



VORTEX

SUBSEA SOLUTIONS



MULTI CUTTER

OPERATIONS MANUAL

WORLD'S MOST POWERFUL 3, 4 AND 6-INCH DREDGES
WWW.VORTEXDREDGE.COM



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YOUR SAFETY IS YOUR RESPONSIBILITY. IF YOU DON'T KNOW, PLEASE ASK.

All information correct as November 2022 and subject to changes without notification.

Introduction

Vortex Multi Cutter is powered by the proven Vortex dredge motor / mechanical sealing system for continued, oil tight reliability.

Three blade options are available in the kit to allow cutting of for example: Fiber rope up to 160mm or more Pennant steel wire rope up to 75mm or more Steel pipes up to 120 mm diameter

Mooring line up to 160 mm diameter

Scaffold tube

5000kg or more slings

Dredge / plastic / rubber hose up to 130mm diameter

Your safety is your responsibility. Please ask if you are unsure about anything.

MULTI CUTTER SPECIFICATIONS.

- Actual depth of cut with 400mm blade = 120 mm
- Cutter motor hydraulic flow required = 40 lpm (10 gpm) minimum
70 lpm (18 gpm) maximum
- Cutter motor hydraulic pressure required = 206 bar (3000 psi) minimum
241 bar (3500 psi) maximum
- P and T fittings are -8 jic female swivel on the end of the 4mtr long hoses.
- Case drain fitting is -6 jic female swivel on the end of the 4mtr long hose.
- Grab arm fittings are -4 jic female swivel on the end of the 4mtr long hoses.

- Overrun valve standard YES
- Direction run valve standard YES
- Coupling compensator required = NO
- Grab arm hydraulic pressure required = 500 psi minimum / 1750 psi maximum
- Grab arm hydraulic flow required = 8 lpm minimum / 12 lpm maximum
- Operating depths = Unrestricted
- Operate Motor in air YES
- Full grab tool weight in air = 43 kg (115lb)
- Full grab tool weight in water = 26 kg (69lb)

Your safety is your responsibility: If you don't know, please ask.

SAFETY

- Personal protection equipment recommended for use when working on ship/platform deck
- Hard hat
- Safety glasses
- Gloves
- Safety boots
- Overalls
-

OPERATING LIMITS

- Unlimited water depth.

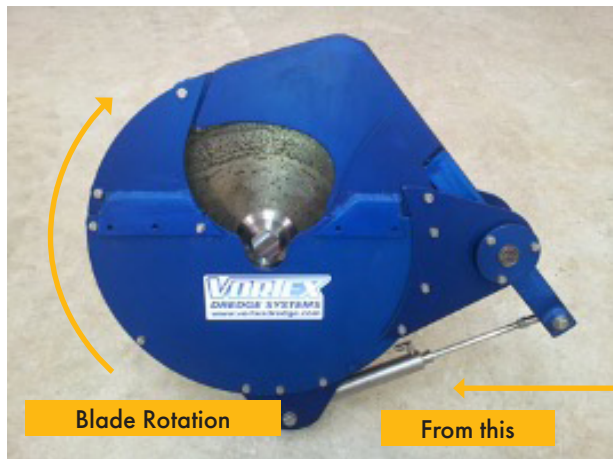
RISKS – NORMAL OPERATIONS

- Sharp edges on cutting blades. Please be careful with blades.
- Working with equipment under pressure (hydraulics or water)
- Hydraulic oil spillage

Assembly options

Cutter comes assembled as full grab cutter.

Remove components as desired to operate as basic half blade cutter.



Full grab cutter with gram arm mounts and mechanism installed.

Weight = 30 kg in air



Basic half blade cutter with gram arm mounts and mechanism removed.

Weight = 24 kg in air



Operation



ROV flies into product – in this case 160mm diameter mooring line, closes clamp onto rope and feeds rope into blade with clamp arm

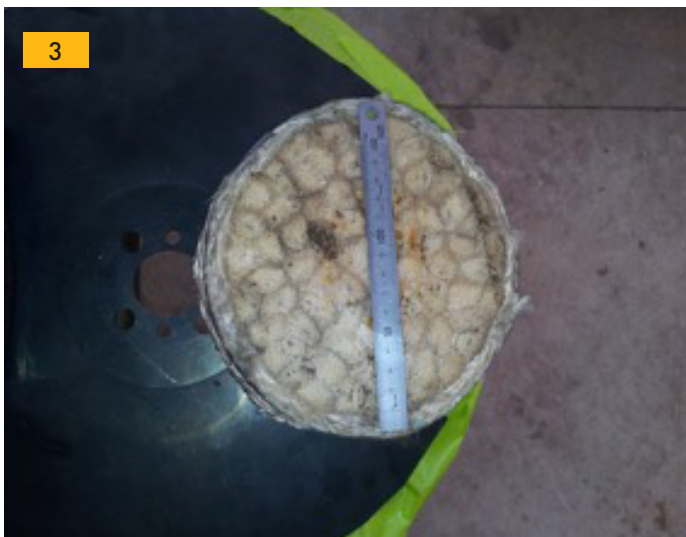
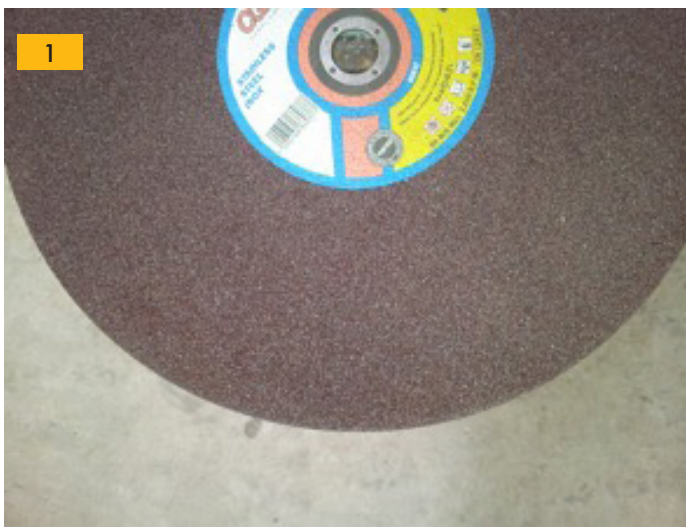


The same system applies to cutting this 120mm FPSO Mooring chain.

Blade Options

1. 400mm diameter metal cutting disc.
2. 400x2.8x4 Diamond impregnated blade
3. 400mm diameter custom made fiber ROPE cutting blade.

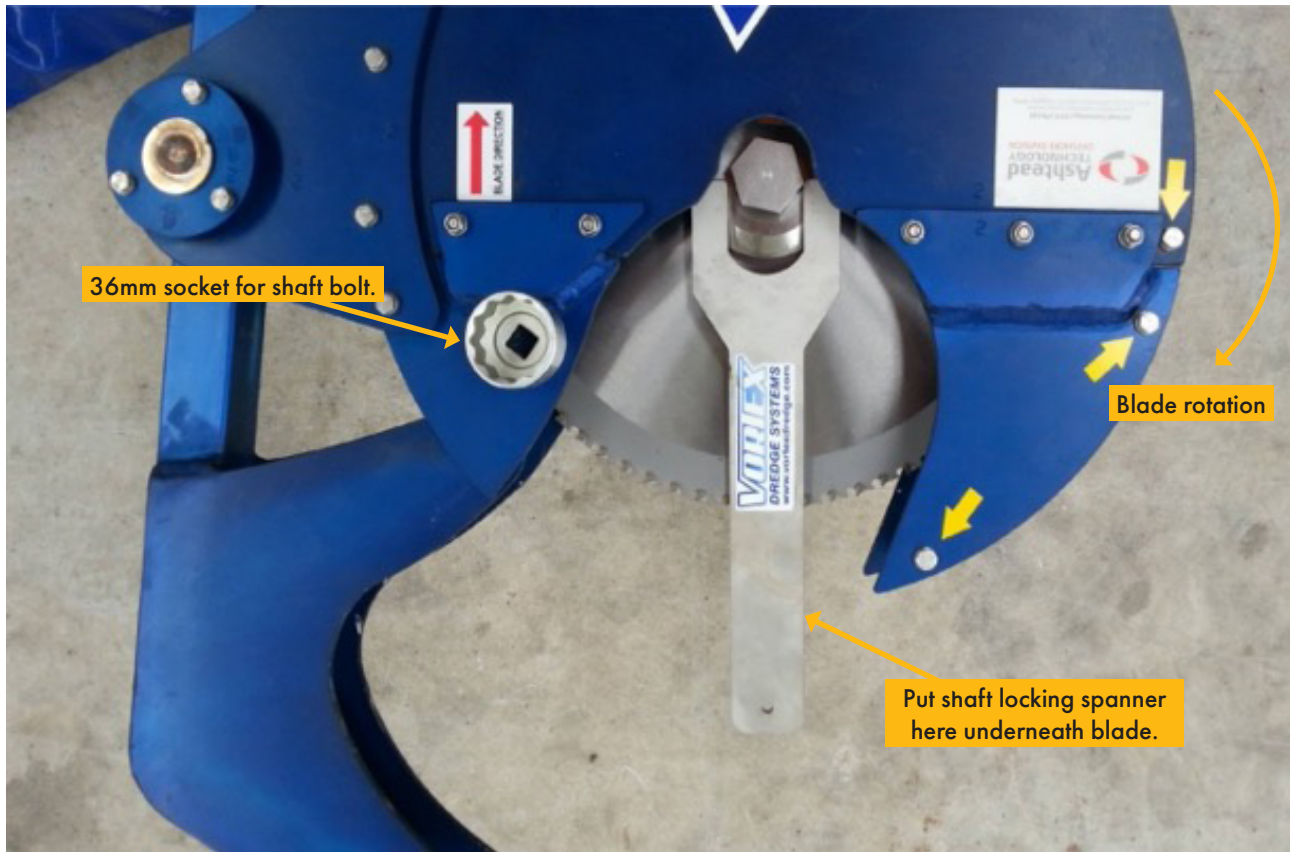
ALL blades are considered CONSUMABLES to be charged to each job.



Sample Cuts

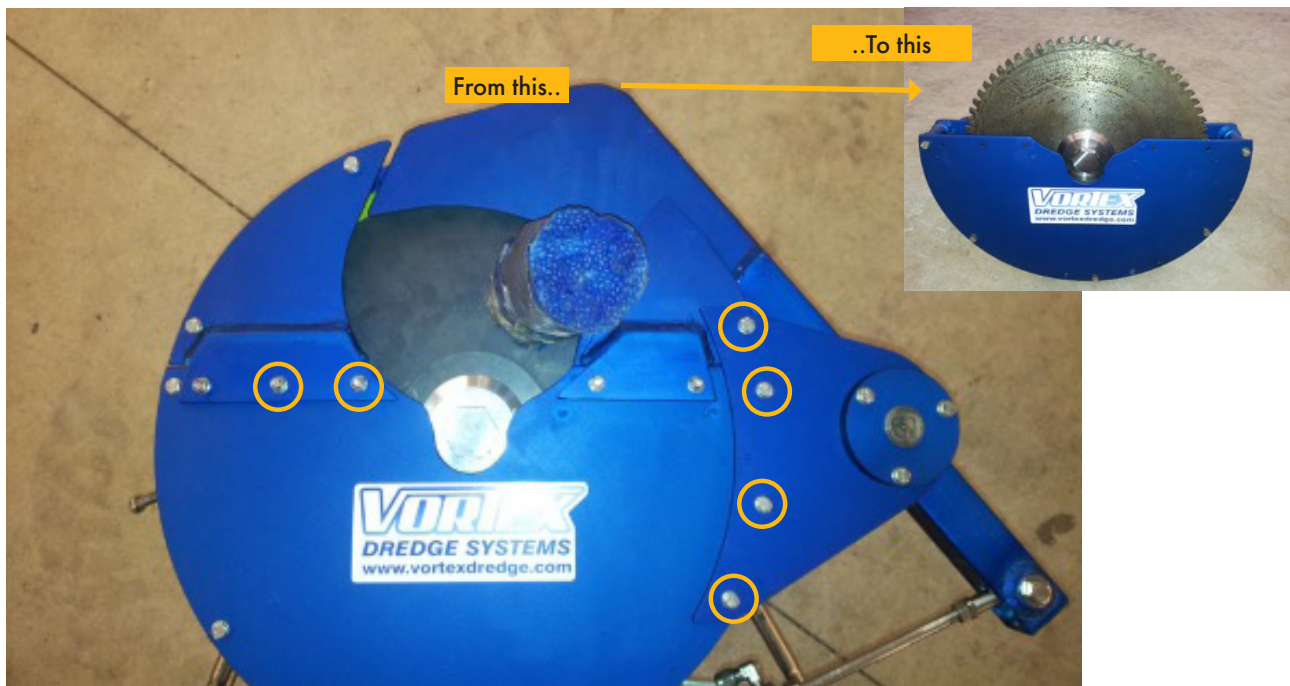


Changing Blades



1. Open grabber arm.
2. Remove these three bolts and spacers (yellow arrows)
3. Fit locking spanner.
4. Shaft bolt is LEFT HAND THREAD so turn clockwise to remove.
5. Choose the correct drive plate, fit to shaft, fit disc, fit outer plate, turn bolt counter clockwise to tighten.
Torque bolt to 80 ft/lbs.

Removing Grabber Arm

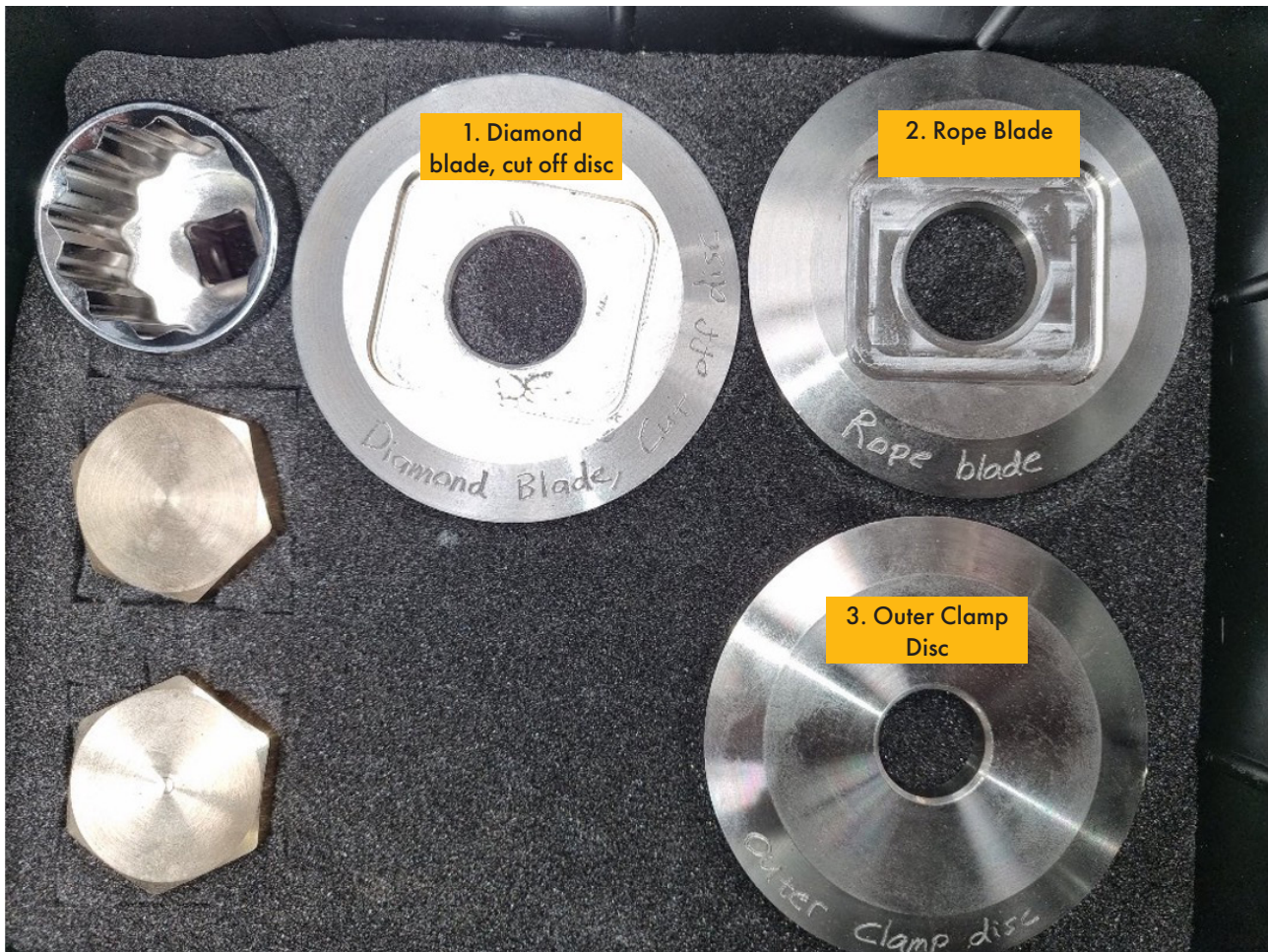


1. Remove these bolts and spacers.
2. Store ALL bolts and components in an orderly way in the kit for reassembly.
3. Fit spacers back into main chassis where necessary to regain structural integrity of chassis.



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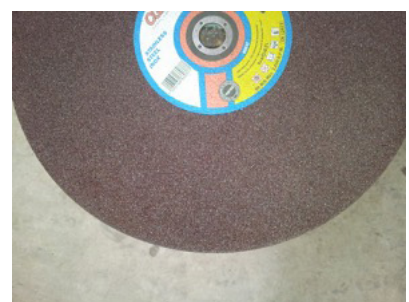
Blade Clamp Options



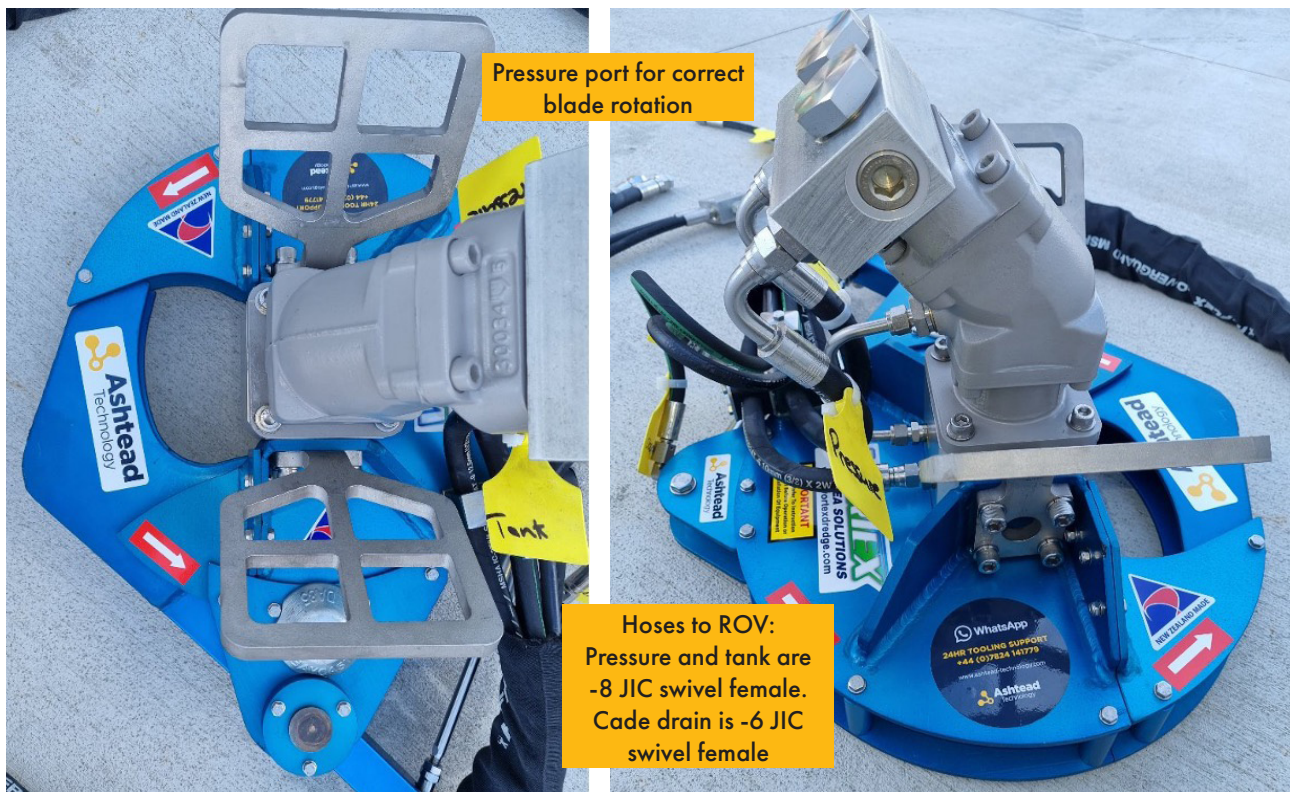
1. Use with blades that have 25mm center hole such as: 400mm Cut off discs and 355 mm tungsten tip blade and diamond blades.
2. Use with custom made fiber rope cutting blades.
3. Outer clamp disc for all applications.



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2. Use with custom made fiber rope cutting blades



Hydraulic connections to ROV



- Fill hydraulic motor and case drains with clean oil before start up and bleed hoses.
- Hoses are 4000 mm long
- Motor can also be run in air.

Hydraulic hose fitted with clear markings to facilitate mobilization times. Pressure and return hoses have identical pressure rating to avoid chance of failure through incorrect assembly

Do NOT remove cross port relief valve on these hoses to grab arm cylinder. Valve is set at 500psi to limit closing force of arm. Maximum setting of 1750psi. SUN RDBA-LAN Maximum flow to grab arm cylinder is 12lpm (3GPM)

Hoses to ROV:
Grab arm OPEN and CLOSE are -4 jic female swivel.



Multi Cutter Thumb Pressure

¼ turn in from fully out	= 260 psi
½ turn in from fully out	= 420 psi
¾ turn in from fully out	= 520 psi = 22kg thumb force
1 turn in from fully out	= 670 psi = 36kg thumb force
1 ¼ turn in from fully out	= 800 psi = 46kg thumb force
1 ¾ turn in from fully out	= 1000 psi = 59kg thumb force
2 turn in from fully out	= 1200 psi = 73kg thumb force
	1250 psi = 82kg thumb force
	1500 psi = 104kg thumb force
	1750 psi = 123kg thumb force



Do NOT remove cross port relief valve on these hoses to grab arm cylinder.

Adjust this valve to alter thumb clamping force as per chart on the left.

Valve is set at 500psi to limit closing force of arm. Maximum setting of 1750psi.
SUN RDDB-LAN

Inventory

A: Blade storage (rope blade is standard kit)

B: Multi Cutter complete

C: Spare shaft seal

PN 10672

D: Spare shaft seal and motor O-ring

PN 10855

E: Blade clamp nut removal 36mm, 1/2" drive socket

F: Blade drive clamps (three items) PN 10854

F1: Two drive plates.

F2: One clamp disc. G: Blade removal spanner

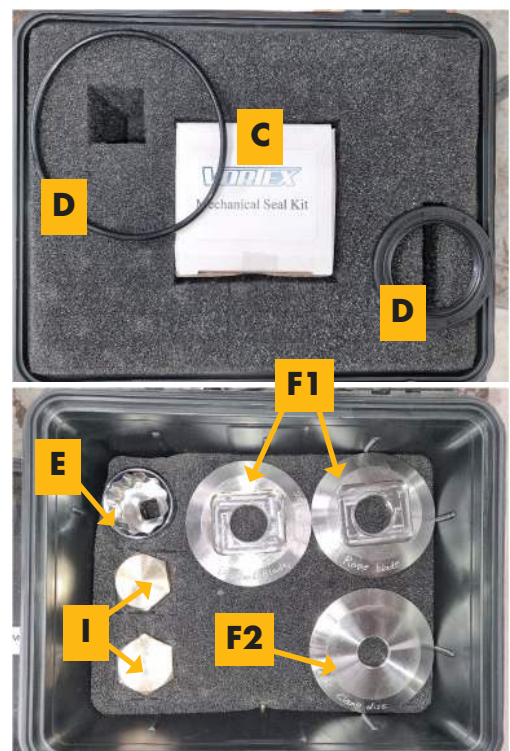
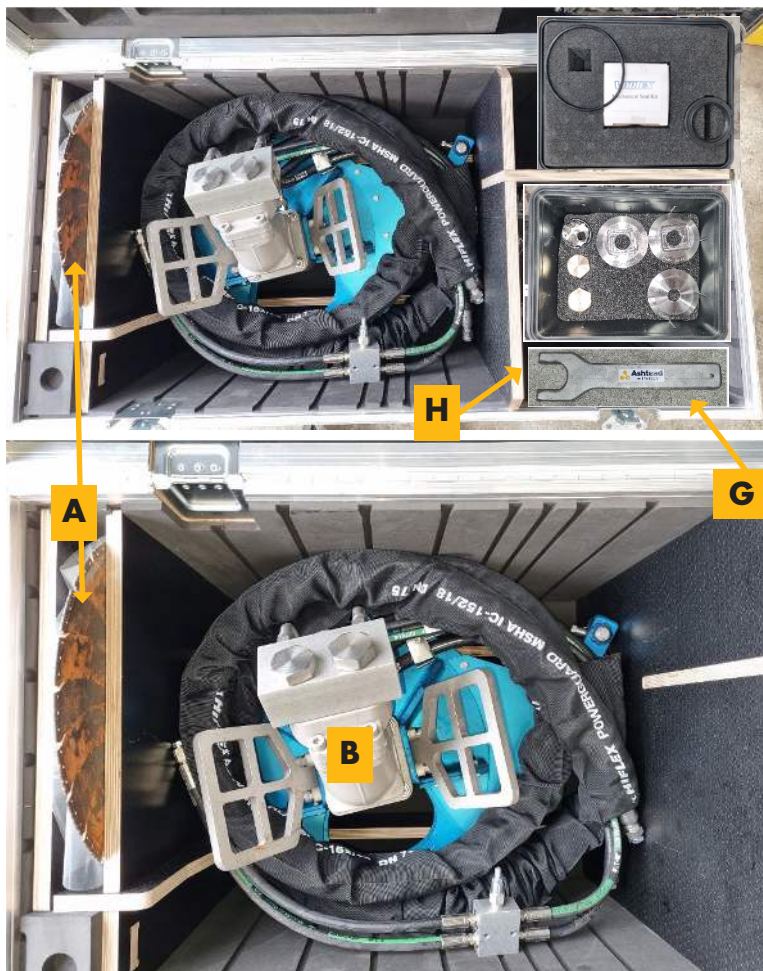
H: Manual

I: Two blade mounting bolts

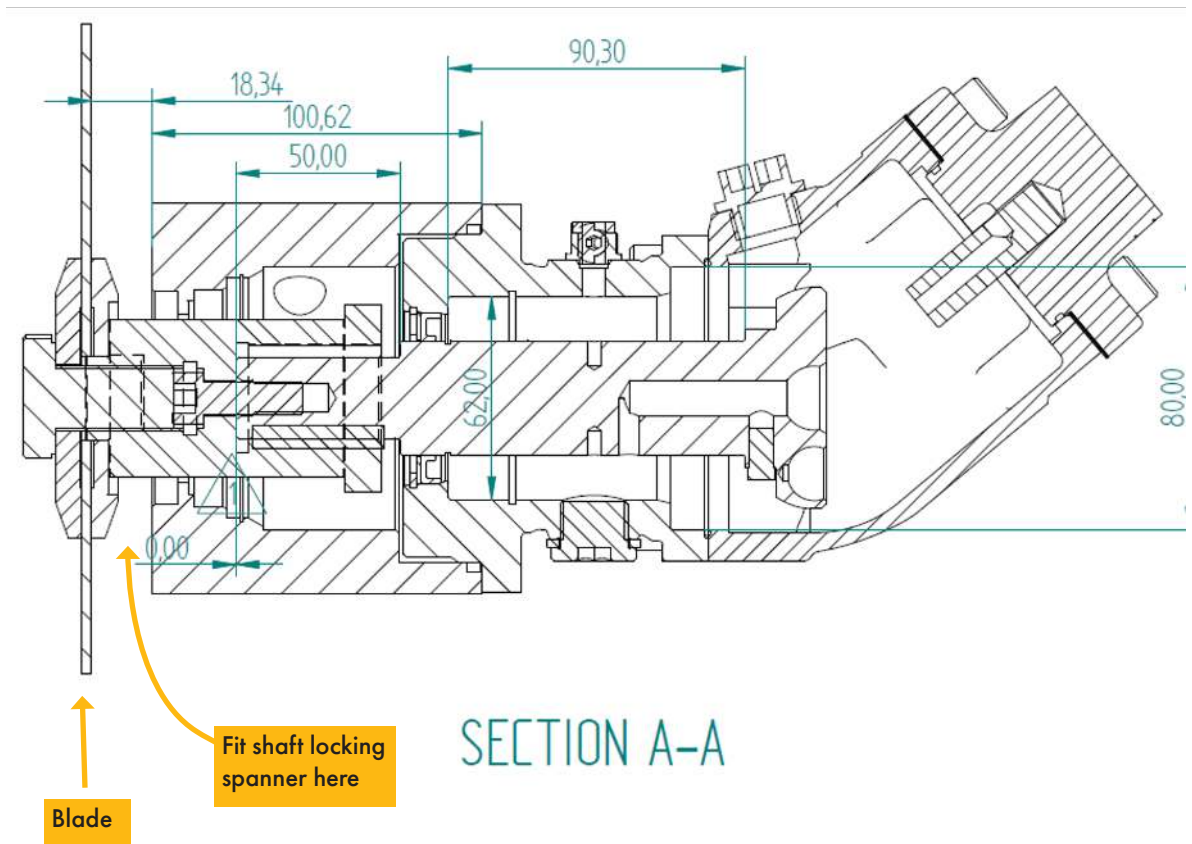
PN 10448



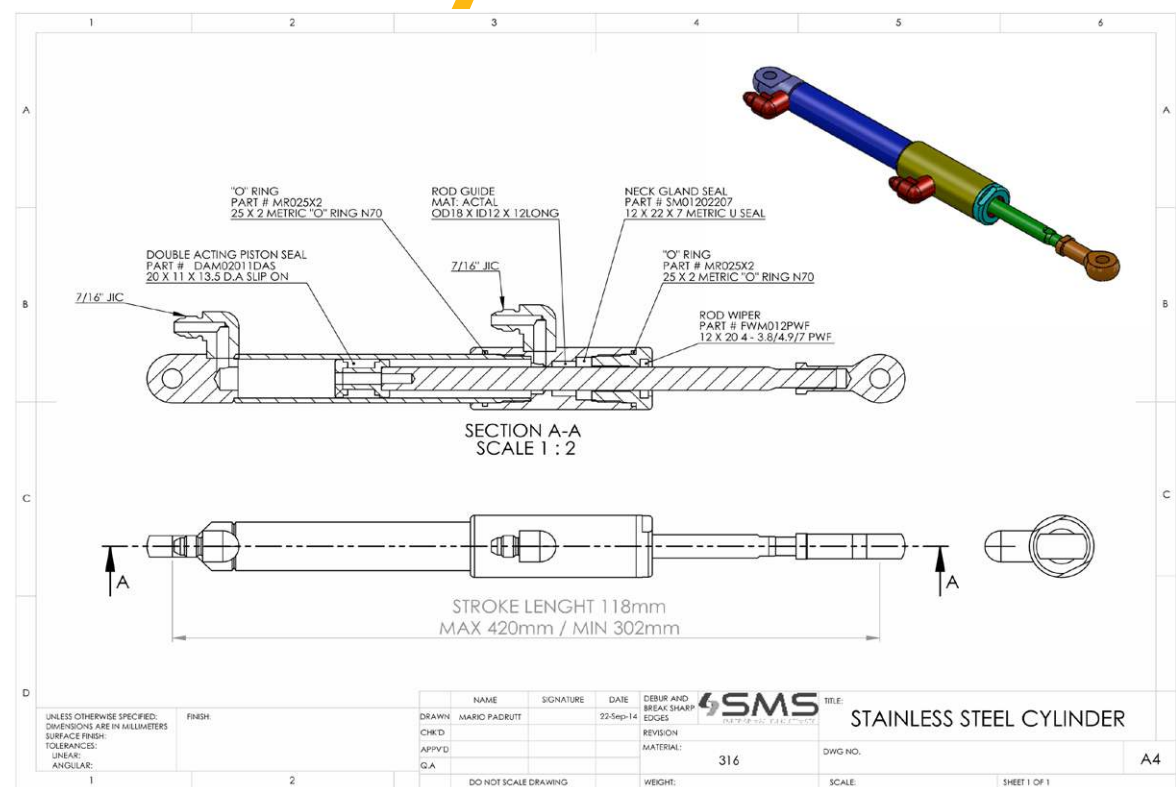
Shipping Box
76cm H x 58cm W x 117cm L
112kg



Cross section drawing



Grab arm cylinder



Servicing Instructions

NOTES

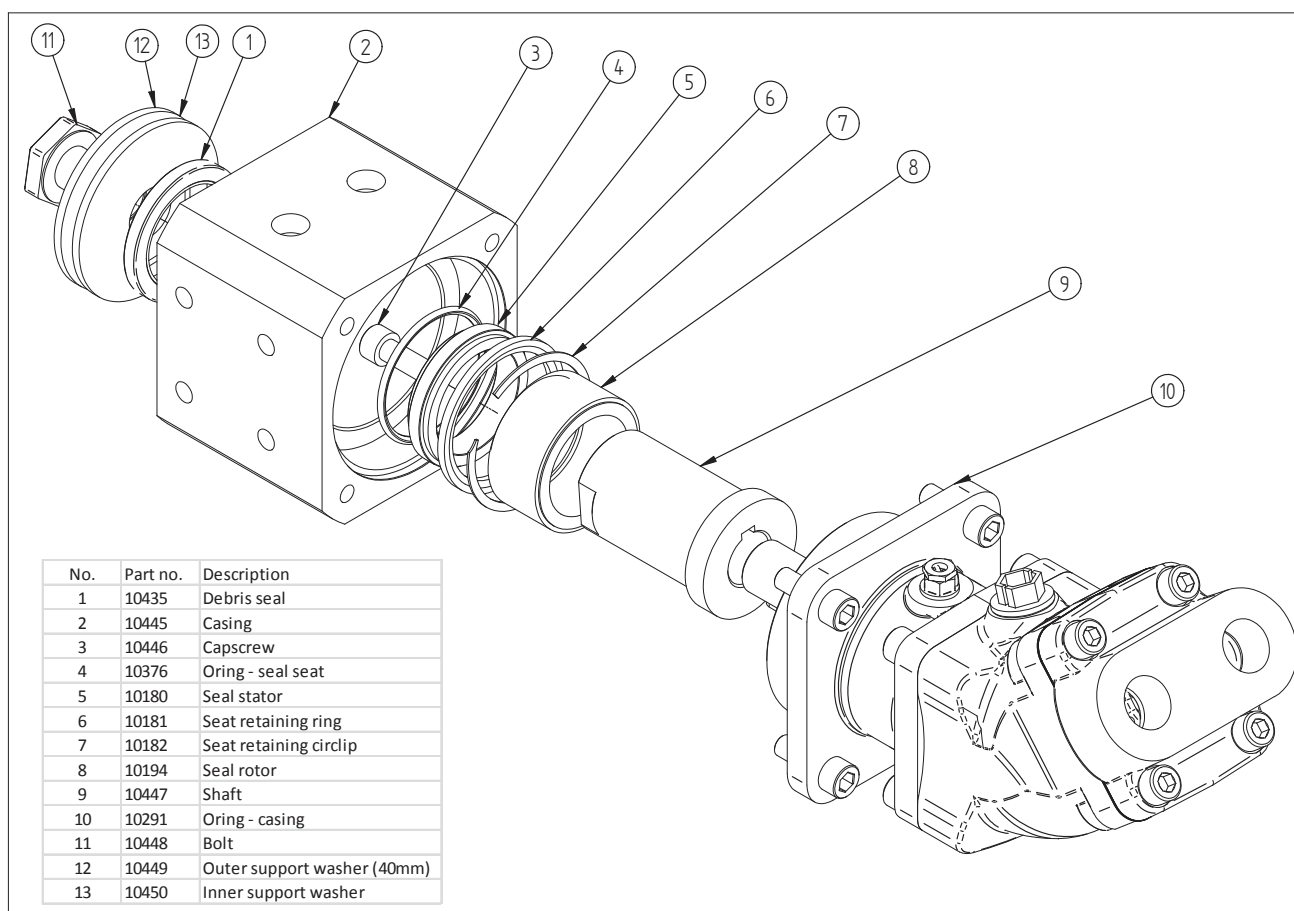
1. The simplicity and design of the Multicutter should ensure extended inter-service periods and ease of repair.
2. The Sunfab Motor contains the support bearings for the Multicutter and any issues with the motor should only be handled by a hydraulic workshop with appropriate experience.
3. The function of the debris seal at the blade end of the assembly is the deflection of sediments and grindings from the underside of the mechanical seal. Mechanical seal failure will be evidenced by excessive leakage past this device and should be dealt with by replacement of the mechanical seal.

MECHANICAL SEAL REPLACEMENT

SEE PAGE 16 FOR PART DIAGRAM

1. Remove the Blade fastening bolt, supporting washers and blade and place the Multicutter face down on a suitable surface.
2. Remove case drain tube-set and supply and return hydraulic hoses from the hydraulic motor.
3. Remove the 4 M10 motor retaining capscrews and carefully withdraw the hydraulic motor and seal from the casing.
4. Using a suitable puller, extract the seal rotor from the stubshaft. This is retained only by means of the interference of the rubber bellows with the shaft surface.
5. Remove the seal retaining circlip (7) from its groove with the careful use of a small screwdriver or similar, remove retaining ring (6) and seal seat (5) and Oring (4) from the cavity. Take care not to scratch the aluminium Oring contact surfaces.
6. If the Debris seal is damaged it may be necessary to remove the aluminium casing (2) from the fabricated body of the Multicutter. Once this has been done the debris seal can be removed from the casing using a blunted and suitably polished screwdriver and replaced with the spare unit. Be sure to wash any debris from the cavity between the debris seal and the mechanical seal seat.
7. Lubricate the Seal seat Oring (4) with a suitable silicone grease, fit to the rear of the mechanical seal seat and insert this into the seal seat cavity in the casing – lapped surface uppermost.
8. Fit the Seal seat retainer (6), heavily chamfered face uppermost and insert the retaining circlip (7). Wipe clean the lapped seal seat face with a solvent soaked rag.
9. Lubricate the inner bellows surface of the mechanical seal rotor and the stubshaft surface with hydraulic oil and slide or press the mechanical seal rearwards until its rear runner face abuts against the stubshaft shoulder. If the seal face has dislodged itself it should be relocated in its normal position in the seal rotor shell using several small dabs of very heavy mineral grease. Wipe the seal face clean with a solvent rag.
10. Fit a new casing Oring against the motor flange and affix with heavy grease. Offer up the motor assembly to the casing (2) and fasten its retaining capscrews.
11. Refit all hydraulic connections and refit washers, blade and stainless fastening bolt

Servicing Diagram



Trouble Shooting

SYMPTOM: MULTI CUTTER NOT WORKING.

Remedy:

1. Ensure that the hydraulic hoses are connected as per manual drawings and match connection labels.
2. Check that correct hydraulic flow and pressure is seen at the Multi Cutter motor.
3. Check any quick connect fittings you may have in the circuit as they can sometimes be faulty.
4. Are your thrusters using most of the available system flow and starving your circuit feeding the Multi Cutter?
5. Ensure the Vortex case drain is connected directly to tank. It is preferable to connect as close as possible to the reservoir and not run any hoses through quick connects.
6. Check that the over spin valve on the hydraulic motor is operating correctly and does not have dirt ingress causing fluid to bypass the check valve. Replace with SUN valve, part number HCV 2743 as necessary.

SYMPTOM: GRAB ARM NOT WORKING.

Remedy:

Ensure that the hydraulic hoses are connected as per manual drawings and match connection labels.
Check that cross line relief valve SUN RDDB-LDN (Body HCV 154Z P6P) is not blocked.
Check that correct hydraulic flow and pressure is seen at the Multi Cutter motor.
Check any quick connect fittings you may have in the circuit as they can sometimes be faulty.

Contacts



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