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# DISCAERATOR

## Primary Cultivators

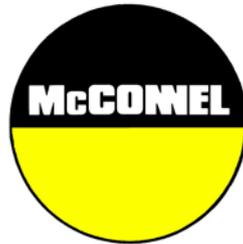
Linkage Mounted & Trailed Models

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](http://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 McConnell 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. McConnell 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 McConnell 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 McConnell 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 McConnell 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 McConnell 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 McConnell Ltd Service Dealer, within 30 days of the date of repair.*
- 2.05. *Following examination of the claim and parts, McConnell Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnell 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 McConnell Ltd. is final.*

## **3. LIMITATION OF LIABILITY**

- 3.01. *McConnell 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. *McConnell Ltd makes no warranty as to the design, capability, capacity or suitability for use of the goods.*
- 3.03. *Except as provided herein, McConnell 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 indirect, 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.*

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*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 Mounted / Trailed Primary Cultivator*

Product Code; *SH32*

Serial No. & Date ..... Type .....

Manufactured in; *United Kingdom*

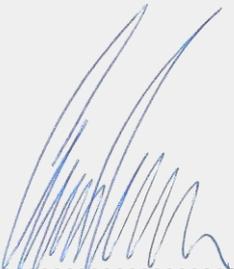
Complies with the required provisions of the Machinery Directive 2006/42/EC  
The machinery directive is supported by the following harmonized standards;

- 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.

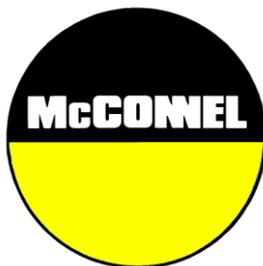
This system is continually assessed by the;

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 THE BOOK FIRST**

**McCONEL LIMITED**

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Ludlow  
Shropshire  
England**

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www.mcconel.com**

**▲ WARNING**

**Cancer and Reproductive Harm**  
www.P65Warnings.ca.gov

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Operating, servicing and maintaining this equipment can expose you to chemicals including gasoline, diesel fuel, lubricants, petroleum products, engine exhaust, carbon monoxide, and phthalates, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov). This website, operated by California's Office of Environmental Health Hazard Assessment, provides information about these chemicals and how individuals may be exposed to them.



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## GENERAL INFORMATION

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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&OE.

## 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

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### **Discaerator 3000 Model**

- 3-point linkage mounted
- 2.95M working width
- 30" breakback protected legs
- Choice of mechanical or Auto-Reset breakback protection
- Height adjustable legs
- Choice of replaceable points
- Replaceable shins
- Choice of height adjustable rollers
- '4 lives' shear bars used on mechanical breakback models
- Rear lighting kit

### **Discaerator 4000 & 5000 Models**

- Trailed
- 4.0M or 5.0M working widths
- Folding wings for transportation and storage
- 30" breakback protected legs
- Choice of mechanical or Auto-Reset breakback protection
- Height adjustable legs
- Hydraulically adjustable leg frame
- Choice of replaceable points
- Replaceable shins
- Choice of height adjustable rollers
- '4 lives' shear bars used on mechanical breakback models
- Rear lighting kit

## INTRODUCTION

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McConnel Discaerators are primary cultivators designed specifically for one-pass seedbed preparation. The Discaerator 3000 model is a linkage mounted 3.0m machine and the 4000 and 5000 models are tractor trailed machines with working widths of 4.0m and 5.0m respectively.

The frames of the machines carry 'breakback protected' 30" legs each fitted with replaceable wear points that lift and loosen the soil beneath the surface while 2 rows of concave serrated discs set at opposing angles follow behind to chop, mix and cultivate the loosened surface. The process is finalised by a rear mounted, height adjusting roller(s) available in a variety of types. The 'breakback protection system' is available on all models in 2 specific options; mechanical or auto-reset.



*Discaerator 3000*

## SPECIFICATIONS

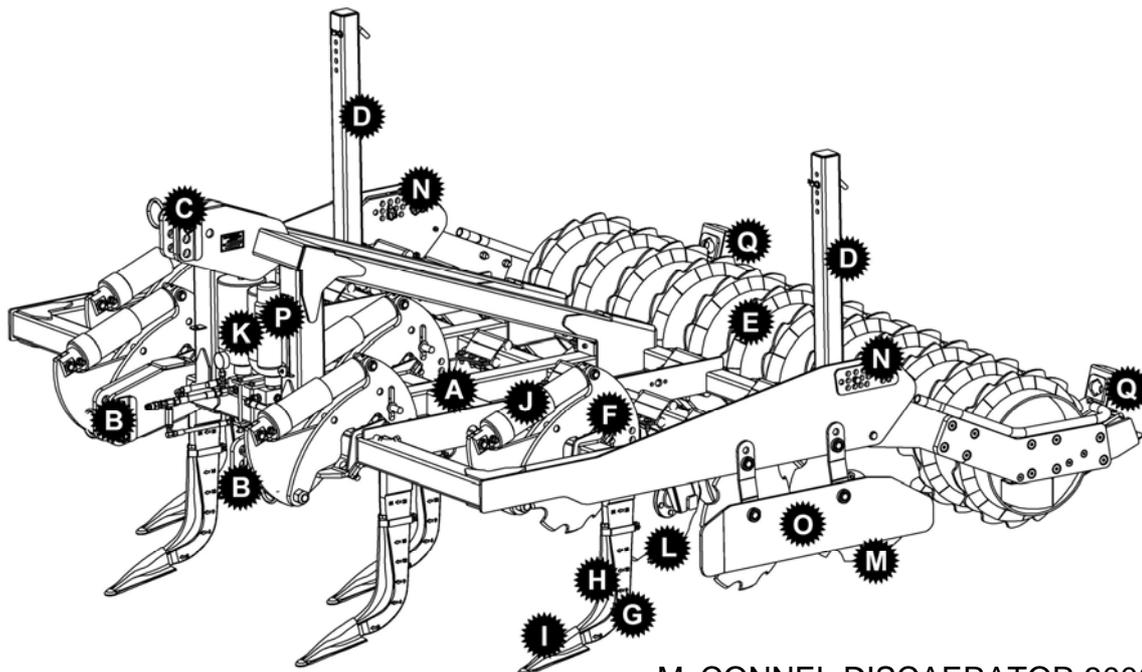
### Discaerator 3000 Model

Tractor Attachment	3-point linkage (CAT.3)
Tractor HP Requirement	160+ (5 leg builds) / 180+ (7 leg builds)
Number of Legs	5 or 7
Leg Depth Adjustment ( <i>Pin adjustment</i> )	35mm increments
Gas Strut Pre-charge	100Bar
Accumulator Pre-charge*	50Bar ( <i>*Hydraulic leg models only</i> )
Accumulator By-pass Valve Pressure*	40Bar ( <i>*Hydraulic leg models only</i> )
Number of Discs	17
Disc Diameter/Type	508mm Concave & Serrated
Disc Angle	15° (opposed)
Disc Configuration – First Row	6 discs @ 500mm spacing
Disc Configuration – Second Row	11 discs @ 250mm spacing
Working Width	2.95m
Transport Width	3.09m
Transport Height	1.65m
Weight - 5 Leg c/w Ridge Packer Roller	2450Kg (Mechanical) / 2600Kg (Hydraulic)
Weight - 7 Leg c/w Ridge Packer Roller	2700Kg (Mechanical) / 2850Kg (Hydraulic)
Leg Shins ( <i>replaceable</i> )	Euroshins
Points ( <i>replaceable</i> )	Longlife / Delta
<b>Roller Options:</b>	
Standard Packer Roller	Ø600mm
Ridge Packer Roller	Ø600mm
Ridge Packer Roller (large)	Ø800mm
Guttler Roller	Ø600mm

### Discaerator 4000 & 5000 Models

Tractor Attachment	Trailed	Trailed
Tractor HP Requirement	250+ (7 leg builds)	300+ (9 leg builds)
Number of Legs	7 or 9	9 or 11
Leg Depth Adjustment ( <i>Pin adjustment</i> )	35mm increments	35mm increments
Gas Strut Pre-charge	100Bar	100Bar
Number of Discs	26	32
Disc Diameter/Type	508mm Concave & Serrated	508mm Concave & Serrated
Disc Angle	15° (opposed)	15° (opposed)
Disc Configuration – First Row	9 discs @ 500mm spacing	11 discs @ 500mm spacing
Disc Configuration – Second Row	17 discs @ 250mm spacing	21 discs @ 250mm spacing
Working Width	4.0m	5.0m
Transport Width	2.85m	2.85m
Transport Height	3.2m	3.7m
Weight - 9 Leg c/w Ridge Packer Roller	6900Kg (Mechanical)	-
Leg Shins ( <i>replaceable</i> )	Euroshins	Euroshins
Points ( <i>replaceable</i> )	Longlife / Delta	Longlife / Delta
<b>Roller Options:</b>		
Standard Packer Roller	-	-
Ridge Packer Roller	Ø600mm	Ø600mm
Ridge Packer Roller (large)	Ø800mm	Ø800mm
Guttler Roller	-	-

## COMPONENT LOCATION & IDENTIFICATION – Linkage Mounted Models

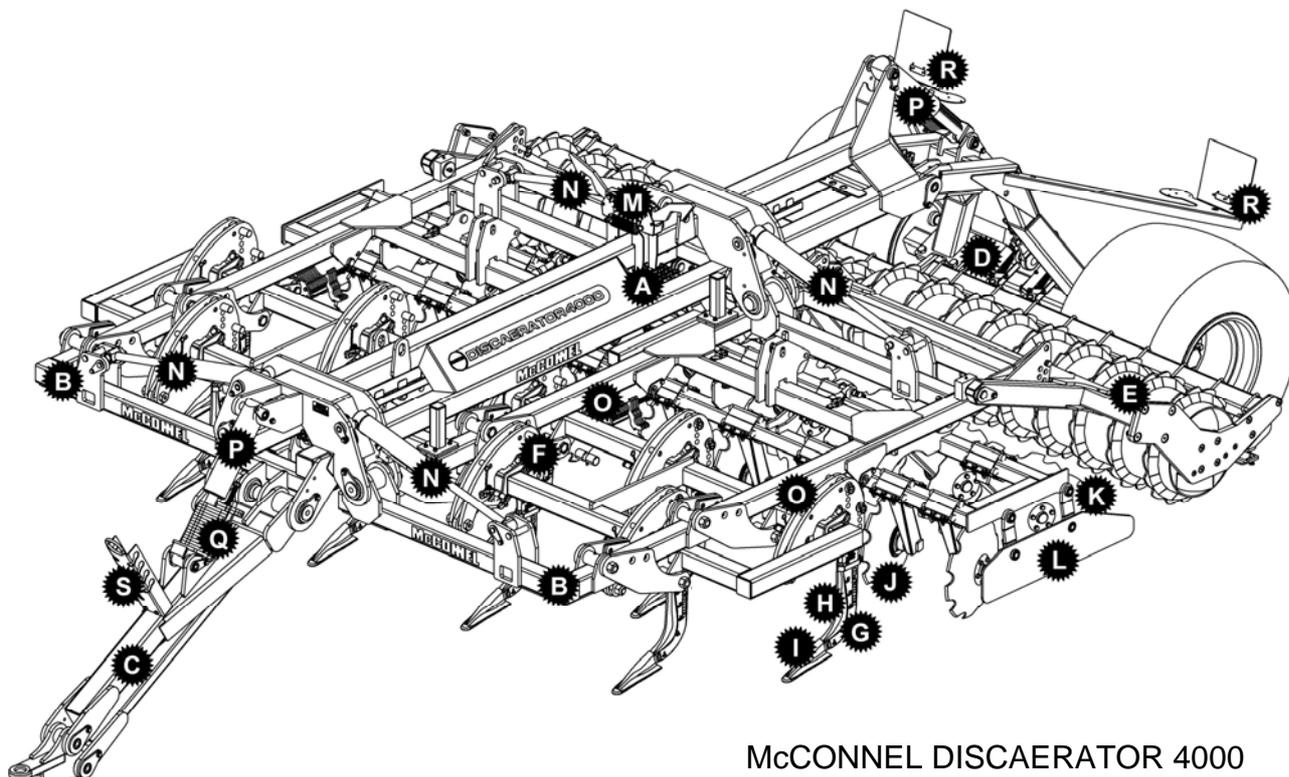


McCONNEL DISCAERATOR 3000  
(Early auto-reset leg version illustrated)

- A) Mainframe
- B) Lower attachment positions
- C) Top link attachment position
- D) Parking/Stand legs
- E) Rear Roller
- F) Leg Assembly
- G) Shank
- H) Wear Shin
- I) Point
- J) Breakaway Ram
- K) Accumulator *(fitted to early builds only)*
- L) Single Disc
- M) Double Disc
- N) Roller height adjustment points.
- O) Side Guard
- P) Literature Holder
- Q) Rear Lights

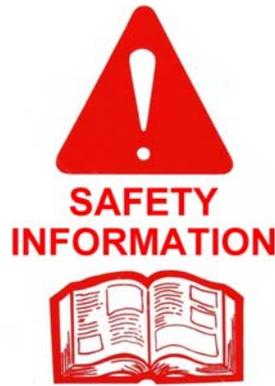
## COMPONENT LOCATION & IDENTIFICATION – Trailed Models

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McCONNEL DISCAERATOR 4000  
(Mechanical leg version illustrated)

- A) Centre Frame
- B) Folding Wings
- C) Tow Bar
- D) Rear Axle & Wheels
- E) Rear Roller
- F) Leg Assembly
- G) Shank
- H) Wear Shin
- I) Point
- J) Single Disc
- K) Double Disc
- L) Side Guard
- M) Transport Locking Mechanism
- N) Wing Rams
- O) Depth Adjustment Rams
- P) Frame Height Rams
- Q) Ram Locks (Stops)
- R) Rear Lights
- S) Hose Stowage



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 lowered to rest on the ground. 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 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.
- ▲ 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 the tractors hydraulic lift – 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

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### **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. It should be borne in mind with linkage mounted machines; any tendency of the tractor to rise on the front end will produce a corresponding lowering of hitch points, in doing so the angle of penetration of the shanks is further increased.

### **Tractor Linkage – Linkage Mounted Models only**

It is essential that only the correct linkage arms for each particular tractor are used with the Discaerator. The arms have been properly matched with the horsepower of the tractor and should be more than 'just' adequate. There are no features on the Discaerator to offer protection against the failure of unmatched, repaired, badly worn, weak or below category tractor linkage.

Failure of either of the tractor's draft links can cause the tractor to run away from one end of the implement or in the case of the top link, the implement to tip, risking damage to the machine and/or tractor.

Under no circumstances should tractors operate in tandem in order to gain extra traction. It is far more practicable to make two or three passes over the ground with one tractor while increasing the depth on each pass.

### **Stabilizers – Linkage Mounted Models only**

The implement must be capable of some side-to-side movement in relation to the tractor therefore stabilizer chains or sway bars must be adjusted to allow for this. They should however be tightened up to prevent side sway when travelling on the highway. In field operations stabilizer bars that hold the implement rigid should not be used.

### **Draft Control – Linkage Mounted Models only**

Use of draft control is beneficial to traction in reducing wheel slip thereby also reducing tyre wear and saving fuel. *Refer to individual tractors instruction book for detailed guidance on the best location for top link fitting.*

For mounting the cultivator on linkage behind crawler tractors, the draft links should be allowed to 'float' - *provision for this is usually made in the hydraulic control valve.*

Do not use position control for regulation of depth. This should be done with the aid of the rear roller.

## HANDLING THE MACHINE – Linkage Mounted Machines



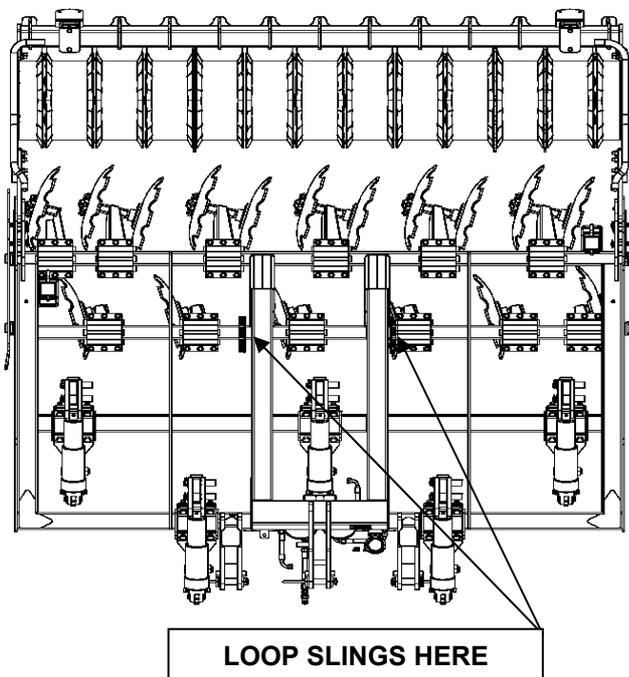
### WARNING!

Read the information stated below before attempting to lift the machine using overhead lifting gear – failure to observe this advice may result in personal injury and/or damage to the machine.

The machine should only be raised or lifted using suitable overhead lifting equipment with a **minimum capacity of 3500kg SWL**. It is recommended that 2 flat belt slings are used rather than chains which can cause surface damage to the machine. The lifting slings used should be 3 metres in length, capable of lifting minimum 3000kg and conform to BS 3481 standard. Straps made from woven material should be inspected prior to use to ensure they are free from cuts, excessive wear or fraying. Protect slings from sharp-edged loads using sacking or similar padding.

### Lifting Points

The slings should be looped under each of the two central box sections of the machine as shown below;



It is vital that all lifts are performed vertically as any sideways pull tends to overload the edges of the belt with potential risk of either tearing them or moving them over possible rough edges that risk cutting them.



### WARNING:

Ensure during the lifting procedures that the area is clear of obstacles and people and onlookers are kept at a safe distance from the machine at all times.

## HANDLING THE MACHINE – Trailed Machines

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### **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 models 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.

The lifting hooks on the top of the machine are primarily for use by the manufacturer during fabrication and assembly. These hooks may be used as a lifting point to raise one or other end of the unit if required but must never be used to lift the whole machine clear of the ground.

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 stands before attempting any maintenance or repairs. Never work under a raised machine that has not been safely and suitably supported.

## ATTACHMENT TO TRACTOR

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### Attachment - Linkage Mounted Models

Attachment of the machine should always be performed on a firm level site.

- Remove linkage pins from machines lower linkage points.
- Reverse the tractor squarely up to the machine until the tractor links align within the machines lower linkage points.
- Attach tractor links to lower linkage points with the pins supplied and secure with lock pins.
- Fit top link between tractor and machines upper linkage position using pins and lock pins.
- Raise the machine on the tractors linkage – *refer to note below*.

**NOTE: For 7 Leg Auto-Reset models raise the machine slowly, constantly checking leg to tractor tyre clearance – when fitting these models to certain tractors the machine legs can foul on the tyres. Where this risk exists, set tractors linkage lift height limiter to a position that ensures ample clearance is retained at all times.**

- Remove pins from parking legs, raise to highest position and refit pins.
- Adjust top link to bring the uprights of the frame into the vertical position.
- Fit and adjust check chains and/or stabiliser bars to centralize the machine on the tractor before locking tight in position for transport (\*).

(\* **NOTE: For transport check chains and/or stabiliser bars must be tightened to prevent sideways sway of the machine during transportation. For work check chains and/or stabiliser bars should be slackened off to allow some degree of movement.**

### Attachment - Trailed Models

Attachment of the machine should always be performed on a firm level site.

- 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 tabs' onto the ram rods of the height rams to support them at the desired height, and bring the rams down to rest on them.
- Connect rear lighting plug to tractor's electrical output socket.

The machine is now ready for transportation to the work site.

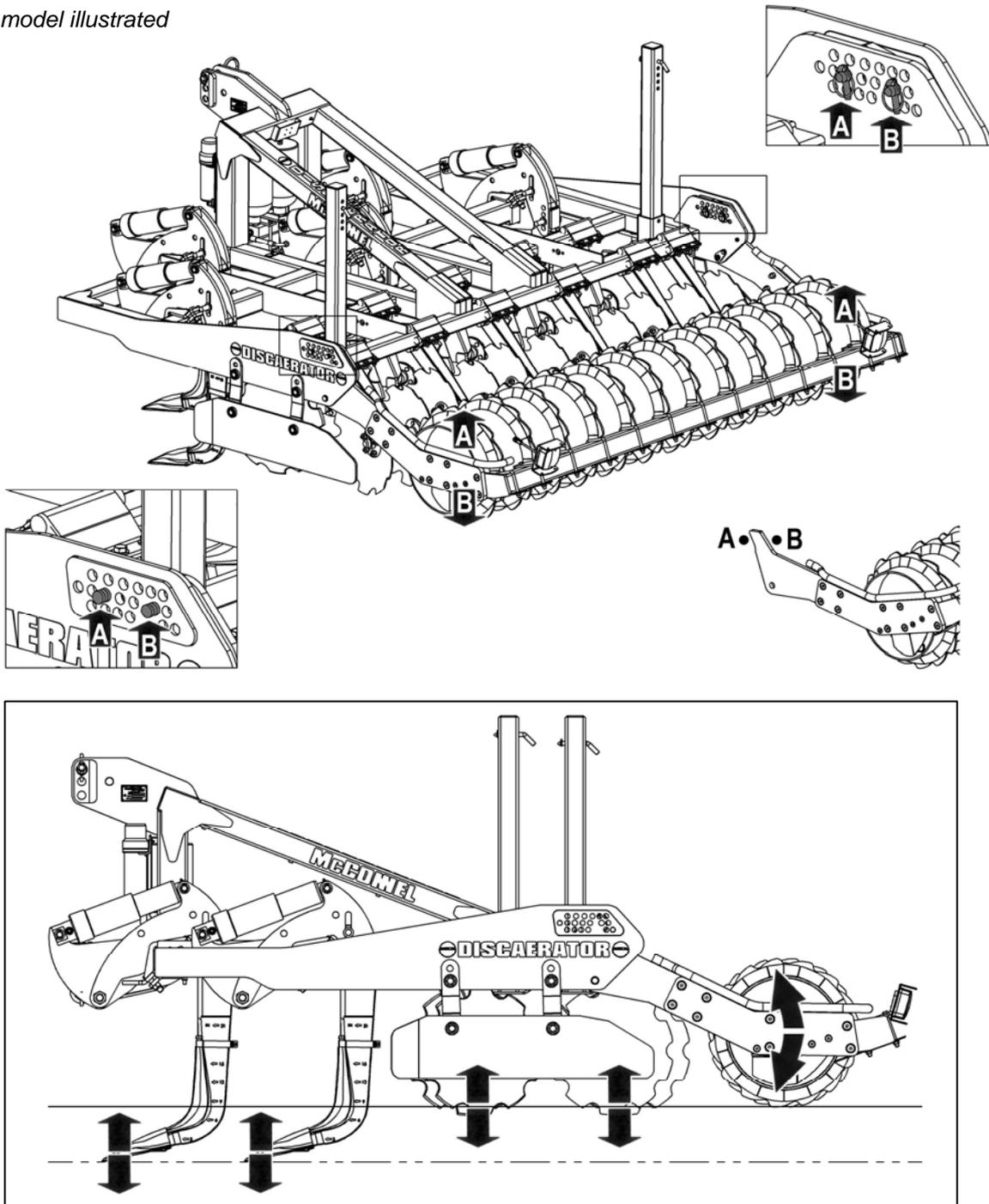
**NOTE: Where a trailed machine is used in conjunction with a crawler tractor equipped with a swinging drawbar, the drawbar should be used in the 'locked' mode for transport and set into swinging mode for working the machine; this will reduce sideways forces on the legs of the machine when manoeuvring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

# OPERATION – Linkage Mounted Machines

## Depth Adjustment & Regulation

The overall working depth (Legs & Discs) is determined and regulated by the height at which the rear roller is set. A selection of holes in the roller bracket attachment point on each side the rear of the frame allows for a choice of height settings at which to set the roller. After selecting the desired height the 'dog legged' roller brackets are locked in position with the pins and lynch pins provided. Pin position 'A' indicated in the illustration below regulates the upper height and pin position 'B' the lower height. Ensure at all times that matching hole positions are selected on each side of the machine.

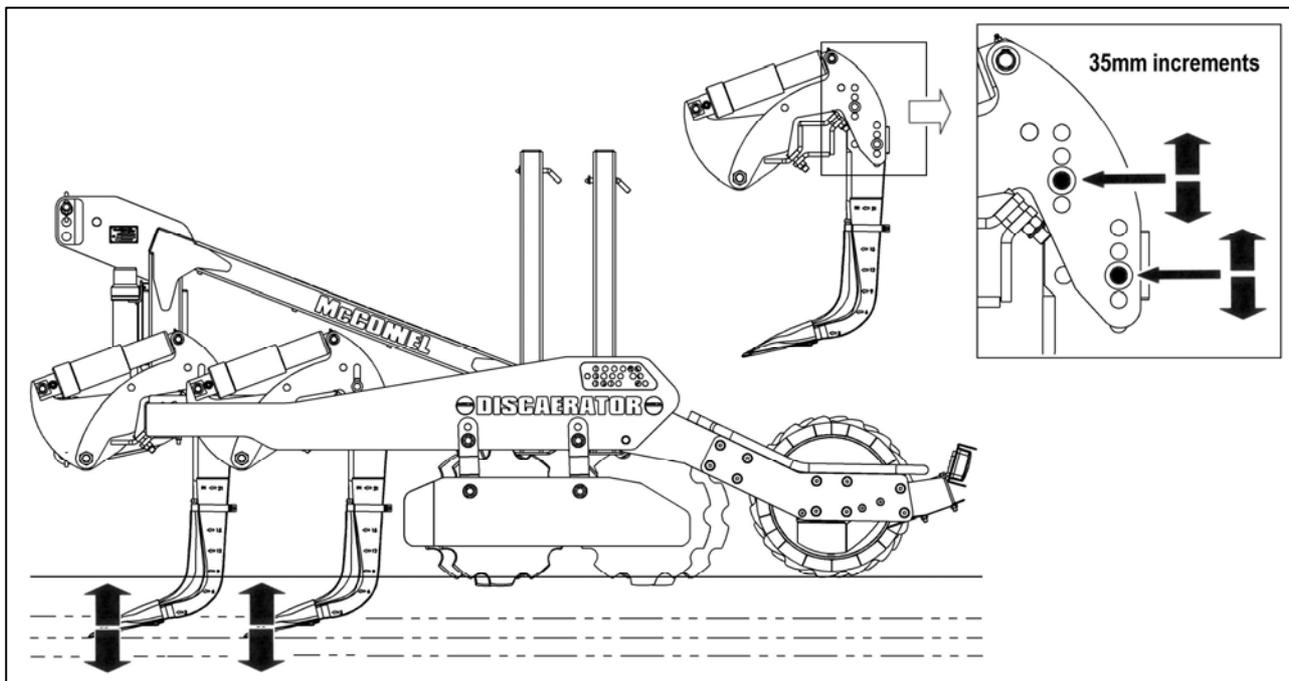
Early model illustrated



NOTE: It is advisable during transportation of the machine that the roller is 'locked tight' in position to avoid risk of the roller bouncing when travelling over rough terrain – this will reduce stress on components and increase stability of the carrying vehicle.

## 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 discs and 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 pins and lynch 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.

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.

## Machine Operation (Linkage Mounted Machines)

**Important note relating to early machines fitted with Hydraulic Accumulators; on initial installation, or after re-attachment to the tractor, the hose system from the tractor spool valve must be pressurized – details for performing this procedure are stated in the section entitled 'Hydraulic Breakback System'.**

At the start of work the machine should be raised just clear of the ground, begin forward movement and lower the machine gradually into the earth on the tractor's hydraulics whilst retaining forward momentum. 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 the machine should be gradually raised on the tractor hydraulics so it is clear of the ground when the run is complete. Reduce speed and keep the machine raised for turning on the headland. Re-start the next pass as before.

## Speed

When first putting the Discaerator 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.

## OPERATION – Trailed Machines

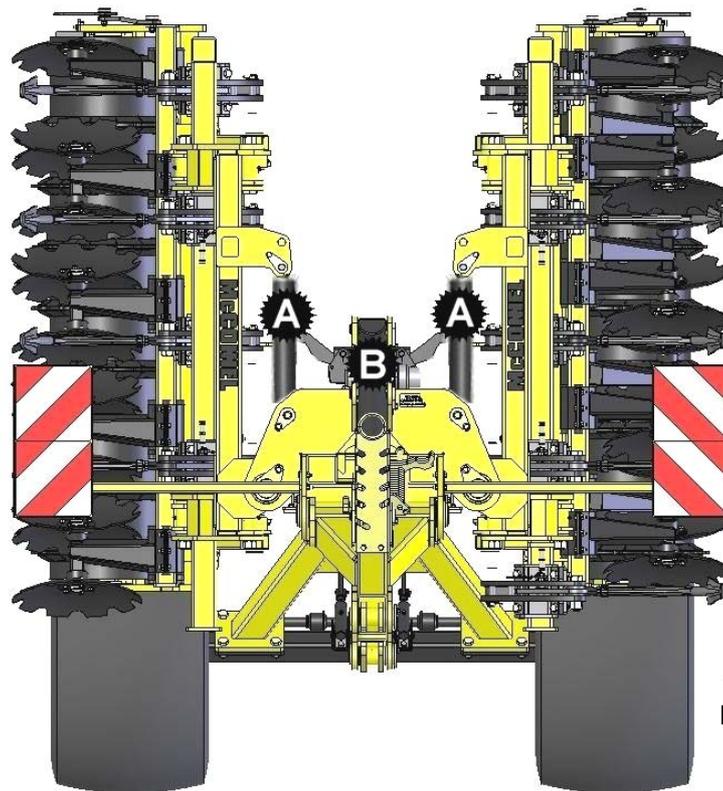
### Moving into Work Position

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 latches, these latches automatically release on operation of the wing rams.



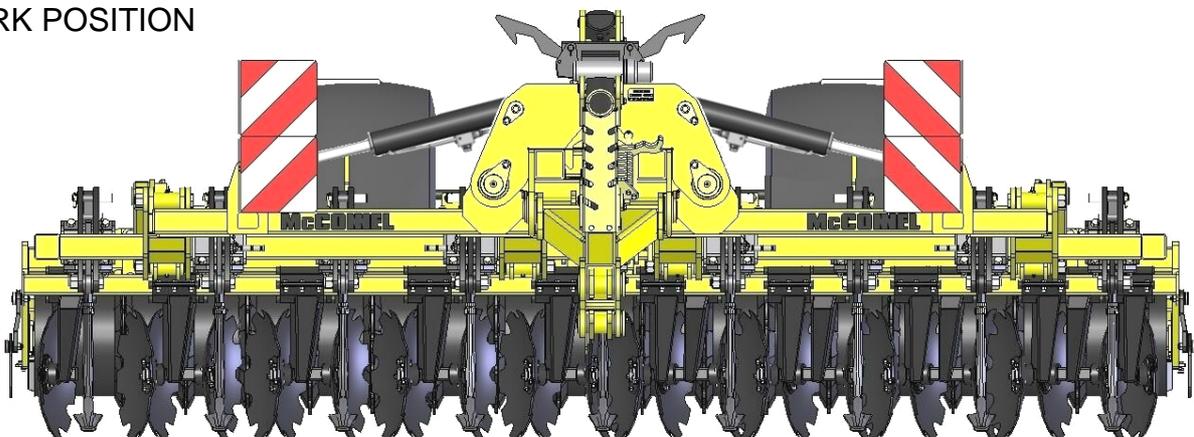
**WARNING!** Ensure there is sufficient space around the machine before lowering the wings. Keep bystanders at a safe distance from the machine during all movements and operations.

### TRANSPORT POSITION



A) Wing Rams  
B) Hydraulic Latch

### WORK POSITION

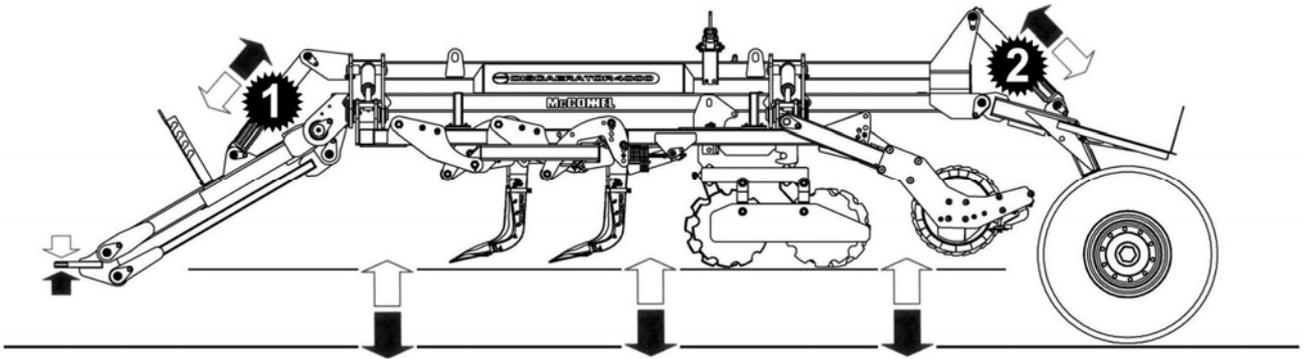


### Moving into Transport Position

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

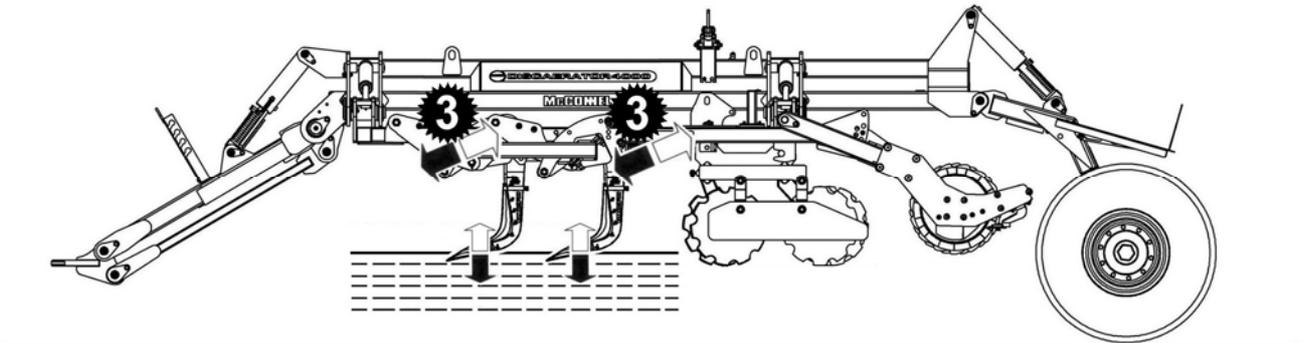
## Machine Height

Operation of rams 1 & 2 adjust the height of the machines main frame, the rams are interconnected and work in tandem. NOTE: Ensure that ram stops are 'swivelled' off the rams before operation. Retracting the rams will lower the machine, extending the rams will raise the machine.



## Leg Working Depth - Hydraulic Height Adjustment of Legs

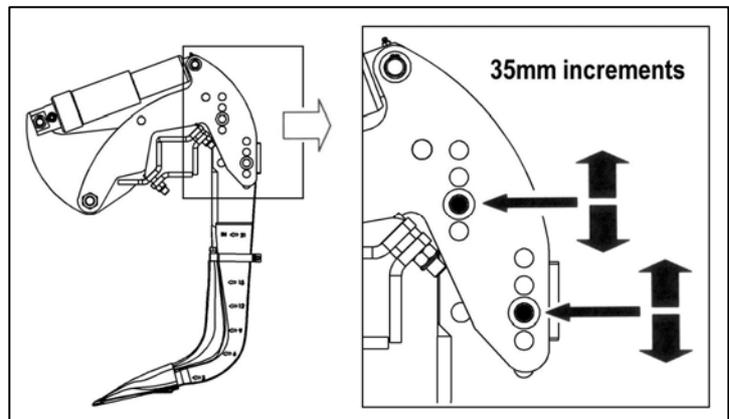
For quick and easy adjustment of leg depth the parallel under-frame onto which the legs are mounted can be moved up or down hydraulically by operation of rams 3. Once the height has been set the rams must be locked by swivelling the 'ram stops' into position over the ram rods of each ram, ensure a matching number of stop tabs are used on each ram. The leg depth settings operate independent to the working depth of the discs.



## Leg Working Depth – Shank Adjustment

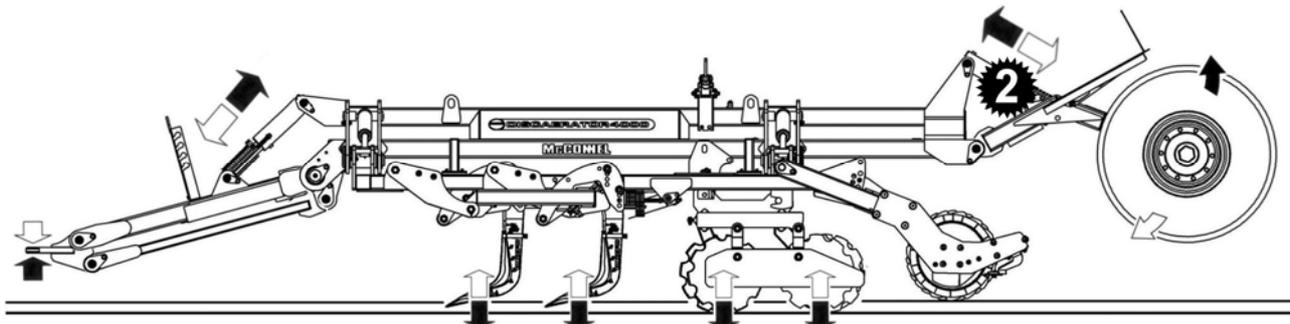
Additional adjustments to the working depth of the legs can be made by manually changing the height position of the shanks within the leg assembly, the working depth can be adjusted in increments of 35mm giving a variety of height adjustments; the shanks are held in position in the leg assemblies with pins and lynch pins.

*(Auto-Reset type leg illustrated)*



### Lowering Machine for Work

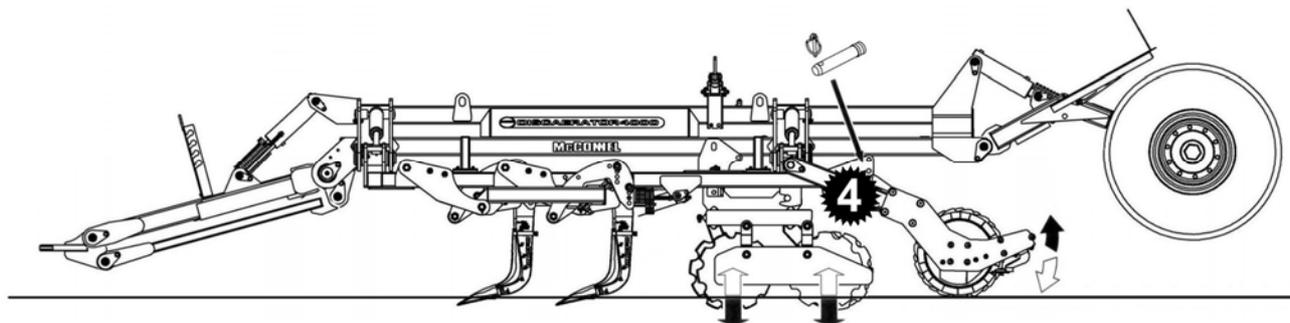
The machine is lowered into work by retracting rams 1 & 2, when the tools contact the ground and resistance is sensed oil flow to ram 1 will be diverted to ram 2 which will then raise the rear axle and wheels clear of the ground.



### Disc Depth Adjustment

Adjust the working depth of the discs by setting the height of the rear rollers; a selection of holes in the roller bracket attachment points, (*indicated 4 below*) allows for a choice of height settings at which to set the roller. After selecting the desired height the 'dog legged' 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'.

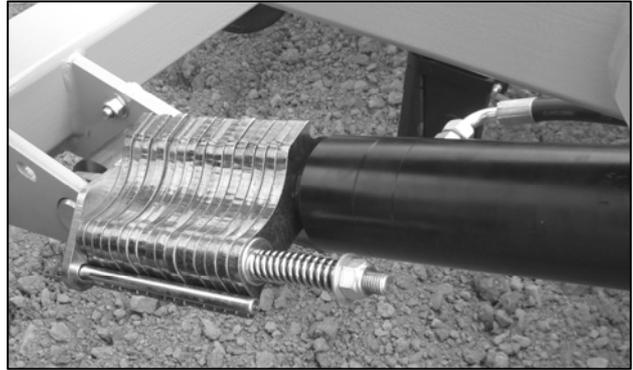
Setting of the roller height is best performed at the work site; draw the machine into the ground sufficient only to take the weight off the roller. Remove the height locking pins from each side of both roller arms before drawing the machine forward into the ground to the required working depth of the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



## Ram Stops

Hydraulic rams on the machine that are subject to intense forces are equipped with ram stops; these can 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. Early models use shaped steel tabs mounted adjacent to the ram which can be individually swivelled into position as required, whereas later models are supplied with a quantity of a 'sprung clasp' type.

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 and work. The required number of ram stops utilised can be varied depending on the particular work setup of the machine. For the hydraulically operated leg frame the same number of ram stops must be used on all 4 rams.



Ram Stops on early models are mounted adjacent to the ram and swivel over the ram rod to 'lock' the cylinder.



◀ Late models are supplied with 'Sprung Clasp' type Ram Stops.



### 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.

## Variable Flow Control (Frame Lifting Rams)

The hydraulic circuit for raising and lowering the machine incorporates variable flow valves linked to the front and rear rams; this allows the operator to adjust and fine tune the rate of oil flow to each of the rams to achieve parallel raising and lowering of the machine. Alternately, they can be adjusted and set to raise and lower the machine at an angle of the operators own preference.

The valves, which feature an incremental scale, are adjusted by rotating the knob to either increase or reduce the flow rate to its particular ram, a grubscrew located in the knob can then be tightened to lock and secure it in position.



Variable Flow Valve ►

## Machine Operation (Trailed Machines)

**Important note relating to early machines fitted with Hydraulic Accumulators; on initial installation, or after re-attachment to the tractor, the hose system from the tractor spool valve must be pressurized – details for performing this procedure are stated in the section entitled 'Hydraulic Breakback System'.**

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.

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.**

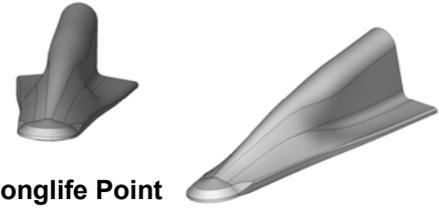
### **Speed**

When first putting the Discaerator 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.

## Point Types

### Narrow points (Longlife Points)

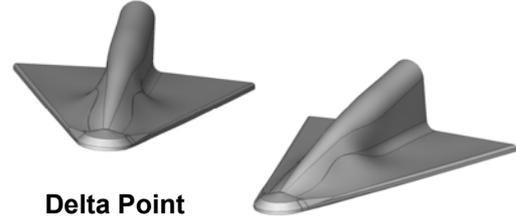
These are the normal choice for deep cultivation; the points will lift and shatter the soil structure with low draft and minimum mixing.



Longlife Point

### Wide points (Delta Points)

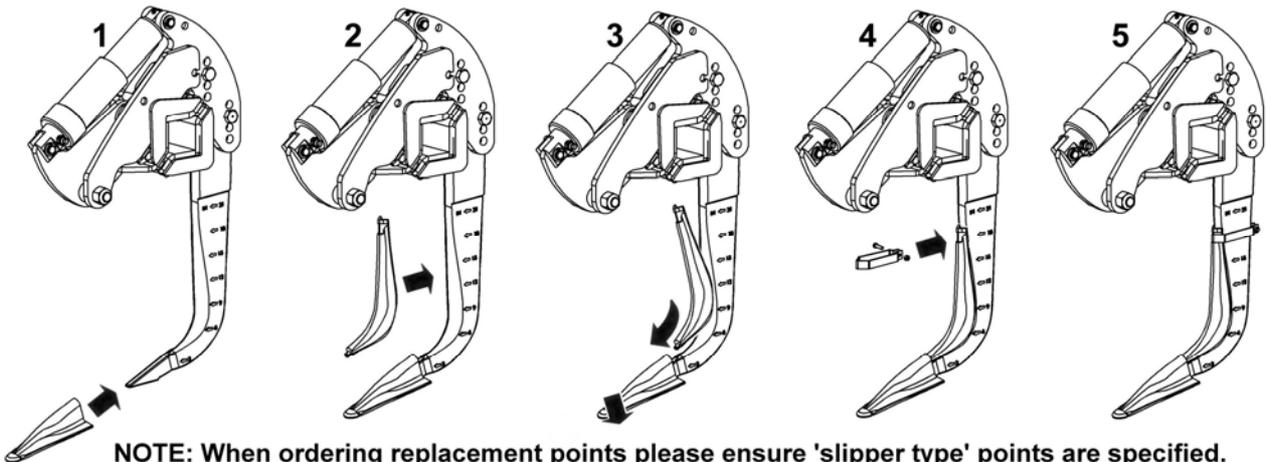
Wide points will break up a bigger area of ground and can therefore be spaced further apart; particularly useful for shallow cultivations.



Delta Point

## Point Fitment

The legs of the Discaerator use McConnel 'slipper' type points and are held in position with the wear shin. 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.

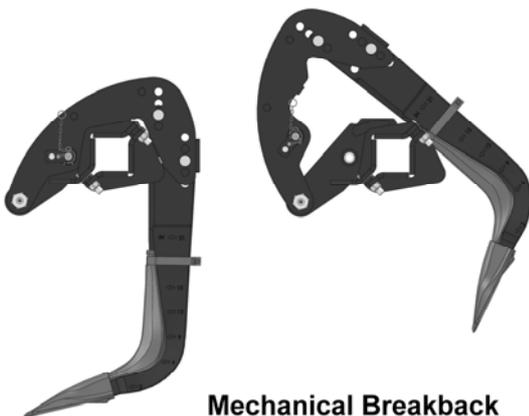


**NOTE:** When ordering replacement points please ensure 'slipper type' points are specified.

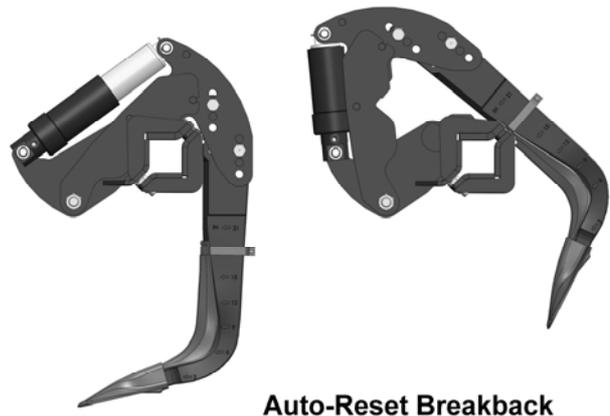
## Breakback Protection Systems

There are 2 types of breakback protection systems available for the Discaerator; these are Mechanical Breakback or Auto-Reset Breakback.

*NOTE: Early Auto-Reset machines utilised hydraulic accumulators and rams to provide breakback - from late 2010 onwards this system is superseded by self-contained gas struts.*



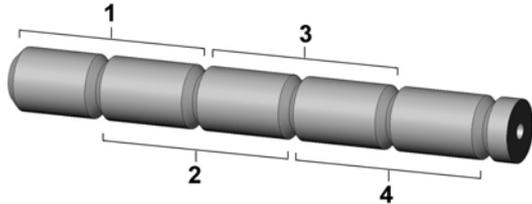
Mechanical Breakback



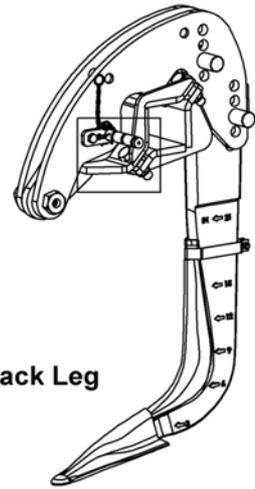
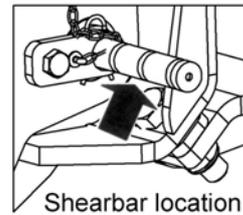
Auto-Reset Breakback

## Mechanical Breakback System

This system works on a shear bar method where a contact force with an object in excess of a measured limit will shear the locking bar of the leg allowing it freedom to pivot backwards and upwards, thus protecting major components from damage. Each shear bar has a total of 4 'lives' before a replacement will be required.



The '4 Lives' Shear Bar (Part No. 22520.54)



Mechanical Breakback Leg

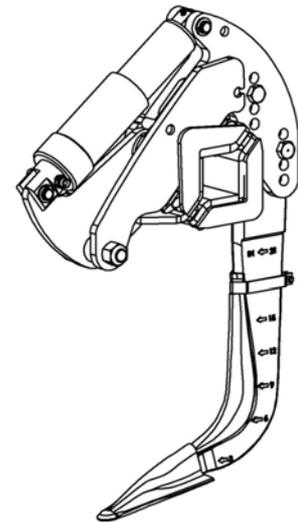
NOTE: It is important when replacing shear bars that genuine McConnel replacements (Part No. 22520.54) are used as these are specially designed to shear under a pre-determined force. Use of non-genuine parts will risk expensive damage to the machine and/or tractor. Under no circumstances should the shear bolt be replaced by a bolt or a metal rod.

## Hydraulic Auto-Reset Breakback System (Early Machines)

This system provides protection via hydraulic rams and accumulators; each leg is held in the work position by a hydraulic ram pressurized by pre-charged accumulators. When an object is struck producing a force in excess of a measured limit, the oil in the rams is forced back into the accumulators allowing the leg to breakback. Once the obstruction has been passed the accumulators will return the oil to re-pressurize the ram which then automatically returns the leg into the work position.



**DANGER!** Keep clear of hydraulic legs when they are in the breakback position, residual pressure in the system may cause them to move without warning.

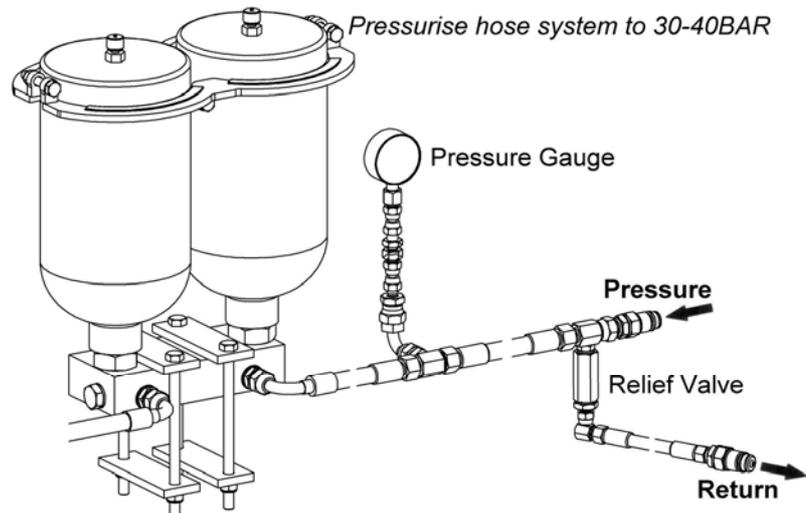


Auto-Reset Breakback Leg

## Pressurising the Hose System

The hose system from the tractor spool valve should be pressurised to 30-40BAR, an inline pressure gauge is fitted for both measuring and checking of the pressure. Pressurise the system by operation of the tractor spool valve until the correct pressure is reached, the spool valve must be set to minimum flow during this procedure to allow control of the flow rate into the system and also prevent the relief valve from being 'overwhelmed' with oil. Once the correct pressure is achieved the tractor spool valve should be returned to the neutral position.

The pressure should always be checked prior to work and at regular intervals thereafter to ensure pressure remains within the specified limits.



Ensure hoses are plumbed into the same tractor spool service

## **Shanks**

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, which can be supplied as an option, 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.**

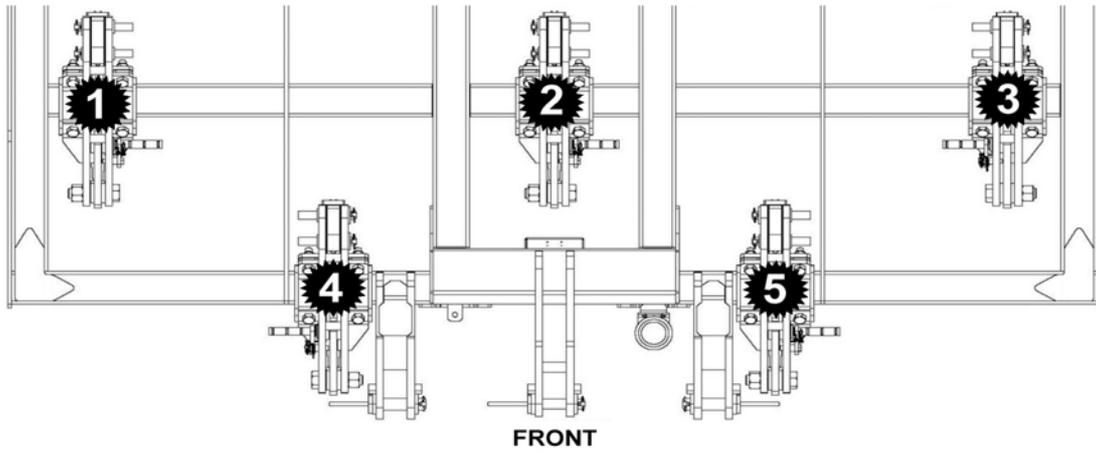
## **Disc Working Depth**

The maximum working depth of the discs should not exceed 125mm (5"), working the discs at any depth greater than this will risk component damage. Always check the roller height is correctly set to ensure the discs cannot work at a depth in excess of this figure.

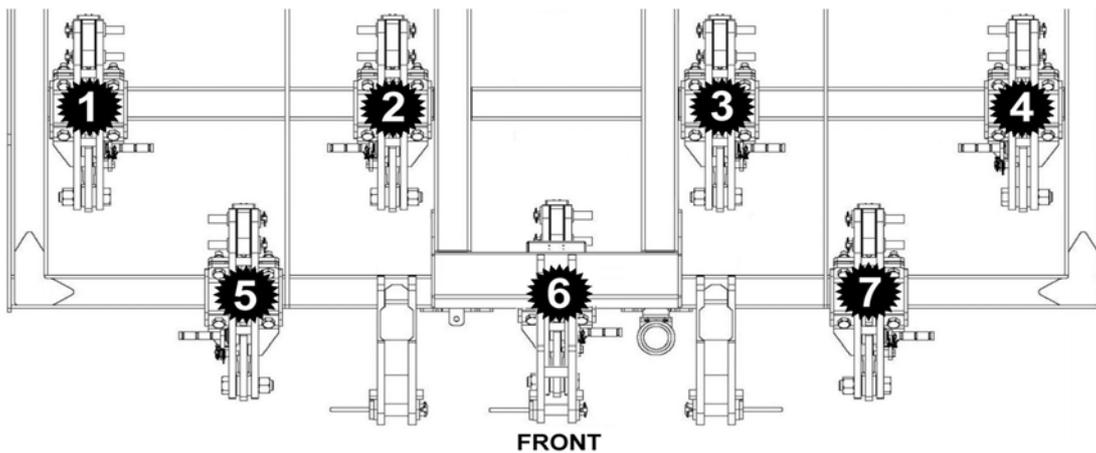
## Leg Positions – 3.0M Linkage Mounted Machines

The legs of the machine are located on the front toolbars of the machine, the number of legs fitted will dictate their specific positions; the diagrams below show the positioning of the legs for each of the builds.

### 5 Leg Builds



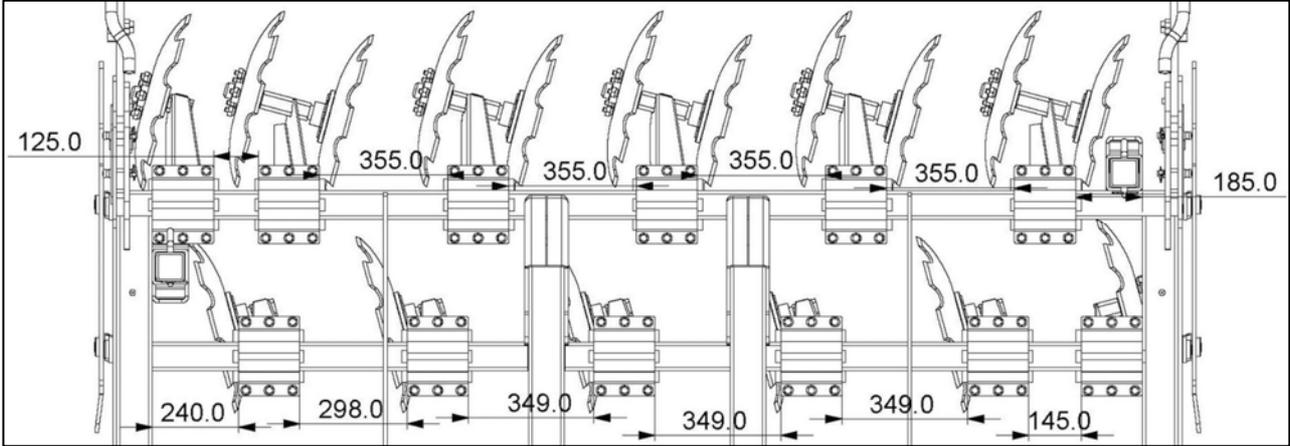
### 7 Leg Builds



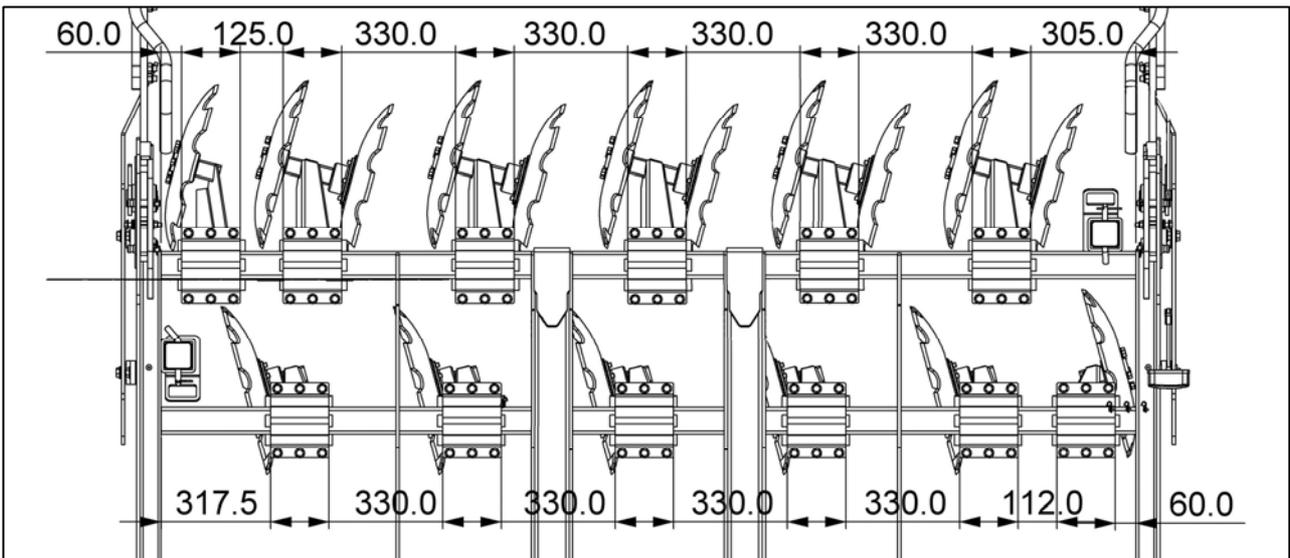
### Disc Positions – 3.0M Linkage Mounted Machines

The machine uses 2 opposed rows of concave serrated discs which are located on the rear toolbars of the machine, the first row consists of 6 single discs positioned at 500mm spacing and the second row has 11 discs (5 double assemblies and 1 single) positioned at 250mm spacing. The diagrams below show the dimensions required to correctly position the disc assemblies for correct spacing of the discs on specific machine builds.

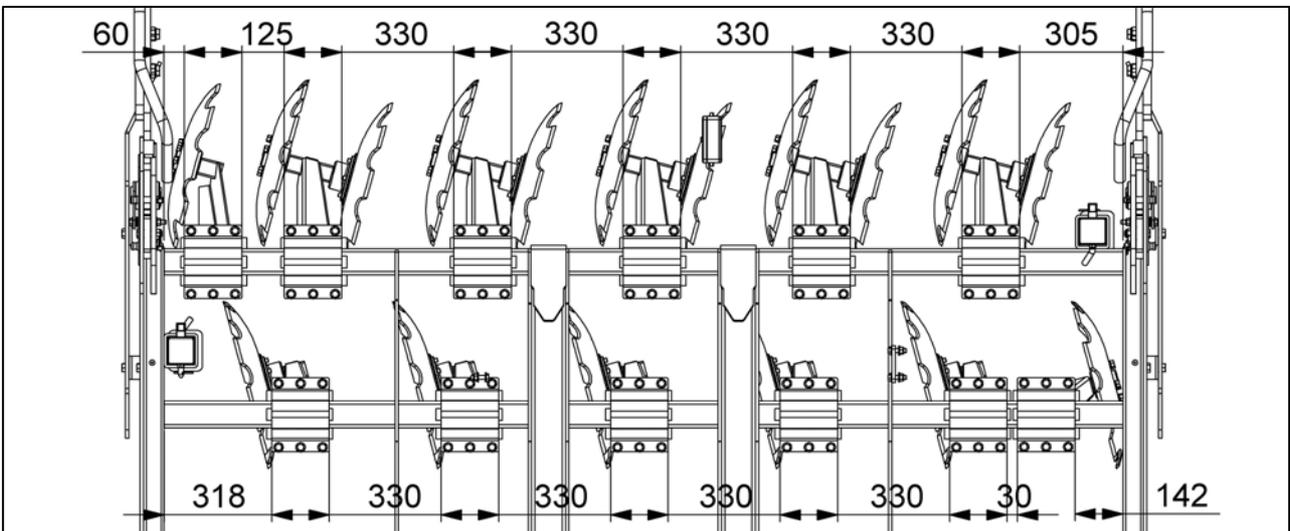
#### Machines WGC 1064900 to 1064919 inclusive



#### Machines WGC 1064800 to 1064819 inclusive (Builds ▶ 11/11)

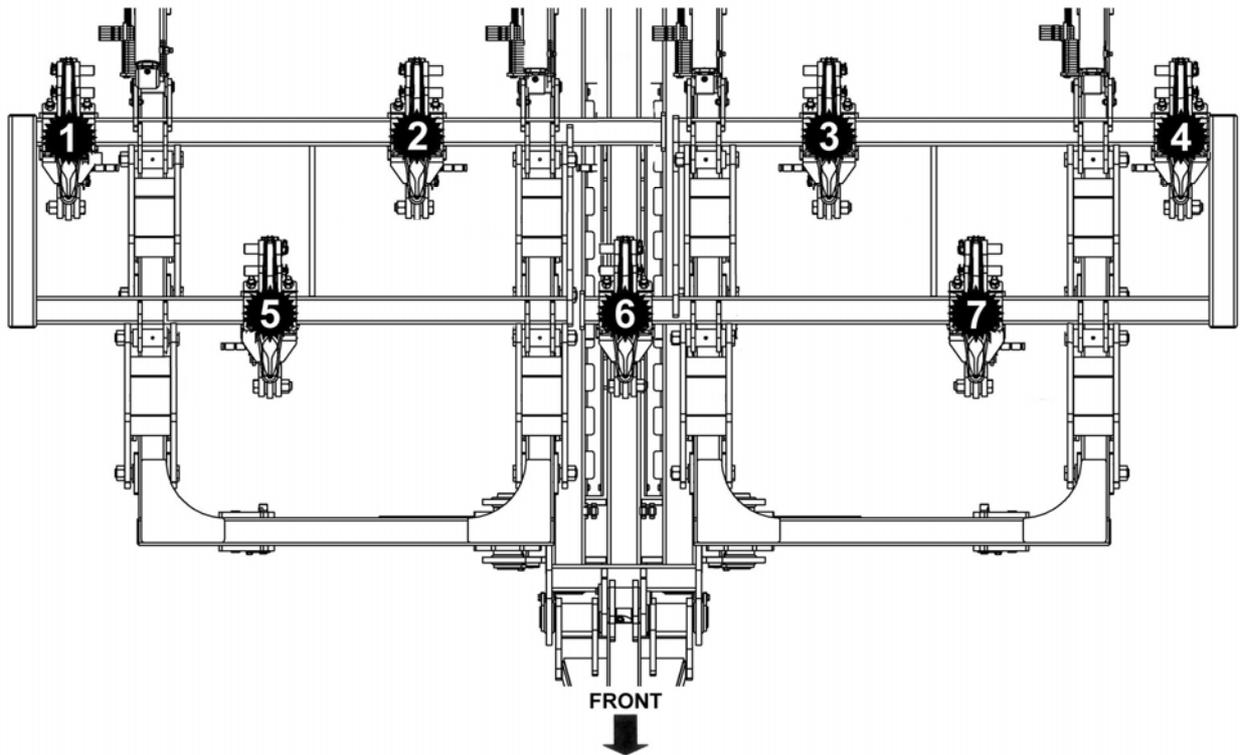


#### Machines WGC 1064800 to 1064899 inclusive (Builds 11/11 ▶)

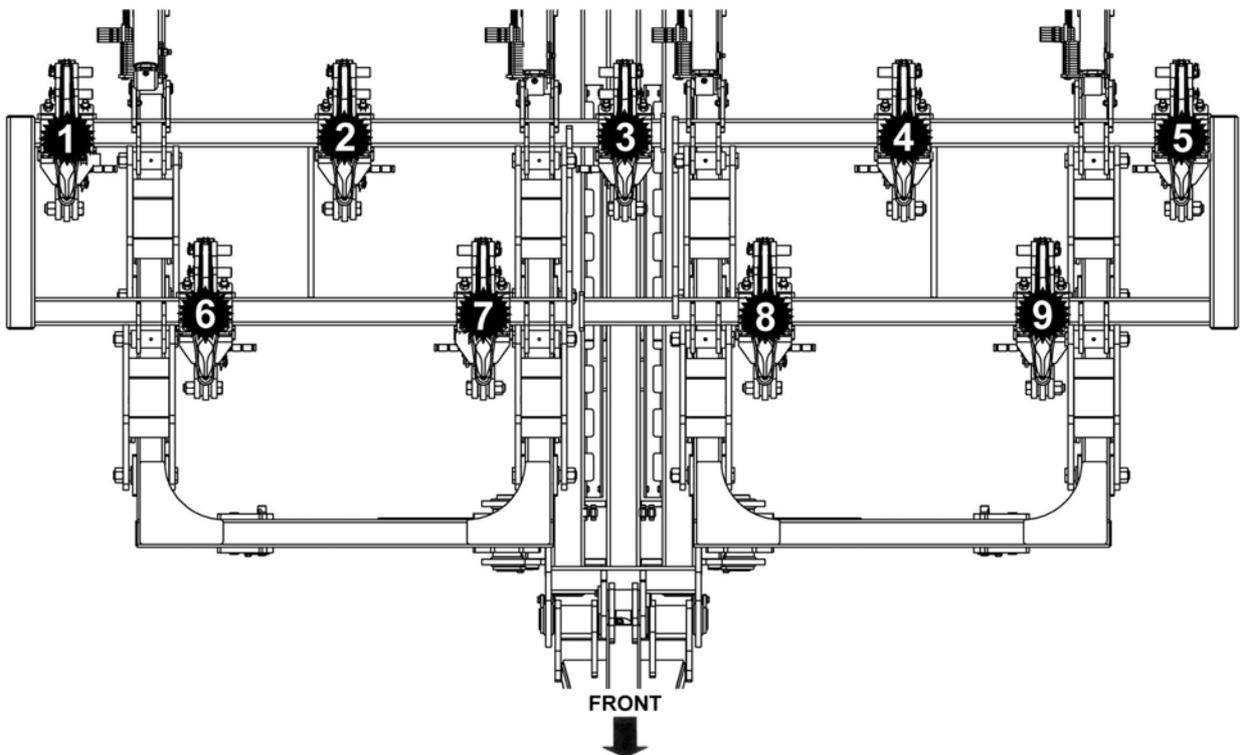


# Leg Positions – 4.0M Trailed Machines

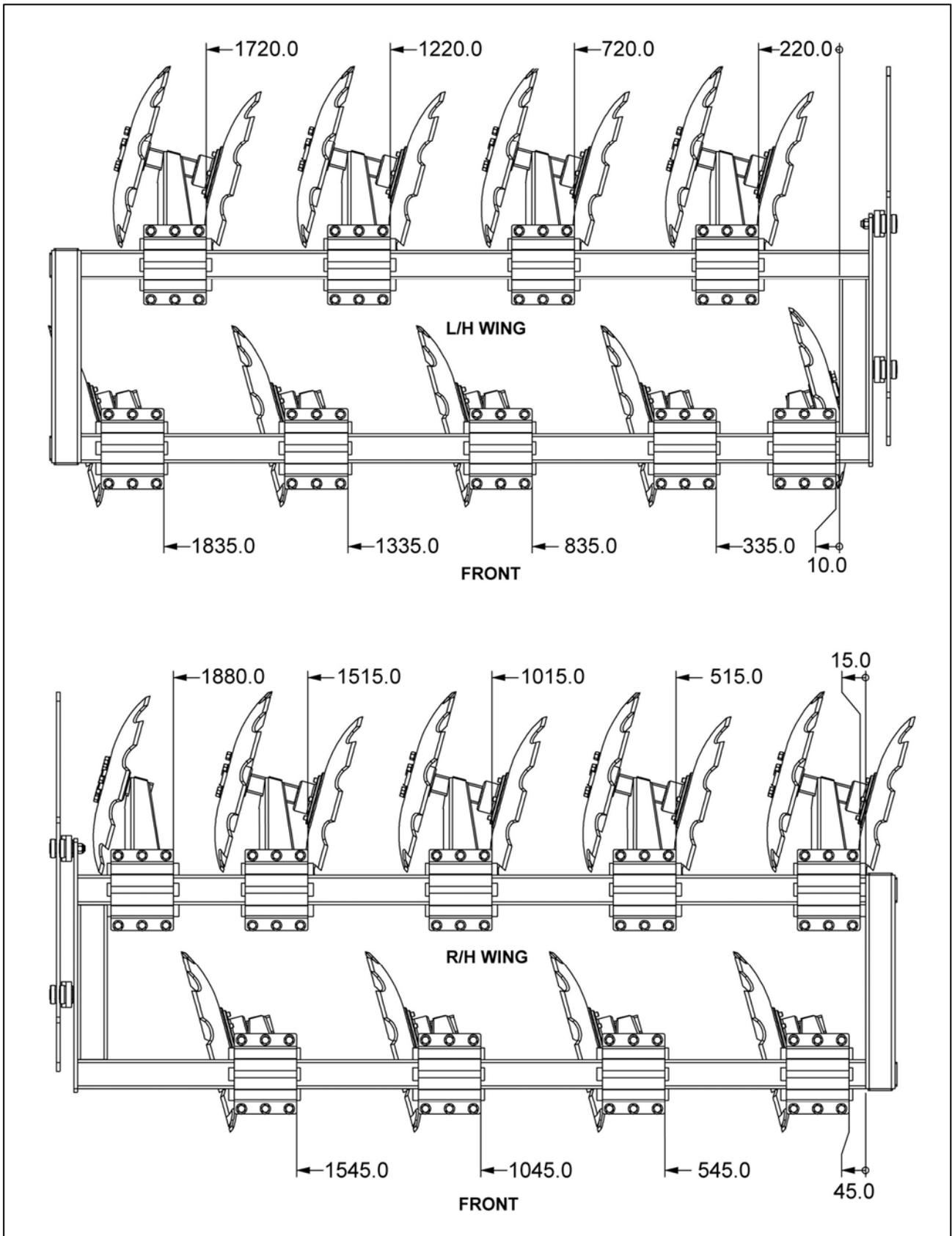
## 7 Leg Builds



## 9 Leg Builds



# Disc Positions – 4.0M Trailed Machines



## Working Depth

The depth to which the Discaerator 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 figure 1. Below the critical depth figure 2 applies. This can often be recognised from the surface but is very clearly seen by digging the profile.

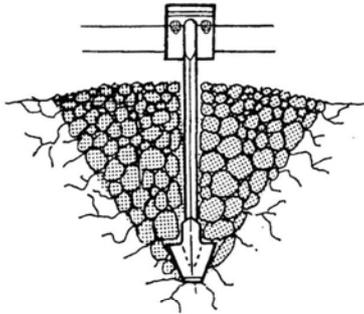


Fig.1

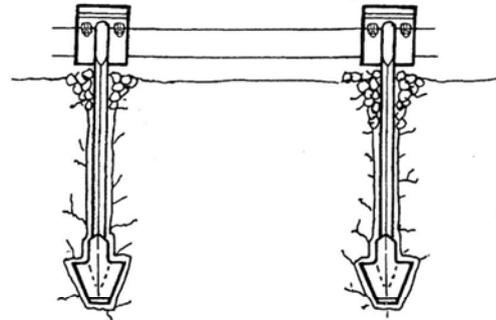


Fig.2

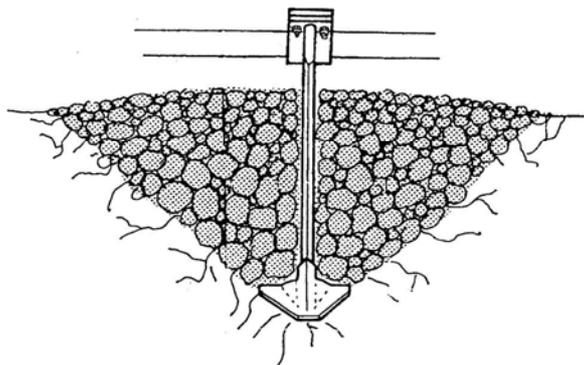


Fig.3

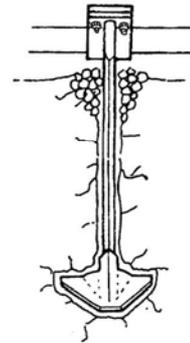


Fig.4

Figure 1 is the pattern produced by the narrow points and figure 3 is the pattern of the wide points – the wide points produce a much greater loosened area.

Figure 4 shows the wide point working below the critical depth. This critical depth with the wide points may be lower than for the narrow points.

The reason for this critical depth is that in for example figure 3 the soil has been loosened upwards because that is the direction of least resistance. In figure 4 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.

## Tine Spacing

The tine spacing is related to the working depth for each type of point. With the narrow points the spacing should be 1.2 - 1.5 times the depth. This gives the least draught force and most even surface finish with complete break up of the soil profile (*Fig.5*).

Figure 6 shows the same tines too far apart giving incomplete break up. With the wide points the spacing can be 2 - 2.2 times the working depth (*Fig.7*).

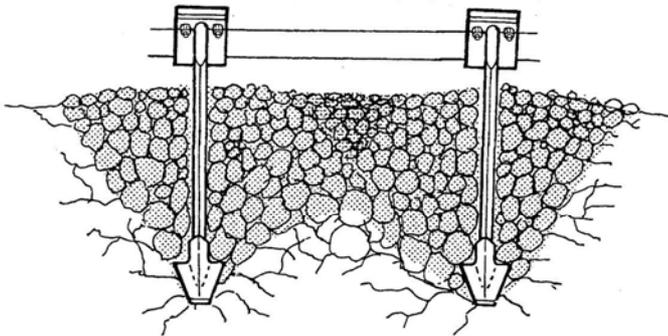


Fig.5

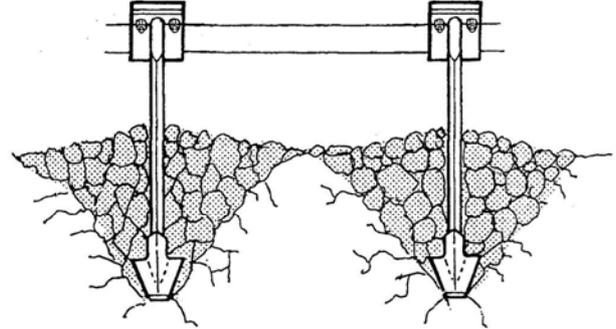


Fig.6

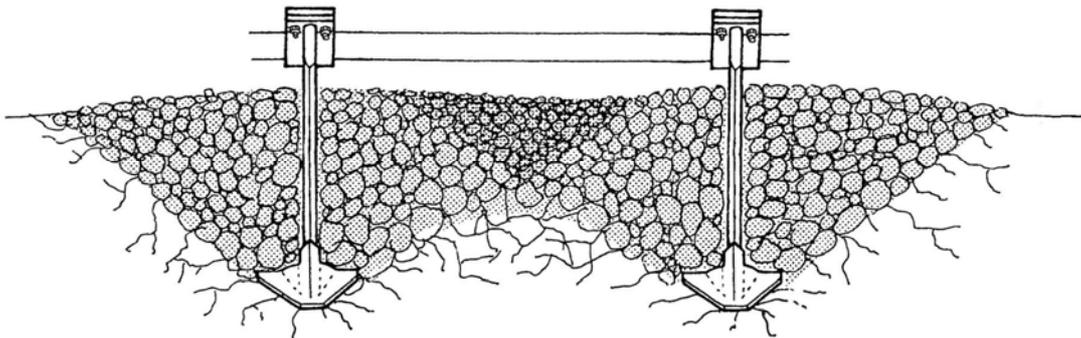


Fig.7

## Shallow Leading Tines

Draught force can be reduced and the amount of soil loosened increased by using shallow tines in front of long ones. The 460mm shanks should be mounted to each side of the 610mm shank and not directly in front. Figure 8 shows an ideal setup.

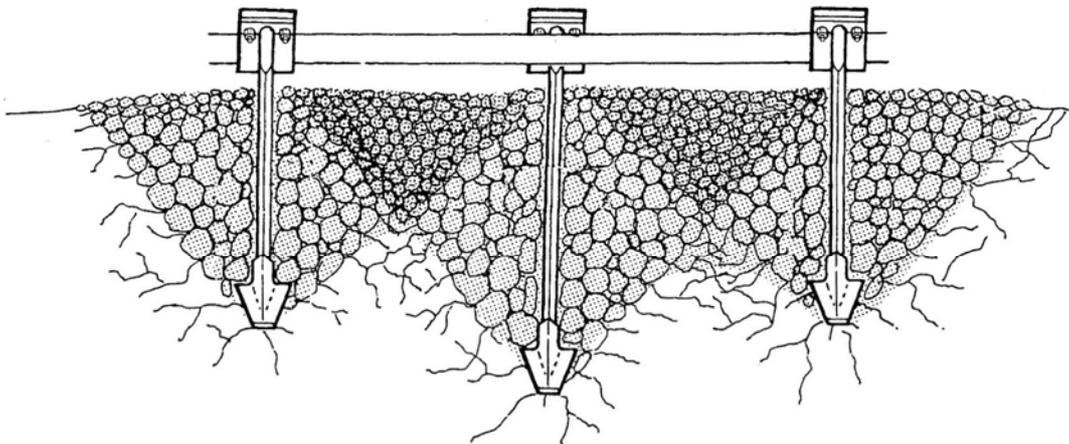


Fig.8

## **Re-compaction**

Loosened soil is extremely prone to re-compaction by subsequent traffic especially in wet conditions when loosening can be achieved by using wide points and shallow leading tines but any re-compaction will be more severe than the original problem. For this reason it is not a good idea to use two passes in different directions but to try to combine the two in one pass with for example shallow leading tines.

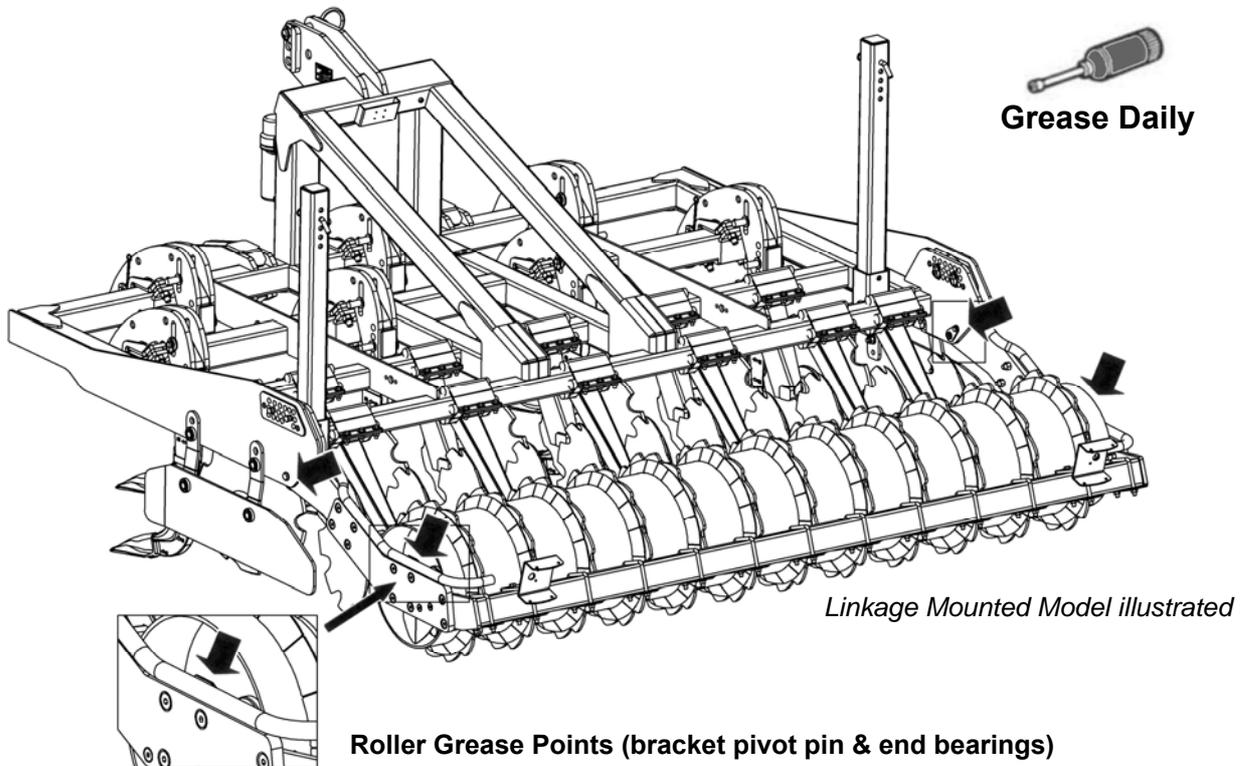
If power is inadequate to cover the full width of the toolbar it is better to remove the shanks in the middle of the frame, which will leave an undisturbed strip of ground in the centre. On the return bout across the field the tractor wheels should be positioned on the unmoved strip to complete the cultivation on a straddle and overlap principle.

## MAINTENANCE

### Service and Maintenance

Apart from regular lubrication of the roller assembly greasers, and ram greasers on models with hydraulic breakback legs, maintenance of the machine is limited to general cleaning and regular checking of the points and shin fixings for tightness.

All lubrication points should be greased on a daily basis prior to work and before storage of the machine.



### Hydraulic System (Hydraulic Breakback Models only)

The hydraulic systems for both the 5 and 7 leg hydraulic breakback models comprise of single acting rams plumbed into three hose runs. The circuit is primed at the factory prior to delivery of the machine and will only require bleeding when hydraulic components are replaced.

### Bleeding the Hydraulic System

Before attempting to bleed the system the oil safety note below should be read and the advice strictly adhered to.

The 3 rams located at the ends of the hose runs are fitted with end caps, these will be the 2 outer rams and the centre ram. With the supply hoses attached to the tractor, loosen the end caps of the 3 rams – *do not loosen too much, 1/2 turn should be sufficient to allow the air to escape*. Start the oil flow and observe the end caps, when oil begins to escape from the end caps, stop the flow and re-tighten the end caps.

NOTE: Suitable containers should be used to catch any oil that escapes from the system – dispose of oil as advised by 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.**

## **Accumulators**

Machines with hydraulic breakaway utilise tandem accumulators that are pre-charged with nitrogen when they leave the factory. Valves are located on the top of the accumulator cylinders for charging purposes only – **do not open the valves or release the pressure**; re-charging the accumulators requires the correct use of specialised equipment and must only be performed by the manufacturer or dealers qualified in this subject.

## **Gas Struts**

Later version auto-reset machines 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.





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