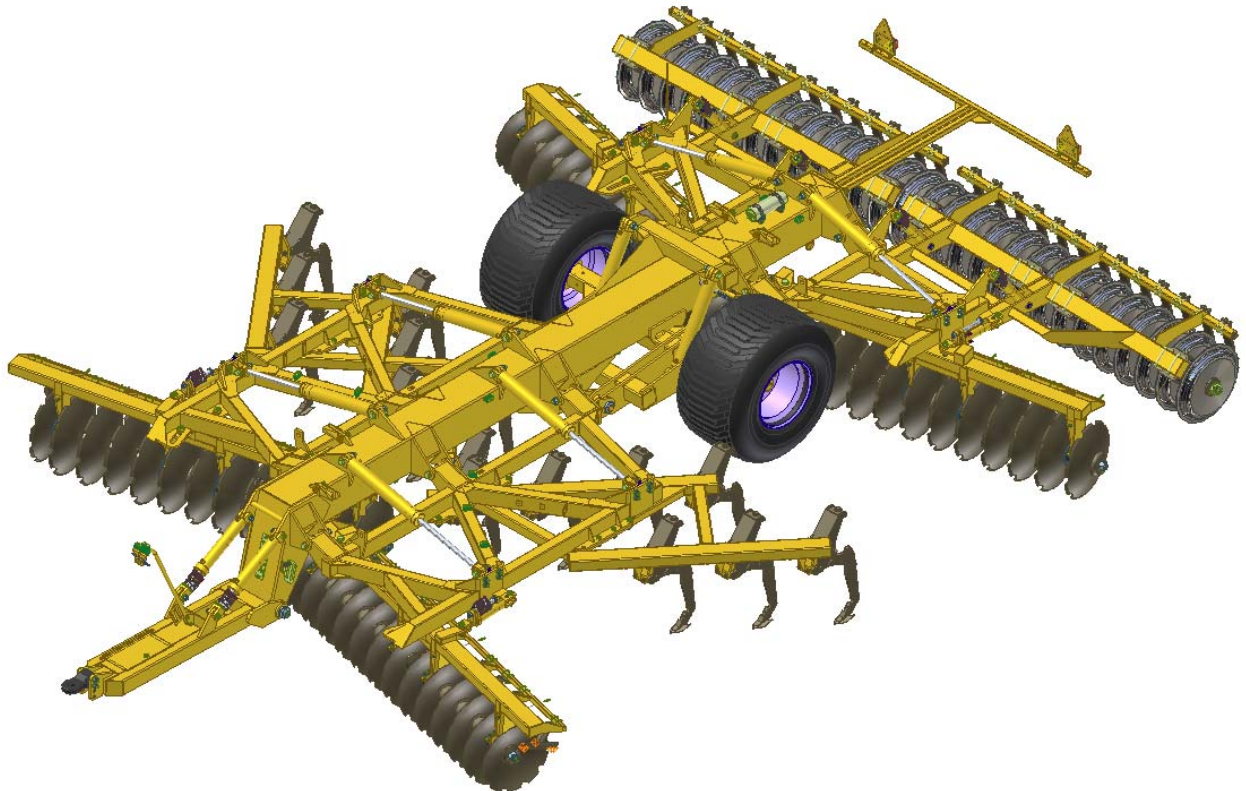


From Serial No. 12880



P15240 07/02/07



DECLARATION OF CONFORMITY

Simba International Limited hereby declare that the Product described in this Operators Manual, and defined by the Serial Number Plate attached to the Chassis of the Machine (a part copy of which is detailed overleaf and must be completed indicating the relevant machine details), conforms with the following Directives and Regulations, and has been certified accordingly.

EC Machinery Directive 89/392/EEC, as amended by 91/3688/EEC, 93/44/EEC, and 93/688/EEC.

In order to fulfill the requirements of health and safety described in the EC Directive, the following standards and technical specifications have been taken into account:

EN 292 - 1
EN 292 - 2

THE MANUFACTURER

Simba International Limited
Woodbridge Road
SLEAFORD
NG34 7EW
Lincolnshire
NG34 7EW
England.

Telephone 01529 304654.

CERTIFIED ON BEHALF OF SIMBA INTERNATIONAL LIMITED.

Philip J. Wright. BSc (Hons) C Eng. MI Agr.E
Technical Director.



WARRANTY

TERMS AND CONDITIONS

In this warranty Simba International 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 Simba International 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 buyers 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
- (b) any repair is carried out to the machine other than by or with the express written approval of the Company or
- (c) any alterations not expressly authorized by the Company in writing are made to the machine or
- (d) the machine is damaged by accident or
- (e) 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 Simba International 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 Simba International 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:

Serial Number	
Type of Machine	
Machine Width	
Year of Construction	
Delivery Date	
First Operation	
Accessories	

Operating Instructions/Spare Parts List: September 2005

Dealer Address: Name:
 Street:
 Place:
 Tel.:

Dealer's Customer No.:

SIMBA Address: SIMBA
 Woodbridge Road Ind. Est.
 Sleaford
 Lincolnshire
 NG34 7EW

Tel.: 01529 304654
 Fax: 01529 413468
 E-Mail: simba.international@simba.co.uk

SIMBA Customer No.:

Contents

Machine Identification	5
Contents	6
Introduction	8
Foreword	8
Warranty Guidelines	8
1. Safety Data	9
1.1 Safety Symbols	9
1.2 Use for the Intended Purpose	11
1.3 Operational Safety	11
1.3.1 No Liability for Consequential Damage	11
1.4 Road Traffic Safety	12
1.5 Accident Prevention	12
1.5.1 Hitching-up the machine	12
1.5.2 On the Hydraulic System	12
1.5.3 Changing Equipment	13
1.5.4 During Operation	13
1.6 Servicing & Maintenance	13
1.7 Operating Areas	14
1.8 Authorised Operators	14
1.9 Protective Equipment	14
2. Transportation and Installation	15
2.1 Delivery	15
2.2 Transportation	15
2.3 Installation	15
2.4 Hitching Up	16
2.4.1 Hitching up a Tractor to the Solo / Preparing for Transport	16
2.5 Folding and Unfolding	17
2.5.1 Unfolding into the Work Position	17
2.5.2 Folding into the Transport Position	17
2.6 Trailing Implements	18
2.6.1 Hitching a Press Roll to the Solo	18
2.7 When driving on the road	18
2.8 Parking the machine	18
3. Technical Data Solo	19
4. Adjustment/Operation	20
4.1 Description	20
4.2 Solo Designations	21
4.3 Disc Gangs	22
4.4 Coulter Coverers	23
4.5 Double Disc Roller	23
4.6 Terra-Grip Tines	24
4.7 Pro-Lift Tines	25
4.8 Pro-Lift Wings	25
4.9 Work Settings	26

4.10	Starting Settings	26
4.11	Depth Control	28
4.12	Work Instructions	29
4.13	Parking the machine	29
4.14	Checks	29
5.	Servicing and Maintenance	30
5.1	Servicing	30
5.2	Cleaning	30
5.3	Tightening Disc Axles	30
5.4	Terra-Grip Tine Points	31
5.5	Pro-Lift Tines	31
5.6	Double Disc Axles	31
5.7	Roll Wing Shims	31
5.8	Hydraulics	32
5.9	Pro-Lift Trip-Reset Tine Hydraulics	32
5.10	Preparation for Storage	34
5.11	Operator Support	34
5.12	Maintenance Intervals	34
5.13	Maintenance Overview	35
5.14	Overview of Lubricating Points	36
5.15	Lubricating the Machine	38
5.16	Handling of Lubricants	38
5.17	Lubricants & Hydraulic Oil	39
6.	Faults and Remedies	40
7.	Parts & Assembly	41
7.1	Parts & Assembly Contents	41

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!

SIMBA 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 SIMBA. 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 Solo.

Warranty Guidelines

1. 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.

2. Warranty claims must be submitted to the SIMBA Customer Service Department in Sleaford via your dealer. It is only possible to process claims which have been correctly completed and submitted no later than 14 days after the date of repair.

3. In the case of deliveries made under the warranty which are subject to the return of the old parts, the old parts must be returned to SIMBA within 28 days after the damage occurred.

4. In the case of deliveries made under the warranty which are not subject to the return of the old parts, these parts must be kept for the purpose of further decisions for a period of 3 months after receipt of the warranty claim.

5. Warranty repairs to be carried out by outside companies, or repairs which are expected to take more than 10 working hours, must be agreed upon in advance with the Customer Service Department.

1. Safety Data

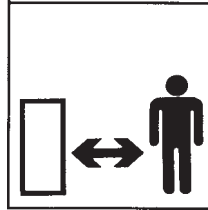
The following warnings and safety instructions apply to all sections of these Operating Instructions.

1.1 Safety Symbols

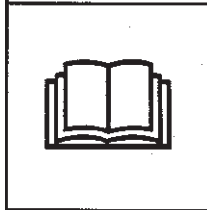
On the machine



Parts may fly off during operation. Keep a safe distance away from the machine!



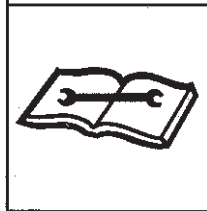
Read and observe the Operating Instructions before starting up the machine!



Keep clear of the working range of foldable machine components!



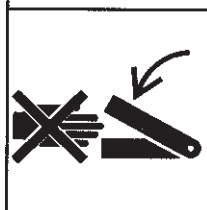
Watch out for escaping pressurised fluids! Follow the instructions in the Operating Instructions!



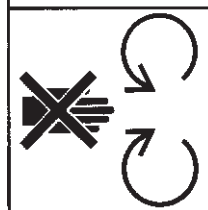
No passengers are allowed on the machine!



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.

1.2 Use for the Intended Purpose

The SIMBA Solo 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 SIMBA 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 SIMBA products may have a detrimental effect on specific design features of the machine and affect the safety of machine operators and the machine itself. SIMBA will accept no liability for damage resulting from the use of non-original parts or accessories.

The SIMBA Solo 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. SIMBA will accept no liability for damage resulting from improper use. The risk will be borne solely by the operator.

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 SIMBA. The "Machine Registration" form is to be completed and returned to SIMBA.

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.

1.3.1 No Liability for Consequential Damage

The Solo has been manufactured by SIMBA 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.

1.4 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.



Passengers on the machine are strictly forbidden!



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

1.5 Accident Prevention

In addition to the Operating Instructions, it is important to observe the accident prevention regulations specified by agricultural trade associations.

1.5.1 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.

1.5.2 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.

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.

1.5.3 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!

1.5.4 During Operation

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

Always ensure adequate visibility!

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 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.
- depressurize the hydraulic system.

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).

Next, check all hydraulic lines for leaks, loose connections, chafe marks and damage. Remedy any deficiencies immediately!

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

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

1.7 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.

1.8 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.

1.9 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.

- The machine can be lifted off with a crane or other suitable lifting equipment.
- The machine should be hitched to a tractor and driven off a low-loader.

2.2 Transportation

The Solo can be transported on public roads by hitching it up to a tractor or on a low-loader.

- It is important to observe the permitted dimensions and weights when transporting the machine.
- If the machine is transported on a trailer or a low-loader, 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!
- Check all hydraulic connections and lines for damage.

2.4 Hitching Up

2.4.1 Hitching up a Tractor to the Solo / Preparing for Transport



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



When the Solo is parked for extended periods of time it should ideally be left in the unfolded, i.e. work, position for stability, safety and ease of access for maintenance. However, parking the Solo in the folded position (using the parking pins provided) is acceptable in the normal course of operation.



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 two drawbar cylinder hoses (red) are together and the trip-reset tine hoses (green) - if applicable - are together.
3. Connect the tractor to the drawbar using the hydraulics to raise or lower the height of the shackle.
4. Carefully operate the hydraulics to lower the drawbar and tilt the Solo onto the road transport wheels. Fully extend the drawbar cylinder and lift axle cylinder and add in the requisite amount of shims for road transport.
5. Ensure that the wing transport pins are fitted.
6. If the machine is already folded it is now ready for transport. If the machine is unfolded then operate the fold circuit and fit the wing transport pins. Refer to 2.5.2.

2.5 Folding and Unfolding

2.5.1 Unfolding into the Work Position

1. Remove 4 wing locking pins and stow.
2. Open taps on rear drawbar (if fitted).
3. Fully raise machine.
4. Set tines to fully extended cylinders (on hydraulic tine models only).
5. Unfold machine - fully blow wings down.
6. Set tine pressures on front two gauges.
7. Lower machine fully to extend rear drawbar fully (if fitted).
8. Close rear drawbar taps.

2.5.2 Folding into the Transport Position

1. Open rear drawbar taps.
2. Fully raise machine. This will retract rear drawbar (if fitted).
3. On ST models move the tines into their shallowest setting so they do not protrude past the 3 metre transport width when folded.
4. Fold machine fully.
5. Pressure the tines into the fully raised position (hydraulic tine models only).
6. Lower machine to just above transport height (350mm from ground min.).
7. Fit shims in drawbar and lift cylinders.
8. Fit wing locking pins.
9. Close rear drawbar taps.
10. Remove excess soil from machine.
11. Lower onto shims.



Road transport speed should not exceed 16mph (25kmh).

2.6 Trailing Implements

2.6.1 Hitching a Press Roll to the Solo (Not applicable for machines with rear roll)



Maximum rear drawbar vertical loading - 1000kg

1. Raise Machine to remove shims from the lift axle to allow rear drawbar to be raised/lowered.
2. Reverse the Solo up to the press roll, ensuring that the drawbars are correctly aligned allowing a slight clearance to enable the machines to be coupled together.
3. Lower the Solo to the ground.
4. Attach the hydraulic hoses between the Solo and the press roll.
5. Open the taps on the press roll drawbar.
6. Raise the press roll drawbar to approximately 300mm above the Solo drawbar clevis.
7. Close the press roll drawbar taps.
8. Raise/lower the Solo to the same height as the press roll drawbar, then reverse the Solo to couple the two machines together.
9. Open the taps on the press roll drawbar.
10. Fully raise both machines into the road transport position.
11. Close the taps on the press roll drawbar.

2.7 When driving on the road

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



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

2.8 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!).

- Park the machine on level and solid ground.
- Raise the machine and remove shims from the lift axle and drawbar cylinders.
- Lower the machine to the ground, ensuring that it is stable.



When parking with the machine unfolded, ensure that no load is carried by the Terra-Grip tines (if fitted). This can lead to breakage of the points.

- Remove the drawbar pin and drive forward slowly until hitch is clear of tractor drawbar.
- Lower the drawbar to the ground.
- Switch off the tractor.
- Disconnect hydraulic lines from the tractor.

3. Technical Data Solo

	450 MID ROLL	450R REAR ROLL	600 MID ROLL	600R REAR ROLL
Working Width	4500mm	4500mm	6000mm	6000mm
Transport Width	2950mm	2950mm	2950mm	2950mm
Transport Height	3250mm	3250mm	3860mm	3860mm
Length	9260mm	10225mm	9260mm	10225mm
Weight with Pro-Lift Tines	9000kg	9400kg	11300kg	11500kg
Weight with ST Tines	9300kg	9700kg	11800kg	12000kg
Tractor Power Required (H.P.)* with Pro-Lift tines	350 - 400	300 - 350	400+	400 - 450
Tractor Power Required (H.P.)* with ST tines	300 - 350	270 - 320	350+	330 - 370

* It is important to correctly match your implement to your tractor for optimum performance.

4. Adjustment/Operation

4.1 Description

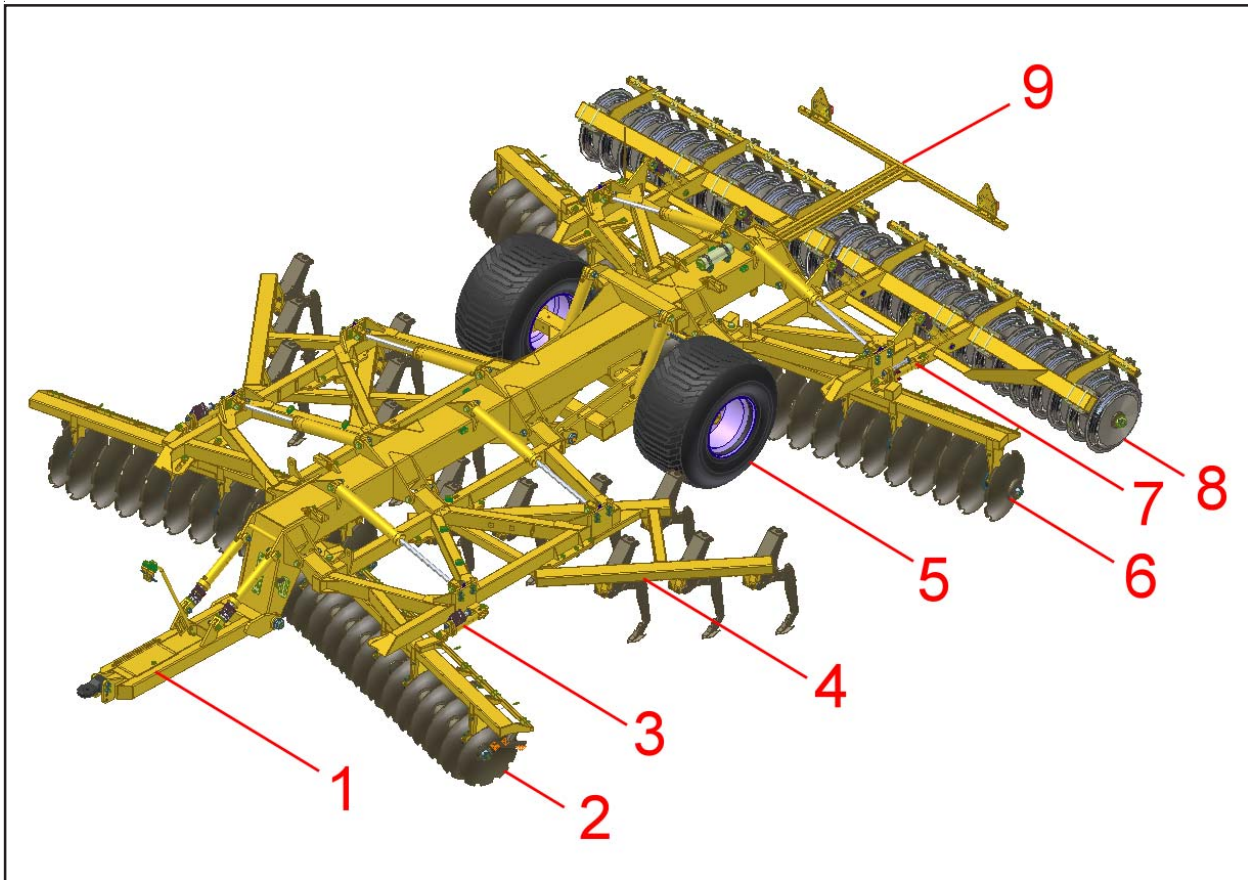


Fig. 4.01: Simba Solo (Solo 600 ST R model shown)

1. Drawbar
2. Front Discs
3. Front Disc Angling Cylinder
4. Tine Beam
5. Transport Wheels
6. Rear Discs
7. Rear Disc Angling Cylinder
8. DD 600 Roll
9. Lights

The **SIMBA Solo** is an amalgamation of time proven, successful Simba design components brought together to form this important development. The Solo has been designed and produced in conjunction with the Simba **ECotillage™** system to provide a one pass mix with a fissured layer at disc depth for through drainage and root access to lower horizons. This enables rapid drainage and access after rain, creating a greater effective capacity for moisture compared to ploughing for the same effective total depth of cultivation.

In principle, the machine is a tandem disc with trip reset Pro-Lift tines or Terra-Grip tines, designed for low draft, high speed operations. The addition of an integral roller ahead of the rear gang, or a rear mounted roll, enables more effective cultivation in one pass. The leading set of disc blades cultivate the top horizon, minimising clod formation and reducing tine loadings and blockage. This starts the 'top down' cultivation process, retaining weathered tilth in the surface level for stale seedbed purposes. The trip reset tines follow the disc blades to shatter at depth retaining the surface intact to work as an **ECotillage™** stale seedbed. This eliminates the problem of 'wet years' in non-plough based terms. The key to the Solo's success is the lower draft tine point and wing which maintain shatter across the full width of cultivation. The mid/rear roll or trailing press then consolidates the surface, cracks any clods and firms the soil profile before/after the rear gang completes mixing to depth. The corrugated top and shattered lower horizons are left fully weatherproof to any conditions between cultivation and drilling whilst retaining moisture below the surface for rapid straw breakdown and optimum establishment of the next crop.

4.2 Solo Designations

Solo **450** **ST** **R**
 1 2 3

1. This number refers to the working width of the machine.
2. The 'ST' stands for Shallow Tine. If a machine is fitted with Terragrip tines it is given this designation. If a machine is fitted with hydraulic reset Pro-Lift tines these letters will be absent from the designation.
3. The 'R' refers to the Rear roll format of the machine. If no 'R' is present in the designation then the machine is set up in the mid-roll format.

Examples:

Solo450 ST - This is a 4.5m wide machine, with Terragrip tines in the mid-roll configuration.

Solo 600 R - This is a 6.0m wide machine, with hydraulic trip-reset tines in the rear roll configuration.

4.3 Disc Gangs

As with any disc combination the angle of the disc gangs is dependant on the type of operation being carried out in terms of the degree of soil movement required. The nearer the disc gang is to minimum angle, the lower the degree of both soil movement and penetration that will be achieved. The main consideration once the discs are working is to ensure that they are leaving a level surface with no ridging or trenching either to the outside or in the centre and are working with equal effect across the width of each group of gangs. In some cases it may be necessary to replace the outer blade on the rear gangs for one of a smaller diameter to return less soil, thereby reducing any trough.

It is widely accepted through field experience that a progressive discing effect will achieve better results under normal circumstances than a more aggressive approach.

Gang angling is set / altered using coloured shims in the hydraulic cylinders. Ensure that the gang angles are mirrored across the machine (for example the right hand front gang should have the same configuration of shims as the left hand front gang). Front to rear gang angles may differ as required.

The Solo should be run level; the rear discs are set lower and will work deeper than the front.



Fig. 4.02: Front Disc Gang

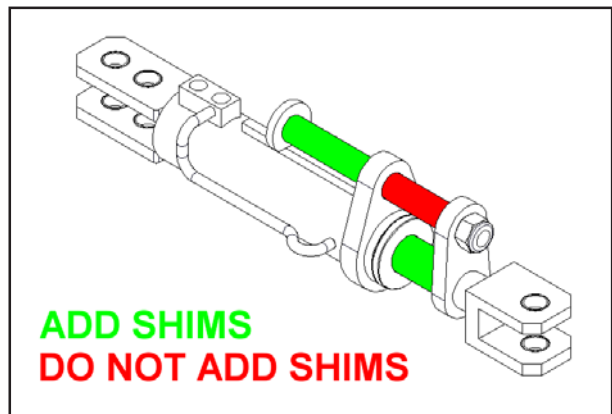


Fig. 4.03: Disc Gang Angling Cylinder

4.4 Coulter Coverer

The coulter coverers (if fitted) are located at the ends of the front disc gangs. These units are designed to stop the throw of soil beyond the cultivating width of the machine.

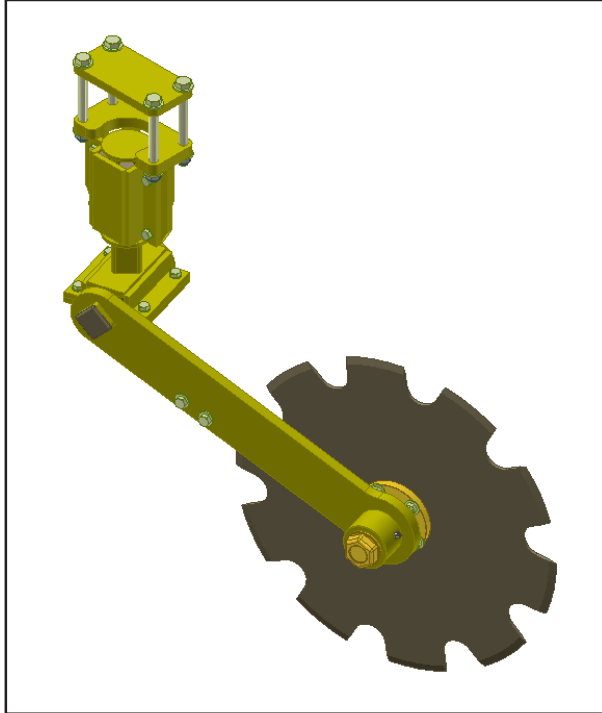


Fig. 4.04: Coulter Coverer

4.5 Double Disc Roller

The standard DD600/DD700 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.

The rear DD roller carries a proportion of the machine's weight to ensure consolidation. It also regulates the depth of the machine. The corrugated surface left by the roller is weatherproof both for wet or dry situations.

The DD roll can be positioned at the rear of the machine (rear roll) or between the tine beam and rear disc gang (mid-roll).

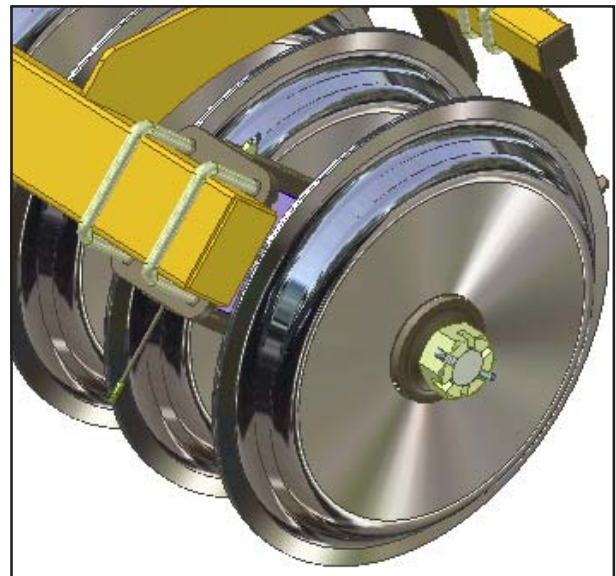


Fig. 4.05: DD600 Roll

4.6 Terra-Grip Tines

Terra-Grip tines have a robust, basic construction and are suitable for all soil types.

The spring-loaded auto-reset system with a 500kg trip force on each tine prevents damage to the tines and tine brackets.

When the auto reset system is activated an initial progressive phase holds the tine in the ground in a steady position until the trip point is reached. In the subsequent spring compression phase the tine is raised gently and rapidly to a maximum height of 230mm.

The tines can be fitted with a selection of points depending on application and have 6 depth settings in 25mm increments.

The clip-on points are attached to the tine with a quick release mechanism. A wedge shaped bracket is bolted on to the tine and a hammer is used to force the coulter on/off the taper using the removal tool provided to disengage the quick release system.

The quick release mechanism makes it possible to change the points quickly and easily without having to use any other tools. The quick release system consists of a wedge, plunger and a rubber spring.

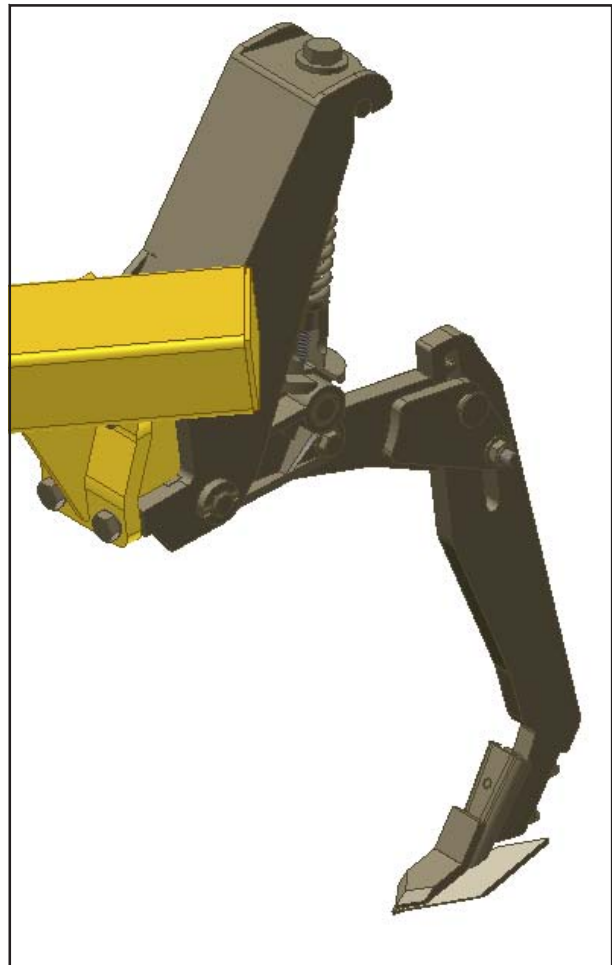


Fig. 4.06: Terra-Grip Tines

4.7 Pro-Lift Tines

The arrangement of the toolbars in a 'V' frame gives lower draught requirements and maximises the loosening effect of each tine.

The depth of the subsurface tines can be altered by moving the tines vertically relative to disc depth in their respective clamps using the 4 holes in the leg. Altering the drawbar and lift circuit depth will also affect subsoiling depth as well as discing depth.

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

It is important to set the machine up correctly in order to achieve an efficient and worthwhile operation. Although the Solo can work down to around 350mm (14") this does not mean that running at this depth is always worthwhile, taking time to identify where there is a problem in the soil profile and working to the minimum depth required will save a lot of otherwise wasted fuel and time. It is also very important not to operate below the critical depth of the tine, this is where the tine no longer produces upward movement of soil and effectively behaves as a mole plough, therefore not producing the shattering effect desired.

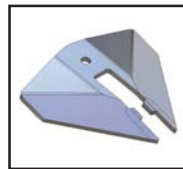
If the tines are operating below their critical depth, this is indicated by a reduced (minimal) heave/shattering effect coupled with an extremely high draft requirement. Under these circumstances either reduce tine depth, increase the front disc depth to alleviate the problem or change the type of wings.

4.8 Pro-Lift Wings



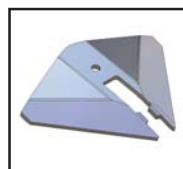
Standard Wing
P09060

- 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.
- Effectively increases critical tine depth.



Extra Wide Wing
P10411

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

4.9 Work Settings

In work the wing cylinders should be fully extended. A simple pressurised hydraulic circuit automatically sets itself as the wings are unfolded.

Optimum performance has been found to be achieved when the press roll rings have worn away the painted finish leaving a smooth shiny surface. When the press roll rings are new or rusty, soil may tend to pick up on the surface and blockage may occur, this will reduce when the rings are shiny again.

The Solo should be run with the chassis level by extending the drawbar cylinder to the necessary position and adding shims as appropriate. In practice it is possible to use the Solo on ground conditions that are unsuitable to achieve the desired effect, and it is usually possible to operate without regular blockage under such unsuitable conditions, assuming that the axles are tight and rings smooth. As such, especially under wet conditions, it is advisable to check on the cultivation effect of the Solo.

Generally a forward speed of 5-7 mph (8-11 kph) will achieve optimum results, maximising inversion and burial. Speeds in excess of those stated above will tend to give a deterioration in the quality of the work. This may be seen as a ridge and trough effect across the work surface due to soil being thrown too far by the leading discs, the rear discs then are unable to turn enough soil back.

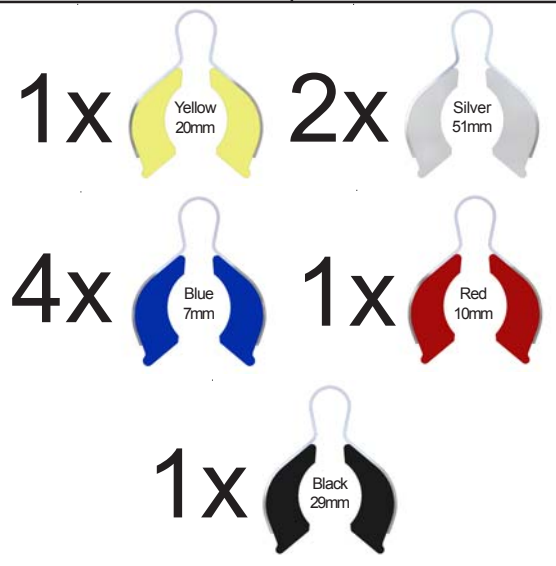
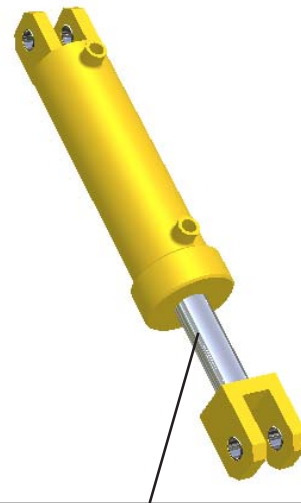
In normal operation the machine should be hydraulically drawn onto the drawbar shims, however, it is permissible to operate the lift circuit in float in order to allow the implement to follow contours as the tractor drawbar drops (eg. over the brow of a hill).

4.10 Starting Settings

This section details the recommended starting settings for the Solo. These settings can then be used as a base for further adjustment in order to get the optimum performance from your machine.

Ensure all settings from the left and right hand sides of the machine mirror each other.

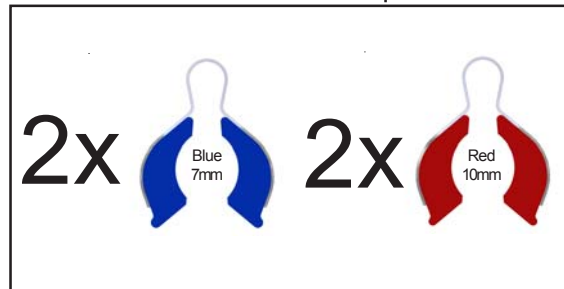
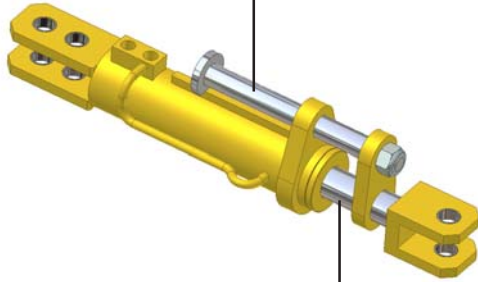
Drawbar Cylinder



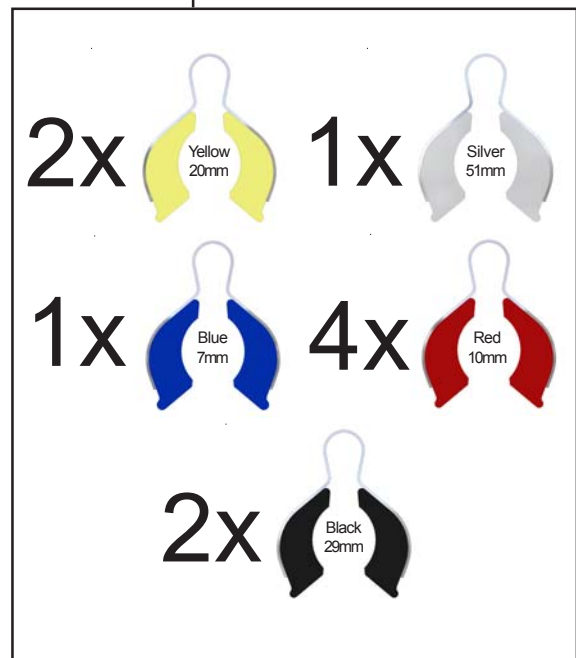
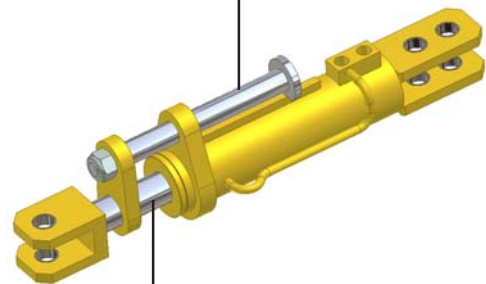
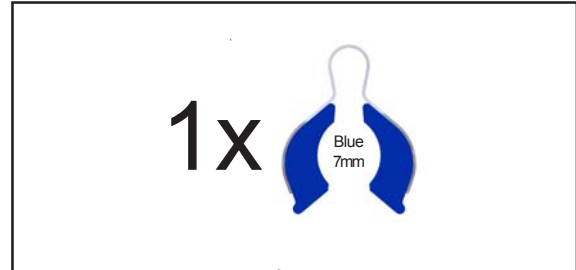
The drawbar cylinder shim settings are subject to the tractor drawbar height. As such, the shim settings shown above are intended as a suggestion only. The machine should be set to run with the chassis level.

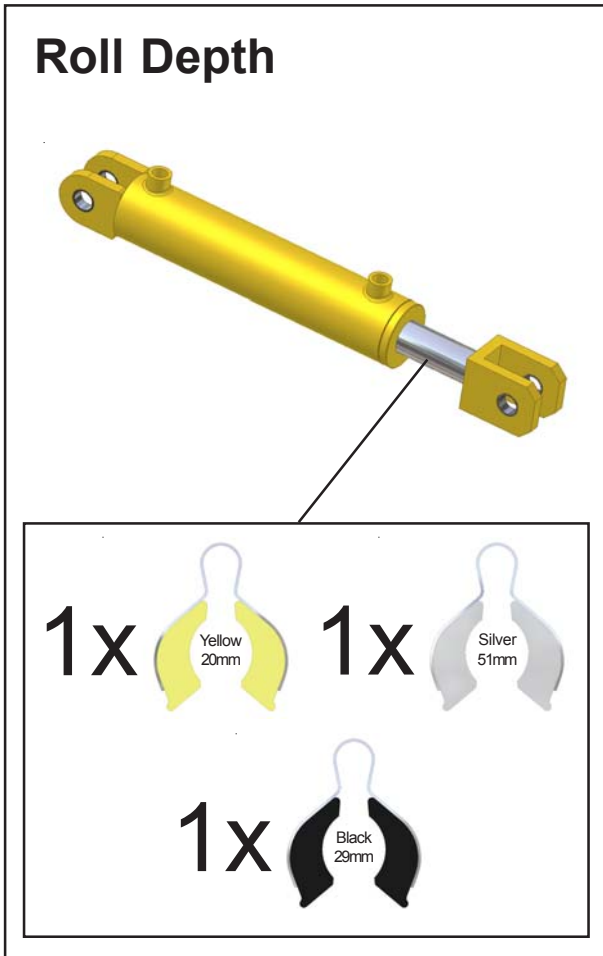
Disc Angles

Front Disc Gangs:



Rear Disc Gangs:





4.11 Depth Control

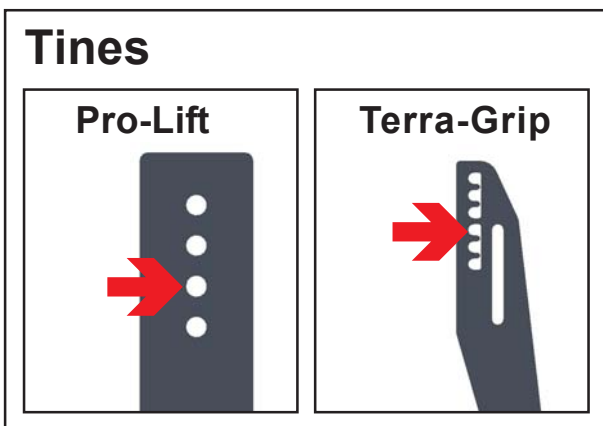
Working depth can be set by mid or rear roll and/or by transport wheels. Under normal conditions the weight of the machine will be carried on the roll and the drawbar of the tractor, with the main lift wheels either fully up or floating. Depth is set using the depth control cylinders situated on the roll unit with shims added and removed as appropriate. The front to rear pitch of the machine should be adjusted as appropriate to compensate for changes in working depth by adjusting the amount of shims on the drawbar cylinder. Some conditions or finished effects may dictate that depth control is carried out using both the roll and the lift wheels.

With a Mid Roll / Rear Roll

Use roll depth adjuster/hydraulic cylinder to set machine working depth - ensure wheels are lifted clear of or just touching soil. Use shims on drawbar cylinders to set chassis pitch level. Machine can be run in float to contour follow.

With the Transport Wheels

Use shims on lift cylinders to set machine depth and shims on drawbar cylinders for pitch. Balance the weight on wheels and roll if they are to be used together for depth control.



4.12 Work Instructions

Driving speed

The Solo can be driven at speeds of up to 12 km/h.

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

Drive more slowly if the conditions are difficult or a firmer finish is required.

Turning:



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

4.13 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!).

- Park the machine on level and solid ground.
- Raise the machine and remove shims from the lift axle and drawbar cylinders.
- Lower the machine to the ground, ensuring that it is stable.



When parking, ensure that no load is carried by the Terra-Grip tines (if fitted). This can lead to breakage of the points.

- Remove the drawbar pin and drive forward slowly until hitch is clear of tractor drawbar.
- Lower the drawbar to the ground.
- Switch off the tractor.
- Disconnect hydraulic lines from the tractor.

4.14 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?
- Have the hydraulic lines been connected according to the colour coding?
- Is the machine in a level operating position and the working depth set correctly?

Working Elements

- Are the discs 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.

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 / disc bearings with a high-pressure hose or a direct water jet. The housing, screwed connections and ball bearings are not watertight.

5.3 Tightening Disc Axles

1. Loosen the bearing mounting bolts on one pillar. This is to allow the bearing to move slightly when tightening the axle. This ensures that the bearings are not preloaded, which could lead to early failure.



When the axle needs tightening again, loosen the bearing that was not loosened the previous time.

2. Undo and remove the locking plate bolt and plate.
3. Loosen axle slightly and spin discs relative to each other / spools and bearings.
4. Fit one of the disc axle spanners onto the nut at the opposite end of the gang that is being tightened. The spanner should be jammed onto the ground to prevent it from slipping when the axle is tightened. Ensure the security of this spanner is maintained as the axle is tightened / loosened. Injury can occur if this spanner is unattended and slips free,
5. Tighten the axle. Continue to tighten the axle until the locking plate can be refitted. **DO NOT** back the nut off to allow the plate to be fitted.
6. Refit and tighten the locking plate bolt.
7. Tighten the bearing bolts.

5.4 Terra-Grip Tine Points



When changing points on Terra-Grip tines extreme care should be taken. Wear goggles at all times when changing tine points.

5.5 Pro-Lift Tines

When fitting new tine points, ensure all rough or square edges on the mating faces of the legs are removed prior to fitting the new tips (if necessary).

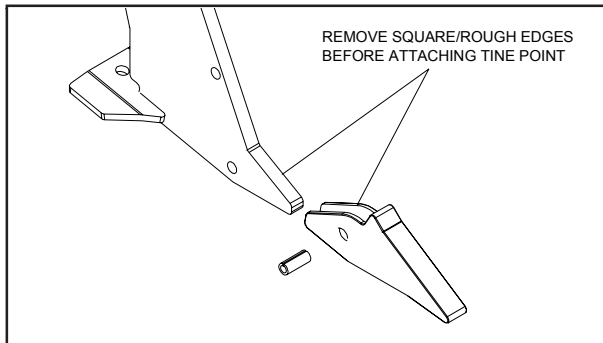


Fig. 5.03: Fitting Pro-Lift Tine Points



Do not attempt to assist fitting tine point 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. Goggles should be worn.

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.

5.7 Wing Pitch

On Solo 450 Models, the pitch of the wings can be altered by using the threaded ends of the wing cylinders. Tightening the will raise the outer tips of the wings and adding shims will lower the outer tips.



Fig. 5.04: Wing Pitch Adjustment - Solo 450

On Solo 600 Models, the pitch of the wings can be altered by adding or removing shims in the adjustable cylinder pivot. Removing shims will raise the outer tips of the wings and adding shims will lower the outer tips.



Fig. 5.05: Wing Pitch Adjustment - Solo 600

5.8 Hydraulics



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



The wing circuit is controlled by an overcentre valve contained within the manifold block which positively locks oil flow until pressurised by the tractor. System pressure can be retained in the circuit **even after depressurisation** of the tractor quick release couplings.



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 simba dealer, and detailed maintenance instructions.

5.9 Pro-Lift Trip-Reset Tine Hydraulics



Fig. 5.06: Pro-Lift Tine Hydraulic Manifold

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 20 to 60 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 First locate the manifold block; it is located at the front of the Solo on the right hand side of the machine, just under the main chassis.
- 2 Locate the valve on the rear face of the block and undo the lock nut. Using a 4mm allen key turn the valve all the way clockwise then turn it anticlockwise 2 full turns.
- 3 Locate the valve on the far side of the block; undo the lock nut and turn the valve all the way clockwise.
- 4 Locate the valve on the near face of the block, undo the lock nut and turn the valve all the way anticlockwise.
- 5 Start the tractor and put the spool that controls the tines into the float position. Both the gauges will go to zero and the tines will go down. This indicates that the system is depressurised.
- 6 Now get someone to pressure the tines down. Whilst they are being pressured down, turn the valve on the near side of the block slowly clockwise. The pressure on the lower gauge will start to rise. Turn the valve until you reach approximately 80 to 90 bar (the pressure on the upper gauge will now be reading approximately 10 to 15 bar). Lock off all the valves. The tine circuit is now set.

5.10 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 / discs against rust. If you need to spray the implements 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.

5.11 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
- Serial Number of Machine
- Date of Purchase and Operating Hours
- Type of Problem

5.12 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.



Avoid sharp-edged and pointed parts (disc blades, 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.

5.13 Maintenance Overview

Solo 450/600 Maintenance Overview			
After first operation	Instructions	Interval	Note
Check all screw, bolt and plug connections	Check they are firmly seated. Tighten / Secure if necessary	---	---
Check wheel studs for tightness	Check on delivery and before transporting the machine	---	---
Lubricate machine	See overview of lubricating points	---	Page 36
During operation			
Lubricate machine	See overview of lubricating points	---	Page 36
Wheel studs	Check tightness before transporting the machine	daily	---
Disc Angle, Working Depth	Check setting and ensure they are firmly secured	daily	Page 22, 28
Hydraulic system and components	Check seals, signs of crushing/wear, function and condition	daily	Page 32
Disc Axle Bearings	Check condition, mountings and smooth operation	daily	Pages 22, 30
Roll Axle bearings	Check condition, mountings and smooth operation	daily	Pages 23, 31
Double Disc roller ring segments	Check condition and ensure they are firmly secured	daily	Pages 23, 31
Safety devices (Transport Pins)	Check condition and function	daily	---
After season			
Lubricate machine	See overview of lubricating points	---	Page 36
Lubricate Wheel Bearings	Disassemble hub and lubricate bearings before reassembling	---	Page 36
Bolts / Lock Bolts	Grease any exposed threads	---	---
Entire machine	Carry out cleaning and maintenance	---	---
Spray Double Disc roll with oil	Use biological oil if possible - cover rubber elements	---	---
After 4 years			
Hydraulic pipes	Replace	MRL Anh I	EN 1533

5.14 Overview of Lubricating Points

Solo lubrication points	Interval	Diag. No.
DD Roll Bearings	Daily	5.08
Disc Bearings (and Coulter Coverer Bearings if fitted)	Daily	5.09
Pro-Lift Time Arms	50 Hours	Not Illustrated
Disc Gang Pivots	50 Hours	5.10
Transport Axle Pivot	50 Hours	5.11
Roll Pivot	50 Hours	5.12
Wing Pivots	50 Hours	5.13
Drawbar Pivot	50 Hours	5.14
Wheel Bearings	End of Season	Not Illustrated



Fig. 5.08: DD Roll Grease Points

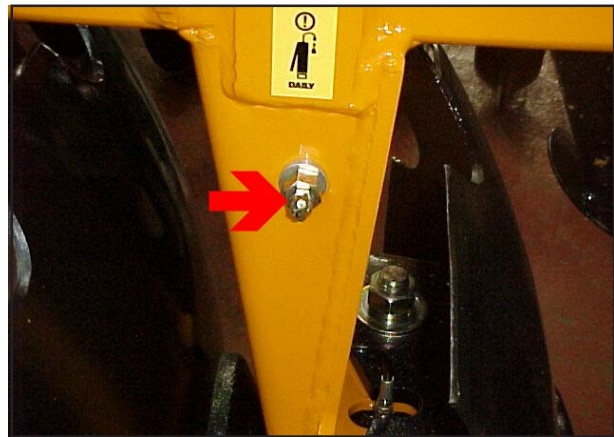


Fig. 5.09: Disc Axle Grease Points

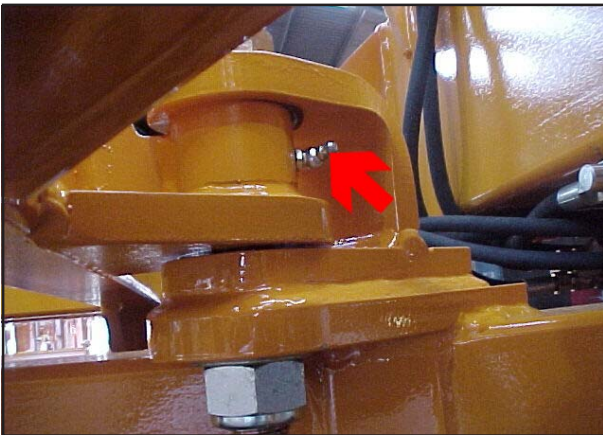


Fig. 5.10: Gang Pivot Grease Points

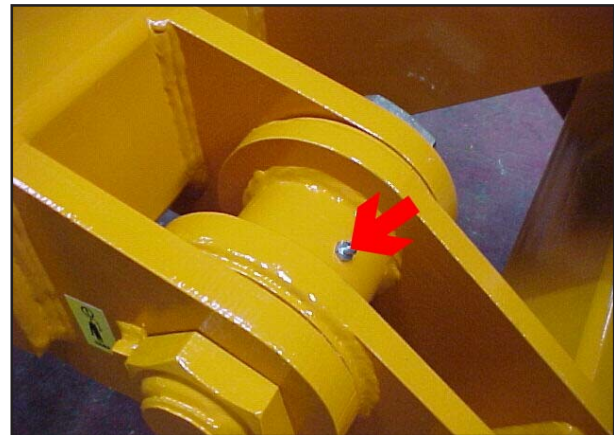


Fig. 5.11: Transport Axle Pivot Grease Points

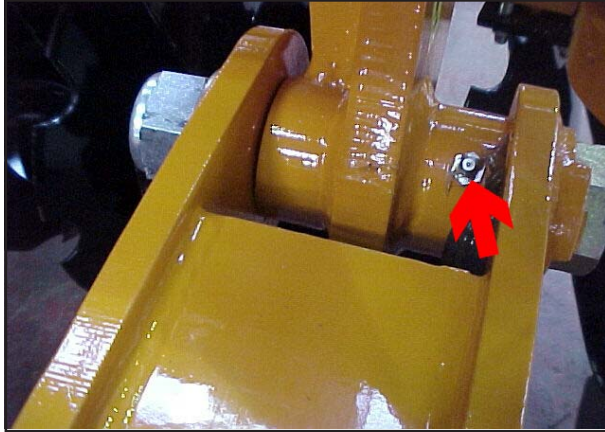


Fig. 5.12: Roll Pivot Grease Points

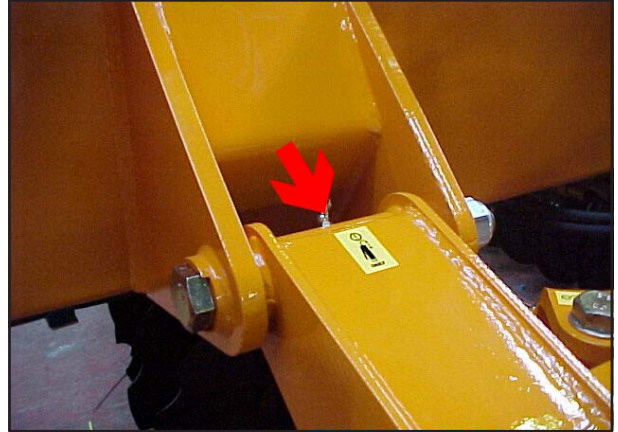


Fig. 5.13: Wing Pivot Grease Points



Fig. 5.14: Drawbar Pivot Grease Points

5.15 Lubricating the Machine

Please read the section entitled "Using Lubricants" 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 "Inspection" and "Maintenance Intervals".

After it has been washed using a high-pressure hose or steam cleaned, the machine should always be lubricated using a grease gun. Ensure that the universal joints and splined shafts are lubricated regularly.

5.16 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.

5.17 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.

6. Faults and Remedies

Solo 450/600 Troubleshooting		
Fault	Possible cause	Remedy
Machine pulls to one side	Discs set unevenly	Adjust each pair of disc gangs
	Tines set unevenly	Adjust tine depth
	Roll blocked	Unblock roll
Machine not running level front to rear (if not deliberate)	Machine set incorrectly	Adjust drawbar shims to compensate or if nose diving decrease mid/rear roll pressure.
Transport wheels fail to lift machine	Tractor relief valve operating tractor hydraulics worn	Decrease flow rate
Discs fail to penetrate	More depth needed	Adjust depth control
	Gang angle too little	Check gang settings and increase gang angle if appropriate
	Blades worn	Replace blades
Disc gang uneven working depth side to side		Adjust depth control unit on roll / shims in drawbar cylinders
Machine pulling up clods	Chassis running nose down	Add shims to drawbar cylinder
Rear disc dragging up wet soil	Chassis running tail low	Remove shims from drawbar cylinder
Ridge is formed between gangs in work	Gang angle too severe	Adjust gang angle and / or operating depth
	Speed too high	Adjust forward speed
Trough is formed between gangs in work	Gang angle too little	Adjust gang angle and / or operating depth
	Speed too low	Adjust forward speed