Twose Series Flailheads

1.2M & 1.5M Belt-Drive Sliding Head Standard Roller / Hydraulic Roller

Operator Manual

Publication 767 June 2016

IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION

DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

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

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

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

Registration Verification

Dealer Name: ……

Dealer Address: ……

Customer Name: ……

Date of Warranty Registration: ……/……/..…… Dealer Signature: ……..……

NOTE TO CUSTOMER / OWNER

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

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

CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES

TORQUE SETTINGS FOR HYDRAULIC FITTINGS

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

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

WARRANTY POLICY

WARRANTY REGISTRATION

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

1. LIMITED WARRANTIES

1.01. All mounted machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.
All Self Propelled Machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months or 1500 hours. Engine warranty will be specific to the Manufacturer of that unit.

1.02. All spare parts supplied by McConnel Ltd and purchased by the end user are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months. All parts warranty claims must be supported by a copy of the failed part invoice to the end user. We cannot consider claims for which sales invoices are not available.

1.03. The warranty offered by McConnel Ltd is limited to the making good by repair or replacement for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined. Pack the component(s) carefully so that any transit damage is avoided. All ports on hydraulic items should be drained of oil and securely plugged to prevent seepage and foreign body ingress. Certain other components, electrical items for example, may require particular care when packing to avoid damage in transit.

1.04. This warranty does not extend to any product from which McConnel Ltd's serial number plate has been removed or altered.

1.05. The warranty policy is valid for machines registered in line with the terms and conditions detailed and on the basis that the machines do not extend a period of 24 months or greater since their original purchase date, that is the original invoice date from McConnel Limited.
Machines that are held in stock for more than 24 months cannot be registered for warranty.

1.06. This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, belts, clutch linings, filter elements, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads, pneumatic tyres or tracks.

1.07. Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.

1.08. Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.

1.09. Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnel Ltd cannot be held liable, and may have safety implications.

1.10. If in exceptional circumstances a non McConnel Ltd part is used to effect a repair, warranty reimbursement will be at no more than McConnel Ltd's standard dealer cost for the genuine part.

1.11. Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of McConnel Ltd.

1.12. For machine warranty periods in excess of 12 months the following additional exclusions shall apply:

1.12.1. Hoses, exposed pipes and hydraulic tank breathers.

1.12.2. Filters.

1.12.3. Rubber mountings.

1.12.4. External electric wiring.

1.12.5. Bearings and seals

1.12.6. External Cables, Linkages

1.12.7. Loose/Corroded Connections, Light Units, LED's

1.12.8. Comfort items such as Operator Seat, Ventilation, Audio Equipment

1.13. All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.

1.14. Repeat or additional repairs resulting from incorrect diagnosis or poor quality previous repair work are excluded from warranty.

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

2. REMEDIES AND PROCEDURES

2.01. The warranty is not effective unless the Selling Dealer registers the machine, via the McConnel web site and confirms the registration to the purchaser by completing the confirmation form in the operator's manual.

2.02. Any fault must be reported to an authorised McConnel Ltd dealer as soon as it occurs. Continued use of a machine, after a fault has occurred, can result in further component failure for which McConnel Ltd cannot be held liable.

2.03. Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by McConnel Ltd. Please note that failure by the customer to release the machine for repair will not be accepted as a reason for delay in repair or submitting warranty claims.

2.04. All claims must be submitted, by an authorised McConnel Ltd Service Dealer, within 30 days of the date of repair.

2.05. Following examination of the claim and parts, McConnel Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnel Ltd and appropriate labour and mileage allowances if applicable.

2.06. The submission of a claim is not a guarantee of payment.

2.07. Any decision reached by McConnel Ltd. is final.

3. LIMITATION OF LIABILITY

3.01. McConnel Ltd disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.

3.02. McConnel Ltd makes no warranty as to the design, capability, capacity or suitability for use of the goods.

3.03. Except as provided herein, McConnel Ltd shall have no liability or responsibility to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the goods including, but not limited to, any indirect, special, consequential, or incidental damages resulting from the use or operation of the goods or any breach of this warranty. Notwithstanding the above limitations and warranties, the manufacturer's liability hereunder for damages incurred by the purchaser or others shall not exceed the price of the goods.

3.04. No action arising out of any claimed breach of this warranty or transactions under this warranty may be brought more than one (1) year after the cause of the action has occurred.

4. MISCELLANEOUS

4.01. McConnel Ltd may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.

4.02. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.

4.03. Applicable law may provide rights and benefits to the purchaser in addition to those provided herein.

McConnel Limited

DECLARATION OF CONFORMITY

Conforming to EU Machinery Directive 2006/42/EC

We,

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

Hereby declare that:

The Product; *Hydraulic Arm Mounted Flail Head*

Product Code; *TWHD*

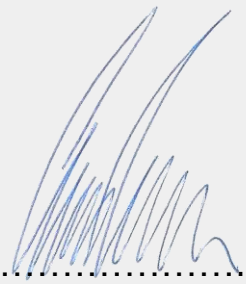
Serial No. & Date …… Type ……

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 best performance…

USE ONLY GENUINE TWOSE SERIES PARTS

To be assured of the latest design improvements purchase your
'Genuine Replacements' from the 'Original Equipment Manufacturer'

McCONNEL LIMITED

Through your local Dealer or Stockist

Always quote:

- ***Machine Type***
- ***Serial Number***
- ***Part Number***

Design improvements may alter some of the parts listed in this manual –
the latest part will always be supplied when it is interchangeable with an earlier one.

LIST OF CONTENTS

GENERAL INFORMATION

Always read this manual before fitting or operating the machine – whenever any doubt exists contact your dealer or the McConnel Service Department for advice and assistance.

Use only Twose Classic Line Parts on Twose Classic Line equipment and machines.

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 emphasis.

LEFT AND RIGHT HAND
This term is applicable to the machine when attached to the tractor and is viewed from the rear – this also applies to tractor references.

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

MACHINE & DEALER INFORMATION

Record the Serial Number of your machine on this page and always quote this number when ordering parts. Whenever information concerning the machine is requested remember also to state the make and model of tractor to which the machine is fitted.	
Machine Serial Number:	**Installation Date:**
Machine Model details:	
Dealer Name:	
Dealer Address:	
Dealer Telephone No:	
Dealer Email Address:	

NOISE STATEMENT

The equivalent daily personal noise exposure from this machine measured at the operators' ear is within the range 78 – 85 dB, these figures apply to a normal distribution of use where the noise fluctuates between zero and maximum. The figures assume that the machine is fitted to a tractor with a 'quiet' cab with the windows closed in a generally open environment. We recommend that the windows are kept closed. With the cab rear window open the equivalent daily personal noise exposure will increase to a figure within the range 82 – 88 dB. At an equivalent daily noise exposure level of 85 – 90 dB ear protection is recommended and must always be used if any window is left open.

Beware of the following Potential Dangers associated with the use of this machine:

- ▲ Becoming trapped when hitching or unhitching.
- ▲ Tractor overbalancing when arm is extended.
- ▲ Electrocution due to hitting overhead power lines.
- ▲ Getting caught on rotating power take off (PTO).
- ▲ Being hit or caught by any moving part, e.g. belts, pulleys, arms, cutting head.
- ▲ Being hit by flying debris or machine parts due to machine damage.
- ▲ Machine overbalancing when not in use.
- ▲ Injection of high pressure oil from damaged couplings or hydraulic hoses.
- ▲ Accidents due to collision with other machines, or debris left on road.

Always

- ▲ Ensure the operator has read this handbook and has been trained to use the machine.
- ▲ Ensure all cab safety guards are in place and all tractor windows closed.
- ▲ Before leaving the tractor cab always ensure that the flail head is firmly on the ground, no weight is on the machine's hydraulics and the rotor has stopped spinning.
- ▲ Check that all guards are properly fitted and there are no damaged or loose parts. Particular attention should be given to the flails to ensure they are not damaged, cracked or missing.
- ▲ Inspect work area for wire, steel posts, large stones and other dangerous materials and remove before starting work.
- ▲ Beware of the danger of overhead power cables. The operator must be aware of the maximum height and reach of the machine when working under power cables. The minimum legal height for 11,000 and 22,000-volt cables is 5.2 metres from the ground. When fully extended, the machine may well exceed this height so extreme caution should be practised. For more information see Overhead Powerlines Section or contact the Health and Safety Executive or your local power company.

- ▲ Ensure that all warning labels are always visible and that they are not damaged, defaced or missing.
- ▲ Lower the head to the ground when parking up.
- ▲ Fit locking pins to slew and height before transport and before unhitching when applicable.
- ▲ Wear ear defenders if operating without a quiet cab or with the cab windows open.
- ▲ Ensure tractor guards are fitted correctly and are undamaged.
- ▲ Work at a safe speed, taking into account terrain, passing vehicles and obstacles.
- ▲ Ensure that the tractor meets the minimum weight recommendations of the machine manufacturer and that ballast is used if necessary.
- ▲ Check that machine fittings and couplings are in good condition.
- ▲ Follow the manufacturer's instructions for attachment and removal of machine from the tractor.
- ▲ Use clear warning signs to alert others to the type of machine working in the vicinity. Signs should be placed at both ends of the work site and should be in accordance with Department of Transport recommendations.
- ▲ Ensure flails are of the type recommended by the manufacturer, are securely fitted and are undamaged.
- ▲ Ensure hydraulic pipes are correctly routed to avoid damage from chafing, stretching, pinching or kinking.
- ▲ Disengage the machine, stop the engine and remove the key before leaving the tractor cab for any reason.
- ▲ Clean up any debris left at the work site.
- ▲ Ensure that when you remove the machine from the tractor it is secured in a safe position using the stands provided.

Never

- ▲ Never operate the machine with other people present, as it is possible for debris, including stones, to be discharged from the front and rear of the flail head.
- ▲ Never operate the machine until you have read and understood the relevant Handbook and are familiar with the controls.
- ▲ Never use a machine that is poorly maintained or has guards that are damaged or missing.
- ▲ Never allow an inexperienced person to operate the machine without supervision.
- ▲ Never use or fit a machine onto a tractor if it doesn't meet the manufacturer's specification.
- ▲ Never use a machine if the hydraulic system shows signs of damage.
- ▲ Never attempt to detect a hydraulic leak with your hand, use a piece of card.
- ▲ Never allow children to play on or around the machine at any time.
- ▲ Never attempt any maintenance or adjustment without first disengaging the PTO, lowering the head to the ground, stopping the tractor engine and applying the tractor parking brake.
- ▲ Never leave the cab without removing the ignition key.

- ▲ Never operate the tractor or any controls from any position other than from the driving seat.
- ▲ Never stop the engine with the PTO engaged.
- ▲ Never operate with flails missing.
- ▲ Never operate PTO above recommended speed, 540 R.P.M.
- ▲ Never operate with wire around the rotor. Stop immediately.
- ▲ Never use the head at an angle, which may throw debris towards the cab.
- ▲ Never attempt to use the machine for any purpose other than that it was designed for.
- ▲ Never transport with the PTO engaged.
- ▲ Never enter the working area of the machine (risk of injury!).
- ▲ Never transport with the controls live, always turn off electrical isolator switch (red) and disconnect supply.

ATTACHING HEAD TO MACHINE

Assuming you have followed the instructions in the operators manual you will have mounted the machine to the tractor rear linkage, connected the PTO and an electrical supply, now the machine arms can be operated from the tractor seat.

WARNING!
Take care when removing/connecting hydraulic fittings as they may contain high pressure oil.

1. Place the flail head along the tractor wheel in the work position, about 1 metre away. Use a hydraulic jack and support stands to level the head if required.

2. Start the tractor and select 540 PTO.

3. Switch on machine electrics via the control panel.

4. Operate the joystick lever and slew switch to place the boom fully forward into the work position about ½ metre off the ground and 1 metre away from the tractor wheel. Use the controls move the boom to enable the head to be attached.

5. Disengage the PTO, switch off the electrics, turn off the tractor and remove the key before leaving the cab.

6. Attach the flail head to the boom using clamps and bolts supplied, we would recommend centre mounting at this point.

7. Ensure all connections are clean and free of any contamination before removing any blanking plugs.

8. Identify the pressure hose on the boom and the pressure port of motor (nearest anti-cav valve) also the returns hose and returns port. Using the hoses supplied make the correct connections as identified previously, the small hose is for the motor case drain this is returned separately to top of tank.

9. Raise boom to lift the flail head clear of the ground before making a test run at low PTO speed, run for 5 minutes, stop and recheck all connections for oil leaks.

10. Restart machine, allow oil to warm before running at full speed too ensure smooth running without any vibration (do not exceed 540 R.P.M.).

WARNING!
It is most important the operator fully understands the procedure for attaching/un-attaching the flail head to/from the reach mower.

The following text must be fully understood before attempting to attach the head. If there is any doubt please contact your supplying dealer or McConnel Service Department. Failure to follow the correct procedure to attach/unattached the head could result in personal injury or machine damage. Any resulting damage to a machine is not covered by warranty.

Always be sure to select a level firm surface, such as concrete before attaching.

When operating the tractor or machine's controls do so only when seated in the tractor cab. Do not allow anyone to stand on or amongst linkage for any reason.

RUNNING UP

1. First ensure the rotor is in the ‘off’ position and PTO drive is disengaged, then start the tractor.

2. Engage PTO into gear and run machine up to low revs, allowing oil to circulate for about 15 minutes before operating arms.

3. Re-check oil level, - check for oil leaks. All Twose series machines have been run-up and checked thoroughly. However, hose connections can become loose in transit and these should be checked again before the machine is put to work.

4. Operate the arms through the full amount of travel; check all movements are functioning correctly.

5. Place flail head near ground in a safe position and with tractor engine revs low, select ‘start’ position for the flail motor.

6. Once the rotor is settled, slowly increase speed of PTO to 540 R.P.M. and run for a further 5 minutes. Slowly reduce speed and then disengage PTO.

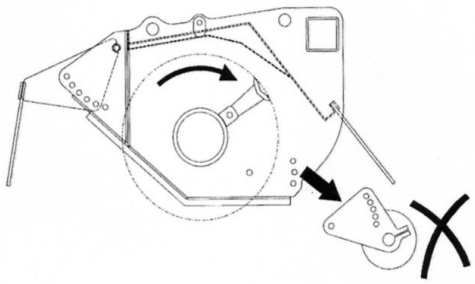
7. Check all hoses for kinks, pinching, chafing and leaks.

8. Re-check oil level.

WARNING!
The rotor will take a long time to stop. Never leave the tractor cab until PTO is disengaged, engine stopped and rotor has stopped spinning.

WARNING!
Never attempt to operate the machine without the rear roller correctly fitted.

The roller performs a key safety function should the rotor shaft pick up wire. It is essential for operator safety that it remains in place. It is also an essential structural part of the cutting head. Removing it will cause premature wear on rotor bearings and will lead to fatigue on the fabrications.



OPERATING HEAD DRIVE

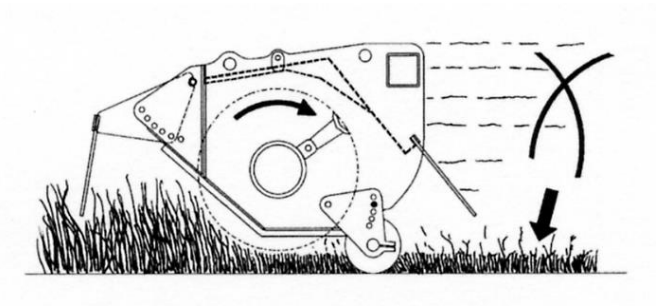
Engaging Head Drive

- Select 540 rpm PTO and run with low engine revs.
- With the flail head in a safe position move rotor control lever to the ‘ON’ position.
- Cold start - it is important not to run at full speed with cold oil. Run at low speed for at least 15 minutes to allow oil to warm up.
- Afterwards slowly increase engine revs to obtain correct PTO speed, 540rpm.
- Never attempt to start rotor while under load.

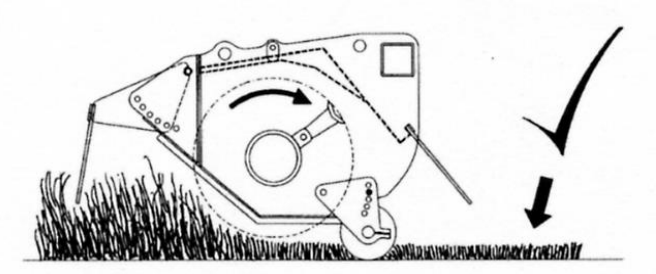
Disengage Head Drive

- Slowly decrease engine revolutions to a fast idle.
- Move rotor control lever to the ‘OFF’ position.
- Never increase or decrease PTO speed rapidly; this could seriously damage pumps and motor.

TRACTOR FORWARD SPEED



Too high a forward speed will impair the finish, leaving it looking ragged, and cause over frequent use of the break back, which will overheat the oil.



A slower forward speed improves the standard of the finish.

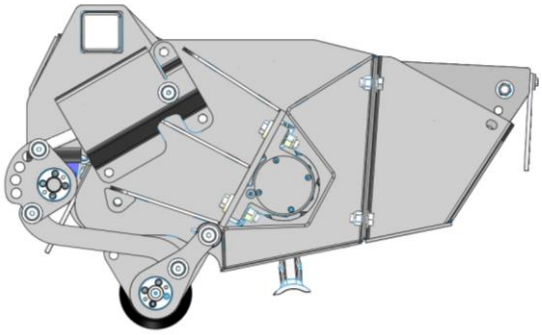
WIRE TRAP

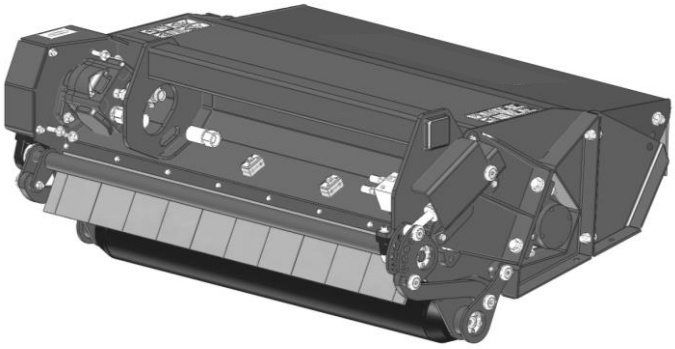
The wire trap is located under the front hood and **must not** be interfered with or altered in any way. Any wire must be removed immediately.

- Lower rotor to ground, select rotor control lever to ‘off’ and **wait until rotor stops spinning**.
- Disengage PTO and stop engine before leaving cab.

WARNING! Wire is extremely dangerous and must be avoided at all times. Always inspect work area before commencing work; remove all loose wire and clearly mark any fixed wire so that it can be avoided.

HYDRAULIC REAR ROLLER





The hydraulic rear roller is controlled by a switch on the control panel. The control of the rear roller is either raised or lowered; there is no in-between height control.

Hydraulic rear roller control switch - positions depends on machine options specified.

NOTE: To ensure the roller moves freely it is vital that the roller side plates and head cowl are kept clean and lubricated.

OPERATION WARNINGS

WARNING!
Please read all the following operation warnings carefully.

▲ Never drive the tractor with arm out-stretched (except when cutting). When moving from work always first retract arms. Transport with care, metal fatigue is always caused by careless transportation and misuse. If the ground is uneven or bumpy, **slow down.**

▲ Read this manual and be fully familiar with all operational maintenance and safety procedures.

▲ Practice in open space without rotor running until familiar with controls. **Take care working the head close to the tractor as it may be possible to strike the tractor.**

▲ Remember some machines have the ability to operate within a very narrow space, often within the tractor's width. This will mean it is quite possible for the flail head to foul the tractor. When in confined space the main arm will need to be slightly slewed backwards from normal working position. Practice all these positions and be very familiar with your machine before ever attempting work.

▲ Never operate above the recommended PTO speed of 540 R.P.M. Failure to heed this warning will result in severe damage i.e. reduced belt and pulley life (when fitted); greatly increased oil temperature; risk of rotor going out of balance, as well as reduced machine life, and may cause expensive repairs.

▲ Failure to start and stop the rotor at a low PTO speed or to operate at the correct speed will result very quickly in severe motor and/or pump damage.

▲ Never attempt to slew arms when fully out stretched - always retract before operating the slew. Be very careful when operating on sloping ground.

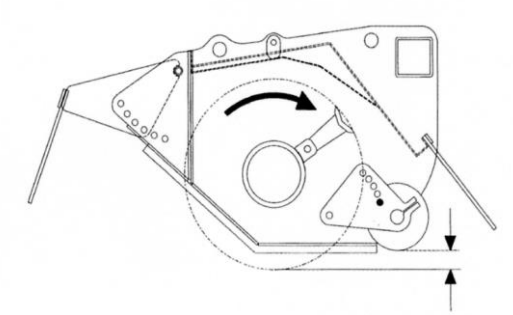
▲ Never attempt to slew arms with the head on the ground, always raise the head before slewing.

▲ Never attempt to operate the machine while going backwards. It will immediately damage the arms and possibly the flail head. Remember, before selecting reverse gear always lift the flail head out of work and retract the arms towards the tractor.

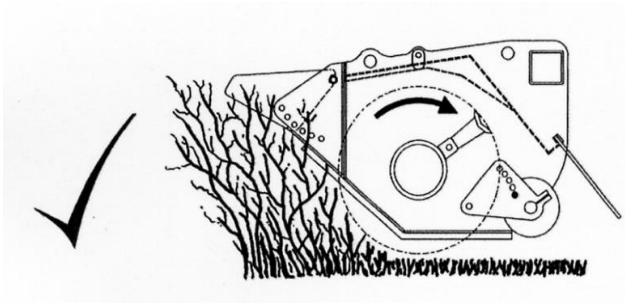
▲ Never change/reverse the rotor rotation until it has come to a standstill, serious damage will occur leading to premature pump and/or motor failure.

Hedge Cutting Recommendation

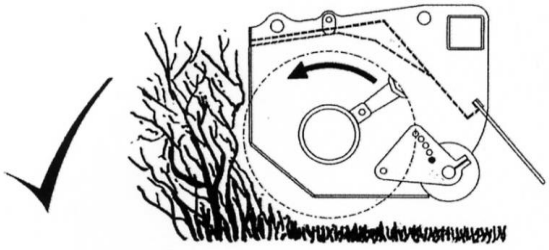
- ‘T’ Flails or ‘Boot’ Flails
- Rear Flap
- Front Flap



Roller Set-Up
The roller should be raised so that it is clear of the top of the hedge. The adjustable front guard should be set as low as possible without restricting the ability of the hedge to enter the cutting head.



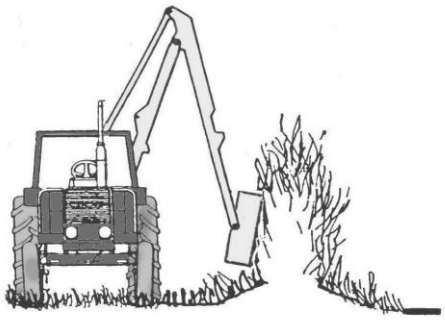
Normal Hedge Cutting
Flail is cutting upwards-reducing flying debris to minimum and leaving a tidy finish.
Open adjustable front hood as required.

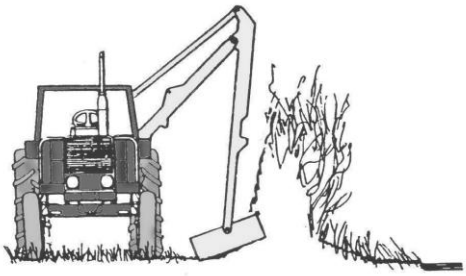


Rough Cutting
Reverse rotation if necessary. Down cut is not good for the hedge and leaves an untidy finish. Only use this position when rough cutting in heavy growth.

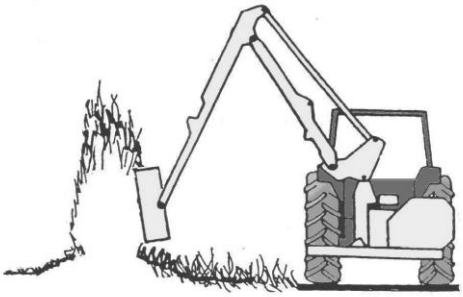
HEDGECUTTING PROCEDURE

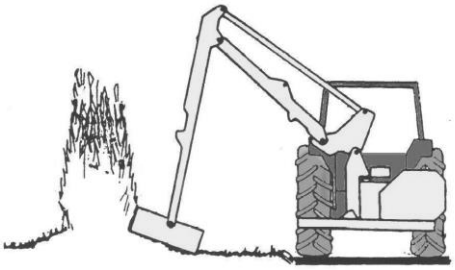
Cut the side and bottom of the field side first. This leaves the maximum thickness of hedge on the road side to prevent the possibility of any debris being thrown through the hedge into the path of oncoming vehicles.



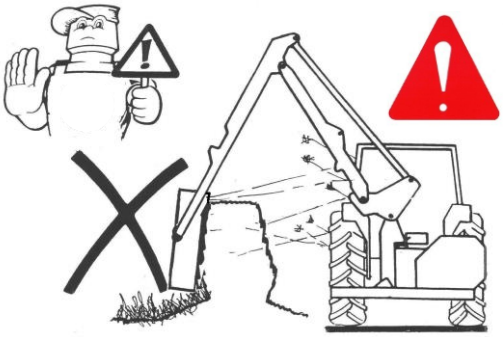


Cut the side and bottom of the road side.





Top cut the hedge to the height required.

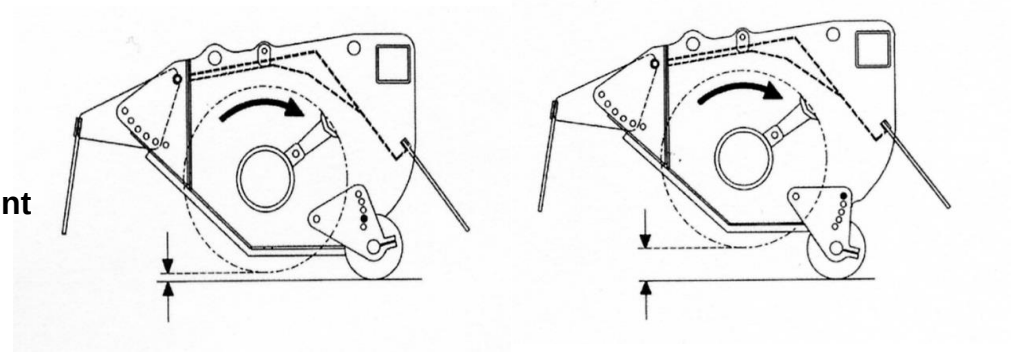


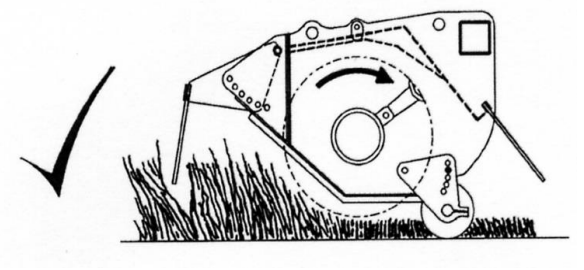
WARNING!
Never attempt to cut on the blind side of a hedge as the operator will not see or be aware of any hazards or dangers to persons or machines.
Never operate with the flail rotor facing towards the tractor; this is potentially dangerous with debris being thrown towards the tractor.

Grass Cutting Recommendation

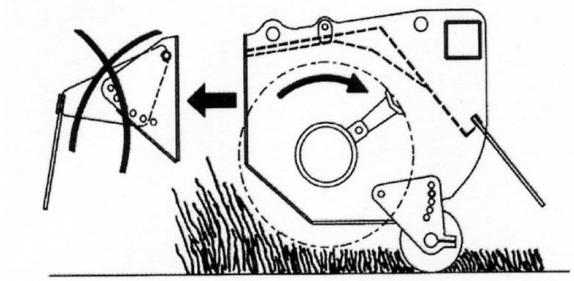
- ‘C’ Flails or ‘Back to Back’ Flails (Optional ‘Boot’ Flails)
- Cowl Wear Plate
- Front & Rear Flap
- Head Float & Angle Float

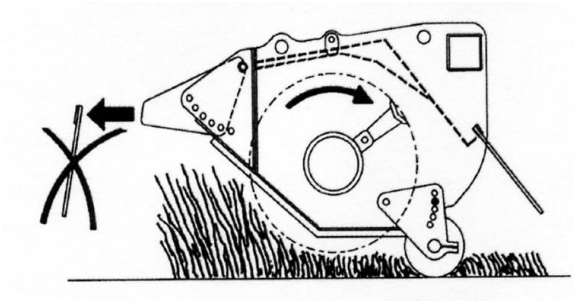
Cutting Height Adjustment

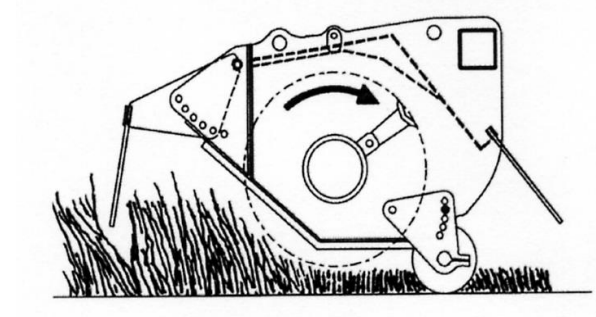




Grass Cutting
Set rear roller down to control cutting height. Have rubber flap fitted to the front and rear of head and close down the adjustable front hood to reduce flying debris to a minimum.







WARNING!

DO NOT operate without front and rear flap.

DO NOT verge mow without a rear roller.

DO NOT verge mow with rear roller set too high; remember the rear roller is used to control the cutting height.

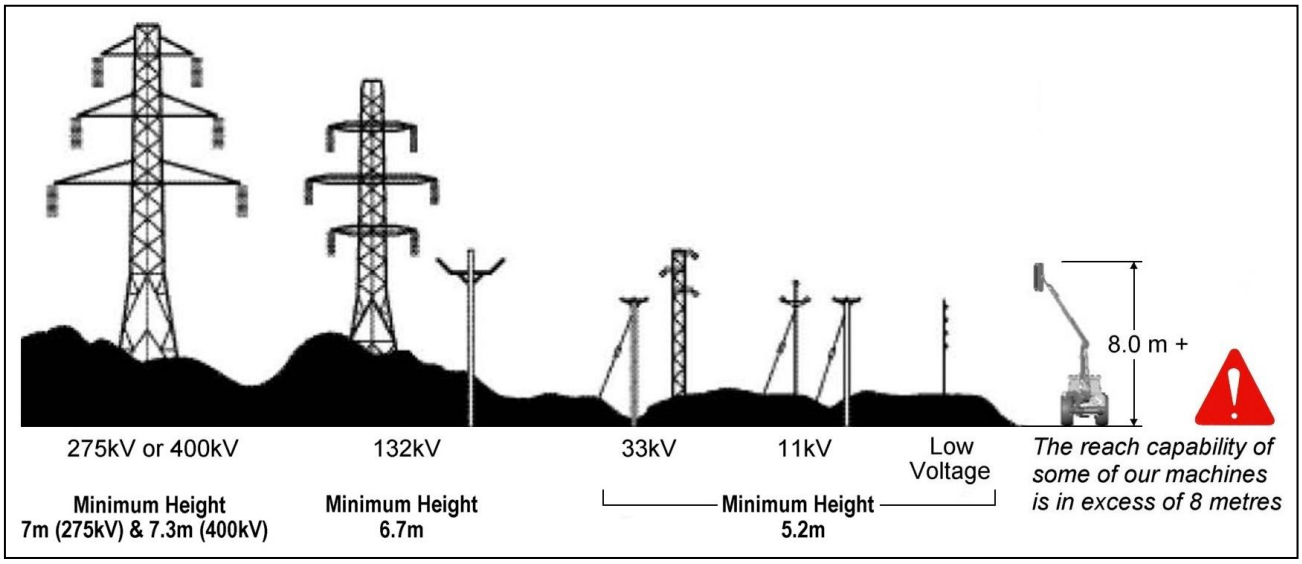
OVERHEAD POWER LINES (OHPLs)

It cannot be stressed enough the dangers involved when working in the vicinity of Overhead Power Lines (OHPLs). Some of our machines are capable of reach in excess of 8 metres *(26');* they have the potential to well exceed, by possibly 3 metres *(9' 9"),* the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines.
Remember electrocution can occur without actually coming into contact with a power line as electricity can 'flashover' when machinery gets close to it.

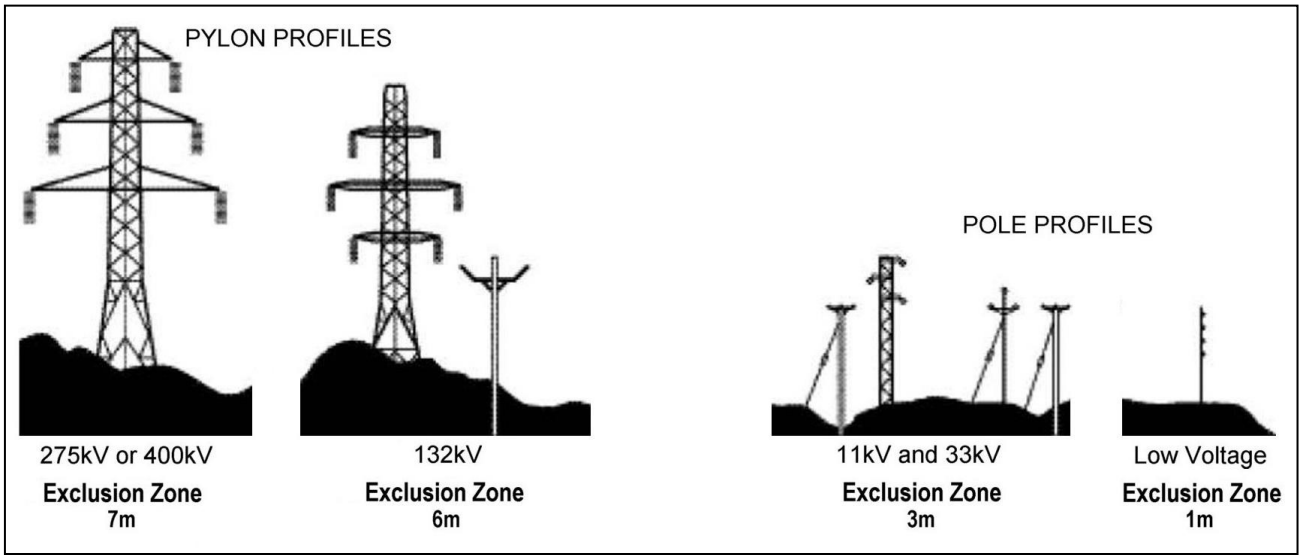
WARNING: All operators must read the following information and be aware of the risks and dangers involved when working in the vicinity of Overhead Power Lines (OHPLs).

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.

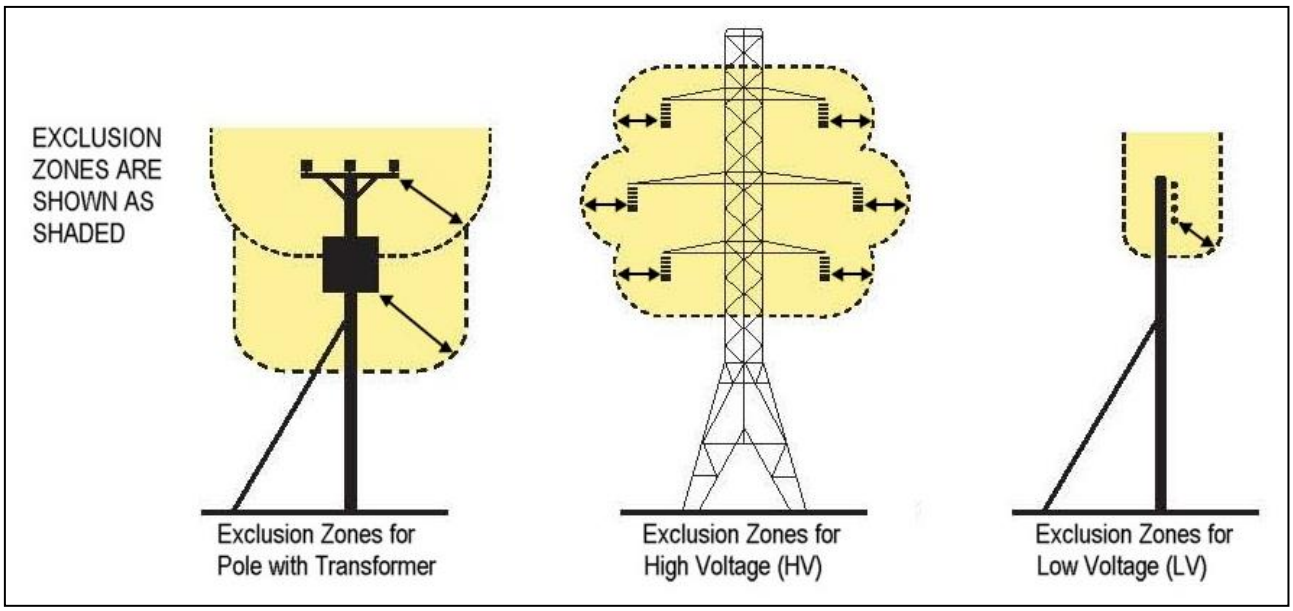
Minimum Heights for Overhead Power Lines



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;

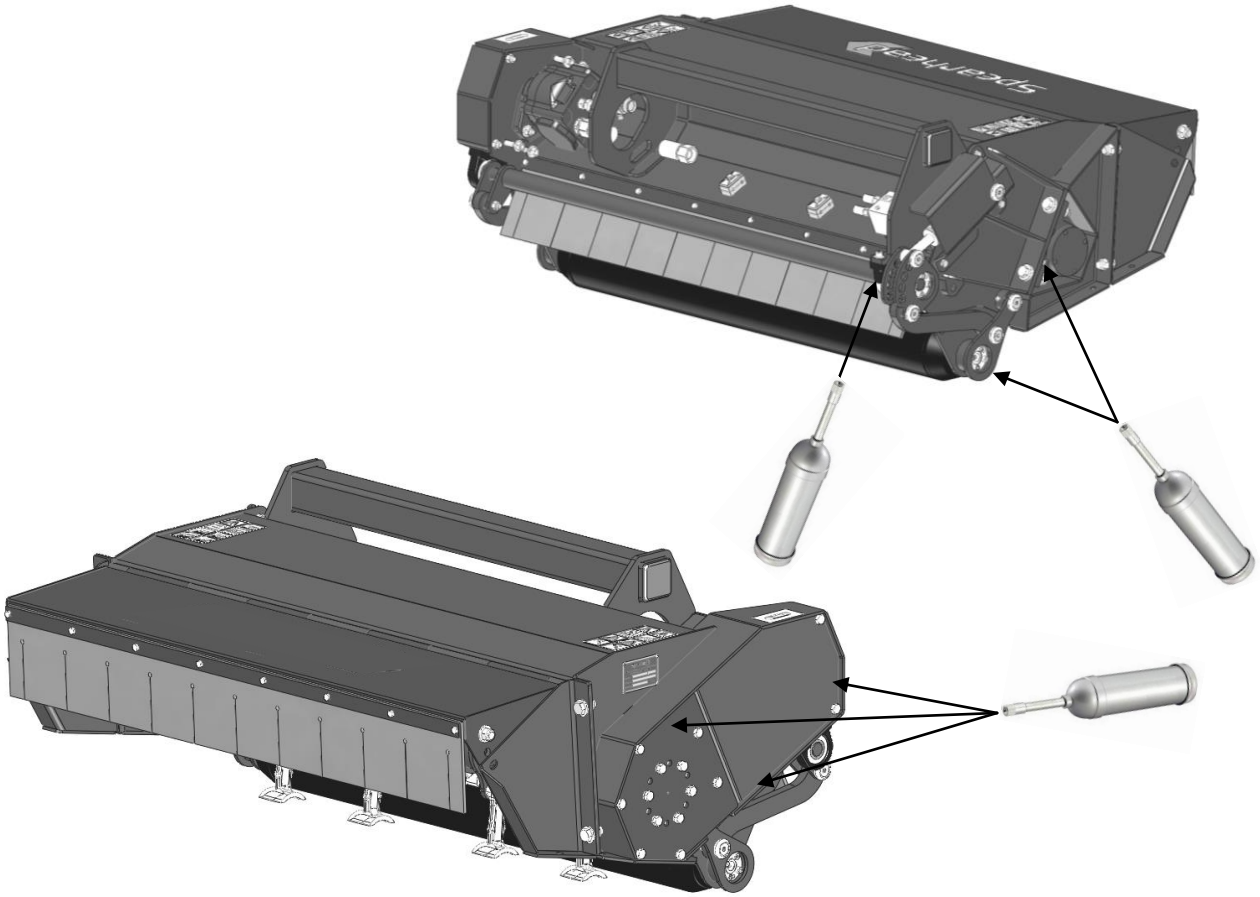
- **Know the risks** of contacting OHPLs and the risk of flashover.
- **Find out** the maximum height and maximum vertical reach of your machine.
- **Find out** the location and route of all Power Lines within the work area.
- **Find out** the operating voltage of all Power Lines within the work area.
- **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

Greasing / Lubrication
Grease the lubrication points indicated below on a daily basis.



Head Rotor & Roller
Lubricate every 8 hours with 5 – 10 pumps of grease.

Motor Drive - Belt Drive
Motor drive splines are lubricated via the pulley shaft and should be greased every 40 hours with 5 pumps of grease.

Washing the Machine
Grease all your machine and optional parts after each time you wash your machine.

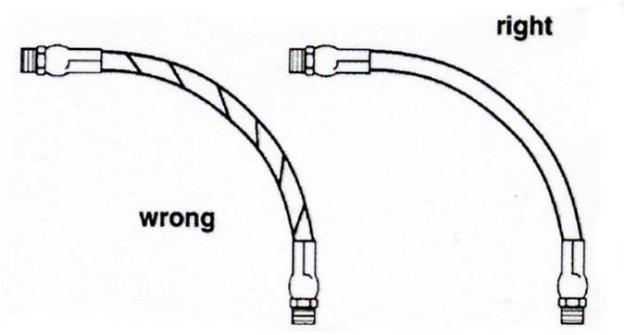
Hydraulic Hoses

Carefully check condition of all hoses during routine service paying particular attention to chafed outer casings. Securely wrap with waterproof adhesive tape to stop the metal braid from rusting.

Inspect all hydraulic hoses and fittings on a daily basis to ensure they are in good working order. Any damages or leaks must be rectified immediately, this is part of the daily maintenance and it is your responsibility to help ensure a long reliable working life. Hoses with damaged metal braid should be replaced immediately.

When replacing hoses, quote the number stamped on the fitting at one end. The hydraulic system works at very high pressure; use genuine hoses only, a burst hose could be very dangerous.

Always replace hoses in exactly the same way they were removed, and to avoid twisting during fitting use two spanners to slacken and tighten.



WARNING!
Hoses are weakened if they are installed in twisted position. Also, pressure pulses in twisted hose tend to fatigue wire and loosen fitting connections. Route hoses in the correct locations so that machine motion will produce bending rather than torsion.

Always check the protective sleeving is in good order, replacing sleeving is far cheaper than replacing expensive hoses.

Hose warranty is limited to replacement of hoses due to faulty materials or manufacture. Warranty will not be considered on hoses damaged by chaffing, abrasion, cuts or pinching while in work, or to damaged threads due to over tightening.

Recommended torque settings for nut

BSP (size)	Tightening (Nm)	Torque (lbs/ft)
1/4 “	24	18
3/8”	33	24
1/2”	44	35
3/4”	84	62
1”	115	85

Recommended torque settings for hose unions in conjunction with bonded seals

BSP (size)	Tightening (Nm)	Torque (lbs/ft)
1/4”	34	25
3/8”	75	55
1/2”	102	75
3/4”	183	135
1”	203	150

All hose connections are of a ‘Soft Seal’ type and only need 1/2 a turn more than finger tight to become leak proof. When dismantling, the hose should be manually flexed to relieve any pressure, and the retaining nut slackened before complete disassembly.

Routine Checks

- Grease all bearings daily.
- Check there is no wrapping of string, plastic, grass or other debris on rotor shaft and rear roller bearings.
- Check the condition of flails and ensure all retaining bolts are tight. When flails are replaced care must be taken to maintain balance of rotor shaft, do not change to a different type.
- Flail retaining bolt and nut torque setting is 203Nm.
- Flail head is supplied centre mounted to get best travel on crowd ram.
- Never operate with any flails missing. This will cause severe vibration and lead to rapid bearing wear and quickly cause the head to crack.
- Blunt flails leave an untidy finish and absorb excessive power, when re-sharpening always wear protective clothing and goggles.
- When flails are showing severe wear, damage or cracking, they must be replaced immediately. Never attempt to weld the flails, as this will make them very brittle and extremely dangerous. Do not take risks with the cutting flails, if in doubt replace.
- When replacing flails always replace the bolts, nuts and bushes with new ones.
- Regularly check that all rotor bearing bolts and hydraulic motor retaining bolts are tight.
- With a new machine or if new bolts have been fitted, particular attention needs to be applied to regular tightening of the new bolts (1hr - 4hrs then daily).
- Check the condition of drive belt, ensuring they are aligned and properly tensioned to avoid any unnecessary belt wear. Remove guard for access to adjuster when tensioning the belt, and ensure it is running in line after adjustment.

WARNING!
When end mounted, head may be at risk of fouling on machine.

WARNING!
Before attempting to perform any repair, service, maintenance or adjustment on the machine, ensure the engine is stopped and the staring key is removed. Disengage PTO, ensure handbrake is secure, and the head is firmly on the ground.

Storage

Before storing away, thoroughly wash the machine, removing all traces of grass and dirt. Extreme care must be adopted when cleaning with high-pressure washers, do not hold the water jet close to the paintwork. Use steam cleaners with caution, be sure to remove all detergents to avoid any discolouring or damage to paint. Grease all grease points until fresh grease shows. Slacken rotor drive belts (where fitted).
It is important where possible to store undercover to protect against rain and sunlight. Always ensure the machine is stored on a firm level surface. Chock the machine if there is and risk of accidental movement on uneven surfaces.

Remember: Regular and correct maintenance will greatly increase the machines life.

Torque Settings
The figures stated below are recommended maximum settings only.

Size:	Tensile strength:	Description:	Torque setting (Nm):
M8	12.9	Pulley clamps	45
M10	8.8	General fasteners	65
M12	8.8	General fasteners	114
M14	10.9	Flail bolts	200
M16	10.9	Flail bolts	203
M16	8.8	Head bracket bolts	280

Regular Service Chart

Service Hrs	Service points	Grease	Check
8 hrs	Bolts are fully tightened		**X**
8 hrs	Condition of flails		**X**
8 hrs	Condition of hoses especially for chafing		**X**
8 hrs	Flail bolts are fully tightened		**X**
8 hrs	Flail head retaining bolts are fully tightened		**X**
8 hrs	Inspect leaks from fittings and pipes		**X**
8 hrs	Rotor bearing bolts are fully tightened		**X**
8 hrs	Rotor Bearings	**X**	
8 hrs	Motor bolts are fully tightened		**X**
8 hrs	Rear roller	**X**	
8 hrs	Maintain correct belt tension (belt drive heads only)		**X**
50 hrs	Motor spline drive	**X**	

TROUBLE SHOOTING

Problem	Cause	Solution
Excessive belt wear	Belt and pulley condition Pulley alignment Incorrect belt tension Overloading of implement	Replace if necessary Check alignment Tension belts to spec Reduce forward speed or increase height of cut
Cut Quality	Flails worn Rotor speed/direction Crop condition	Replace worn flails Check tractor PTO speed Look for suitable conditions
Rotor bearing failure	Rotor out of balance Wire/string in bearing Lack of maintenance Water in bearing	See rotor vibration Remove wire/string Grease bearings to schedule Expel water with grease
Rotor vibration	Flails broken or missing Bearings worn or damaged Rotor shaft bent Build up of debris Incorrect speed	Replace flails Replace bearings Re-balance/replace rotor Remove debris Check rotor R.P.M.
Oil overheating	Oil level incorrect Oil grade incorrect PTO speed too fast Ambient temperature too high Machine overloaded	Fill tank to correct level Drain and refill tank with correct grade oil Ensure the tractor's PTO speed matches implement Reduce work rate / install oil cooler Reduce forward speed or increase height of cut
Hydraulics not responding	Oil level low Oil pump suction filter blocked Oil leak in pressure line Drive line broken	Fill oil to correct level Replace filter element Check machine of leaks Check pump is rotating

Pump & Motor Failure

There are many reasons for pump and motor failure, cavitations (suction of air), peak pressure, contamination. These can be avoided by the following:

- Never run out of oil
- Never run a cold machine straight up to speed, ensure the engine idle speed before engage/disengage the head motor.
- Never increase or decrease engine speed quickly
- Regularly check that suction hose and pump fittings are tight.
- Never stop or start the rotor at 540 R.P.M.
- Never cause sudden movements to the arms via your controls or bumps in the ground as pressure spikes will be transmitted back to the pump, resulting in failure.
- Avoid striking the rotor on obstacles i.e., road gullies as this causes pressure spikes.
- Never transport the machine with the PTO in gear.
- Never select 1000 speed gear for economy start up, speed is too high.
- Never operate above recommended PTO speed 540 R.P.M. and risk overheating.

Remember: pump and motor warranty is limited to replacement due to faulty materials or manufacture. Cavitations, contamination and peak pressures are easily detected on inspection, warranty will not be considered if failure is due to misuse.

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