

TWOSE SUBSOILER

Models: SS250 / SS300
Arable & Grassland Builds

Operator Manual

Publication 717 (Rev. 19.06.13)

Part No. 22675.17

IMPORTANT VERIFICATION OF WARRANTY REGISTRATION



DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with Twose of Tiverton 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 Twose web site at www.twose.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 Twose Office on 01884 253691.

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 Twose of Tiverton 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.

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 Twose of Tiverton 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 machines supplied by Twose of Tiverton 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.*
- 1.02. *All spare parts supplied by Twose of Tiverton 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 Twose of Tiverton 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 Twose of Tiverton Ltd's serial number plate has been removed or altered.*
- 1.05. *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.*
- 1.06. *Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.*
- 1.07. *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.*
- 1.08. *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 Twose of Tiverton Ltd cannot be held liable, and may have safety implications.*
- 1.09. *If in exceptional circumstances a non Twose of Tiverton Ltd part is used to effect a repair, warranty reimbursement will be at no more than Twose of Tiverton Ltd's standard dealer cost for the genuine part.*
- 1.10. *Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of Twose of Tiverton Ltd.*
- 1.11. *For machine warranty periods in excess of 12 months the following additional exclusions shall apply:*
 - 1.11.1. *Hoses, exposed pipes and hydraulic tank breathers.*
 - 1.11.2. *Filters.*
 - 1.11.3. *Rubber mountings.*
 - 1.11.4. *External electric wiring.*
 - 1.11.5. *Bearings and seals.*

- 1.12. 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.
- 1.13. 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. Twose of Tiverton 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 Twose of Tiverton Ltd 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 Twose of Tiverton 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 Twose of Tiverton 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 Twose of Tiverton 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 Twose of Tiverton Ltd Service Dealer, within 30 days of the date of repair.
- 2.05. Following examination of the claim and parts, Twose of Tiverton Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by Twose of Tiverton 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 Twose of Tiverton Ltd is final.

3. LIMITATION OF LIABILITY

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



DECLARATION OF CONFORMITY

Conforming to EU Machinery Directive 2006/42/EC

We,

TWOSE of TIVERTON LIMITED,
6 Chinon Court, Lower Moor Way,
Tiverton Business Park, Tiverton, Devon, EX16 6SS, UK

Hereby declare that:

The Product; *Tractor Mounted Cultivator*

Product Code; *TWSS*

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 953 (1997) + A1 (2009) 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.

Signed  *Responsible Person*
CHRISTIAN DAVIES on behalf of TWOSE OF TIVERTON LIMITED

Status: *General Manager*

Date: *September 2015*

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GENERAL INFORMATION

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

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

DEFINITIONS - The following definitions apply throughout this manual:

WARNING:

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

CAUTION:

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

NOTE:

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

LEFT AND RIGHT HAND:

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

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

MACHINE & DEALER INFORMATION

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

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

SPECIFICATIONS

Two-Point Subsoiler

- 3-Point Linkage Mounted
- Available in working widths of 2.5m & 3.0m
- Choice of 2, 3 or 5 legs
- Adjustable leg spacing
- Choice of shear bolt or hydraulic auto trip leg protection
- Replaceable, shanks, shins and points.
- Linkage kit provision on models 2.5m upwards
- Optional Grassland configuration
- Optional Grassland or Arable Packer Rollers

INTRODUCTION

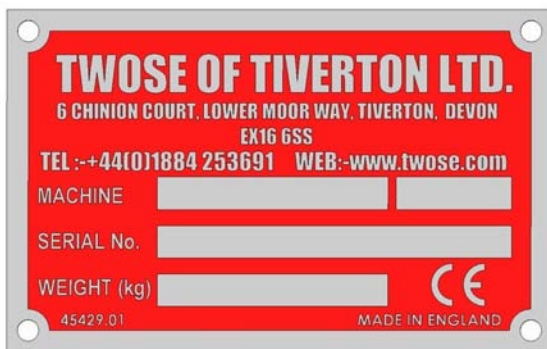
TwoSe Subsoilers are 3-point linkage mounted multi-purpose cultivators available in working widths of 2.5m or 3.0m. Machines are designed to shatter compacted soil with minimum surface disturbance to encourage growth by improving drainage and soil aeration in the plant root area.

For the protection of the machine and components all models feature leg 'breakback' systems with the option of either shear bolt protection or an auto-resetting hydraulic system.

Optional rollers are available for the machines with a choice of either a plain grassland roller or a toothed arable packer roller.

Machine Identification

Each machine is fitted with an identification plate with 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.

Horsepower Requirements

Model	Frame Size	No. of Legs	Power Req. (Min.)
SS250A2S	2.5m	2	90HP
SS250A2H	2.5m	2	90HP
SS250G2S	2.5m	2	90HP
SS250G2H	2.5m	2	90HP
SS250A3S	2.5m	3	120HP
SS250A3H	2.5m	3	120HP
SS250G3S	2.5m	3	120HP
SS250G3H	2.5m	3	120HP
SS300A5S	3.0m	5	180HP
SS300A5H	3.0m	5	180HP
SS300G5S	3.0m	5	180HP
SS300G5H	3.0m	5	180HP



This machine has the potential to be extremely dangerous - in the wrong hands it can kill or maim; 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 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.

FITTING REQUIREMENTS

Tractor Selection

It is impossible to give any hard and fast figures on horsepower requirements for use of these machines as soil types and particular ground conditions can vary enormously; as a general guide refer to the 'horsepower requirements' chart in the introduction section of this manual.

Front End Weight

It may be found to be 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 that any tendency of the tractor to rise on the front end will produce a corresponding lowering of hitch points and in doing so, the angle of penetration of the shanks is further increased.

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 inbuilt features on the machine to offer protection against the failure of unmatched, repaired, badly worn, and weak or below category tractor linkages.

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 forwards.

Under no circumstances should tractors operate in tandem 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

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 traveling on the highway. In field operations stabilizer bars that hold the implement rigid should not be used.

Draft Control

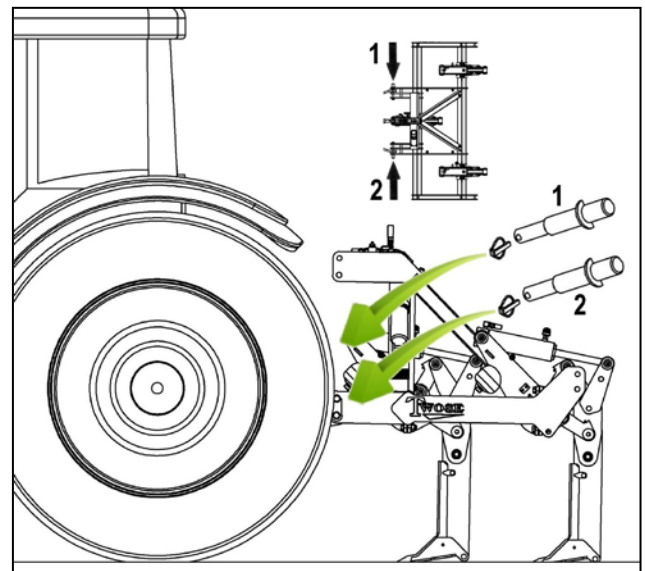
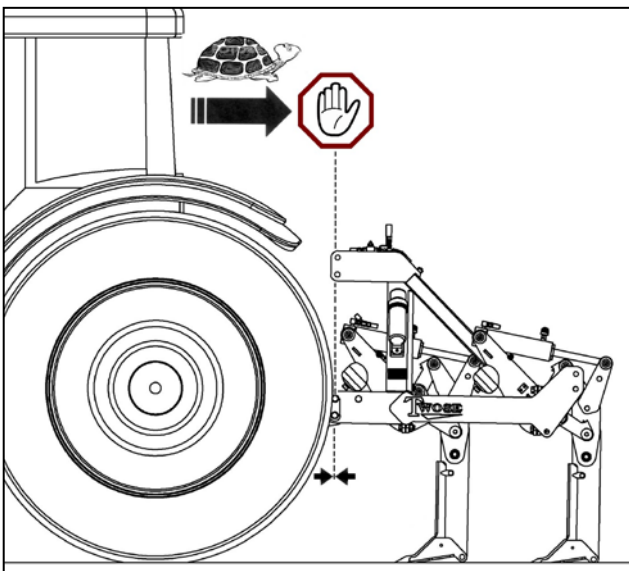
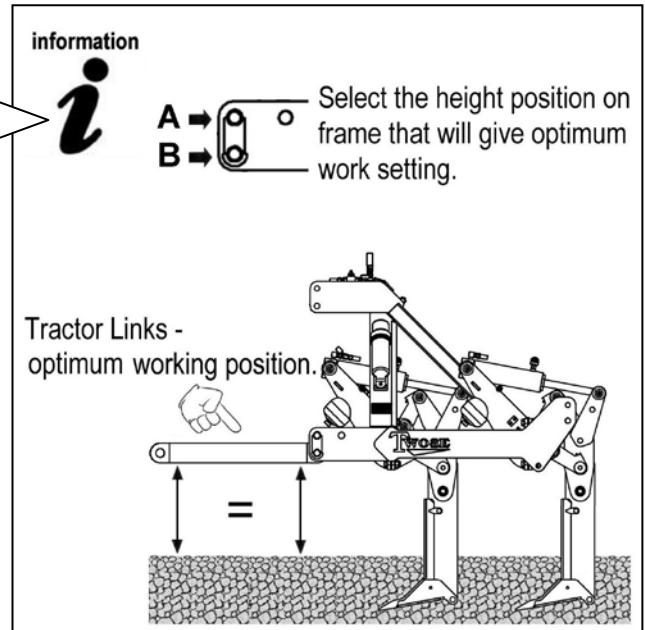
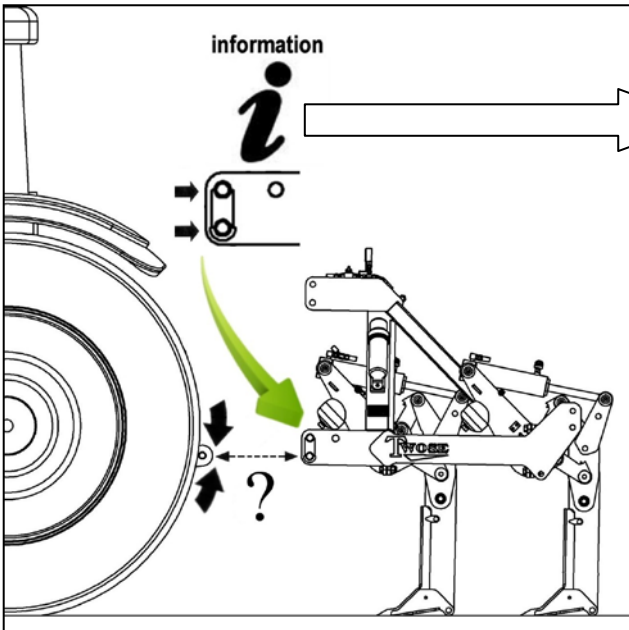
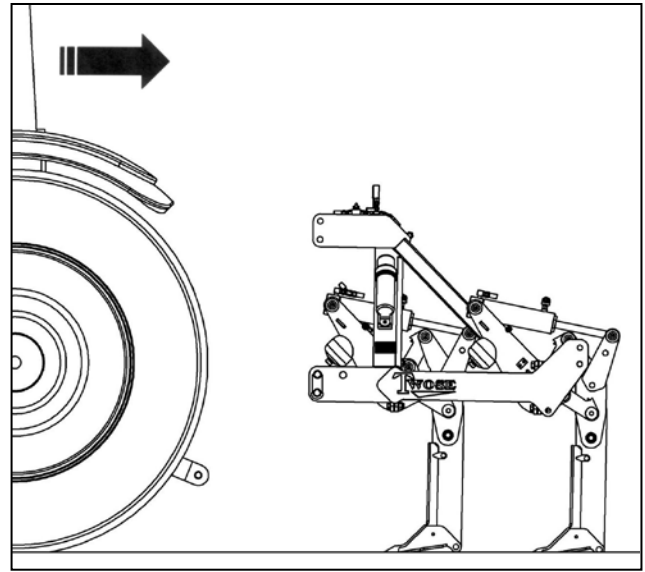
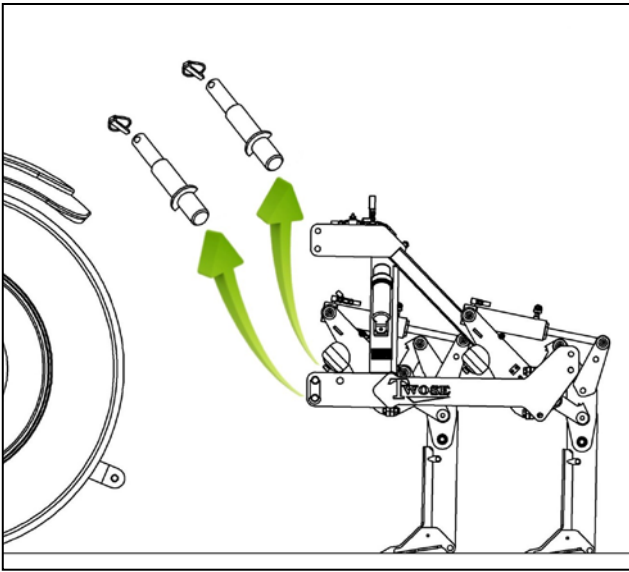
Use of draft control is beneficial to traction in reducing wheel slip thereby also reducing tyre wear and saving fuel. *Refer to individual tractors instruction book for detailed guidance on the best location for top link fitting.*

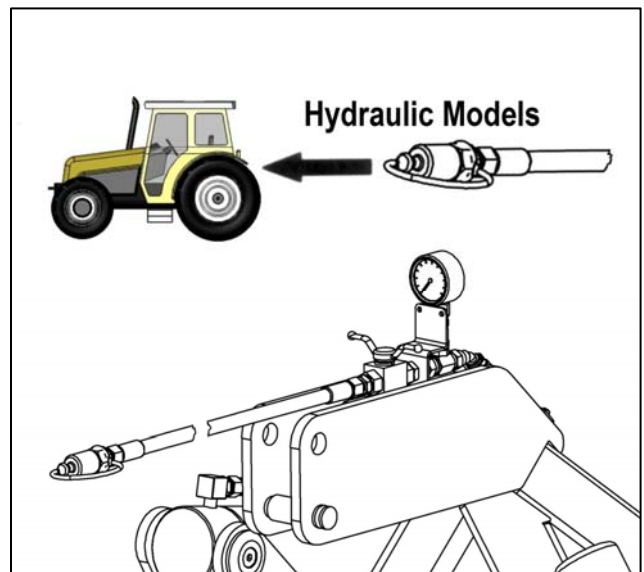
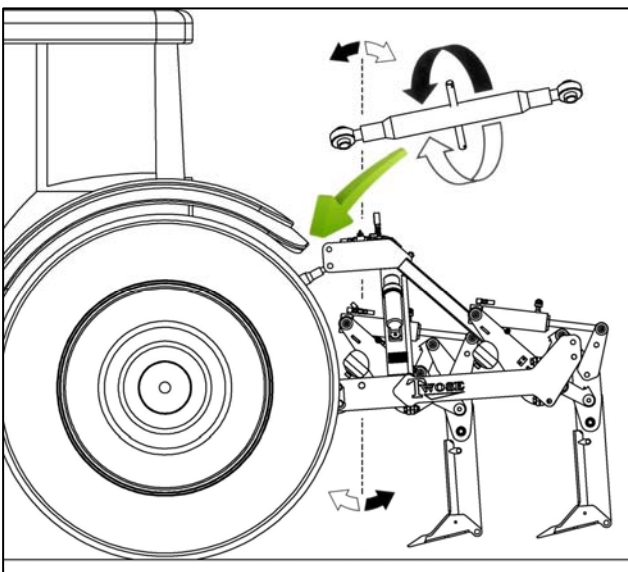
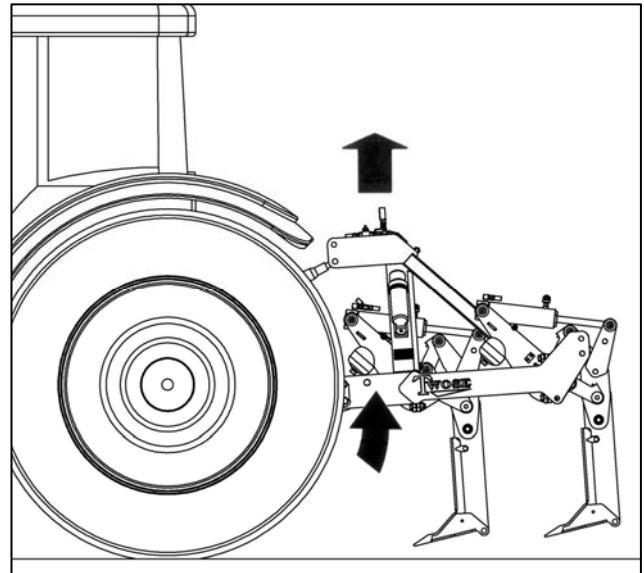
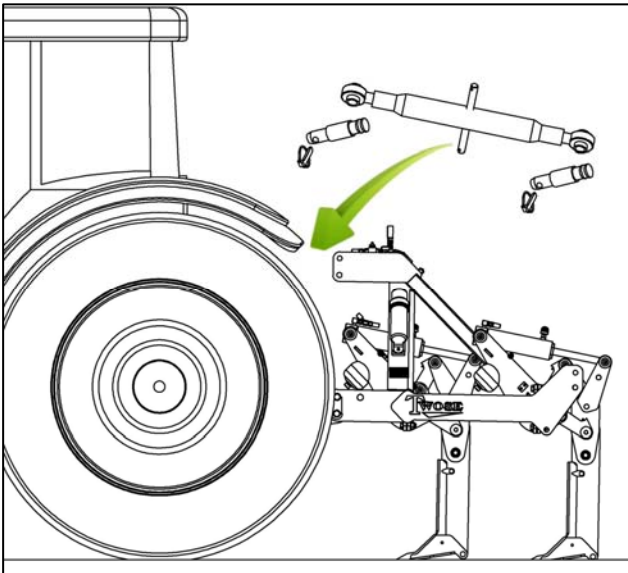
For mounting the cultivator on linkage behind crawler tractors, the draft links should be allowed to 'float' - *provision for this is usually made in the hydraulic control valve.*

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

MACHINE ATTACHMENT

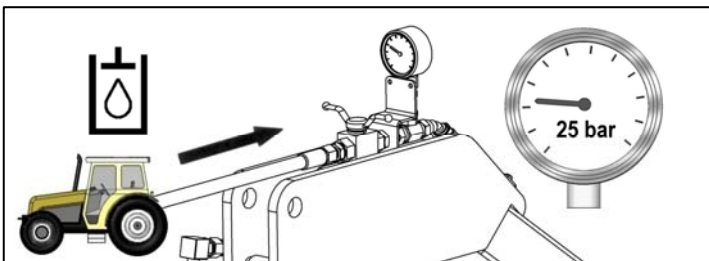
Attachment and subsequent removal of the machine should always be performed on a firm level site. Keep bystanders at a safe distance from the tractor and the machine at all times.



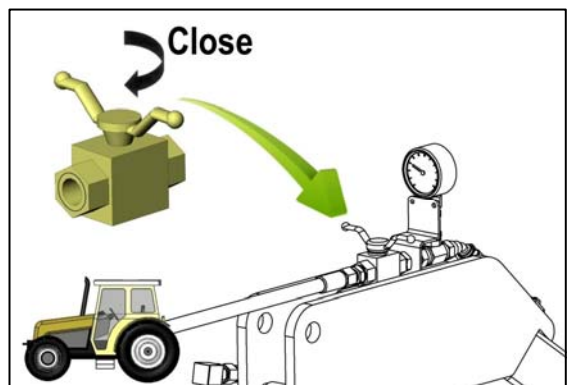
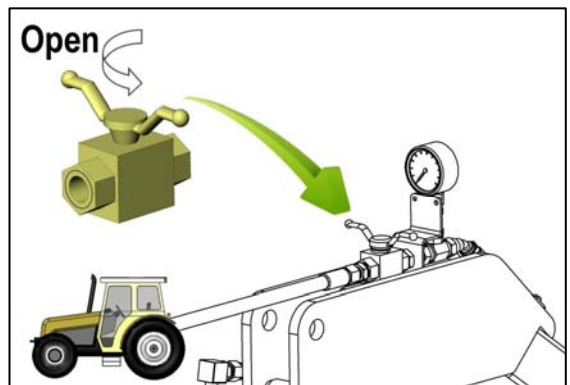


Pressure Setting - Hydraulic Models

- Connect machine hose to tractor.
- Open valve tap on machine.
- Operate tractor control to add oil to the machines system until the gauge reaches approximately 25 bar (**Maximum 50 bar**).

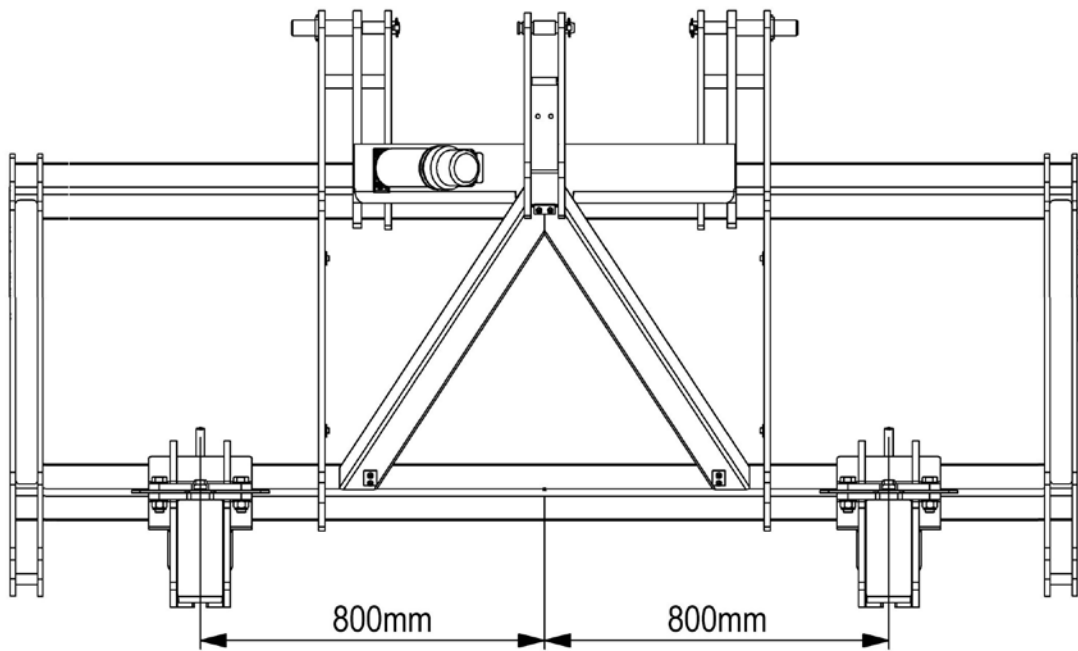


- Close valve tap on machine.
- Disconnect machine hose from tractor.
- Operate machine slowly and with care to ascertain that pressure is set correctly for the legs to breakback at the required resistance.
- Repeat above in 5 bar increments to add or remove oil if the resistance level is incorrect.

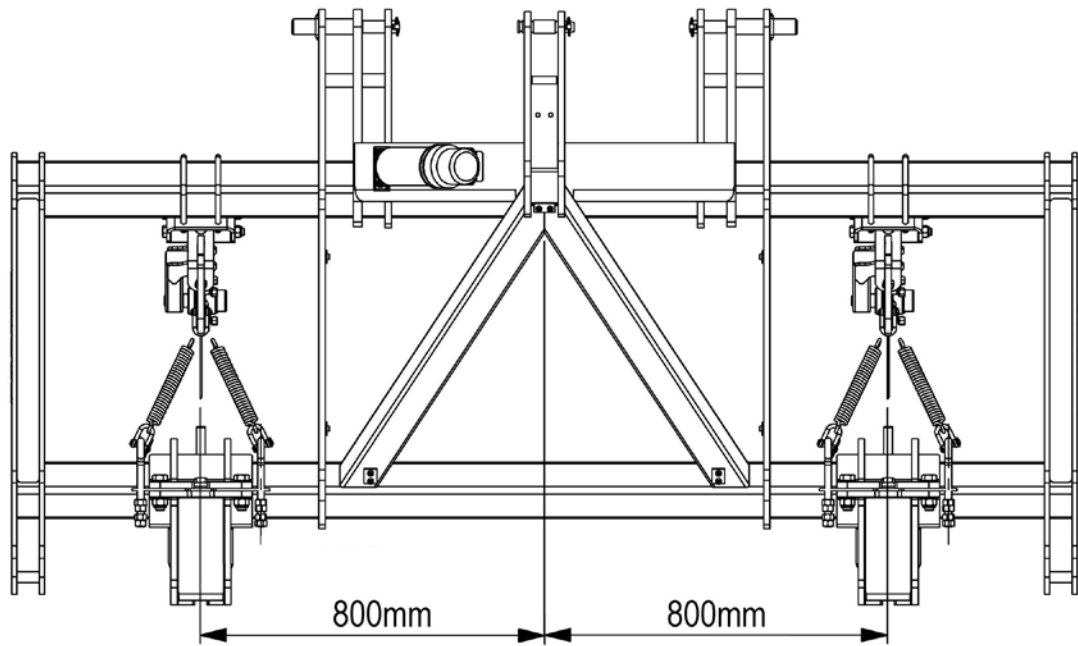


LEG POSITIONS

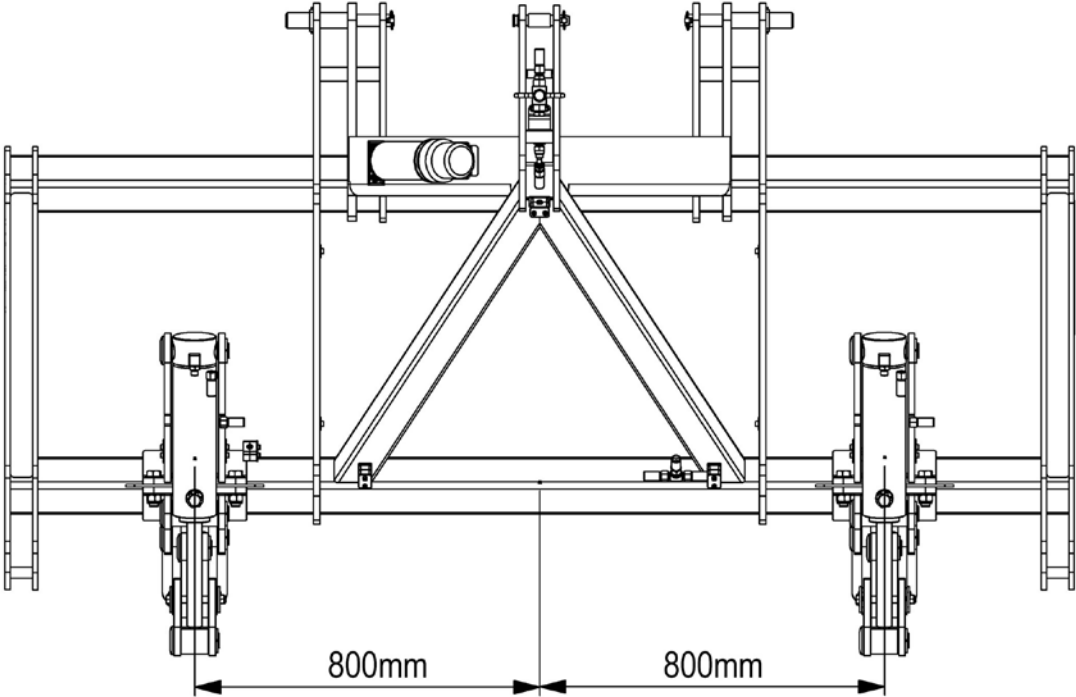
2.5m Model – 2 Leg (Shear Bolt) Arable Build



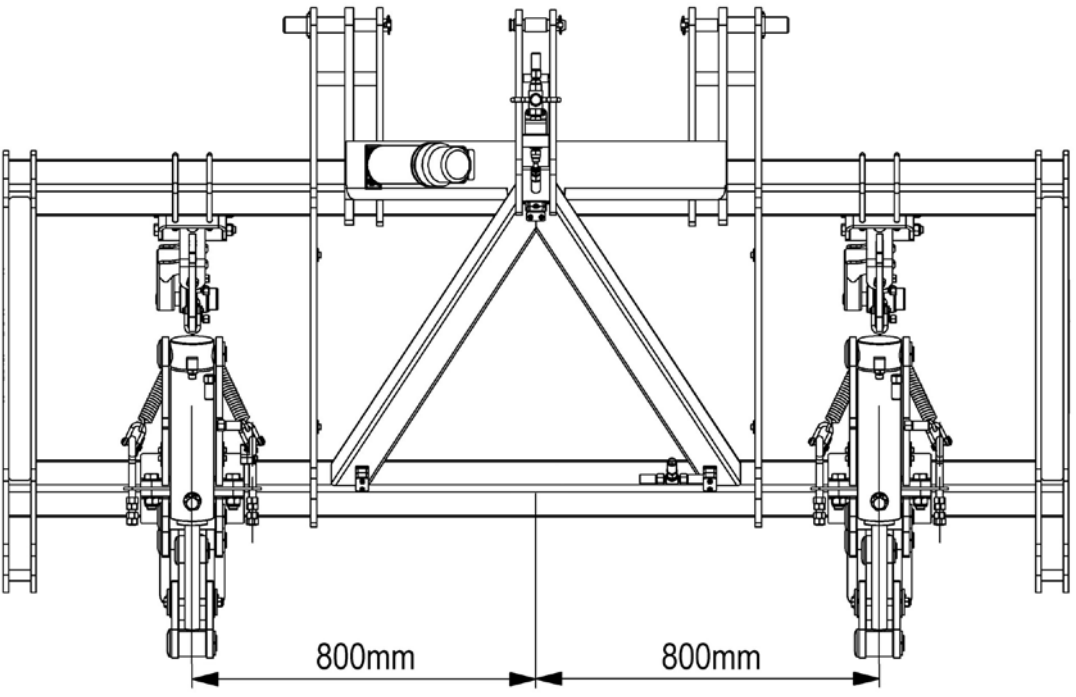
2.5m Model – 2 Leg (Shear Bolt) Grassland Build



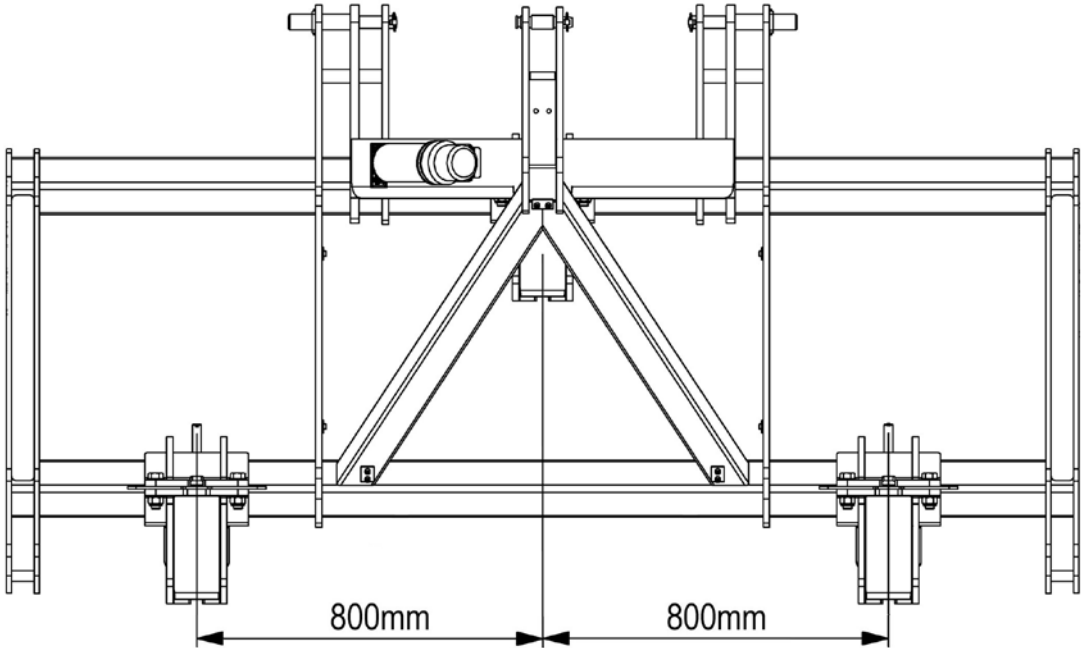
2.5m Model – 2 Leg (Hydraulic) Arable Build



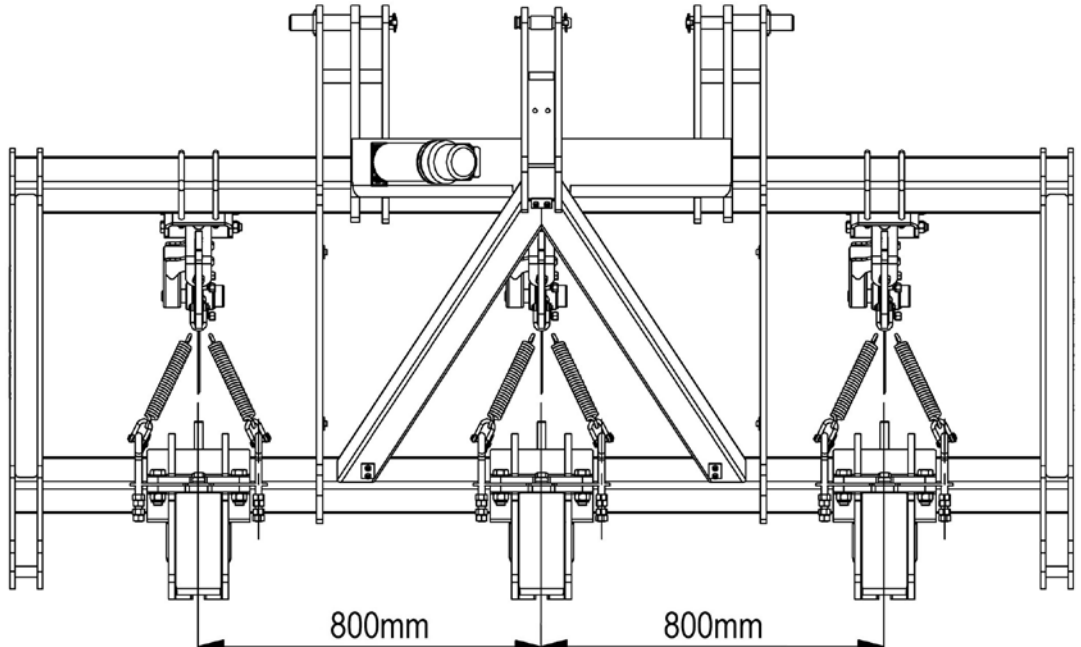
2.5m Model – 2 Leg (Hydraulic) Grassland Build



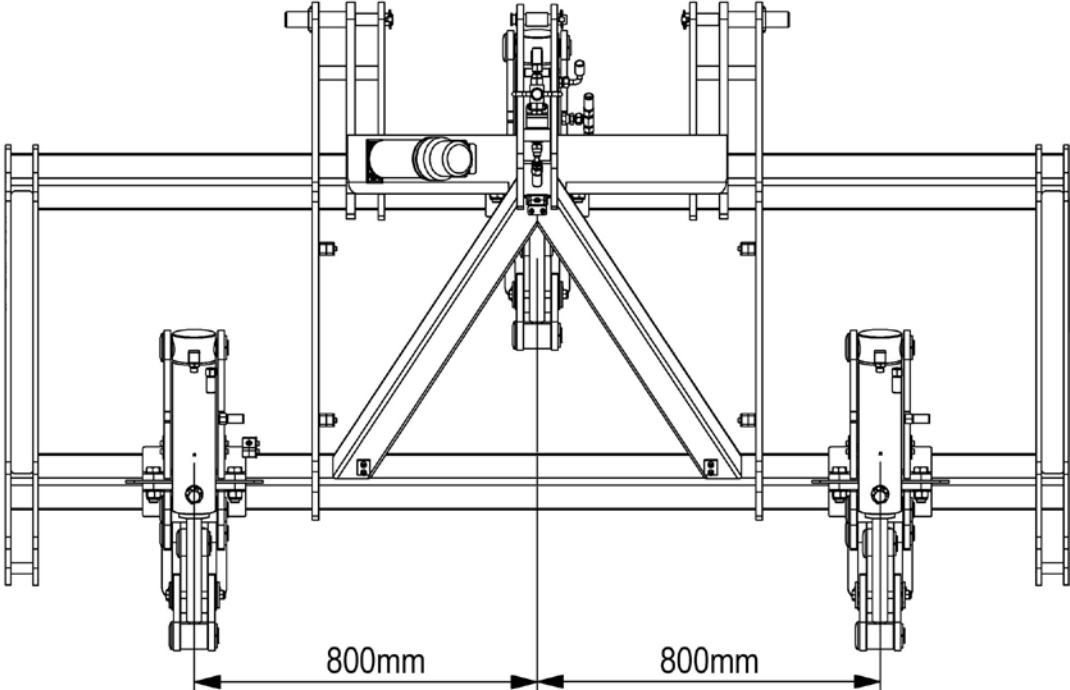
2.5m Model – 3 Leg (Shear Bolt) Arable Build



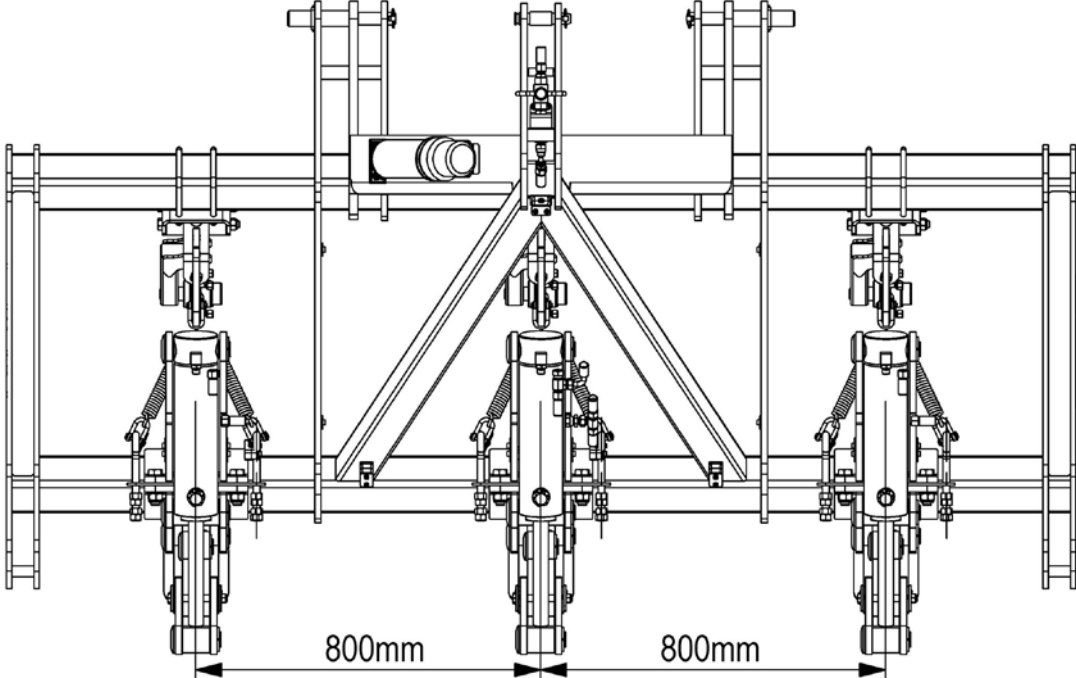
2.5m Model – 3 Leg (Shear Bolt) Grassland Build



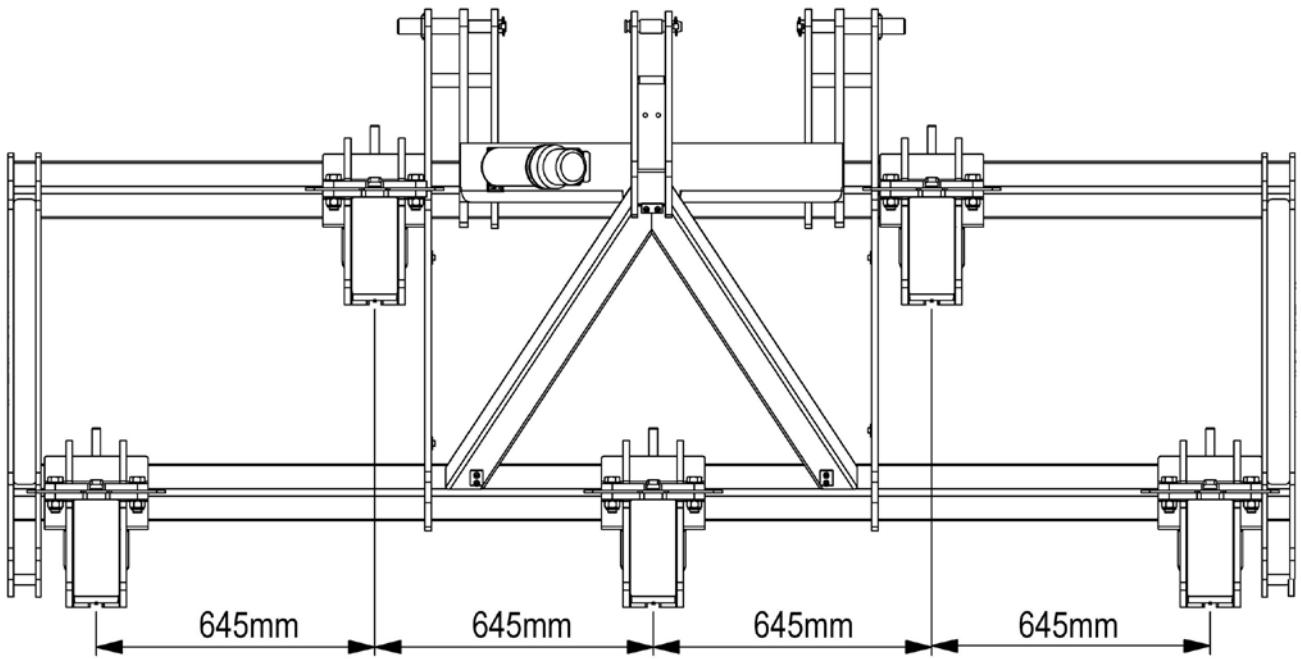
2.5m Model – 3 Leg (Hydraulic) Arable Build



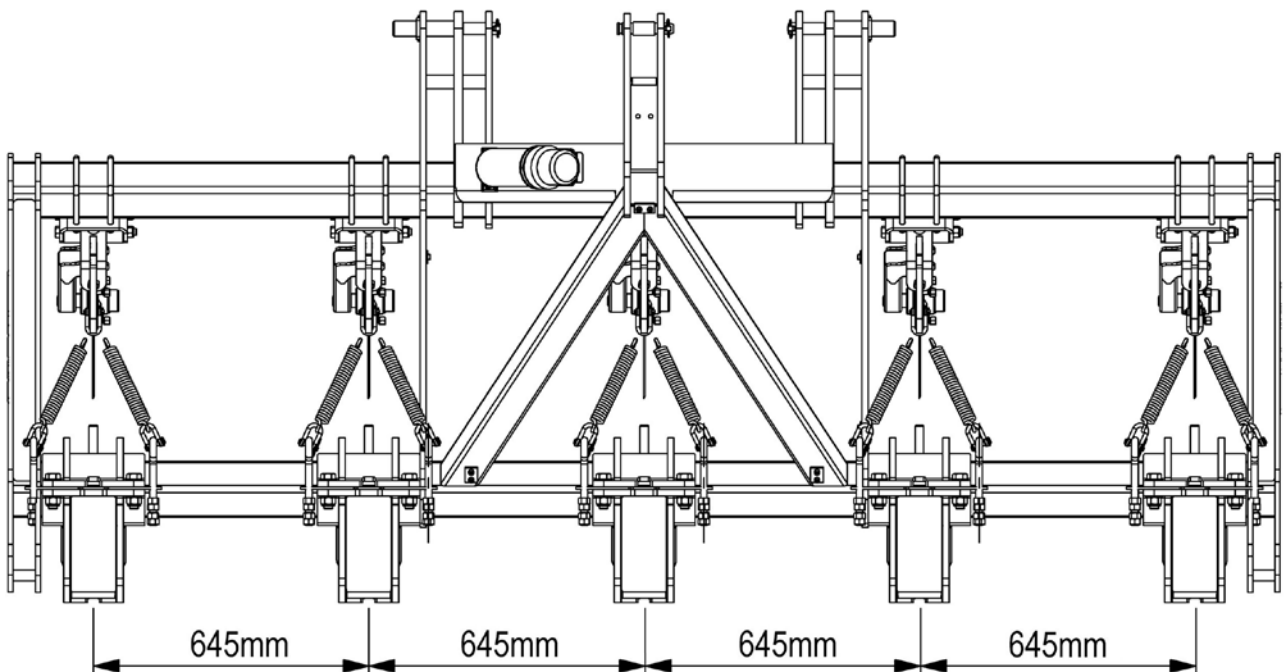
2.5m Model – 3 Leg (Hydraulic) Grassland Build



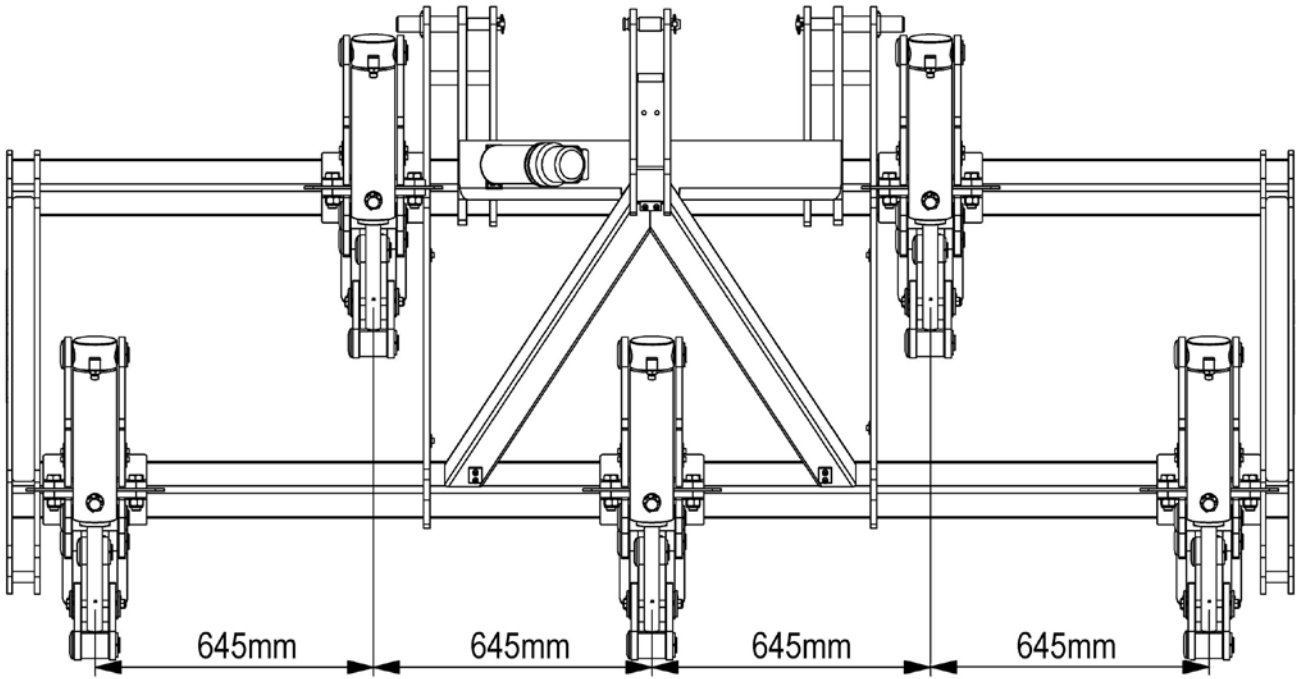
3.0m Model – 5 Leg (Shear Bolt) Arable Build



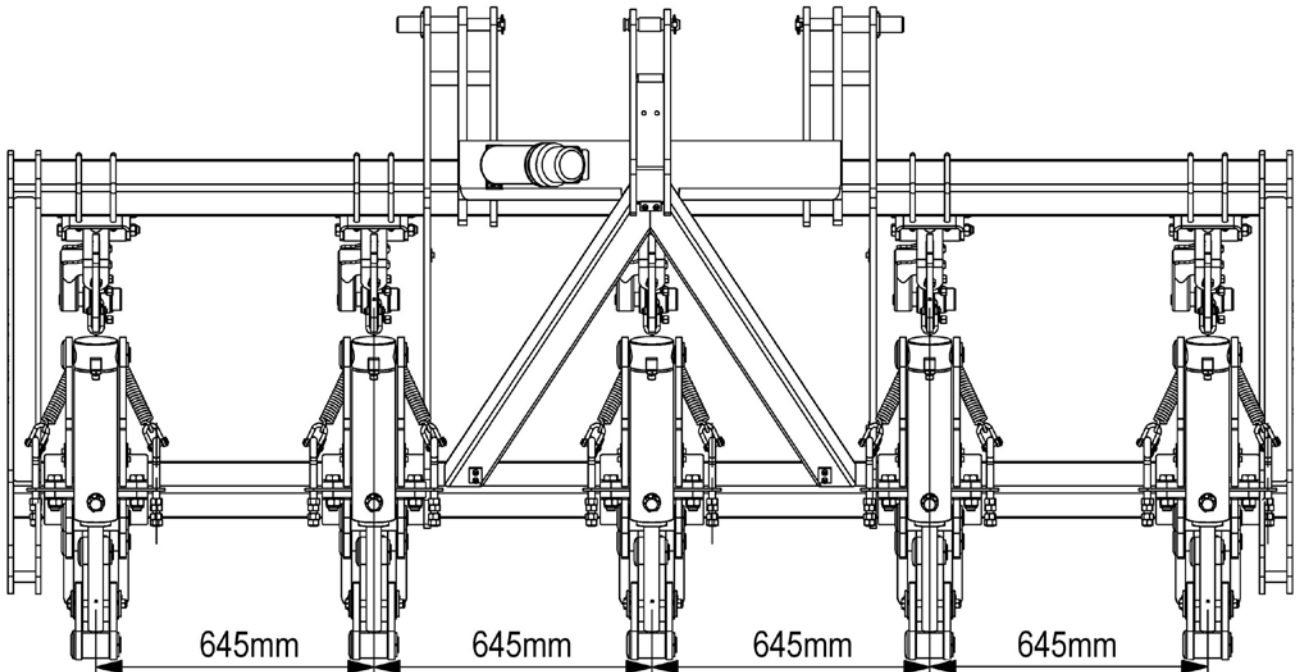
3.0m Model – 5 Leg (Shear Bolt) Grassland Build



3.0m Model – 5 Leg (Hydraulic) Arable Build



3.0m Model – 5 Leg (Hydraulic) Grassland Build



LEG PROTECTION SYSTEMS

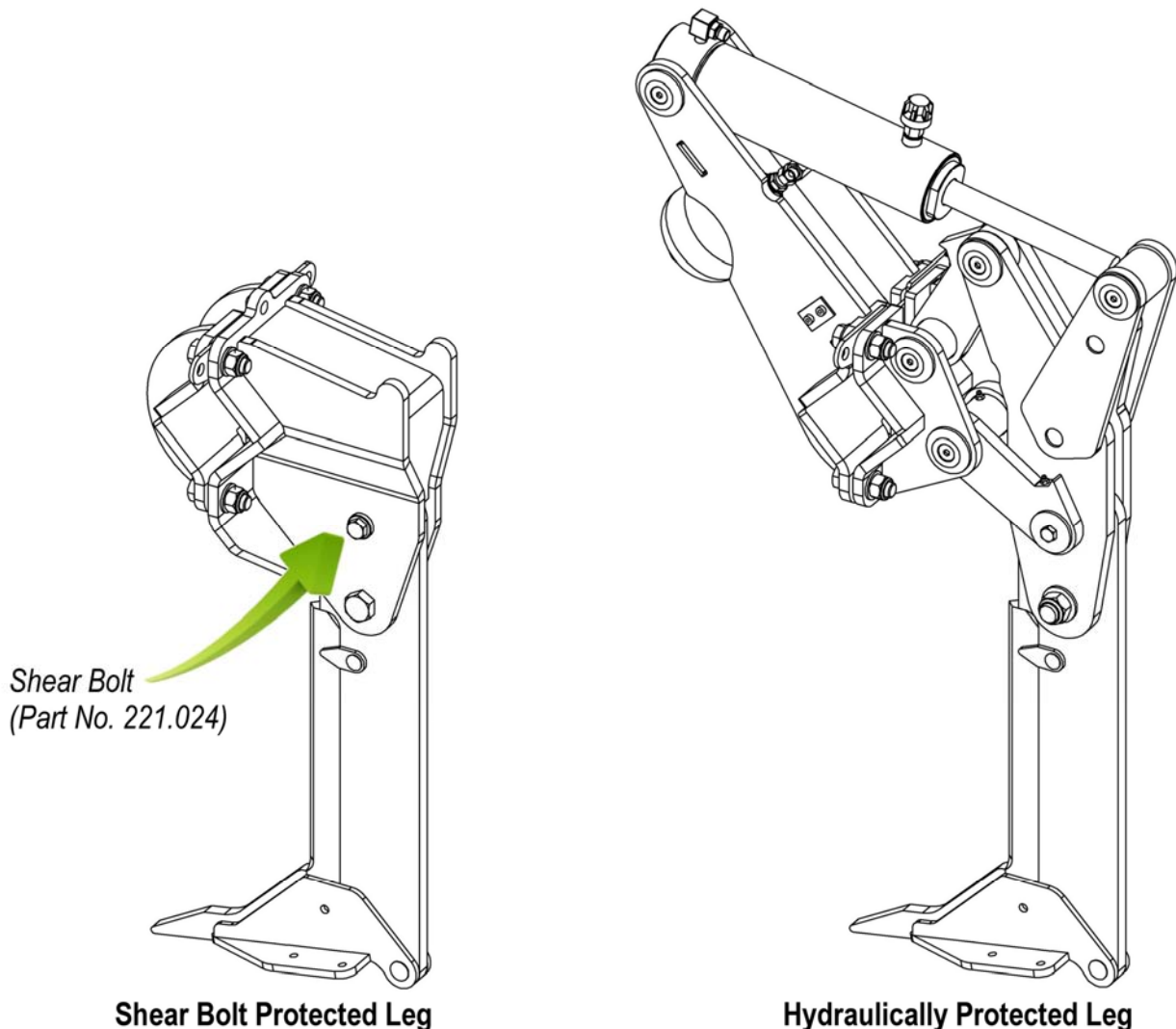
All machines are provided with built in leg protection systems available in a choice of either shear bolt protected legs or hydraulic 'auto trip' legs, the systems are outlined below.

Shear Bolt Protection System

Legs are fitted with a shear bolt that is designed to fail when a pre-determined force is exerted on the leg; this will protect the leg if the machine comes into contact with a heavy or immovable object.

In the event of a shear bolt breakage a replacement shear bolt (*Part No. 221.024*) must be fitted.

It is vitally important that genuine replacement shear bolts are used as they must exactly match the manufacturer's original specification in order to protect the machine. **Never attempt to replace a shear bolt with a normal bolt or bar; failure to observe this can result in damage to the machine and/or injury.**

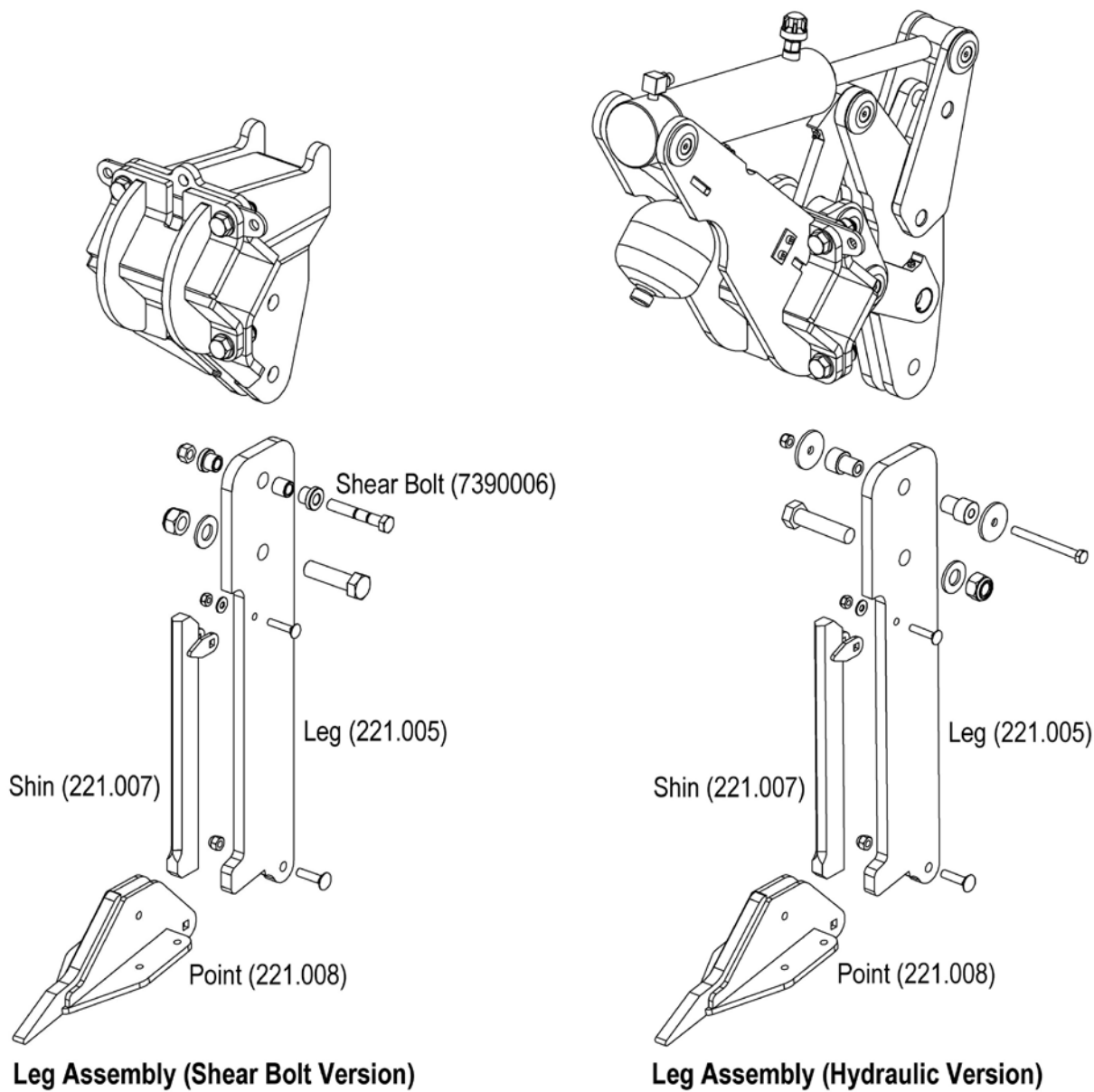


Hydraulic Protection System

Legs are fitted with pressurized hydraulic rams that will independently close if that particular leg comes into contact with a heavy or immovable object; as the ram closes it retracts the leg backwards and upwards to clear the obstacle thus protecting the leg. Once the obstacle has been passed the ram will automatically reset and return the leg into its normal work position.

LEGS, SHINS & POINTS (WEAR PARTS)

Legs, Shins & Points are wear parts and as such have been designed for quick and easy replacement. Both types of leg assemblies use identical wearing parts as identified below.

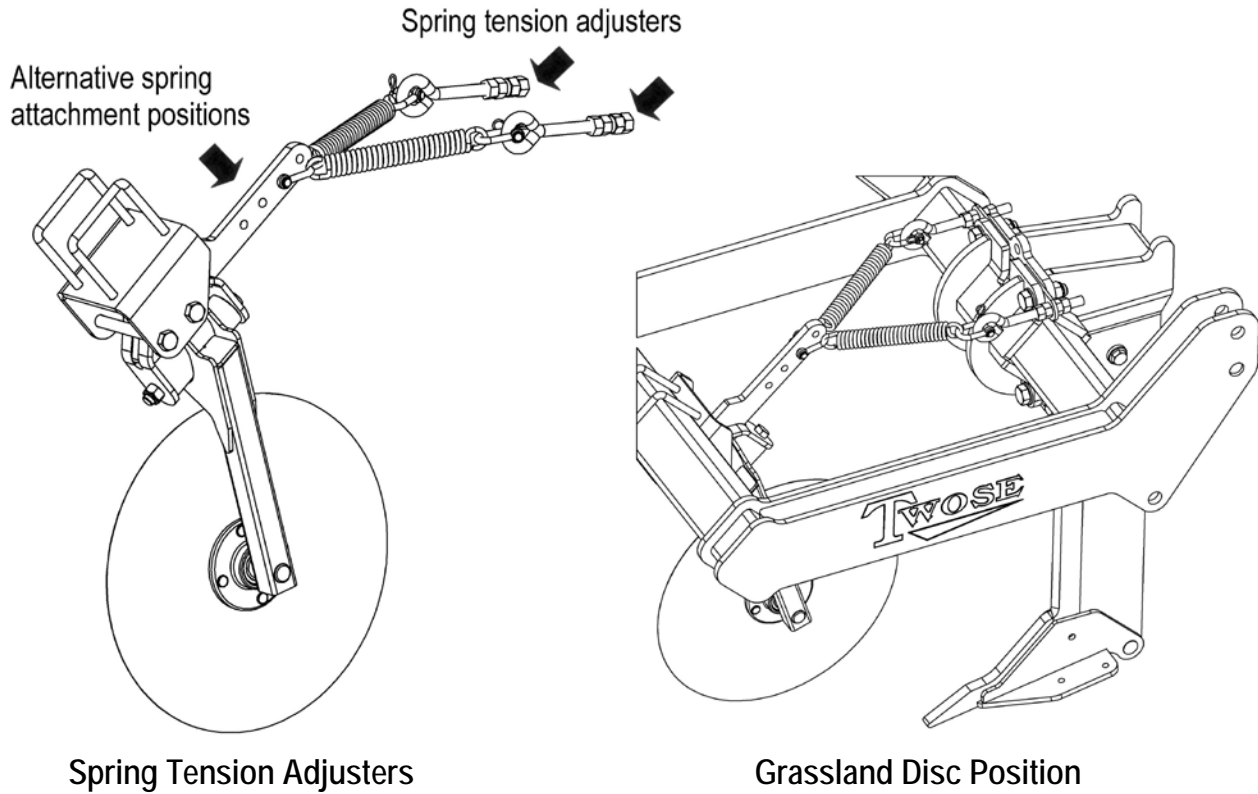


GRASSLAND DISCS

Grassland models are equipped with adjustable grass slitter discs mounted in front of each leg and are designed to slice through the turf ahead of the leg so as to create minimum surface disturbance in pastureland.

Disc pressure is adjusted by increasing or decreasing the tension on the disc springs via the locking nuts on the spring eye bolts. Additional adjustment can be gained by the use of alternative spring attachment positions on the slitter pivot – *see illustration below*.

Disc should be adjusted to produce a good clean cut through the turf to the depth required.



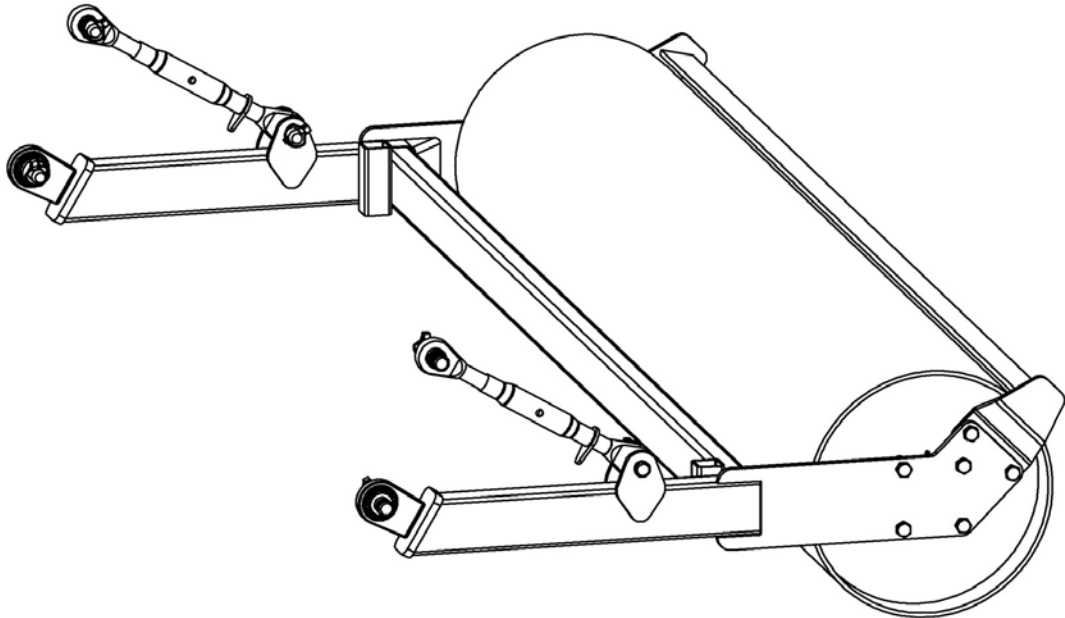
ROLLERS (Optional Extra)

Two types of rear rollers are available for the machines as optional extras, these are shown below.

Grassland Rollers

2.5m Grassland Roller (Part No. SSR250PL)

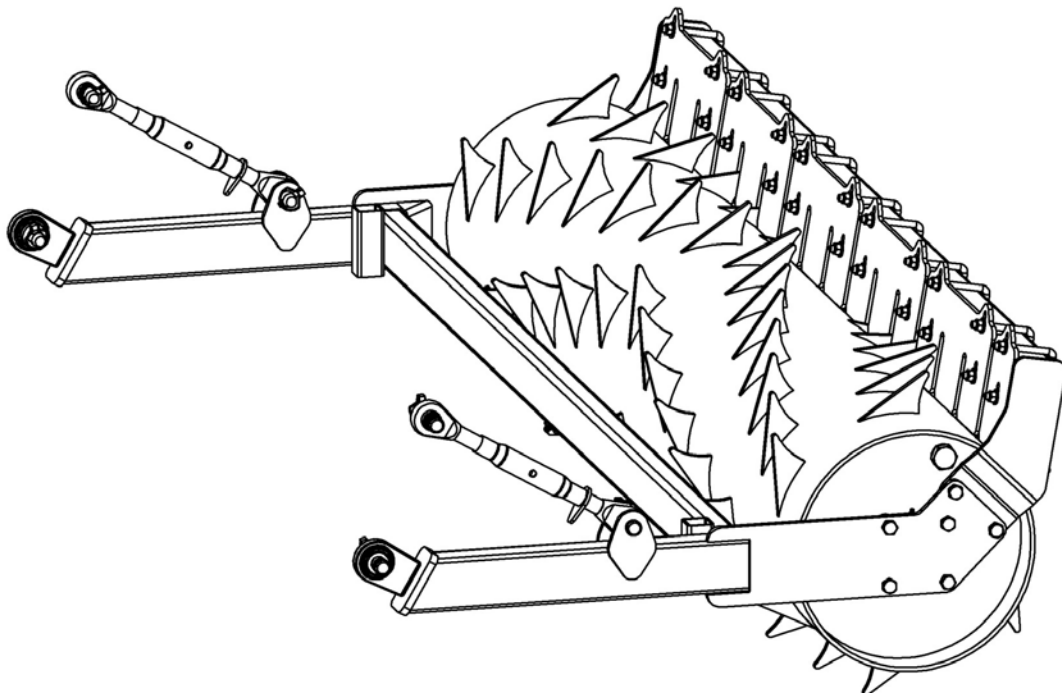
3.0m Grassland Roller (Part No. SSR300PL)



Arable Packer Rollers

2.5m Arable Packer Roller (Part No. SSR250PK)

3.0m Arable Packer Roller (Part No. SSR300PK)



OPERATION

When first putting the machine into work the tractors forward speed should be limited to less than 3mph (5kph), this can gradually be increased to a reasonable speed later as the operator gains experience of the machine and the prevailing ground conditions.

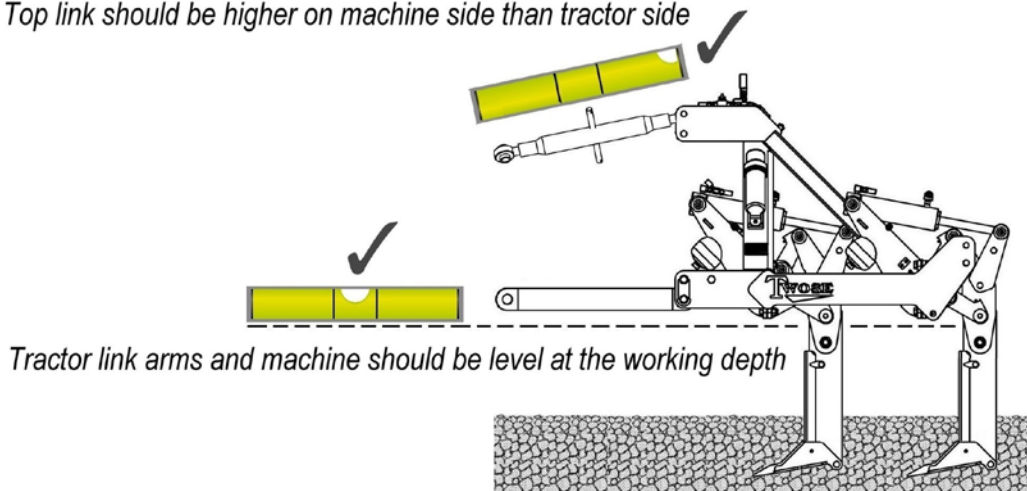
For best results use the machine at a reasonable speed working at a slight angle towards previous crop seeding line; this will avoid excessive track compaction helping to leave an aerated and levelled ground surface.

Always lift the machine out and clear of the ground before manoeuvring or turning on headlands. Never attempt a sharp turn with the machine in the ground and always reduce speed before manoeuvring or crossing obstacles such as ditches, ridges, etc.

Depth Control & Front to Rear Levelling

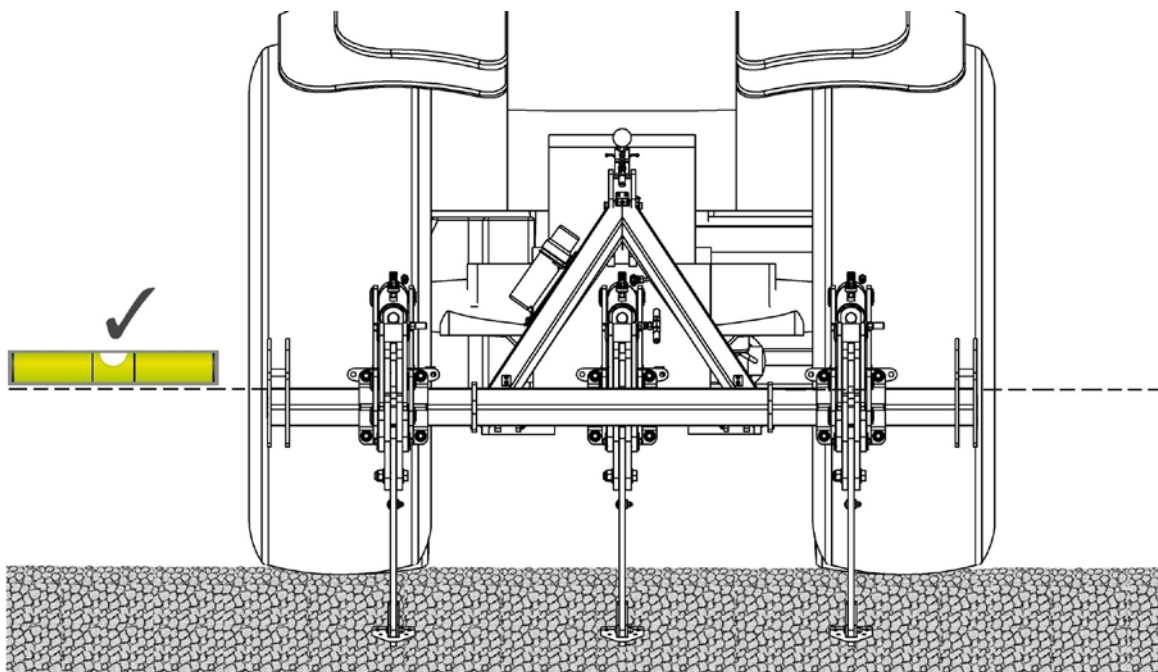
The working depth of the machine is set by the tractors hydraulic lift. When the depth has been determined the top link should be adjusted so that the tractor link arms and the machine are level (front to rear) at that working depth. The top link should always be positioned higher on the machine side than on the tractor side to permit optimum weight transfer to the front axle.

Top link should be higher on machine side than tractor side



Side to Side Levelling

In work the machine should be evenly mounted on the tractor and parallel to the ground.



TRANSPORTING

Transport Position

For transportation of the machine it should be raised to a suitable height on the tractors hydraulic linkage, ensuring that the machines legs and discs (where fitted) are at a height where they will not come into contact with the ground whilst travelling or manoeuvring.

Transport Speed

The acceptable speed of transport will vary greatly depending upon the ground conditions. In any conditions avoid driving at a speed which causes exaggerated bouncing as this will put unnecessary strain on the tractors top hitch position and reduce steering efficiency. When transporting the machine on the public highway operators must comply with the rules and regulations applicable to their location.

MAINTENANCE

Maintenance duties on these types of machines are minimal and comprise mainly of regular inspection of components for signs of wear or damage, checking nut and bolt tightness, and cleaning down of the machine after work and prior to long term storage. Hoses and fittings on hydraulic machines should be checked on a daily basis for signs of damage or leakage and components repaired and/or replaced if problems are detected.

Lubrication

Hydraulic leg assemblies and grassland disc assemblies should be lubricated on a daily basis prior to work, refer to illustrations below for the locations of the greasing points on these components.

