

Publication 715
June 2012
Part No. 22675.15
Revision: 21.03.18

McCONEL

BARRIER MOWER



Operator Manual



IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION



DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

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

To register machines go to the McConnel Limited web site at www.mcconnel.com, 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		
BSP	Setting	Metric
1/4"	18 Nm	19 mm
3/8"	31 Nm	22 mm
1/2"	49 Nm	27 mm
5/8"	60 Nm	30 mm
3/4"	80 Nm	32 mm
1"	125 Nm	41 mm
1.1/4"	190 Nm	50 mm
1.1/2"	250 Nm	55 mm
2"	420 Nm	70 mm

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

WARRANTY POLICY

WARRANTY REGISTRATION

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

1. LIMITED WARRANTIES

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

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

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

2. REMEDIES AND PROCEDURES

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

3. LIMITATION OF LIABILITY

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

4. MISCELLANEOUS

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

McConnel Limited



DECLARATION OF CONFORMITY

Conforming to EU Machinery Directive 2006/42/EC

We,

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

Hereby declare that:

The Product; *Tractor Mounted Barrier Mower*

Product Code; *BMOW*

Serial No. & Date Type

Manufactured in; *Italy*

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*

POWER ARM INSPECTION AND MAINTENANCE

A daily equipment inspection of the tractor and mower should be conducted before the equipment is used. You may use the inspection sheets to assist with these daily inspections. Any damaged or missing guards should be repaired or replaced before operating the mower. Failure to repair the damaged shield can result in objects being thrown from the mower and possibly hitting the operator or bystander.

Inspect the Mower for Safe Operating Condition

- Make sure the driveline guards and shielding are in place and in good repair.
- Inspect the flexible thrown object shielding to assure that they are in place on the front and rear of the mower head and in good repair. Repair or replace any damaged or missing thrown object shields.
- Ensure the mower cutting height is set high enough to reduce the possibility of the mower blades contacting the ground. Actual height will be dependent on the ground conditions. Increase the height when working in rough or undulating conditions.
- Inspect for broken, chipped, bent, missing, or severely worn blades. Replace damaged blades before operating the mower. Ensure the blade retaining bolts and fasteners are secure and tight.
- Ensure all head bolts and nuts are tight.
- Lubricate the driveline universal joints and telescoping members daily.
- Grease the rotor and roller bearings and inspect their condition.
- Inspect for any oil leaks or damaged hoses
- Inspect for worn or damaged decals and safety instructions. Replace unreadable, damaged or missing safety decals.
- Follow the operator's manual(s) inspection and maintenance instructions for lubricating parts, and keeping thrown object shielding, driveline guards, rotating parts shields, mower blades and decals in good repair.

Inspect the Tractor for Safe Operating Condition:

- Inspect the controls, lights, SMVs (Slow Moving Vehicle sign), seat belts, and ROPS to assure that they are in place and in good working order.
- Be sure the tires, wheels, lug bolts/nuts are in good condition.
- Make sure the tractor brakes and steering are in proper operating condition.
- Follow the operator's manual(s) inspection and maintenance procedures for keeping the tractor in good and safe condition before operating.

The inspection sheet on the following page should be kept in this book as a record. A second sheet is included for you to cut out and photocopy or the inspection sheets can be downloaded from our website at;

<http://www.mcconnel.com/support/aftersales/default.aspx?nav=After Sales>



POWER ARM PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING



Before conducting the inspection, make sure the tractor engine is off, the key removed, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower head is resting on the ground or is securely blocked up and supported and all hydraulic pressure has been relieved.

Item	Condition at start of shift	Specific Comments if not O.K.
The Operator's Manual is in the Canister on the mower		
All Warning Decals are in place, clean and legible		
All Lights are clean and working		
The Mounting frame bolts are in place and tight		
The Arm pivot pins are tight and correctly secured		
There are no cracks in the arms		
The Hyd. Cylinder pins are tight and correctly secured		
The Hyd Cylinder hose connections are tight		
The Hyd. Pump hose connections are tight		
The Hyd. Valve hose connections are tight		
The Hyd. Valve controls function properly		
There are no damaged hoses		
The Oil level is to the green mark on the tank sight glass		
There is no evidence of Hydraulic oil leaks		
Flails are not missing, chipped, broken or excessively worn		
The Flail bolts are tight		
The Front & Rear Flaps are fitted and in good condition		
The Front hood is in place and in good condition		
The Wire Trap is in good condition		
The Skid shoes are in good condition & tight		
There are no cracks or holes in flail casing		
The Hyd. motor mounting bolts are tight		
All Flail Head Nuts and Bolts are tight		
The Rotor Bearings are in good condition and greased		
The Roller bearings are in good condition and greased		
The drive line Shaft guard is in good condition		
The drive line shaft guard is correctly secured		
Controls are securely mounted in the cab		
With engine running check arm operation		
Have a spare pack of flails, bushes, bolts and nuts		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER



TRACTOR PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING



Before conducting the inspection, make sure the tractor engine is off, the key is removed all rotation has stopped and the tractor is in park with the parking brake engaged. Any implement attached to the tractor is firmly on the ground.

Item	Condition at start of shift	Specific Comments if not O.K.
The flashing lights function properly.		
All lights are clean and working correctly		
All cab windows are clean and wipers working correctly		
The SMV sign, where required, is clean and visible.		
The tyres are in good condition with correct pressure.		
The wheel nuts are tight.		
The tractor brakes are in good condition.		
The steering linkage is in good condition.		
There are no visible oil leaks.		
The hydraulic controls function properly.		
The ROPS or ROPS cab is in good condition.		
The seatbelt is in place and in good condition.		
The 3-point hitch is in good condition.		
The drawbar/pick up hook is secure & in good condition		
The PTO master shield is in place.		
The engine oil level is full.		
The brake fluid level is full.		
The power steering fluid level is full.		
The fuel level is adequate.		
The engine coolant fluid level is full.		
The radiator & oil cooler are free of debris.		
The air filter is in good condition		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER



POWER ARM PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING



Before conducting the inspection, make sure the tractor engine is off, the key removed, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower head is resting on the ground or is securely blocked up and supported and all hydraulic pressure has been relieved.

Item	Condition at start of shift	Specific Comments if not O.K.
The Operator's Manual is in the Canister on the mower		
All Warning Decals are in place, clean and legible		
All Lights are clean and working		
The Mounting frame bolts are in place and tight		
The Arm pivot pins are tight and correctly secured		
There are no cracks in the arms		
The Hyd. Cylinder pins are tight and correctly secured		
The Hyd Cylinder hose connections are tight		
The Hyd. Pump hose connections are tight		
The Hyd. Valve hose connections are tight		
The Hyd. Valve controls function properly		
There are no damaged hoses		
The Oil level is to the green mark on the tank sight glass		
There is no evidence of Hydraulic oil leaks		
Flails are not missing, chipped, broken or excessively worn		
The Flail bolts are tight		
The Front & Rear Flaps are fitted and in good condition		
The Front hood is in place and in good condition		
The Wire Trap is in good condition		
The Skid shoes are in good condition & tight		
There are no cracks or holes in flail casing		
The Hyd. motor mounting bolts are tight		
All Flail Head Nuts and Bolts are tight		
The Rotor Bearings are in good condition and greased		
The Roller bearings are in good condition and greased		
The drive line Shaft guard is in good condition		
The drive line shaft guard is correctly secured		
Controls are securely mounted in the cab		
With engine running check arm operation		
Have a spare pack of flails, bushes, bolts and nuts		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER



TRACTOR PRE-OPERATION Inspection

Power Arm ID _____ Date: _____ Shift: _____

WARNING

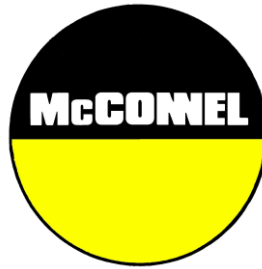


Before conducting the inspection, make sure the tractor engine is off, the key is removed all rotation has stopped and the tractor is in park with the parking brake engaged. Any implement attached to the tractor is firmly on the ground.

Item	Condition at start of shift	Specific Comments if not O.K.
The flashing lights function properly.		
All lights are clean and working correctly		
All cab windows are clean and wipers working correctly		
The SMV sign, where required, is clean and visible.		
The tyres are in good condition with correct pressure.		
The wheel nuts are tight.		
The tractor brakes are in good condition.		
The steering linkage is in good condition.		
There are no visible oil leaks.		
The hydraulic controls function properly.		
The ROPS or ROPS cab is in good condition.		
The seatbelt is in place and in good condition.		
The 3-point hitch is in good condition.		
The drawbar/pick up hook is secure & in good condition		
The PTO master shield is in place.		
The engine oil level is full.		
The brake fluid level is full.		
The power steering fluid level is full.		
The fuel level is adequate.		
The engine coolant fluid level is full.		
The radiator & oil cooler are free of debris.		
The air filter is in good condition		

Operators Signature: _____

DO NOT OPERATE an UNSAFE TRACTOR or MOWER



For Safety and Performance...

ALWAYS READ THE BOOK FIRST

McCONEL LIMITED

**Temeside Works
Ludlow
Shropshire
England**

**Telephone: +44 (0)1584 873131
www.mcconel.com**

- NOISE STATEMENT -

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



Operating, servicing and maintaining this equipment can expose you to chemicals including gasoline, diesel fuel, lubricants, petroleum products, engine exhaust, carbon monoxide, and phthalates, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. This website, operated by California's Office of Environmental Health Hazard Assessment, provides information about these chemicals and how individuals may be exposed to them.

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GENERAL INFORMATION

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

Use only McConnel Genuine Service 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 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

These terms are applicable to the machine when it is viewed from the rear facing forwards.

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

Machine & Dealer Information

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

Machine Serial Number:

Installation Date:

Machine Model details:

Dealer Name:

Dealer Address:

Dealer Telephone No:

Dealer Email Address:

MACHINE DESCRIPTION

The McConnel Barrier Mower is a tractor mounted three-point linkage machine specifically designed for cutting around roadside obstacles such as barriers, guard rails and road signs. The machine is compatible with tractors and other suitable carrying vehicles of 85hp and above and features the ability to be front or rear and left hand or right hand mounted.

Its multi-positional alignment, high speed cutting system, and choice of mounting positions make it the ideal equipment for use by contractors or local authorities for efficient highway verge maintenance.

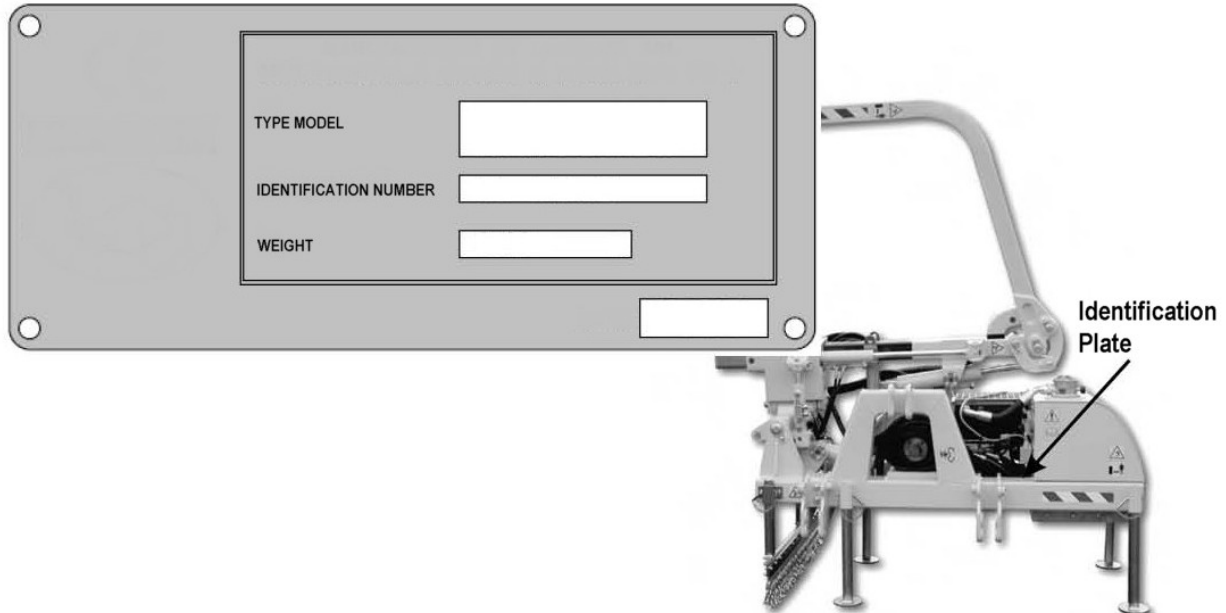
This machine must only be used to perform duties for which it was specifically designed. Use on tasks that it is not designed for will risk personal injury and/or damage to the machine.

MACHINE IDENTIFICATION

The machine will have an identification plate stating the following information;

- 1) Machine Model
- 2) Identification Number (Serial No.)
- 3) Machine Weight.

When ordering spares or replacement parts from your local dealer it is important to quote both the machine model and the serial number as stated on the identification plate so the machine can be quickly and correctly identified. The location of the identification plate is shown below.



FEATURES

Barrier Mower

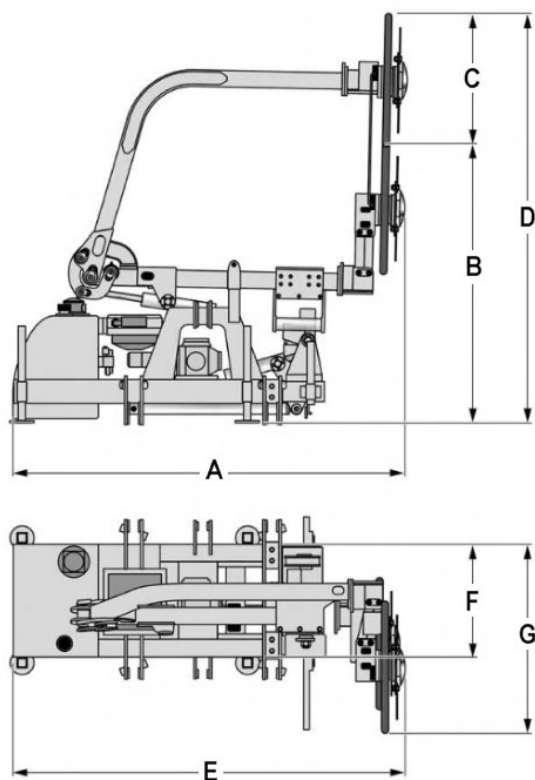
- Three-point linkage mounted.
- Left or right hand mounting capability.
- Front and rear mounting capability.
- Hydraulically folding.
- 45HP hydraulic system.
- 170 litre hydraulic oil tank.
- 3,000 rpm blade speed.
- Excellent operating visibility.
- Compatible with a variety of carrying vehicle.

TECHNICAL SPECIFICATIONS

Power Requirement (Minimum)	85HP / 62kW
Absorbed Power (Maximum)	45HP / 33kW @ 1000 rpm PTO
Knife Speed (Maximum)	3000 rpm
Oil Tank Capacity	170 litres
Machine Weight	1500 Kg
Attachment Type	3-point linkage (Cat. II)
PTO Speed	1000 rpm (standard) / 540 rpm (option)
Hydraulic Motor Pressure (Maximum)	140 bar
Service Pressure (Maximum)	160 bar

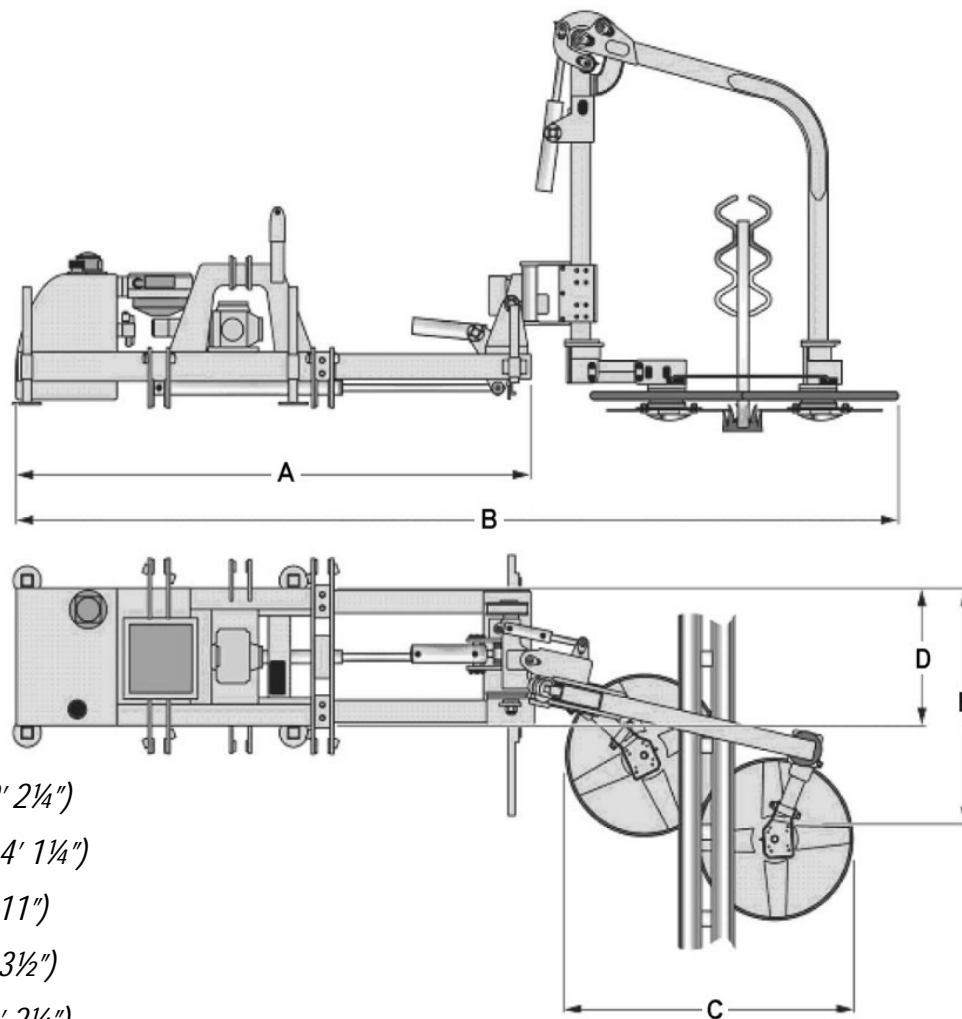
MACHINE DIMENSIONS

Transport Position



- A = 2500mm (8' 2½")
- B = 1800mm (5' 11")
- C = 800mm (2' 7½")
- D = 2500mm (8' 2½")
- E = 2500mm (8' 2½")
- F = 700mm (2' 3½")
- G = 1300mm (4' 3")

Work Position



- A = 2800mm (9' 2¼")
- B = 4300mm (14' 1¼")
- C = 800mm (4' 11")
- D = 700mm (2' 3½")
- E = 1250mm (4' 2¼")



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.

When the machine is not in use it should be parked on a firm level site with the cutting head resting on the ground and the starting key removed.

In the event of any fault being detected with the machine's operation it must be stopped immediately and not used again until the fault has been corrected by a qualified technician.

POTENTIAL SIGNIFICANT DANGERS ASSOCIATED WITH THE USE OF THIS MACHINE:

- ▲ *Being hit by debris thrown by rotating components.*
- ▲ *Being hit by machine parts ejected through damage during use.*
- ▲ *Being caught on a rotating power take-off (PTO) shaft.*
- ▲ *Being caught in other moving parts i.e.: belts, pulleys and cutting heads.*
- ▲ *Electrocution from Overhead Power Lines (by contact with or 'flashover' from).*
- ▲ *Being hit by cutting heads or machine arms as they move.*
- ▲ *Becoming trapped between tractor and machine when hitching or unhitching.*
- ▲ *Injection of high-pressure oil from hydraulic hoses or couplings.*
- ▲ *Machine overbalancing when freestanding (out of use).*
- ▲ *Road traffic accidents due to collision or debris on the road.*

BEFORE USING THIS MACHINE YOU MUST:

- ▲ *Ensure you read all sections of the operator handbook.*
- ▲ *Ensure the operator is, or has been, properly trained to use the machine.*
- ▲ *Ensure the operator has been issued with and reads the operator handbook.*
- ▲ *Ensure the operator understands and follows the instructions in operator handbook.*
- ▲ *Ensure the tractor front, rear and sides are fitted with metal mesh or polycarbonate guards of suitable size and strength to protect the operator against thrown debris or parts.*
- ▲ *Ensure tractor guards are fitted correctly, are undamaged and kept properly maintained.*
- ▲ *Ensure that all machine guards are in position, are undamaged, and are kept maintained in accordance with the manufacturer's recommendations.*
- ▲ *Ensure knives/blades and their fixings are of a type recommended by the manufacturer, are securely attached and that none are missing or damaged.*
- ▲ *Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.*
- ▲ *Always follow the manufacturer's instructions for attachment and removal of the machine from the tractor.*
- ▲ *Check that the machine fittings and couplings are in good condition.*
- ▲ *Ensure the tractor meets the minimum weight recommendations of the machine's manufacturer and that ballast is used as necessary.*
- ▲ *Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.*
- ▲ *Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their, and the Local Highways Authority, guidelines).*
- ▲ *Ensure the operator is protected from noise. Ear defenders should be worn and tractor cab doors and windows must be kept closed. Machine controls should be routed through proprietary openings in the cab to enable all windows to be shut fully.*
- ▲ *Always work at a safe speed taking account of the conditions i.e.: terrain, highway proximity and obstacles around and above the machine. Extra special attention should be applied to Overhead Power Lines. Some of our machines are capable of reach in excess of 8 metres (26 feet) this means 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. It cannot be stressed enough the dangers that surround this capability, it is therefore vital that the operator is fully aware of the maximum height and reach of the machine, and that they are fully conversant with all aspects regarding the safe minimum distances that apply when working with machines in close proximity to Power Lines. (Further information on this subject can be obtained from the Health & Safety Executive or your Local Power Company).*
- ▲ *Do not raise the machine when the knives/blades are moving; switch the rotors off and wait for them to stop completely before attempting to raise the machine.*

- ▲ *Never allow the knives/blades to touch the ground during work.*
- ▲ *Always disengage the machine, kill the tractor engine, remove and pocket the key before dismounting for any reason.*
- ▲ *Always clear up all debris left at the work area, it may cause hazard to others.*
- ▲ *Always ensure when you remove your machine from the tractor that it is left in a safe and stable position using the stands and props provided and secured if necessary.*

WHEN NOT TO USE THIS MACHINE:

- ▲ *Never attempt to use this machine if you have not been trained to do so.*
- ▲ *Never use a machine until you have read and understood the operator handbook, are familiar with it, and practiced the controls.*
- ▲ *Never use a machine that is poorly maintained.*
- ▲ *Never use a machine if guards are missing or damaged.*
- ▲ *Never use a machine on which the hydraulic system shows signs of wear or damage.*
- ▲ *Never fit, or use, a machine on a tractor that does not meet the manufacturer's minimum specification level.*
- ▲ *Never use a machine fitted to a tractor that does not have suitable front, rear and side(s) cab guarding made of metal mesh or polycarbonate.*
- ▲ *Never use the machine if the tractor cab guarding is damaged, deteriorating or badly fitted.*
- ▲ *Never turn a machine cutting head to an angle that causes debris to be ejected towards the cab.*
- ▲ *Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing. WARNING: Some cutting heads may continue to 'freewheel' for up to 40 seconds after being stopped.*
- ▲ *Never attempt to use a machine on materials in excess of its capability.*
- ▲ *Never use a machine to perform a task it has not been designed to do.*
- ▲ *Never operate the tractor or machine controls from any position other than from the driving seat, especially whilst hitching or unhitching the machine.*
- ▲ *Never carry out maintenance of a machine or a tractor whilst the engine is running – the engine should be switched off, the key removed and pocketed.*
- ▲ *Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.*
- ▲ *Never leave a tractor with the key in or the engine running.*
- ▲ *Never carry out maintenance on any part or component of a machine that is raised unless that part or component has been properly substantially braced or supported.*
- ▲ *Never attempt to detect a hydraulic leak with your hand – use a piece of cardboard.*

- ▲ *Never allow persons or animals to ride on the machine either in work or in transport.*
- ▲ *Never allow children near to, or play on, a tractor or machine under any circumstances.*

ADDITIONAL SAFETY ADVICE

Training

Operators need to be competent and fully capable of operating this machine in a safe and efficient way prior to attempting to use it in any public place. We advise therefore that the prospective operator make use of relevant training courses available such as those run by the Agricultural Training Board, Agricultural Colleges, Dealers and McConnel.

Working in Public Places

When working in public places such as roadsides, consideration should be paid to others in the vicinity. Stop the machine immediately when pedestrians, cyclists and horse riders etc. pass. Restart only when they are at a distance that causes no risk to their safety.

Warning Signs

It is advisable that any working area be covered by suitable warning signs and statutory in public places. Signs should be highly visible and well placed in order to give clear advanced warning of the hazard. Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject. The latter should be contacted prior to working on the public highway advising them of the time and location of the intended work asking what is required by way of signs and procedure. – *'Non-authorized placement of road signs may create offences under the Highways Act'*.

Suggested Warning Signs Required

'Road works ahead' warning sign with a supplementary *'Hedge cutting'* plate. *'For 1 mile'* or appropriate shorter distance may be added to the plate.

'Road narrows' warning signs with supplementary *'Single file traffic'* plate.

White on blue *'Keep right'* (*) arrow sign on rear of machine.

** Note – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow sign will depend on the country of use and the Local Highway Authorities regulations in the locality.*

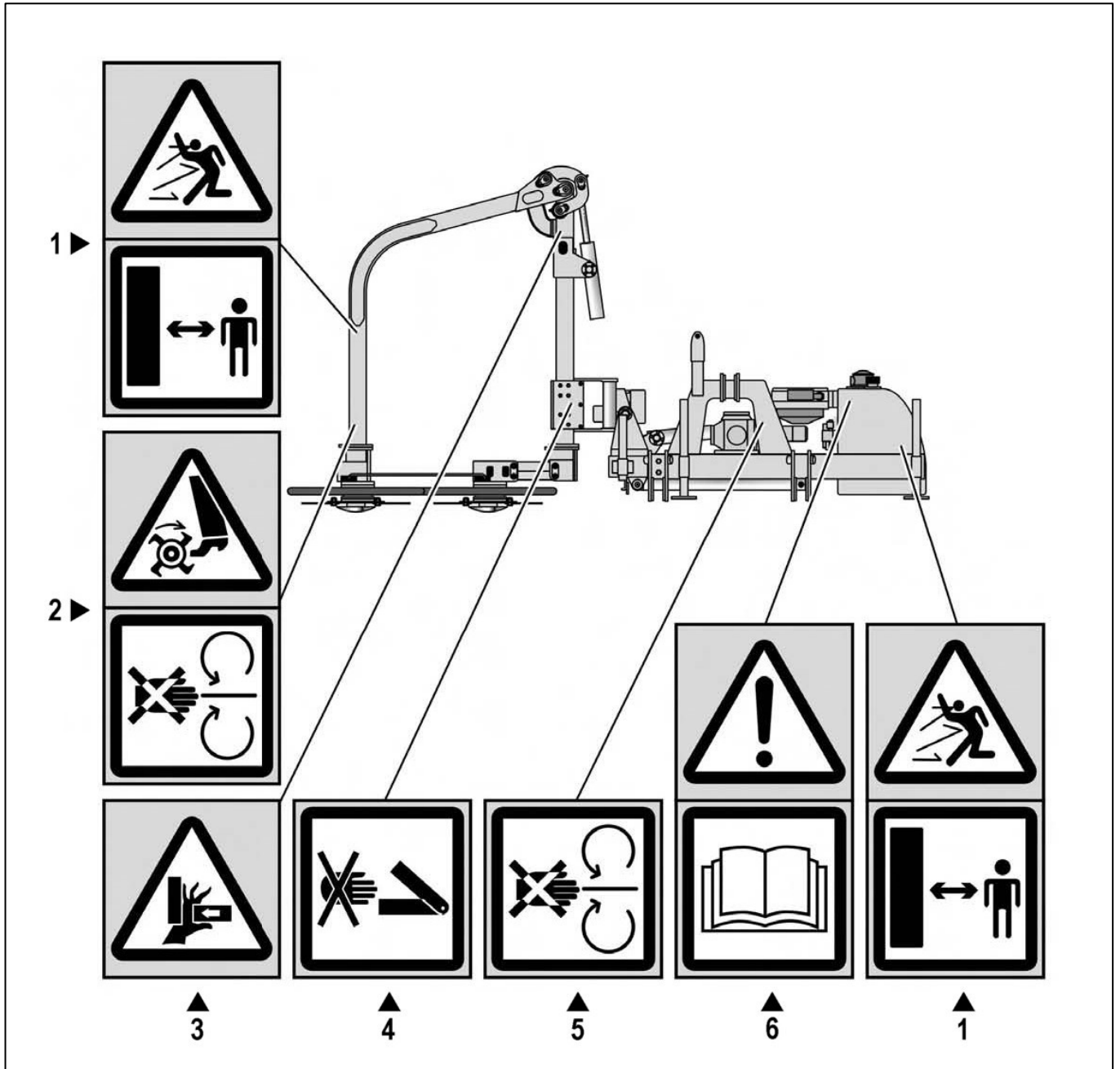
Use of Warning Signs

- ▲ *On two-way roads one set of signs is needed facing traffic in each direction.*
- ▲ *Work should be within 1 mile of the signs.*
- ▲ *Work only when visibility is good and at times of low risk e.g.: NOT during 'rush-hour'.*
- ▲ *Vehicles should have an amber-flashing beacon.*
- ▲ *Ideally, vehicles should be conspicuously coloured.*
- ▲ *Debris should be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.*
- ▲ *Collect all road signs promptly when the job is completed.*

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.

SAFETY DECALS

Location & Identification of Safety Decals



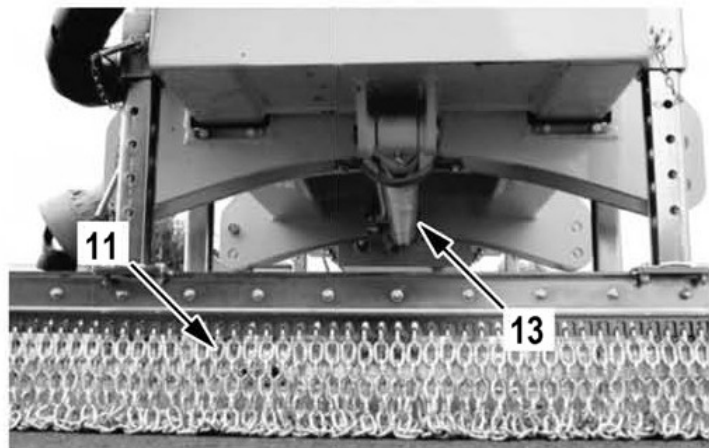
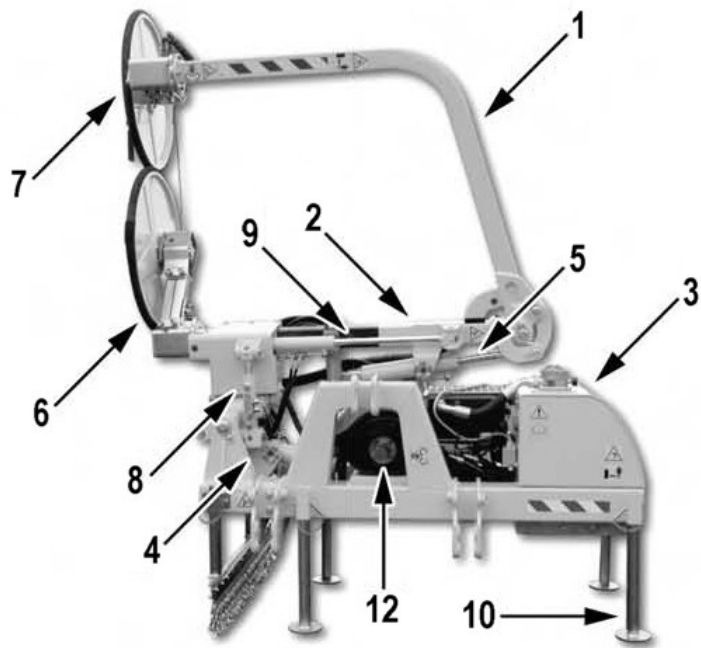
- 1) Flying Objects Hazard – Keep Clear of Working Machine.
- 2) Rotating Tool Hazard – Keep Limbs Clear of Rotating Components.
- 3) Crush Risk Hazard – Keep Clear of Moving Components in this Area.
- 4) Pinch Risk Hazard – Keep Clear of Moving Components in this Area.
- 5) Rotating Component Hazard – Keep Limbs Clear of Rotating Components.
- 6) Warning – Read the Manual First.



Ensure all operators of the machine understand the meaning of all the warning decals. Replace decals immediately if they become damaged or unreadable.

COMPONENT IDENTIFICATION

1. Outer Arm
2. Inner Arm
3. Oil Tank
4. Machine Rotation Ram
5. Outer Arm Opening Ram
6. Inner Rotor
7. Outer Rotor
8. Tilting Ram
9. Lift Ram
10. Support Leg
11. Chain Guard
12. PTO
13. Side Movement Ram



MACHINE HANDLING

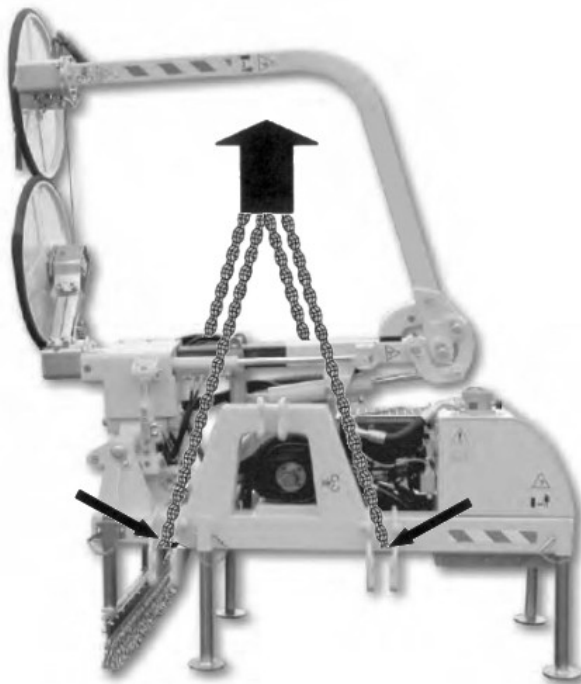
Handling the Machine

Handling of the machine should always be performed using suitable overhead lifting equipment with a minimum safe lifting capacity over and above the maximum weight of the machine. Always ensure the machine is balanced during the lifting procedure and that all bystanders are kept well clear of the raised machine.

Lifting Points

To ensure even weight distribution when handling the machine it should be lifted using a sling eye and sling shackle attached to the machine at the lifting points illustrated below on both the front and the back of the machine (4 points).

The lifting sling or chain should be adjusted to ensure the machine is level and balanced when raised clear of the ground.



After lifting the machine it should be placed to rest on flat and solid ground. Ensure the support feet are properly positioned and safety pins are fitted.

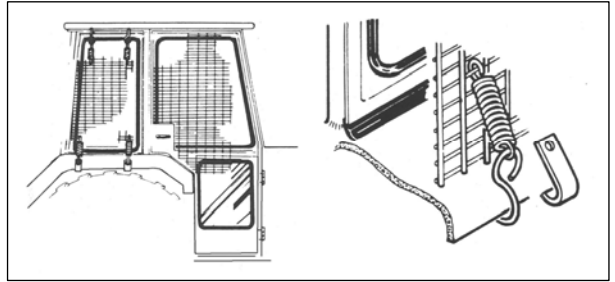
Never leave the machine in an unbalanced or unsecure condition.

VEHICLE/ TRACTOR PREPARATION

We recommend vehicles are fitted with cabs using safety glass windows and protective guarding when used with our machines.

Fit Operator Guard (part number 7313324) using the hooks provided. Shape mesh to cover all vulnerable areas.

Remember the driver must be looking through mesh and/or polycarbonate glazing when viewing the flail head in any working position - unless the vehicle/ cab manufacturer can demonstrate that the penetration resistance is equivalent to, or higher than, that provided by mesh/polycarbonate glazing. If the tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing. The operator should also use personal protective equipment to reduce the risk of serious injury such as; eye protection (mesh visor to EN1731 or safety glasses to EN166), hearing protection to EN352, safety helmet to EN297, gloves, filter mask and high visibility clothing.



Vehicle Ballast: It is imperative when attaching 'third-party' equipment to a vehicle that the maximum possible stability of the machine and vehicle combination is achieved – this can be accomplished by the utilisation of 'ballast' in order to counter-balance the additional equipment added.

Front weights may be required for rear mounted machines to place 15% of total outfit weight on the front axle for stable transport on the road and to reduce 'crabbing' due to the drag of the cutting unit when working on the ground.

Rear weights may be required to maintain a reasonable amount of rear axle load on the opposite wheel from the arms when in work; for normal off-ground work i.e. hedge cutting this should be 20% of rear axle weight or more for adequate control, and for ground work i.e. verge mowing with experienced operators, this can be reduced to 10%.

All factors must be addressed in order to match the type and nature of the equipment added to the circumstances under which it will be used – in the instance of Power Arm Hedgecutters it must be remembered that the machines centre of gravity during work will be constantly moving and will differ from that during transport mode, therefore balance becomes critical.

Factors that affect stability:

- *Centre of gravity of the tractor/machine combination.*
- *Geometric conditions, e.g. position of the cutting head and ballast.*
- *Weight, track width and wheelbase of the tractor.*
- *Acceleration, braking, turning and the relative position of the cutting head during these operations.*
- *Ground conditions, e.g. slope, grip, load capability of the soil/surface.*
- *Rigidity of implement mounting.*

Suggestions to increase stability:

- *Increasing rear wheel track; a vehicle with a wider wheel track is more stable.*
- *Ballasting the wheel; it is preferable to use external weights but liquid can be added to around 75% of the tyre volume – water with anti-freeze or the heavier Calcium Chloride alternative can be used.*
- *Addition of weights – care should be taken in selecting the location of the weights to ensure they are added to a position that offers the greatest advantage.*
- *Front axle locking, check with tractor manufacturer.*

The advice above is offered as a guide for stability only and is not a guide to vehicle strength. It is therefore recommended that you consult your vehicle manufacturer or local dealer to obtain specific advice on this subject, additionally advice should be sought from a tyre specialist with regard to tyre pressures and ratings suitable for the type and nature of the machine you intend to fit.

ATTACHING THE MACHINE

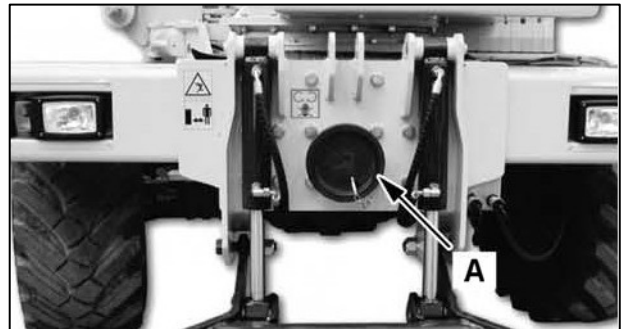
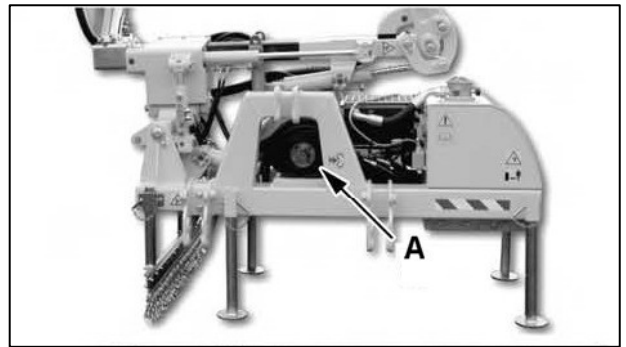


Attachment of the machine must always be performed on a firm level site. Ensure bystanders are kept at a safe distance from both the machine and tractor during the attachment procedure.

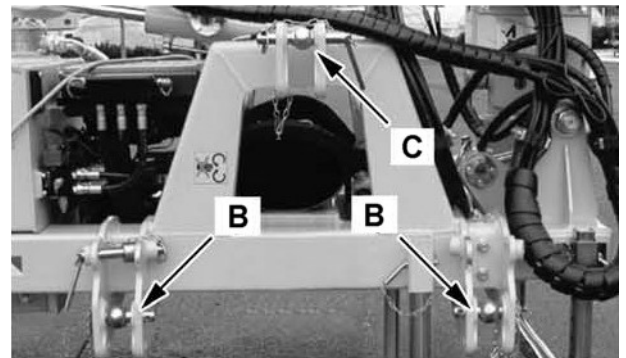
Before attempting to attach the machine to the tractor, carefully read the tractor operator's manual, especially chapters concerning the 3-point linkage, tractor-tool connection, and the hydraulic lift system. The PTO shaft operator's manual should also be referred to for specific information on that component.

The attachment procedure is as follows;

Where applicable; remove the PTO stub shaft end covers (A) from the attaching side of the machine and the tractor.

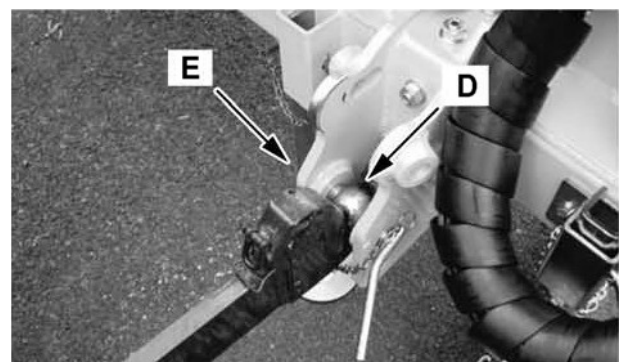


Fit and secure the Cat II linkage pins and lower link balls (B) in the lower attachment points of the machine's mainframe.



Fit and secure the top link pin and link ball (C) in the upper attachment point of the machine's mainframe.

With the tractor's link arms lowered, carefully drive the tractor squarely up to the machine to align the connection positions directly below the lower attachment points of the machine.

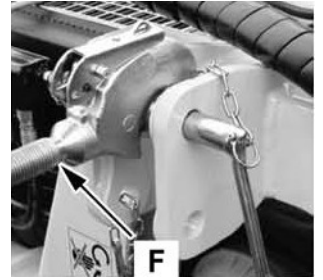


Slowly raise the tractor link arms until automatic coupling is achieved, check the linkage arms have correctly engaged on the link balls (D), and ensure all safety pins are fitted correctly (E).



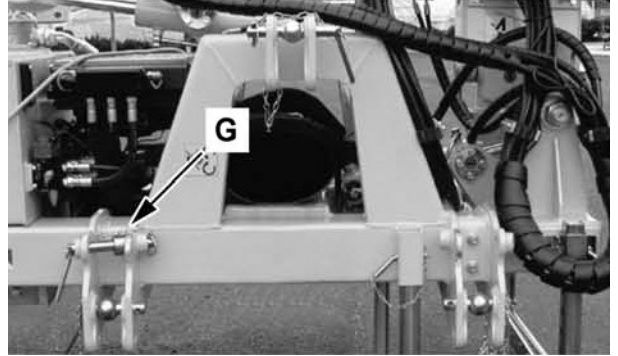
For the following operations ensure the tractor engine is switched off, the parking brake applied and the starting key removed.

Adjust the top link length (F) so that it fully engages on the link ball.



Fit adjustable link bars from the lower attachment points (G) to the upper connection position on the tractor and secure with pins.

Link bars should be adjusted so that the machine is parallel to the ground when raised.

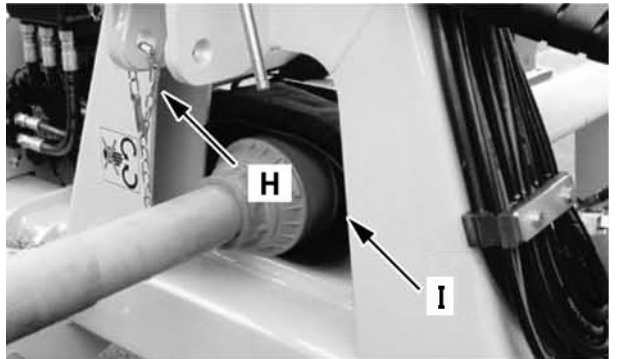


Fit the PTO shaft ensuring the PTO speed of the tractor and the machine correspond.

Note; for initial fitment refer to the following page for details of measuring and cutting the PTO shaft.

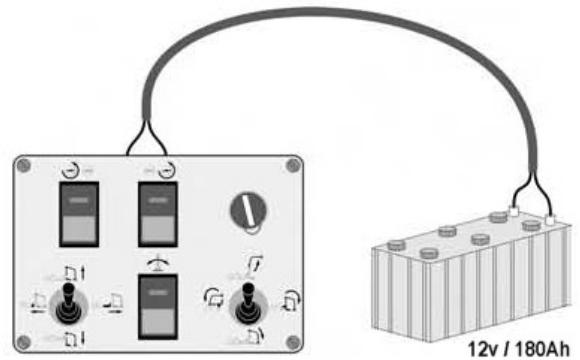
Fit and secure torque chains to PTO guards.

Check the PTO shaft does not interfere with any of the machine or tractor components.



Fit the machines control unit within the tractor cab selecting a suitable operating position. Ensure all wiring is routed neatly and is kept clear of sharp edges and moving parts.

Power for the control unit requires a 180Ah rated battery with a 12v operating voltage.



Make a check of the installation to ensure that all attachment pins are fitted correctly and secured with locking pins.

Lift the machine off the ground using the tractor hydraulics then raise the four support legs and secure in position with pins and R-clips.

With the machine attached it can now be folded into the transport position for transfer to the work site.

Machine Removal

The procedure of removing the machine is basically a reversal of the attachment procedure. Removal and parking up should always be performed on a firm level site. Always ensure the machine is parked or stored in a safe condition.

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.

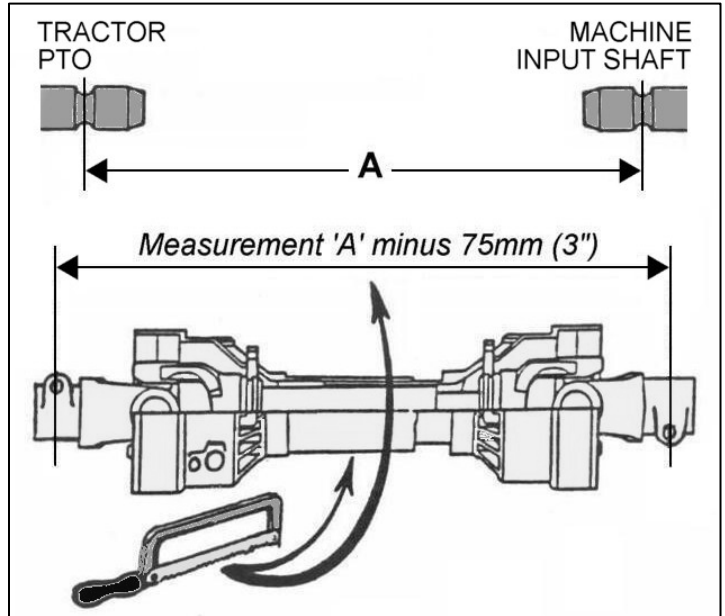
The procedure for measuring and cutting the shaft is as follows;

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 machines 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.*

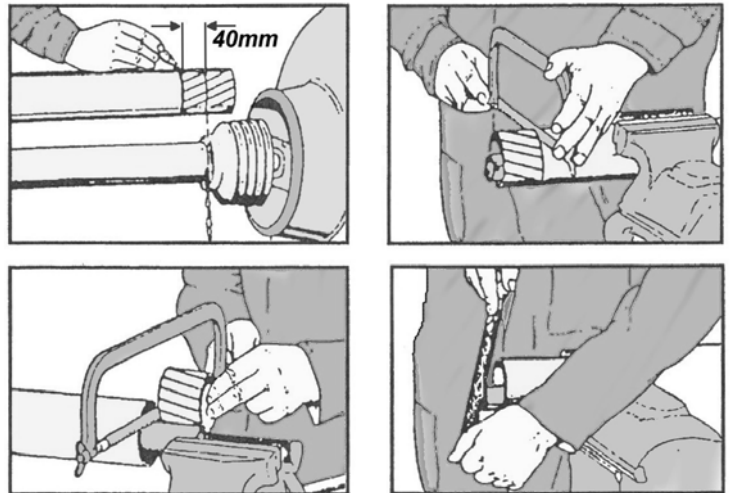
If the shaft is longer subtract the required shaft length plus an additional 75mm (3”) - *the resulting figure is the excess length that will need to be removed from each half of the shaft.*



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”).*

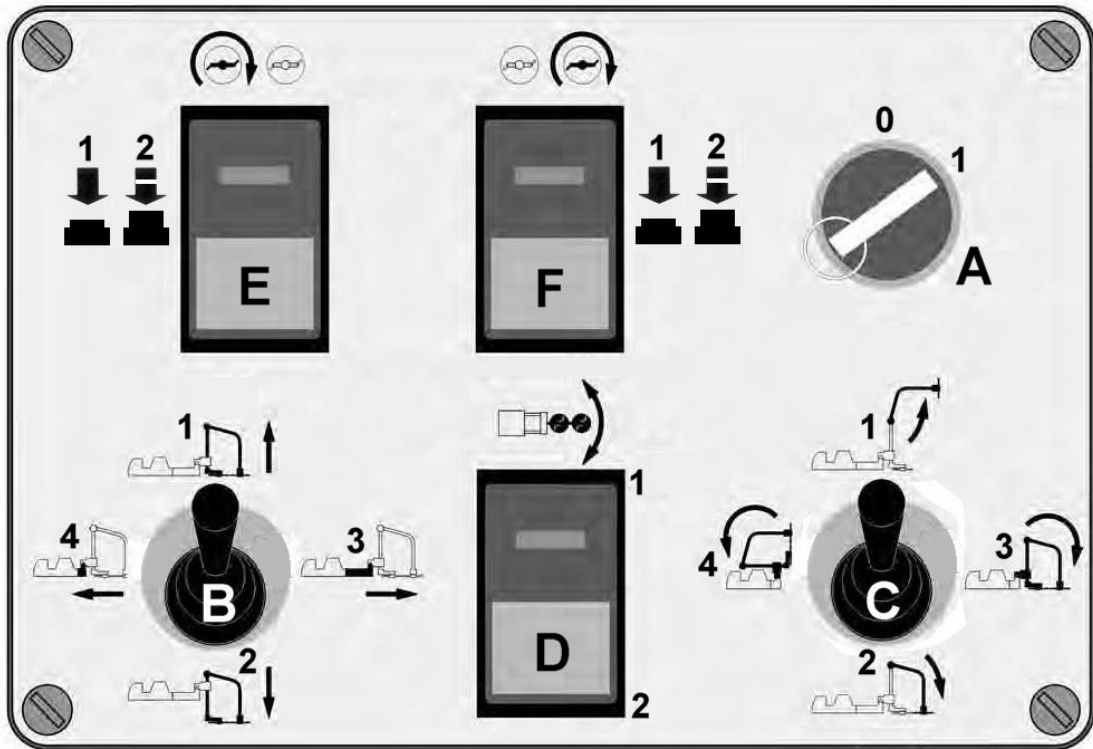


Maintenance

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.*

MACHINE CONTROLS

Controls Identification & Function



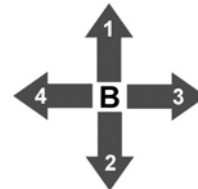
A Power Switch

- A0 - Power Off
- A1 - Power On



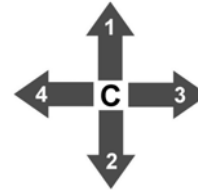
B Machine Position (Joystick)

- B1 - Raises Arm-Set
- B2 - Lowers Arm-Set
- B3 - Extends Arm-Set
- B4 - Retracts Arm-Set



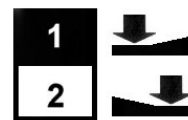
C Arm Control (Joystick)

- C1 - Opens Outer Arm
- C2 - Closes Outer Arm
- C3 - Unfolds Arm-Set (Work Position)
- C4 - Folds Arm-Set (Transport Position)



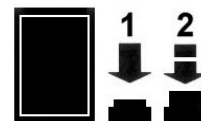
D Rotor Angle (Rocker Switch)

- D1 - Moves Outer Rotor forwards
- D2 - Moves Outer Rotor rearwards



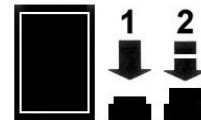
E Inner Rotor On/Off Switch

- E1 - Press to Start Rotor
- E2 - Press again to Stop Rotor



F Outer Rotor On/Off Switch

- F1 - Press to Start Rotor
- F2 - Press again to Stop Rotor



TRANSPORT POSITION

For moving between sites and for transportation on the public highway the machine must be placed into its compact transport position; this is with the Arm-Set fully retracted and folded over the mainframe as shown below.



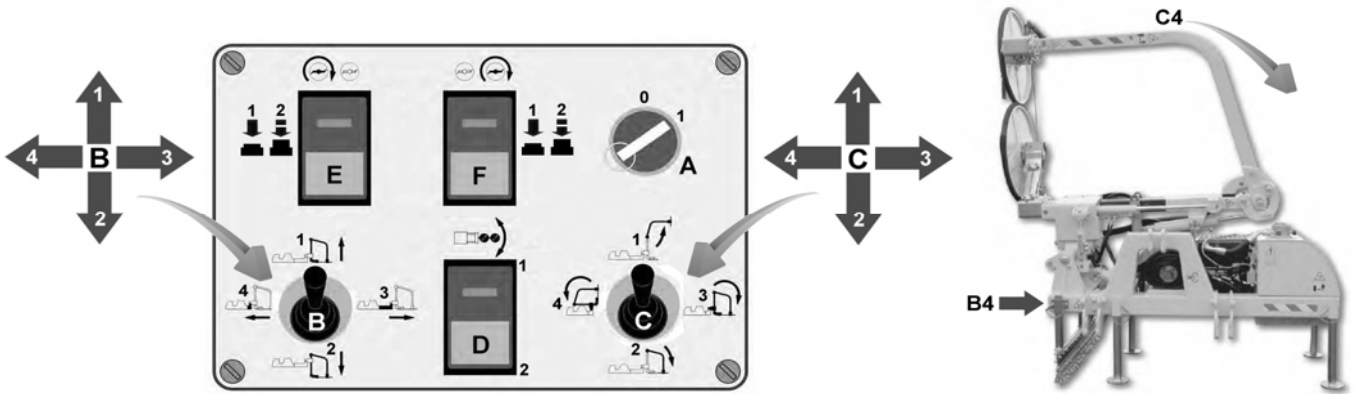
WARNING: Onlookers must be kept at a safe distance from the machine at all times when moving the Arm-Set in or out of the transport position. Ensure the machine is clear of any obstructions before operating.

Moving the Machine into Transport

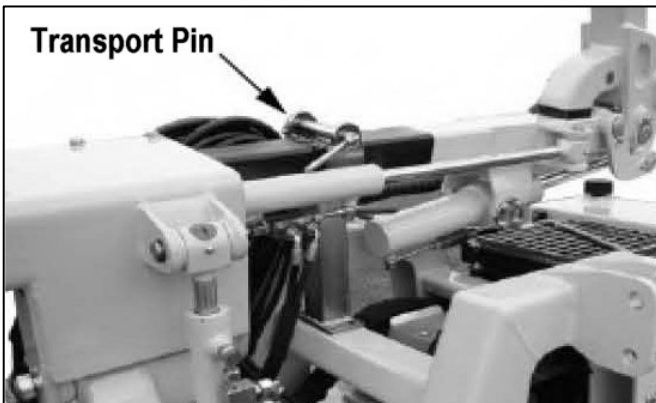
With Rotors switched off and the Arm-Set at right-angles to the tractor in the closed and vertically raised position;

Retract the Arm-Set fully up to the machine by operating Joystick 'B' in direction 4.

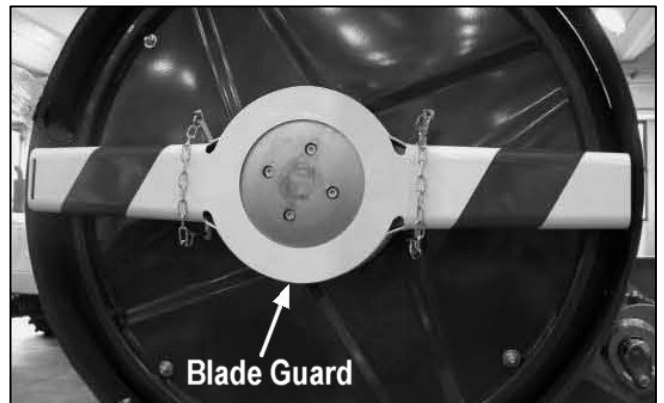
Raise the Arm-Set and fold it over the mainframe by operating Joystick 'C' in direction 4.



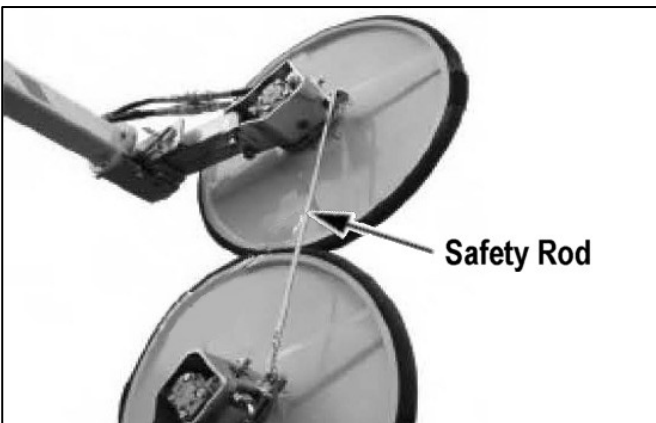
Secure the components below with the devices shown before transporting the machine.



Fit transport pin to secure the arms in position.



Fit and secure the blade guards to each rotor.



Fit safety rod to secure the rotors together.



Fit safety pins on rotor arms to secure them in position.

Transportation

For transportation on public roads always abide by the Highway Code and any local by-laws.

- Equip the machine with signs required by the Highway Code for Agricultural Machinery.
- Ensure, if the machine is coupled to the hydraulic lifting device on the tractor that the lift control lever is in the locked position and that check chains and/or stabilisers are tightened and secured.
- Ensure all linkage pins are in good condition and secure with lock pins.

The acceptable speed of transport will vary greatly depending upon the ground conditions. In any conditions avoid driving at a speed which causes exaggerated bouncing as this will put unnecessary strain on the tractors top hitch position.



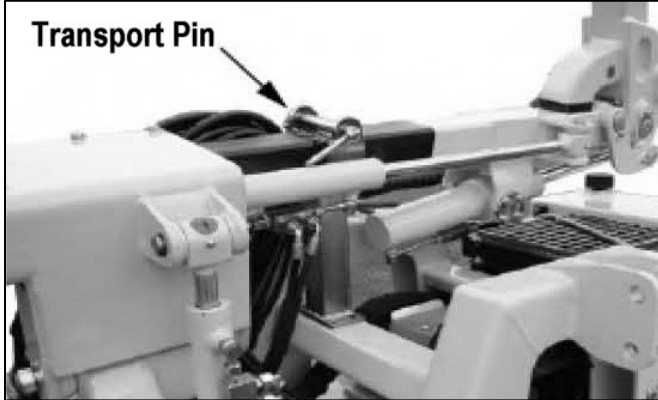
CAUTION: During transportation of the machine the PTO must be disengaged and power to the controls switched off.

MOVING INTO WORK POSITION

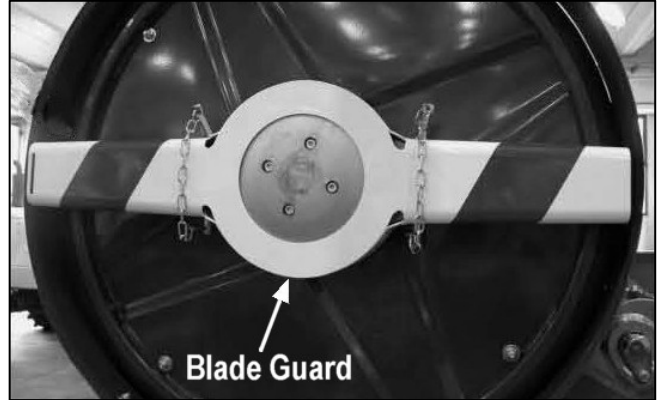
The procedure for moving the machine into the work position is as follows;

Select a level site, apply the tractor handbrake, switch off engine and remove the starting key.

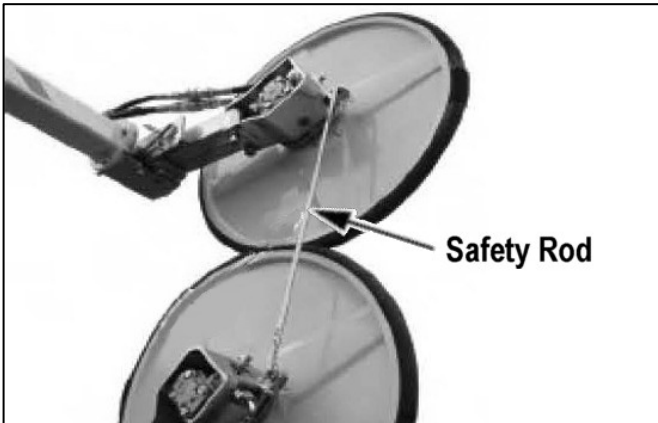
Remove the security devices fitted to the components shown below.



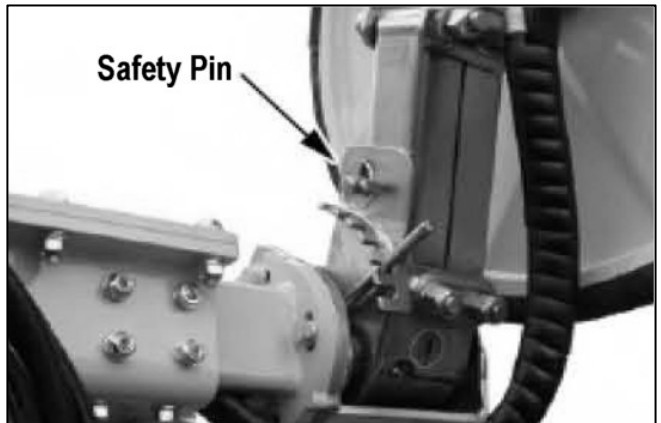
Remove transport pin..



Remove the blade guards from each rotor.



Remove the safety rod from the rotors.

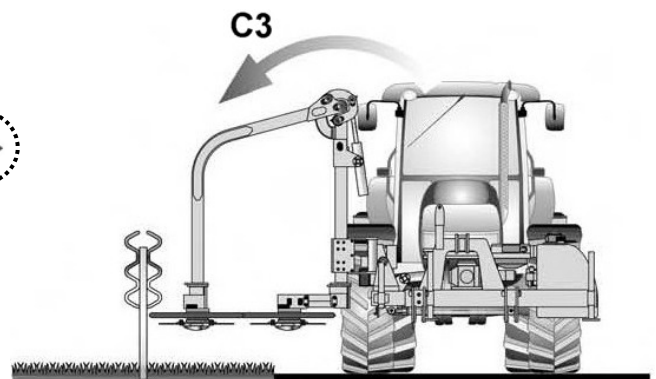
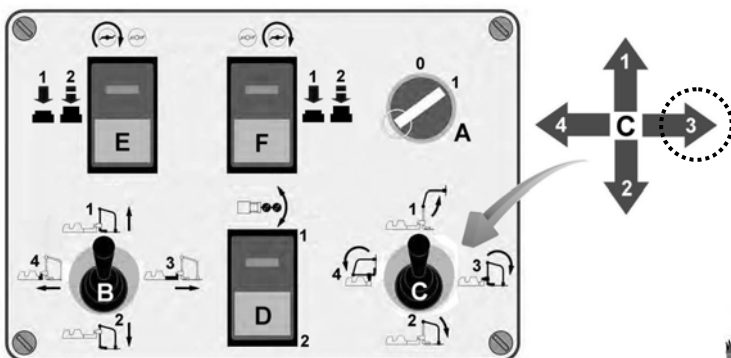


Remove security pins from both rotor arms.



WARNING: Onlookers must be kept at a safe distance from the machine at all times when moving the Arm-Set in or out of the transport position. Ensure the machine is clear of any obstructions before operating.

Unfold the Arm-Set into position at the side of the tractor by operating Joystick 'C' in direction 3.

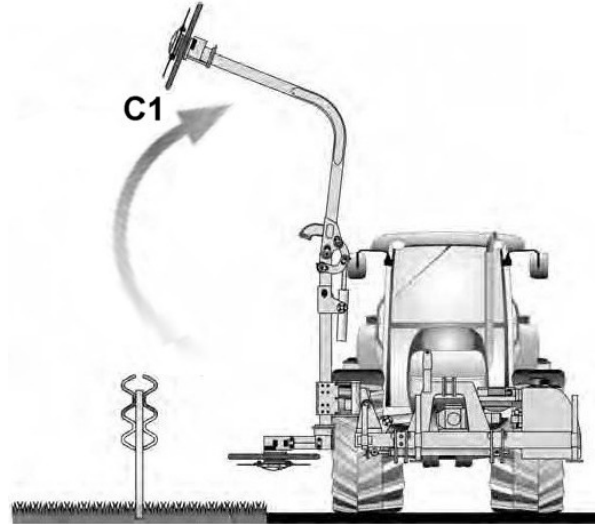
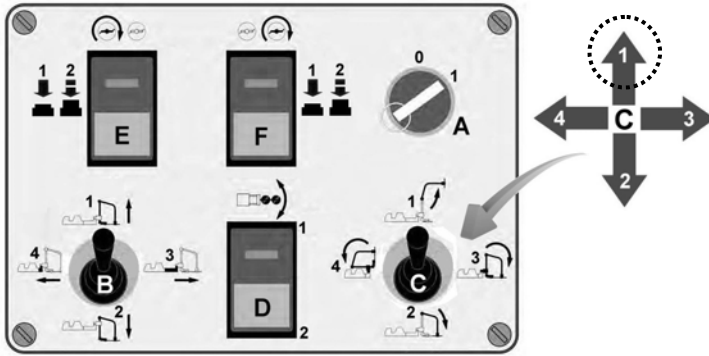


MACHINE OPERATION

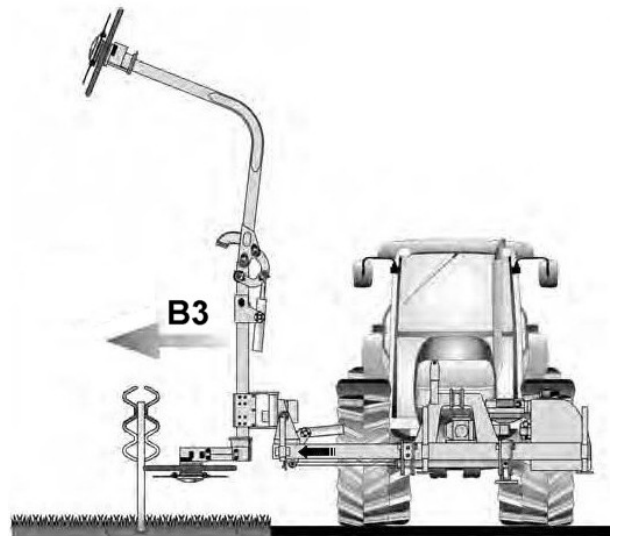
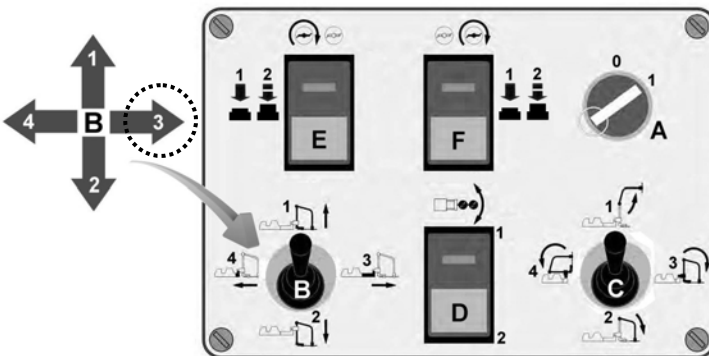
Positioning the Arms

Position the unit at the start of the work site, the procedure for placing the machine into work is as follows;

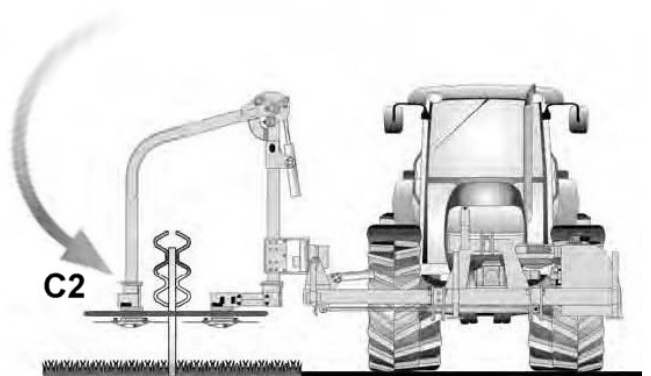
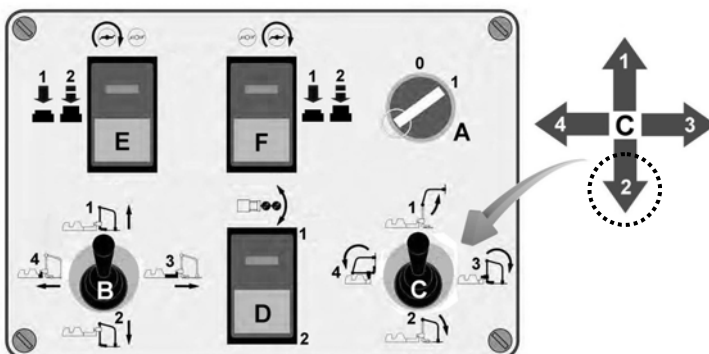
Raise the outer arm to the upright position by operating Joystick 'C' in direction 1.



Extend Arm-Set to place inner rotor adjacent to barrier by operating Joystick 'B' in direction 3.

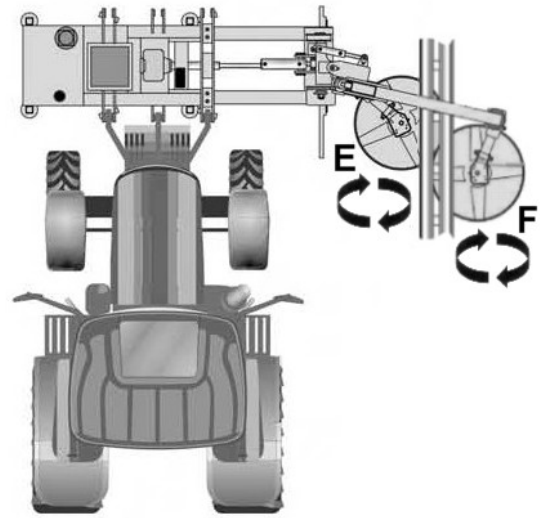
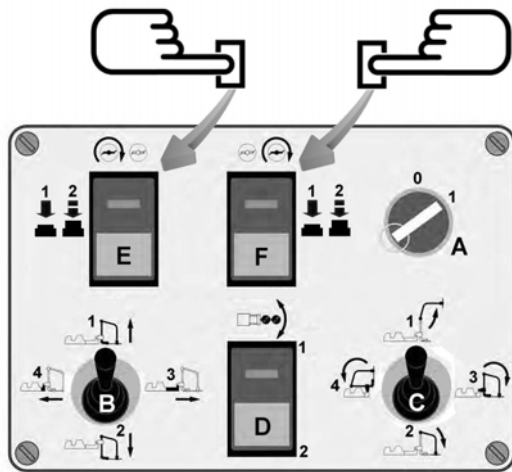


Lower outer arm to opposing side of barrier by operating Joystick 'C' in direction 2.



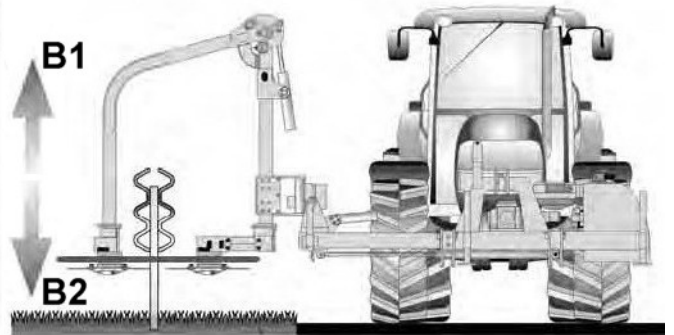
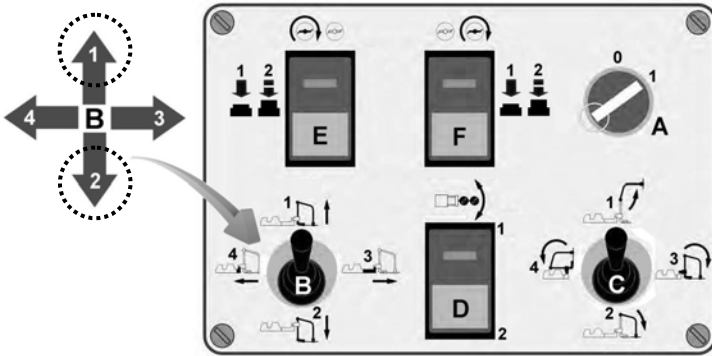
Rotor Operation (On/Off)

Inner rotor is started by pressing button 'E'. Outer rotor is started by pressing button 'F'. Rotors are switched off by subsequent operation of their respective button.



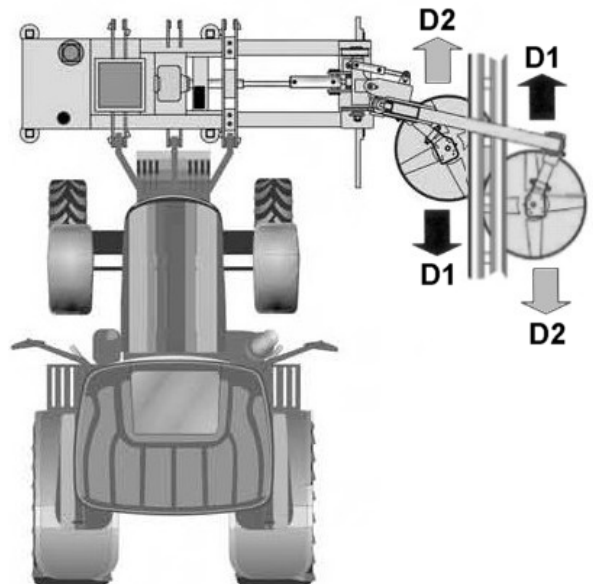
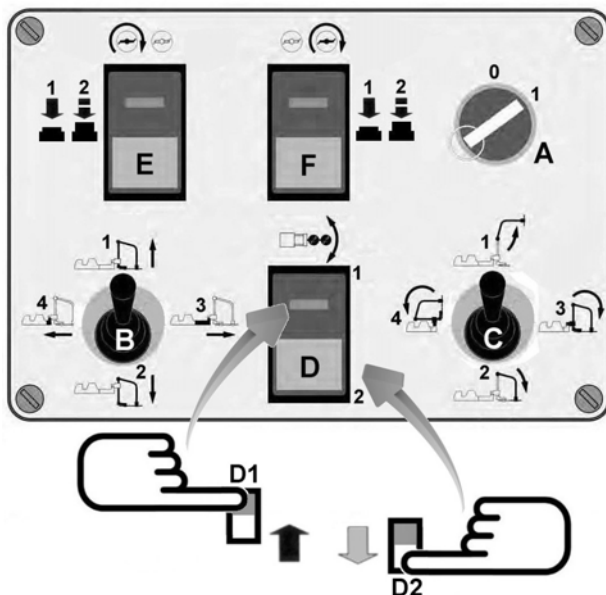
Cutting Height Adjustment

Adjustment to the cutting height of the machine by operating Joystick 'B' in directions 1 or 2; Direction 1 will increase the cutting height and direction 2 will reduce the cutting height.



Rotor Angle (Fore & Aft Slew)

The working positions of the rotors are adjusted by operation of rocker switch 'D'. Pressing the top of the switch (D1) slews the outer rotor forwards in relation to the inner rotor, and pressing the bottom of the switch (D2) slews it rearwards in relation to the inner rotor – refer below;



WORKING THE MACHINE

It is advisable that all new operators practice using the machine in a safe open area, without the rotors running, to familiarise themselves with the controls and operations of the machine. Only attempt work with the machine when fully satisfied that you can operate the machine competently and safely.



WARNING: Before attempting to start the machine ensure you are acquainted with the controls and safety aspects relating to the safe use of this equipment.



WARNING: Before attempting to move the machine ensure there are no persons or animals in close proximity. Keep persons at a safe distance from the machine at all times.

Work Site Checks & Procedures

Where it is practical to do so, to avoid risk of personal injury or damage to the machine it is good practice to inspect the work area prior to operation – take time to pick up rocks, bottles, wire etc. and any other hazardous debris you may find in order to avoid them coming into contact with the working machine. Mark or note the position of non-removable hazards and dangers so that they can be avoided during operation.

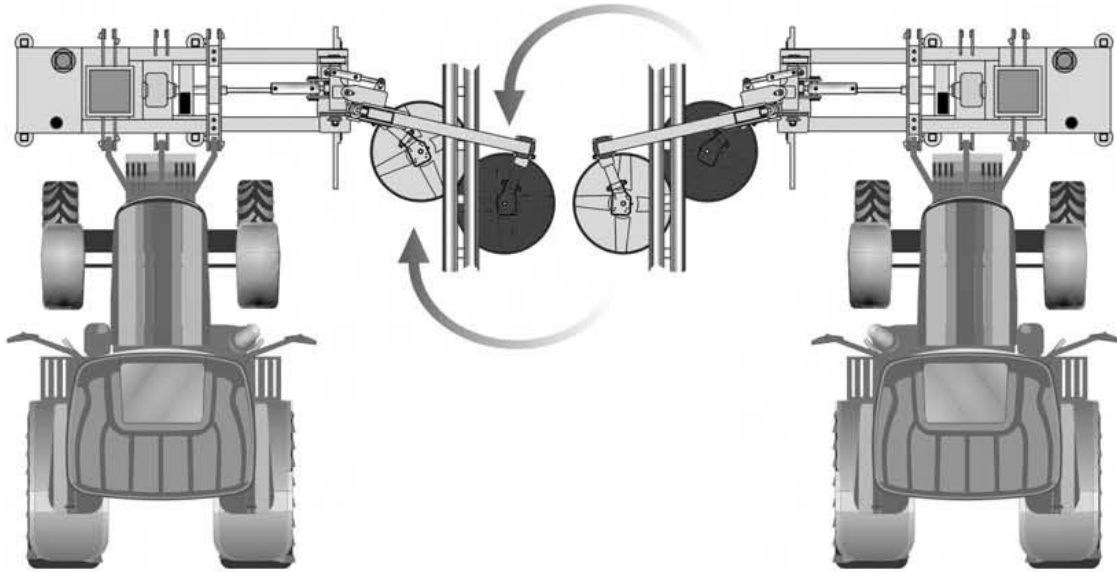
Fixed Obstacles

When approaching a fixed obstacle that cannot pass beneath the rotors the following procedure should be adopted;

- Stop tractor forward movement before the object is contacted.
- Switch off the outer rotor and wait for the blades to come to a complete standstill.
- Raise the outer arm to a height that will clear the object.
- Drive forward until the object is passed (retracting arm-set if necessary).
- Lower the outer arm (extend arm-set to work position if previously retracted).
- Re-start the outer rotor.

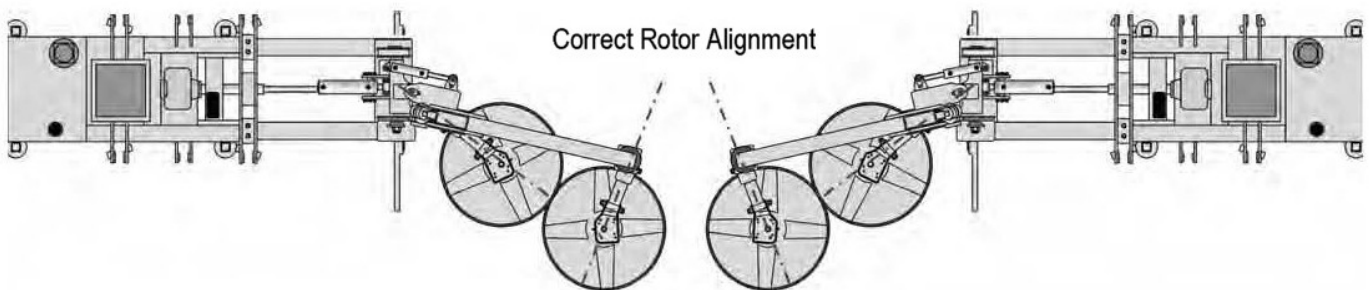
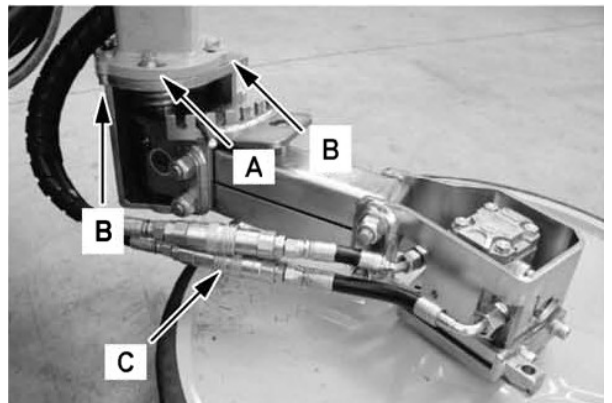
CHANGING WORK SIDE

Changing the work side requires the machine to be mounted on the opposing side and the rotors swapped over.



The procedure for changing the work side is stated below, ensure a firm level site is selected on which to perform this task.

- Remove machine from tractor and re-attached on the opposing side - *refer to the machine attachment section for details.*
- Remove retention bolts (A) to release the rotor.
- Release 'quick couplings' on hydraulic pipes (C).
Repeat the above procedure for the other rotor.
- Swap the rotors over.
- Re-attach the rotors ensuring reference notches (B) are aligned so that the rotors are in the correct position as shown in the illustration below.



- Tighten retention bolts (A).
- Re-attach hydraulic pipes (C).

The machine is now ready for work on the opposing side.

MAINTENANCE SECTION



WARNING: All maintenance, cleaning and repair operations must be performed with the engine switched off and the ignition key removed.

Fluid & Grease Specifications

Component	Recommended Lubricant	International Specification
HYDRAULIC SYSTEM - Mineral Oil	ISO 46 Q8 HELLER 46	DIN 51 524, 2-HLP DIN 51 524, 3-HLP API CD, CE, CF
HYDRAULIC SYSTEM - Biodegradable Oil	PANOLIN BIO HLP SYNTH E	FZG Test A/8.3/90 stage 12 ISO 15380 HEES
	Q8 HOLBEIN HP SE BIO 46	ISO 11158 Category HV Din 51524, Part 3 Category HVLP ISO 15380 / CEC-L33-A-93 - Water Hazard Class (VwVwS) WGK 1 - Category HEES
PINS AND BUSHINGS	MOLY GREASE EP NLGI2 or NLGI3EP GREASE	Black lithium soap grease with Molybdenum Disulphide. For automatic greasing the use of CONTACT GREASE NLG2 with purple lithium soap is recommended.
BEARINGS	PAKELO GREENPLEX EP NLGI 2 GREASE	EP ADHESIVE Grease, Aluminium complex soap
GEARBOX	SAE 90 EP	API GL-4

Daily Pre-Work Checks

The following tasks should be carried out on a daily basis prior to using the machine;

- Check tightness of screws, nuts and bolts and retighten if required.
- Check machine guards and protection for signs of wear or damage; replace immediately any components that are excessively worn, damaged or no longer perform their designed function.
- Inspect all warning and caution decals on the machine to ensure that they are both visible and readable - replace missing or damaged decals immediately.
- Lubricate the machine fully – see *following pages for details of lubrication points*.

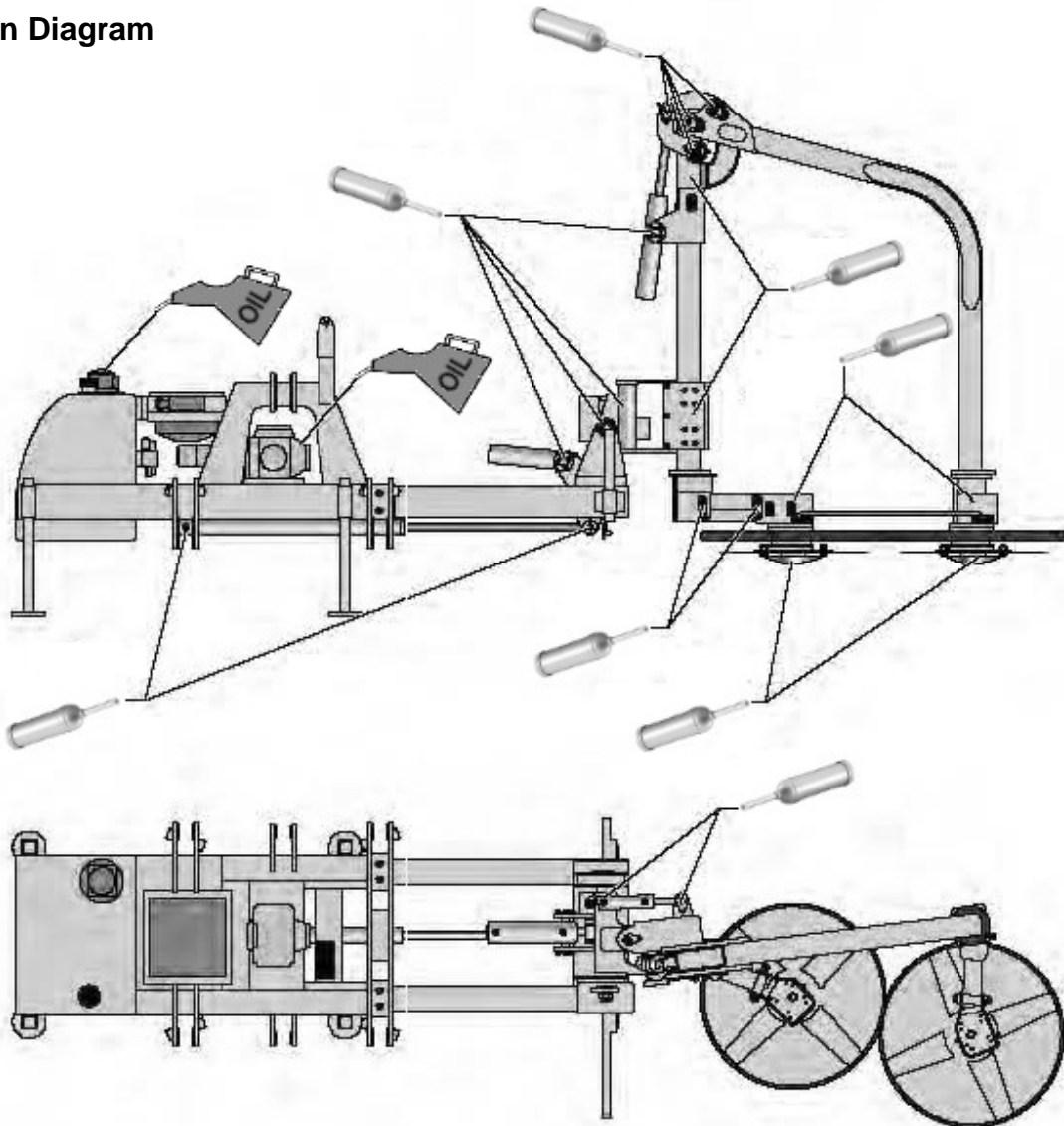
Basic Troubleshooting

Problem	Possible Cause	Suggested Remedy
Machine will not move	Hydraulic hose leaking No pressure in system No power supply	Replace hose Check condition of hoses Check fuse
Rotor not turning	Hydraulic hose leaking No pressure in system	Replace hose Check condition of pump Check condition of motor

Daily Maintenance

Lubricate the grease points indicated on a daily basis prior to work and before machine storage. Clean lubricators prior to greasing to remove dirty grease residue.

Lubrication Diagram

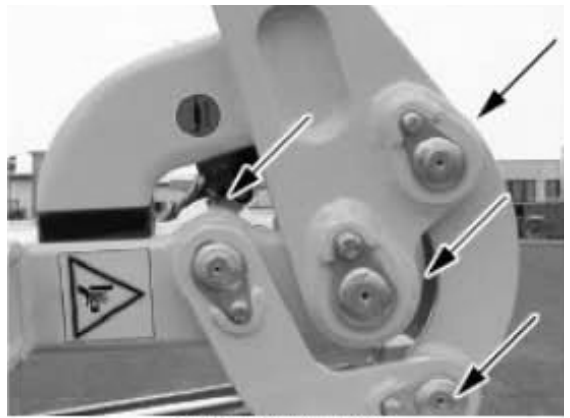


WARNING: When performing these tasks the machine must be parked on firm level ground with the tractor engine switched off and the starting key removed. Use protective clothing.

Lubrication Points



Hydraulic ram pivot lubrication points



Pivot pin lubrication points



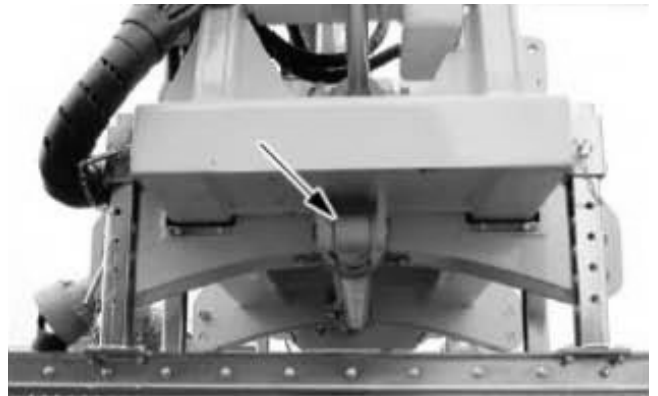
Bearing lubrication point



Rotor support arm lubrication points



Rotor support arm lubrication point



Sliding chassis lubrication point



Hydraulic tank filler location

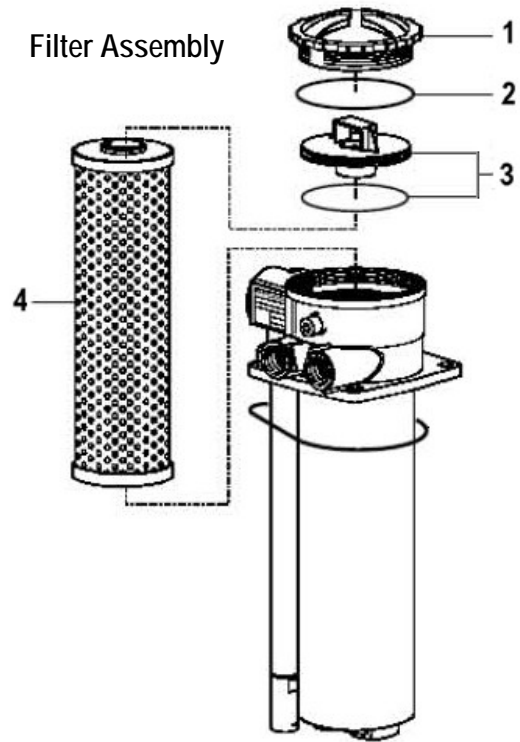
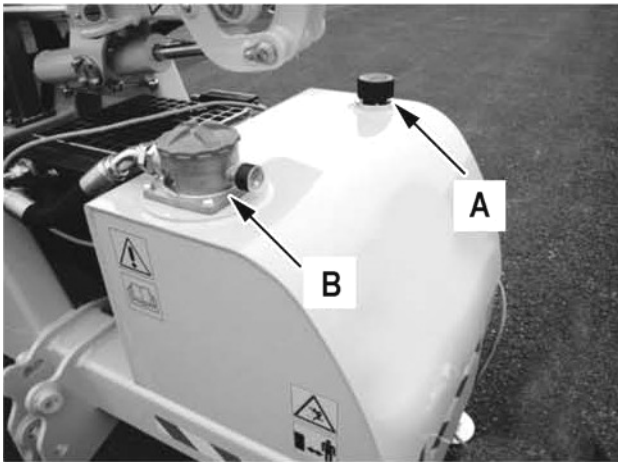


Gearbox oil plug location

Oil Filter Replacement (Every 1000 Hours)

For component protection and efficient operation the hydraulic oil filter (Part No. 7315536) should be replaced every 1000 hours. The procedure for changing the filter is as follows;

- Loosen Filler Cap (A).
- Remove Filter Cover (1) and O-Ring (2) from Filter Assembly (B).
- Remove By-Pass (3).
- Remove Filter Cartridge (4).
- Fit new Filter Cartridge (4).
- Re-fit By-Pass (3).
- Fit new O-Ring (2).
- Re-fit Filter Cover (1).
- Tighten Filler Cap (A).



Slide Blocks (Periodic Maintenance)

The tightness of the slide block adjustment bolts on the arm and the frame should be checked periodically. If excessive wear of the blocks is detected they should be replaced using genuine replacement parts.



Location of slide block adjustment bolts on arm



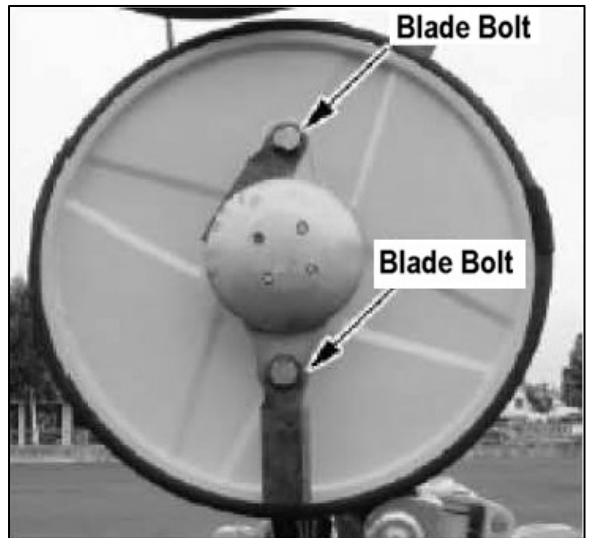
Location of slide block adjustment bolts on frame



WARNING: When replacing slide blocks ensure that all relevant machine components are safely supported to avoid risk of personal injury or damage.

Blade Replacement

Blades should be checked for wear or damage on a regular basis. Replace blades if excessive wear or damage is detected. Always replace blades in pairs to avoid imbalance of the rotor which can result in vibration and/or damage to rotor components. Replacement of blades requires the removal of the blade bolts indicated opposite.



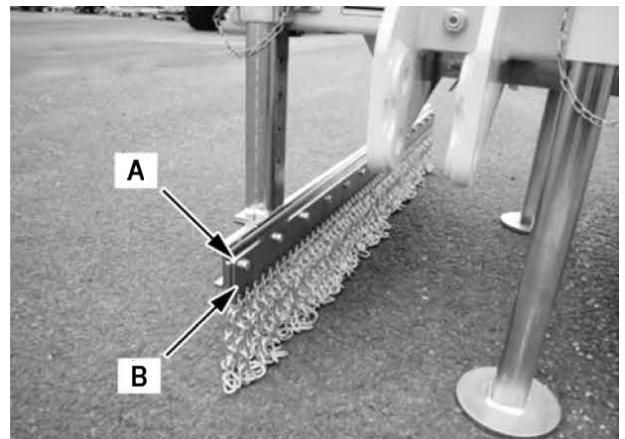
WARNING: Inspection and maintenance tasks must only be performed with the tractor engine switched off and the starting key removed.

Protection Chain Guard Replacement

Protection chains should be inspected periodically for signs of wear or damage. Replace chain guards if they are excessively worn, damaged, or no longer perform their designed function.

To replace guards, remove bolts (A) and remove the support bar (B) as shown opposite. Care should be adopted as the guard assembly is a considerable weight.

Re-fitting is a reversal of the above.



Damper Springs Adjustment

To adjust the damper spring tension attach an extension bar to the spring tail and prise it upwards and sideways to position it into one of the pre-set location notches. Moving it leftwards will increase spring tension, moving it rightwards will decrease tension.



PTO Shaft Lubrication

The PTO shaft should be lubricated on a regular basis using lithium based grease – each end of the shaft has 2 greasing points; one for lubrication of the universal joint and one for lubricating the rotating fixing ring of the shaft shield – access to the lubrication points is gained by releasing the shaft shield from its fixing ring and sliding it back along the body of the driveshaft – *the procedure and lubrication frequency is illustrated below.*



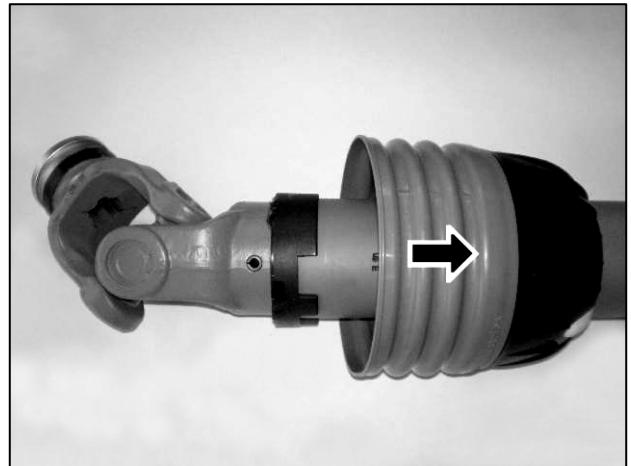
Shaft shield fixing clasps



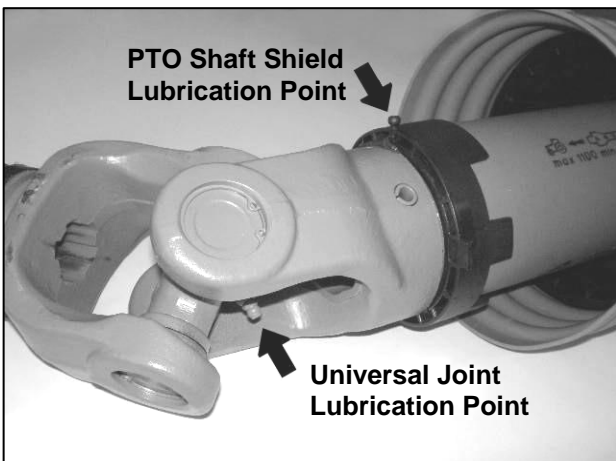
Insert screwdrivers into the clasps



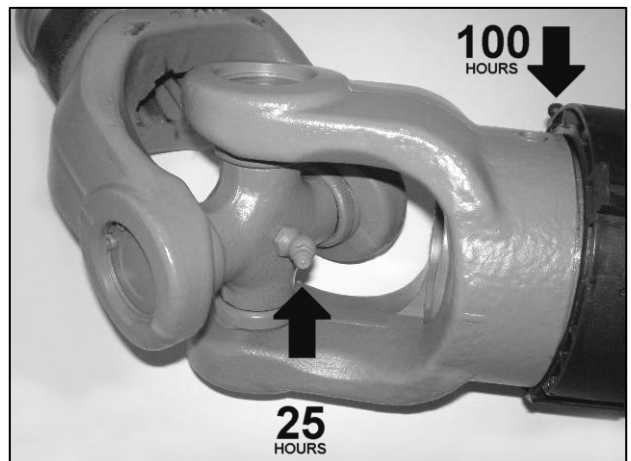
Prise clasps open to release the shield



Slide shield back to reveal universal joint



Location of lubrication points



Recommended lubricating frequency

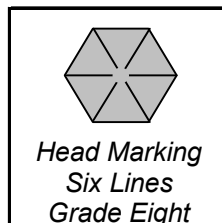
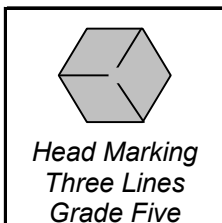
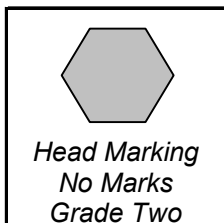
Slide the shaft shield back into place after lubrication ensuring the clasps relocate correctly in the fixing ring – always fit torque chains to the shields to stop them from rotating with the shaft during operation.

TORQUE SETTINGS FOR FASTENERS

The Chart below lists the correct tightening torque for fasteners. The Chart should be referred to when tightening or replacing bolts in order to determine the grade of bolt and the correct torque unless specific torque values are assigned in the text of the manual.

*Recommended torque is quoted in Foot-Pounds and Newton-Metres within this manual.
The equation for conversion is 1 Nm. = 0.7376 ft.lbs.*

TORQUE VALUES FOR IMPERIAL BOLTS



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

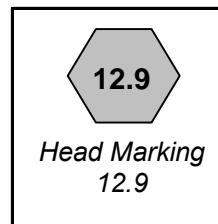
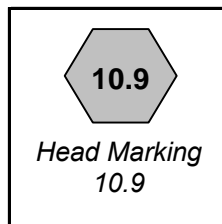
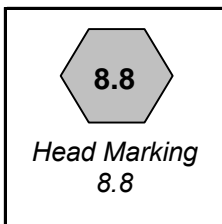
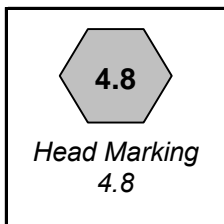
Bolt Dia.
1/4"
5/16"
3/8"
7/16"
1/2"
9/16"
5/8"
3/4"
7/8"
1"
1-1/8"
1-1/4"
1-3/8"
1-1/2"

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

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

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

TORQUE VALUES FOR METRIC BOLTS.



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

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

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

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

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



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