



## **POWAVATOR 150**

Standen Engineering Limited.  
Hereward Works,  
Station Road, Ely,  
Cambridgeshire.  
CB7 4BP  
England.



# EU & UKCA Declaration of Conformity

According to the Machinery Directive 2006 / 42 / EC  
& The Supply of Machinery (Safety) Regulations 2008

**Manufacturer: Standen Engineering Limited**  
**Station Road, ELY**  
**Cambridgeshire**  
**CB7 4BP England**

We declare that the product, described below, meets the requirements of the above mentioned directive and has been assessed against and complies with the essential safety requirements application as specified in the Standards listed here.

<b>Model</b>	Powavator 150
<b>Serial No.</b>	PV150.....

## British Standards used in the implementation of this certificate

BS EN ISO 12100-1  
BS EN ISO 12100-2  
BS EN ISO 4254

Place of Issue: **Standen Engineering Limited, Station Road, Ely,  
Cambridgeshire, UK**



M R Gammon - Technical Manager  
For Standen Engineering Limited





# **IMPORTANT**

- This operators handbook should be regarded as part of the machine. Suppliers of both new and second-hand machines are advised to retain documentary evidence that this handbook was supplied along with the machine.
- On installation of the machine (i.e. starting off in the field), the New Machine Installation Record Card should be completed by the dealer/distributor and be countersigned by the customer. The document is proof that the correct procedures have been followed.
- The New Machine Installation Record Card should be returned to Standen Engineering Limited within 7 days of installation. Failure to do so may invalidate the machine warranty.

On delivery, check that the machine is as ordered and has not been damaged in transit. Please report any shortfall to your STANDEN dealer.

The contents of this handbook, although correct at the time of publication, may be subject to alteration by the manufacturers without prior notice.

Standen Engineering Limited operate a policy of continual product development. Therefore, some illustrations and/or text within this publication may differ from your machine.

The copyright of this handbook is the property of Standen Engineering Limited, Hereward Works, Station Road, Ely, Cambridgeshire. CB7 4BP. This handbook is issued on the condition that it must not be used, copied or exhibited without their written permission.



# POWAVATOR 150

## CONTENTS

### SECTION 1

#### INTRODUCTION

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- 1:1 Warranty
- 1:2 Replacement Parts
- 1:3 Machine Layout
- 1:4 Introduction to the Manual
- 1:5 Copyright

### SECTION 2

#### SAFETY

---

- 2:1 Noise Levels
- 2:2 Personnel Safety
- 2:3 Safety in Operation
- 2:4 Safety in Transit
- 2:5 Safety in Maintenance
- 2:6 Safety in Lifting
- 2:7 Safety Label Locations
- 2:8 Safety Labels Explained

### SECTION 3

#### TECHNICAL INFORMATION

---

- 3:1 Description
- 3:2 Specifications
- 3:3 Dimensions
- 3:4 Tractor Suitability
- 3:5 Tractor Tyres

### SECTION 4

#### SETTING INSTRUCTIONS

---

- 4:1 Attaching the Powavator to the Tractor
- 4:2 Removing the Powavator from the Tractor
- 4:3 Speedset Gearbox
- 4:4 Overload Clutch Unit
- 4:5 Depth Control
- 4:6 Weed Cutter Blades
- 4:7 Trailing Shields

### SECTION 5

#### OPERATING INSTRUCTIONS

---

- 5:1 Checks Before Operation
- 5:2 Working Instructions
- 5:3 Operators Check List

### SECTION 6

#### MAINTENANCE

---

- 6:1 Lubrication
- 6:2 Preliminary Maintenance
- 6:3 Service Schedule
- 6:4 Wear Skids
- 6:5 Rotor Blades
- 6:6 Spike Removal/Fitting

### SECTION 7

#### SUPPLEMENTS

---

- 7:1 Bedformer Kit
- 7:2 Fitting the Frame

## SECTION 1 INTRODUCTION

### 1:1 WARRANTY

Should defective material and/or workmanship used in Manufacture give rise to failure, the products themselves or The components and sub-assemblies affected, will be Replaced or repaired free of charge during the first 12 months. The fitting of non Standen parts, or repairs, or modifications Carried out by unauthorised persons may invalidate the Warranty. No major work is to be undertaken without prior consultation with Standen Engineering Limited.

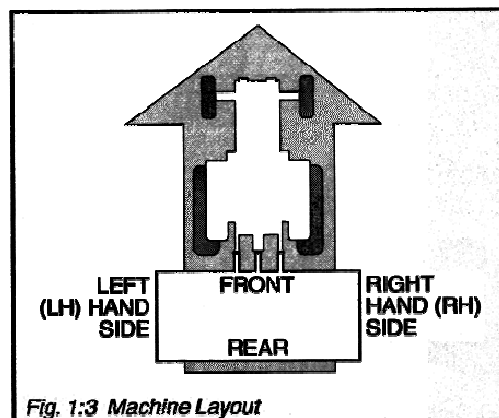
Save to the extent covered by the warranty, the Company Shall not be liable in any circumstances for any loss, injury Or expense, whether direct or indirect, which may arise for any reason whatsoever from any defect in or otherwise in connection with any goods supplied or work done by the Company.

### 1:2 REPLACEMENT PARTS

Use only genuine STANDEN spares, which have the full Warranty. Refer to the parts section for information on ordering spares.

### 1:3 MACHINE LAYOUT

Fig. 1:3 (below) shows the Left, Right, Front and Rear terminology as used throughout this manual.





# POWAVATOR 150



## 1:4 INTRODUCTION TO THE MANUAL

Standen products comply with the Machinery Directive 89/392/EEC, as amended by Directive 91/368/EEC, 99/44, 99/68.

This manual has been written and provided to enable users Of the Standen products to :-

1. Understand how the machine operates.
2. Be able to operate the machine safely and without hazard to either the operator or persons in the vicinity.
3. Be able to use the machine to its full potential.

The operator must read all of the manual and fully understand its contents before attempting to operate, adjust or service the machine.

**The contents of this manual are intended as a guide to the operation and servicing of the machine. It is not a training manual.**

### **WARNINGS AND CAUTIONS**



*This symbol indicates important safety messages within this handbook. When you see this symbol be alert to the possibility of injury to yourself or to others and carefully read the message that follows.*

Whilst all care and attention has been taken in the design and production of all Standen products, as with all machinery there remains a certain amount of risk to personnel whilst the machine is in use.

It is strongly recommended that operators take all possible precautions to ensure both their own safety and the safety of others that may be in the vicinity.

# POWAVATOR 150

## 1:5 COPYRIGHTS

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Ely, Cambridgeshire. CB74BP

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## SECTION 2 SAFETY

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### 2:1 NOISE LEVELS

In accordance with the Supply of Machinery (Safety) Regulations 1992 the equivalent continuous A-weighted sound pressure level at the drivers seat does not exceed 70 dB(A).



### 2:2 PERSONNEL SAFETY

The STANDEN machine has been designed and constructed to comply with current Safety Regulations. However, as with all machinery, there will be inherent dangers whilst operating and carrying out maintenance on the Implement.

Safety is the responsibility of persons working with the machine. Think 'SAFETY' at all times. Read and remember the contents of this handbook.

The following list of precautions should be brought to the attention of all persons operating or working on the machine and should be complied with at all times.



### 2:3 SAFETY IN OPERATION

1. Untrained personnel or children must never operate the Implement.
2. The tractor must be of a suitable size to be able to operate the Implement safely.
3. Always check that the Implement has been correctly mounted to the tractor before moving off.
4. Normal safe working procedures should be adopted at all times. Reduce speed when moving across sloping ground and when turning. Do not work on ground where there is a possibility of overturning or across steep slopes.
5. Before carrying out any work on the machine, make sure the Machine is lowered to the ground, switch off the tractor engine, apply the handbrake and remove the ignition key.

## POWAVATOR 150

6. Never work on, or under the machine when it is in a raised position without suitable blocks/props being used to fully support the weight of the Implement.
7. The Implement should only be used for the purpose for which it was designed and as per the instructions in the operators manual.
8. Wear substantial or proper footwear. Wear gloves when handling the Implement or parts with sharp edges.
9. In low light conditions, a sufficient level of artificial light should be made available to ensure safe working conditions.



### 2:4 SAFETY IN TRANSIT

1. Only transport the machine at a speed suitable to the prevailing conditions
2. Be aware of the weight and overall size of the machine at all times.
3. When travelling on the highway in restricted light or at night, a suitable lighting board should be attached to the rear of the machine.



### 2:5 SAFETY IN MAINTENANCE

1. Lubricate the Implement as per section 6 of this manual.
2. Check the tightness of all nuts and bolts regularly.
3. Never work on or under the machine when it is in a raised position without suitable blocks/props being used to fully support the weight of the Implement.
4. Beware of pinch and trap points. Lock moving parts as required before working in the vicinity.
5. Wear substantial or proper footwear. Wear gloves when handling the Implement or parts with sharp edges.
6. Always use mechanical or additional help when lifting heavy parts.
7. Use only genuine STANDEN replacement parts.



### 2:6 SAFETY IN LIFTING

1. Ensure lifting equipment is fully tested and has a rated lifting capacity capable of lifting the Implement.
2. The machine should only be lifted using nylon straps or similar. Only fix straps to the main chassis and hitch.
3. Lifting without total care and attention can cause damage to the machine and may cause injury to personnel.

*For weight of machine – refer to 3:2 Technical Specifications*

# POWAVATOR 150

## 2:7 SAFETY LABEL LOCATIONS

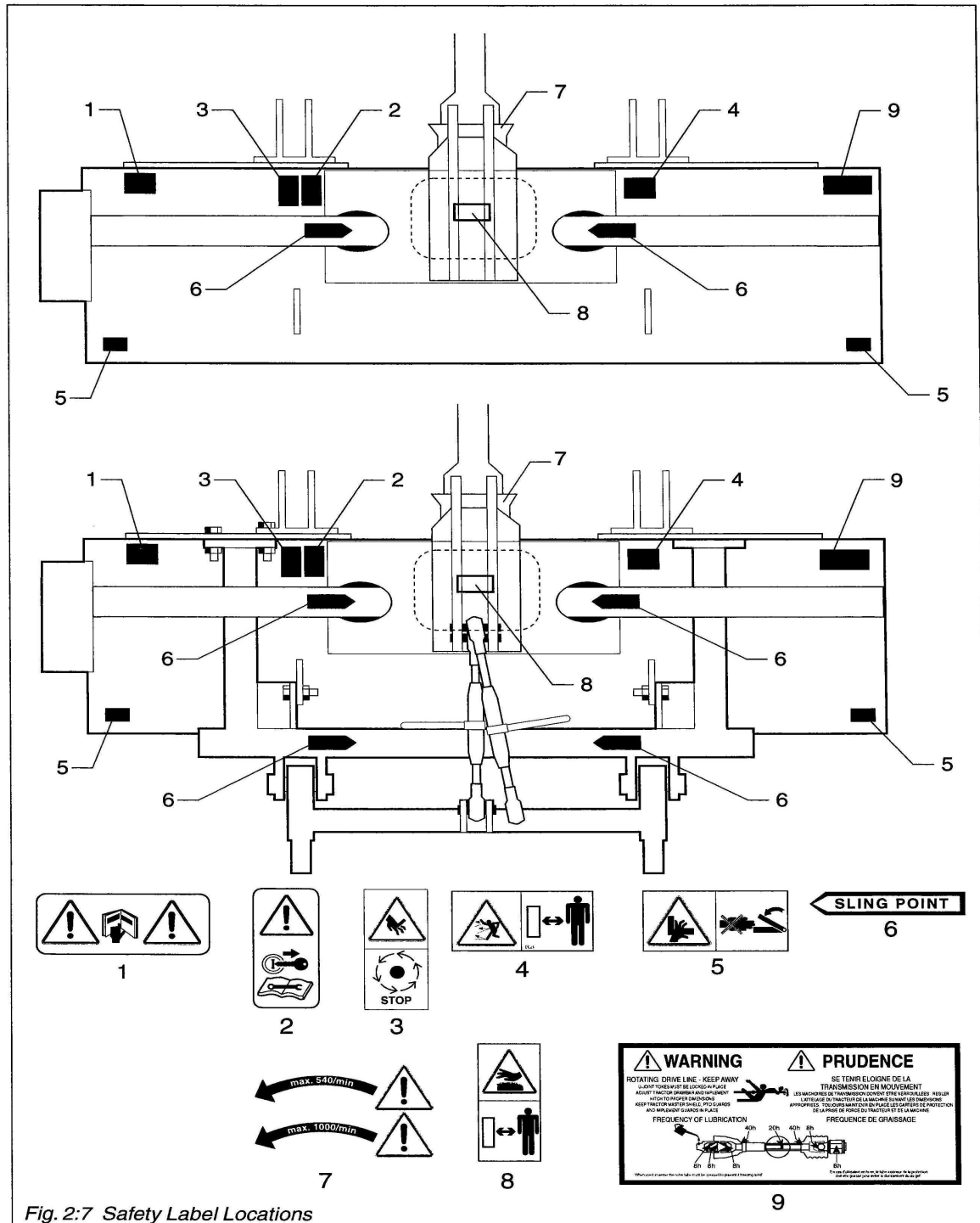
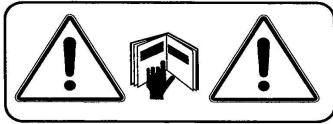


Fig. 2:7 Safety Label Locations

# POWAVATOR 150

## 2:8 SAFETY LABELS EXPLAINED



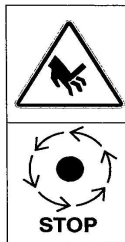
1. .... Pt. No. 209095290

Read Instruction Book before operating or performing maintenance on machine.



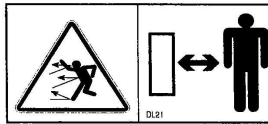
2. .... Pt. No. 209095310

Stop Tractor, remove Ignition Key and read instructions before carrying out any maintenance, cleaning or servicing.



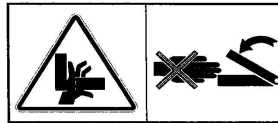
3. .... Pt. No. 209095350

Ensure machine has stopped before work area of machine is approached.



4 ..... Pt. No. 209095400

Keep onlookers and bystanders a safe distance from the machine whilst in operation.



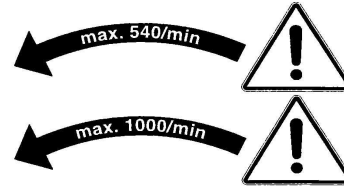
5. .... Pt. No. 209095380

Warning - Danger of cutting or severing.



6. .... Pt. No. 85005

Designated lifting point for machine. Do not use any other point.



7. .... Pt. No. 209095270

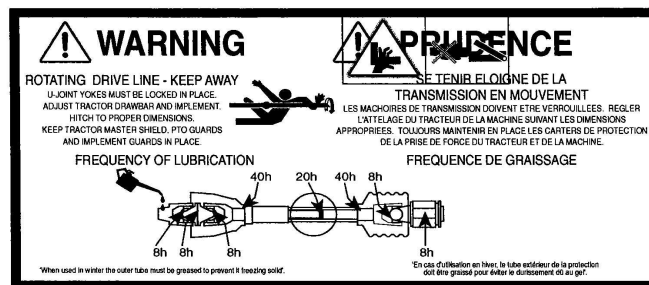
7. .... Pt. No. 801482

Speed and rotation of PTO.



8. .... Pt. No. 209095570

Stay Clear of hot surfaces.



9. .... Pt. No. 209095440

PTO Label for Safety and maintenance.

# POWAVATOR 150

## SECTION 3 TECHNICAL INFORMATION

### 3:1 DESCRIPTION

The Powavator 150 series is ideally suited for either primary or secondary cultivation's and will produce seedbeds, control weeds, incorporate chemicals, trash and sterilising agents.

The implement has an option of Soil Blades or Spikes that are driven from the tractor PTO. A substantial bevel gearbox with interchangeable gear sets, enables speed change to suit soil conditions. An overload clutch unit provides protection to the machine.

All width versions are suitable for category 2 or 3 mounting in the central position only. Depth of cultivation is maintained by side mounted wheels or a rear mounted roller.

### 3:2 SPECIFICATIONS

Model		70	90	100	120	140
TRACTOR	Power	65 – 112kW (90 – 150 HP)				
	PTO rpm	540 or 1000				
	Three point Linkage	Category 2 or Category 3				
MACHINE WIDTH	Overall (maximum)	1270mm (90")	2800mm (110")	3050mm (120")	3550mm (140")	4060mm (160")
	Cultivating (approx.)	1780mm (70")	2250mm (90")	2550mm (100")	3050mm (120")	3560mm (140")
WEIGHT	Standard Spec. Kg	850Kg	1100Kg	1200Kg	1450Kg	1700Kg
ROTOR	Cultivating Depth	Up to 200mm (8")				
	Control Device	Side mounted wheels or Rear mounted Roller				
	Speed (approx.)	190,215,235 and 260 rpm with standard Gears Supplied				
		173 and 290 rpm with 'optional' gears				



<b>POWAVATOR 150</b>
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### **3:3 DIMENSIONS**

See table 3:2

### **3:4 TRACTOR SUITABILITY**

Power requirement – up to 112kW – 150 HP

The tractor must be of a suitable size to suit land conditions and to handle and lift the implement safely.

### **3:5 TRACTOR TYRES**

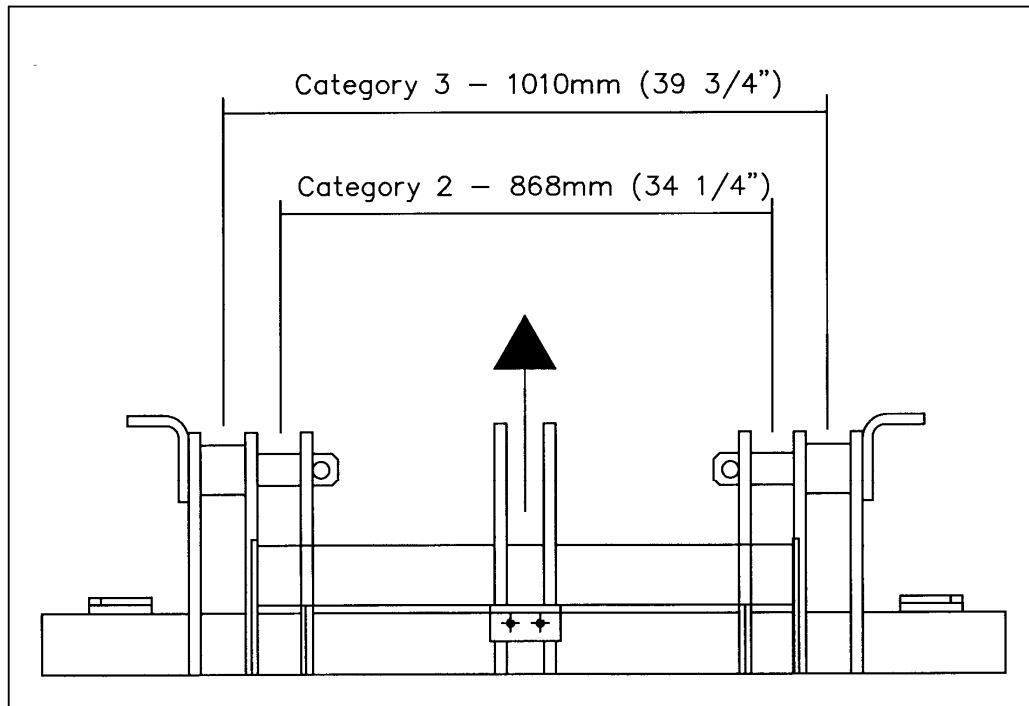
Ensure that all tractor tyres are at the manufacturers recommended pressures and that left and right hand side tyres are identical and state of wear is approximately the same.

# POWAVATOR 150

## SECTION 4 SETTING INSTRUCTIONS

### 4:1 ATTACHING THE POWAVATOR TO THE TRACTOR

The Powavator 150 Series is suitable for either category 2 or 3 three point linkage, it must be mounted in the central position only. (See fig.4:1a)



*Fig. 4:1a Lower Mounting Brackets*

To determine the correct mounting position :-

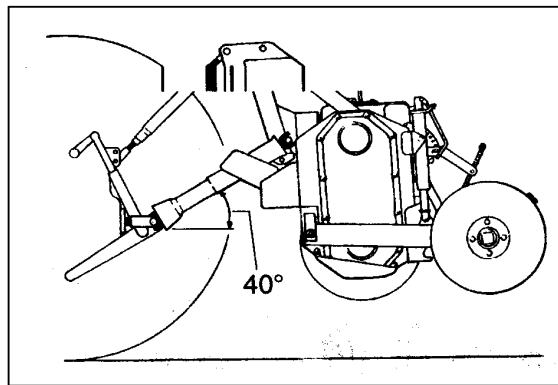
1. With the Powavator on a firm level surface, adjust the depth control device until the machine gearbox input shaft is horizontal.
2. Reverse the tractor up to the machine to give 150mm (6 ins) minimum engagement of the male half of the PTO drive shaft in the female tube when connected to the tractor. The safe working length between centres of the cross journals is 660-870mm (26-34 inches).
3. Position the tractor lower link ball ends in line with the machine lower mounting brackets.

## POWAVATOR 150



### **4. APPLY THE TRACTOR HANDBRAKE AND SWITCH OFF THE ENGINE**

5. Insert the mounting pins through the brackets and the tractors lower link ball ends. Secure using clip pins.
6. Adjust the tractor top link length and fit to the machine using the mounting pin supplied. Secure using a clip pin.
7. Fit and adjust stabiliser bars or chains to limit sway to a maximum of 50mm (2 inches).
8. Fit the PTO drive shaft to the tractor PTO, ensuring that the end yoke quick-release pin locates fully in the tractor PTO shaft groove. Clip the safety check chain to the tractor.
9. Before engaging the tractor PTO, check that the length of the PTO drive shaft is within the specified operating range when the machine is in the horizontal and raised positions. When raised, the angle on the universal joint must not exceed 40° or damage may occur (see fig 4:1b).
10. Raise the parking prop and secure in the raised position.



*Fig. 4:1b*

## POWAVATOR 150

### 4:2 REMOVING THE POWAVATOR FROM THE TRACTOR

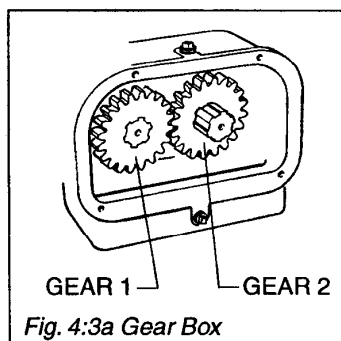
1. Locate and secure the parking prop in the lowered position. Lower the Powavator to the ground.



2. **APPLY THE TRACTOR HANDBRAKE AND SWITCH OFF THE ENGINE.**

3. Disconnect the PTO drive shaft safety guard check chain from the tractor
4. Depress the quick-release pin on the tractor end yoke and slide the yoke off the tractor PTO shaft and put it in the stow position.
5. Disconnect the tractor top link from the machine.
6. Remove the stabiliser bars or chains and then disconnect the tractor lower links from the machine.

# POWAVATOR 150



## 4:3 SPEEDSET GEARBOX

Two pairs of gears are supplied with each new machine which, together with the optional extra gears, provide the following range of rotor speeds.

ATTENTION: DO NOT MIX THE GEAR SETS.

\*Factory Fitting

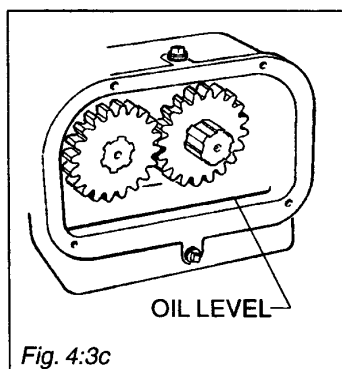
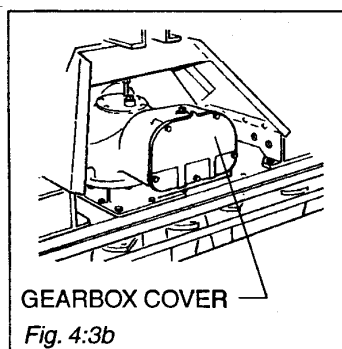
ROTOR SPEED	173 rpm	190 rpm	*215 rpm	235 rpm	260 rpm	290 rpm
Gear 1	22	21	20	19	18	17
Gear 2	17	18	19	20	21	22

## WARNINGS



*Never remove Gearbox cover when Tractor engine is running.*

*The gearbox oil may be hot and harmful to sensitive skin.*



To change SPEEDSET gears:-

1. Ensure machine is level so that oil does not spill when Gearbox cover is removed.
2. Disengage the PTO drive and switch off the tractor engine.
3. Clean away any dirt from around the rear of the speedset Gearbox.
4. Remove the Gearbox cover and gasket.
5. Remove the existing gears from the gearbox and replace with the required set as detailed in the above table.
6. Check Oil Level, this should be level to the bottom lip of the casting with the machine level.
7. Refit the gearbox cover plate and secure. Ensure gasket is in good condition and replace if required.

## POWAVATOR 150

### 4:4 OVERLOAD CLUTCH UNIT



#### WARNING

**Never remove PTO cover when Tractor engine is running.**

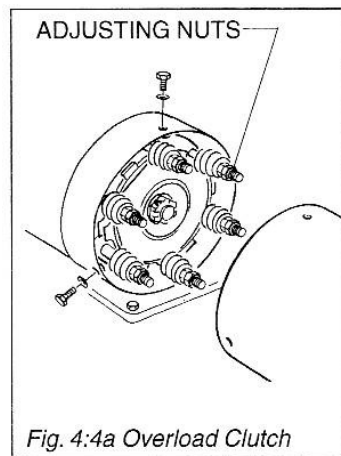


Fig. 4:4a Overload Clutch

The overload clutch unit (part of PTO shaft supplied) protects the machine transmission should the blades encounter an obstruction.

#### CAM CLUTCH UNIT (machines prior to 2010)

The cam clutch unit is supplier-set and is **not** adjustable. For any other information refer to the suppliers literature (supplied with the machine).

#### FRICTION CLUTCH UNIT (machines from 2010)

If set too loosely the blades will turn erratically leading to excessive friction plate wear and poor work finish. If set too tightly it will not provide the necessary protection.

To adjust the clutch setting:

1. Disengage the PTO drive and switch off the tractor engine.
2. Disconnect the PTO drive shaft safety guard check chain and remove the clutch guard from the machine.
3. Tighten two opposite nuts until the springs are coil bound as this will help to centralise the plates.
4. Tighten the other nuts until they just touch the washers, then tighten each nut an additional 2 1/2 complete turns for 540 rpm, or 1 3/4 turns for 1000 rpm.
5. Slacken off the two coil bound springs and reset the same as the others.
6. Refit and secure the clutch unit safety guard and clip the PTO drive shaft safety guard check chain to the machine.

### 4:5 DEPTH CONTROL

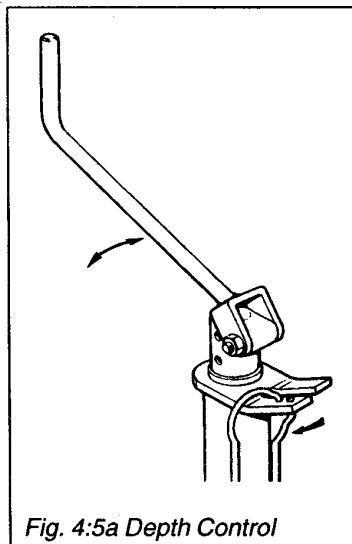


Fig. 4:5a Depth Control

The depth of cultivation is controlled down to a maximum of 200mm (8 inches) by means of side mounted wheels or a rear mounted roller.

To adjust depth :-

1. Unclip the screw adjuster handles and rotate clockwise to increase depth or anticlockwise to decrease depth.
2. When correct, fold the handles down and secure using the clip.

#### NOTE

*Adjustment should be the same on both sides to ensure even depth of cultivation*

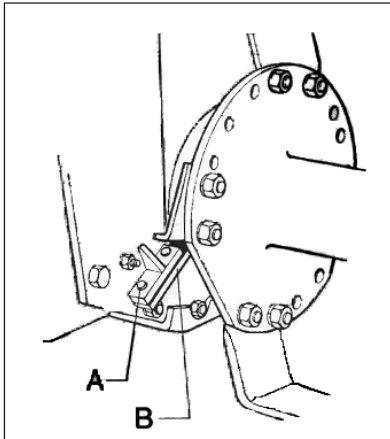
# POWAVATOR 150



## **WARNING**

***Never adjust Weed Cutter when Tractor engine is running.***

(on machines prior to 2020 only)



## **4:6 WEED CUTTER BLADES**

Weed cutter blades are fitted to the end flanges of the bladed rotor to help prevent trash from wrapping around the bearing housings.

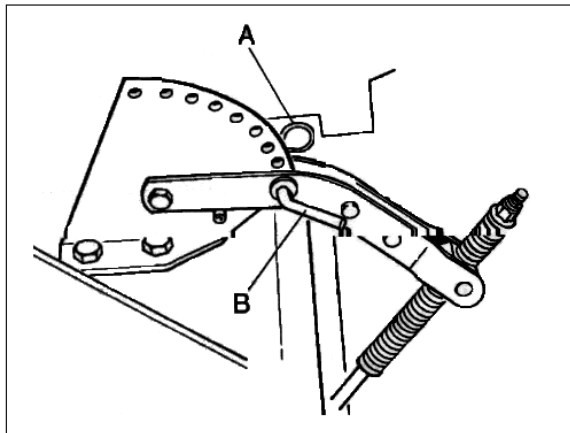
To adjust blade positions:-

1. Slacken the two adjusting Bolts (A) and slide the Cutter Blade (B) out until it just touches the shearing blade on the rotor end flanges.
2. When correct, tighten the two adjusting screws.
3. Rotate the rotor by hand and check that the blade adjustment is correct.

## **4:7 TRAILING SHIELDS**

The position of the trailing shields helps control the type of tilth produced. With the shields lowered, the cultivated soil strikes them and the clods are broken on impact, producing a fine tilth. Trash is buried and the shields have a levelling effect.

With the shields raised, the soil is thrown out unimpeded producing a coarse tilth. Trash and weeds are brought to the surface and left to wither and die.



To adjust:-

1. Remove the 'R' clips (A).
2. Slightly raise the trailing board and remove the securing pins (B).
3. Re-position the trailing board as required.
4. Replace the securing pins and 'R' clips.

# POWAVATOR 150

## SECTION 5 OPERATING INSTRUCTIONS



### WARNING

***Read Safety Section of this Manual  
Before using the Machine.***

### NOTE

If the Tractor is equipped with dual Hydraulics ensure that the system used is that for implements having depth Control wheels i.e. position control not Draft control.



### WARNING

***Damage to PTO driven machines  
could Occur if a fast revolving PTO  
shaft is brought to a sudden stop.***

***DO NOT operate the machine with  
the tractor in neutral.***

### 5:1 CHECKS BEFORE OPERATION

1. Check PTO drive shaft and tractor PTO connection.
2. Check hitch pins are correctly fitted

### 5:2 WORKING INSTRUCTIONS

Before use: -

1. Ensure that all safety precautions have been observed and that preliminary maintenance has been carried out as detailed in the Lubrication and Maintenance section of this publication

During use: -

1. Ensure that the machine is correctly mounted at all times and that all safety guards are correctly fitted and in good condition.
2. Engage the tractor PTO drive.
3. Lower the machine to the ground and drive forward at a speed suitable for prevailing conditions. Work a short distance then stop the tractor, disengage the PTO drive and switch off the tractor engine. Check that the tilth obtained is satisfactory and that the depth of tillage is even across the full machine width. Make any adjustments before proceeding.

It may be necessary to start at a shallow depth and work progressively deeper on each subsequent pass. When turning at headlands, lift the machine clear of the ground and disengage the PTO drive.

4. If the tractor is equipped with a PTO brake, reduce the engine speed before disengaging the PTO drive.
5. If the machine fails to operate as expected, stop the tractor, lower the machine to the ground and switch off the tractor engine before investigating the fault (see operators Check List).



## POWAVATOR 150

Producing Tilth: -

The following controls the type of tilth, fine or coarse, produced by the Powavator: -

1. Soil type – heavy or light.
2. Rotor speed – fast or slow.
3. Forward speed – fast or slow.
4. Trailing board position – raised or lowered.
5. Soil moisture content.

### 5:2.1 The Effect of soil type.

The amount of clay present in heavier soils gives them cohesion, and a greater variation of tilth is therefore possible.

Light soils usually contain insufficient clay to give cohesion and a finer tilth is usually produced.

### 5:2.2 The Effect of rotor speed.

At a constant forward travel speed, the rotor speed controls the size of the slice cut in the soil. A 2-blade rotor at a slow speed will produce a large cut leaving a rough cloddy finish. A 3-blade rotor at a fast speed reduces the cut size resulting in a fine tilth. The 3-blade formation is suitable for general use but the 2-blade formation has the advantage on the following counts:-

1. There is less tendency to clog in wet or very sticky conditions.
2. The rotor is self-cleaning in heavy trash and, under these conditions, it is possible to work to a greater depth thus providing more soil to mix with the crop residue.
3. A good cloddy autumn finish is easier to obtain.

Slow rotor speeds require much less power than high speeds. Extremely high rotor speeds should be avoided as the blade wear will increase sharply and the soil structure may be damaged.

Wet soil will tend to clog the rotor if the speed is too slow to throw the soil clear.

### **5:2.3 The Effect of Forward Travel Speed.**

The size of the soil slice can also be varied by use of the tractor gears; low gear will produce a fine tilth, higher gears will produce a progressively rougher finish. High travel speeds may be used for shallow seedbeds in previously cultivated ground provided that the rotor speed is increased proportionally to maintain tilth.

### **5:2.4 The Effect of Trailing Board Position.**

With the trailing board lowered, the clods are broken on impact and a fine tilth is produced, trash is buried and the trailing board will have a levelling effect.

With the trailing board raised, a relatively coarse tilth is produced as the soil is not broken and the larger particles remain on top. Trash and weed roots are also thrown up and stay on the surface.

### **5:2.5 The Effect of Soil Moisture Content.**

The moisture content of the soil affects its suitability for tillage. If the soil has a high moisture content it tends to 'ball'. If the soil is dry, dust will be produced and the blade wear will be increased. Care must be taken not to work soil with a high moisture content, as working extremely wet soil with any implement will tend to break down soil structure.

## POWAVATOR 150

### 5:3 OPERATORS CHECK LIST

If the Powavator fails to operate as expected, check with the list below to find the possible cause and rectify accordingly. Make only one adjustment at a time in the order listed in each section.

#### **Rotor will not turn**

1. PTO not engaged.
2. Overload clutch slipping.
3. Speedset gears not fitted correctly.

#### **Rotor turns erratically**

1. Cam clutch slipping.
2. Blades/spikes missing or fitted incorrectly.
3. PTO drive shaft operating angle exceeded.
4. Obstacle in rotor.

#### **Insufficient depth of work.**

1. Machine carried by the tractor hydraulics.
2. Insufficient power.
3. Depth control set too low.
4. Worn, bent or missing blades/spikes.
5. Rotor speed too slow.
6. Obstacle in rotor

#### **Tilth – too coarse**

1. Trailing board too high.
2. Rotor speed too slow.
3. Forward speed too fast.
4. 2-blade formation.
5. Soil too wet.

#### **Tilth – too fine.**

1. Trailing board too low.
2. Rotor speed too fast.
3. Forward speed too slow.
4. 3-blade formation.
5. Soil too dry.

#### **Rotor clogged.**

1. Soil too wet.
2. Worn, bent or missing blades/spikes.
3. Rotor speed too slow.
4. Obstacle in rotor.

# POWAVATOR 150

## SECTION 6 MAINTENANCE

### 6:1 LUBRICATION

Correct lubrication should be used to ensure the full life of working parts and efficient operation of the machine.

Shafts and bearings fitted with grease nipples should be lubricated using a good quality general purpose grease.

Bearings must not be allowed to run dry. When greasing it is better to give a little frequently, than a lot at long intervals.

#### Lubricants.

Gearbox -Castrol EPX 85/140 Multigrade Oil 4½ litres

Side Drive -Castrol EPX 85/140 Multigrade Oil 1½ litres

Grease Points (including U/J Bearings)

- Lithium Based

PTO Drive Shaft - Graphite or Molybdenum Di-sulphide grease

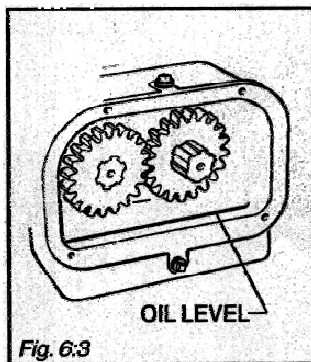
Oil points - General purpose machine oil.



### 6:2 PRELIMINARY MAINTENANCE

Check that all safety guards are correctly fitted, safety mechanisms and devices are operative and warning labels in position.

1. **Gearbox oil level.** Check by removing the rear cover. Oil should be level to the bottom lip of the casting with the machine level.
2. **Side drive oil level.** Check by removing the small level plug on the lower rear edge of the gearcase. Oil should just appear over the plug hole thread.
3. **Overload clutch unit.** Check setting as detailed in section 4 :4 of this handbook.
4. Ensure that all grease and oil points have been lubricated (see 10 and 50 hour maintenance).
5. Ensure that ALL blade/spike fixings are tight.
6. Ensure that all frame fixings are tight.
7. Ensure that the side drive and rotor stub axle wear skids are in position.



# POWAVATOR 150

## 6:3 SERVICE SCHEDULE

### ON DELIVERY AND AFTER FIRST 8 HOURS

All Nuts and Bolts                      Check and tighten if required

### EVERY 10 HOURS (DAILY)

1. Check that all safety guards are correctly fitted and in good condition.
2. Replace any bent, worn or missing blades/spikes and check that the fixings are tight.
3. Grease the PTO drive shaft bearings.
4. Oil the trailing board hinges.

### EVERY 50 HOURS (WEEKLY)

All Nuts and Bolts                      Check and tighten if required

Hydraulic Hoses and Fittings                      Check condition

Grease Points    Lubricate

Replace wearing parts as necessary to prevent damage to non-wearing parts.

1. Check the gearbox oil level.  
Change oil after first 10 hours then every 500 hours.
2. Check side drive oil level.  
Change oil after first 10 hours then every 500 hours.
3. Grease rotor stub axle bearing, PTO drive shaft telescopic sections.
4. Oil the depth control pivot points.

### EVERY 500 HOURS (THREE MONTHLY)

1. Drain, flush and refill the gearbox and side drive with oil.  
This operation is best carried out after the machine has been run for a few minutes so that any sediment is held in suspension in the oil.
2. Check the condition of the side drive and rotor stub axle wear skids and replace if necessary.



#### **WARNING**

*The oil may be hot and  
harmful to sensitive  
skin.*

## POWAVATOR 150

### END OF SEASON

Implement                                      Clean down thoroughly.

Hydraulic Hoses and Fittings                      Check condition

All Nuts and Bolts                      Check and tighten if required

Grease Points                                      Lubricate

Paint Work                                      Touch up

Bare metal surfaces                      Apply rust preventative

Replace wearing parts as necessary to prevent damage to non-wearing parts.

### END OF SEASON STORAGE

Clean all soil working parts and smear with grease. Separate, clean and grease the PTO drive shaft. Lubricate all oil and grease points.

### 6:4 WEAR SKIDS

To protect the side drive and rotor stub axle from wear, replaceable skids are fitted. Failure to renew these skids when worn could result in wear to the rotor bearing housings, allowing lubricant to escape, with consequent damage to the bearings.

To replace wear skids simply remove the two securing nuts, washers and screws and remove the old skid. Fit the new skid using the original fixings, if still suitable, and tighten to 10 kgsM (72 lbs/ft).

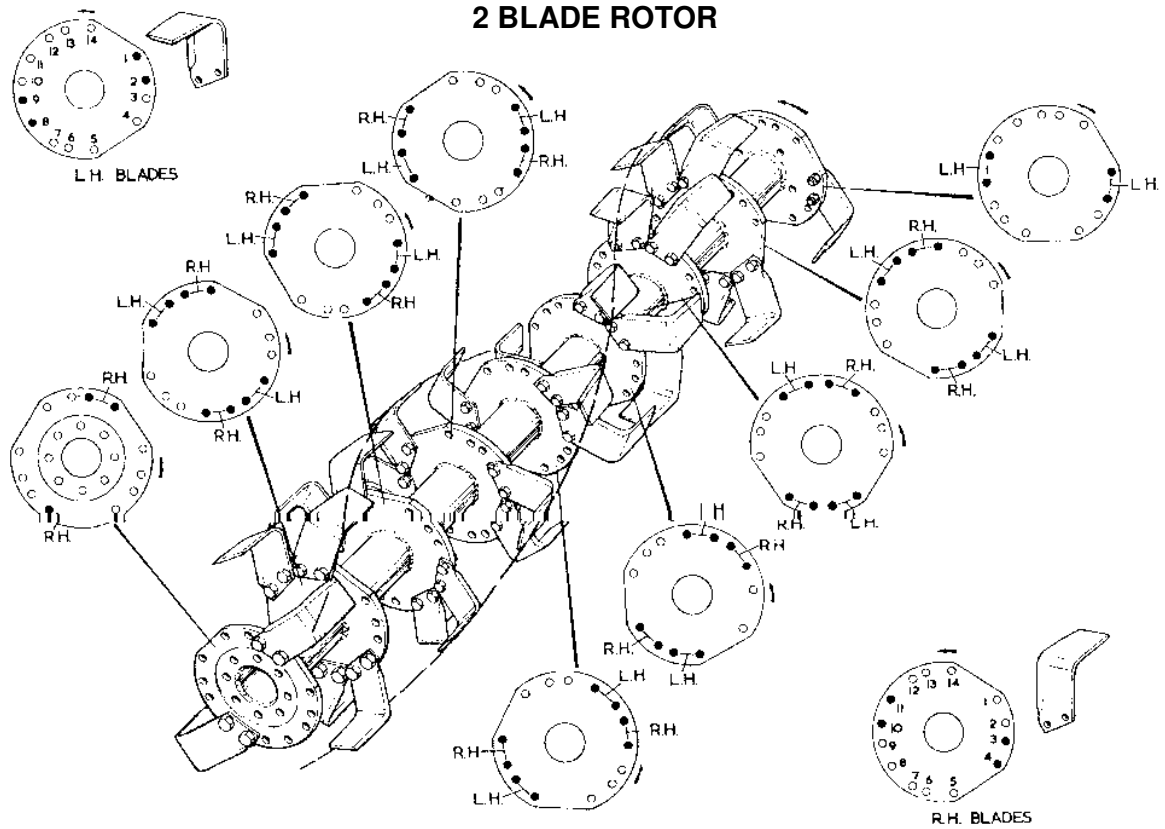
### 6:5 ROTOR BLADES

Note that each flange plate is rotated slightly from the previous one creating a scroll pattern along the rotor shaft. This ensures that the blades enter the soil at regular intervals to even out the load on the machine transmission. When replacing worn blades, remove one blade at a time and fit a replacement before proceeding to the next. This will ensure that the blade 'scroll' pattern is maintained. When fitting new blades use only genuine STANDEN blades and blade bolts. Only genuine blade bolts will have the correct shank length and tensile strength. Fit the bolt head against the blade with the spring washer and nut against the flange. Tighten the nuts to 35 kgsM (250 lbs/ft). To help provide alternative tilths the rotor flanges are drilled for either two or three blade formation.

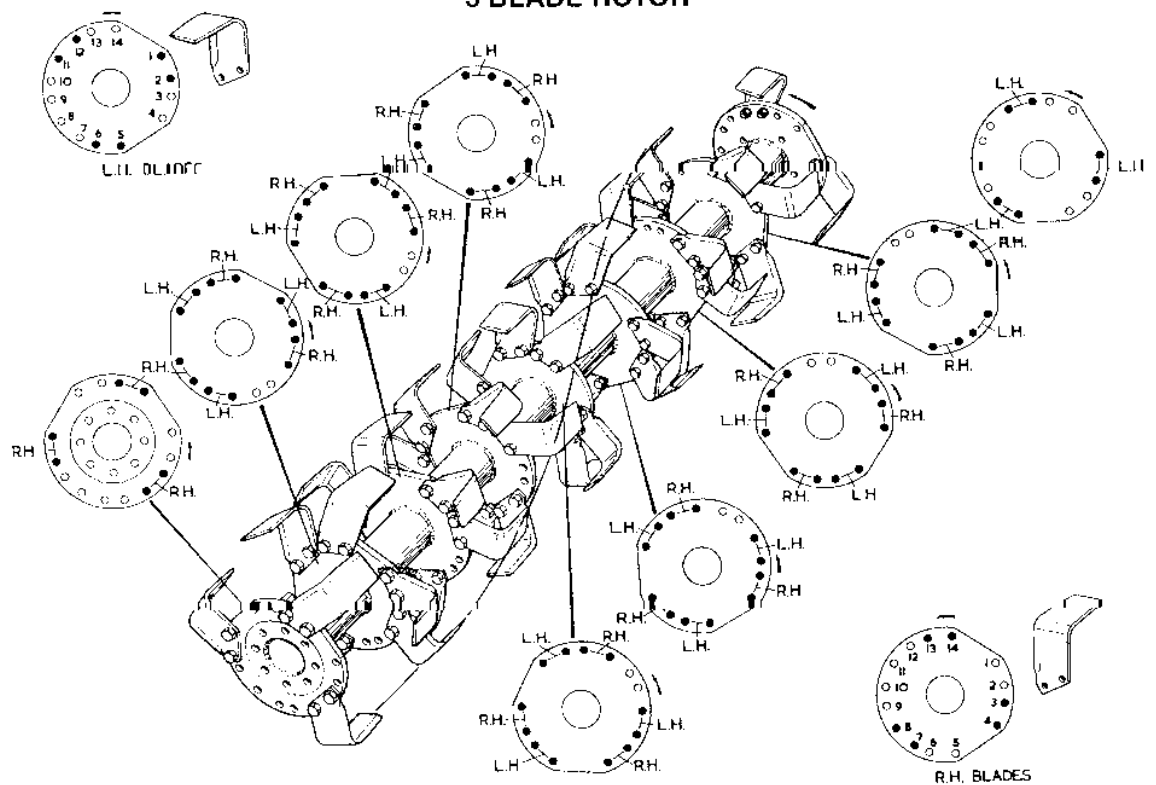
# POWAVATOR 150

## ROTOR ASSEMBLIES PRIOR TO 2020

### 2 BLADE ROTOR

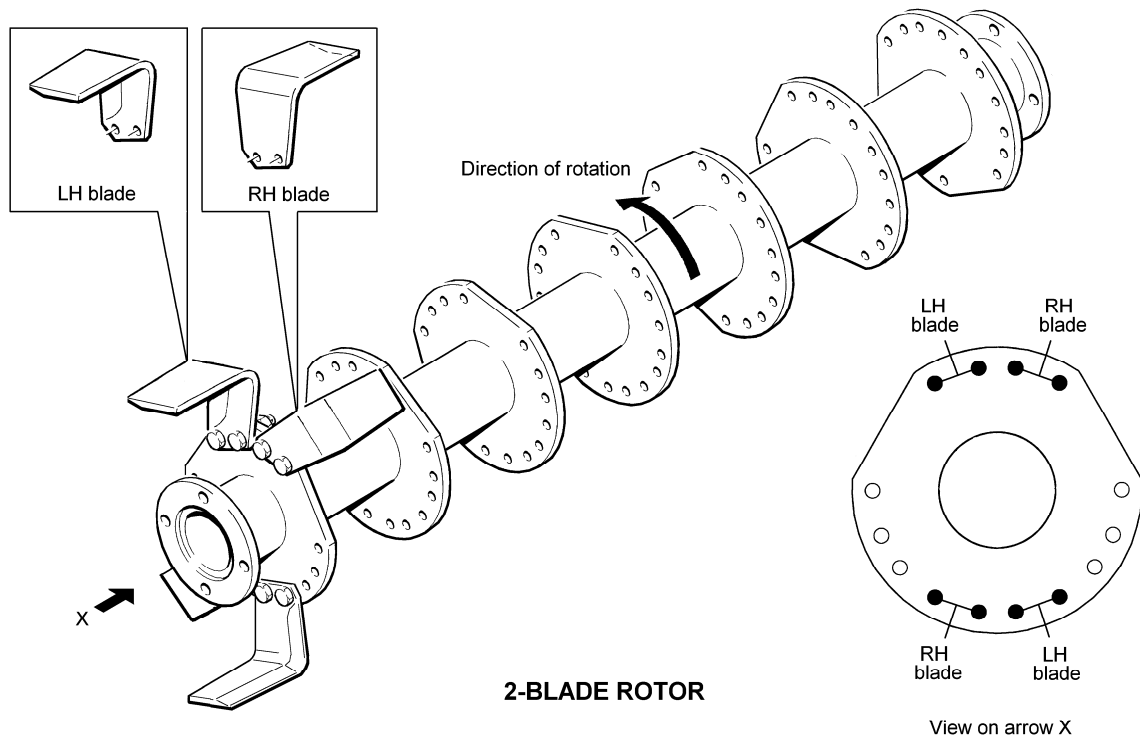


### 3 BLADE ROTOR

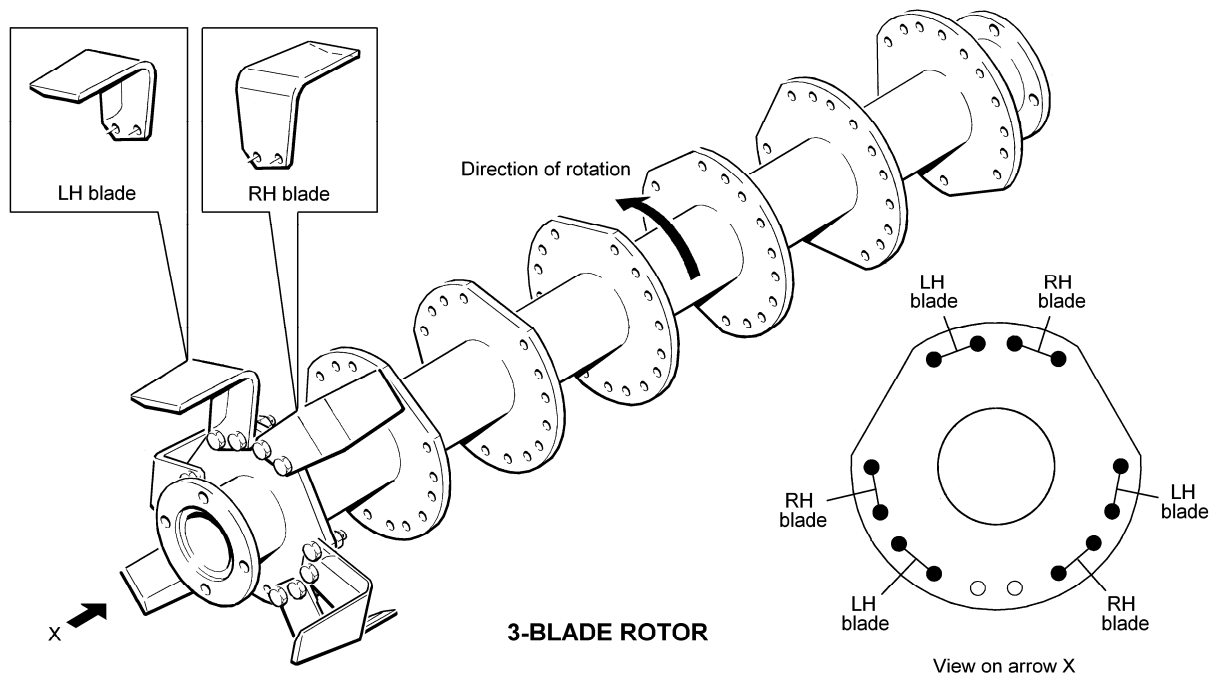


# POWAVATOR 150

## ROTOR ASSEMBLIES FROM 2020



PV-SP107





## POWAVATOR 150

### 6:6 SPIKE REMOVAL/FITTING

To remove a worn or damaged spike:-

Hammer out the retaining pin and remove the old spike.

If after removing the pin the spike cannot be removed because it is bent, it will be necessary to cut the spike as follows:

1. Hammer the end of the spike in and out of the rotor until it is loose. DO NOT hit the spike sideways as this may damage the retaining block making the new spike too loose when fitted.
2. Cut the spike as close to the rotor as possible taking care not to damage the retaining block.
3. Knock the cut end of the spike through the rotor tube.



#### **CAUTION**

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***The retaining pin is a very tight fit and considerable effort will be required to remove it, therefore when it does come out it will be with some force.***

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To fit a new spike:-

Insert the new spike through the rotor tube so that the machined groove aligns with the pin hole in the retaining block. Insert a new pin, with the lap edge against the block to ensure maximum pin contact with the spike, and hammer it through the block.

# POWAVATOR 150

## SECTION 7 SUPPLEMENTS

### 7:1 BEDFORMER KIT

A Bedformer Kit is available that is either factory fitted or can be retro-fitted to all models in the 150 Powavator range.

The kit has a Frame Assembly which is permanently fitted to the Powavator, pivoted from this frame is the Bedformer's two lower mounting brackets which have a ratchet linkage for height adjustment.

The Bedformer is demountable from the Powavator by way of its standard 3 point linkage enabling the Powavator to be used either with or without the Bedformer.

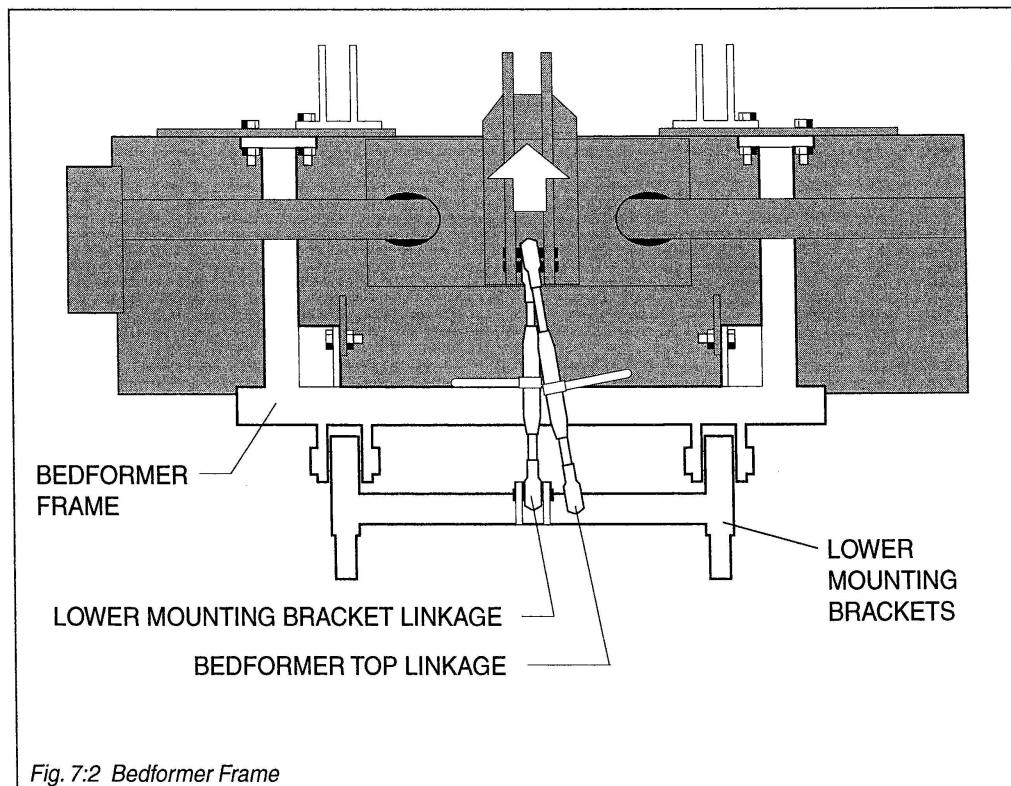
The working depth of the Bedformer can be adjusted by the two ratchet linkages.

#### NOTE

*For Information on the Bedformer unit refer to the Bedformer Instruction Book supplied.*

### 7:2 FITTING THE FRAME

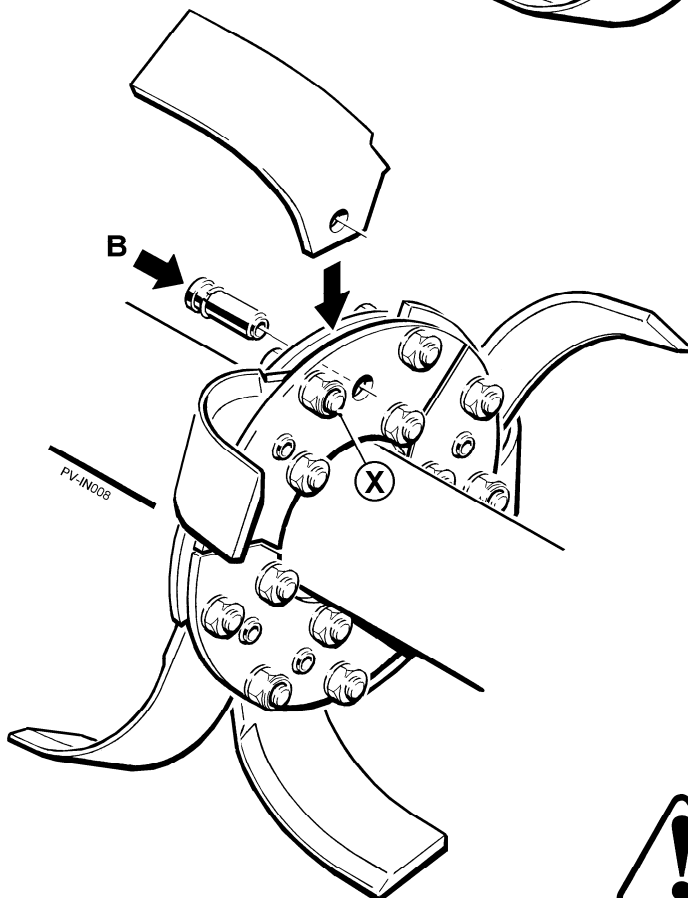
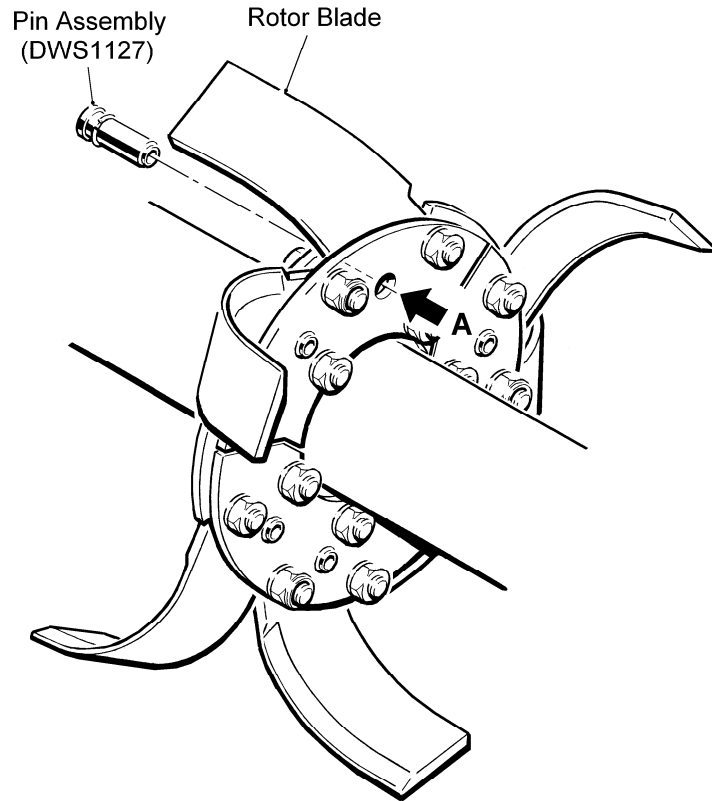
The Frame assembly is bolted to the Powavator as shown in fig. 7:2.



# Quick Release Rotor Blade Changing Instructions

## To remove a rotor blade:

1. Remove the pin assembly with a firm hammer blow at 'A'.
2. Remove the rotor blade.



## To fit a rotor blade:

1. Fit the new rotor blade between the plates.
2. Align the holes and fit a new pin assembly.
3. Drive the pin fully home using a firm hammer blow at 'B'.
4. If necessary, tighten bolt (X) to set blade space between flange plates.

**Note:** All other bolts should be torque set to 345 Nm (255 lb/ft).



Standen Eng. Ltd. recommend that a new pin assembly (Part No. DWS1127) is used when replacing blades.