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SEEDAERATOR

Linkage Mounted Seed Drill

For use in conjunction with the Artemis Lite Controls Manual (Publication 741)

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 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.

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 Seed Drill*

Product Code; *DRIL*

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

McCONNEL LIMITED

Temeside Works
Ludlow
Shropshire
England

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www.mcconnel.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 an equivalent daily noise exposure level of 85 – 90 dB ear protection is recommended and must always be used if any window is left open.

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. 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

Read this manual before fitting or operating the machine. Whenever any doubt exists contact your dealer or the McConnel 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 damage to either machine or equipment if not observed carefully.

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

LEFT AND RIGHT HAND:
These terms are applicable to the machine when it is viewed from the rear facing forwards.

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

Seedaerator

- 3-point Linkage Mounted
- 3.0M Working Width
- 9 Sowing Bands
- ‘A’ Share Tine Coulters (175mm Sowing Band Width)
- Depth Adjustable Leading Tines (100 - 300mm)
- Tines Safety Break-back System
- Large Diameter Consolidating Wheels with Pneumatic Tyres
- Incremental Depth Adjustable Tine Coulters with Safety Break-back System
- Pressure Adjustable Rear Press Wheels
- 850 Litre Hopper
- Large Capacity Hopper Extension (Option)
- Rear lighting kit

INTRODUCTION

Machine Description & Purpose of Use

The McConnel Seedaerator is a high performance Strip Till Drill specifically designed to deliver single pass drilling straight into previous crop residues saving time, money and fuel costs while maintaining crop yields in even the most challenging weather and soil conditions.

The machine provides cultivation and drilling of the land in strips ensuring the adjoining soil structure is left undisturbed with crop residues remaining on the surface to decay so nutrients can be released back into the ground to create a living biotic soil with high levels of organic activity improving soil quality, aeration, water percolation and moisture retention, thus creating the perfect environment for crop growth.

The Seedaerator has been developed for both farmers and contractors who are looking to reap the benefits of strip till drilling with improved soil structure, lower operating costs to deliver sustainable intensive farming without damaging the environment.

Key Benefits

- Improves soil structure
- Improves organic activity
- Increases nitrogen release
- Improves drainage and moisture retention
- Dramatically reduces compaction levels
- Reduces labour & fuel costs

Machine Specifications

Working Width	*3.0m*
Mounting Type	*3-point linkage*
Number of Seed Bands / Spacing	*9 bands / 333mm spacing*
Leading Leg Options	*Winged Point or Low Disturbance*
Leading Leg Working Depth	*100 – 300mm in 50mm increments (*)*
Large Diameter Press Wheels	*Standard*
Seed Coulter Option	*Standard, Double Shot or Bean*
Seed Coulter Working Depth	*25 – 150mm in 12mm increments*
Rear Press Wheels	*Standard*
Rear Harrow	*Standard or Paddle Board option*
Hopper Capacity	*600kg or 1200kg*
Controls	*RDS Artemis Lite*
Variable Seed Rate	*Standard*
Marker Arms	*Standard*
Machine Weight *(dependant on build)*	*2500 - 3000kg*
Minimum Tractor Requirement	*160HP*

(*) Recommended maximum working depth for Low Disturbance Legs is 150mm

Machine Identification

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

1. Machine Part Number
2. Machine Serial No.
3. Machine Weight

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

Machine Identification Plate

Noise Level

The sound level of this machine, as measured at the operator's ear, is within the range of 70 to 90 dB when the rear window of the tractor is open. We recommend that ear protectors are worn and the tractor windows kept closed at all times when operating this machine.

MAIN COMPONENTS - LOCATION & IDENTIFICATION

A. Main Frame
B. Hopper
C. Access Platform
D. Safety Rail
E. Platform Ladder (Stowed)
F. Support Legs (Stowed)
G. Bout Marker Arm
H. Bout Marker Ram
I. Bout Marker
J. Bout Marker Support Wheel
K. Hydraulic Fan
L. Seed Distribution Head
M. Seed Pipes
N. Seed Coulter (Adjustable)
O. Rear Press Wheel
P. Press Wheel Adjuster
Q. Levelling Harrow
R. Cultivation Leg
S. Press Wheel
T. Road Lighting Kit

Front View

Rear View

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 risks before starting work.
- ALWAYS ensure all machine 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 stop a working machine when other people enter a work area and only restart when the area is clear of any risk.
- 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.

SAFETY DECALS

The following safety decals are displayed on the machine; these decals should be kept in a readable condition at all times and replaced immediately if damaged or missing.

1. 2. 3. 4. 5.

1. DANGER - Unsupported Machine Danger.

2. DANGER - Keep Out Zone.

3. DANGER - Thrown Debris Risk.

4. DANGER – Falling Wing Danger.

5. DANGER – Pinch Point Risk.

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 will vary depending on local conditions and specific circumstances.

Free Flow Return
Tractors must be fitted with a Free Flow Return (minimum 3/4”).

Vehicle Ballast
It is imperative when attaching ‘third-party’ equipment to a vehicle that the maximum possible stability of the machine and vehicle combination is retained; this can be accomplished by the use of ballast to counter-balance the weight of the implement.
Front weights may be required in order to place 15% of total outfit weight on the front axle for stability in transport and when turning the machine on the headland.

Tractor Linkage
It is essential that only the correct linkage arms for each particular tractor are used with the machine. 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 machine to offer protection against the failure of unmatched, repaired, badly worn, weak or below category tractor linkage.

Stabilisers
Check Chains and/or Stabilisers must be fitted and tightened at all times.

Attachment of the machine should be performed on a safe firm level site. Ensure all bystanders are at a safe distance from the machine and tractor.

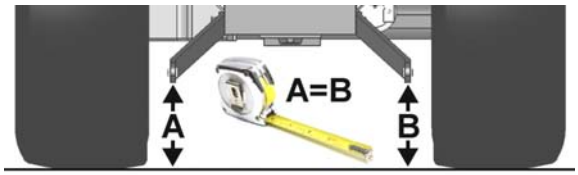
Ballasting for Stability

It is imperative when attaching 'third-party' equipment to a vehicle that maximum possible stability of the machine and vehicle combination is achieved; this can be accomplished by the use of 'ballast' in order to counter-balance the weight of machine.

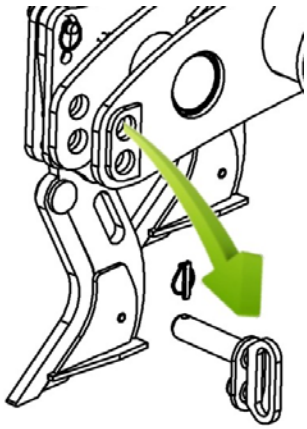
Depending on the size and weight of the carrying vehicle front weights may need to be added to ensure maximum stability when transporting and/or working the machine - *contact the tractor manufacturer or local tractor dealer for advice on ballasting.*

The procedure for attaching the machine is as follows;

Measure and set the tractors lower links to identical height settings; this will ensure the machine is mounted level *(side to side)* in relation to the tractor when it is attached.



Remove linkage pins from the machines lower linkage points on both sides of the main frame.



Slowly reverse the tractor squarely up to the machine with draft links positioned between the lower attachment points on the main frame.

Raise or lower the draft links to a height where they are aligned with either the upper or lower holes in the main frame attachment points; *the attachment hole selected will depend on the desired carrying height required.*

Fit linkage pins and secure with linch pins.

Fit and adjust top link to place the machine in a suitable position for transportation.

Fit operator controls in the cab in a suitable location that allows for ease of operation.

Connect machine electrics to suitable connections on the tractor; *refer to tractor handbook.*

Remove stand legs and place them horizontally in their storage location on the machine*; refer to stand legs page for details.*

With the tractor and attached machine still located on a firm level site it should now be transversely levelled for work – *refer to levelling section for details of this procedure.*

Longitudinal levelling for work must be performed when the machine is at the work site in order to suit specific task and conditions – *refer to levelling section.*

SHIPPING / STORAGE LEG SUPPORTS (Auto-Reset Models only)

Auto-reset machines are fitted with shipping/storage supports to the four front legs; these must be removed prior to using the machine. It is recommended that the supports are refitted for machine storage to ensure the unit is stored in a safe stable condition.
The machine must be raised and suitably supported before attempting to remove the supports; when the supports have been removed the auto-reset system should be pressurised as per the procedure stated below.

WARNING!
Ensure the machine is raised and suitably supported before attempting to remove the shipping/storage leg supports.

AUTO-RESET LEG CHARGING PROCEDURE

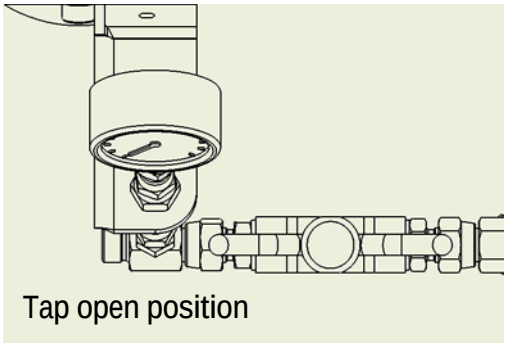
The procedure should be performed with the auto-reset legs clear of the ground.

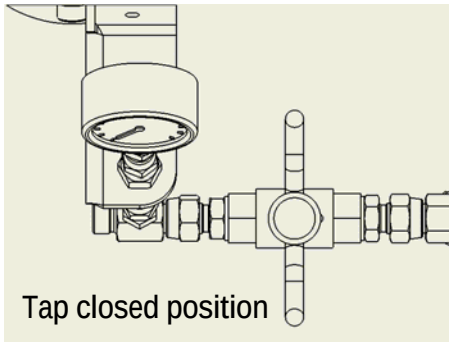
1. Connect the auto-reset 'pressure' & 'return' hoses to the tractor spool valve; the larger diameter hose *(3/8")* is marked 'pressure' and the smaller diameter hose *(1/4")* is the return.

2. Ensure tap adjacent to pressure gauge is open *(refer to illustrations below for open and closed positions).* Energise tractor spool to charge the circuit with oil until the pressure gauge shows a reading of 150 bar *(+/-10 bar)*.

3. Close the tap when the circuit is correctly charged ensuring the gauge continues to show a reading of 150 bar.

4. The auto-reset hoses can now be disconnected from the tractor until such time that the circuit needs recharging. Hoses must be reconnected before any future operation of the tap, never attempt to operate the tap with the auto-reset hoses disconnected.


Tap open position

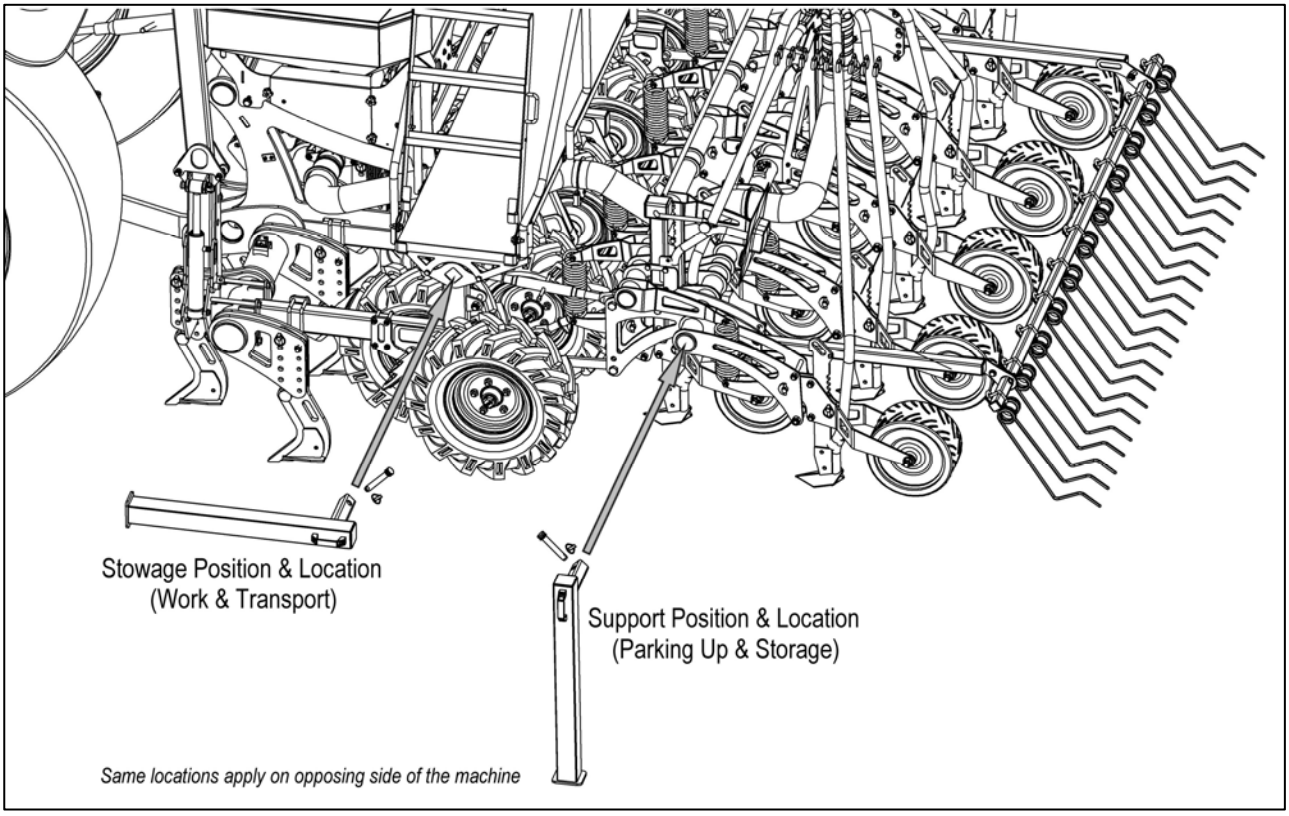

Tap closed position

CAUTION! When the auto-reset circuit is in a pressurised condition hoses must be connected to the tractor spool valve before attempting to operate the hydraulic tap; failure to observe this will result in a pressure build up within the hoses.

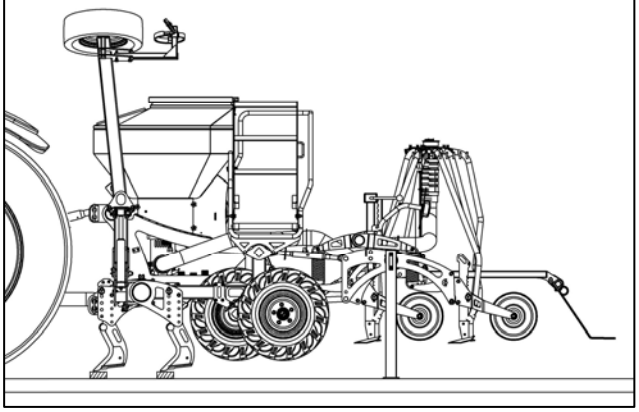
STAND LEGS

The machine is equipped with 2 stand legs; these are primarily for supporting the machine when it is either 'parked up' or in storage.
In addition to the instances mentioned above, the machine should also be placed onto its stand legs before attempting to make adjustments to any components or when performing maintenance tasks.
Before resting the machine down on the stand legs they must be fitted in the correct location on each side of the machine and secured in place with the pins and linch pins provided - *refer to illustrations below.*
A firm level site capable of supporting the weight of the machine must always be selected.
For 'parking up' and/or storage the site should be level hard standing ground. Protect front tines by parking them on wood blocks or planks.

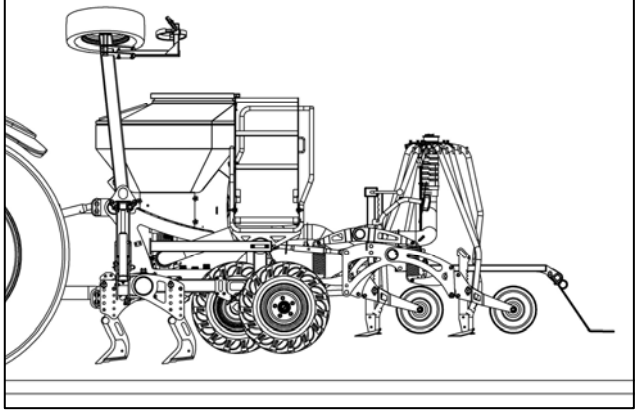
Stand Leg Locations & Positions



Stand legs in machine support location / position.



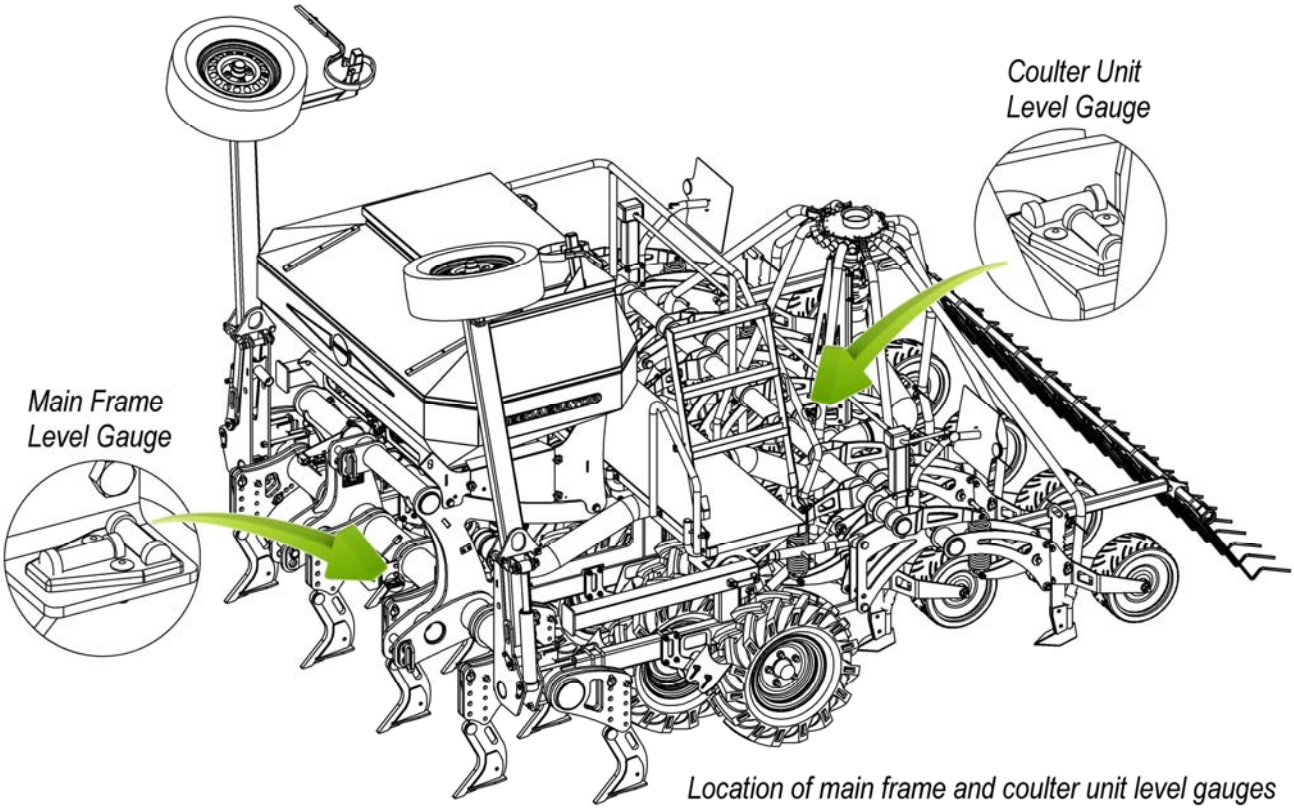
Stand legs in stowed location / position.



CAUTION! Machine must always be placed to rest on its stand legs during adjustments, maintenance, extended parking periods and at all times when it is not attached to a tractor. Stand legs must always be secured with pins and linch pins. Park tines on wooden blocks.

LEVELLING THE MACHINE

For efficient and accurate operation the machine must be correctly levelled for work. Transverse levelling *(side to side)* should be performed on firm level site during the machine's initial attachment to the tractor. Longitudinal levelling *(front to rear)* is performed on the work site once the machine has been drawn into the ground to its working depth.
Transverse and longitudinal level gauges are mounted on the main frame and coulter unit to aid levelling; the transverse gauges should only be used to confirm matching levels between the mainframe and the coulter unit and not as a guide to the overall level as even the slightest degree of sideways ground slope would provide a false level reading.



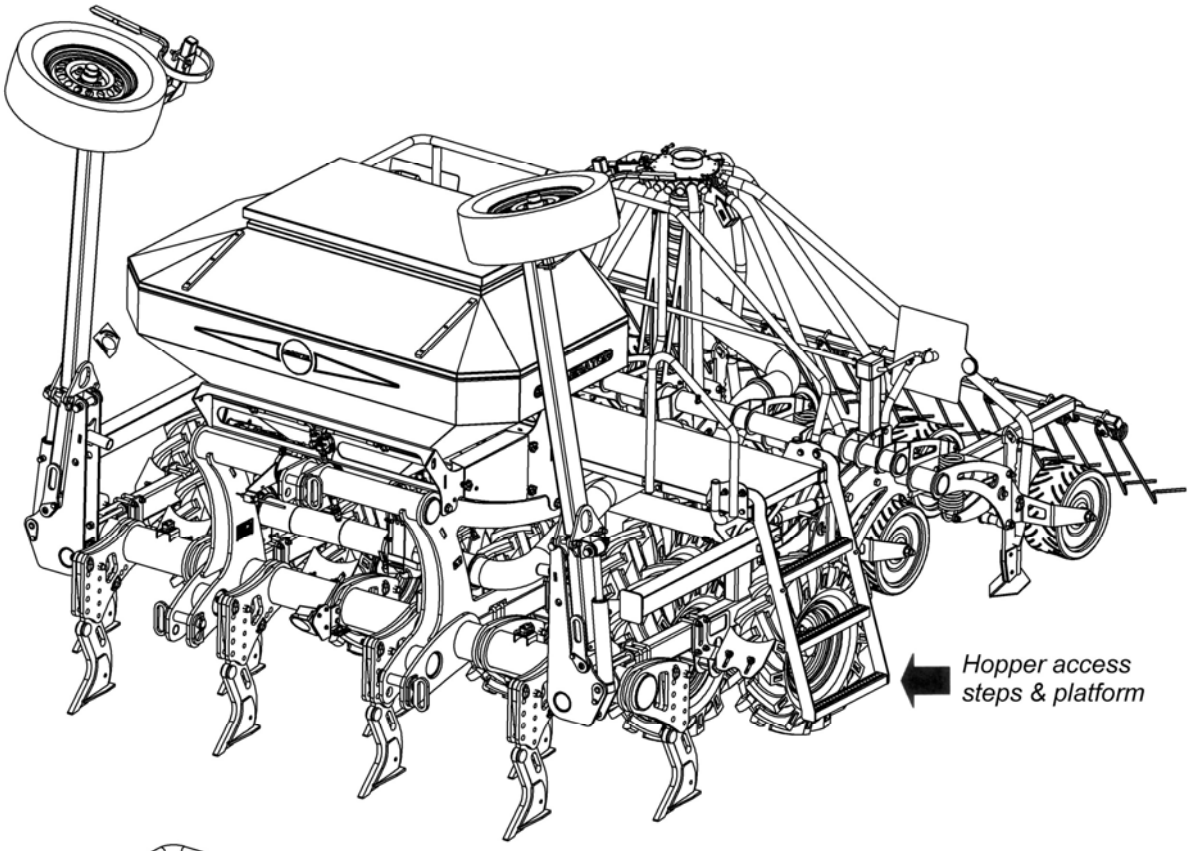
Location of main frame and coulter unit level gauges

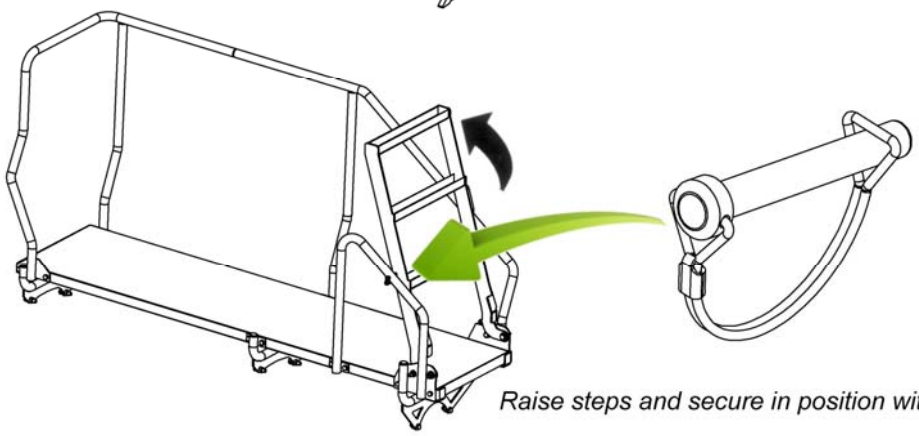
Transverse Levelling (Side to Side) – *on initial attachment to tractor*
Measure the height of the tractors lower links and adjust each side as required to place them at exactly the same height - this will ensure the main frame of the machine is level with the tractor in the transverse direction.
With the main frame level, the coulter unit can then be transversely levelled in relation to the main frame; this is achieved using the adjustable upper links that connect it to the main frame, adjust the links so that the coulter unit and the main frame are visually level when viewing them from the rear of the machine, check the transverse level gauges to confirm the levels match.

Longitudinal Levelling (Front to Rear) – *at the work site*
With the leading legs of the machine set at the desired depth setting, drawn the machine into the ground to its working depth before levelling the main frame of the machine by adjusting the top link; shorten or lengthen the top link as required until the longitudinal level gauge on the main frame indicates that the main frame is level.
With the main frame level the coulter unit can now be levelled using the adjustable upper links that connect it to the main frame – ensure each side is adjusted by equal amounts to ensure it remains transversely level to the main frame.

HOPPER ACCESS PLATFORM

The machine is equipped with fold down steps and fixed platform to provide the operator with a safe means of access to the hopper unit for filling or maintenance. The steps should be folded up and secured in position at all times other than during hopper access; never attempt to transport or operate the machine with the steps in their lowered position, this will risk damage to components.





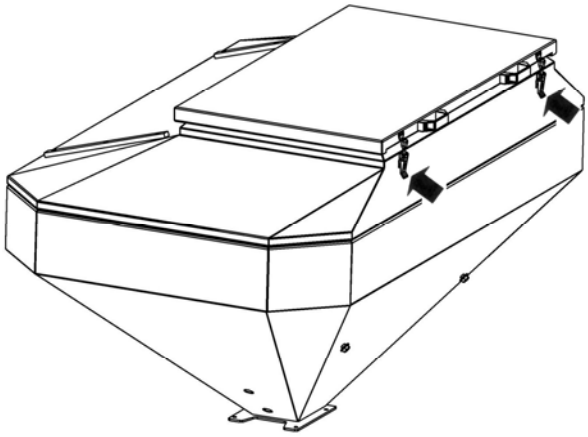
WARNING! Never allow persons to ride on the access steps, platform or any other part of the machine.

WARNING! Never attempt to access the hopper by any means other than by use of the steps and platform.

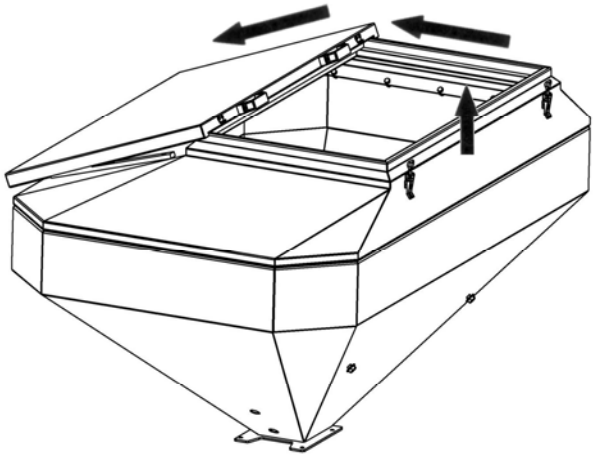
CAUTION! Always ensure that the access steps are in the raised and secured position for machine transport and work.

HOPPER & HOPPER EXTENSION KIT

The seed hopper is mounted on the top of the machine and has a capacity of 850 litres which equates to approximately 600kg of wheat seed.



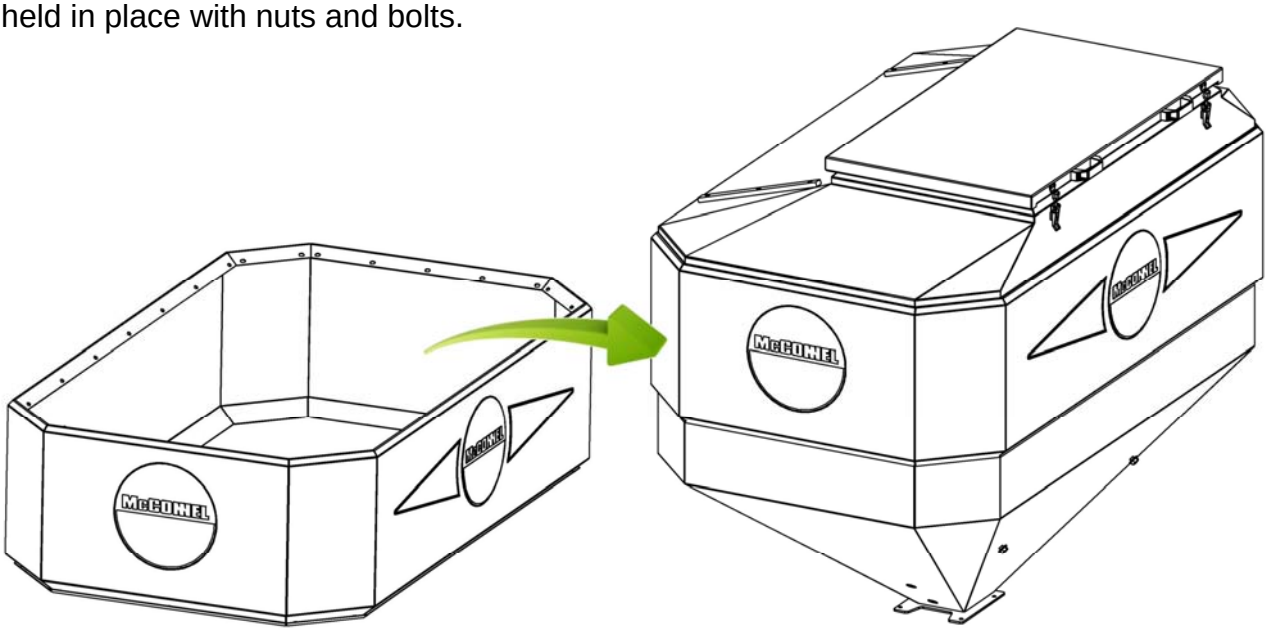
Hopper lid locks in position with overcenter fasteners



Lift and slide hopper lid rearwards to its open position

When filling the hopper with the required seed the machine should be parked on firm level ground and both machine and tractor must be switched off and the starting key removed.
The hopper is accessed via the machines ladder and loading platform. Never attempt to gain access to the hopper from any other part of the machine; this is not only highly dangerous but also risks damage to vital components.
The lid of the hopper is held in place by two overcenter fasteners; once released, the lid can be lifted and slid backwards on the slides to the fixed open position allowing for easy loading. A level mark on the inside the hopper indicates the minimum seed level required.
Care should be taken to avoid over filling the hopper, always leave sufficient space for the lid to be properly closed.
Raise and secure the ladder before moving or operating the machine.

Hopper Extension Kit (P/No.1301729)
A Hopper Extension Kit is available that increases the overall load capacity to 1700 litres, this equates to approximately 1200kg (wheat seed).
Fitment requires the upper section of the hopper to be removed and replaced with the extension; the upper section is then refitted onto the top of the extension. All sections are held in place with nuts and bolts.



Hopper Extension Kit

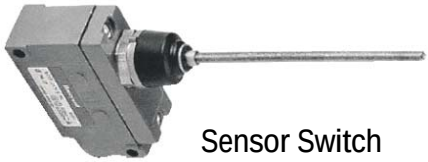
Hopper with Extension Kit Fitted

SENSOR SWITCH (Metering Unit Activation / De-activation)

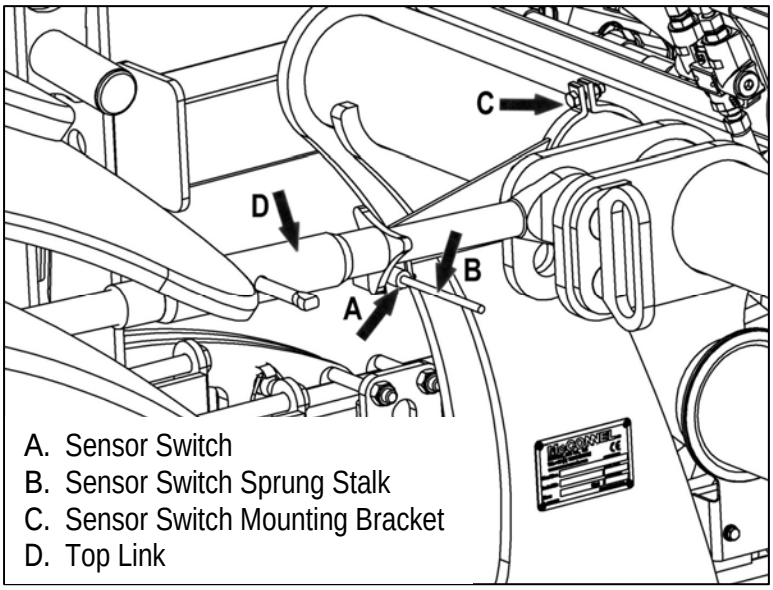
Activation and de-activation of the metering unit during operation is jointly controlled by two automatic control devices; a physical sensor switch and a radar movement sensor.

Metering Unit Sensor Switch

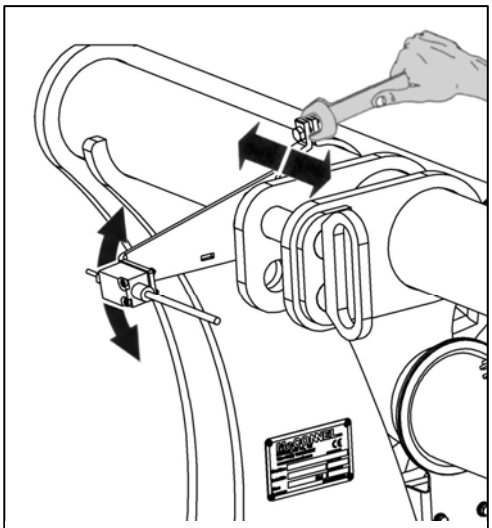
The metering unit sensor switch is located on the upper main frame adjacent to the machines top link mounting point; the sensor switch features a sprung stalk sited in a position where it is free of the top link when the machine is lowered to the ground for work but is in physical contact with the top link when the machine is raised off the ground on the tractors hydraulic lift.



Sensor Switch



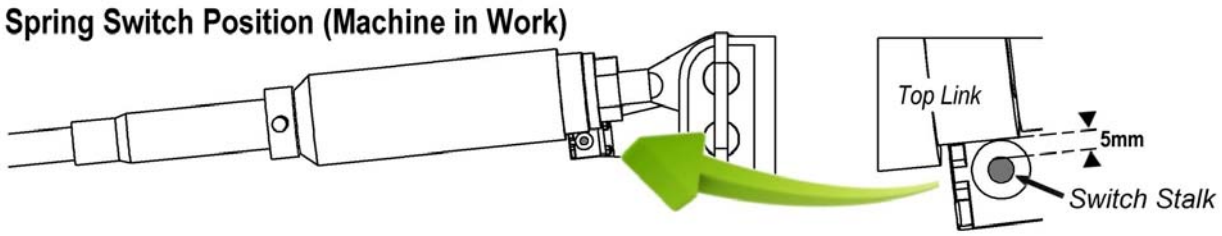
A. Sensor Switch
B. Sensor Switch Sprung Stalk
C. Sensor Switch Mounting Bracket
D. Top Link



Sensor Switch Bracket Adjustment

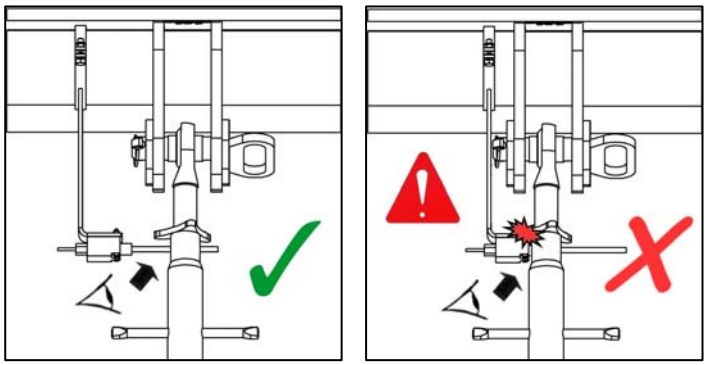
Sensor Switch Position Adjustment

The sensor switch mounting is fully adjustable to permit accurate positioning of the switch stalk in relation to the top link. Adjustment is performed by loosening the clamp on the mounting bracket allowing the unit to be moved vertically and/or horizontally into the optimum position for correct operation. Re-tighten the clamp when the unit is correctly positioned. The correct position for the switch stalk is beneath the top link with 5mm clearance when the machine is placed in work.



CAUTION!

When adjusting the position of the sensor switch ensure that only the sprung stalk is allowed to come into contact with the top link – do not place the bracket in any position where the switch body is at risk of contact with the top link; failure to observe this will result in damage to the switch and/or switch bracket assembly.

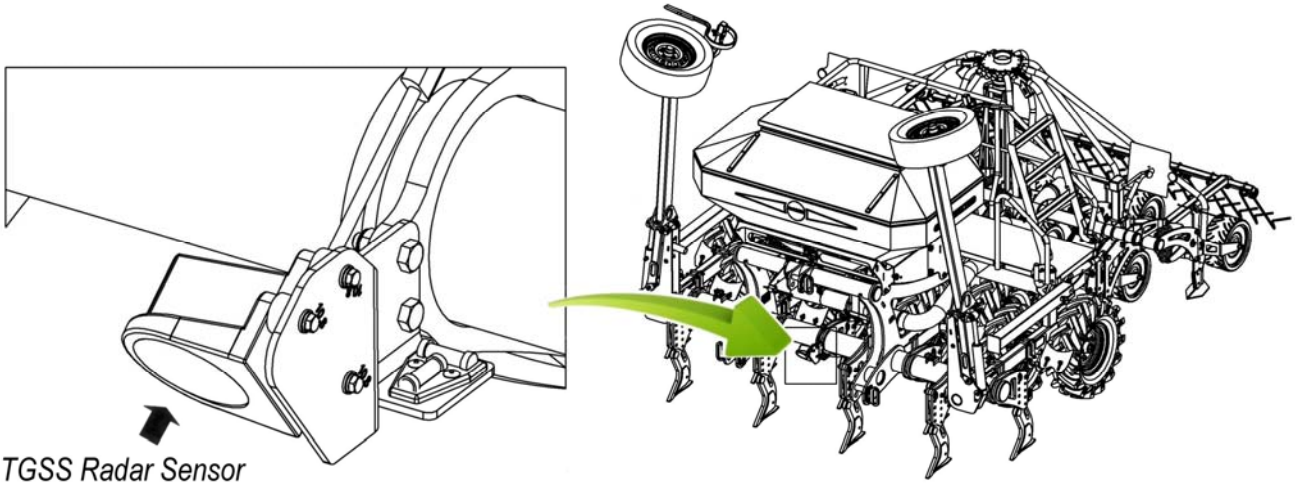


CORRECT POSITION INCORRECT POSITION

TGSS Radar Sensor (True Ground Speed Sensor)

The radar sensor is located on lower main frame in a forward pointing position where its beam is free to receive a clear uninterrupted view of the ground.

The function of the radar is to provide the control unit with an accurate forward speed signal in order to determine the motor speed requirement of the metering unit.



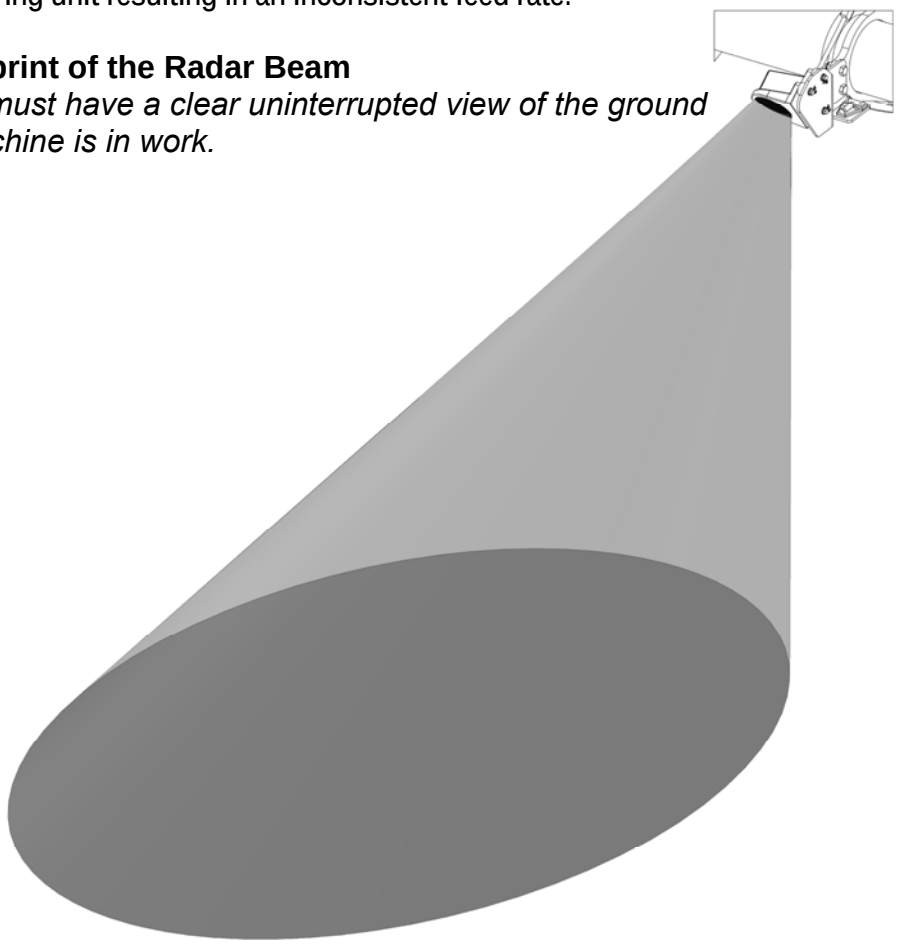
TGSS Radar Sensor

The accuracy of this instrument is dependent on two major factors; it must have a clear uninterrupted view of the ground, and it must have a working beam angle of 37° (± 2°) from the horizontal; *in the case of the latter the angle is predetermined by the fixed mounting and providing the machine is correctly levelled for work the angle will be correct.*

NOTE: Ensure the radar sensor has a clear uninterrupted view of the ground at all times when the machine is working; any disruption of its beam will send false readings to the metering unit resulting in an inconsistent feed rate.

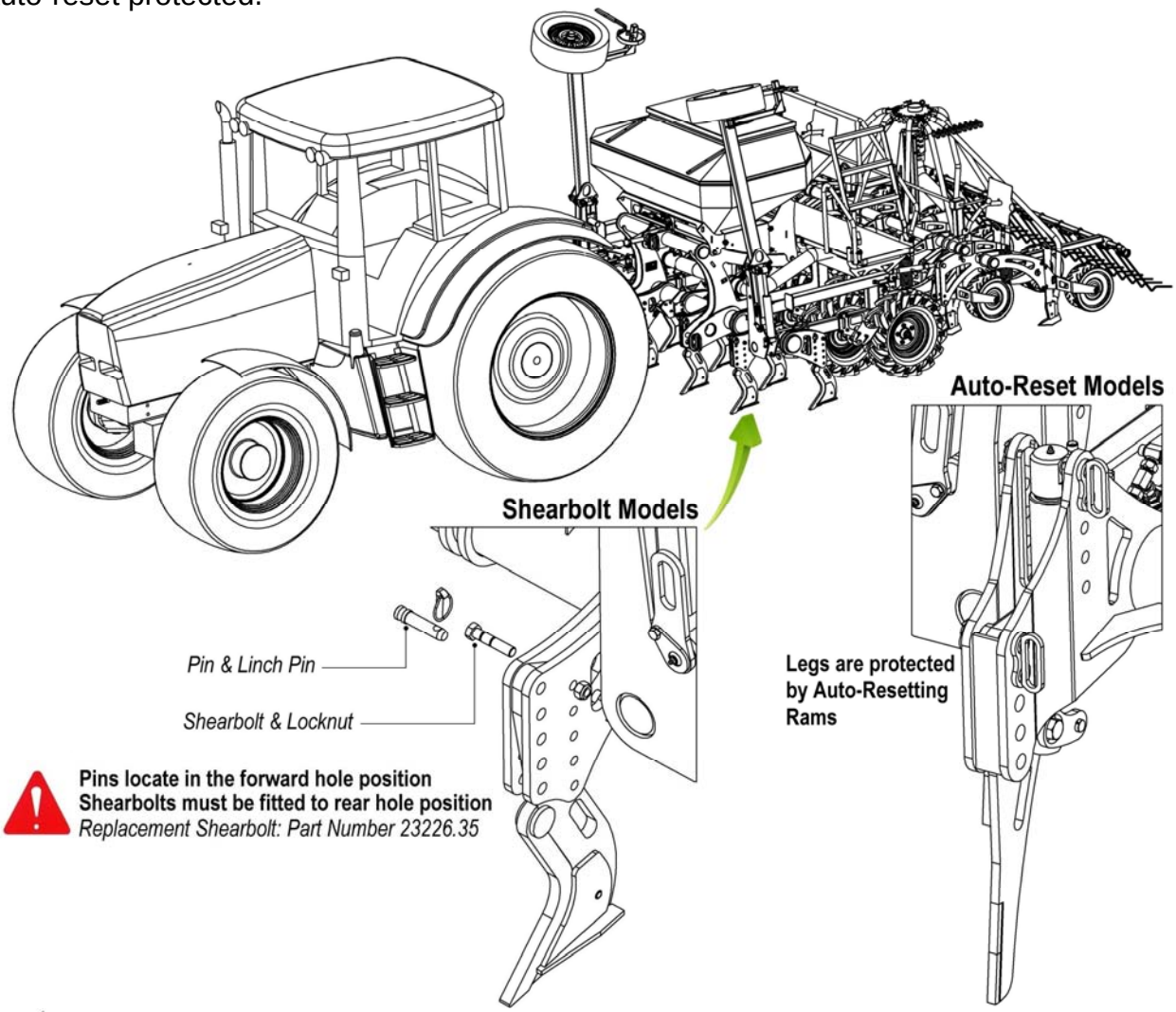
Optical Footprint of the Radar Beam

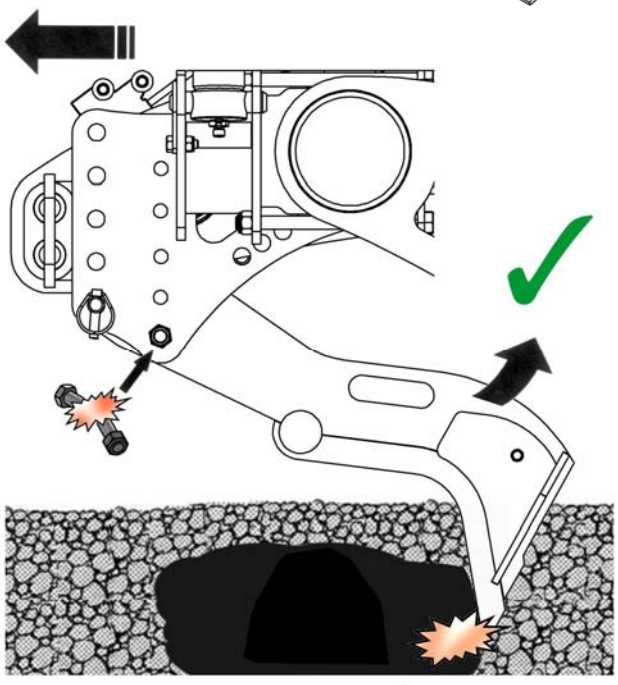
Radar beam must have a clear uninterrupted view of the ground whilst the machine is in work.



LEADING TINE LEGS

The machine features 9 tine legs mounted in staggered rows at the front of the machine; these are specifically designed to cultivate the seed root zone prior to the planting process whilst leaving the soil structure between the bands relatively undisturbed. The leg tines are all working depth adjustable and depending on the particular model either shearbolt or auto-reset protected.





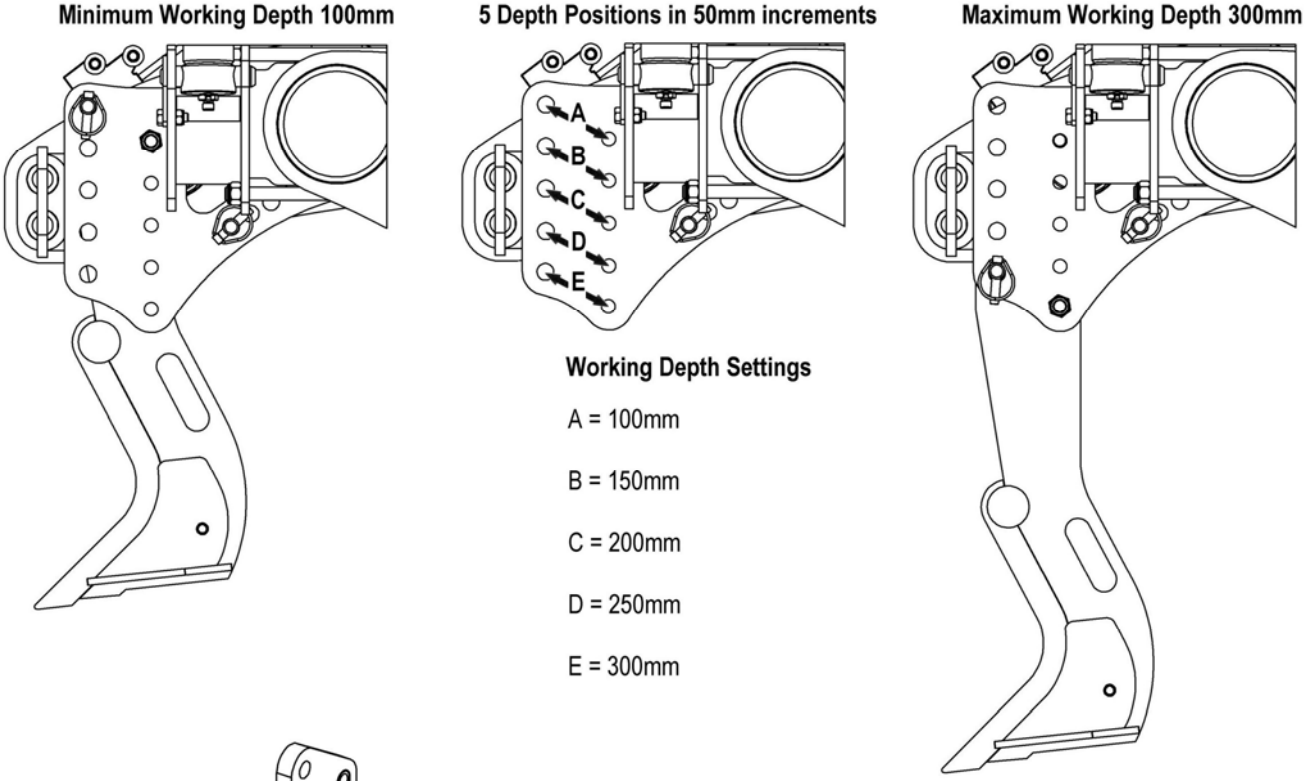
Shearbolt Protection

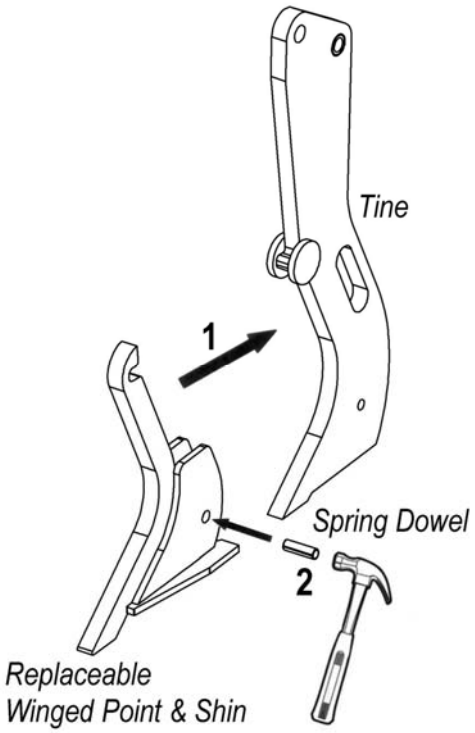
The tine legs are all shearbolt protected to prevent damage to the machine should it accidentally come into contact with a heavy or immoveable object when the machine is working in the ground; in these cases the shearbolt is designed to fail allowing the tine freedom to move rearwards and upwards to clear to object.

It is extremely important that shearbolts are always located in the rear hole positions on each of the legs and that the correct shearbolts *(Part No. 23226.08)* are always used when replacements are required; failure to observe this will result in damage to the machine and/or tractor.

Tine Working Depth
The working depth of the tines is adjustable in 50mm increments from a minimum depth of 100mm to a maximum depth of 300mm.
The working depth required will vary depending on the specifics of the task in hand and will be mainly influenced by seed type, local conditions and personal preference.
NOTE: The maximum recommended working depth for 'low disturbance' tines is 150mm; deeper working serves little purpose and promotes rapid tine wear.

Tine Depth Adjustment
Depth adjustment is made by altering the mounted height of the tine within the leg assembly; the higher it is mounted the shallower it will work. The front of each tine is held in position with a pin secured in place with a linch pin, and the rear of each tine is fixed with a shearbolt *(refer to previous page).* Ensure all the tines are set to work at an identical depth.

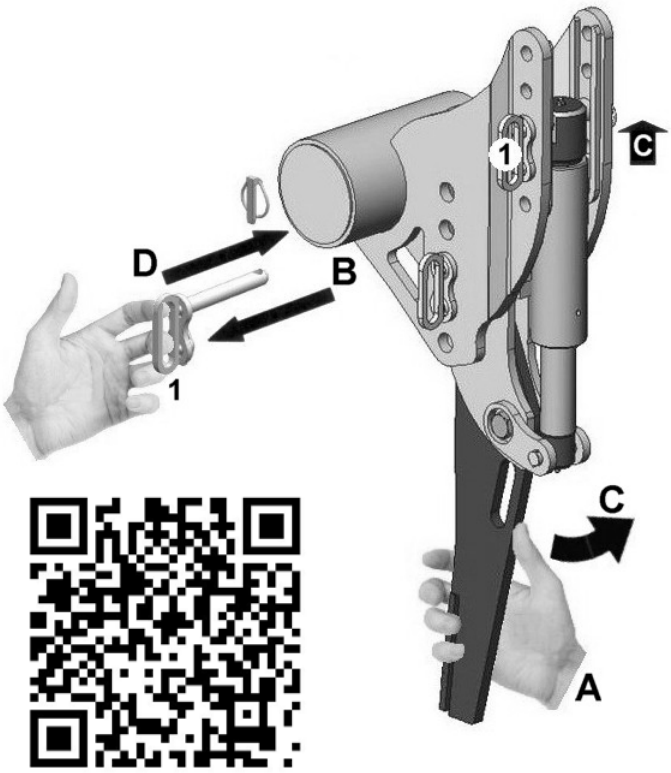


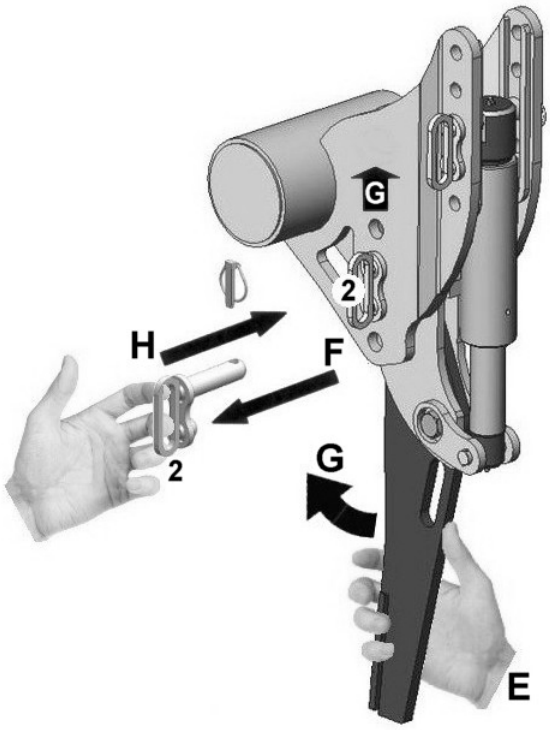


Point & Shin Assembly
Each tine is fitted with a winged point and shin, these are located over the front of each tine and are held in place by a spring dowel; as the point and shin will suffer wear over a period of time they are designed to be quickly and easily replaceable.
Points and shins must be replaced immediately when they become excessively worn or damaged.
Never use the machine with a point and shin missing; this will cause inefficient cultivation and damage the tine.

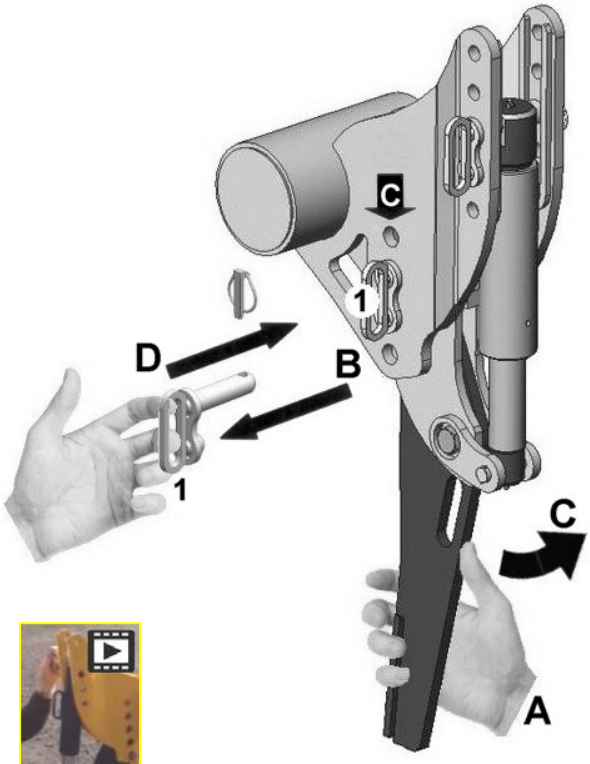
To remove the point and shin the spring dowel must be tapped out of the assembly using a hammer and suitable blunt punch. Fit the new point and shin over the front of the tine and tap the spring dowel through the point and tine to secure.

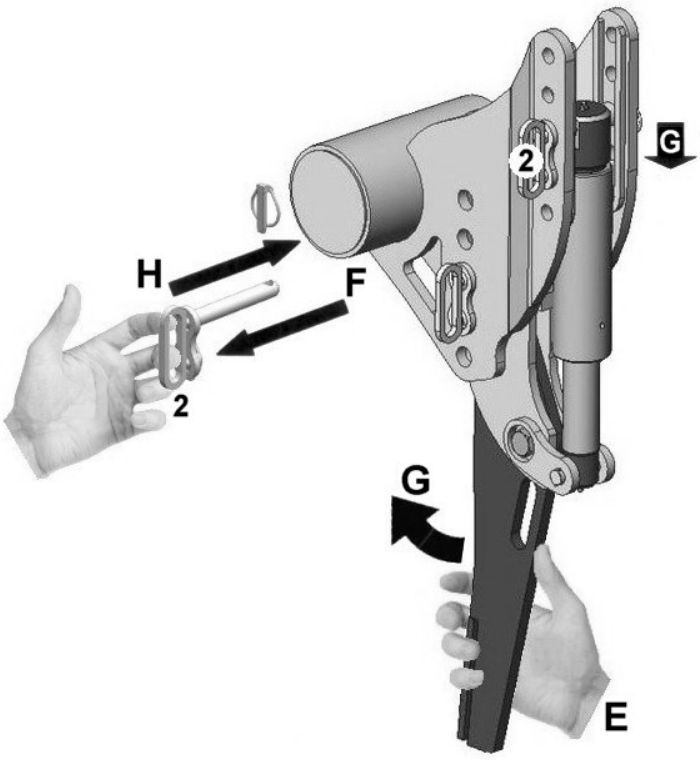
Depth Adjustment – Raising Tine



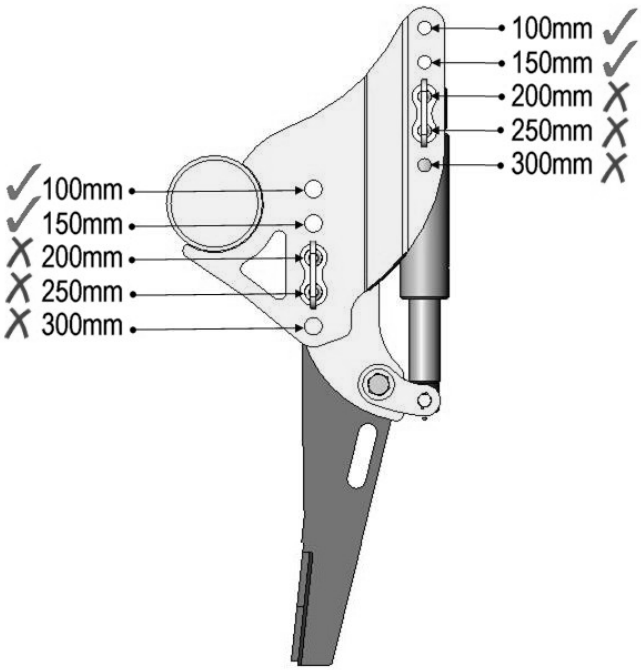


Depth Adjustment – Lowering Tine

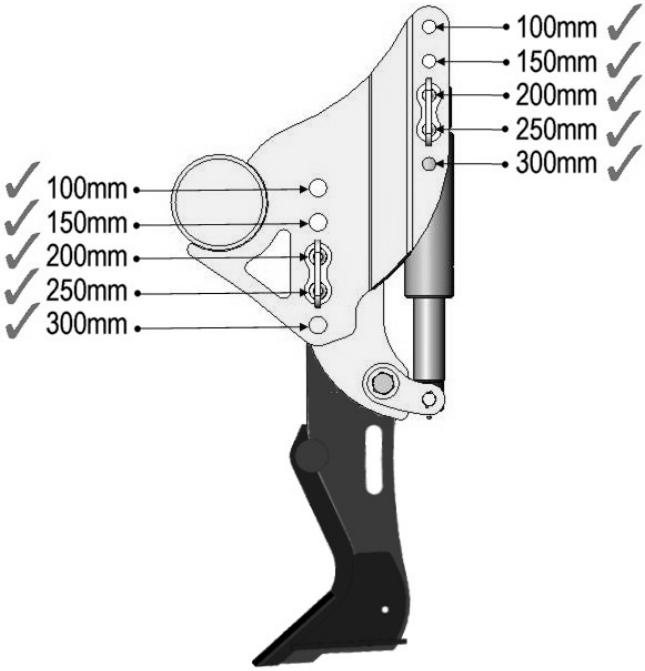




Leg Working Depths



Low Disturbance Tine

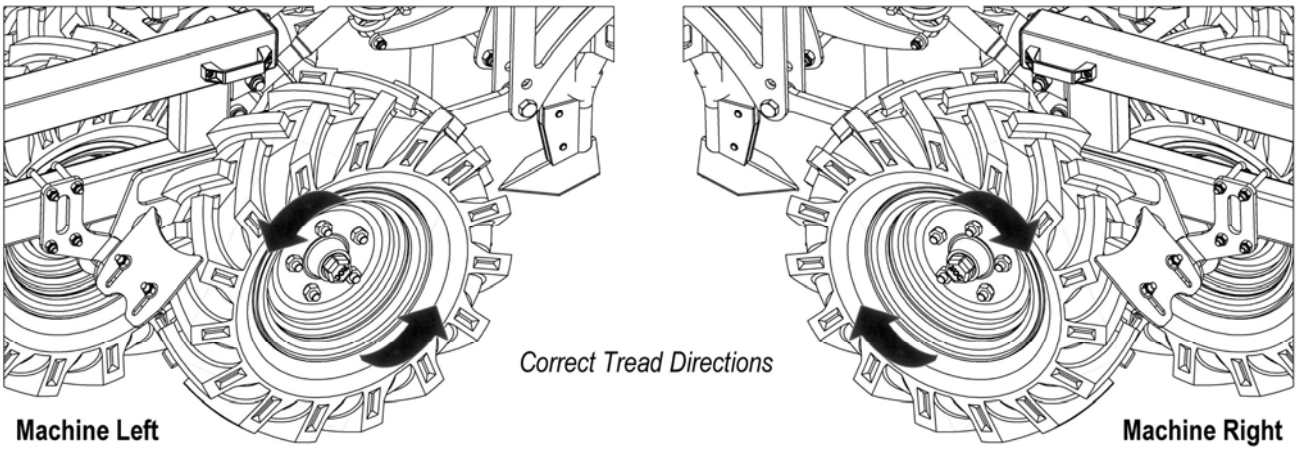


Winged Tine

Wheels & Tyres

The large wheels on the machine are fitted with pneumatic cleated tyres designed to firm and till the soil; the design of the machine requires the tyres to be fitted to the wheels with the 'V' tread pointing away from the direction of travel.

Always ensure when removing and replacing wheels and/or tyres that the tread direction is correct as shown in the illustrations below. Ensure wheel nuts are kept tight at all times.



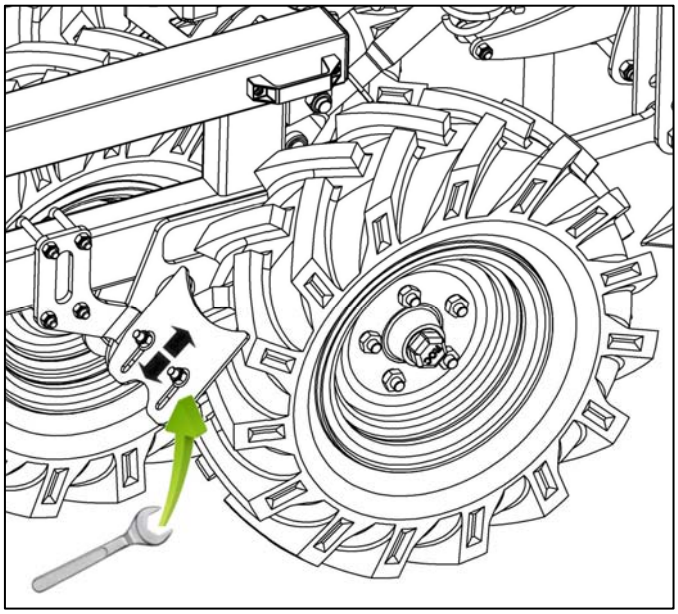
Tyre Pressure

Working tyre pressure: 0.8 bar *(11.6 psi)*.

Maximum tyre pressure: 3.4 bar *(49 psi).*

Packer Wheel Scrapers

Scrapers are mounted adjacent to each of the wheels to aid the removal of mud that can stick to tyres when working in wet conditions. All the scrapers are fully adjustable to allow them to be accurately positioned close to the tyre tread.



Scraper Adjustment

Adjustment of the scraper blades is by loosening their fixing nuts and bolts to allow the blade to be moved into the required position close to the tyre. Ensure the blade is not placed so close that it fouls on the tyre.

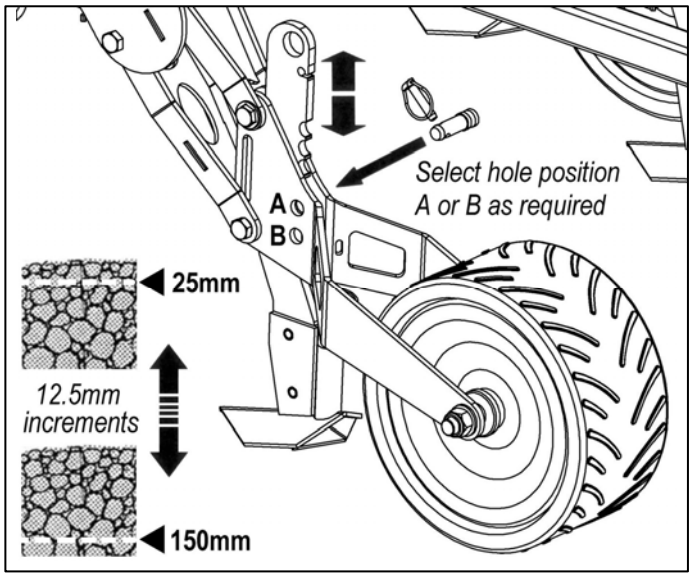
Retighten both sets of nuts and bolts when the correct position is achieved.

SEED COULTERS

The machine has 9 coulters mounted over 2 rows and are designed to place the seed in a 150mm wide band consistently at the pre-determined working depth.
The working depth of the coulters can be adjusted in 12.5mm increments from a minimum of 25mm to a maximum 150mm; this is achieved by altering the mounting height of the coulter leg.

The coulter legs features a series of notches; by raising or lowering the leg the notches will line up with either one of two holes in its mounting bracket, the specific hole and notch selected will determine the mounted height and therefore the working depth; 12 possible height positions are available. The legs are held in position by a locking pin that locates through the selected hole and notch.


Coulter Leg



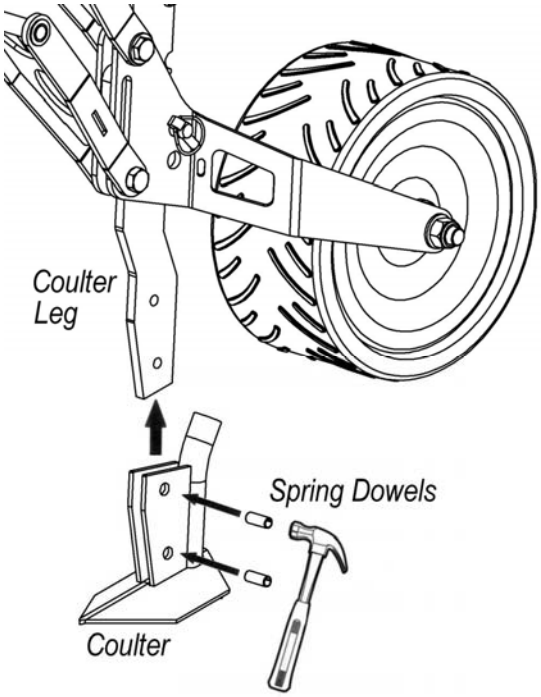
When setting the working depth of the seed coulters make sure that the selected leg notch and hole position are identical on all 9 coulter assemblies to ensure all are working at an identical depth.

Coulters are available in different widths and materials for specific applications.

Coulter Removal & Replacement
The coulters are designed to be quickly and easily replaced and are held in position on the leg with two spring dowels.

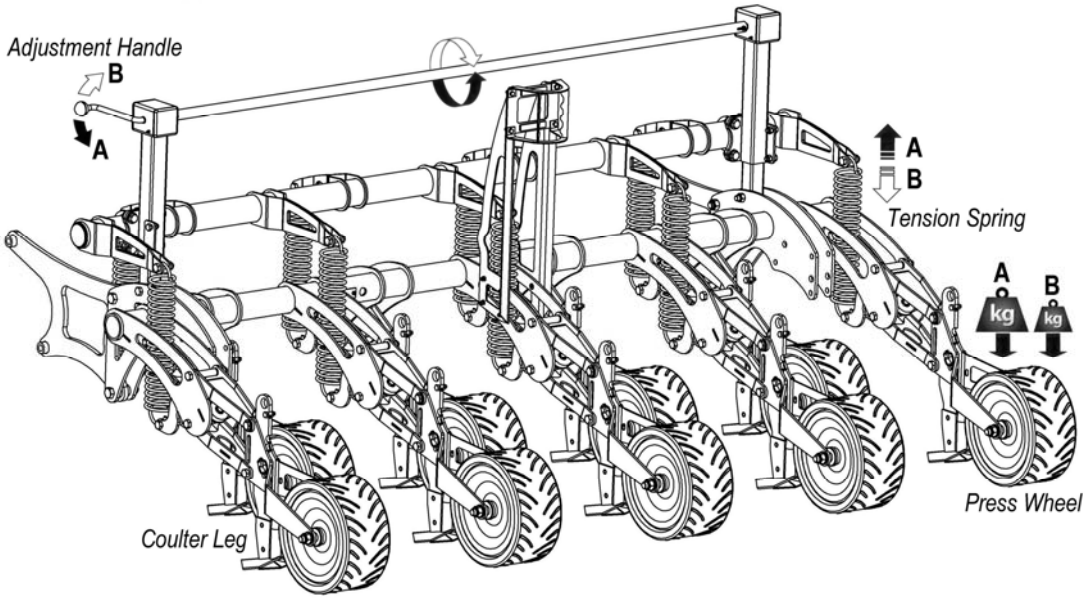
To remove a coulter the spring dowels must be tapped out of the assembly using a hammer and suitable blunt punch, when the dowels have been removed the coulter can be drawn off the leg.

Fit the replacement coulter onto the leg and tap the spring dowels back through the coulter and leg until they are flush.

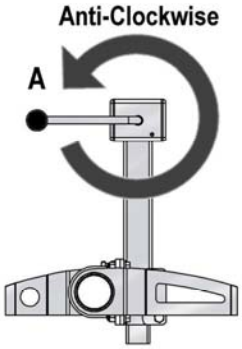


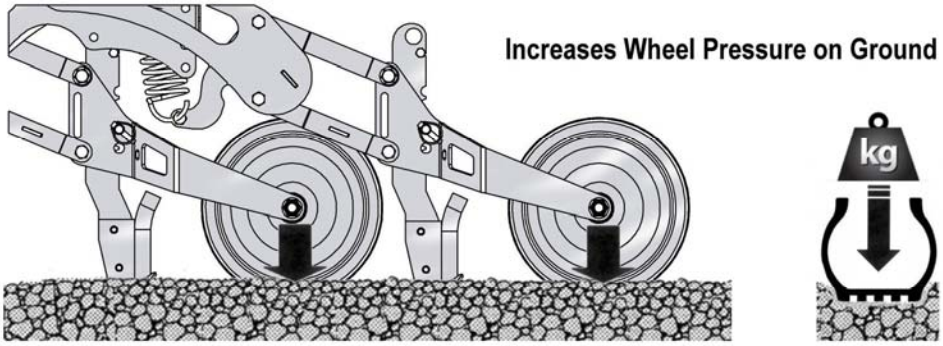
PRESS WHEELS

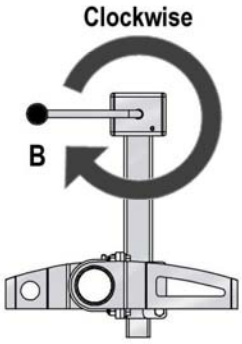
Press wheels are located directly behind each of the coulter legs and form an integral part of the coulter assembly – these wheels perform a dual function; firstly they ensures that the working tools consistently remain in the ground at their pre-set working depth, and secondly, they compress the cultivated soil back into place after the seeds have been placed in the ground by their respective coulters.
The unique sprung design of the press wheel assemblies enables them to distribute weight evenly to provide accurate and consistent leg and coulter depth even on bumpy or undulating terrain. The system affords 200mm fluctuation of rise and fall allowing the machine to plant accurately and efficiently whilst travelling over the contours of the ground.

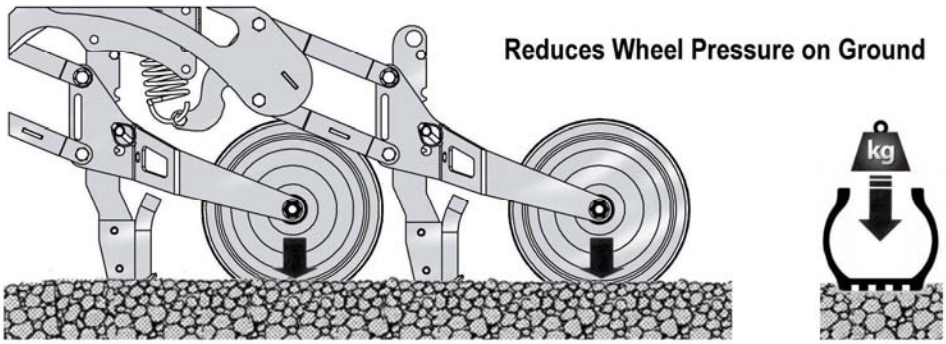


Press Wheel Pressure Setting
The downward working pressure of the press wheels is adjustable using the handle located on the machines left hand side. Winding the handle in an anti-clockwise direction increases downward pressure of the wheels and winding in a clockwise direction reduces downward pressure. The required pressure setting will mainly depend on the specific task being performed and work site conditions at the time.





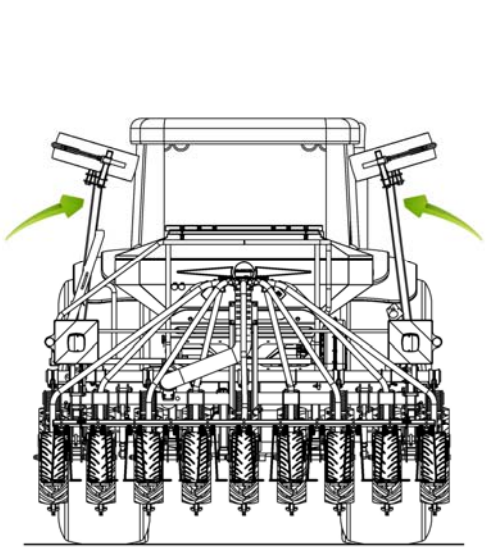


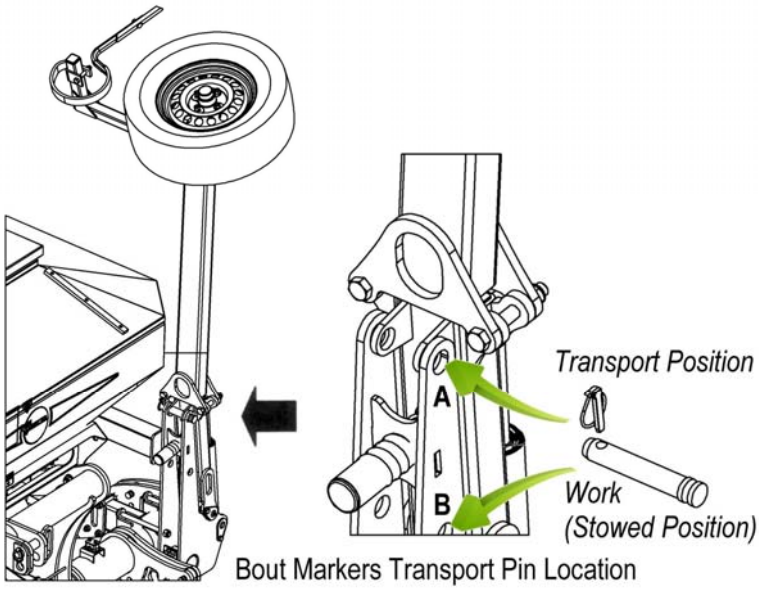


BOUT MARKERS

The Seedaerator is equipped with 'bout' markers on each side of the machine; these are devices for creating a tramline mark on the ground on each pass in order to provide a driving guide for the subsequent pass.
The tramline created by the bout markers are placed at a distance from the machine equal to half of its working width so that the tractor can be driven centrally along the tramline on the subsequent pass.
Bout markers arms are hydraulically operated for independent raising and lowering and are fitted with replaceable Shear Bolts *(Part No. 23220.41)* for component protection.

Bout Marker Transport Lock
For machine transportation both bout markers must be in the raised position and secured in place with their respective transport locking pins using hole positions 'A' *(refer to the illustration below right).* For work mode the locking pins should be removed from hole positions 'A' on each side of the machine and securely stowed in hole positions 'B'.


Bout Markers Transport Position



Bout Markers Transport Pin Location

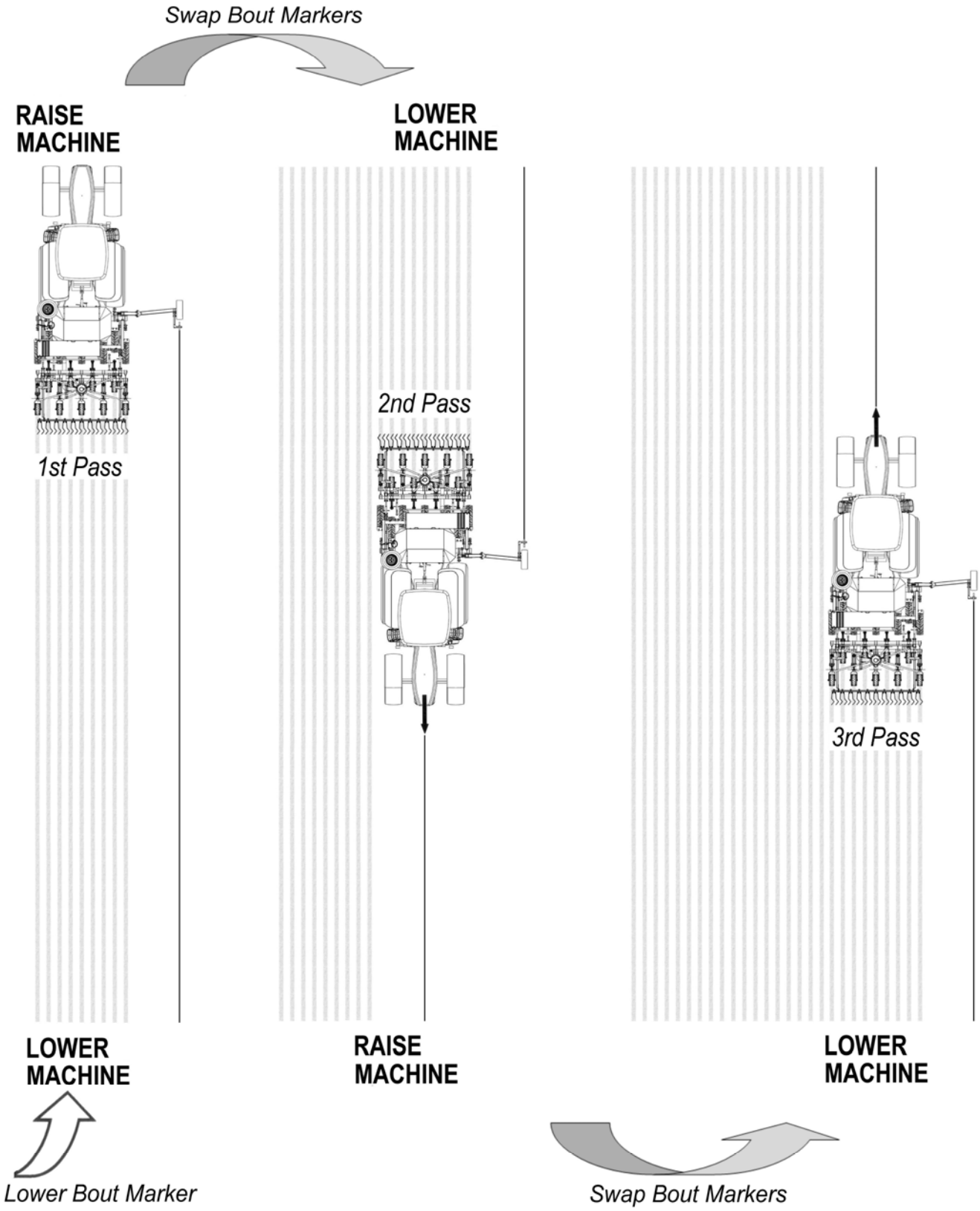
Bout Marker Arm Operation
Before attempting to lower the bout markers arms ensure that the transport locking pins have been removed on both sides of the machine; when the pins have been removed they should then be placed in the stowage holes lower down on the brackets for safe storage.

Operation of the bout marker arms is via a single acting spool on the tractor; in their raised position they are held in position by residual pressure within the hydraulic system, operating the spool valve releases the pressure allowing one or other of the arms to lower.

NOTE: On initial operation of the spool valve either one of the arms will start to lower depending on the active flow direction within the machines directional valve; if the arm that begins to lower is not the one on the side required, stop operation of the spool to raise the arm before operating the spool valve again, at which point the flow direction will be switched and the opposing arm will lower.

WARNING! Always ensure bystanders are kept at a safe distance and that there is sufficient space to the sides of the machine before lowering bout marker arms.

Working with Bout Marker

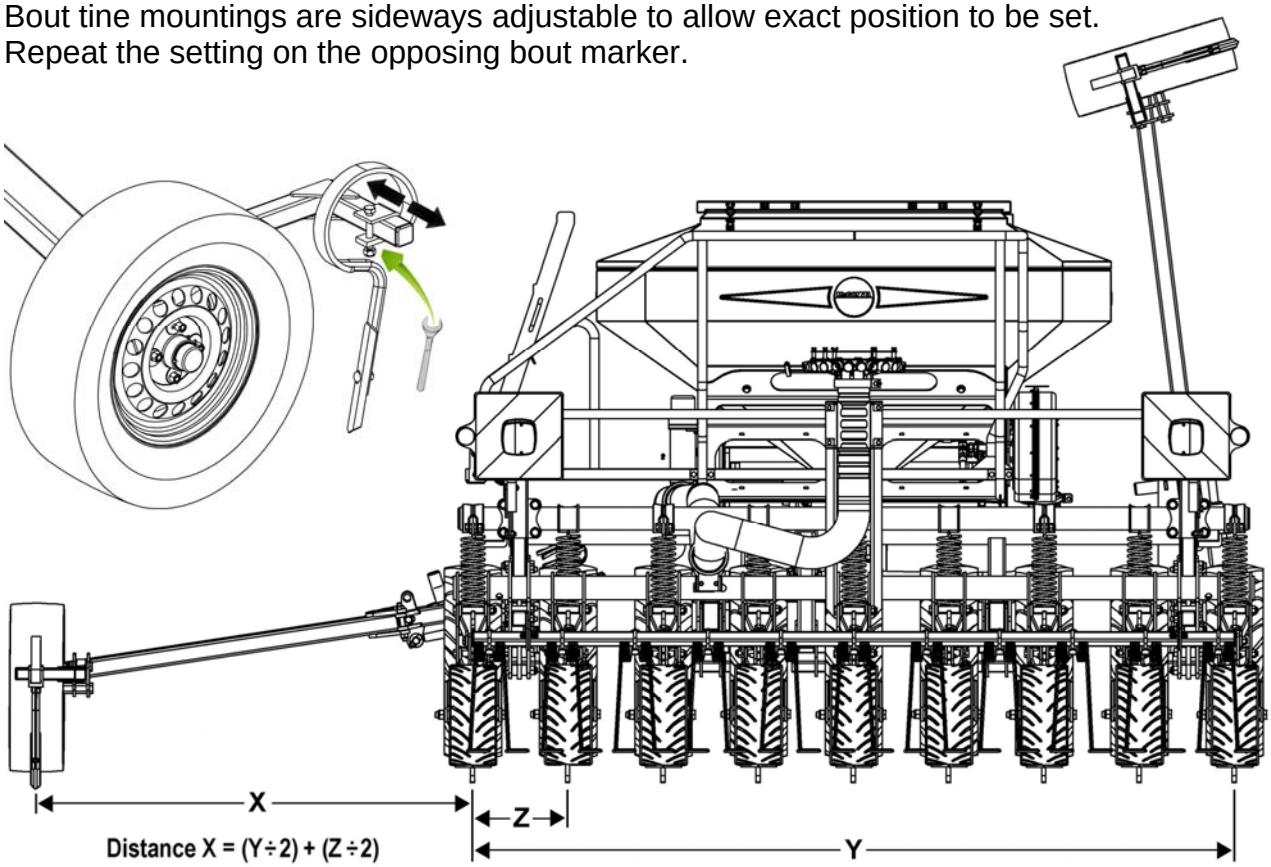


CAUTION! Always ensure the machine is raised clear of the ground before attempting to turn the tractor. Ensure there is sufficient space each side of the machine before attempting to swap over the bout markers.

Bout Marker Width Setting

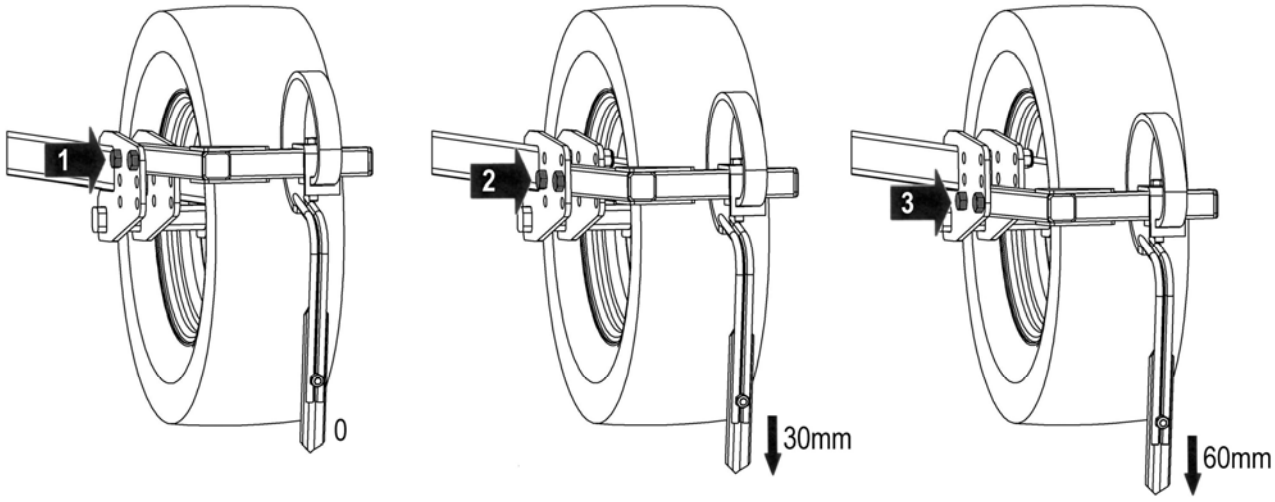
For accurate positioning of the tramlines the bout tines must be positioned an exact distance from the outermost row of tools on the same side of the machine, the following measurements are required to calculate this distance; Measure the machines total working width *(the distance between the centres of the 2 outermost tools – indicated 'Y' below)* and halve the figure, then measure the row width *(distance between the centres of adjacent tools – indicated 'Z' below)* and halve the figure. Add these figures together to get the distance the bout tine should be positioned from the outermost tool *(indicated 'X' below).* Bout tine mountings are sideways adjustable to allow exact position to be set.

Repeat the setting on the opposing bout marker.



Bout Marker Depth Adjustment

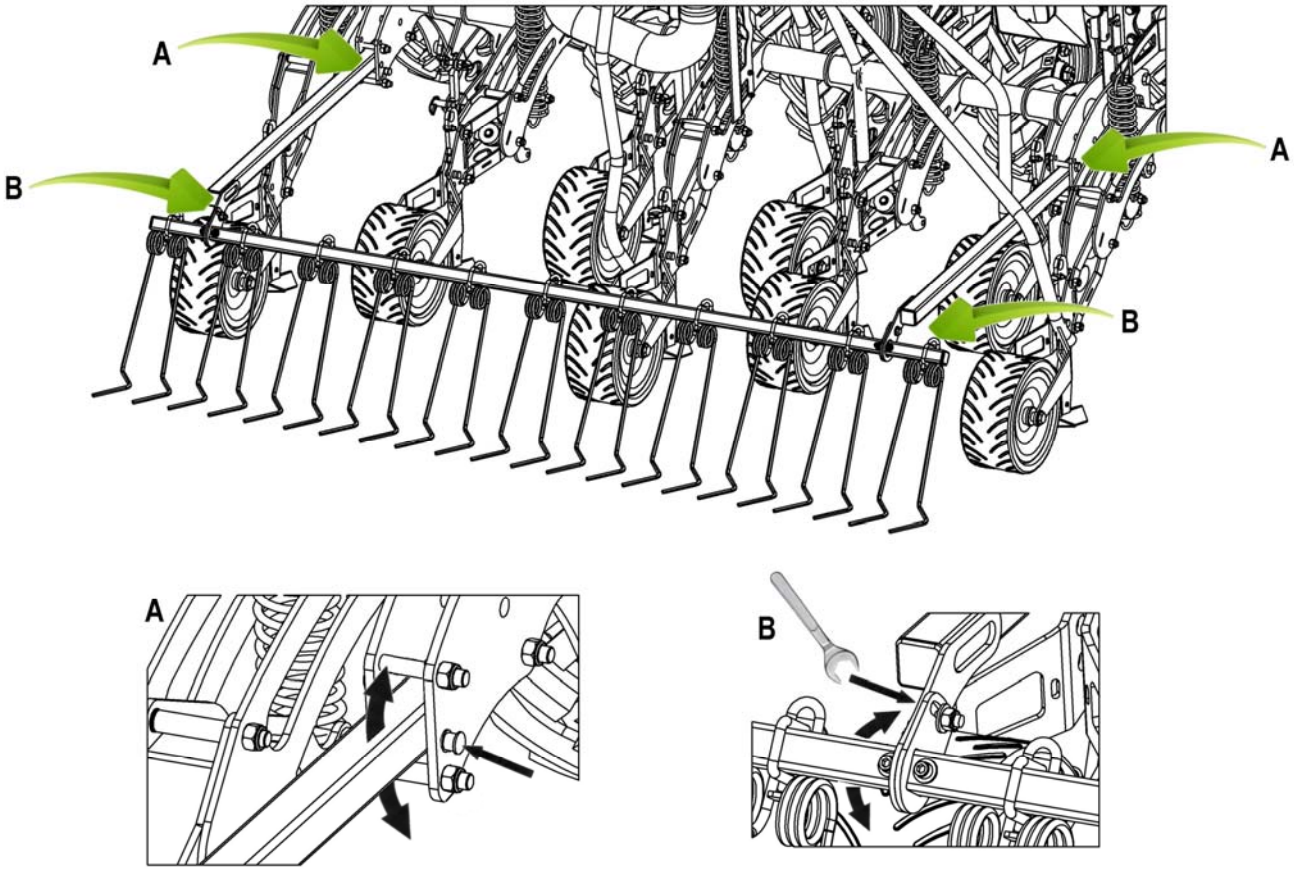
The bout marker tine supports can be attached to the arms at any one of the three mounting positions located on the outer arms; this not only allows the working depth of bout tines to be adjusted to increase or decrease the depth of the marker line created, but also allows the tines to be lowered as they begin to suffer wear.



The height adjustment between each of the three positions is 30mm; this provides a total available adjustment of 60mm.

REAR HARROW

The rear harrow features two types of adjustments as shown in the illustrations below;



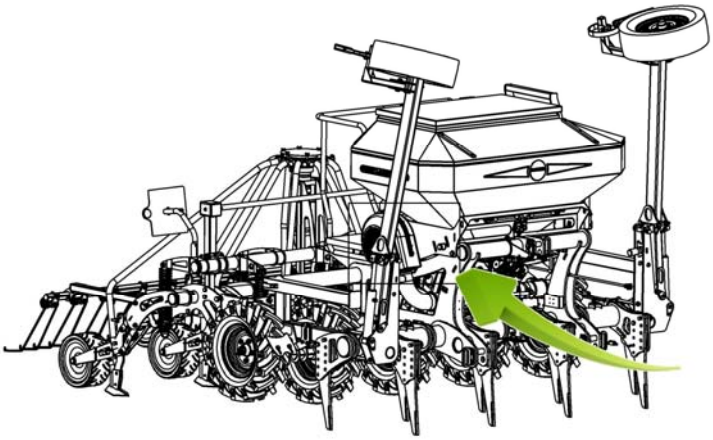
A) ‘In Work’ *(lower position)* or ‘Out of Work’ *(raised position)*

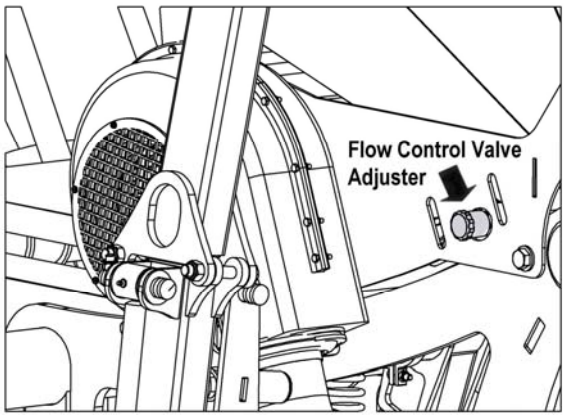
B) Adjustable angle setting

Fan Speed
When operating the machine the fan speed will be displayed on the main screen of the control unit; fan speed for machine operation is up to 4400RPM.

Fan Speed Control
A flow valve is fitted to the machine for adjusting the fan speed when the machine is used with a tractor that does not feature a flow control facility.
Where a tractor has its own flow control facility the machines flow control adjustment will only need to be used to 'fine tune' the fan speed as the operator will be able to control the fan speed direct from the operating position in the tractor cab.

CAUTION!
For the protection of motor seals it is vital that the tractor is fitted with a Free Flow Return.



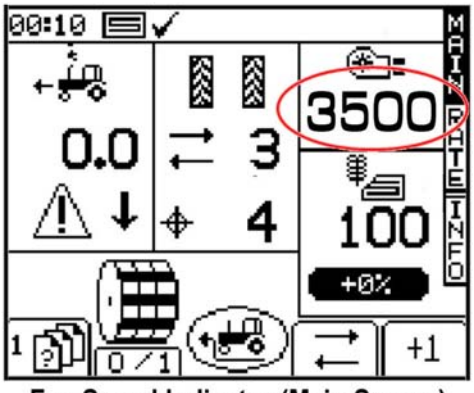


Setting Fan Speed – *Tractors <u>without</u> a Flow Control Facility*
Setting of the fan speed is via the flow control valve adjuster located on the right hand side of the machine.

Anti-Clockwise increases fan speed.
Clockwise decreases fan speed.

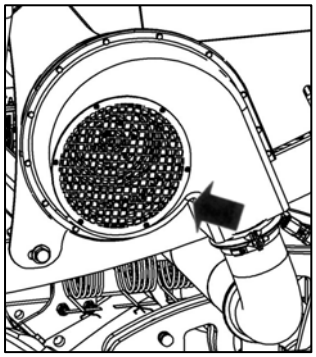
Flow Control Valve Adjuster

Setting Fan Speed – *Tractors <u>with</u> a Flow Control Facility*
Setting of the fan speed is via the tractors flow control facility.
Set the machines flow control valve to maximum flow and the tractors flow control to minimum; use tractors control to adjust the speed and 'fine tune' using the machines control should it be required.



Fan Speed Indicator (Main Screen)

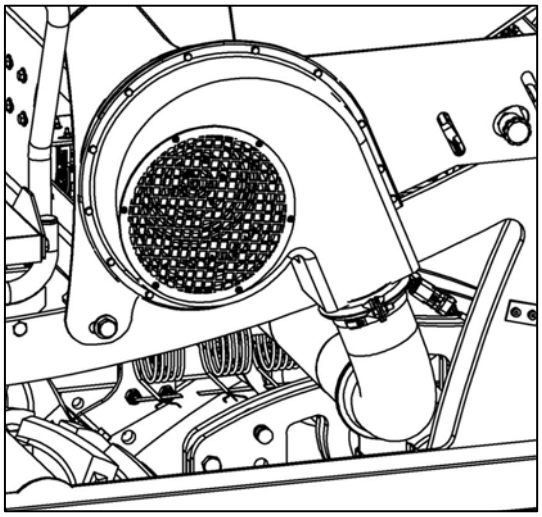
Fan Deflector Vane
The fan features an adjustable deflector vane; the latch for setting the deflector position is located on the inner face of the fan cowling. The deflector latch must be set in line with the airflow at all times.



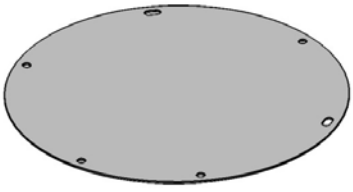
System Overview

The seed distribution system delivers the seed from the storage hopper via a metering unit to the coulters. The main components of the system consist of a hydraulically driven fan located adjacent to the hopper and a distribution unit mounted above the coulters.

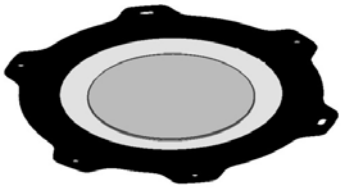
The 'measured' seed is blown by the fan from the metering unit through a large bore hose to the distribution unit which then distributes the seed direct to the individual coulters via a series of smaller bore hoses.



Hydraulically Driven Fan

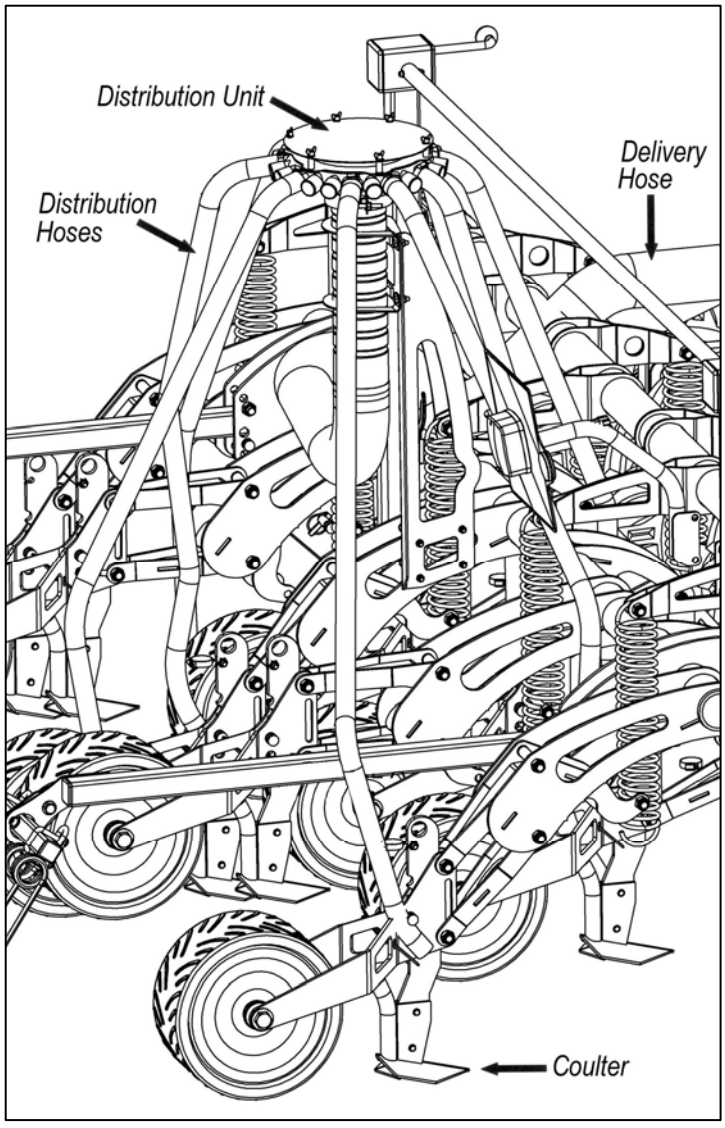


Plain Cover



Vented Cover

Distribution Unit Covers



Seed Distribution System

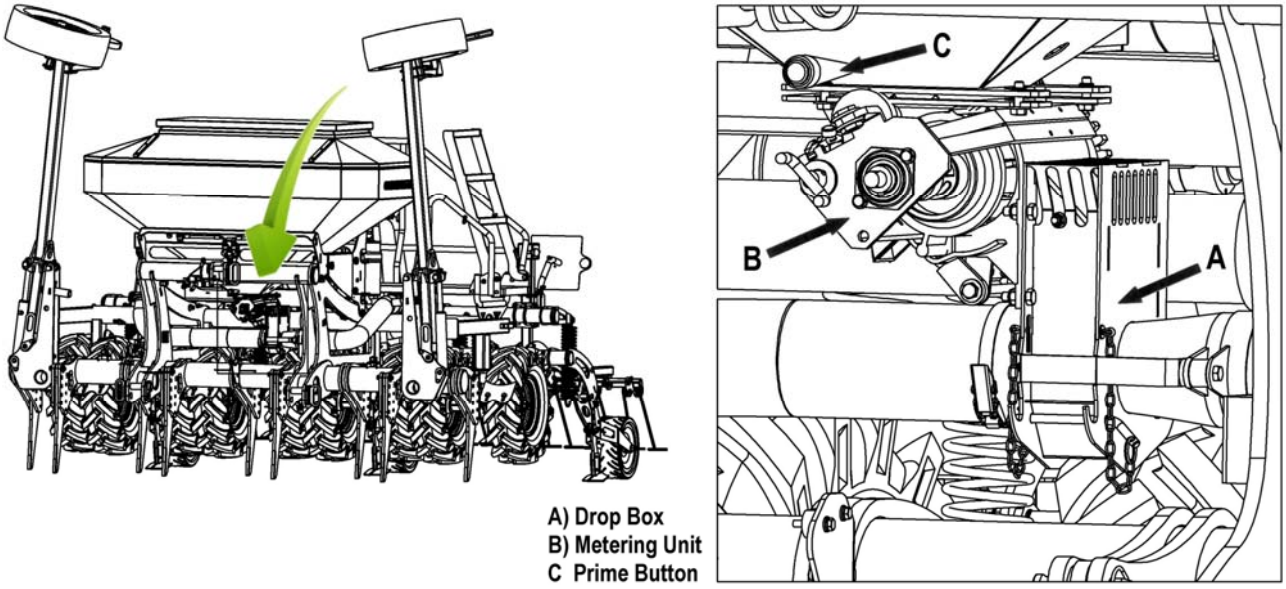
Distribution Unit

The distribution unit is supplied with 2 different types of top covers for use in different applications.

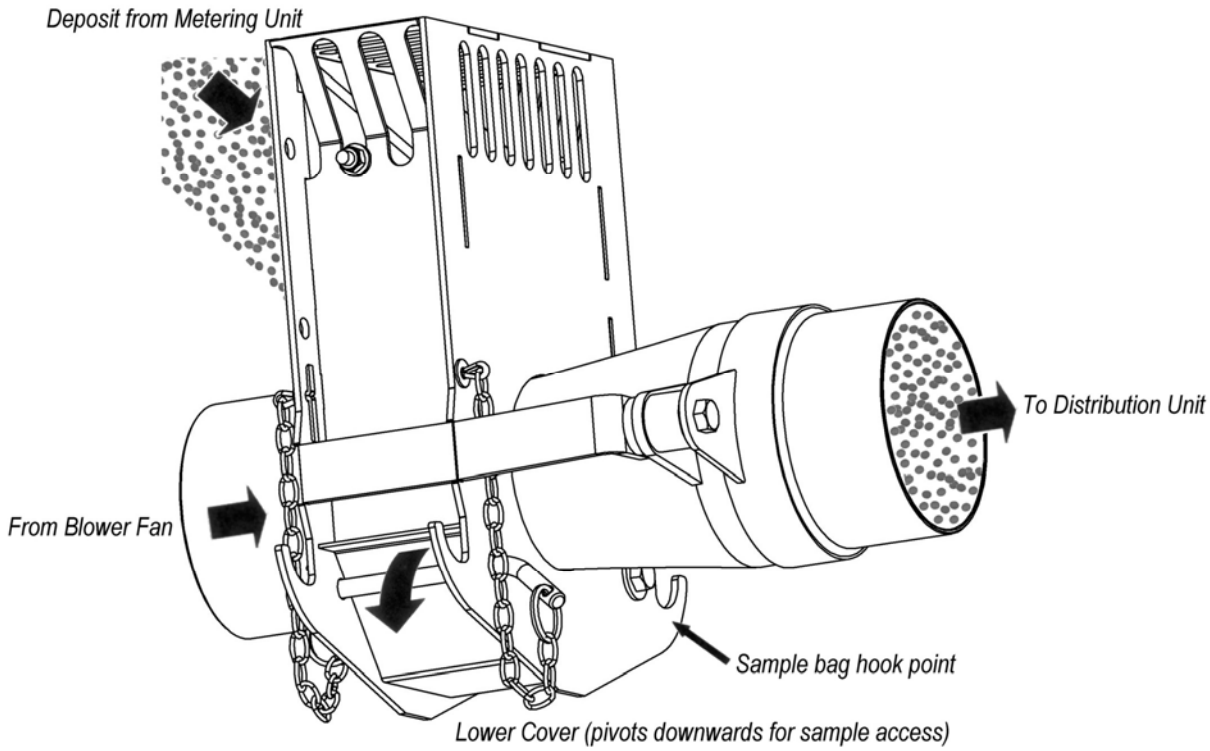
Plain Cover: *For use with smaller seeds such as grass or oil seed rape.*
Vented Cover: *For use with larger seeds such as cereals, peas beans etc.*

The covers, which are fixed in place with wing nuts, can be quickly and easily changed for the required task.

In wet weather conditions the plain cover is designed to be mounted above the vented cover using spacers supplied; this will allow it to act as rain cover preventing moisture from entering the seed delivery system. It is recommended that just the plain cover is fitted on the machine for extended parking periods and storage to again prevent the entry of water.



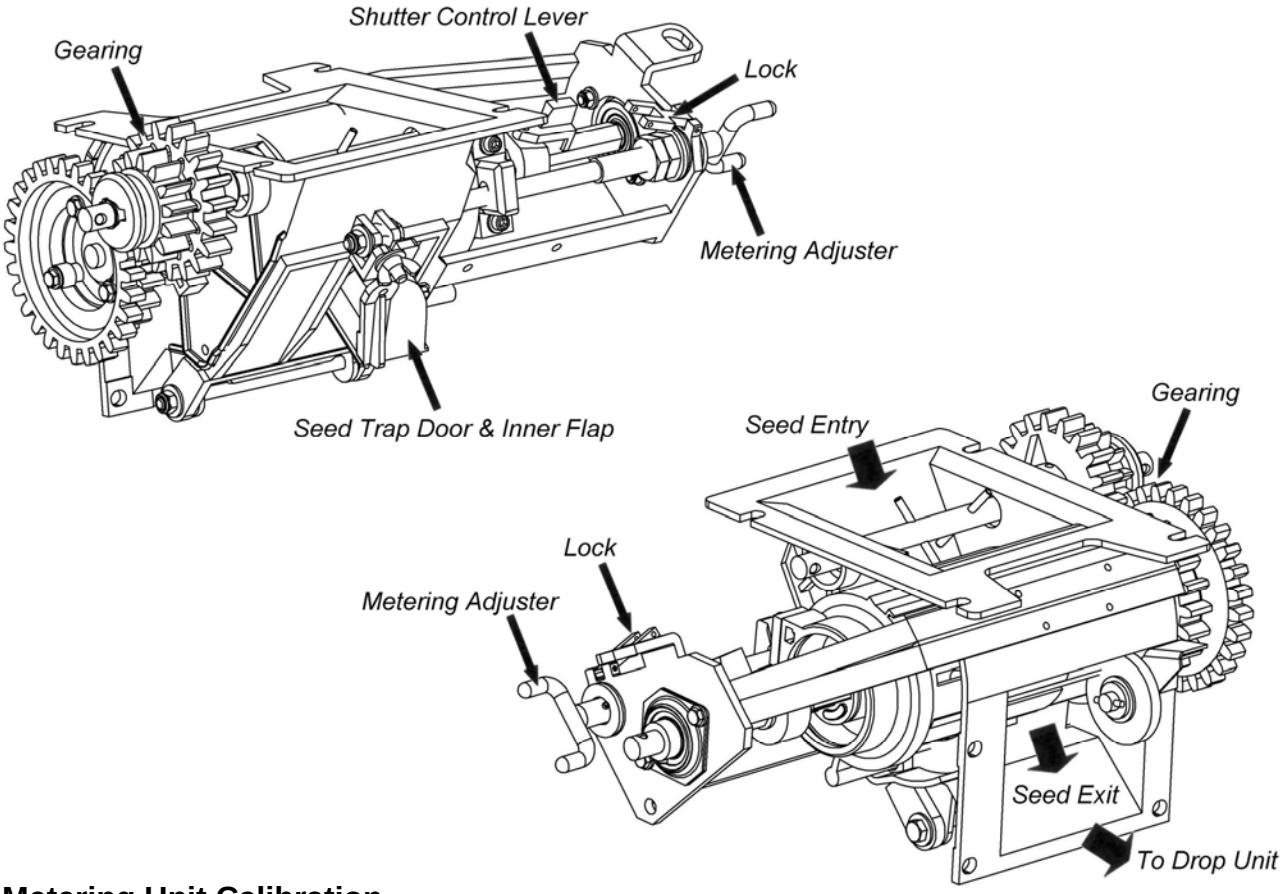
The drop box is attached to the exit side of the metering unit where it receives the deposits of measured seed and guides it directly into the air stream created by the blower unit; the air stream carries the seed onwards to the distribution unit that subsequently feeds the individual coulters.



Seed Sample Access

The base of the drop box features a pivoting lower cover and four hook points on the corners to allow access for taking a seed sample. Removal of the locking pin permits the lower cover to be pivoted downwards so that the sample bag (supplied with the machine) can be suspended below the drop box to receive a weighing sample of seeds for use when calibrating the machine.

Metering Unit Components



Metering Unit Calibration

Prior to operation a metered sample of the seed being used must be taken from the drop unit to check that the machine is measuring out the correct amount of seed for the desired seed rate; the sample taken must be weighed and the figures entered into the control unit. The control unit will calculate the volume of seed that passes through the metering unit on each revolution and adjust for differentials between the expected rate and the actual rate based on the weight of the sample provided.

Calibration Procedure

The following information describes the procedure for calibrating the Metering Unit;

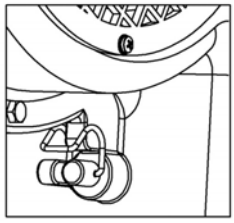
1. Turn the metering adjuster to close the shutter; if the metering unit is empty this will be the '0' position on the gauge.
   Note: If seeds are already present in the unit the shutter may meet resistance before reaching the fully closed position - in this event, stop at that position as forcing the shutter against the obstruction will risk damaging the metering unit components.

2. Turn the shutter control lever to the correct position for the size of the seed to be sown.

   Small seed types *(lever latched on shaft)*
   Permits shutter opening from 0-25 and reduces flute size to 50%

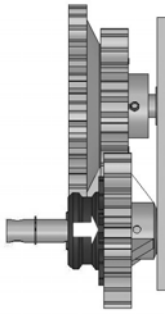
   Large seed types *(lever clear of shaft)*
   Permits shutter opening from 0-110 at maximum flute size

3. Set fan deflector to correct position; latch must be positioned in-line with the air flow, *see opposite* ►



4. Check that correct gear is selected; fine or normal seed.
   High gear is with the red cog in the closed position; located inside the larger cog on the same driveshaft – *see opposite* ►

   NOTE: Low gear (red cog in open position) is usually required for fine seed planting.



5. Set the metering unit shutter position.
   Refer to 'Calibration Guide Chart' shown below to obtain a guide shutter position.
   Rotate the metering adjuster to set the shutter to the recommended position for the specific seed type using the shutter position indicator located on the metering unit.

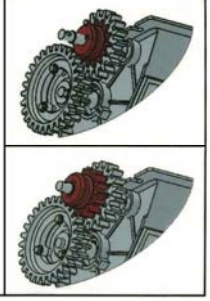
CALIBRATION GUIDE CHART

SEED	WHEAT	RYE	BARLEY	OATS		BEANS	PEAS	VETCHES	MAIZE	GRASS	McCONNEL	RAPE	LUCERNE	GRASS	RADISH
Kg/l	0.77	0.74	0.68	0.50		0.85	0.81	0.83	0.79	0.36					
SETTING 'A'	NORMAL SEED Kg/ha										SETTING 'Z' FINE SEED Kg/ha				
10	17	25	15	22		23	12	20	7			2.5	**1.8**	**2.3**		2.5
15	38	43	32	37		42	27	38	**22**	**18**		5	**4.6**	**5.3**		**5.0**
20	56	58	47	51		61	55	56	**43**	**26**		7.5	6.8	**8.6**	**2.8**	**7.5**
25	74	75	61	66		79	**74**	**75**	61	**34**		10	9.1	12.0	**5.2**	**10.0**
30	90	**91**	77	**80**		**98**	**93**	**91**	81	42		12.5	11.4	15.3	**7.2**	12.5
35	106	**108**	87	**95**		**116**	**109**	**109**	98	50		15	13.7	18.0	9.2	15.0
40	**121**	**124**	99	**108**		**135**	**127**	**127**	113			17.5	15.9	21.3	11.2	17.5
45	**138**	**141**	**113**	**123**		**154**	**145**	**142**	131			20	18.2	24.0	13.2	20.0
50	**153**	**156**	**126**	**137**		172	**160**	**159**	149			22.5	20.5	26.6	15.0	21.5
55	**170**	**170**	**141**	**149**		191	**179**	175	165			25	22.8	27.5	16.2	23.0
60	**186**	**187**	**154**	**164**		209	198	194	181							
65	**202**	203	**167**	**177**		228	215	209	200							
70	**218**	218	**181**	191		246	233	226	216							
75	235	234	**194**	208		265	251	243	233							
80	252	251	207	220		283	269	257	250							
85	267	266	221	233		302	286	275	268							
90	284	283	234	247		320	304	292	284							
95	300	298	249	261		338	323	309	301							
100	317	310	262	272		356	342	327	317							
105	334	328	276	287		374	358	343	335							
110	351	343	290	300		393	376	359	352							

SCALE

SETTING 'A' NORMAL SEED

SETTING 'Z' FINE SEED



A copy of this chart is also located on the hopper under panel.

6. Secure the metering adjuster in the chosen position with its lock.

7. Open cover on base of drop unit and attach the sample bag supplied over the 4 hooks.

8. Press and hold the Prime Button for approximately 5 seconds to allow the metering unit flutes to fill up with new seed from the hopper *(and remaining remnants from previous work to fall into the bag).* If the work is a seed type change, dispose of the seeds caught in the bag - *same type seed can be returned to the hopper and re-used.*

9. Re-attach the sample bag then press and hold the prime button until a suitable sample quantity is captured in the bag.

10. Carefully remove the bag then close and secure the lower cover of the drop box.

11. Weigh the seed remembering to deduct the weight of the bag ensuring an accurate figure is obtained.

12. Enter the sample weight data into the operator control panel of the machine.

Refer to 'Artemis Lite' Operation Manual *(Publication 741)* for details of controls operation.

WARNING! Operators of the machine must read this manual in association with the specific operation manual for the control system before attempting to use the machine. All users must be capable of operating this type of equipment both safely and correctly.

WARNING! Ensure onlookers and bystanders are kept at a safe distance from the working machine at all times, stop operation and switch off the machine if persons enter the work area. Do not restart operations until it is safe to do so.

CAUTION! For initial work with a new machine it is recommended that nuts and bolts are checked for tightness after the first 2 hours of use; re-tighten as and when required. Future checks should be made on a regular basis and always prior to using the machine.

Pre-Operation

With the Seedaerator located at the work site and the seed system correctly prepared and calibrated as previously outlined, the machine must be longitudinally levelled to ensure that both rows of leading legs and both rows of seed coulters (respectively) are levelled for accurate and uniform cultivation and planting; *refer to the machine levelling section for details of this procedure.*

Seeding Depth & Ground Tools Setting

Set the ground working tools to suit the requirement of the job; this will include leading leg depth, seed coulter depth, press wheel pressure, bout marker depth and settings for the rear harrow if required. *Information regarding these components is detailed in this manual.*

NOTE: When first starting operation a sample strip should be sown and inspected to check that the desired depth and finish is achieved, at this point further adjustments can be made if needed.

Work Operation

Refer to the control system manual for details of operating the cab unit control box - the procedure for machine work in association with that information is as follows;

- Line the unit up at the start of the work area and check airflow at all coulters.
- Lower the bout marker arm on the side of the machine adjacent to the next bout.
- Start forward movement of the tractor and then lower the machine into the ground; *the metering unit will automatically start to feed the seed when the machine is lowered.*
- Continue forward movement at suitable work speed 6mph (10km/h) maximum.
- At the end of the bout raise the machine out of the ground before attempting to turn; *the metering unit will automatically stop when the machine is raised.*
- With the machine raised clear of the ground, turn the unit at the headland and switch the bout marker for the opposing one ready for the return bout.

  CAUTION! Never attempt to turn the machine when it is in the ground; failure to observe this can result in damage to machine and/or tractor components

  Continue work repeating the procedure above.

NOTE; A slight delay exists from the metering unit feeding seed to its arrival at the coulters; this can result in a small area of un-seeded ground at the beginning of a bout. In order to combat the delay a 'pre-start function' is built in to the controls – *refer to the controls operation manual for details.*

NOTE; should forward movement be halted on an uphill incline take care to avoid the unit from 'dropping back'; this can cause a soil blockage in the coulter's seed exit channel.

MAINTENANCE

WARNING! Suitable safety clothing including safety glasses, gloves and masks should be worn when cleaning or servicing the machine and all tasks should be performed in a safe well ventilated area.

WARNING! Ensure stand legs are fitted in their support position and wheels are chocked when servicing or maintaining the machine.

CAUTION!
Where use of pressure washer is employed avoid using them on areas of paintwork or near electrical components and connections.

Machine Maintenance
Maintenance of the machine is basically restricted to cleaning and regular lubrication.

Cleaning
Clean the machine on a regular basis to remove dirt, dust and remnants of seed.

Lubrication
The machine is fitted with greasing decals that indicate the location of grease points; these points should be greased at the frequency stated on the decal.

Metering Unit – Daily Cleaning
External cleaning of the metering unit should be carried out on a daily basis at the end of each working day to remove dirt and dust build ups.

Metering Unit – Cleaning For Seed Changes
The metering unit should always be emptied and cleaned out prior to a change of seed. Whilst empty, the unit should be cleaned internally and externally using a pressure washer and dried thoroughly using a compressed air line; ensure it is completely dry before use.

STORAGE

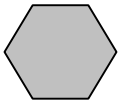
Storage of the machine should on a firm safe site where it is protected from the elements.
The machine should be cleaned and fully lubricated prior to storage.
Extra thorough cleaning of all components should be performed prior to machine storage as it is important that all remnants of seed are removed from the machine so that they do not attract rodents and vermin.
Park the machine in a safe condition with the stand legs in the support position and the wheels chocked. Protect front tines by parking them on wooden blocks or planks. Electrical connection wires should be neatly coiled and stored on the machine clear of the ground.

TORQUE SETTINGS FOR FASTENERS

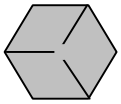
The Chart below lists the correct tightening torque for fasteners. The Chart should be referred to when tightening or replacing bolts in order to determine the grade of bolt and the correct torque unless specific torque values are assigned in the text of the manual.

Recommended torque is quoted in Foot-Pounds and Newton-Metres within this manual. The equation for conversion is 1 Nm. = 0.7376 ft.lbs.

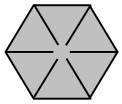
TORQUE VALUES FOR IMPERIAL BOLTS



Head Marking
No Marks
Grade Two



Head Marking
Three Lines
Grade Five



Head Marking
Six Lines
Grade Eight

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.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.
1/4"	*5.5*	*7.5*	*9*	*12.2*	*12.5*	*17.0*
5/16"	*11*	*15.0*	*18*	*25.0*	*26*	*35.2*
3/8"	*20*	*27.0*	*33*	*45.0*	*46*	*63.0*
7/16"	*32*	*43.0*	*52*	*70.0*	*75*	*100.0*
1/2"	*50*	*68.0*	*80*	*110.0*	*115*	*155.0*
9/16"	*70*	*95.0*	*115*	*155.0*	*160*	*220.0*
5/8"	*100*	*135.0*	*160*	*220.0*	*225*	*305.0*
3/4"	*175*	*240.0*	*280*	*380.0*	*400*	*540.0*
7/8"	*175*	*240.0*	*450*	*610.0*	*650*	*880.0*
1"	*270*	*360.0*	*675*	*915.0*	*975*	*1325.0*
1-1/8"	*375*	*510.0*	*850*	*115.0*	*1350*	*1830.0*
1-1/4"	*530*	*720.0*	*1200*	*1626.0*	*1950*	*2650.0*
1-3/8"	*700*	*950.0*	*1550*	*2100.0*	*2550*	*3460.0*
1-1/2"	*930*	*1250.0*	*2100*	*2850.0*	3350	4550.0

TORQUE VALUES FOR METRIC BOLTS.

Head Marking
4.8

Head Marking
8.8

Head Marking
10.9

Head Marking
12.9

Bolt Dia.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.	Value (Dry) ft.lb.	Nm.
6mm	*4.5*	*6.1*	*8.5*	*11.5*	*12*	*16.3*	*14.5*	*20.0*
8mm	*11*	*14.9*	*20*	*27.1*	*30*	*40.1*	*35*	*47.5*
10mm	*21*	*28.5*	*40*	*54.2*	*60*	*81.4*	*70*	*95.0*
12mm	*37*	*50.2*	*70*	*95.0*	*105*	*140.0*	*120*	*160.0*
14mm	*60*	*81.4*	*110*	*150.0*	*165*	*225.0*	*190*	*260.0*
16mm	*92*	*125.0*	*175*	*240.0*	*255*	*350.0*	*300*	*400.0*
18mm	*125*	*170.0*	*250*	*340.0*	*350*	*475.0*	*410*	*550.0*
20mm	*180*	*245.0*	*350*	*475.0*	*500*	*675.0*	*580*	*790.0*
22mm	*250*	*340.0*	*475*	*645.0*	*675*	*915.0*	*800*	*1090.0*
24mm	*310*	*420.0*	*600*	*810.0*	*850*	*1150.0*	*1000*	*1350.0*
27mm	*450*	*610.0*	*875*	*1180.0*	*1250*	*1700.0*	*1500*	*2000.0*
30mm	*625*	*850.0*	*1200*	*1626.0*	*1700*	*2300.0*	*2000*	*2700.0*

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