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PA52
PA59
HY REACH

Operator Manual

McCONNEL

IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION

(Applies to UK Machines only)

UK DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with McConnel Limited within 7 days of delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register a machine go to the McConnel Limited web site at **www.mcconnel.com**, log on to '**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 (UK Machines)

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.

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 Cutter ……..

…….

Product Code PA52, PA59 ……..

Serial No. & Date ……. Type ……

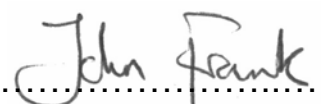
Manufactured by the above company/* …….

…….
(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:* 25th January 2005

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)* Hydraulic Arm Mounted Flailhead ……..

…….

Product Code BD12, BD16, F110, F112, F115, F012, F016 ……..

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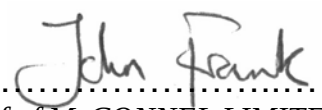
Signed 
……
on behalf of McCONNEL LIMITED *Responsible Person*

Status: Chief Design Engineer *Date:* 25th January 2005

For Safety and Performance …

ALWAYS READ THIS BOOK FIRST

McCONNEL LIMITED

Temeside Works
Ludlow
Shropshire
England

Telephone: 01584 873131
www.mcconnel.com

NOISE STATEMENT

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

LIST OF CONTENTS

LIST OF CONTENTS - *Continued*

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 spare 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.

Record the serial number of your machine on this page and always quote this number when ordering spares. Whenever information concerning the machine Is requested remember to also state the type of tractor to which it is fitted.	
MACHINE SERIAL NUMBER	INSTALLATION DATE
MODEL DETAILS	
DEALERS NAME	
DEALERS TELEPHONE NUMBER	

FEATURES

PA52 & PA59 – *all models*

- *Linkage mounted.*
- *Right or Left hand cutting.*
- *Front, Rear and Reverse Drive models.*
- *Cast iron gearbox.*
- *Operator guard.*
- *Hydraulic breakaway.*
- *95° powered slew.*
- *200 Litre hydraulic reservoir.*
- *Choice of Flailheads.*

PA52 & PA59 *Si*

- *Semi independent hydraulics - tractor power for arm movement, PTO pump for rotor.*
- *Rotor engagement by tractors PTO lever.*
- *54 hp hydraulic system.*
- *Cable controls.*
- *Head angle float.*

PA52 & PA59 *Ti*

- *Totally independent hydraulics powered by tandem PTO pump.*
- *Independent reversible rotor on/off valve.*
- *54 hp hydraulic system.*
- *Cable controls.*
- *Head angle float.*

PA52 & PA59 *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.*
- *54 hp hydraulic system.*

OPTIONAL EXTRAS

- *Lift float – available for all models.*
- *Lighting Kits – available for all models.*

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 side(s) 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 either 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. 45900.02)*
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.

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.

FITTING - Tractor requirements

MINIMUM TRACTOR WEIGHTS - including ballast weight if necessary:

All models – 3250 kg.

MINIMUM HP REQUIREMENTS:

All models – 60 HP

LINKAGE:

Category 2

PTO SHAFT:

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

LINKAGE ISOLATION:

A linkage isolation facility is necessary for 'SI' models only.

CHECK CHAINS/STABILIZERS:

Check chains or stabilizers must be fitted and tightened.

TRACTOR RELIEF VALVE:

For 'SI' models only tractor relief valve must be set above 2750 psi (190 bar).

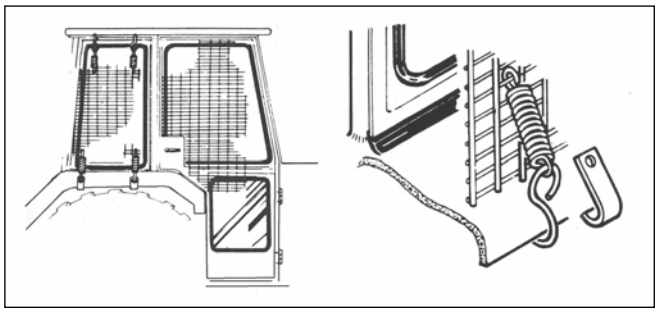
TRACTOR HYDRAULIC FLOW RATE:

Hydraulic flow rates are not crucial for 'SI' models.

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 tractor that the maximum possible stability of the machine and tractor 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 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:

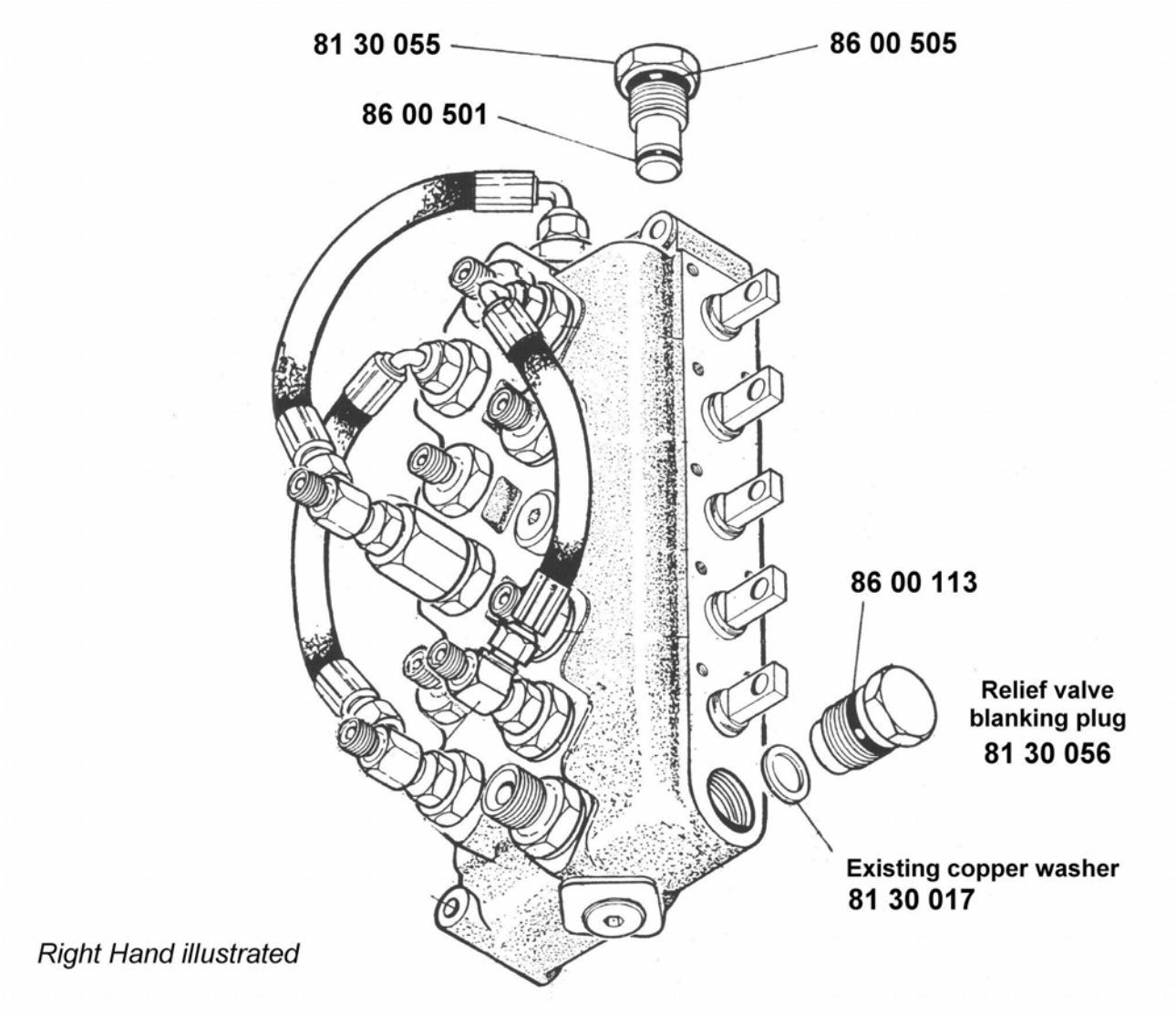
- *Centre of gravity of the tractor/machine combination.*
- *Geometric conditions, e.g. position of the cutting head and ballast.*
- *Weight, track width and wheelbase of the tractor.*
- *Acceleration, braking, turning and the relative position of the cutting head during these operations.*
- *Ground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

Suggestions to increase stability:

- *Increasing rear wheel track; a tractor 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; a ram can be used to 'lock' the front axle in work only – locking the axle moves the 'balance line' and can be used to transfer weight to the front axle from the rear (check with tractor manufacturer).*

The advice above is offered as a guide for stability only and is not a guide to tractor strength - it is therefore recommended that you consult your tractor manufacturer or local dealer to obtain specific advise 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.

CLOSED CENTRE CONVERSION KIT (8130059) – *Si models only*

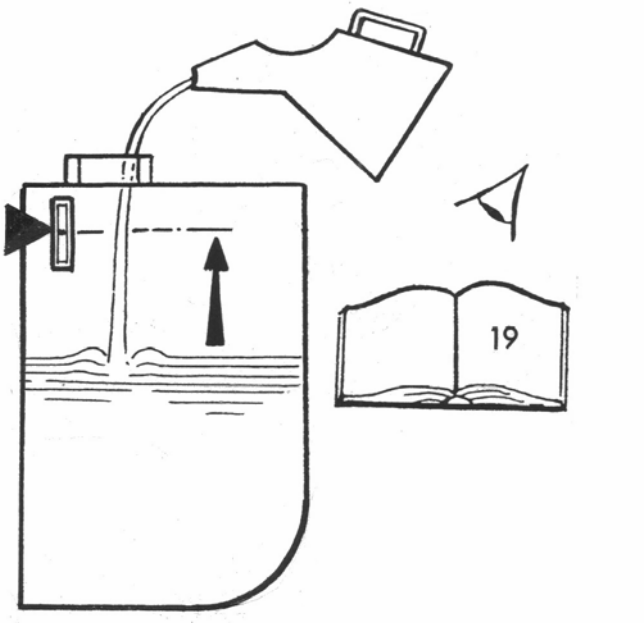


A control valve conversion kit consists of a relief valve blanking plug which should be installed in place of the existing relief valve and a pressure gallery blanking adaptor which is installed in place of the standard adaptor at the valve outlet end next to the lift loop hose connection. - *Take care when extracting the relief valve not to damage the copper 'sealing' washer, as it is re-used.*

INITIAL ATTACHMENT TO TRACTOR

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

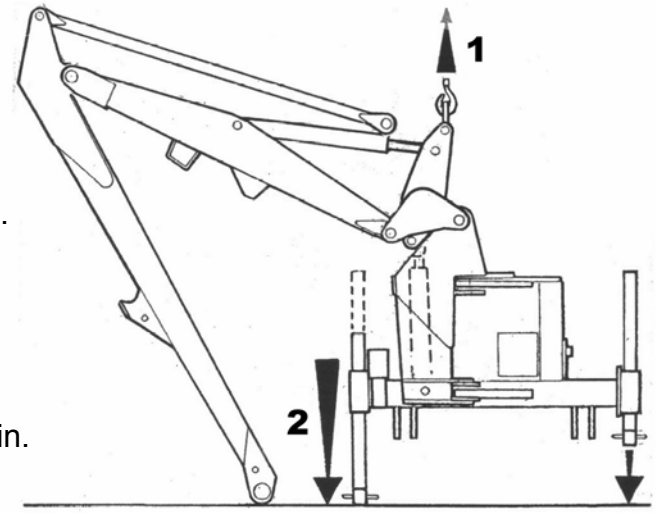
- Choose a **firm level site**.



- Remove the transport strap, banding straps and loose items.

- Fill tank with oil from the chart or equivalent *(see page 19).*

- 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.

- With the machine positioned on a firm level site and securely supported, maneuver the tractor squarely up to the machine with the tractor's draft links set to a height level with the machines lower link brackets.
  Fig.1

- Connect the tractor's draft links to the machine's lower link brackets, retain in position with the linkage and lynch pins supplied. Ensure that the same 'hole position' is selected on each side of the machine.
  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.*

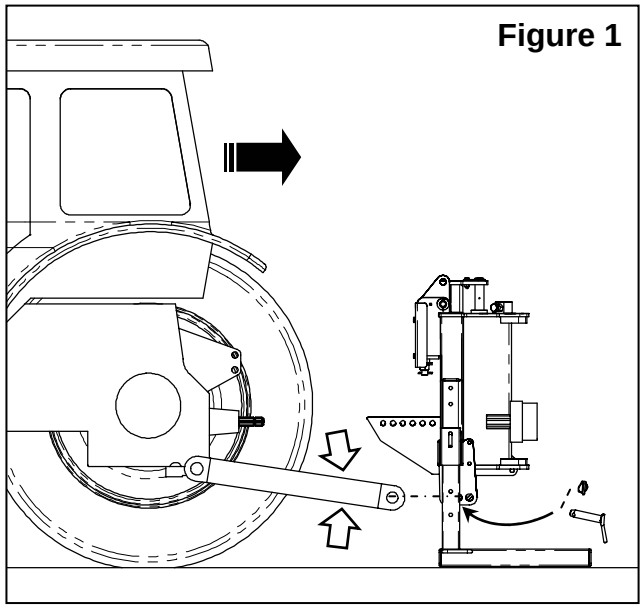


Figure 1

LIFTING EQUIPMENT MAY NOW BE REMOVED.

- Fit and secure stabiliser nose into the tractors top link selecting the highest position available avoiding any load sensing properties. *Fig.2*
  NOTE: *The bolt on nose of the stabiliser is reversible in order to accommodate variations of tractor linkage designs.*

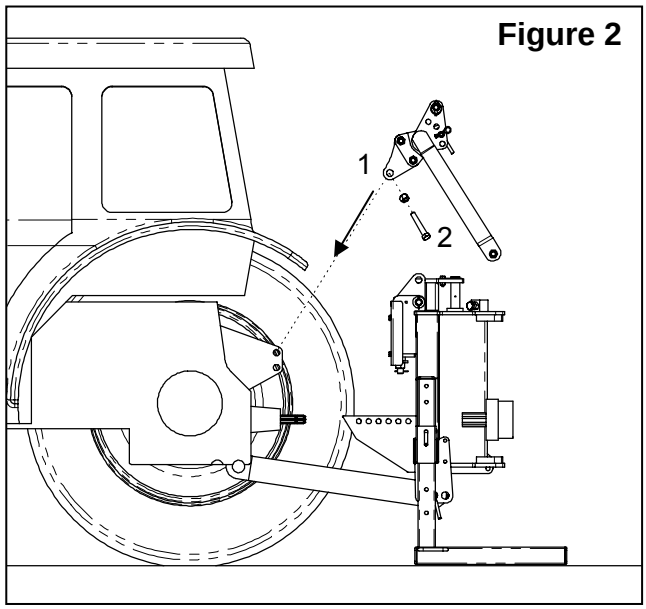


Figure 2

- Remove the 'R' clip and quadrant pin from stabiliser and swing it rearwards to locate with one of the holes on the mainframe - select the hole that is furthest away from the tractor and secure loosely with the bolt provided. DO NOT TIGHTEN AT THIS STAGE and DO NOT REPLACE QUADRANT PIN AT THIS STAGE.
  Fig.3

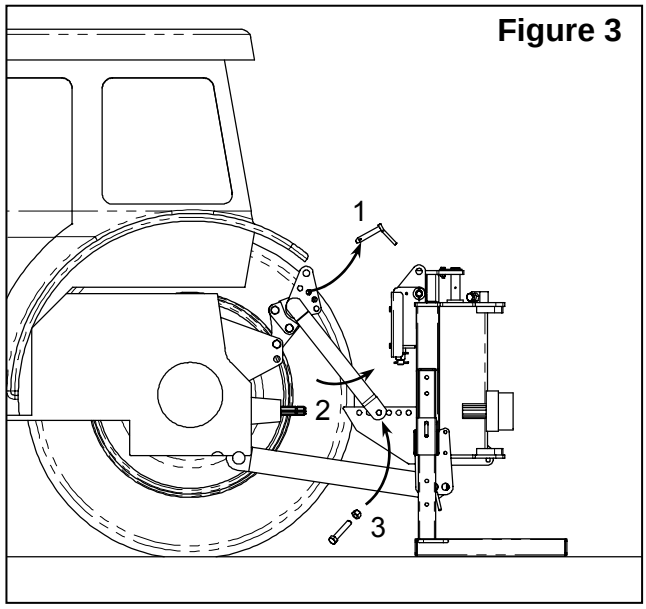


Figure 3

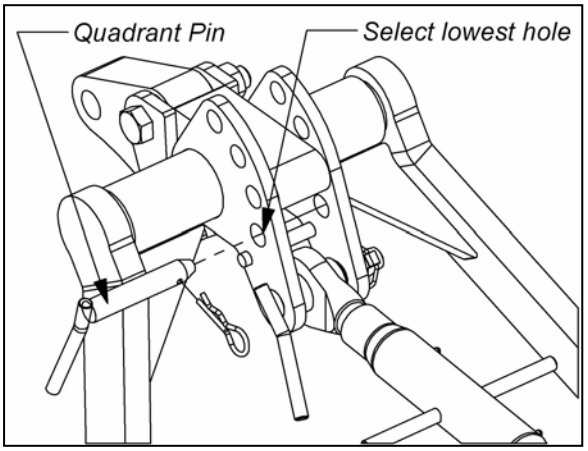
- Fit the machines top link.
  Fig.4

- Raise the machine on the tractors linkage to a position where the tractor PTO and the machines gearbox stub shaft 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 be operated from the tractor seat. Ensure no one is standing on or between the linkage arms or bars.

- Replace the stabiliser quadrant pin and secure with the 'R' clip.
  Fig.5

NOTE: The quadrant pin must be fitted in the lowest hole on the stabiliser in order that it acts as a 'bottom stop' - *this will prevent the machine from dropping when stopped and permit the tractor's inbuilt transport protection system to function correctly during operation and transportation.*
Ensure the tractor's linkage is in 'position control' and the linkage raised sufficiently to hold the hedgecutter at the correct height and remove the load from the quadrant pin.
Never fit the quadrant pin in a location hole that locks the stabiliser as this can cause damage to the machine and/or tractor.



- Adjust the top link to bring the machine frame into the vertical position.
  Fig.6

Figure 4

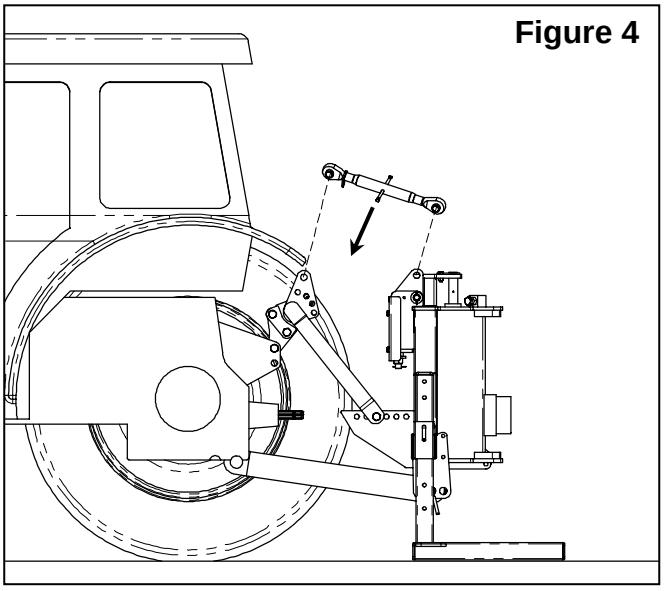


Figure 5

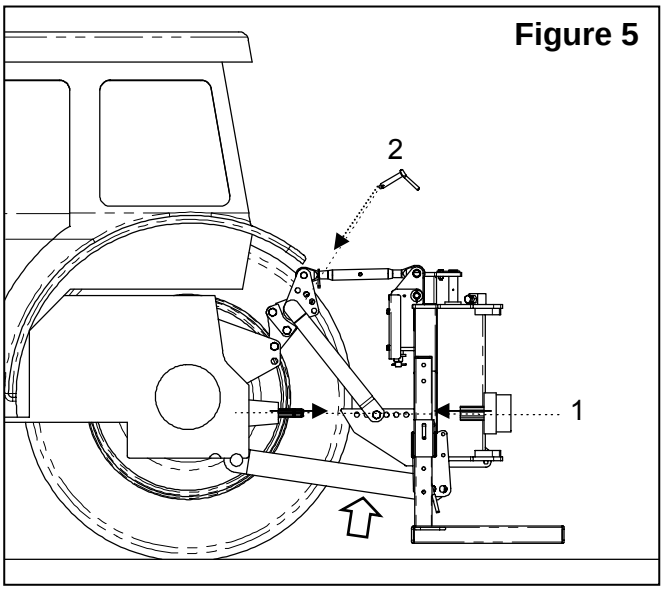
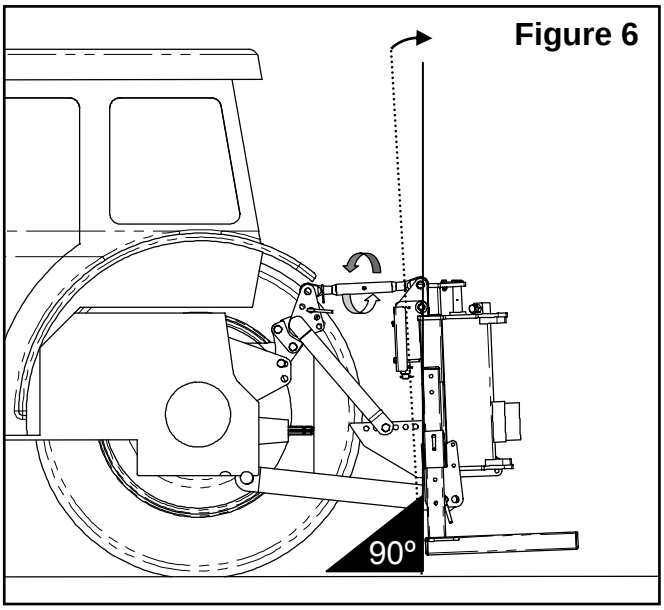


Figure 6



- Fully tighten the stabiliser lower bolts *Fig.7*

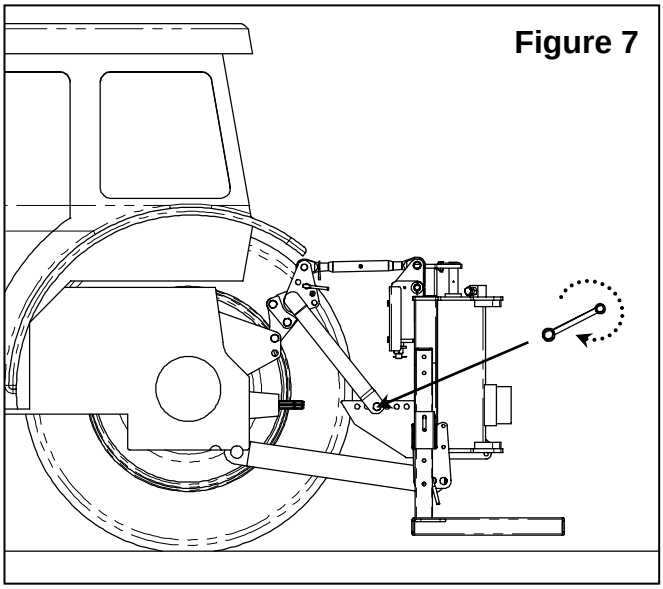


Figure 7

- Measure the PTO shaft and cut to the dimension shown – the finished length of the PTO shaft should be 75mm (3") less than the measured distance '**A**' - between tractor shaft and gearbox stub shaft - to enable fitting.
  Fig.8
  NOTE:
  For subsequent use with different tractors measure again, there must be a minimum shaft overlap of 150mm (6").

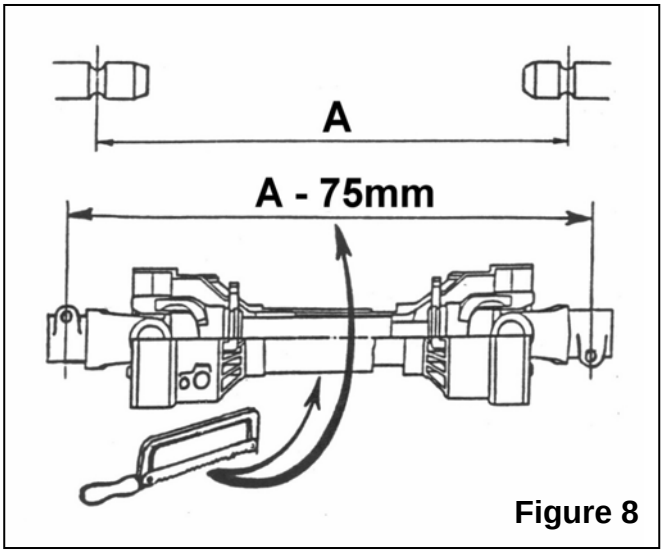


Figure 8

- Fit PTO in position and attach the torque chains to a convenient location to prevent the shaft guards from rotating.
  Fig.9

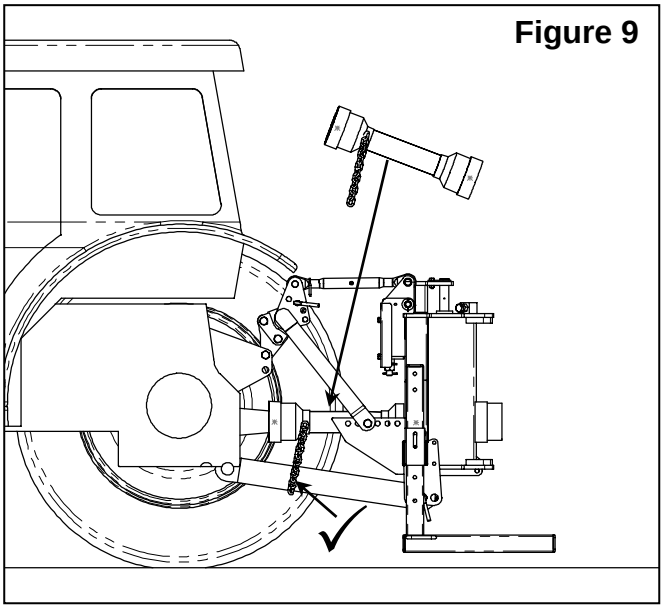
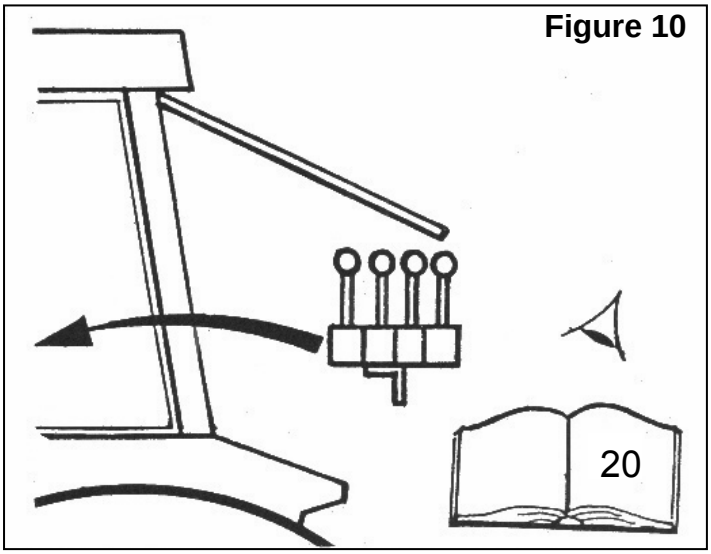


Figure 9

- **On semi independent machines only** connect up the supply and return hoses.
  Supply – *from tractors auxiliary service.*
  Return – *to tractors transmission casing (refer to Tractors Handbook).*

Figure 10

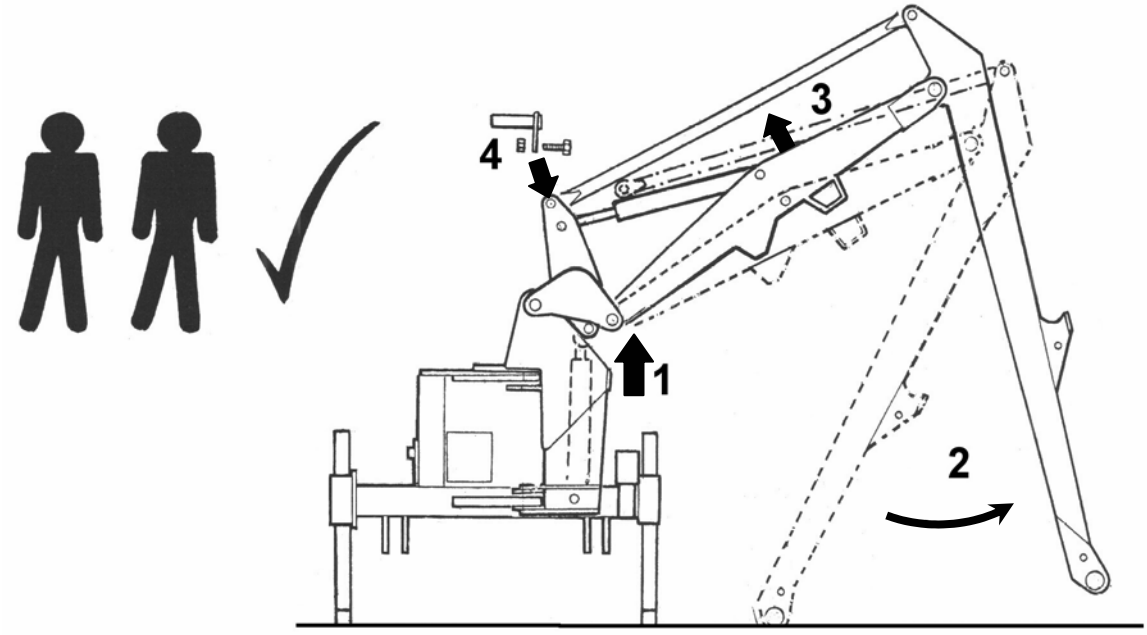


- Fit the machine control unit into the tractor cab *(see page 20 for details).*

Note: On semi independent machines only select tractors external services.

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

Figure 11

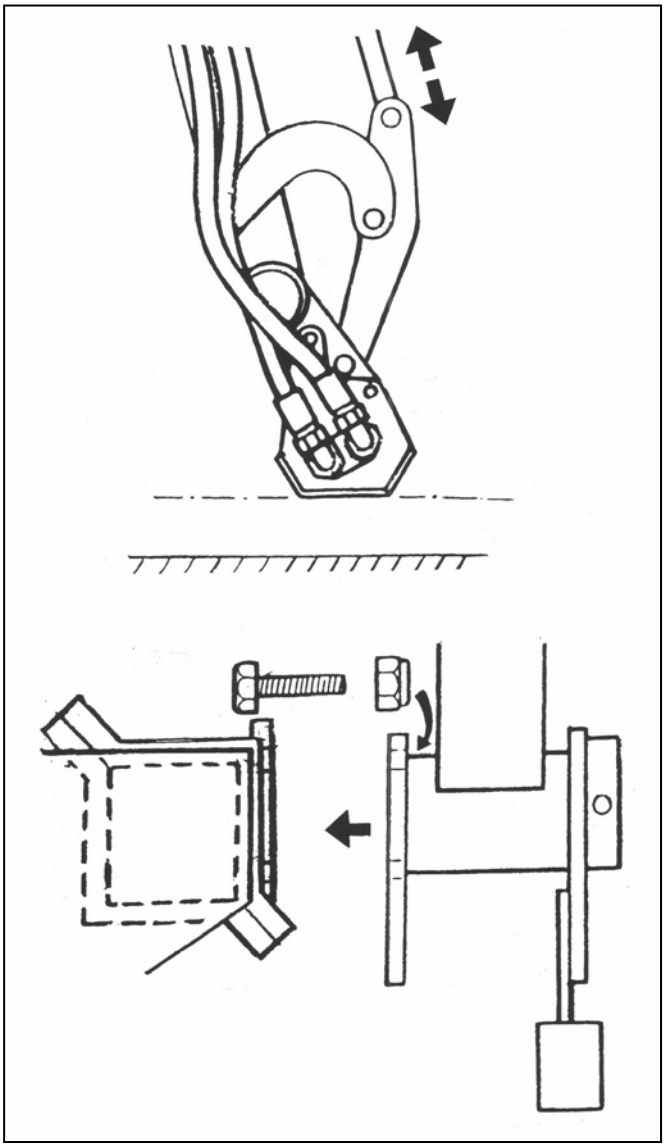


- Request assistance.
- Operate 'lift up' on machine controls sufficient only for the end of the dipper arm to clear the ground.
- Pivot out the dipper arm until the tension link can be connected.
- Operate the controls to 'slew' the arms towards the rear only until the frame is horizontal.
- Carefully 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 *(see pages 40-43 for details).* The machine is now ready to proceed to the work site.

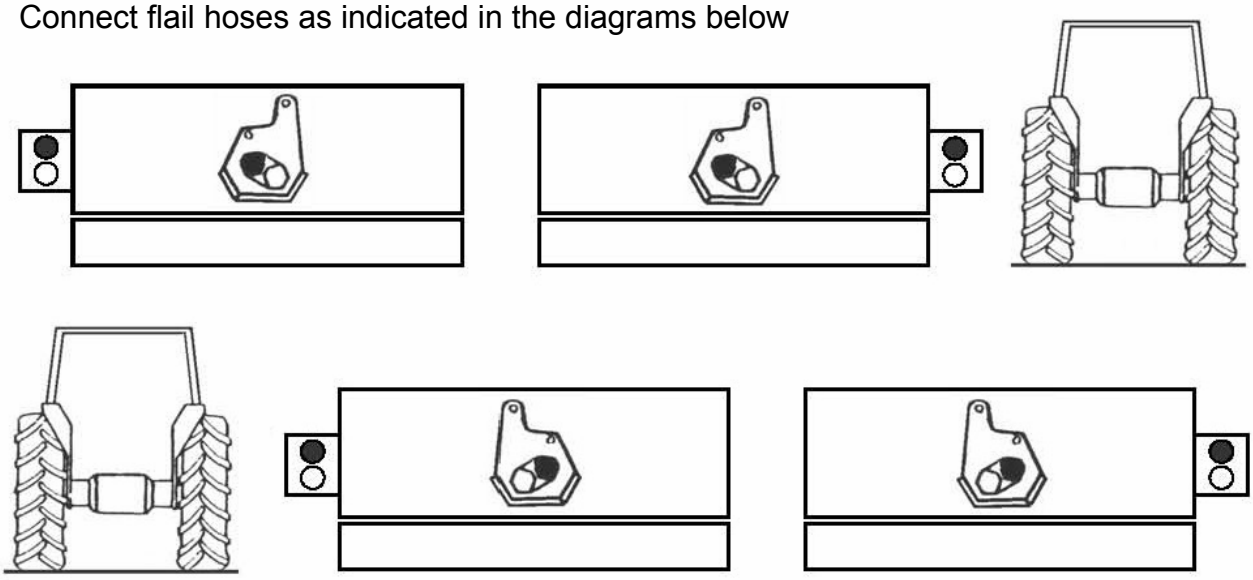
FLAILHEAD ATTACHMENT

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 the 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* *Energol HLP-HM 46*	*Bartran 68* *Energol HLP-HM 68*
CASTROL	*Hyspin AWH-M 46*	*Hyspin AWH-M 68*
COMMA	*Hydraulic Oil LIC 15*	*Hydraulic Oil LIC 20*
ELF	*Hydrelf HV 46* *Hydrelf XV 46*	*Hydrelf HV 68*
ESSO	*Univis N 46*	*Univis N 68*
FUCHS (UK/Non UK markets*)	*Renolin 46* *Renolin HVZ 46* *Renolin CL46/B15** *Renolin AF46/ZAF46B**	*Renolin 68* *Renolin HVZ 68* *Renolin CL68/B20** *Renolin AF68/ZAF68B**
GREENWAY	*Excelpower HY 68*	*Excelpower HY 68*
MILLERS	*Millmax 46* *Millmax HV 46*	*Millmax 68* *Millmax HV 68*
MORRIS	*Liquimatic 5* *Liquimatic HV 46* *Triad 46*	*Liquimatic 6* *Liquimatic HV 68* *Triad 68*
SHELL	*Tellus 46* *Tellus T46*	*Tellus 68* *Tellus T68*
TEXACO	*RandoHD 46* *Rando HDZ 46*	*Rando HD 68* *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 or to any 30 amp electrical output provided by the tractor manufacturer. Avoid using cigarette lighter type connections as these may 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

TI MODELS ONLY

Ensure that the rotor control valve is in "STOP" position, start tractor, engage P.T.O. 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 P.T.O. 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.

SI MODELS ONLY

Ensure P.T.O. lever is in neutral position, and isolate tractor hydraulic linkage. Start tractor and select external service supply. Allow the tractor to run for several minutes before attempting to operate any of the machine control levers.

On operating move the levers through their complete range ensuring that all movements are functioning correctly.

Check the tractor rear axle oil level and top up if necessary.

Place the flail head at a safe attitude and bring tractor engine revolutions to 1000 rpm. Engage P.T.O. and allow the rotor to run for several minutes. Do not leave the tractor cab or allow anyone to approach the flail head at this time.

CAUTION

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

After running up the machine increase P.T.0. speed to approximately 360 rpm. and run for a further five minutes to allow the oil to circulate through the return line filter before disengaging the P.T.O. and stopping tractor.

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

REMOVAL FROM TRACTOR

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.
- Replace parking legs in their sockets and secure in their lowest position.
- 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 P.T.O. 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.
- **On Si models only** disconnect the supply and return hoses and stow with hose ends clear of the ground.
- Disconnect the stabiliser from the tractors top hitch position. Allow the stabiliser to slide along the rail until it contacts the eccentric stops.
- 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'*** *(page 13)*

- Connect Stabiliser into tractors top hitch position used previously.
- Raise the machine on the tractor linkage until the Stabiliser contacts the eccentric stops.
- Fit Stabiliser 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 leveling box to bring frame horizontal.
- Tighten Check Chains if fitted.
- Stow parking legs.
- Fold machine into transport position *(see page 36).*
- Proceed to the work site.

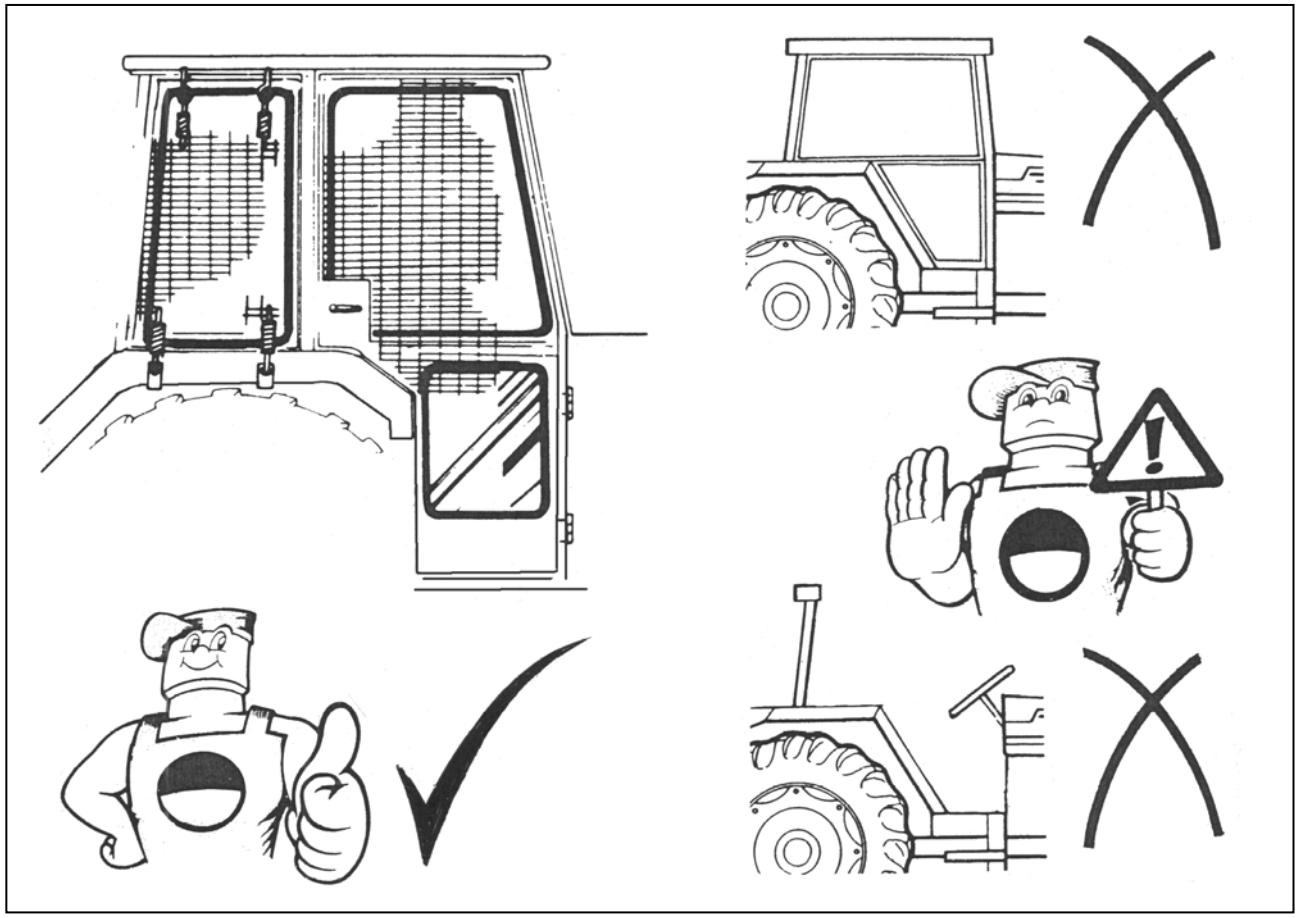
SUBSEQUENT ATTACHMENT TO DIFFERENT TRACTOR

- Remove Stabiliser and Top Link from machine and separate.

Refer to and follow steps ***'initial attachment to tractor'*** *(page 13)*

OPERATION

OPERATOR GUARD



PREPARATION

READ THE BOOK FIRST

Practice 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

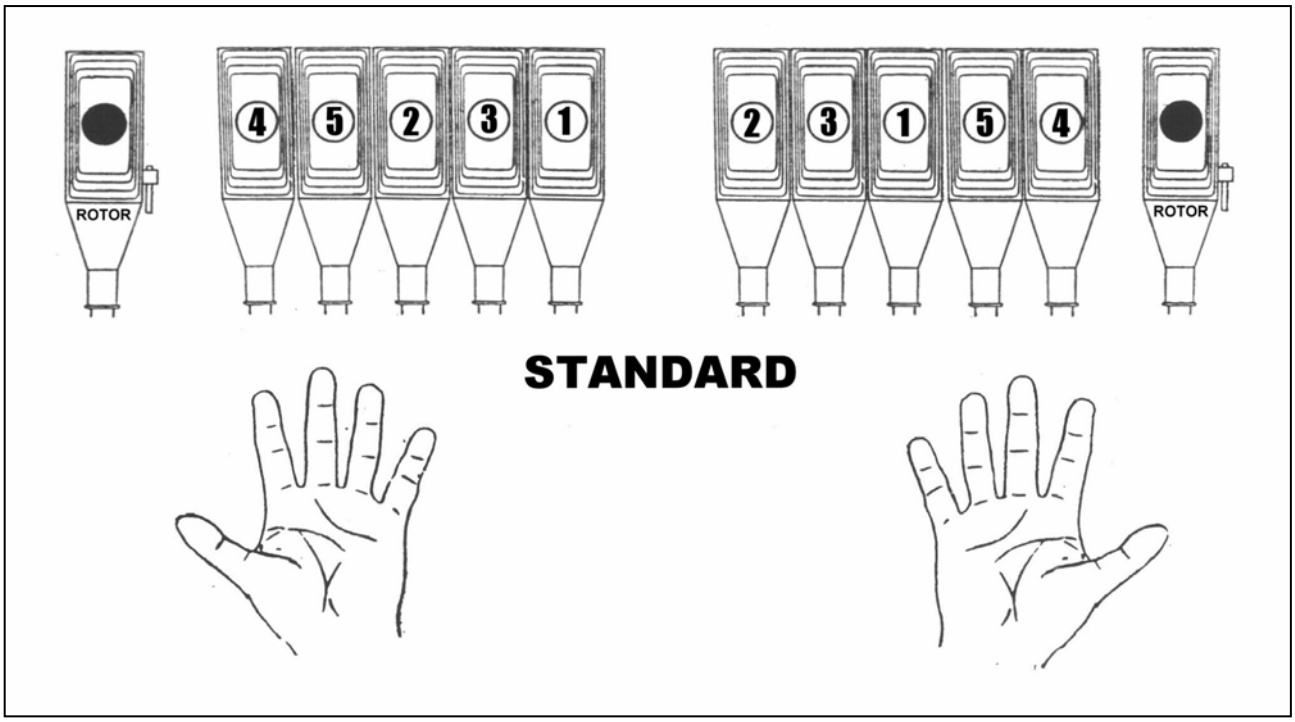
Care must be taken when working with the flail head close in as it can come into contact with the tractor.

TRACTOR CONTROLS

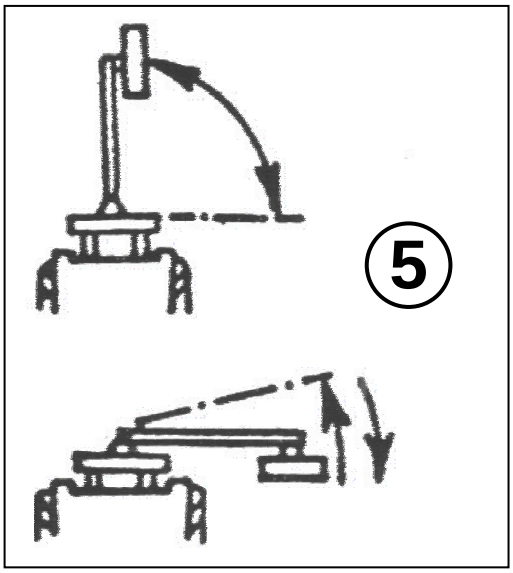
For **Si models only** the tractor linkage will need to be isolated.

MACHINE CONTROLS

Cable controlled machines only

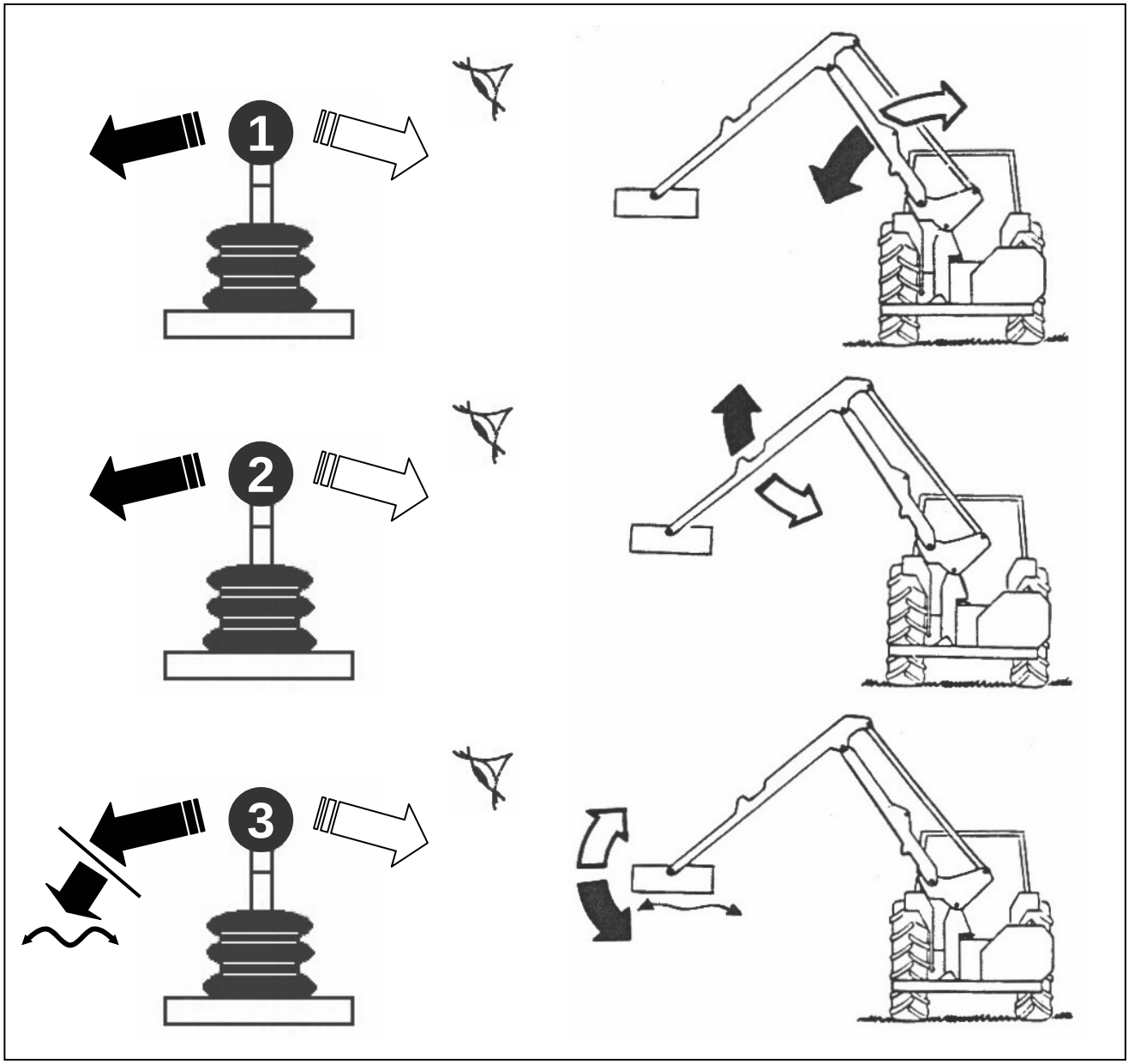


LEVER FUNCTIONS

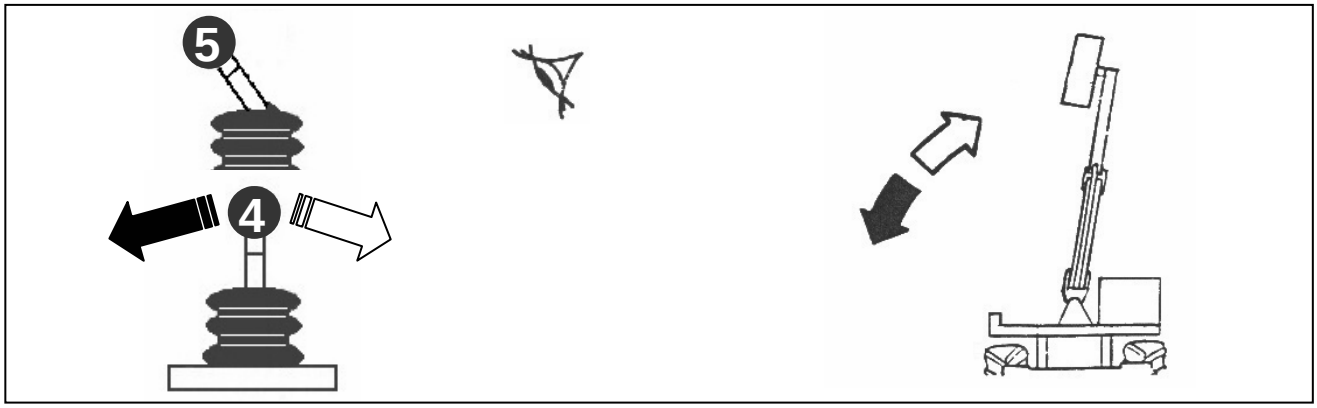


SLEW –
Allows slew working

AUTO RESET –
Allows normal working

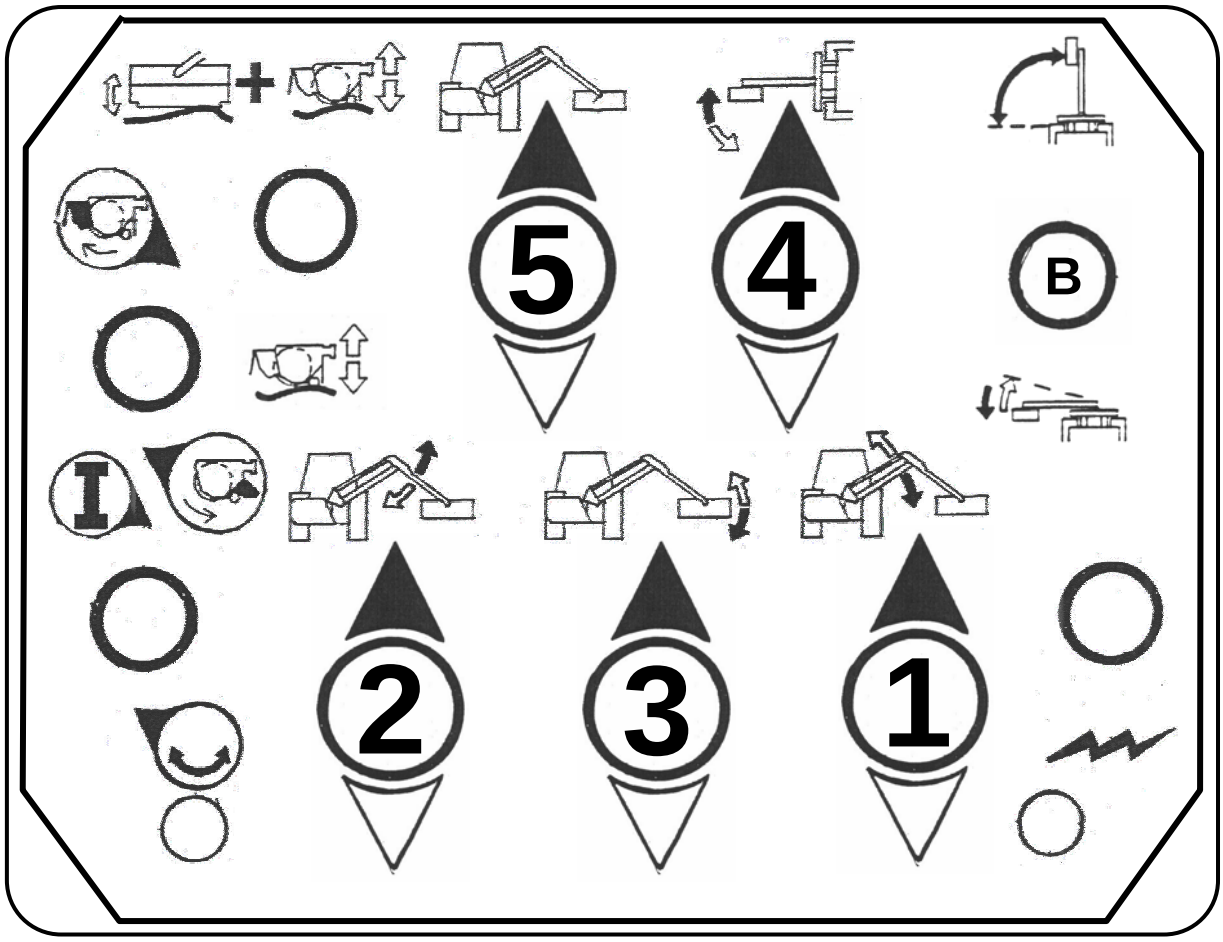


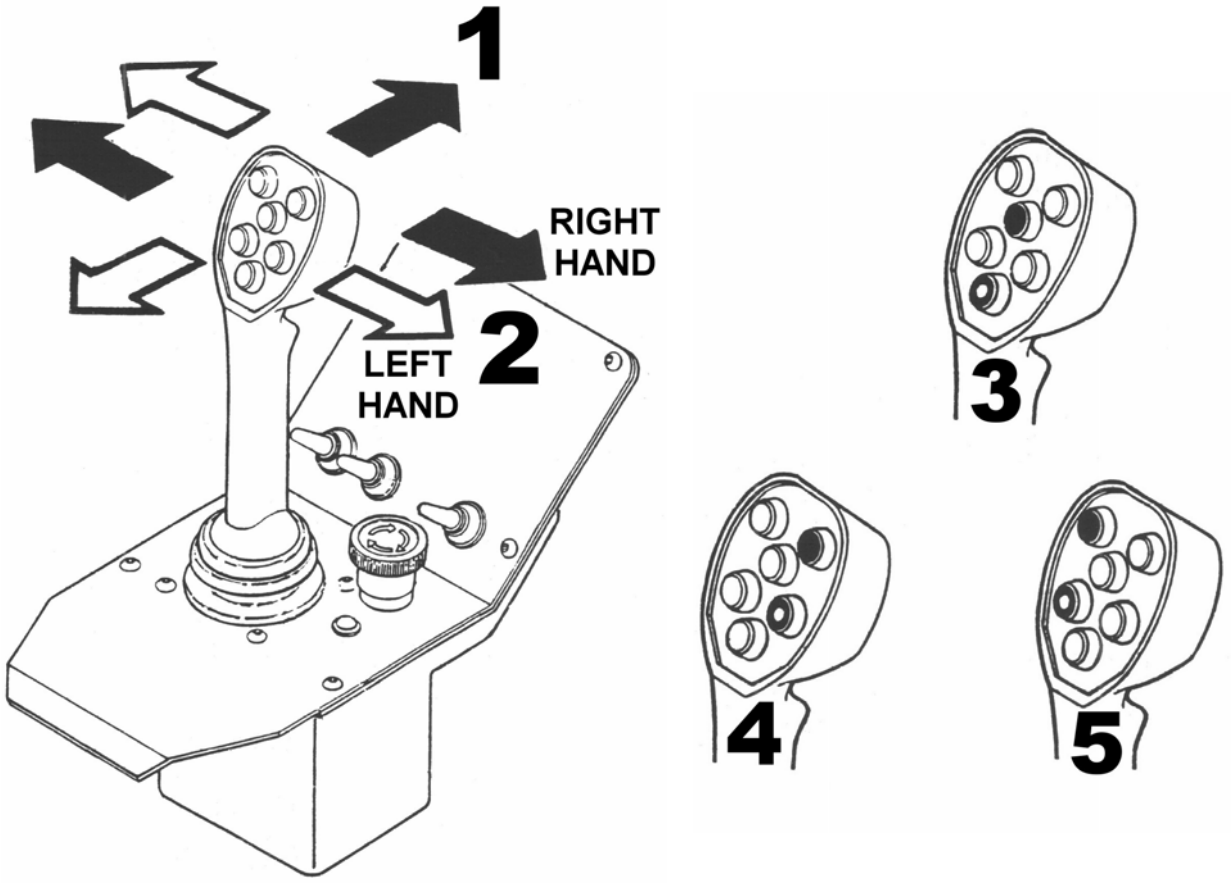
An angle ‘float’ position can be selected which allows the flail head to automatically angle itself to follow the contours of the ground. To obtain this position the control lever must be pushed away from the operator beyond its normal range until it locks into the float position. To return to normal 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.



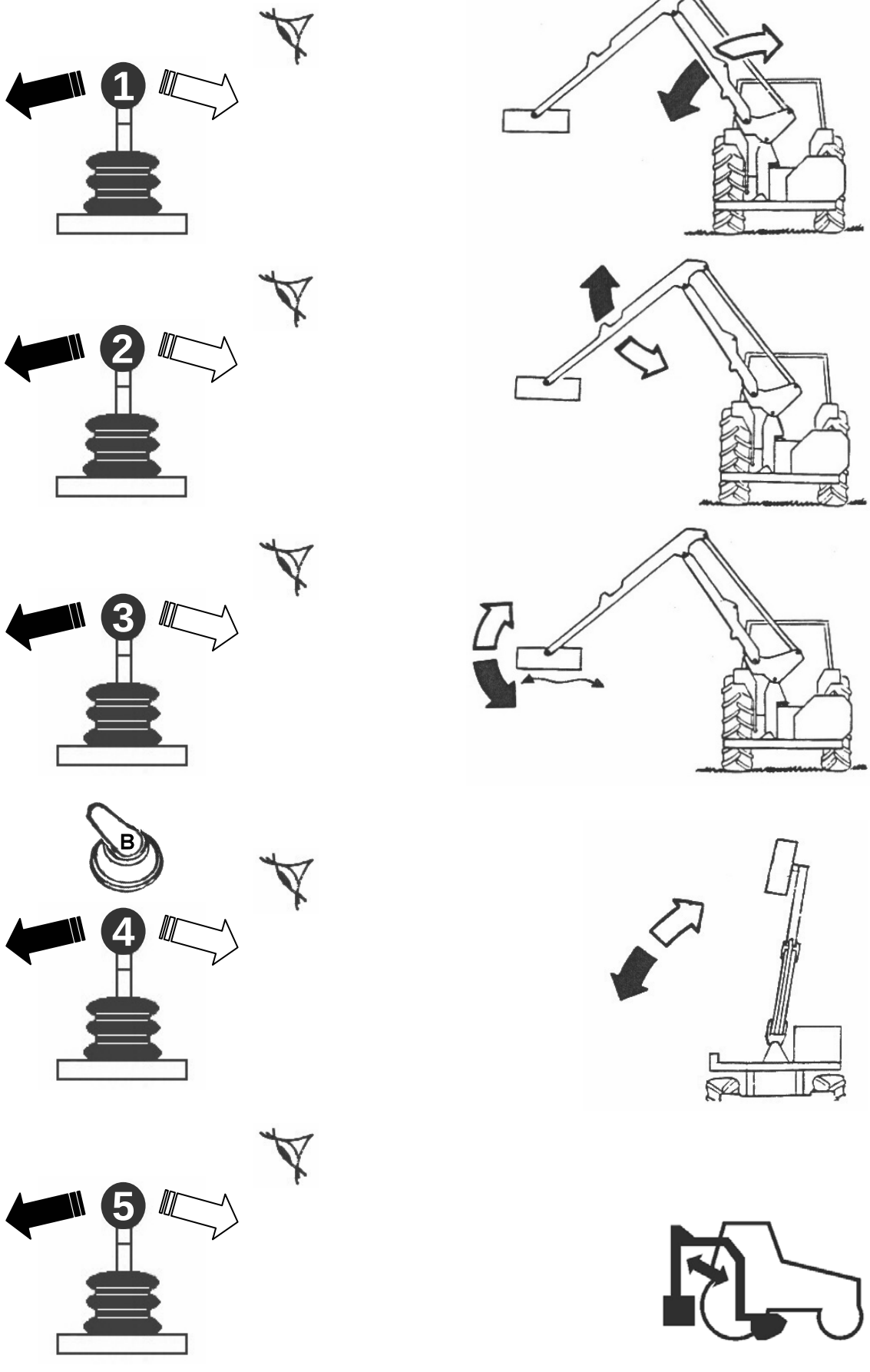
ARM CONTROLS

Electric controlled machines only



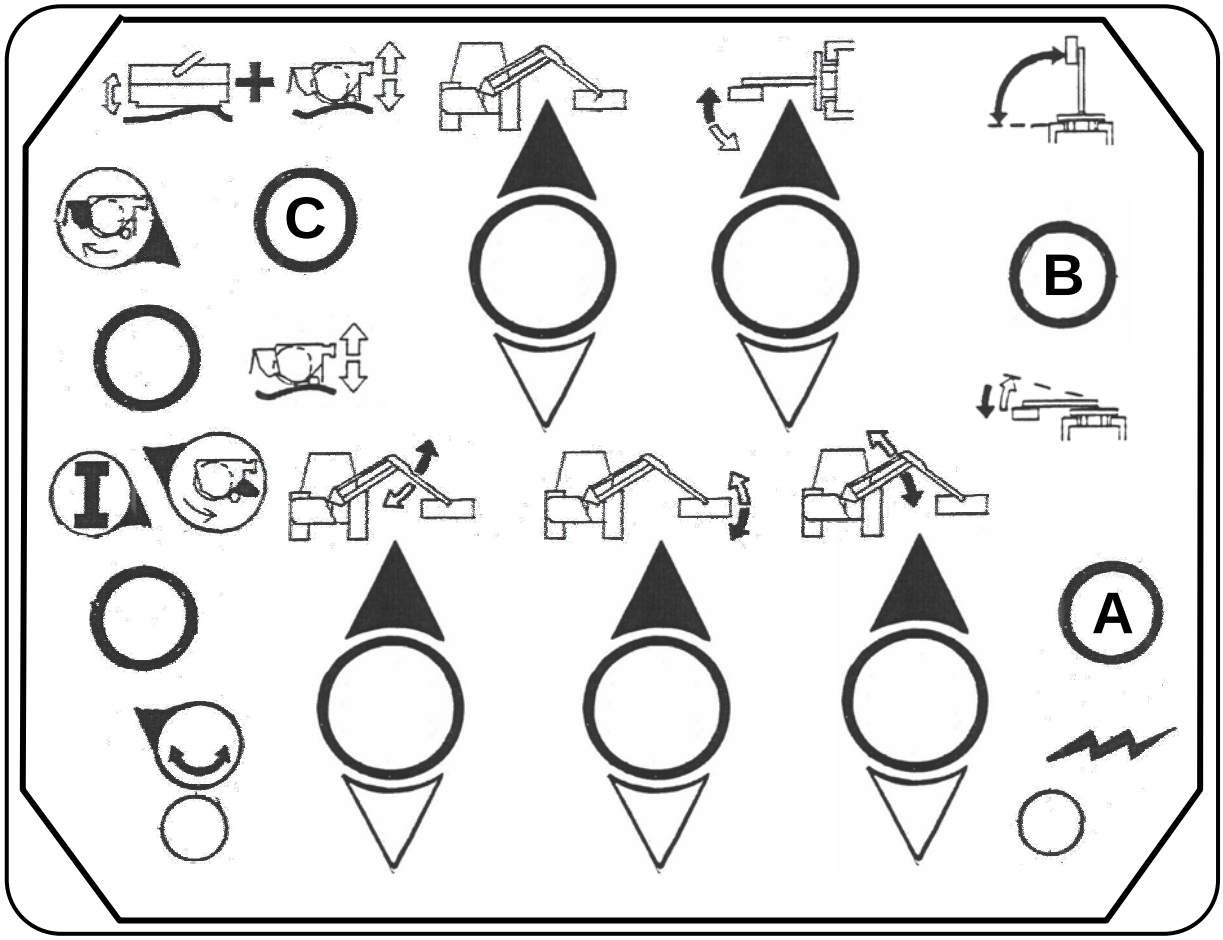


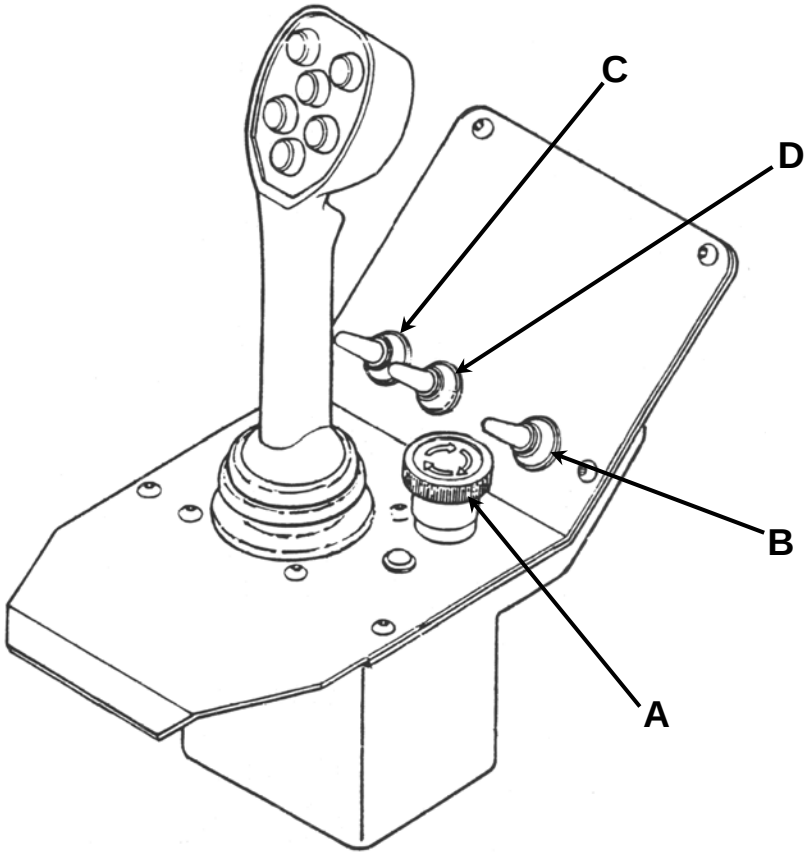
LEVER FUNCTIONS



SWITCH FUNCTIONS

Electric controlled machines only





SWITCH FUNCTIONS

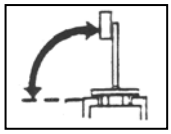
SWITCHBOX CONTROLS

POWER ON

A 

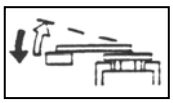
POWER OFF

SLEW – allows slew working.



B

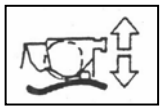
AUTO RESET – allows normal working.



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

C

LIFT FLOAT – allows lift float selection only.



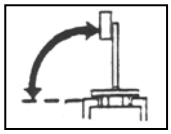
MONOLEVER CONTROLS

POWER ON - turn 'CLOCKWISE'

A

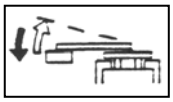
POWER OFF - push 'DOWN'

SLEW – allows slew working.

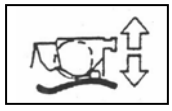


B

AUTO RESET – allows normal working.



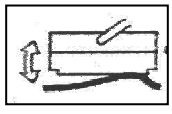
LIFT FLOAT ON



C ***(if fitted)***

LIFT FLOAT OFF

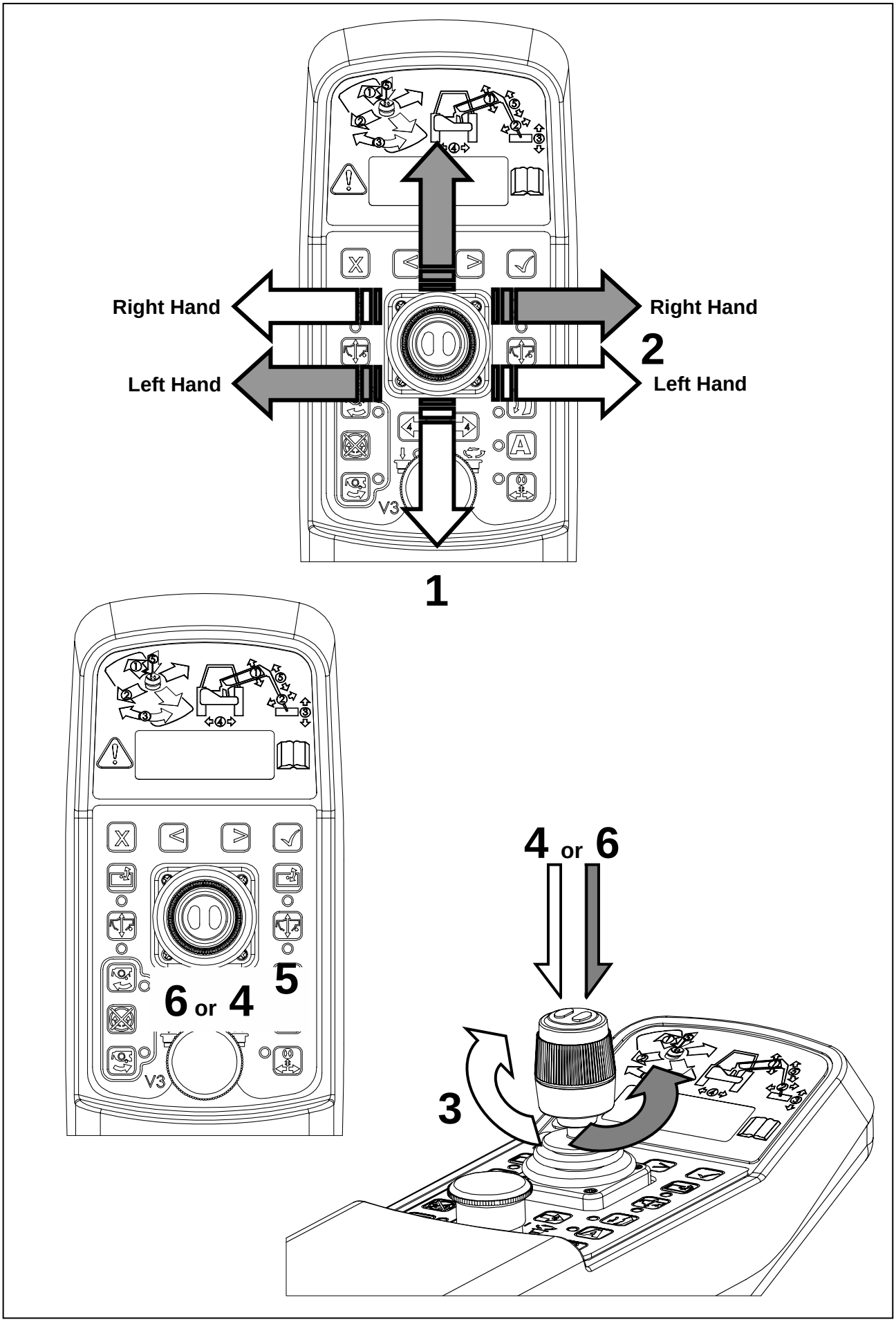
ANGLE FLOAT ON



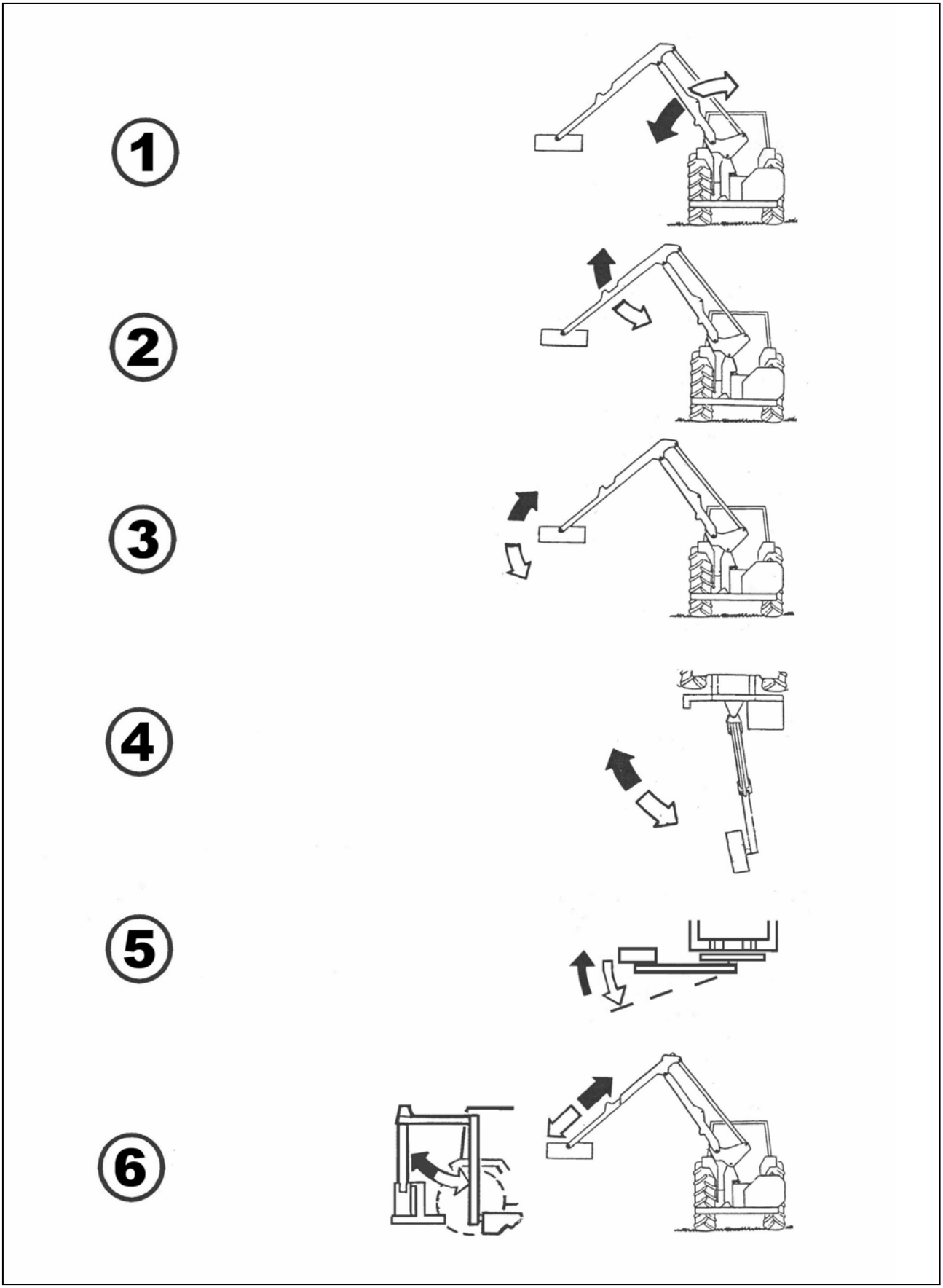
D ***(if fitted)***

ANGLE FLOAT OFF

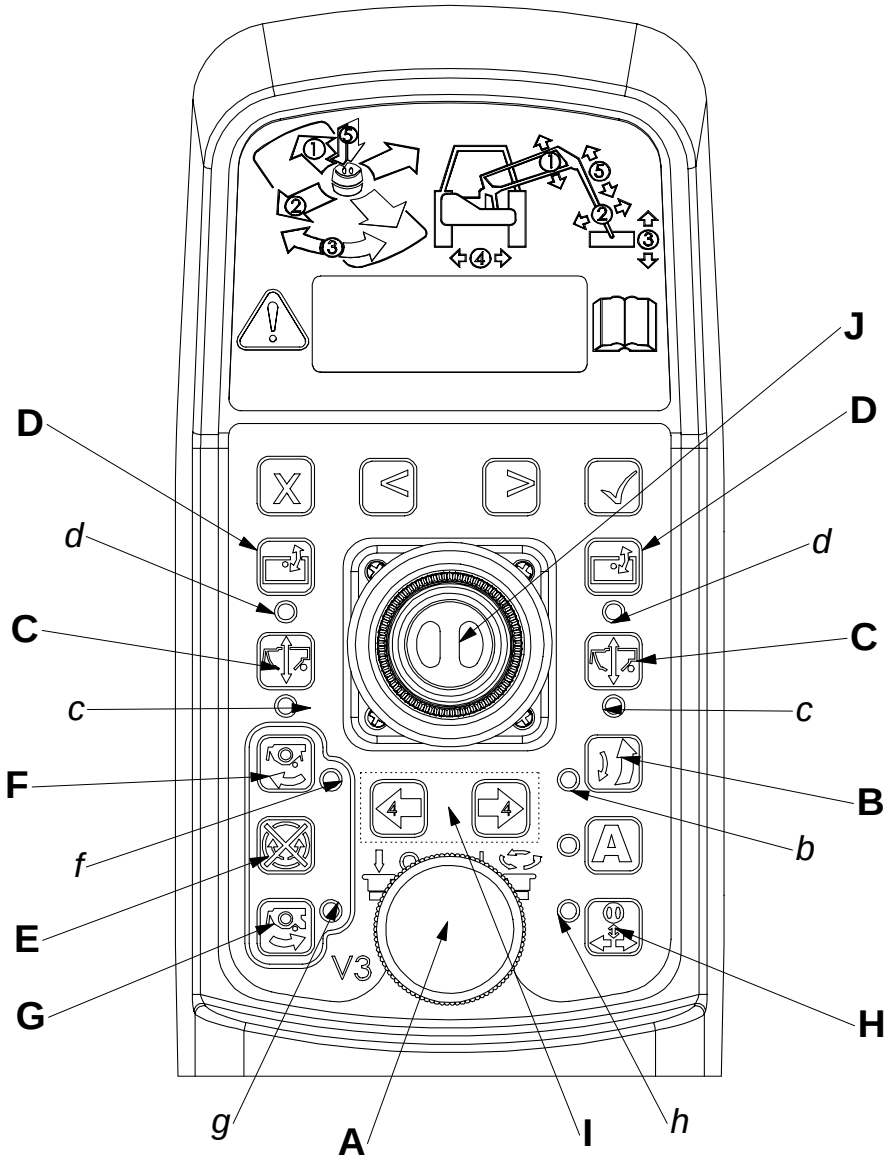
V3 PROPORTIONAL ARMREST CONTROLS



ARMHEAD FUNCTIONS – *V3 Electric Proportional Control Machines*



SWITCH LOCATIONS - *V3 Proportional Armrest Controls*



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 <u>does</u> <u>not</u> 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.

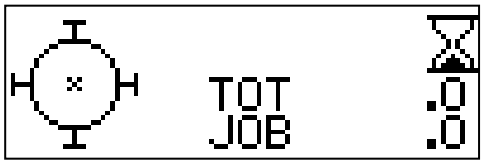
SWITCH	FUNCTION/OPERATION
SWITCH 'A'	**POWER ON/OFF** ***Turn clockwise*** *for* ***'ON'*** *and* ***push down*** *for* ***'OFF'***
SWITCH 'B' **(L.E.D. light 'b')**	**AUTO RESET** ***Press down*** *to select* ***'auto reset'*** *(i.e. normal working). Pressing either 'Slew' buttons will de-select 'Auto Reset' and allow 'Slew' operation. 'Auto Reset' will have to be reselected if required.*
SWITCHES 'C' **(L.E.D. light 'c')**	**LIFT FLOAT** *Press either switch to select or deselect the 'lift float' function.* *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' **(L.E.D. light 'd')**	**HEAD ANGLE FLOAT** *Press either switch to select or deselect the 'head angle float' function.* *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' **(L.E.D. light 'f')**	**ROTOR ON - UPWARD CUTTING** **Press to select**
SWITCH 'G' **(L.E.D. light 'g')**	**ROTOR ON - DOWNWARD CUTTING** **Press to select**
REVERSING ROTATION:	**TURN ROTOR OFF** ***WAIT until Rotor has STOPPED*** ***Select opposite rotation***
SWITCH 'H' **(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** *dependent on mode of Switch 'H'*

SCREEN DISPLAY AND FUNCTIONS

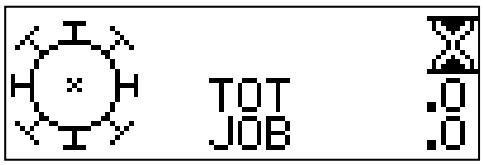
Twist E/stop on armrest controls to power on and the screen will light up. Note: 12Volts at the battery are required for correct function.

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

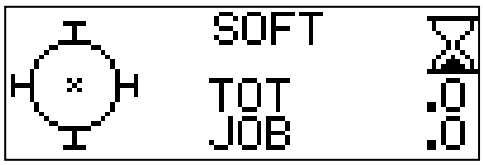
2. Pressing scroll forward once will display the running screen. The **TOT** displays the total time the rotor has been switched on. The **JOB** also displays the rotor on time but may be reset to zero by pressing the **X** button for 3 seconds.



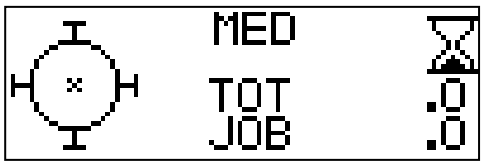
3. Pressing either of the Rotor ON buttons will activate the 'egg timer' and rotor image.

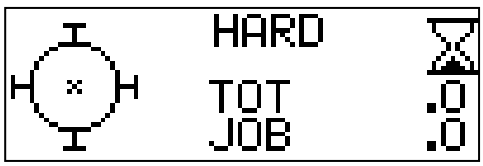


4. Pressing the EDS Lift float button will turn on the EDS (EDS Lift Float machines only). Then SOFT, MED or HARD will be added to the running screen.

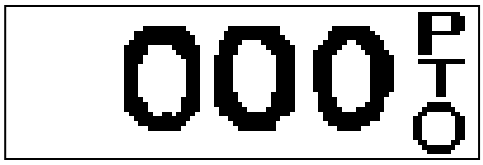


5. Pressing ✓ while the EDS is turned on will scroll through the SOFT, MED and HARD working settings.

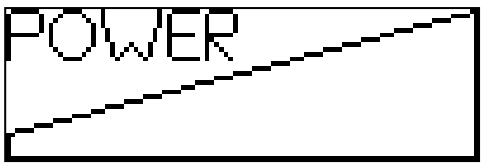




6. Pressing scroll forward displays the actual Tractor PTO running speed



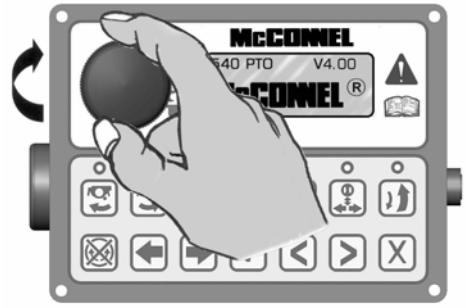
7. Scrolling forward again displays the Power Monitor screen.

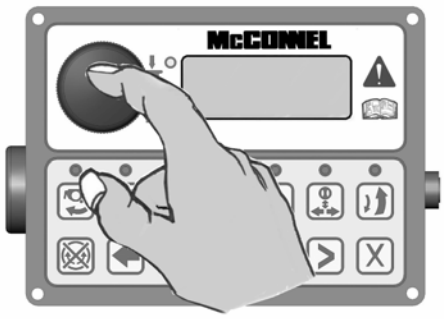


Scrolling backwards will display the screens in the opposite order.

V4 PROPORTIONAL CONTROLS

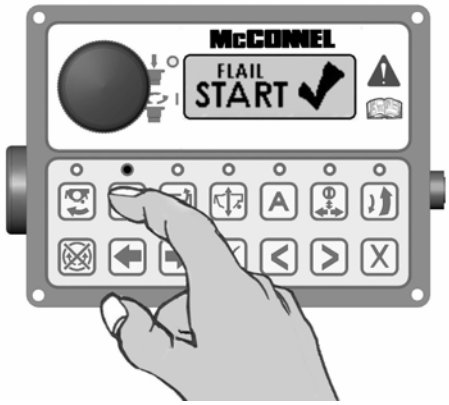
POWER ON / OFF (Emergency Stop)
Rotate Clockwise to Power On – control unit will emit a single beep and screen will display the selected PTO speed, software version and the McConnel name. Press to Power Off.



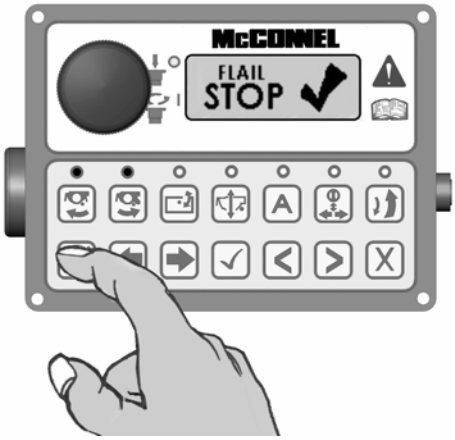


ROTOR START – Uphill Cutting
This button starts the rotor for 'uphill' cutting – when the button is pressed the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'FLAIL START ✓'.

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.

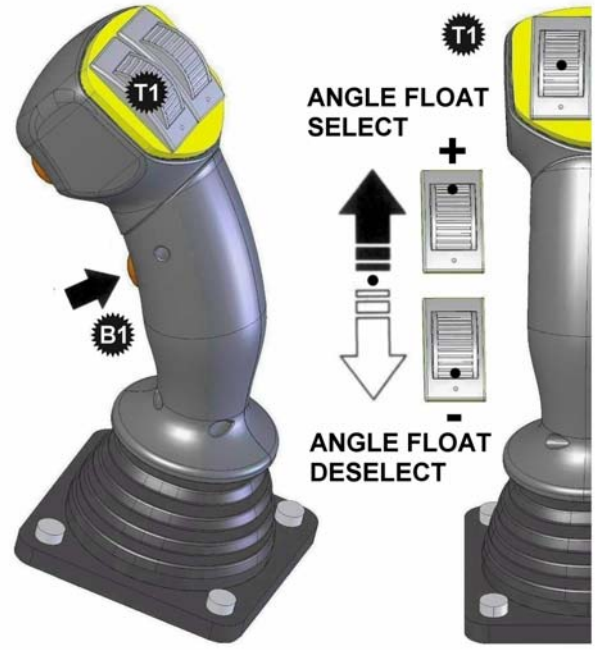
HEAD ANGLE FLOAT

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) fully 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) fully backwards – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'ANGLE FLOAT X'.

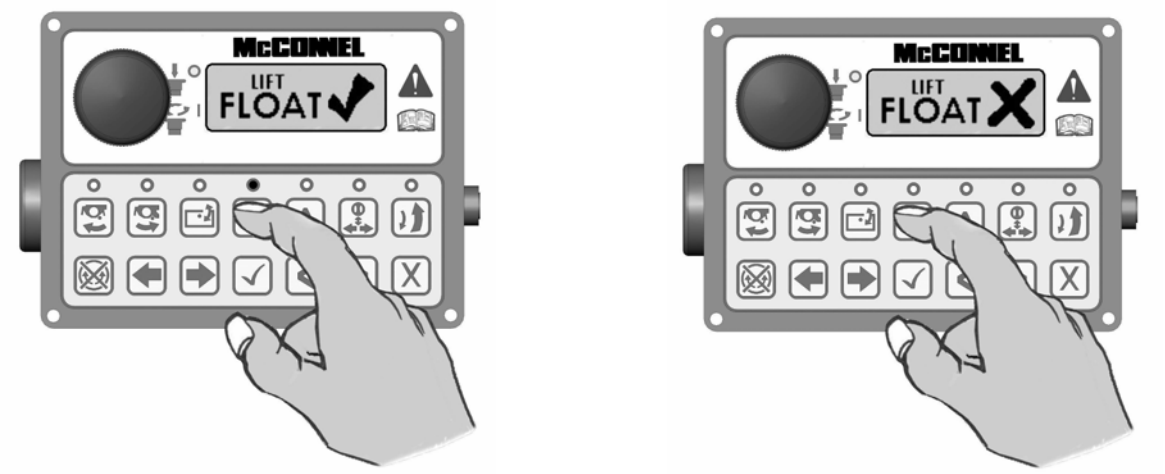


NOTE: When selecting or deselecting the function, the thumbwheel (T1) should be allowed to return to its centre position before releasing the lower frontal button (B1).

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'.



2. Press and hold in the lower frontal button (B1) on the joystick control and roll the right hand thumbwheel (T2) fully 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) fully 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).

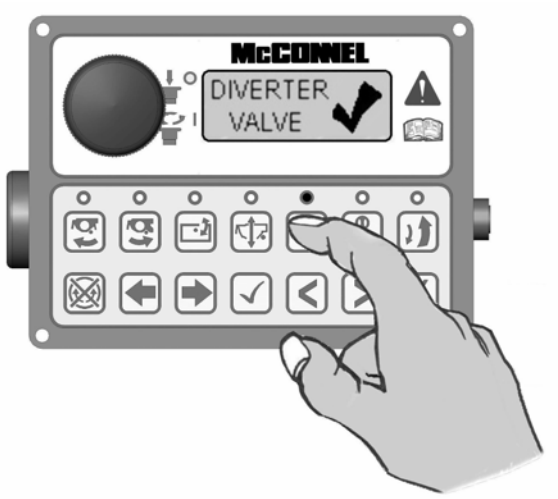
In the case of EDS models once this function is engaged and the rotor is running the EDS settings (SOFT – MED – HARD) will automatically be displayed on the control unit screen and can be scrolled through using button B1 on the joystick or the tick [✓] button on the control unit, if the rotor is not 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. When not in the EDS work settings screen, operation of button B1 activates the Slew/Tele swap function.

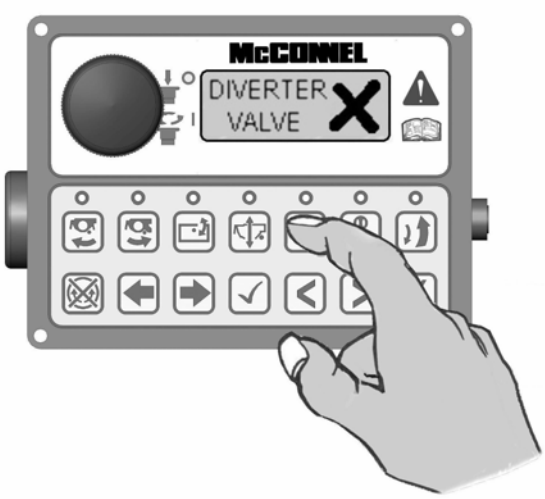
AUXILIARY FUNCTION CONTROL

This 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. 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 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 ON ✓'.
   Holding the button in will select Diverter Valve 2.

   NOTE: Diverter Valve #2 operates only whilst its selection button is held in – releasing the button will de-activate the valve.





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 ON ✓'.
   Holding the button in will select Diverter Valve #2.

   NOTE: Diverter Valve #2 only operates whilst its selection button is held in – releasing the button will de-activate the valve.

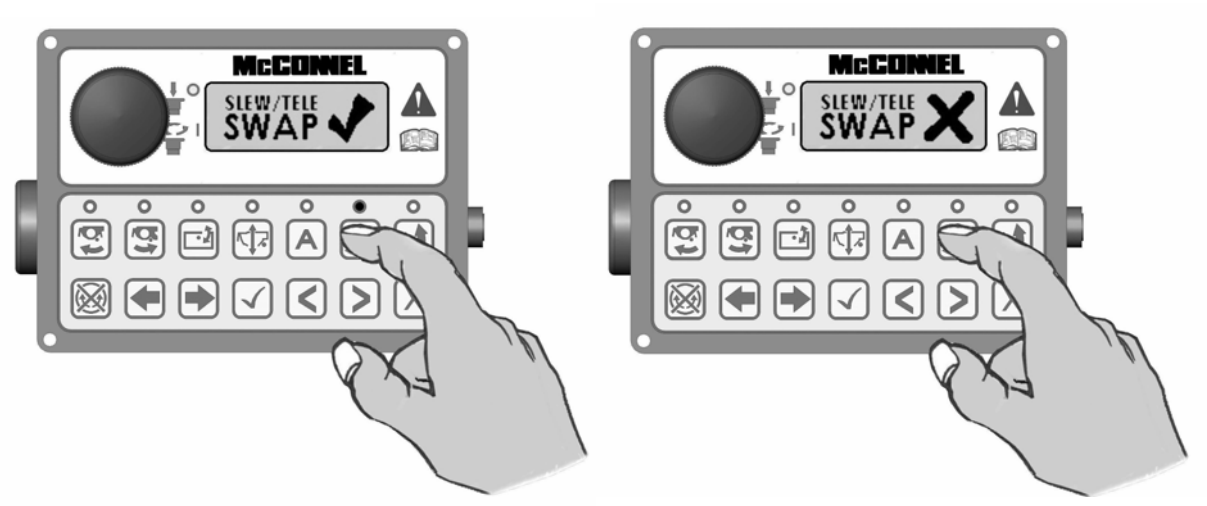
Button B2 not available on some models.

SLEW / TELE (MIDCUT) SWAP

IMPORTANT NOTE RELATING TO THE OPERATION OF PA180 MODELS 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/Tele (Midcut). By default, Slew operation is performed with the right hand thumbwheel (T2) and Tele or Midcut 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.
There are 2 methods available for swapping these controls; via the control unit - *refer to #1 below,* or via the joystick controls - *refer to #2 below*.

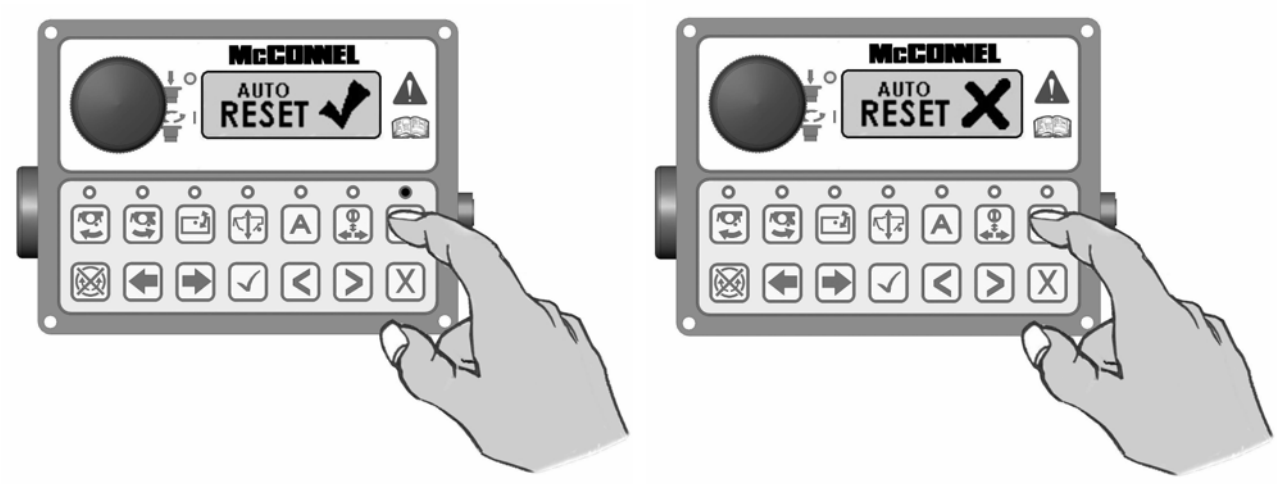
1. Press the swap button once to select swap mode – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'SLEW/TELE SWAP ✓'. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED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



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'.

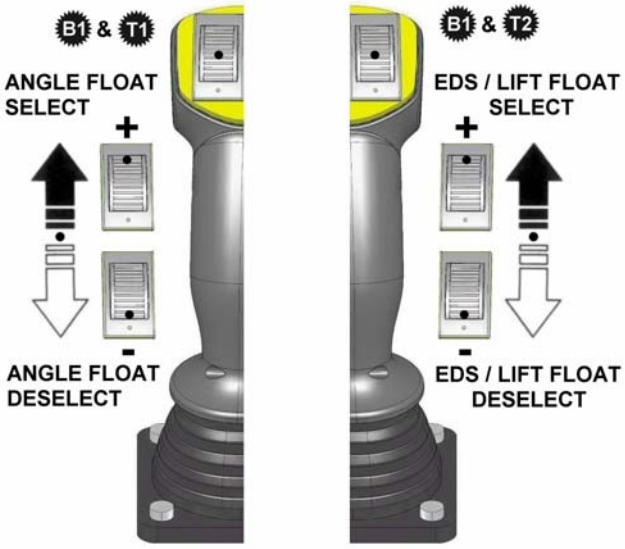


V4 JOYSTICK CONTROLS - Buttons & Thumbwheels Operation

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.

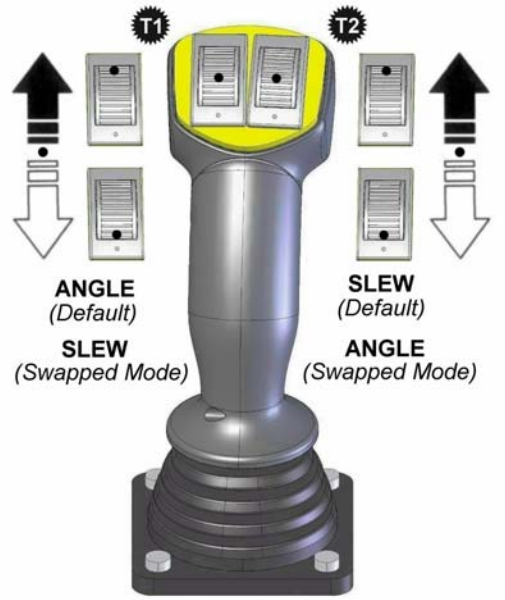
FLOAT SELECTION & DE-SELECTION

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



ANGLE & SLEW OPERATION

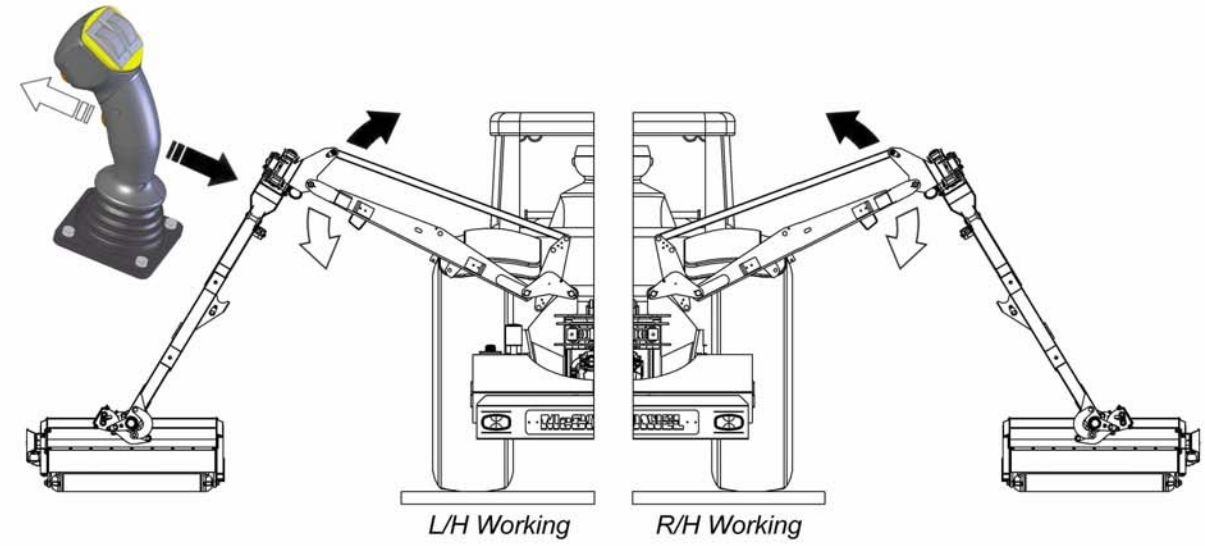
Rotate thumbwheels in required direction.

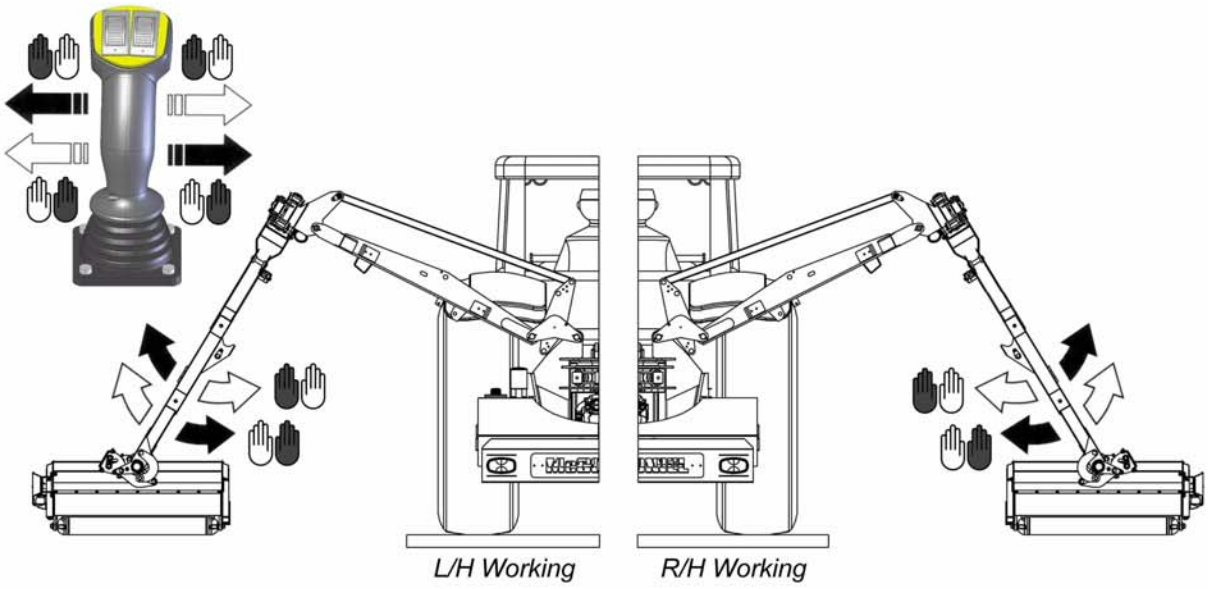


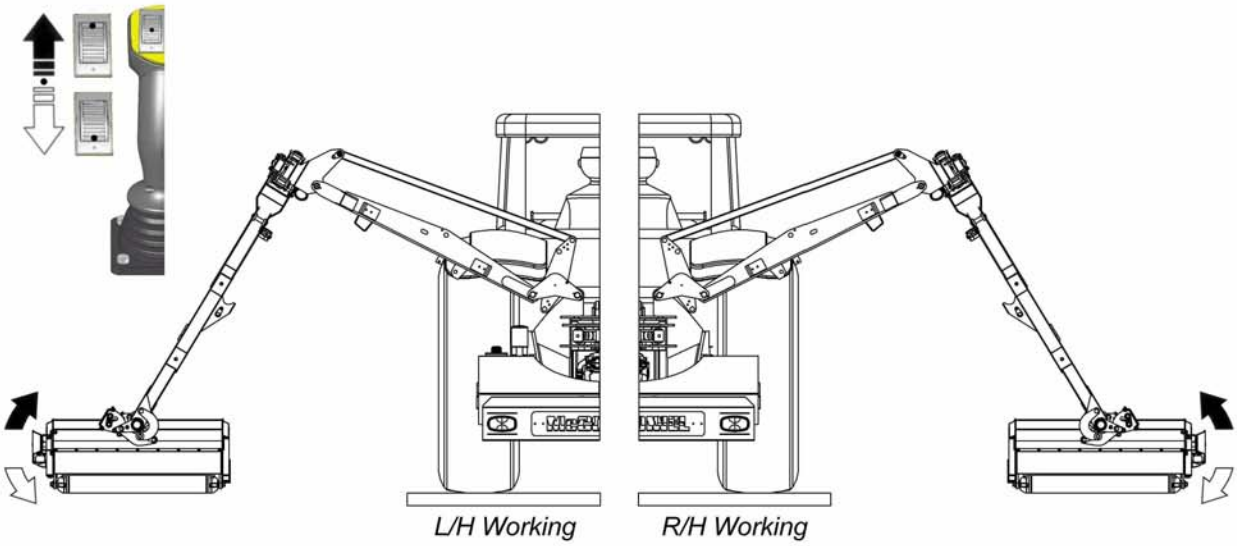
DIVERTER VALVE SELECTION

Diverter selection is via button B2

ARMHEAD OPERATION – JOYSTICK CONTROLS



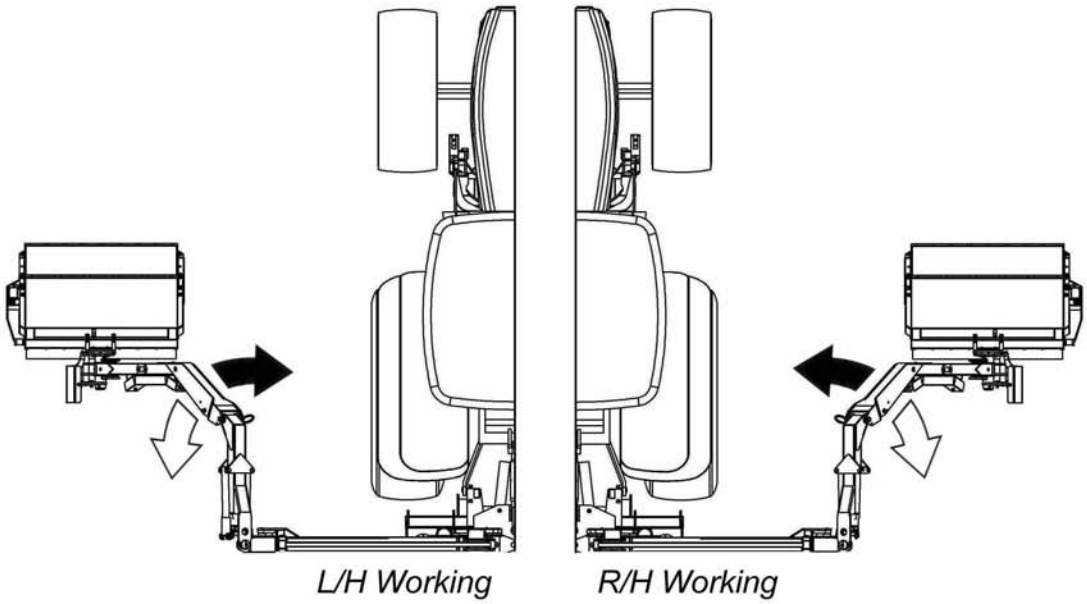


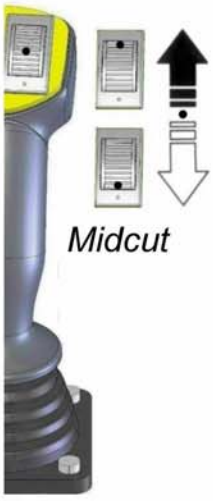


NOTE: Illustration shows the left hand thumbwheel as the default angle control, this can be swapped within the settings to the right hand thumbwheel if desired.

MIDCUT OPERATION – JOYSTICK CONTROLS (Diverted Mode)

Activate Diverter Valve #1 - Midcut Arm is then operated using the right hand thumbwheel.

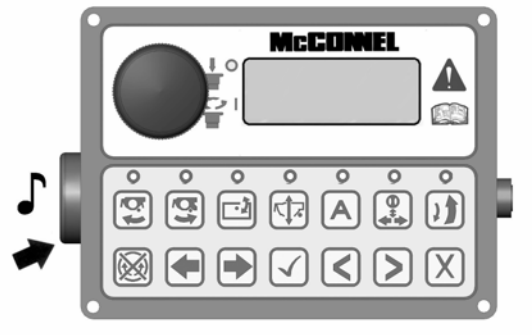




V4 CONTROL UNIT – Screen Access & Menu Buttons

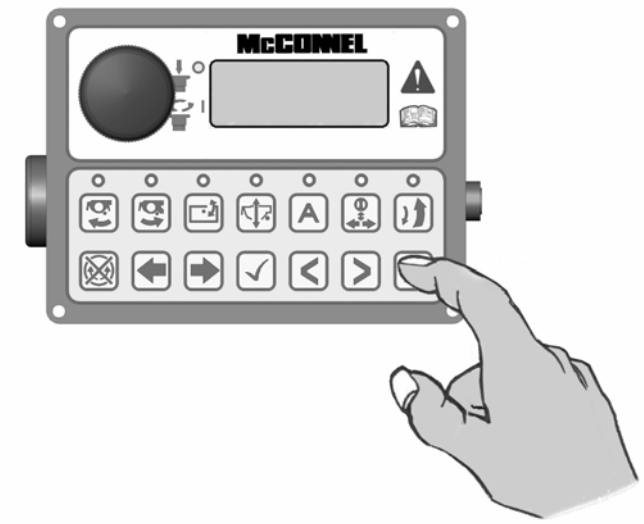
Power on/off switch (E/Stop)

Speaker (audible confirmation)

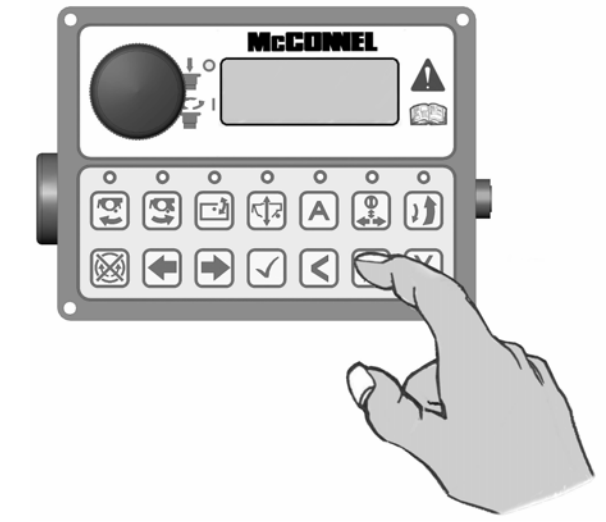


Command Button [✓]

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 are required for correct function.*

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.

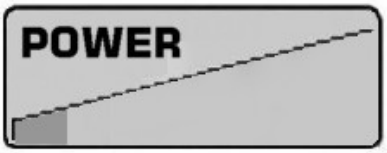
6. Pressing scroll forward [►] button will now display the actual Tractor PTO running speed.

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.

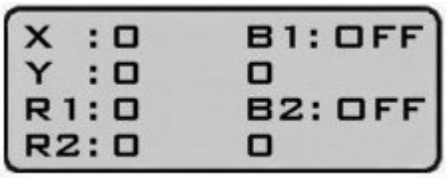
CAUTION: Avoid adjusting the contrast level to a state where the screen cannot be viewed as exiting the settings menu in this condition may render the LCD unusable as the 'on screen' prompts may no longer be visible to the user.

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.

TEST & FAULT FINDING SCREENS

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.

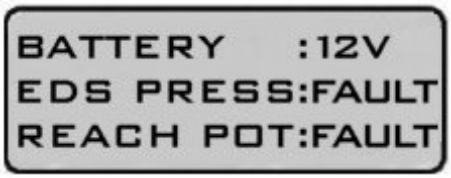
R1 and R2 Display

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.

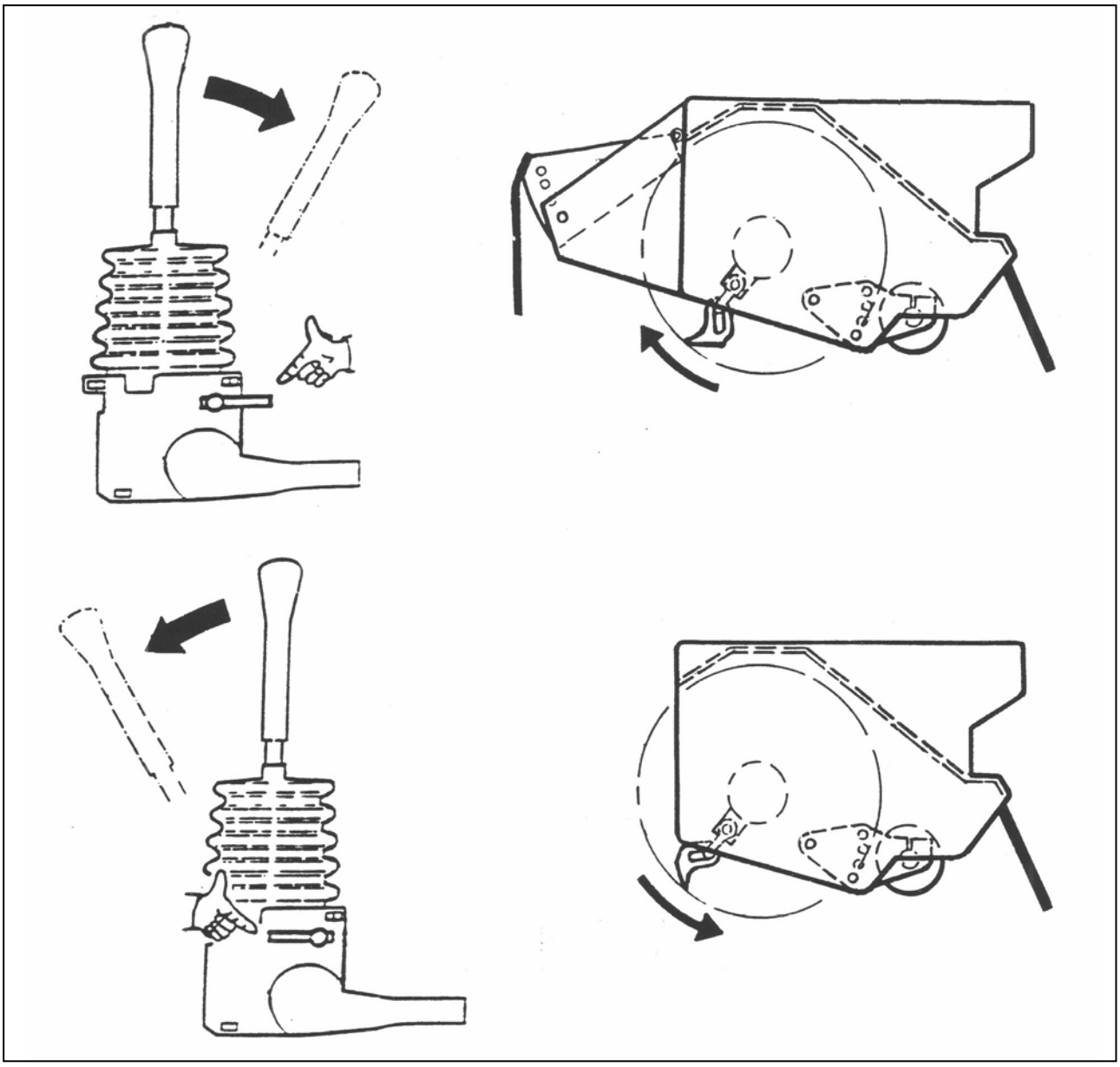
REACH FUNCTION SCREEN

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

ROTOR CONTROLS – *Gear hydraulic machines only.*



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).

ROTOR CONTROL - *S.i. machines only*

Rotor ON /OFF is controlled by operation of the tractor P.T.O. lever.

To start rotor:-

- Bring tractor engine revs up to 500-800 RPM
- Engage P.T.O.

To stop rotor:-

- Disengage P.T.O. **Do not leave tractors seat until the rotor is stationary.**

REVERSING ROTATION - *S.i. models only*

- Fully extend the armhead and lower flail to the ground to minimise oil loss.
- Release the hoses from the rotor relief valve and interchange. *(Do not interchange the flail supply and return hoses at any other point as the hose routing and cross overs in the installation are necessary to allow the hoses to flex correctly during arm movements).*

To ascertain the direction of cut without running the machine the following applies.

Connection P - (*lower motor rigid pipe)*
Connection MR - (*Upper motor right pipe)* } **upward cutting**

Connection P - (*Upper motor rigid pipe)*
Connection MR - (*Lower motor rigid pipe)* } **downward cutting**

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.

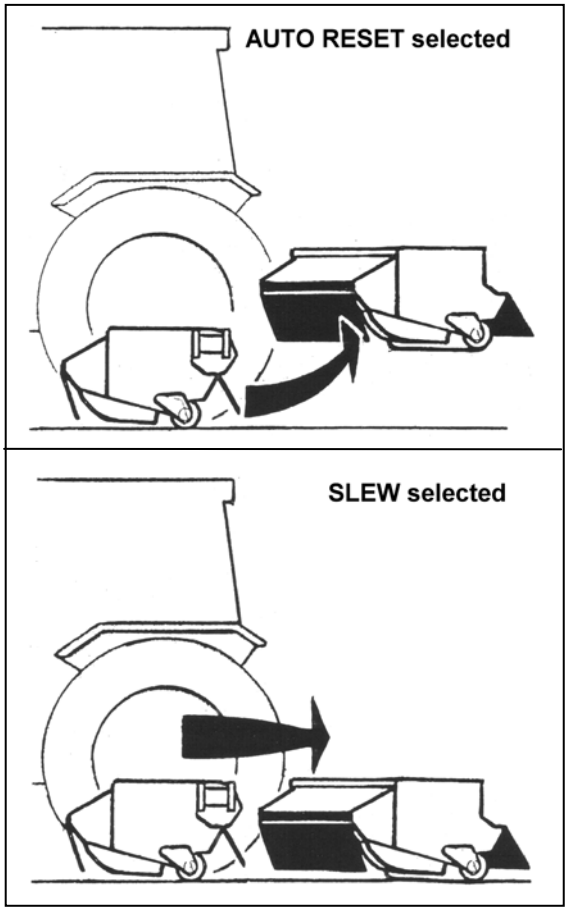
Breakaway may occur momentarily during normal work should an extra thick or dense patch of vegetation be encountered. In these instances tractor forward motion may be maintained with care.
Where breakaway has occurred as a result of contacting a post or tree etc. the tractor must be halted and the controls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

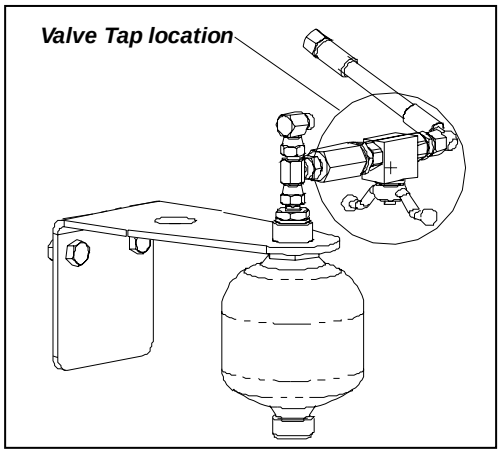


With 'SLEW' selected:
When the slew relief valve setting is exceeded oil is displaced from the slew ram allowing the arm to pivot backwards horizontally and the obstacle to be cleared.

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:

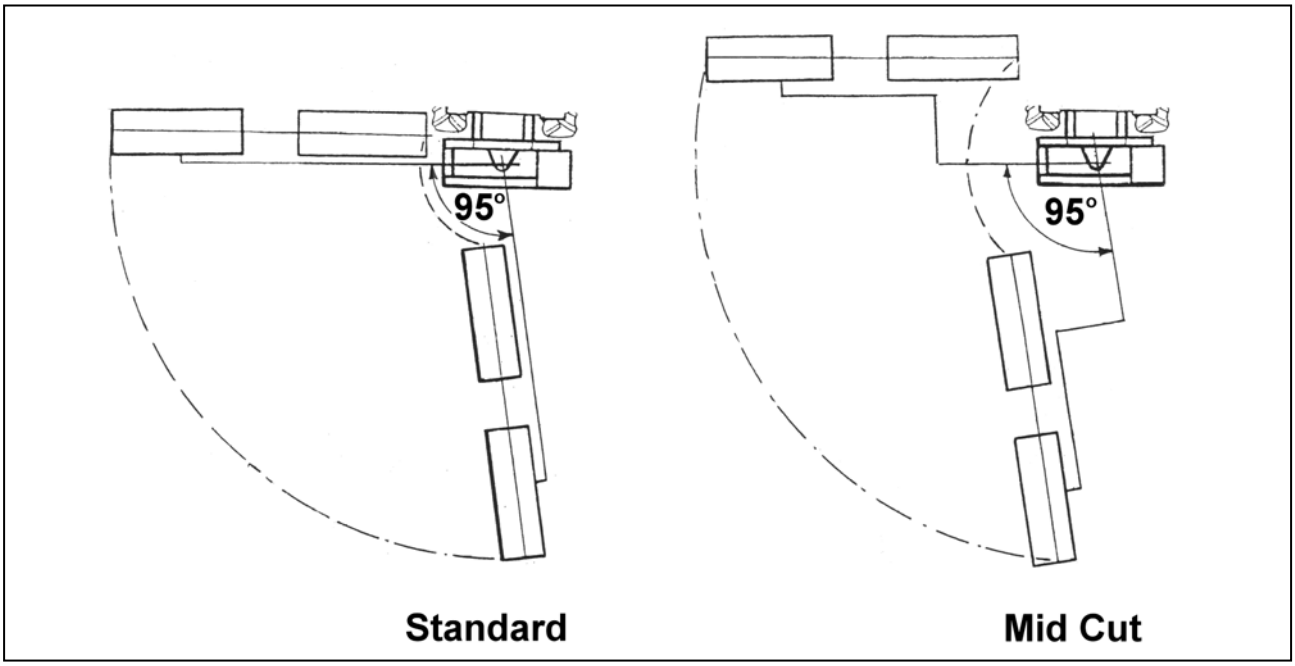


- Maneuver flailhead to a horizontal position where it is close to the tractor and resting on the ground.
- Open Valve Tap to allow oil in.
  see diagram opposite for Tap location.
- Operate machine to raise the flailhead until it is clear of the ground and then return it back to the ground.
- Close 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 95° arc of powered arm movement on the working side, from right angles to the tractor, to 5° 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.

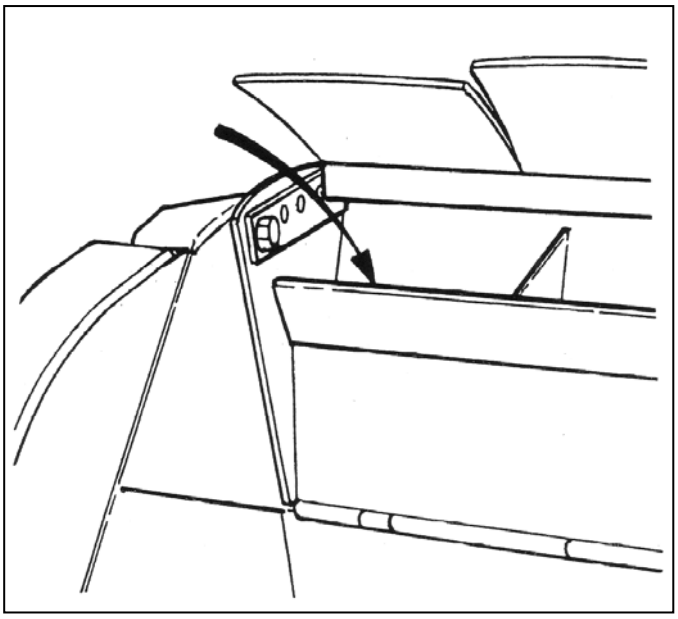
CAUTION:
Extra care must be taken when working in 'SLEW' mode with the reach fully in
IT IS POSSIBLE FOR THE FLAIL HEAD TO HIT THE TRACTOR OR MACHINE FRAME.

WIRE TRAP

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).*



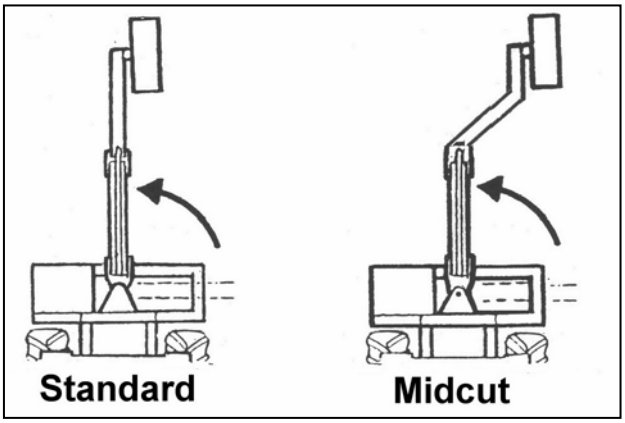
REMOVING WIRE

- 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

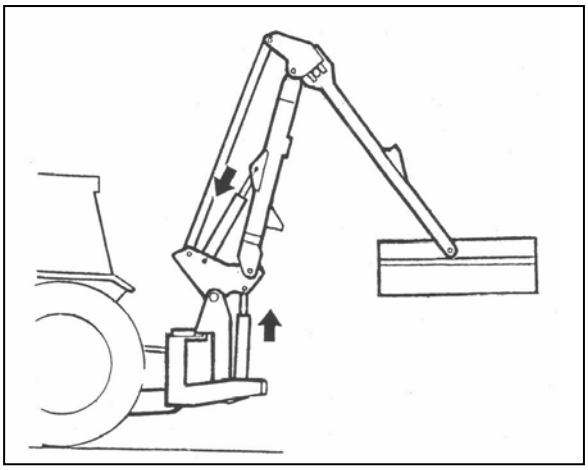
- Select ‘ROTOR OFF’ and wait until the **rotor has stopped turning.**



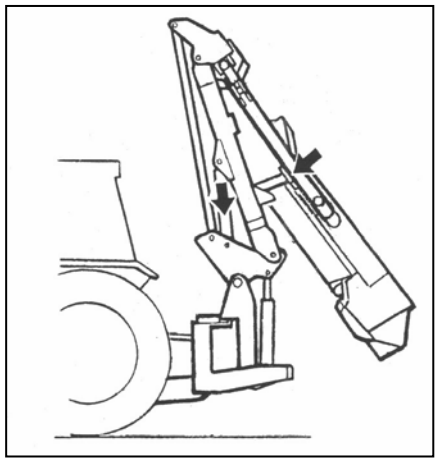
- Ensure that the **‘lift’** and **‘angle float’** are switched **off.**

- Select ‘SLEW’ mode on the control assembly.

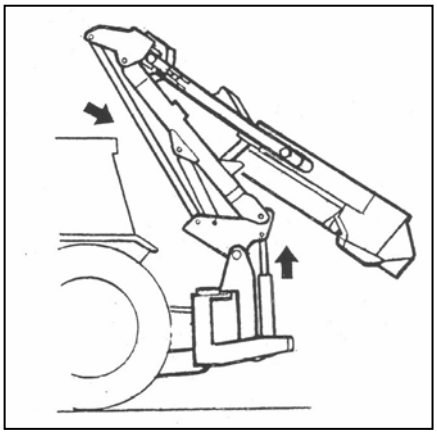
- Operate ‘SLEW IN’.



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



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



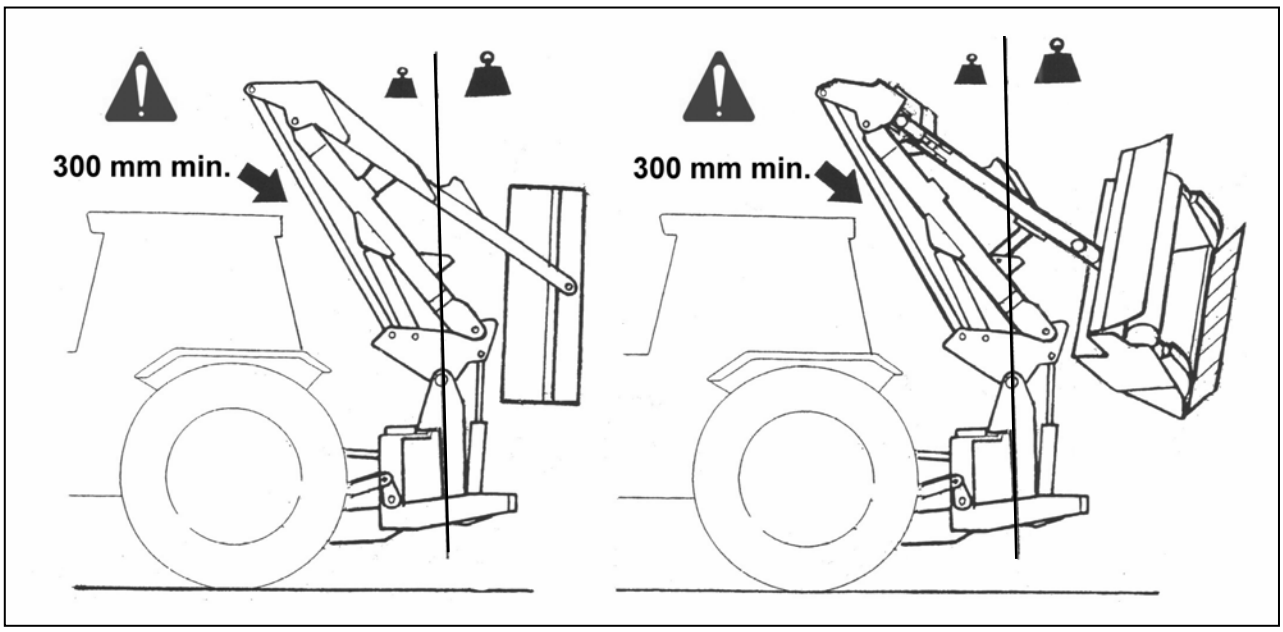
- Select ‘LIFT UP’ and raise the arms until the tension link is 300mm from the tractor cab.

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

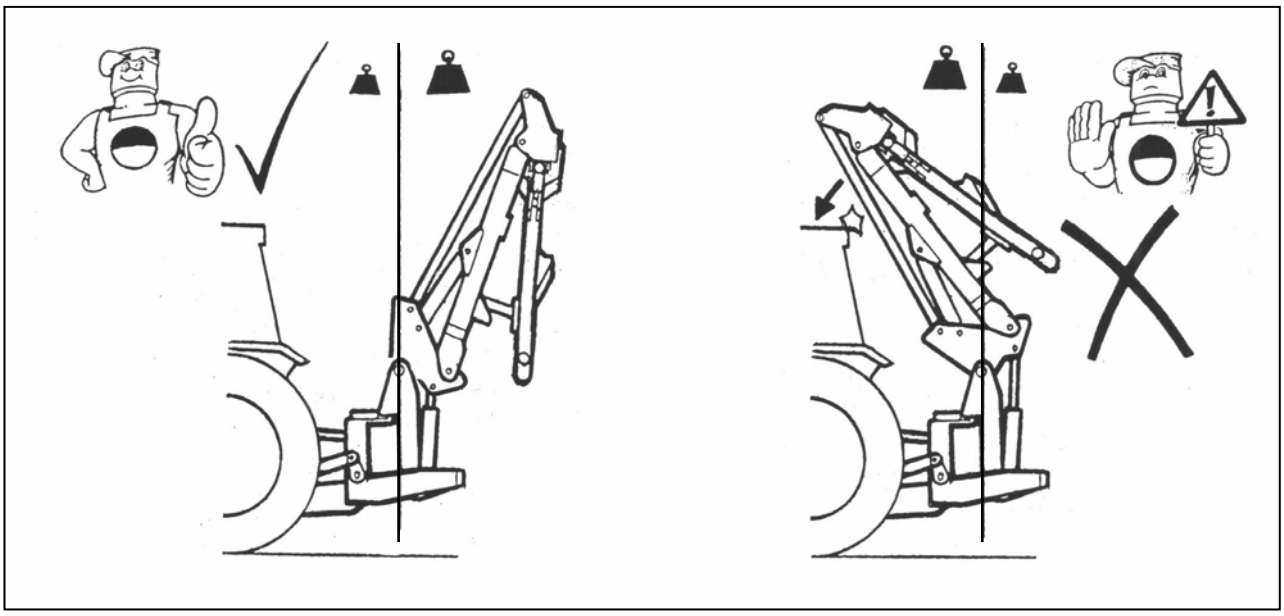
Fully screw in the lift ram and slew ram taps.

TRANSPORT POSITION – Rear Mounted Machines

The machine is transported in line to the rear of the tractor with a minimum of 3OOmm 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

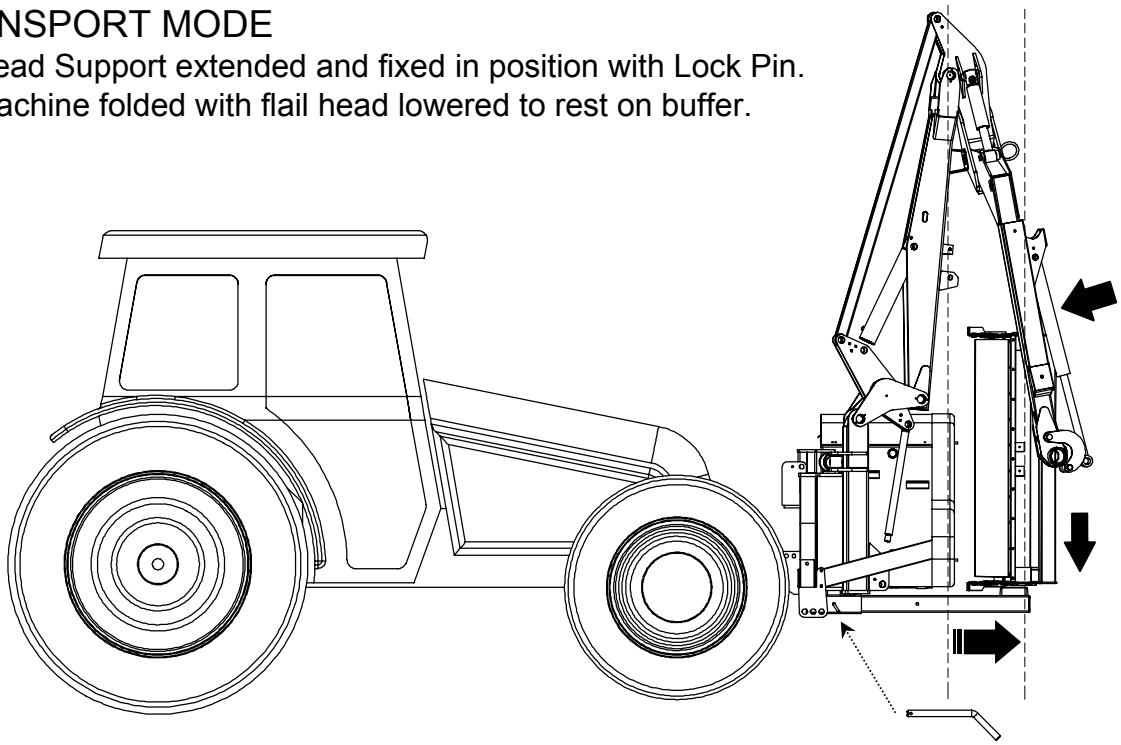
During transport:

The 'SLEW’ mode must ALWAYS be selected on the control assembly.

TRANSPORT POSITION– Front Mounted Machines

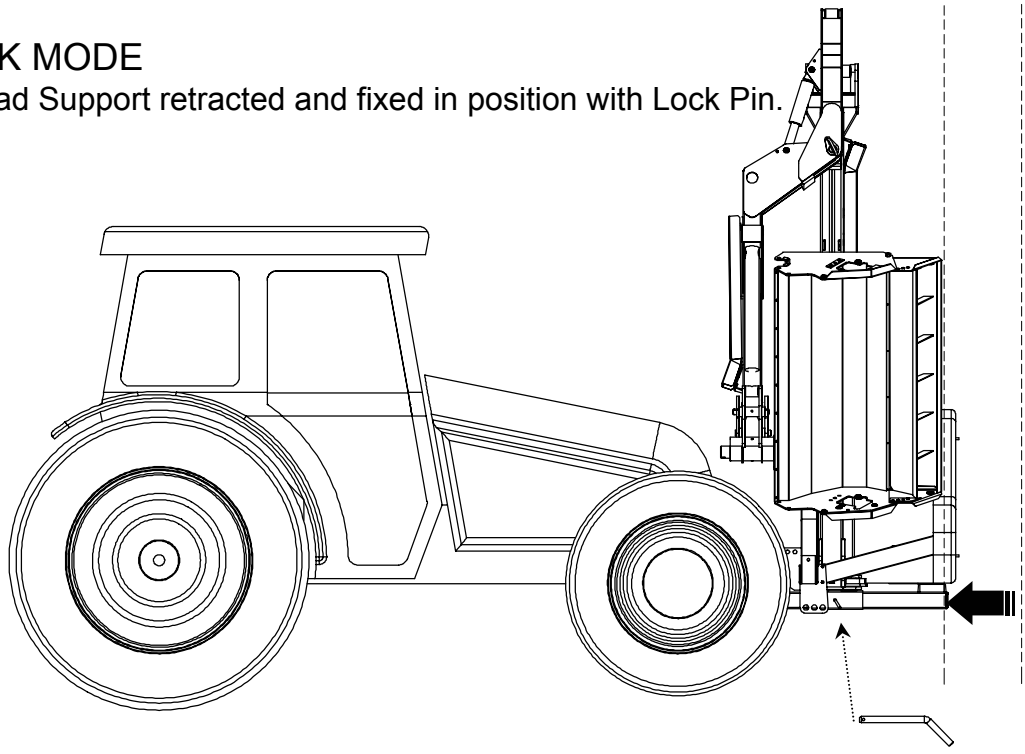
TRANSPORT MODE

- 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 P.T.O. must be disengaged and the power to the control box switched off.

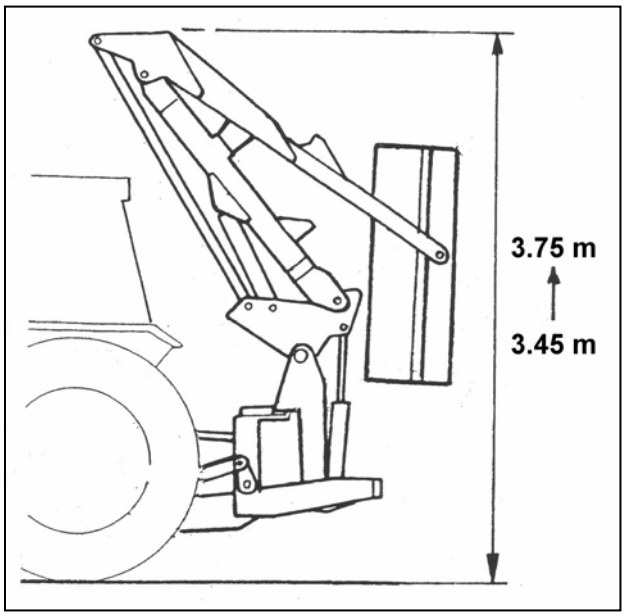
The acceptable speed of transport will vary greatly depending upon the ground conditions.

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.

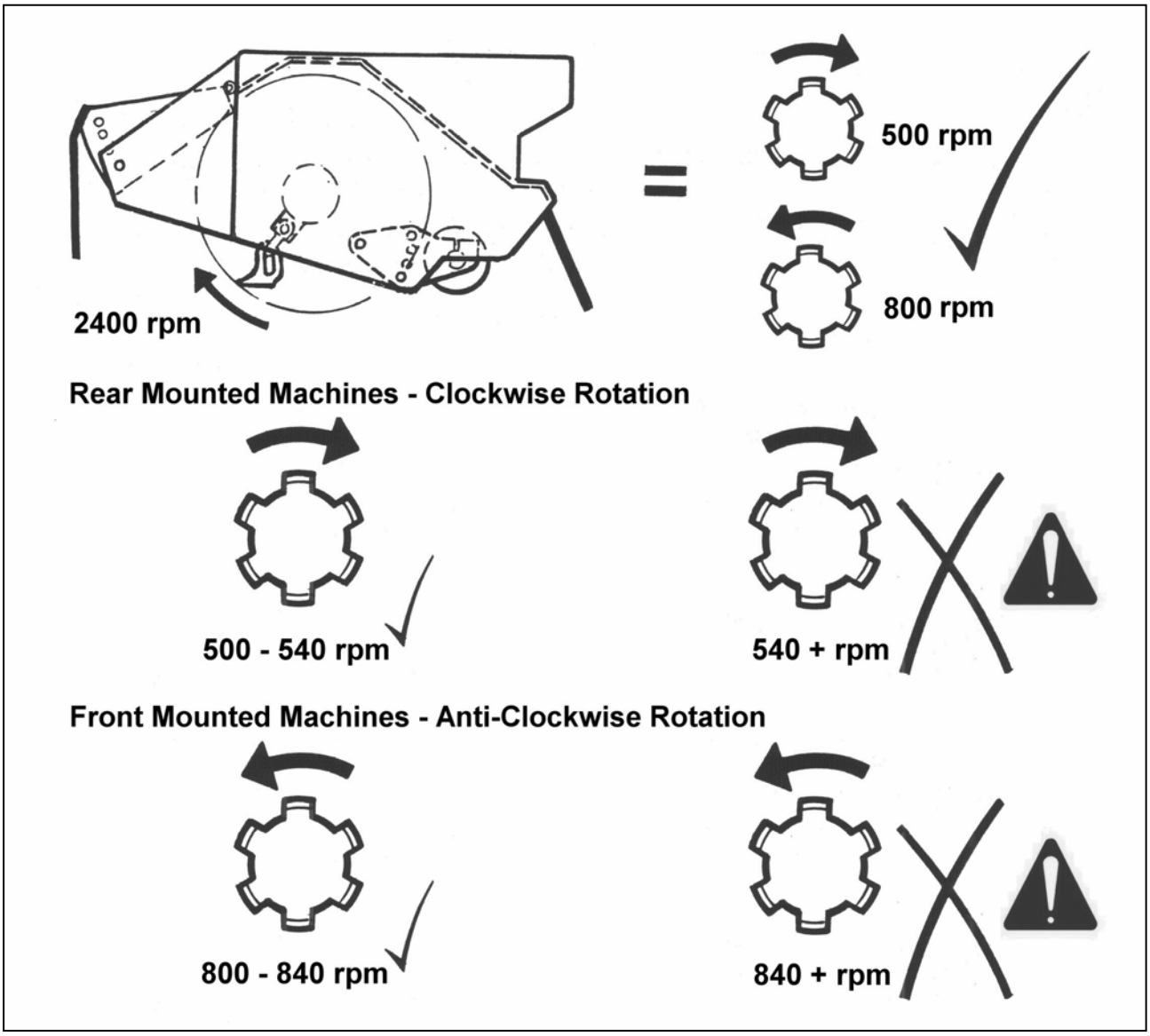
NOTE: Remember to unscrew the lift ram tap.

ENGAGING DRIVE

T.i. models only
Ensure that the rotor control lever is in the 'Stop' position before engaging the P.T.O. 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.

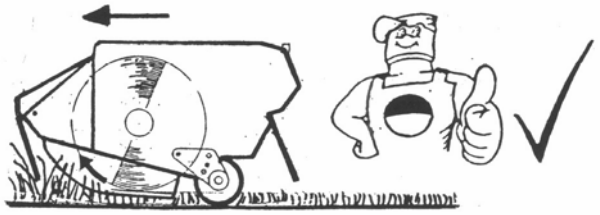
S.i. models only
Place the flail head at a safe attitude and bring the tractor engine revolutions to between 500 - 800 r.p.m. Engage the P.T.O. and slowly increase revs. until operating speeds are attained.

ROTOR OPERATING SPEED

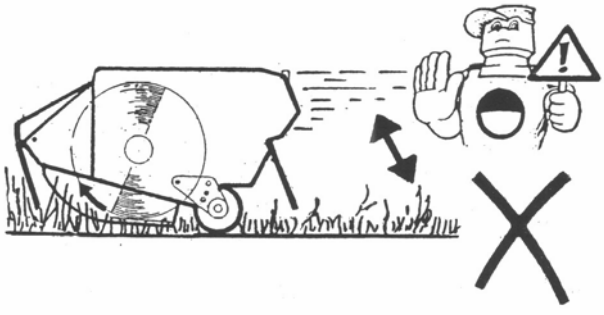


TRACTOR FORWARD SPEED

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.

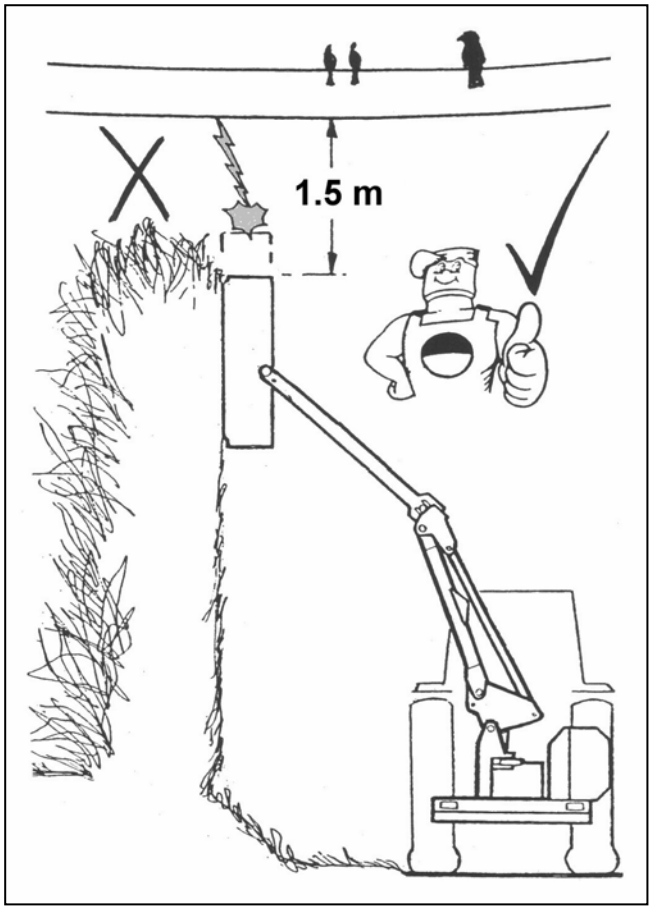


HIGH VOLTAGE CABLES

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 1.5 M 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.

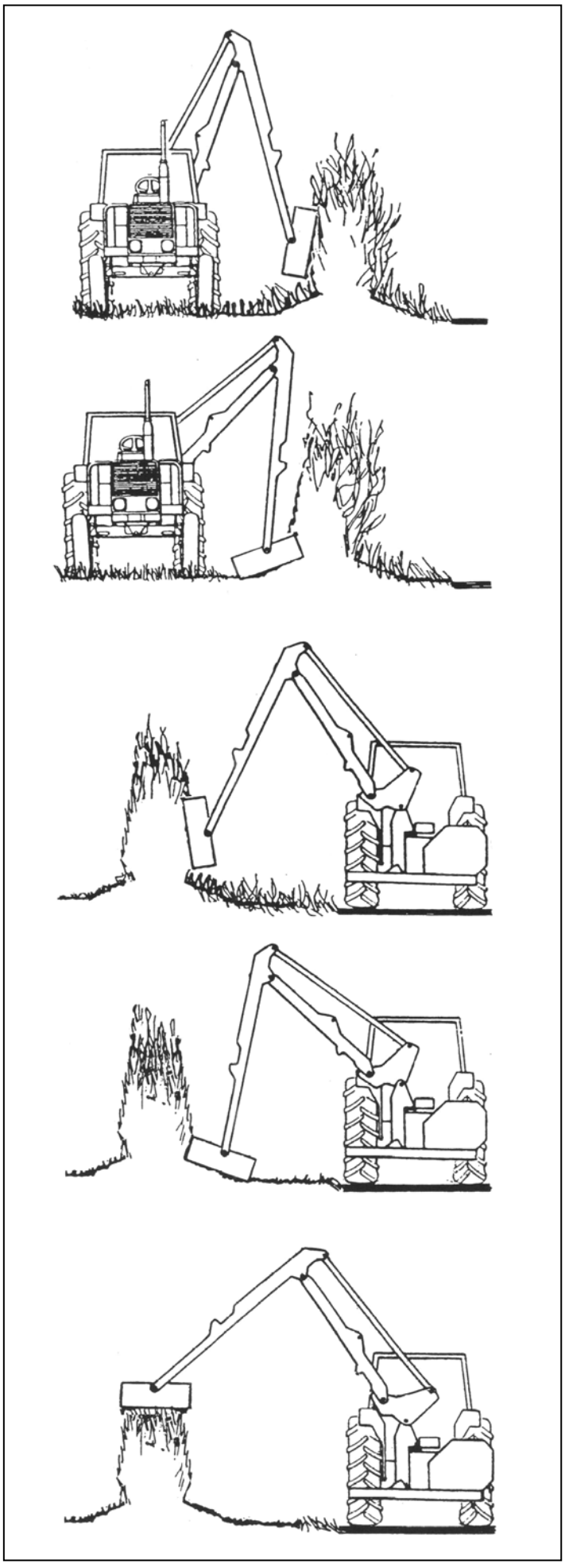


OVERHEAD OBSTRUCTIONS

Always be aware of the height of the machine when working or folded and take care especially when maneuvering near or under bridges, buildings, power cables or any other obstacles you may encounter when moving your machine.

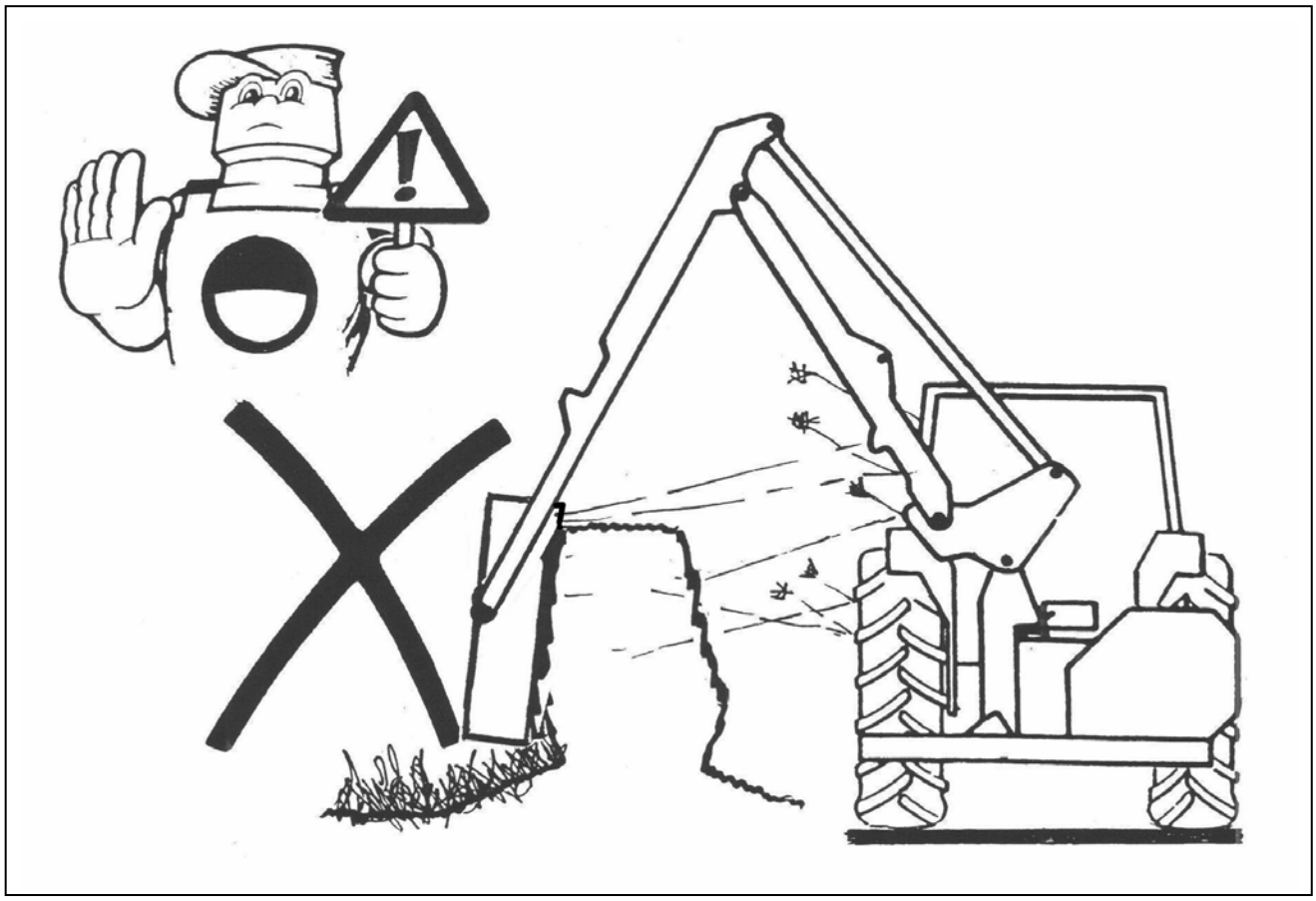
HEDGE CUTTING PROCEDURE

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.

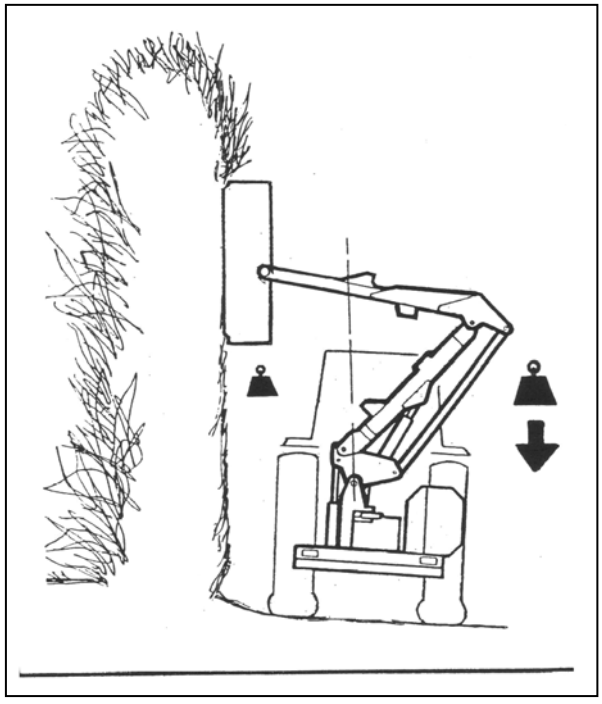
WORKING ON ADVERSE SLOPES

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

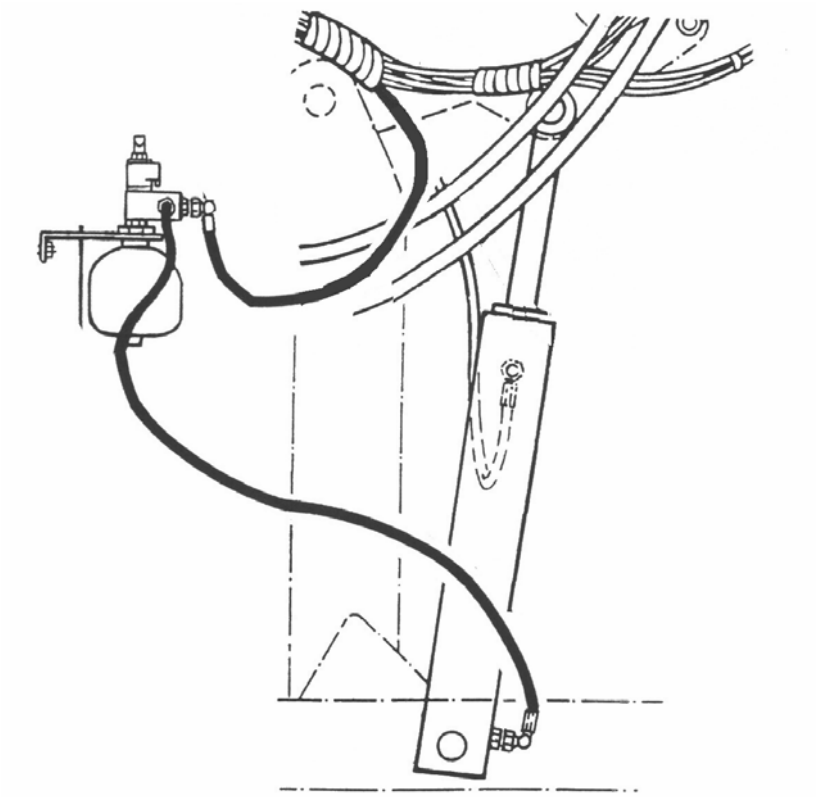
Do not remove this restrictor from the lift ram gland connection.

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



LIFT FLOAT KIT *(Optional extra for ground cutting)*

The hydraulic float kit should be mounted onto the special bracket in such a position that it does not foul any other component during the slewing motion.



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
On electric controlled machines the cable from the poppet valve solenoid is connected to the auxiliary switch on the control unit. It is permissible to also have the angle float facility connected to the auxiliary switch. In this case both functions will operate in unison.
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.

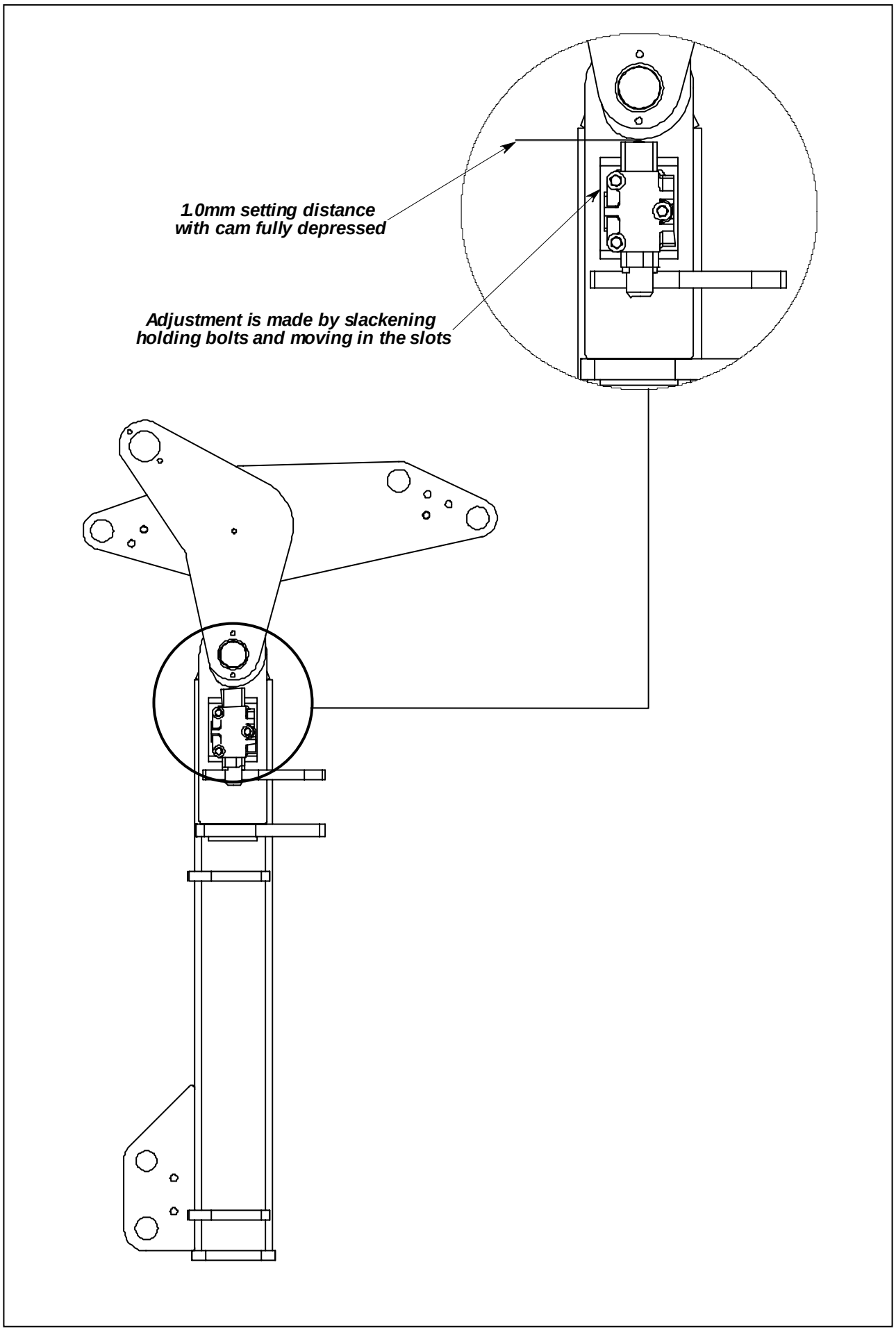
MULTILEVER SWITCHBOXES
For multilever switchboxes an additional switching kit *(Part No. 8402303)* is available which will, when the dual action position is selected, isolate the lift float function and allow angle float to be selected alone.

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.

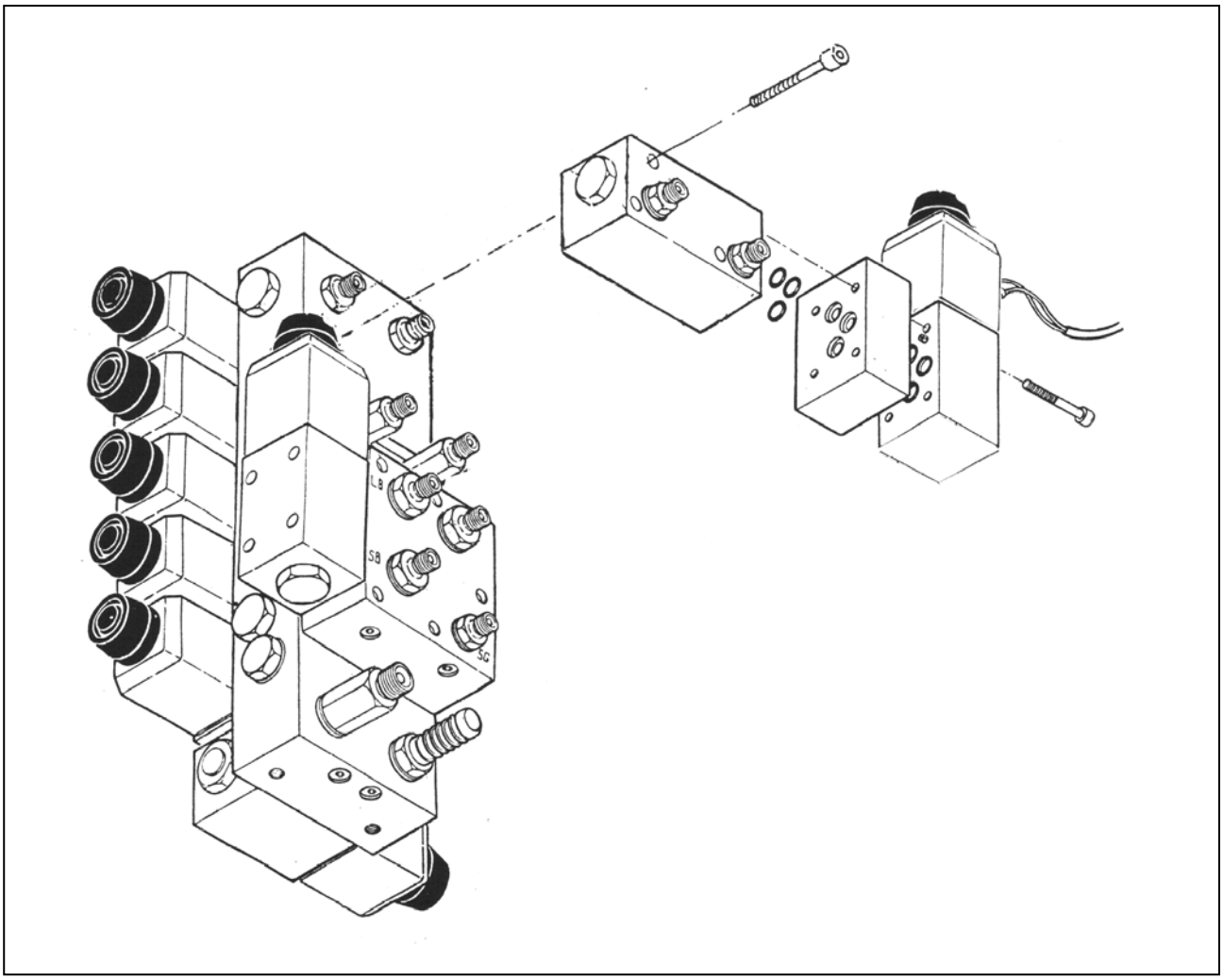
The lift control should be operated to take a proportion of the flail head weight off the flail roller. This is important, too little weight on the roller will leave areas of grass while with too much weight on the roller the ground will be scalped in places and increased flail wear, damage, or even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



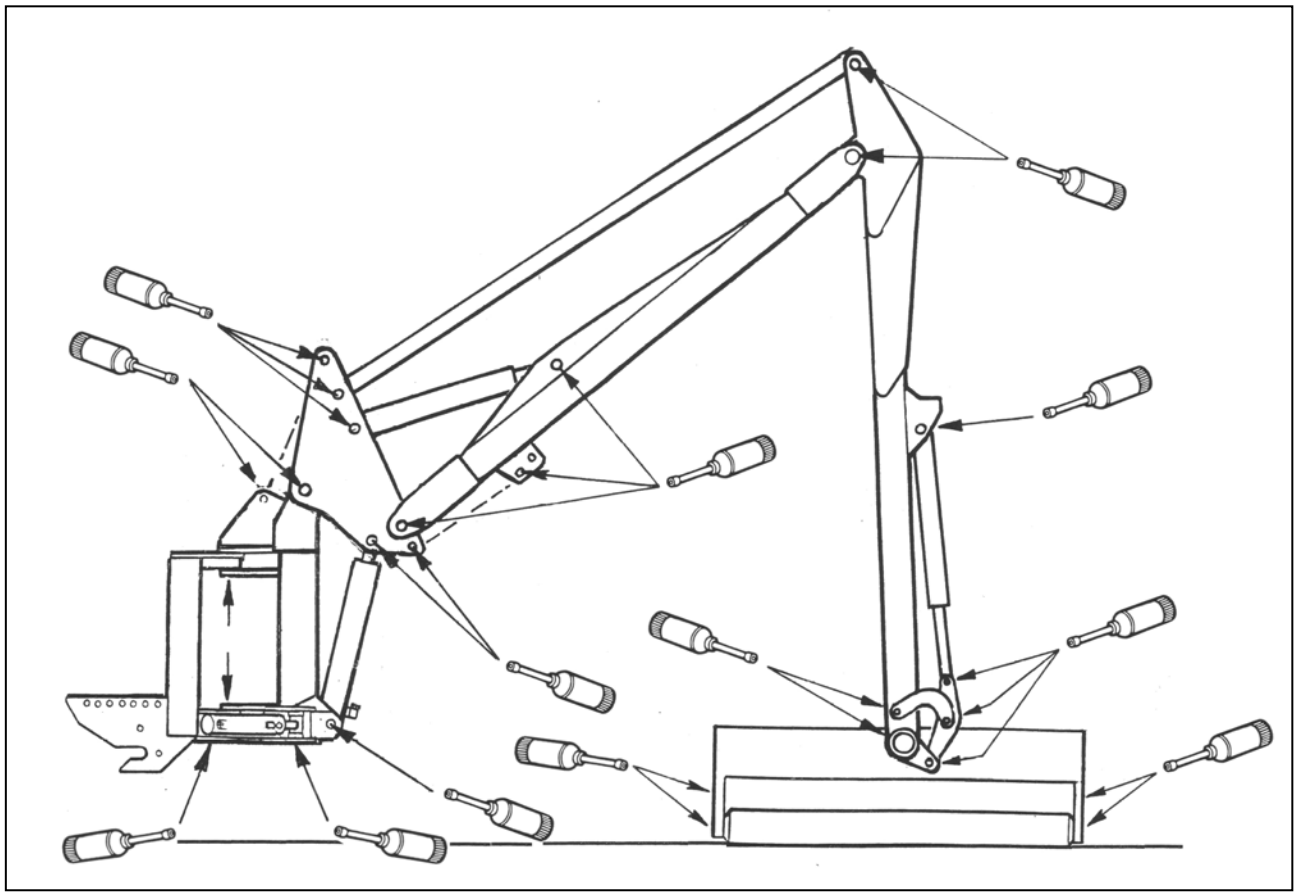
HEAD ANGLE FLOAT KIT – Standard



This facility will allow the flailhead to angle itself automatically to suit the contours of the ground. It is activated by selecting ‘B’ on a Multilever Switchbox or ‘C’ on a Monolever Switchbox *(see page 29).*

The two-core cable is connected from the solenoid to the common link harness and connection 14 on the main harness.

When working with head angle float, the flailhead mount must be positioned such that the flailhead is balanced about the mounting position. *Failure to observe this will result in a poor untidy cut.*



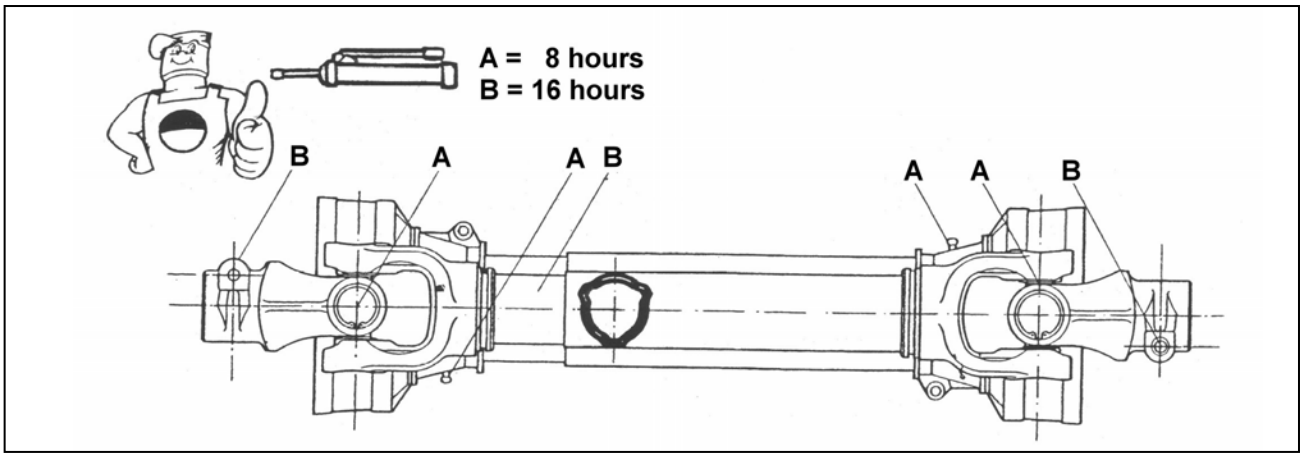
LUBRICATION

GENERAL

Grease daily all the points shown in the diagram above.

P.T.O. SHAFT

Regularly check the P.T.O. guards for damage and ensure the anti rotation chains are in place and that their anchor points are in good condition.
Lubricate the points shown on the diagram below at the intervals indicated using general purpose lithium based grease.



WARNING

DO NOT OPERATE THE MACHINE WITH ANY DAMAGED GUARDS
REPLACE SUSPECT ITEMS IMMEDIATELY

HYDRAULIC SYSTEM

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

The machine is protected by a 125 micron suction strainer and a low pressure 10 micron full flow return line filter.

- Suction strainer

The strainer is permanently fixed within the reservoir.

Should symptoms of pump cavitation or spongy intermittent operation occur the tank must be drained and flushed out with a suitable cleaning agent e.g. clean diesel oil

- Return Line Filter

The elements 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.

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.

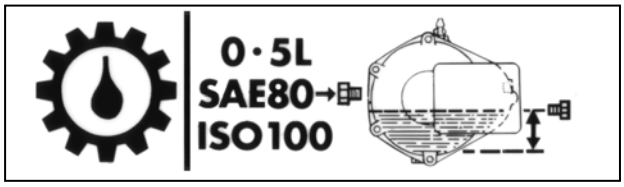
Note: Take care to ascertain the correct cable connections on both the control unit and the valve in the event of cable replacement.

PTO GEARBOX

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

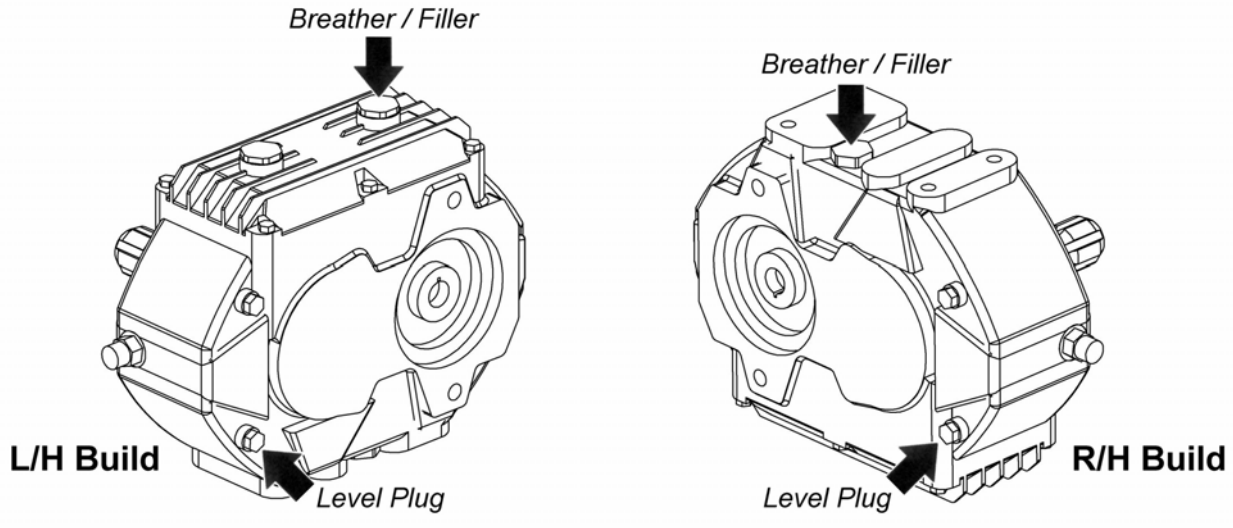
Gearbox Capacities

Alloy Gearboxes – Capacity 0.5 Litre SAE80



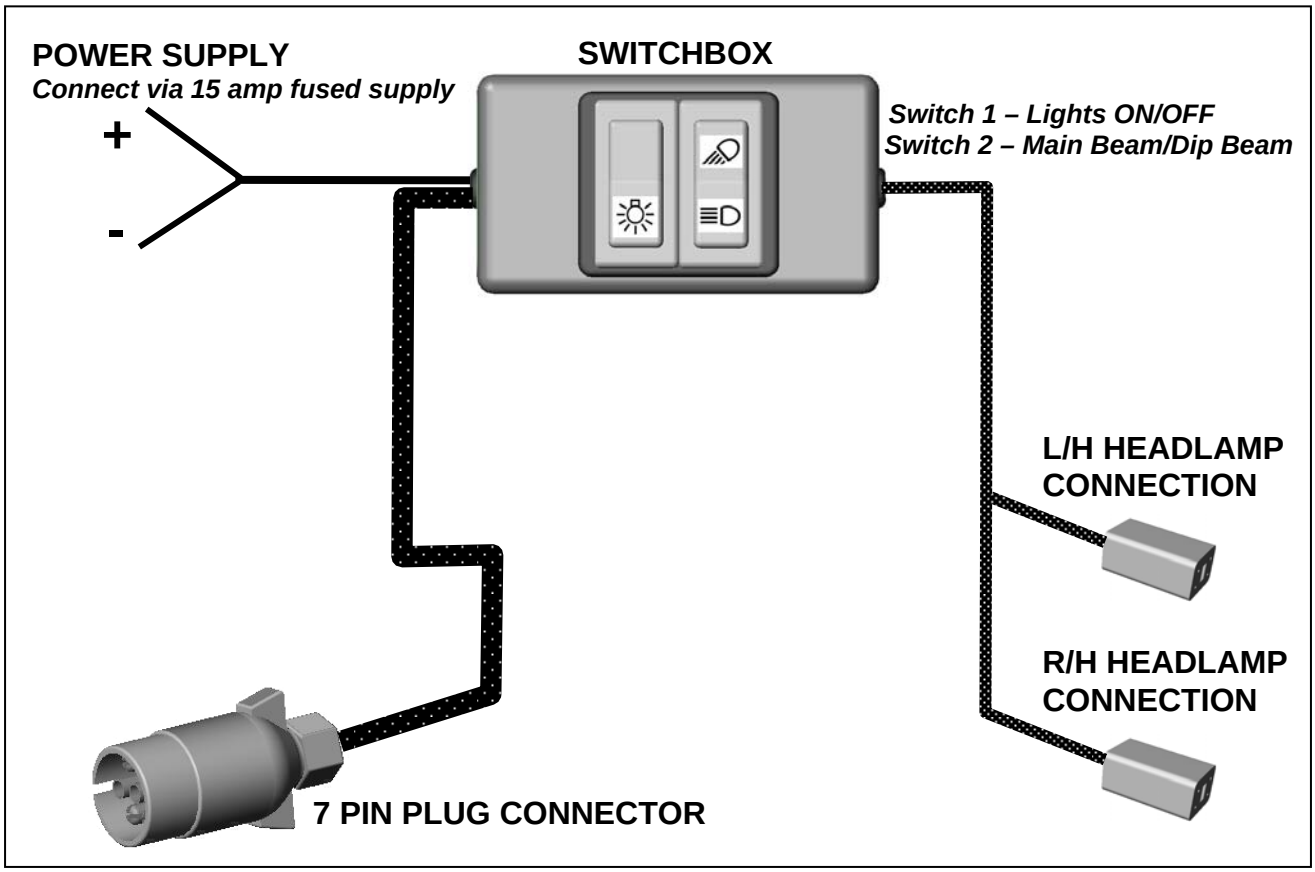
Cast Iron Gearboxes – Capacity 0.7 Litre SAE90

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.



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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