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TOP COLLAR HYDRAULIC NUT HNIC6102900D

Operation and Maintenance Instructions



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Safety Notes

High pressure hydraulics should be treated with respect. Please ensure that the following basic rules are followed:

1. ALWAYS WEAR SAFETY GLASSES when working near a pressurised hydraulic system. Your eyesight is important – **PROTECT IT**.
2. Suitable footwear and gloves should be worn when operating this equipment.
3. ALWAYS check the following points before pressurising a hydraulic system:
 - a) Check that the hydraulic harness is fully connected. There should be no loose ends and every male nipple should be connected to its corresponding female coupling.
 - b) Check that each female coupling is securely locked in position on the corresponding nipple by physically pulling the connection.

IT IS DANGEROUS TO PRESSURISE THE BACK OF AN UNCOUPLED QUICK DISCONNECT NIPPLE OR COUPLING. ALL CONNECTIONS MUST BE CONNECTED OR BLANKED OFF BEFORE PRESSURISING.

- c) Check that the bolt material is capable of taking the initial load to be applied. The tools are powerful and are capable of yielding or breaking bolts if tensile/yield properties are not sufficient to support the load applied.
- d) Check that there is sufficient bolt protrusion above the joint face and ensure that when screwed onto the bolt the hydraulic nut mates with the joint face.

Note

Thread engagement should be a minimum of one bolt diameter (see data sheet).

4. NEVER exceed the maximum working pressure specified for the equipment (see data sheet).

Note

The maximum safe working pressure specified for the tool does not necessarily represent the maximum safe load that may be induced in the bolt.

5. NEVER exceed the maximum extension quoted for the equipment (see data sheet).

Note

An indicator will appear when the tool is close to maximum extension.

6. ALWAYS take care when pressurising a system. Always observe the gauge and be ready. Pressure can rise faster than you think.
7. NEVER leave a pressurised system unattended. If you must leave the area release the pressure and ensure that the return to tank valve on the pump unit is fully open.
8. NEVER bend the hydraulic hoses less than six times their own diameter. Do not use kinked hoses.
9. NEVER stand in line with the bolt axis whilst tensioning is in progress.

Note

Personnel must be aware of this point at all times.

10. When working on site the work area should be roped off and all personnel not connected with the site operation should be kept clear of the working area.
11. High pressure hydraulic equipment can be very dangerous if misused. Keep away from oil leakages at high pressure. Liquid escaping from highly pressurised equipment has sufficient power to penetrate the skin, which can cause blood poisoning. In the case of such an accident IMMEDIATE medical attention must be sought.

REMEMBER:

TAKE CARE! HIGH PRESSURE HYDRAULICS ARE PERFECTLY SAFE IF THE BASIC SAFETY RULES ARE FOLLOWED.

PLEASE NOTE:

MODIFICATION TO ANY EQUIPMENT COVERED BY THIS MANUAL SHOULD NOT BE ATTEMPTED BY THE CUSTOMER.

IF MODIFICATIONS ARE REQUIRED TO SUIT A SPECIFIC APPLICATION, CONSULT HYDRATIGHT LTD BEFORE MAKING THEM.

INAPPROPRIATE MODIFICATIONS MADE RENDER THE EQUIPMENT DANGEROUS.

Operation of the Hydraulic Nut

Tightening Procedure for Top Collar Hydraulic Nut

To install the top collar hydraulic nut on to a bolt proceed as follows, refer to drawing HNIC6102900D as necessary.

1. Check that the bolt has been assembled correctly, and that there is sufficient bolt protrusion to engage with the hydraulic nut (see data sheet).
2. Screw the fully assembled hydraulic nut onto the bolt.
3. Use either the two tightening holes provided in the top face of the hydraulic nut insert or the castellation in the top face of the hydraulic nut collar to screw the hydraulic nut down tightly to the joint face. To aid this use either the tommy bar (HNIC6102904E) or spanner (HNIC610290900D) provided with the hydraulic nut.

Note

To check that the insert is fully screwed onto the bolt back off (rotate anticlockwise) the collar ½ (half) a turn and screw the insert down (rotate clockwise) using the holes in the top face, once completed screw the collar down (rotate clockwise) until it makes contact with the body.

4. Check that the hydraulic nut is seated squarely on the joint face, if it is not then this must be investigated and corrected.

Note

Out of squareness will result in uneven loading and higher load losses.

5. Connect the hydraulic harness to the tool(s) and check that each coupling is securely connected to each quick disconnect nipple.

Note

If all the hydraulic nuts in the system are not being tightened simultaneously then a sensible tightening sequence should be used. If in doubt consult Hydratight Limited for advice.

6. Operate the hydraulic pump to pressurise the hydraulic nut(s). Observe the extension and operating pressure constantly during this operation and do not exceed the maximum quoted on the enclosed data sheet.

Note

The extension will appear between the body and collar.

7. When the desired operating pressure is reached stop the pump and whilst holding the pressure constant tighten down (rotate clockwise) the load retaining collar using a tommy bar and tap down with a copper hammer. Check that the collar is properly seated.

Note

Do not exceed the maximum working pressure of the hydraulic nut (refer to data sheet).

8. Release the oil pressure slowly.
9. Remove the hydraulic harness and fit protective caps to the hydraulic connections.

10. If desired remove the quick disconnect nipple and adaptor from the hydraulic nut(s), using suitably sized wrenches 22mm (7/8") and 17mm (11/16") across flats hexagon respectively, and plug the hydraulic port(s) with the blanking plug supplied.

Note

Blanking the hydraulic ports will provide added protection for the quick disconnect nipple. The adaptor and quick disconnect nipple should be kept for future use.

Release Procedure

Proceed as follows to remove top collar hydraulic nuts.

1. If fitted remove the blanking plug and screw in the adaptor and quick disconnect nipple using suitable torque wrenches.

Note

The across flats of the hexagons of the adaptor and quick disconnect nipple are 17mm (11/16") and 22mm (7/8") respectively. To provide an effective seal the torque requirement for the adaptor (1/8" BSP) and quick disconnect nipple (1/4" BSP) is 40-50 Nm or 354-443 lbf.in..

2. Connect the hydraulic harness and check that each coupling is securely connected to the corresponding quick disconnect nipple.
3. Operate the pump unit to pressurise the hydraulic nut(s). As the pressure increases fit the tommy bar (HNIC6102904E) or spanner (HNIC610290900D) to the load retaining collar and continually check to see if the collar can be unscrewed (turned anticlockwise). As soon as the collar can be turned stop the pump and turn the collar back sufficiently to allow tension in the bolt to be released.

Note

Do not exceed the maximum operating pressure and extension of the top collar hydraulic nut.

4. Release the oil pressure slowly.
5. The hydraulic nut assembly should now be free to be unscrewed (turned anticlockwise) from the bolt. If the collar is still screwed down onto the body and the hydraulic nut cannot be unscrewed then it is likely that the collar was not screwed back far enough in operation 3, in this case repeat operations 3 to 5.

Note

If it is still not possible to remove the hydraulic nut from the bolt contact Hydratight Limited for advice

Trouble Shooting Guide

Problem/Symptom	Probable Cause	Corrective Action
Oil is leaking from the hydraulic connection.	The connection is not seating properly.	Tighten the connection. Where applicable replace connection components (see general arrangement drawing).
Oil is leaking from the hydraulic nut body.	Seal failure.	Change the seals.
When detensioning the bolt the tool becomes locked onto the bolt.	Thread damage or corrosion of the bolt above the hydraulic nut.	Turn the hydraulic nut down and clean up the threads above the hydraulic nut.
When detensioning the bolt the tool becomes locked onto the bolt.	On an application that has been tensioned simultaneously and nuts are being removed individually the last few nuts may lock on.	Refit several hydraulic nuts around the joint and pressurise until the locked hydraulic nut becomes loose.
The pump is not building pressure with oil return to tank valve closed.	<ol style="list-style-type: none"> 1. Oil return to tank valve may be defective. 2. Check valve may be sticking inside the pump head. 	<ol style="list-style-type: none"> 1. Replace the return to tank valve. 2. Tap the pump head lightly with a hide hammer. If this fails the pump must be stripped down.
The hydraulic nut collar is not turning when the system is under pressure.	The hydraulic hose is not connected properly to the tool.	Release the pressure and check the hose connection.
The hydraulic nut body will not retract.	<ol style="list-style-type: none"> 1. Oil return to tank valve is not open. 2. One of the connections is not connected properly. 	<ol style="list-style-type: none"> 1. Ensure that the oil return to tank valve is fully open. 2. Check that the hydraulic connections are secure.

Maintenance Instructions

The tool is of rugged construction and utilises reliable seals. The only maintenance that may be occasionally required is the replacement of seals or repair of a hydraulic fitting.

It is strongly recommended that in the event of seal failure these hydraulic nuts are returned to Hydratight Limited for seal replacement, if this is not possible then the enclosed procedure should be followed.

Precautions to Replace Hydraulic Seals

The following precautions must be taken with the assembly of the hydraulic seals:

1. Avoid sharp edges (cover threaded areas).
2. Remove all dust, dirt, swarf and foreign particles.
3. Do not use sharp edged tools.
4. Lubricate all components before assembly.

Hydraulic Seals Component Parts

The seal kit comprises an inner seal and outer seal complete with o-rings.

Hydraulic Seals - Disassembly of Hydraulic Nut

Throughout the following instructions refer to drawing HNIC6102900D.

1. Remove the quick disconnect nipple and adaptor using appropriate sized wrenches or spanners.

Note

The across flats of the hexagons of the quick disconnect nipple and adaptor are 22mm (7/8") and 17mm (11/16") respectively.

2. Unscrew (rotate anticlockwise) the collar and remove it from the insert.
3. Protect the threads of the collar and insert at all times.
4. Using a small bench press remove the insert from the body.
5. Remove the seals and o-rings from the body and insert.

Note

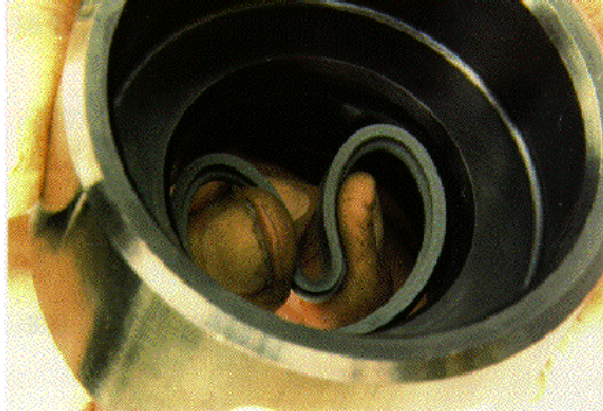
It may be necessary to use a flat bladed tool, such as a screwdriver to remove the o-rings from the seal grooves.

Seal Assembly

Pictures enclosed are for guidance only and may not be of the actual component parts.

1. Place the nut body on a clean flat surface with the large bore facing upwards.
2. Place the inner seal o-ring into the seal groove.

3. Insert the inner seal into the nut body as indicated in the following picture, ensuring that the chamfer on the seal is adjacent to the seal groove chamfer, and fold the seal out on top of the o-ring removing any kinks in the seal.



4. Place the insert on a clean flat surface with the small end facing upwards.
5. Simply stretch the outer o-ring over the boss of the insert into the groove.

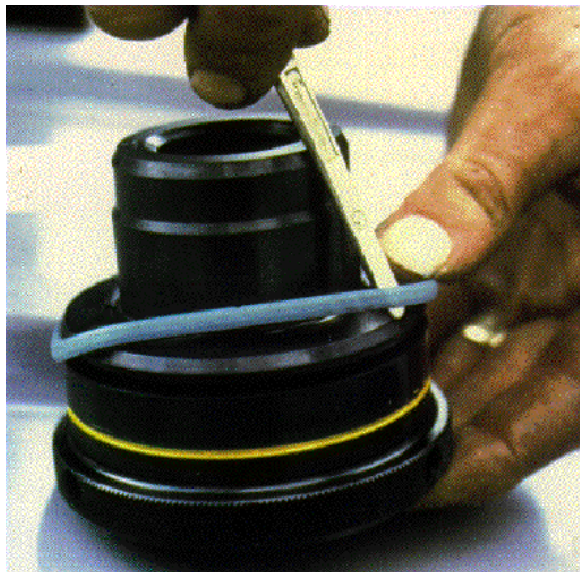
Note

If necessary use a flat bladed tool such as a screwdriver.

6. Locate part of the outer seal in the seal groove and work around the outside diameter stretching it over the boss, as shown below, until it completely slips into the groove.

Note

If the seal is chamfered on both faces it may be inserted either way round, however if only chamfered on one face the chamfer should be adjacent to the insert seal groove chamfer.



Hydraulic Seals - Reassembly of Hydraulic Head

1. Ensure that all surfaces of the body and insert are free from dirt and other foreign particles.

2. Lubricate all inner faces concentrating on the seals and seal contact faces, preferably using hydraulic oil.
3. Position the insert assembly into the body assembly, ensuring that squareness between the components is maintained, apply pressure until the insert assembly is fully engaged with the body assembly.

Note

It may be possible to press the two assemblies together by hand but if necessary use a small bench press.

4. Remove the insert and collar thread protection applied earlier.
5. Screw (rotate clockwise) the collar back onto the insert until it mates with the body.
6. Screw the hydraulic connection adaptor and quick disconnect nipple back into the hydraulic port in the top of the insert using appropriate torque wrenches (see disassembly for sizes).

Note

To provide an effective seal the torque requirement for the adaptor (1/8" BSP) and quick disconnect nipple (1/4" BSP) is 40-50 Nm or 354-443 lbf.in..

Hydraulic Fittings

Hydraulic connections are of the following types:

1. Hydraulic head assembly – the connection in the tool is 1/8" BSP female thread. If there is a slight leak it can usually be solved by applying the correct torque of 40-50 Nm or 354-443 lbf.in.
2. Hose – the hose end connection is a 1/4" BSP female swivel with male cone. A seal is effected by screwing down on to the mating adaptor with sufficient pressure. Any problems are usually minimal and normally solved by ensuring that the correct torque of 40-50 Nm or 354-443 lbf.in is applied.

Note

If the problem persists then the threads should be checked and repaired if possible. If the threads cannot be repaired the component part(s) will need replacing. In the event of any further problems please consult with Hydratight Limited for advice.

Storage of Equipment

Hydraulic Nut

1. Store tools fully retracted.
2. The finish will protect the tools from rust etc but for added protection a light coating of oil or rust inhibitor should be applied to all plated surfaces.
3. Cover the internal threads on the inside of the collar and adjusting collars with a rust inhibitor.
4. Store tools upright.
5. Keep dust caps on the oil inlet nipples.

Hydraulic Harness and Hoses

1. Wipe all hoses clean and apply a light coating of oil or suitable rust inhibitor to all nipples, couplings and tee blocks.
2. Always keep dust caps fitted to nipples and couplings.

Air/Hand Driven Pump

1. Always store the pump upright.
2. Apply a light oil coating or suitable rust inhibitor to all exposed unplated metal items.
3. Leave the oil return to tank valve in the open position.
4. Leave the air control valve in the open position (air pump only).
5. Always keep dust caps on inlet and outlet hydraulic fittings.

Technical Data Sheet

CUSTOMER:	Tennessee Gas Pipeline	
TOOL SIZE:	1.1/2"-12 UNF	
TENSIONER ITEM No.	HNIC6102900D	
TENSIONER O.D.	75 mm	2.95 in
SEAL O.D.	67 mm	2.64 in
SEAL I.D.	44 mm	1.73 in
HYDRAULIC AREA:	2005 mm²	3.11 in²
MAX OPERATING PRESSURE:	1500 bar	21750 psi
MAX INITIAL LOAD:	301 kN	67598 lbf
MAX STROKE:	6 mm	0.24 in
MINIUM STUD PROTRUSION ABOVE JOINT FACE	57 mm	2.24 in

CALCULATION OF REQUIRED OPERATING PRESSURE

$$\text{Operating Pressure} = \frac{\text{Initial load}}{\text{Hydraulic Area}}$$

$$\text{Initial load} = \text{Residual Load} \times \text{Load loss Factor}$$

Note: The Load Loss Factor is based on a theoretical approximation of the amount of load lost when the pressure in the hydraulic head is released, and the load is transferred to the permanent nut. The main variable which affects the load loss factor is the grip length of the application.

IF IN DOUBT CONSULT HYDRATIGHT FOR FURTHER INFORMATION

Pressure Load Graph

HNIC6102900D

1.1/2"-12 UNF

