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McCONEL

PA7070T FRONT MOUNT



Operator Manual

*This manual must be used in conjunction with the
Operation Manual for the specific control system*



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; log onto <https://my.mcconnel.com> and select 'Machine Registration' which can be found in the 'Warranty' section of the site. **Confirm to the customer that the machine has been registered by completing the verification form below.**

Registration Verification	Serial No. <input type="text"/>
Dealer Name:	
Dealer Address:	
Customer Name:	
Date of Warranty Registration:/...../..... Dealer Signature:	

Note to Customer / Owner

Please ensure the section above has been completed and signed by the dealer to verify 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 machine's general maintenance procedure.

CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES

Torque Settings for Hydraulic Fittings

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

Port Adaptors with Bonded Seals		
BSP	Setting	Metric
1/4"	34 Nm	19 mm
3/8"	47 Nm	22 mm
1/2"	102 Nm	27 mm
5/8"	122 Nm	30 mm
3/4"	149 Nm	32 mm
1"	203 Nm	41 mm
1.1/4"	305 Nm	50 mm
1.1/2"	305 Nm	55 mm
2"	400 Nm	70 mm

WARRANTY POLICY

WARRANTY REGISTRATION

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

1. LIMITED WARRANTIES

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

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

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

2. REMEDIES AND PROCEDURES

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

3. LIMITATION OF LIABILITY

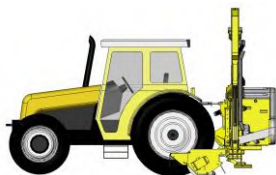
- 3.01. *McConnell Ltd disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.*
- 3.02. *McConnell Ltd makes no warranty as to the design, capability, capacity or suitability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

4. MISCELLANEOUS

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

McConnel Limited

POWER ARM & TRACTOR PRE-OPERATION INSPECTION



A daily equipment inspection of machine and tractor should be conducted before the equipment is used.

Use the inspection sheets on the following pages to assist with these daily inspections. Damaged or missing guards should be repaired or replaced before operating the mower. Failure to repair or replace damaged guards can result in objects being thrown from the mower and possibly hitting the operator and/or bystanders.

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 and/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, SMV's (Slow Moving Vehicle sign), seat belts, and ROPS to ensure they are in place and in good working order.
- Ensure tyres, 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.

Copies of the inspection sheets on the following pages should be retained in this manual for reference; two sets are included to allow removal of one set for photocopying purposes. Alternatively, these inspection sheets can be download from our website via the QR code or using the link below;
<https://my.mcconnel.com/service/pre-operation-inspection-documents/>





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.

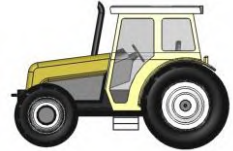
Item	Condition at start of shift	Specific Comments if not O.K.
The operator's manual is in the canister on the mower.		
All warning decals are in place, clean and legible.		
All lights are clean and working.		
The mounting frame bolts are in place and tight.		
The arm pivot pins are tight and correctly secured.		
There are no cracks in the arms.		
Hydraulic cylinder pins are tight and correctly secured.		
Hydraulic cylinder hose connections are tight.		
Hydraulic pump hose connections are tight.		
Hydraulic valve hose connections are tight.		
Hydraulic 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 and 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 and tight.		
There are no cracks or holes in flail casing.		
Hydraulic 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 MACHINE



TRACTOR 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. Ensure any implement attached to the tractor is firmly on the ground.

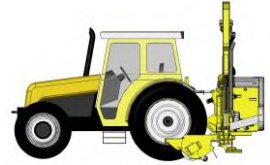
Item	Condition at start of shift	Specific Comments if not O.K.
The flashing lights function properly.		
All lights are clean and working correctly.		
All cab windows are clean and wipers working correctly.		
The SMV sign, where required, is clean and visible.		
The tyres are in good condition with correct 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 and 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 and oil cooler are free of debris.		
The air filter is in good condition.		

Operators Signature:

DO NOT OPERATE AN UNSAFE TRACTOR OR MACHINE



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.

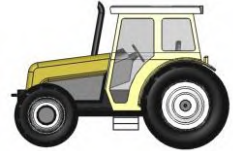
Item	Condition at start of shift	Specific Comments if not O.K.
The operator's manual is in the canister on the mower.		
All warning decals are in place, clean and legible.		
All lights are clean and working.		
The mounting frame bolts are in place and tight.		
The arm pivot pins are tight and correctly secured.		
There are no cracks in the arms.		
Hydraulic cylinder pins are tight and correctly secured.		
Hydraulic cylinder hose connections are tight.		
Hydraulic pump hose connections are tight.		
Hydraulic valve hose connections are tight.		
Hydraulic 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 and 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 and tight.		
There are no cracks or holes in flail casing.		
Hydraulic 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 MACHINE



TRACTOR 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. Ensure 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 and 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 and oil cooler are free of debris.		
The air filter is in good condition.		

Operators Signature:

DO NOT OPERATE AN UNSAFE TRACTOR OR MACHINE



For Safety and Performance...

ALWAYS READ THE BOOK FIRST

McCONEL LIMITED

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Ludlow
Shropshire
England**

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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.



For best performance...

USE ONLY GENUINE McCONEL SERVICE PARTS

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

McCONEL LIMITED

Through your local Dealer or Stockist

Always quote:

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

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

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GENERAL INFORMATION

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

This manual must be used in conjunction with the specific control unit operation manual and the operation manual for the particular type of head attachment fitted to the machine.

Only use 'Genuine McConnell Parts' on McConnell machinery and equipment.

DEFINITIONS: *The following definitions apply throughout this manual;*

⚠ DANGER

DANGER: Alerts to a hazardous situation which will result in death or serious injury if not observed carefully.

⚠ WARNING

WARNING: Alerts to a hazardous situation which could result in death or serious injury if not observed carefully.

⚠ CAUTION

CAUTION: Alerts to a hazardous situation which could result in damage to the machine and/or equipment if not observed carefully.

NOTICE

NOTICE: Specific or general information considered important or useful to emphasise.

LEFT HAND (LH) & RIGHT HAND (RH): *These terms are applicable to the machine when fitted to the tractor and viewed from the rear; these terms also apply to tractor references.*

SERIAL PLATE

All machines are equipped with a serial number plate containing important information relating to the machine including a unique serial number used for identification purposes.

Note: Images in this manual are provided for instruction and informational purposes only and may not show components in their entirety. In certain instances images may appear different to the actual machine; where this occurs the general procedure will be basically the same. E&OE.

MACHINE & DEALER INFORMATION

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

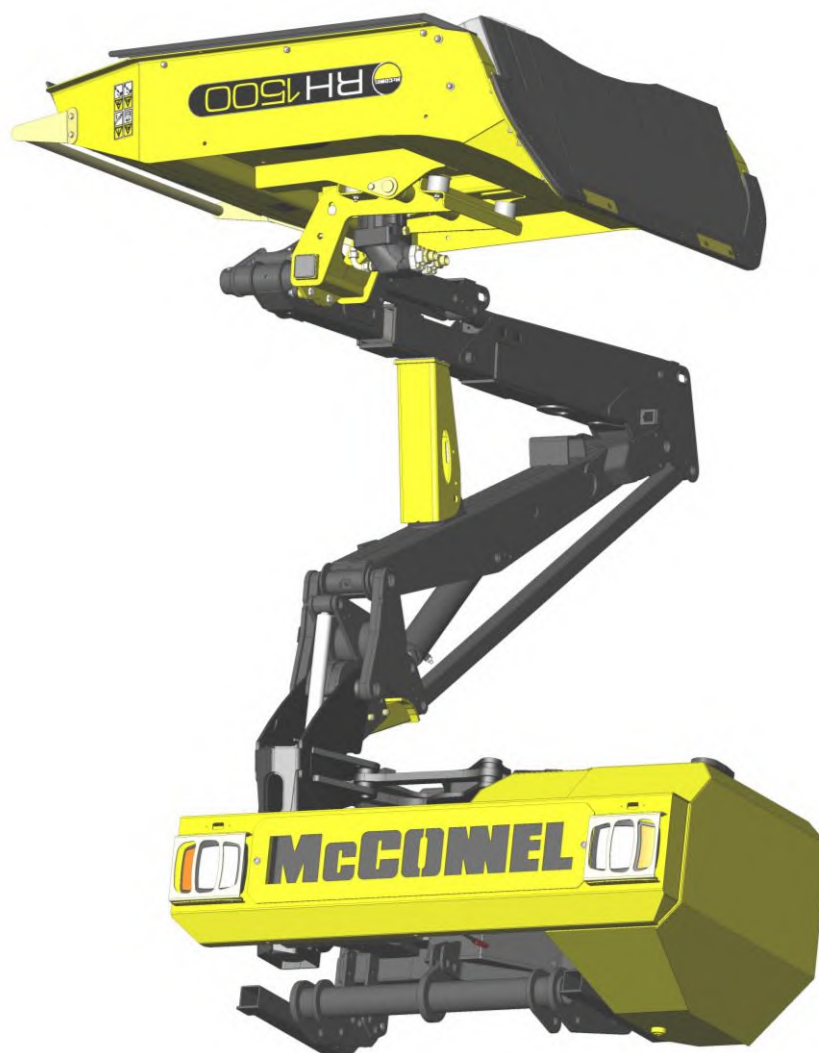
FEATURES / SPECIFICATIONS

PA7070T FM

- Linkage mounted.
- Right or left hand cutting.
- Cast iron gearbox.
- Operator guard.
- Hydraulic breakaway.
- 50° Breakback.
- 200 Litre hydraulic reservoir.
- 85HP Hydraulic System.

Options

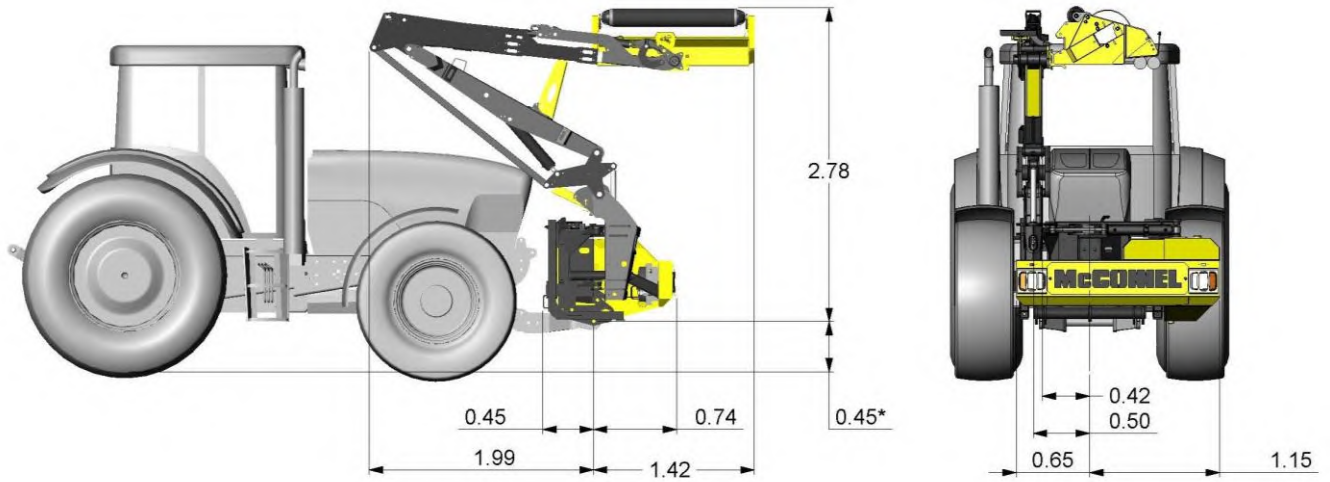
- Choice of Flailheads & Attachments.
- Choice of Control Options.
- Lift Float Kit.



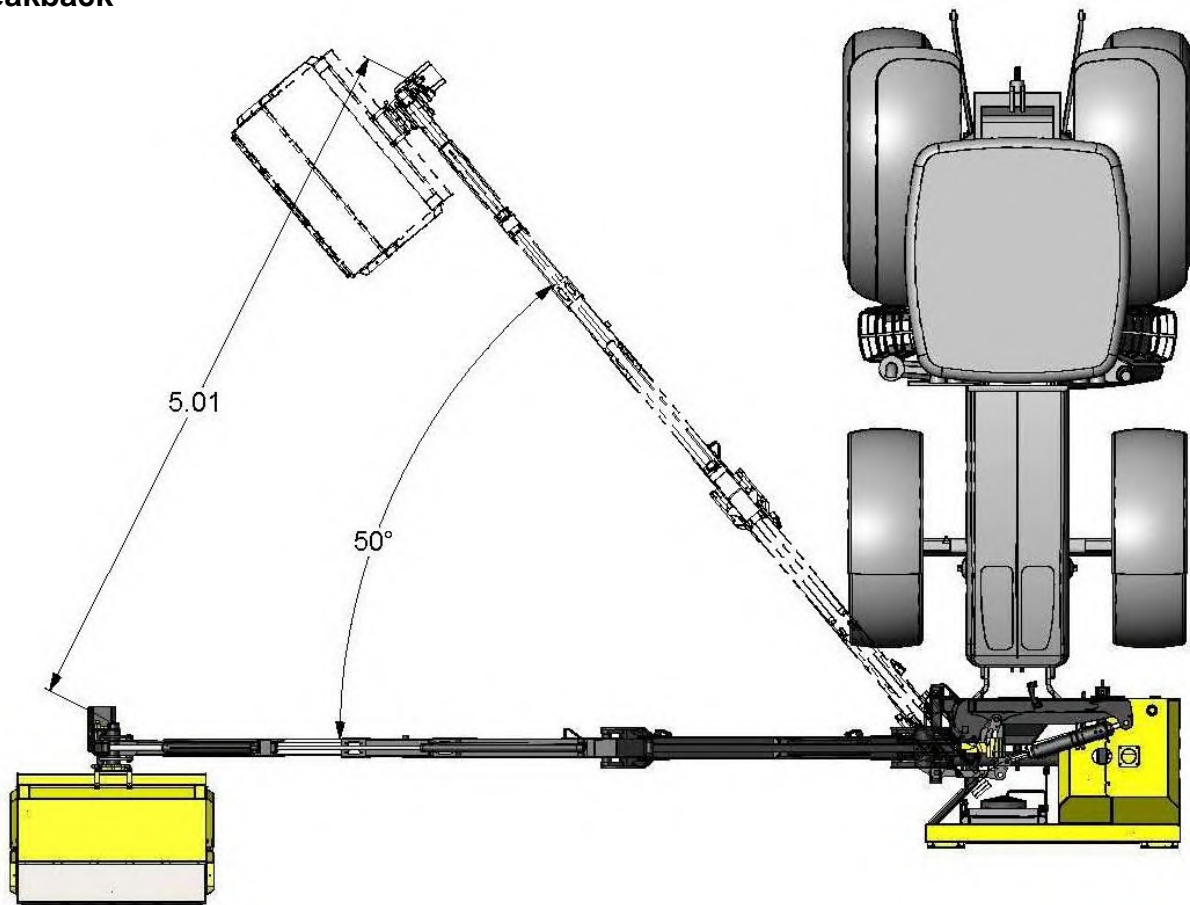
DIMENSIONS

Transport Dimensions

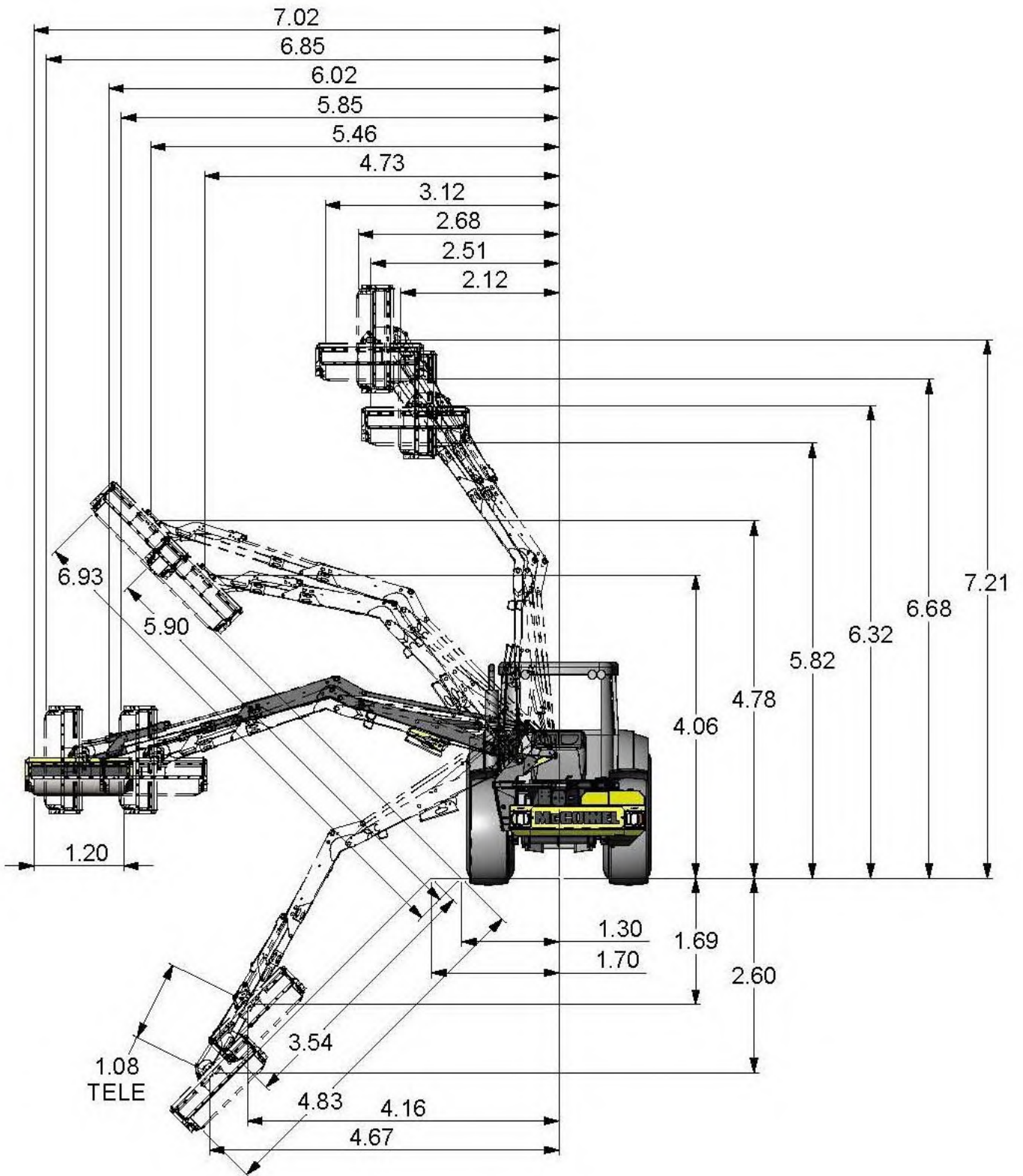
Note: the mounting height (*) is stated as 0.45m but may vary depending on the specific application, where a variance occurs the overall transport height will also alter. Operators are advised to take their own measurements in order to determine the overall transport height for their machine.



Breakback



Operating Dimensions





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 the cutting head should be lowered to rest on the ground. 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.*
- ▲ *Tractor overbalancing when machine arm is extended.*
- ▲ *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 flails 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).*

- ▲ *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 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.

TRACTOR REQUIREMENTS

Minimum Tractor Weights - including ballast weight if necessary.

PA7070T FM Models – 7000kg

Minimum HP Requirements

All models – 125HP

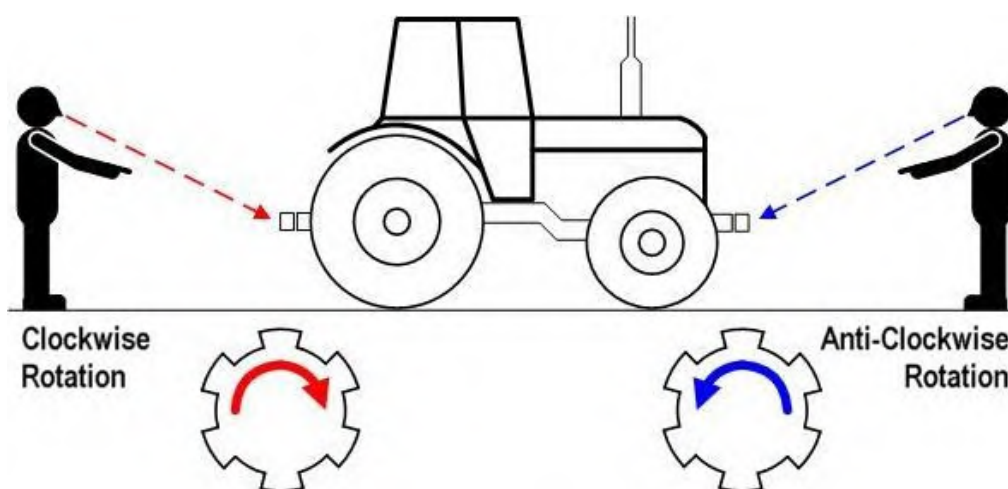
Linkage

Category 2

PTO Shaft

Tractor must be equipped with a live drive PTO to enable forward motion to be stopped while the flailhead continues to operate.

Standard PTO Drive Directions



Front Mounted Machines

Before fitting a front mounted machine to your tractor, seek the advice of the tractor manufacturer or dealer regarding both suitability and necessary linkage, ballast or weight requirements that may be needed.

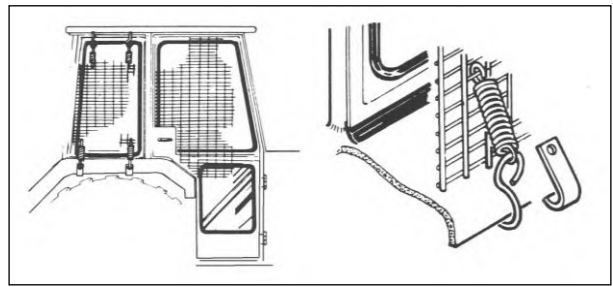
VEHICLE/ TRACTOR PREPARATION

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

Fit Operator Guard (part no. 73 13 324) 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.

DELIVERY & PRE-ATTACHMENT (Dealer Reference)

Delivery

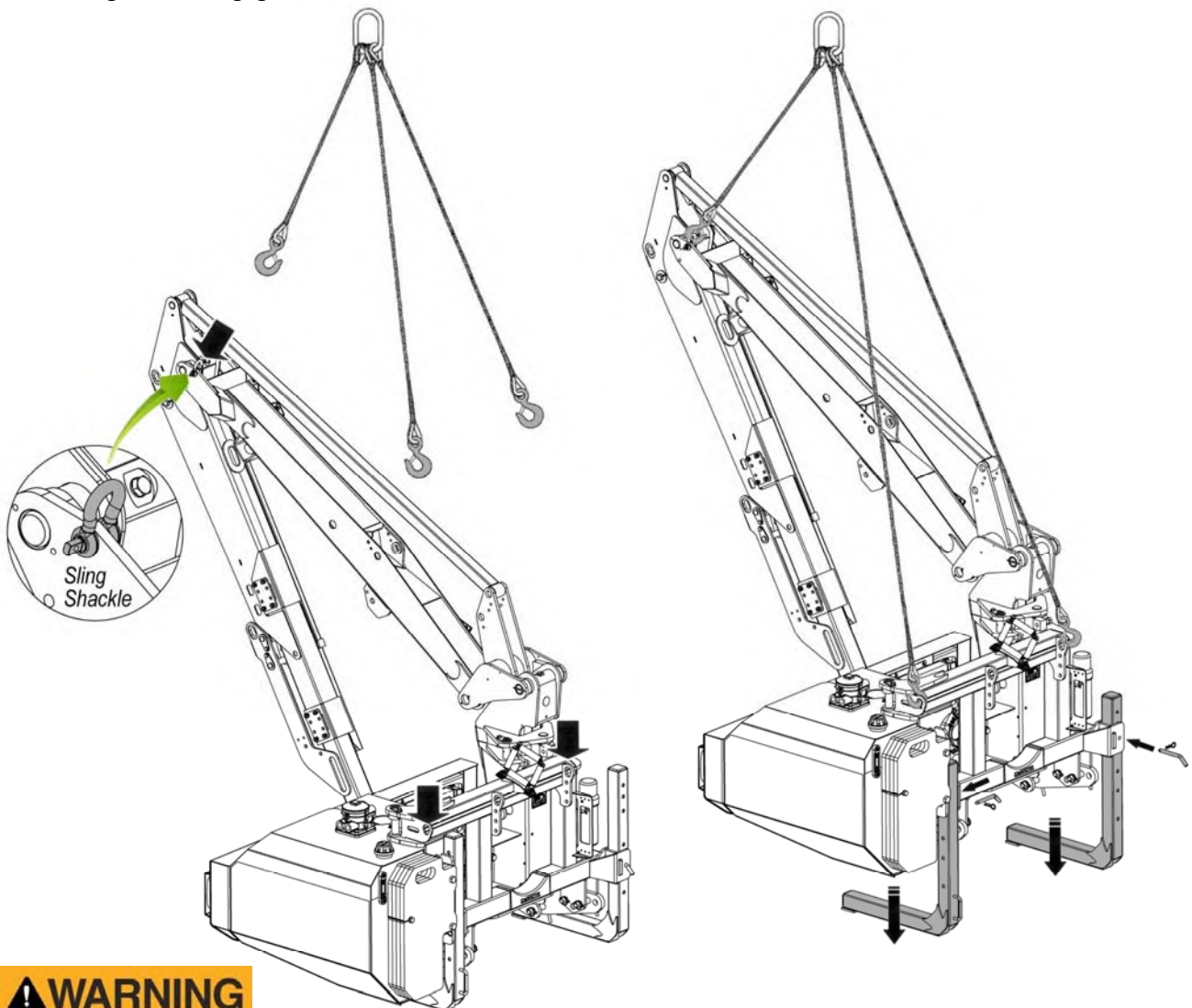
The machine will be delivered in a secure condition with transport straps and banding. Select a firm level site on which to place the machine before removing the straps, banding and any other loose items.

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.

Lifting Points

To ensure even weight distribution when handling the machine it should be lifted using the three lifting points indicated in the illustration below; a sling shackle should be used for attaching the lifting gear to the main arm.



WARNING

Ensure the machine is securely attached to suitable lifting gear and is in a level balanced state at all times during the lifting procedure. Keep bystanders at a safe distance from the raised machine at all times.

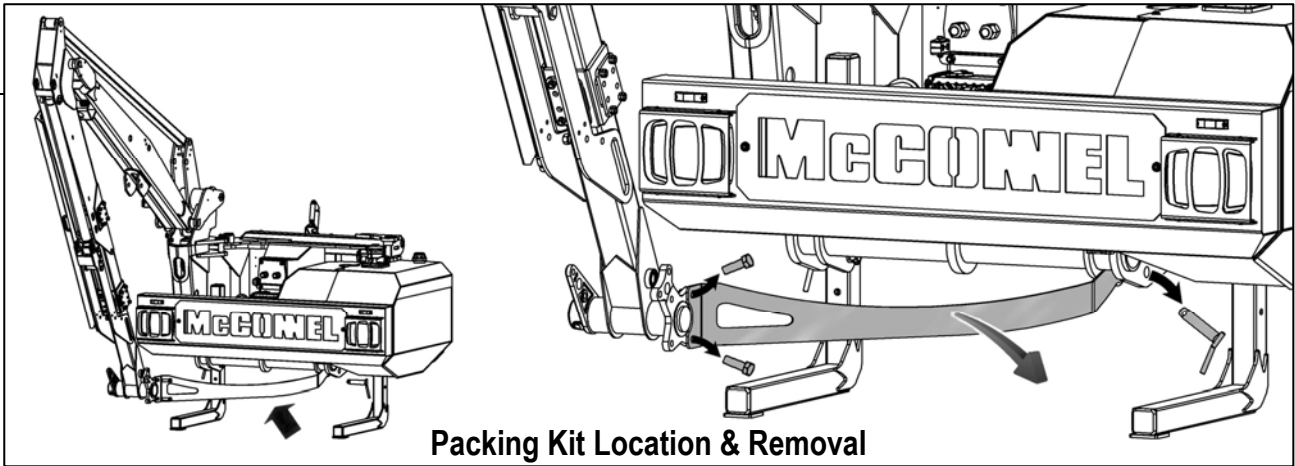
Stand Legs

With the machine raised clear of the ground; lower and secure both stand legs to place the machine at a suitable height for attachment to the tractor. Lower machine onto the ground, ensure machine is in a stable state before removing the lifting equipment.

Packing Kit

A packing kit is fitted to secure the machine in a stable condition during shipping; this must be removed prior to attaching the machine to the tractor. The packing kit comprises of a steel strap securing the lower dipper arm to the mounting frame. Removal of the strap is by releasing the 2 fixing nuts and bolts and a linkage pin on the mounting frame. Refit the linkage pin to the mounting frame after removal of the strap.

The nuts, bolts and packing strap can be discarded or saved for future shipping use.

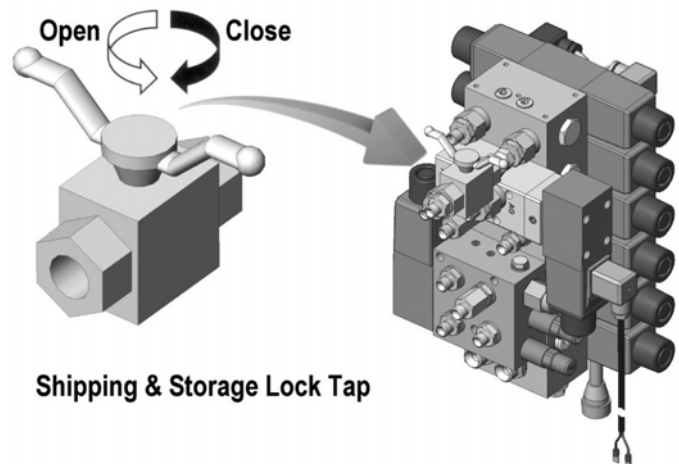


CAUTION

Shipping / Storage Lock

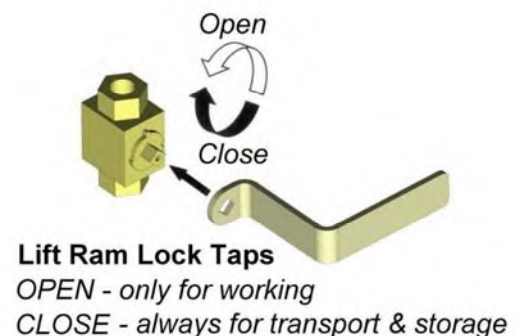
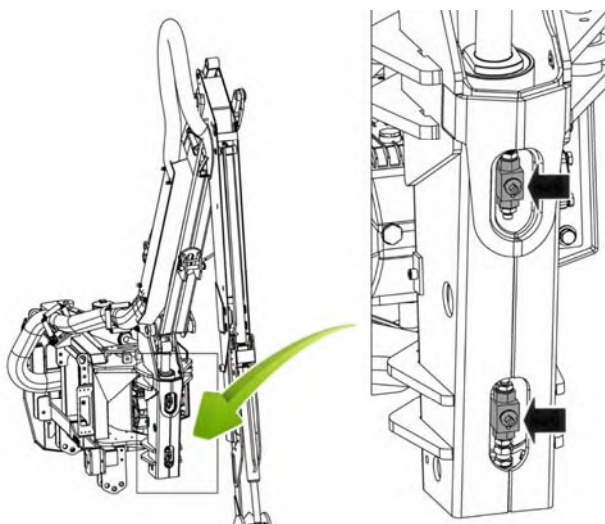
Machines are fitted with a security lock tap located on the control valve's reach gland port; this is to prevent the risk of arm movement during shipping of the machine.

Ensure this lock tap is fully opened before attempting to operate the machine. The tap should be kept open and only closed for any future shipping or as an added safety precaution when storing the machine if it is not attached to the tractor.



Transport Locks

Machines are equipped with 2 transport lock taps located on the lift ram; these must be fully opened prior to machine operation and always closed for machine transportation, parking and storage. **The status of all lock taps is a vital aspect of pre-operational checks.**

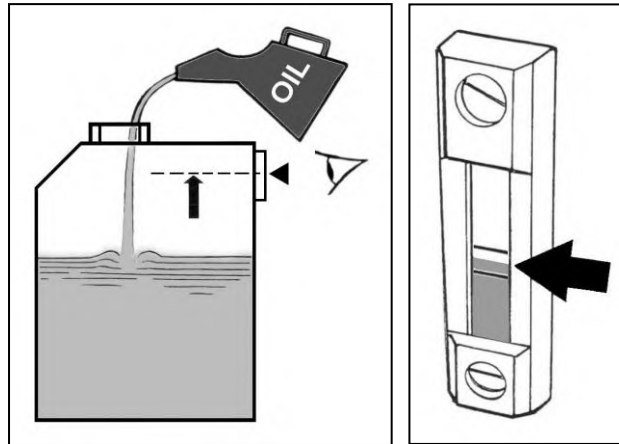


HYDRAULIC OIL

Hydraulic Oil Reservoir

Fill the tank with oil selected from the chart below or a good quality equivalent to a point where the level is between the minimum and maximum marks on the tank gauge. When the machine is initially run the level will drop as the oil is drawn into the circuit - *top back up as required to the correct level on the gauge.*

Always use clean receptacles when handling and transferring oil to avoid moisture or dirt contamination that can damage components and/or reduce machine performance.



NOTICE

Refer to the maintenance section for further information on the subject of hydraulic oil and system filtration.

Reservoir Capacity

The oil tank capacity of the machine is approximately **200 Litres**.

Recommended Hydraulic Oils

For initial filling of the oil reservoir, periodic oil changes and replenishment purposes the following hydraulic oils, or a good quality equivalent are recommended:

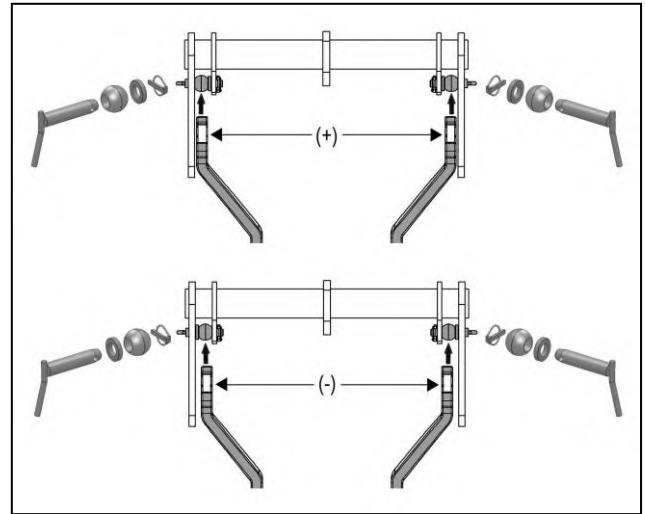
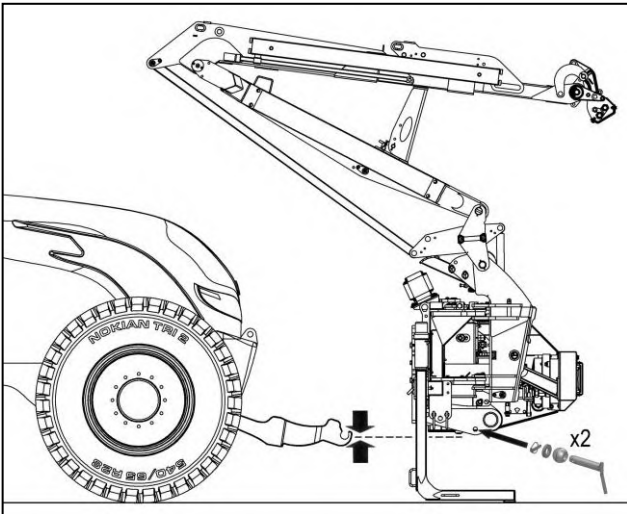
NOTICE

Only use oils that are ISO 18/16/13, NAS7, or cleaner.

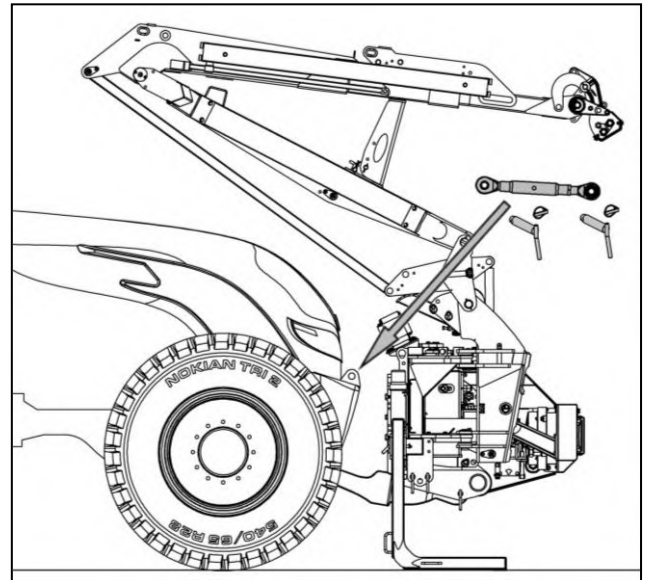
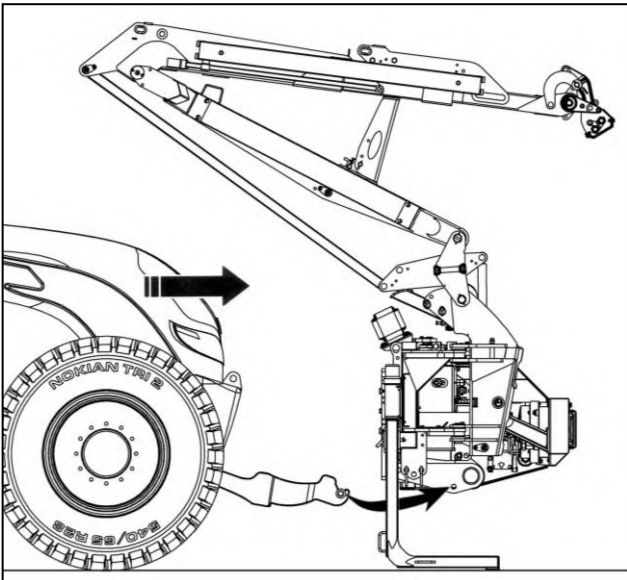
Manufacturer	Cold or Temperate Climate	Hot Climate
BP	Bartran 46 Energol HLP-HM 46	Bartran 68 Energol HLP-HM 68
CASTROL	Hyspin AWH-M 46	Hyspin AWH-M 68
COMMA	Hydraulic Oil LIC 15	Hydraulic Oil LIC 20
ELF	Hydrelf HV 46 Hydrelf XV 46	Hydrelf HV 68
ESSO	Univis N 46	Univis N 68
FUCHS (UK/Non UK markets*)	Renolin 46 Renolin HVZ 46 Renolin CL46/B15* Renolin AF46/ZAF46B*	Renolin 68 Renolin HVZ 68 Renolin CL68/B20* Renolin AF68/ZAF68B*
GREENWAY	Excelpower HY 68	Excelpower HY 68
MILLERS	Millmax 46 Millmax HV 46	Millmax 68 Millmax HV 68
MORRIS	Liquimatic 5 Liquimatic HV 46 Triad 46	Liquimatic 6 Liquimatic HV 68 Triad 68
SHELL	Tellus 46 Tellus T46	Tellus 68 Tellus T68
TEXACO	Rando HD 46 Rando HDZ 46	Rando HD 68 Rando HDZ 68
TOTAL	Equivis ZS 46	Equivis ZS 68

MACHINE ATTACHMENT

WARNING Attachment of the machine to the tractor must be performed on a firm level site. Ensure bystanders are kept at a safe distance at all times.

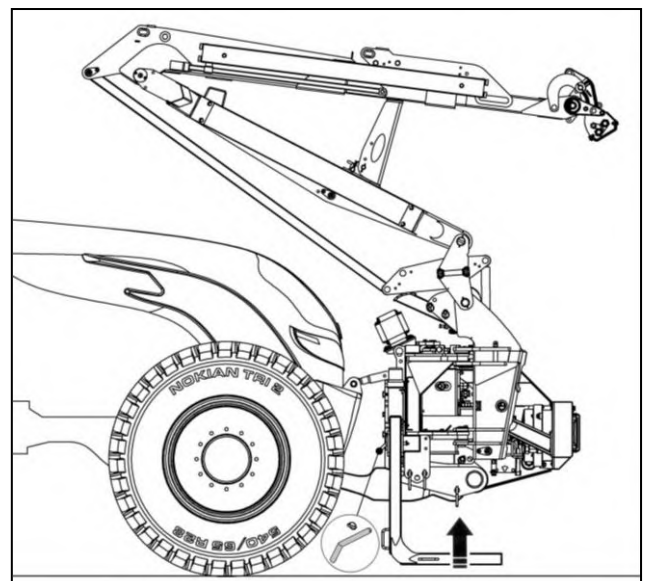
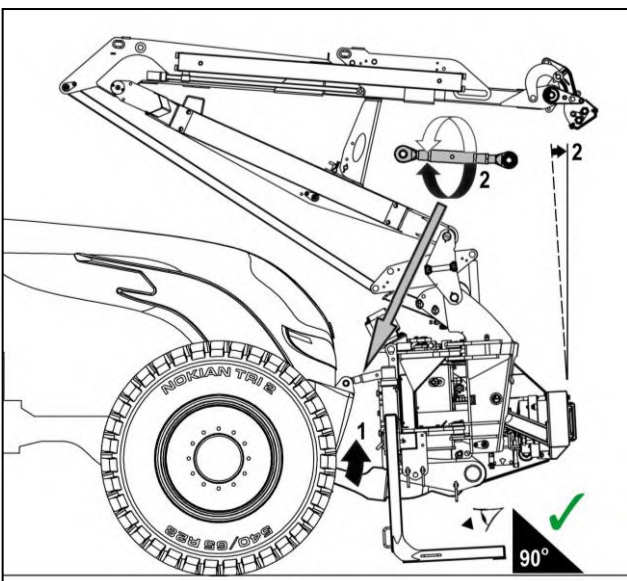


Set link arms to connection height. Install link balls & spacers on link pins; assemble to match linkage width.



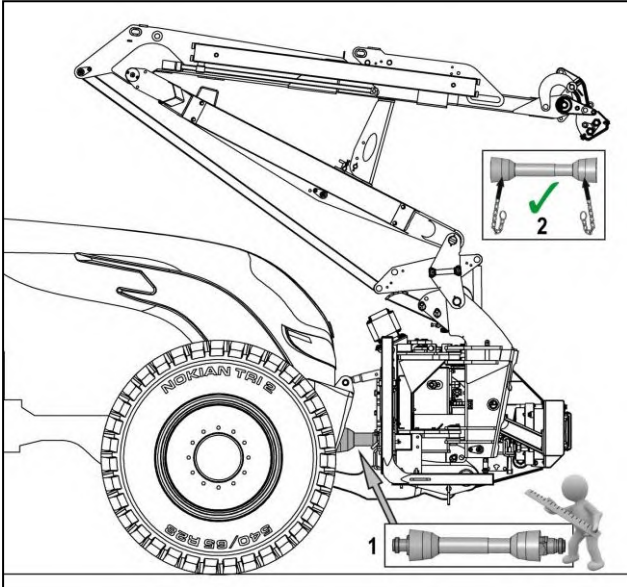
Drive forwards, raise linkage to connect on link balls.

Fit adjustable top link to the tractor and the machine.

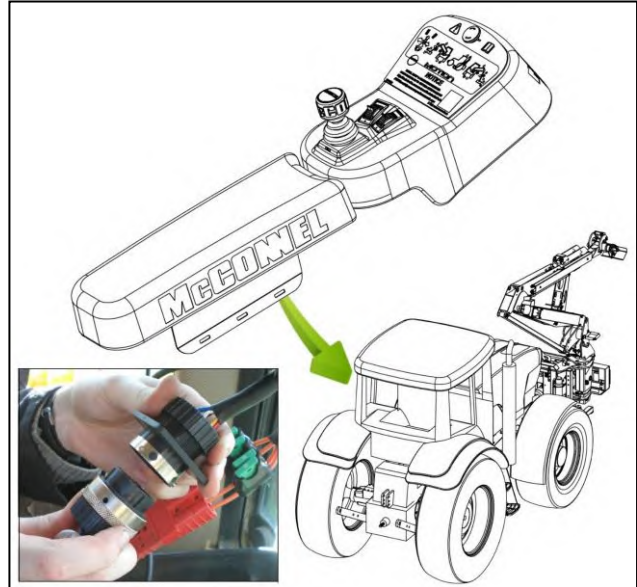


Raise linkage. Adjust the top link to level the machine.

Raise stand legs fully; secure in position with lock pins.



Measure and fit PTO shaft; see *PTO installation page*.
Attach torque chains to stop guards from rotating.



Install the operator control unit in the tractor's cab.
Route wiring looms with care avoiding moving parts.

! DANGER Operation of external linkage lift controls – *if applicable*



If the tractor is equipped with external lift control the operator and all other persons must remain clear of the machine at all times when raising or lowering the machine on the tractor's linkage.
Never stand between tractor and machine.

Pre-operational Check

Before operating the machine; ensure that the shipping/storage lock tap on the control valve and the two transport lock taps on the lift ram are in their open positions.

! CAUTION

Never attempt to use the machine with the shipping/storage and/or transport lock taps in their closed position.

! CAUTION

Transport lock taps must always be closed before attempting to transport the machine. Keep transport lock taps closed for parking and storage of the machines.

MACHINE REMOVAL

! WARNING

Removal of the machine must be performed on a firm level site. Ensure bystanders are kept at a safe distance at all times.

Removal of the machine is basically a reversal of the attachment procedure. Ensure the stand legs are lowered to an identical height position and the lock pins are fitted and secured with R-clips.

When parking a dismantled machine the arms should be placed at approximately half reach directly ahead of the machine with the tele arm retracted and the flail head resting on the ground.

Always ensure the unit is in a level and stable condition before attempting to detach the tractor; *for additional safety, the shipping/storage lock tap can be closed.*

Disconnect control unit loom before carefully driving the tractor away from the machine.

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

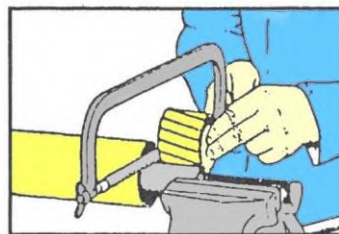
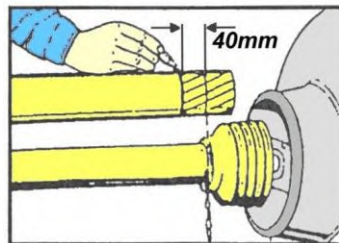
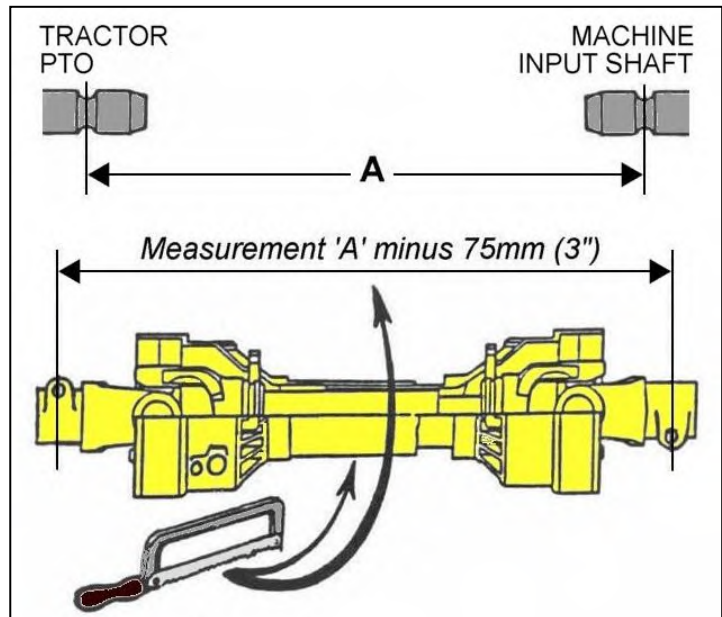
With the machine attached to the tractor in the working position measure the horizontal distance ‘A’ from the tractor’s PTO to the input shaft on the machines gearbox and subtract 75mm (3”) – *this figure is the required shaft length.*

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.



NOTICE

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.*

FITTING OPERATOR CONTROL UNITS

Fitment of the operator controls in the tractor cab will vary depending on the particular model or specification of machine – the information below lists the differing methods of fitment for the various types of controls available.

NOTICE

Electric control units work within the range of 12v-16v DC and will require a minimum power supply of 12v DC.

Cable Controls

Cable control units are provided with, and attached to, a mounting bracket – the bracket should be securely fixed to the internal mud wing or cab cladding in a suitable convenient location that offers ease of use without interfering with normal tractor operation.

In deciding the final position of the control unit bear in mind the location of the cable run – make sure the minimum acceptable cable bend radii of 8" (200mm) is not exceeded.

Ensure during fitting that no structural member of the tractor cab or roll bar is drilled or damaged.

The cable rotor control valve lever on cable controlled machines will be assembled as a component part of the main bank of controls and therefore shares the same mounting bracket.

On electric machines with cable operated rotor control valve the lever will be supplied as a 'standalone' unit with its own individual mounting bracket – this should be fitted in the same manner as above adopting the same precautions pertaining to attachment and cable runs.

Electric Controls

Depending on the particular type of control, electric units are supplied either with a mounting bracket or a mounting pillar which should be bolted to the internal mud wing or cab cladding in a suitable convenient location that offers ease of use without interfering with normal tractor operation. Mounting pillars can be bent or twisted to achieve a comfortable working position. Ensure during fitting that no structural member of the tractor cab or roll bar is drilled or damaged.

The power supply cable should be connected directly to the tractors battery - *do not use cigarette lighter type connections as these prove to be sporadic and unreliable for control applications.*

Control units are 12 volt DC operated; the brown lead is positive (+) and the blue lead is negative (-).

Revolution Proportional Controls

Revolution proportional controls comprise of 2 units; these are a control screen and an armrest control unit. The control screen is supplied with a mounting bracket and suction cup assembly that allows the unit to be mounted on the window of the tractor cab – *ensure the surface used is clean and dry and that the unit is mounted in a position where it does not obstruct the operator's vision.*

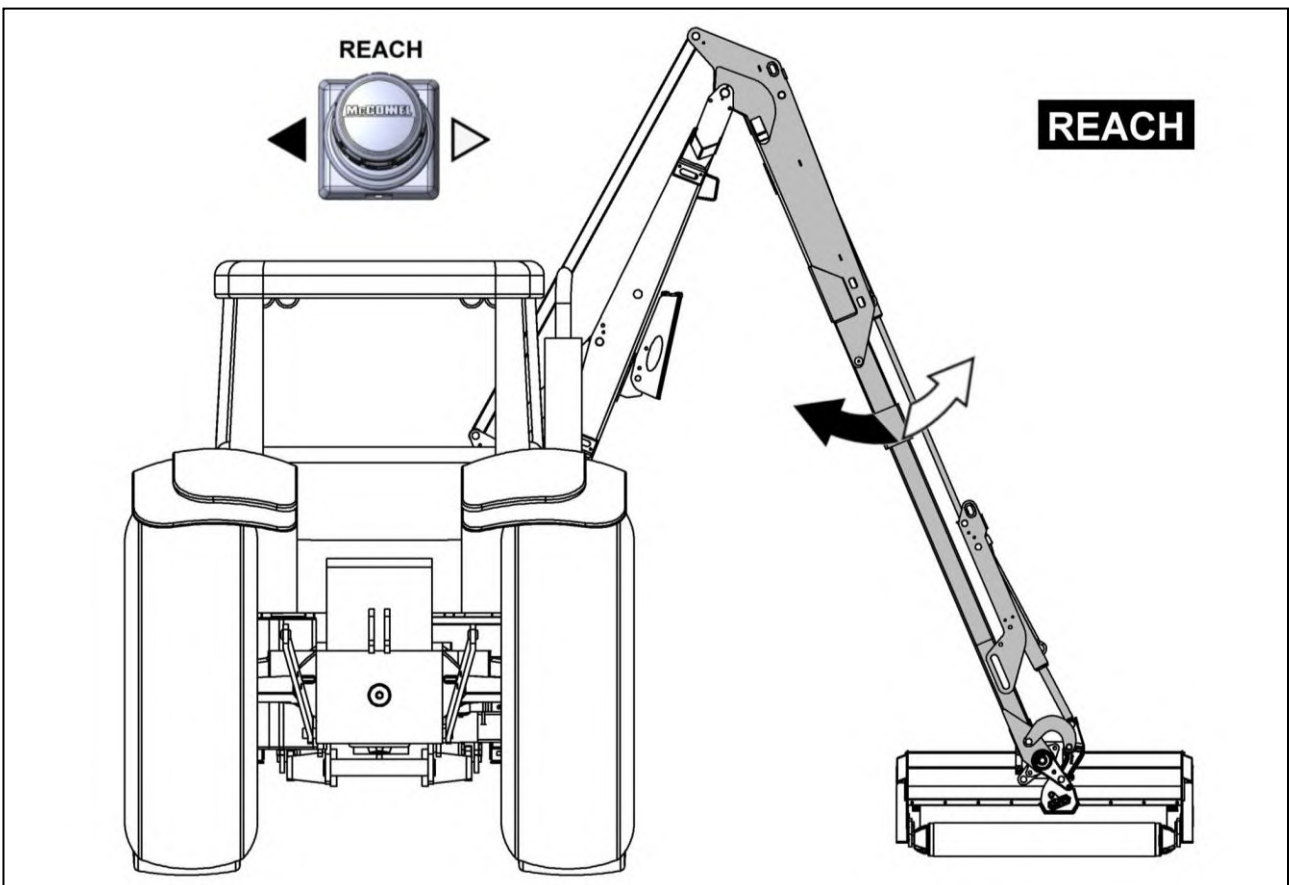
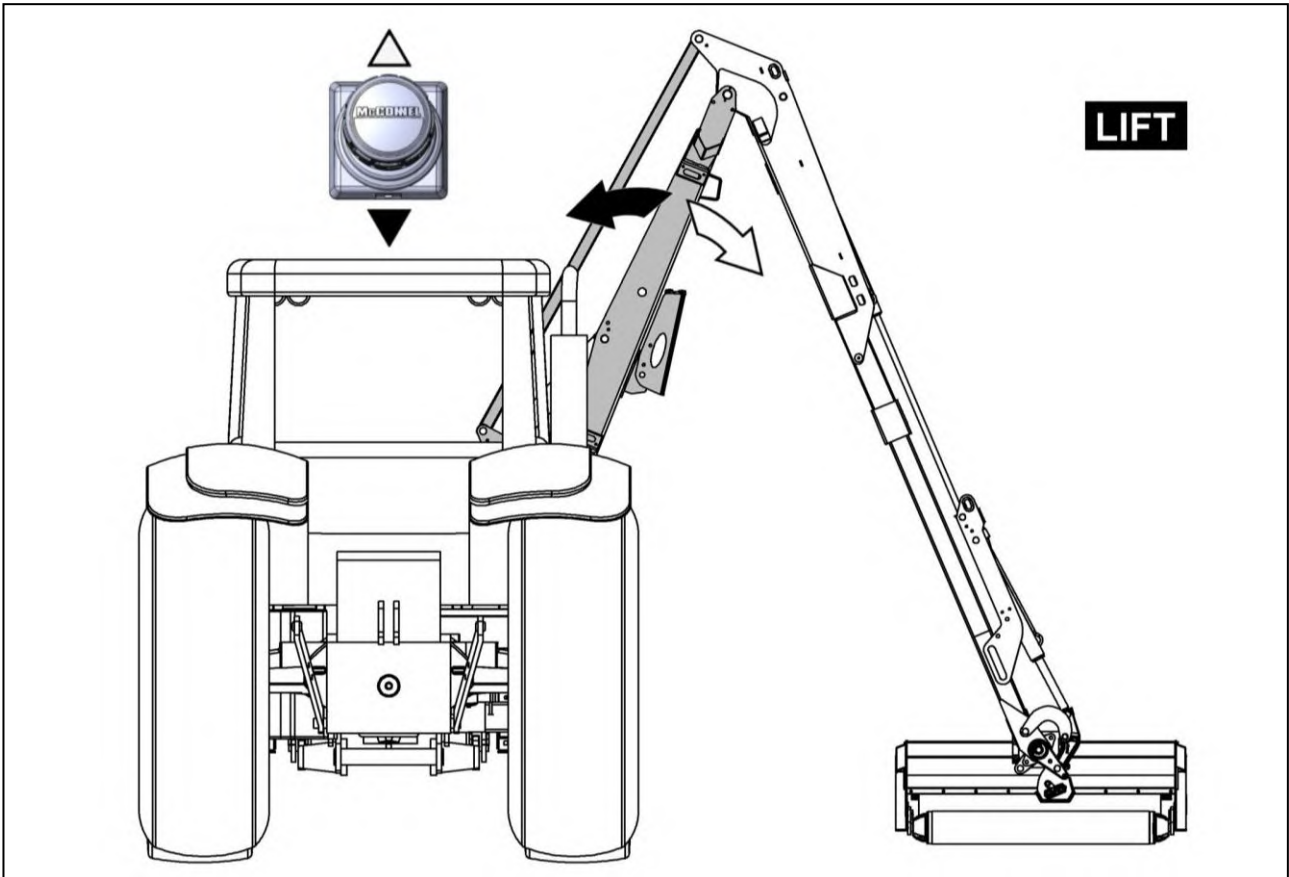
The armrest unit is designed to slide over the armrest of the tractor seat and is held in place with the fixing straps provided. Alternately, a mounting bar is supplied with Revolution controls that can be used should a more permanent installation be required; *when fitting the mounting bar, ensure that any holes drilled in the tractor cab are clear of important components and/or any electrical wiring. Units should not be fitted to a location that affects the safety structure of the cab.*

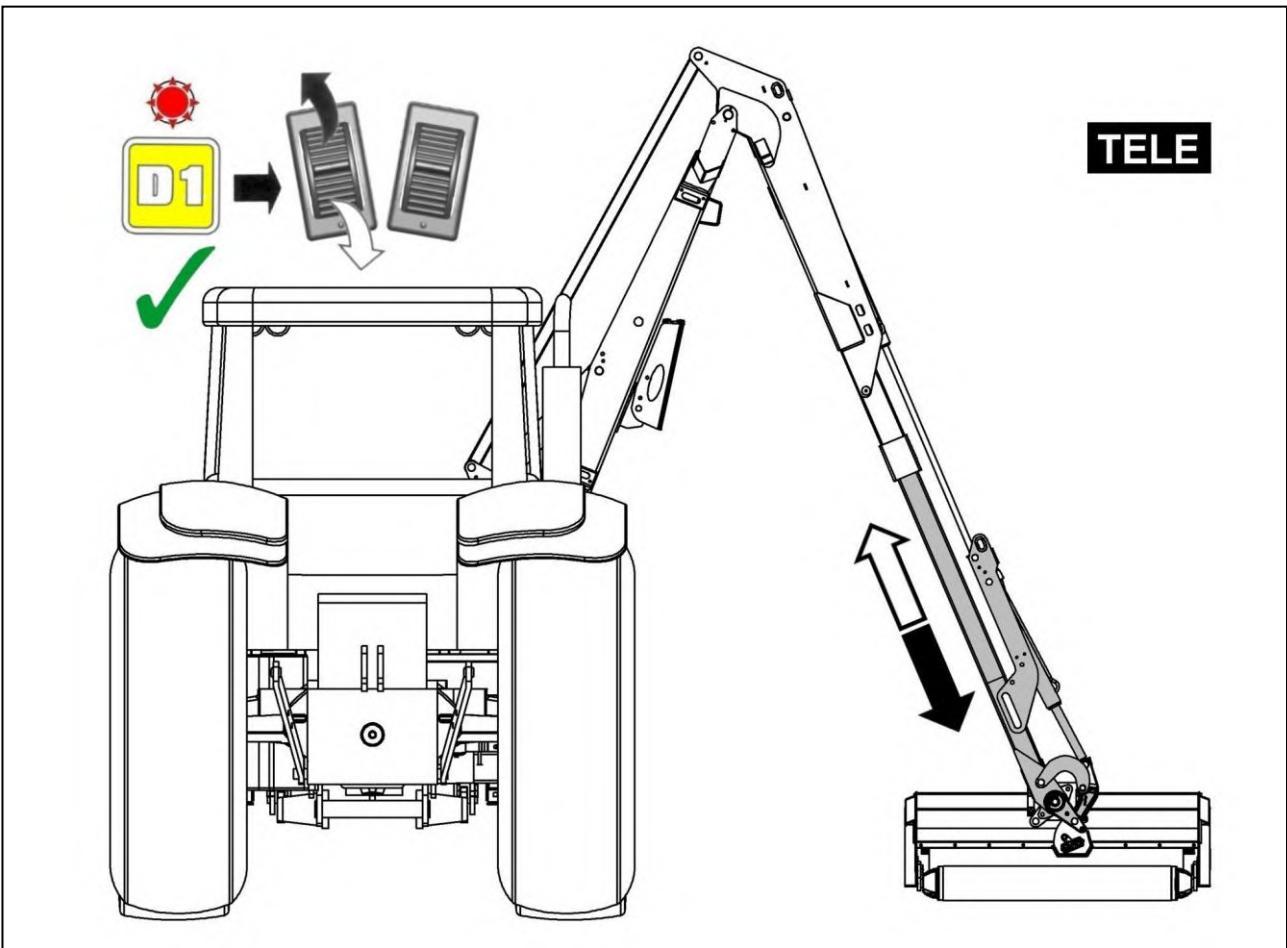
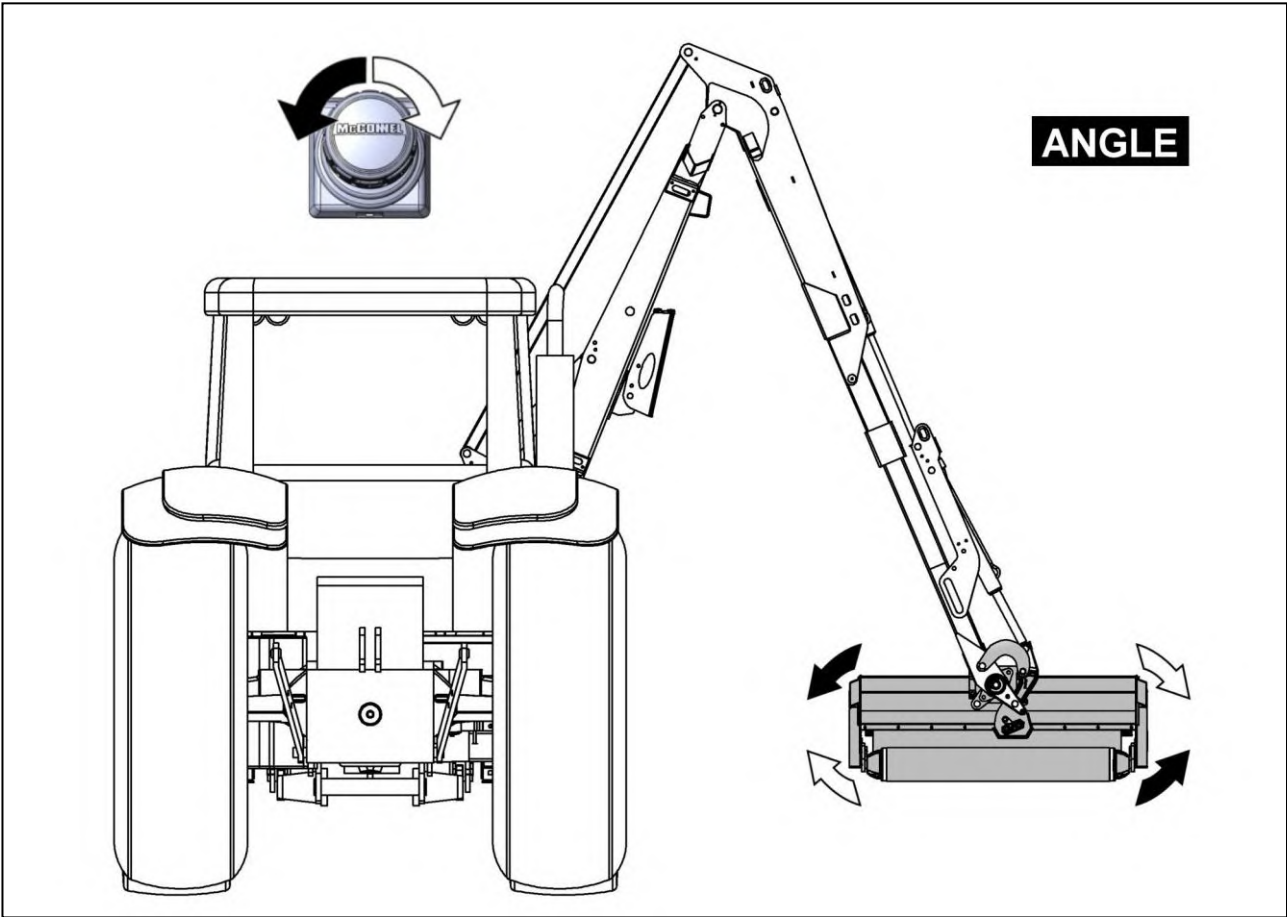
The power supply cable should be connected directly to the tractors battery - *do not use cigarette lighter type connections as these prove to be sporadic and unreliable for control applications.*

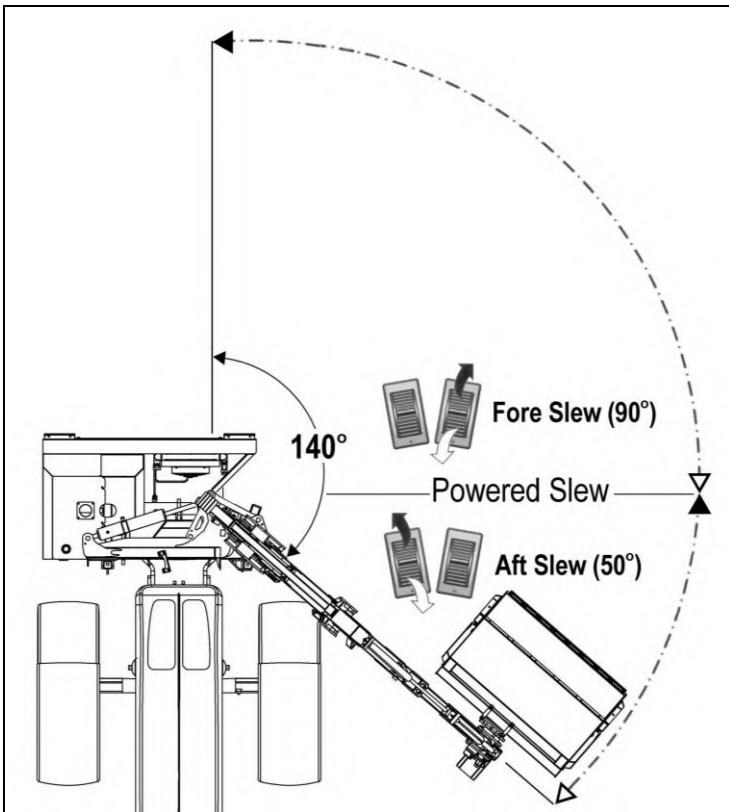
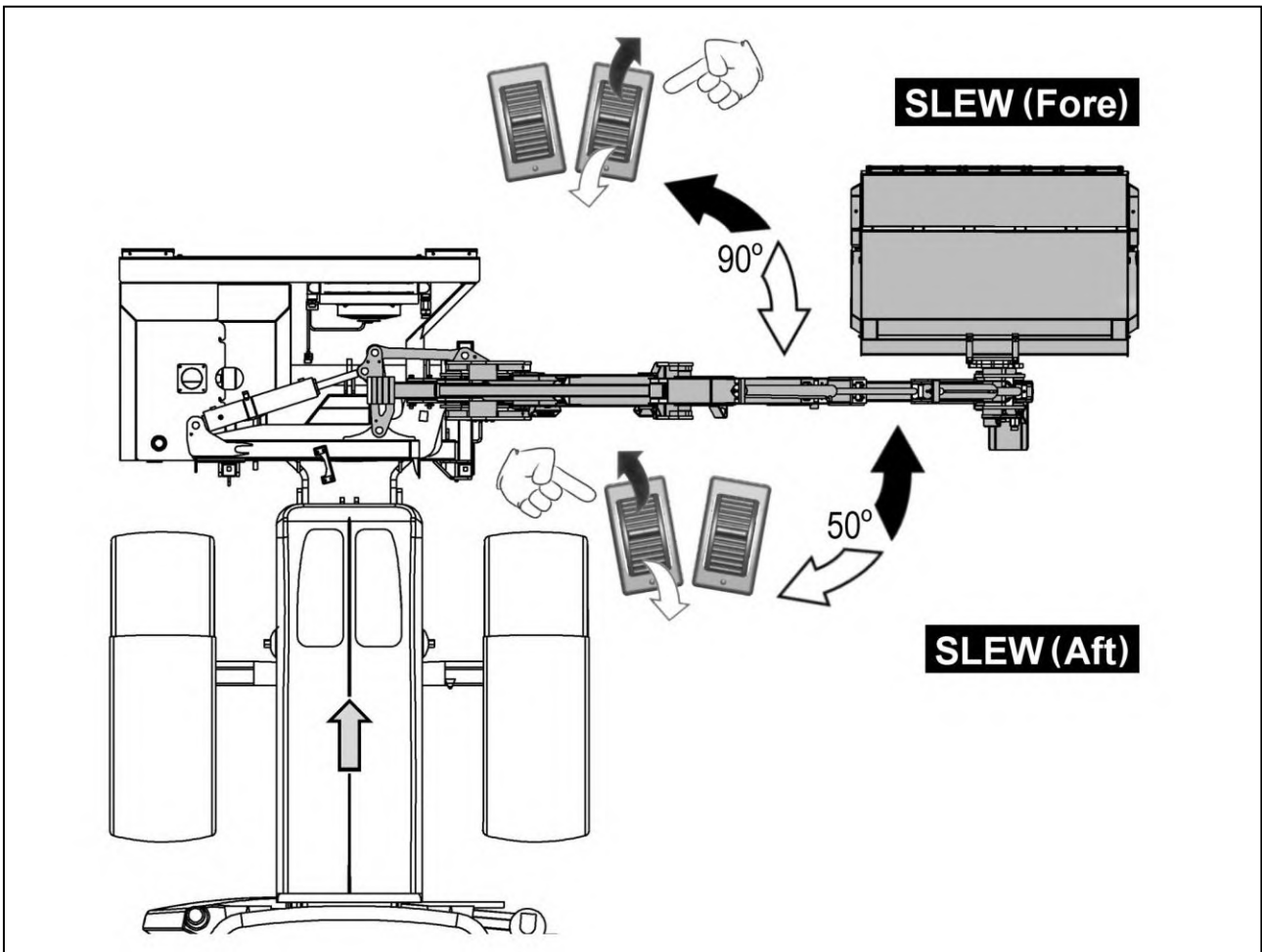
Revolution control units are 12 volt DC operated; the red lead is positive (+) and the black lead is negative (-).

MACHINE DEFAULT CONTROLS - PA7070T 85HP Front-Mount Machines

The following illustrations identify the default controls for the PA7070T 85HP Front-Mount machines; for further details and customisation options this information must be used in conjunction with the generic Motion Controls Manual that was provided with the machine.







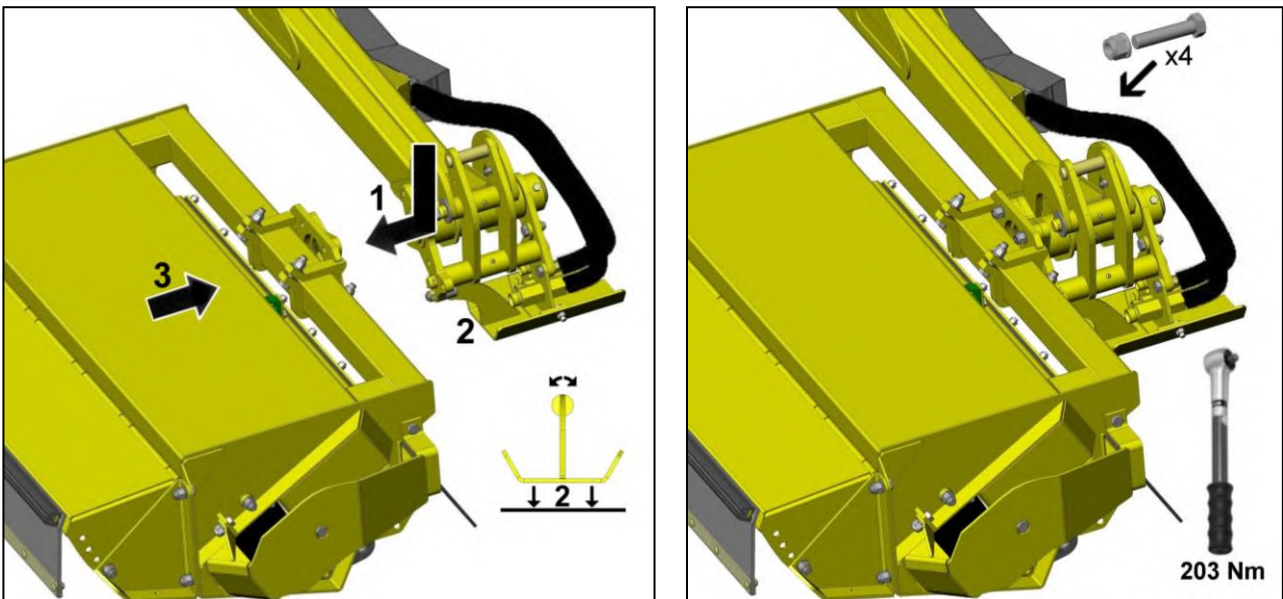
This information must be use in conjunction with the detailed instructions stated in the operator manual for the specific control unit fitted.

FLAILHEAD ATTACHMENT

For ease of attachment and safety this procedure is best performed on a firm level site. With the tractor parked alongside the flailhead operate the controls of the machine to position the pivot bracket of the machines head angling mechanism directly behind flailhead with the base of the hose tray (or junction bracket) parallel to the ground. Manoeuvre the flailhead backwards on its roller until the heads attachment bracket is adjacent to the machines pivot bracket. Fit the 4 attachment bolts through the brackets from the arm side - *if the holes are mis-aligned carefully operate the angling ram until the holes correspond.*

WARNING: Ensure all persons remain at a safe distance whilst operating the angling function as the geometry of the head angling mechanism produces several pinch risk areas.

With the attachment bolts correctly located through the brackets fit the self-locking nuts and tighten alternately until the brackets are drawn flush before finally tightening them to a torque setting of 203Nm (150ft.lbs).

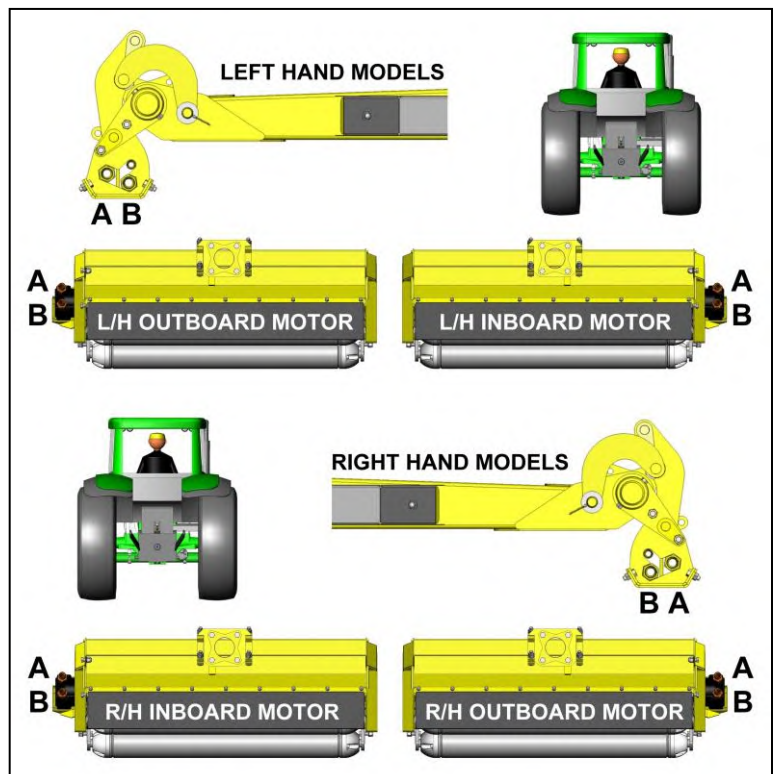


Flailhead Hose Attachment

With the flailhead attached to the machine the hydraulic hoses can now be connected – refer to diagrams opposite. Upper port 'A' on the motor connects to junction bracket point 'A' on the arm and lower port 'B' on the motor connects to junction bracket point 'B' on the arm.

NOTICE

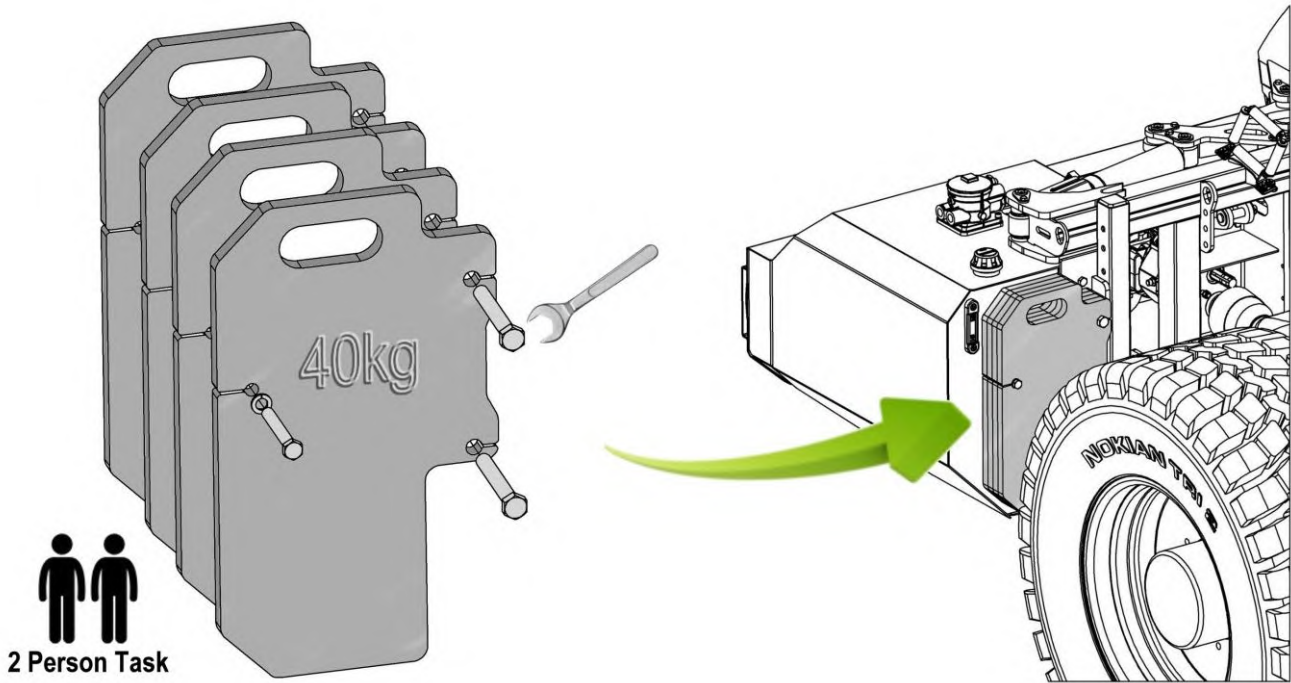
If a hose tray is already fitted to the arm it will need to be removed to allow hoses to be connected to the junction bracket – ensure that the hose tray is replaced once the hoses have been connected.



WEIGHT KIT (7470550)

Machines are supplied with a weight kit comprising of four 40kg weight plates and the necessary fixings required for attaching them to the machine.

The individual weights attach to the rear of the hydraulic tank assembly and held in place with bolts. The number of weights employed is dependent on the particular mass of the head attachment being used; fit the weights in required multiples that will ensure the unit is as level and stable as possible for both transport and work.



⚠ WARNING

Due to the heavy weight of these items, use suitable lifting equipment wherever possible; if not available employ smart lifting practices.

⚠ WARNING

Fitting and removal of these components must be performed with the help of a second person; always evaluate all risks prior to the task.

⚠ WARNING

Safety protection gear should be worn when performing this task; i.e. safety boots, gloves etc. Keep clear of unsupported raised weights.

RUNNING UP PROCEDURE

⚠ CAUTION

Before initial use of a new machine, all lubrication points must be greased and the gearbox and oil tank levels checked and where required topped up before attempting to use the machine. *Refer to maintenance section for details.*

Initial 'Running Up'

Ensure that the rotor control valve is in "STOP" position, start tractor, engage PTO and allow the oil to circulate through the return line filter for about 5 minutes without operation of the armhead controls.

Operate the armhead controls through their complete range of movements ensuring that all armhead movements function correctly.

Place the flail head at a safe attitude and move the rotor control to "START" position; *after initial fluctuation the rotor should settle to a steady speed.*

Increase PTO speed to approximately 360RPM and run for a further five minutes before disengaging PTO and stopping tractor.

⚠ CAUTION

Do not allow the pump to continue working if the rotor does not turn; overheating and serious damage to the pump can be caused in a very short time.

Check the hose runs and observe that they are free from any pinching, chafing, straining or kinks. Re-check the oil level in the tank and top up as necessary.

EMERGENCY STOPPING

In all emergency situations machine operation and functions must be stopped immediately; **Stop PTO operation** using tractor controls, then immediately kill electrical power to the machine using the **OFF (Emergency Stop)** switch on the machine's control unit.

⚠ WARNING Auto-Reset Machines

When the Auto-Reset feature is active the machines arm set is capable of unintentional movement even when the PTO is switched off and stationary. Always ensure that electrical power to the machine is switched off using the **Off (Emergency Stop)** switch on the machine's control unit in emergency situations and/or when the machine is not being operated.

⚠ WARNING Cable Operated Machines

In certain conditions, and/or if the Auto-Reset feature is active, the arm sets on cable operated machines possess the potential to move unintentionally, even when the PTO is switched off and stationary, if the levers were to be accidentally operated. Care must be adopted to avoid any movement of the levers when the machine is not being operated. Ensure arm sets are lowered fully to the ground when the machine is parked up or not in use.

BREAKAWAY PROTECTION

The machine is equipped with a hydraulic breakaway device offering 50° of breakback; this protects the structure of the machine should an unforeseen obstacle be encountered.

NOTICE

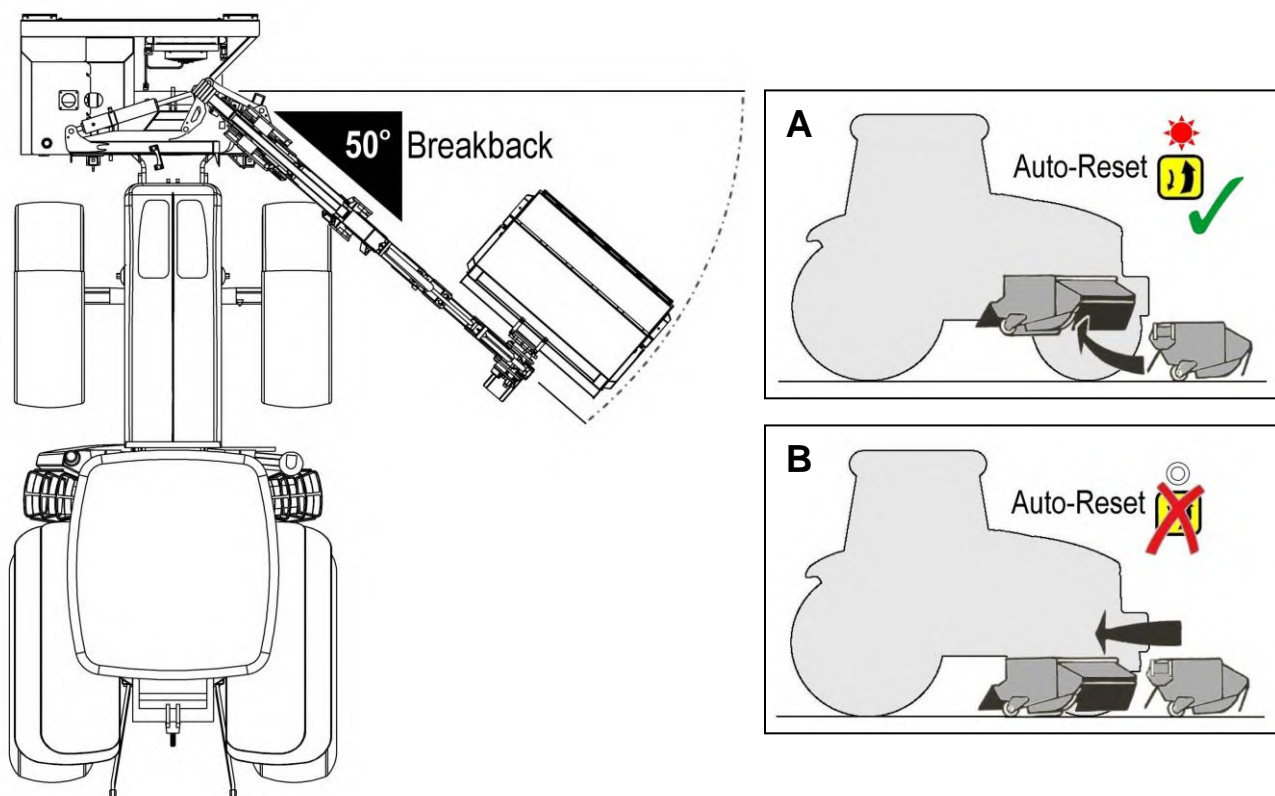
The machines breakaway function does not relieve the operator of his responsibility to drive carefully; always be alert and avoid obvious hazards before contact occurs.

Breakaway may occur momentarily during normal work should an extra thick or dense patch of vegetation be encountered. In these instances tractor forward motion may be maintained with care.

Where breakaway has occurred as a result of contacting a post or tree etc. the tractor must be halted and the controls of the machine utilised to manoeuvre the head away from the obstacle. **Never continue forward motion to drag the head around the obstacle in breakback position.**

NOTICE

The forces required to activate the breakaway system will vary dependent upon the gradient of work; it will require less force when working uphill and vice versa.



A) With 'AUTO RESET' selected:

When the slew relief valve setting is exceeded oil is displaced from the slew ram into the base of the lift ram which causes the head to rise as the arm pivots backwards to clear the obstruction.

Resetting of the head into the work position occurs automatically.

B) With 'SLEW' selected:

When the slew relief valve setting is exceeded oil is displaced from the slew ram allowing the arm to pivot backwards horizontally and the obstacle to be cleared.

Re-setting the head into the work position is carried out manually by selecting 'slew out' on the control assembly

POWERED SLEW

The powered slew feature allows up to 140° of fore and aft arm movement on the working side of the tractor; forwards by 90° and rearwards by 50°.

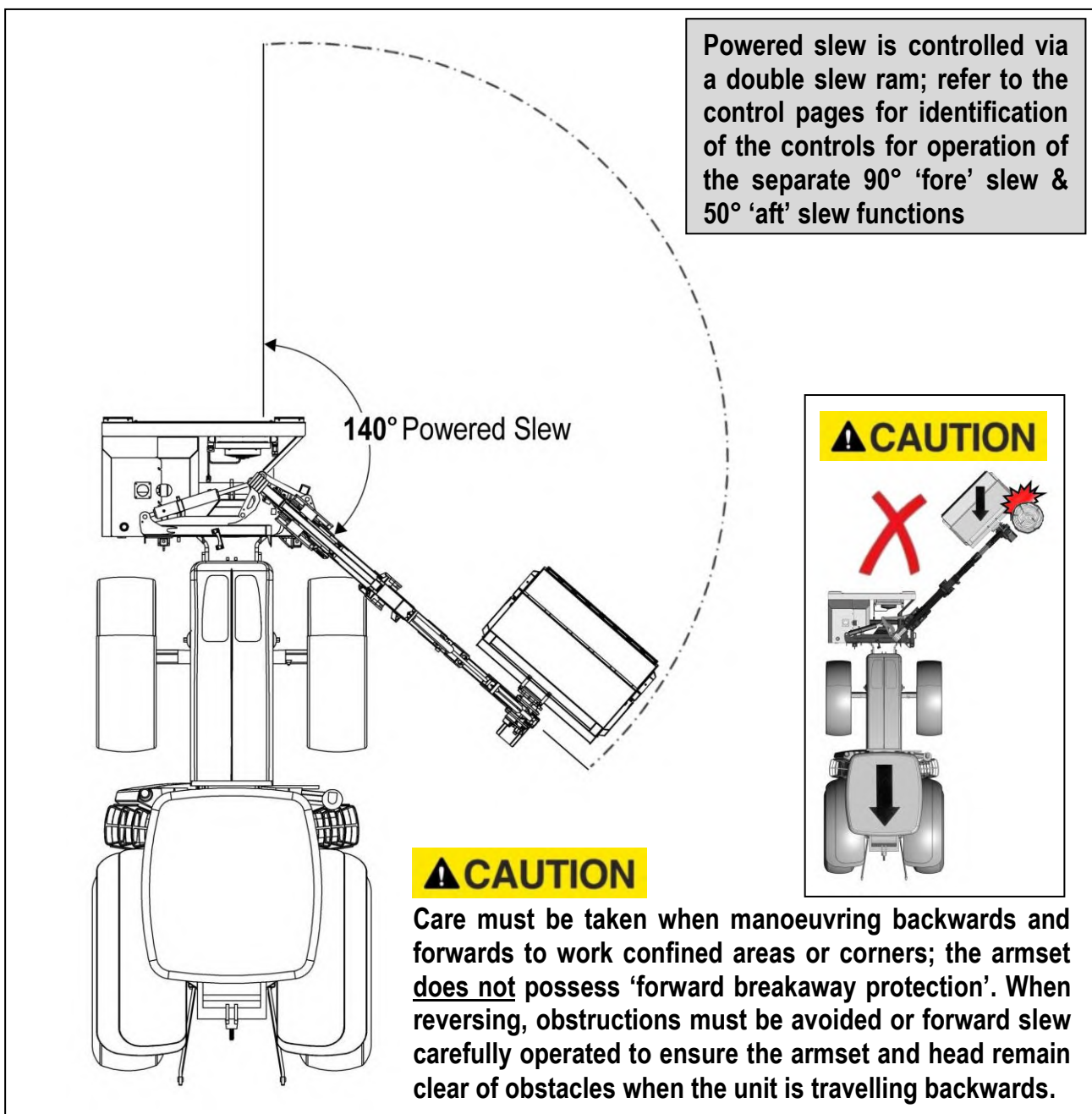
The forward slew feature is primarily required to place the machine into the transport position but can also be used to sweep the arm 'to and fro' whilst cutting awkward areas and corners, thus avoiding the need to constantly re-position the tractor; to operate in this way 'slew' must be selected on the control assembly.

NOTICE

If breakaway occurs the slew motion must be reversed to allow the slew breakaway relief valve to re seat and the ram to become operable again.

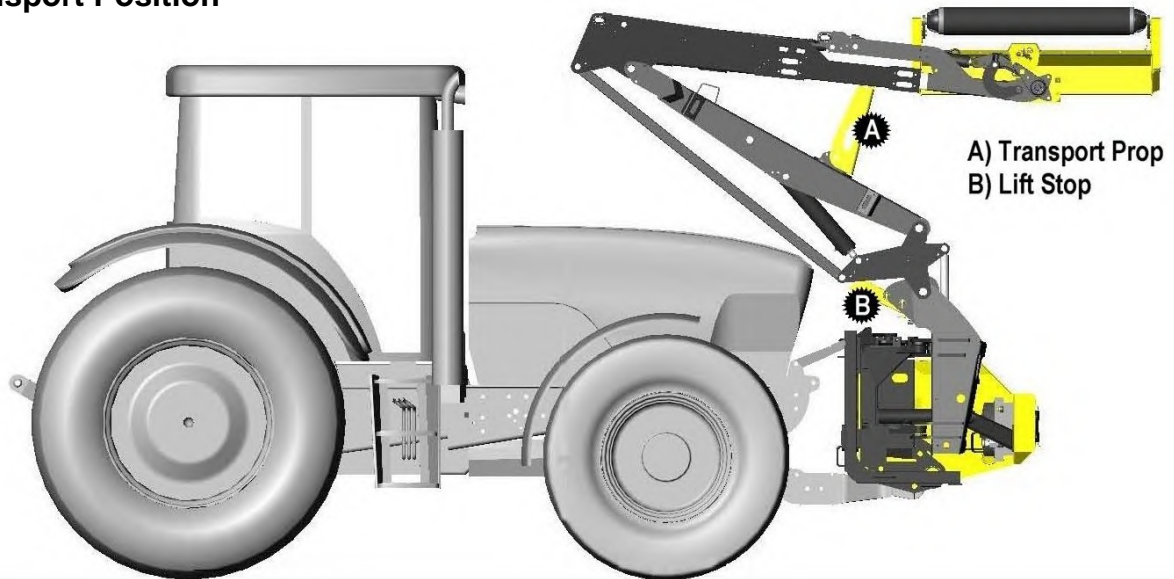
CAUTION

Extra care must be taken when working in 'Slew' mode with 'Reach' fully in; it is possible for the flail head to come into contact with the tractor and/or machine frame.



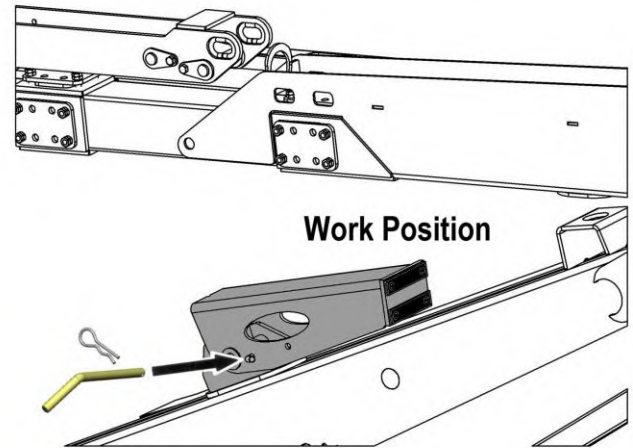
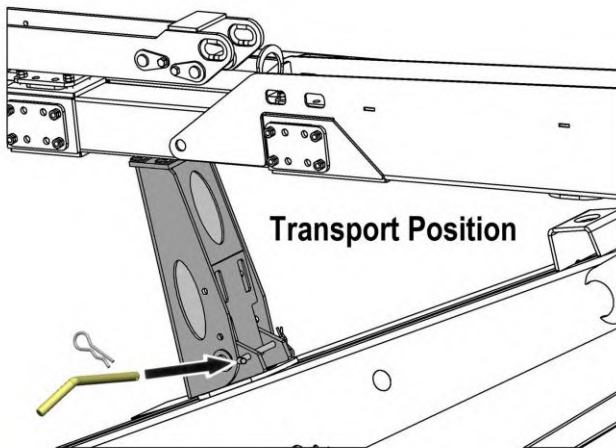
TRANSPORTATION

Transport Position



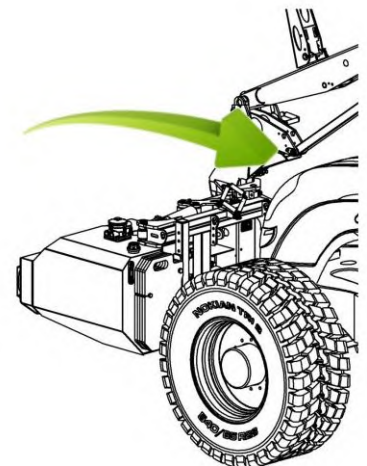
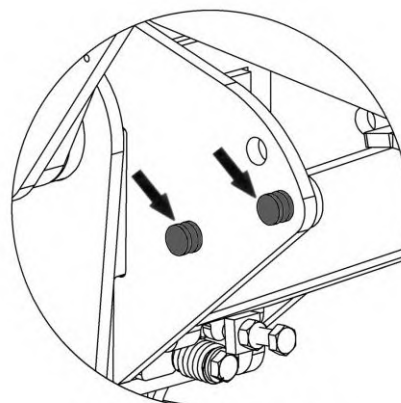
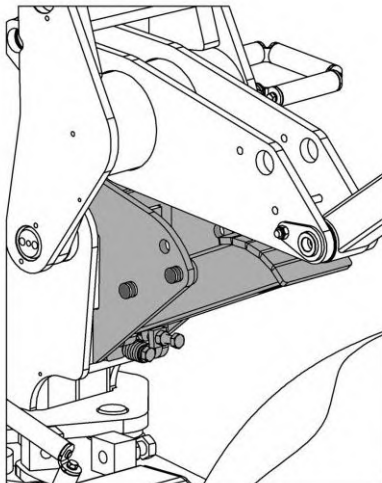
A) Transport Prop

Transport prop must be placed in the raised position to support arm for machine transport. Transport prop must be placed in the lowered position for working with the machine.



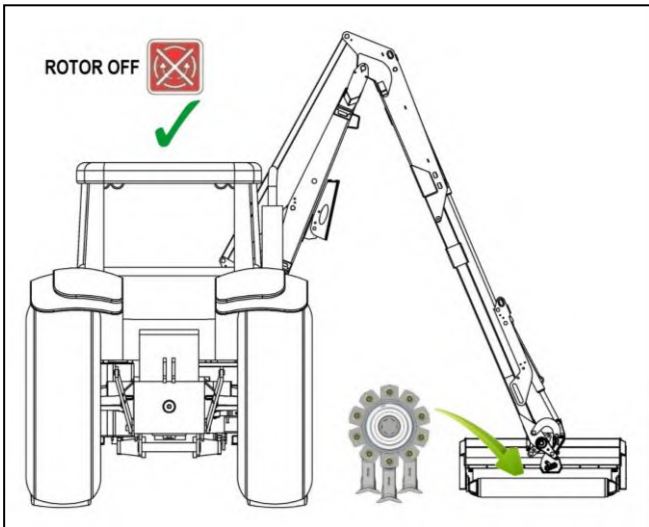
B) Lift Stop

For additional component protection a lift stop kit is fitted to the machine; the prop of the lift stop must be secured with its locking pins in the lower of its two possible positions at all times – refer to the illustrations below for the correct pin positions.

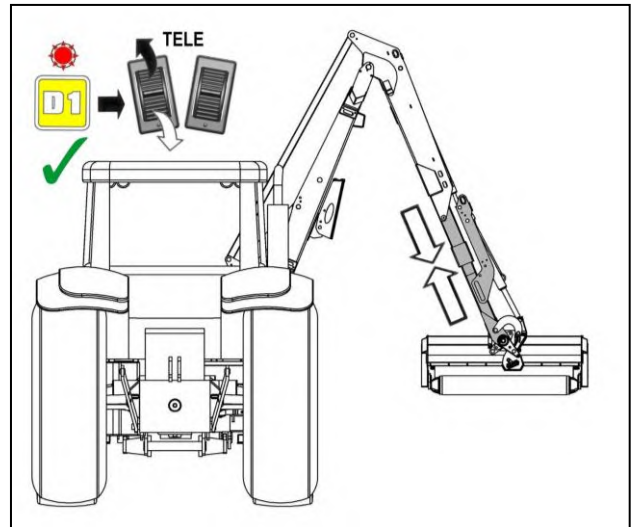


Moving into the Transport Position

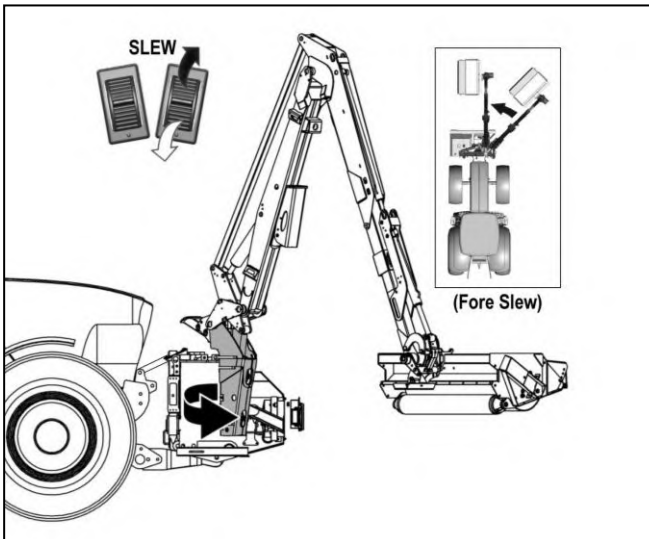
The procedure for moving from work to transport is as follows; *ensure that the lift and angle float functions are deactivated before beginning this procedure.*



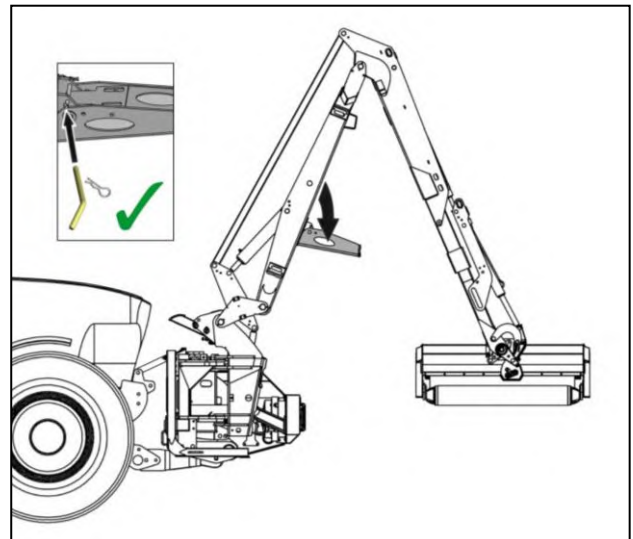
Switch Rotor OFF; wait until it comes to a standstill.



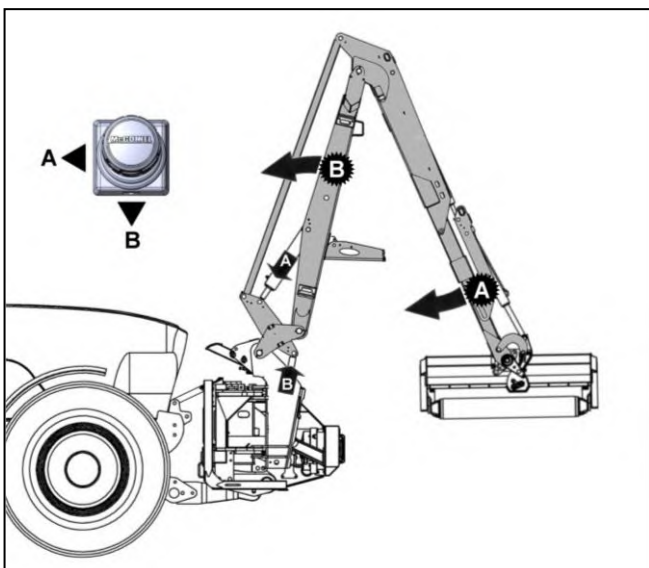
Operate Tele; retract arm to the fully in position.



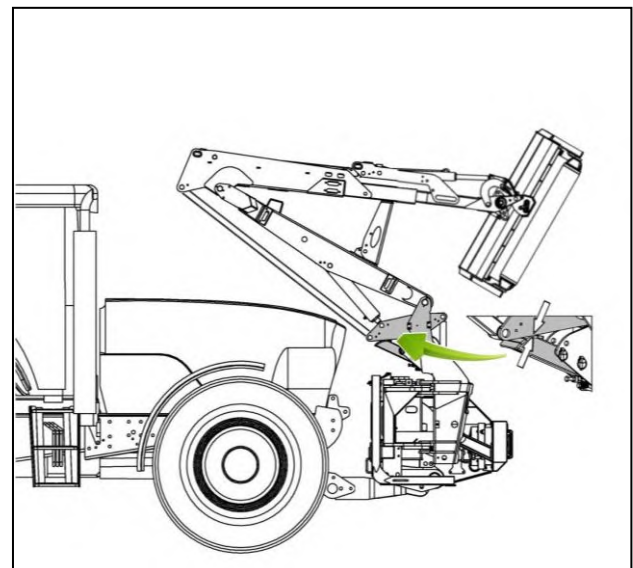
Operate Slew; place armset in line with the tractor.

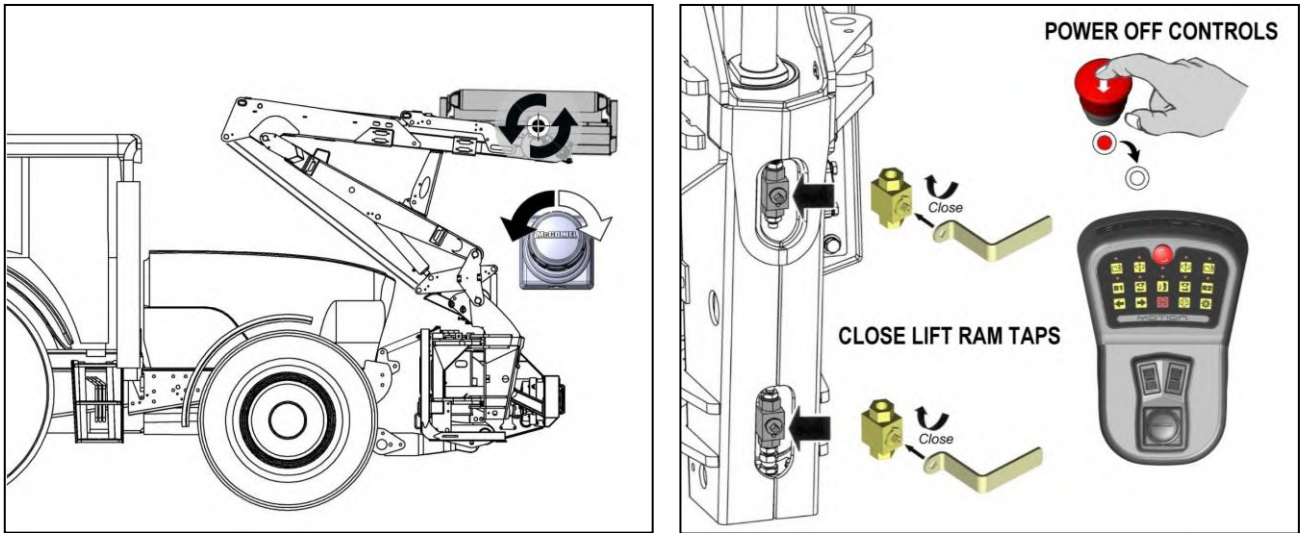


Lower Transport Prop and secure with lock pin.



Operate Reach & Lift; fold armset compactly with dipper on transport prop & rocker resting on lift stop.

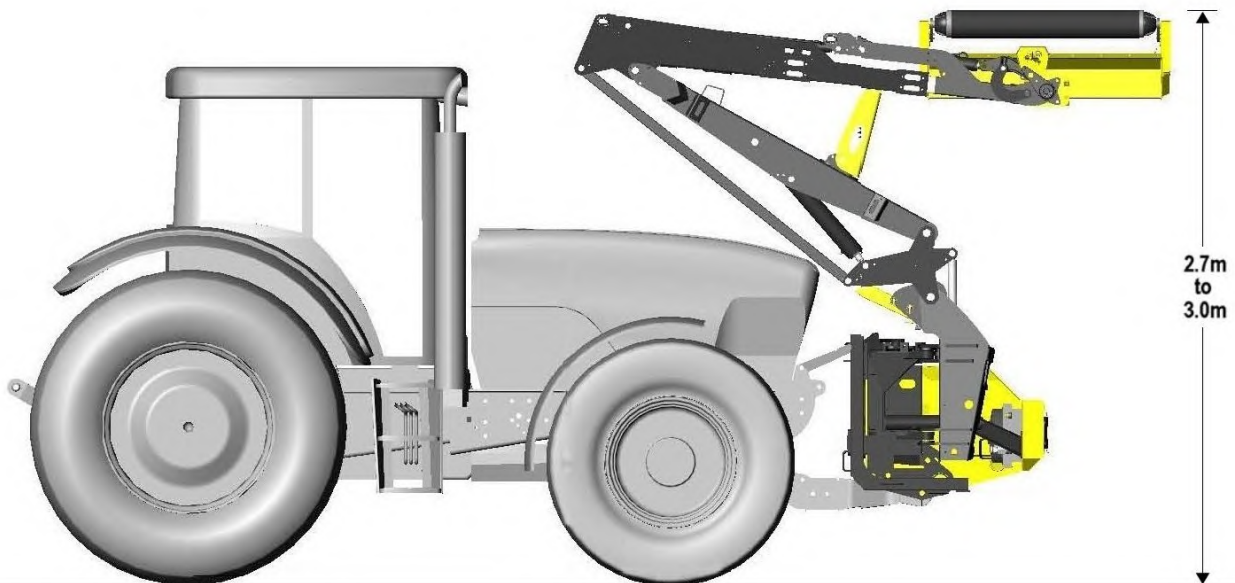




Operate Angle; rotate flail head to inverted position. Close taps on Lift Ram & switch OFF control unit. Disengage PTO shaft during machine transport.

Transport Height

There are no fixed dimensions for the machines transport height as this can vary for the various differing applications i.e. tractor size, carrying height and dimensions of the particular flailhead or accessory attached to the machine; for the majority of installations the transport height will be in the region of approximately 2.7 to 3.0m.



CAUTION It is advisable that once your machine has been installed on the tractor that the machine is then folded into the transport position and your own measurements taken to ensure you have an accurate figure for transport height. **Always be aware of the transport height of your machine and proceed with care when manoeuvring near building, bridges and all other overhead obstructions.**

Transport Speed

The acceptable speed of transport will vary greatly depending on 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 and reduce control of the vehicles steering.

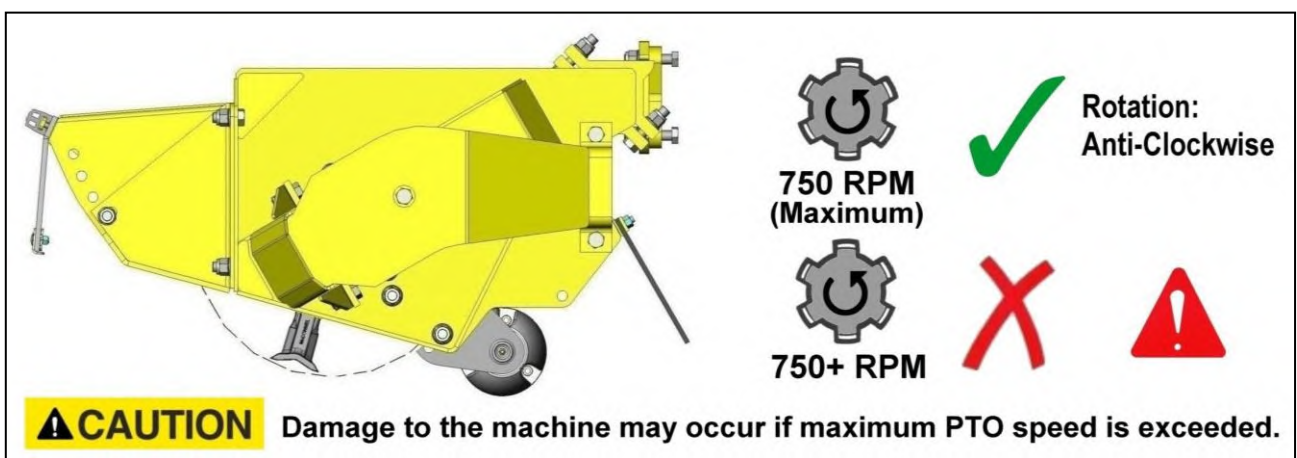
WARNING During transportation of the machine the PTO must be disengaged, transport lock taps closed and power to the control unit switched off.

Moving from Transport to Work

Reverting to the work position is basically a reversal of the previous work to transport procedure.

CAUTION Remember to open both lift lock taps before attempting to move the machine out of the transport position.

OPERATING SPEED



Engaging Drive

- Ensure the rotor control is in the 'stop' position before engaging the PTO.
- Allow the hydraulic oil to circulate for a minute or so before operating armhead controls.
- Move the flail head into a safe working position just clear of the material to be cut.
- Increase engine speed to a high idle and start the rotor – *after initial 'surging' the rotor will run at an even speed.*
- Carefully lower the flail head into the work area and begin work.

Tractor Forward Speed

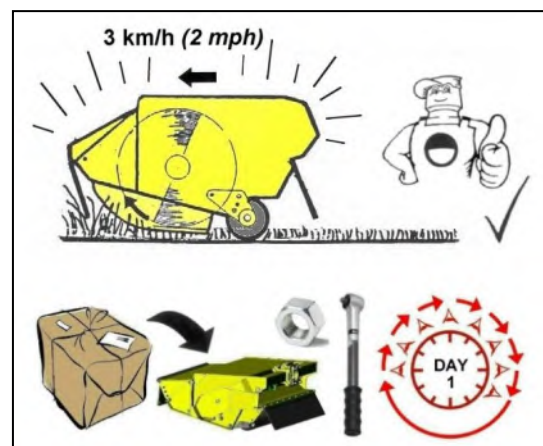
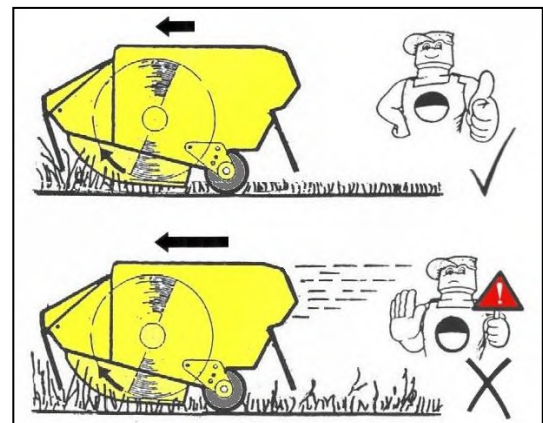
The material being cut will determine the tractor forward speed. Forward speed can be as fast as that which allows the flail head sufficient time to cut the vegetation both efficiently and neatly.

If forward speed is too fast this be indicated by over frequent operation of the breakaway system, a 'fall off' in tractor revs and poor untidy finish to the work leaving ragged uncut tufts and poorly mulched cuttings.

'Running In' a New Machine

During the first day's work with a new machine it is recommended that the forward speed of the tractor is restricted to 3km/hr (2mph) maximum; this will permit machine components to 'bed in' and allow the operator to become familiar with the controls and their response under working conditions whilst operating at a relatively slow speed. If possible, select a first day's work that affords mainly light to average cutting with occasional heavy duty work – *during this period check tightness of nuts and bolts every hour, retightening as and when required.*

First day use; check tightness of nuts & bolts hourly ►

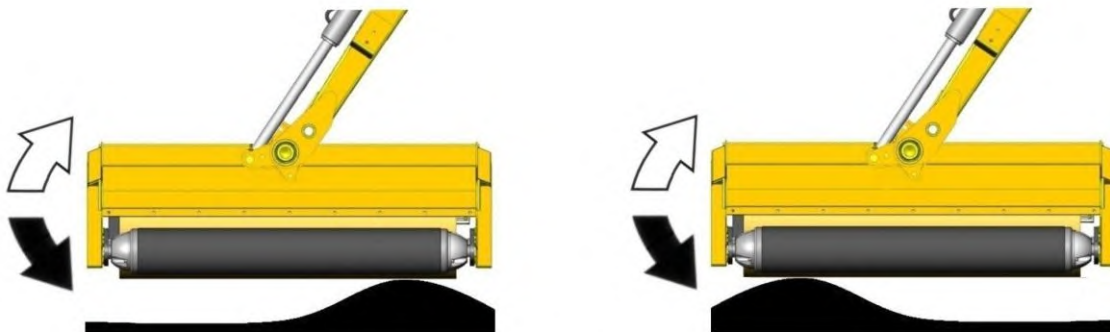


ANGLE FLOAT KIT (Standard Feature)

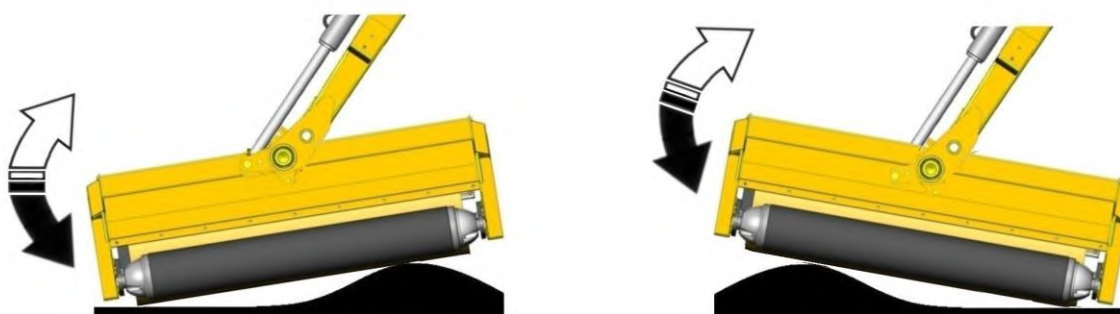
Machines are fitted with Angle Float as standard – when activated the feature connects the base and gland circuits of the angle ram to allow free movement of oil in both directions thus allowing the head to automatically angle itself to match the contours of the ground.

Refer to specific controls section for details of operation.

NOTE: On machines with V4 proportional controls any operation of the angle float thumbwheel will override and de-activate the automatic angle float function, on release of the thumbwheel it will revert back to automatic angle float.



Angle Float Off – Requires operator input to adjust flail head angle



Angle Float On – Flail head automatically angles itself to match the ground contours.

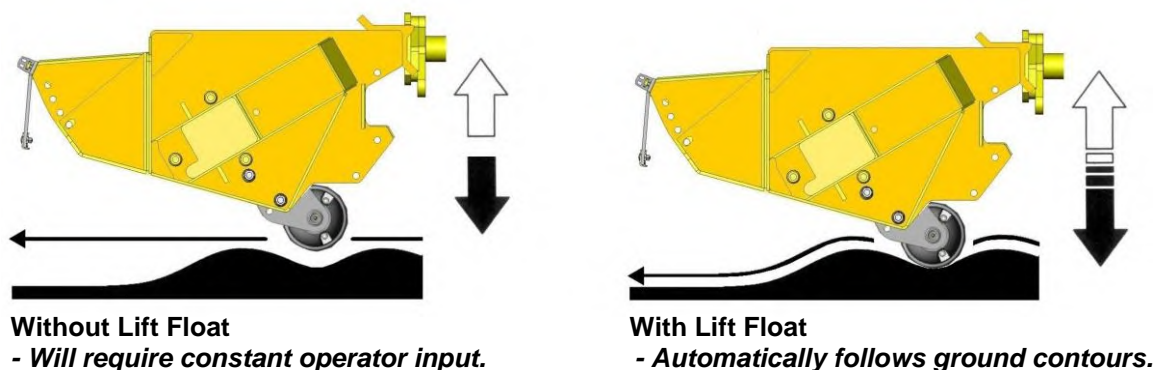
LIFT FLOAT (Optional Extra for Ground Work)

Work without lift float requires far more concentration and input from the operator to quickly react and re-adjust to the ground contours often resulting in patches of higher cut material where the head is cutting too high and ‘scalping’ of the ground where it is cutting too low – *in the case of the latter this can lead to increased flail wear, damage or even loss of flails.*

The lift float feature is an optional extra for use during mowing work. When the function is activated the pressurised accumulator(s) work in conjunction with the valve and lift ram to take a proportion of the flailheads weight off the flail roller allowing the head to automatically follow the natural contours of the ground; this produces a cleaner more uniform cut without the need for constant operator re-adjustment. On EDS models the function has 3 user settings for differing working conditions – these are soft, medium and hard. *Refer to the relevant control section for details of selecting the required setting.*

Operation of the lift float function is as follows: with lift float switched off, position the flailhead approximately 1m clear of the ground before switching the float function on to charge the accumulator(s) – *the arms may drop at this point depending on the current level of retained pressure.* Lower the flailhead into the work position, release the lift control and proceed to work.

NOTE: *with the exception of EDS models, occasional operation of the lift function will be required when working on downhill or uphill slopes and when reaching in or out in order to replenish the oil level within the accumulator(s) to retain optimum float capability.*



Lift float operation when supplied as a factory fitted option is controlled from the controls unit that accompanied the machine (*refer to controls section for details*), but the feature is also available for a range of models as an aftermarket kit, in which case operation will either be via an auxiliary switch on cable controlled machines, or by utilisation of the auxiliary three-position type switch on the control unit of electric controlled machines - *this will allow for selection of 'lift float alone' or 'lift and angle float in unison' if both features are fitted.* Operation of the lift float control for these models will then be as specified in the main controls section.

Power Connection on Cable Machines

On cable controlled machines the switch supplied will need to be mounted in a convenient location in the cab. The supply cable from the poppet valve solenoid must be connected into the tractors ignition system - the brown lead is positive and the blue lead is negative.

Power Connection on Electric Machines

On electric controlled machines power to the unit is via the following connections:

Machines with 14 core looms use connection 10 and common connection 11.

Machines with 19 core looms use connection 15 and common connection 16.

Non-EDS proportional machines use connections LF and C.

OVERHEAD POWER LINES (OHPLs)

It cannot be stressed enough the dangers involved when working in the vicinity of Overhead Power Lines (OHPLs). Some of our machines are capable of reach in excess of 8 metres (26'); they have the potential to well exceed, by possibly 3 metres (9' 9"), the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines.

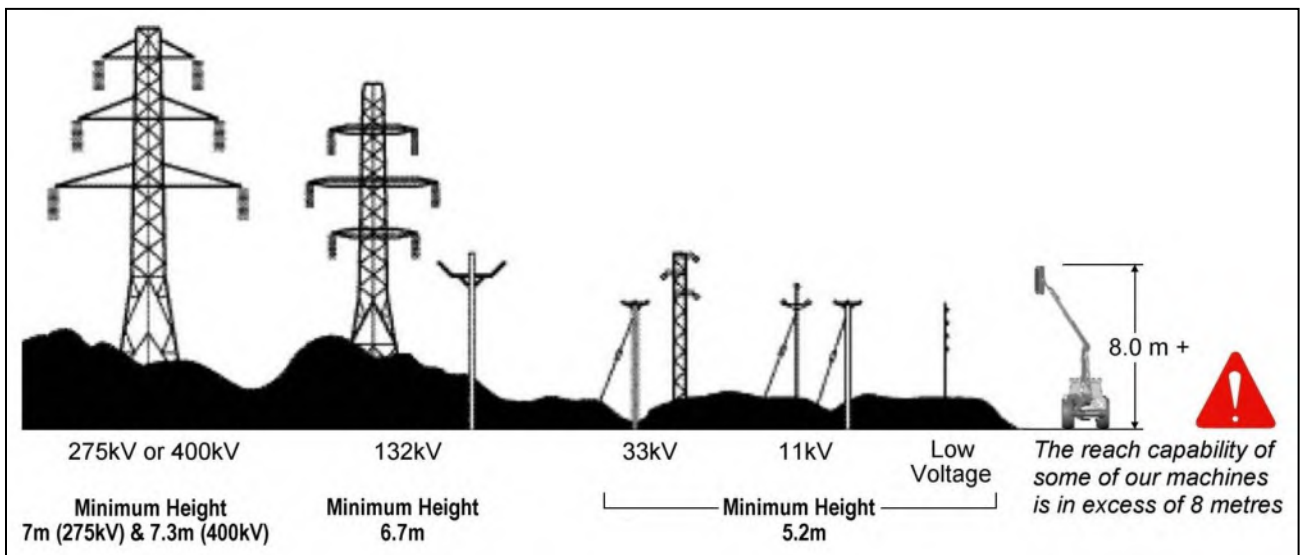
Remember electrocution can occur without actually coming into contact with a power line as electricity can 'flashover' when machinery gets close to it.

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

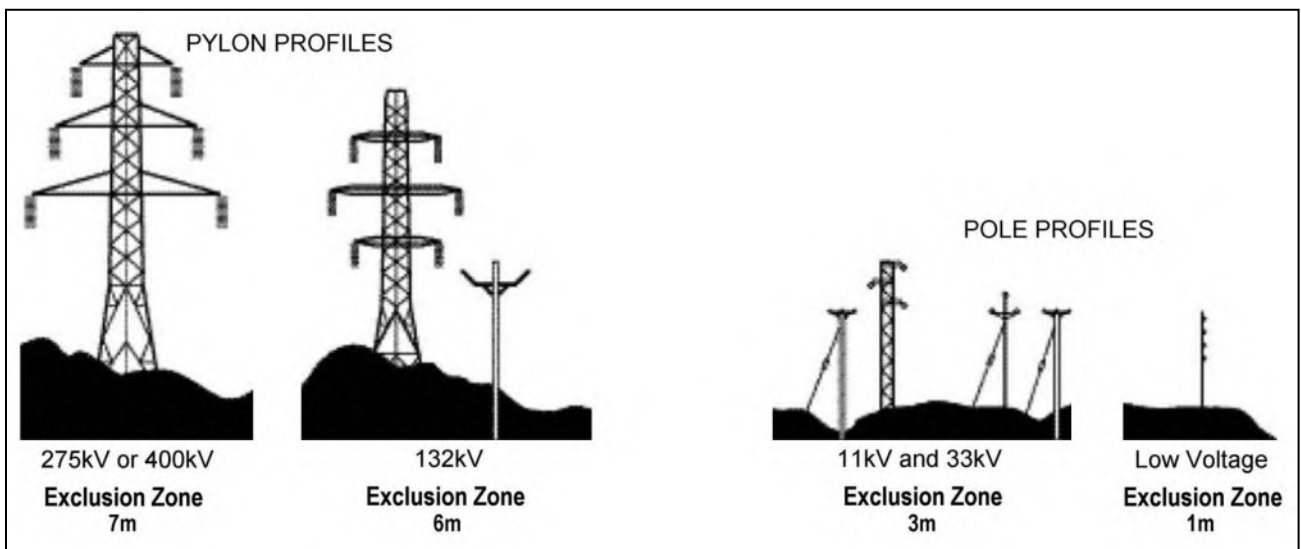
Wherever possible the safest option is always to avoid working in areas close to OHPLs. Where unavoidable, all operators must perform a risk assessment and implement a safe procedure and system of work – see *following page for details*.

All operators should perform a risk assessment before operating the machine within 10m horizontal distance of any OHPLs.

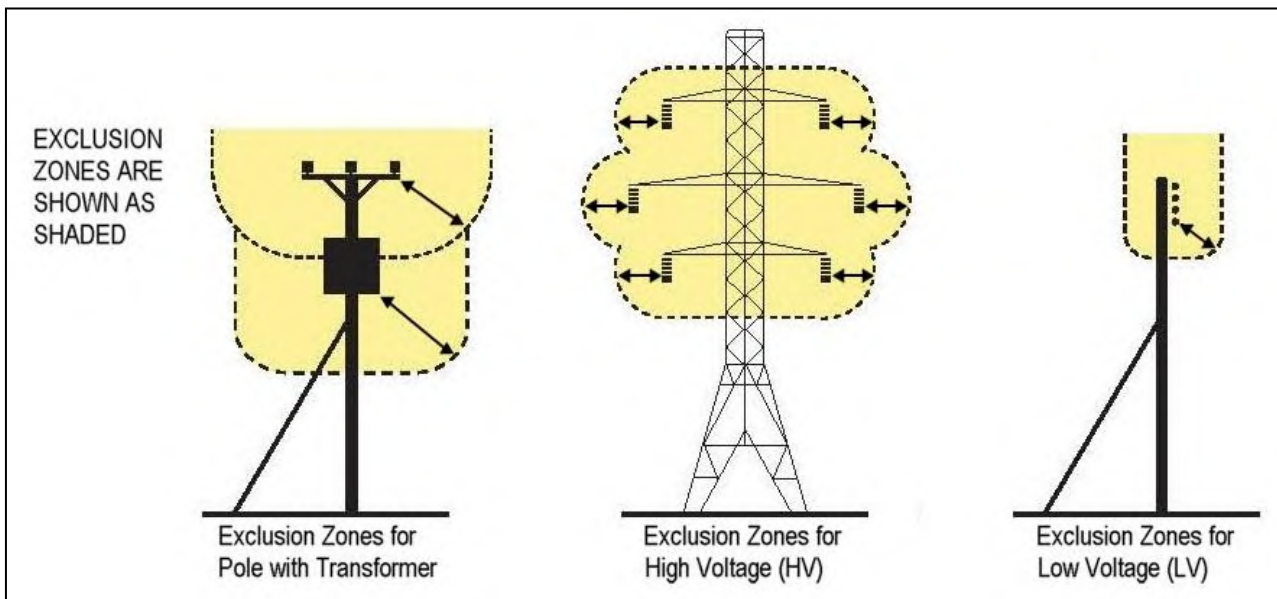
Minimum Heights for Overhead Power Lines



Absolute Minimum Exclusion Zones for Specific Overhead Power Lines



Definitions of Exclusion Zones



Risk Assessment

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

Know the risks of contacting OHPLs and the risk of flashover.

Find out the maximum height and maximum vertical reach of your machine.

Find out the location and route of all Power Lines within the work area.

Find out the operating voltage of all Power Lines within the work area.

Contact the local Distribution Network Operator (DNO) who will be able to advise you on the operating voltage, safe minimum clearance distance for working, and additional precautions required.

Never attempt to operate the machine in exclusion zones.

Always work with extreme caution and plan your work ahead to avoid high risk areas.

If doubt exists do not work in the area – never risk the safety of yourself or others.

Emergency Action for Accidents Involving Electricity

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

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

HAZARDS & DANGERS

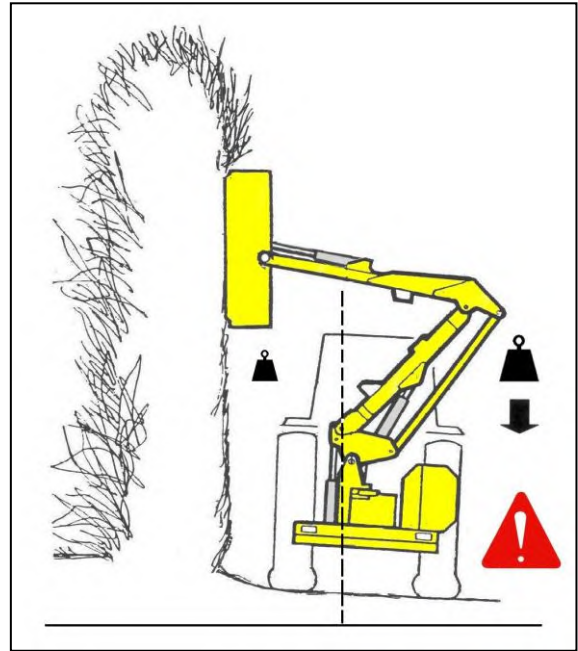
Adverse Slopes

When working with the flailhead high and reach fully in it is possible for the main arm balance to go over centre and take the weight off the lift ram. A restrictor in the gland circuit of the lift ram will prevent sudden unpredictable movements if this should occur - *for reasons of safety this restrictor should not be removed.*

⚠ DANGER

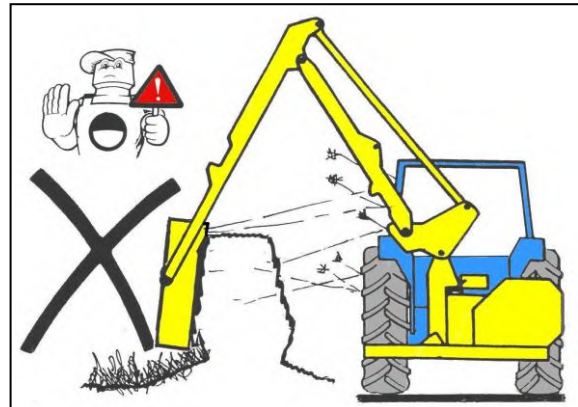
NEVER REMOVE THE RESTRICTOR FROM THE LIFT RAM GLAND CIRCUIT.

Never work the machine on adverse slopes with the arms positioned such that the tractor is unbalanced ►



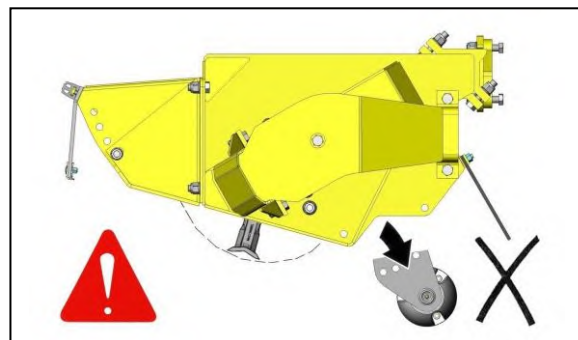
⚠ DANGER

NEVER CUT TO THE BLIND SIDE OF A HEDGE
- it is impossible to see any potential hazards or dangers and the position of the flail head would allow debris to be propelled through the hedge towards the tractor and operator.



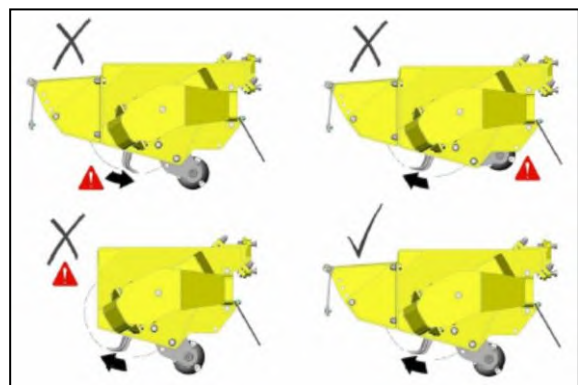
⚠ DANGER

NEVER OPERATE THE MACHINE WITH THE FLAIL HEAD ROLLER REMOVED



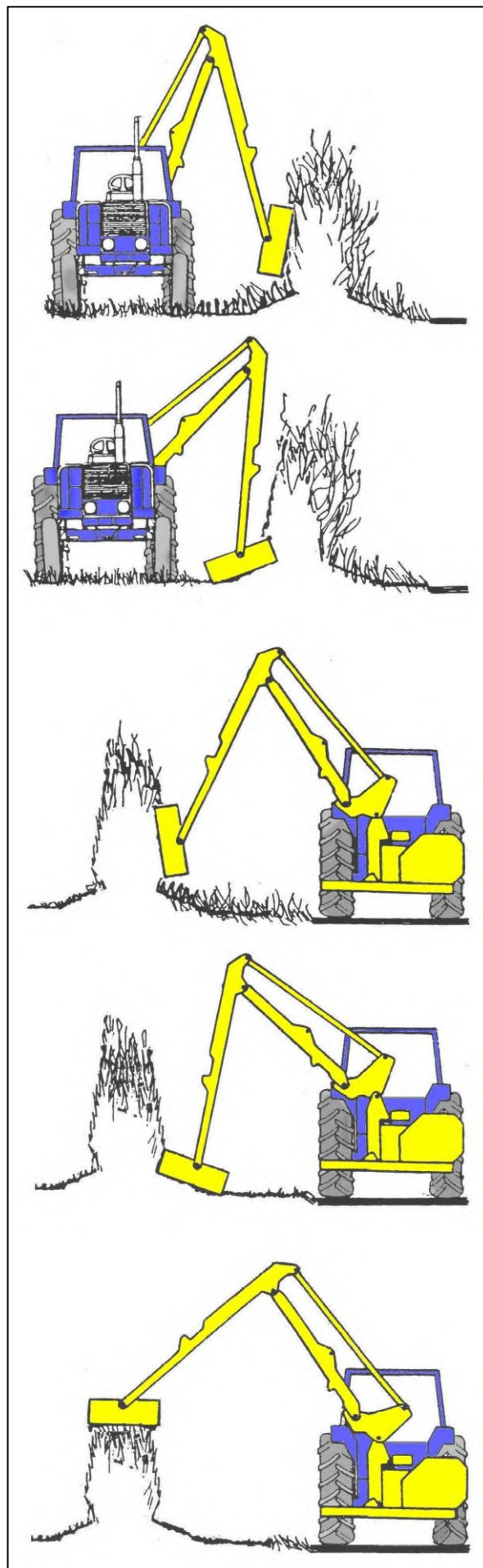
⚠ DANGER

WHEN GRASS MOWING THE ROTOR MUST ALWAYS CUT IN THE UPHILL DIRECTION WITH FRONT HOOD FITTED AND THE ROLLER POSITIONED BELOW THE CUTTING HEIGHT OF THE FLAILS



HEDGECUTTING PROCEDURE

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



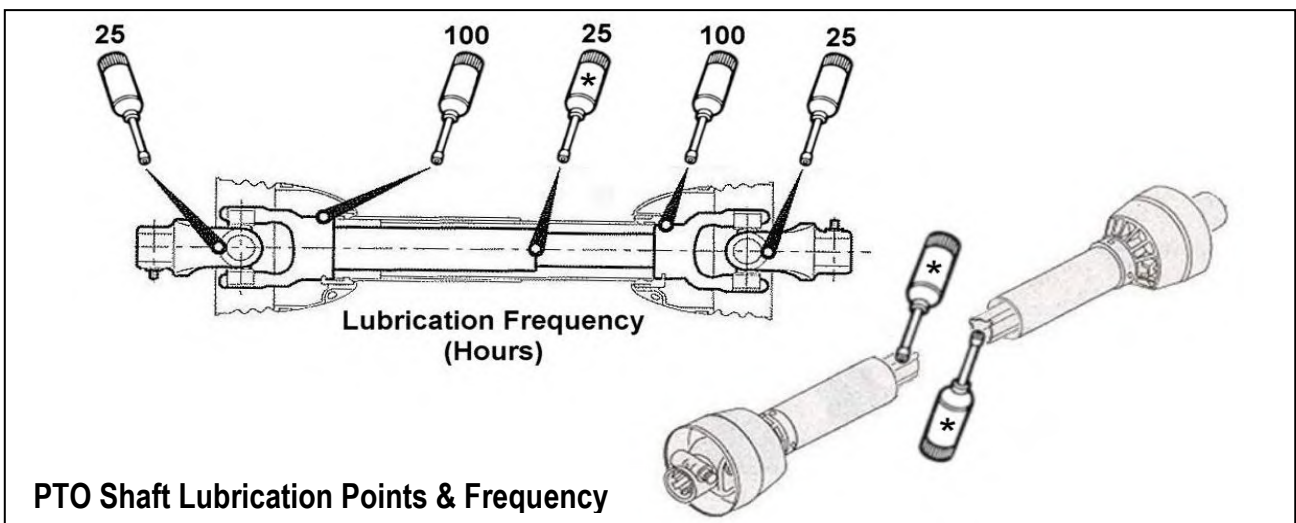
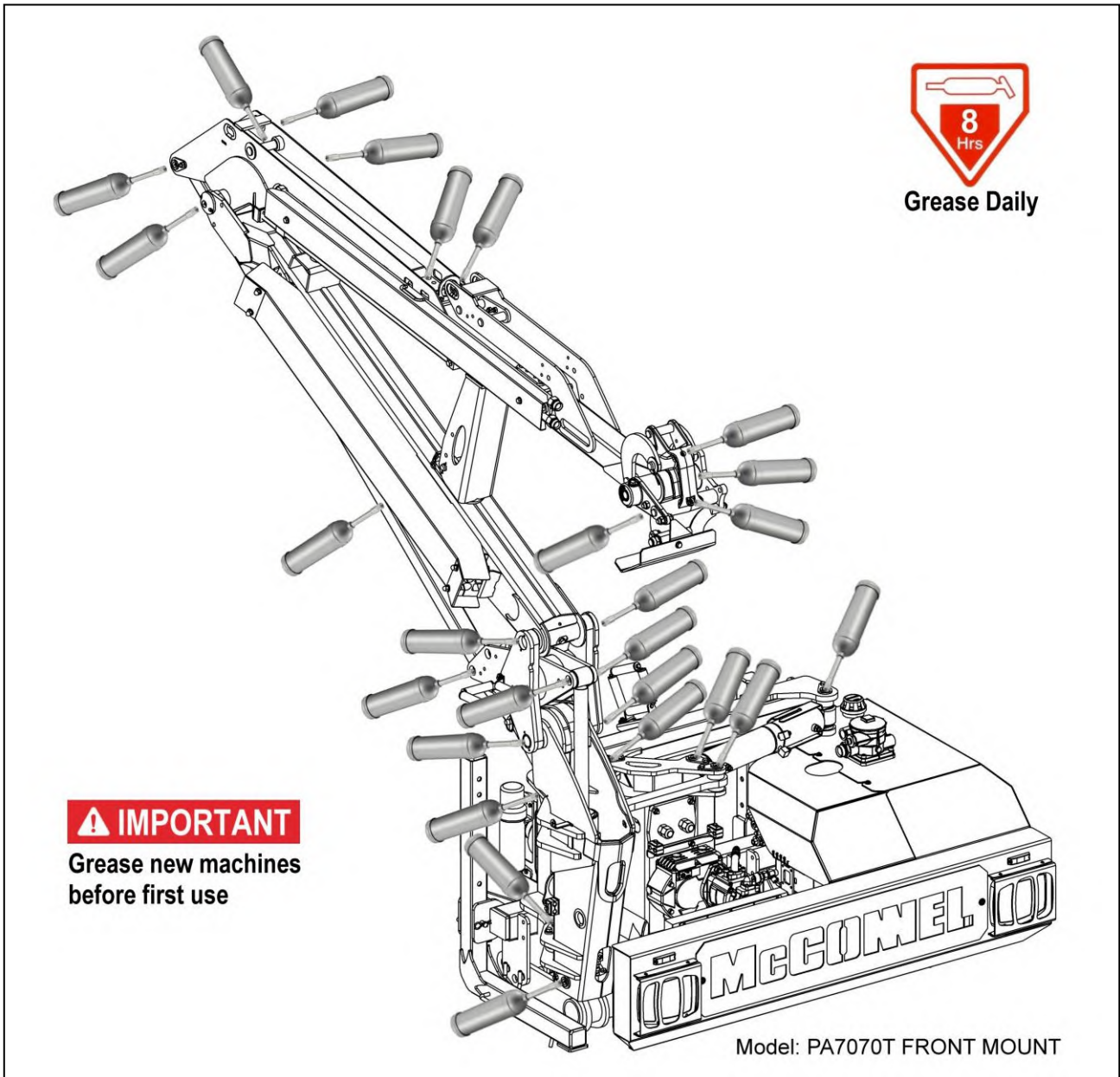
Cut the side and bottom of the road side.

Top cut the hedge to the height required.

MAINTENANCE

General Lubrication

All points indicated below should be greased on a daily basis and prior machine storage. New machines must be greased prior to first use.



PTO Gearbox

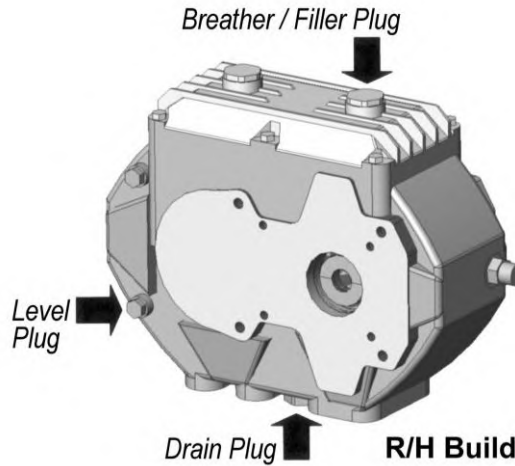
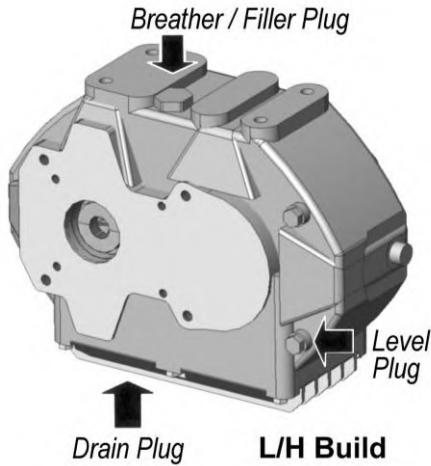
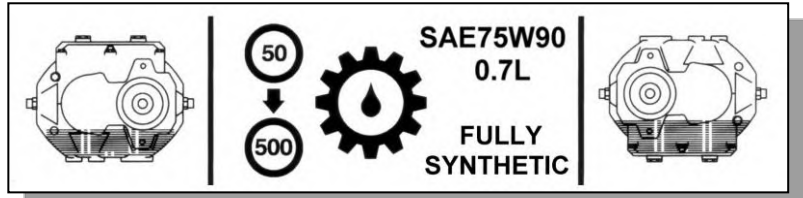
Check gearbox oil level on new machines prior to first use, top up if required before using the machine. **Replace gearbox oil after an initial 50 hours of use** and thereafter at annual or 500 hour intervals; *whichever occurs earliest*.

Gearbox Capacity (Machine builds ►05/16)

0.7 Litre SAE75W90 Fully Synthetic which meets the following minimum requirements;

Viscosity at 40°C, cSt, 100.0 min.

Viscosity at 100°C, cSt, 17.2 min.

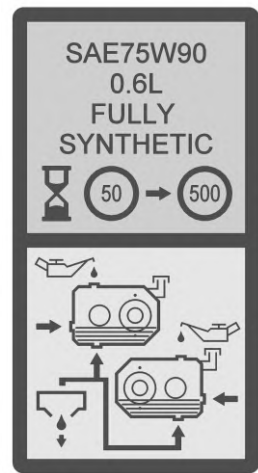
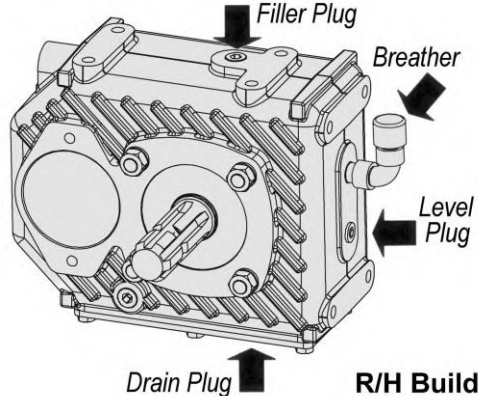
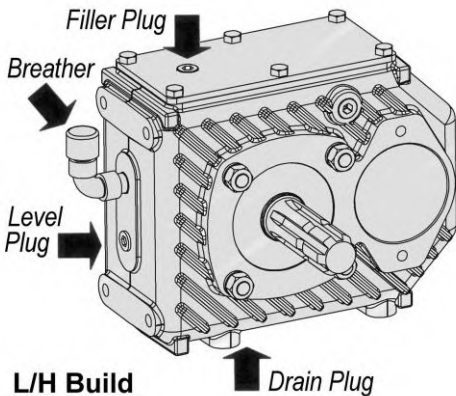


Gearbox Capacity (Machines builds 06/16 ►)

0.6 Litre SAE75W90 Fully Synthetic which meets the following minimum requirements;

Viscosity at 40°C, cSt, 100.0 min.

Viscosity at 100°C, cSt, 17.2 min.



Gearbox Oil Replacement & Topping Up Procedure

Drainage of the gearbox for an oil change is via the drain plug which is located on the base of the gearbox.

To refill gearbox or for 'topping up' remove filler and level plugs indicated in the illustrations above and fill gearbox via the filler plug to a point where the oil starts to run out of the level plug orifice. Replace both plugs and tighten securely.

SERVICE SCHEDULE

Every Day

- Grease machine fully prior to work (and prior to storage).
NOTE: New machines must be greased before initial use.
- Check for broken or damaged flails.
- Check tightness of flail nuts and bolts.
- Visually check for oil leaks and damaged hoses.
- Check all guards and safety shields are correctly fitted and undamaged.
- Ensure all lights are working and clean.
- Check oil level.
- Clean the cooler matrix, in dusty conditions more frequent cleaning is required.

After initial 50 Hours

- Change gearbox oil.

Every 25 Hours

- Grease PTO Shaft universal joints and tubes.

Every Week

- Check tightness of all nuts and bolts.
- Check gearbox oil level.
- Check for wear on telescopic arm pads – *where applicable*.

Every 100 Hours

- Grease PTO shaft shield lubrication points.

Every 500 Hours

- Change return line filter element (*Every 500 hours or yearly whichever occurs first*).
- Change gearbox oil.
- Check condition of hydraulic oil and change if required; *when changing oil new return line filter and suction strainer elements should be fitted and return line filter changed again after 100 hours of work.*

Annually

- Change tank breather.

Cooler Matrix

To ensure maximum efficiency of the cooling system the cooler matrix must be kept as clean as possible to allow air to flow freely through the unit; this is especially important in dry hot arduous conditions where the matrix can rapidly become blocked by dust causing the machine to overheat.

The unit is best cleaned using a high pressure airline that will clear blocked areas without risk of damage to the matrix.

HYDRAULIC SYSTEM

Oil Supply

Check the oil level in the reservoir daily.

Oil Condition & Replacement

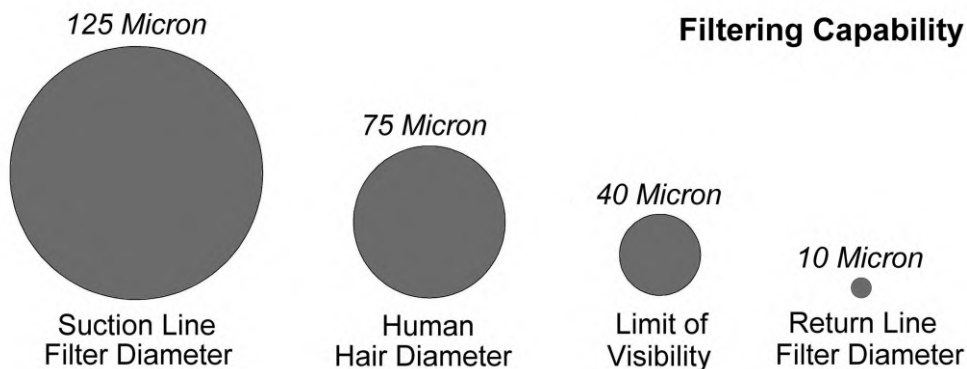
No fixed time period can be quoted for oil changes as operating conditions can vary widely but a visually inspection of the oil will often indicate its current overall state. Signs of a reduction in its condition will be apparent by changes in colour and appearance when compared to new oil. Oil in poor condition can be dark, smell rancid or burnt, or in some cases be yellow, unclear or milky in appearance indicating the presence of air or emulsified water. Moisture resulting from condensation can become entrapped in the oil causing emulsification that can block the return line filter, consequentially the filter system will be by-passed and the oil and any possible contaminants present will continue to circulate without filtration risking damage to hydraulic components. All are indications or conditions that will require replacement of the oil.

Hydraulic oil is a vital component of the machine; contaminated oil is the root cause of 70% of all hydraulic system failures. Contamination can be reduced by the following:

- Cleaning around the reservoir cap before removal, and keeping the tank area clean.
- Use of clean containers when replenishing the system.
- Regular servicing of the filtration system.

Filtration System

Machines are protected by both replaceable 125 micron suction strainers and low pressure 10 micron full flow return line filters – the diagram below is a ‘scaled up’ view illustrating the filtering capability built into the hydraulic system of the machine:



Suction strainers

The replaceable 125 micron suction strainers (*Part No. 8401097*) are fitted within the hydraulic tank and are ‘screw’ fitted with easy access for removal and replacement.

Return Line Filter

The 10 micron absolute filter elements (*Part No. 23371.02*) should be changed every 500 or annually, *whichever occurs first*. It is important to note hours worked as if the filter becomes blocked an internal by-pass within the canister will operate and no symptoms of filter malfunction will occur to jog your memory.

Tank Breather

To reduce the risk of pump cavitation it is advisable to replace the 10 micron absolute tank breather (*Part No. 8401137*) on an annual basis under normal working conditions – for machines operating in dry dusty environments it is recommended that replacement be increased to 6 monthly.

HYDRAULIC HOSES

The condition of all hoses should be carefully checked during routine service of the machine. Hoses that have been chaffed or damaged on their outer casing should be securely wrapped with waterproof adhesive tape to stop the metal braid from rusting. Hoses that have suffered damage to the metal braid should be changed at the earliest opportunity.

Hose Replacement

- Replace one hose at a time to avoid the risk of wrong connections.
- When the hose is screwed to an additional fitting or union, use a second spanner on the union to avoid breaking both seals.
- Do not use jointing compound on the threads.
- Avoid twisting the hose. Adjust the hose line to ensure freedom from rubbing or trapping before tightening hose end connections.

Before changing hoses study the installation, these are carefully calculated to prevent hose damage during operation. Always replace hoses in exactly the same manner. This is especially important for the flail hoses where they must be crossed, upper to lower, at the dipper and head pivots.

All Hydraulic Hoses (BSP) now fitted to McConnel Power Arm Hedge/Grass Cutters have 'Soft Seal' connections on both flail and ram circuit hoses.

Recommended torque settings for nut security are as follows:-

1/4" BSP	=	24 Nm	or	18 lb ft	REF.'O' ring
3/8" BSP	=	33 Nm	or	24 lb ft	10 000 01
1/2" BSP	=	44 Nm	or	35 lb ft	10 000 02
5/8" BSP	=	58 Nm	or	43 lb ft	10 000 03
3/4" BSP	=	84 Nm	or	62 lb ft	10 000 04
1" BSP	=	115 Nm	or	85 lb ft	10 000 05
					10 000 06

For hose unions (BSP) fitted in conjunction with bonded seals the recommended torque settings are as follows:-

1/4" BSP	=	34 Nm	or	25 lb ft
3/8" BSP	=	75 Nm	or	55 lb ft
1/2" BSP	=	102 Nm	or	75 lb ft
5/8" BSP	=	122 Nm	or	90 lb ft
3/4" BSP	=	183 Nm	or	135 lb ft
1" BSP	=	203 Nm	or	150 lb ft

Safety Note

Soft Seal hose connections are capable of holding pressure when the nut is only 'finger tight'; it is therefore recommended that during dismantling, the hose be manually flexed to relieve any residual pressure with the retaining nut slackened, prior to the completing disassembly.

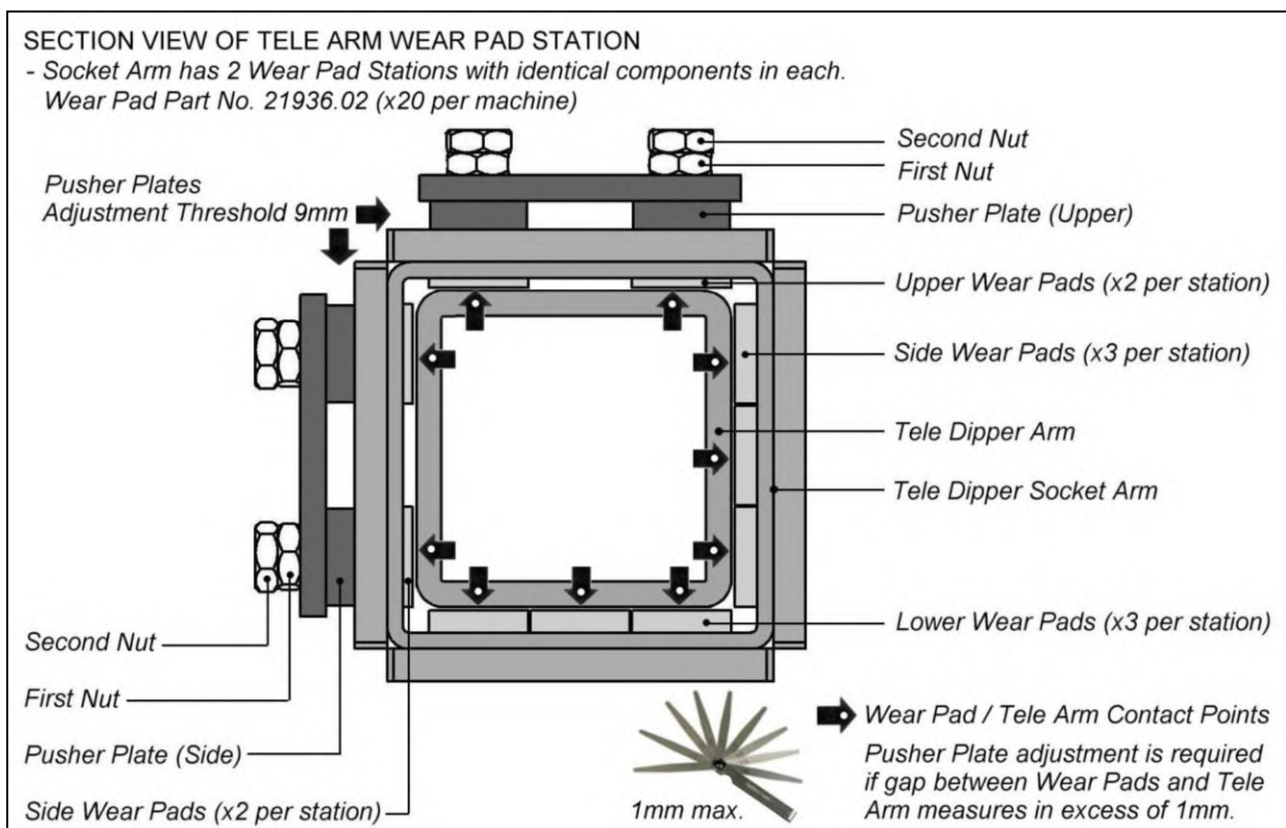
TELE ARM WEAR PADS

Over a period of time during normal use the contact faces of the replaceable wear pads will erode due to friction generated from the sliding surfaces of the tele arm – the wear rate of these nylon compound pads may vary considerably and will be determined by the frequency of use of the telescopic function. To accommodate for pad wear the side and upper pusher plates located at the two wear pad stations on the socket arm will each offer approximately 9mm of adjustment.

Wear of the pads should be checked on a regular basis by measuring the gap between the pads and the tele arm using a feeler gauge at the open end of the socket arm - if the gap is in excess of 1mm the pusher plates will need to be adjusted. *NOTE: The telescopic arm should be fully retracted before attempting to loosen or adjust the pusher plates.*

Wear pads will need replacing when their respective pusher plate comes into contact with the outer arm and no further adjustment is possible – *always replace the pads in opposing sets.*

Refer to the following sections for details of wear pad installation and adjustment.



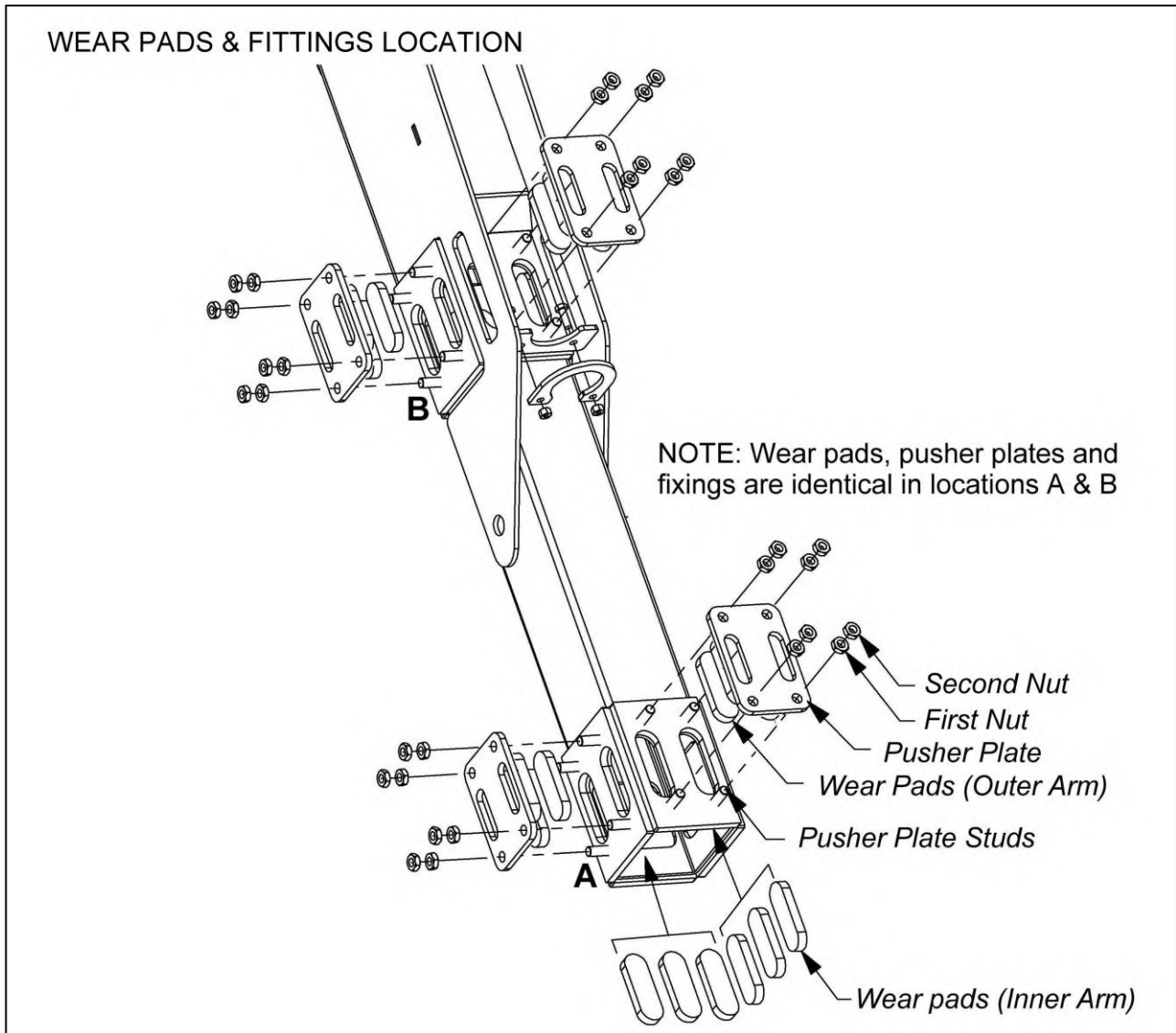
Wear Pad Installation

Replacement of the tele arm wear pads will necessitate the removal of the following components in order to remove the tele dipper arm from the dipper arm socket:

- Removal of the flail head.
- Disconnection of the flail head hoses from the angling gear.
- Removal of the lower end fixings of the rigid flail pipes.
- Disconnection of the angling ram's hoses.
- Removal of the tele ram (piston rod end) from the tele dipper arm.
- Release of the pusher plates and withdrawal of the tele dipper arm from its socket.

With the dipper arm socket and telescopic dipper separated coat the inner surfaces of the socket arm and outer surfaces of the tele arm with wax oil prior to re-assembly this will serve to both protect and lubricate the arms - this procedure should be performed in a clean and dry dust free environment to ensure the lubricated sliding surfaces of the arms do not become contaminated by dirt, grit or moisture.

Prior to insertion of the tele dipper into the socket arm the 12 inner wear pads should be assembled within the dipper arm socket – 6 are located midway within the arm and 6 are located at the 'open' end of the arm, in both locations the pads are fitted in sets of 3's to the both the lower and one side surface of the arm (when viewed from the 'open end' of the arm these side surfaces will be to the right hand side on left hand machines and the left hand side on right hand machines). *Note: A few 'dabs' of grease placed on the backs of inner wear pads will help to keep them in position during the assembly procedure.*



The tele arm may now be inserted into the socket arm (care should be adopted to avoid dislodging the inner wear pads), slide the tele arm into the socket to its furthest point. Place the outer wear pads (8 in total) into their slots in the socket arm and fit the pusher plates over the studs and retain 'loosely' in place with the first set of nuts.

Adjustment

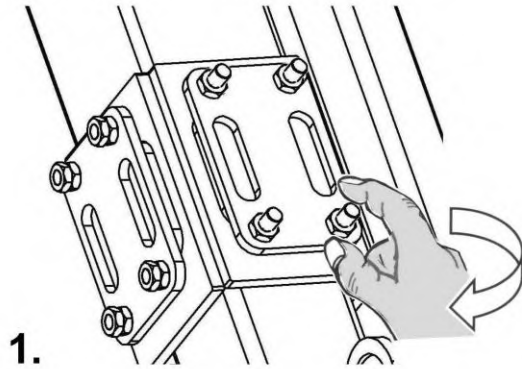
When all pads and pusher plates have been located correctly tighten each set in a cross sequence to a torque setting of 20 Nm. When they have all have been tightened they should then be 'slackened back' by 1/2 a turn; *the tele arm will now be held securely in place but capable of being slid with a slight degree of effort.* Assemble the second set of nuts on the studs and evenly tighten them against the first set to a torque setting of 50 Nm.

NOTE: When tightening second sets of nuts the first nuts should be held in position with a spanner to ensure their correct torque setting is retained.

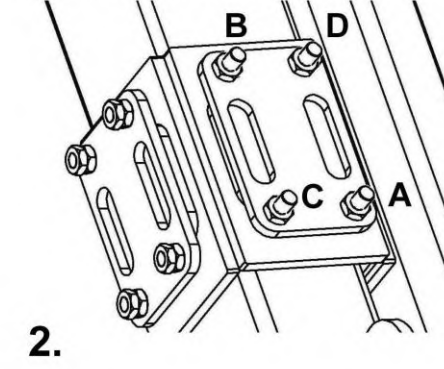
The tele arm should now be extended out to its furthest point and a coating of good quality agri-grease applied to its sliding surfaces. Re-attach all components previously removed to complete the job.

WEAR PAD PUSHER PLATE ADJUSTMENT

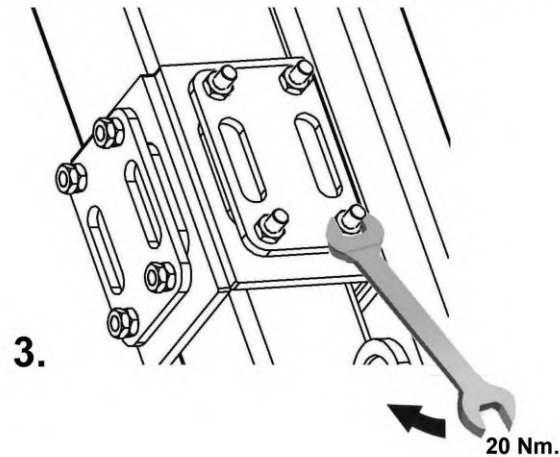
Fit all sets of first nuts finger tight



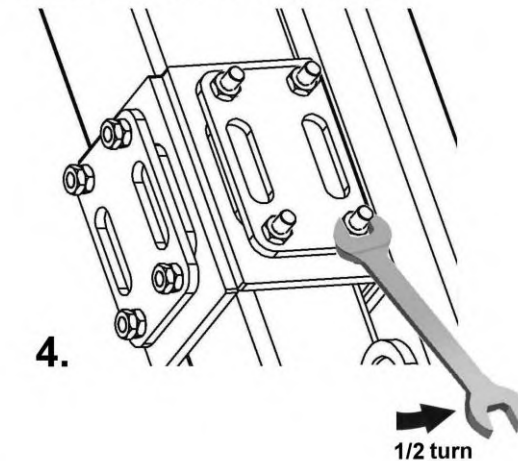
Tighten pusher plates in a cross sequence



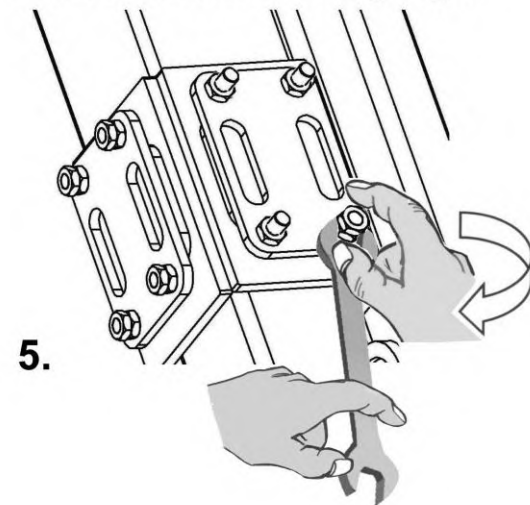
Evenly torque all sets of first nuts to 20 Nm.



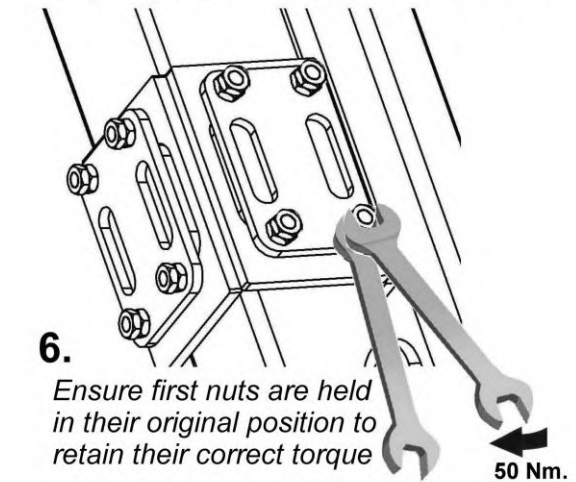
Slacken off each set by 1/2 turn



Fit all sets of second nuts finger tight



Evenly torque second sets of nuts to 50 Nm.



PTO SHAFT

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.*



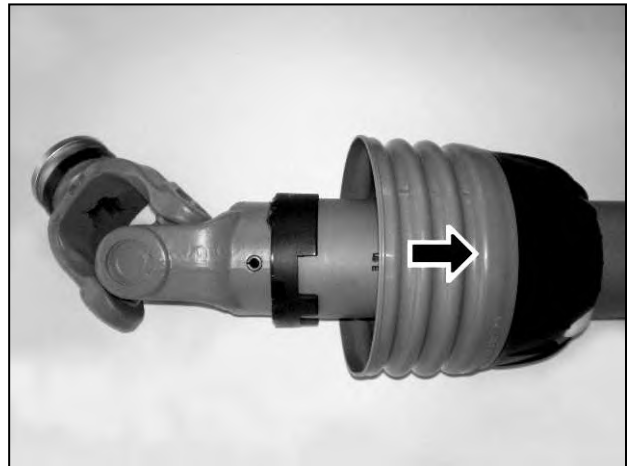
Shaft shield fixing clasps



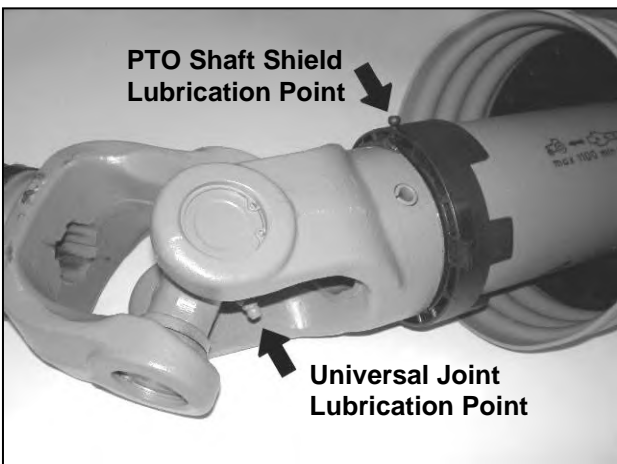
Insert screwdrivers into the clasps



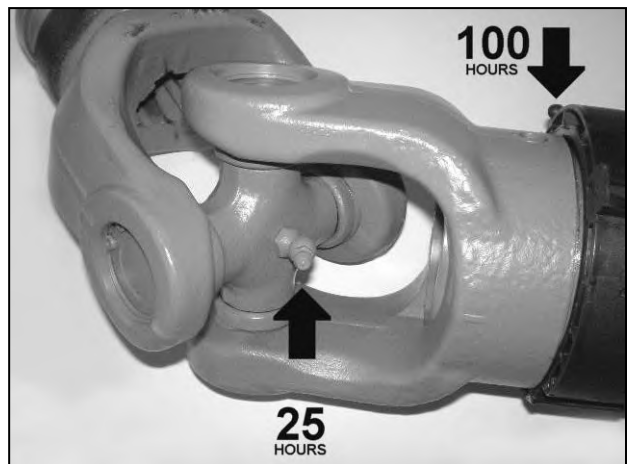
Prise clasps open to release the shield



Slide shield back to reveal universal joint



Location of lubrication points



Recommended lubricating frequency

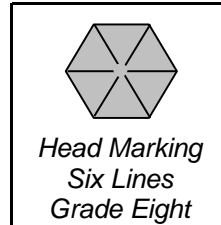
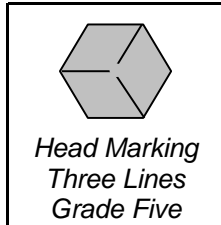
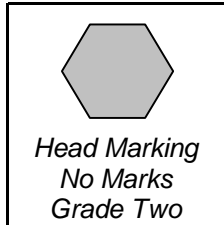
Slide the shaft shield back into place after lubrication ensuring the clasps relocate correctly in the fixing ring – always fit torque chains to the shields to stop them from rotating with the shaft during operation.

TORQUE SETTINGS FOR FASTENERS

The chart below lists the correct tightening torque for fasteners. This 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.

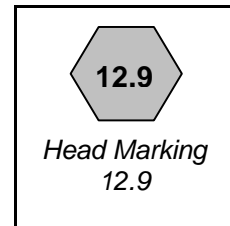
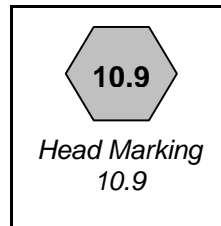
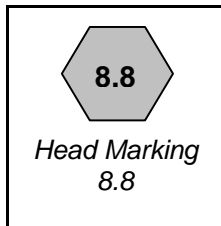
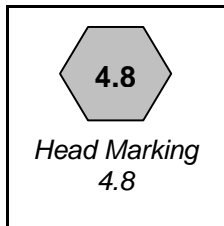
Bolt Dia.
1/4"
5/16"
3/8"
7/16"
1/2"
9/16"
5/8"
3/4"
7/8"
1"
1-1/8"
1-1/4"
1-3/8"
1-1/2"

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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