Sward Slit Injector

OPERATOR
AND
MAINTENANCE MANUAL

Issue 1.1

NOTES:

1. MACHINE IDENTIFICATION

Please complete the identification form as soon as you receive your machine. This information will be required for all future correspondence.

Machine: _____

Type: _____

Serial Number: _____

2. INTRODUCTION

This booklet is the operator and maintenance manual for the OPICO Sward Slit Injector.

OPICO aims to continuous improve machines which is why we reserve the right to modify and change products without giving it any commitment to earlier delivered machines. Modifications that have been made to the equipment during its technical evolution do not apply to equipment already in service. With the changes it is possible that the machine, which is purchased by you, is not totally the same as the images, the technical specifications, descriptions in this user's manual.

This booklet has been compiled so that you will always have information at your disposal regarding the use and maintenance of your OPICO Sward Slit Injector.

This booklet must be placed at the disposal of the person who is responsible for the use and maintenance of the machine.

This booklet takes into account the most recently available spare parts. If you need other spare parts or additional information, please do not hesitate to contact your OPICO dealer.

Figure 1 – OPICO Sward Slit Injector

3. MANUFACTURERS WARRANTY

Upon Warranty Registration with OPICO, the warranty period for this machine is 1 calendar year from the date of delivery of the machine to the end user or 1 calendar year from the date of first use of the machine whichever comes first. Failure to register for warranty will invalidate warranty of the machine.

Manufacturer's Warranty is applicable on any parts which show premature failure, or where material and / or where errors in manufacture has caused the failure.

Any unauthorized modifications or repairs to the machine during the warranty period will invalidate the warranty of the machine from that date forward.

4. SAFETY MEASURES

- Never render any safety guards or safety devices in-operable. If any guards or safety devices are missing replace them immediately before operating the machine.
- Never stand between the tractor wheels and the machine.
- Never wear loose clothing, which could be caught up in the machine.
- Periodically check the condition of all the safety guards.
- It is forbidden to climb onto the machine when in operation.
- Ensure that all personnel are a sufficient distance away when the machine is in operation.
- Before undertaking maintenance or repair work, switch off the tractor if the machine is attached, and remove the key.
- Regularly check the machine in order to detect any damaged parts.

5. GENERAL DESCRIPTION

The Sward Slit Injector is a band slurry applicator, which is intended to be directly mounted to an OPICO Sward Slitter and used directly behind a tractor with feed from an umbilical line.

Figure 2 – OPICO 6m Sward Slitter c/w Slit Injector

The Sward Slit Injector is a slurry band applicator which can apply slurry in bands at band spacing of 166mm; it can work at an application rate of up to 56m³/hectare (5,000gal/acre).

The side wings arms of the Sward Slit Injector are hydraulic folding with the Sward Slitter, so the machine is suitable for easy transport on public roads.

All Sward Slit Injectors are fitted with a Vogelsang ExaCut Macerator / Distributor as standard which chops up any fibers present in the slurry and then distributes the slurry accurately across the full width of the machine.

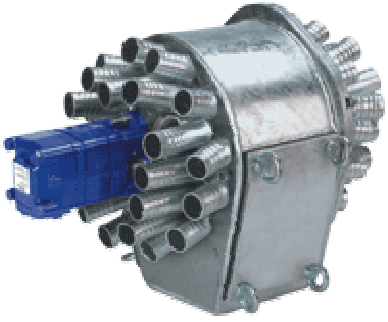


Figure 3 - Vogelsang ExaCut Macerator/Distributor

6. USING THE MACHINE

6.1 Purpose of use

The Sward Slit Injector is an agricultural machine which is exclusively developed for the application of liquids into agricultural land with a limited amount of solid matter, such as Sludge's or Slurry.

The Sward Silt Injector is intended to be mounted onto an OPICO Sward Slitter.

The suitability of the Tractor to which the Sward Slitter is to be mounted on is the sole responsibility of the customer.

Important issues when deciding the suitability of the Tractor are, Machine Weight, Hydraulic Flow Requirements and Connections, Lift capacity of the Linkage System.

Other applications and other uses of the Sward Slit Injector other than that described in this manual have not been taken into account, and may be dangerous.

6.2 Safety

At the manufacturers of the Sward Slit Injector there are provisions taken which protect the user, the provisions allow the user to work the machine as well as possible in a safe manner.

The measures are taken according to the European fundamental safety and welfare demands, as the Counsel of European Communities described in the machine line-of sight.
In the subjoining paragraphs the several important safety aspects will be described in more detail.

6.3 Safe Working

- Make sure that all persons are well clear of the machine when the machine is in operation.
- Never use your hand to search for any damage on any hydraulic systems. High oil pressure can penetrate the skin of your hand.
- Never stand between the Sward Slitter and the Mounting Vehicle when coupling.
- The hydraulic connections between the Sward Slitter/Slit Injector and the Mounting Vehicle should only be done with the tractor engine switched off.
- Always use the correct coupling pins and locking pins when you couple the Sward Slitter/Slit Injector to the Mounting Vehicle.
- Never lift or remove the parking support legs before you are sure that the Sward Slitter/Slit Injector is coupled on the Mounting Vehicle in the correct way.
- Never attach the feed hose to the machine before the Sward Slitter/Slit Injector is coupled on the Mounting Vehicle in the correct way.
- When carrying out maintenance or cleaning work on the machine, always switch of the tractor and take the ignition key with you, so no one can switch the tractor on by mistake.
- Never render any safety guards or safety devices inoperable. If any guards or safety devices are missing replace them immediately before operating the machine.

6.4 Warnings

6.4.1 Sound-level

The average working sound level of the Slit Injector is no more than than 70 dB (A).

Take care, the average sound-level of the mounting vehicle may be more than 80 dB (A), in which case ear protection must be used.

6.4.2 Tools

Don´t leave any tools on the machine, it can damage the mounting vehicle or injure the operator or bystanders.

6.4.3 Operating

Operating of the Sward Slit Injector should only be done by personnel who are well informed about possible dangers, and who have read this user handbook. Operating by more than one person at once can be dangerous.

6.4.4 Modifications

If the Sward Slit Injector is modified in any way warranty may become invalid. Changes or modifications to the Slit Injector are completely the responsibility of the person who makes the changes or modifications.

6.4.5 Warning Decals

Always replace missing or damaged warning decals.

6.4.6 Public roads

When the Sward Slit Injector is transported on the public road, all applicable road use rules must be followed.

6.4.7 Driving speed

Always drive at a speed that is suitable to the current surroundings and the conditions. Always take into account the total width and the height of the vehicle.

6.4.8 Driving along

The transport of persons on the Sward Slit Injector is **not** allowed.

6.4.9 Children

Pay special attention to children. Never allow children to play in the surrounding area of a parked or working machine.

6.4.10 Climbing on the Slit *Injector*

Do not climb on a working machine.

6.4.11 Hydraulic Connectors

Before coupling the hydraulic connectors from the Sward Slit Injector to the mounting vehicle ensure that all the couplings are clean and free from dirt. Dirt entering the hydraulic system will invalidate warranty.

6.4.12 Folding Wings

When folding and unfolding of the Sward Slitter/Slit Injector side wings the working area of the machine should be free from other people.

Serious injury can occur if persons are hit by a folding or unfolding part or limbs get caught in one of the many pinch areas on the machine.

7. Coupling Up Of The Machine.

Never stand between the Sward Slitter/Slit Injector and the mounting vehicle.

Attach or detach hydraulic connections with the engine of the tractor switched off.

Make sure the hydraulic couplings, hydraulic hoses and electric cables are coupled in a way that there is not a chance of damage when machine is working.

The Machine should only be coupled up to a mounting vehicle by persons who have previously fully read and understood the following coupling instructions before commencing.

NEVER Use any pins and lock clips for coupling the Sward Slitter/Slit Injector other than the ones that were delivered with the machine or supplied as spare parts specifically for the Sward Slitter/Slit Injector.

The Maximum chamber operation pressure of the Vogelsang ExaCut fitted to the Sward Slit Injector should NEVER exceed 3 bars.

The Sward Slit Injector should be coupled up to the Tractor in the usual manner with the top link(s) adjusted so that when the machine is unfolded and in the work position the main beam of the machine is parallel with the ground.

If fitted attach the cable of the lights to the socket (standard 7-contact plug).

Connect all hydraulic connectors ensuring that the correct hoses are connected to the correct plugs.

LINE IDENTIFICATION COLOUR	No off x Size of Line	Function	Recommended Connection Valve
RED	2 x 3/8”	Folding of Wings	Double Acting Non Detent
GREEN	2 x 1/4”	Umbilical Line Feed Valve	Double Acting Non Detent
BLUE	2 x 1/2" 1 x 3/8”	Macerator/Distributor Feed Macerator/Distributor Drain	Double Acting Detent Pressure Free Return

Always attach or detach hydraulic connections with the engine of the tractor switched off.

Make sure the hydraulic couplings, hydraulic hoses and electric cables are coupled in a way that there is not a chance of damage when machine is working.

Check that the machine is connected to the mounting vehicle correctly and all functions operate correctly.

Place Sward Slitter/Slit Injector in the transport position - linkage fully up and wings folded in.

Check again that the machine is connected to the mounting vehicle correctly

Place the support legs in the transport position.

7.1 Before Driving Away

Before driving away with the Mounting Vehicle and the Sward Slitter/Slit Injector, the following points should be checked and followed:

- Check the entire technical condition of the machine.
- Check the locking of all couplings.
- Check the hydraulic system for leakages.
- Check slurry valves and hoses for leakages and good coupling.
- Check all the lights if applicable for a good operation.

7.1.1 Driving On Public Roads With The Sward Slit Injector

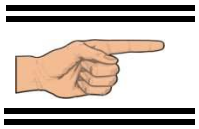
When driving with the machine on public roads ensure that you comply with all the local and national rules and laws for your type of vehicle.

8. Uncoupling Of The Machine

The Sward Slitter / Slit Injector should only be uncoupled on stable, flat and horizontal ground with the wings unfolded. All parking stands must be positioned before uncoupling.

Keep the following points in mind when uncoupling.

- Place the support legs in the right place.
- Let the Sward Slitter/Slit Injector down with the tractor linkage system.
- Switch of the engine of the tractor.
- Depressurize all hydraulic functions.
- Detach all hydraulic hoses place the dustcovers over connectors.
- Place all hydraulic hoses in a way that they cannot be damaged by other vehicles.
- Uncouple the light cable if applicable.
- Uncouple the Sward Slitter / Slit Injector from the linkage of the tractor.



Be aware of hydraulic down forces when uncoupling the Sward Slitter / Slit Injector

a.

9. USING THE MACHINE

All normal operation of the Slit Injector is done from the cab of the tractor.

It is very important when working with the Slit Injector, to follow and understand the following operating method

9.1 ENTERING WORK

1. Removing the Sward Sward Slitter safety transport pins.

2. Using the relevant hydraulic spool valve of the tractor SLOWLY fully unfold both wings of the Sward Slitter / Slit Injector.

3. Check that the Slit Injector coulter bars are in there top most position and adjust accordingly.

Figure 4 – Slit Injector coulter bar adjustment.

4. Using the tractor linkage control, drop the Sward Slitter / Slit Injector into the required working depth.

5. Adjust the Sward Slit Injector coulter bars to the most suitable working height; ideally the correct working height is achieved when the discharge nozzles are about 25mm (1in) clear of the ground.

6. Start travelling forward slowly.

7. Start the distributor / maccarator.

8. Open the main feed valve to the Sward Slit Injector.

N.B. If the main feed valve is opened before the distributor/macerator is started blockage of the distributor/macerator might occur.

9. Start the relevant Feed Pump

10. Adjust Forward speed untill desired application rate is achived.

When working normally slurry will stream out of all the outlet nozzles at a constant rate – If this is not the case stop the machine and investigate and solve the problem.

9.2 EXITING WORK

1. Stop the feed pump.
2. Close the main feed valve to the Sward Slit Injector.
3. Stop the distributor / maccarator.
4. Adjust the Sward Slit Injector coulter bar into its top most position
5. Fully fold in both wings of the Sward Slitter / Slit Injector
6. Insert Sward Slitter safety transport pins

Do not drive on the public road with the Slit Injector, if the wings are not folded, safety pins secured and relevant Tractor Valve locked!

9.3 OPERATING TIPS

9.3.1 BurnOut Of Macerator/Distributor Blades

Avoid running dry the ExaCut for longer than 30 seconds – Failure to do this will result in overheating of the blades causing blade sharpness to be lost.

9.3.2 Even Wear Of Macerator/Distributor Blades

It is advised that the direction of rotation of the macerator/distributor is changed periodically (e.g. For Each Bout Run). This will ensure that even wear of the macerator/distributor blades is achieved.

9.3.3 Unblocking of Macerator/Distributor

Under normal working conditions if the Macerator/Distributor hydraulic supply hoses are connected to a Detenting Spool Valve, as soon as a blockage occurs the Hydraulic Drive Motor of the Macerator/Distributor will stall causing the control leaver to jump out of detent, simply reversing the direction of rotation of the Macerator/Distributor by reversing the oil flow to the drive motor a few times is enough to usually enough to clear any blockage problem caused by foreign objects in the slurry. Once the blockage has been cleared return the control leaver to the detent position. If blockage still occurs stop the machine and do some further investigating of the reason.

10. MAINTENANCE

When maintenance or repairs are carried out to the Slit Injector the following Security measures should be followed.

Maintenance and repair activities may only be done by skilled people who have knowledge of the machine

10.1 Cleaning

To make sure that all parts of the Slit Injector function properly, the machine has to be cleaned regularly. Clean the machine after use (daily) with water.

10.2 Visual Examination

The following points should be examined regularly (weekly):

- Check slurry valves for damage/ leakages.
- Check hydraulic valves for damage / leakages.
- Check hydraulic joints for damage / leakages.
- Check hydraulic rams for leakages.

10.3 The ExaCUT Macerator/Distributor Maintenance

The distributor should be checked daily and should be kept as clean as possible. The air bleed hoses on the distributor should be kept in a clean and unblocked condition. To get an optimum lateral distribution of the slurry it is essential that the air bleed system works correctly.

Maintenance and repair work on the ExaCUT may only be done if the main engine spreader vehicle is turned off and the oil motor and outlet hoses are depressurized (hydraulic valve in floating position)!

Caution! Risk of injury!
The ExaCut has got sharp blades!

10.4 Initial Checking of Eccentric Adjuster Mounting Bolts

After first 50 operating hours retighten the countersunk screws of the eccentric adjuster to a torque of 24 Nm

10.5 Cleaning and checking

• Remove foreign bodies like stones through the stone trap at regular intervals (intervals depend on the amount of foreign bodies).

Attention!

• Clean the distributor while working slowly regularly with fresh water in order to keep the air pipe at the inner side of the distributor free. Rinse through air connections.

• Check the manoeuvrability of eccentric adjuster at regular intervals, remove it if necessary and keep it going.

• Thoroughly Clean and Lubricate the ExaCut also before long breaks in use.

• The ExaCut must be cleaned through the maintenance hatches and checked for wear.

• Lubricate the oil motor holding fixture with a lot of grease after cleaning in order to protect the sealingwasher´s running surface.

• All cutting surfaces have to be sprayed with biodegradable oil before long breaks in use.

Attention!

Before Any maintenance operations are carried out First turn off the tractor and put hydraulic valve in floating position!

• Open stone trap and empty the distributor. Then unscrew the lateral lid for maintenance. Grease cutting parts.

Attention!

If you demount the housing lid for cleaning, the eccentric adjuster will release. Before mounting the housing lid again, you have to preload the eccentric adjuster as described in section 14.3.4

10.6 Replacement of wear parts

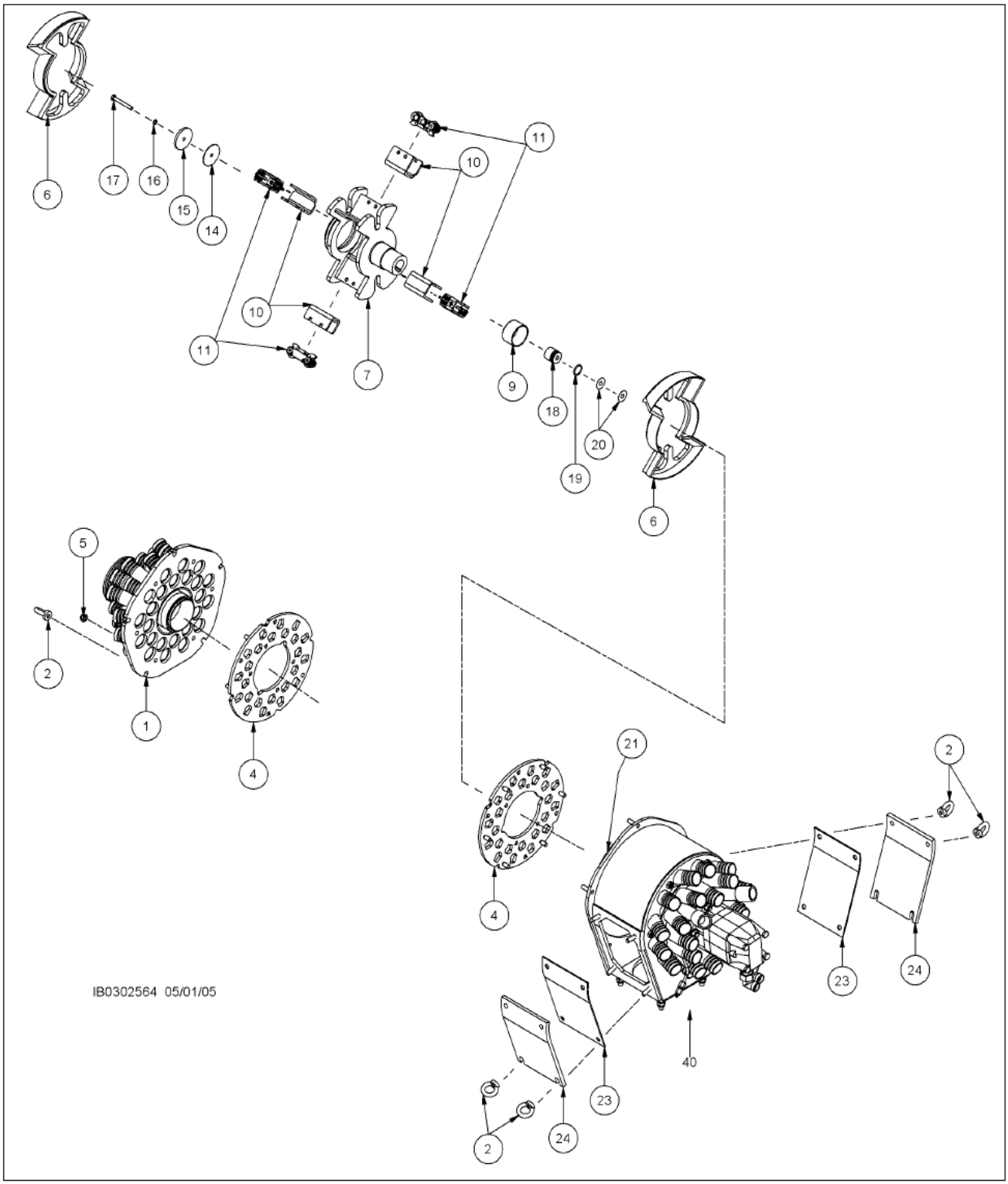


Figure 5 – ExaCut exploded diagram

Change cutting parts if the driving hub of the rotor stands out 8-10 mm out of the cutting part.

1. Turn off the engine of the tractor and put the hydraulic valve into floating position.
2. Open the stone trap and let the distributor drain.
3. Open lid for maintenance (pos.24+23).
4. Unscrew housing lid (pos.1) of the ExaCut.
5. Screw out the screws (pos.17) of the rotor (pos.7).
6. Pull off the rotor of the distributor (pos.7). Pay attention to the adjusting washers [pos.20]. If the distributor rotor won't come off, it's possible to pull off the rotor by using a hexagon head bolt M30 (see section 10.7)
7. Unscrew the nuts of the cutting rings (pos.5) from the rear side and remove the cutting rings (pos.4). Before mounting the new cutting rings clean the bearing surface and moisten the surrounding area of the threaded bolts with sealing compound, for example silicone. While screwing the nuts tight, apply a tightening torque of 28 Nm maximum.
8. Check control shaft sealing rings and bushes (pos.9) for wear, change it if required.
9. Lubricate Cell-PU sheet gasket (pos.8). Check for wear, change if required.
10. Clean lid seals (pos.21) and check for possible damage.
11. Preload the eccentric adjuster (pos.11) with a little water pump tong and lock it with spring cotter pins.(see chapter 10.8)
12. Fit the cutting blades (pos.6).
13. Grease bushes (pos.9) on the rotor. Mount rotor (pos.7) using a slight turning motion in order to protect the shaft sealing ring. Pay attention to the adjusting washers (pos.20) and distance sleeve (pos.18) with o-Ring (pos.19) between rotor and hydraulic motor.
14. Fit the cover (pos.1).
15. Check that the rotor is on central, adjust it, if required.
16. Remove spring cotter pins (while doing so you should hear a noise like a 'click' – the eccentric adjuster is rotating), close stone trap (pos.40) and lid for maintenance (pos.24+23).

10.7 Disassembly of rotor from hydraulic motor

Pull off the rotor form the hydraulic motor by using a hex. Head cap screw M30.

Remove the screw, the washer and the sealing.	
For centering the washer put a hex. head cap screw M10 x * into the boring of sleeve. (* max. 30 mm length)	
For pulling off the rotor from the motor, screw on a greased hex. head cap screw M30 into the rotor. After screwing in deeply enough, the rotor comes off from the motor.	

Please note:
In case of tight rotors it can be necessary to pull off without center-screw first and to use this method afterwards

10.8 Preloading the eccentric adjuster

First preload the eccentric adjuster manually and lock it with the R-Clip behind the hinge spring.

Caution!
Use gloves to avoid injury!

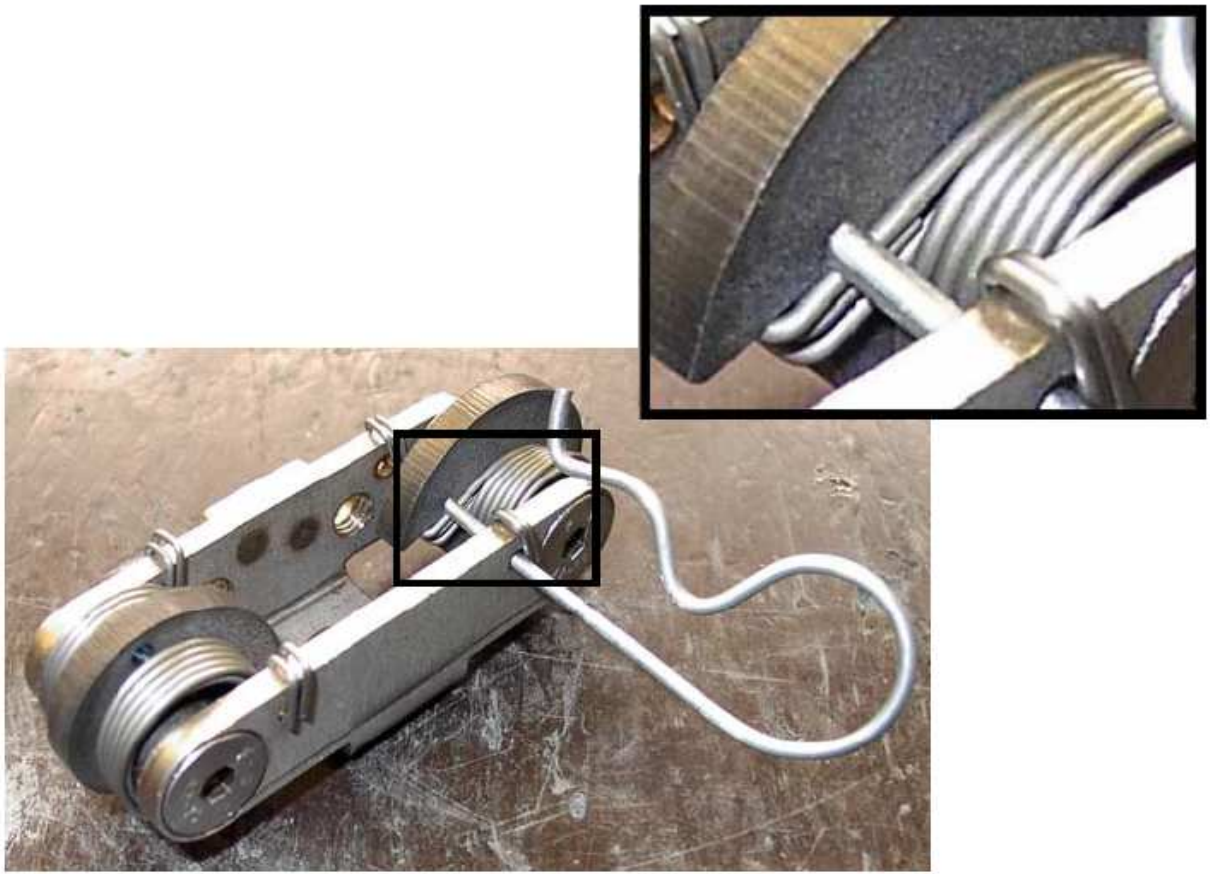


Figure 6 – Pre Loading Eccentric Adjuster

Then preload more using small water pump pliers so that the holes are in alignment and lock it in place through the holes with the R-Clip.

Figure 7 – Pre Loading Eccentric Adjuster

Important
Remove R-Clips through the maintenance hatch before fitting hatch cover.

10.9 Greasing schedule

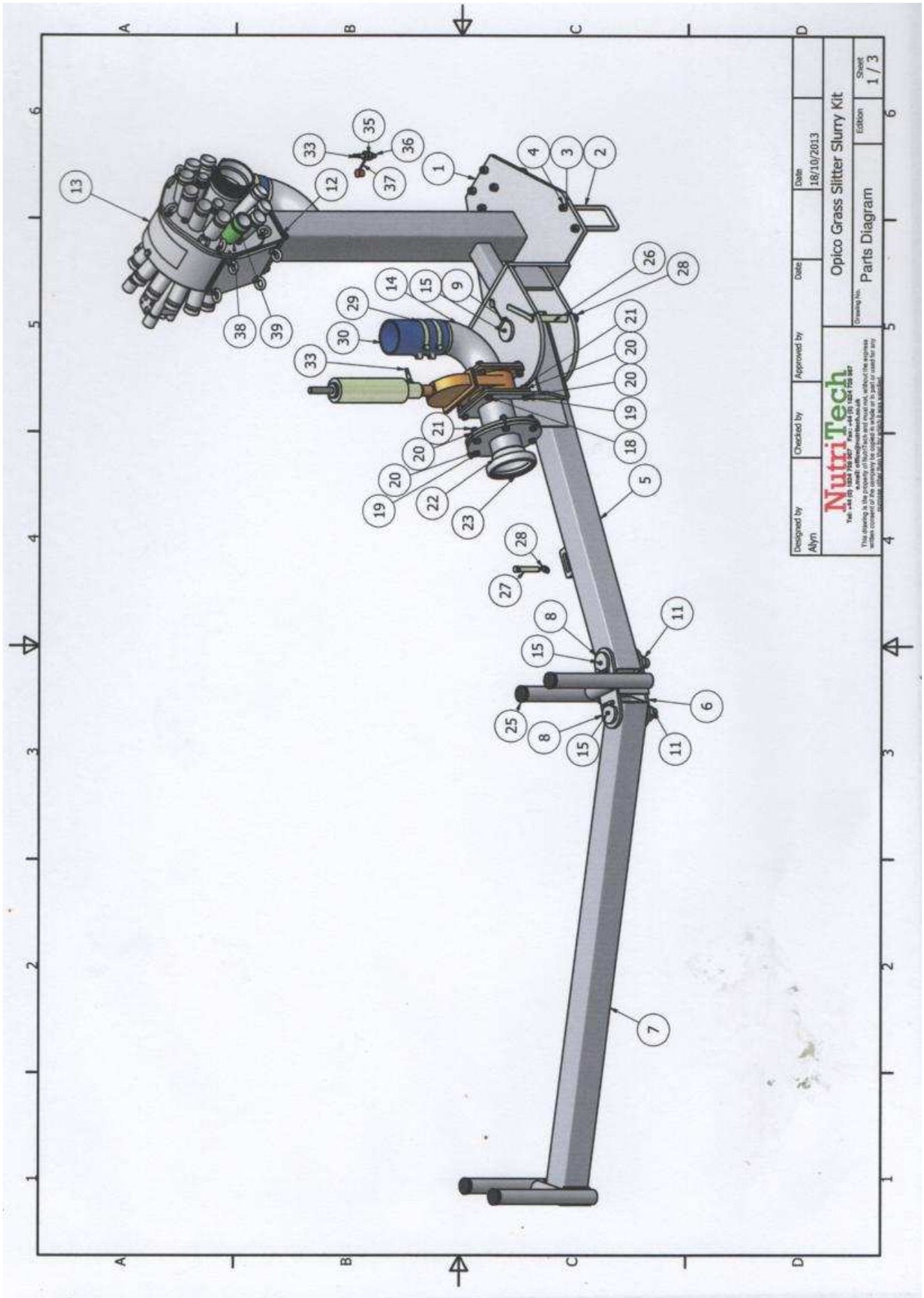
- Use EP2 grease EP2 or an equal type of grease.

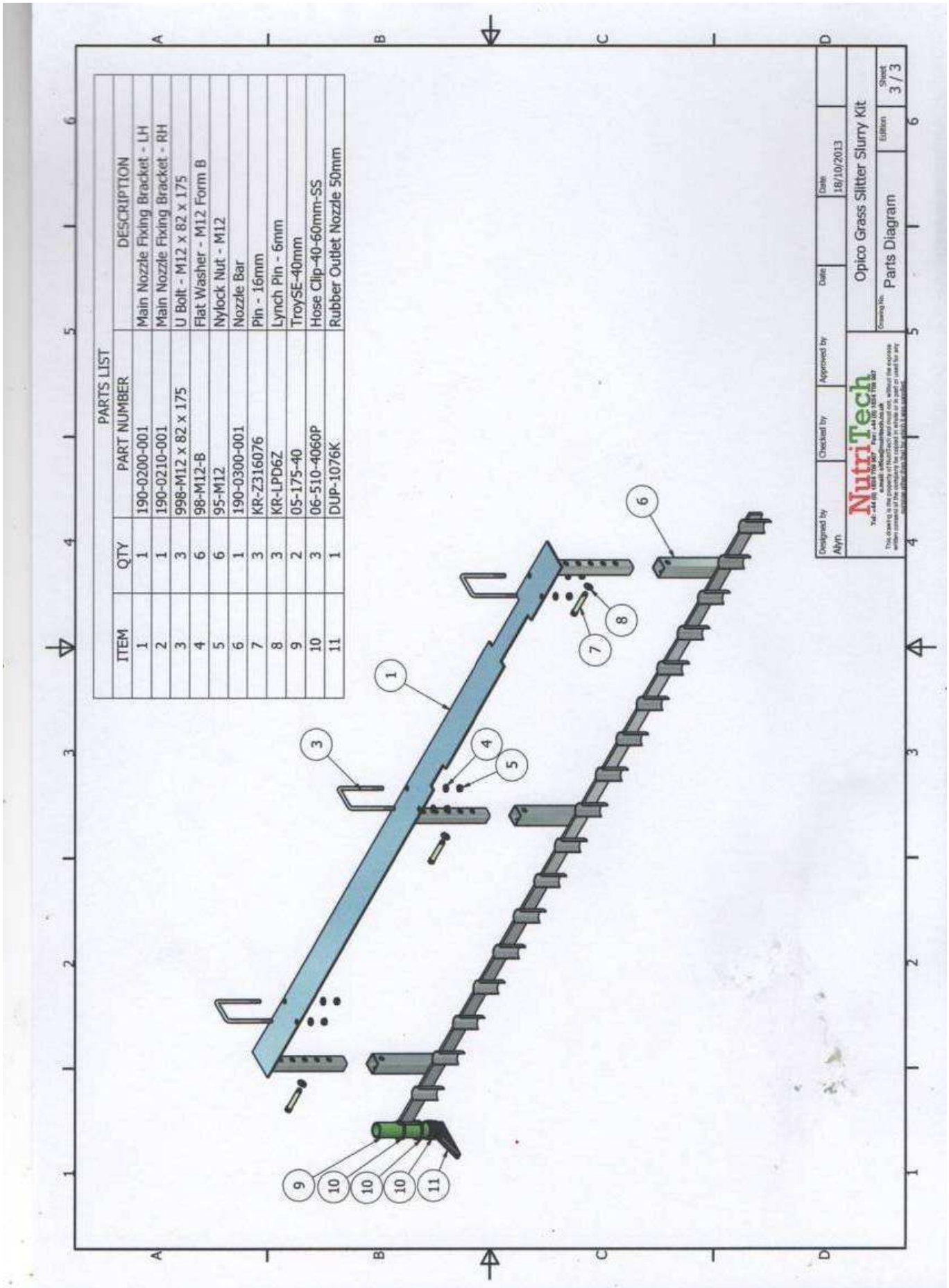
Never mix biological oil with non-biological types of oil.

Daily (after use)	Swing Arm Swivel Pins	• Grease nipple
	Grease Macerator/Distributor Hydraulic Motor Seal	• Grease nipple
Weekly	All Wing Swivel Pins	• Grease nipple

11. PROBLEMS AND REMEDIES

Fault	Possible cause	Remedy
ExaCut vibrates	• rotor`s rotation speed is to low • rotor clogged • ventilation clogged	• check hydraulic • clean ExaCut • rinse air pipes with water
insufficient cutting effect	• too high liquid manure capacity • cutting parts out of order • pretension element out of order • cutting parts do not move • rotor works too slowly	• reduce pump speed • change cutting parts • change pretension element • make cutting part practicable • check hydraulic
bad distribution pattern	• too low/high rotor speed • pot pressure too low • hose´s installation wrong • fibrous material under cutting part	• check the tractor´s oil delivery rate • increase flow rate quantity • see hose´s installation plan • remove fibrous material
only hoses are fed with liquid manure	• the rotor is clogged	• if possible, reverse rotor briefly • remove blockage • check hydraulic
You can't mount the cover	• eccentric adjuster is not preloaded	• preload eccentric adjuster


Opico Grass Slitter Slurry Kit
Parts Diagram
Date 18/10/2013
Sheet 1 / 3
Designed by Alyn
Checked by
Approved by
Date
Drawing No.
Edition
NutriTech



PARTS LIST

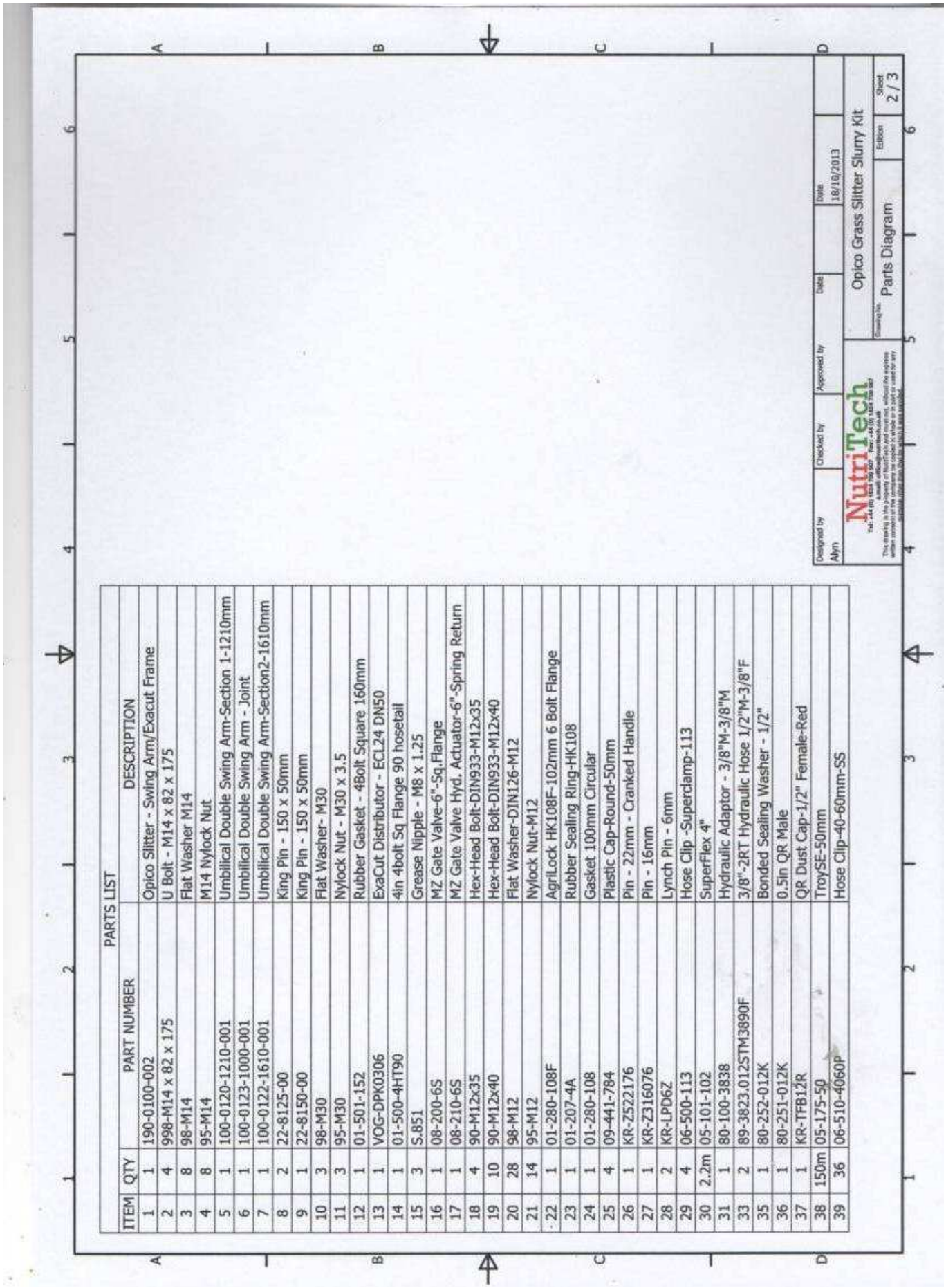
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	190-0200-001	Main Nozzle Fixing Bracket - LH
2	1	190-0210-001	Main Nozzle Fixing Bracket - RH
3	3	998-M12 x 82 x 175	U Bolt - M12 x 82 x 175
4	6	98-M12-B	Flat Washer - M12 Form B
5	6	95-M12	Nylock Nut - M12
6	1	190-0300-001	Nozzle Bar
7	3	KR-Z316076	Pin - 16mm
8	3	KR-LPD6Z	Lynch Pin - 6mm
9	2	05-175-40	TroySE-40mm
10	3	06-510-4060P	Hose Clip-40-60mm-SS
11	1	DUP-1076K	Rubber Outlet Nozzle 50mm

Designed by: Alyn | Checked by | Approved by | Date | Date: 18/10/2013

NutriTech

Opico Grass Slitter Slurry Kit

Drawing No. | Parts Diagram | Edition | Sheet 3 / 3



PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	190-0100-002	Opico Slitter - Swing Arm/Exacut Frame
2	4	998-M14 x 82 x 175	U Bolt - M14 x 82 x 175
3	8	98-M14	Flat Washer M14
4	8	95-M14	M14 Nylock Nut
5	1	100-0120-1210-001	Umbilical Double Swing Arm-Section 1-1210mm
6	1	100-0123-1000-001	Umbilical Double Swing Arm - Joint
7	1	100-0122-1610-001	Umbilical Double Swing Arm-Section2-1610mm
8	2	22-8125-00	King Pin - 150 x 50mm
9	1	22-8150-00	King Pin - 150 x 50mm
10	3	98-M30	Flat Washer- M30
11	3	95-M30	Nylock Nut - M30 x 3.5
12	1	01-501-152	Rubber Gasket - 4Bolt Square 160mm
13	1	VOG-DPK0306	ExaCut Distributor - ECL24 DN50
14	1	01-500-4HT90	4in 4bolt Sq Flange 90 hosetail
15	3	S.851	Grease Nipple - M8 x 1.25
16	1	08-200-6S	MZ Gate Valve-6"-Sq.Flange
17	1	08-210-6S	MZ Gate Valve Hyd. Actuator-6"-Spring Return
18	4	90-M12x35	Hex-Head Bolt-DIN933-M12x35
19	10	90-M12x40	Hex-Head Bolt-DIN933-M12x40
20	28	98-M12	Flat Washer-DIN126-M12
21	14	95-M12	Nylock Nut-M12
22	1	01-280-108F	AgriLock HK108F-102mm 6 Bolt Flange
23	1	01-207-4A	Rubber Sealing Ring-HK108
24	1	01-280-108	Gasket 100mm Circular
25	4	09-441-784	Plastic Cap-Round-50mm
26	1	KR-Z522176	Pin - 22mm - Cranked Handle
27	1	KR-Z316076	Pin - 16mm
28	2	KR-LPD6Z	Lynch Pin - 6mm
29	4	06-500-113	Hose Clip -Superclamp-113
30	2.2m	05-101-102	SuperFlex 4"
31	1	80-100-3838	Hydraulic Adaptor - 3/8"M-3/8"M
33	2	89-3823.012STM3890F	3/8"-2RT Hydraulic Hose 1/2"M-3/8"F
35	1	80-252-012K	Bonded Sealing Washer - 1/2"
36	1	80-251-012K	0.5in QR Male
37	1	KR-TFB12R	QR Dust Cap-1/2" Female-Red
38	150m	05-175-50	TroySE-50mm
39	36	06-510-4060P	Hose Clip-40-60mm-SS

Designed by: Alyn | Checked by | Approved by | Date | Date: 18/10/2013

NutriTech

Opico Grass Slitter Slurry Kit

Parts Diagram

Edition | Sheet 2 / 3