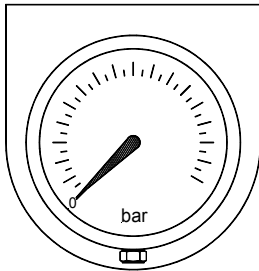


When the pressure has fallen to zero, the hydraulic nut will be loose.

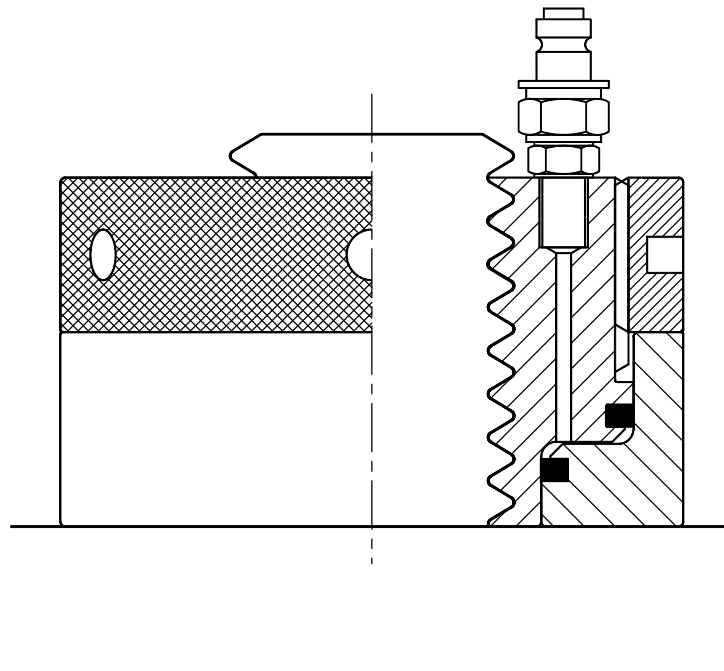
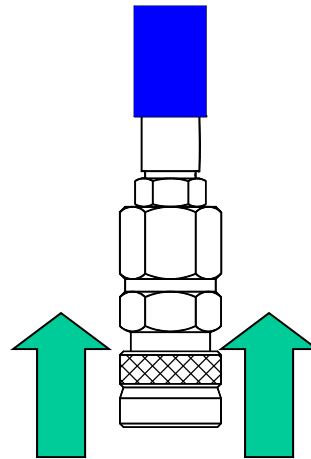




## STEP 8 LOOSENING A BOLT



Remove the Hydraulic Hose

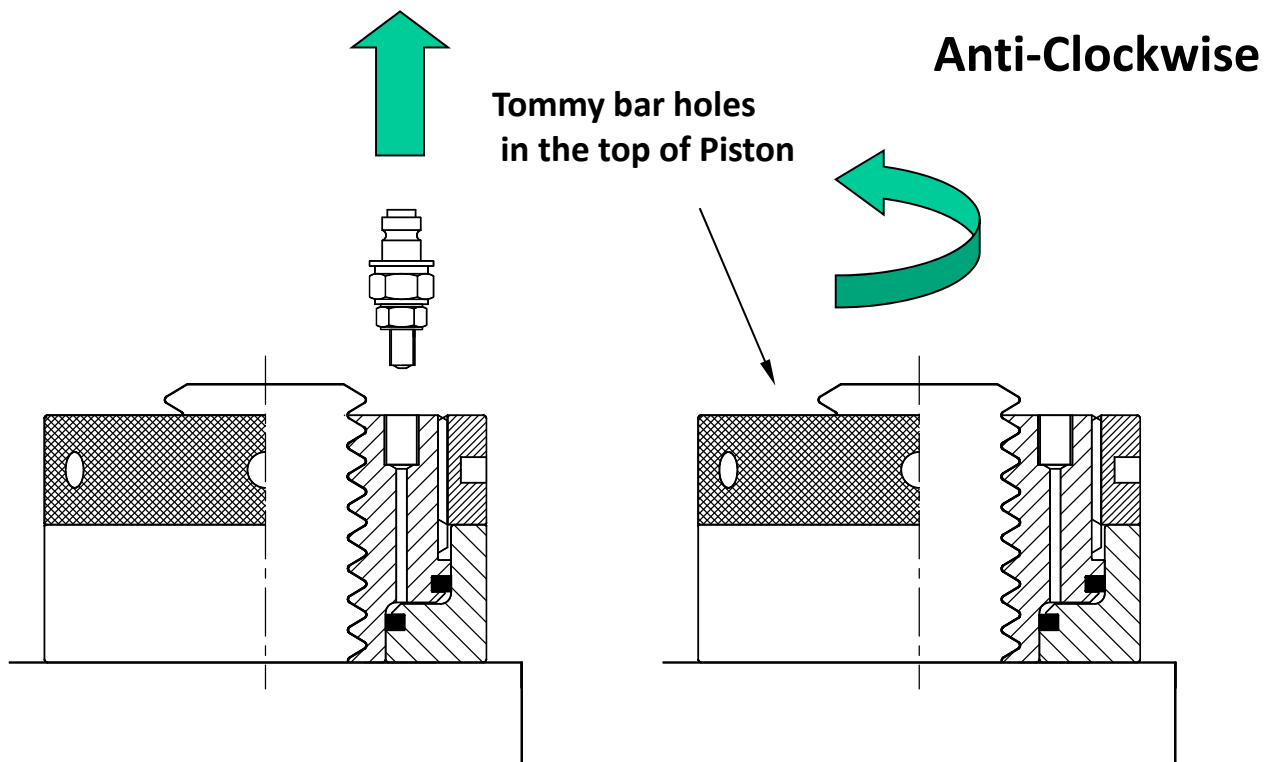


## STEP 9 LOOSENING A BOLT

The quick connect nipple and adaptor may now be removed.

The HYDRAULIC NUT can be unscrewed.

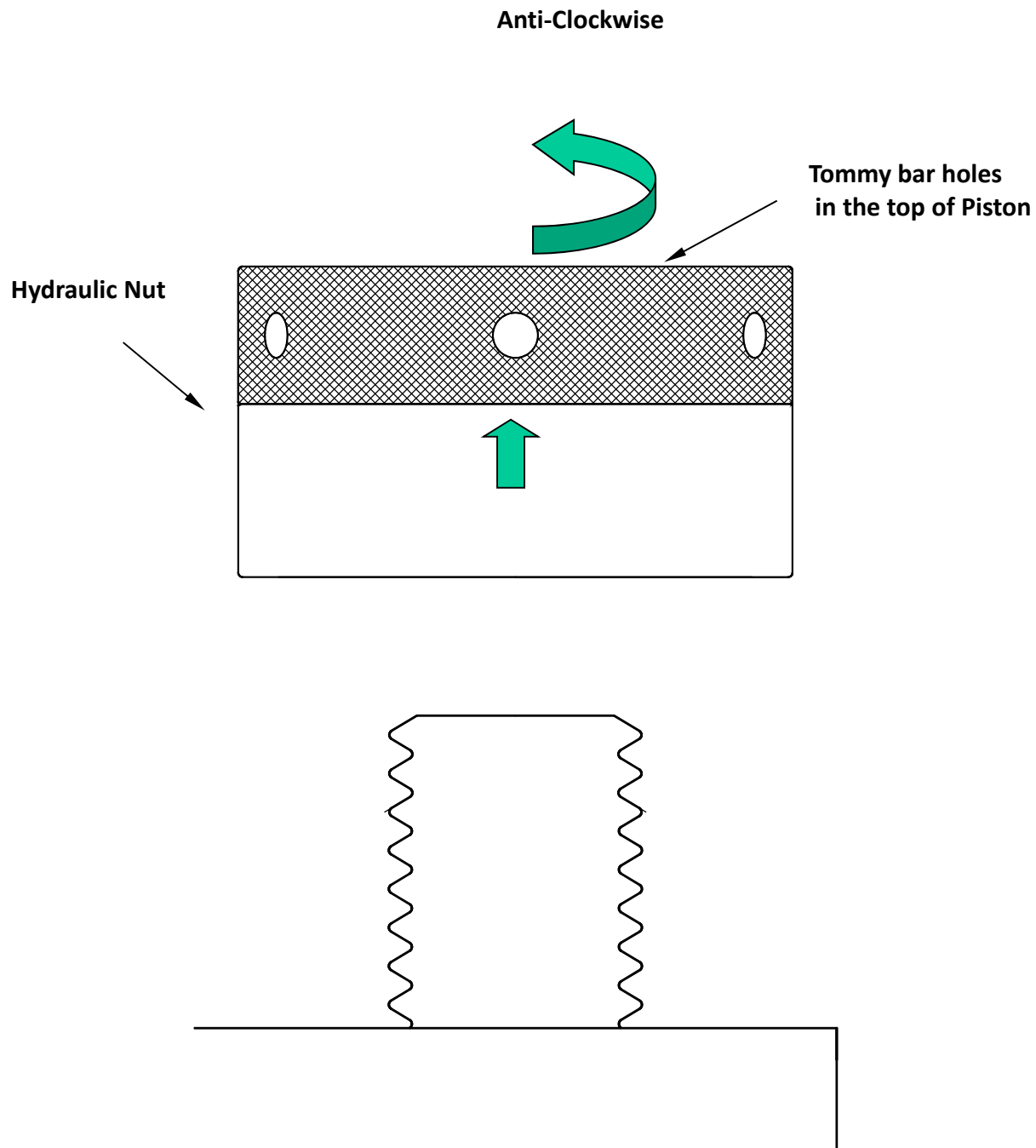
Use a tommy bar to release the nut. Tommy bar holes are provided in the top face of the piston.





## STEP 10 LOOSENING A BOLT

Remove the HYDRAULIC NUT.



## Chapter 4

### OPERATING INSTRUCTIONS

### SIMULTANEOUS BOLT TENSIONING

In flanged applications, TITAN strongly recommends simultaneous tensioning of 100% of the bolts if space allows. If insufficient space is available it is usually possible to simultaneously tighten 50% of the bolts. The time required to complete the bolt tensioning operation will be a minimum when 100% tensioning is used. In a gasket and flange application 50% tensioning will take more than twice the time when compared with 100% tensioning. This is because the gasket is not always fully compressed by tightening only half the bolts. Tightening the second half will cause the gasket to compress further reducing the tension in the first bolts tightened and necessitating a return to the first bolts. If the gasket compresses further a return to the second set of bolts may also be necessary. Even so, this method is far quicker and superior to conventional tightening methods which suffer even more from the gasket compressing as each bolt is tightened.

The method for simultaneous tensioning is similar to tightening one bolt, but requires an additional operation. This involves using flexible hoses to gang the tools and the hydraulic pump together so that oil under pressure will be supplied to all of the tools simultaneously.





# Chapter 5

## MAINTENANCE AND STORAGE INSTRUCTIONS

## **MAINTENANCE AND STORAGE INSTRUCTIONS**

### **Introduction**

A hydraulic nut will provide many years of trouble free service if used, maintained and stored correctly.

### **Storage**

Nuts may be delivered in self colour or chemically blacked before leaving the factory. This later provides a degree of corrosion protection but additional protection should be applied when the nuts are installed or are to be stored for any period of time. It is recommended that, before storage, the nuts should be checked for damage and if OK, lightly oiled or greased.

The nut should be stored with the piston returned to the zero stroke position and the quick connect nipple must have it's plastic protective cap fitted or alternatively the hydraulic connection should be fitted with a blanking plug.

Nuts that have been installed may be coated with grease, oil or painted.

### **Maintenance.**

Very little maintenance is required for a hydraulic nut. The only items which may require changing will be the seals and the quick connect fittings.



## **Important Notes on Seal Operation**

The seals used are self energising. The seals only start to seal when they are subject to oil pressure. This means small volumes of oil are allowed to pass the seal when the piston is being moved without pressure. This happens when the piston is being pushed, unrestrained, out of the nut body and when the piston is being retracted. The small amount of oil which may pass the seals acts as a lubricant.

The seals therefore do not run dry and will always exhibit a small amount of oil around the inner and outer edges of the piston. The presence of oil around the piston is NOT a signal the seals need to be changed. It is normal and to be expected. The oil lubricates the cylinder wall, reduces the force required to return the piston and helps to prevent corrosion.

After extensive use as much as 5 ml of oil may be present around the piston. Simply wipe away any oil when the tools have been used.

The seals will need to be changed only if the nut will not pressurise or a very large volume of oil escapes whilst the oil pressure is being increased, or if the nut will not hold pressure.

## Fitting a Quick Connect Nipple

To fit a quick connect nipple to the hydraulic nut you will need a self sealing quick connect nipple T-1502, a male/male threaded adaptor T-1503 and a suitable spanner. First assemble the quick connect nipple T-1502 onto the  $\frac{1}{4}$ " BSP end of the adaptor T-1503. Hold the across flats of the hexagon part of the adaptor in a vice and tighten the nipple onto the adaptor. Now the assembly can be fitted into the top of the hydraulic nut. Screw the  $\frac{1}{4}$ " BSP male part of the adaptor into the hydraulic connection in the top of the nut and tighten with a spanner.

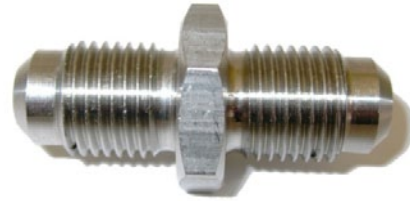
To fit a self sealing blanking plug T1512 use a suitable spanner and screw the plug directly into the port.



Quick Connect Nipple  
T-1502



$\frac{1}{4}$ " BSP to  $\frac{1}{4}$ " BSP Male/male adaptor  
T-1503



$\frac{1}{4}$ " BSP Blanking Plug  
T-1512



Adaptor and Nipple  
assembled





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