Read the operators manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

Illustrations may show optional equipment not supplied with standard unit.
If you require a copy of this document in your native language please contact your dealer or Great Plains.
DECLARATION OF CONFORMITY

Great Plains UK Ltd. hereby declare that the Great Plains Simba Flatliner 500, as defined by the Serial Number attached to the Machine Chassis, conforms with the following Directives and Regulations, and has been certified accordingly.

EC Machinery Directive 2006/42/EC.

The Supply of Machinery (Safety) Regulations 2008.


Specifically related harmonised standards are:

EN ISO 12100-1: 2003 (Safety of Machinery).


THE MANUFACTURER:

Great Plains UK Ltd.
Woodbridge Road
Sleaford
Lincolnshire
NG34 7EW
England

Telephone (+44) (0)1529 304654.

CERTIFIED ON BEHALF OF GREAT PLAINS UK LTD.:  

Colin Adams
Managing Director
WARRANTY
TERMS AND CONDITIONS

In this warranty Great Plains UK Ltd., is referred to as "the Company".

1. Subject to the provisions of this warranty the Company warrants each new machine sold by it to be sold free from any defect in material or workmanship for a period of 12 months from date of installation with the end-user.

Some specific items have additional warranty over and above the standard 12 months. Details of these can be obtained upon request directly from the distributor or Great Plains UK Ltd.

2. If the machine or part thereof supplied by the Company is not in accordance with the warranty given in clause 1 the Company will at its option:

(a) make good the machine or part thereof at the Company’s expense, or
(b) make an allowance to the purchaser against the purchase price of the machine or part thereof, or
(c) accept the return of the machine and at the buyer’s option either:
   I) repay or allow the buyer the invoice price of the machine or part thereof, or
   II) replace the machine or part thereof as is reasonably practical.

3. This warranty shall not oblige the Company to make any payment in respect of loss of profit or other consequential loss or contingent liability of the Purchaser alleged to arise from any defect in the machine or impose any liability on the Company other than that contained in clause 2.

4. Any claim under this warranty must be notified to the Company in writing specifying the matters complained of within 14 days from the date of repair.

5. Any claim under this warranty must be made by the original purchaser of the machine and is not assignable to any third party.

6. If the purchaser hires out the machine to any third party the warranty shall apply only to matters notified to the Company in writing within 90 days of the date of delivery and clause 1 shall be read as if the period of 90 days were substituted for the period of 12 months.

7. The warranty will cease to apply if:

(a) any parts not made, supplied or approved in writing by the Company are fitted to the machine or any repair is carried out to the machine other than by or with the express written approval of the Company or
(b) any alterations not expressly authorized by the Company in writing are made to the machine or the machine is damaged by accident or
(c) the machine is abused or overloaded or used for a purpose or load beyond its design capabilities, or used in conjunction with a tractor whose power output capability exceeds the stated implement power requirement by more than 40%. For the purpose of these terms and conditions, “stated implement power requirement” refers to wheeled tractors unless specifically stated. These power requirements should be reduced by 20% when used in conjunction with tracked tractors.
(f) the machine is operated as part of a ‘cultivation train’ where more than one implement is being towed, without the express written approval of Great Plains UK Ltd.
(g) any maintenance is not carried out in accordance with the service schedules in the operator's manual.
(h) the Installation and Warranty Registration Certificate is not received by Great Plains UK Ltd., Service Dept., Woodbridge Road, Sleaford, Lincolnshire, England, NG34 7EW, within 7 days of installing a new machine.
# Machine Identification

Enter the relevant data in the following list upon acceptance of the machine:

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Type of Machine</th>
<th>Machine Width</th>
<th>Year of Construction</th>
<th>Delivery Date</th>
<th>First Operation</th>
<th>Accessories</th>
</tr>
</thead>
</table>

**Dealer Address:**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Street:</th>
<th>Place:</th>
<th>Tel.:</th>
</tr>
</thead>
</table>

Dealer’s Customer No.: ______________________________

**Great Plains Address:**

Great Plains UK Ltd.
Woodbridge Road Ind. Est.
Sleaford
Lincolnshire
NG34 7EW

Tel.: +44 (0) 1529 304654
Fax: +44 (0) 1529 413468
E-Mail: simba@greatplainsmfg.com

Great Plains Customer No.: ______________________________
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Introduction

Foreword
Make sure you have read and follow the Operating Instructions carefully before using the machine. By doing so, you will avoid accidents, reduce repair costs and downtime and increase the reliability and service life of your machine. Pay attention to the safety instructions!

Great Plains will not accept any responsibility for any damage or malfunctions resulting from failure to comply with the Operating Instructions.

These Operating Instructions will assist you in getting to know your machine and in using it correctly for its intended purposes. First, you are given general instructions in handling the machine. This is followed by sections on servicing, maintenance and the action to be taken should a malfunction occur.

These operating instructions are to be read and followed by all persons working on or with the machine, e.g.:

- Operation (including preparation, remedying of faults in the operating sequence and servicing).
- Maintenance (maintenance and inspection)
- Transportation.

Together with the Operating Instructions, you receive a Spare Parts List and a Machine Registration form. Field service technicians will instruct you in the operation and servicing of your machine. Following this, the Machine Registration form is to be returned to your dealer. This confirms your formal acceptance of the machine. The warranty period begins on the date of delivery.

We reserve the right to alter illustrations as well as technical data and weights contained in these Operating Instructions for the purpose of improving the machine.

Warranty Guidelines
The period of liability for material defects (warranty) relating to our products is 12 months. In the case of written deviations from the statutory provisions, these agreements shall apply.

They shall become effective upon installation of the machine with the end customer. All wear parts are excluded from the warranty.

All warranty claims must be submitted to Great Plains via your dealer.
1. Safety Data

The following warnings and safety instructions apply to all sections of these Operating Instructions.

1.1 Safety Symbols

On the machine

- Read and observe the Operating Instructions before starting up the machine!

- Keep clear of the working range of foldable machine components!

- Watch out for escaping pressurised fluids! Follow the instructions in the Operating Instructions!

- No passengers are allowed on the machine!

- Never reach into areas where there is a danger of being crushed by moving parts!

- Never reach into any revolving parts!
Refer to Operating Instructions before attempting maintenance.

Operating Instructions:

The Operating Instructions distinguish between three different types of warning and safety instructions. The following graphic symbols are used:

- **Important!**
- **Risk of injury!**
- **Risk of fatal and serious injuries!**

It is important that all the safety instructions contained in these Operating Instructions and all the warning signs on the machine are read carefully.

Ensure that the warning signs are legible. Replace any signs that are missing or damaged.

These instructions must be followed in order to prevent accidents. Inform other users of the warnings and safety instructions.

Do not carry out any operations which may affect safe use of the machine.

All references to left and right in this manual are made from the rear of the machine, facing the direction of travel (unless otherwise stated).
1.2 Use for the Intended Purpose

The Great Plains Simba Flatliner 500 is built using the latest technology and in accordance with the relevant recognised safety regulations. However, risks of injury for the operator or third parties and impairment of the machine or other tangible assets can arise during use.

The machine is only to be operated when in a technically perfect condition and for the intended purpose, taking into consideration safety and risks and following the Operating Instructions. In particular, faults that can impair safety are to be remedied immediately.

Original parts and accessories from Great Plains have been specially designed for this machine. Spare parts and accessories not supplied by us have not been tested or authorised. Installation or use of non-original Great Plains products may have a detrimental effect on specific design features of the machine and affect the safety of machine operators and the machine itself. Great Plains will accept no liability for damage resulting from the use of non-original parts or accessories.

The Great Plains Simba Flatliner 500 is designed solely as a cultivation implement. Use for any other purpose, e.g., as a means of transport, will be deemed to be improper use. Great Plains will accept no liability for damage resulting from improper use. The risk will be borne solely by the operator.

Use of the Simba Flatliner 500 behind high power tractors (in excess of 40% above the maximum recommended) can lead to high loads and stresses which can cause long term structural damage to the chassis and key components. Such overloading can compromise safety and is to be avoided.

1.3 Operational Safety

The machine is to be put in operation only after instruction has been provided by an employee of the authorised dealer or an employee of Great Plains. The “Machine Registration” form is to be completed and returned to your dealer.

All protective and safety equipment, such as removable protective equipment, must be in place and functioning reliably before the machine is put in use.

- Check screws and bolts regularly for tightness and retighten if necessary.
- In the event of malfunctions, stop and secure the machine immediately.
- Ensure that any faults are remedied immediately.

1.4 No Liability for Consequential Damage

The Simba Flatliner 500 has been manufactured with great care. However, problems may still occur when it is used for the intended purpose. These may include:

- Worn wearing parts.
- Damage caused by external factors.
- Incorrect driving speeds.
- Incorrect setting of the unit (incorrect attachment, non-adherence to the Setting instructions).

Therefore, it is crucial to always check your machine before and during operation for correct operation and adequate application accuracy.

Compensation claims for damage which has not occurred to the machine is excluded. This includes any consequential damage resulting from incorrect operation.
1.5 Road Traffic Safety
When driving on public roads, tracks and areas, it is important to observe the relevant road traffic laws as well as the specific regulations relating to this machine.

Pay attention to the permitted axle loads, tyre carrying capacity, and total weight in order to maintain adequate braking and steerability (these figures are shown on the serial plate).

Passengers on the machine are strictly forbidden!

Max. road transport speed 16mph (25km/h).

1.6 Accident Prevention
In addition to the Operating Instructions, it is important to observe the accident prevention regulations specified by agricultural trade associations. It is the Operator’s responsibility to ensure that all other persons are excluded from the danger zones surrounding or on the machine during its operation.

It is the Owner’s responsibility to ensure:

• the Operator is trained and competent to use the machine & tractor,
• the tractor is suitable for the machine
• adequate Risk and COSHH assessments have been undertaken regarding the machine’s use. Specifically, these include issues concerning contact with the soil, dust, crop residues, chemicals, lubricants and other compounds during operation or maintenance, and the possibility of stones being ejected at high speed during work.

Beware of trapping hazards when manipulating the parking stands or other moving parts. Ensure any heavy components are fully supported when removing pins / bolts.

1.6.1 Hitching-up the machine
There is a risk of injury when hitching/unhitching the machine. Observe the following:

• Secure the machine against rolling.
• Take special care when reversing the tractor!
• There is a risk of being crushed between the machine and the tractor!
• Park the machine on firm, level ground.

1.6.2 On the Hydraulic System
Do not connect the hydraulic lines to the tractor until both hydraulic systems (machine and tractor) are depressurised.

Any hydraulic system containing an accumulator can remain under pressure permanently (even after following manual depressurisation procedures with a tractor / implement combination). It is therefore important to check all lines, pipes, and screw connections regularly for leaks and any recognisable external damage.

The hydraulic circuit contains specialised fittings which should not be tampered with under any circumstances. Do not attempt to modify hose routings or hose clamping arrangements, doing so may cause serious damage to the machine and/or injury.
Only use appropriate aids when checking for leaks. Repair any damage immediately. Spurting oil can cause injuries and fires!

In case of injury, contact a doctor immediately.

The socket and plugs for the hydraulic connections between the tractor and the machine should be colour-coded in order to avoid incorrect use.

Do not stand on the machine while it is in operation!

Operators must have a valid driving licence in order to drive on public roads. In the operating area, the operator is responsible for third parties.

The person in charge must:

- provide the operator with a copy of the Operating Instructions, and
- ensure that the operator has read and understood the instructions.
- make sure that the operator is aware of the specific regulations relating to the machine when driving on public roads.

1.6.3 Changing Equipment

- Secure the machine to prevent it from accidentally rolling away!
- Use suitable supports to secure any raised frame sections suspended above you!
- Caution! Risk of injury due to projecting parts!

Never climb on to rotating parts such as the roll unit. These parts may rotate causing you to slip and suffer serious injury!

Removing components during maintenance may affect the stability of the machine. Ensure it is fully supported in case of unexpected weight shifts.

1.6.4 During Operation

Ensure that the working range and the area around the machine are clear (children!) before operating the machine.

Always ensure adequate visibility!

Fig. 1.01: HydraulicTaps

1.7 Servicing & Maintenance

Ensure that regular checks and inspections are always carried out within the periods required by law or specified in these Operating Instructions.

When carrying out service and maintenance work always:

- switch off the tractor engine and remove the ignition key.
- wait until all the machine parts have stopped moving.
- depressurise the hydraulic system.

Many hydraulic circuits contain lock or overcentre valves which can retain pressure in the lines even after depressurising the tractor side of these circuits. If in doubt, consult trained personnel (such as your local Great Plains Dealer) to ensure such valves are depressurised to the correct procedure before removing or servicing any parts connected downstream of these valves.
Check all hydraulic lines for leaks, loose connections, chafe marks and damage. Remedy any deficiencies immediately! Pay particular attention to hose renewal intervals as outlined in the specific sections which follow. ALL hydraulic hoses have a safe maximum working life of 6 (SIX) years from date of installation, provided they remain in a safe condition. Hoses which exceed 6 years of age should be replaced, or inspected and certified by a suitably qualified person to have an extended life period which should be recorded.

Pay particular attention to those items which require specialist service tools or training to be carried out by qualified personnel. Do not attempt to service these items yourself! These include items retaining pressure (e.g. accumulator circuits), or force (e.g. spring tines), and DD Rolls of any type.

Prior to performing maintenance and servicing work, ensure that the machine is positioned on solid, level ground and is secured to prevent it rolling away. Do not use any parts to climb on to the machine unless they are specifically designed for this purpose.

Before cleaning the machine with water, steam jets (high-pressure cleaning apparatus) or other cleaning agents, cover all openings into which, for reasons of safety or operation, no water, steam or cleaning agents are to penetrate (bearings, for instance).

Lubricate all the lubricating points to force out any trapped water.

When carrying out servicing and maintenance work, retighten any loose screw connections.

When servicing the machine take precautions against soil, dust, seed coatings, oil or any other hazardous substances that you might encounter.

On a new machine tighten all nuts and bolts after 5 hours work and again after 15 hours. This also applies to parts that have been moved or replaced. After the initial 15 hours of work a once a week check should be sufficient depending on daily work rates.

1.8 Operating Areas
The operating areas include the drawbar, hydraulic connections and depth adjustment equipment as well as all operating points requiring maintenance.

All operating areas will be specified and described in detail in the following chapters on servicing and maintenance.

Observe all safety regulations included in the section dealing with Safety, and in the subsequent sections.

1.9 Authorised Operators
Only those persons who have been authorised and instructed by the operator may operate the machine. The operator must be at least 16 years of age.

1.10 Protective Equipment
For operation and maintenance, you require:

• Tight fitting clothing.

• Strong protective gloves (to provide protection against sharp-edged machine components).

• Protective goggles (to stop dirt getting into your eyes).
2. Transportation and Installation

Transportation and initial installation of the machine are described in this chapter.

2.1 Delivery

The machine is normally delivered, fully assembled, on a (low-bed) truck.

- The machine can be lifted off with a crane, fork-lift truck, or other suitable lifting equipment. When doing so, the weights (see Technical Data), the centre of gravity and the attachment points on the machine are to be taken into account. Depending on the lifting gear, attachment is only to be at appropriate points on the frame.

- The machine can be hitched to a tractor and driven off a low-loader.

2.2 Transportation

The Simba Flatliner 500 can be transported on public roads by hitching it up to a tractor or on a low-bed truck.

- It is important to observe the permitted dimensions and weights when transporting the machine.

- Use suitable lifting gear, e.g. a fork-lift truck.

- If the machine is transported on a trailer or a flat-bed truck, it must be secured using straps or other devices.

- Before transporting the machine on public roads, it must be adjusted to its transportation position and the stipulations relating to road transportation fulfilled.

- The maximum permissible speed is 25 km/h.

2.3 Installation

When carrying out installation and maintenance work there is a higher risk of injury. It is important that you familiarise yourself with the machine and read the Operating Instructions beforehand.

Operator instruction and initial installation of the machine are carried out by our service technicians or authorised distributors.

The machine must not be used in any way beforehand! The machine can only be released for operation after instructions have been provided by our service technicians or authorised distributors.

- If any modules or parts have been removed for transportation, these shall be mounted by our service technicians/authorised dealers before the instruction takes place.

- Check all important screw connections!

- Lubricate all nipples and joints!
2. Transportation / Installation

2.4 Hitching Up

2.4.1 Hitching up a Tractor to the Simba Flatliner 500 / Preparing for Transport

If the machine was parked unfolded ensure that it is fully raised, then fold using the wing cylinders.

When hitching-up the machine, ensure that no-one is between the tractor and the machine.

Tractor Oil Flow Adjustment: As a general rule the tractor oil flow rate should be set in the lowest setting before starting. This can then be increased to allow the desired rate of operation as applicable. This will minimise excessive oil flow and consequent power usage and heat generation.

1. Ensure the tractor hydraulics are depressurised and in the locked or closed (not float) setting.
2. Couple the hydraulic hoses to the tractor ensuring that the two wing hoses (yellow) are together, the roll circuit hoses are together and the tine circuit hoses (if applicable) are together.
3. Connect the tractor to the machine using the hydraulics to raise or lower the the height of the tractor lower link arms.
4. When the lower link arms are aligned fit the lower link pins and the lynch pins.
5. Fit the tractor toplink between the tractor and the machine.
6. Raise the machine using the tractor link arms.

When driving on the road, raise the machine completely to prevent the working elements dragging on the ground.

2.5 When driving on the road

When driving on the road the machine must be converted to the transportation position.

When driving on the road, the machine should be parked, if possible, indoors or under cover.

When manoeuvring the machine, pay attention to your surroundings. Ensure that nobody is in the manoeuvring area (watch for children!).

- Unfold the machine.
- Extend the roll cylinders to lower the rolls. Add shims to the cylinders.
- Lower the parking stands into the parking position.
- Lower the machine to the ground ensuring that it is stable.
- Remove the toplink and lower the link arms so that pins can be removed.
- Switch off the tractor.
- Disconnect hydraulic and electric lines from the tractor.

Fig. 2.01: Parking Position

2.6 Parking the machine

In order to avoid damage as a result of moisture, the machine should be parked, if possible, indoors or under cover.
### 3. Technical Data
Simba Flatliner 500

<table>
<thead>
<tr>
<th></th>
<th>Shear Tine Models</th>
<th>Trip Reset Tine Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Width (mm)</td>
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<tr>
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<tr>
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<tr>
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<tr>
<td>Tines Qty/Spacing (mm)</td>
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</tr>
<tr>
<td>Power Requirement (Hp)*</td>
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<td>210-360</td>
</tr>
</tbody>
</table>

* It is important to correctly match your implement to your tractor for optimum performance.
4. Adjustment/Operation

4.1 Description

The Great Plains Simba Flatliner 500 is a heavy duty ‘V’ framed subsoiler designed to operate at depths of 300-500mm. Adjustable tine clamps offer flexibility of spacing to provide optimum shatter. Depth control is achieved using the rear roll, ensuring maximum consolidation.
4.2 Tines

The Simba Flatliner 500 is fitted with with Pro-Lift tines and points. The tines are arranged in a ‘V’ frame to give lower draft requirements and the ability to work progressively deeper.

Different wings are available to suit the soil conditions and optimise the performance of the machine.

Main working depth is set using the rear roll. On machines fitted with shear-bolted tines coarse tine depth can be adjusted by moving the tines up and down in the adjustable clamps.

4.3 Pro-Lift Wings

- Standard Wing
  P09060
  - Maximum soil disturbance with minimum draft requirement under normal circumstances.
  - Wing angle reduces wear rates on leg.

- Extra Lift Wing
  P10392
  - Increased lift height and rake angle creates greater soil disturbance on all soil types especially in moister conditions.
  - Lower relative distance between edge of wing and point reduces draft requirement.
  - Has ability to work at lower depths with no decrease in soil disturbance or risk of smear.

- Extra Wide Wing
  P10411
  - Improved lateral shatter in moist/wet soils, or non-cohesive soils.
  - Ideal for deep vegetable applications under light/medium soils.

- Wear Shroud
  P11181
  - Wear plate to take soil abrasion so lower trailing edge of tine does not wear.
4.4 Double Disc Roller

The standard DD600 roller is made up of individual Double Disc (patented) Ring segments.

The DD rings are designed to consolidate the soil whilst cutting and crushing any clods.

Even in heavy, wet soils it can easily be operated with minimal blockages occurring.
4.5 Operation

With the Simba Flatliner 500 mounted on the tractor three-point linkage, lower the machine until the foot of the leading tine is resting on the ground. The trailing tines should be 50 to 125mm clear of the ground, depending on the width of the implement and what the desired operating depth is to be. Set the trailing tines by adjusting the length of the toplink (A).

Once in work the operating depth of the machine has to be controlled by the roll unit or else it will attempt to go deeper. The roll unit is set using shims in the roll cylinders (B).

The roll unit serves two functions; it conserves soil moisture, breaking up any clods left by the tines and limits the operating depth of the machine. The pressure that may be exerted upon the clods by the roll is limited by the weight of the implement and the downward tine thrust. This downward thrust can be increased by fitting wider wings, or slightly increasing the angle of the points and wings (shortening the toplink - A), and by minimising any draft control setting on the tractor. This is the first area to be investigated, if more crumbler pressure should be required. Draft control can also inhibit initial penetration if the implement is lowered too quickly on the move into work. The rapid increase in draft is sensed by the tractor, which then inhibits further penetration. The solution is to gradually lead the implement into work, thereby not imposing a rapid increase in pulling force.

In most cases where a significant roll pressure is required it is advisable to eliminate draft control if possible.

The Simba Flatliner 500 must run reasonably level or slightly nose down to achieve consistent results across its width and any increase in downward thrust will significantly increase the pull required.
If the roll is exerting too much pressure for the conditions, but if raised will cause the machine to operate too deeply, then draft control may have to be used. The operating depth can be controlled to a certain extent by lengthening the tractor top link. This causes the implement to run tail down and reduces the downward thrust on the points and wings, reducing the shattering effect of the tines.

The lowest draught requirement is achieved when the machine is slightly tail down (all points touching the ground at the same time). However the best shattering effect is achieved when the main frame is running level, this attitude being more desirable.

**Hard/Dry Conditions**

The Simba Flatliner 500 achieves best results in dry conditions but under very hard/dry conditions it may produce large clods of soil at the surface. If the roll unit is unable to break these clods down effectively this may be overcome by removing the tines and increasing the spacing, or an initial precultivation at 50 to 100mm (eg. Disc) depth to eliminate the possibility of forming large clods from soil at this depth.

**Surface Trash**

The ‘V’ shape of the Flatliner frame is ideal for fields with surface trash as there are few places for blockages to occur, but under extreme conditions fouling may still be evident. This can be overcome by either increasing the mainframe to ground clearance of the implement (by lowering the tines in their clamps) or by removing some tines if necessary.

### 4.6 Using Shims

Before using shims to alter machine settings ensure the machine is stationary and the tractor is turned off with the keys out. Ensure that all operators are clear of the machine and that no load is being held on any existing shims in the cylinder / depth control rod.

To fit the shims hold them by the handle and, using a firm action, clip them onto the rod as shown in Fig. 4.05. They are removed by using a finger to pull firmly on the handle.

- Check the cylinder / depth control rod for damage and debris before fitting shims.
- Only attempt to add or remove shims using the handle. Trying to manipulate shims using the jaws could result in injury.
- When changing machine settings ensure both sides of the machine mirror each other. The left hand cylinder should contain the same amount of shims as the right, for example. Failure to do this could result in damage to the machine.
4.7 Work Instructions

Driving speed
The Simba Flatliner 500 should be driven within a speed range of 7-10 km/h.

This depends on the field conditions (type of soil, surface trash, etc.).

Drive more slowly if the conditions are difficult.

Turning:
Before turning, the machine should be eased out of work while driving. Likewise, it should eased back into work once the turn has been completed.

4.8 Parking the machine
In order to avoid damage as a result of moisture, the machine should be parked, if possible, indoors or under cover.

When manoeuvring the machine, pay attention to your surroundings. Ensure that nobody is in the manoeuvring area (watch for children!).

• Unfold the machine.
• Extend the roll cylinders to lower the rolls. Add shims into the cylinders.
• Lower the parking stands into the parking position.
• Lower the machine to the ground ensuring that it is stable.
• Remove the toplink and lower the link arms so that pins can be removed.
• Switch off the tractor.
• Disconnect hydraulic and electric lines from the tractor.

4.9 Checks
The working quality depends on the adjustments and checks made prior to and during work, as well as on regular servicing and maintenance of the machine.

Before beginning work it is therefore important to carry out any necessary servicing and to lubricate the machine as required.

Checks prior to, and during work:
• Is the machine correctly hitched up and the coupling device locked?
• Is the machine in a level operating position and the working depth set correctly?

Working Elements
• Are the tines and other cultivation tools in a serviceable condition?
• Are the scrapers still operable, so that the rolls do not jam?
5. Servicing and Maintenance

Follow the safety instructions for servicing and maintenance.

Specialist equipment is required for the disassembly of Double Disc axles. Please consult your dealer under any circumstances that require disassembly of these axles.

5.1 Servicing

Your machine has been designed and constructed for maximum performance, operational efficiency and operator friendliness under a wide variety of operating conditions.

Prior to delivery, your machine has been checked at the factory and by your authorised dealer to ensure that you receive a machine in optimum condition.

To ensure trouble-free operation, it is important that servicing and maintenance work is performed at the recommended intervals.

5.2 Cleaning

In order to ensure that the machine is always in operating condition and to achieve optimum performance, perform the cleaning and servicing work at regular intervals.

Avoid cleaning the roll bearings with a high-pressure hose or a direct water jet. The housing, screwed connections and ball bearings are not watertight.

5.3 Changing Tine Points and Wings

When changing the tine points and wings it is important to observe safe working practices.

- The machine should be raised and the parking stands should be put into the lowest setting.
- Fully extend the roll cylinders and add shims in.
- Lower the machine so it is supported by the roll and parking stands
- While still attached to the tractor, the tine points will be clear of the ground allowing for the maintenance to take place (remove the tractor key for safety).

Do not attempt to assist fitting tine points with a steel headed hammer, as this can lead to splintering of the metal due to its hardness, which can cause injury. If tine fitting requires assistance, a copper/hide mallet should be used. Wear eye protection.

5.4 Hydraulics

A low oil flow should be used, i.e., tractor tickover or low flow selected.

Exercise extreme care when checking the valve or circuits, and under no circumstances attempt to adjust or loosen fittings without prior reference to your authorised dealer, and detailed maintenance instructions.

The hydraulic circuit contains specialised fittings which should not be tampered with under any circumstances. Do not attempt to modify hose routings or hose clamping arrangements, doing so may cause serious damage to the machine and/or injury.
5.5 Trip Reset Tine Hydraulics

The circuit allows for the tines to be pressurised down into work where a relief valve allows the tine to trip up if necessary.

In normal operation, oil is locked in the cylinder circuit at a pressure determined by the relief valves.

De-pressurising the Circuit

To de-pressurise the circuit, identify and adjust the following valves on the Tine Control Manifold.

All valves can be identified by stamped codes adjacent to each valve (above).

1. Set tractor hydraulics to neutral, machine raised.
2. Adjust accumulator relief valve (marked 2 / coloured red) fully anticlockwise. If necessary, note the number of turns that it takes for the system to be reset.
3. Adjust relief (marked 1 / coloured green) fully anticlockwise. If necessary, note the number of turns that it takes for the system to be reset.
4. Set tank return line circuit to float or down to return oil to tractor.
5. Set main system to float, or allow oil pressure to be released in both directions.
6. Refer to pressure gauge on machine. Ensure it reads zero before attempting any maintenance. Repeat the above procedure until gauge reads zero in all circumstances.

Follow detailed setting sequence on page 26 to reset the system prior to returning to work, or alternatively revert the above valves back to their original setting (number of turns).
5.6 Setting Trip-Reset Tine Hydraulics

The circuit allows for the tines to be pressurised down into work, whereupon a relief valve limits this applied tractor down pressure to a value less than the main system accumulator (80b x 2 litre). This allows tines to trip in work, the oil being absorbed by the main accumulator. A secondary (rod side) accumulator ensures this side of the cylinder is maintained full of oil to minimise cavitation and seal damage. A pre charge valve restricts return rod side oil flow to the tractor as the tines are pressurised down to ensure this secondary circuit is charged.

In operation, oil is locked in the cylinder circuit at a pressure determined by the relief valves 90-120 bar full bore side and 0-20 bar rod side. This occurs at all times, even with the circuit in float at the tractor, provided the tines are fully down. For extremely stony conditions, adjust the valve to read 90 bar on the gauge as the tines are pressured down. For heavy soils with little stone where compaction is present it is possible to increase this pressure to 120 bar.

If the tine circuit should need setting the following procedure should be followed (an assistant will be required):

1. Raise machine, to ensure tines are fully clear of the ground at depth.
2. Adjust relief valve (marked 1 / coloured green) clockwise fully. Turn anticlockwise one full turn.
3. Adjust flow control (marked 5 / coloured blue) fully clockwise, then anti-clockwise 4 turns.
4. Adjust accumulator relief valve (marked 2 / coloured red) anticlockwise fully. Turning clockwise now will increase the pressure on the top gauge.
5. Remove cap from sequence valve and remove the anti-tamper pin. Loosen anticlockwise fully and then tighten clockwise until slight resistance is felt.
6. Pressure tines down and further adjust sequence valve (marked 3 / coloured yellow) until bottom gauge reads 10-20 bar. Lock with lock nut and refit anti-tamper pin and cap.
7. Continue to hold pressure in tine circuit and set accumulator relief (2) to between 90 and 150 bar (see section 5.9.1) as tines are lowered.

If tines do not relieve under severe overload, this valve should be reduced (anti-clockwise) until this occurs in work, otherwise damage may occur.

8. Put main circuit in float, check that pressure is maintained.

5.6.1 Valve Adjustment - To Suit Field Conditions

Normal / Stony conditions - To avoid damage to tines and chassis in severe stone conditions reduce accumulator relief (2 / red) as tines are held in 'lower' to read 90 bar.
Hard, stone free conditions - It is permissible to increase gauge pressure for accumulator relief (2 / red) as tines are held in ‘lower’ to read up to 150 bar.

5.6 Double Disc Axles
The axles on this roller are tensioned by the main axle through the centre of the rings and bearings.

Specialist equipment is required for the disassembly of Double Disc axles. Please consult your dealer under any circumstances that require disassembly of these axles.

Maintenance of these rollers is limited to daily greasing of the bearings to flush out dirt, and regular inspection to ensure the assemblies are tight, and scrapers are correctly set. The axles can be tightened provided the bearing pillar ‘U’ bolts are loosened to avoid preloading the bearings as they move sideways to each other. Ensure the bearing pillars are re-tightened to the mainframe after this.

5.8 Preparation for Storage
If you need to store the machine for a longer period, observe the following points:

- Park the machine undercover if possible.
- Protect the roll against rust. If you need to spray the roll with oil, use light biologically degradable oils, e.g. rape oil.
- Cover any rubber sections before using oil sprays. These sections must not be oiled. Remove any traces of oil with a suitable cleaning agent.
- Avoid sharp-edged and pointed parts (tine points, etc.) when working on the machine.
- Place the machine on suitable supports when working underneath! Do not work under a machine which is not supported!

On a new machine tighten all nuts and bolts after 5 hours work and again after 15 hours. This also applies to parts that have been moved or replaced. After the initial 15 hours of work a once a week check should be sufficient depending on daily work rates.

5.9 Operator Support
If you have a problem, please contact your dealer. They will endeavour to solve any problems which may occur and provide you with support at all times.

In order to enable your dealer to deal with problems as quickly as possible, it helps if you can provide them with the following data. Always state the:

- Customer Number
- Name and Address
- Machine Model
- Date of Purchase and Operating Hours
- Type of Problem

5.10 Maintenance Intervals
Apart from daily maintenance, the maintenance intervals are based on the number of operating hours and time data.

Keep a record of your operating hours to ensure that the specified maintenance intervals are adhered to as closely as possible.

Never use a machine that is due for maintenance. Ensure that all deficiencies found during regular checks are remedied immediately.
5.11 Maintenance Overview

**Key**
- **Inspect**
- **Grease**

**3 Point Linkage**
- Inspect
- Before Each Use

**Wheel Nut Torque:** 270Nm
**Tyres:** 10.0/75-15.3 10 Ply
**Max Tyre Pressure:** 75psi / 5bar
- Inspect
- Before Each Use

**Roll Linkage**
- Inspect
- 10 Hours

**Parking Stands**
- Inspect
- Before Each Use

**Lights**
- Inspect
- Before Each Use

**Scrapers**
- Inspect
- 10 Hours

**Tines & Clamps**
- Inspect
- 10 Hours
5. Servicing and Maintenance

- **Wheel Hubs**: 600 Hours
- **Wheel Pivots**: 50 Hours
- **Wing Pivots**: 50 Hours
- **Wing Cylinders**: 50 Hours
- **DD Axles**: 10 Hours
- **Trip Reset Tines**: 50 Hours
- **Wing Cylinders**: 50 Hours
- **Wheel Pivots**: 50 Hours
- **Wing Pivots**: 50 Hours
- **Wheel Hubs**: 600 Hours
5.12 Lubricating the Machine
Please read the section below carefully before lubricating the machine.

The machine must be lubricated regularly in order for it to remain serviceable. Regular lubrication also contributes towards extending the service life of your machine.

The recommended lubricating intervals are specified in “Maintenance Overview”.

After it has been washed using a high-pressure hose or steam cleaned, the machine should always be lubricated using a grease gun.

5.13 Handling of Lubricants
Please ensure that you read the following instructions as well as the relevant information. This also applies to any of your employees who handle lubricants.

**Hygiene**
Lubricants do not present a health hazard provided they are used for their specified purpose.

In the case of prolonged skin contact, lubricants, especially low-viscosity oils, may remove the natural layer of fat contained in the skin, resulting in dryness and possible irritation.

It is important to take extreme care when handling waste oil as it may contain other irritants.

Vapours given off by cleaning agents and oils are also a potential health hazard. You should therefore not carry any oily cloths around. Change soiled work clothing as soon as possible.

Always exercise extreme care and observe the recommended hygiene rules when handling mineral oil products. Details of these handling regulations can be found in information provided by the health authorities.

**Storage and Handling**
- Always store lubricants where they cannot be accessed by children.
- Never store lubricants in open or unlabelled containers.

**Fresh Oil**
- Apart from taking the usual care and observing hygiene rules, there is no need to take any special precautions when handling fresh oil.

**Waste Oil**
- Waste oil can contain harmful contaminants which may cause skin cancer, allergies and other illnesses.

**Attention!**
Oil is a toxic substance. Should you swallow any oil, do not try to vomit. Contact a doctor immediately. Protect your hands with barrier cream or wear gloves to avoid contact with the skin. Wash off any traces of oil thoroughly with soap and hot water.

- Wash your skin thoroughly with soap and water.
- Use special cleaning agents to clean any dirt off your hands.
- Never wash oil residue from your skin with petrol, diesel fuel or paraffin.
- Avoid skin contact with any oily clothing.
- Do not keep any oily rags in your pockets.
- Wash soiled clothing before wearing it again.
- Ensure that any oily footwear is disposed of in the proper manner.
Measures in case of injury through oil

**Eyes:**
Should any oil be splashed into your eyes, rinse with water for 15 minutes. If the eye is still irritated, contact a doctor immediately.

**If oil is swallowed**
If oil is swallowed, it is important not to induce vomiting. Contact a doctor immediately.

**Skin irritation caused by oil**
In case of prolonged skin contact, wash off the oil with soap and water.

**Oil Spills**
Use either sand or a suitable granular absorbent to soak up any spilt oil. Dispose of the oil-contaminated absorbent in the proper manner.

**Oil Fires**
Never use water to extinguish an oil fire. The oil will float on the water causing the fire to spread.

Burning oil-lubricant must be extinguished using a carbon dioxide powder or foam extinguisher. Always wear respiratory equipment when dealing with fires of this type.

**Waste Oil Disposal**
Oil-contaminated waste and used oil must be disposed of in accordance with current legislation.

Waste oil must be collected and disposed of in accordance with local regulations. Never pour used oil into unsealed sewage systems or drains or onto the ground.

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### 5.14 Lubricants & Hydraulic Oil

**Hydraulic System**
The hydraulic fluid from the tractor is mixed with the hydraulic fluid from the machine.

The supplied machine hydraulic system contains Total AZOLLA ZS 32 oil.

**Lubricants**
All lubricating points on the machine can be lubricated with multigrade lubricating grease as specified in DIN 51825 KP/2K - 40.

### 5.15 End of Season Service/Storage

The machine should be left parked in the unfolded position

Wheel bearings should be inspected and re-packed with grease if required

All greased pins/pivots should be lubricated.

Check for worn or damaged components and hardware, replace where required.

If fitted, check and where required adjust DD roller tension

Where hydraulic cylinder rods are exposed, re-coat chrome with oil/grease.

If the machine has been washed before storage it is good practice to function all hydraulic cylinders and services before storage.

Remove all fertiliser and seed from all metering units and hoppers.

Remove all metering cassette elements.
# 6. Faults and Remedies

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