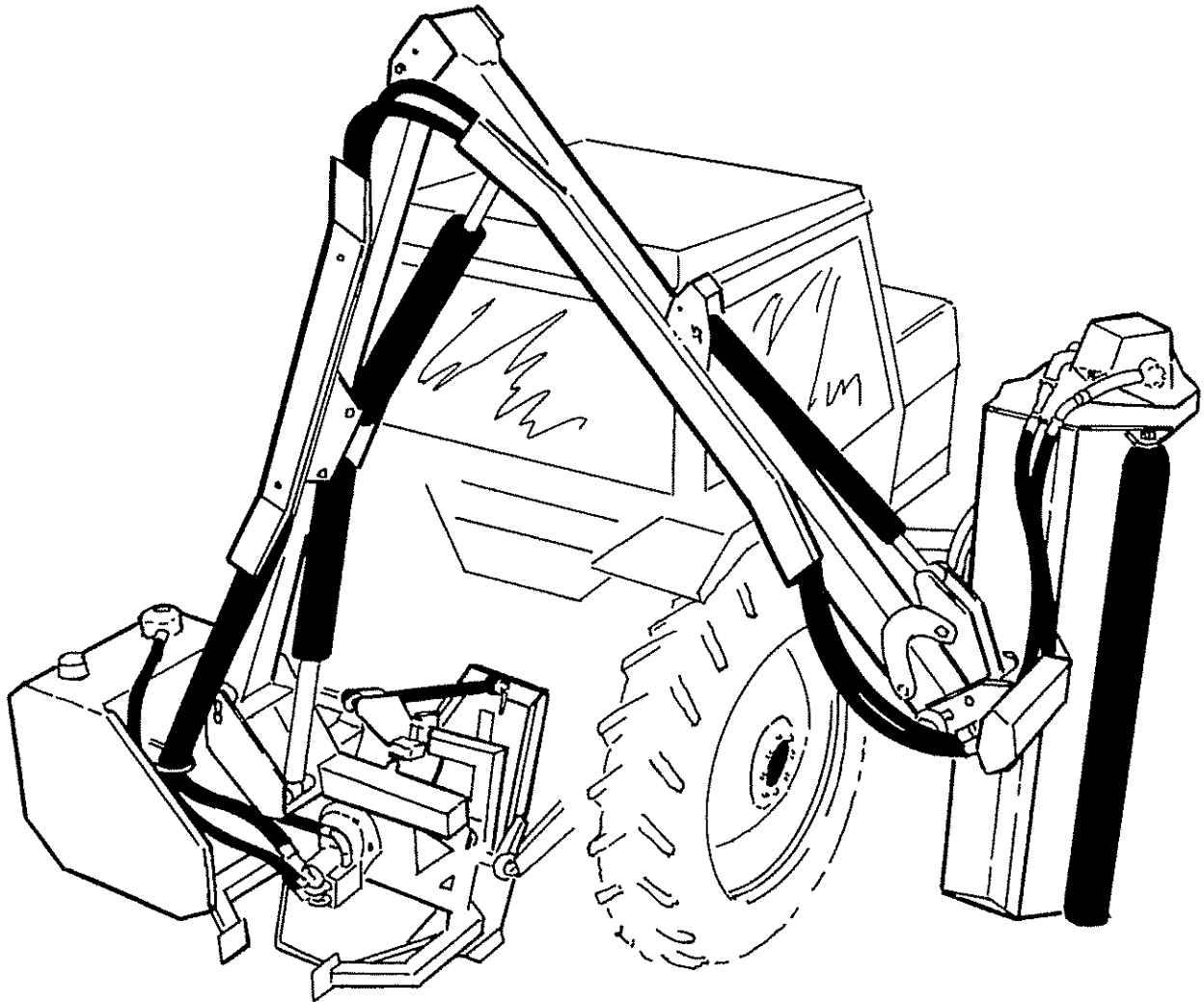




PA92



OPERATOR'S MANUAL WITH PARTS LIST

ALAMO-McCONNEL
P.O. Drawer 549
Seguin, TX 78156
210-372-3551

An Alamo Group Company

READ THE BOOK FIRST

It might save hours and pounds later

**When ordering spare parts always
quote the machine type and serial
number as well as the part number**

**Factory re-built service exchange
units of the major hydraulic components
are available from you 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 noise fluctuates between zero and maximum. The figures assume that the machine is fitted to a tractor with a quiet cab with the windows closed in a generally open environment. We recommend that the windows are kept closed.

With the cab rear window open the equivalent daily personal noise exposure will increase to a figure within the range 82-88 DB.

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

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FOR NOTES

GENERAL INFORMATION

Read this manual before fitting or operating the machine. If in doubt contact your dealer or the McConnel Service Department for assistance.

Use only McConnel spare parts on McConnel equipment and machines. Refer to the parts section before ordering spares.

DEFINITION

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

INTRODUCTION

- The PA 92 features :-
- Three point linkage mounting
 - Totally independent or semi independent hydraulic systems with 44 gallon (200 ltr) reservoir
 - 45 Hp or 50 Hp hydraulic systems
 - Independent reversible rotor ON/OFF valve (Ti models only)
 - Cable controls
 - 1.2 M Lightweight flail head with choice of two flails
 - Option of 90 series 1.2M Hedge or grass flail heads with choice of two rotors and three flails
 - Spring assisted automatic gravity resetting breakaway mechanism
 - Right or left hand cut
 - Operator guard

SAFETY PRECAUTIONS

DANGER



There are obvious and hidden potential hazards involved in the operation of this implement. Serious injury or death may occur unless care is taken to insure the safety of both the operator and any other persons in the area. **KEEP CLEAR**

The following is a list of some safeguards which should be followed. Serious injury or death may occur unless care it taken.

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.

DANGER



...

This is a rear-mounted implement which removes weight from front wheels and can cause less of steerage with possible overturn. Add front end weight until 20% of tractor original weight is on front wheels when boom is in transport position for steering safety and prevention of bodily injury. Transport slowly on rough surface to prevent bouncing front wheels off surface wit loss of steerage and possible injury.

DANGER



...

Always set tractor widths as wide as possible and add weights to the relevant opposite wheel to counteract the weight of the extended mower head.

DANGER



...

Operate the mower only with a tractor equipped with an approved roll-over-protection system. **ROPS**. Always wear approved seat belts whenever the tractor or mower is running. Serious injury or death could result from falling off the tractor seat. Do not alter ROPS structure.

DANGER



...

Make sure the PTO shield is installed when using PTO-driven equipment, and always replace the PTO shield if damaged.

WARNING



...

The operator and all support personnel should wear "Safety Shoes", "Hard Hats", and "Safety Glasses" at all times to protect them against falling objects and items thrown by the machine.

WARNING



...

Never allow inexperienced or untrained personnel to operate the tractor/mower combination without supervision.

WARNING



... Always read and understand the instruction manual first. If anything is unclear consult your dealer or Alamo direct.

WARNING



... Always familiarise yourself with the controls in a clear area before commencing work.

DANGER



... Always engage all transport devices fitted. See operator manual for details.

WARNING



... Always familiarise yourself with the local highway regulations and abide by them at all times.

DANGER



... Never transport the machine even for a short distance with the flails rotating.

DANGER



... The Boom and Mower Head change the balance of the machine in transport. Be especially careful when transporting on slopes. Never turn uphill in transport except at very slow speed and a low rate of turn. Never transport or operate this machine on steep slopes. **BE CAREFUL.**

WARNING



... Always operate the machine at the recommended PTO speed. Never exceed the maximum permitted.

DANGER



... Mowers are capable under some conditions of throwing objects for great distances and inflicting serious injury or death. Follow Safety messages carefully. **STOP MOWING IF PASSERBY ARE WITHIN 100 YARDS UNLESS:**

... Front and/or rear guards or rubber flaps are installed and in good condition. See decal on flailhead and instruction book for correct installation.

... The mower head is running on the ground over most of its length.

... Passersby are outside the existing throw-object zone.

... All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed. **NOTE:** Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be inspected and large debris removed, mowed at an intermediate height, inspected closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required and reduce wear on the mower.

DANGER



...

Extreme care should be taken when operating near loose objects such as gravel, rocks and debris. These objects should be removed or avoided to prevent injury from thrown objects.

DANGER



...

The rotating parts of this machine have been designed and tested for rugged use. However, they could fail upon impact with heavy solid objects such as steel guard rails, concrete abutments, etc., causing them to be thrown at very high velocities. Never allow the cutting blades to contact such obstacles.

WARNING



...

Objects such as wire, cable, rope, chains, etc., can become entangled in the operating parts of the Mower Head. These items could then swing outside the housing at greater velocities than the blades creating an extremely dangerous condition. Inspect the cutting area for such objects prior to mowing. Never allow the Cutting Blades to contact such items.

WARNING



...

When the mower is swung to the side (working Position) of the tractor, it exerts a moment on the tractor causing the tractor to rock from side-to-side. Extreme Care should be taken when operating on slopes. Bodily Harm or Death could result from tractor's tipping over.

WARNING



...

Never allow riders on the tractor. Never lift a person with the Boom or Mower Head. **KEEP BYSTANDERS CLEAR.**

WARNING



...

Inspect the entire machine periodically. Look for loose bolts, worn or broken parts, pinched hydraulic hoses, and leaky or loose fittings. Make sure all pins are secure. Serious injury may occur from not maintaining this machine in good working order.

DANGER



...

Do not mount tractor when tractor is moving. Avoid serious injury or death from contact with the rotating tires. Mount and dismount the tractor only when it is completely stopped.

DANGER



...

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.

WARNING



...

Always take extreme care when folding the machine to cut close in as the mower head can contact the tractor in some situations.

DANGER



...

The Boom is designed only to position the Mower Head which is attached to it. Never attempt to lift, pull, or push other objects with it. Serious injury could result from a structural failure when the Boom is used for purposes other than those for which it was designed.

DANGER



...

The boom on this machine has a safety break - back system with automatic return to the work position. Never allow anyone to stand in front of the boom or mower head in a position where they could be injured if the boom were to move forward suddenly.

DANGER



...

Do not operate the machine with hydraulic oil leaking. Oil is expensive, and its presence could present a hazard. Do not check for leaks with your hand-use cardboard. High-pressure oil can penetrate the skin and cause **GANGRENE**. If oil does penetrate the skin, have it surgically removed at once by a surgeon knowledgeable in this procedure.

WARNING



...

Never continue to operate the machine if a damaged or lost flail is causing vibration.

WARNING



...

Always select 'Rotor off' before disengaging PTO driveshaft on totally independent (Ti) models.

DANGER



...

Never cut over the far side of a hedge with the flails cutting towards the operator.

DANGER



...

Never become complacent and ignore any safety instructions.

WARNING



...

Before leaving the tractor seat, always select 'Rotor off', disengage the PTO. Turn the tractor engine off, and wait for all moving parts to stop. Place the tractor shift lever into a low range gear or park to prevent the tractor from rolling and apply the handbrake. Never mount or dismount a moving tractor. Operate the tractor controls from the tractor seat only.

WARNING



...

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

DANGER



...

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.

WARNING



...

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

DANGER



...

Never walk or work under any raised boom or mower head. The boom could fall and cause serious bodily injury or death. Always lower the boom and mower head flat on the ground or support the Boom and Head on safety stands. On cable control machines unload all hydraulic actuators prior to doing any maintenance. To do this, set the Cutter head on the ground, then kill the tractor engine. Push and pull the Lift and Reach Control levers in and out several times to remove pressure. Do not work under raised Boom or Head unless components are securely blocked up to prevent inadvertent dropping.

DANGER



...

Always read carefully and comply fully with the manufacturers instructions when handling oil, solvents, cleansers and any other chemical agent

DANGER



...

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

DANGER



...

In addition to the design and configuration of this implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the Tractor and Mower Manuals. Pay close attention to the Safety Signs affixed to the Tractor and Mower.

CAUTION



...

PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Tractors with or without Mowers attached can often be noisy enough to cause permanent, partial hearing loss. We recommend that you wear hearing protection on a full-time basis as the noise level at the operation position is likely to exceed 80 db. for extended periods of time. Noise over 85 db on a long-term basis can cause severe hearing loss. Noise over 90 db adjacent to the Operator over a long-term basis may cause permanent, total hearing loss. Note: Hearing loss from loud noise (from tractors; chain saws, radios, and other such sources close to the ear) is cumulative over a lifetime without hope of natural recovery.

P.T.O. DRIVE SHAFT SAFETY PRECAUTIONS

DANGER ON EACH TRACTOR CHECK:-



All machines

Ensure the correct end of the drive shaft 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 drawbar.

FITTING

TRACTOR SELECTION

Linkage requirements

The power Arm 92 will fit almost any tractor with a category II linkage.

Linkage isolation

Although it may be possible to operate the semi independent version of the PA92 without linkage isolation a severe strain would be put upon the attachment yoke and pins. Most modern tractors are equipped with a ready means of providing linkage isolation is not required on the fully independent model of the PA 92 and the tractors hydraulic controls should be neutralised.

Check chains/stabilisers

To hold the machine firmly in position, check chains or stabiliser bars must be fitted. It is dangerous to operate the machine without.

Tractor relief valve

The main relief valve in the hedger hydraulic control unit is set at 2000 PSI (140 Bar). Therefore if operating the PA92 in semi independent form the tractors relief valve setting must be at least a little above this figure for satisfactory operation.

Tractor hydraulic flow rates

Oil flow rates are not crucial when operating a semi independent PA 92. Flow rates of up to 10 gpm (45 l/min) should not have any adverse affect to the inching response that is sometimes required from the control valve.

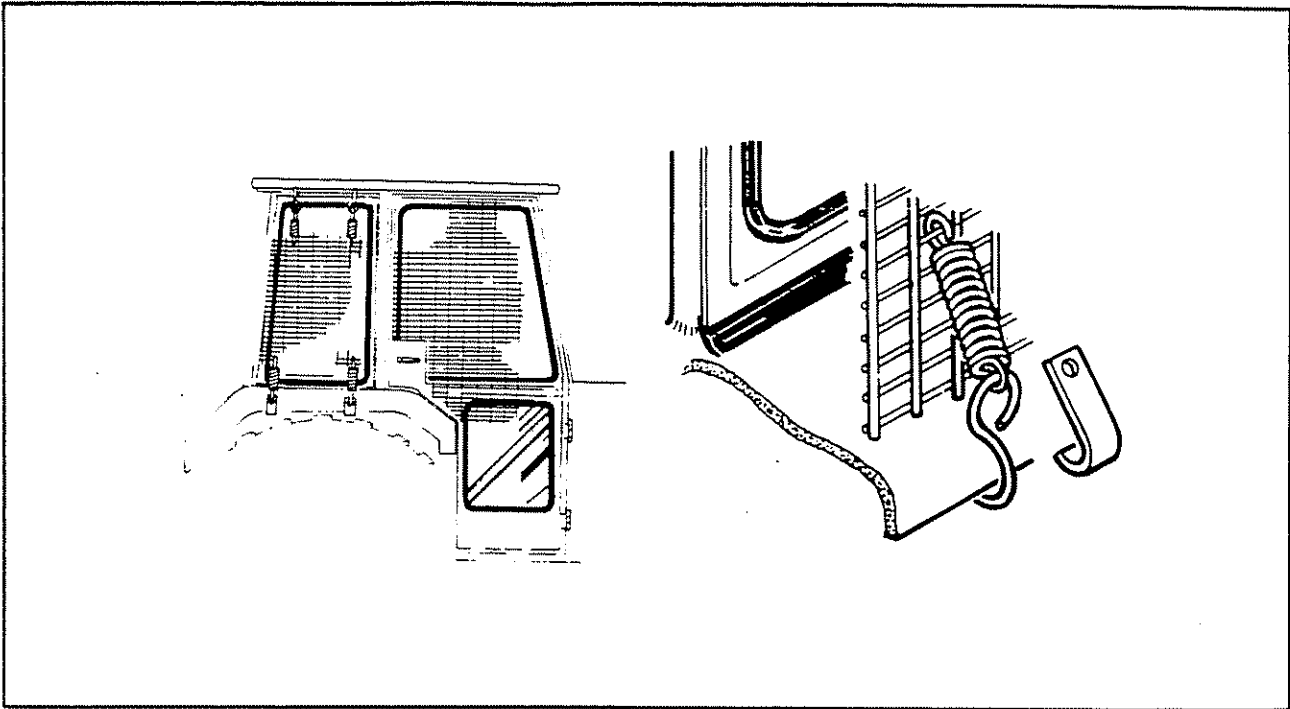
P.T.O. shaft

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

Draft control

Loads imposed through the draft sensing mechanism will not normally be sufficient to put a strain on the tractor, however any provision for draft control should be set to minimum response. Where a draft control rocker is fitted with a dead pin position this should be utilized.

TRACTOR PREPARATION



Fitting operator 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 at the flail hed in **any** working position.

If windows are not laminated safety glass polycarbonate glazing must also be fitted.

If tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing.

Wheel width

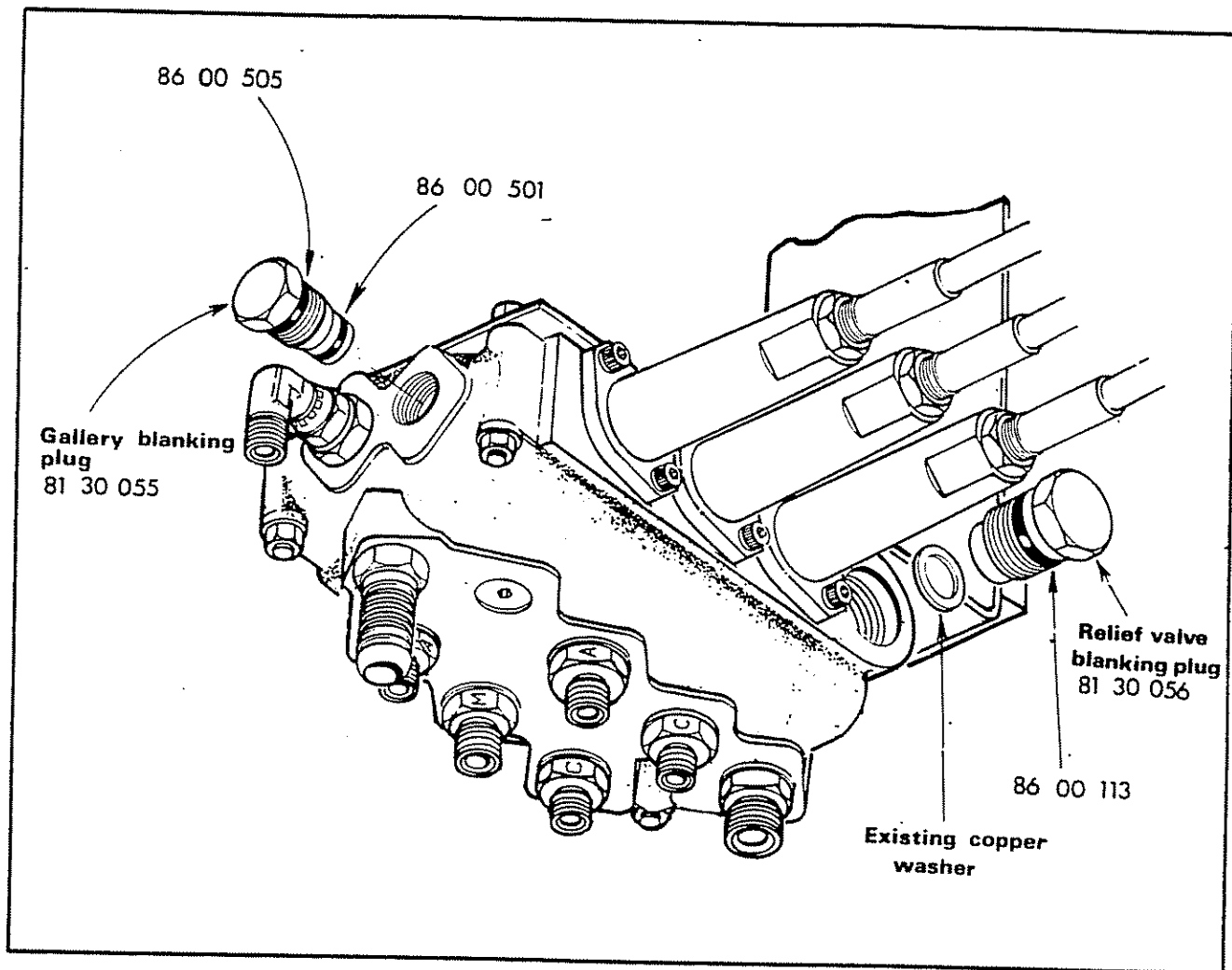
Set wheel widths as wide as possible.

Ballast weight.

Add ballast weight whenever necessary within tractor manufacturers recommended limits to ensure stability under all working conditions.

Lift links

Adjust lift links until they are equal length.



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).

OIL REQUIREMENTS

Tank

Fill the reservoir to approximately 2" below the top of the tank. The capacity is approximately 200 litres (44 imp galls)

Do not overfill.

Supplier	Cold or temperate climate	Hot climate
Castrol	Agricastrol hydraulic oil Hy-spin AWS32	Hy-spin AWS68
Shell	Tellus 32	Tellus 68
Mobil	D.T.E. 24	D.T.E. 26
Esso	Nuto 'H' or 'A' 32	Nuto 'H' or 'A' 68
Texaco	Rando HD 32	Rando D 68
Gulf	Hydrasil 32	Hydrasil 68
B.P.	Energal HLP 32	Energal HLP 68
Dalton	Silkolene Dove 32 or Derwent 32	Silkolene Dove 68 or Derwent 68
Elf	Hydrelf 32	Hydrelf 68

Gearbox

Check the gearbox oil level. On level ground gearbox should be filled until oil dribbles out of the level plug. Top up if required with SAE 30/50 Universal tractor oil.

DELIVERY

The machine is delivered in a partially dismantled condition. To make ready for attachment to the tractor it will be necessary to:-Select a hard level surface.

- *Cut the banding straps and remove loose items.
- *Fill the reservoir to capacity with oil selected from the chart on page II to increase the stability of the machine.
- *Remove and discard the transport strap connecting the flail head to the frame.

ATTACHMENT TO TRACTOR

*On Si model reverse the tractor up as closely as possible and connect the return and supply hoses to the tractor. Fit suitable return connection to the tractor and connect the return hose before connecting the supply hose to the tractors external services point with a suitable self seal coupling.

Ensure the lift ram tap is fully open.

*With the aid of a crowbar prise the flail head sideways until there is sufficient clearance to allow the tractor to be reversed up and the draft links connected. Assistance will be needed to simultaneously select "Reach out" and "angle down" to allow the oil to flow whilst the arms are being moved.

WARNING

As a safety precaution to prevent the possibility of the flail head slipping sideways and the arm collapsing on the fitter as he is prying the head sideways a loop of strong rope or wire, with sufficient slack to allow the required flail head movement should connect the frame and dipper. This will then act as an arrestor in the event of this happening. Leave in position until attachment is complete.

Adjust tractor drop arms to enable the draft links to lower within 15 ins (375mm) of the ground.

Remove the top link and machine yoke completely.

Reverse the tractor squarely to the front of the machine, engage draft link pins and secure.

Attach yoke to the top hitch position on the tractor ensuring the lug for the top link is uppermost.

Unlimber the machine controls and fit into the tractor cab. See page 16

Install the top link between yoke and upper hitch position on the machine. If necessary fitting Cat. 1 sleeves into the ball ends of the top link.

*Raise the machine on its three point linkage until the PTO shaft and the gearbox stub shaft are as near as possible in a straight line.

*At this point check that the welded in pins between the jaws of the yoke are tightly against the top of the mounting rail

If the welded in pins are not in contact with the rail the machine must be lowered to the ground, the next hole on the yoke top link lug selected, the machine raised again and contact checked. Repeat again in the third hole if necessary. On subsequent fitting to the same tractor the hole selected is always used.

Secure the yoke with the locking pins and spring cotters provided ensuring that they engage in matching holes in the mounting rails.

Lower the quadrant lever so that the machines weight is taken by the yoke.

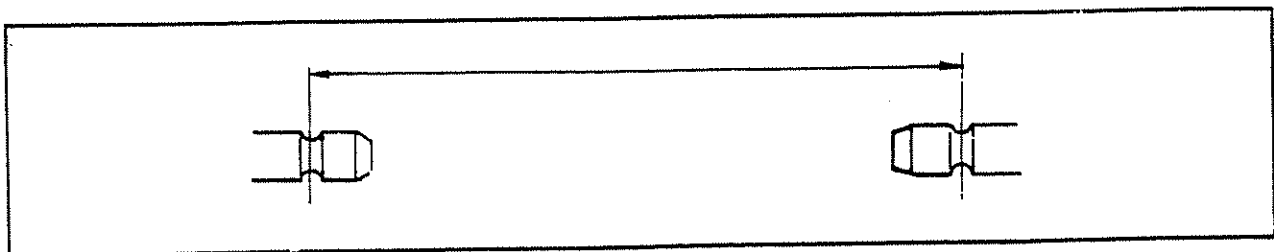
Adjust the top link to bring the pillar upright.

*Reposition the eccentric collars in the holes immediately behind the yoke and adjust until both collars each side abut against the face of the yoke plates. Tighten in position. These collars act as stops for the yoke during subsequent fitting to the same tractor. If the tractor used is changed new collar positions will need to be worked out following the previous procedure.

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 arms or bars.

*Measure the PTO drive shaft length as shown in the diagram below and subtract 2 inches (50mm).



*This measurement which is the fully closed final length of the PTO drive shaft measured button to button should be taken carefully before the PTO drive shaft and guards is shortened to suit by cutting off both the driving and driven members of the tube by an equal amount.

Accurate measurement is important on some close coupled tractors to ensure maximum engagement during operation.

Fit the P.T.O. shaft in position. Ensure that the collar locking devices on the P.T.O. shaft are fully engaged and wrap the torque chain around any convenient point to prevent the shaft guard from rotating.

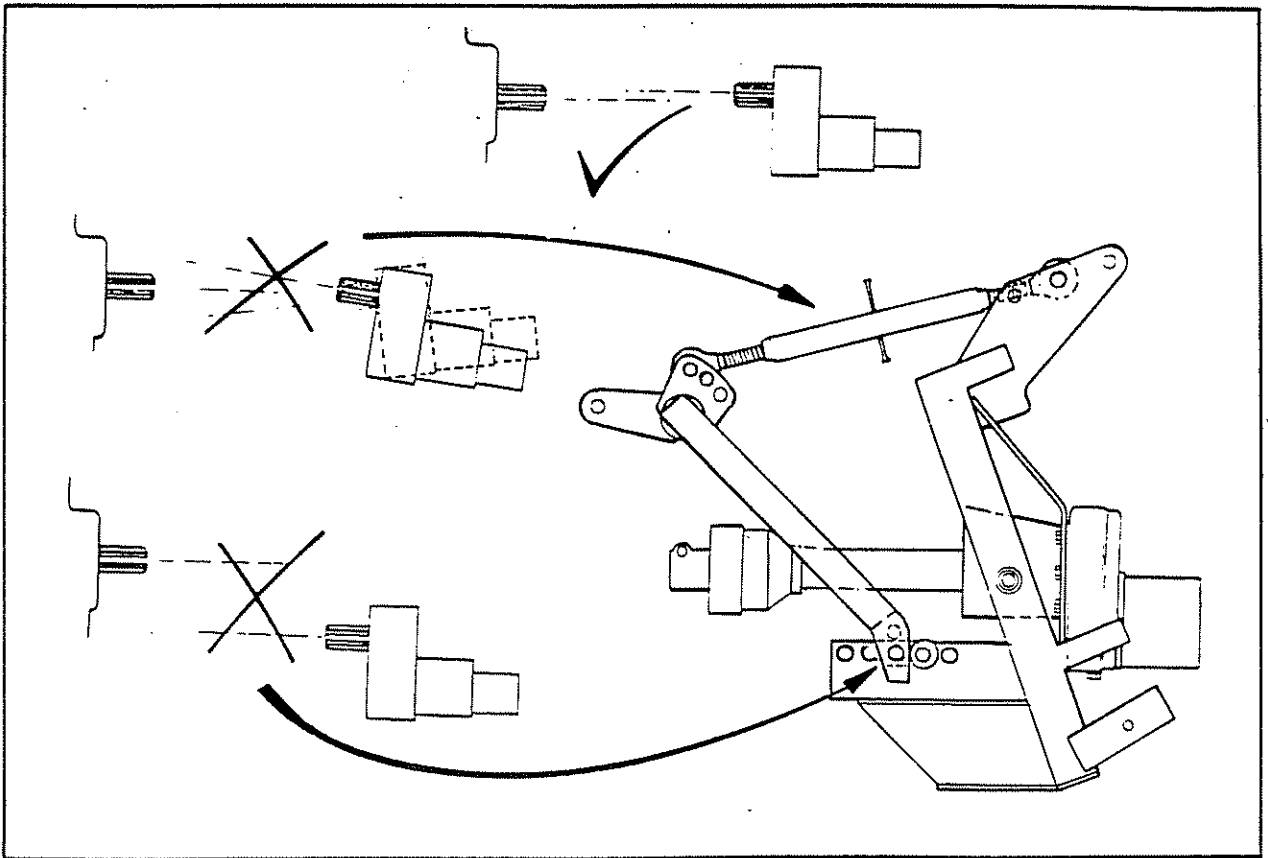
Check that the rotor control valve is in the stop position (T.i. models only).

*For electric controlled machines only engage the P.T.O. (see page 19) and select "Lift down" until the lift ram rod together with its pin can be re-assembled in position. Similarly selecting "Reach out" and "Angle down" will enable the respective ram rods and pins to be replaced.

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

*Remove the rope arrestor loop.

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



Remove the parking feet, turn inward 90 degrees and re-locate in their housings.

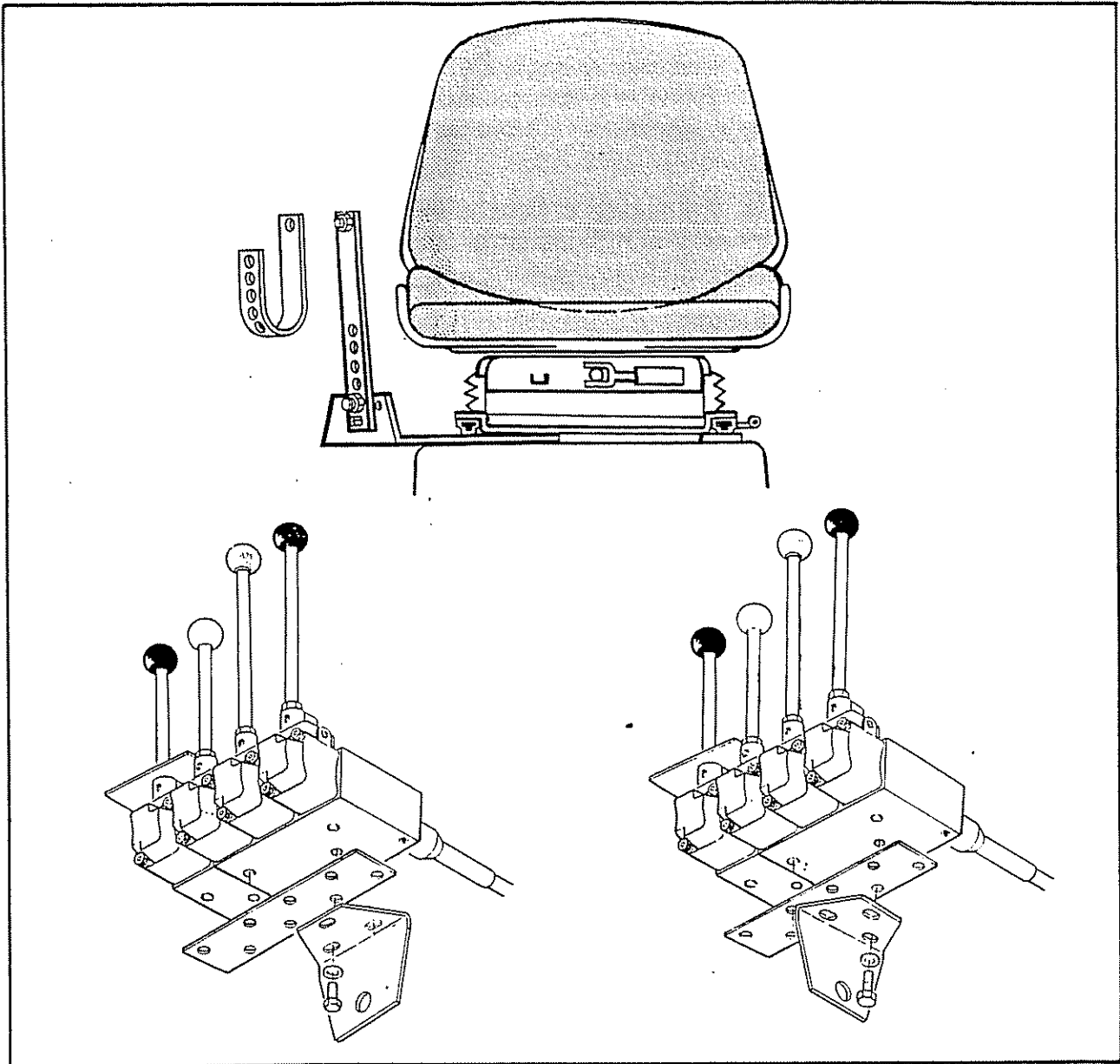
Carefully operate the machine through its full range of movement whilst checking that the hoses are not strained, pinched, chafed or kinked and that all movements are functioning correctly.

* Assemble the cover plate and the hedge hood into position

Fold the machine into the transport position (see page 23)

The machine is now ready to proceed to the work site

This procedure is for initial attachment only, for subsequent attachment paras marked * do not apply.



FITTING CONTROL UNIT IN CAB

A bracket is clamped between the seat runners and their mounting base. Attached to this is a stalk which carries the control units. Modification to either may be necessary to achieve a comfortable working position.

On tractors other than the quiet cab models the stalk can be bent and bolted to the mudwing or the cladding of the cab ensuring that no structural member of the safety frame is drilled. See 'B'.

The control unit is bolted to an angled mounting bracket in either a transverse or longitudinal position thus giving a variety of mounting positions, which in conjunction with the flexibility of the mounting pillar will enable a satisfactory working position to be achieved.

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

The handles may be screwed into alternative holes in the levers to give an 'in line' installation should it be desirable.

RUNNING UP PROCEDURE

PA92Ti

Ensure that the rotor control valve is in "STOP" position, start tractor, engage P.T.O. and allow the oil to circulate for about 5 minutes before operating the arms

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

Check that flail nuts and bolts are tight. Place the flail head at a safe attitude and move the rotor control to ON position. After initial fluctuation due to priming 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.

PA92Si

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

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

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

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

Caution

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

After running up the machine increase P.T.O. speed to approximately 360 rpm. and run for a further five minutes before disengaging the P.T.O. and stopping tractor. The reason for this running period under a no load condition is to thoroughly circulate the oil in the reservoir through the return line filter.

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

REMOVAL FROM TRACTOR

DANGER

READ CAREFULLY BEFORE COMMENCING TO REMOVE THE MACHINE FROM THE TRACTOR

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

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

WARNING

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

Select a firm level site for parking the machine.

Remove the parking feet, turn through 90 degrees to face towards the ground and re-locate in their housings.

Unscrew the lift ram tap and with the machine at approximately half reach in normal working position, i.e. not broken back, operate the hydraulic services until the flail head roller is horizontal and level with the feet on the main frame.

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 the levers or switchbox clear of the ground. On Si models only disconnect the supply and return hoses and stow with hose ends clear of the ground.

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

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

Remove draft links and the top link from the machine, drive tractor forward and remove yoke. Blank off the end of the return hose with plug or small plastic bag if a self seal coupling is not fitted.

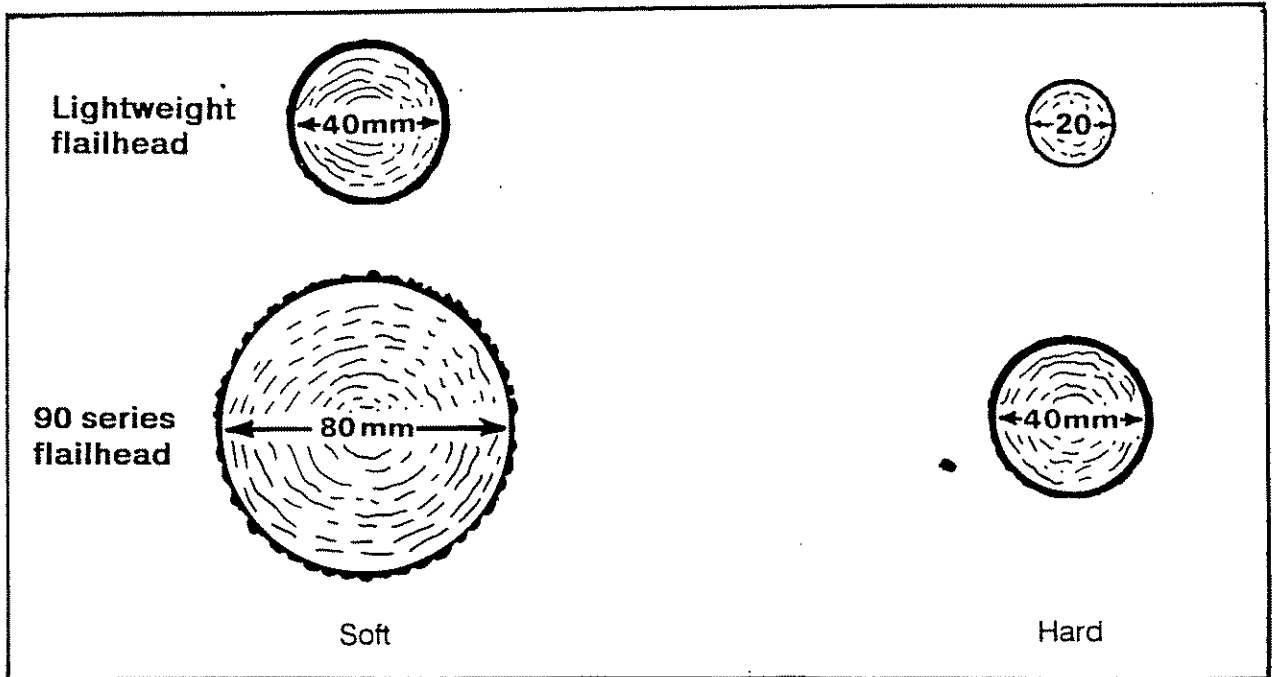
STORAGE

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

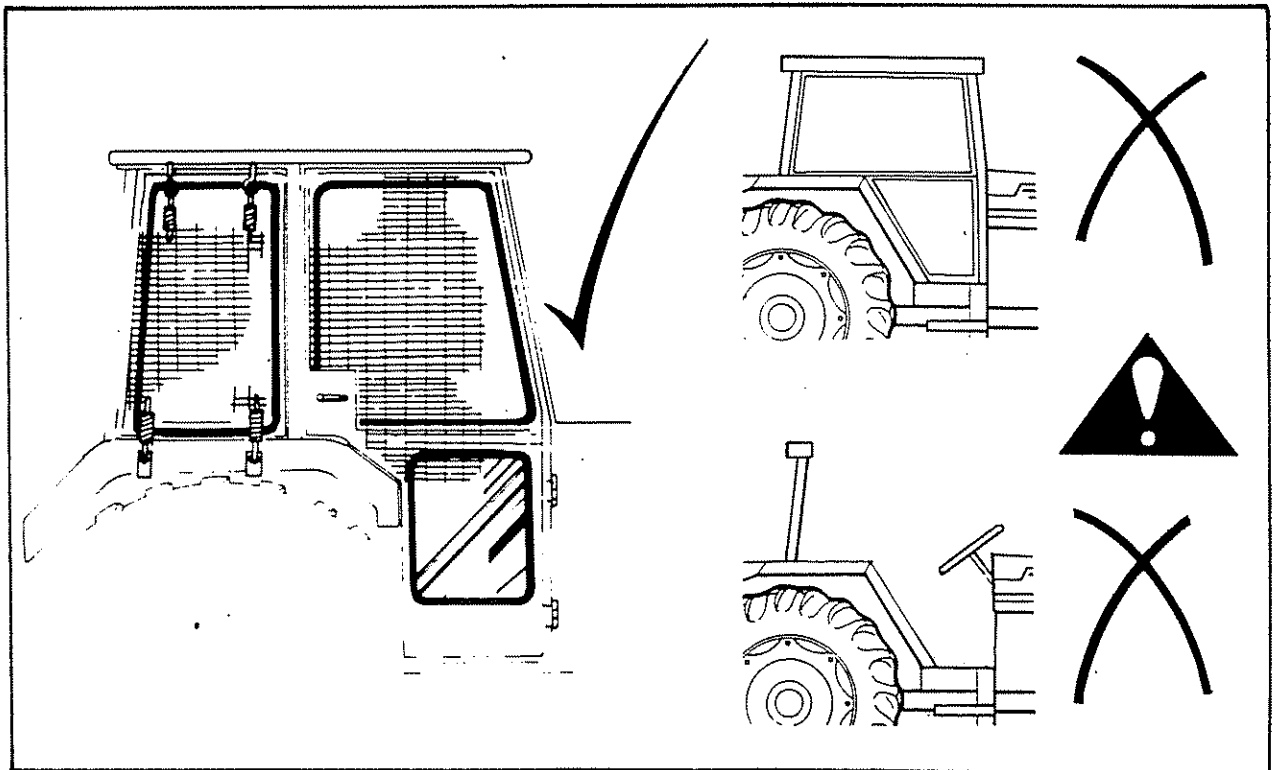
If the machine has to be stored outside tie a piece of tarpaulin or canvas over the control assembly do not use a plastic fertilizer bag which could lead to rapid corrosion.

OPERATION

MATERIAL THICKNESS CUTTING LIMITATIONS



OPERATOR GUARD



PREPARATION

Read the book first

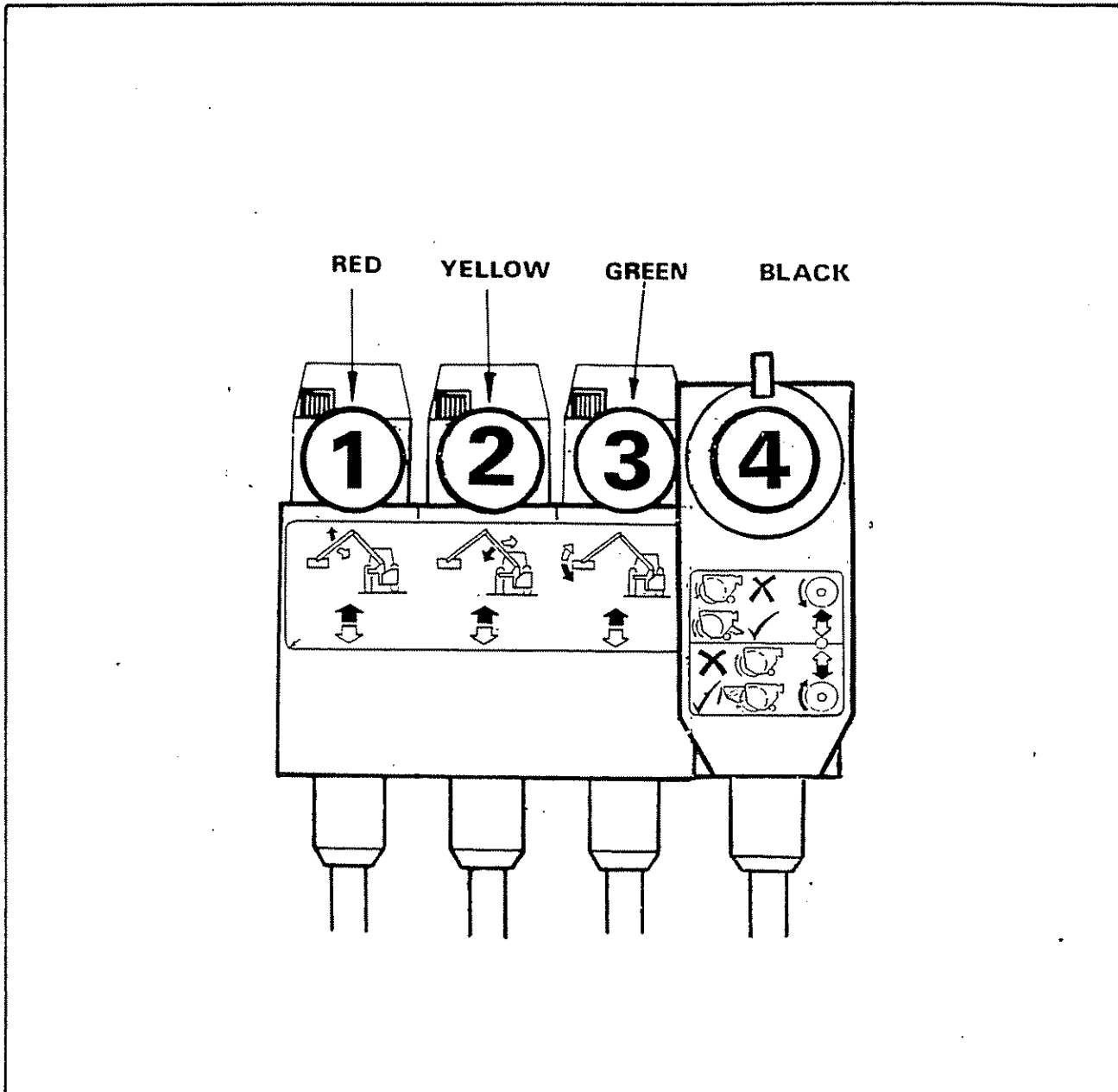
Practise in an open space without rotor running until familiar with controls.

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

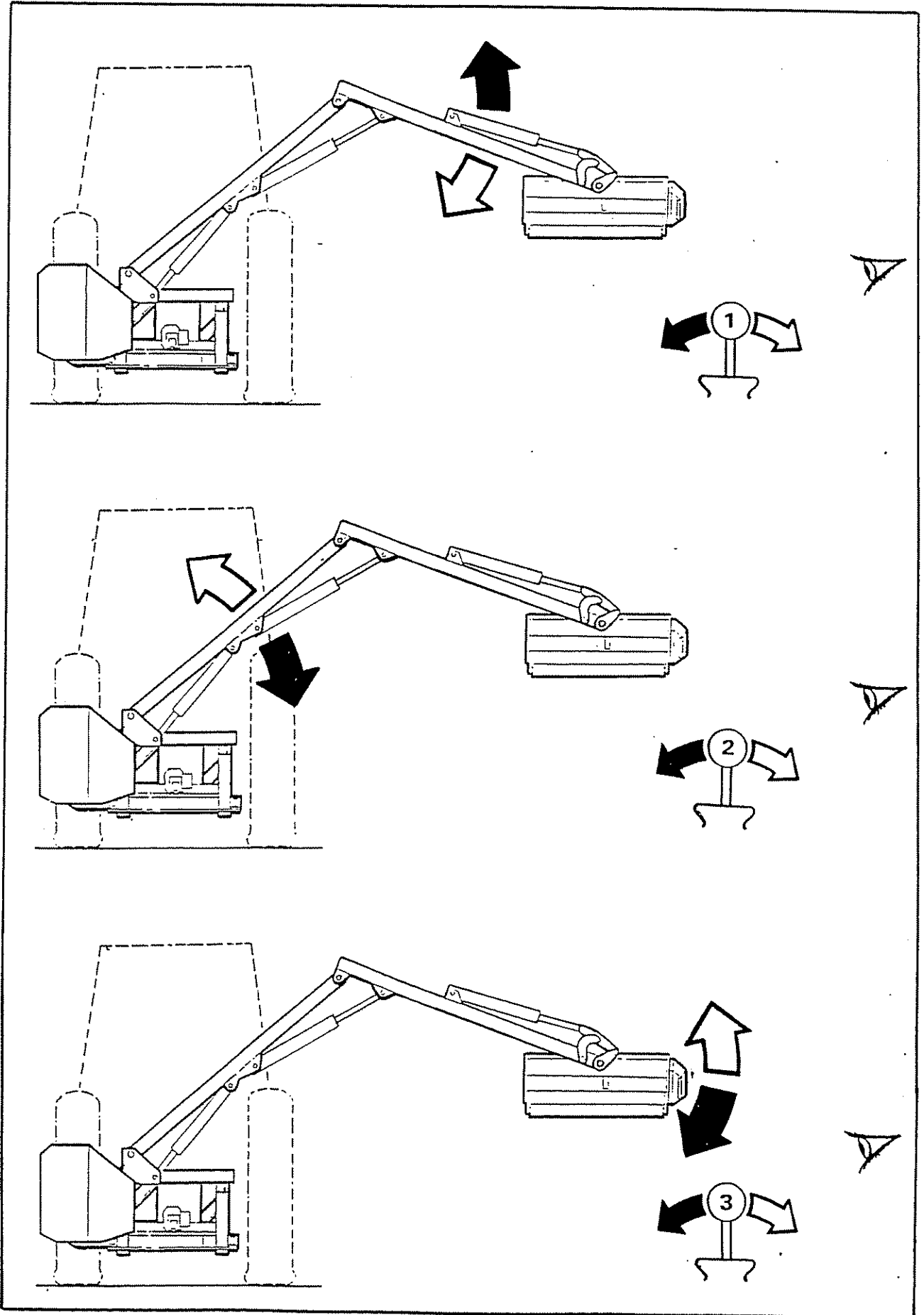
TRACTOR CONTROLS

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

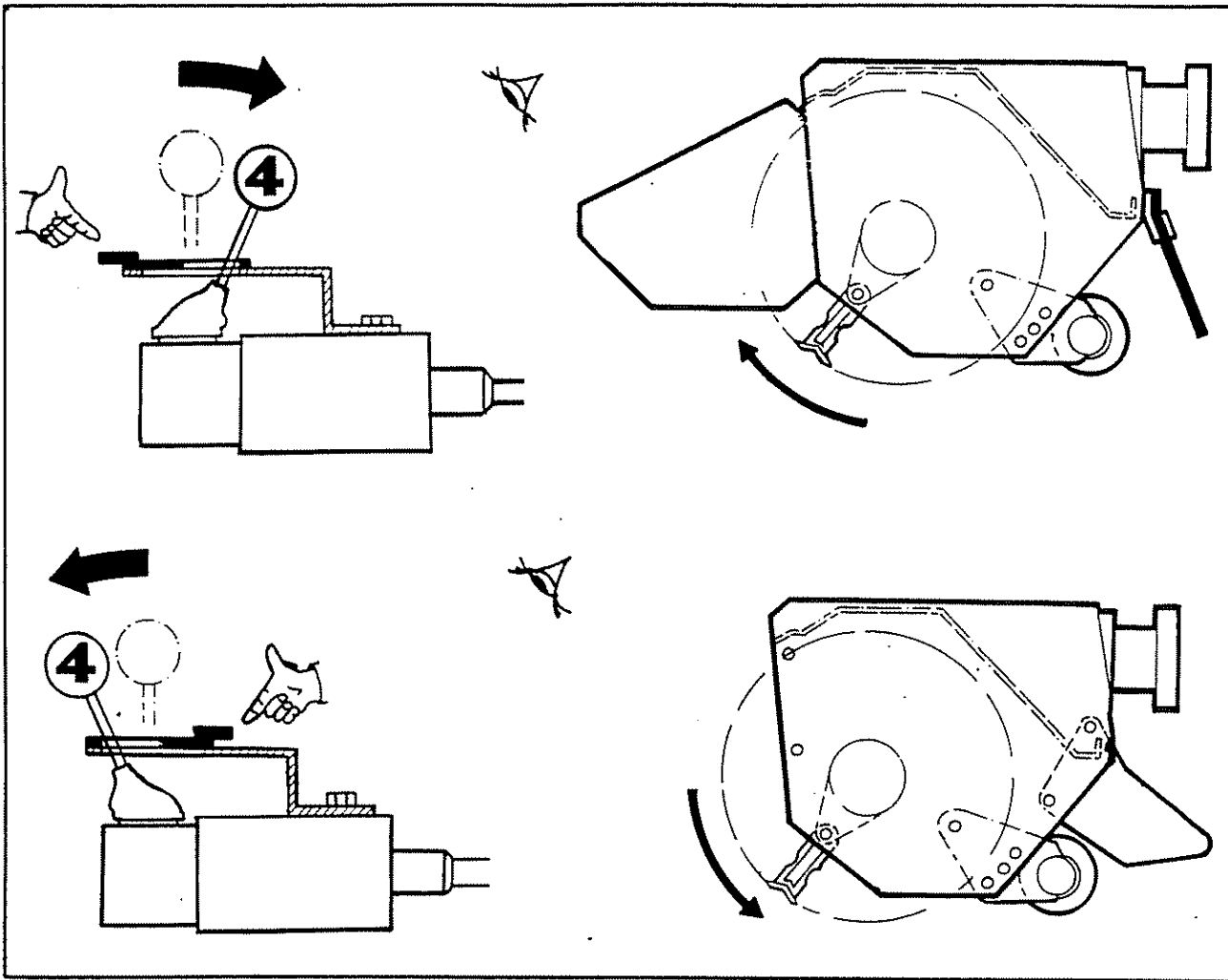
MACHINE CONTROLS



ARM CONTROLS



ROTOR CONTROLS - T.I. only



ROTOR ON/OFF - S.I. only

Rotor on/off is controlled by operation of the tractors P.T.O. lever

To start rotor :-

Bring tractor engine revs up to 1000 RPM

Engage P.T.O.

To stop rotor :-

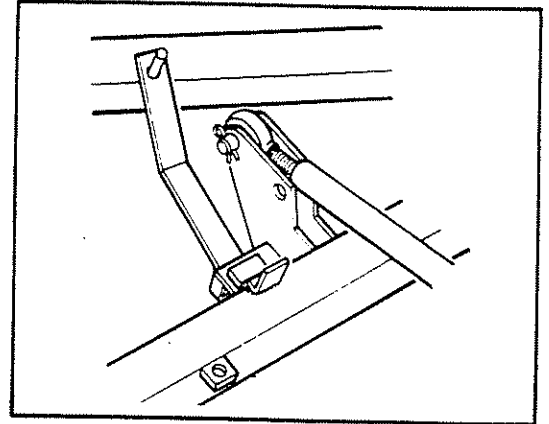
Disengage P.T.O. Do not leave tractors seat until the rotor is stationary.

TRANSPORT POSITION

With the armhead in the working position at right angles to the main frame, the flail can be raised and folded to close proximity of the tractor wheel. Where it is desirable to fold the machine to within tractor's overall width it is necessary to lock the armhead back in the breakaway position by engagement of the breakaway lock pin.

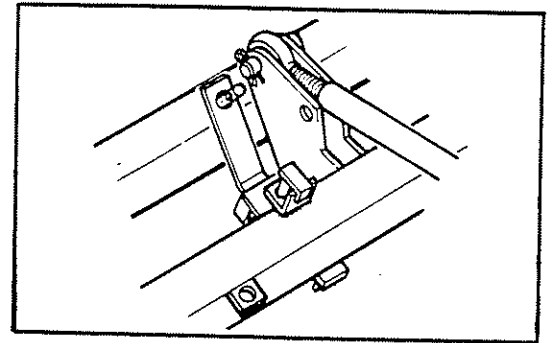
This is best done by releasing the lock pin, placing the flailhead on the ground and driving forwards, while at the same time operating the 'main arm down' lever.

The released lock pin will drop in and locate itself behind the breakaway bar when maximum position is reached. The flail head should then be angled inboard to a vertical position.



MOVING FROM THE TRANSPORT TO THE WORK POSITION

To revert back to the working position it is only necessary to place the flail head firmly on the ground, drive the tractor forward sufficiently to take the weight off the breakaway bar, when the lock pin can then be raised and turned so that its head is held against the protruding lug on the frame.



The arm can then be returned to the work position by either reversing the tractor or by operating the 'lift' control to raise the head which allows the breakaway mechanism to position the flail head for work.

ENGAGING DRIVE

a) Fully independent model

Ensure that the rotor control lever is in the " OFF " position and the lever stop gate allows the required flail rotation.

Engage P.T.O.shaft

Allow the oil to circulate for a few minutes

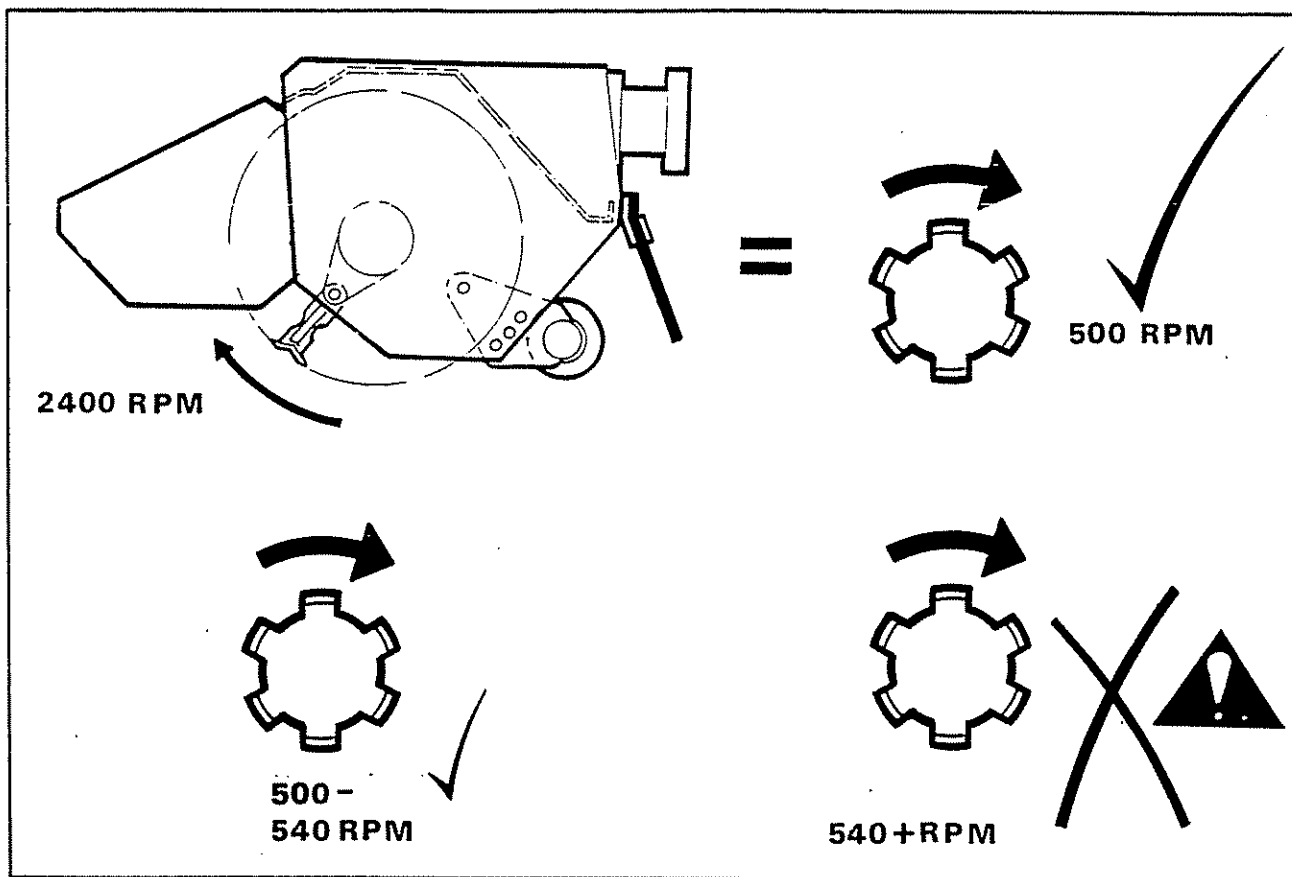
Place the flail head in a safe position

Increase the engine speed to a high idle and move rotor control lever to "ON". After initial surging the rotor will run at an even speed.

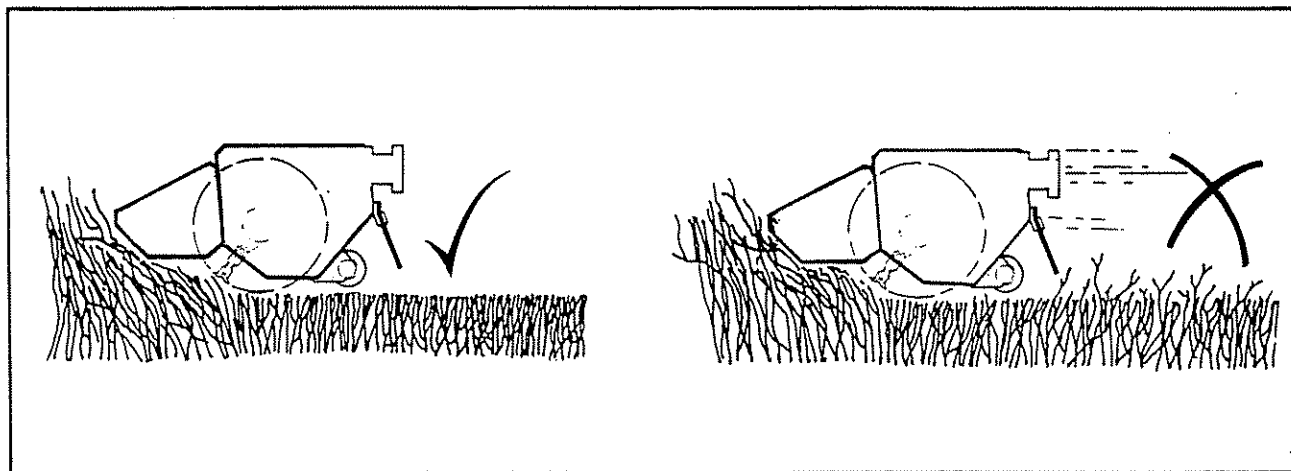
b) Tractor supply model.

Place the flail head at a safe attitude and bring the tractor engine revolutions to 1000 r.p.m. to avoid stalling when the starting load is placed on the motor. Engage the P.T.O. and slowly increase revs. until operating speeds are attained.

ROTOR OPERATING SPEED



TRACTOR FORWARD SPEED



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.

GENERAL WORKING PRACTISES

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 flail has stopped running **before** leaving the tractor seat.

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

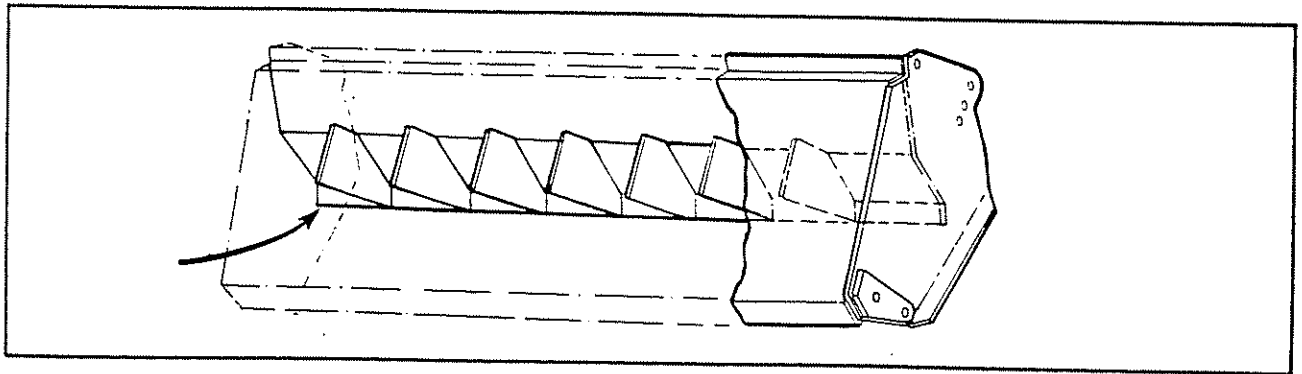
Check frequently that all nuts and bolts are tight.

Keep bystanders at a safe distance.

BREAKAWAY ACTION

When the flail head meets an obstruction and the tractor continues to move forward, the complete armhead which is hinged on the frame will be forced backwards and upwards at the same time in an effort to clear the obstruction. Resetting of the breakaway is completely automatic with the armhead returning to its working position under its own weight. Breakaway reset forces are absorbed by rubber damper.

WIRE TRAP



Both flail hoods are 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.

REMOVING WIRE

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

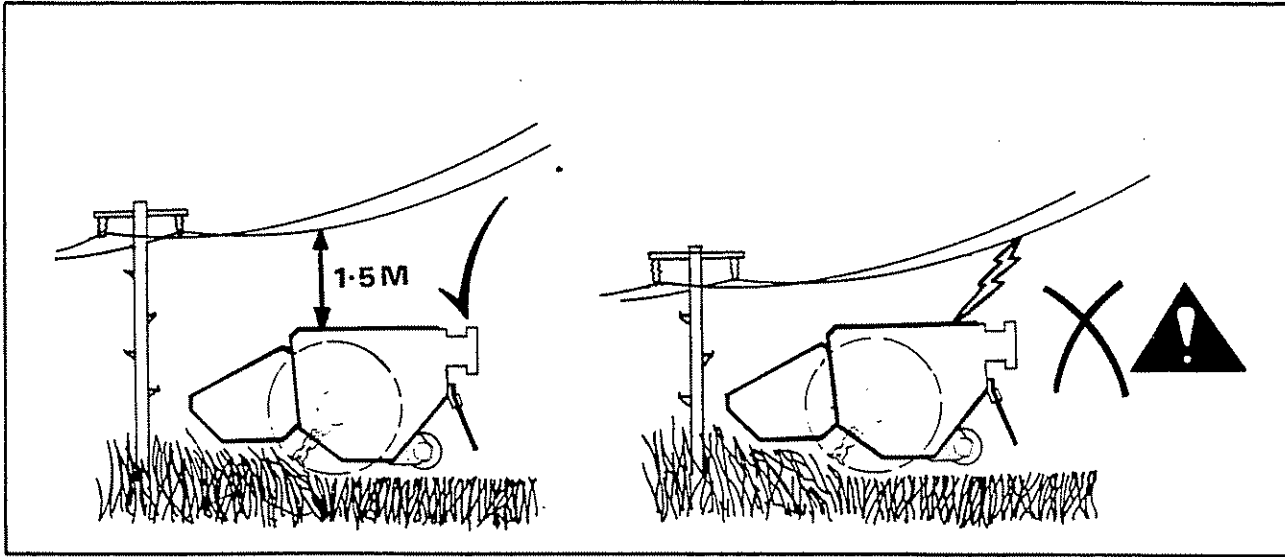
STOP the tractor and only then remove wire.

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

OVERHEAD OBSTRUCTIONS

Always be aware the machine is approximately 4 metres high when folded and take extra care when manoeuvring in areas with overhead obstacles especially power cables.

HIGH VOLTAGE CABLES



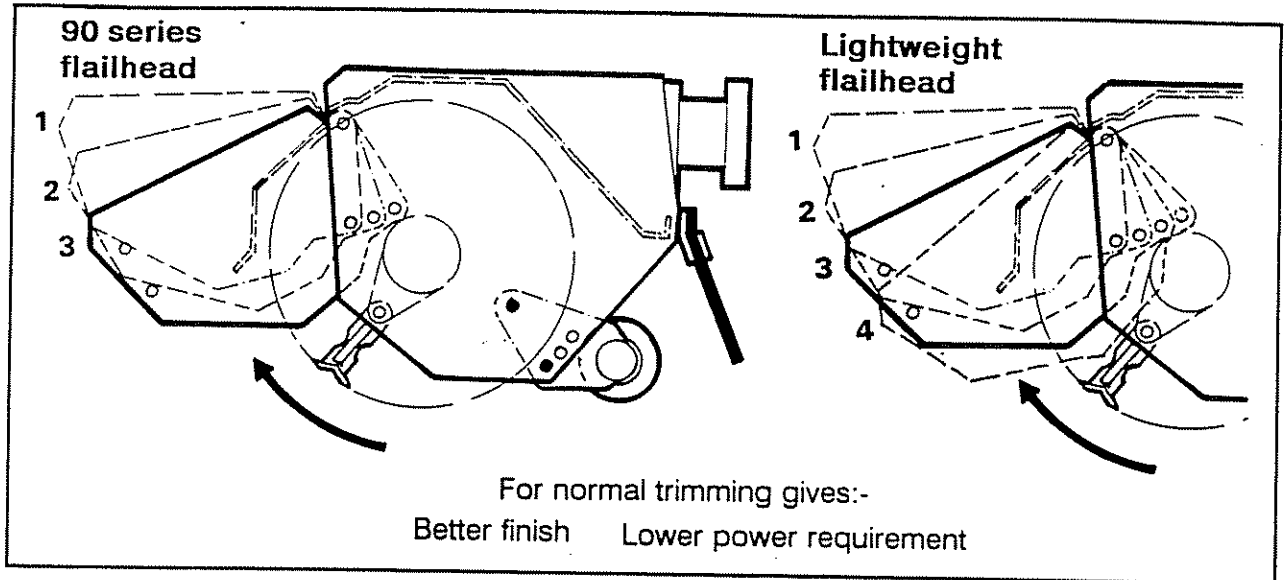
If in doubt consult your local electricity company regarding a safe procedure for work.

HEDGE CUTTING PROCEDURE

Preliminary Precautions

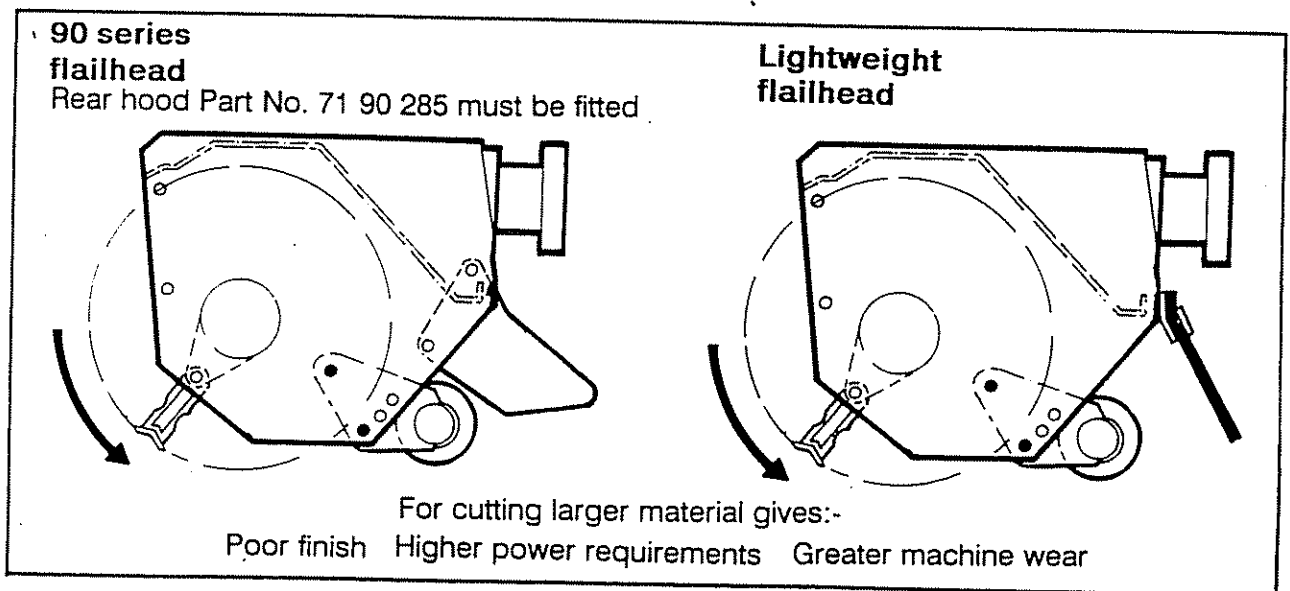
Inspect the work area, remove hazardous materials and note any immovable obstructions.

Upward cutting



Front hood and rear flap must always be in position.

Downward cutting



REVERSING ROTATION T.i., models only

Select Rotor 'OFF'

Wait until rotor has **stopped** rotating

Swing lever stop gate through 180 degrees to allow opposite rotation to be selected.

Caution. Do not remove the lever stop gate

REVERSING ROTATION - S.i. only

Fully extend the armhead and lower flail to the ground to minimise oil loss.

Release the hoses from the flail motor rigid pipes or the rotor control valve and interchange. Do not interchange the flail supply and return hoses at any other point as the hose routing and cross overs in the installation are necessary to allow the hoses to flex correctly during arm movements.

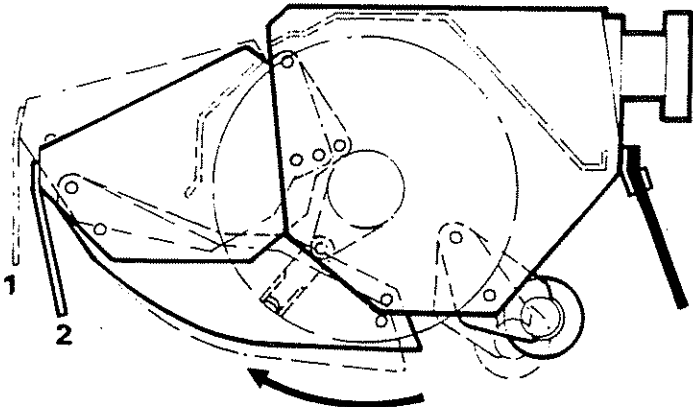
To ascertain the direction of cut without running the machine the following applies.

Connection MP - lower motor rigid pipe } upward cutting
Connection MR - Upper motor right pipe }

Connection MP - Upper motor rigid pipe } downward cutting
Connection MR - Lower motor rigid pipe }

GRASS CUTTING Flails must cut upwards:

90 series flailhead

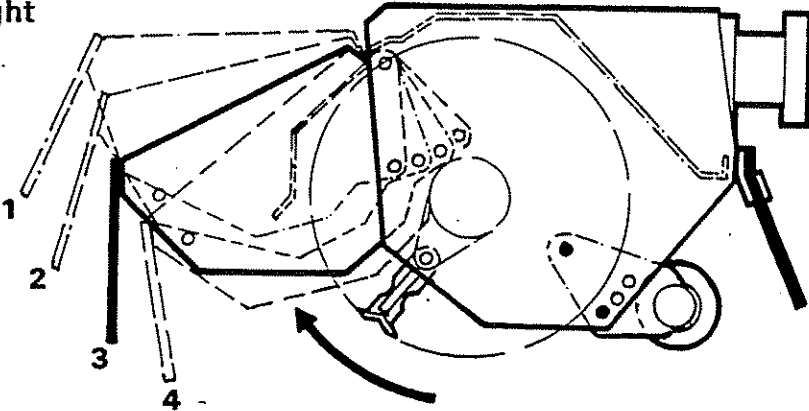


Front hood cw flaps, skids and rear flap must be fitted.

The mounting holes allow two positions for the front hood and two positions for the skids. Any combination of these positions may be used.

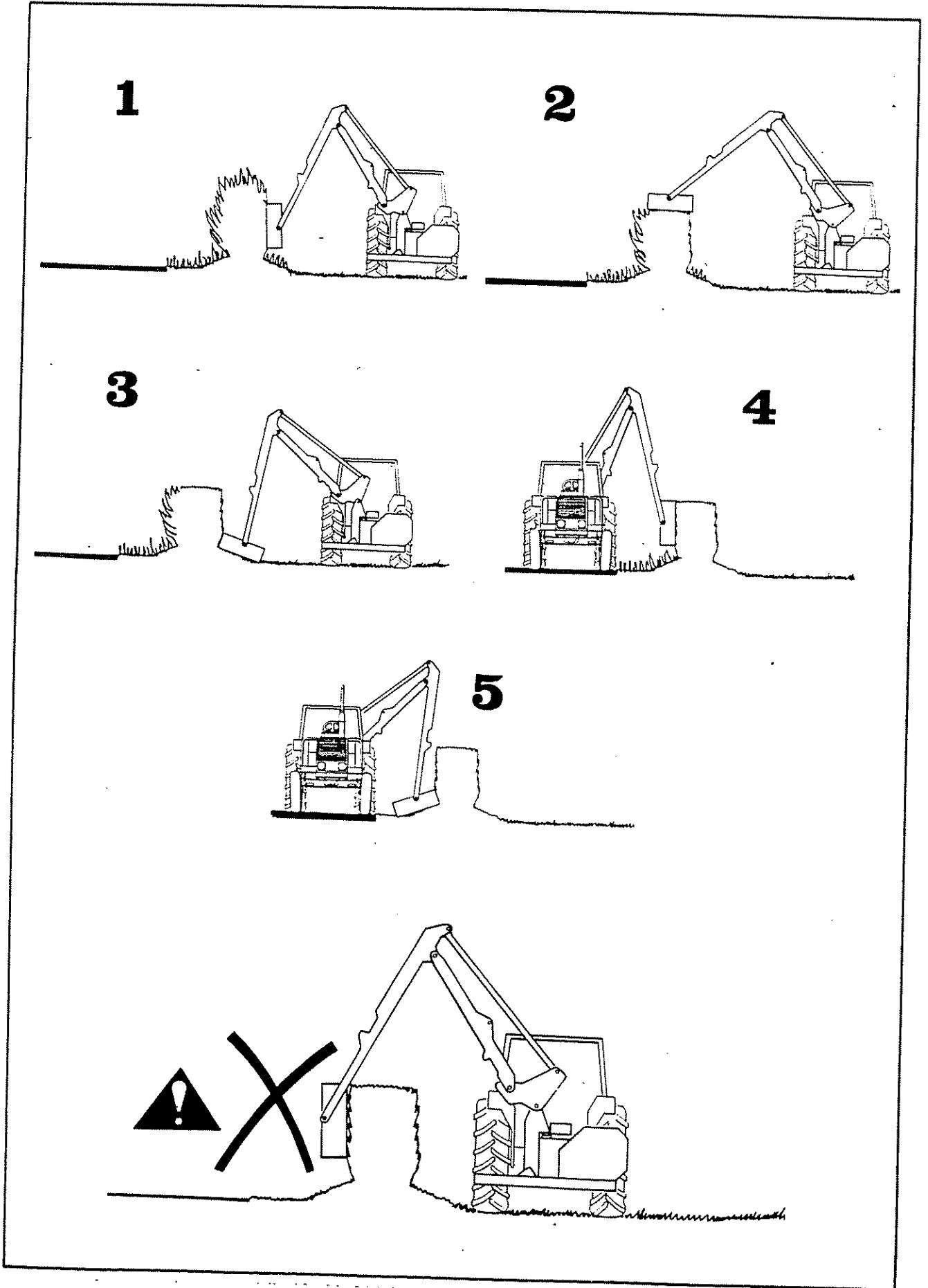
The roller can be set in positions 2 and 3 for bushed rollers or positions 2,3 and 4 for ball bearing rollers.

Lightweight flailhead



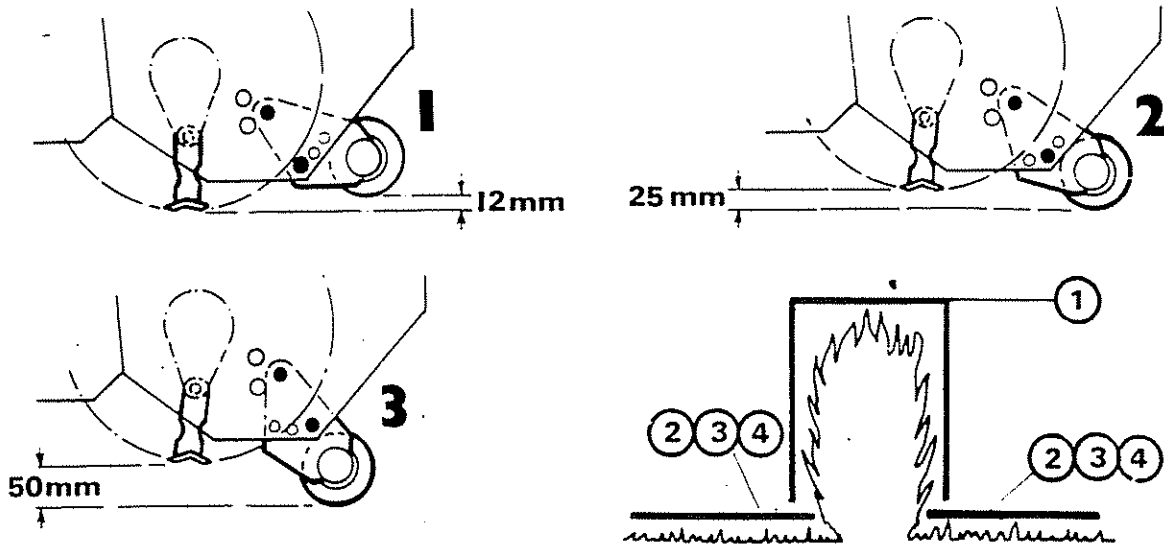
A front hood c/w flaps and a rear flap must be fitted. The front hood must be set in the lowest position which allows the material to be cut. The roller may be set in positions 2 or 3.

Cutting sequence

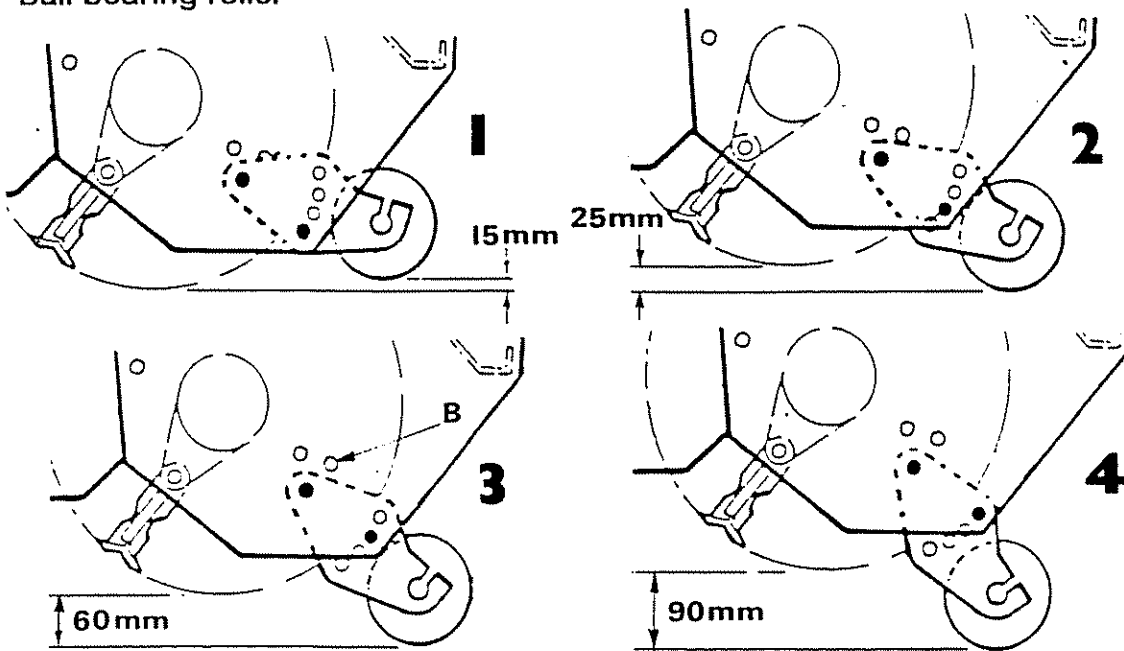


ROLLER POSITION 90 series flailhead

Bushed roller

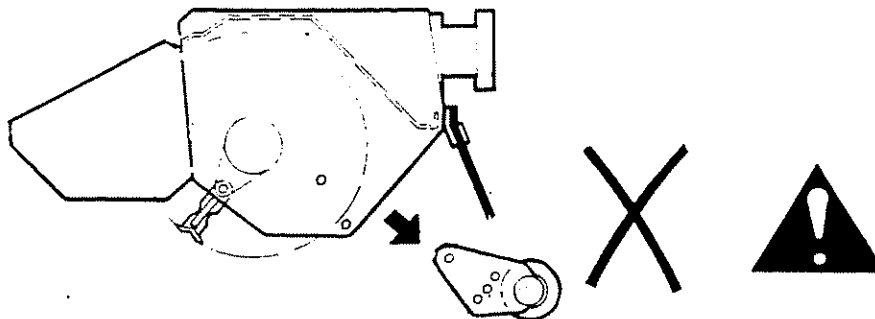


Ball bearing roller



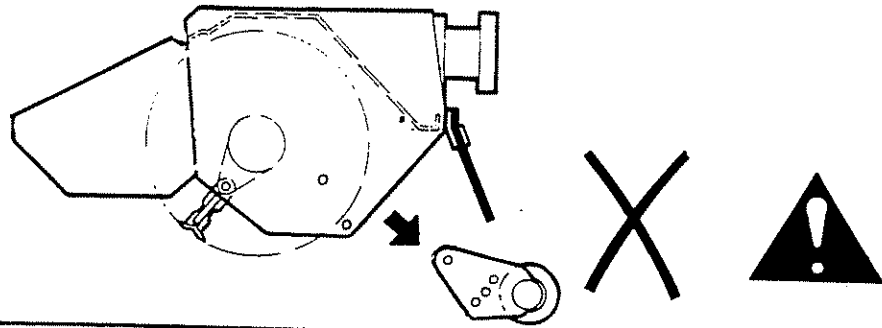
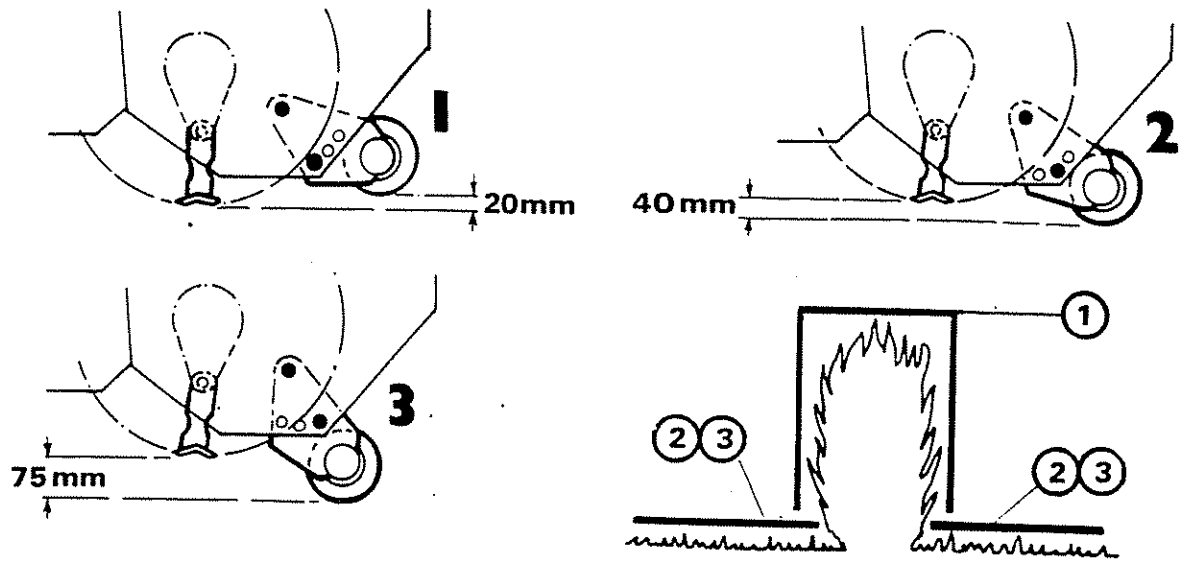
Warning

The ball bearing roller must never be mounted in position B.



ROLLER POSITION Lightweight flailhead

Bushed roller



LIFT FLOAT KIT (Optional extra for ground cutting)

The hydraulic float kit, if fitted, should be mounted as shown clamped to the lift ram barrel. On electric controlled machines the cable from the poppet valve solenoid is connected to the auxiliary switch on the switchbox, it is permissible to also have the angle float facility connected to the auxiliary switch. In this case both functions will operate in unison.

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

The float action is engaged either :-

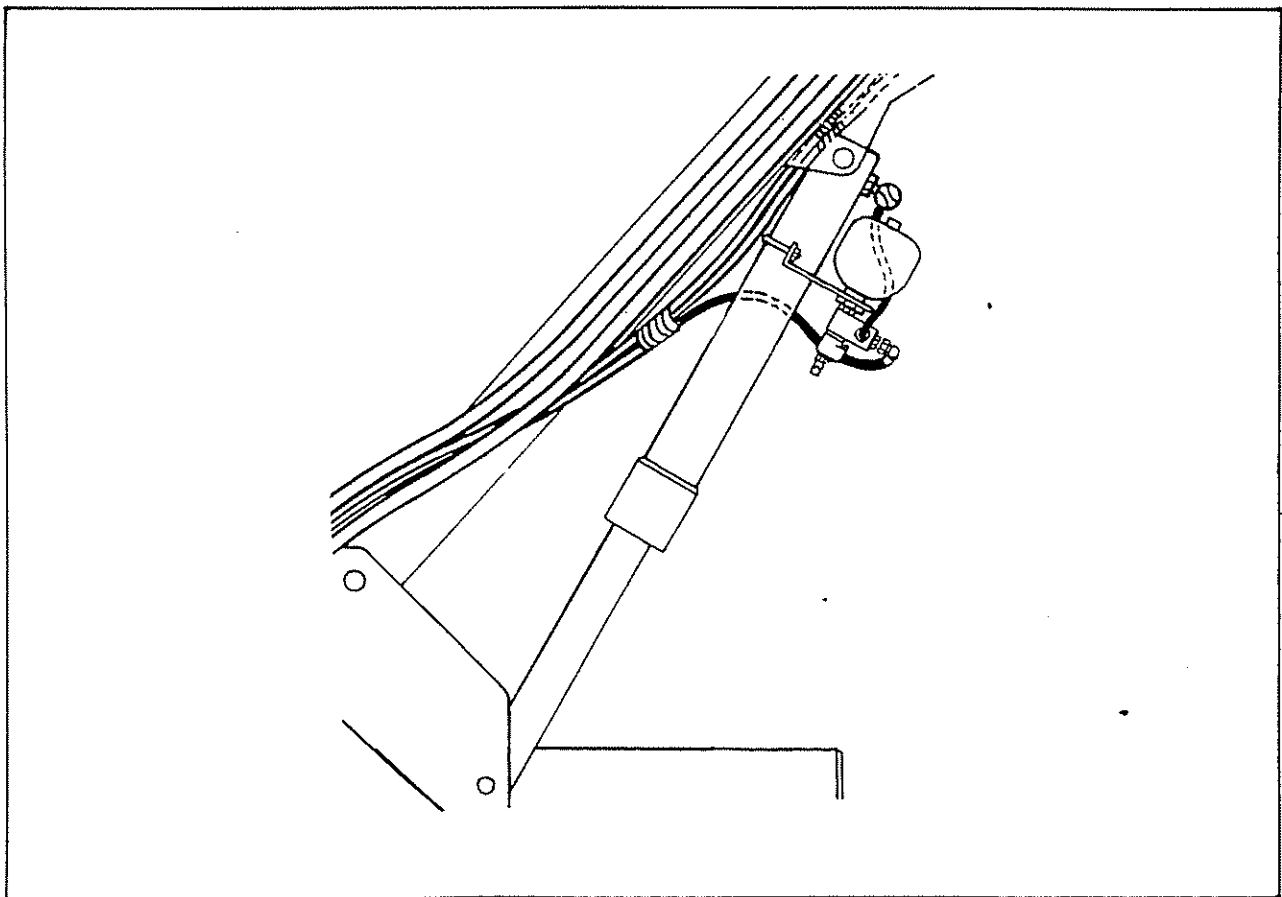
By selection of the auxiliary (angle float) switch on electric machines

Or by manually lifting the knurled plunger on top of the poppet valve out of the V groove and rotating through 90 degrees on cable operated machines.

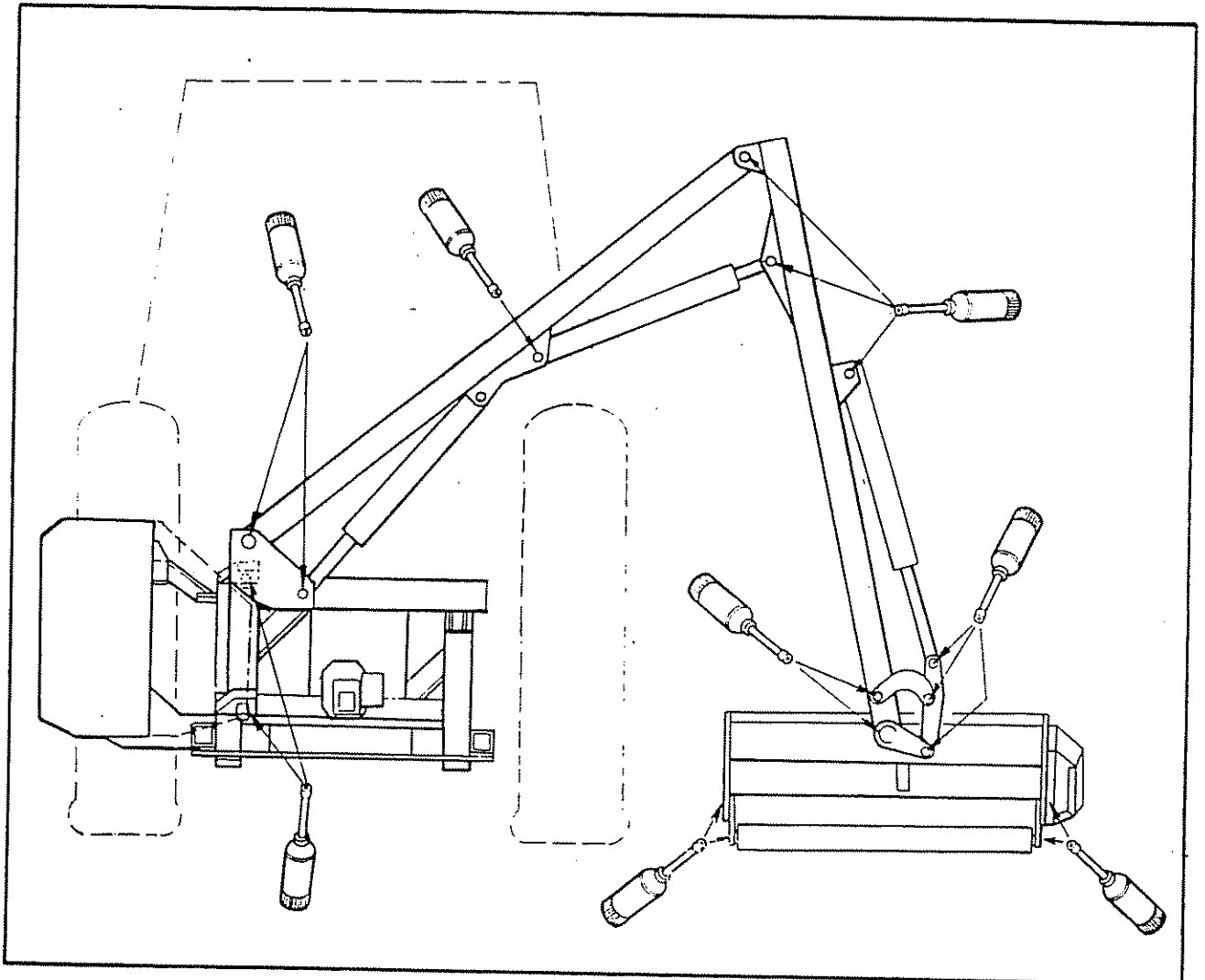
The lift control should be operated to take a proportion of the flail head weight off the flail roller. This is important, too little weight on the roller will leave uncut areas of grass while with too much weight on the roller the ground will be scalped in places and increased flail wear, damage, or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

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

On electric machines where both float functions are fitted a switching kit , part number 84 02 303 is available which isolates the angle float. This allows the machine to be operated with either the lift and angle floats functioning together or with the lift float operating alone.



MAINTENANCE



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.

HYDRAULIC SYSTEM

Oil supply

Check the oil level in the reservoir daily.

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

Moisture 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 element 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.

FLAILHEAD

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. Im-balance 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 re-sharpened 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.

HYDRAULIC HOSES

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 jointing 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. The 90 degree elbows at the head bracket must point directly across the pivot and the hoses must have no slack at this point.

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.

Hose warranty

Warranty is limited to replacement of hoses which have failed due to faulty materials or manufacture. Warranty will not be considered on hoses that have suffered damage by abrasion, cuts or being pinched or trapped while in work. Neither will a claim be considered where a hose end has been damaged by a blow or where the threads or unions have been damaged by overtightening.

P.T.O. GEARBOX

The gearbox is rigidly bolted on to the main frame and has a filler plug. Oil level is correct when level with the filler plug aperture. The gearbox oil should be changed every two years or at 1000 hour intervals: whichever occurs first. The capacity of the gearbox is .25 litres (1/2 pints) S.A.E. 30/50 Tractor universal oil.

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.

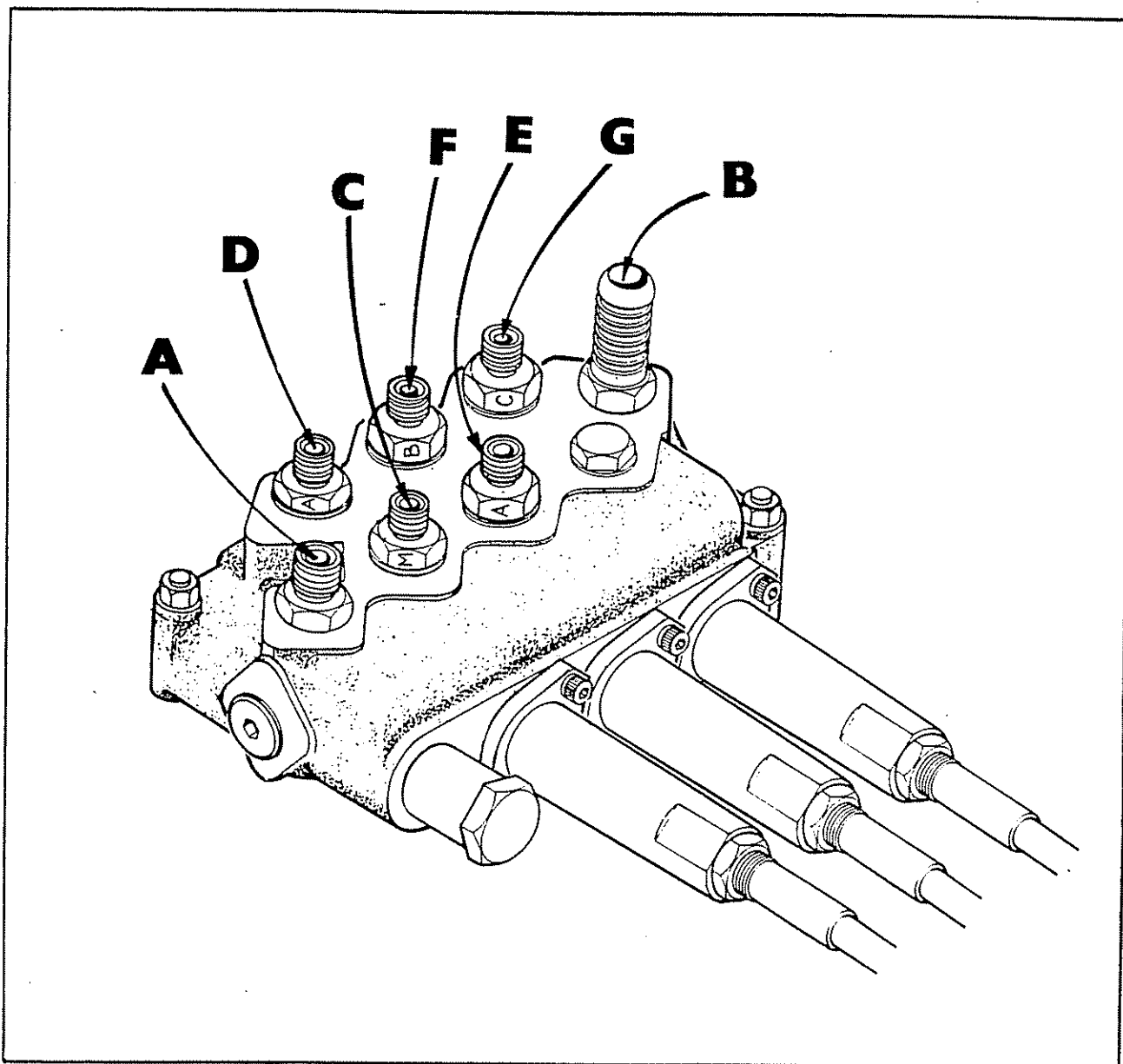
Care should be taken during installation and operation to ensure that the cables are not trapped or kinked. Any abrasion or damage to the outer casing should be sealed with plastic insulation tape to avoid moisture penetrating.

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.

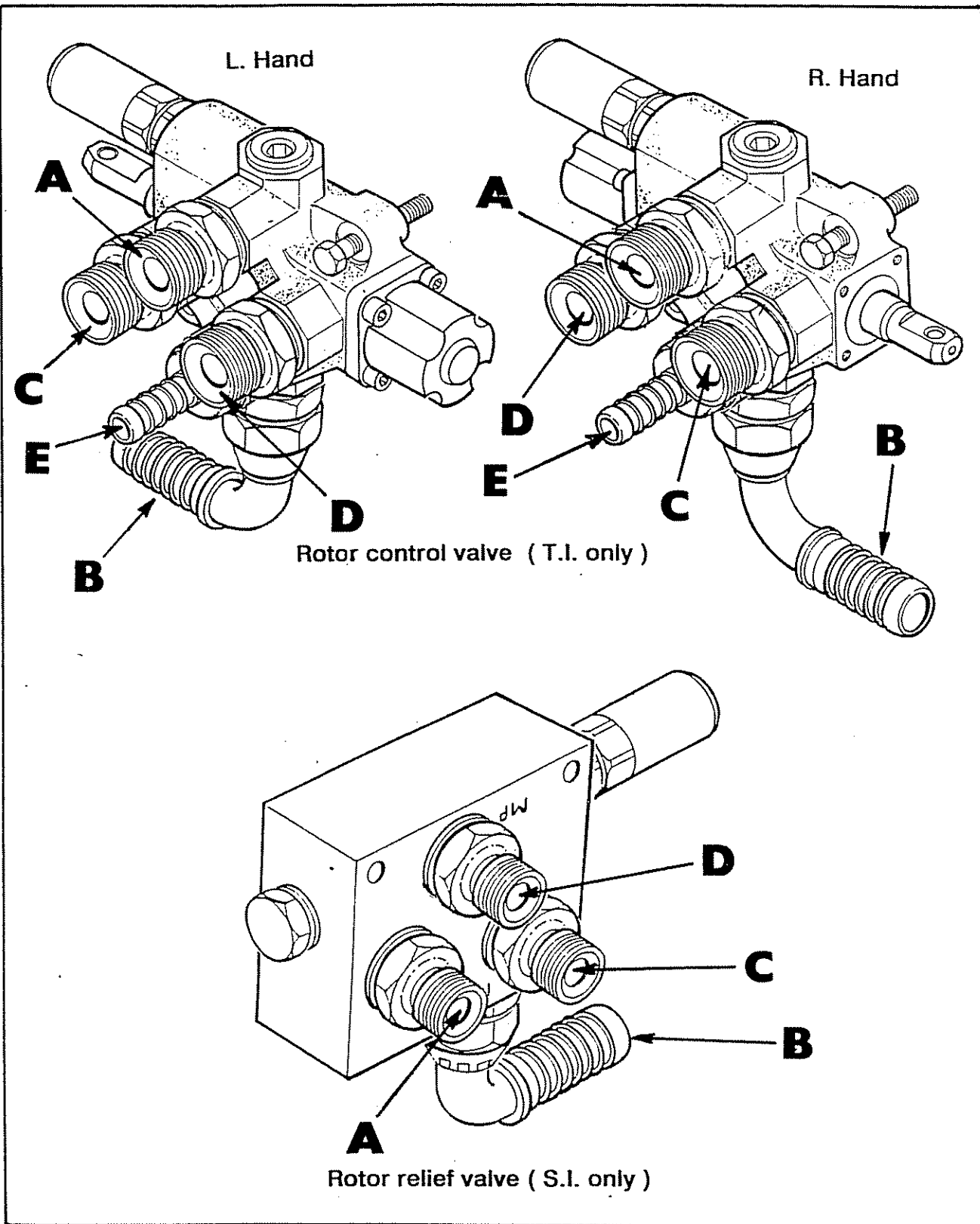
NOTE Take care to ascertain the correct cable connections on both the control unit and the valve in the event of cable replacement.

HOSE CONNECTIONS



Main control valve

- A Supply
- B Return (T.I. illustrated)
- C Reach base - Restrictor M
- D Reach gland - Restrictor A
- E Angle base - Restrictor A
- F Angle gland - Restrictor B
- G Lift base - Restrictor C



L. Hand

R. Hand

Rotor control valve (T.I. only)

Rotor relief valve (S.I. only)

- A Supply from pump
- B Return to tank
- C Motor upper
- D Motor lower
- E Return from main valve

SPARE PARTS MANUAL

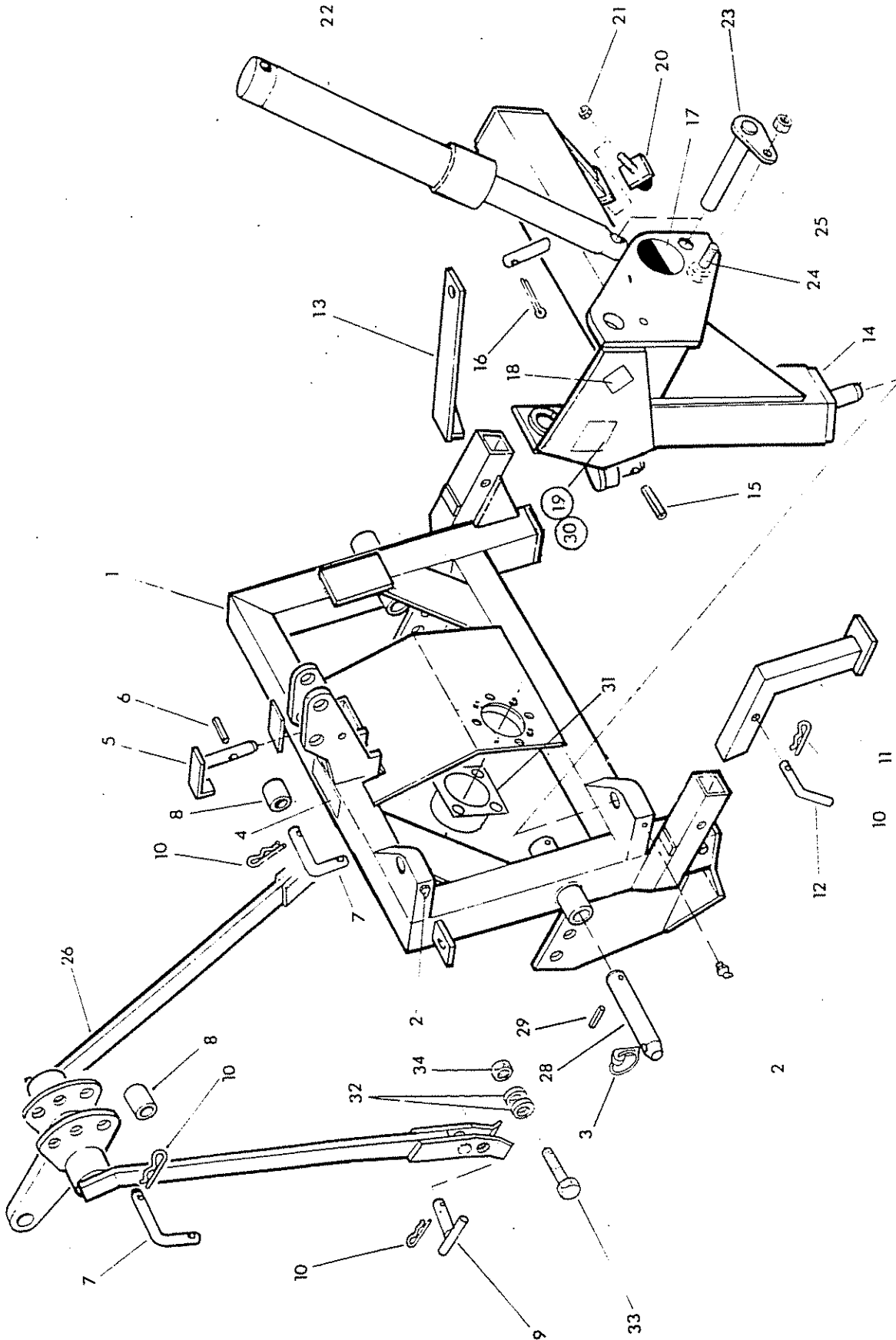
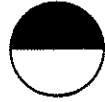
FOR BEST PERFORMANCE....

USE ONLY McCONNEL SPARE PARTS

To be assured of the latest design improvements purchase your genuine replacements from the original equipment manufacturer **McConnel Ltd.** through your local dealer or stockist.

Always quote machine type and serial number as well as the part number.

Design improvement may have altered some of the parts listed in this manual - The latest part will always be supplied when it is interchangeable with an earlier one.





Ref.	Part No.	Qty	Description
FRAMES AND STABILISER R. HAND			
1	71 92 381	1	Main frame - R Hand
2	09 01 125	2	Greaser
3	04 31 217	2	Linch pin
4	71 35 295	1	Sticker - 'Tighten check chains'
5	71 92 038	1	Breakaway lock pin
6	04 25 630	1	Spring dowel
7	71 92 026	2	Top link pin
8	14 67 063	2	Sleeve
9	71 92 027	2	Stabiliser pin
10	04 31 105	6	Spring cotter
11	71 92 307	2	Stand leg
12	71 92 023	2	Leg pin
13	71 92 043	1	Breakaway strap R. Hand
14	71 92 317	1	'T' frame R. Hand
15	04 22 632	1	Spring dowel
16	95 01 406	1	Split pin
17	12 90 296	1	Sticker "Logo roundel"
18	71 05 130	1	Sticker "Read instruction book"
19	13 35 246	1	Serial Number plate
20	13 37 114	1	Buffer including nut
21	01 41 003	1	Self locking nut
22	71 92 326	1	Lift ram assembly (see page90)
23	71 92 040	1	Pivot pin -lift ram rod
24	93 13 066	1	Setscrew
25	91 43 006	1	Self locking nut
26	71 92 405	1	Stabiliser
27	71 36 330	1	P.T.O. drive shaft - not illustrated
28	71 93 020	2	Linkage pin
29	04 22 628	2	Spring dowel
30	71 03 230	4	Pop rivet
31	71 92 071	1	P.T.O. gaurd carrier
32	71 92 080	4	Eccentric collar
33	92 13 148	2	Bolt
34	91 43 008	2	Self locking nut

FRAMES AND STABILISER L. HAND

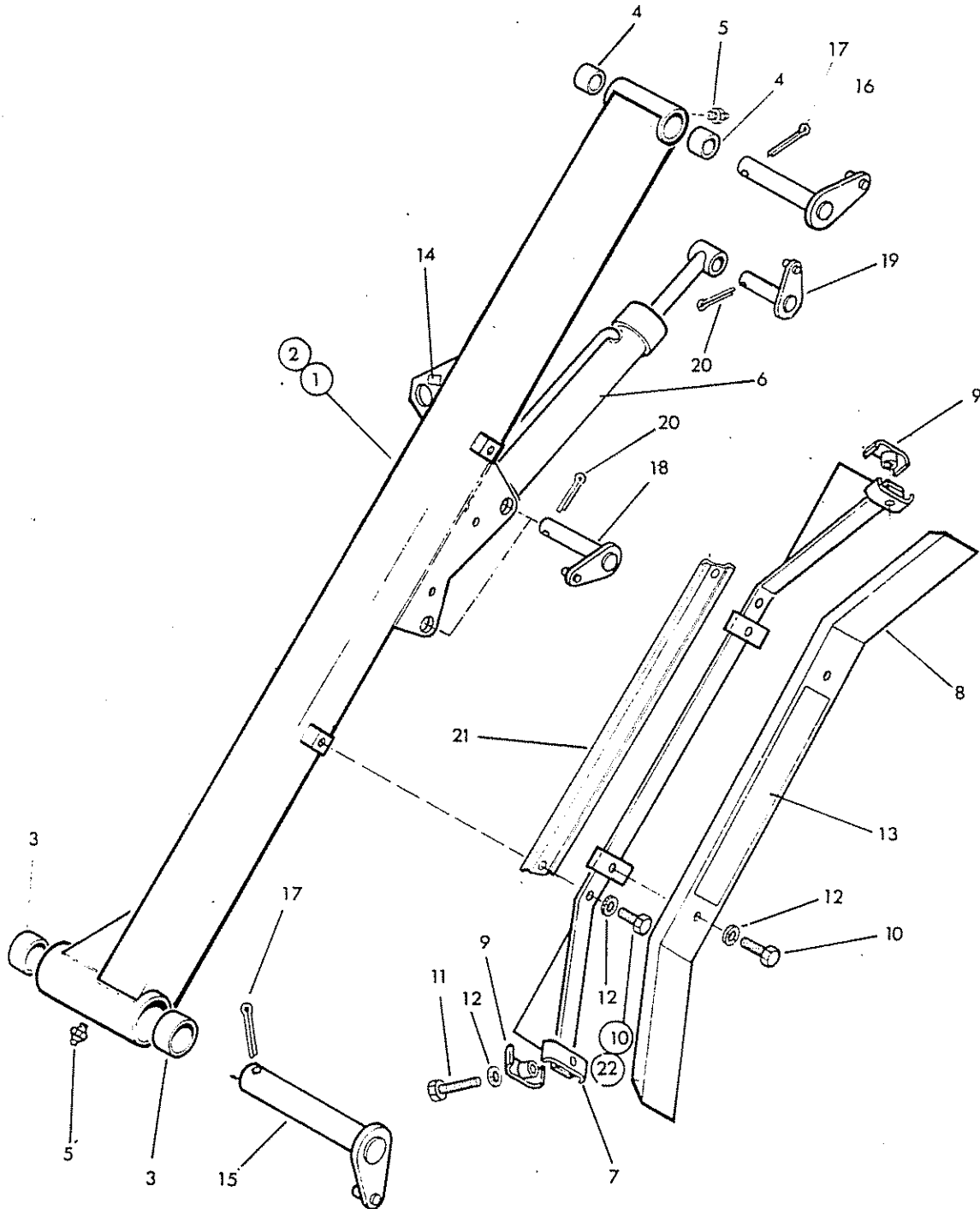
The parts list is common to the above with the following exceptions

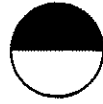
1	71 92 382	1	Main frame L. Hand
13	71 92 055	1	Breakaway strap L. Hand
14	71 92 347	1	T frame L. Hand

MAIN ARM



MCDONNELL



**McCONNEL**

Ref.	Part No.	Qty.	Description
MAIN ARM - STD POWER			
1	71 92 361	1	Main arm R. Hand
2	71 92 362	1	Main arm L. Hand
3	72 13 023	2	Bush main arm pivot
4	71 01 134	2	Bush dipper arm pivot
5	09 01 121	2	Greaser
6	71 92 410	1	Reach ram assembly
7	71 93 313	1	Hose guide
8	71 93 321	1	Hose cover
9	71 93 014	2	Hose clamp
10	93 13 055	4	Setscrew
11	92 13 085	2	Bolt
12	91 00 305	6	Internal serrated washer
13	12 90 255	1	Sticker 'McConnel'
14	60 55 002	1	Sticker ' Sling here'
15	71 92 039	1	Pivot pin - main arm
16	71 92 042	1	Pivot pin - dipper
17	95 01 509	2	Split pin dia
18	71 92 041	2	Pivot pin - Lift and reach ram base
19	71 92 060	1	Pivot pin - Reach ram rod
20	95-01-406	3	Split pin dia

MAIN ARM - HI POWER

The parts are identical to above with the following exceptions

7	71 95 310	1	Hose guide
9	71 93 015	2	Hose clamp
21	71 95 312	1	Hose plate
22	92 13 095	2	Bolt

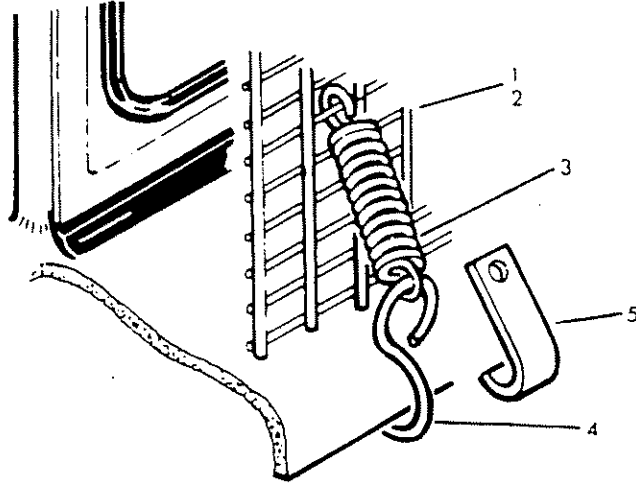
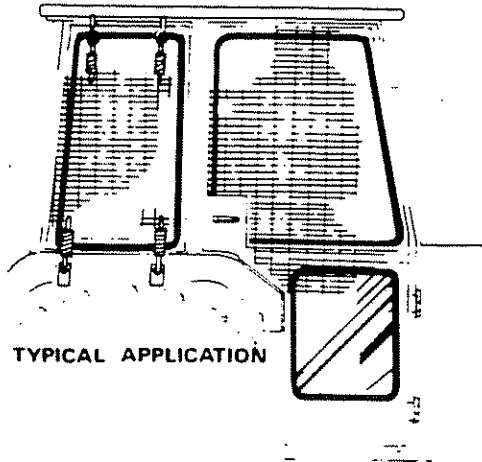


Ref.	Part No.	Qty.	Description
DIPPER ARM AND ANGLING -STD POWER			
1	71 92 363	1	Dipper arm
2	71 36 035	2	Bush - head pivot
3	71 01 083	6	Bush - radius arm and slave link
4	09 01 121	4	Graser
5	75 60 344	1	Angling ram assembly (see page 92)
6	71 92 024	1	Pivot pin - angle ram base
7	71 92 008	1	Pivot pin - angle ram rod
8	71 92 311	1	Radius arm - front
9	71 92 310	1	Radius arm - rear
10	95 01 406	5	Split pin
11	71 93 313	1	Hose guide
12	71 93 321	1	Hose cover
13	93 13 055	4	Setscrew
14	92 13 085	1	Bolt
15	92 13 125	1	Bolt
16	91 00 305	6	Internal serrated washer
17	71 93 014	2	Hose clamp
18	71 93 019	1	Hose clip - angle hoses
19	12 90 295	1	Sticker 'Power arm'
20	12 90 294	1	Sticker '92'
21	71 92 308	1	Head pivot tube
22	71 92 309	1	Slave link
23	71 92 316	1	Jaw plate
24	04 23 548	1	Spring dowel
25	92 13 185	1	Bolt
26	71 92 321	1	Hose junction bracket
27	02 11 126	1	Bolt
28	71 92 009	1	Pivot pin - slave link
29	02 11 146	1	Bolt
30	01 41 006	2	Self locking nut
31	71 92 324	1	Hose tray 90 series flail head - as illustrated
	71 93 375	1	Hose tray lightweight flail head - not illustrated
32	93 13 045	2	Setscrew
33	91 43 005	3	Self locking nut
34	12 90 047	1	Sticker 'S'

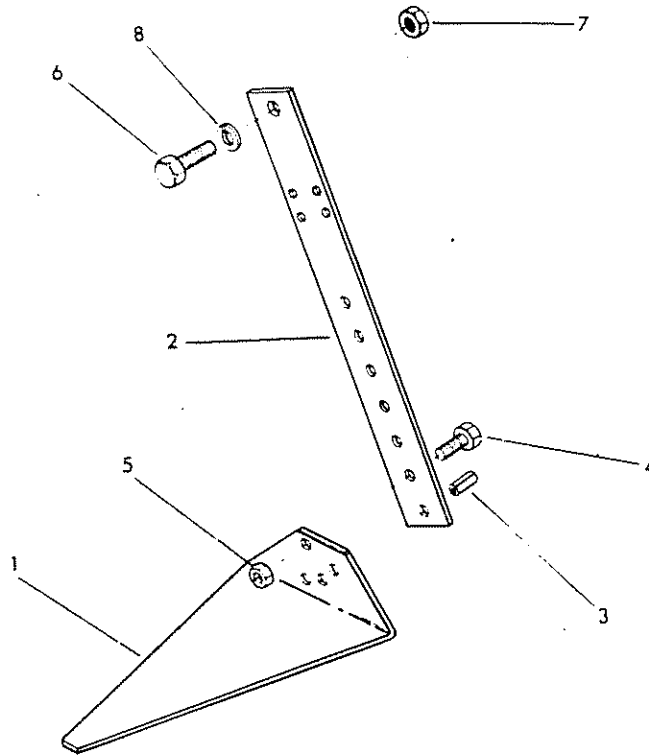
DIPPER ARM AND ANGLING - HI POWER

The parts list is identical to above with the following exceptions.

11	71 95 310	1	Hose guide
17	71 93 015	2	Hose clamp
26	71 95 303	1	Hose junction bracket
35	71 95 312	1	Hose plate
36	92 13 095	2	Bolt

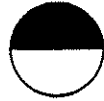


Ref.	Part No.	Qty.	Description
	73-13-324		CAB GUARD KIT
1	73-13-049	1	Guard panel - large
1	73-13-050	1	Guard panel - small
2	60-01-064	12	Spring
3	60-01-065	6	Hook
4	73-13-051	6	Hook



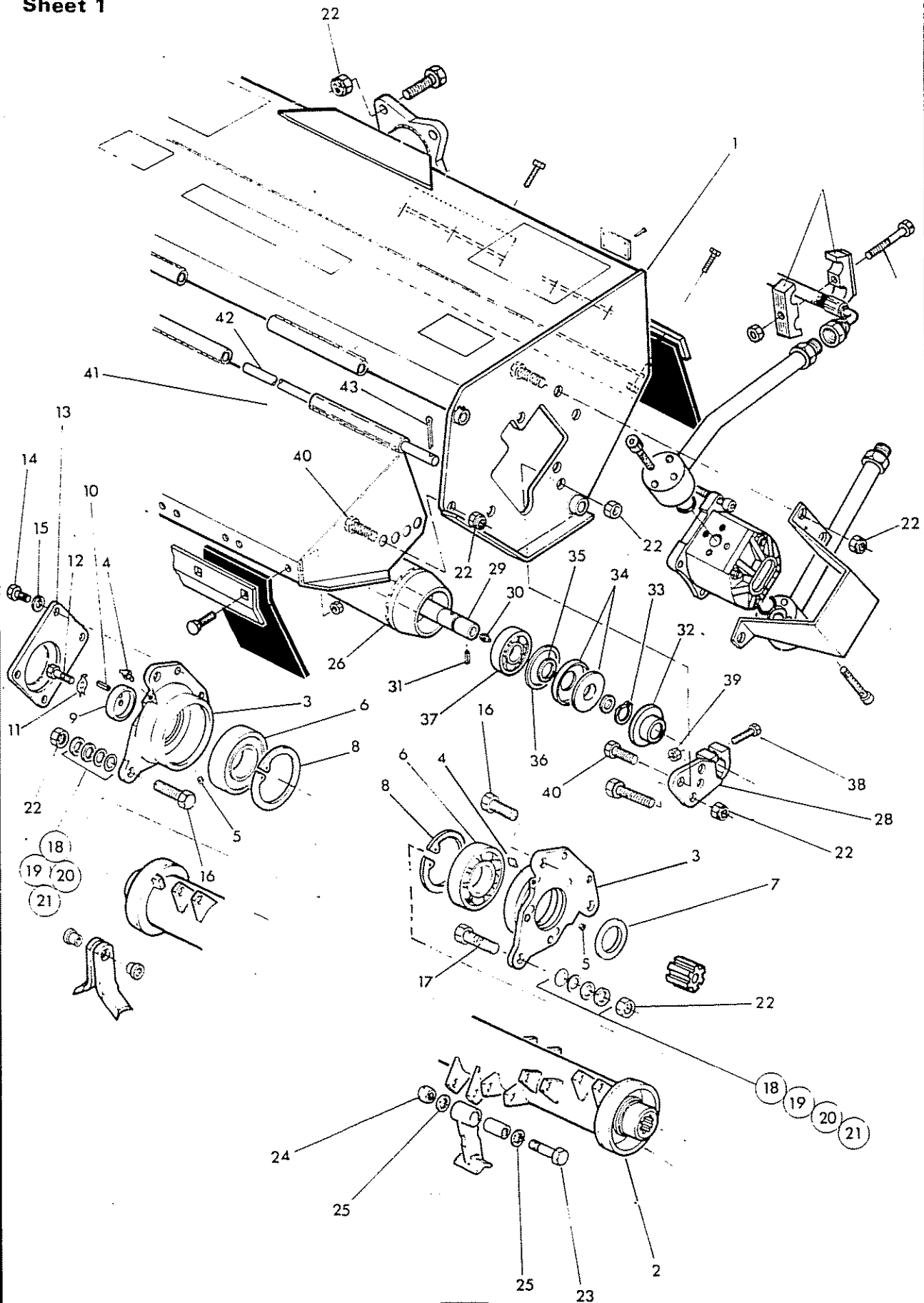
Ref.	Part No.	Qty.	Description
	71-09-319		CONTROL MOUNTING ASSEMBLY
1	71-09-320	1	Sandwich plate
2	71-09-146	1	Pillar including spring dowel
3	04-22-816	1	Spring dowel
4	93-13-066	1	Setscrew
5	91-13-006	1	Nut
6	93-11-086	1	Setscrew
7	01-11-006	1	Nut
8	01-00-206	1	Spring washer

LIGHTWEIGHT FLAILHEAD



McCONEL

Sheet 1





Ref.	Part No.	Qty.	Description
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1.2 LIGHTWEIGHT FLAIL HEAD**Items 1- 69 inclusive are common to all lightweight flail head builds**

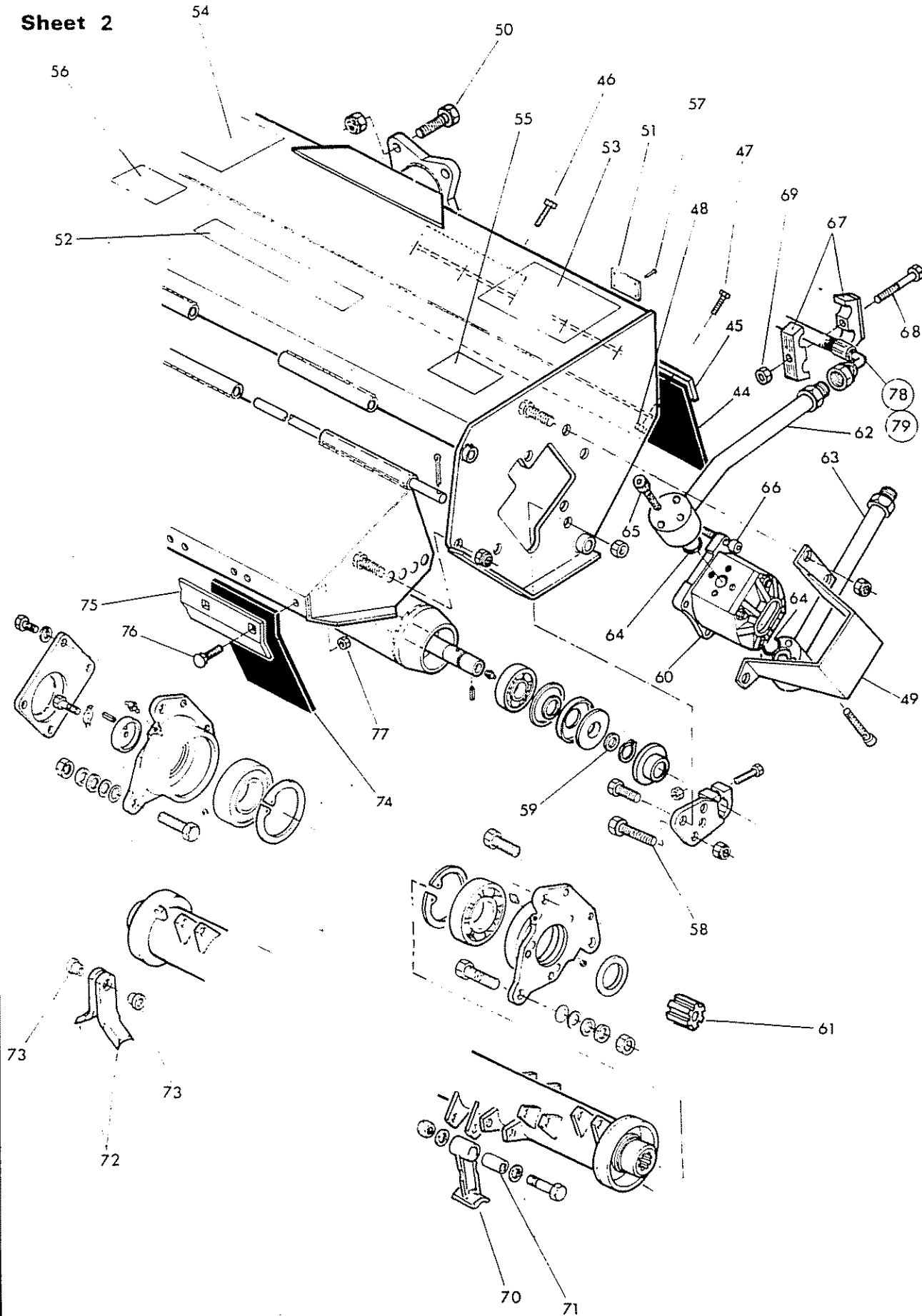
1	71 92 388	1	Flail casing
2	71 91 358	1	Rotor
3	71 90 261	2	Bearing housing
4	09 01 124	2	Greaser
5	85 82 041	2	Plug
6	06 00 018	2	Ball bearing
7	71 90 015	1	Motor locating washer
8	71 90 022	2	Internal circlip
9	71 90 025	1	Clamp washer
10	04 21 608	1	Spring dowel
11	71 90 024	1	Tabwasher
12	93 13 076	1	Setscrew
13	71 90 292	1	Cover plate
14	93 13 045	4	Setscrew
15	91 00 205	4	Spring washer
16	03 11 126	5	Setscrew
17	03 11 146	1	Setscrew
18	81 21 044	as req	Shim
19	81 21 043	as req	Shim
20	71 91 099	as req	Shim
21	71 91 098	as req	Shim
22	01 41 006	18	Self locking nut
23	71 91 109	24	Bolt
24	01 41 005	24	Self locking nut
25	01 00 305	48	Internal shakeproof washer
26	71 91 359	1	Roller
27	71 91 288	1	Roller bracket - Right hand - not illus
28	71 91 287	1	Roller bracket - Left hand
29	71 91 360	1	Roller axle
30	09 01 121	2	Greaser
31	04 25 408	1	Spring dowel
32	71 91 285	2	Roller spacer
33	04 01 225	2	External circlip
34	71 91 091	2	Sealing washer set
35	71 91 092	2	Spacer washer - small
36	71 91 093	2	Spacer washer - inner
37	06 00 088	2	Ball bearing
38	02 11 183	2	Bolt
39	01 41 003	2	Self locking nut
40	03 11 106	6	Setscrew
41	71 91 352	1	Front hood
42	71 91 116	1	Hood pivot pin
43	95 01 406	1	Split pin dia

LIGHTWEIGHT FLAILHEAD



McCOMBELL

Sheet 2





LIGHTWEIGHT FLAIL HEAD - Continued

44	71 91 361	1	Rear flap
45	71 91 362	1	Clamp strip
46	93 13 075	3	Setscrew
47	93 13 055	10	Setscrew
48	91 43 005	13	Self locking nut
49	71 91 283	1	Motor cover
50	02 11 186	4	Bolt
51	13 35 246	1	Serial No. plate
52	12 90 255	1	Sticker "McConnel"
53	12 90 377	1	Sticker "Instructions"
54	12 90 341	1	Sticker 'Flail' guarding
55	12 90 392	1	Sticker 'McConnel Parts'
56	00756485	1	Sticker 'Blade warning'
57	71 03 230	1	Pop rivet
58	03 11 146	2	Setscrew
59	71 91 107	as req	Roller shim
60	83 01 263	1	Hydraulic motor Until April 1993
	83 01 281	1	Hydraulic motor From April 1993
61	71 90 009	1	Drive coupling
62	71 90 376	1	Rigid pipe - upper
63	71 90 377	1	Rigid pipe - lower
64	86 00 121	1	O ring
65	93 00 014	6	Capscrew
66	93 00 144	4	Capscrew
67	71 90 148	1	Hose clamp assembly
68	92 13 165	1	Bolt
69	91 43 005	1	Self locking nut

The remaining items are additional and specific to the individual assys listed

HEDGE FLAIL HEADS

70	71 91 320	24	Flail - cast
71	71 91 054	24	Bush

GRASS FLAIL HEADS

72	71 91 315	48	Flail - pressed
73	71 91 095	48	Bush
	71 91 363	1	Front flap kit
74	71 91 020	8	Front flap
75	71 90 304	1	Clamp
76	92 93 054	16	Bolt cup square
77	91 43 004	16	Self locking nut

FLAIL HEADS WITH OUTBOARD MOTORS

78	85 38 015	2	Hose 3/4" BSP x 34" long
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FLAIL HEADS WITH INBOARD MOTORS

79	85 38 025	2	Hose 3/4" BSP x 42" long
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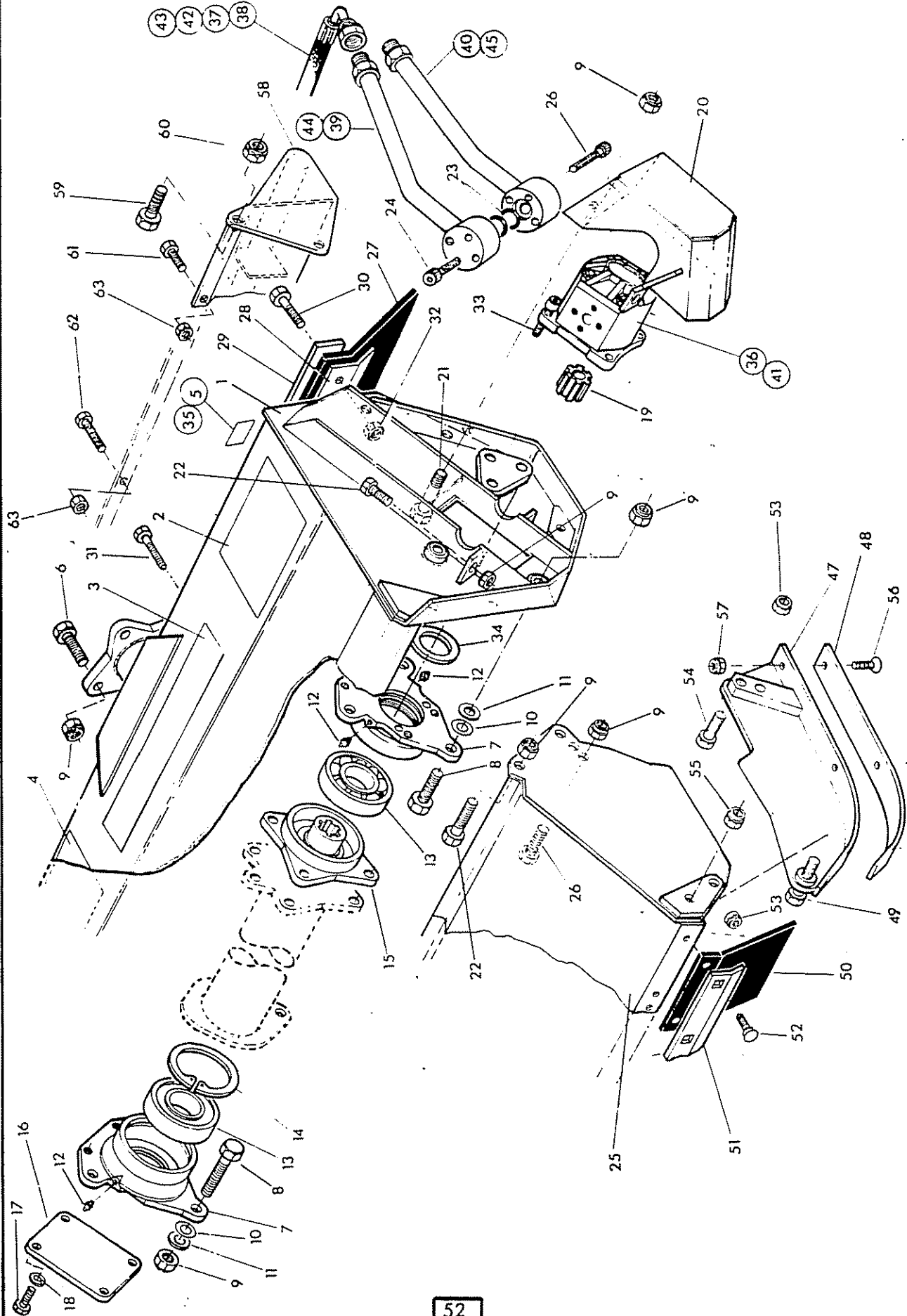
86 99 216
86 99 236

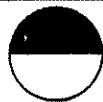
SEAL KIT for hydraulic motor Until April 1993
SEAL KIT for hydraulic motor From April 1993

FLAIL HEAD CASING 90 series



McCONNELL





McCONNEL

Ref.	Part No.	Qty.	Description
FLAIL HEAD CASING 90 series			
1	71 90 262	1	Flail casing
2	12 90 377	1	Sticker 'Flail head instructions
3	12 90 255	1	Sticker 'McConnel'
4	12 90 341	1	Sticker 'Flail guarding'
5	13 35 246	1	Serial No. plate
6	02 11 186	4	Bolt
7	71 90 261	2	Bearing housing
8	02 11 166	4	Bolt
9	01 41 006	17	Self locking nut
10	81 21 043	as reqd	Shim
11	81 21 044	as reqd	Shim
12	09 01 121	4	Greaser
13	06 00 018	2	Bearing
14	71 90 022	1	Internal circlip
15	71 90 472	1	Rotor hub
16	71 90 444	1	Cover plate
17	93 13 045	4	Setscrew
18	91 00 205	4	Spring washer
19	71 90 009	1	Drive coupling
20	71 90 488	1	Motor cover
21	02 11 266	1	Bolt
22	03 11 126	4	Setscrew
23	86 00 121	2	'O' ring
24	93 00 014	6	Capscrew 'wedglok'
25	71 90 288	1	Front hood
26	03 11 106	2	Setscrew
27	71 90 314	1	Rear flap
28	71 90 312	1	Mounting strip
29	71 90 313	1	Clamp strip
30	93 13 065	7	Setscrew
31	93 13 075	2	Setscrew
32	91 43 005	9	Self locking nut
33	93 00 144	4	Capscrew wedglok
34	71 90 015	1	Motor locating washer
35	71 03 230	4	Pop rivet

The following items 36-40 inclusive are also required for std power machines.

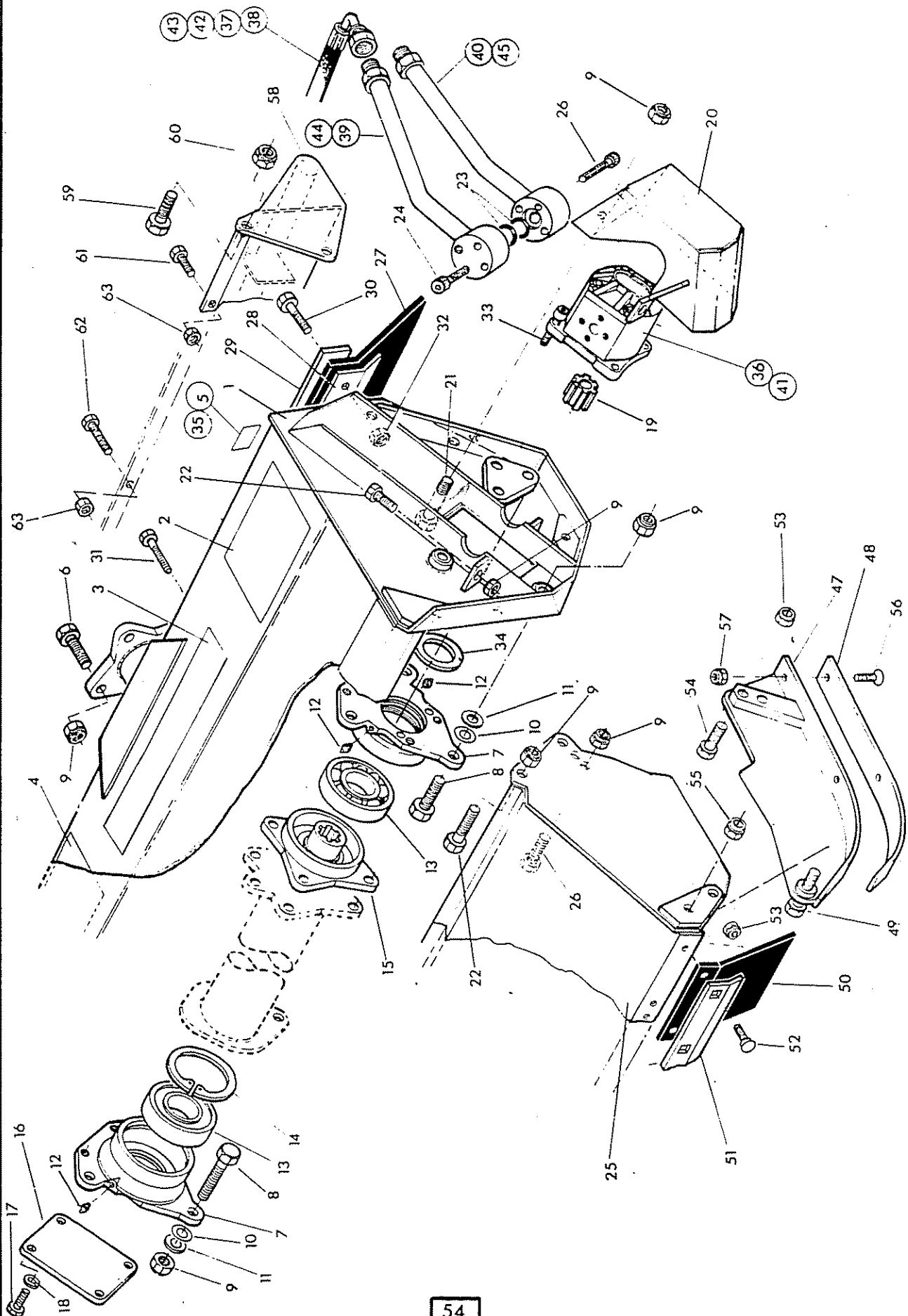
36*	83 01 263	1	Hydraulic motor
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Continued overleaf

FLAIL HEAD CASING 90 series



McCONNELL





FLAIL HEAD CASING continued.

37	85 38 015	2	Hose 3/4" BSP x 34" long for heads with motor outboard SF - 90F
38	85 38 025	2	Hose 3/4" BSP x 42" long for heads with motor inboard SF - 90F
39	71 90 295	1	Motor pipe upper
40	71 90 296	1	Motor pipe lower

86 99 236

SEAL KIT - for hydraulic motor

The following items 41-45 inclusive are also required for Hi Power machines

41	83 01 282	1	Hydraulic motor
42	85 01 097	2	Hose 1" BSP x 34" long for heads with motor outboard SF - 90F
43	85 01 154	2	Hose 1" BSP x 42" long for heads with motor inboard SF - 90F
44	71 90 297	1	Motor pipe upper
45	71 90 298	1	Motor pipe lower

86 99 236

SEAL KIT- for hydraulic motor

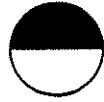
EXTRA PARTS FOR GRASS CUTTING

46	71 90 300	1	Skid R. Hand - not illus
47	71 90 301	1	Skid L. Hand
48	73 14 323	2	Replaceable skid
49	03 11 146	2	Setscrew
50	71 90 020	8	Flap
51	71 90 304	1	Flap clamp strip
52	92 93 054	16	Cup square bolt
53	91 43 004	16	Self locking nut
54	03 11 086	2	Setscrew
55	01 41 006	4	Self locking nut
56	93 33 065	6	Setscrew c/sunk
57	91 43 005	6	Self locking nut

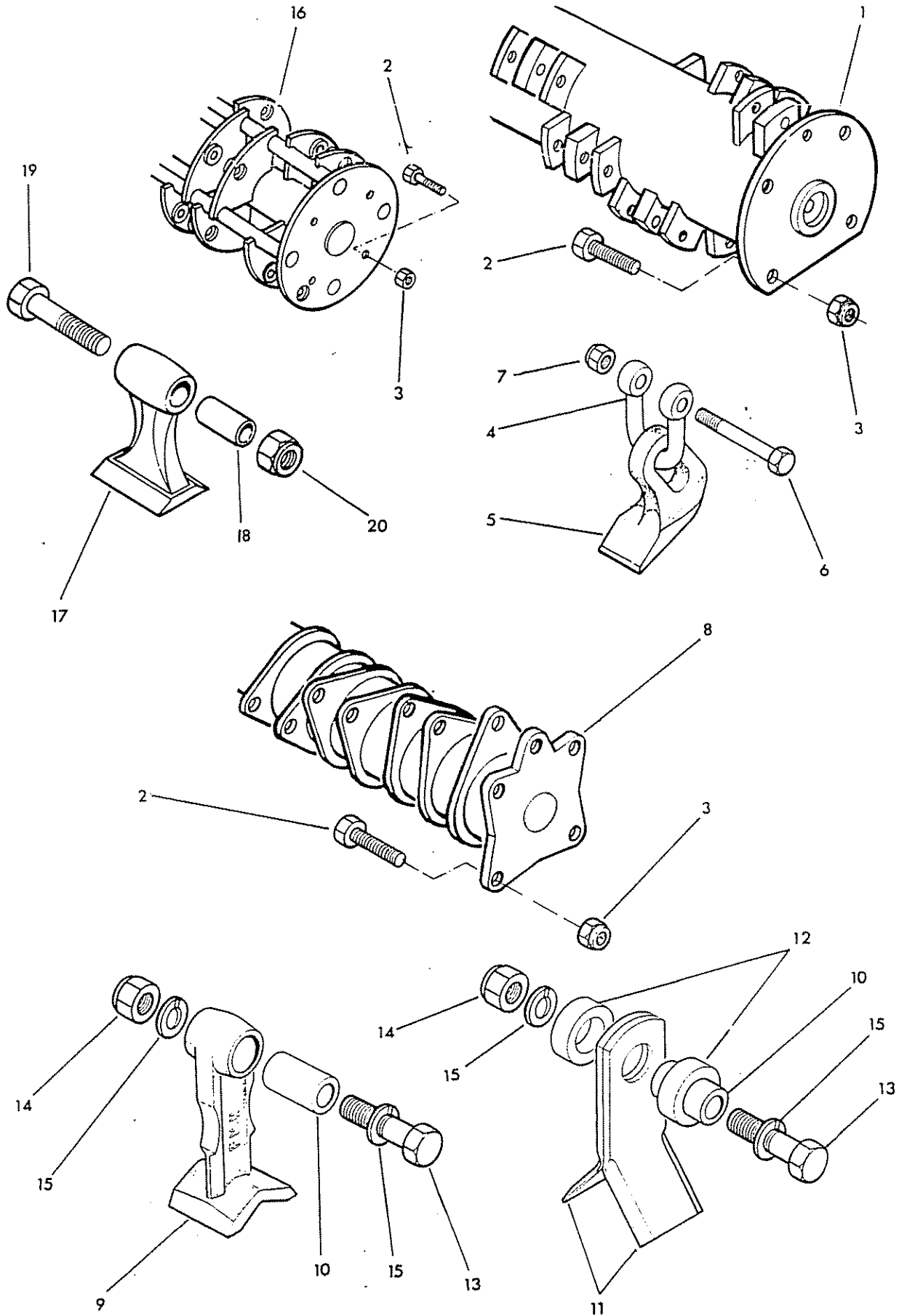
EXTRA PARTS FOR DOWNWARD CUTTING

	71 90 310	1	Rear hood kit
58	71 90 285	1	Rear hood
59	03 11 106	4	Bolt
60	01 41 006	4	Self locking nut
61	93 13 045	7	Setscrew
62	93 13 055	2	Setscrew
63	91 43 005	9	Self locking nut

ROTOR & FLAIL OPTIONS
90 Series flailhead

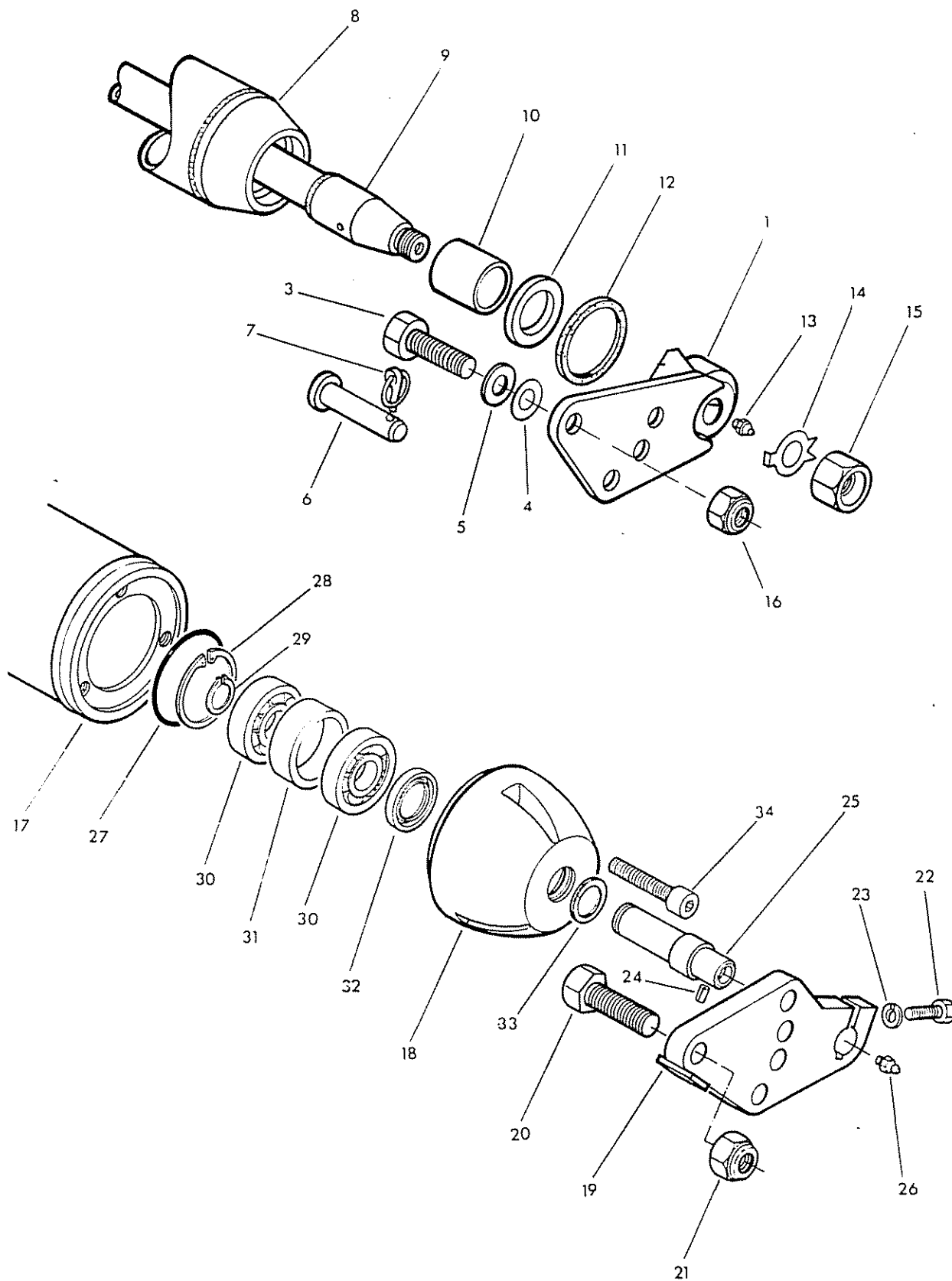


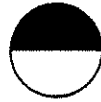
McDONNELL



**McCONNEL**

Ref.	Part No.	Qty.	Description
ROTORS AND FLAILS			
140mm DIA ROTOR SUITABLE FOR HI POWER FLAIL HEADS ONLY			
1	71 90 424	1	Rotor 1.2m (32 flail stations)
2	03 11 146	4	Setscrew
3	01 41 006	4	Self locking nut
FLAIL FOR 140mm DIA ROTORS-Quantities shown are per flail station			
4	71 90 086	1	Shackle
5	71 90 463	1	Flail
6	71 90 088	1	Special bolt
7	01 41 004	1	Self locking nut
100mm DIA ROTOR SUITABLE FOR STANDARD AND HI POWER FLAIL HEADS			
8	71 90 320	1	Rotor (24 flail stations)
FLAIL OPTIONS FOR 100mm DIA ROTORS - Quantities shown are per flail station.			
9	73 14 366	1	Flail F10H
10	73 14 223	1	Pivot bush
11	71 90 315	2	Flail
12	71 90 010	2	Flail spacer
13	73 14 201	1	Special bolt
14	01 41 006	1	Self locking nut
15	01 00 206	2	Spring washer
OMEGA ROTOR _ SUITABLE FOR 1.2 METRE FLAIL HEADS			
16	71 90 465	1	Rotor (20 flail stations)
FLAIL FOR OMEGA ROTOR - Quantities are per flail station			
17	71 90 464	1	Flail
18	71 90 117	1	Bush
19	71 90 118	1	Special bolt
20	01 41 006	1	Self locking nut

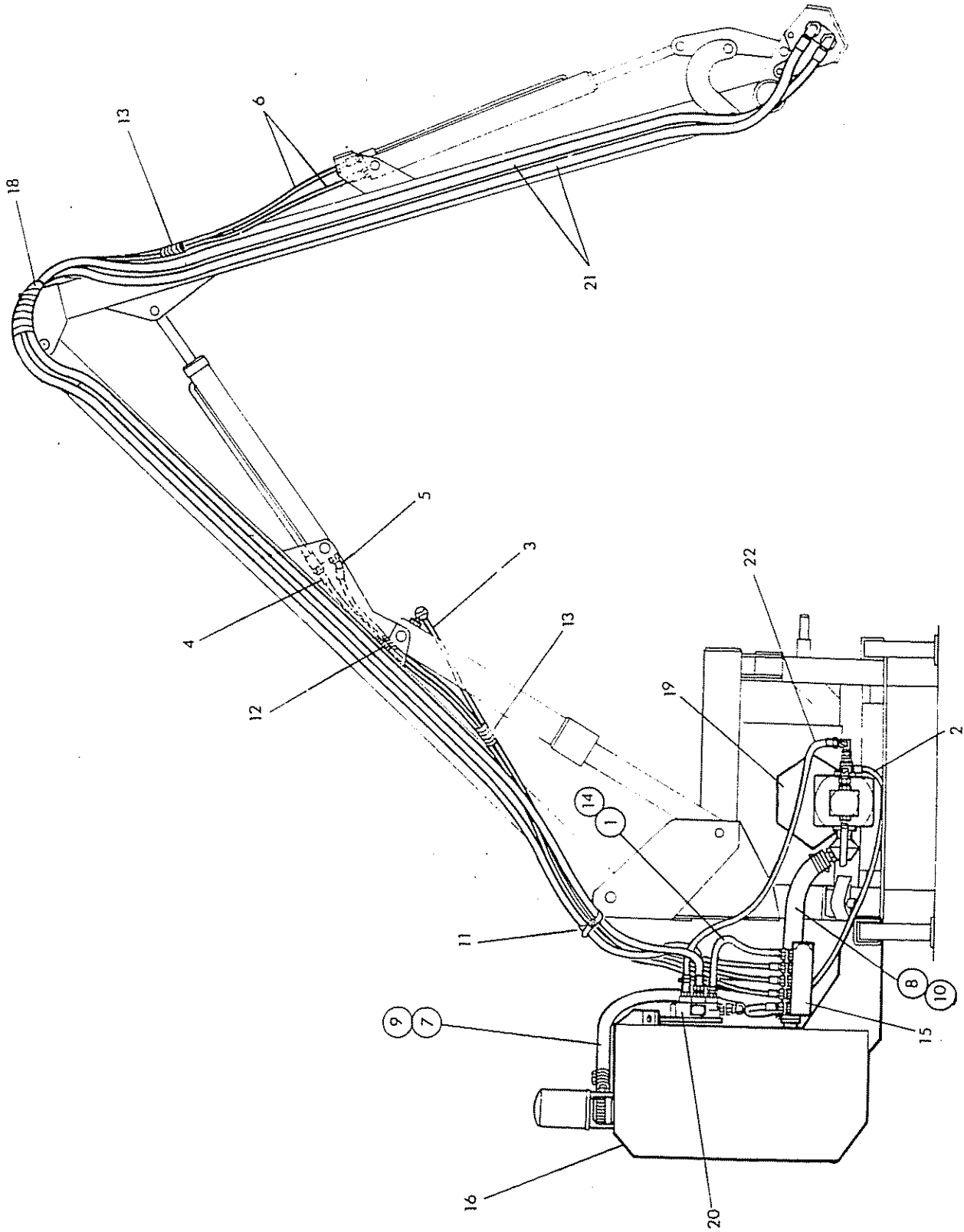




Ref.	Part No.	Qty.	Description
ROLLERS OPTIONS FOR 1.2m FLAIL HEADS			
BUSHED ROLLER ASSEMBLY			
1	71 90 306	1	Roller bracket L. Hand
2	71 90 305	1	Roller bracket R. Hand - not illus
3	02 11 166	2	Bolt
4	81 21 043	as reqd	Shim
5	81 21 044	as reqd.	Shim
6	71 90 032	2	Pin
7	04 31 213	2	Linch pin
8	71 90 307	1	Roller
9	71 90 308	1	Roller tie rod
10	72 13 023	2	Bush
11	71 90 026	2	Thrust washer
12	71 90 028	2	Felt seal
13	09 01 121	2	Greaser
14	71 90 023	2	Tab washer
15	71 14 176	2	Special nut
16	01 41 006	4	Self locking nut
BALL BEARING ROLLER ASSEMBLY			
17	71 90 434	1	Roller
18	71 90 429	2	Roller end
19	71 90 428	2	Mounting bracket
20	02 11 206	4	Bolt
21	01 41 006	4	Self locking nut
22	02 11 123	2	Bolt
23	01 00 203	2	Spring washer
24	04 25 408	2	Spring dowel
25	71 90 430	2	Stub axle
26	09 01 121	2	Greaser
27	86 00 139	2	'O' ring
28	04 11 262	2	Internal circlip
29	04 01 225	2	External circlip
30	06 00 088	4	Bearing
31	71 90 082	2	Spacer
32	86 29 125	2	Seal
33	04 12 120	2	Spring ring
34	93 00 104	6	Capscrew - self locking



T.I. R.Hand





Ref.	Part No.	Qty.	Description
PA 92 HYDRAULIC INSTALLATIONS FOR T.I. MACHINES - R. HAND			

Items 1 - 17 inclusive are common to all T.I. R.Hand hydraulic installations

1	85 01 158	1	Hose 5/8" bore x 24" long. Return to rotor valve
2	85 31 213	1	Hose 3/8" BSPx 36"long. Supply from pump
3	85 35 112	1	Hose 1/4" BSP x 66"long. Lift
4	85 15 062	1	Hose 1/4" BSP x 72" long. Reach gland
5	85 15 062	1	Hose 1/4" BSP x 72" long. Reach base
6	85 15 142	2	Hose 1/4" BSP x 144" long-Angle
7	85 00 828	1	Hose low pressure 1" bore x 28' long rotor valve tank
8	85 01 151	1	Hose 1 1/2" bore x 19" long Suction
9	09 04 106	4	Hose clip
10	09 04 107	4	Hose clip
11	71 06 187	1	Hose tie
12	71 92 044	2	Hose armour
13	71 35 090	2	Hose armour coil
14	09 04 204	2	Hose clip
15	81 30 380	1	Hydraulic control assembly - see page 68
16		1	Tank assembly see page 86
17	71 09 319	1	Control mounting assembly - see page 47

Additional items are required for the following specific installations

HYDRAULIC INST. TI STD POWER R.HAND

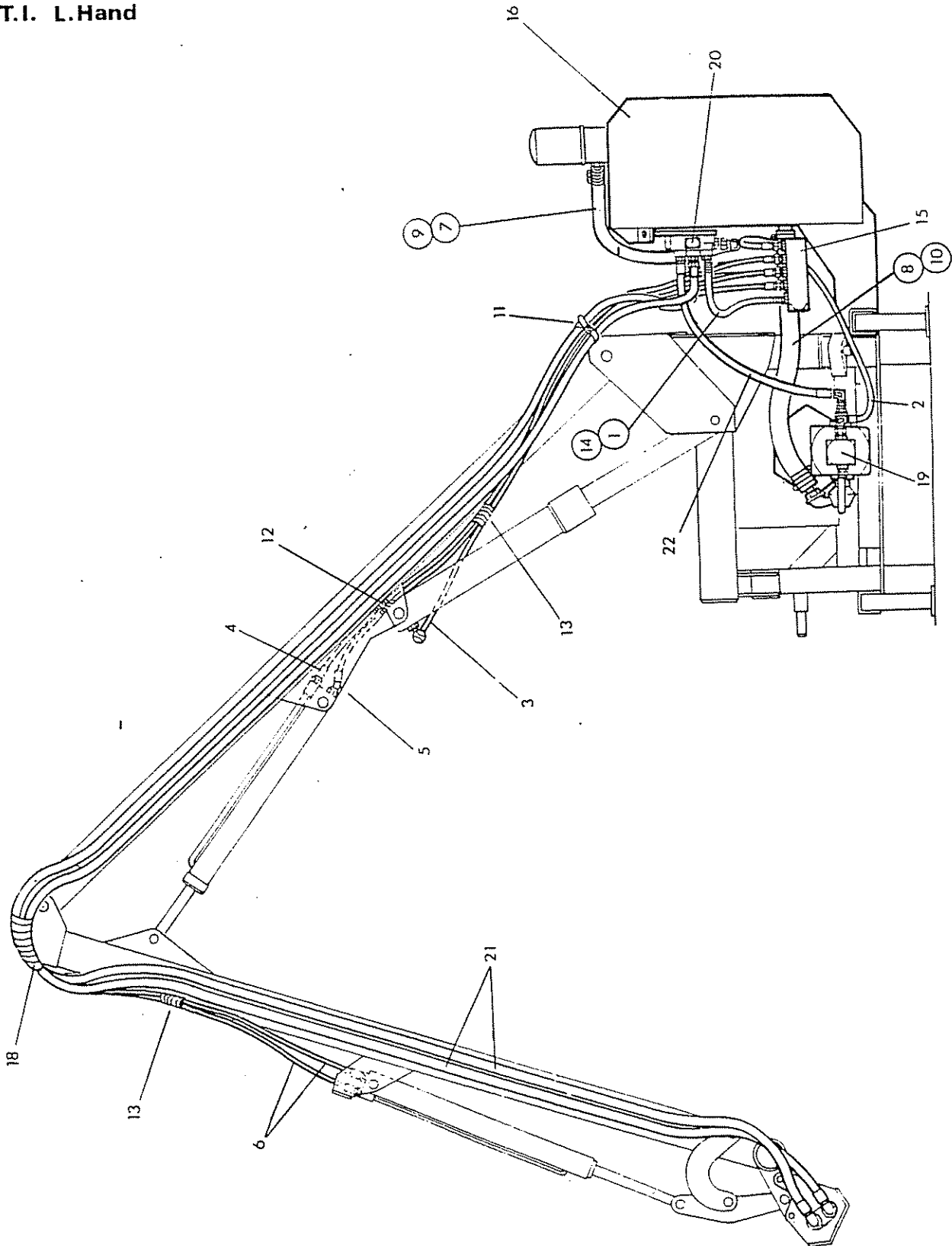
18	71 93 026	2	Hose armour coil
19	80 13 455	1	Pump/gearbox assembly R.Hand-See page 72
20	81 25 373	1	Rotor control valve assembly R.Hand-see page 82
21	85 38 065	2	Hose 3/4" BSP x 200" long-Flail motor
22	85 38 015	1	Hose 3/4 BSP x 33"lg-Pump-R.C.Valve

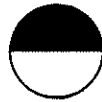
HYDRAULIC INST. HI POWER R. HAND

18	71 36 143	2	Hose armour coil
19	80 13 468	1	Pump/gearbox assembly -see page 74
20	81 25 375	1	Rotor control valve assembly R.Hand-see page 82
21	85 01 183	2	Hose 1" BSP x 200"long.Flail motor
22	85 01 097	1	Hose 1" BSP x 34"lg. Pump-R.C.Valve



T.I. L.Hand





Ref.	Part No.	Qty.	Description
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PA 92 HYDRAULIC INSTALLATIONS FOR T.I. MACHINES L.HAND

Items 1 -17 inclusive are common to all T.I. L.Hand hydraulic installations

1	85 01 158	1	Hose 5/8" bore x 24" long.Return to rotor valve
2	85 31 213	1	Hose 3/8" BSP x 36" long.Supply
3	85 35 112	1	Hose 1/4" BSP x 66" long. Lift
4	85 15 062	1	Hose 1/4" BSP x 72" long. Reach gland
5	85 15 062	1	Hose 1/4" BSP x 72" lg. Reach base
6	85 15 142	2	Hose 1/4" BSP x 144" long-Angle
7	85 00 828	1	Hose low pressure 1" bore x 28" long rotor valve tank
8	85 01 192	1	Hose 1 1/2" bore x 27 1/2" long-Suction
9	09 04 106	4	Hose clip
10	09 04 107	4	Hose clip
11	71 06 187	1	Hose tie
12	71 92 044	2	Hose armour
13	71 35 090	2	Hose armour
14	09 04 204	2	Hose clip
15	81 30 380	1	Hydraulic control assembly -see page 68
16		1	Tank assembly see page
17	71 09 319	1	Control mounting assembly - see page 47

Additional items are required for the following specific installations

HYDRAULIC INST. TI STD POWER L.HAND

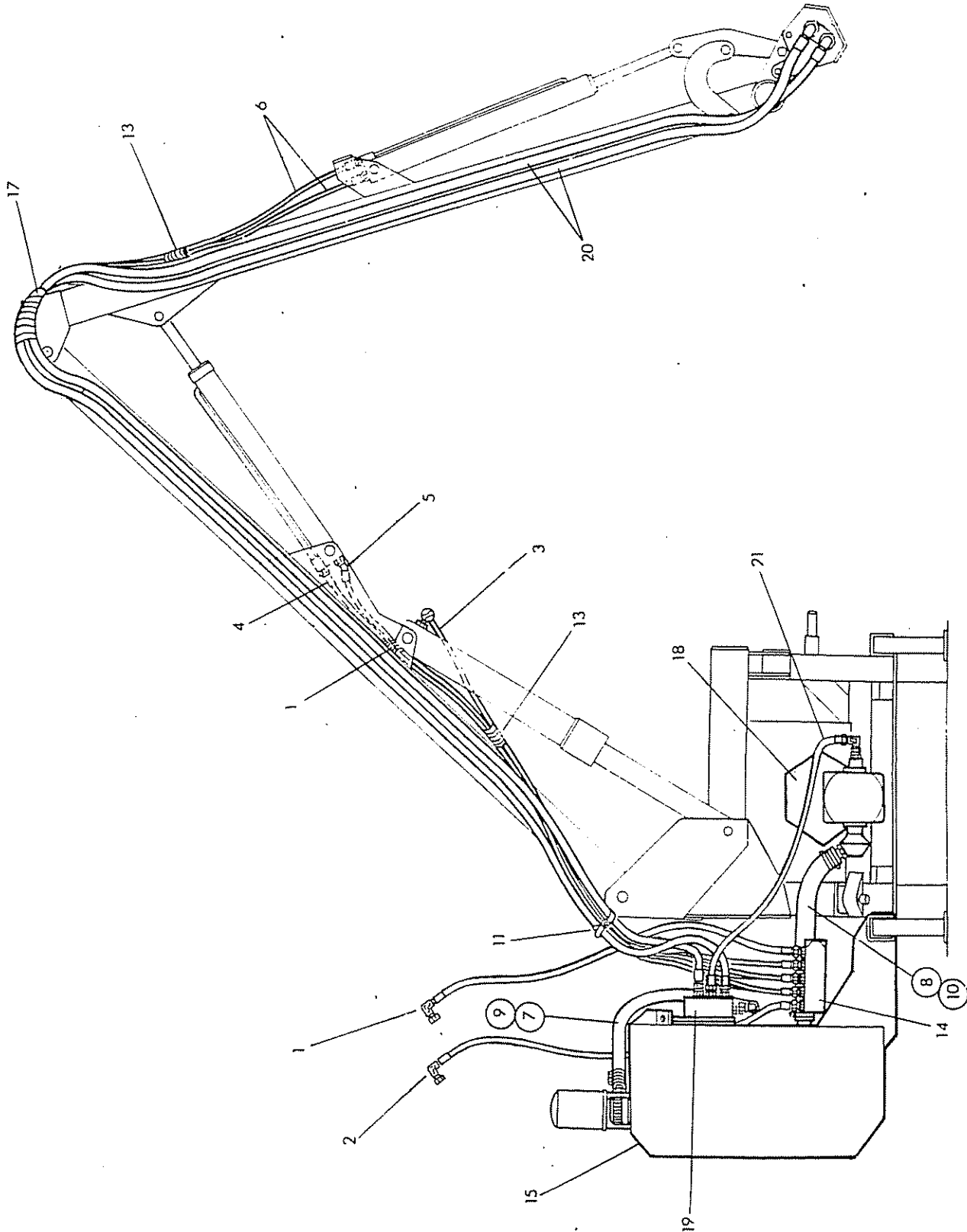
18	71 93 026	2	Hose armour coil
19	80 13 454	1	Pump/gearbox assembly L.Hand -see page 72
20	81 25 374	1	Rotor control valve assy L.Hand-see page 82
21	85 38 065	2	Hose 3/4 BSP x 200"long-Flail motor
22	85 38 015	1	Hose 3/4" BSP x 33"long-Pump-R.C. Valve

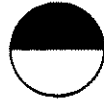
HYDRAULIC INST. T.I. HI POWER L. HAND

18	71 36 143	2	Hose armour coil
19	80 13 467	1	Pump/gearbox assembly see page 74
20	81 25 376	1	Rotor control valve assy L.Hand see page 82
21	85 01 183	2	Hose 1" BSP x 200" long-Flail motor
22	85 01 097	1	Hose 1" BSP x 34" lg.Pump R.C.Valve



S.I. R. Hand





Ref.	Part No.	Qty.	Description
PA 92 HYDRAULIC INSTALLATIONS FOR R.HAND S.I. MACHINES			
Items 1 to 16 inclusive are common to all S.I. R Hand hydraulic installations.			
1	85 32 014	1	Hose 1/2" BSP x 80" long-Return tractor
2	85 31 323	1	Hose 3/8 BSP x 80"long-supply
3	85 35 112	1	Hose 1/4" BSP x 66" long.Lift
4	85 15 062	1	Hose 1/4" BSP x 72"long.Reach gland
5	85 15 062	1	Hose 1/4" BSP x 72"long.Reach base
6	85 15 142	2	Hose 1/4" BSP x 144" long. Angle
7	85 00 828	1	Hose low pressure 1" bore x 28'long rotor valve- tank
8	85 01 157	1	Hose 1 1/2" bore x 19" long - suction
9	09 04 106	4	Hose clip
10	09 04 107	4	Hose clip
11	71 06 187	1	Hose tie
12	71 92 044	2	Hose armour
13	71 35 090	2	Hose armou:
14	81 30 380	1	Hydraulic control assembly see page 68
15		1	Tank assembly see page 86
16	71 09 319	1	Control mounting assembly see page 47

Additional items are required for the following specific installations

HYDRAULIC INSTALLATION - S.I. -STD POWER R HAND

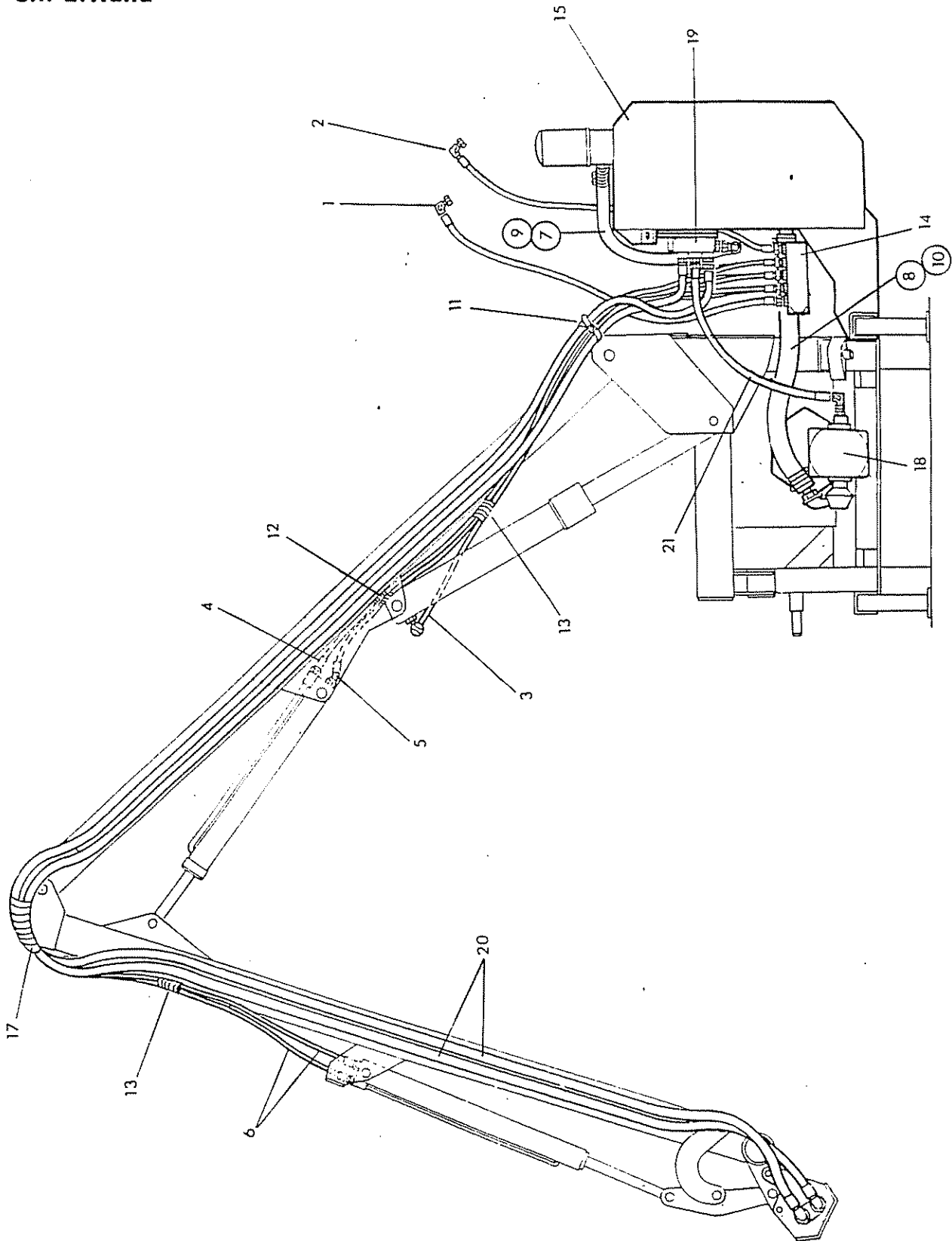
17	71 93 026	2	Hose armour coil
18	80 13 453	1	Pump/gearbox assembly R.Hand see page 76
19	81 25 360	1	Rotor relief valve assembly 84
20	85 38 065	2	Hose 3/4" BSP x 200"long-Flail motor
21	85 38 015	1	Hose 3/4" BSPX 33"long pump- RR valve

HYDRAULIC INSTALLATON - SI-HI POWER R.HAND

17	71 36 143	2	Hose armour coil
18	80 13 466	1	Pump/gearbox assembly see page 78
19	81 25 400	1	Rotor relief valve assembly 84
20	85 01 183	2	Hose 1" BSP x 200" long-Flail motor
21	85 01 097	1	Hose 1" BSP x 34"lg pump R.R.Valve



S.I. L. Hand





Ref.	Part No.	Qty.	Description.
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PA 92 HYDRAULIC INSTALLATIONS FOR L. HAND S.I. MACHINES

Items 1 to 16 inclusive are common to all S.I.-L.Hand hydraulic installations

1	85 32 014	1	Hose 1/2" BSP x 80"long-Return tractor
2	85 31 323	1	Hose 3/8 BSP x 80"long-Supply
3	85 35 112	1	Hose 1/4" BSP x 66"long. Lift
4	85 15 062	1	Hose 1/4" BSP x 72"long. Reach gland
5	85 15 062	1	Hose 1/4" BSPx72"long.Reach base
6	85 15 142	2	Hose 1/4" BSP x 144" long-Angle
7	85 00 828	1	Hose low pressure 1" bore x 28'long rotor valve - tank
8	85 01 192	1	Hose 1 1/2" bore x 27 1/2" long-Suction
9	09 04 106	4	Hose clip
10	09-04-107	4	Hose clip
11	71 06 187	1	Hose tie
12	71 92 044	2	Hose armour
13	71 35 090	2	Hose armour
14	81 30 380	1	Hydraulic control assembly. see page 68
15		1	Tank assembly see page 86
16	71 09 319	1	Control mounting assembly see page 47

Additional items are required for the following specific installations

HYDRAULIC INSTALLATION SI-STD POWER-L.HAND

17	71 93 026	2	Hose armour coil
18	80 13 452	1	Pump/gearbox assembly see page 76
19	81 25 360	1	Rotor relief valve assembly see page 84
20	85 38 065	2	Hose 3/4" BSP x 200"long. Flail motor
21	85 38 015	1	Hose 3/4" BSP x 33"long-Pump-RR Valve

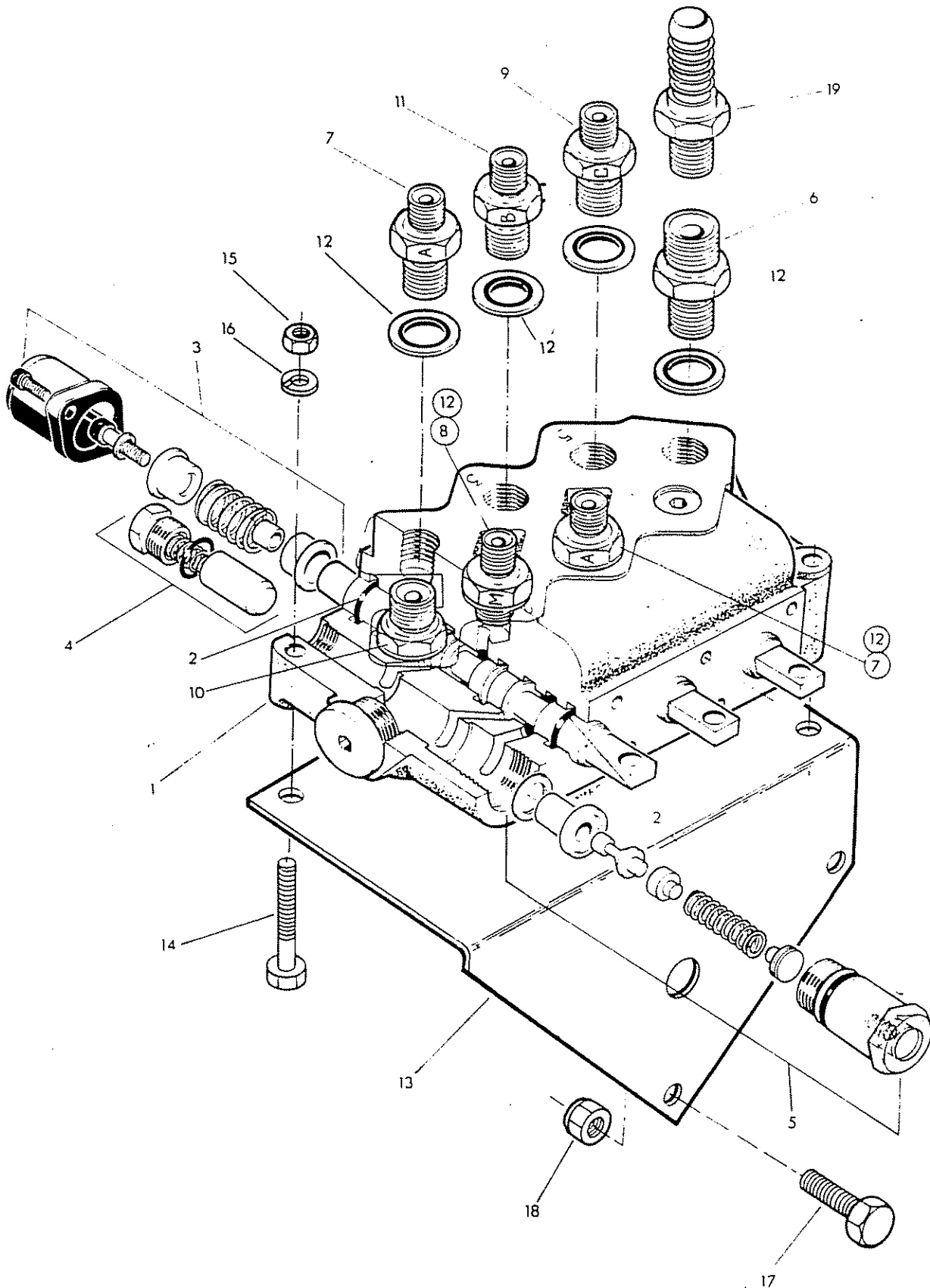
HYDRAULIC INSTALLATION-SI-HI POWER-L. HAND

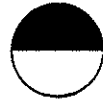
17	71 36 143	2	Hose armour coil
18	80 13 465	1	Pump/gearbox assembly see page 78
19	81 25 400	1	Rotor relief valve assembly see page 84
20	85 01 183	2	Hose 1" BSP x 200" long.Flail motor
21	85 01 097	1	Hose 1" BSP x 34"lg. Pump-R.R.Valve

CONTROL VALVE



McCONNEL





Ref.	Part No.	Qty.	Description
HYDRAULIC CONTROL ASSEMBLY FOR PA92 SEMI INDEPENDENT MODEL			
		1	Valve c/w connections
1	81-30-334	1	Valve block c/w spools 'O' rings
2	86-00-112	6	'O' ring
3	81-30-134	3	Centering spring assembly
4	81-30-022	1	Non-return valve assembly
5	G381-2539	1	Relief valve assembly
6	60-00-112	1	Union
7	81-30-046	2	Restrictor union A
8	81-30-066	1	Restrictor union m
9	81-30-048	1	Restrictor union 'C'
10	60-00-113	1	Union 3/8 BSP M-M
11	81-30-047	1	Restrictor union B
12	86-50-103	7	Bonded seal
13*	71-92-025	1	Valve mounting plate R. hand
14	92-13-124	3	Bolt
15	91-13-004	3	Nut
16	91-00-204	3	Spring washer
17	93-13-055	2	Setscrew
18	91-43-005	2	Self locking nut
	86-00-163		SEAL KIT
HYDRAULIC CONTROL ASSEMBLY FOR PA 92 FULLY INDEPENDENT MODEL			

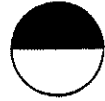
The parts list is identical to above with the following exception - Item 6 is deleted and replaced by

19	81-25-008	1	Return connection
			Lever control. See following page.

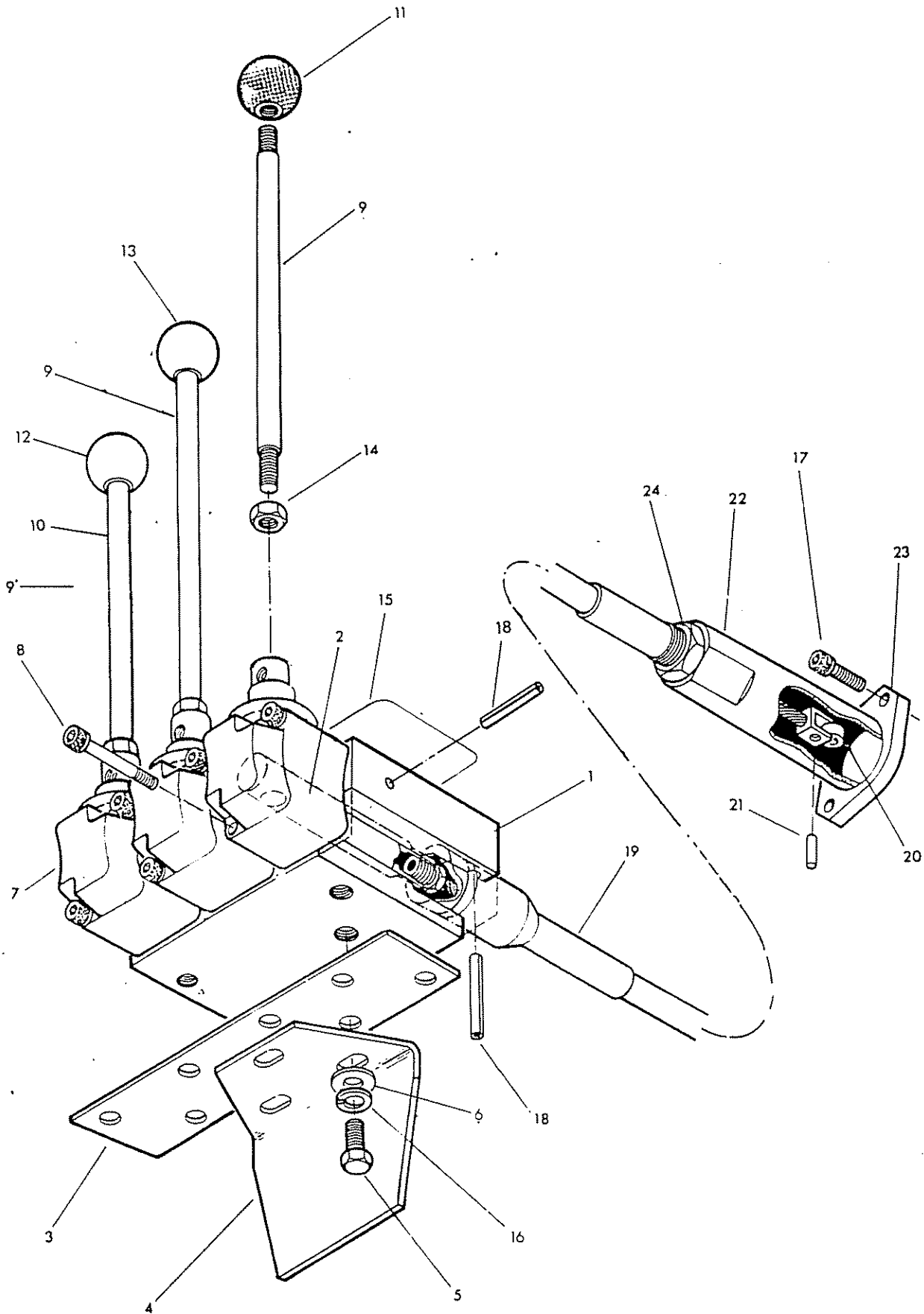
*** Spares note**

13	71-92-057	1	Valve mounting plate L. hand
----	-----------	---	------------------------------

CONTROL LEVERS



McDONNELL



**McCONNEL**

Ref.	Part No.	Qty.	Description
	81 30 379		HYDRAULIC CONTROL ASSY FOR PA 92 T.I. MODELS-continued
	81 30 380		HYDRAULIC CONTROL ASSY FOR PA 92 SI MODELS - continued
1	81 30 391	1	Control block
2	81 30 144	3	Control block spindle
3	71 14 071	1	Control block mounting base
4	80 17 006	1	Mounting bracket
5	93 13 034	6	Setscrew
6	01 00 102	6	Thin washer
7	81 30 065	3	Lever pivot box assembly
8	92 43 072	6	Socket headed capscrew
9	71 09 131	2	Lever handle long
10	71 09 132	1	Lever handle short
11	09 03 112	1	Lever knob Reach (Red)
12	09 03 113	1	Lever knob Angle (Green)
13	09 03 114	1	Lever knob-Lift (Yellow)
14	91 13 004	3	Hexagon nut
15	12 90 354	1	Operating instruction label
16	91 00 204	3	Spring washer
17	93 43 022	6	Socket headed capscrew
18	04 25 540	6	Spring dowel dia
19	81 25 046	3	Cable & spacer & pin,sleeve, flange etc
20	71 15 158	1	Spool eye bush
21	71 15 160	1	Pin
22	71 15 162	1	Sleeve
23	81 25 050	1	Flange
24	01 31 006	1	Thin locknut

* An alternative cable assembly may be fitted depending on supply availability

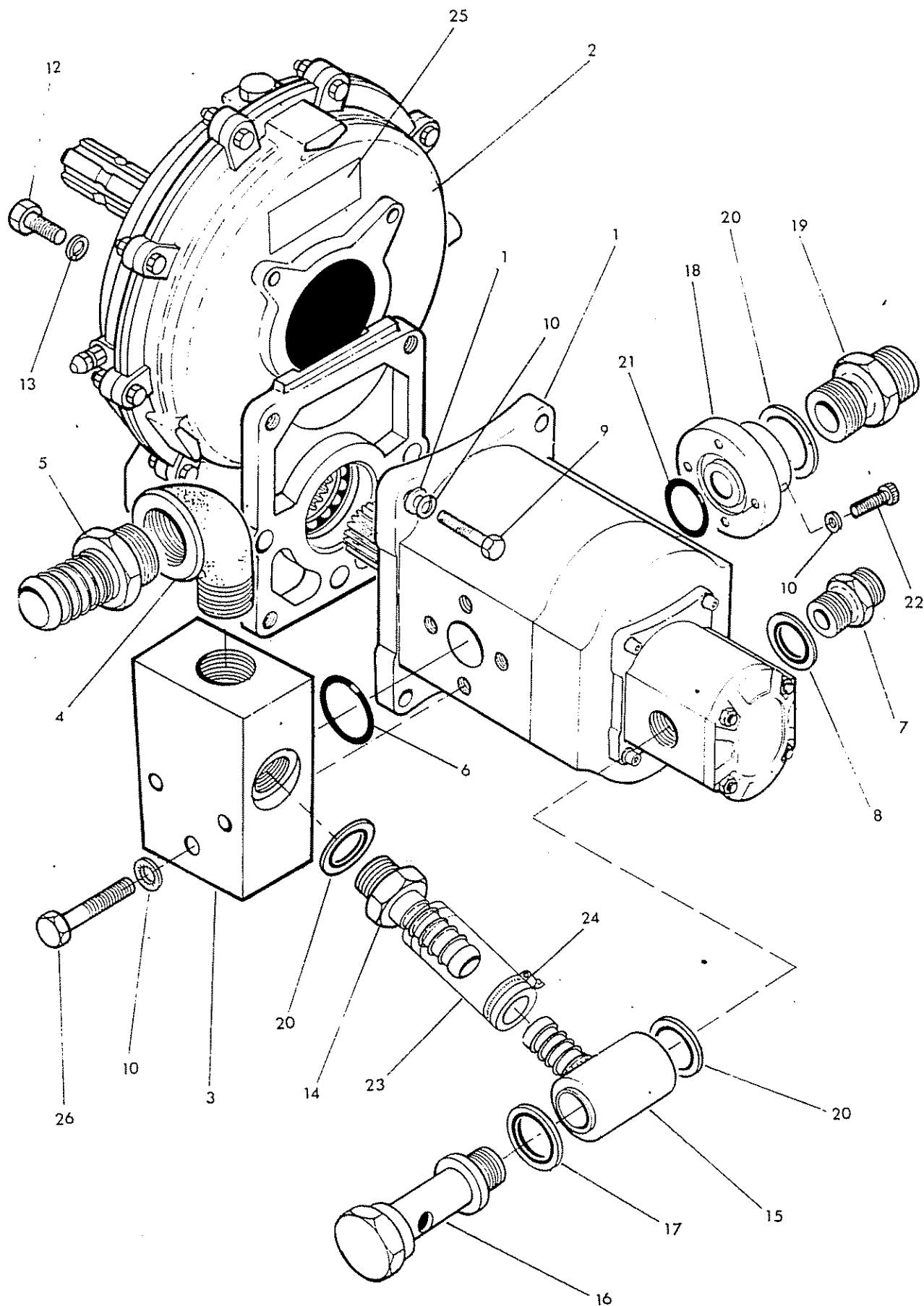
The complete assembly is interchangeable and thus retains the same assembly Part Number i.e. 81 25 046

Individual cable components are not interchangeable thus before ordering spares the cable must be correctly identified.

The cable listed above is **BLACK**

The alternative cable is **RED** and consists of

19	81 25 046	1	Cable assembly incl. sleeve, flange etc
20	81 25 049	1	Cable sleeve
21	81 25 050	1	Flange
22	81 25 051	1	Pin
23	91 00 016	1	Thin locknut
24	80 17 004	1	Spool eye bush



**McCORMELL**

Ref	Part No	Qty	Description
	80 13 455		GEARBOX/PUMP ASSEMBLY - TI R.HAND STD POWER
	80 13 454		GEARBOX/PUMP ASSEMBLY - TI L.HAND STD POWER

The parts list for right and left hand are identical. Assemblies vary only in build arrangement and comprise:-

1	82 01 466	1	Tandem pump CPL33/5.7 as shown - compr.
	82 01 664	1	Large pump
	82 01 667	1	Small pump
	82 01 466	1	Tandem pump -cast iron end plate - alternative build compr:-
	82 01 684	1	Large pump
	82 01 677	1	Small pump
2	80 13 444	1	Gearbox see page 80
3	71 92 372	1	Suction block
4	85 81 261	1	Elbow
5	85 81 260	1	Adaptor
6	86 00 122	1	'O' ring
7	60 00 112	1	Union
8	86 50 104	1	Bonded seal
9	92 13 094	4	Bolt
10	91 00 404	11	Shakeproof washer
11	91 00 104	7	Plain washer
12	93 13 056	4	Setscrew
13	91 00 206	4	Spring washer
14	85 81 301	1	Adaptor
15	80 13 096	1	Banjo
16	80 13 095	1	Banjo bolt
17	86 50 107	1	Bonded seal
18	80 13 088	1	Pump flange
19	85 81 136	1	Union
20	86 50 106	3	Bonded seal
21	86 00 119	1	'O' ring
22	93 13 054	4	Setscrew
23	85 01 213	1	Connecting hose
24	09 04 204	2	Hose clip
25	12 90 054	1	Gearbox label
26	92 13 144	3	Bolt

86 99 215 PUMP SEAL KIT -CPL33/5.7

86 99 231 PUMP SEAL KIT -Cast iron end plate

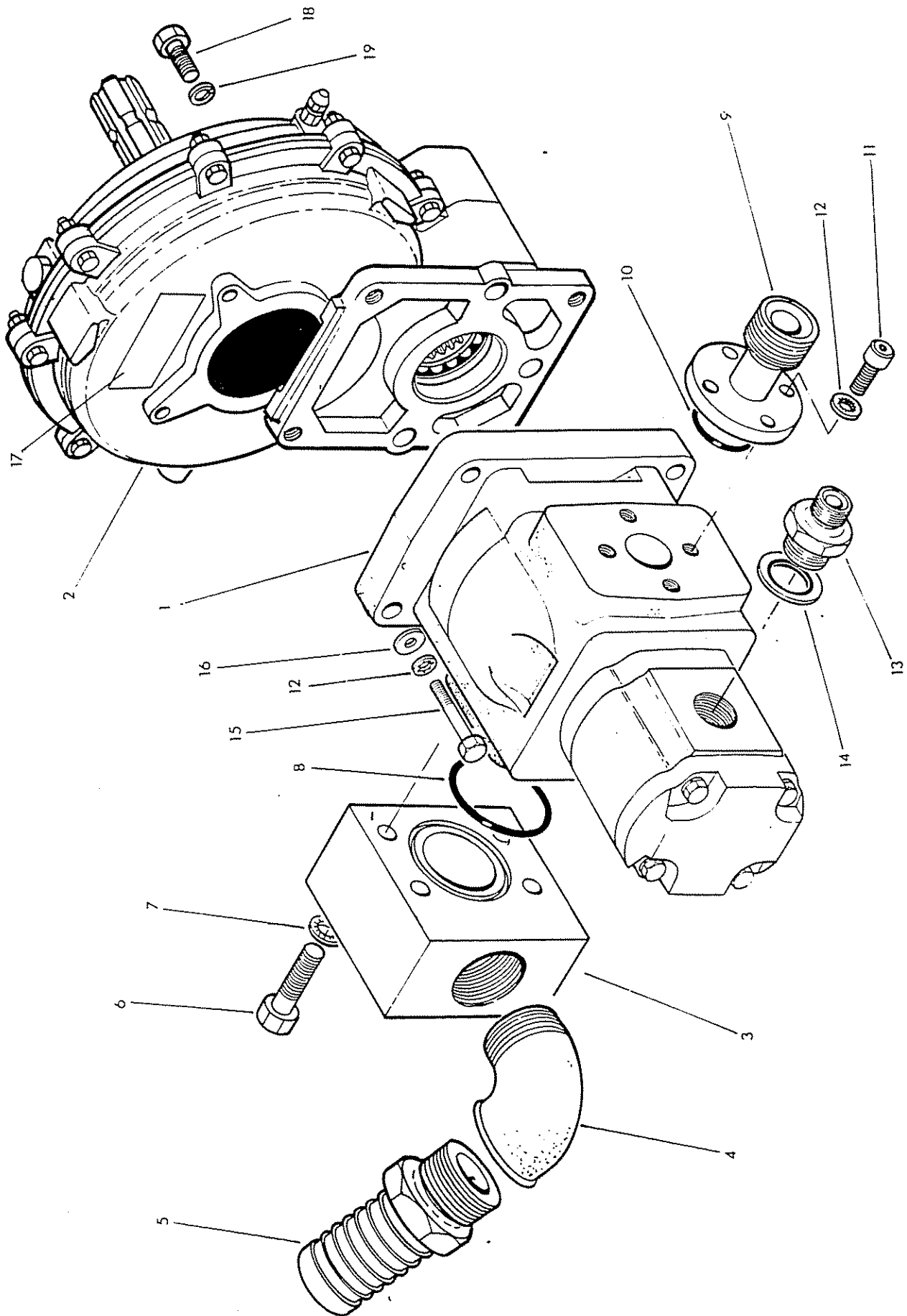
***Assembly note :-** tems 4 and 5 to be assembled into item 14 using PTFE tape

Spares note :- Check pump identification carefully before ordering replacement sections.

PUMP/GEARBOX

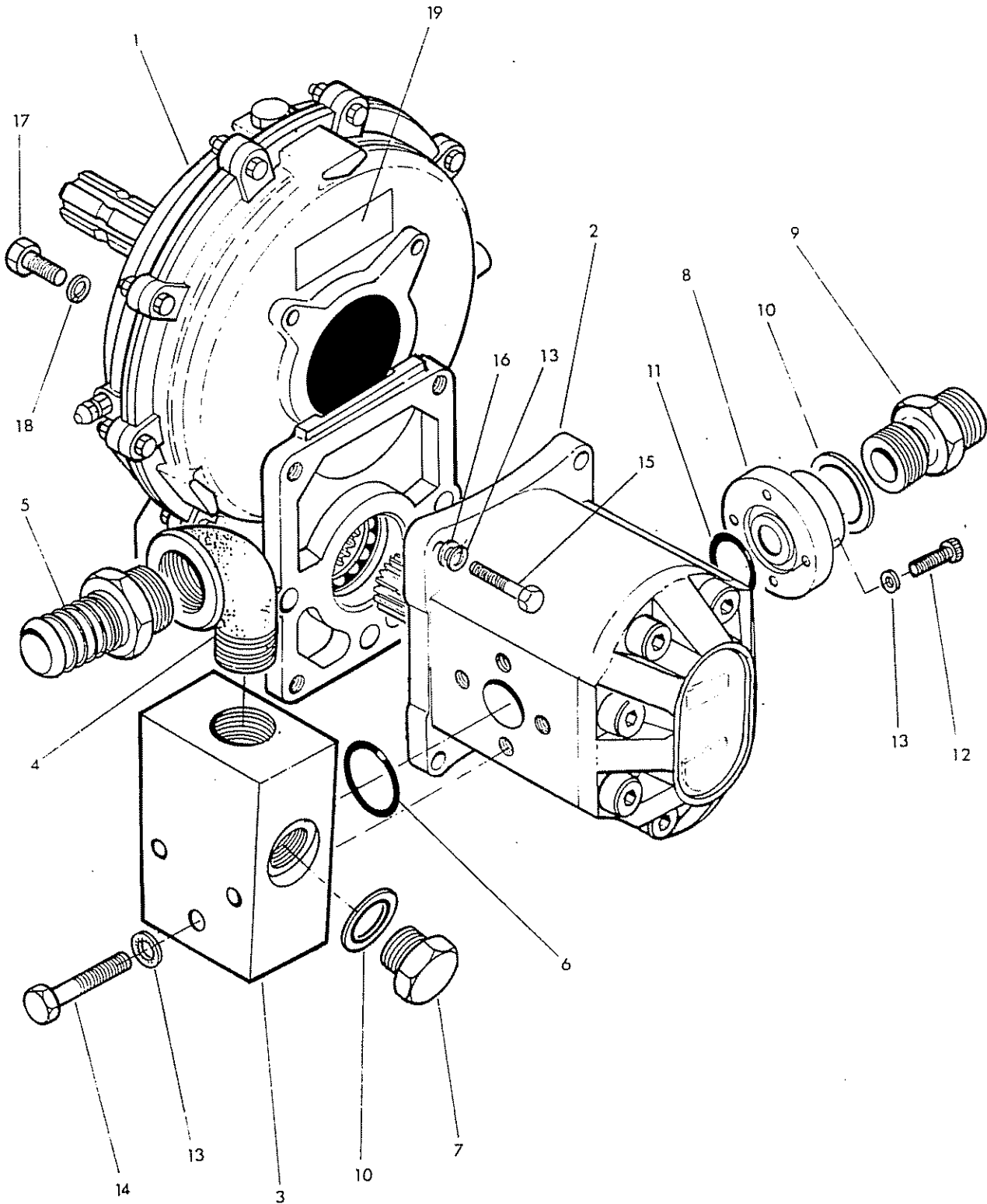
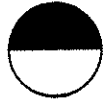


McCOMICK





Ref	Part No	Qty	Description
			T.I PUMP AND GEARBOX R.HAND HI POWER - as illustrated
			T.I PUMP AND GEARBOX L.HAND HI POWER
			The parts list for right and left hand is identical. Assemblies vary only in build arrangement and comprise:-
1	82 01 685	1	Tandem pump compr:-
	82 01 165	1	Large-pump
	82 01 166	1	Small-pump
2	80 13 444	1	Gearbox
3	85 81 312	1	Suction flange
4	85 81 261	1	Elbow 90 degrees
5	85 81 260	1	Adaptor
6	92 13 146	4	Bolt
7	91 00 406	4	Shakeproof washer
8	86 00 304	1	'O' ring
9	80 13 090	1	Pressure connection
10	86 00 117	1	'O' ring
11	93 43 054	4	Cap screw
12	91 00 404	8	Shakeproof washer
13	60 00 112	1	Adaptor
14	86 50 104	1	Bonded seal
15	93 13 074	4	Bolt
16	91 00 104	4	Plain washer
17	12 90 054	1	Gearbox label
18	93 13 056	4	Setscrew
19	91 00 206	4	Spring washer
	86 99 234		SEAL KIT





Ref	Part No	Qty	Description
	80 13 453		GEARBOX/PUMP ASSEMBLY - SI-R.HAND STD POWER
	80 13 452		GEARBOX/PUMP ASSEMBLY - SI-L.HAND STD POWER

The parts lists for right and left hand are identical. Assemblies vary only in build arrangement and comprise:-

1	80 13 444	1	Gearbox see page 80
2	82 01 463	1	Pump CPL33/5.7 - as shown
	82 01 463	1	Pump - cast iron end plate - alternative build
3	71 92 372	1	Suction block
4	85 81 261	1	Elbow
5	85 81 260	1	Adaptor
6	86 00 122	1	'O' ring
7	85 81 302	1	Plug
8	80 13 088	1	Pump flange
9	85 81 136	1	Union
10	86 50 106	2	Bonded seal
11	86 00 119	1	'O' ring
12	93 13 054	4	Setscrew
13	91 00 404	11	Shakeproof washer
14	92 13 144	3	Bolt
15	92 13 094	4	Bolt
16	91 00 104	7	Plain washer
17	93 13 056	4	Setscrew
18	91 00 206	4	Spring washer
19	12 90 054	1	Gearbox label

86 99 215

PUMP SEAL KIT -CPL33/5.7

86 99 231

PUMP SEAL KIT -Cast iron end plate

***Assembly note**

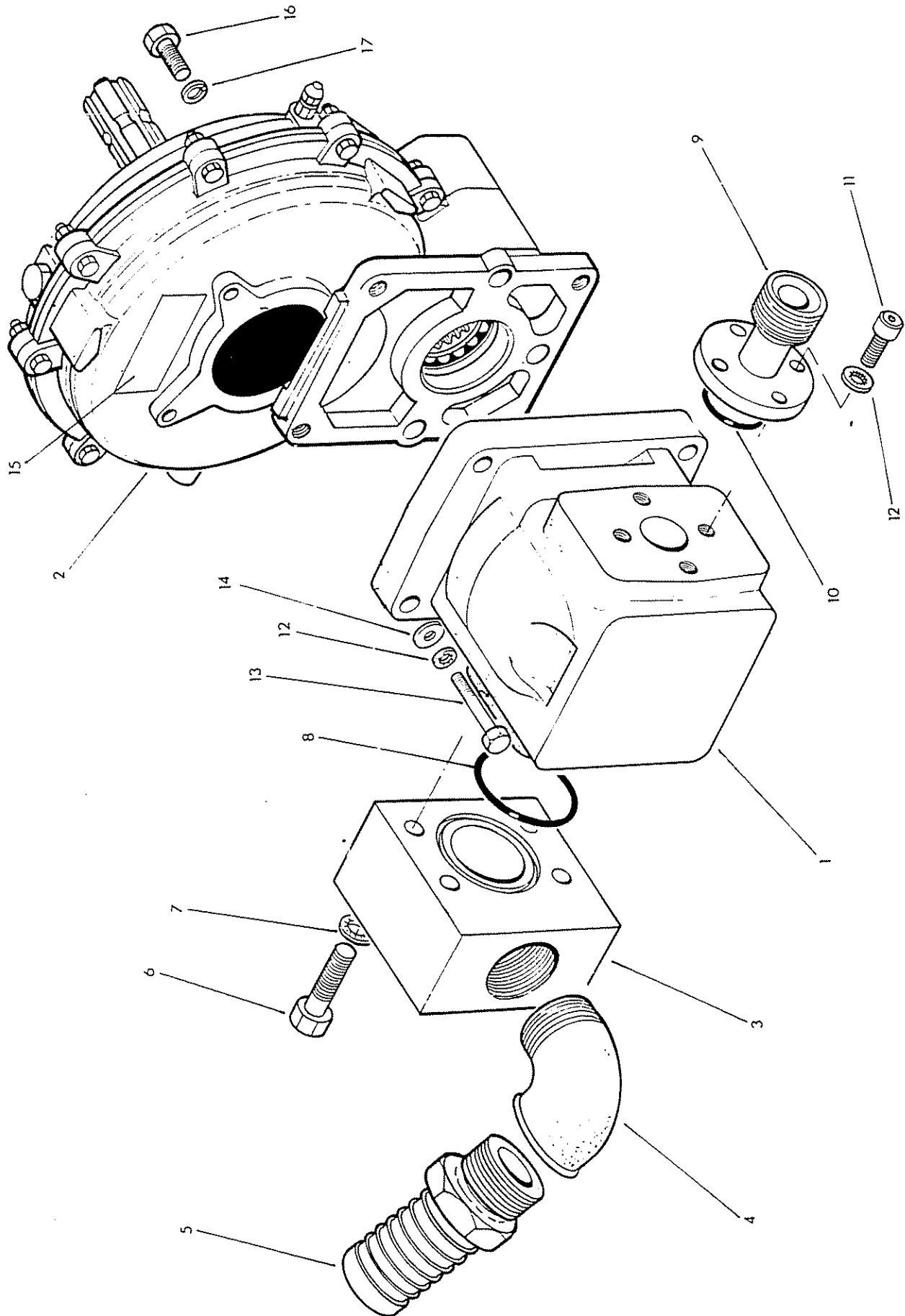
Item 1 or items 2 and 3 to be assembled into item 6 using PTFE tape.

Check pump carefully to ensure correct identification before ordering replacement sections.

PUMP/GEARBOX



McCONNELL



**McCORMELL**

Ref	Part No	Qty	Description
			S.I PUMP AND GEARBOX R.HAND HI POWER - as illustrated
			S.I PUMP AND GEARBOX L.HAND HI POWER -

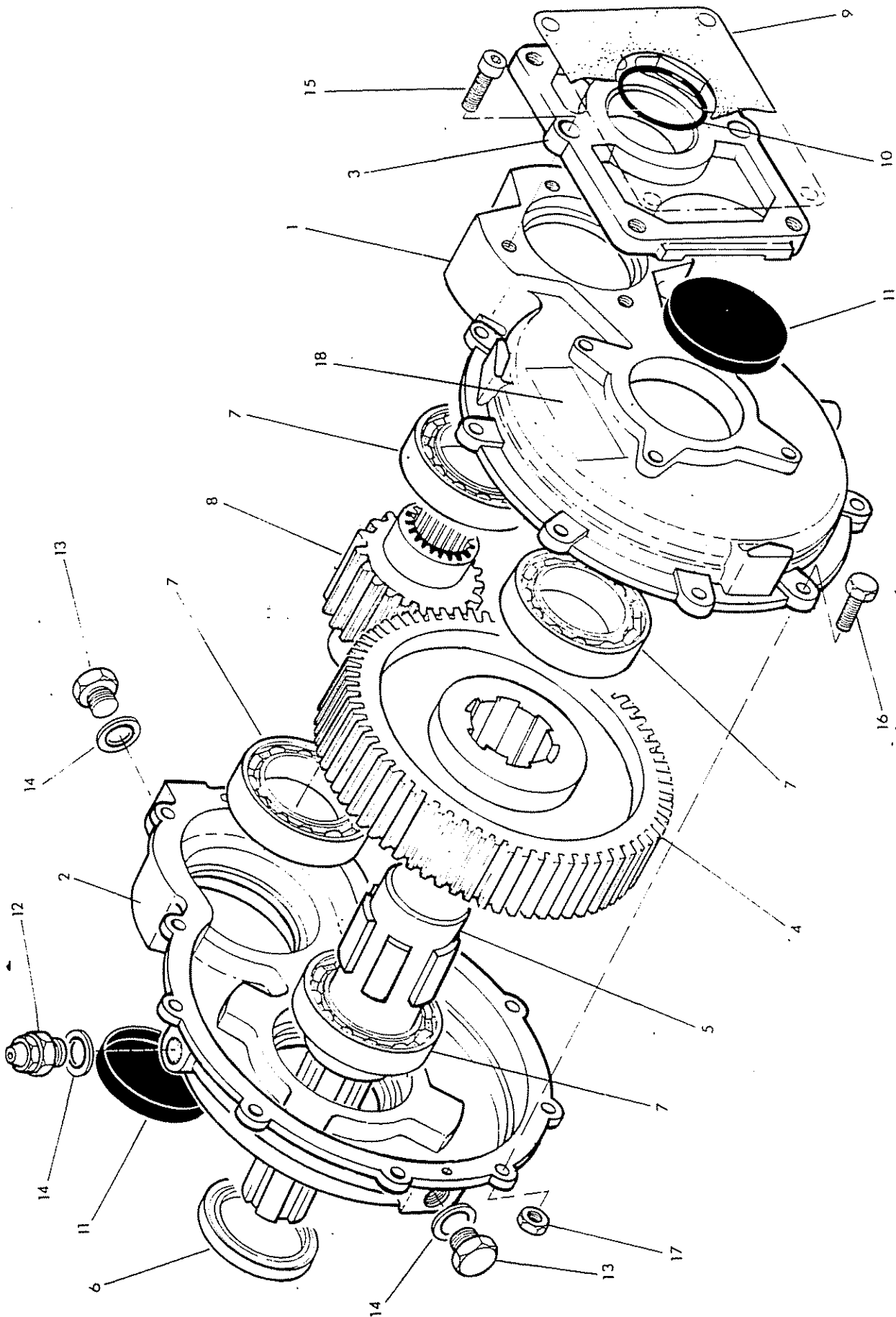
The parts list for right and left hand is identical. Assemblies vary only in build arrangement and comprise:-

1	82 01 686	1	Pump
2	80 13 444	1	Gearbox
3	85 81 312	1	Suction flange
4	85 81 261	1	Elbow
5	85 81 260	1	Adaptor
6	92 13 146	4	Bolt
7	91 00 406	4	Shakeproof washer
8	86 00 304	1	'O' ring
9	80 13 090	1	Pressure connection
10	86 00 117	1	'O' ring
11	93 43 054	4	Cap screw
12	91 00 404	8	Shakeproof washer
13	93 13 074	4	Bolt
14	91 00 104	4	Plain washer
15	12 90 054	1	Gearbox label
16	93 13 056	4	Setscrew
17	91 00 206	4	Spring washer
	86 99 235		SEAL KIT

GEARBOX



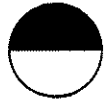
McCONNELL





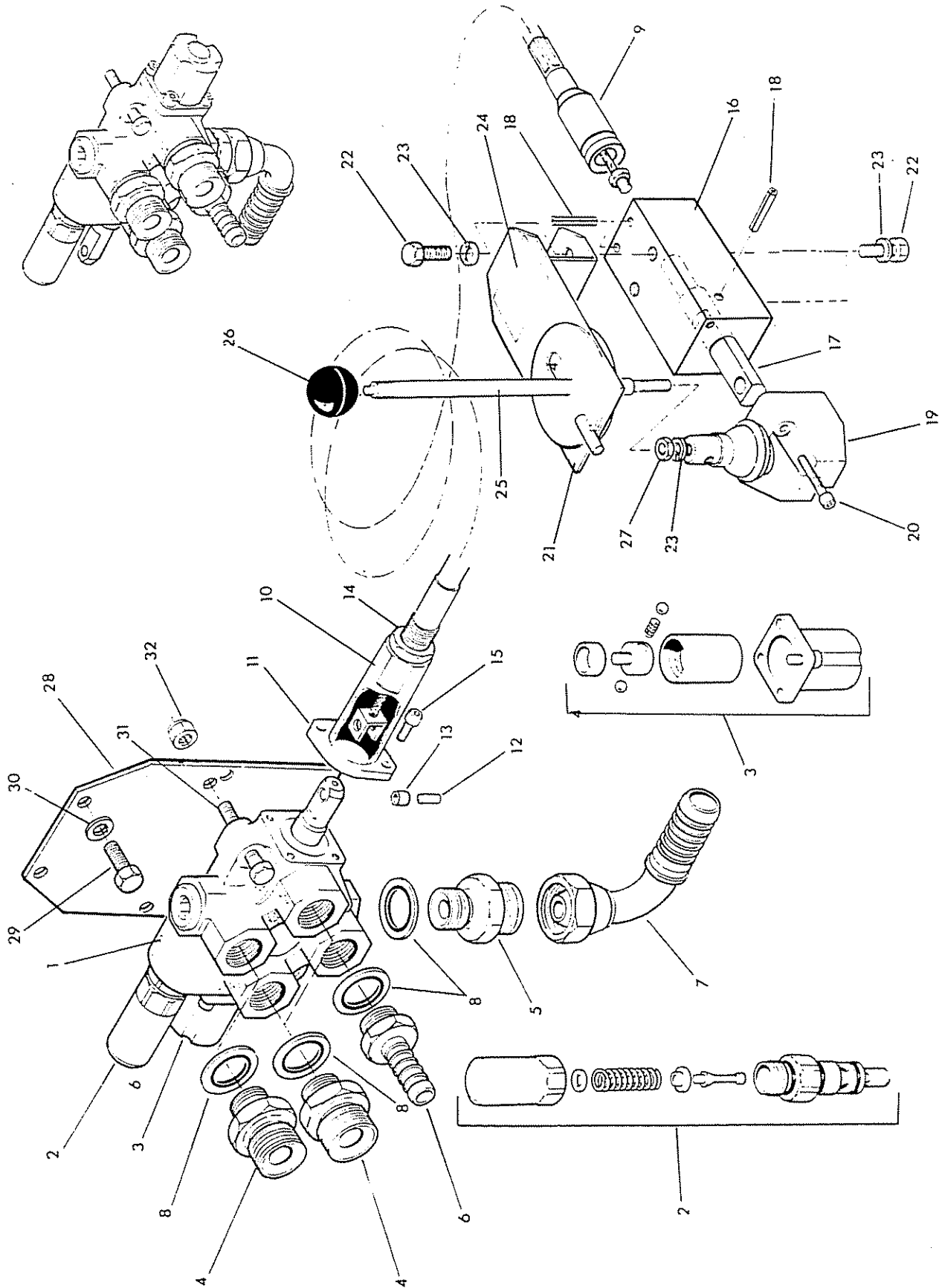
Ref	Part No	Qty	Description
	80 13 444		GEARBOX
1	80 13 100	1	Case - output side
2	80 13 101	1	Case - input side
3	80 13 102	1	Pump mounting flange
4	80 13 105	1	Gear
5	80 13 105	1	Shaft
6	86 29 196	1	Shaft seal
7	06 00 042	4	Bearing
8	80 13 104	1	Pinion
9	80 13 056	1	Gasket
10	86 00 523	1	'O' ring
11	80 13 106	2	End cover
12	80 13 107	1	Breather/adaptor
13	85 81 133	4	Plug
14	86 50 102	4	Bonded seal
15	93 43 045	3	Capscrew socket headed
16	92 13 064	10	Bolt
17	91 43 004	10	Self locking nut
18	12 90 054	1	Sticker

ROTOR CONTROL VALVE



McCONNELL

T.I. only





McCONEL

Ref.	Part No.	Qty.	Description
	81 25 373		ROTOR CONTROL VALVE ASSEMBLY R.HAND - STD POWER - as shown exploded
	81 25 374		ROTOR CONTROL VALVE ASSEMBLY L. HAND - STD POWER - as shown assembled inset

Individual parts for both assemblies are identical. Assemblies vary only in build

1	81 25 355	1	Rotor control valve incl. relief valve and detent
2	81 25 107	1	Relief valve
3	81-25-109	1	Detent assembly
4	85 81 136	3	Union
5	80 02 086	1	Adaptor
6	85 81 269	1	Adaptor
7	71 14 005	1	Elbow
8	86 50 106	5	Bonded seal
9	81 25 102	1	Cable assembly incl. sleeve flange etc
10	81 25 097	1	Sleeve
11	81 25 098	1	Flange
12	81 25 099	1	Pin
13	81 25 100	1	Bush
14	01 31 006	1	Thin locknut
15	93 43 033	2	Capscrew - socket headed
16	81 25 093	1	Control block
17	81 30 053	1	Control spindle
18	04 25 540	3	Spring dowel
19	81 30 065	1	Pivot box assembly
20	92 43 072	2	Capscrew -socket headed
21	81 25 089	1	Lever control gate
22	93 13 034	4	Setscrew
23	91 00 204	5	Spring washer
24	12 90 339	1	Operating label
25	71 14 072	1	Lever
26	09 03 121	1	Knob - black
27	91 13 004	1	Thin nut
	81 25 375		ROTOR CONTROL VALVE ASSEMBLY - R. HAND - HI POWER
	81 25 376		ROTOR CONTROL VALVE ASSEMBLY - L. HAND - HI POWER

The parts lists for Hi-power rotor control valves are identical to their std power counterparts with the following exceptions.

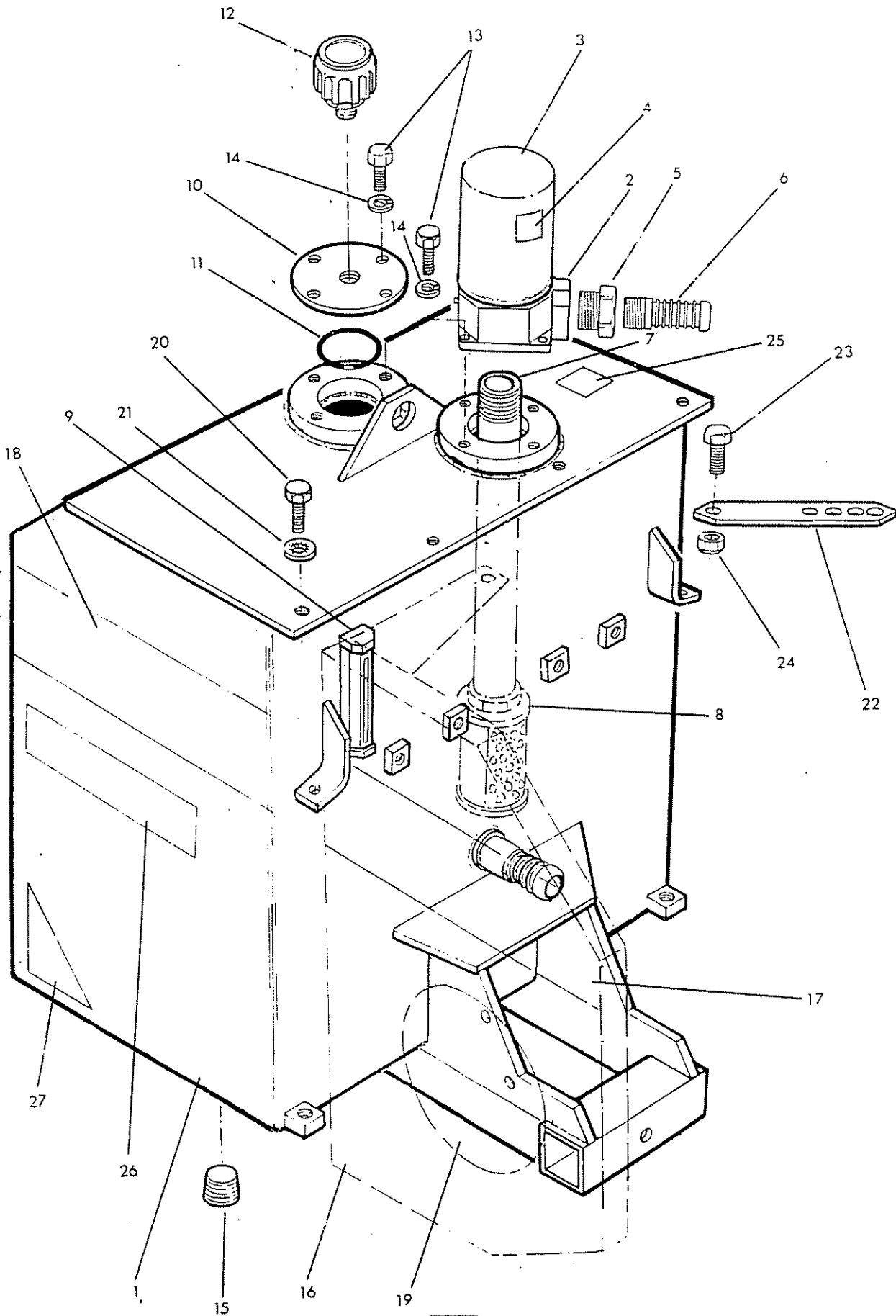
1	81 25 356	1	Rotor control valve incl. relief valve
2	81 25 108	1	Relief valve
4	80 02 086	3	Adaptor
	86-99-218		SEAL KIT - for all rotor control valves
			ANCILLIARY PARTS - For all rotor control valves
28	71-92-054	1	Mounting plate
29	93-13-045	2	Setscrew
30	91-00-305	2	Internal serrated washer
31	93-13-085	2	Setscrew
32	91-43-005	2	Self locking nut



Ref.	Part No.	Qty.	Description
	81 25 360		ROTOR RELIEF VALVE ASSEMBLY STD POWER S.I. MODELS ONLY
1	81 25 352	1	Valve block
2	81 25 107	1	Relief valve cartridge incl 'O' rings
3	85 81 136	3	Union
4	80 02 086	1	Adaptor
5	86 50 106	4	Bonded seal
6	71 14 005	1	Swept 90 elbow
7	80 03 001	1	Plug
8	86 50 103	1	Bonded seal
9	92 13 135	2	Bolt
10	91 13 005	2	Nut
11	91 00 205	2	Spring washer
12	71 92 054	1	Mounting bracket
13	93 13 045	2	Setscrew
14	91 00 305	2	Internal serrated washer
	81 25 400		ROTOR RELIEF VALVE ASSEMBLY HI -POWER S.I. MODELS ONLY

The parts list is identical to the above with the following exceptions

2	81 25 108	1	Relief valve cartridge incl 'O' rings
3	80 02 086	3	Adaptor





Ref	Part No	Qty	Description
ENDURO HYDRAULIC TANK AND COVER PLATE			
	71 92 385		Oil tank assembly compr:-
1	71 92 373	1	Oil tank
2	84 01 040	1	Return filter assy. incl. element
3	84 01 041	1	Filter element
4	12 90 023	1	Sticker 'filter instruction'
5	85 81 262	1	Adaptor
6	80 05 037	1	Adaptor
7	71 92 380	1	Return pipe
8	84 01 065	1	Diffuser
9	84 01 048	1	Level guage
10	71 92 063	1	Cover
11	86 00 151	1	'O' ring
12	84 01 063	1	Breather
13	93 13 054	8	Set screw
14	91 00 204	8	Spring washer
15	85 81 203	1	Drain plug
16	71 93 389	1	Cover plate R. hand
17	12 90 283	1	Stripe - R. hand
18	12 90 288	1	Tank stripe PA92
19	12 90 365	1	Sticker 'McConnell' rounded
20	93 13 045	2	Set screw
21	91 00 305	2	Internal serrated washer
22	71 92 029	1	Tank strap
23	93 13 056	2	Set screw
24	91 43 006	2	Self locking nut
25	12 90 023	1	Label 'oil filter'
26	12 90 362	1	Sticker 'Hi Power'
27	12 90 376	1	Sticker 'Enduro'

ENDURO HYDRAULIC TANK AND COVER PLATE

Parts are identical to the R. hand assembly with the following exceptions.

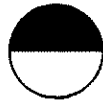
15	71 93 390	1	Cover plate L. hand
16	12 90 284	1	Stripe L. hand

Assembly note :- Items 6,7,8,9 and16 to be assembled using PTFE tape

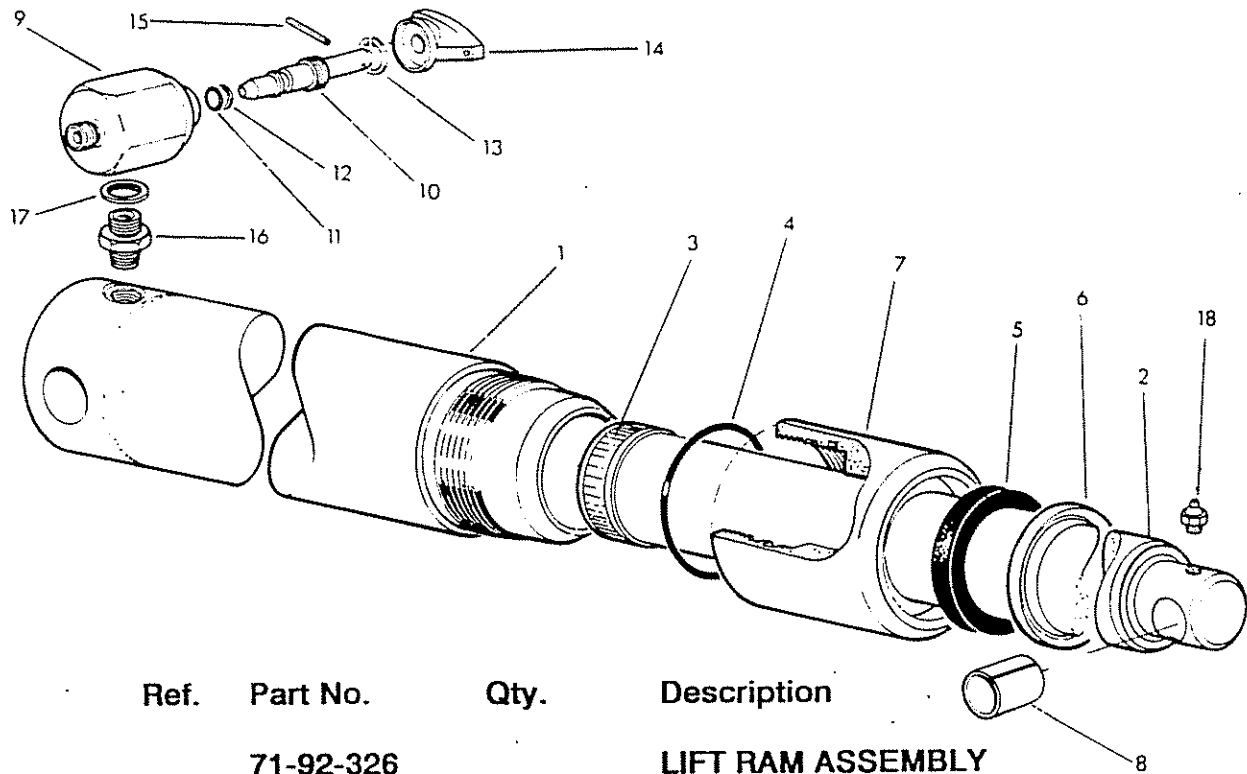


Ref.	Part No.	Qty.	Description
	81 26 290		LIFT FLOAT KIT - Quick response
1	81 26 042	1	Accumulator
2	G241 0380	1	Adaptor
3	81 26 035	1	Bulkhead nut
4	81 26 286	1	Bracket
5	81 26 031	1	U.bolt
6	91 43 004	2	Self locking nut
7	86 50 322	1	Bonded seal
8	86 50 103	3	Bonded seal
9	81 26 287	1	Control block
10	81 26 037	1	Response piston
11	81 16 011	1	Spring
12	85 81 115	2	Adaptor
13	12 90 061	1	Operating sticker
14	85 35 012	1	Hose
15	81 30 183	1	Poppet valve including :-
16	81 30 184	1	Coil
17	87 00 017	1	O ring
18	87 00 511	1	O ring
19	87 09 511	1	Anti extrusion ring
20	84 02 159	1	Cable - electric machines only

LIFT RAM



McCONNEL



Ref.	Part No.	Qty.	Description
	71-92-326		LIFT RAM ASSEMBLY
	71-92-332	1	Ram assembly including:-
1	71-92-333	1	Ram cylinder
2	71-92-334	1	Ram rod
3	86-29-174	1	Wear ring
4	86-00-435	1	'o' ring
5	86-29-172	1	Rod seal
6	86-29-173	1	Rod wiper
7*	71-92-033	1	Cylinder head
8	71-05-050	1	Rod bush
	71-35-005	1	Lock tap including:-
9	71-35-284	1	Tap body
10	71-35-006	1	Tap spindle
11	86-00-107	1	'O' ring
12	86-09-107	1	Anti extrusion ring
13	04-16-110	1	Internal circlip
14	81-08-006	1	Knob
15	04-20-820	1	Spring dowel
16	80-05-007	1	Taper adaptor
17	86-50-103	1	Bonded seal
18	09-01-121	1	Greaser
	86-99-213		SEAL KIT

Assembly notes

*To be assembled onto cylinder using 'Permabond A113' or equivalent

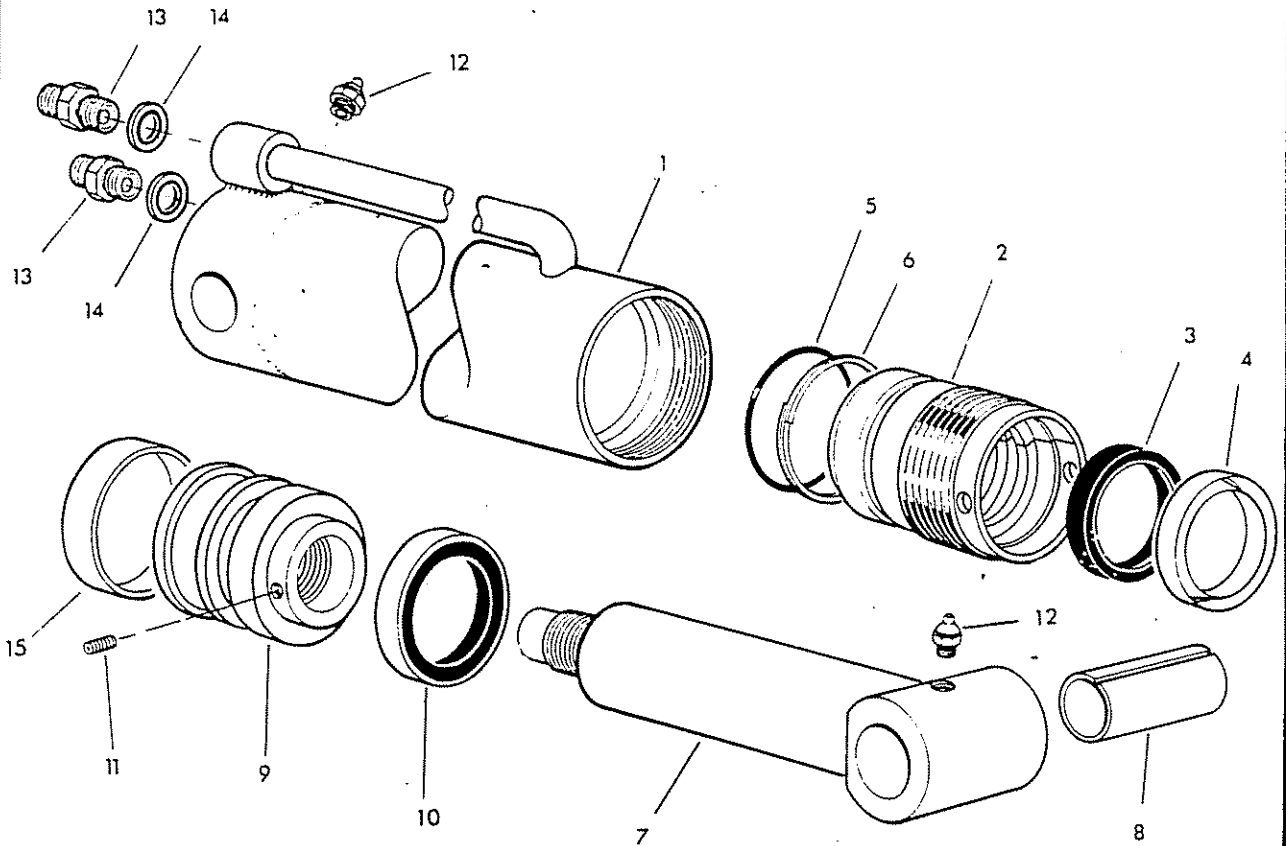
To be assembled into cylinder using 'Permabond A121' or equivalent

To be assembled with tap across the body of the ram and with knob to the rear

REACH RAM



McDONNELL

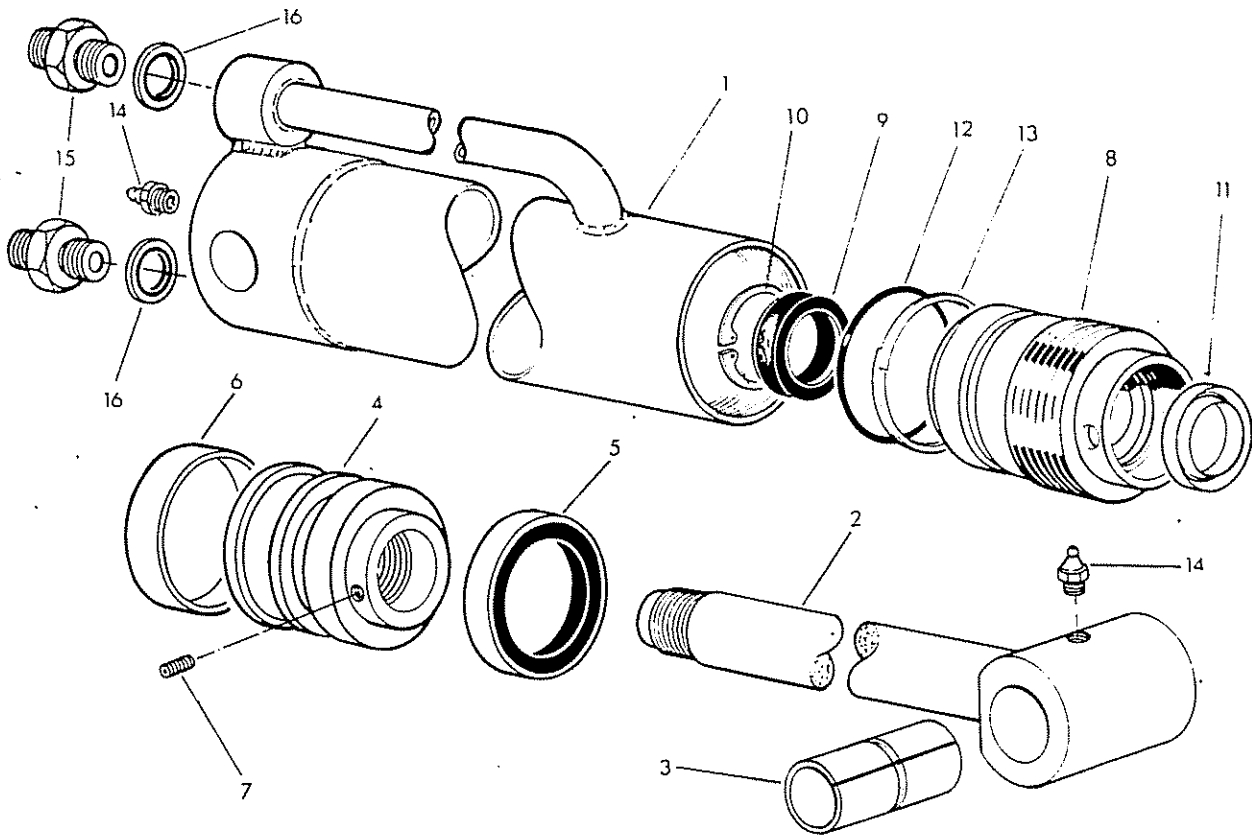


Ref.	Part No.	Qty.	Description
	71 92 410		REACH RAM ASSEMBLY
1	71 91 306	1	Ram barrel
2	11 86 512	1	Gland housing
3	86 29 164	1	Gland seal
4	86 29 147	1	Piston rod wiper seal
5	86 00 306	1	'O' ring
6	86 09 306	1	Anti extrusion ring
7	71 91 307	1	Piston rod
8	71 05 050	1	Bush
9	71 20 368	1	Piston
10	86 29 156	1	Piston seal
11	93 63 023	1	Grub screw
12	09 01 121	2	Greaser
13	85 81 209	2	Union
14	86 50 103	2	Bonded seal
15	86 29 157	1	Guide ring
	86 99 217		SEAL KIT

ANGLING RAM



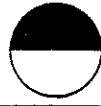
MCDONNELL



Ref.	Part No.	Qty.	Description
	75-60-344		ANGLING RAM ASSEMBLY
1	71-35-292	1	Cylinder
2	71-35-009	1	Rod
3	71-05-050	1	Bush
4	75-60-095	1	Piston
5	86-29-187	1	Piston seal
6	86-29-188	1	Bearing ring
7*	93-63-023	1	Grub screw socket head
8	71-35-291	1	Gland housing
9	86-29-148	1	Gland seal
10	04-16-240	1	Internal circlip
11	86-29-149	1	Wiper seal
12	86-00-302	1	'O' ring
13	86-09-302	1	Anti extrusion ring
14	09-01-121	2	Greaser
15	85-81-169	2	Union
16	86-50-102	2	Bonded seal
	86-99-188		SEAL KIT

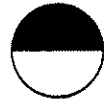
*** Assembly note**

Tighten fully and centre punch edge of hole to secure.

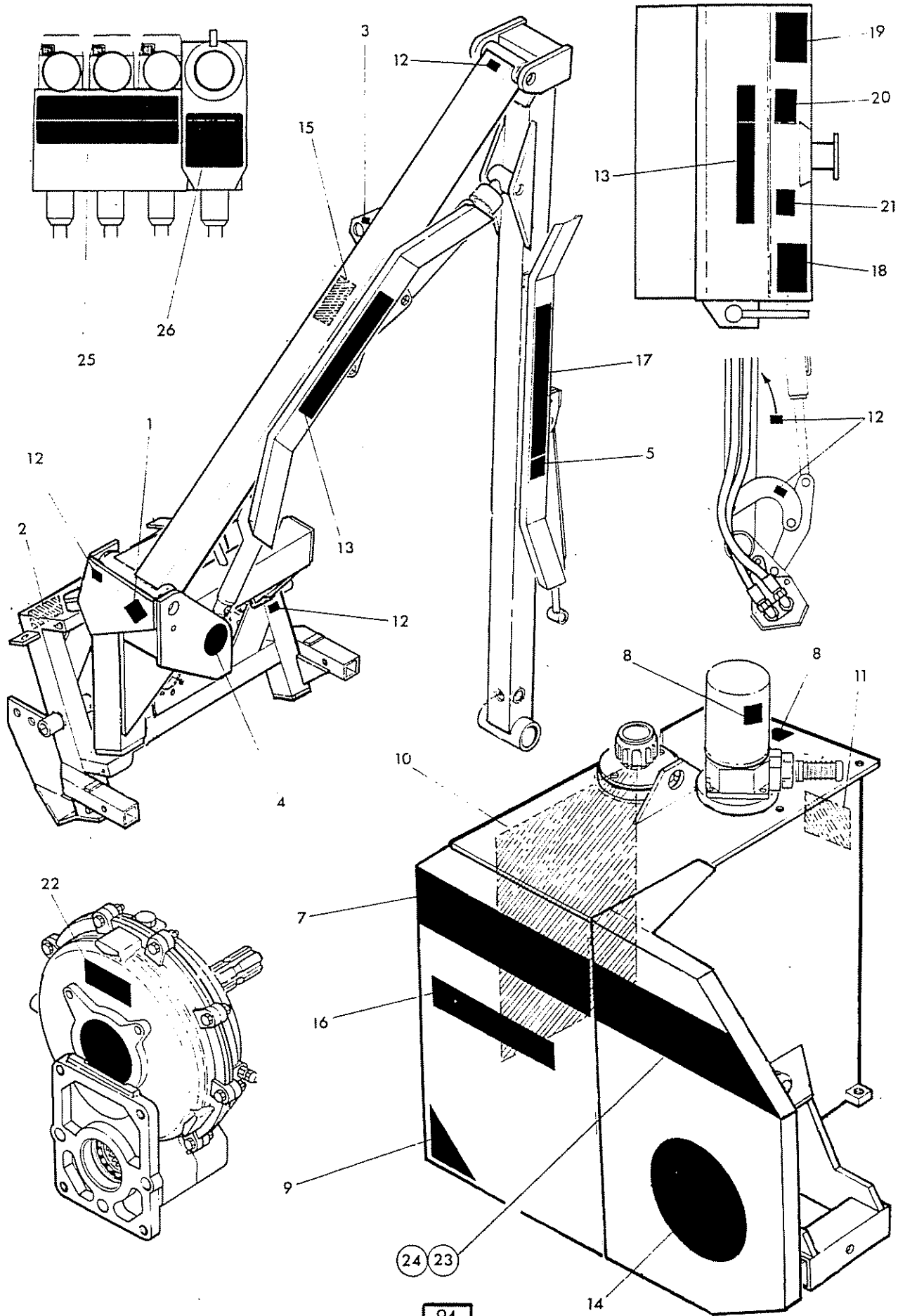


McCONNEL

DECALS



McCONEL



**McCONNEL**

Ref	Part No	Qty	Description
STICKERS			
1	71 05 130	1	Read book first
2	71 35 295	1	Tighten check chains
3	C0 55 002	1	Sling here symbol
4	12 90 296	1	Logo roundel
5	12 90 294	1	92
6	12 90 352	1	Gen. warning - despatched loose
7	12 90 288	1	PA92
8	12 90 023	3	Oil filter instructions
9	12 90 376	1	Enduro tank
10	12 90 391	1	General warning
11	0075 6494	1	Fitting P.T.O. shaft
12	0096 2764	5	Pinch point
13	12 90 255	2	McConnel
14	12 90 365	1	McConnel roundel
15	12 90 403	1	Breakaway return warning
16	12 90 362	1	Hi power (Hi power only)
17	12 90 295	1	Power Arm
18	12 90 377	1	Flail head instructions
19	12 90 341	1	Flail head gaurding
20	0075 6485	1	Rotating blade warning
21	12 90 392	1	Use McConnel spares
22	12 90 054	1	Gearbox oil capacity
23	12 90 283	1	Cover plate stripe (R.Hand only)
24	12 90 284	1	Cover plate stripe (L.Hand only)
25	12 90 354	1	Lever controls
26	12 90 338	1	R.C. valve controls (Ti only)



McCORMEL

Peel off sticker and affix to tractor in operators view.

Vignette à coller au poste de conduite de votre tracteur bien en vue du conducteur.

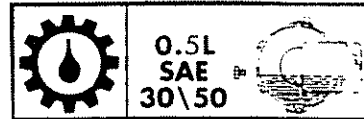
McCORMEL	McCORMEL
VITAL SAFETY RULES	IMPORTANTES REGLES DE SECURITE
<ul style="list-style-type: none"> - Read the instruction book first - Fit safety screens - If no cab fitted wear helmet and goggles - Keep all bolts and nuts tight. - PTO speed 500 R.P.M. - Always disengage PTO when rotor is OFF - Grease daily 	<ul style="list-style-type: none"> - Avant la premier mise en route, vous reporter au manue de l'utilisateur - Mettez en place les grilles de protection - Si le tracteur n'est pas equipe d'une cabine, portez un casque et des lunettes de securite - Verifier tous les jours, le bon serrage des boulons et de ecrous - En position de transport, debrazez la prise de force - Ne jamais depasser 500 T·MN à la prise de force - Graisseur tous les jours

6

⚠ DANGER ⚠

FAILING TO FOLLOW SAFETY MESSAGES AND OPERATING INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH TO OPERATOR OR OTHERS IN AREA

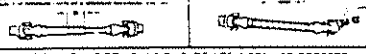
- 1 Study operator manual and safety decals for tractor and PTO mower thoroughly to prevent misuse, abuse and accidents. Practice before operating.
- 2 Operate only with safety ccd or roll bars to prevent injury and possible crushing death from overturn. Allow no riders on machine. Failing off can cause serious injury or death by being run over by the tractor or by being cut by the mower. Allow no bystanders, especially children, near the tractor/mower.
- 3 Operator and assistants must wear a hard hat safety glasses and shoes to prevent injury from falling or thrown objects.
- 4 Before transport, engage all transport devices. See operator manual.
- 5 Block up or support machine securely before placing any part of the body beneath the machine to prevent crushing injury or death from sudden dropping. Make certain area is clear before lowering.
- 6 Make certain lights, reflectors, and in U.S.A. the SMV sign is clearly visible. Follow highway regulations. Slow down at night, in turns and on hillside.
- 7 Before dismounting, secure PTO mower in transport position or lower to ground. Stop PTO, put tractor in park or set hand brake, stop engine and remove the key. Never mount or dismount a moving vehicle to prevent possible injury or death.
- 8 Each rear wheel must have a minimum of 100lbs contact with ground to prevent lateral instability and possible tip over and bodily injury. Widen wheel track and add weights if needed. Contact manufacturer for counterweights procedure.
- 9 Rear mounted PTO mowers move centre of gravity to rear and remove weight from front wheels. Add front ballast until at least 20% of the tractor's weight is on front wheels to prevent rearing up, loss of steering control and possible injury.
- 10 Never operate until without an operator guard to prevent injury from falling or thrown objects. Keep bystanders at a safe distance. Stop cutting if they enter the danger area.
- 11 Never operate the machine without the correct PTO head guards in position. Ensure they are in good condition.
- 12 Beware overhead obstructions. Keep at least five feet away from power lines to prevent accidental contact or electronic flashover and possible serious injury or death.
- 13 Transport carefully! Slow down even more on slopes and when turning. Never turn up a slope sharply or at high speed and use extra care in rough or bumpy areas to prevent overturn and possible crushing injury or death. If your view to the rear is blocked it is your responsibility to install mirrors that provide a rear view to prevent accidents from blind spots.



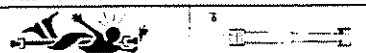
22

⚠ DANGER ⚠

MAKE CERTAIN DRIVELINES ARE OF THE CORRECT LENGTH AND SECURELY ATTACHED. DRIVELINE SEPARATION AND OR PTO SHAFT FAILURE CAN CAUSE INJURY OR DEATH. See Operator's Manual for procedure.



MAKE CERTAIN THAT DRIVELINE SHIELDS ARE INSTALLED CORRECTLY AND TURN FREELY TO PREVENT INJURY OR DEATH FROM ENTANGLEMENT!






DRIVELINE SHIELDS HAVE TETHER CHAINS. ATTACH TETHER CHAINS SECURELY TO MOWER AND TRACTOR TO PREVENT SHIELD MISALIGNMENT, BEND AND OR SHIELD FAILURE AND SERIOUS INJURY OR DEATH.

4 540 PTO RPM UNLESS SPECIFICALLY MARKED OTHERWISE

11


GUARDING REQUIREMENTS EQUIPMENTS DE SECURITE

GROUND CUTTING COUPE DE SOL  <p>Always cut upwards. Roller set below flails. Studs recommended.</p> <p>Toujours couper en ascension. Rouleau regle sous les flails. Perons recommandes.</p>	HEDGE CUTTING TAILLE DE HAIES  <p>With flails cutting upwards. Roller set above flails.</p> <p>Les flails travaillent en aspiration. Rouleau regle au dessus des flails.</p>	HEDGE CUTTING TAILLE DE HAIES  <p>With flails cutting downwards. Roller set above flails.</p> <p>Les flails travaillent en attaque. Rouleau regle au dessus des flails.</p>
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⚠ DANGER ⚠

CUTTING BLADES THROWN OBJECTS



FLAIL ROTARY FLAIL ROTARY

KEEP AWAY - ROTATING BLADES

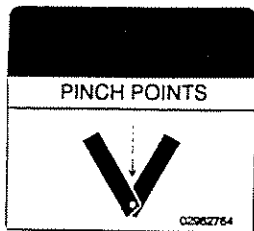
SERIOUS INJURY OR DEATH CAN RESULT FROM THROWN OBJECTS OR BLADE CONTACT

- STOP MOWING IF PERSONS ARE NOT CLEAR OF THROWN OBJECTS
- DO NOT STAND ON OR NEAR MACHINE WHEN IN OPERATION
- DO NOT OPERATE WITH DEFLECTORS OR GUARDS REMOVED

20



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12

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14



3

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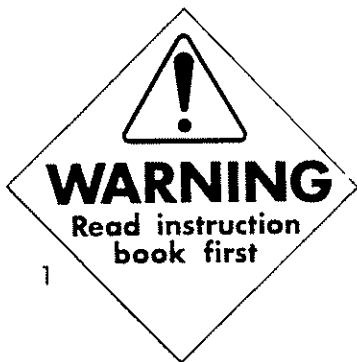
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Power Arm

17



24



1

HI-POWER

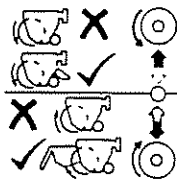
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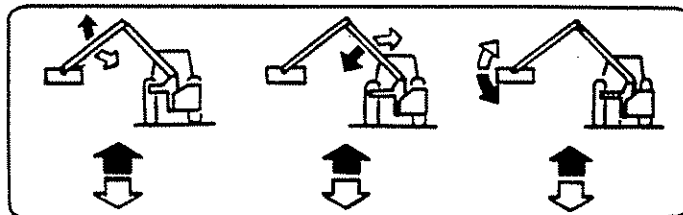
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TIGHTEN CHECK CHAINS AND/OR STABILISER BARS BEFORE OPERATION

2



9



FLAIL PARTS INFORMATION

McCormel Flail Mowers use dynamically balanced and mated system components for Cutter Shafts (Rotors), Knives (Flails), Knife Hangers (Shackles), Bolts, Bushes, Rollers, Drivetrain Components, Bearings Bolts and Belt Pulleys. McCormel parts are made and tested to meet close-tolerance specifications of balance, quality and consistency that assure long, trouble-free service. "Will-Fit" parts do not ordinarily meet McCormel Standards and could reduce Mower performance, void warranties, and present an increase in the safety hazard potential.

DON'T GAMBLE!
USE GENUINE McCORMEL SERVICE PARTS
See your McCormel dealer

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⚠ DANGER ⚠

BEWARE AUTOMATIC BREAKAWAY RETURN. KEEP WELL CLEAR OF THE FRONT OF THE ARM AND HEAD.

15



ATTENTION



Recommended P.T.O. speed 500 r.p.m.

Vitesse recommandee 500 T/min a la prise de force.

DANGER

Rotating cutters under here.

DANGER

Rotor ne pas approcher.

KEEP BOLTS TIGHT

Check bolt tightness after 1 hour, 4 hours, 10 hours and thereafter daily.

MAINTENEZ LES BOULONS SERRES

Et controlez serrage apres 1 heure, 4 heures, 10 heures puis chaque jour.

BEWARE OF FLYING DEBRIS. KEEP PEOPLE AWAY.
ATTENTION AUX PROJECTIONS. SE TENIR A L'ECART.

18

IMPORTANT

We recommend that Element is replaced after first 50 hours service and every 500 hours service thereafter. Apply Oil film to gasket when replacing element.

Nous recommandons de remplacer le cartouche une premiere fois apres 50 heures de service puis ensuite toutes les 500 heures. Enduire le joint d'une pellicule d'huile lorsque on change le cartouche.

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