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# RAKAERATOR

## Tractor Mounted Straw Harrow



Operator Manual



# IMPORTANT

## VERIFICATION OF WARRANTY REGISTRATION



### DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

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

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

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

#### Registration Verification

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

#### NOTE TO CUSTOMER / OWNER

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

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

**CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES**

#### TORQUE SETTINGS FOR HYDRAULIC FITTINGS

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

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





# WARRANTY POLICY

## WARRANTY REGISTRATION

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

### 1. LIMITED WARRANTIES

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

- 1.11. *Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of McConnell Ltd.*
- 1.12. *For machine warranty periods in excess of 12 months the following additional exclusions shall apply:*
  - 1.12.1. *Hoses, exposed pipes and hydraulic tank breathers.*
  - 1.12.2. *Filters.*
  - 1.12.3. *Rubber mountings.*
  - 1.12.4. *External electric wiring.*
  - 1.12.5. *Bearings and seals*
  - 1.12.6. *External Cables, Linkages*
  - 1.12.7. *Loose/Corroded Connections, Light Units, LED's*
  - 1.12.8. *Comfort items such as Operator Seat, Ventilation, Audio Equipment*
- 1.13. *All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.*
- 1.14. *Repeat or additional repairs resulting from incorrect diagnosis or poor quality previous repair work are excluded from warranty.*

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

## **2. REMEDIES AND PROCEDURES**

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

## **3. LIMITATION OF LIABILITY**

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

#### **4. MISCELLANEOUS**

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

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*McConnel Limited*



# DECLARATION OF CONFORMITY

*Conforming to EU Machinery Directive 2006/42/EC*

We,

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

*Hereby declare that:*

The Product; *Tractor Mounted Harrow*

Product Code; *RKAR*

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

Manufactured in; *United Kingdom*

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

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

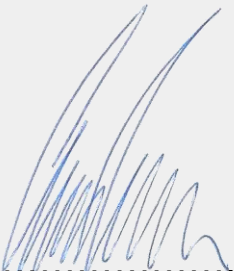
McCONNEL LIMITED operates an ISO 9001:2008 quality management system, certificate number: FM25970.

This system is continually assessed by the;

British Standards Institution (BSI), Beech House, Milton Keynes, MK14 6ES, UK

BSI is accredited by UK Accreditation Service, accreditation number: UKAS 003.

The EC declaration only applies if the machine stated above is used in accordance with the operating instructions.

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

Status: *General Manager*

Date: *January 2018*



*For Safety and Performance...*

**ALWAYS READ THIS BOOK FIRST**

# **McCONEL LIMITED**

**Temeside Works  
Ludlow  
Shropshire  
England**

**Telephone: 01584 873131  
[www.mcconnel.com](http://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 equivalent daily noise exposure levels of between 85 – 90 dB ear protection is recommended – it should be used if any window is left open.*





## LIST OF CONTENTS

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General Information	1
Features	2
Introduction	3
Technical data	4
Dimensions	5
Component Identification	6
Safety Information	7
Machine Attachment	9
Operation	12
Maintenance	20



## GENERAL INFORMATION

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

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

DEFINITIONS - The following definitions apply throughout this manual:

**WARNING:**

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

**CAUTION:**

An operating procedure, technique etc., which –  
***can result in 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

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### **Rakaerator 7400**

- 3-point linkage mounted (CAT. II & CAT. III)
- 7.4m working width
- Hydraulic folding
- 6 tine rows
- Hydraulic tine angle adjustment
- Hard-wearing 13mm tines
- Easy tine replacement
- Cushioned top-link
- Rear lighting kit

### **Options**

- Hard-wearing 14mm or 16mm tines



## INTRODUCTION

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### **Machine Description & Purpose of Use**

The McConnel Rakaerator 7400 is a 7.4m working width, three-point linkage mounted straw harrow suitable for use on tractors of 120hp and over.

The machine is primarily designed to break-up and evenly distribute straw and crop residue to accelerate the rotting process and create a fine tilth finish; this aids the retention of soil moisture and provides the perfect environment for weed seed germination.

Additionally, the machine proves to be a highly effective tool in the destruction of slug eggs and habitat.

The machine is fitted with hydraulic tine angle adjustment allowing the working angle of the tines to be altered during work ensuring optimal performance in a wide variety of working conditions.

Hydraulically operated wings allow the machine to be quickly and easily folded for ease of transportation and compact storage.

*This machine must not be used to perform any tasks for which it is not designed; use of the machine for the wrong purpose will risk damage to the machine and/or tractor and may be highly dangerous to persons.*



## TECHNICAL DATA

### Machine Specifications

Mounting Type	3-point linkage (CAT.II / CAT.III)
Minimum Tractor Requirement	120HP
Working Width	7.4m
Number of Tine Rows	6
Number of Tines	144 (72 Pairs)
Tine Spacing	52mm
Tine Diameter (Standard)	13mm
Tine Diameter (Options)	14mm or 16mm
Machine Weight	1650kg
Machine Height (Folded and un-mounted)	3713mm
Machine Width (Folded)	2230mm
Machine Length (Folded)	3494mm

### Tractor Hydraulic & Electrical Connection Requirements

2 x double acting spool valves (1/2" quick release connections).

1 x auxiliary lighting connection (standard 7-pin UK/EU lighting board connection).

### 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

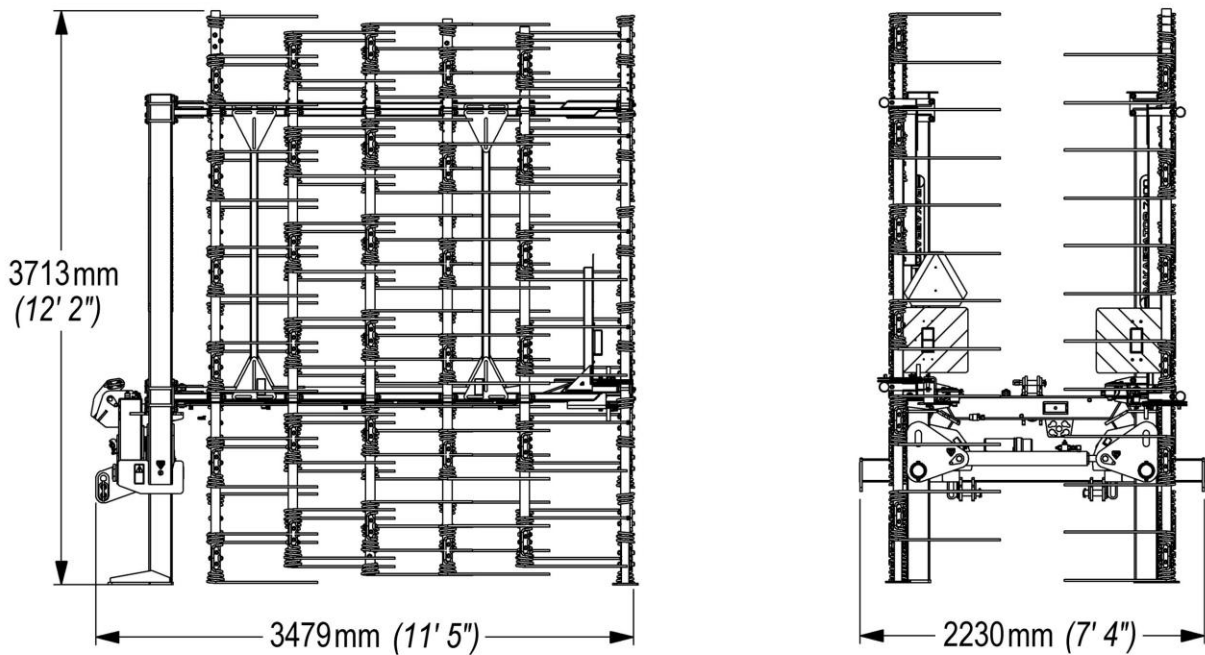
### Noise Level

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.

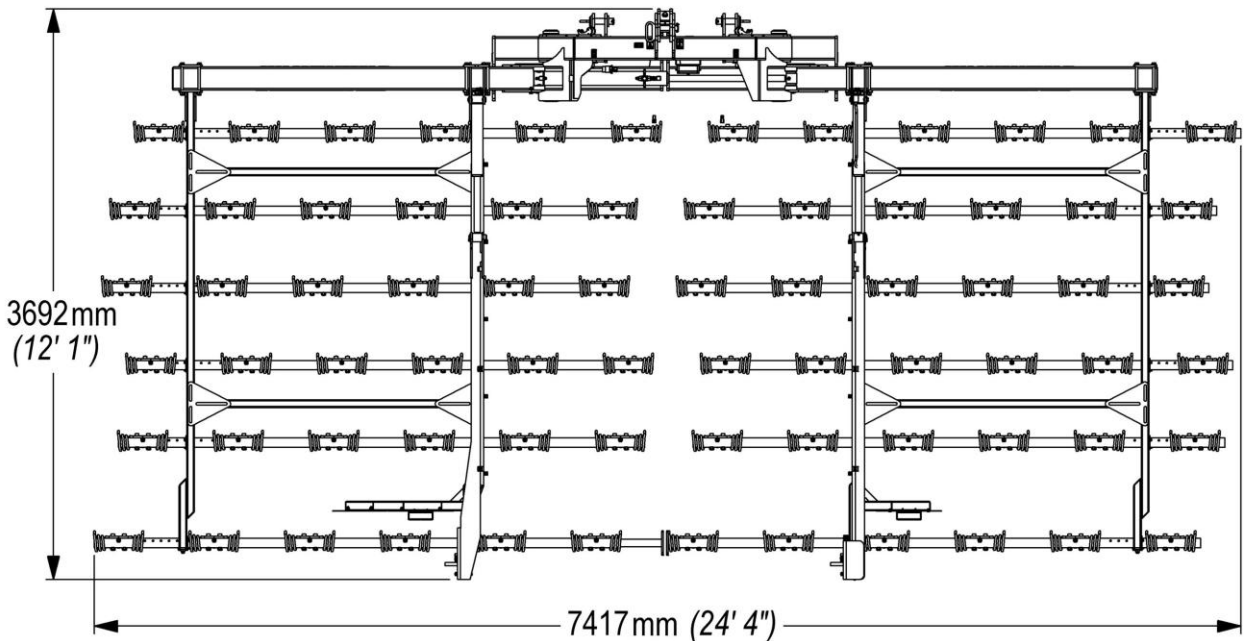


# DIMENSIONS

## Transport Position Dimensions (Free Standing)



## Work Position Dimensions



### CAUTION!



The transport position height dimension stated above relates to a 'free standing' machine; when transporting the machine the additional height of the mount position on the vehicle must be taken into consideration when calculating the overall transport height.

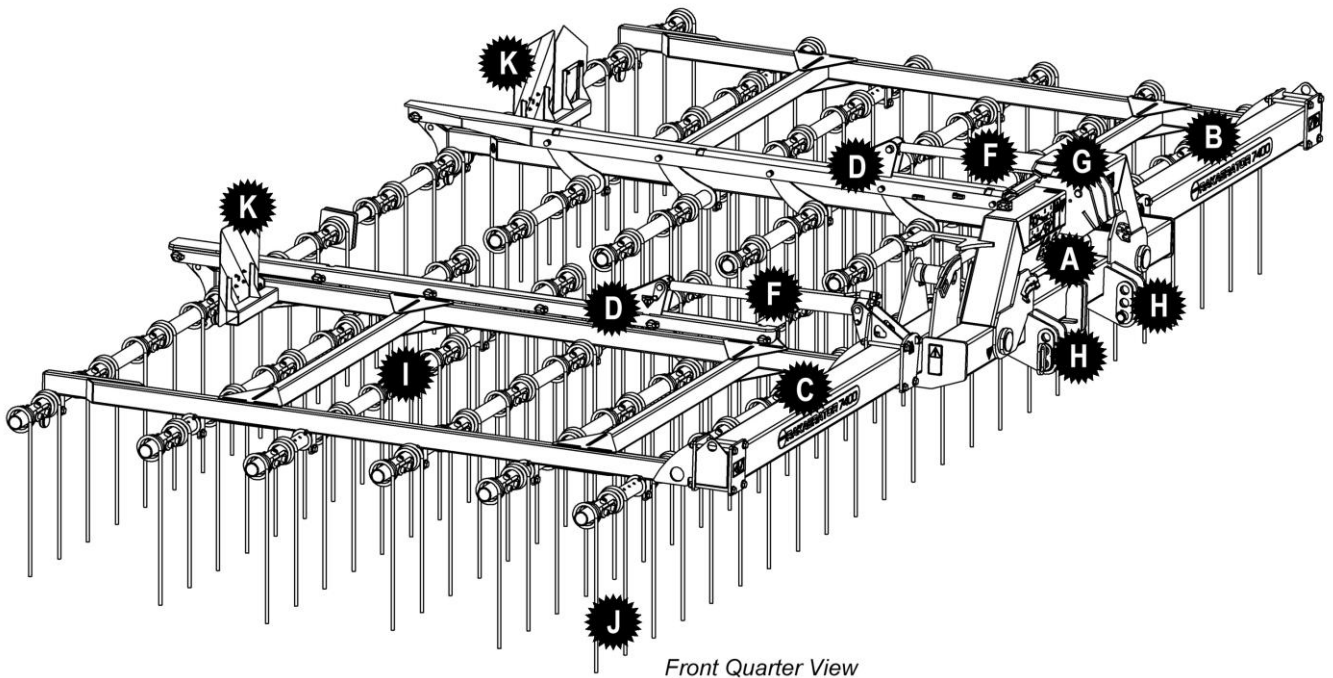
### CAUTION!



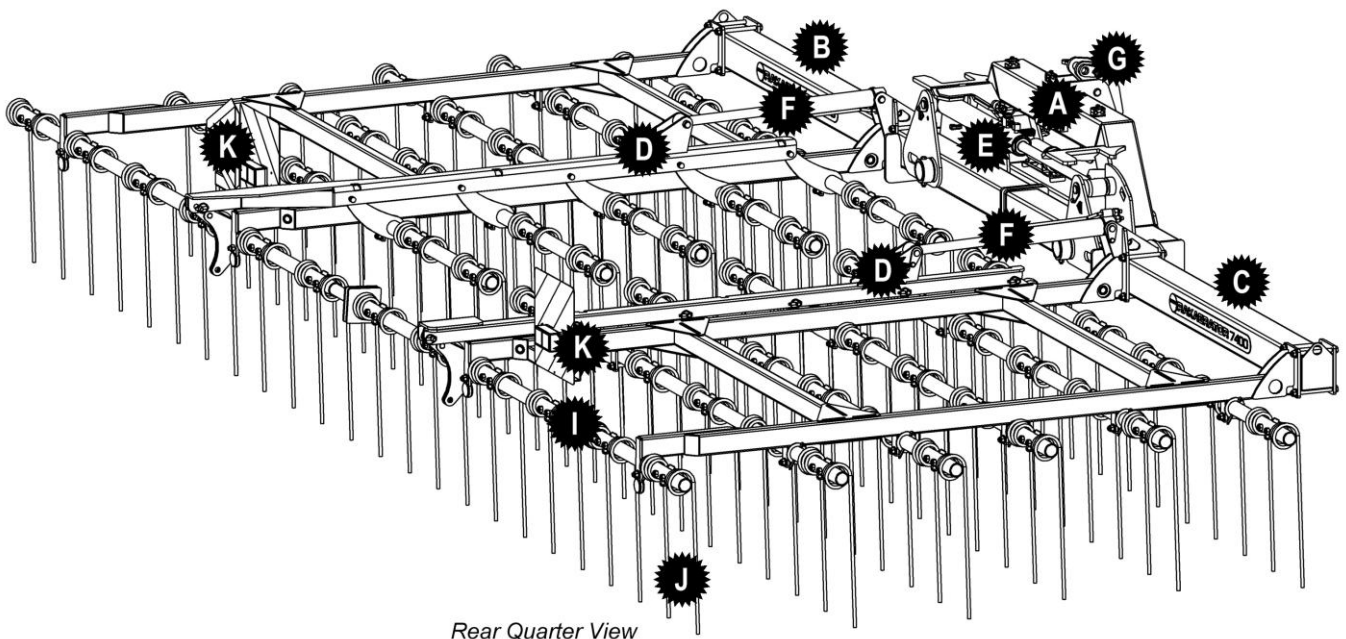
The transportation height of the mounted machine will vary depending on the carrying vehicle and mount height. In certain circumstances the mounted machine may be too high to pass under some bridges and obstructions; check heights on route prior to transporting.

# MACHINE COMPONENTS

## Component Location / Identification



Front Quarter View



Rear Quarter View

- |                                 |                                  |
|---------------------------------|----------------------------------|
| A. Mainframe                    | G. Upper Attachment Point        |
| B. LH Wing                      | H. Lower Attachment Points       |
| C. RH Wing                      | I. Tine Bar                      |
| D. Tine Control Bar             | J. Spring Tines                  |
| E. Hydraulic Ram (Wing Control) | K. Rear Lighting / Marker Boards |
| F. Hydraulic Ram (Tine Control) |                                  |



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 correctly folded and lowered to rest on a firm level site. In the event of any fault being detected with the machine's operation it must be stopped immediately and not used again until the fault has been corrected by a qualified technician.

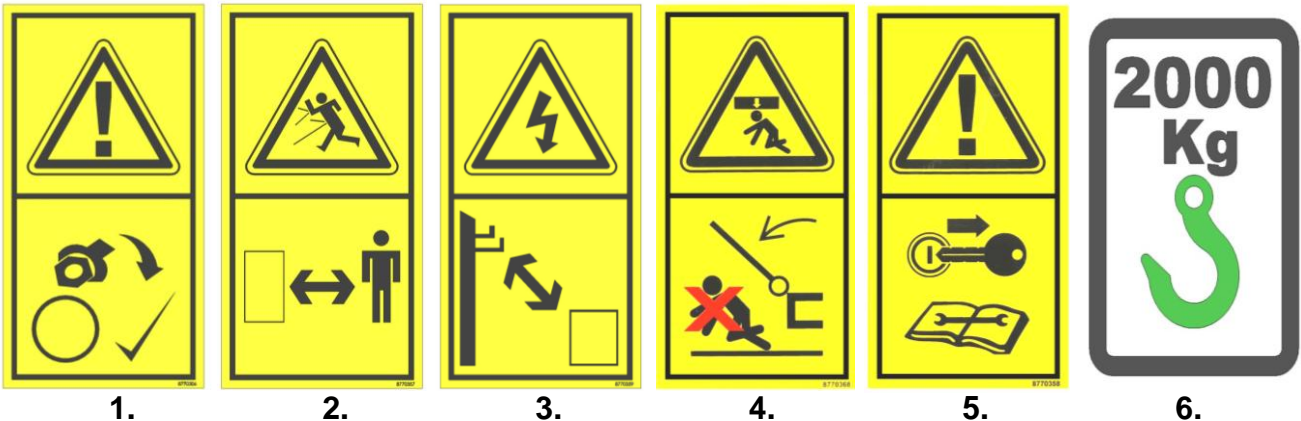
- ▲ ALWAYS ensure all operators have read and understood the operation and safety information in the manual before using the machine.
- ▲ ALWAYS inspect the work area for possible dangers or risks before starting work.
- ▲ ALWAYS ensure all machine guards (if applicable) are in place and are kept in good condition – they are there for your protection and the safety of others.
- ▲ ALWAYS keep clear of any moving or rotating components.
- ▲ ALWAYS keep onlookers at a safe distance when folding or unfolding the machine.
- ▲ ALWAYS be aware of potential overhead risks and dangers when folding or unfolding the machine such as power lines, buildings, trees etc.
- ▲ 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

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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. **DANGER – Keep Bolts Tight**
2. **DANGER – Keep All Persons at Safe Distance.**
3. **DANGER – Keep Distance from Power Lines.**
4. **DANGER – Falling Wing Danger.**
5. **DANGER – Shut Off Engine / Remove Key for Service or Maintenance.**
6. **WARNING – Lifting Equipment Minimum Requirement (SWL).**

## TRACTOR REQUIREMENTS

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### Tractor Power Requirements

Rakaerator 7400 model: 120hp / 88kW Minimum

### 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.

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

## MACHINE ATTACHMENT



### WARNING!

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

### Ballasting for Stability

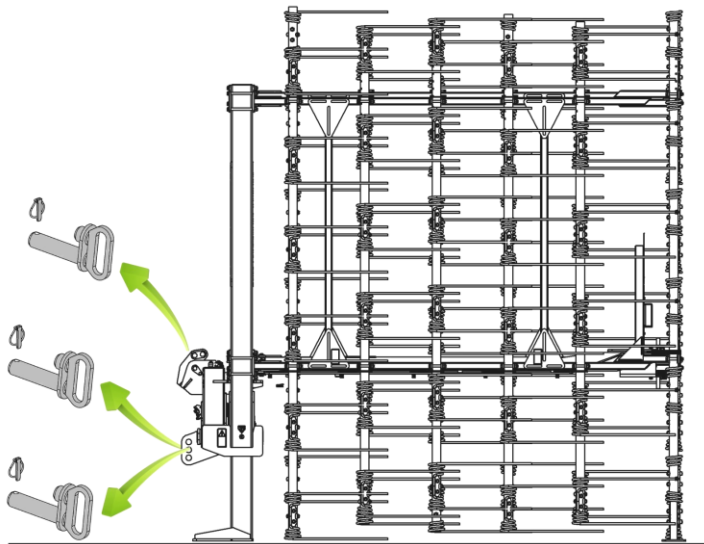
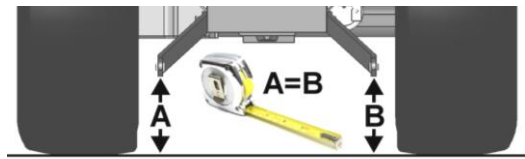
It is imperative when attaching 'third-party' equipment to a vehicle that maximum possible stability of the machine and vehicle combination is achieved; this can be accomplished by the use of 'ballast' in order to counter-balance the weight of machine.

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.*

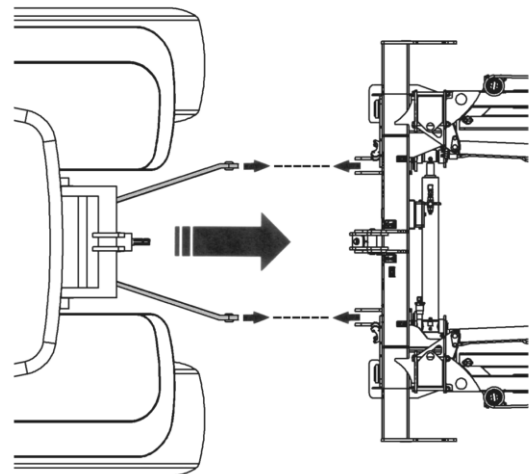
### Attachment & Removal

*The procedure for attaching the machine is as follows; removal is basically a reversal of the attachment procedure.*

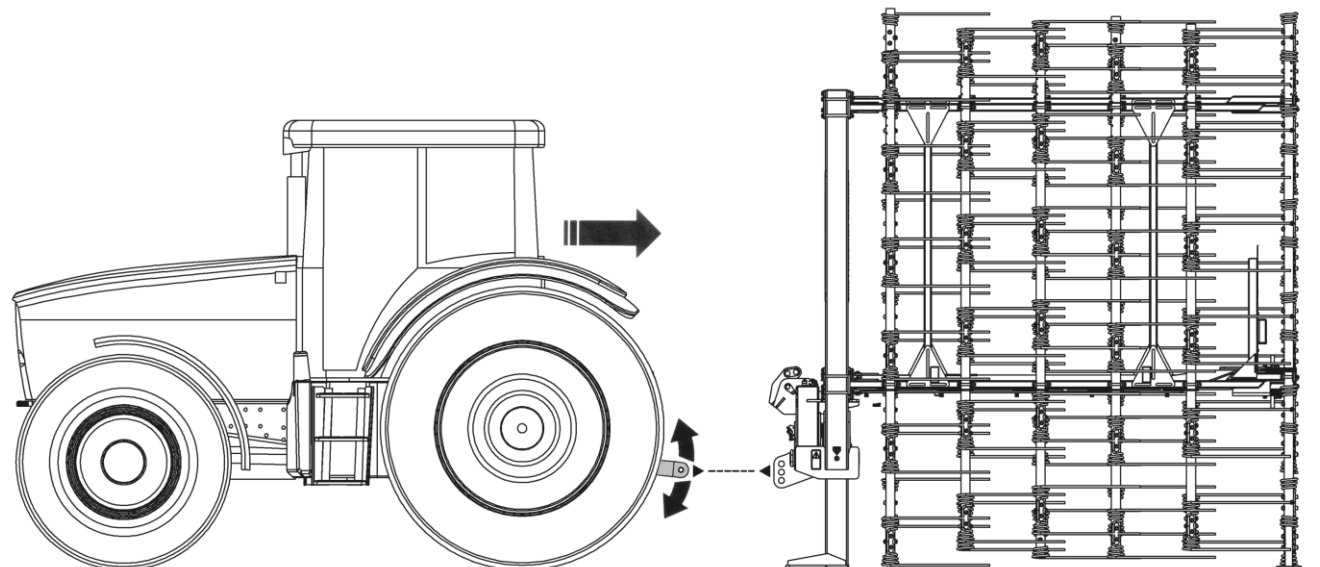
Measure and set the tractor's draft links to identical height settings; this will ensure the machine is mounted level (*side to side*) in relation to the tractor when attached.



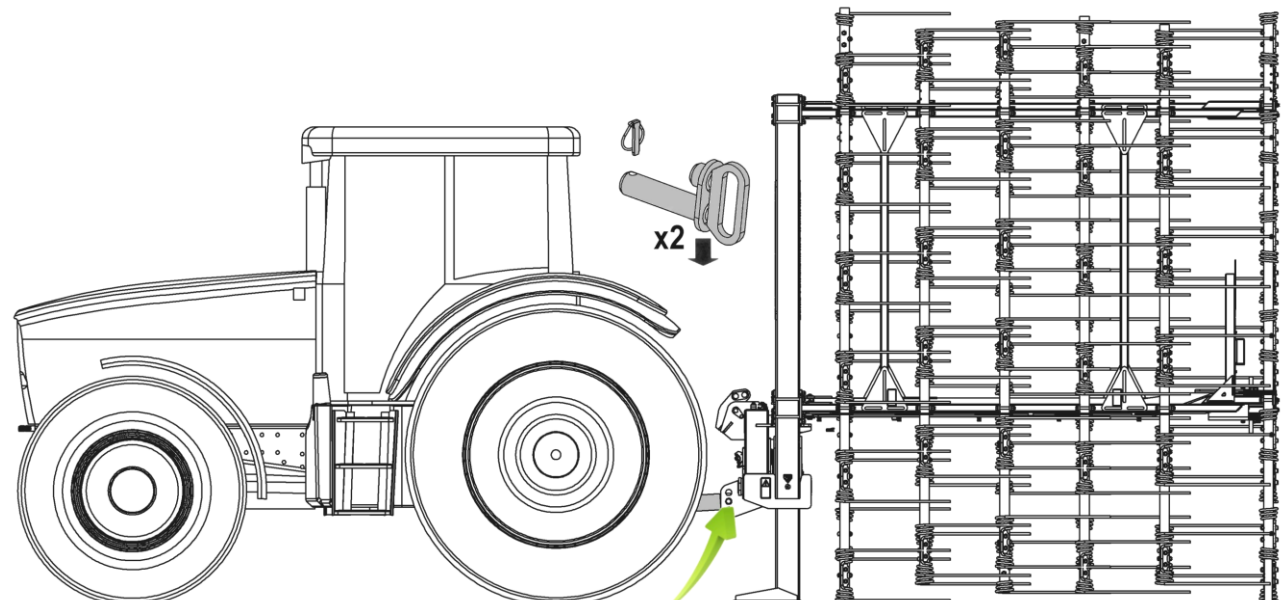
Remove machines lower and upper linkage pins.



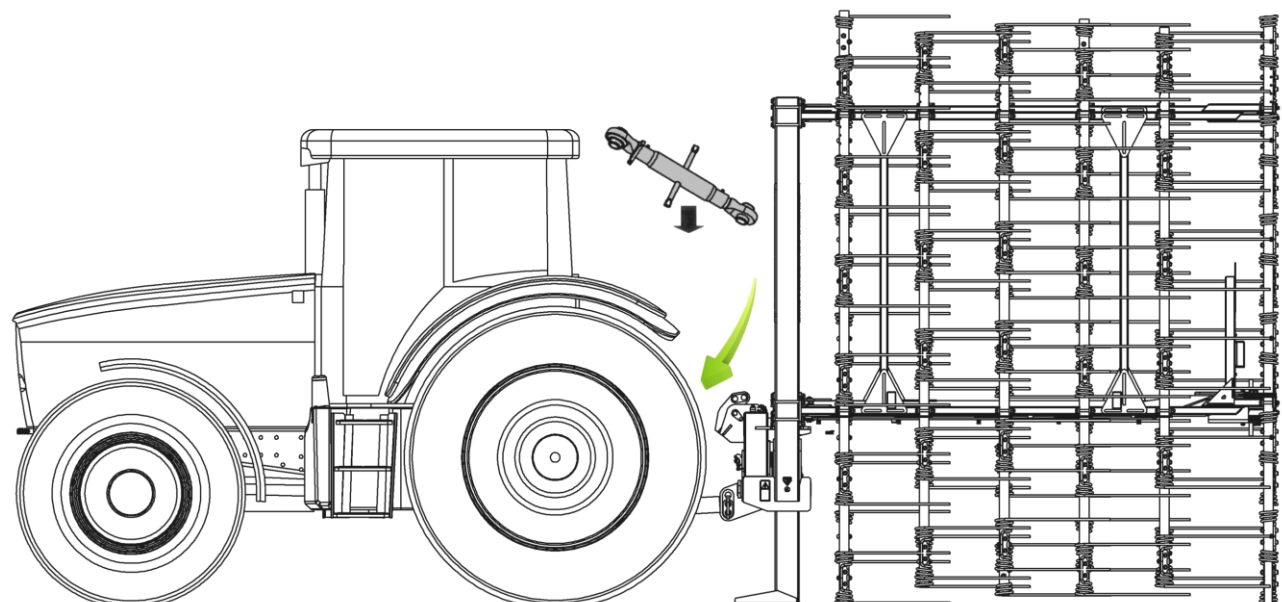
Position the tractor centrally to the machine.



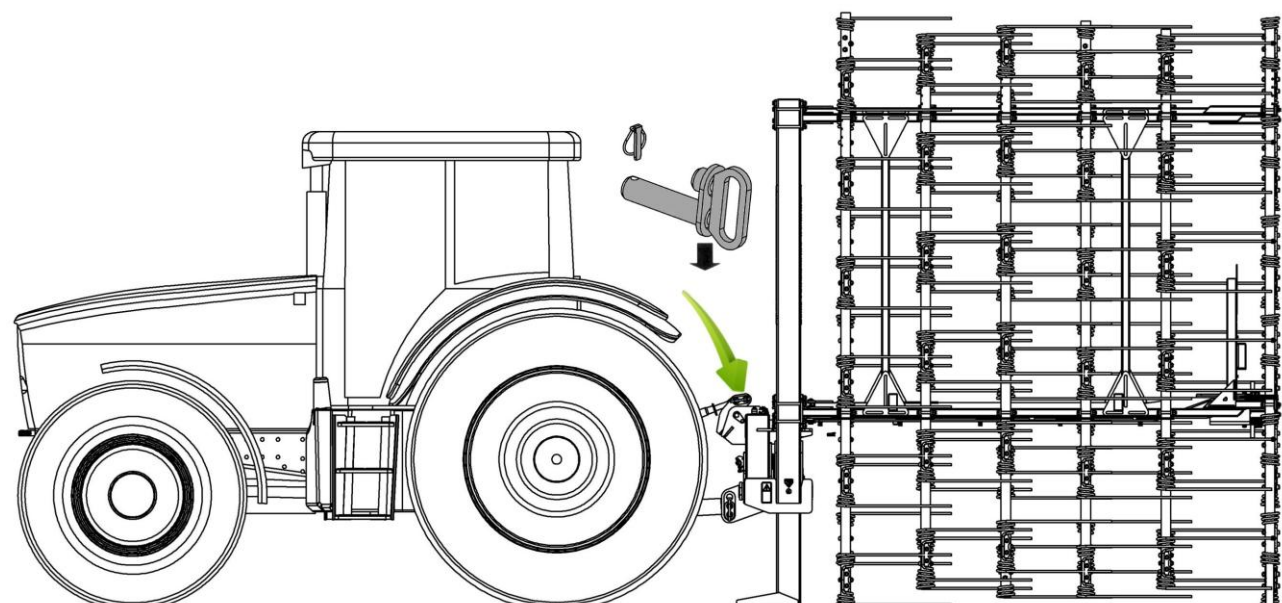
Slowly reverse to machine with tractor draft links at the same height as the machine's lower attachment points.



Connect draft links to machine lower attachment points with linkage pins provided and secure with lynch pins.

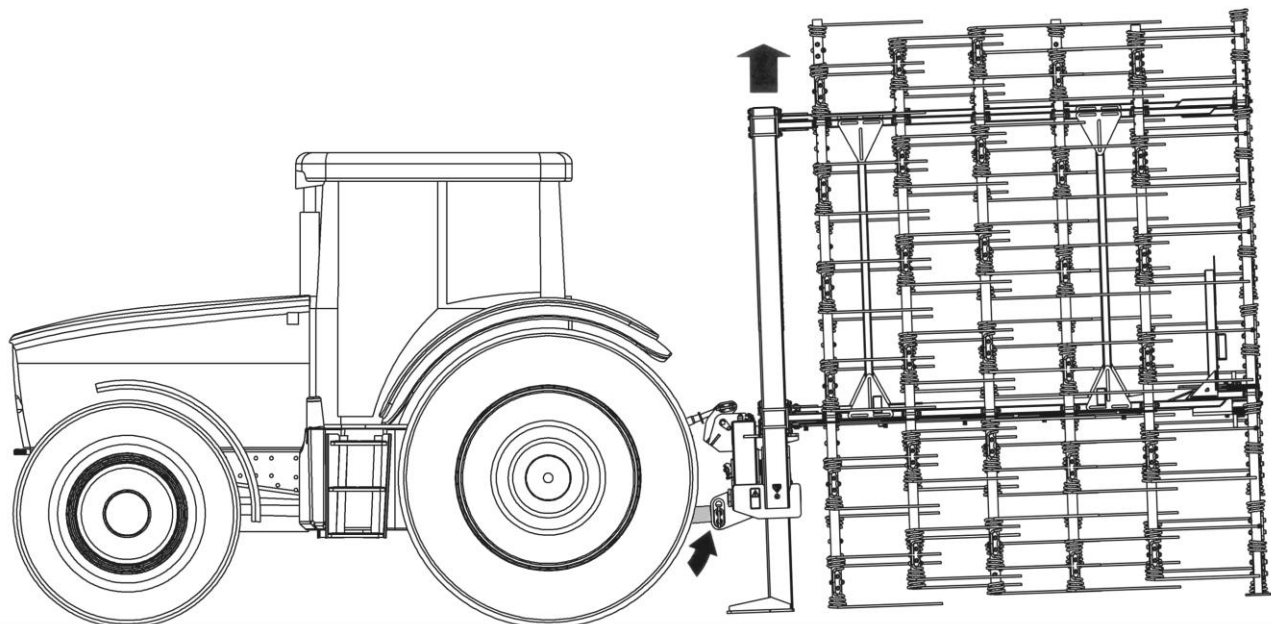


Fit top link between tractor's upper linkage position and machine's upper attachment point.

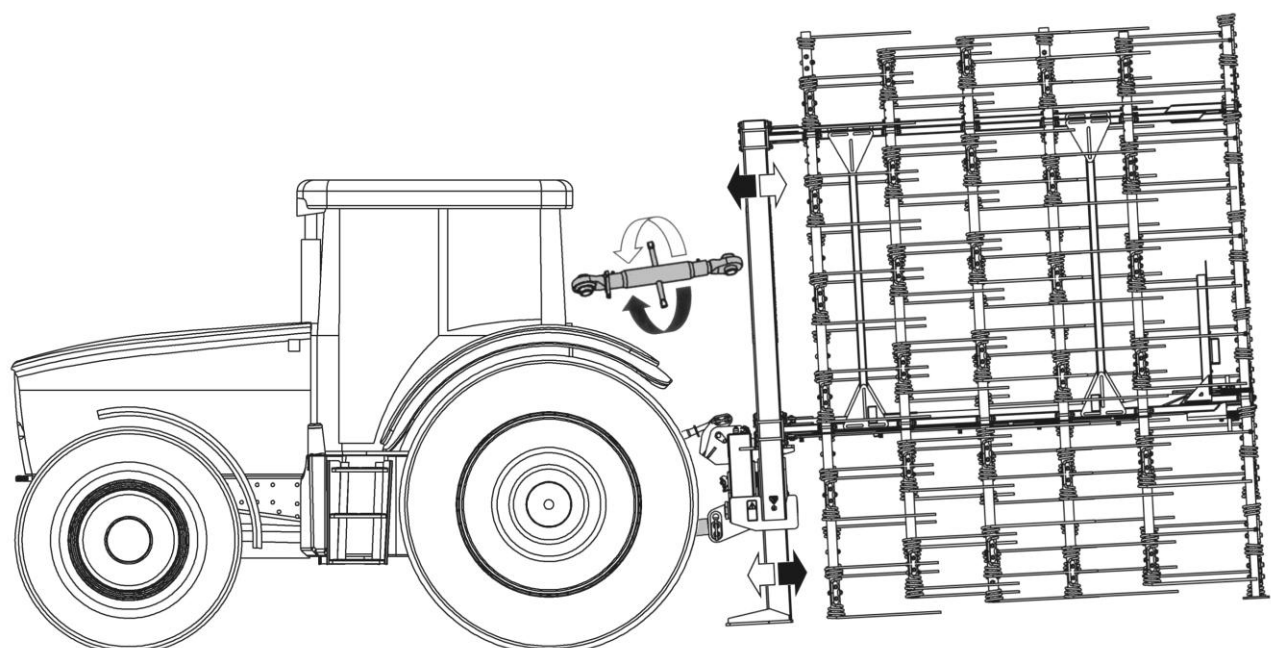


Connect top link assembly to machine using the linkage pin provided and secure with lynch pin.



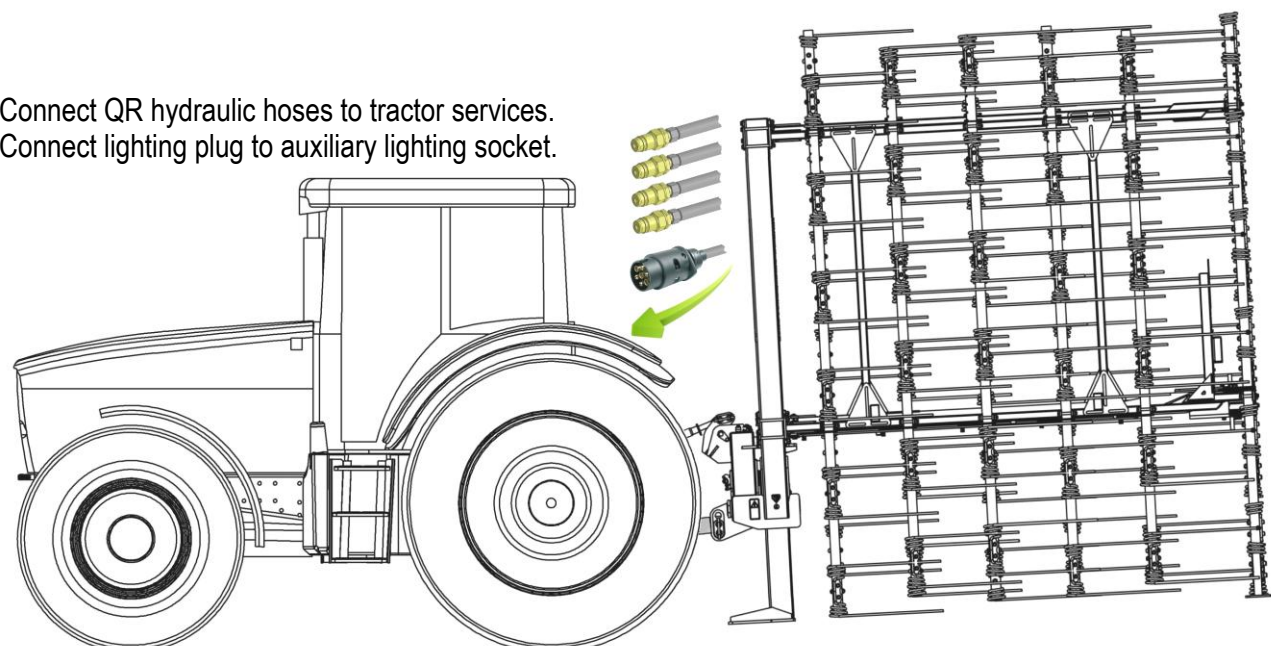


Raise the machine on tractor's hydraulics to a suitable height for safe transportation.



Adjust transport angle with the top link if required; the angle must be checked and re-set before starting work.

Connect QR hydraulic hoses to tractor services.  
Connect lighting plug to auxiliary lighting socket.



# OPERATION

## Transport Latches

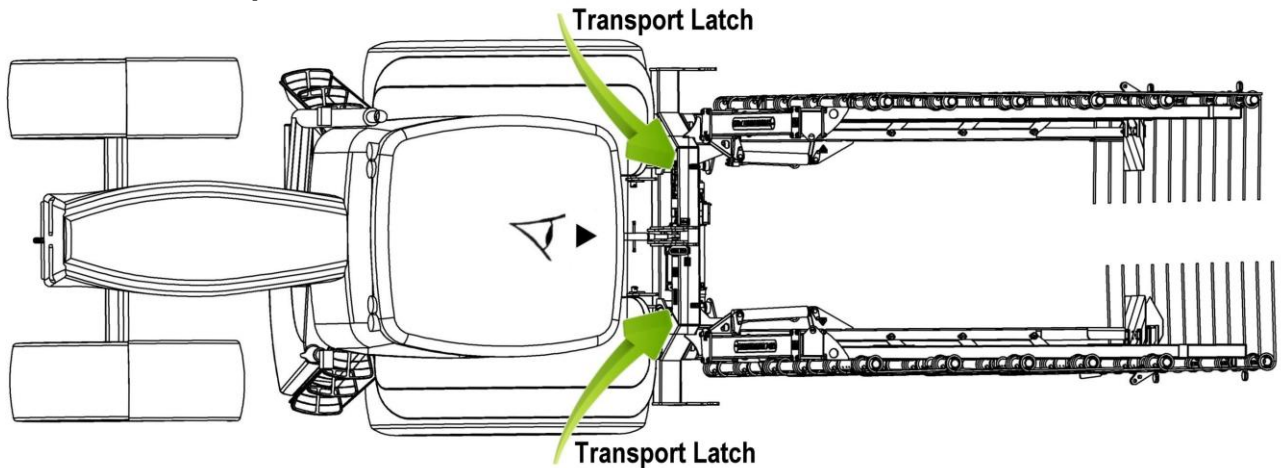
When the machine is folded into the upright position for transport or storage each wing is secured with a transport latch; the latches are located on the front of mainframe adjacent to each wing. Latches must be disengaged before unfolding the wings.



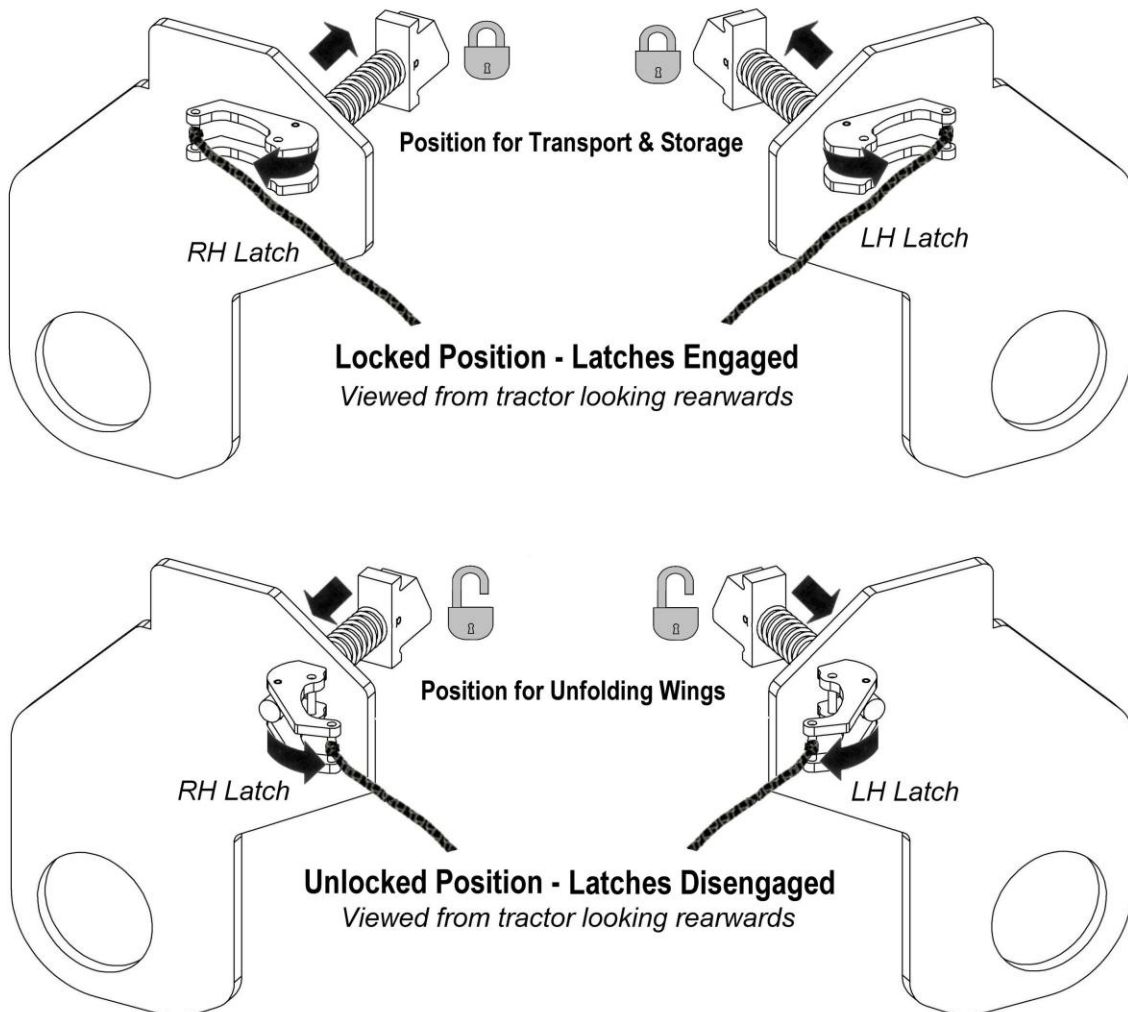
### CAUTION!

Both transport latches must be operated and placed into the disengaged position before attempting to unfold the machine.

## Location of Transport Latches

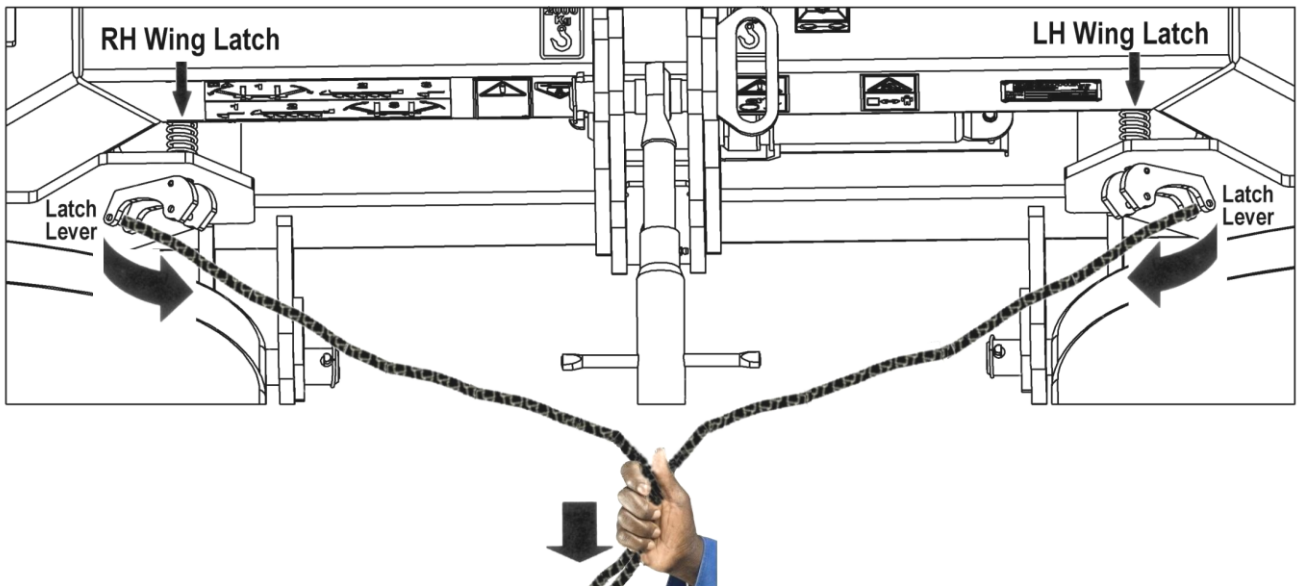


## Transport Latch Locked / Unlocked Positions





## Transport Latch Operation

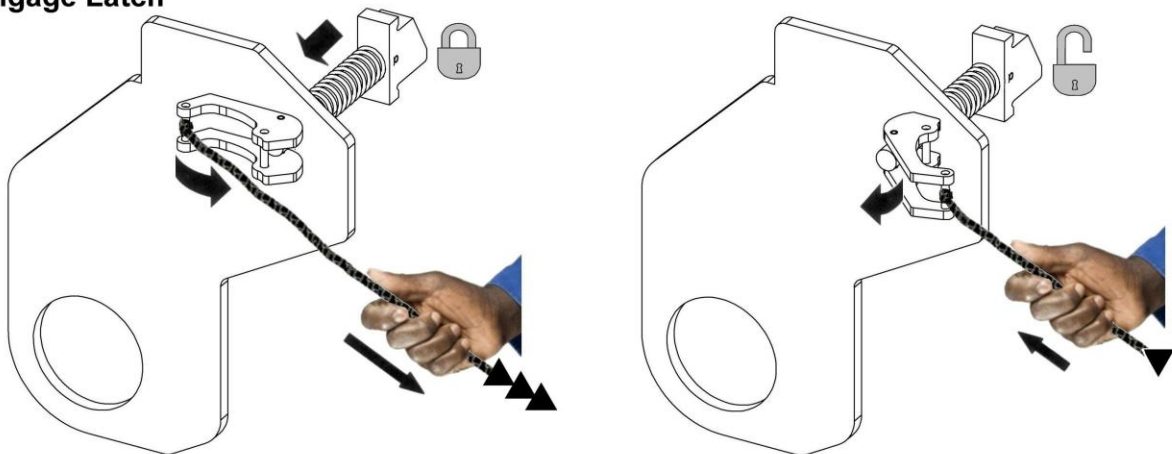


The sprung latches are operated by ropes attached to the latch levers allowing them to be controlled through the rear window of the tractor cab. The latches are designed to be 'self-holding' in their disengaged position allowing the wings to be unfolded without the need to retain tension on the ropes.

Ensure ropes are routed where they do not risk interference from moving or rotating components on either the tractor or machine and can be freely operated when required.

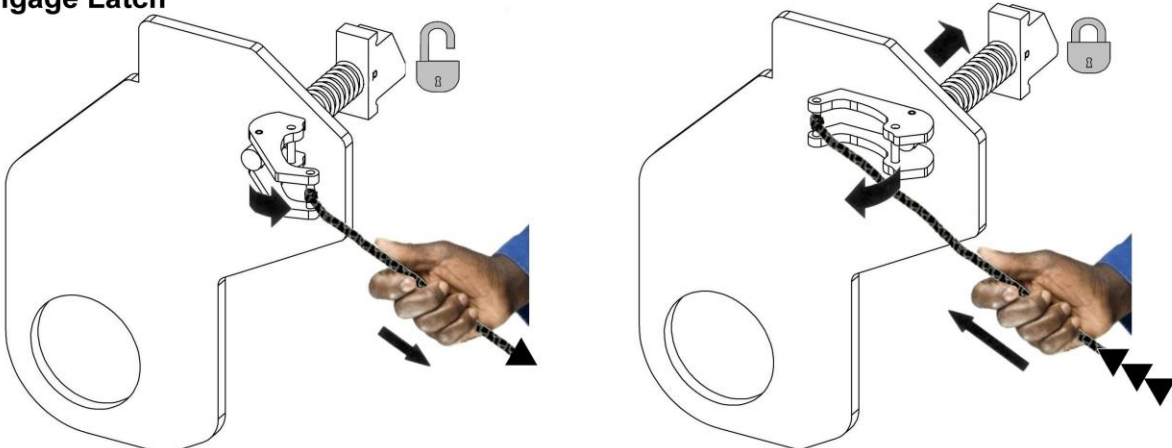
The procedure for operating the transport latches is shown below (*RH latch illustrated*);

### Disengage Latch



Pull rope to draw cam lever over its cam, then slowly release the rope until lever rests on its shoulder.

### Re-engage Latch



Pull rope to draw cam lever fully off its shoulder, then release the rope allowing lever to return fully.

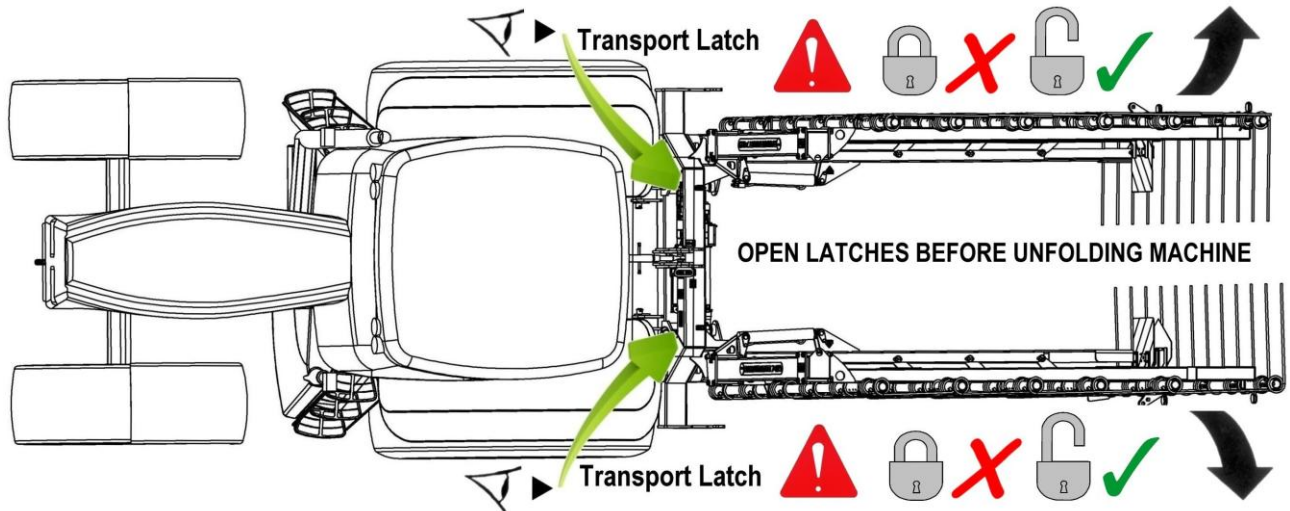
## Automatic Transport Latching

When latches have been disengaged and the wings folded down into the work position, it is permissible to immediately return the latches to the engaged position; this will allow automatic latching when the wings are next folded into transport.

If the latches have not been returned to the engaging position before raising the wings the latches must be manually re-engaged after the wings have been fully raised; this will be by using the ropes to operate the latch levers as previously described.

## Moving from Transport to Work Position

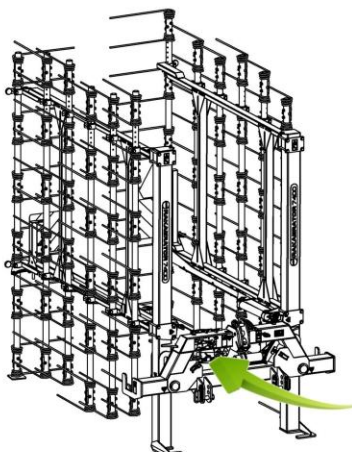
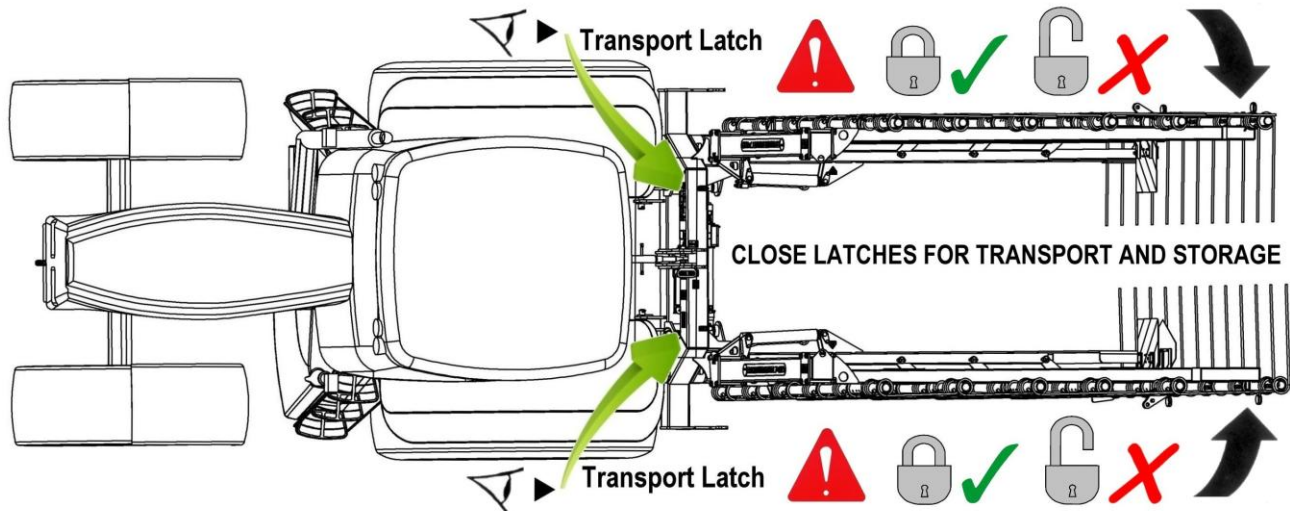
Requires manual operation of both transport latches before lowering the wings.



## Moving from Work to Transport Position

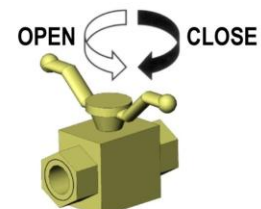
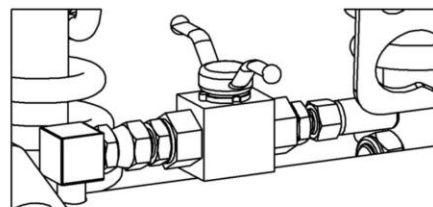
Requires manual latching after folding if transport latches are in the disengaged position.

Automatic latching only if transport latches are in the engaged position prior to folding.



## Wing Ram Lock Tap (Transport/Storage)

The hydraulic ram that operates the wings is equipped with a lock tap for additional security when the wings are raised; the lock tap should be closed for transportation and storage and opened for ram operation and work.

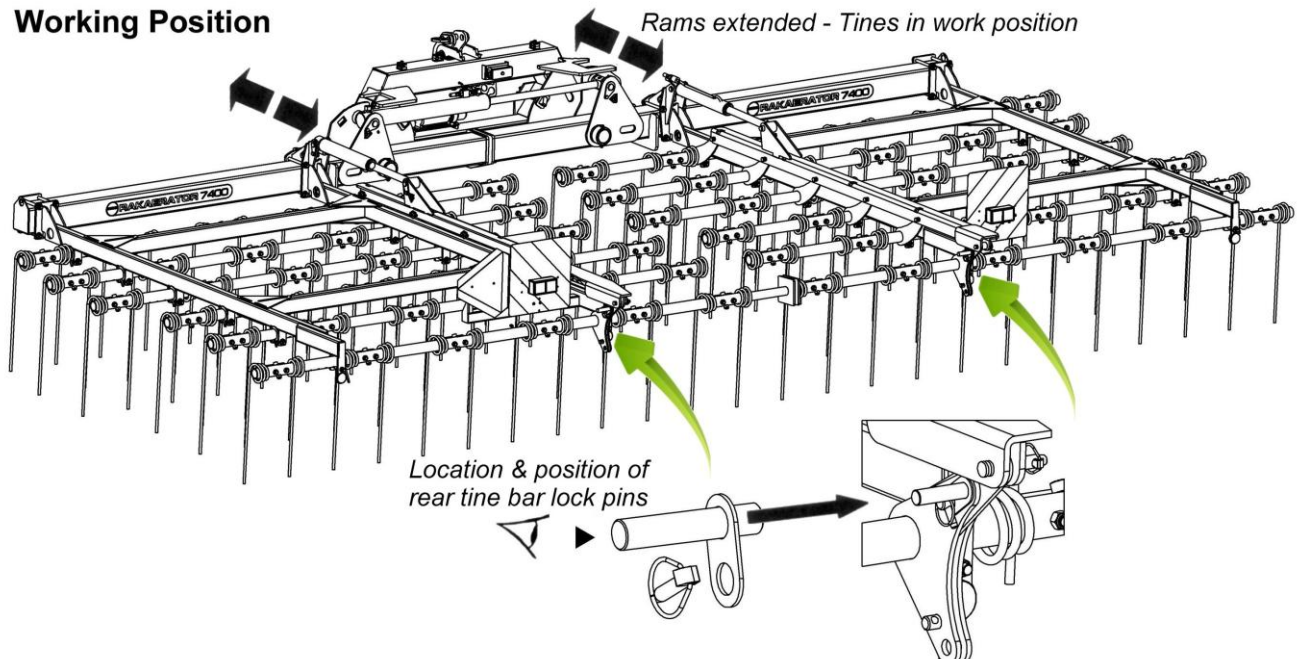




## Rear Tine Bar Transport Setting

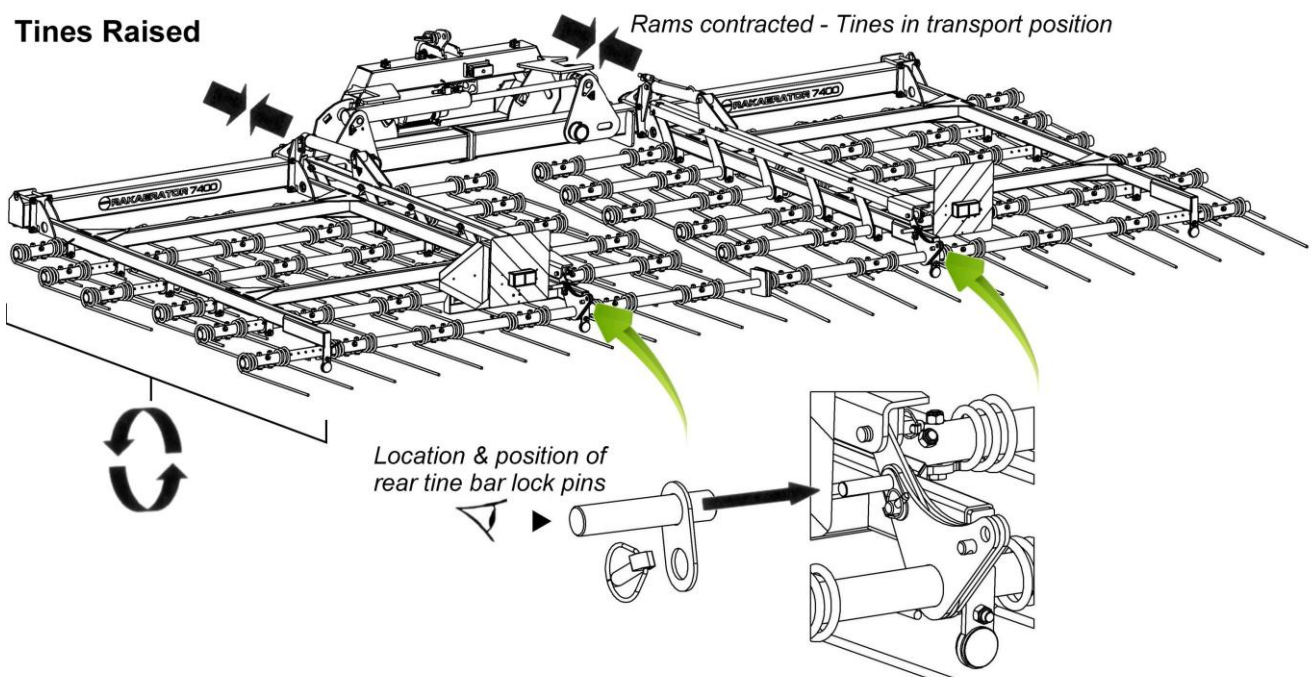
For safety and compact transportation the rear tine bars must be manually adjusted so that the tines are positioned inwards when the machine is folded into its transport/storage position; the procedure for this adjustment is shown below and must be performed before folding the machine.

### Working Position



With the machine raised clear of the ground; fold the rows of tines into their raised position by operating the tractor controls to contract the tine bar control rams.

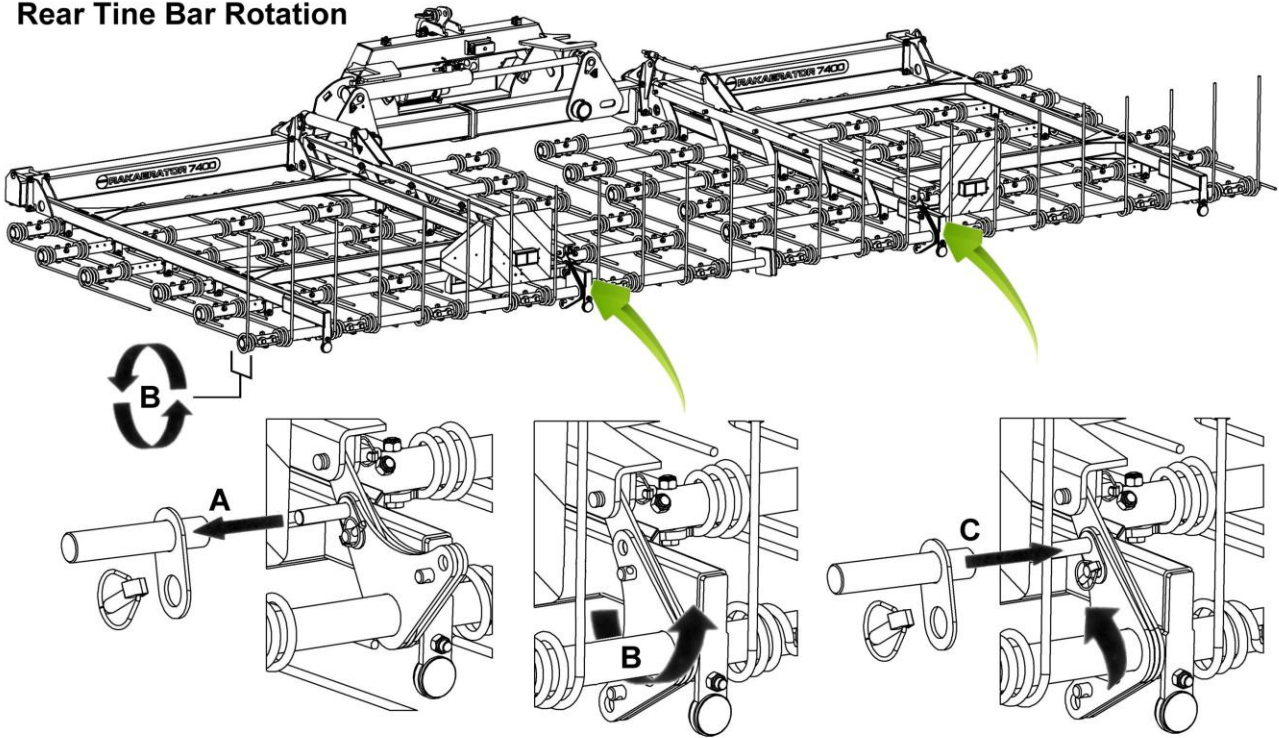
### Tines Raised



Remove the rear tine bars locking pins and rotate each of the rear tines bars through 90° before replacing the pins to lock them into their transport/storage position.

*Note; rotation of the rear tine bars can be performed when the tines are in their lowered work position providing they are clear of the ground.*

## Rear Tine Bar Rotation

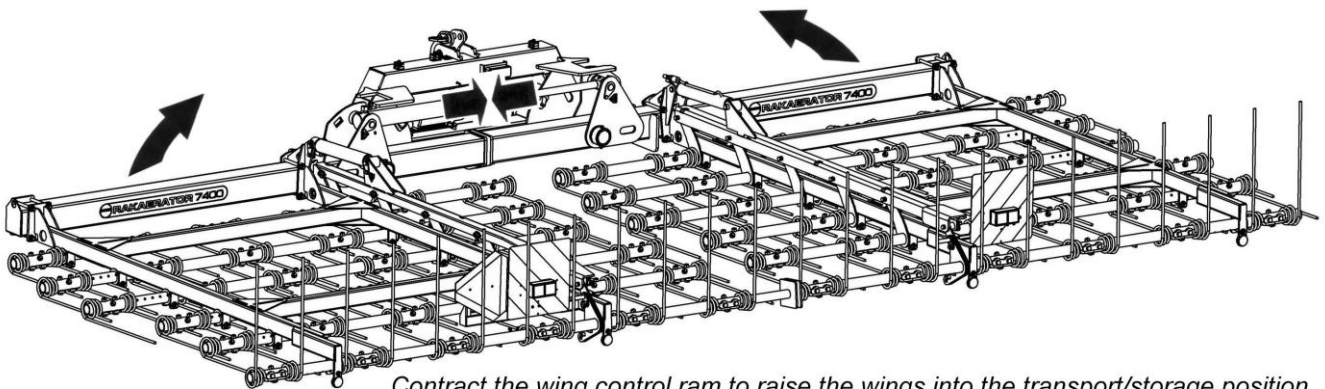


A) Remove rear tine bar lock pin

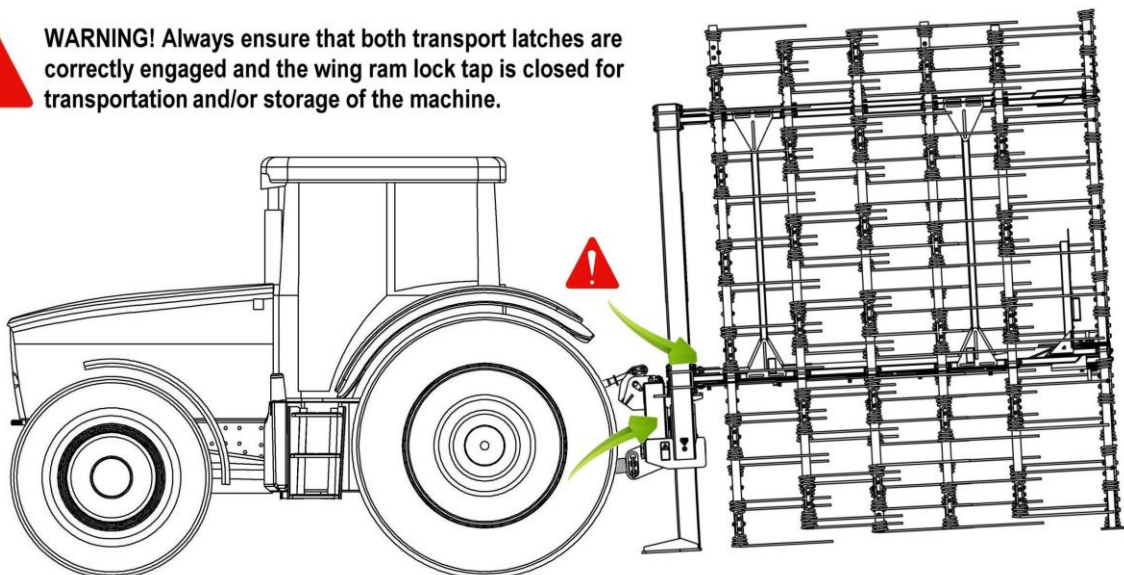
B) Rotate rear tine bar upwards

C) Replace rear tine bar lock pin

With the machine's tines raised and the rear tine bars placed into their transport/storage mode the machine can now be folded into the transport position by operating the central wing control ram; when wings have been raised ensure that both transport latches are correctly engaged. Close the wing ram lock tap during machine transportation and storage.



**WARNING!** Always ensure that both transport latches are correctly engaged and the wing ram lock tap is closed for transportation and/or storage of the machine.





## 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. Excessive transport speed must be avoided at all times to ensure the driver retains complete control of the unit, especially on public highways. When manoeuvring in close proximity to any form of overhead obstructions speed should be kept to a minimum to allow sufficient time to either stop or avoid the obstacle.

## Transport Width

In the transport position the width of the machine will be within the confines of the tractor.

## Transport Height

There is no fixed dimension for the overall transport height of the machine as this will vary for differing applications i.e. tractor size and carrying height but It must be noted that the machine alone when folded has a standing height of approximately 3.7m (12' 2"); therefore great care must be adopted at all times during transportation when it is raised on a tractor, especially when manoeuvring close to buildings, trees, bridges and other overhead obstructions.

It is advisable that the operator takes accurate height measurements of the machine in its transportation state so that they are fully aware of the overall transport height. Transport routes should be carefully planned to avoid obstacles that are likely to be lower than the height of the machine.

## Overhear Power Lines (OHPL's)

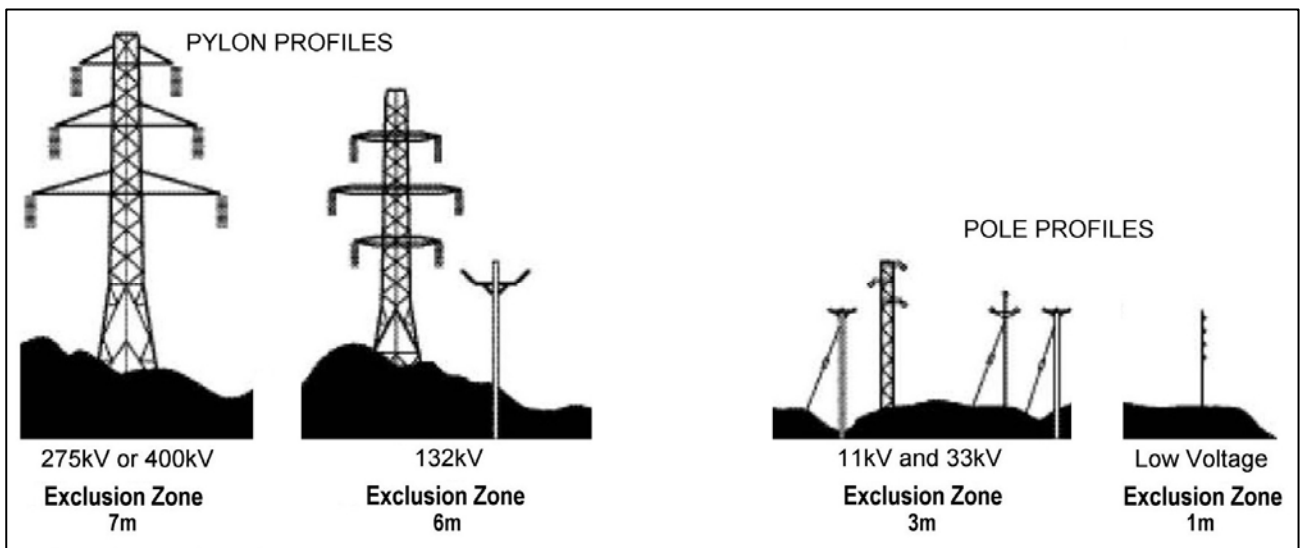
It cannot be stressed enough the dangers involved when working or transporting machines in the vicinity of Overhead Power Lines (OHPLs). Remember electrocution can occur without actually coming into contact with a power line as electricity can 'flashover' when machinery gets close to it.



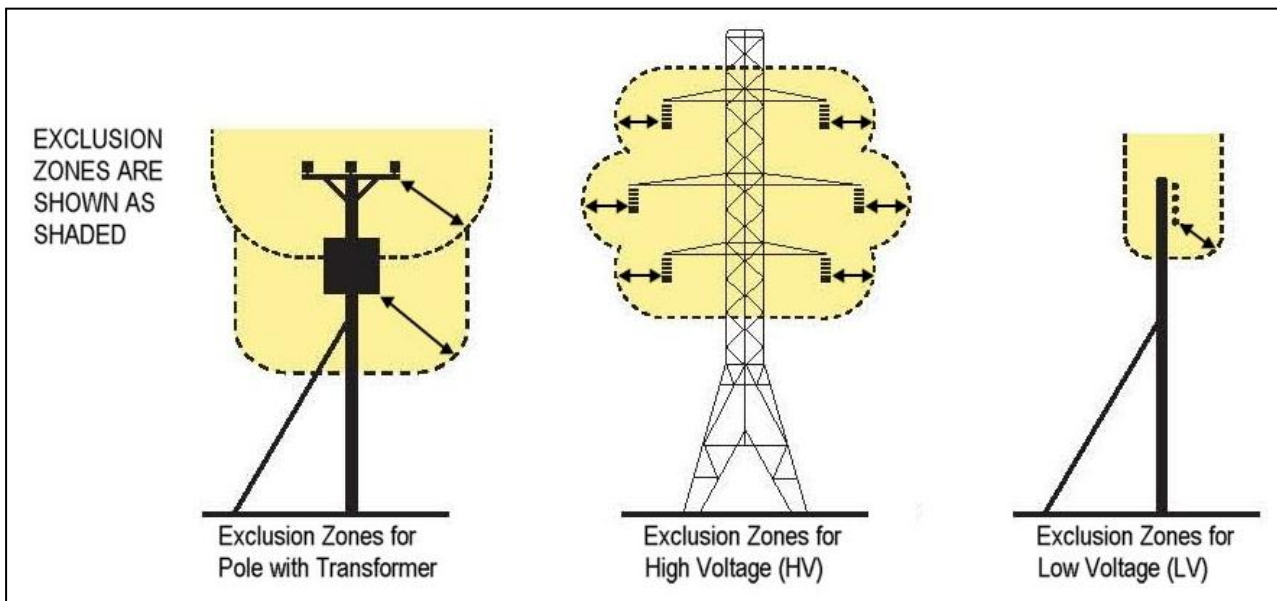
**WARNING: All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPLs).**

Wherever possible the safest option is always to avoid working in areas close to OHPLs. Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work – see *following page for details*. All operators should perform a risk assessment before operating the machine within 10m horizontal distance of any OHPLs.

## Absolute Minimum Exclusion Zones for Specific Overhead Power Lines



## Definitions of Exclusion Zones



### Risk Assessment

Before starting to work near OHPLs you should always assess the risks. The following points should be observed;

- **Know** the risks of contacting OHPLs and the risk of flashover.
- **Find out** the maximum height and maximum vertical reach of your machine.
- **Find out** the location and route of all Power Lines within the work area.
- **Find out** the operating voltage of all Power Lines within the work area.
- **Contact** the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, safe minimum clearance distance for working, and additional precautions required.
- **Never** attempt to operate the machine in exclusion zones.
- **Always** work with extreme caution and plan your work ahead to avoid high risk areas.
- **If doubt exists** do not work in the area – never risk the safety of yourself or others.

### Emergency Action for Accidents Involving Electricity

- Never touch an overhead line - even if it has been brought down by machinery, or has fallen. Never assume lines are dead.
- When a machine is in contact with an overhead line, electrocution is possible if anyone touches both the machine and the ground. Stay in the machine and lower any raised parts in contact or drive the machine out of the lines if you can.
- If you need to get out to summon help or because of fire, jump out as far as you can without touching any wires or the machine - keep upright and away.
- Get the electricity company to disconnect the supply. Even if the line appears dead, do not touch it - automatic switching may reconnect the power.

Further information and leaflets on this and other agricultural safety subjects are available on the 'Health & Safety Executive' website at the following address: [www.hse.gov.uk/pubns/agindex.htm](http://www.hse.gov.uk/pubns/agindex.htm)

## Tractor Hydraulics Setting

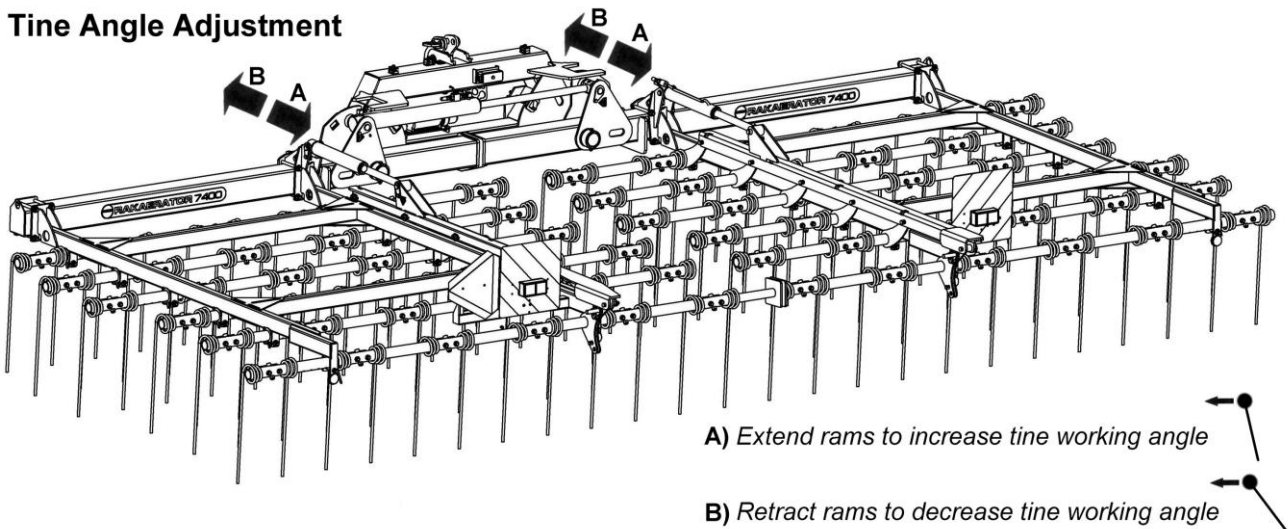
Set tractor hydraulics to 'float' position for work.

## Machine Work Height

There is no set operating height for the machine as it will be dependent on the length of the tines and the angle they are set at for work; the sharper the work angle of the tines, the lower the operating height of the machine.

When setting the working height the frame and wings of the machine must be set parallel to the ground both lengthways and transversely to ensure all the tines have equal contact with the ground.

## Tine Angle Adjustment



## Operating Speed

Forward operating speed will be dependent on various factors such as tractor horsepower, ground conditions and the particular task being undertaken. In the majority of cases speed will fall within the region of 8-12mph; select a safe speed that produces the best results for the task in hand.

## Initial Operation with a New Machine

Restrict forward speed to a minimum on the first day of work with a new machine to allow components to 'bed in'; during this period regular checks of nuts and bolts should be made and if necessary re-torqued. Lubricate the machine fully prior to use.

## Machine Storage

For extended periods of storage it is advisable that the machine be kept in a clean dry environment protected from the elements to avoid risk of corrosion. The machine should be thoroughly cleaned and lubricated prior to storage. At this point it is good practice to check the machine for worn or damaged components - any parts that require replacing should be ordered and fitted at the earliest opportunity so the machine is fully prepared for the next seasons work.



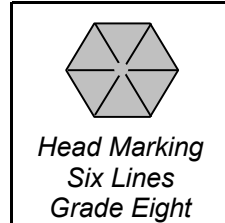
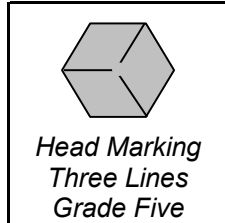
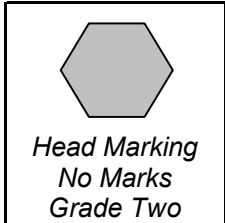


# TORQUE SETTINGS FOR FASTENERS

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



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

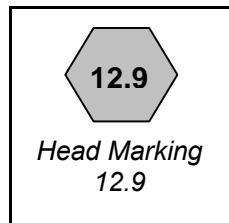
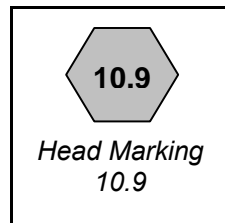
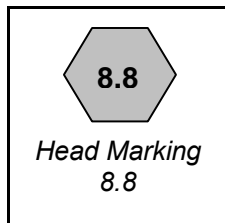
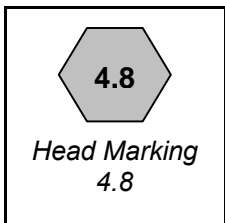
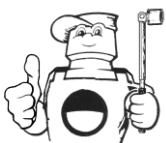
Bolt Dia.
1/4"
5/16"
3/8"
7/16"
1/2"
9/16"
5/8"
3/4"
7/8"
1"
1-1/8"
1-1/4"
1-3/8"
1-1/2"

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

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

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

## TORQUE VALUES FOR METRIC BOLTS.



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

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

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

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

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





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