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# PA55 *Mk2*
# PA60 *Mk2*
# PA65T
# PA70T

Operator Manual


# IMPORTANT

## VERIFICATION OF WARRANTY REGISTRATION

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

To register machines go to the McConnel Limited web site at **www.mcconnel.com**, log onto '**Dealer Inside**' and select the '**Machine Registration button**' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.
Should you experience any problems registering a machine in this manner please contact the McConnel Service Department on 01584 875848.

**Registration Verification**

Dealer Name: ……

Dealer Address: ……

Customer Name: ……

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

**NOTE TO CUSTOMER / OWNER**
*Please ensure that the above section above has been completed and signed by the selling dealer to verify that your machine has been registered with McConnel Limited.*

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

**TORQUE SETTINGS FOR HYDRAULIC FITTINGS**

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

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

# WARRANTY POLICY

## WARRANTY REGISTRATION

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

### 1. LIMITED WARRANTIES

1.01. All machines supplied by McConnel Limited are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.

1.02. All spare parts supplied by McConnel Limited are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months.

1.03. The manufacturer will replace or repair for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined.

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

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

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

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

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

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

1) Hoses, external seals, exposed pipes and hydraulic tank breathers.
2) Filters.
3) Rubber mountings.
4) External electric wiring.

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

## 2. REMEDIES AND PROCEDURES

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

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

2.03. Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by McConnel Ltd.

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

2.05. Following examination of the claim and parts the manufacture will pay, at their discretion, for any valid claim the cost of any parts and an appropriate labour allowance if applicable.

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

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

## 3. LIMITATION OF LIABILITY

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

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

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

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

## 4. MISCELLANEOUS

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

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

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

# EC DECLARATION OF CONFORMITY

*Conforming to EEC Machinery Directive 98/37/EC**

We,

**McCONNEL LIMITED,**
Temeside Works, Ludlow, Shropshire SY8 1JL.

*Declare under our sole responsibility that:*

The product *(type)* Tractor Mounted Hedge / Grass Mower……..

…….

Product Code ..PA55, PA60, PA65T, PA70T……..

Serial No. & Date ……. Type ……

Manufactured by the above company/* ……..

…….

*(* insert business name and full address if not stated above)*

Complies with the required provisions of the Machinery Directive 98/37/EC, * previously Directive 89/392/EEC as amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC.
The machinery directive is supported by;

- BS EN ISO 12100:2003 Safety of Machinery. This standard is made up of two parts; Part 1 Terminology, methodology, Part 2 Technical Specifications.
- BS EN 1050 Safety of machinery - Principles of risk assessment.
- and other national standards associated with its design and construction as listed in the Technical File.

The Machinery Directive is fully implemented into UK law by means of the Supply of Machinery (Safety) Regulations 1992 (SI 1992/3073) as amended by The Supply of Machinery (Safety) (Amendment) Regulations 1994 (SI 1994/2063).

Signed ……..……...
*on behalf of McCONNEL LIMITED* *Responsible Person*

*Status:* Chief Design Engineer *Date:* June 2009

*For best performance…*

# USE ONLY McCONNEL SERVICE PARTS

To be assured of the latest design improvements purchase your **'Genuine Replacements'** from the **Original Equipment Manufacturer**: **McCONNEL LIMITED** through your local Dealer or Stockist.




**GENUINE PARTS ~ QUALITY SERVICE**

# LIST OF CONTENTS

# Notes

# READ THE BOOK FIRST

***It might save hours and pounds later !***

*When ordering spare parts always quote*

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

*Factory re-built service exchange units of the major hydraulic components are available from your Dealer*

# NOISE

*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 equivalent daily noise exposure levels of between 85 and 90 DB, ear protection is recommended, it should be used if any window is left open.*

# GENERAL INFORMATION

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

**Use only McConnel Genuine Parts on McConnel equipment and machines.**

DEFINITIONS The following definitions apply throughout this manual:

## WARNING:
An operating procedure, technique etc., which can result in personal injury or loss of life if not observed carefully.

## CAUTION:
An operating procedure, technique etc., which can result in the damage of either machine or equipment if not observed carefully.

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

## LEFT AND RIGHT HAND:
This term is applicable to the machine when fitted to the tractor and viewed from the rear. This also applies to tractor references.

### MACHINE & DEALER INFORMATION

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

# FEATURES

**PA55, PA60, PA65T & PA70T – *all models***

- *Linkage mounted.*
- *Right or Left hand cutting.*
- *Front, Rear and Reverse Drive models.*
- *Cast iron gearbox.*
- *Operator guard.*
- *Hydraulic breakaway.*
- *108° powered slew.*
- *200 Litre hydraulic reservoir.*
- *Choice of Flailheads.*
- *65HP Hydraulic System*

**PA55, PA60, PA65T & PA70T TI**

- *Totally Independent Hydraulics - powered by tandem PTO pump.*
- *Independent reversible rotor on/off valve.*
- *65HP Hydraulic System.*
- *Cable Controls.*
- *Head Angle Float.*

**PA55, PA60, PA65T & PA70T E**

- *Totally independent hydraulics powered by tandem PTO pump.*
- *Independent reversible rotor on/off valve.*
- *Solenoid operated controls.*
- *Choice of 'Multi switch' or 'Joystick' controls.*
- *65HP Hydraulic System.*

**PA65T & PA70T**

- *Telescopic Dipper Arm*

**OPTIONAL EXTRAS**

- *Lift Float – available for all models.*
- *Electric Rotor Control – available for Electric models and above.*
- *Proportional Builds c/w Power Monitor.*
- *Proportional EDS Build.*

# SAFETY INFORMATION

# SAFETY INFORMATION

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 this machine, read and understand the following section to ensure that 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 a fault being detected with the machine's operation it should 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 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 uses a machine until you have read and understood the operator handbook, are familiar with, 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.*

## FRONT MOUNTED MACHINES – Additional Safety Advice

During transportation and operation of 'Front-Mounted Machinery', the operator should be reminded that the machine is located further away from his point of vision than a rear mounted machine, and in many cases the immediate work area is out of view. Additional care should therefore be applied whilst working with machinery of this nature. The intended work area should be thoroughly scrutinised immediately prior to work to check for potential hidden hazards and dangers, bearing in mind that these many not be identifiable from the operating position on the tractor. Removable objects that may cause a hazard should be removed from the work area and any fixed hazards should be clearly indicated with a visible marker that can easily be seen from the operating position.
The operator should also be reminded that rotating cutting heads will throw debris either forwards or rearwards - dependent upon the nature of the job - it is therefore vital that suitable safety guarding is fitted where danger to the operator, bystanders or property exists. Tractor windows should be protected with suitable materials of the correct specification to ensure the safety of the operator whilst allowing good all round visibility without impairing the functions of the tractor. Any side guarding fitted to the tractor to protect it from thrown debris should be fitted in such a way that it does not further obscure the operators vision of the machine or the working area. – *Contact your tractor manufacturer or local dealer for advice on this subject.*

## LIGHTING KITS

For added safety, the following Lighting Kits are available for this machine:

***Rear Mount Lighting Kit*** *(Part No. 7155719)*
***Front Mount Lighting Kit*** *(Part No. 7452774)*

NOTE: The front mount headlights are fully adjustable to suit differing conditions. It is the responsibility of the operator to ensure that they are correctly adjusted and are used within the confines of the law when working or transporting on a public highway, and that they do not impede the vision of, or cause hazard to, other road users - *Contact the Department of Transport or your Local Highways Authority to obtain detailed information on this subject.*

## 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-authorised 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 sign with supplementary* ***"Single file traffic"*** *plate.*

*White on blue* ***"Keep right"*** *arrow sign on rear of machine.*

**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 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.*

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

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**MINIMUM TRACTOR WEIGHTS** - *including ballast weight if necessary.*
PA55 Model – 3500kg
PA60 Model – 3600kg
PA65T Model – 4000kg
PA70T Model – 4500kg

**MINIMUM HP REQUIREMENTS:**
All models – 65HP

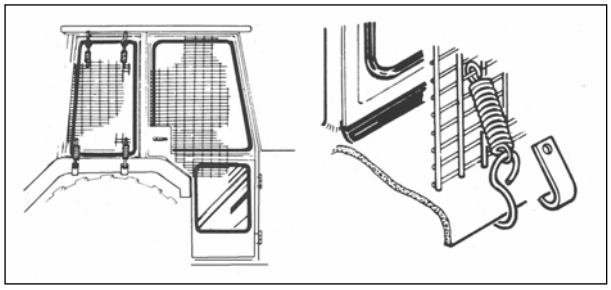
**LINKAGE:**
Category 2

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

**CHECK CHAINS/STABILIZERS:**
Check chains or stabilizers must be fitted and tightened.

**FRONT MOUNTED MODELS**
Before fitting a front mounted machine to your tractor, seek advice from the tractor manufacturer or dealer regarding its suitability and additionally any 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 effect 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:**

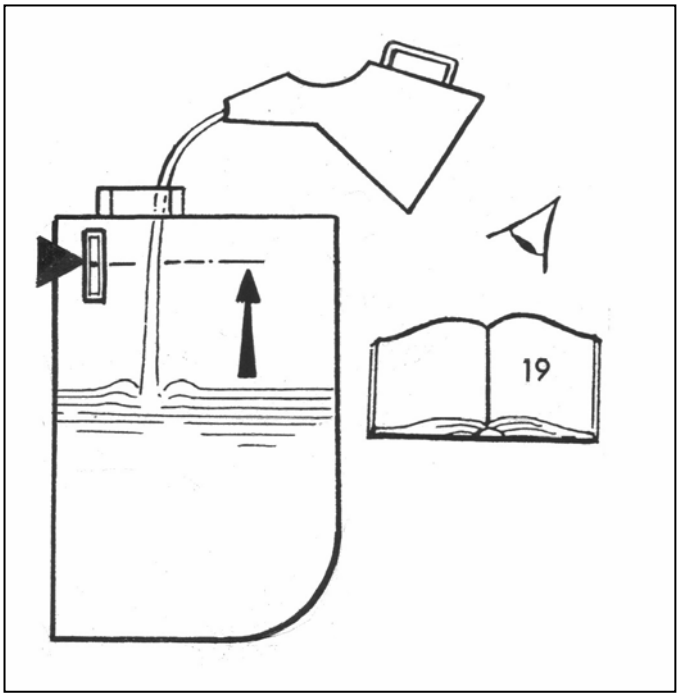
- *Increasing rear wheel track; a vehicle with a wider wheel track is more stable.*
- *Ballasting the wheel; it is preferable to use external weights but liquid can be added to around 75% of the tyre volume – water with anti-freeze or the heavier Calcium Chloride alternative can be used.*
- *Addition 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.**

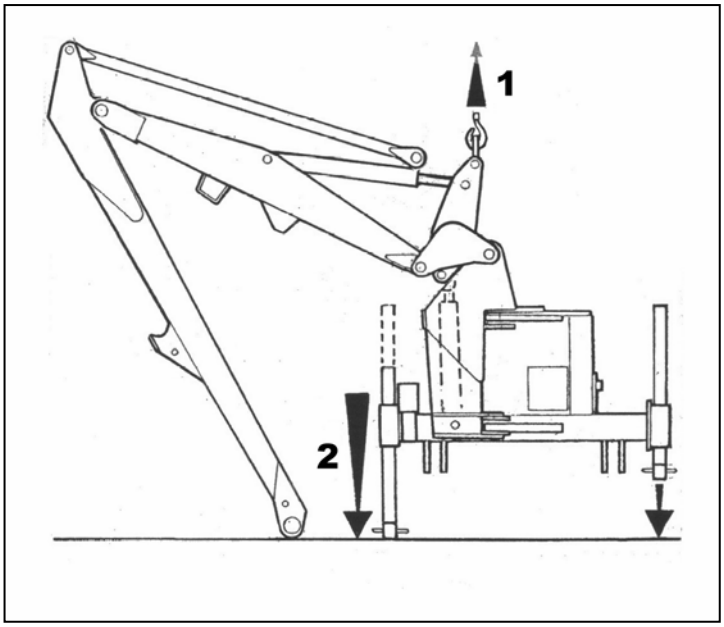
# INITIAL ATTACHMENT TO TRACTOR

The machine will be delivered in a partially dismantled condition, secured with transport strap and banding.

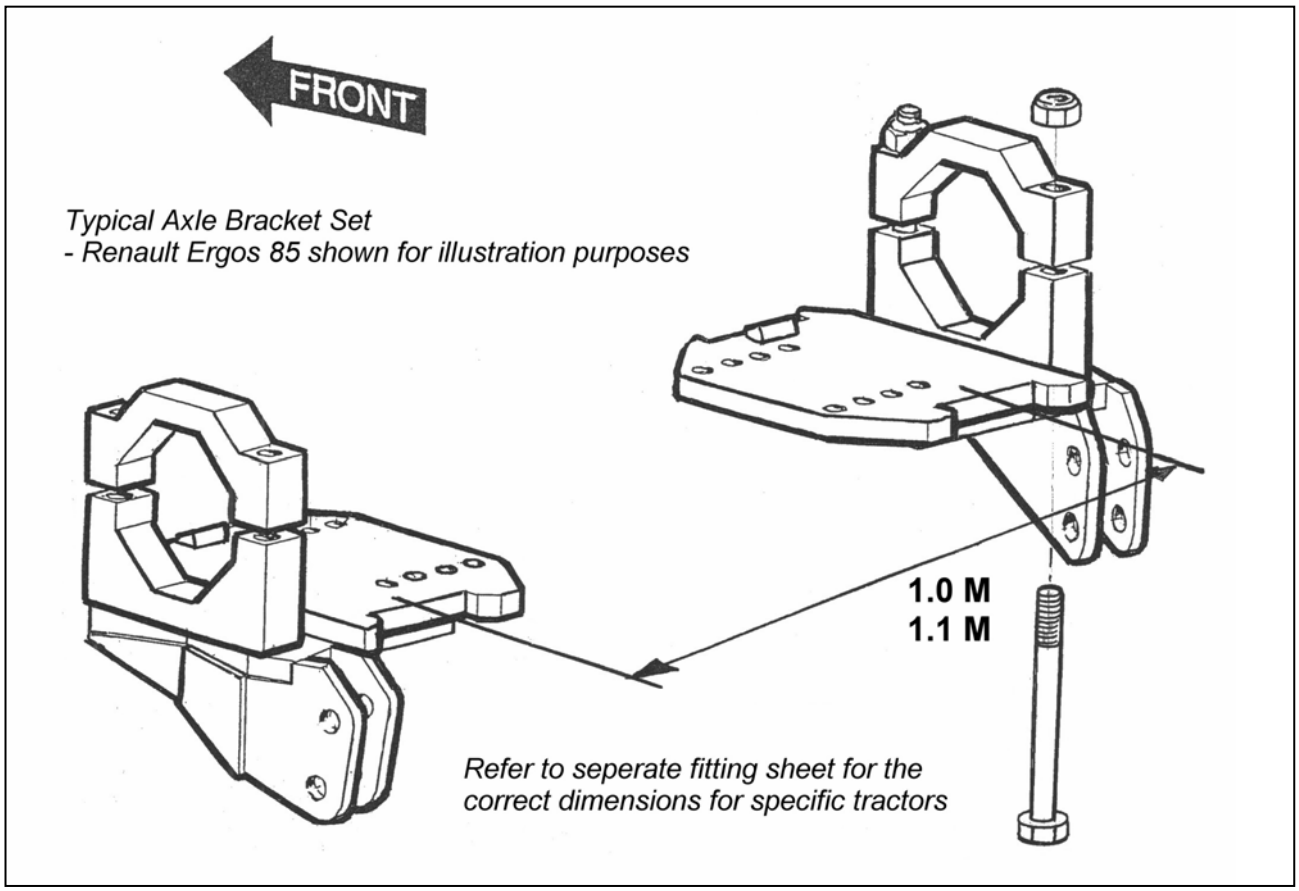
- Choose a **firm level site**.
- Remove the transport strap, banding straps and loose items.
- Fill tank with oil – *refer to page 28 for a list of recommended oils.*




- Raise the machine using overhead lifting equipment with a minimum capacity of 1500kg SWL. **LEAVE IN POSITION AT THIS STAGE.**
- Lower the legs and pin in position selecting the holes that position the machines gearbox stub shaft approx. 75 mm below the tractors P.T.O. shaft.
  ***Note: Leg pin position used.***
- Unbolt stabiliser from machine and remove the stabiliser nose quadrant pin.



## AXLE BRACKET/CATCH ASSEMBLY – Fitting by Dealer

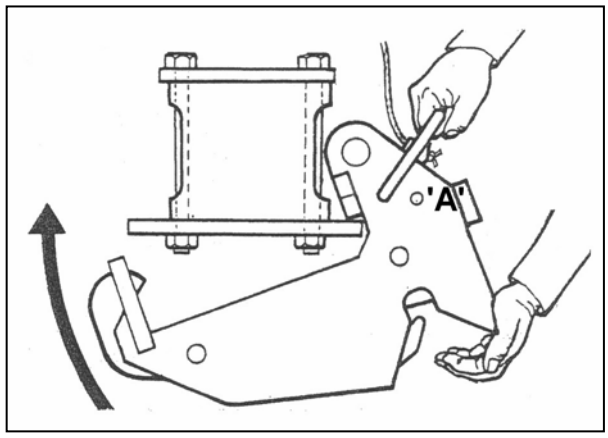



Bolt axle plates to the tractor axle at either 1.0M or 1.1M apart - this may necessitate the to removal of the tractor's check chains and/or assister ram brackets, if this is the case the axle plate will include replacement brackets for these functions.

The axle brackets supplied will be accompanied by a fitting sheet with instruction for their attachment to your tractor, follow the instructions exactly as they are specific to your particular make and model of tractor. Replace assister ram(s) if fitted.

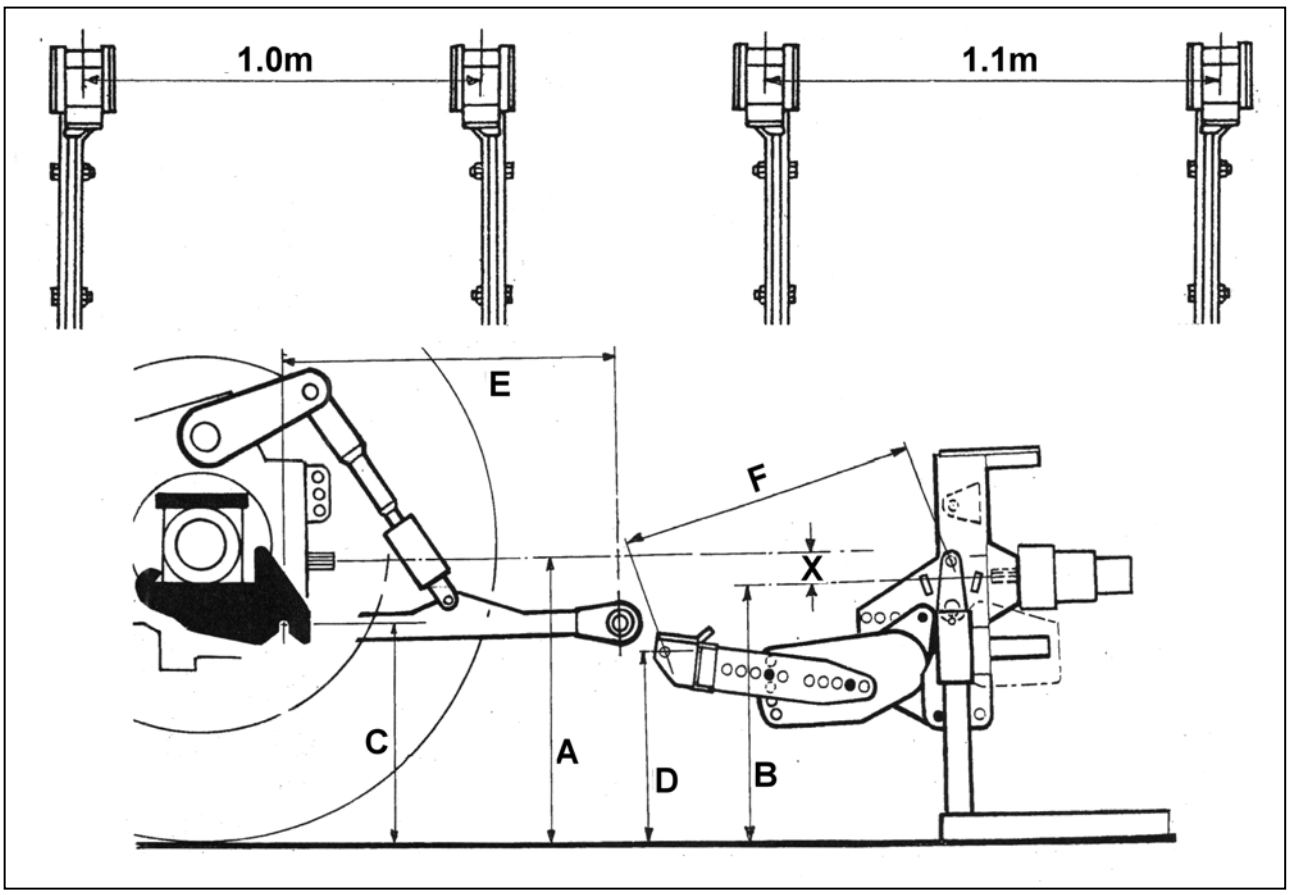
Hook the catch assemblies onto the rear of the axle plates, push firmly against the plate and vigorously pivot the catch in a forward and up direction until the spring loaded hook 'snaps' into position. Pass the release cords up into the cab.

**NOTE:**
*On some tractors fitted with auxiliary fuel tanks, there is insufficient space for the spring catches to be fitted, in these instances special axle brackets and catches with a 'pin on' facility are available on request.*

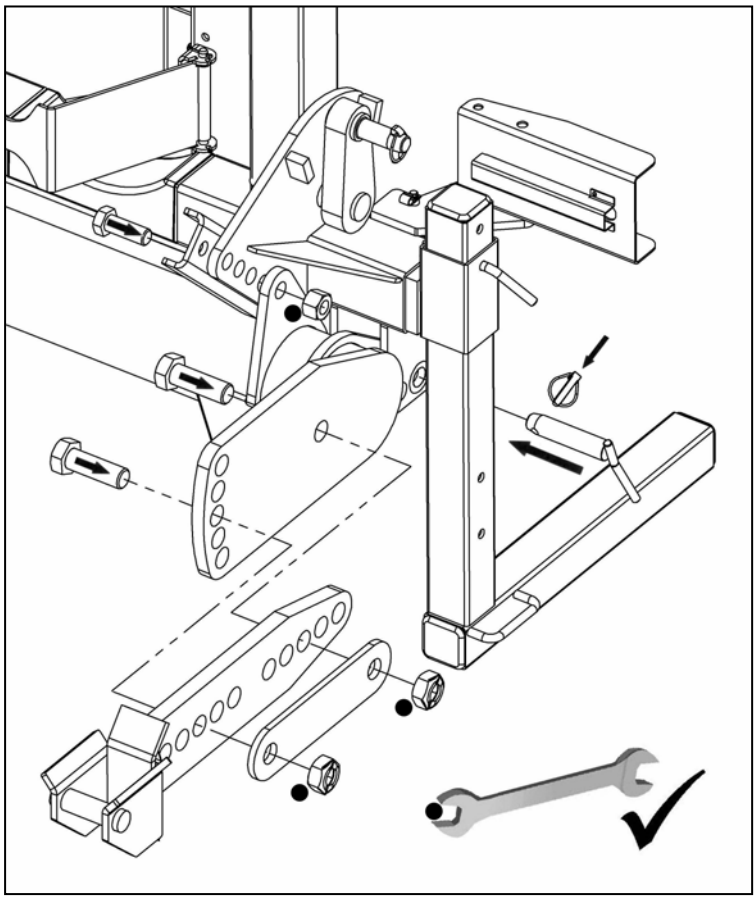


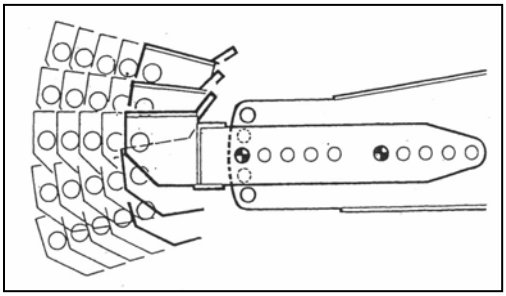

***Ensure catch-locking pin 'A' is removed.***

## STANDARD TYPE BRACKETS




Locate axle-mounting arms onto the mainframe and secure in position using the correct nuts and bolts supplied, tighten nuts when correct hole location has been selected - *see below for details on mounting hole selection.*





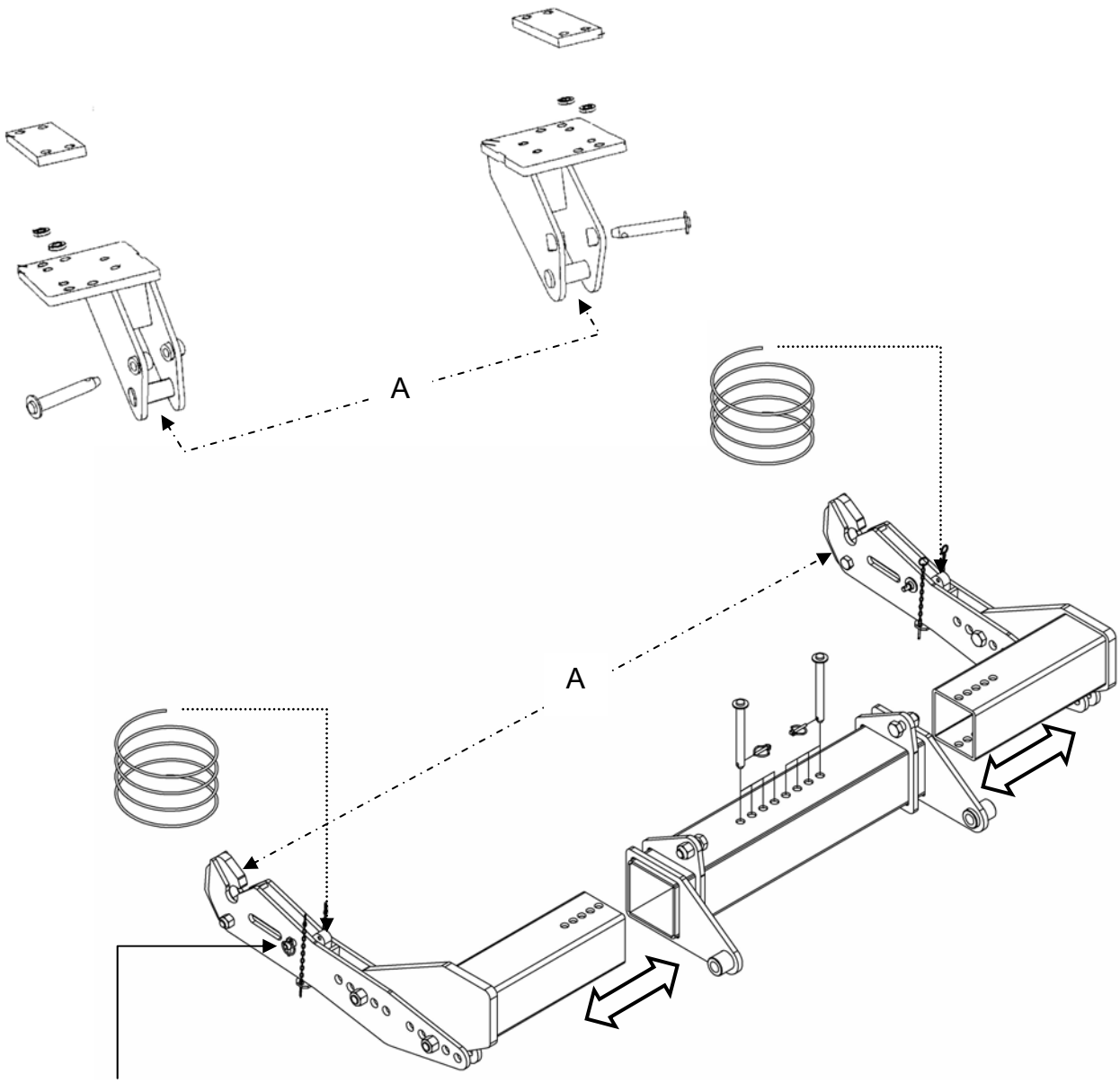
With the frame in the vertical position, measure dimensions 'A' and 'B', subtract 'B' from 'A' to obtain measurement 'X'. Measure dimension 'C'.

Select mounting holes which position the mounting bars in the end of the latch arms so that dimension 'D' equals dimension 'C' minus measurement 'X' and also when the draft link is horizontal and the rocking draft pin is in the upright position dimensions 'E' and 'F' are equal.

**Frame Adjustment**

Measures the distance between the centres of the existing brackets fitted to the tractor's axle and adjust the frame (by equal amounts each side) to the same width by sliding the outer mounts within the frame, secure in position with the pins provided – *see diagram below.*

Attach cords to latches at the positions indicated to assist future removal of the frame – stow cords neatly where they will not 'foul' any components or moving parts.

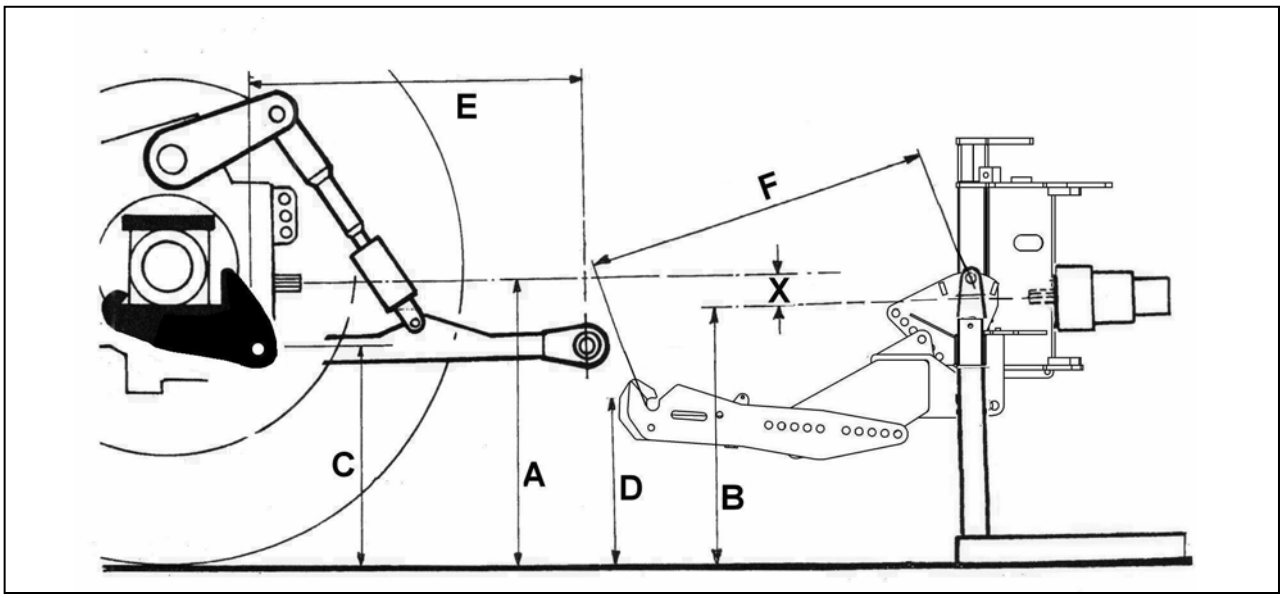


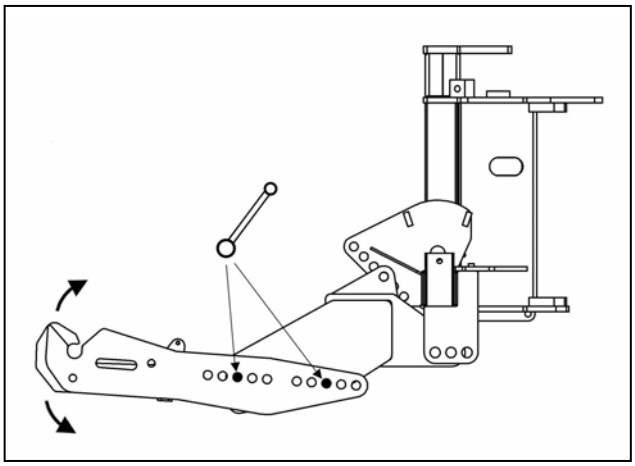

*Pins illustrated in the locked position – pins should be removed only for attachment or removal of the brackets, once brackets are connected the pins must be replaced to lock the latches in place.*

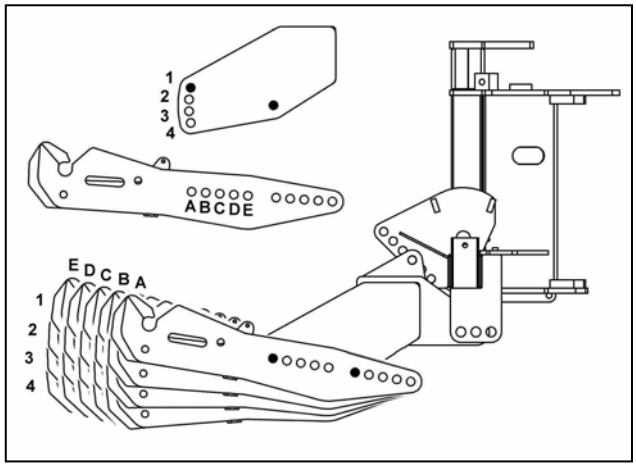
*Note: locking pins are located through the arms and above the latches.*

The correct mounting position is determined by the formula outlined below -
*Note: in some cases certain tractors have a low PTO and/or small wheels and therefore have limited ground clearance, where this is the case, the operator must decide what is sufficient ground clearance for his needs; where there is insufficient ground clearance the latch arms can be pivoted down to a lower position. When doing this be aware that it will cause the PTO shaft to become mis-aligned - Ensure you do not exceed the angular mis-alignment allowed by the PTO shaft manufacturer and remember that this will reduce the working life of the shaft, increase noise and cause vibration.*

## ALTERNATIVE TYPE BRACKETS

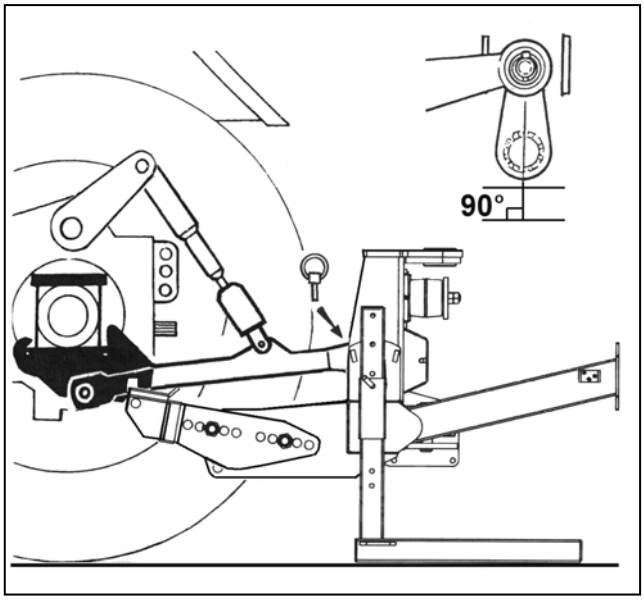


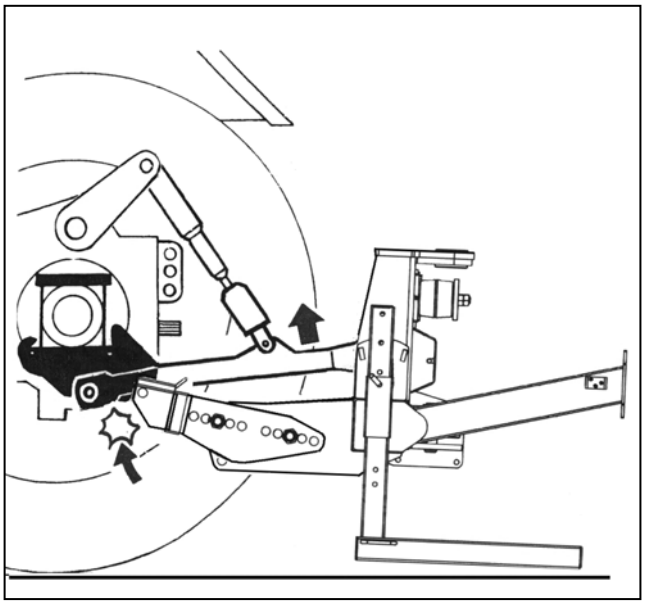



With the frame in the vertical position, measure dimensions 'A' and 'B', subtract 'B' from 'A' to obtain measurement 'X'. Measure dimension 'C'.
Select mounting holes which position the mounting bars in the end of the latch arms so that dimension 'D' equals dimension 'C' minus measurement 'X' and also when the draft link is horizontal and the rocking draft pin is in the upright position dimensions 'E' and 'F' are equal.

Reverse tractor squarely into position adjacent to the machine and connect the draft links to the machine - *manoeuvre tractor until both draft pin rockers are vertical.*



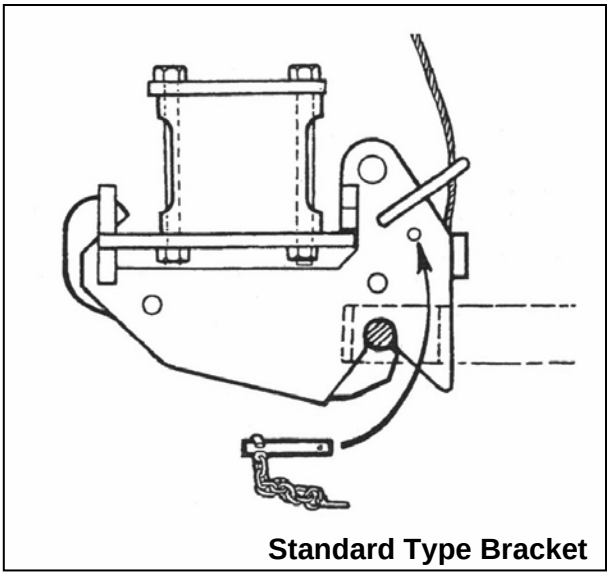

Raise the machine on the tractors linkage sufficient only for the latch bar to fully engage in the axle catch.



**WARNING!**
**The quadrant lever or machine controls must only be operated from the tractor seat. Ensure no one is standing close to or within the linkage arms or bars.**

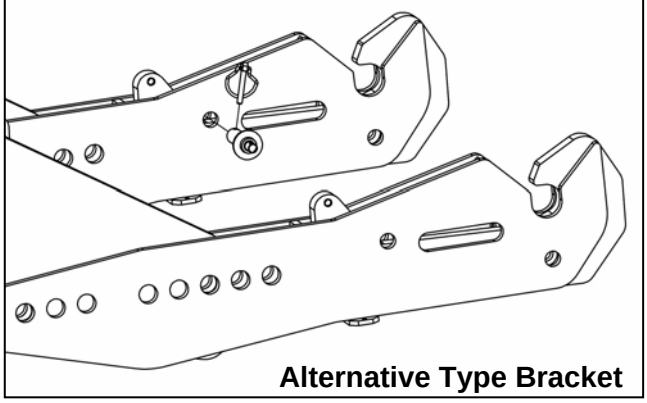
**NOTE:**
***Be aware - as lift occurs the machinery may tilt slightly.***

Insert catch lock pins – *refer to diagrams below for specific type*



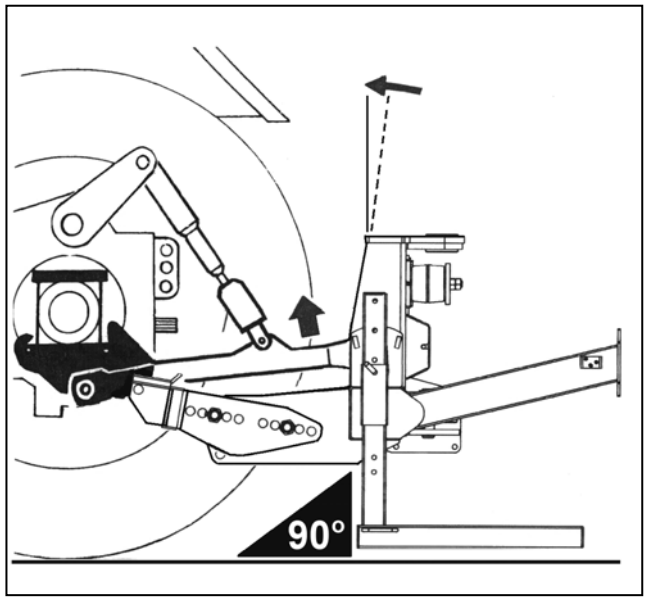
**Standard Type Bracket**

**Locking Pins on this type of bracket pass through the arms above the latches and are secured with lynch pins.**

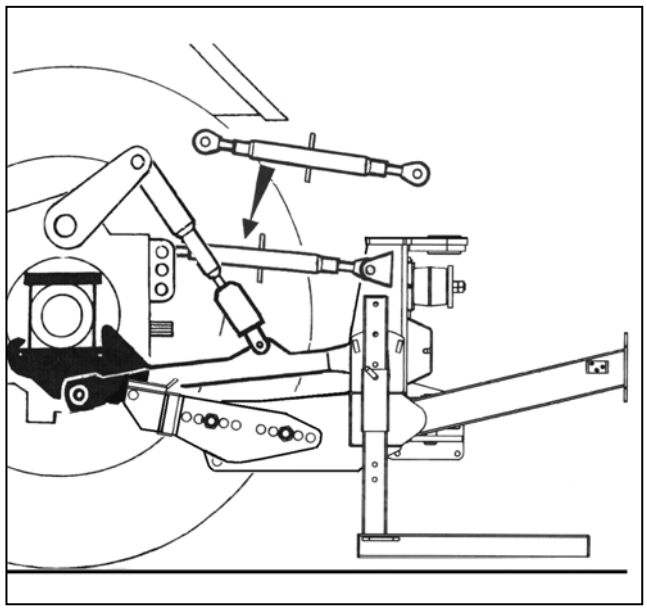


**Alternative Type Bracket**

Raise the machine on the tractors linkage until the frame is vertical.

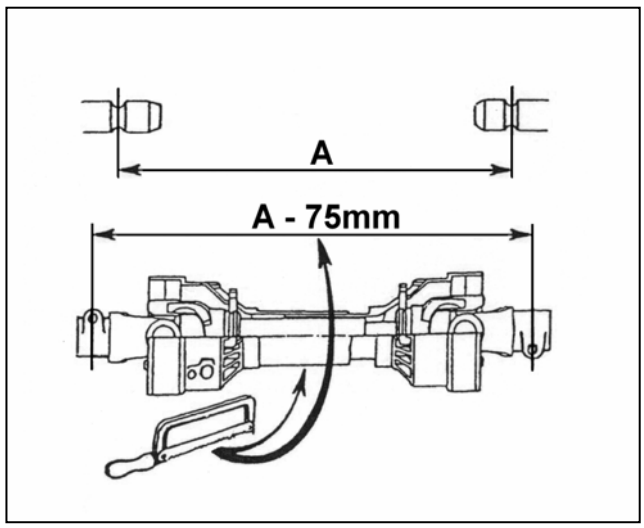



Fit top link.



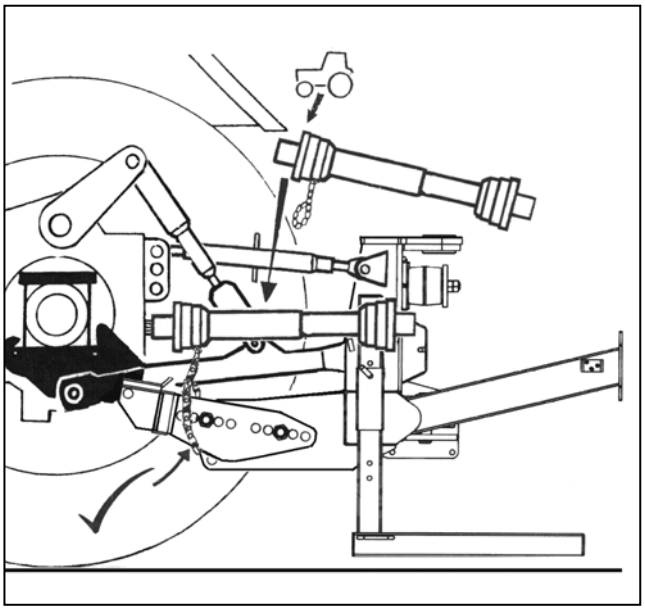
Measure PTO shaft and cut to dimension shown (distance 'A' minus 75mm) - *see diagram opposite and refer to maintenance section for further details.*

NOTE:
*For subsequent use on a different tractor measure again - there must be a minimum of 6" (150mm) of shaft overlap.*

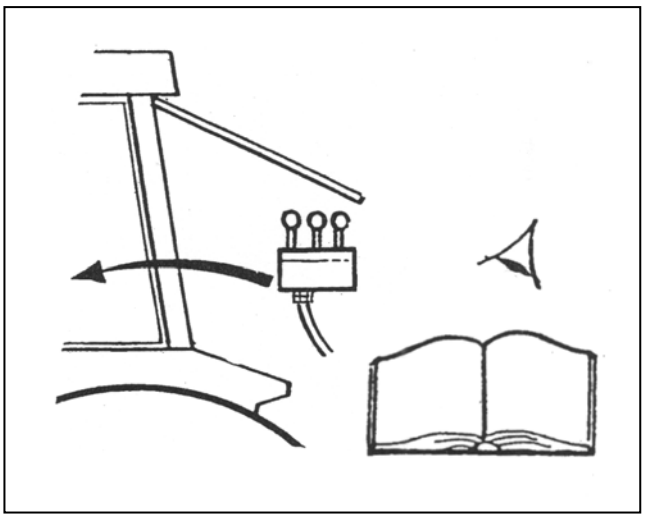


Fit PTO shaft into position.

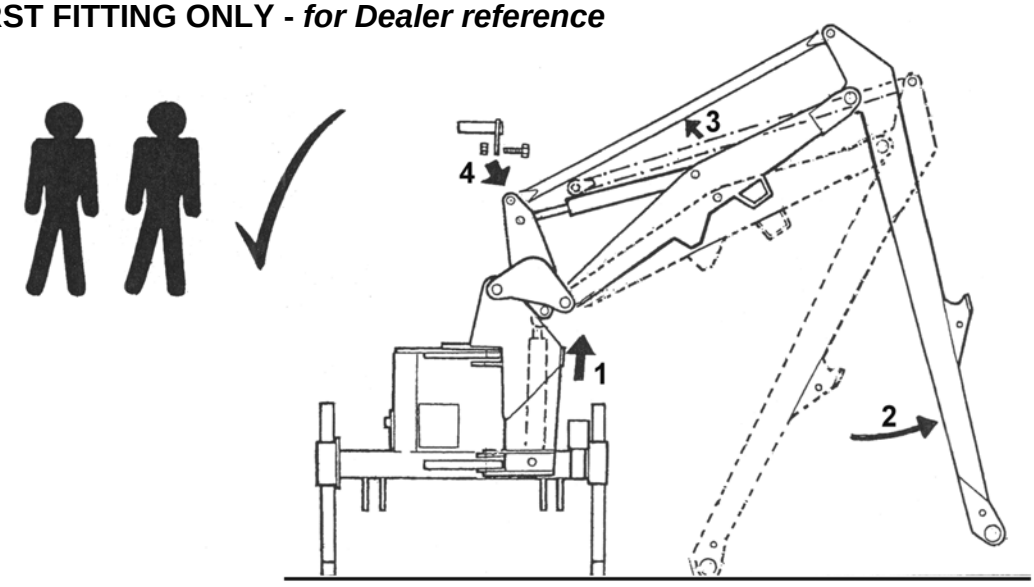
Attach the torque chains to a convenient location to prevent rotation of the shaft guards.



Fit machine controls into the cab - *refer to the specific page on this subject for further details.*

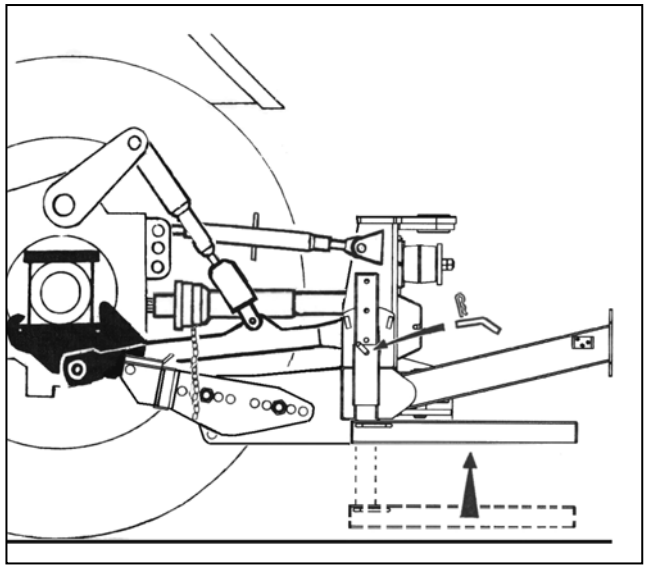


**FIRST FITTING ONLY - *for Dealer reference***




- **Request assistance**.
- Operate 'Lift up' on machine controls sufficient only for the dipper arm to clear the ground.
- Pivot out the dipper until the tension link can be reconnected.

Raise the stand legs into the work position and secure with their pins - *see diagram opposite.*



Tighten check chains and/or stabiliser bars.

The machine should now be carefully operated throughout its full range of movements to check hoses are not being strained, pinched, chafed or kinked, and that all movements are functioning correctly.

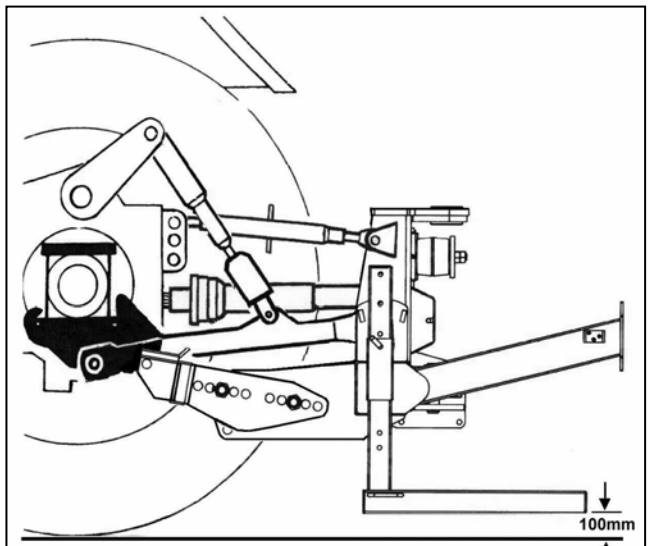
The machine can now be folded into the transport position ready to proceed to the work site - *Refer to the section on Transport Position for details on this subject.*

**REMOVAL FROM TRACTOR**

Select a firm safe site to remove the machine

Locate parking legs into their housings.

*NOTE:* The correct, and most stable, position for removing the machine from the tractor is with the arm positioned to the rear of the machine.




**Locate parking legs into their housings.**

Position the flail head on the ground directly to the rear of the machine at approximately half reach.

Disengage PTO.

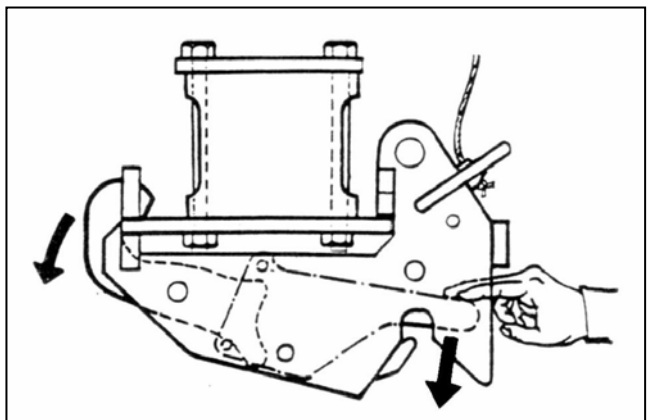
Remove latch security pins.

Take machine weight on draft links sufficient only to allow the top link to be disconnected.

Open axle catches using the release cord and lower the machine.

Disconnect draft links and remove the PTO shaft.

Remove control units from the tractor cab and stow clear of the ground in a location where they are protected from the weather or risk of accidental damage.



**Remove the axle catches from the tractor.**

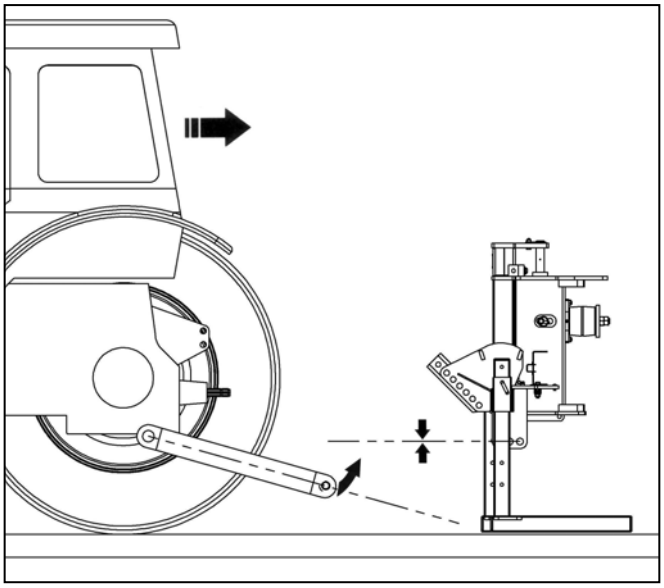
Drive tractor away from machine.

Replace check chains / stabiliser bars
– The axle plates can remain permanently in position.

**STORAGE**

*If the machine is to be left standing for extended periods of time, lightly coat the exposed portions of the ram rods with grease. Subsequently this grease should be wiped off before the rams are next moved. If the machine is to be stored outside tie a piece of tarpaulin or canvas over the control assembly -* ***do not use a plastic bag*** *as this can lead to corrosion in the unit.*

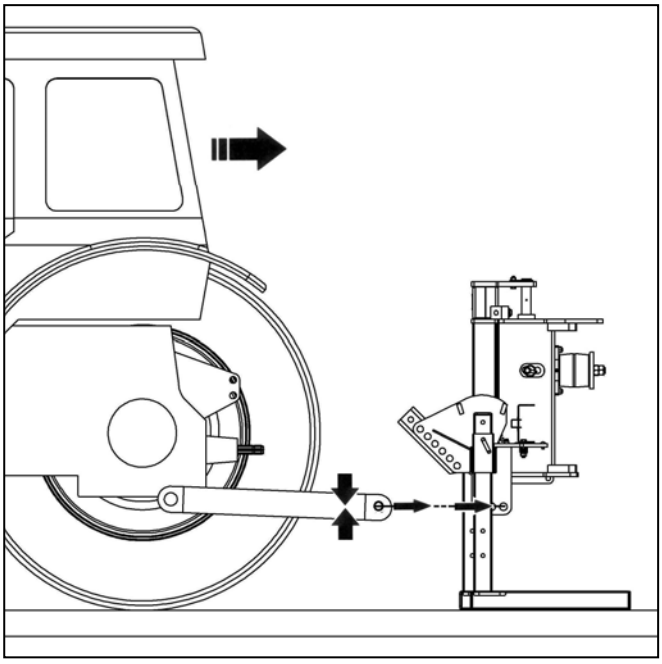
With the machine positioned on a firm level site and securely supported, manoeuvre the tractor squarely up to the machine.



Set the tractor's draft links to a height level with the machines lower link brackets and carefully reverse the tractor to a point that allows attachment of the lower links.

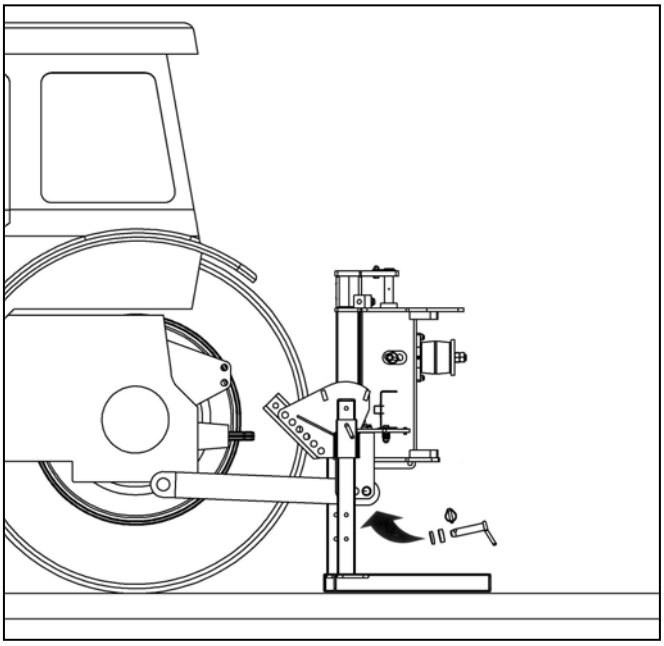
NOTE: *The hole selected on the lower link bracket should be the rear most that permits the machine to be mounted without fouling the tractor.*

Ensure the same hole position is selected both sides of the machine.

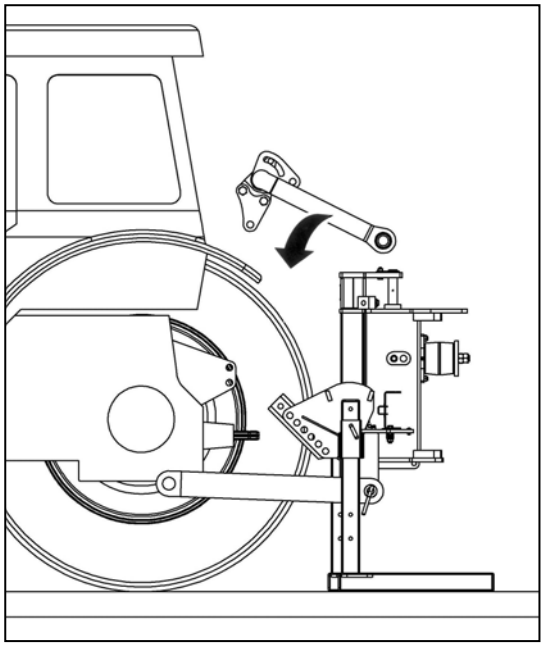


Insert lower linkage pins and spacers and secure in position with lynch pins.

ANY LIFTING EQUIPMENT USED TO POSITION THE MACHINE MAY NOW BE REMOVED

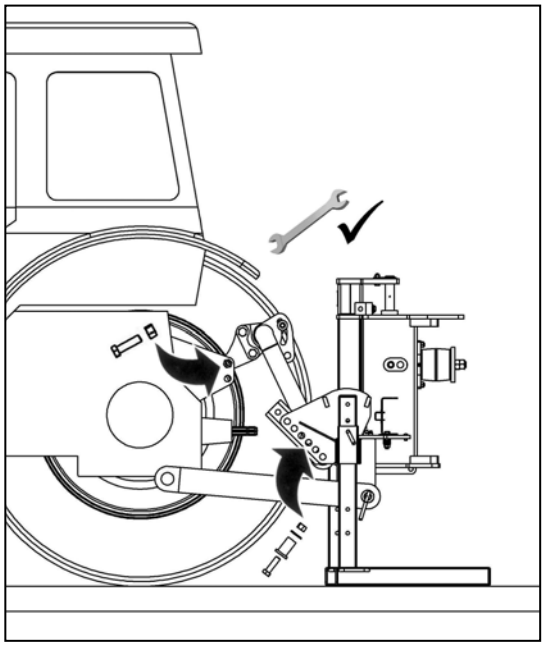


Fit the stabilizer into position with its arms aligned in the connection channels of the main frame and attach the stabilizer nose to the tractors top link – select the highest possible position available avoiding any load sensing properties.
NOTE: *The bolt on nose of the stabiliser is reversible in order to accommodate variations of tractor linkage designs.*

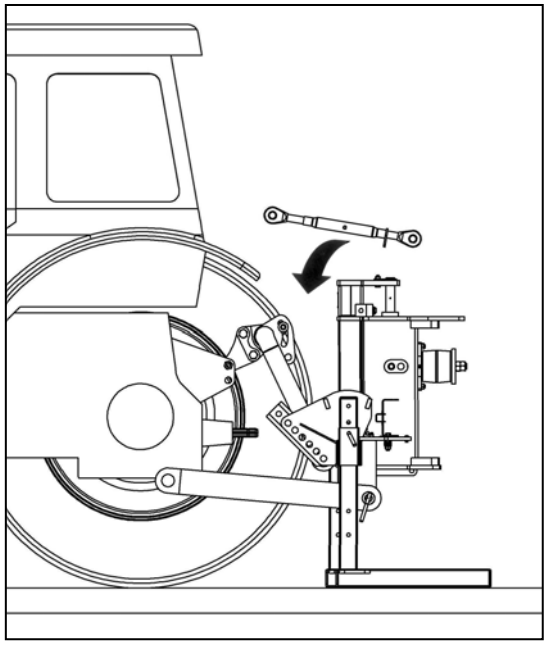


McConnel offer various versions of stabilizer noses for differing types and makes of tractors – contact your local dealer or McConnel Parts Department for further information.

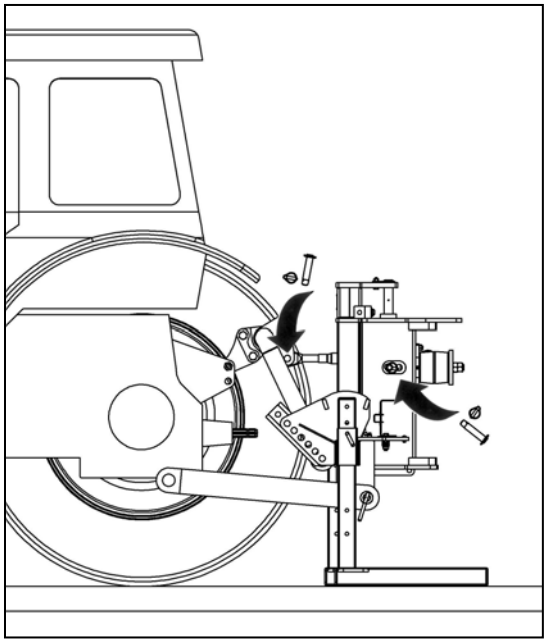
Secure the stabilizer in position with the fixings supplied – the arms of the stabilizer should be attached to the main frame selecting the hole that is farthest away from the back of the tractor.



Place the machines top link into position between the stabilizer and the machine main frame.



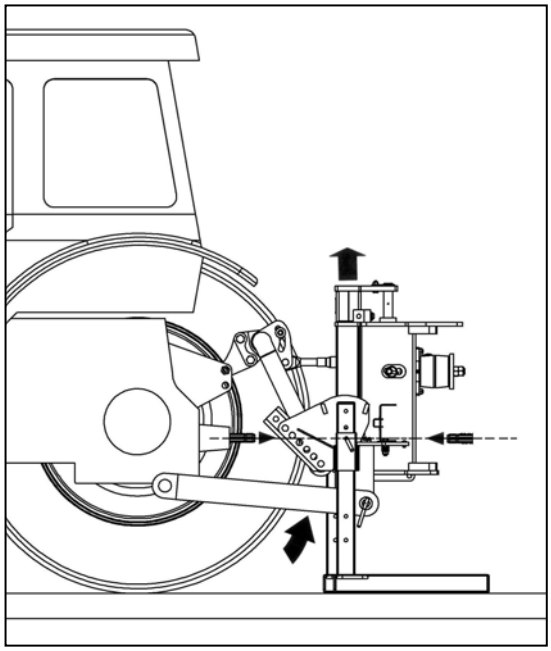
Attach the machines top link to both the stabilizer and the main frame using the linkage pins supplied and secure in position with lynch pins.



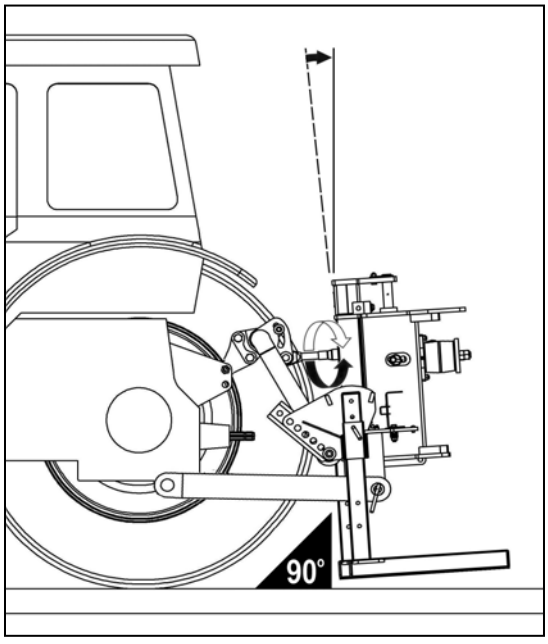
Raise the machine on the tractors linkage to a height where the tractors PTO and the stub axle of the machines gearbox are approximately in line with each other.
Note: *As lift occurs be aware the machine may tilt slightly.*

**WARNING**

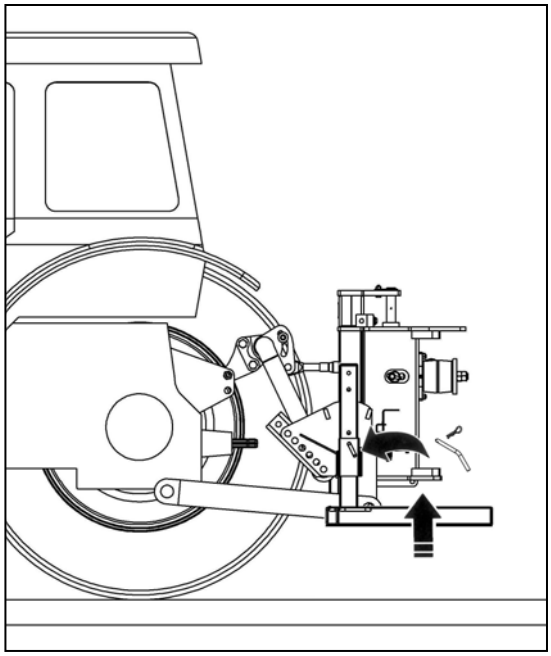
The quadrant lever or machine controls must only be operated from the tractor seat. Ensure no one is standing on, between, or near the linkage arms or bars during this procedure.



Adjust the top link to bring the machine frame into the vertical position.

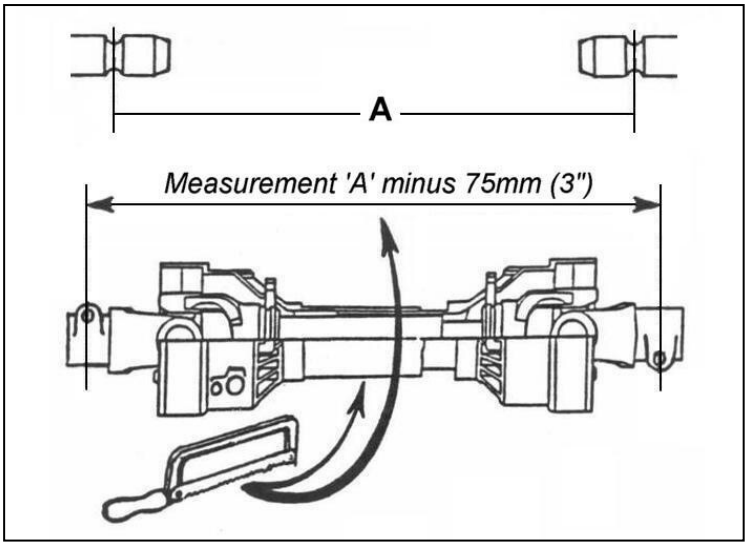


Remove leg pins and raise the stand legs to their stowage position – replace leg pins and secure in place with ‘R’ clips.

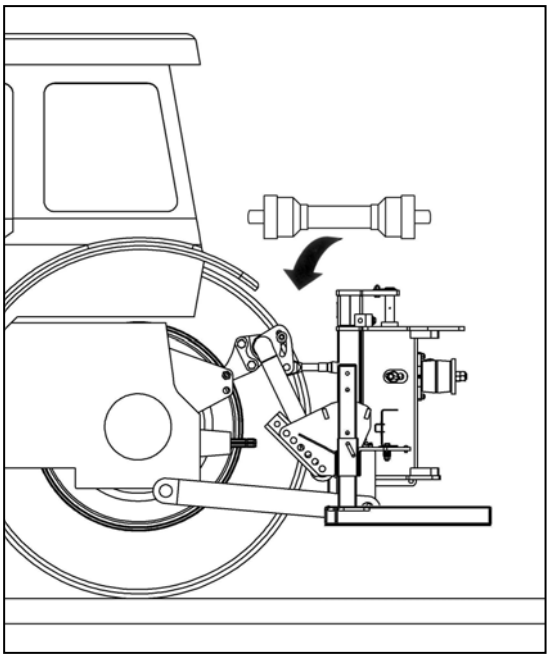


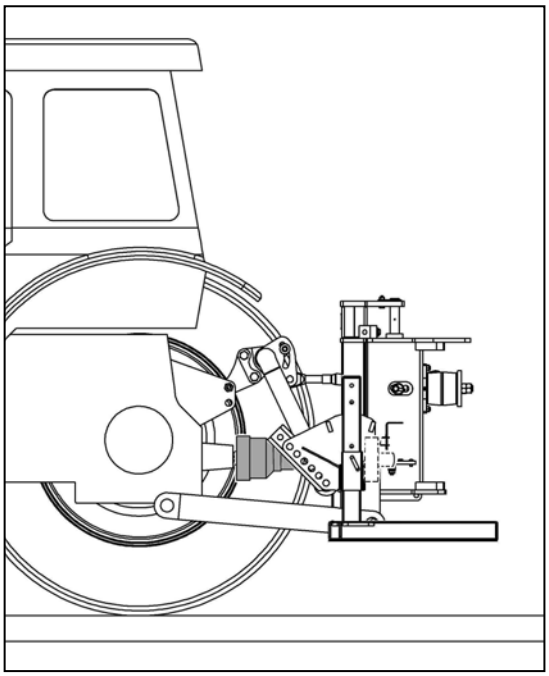
Adjust check chains to prevent sideways movement of the tractor’s linkage.

Measure the PTO shaft and cut to the dimension shown below. The finished length of the shaft should be 75mm (3”) less than the measured distance ‘A’ between tractor shaft and gearbox stub shaft to allow for fitting.

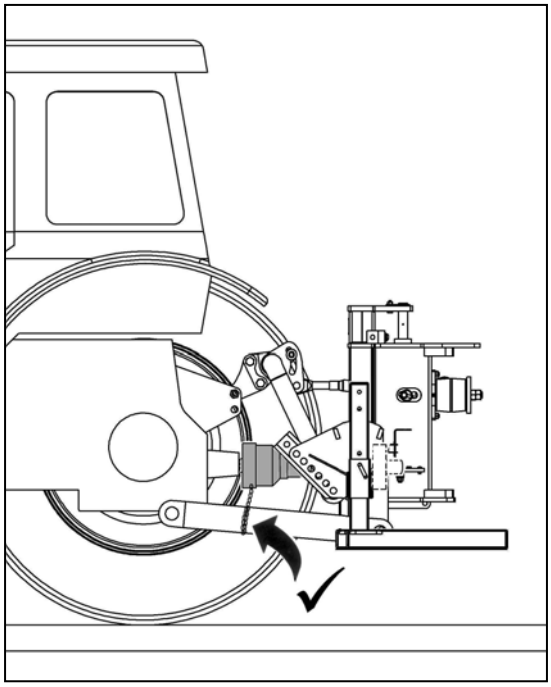



NOTE: *For subsequent use with different tractors measure again - there must be a minimum shaft overlap of 150mm (6”).*

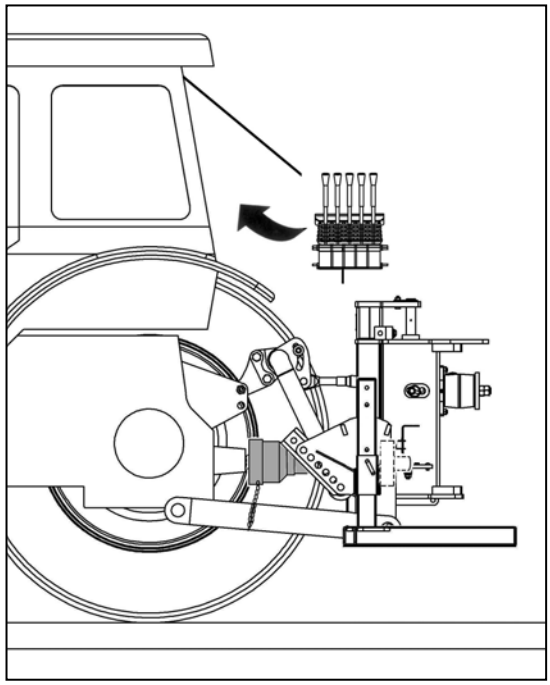




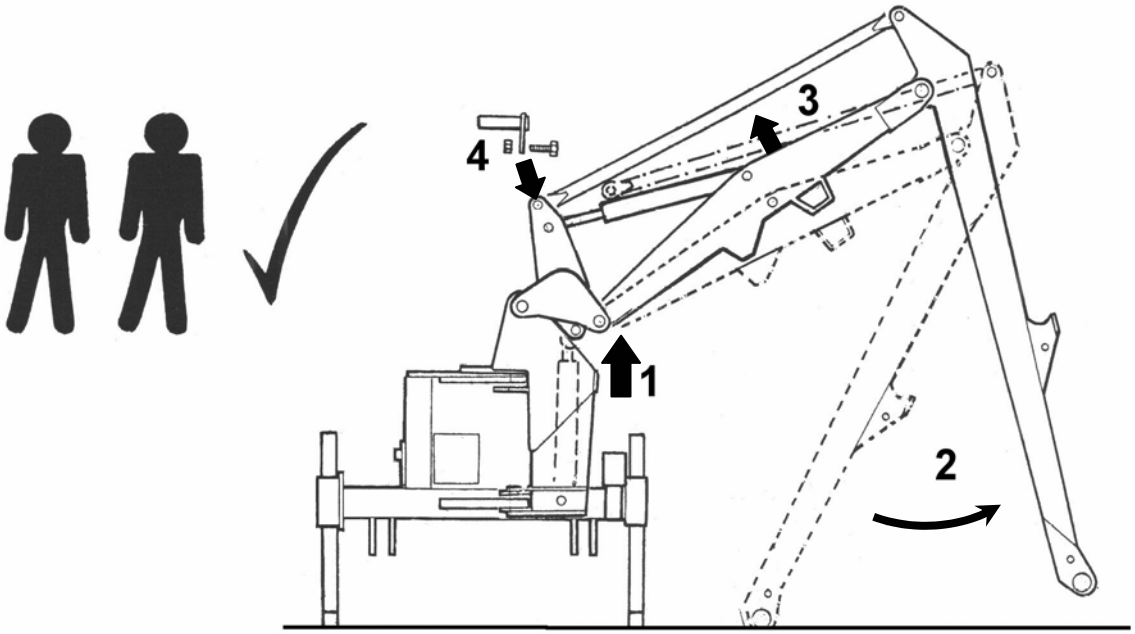
When the PTO shaft is in position attach torque chains to convenient locations to prevent rotation of the shaft guarding.



Fit the machine control unit in the tractor cab in a convenient location that allows for safe and easy operation of all the controls and functions.



- Ensure the Lift Ram tap and Slew Ram taps are open.



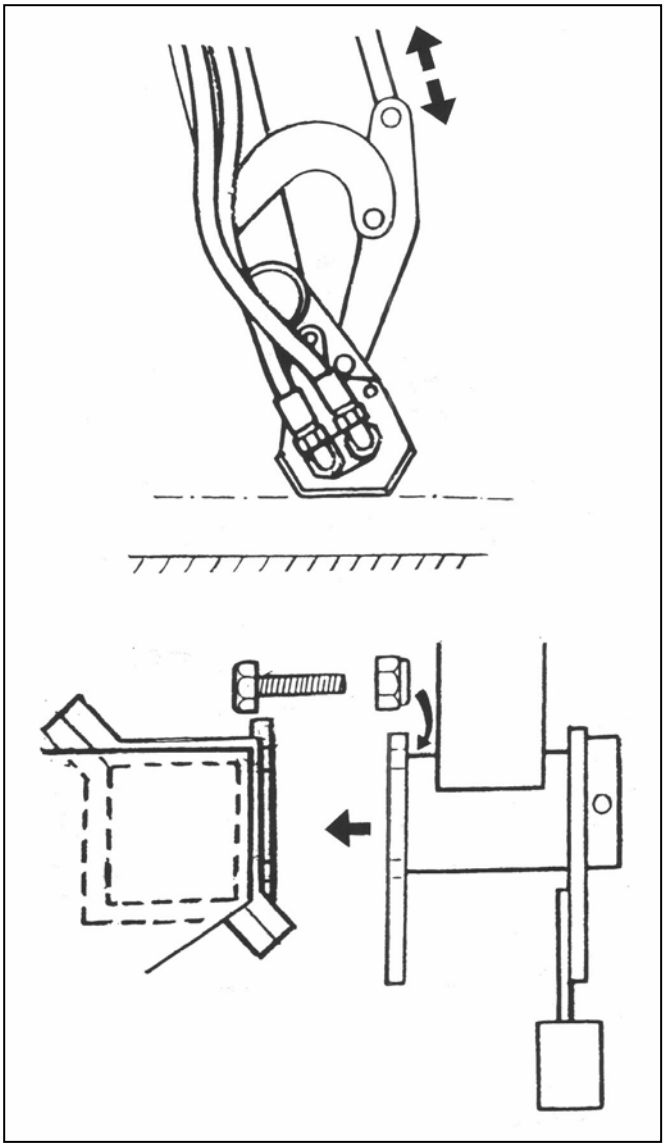

- **Request assistance.**
- Operate ‘lift up’ on machine controls sufficient only for the end of the dipper arm to clear the ground.
- Pivot out the dipper arm until the tension link can be connected.

- Operate the controls to ‘slew’ the arms towards the rear only until the frame is horizontal.
- Carefully operate the machine through its full range of movements whilst checking that hoses are not strained, pinched, chaffed or kinked, and that all machine movements are functioning correctly.
- On initial installation, the machine is now ready for attachment of the flailhead *(see following page for fitting details).*
- Fold the machine into the transport position *(refer to pages 51-54 for details).* The machine is now ready to proceed to the work site.

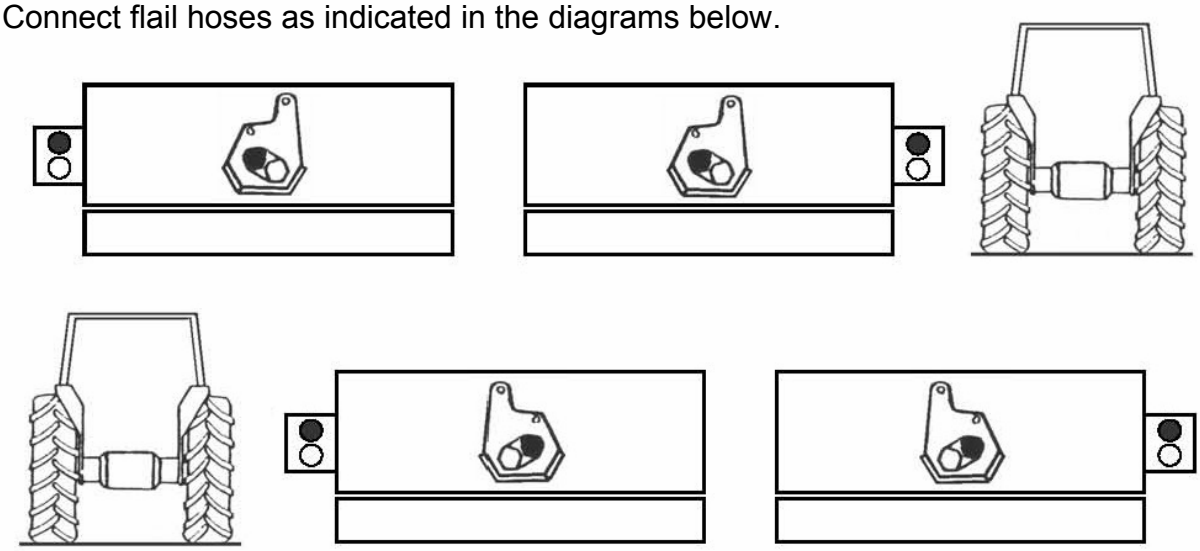
# FLAILHEAD ATTACHMENT

Operate machine controls to manoeuvre into a position to enable attachment of the flailhead – the bottom of the hose junction bracket must be parallel with the ground.

*Refer to 'Pre operational checks' for correct bolt torque settings.*



Connect flail hoses as indicated in the diagrams below.



With machine arms at 'half reach' and the flailhead clear of the ground carry out final adjustment of the lift arm levelling box to bring the main frame horizontal.

## OIL RECOMMENDATIONS

| Supplier | Cold or Temperate Climate | Hot Climate |
|---|---|---|
| **BP** | *Bartran 46*<br>*Energol HLP-HM 46* | *Bartran 68*<br>*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*<br>*Hydrelf XV 46* | *Hydrelf HV 68* |
| **ESSO** | *Univis N 46* | *Univis N 68* |
| **FUCHS**<br>(UK/Non UK markets*) | *Renolin 46*<br>*Renolin HVZ 46*<br>*Renolin CL46/B15**<br>*Renolin AF46/ZAF46B** | *Renolin 68*<br>*Renolin HVZ 68*<br>*Renolin CL68/B20**<br>*Renolin AF68/ZAF68B** |
| **GREENWAY** | *Excelpower HY 68* | *Excelpower HY 68* |
| **MILLERS** | *Millmax 46*<br>*Millmax HV 46* | *Millmax 68*<br>*Millmax HV 68* |
| **MORRIS** | *Liquimatic 5*<br>*Liquimatic HV 46*<br>*Triad 46* | *Liquimatic 6*<br>*Liquimatic HV 68*<br>*Triad 68* |
| **SHELL** | *Tellus 46*<br>*Tellus T46* | *Tellus 68*<br>*Tellus T68* |
| **TEXACO** | *Rando HD 46*<br>*Rando HDZ 46* | *Rando HD 68*<br>*Rando HDZ 68* |
| **TOTAL** | *Equivis ZS 46* | *Equivis ZS 68* |

## FITTING CONTROL UNIT IN CAB

**Electric controlled models.**
A mounting pillar is supplied to which the control unit is bolted. The pillar is bolted to the tractor ensuring that no structural member of the cab or roll bar is drilled and it can be bent or twisted to achieve a comfortable working position.

The 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.

The control is 12 volt D.C. operated; the brown lead is Positive and the blue is Negative.

**Cable controlled models.**
The control unit is bolted to a mounting bracket

This bracket may be bolted to the mud wing or cab cladding in a convenient location ensuring that no structural member of the cab or roll bar is drilled.

In deciding the final position of the control box remember not to exceed the minimum acceptable bend -radii of 8" for the cables.

The control lever for the cable operated rotor control valve is mounted in a similar fashion adopting the same precautions pertaining to drilling and cable runs.

## 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. *See maintenance section for details.***

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

Operate the armhead levers through their complete range ensuring that all movements are functioning 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 360 rpm. and run for a further five minutes before disengaging and stopping tractor.

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

# DANGER

## READ CAREFULLY BEFORE COMMENCING TO REMOVE THE MACHINE FROM THE TRACTOR.

THE ORDER OF THE FOLLOWING STEPS MUST BE FOLLOWED EXACTLY DISCONNECTING THE TOP LINK MUST BE THE LAST OPERATION PRIOR TO DRIVING THE TRACTOR AWAY FROM THE MACHINE.

**WARNING!**
**Do not operate quadrant lever or machine controls through the rear cab window whilst standing on or amongst linkage components - Always seek assistance.**

- Select a firm level site for parking the machine.
- Position stand legs in their lowest position – secure with leg pins and lynch pins.
- Raise the machine on the tractor linkage until the weight is taken off the stabiliser.
- Remove the lower stabiliser pins.
- Unscrew the lift ram tap.
- Lower the machine to be ground.
- Extend the arms and place the flail head on the ground at half reach.
- Disengage tractor PTO and remove.
- Disconnect stabiliser bars or loosen check chains as applicable.
- Unbolt the control unit from the mounting pillar, remove from tractor cab and stow the levers or switchbox clear of the ground.
- Disconnect the stabiliser from the tractors top hitch position.
- Remove draft link pins and drive tractor away from machine.

# STORAGE

If machine is to be left standing for an extended period of time, lightly coat the exposed portions of the ram rods with grease. Subsequently this grease should be wiped off before the rams are next moved.

If the machine has to be stored outside tie a piece of tarpaulin or canvas over the control assembly, do not use a plastic fertilizer bag which could lead to rapid corrosion.

## SUBSEQUENT ATTACHMENT TO IDENTICAL TRACTOR

Refer to and follow steps on ***'initial attachment to tractor'*.**

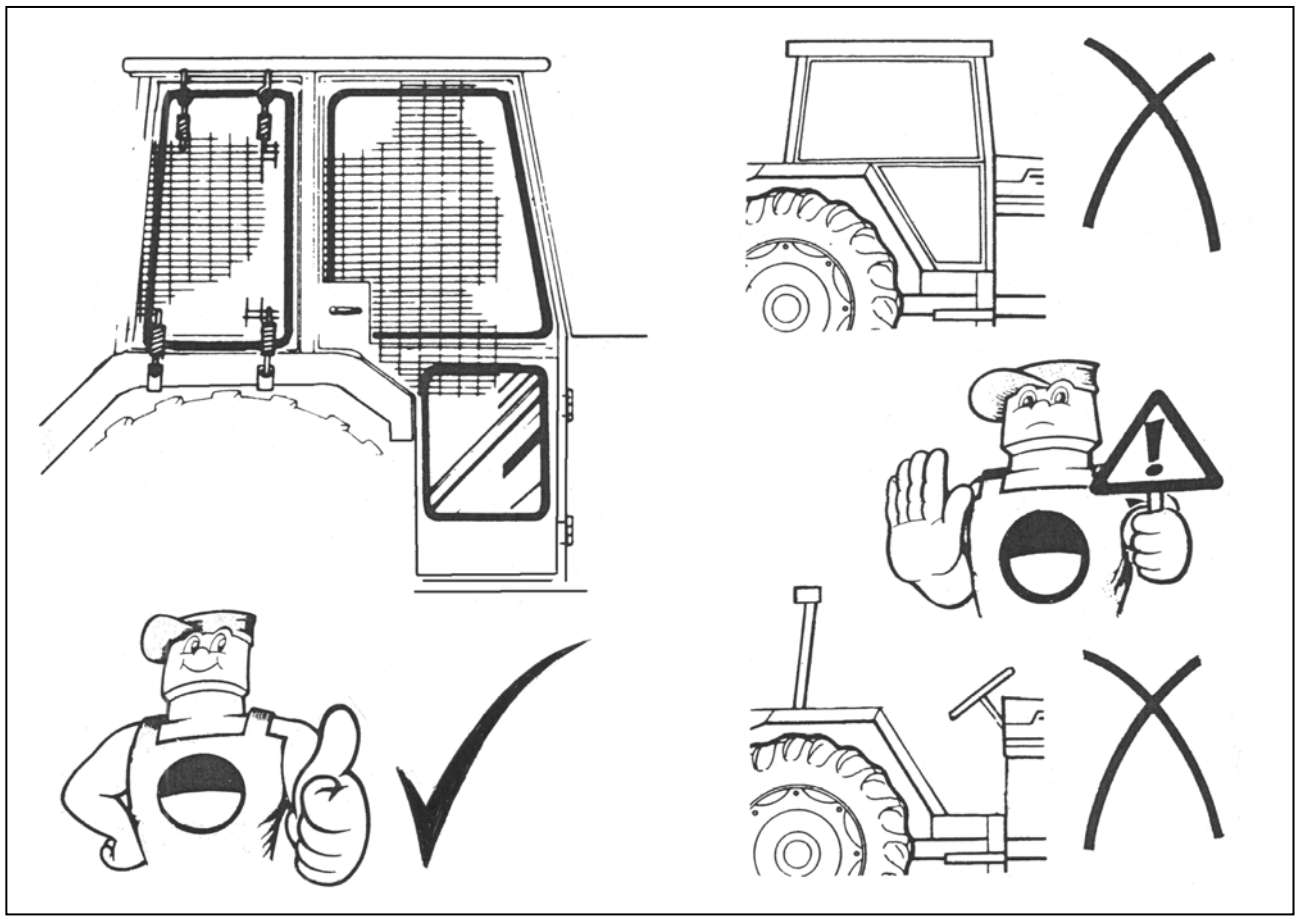
- Connect Stabiliser into tractors top hitch position used previously.
- Raise the machine on the tractor linkage until the Stabiliser contacts the eccentric stops.
- Fit Stabilizer lower pins.
- Mount controls in the tractor cab.
- Fit PTO Shaft and attach torque chain to a convenient point to prevent the shaft guard rotating.
- Place arms in work position at half reach and adjust lift arm levelling box to bring frame horizontal.
- Tighten check chains if fitted.
- Stow parking legs.
- Fold machine into transport position *(see pages 51-54).*
- Proceed to the work site.

## SUBSEQUENT ATTACHMENT TO DIFFERENT TRACTOR

- Remove Stabiliser and Top Link from machine and separate.

Refer to and follow steps ***'initial attachment to tractor'.***

**OPERATOR GUARD**



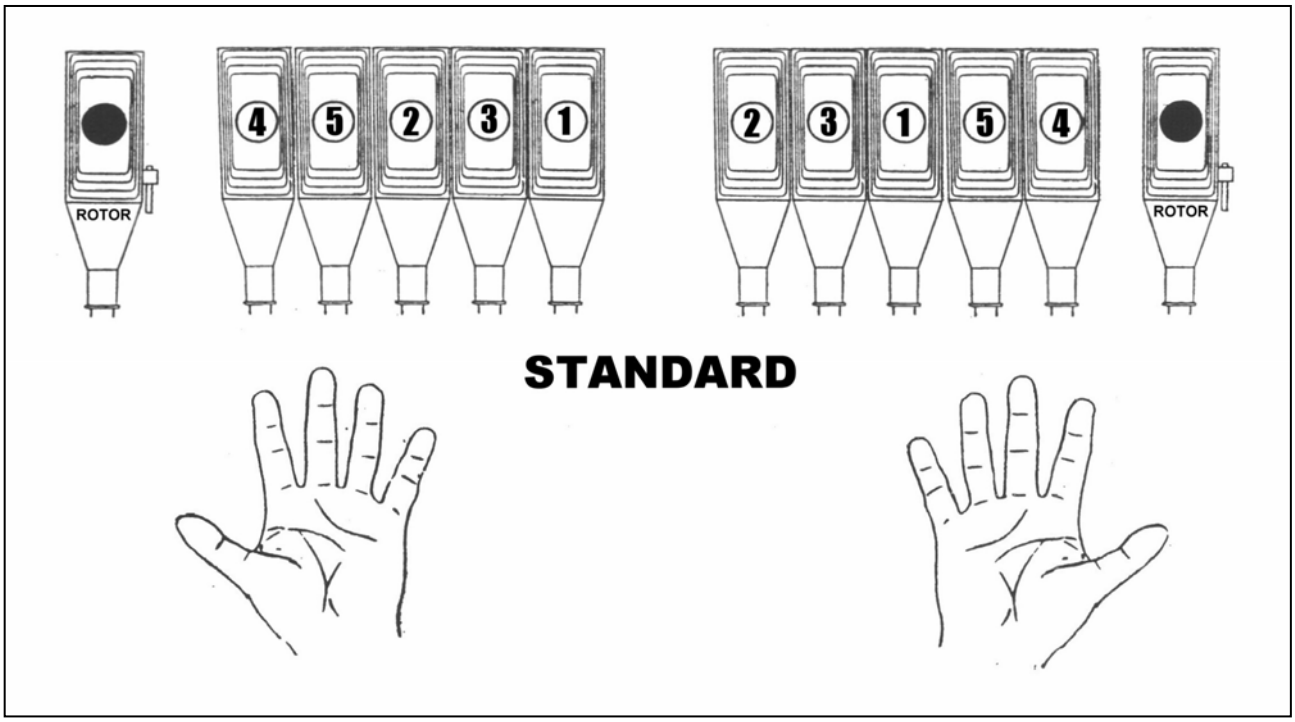
**PREPARATION**

## READ THE BOOK FIRST

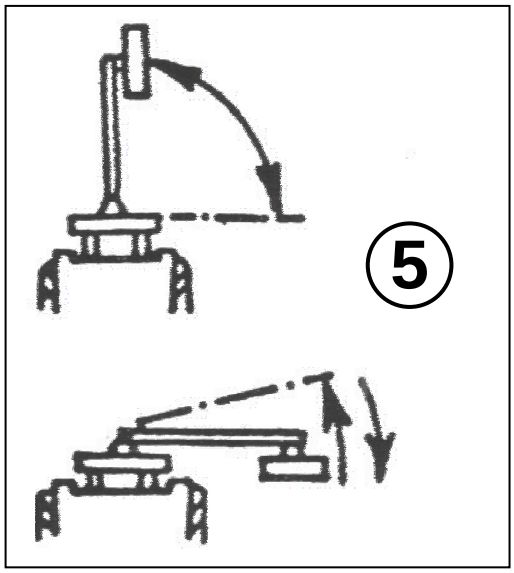
Practices operating the machine in an open space without the rotor running until you are fully familiar with the controls and operation of the machine.

**CAUTION**

**Care must be taken when working with the flail head close in as it can come into contact with the tractor.**

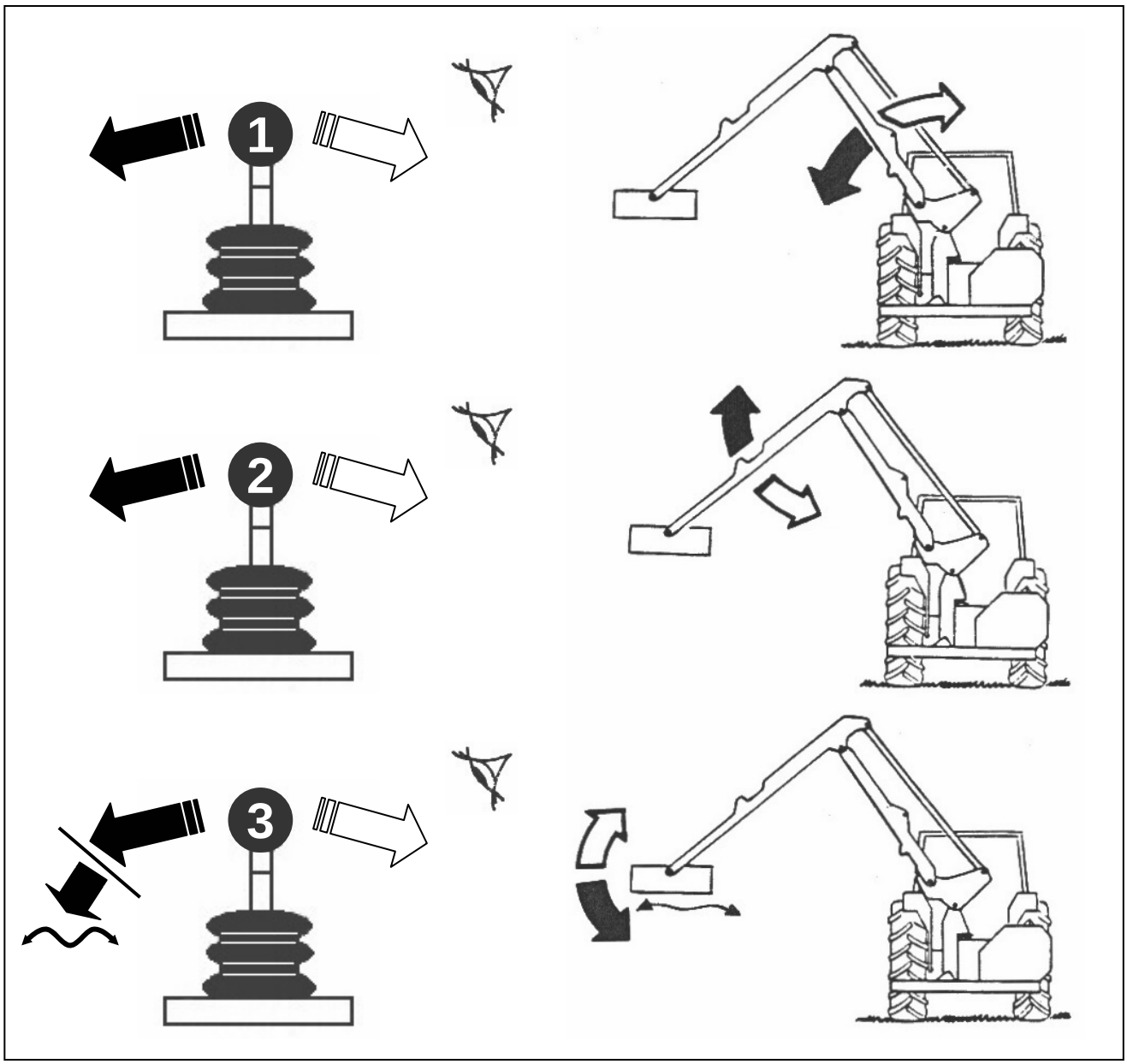



**LEVER FUNCTIONS**

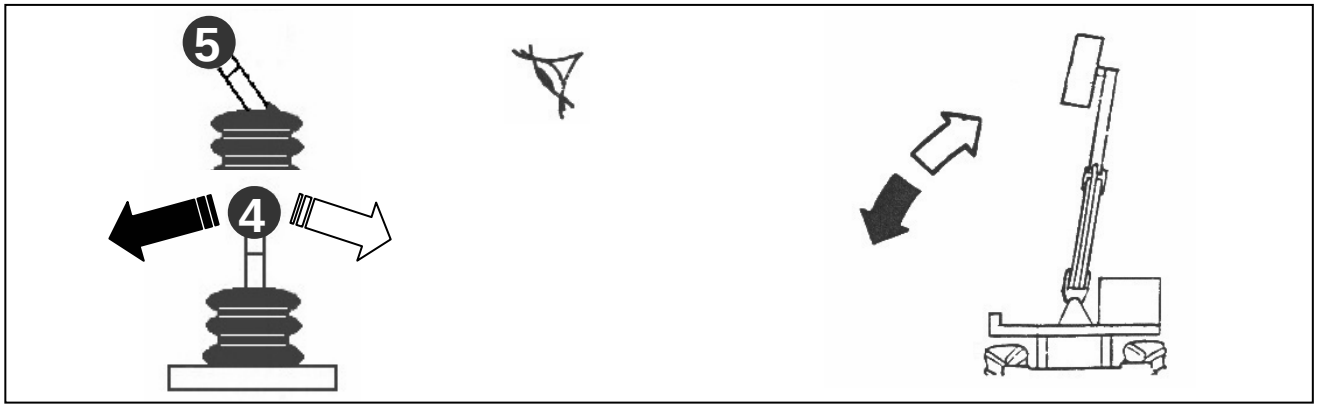


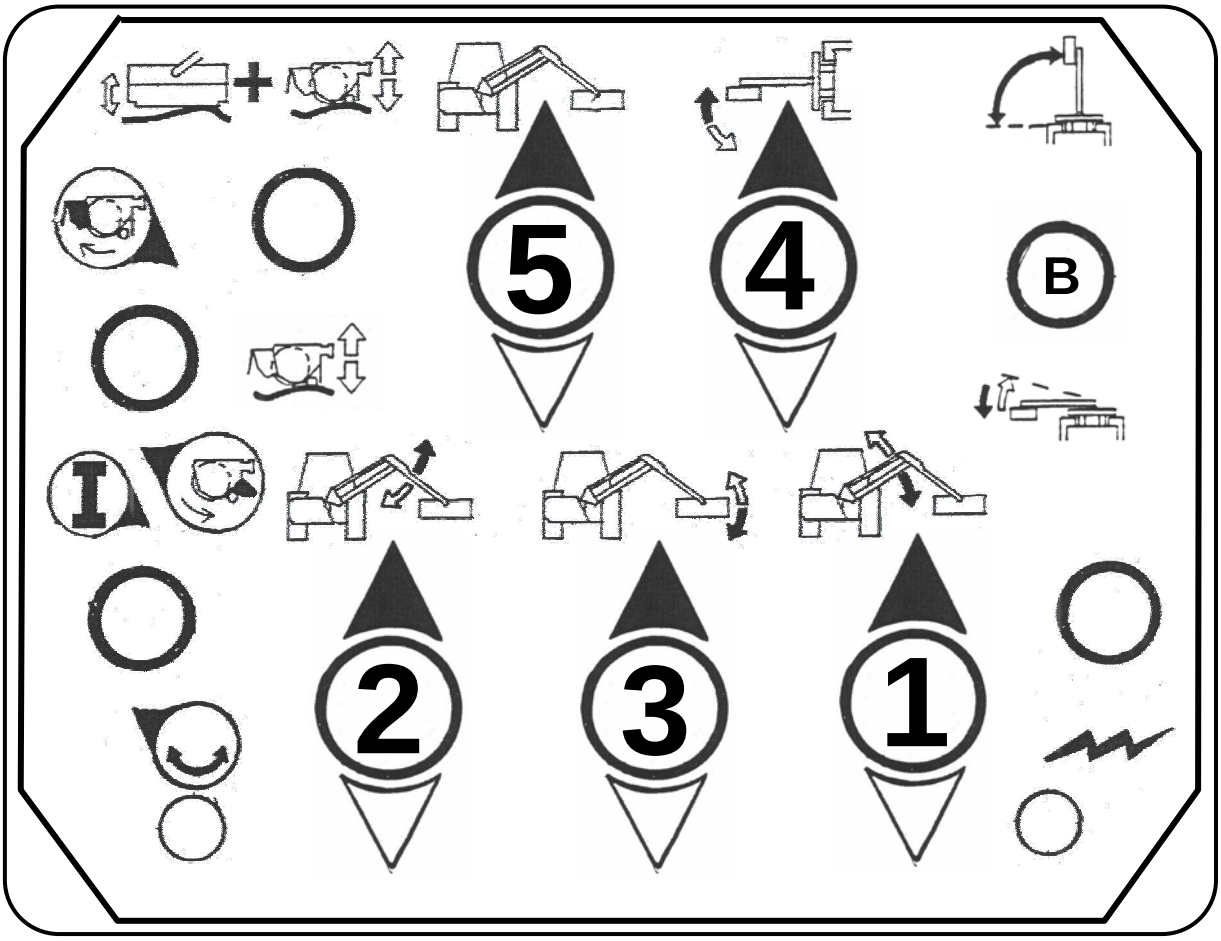

**SLEW –**
Allows slew working

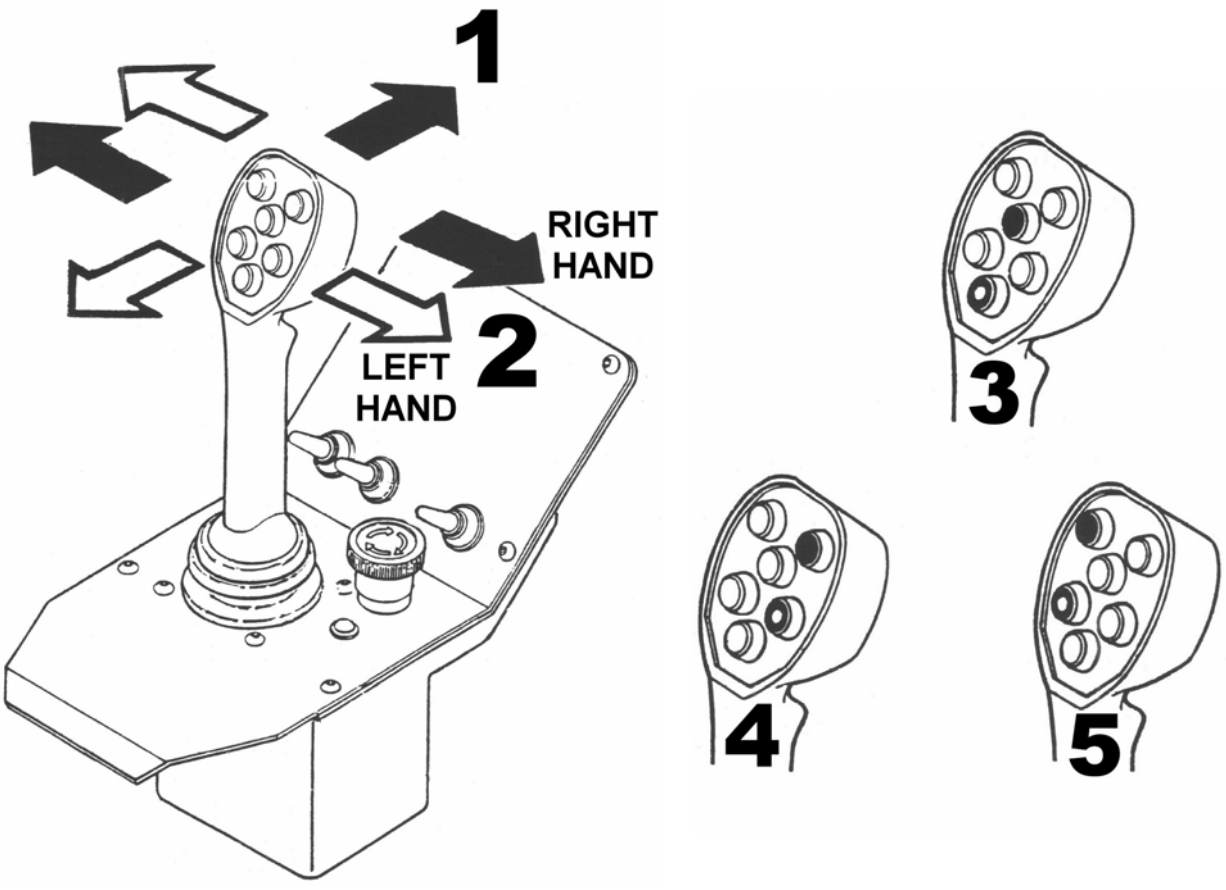
**AUTO RESET –**
Allows normal working

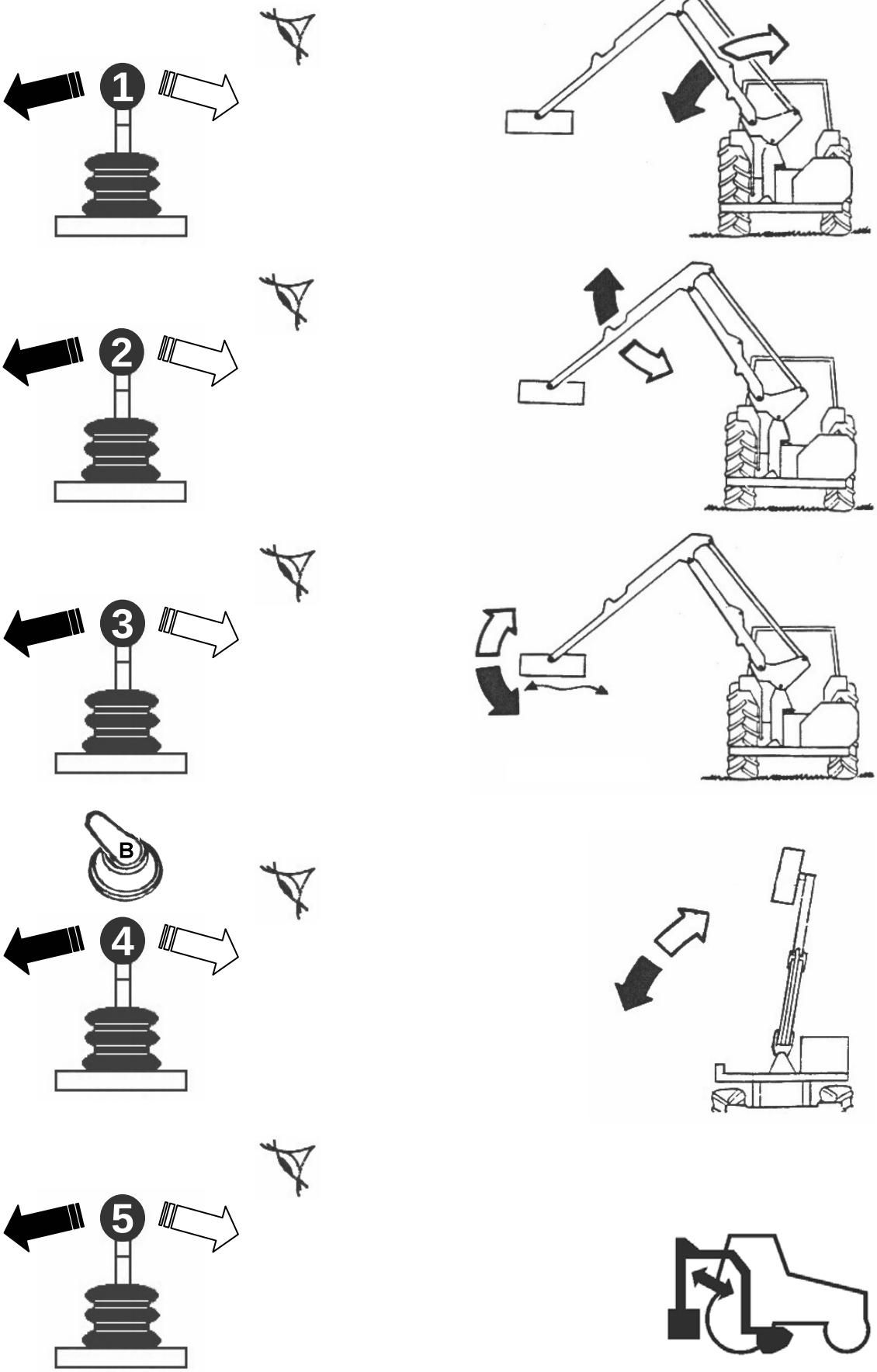



An angle ‘float’ position can be selected which allows the flail head to automatically angle itself to follow the contours of the ground. To obtain this position the control lever must be pushed away from the operator beyond its normal range until it locks into the float position. To return to normal operation the float position must be manually deselected.
When working with ‘head angle float’ the flail head must be in balance about its mounting point. Failure to observe this will result in a poor untidy finish.




5
4
B
2
3
1


1
RIGHT HAND
LEFT HAND
2
3
4
5


1
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B
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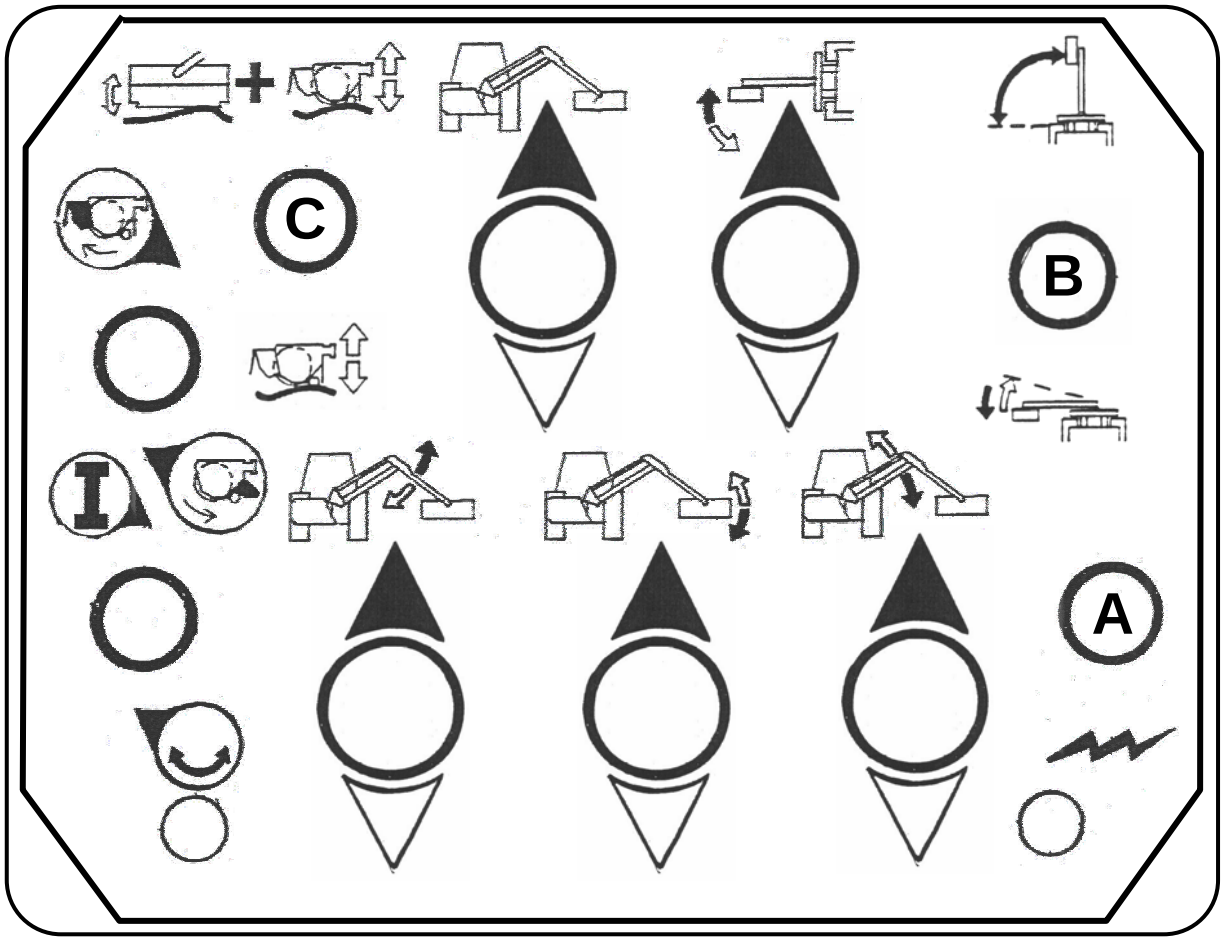
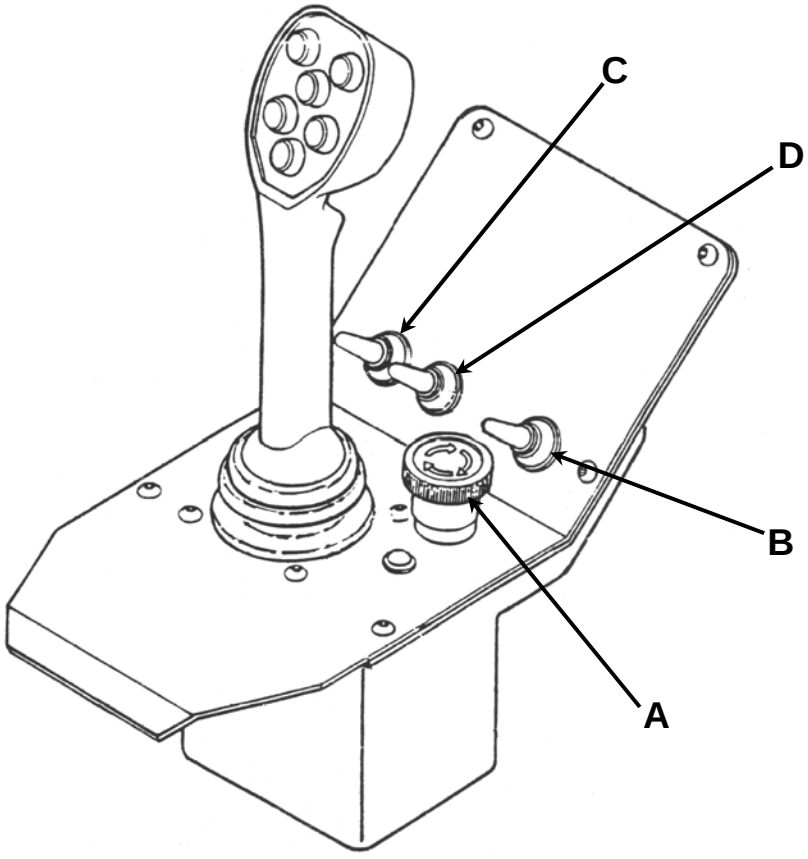

C
B
A


C
D
B
A

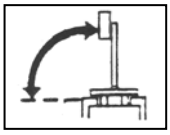
**SWITCHBOX CONTROLS**

**POWER ON**

**A**

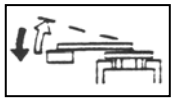
**POWER OFF**

***SLEW – allows slew working.***



**B**

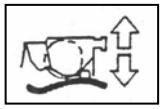
***AUTO RESET – allows normal working.***



***LIFT & ANGLE FLOAT – allows lift & angle float in unison.***

**C**

***LIFT FLOAT – allows lift float selection only.***



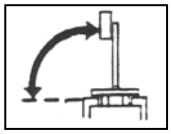
**MONOLEVER CONTROLS**

***POWER ON - turn 'CLOCKWISE'***

**A**

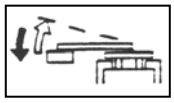
**POWER OFF - push 'DOWN'**

***SLEW – allows slew working.***

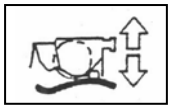


**B**

***AUTO RESET – allows normal working.***



***LIFT FLOAT ON***



**C** ***(if fitted)***

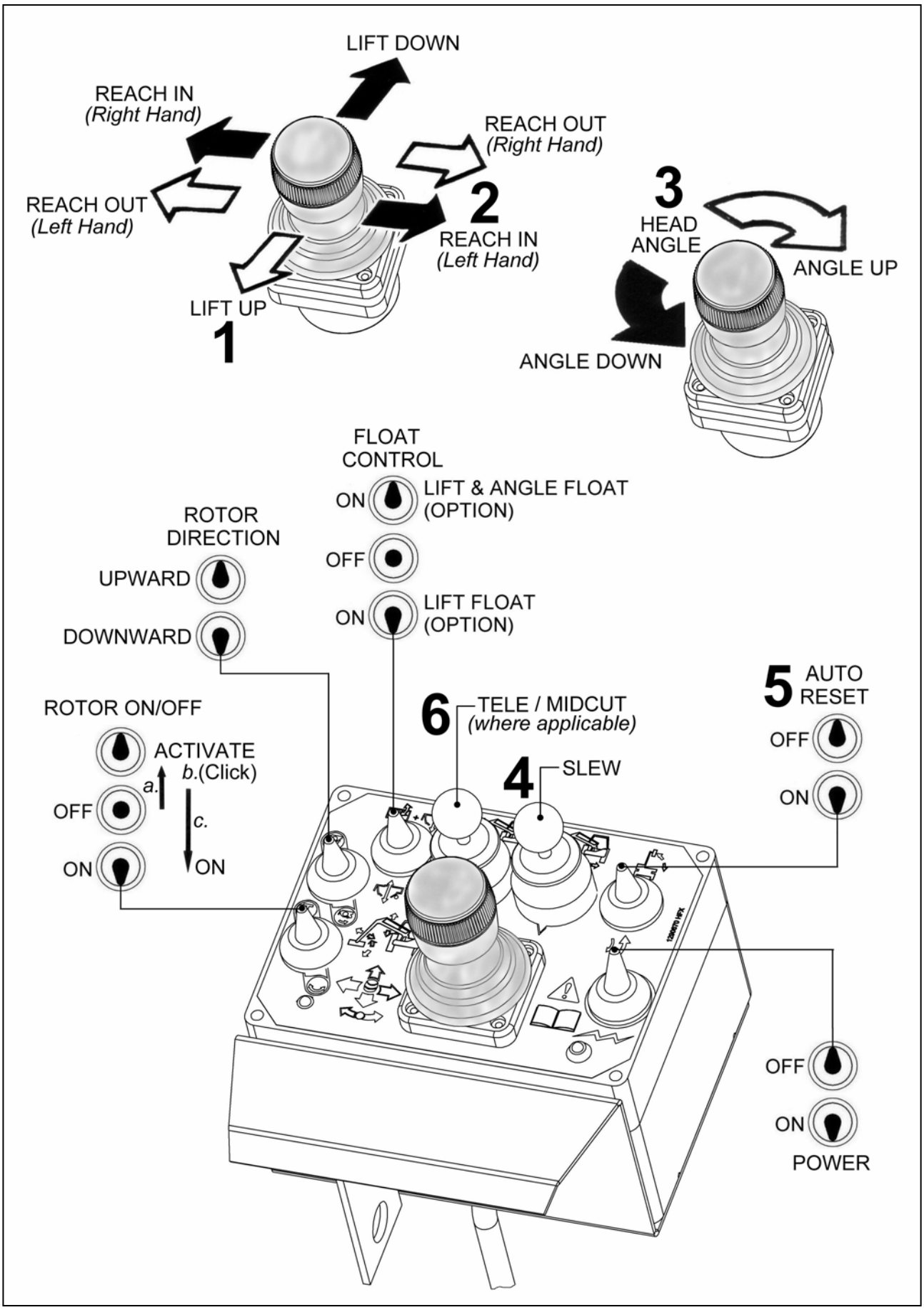
***LIFT FLOAT OFF***

***ANGLE FLOAT ON***

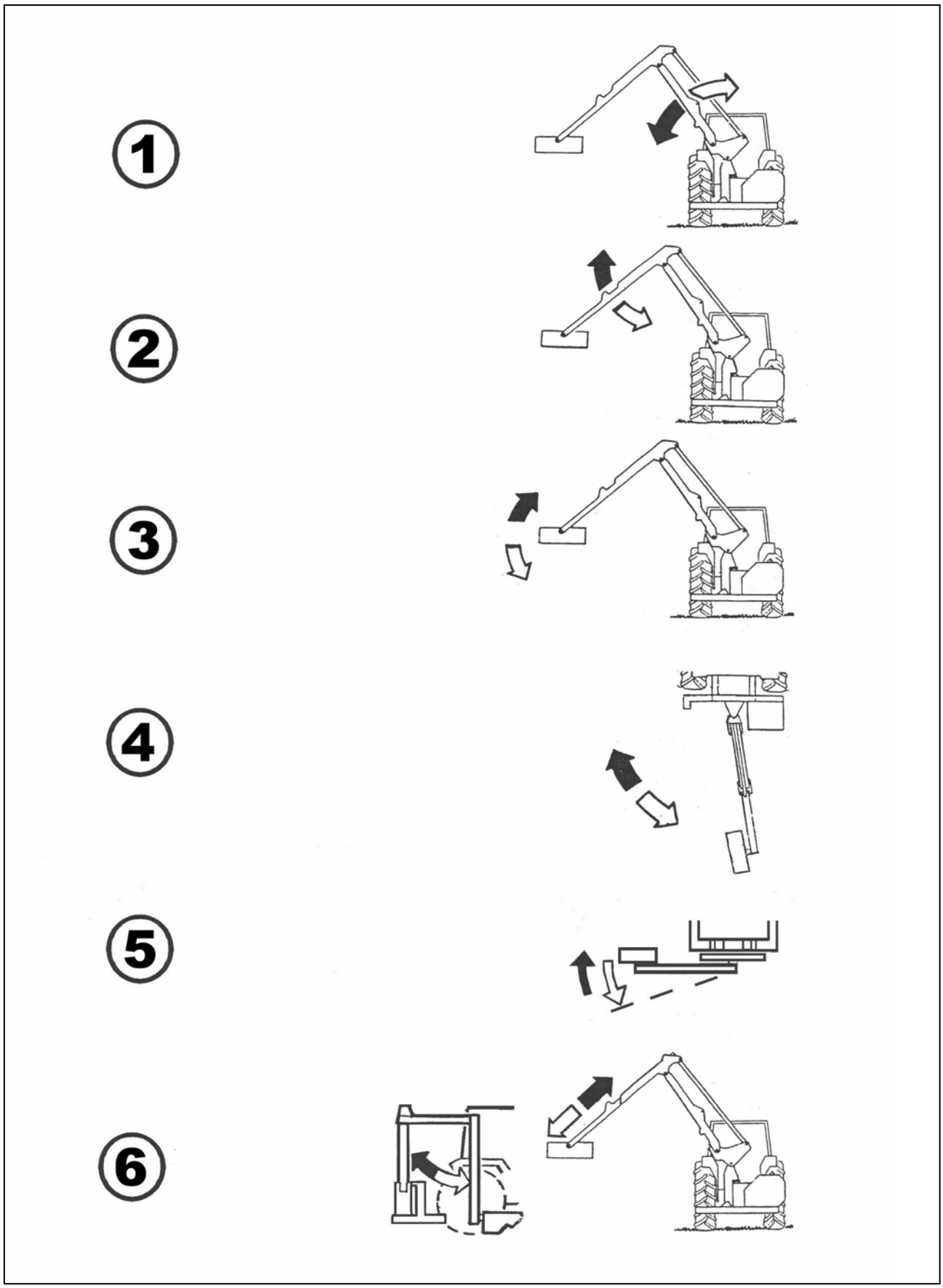
**D** ***(if fitted)***

***ANGLE FLOAT OFF***

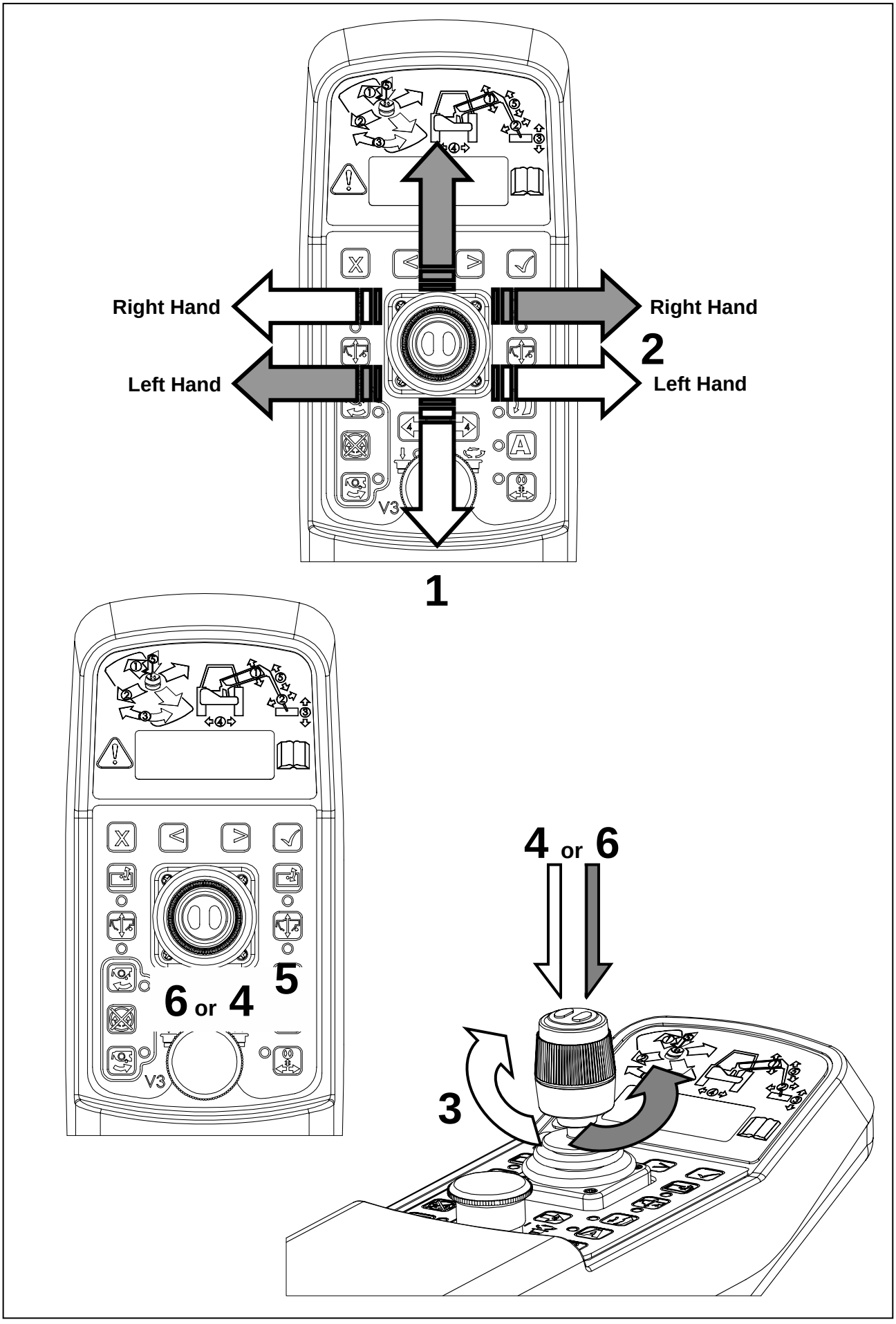
# XTC PROPORTIONAL SWITCHBOX CONTROLS

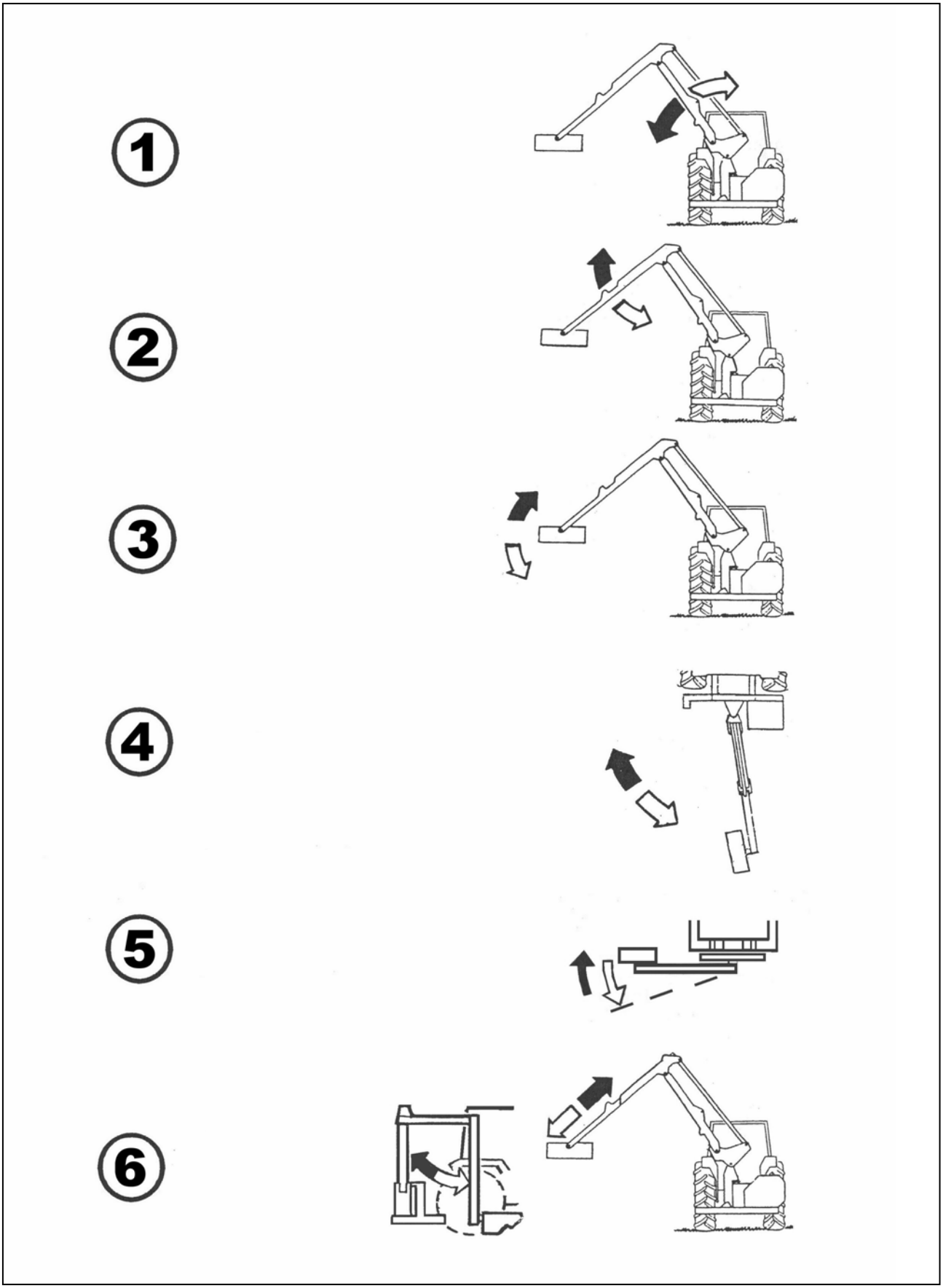


## ARM FUNCTIONS – Electric Proportional Control Machines



# V3 PROPORTIONAL ARMREST CONTROLS

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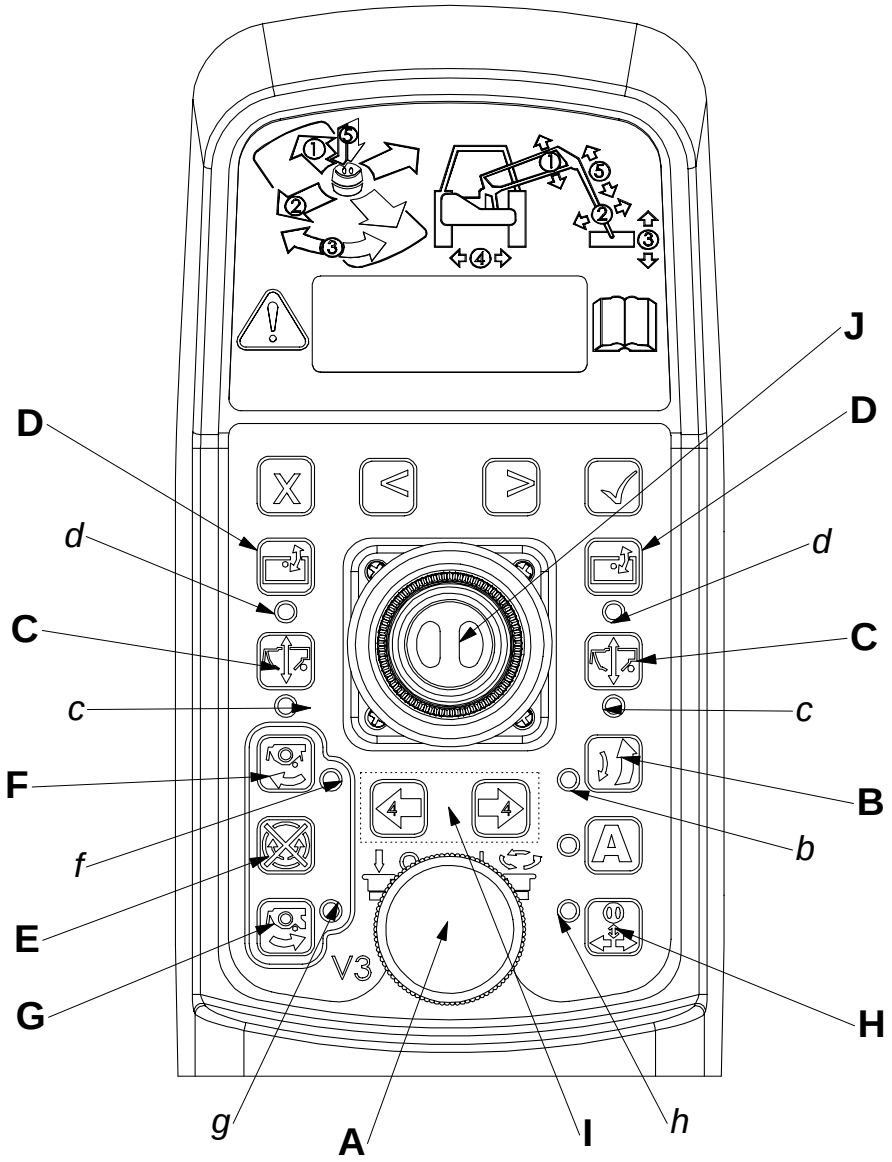
6




| SWITCH | FUNCTION | L.E.D. |
|---|---|---|
| A | *Power ON/OFF - Turn clockwise for ON, Push for OFF* | - |
| B | *Auto Reset* | *b* |
| C | *Lift Float* | *c* |
| D | *Head Angle Float* | *d* |
| E | *Rotor Off* | *e* |
| F | *Rotor On - Upward Cutting* | *f* |
| G | *Rotor On - Downward Cutting* | *g* |
| H | *Tele/Slew Swap - determines operating mode of: I & J* | *h* |
| I | *Slew Operation - H deactivated* | *h OFF* |
| J | *Tele Operation - H deactivated* | |
| I | *Tele Operation - H activated* | *h ON* |
| J | *Slew Operation - H activated* | |

Note: *The mode selection of H is retained in the circuit memory when powering off and on, it does not deselect when the unit is switched off.*

## SWITCH FUNCTIONS – V3 Proportional Armrest Controls

*All auxiliary switch controls are accompanied by an L.E.D. light, these indicate to the operator that a function is selected and working correctly.*

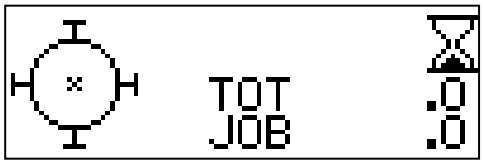
| **SWITCH** | **FUNCTION/OPERATION** |
|---|---|
| **SWITCH 'A'** | **POWER ON/OFF**<br>***Turn clockwise*** *for* ***'ON'*** *and* ***push down*** *for* ***'OFF'*** |
| **SWITCH 'B'**<br>**(L.E.D. light 'b')** | **AUTO RESET**<br>***Press down*** *to select* ***'auto reset'*** *(i.e. normal working). Pressing either 'Slew' buttons will de-select 'Auto Reset' and allow 'Slew' operation. 'Auto Reset' will have to be reselected if required.* |
| **SWITCHES 'C'**<br>**(L.E.D. light 'c')** | **LIFT FLOAT**<br>*Press either switch to select or deselect the 'lift float' function.*<br>*When ' lift float ' is selected operating the lift service will override the float operation. On completion of the arm adjustment 'lift float' will automatically be reinstated.* |
| **SWITCHES 'D'**<br>**(L.E.D. light 'd')** | **HEAD ANGLE FLOAT**<br>*Press either switch to select or deselect the 'head angle float' function.*<br>*When 'angle float' is selected operating the angle service will override the float operation. On completion of the head adjustment 'angle float' will be automatically reinstated.* |
| **SWITCHES 'E', 'F' & 'G'** | **OPERATIONAL ON MACHINES WITH ELECTRIC ROTOR ON/OFF CONTROL ONLY** |
| **SWITCH 'E'** | **ROTOR OFF** |
| **SWITCH 'F'**<br>**(L.E.D. light 'f')** | **ROTOR ON - UPWARD CUTTING**<br>**Press to select** |
| **SWITCH 'G'**<br>**(L.E.D. light 'g')** | **ROTOR ON - DOWNWARD CUTTING**<br>**Press to select** |
| **REVERSING ROTATION:** | **TURN ROTOR OFF**<br>***WAIT until Rotor has STOPPED***<br>***Select opposite rotation*** |
| **SWITCH 'H'**<br>**(L.E.D. light 'h')** | ***Press switch 'H'*** *to swap the operation controls of the Slew' and 'Tele' (red light appears). The Control box will remember this mode when the controls are turned off and will remain in the same mode when next switched on.* |
| **SWITCHES 'I' & 'J'** | **SLEW & TELE or TELE & SLEW**<br>*dependent on mode of Switch 'H'* |

## SCREEN DISPLAY AND FUNCTIONS

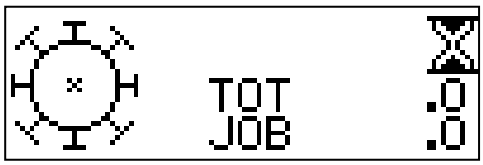
Twist E/stop on armrest controls to power on and the screen will light up. Note: 12Volts at the battery are required for correct function.

1. The screen will initially display the McConnel logo, software version and the PTO maximum speed.

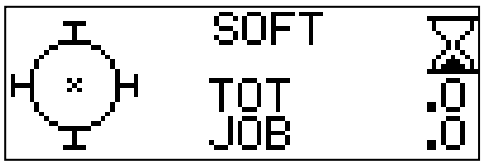

2. Pressing scroll forward once will display the running screen. The **TOT** displays the total time the rotor has been switched on. The **JOB** also displays the rotor on time but may be reset to zero by pressing the **X** button for 3 seconds.



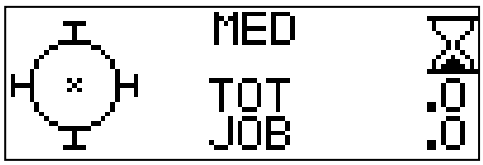

3. Pressing either of the Rotor ON buttons will activate the 'egg timer' and rotor image.

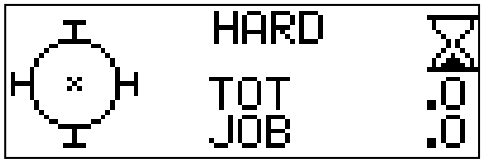



4. Pressing the EDS Lift float button will turn on the EDS (EDS Lift Float machines only). Then SOFT, MED or HARD will be added to the running screen.

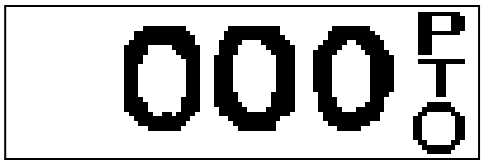



5. Pressing ✓ while the EDS is turned on will scroll through the SOFT, MED and HARD working settings.

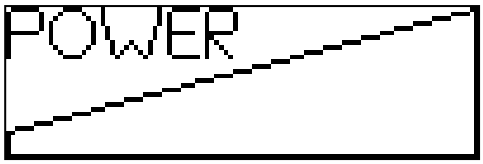



6. Pressing scroll forward displays the actual Tractor PTO running speed




7. Scrolling forward again displays the Power Monitor screen.




Scrolling backwards will display the screens in the opposite order.

## SCREEN CONTRAST ADJUSTMENT – V3 Armrest Controls

Later versions of the v.3 Proportional Armrest Controls that are installed with v.3.07 software feature adjustable screen contrast. Adjustments to the contrast settings are made as follows:

- Power up the armrest.
- Press and hold both left [<] and right arrows [>] simultaneously for 3 seconds until the options menu is displayed.
- Scroll right [>] until the LCD option is shown.
- Press the 'Tick' button.

The screen will now display the options 'Contrast Up' and 'Contrast Down'
Select the option you require and press the 'Tick' button in increments until the desired contrast is achieved.

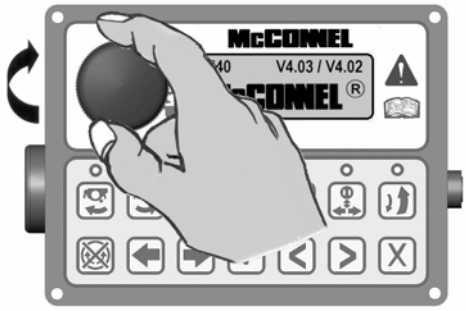
CAUTION: *If over adjusted the screen will become either too dark or too light and you will no longer be able to read the on-screen instructions - if this should occur take care not to press any buttons other than the arrow keys or tick button as you may inadvertently enter and change the settings within a different menu.*
*If this should happen, you can return to the contrast menu using the following instructions:*

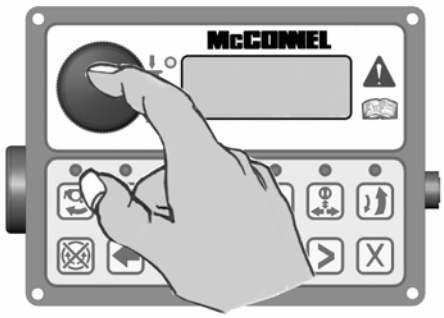
Power off and re-start the procedure – you will now need to count the seconds and the number of menus that you need to scroll through to get back to the contrast options as described below:

- Press and hold both arrow keys [<] [>] simultaneously for 3 seconds.
- Scroll either right [>] 9 times or left [<] 5 times.
- Press the 'Tick' button.

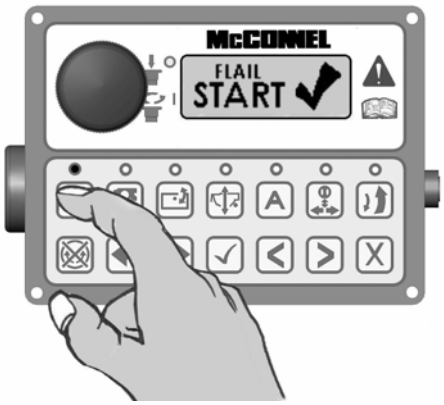
You are now back to the LCD screen contrast menu - simply press the 'tick' button once and if no change then press the left arrow [<] once and then the 'tick' button and the screen contrast will now become either lighter or darker and visibility of the display will return.

**POWER ON / OFF (Emergency Stop)**
Rotate Clockwise to Power On – control unit will emit a single beep and screen will display the selected PTO speed, software version and the McConnel name. Press to Power Off.

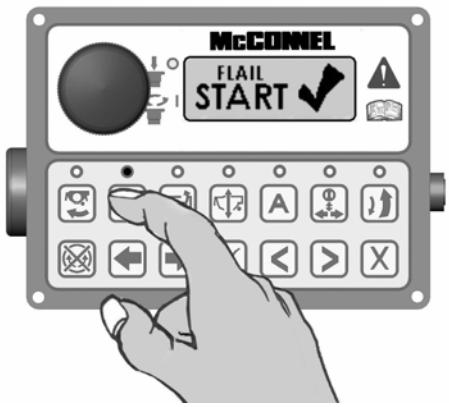



**ROTOR START – Uphill Cutting**
This button starts the rotor for 'uphill' cutting – when the button is pressed the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'FLAIL START ✓'.




**ROTOR START – Downhill Cutting**
This button starts the rotor for 'downhill' cutting – when the button is pressed the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'FLAIL START ✓'.



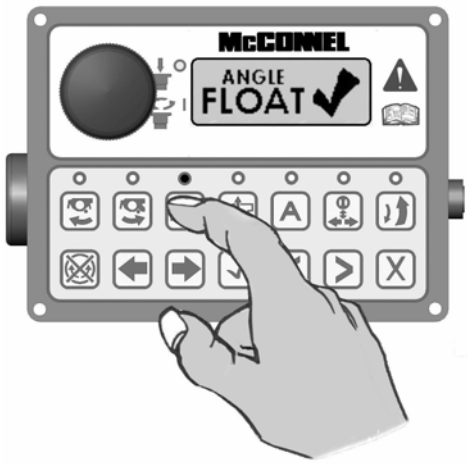

**ROTOR STOP**
This button stops the rotor – when the button is pressed the control unit will emit a single beep and the screen will momentarily display 'FLAIL STOP ✓' – the LED lights above both rotor start buttons will be illuminated for approximately 10 seconds, during this period the rotor start buttons will be disabled to allow sufficient time for the rotor to power down. When the LED lights go out the rotor direction can be changed or the rotor allowed to stop.


**WARNING: The LED lights going out do not indicate that the rotor has stopped rotating, it signifies only that the oil flow to the rotor has ceased sufficient for the direction of rotation to be changed - therefore when stopping a rotor it must be noted that it will continue to freewheel for a considerable length of time after the stop button has been activated, in some case this can be up to 40 seconds.**

## HEAD ANGLE FLOAT

There are 2 methods available for selection and de-selection of this function; activation via the control unit - *refer to #1 below,* or activation via the joystick controls - *refer to #2 below*.

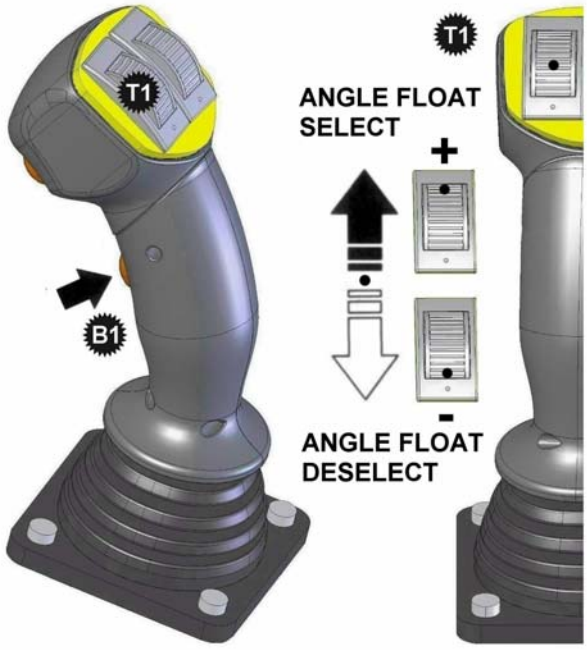
1. Pressing the Head Angle Float button – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'ANGLE FLOAT ✓' pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'ANGLE FLOAT X'.





2. Press and hold in the lower frontal button (B1) on the joystick control and roll the left hand thumbwheel (T1) forwards – the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'ANGLE FLOAT ✓'.

   To deselect press and hold in the lower frontal button (B1) on the joystick control and roll the left hand thumbwheel (T1) backwards – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'ANGLE FLOAT X'.



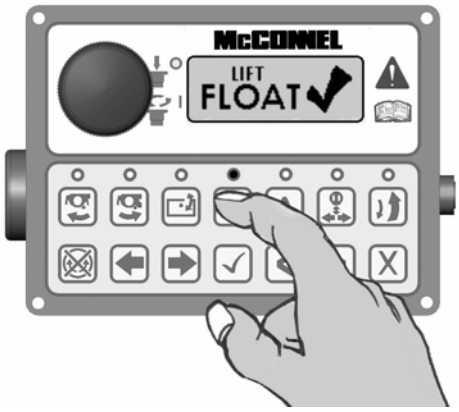

**NOTE: When selecting or deselecting the function, the thumbwheel (T1) should be allowed to return to its centre position before releasing the lower frontal button (B1).**

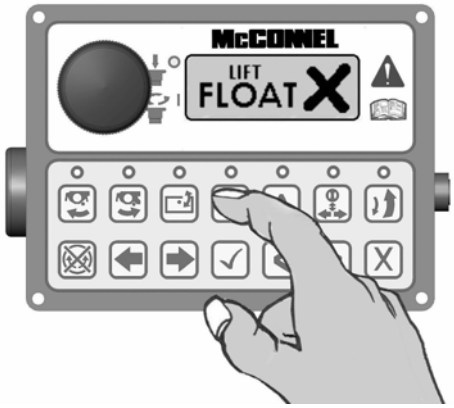
**NOTE: By default operation of thumbwheels T1 and T2 in conjunction with button B1 activates Head Angle Float and EDS/Lift Float respectively. These controls can, if required, be swapped over so that the thumbwheels operate the opposing functions – this procedure is performed by accessing the settings menu on the control unit via the screen and menu buttons.**

## EDS FUNCTION (EDS Models) / LIFT FLOAT (Non EDS Models)

There are 2 methods available for selection and de-selection of this function; activation via the control unit - *refer to #1 below,* or activation via the joystick controls - *refer to #2 below*.

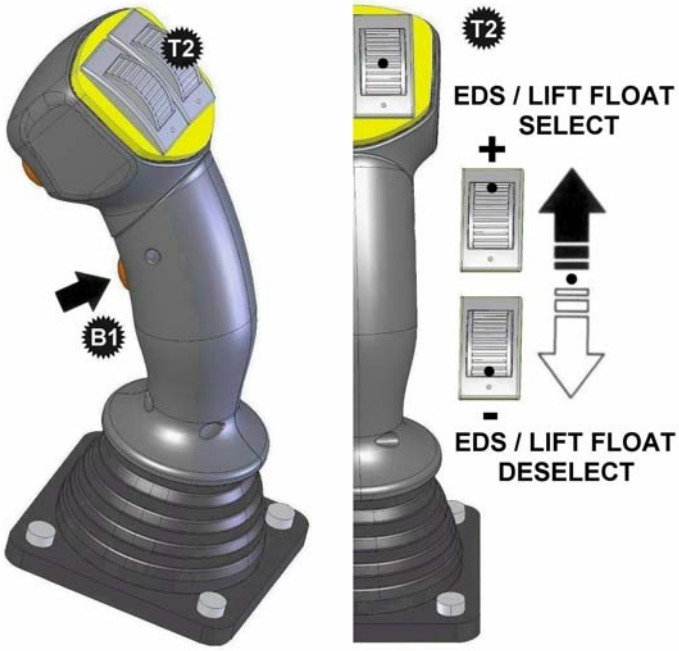
1. Pressing the EDS / Lift Float button will activate the relevant function – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'LIFT FLOAT✓'. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'LIFT FLOAT X'.




Press and hold in the lower frontal button (B1) on the joystick control and roll the right hand thumbwheel (T2) forwards – the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'LIFT FLOAT ✓'. To deselect press and hold in the lower frontal button (B1) on the joystick control and roll the right hand thumbwheel (T2) backwards – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'LIFT FLOAT X'.

**NOTE: When selecting or deselecting the function, the thumbwheel (T2) should be allowed to return to its centre position before releasing the lower frontal button (B1).**




**All models with v4.08 software onwards:** With the function engaged subsequent operation of button B1 on the joystick or the [✓] button on the control unit will alternately disable and enable all active floats.

**EDS models with pre v4.08 software:** With the function engaged and the rotor running EDS settings (SOFT – MED – HARD) will automatically be displayed on the control unit screen and can be scrolled through using button B1 on the joystick or the tick [✓] button on the control unit, if the rotor is not running the EDS settings can manually be viewed on the screen by pressing either [◄] [►] buttons on the control unit and scrolling to the EDS work screen.

There are 3 possible types of auxiliary service control as described in A, B & C below – the particular type used will be dependant on the build specification of the machine. Control operation of the function for all types remains the same *(see below).*

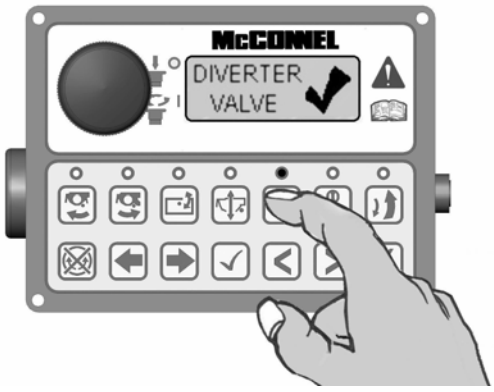
**A) Diverter Valve System Utilising an Existing Service *(Physical Diverter Valve)***
The control selects either of the two diverter valves for the operation of additional equipment that may be fitted to the machine such as: Directional Ram, Orbiter Head Kit, Hydraulic Roller etc.

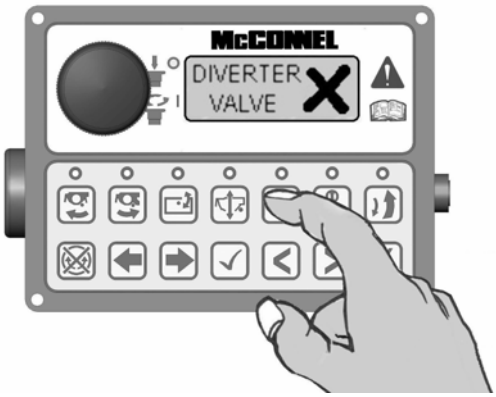
**B) 6/7 Service Manifold Systems *(Electronic Diverter Valve)***
Only available on stackable manifold systems either as a factory fitted option or as an aftermarket kit, in the case of the latter 'D1 and/or D2 PROP' will need to be changed from 'N' to 'Y' within 'options' of the setup menu on initial installation of the kit.

**C) Integrated Debris Blower**
Operated by D1 on machines with standard arm or D2 on machines with Tele, Midcut or VFR arms.

There are 2 methods of control available for selection and de-selection of the functions; activation via the control unit - *refer to #1 below,* or activation via the joystick controls - *refer to #2 below*.

1. Pressing the button momentarily will select Diverter Valve #1 – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'DIVERTER VALVE 1 ✓'. Pressing the button again momentarily will deactivate diverter #1, the screen will display 'DIVERTER VALVE 1 **X**'
   Holding the button in for 2 seconds will select Diverter Valve #2 – when selected it remains active until it is subsequently deselected by holding the button in again for 2 seconds.



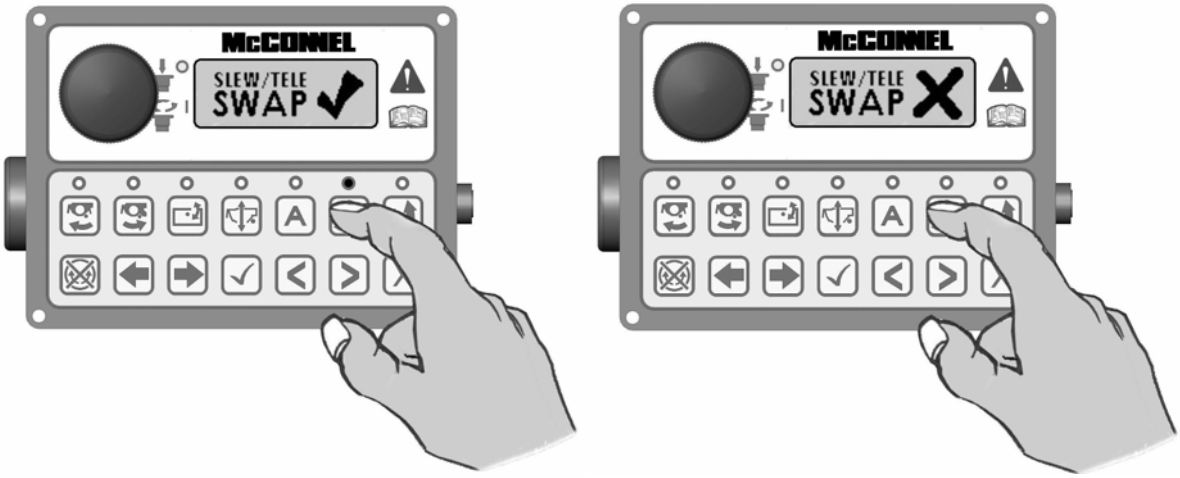

2. Pressing the upper frontal button (B2) on the joystick momentarily will select Diverter Valve #1 – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'DIVERTER VALVE 1 ✓'. Pressing the button again momentarily will deactivate diverter #1, the screen will display 'DIVERTER VALVE 1 **X**'
   Holding button (B2) in for 2 seconds will select Diverter Valve #2 – when selected it remains active until it is subsequently deselected by holding the button in again for 2 seconds.

# SLEW – TELE / MIDCUT / VFR SWAP

**IMPORTANT NOTE RELATING TO THE OPERATION OF PA180 MACHINES ONLY:**
**Where these controls are fitted to PA180 models it must be noted that the default function of the right hand thumbwheel is Forward Extension operation and NOT Slew operation as stated below – therefore for PA180 Models only please read all text references to Slew operation on this page as Forward Extension operation.**

This function swaps over the controls used to operate Slew and Tele/Midcut/VFR. By default, Slew operation is performed with the right hand thumbwheel (T2) and Tele/Midcut/VFR operation with the [◄] [►] buttons on the control unit - in the swapped mode these will be the opposite way around and the LED on the control unit will be lit to indicate that the swapped mode is selected.
Swapping these controls is performed via the control unit - *refer to #1 below.* On machines installed with pre v4.08 software the same function could also be performed via the joystick controls – *for these models only refer also to #2 below*.

1. Press the swap button once to select swap mode – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'SLEW/TELE SWAP ✓'. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'SLEW/TELE SWAP X'.

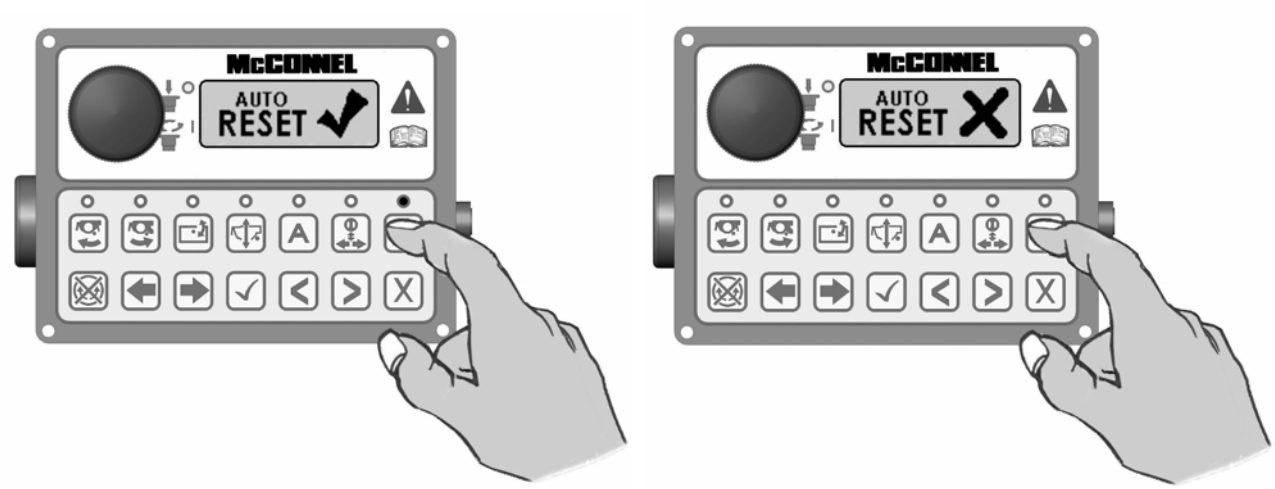



**Models with pre v4.08 software only**

2. Press the joysticks lower frontal button (B1) once to select swap mode – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'SLEW/TELE SWAP✓'. De-selection is with subsequent use of the same button - the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'SLEW/TELE SWAP X'.

## AUTO RESET

This button is for the selection and de-selection of the Auto Reset function – pressing the button once will activate Auto Reset, the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display ‘AUTO RESET ✓’. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display ‘AUTO RESET X’.

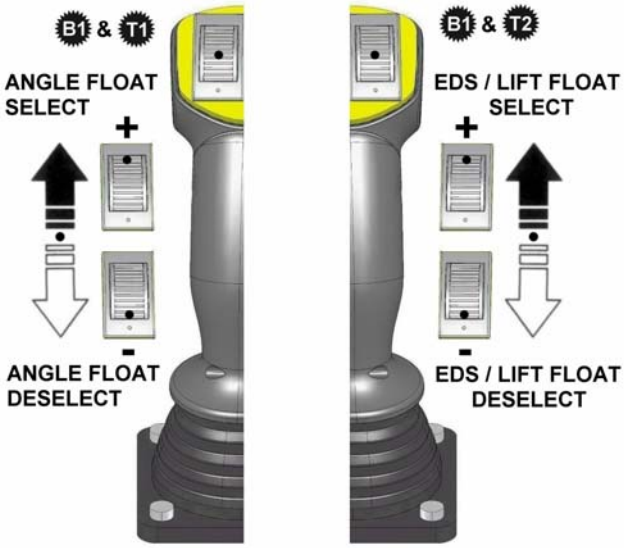



**NOTE: By default operation of thumbwheels T1 and T2 in conjunction with button B1 activates Head Angle Float and EDS/Lift Float respectively. These controls can, if required, be swapped over so that the thumbwheels operate the opposing functions – this procedure is performed by accessing the settings menu on the control unit via the screen and menu buttons.**

LH/RH Swap Shortcut; Press and hold ✓& X on Control Unit for 3 seconds (unit will 'bleep' to confirm).

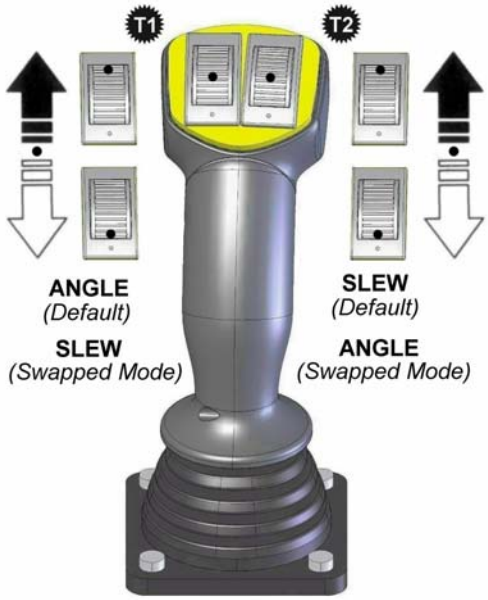
## FLOAT SELECTION & DE-SELECTION

Operate thumbwheels to their furthest points (+ or -) to select or deselect float functions.

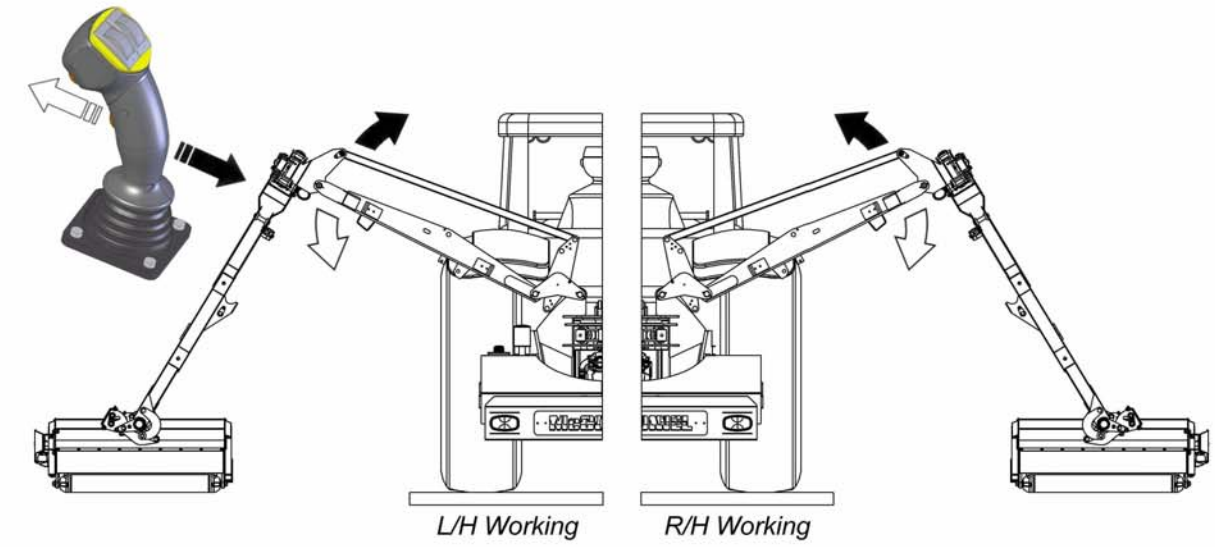

## ANGLE & SLEW OPERATION

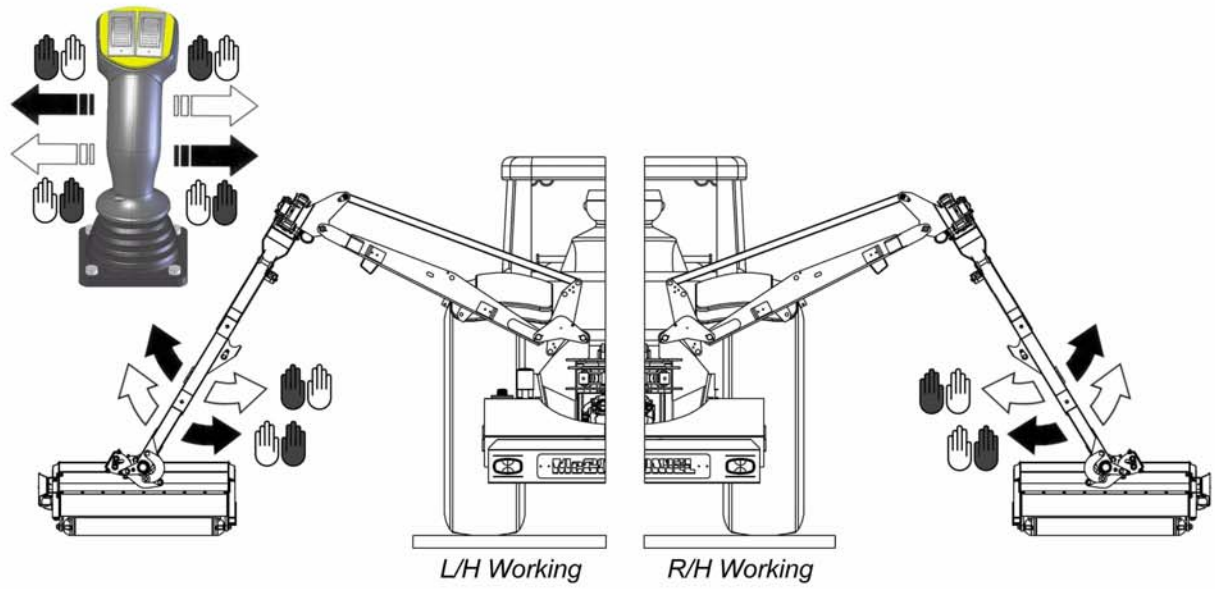
Rotate thumbwheels in required direction.

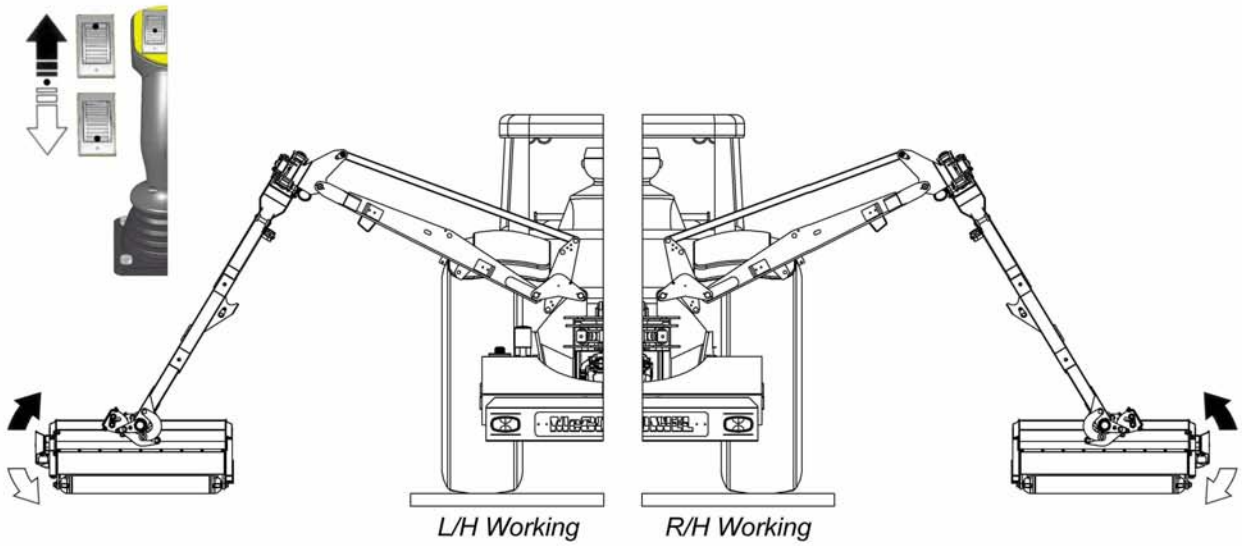



## DIVERTER VALVE SELECTION

Diverter selection is via button B2

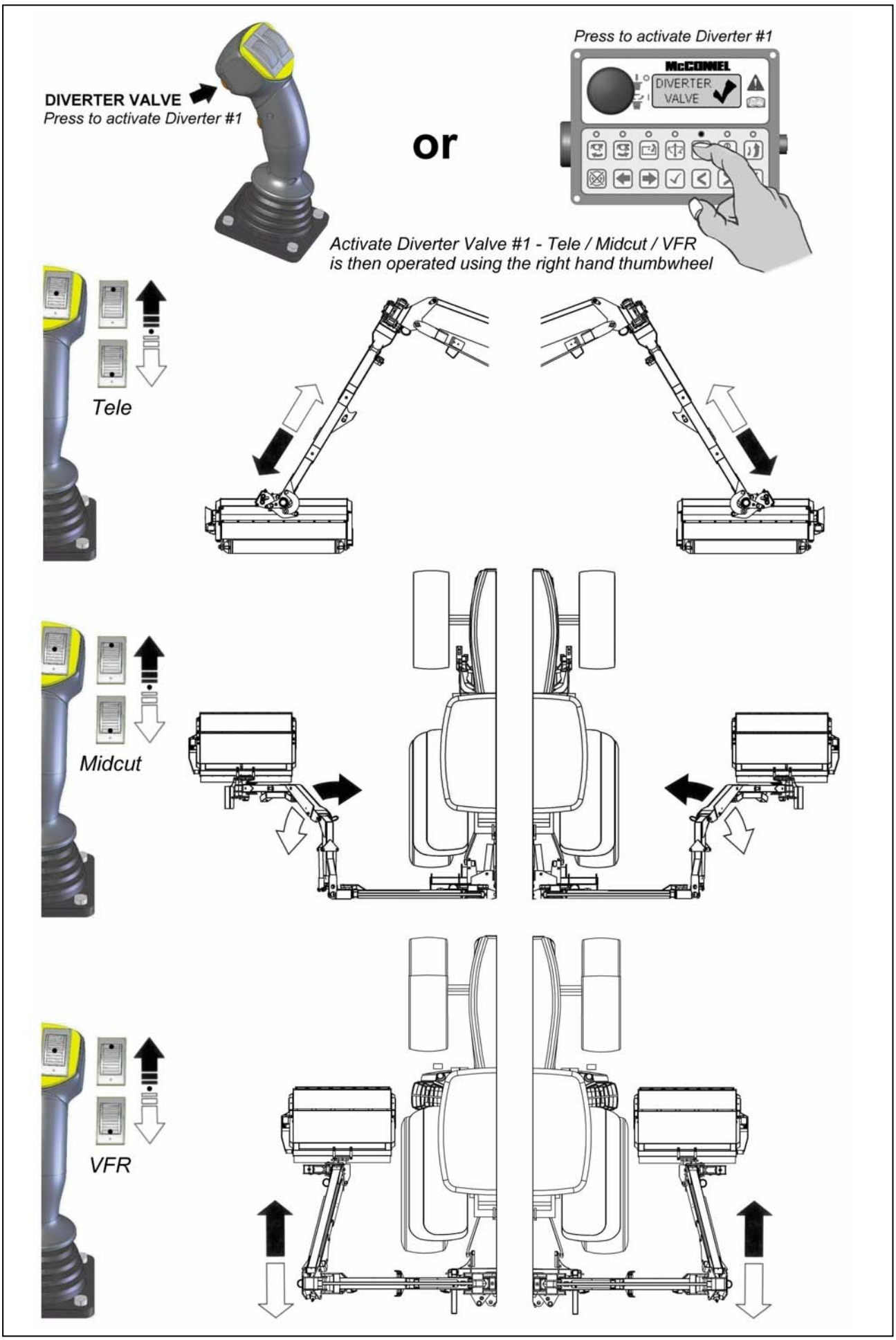


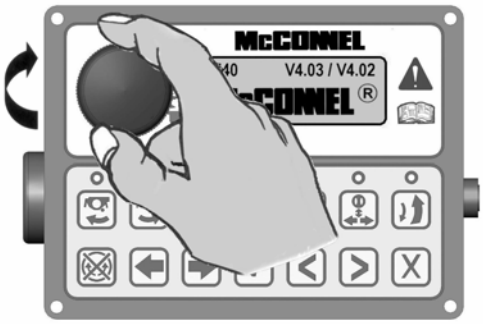




*NOTE: Illustration shows the left hand thumbwheel as the default angle control, this can be swapped within the settings to the right hand thumbwheel if desired.*

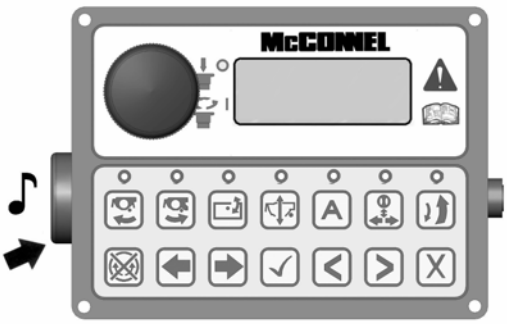
# TELE / MIDCUT / VFR OPERATION – JOYSTICK CONTROLS (Diverted Mode)



**Power on/off switch (E/Stop)**

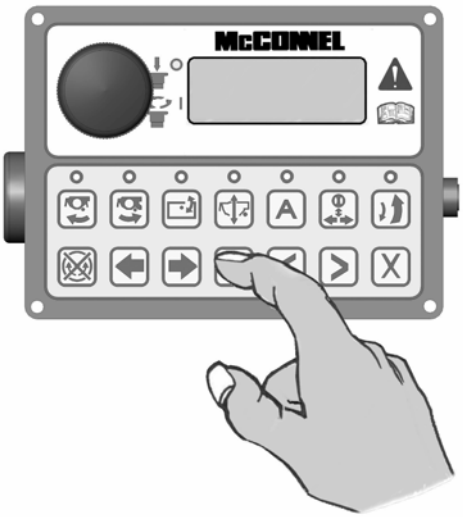



**Speaker (audible confirmation)**

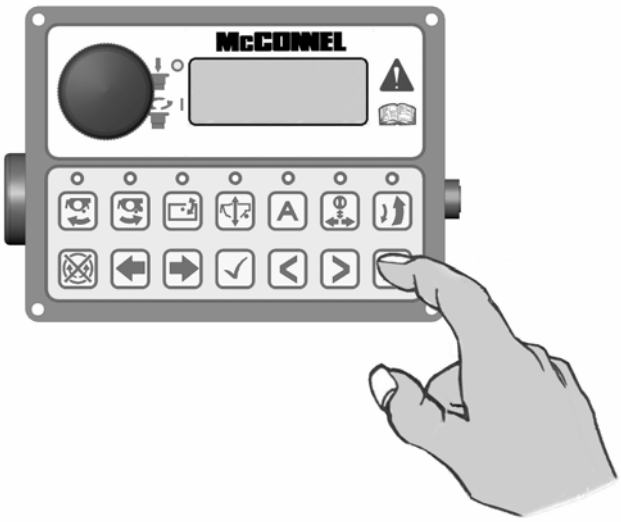



**Control unit emits an audible confirmation 'beep' when the buttons are pressed.**

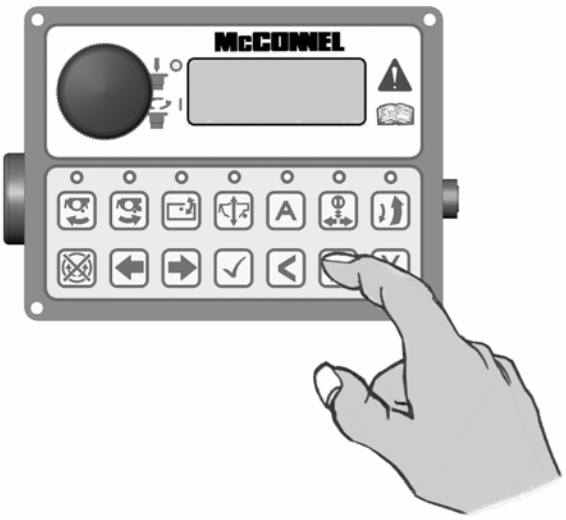
**Command Button [✓]**




**Command Button [X]**




**Navigate Forward Button [>]**




**Navigate Back Button [<]**

# V4 CONTROL UNIT – LED Screen Display & Functions

**IMPORTANT: Under no circumstances should a V4 Control Unit be connected to a V3 ACB (Auxiliary Control Box). Dedicated V3.5 & V4 Upgrade Kits are available from McConnel Limited – contact your local dealer or McConnel direct for available options and specific advice on this subject.**

Rotate the ON/OFF switch on the control unit clockwise to power up controls - unit will emit a single beep and the LED screen will light up. *Note: 12 Volts at the battery is required for the unit to function correctly.*

1. Screen will initially display the 'McConnel' name along with the selected PTO speed and the software versions installed on the Armrest and the Control Box respectively.


2. Pressing the scroll forward [►] button once will display the rotor running times screen. '**TOT'** displays the overall total running time of the rotor which is a cumulative total and cannot be reset. '**JOB'** is a 'trip' total for the current rotor running time and can be reset to zero by pressing and holding the [X] button for 3 seconds.


3. Pressing either of the 'Rotor On' buttons will activate the 'egg timer' icon and display the rotor on image.


4. Pressing the EDS Lift float button will turn on the EDS (EDS Lift Float machines only). Then SOFT, MED or HARD will be added to the running screen.


5. Pressing the tick [✓] button when EDS is turned on will scroll through the EDS work settings of SOFT, MED or HARD. This may also be operated via button B1 on the joystick.



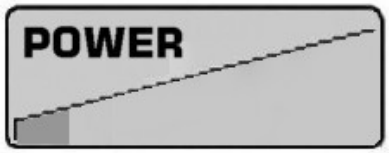
6. Pressing scroll forward [►] button will now display the actual Tractor PTO running speed.


7. Scrolling forward [►] again displays the Power Monitor screen.

   Scrolling backwards [◄] will display the screens in the opposite order.

## POWER MONITOR

When displayed the power screen will indicate to the operator the level of power being demanded by the cutting head – an ascending graphic indicates the power demand status from minimum on the left of the screen to maximum on the right.




**Power Status – Low Demand**


**Power Status – High Demand**

When the power demand approaches the maximum limit an audible warning will alert the operator to indicate that the rotor is under excess load and at risk of 'stalling' – when this audible warning sounds the operator should reduce the forward tractor speed to protect the machine and regain efficient cutting power – the audible warning will cease when the power demand returns to an acceptable level.
In certain cases, cutting materials of extreme density may cause an increase in the power usage to the 'warning level' – in these types of conditions raising the cutting head into a less dense area of the material will regain an acceptable power demand. It is advisable that work in problematic high density materials be performed in several passes, lowering the cutting head slightly on each pass until the required cut height is achieved.

### ADDITIONAL CONTROL & SCREEN SETTINGS

Additional settings available to the operator can be found within the settings menu of the control unit and accessible via the screen and menu buttons on the control panel.
Access is gained by simultaneously pressing the scroll [◄] [►] buttons on the control panel until the unit emits a 'beep' and the setup screen appears on the LCD - the features can then be 'scrolled' to (forwards or backwards) by subsequent operation of either of the scroll [◄] [►]buttons. When the required screen is reached the tick [✓] button should be pressed to enter the settings menu for that feature.

**THUMB (Thumbwheel Switching)** – this allows the operator to 'swap over' the left and right thumbwheel functions so that they control the opposing features. In most cases this setting will be dictated by the operators' personal preference and once chosen the operator will keep it in the selected mode.
Options are 'Normal' or 'Swap' – selection is by 'highlighting' the required option using either of the scroll [◄] [►] buttons – the feature is then activated using the tick [✓] button. Pressing the [X] button exits the screen settings and returns to the normal work screen.

**LED (Screen Contrast)** - this setting allows the operator to adjust the contrast level of the LED display – the feature affords the option to increase or decrease the contrast level to suit differing lighting conditions; this is particularly useful on dull or sunny days where reduced or increased natural light can affect screen clarity.
Options are 'Increase Contrast' or 'Decrease Contrast' – selection is by 'highlighting' the required option using either of the scroll [◄] [►] buttons – once selected that particular option can then be adjusted in incremental steps by pressing the tick [✓] button the required number of times to achieve the desired contrast. Pressing the [X] button exits the screen settings and returns to the normal work screen.

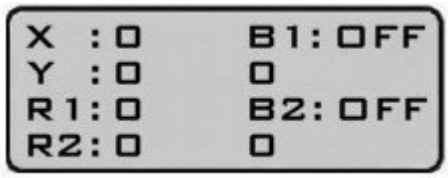
**CAUTION: Avoid adjusting the contrast level to a state where the screen cannot be viewed as exiting the settings menu in this condition may render the LCD unusable as the 'on screen' prompts may no longer be visible to the user.**

**NOTE: Some screen menus are inaccessible to the operator – these are for factory or dealer use only and are password protected to avoid inadvertent changes to specific control settings.**

The following screens are available for testing and fault finding purposes, these are:

**JOYSTICK TEST SCREEN**

This screen reports the status of the CAN *(Controller Area Network)* signal from the joystick during its various functions.




**X and Y Display**

These report the joystick signal as it travels through its range of movements in its 2 axis – the 'X' axis being the 'Lift' up and down function and the 'Y' axis the 'Reach' in and out function.

With the joystick in the central *(neutral)* position both 'X' and 'Y' on the screen should read 0 *(zero)*. When the joystick is moved through a specific axis the relevant readout will increase or decrease depending on the direction and distance of movement up to a maximum of +1000 in the fully forward or fully right position and -1000 in the fully back or fully left position. If the display reports a reading above the + or – 1000 figure at any point of full travel the joystick has developed a fault and should be repaired or replaced.

**R1 and R2 Display**

These report the signals from the 2 thumbwheels on the top of the joystick and are calibrated to read +1000 in the fully back position and -1000 in the fully forward position. If either of the 'R' readings are above the + or – 1000 figure at the point of full travel the thumbwheel has developed a fault and should be repaired or replaced.

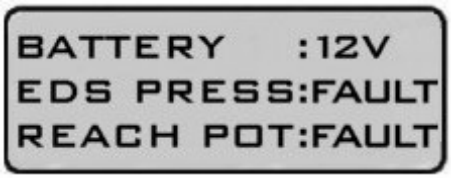
**B1 and B2 Display**

These report the status of the 2 joystick buttons and will display 'ON' when the button is activated or 'OFF' when deactivated. The readings below B1 and B2 on the screen record usage of the buttons.

**EDS STATUS SCREEN**

Although this screen is present on all v4 controls, with the exception of the voltage reading, the information it reports is only actually relevant to machines fitted with EDS.

In addition to the aforementioned voltage reading the screen will report Lift Ram Pressure and Reach Position status – in each case these will display 'OK' when the system is working correctly. If 'FAULT' is displayed next to one or other feature it means a problem has been detected with that component and it should be investigated further to locate and correct the problem.

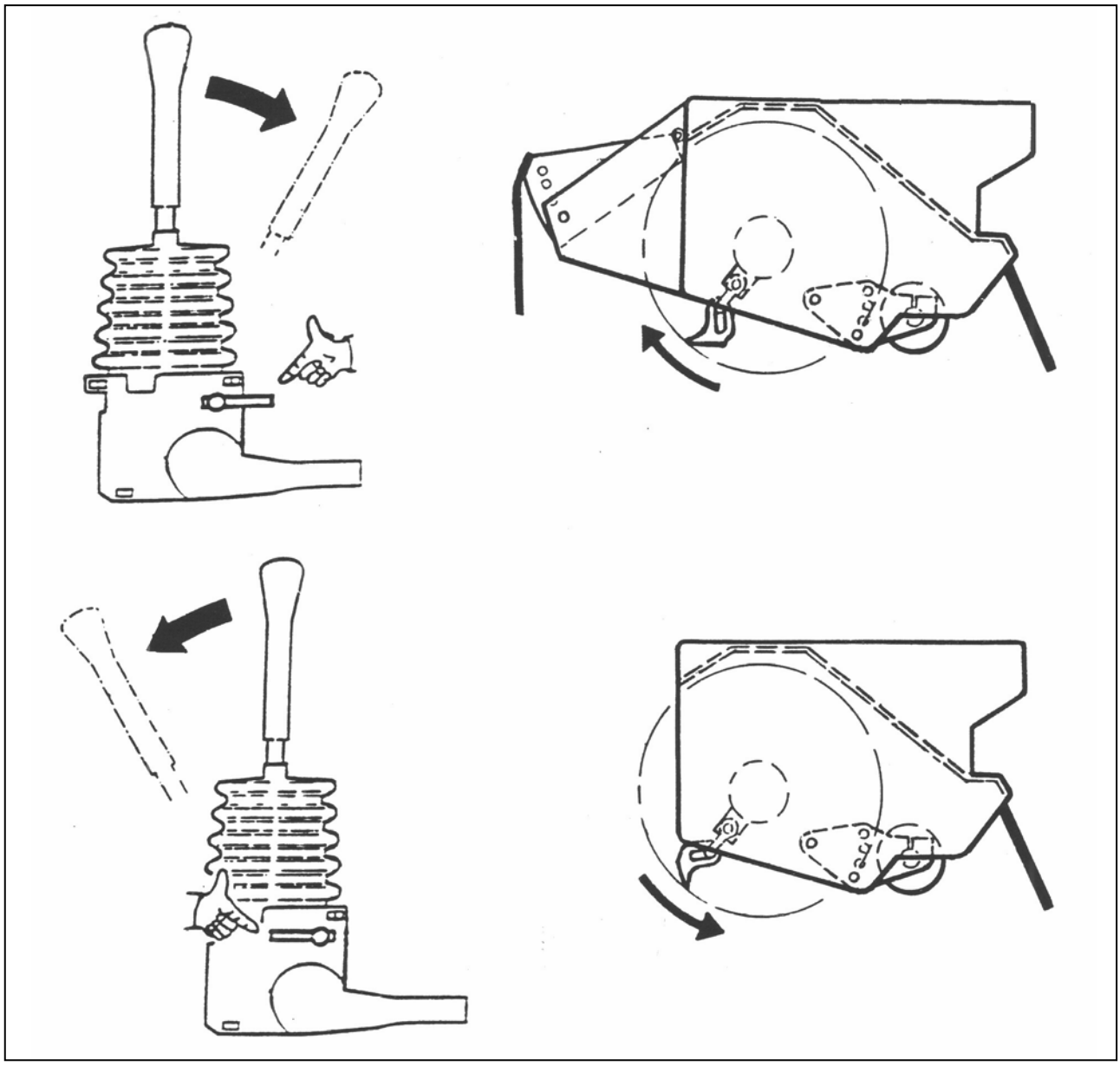

**NOTE: As the pressure and position features are not present on Non EDS machines by default the screen will display 'FAULT' next to the features on these models – this is normal and should be ignored. The voltage reading will be relevant on all models.**

**REACH FUNCTION SCREEN**

This screen displays the status of the joystick reach function and indicates to the operator if the controls are set for correct operation of the machine to the left hand side of the tractor or to the right hand side of the tractor. The hand symbol with a ✓ displayed on it indicates the operating side that is currently active.


**L/H Machine Operation**


**R/H Machine Operation**



**REVERSING ROTATION**

- Select ‘ROTOR OFF’.
- Wait until rotor has **stopped** turning.
- Turn the small lever on the side of the rotor control lever pivot box through 180° - *this will reset the control lever stop inside the pivot box and allow opposite rotation to be selected.*

## BREAKAWAY

The machine is fitted with a hydraulic breakaway device which protects the structure of the machine should an unforeseen obstacle be encountered.

**NOTE:**
**The breakaway function does not relieve the operator of his responsibility to drive carefully, be alert and AVOID OBVIOUS HAZARDS BEFORE CONTACT OCCURS.**

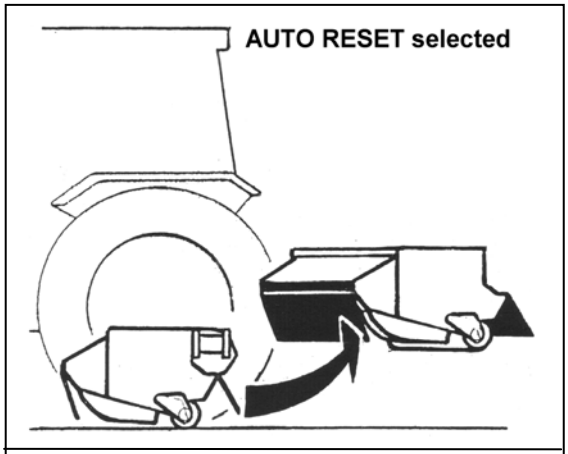
Breakaway may occur momentarily during normal work should an extra thick or dense patch of vegetation be encountered. In these instances tractor forward motion may be maintained with care.
Where breakaway has occurred as a result of contacting a post or tree etc. the tractor must be halted and the controls 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.**

**NOTE:**
**The force 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.**

On mid-cut machines the geometry of the breakaway will cause the head to initially move outwards in addition to rearwards. Therefore be aware that the breakaway action will be impeded if the outer end of the head is working against a steep bank. In this circumstance extra care must be taken during operation to avoid this occurrence.
Breakaway occurs at the slew column pivot. When an obstacle is encountered continued forward motion causes the pressure in the slew ram base to rise until the relief valve setting is exceeded.

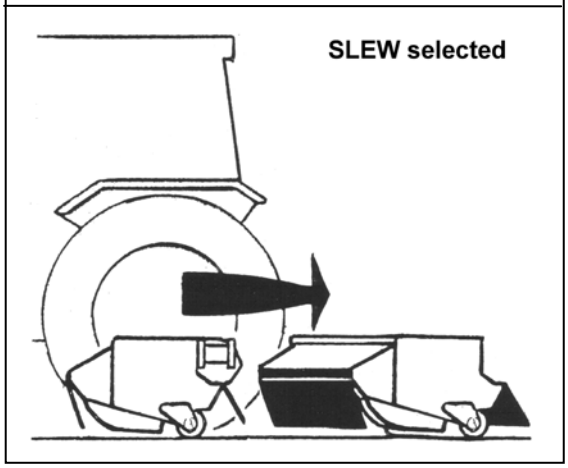
**With 'AUTO RESET' selected:**
When the slew relief valve setting is exceeded oil is displaced from the slew ram into the base of the lift ram which causes the head to rise as the arm pivots backwards to clear the obstruction.

Resetting of the head into the work position occurs automatically.



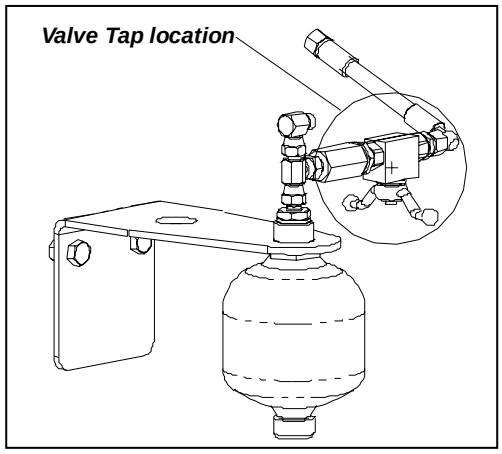

**With 'SLEW' selected:**
When the slew relief valve setting is exceeded oil is displaced from the slew ram allowing the arm to pivot backwards horizontally and the obstacle to be cleared.

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



## AUTO-RESET – Pressure Setting for Front Mounted Machines

The procedure for automatically setting pressures for Auto-reset on Front Mounted models is as follows:

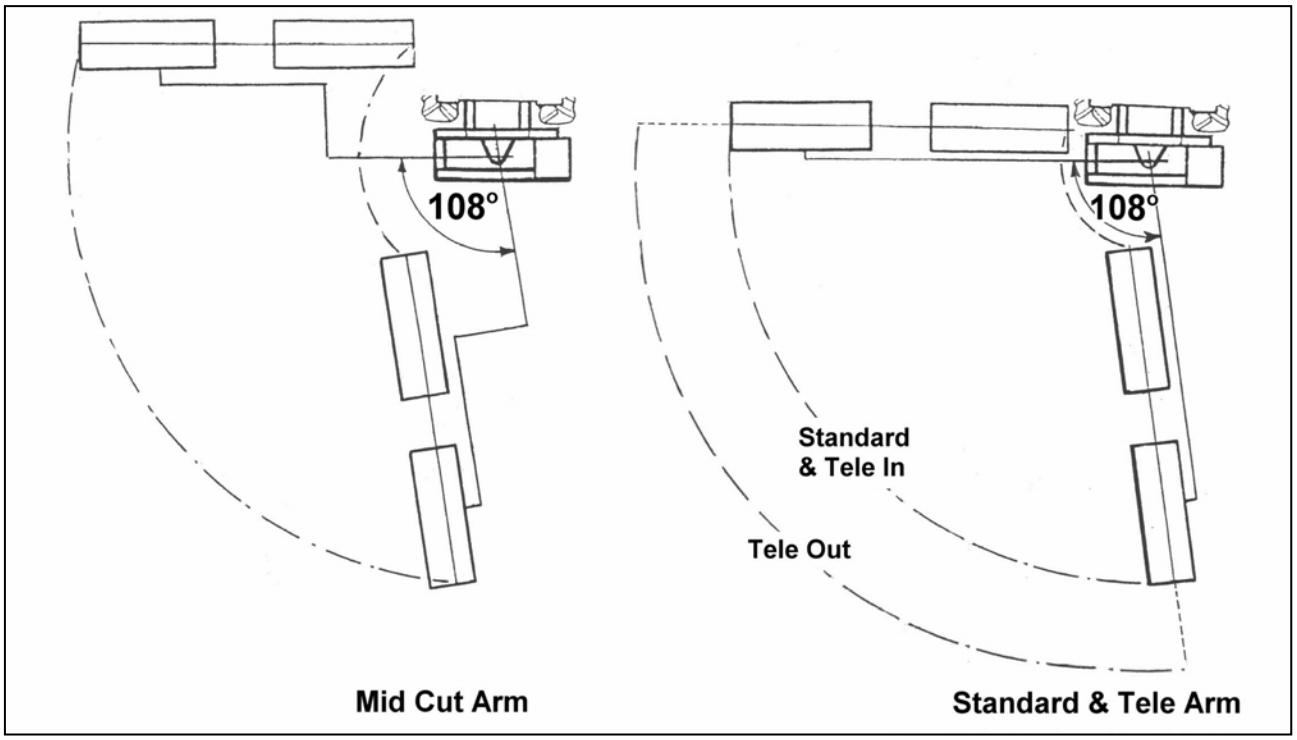



- Manoeuvre flailhead to a horizontal position where it is close to the tractor and resting on the ground.
- Open valve tap to allow oil in - *see diagram opposite for tap location.*
- Operate machine to raise the flailhead until it is clear of the ground and then return it back to the ground.
- Close valve tap.

The pressures will now be automatically set.

NOTE: *A test point is located on the Breakaway Ram to allow pressure to be checked or to 'bleed' air from the system should it be required.*

## POWERED SLEW

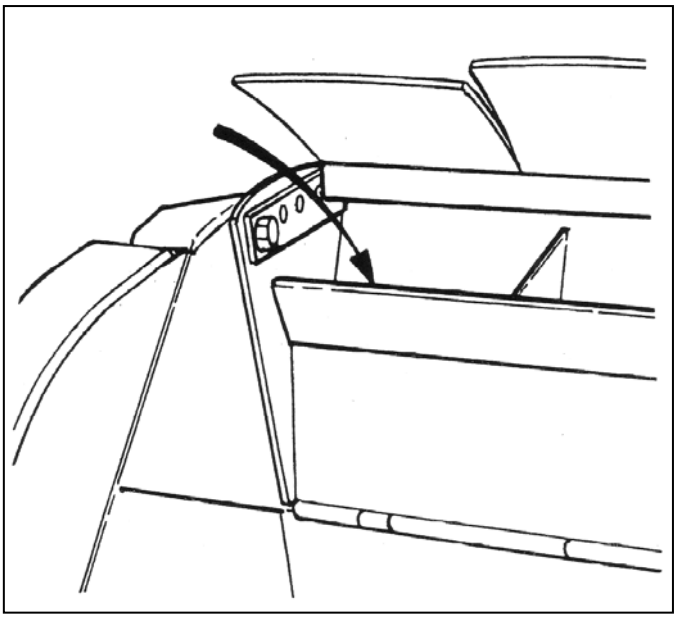



The slew feature allows a 108° arc of powered arm movement on the working side, from right angles to the tractor, to 18° beyond the direct line astern.
This feature is required to place the machine in the transport position but can also be used to sweep the arm 'to and fro' whilst cutting awkward areas 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.

**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 the reach fully in**
**IT IS POSSIBLE FOR THE FLAIL HEAD TO HIT THE TRACTOR OR MACHINE FRAME.**

The flail head is equipped with a wire cutting edge welded into the underside. This is to ensure that the ends of any wire that may be entwined in the rotor are cut and fall within the confines of the flail head. ***This plate should not be interfered with in any way.***
Any wire caught in the rotor must be immediately removed *(see below).*



**REMOVING WIRE**

- Select rotor **'OFF'** and wait until it has **stopped rotating.**
- **STOP** the tractor and **only then** remove wire.

***Do not reverse the rotor in an attempt to unwind any wire.***

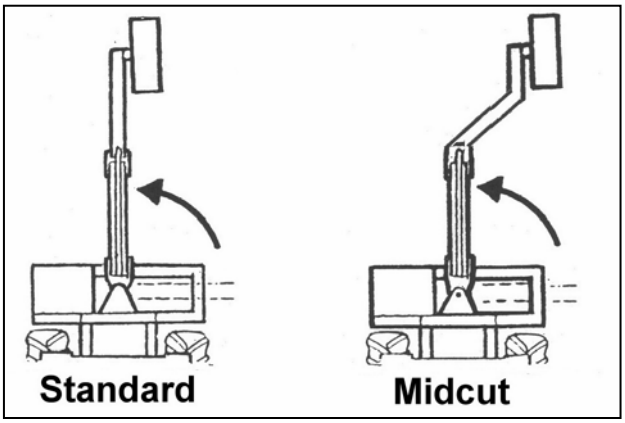
## MOVING INTO THE TRANSPORT POSITION

- Select ‘ROTOR OFF’ and wait until the **rotor has stopped turning.**

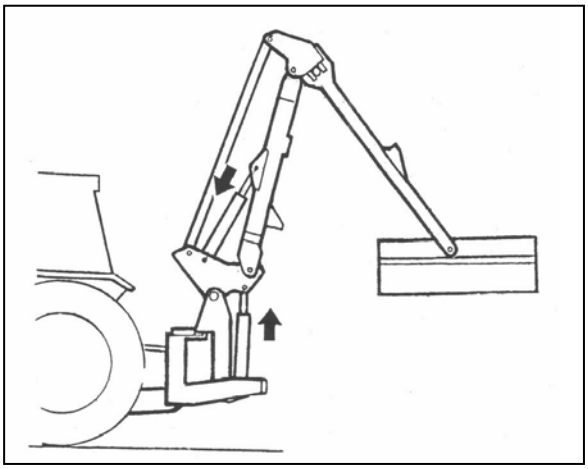
- Ensure that the **‘lift’** and **‘angle float’** are switched **off.**

- Select ‘SLEW’ mode on the control assembly.

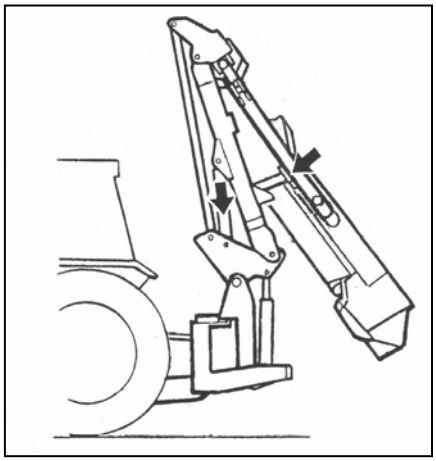
- Operate ‘SLEW IN’.




- Operate ‘LIFT’ and ‘REACH’ to position the machine *(see diagram).*



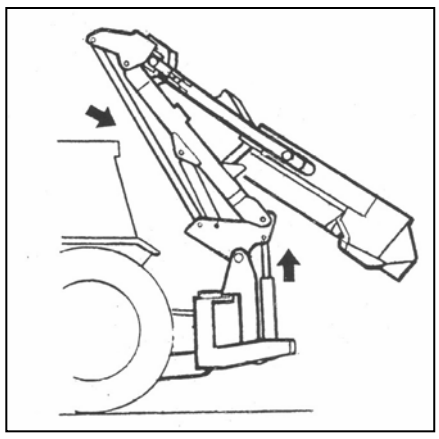
- Operate ‘REACH IN’ until the dipper arm contacts the transport cradle.



- Select ‘LIFT UP’ and raise the arms until the tension link is 300mm from the tractor cab.

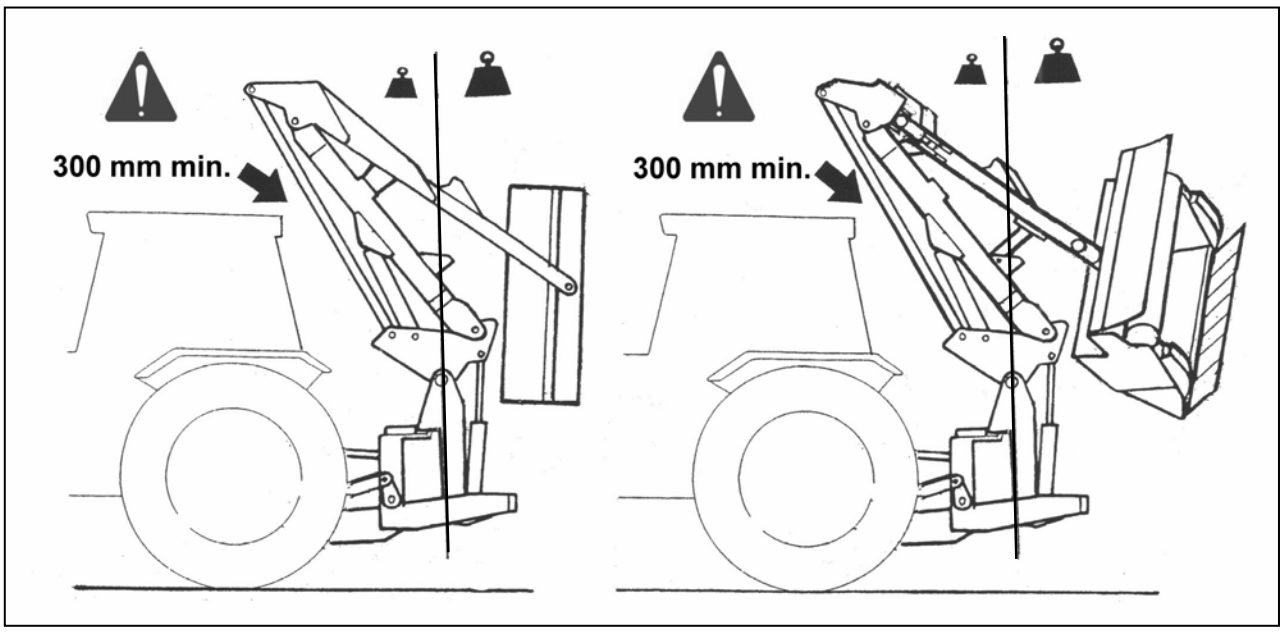
- Operate ‘ANGLE’ and position the flail head in as compact position as possible. *(see transport position)*

- Fully screw in the lift ram and slew ram taps.

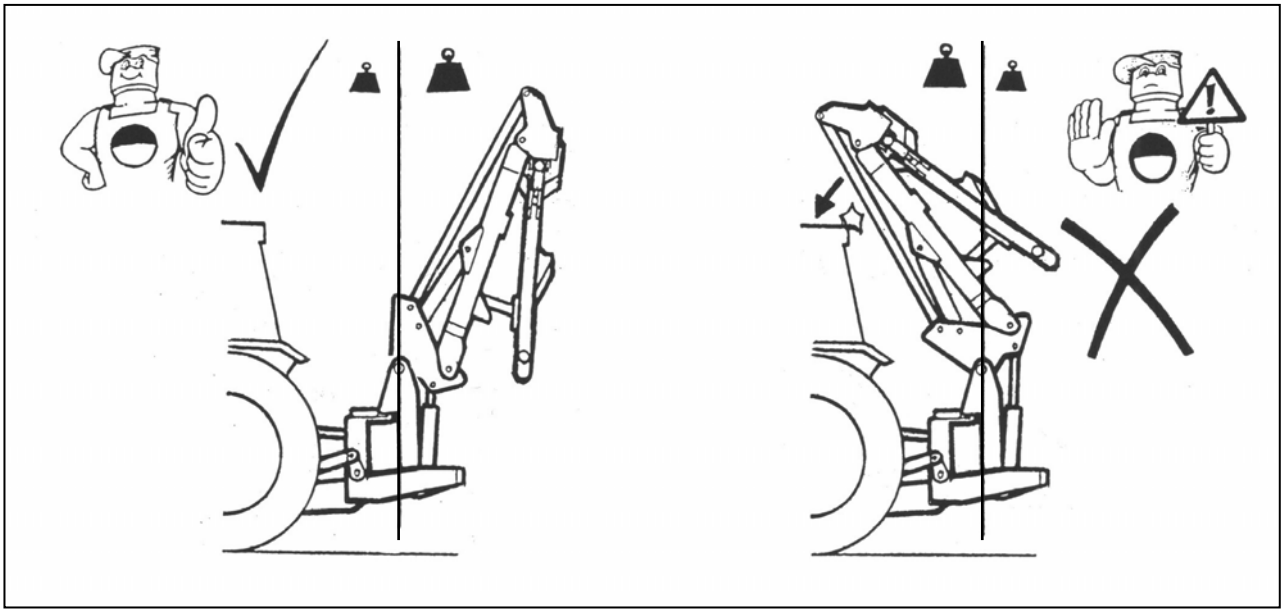


## TRANSPORT POSITION – Rear Mounted Machines

The machine is transported in line to the rear of the tractor with a minimum of 300mm clearance between the tension link and the rear cross member of the tractor cab.




## TRANSPORT POSITION WITH FLAILHEAD REMOVED

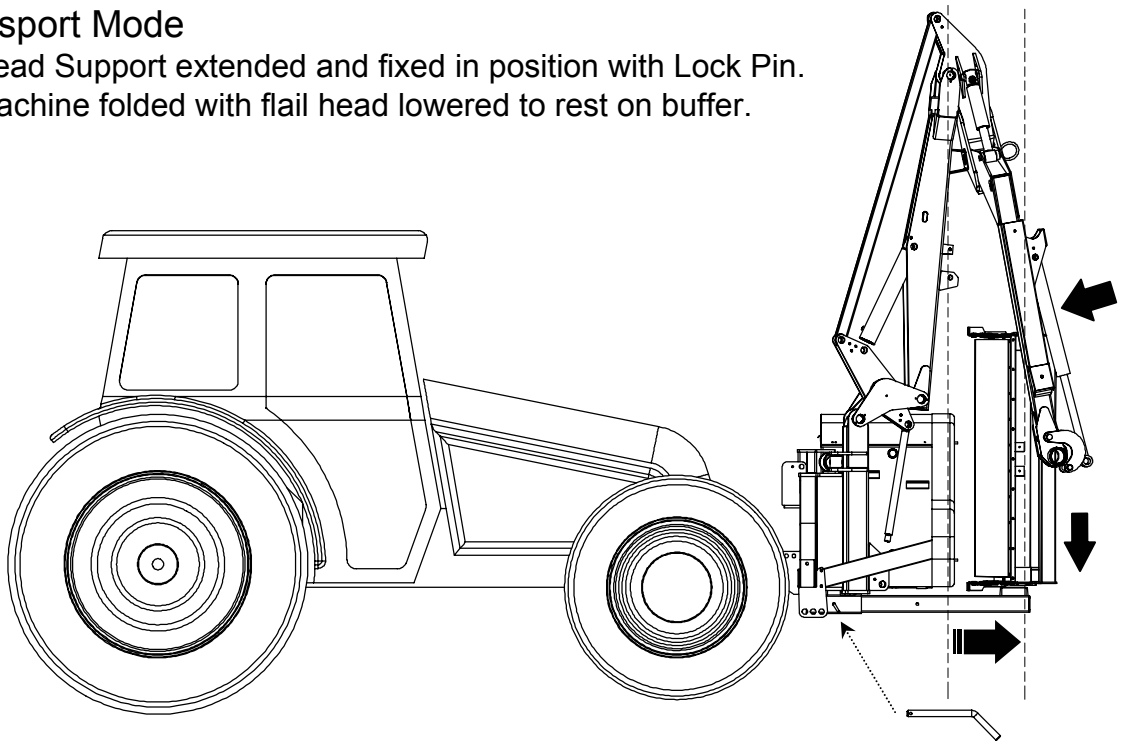


With the flailhead removed the arms are fully folded but with the lift ram fully retracted. If the lift ram is extended the weight of the arms will result in the balance of the machine to go ‘over centre’ causing the tension link to crash into the rear cross member of the tractor’s cab.

**WARNING!**
**During transport the 'SLEW’ mode must ALWAYS be selected on the controls.**

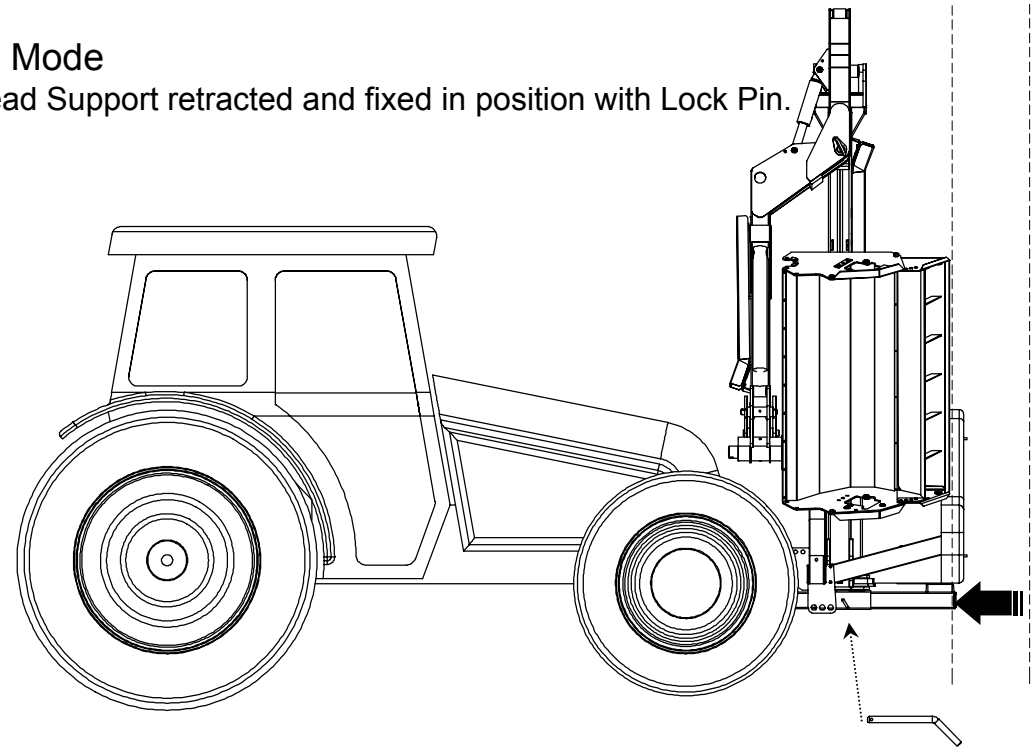
## Transport Mode

- Head Support extended and fixed in position with Lock Pin.
- Machine folded with flail head lowered to rest on buffer.



## Work Mode

- Head Support retracted and fixed in position with Lock Pin.

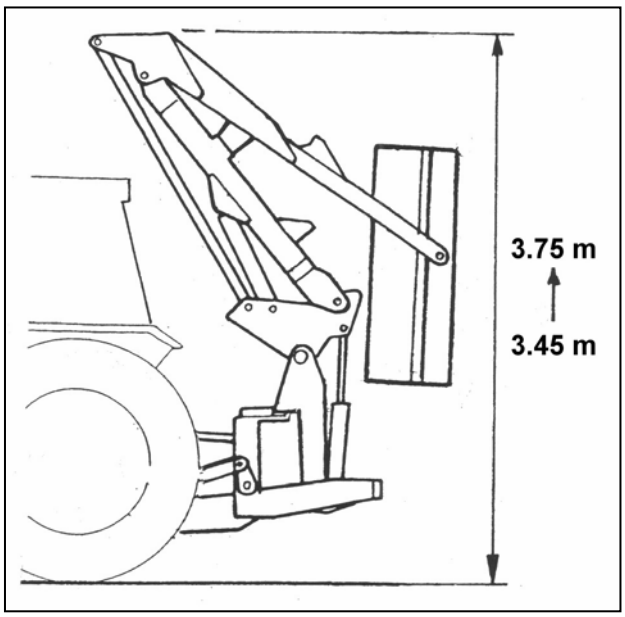


## TRANSPORT

When in transport the PTO must be disengaged and the power to the control box switched off.
The acceptable speed of transport will vary greatly depending upon the ground conditions. In any conditions avoid driving at a speed which causes exaggerated bouncing as this will put unnecessary strain on the tractors top hitch position and increase the likelihood of the tension link contacting the cab rear cross member.

**TRANSPORT HEIGHT**
There is no fixed dimension for transport height. It will vary depending on the height that the machine is carried and the degree of arm fold that the rear of the cab will allow.

For the majority of installations the transport height will generally fall between a minimum of 3.45m and a maximum of 3.65m when the machine is correctly folded




## MOVING FROM TRANSPORT TO WORK POSITION (all models)

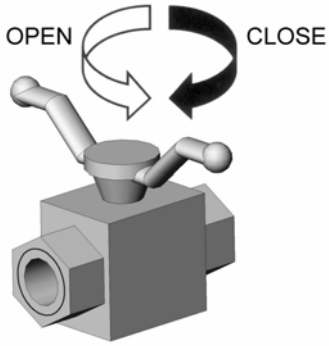
To revert to the work position' the previous procedures for the relevant models are largely reversed.

**NOTE: Remember to unscrew the lift ram tap.**

**ENGAGING DRIVE**
Ensure that the rotor control lever is in the 'Stop' position before engaging the PTO shaft. Allow the oil to circulate for a minute or so before operating the armhead levers. Position the flail head in a safe position, increase the engine speed to a high idle and move rotor control lever to 'START' – After initial 'surging' the rotor will run at an even speed.

**Slew Lock**

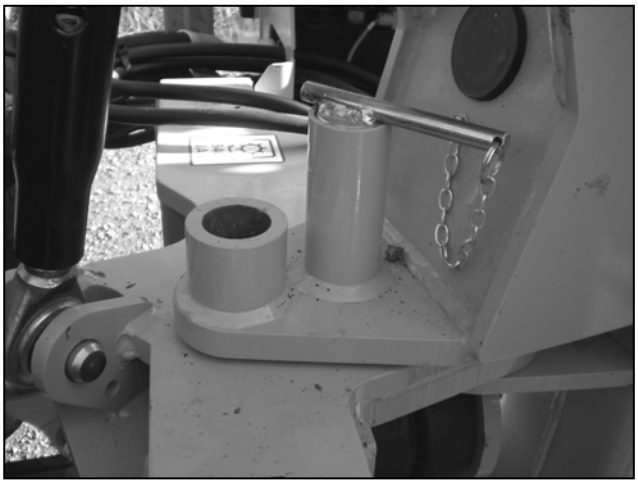
All machines with slewing capability are fitted with a slew lock – depending on the particular machine this will either be in the form of a lock tap fitted to the slew ram or a slew locking pin that locates through the pillar into the top of the mainframe. The slew function must be 'locked' at all times during transportation and storage of the machine and only unlocked for work. The illustrations opposite and below show the different types of slew locks:




**TAP TYPE SLEW LOCK ►**
**Open** – ***only for working***
**Closed – *always for transport & storage***

**PIN TYPE SLEW LOCK *(NOTE: PA600 model shown for illustration purposes only)***

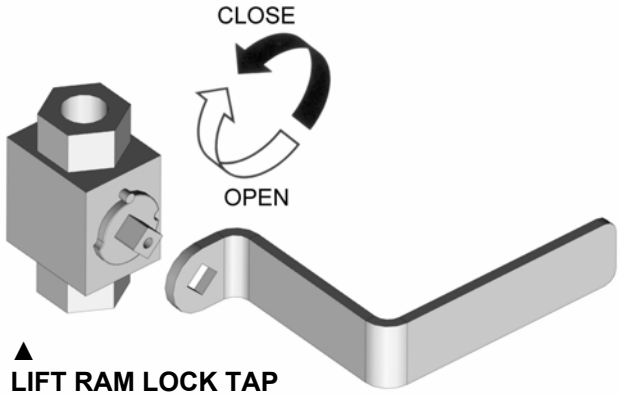
**Slew Locked – *always for transport & storage***



**Slew Unlocked – *only for working***

**Lift Ram Lock**

Certain machines, predominantly larger models, will be fitted with either one or two lift ram lock taps – on machines where these are fitted the tap(s) should always be closed during transportation and storage of the machine to prevent movement of the arms during transport or when the machine is parked up. The tap lock(s) will be similar to the one illustrated opposite.

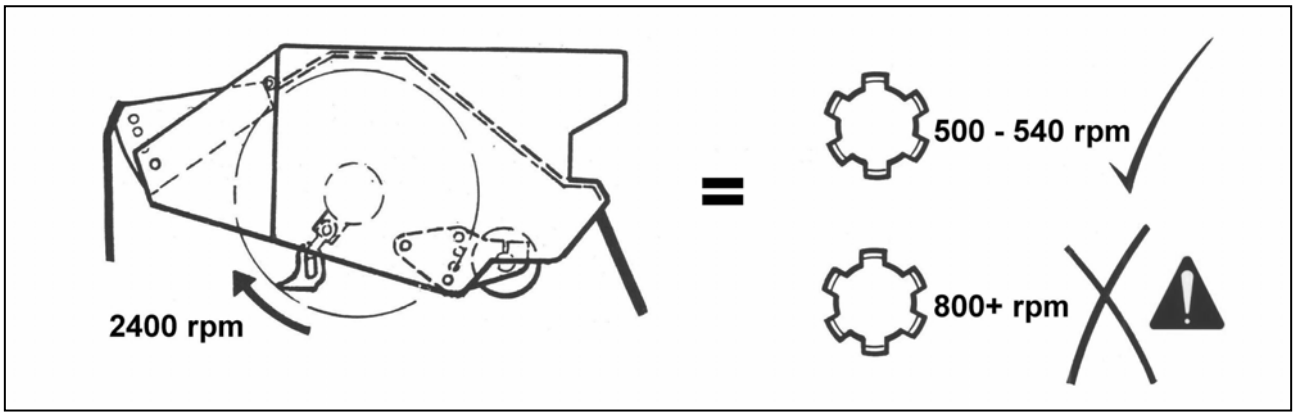



▲
**LIFT RAM LOCK TAP**
**Open** – ***only for working***
**Closed – *always for transport & storage***

**CAUTION!**

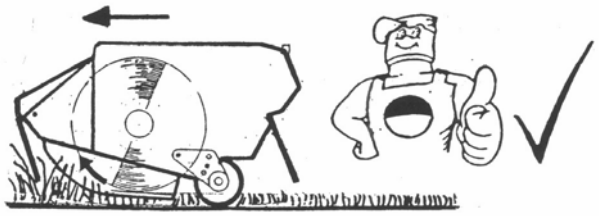
**Where fitted Slew and Lift Locks must be in the closed / locked position at all times during machine transportation and storage – open / unlock only for work.**

## ROTOR OPERATING SPEED - Rear Mounted 65HP Gear Machines

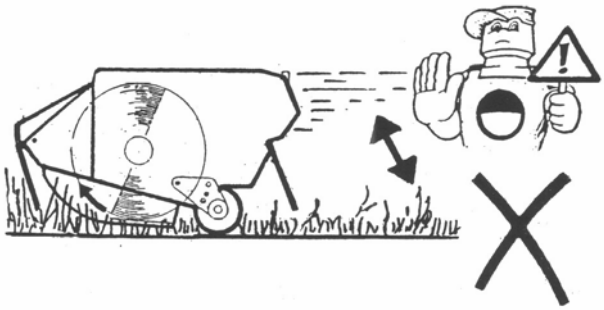



### TRACTOR FORWARD SPEED

The material being cut determines tractor forward speed. Forward speed can be as fast as that which allows the flail head sufficient time to cut the vegetation properly.

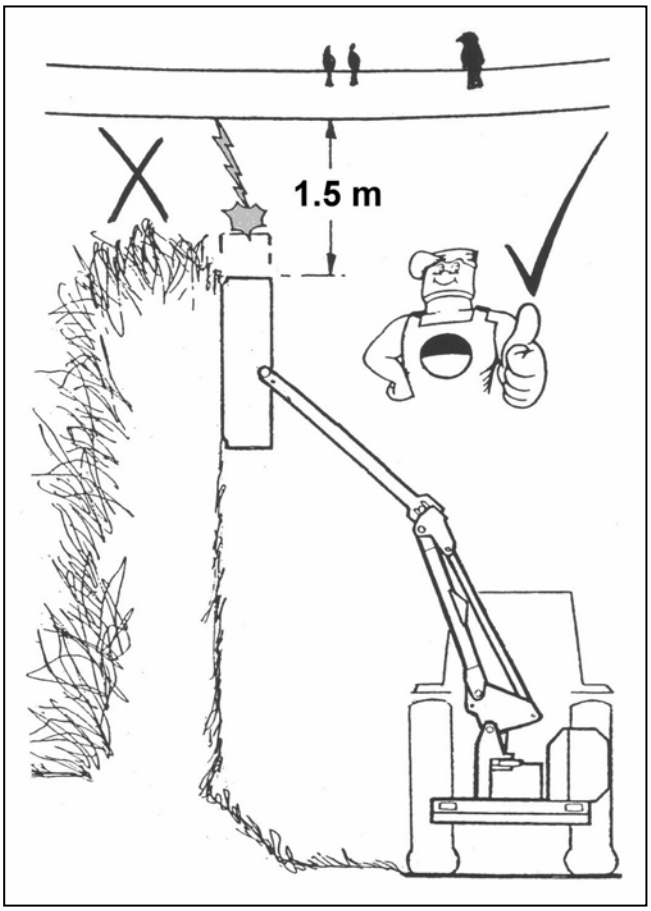


Too fast a speed will be indicated by over frequent operation of the breakaway system, a fall off in tractor engine revs and a poor finish to the work leaving ragged uncut tufts and poorly mulched cuttings.



## HIGH VOLTAGE CABLES

It cannot be stressed enough the dangers involved when working near high voltage electricity cables. Before attempting to work in these areas ensure you have read and fully understood the safety section at the beginning of this manual which includes information on this subject.




**ALWAYS MAINTAIN A MINIMUM CLEARANCE DISTANCE OF 1.5M WHEN OPERATING NEAR HIGH VOLTAGE CABLES**

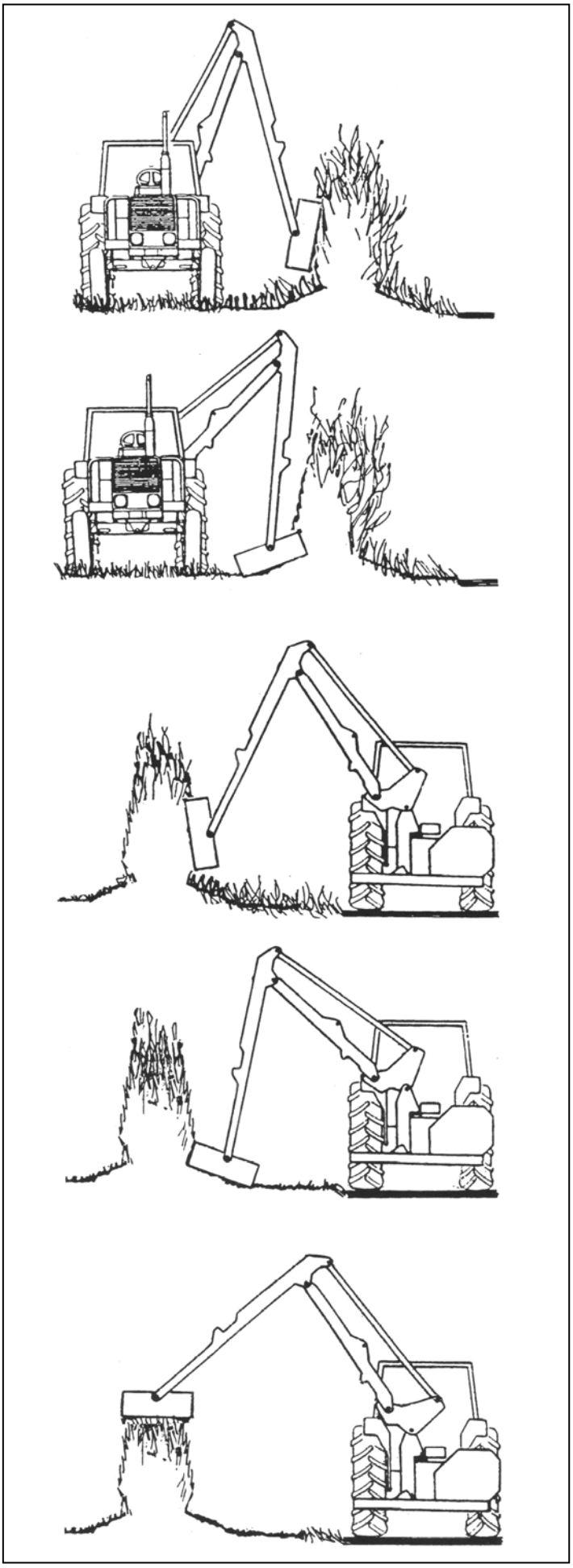
***It is advisable that you consult your Local Power Company to obtain information regarding a safe procedure for working in close proximity to power lines.***

## OVERHEAD OBSTRUCTIONS

Always be aware of the height of the machine whilst working or in the folded position - take care especially when manoeuvring near or under bridges, buildings, power cables or any other obstacles you may encounter whist moving your machine.

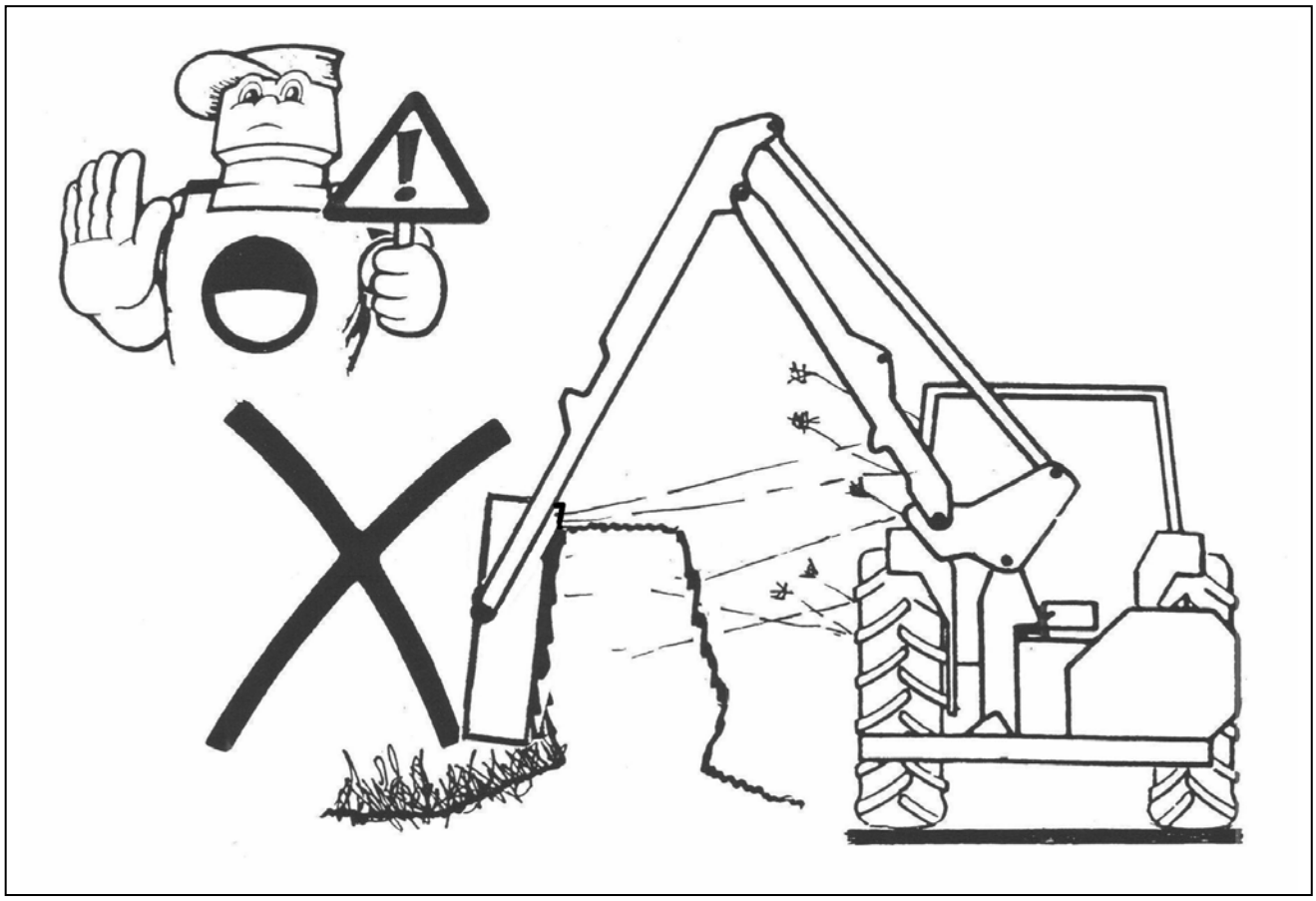
# HEDGE CUTTING PROCEDURE

1. 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.



2. Cut the side and bottom of the road side.

3. Top cut the hedge to the height required.



**WARNING!**

**NEVER CUT ON THE BLIND SIDE OF THE HEDGE.**

**It is impossible to see potential hazards or dangers and the position of the flail head would possibly allow debris to be propelled through the hedge towards the tractor and the operator.**

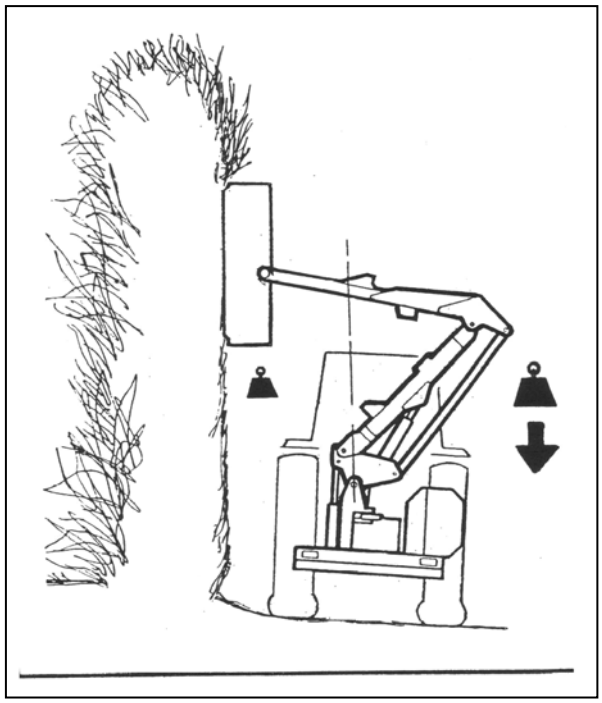
## WORKING ON ADVERSE SLOPES

When working high with the 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 connection of the lift ram prevents sudden unpredictable movements should this occur.

**WARNING**

**Do not remove this restrictor from the lift ram gland connection.**

The machine is fitted with a cam valve which stops unpredictable movements when working with the machine in a high position.

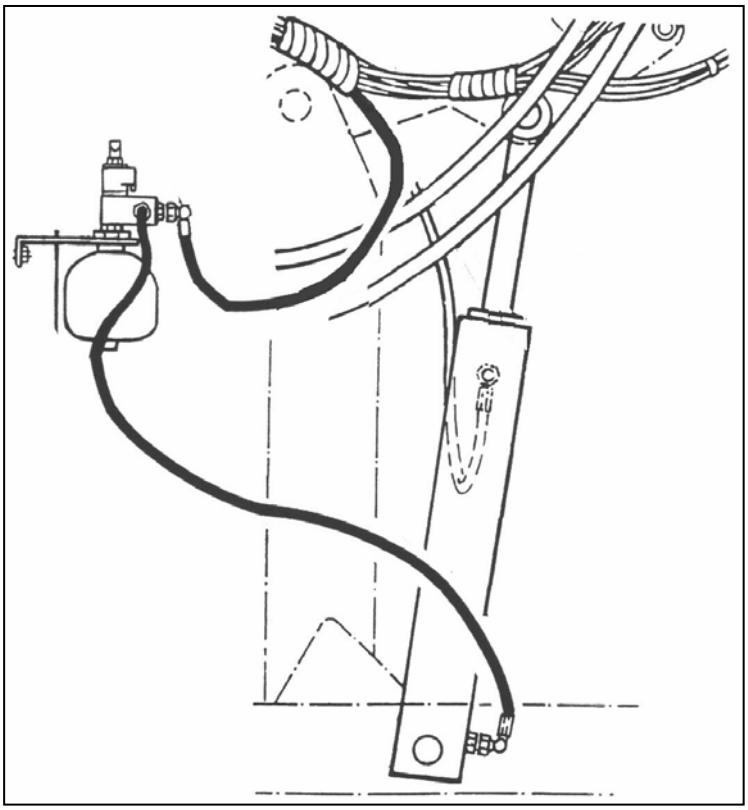


## HEAD ANGLE FLOAT KIT – Standard Feature

This facility allows the flailhead to angle itself automatically to suit the contours of the ground – on multilever and monolever switchboxes the function is activated by selecting 'C'.

## LIFT FLOAT KIT – Optional Extra for ground cutting

**When fitting float kits always ensure they are mounted on their special bracket and positioned such that they do not foul or interfere with other components during the slewing movements of the machine.**



**CABLE CONTROLLED MACHINES**

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

**ELECTRIC CONTROLLED MACHINES**

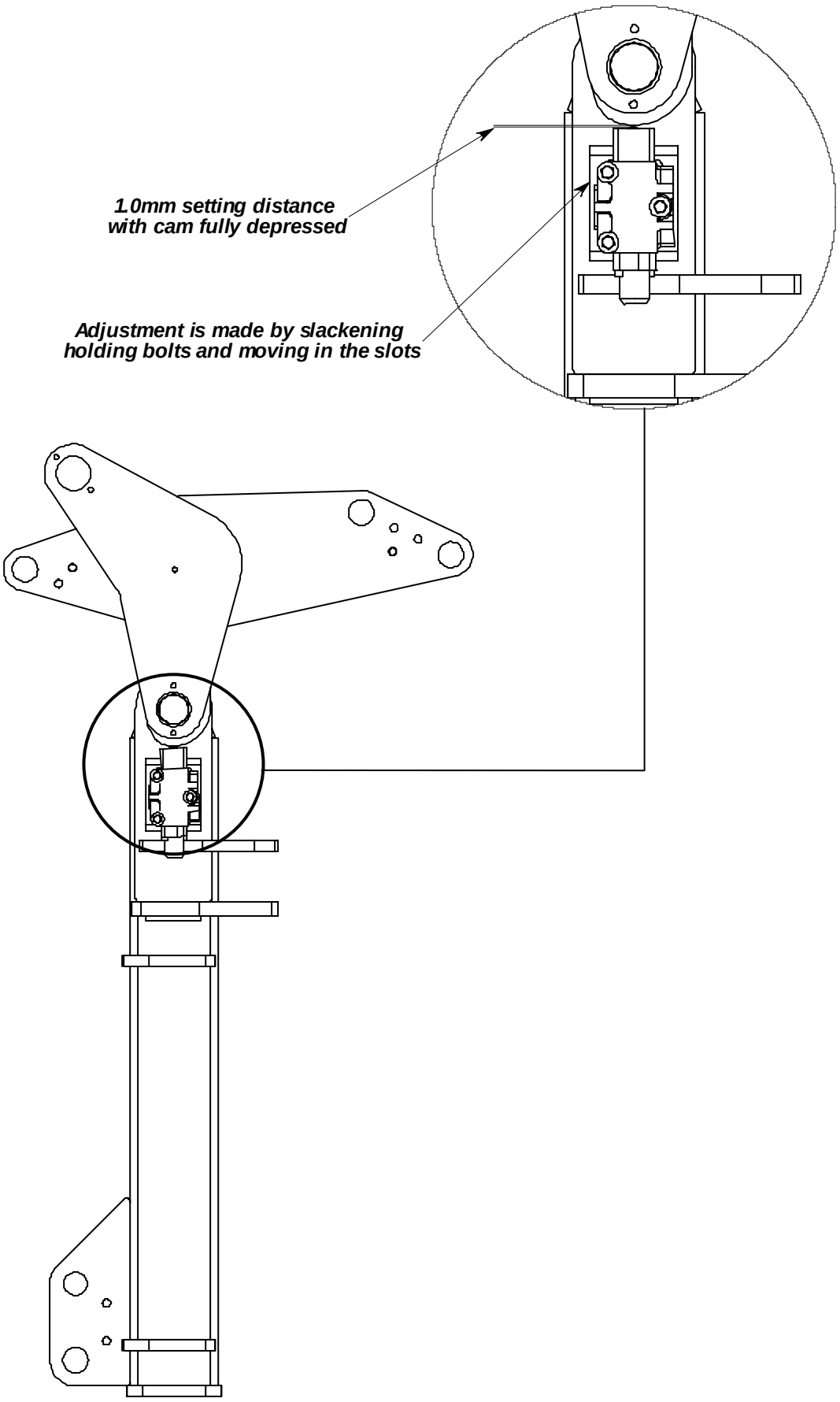
The auxiliary switch on multilever electric controlled machines is a three-position type, which will allow the selection of head float alone, or head and angle float in unison, if both options are fitted. For standard electric controlled machines power to the unit is via connection 15 and common connection 16. V.3 non-EDS proportional machines use connections LF and C.

In work with the solenoid valve open the flailhead will automatically follow the ground contours. The float action is engaged by selection of the auxiliary switch.

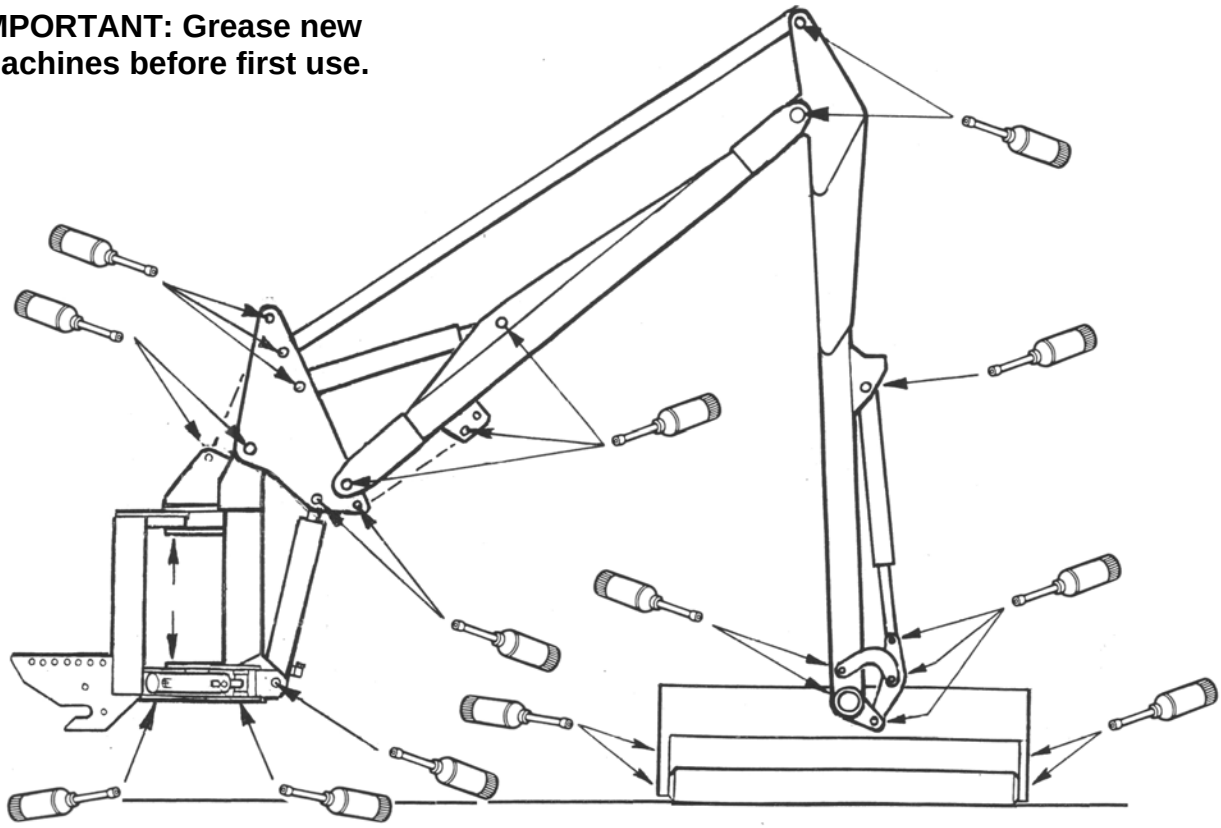
The lift control should be operated to take a proportion of the flail head weight off the flail roller. This is important, too little weight on the roller will leave areas of grass while with too much weight on the roller the ground will be scalped in places and increased flail wear, damage, or even loss of flails could occur.

To revert to standard operation the accumulator(s) is isolated from the lift ram by deselecting the float switch.

# CAM VALVE ADJUSTMENT



**IMPORTANT: Grease new machines before first use.**



## GENERAL

All points shown above should be greased on a daily basis and prior storage of the machine. New machines must be greased prior to first use.

## GEARBOX LUBRICATION

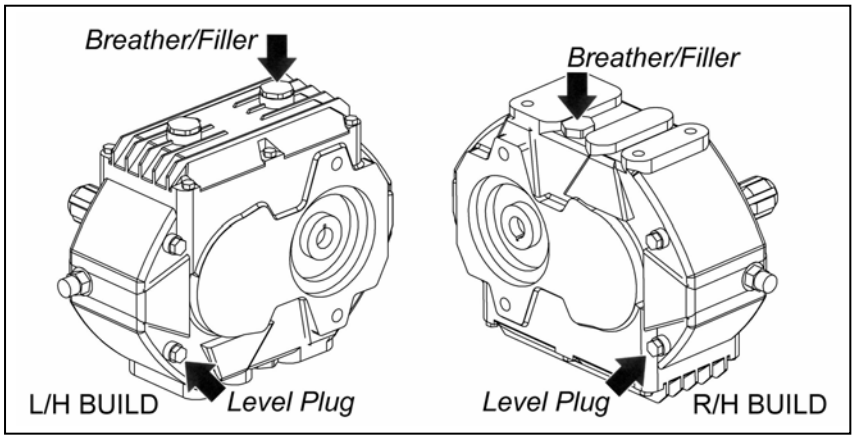
Check gearbox oil level on new machines prior to first use, top up if required before using the machine. Refill the gearbox after an initial 50 hours of use and thereafter at annual or 500 hour intervals, whichever occurs earliest.

### Gearbox Capacity

**Cast Iron Gearbox – *Capacity 0.7 Litre SAE90***


Drainage of the gearbox for changes of oil is via the drain plug located on the base of the gearbox.

For refilling or for 'topping up' the oil remove both plugs indicated opposite and fill gearbox via the filler plug to a point where the oil starts to run from the level plug orifice – replace plugs and tighten securely.



**OIL SUPPLY**
Check the oil level in the reservoir daily.

No fixed time period can be quoted for oil changes as operating conditions and maintenance standards vary so widely. Burnt and scorched oil odours and the oil darkening and thickening are all signs of oxidation and indicate the oil should be changed.

Moisture that results from condensation can become entrapped in the oil and cannot be removed by filtration so that water contamination is progressive.

Contamination can be reduced by:

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

**FILTRATION MAINTENANCE**
Machines are protected by both replaceable 125 micron suction strainers and low pressure full flow return line filters.

**Suction strainers**
The replaceable suction strainers *(Part No. 8401091)* are fitted within the reservoir.

**Return Line Filter**
The 25 micron filter elements *(Part No. 8401089)* should be changed after the first 50 hours and thereafter at 500-hour intervals. 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 tank breather *(Part No. 8401090)* annually.

# 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 (B.S.P.) 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:-

| | | | | | **REF.'O' ring** |
|---|---|---|---|---|---|
| ***1/4" BSP*** | ***=*** | ***24 N.m*** | ***or*** | ***l8 lbf ft*** | ***10 000 01*** |
| ***3/8" BSP*** | ***=*** | ***33 N.m*** | ***or*** | ***24 lbf ft*** | ***10 000 02*** |
| ***1/2" BSP*** | ***=*** | ***44 N.m*** | ***or*** | ***35 lbf ft*** | ***10 000 03*** |
| ***5/8" BSP*** | ***=*** | ***58 N.m*** | ***or*** | ***43 lbf ft*** | ***10 000 04*** |
| ***3/4" BSP*** | ***=*** | ***84 N.m*** | ***or*** | ***62 lbf ft*** | ***10 000 05*** |
| ***1" BSP*** | ***=*** | ***115 N.m*** | ***or*** | ***85 lbf ft*** | ***10 000 06*** |

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

| | | | | |
|---|---|---|---|---|
| ***1/4" BSP*** | ***=*** | ***34 N.m*** | ***or*** | ***25 lbf ft*** |
| ***3/8" BSP*** | ***=*** | ***75 N.m*** | ***or*** | ***55 lbf ft*** |
| ***1/2" BSP*** | ***=*** | ***102 N.m*** | ***or*** | ***75 lbf ft*** |
| ***5/8" BSP*** | ***=*** | ***122 N.m*** | ***or*** | ***90 lbf ft*** |
| ***3/4" BSP*** | ***=*** | ***183 N.m*** | ***or*** | ***135 lbf ft*** |
| ***1" BSP*** | ***=*** | ***203 N.m*** | ***or*** | ***150 lbf ft*** |

**SAFETY NOTE**

Soft Seal hose connections are capable of holding pressure when the nut is only ‘finger tight’. It is therefore recommended that when dismantling, the hose be manually flexed, to relieve any residual pressure, with the retaining nut slackened prior to complete disassembly.

## CABLES

The cables operate on a push/pull system with the spool centring springs always returning the spool to the neutral position when the handle is released.
Care should be taken during installation and operation to ensure that the cables are not trapped or kinked. Any abrasion or damage to the outer casing should be sealed with plastic insulation tape to avoid moisture penetrating.
No routine adjustments of the cables are necessary, as they do not stretch. The threaded collar is correctly adjusted when the lever is in a vertical position in its housing allowing an equal amount of travel in either direction.

**CAUTION**

**On no account should any attempt be made to lubricate the cables, which are assembled with a special lubricant during manufacture.**

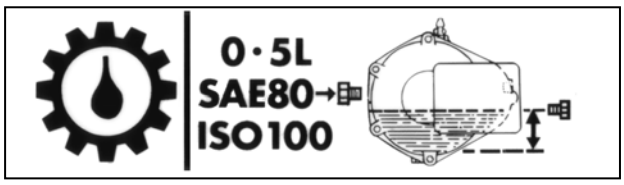
**Note:** Take care to ascertain the correct cable connections on both the control unit and the valve in the event of cable replacement.

## PTO GEARBOX

Refill the gearbox after an initial 50 hours of use and thereafter at annual or 500 hour intervals, whichever occurs earliest.

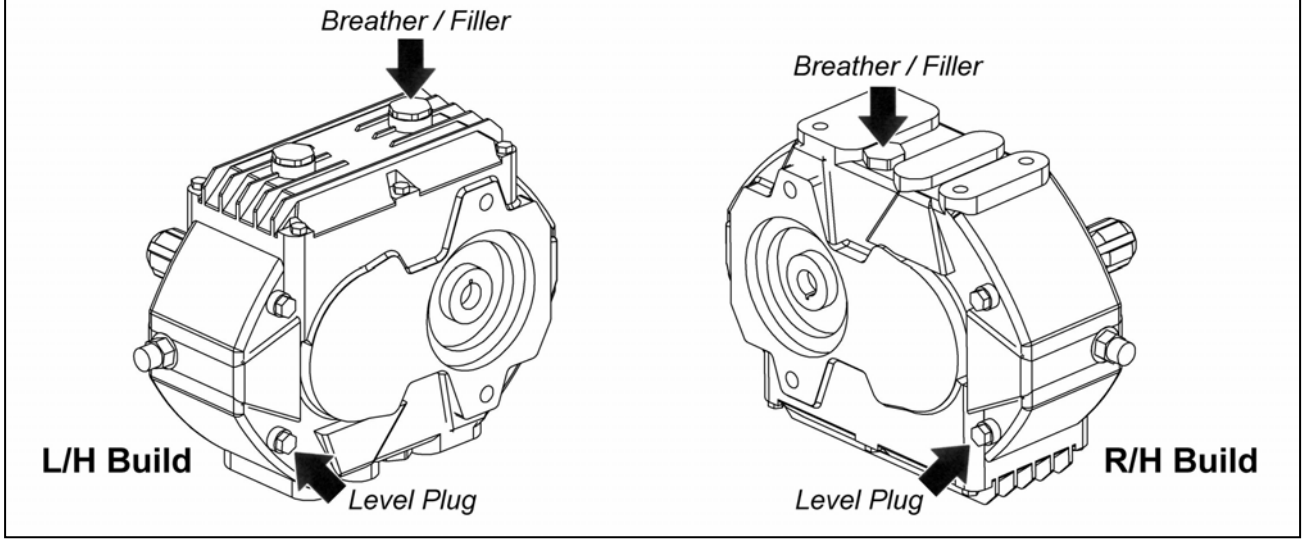
**Gearbox Capacities**

Alloy Gearboxes – Capacity 0.5 Litre SAE80




Cast Iron Gearboxes – Capacity 0.7 Litre SAE90


**Drainage of the gearbox for an oil change is via the drain plug located on the base of the gearbox. To refill or for 'topping up' remove both plugs indicated below and fill gearbox via the filler plug to a point where the oil starts to run from the level plug orifice – replace plugs and tighten securely.**

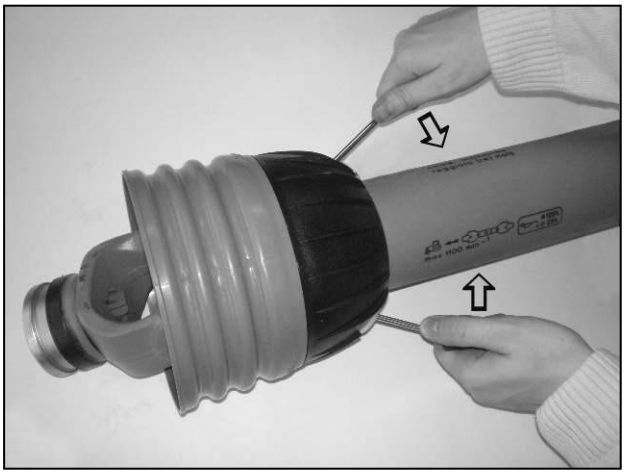


**PTO Shaft Lubrication**

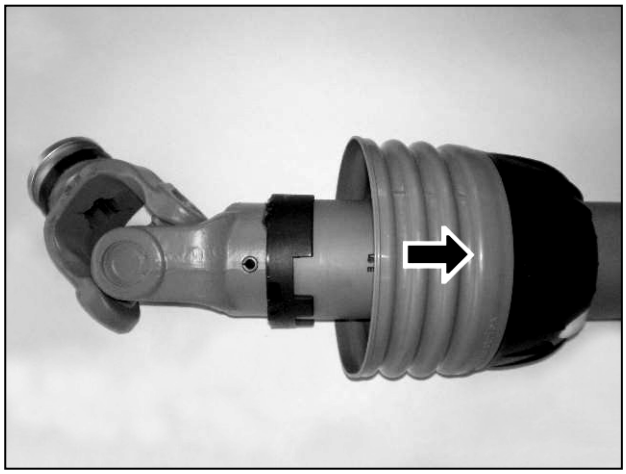
The PTO shaft should be lubricated on a regular basis using lithium based grease – each end of the shaft has 2 greasing points; one for lubrication of the universal joint and one for lubricating the rotating fixing ring of the shaft shield – access to the lubrication points is gained by releasing the 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**

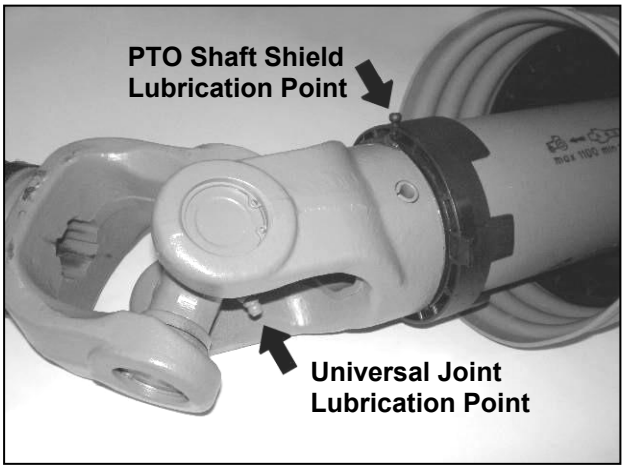
**Insert screwdrivers into the clasps**



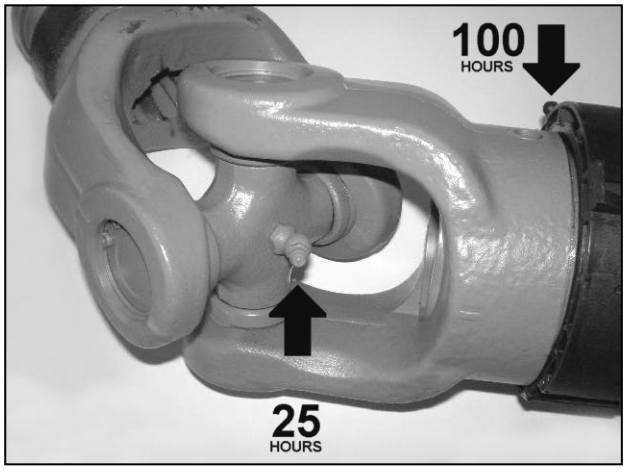
**Prise clasps open to release the shield**



**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.

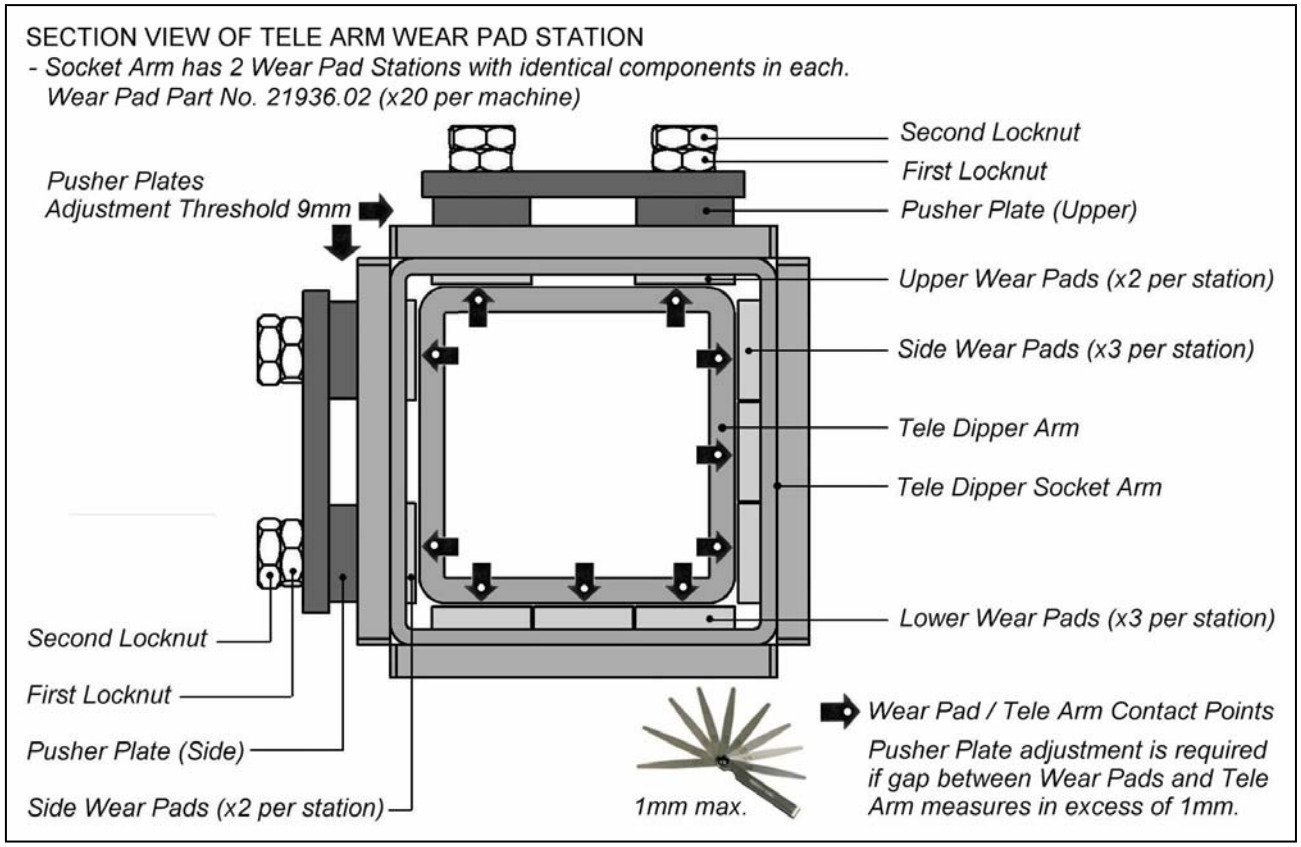
## TELE ARM WEAR PADS – PA65T & PA70T Models

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 tele 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.

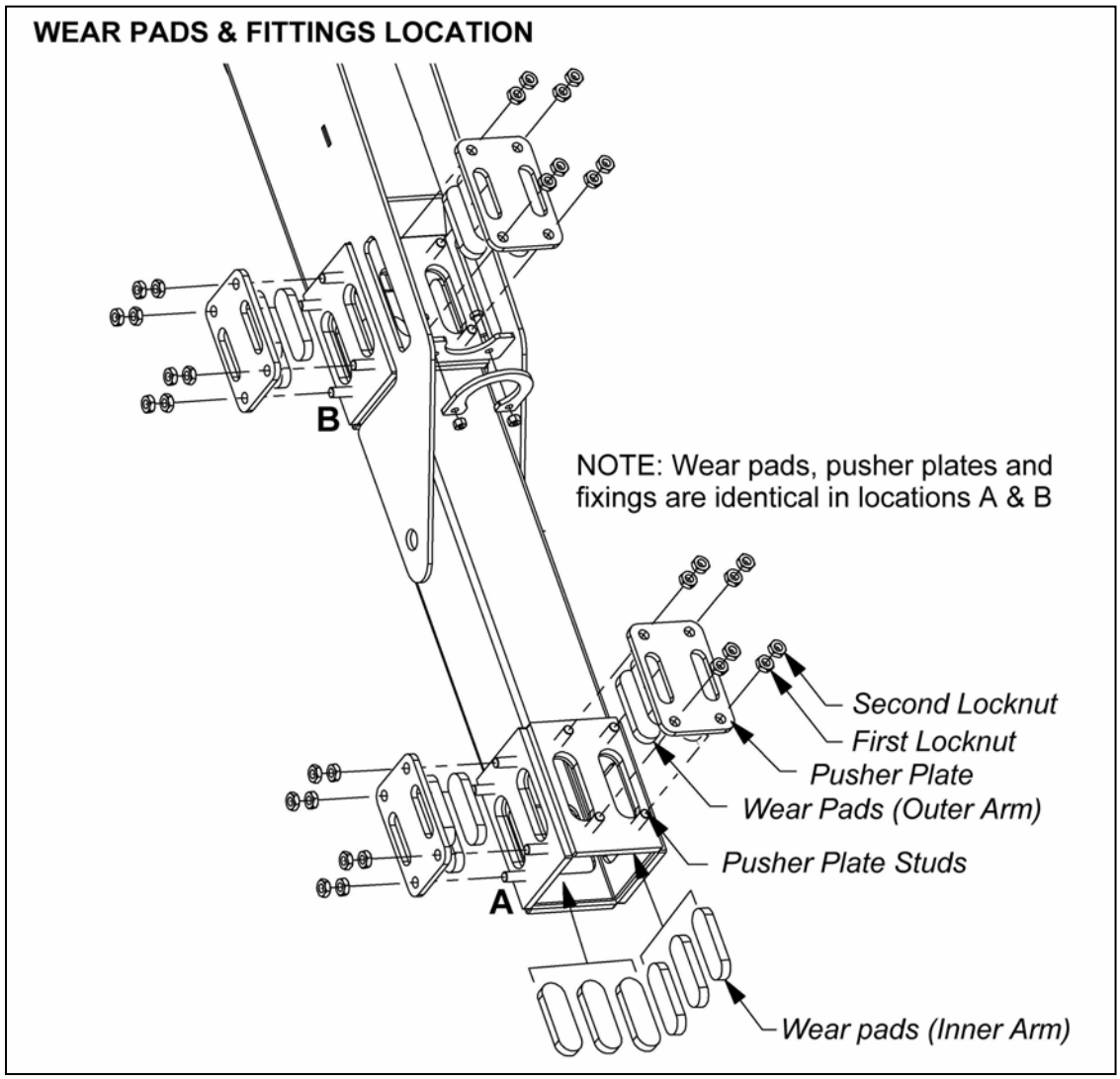



**WEAR PAD INSTALLATION**

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.*



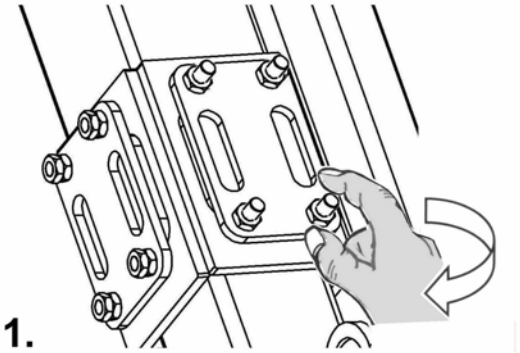

The tele arm may now be inserted into the socket arm (care should be adopted to avoid dislodging the inner wear pads), slide the tele arm into the socket to its furthest point. Place the outer wear pads (8 in total) into their slots in the socket arm and fit the pusher plates over the studs and retain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

**ADJUSTMENT**
When all pads and pusher plates have been located correctly tighten each set in a cross sequence to a torque setting of 5 Nm. Once they have all have been tightened each one should then be 'slackened back' approximately ¼ of a turn and retightened by hand to finger tightness – 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 locknuts on the studs and tighten

them up to the first set using two spanners to avoid loading additional torque to the first set of locknuts. 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.

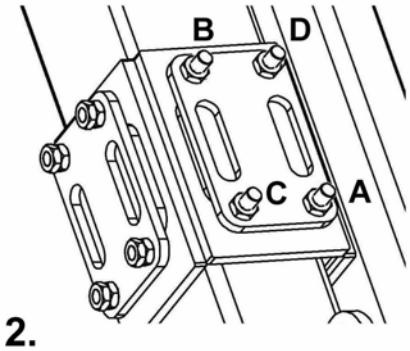
## WEAR PAD PUSHER PLATE ADJUSTMENT

*Fit first locknuts finger tight*



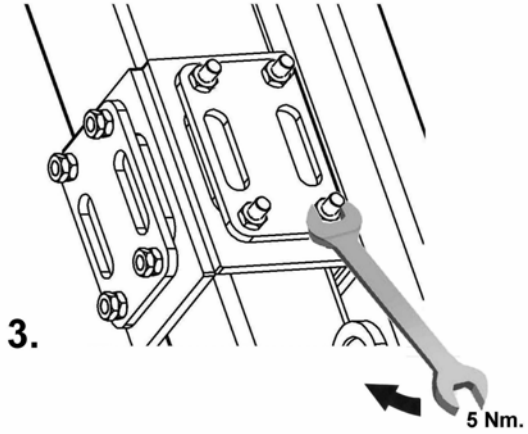
1.

*Tighten pusher plates in a cross sequence*



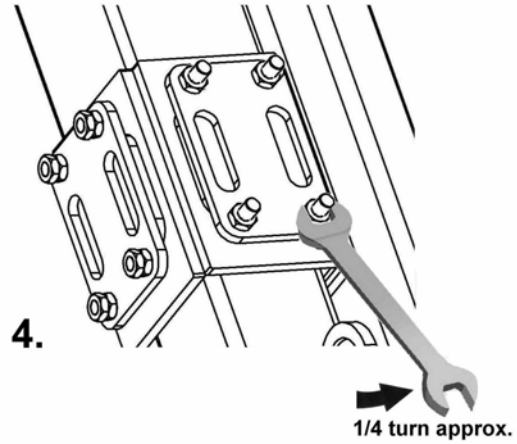

2.

*Torque all sets of first locknuts to 5 Nm.*



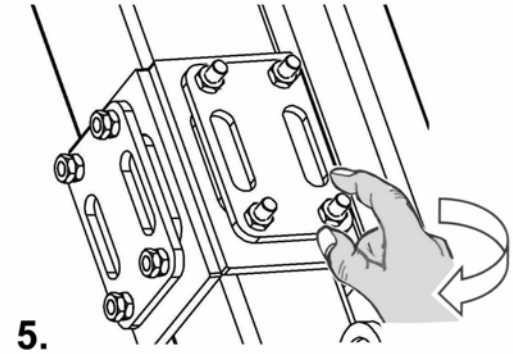

3.

*Slacken off each set by approx 1/4 turn*



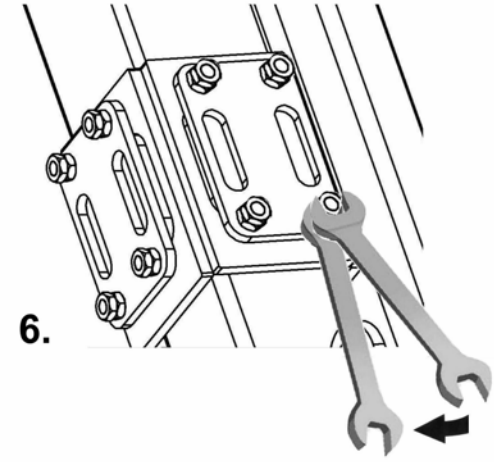

4.

*Take up any slackness by hand if it permits*



5.

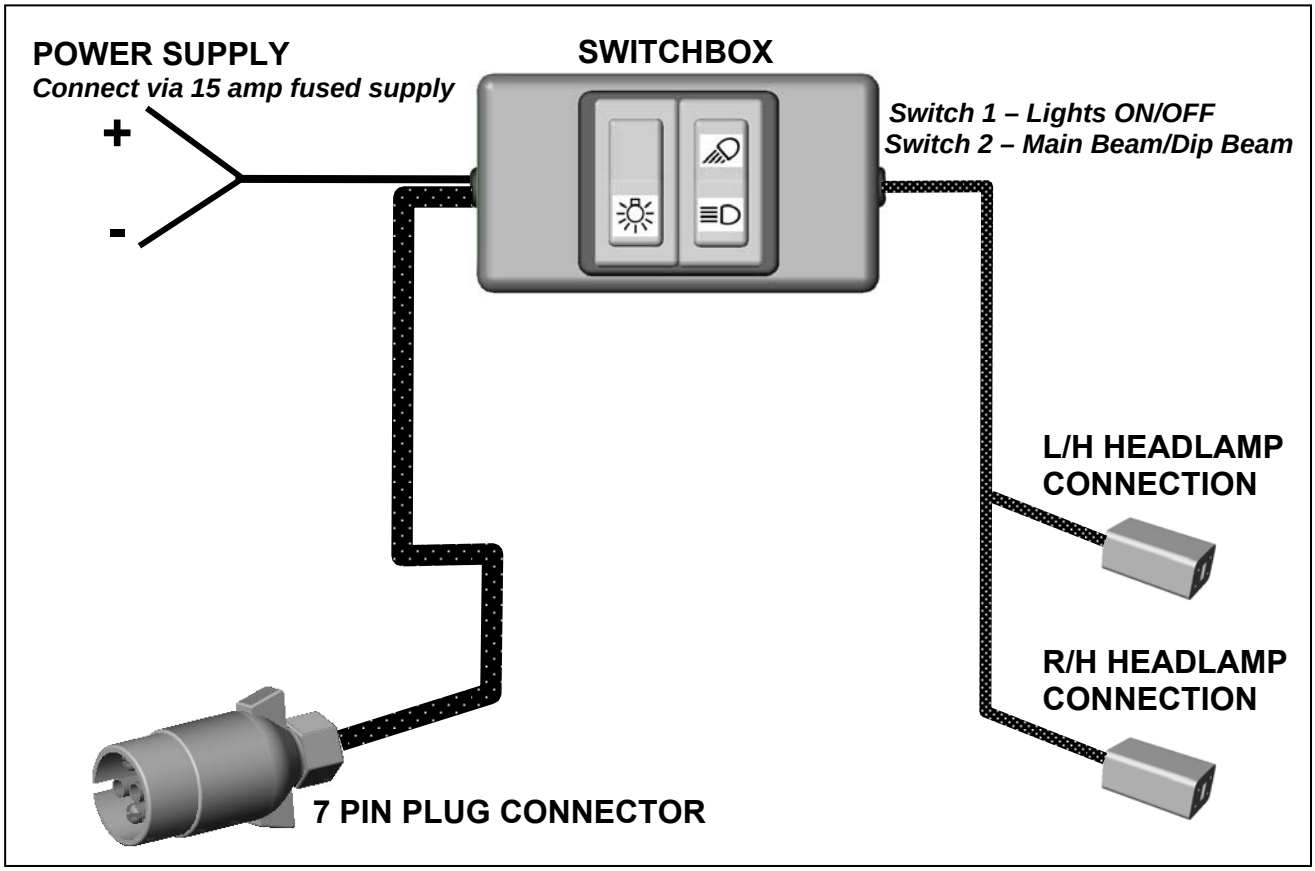
*Fit and tighten the second set of locknuts - use 2 spanners to avoid tightening of the first locknut*



6.

## FRONT LIGHTING KIT INSTALLATION

The Switchbox for the Front Lighting Kit should be located in a convenient position within the tractor cab.

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