

Spearhead

Excel 474

Reach Mower

& Twiga 4000

Handbook

1st Edition - March 2008

Please ensure that this manual is handed to the operator before using the machine for the first time. The operator must fully understand the contents of this manual before using this machine.
(If the machine is resold the Manual must be given to the new owner.)

Important Note

The information contained in this manual is correct at the time of publication. However, in the course of constant development, changes in specification are inevitable. Should you find the information given in this book different to the machine it relates to please contact the "After Sales Department" for advice

Spearhead Machinery
Green View,
Salford Priors,
Evesham,
Worcestershire,
WR11 8SW
Tel: 01789 491860
Fax: 01789 778683
www.spearheadmachinery.com
enquiries@spearheadmachinery.com

Spearhead Excel 474 & Twiga 4000

EC Declaration of Conformity, Conforming to EEC Directive 89/392/EEC, 98/37/EC & 98/38/EC

We, Spearhead Machinery Ltd, Green View, Salford Priors, Evesham, Worcestershire, WR11 8SW declare under our sole responsibility that the :

Product

Product Code

Serial No

Flail Head Serial No

Type

Manufactured by the above company complies with the required provisions of the directive 89/392/EEC, 98/37/EC and 98/38/EC and AMD 91/368/EEC, AMD 93/44/EEC, AMD 93/68/EEC and conforms with European norm. BSEN 292; Part 1: 1991 Safety of Machinery – Technical, Methodology; Part 2: 1991 Safety of Machinery - Technical Specifications and other national standards associated with its design and construction as listed in the Technical File.



Signed.....

(On behalf of Spearhead Machinery Ltd)

Status General Manager

Date.....

Spearhead Excel 474 & Twiga 4000

Contents

General Information

| | |
|---------------|---|
| Introduction | 4 |
| Specification | 5 |

Safety

| | |
|-------------------------|---|
| Machine Safety Stickers | 6 |
| Safety Recommendation | 7 |
| Warning Signs | 9 |
| Training | 9 |

Installing/Removing Machine

| | |
|---------------------------------------|----|
| Tractor Requirements | 10 |
| Lifting Points | 10 |
| Attaching Your Machine To The Tractor | 11 |
| Running up your Machine | 16 |
| Removing from the Tractor | 17 |

Set-up

| | |
|------------------------|----|
| Hydraulic Controls | 18 |
| How your Controls Work | 19 |
| Flail Head Set-Up | 20 |
| Hedge Trimming | 21 |

Operation

| | |
|--------------------------------|----|
| Optional Hydraulic Rear Roller | 22 |
| Operation Warnings | 23 |
| Moving into Transport Position | 24 |
| Transport to Work Position | 25 |
| Engaging Head Drive | 26 |
| Disengage Head Drive | 26 |
| Break Back | 27 |
| Tractor Forward Speed | 28 |
| Cutting Sequence | 28 |
| Wire Trap | 29 |
| High Voltage Cables | 29 |
| Optional Angle Float | 30 |
| Optional Head/Arm Float | 31 |

Spearhead Excel 474 & Twiga 4000

Service & Maintenance

| | |
|------------------------|----|
| Greasing / Lubrication | 32 |
| Hydraulic hoses | 34 |
| Oil Supply | 35 |
| Oil Recommendations | 35 |
| Filtration Maintenance | 35 |
| Flail Head | 36 |
| Cables | 37 |
| Pin & Bushes, Storage | 37 |
| Storage | 37 |
| Torque Settings | 38 |
| Regular Service Chart | 38 |

Diagnostics

| | |
|------------------------|----|
| Trouble shooting Excel | 39 |
| Pump and Motor failure | 42 |

Warranty

| | |
|------------------------|----|
| The Spearhead Warranty | 43 |
| Extended Warranty | 44 |

Spearhead Excel 474 & Twiga 4000

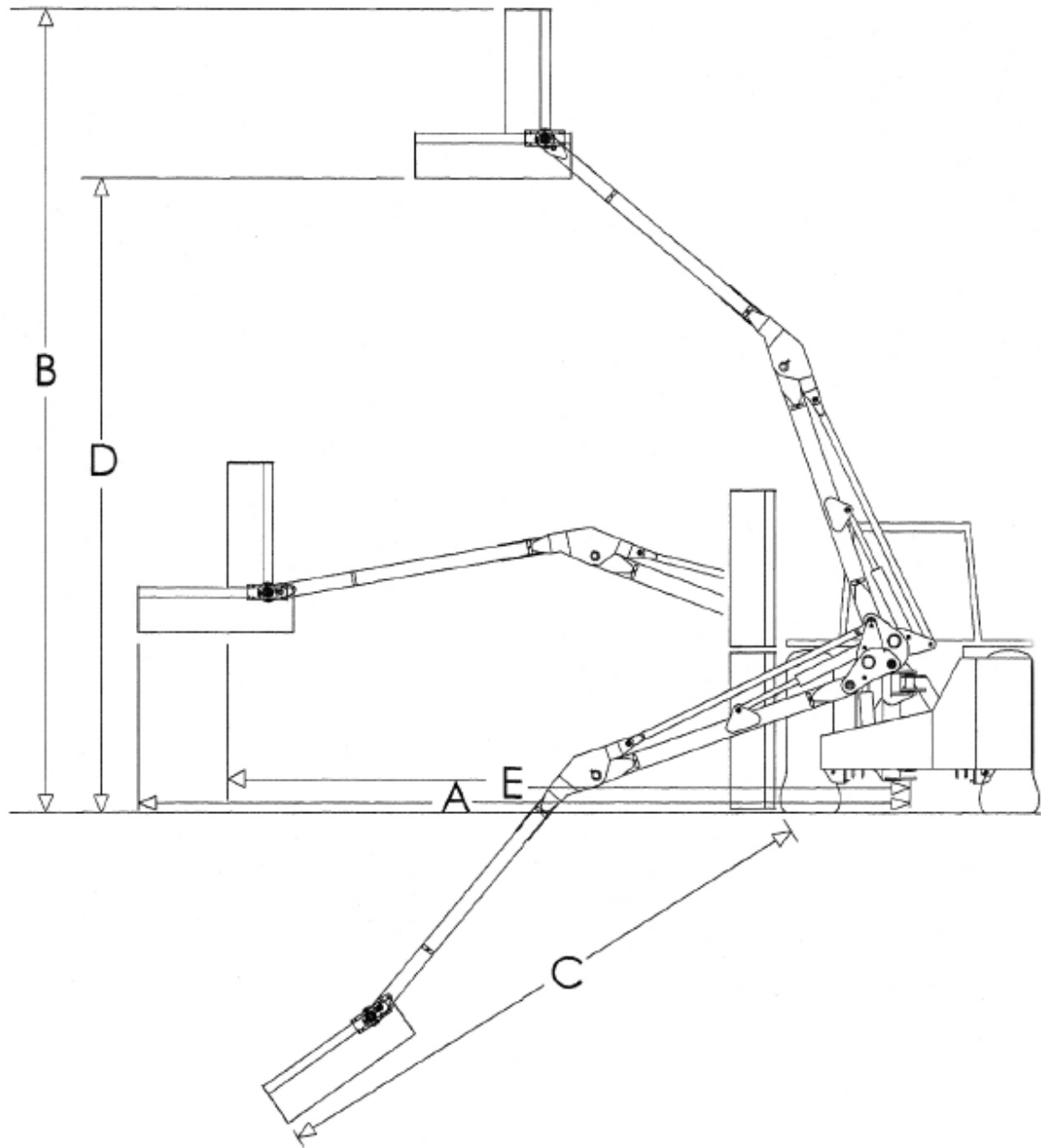
Introduction

The Excel is a very robust medium capacity hedge trimmer that is easy to operate and maintain, ideally suited for annual trimming of field boundaries. To ensure trouble free operation this manual should be carefully studied.

The term Left and Right hand applies to the machine when coupled to the tractor and viewed from the rear, this also applies to the tractor.

Spearhead Excel 474 & Twiga 4000

Specification



| Excel 474 | |
|---|----------|
| Weight including head & oil (kg) | 1320 kg |
| Tractor (hp) | 70-95 hp |
| Minimum tractor weight (kg) | 2500 kg |
| Oil tank capacity | 200 ltr |
| A reach (m) | 4.58 m |
| B reach (m) | 5.45 m |
| C reach (m) | 2.80 m |
| D reach (m) | 4.25 m |
| E reach (m) | 4.38 m |

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Machine Safety Stickers



Warning
 Avoid fluid escaping under pressure. Consult technical manual for service procedures.



Warning
 Shut off engine and remove key before performing maintenance or repair work.



Warning
 Beware of overhead electrical power line.



Warning
 Danger – flying objects keep safe distance from the machine as long as the engine is running.



Warning
 Stay clear of mower flails.



Warning
 Do not remove/open guard.



Warning
 Carefully read operator's manual before handling this machine. Observe instructions and safety rules when operating.



Warning
 Check all nuts and bolts are tight every 8 hours

Safety Recommendations

Beware of the following Potential Dangers associated with the use of this machine:

- Becoming trapped when hitching or unhitching
- Tractor overbalancing when arm is extended
- Electrocution due to hitting overhead power lines
- Getting caught on rotating power take off (PTO)
- Being hit or caught by any moving part, e.g. belts, pulleys, arms, cutting head
- Being hit by flying debris or machine parts due to machine damage
- Machine overbalancing when not in use
- Injection of high pressure oil from damaged couplings or hydraulic hoses
- Accidents due to collision with other machines, or debris left on road

Always

- Ensure the operator has read this handbook and has been trained to use the machine.
- Ensure all cab safety guards are in place and all tractor windows closed.
- Before leaving the tractor cab always ensure that the flail head is firmly on the ground, no weight is on the machine's hydraulics and the rotor has stopped spinning.
- Check that all guards are properly fitted and there are no damaged or loose parts. Particular attention should be given to the flails to ensure they are not damaged, cracked or missing.
- Inspect work area for wire, steel posts, large stones and other dangerous materials and remove before starting work.
- Beware of the danger of overhead power cables. The operator must be aware of the maximum height and reach of the machine when working under power cables. The minimum legal height for 11,000 and 22,000-volt cables is 5.2 metres from the ground. When fully extended, the machine may well exceed this height so extreme caution should be practised. For more information contact the Health and Safety Executive or your local power company.
- Ensure that all warning labels are always visible and that they are not damaged, defaced or missing.
- Lower the head to the ground when parking up
- Fit locking pins to slew and height before transport and before unhitching when applicable.
- Wear ear defenders if operating without a quiet cab or with the cab windows open.
- Ensure tractor guards are fitted correctly and are undamaged
- Work at a safe speed, taking into account terrain, passing vehicles and obstacles

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- Ensure that the tractor meets the minimum weight recommendations of the machine manufacturer and that ballast is used if necessary
- Check that machine fittings and couplings are in good condition
- Follow the manufacturer's instructions for attachment and removal of machine from the tractor are warning signs to alert others to the type of machine working in the vicinity. Signs should be placed at both ends of the work site and should be in accordance with Department of Transport recommendations.
- Ensure flails are of the type recommended by the manufacturer, are securely fitted and are undamaged.
- Ensure hydraulic pipes are correctly routed to avoid damage from chafing, stretching, pinching or kinking.
- Disengage the machine, stop the engine and remove the key before leaving the tractor cab for any reason.
- Clean up any debris left at the work site.
- Ensure that when you remove the machine from the tractor it is secured in a safe position using the stands provided.

NEVER

- Never operate the machine with other people present, as it is possible for debris, including stones, to be discharged from the front and rear of the flail head.
- Never operate the machine until you have read and understood the relevant Handbook and are familiar with the controls.
- Never use a machine that is poorly maintained or has guards that are damaged or missing
- Never allow an inexperienced person to operate the machine without supervision.
- Never use or fit a machine onto a tractor if it doesn't meet the manufacturer's specification.
- Never use a machine if the hydraulic system shows signs of damage.
- Never attempt to detect a hydraulic leak with your hand, use a piece of card.
- Never allow children to play on or around the machine at any time.
- Never attempt any maintenance or adjustment without first disengaging the PTO, lowering the head to the ground, stopping the tractor engine and applying the tractor parking brake.
- Never leave the cab without removing the ignition key.
- Never operate the tractor or any controls from any position other than from the driving seat.
- Never stop the engine with the PTO engaged.
- Never operate with flails missing.
- Never operate PTO **above** recommended speed, 540 R.P.M.
- Never operate with wire around the rotor. Stop immediately.
- Never use the head at an angle, which may throw debris towards the cab.
- Never attempt to use the machine for any purpose other than that it was designed for.
- Never transport with the PTO engaged
- Never enter the working area of the machine (risk of injury!)
- Never transport with the controls live, always turn off electrical isolator switch (red) and disconnect supply.

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Warning Signs

You are advised to display clear warning signs to indicate the type of machine when working in public places. The signs should be carefully placed at either end of the work site to give advanced warning of the hazard.

Contact your local Highways Authority or Department of Transport for more information.

Roadwork Guidelines:

On two-way roads, one set of signs should face the 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 show an amber flashing light.

Vehicles should be conspicuously coloured.

Debris should be removed from the road or path at regular intervals and the operator should wear high visibility clothing.

Collect all warning signs promptly when the job is finished.

Training

It is the responsibility of the Spearhead dealer to provide instruction on the safe installation, operation and maintenance of the machine in the first instance. Further training is available from Spearhead Machinery Ltd on request, at cost.

Lifting Point



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Tractor Requirements



- Check your tractor size and minimum weight on the Specification table (page 5).
- Before hitching, ensure position control is selected. DO NOT attempt to hitch in draft control.
- Set wheel width as wide as possible.
- Front and offside ballast weight is to be fitted within tractor manufacturer's recommended requirements.
- Check chains and stabilisers must be in good working order to hold the machine firmly. Do not operate without ensuring that chains and stabilisers are tight.
- Spearhead particularly recommend 'turn buckle' type stabiliser.
- A linkage isolation facility is necessary for all models. Set linkage lift rods to an equal length.
- Joystick machines require a 12v fused supply. A 30 amp DIN connector is provided, but if not, the lead should be taken directly to the vehicle battery. Avoid cigarette lighter plugs, as they are unsuitable. The supply cable has a red wire for positive (+ve) and black wire for negative (-ve)
- Spearhead particularly recommend "Category 2" three point linkage of ball end type, we do not advise the use of claw type hitching. When using hooks the quick release latches should be checked, if worn or insecure they may cause accidental damage or personal injury if the machine becomes detached.
- The machine is sold to suit Cat. 2 linkages, some modification may be necessary before mounting on Category 3 linkage.
- Ensure tractor link arms can be isolated from accidental lifting.

Attaching Your Machine To The Tractor – 3 Point Linkage



Warning

It is most important the operator fully understands the procedure for attaching/unattaching the reach mower to/from the tractor. The following text must be fully understood before attempting to attach the machine. If there is any doubt please contact your supplying dealer or Spearhead Service Department. Failure to follow the correct procedure

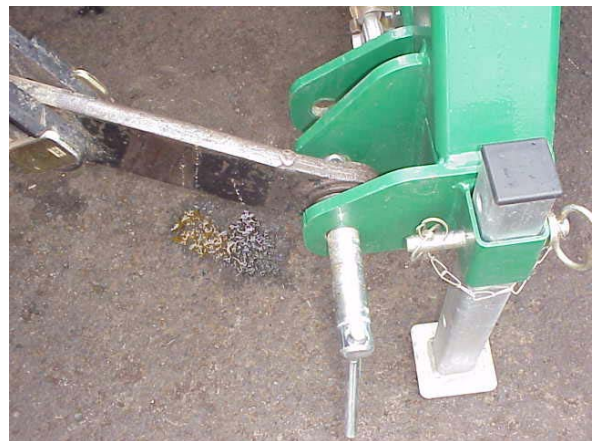
to attach/un-attach the machine could result in personal injury or machine damage. Any resulting damage to a machine is not covered by warranty.

Always be sure to select a level firm surface, such as concrete before attaching to the tractor.

When operating the tractor or machine's controls do so only when seated in the tractor cab. Do not allow anyone to stand on or amongst linkage for any reason.



1. Fit stabiliser yoke to the tractor's top hitch bracket.



2. Reverse tractor and attach lower link arms by inserting lower linkage pins into the outer holes.



3. Place the stabiliser tubes to the inner holes on frame insert the same lower linkage pin to secure.

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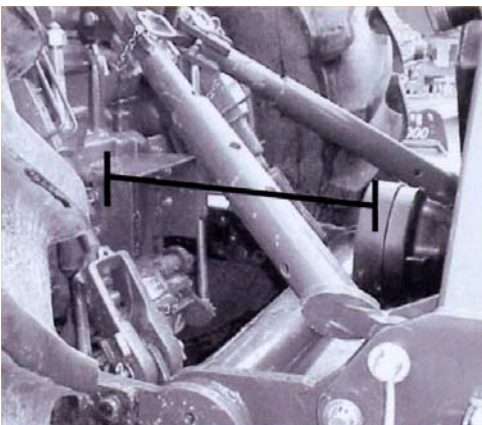
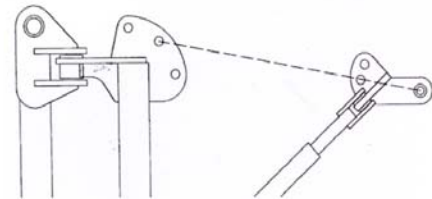
Attaching Your Machine To The Tractor – 3 Point Linkage

4. Swing forward stabiliser bars and attach to stabiliser yoke. Be sure the stabiliser bars are free to slide. Do not fit locking pins.



5. Fit top link between machine and the tractor

6. Caution: when positioning the top link, it is most important to select the most suitable hole position to achieve as near as possible a straight line between all 3 holes.



7. Lift the machine up on the tractor's hydraulics until both PTO stub shafts are approximately in line. PTO angle may vary between tractor makes - up to 17° above horizontal is acceptable. Ensure there is enough ground clearance below frame.

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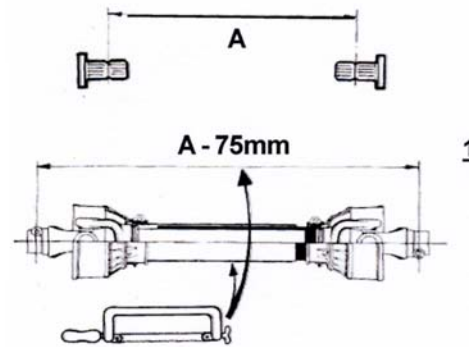
Attaching Your Machine To The Tractor – 3 Point Linkage



8. Check the machine is at the correct height and level, ensuring both stabiliser bars are at an equal length. Fit locking pins to both stabilisers. Once the stabilising bars are correctly fitted, lower the tractor hydraulics allowing **all the weight of the machine to be carried by the stabiliser bars.**

9. If fitting the PTO shaft for the first time measure and cut to the correct length.

Example: $A (900\text{mm minus } 75\text{mm}) = 825\text{mm}$



10. Fit the PTO shaft connecting the tractor output shaft to the machine input shaft.



Warning

Always stop the engine and ensure the PTO drive is disengaged before fitting the PTO.

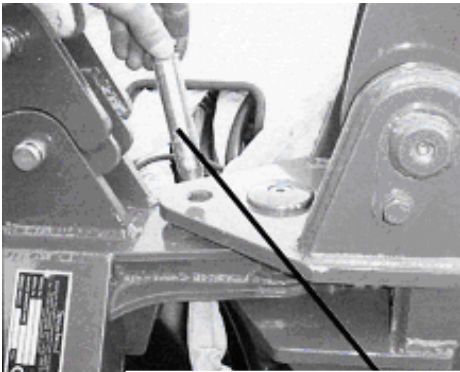
Always replace slew pin for the transport and before unhitching the hedge cutter.

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Attaching Your Machine To The Tractor – 3 Point Linkage

11. Spearhead strongly recommend mounting the control unit to the seat in place of the armrest to the head side of the tractor. Modification and additional bracket may need to be fabricated Consult your local dealer for advice.

An electric 12-volt supply cable will be needed from a 30-amp source for joystick model.



Remove slew-locking pin

12. Remove locking pin from slew post before operating the machine, and slew forward

13. Operate the main arm to bring the frame horizontal by lowering the head weight to the ground.



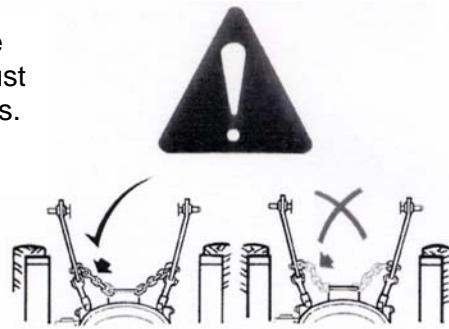
Adjust top link

14. Adjust top link length until the main frame is vertical.

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Attaching Your Machine To The Tractor – 3 Point Linkage

15. **Warning** - fully tighten chains and linkage stabilisers to hold the machine rigid. There must be no sideways movement, it is very dangerous.



16. Remove parking stands and store safely. The machine cannot be unhitched without these stands.

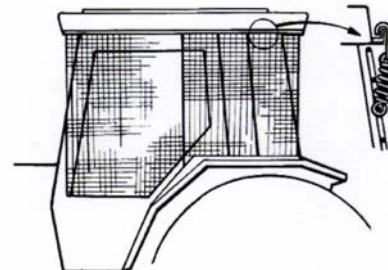


Warning

Avoid raising the tractor linkage once the stabiliser bars are locked in place.

Always lower the tractor linkage and allow all the weight to be carried by the stabiliser frame. **Failure to observe this warning will result in bending the stabiliser bars.**

17. Use only tractors with safety glass. If windows are not laminated safety glass, polycarbonate glazing must be fitted between operator and cab meshing. Shape mesh to cover all windows that the driver will look through to view flail head in any operating position. Mesh can be retained by springs and clips supplied, but it is the operators responsibility to ensure guarding is firmly in place.



Running Up Your Machine

1. First ensure the rotor is in the 'off' position and PTO drive is disengaged, then start the tractor.
2. Engage PTO into gear and run machine up to half revs, allowing oil to circulate for about 15 minutes before operating arms.
3. Re-check oil level, - check for oil leaks. All Spearhead machines have been fitted to a tractor and checked thoroughly. However, hose connections can become loose in transit and these should be checked again before the machine is put to work.
4. Operate the arms through the full amount of travel; check all movements are functioning correctly.
5. Place flail head near ground in a safe position and with tractor revs low, select 'start' position for the flail motor.
6. Once the rotor is settled, slowly increase revs of PTO to 540r.p.m. and run for a further 5 minutes. Slowly reduce revs and then disengage PTO.
7. Check all hoses for kinks, pinching, chafing and leaks.
8. Re-check oil level.



Warning

The rotor will take a long time to stop. Never leave the cab until PTO is disengaged, engine stopped and rotor has stopped spinning.

Removing From The Tractor



The following steps **MUST** be followed in exactly the same order in which they appear, with removal of the top link being the last action before driving the tractor away. Do not attempt to operate machine controls through the rear cab window whilst standing on or amongst the linkage.

1. Select a level firm site such as a concreted surface.
2. Fit parking stands. Place the flail head on the ground approximately 1m out from machine main assembly, to the rear.
3. Ensure head float is discharged and turned off.
4. The arms must be slewed back into transport position and the locking pin fitted to slew post.
5. Disengage PTO.
6. Slightly raise the lower lift arms with great care to take the weight to enable the stabiliser locking pins to be removed. **Be very careful not to raise the machine, as the stabiliser bars will get damaged if locked with a pin.**
7. Lower all weight securely onto parking stands (Fig.1).



Fig. 1

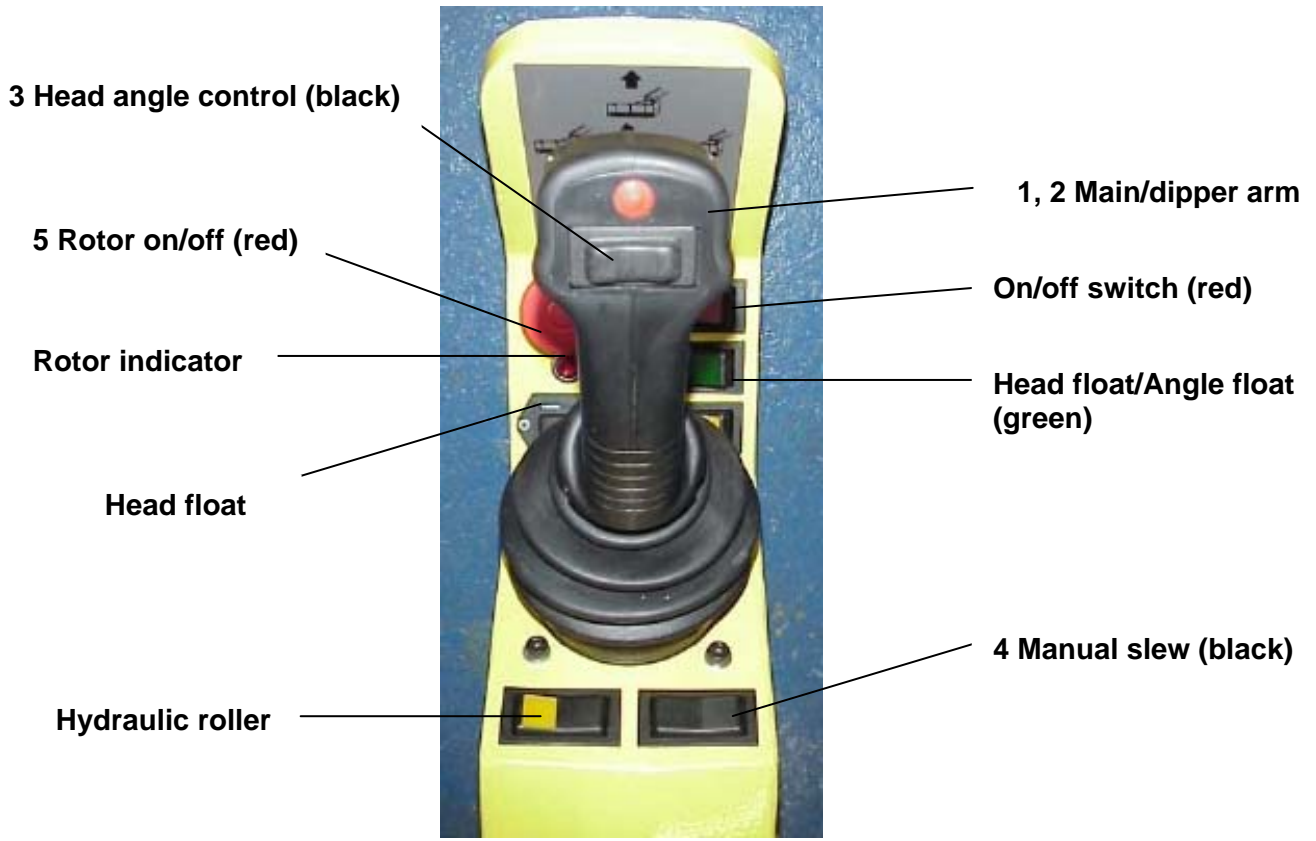
8. Stop engine; ensure all weight is off the tractor and machine hydraulics.
9. Remove stabiliser bars, lower link pins, and PTO shaft and control unit from the cab.
10. Remove top link.
11. Slowly drive tractor away.

Subsequent Attachment to a Different Tractor

Follow the steps for “Attaching Your Machine To The Tractor” (page 11).

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Hydraulic Joystick Control



5 4 3 2 1

Cable Controls

See explanatory diagram on page 19



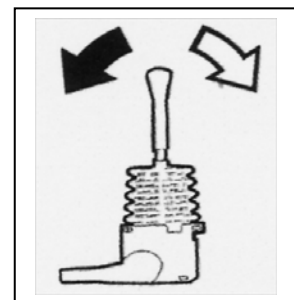
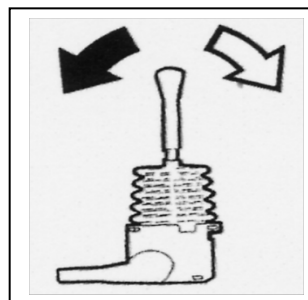
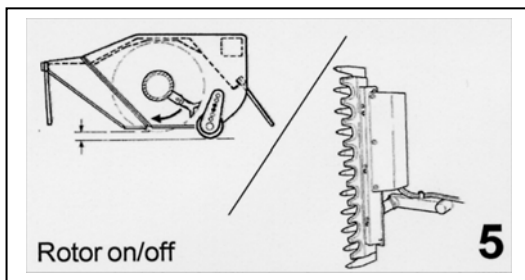
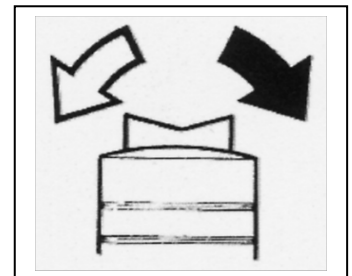
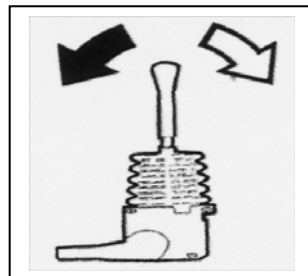
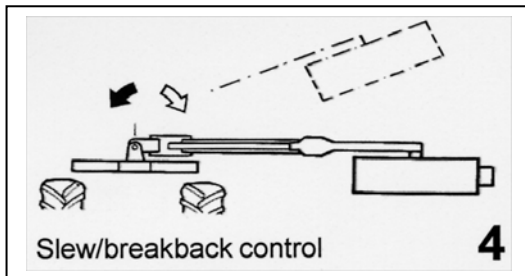
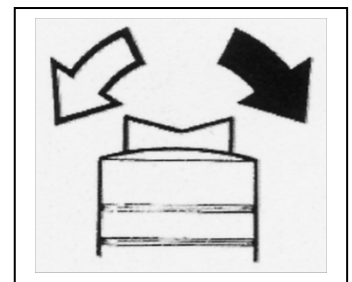
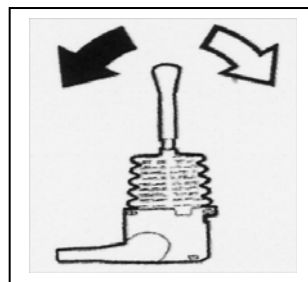
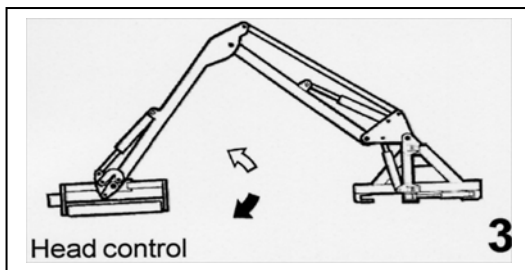
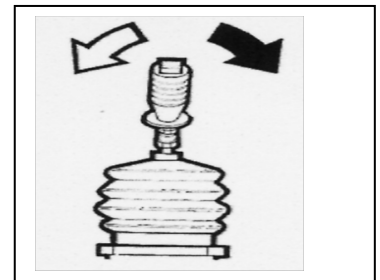
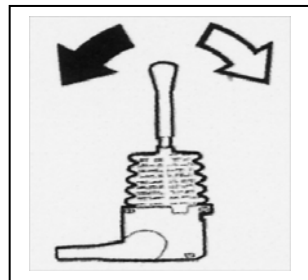
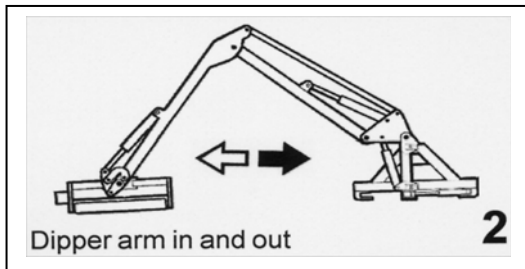
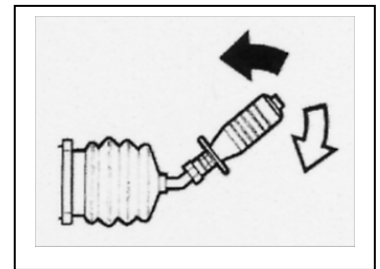
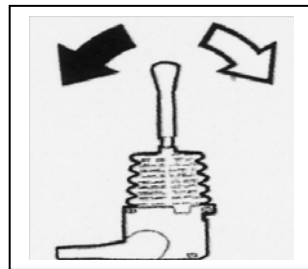
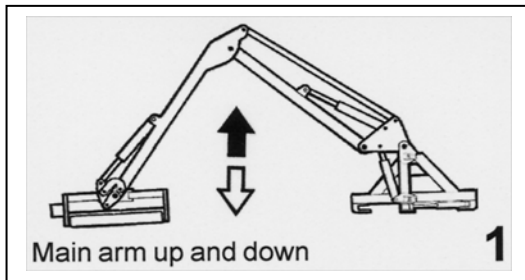
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How Your Controls Work

Movements

Cable controls

Hydraulic/Electric controls



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Flail Head Set-Up

Direct Drive option minimises weight at the end of a long arm, by compact mounting and benefit of reduced maintenance. Running at a single speed of 2700 rpm.

Cutting Width

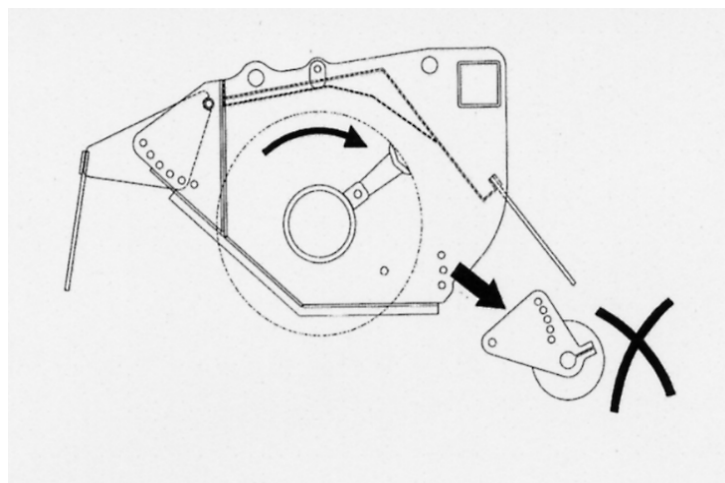
Standard 1.2m is suitable for hedges, and optimises power to weight ratio.

We DO NOT recommend fitting a 1.5m flail head.



Warning

Never attempt to operate the machine without the rear roller correctly fitted. The roller performs a key safety function should the rotor shaft pick up wire. It is essential for operator safety that it remains in place. It is also an essential structural part of the cutting head. Removing it will cause premature wear on rotor bearings and will lead to fatigue on the steel fabrications.



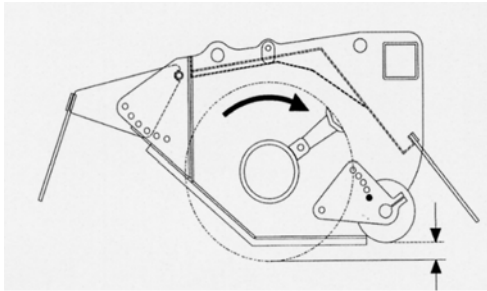
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Hedge Trimming

Recommended for Hedge Trimming

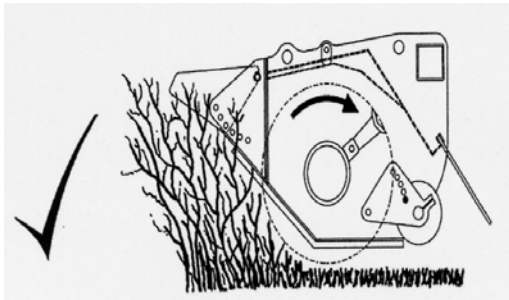
- 1.2m rotor
- 5" Rear roller
- "T" flails or "Boot" flails
- Rear flap
- Front flap

Note: The 1.5m head is not recommended on Excel 474 models.



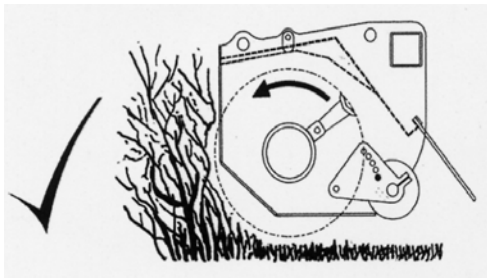
Roller Set-Up

Roller should be set to just clear the top of the hedge.



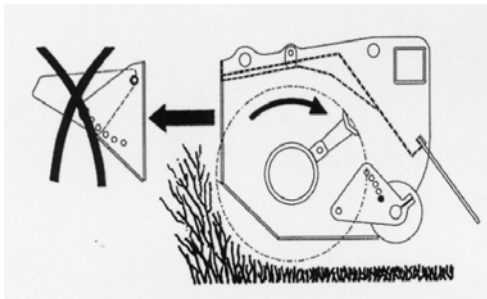
Normal Hedge Cutting

Flail is cutting upwards reducing flying debris to minimum and leaving a tidy finish. Open adjustable front hood as required.



Rough Cutting/Reverse Rotation

When reversing rotor rotation open the front cowling or remove if necessary. This method of down cut is not good for the hedge and leaves an untidy finish. Only use this position when rough cutting in heavy growth.

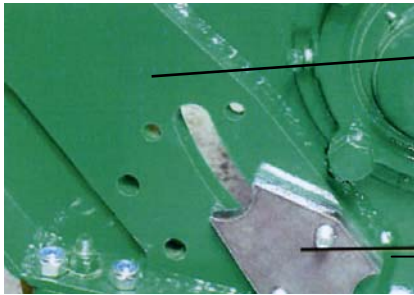


Warning

Do not remove cowling from the head when cutting "up".

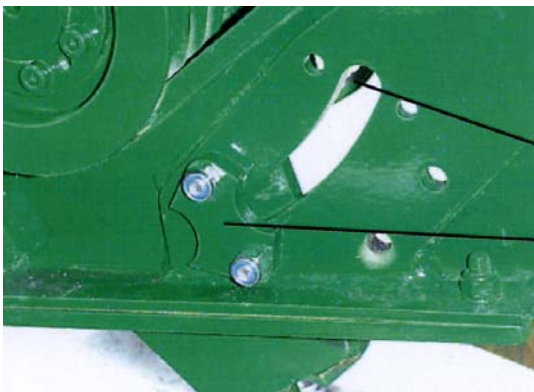
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Optional Hydraulic Rear Roller (not available with cable controls)



Grease daily

Set-up for hedge trimming uses large stops in either position at bottom of adjustment slot keeping the roller high, for a short cut.



Set-up for mowing with roller on the ground on the last pass during hedge trimming uses small stops in either position, with the option of an additional stop at the top of the adjustment slot.

The hydraulic rear roller is operated by a switch on the control panel. The rear roller is either raised or lowered; there is no in-between height control, this is achieved by the size and position of the stops fitted.

Hydraulic rear roller control switch location depends on machine options specified.



Note

To ensure the roller moves freely its important to keep the roller Side plates and head cowl clean and lubricated



Attention

When hedge trimmer is fitted with reverse rotor direction control the hydraulic rear roller will not function.

To set rear roller when rotor is reversed, bolts must be fitted to Hold the roller in position.

Operation Warnings



Warning

Please read all the following operation warnings carefully

- Never drive the tractor with arm out-stretched (except when cutting). When moving from work always first retract arms. Transport with care, metal fatigue is always caused by careless transportation and misuse. If the ground is uneven or bumpy, **slow** down.
- Read this manual and be fully familiar with all operational maintenance and safety procedures.
- Practice in open space without rotor running until familiar with controls. **Take care working the head close to the tractor, as it may be possible to strike the tractor.**
- Remember one of the clever features of the Excel range is its ability to operate within a very narrow space, often within the tractor's width. This will mean it is quite possible for the flail head to foul the tractor. When in confined space the main arm will need to be slightly slewed backwards from normal working position. Practice all these positions and be very familiar with your machine before ever attempting work.
- Never operate above the recommended PTO speed of 540r.p.m. Failure to heed this warning will result in severe damage i.e. reduced belt and pulley life (when fitted); **greatly increased oil temperature**; risk of rotor going out of balance, as well as reduced machine life, and may cause expensive repairs.
- Failure to start and stop the rotor at a low PTO speed or to operate at the correct speed will result very quickly in severe motor and/or pump damage.
- Never attempt to slew arms when fully out stretched - always retract before operating the slew. Be very careful when operating on sloping ground.
- Never attempt to slew arms with the head on the ground, always raise the head before slewing.
- Never attempt to operate the machine while going backwards. It will immediately damage the arms and possibly the flail head. Remember, before selecting reverse gear always lifts the flail head out of work and retract the arms towards the tractor.

Moving Into Transport Position



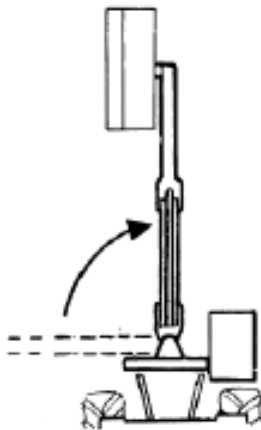
Warning

Always transport machine with the slew locking pin and transport link fitted and the arms closed in their transport position on the bump stops.

Avoid high transport speeds which will cause unnecessary strain on machine and tractor.

Never travel with the reach arm away from bump stop on the main arm. Failure to adhere to this warning will cause damage to ram seals and arms.

Do not attempt to move the main lift ram until transport link has been removed. Failure to adhere to this warning may cause damage to the frame, link or ram.

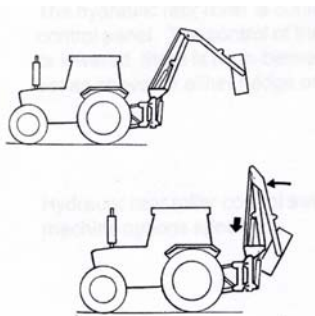


1. Disengage head motor drive

Ensure that arm and angle float are discharged and turned off (if fitted).

Retract arms to bring fail head approx 1 metre from tractor wheel and 1 metre off the ground.

Slew rearwards to fully close slew ram.

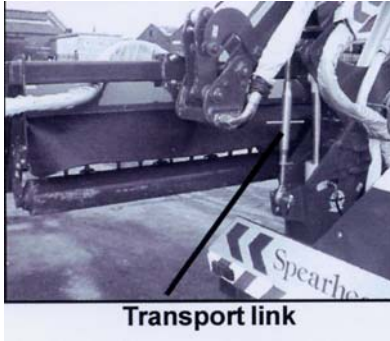


2. Gently close reach arm into cradle and bump stop on main arm.

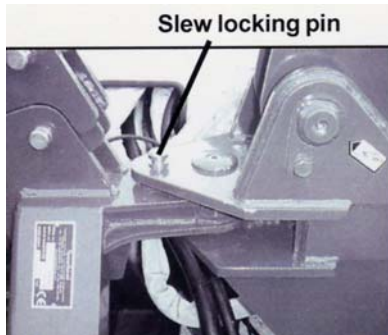


3. Carefully position main boom over the tractor cab roof.
Warning: Boom may over centre and drop onto cab roof if placed to close.

Spearhead Excel 474 & Twiga 4000



4. Mount adjustable transport link



5. Fit locking pin into slew frame.

Transport To Work Position

- Remove locking pin from slew post, and then remove the transport link.
- Ensure motor valve lever is off, engage P.T.O. low revolutions.
- Position head 45° to the dipper arm.
- Lower main lift ram only, until main arm is vertical
- Extend dipper arm outward.
- Slew arm forward through 90°.
- Position head till horizontal, just above ground.

Spearhead Excel 474 & Twiga 4000

Engaging Head Drive

- Select 540rpm PTO and run with low engine revs.
- With flail head in safe position move rotor control lever reward (5) to 'ON'.
- **Cold start** - it is important not to run at full speed with cold oil. Run at low speed for at least 15 minutes to allow oil to warm up.
- Afterwards slowly increase engine revs to obtain correct PTO speed, 540rpm.
- Never attempt to start rotor while under load.

Disengage Head Drive

- Slowly decrease engine revolutions to a fast idle.
- Move rotor control lever toward middle (5) to 'OFF'.
- Never increase or decrease PTO speed rapidly, this could seriously damage pumps and motor.

Reversing Head Drive

- Slowly decrease engine revolutions to a fast idle.
- Move rotor control lever (5) to 'OFF'
- Wait for rotor to stop spinning and come to a stand still.
- Move the red knob to change the gate on the rotor control lever.
- Move rotor control lever forward (5) to 'ON'



Warning

Never attempt to change the rotor rotation until the rotor shaft has come to a standstill,
Never attempt to use the rotor reverse facility to unblock the flail head.
Serious harm to both pump and motor will result from a pressure spike.

Break-Back System

Manual – Standard

The Excel range of reach mowers have as standard a slew ram to position the machine from transport to work or any position midway for narrow lane cutting. This ram also acts as the break back ram for machine protection should an obstacle be encountered while travelling forward.

The break back will operate if the machine is overloaded i.e. a dense patch of vegetation, too high a forward speed, and when working uphill. The tractor must be halted and the flail head manoeuvred around the obstacle before the break back is reset via slew control lever no.4.



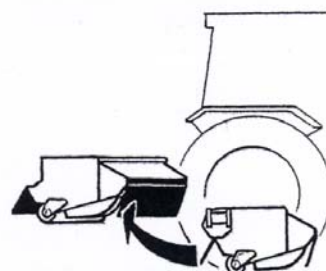
Manual

Recommended for
Confined areas and on steep hills

Auto Reset - Joystick Models Only

With auto reset the flail head and arm will slew back past an obstacle, once past, the charge pressure within the hydraulic circuit causes the arm to automatically slew fully forward position. Therefore, when grass mowing too much weight on rear roller will cause arm to break back prematurely, as will too high a forward speed and a dense crop.

To improve the machine's performance keep the hydraulic circuit fully charged by operating the slew lever periodically, also ensuring only a light contact when mowing with the roller on the ground.



Auto reset

Recommended for
Normal use



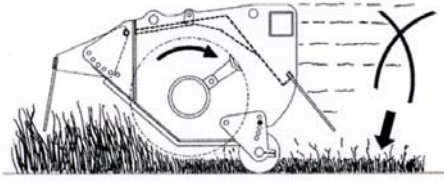
Warning

Never attempt to operate the machine when travelling backwards, the break back will not function and any damage caused will not be considered warranty.

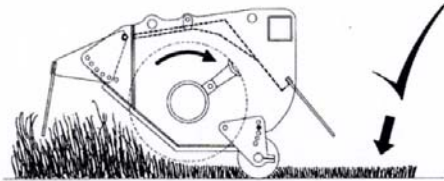
The break back feature does not excuse the machine operator of their need to be aware of obstacles and to avoid hazards. It is your responsibility to maintain a long reliable working life.

Spearhead Excel 474 & Twiga 4000

Tractor Forward Speed

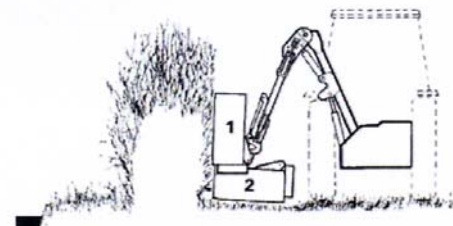


Too high a forward speed will impair the finish, leaving it looking ragged, cause over frequent use of the break back, and overheat the oil.

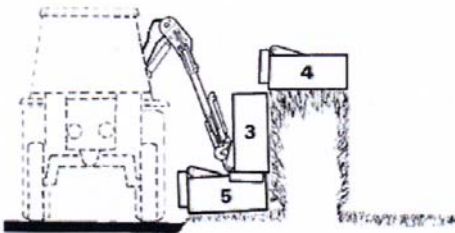


A slower forward speed improves the standard of the finish.

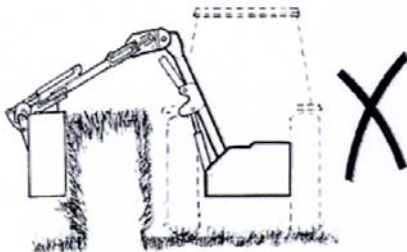
Cutting Sequence



Cut field side and bottom of hedge first.



Cutting hedge from roadside



Warning

Never operate with flail rotor facing towards the tractor. This is potentially dangerous with debris being thrown towards the tractor, Unseen hazards will cause damage to the rotor and possibly the arm, as the break-back cannot function.

Spearhead Excel 474 & Twiga 4000

Wire Trap

This is located under the front hood. It must not be interfered with in any way.

Any wire must be removed immediately.

Lower rotor to ground, move rotor control lever to 'off' and wait until rotor stops spinning. Disengage PTO and stop engine before leaving cab.



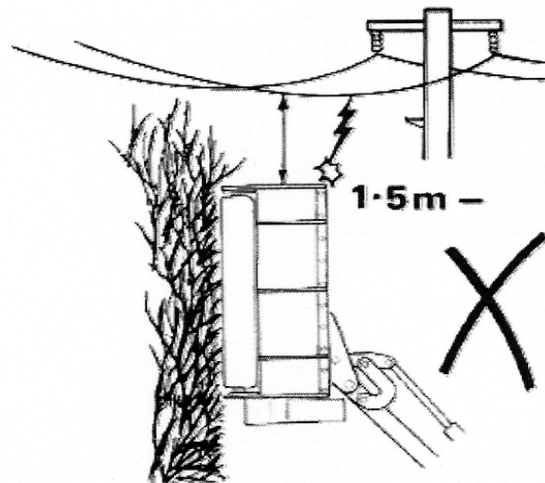
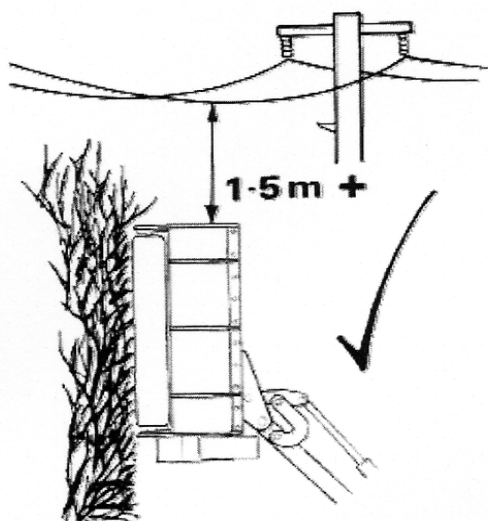
Warning

Wire is extremely dangerous and must be avoided at all times. Inspect work area before commencing, removing all loose wire and clearly marking fixed wire.



High Voltage Cables

Always be very aware of overhead cables. Between poles wires can be well within reach of the machine. If in any doubt of the danger, consult your local electricity company regarding a safe procedure for work.

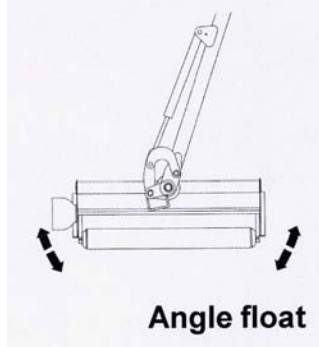


Spearhead Excel 474 & Twiga 4000

Optional – Head Angle Float



Hydraulic Controls



Cable Control

Head Angle Float

This option allows the flail head to follow contours of the ground without having to constantly control the angle of the head.

The centre of balance is the best mounting point for the head if angle float is to function properly, slide head along box section mount to suit.

Operating The Head Angle Float

Place flail head on the ground and switch on angle float control, this opens the head ram to tank, and allows the ram to extend or retract, maintaining full contact with the ground automatically.

To regain manual control switch off and operate the ram full stroke in and out to expel any air.

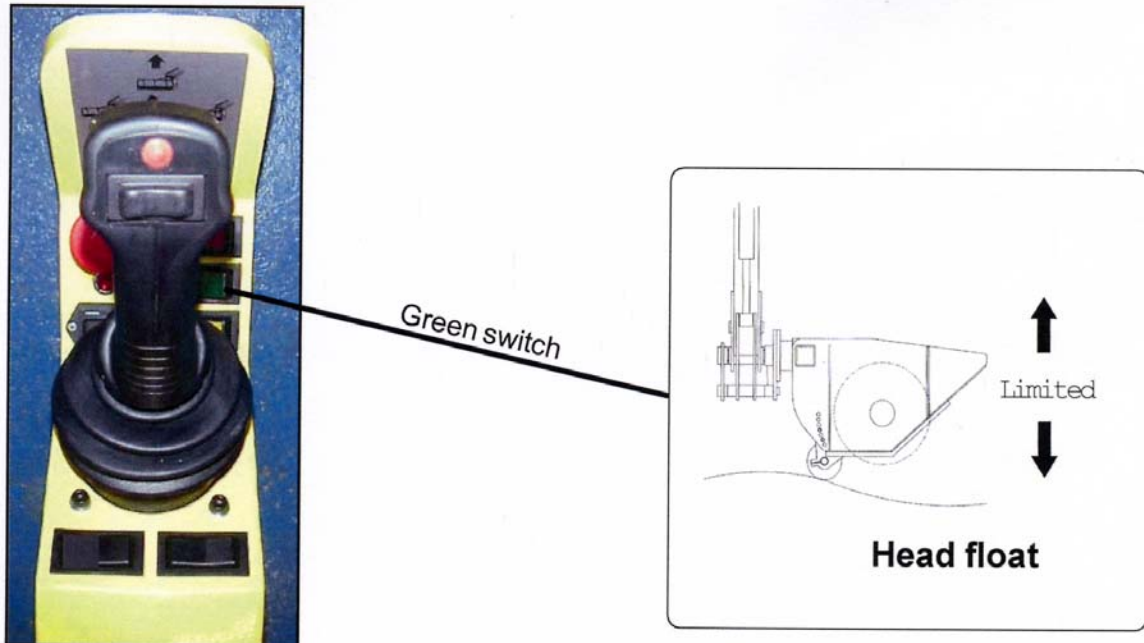


Warning

Do not fold the machine up for transport before turning off the angle float.

Spearhead Excel 474 & Twiga 4000

Optional – Head/Arm Float



Head/Arm Float

This is only used in verge mowing set up, it will reduce weight on the rear roller allowing head to move more easily, following small changes in ground contours in a forward motion, with the aid of a pre-charged gas accumulator.

Operating The Head/Arm Float

To select head float, first lower cutting head to the ground, disengage PTO and stop tractor engine. To the back of the slew frame is situated the float on/off tap. Turn tap in line for 'on' float. Main Lift control lever should be operated to take a proportion of the flail head weight off the rear roller. This is important, as too little weight on the rear roller will leave uncut areas of grass, too much weight on the roller will cause scalping in places and increase flail wear and damage. We strongly recommend the use of auto reset - break back (if fitted).

When the head is pushed further out more weight will be applied to the accumulator causing the head to drop, reset with control lever.

As the ground contours alter it is necessary to reset the pressure within the main lift circuit as above, constantly raising or lowering control lever for the main lift.



Warning

Do not fold the machine up for transport before turning off the head/arm float.

Spearhead Excel 474 & Twiga 4000

Service & Maintenance

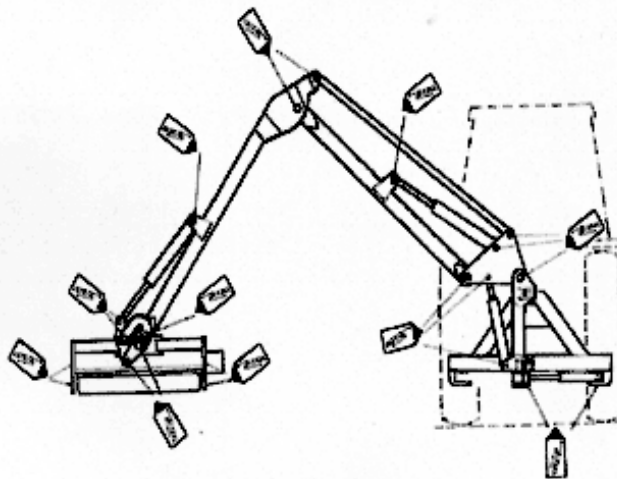


Warning

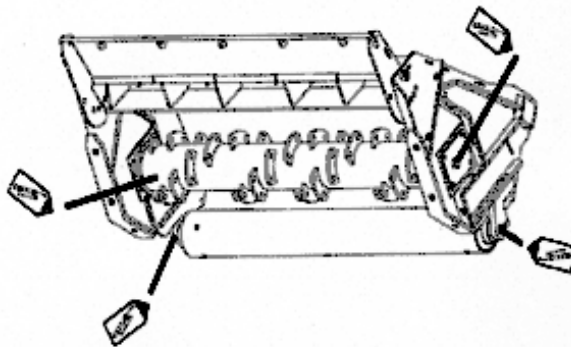
Before you attempt to do any repair, service, maintenance or adjustment on your machine, ensure the engine has stopped and the key is removed. P.T.O. is disengaged, handbrake secure, and the head is firmly on the ground.

Greasing/Lubrication Points

All the following grease points need to be greased daily



Excel/Highway machine

















Head Rotor & Roller

Grease 1.2m head every 8 hours (5-10 pumps)

Spearhead Excel 474 & Twiga 4000

Lubrication Chart

| | Daily | Weekly | Monthly |
|----------------------|---|--|---|
| Rotor shaft bearings |  | | |
| PTO shaft bearings |  | | |
| PTO shaft tubes |  | | |
| Pivot pins | |  | |
| Roller bearings |  | | |
| Oil tank |  | |  |
| Gearbox |  | |  |
| Belt drive head | |  | |
| Flail head |  | | |

Key: Grease =  Oil =  Check = 

Greasing/Lubrication

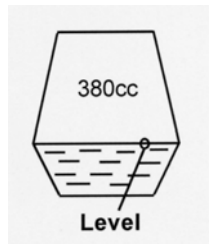
Washing your machine

Grease all your machine and optional parts after each time you wash your machine.

Gearbox

Gearbox oil level / quantity 380cc. Replace after 50hrs then once a year with EP90.

Note: Do not over tighten filler / drain plugs as this will damage gearbox casing.



PTO

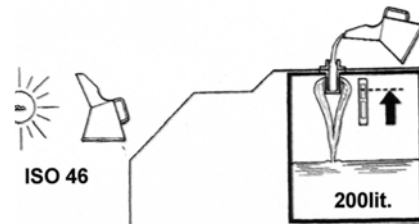
Dismantle; clean the input drive shaft sliding surfaces and re-grease, failure to do this will result in serious damage to the gearbox. Grease both U.J. joints every 8 hours.

Motor Drive - Direct Drive

Motor drive splines are lubricated via the rotor bearings and should be greased every 8 hours with 10-30 pumps of grease.

Oil requirements

Fill the tank to centre of sight gauge with approximately 200 litres of Texaco Rando HD46 or equivalent oil. Do not over fill.



Spearhead Excel 474 & Twiga 4000

Service & Maintenance

Hydraulic Hoses

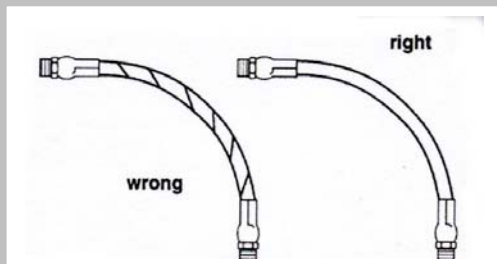
Carefully check condition of all hoses during routine service, paying particular attention to chafed outer casing. Securely wrap with waterproof adhesive tape to stop the metal braid from rusting.

Daily inspect all hydraulic hoses and fittings to be in good order. Any damages or leaks must be rectified immediately, this is part of the daily maintenance and it is your responsibility to help ensure a long reliable working life.

Hoses with damaged metal braid should be replaced.

When replacing hoses, quote number stamped on fitting at one end. The Spearhead hydraulic system works at very high pressure. Use only genuine hoses; a burst hose could be very dangerous.

Always replace hoses in exactly the same way they were removed, and to avoid twisting during fitting use two spanners to slacken and tighten.



Warning

Hose is weakened when installed in twisted position. Also, pressure pulses in twisted hose tend to fatigue wire and loosen fitting connections. Design so that machine motion produces bending rather than torsion.

Always check the yellow protective sleeving is in good order, replacing sleeving is far cheaper than replacing expensive hoses.

Hose warranty is limited to replacement of hoses due to faulty materials or manufacture. Warranty will not be considered on hoses damaged by chaffing, abrasion, cuts or pinching while in work, or to damaged threads due to over tightening.

Recommended torque settings for nut

| BSP (size) | Tightening (Nm) | Torque (lbs/ft) |
|------------|-----------------|-----------------|
| 1/4" | 24 | 18 |
| 3/8" | 33 | 24 |
| 1/2" | 44 | 35 |
| 1/4" | 84 | 62 |
| 1" | 115 | 85 |

Recommended torque settings for hose unions in conjunction with bonded seals

| BSP (size) | Tightening (Nm) | Torque (lbs/ft) |
|------------|-----------------|-----------------|
| 1/4" | 34 | 25 |
| 3/8" | 75 | 55 |
| 1/2" | 102 | 75 |
| 3/4" | 183 | 135 |
| 1" | 203 | 150 |

All hose connections are of a "Parker" soft seal type and only need 1/2 a turn more than finger tight to become leak proof. When dismantling, the hose should be manually flexed to relieve any pressure, and the retaining nut slackened before complete disassembly.

Spearhead Excel 474 & Twiga 4000

Service & Maintenance

Oil Supply

- Daily before starting up check oil level in tank reservoir.
- It is a good practice to constantly keep an eye on the tank level gauge, (this can be seen from the tractor seat) as a pipe burst could empty the tank within minutes.
- A pump or motor which is starved of oil will be damaged beyond repair.
- Replace oil if signs of contamination occur (discoloured)
- Contamination can be reduced by:
 - Thoroughly cleaning around reservoir cap before removing.
 - Using a clean container when replenishing the system.
 - Regularly servicing the filtration system.
 - Never allow oil level to fall below the sight gauge.
- Daily inspect all hydraulic connections and fittings. Any damage or leaks must be rectified immediately, this is part of the daily maintenance and it is your responsibility to help maintain a long reliable working life.
- When tightening fittings always use two spanners when necessary and do not over tighten. If a fitting persists in leaking it will need to be replaced.

Oil Recommendations

| Oil Supplier | Description |
|--------------|-------------------|
| Texaco | Rando HD 46 |
| | Rando HDZ 46 |
| Esso | Univis N 46 |
| Shell | Tellus 46 |
| | Tellus T46 |
| BP | Bartran 46 |
| | Energol HLP-HM 46 |
| Castrol | Hyspin AWH-M 46 |
| Total | Equivis ZS 46 |
| Elf | Hydrelf HV 46 |
| | Hydrelf XV 46 |

Filtration Maintenance

The machine is protected by a suction strainer and a full flow returns line filter.

1. The suction filter (inside tank) is permanently fixed in the reservoir tank. Should symptoms of pump cavitations or spongy operation occurs the tank must be drained, and the tank and suction filter thoroughly cleaned and dried before refilling with clean oil.
2. The return line filter element (top of tank) should be replaced after the first 50 hours and thereafter at 300 hour intervals. It is most important to replace the filter within these intervals because once blocked, oil will bypass the filter element un-filtrated, causing pump & motor damage
3. On hydraulic proportional controls only the mini filter (top of tank) must be replaced at 300 hour intervals.
4. If any failure or replacement of hydraulic parts have occurred then the return line filter must be replaced immediately.

Service & Maintenance

Flail Head

- Grease all bearings daily
- Check there is no wrapping of string, plastic, grass or other debris on rotor shaft and rear roller bearings.
- Check the condition of flails and ensure all retaining bolts are tight. When flails are replaced care must be taken to maintain balance of rotor shaft, do not change to a different type.
- Flail retaining bolt and nut torque setting is 200Nm.
- Flail head is supplied centre mounted to get best travel on crowd ram.
- Never operate with any flails missing. This will cause severe vibration and lead to rapid bearing wear and quickly cause the head to crack.
- Blunt flails leave an untidy finish and absorb excessive power, when re-sharpening always wear protective clothing and goggles.
- When flails are showing severe wear, damage or cracking, they must be replaced immediately. Never attempt to weld the flails, as this will make them very brittle and extremely dangerous. Do not take risks with flails, if in doubt replace.
- When replacing flails always replace bolts, nuts and bushes with new.
- Regularly check that all rotor bearing bolts and hydraulic motor retaining bolts are tight.
- With a new machine or if new bolts have been fitted, particular attention needs to be applied to regular tightening of the new bolts. (1hr - 4hrs then daily).

Service & Maintenance

Cables

Care should be taken during installation and operation to ensure the cables are not trapped or kinked.

Correctly adjusted cables will position the lever with equal amount of travel in either direction from neutral.

It is recommended to pack with grease all moving parts of cable operated spool valve, especially the motor control, to ensure reliability.

Pins & Bushes

All main pivot points are furnished with replaceable pins and bushes. If there are any signs of wear, these must be replaced. The pins are secured with a nut and bolt through the head to prevent turning. A retaining washer and screw are clamped to the base of the pin to prevent spreading and must be kept tight (use locking compound).

Storage

Before storing away, thoroughly wash the machine, removing all traces of grass and dirt.

Great care must be taken when washing with high pressure hoses, do not hold the water jet close to the paintwork. Use steam cleaners with caution; be sure to remove all detergents to avoid any discolouring or damage to paint. Lubricate all grease points until fresh grease shows. Slacken rotor drive belts (where fitted). It is important where possible to store undercover to protect against rain and sunlight. Always ensure a firm level surface. Control levers must be wrapped in plastic sheeting and taped over to keep dry.

Smear grease on all areas vulnerable to corrosion, in particular the chrome on the ramrods.

Remember: regular maintenance will greatly increase the life of the machine.



Warning

Regularly inspect the slew post and tank areas and remove any hedge trimmings which may have become lodged there. Failure to do this may cause damage to the machine's main lift ram.

Spearhead Excel 474 & Twiga 4000

Service & Maintenance

Torque Settings

The Torque figures given below are recommended maximum settings only.

| Size: | Tensile strength: | Description: | Torque setting: Nm: |
|-------|-------------------|--------------------|------------------------|
| M10 | 8.8 | General fasteners | 65 |
| M12 | 8.8 | General fasteners | 114 |
| M12 | 12.9 | Head bolts | 170 |
| M14 | 10.9 | Flail bolts | 200 |
| M16 | 8.8 | Head bracket bolts | 280 |

Regular Service Chart

| Service Hours | Service points | Page | Grease | Drain | Check | Clean | Change |
|---------------|---|------|--------|-------|-------|-------|--------|
| 1 – 4 hrs | Nuts and Bolts are fully tightened | | | | X | | |
| | Condition of flails | 36 | | | X | | |
| | Condition of hoses especially for chafing | 34 | | | X | | |
| | Flail bolts are fully tightened | 36 | | | X | | |
| | Flail head retaining bolts are fully tightened | | | | X | | |
| | Gearbox seals (If oil is leaking replace immediately) | | | | X | | (X) |
| | Inspect leaks from fittings and pipes | 34 | | | X | | |
| | Pins and bushes | 37 | | | X | | |
| | Rotor bearing bolts are fully tightened | | | | X | | |
| 8 hrs | Bearings | 33 | X | | | | |
| | Gearbox & pump bolts are fully tightened | | | | X | | |
| | Gearbox oil level | 33 | | | X | | |
| | Grease points & PTO shaft | 33 | X | | | | |
| | Oil level in reservoir | 33 | | | X | | |
| | U.J. joints | 33 | X | | | | |
| 50 hrs | Gearbox oil (use EP 90 oil) | 33 | | X | | | X |
| | Return line filter element | 35 | | | | | X |
| 250-300 hrs | Mini filter | 35 | | | | | X |
| | Remove cable controlled spool | 37 | X | | | | |
| | Motor drive | 33 | X | | | | |
| | Return line filter element | 35 | | | | | X |
| | Hydraulic oil if any signs of contamination appears | 35 | | X | X | | |

Spearhead Excel 474 & Twiga 4000

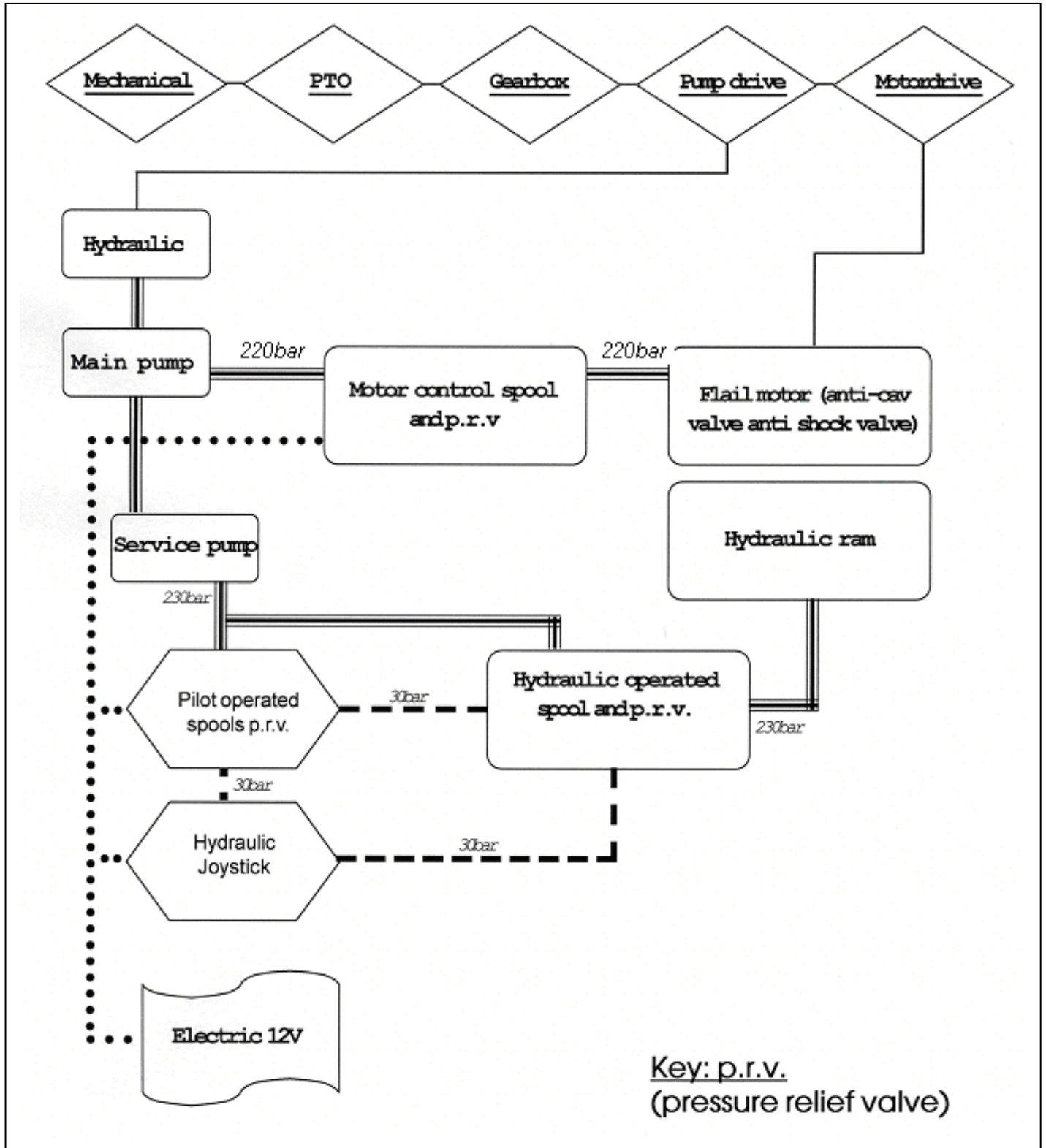
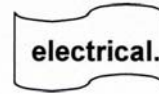
Trouble Shooting Excel

In the event of your machine not functioning correctly you will need to

Identify the type of failure



or



Spearhead Excel 474 & Twiga 4000

Trouble Shooting Excel

| Problem | Cause | Solution |
|------------------------|---|--|
| Gearbox overheating | Oil level incorrect | Check oil level |
| | Oil grade incorrect | Check oil grade |
| | Implement overloaded | Reduce forward speed |
| | Wrong PTO speed | Ensure tractor PTO speed matches implement |
| P.T.O. wear UJ failure | Working angle too great | Reduce offset of implements |
| | Shaft incorrect length i.e. bottoming out | Resize PTO shaft as recommended |
| | Lack of maintenance | Grease PTO shaft as recommended |
| Cut Quality | Flails worn | Replace worn flails |
| | Rotor speed/direction | Check tractor PTO speed |
| | Crop condition | Look for suitable conditions |
| Rotor bearing failure | Rotor out of balance | See rotor vibration |
| | Wire/string in bearing | Remove wire/string |
| | Lack of maintenance | Grease bearings to schedule |
| | Water in bearing | Expel water with grease |
| Rotor vibration | Flails broken or missing | Replace flails |
| | Bearings worn or damaged | Replace bearings |
| | Rotor bent | Re-balance/replace rotor |
| | Build up of debris | Remove debris |
| | Incorrect speed | Check rotor R.P.M. |
| Oil tank overheating | Oil level incorrect | Fill tank to correct level |
| | Oil grade incorrect | Drain and refill tank with correct grade oil |
| | PTO speed too fast | Ensure the tractor's PTO speed matches implement |
| | Ambient temperature too high | Reduce work rate / install oil cooler |
| | Machine overloaded | Reduce forward speed or increase height of cut |

Spearhead Excel 474 & Twiga 4000

Trouble Shooting Excel

| Problem | Cause | Solution |
|--|--|--|
| Break-back operating Frequently | Machine overloaded | Reduce forward speed or increase height of cut |
| | Machine being used on excessive incline | Find more suitable conditions |
| | Weight of machine being carried upon rear roller | Use head float |
| | Machine not set vertical | Shorten top link |
| Electrical switches not responding | Faulty supply from tractor | Check supply from your tractor fuse and connections |
| | Switch exposed to water | Store your machine under cover |
| Hydraulics not responding | Oil level low | Fill oil to correct level |
| | Oil pump suction filter blocked | Replace filter element |
| | Oil leak in pressure line | Check machine of leaks |
| | Drive line broken | Check pump is rotating |
| Joystick control sluggish | Air in pilot lines from joystick | Slacken off each line of pilot circuit individually at spool valve whilst operating. When all air is expelled retighten the line |
| Irregular arm movement | Spool contacting with housing | Check spool is free moving |
| | Broken spring in spool valve | Check spring |
| | Failed ram seals | Repair ram |
| Electrically operated valve not responding | Faulty wiring | Check wiring and switches |
| | Dirt in valve | Check of ingress of dirt |
| | Sticking valve | Replace the valve |
| | Insufficient voltage | Attend to bad connection |

Pump & Motor Failure

There are many reasons for pump and motor failure, cavitations (suction of air), peak pressure, contamination. These can be avoided by the following:

- Never run out of oil
- Never run a cold machine straight up to speed, ensure the engine idle speed before engage/disengage the head motor.
- Never increase or decrease engine speed quickly
- Regularly check that suction hose and pump fittings are tight.
- Never stop or start the rotor at 540r.p.m.
- Never cause sudden movements to the arms via your controls or bumps in the ground as pressure spikes will be transmitted back to the pump, resulting in failure.
- Avoid striking the rotor on obstacles i.e., road gullies as this causes pressure spikes.
- Never transport the machine with the PTO in gear.
- Never select 1000 speed gear for economy, start up speed is too high.
- Never operate above recommended PTO speed 540r.p.m. and risk over heating.

Remember: pump and motor warranty is limited to replacement due to faulty materials or manufacture. Cavitations, contamination and peak pressures are easily detected on inspection, warranty will not be considered if failure is due to misuse.

The Spearhead Warranty

Spearhead warrants that the Spearhead machine referred to in the Warranty Registration Form will be free from defects in materials and workmanship for a period of 12 months from the date of sale. This warranty does not affect your statutory rights, but merely adds to them. Should you have a problem within 12 months from the date of sale please contact your original Spearhead dealer, or Spearhead's Service Department. Any part found to be defective during this period would be replaced or repaired, at Spearhead's discretion, by the dealer or a Spearhead Service Engineer.

Spearhead Warranty Conditions

1. The Warranty Registration Form must be completed and returned to Spearhead within 30 days of the date of sale.
2. This warranty does not cover defects arising from fair wear and tear, willful damage, negligence, misuse, abnormal working conditions, use in competition, failure to follow Spearhead's instructions (oral or written, including all instructions and recommendation made in the Operator's Manual) or alteration or repair of the machinery without Spearhead's approval.
3. The machinery must have been serviced in accordance with the Operator's Manual and the Service Log must have been kept up to date and made available to the dealer should service, repair or warranty work be undertaken
4. This warranty does not cover claims in respect of wearing parts such as blades, flails, paintwork, tyres, belts, hydraulic hoses, bearings, bushes, linkage pins, top links, ball ends unless there is a manufacturing or material defect or the cost of normal servicing items such as oils and lubricants.
5. This warranty does not cover any expenses or losses incurred whilst the machinery is out of use for warranty repairs or parts replacement.
6. This warranty does not extend to parts, materials or equipment not manufactured by Spearhead, for which the Buyer shall only be entitled to the benefit of any such warranty or guarantee given by the manufacturer to Spearhead. Only genuine Spearhead replacement parts will be allowable for warranty claims.
7. All parts replaced by Spearhead under warranty become the property of Spearhead and must be returned to Spearhead if Spearhead so request. Such parts may only be disposed of after a warranty claim has been accepted and processed by Spearhead.
8. Spearhead is not liable under this warranty for any repairs carried out without Spearhead's written consent or without Spearhead being afforded a reasonable opportunity to inspect the machinery the subject of the warranty claim. Spearhead's written consent must, therefore, be obtained before any repairs are carried out or parts replaced. Use of non-Spearhead parts automatically invalidates the Spearhead Warranty. Failed components must not be dismantled except as specifically authorised by Spearhead and dismantling of any components without authorisation from Spearhead will invalidate this warranty.
9. All warranty claims must be submitted to Spearhead on Spearhead Warranty Claim Forms within 30 days of completion of warranty work.

Using the machine implies the knowledge and acceptance of these instructions and the limitations contained in this Manual.

Extended Warranty

As an extension to the 12-month warranty set out above, Spearhead will provide an additional 12-month warranty cover subject to the Spearhead Warranty Conditions above and the Extended Warranty Conditions below.

Extended Warranty Conditions

1. The extended warranty applies to hydraulic pumps, motors, valves and gearboxes only. It does not apply to other parts, to consumables such as lubricants, seals or filters or to labour charges.
2. The machinery must have had an annual service carried out by an Authorised Spearhead Dealer or a Spearhead Service Engineer within 1 month of the first anniversary of the date of sale and the Service Report form must have been completed and stamped by the servicing dealer or Spearhead Service Engineer and sent to Spearhead within 14 days after the first annual service.
3. The extended warranty does not cover costs of transportation of the machinery to or from the dealer or Spearhead or the call out costs or traveling expenses of on-site visits.

Transfer of Warranty

The Spearhead warranty may be transferred to a subsequent owner of the machinery (for use within the UK) for the balance of the warranty period, subject to all of the warranty conditions and provided that the Change of Owner form is completed and sent to Spearhead within 14 days of change of ownership.

Spearhead reserves the right to make alterations and improvements to any machinery without notification and without obligation to do so.