

# TWIN ROTARY RAKE

## Model: RR850-26

### OPERATOR MANUAL

Publication 765

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# 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](http://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 Limited 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 Limited 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 Limited 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.
- 1.03. The manufacturer will replace or repair 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.
- 1.04. 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, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads or pneumatic tyres.
- 1.05. Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.
- 1.06. 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.
- 1.07. 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 Limited cannot be held liable, and may have safety implications.
- 1.08. 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 Limited.
- 1.09. For machine warranty periods in excess of 12 months the following additional exclusions shall apply:
  - 1) Hoses, external seals, exposed pipes and hydraulic tank breathers.
  - 2) Filters.
  - 3) Rubber mountings.
  - 4) External electric wiring.

**N.B. 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 Limited 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 web site and confirms the registration to the purchaser by completing the Verification of Warranty Registration in the operator's manual.
- 2.02. Any fault must be reported to an authorised Twose 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 Limited 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 Limited.
- 2.04. All claims must be submitted, by an authorised Twose Service Dealer, within 30 days of the date of repair.
- 2.05. Following examination of the claim and parts the manufacture will pay, at their discretion, for any valid claim the cost of any parts and an appropriate labour allowance if applicable.
- 2.06. The submission of a claim is not a guarantee of payment.
- 2.07. Any decision reached by Twose of Tiverton Limited is final.

## **3. LIMITATION OF LIABILITY**

- 3.01. The manufacturer 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. The manufacturer makes no warranty as to the design, capability, capacity or suitability for use of the goods.
- 3.03. Except as provided herein, the manufacturer 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. The manufacturer 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 Trailed Twin Rotary Rake

Product Code; RR850-26

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

Manufactured in; Slovenija

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 14121-1 (2007) Safety of machinery - Risk assessment, Part 1: Principles Part 2: practical guide and examples of methods.
- BS EN ISO 12100-1 (2010) Safety of machinery - Part 1: Basic terminology and methodology Part 2: Technical principles.
- BS EN 349(1993)+ A1 (2008) Safety of machinery - Minimum distances to avoid the entrapment with human body parts.
- BS EN 953 (1998) Safety of machinery - Guards General requirements for the design and construction of fixed and movable guards.
- BS EN 982(1996)+ A1 (2008) Safety requirements for fluid power systems and their components. Hydraulics

Signed ..... *Responsible Person*  
*on behalf of TWOSE of TIVERTON LIMITED*

*Status:* General Manager

*Date:* May 2011

## LIST OF CONTENTS

Specifications	1
Description	2
General Arrangement	3
Safety Information	4
Safety Decals	6
Machine Attachment	7
PTO Shaft	7
Connection Height Adjustment	9
Tine Height Adjustment	9
Rotor Level Adjustment	9
Spring Tine Arms	10
Safety Guarding	10
Swath Width Adjustment	11
Rake Timing	12
Moving into Transport	13
Moving into Work	13
Parking & Storage	14
Maintenance	15

## Technical Data

Specification	RR850-26
Working width ( <i>Maximum</i> )	8.30m
Working width ( <i>Minimum</i> )	7.24m
Transport width	2.99m
Machine length	5.82m
Transport height ( <i>with protections raised</i> )	3.99m
Transport height ( <i>with protections folded</i> )	3.20m
Number of rotors	2
Rotor diameter ( <i>each</i> )	3.55m
No. arms per rotor	13
No. of double tines per arm	4
No. of double tines per machine	104
Depositing direction	Centre swath
PTO speed ( <i>Maximum</i> )	540RPM
PTO speed ( <i>Optimum</i> )	400 – 500RPM
PTO safety clutch adjustment	900Nm
Tyres on rotor chassis	16x6.50-8 4ply
Tyres on chassis	10.0 / 75 - 15.3
Tyre pressure ( <i>Rotor chassis tyres</i> )	2.0 Bar
Tyre pressure ( <i>Chassis tyres</i> )	3.0 Bar
Tractor power required ( <i>Minimum</i> )	40kW / 54HP
Machine weight	2040kg
Hitch type	Linkage

## Noise Level

The noise level of the machine is less than 70dB

## Machine Serial Number Plate

All machines will have a serial number plate fitted to them stating; the machine model, serial number of the machine, and the machine's weight. When ordering replacement parts or requesting service information always quote the machine model and serial number as stated on the serial number plate.



## Description

The Twose RR850-26 is a linkage mounted, twin rotary rake specifically designed for gathering into swaths dry or faded forage, grass, and clover. The rotors of the machine turn in opposing directions to produce a centralised swath under the main chassis of the machine.

The rotors, which are each mounted on their own tandem 'walking' axles, are equipped with 13 arms with 4 sets of double spring tines per arm for efficient raking action with excellent machine manoeuvrability provided by the rear wheel steering system.

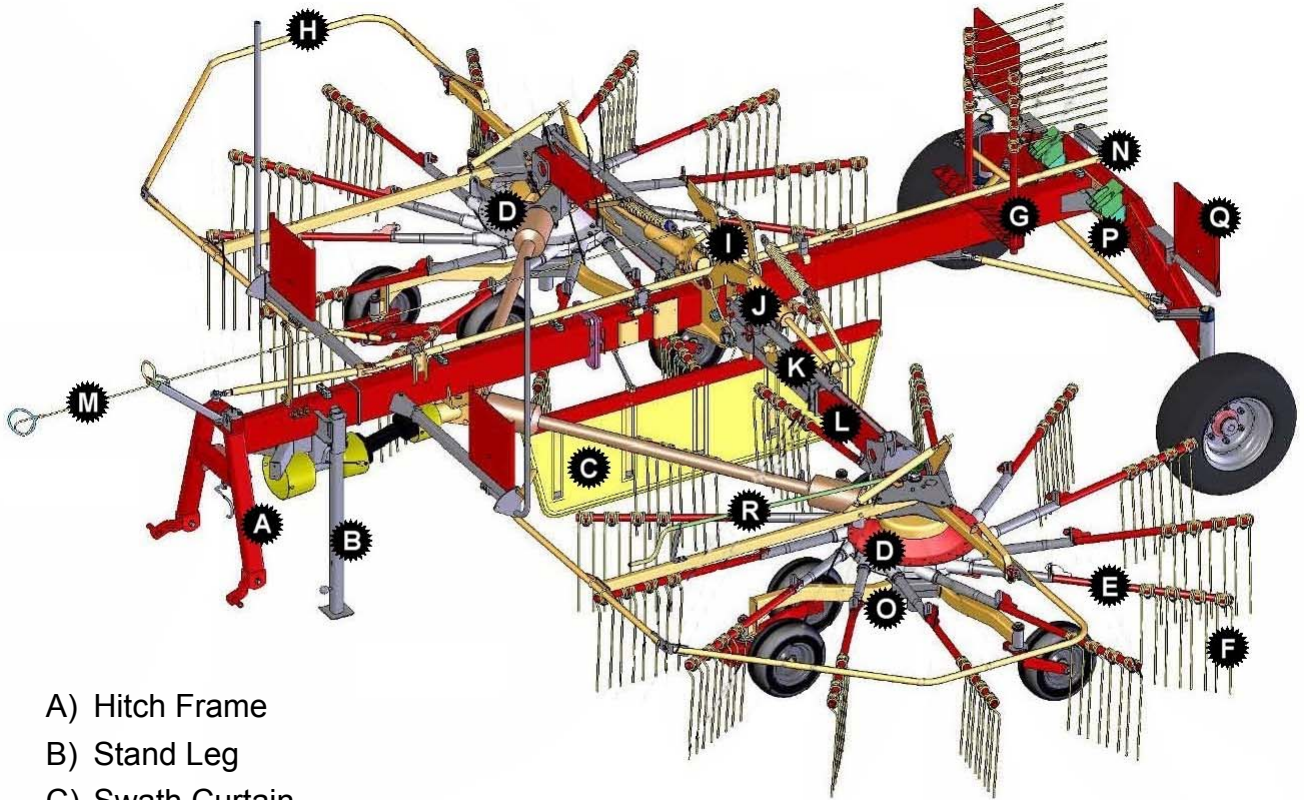
The rotors are hydraulically folded for compact transportation of the machine between work sites.

This machine must only be used to perform the task for which it is designed. Use of the machine for any other function may cause damage to the machine and possible injury to the operator or other persons.



### General Arrangement

The diagram below shows the location of the machines main components.



- A) Hitch Frame
- B) Stand Leg
- C) Swath Curtain
- D) Rotor
- E) Tine Arm
- F) Tine
- G) Tine Arm Stowage (Transport)
- H) Protection Guard
- I) Transport Latch (Rotor Arms)
- J) Rotor Arm Lifting Ram
- K) Rotor Arm Extending Ram
- L) Rotor Arm
- M) Latch Operation Cord
- N) Rear Steering Mechanism
- O) Rotor Tandem Axle
- P) Wheel Chocks (Stowed)
- Q) Sign and Lighting Plate
- R) Tine Height Adjuster



## Safety Information

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In the interest of safety it is important that great care is adopted at all times during the attachment, transportation, operation and maintenance of this machine. Both the owner and the operator of the machine should read and understand the following section to ensure the safety of themselves and all other persons who enter into the close proximity of these machines.

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- ▲ In addition to the instructions stated here always abide by general safety and accident regulations.
- ▲ Safety and warning decals placed on the machine give important instructions for safe work - take them into consideration for your safety and the safety of others.
- ▲ While driving on public roads always abide by traffic signs and road regulations.
- ▲ Familiarise yourself with the controls and functions of the machine and practice them in a safe location before attempting to start work.
- ▲ Never approach this machine whilst it is working or running – switch off the machine and wait until it has stopped fully before approaching.
- ▲ Do not wear loose fitting clothes in the vicinity of this machine - clothes should fit tight to the user's body.
- ▲ Check no one is near to, or on, the machine before attempting to start or transport it. Ensure your visibility is kept clear at all times.
- ▲ Never permit anyone to ride on this machine.
- ▲ Implements should always be attached according to the manufacturer's instructions and fastened correctly to the prescribed devices using the correct components.
- ▲ When disconnecting the machine from the tractor select a firm level site and use the support leg.
- ▲ Take care when connecting or disconnecting the implement to the tractor – keep onlookers at a safe distance.
- ▲ Ensure controls for the machine are positioned such that the machine cannot accidentally be started during transport.
- ▲ For transportation on the road, prepare and secure the machine according to the manufacturer's instructions.
- ▲ Never leave the driver seat whilst the tractor or the machine is running.
- ▲ Always adjust the driving speed to suit the driving conditions. Avoid fast turning when driving uphill, downhill or across a slope. Braking performance and turning ability will be affected when implements are connected or mounted to the tractor - allow extra time for turning and braking.

- ▲ Never attempt to operate a machine without its safety devices fitted or incorrectly secured.
- ▲ Ensure all bystanders are kept at a safe distance from a moving or working machine.
- ▲ Even when the machine is unattached some hydraulic or mechanical components on the machine are able to be rotated or moved by hand and are therefore capable of causing injury to fingers or hands due to trapping. Wherever possible secure these components during storage to prevent accidental injuries.
- ▲ Always place the machine in a safe position before leaving the tractor - lower the implement completely, switch off the engine and remove the ignition key.
- ▲ Never permit anyone between the machine and the tractor whilst either is working or when the machine is in a raised position.
- ▲ Only use machines on a tractor that is capable of taking its weight - use weights or ballast as required ensuring stability of the unit.
- ▲ Be aware at all times of the width, height and length of any machinery you are operating – especially when transporting on the public highway or near obstructions.
- ▲ Ensure the work area is clear of obstructions before starting work – clear stones, wire, glass or any other dangerous objects from the work site before attempting to start work.

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**Although the information given here covers a wide range of safety subjects it is impossible to predict every eventuality that can occur under differing circumstances whilst operating this machine. No advice given here can replace 'good common sense' and 'total awareness' at all times but will go a long way towards the safe use of your Twose machine.**

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## Safety Decals



1



2



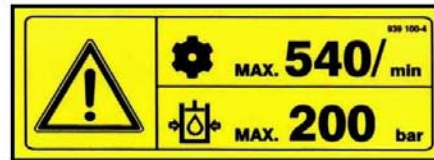
3



4



5



6



7



8

**2,0 bar**

9

**3,0 bar**

10

1. Read the book first.
2. Keep clear of articulation area whilst engine is running.
3. Switch off engine and remove key before performing maintenance or repairs.
4. Lower protection rails before operating the machine.
5. Keep clear of swinging area of implements.
6. Maximum PTO speed 540RPM.
7. DANGER – Moving parts, risk of trapping - keep clear.
8. DANGER – Keep a safe distance from working machine.
9. Tyre pressure – rotor chassis wheels.
10. Tyre pressure – main chassis wheels.

### Machine Attachment

Select a firm level site on which attach the machine to the tractor.

Reverse the tractor squarely up to the machine to a position where the machine's hitch frame (1) can be attached to the tractor's lower links (2) and secure in position with pins (3) - *refer opposite*.

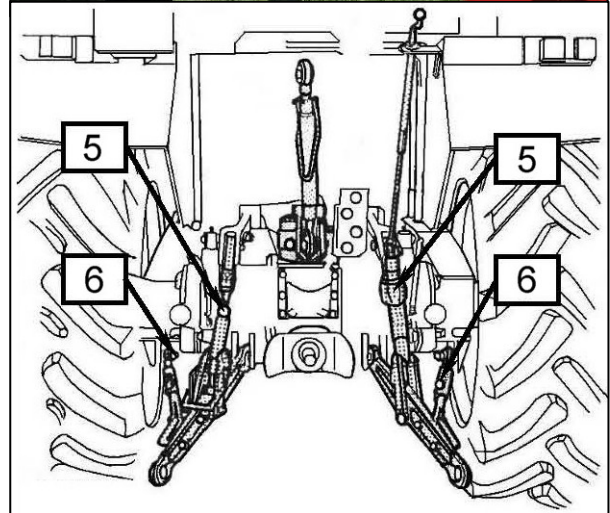
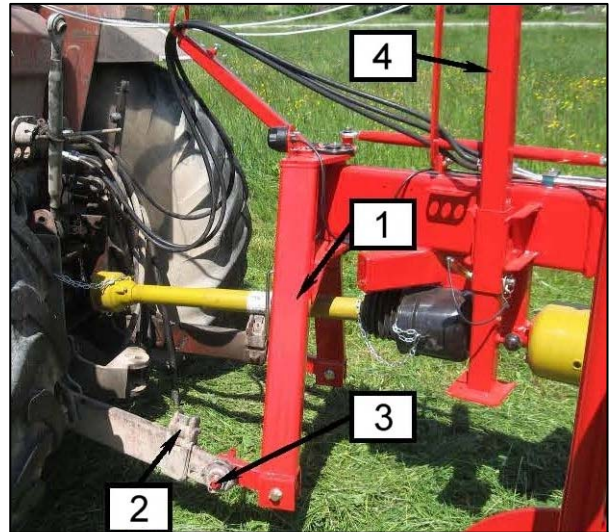
Raise machine with the tractor's hydraulics to take the weight off the support leg (4). Raise support leg into transport position and secure in place. **Do not remove the support leg.**

Connect hydraulic hoses and test to ensure the rams function correctly.

Connect the lighting connection and check all lights are working correctly.

Carefully feed the transport latch operation cable into the tractor cab via the rear window – ensure the cable is slack and is kept clear of any components that could cause unintentional operation.

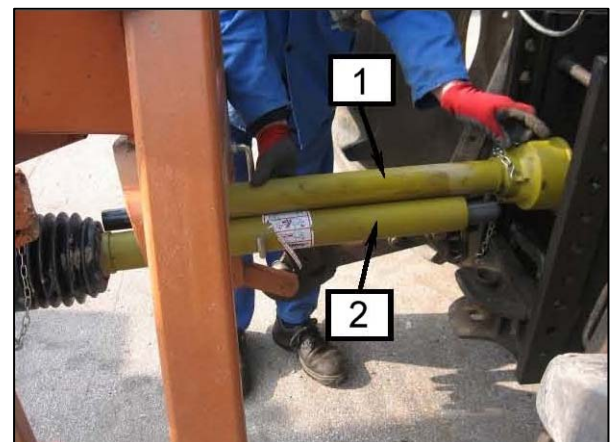
Fit and tighten check chains (6) and/or stabiliser bars (5) to secure the lower linkage and prevent sideways movement.



### PTO Shaft

Fit and connect the PTO shaft. When fitting the PTO, the half with the overload clutch must be fitted on the machine side (2).

On initial attachment the shafts will need to be measured and adjusted to suit the tractor used. To adjust the length, pull the shafts apart and place them on the tractor side (1) and the machine side (2) before measuring and cutting the shafts - *refer below*.

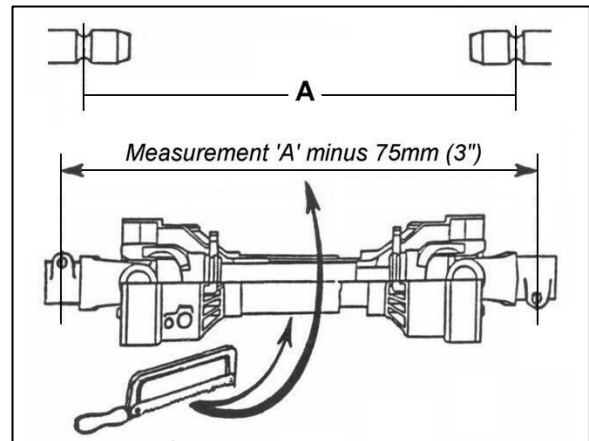




Measure the PTO shaft and cut to the dimension shown - see *diagram opposite*.

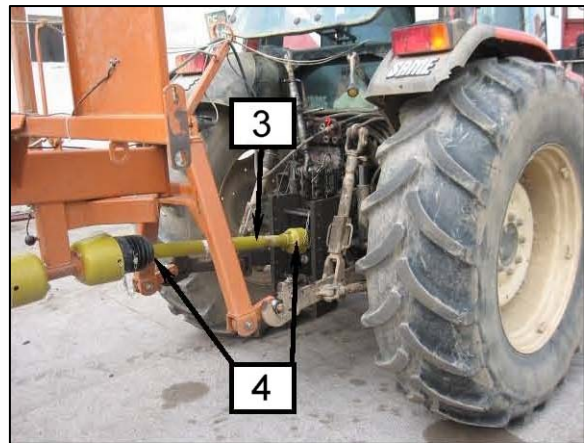
The finished length of the PTO shaft should be 75mm (3") less than the measured distance 'A' - between the tractor shaft and gearbox stub shaft to enable correct fitting.

Note: For subsequent use with different tractors measure again - there must be a minimum shaft overlap of 150mm (6").



Once fitted, ensure the PTO has freedom of movement and does not foul on the tractor or machine during normal manoeuvres.

When the PTO shaft has been fitted, secure the guards (3) and (4) with torque chains to prevent them from rotating with the shaft.



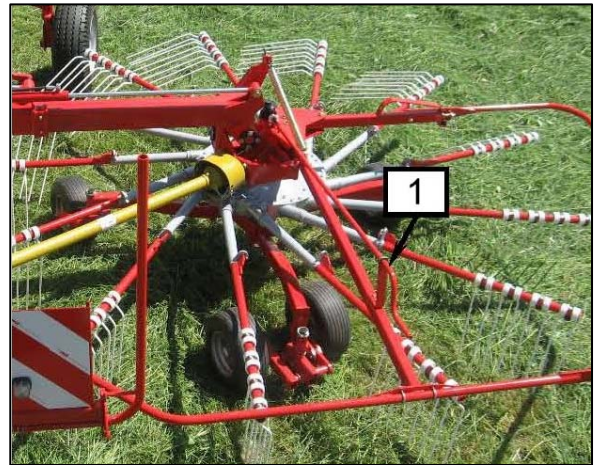
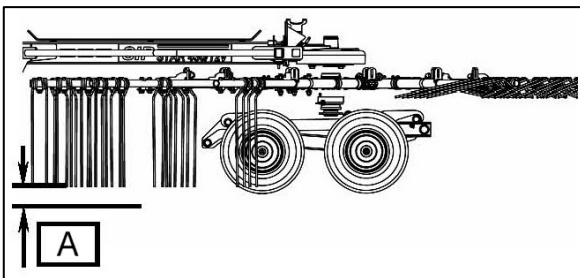
### Connection Height Adjustment

With the tractor and machine on firm level ground, adjust the tractor's hydraulics to position the machine's main beam (1) parallel to the ground.



### Tine Height Adjustment

For efficient clean 'swathing' the distance between the tines and the ground should remain constant.



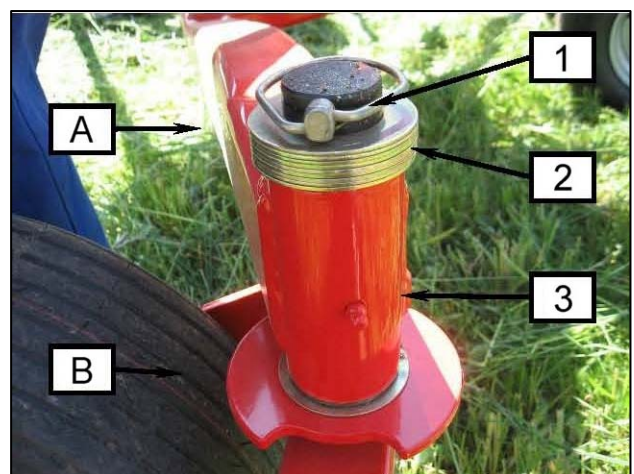
Set the height (A) so the tines are approximately 25mm clear of the ground – this should be set with the machine positioned on a level surface.

Height is altered by via an adjustment lever (1) on each rotor as shown above.

### Rotor Level Adjustment

Rotors must be level both transversely and longitudinally – each rotor chassis wheel is fitted with sets of adjustment washers to enable rotor adjustment by altering the ride height.

To adjust the ride height of one or more wheels to level a rotor, remove linch pin (1), and position the shim washers (2) above or below the wheel pivot tube (3) in position 'A' or 'B' to increase or decrease the ride height for that wheel. Re-secure the wheel with the linch pin.

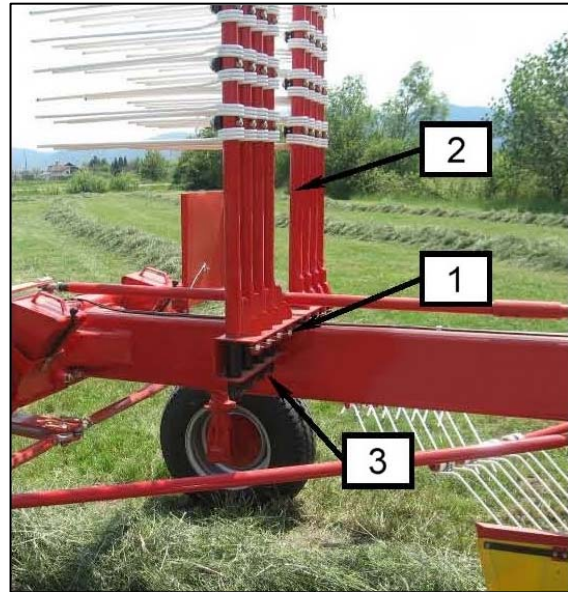
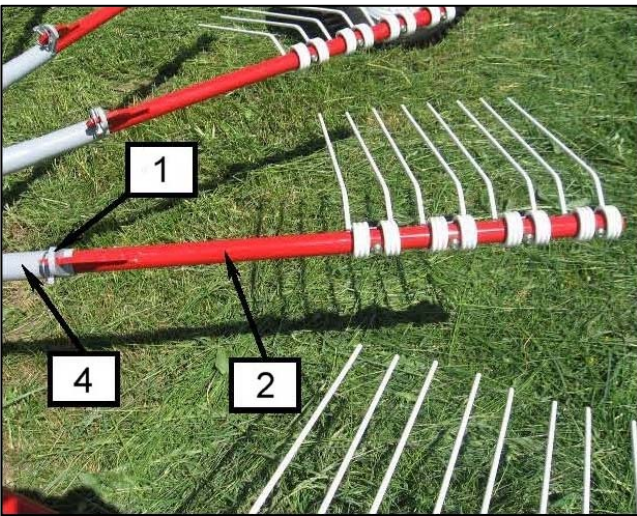




## Spring Tine Arms – Work & Transport Positions

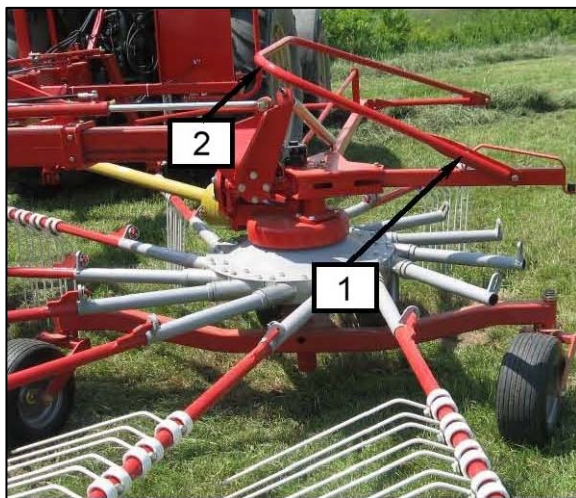
For work, all spring tine arms should be located and secured in their positions on the rotor. For transportation of the machine, the four outermost tine arms on each rotor should be removed and stowed upright in the transport rack (3) located on top of the main beam – the arms (2) are secured in position with the pins (1), these are the same pins used to secure them onto the rotor arms (4).

Ensure the tractor engine is switched off and the starting key pocketed before removing or replacing the tine arms on the rotor.

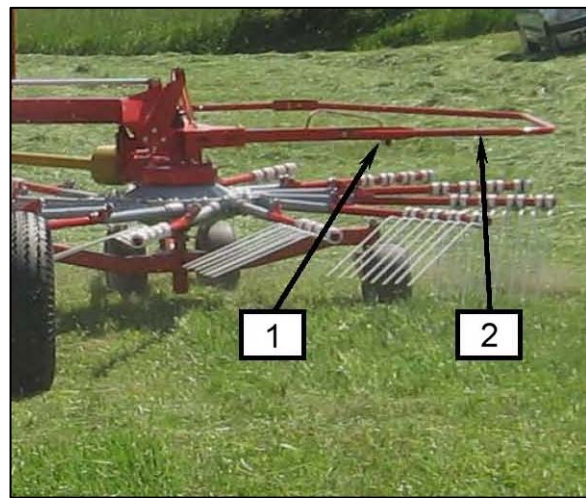


## Safety Guarding – Work & Transport Positions

For transportation the safety guards on both sides of the machine are folded over towards the centre of the machine; pull out bolt (1) and raise the guard (2) to fold it inwards, the bolt will re-lock automatically to hold the guard in position. Moving the guard into the work position is a reversal of this procedure.



Safety Guard - Transport Position



Safety Guard - Work Position

### Swath Width Adjustment

The width of the swath is adjusted from the driver's seat whilst working by operation of the two-way hydraulic rams that link the rotors to the central chassis beam. Increasing or decreasing the working distance of the rotor unit to swath curtain will increase or decrease the width of the swath. Other factors that influence swath width will be type and density of the material being worked and the forward speed of travel.



### Swath Curtain

The swath curtain is automatically raised when the machine is placed into transport position and lowered when the machine is brought into the work position.

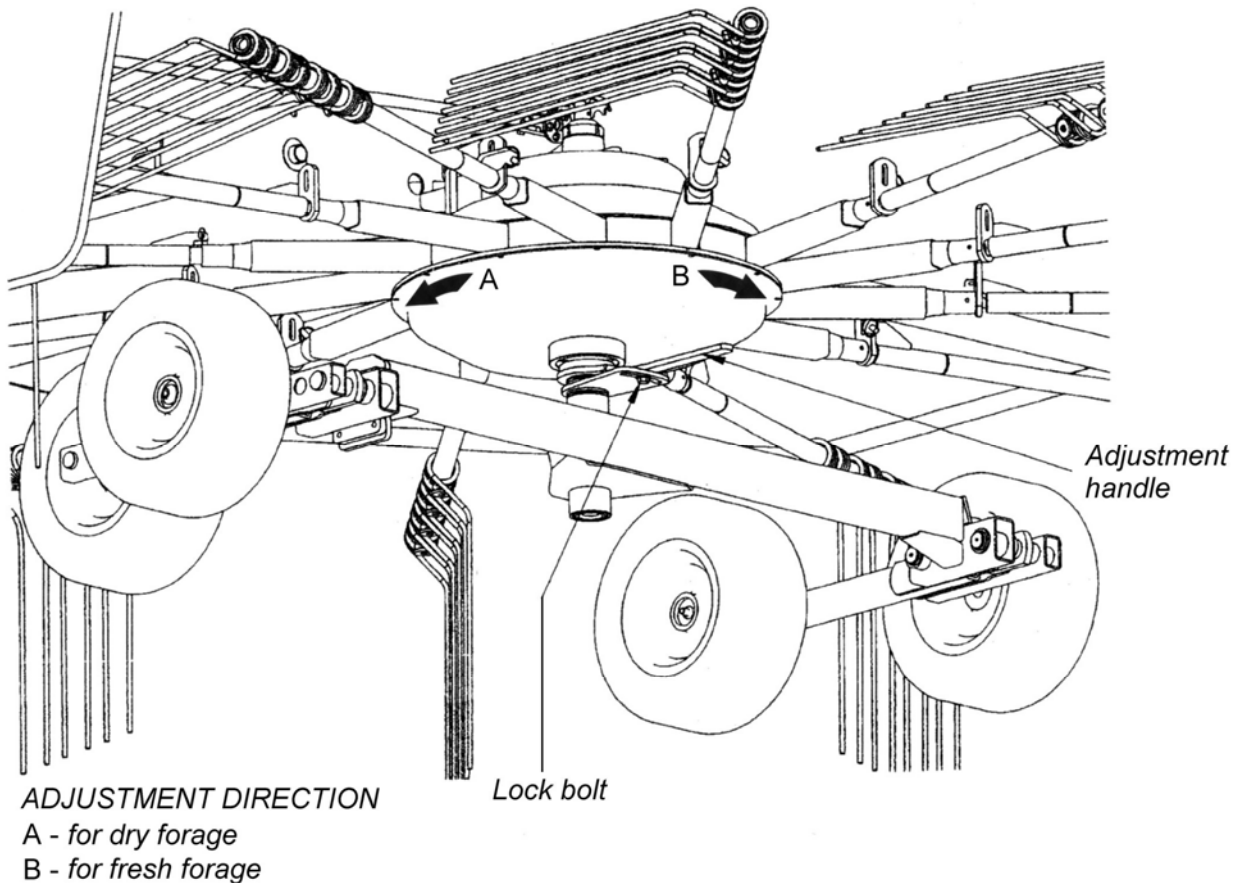
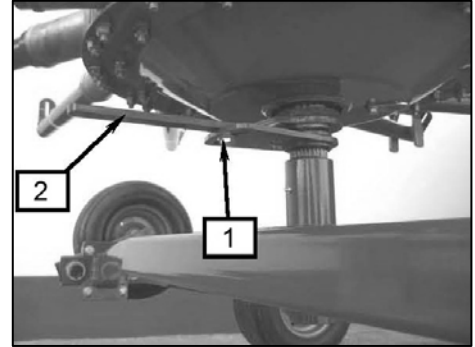


## Rotary Rake Timing

If it is found that the spring tines of the rake are lifting too early or too late and failing to produce a proper swath this can be corrected by an adjustment on the underside of the rotor – raise the machine and loosen the lock bolt (1) on the base of the rotor body, the tine lifting timing can then be adjusted by turning the adjustment handle (2) in a clockwise or anti-clockwise direction to advance or retard the lifting of the tines.

Ensure that the lock bolt is tightened fully after adjustment has been made. This adjustment can be used to set the machine for more efficient raking of the particular forage types – adjust the rotor anti-clockwise when viewed from below for dryer forage and clockwise for fresher forage. Practice at the different settings will determine the best work results.

*Refer to the example diagram below for the location of the adjustment components and suggested adjustment direction.*



### Preparing the Machine for Transport

The machine is equipped with 4 hydraulic rams located on the rotor support arms; 2 single acting rams for raising or lowering the rotors in and out of transport position, and 2 double acting rams that move the rotors in and out to adjust the width of the swath. The latter, when operated in the transport position will raise or lower the transport height of the folded rotors.

**Note: The rotor support arms must be extended outwards to their furthest point before folding them up into the transport position and then lowered (retracted) when they are in the transport position. The same procedure must be reversed when moving back into the work position.**

When the machine is in the folded transport position an automatic sprung safety latch locks the raised rotor arms. Operation of the latch to release the rotor arms for lowering is by means of the latch operation cord; this is operated from the driving position in the tractor cab.

### Moving into Transport Position

**Warning: when moving in or out of the transport position, ensure any bystanders are kept at a safe distance from the machine and that there is sufficient space around the machine to allow free movement of the rotors and tine arms.**

With the tractor switched off and the key removed, fold the rotor guard rails into their transport positions. Detach the 4 outermost tine arms from the rotors and stow in the transport rack secured in place with their locking pins.

Start the tractor, extent the rotors to their widest position, pull the latch operation cord to release latches and carefully operate the single acting rams to raise the rotor arms into the vertical transport position to a point where the safety latches connect to lock the arms. Retract the double acting ram to lower the transport height of the rotors.

### Moving into Work Position

Start the tractor, operate the double acting rams to raise the rotors to their highest position, operate the single acting rams to retract the rotor arms slightly to take their weight off the safety latch, pull the latch operation cord to release the safety latch and operate the rams to lower the rotor arms, keep the latch operation cord taught until the arms are clear of the latch. Continue to operate the rams until the rotors are fully lowered and locked into their work position.

With the engine switched off and the key pocketed, remove stowed tine arms from their transport rack and replace in their positions on the rotors. Fold protection guards outwards into their work position.

Note: Ram operation speeds will be determined by the flow of oil from the tractor; adjust the oil flow to produce steady smooth operation.

### Working the Machine

The machine is designed to rake materials in from both sides of the machine and produce a single central swath. The machine should be worked at a width and speed that produces a clean even swath; adjustments to speed, working width and rake timing may need to be made to suit different densities and/or types of materials.

To cross over a previously produced swath during work the rotors should be raised to the stops by operation of their single acting rams without operation of the latch cord.

### **Transporting the Machine on Public Roads**

The machine is equipped with warning plates and lighting suitable for transporting it on the public highway. When driving the machine on public roads always abide with local and national traffic regulations.

### **Parking the Machine**

When parking up the machine always select a firm level site and leave the machine in a safe and secure state; wheel chocks are provided for this purpose and should be used at all times when the machine is parked or stored. When not in use the chocks are stowed in their storage brackets located on the front of the rear axle beam.

### **Storage**

Wherever possible, storage of the machine should be in a clean dry environment where it is protected from the elements.

Always clean the machine prior to storage, high pressure washers are not recommended as these can cause damage to paintwork.

After cleaning, thoroughly grease the machine, driveshafts, and contact areas of the spring tines.

Check the machine for damaged or worn parts and replace immediately so the machine is ready for the next seasons work.

When restarting a new season, clean off any oil or grease used to preserve components and re-lubricate the machine. Check tyre pressures, lubricant levels and check all nuts and bolts for tightness.

### Maintenance

All maintenance of the machine must be performed with the machine on a firm level site with the tractor engine switched off and the ignition key removed. Never attempt to work on any machine that is raised and not suitably supported.

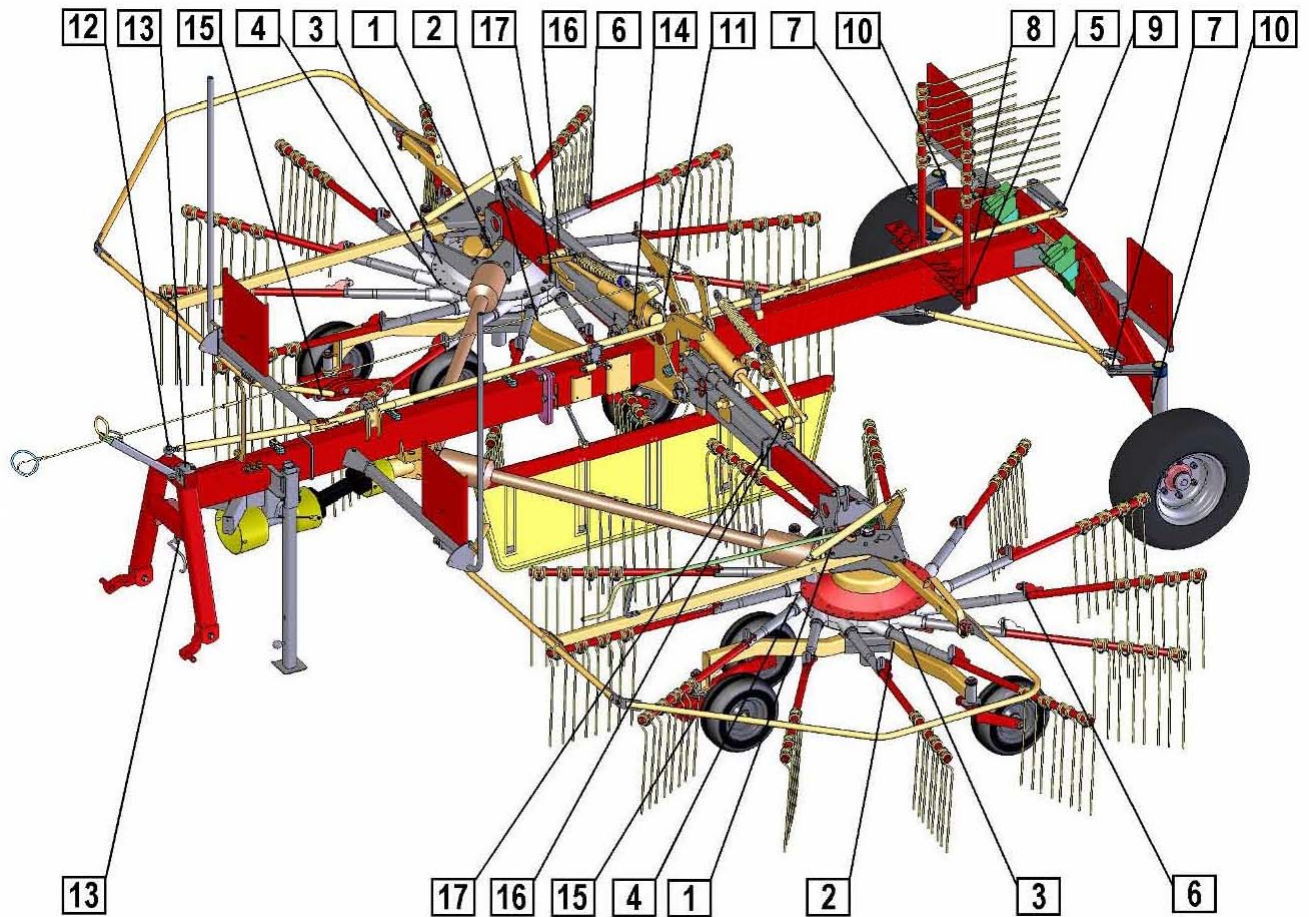
### Tyres

Tyre pressure should be checked on a regular basis – the recommended tyre pressures are;

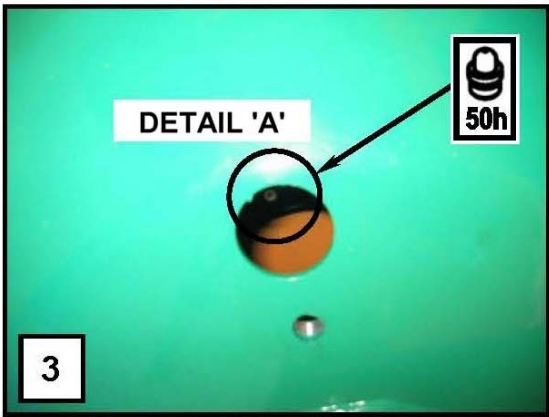
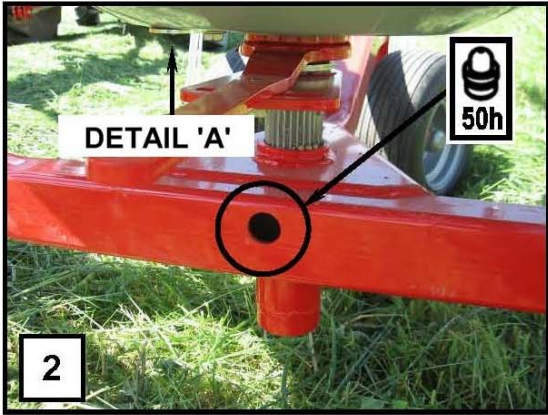
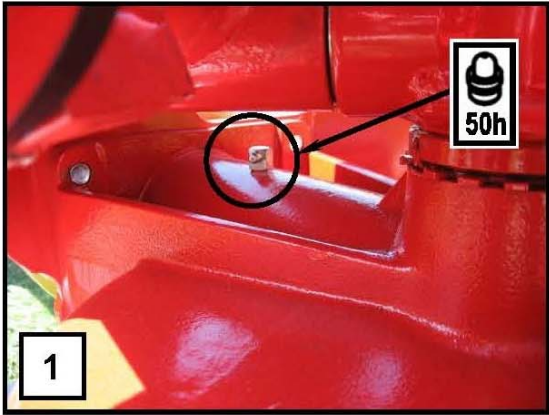
Rear Axle Tyres: 3.0 bar (approx 29psi).

Rotor Axle Tyres: 2.0 bar (approx 43psi).

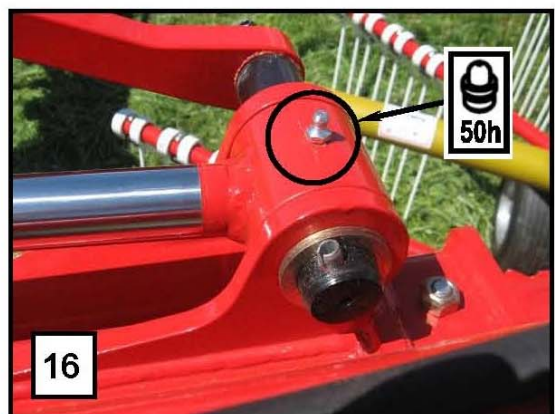
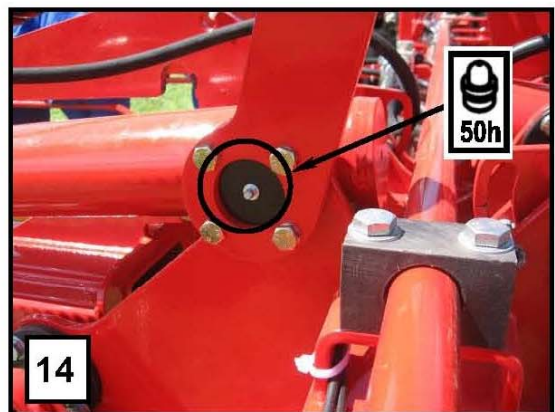
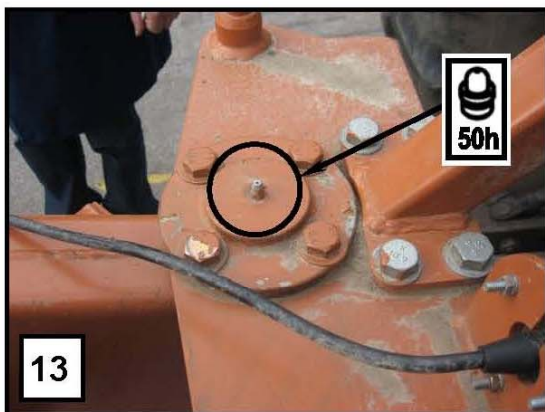
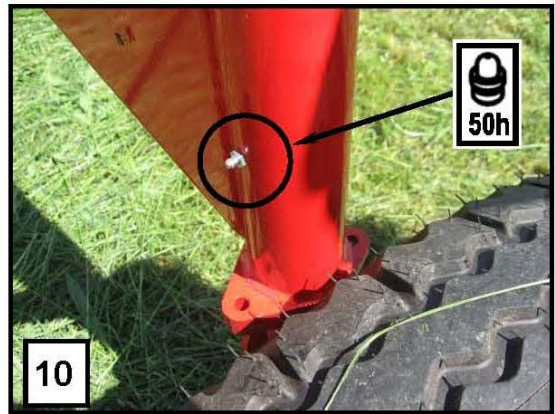
### Lubrication Points



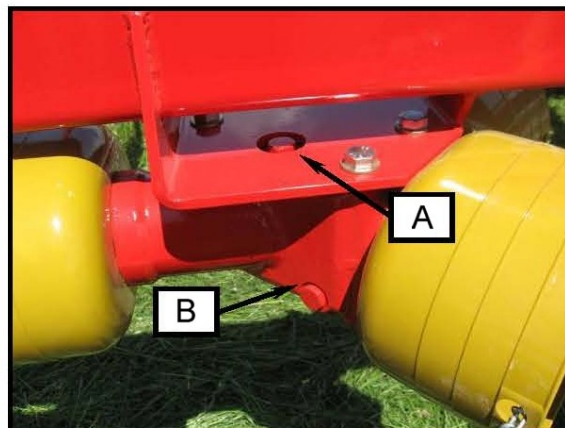
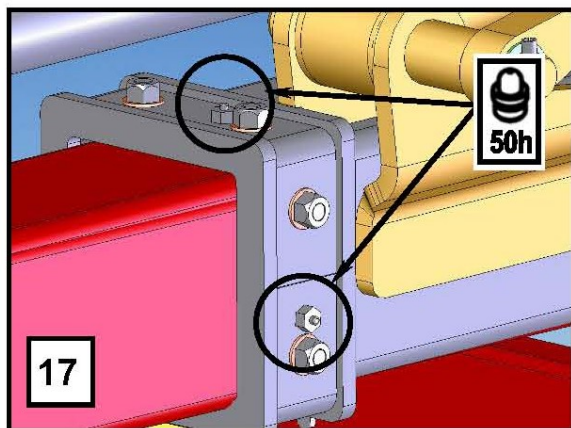












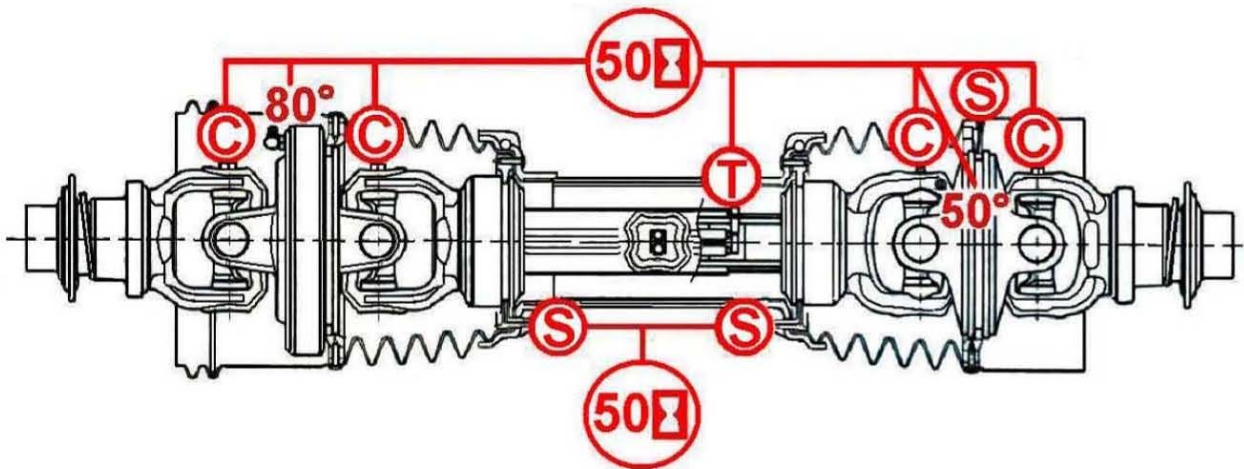
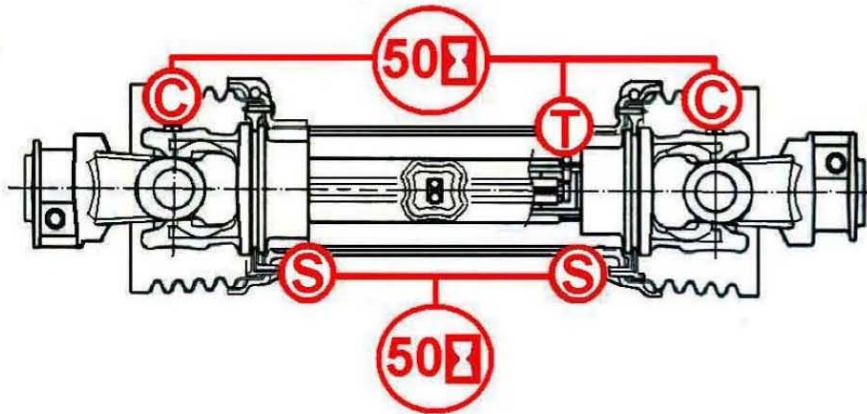
### Driving Gear Lubrication ▲

Lubricant: SAE90

Capacity: 0.9L

A) Filling hole location

B) Drain hole location



1 oz. = 28,3 gr.

	S1	S2	S4	S5	S6	S7	S8	H8	S9	SH	S0
<b>C</b>	2 gr.		4 gr.				5 gr.		8 gr.		
<b>S</b>	1 gr.										
<b>T</b>	3 gr.		5 gr.				8 gr.				
<b>80°</b>		20 gr.	20 gr.		30 gr.	30 gr.	40 gr.			60 gr.	
<b>50°</b>			3 gr.		4 gr.	4 gr.	4 gr.			4 gr.	

