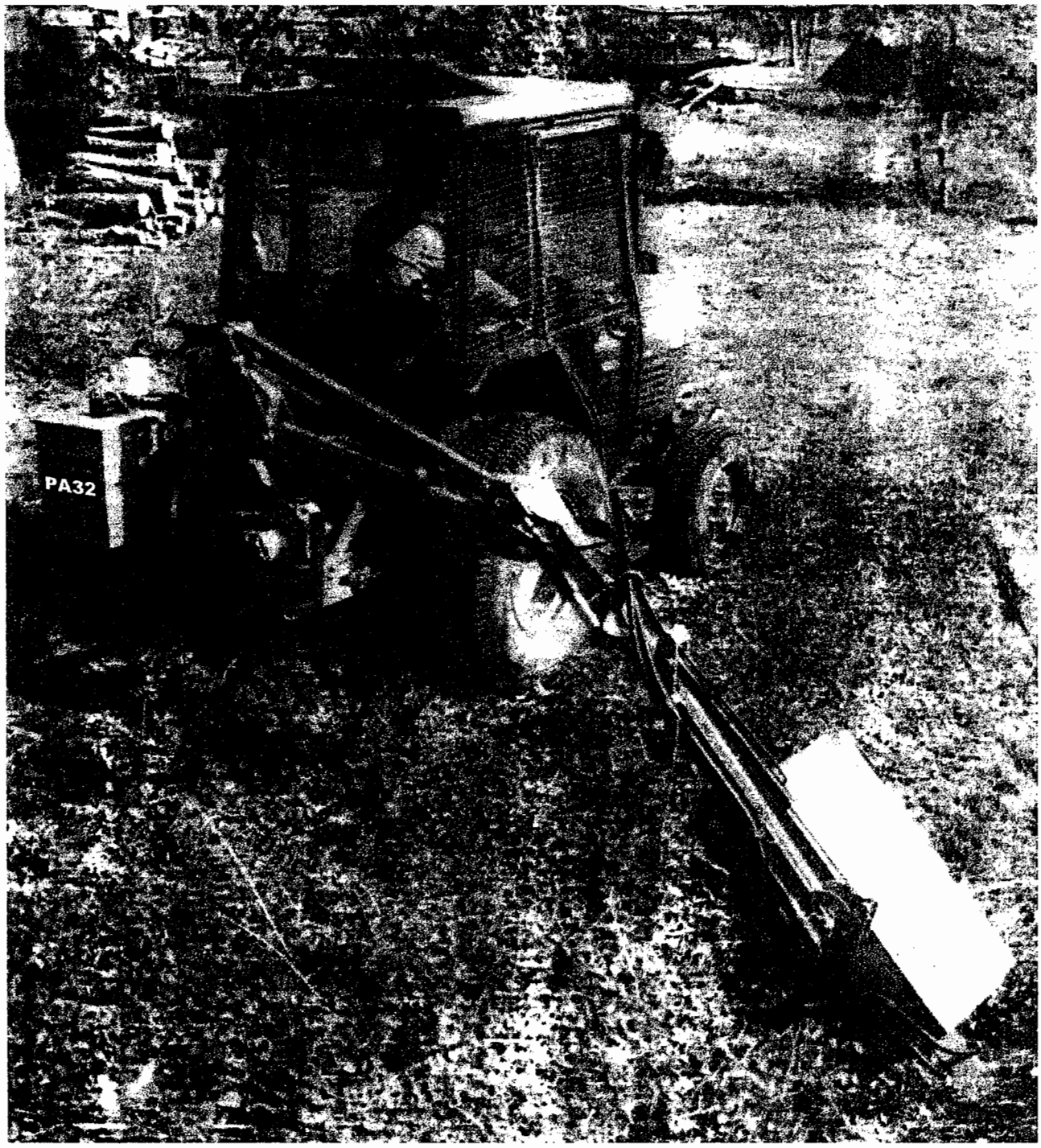
August 2001
Part No. 41570.10

# PA 32

## HEDGE/GRASS TRIMMER

McCONNEL

# *Operator Manual*



## READ THE BOOK FIRST

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

*When ordering spare parts always quote*

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

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

## NOISE

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

# LIST OF CONTENTS

# Notes

# INTRODUCTION

## PA32 - *all models*

- **Linkage mounted**
- **Right of left hand cutting**
- **Operator guard**
- **Hydraulic breakaway return**
- **65 litre/14 gallon hydraulic reservoir**
- **Cable controls**

## PA32 *Si* *(semi independent models)*

- **Semi independent hydraulics - *tractor power for arm movements,***
  ***- P.T.O. pump for rotor or cutterbar.***
- **Rotor or cutterbar engagement by tractors P.T.O. lever.**
- **Choice of 1.5m cutterbar or 0.9m flailhead.**
- **20 Hp single pump hydraulic system.**

## PA32 *Ti* *(totally independent models)*

- **Totally independent hydraulics**
- **0.9m flail only**
- **Independent reversible Rotor on/off valve.**
- **20 Hp tandem pump hydraulic system.**
- **Option of lift float.**

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

***Use only McConnel Genuine spare parts on McConnel equipment and machines.***

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

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

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

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

### *LEFT AND RIGHT HAND*

This term is applicable to the machine when fitted to the tractor and viewed from the rear. This also applies to tractor references.

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

# SAFETY PRECAUTIONS

## WARNING

- **Always** ensure that the tractor is fitted with an operator protection guard and it is so positioned that the operator is always looking through it at the flail head whatever its position.
- Add sufficient front weights where required to maintain tractor/machine stability. Drive slowly to prevent front wheels bouncing.
- Set tractor wheel widths as wide as required to maintain sideways stability in all working conditions.
- Operate the machine **only** on a tractor fitted with a roll over protection system. Wear seat belts if fitted. **Do not** alter the R.O.P.S. structure.
- Make sure the P.T.O shield is installed when using P.T.O. driven equipment, and **always** replace the P.T.O. shield if damaged.
- **Always** wear 'Hard hats', safety glasses and safety footwear.
- **Never** allow inexperienced or untrained personnel to operate the tractor/mower combination without supervision.
- **Always** read and understand the instruction manual first. If anything is unclear consult your dealer or McConnel direct.
- **Always** familiarise yourself with the controls in a clear area before commencing work.
- **Always** engage all transport devices fitted. *(See operator manual for details).*
- **Always** familiarise yourself with the local highway regulations and abide by them at all times.
- **Never** transport the machine even for a short distance with the flails rotating.
- **Never** transport or operate on steep slopes. If working across slopes turn very slowly.
- **Always** operate the machine at the recommended P.T.O. speed. **Never** exceed the maximum permitted.

# SAFETY PRECAUTIONS

## WARNING

- **Ensure** the work area has been inspected and any dangerous or loose items are removed and that all flail head guards are in position and in good condition.
- **Never** allow the flails to contact hard immovable objects or to become entangled in wire.
- **Never** allow riders on the tractor. Never lift a person with the Boom or Mower Head. KEEP BYSTANDERS CLEAR.
- **Inspect** all machine parts regularly and maintain in safe working condition.
- **Always** take extreme care when working around overhead obstructions. When working close to overhead power lines consult your electric company for a safe code of operation.
- **Always** take extreme care when folding the machine to cut close in as the mower head can contact the tractor in some situations.
- **Never** attempt to use the arms for any other purpose than manoeuvring the flail head or cutterbar.
- **Never** allow anyone to stand close to the arms during operation.
- **Do not** operate machine with high-pressure oil leaks. **Never** test for oil leaks with your hand, use cardboard. If high-pressure oil contacts the skin seek medical assistance instantly.
- **Never** continue to operate the machine if a damaged or lost flail is causing vibration.
- **Always** select 'Rotor off' before disengaging P.T.O. driveshaft on totally independent (Ti) models.
- **Never** cut over the far side of a hedge with the flails cutting towards the operator.
- **Never** become complacent and ignore any safety instructions.
- **Always** select 'Rotor off', disengage the P.T.O., switch off tractor and wait for the flail to stop rotating before leaving the tractor seat.

# SAFETY PRECAUTIONS

## WARNING

- **Always** check all nuts, bolts, hoses and other fixings **daily** for tightness, security and damage. Repair immediately if required.

- Should wire become entangled in the rotor despite all precautions **always** remove it by unwinding by hand or by using shears. **Never** attempt to unwind it by reversing the rotor.

- **Always** replace a lost or damaged flail together with its opposite one in pairs as soon as possible.

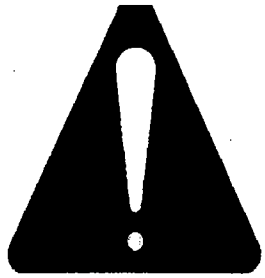
- **Never** work or walk under a raised boom or head unless it is independently supported. On cable control machines exhaust all rams by operating the levers several times before starting maintenance works.

- **Always** read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers and any other chemical agent.

- **Always** maintain the safety decals in good readable condition. If the decals become damaged or unreadable, reorder them immediately.

- Although designed to be as safe as possible flails and cutterbars are still dangerous. **Always** be aware of the potential hazards and operate with care and responsibility.

- If operating without a quiet cab or with the cab windows open **always** wear ear defenders.



**WARNING**

## FLAILHEADS

- **Never** allow the flails to contact hard immovable objects or to become entangled in wire.
- **Never** continue to operate the machine if a damaged or lost flail is causing vibration.
- **Never** cut over the far side of a hedge with the flails cutting towards the operator.
- Should wire become entangled in the rotor despite all precautions always remove it by unwinding by hand or by using shears. **Never** attempt to unwind it by reversing the rotor.
- **Always** replace a lost or damaged flail together with its opposite one in pairs as soon as possible.

## CUTTERBARS

- Always at all times keep fingers away from the cutter knife as it can be operated by movement of the crankshaft flywheel caused by gravity, even though the tractor engine is switched off.
- When clearing any blockage always lay the cutterbar flat on the ground, switch off the tractor engine and remove the key, clamp the cutter knife firmly and remove the blockage using a suitable tool.

## P.T.O. DRIVE SHAFT SAFETY PRECAUTIONS

### ON EACH TRACTOR CHECK:

- **All** machines
- **Ensure** the correct end of the driveshaft is fitted to the tractor. See labels on the drive shaft.
- **Check carefully** that the drive shaft does not 'bottom out' and that a minimum of 6" (150mm) of engagement is maintained.
- **Ensure** that the guards are always in position, can rotate freely and the check chains are not stretched when the machine is raised or lowered.
- **Check** that when, in the continuous working position, the drive shaft is not at an angle of more than 20 degrees to the P.T.O. centre line.
- **Ensure** the drive shaft does not foul the tractor P.T.O. guard, the gearbox-input shield or the tractor draw bar.

# FITTING
## TRACTOR SELECTION

**Linkage requirements**
Tractor must be equipped with Category 1 Linkage.

**Linkage isolation**
A linkage isolation facility is necessary for Si models **only.**

**Check chains/stabilisers**
Check chains or stabiliser **bars** must be fitted and tightened.

**Tractor relief valve**
For Si models only tractor relief valve must be set above 160 Bar (2300 PSI).

**Tractor hydraulic flow rate**
Hydraulic flow rates are not crucial for Si models

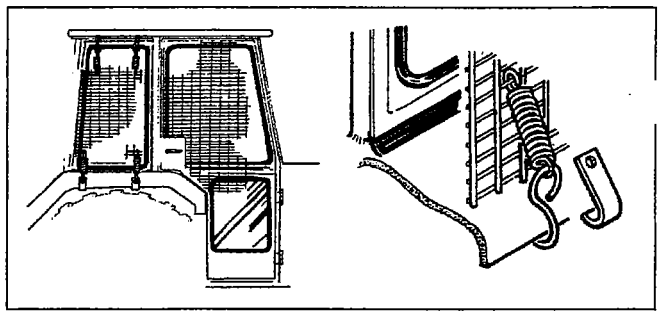
**P.T.O. shaft**
Tractor must be equipped with live drive independent PTO shaft to enable forward movement to be halted while the flail head continues to operate.

**Horse power requirements.**
25 h.p. min PA32 with cutterbar
30 h.p. min PA32 with flail head

**Stability requirements**
PA32 with cutterbar:- 750 kg min tractor weight including front ballast.

PA32 with flail head:-,850 kg min tractor weight including front ballast and with a minimum outside tyre width of 1.4m.

## TRACTOR PREPARATION



**Fitting Tractor Guard:** Use tractor with safety glass windows if possible and 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 tractor/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.

**Wheel Width:** Set wheel widths as wide as possible.

**Lift Links:** Adjust lift links until they are equal length.

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

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

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

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

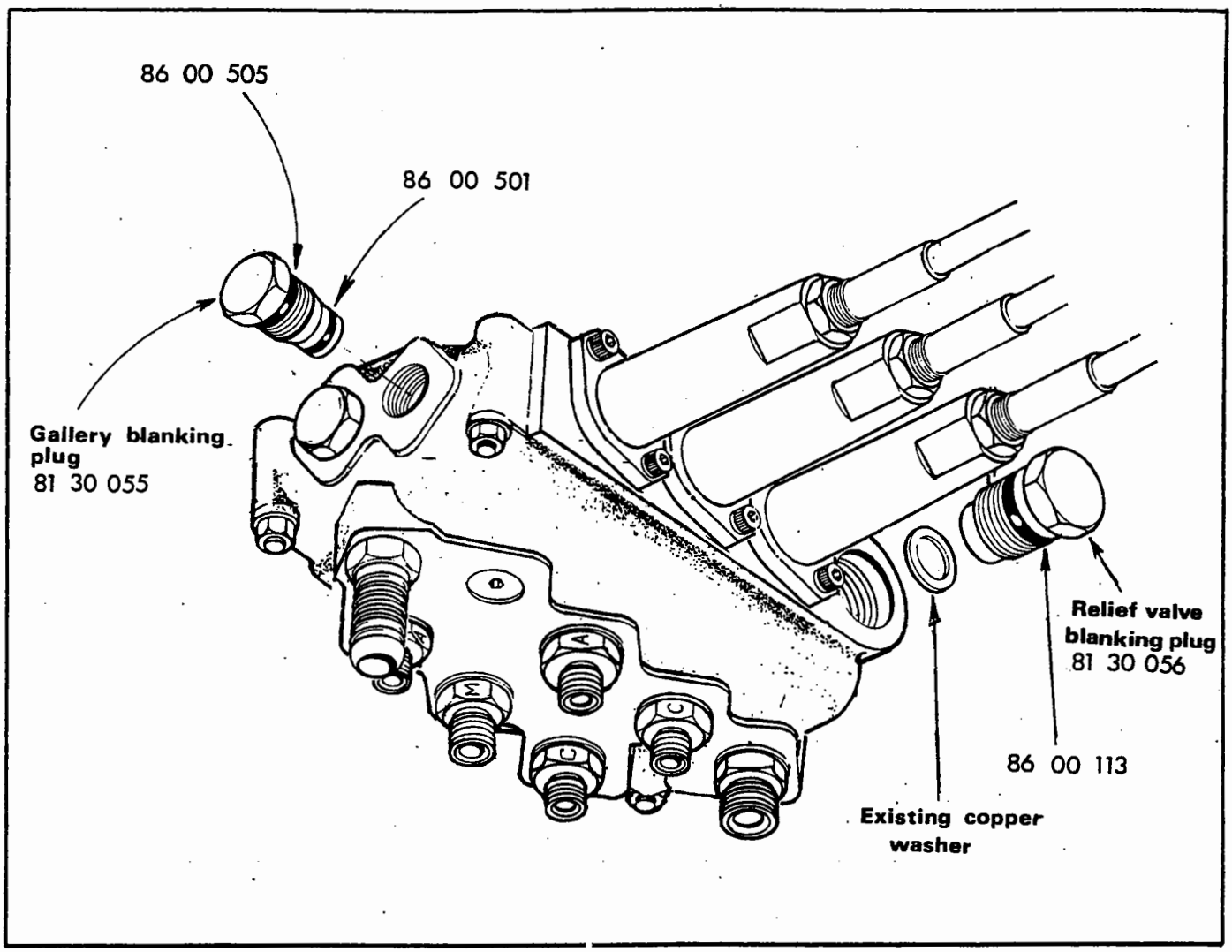
**Factors that effect stability:**

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

**Suggestions to increase stability:**

- *Increasing rear wheel track; a tractor with a wider wheel track is more stable.*
- *Ballasting the wheel; it is preferable to use external weights but liquid can be added to around 75% of the tyre volume – water with anti-freeze or the heavier Calcium Chloride alternative can be used.*
- *Addition of weights – care should be taken in selecting the location of the weights to ensure they are added to a position that offers the greatest advantage.*
- *Front axle locking; a ram can be used to 'lock' the front axle in work only – locking the axle moves the 'balance line' and can be used to transfer weight to the front axle from the rear (check with tractor manufacturer).*

The advice above is offered as a guide for stability only and is not a guide to tractor strength - it is therefore recommended that you consult your tractor manufacturer or local dealer to obtain specific advise on this subject, additionally advice should be sought from a tyre specialist with regard to tyre pressures and ratings suitable for the type and nature of the machine you intend to fit.




## CLOSED CENTRE CONVERSION KIT 81 30 059 for S.i. models only

A control valve conversion kit Part No. 81 30 059 consists of a relief valve blanking plug which should be installed in place of the existing relief valve and a pressure gallery blanking plug which is installed in place of the standard blanking plug at the valve outlet end next to the lift ram gland connection.

Take care when extracting the relief valve not to damage the copper sealing washer as it is re-used.

When working in this mode the tractor's pressure control valve must not exceed 2500 P.S.I. (170 Bar).

## Tank

The machine is delivered from the factory without oil. Fill the reservoir with a light hydraulic oil as recommended in the chart until the oil level is approximately 3" below the top of the tank. The total capacity is approximately 65 litres (14 galls). Do not overfill.

| Supplier | Cold or temperate climate | Hot climate |
|---|---|---|
| Castrol | Agricastrol hydraulic oil Hy-spin AWS46 | Hy-spin AWS68 |
| Shell | Tellus 46 | Tellus 68 |
| Mobil | D.T.E. 25 | D.T.E. 26 |
| Esso | Nuto 'H' or 'A' 46 | Nuto 'H' or 'A'68 |
| Texaco | Rando HD 46 | Rando HD 68 |
| Gulf | Hydrasil 46 | Hydrasil 68 |
| B.P. | Energal HLP 46 | Energal HLP 68 |
| Dalton | Silkolene Dove 46 or Derwent 46 | Silkolene Dove 68 |
| Elf | Hydrelf 46 | Hydrelf 68 |
| ISO VG | 46 | 68 |
| SAE | 10W | 20 |

## Gearbox

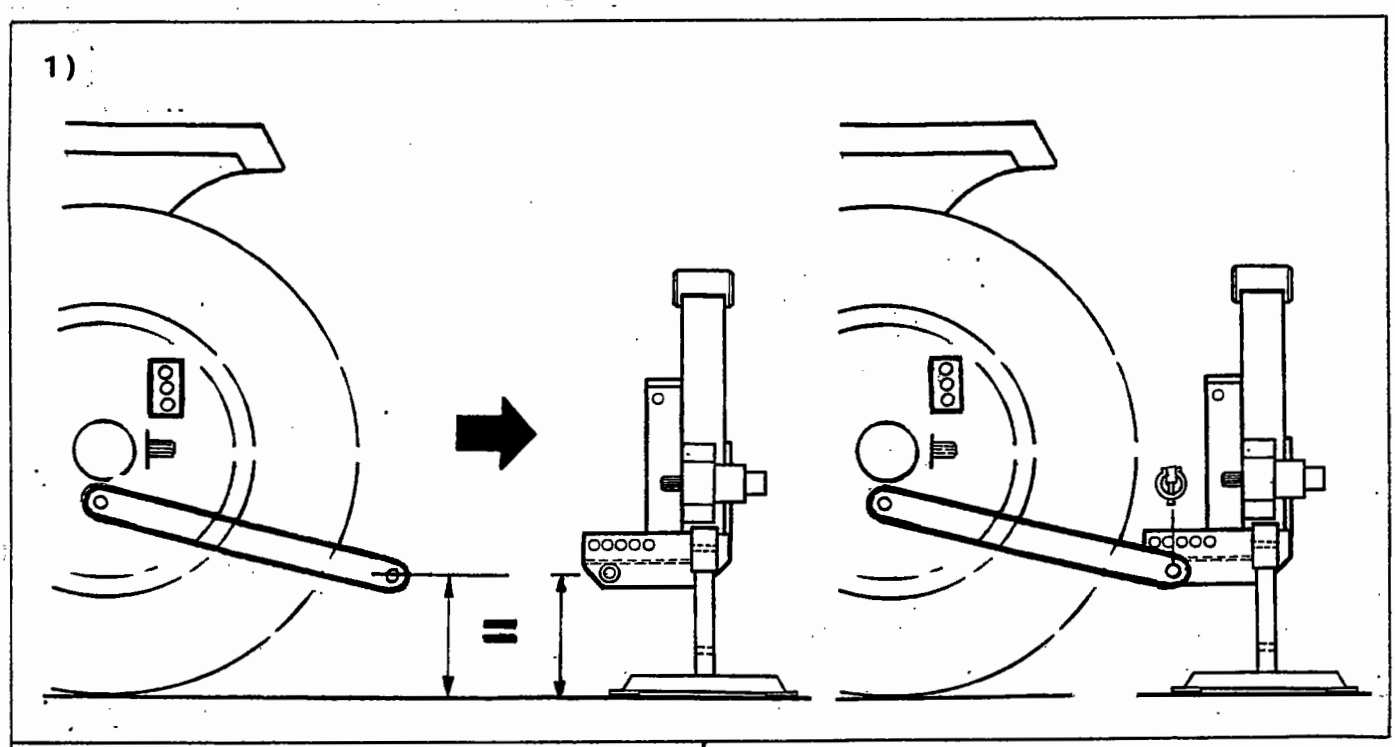
Check the gearbox oil level. On level ground it should be filled until oil is visably level with the lip of the filler plug aperture. Do not attempt to fill by removing the breather as the depth of tapped thread in the casing at this point is insufficient to allow repeated loosening and tightening of the breather plug.

The gearbox capacity is 700 millitires (1 1/4 pint use EP 90 gear oil.

## ATTACHMENT TO TRACTOR

Before commencing select a firm level site, cut the banding straps and remove loose items and the stabiliser. Leave the transport straps at this stage.

1)



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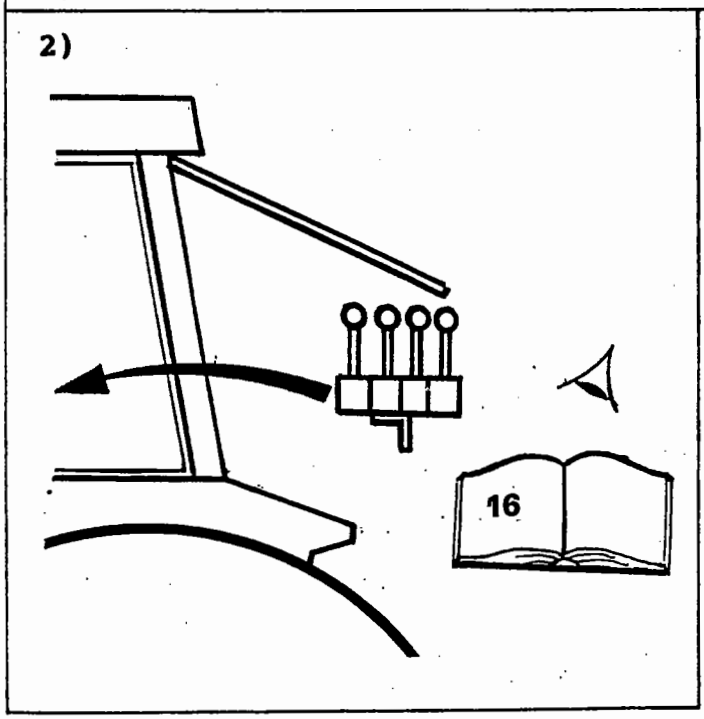
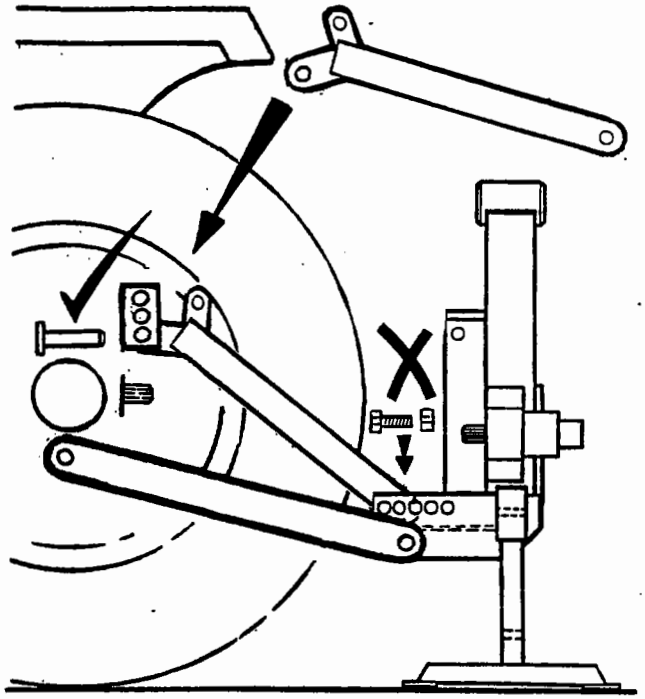
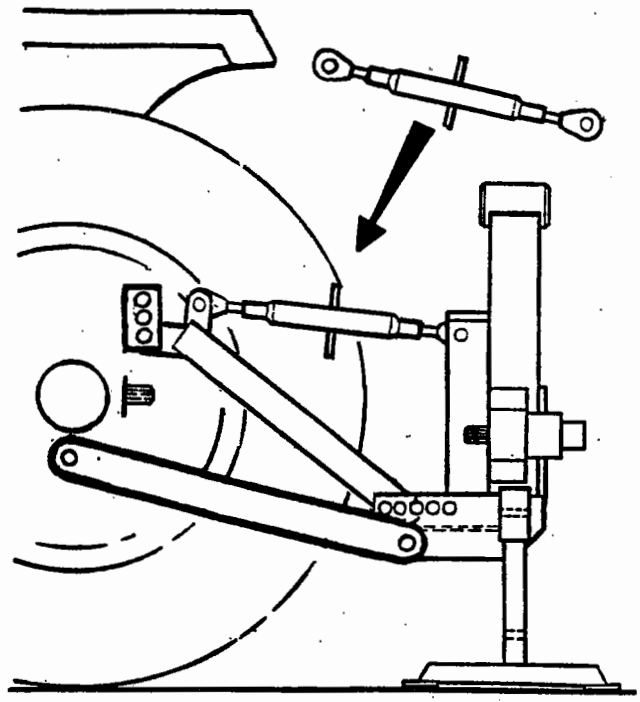



3) Si only

Connect supply and return hoses to tractor. Supply is taken from the tractors auxiliary service. Return is direct to the tractors transmission casing (see tractors handbook for correct procedure). Extra hoses and fittings may be required.





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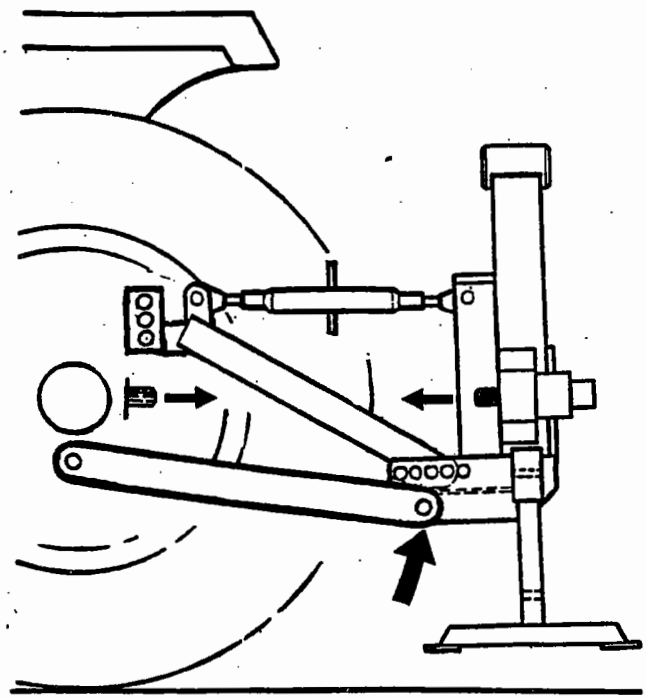
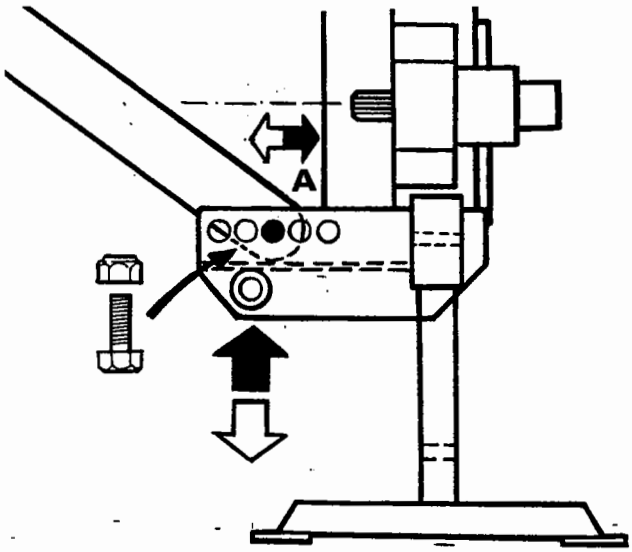


**WARNING**

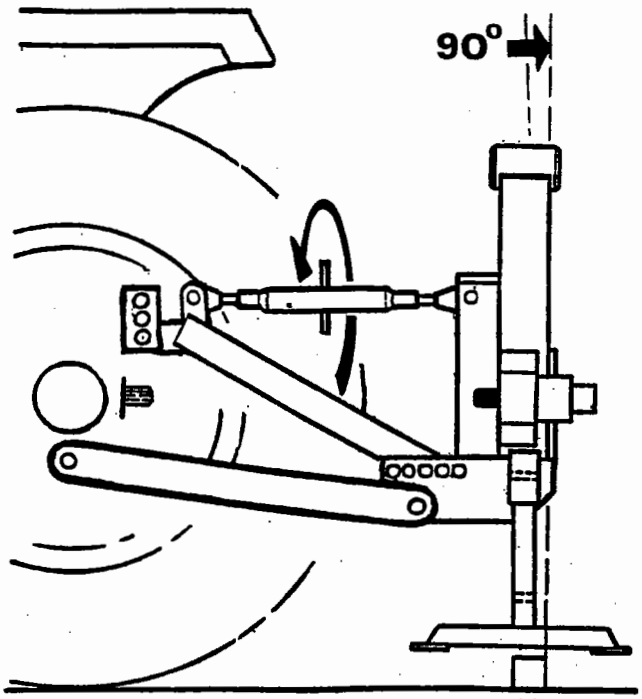
The quadrant lever or machine controls must be operated from the tractor seat. During this operation ensure no one is standing on or amongst the linkage arm or bars.

Note:
As lift occurs be aware the machinery may tilt slightly.




7) Fine adjust 'A'.
Use the mounting hole that allows the PTO and gearbox stub shaft to as nearly as possible in alignment.

8) Lower tractor linkage control so that machines weight is taken by the yoke and :-

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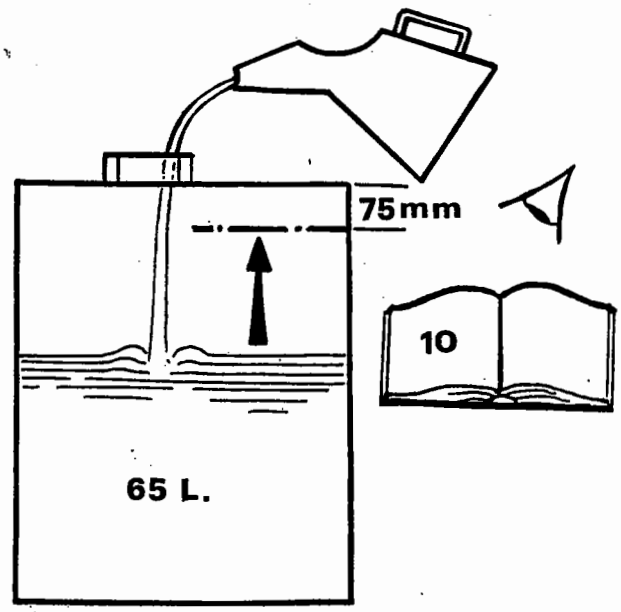


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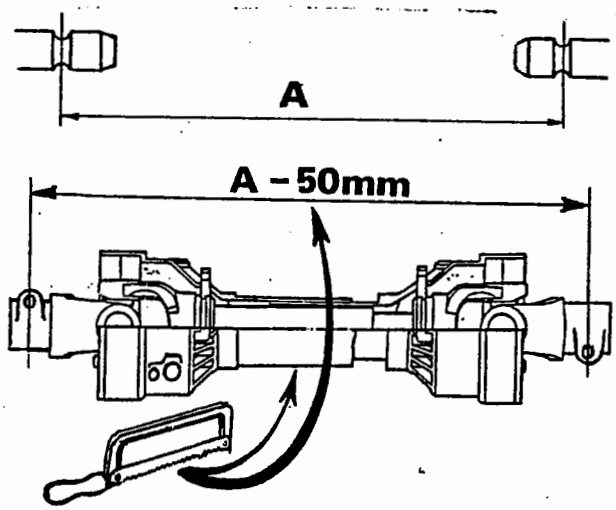
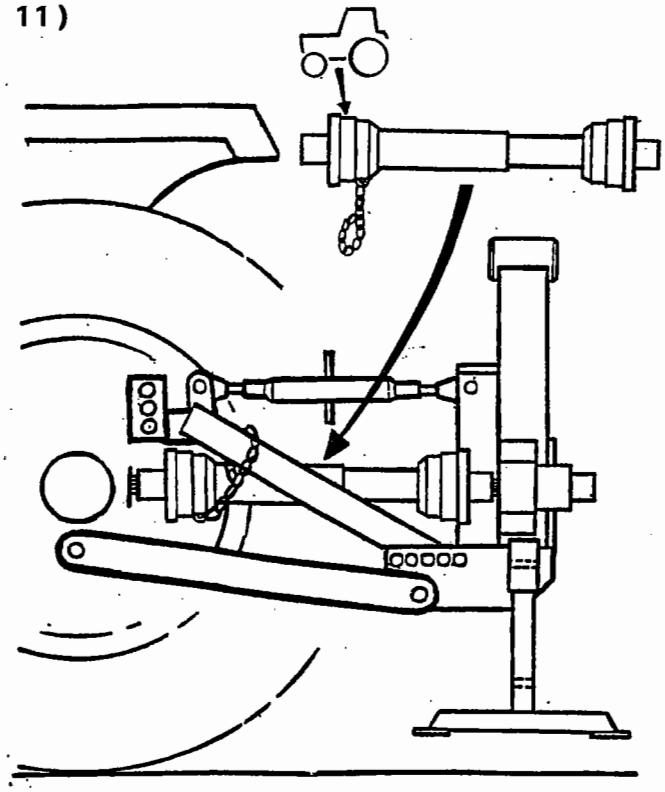


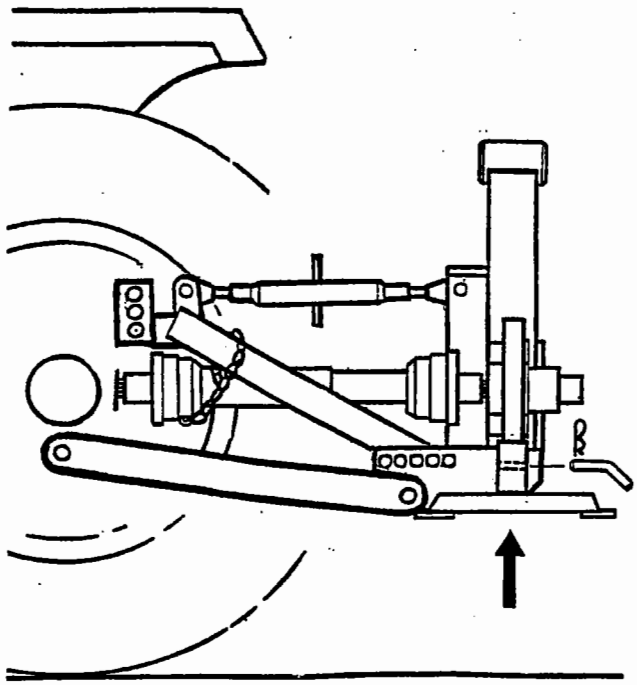

Measure 'A'.
Cut PTO shaft equal amounts of both halves to measure. A - 50mm when fully closed.

11)



Fit PTO shaft and attach torque chain to a convenient point to prevent the shaft guard rotating.

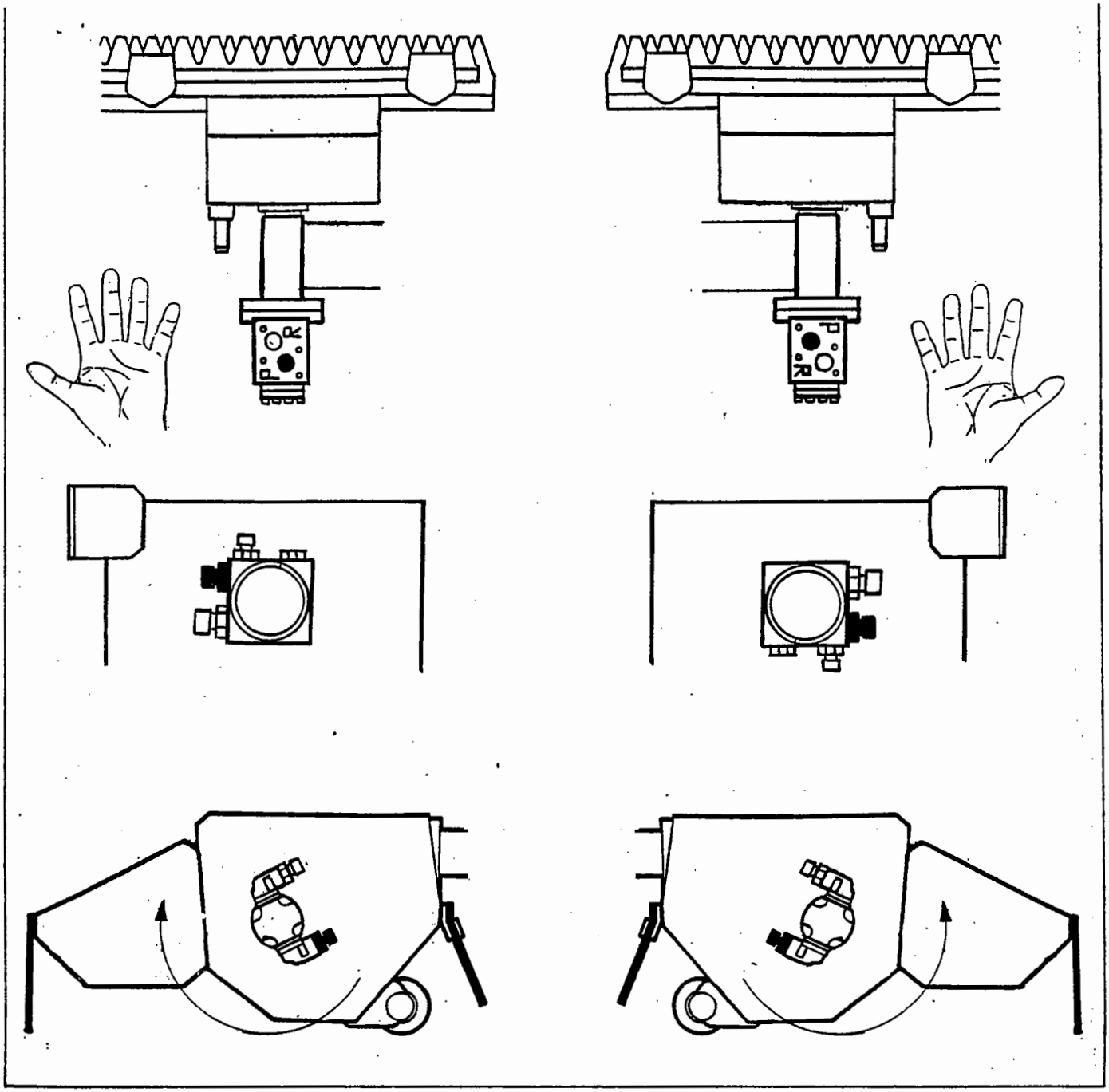
12)



13) Remove transport strap.

14) With tractor external services activated on Si models or with PTO engaged on Ti models manoevre the arms into a position that will allow the cutter head to be fitted. Fill cutter head and secure with circlip, washers and split pin.

15) Cutterbar only
Engage motor splines in the drive tube and bolt in position with connection uppermost.



17) Carry out final adjustment of the tractor lift arm levelling box to bring the main frame horizontal. This should be checked at half reach with cutter head clear of the ground.

18) Tighten check chains/stabiliser bars.

19) Carefully operate the machine through its full range of movements whilst checking that hoses are not strained, pinched, chafed or kinked and that all movements are functioning correctly.

20) Fold machine into the transport position (see page22). The machine is now ready to transport to the worksite.

## FITTING CONTROL UNIT IN CAB

An angled bracket is supplied to provide a mounting location for the control unit.

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

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

When the control unit is removed from the cab ensure the rubber edge strip is fitted to the mounting bracket to cover any possible sharp edges.

**Ti models only - with flail head only.**

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

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

Place the flail head at a safe attitude and move the rotor control to "START" position. After initial fluctuation the rotor should settle to a steady speed. Increase P.T.O. speed to approximately 360 rpm. and run for a further five minutes before disengaging and stopping tractor.

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

**Si models only - with cutterbar or flail head.**

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

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

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

On cutterbar models ensure the motor hoses are connected correctly - see page .

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

**Caution**

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

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

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

DANGER

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

THE ORDER OF THE FOLLOWING STEPS **MUST** BE FOLLOWED **EXACTLY**

DISCONNECTING THE TOP LINK **MUST** BE THE **LAST** OPERATION PRIOR TO DRIVING THE TRACTOR AWAY FROM THE MACHINE

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

Select a firm level site for parking the machine.

Lower the parking legs and secure.

Operate the hydraulic service to place the arms at half to three quarters reach and with the flail head roller or cutterbar horizontal and level with the bottom of the parking feet.

Disengage tractor P.T.O. and remove.

Disconnect stabilizer bars or loosen check chains as applicable.

Unbolt the control unit from the mounting pillar, remove from tractor cab and stow in a suitable location clear of the ground. On Si models only the supply and return hoses must be disconnected from the tractor and stowed with their ends covered and clear of the ground.

Raise the machine on the tractors linkage to take the weight off the yoke and remove the lower yoke bolts.

Lower the tractor draft links and place machine firmly on the ground.

Remove draft links and top link from the machine, drive tractor away and remove yoke.

**STORAGE**

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

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

## MATERIAL THICKNESS CUTTING LIMITATIONS

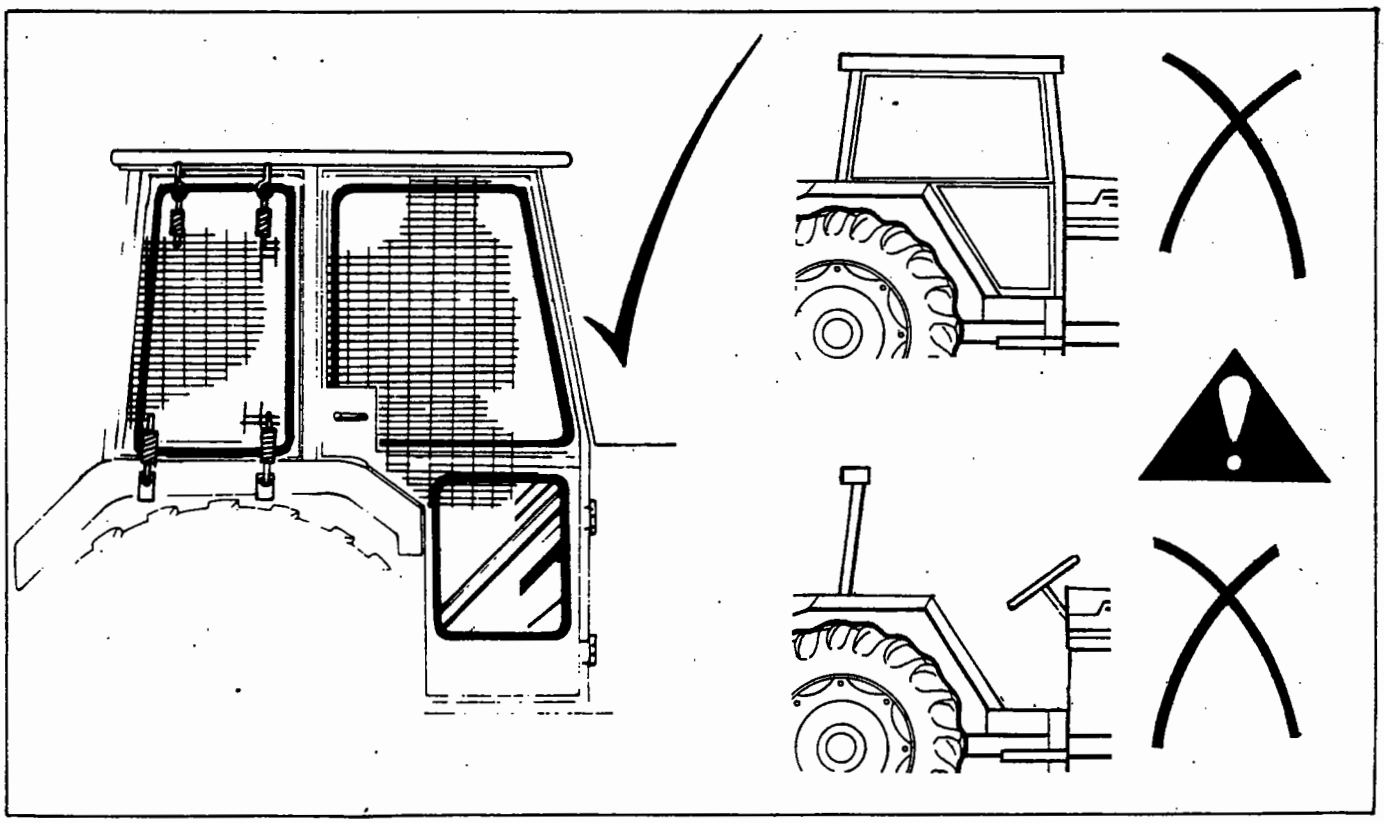
**Flailhead**


**Cutterbar**

The cutterbar is light trimming tool.

Attempting to cut unsuitable material will cause the knife to stall resulting in motor's relief valve blowing and overheated oil.

## OPERATOR GUARD

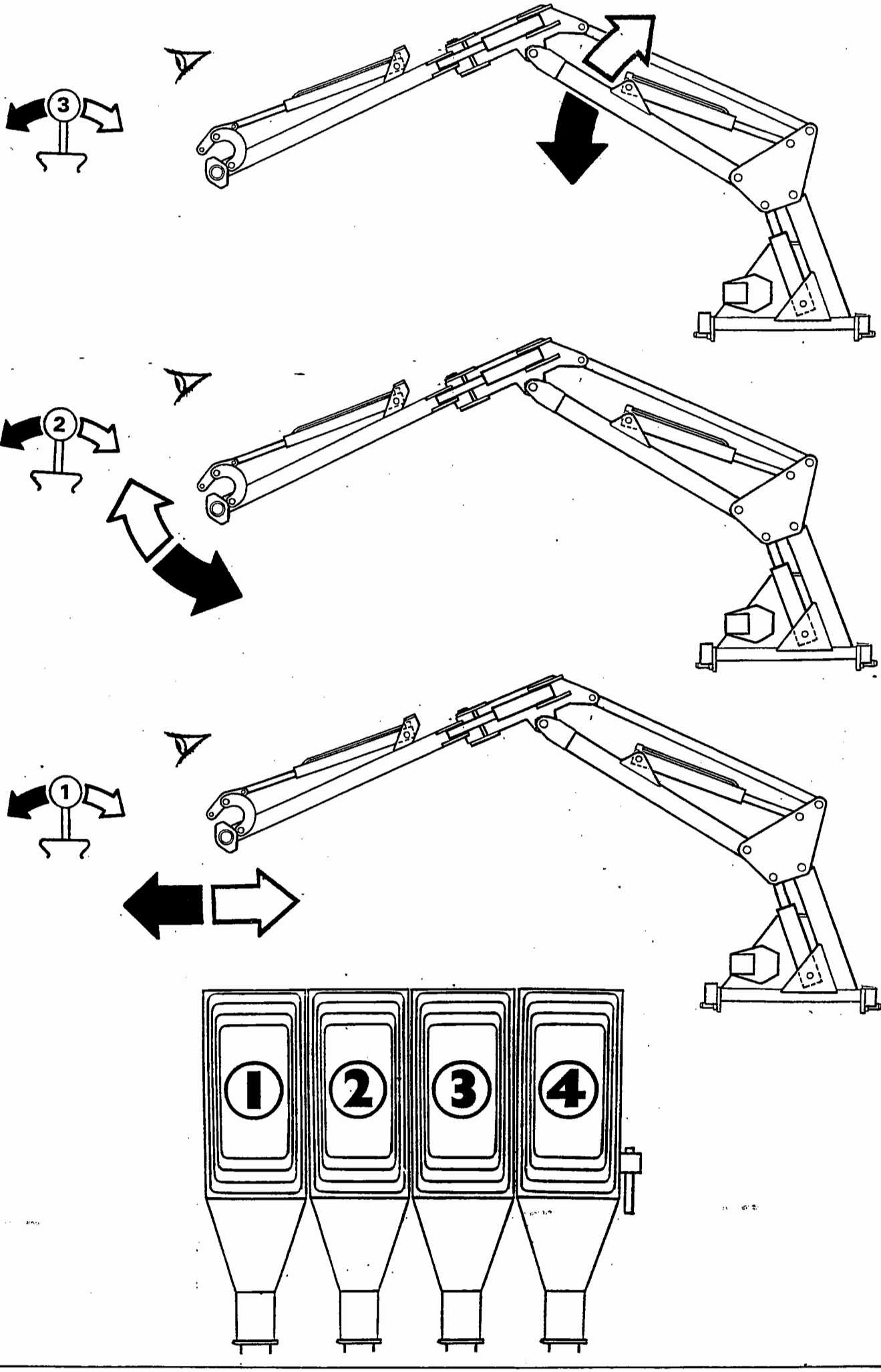


## PREPARATION

Read the book first

Practise in an open space without rotor running until familiar with controls.

Caution: Take care when working with the head close in as it can hit the tractor.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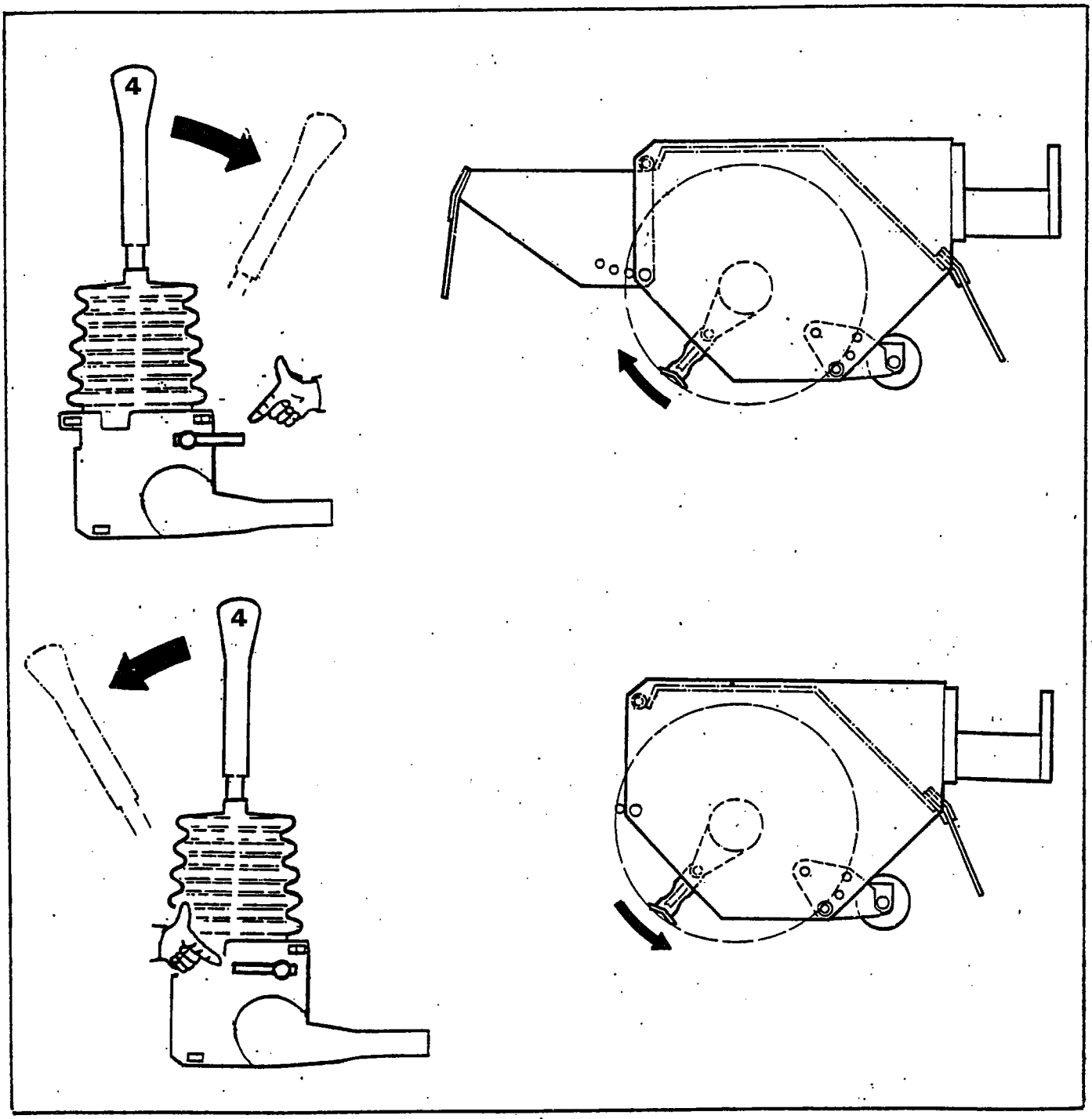



Select "Rotor **OFF**"

**WAIT** until the rotor has stoppedturning.

Turn the small lever on the side of the rotor control lever pivot box through 180 degrees. This will reset the control lever stop inside the pivot box and allow opposite rotation to be selected.

## TRANSPORT POSITION

For transport on the public highway the flail must be folded within the overall width of the tractor.

**PA32 with flail head**

Position the arm until the head is approximately four feet (1.5m) clear of the ground and the dipper is horizontal.

Pull the dipper arm to the rear to remove tension on the breakaway ram base pin and remove it.

Manually break back the dipper until the base of the ram is re located between the inboard holes in the ram lugs. Replace the ram base pin.

Select ***'Lift up'*** until the main arm is as high as it can go without projecting beyond the tractor width. Fully select ***'Reach in'***. Select ***'Angle down'*** to turn the flails towards the tractor.

For off road transport where width is not critical it will be sufficient to fully fold the arms.

**PA32 with cutterbar**

With cutterbar horizontal and with tractor switched off fit knife guard. Remember to keep fingers away from the knife as it can move even with the tractor engine switched off.

Select ***'Lift up'*** until the main arm is as high as it can go without projecting beyond the tractor width. Fully select ***'Reach in'***. Fully select ***'Angle up'***.

To revert to ***'work'*** mode, the above procedures must be reversed.

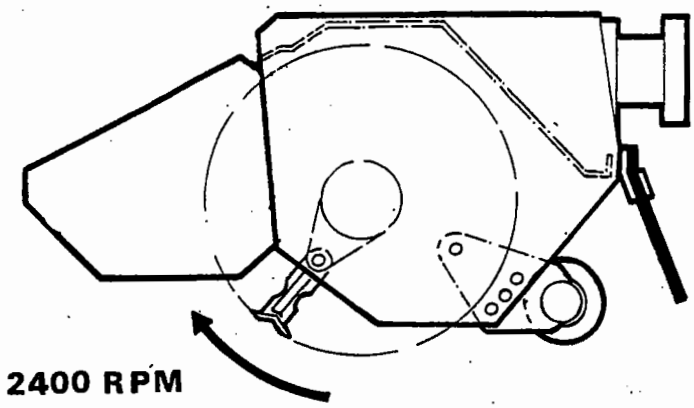
## ENGAGING DRIVE

**a) Ti models only**

Ensure that the rotor control lever is in the ***'Stop'*** position before engaging the P.T.O. shaft. Allow the oil to circulate for a minute or so before operating the armhead levers. Position the flail head in a safe position, increase the engine speed to a high idle and move rotor control lever to ***'Start'***. After initial surging the rotor will run at an even speed.

**b) Si models only**

On cutterbar models ensure that the motor hoses are connected correctly *(see page 15)* Place the cutter head at a safe attitude and bring the tractor engine revolutions to 1000 rpm. Engage the P.T.O. and slowly increase revs. until operating speeds are attained.



2400 RPM

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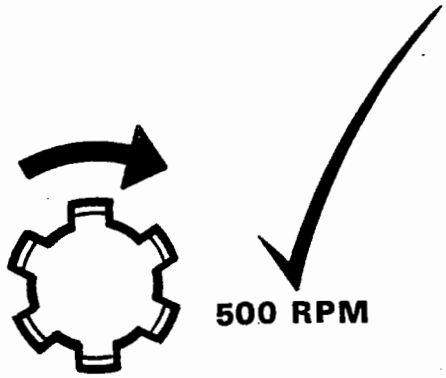
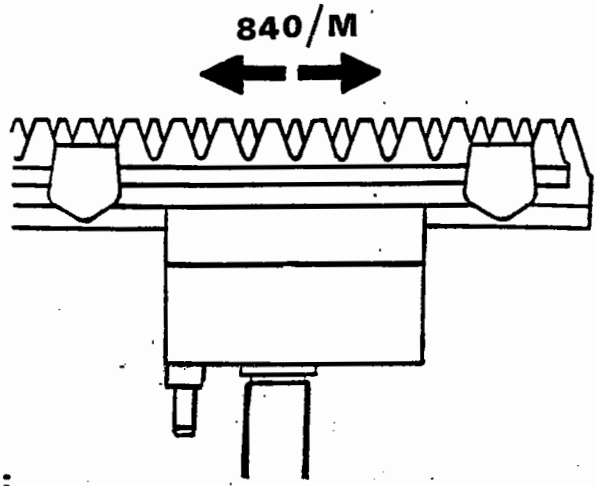
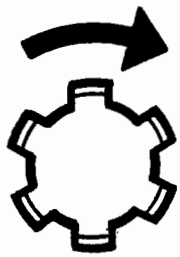


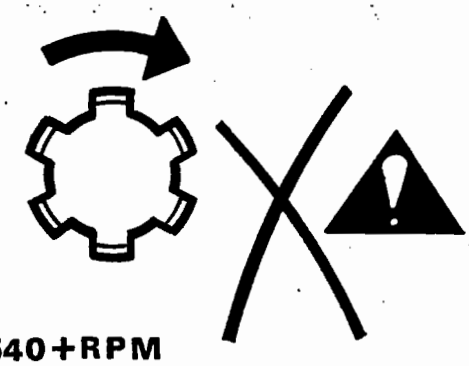
500 RPM



840/M



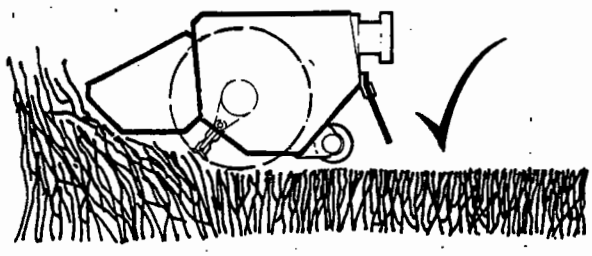
500 - 540 RPM

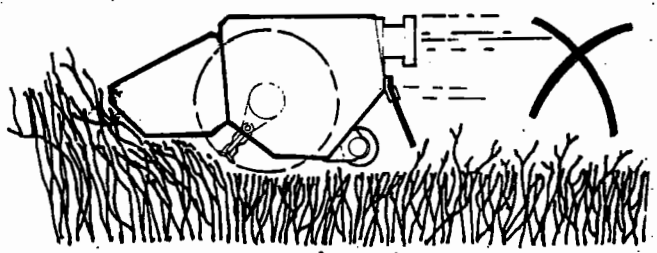


540+RPM

Note:
For cutterbars 500 r.p.m is a guide speed only. It should be run only as fast as necessary to do the job. Never exceed 540 r.p.m P.T.O. speed.

**TRACTOR FORWARD SPEED**





Flail illustrated.
Too fast will cause untidy finish and eventually stall cutterhead.

**HIGHWAY WORKING**

Local highway working regulations must be observed at all times.

**WARNING**
**It is the operators responsibility to observe these regulations and to keep bystanders at a safe distance.**

It is the operators responsibility to develop safe working procedures.

**Always:-**

Be aware of hazards in the vicinity

Make sure all guards are in position and in good condition

Disengage P.T.O. before stopping the engine.

Wait until the cutter has stopped running before leaving the tractor seat.

Disengage the P.T.O. and stop the tractor engine before making any adjustments.

Check frequently that all nuts and bolts are tight.

Keep bystanders at a safe distance.

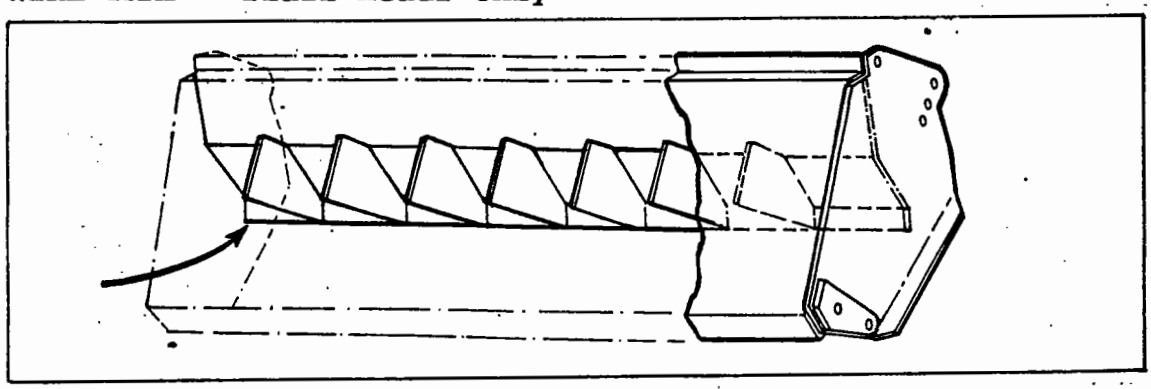
**BREAKAWAY**

The pivoted arm is held and in line by the oil pressure in the fully extended breakaway ram. When the flail head meets an obstruction and the tractor continues to move forward oil pressure will build up, against a relief valve situated in the base of the breakaway ram. When the preset pressure is reached the valve will blow and the oil will be vented into the lift ram. This will allow the flail head to pivot backwards and at the same time cause the arms to rise. When the obstruction is cleared oil pressure contained in the lift ram will cause the arm and flail head to return to the work position.

**WORKING CLOSE IN TO THE TRACTOR**

When working close in to the tractor always be aware that the main arm projects beyond the tractors cab on the offside and potentially into the path of parked or oncoming vehicles.

**WIRE TRAP - flail heads only**



The flail head is equipped with a wire cutting edge welded into the underside. This plate should not be interfered with in any way.

Any wire caught in the rotor must be immediately removed.

Select rotor 'OFF' and wait until it has stopped rotating.

**STOP** the tractor and only then remove wire.

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

**UNCLOGGING CUTTERBAR, CHECKS OR ADJUSTMENTS.**

Before leaving the tractor seat select "Cutterbar - off" and switch off tractor engine. Should the cutterbar become clogged NEVER, NEVER, NEVER clear any debris from the fingers or knife with the hands. Use a stick from the hedge or other suitable tools.

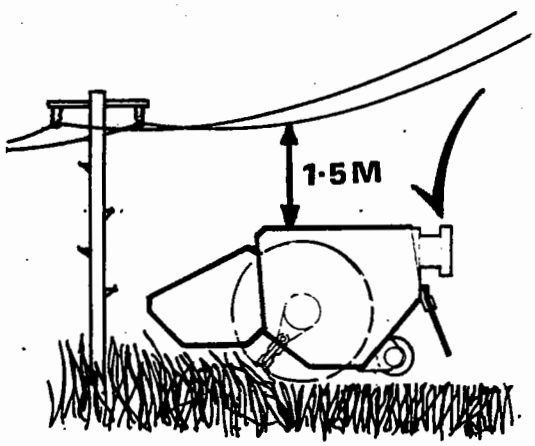
**WARNING**

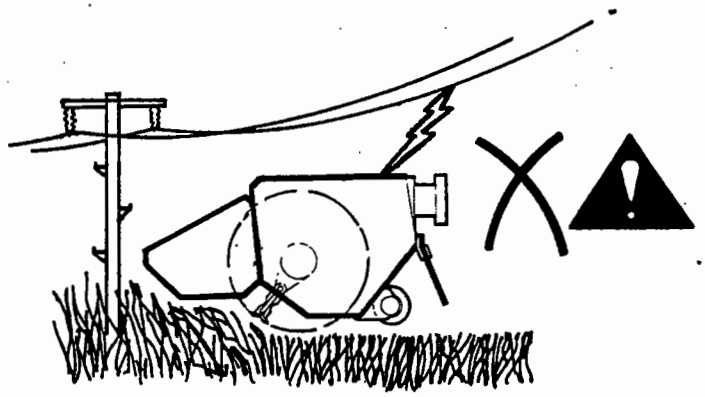
Always keep fingers away from the knife as the crankshaft fly wheel, can move under gravity and activate the knife even though the tractor engine is switched off.

**OVERHEAD OBSTRUCTIONS**

Always take extra care when manoeuvering in areas with overhead obstacles especially power cables.

**HIGH VOLTAGE CABLES**



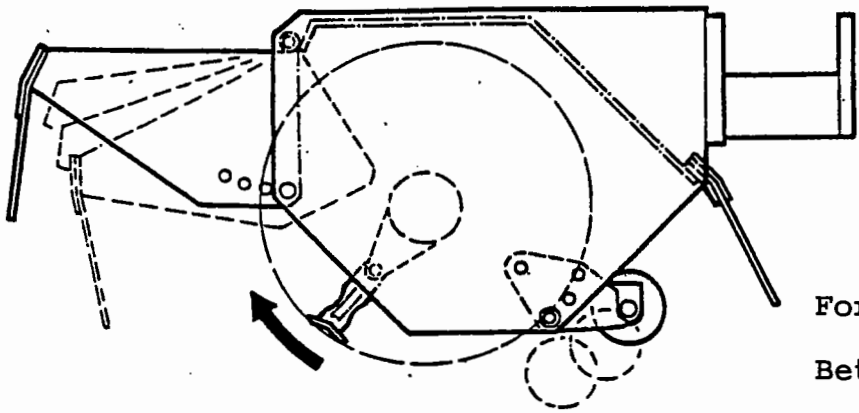
Flail head illustrated. Some dimension applies to cutterbar.

If in doubt consult your local electricity company regarding a safe procedure for work.

**Preliminary Precautions**

Inspect the work area, remove hazardous materials and note any immoveable obstructions.

**Upward cutting - flail head only**



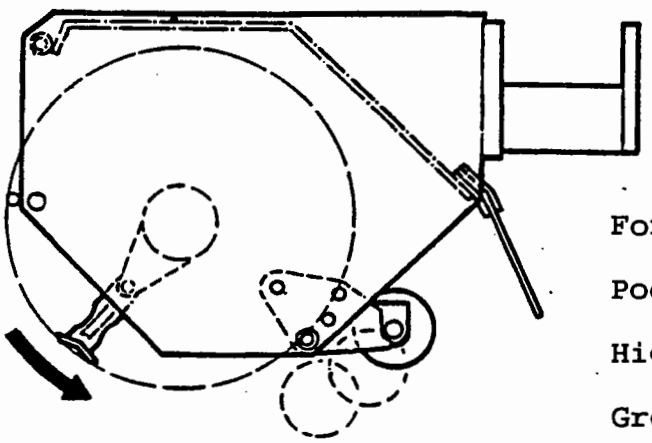
For normal trimming gives:-

Better finish

Lower power requirement

Front hood and rear flap must always be in position.

**Downward cutting - Flail head only.**



For cutting larger material gives:-

Poor finish

Higher power requirements

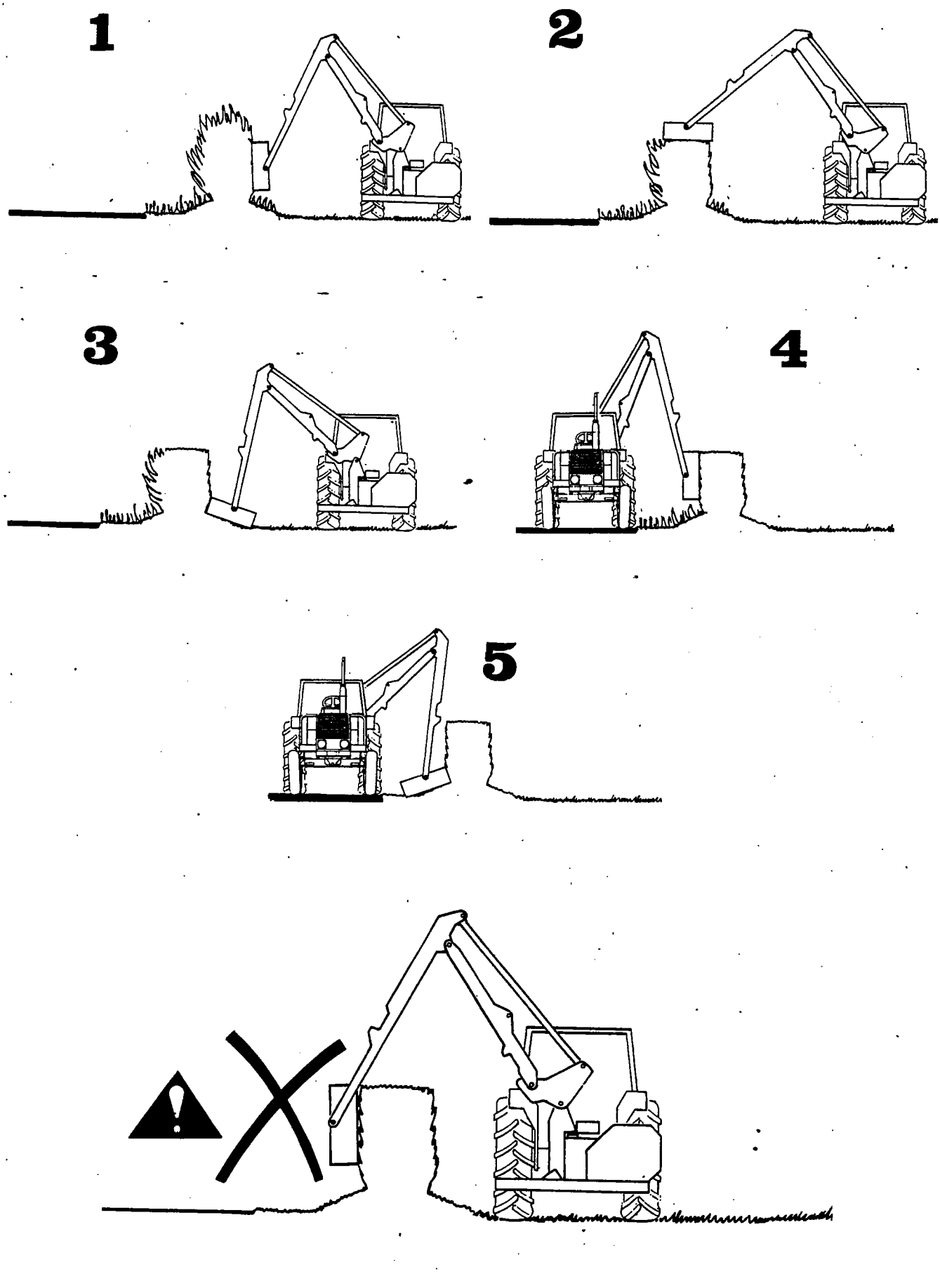
Greater machine wear

**Reversing rotation - flail head only**

**Ti machines** - see page 21

**Si machines**

The flail hose connections on the junction bracket at the lower end of the dipper arm must be interchanged.
**Note** if machine is converted to cutterbar configuration check hose connections to cutterbar motor carefully as the wrong connections could damage the knife drive.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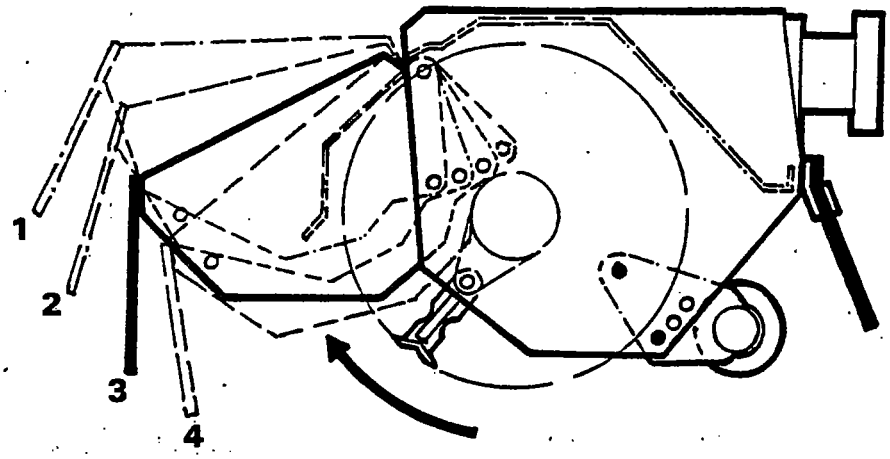
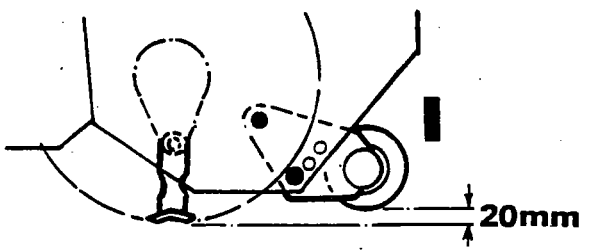
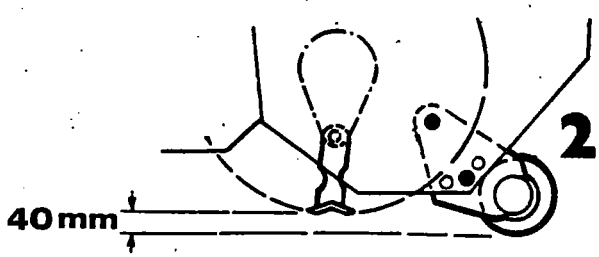
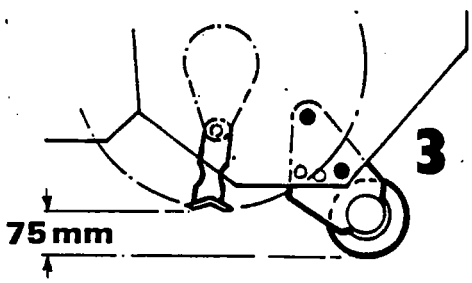


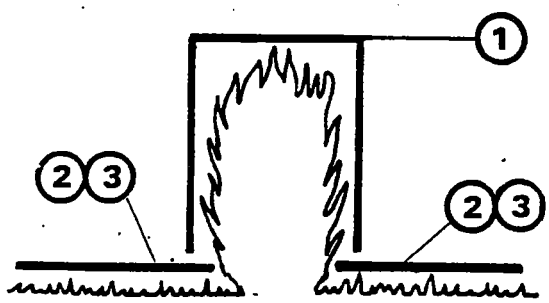

A front hood c/w flaps and a rear flap must be fitted. The front hood must to set in the lowest position which allows the material to be cut. The roller may be set in positions 2 or 3.

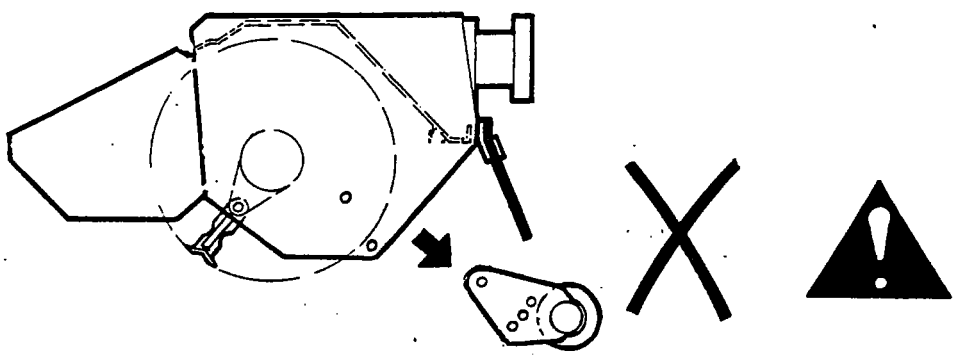
ROLLER POSITION - flail head only



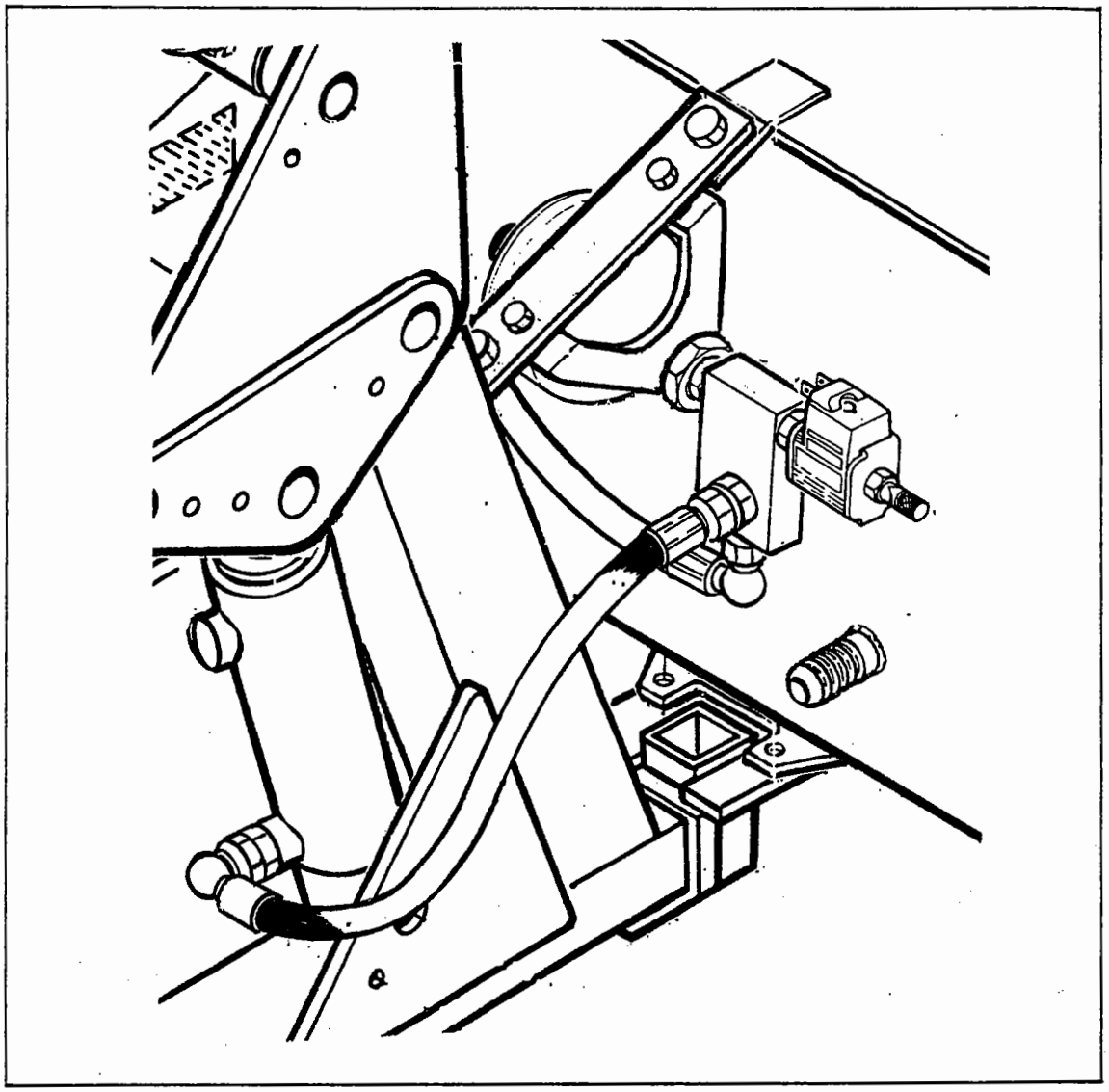



machines only).



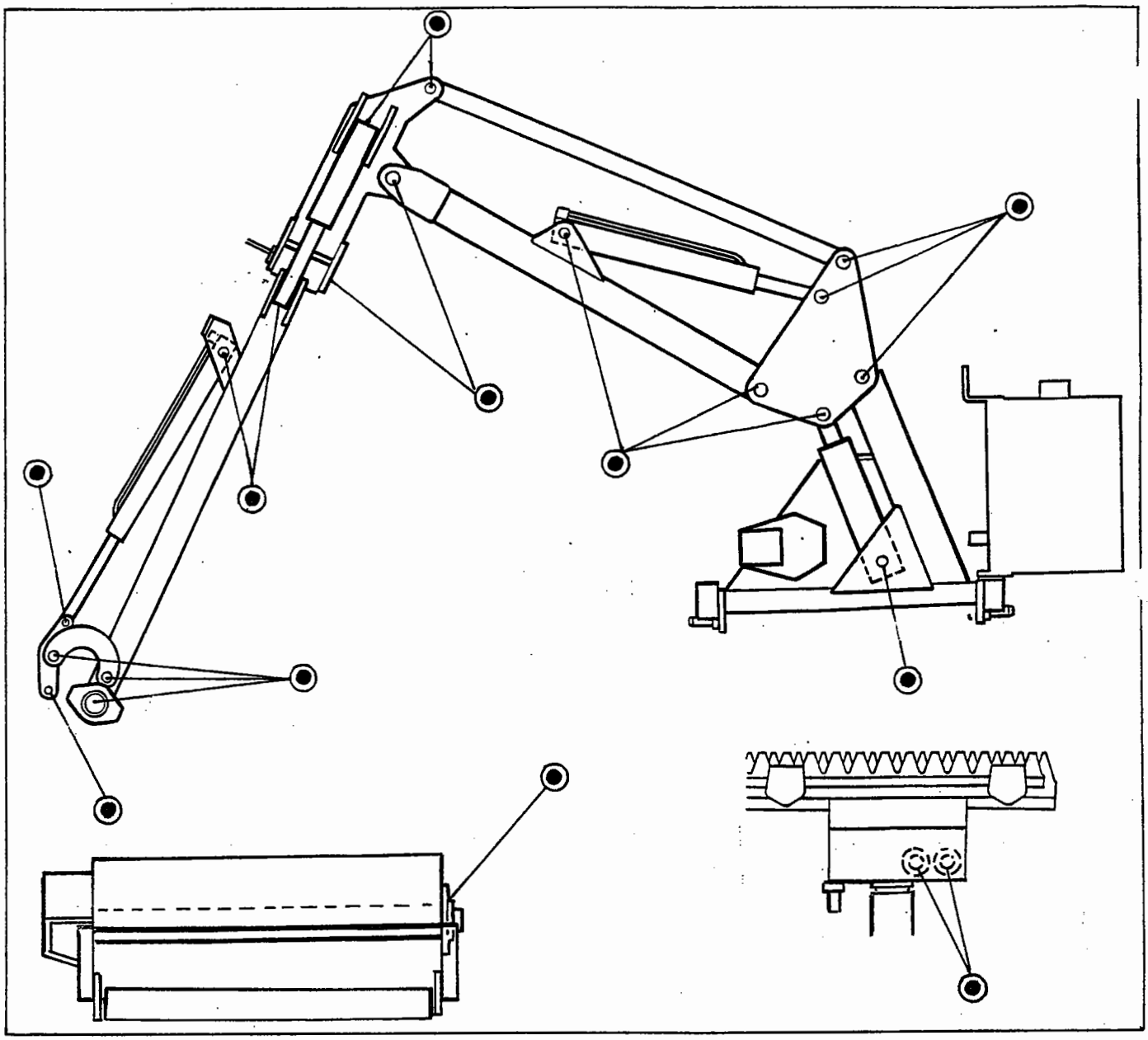
The hydraulic float kit, if fitted, should be mounted as shown bolted to the tank stay strap.

In work with the poppet valve open the flail head will automatically follow the ground contours.

The float action is engaged by manually lifting the knurled punger on top of the poppet valve out of the V groove and rotating through 90 degrees.

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

To revert to standard operation the accumulator is isolated from the lift ram by returning the knurled plunger to the 'off' position.



**LUBRICATION**

**General**

Grease daily all points shown.◉

**Power take-off shaft**

The P.T.O. shaft and its guards should be regularly examined. The universal joints should be greased very sparingly i.e. one shot weekly.

Note: Overgreasing a universal joint will blow-out the cork or neoprene sealing rings that exclude the dirt from the needle bearings inside.

The two halves of the plastic guard should be checked daily to ensure that they can spin freely on the shaft. The nylon slip rings which support the guard on the drive shaft should be lightly greased at weekly intervals.

The telescopic drive shaft should be similarly separated and grease applied to the internal shaft at approximately 100 hour intervals.

Oil supply

Check the oil level in the reservoir daily.

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

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

Contamination can be reduced by:-

1) Cleaning around the reservoir cap before removal, and keeping that area clean

11) Using clean containers when replenishing the system

111) Regular servicing of the filtration system

**Filtration Maintenance**

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

1) Suction strainer

The strainer is permanently fixed within the reservoir.

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

111) Return Line Filter

The elements should be changed after the first 50 hours and thereafter at 500 hour intervals. It is important to note hours worked as if the filter becomes blocked an internal by-pass within the canister will operate and no symptoms of filter malfunction will occur to jog your memory.

**P.T.O. GEARBOX**

The gearbox oil should be changed every workingyear or at 600 hour intervals, whichever occurs first. On level ground gearbox should be filled until oil is visably level with the lip of the filler plug aperture. Do not attempt to fill by removing the breather as the depth of tapped thread in the casing at this point is insufficient to allow repeated loosening and tightening of the breather plug.

The gearbox capacity is 700 millitires (1 1/4 pint) use EP 90 gear oil.

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

Hose replacement

a. Replace one hose at a time to avoid the risk of wrong connections.

b. When the hose is screwed to an additional fitting or union, use a second spanner on the union to avoid breaking both seals.

c. Do not use joining compound on the threads.

d. Avoid twisting the hose. Adjust the hose line to ensure freedom from rubbing or trapping before tightening hose end connections.

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

Two hose clips are provided at either end of the large bore suction and return hoses. These should be positioned so that their worm drive barrels are opposed at 180 degrees to reduce the possibility of air entering the system. A stop tap is provided to enable the suction hose to be changed without draining the tank.

**CABLES**

The cables operate on a push/pull system with the spool centering springs always returning the spool to the neutral position when the handle is released.

Care should be taken during installation and operation to ensure that the cables are not trapped or kinked. Any abrasion or damage to the outer casing should be sealed with plastic insulation tape to avoid moisture penetrating.

No routine adjustment of the cables are necessary as they do not stretch. The threaded collar is correctly adjusted when the lever is in a vertical position in its housing allowing an equal amount of travel in either direction.

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

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

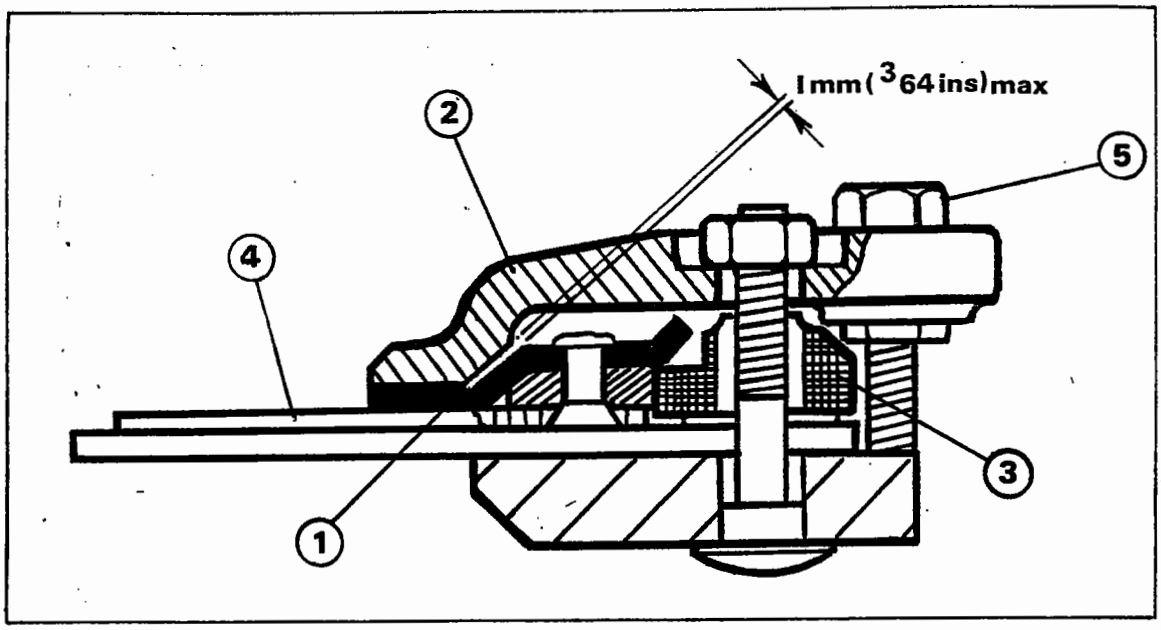
Frequently inspect the rotor assembly for damaged or missing flails. Bolts and nuts securing the flails to the rotor should be regularly checked and kept tight. The correct torque setting for these locknuts is 135 Nm (100 lbf/ft). Use only the correct flail bolt and locking nut. Check the flail pivot bushes for possible damage or wear. They do not require oil.

Do not attempt to run the rotor with flails missing. Imbalance will cause severe vibration and can rapidly damage the rotor shaft bearings. As an emergency measure if a flail is broken off or lost, remove another on the opposite side of the rotor to retain balance. Always replace flails in opposite pairs and never match up a new flail with a resharpened one which will of course be lighter.

Blunt flails absorb a lot of power and leave an untidy finish to the work. They should be sharpened on a grindstone or with a portable grinder periodically.

Wear protective gear when sharpening flails.

Ensure that the bearing housings and hydraulic mounting nuts and bolts are kept tight. They should be checked during servicing.




**CUTTERBAR**

Adjusting the knife guides

Before commencing any checks or adjustments lay the cutterbar flat on the ground. Select 'cutterbar off', switch off the tractor and disconnect the con rod.

When adjusted correctly the knife sections (4) lie flush between the fingers and the underside of the knife holder (1)

In addition there must be a maximum clearance of 1mm between the sloping faces of the knife holder (1) and the guide plate (2). This allows clearance for the knife to move freely and can be checked by placing a 5/8" dia bar into the con rod socket in the knife heel and operating by hand.

The guide plate (2) and rubbing plate (3) are mounted, through slotted holes which allow the correct lateral positioning of the knife in relation to the fingers.

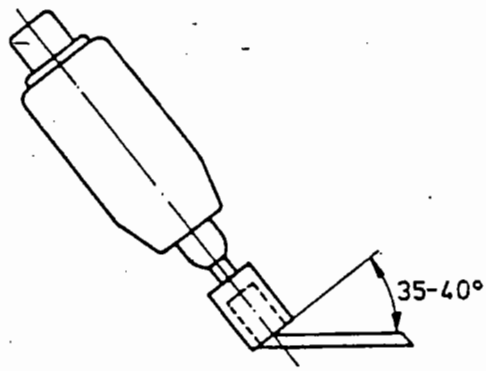
Any play caused by wear between the knife holder (1) and the knife sections (4) is removed by turning the setscrew (5). The knife should be adjusted until the mating surfaces are flush. No downward pressure should be exerted onto the knife as this may impede its free movement.

After five to twenty operating hours, depending on the work involved the knives require re-sharpening.

It is recommended that knives are removed from the cutterbar for resharpening.

Switch off tractor, disconnect the con rod, remove the three setscrews securing the knife heel to the knife and withdraw the knife from the cutterbar.

Clean the knife and ensure that neither the back nor the knife sections are bent. Straighten as necessary.




A cutting angle of 35 degrees - 40 degrees is required.

A high speed hand grinder should be used with ideally, a pot shaped pencil grinder of approximately 25mm (1") dia by 35mm (13/8) long. Grinding is carried out with the end face of the grinder moving from the base of the knife.

It is possible to re-sharpen the knives in situ. Position the cutterbar on or parallel to the ground. Switch off the tractor engine and disconnect the con-rod. Manually position the knives so that they cover the fingers and clamp together in this position.

Sharpening with files is not recommended as the process tends to leave small burrs on the edge which; when the knife is replaced will curl under, impede the free movement of the knife and leave a blunt cutting edge.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