

# Spearhead

## TWIGA PRO Reach Mower 830M



## HANDBOOK

# Spearhead TWIGA PRO

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# CE Declaration of Conformity, Conforming to EU Machinery Directive 2006/42/EC

We, Spearhead Machinery Ltd, Green View, Salford Priors, Evesham,  
Worcestershire, WR11 8SW hereby declare that:

*Product* .....

*Product Code*.....

*Serial No*.....

*Type*.....

Manufactured by: Alamo Manufacturing Services (UK) Limited, Station Road, Salford Priors, Evesham, Worcestershire, WR11 8SW

Complies with the required provisions of the Machinery Directive 2006/42/EC. The Machinery Directive is supported by the following harmonized standards:

- BS EN ISO 14121-1 (2007) Safety of Machinery – Risk Assessment, Part 1: Principles Part 2: Practical Guide and Examples of Methods.
- BS EN ISO 12100-1 (2010) Safety of Machinery – Part 1: Basic Terminology and Methodology Part 2: Technical Principles.
- BS EN 349 (1993) + A1 (2008) Safety of Machinery – Minimum Distances to avoid the Entrapment of Human Body Parts.
- BS EN 953 (1998) Safety of Machinery – Guards General Requirements for the Design and Construction of Fixed and Movable Guards.
- BS EN 982 (1996) + A1 (2008) Safety Requirements for Fluid Power Systems and their Components. Hydraulics.

The EC Declaration only applies if the machine stated above is used in accordance with the operating instructions.

*Signed*



(On behalf of Spearhead Machinery Ltd)

*Status*

General Manager

*Date*

.....

# Spearhead TWIGA PRO

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# Spearhead

## READ THE BOOK FIRST

*It might save hours and pounds later!*

*When ordering spare parts always quote*

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

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### **NOISE**

*The equivalent daily personal noise exposure from this machine, measured at the operators' ear, is within the range 78 – 85 dB.*

*These figures apply to a normal distribution of use where the noise fluctuates between zero and maximum. The figures assume that the machine is fitted to a tractor with a quiet cab with the windows closed in a generally open environment. We recommend that the windows are kept closed.*

*With the cab rear window open, the equivalent daily personal noise exposure will increase to a figure within the range 82 – 88 dB.*

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

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## GENERAL INFORMATION

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

**Use only Spearhead Genuine spare parts on Spearhead 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. Remember whenever information concerning the machine is requested to also state the type of tractor to which the machine is fitted.*

<b>Machine Serial No.:</b>	<b>Model Details:</b>	<b>Installation Date:</b>
<b>Dealer Name:</b>	<b>Telephone No:</b>	
<b>Address:</b>		



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## FEATURES

### TWIGA PRO 830M Mid-Mount

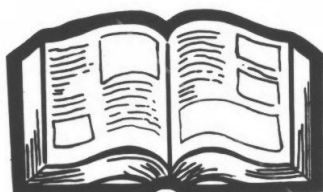
- Full chassis under frame for rigid attachment, tractor specific.
- Quick attach arm set.
- Quick release connections from arm set to rear power pack.
- 3-point linkage mounted rear frame power pack with enclosed hydraulics.
- Right or Left hand cutting.
- 72HP variable servo piston pump flail drive
- Independent reversible, on/off rotor operation.
- Power braking of flail drive when stopping.
- Pressure compensated piston pump powering arm movements.
- Proportional solenoid valves on main services all with manual override.
- Pilot operated check valves on all services to remove ram droop.
- Head angle float.
- Lift float on both 1<sup>st</sup> and 2<sup>nd</sup> Arms
- High capacity oil cooler c/w removable easy access easy clean dust guard.
- Proportional controls with LED display.
- Ergonomic joystick allows up to four services to be operated simultaneously.
- Power monitor with readout on display.
- PTO speed sensor with readout on display.
- Operator Guard.
- 30° of Hydraulic Breakaway
- 138° powered slew.
- 240 Litre hydraulic reservoir.
- 125micron abs Suction, 10micron abs medium pressure and 10micron abs return line filters fitted.
- Rear Lighting.
- Front frame fitting kit for stowage of Arm/head during transport
- Choice of 1.6m flailhead and sawhead attachments.

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## 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.*

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## 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 correctly fitted, 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.*

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*(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.*

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- ▲ *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 may 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.*

## **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 Spearhead.

### **Working in Public Places**

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

### **Warning Signs**

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

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## 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 be removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.*

*Collect all road signs promptly when the job is completed.*

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

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# Spearhead TWIGA PRO

## FITTING - Tractor requirements

**Minimum Tractor Weights** - including ballast weight if necessary:

7800 kg.

**Minimum HP requirements:**

120 HP

**Linkage:**

Category 2 Rear Linkage

**PTO shaft:**

800 RPM with a 6-spline output required.

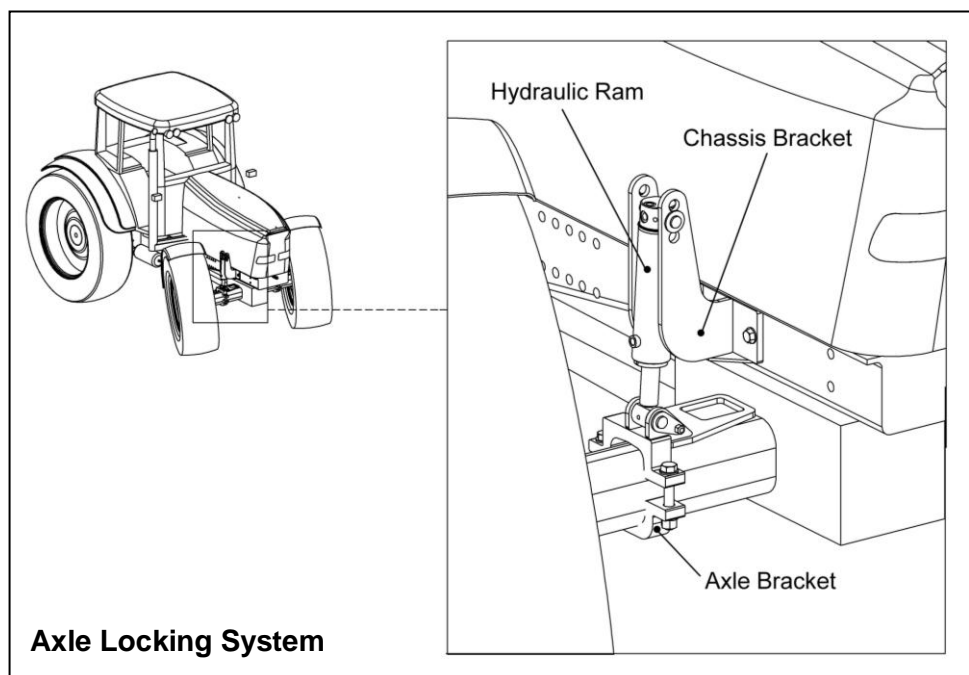
## AXLE LOCKING BRACKETS

For additional stability of the unit during work an 'Axle Locking System' may be fitted to the tractor. The axle locking system comprises of 2 pairs of brackets attached to the front axle and chassis on each side of the tractor - the axle and chassis brackets are each connected by a hydraulic ram which, when activated via the tractors external service, will lock the axle rigidly to the tractor chassis.

For normal operation the tractor's external service control lever should be set to the float position - refer to your tractor handbook for operation instructions. Float position will allow the tractor's suspension to function in the normal manner.

The front suspension is locked by moving the external service control lever to the centre position. When working for long periods of time with the arm extended to the side, leakage may occur through the tractor's spool valve – this can be rectified by lowering the flailhead to the ground, moving the external service lever to float before returning it to the centre position and resuming work.

**IMPORTANT – The Axle Locking System must only be activated or used whilst the machine is in normal work mode. NEVER lock the axles of the tractor during transportation or whilst manoeuvring the unit.**



# Spearhead TWIGA PRO

## VEHICLE/ TRACTOR PREPARATION

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

**Fit Operator Guard** (part no. 73 13 324) using the hooks provided. Shape mesh to cover all vulnerable areas.

**Remember** the driver must be looking through mesh and/or polycarbonate glazing when viewing the flail head in any working position - unless the vehicle/ cab manufacturer can demonstrate that the penetration resistance is equivalent to, or higher than, that provided by mesh/polycarbonate glazing.

If the tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing. The operator should also use personal protective equipment to reduce the risk of serious injury such as; eye protection (mesh visor to EN1731 or safety glasses to EN166), hearing protection to EN352, safety helmet to EN297, gloves, filter mask and high visibility clothing.

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

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

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

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

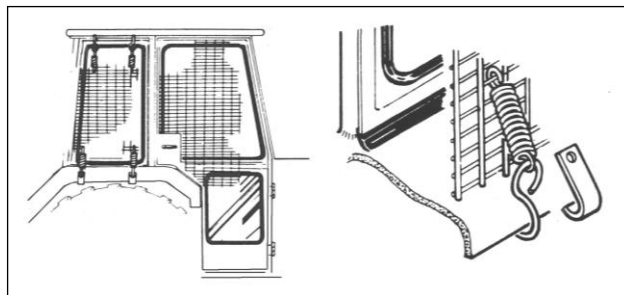
### Factors that effect stability:

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

### Suggestions to increase stability:

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

The advice above is offered as a guide for stability only and is not a guide to vehicle strength. It is therefore recommended that you consult your vehicle manufacturer or local dealer to obtain specific advice on this subject, additionally advice should be sought from a

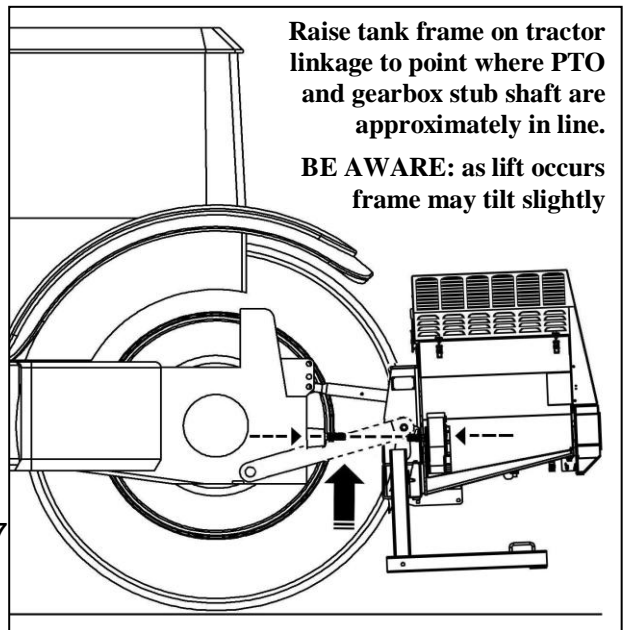
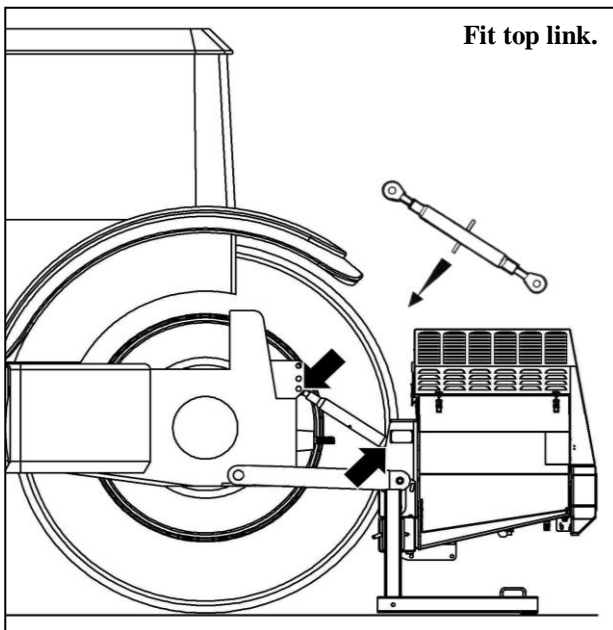
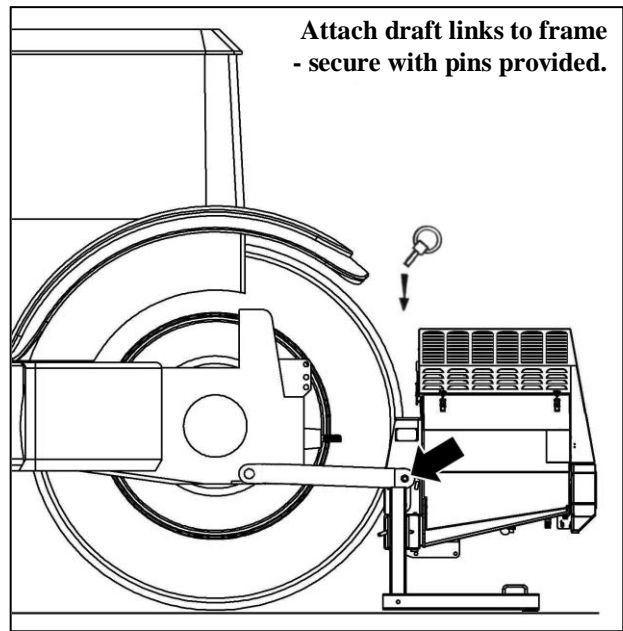
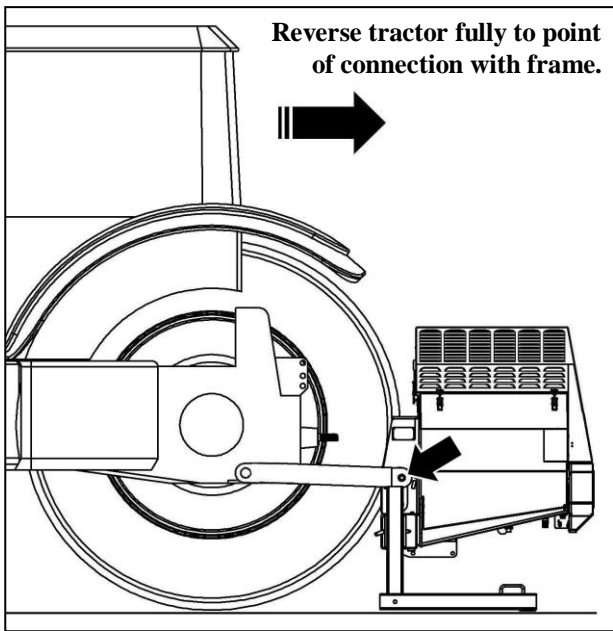
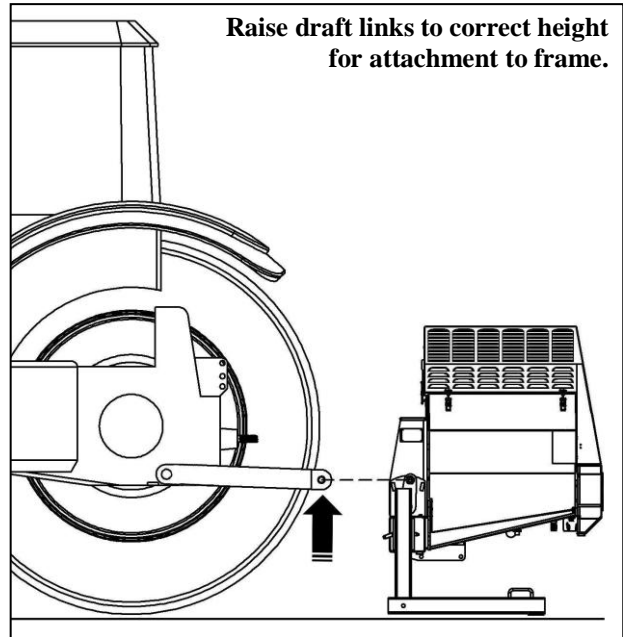
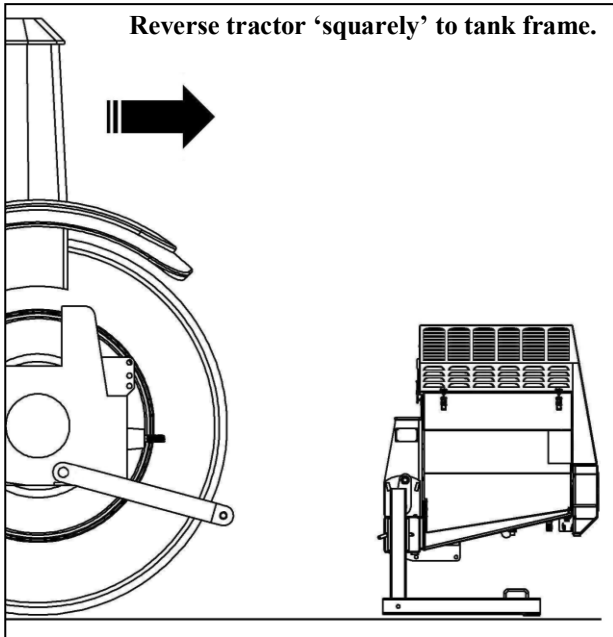




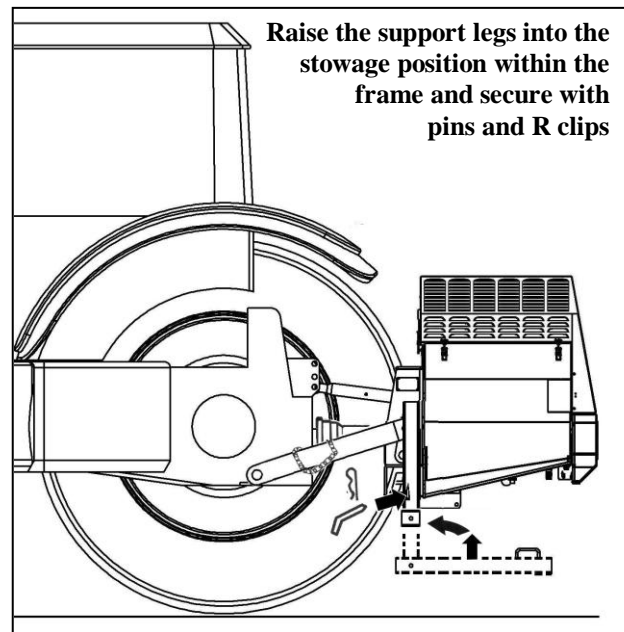
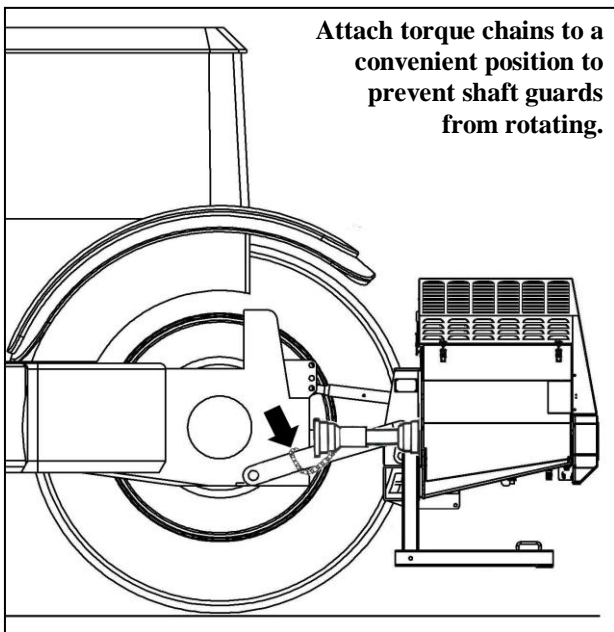
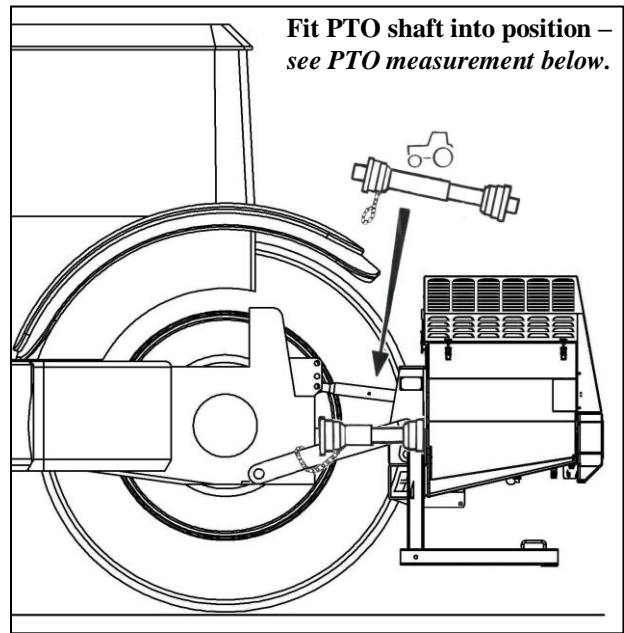
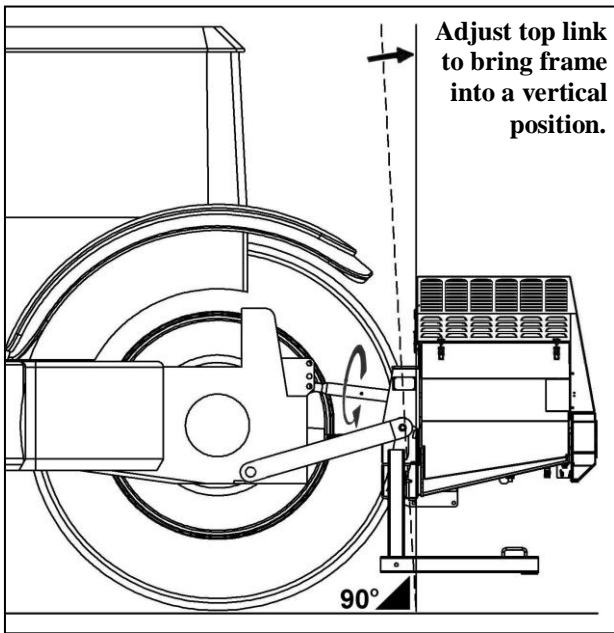
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tyre specialist with regard to tyre pressures and ratings suitable for the type and nature of the machine you intend to fit.

## REAR TANK FRAME ATTACHMENT



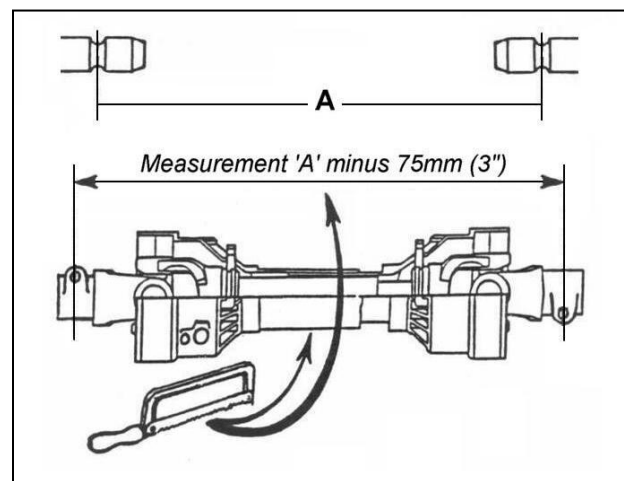
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## PTO Measurement

Measure distance 'A' shown in illustration opposite – cut PTO to measurement 'A' minus 75mm (3").

**Note** - for subsequent use on a different tractor measure again – there must always be a minimum shaft overlap 150mm.



## Rear Tank Frame Removal

Removal of the rear tank frame is a reversal of the above procedure.

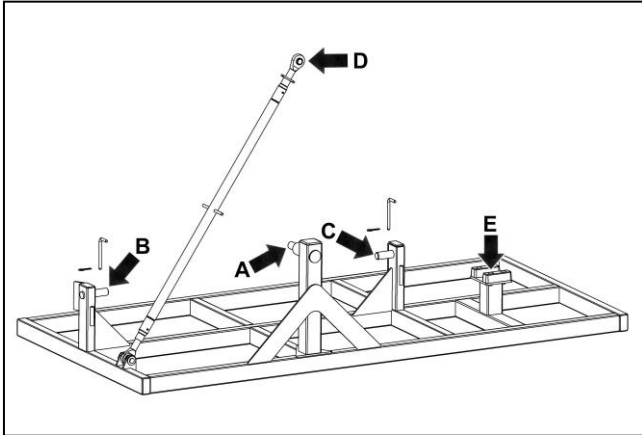
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## DETACHING THE ARM UNIT

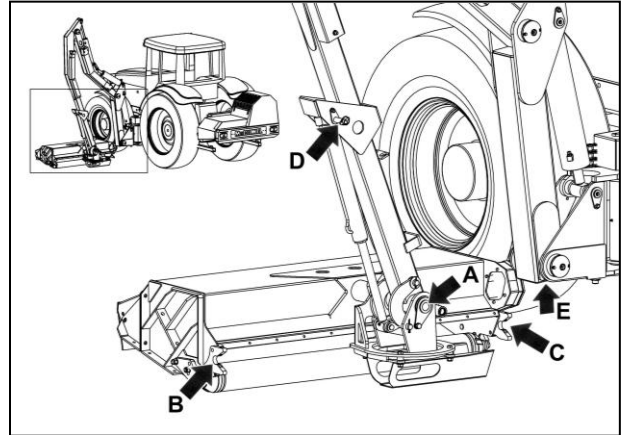
### Support & Storage Frame

Removal of the Mid-Mount arm unit necessitates the use of a purpose-built support and storage frame that ensures the unit is safely and securely supported throughout the removal process and during it's storage – NEVER attempt to remove or store the arm unit without the use of this frame.

The illustrations below show the support frame and arm unit attachment locations – 'A' to 'D' are 'fixing' points and 'E' is a 'resting' point.



Support Frame showing attachment points

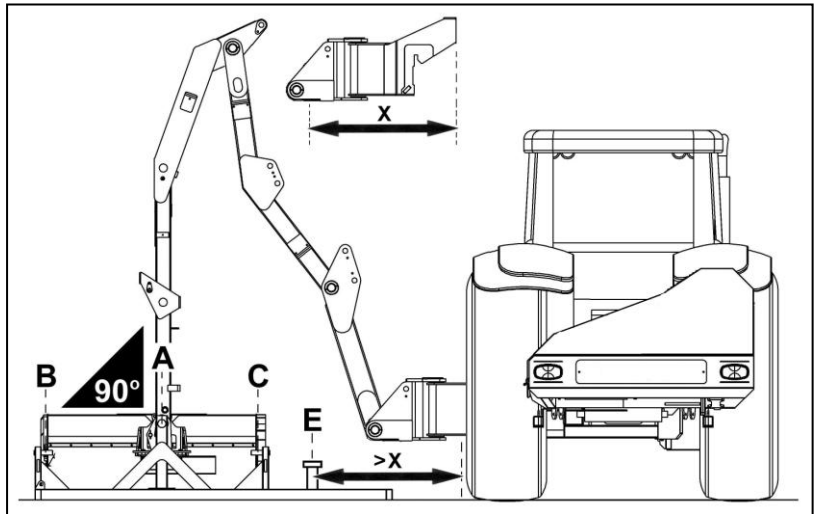


Arm Unit to Support Frame attachment points

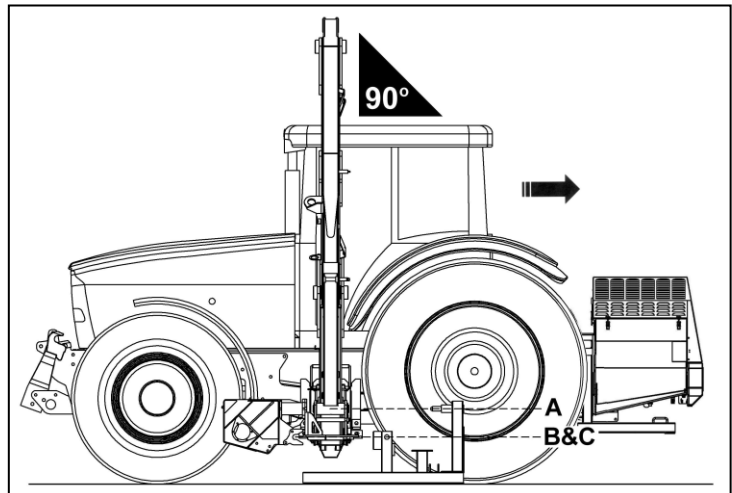
### Attaching Arm Unit to Support and Storage Frame

It is vital during attachment or detachment of the arm unit to the support frame that both the tractor and frame are sited on firm level ground.

With the machines arms positioned at right angles to the tractor reverse the unit into a position alongside and slightly ahead of the support frame - ensure that the distance between tractor and frame is sufficient to allow the tractor to be driven away freely without fouling the arm unit once it has been removed.

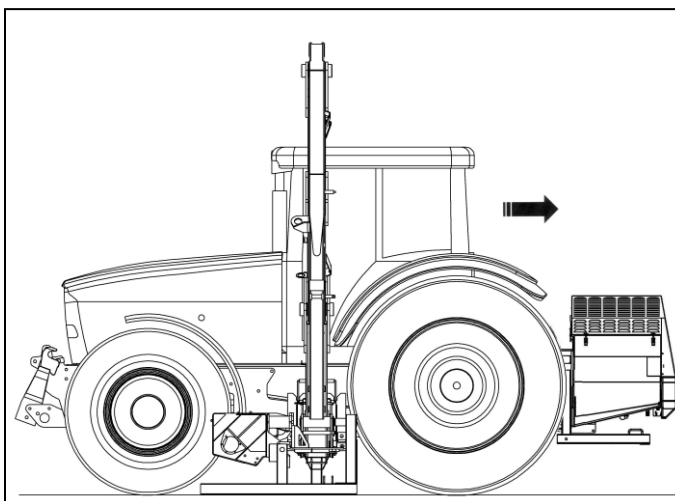
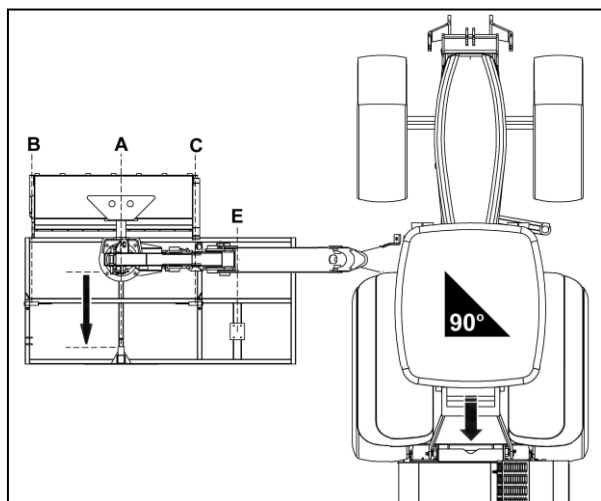


Angle the arms and flailhead to a position where, with the dipper arm vertical and the flailhead parallel to the ground, the attachment points 'A', 'B' & 'C' on the machine are lined up with their respective connection points on the support frame.

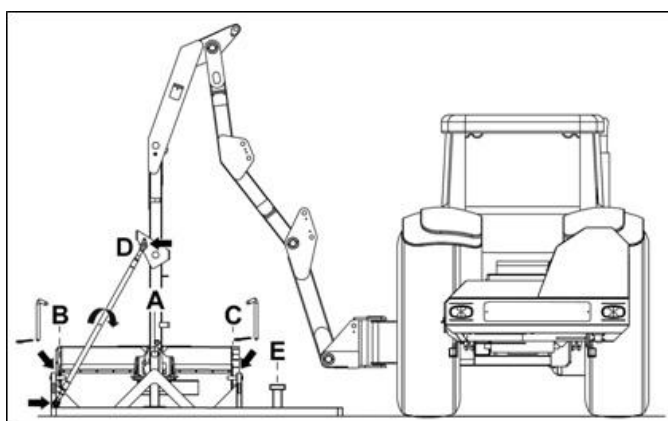


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Reverse tractor slowly until all attachment points locate and connect fully.

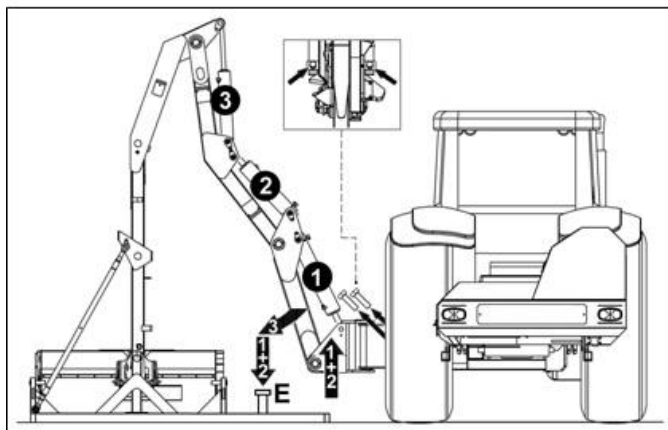


Secure points 'B' and 'C' using locking pins and R-Clips provided then connect and tighten the angle brace supplied from the frame to point 'D' on the machines dipper arm – see *diagram opposite*.



## Detaching the Arm Unit

Loosen and remove the two bolts, nuts and washers that secure the lower part of the intermediate frame to the tractor subframe – refer to *diagram opposite*. The arm unit is now ready to be detached from the tractor by utilisation of the machines hydraulic rams – *great care should be adopted when carrying out this procedure ensuring that bystanders are kept at a safe distance*.



As the upper part of the intermediate frame hooks over the top of the subframe the intermediate frame will need to be raised before arm unit is free to be detached - this is done by operation of the 1<sup>st</sup> and 2<sup>nd</sup> rams of the machine – Note: only raise the unit to a height sufficient to allow it to be manoeuvred clear of the subframe – if it is raised too high it will risk fouling on the tractor components above.

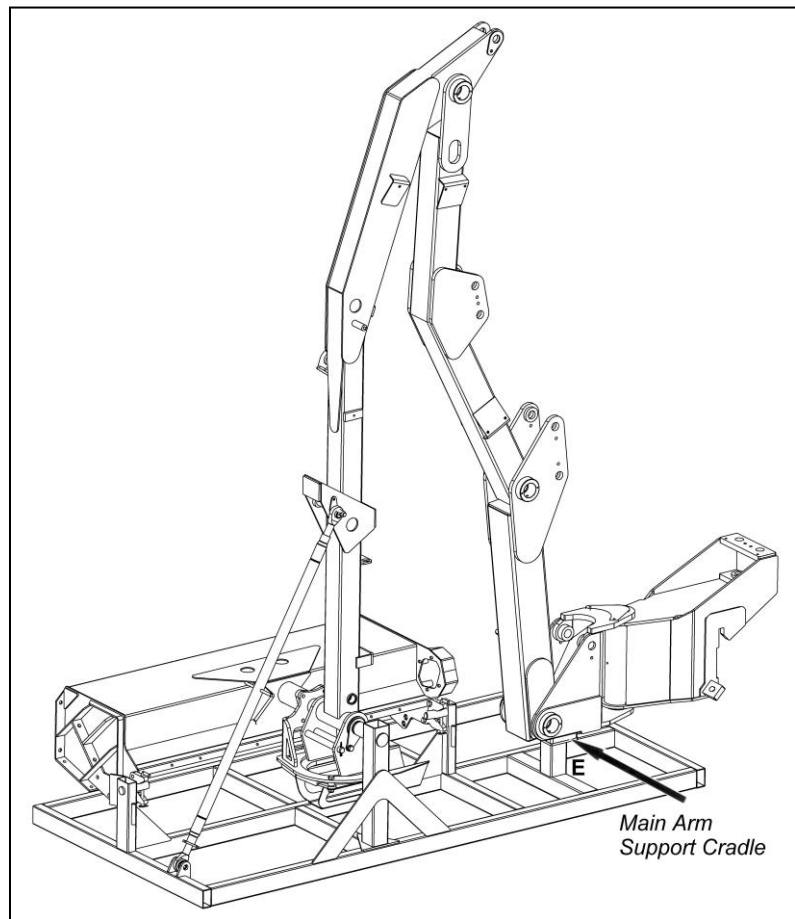
Once the unit is clear of the subframe the machine's arms can then be folded into the support frame by operation of the 3<sup>rd</sup> ram, and with subsequent use of the 1<sup>st</sup> and 2<sup>nd</sup> rams positioned and placed onto its support cradle 'E' – indicated in the diagrams.

# Spearhead TWIGA PRO

Once the arm unit has been correctly parked on the support frame the hydraulic hoses should then be disconnected from the quick release couplings mounted on the bulkhead of the rear tank frame and carefully withdrawn from their routing location. Stow hose lines neatly, clear of the ground and away from risk of accidental damage.

## Re-attachment of Arm Unit

Re-attachment of the arm unit to the tractor is a reversal of the removal procedure – *as with all tasks of this nature safety and caution at all times should be of primary importance to avoid risk of personal injury or damage to machinery.*



**Arm Unit correctly positioned on Support Frame**

# Spearhead TWIGA PRO

## OIL REQUIREMENTS

### Hydraulic Tank

Fill the reservoir to approximately 50mm (2") below the top of the tank - **do not overfill**.  
The capacity is approximately 240 Litres

### Recommended Oil

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

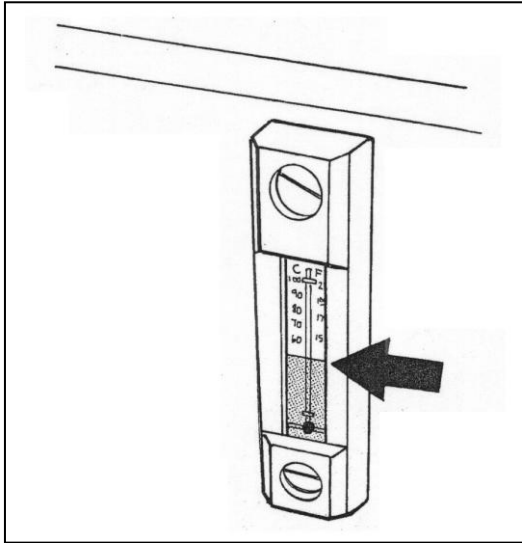
## FITTING CONTROL UNIT IN CAB

A mounting pillar/bracket is supplied onto which the control unit is fitted. The pillar/bracket should be attached to the tractor ensuring that no structural component of the cab or roll bar is drilled – it should be located in a suitable, comfortable, working position.

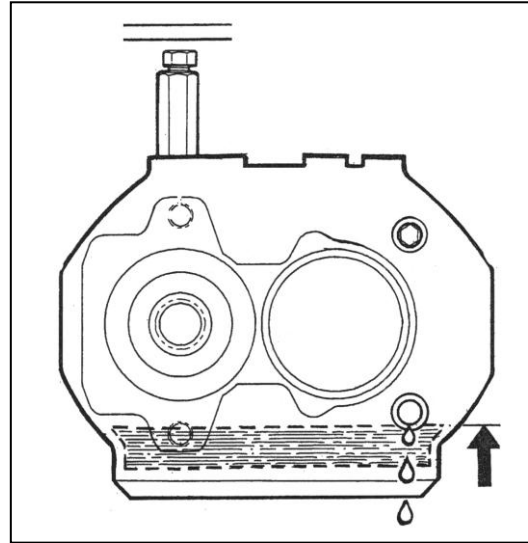
The supply cable should be connected directly to the tractor's battery or to any 30 amp electrical output provided by the tractor manufacturer. Avoid using cigarette lighter type connections as these may prove to be sporadic and unreliable for control applications. The control is 12 volt D.C. operated; The Red lead is Positive and the Blue lead is Negative.

# Spearhead TWIGA PRO

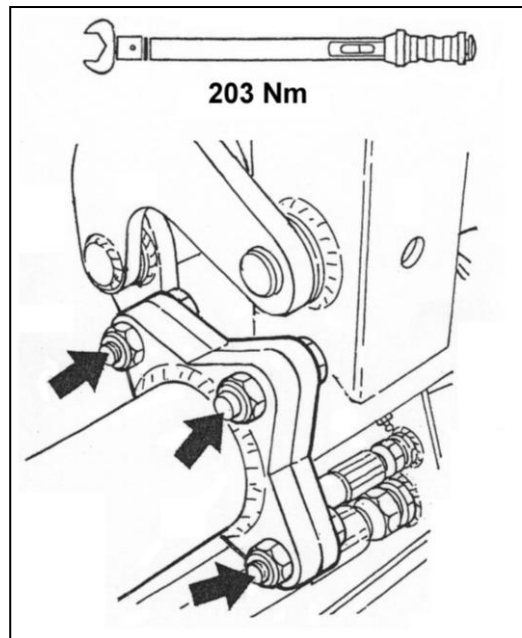
## PRE-OPERATIONAL CHECKS



**CHECK: Oil level in Hydraulic Tank.**



**CHECK: Oil level in Gearbox.**



**CHECK: All bolts are tight and that those in the specific locations indicated above are torqued to the figure stated.**

## RUNNING UP PROCEDURE

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

Operate the armhead levers through their complete range ensuring that all movements are functioning correctly.

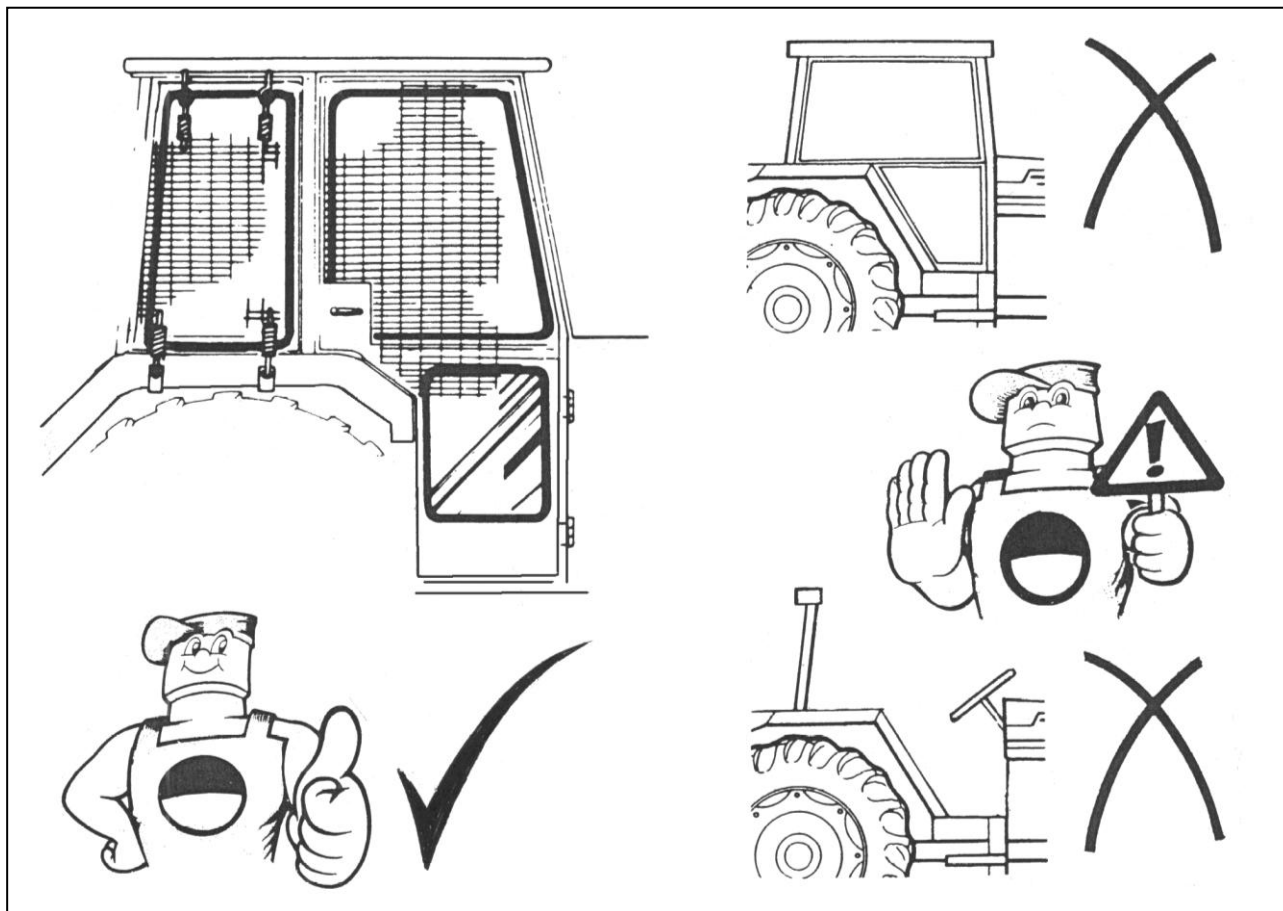
Place the flail head at a safe attitude and move the rotor control to "START" position. After initial fluctuation, the rotor should settle to a steady speed. Increase PTO speed to approximately 650 rpm and run for a further five minutes before disengaging and stopping tractor.

# Spearhead TWIGA PRO

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

## OPERATION

### Operator Guard



### Machine Guards

Before each period of work, check that all the relevant tractor and machine guards are in place and in good working condition.

Small splits and abrasions on the lower edges of the flail head rubber flaps are permissible, but should one or more of these cuts or splits become fifty per cent or more of the flap height they should be replaced immediately as they will have become ineffective for debris containment.

### Operator Safety

During operation all the tractor windows should be kept firmly closed with the exception of the rear window which may be opened only to the extent that is sufficient to allow entry of electrical or operating cables for the machine into the cab.

Should the tractor not be fitted with a 'quiet' cab ear defenders must be worn at all times, failure to heed this warning may result in permanent damage to hearing.

Although in normal circumstances a working machine or rotating parts should never be approached it is an additional wise precaution to avoid wearing loose or flapping clothes especially scarves and neckties whilst in close proximity to a machine.

The operator should continually guard himself and others from complacency that can arise from familiarity. Never attempt to take 'short cuts', always follow the correct procedures diligently and abide by the restrictions imposed by safety considerations.



# Spearhead TWIGA PRO

**REMEMBER: there is only one right way - the safe way!**

## PREPARATION

### READ THE BOOK FIRST

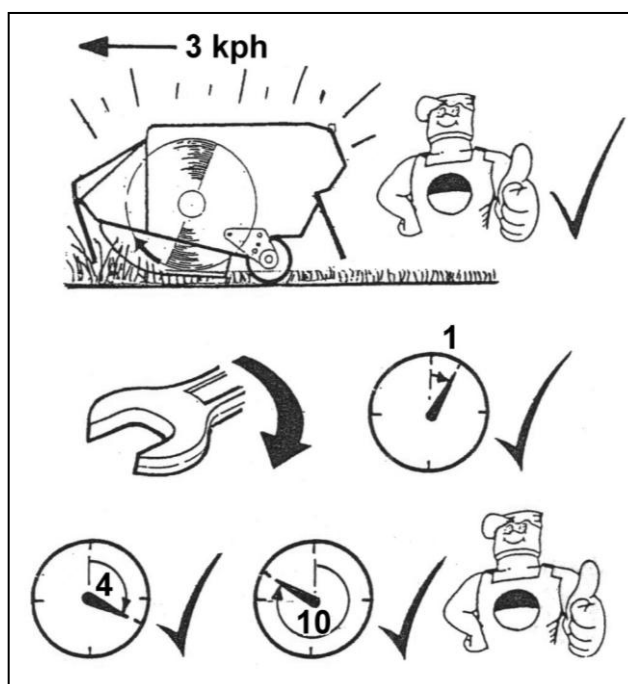
Practice operating the machine in an open space **without the rotor running** until you are fully familiar with all the controls and the operation of the machine.

### CAUTION

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

### Running In a New Machine

For the first days work it is recommended that tractor forward speed is restricted to 3 km/hr maximum - this will allow machine components to 'bed in' and allow the operator to become familiar with the controls and their response under working conditions whilst operating at a relatively slow speed. If possible, select a first days work that will provide a majority of light to average cutting with only occasional heavy duty work - *during this period check that nuts and bolts are tight after: one hour, four hours and again at the end of the day.*



### Cutting Precautions

Inspect the work area, remove any hazardous materials and note any immovable objects - *it may also be a wise precaution to indicate these hazards with a visible marker than can be easily seen from the tractors operating position.*

If the type of work being undertaken makes this important precaution impractical, always maintain a high degree of alertness and observation and restrict the tractors forward motion to a speed that will allow the operator sufficient time to stop the tractor before contact is made with the hazard.

### General Working Practices

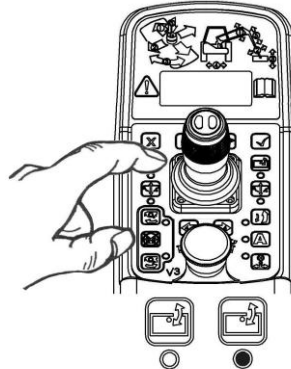
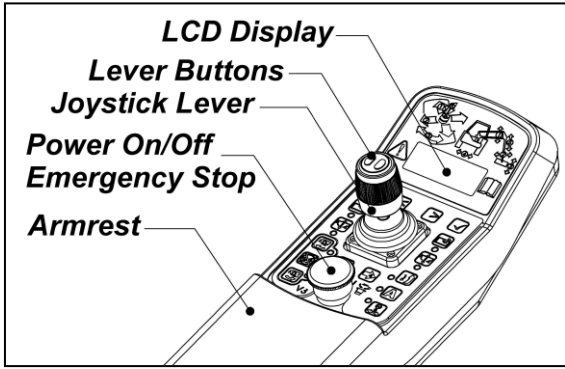
It is the operator's responsibility to develop safe working procedures;

#### **ALWAYS:**

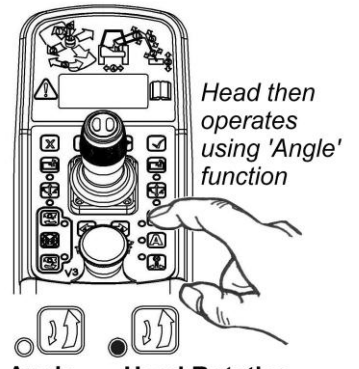
- Be aware of hazards in the vicinity.
- Ensure all guards are in position and in good condition.
- Disengage PTO before stopping the engine.
- Wait until the flail has stopped running before leaving the tractor seat.
- Disengage the PTO, stop the engine and pocket the key before making any adjustments.
- Check frequently that all nuts and bolts are tight.
- Keep bystanders at a safe distance.

# Spearhead TWIGA PRO

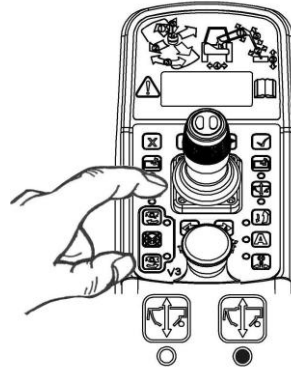
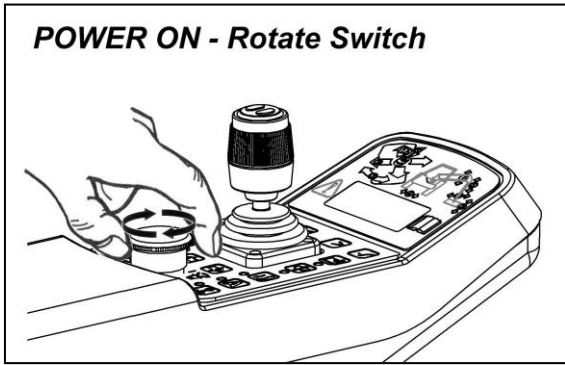
## PROPORTIONAL ARMREST CONTROL – Button Functions



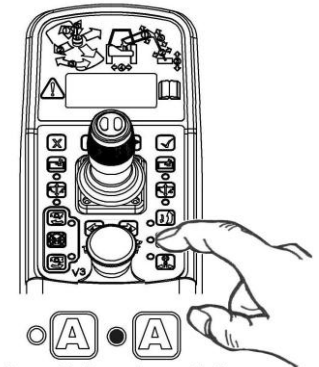
Head Angle Float



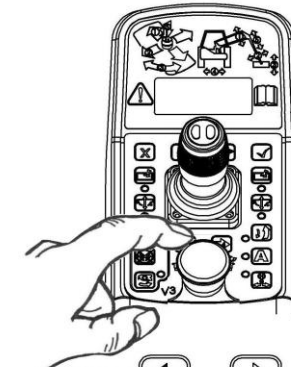
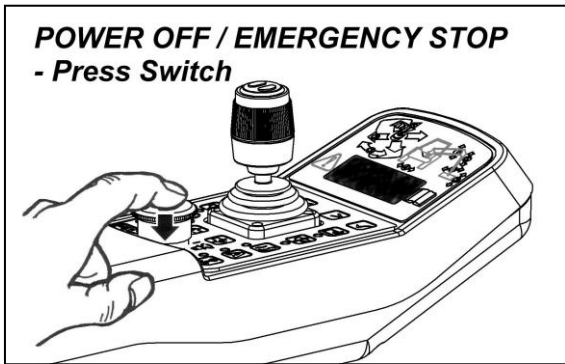
Angle Activated    Head Rotation Activated



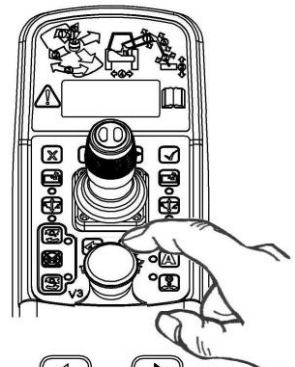
Lift Float



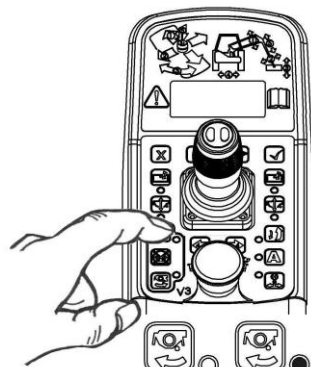
Joystick Active    Joystick Disabled



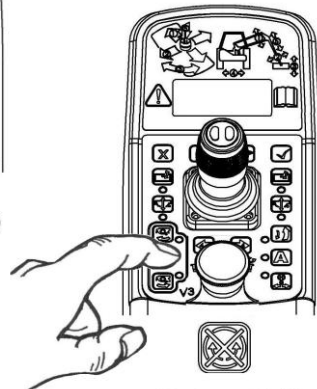
Slew ← →



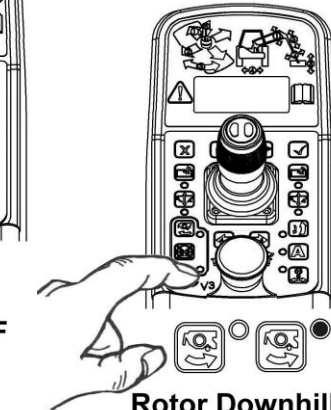
← → Slew



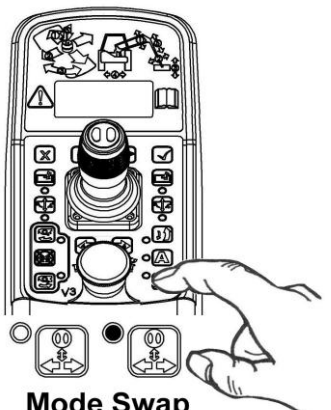
Rotor Uphill



Rotor OFF



Rotor Downhill



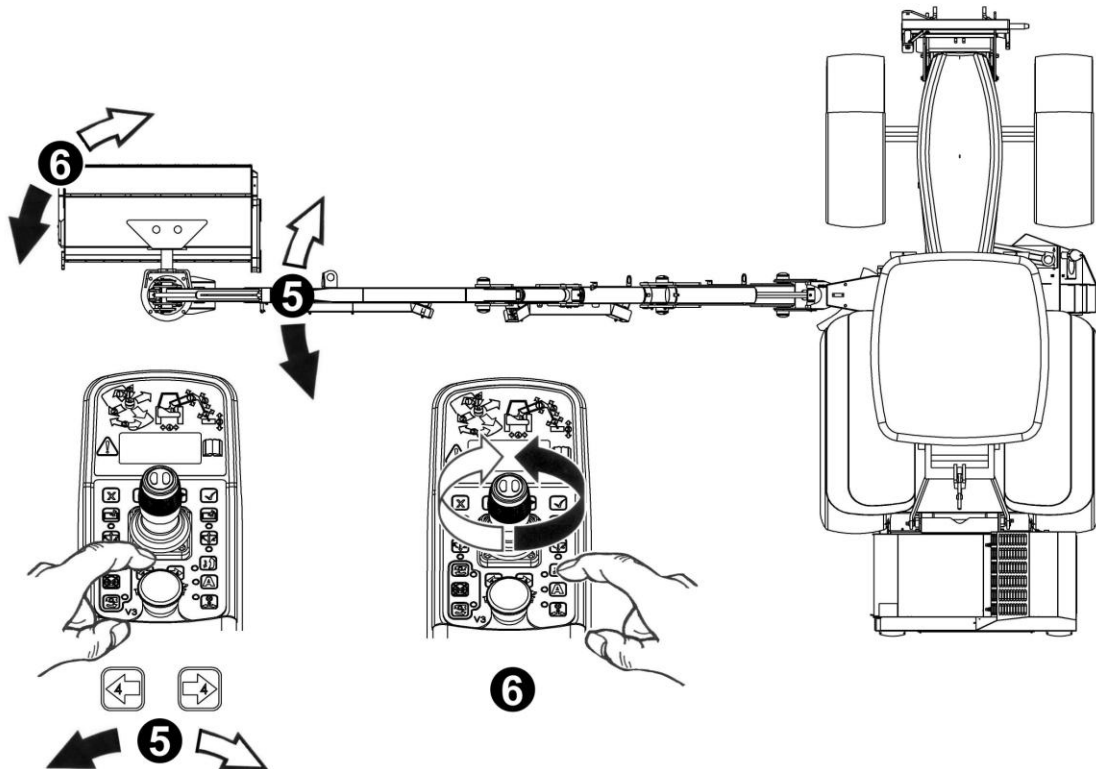
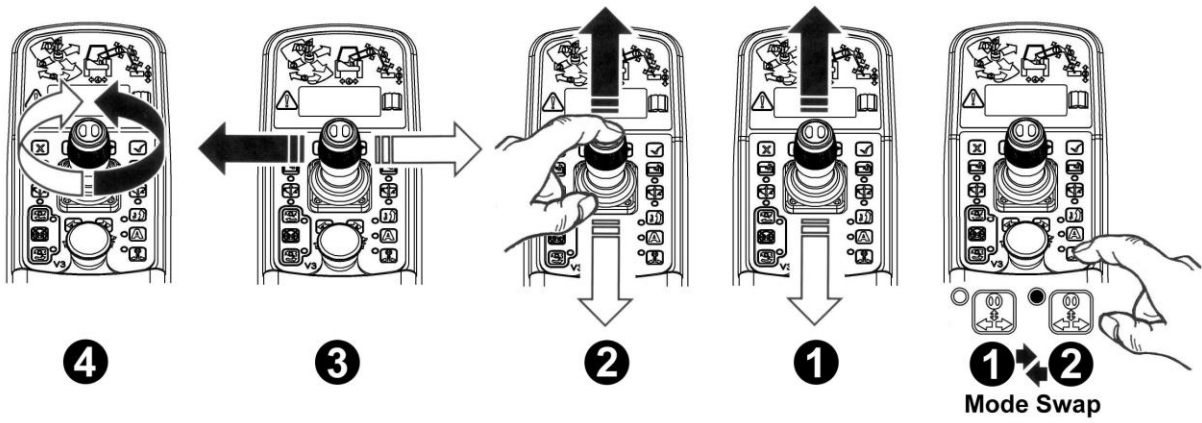
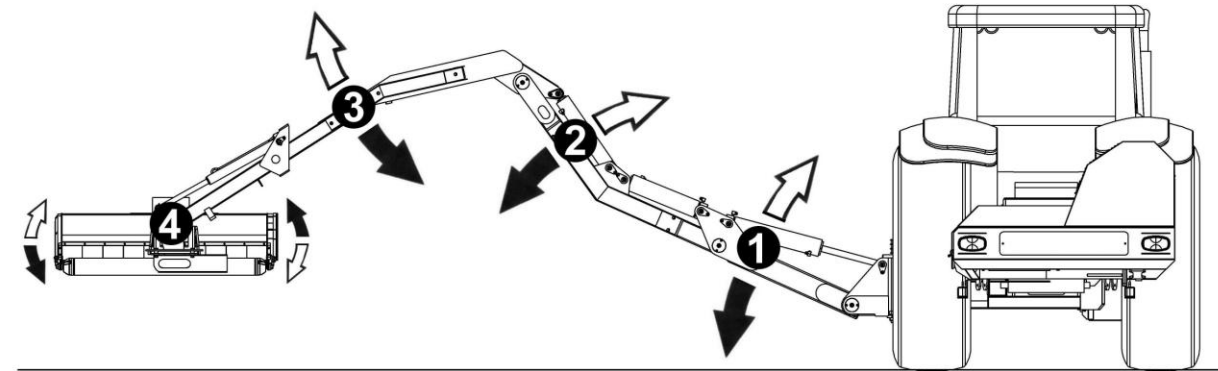
Mode Swap

FEATURE STATUS (Indicated by L.E.D.)

- Deactivated
- Activated

# Spearhead TWIGA PRO

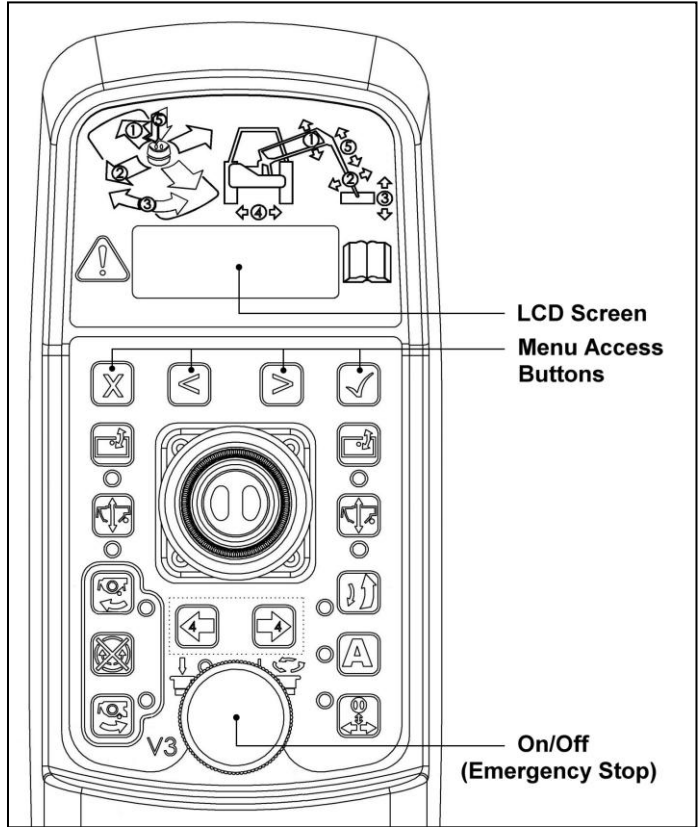
## PROPORTIONAL CONTROLS – Arm Operation



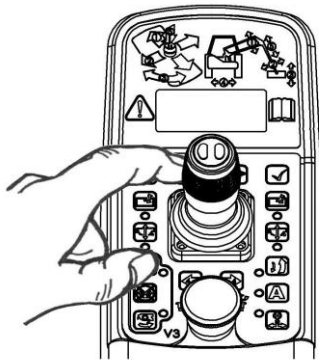
# Spearhead TWIGA PRO

## PROPORTIONAL CONTROLS – Screen & Menu Access Buttons

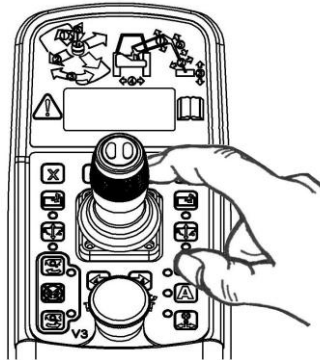
The selection and monitoring of flailhead and rotor features is achieved via the built in LCD screen on the v3 Proportional Control unit. Through a series of 'on-screen menus' the operator can select and monitor certain functions – the four 'touch pad' buttons directly below the screen allow the operator to 'scroll' through and access the menus to select the features - *the diagrams opposite and below show the location of the screen and access buttons on the control unit and their function.*



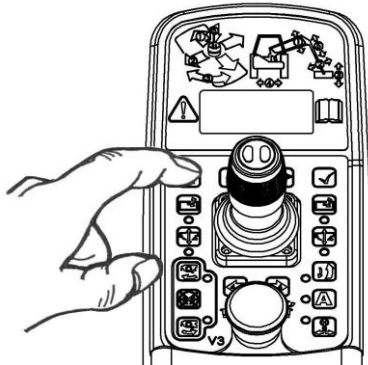
LCD Screen Access & Command Buttons



Scroll Back



Scroll Forward



Decline Command



Accept Command

# Spearhead TWIGA PRO

## PROPORTIONAL CONTROLS – Screen Display & Functions

The Proportional Control Unit is switched on by rotation of the ON/OFF button, at which point the LCD screen will light up – *Note: 12 volts at the battery are required for this unit to function correctly.*

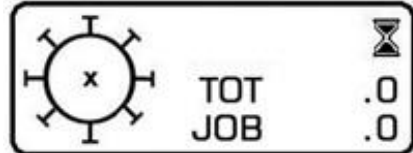
1. On powering up of the unit the initial display will show 'SPEARHEAD', software version, and PTO maximum speed.



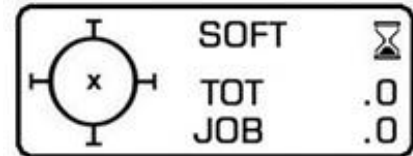
2. Pressing scroll forward once will display the running screen. The **TOT** displays the total time the rotor has been switched on. The **JOB** also displays the rotor on time but may be reset to zero by pressing the **X** button for 3 seconds.



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



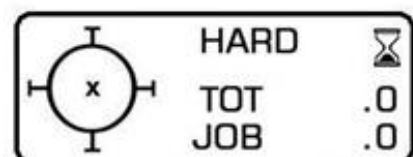
4. Pressing the EDS Lift float button will turn on the EDS (EDS Lift Float machines only). Then SOFT, MED or HARD will be added to the running screen.



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.

# Spearhead TWIGA PRO

## OPERATING WITH 'SLEW' SELECTED

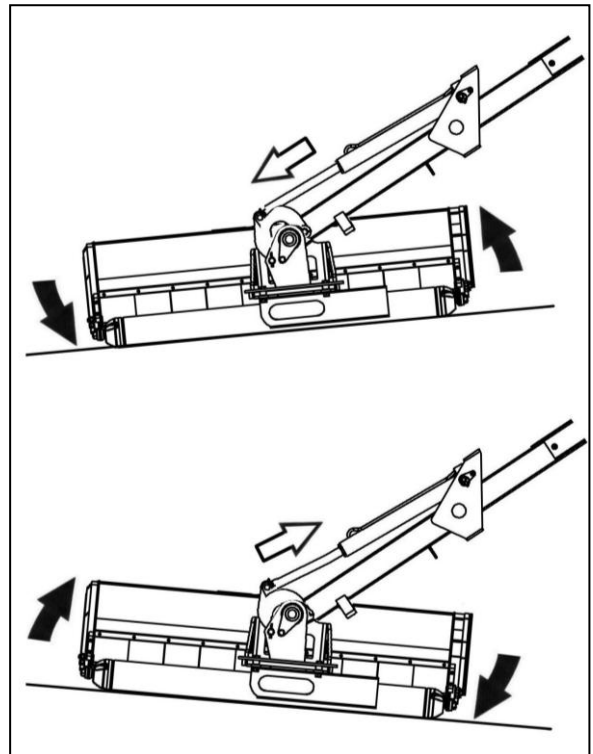
When the slew relief valve setting is exceeded oil is displaced from the slew ram allowing the arm to pivot backwards horizontally and the obstacle to be cleared.

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

## OPERATING WITH 'HEAD ANGLE FLOAT' SELECTED

The selection of the angle float on the controls simultaneously connects both gland and base side of the angling ram to the tank. The ram rod then can extend and retract freely allowing the flail head to automatically follow the contours of the ground.

Angle float is an 'operator friendly' mowing feature and can be used singly or in conjunction with lift float.



## GRASS MOWING

It is recommended that both lift float and angle float are used when grass mowing. To ensure maximum visibility of the head during work it is suggested that the 1<sup>st</sup> and 3<sup>rd</sup> rams are used to control the flailhead reach – the 2<sup>nd</sup> ram should be fully or nearly closed. The 2<sup>nd</sup> and 3<sup>rd</sup> rams can be used for the same operation but the operator's visibility of the front of the head and its immediate cutting area may be impaired.

# Spearhead TWIGA PRO

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## **EASY DRIVE SYSTEM (EDS)**

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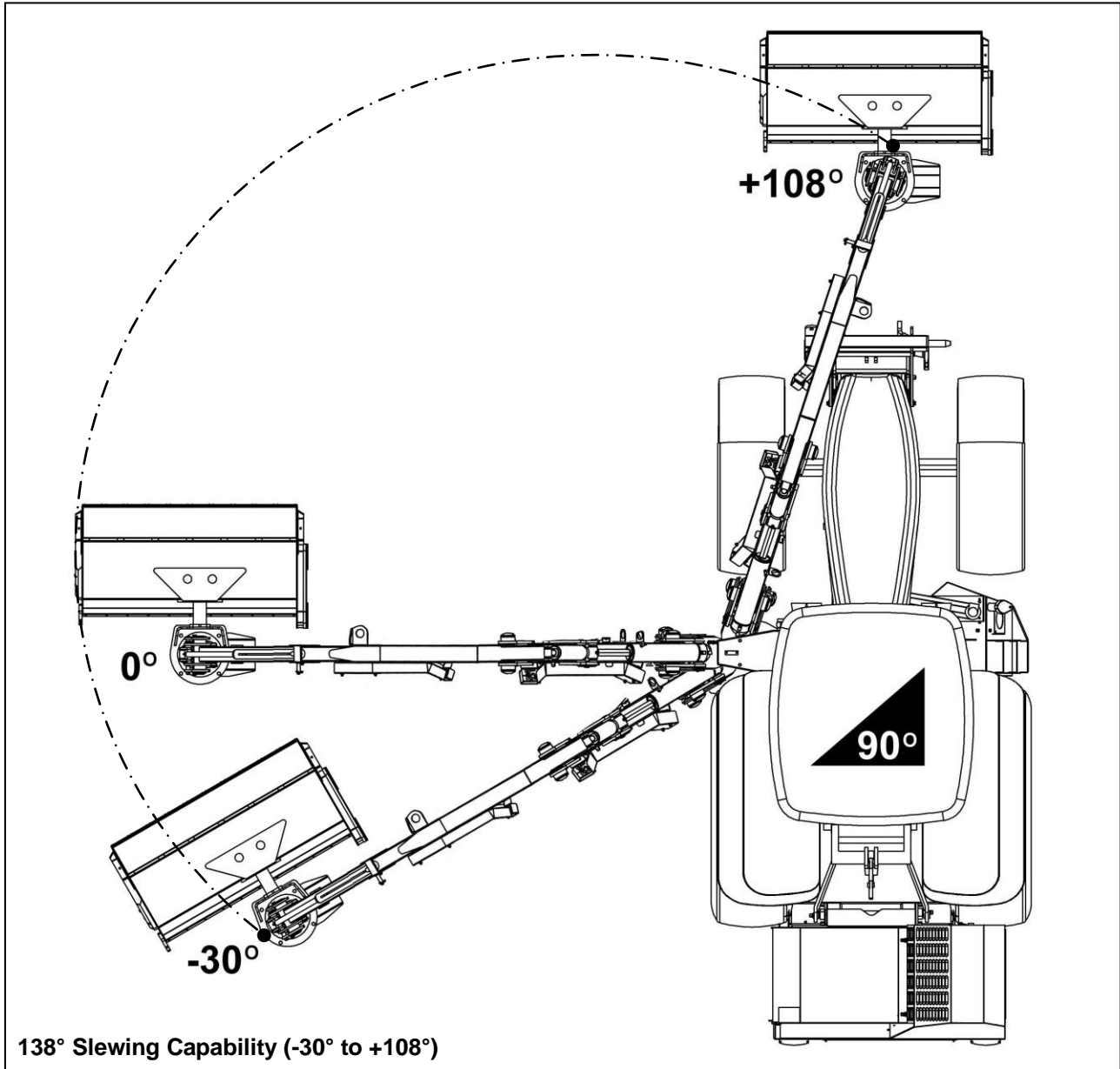
The EDS system automatically controls and adjusts the height of the flailhead during work – once selected on the controls it enables the flailhead to accurately follow the contours of the ground without the need for additional adjustment of the lift service by the operator, thus allowing increased working speed.

The proportion of the flailhead weight taken by the lift ram is factory preset to provide optimum ground following characteristics - therefore if the flailhead is replaced with one that is of considerable weight difference you will need to contact the Spearhead Service Department to have the float response re-calibrated to suit the new head.

# Spearhead TWIGA PRO

## POWERED SLEW

The machine features a powered arm slewing capability of  $138^\circ$  - from  $30^\circ$  rearwards of the right angle position or forwards of it by up to  $108^\circ$  - the latter, with use of the turnaround kit, makes it possible to work with the flailhead positioned directly in front of the tractor – *caution should be adopted when operating the machine in this position as the flailhead and its immediate cutting area will not be visible from the operator position.*





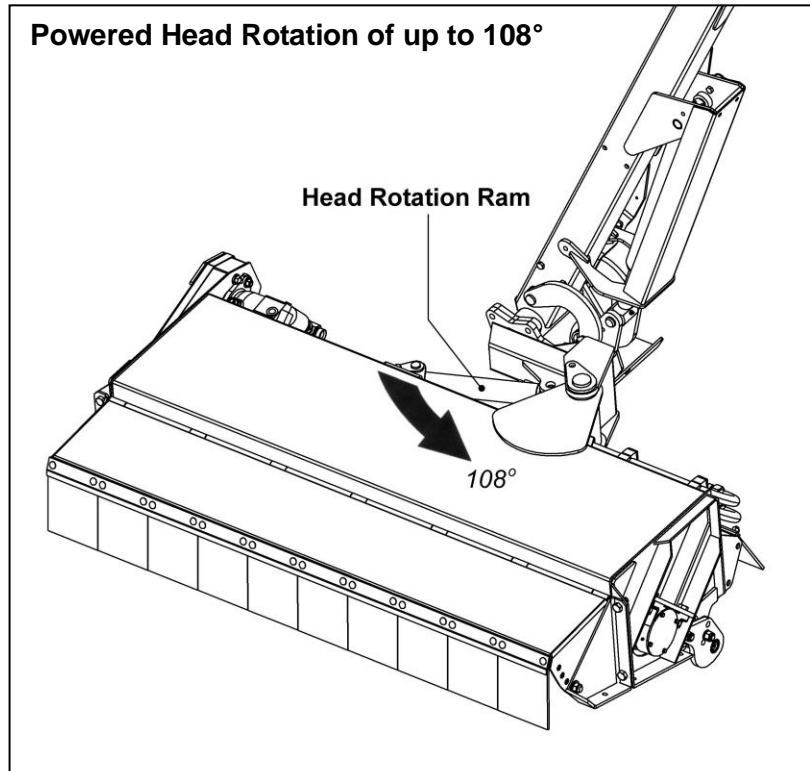
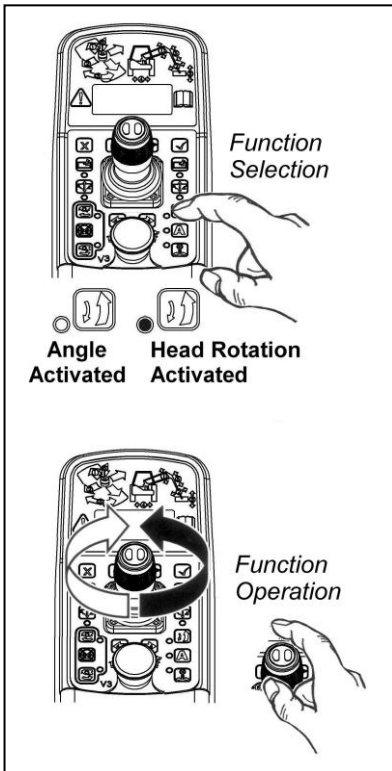
# Spearhead TWIGA PRO

## POWERED HEAD ROTATION

The flailhead can be rotated in both the horizontal and vertical planes by activation of the controls that operate the head rotation ram and angle ram respectively. Both functions share the same button on the control panel and an LED light next to the button indicates to the operator which particular function is selected.

- LED light OFF indicates that the ANGLE function is active.
- LED light ON indicates that the HEAD ROTATION function is active.

Adjustment to the position of the head, in whichever function is selected, is made by rotating the knob of the joystick in the desired direction – refer to diagram below.



The powered head rotation in the horizontal plane permits the head to be rotated by any angle up to 108° anti-clockwise from the normal work position at right angles to the arm. This function allows the flailhead to be positioned in front of the tractor for both forward travel cutting and for stowage of the head on the transport cradle during transportation.

### **DANGER**

**Never attempt to perform adjustments or maintenance to the flailhead with the machine or tractor running.**

# Spearhead TWIGA PRO

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## FLAILHEAD

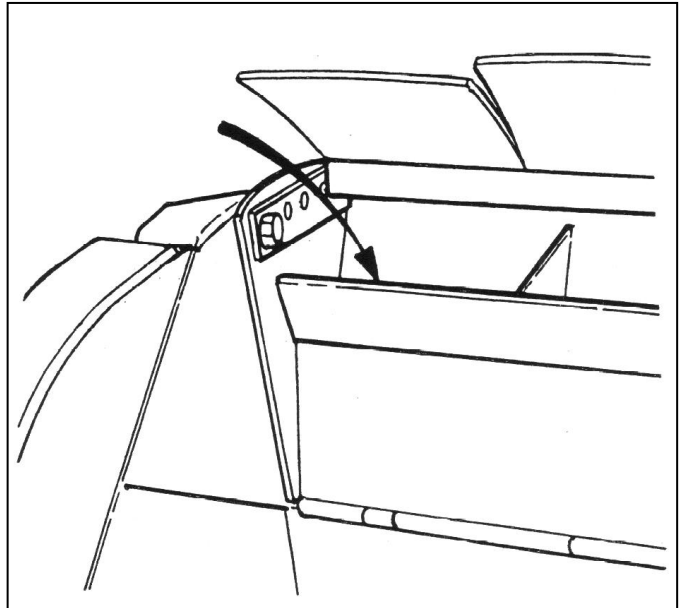
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### WIRE TRAP

The flailhead 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 flailhead.

**IMPORTANT: 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.

**NEVER reverse the rotor** in an attempt to unwind any wire.

# Spearhead TWIGA PRO

## Engaging Drive - Piston Hydraulic Machines

- Ensure Rotor is in 'Stop' position.
- Switch main power 'On'.
- Prime pump and switch pump power 'On'
- Allow the oil to circulate for a few minutes.
- Place the flail head in a safe position.
- Increase engine speed to a 'high idle' and switch to 'On' selecting the rotation required - *after initial surging the rotor will run at an even speed.*

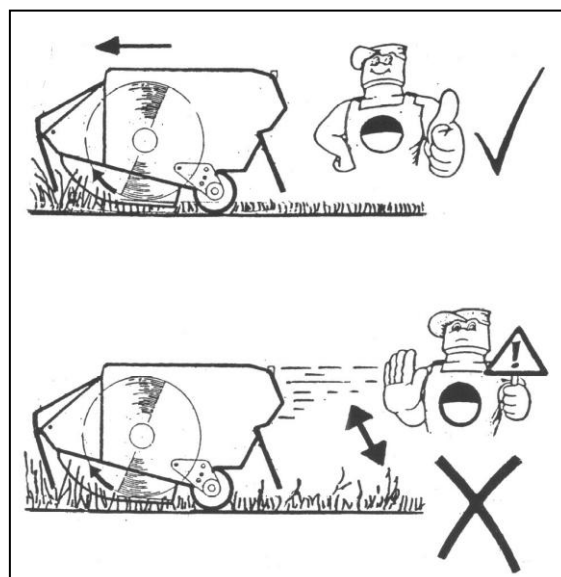
## Rotor Operating Speed



## 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.

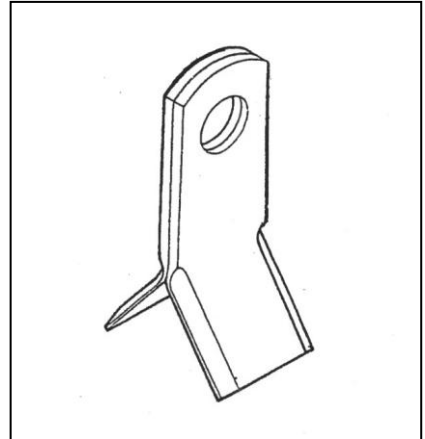


# Spearhead TWIGA PRO

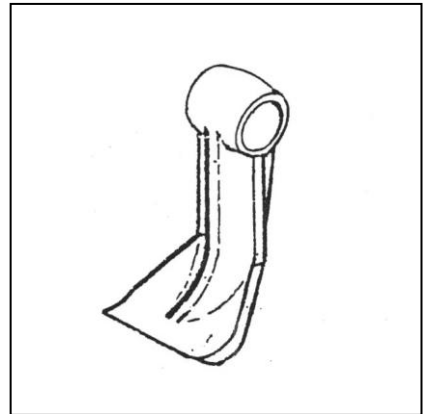
## FLAIL SELECTION

Four types of flail are available in order to provide the optimum cutting characteristics required for the various types of work being carried out, these are as follows:

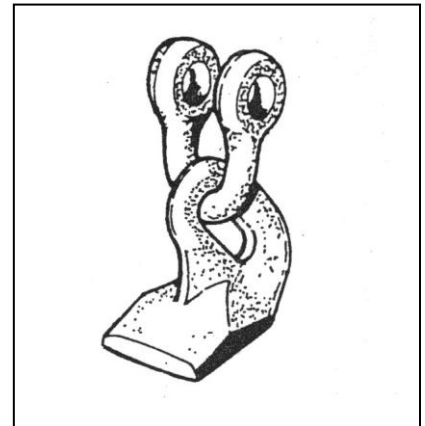
1. Designed specifically for **general mowing** activities.



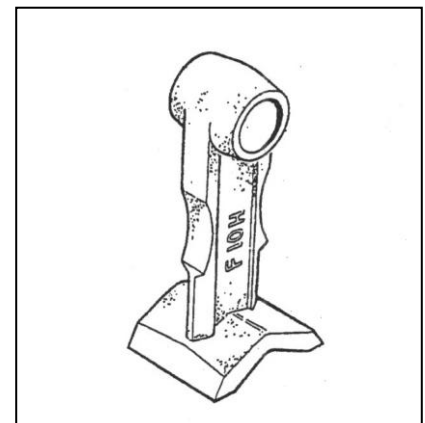
2. Designed specifically for **heavy-duty hedge cutting**; this flail is capable of dealing with materials up to 75/80mm diameter. - *These flails will also provide a good mowing finish but will require considerably more power when used for this purpose.*



3. Designed for **general-purpose work**, this flail is suitable for both mowing and the cutting of hedges up to two years growth.



4. Designed specifically for **heavy-duty hedge cutting**; this flail is capable of dealing with materials up to 75/80mm diameter. - *These flails will also provide a good mowing finish but will require considerably more power when used for this purpose.*

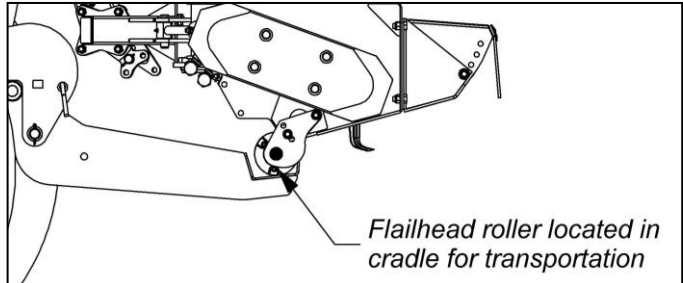


# Spearhead TWIGA PRO

## TRANSPORTATION CRADLE

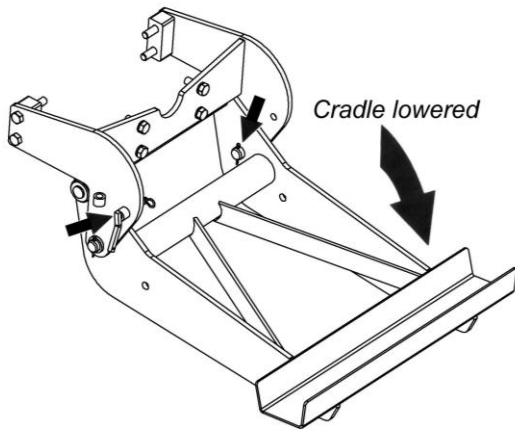
A transportation cradle mounted onto the front end of the tractor provides a safe compact storage location for the flailhead during transportation of the machine as well as offering additional support for the arms. The cradle has 2 available positions – transportation position and work position.

For transportation of the machine the cradle should be placed in the down position which allows the flailhead to be positioned onto it with its roller located and supported in the trough of the cradle. The work position is with the cradle raised upwards to the front of the tractor.

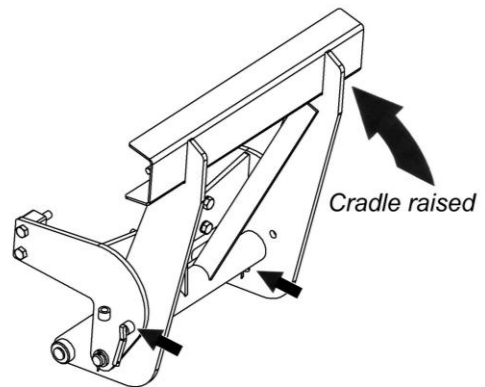


In both positions the cradle must be locked into position using pins and lynch pins in the appropriate locating holes on each side of the cradle. Refer to diagrams below.

Cradle must be locked into whichever position on both sides using pins & lynch pins as indicated below

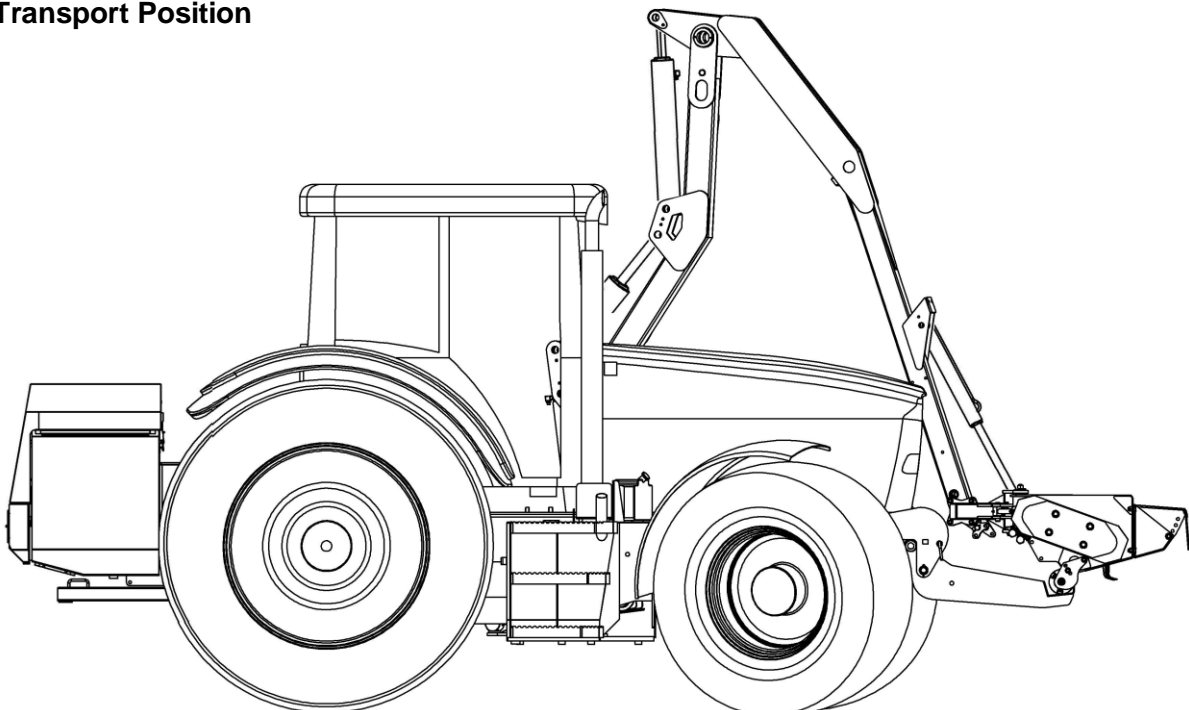


TRANSPORT POSITION



WORK POSITION

Transport Position



# Spearhead TWIGA PRO

## TRANSPORTING THE MACHINE

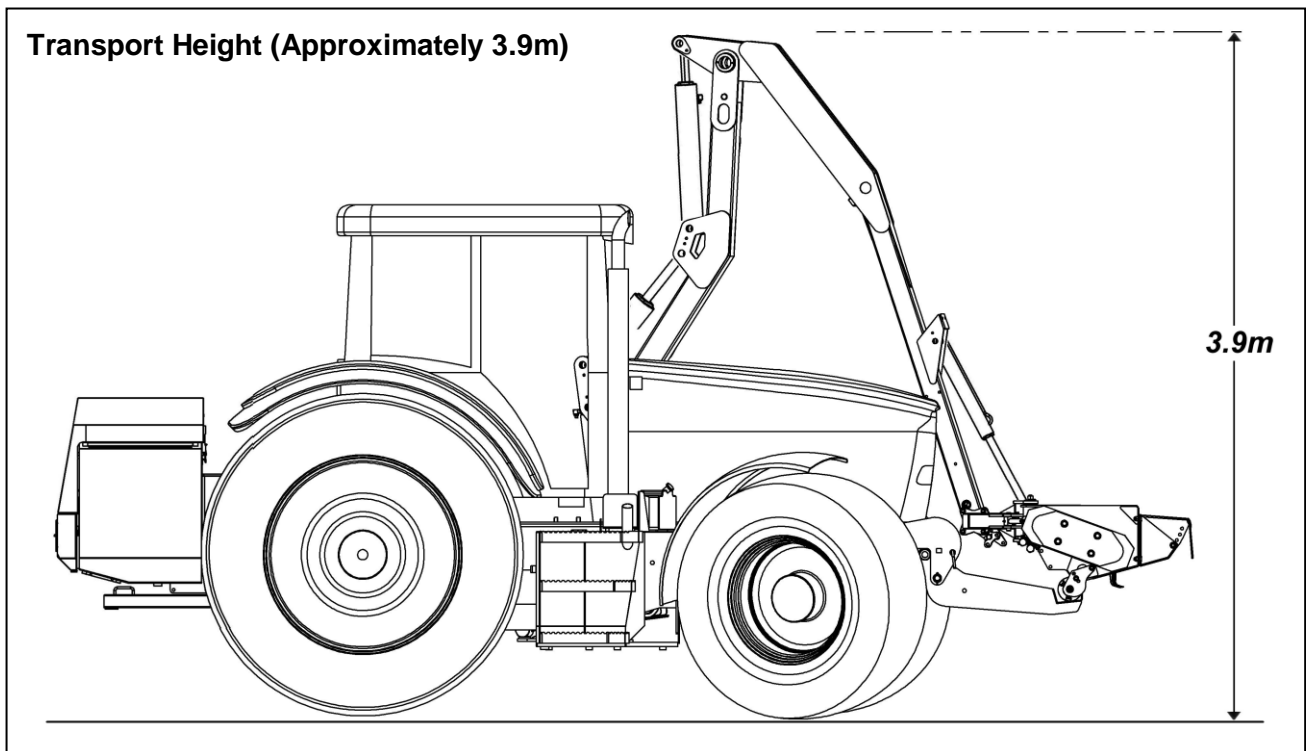
When in transport the PTO must be disengaged and the power to the control box switched off.

### Transport Speed

The acceptable speed whilst in transport will vary greatly depending upon ground conditions; the maximum recommended speed is < 20mph. In any conditions avoid driving at speeds that will cause exaggerated 'bouncing' - this may create undue strain on the machine and tractor mounting points.

### Transport Height

The approximate height of the machine in the transport position is 3.9m but this will vary depending on the ride height of the driving unit to which the machine is attached. It is the responsibility of the operator to be fully aware of the height of the machine they are operating at all times and must exercise care when working or manoeuvring under low obstacles such as bridges, building etc. and with extreme caution near power lines.



# Spearhead TWIGA PRO

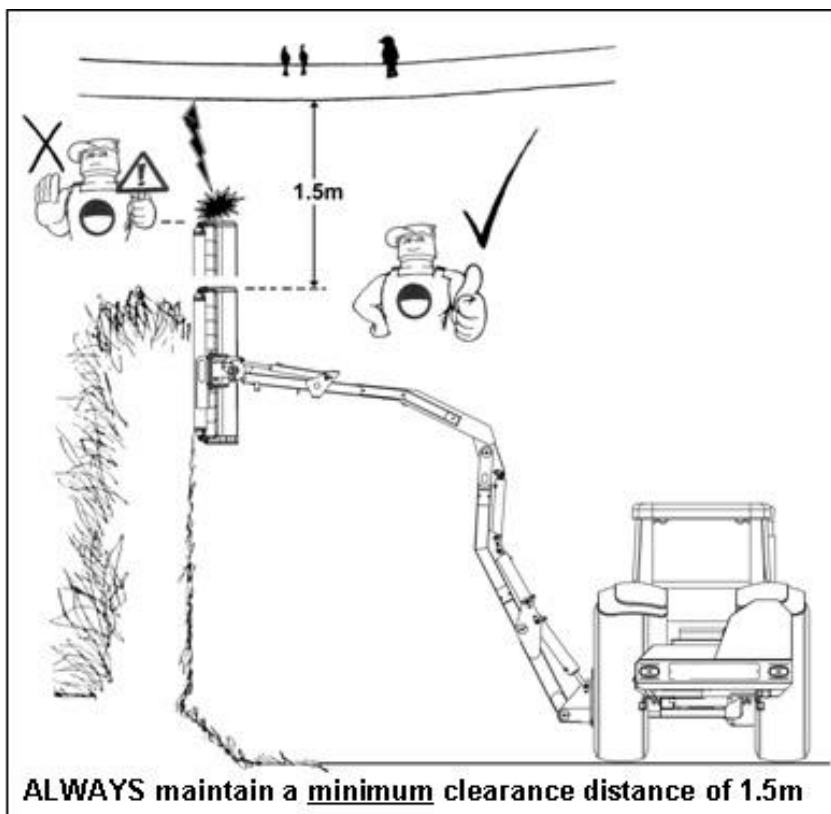
## OVERHEAD POWER LINES, OBSTRUCTIONS & PUBLIC HIGHWAYS

### 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 always advisable to consult your Local Power Company to obtain information regarding a safe procedure for working.*



### Overhead Obstructions

Always be aware the height of the machine is approximately 4 metres when folded, take care especially when maneuvering near or under bridges, buildings, power cables or any other obstacles you may encounter when moving your machine.

### Working on Public Highways

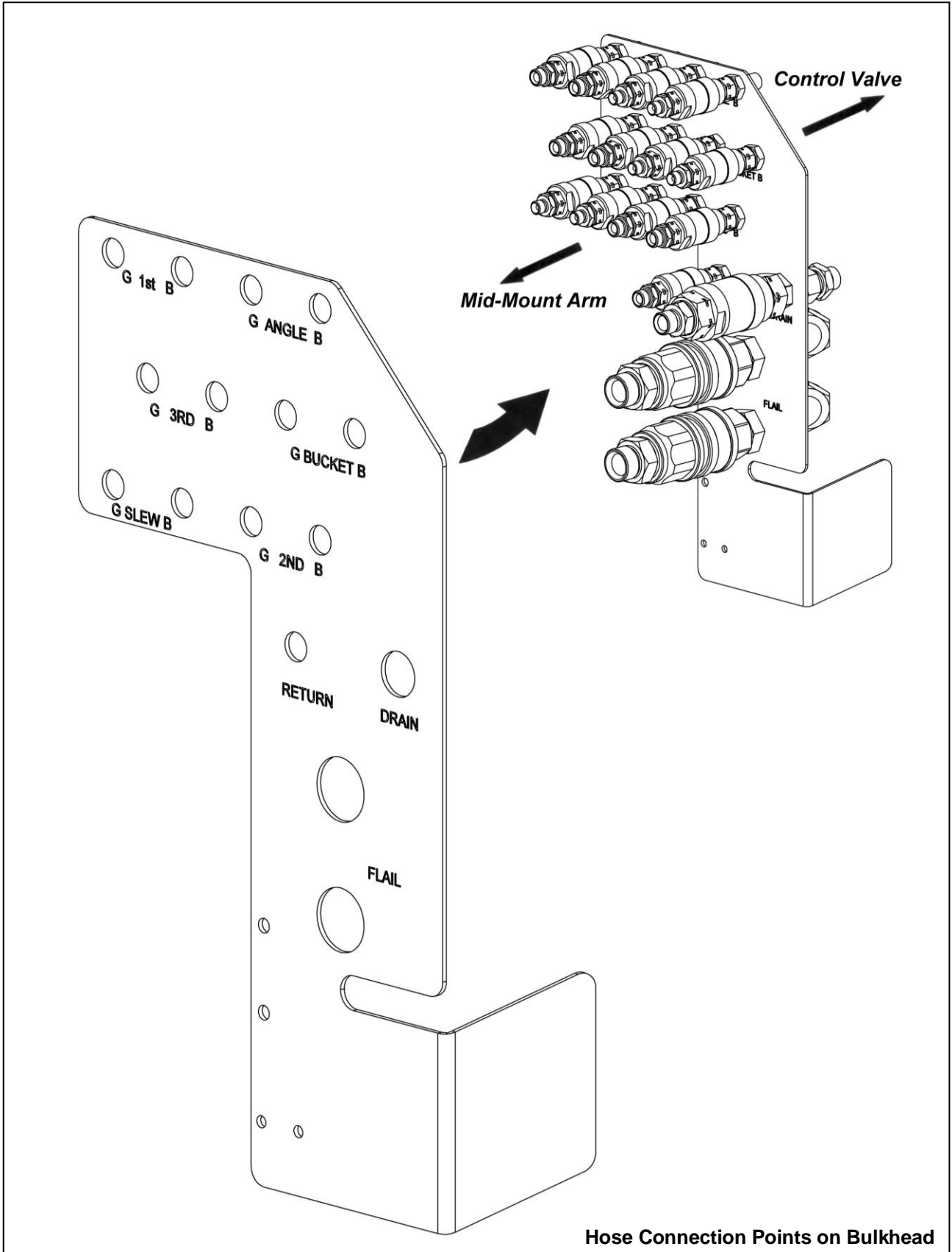
When working on the public highway it is the operators responsibility to familiarise himself with any national and local regulations concerning this type of activity, and ensure that they are abided at all times. In addition, it must be remembered that there is a potential for debris to be thrown long distances should it escape the head shrouds.

In inhibited areas, work should only proceed with extreme caution and care, all bystanders must be kept away from the potential danger area - *it the operators' responsibility to protect the safety of others in the vicinity.*

# Spearhead TWIGA PRO

## HYDRAULIC HOSE CONNECTION POINTS – Bulkhead Plate

The diagram below shows the hydraulic hose connection points on the bulkhead plate of the rear tank frame assembly – the positions of the hoses are indicated on the plate to assist the operator or fitter in identifying the correct connection point. On hydraulic ram connections G = Gland Port and B = Base Port.



Hose Connection Points on Bulkhead

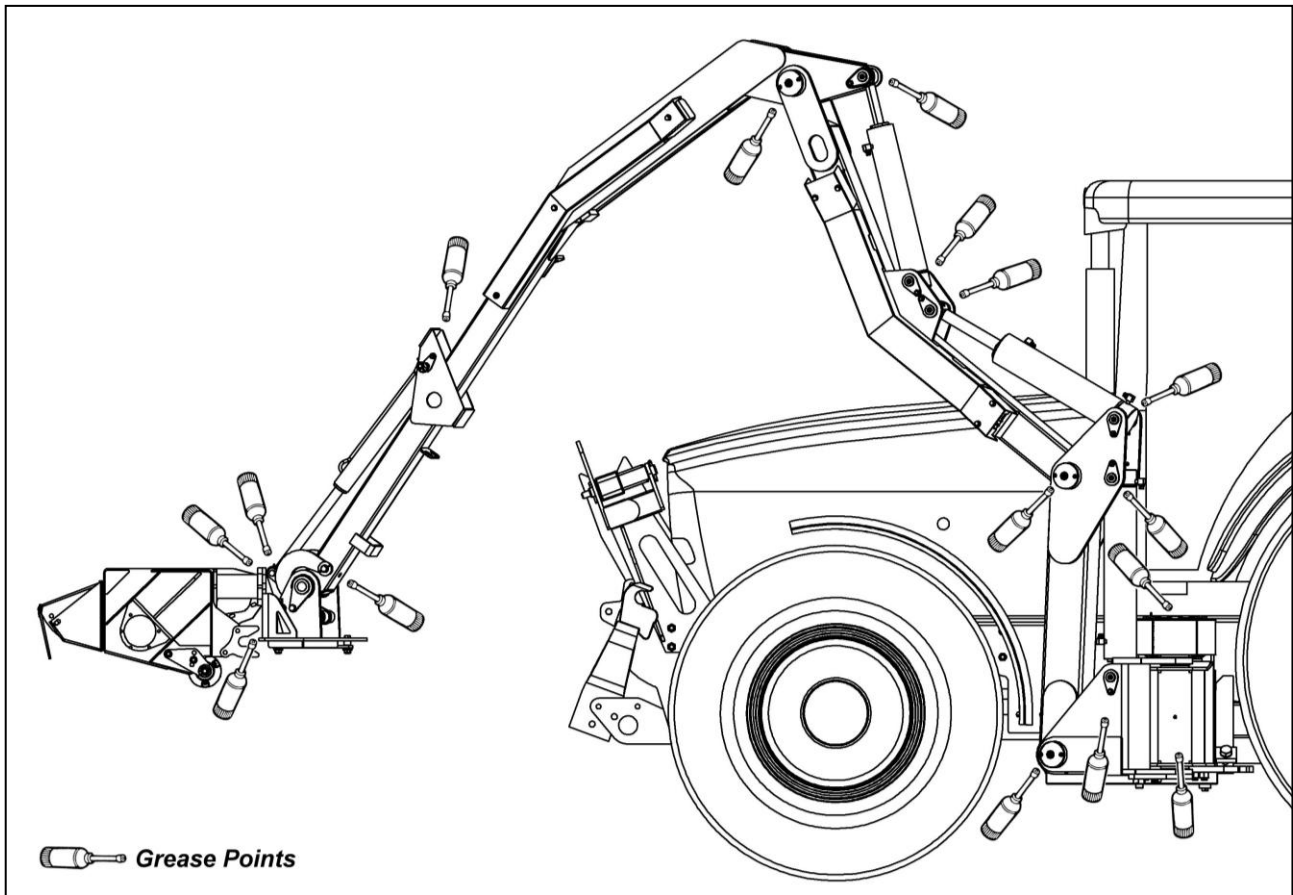


# Spearhead TWIGA PRO

## MAINTENANCE - Lubrication

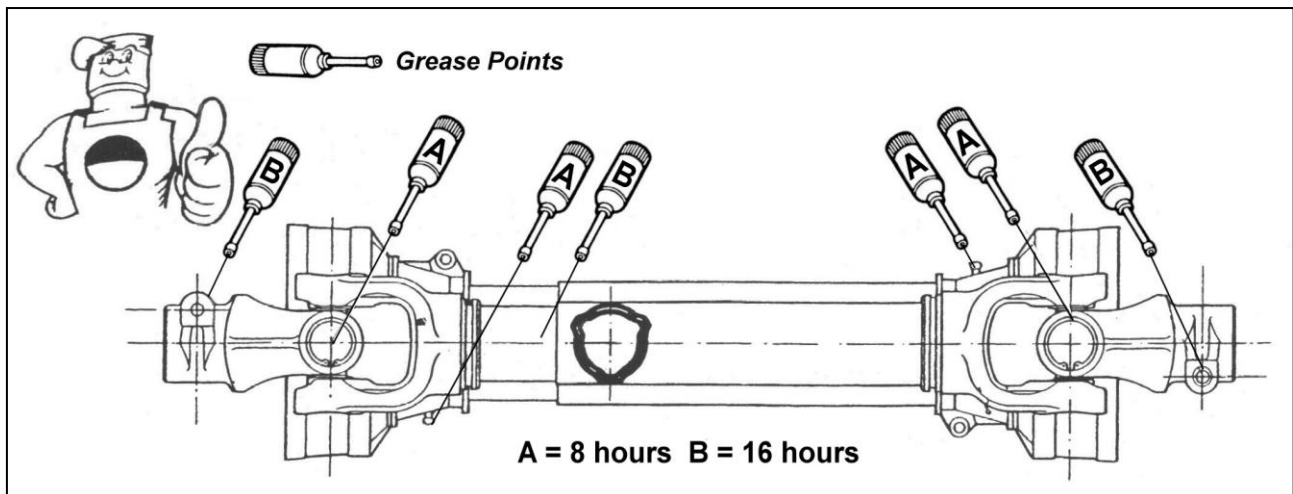
### Arm Unit Lubrication

Lubricate all greasing points at regular intervals using general-purpose lithium based grease. The diagram below shows the locations of the arms greasing points.



### PTO Shaft Lubrication

Lubricate all points indicated in the diagram below at the intervals stated using general-purpose lithium based grease.



### Gearbox Lubrication

Refill the gearbox with 0.5 Litres of either SAE80 or ISO100 lubricant after an initial 50 hours of use and thereafter at annual or 500-hour intervals - whichever occurs earliest.

# Spearhead TWIGA PRO

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## MAINTENANCE – Hydraulic System

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### Hydraulic Oil Supply

Check the oil level in the reservoir on a daily basis. No fixed time periods can be quoted in regard to replacement of the oil in the hydraulic system as operating conditions and maintenance standards may vary widely. Whatever, the oil should always be changed at the first signs of oxidation; this may be noticeable by burnt or scorched oil odours and the darkening or thickening of the oil.

### Contamination

The hydraulic system can sometimes become contaminated by moisture resulting from condensation entrapped in the oil – this cannot be removed by filtration, therefore water contamination is progressive.

General contamination can be reduced by:

- Ensuring that the reservoir cap and surrounding area is cleaned prior to removal.
- Keeping the reservoir cap and surrounding area clean.
- Using clean containers when replenishing the system.
- Working in a clean dry dust free environment when replacing or replenishing the oil.
- Regular servicing of the filtration system.

### Filtration

A 125-micron suction strainer and a low-pressure 10-micron full flow return filter protect the machine.

**Suction Strainer** - the suction strainer is permanently fixed within the reservoir. Should symptoms of pump cavitation or spongy intermittent operation occur the reservoir should be drained and flushed out with a suitable cleaning agent such as clean diesel oil.

**Return Line Filter** - filter elements should be changed after the first 50 hours of work and thereafter at 500-hour intervals. It is important to note the hours worked as should the filter become blocked an internal by-pass within the canister will operate and no symptoms of filter malfunction will occur to jog your memory or indicate that the oil is no longer being filtered.

### Hydraulic Hoses

The condition of all hydraulic hoses should be carefully checked on a regular basis – any hoses that have become chuffed 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 replaced at the earliest possible opportunity.

### Hydraulic Hose Replacement

- Replace hoses one at a time to avoid the risk of wrong connections.
- Run the replacement hose alongside the damaged hose before removing it to ensure it is correctly routed.
- When a hose is attached 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 the hose end connections.

Before changing hoses study the installation as they are carefully calculated to prevent hose damage during use. Always replace hoses in exactly the same manner and location,

# Spearhead TWIGA PRO

this is especially important for flail hoses where they must be crossed 'upper to lower' at the dipper and head pivots.

## WIRING DIAGRAM - V3 Controller

