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HYDRAULIC NUT SPLITTER

Operation and Maintenance Instructions



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Doc: T-ENG-0026	Rev: AC	DATE: February 2004	
Authorised by: P Holland			
Issued by: M Heaviside		PAGE: 2 of 12	

1. Introduction

IT IS IMPORTANT TO APPRECIATE THAT THESE TOOLS GENERATE VERY HIGH FORCES AND TO REALISE THAT THEY CONTAIN COMPONENTS WHICH ARE HIGHLY STRESSED UNDER NORMAL WORKING CONDITIONS, THEY MUST THEREFORE BE OPERATED CORRECTLY TO AVOID POSSIBLE DAMAGE OR INJURY CAUSED THROUGH MISUSE.

- 1.1 All nutsplitters are fitted with a single acting, spring return, hydraulic cylinder that requires only one hose to be connected to the pump unit. There are just four cylinder sizes (Ref's A, B, C & D) covering the full range of seventeen nutsplitter heads, as shown colour coded on the "Hydratight Nutsplitter" data sheet.
- 1.2 The optimum operating pressure is variable according to the size of nutsplitter being used. This optimum pressure is stated on the nutsplitter head and should not normally be exceeded, thus prolonging the life of the tool.
- 1.3 All hydraulic cylinders are rated at 20000 psi (1380 bar) maximum working pressure, and are fitted with a pressure relief valve set at approximately 20500 psi.
- 1.4 The nutsplitter may be operated by our hand operated or air driven pump units.
- 1.5 **BEFORE COMMENCING ANY NUTSPLITTING PROCEDURES, THE OPERATOR SHOULD READ AND FAMILIARISE THEMSELVES WITH THESE INSTRUCTIONS, AND IN PARTICULAR THE "GENERAL SAFETY NOTES".**
- 1.6 Different nut materials may require different cutting wedges which should be selected as per Section 4.
- 1.7 Users should understand that these tools can sometimes generate sparks during the splitting action with attendant risks in volatile or explosive atmospheres.

In the event of difficulty please contact Hydratight Limited

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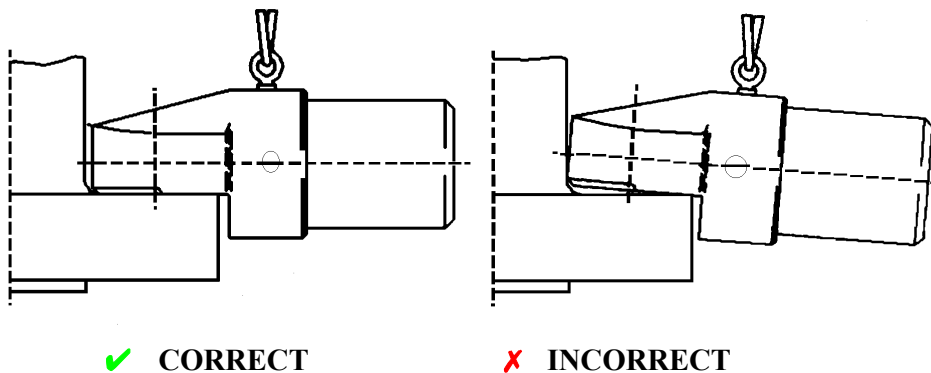
2. General Safety Notes

- 2.1 Safety glasses must be worn at all times. It is recommended that ear protection is worn during nut splitting operation.
- 2.2 Hydratight nutsplitters and hoses are fitted with quick connect/disconnect self-sealing couplings. Always ensure that couplings are properly connected before pressurisation. Never allow disconnected couplings within the system to become pressurised.
- 2.3 It is recommended that all sizes of nutsplitter be supported by some means during the splitting operation. The provision of a handle on the Nos. 5 to 9, and a multi-position lifting eye on the Nos. 10 to 17, provide an adequate means to do this (see sketch below). The nos. 1 to 4 nutsplitters have been designed to be hand held during normal operation.

UNDER NO CIRCUMSTANCES SHOULD THE MAXIMUM DESIGN PRESSURE OF 20000 PSI BE EXCEEDED.

- 2.4 The bottom face of the nutsplitter must be in full contact with the surface on which the nut is sitting, as shown in the sketch below. If not then a smaller size nutsplitter must be selected, if at all possible.
- 2.5 During the operation of this tool it is recommended, as with all hydraulic cylinders, that the operator does not position himself directly in front of, or behind, the cylinder.

Should you require any assistance with either Nutsplitter or Wedge selection please contact the Hydratight office.



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3. Operating Instructions

- 3.1 Select the correct size nutsplitter for the application.
- 3.2 Ensure that the correct style of cutting wedge is being used for the application. (See selection chart).
- 3.3 It is recommended that some form of grease lubrication be used on the cutting wedge and/or the face of the nut to be split.
- 3.4 Position the nutsplitter *centrally* over the nut to be removed.
- 3.5 Connect the nutsplitter to the pump unit using the link pipe.
- 3.6 **Using Hand Pump Unit.**
 - 3.6.1 Close the valve on the pump and operate the handle, increasing pressure until the nut is split. Refer to the optimum operating pressure stated on the nutsplitter head.

**UNDER NO CIRCUMSTANCES EXCEED THE MAXIMUM DESIGN PRESSURE
OF 20000 PSI.**

- 3.6.2 Open the pump valve and thus release any remaining pressure. The cutting wedge will automatically retract via the spring return mechanism.
 - 3.6.3 If the nut is not free of the bolt a second cut may be made at 120 deg to the first.

3.7 **Using Air Driven Pump Unit.**

Reference should also be made to the operating instructions supplied with the pump unit.

- 3.7.1 Close the “RETURN TO TANK VALVE” and operate the pump, slowly increasing pressure until the nut is split. Refer to the optimum operating pressure stated on the nutsplitter head.

**UNDER NO CIRCUMSTANCES EXCEED THE MAXIMUM DESIGN PRESSURE
OF 20,000 PSI.**

- 3.7.2 Open the “RETURN TO TANK” valve thus releasing any remaining pressure. The cutting wedge will automatically retract via the spring return mechanism.
- 3.7.3 If the nut is not free of the bolt a second cut may be made at 120 deg to the first.

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4. Maintenance

4.1 Changing the Cutting Wedge

4.1.1 The Cutting Wedge is triangular in section and has three cutting edges. It is retained in the wedge holder by 1 or 2 spring-loaded plungers. Should the cutting edge become chipped or blunted it can readily be pushed out and rotated or replaced as necessary.

4.1.2 It is important to use the correct wedge holder according to nut size, since the holder controls the depth of cut. Failure to do this may result in damage to the bolt.

4.2 Cutter Selection

4.2.1 *Style '3T'* - General purpose cutting wedge, suitable for carbon steel nuts manufactured to ASTM A194 specification. Incorporates three cutting edges.

4.2.2 *Style '1T'* - Special purpose cutting wedge, suitable for stainless steel nuts manufactured to ASTM A193 specification. Also suitable for 'softer' carbon steel nuts which may be difficult to split using the '3T' style wedge. Incorporates one cutting edge.

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5. Changing Cylinder Seal Kits

NOTE:

CHANGING THE HYDRAULIC SEALS IS A STRAIGHT FORWARD OPERATION AND SHOULD BE WITHIN THE SCOPE OF THE AVERAGE FITTER OR TECHNICIAN WITH EXPERIENCE OF HYDRAULIC OR PNEUMATIC CYLINDERS.

Refer to the general arrangement drawing as supplied with this manual.

5.1 Procedure for Nos. 1 to 4 nutsplitters

- 5.1.1 Remove the Guide Screw (Item 2) from the Head Assembly.
- 5.1.2 Unscrew the Head from the Hydraulic Cylinder.
- 5.1.3 Drive out the Retaining Pin (Item 5) and remove the Wedge Holder (Item 9).
- 5.1.4 Unscrew the Preload Ring (Item 13) from the Cylinder, using an adjustable pin spanner or similar. The Dry Bearing (Item 12), retained by an inner shoulder on the Pre-Load Ring should be inspected for damage and / or excessive wear and replaced if necessary when re-assembly takes place.

Note! The Dry Bearing is intentionally split axially along its length.

- 5.1.5 Remove the Disc Springs from inside the Cylinder body, and make a note of the order of assembly.
- 5.1.6 In order to withdraw the Piston (Item 15) from the Cylinder Body, air must be allowed to enter the piston chamber. You must therefore either: -
 - (a) Fit an open ended coupling to the nipple (Item 22)

Or

 - (b) Remove the nipple fitting (Item 22).
- 5.1.7 Remove and discard the Seal (Item 17), the O-Ring (Item 17) and the Bearing Strip (Item 16). Replace items 16 and 17, with a new Seal Kit.
- 5.1.8 Re-assemble the Cylinder in reverse order to the above.

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5.1.9 Once the Cylinder has been re-assembled it is advisable to pressure test it to check for leaks and spring return function prior to fitting the Head Assembly.

5.2 Procedure for Nos. 5 to 17 Nutsplitters

5.2.1 Remove the Wedge Holder (Item 9) from the Head Assembly.

5.2.2 Slacken off the Spacer Block Screw (Item 10).

5.2.3 Remove the Guide Screw (Item 2) from the Head Assembly.

5.2.4 Unscrew the Head from the Cylinder Assembly.

5.2.5 Remove the Spacer Block (Item 11).

5.2.6 Unscrew the Pre-Load Ring (Item 13) from the Cylinder, using an adjustable pin spanner or similar. The Dry Bearing (Item 12), retained by an inner shoulder on the Pre-Load Ring should be inspected for damage and / or excessive wear and replaced if necessary when re-assembly takes place.

Note! The Dry Bearing is intentionally split axially along its' length.

5.2.7 Remove the Disc Springs from inside the Cylinder Body, and make a note of the order of assembly.

5.2.8 In order to withdraw the Piston (Item 15) from the Cylinder Body, air must be allowed to enter the piston chamber. You must therefore either: -

(a) Fit an open ended coupling to the nipple (Item 22)

Or

(b) Remove the nipple fitting (Item 22).

5.2.9 Remove and discard the Seal (Item 17), the O-Ring (Item 17) and the Bearing Strip (Item 16). Replace Items 16 and 17 with a new Seal Kit.

5.2.10 Re-assemble the Cylinder in reverse order to the above.

5.2.11 Once the Cylinder has been re-assembled it is advisable to pressure test it to check for leaks and spring return function prior to fitting the Head Assembly.

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6. Ordering Spare Parts

When ordering the minimum service spares pack please specify the Name and Part Number of the component required as noted on the G.A. drawing(s) supplied, and the Nutsplitter Model Number, e.g. HT NS 6.

6.1 Recommended Minimum Service Spares

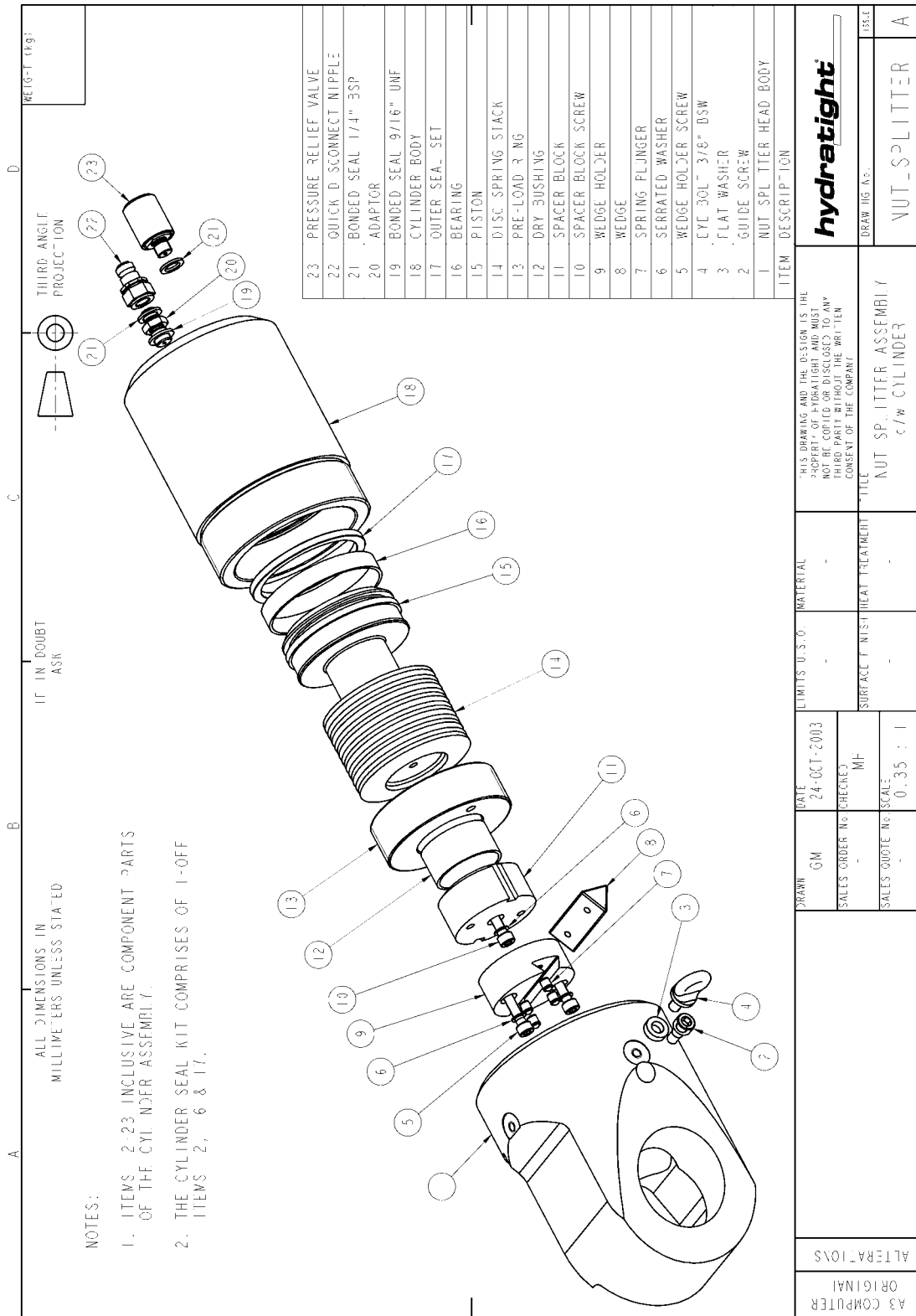
Item	Qty	Item Number	Description
1	1	NSCXSK000000	Seal Kit Comprising:
			1 off Dry Bearing
			1 off Bearing Strip
			1 off OD Seal
			1 off 'O' Ring
	1	QDCJN1161500	Male Coupling
	1	ADMMBFDX1500DL	Adaptor
	2	SLBDBXXX1540	Bonded Seal (1/4")
	1	SLBDDXXX1560	Bonded Seal (9/16")

Seal Kit Part Number	To Suit Cylinder
NSCASK000000	Cylinder A
NSCBSK000000	Cylinder B
NSCCSK000000	Cylinder C
NSCDSK000000	Cylinder D

6.2 Recommended Optional Spares

Cutting Wedge Part Number	To Suit Head
NSXXWE01-04	Head Numbers 1 to 4
NSXXWE05-09	Head Numbers 5 to 9
NSXXWM10-14	Head Numbers 10 to 14
NSXXWM15-17	Head Numbers 15 to 17

Cutting Wedge Holder Part Number	To Suit Head
NSXXWH01-02X	Head Numbers 1 and 2
NSXXWH03-04X	Head Numbers 3 and 4
NSXXWH05-07X	Head Numbers 5, 6 and 7
NSXXWH08-09X	Head Numbers 8 and 9
NSXXWH10-11X	Head Numbers 10 and 11
NSXXWH12-14X	Head Numbers 12, 13 and 14
NSXXWH15-17X	Head Numbers 15, 16 and 17



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Nut Splitter Parts Lists:

HEAD ASSEMBLIES		
ITEM	DESCRIPTION	ITEM NUMBER
1	Nut Splitter Head Body	NS**HB000000
2	Guide Screw (05 – 09)	NSXXGS**-**X
3	Flat Washer (10 – 14)	BFLW02001106
	Flat Washer (15 to 17)	BFLW02901708
4	Eye Bolt (10 – 14)	BEYECT0375W
	Eye Bolt (15 – 17)	BEYECTM16
5	Wedge Holder Screw	NSXXWS**-**X
6	Serrated Washer (05 – 09)	NSXXSWM06XXX
	Serrated Washer (05 – 09)	NSXXSWM08XXX
	Serrated Washer (15 – 17)	NSXXSWM10XXX
7	Spring Plunger	NSSPP0000000
8	Wedges (01 - 9)	NSXXWE**-**X
	Wedges (10 - 17)	NSXXWM**-**X
9	Wedge Holder	NSXXWH**-**X
10	Spacer Block Screw (05 - 17)	NSXXSS**-**X
	Roll Pin (01 - 04)	NSXXRP01-04
11	Spacer Block (05 - 17)	NSXXSB**-**B
	Wedge Retaining Screw (01 - 04)	NSXXWR01-04
Not Shown	Handle (05 - 09)	NS**BH000000
	Handle Screw (05 - 09)	NSXXHS05-09X

** Denotes Head Number 01, 02 etc. In some cases this will be **-** (01 - 09)

CYLINDER ASSEMBLIES		
ITEM	DESCRIPTION	ITEM NUMBER
12	Dry Bushing (Sizes A, C & D)	NSC*DB000000
	Dry Bushing (Size B only)	WMTM000SHRFB
13	Pre-Load Ring	NSC*PR000000
14	Disc Spring Stack (A-15, B to D-11)	NSC*DS000000
15	Piston	NSC*RM000000
16	Bearing Strip (A-170mm & B-225mm)	SLYDS57168-47
	Bearing Strip (C-335mm & D-410mm)	NSXXBS000000
17	Outer Seal Set	---
18	Cylinder Body	NSC*BY000000
19	Bonded Seal 9/16"	SLBDDXXX1560
20	Adaptor	ADMMBFDX1500DL
21	Bonded Seal 1/4"	SLBDBXXX1540
22	Quick Disconnect Nipple	QDCJN1161500
23	Pressure Relief Valve	VVPRCAP20000
24	Cylinder Seal Kit 12, 16, 17	NSC*SK000000
* Denotes Cylinder Size A, B, C or D		

Amendment Record for this document:

Issue 'AC' Updated to Hydratight 20-Jun-2006 MH

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