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SHAKAERATOR 5000

TRAILED FOLDING PRIMARY CULTIVATOR

Operator Manual



IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION



DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with McConnel Limited before delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register machines go to the McConnel Limited web site at www.mcconnel.com, log onto 'Dealer Inside' and select the 'Machine Registration button' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.

Should you experience any problems registering a machine in this manner please contact the McConnel Service Department on 01584 875848.

Registration Verification

Dealer Name:
Dealer Address:
Customer Name:
Date of Warranty Registration:/...../..... Dealer Signature:

NOTE TO CUSTOMER / OWNER

Please ensure that the above section above has been completed and signed by the selling dealer to verify that your machine has been registered with McConnel Limited.

IMPORTANT: During the initial 'bedding in' period of a new machine it is the customer's responsibility to regularly inspect all nuts, bolts and hose connections for tightness and re-tighten if required. New hydraulic connections occasionally weep small amounts of oil as the seals and joints settle in – where this occurs it can be cured by re-tightening the connection – *refer to torque settings chart below*. The tasks stated above should be performed on an hourly basis during the first day of work and at least daily thereafter as part of the machines general maintenance procedure.

CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES

TORQUE SETTINGS FOR HYDRAULIC FITTINGS

HYDRAULIC HOSE ENDS		
BSP	Setting	Metric
1/4"	18 Nm	19 mm
3/8"	31 Nm	22 mm
1/2"	49 Nm	27 mm
5/8"	60 Nm	30 mm
3/4"	80 Nm	32 mm
1"	125 Nm	41 mm
1.1/4"	190 Nm	50 mm
1.1/2"	250 Nm	55 mm
2"	420 Nm	70 mm

PORT ADAPTORS WITH BONDED SEALS		
BSP	Setting	Metric
1/4"	34 Nm	19 mm
3/8"	47 Nm	22 mm
1/2"	102 Nm	27 mm
5/8"	122 Nm	30 mm
3/4"	149 Nm	32 mm
1"	203 Nm	41 mm
1.1/4"	305 Nm	50 mm
1.1/2"	305 Nm	55 mm
2"	400 Nm	70 mm

WARRANTY POLICY

WARRANTY REGISTRATION

All machines must be registered, by the selling dealer with McConnel Ltd, before delivery to the end user. On receipt of the goods it is the buyer's responsibility to check that the Verification of Warranty Registration in the Operator's Manual has been completed by the selling dealer.

1. LIMITED WARRANTIES

- 1.01. *All mounted machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.
All Self Propelled Machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months or 1500 hours. Engine warranty will be specific to the Manufacturer of that unit.*
- 1.02. *All spare parts supplied by McConnel Ltd and purchased by the end user are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months. All parts warranty claims must be supported by a copy of the failed part invoice to the end user. We cannot consider claims for which sales invoices are not available.*
- 1.03. *The warranty offered by McConnel Ltd is limited to the making good by repair or replacement for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined. Pack the component(s) carefully so that any transit damage is avoided. All ports on hydraulic items should be drained of oil and securely plugged to prevent seepage and foreign body ingress. Certain other components, electrical items for example, may require particular care when packing to avoid damage in transit.*
- 1.04. *This warranty does not extend to any product from which McConnel Ltd's serial number plate has been removed or altered.*
- 1.05. *The warranty policy is valid for machines registered in line with the terms and conditions detailed and on the basis that the machines do not extend a period of 24 months or greater since their original purchase date, that is the original invoice date from McConnel Limited.
Machines that are held in stock for more than 24 months cannot be registered for warranty.*
- 1.06. *This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, belts, clutch linings, filter elements, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads, pneumatic tyres or tracks.*
- 1.07. *Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.*
- 1.08. *Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.*
- 1.09. *Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnel Ltd cannot be held liable, and may have safety implications.*
- 1.10. *If in exceptional circumstances a non McConnel Ltd part is used to effect a repair, warranty reimbursement will be at no more than McConnel Ltd's standard dealer cost for the genuine part.*
- 1.11. *Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of McConnel Ltd.*

- 1.12. For machine warranty periods in excess of 12 months the following additional exclusions shall apply:
- 1.12.1. Hoses, exposed pipes and hydraulic tank breathers.
 - 1.12.2. Filters.
 - 1.12.3. Rubber mountings.
 - 1.12.4. External electric wiring.
 - 1.12.5. Bearings and seals
 - 1.12.6. External Cables, Linkages
 - 1.12.7. Loose/Corroded Connections, Light Units, LED's
 - 1.12.8. Comfort items such as Operator Seat, Ventilation, Audio Equipment
- 1.13. All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.
- 1.14. Repeat or additional repairs resulting from incorrect diagnosis or poor quality previous repair work are excluded from warranty.

NB Warranty cover will be invalid if any non-genuine parts have been fitted or used. Use of non-genuine parts may seriously affect the machine's performance and safety. McConnel Ltd cannot be held responsible for any failures or safety implications that arise due to the use of non-genuine parts.

2. REMEDIES AND PROCEDURES

- 2.01. The warranty is not effective unless the Selling Dealer registers the machine, via the McConnel web site and confirms the registration to the purchaser by completing the confirmation form in the operator's manual.
- 2.02. Any fault must be reported to an authorised McConnel Ltd dealer as soon as it occurs. Continued use of a machine, after a fault has occurred, can result in further component failure for which McConnel Ltd cannot be held liable.
- 2.03. Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by McConnel Ltd. Please note that failure by the customer to release the machine for repair will not be accepted as a reason for delay in repair or submitting warranty claims.
- 2.04. All claims must be submitted, by an authorised McConnel Ltd Service Dealer, within 30 days of the date of repair.
- 2.05. Following examination of the claim and parts, McConnel Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnel Ltd and appropriate labour and mileage allowances if applicable.
- 2.06. The submission of a claim is not a guarantee of payment.
- 2.07. Any decision reached by McConnel Ltd. is final.

3. LIMITATION OF LIABILITY

- 3.01. McConnel Ltd disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.
- 3.02. McConnel Ltd makes no warranty as to the design, capability, capacity or suitability for use of the goods.
- 3.03. Except as provided herein, McConnel Ltd shall have no liability or responsibility to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the goods including, but not limited to, any In direct, special, consequential, or incidental damages resulting from the use or operation of the goods or any breach of this warranty. Notwithstanding the above limitations and warranties, the manufacturer's liability hereunder for damages incurred by the purchaser or others shall not exceed the price of the goods.
- 3.04. No action arising out of any claimed breach of this warranty or transactions under this warranty may be brought more than one (1) year after the cause of the action has occurred.

4. MISCELLANEOUS

- 4.01. McConnel Ltd may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.*
- 4.02. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.*
- 4.03. Applicable law may provide rights and benefits to the purchaser in addition to those provided herein.*

McConnel Limited



DECLARATION OF CONFORMITY

Conforming to EU Machinery Directive 2006/42/EC

We,

McCONNEL LIMITED, Temeside Works, Ludlow, Shropshire SY8 1JL, UK

Hereby declare that:

The Product; *Tractor Trailed Primary Cultivator / Subsoiler*

Product Code; *SF50*

Serial No. & Date Type

Manufactured in; *United Kingdom*

Complies with the required provisions of the Machinery Directive 2006/42/EC
The machinery directive is supported by the following harmonized standards;

- BS EN ISO 12100 (2010) Safety of machinery – General principles for design – Risk assessment and risk reduction.
- BS EN 349 (1993) + A1 (2008) Safety of machinery - Minimum distances to avoid the entrapment with human body parts.
- BS EN ISO 14120 (2015) Safety of machinery - Guards general requirements for the design and construction of fixed and movable guards.
- BS EN 4413 (2010) Hydraulic fluid power. Safety requirements for systems and their components.

McCONNEL LIMITED operates an ISO 9001:2008 quality management system, certificate number: FM25970.

This system is continually assessed by the;
British Standards Institution (BSI), Beech House, Milton Keynes, MK14 6ES, UK
BSI is accredited by UK Accreditation Service, accreditation number: UKAS 003.
The EC declaration only applies if the machine stated above is used in accordance with the operating instructions.

Signed *Responsible Person*
CHRISTIAN DAVIES on behalf of McCONNEL LIMITED

Status: *General Manager*

Date: *January 2018*



For Safety and Performance ...

ALWAYS READ THIS BOOK FIRST

McCONEl LIMITED

**Temeside Works
Ludlow
Shropshire
England**

**Telephone: 01584 873131
www.mccommel.com**

NOISE STATEMENT

The equivalent daily personal noise exposure from this machine measured at the operators' ear is within the range 78 – 85 dB, these figures apply to a normal distribution of use where the noise fluctuates between zero and maximum. The figures assume that the machine is fitted to a tractor with a 'quiet' cab with the windows closed in a generally open environment. We recommend that the windows are kept closed. With the cab rear window open the equivalent daily personal noise exposure will increase to a figure within the range 82 – 88 dB. At equivalent daily noise exposure levels of between 85 – 90 dB ear protection is recommended – it should be used if any window is left open.

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GENERAL INFORMATION

Read this manual before fitting or operating the machine. Whenever any doubt exists contact your dealer or the McConnell Service Department for assistance.

Use only 'McConnel Genuine Parts' on McConnel equipment and machinery

DEFINITIONS - The following definitions apply throughout this manual:

WARNING:

An operating procedure, technique etc., which can result in personal injury or loss of life if not observed carefully.

CAUTION:

An operating procedure, technique etc., which can result in the damage of either machine or equipment if not observed carefully.

NOTE:

An operating procedure, technique etc., which is considered essential to emphasise.

LEFT AND RIGHT HAND:

This term is applicable to the machine when fitted to the tractor and viewed from the rear. This also applies to tractor references.

Note: The illustrations in this manual are for instructional purposes only and may on occasion not show some components in their entirety. In some instances an illustration may appear slightly different to that of your particular model but the general procedure will be the same. E&OA.

MACHINE & DEALER INFORMATION

Record the Serial Number of your machine on this page and always quote this number when ordering parts. Whenever information concerning the machine is requested remember also to state the make and model of tractor to which the machine is fitted.

Machine Serial Number:	Installation Date:
Machine Model details:	
Dealer Name:	
Dealer Address:	
Dealer Telephone No:	
Dealer Email Address:	

FEATURES

Shakaerator 5000 Model

- Trailed.
- 5.0M working widths.
- Folding wings for compact transportation and storage.
- 30" breakback protected legs.
- Auto-Reset breakback protection.
- Height adjustable legs.
- Hydraulically adjustable leg frame.
- Replaceable Longlife points.
- Replaceable shins.
- Height adjustable Guttler roller.
- Rear lighting kit.
- Amber safety beacon.

INTRODUCTION

The McConnel Shakaerator 5000 is a trailed Primary Cultivator / Subsoiler with a 5 metre working width suitable for use with tractors of 200HP and above.

The machine is equipped with 9 'auto-reset breakback protected' 30" legs each fitted with replaceable wear points that lift and loosen the soil; rear mounted, height adjustable Guttler rollers complete the process by effectively consolidating the soil.

Machines feature 2 folding 'wings' that can be hydraulically raised into a compact position for both ease of transportation and efficient storage.

For added safety an automatic latching system is built into the frame of the machine to lock the wings when they are in their raised transport / storage position.

SPECIFICATIONS

Shakaerator 5000 Model

Tractor Attachment	Trailed
Tractor HP Requirement	200HP (Minimum)
Number of Legs	9
Leg Depth Adjustment (<i>Pin adjustment</i>)	35mm increments
Gas Strut Pre-charge	100Bar
Number of Wheels	2
Tyre Size	600/50R22.5
Tyre Pressure	40PSI
Wheel Studs (Torque Setting)	270Nm +20/-0
Braking System	Hydraulic Self Adjusting
Working Width	5.16m
Transport Width	2.82m
Transport Length (Approximate)	7.2m
Transport Height (Dependent on clearance setting)	3.2m (±)
Machine Weight	5115Kg
Weight on Front Hitch in Transport	1360Kg
Leg Shins (<i>replaceable</i>)	Euroshins
Type of Points	Replaceable Longlife
Roller Type	Guttler Ø550mm

MACHINE IDENTIFICATION

Each machine is fitted with an identification plate with the following information:

1. Machine / Model Type
2. Machine Serial No.
3. Machine Mass
4. Production Year
5. Model Year

When ordering spares or replacement parts from your local dealer it is important to quote the Machine / Model Type and Serial Number as stated on the identification plate so the machine and model can be quickly and correctly identified.



Machine Identification Plate



This machine has the potential to be extremely dangerous, it is therefore imperative that both owner and operator of the machine reads and understands the following section to ensure they are fully aware of the dangers that do, or may exist, and their responsibilities surrounding the use and operation of the machine.

When the machine is not in use it should be parked up or stored in a safe condition on a firm level site. In the event of any fault being detected with the machine's operation it must be stopped immediately and not used again until the fault has been corrected by a qualified technician.

- ▲ ALWAYS ensure all operators have read and understood the operation and safety information in the manual before using the machine.
- ▲ ALWAYS inspect the work area for possible dangers or risk before starting work.
- ▲ ALWAYS ensure all guards (if applicable) are in place and are kept in good condition – they are there for your protection and the safety of others.
- ▲ ALWAYS keep clear of any moving or rotating components.
- ▲ ALWAYS ensure that nuts holding the shanks to the machine frame are on the underside.
- ▲ ALWAYS stop a working machine when other people enter a work area and only restart when the area is clear of any risk.
- ▲ ALWAYS wear protective eye shields when striking points.
- ▲ ALWAYS be alert – if any help is being given during the coupling or uncoupling of machines or any other equipment ensure the assistant is kept clear of risk of entrapment.
- ▲ ALWAYS ensure machine is fully folded and locked with the safety latch correctly for transport and storage.
- ▲ NEVER wear loose or flapping clothing near a working machine
- ▲ NEVER permit anyone to ride on the machine, whether in transport or in work.
- ▲ NEVER approach a working machine or attempt any kind of maintenance on a working machine.
- ▲ NEVER work under a machine that is unsupported or raised on hydraulics – always use suitable substantial supports placed under the machine on a firm level work area.
- ▲ NEVER allow bystanders near a working machine – ensure they remain at a safe distance from the machine.
- ▲ NEVER permit children to play on a machine even when removed from the tractor and stored.

TRACTOR REQUIREMENTS

Tractor Power Requirements

It is impossible to give any hard and fast figures on horsepower requirements as ground conditions can vary enormously. Figures quoted in the specification section are advisory only and may therefore vary depending on specific circumstances and conditions.

Front End Weight

It may be found to advantageous to apply front-end weight to some smaller and medium powered tractors. The amount of weight necessary can only be determined by local circumstances.

HANDLING THE MACHINE



WARNING!

Read the information stated below before handling the machine – failure to observe this advice may result in personal injury and/or damage to the machine.

As trailed machines are axle and wheel mounted all major handling of the machine can be performed using a tractor or similar suitable vehicle. Always ensure the vehicle used is capable of towing the machines weight and that it is connected directly onto the tow hitch and not via chains or ropes.

Any form of raising the machine must only be performed on a firm level site using suitable equipment with a minimum lifting capability well in excess of the total weight being raised; wheels must be chocked front and rear before raising the machine and bystanders should be kept at a safe distance. Once raised the machine must be supported with blocks or suitable substantial stands before attempting any maintenance or repairs. Never work under a raised machine that has not been safely and suitably supported.

ATTACHMENT TO TRACTOR

Attachment

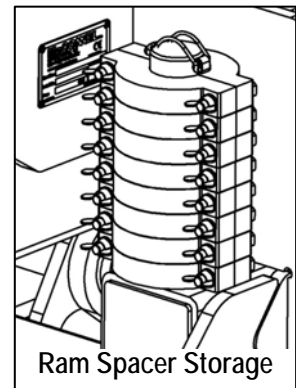
Attachment of the machine should always be performed on a firm level site. A similar site should also be used for subsequent removal and parking of the machine.

- Reverse tractor squarely up to the front of the machine with the tow hitch inline and directly in front of the machines towing eye.
- Connect machine hoses to tractor's external service points.
- Operate machine hydraulics to adjust tow bar to correct height for connection.
- Reverse tractor, connect hitch and secure.
- Operate height rams to raise frame to a height that gives suitable ground clearance for safe transportation.
- Swivel 'stop blocks' onto the ram rods of the front and rear height rams to support them at the desired height, and bring the rams down to rest on them.

NOTE: Spacers may need to be added onto the ram rod of the front ram if it is found that it is not arrested by the stop block at the ride height required; spacers for this function are supplied and stored on the front of the main frame close to the ram.



Care must be adopted when fitting ram spacers as there are pinch point risks associated with this area of the machine.



- Connect rear lighting plug to tractor's electrical output socket and check that all lights are working correctly.
- The machine is now ready for transportation to the work site.

Transporting the Machine



CAUTION!

Ensure ram stop blocks are swivelled into position on ram rods of both front and rear lift ram and arresting the rams during transportation of the machine.

The machine and tractor form a large unit, therefore during transportation the operator must make themselves fully aware of the width, length, height and ground clearance of the machine and drive with due care and attention with respect to these issues. On a safety aspect consideration should be paid to other road users when transporting a machine of this dimension.

An amber warning beacon is fitted as standard to the rear of the machine and this should be switched on during transportation as a danger warning to other road users.

NOTE: Where the machine is used in conjunction with a crawler tractor equipped with a swinging drawbar, the drawbar should be used in the 'locked' mode for transport and set into swinging mode for working the machine; this will reduce sideways forces on the legs of the machine when manoeuvring in work.



Maximum transport speed for this machine is 20mph (32kph).

OPERATION

Moving into Work Position

Moving the machine from transport to work position is performed by extending the wing rams to move the wings from the vertical transport position to the horizontal work position. For additional safety during transport the wings are secured in the vertical position by hydraulically operated safety latches, these latches automatically release on operation of the wing rams.

Safety Latches ►

NOTE; *if the safety latches are in contact with the frames the wings must be raised slightly to allow the latches to be released before then lowering the wings.*



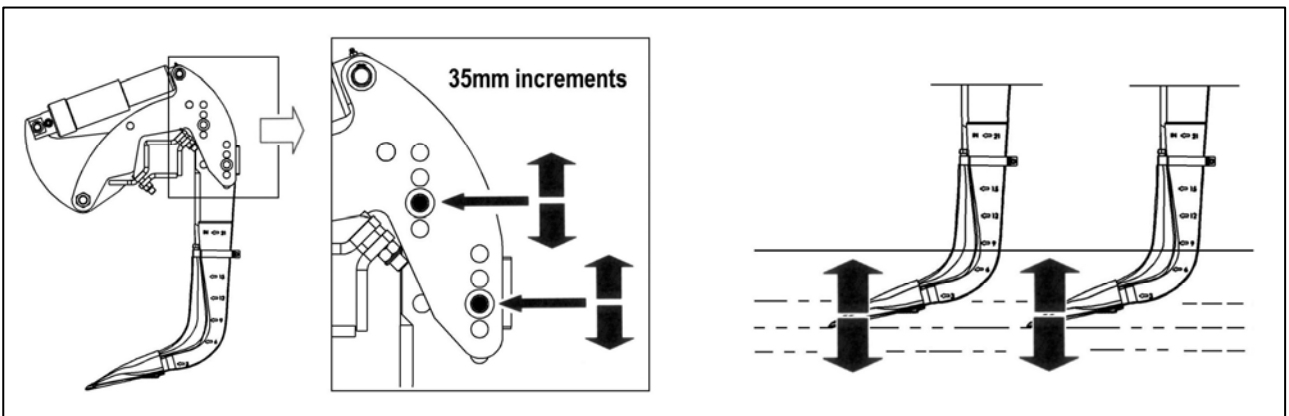
WARNING! Ensure there is sufficient space around the machine before lowering the wings. Keep bystanders at a safe distance from the machine during all movements and operations.

Lowering Machine into Work

The machine is lowered into work by retracting rams the fore and aft lift rams, when the tools contact the ground and resistance is sensed oil flow to the front ram will be diverted to the rear ram which will then raise the rear axle and wheels clear of the ground.

Leg Depth Adjustment

The working depth of each leg can be individually adjusted allowing them the ability to working higher or lower in relation to the roller. By changing the height position of the shanks within the leg assembly the working depth can be adjusted in 35mm increments; this gives a variety of height adjustments. The shanks are held in position in the leg assemblies with nuts and bolts.



Leg Working Depth - Hydraulic Height Adjustment

For quick and easy adjustment of leg depth the parallel frames onto which the legs are mounted can be moved up or down in unison by operation of the hydraulic height rams. Once the height has been set the rams must be 'locked' by swivelling the 'ram stops' into position over the ram rods of each ram, ensure a matching number of stop tabs are used on all the depth rams.

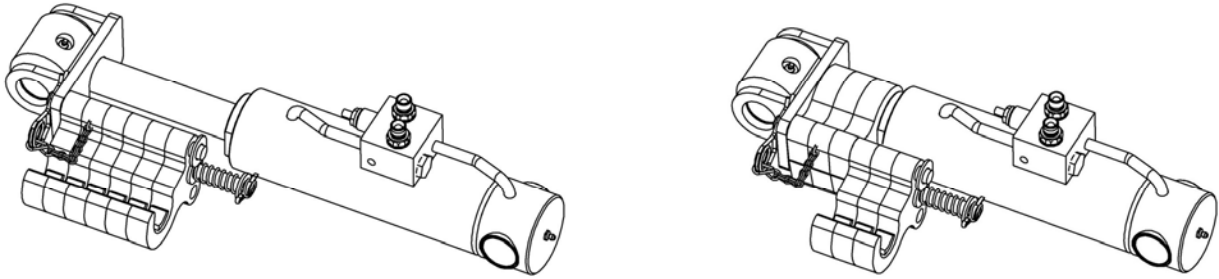
Ram Stops

Hydraulic rams on the machine are subject to intense forces and are therefore equipped with ram stops; these should be positioned over the ram rod to physically 'lock' the cylinder at a specified point of extension, this not only strengthens the unit but also protects the ram and the hydraulic circuit.

On the depth rams the stops are in the form of shaped steel tabs mounted adjacent to each ram and can be individually swivelled into position as required.

It is vital that ram stops are always fitted in position and the cylinders brought into contact with them on all relevant rams during machine operations.

The required number of ram stops utilised can be varied depending on the particular work setup of the machine. It is important when setting the machine for work that a matching number of ram stops are used on all the depth rams.



Ram Stops are mounted adjacent to the depth rams and swivel onto the ram rods to 'lock' the cylinder.



CAUTION!

'Ram Stops' MUST be used to lock all applicable rams when working the machine, failure to observe this may result in damage to the machine.

Depth Adjustment

Adjust the working depth by setting the height of the rear rollers; a selection of holes in the roller bracket attachment points allows for a choice of height settings at which to set the rollers. After selecting the desired height the roller brackets are locked in position with the pins and lynch pins provided. Ensure that the hole positions selected for the roller height are identical both side to side and roller to roller. The holes are elongated to allow for a modicum of roller 'float'.

Setting of the roller height is best performed at the work site; draw the machine into the ground sufficient only to take the weight off the roller. Remove the height locking pins from each side of both roller arms before drawing the machine forward into the ground to the required working depth. Replace the roller height locking pins.

Depth Control

To achieve maximum depth with a lower draft requirement it is possible where necessary to make more than one pass over the ground increasing the depth each time. Alternatively, some shanks can be removed. If removing shanks ensure they are removed evenly i.e. same position leg from each side of the machine.

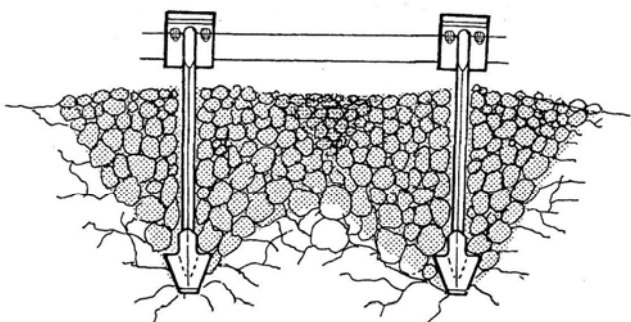
Calibration marks are cast into the sides of the shanks; centimetres on one side and inches on the other to assist the operator in maintaining more precise depth control. These are approximate calibrations and, obviously, will vary as the points wear.

In setting the depth, it may be an advantage to set the rear roller high before pulling the points into the earth to the depth required; the roller can then be lowered to set and maintain the required depth.

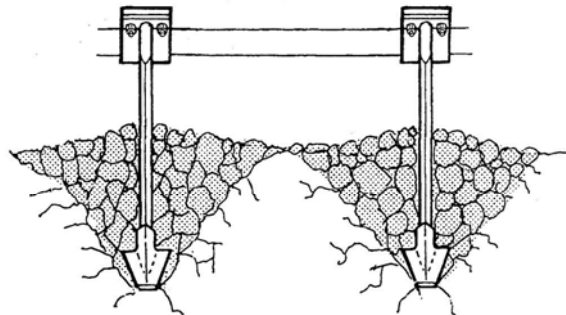
Roller height is determined by the position of pins located in the roller mountings. Ensure when adjusting the roller height that all pins are replaced in matching hole positions at each mounting point.

Tine Spacing

Correct tine spacing is related to the working depth of the point, on these machines that use standard narrow points the spacing should be 1.2 to 1.5 times the working depth; this will give the least draught force and most even surface finish with efficient soil break-up as shown in the illustrations below.



Correct Spacing
Efficient soil break-up



Incorrect Spacing
Inefficient soil break-up

Starting Work

At the start of work the machine should be folded out into the work position and the required number of 'ram stop tabs' located onto the front frame lifting ram to hold the machine parallel when working in the ground – *the number of tabs selected will vary depending on the particular setup of the individual machine.*

With the machine raised just clear of the ground, begin forward movement and gradually lower the machine into the earth whilst retaining forward momentum, the rear axle and wheels will automatically rise off the ground into their work position. When the roller settles on the surface the working depth has been reached and forward movement can continue at optimum speed for the job.

On approaching the end of the pass gradually lift the machine out of work and up onto the wheels which will have automatically lowered into position thus allowing the machine to be turned. **Never attempt to turn the machine whilst it is still in the ground.**

Reduce speed and keep the machine raised for turning on the headland. Re-start the next pass as before.

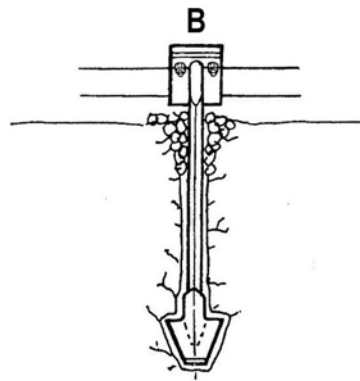
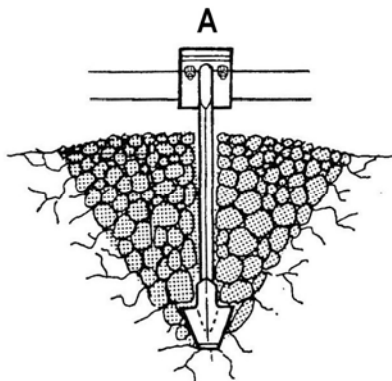


CAUTION!

Always raise the machine clear of the ground before attempting excessive turning or manoeuvres. Do not lower the machine into the ground whilst turning the unit.

Working Depth (Critical Depth)

The depth to which the machine can best be used depends entirely on soil type and moisture content; the combination of these factors produces a critical depth, below this depth less soil is loosened and the tractor draught force is considerably greater. Down to the critical depth the breakout pattern is similar to illustration 'A' below. Below the critical depth illustration 'B' will apply. This can often be recognised from the surface but is very clearly seen by digging the profile.



The reason for critical depth (as shown the illustrations above) is that the soil has been loosened upwards because that is the direction of least resistance. Below critical depth the resistance to upwards movement is greater and it is easier for the soil to compact sideways than to loosen upwards. The very small amount of loosened soil at the top of the tine is because the loosening has been done by only the width of the shank. The sides of the compacted channel may be smeared and it is obvious that this is a very detrimental condition in which to leave the soil.

Work Speed

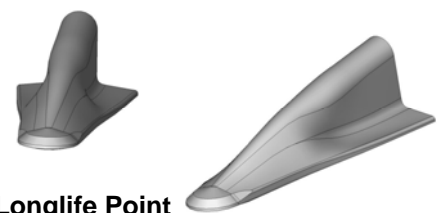
When first putting the machine into operation it is suggested that the tractor's forward speed be limited to less than 3mph (5kph). This can gradually be increased to find the optimum speed as experience with the machine is gained.

Moving into Transport Position

With leg frame raised to its highest position retract the wing rams to move the machine from work position to transport position, the safety latches will automatically engage and lock to secure the wings when fully raised.

Point Type

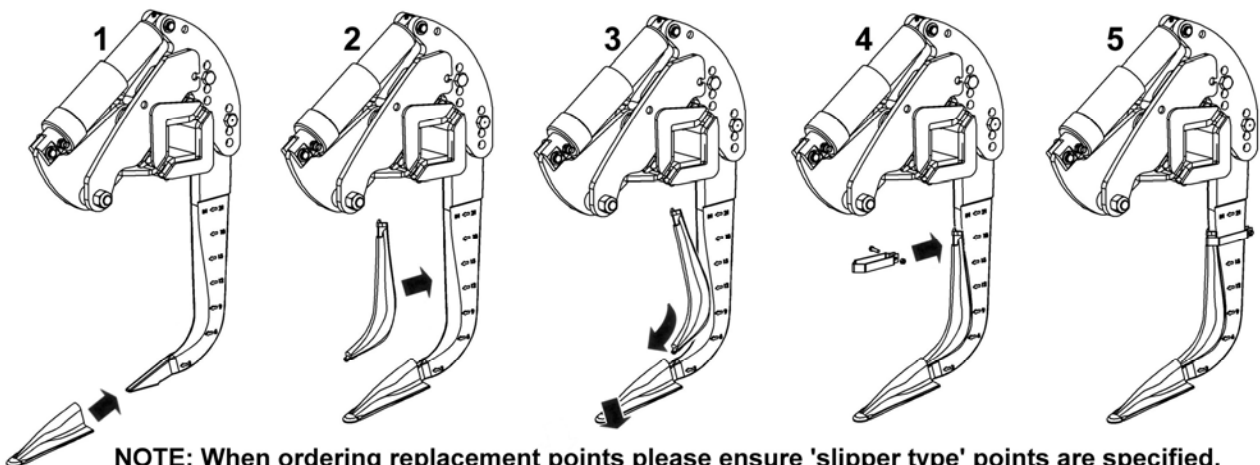
The machine uses the narrow type Longlife 'Slipper' Points that are suitable for deep cultivation; these points will lift and shatter the soil structure with low draft and minimum mixing.



Longlife Point

Slipper Point Fitment

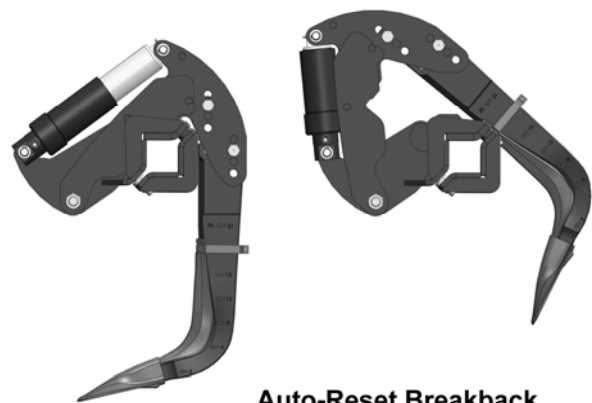
For fitment, the point is slid onto the shank and angled downwards to allow the toe of the wear shin to locate in the upper rear recess of the point – the shin may require 'tapping' into position to ensure a tight fit is achieved – the top of the shin is then secured on the shank with its fixing bracket, nut, and bolt.



NOTE: When ordering replacement points please ensure 'slipper type' points are specified.

Breakback Protection System

For machine and component protection the machine is fitted with 'Auto-Reset' legs that 'breakback' when a heavy or immovable object comes into contact with the leg whilst it is working in the ground; the legs are designed to automatically return to the work position when the obstruction has been passed.



Auto-Reset Breakback

Shanks & Shin Guards

The leg shanks are made from extremely tough abrasive resistant steel and are subjected to a special heat treatment during manufacture. Do not attempt to hard face or otherwise weld the shank as this will destroy the shank's properties. Owners are reminded that no warranty can be entertained on shanks that show evidence of welding.

Shin guards are made of special hard steel that will readily accept hard-face welding reinforcement.



CAUTION!

Do not attempt to hard face or otherwise weld the shanks; this will destroy the shank's properties.

SERVICE AND MAINTENANCE

Apart from regular lubrication, maintenance of the machine is limited to general cleaning and regular checking of the points and shin fixings for tightness.

Lubrication

All lubrication points should be greased on a daily basis prior to work and before storage of the machine, grease points are located in the following major locations; rams, legs, frame pivot points and roller assembly.

Wheels and Tyres

Check tyre pressures and wheel nut tightness on a regular basis.

The correct tyre pressure is: 40psi.

Wheel nut torque setting is: 270Nm (+60/-0)

Hydraulic Brakes

Check brake pads on a regular basis for level of wear; replace pads when there are signs of excessive wear and/or a loss in braking efficiency. The brakes on the machine are self-adjusting.

Gas Struts

Auto-Reset Legs are equipped with Nitrogen filled Gas Struts; these are factory pre-charged to 100Bar and will not require any intervention or maintenance by the operator. The filling valve located on the base of the strut must not be opened or interfered with under any circumstances – any adjustments or maintenance to this component must only be carried out by specialists or the manufacturer.

Oil Safety



Always wear suitable eye, hand and body protection when working with hydraulic oils – refer to the oil manufacturers' safety information for further details and advice.

Escaping oil under pressure is extremely dangerous – never check for leaks with your hand, use a piece of cardboard or similar material held at arms length.

MACHINE STORAGE

Storage

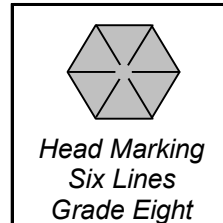
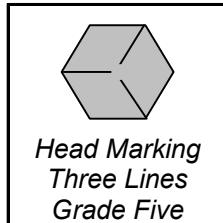
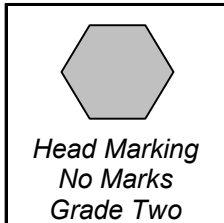
The machine should be cleaned and lubricated prior to storage. It should be stored on a firm level site with the wheels chocked. Park the machine in its lowered position with the wing stantions resting on the ground. Hydraulic hoses should be neatly stowed clear of the ground on the tow bar. Always ensure the machine is left in safe stable condition.

TORQUE SETTINGS FOR FASTENERS

The Chart below lists the correct tightening torque for fasteners. The Chart should be referred to when tightening or replacing bolts in order to determine the grade of bolt and the correct torque unless specific torque values are assigned in the text of the manual.

Recommended torque is quoted in Foot-Pounds and Newton-Me tres within this m anual. The equation for conversion is 1 Nm. = 0.7376 ft.lbs.

TORQUE VALUES FOR IMPERIAL BOLTS



NOTE:
The values in the chart apply to fasteners as received from the supplier, dry or when lubricated with normal engine oil. They DO NOT apply if special graphited, molydisulphide greases, or other extreme pressure lubricants are used. This applies to both UNF and UNC coarse threads.

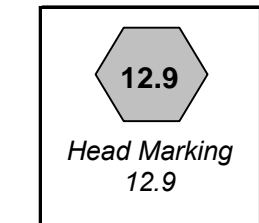
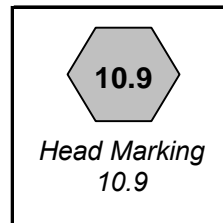
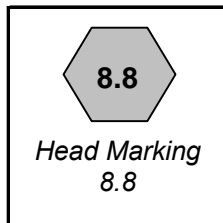
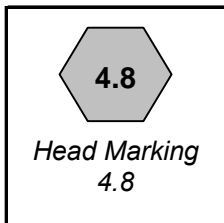
Bolt Dia.
1/4"
5/16"
3/8"
7/16"
1/2"
9/16"
5/8"
3/4"
7/8"
1"
1-1/8"
1-1/4"
1-3/8"
1-1/2"

Value (Dry)	
ft.lb.	Nm.
5.5	7.5
11	15.0
20	27.0
32	43.0
50	68.0
70	95.0
100	135.0
175	240.0
175	240.0
270	360.0
375	510.0
530	720.0
700	950.0
930	1250.0

Value (Dry)	
ft.lb.	Nm.
9	12.2
18	25.0
33	45.0
52	70.0
80	110.0
115	155.0
160	220.0
280	380.0
450	610.0
675	915.0
850	115.0
1200	1626.0
1550	2100.0
2100	2850.0

Value (Dry)	
ft.lb.	Nm.
12.5	17.0
26	35.2
46	63.0
75	100.0
115	155.0
160	220.0
225	305.0
400	540.0
650	880.0
975	1325.0
1350	1830.0
1950	2650.0
2550	3460.0
3350	4550.0

TORQUE VALUES FOR METRIC BOLTS.



Bolt Dia.
6mm
8mm
10mm
12mm
14mm
16mm
18mm
20mm
22mm
24mm
27mm
30mm

Value (Dry)	
ft.lb.	Nm.
4.5	6.1
11	14.9
21	28.5
37	50.2
60	81.4
92	125.0
125	170.0
180	245.0
250	340.0
310	420.0
450	610.0
625	850.0

Value (Dry)	
ft.lb.	Nm.
8.5	11.5
20	27.1
40	54.2
70	95.0
110	150.0
175	240.0
250	340.0
350	475.0
475	645.0
600	810.0
875	1180.0
1200	1626.0

Value (Dry)	
ft.lb.	Nm.
12	16.3
30	40.1
60	81.4
105	140.0
165	225.0
255	350.0
350	475.0
500	675.0
675	915.0
850	1150.0
1250	1700.0
1700	2300.0

Value (Dry)	
ft.lb.	Nm.
14.5	20.0
35	47.5
70	95.0
120	160.0
190	260.0
300	400.0
410	550.0
580	790.0
800	1090.0
1000	1350.0
1500	2000.0
2000	2700.0



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