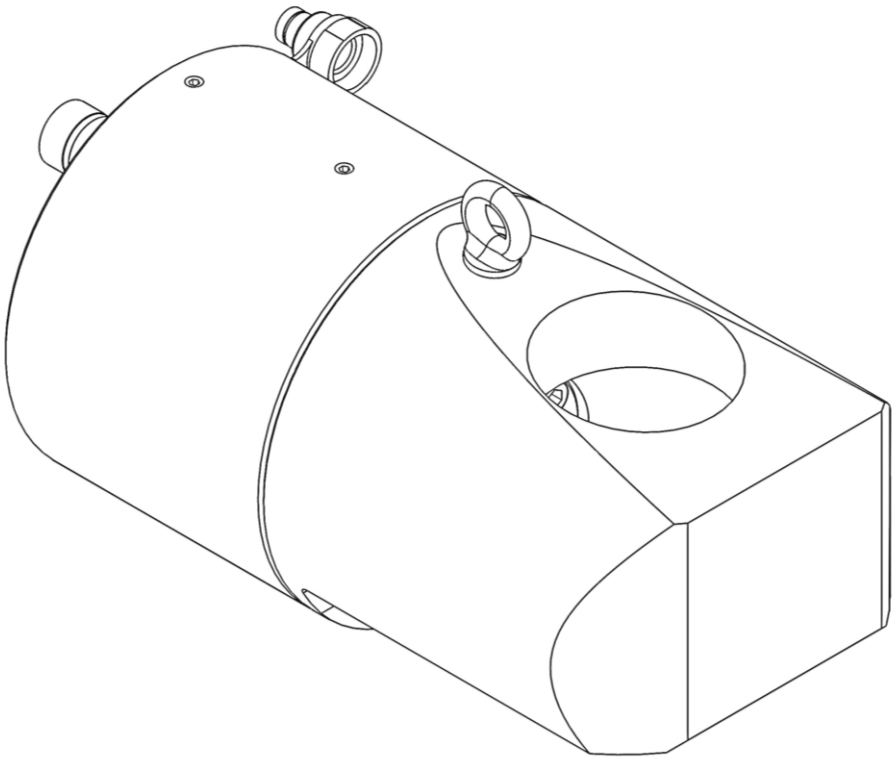
Operating Instruction Manual: OM-DNS-01	Serial Numbers: From: BV 3654

This ‘Original instructions’ document assumes that the operator carrying out any operation with this product is trained and competent to do so. This manual does not attempt to cover all details or variations in the equipment. Nor does this manual claim to provide for every possible contingency met in connection with the installation, operation, or maintenance thereof. Should further information be desired, or should a particular problem arise which is not covered in sufficient detail, the matter should be referred to Hi-Force.

OPERATING INSTRUCTION MANUAL

DNS SERIES | DOUBLE ACTING NUT SPLITTERS



This manual applies to the Hi-Force DNS double acting nut splitter. It contains the latest product information available at the time of publication and approval. Information pertaining to the servicing of the nut splitter is contained in the servicing instructions which are available on the Hi-Force website. The right is reserved to make changes at any time without notice.

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NOTE: Images contained within this document are for illustrative purposes **ONLY**.

1.0 Inspection upon Receipt

Upon receipt of the product, visually inspect the item for any evidence of shipping damage. Please note: the warranty does not cover shipping damage. Notify the courier immediately if shipping damage is found and refrain from putting the product into service. The carrier is responsible for repair and replacement costs resulting from damage that occurred in transit.

2.0 Safety Precautions

2.1 Introduction

Read and follow all the instructions and safety warnings carefully before handling, installation, or use of any hydraulic equipment. Failure to do so could lead to equipment damage, equipment failure, personal injury or even death. Hi-Force will not be held responsible for any damage to the equipment, injury or death resulting from the unsafe use of, lack of maintenance to, or incorrect operation of the product. If in doubt on the correct use of any Hi-Force equipment, contact your nearest Hi-Force office or distributor. Only qualified personnel should be allowed to operate hydraulic equipment. If an operator has not been trained on high-pressure hydraulic equipment and its safe usage, consult your local Hi-Force sales office or distributor who can offer training courses for operators.

2.2 Work Area Safety

- Keep work areas clean and well lit. cluttered spaces and inadequate lighting can result in unnecessary accidents.
- Keep bystanders clear of any hydraulic tool activity. Personnel working in close-range should be made aware of all high-pressure work before commencing.

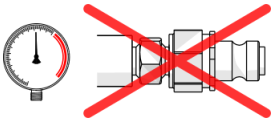
2.3 General Hydraulic System Safety Precautions

⚠ WARNING! Failure to observe and obey the following safety precautions could result in property damage, significant personal injury, or death.

- When operating any hydraulic equipment, all operators should ensure that all necessary personal protective equipment (PPE) is worn, as specified by their employer. Steel toe-cap safety shoes, safety glasses / visor, ear protection, and protective gloves should be always worn. All relevant risk assessments should be completed before the use of the equipment.
- Keep hydraulic equipment away from open flames and direct heat.
- **NEVER** use a coupler as a tool handle, especially if the system is pressurised.
- Inspect hoses regularly for damage and wear.
- **NEVER** use hoses that are frayed, kinked, braided or leaking.
- **NEVER** handle a pressurised hydraulic hose. Hydraulic fluid escaping under pressure from a ruptured hose can penetrate the skin and lead to a significant medical emergency, and in some cases, death. Should this incident occur, seek out medical attention immediately.
- Seek medical attention immediately if a hydraulic injection injury (no matter how minor) occurs.
- The system operating pressure MUST NOT exceed the pressure rating of the lowest-rated component in the system.

Good Practice: Use a pressure gauge to monitor the entire system.

- Only use hydraulic tools / cylinders in a complete and tested, coupled system. **NEVER** attempt to use a tool / cylinder that is not correctly coupled to its operational pump.

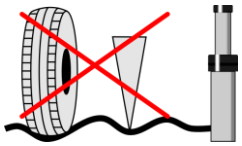


NEVER pressurise an unconnected male coupler/s.

- **NEVER** attempt to disconnect a hose from a hydraulic system until the system's pressure has been completely released. Doing so can result in that pressure becoming trapped within the system and relieving trapped pressure can be dangerous.
- **NEVER** try to relieve trapped hydraulic pressure in the system by loosening or attempting to remove the coupler. Trapped hydraulic pressure can cause a loosened coupler to dislodge unexpectedly with great force. This action could result in serious personal injury or death.
- Loosening a coupler under pressure can result in the escape of hydraulic oil at high pressure, which can penetrate the skin and cause significant injury or death.
- **NEVER** use a hammer and punch to unseat a coupler check valve that is under pressure. Doing so could result in the sudden, uncontrolled release of hydraulic oil at high pressure, which could cause significant injury or death.
- **NEVER** attempt to solve, or clean-up leaks in the system while the system is pressurised.
- Immediately replace any worn or damaged parts using genuine Hi-Force parts only.
- **DO NOT** use any hydraulic equipment if you are under the influence of alcohol, drugs or medication. Lack of attention whilst operating high-pressure hydraulic tools can result in personal injury or death.

⚠ CAUTION! Failure to observe and obey the following safety precautions could result in property damage, equipment damage or minor / moderate personal injury.

- **NEVER** lift, carry, or move any hydraulic components by the hose or hoses connected to them.
- Avoid damaging hydraulic hoses. **ALWAYS** route hoses to ensure that they are free from sharp bends and kinks. Using a sharply bent or kinked hose will result in severe back-pressure, which can lead to hose failure.
- **NEVER** use a coupler/s to lift, carry or position a tool.
- Servicing of hydraulic equipment must only be undertaken by a qualified technician.



- **DO NOT** drop or place heavy objects on a hydraulic hose, as this may cause internal damage, which could result in rupture of the pressurised hose. A ruptured hose could cause significant damage to components and possible severe injury to personal operating nearby.
- **DO NOT** let familiarity gained with any hydraulic tools allow you to become complacent. Complacency with any tooling can result in a lack of discipline toward working guidelines and safety principles.
- **DO NOT** remove any labels from the product. Replace any damaged or unreadable labels immediately.
- Avoid loose clothing and jewellery that could get caught in moving parts, tie back long hair.

2.4 Hydraulic Pump Specific Safety Precautions

⚠ WARNING! Failure to observe and obey the following safety precautions could result in property damage, serious personal injury or death;

- **NEVER** exceed the maximum rated pressure of any hydraulic equipment. Hi-Force manufactures its HTWP Electric hydraulic pumps to operate at a maximum working pressure of 700 bar (10,000 psi).
- **DO NOT** connect hydraulic torque equipment with a lower pressure capacity rating to any Hi-Force pump of this model series.
- Make sure all equipment connected to the pump is in good working condition.
- **NEVER** invert the unit or lay it on its side, either in use, in transport or in storage.
- **DO NOT** weld any items to the pump unit or modify it in any way from its delivered condition. Your warranty may be invalidated, and it could lead to serious personal injury.
- **ALWAYS** ensure there is clear communication between the pump operator and the tool operator/s. **DO NOT** operate the pump unless the tool operator/s indicates it is safe to do so.
- **NEVER** attempt to connect or disconnect a tool / hose / component while the system / pump is under pressure.
- **NEVER** operate the pump without both hydraulic hoses and a suitable torque wrench connected to it.
- **NEVER** leave a pressurised system unattended. If you must leave the area, release the pressure and ensure the hydraulic relief valve on the pump is fully open.
- **ALWAYS** disconnect the pump from the power supply when carrying out maintenance or adjustments (except pressure relief valve adjustments)
- This pump is NOT ATEX RATED I.e., NOT suitable for work which takes place in explosive environments.

⚠ CAUTION! Failure to observe and obey the following safety precautions could result in property damage, equipment damage or minor / moderate personal injury.

- **ALWAYS** stand the pump on a stable, level surface during operation.
- **BEWARE** of hot surfaces on the motor. DO NOT obstruct the flow of cooling air around the motor.
- To protect your warranty, only use the hydraulic oil grade specified in Section 5.2.

3.0 Declaration of Incorporation / Conformity

Hi-Force declares that this product has been tested and complies with the standards and declarations as set out in the Declaration of Incorporation / Conformity (DoI/DoC). The DoI/DoC is included as Annex A to this instruction document and is supplied with all shipments of this product.

4.0 Specifications

4.1 Nut Splitter Specification

Refer to the identification plate on the pump for model identification.

DNS | Nut splitter							
Model Number	Capacity tonnes	Oil Capacity [cm³]	Hexagon AF sizes		Stud Bolt Thread Sizes		Weight [Kg]
			mm	inch	Metric	Imperial	
DNS404	119.6	796	75 - 105	2 15/16” – 4 1/4”	M48 – M72	1 7/8” – 2 3/4”	60
DNS506	203.4	1510	105-136	4 1/4” – 5 3/8”	M72 – M95	2 3/4” – 3 1/2"	96

5 Component Identification

1	Cylinder	4	Advance Coupler	7	Blade
2	Jaw	5	Retract Coupler	8	Coupler Dust covers
3	Lifting Eye	6	Pressure Relief Valve		

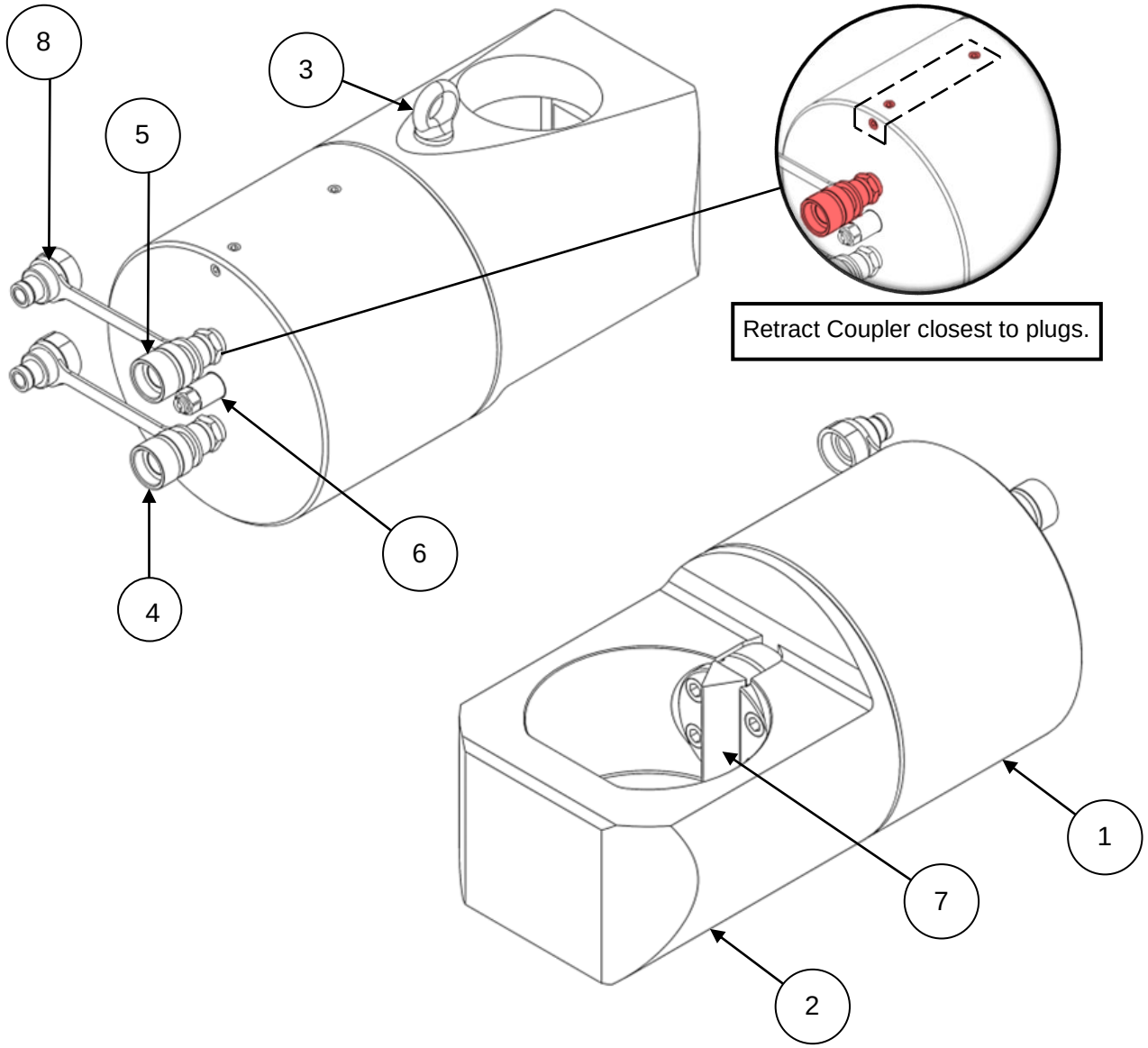


Figure 5.1: DNS### Components Identification

6.0 Installation / Setup

6.1 Before First Use / Preparation

- Immediately after unpacking, examine the unit for signs of transit damage and if found contact the shipping company.
- Check the selected product against its specification (Refer to section 4.1), and that it is suitable for the required job prior use.
- Check the external surfaces for signs of mechanical damage and/or oils. If either are present, **DO NOT** use the product until it has been serviced and returned to its proper operating condition.
- Ensure all surfaces are free from dirt and debris.
- Pump Requirements
- It is **ESSENTIAL** that a hydraulic pump with a four-way valve suitable for double acting cylinders is used for the DNS nut splitters. **BOTH** hoses **MUST** always be connected.
- Always check that the hydraulic pump to be used with the DNS nut splitter is of sufficient pressure capacity (700 bar) and has a sufficient quality of clean, compatible oil in the reservoir (to avoid contaminating the nut splitter and causing damage). Hi-Force hydraulics manufacture a wide range of manual, air powered, electric and petrol engine driven hydraulic pumps which are compatible to be used with the DNS nut splitters.

  Ask your local Hi-Force distributor for further details or consult Hi-Force hydraulics direct.

6.3.1 Connections (*See figure 6.1*)

Connect the hydraulic hose/s between the nut splitter couplers (4 &5) and the pump outlet/s, ensuring that the coupler/s are **fully hand-tightened ONLY**. To do so: [1] Press the male coupler into the female coupler, [2] then turn the threaded collar clockwise (by hand) until the threads are fully engaged.

⚠ **CAUTION!** **NEVER** use wrenches to connect the coupling/s. Incorrectly connected couplers are one of the most common causes of faulty operation.

IMPORTANT: Make sure that all coupler threads are fully engaged. (*See figure 5.4, panel 3*)

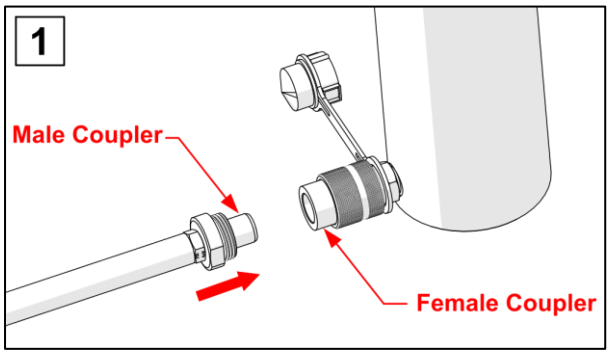


Figure 5.2: connecting couplers

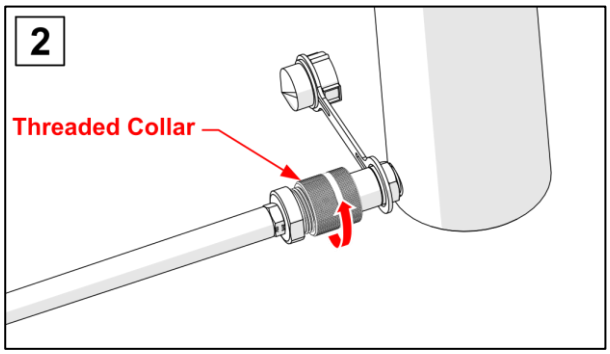


Figure 5.3: securing couplers

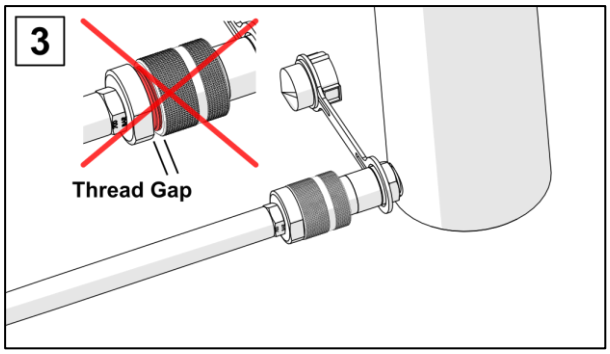


Figure 5.4: Hydraulic Connection

7.0 Operation

Hi-Force DNS Nut splitters are designed to be used to splitting nuts with across flats (AF) sizes ranging from 75 mm to 136 mm (2 15/16” to 5 3/8”), refer to section 4.1 for model numbers and specifications. It is the responsibility of the owner and all operators of the equipment to read, understand and comply with all appropriate safety warnings and operating instructions relating to all the equipment being used.

Before applying pressure to the system make sure you observe the following points

- You are aware of the correct operation of the Nut Splitter.
- You are aware of the maximum working pressure of the Nut Splitter.
- You are aware of the required working pressure/s that must be applied to the Nut Splitter.
- You have performed the relevant risk assessment/s and have a method statement (safe system of work) for all operators to follow.

Using suitable lifting equipment, place the nut splitter over the nut to be cut so that the blade is aligned with the centre of one flat of the nut (Fig 7.3), and the opposite flat is against the flat face of the jaw. NEVER try to cut on a corner of a nut (Fig 7.4). Operate the pump whilst holding the nut splitter in position. Stop the pump when the nut has been cut through, to avoid damage to the stud, bolt or blade. Retract the blade by reversing the oil flow by means of the valve on the pump.

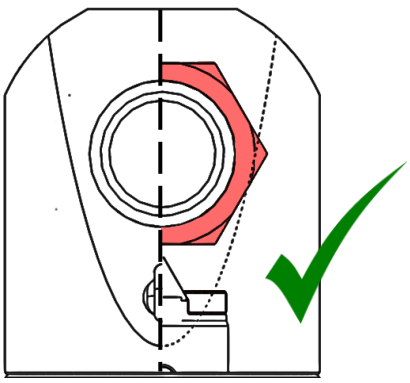


Figure 7.3: Correct nut alignment

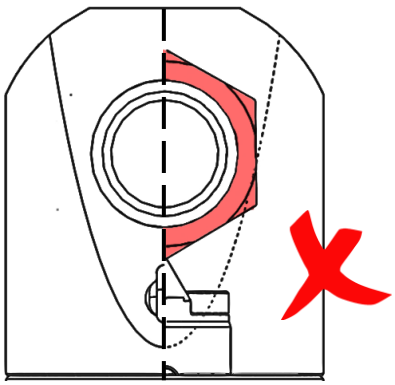


Figure 7.4: Inorrect nut alignment

If the nut cannot be removed after the intial cutting operation, reposition the nut splitter 180° from the first cut and proceed with (Fig 7.5).

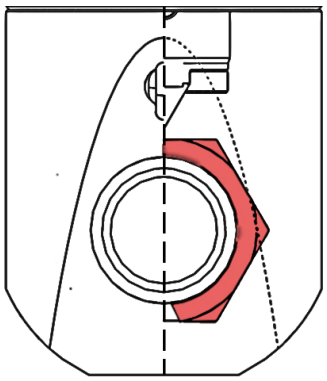


Figure 7.5: Secondary nut cut

After completing each cutting operation **ALWAYS** clean any debris from around the cutting blade and cutter jaw. This will greatly reduce the possibility of blade jamming.

7.1 Blade replacement

After a period of operation, depending on the material being cut, the blade may become blunt or worn. The blade has three cuting edges and can be removed and reposintioned by loosening the 4 OFF blade retaining screws (Fig 7.6) and sliding the blade out, ensure that the blade is fully inserted before tightening the screws.

⚠ **CAUTION!** **ENSURE** This operation is carried out with the nut splitter is discounted from the pump.

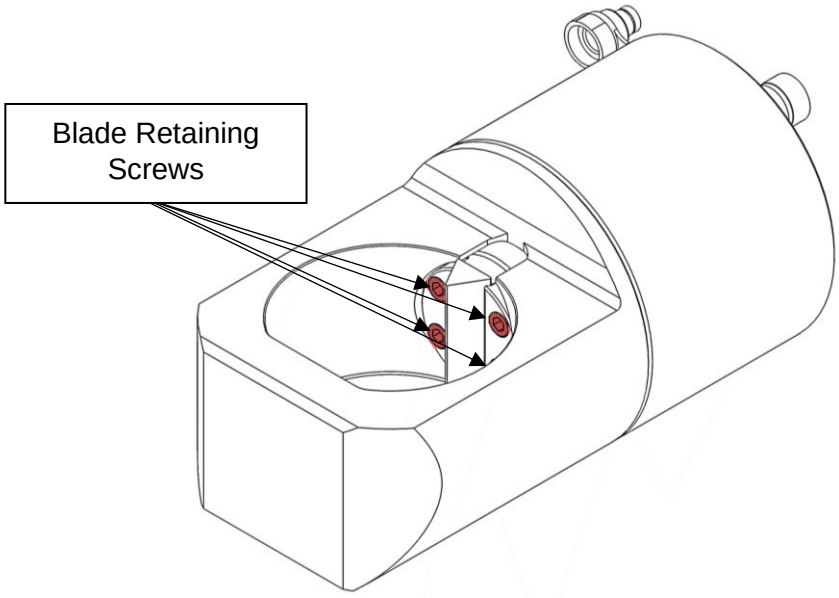


Figure 7.6: Blade Retaining screws

8.0 Troubleshooting

Hi-Force DNS Nut splitters should be serviced and repaired only by authorised Hi-Force repair centres. The following table gives possible causes and solutions for common problems.

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Solution
1. Blade will not advance.	a. Pump pressure Release valve open.	Close pump pressure release valve.
	b. coupler not fully tightened.	Tighten coupler.
	c. Oil level in pump I low	Top up oil to pump reservoir.
	d. Pump Malfunctioning	Repair or replace pump.
	e. Nut Splitter seals leaking	Replace seals or replace tool.
	f. hoses have been connected incorrectly (“advance” hose connected to “retract port” and vice versa).	Switch the hoses at the ports
2. Nut splitter not cutting nut	a. blade damaged/dulled.	Replace blade head refer to section 7.1
	b. incorrect Nut splitter model being used.	Check model specification in section 4.1 and use the correct model nut splitter.
	c. oil level in pump reservoir low	Top up oil in pump oil reservoir.
	d. pump oil capacity too small	Replace pump with a larger capacity.
3. blade advances slower than normal	a. leaking connection.	Replace faulty component.
	b. Coupler not fully tightened.	Tighten coupler
	c. Pump malfunctioning.	Repair or replace pump.
4. Nut splitter leaks oil.	a. Worn or damaged seals.	Repair or replace nut splitter.
	b. Internal nut splitter damage.	Repair or replace nut splitter.
	c. Loose connection.	Tighten or repair connection.
5. Blade will not retract or retracts slower than normal.	a. Pump pressure release valve is closed	Open pump pressure release valve.
	b. coupler not fully tightened.	Tighten couplers.
	c. Pump oil reservoir over-filled.	Drain excess oil from pump reservoir
	d. Narrow hose restricting flow.	Replace with larger diameter hose.
	e. Nut splitter damaged internally.	Repair or replace Nut Splitter.
6. Nut can not be loosened once cut is made.	a. Nut still under tension/corroded/ stuck	Make a second cut refer to section 7.0

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