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# McCONEL

## FX400 & FX500 FLAIL MOWERS

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 within 7 days of 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.

### TORQUE SETTINGS FOR HYDRAULIC FITTINGS

HYDRAULIC HOSE ENDS			PORT ADAPTORS WITH BONDED SEALS		
BSP Setting	Metric		BSP Setting	Metric	
1/4"	18 Nm	19 mm	1/4"	34 Nm	19 mm
3/8"	31 Nm	22 mm	3/8"	47 Nm	22 mm
1/2"	49 Nm	27 mm	1/2"	102 Nm	27 mm
5/8"	60 Nm	30 mm	5/8"	122 Nm	30 mm
3/4"	80 Nm	32 mm	3/4"	149 Nm	32 mm
1"	125 Nm	41 mm	1"	203 Nm	41 mm
1.1/4"	190 Nm	50 mm	1.1/4"	305 Nm	50 mm
1.1/2"	250 Nm	55 mm	1.1/2"	305 Nm	55 mm
2"	420 Nm	70 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 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.*
- 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. *This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, belts, clutch linings, filter elements, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads, pneumatic tyres or tracks.*
- 1.06. *Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.*
- 1.07. *Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.*
- 1.08. *Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnel Ltd cannot be held liable, and may have safety implications.*
- 1.09. *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.*
- 1.10. *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.*
- 1.11. *For machine warranty periods in excess of 12 months the following additional exclusions shall apply:*
  - 1.11.1. *Hoses, exposed pipes and hydraulic tank breathers.*
  - 1.11.2. *Filters.*
  - 1.11.3. *Rubber mountings.*
  - 1.11.4. *External electric wiring.*
  - 1.11.5. *Bearings and seals.*

- 1.12. *All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.*
- 1.13. *Repeat or additional repairs resulting from incorrect diagnosis or poor quality previous repair work are excluded from warranty.*

***NB Warranty cover will be invalid if any non-genuine parts have been fitted or used. Use of non-genuine parts may seriously affect the machine's performance and safety. 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 Ltd web site and confirms the registration to the purchaser by completing the confirmation form in the operator's manual.*
- 2.02. *Any fault must be reported to an authorised 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.*







# 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 Trailed Gang Flail Mower*

Product Code; *FX400, FX500*

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

Manufactured in; *United Kingdom*

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

- BS EN ISO 12100 (2010) Safety of machinery – General principles for design – Risk assessment and risk reduction.
- BS EN 349 (1993) + A1 (2008) Safety of machinery - Minimum distances to avoid the entrapment with human body parts.
- BS EN 953 (1997) + A1 (2009) Safety of machinery - Guards general requirements for the design and construction of fixed and movable guards.
- BS EN 4413 (2010) Hydraulic fluid power. Safety requirements for systems and their components.

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: *September 2015*



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## GENERAL INFORMATION

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

**Use only McConnel Genuine Parts on McConnel equipment and 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 the damage of either machine or equipment if not observed carefully.

**NOTE:**

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

**LEFT AND RIGHT HAND:**

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

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



This machine has the potential to be extremely dangerous - in the wrong hands it can kill or maim; It is therefore imperative that both owner and operator of the machine reads and understands the following section to ensure they are fully aware of the dangers that do, or may exist, and their responsibilities surrounding the use and operation of the machine. The operator of this machine is responsible not only for their own safety but equally for the safety of others who may come into the close proximity of the machine, as the owner you are responsible for both.

**Beware of the following Potential Dangers associated with the use of this machine;**

- ▲ Becoming trapped when hitching or unhitching.
- ▲ Getting caught on rotating power take off (PTO).
- ▲ Being hit or caught by any moving parts, e.g. belts, pulleys, arms and cutting body.
- ▲ 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 body is firmly on the ground, no weight is on the machines hydraulics and the rotor has stopped spinning.
- ▲ Check that all guards are properly fitted; check 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 posits, large stones and other dangerous materials and remove before starting work.
- ▲ Ensure that all warning labels are always visible and that they are not damaged, defaced or missing.
- ▲ Lower the mower bodies to the ground when parking up.
- ▲ Fit locking pin and strap 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 coupling are in good condition.
- ▲ Follow the manufacturer's instructions for attachment and removal of the machine from the tractor.
- ▲ Use 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 the 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 and 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 parking stand 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 body.
- ▲ 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 without supervision.
- ▲ Never use or fit a machine onto a tractor if it does not 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 flail bodies 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 the PTO **above** the recommended speed, 540RPM.
- ▲ Never operate with wire around the rotor. Stop immediately.
- ▲ Never use the flail body 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!).

### **Safety Decals**

Safety decals are located on various points of the machine. They can be identified by the yellow upper panel depicting the hazard, and the lower white panel indicating means of avoidance or precautions to be taken. These decals have no text. It is essential that all operators and personnel associated with the machine fully understand their meanings, which are shown on the following page.

Any safety decals that are missing should be replaced at the earliest possible opportunity.

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**Although the information stated 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 McConnel machine.**

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## SAFETY DECALS

In addition to company branding and model identification the following safety decals are displayed – familiarise yourself with, and heed the messages they state, they are there for your safety and guidance. If any of the safety decals go missing or become damaged beyond a readable state they should be replaced at the earliest possible opportunity.



**WARNING!**  
Avoid fluid escaping under pressure. Consult technical manual for services procedures.



**WARNING!**  
Shut off engine and remove key before performing maintenance or repair work.



**WARNING!**  
Danger – flying objects keep safe distance from the machine as long as the engine is running.



**WARNING!**  
Check all nuts are tight every 8 hours.



**WARNING!**  
Stay clear of mower blade as long as engine is running.



**WARNING!**  
Carefully read operator's manual before handling this machine. Observe instructions and safety rules when operating.



**WARNING!**  
Stay clear of swinging area of implements.

**WARNING!**  
Securely prop all hydraulic rams before attempting any repairs or maintenance.



## INTRODUCTION

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The FX400 & FX500 are robust high capacity flail mowers that are easy to operate and maintain, to ensure trouble-free operation of the machine this manual should be carefully studied.

### Safety First

Do not start the machine until you fully understand the operation and safety precaution requirements. Always ensure the operators are proficient with the operation of this type of machine.

### Tractor Requirements

Recommended tractor power:

**FX400 Model: 70 – 90HP tractor**

**FX500 Model: 80 – 110HP tractor**

Fixed clevis drawbar minimum height (17") 430mm, at maximum extension (14") 355mm.

Minimum tractor weight 3000kg including ballast.

PTO must be independent live drive to enable continuous PTO drive even when tractor clutch is pressed down.

External oil supply (min. pressure 140 bar) and free flow returns.

## ATTACHING TO THE TRACTOR

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It is advisable to remove the tractor rear link arms. However, if this is not convenient, at least check the link arms do not contact the PTO shaft when turning.

Before coupling to the tractor, it is important to check that the tractor draw bar is out at its longest setting, which will give the tightest turning circle without risk of bottoming the PTO shaft.

**NOTE:** When fitting the pin through the drawbar clevis, insert the plastic washer between the tractor and machine drawbar as shown opposite (*Fig.1*). ►

This washer is a replaceable wearing part.



### CAUTION!

Do not attach the machine to the pick-up hook as this will result in serious damage to the PTO



*Fig.1*

Fit the PTO shaft to the machine and attach torque chains to the PTO guards to prevent them from rotating with the shaft. For initial attachment of the machine to a tractor refer to the following page for details regarding measuring and cutting the PTO shaft.

Connect the two hydraulic pipes to the tractor's hydraulics, thinner hose to pressure and hose thicker to returns. **It is important not to reverse the oil flow.**

## PTO DRIVESHAFT INSTALLATION

The PTO driveshaft attaches between the tractor and the machine gearbox to transfer the power required to run and operate the machine – it is important to achieve the correct shaft length to avoid risk of it 'bottoming out' when raising or lowering the machine.

The procedure for measuring and cutting the shaft is as follows:

### Measuring the PTO Shaft

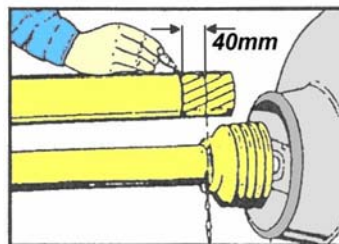
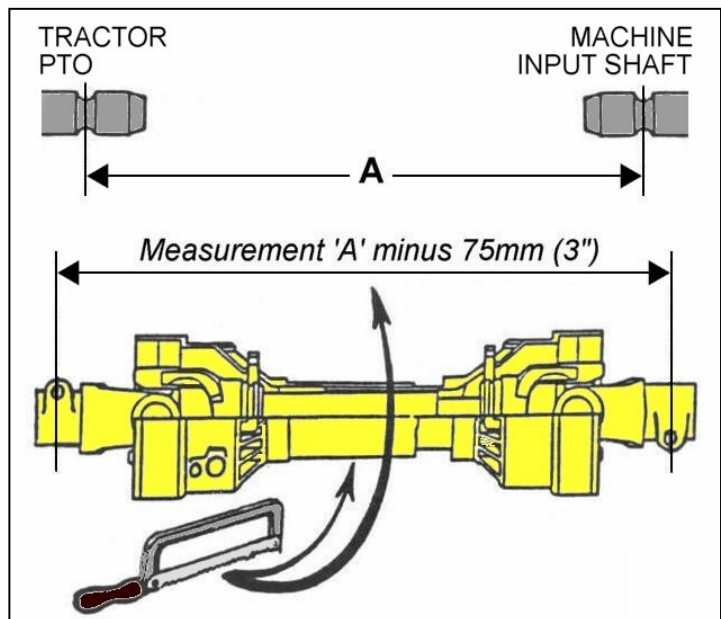
With the machine attached to the tractor in the working position measure the horizontal distance 'A' from the tractor's PTO to the input shaft on the machine's gearbox and subtract 75mm (3") – *this figure is the required shaft length.*

Place the fully closed PTO shaft on the ground and measure its overall length, if the shaft is shorter than the required length you can use it without the need to shorten, providing it allows for a minimum 150mm (6") overlap when fitted.

If the shaft is longer subtract the required shaft length plus an additional 75mm (3") - *the resulting figure is the excess length that will need to be removed from each half of the shaft.*

### Cutting the PTO Shaft

Separate the two halves and using the measurement obtained above shorten both the plastic guarding and the inner steel profile tubes of each shaft by this same amount. De-burr the cut tubes with a file to remove rough or sharp edges and thoroughly clean to remove swarf before greasing, assembling and fitting the shaft.



NOTE: For subsequent use with different tractors the shaft should be measured again to check suitability – *there must be a minimum shaft overlap of 150mm (6").*

### Maintenance

To increase the working life of the PTO shaft it should be periodically checked, cleaned and lubricated – *refer to the PTO maintenance section for further details on this subject.*



## TRANSPORT TO WORK

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### With Cable Operated Spool Valve

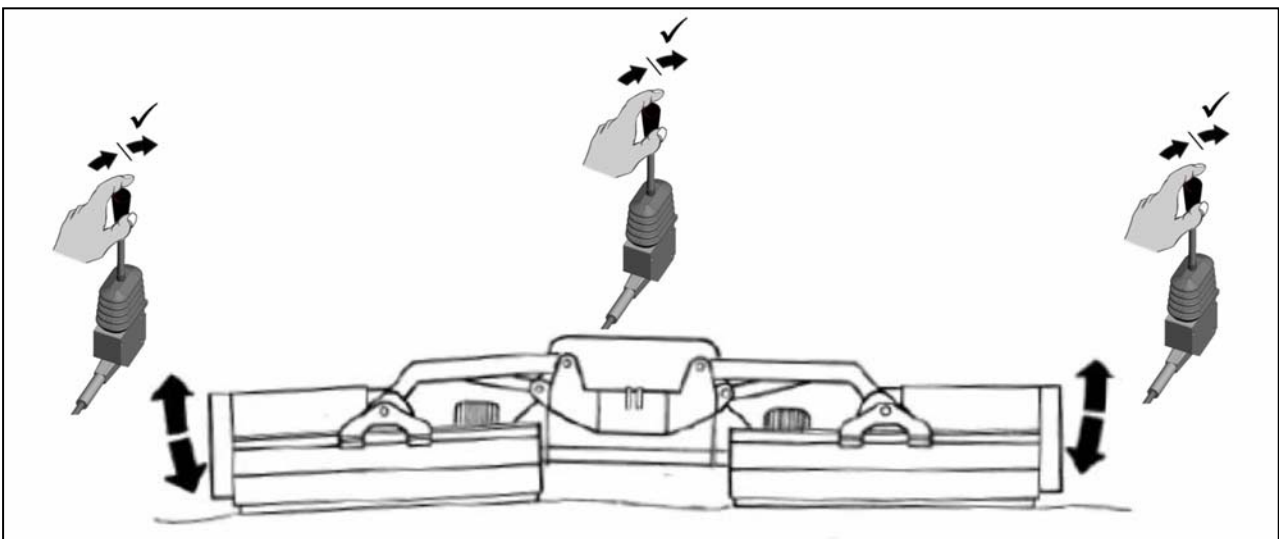
Set tractor external spool valve to supply oil to the machine before operating the two outer control levers to ensure the wing hydraulic rams are fully charged and extended before removing the transport strap. Follow the same procedure for the centre lever and rear deck.



#### **WARNING!**

**Take care to ensure no one is near or beneath the raised cutting bodies when releasing the transport strap and carrying out the lowering procedure.**

Push all the control levers fully forward to lock into the detent position, allowing the mowing decks to float and follow ground contours (*Fig.2*). Ensure the transport links for the rear and wing bodies are safely stored.



*Fig.2*

### With Hoses Only (No Valve)

Connect each hose to a different external spool on the tractor, ensuring the mower will rise when lever is operated backwards and float when forward.

Fully charge the hydraulic rams before removing the transport strap. Store transport strap safely.

**NOTE:** If isolating taps are mounted on wing rams, these should be set fully open before operating the tractor spool.

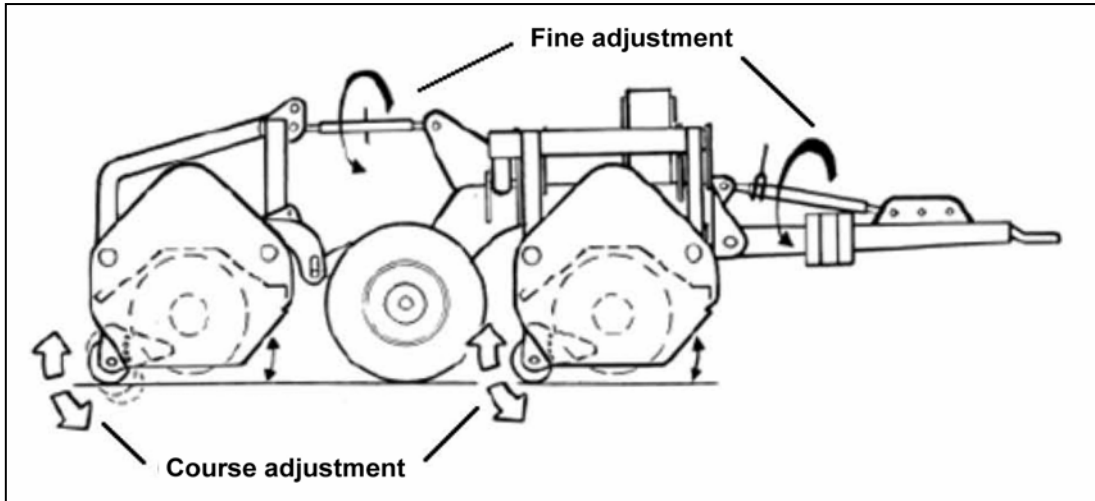
Push each control lever forward to lower the mower bodies onto the ground. Once in work position, set the tractor controls in float, allowing the mower to follow ground contours.

## SETTING UP

### Height Adjustment

To achieve major adjustment of cutting height; re-position the two side plates carrying the rear rollers. Ensure the rear roller plates are fixed parallel using the same bolt holes positions in all three mower bodies (*Fig.3*).

Finer adjustment to cutting height can be achieved by lengthening or shortening the 2 threaded links onto the drawbar for the wings, and the top link to the rear deck

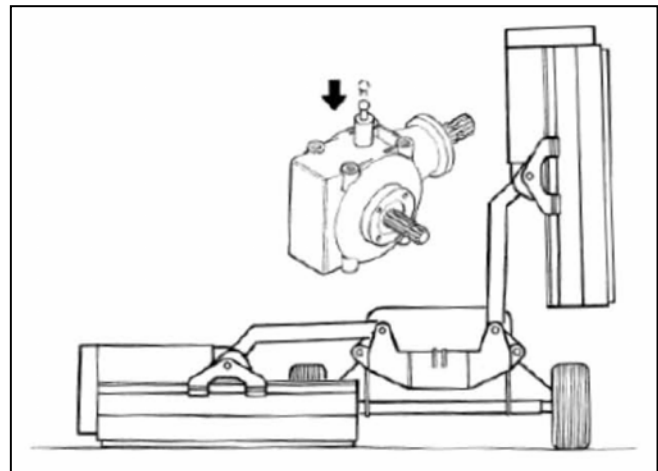


*Fig.3*

**NOTE:** Do not over-adjust the front tie bars placing the drawbar at an acute angle to the tractor - this will cause premature wear on the towing eye. Always compensate by altering the position of the rear rollers.

### Raising the Wings

The machine can be operated in work with one wing raised to overcome obstructions, however, for prolonged use it is recommend that the optional wing gearbox selector is disengaged (*Fig.4*).



*Fig.4*



#### **WARNING!**

Never operate the machine with persons or animals in close proximity as it is possible for debris to be thrown from the mower.



#### **WARNING!**

Never allow anyone near to the machine with the wing raised unless it is securely propped.

## OPERATION

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Engage the PTO only when the tractor engine is at low revs to prevent shock load damage to machine. Slowly increase the engine revs to achieve the standard 540rpm PTO speed. **If at any time serious vibration occurs, stop the engine immediately and check that no flails are missing**, (following all safety precautions). The cause must be found and rectified immediately or other components may be affected.

When in work, lower the machine to the ground carrying all its weight on the rear roller, allowing the machine to follow the contours of the ground. Select a sensible forward speed bearing-in-mind the density of growth, the terrain and the available horsepower, taking extra care when turning, particularly on slopes.

Quality of finish is determined by the forward speed i.e. a slow speed will produce a high quality of cut, whereas faster forward speeds are used when high output is first priority.

When in work, always ensure the hydraulic spool valve that operates the mowing decks is in 'float' position to enable the decks to freely follow all contours of the ground.

The constant velocity joint on the input PTO shaft can allow large joint angles of up to 80 degrees, this should only be allowed for a brief period, for example when turning on headlands out of work. To extend the maximum working life of the PTO ensure the joint angle is no more than 16 degrees @ 540 rpm under load.

**NOTE: Take care when turning not to run the tractor wheel against the mower drawbar or the tractor lower links fouling the PTO, as this will result in serious damage.**



### **WARNING!**

**Maximum recommended joint angle is 16 degrees @ 540rpm.**

## OPTIONAL EXTRAS

**Scraper Wires** are available for the rear rollers to prevent a build up of debris - *under difficult conditions these may clog*. In normal use turning will scrub the rollers clean.

**Rear Rubber Flaps** are available to prevent debris being thrown out of the machine but may cause clogging in difficult conditions.

**Wheels** we offer an option of low ground pressure wheels, ideal for turf, or alternatively a road wheel which is ideal for road transport, especially for a machine which is used between several sites.

## TRANSPORTATION

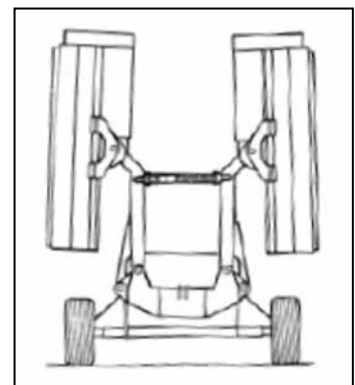
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First disengage the PTO drive and fully raise the machine; fold the wings to fully upright position and attach the transport strap. Lift rear mower to maximum and securely lock in place with adjustable transport link.

**Never transport along public highways with the wings only supported by the hydraulics; always use the locking strap (Fig. 5).**

Please observe Public Highway Regulations concerning the towing of implements and ensure all rear lights are working.

**The maximum recommended speed is 20mph (30km/h).**



**Fig.5**

## SERVICING & MAINTENANCE

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### **WARNING!**

**Never perform servicing or maintenance work without first disengaging the PTO, stopping the engine and removing the key.**

### **Safety First**

- Never leave the tractor seat without first disengaging the PTO and stopping the engine.
- Ensure all rotating parts of the machine have stopped turning.
- Never attempt any repairs, maintenance, service or any other work with the machine held on the tractor hydraulics alone.
- Always fully lower to the ground, or securely prop the machine on substantial servicing stands.
- Always replace all guards and retaining chains after servicing/maintenance is completed.

### **ROTOR CARE**

**Always** operate at 540 PTO speed.

**Always** inspect the condition of the flails and bolts on a very regular basis.

**Always** replace bolts and nuts when replacing flails.

**Always** use genuine flail bolts and nuts. The flails and bolts are made to a very high standard from high tensile steel, being fully heat treated and subjected to rigorous testing in very stringent conditions to comply with our rigid quality control requirements

**Never** operate with bolts loose or flails missing.

**Never** change to a different spec or type of flail, this will immediately put the rotor out of balance.

**Never** engage rotor at high PTO speeds.



**WARNING: Rotor is balanced to be run at 540 PTO speed, do not operate above or below this speed.**

**Remember, the rotor is highly complex and expensive to manufacture, please treat it with care.**

**Never perform servicing or maintenance work without first disengaging the PTO, stopping the tractor and removing the key.**

**TORQUE SETTINGS** – The torque figures stated are recommended maximum settings only

SIZE	TENSILE STRENGTH	DESCRIPTION	TORQUE Nm.
	12.9	Wing Pulley 3 vee	50
	12.9	Centre Pulley 6 vee	115
M8	12.9	Flail pulley 2 vee	41
M10	8.8	General Fasteners	65
M12	8.8	General Fasteners	114
M16	8.8	General Fasteners	280
M12	10.9	Flail Bolts	100
M16		Wheel Nuts	130

## GEARBOXES

- Before first use check gearbox oil level, thereafter check every 8 hours.
- After the first 50 hours drain and replace the gearbox oil, thereafter the oil should be replaced annually. Replace with EP90.
- Regularly inspect gearbox seals. If oil is leaking replace immediately. It is your responsibility to maintain the components in order to ensure a long and reliable working life.
- Check that gearbox bolts are fully tightened – torque to 85Nm Max.



### **WARNING!**

**Check that all gearbox fixing bolts are tight. When the machine is new there will be a 'bedding in' period when very frequent checking is important.**



### **WARNING!**

**It is imperative the grub screws are checked on the bearing and pulley taper locks (once bedded in Loctite glue may prove useful).**



### **WARNING!**

**Never carry out any servicing or maintenance work without first disengaging the PTO and stopping the tractor.**

## FLAIL ROTOR & ROLLER (DAILY)

- Grease all bearings daily, at least every 8 hours and especially after washing. 10-30 pumps of grease may be required to flush any contamination from the bearings.
- Check there is no wrapping of string, plastic, grass or other debris on rotor shaft and rear roller.
- Check the condition of flails and ensure all retaining bolts are tight. When flails are replaced, care must be taken to maintain balance of the rotor shaft, do not change to a different type.

**NOTE: Never operate with machine with flails missing - this will cause severe vibration and lead to rapid bearing wear and can rapidly cause the hood 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 thus extremely dangerous. Do not take risks with the cutting flails, if in doubt replace.
- When replacing flails always replace bolts and nuts for new.
- Regularly check that all rotor-bearing bolts are tight (85Nm).
- When replacing a worn flail with a new one, replace the diametrically opposite flail with a new one at the same time to retain rotor balance. Save the worn flail for future replacement opposite another worn flail.

## REAR ROLLER

- Ensure roller shafts are clamped tight.
- Grease rear roller daily, at least every 8 hours and always after washing. 10-30 pumps of grease may be required until fresh grease shows.

## PULLEYS

- Three types of pulley centers are used: Centre (6 vee pulley – 115Nm), Gearbox (3 vee pulley – 50Nm) and Flail (2 vee pulley – 41Nm)  
These must be checked and tightness maintained after the first hour of work, then on a daily basis and thereafter weekly.  
The 'Allen Screws' tighten the taper lock - these may require Loctite to secure them.  
The vacant holes are for use to aid removal.

### Regularly:

- Check the condition of drive belts, ensuring they are aligned and properly tensioned at all times to avoid any unnecessary belt wear.
- Remove all guards for access when tensioning belts, ensure the belts are running in line after adjustment.
- Check there is no wrapping of string, plastic, grass or other debris on around the rear roller.
- Check wheel nuts for tightness (130Nm)
- Check tyre pressures: **Turf Tyres** – 39psi max. **Road Tyres** – 35psi.

## PTO SHAFT MAINTENANCE & GREASING

### Primary Drive

The primary drive shaft has fitted a combined overrun and slip clutch; this should be stored in the dry. After a long period of storage/use it may be necessary to disassemble the clutch to check its condition.

- All points should be lubricated every 8 hours of use.

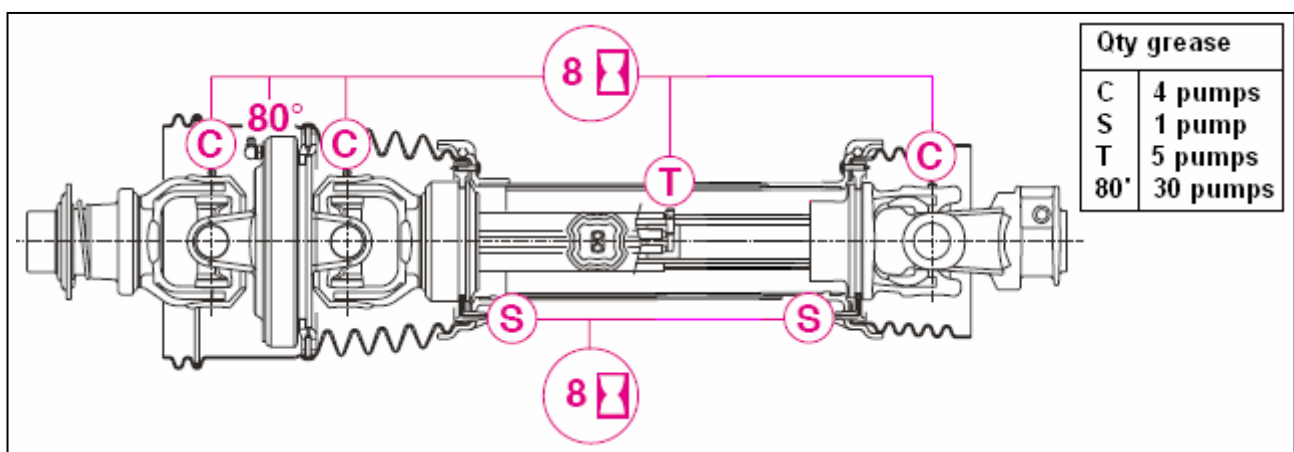
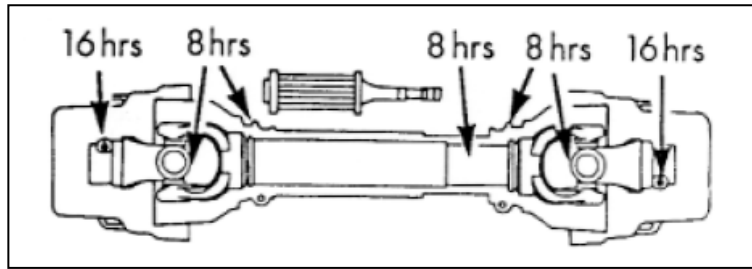


Fig.6

## Secondary Drive

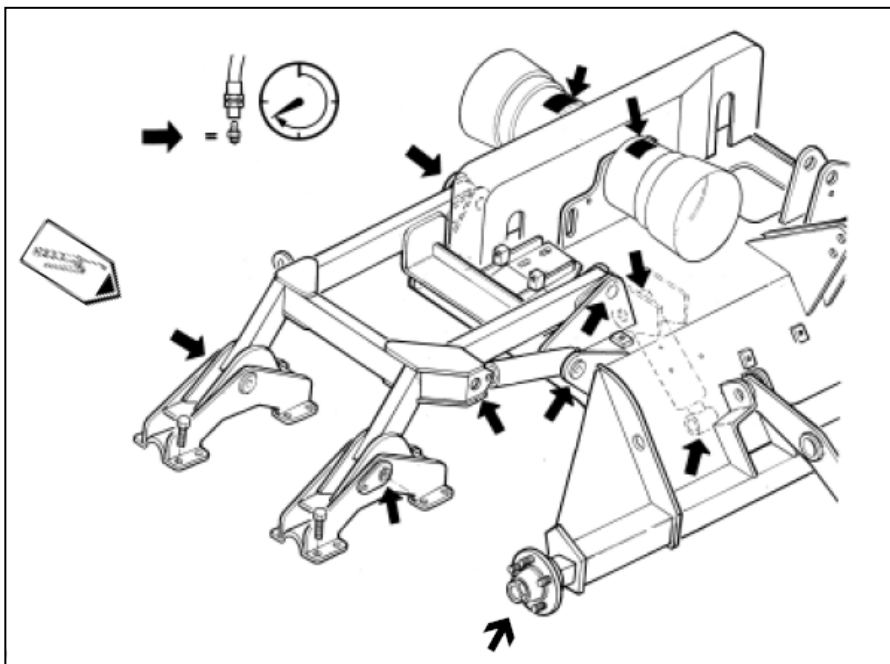


**Fig.7**

- For maximum life and performance, the CV body must be greased regularly on the primary shaft. Lubricate with the driveline in a straight position – *up to 30 pumps of grease may be required.*
- Dismantle the metal sliding tubes, clean and re-grease to operate properly.
- Shielding is subject to damage from abuse and weathering. Replace **all** damaged components and **all** shielding removed during maintenance.
- Do not use PTO adaptors with CV drivelines. Replace special Taper Pin Bolts only with genuine OEM parts. Periodically check tightness of nuts (150Nm).
- Consult PTO Manual for additional information.

## Main Body Grease

Daily grease all the points indicated in the diagram below:



**Fig.8**



## Rotor, Cross Shaft & Rear Roller Bearings Grease

Daily grease all the points indicated in the diagram below:

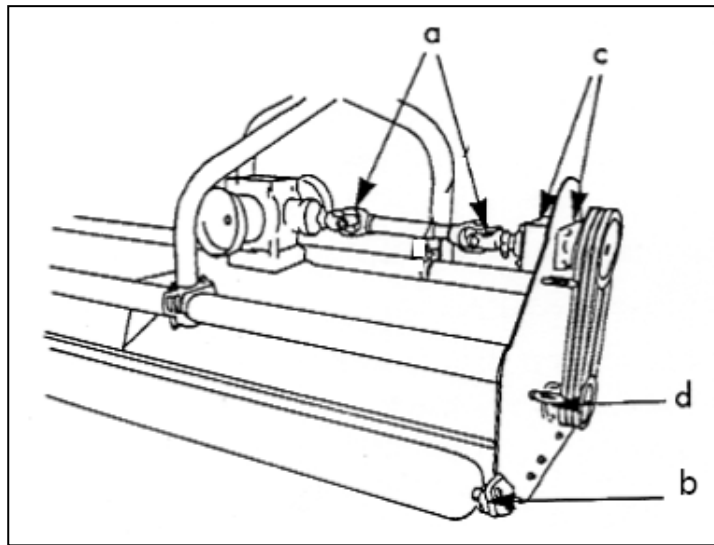


Fig.9

## Tensioning Drive Belts on Primary Drive

Slacken gearbox mounting bolts and tension belts via jacking bolts using a straight edge to maintain alignment (Fig.10). Retighten all bolts.

**Note: Adjust belt tension when in work position.**

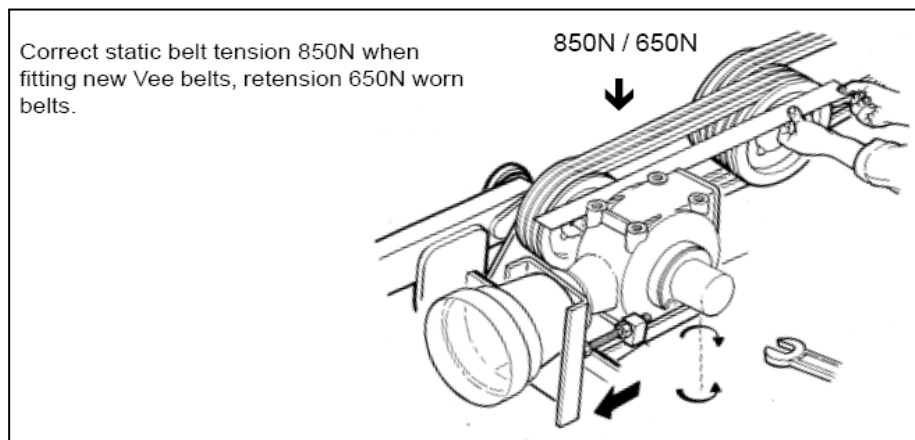


Fig.10

## Tensioning Drive Belts on Secondary Drive

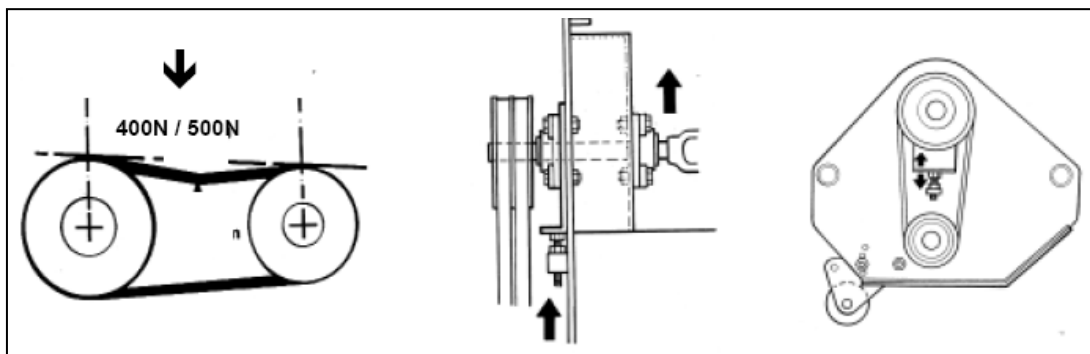


Fig.11

Correct static belt tension 500N when fitting new vee belts to retention worn belts 400N.

## CABLE CONTROLS

- Care should be taken during installation and operation to ensure the cables are not trapped or kinked.
- Correctly adjusted cables will position the lever with equal amount of travel in either direction.
- it is recommended to pack with grease all moving parts of the spool valve detent kit, mounted on the bottom of each spool valve assembly.

## STORAGE

At the end of the season before prior to storage, thoroughly wash the machine off to remove all traces of grass and dirt. Great care must be taken when washing with high-pressure hoses, do not hold the water jet close to the paintwork. Use steam cleaners with caution and be sure to remove all detergents to avoid any discoloring or damage to paint. Lubricate all grease points until fresh grease shows. Store PTO shaft and drive belts in a clean dry location. Control levers must be kept dry. Smear grease on all areas vulnerable to corrosion, in particular the chrome ram rods.

**Remember regular maintenance will greatly increase the life of the machine.**

### **SERVICING CHECKLIST** *(refer to relevant sections for full details)*

#### **Regularly:**

Gearbox: Inspect seals, check bolts for tightness.

Flail rotor: check bolts for tightness, check condition of flails, check retaining bolts for tightness, check rotor bearing bolts tightness.

#### **Daily:**

Maintain correct belt tension.

Check gearbox oil level.

Grease PTO shaft.

Grease all points as shown in diagram.

Check wheel bolts and tyre pressures.

#### **Yearly:**

Drain and replace gearbox oil with EP90.

Inspect PTO slip clutch.

## TROUBLESHOOTING CHART

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Gearbox Overheating	Oil level incorrect Oil grade incorrect Implement overloaded Wrong PTO speed	Check oil level Check oil grade Reduce forward speed Ensure tractor PTO speed matches implement
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
P.T.O. Wear UJ Failure	Working angle too great Shaft incorrect length i.e. bottoming out Lack of maintenance	Increase turning radius to reduce PTO angle Resize PTO shaft as recommended  Grease PTO shaft as recommended
Cut Quality	Flails worn Rotor speed/Direction Crop condition	Replace worn flails Check tractor P.T.O. 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 damaged / bent Build up of debris Incorrect speed	Replace flails Replace bearings Re-balance/replace rotor Remove debris Check rotor RPM
Tractor external oil supply overheating/not staying in detent	High back pressure in returns line  Too much oil flow	Connect implement return hose to a free flow returns on tractor Reduce to 45lt/per min or less.
Control levers stiff/not operating	Cables trapped, rusted or snapped	Ensure cables are routed correctly. Keep levers covered when not mounted on tractor
Slip clutch excessive slip	Friction discs worn Bearing or drive line failure	Replace friction discs Check drive train for free smooth running
Wide angle PTO joint premature wear	Tractor & implement turning at too sharp an angle  Lack of maintenance	When turning at a sharp angle disengage PTO  Refer to service schedule
Decks dropping	Ram seal leaking Cable sticking/out of adjustment Control valve worn	Replace ram seals Replace/adjust cables Replace control valve



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