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TOP COLLAR HYDRAULIC NUT HNTC6135300C

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 HNTC6135300C 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 the two tightening holes provided in the top face of the hydraulic nut ram to screw the hydraulic nut down tightly to the joint face.

Note

To check that the ram is fully screwed onto the bolt back off (rotate anticlockwise) the collar $\frac{1}{2}$ (half) a turn and proceed as above, 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 the coupling is securely connected to the 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. Ensure that the last hydraulic nut in the hydraulic circuit is fitted with a blanking plug in one hydraulic port. To remove the quick disconnect nipple and adaptor use suitably sized wrenches 22mm (7/8") and 17mm across flats hexagon respectively.

Note

A male hexagonal key 3/16" across flats will be required to screw the blanking plug into the hydraulic port. To provide an effective seal the torque requirement for the blanking plug (1/8" BSP) is 40-50 Nm or 354-443 lbf.in.

7. 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.

8. 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).

9. Release the oil pressure slowly.
10. Remove the hydraulic harness and fit protective caps to the hydraulic connections.
11. If desired remove the quick disconnect nipple(s) and adaptor(s) from the hydraulic nut(s), using suitably sized wrenches 22mm (7/8") and 17mm across flats hexagon respectively, and plug the hydraulic port(s) with the blanking plug(s) supplied.

Note

A male hexagonal key 3/16" across flats will be required to screw the blanking plug(s) into the hydraulic port(s). 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(s) and screw in the adaptor(s) and quick disconnect nipple(s) using suitable torque wrenches. Ensure that the last hydraulic nut in the hydraulic circuit is fitted with a blanking plug in one hydraulic port (see operation 6 in Tightening Procedure).

Note

The across flats of the hexagons of the adaptor and quick disconnect nipple are 17mm 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 a tommy bar to the load retaining collar(s) and continually check to see if the collar(s) can be unscrewed (turned anticlockwise). As soon as the collar(s) can be turned stop the pump and turn the collar(s) 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 4, in this case repeat operations 4 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 and outer seal, both of which are comprised of two parts; the main seal is a red polyurethane elastomer and is very flexible and an anti-extrusion ring which is manufactured from a harder material. Care must be taken to ensure that the anti-extrusion ring is not damaged or kinked before or during assembly.

Hydraulic Seals - Disassembly of Hydraulic Nut

Throughout the following instructions refer to drawing HNTC6135300C.

1. Unscrew (rotate anticlockwise) the collar by one turn.
2. 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 respectively.

3. Whilst holding the hydraulic nut body vertically in a vice insert a flat bladed tool such as a screwdriver between the collar and body and gently lever the collar and ram assembly out of the body until the outer seal is visible.

Note

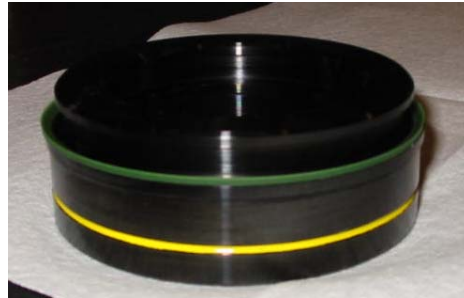
During this process take care not to damage the threads on the ram and wind the collar down when the gap is too large.

4. Whilst holding the collar and ram assembly continue operation 3 until the assembly is free from the body.
5. Remove the seals from the ram, if necessary use a flat bladed tool such as a screwdriver.

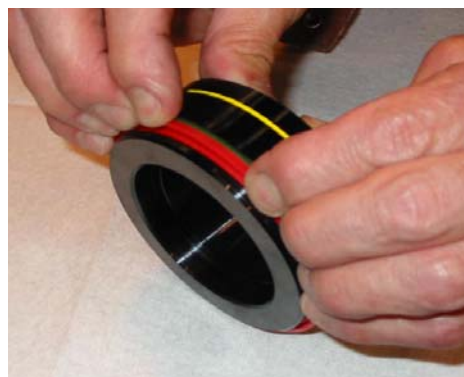
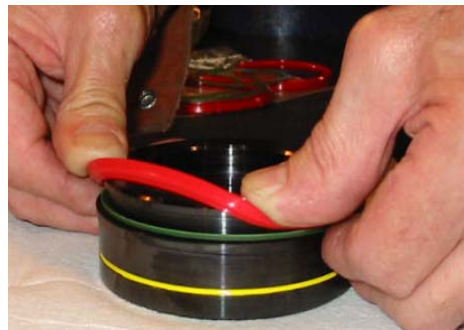
Outer Seal Assembly

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

1. Place the hydraulic nut ram assembly on a clean flat surface with the seal grooves facing upwards.
2. Place the anti-extrusion ring into the rearmost position of the seal groove ensuring it is the correct way round to mate with the seal.



3. Gently stretch the main seal over the retaining lip of the ram applying gentle finger pressure to ensure the main seal seats fully and correctly into its groove with the anti-extrusion ring seated in place behind it.



Inner Seal Assembly

1. Insert and direct the anti-extrusion ring at a slight angle to the seal groove, leaving it behind the seal groove. Starting from one side using gentle finger pressure push and seat the seal into position.



2. Pull the anti-extrusion ring gently forward, finger pressure. Ensure it is seated fully and correctly into the seal groove behind the seal. It should sit flush with the seal and ram inner diameter.



Hydraulic Seals - Reassembly of Hydraulic Head

1. Remove (rotate anticlockwise) the collar from the ram and place on a clean flat surface.
2. Ensure that all surfaces of the body and ram are free from dirt and other foreign particles.
3. Lubricate all inner faces concentrating on the seals and seal contact faces, preferably using hydraulic oil.
4. Position the ram assembly into the body ensuring that squareness between the components is maintained, apply pressure until the ram 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.

5. Screw (rotate clockwise) the collar back onto the ram 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 ram using appropriate torque wrenches (see disassembly for sizes).

Note

To provide an effective seal the minimum 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 nut assembly – the connection in the tool is coned with 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:	Danieli	
TOOL SIZE:	M72 x 6	
TENSIONER ITEM No.	HNTC6135300C	
TENSIONER O.D.	164 mm	6.46 in
SEAL O.D.	136 mm	5.35 in
SEAL I.D.	93 mm	3.66 in
HYDRAULIC AREA:	7734 mm²	11.99 in²
MAX OPERATING PRESSURE:	1379 bar	20000 psi
MAX INITIAL LOAD:	1067 kN	107.0 tons
MAX STROKE:	20 mm	0.79 in
MIN STUD PROTRUSION	114 mm	4.49 in

CALCULATION OF REQUIRED OPERATING PRESSURE

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

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

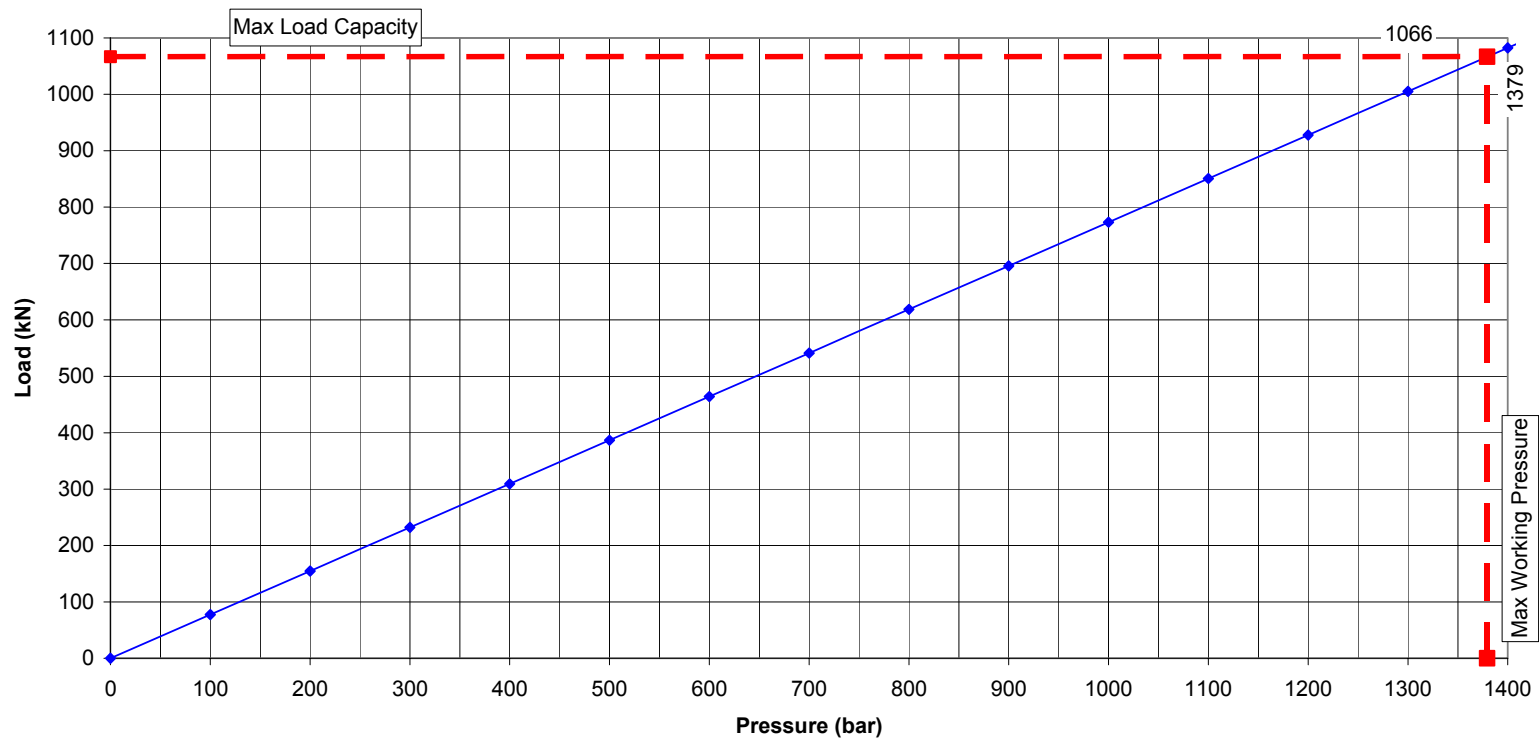
Note: The Load Loss Factor is based on a theoretical approximation of the amount of load lost when the pressure in the hydraulic head is released, and the load is transferred to the permanent nut. The main variable which affects the load loss factor is the grip length of the application.

IF IN DOUBT CONSULT HYDRATIGHT LTD FOR FURTHER INFORMATION

Pressure Load Graph

HNTC6135300C

M72 x 6



AMENDMENT RECORD FOR THIS DOCUMENT IS SHOWN BELOW:

Rev	Comments	ECN No.	Date	By
1	Original Issue		12-Oct-2005	MH
2	References to Hydratight Sweeney now read Hydratight.		26-Feb-2007	MH