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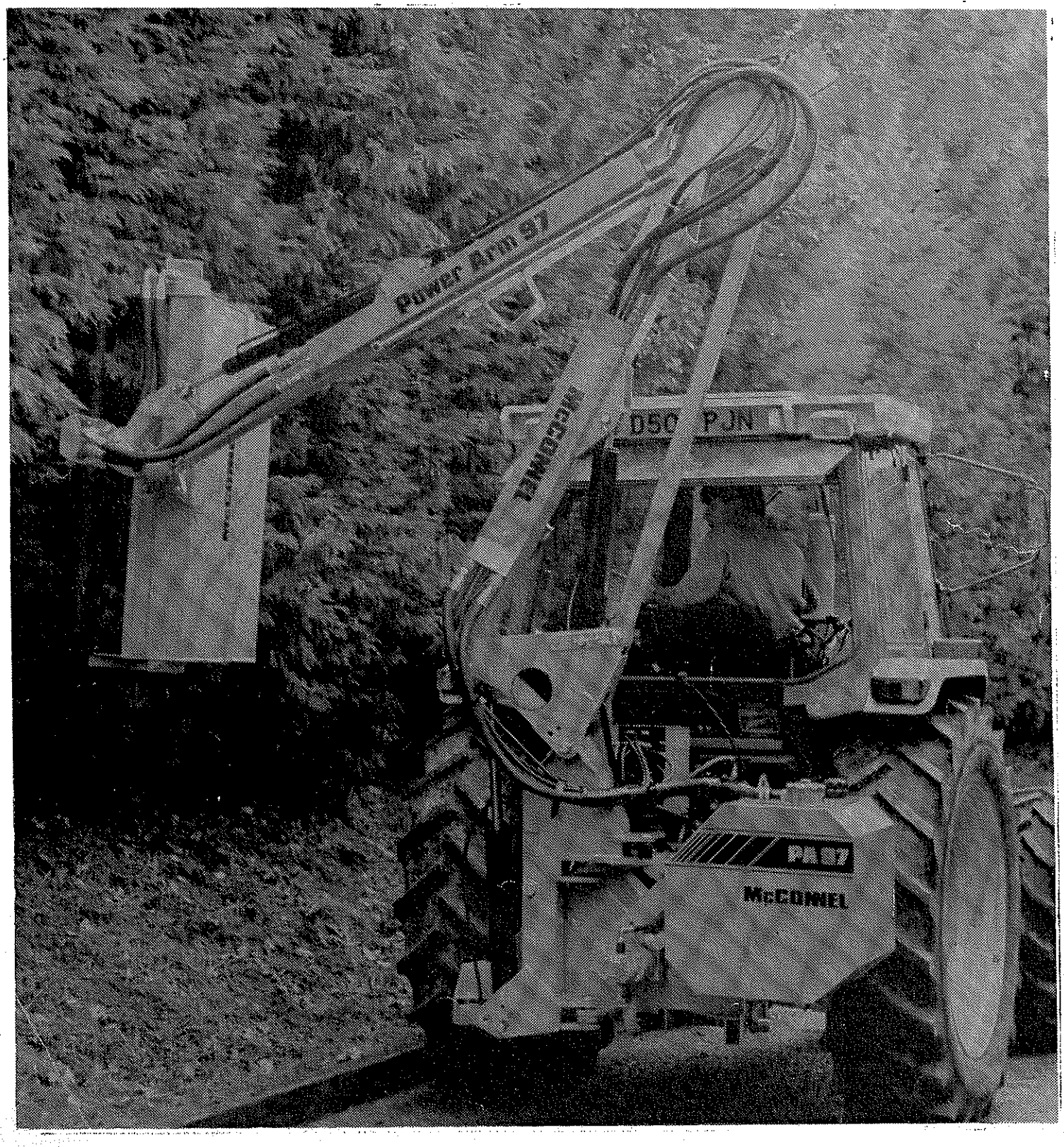
PA96 & PA97

Operation & Spares manual



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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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 Power Arms 96 and 97 are fully independent hydraulically driven flails of which the PA97 is fitted with a telescopic dipper arm. In addition each model can be supplied in either a hedge cutting or grass cutting format and can be fitted onto a wide range of tractors using series 40 tractor mounting brackets.

The machine has been designed in such a way that it can be constructed to work on either the right or left side of the tractor and in addition flail rotation can be altered for an upward or downward cutting motion.

All power for operation of the flail rotor and for the movement of the arms is provided by a frame mounted tandem pump unit that is powered from the tractor P.T.O. shaft. The machine carries its own 32 gallon (145 litre) oil reservoir which incorporates an oil strainer and a 10 micron return flow filter.

The flail head is despatched with the flails to cut in an upward motion and is equipped with a mounted hood to minimise flying debris. An additional hood for the rear of the flail head is available should the rotation of the flails be reversed. The operator is further protected by a mesh guard which attaches to the tractor.

The in cab controls for movement of the arms and flail head are electric solenoid operated while the rotor is started and stopped by a cable operated on/off valve.

The machine is equipped with an hydraulically actuated breakaway system which links the slew and lift services to give a simultaneous upward and backward motion when the "Auto reset" mode on the control box is selected.
By selecting "Slew" the machine can be folded within the tractors wheel width for transport on the highway.

The arm geometry is provided with compensating rams which provide auto head control, a feature which maintains the set position of the head angle during subsequent movement of the lift and reach.

The hydraulic system is equipped with check valves on all services which prevents any movement of the arms without pressure being available.

Screw jack legs are provided to aid stability when the machine is unhitched from the tractor.

P.T.O. DRIVE SHAFT SAFETY PRECAUTIONS

ON EACH TRACTOR CHECK:-

All machines

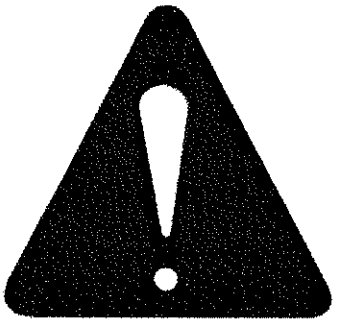
Ensure the correct end of the drive shaft is fitted to the tractor.. See labels on the drive shaft.

Check carefully that the drive shaft does not bottom out and that a minimum of 6" (150mm0 of engagement is maintained.

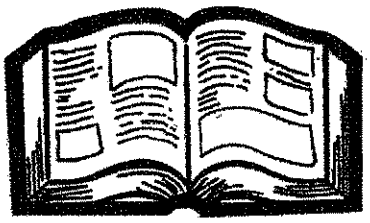
Ensure that the guards are always in position, can rotate freely and the check chains are not stretched mwhen the machine is raised or lowered.

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.



SAFETY INFORMATION



This machine has the potential to be extremely dangerous, in the wrong hands it can kill or maim. It is therefore imperative that the owner, and the operator of this machine, read the following section to ensure that they are both fully aware of the dangers that do, or may exist, and their responsibilities surrounding its use.
The operator of this machine is responsible not only for their own safety but equally for the safety of others who may come into the close proximity of the machine, as the owner you are responsible for both.

POTENTIAL SIGNIFICANT DANGERS ASSOCIATED WITH THE USE OF THIS MACHINE:

- *Being hit by debris thrown by rotating components.*
- *Being hit by machine parts ejected through damage during use.*
- *Being caught on a rotating power take-off (PTO) shaft.*
- *Being caught in other moving parts i.e.: belts, pulleys and cutting heads.*
- *Electrocution from Overhead Power Lines (by contact with or 'flashover' from).*
- *Being hit by cutting heads or machine arms as they move.*
- *Becoming trapped between tractor and machine when hitching or unhitching.*
- *Tractor overbalancing when machine arm is extended.*
- *Injection of high-pressure oil from hydraulic hoses or couplings.*
- *Machine overbalancing when freestanding (out of use).*
- *Road traffic accidents due to collision or debris on the road.*

BEFORE USING THIS MACHINE YOU MUST:

- *Ensure you read all sections of the operator handbook.*
- *Ensure the operator is, or has been, properly trained to use the machine.*
- *Ensure the operator has been issued with and reads the operator handbook.*
- *Ensure the operator understands and follows the instructions in operator handbook.*
- *Ensure the tractor front, rear and side(s) are fitted with metal mesh or polycarbonate guards of suitable size and strength to protect the operator against thrown debris or parts.*
- *Ensure tractor guards are fitted correctly, are undamaged and kept properly maintained.*
- *Ensure that all machine guards are in position, are undamaged, and are kept maintained in accordance with the manufacturer's recommendations.*
- *Ensure flails and their fixings are of a type recommended by the manufacturer, are securely attached and that none are missing or damaged.*
- *Ensure hydraulic pipes are carefully and correctly routed to avoid damage by chaffing, stretching or pinching and that they are held in place with the correct fittings.*
- *Always follow the manufacturer's instructions for attachment and removal of the machine from the tractor.*
- *Check that the machine fittings and couplings are in good condition.*
- *Ensure the tractor meets the minimum weight recommendations of the machine manufacturer and that ballast is used as necessary.*
- *Always inspect the work area thoroughly before starting to note obstacles and remove wire, bottles, cans and other debris.*
- *Use clear suitably sized warning signs to alert others to the nature of the machine working within that area. Signs should be placed at both ends of the work site. (It is recommended that signs used are of a size and type specified by the Department of Transport and positioned in accordance with their and the Local Highways Authority guidelines).*
- *Ensure the operator is protected from noise. Ear defenders should be worn and tractor cab doors and windows must be kept closed. Machine controls should be routed through proprietary openings in the cab to enable all windows to be shut fully.*
- *Always work at a safe speed taking account of the conditions i.e.: terrain, highway proximity and obstacles around and above the machine.*
- *Extra special attention should be applied to Overhead Power Lines. Some of our machines are capable of reach in excess of 8 metres (26 feet) this means they have the potential to well exceed, by possibly 3 metres (9' 9"), the lowest legal minimum height of 5.2 metres from the ground for 11,000 and 33,000 volt power lines. It cannot be stressed enough the dangers that surround this capability, it is therefore vital that the operator is fully aware of the maximum height and reach of the machine, and that they are fully conversant with all aspects regarding the safe minimum distances that apply when working with machines in close proximity to Power Lines. (Further information on this subject can be obtained from the Health & Safety Executive or your Local Power Company).*
- *Always disengage the machine, kill the tractor engine, remove and pocket the key before dismounting for any reason.*

- *Always clear up all debris left at the work area, it may cause hazard to others.*
- *Always ensure when you remove your machine from the tractor that it is left in a safe and stable position using the stands and props provided and secured if necessary.*

WHEN NOT TO USE THIS MACHINE:

- *Never attempt to use this machine if you have not been trained to do so.*
- *Never uses a machine until you have read and understood the operator handbook, are familiar with, and practiced the controls.*
- *Never use a machine that is poorly maintained.*
- *Never use a machine if guards are missing or damaged.*
- *Never use a machine on which the hydraulic system shows signs of wear or damage.*
- *Never fit, or use, a machine on a tractor that does not meet the manufacturer's minimum specification level.*
- *Never use a machine fitted to a tractor that does not have suitable front, rear and side(s) cab guarding made of metal mesh or polycarbonate.*
- *Never use the machine if the tractor cab guarding is damaged, deteriorating or badly fitted.*
- *Never turn a machine cutting head to an angle that causes debris to be ejected towards the cab.*
- *Never start or continue to work a machine if people are nearby or approaching - Stop and wait until they are at a safe distance before continuing.*
- *Never attempt to use a machine on materials in excess of its capability.*
- *Never use a machine to perform a task it has not been designed to do.*
- *Never operate the tractor or machine controls from any position other than from the driving seat, especially whilst hitching or unhitching the machine.*
- *Never carry out maintenance of a machine or a tractor whilst the engine is running – the engine should be switched off, the key removed and pocketed.*
- *Never leave a machine unattended in a raised position – it should be lowered to the ground in a safe position on a level firm site.*
- *Never leave a tractor with the key in or the engine running.*
- *Never carry out maintenance on any part or component of a machine that is raised unless that part or component has been properly substantially braced or supported.*
- *Never attempt to detect a hydraulic leak with your hand – use a piece of cardboard.*
- *Never allow children near to, or play on, a tractor or machine under any circumstances.*

ADDITIONAL SAFETY ADVICE

TRAINING

Operators need to be competent and fully capable of operating this machine in a safe and efficient way prior to attempting to use it in any public place. We advise therefore that the prospective operator make use of relevant training courses available such as those run by the Agricultural Training Board, Agricultural Colleges, Dealers and McConnel.

WORKING IN PUBLIC PLACES

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

WARNING SIGNS

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

SUGGESTED WARNING SIGNS REQUIRED

"Road works ahead" *warning sign with a supplementary* ***"Hedge cutting"*** *plate.* ***"For 1 mile"*** *or appropriate shorter distance may be added to the plate.*

"Road narrows" *warning sign with supplementary* ***"Single file traffic"*** *plate.*

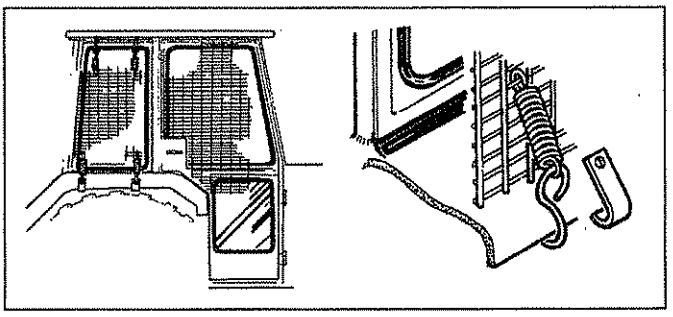
White on blue ***"Keep right"*** *(*) arrow sign on rear of machine.*
** Note – this applies to UK Market machines where traffic passes to the right of a machine working in the same direction as the traffic flow. The direction, use and colour of the arrow sign will depend on the country of use and the Local Highway Authorities regulations in the locality.*

USE OF WARNING SIGNS

- *On two way roads one set of signs is needed facing traffic in each direction.*
- *Work should be within 1 mile of the signs.*
- *Work only when visibility is good and at times of low risk e.g.: NOT during 'rush-hour'.*
- *Vehicles should have an amber flashing beacon.*
- *Ideally, vehicles should be conspicuously coloured.*
- *Debris should removed from the road and path as soon as practicable, and at regular intervals, wearing high visibility clothing and before removing the hazard warning signs.*
- *Collect all road signs promptly when the job is completed.*

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

VEHICLE/ TRACTOR PREPARATION



We recommend vehicles are fitted with cabs using safety glass windows and protective guarding when used with our machines.
Fit Operator Guard *(part no. 73 13 324)* using the hooks provided. Shape mesh to cover all vulnerable areas.
Remember the driver must be looking through mesh and/or polycarbonate glazing when viewing the flail head in any working position - unless the vehicle/ cab manufacturer can demonstrate that the penetration resistance is equivalent to, or higher than, that provided by mesh/polycarbonate glazing. If the tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing. The operator should also use personal protective equipment to reduce the risk of serious injury such as; eye protection (mesh visor to EN1731 or safety glasses to EN166), hearing protection to EN352, safety helmet to EN297, gloves, filter mask and high visibility clothing.

Vehicle Ballast: It is imperative when attaching 'third-party' equipment to a vehicle that the maximum possible stability of the machine and vehicle combination is achieved – this can be accomplished by the utilisation of 'ballast' in order to counter-balance the additional equipment added.
Front weights may be required for rear mounted machines to place 15% of total outfit weight on the front axle for stable transport on the road and to reduce 'crabbing' due to the drag of the cutting unit when working on the ground.
Rear weights may be required to maintain a reasonable amount of rear axle load on the opposite wheel from the arms when in work; for normal off-ground work i.e. hedge cutting this should be 20% of rear axle weight or more for adequate control, and for ground work i.e. verge mowing with experienced operators, this can be reduced to 10%.
All factors must be addressed in order to match the type and nature of the equipment added to the circumstances under which it will be used – in the instance of Power Arm Hedgecutters it must be remembered that the machines centre of gravity during work will be constantly moving and will differ from that during transport mode, therefore balance becomes critical.

Factors that effect stability:

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

Suggestions to increase stability:

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

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

FITTING

TRACTOR SELECTION

The tractor selected should be 75 hp. minimum and equipped with Category II linkage.

In addition the tractor must be equipped with a live drive P.T.O. to enable forward motion to be halted while the flail head continues to operate.

TRACTOR PREPARATION

Machine mounting brackets

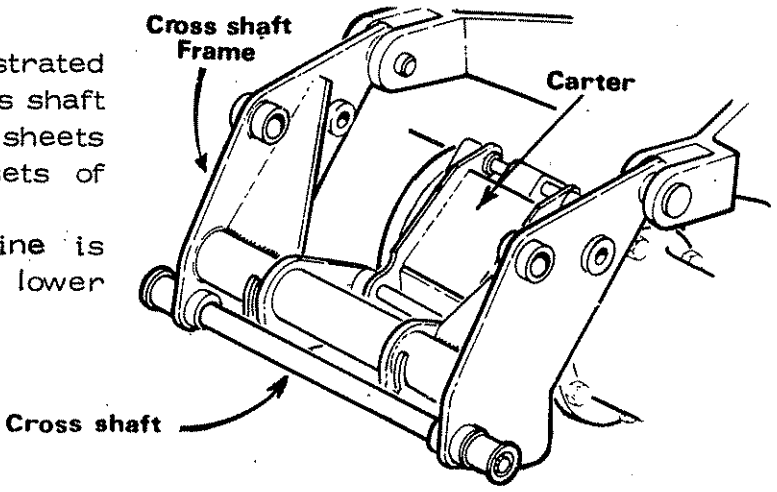
Series 40

These fittings provide a horizontal cross shaft rigidly mounted across the rear of the tractor in two alternative positions. As far as possible the lower position is a standard height of 30" to 34" above ground level; the higher position gives the maximum possible increment of height for each range of tractor models.
The two ends of the crossbar in conjunction with the standard tractor draft links, provide a rigid 4 point mounting base for the machine.

Use of any fitting set means the removal of tractor drop links and locking of the hydraulic lift arms by the cross shaft frame.

For reversion to normal 3 point linkage operation, it should only be necessary to remove the cross shaft frame and reconnect the drop links to the lift arms. Carters, brackets etc., can usually be left in place on the tractor after checking that they do not interfere with the normal operation of the linkage pick-up hitch etc.

A typical series 40 fitting is illustrated showing the assembly of the cross shaft frame and Carter. Detailed fitting sheets are supplied with individual sets of fittings.
It is recommended that the machine is fitted with the cross shaft in the lower position.



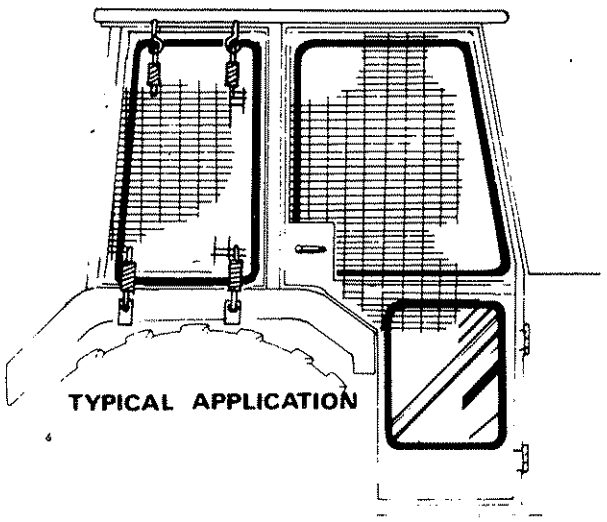
Axle bracket fittings.

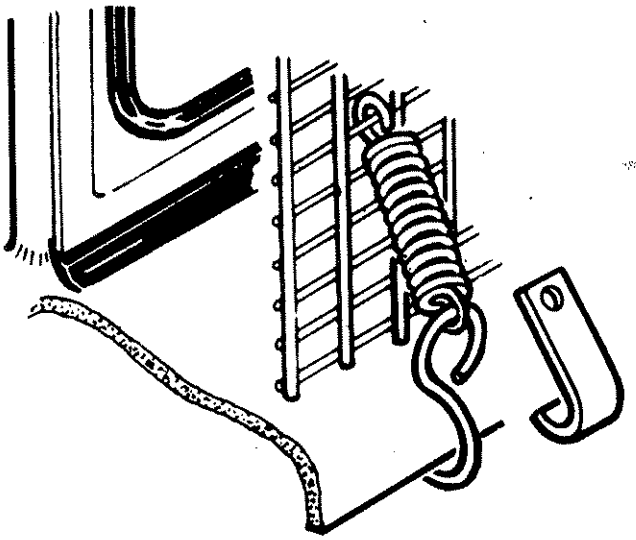
Alternative fittings available for certain tractors depend on lift arm and axle brackets for their mounting points.
A series of inclined pick up points are provided and it is recommended that the one selected should be 34" above the ground. Carefully operate the machine throughout its range and check cab clearance. If cause for alarm is given it is permissable to mount the machine as low as 30" above the ground to increase clearance. Any lower and it will be impossible to position the stand legs for parking.

Ballast weight

Irrespective of the size of tractor it must be stable whilst operating the hedge cutters under all conditions. Due regard must be paid to operating on slopes and front end ballast as well as rear wheel weights to counterbalance the overhang of the flail head should be added as appropriate. On steeply banked ground it may not be sufficient to depend alone on the counterweight afforded by the oil reservoir.

In addition rear wheel track should be set as wide as possible to increase stability. It will also increase the protection to the reservoir.





Fitting operator guard.

The Power Arms 96 & 97 are supplied with an operator guard kit part number 73 13 324 which must be fitted to the tractor before commencing work.

It consists of two areas of wire mesh which can be shaped to suit and secured against the cab window with spring loaded hooks, the upper edge being anchored around the cab gutter and the lower edge around the mudwing.

Owing to the great range of cabs it may be necessary to adapt or make brackets to secure the mesh.

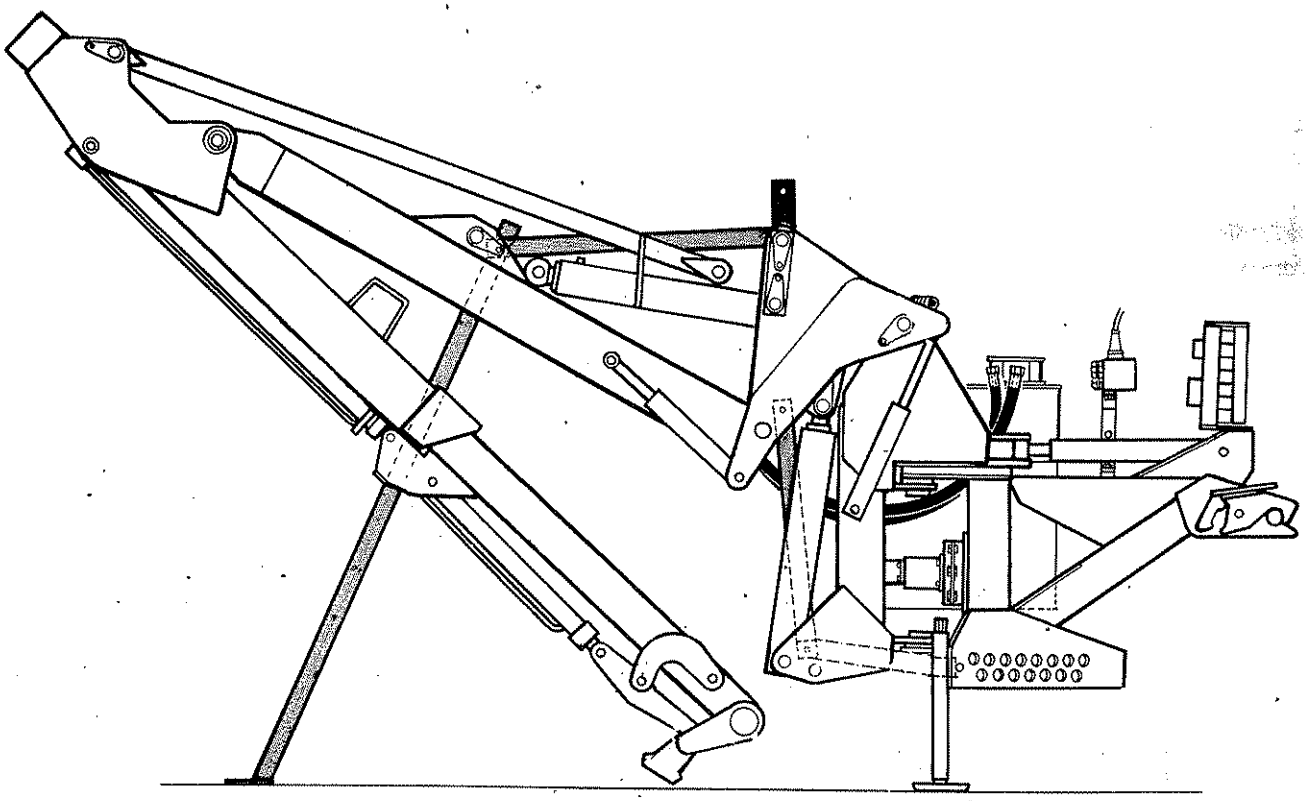
A tractor fitted with a cab that has safety glass windows should be used whenever possible. This is a basic safety precaution applicable to the use of all flail-type hedge trimmers.

Where the flail is operated on a tractor that is equipped with a safety frame or roll bar only, then an additional frame must be made and fixed to the tractor on to which the guard mesh can be secured. In addition to the guard mesh, a sheet of Polycarbonate transparent glazing must be fitted to the frame to provide further operator protection. This material must also be used when the cab does not have safety glass installed.

Polycarbonate transparent sheeting is an impact resistant material which can be readily sawn and shaped to requirements. Unfortunately it is susceptible to surface damage and scratching, therefore it is advisable to place the material on the inside of the window for protection. No attempt should be made to wipe the sheeting with dirt engrained cloth.

Toughened grades of polycarbonate sheeting are available under the brand names of "Makrolon", "Tuffak", and "Lexan".

In case of difficulty in obtaining this material locally, contact F.W. McConnel Ltd through your normal dealer.



DELIVERY

The machine is despatched from the factory with the flail head, the operator guard and the switchbox mounting equipment packed separately. The arms are locked securely with packing straps to prevent the machine collapsing during transport. In addition the reach ram rod is disconnected and also the tension link at the rocker end, likewise the flail hoses are disconnected from the flail motor rigid pipes and looped together with a ¾ BSP union.

On delivery, check that all parts are present and that they are undamaged

INITIAL ATTACHMENT TO TRACTOR

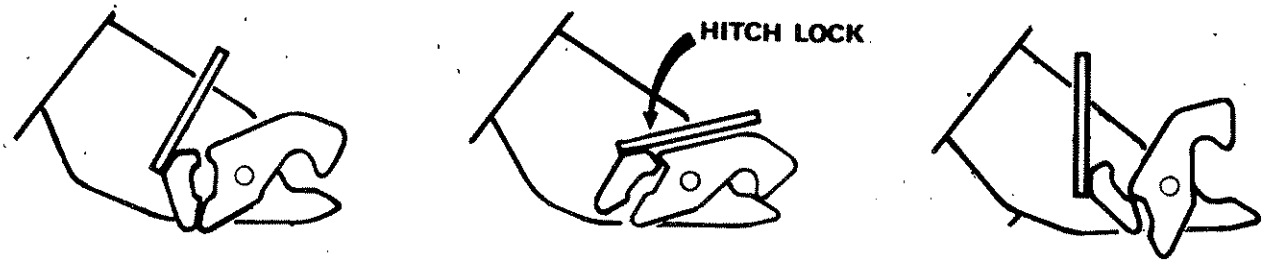
Attaching the machine to the tractor is best carried out on firm level ground and the 'Slew' mode must be selected on the switchbox. The procedure can be carried out by one man.

Fit the machine mounting fittings onto the tractor as detailed in the sheet accompanying the fittings. Also refer to page 4

Fit operator guard (see page 5)

Reverse the tractor centrally up to the machine and offer up the cross shaft of the fittings to the locking catches of the machine.

LOCKING-CATCH POSITIONS



HITCH **LOCK** **RELEASE**

Set the locking catches to the hitch position.

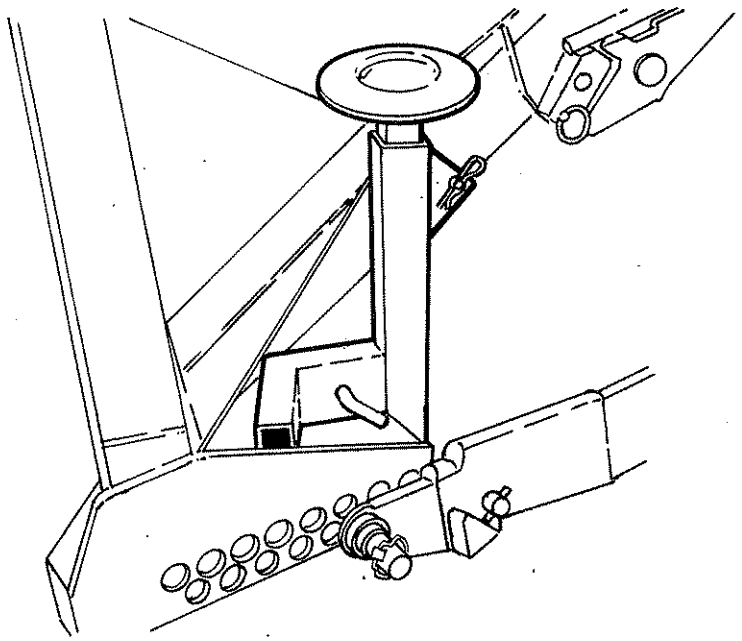
Extend the screw jack legs to raise the machine and bring the locking catches horizontally in line with the cross shaft of the tractor fittings.

Reverse the tractor and engage the locking catches on the outer ends of the cross shaft. Lock in position.

Use the screw jack legs to level the machine

Offer up the draft links to the linkage block and attach with the linkage pin in the hole that lines up with the draft link ends, or the nearest hole forward of that. Further use of the screw jack legs may be necessary to achieve alighment.

Remove the screw jack legs and stow as shown.



Remove the guard around the gearbox stub shaft and install P.T.O. drive shaft. Cutting the shaft to the correct length may be necessary and it is essential that the shaft is not allowed to 'bottom out' There should be a minimum of 25mm (1") of further travel before the shaft is fully closed. This measurement should be taken carefully before cutting off both the driving and driven members of the tube by an equal amount. Likewise the plastic shield will similarly have to be cut. Take heed that if too much is cut off it cannot be stuck back on. MEASURE TWICE AND CUT ONCE.

Refit the Gearbox stub shaft guard.

Fill the hydraulic tank (see chart page 9). In addition the circuit will have to be primed, this is done by releasing the hose which runs from the tank top to the pump at the tank connection and filling it to approximately 6" from the top. Re-fit the hose onto the suction connection and tighten the hose clips ensuring that their worm drive barrels are opposed at 180 degrees.

Check gearbox oil level see page 9

Install the electric switchbox, the flail stop/start lever and their mounting bracket assembly into the tractor cab. (see page10)

Check that the flail lever is in the stop position; start the tractor, engage the P.T.O and allow the oil to circulate for about 20 minutes without operation of the armhead control valve . This will allows the oil to thoroughly circulate through the return line filter.

Extend the reach ram and connect up the rod end.

Remove the packing straps, all straps may be discarded except the lift ram locking strap which is retained for when subsequently parking themachine. Remember the nose of the dipper arm is suspended clear of the ground and it will fall when the connecting strap is released. KEEP FEET WELL CLEAR. It may be necessary to operate the control slightly to take the tension off the packing straps to facilitate removal.

Select reach in, raise the main arm and connect up the tension link to the rocker.

Reverse the machine up to the flail head and release the flail hoses

Operate the angling mechanism until the extended lug on the head pivot tube is pointing down and away from the machine.

Bolt the head pivot tube to the rear of the flail head.

Bolt the hose tray to the lip on the rear of the flail head.

Raise the flail head until it is just above the level of the tank top,this will minimise oil leakage.

Disconnect the main flail supply and return hoses.The union may be discarded. Lay the hoses along the tray, across the back of the flail head andconnect to the motor. For upward cutting the pressure hose is connected to the lower motor rigid pipe and vice-versa.

Run up the flail circuit as outlined in Page9 "Running up" para 3.

Carefully operate the machine through its full range of movements while checking that the hoses are not strained, pinched, chafed or kinked.

Recheck the oil level in the tank and top up if necessary.

OIL REQUIREMENTS

Tank

Fill the reservoir with oil selected from the chart below or their equivalents. Do not overfill.

Tank capacities are :-

Standard tank 32 imp galls - 145 litres

Enduro tank 44 imp galls - 200 litres

Supplier	Cold or temperate climate	Hot climate
Castrol	Agricastrol hydraulic oil Hy-spin AWS32	Hy-spin AWS68
Shell	Tellus 27	Tellus 33
Mobil	D.T.E.25	D.T.E.26
Esso	Nuto 'H' or 'A' 32	Nuto 'H' or 'A' 68
Texaco	Rando HD 32	Rando HD 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

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.

RUNNING UP

Ensure that the rotor control is in "STOP" position, start tractor, engage p.t.o. and allow the oil to circulate for about 20 minutes without operation of the armhead control lever. This will allow all the oil to thoroughly circulate through the return line filter.

Operate the armhead levers, ensuring that all movements are functioning correctly.

Place the flail head at a safe attitude and move the rotor control to "START" position. After initial fluctuation 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 5 minutes before disengaging and stopping tractor.

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

Installation of cab controls

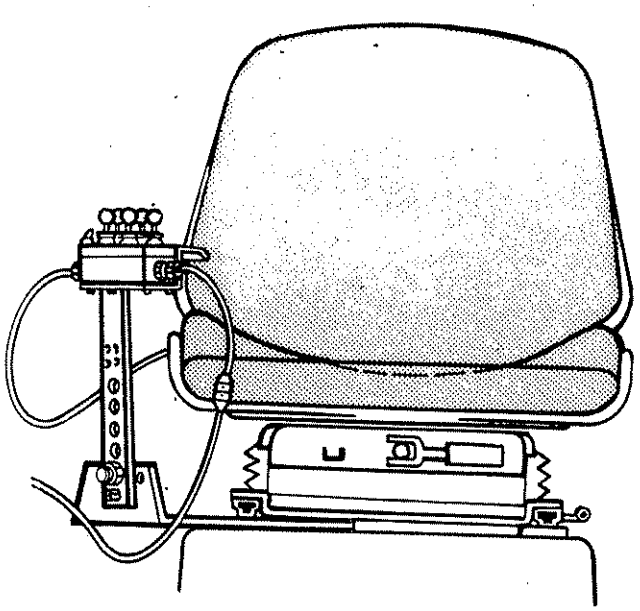
The electrically operated control box eliminates the presence of any hydraulic equipment within the cab. Instead a single multicore cable which can be easily routed to the implement behind simplifies the task of hitching and demounting.

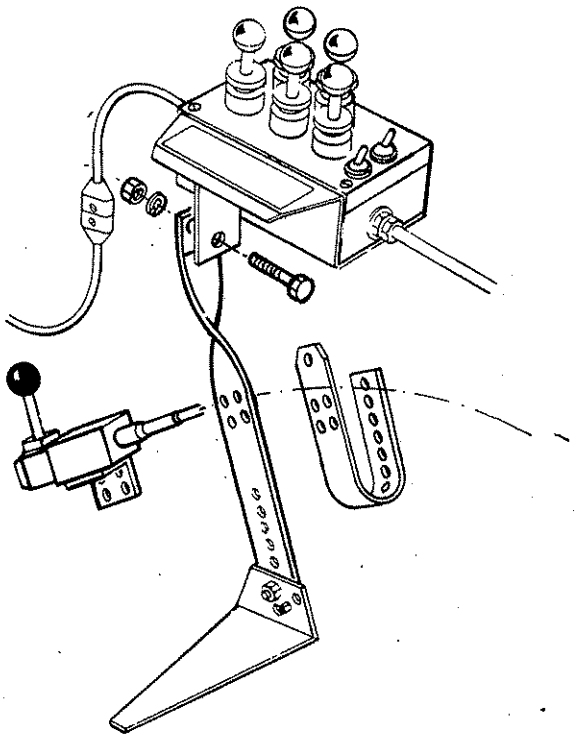
The control box is mounted as required in the cab on a seat bracket and stalk which can be bent to achieve a good operator position.

The seat bracket which is of universal design for mounting in many models of tractor is normally trapped between the seat runners and their mounting base. It may sometimes be necessary to drill extra holes in the seat bracket to find the ideal operator position.

On tractors other than quiet cab models it is permissable to attach the control box to the mud wing or the cladding of the cab observing the precaution that no structural member of the safety frame should be drilled.

For this purpose the mounting stalk can be bent round in a 'U' shape.





The supply cable with the disconnect plug should be connected to the tractor's electrical system prefereably at the fuse box or the ignition switch where it can be switched off with the tractor's isolation key.

The control is 12 volt D.C. operated; the brown lead is Positive and the blue lead is Negative.

The control lever for the cable operated Flail rotor on/off valve is then bolted into position on the mounting stalk using the mounting holes provided.

The control handle can be fitted at right angles to the cable run as shown or in line with the cables as required. In addition the four mounting holes are equi-spaced which allows a variety of mounting angles.

REMOVAL

Select a firm level site for parking the machine.

Extend the arms to about one quarter reach and lower the flail head to the ground.

Remove the screw jack legs from their stowage position and refit them in their sockets on the main frame . The legs, when fitted must be splayed outwards from their sockets to aid stability.

Fit the lift ram locking stay.On completion the flail head must be on the ground

Disconnect the electrical plug within the cab. Unbolt the switchbox from its mounting pillar and stow in position in its cradle on the underside of the mainframe deck.

Unbolt the rotor control lever and stow conveniently on the machine.

Unhitch the tractor draft links and disconnect the p.t.o. shaft.

Set the cross shaft locking catch to the 'release' position and drive the tractor forward.

STORAGE

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

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

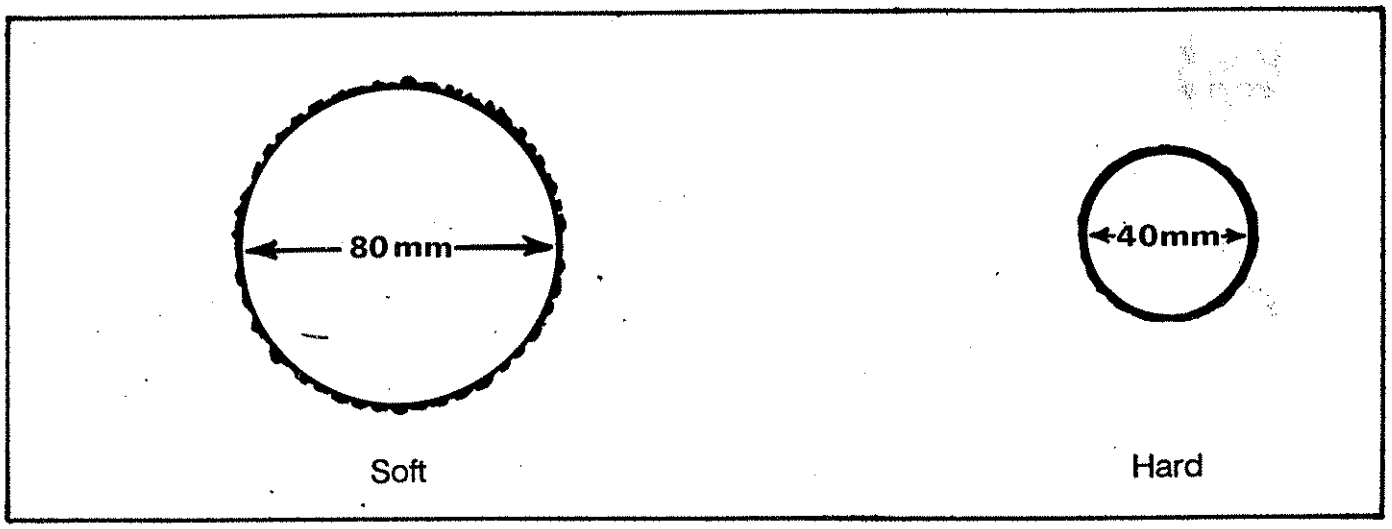
In addition lubricate all grease points and the tele dipper wear pads if fitted.

SUBSEQUENT ATTACHMENT TO TRACTOR

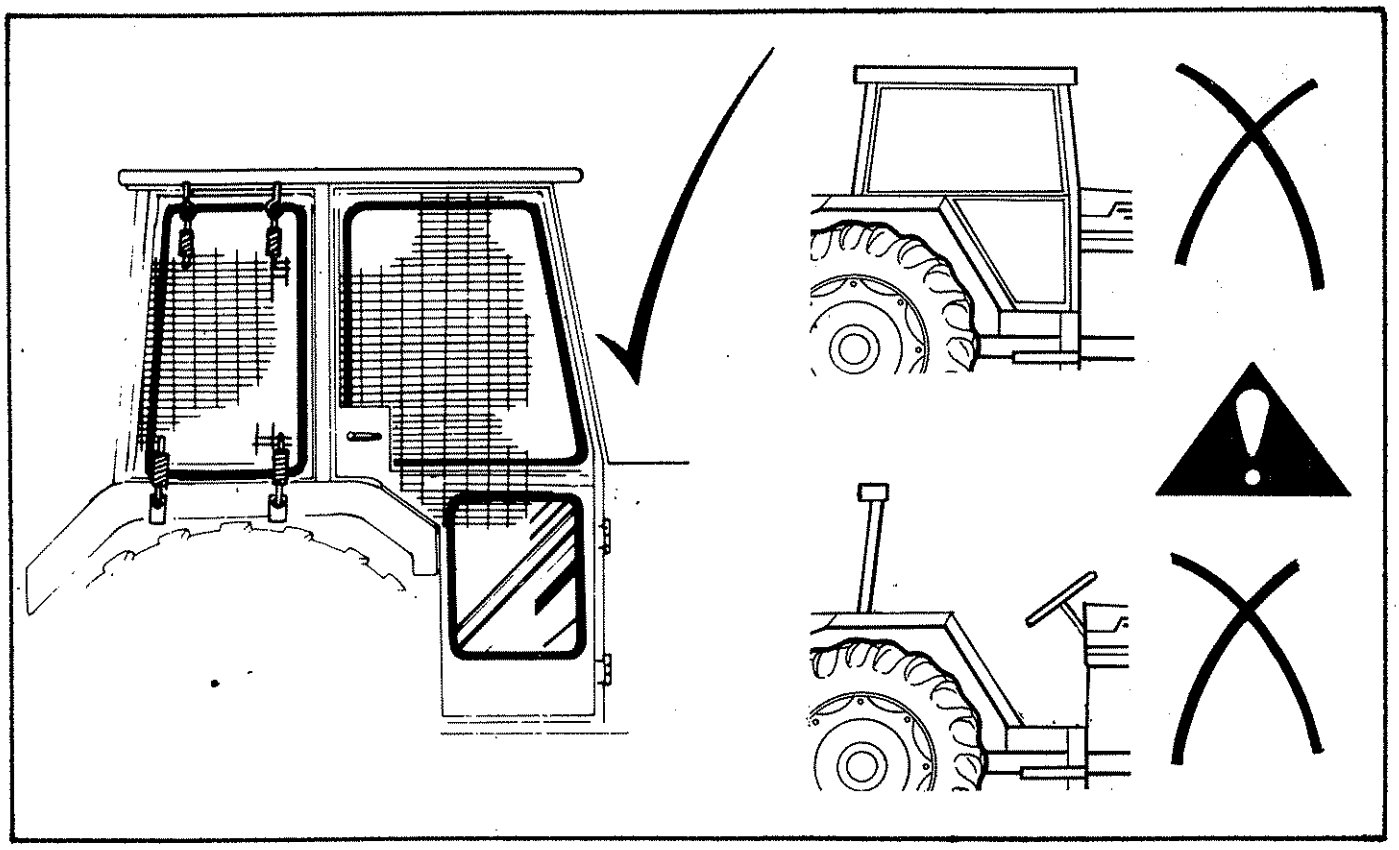
Providing the machine has been parked in a stable position as outlined in "removal" page 11 subsequent attachment is a simple matter of reversing the tractor into the locking catches; attaching the draft links,connecting the p.t.o. shaft, re-mounting the switchbox and the flail stop/start lever into the tractor cab and removing the lift ram locking strap.

OPERATION

MATERIAL THICKNESS CUTTING LIMITATIONS



OPERATOR GUARD



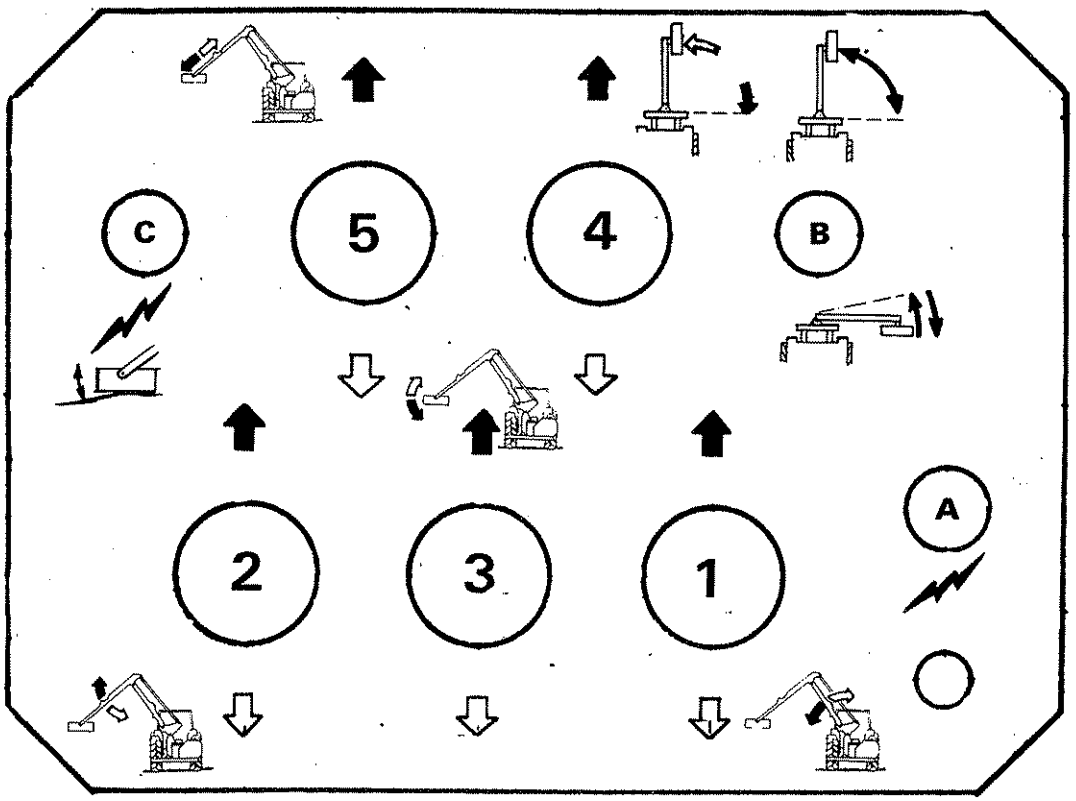
PREPARATION

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

MACHINE CONTROL BOX



1 -- LIFT

2 -- REACH

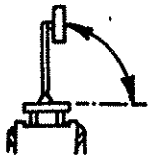
3 -- ANGLE

4 -- SLEW

5 -- TELE (If fitted)

Switch functions

A Power on/off

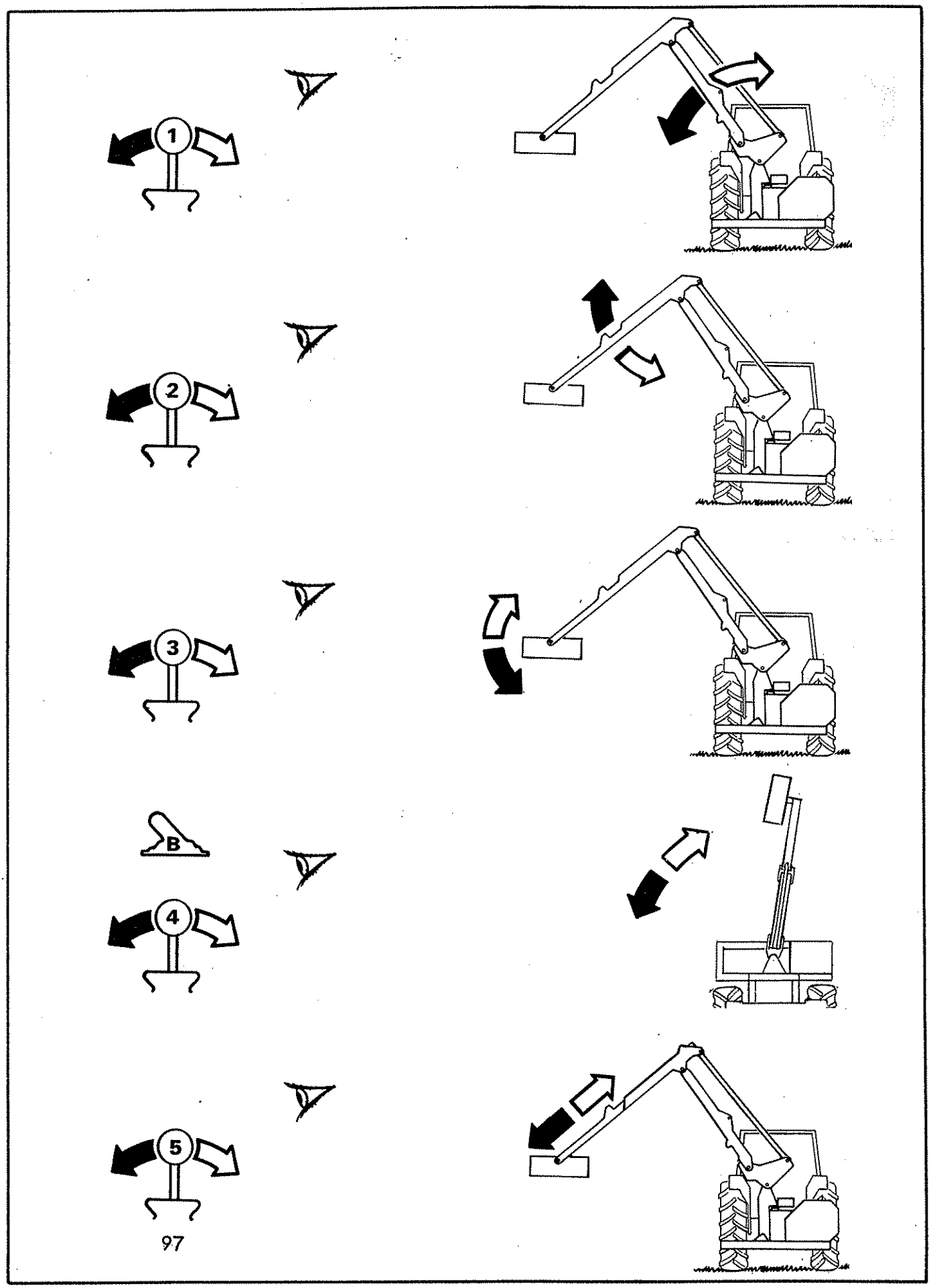
B  **Slew** - Allows slew working

B  **Auto reset** - Allows normal working

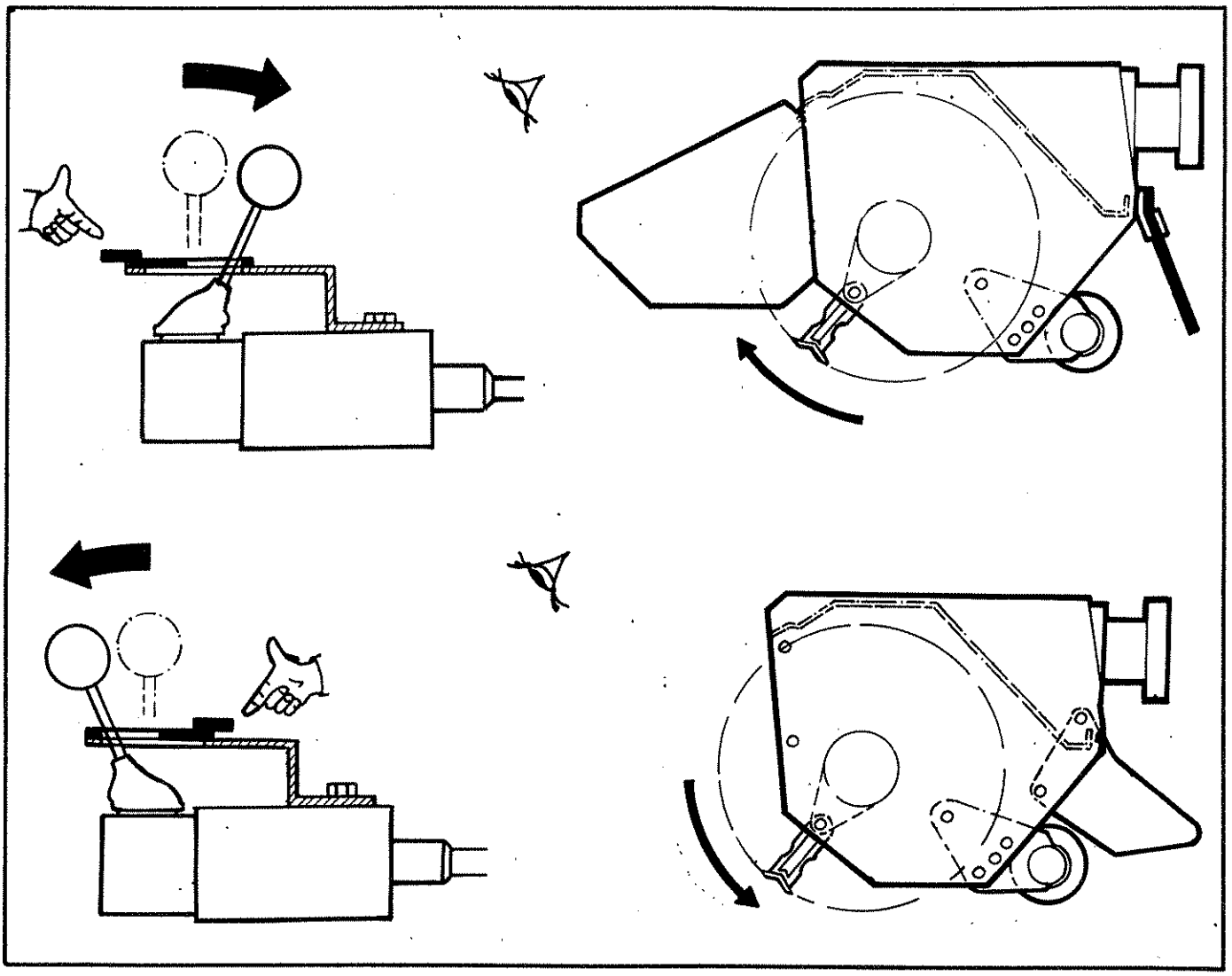
C Head angle float on/off (if fitted)

ARM CONTROLS

Lever functions



ROTOR CONTROLS



TRANSPORT POSITION

When transporting the machine the p.t.o. must be dis-engaged ,the power to the switchbox must be off and the armhead positioned to the rear of the tractor. To swing the arm to the rear select "slew" mode on the control box and operate the control lever.

Caution: Take care when slewing as the geometry of the arms may enable them to hit the tractor cab when fully folded.

It is a wise precaution to extend the arms to about half reach before slewing to the rear, and then,fold the arms in and up carefully.

WARNING

During transport and parking the 'slew' mode must remain selected on the control box. Cancellation of this will result in the armhead auto resetting to the work position which may cause injury or damage as it does so.

MOVING FROM TRANSPORT TO WORK POSITION

Use the slew control to move the arms into the work position taking care that the arms and flail head do not hit the cab or mudwing. If there is sufficient space available extending the arms to mid reach will avoid this possibility. On completion 'Auto reset' would then be selected for general working purposes.

ENGAGING DRIVE

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

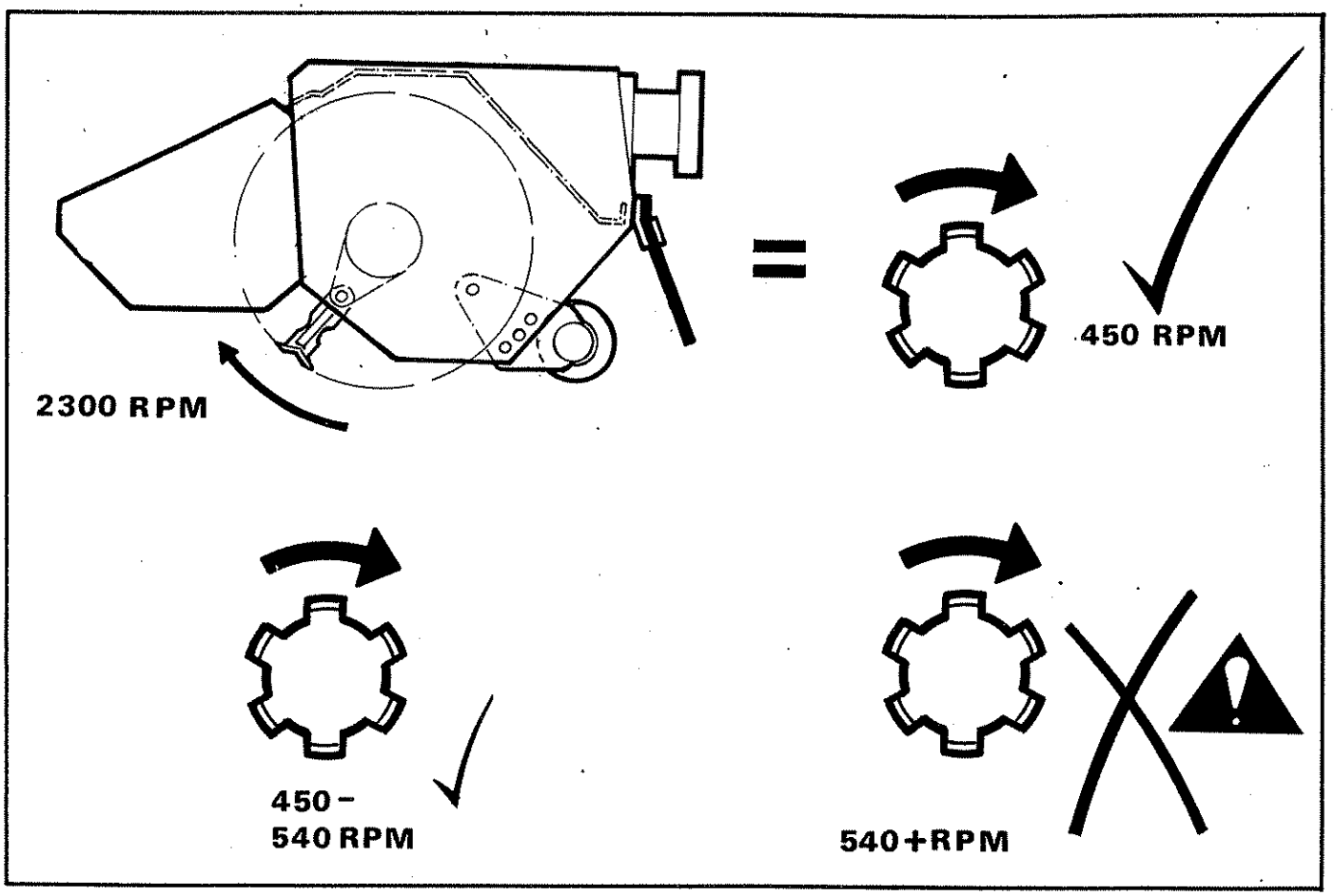
Engage P.T.O. shaft

Allow the oil to circulate for a few minutes.

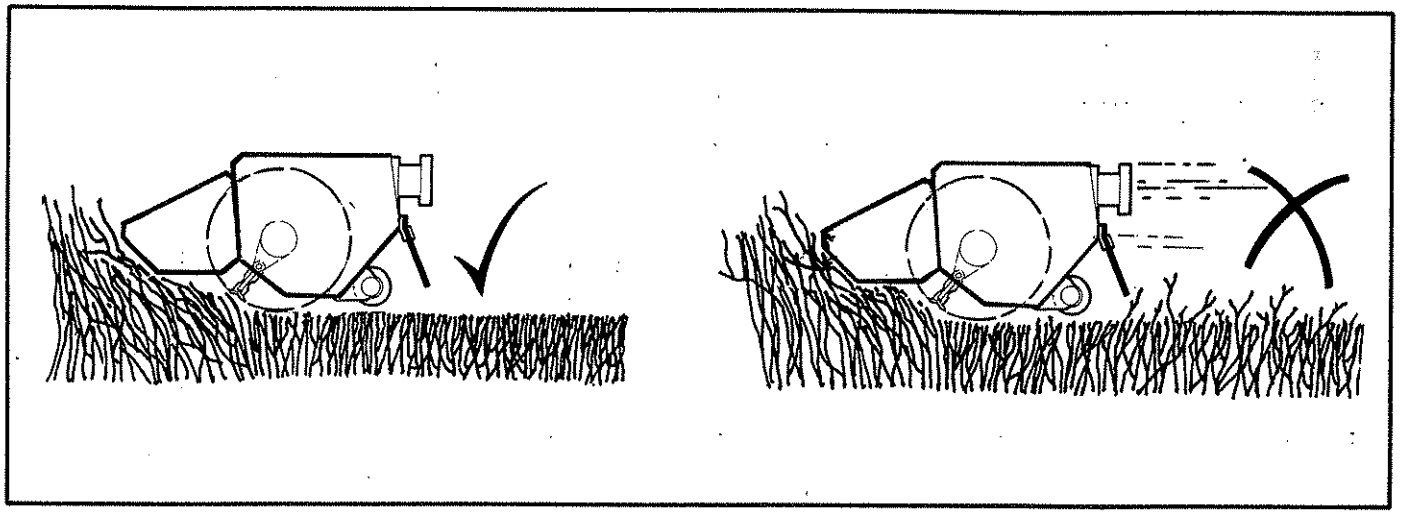
Place the flail head in a safe position.

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

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

With "**Auto Reset**" selected

Breakaway to the rear and up occurs when an obstacle is encountered. On clearing the obstacle the head automatically returns to the work position.

With "**Slew**" selected

When an obstacle is encountered the head breaks back horizontally until the obstruction is cleared. Re-setting the head is carried out manually by operating the slew lever.

WORKING ON ADVERSE SLOPES

When working high with the reach fully in it is possible for the main arm balance to go over centre and take the weight off the lift ram. A restrictor in the gland connection of the lift ram prevents sudden unpredictable movements should this occur.

WARNING

Do not remove this restrictor from the lift ram gland connection

To regain the lower position extend the reach ram to return the centre of balance onto the lift ram which will then retract when 'Lift down' is selected.

POWERED SLEW

97 degrees of powered slew allows awkward areas to be cut more easily.

"**Slew**" must be selected on the switch box.

AUTO HEAD CONTROL

An automatic function which maintains the flail head angle at the chosen setting during normal 'Lift' and 'Reach' adjustments.

Note:- The performance of the function deteriorates when working within half a metre of full reach.

Should "**Head angle float**" be selected the auto head control feature ceases to function. On de-selection it becomes automatically re-instated.

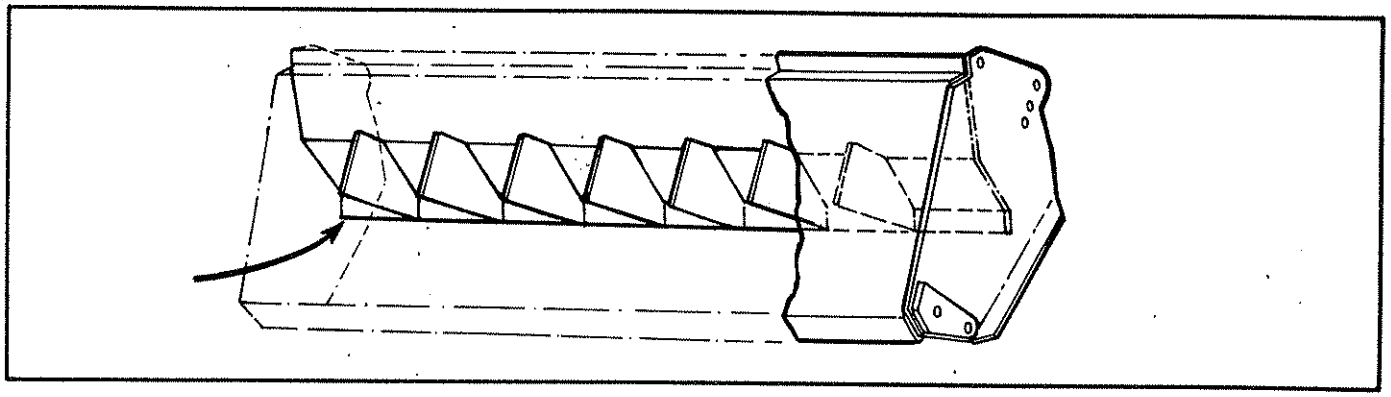
TELESCOPIC DIPPER PA 97

The telescopic dipper gives 1.05 metres of extra reach.

Normally the tele is pre-set and then the machine operated using the normal controls. The 'Tele' function could be used in place of 'Reach' but a slower response to the controls must be expected.

'Tele' alters the parallel motion geometry. This works best at ground level when 'tele' is fully out and at 4 -5 feet (1.2 - 1.5 metre) high when fully in.

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.**

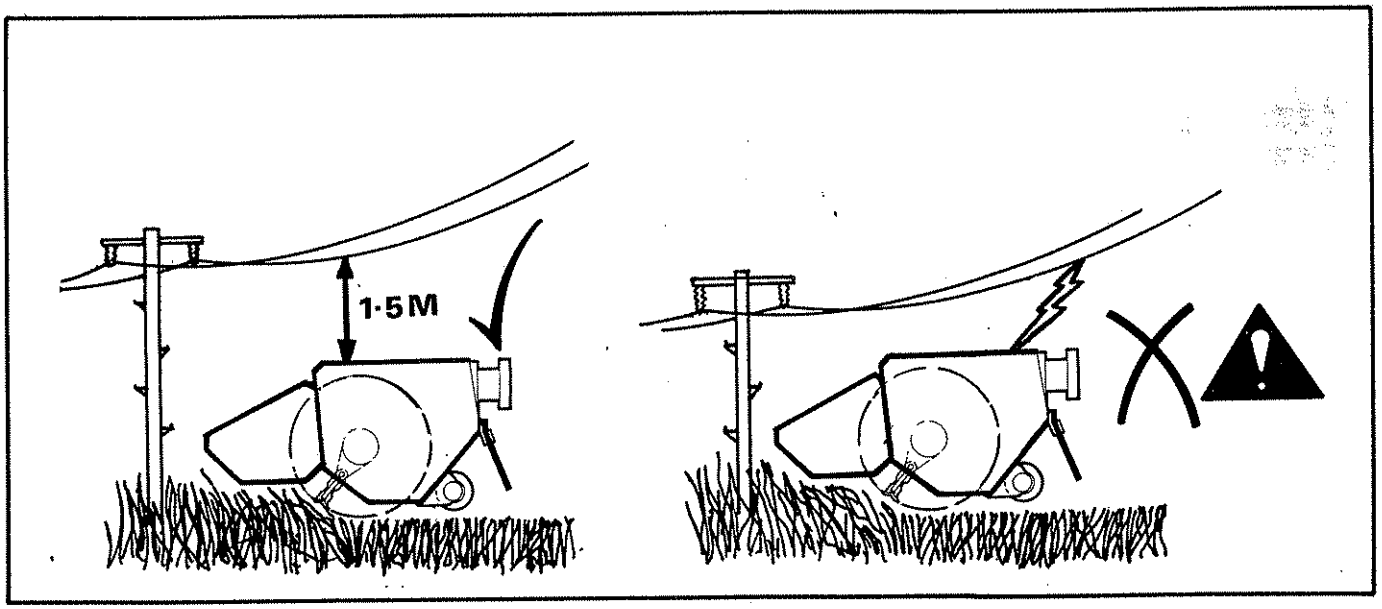
STOP the tractor and only then remove wire.

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



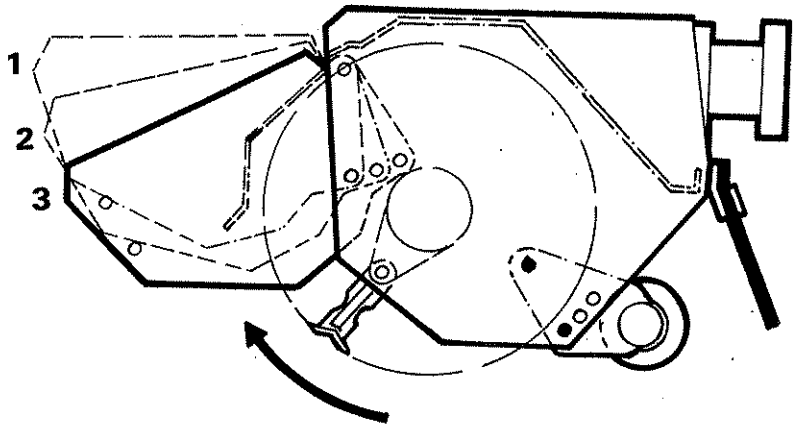
If in doubt consult your local electricity company regarding a safe procedure for work.

HEDGE CUTTING PROCEDURE

Preliminary Precautions

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

Upward cutting



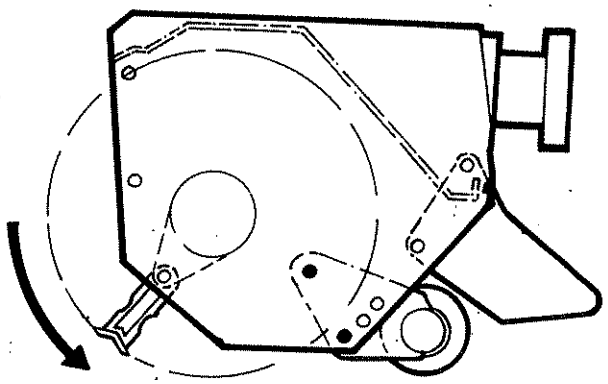
For normal trimming gives:-

Better finish

Lower power requirement

Front hood and rear flap must always be in position.

Downward cutting



For cutting larger material gives:-

Poor finish

Higher power requirements

Greater machine wear

Rear hood Part No. 71 90 285 must be fitted

Reversing rotation

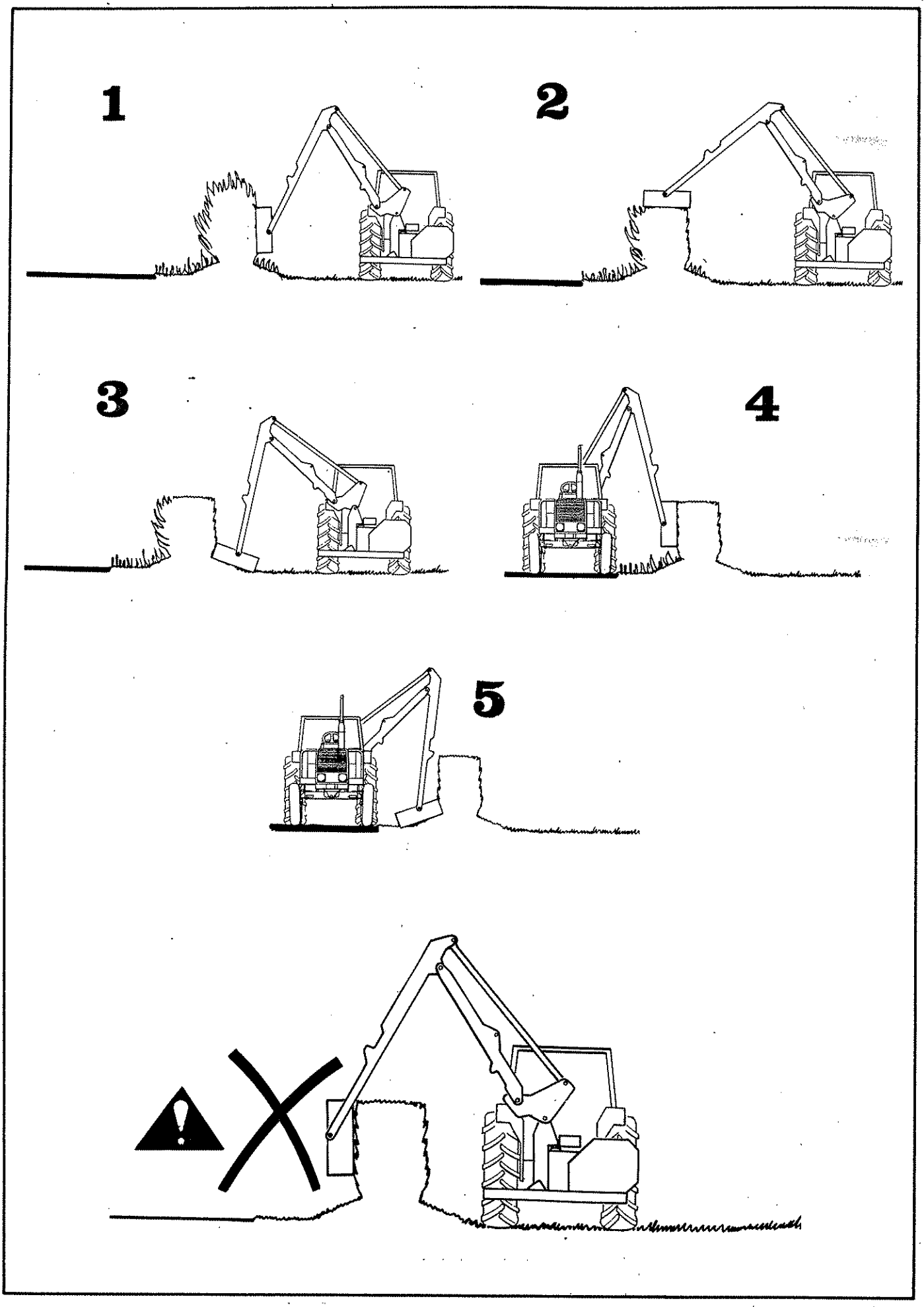
Select Rotor **'OFF'**

Wait until rotor has **stopped** rotating

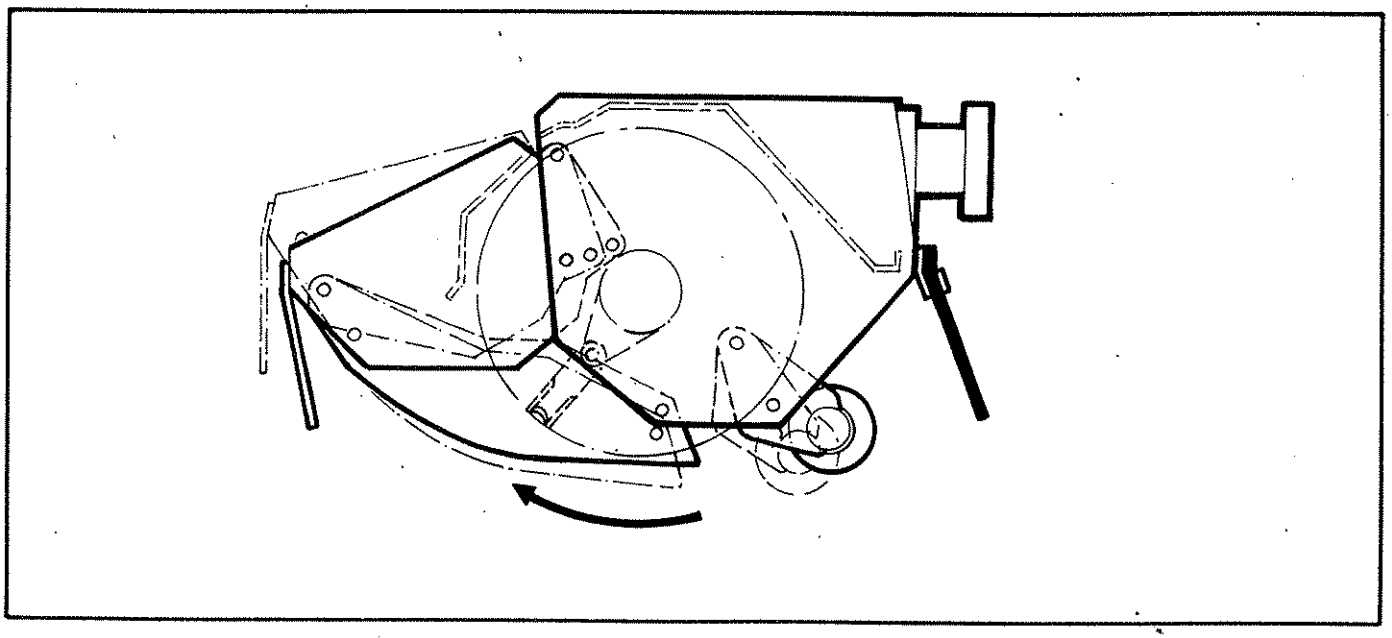
Swing lever stop gate through 180 degrees to allow opposite rotation to be selected.

Caution. Do not remove the lever stop gate.

Cutting sequence



GRASS CUTTING



Flails must cut upwards

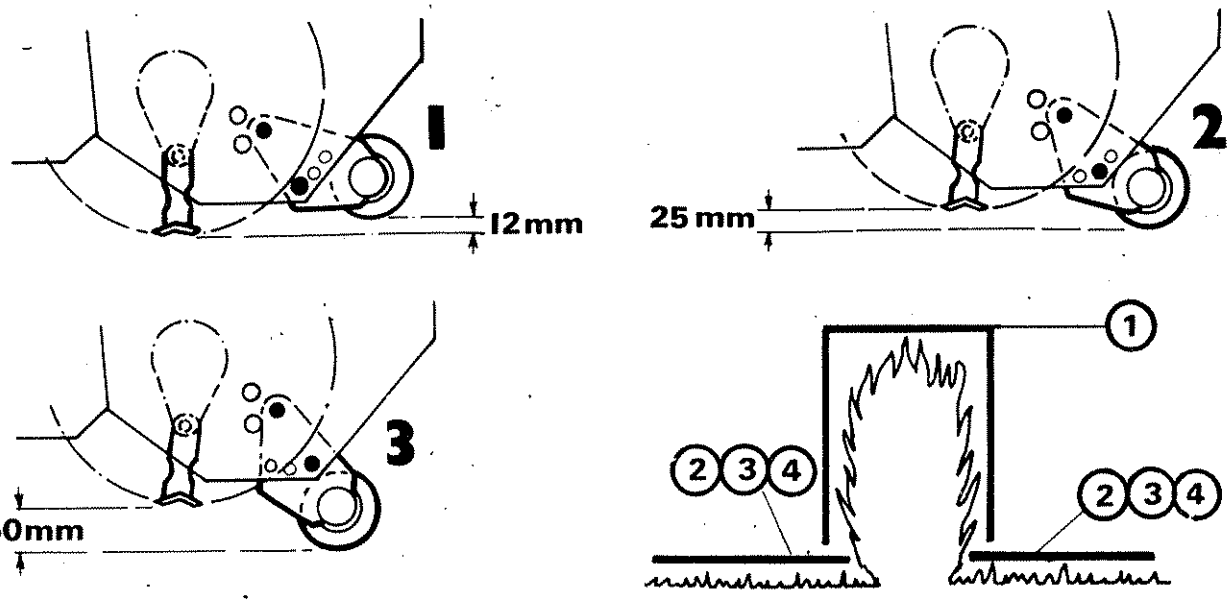
Front hood cw flaps, skids and rear flap must be fitted.

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

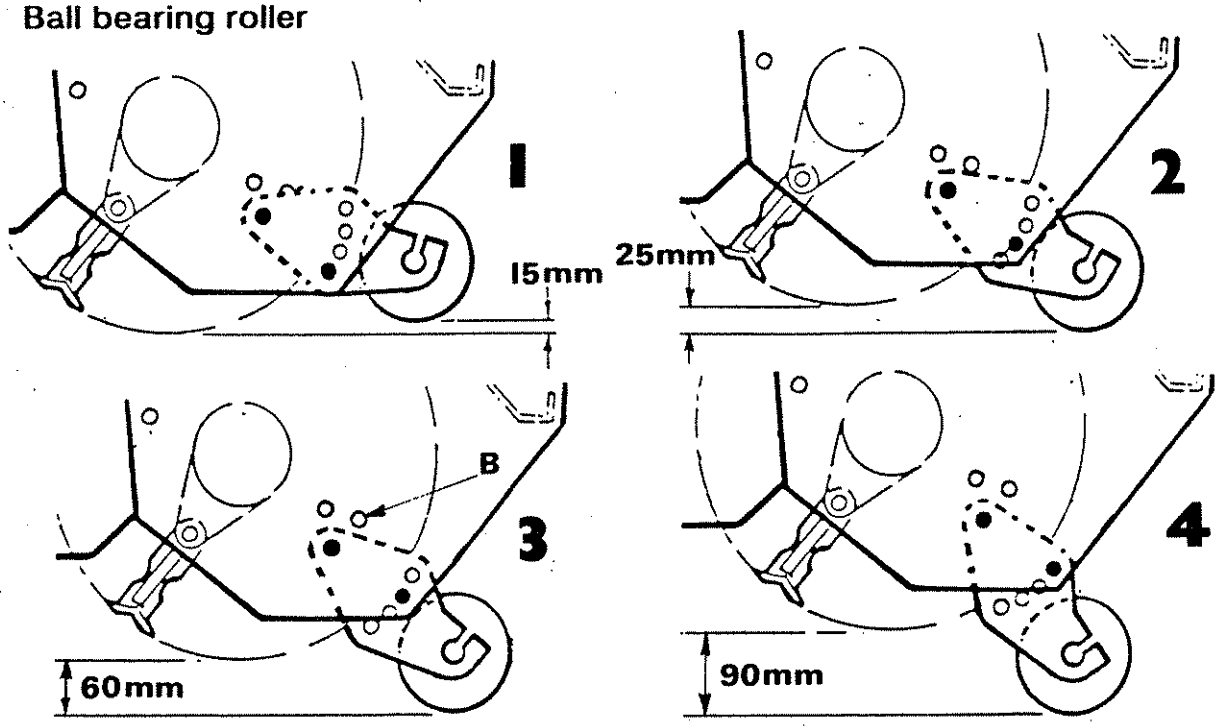
The roller can be set in either position 2 3 or 4

ROLLER POSITION

Bushed roller

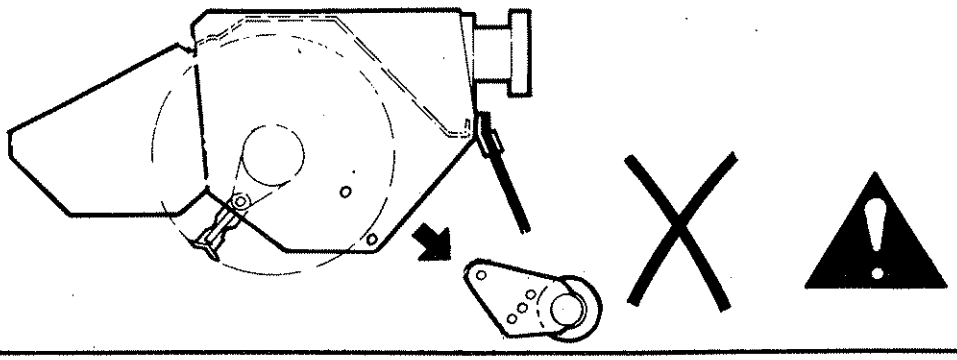


Ball bearing roller



Warning

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



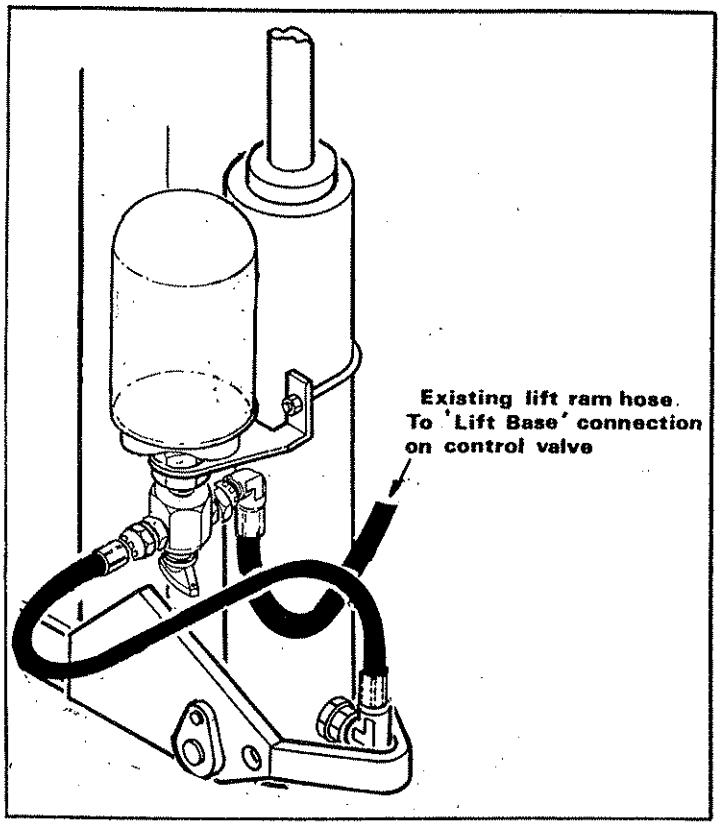
LIFT FLOAT KIT (optional extra)

The hydraulic float kit, if fitted, should be mounted as shown in the vertical position clamped to the lift ram barrel.

In work, with the tap open the flail head automatically follows the ground contours.

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, loss, or damage to flails could occur.

To revert to hedge cutting or to use the flail without it running along the ground the stop tap should be closed to isolate the accumulator.



POWER MONITOR - Optional extra

The power monitor is a device which informs the operator of the amount of power that is being consumed by the cutting operation. It will help him to get the best performance from his machine without risk of overload.

A pressure sensor is sandwiched between the pressure connection and the face of the large pump on the outlet side. The readout panel is located alongside the flail controls.

On engaging the flail circuit the first green light will illuminate. As cutting commences one of the remaining green lights will light up indicating approximately the power consumption.

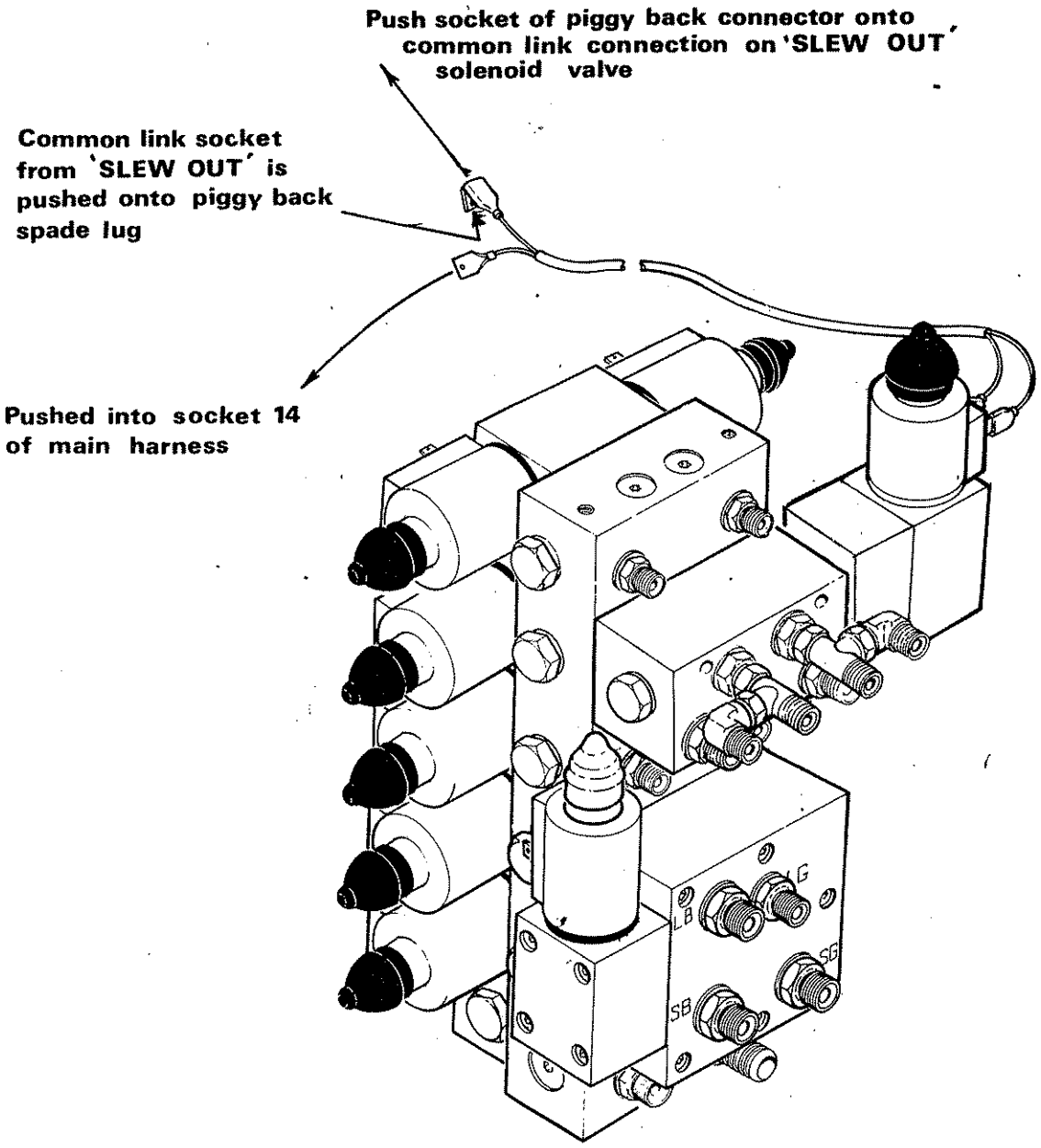
Power consumption will vary depending upon the forward speed and the material being cut. When hedgecutting one of the first two green lights will usually be lit. Grass cutting requires more power and it will be normal to run on the third or fourth light.

It is permissable to continually run the machine when the fourth green light is illuminated and with the orange one flashing on only occasionally providing that the quality of the work finish is satisfactory.

When the orange and red lights are illuminated the hydraulic system will overheat and component life will be reduced.

In these cases forward speed must be reduced until the power monitor is displaying green.

FLAIL HEAD ANGLE FLOAT(optional extra for ground cutting)



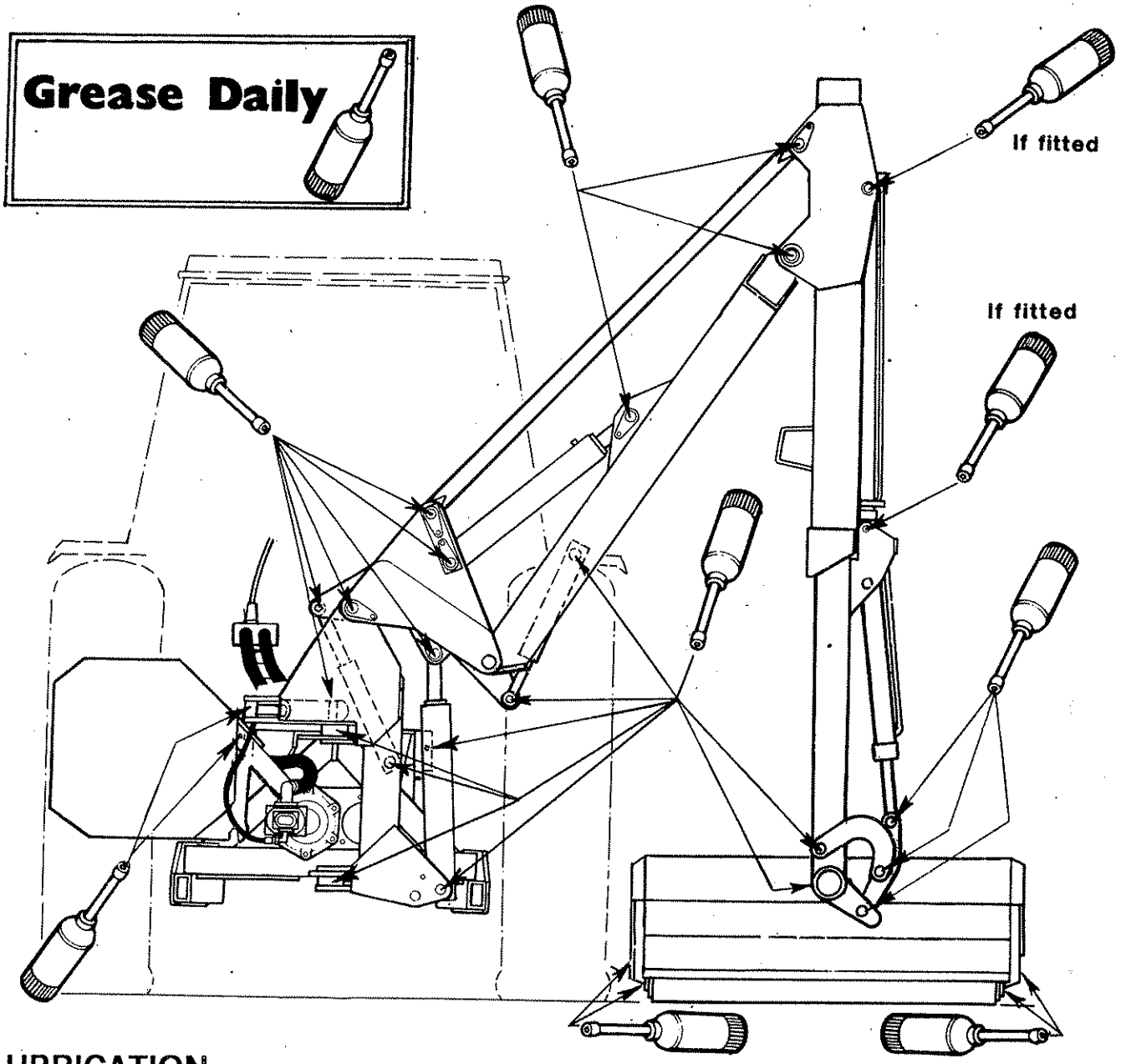
A kit is available part No. 81 26 281 which will allow the flail head to angle itself automatically to suit the contours of the ground.

The kit is bolted to the compensator valve in place of the blanking plate.. The O rings from the blanking plate must be extracted carefully and re-used with the solenoid bridging plate.

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

Selection of head angle float is by the auxiliary switch on the control box. In the 'off' position the head will work in the normal fashion.

MAINTENANCE



LUBRICATION

General

Grease daily all points shown.

In addition, on PA 97 only, the "tele" dipper wear pads must be greased weekly.

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 off 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

i11) 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.

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.

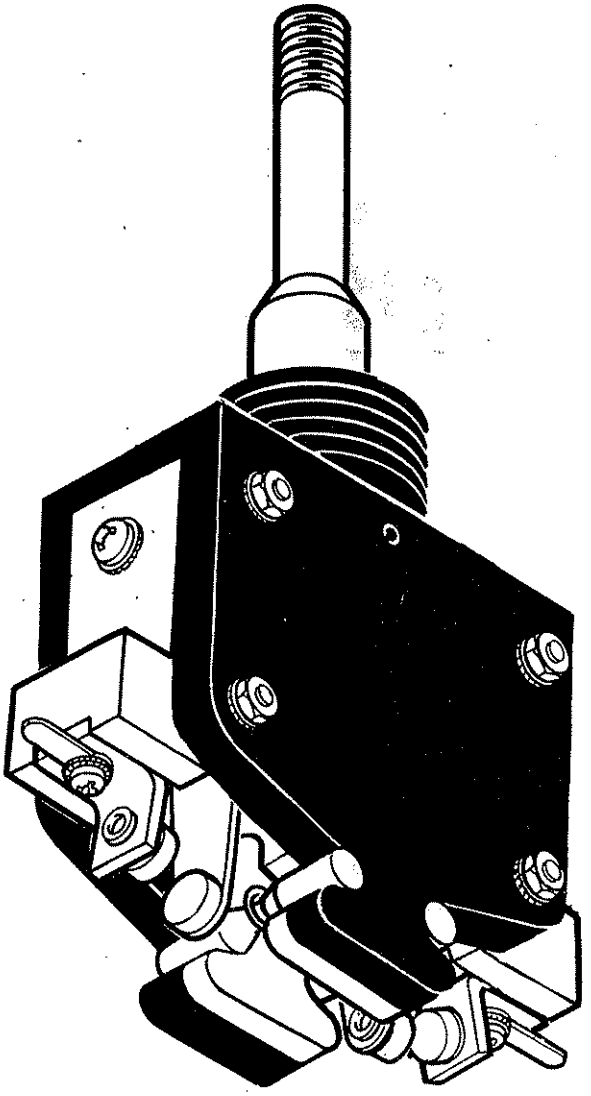
Care should be taken during installation and operation to ensure that the cables are not trapped or kinked. Any abrasion or damage to the outer casing should be sealed with plastic insulation tape to avoid moisture penetrating.

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.

SWITCH BOX



The control unit contains five lever switch units (the 'tele' switch is non operational on the PA96) each comprising two contact breaker assemblies. Little maintenance should be required other than cleaning of the contact points with a suitable point cleaning file; or a very fine abrasive if switching becomes intermittent. Clean off any traces of contaminant; contact cleaner spray is suggested and generally extends the life of the contacts. The ten contact assemblies are easily accessible after the switch box lid has been carefully removed.

In addition the unit is equipped with three toggle switches, a power isolator switch, slew/break-away selection switch and an auxiliary service switch. The latter is used for activating the auto-matic head angle float if fitted.

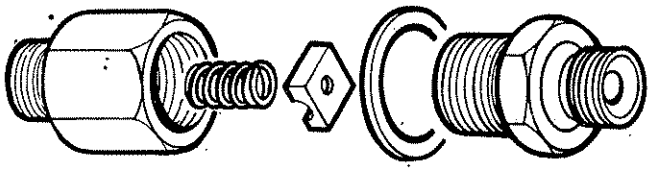
The complete assembly is protected by a 20 amp fuse in the power supply harness.

For investigating machine failure the manual 'push pins' on the ends of the solenoid valves can be operated to ascertain that hydraulic supply is available, remebering that the cut-off solenoid pin must be operated simultaneously. A 12volt bulb wired across the terminals will determine whether electrical current is reaching the solenoid. Attempting to 'spark' the lead will result in a blown fuse.

HYDRAULIC RESTRICTORS

Solid two way restrictors.

Solid drilled hole restrictor unions control oil flow in both directions. Letter coded and situated in the reach and angle sections of the manifold block they are carefully calibrated for correct speed of operation. The restricted hole should not be enlarged or the restrictors interchanged.



One way restrictors

Spring loaded one way restrictor assemblies are situated in the following locations. Lift base, lift gland and slew base end connections on the slew circuit valve; also at the gland connection on the slew breakaway ram.

The restrictor discs are colour coded and should not, for any reason, be enlarged, interchanged or removed.

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.

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.

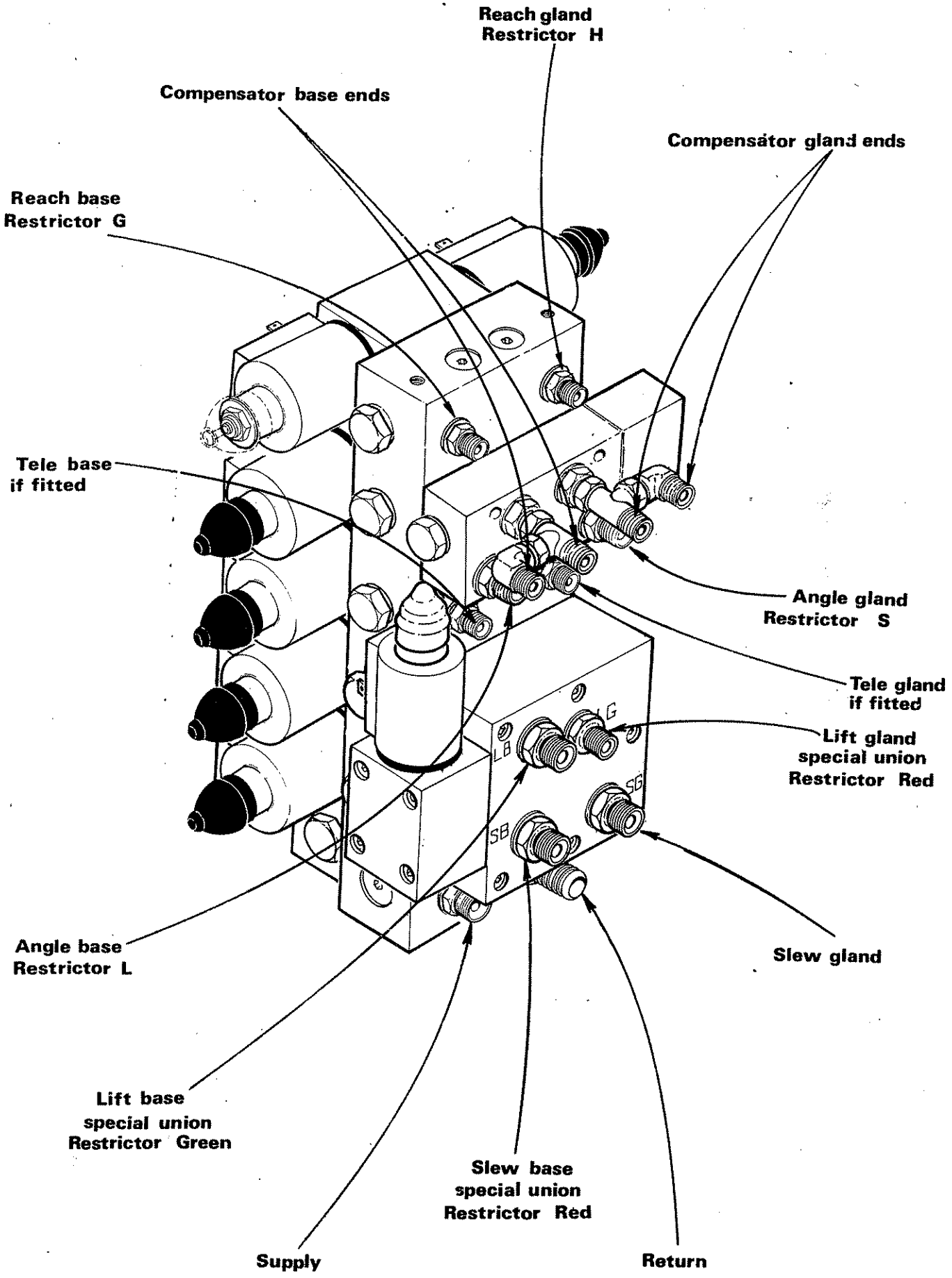
Before changing hoses study the installation these are carefully calculated to prevent hose damage during operation. Always replace hoses in exactly the same manner. This is especially important for the flail hoses where they must be crossed, upper to lower, at the dipper and head pivots. The 90 degree elbows at the head bracket must point directly across the pivot and the hoses must have no slack at this point.

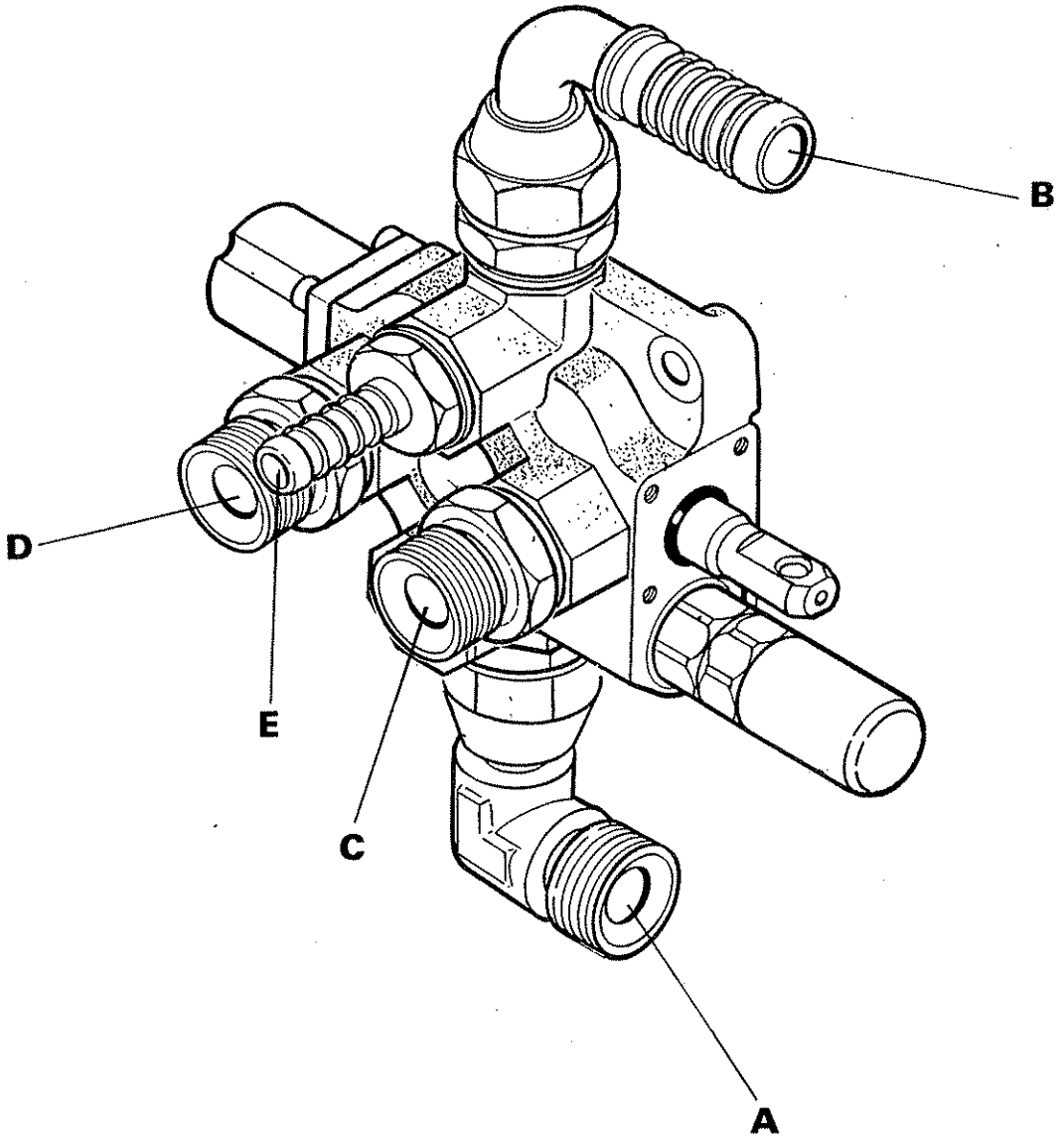
Two hose clips are provided at either end of the large bore suction and return hoses. These should be positioned so that their worm drive barrels are opposed at 180 degrees to reduce the possibility of air entering the system. A stop tap is provided to enable the suction hose to be changed without draining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

HOSE CONNECTIONS





ROTOR CONTROL VALVE

A - Supply from pump

B - Return to tank

C - Motor upper

D - Motor lower

E - Return from main valve.

SPARE PARTS MANUAL

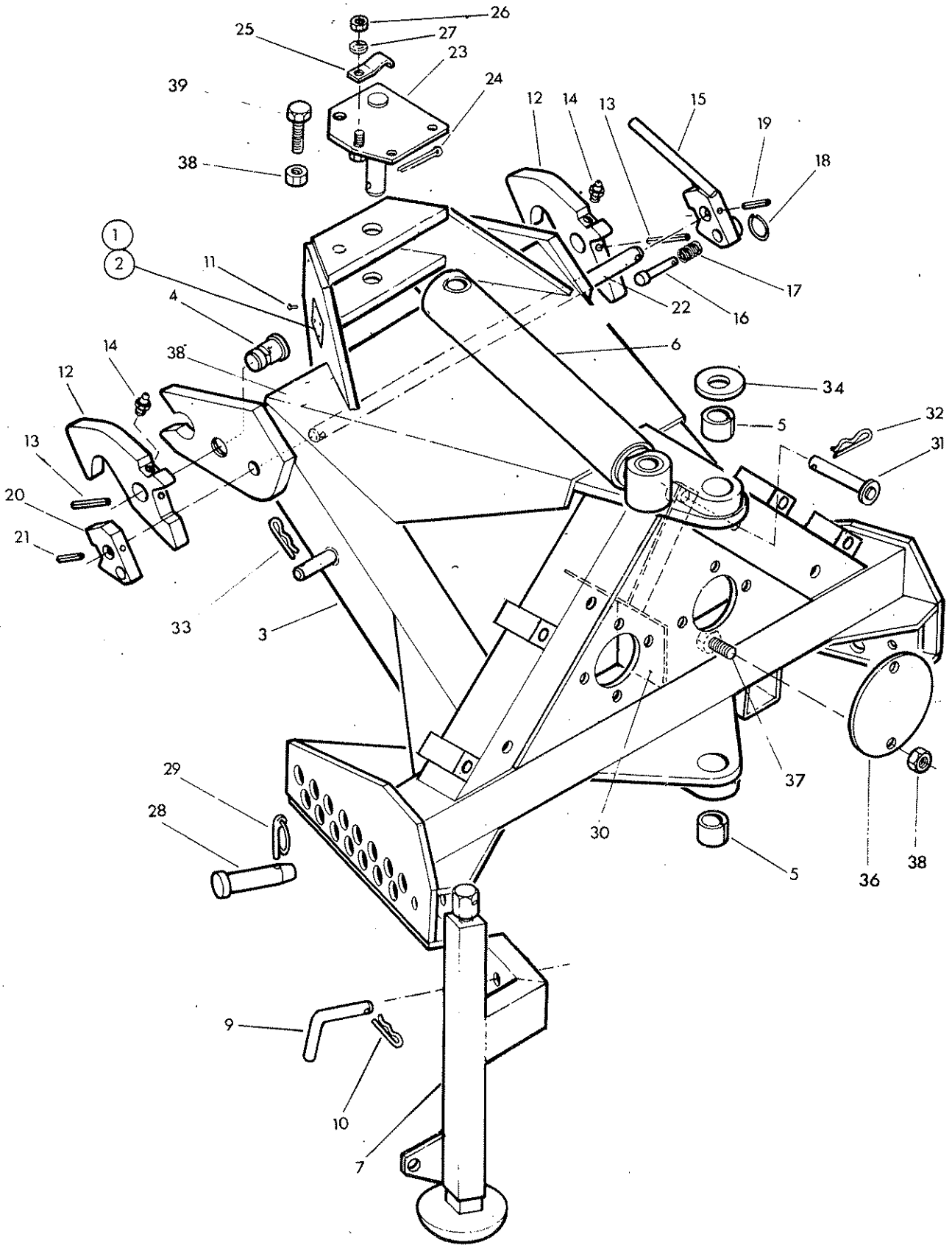
FOR BEST PERFORMANCE....

USE ONLY McCONNEL SPARE PARTS

To be assured of the latest design improvements purchase your genuine replacements from the original equipment manufacturer F.W. 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.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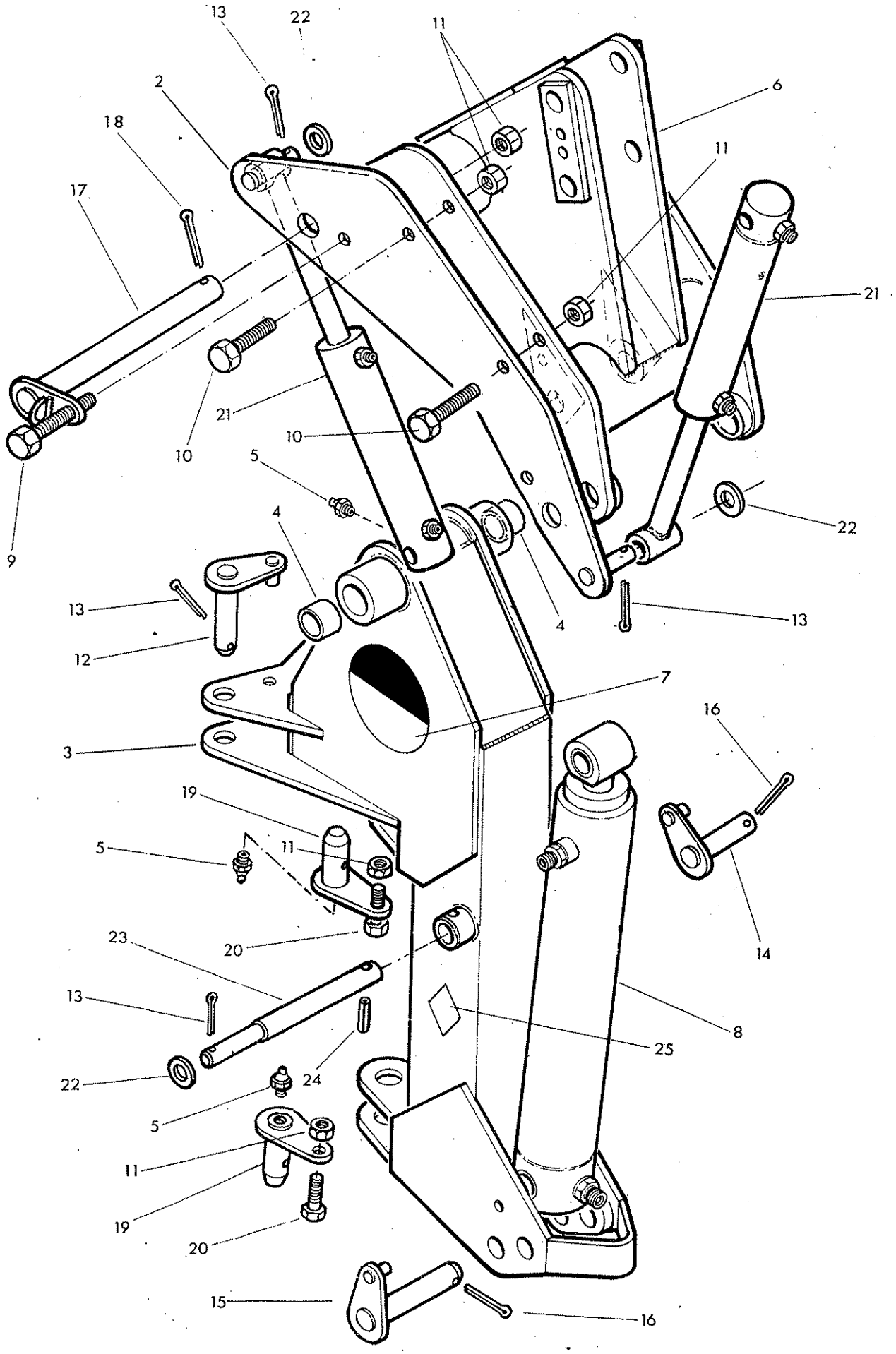
Ref.	Part No.	Qty.	Description
			PA 96 MAIN FRAME
1	71-96-028	1	Serial No. plate
			PA97 MAIN FRAME
2	**71-97-010**	**1**	**Serial No. plate**
The following items are common to both PA96 and97			
3	71 96 280	1	Main frame - for 117 ltr. tank
	71 96 323	1	Main frame -for Enduro tank - as illus.
4	71-06-061	2	Pivot pin
5	70-16-010	2	Bush
6	71-36-274	1	Slew/breakaway ram assembly see page 93
7	71-96-294	1	Screw jack leg L.Hand
8	71-96-295	1	Screw jack leg R.Hand -not illustrated
9	71-92-023	2	Leg pin
10	04-31-105	2	Spring cotter
11	71-03-230	4	Pop rivet 1/8" dia
12	71-06-063	2	Cross shaft latch c/w sp. dowel and greaser
13	04-21-836	1	Spring dowel 1/4" dia x 2 1/4" long
14	09-01-121	1	Greaser 1/8 BSP straight
15	71-06-064	1	Hand operated locking catch c/w plunger etc
16	71-06-192	1	Plunger
17	81-11-009	1	Spring
18	71-05-094	1	Ring
19	04-22-524	1	Spring dowel 5/16" dia x 1 1/2" long
20	71-06-066	1	Slave locking catch c/w sp. dowel & greaser
21	04-21-836	1	Spring dowel 1/4" dia x 2 1/4" long
22	71-06-067	1	Locking rod
23	71-96-296	1	Slew/breakaway ram base pin
24	95-01-406	1	Split pin dia 5 x 40
25	71-09-151	1	Cable clamp
26	91-13-004	1	Nut M8
27	91-00-204	1	Spring washer dia 8
28	71-96-023	2	Linkage pin
29	04-31-217	2	Linch pin
30	71-96-297	1	PTO guard
31	71-96-022	1	Pin
32	04-31-105	1	Spring cotter
33	04-31-104	2	Spring cotter
34	60-01-136	1	Thrust washer
35	71-36-330	1	P.T.O. drive shaft assembly - not illus.
36	71-96-003	1	Cover plate
37	93-13-056	2	Setscrew M12 x 25
38	91-43-006	3	Self locking nut M12
39	92-13-086	1	Bolt M12 x 40

SLEW COLUMN AND ROCKER



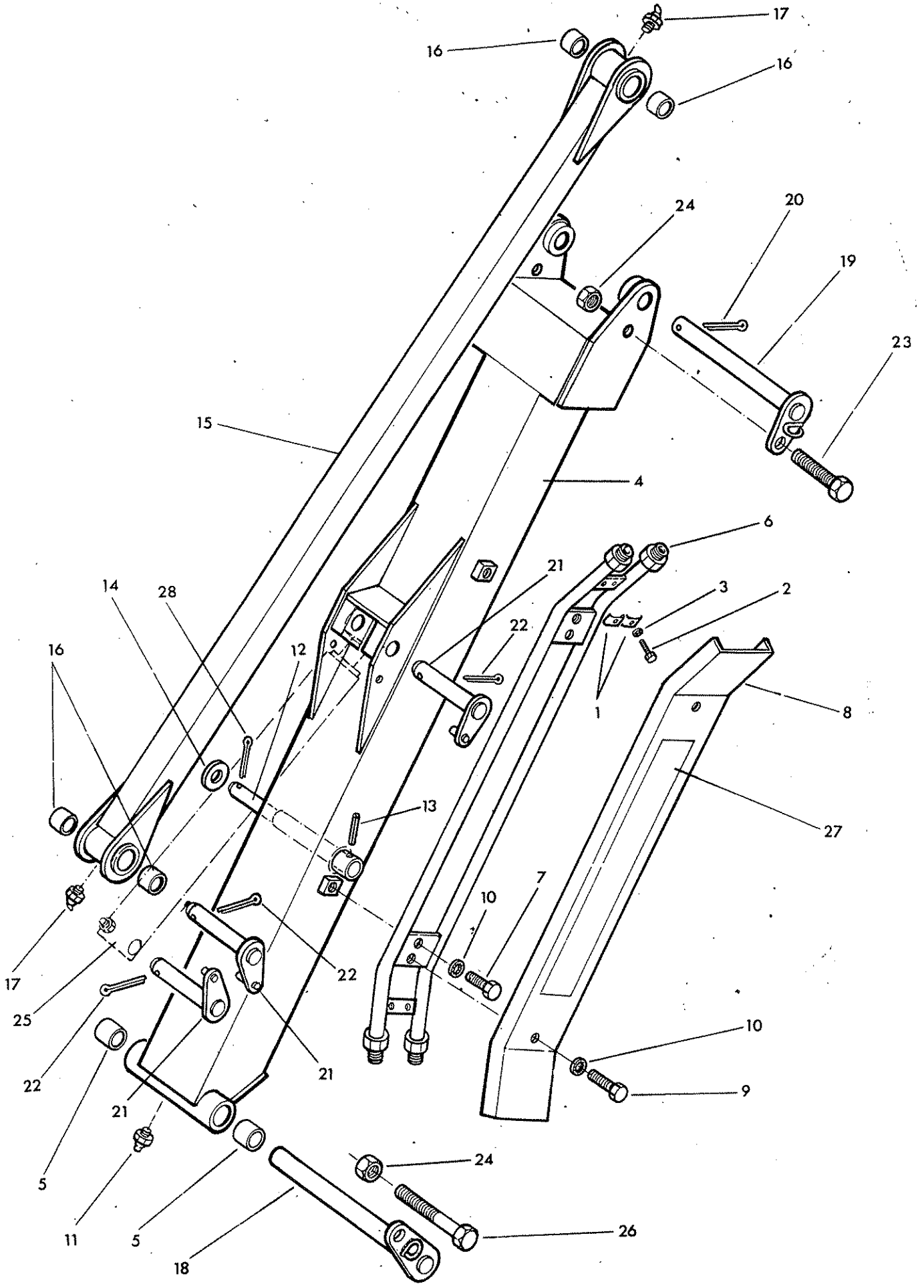
Ref.	Part No.	Qty.	Description
			SLEW COLUMN AND ROCKER FOR PA96 & PA97 R.HAND
1	71-96-306	1	Compensator ram plate - R.Hand. not illus
			SLEW COLUMN AND ROCKER FOR PA96 & PA97 L.HAND
2	71-96-307	1	Compensator ram plate L.Hand
	The following items are common to both PA96s and PA97s		
3	71-96-291	1	Slew column
4	71-96-047	2	Bush
5	09-01-121	3	Greaser 1/8 BSP-straight
6	71-96-303	1	Rocker
7	12-90-286	1	Sticker - roundel
8	71-36-270	1	Lift ram assembly - see page 93
9	92-13-127	1	Bolt M16 x 60
10	92-13-107	2	Bolt M16 x 50
11	91-43-007	5	Self locking nut M16
12	71-96-021	1	Pivot pin-slew/breakaway ram rod
13	95-01-406	4	Split pin Ø 5 x 40
14	71-96-016	1	Pivot pin - lift ram rod
15	71-96-017	1	Pivot pin - lift ram base
16	95-01-507	2	Split pin Ø 6 x 50
17	71-96-018	1	Pivot pin - rocker
✱18	05-03-166	1	Split pin 1/4" dia x 2" long
19	71-96-020	2	Pivot pin - slew column
20	93-13-087	2	Bolt M16 x 40
21	71-95-318	2	Compensator ram see page 96
22	71-92-001	3	Washer 1" dia
23	71-96-011	1	Pivot pin-Lift compensator ram base
24	04-22-628	1	Spring dowel 3/8" dia x 1¾" long
25	71-05-130	1	'Read instruction book first' Sticker

✱ Spares Note:

As from August 1988 Item 18 is deleted.

MAIN ARM AND TENSION LINK

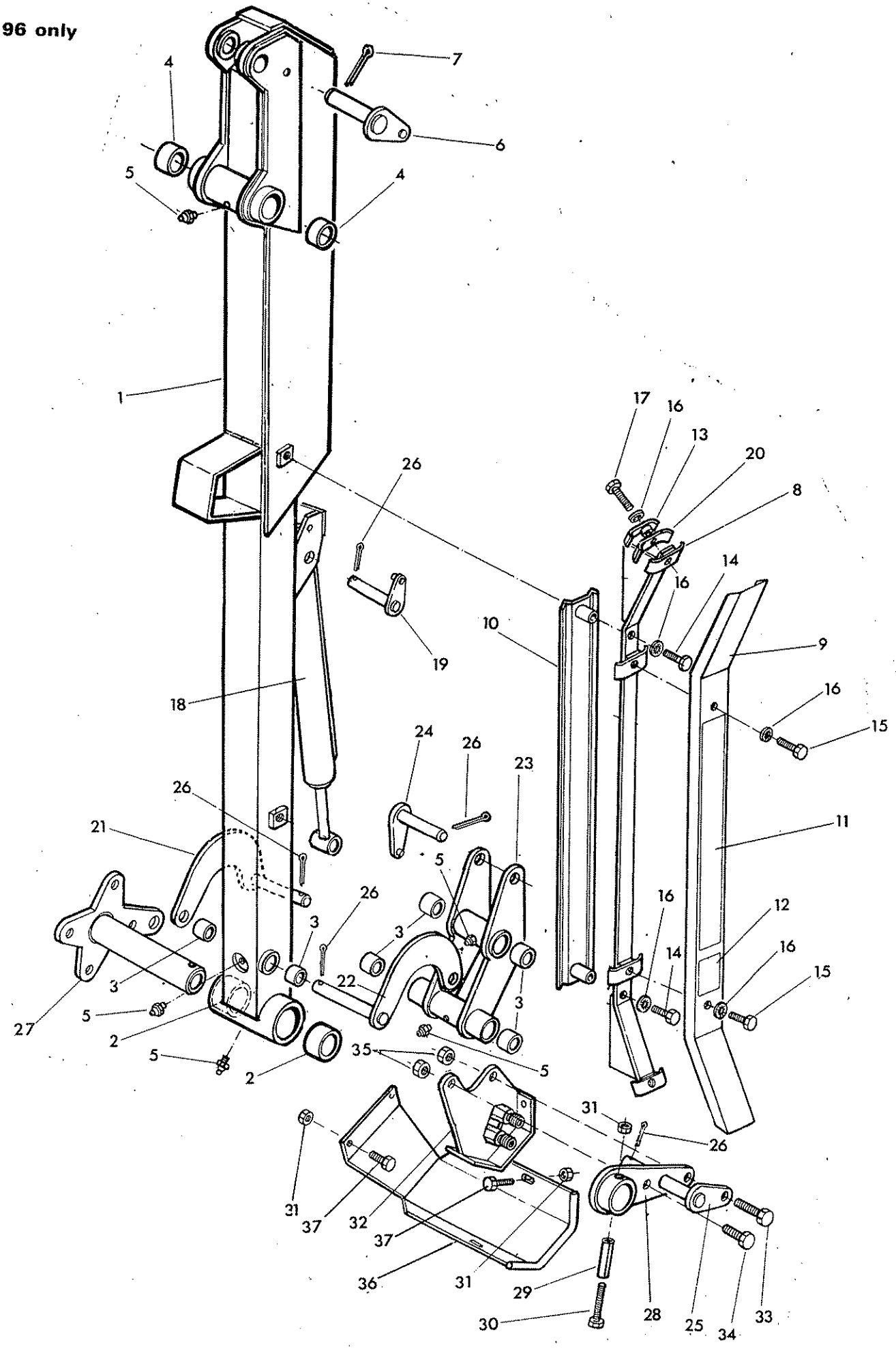
McCONNEL



Ref.	Part No.	Qty.	Description
			MAIN ARM AND TENSION LINK PA96
1	71-96-024	2	Hose clamp
2	93-13-053	2	Setscrew M6 x 25
3	91-00-203	2	Spring washer Ø 6
			MAIN ARM AND TENSION LINK PA97
1	71-96-024	4	Hose clamp
2	93-13-053	4	Setscrew M6 x 25
3	91-00-203	4	Spring washer Ø 6
	the following items are common to both PA96 and PA97		
4	71-96-290	1	Main arm
5	71-96-047	2	Bush .
6	71-96-298	1	Rigid pipes
7	93-13-045	2	Setscrew M10 x 20
8	71-96-299	1	Pipe cover
9	92-13-075	2	Bolt M10 x 35
10	91-00-305	4	Internal serrated washer Ø10
11	09-01-121	1	Greaser 1/8 BSP straight
12	71-96-012	1	Pivot pin - reach compensator ram base
13	04-22-628	1	Spring dowel 3/8" dia x 1¾" long
14	71-92-001	1	Washer 1" dia
15	71-96-301	1	Tension link
16	60-12-032	4	Bush
17	09-01-125	2	Greaser 1/8" BSP 67½°
18	71-96-018	1	Pivot pin - main arm
19	71-96-019	1	Pivot pin - dipper arm
20	05-03-166	1	Split pin 1/4" dia x 2" long
21	71-96-017	3	Pivot pin - reach ram & tension link lower
22	95-01-507	3	Split pin Ø 6 x 50
23	93-13-087	1	Bolt M16 x 40
24	91-43-007	2	Self locking nut M 16
25	71-36-270	1	Reach ram see page 93
26	93-13-167	1	Bolt M16 x 80
27	12-90-255	1	Sticker 'McConnel'
28	95-01-406	1	Split pin ø5

Model	McCONNEL	Temeside Works, Ludlow, Shropshire, SY8 1JL, England. Telephone: (0584) 3131. Telex 35313. Facsimile: (0584) 6463.
DIPPER ARM		

PA 96 only



Ref.	Part No.	Qty.	Description
			DIPPER ARM & ANGLING MECHANISM FOR PA96 ONLY
1	71-96-289	1	Dipper arm
2	71-36-035	2	Bush - head pivot
3	71-01-083	6	Bush - Radius arm pivot and slave link
4	70-16-010	2	Bush - Dipper pivot
5	09-01-121	5	Greaser 1/8" BSP - straight
6	71-96-017	1	Pivot pin - Tension link
7	95-01-507	1	Split pin Ø 6 x 50
8	71-95-310	1	Hose guide - dipper
9	71-93-321	1	Hose cover - dipper
10	71-95-312	1	Hose plate - dipper
11	12-90-295	1	Sticker "Power Arm"
12	12-90-290	1	Sticker "96"
13	71-93-019	1	Hose clip - angle
14	92-13-095	3	Bolt M10 x 45
15	93-15-055	2	Setscrew M10 x 25
16	91-00-305	6	Internal serrated washer Ø 10
17	92-13-125	1	Bolt M10 x 60
18	71-35-290	1	Angle ram assembly - see page 94
19	71-92-024	1	Pivot pin - Angle ram base
20	71-93-015	2	Hose clamp
21	71-92-311	1	Radius arm - front
22	71-92-310	1	Radius arm - rear
23	71-92-309	1	Slave link
24	71-92-008	1	Pivot pin - Angle ram rod
25	71-92-009	1	Pivot pin - Slave link
26	95-01-406	5	Split pin Ø 5 x 40
27	71-92-308	1	Head pivot tube
28	71-92-316	1	Jaw plate
29	04-23-548	1	Spring dowel 5/8" dia x 3" long
30	92-13-185	1	Bolt M10 x 90
31	91-43-005	5	Self locking nut M10
32	71-95-303	1	Hose junction bracket
33	02-11-146	1	Bolt 5/8" UNF x 1¾" long
34	02-11-126	1	Bolt 5/8" UNF x 1½" long
35	01-41-006	2	Self locking nut 5/8 UNF
36	71-92-324	1	Hose tray
37	93-13-045	4	Setscrew M10 x 20

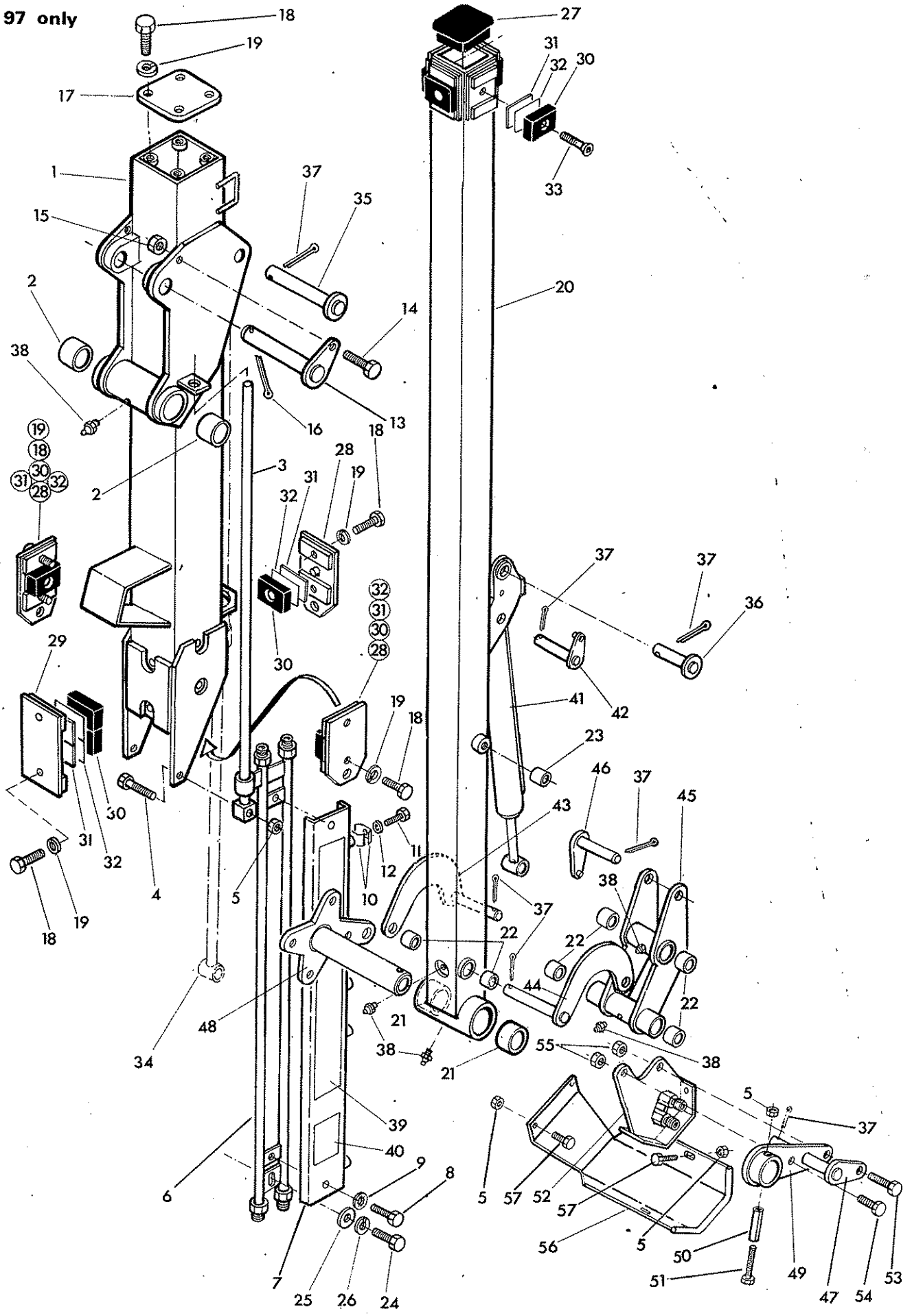
Model

TELESCOPIC DIPPER ARM

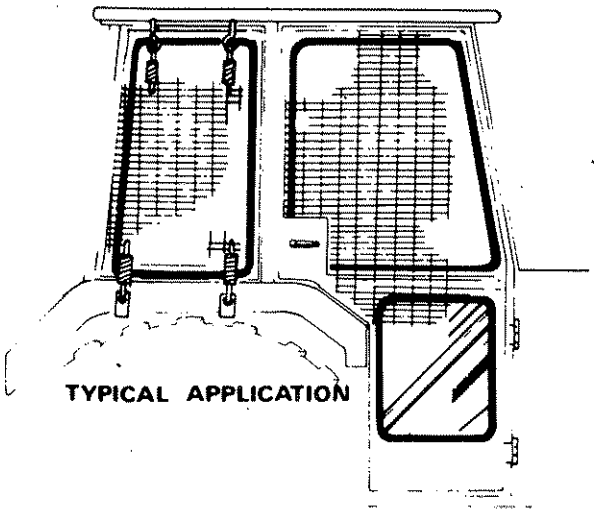
McCONNEL

Temeside Works, Ludlow,
Shropshire, SY8 1JL, England.
Telephone: (0584) 3131.
Telex 35313. Facsimile: (0584) 6463.

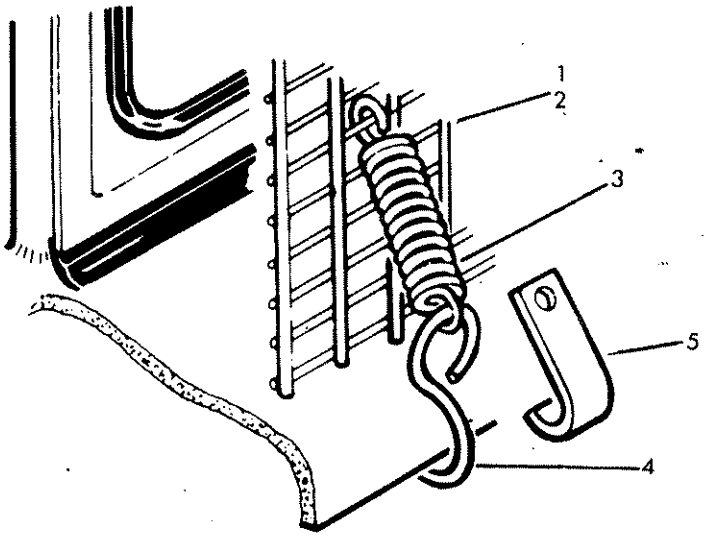
PA 97 only



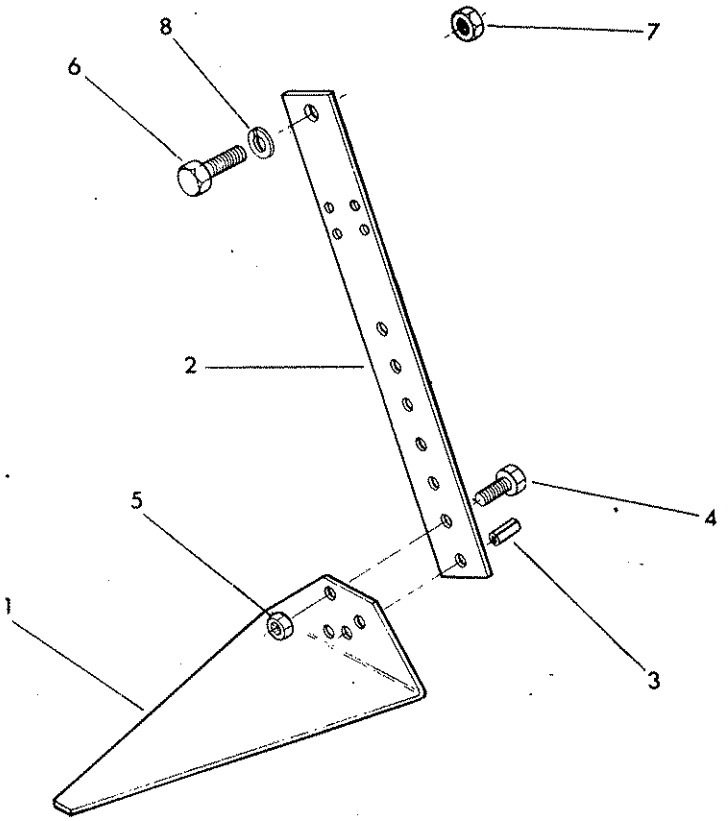
Ref.	Part No.	Qty.	Description
			DIPPER ARM AND ANGLING MECHANISM FOR PA97 ONLY
1	71-97-281	1	Dipper socket
2	70-16-010	2	Bush
3	71-97-012	1	Guide rod
4	92-13-125	1	Bolt M10 x 65
5	91-43-005	6	Self locking nut M10
6	71-97-282	1	Pipe assembly
7	71-97-015	1	Pipe cover
8	93-13-055	2	Setscrew M10 x 25
9	91-00-305	2	Internal serrated washer Ø 10
10	71-96-024	4	Hose clamp
11	93-13-053	2	Setscrew M6 x 25
12	91-00-203	2	Spring washer Ø 6
13	71-97-005	1	Pivot pin - tension link upper
14	92-13-066	1	Bolt M12 x 30
15	91-43-006	1	Self locking nut M12
16	95-01-507	1	Split pin Ø 6 x 50
17	71-36-069	1	Cover plate
18	03-11-065	12	Setscrew ½" UNF x ¾" long
19	01-00-205	12	Spring washer ½" dia
20	71-97-280	1	Tele dipper
21	71-36-035	2	Bush
22	71-01-083	6	Bush
23	71-97-009	1	Spacer
24	92-17-406	1	Bolt M12
25	91-00-106	1	Plain washer ø 12
26	91-00-206	1	Spring washer ø 12
27	71-36-148	1	Plastic bung
28	71-36-314	3	Wear pad carrier - side and top
29	71-36-315	1	Wear pad carrier - bottom
30	71-36-001	13	Wear pad
31	71-36-059	as reqd	Shim 1mm
32	71-36-058	as reqd	Shim 0.25 mm
33	93-53-075	4	Socket head c/sunk screw M10 x 35
34	71-36-275	1	'Tele' ram assembly see page 95
35	71-97-003	1	Pivot pin -'tele'ram base
36	71-97-004	1	Pivot pin - 'tele' ram rod
37	95-01-406	7	Split pin Ø 5 x 40
38	09-01-121	5	Greaser 1/8 BSP straight
39	12-90-295	1	Sticker 'Power Arm'
40	12-90-289	1	Sticker '97'
41	71-35-290	1	Angle ram assembly - see page 97
42	71-92-024	1	Pivot pin -Angle ram base
43	71-92-311	1	Radius arm - front
44	71-92-310	1	Radius arm - rear
45	71-92-309	1	Slave link
46	71-92-008	1	Pivot pin - Angle ram rod
47	71-92-009	1	Pivot pin - Slave link
48	71-92-308	1	Head pivot tube
49	71-92-316	1	Jaw plate
50	04-23-548	1	Spring dowel 5/8" dia x 3" long
51	92-13-185	1	Bolt M10 x 90
52	71-95-303	1	Hose junction bracket
53	02-11-146	1	Bolt 5/8" UNF x 1¾" long
54	02-11-126	1	Bolt 5/8" UNF x 1½" long
55*	01-41-006	2	Self locking nut 5/8 UNF
56	71-92-324	1	Hose tray
57	93-13-045	4	Setscrew M10 x 20



TYPICAL APPLICATION



Ref.	Part No.	Qty.	Description
	73-13-324		CAB GUARD KIT
1	73-13-049	1	Guard panel - large
2	73-13-050	1	Guard panel - small
3	60-01-064	12	Spring
4	60-01-065	6	Hook
5	73-13-051	6	Hook

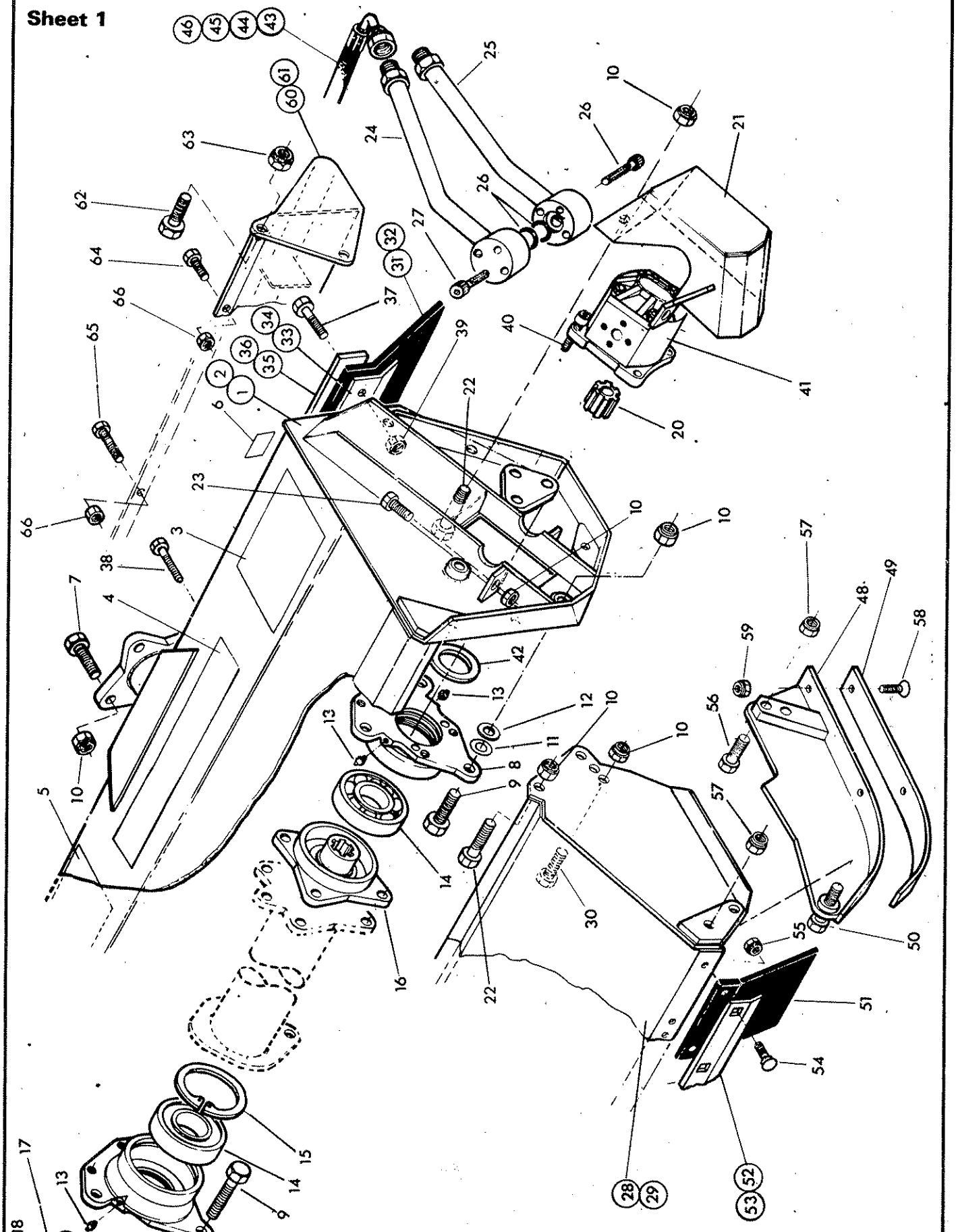


Ref.	Part No.	Qty.	Description
	71-09-319		CONTROL MOUNTING ASSEMBLY
1	71-09-320	1	Sandwich plate
2	71-09-146	1	Pillar including spring dowel
3	04-22-816	1	Spring dowel
4	93-13-066	1	Setscrew M12 x 30
5	91-13-006	1	Nut M12
6	93-11-086	1	Setscrew 5/8 UNF x 1" long
7	01-11-006	1	Nut 5/8 UNF
8	01-00-206	1	Spring washer 5/8" dia

FLAIL HEAD CASING 1·2M &1·6M
90 Series

McCONNEL

Sheet 1

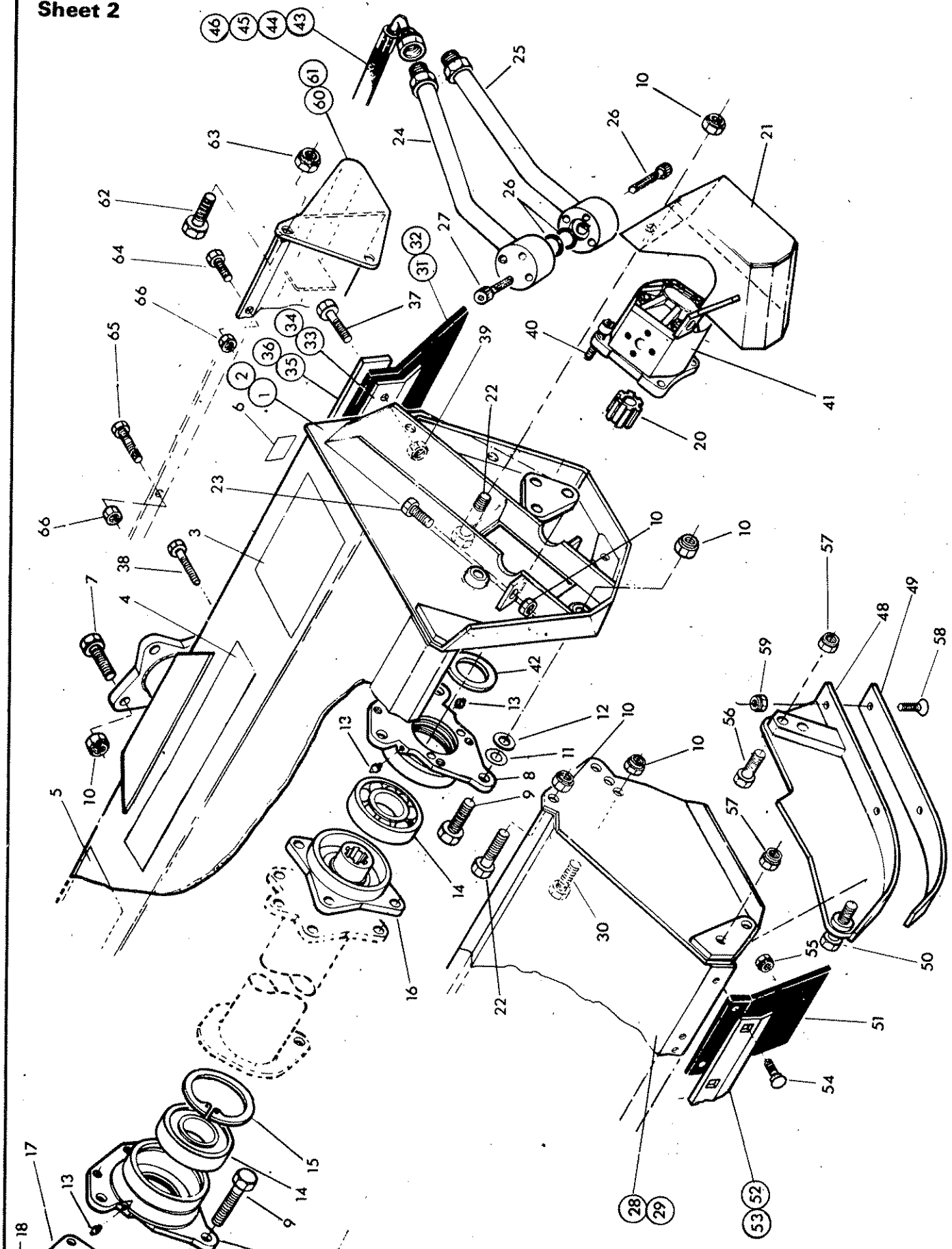


FLAIL HEAD CASING 1.2M & 1.6M - 90 series

Ref.	Part No.	Qty.	Description
1	71 90 262	1	Flail casing 1.2M
2	71 90 406	1	Flail casing 1.6M
3	12 90 297	1	Flail head instruction sticker
4	12 90 255	1	Sticker 'McConnel'
5	12 90 341	1	Sticker - 'Flail guarding'
6	12 90 033	1	Serial No. plate
7	02 11 186	4	Bolt 5/8 UNF x 2 1/4" long
8	71 90 261	2	Bearing housing
9	02 11 166	6	Bolt 5/8 UNF x 2" long
10	01 41 006	13	Self locking nut 5/8" UNF
11	81 21 043	as reqd	Shim .015"
12	81 21 044	as reqd	Shim .025"
13	09 01 121	4	Greaser 1/8 BSP-straight
14	06 00 018	2	Bearing
15	71 90 022	1	Internal circlip dia 120
16	71 90 280	1	Rotor hub
17	71 90 444	1	Cover plate
18	93 13 045	4	Setscrew M10 x 20
19	91 00 205	4	Spring washer dia 10
20	71 90 009	1	Drive coupling
21	71 90 282	1	Motor cover - Prior to October 1991
	71 90 449	1	Motor cover - From October 1991
22	02 11 266	1	Bolt 5/8 UNF x 3 1/4" long
23	03 11 126	2	Setscrew 5/8 UNF x 1 1/2" long
24	71 90 297	1	Motor pipe - upper
25	71 90 298	1	Motor pipe - lower
26	86 00 121	2	'O' ring
27	93 00 014	6	Capscrew 'wedglok' M10 x 60
28	71 90 288	1	Front hood 1.2M
29	71 90 401	1	Front hood 1.6M
30	03 11 106	2	Setscrew 5/8 UNF x 1 1/4" long
31	71 90 314	1	Rear flap 1.2M
32	71 90 425	1	Rear flap 1.6M
33	71 90 312	1	Mounting strip 1.2M
34	71 90 426	1	Mounting strip 1.6M
35	71 90 313	1	Clamp strip 1.2M
36	71 90 427	1	Clamp strip 1.6M
37	93 13 065	as reqd	Setscrew M10 x 30
38	93 13 075	2	Setscrew M10 x 35
39	91 43 005	as reqd	Self locking nut M10
40	93 00 136	4	Capscrew wedglok M10 x 45

McCONNEL

Sheet 2



FLAIL HEAD CASINGS FOR 1.2M & 1.6M - 90 series. Continued

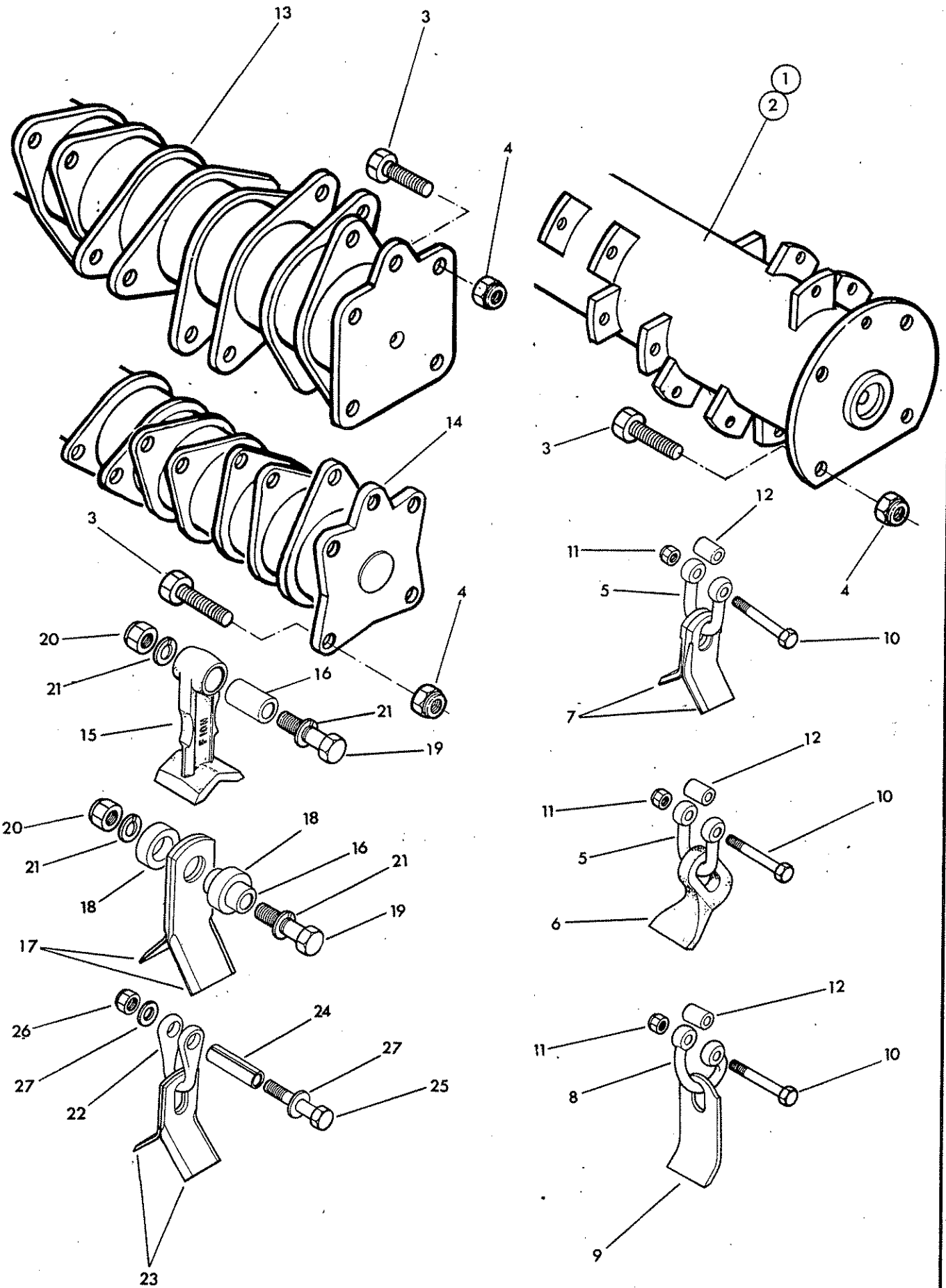
41	83 01 272	1	Hydraulic motor 1.6 head - KM30/43
	83 01 271	1	Hydraulic motor 1.2 head - KM30/38
42	71 90 015	1	Motor locating washer
43	85 01 097	2	Hose 1" BSP SF-90 deg F x 34" long for 1.2 heads. with motor outboard
44	85 01 154	2	Hose 1" BSP SF-90 deg F x 42" long for 1.6 heads with motor outboard
45	85 01 154	2	Hose 1" BSP SF-90 deg F x 42" long for 1.2 heads with motor inboard
46	85 01 206	2	Hose 1" BSP SF - 90 deg F x 50" long for 1.6 heads with motor inboard
	86 99 222		**SEAL KIT for both hydraulic motors**

ADDITIONAL PARTS FOR GRASS CUTTING

47	71 90 300	1	Skid R. Hand - not illus
48	71 90 301	1	Skid L. Hand
49	73 14 323	2	Replaceable skid
50	03 11 146	2	Setscrew 5/8 UNF x 1 3/4" long
51	71 90 020	as reqd	Flap
52	71 90 304	1	Flap clamp strip 1.2M
53	71 90 405	1	Flap clamp strip 1.6M
54	92 93 054	as reqd	Cup square bolt M8 x 25
55	91 43 004	16	Self locking nut M8
56	03 11 086	2	Setscrew 5/8" UNF x 2 1/4" long
57	01 41 006	4	Self locking nut 5/8" UNF
58	93 33 065	6	Setscrew c/sunk M10 x 30
59	91 43 005	6	Self locking nut M10

EXTRAS FOR DOWNWARD CUTTING FLAILS

	71 90 310	1	Rear hood kit for 1.2M heads
	71 90 085	1	Rear hood kit for 1.6M heads
60	71 90 285	1	Rear hood 1.2M
61	71 90 443	1	Rear hood 1.6M
62	03 11 106	4	Bolt 5/8" UNF x 1 1/4" long
63	01 41 006	4	Self locking nut 5/8 UNF
64	93 13 045	as reqd	Setscrew M10 x 20
65	93 13 055	2	Setscrew M10 x 25
66	91 43 005	as reqd	Self locking nut M10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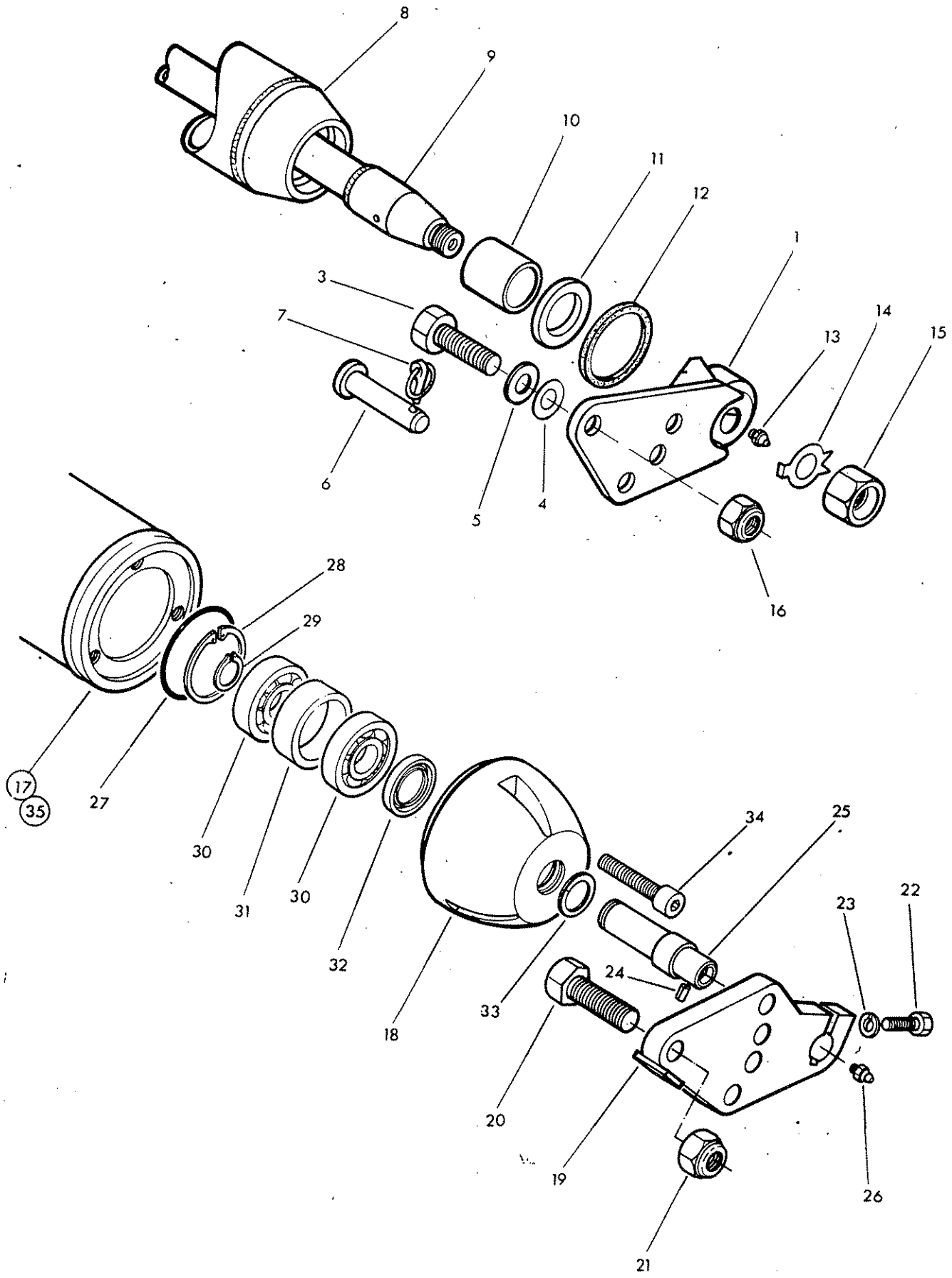
Ref.	Part No.	Qty.	Description
			ROTORS AND FLAILS for 90 series heads
			140mm DIA ROTOR SUITABLE FOR 1.2m HI.POWER AND 1.6m FLAIL HEADS
1	71 90 422	1	Rotor 1.6m PA96,/2060/2080 only - 44 flail stations
2	71 90 424	1	Rotor 1.2m - 32 flail stations
3	03 11 146	4	Setscrew 5/8 UNFx 1 3/4" long
4	01 41 006	4	Self locking nut 5/8 UNF
			FLAIL OPTIONS FOR 140mm DIA ROTORS- Quantities shown are per flail station
5	71 90 086	1	Shackle
6	71 11 172	1	Flail
7	71 90 090	2	Flail
8	71 90 089	1	Shackle
9	71 90 091	1	Flail
10	71 90 088	1	Special bolt
11	01 41 004	1	Self locking nut 7/16 UNF
12	71 90 087	1	Spacer
			120mm DIA ROTOR SUITABLE FOR 1.6m FLAIL HEADS
13	71 90 424	1	Rotor 1.6m PA96/2060/2080 only - 32 flail stations
			100mm DIA ROTOR SUITABLE FOR 1.2m FLAIL HEADS
14	71 90 320	1	Rotor 1.2 - 24 flail stations.
			FLAIL OPTIONS FOR 120mm and 100mm DIA ROTORS -Quantities shown are per flail station.
15	73 14 366	1	Flail F10H
16	73 14 223	1	Pivot bush
17	71 90 315	2	Flail
18	71 90 010	2	Flail spacer
19	73 14 201	1	Special bolt
20	01 41 006	1	Self locking nut 5/8 UNF
21	01 00 206	2	Spring washer 5/8" dia
22	71 90 080	1	Shackle
23	71 11 022	2	Flail
24	04 28 660	1	Spring dowel dia 16 x 60
25	02 11 243	1	Bolt 3/8 UNF x 3" long
26	01 41 003	1	Self locking nut 3/8 UNF
27	01 00 103	2	Plain washer 3/8" dia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Ref.	Part No.	Qty.	Description
			ROLLERS OPTIONS FOR 1.2M 90 SERIES 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 5/8 UNF x 2" long
4	81 21 043	as reqd	Shim .015"
5	81 21 044	as reqd.	Shim .025"
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 1/8 BSP straight
14	71 90 023	2	Tab washer dia 20
15	71 14 176	2	Special nut M20
16	01 41 006	4	Self locking nut 5/8" UNF
			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 5/8 UNF x 2 1/2" long
21	01 41 006	4	Self locking nut 5/8 UNF
22	02 11 123	2	Bolt 3/8 UNF x 1 1/2" long
23	01 00 203	2	Spring washer 3/8" dia
24	04 25 408	2	Spring dowel dia 4 x 8
25	71 90 430	2	Stub axle
26	09 01 121	2	Greaser 1/8 BSP - straight
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 31 232	2	Spring ring
34	93 00 104	6	Capscrew - self locking M10 x 40
			ROLLER FOR 1.6 METRE 90 SERIES FLAIL HEAD FLAIL HEAD
			BALL BEARING ROLLER ASSEMBLY ONLY

The parts list is identical with the 1.2m ball bearing roller with the following exception

35	71 90 435	1	Roller

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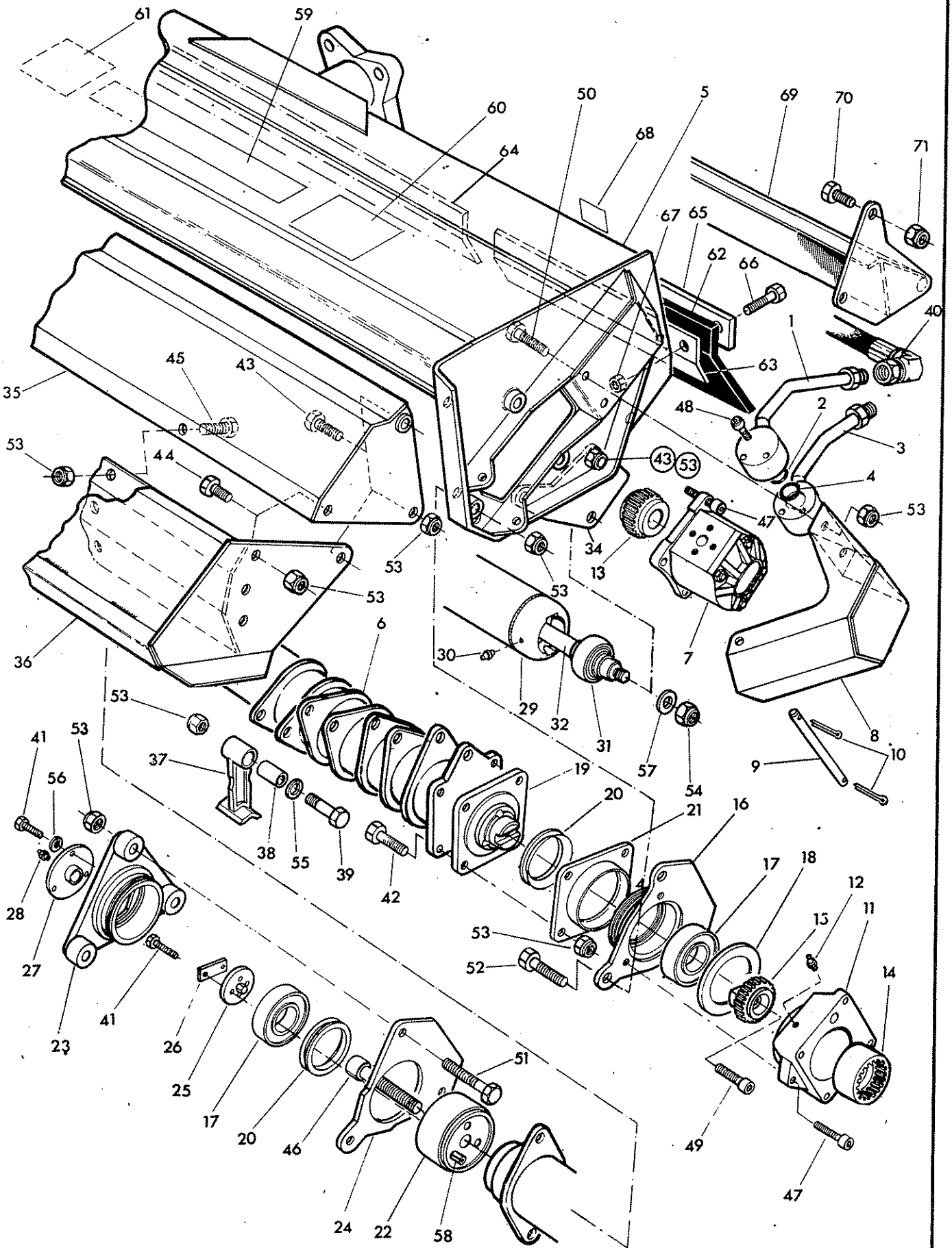
SHEET 1



Ref.	Part No.	Qty.	Description
	71-36-400		**1.6 METRE FLAIL HEAD TO CUT ON R HAND SIDE OF TRACTOR WITH MOTOR OUTBOARD**
	71-36-389		Rigid pipe upper
	86-00-121	1	O ring not
	71-36-387	1	Rigid pipe lower illustrated
	86-00-121	1	O ring
	71-36-401		**1.6 METRE FLAIL HEAD TO CUT ON L HAND SIDE OF TRACTOR WITH MOTOR OUTBOARD**
1	71-36-390	1	Rigid pipe upper
2	86-00-121	1	O ring
3	71-36-388	1	Rigid pipe lower
4	86-00-121	1	O ring
The remaining items are common to both flail head assemblies			
5	71-36-344	1	Flail casing
6	71-36-367	1	Rotor
7	83-01-272	1	Hydraulic motor
8	71-36-373	1	Motor cover
9	73-14-202	1	Motor cover mounting pin
10	05-03-095	2	Split pin 3/16" dia x 1 1/8" long
11	71-36-384	1	Coupling spacer block
12	09-01-124	1	Greaser 1/8 BSP angled
13	73-14-204	1	Coupling - motor half
14	73-14-205	1	Coupling sleeve
15	73-14-203	1	Coupling - rotor half
16	71-36-350	1	Bearing housing- motor end
17	06-00-070	2	Spherical roller bearing
18	71-36-145	1	Bearing retainer
19	71-36-353	1	Rotor hub - motor end
20	86-29-155	2	Face seal
21	71-36-354	1	Shroud ring
22	71-36-352	1	Rotor hub - free end
23	71-36-351	1	Bearing housing - free end
24	71-36-349	1	Shield plate
25	71-36-128	1	Lock plate
26	71-36-129	1	Tab plate
27	71-36-126	1	Cover plate
28	09-01-121	1	Greaser 1/8 BSP straight
29	71-36-376	1	Roller
30	09-01-111	2	Greaser 1/4 BSP straight

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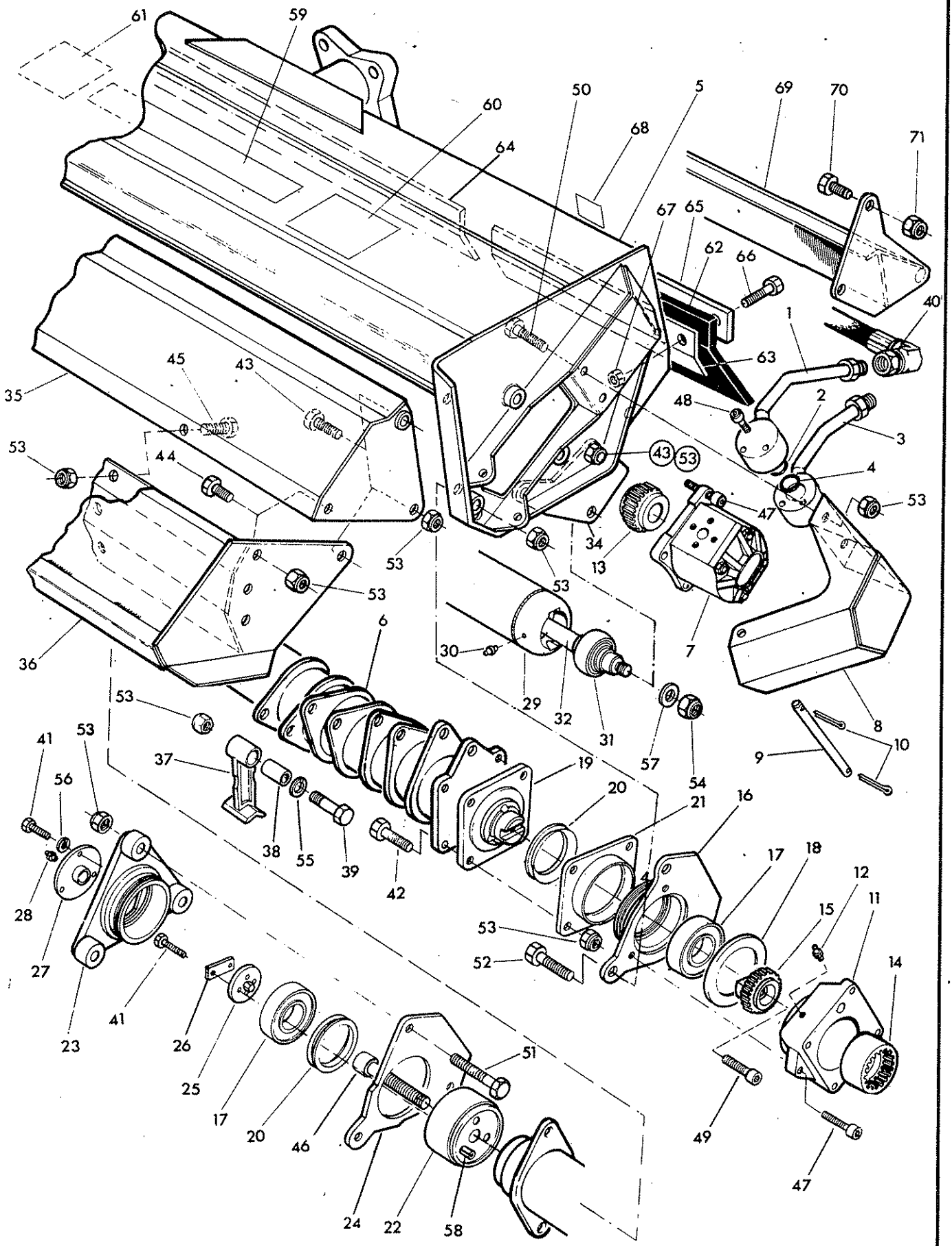
SHEET 2



Ref.	Part No.	Qty.	Description
			1.6 METRE FLAIL HEADS continued
31	06-00-071	2	Bearing insert
32	71-36-380	1	Roller tie rod
33	71-36-379	1	Roller bracket R hand -not illustrated
34	71-36-378	1	Roller bracket L. hand
35	71-36-360	1	Front hood - fixed
36	71-36-363	1	Front hood adjustable
37	73-14-366	32	Hedge flail F10H
38	71-36-133	32	Flail pivot bush
39	73-14-222	32	Special bolt 5/8 UNF
40	85-01-154	2	Hose 1" BSP SF 90 degrees F x 41" long
41	03-11-062	5	Set screw 5/16 UNF x 3/4" long
42	03-11-146	4	Set screw 5/8 UNF x 1 3/4" long
43	03-11-126	8	Set screw 5/8 UNF x 1 1/2" long
44	03-11-106	2	Set screw 5/8 UNF x 1 1/4" long
45	03-11-086	2	Set screw 5/8 UNF x 1" long
46	03-41-207	1	Socket headed set screw 3/4 UNF x2 1/2" long
47	93-00-104	7	Socket headed screw M10 x 40 self locking
48	93-00-014	8	Socket headed screw M10 x 60 self locking
49	73-14-221	1	Socket headed screw M12 x 50
50	02-11-286	2	Bolt 5/8 UNF x 3 1/2"" long
51	02-11-246	3	Bolt 5/8 UNF x 3" long
52	02-11-166	3	Bolt 5/8 UNF x 2" long
53	01-41-006	56	Self locking nut 5/8 UNF
54	01-41-007	2	Self locking nut 3/4 UNF
55	01-00-206	32	Spring washer 5/8" dia
56	01-00-202	3	Spring washer 5/16" dia
57	01-00-107	2	Plain washer 3/4" dia
58	04-22-516	1	Spring dowel 5/16" dia x 1" long
59	12-40-255	1	Sticker 'McConnel'
60	12-90-297	1	Sticker 'Rotor speed'
61	12-90-341	1	Sticker 'Flail guarding'
62	71-36-394	1	Rear flap
63	71-36-396	1	Mounting strip - outer
64	71-36-395	1	Mounting strip - centre
65	71-36-393	1	Clamp strip
66	93-13-055	13	Setscrew M10 x 25
67	91-43-005	13	Self locking nut M10
68	12-90-033	1	Serial No. plate
	86-99-216		**SEAL KIT FOR HYDRAULIC MOTOR**
	71-36-150		**REAR HOOD KIT FOR DOWNWARD CUTTING**
69	71-36-355	1	Rear hood
70	03-11-106	4	Setscrew 5/8" UNF x 1 3/4" long
71	01-41-006	4	Self locking nut 5/8" UNF

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Temeside Works, Ludlow,
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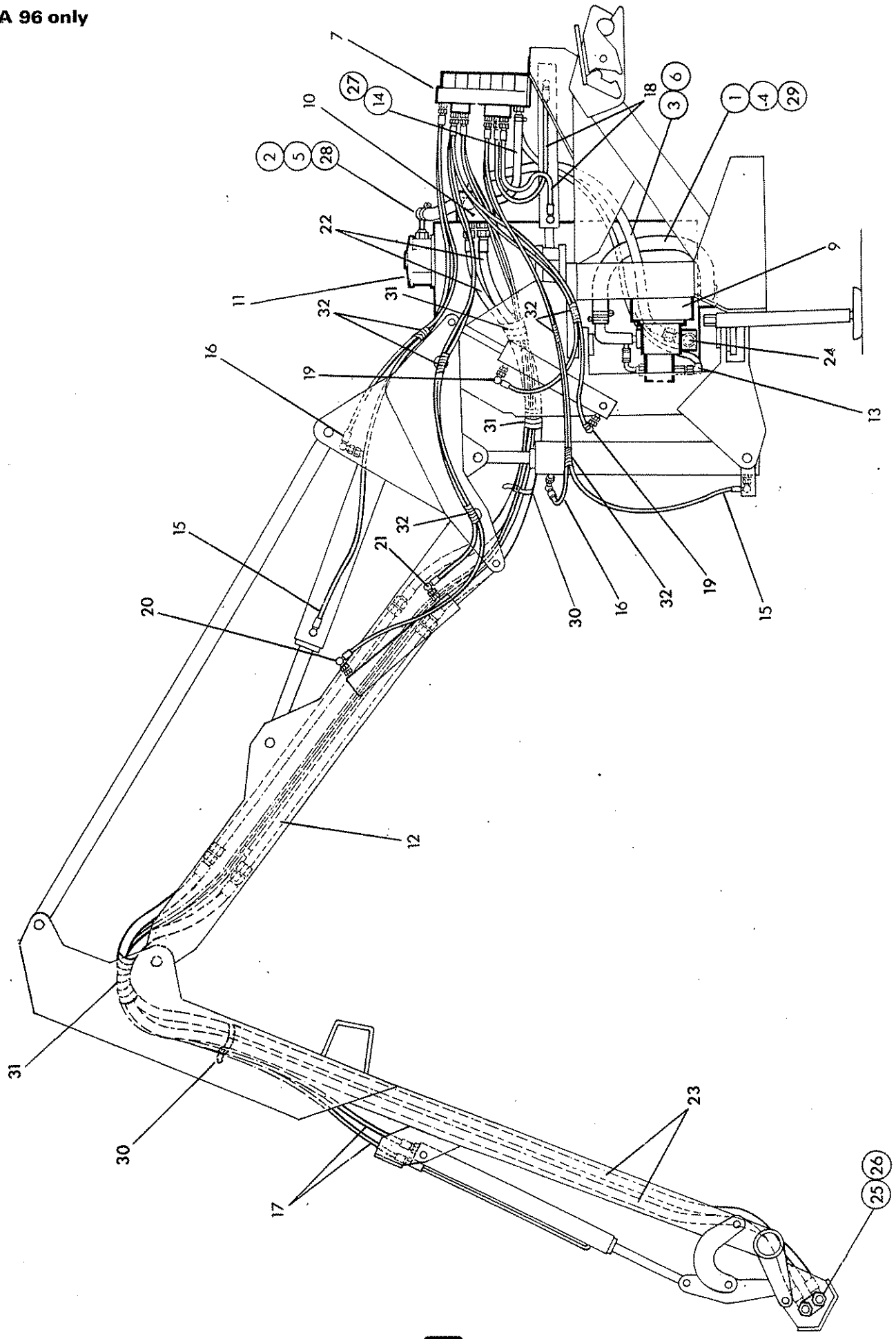
PA 96 only



Ref.	Part No.	Qty.	Description
			HYDRAULIC INSTALLATION PA96 ONLY
1	85-01-162	1	Hose 1 1/2" bore x 52" long-Suction L.Hand only
2	85-01-163	1	Hose 1 1/2" bore x 60" long-Suction-R hand only
The remaining items are common to both right and left hand installation			
3	85-01-060		Hose 1" BSP SF-90 degrees Swept F x 43" long-Pump RC Valve R Hand only
4	85-00-821	1	Hose 1" bore x 21" long
5	85-35-072	1	Hose 1/4" BSP SFF 90 F x 60" long-Reach base
6	71-96-041	1	Hose clamp strap
7	81-30-387	1	Control valve assembly - see page 63
8	71-09-319	1	Control mounting assembly - see page 46
9	80-13-366	1	Pump/gearbox assembly - see page 75 - 78
10	81-25-363	1	Rotor control valve assembly - see 81
11			Tank assembly - see 83 - 88
12	71-96-298	1	Rigid pipe - ref only
13	85-31-243	1	Hose 3/8 BSP SF- 90 degrees F x 51" long-Supply from pump
14	85-01-158	1	Hose 5/8" bore x 24" long-return Control valve-R.C. Valve
15	83-35-052	2	Hose 1/4" BSP SF - 90 degrees x 70" long-Lift base and Reach gland
16	85-35-022	2	Hose 1/4" BSP SF-90 degrees F x 48" long-Lift gland and reach base
17	85-15-072	2	Hose 1/4" BSP SF-SF x 174" long - Angle
18	85-35-012	2	Hose 1/4" BSP SF - 90 degrees x 18" long - Slew
19	85-35-162	2	Hose 1/4" BSP SF-90 degrees F x 36" long-Lift compensator
20	85-35-182	1	Hose 1/4" BSP SF- 90 degrees F x 54" long-Reach compensator base
21	85-35-112	1	Hose 1/4" BSP SF- 90 degrees F x 66" long-Reach compensator gland
22	85-01-179	2	Hose 1" BSP SF-SF x 53" long-R.C. Valve-Rigid pipes
23	85-01-159	2	Hose 1" BSP SF-90 degrees F x 110 long-Rigid pipes-hose junction
24	85-81-212	1	Elbow 1" BSP M-F
25 *	85-81-241	1	Extension union 1" BSP MF
26	86-50-108	1	Bonded seal 1" BSP
27	09-04-204	2	Hose clip 5/8" bore hose
28	09-04-106	4	Hose clip - 1" bore hose
29	09-04-107	4	Hose clip 1 1/2" bore hose
30	71-35-084	9	Hose tie
31	71-36-143	4	Hose armour cable 1" x 80mm long
32	71-35-090	6	Hose armour cable 3/8" dia x 50mm long
33	71-14-076	1	Hose clamp lower
34	71-14-075	1	Hose clamp upper
35	71-96-043	2	Hose guide
36	71-96-046	2	Hose armour cable 1" dia x 200mm long
37	93-13-025	1	Setscrew M10 x 35
38	91-43-005	1	Self locking nut

* After April 1990 item is deleted

Model

HYDRAULIC INSTALLATION

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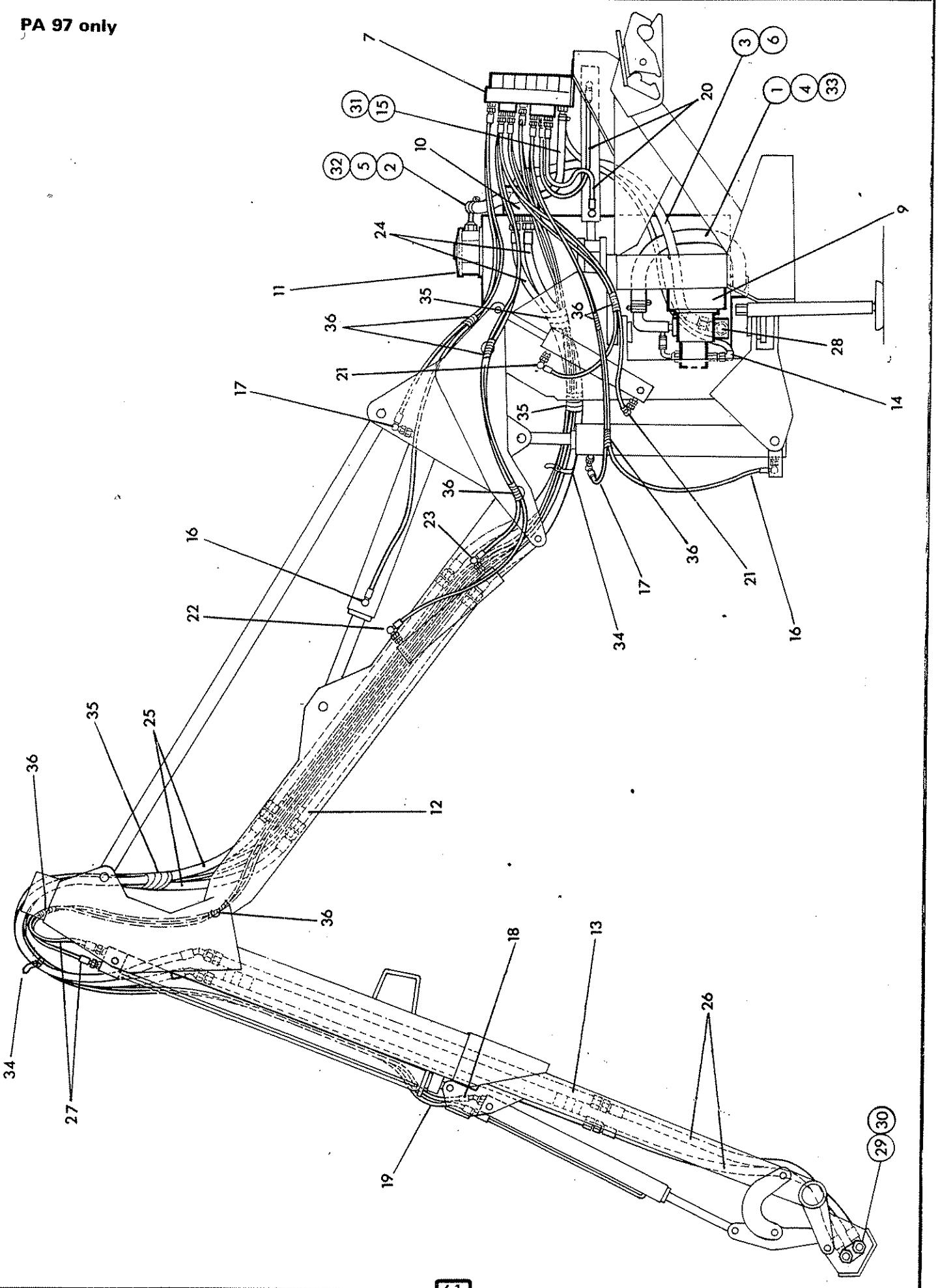

Ref.	Part No.	Qty.	Description
			HYDRAULIC INSTALLATION PA97 ONLY
1	85-01-162	1	Hose 1 1/2" bore x 52" long-Suction L Hand only
2	85-01-163	1	Hose 1 1/2" bore x 60" long-Suction-R hand only
The remaining items are common to both right and left hand installations			
3	85-01-060	1	Hose 1" BSP SF - 90 degrees Swept F x 43" long-Pump- R.C. Valve R Hand only
4	85-00-821	1	Hose 1" bore x 21" long
5	85-35-072	1	Hose 1/4" BSP SF-90F x 60" long -Reach base
6	71-96-041	1	Hose clamp strap
7	81-30-388	1	Control valve assembly - see page 65
8	71-09-319	1	Control mounting assembly - see page 46
9	80-13-366	1	Pump/gearbox assembly - see page 75 – 78
10	81-25-363	1	Rotor control valve assembly - see 81
11		1	Tank assembly - see 83 – 88
12	71-96-298	1	Rigid pipe - Main arm - ref only
13	71-97-282	1	Rigid pipe - Dipper arm-ref only
14	85-31-243	1	Hose 3/8BSP SF- 90 degrees F x 51" long-Supply
15	85-01-158	1	Hose 5/8" bore x 24" long-return Control valve R.C. valve
16	85-35-052	1	Hose 1/4" BSP SF-90 degrees F x 70" long-Lift base and reach gland
17	85-35-022	2	Hose 1/4" BSP SF - 90 degrees F x 48" long-Lift gland and reach base
18	85-45-012	1	Hose 1/4" BSP SF 135 degrees F x 212" long-Angle base
19	85-15-022	1	Hose 1/4" BSP SF-SF x 212" long-Angle gland
20	85-35-012	2	Hose 1/4" BSP SF-90 degrees F x 18" long-Slew
21	85-36-162	2	Hose 1/4" BSP SF- 90 degrees F x 36" long-Lift compensator
22	85-35-182	1	Hose 1/4" BSP SF- 90 degrees F x 54" long-Reach compensator base
23	85-35-112	1	Hose 1/4" BSP SF-90 degrees F x 66" long-Reach compensator gland
24	85-01-179	2	Hose 1" SP SF-SF x 57" long -R.C. Valve-Rigid Pipes
25	85-01-161	2	Hose 1" BSP SF - 135 degrees F x 65" long-Rigid pipes- Rigid pipes
26	85-01-097	2	Hose 1" BSP SF 90 degrees Swept F x 34" long-Rigid pipes-hose junction
27	85-15-122	2	Hose 1/4" BSP SF x 162" long - Tele Elbow 1" BSP M-F
28	85-81-212	1	Elbow 1" BSP M-F
29*	85-81-241	1	Extension union 1" BSP MF
30	86-50-108	1	Bonded seal 1" BSP
31	09-04-204	2	Hose clip - 5/8" bore hose
32	09-04-106	4	Hose clip- 1" bore hose
33	09-04-107	4	Hose clip 1 1/2" bore
34	71-35-084	9	Hose tie
35	71-36-143	4	Hose armour calbe 1" x 80 mm long
36	71-35-090	8	Hose armour cable 3/8" x 50 mm long
37	71-14-076	1	Hose clamp strap
38	71-14-076	1	Hose clamp lower
39	71-14-075	1	Hose clamp upper
40	71-96-043	2	Hose guide
41	71-96-046	2	Hose armour cable 1" dia x 100mm long
42	93-13-025	1	Setscrew M10 X 35
43	91-43-005	1	Self locking nut M10

*After April 1990 item is deleted

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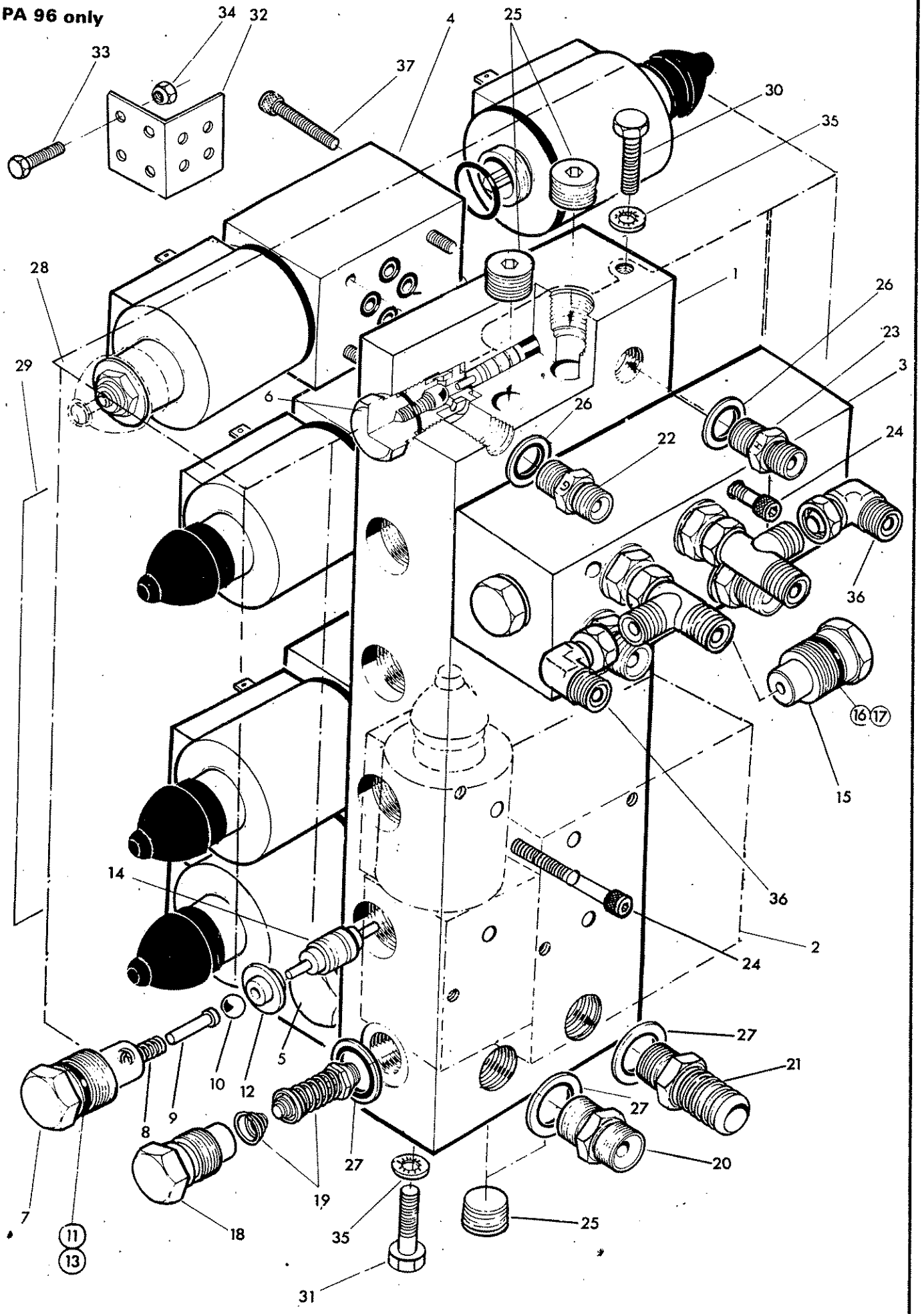
PA 96 only



Ref.	Part No.	Qty.	Description
	81-30-387		ELECTRIC CONTROL PACK - PA96
	81-30-383		Solenoid/manifold valve assembly compr:
1	81-30-346	1	Manifold block
2	81-30-349	1	Slew circuit valve assembly see page 67
3	81-30-362	1	Head compensator valve assy -see page 69
* 4	81-30-455	4	Double solenoid valve - see page 71
* 5	81-30-456	1	Single solenoid valve - see page 71
6	81-30-090	7	Check valve assembly compr:
7	81-30-025	1	Check valve cap
8	81-14-045	1	Check valve spring
9	81-30-089	1	Spring guide
10	09-05-509	1	Steel ball Ø9
11	87-00-644	1	'O' ring
12	81-30-088	1	Check valve seat
13	87-09-644	1	Anti extrusion ring
14	81-30-087	4	Actuator
15	81-30-078	1	Check valve blank
16	87-00-644	1	'O' ring
17	87-09-644	1	Anti extrusion ring
18	81-30-032	1	Relief valve cap
19	81-30-142	1	Relief valve cartridge c/w spring
20	60-00-113	1	Union 3/8 BSP MM - supply
21	81-25-008	1	Return connection
22	81-30-104	1	Restrictor union 'G' reach base
23	81-30-105	1	Restrictor union 'H' reach gland
24	92-43-082	9	Socket headed cap screw M5 x 40
25	85-82-042	4	Taper plug ¼ BSPT
26	86-50-102	2	Bonded seal ¼ BSP
27	86-50-103	3	Bonded seal 3/8 BSP
28	71-96-302	1	Solenoid cover
29	84-02-136	1	Solenoid wiring sticker
30	93-13-035	2	Setscrew M10 x 16
31	93-13-055	2	Setscrew M10 x 25
32	81-25-670	1	Flail on/off lever mounting bracket
33	93-13-034	2	Setscrew M8 x 16
34	91-43-004	2	Self locking nut M8
35	91-00-305	4	Internal serrated washer Ø 10
36	85-81-190	2	Elbow ¼ BSP M-F
37	92-43-102	20	Capscrew socket headed M5 x 50
	86 99 197		SEAL KIT

* Spares note
For machines prior to July 1988 a new solenoid must be ordered c/w 4 off item 37

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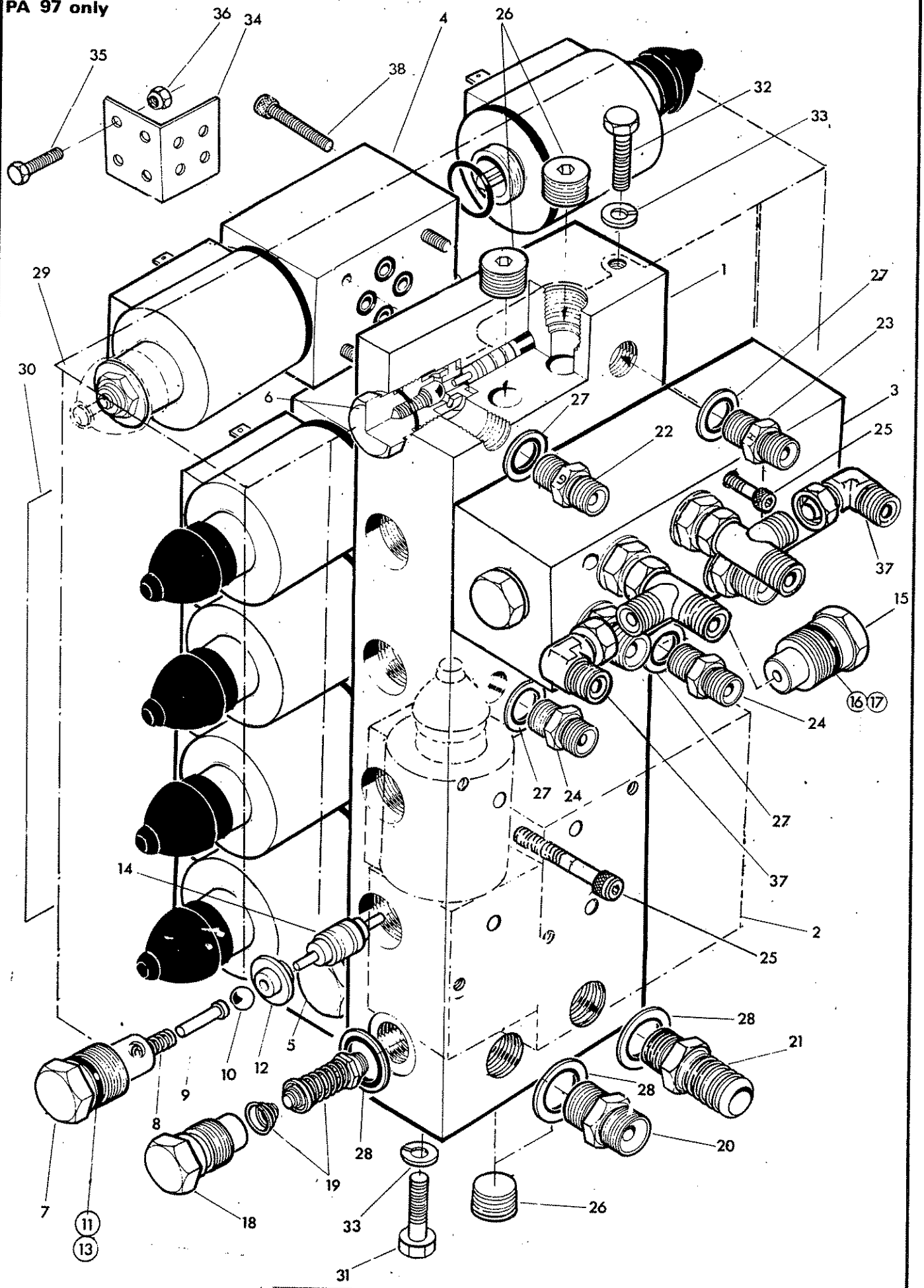
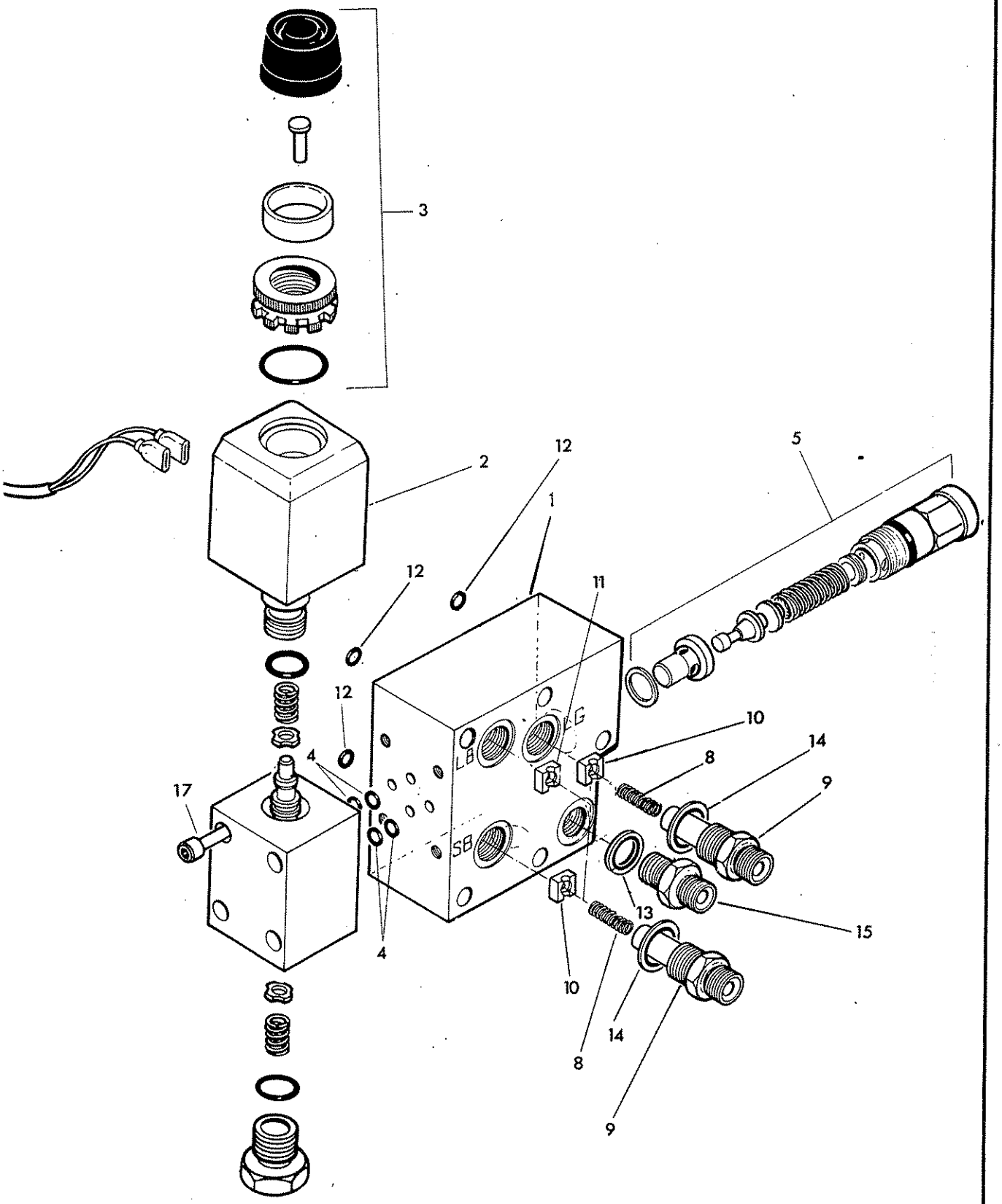
PA 97 only



Ref.	Part No.	Qty.	Description
	81-30-388		ELECTRIC SOLENOID PACK - PA97
	81-30-384	1	Solenoid/manifold valve assembly compr:
1	81-30-347	1	Manifold block
2	81-30-349	1	Slew circuit valve assembly see page 67
3	81-30-362	1	Head compensator valve see page 69
* 4	81-30-455	5	Double solenoid valve - see page 71
* 5	81-30-456	1	Single solenoid valve
6	81-30-090	9	Check valve assembly compr:
7	81-30-025	1	Check valve cap
8	81-14-045	1	Check valve spring
9	81-30-089	1	Spring guide
10	09-05-509	1	Steel ball Ø 9
11	87-00-644	1	'O' ring
12	81-30-088	1	Check valve seat
13	87-09-644	1	Anti extrusion ring
14	81-30-087	5	Actuator
15	81-30-078	1	Check valve blank
16	87-00-644	1	'O' ring
17	87-09-644	1	Anti extrusion ring
18	81-30-032	1	Relief valve cap
19	81-30-029	1	Relief valve cartridge cw spring
20	60-00-113	1	Union 3/8 BSP MM - supply
21	81-25-008	1	Return connection
22	81-30-104	1	Restrictor union 'G' reach base
23	81-30-105	1	Restrictor union 'H' reach gland
24	80-02-177	2	Union ¼" BSP M-M
25	92-43-082	9	Capscrew - socket headed M5 x 40
26	85-82-042	4	Taper plug ¼ BSPT
27	86-50-102	4	Bonded seal ¼ BSP
28	86-50-103	3	Bonded seal 3/8 BSP
29	71-36-302	1	Solenoid cover
30	84-02-136	1	Solenoid wiring label
31	93-13-055	2	Setscrew M10 x 25
32	93-13-085	2	Setscrew M10 x 16
33	91-00-305	4	Internal serrated washer Ø 10
34	91-25-070	1	Flail on/off lever mounting bracket
35	93-13-034	2	Setscrew M 8 x 16
36	91-43-004	2	Self locking nut M8
37	85-81 190	2	Elbow ¼ BSP M-F
38	92 43 102	24	Capscrew socket headed M5 xx50
	86 99 197		SEAL KIT

* Spares note

'For machines prior to July 1988 a new solenoid must be ordered c/w 4 off item38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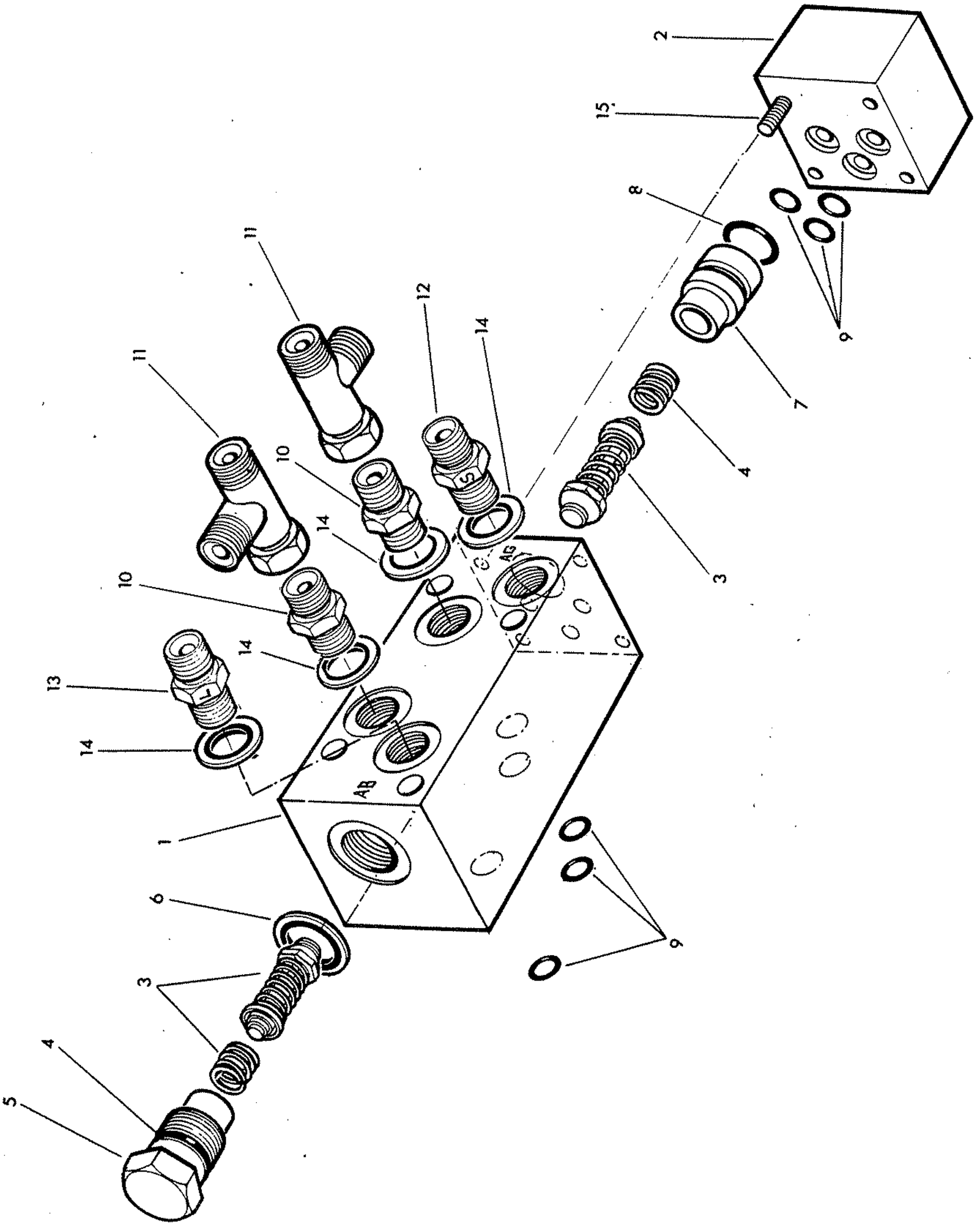
Ref.	Part No.	Qty.	Description
	81-30-349		SLEW VALVE ASSEMBLY
1	81-30-348	1	Valve block
	31-30-457	1	Single solenoid valve inc:-
2	81-30-175	1	Coil
3	81-30-176	1	Manuel overide kit
4	87-00-511	4	O ring
5	G381-2540	1	Relief valve assembly 170 bar (2500 Psi)
9	85-81-210	3	Special union 3/8 BSP ¼" BSP
10	81-23-041	2	Restrictor disc red-Lift gland, slew base
11	81-23-043	1	Restrictor disc green - Lift base
12	87-00-511	3	'O' ring
13	86-50-102	1	Bonded seal ¼" BSP
14	86-50-103	3	Bonded seal 3/8 BSP
15	85-81-169	1	Union ¼ BSP MM
16	85-82-041	4	Plug ¼ BSPT
17	92-43-102	4	Capscrew - socket headed M5 x 50
	86-99-224		SOLENOID SEAL KIT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Ref.	Part No.	Qty.	Description
	81-30-362		HEAD COMPENSATOR VALVE
1	81-30-361	1	Valve block
2	81-30-139	1	Blanking plate
3	81-30-141	2	Relief valve cartridge
4	81-16-011	2	Spring
5	81-30-032	1	Relief valve cap
6	86-50-103	1	Bonded seal 3/8" BSP
7	81-30-140	1	Relief valve plug
8	86-00-109	1	'O' ring
9	87-00-511	6	'O' ring
10	85-81-169	2	Union ¼ BSP - MM
11	85-81-254	2	Tee piece M.F.M. ¼ BSP
12	81-30-037	1	Restrictor union 'S' ¼ BSP MM -Angle gland
13	81-30-038	1	Restrictor union 'L' ¼ BSP MM-Angle base
14	86-50-102	4	Bonded seal ¼" BSP
15	92-43-062	4	Capscrew - socket headed M 5 x 20

Model

SOLENOID ASSEMBLIES

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Temeside Works, Ludlow,
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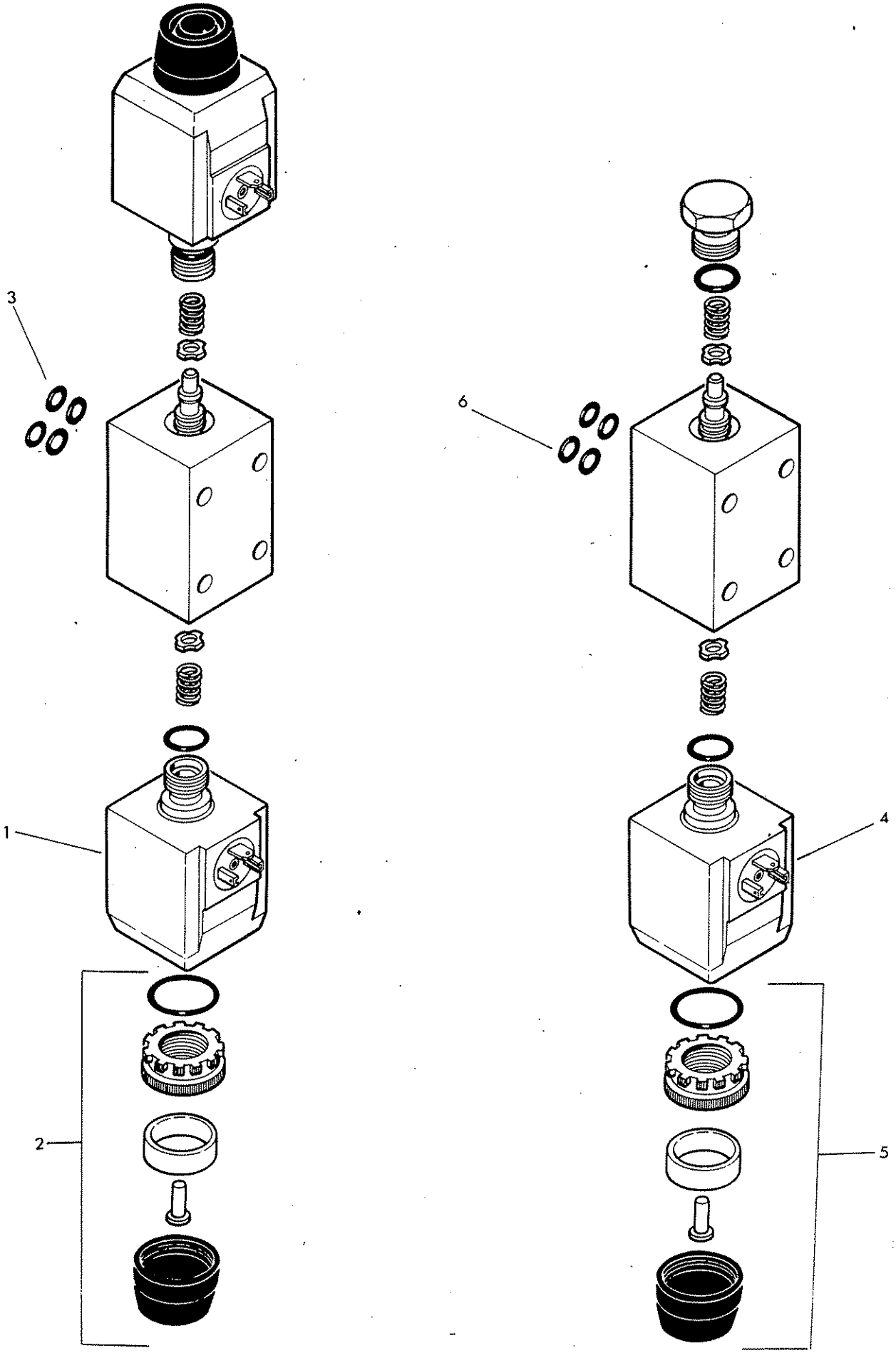
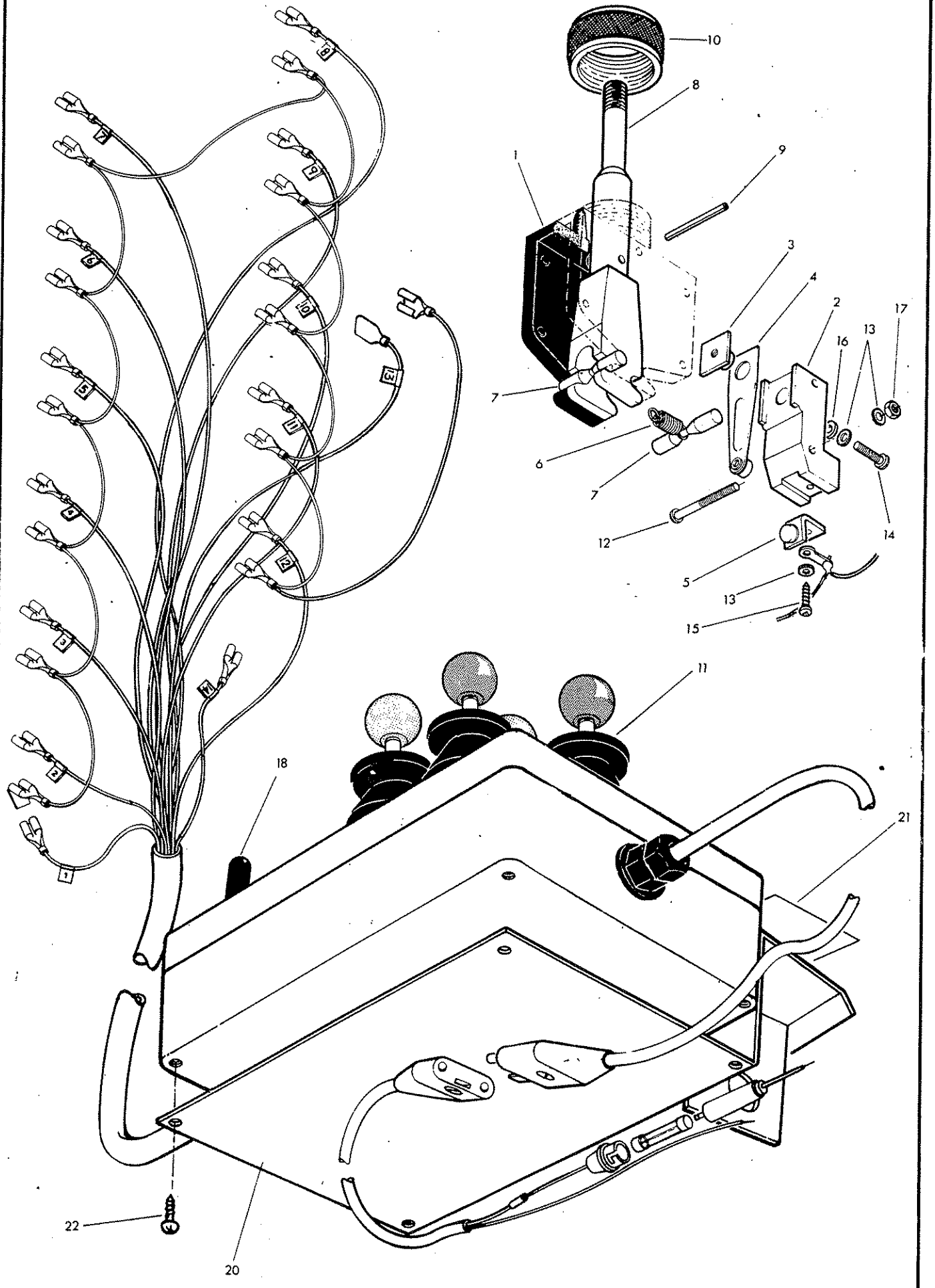


	81-30-455		**DOUBLE SOLENOID VALVE**
1	81-30-175	2	Coil
2	81-30-176	2	Manual overide kit
3	87-00-511	4	'O' ring
	81-30-456		**SINGLE SOLENOID VALVE**
4	81-30-175	1	Coil
5	81-30-176	1	Manual overide kit
6	87-00-511	4	'O' ring
	86-99-224		**SEAL KIT**

SWITCHBOX ASSEMBLY

McCONNEL

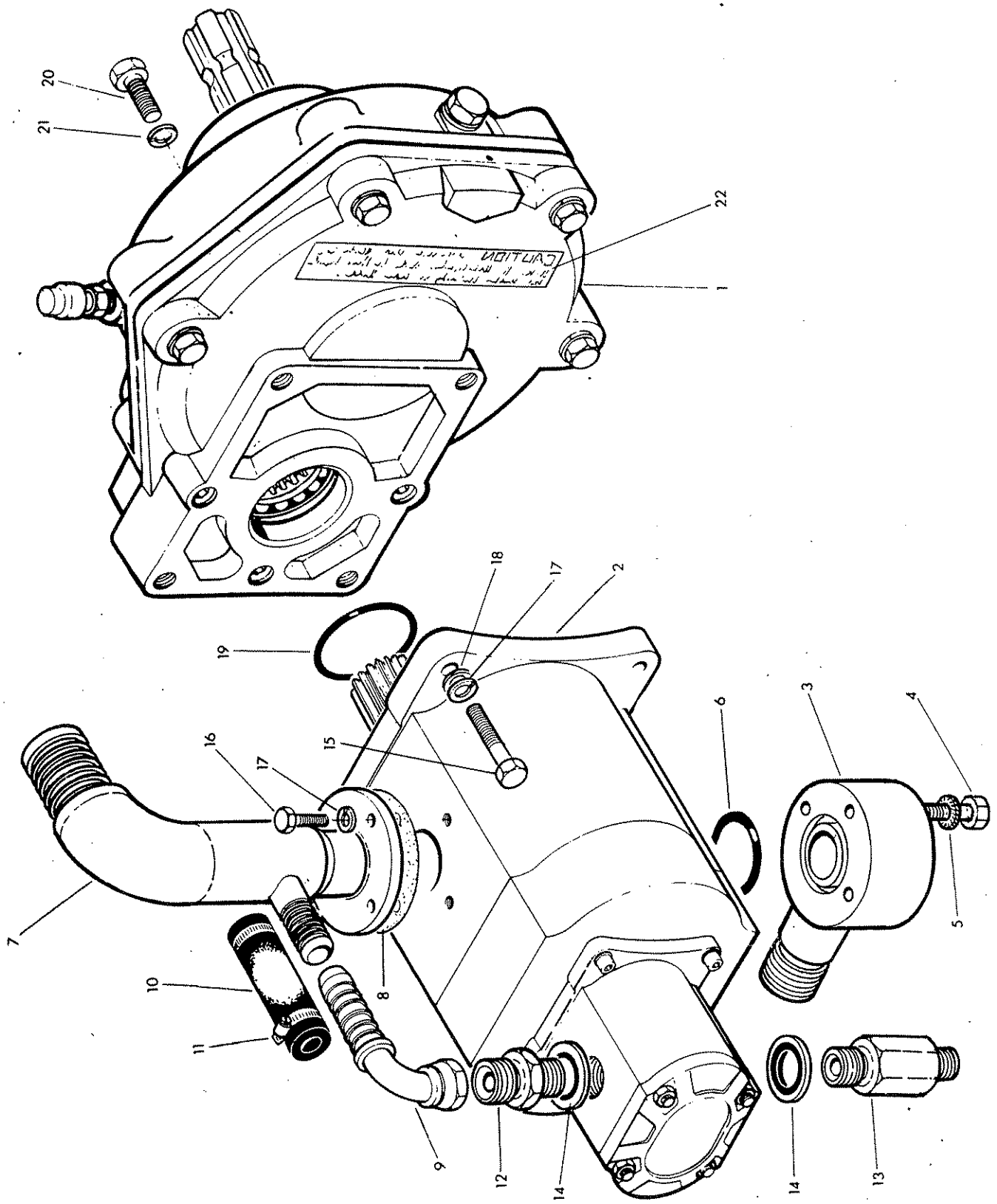


Ref	Part No	Qty	Description
	81 30 387		ELECTRIC CONTROL PACK Cont.
	81 30 388		ELECTRIC CONTROL PACK Cont.
	84 02 290	1	Switch box assembly compr:
	84 02 122	5	Switch unit compr:
1	84 02 285	1	Switch body
2	84 02 106	2	Contact holder
3	84 02 109	2	Spring contact retainer
4	84 02 113	2	Spring contact
5	84 02 108	2	Fixed contact
6	84 02 101	1	Spring
7	84 02 111	2	Bar
8	84 02 256	1	Lever
9	04 25 320	1	Spring dowel Ø3 x 20
10	84 02 051	1	Bazel ring
11	84 02 022	1	Lever gaiter
12	92 00 006	4	Screw -posidrive - panhead M3 x 25
13	91 00 400	8	External serrated washer Ø3
14	92 00 005	2	Screw - posidrive - panhead M3 x 12
15	84 02 119	2	Self tapping screw No.4 type B x 10mm long
16	84 02 280	2	Plain washer Ø3
17	91 13 000	2	Hexagon nut - plated M3
18	84 02 024	3	Toggle switch weather gaiter
19	12 90 351	1	Operating label - not illustrated.
20	84 02 294	1	Switch box mounting bracket c/w label
21	84 02 135	1	'Slew caution' label
22	28 00 203	4	Self tapping screw No.10 x ½" long.

McCONNEL

Up until October 1991

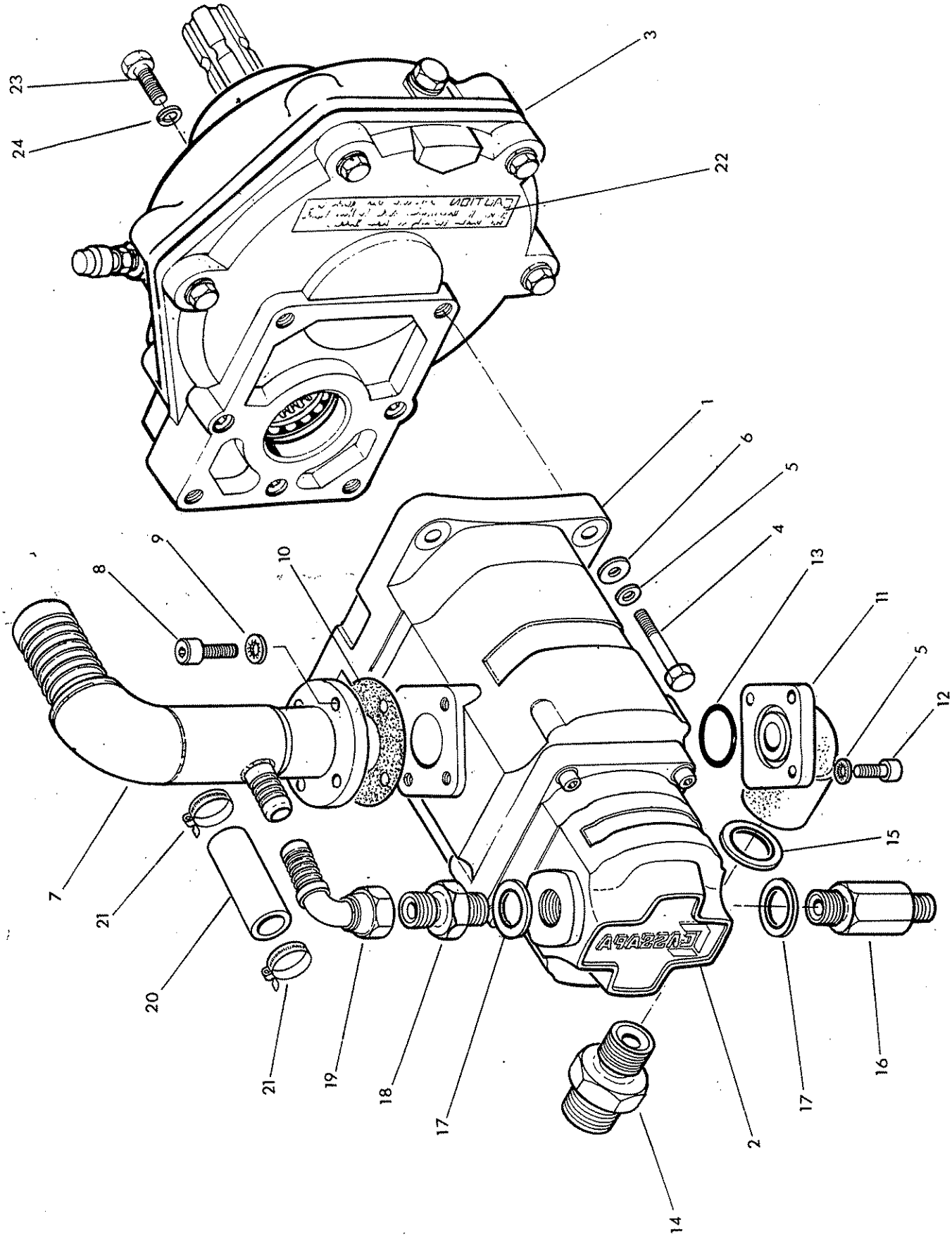
Shown assembled for R hand cutting



Ref.	Part No.	Qty.	Description
	80-13-366		PUMP/GEARBOX ASSEMBLY
1	80-13-360	1	Gearbox (see page 79)
2	82-01-660	1	Tandem pump CPL46/CPL9
3	80-05-049	1	Pressure connection c/w bolts & 'O'ring etc.
4	92-13-124	3	Bolt M8 x 60
5	91-00-404	3	Shakeproof washer Ø 8
6	86-00-121	1	'O' ring
7	71-36-029	1	Suction junction connection
8	80-13-023	1	Gasket
9	85-81-173	1	Swept elbow connection
10	85-01-103	1	Connecting hose
11	09-04-204	2	Hose clip 5/8 bore hose
12	85-81-180	1	Union ½" BSP 5/8 BSP MM
13	81-24-053	1	Union ½" BSP 3/8 BSP MM
14	86-50-104	2	Bonded seal ½" BSP
15	92-13-094	4	Bolt M8 x 45
16	93-13-044	4	Setscrew M8 x 20
17	91-00-204	8	Spring washer Ø 8
18	91-00-104	4	Plain washer Ø 8
19	86-00-523	1	'O' ring
20	93-13-056	4	Setscrew M12 x 25
21	91-00-206	4	Spring washer
22	80-13-081	1	Gearbox instruction label
	86-99-189		PUMP SEAL KIT

McCONNEL

After October 1991 - June 1992



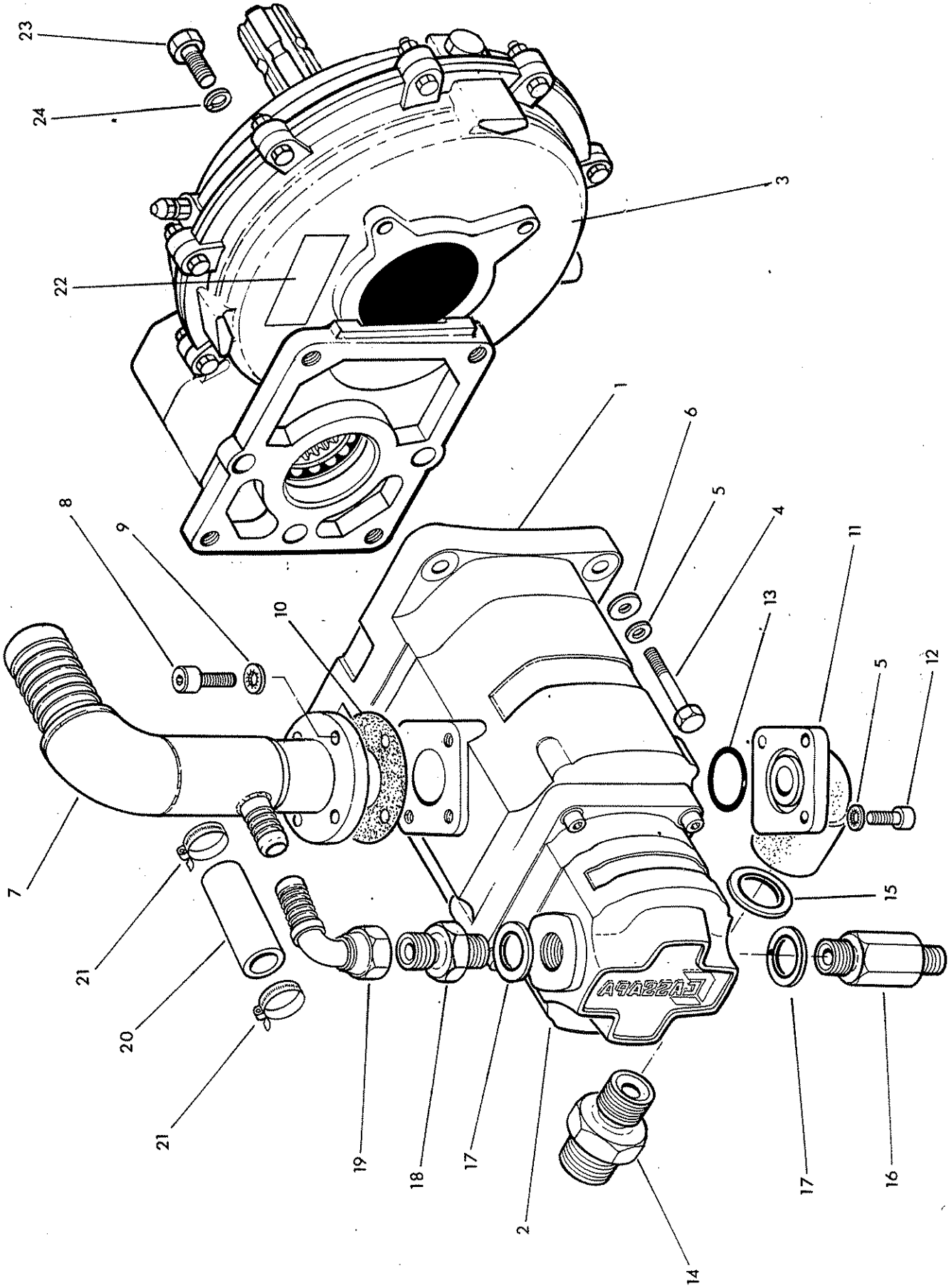
Ref	Part No	Qty	Description
	80 13 433		**PUMP AND GEARBOX WITH IRON PUMP R. HAND**
	80 13 434		**PUMP AND GEARBOX WITH IRON PUMP L. HAND**

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

	82 01 673	1	Tandem pump compr:-
1	82 01 674	1	Large pump
2	82 01 675	1	Small pump
3	80 13 360	1	Gearbox - see page 79
4	92 13 084	4	Bolt M8x40
5	91 00 404	7	Shakeproof washer dia 8
6	91 00 204	4	Plain washer dia 8
7	71 96 057	1	Suction manifold
8	93 43 045	4	Cap screw M10x20
9	91 00 405	4	Shakeproof washer dia 10
10	80 13 023	1	Gasket
11	80 05 052	1	Pressure connection
12	93 43 054	3	Cap screw M8x25
13	86 00 403	1	'O' ring
14	80 02 086	1	Adaptor 1" BSP - 3/4 BSP MM
15	80 02 086	1	Bonded seal 3/4 BSP
16	81 24 053	1	Adaptor 1/2 BSP - 3/8 BSP MM
17	86 50 104	2	Bonded seal 1/2" BSP
18	85 81 180	1	Adaptor 1/2" BSP - 5/8 BSP MM
19	85 81 173	1	Swept elbow 5/8 BSP - 5/8" low pressure
20	85 01 103	1	Hose 5/8 bore
21	09 04 204	2	Hose clip
22	80 13 081	1	Gearbox label
23	93 13 056	4	Setscrew M12x25
24	91 00 206	4	Spring washer dia 12
	86 99 221	**SEAL KIT**	

McCONEL

From June 1992



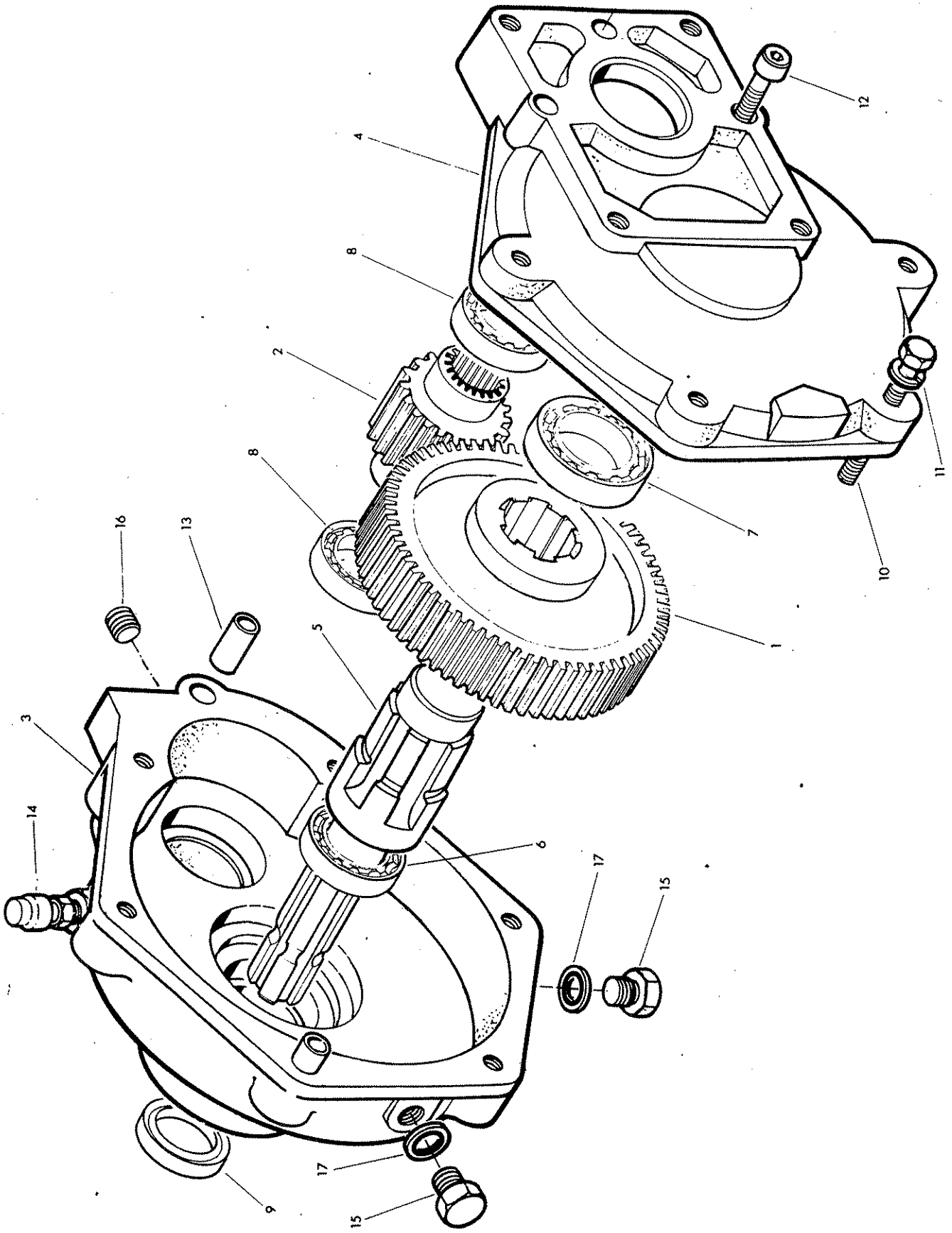
Ref	Part No	Qty	Description
	80 13 478		**PUMP AND GEARBOX R.HAND -from June1992**
	80 13 479		**PUMPAND GEARBOX L.HAND -from June 1992**

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

	82 01 673	1	Tandem pump comp:-
1	82 01 674	1	Large pump
2	82 01 675	1	Small pump
3	80 13 444	1	Gearbox - see page
4	92 13 084	4	Bolt M8x40
5	91 00 404	7	Shakeproof washer dia 8
6	91 00 204	4	Plain washer dia 8
7	71 96 057	1	Suction manifold
8	93 43 045	4	Cap screw M10x20
9	91 00 405	4	Shakeproof washer dia 10
10	80 13 023	1	Gasket
11	80 05 052	1	Presure connection
12	93 43 054	3	Cap screw M8x25
13	86 00 403	1	'O' ring
14	80 02 086	1	Adaptor 1" BSP -3/4 BSP MM
15	80 02 086	1	Bonded seal 3/4 BSP
16	81 24 053	1	Adaptor 1/2 BSP -3/8 BSP MM
17	86 50 104	2	Bonded seal 1/2" BSP
18	85 81 180	1	Adaptor 1/2" BSP -5/8 BSP MM
19	85 81 173	1	Swept elbow 5/8 BSP -5/8" low pressure
20	85 01 103	1	Hose 5/8 bore
21	09 04 204	2	Hose clip
22	12 90 054	1	Gearbox label
23	93 13 056	4	Setscrew M12x25
24	91 00 206	4	Spring washer dia 12
	86 99 221		**SEAL KIT**

McCONNEL

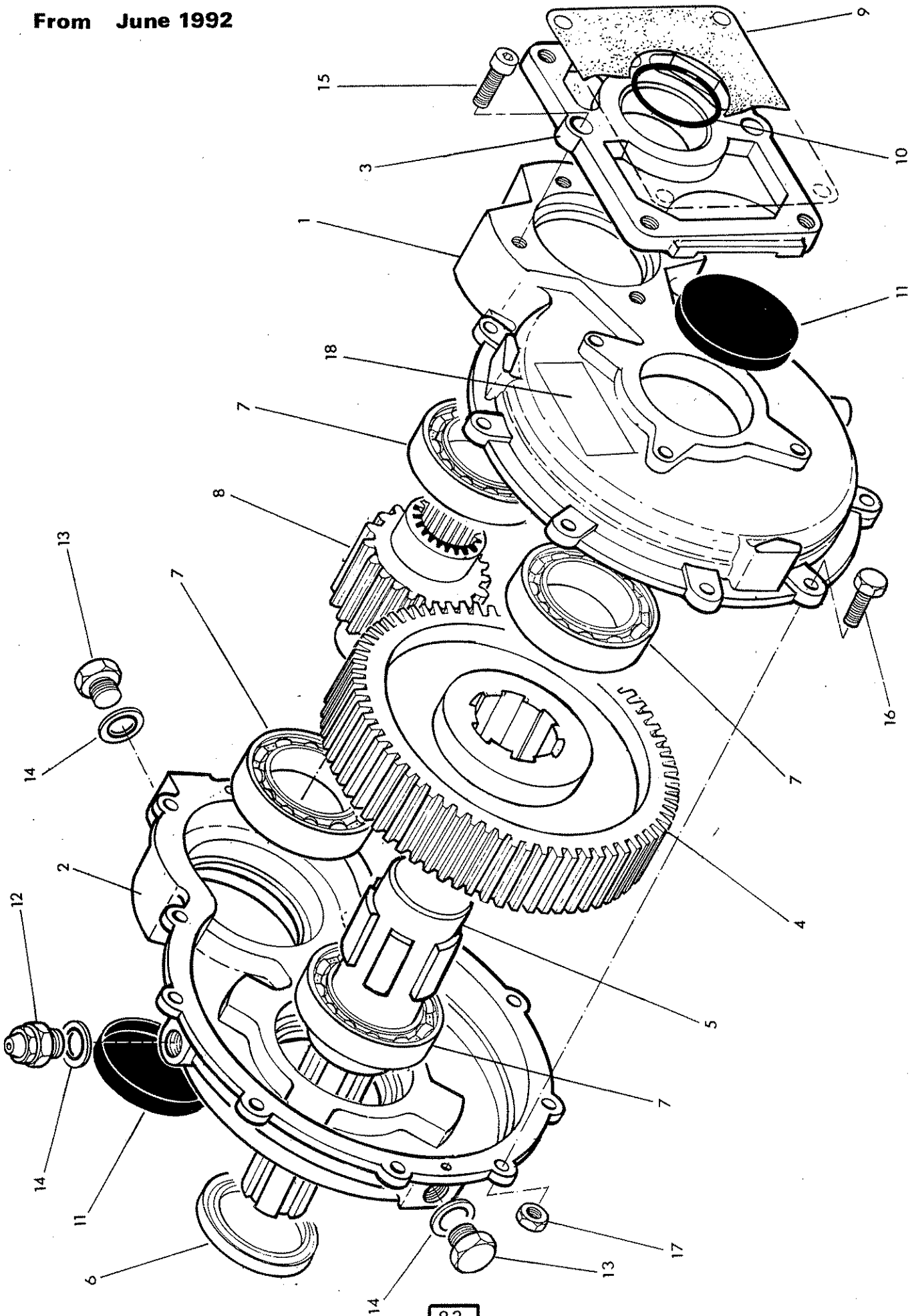
Until May 1992



Ref.	Part No.	Qty.	Description
	80-13-360		GEARBOX ASSEMBLY (4.59:1)
1	80-13-384	1	Gear 78 teeth
2	80-13-385	1	Pinion 17 teeth
3	80-13-370	1	Gearbox casing - input
4	80-13-371	1	Gearbox lid - output
5	80-13-374	1	Input Shaft 1 3/8" dia. x 6 spline
6	06-00-063	1	Bearing
7	06-00-064	1	Bearing
8	06-00-065	2	Bearing
9	86-29-151	1	Shaft seal 2 1/8" x 1 3/8" x ½"
10	92-13-064	4	Bolt M8 x 30
11	91-00-204	4	Spring Washer Ø 8
12	93-43-074	3	Capscrew socket headed M8 x 35
13	80-13-375	2	Sleeve dowel
14	80-13-376	1	Breather
15	85-81-133	2	Plug-level and drain ¼BSP
16	85-82-042	1	Taper plug ¼ BSPT
17	86-50-102	2	Bonded seal ¼" BSP

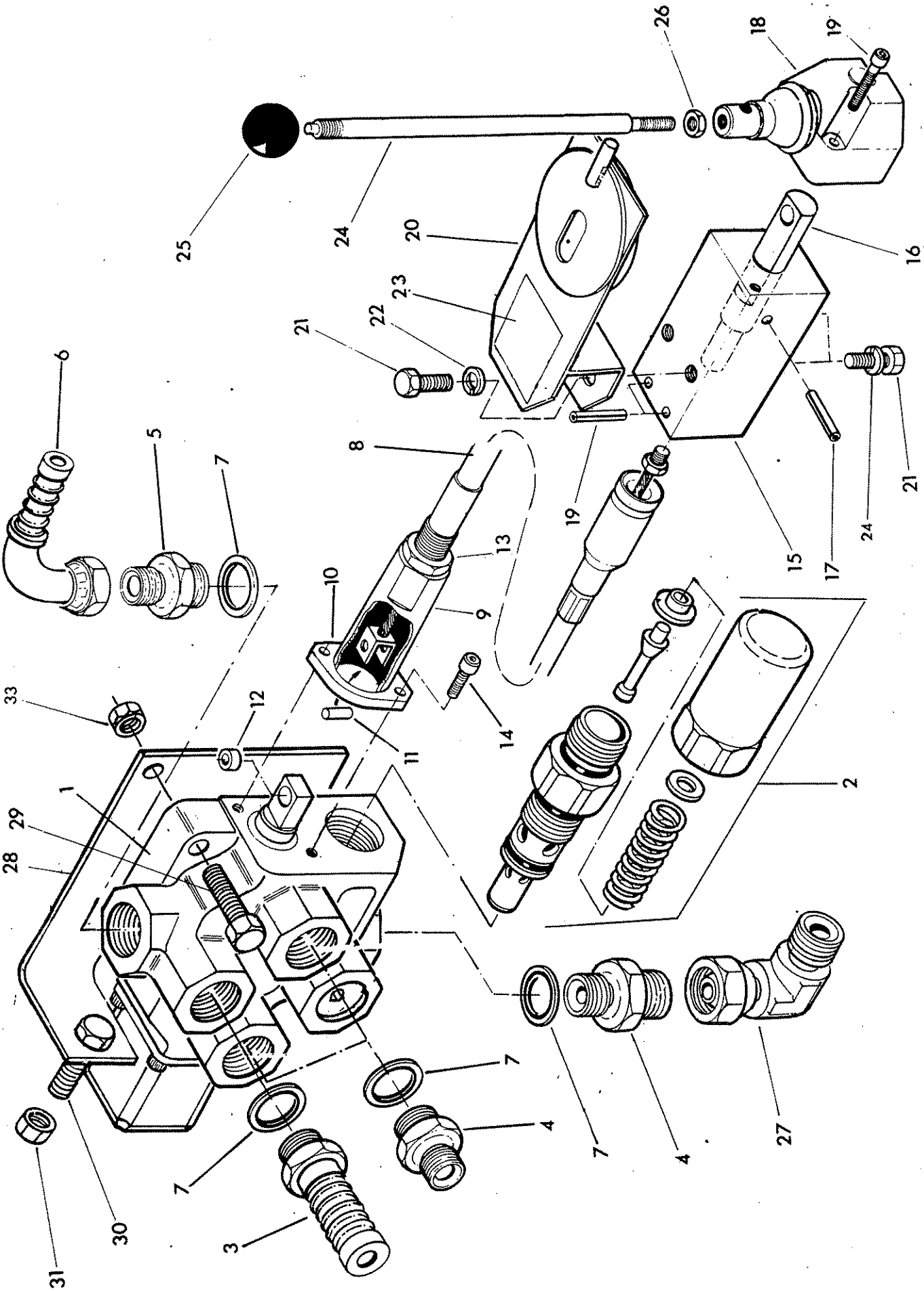
McCONNEL

From June 1992



Ref	Part No	Qty	Description
	80 13 444		**GEARBOX - from June 1992**
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 72t.
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 17t.
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 1/4 BSP
14	86 50 102	4	Bonded seal 1/4 BSP
15	93 43 045	3	Capscrew socket headed
16	92 13 064	10	Bolt M8x30
17	91 43 004	10	Self locking nut M8
18	12 90 054	1	Sticker

McCONNEL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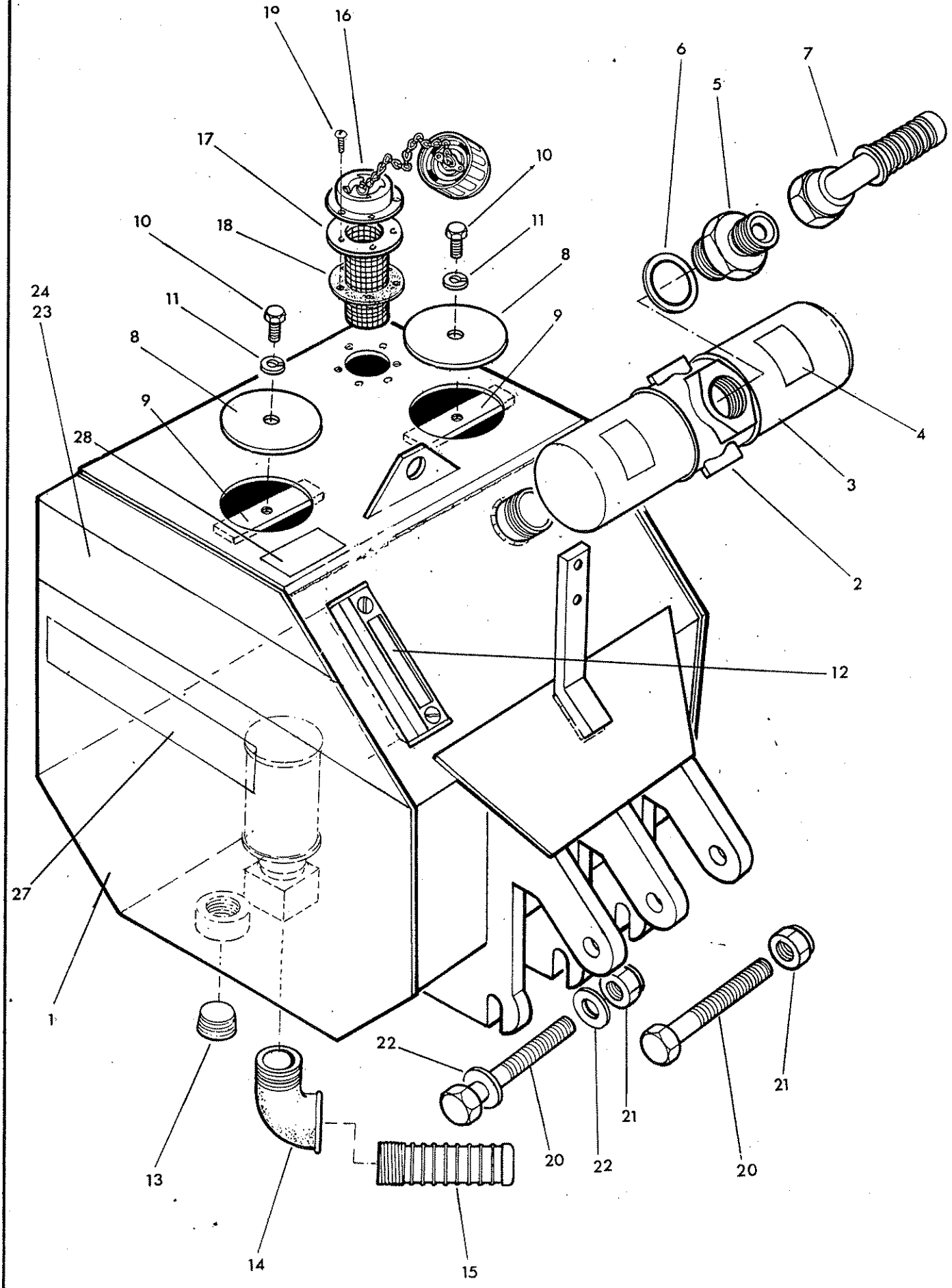
Ref.	Part No.	Qty.	Description
	81-25-363		**ROTOR CONTROL VALVE ASSEMBLY**
1	81-25-356	1	Rotor control valve
2	81-25-108	1	Relief valve 2750 PSI (190 Bar)
3	85-81-246	1	Adaptor 3/4" BSP x 1" low pressure
4	80-02-086	3	Adaptor 3/4" BSP - 1" BSP MM
5	85-81-270	1	Adaptor 3/4" BSP - 5/8 BSP
6	85-81-173	1	Elbow 5/8 bsp X 5/8" low pressure
7	86-50-106	5	Bonded seal 3/4" BSP
8	81-25-096	1	Cable assembly c/w sleeve flange etc
9	81-25-097	1	Sleeve
10	81-25-098	1	Flange
11	81-25-099	1	Pin
12	81-25-100	1	Bush
13	01-31-006	1	Thin locknut
14	93-43-033	2	Capscrew - socket headed M6 x 16
15	81-25-093	1	Control block
16	81-30-053	1	Control spindle
17	05-25-525	3	Spring dowel dia 5 x 25
18	81-30-065	1	Pivot box assembly
19	92-13-072	2	Capscrew - socket headed M5 x 35
20	81-25-089	1	Lever control gate
21	93-13-034	4	Setscrew M8 x 16
22	91-00-204	4	Spring washer dia 8
23	12-90-338	1	Operating label
24	71-14-072	1	Lever
25	09-03-121	1	Knob - black
26	91-13-004	1	Thin nut M8
27	85-81-212	1	Elbow 90 degree 1" BSP MF
28	71-96-048	1	Rotor valve mounting plate
29	93-13-085	2	Setscrew M10 x 40
30	92-13-075	2	Bolt M10 x 35
31	91-43-005	4	Self locking nut M10
	86-99-218		**SEAL KIT**

McCONNEL

Up until October 1991

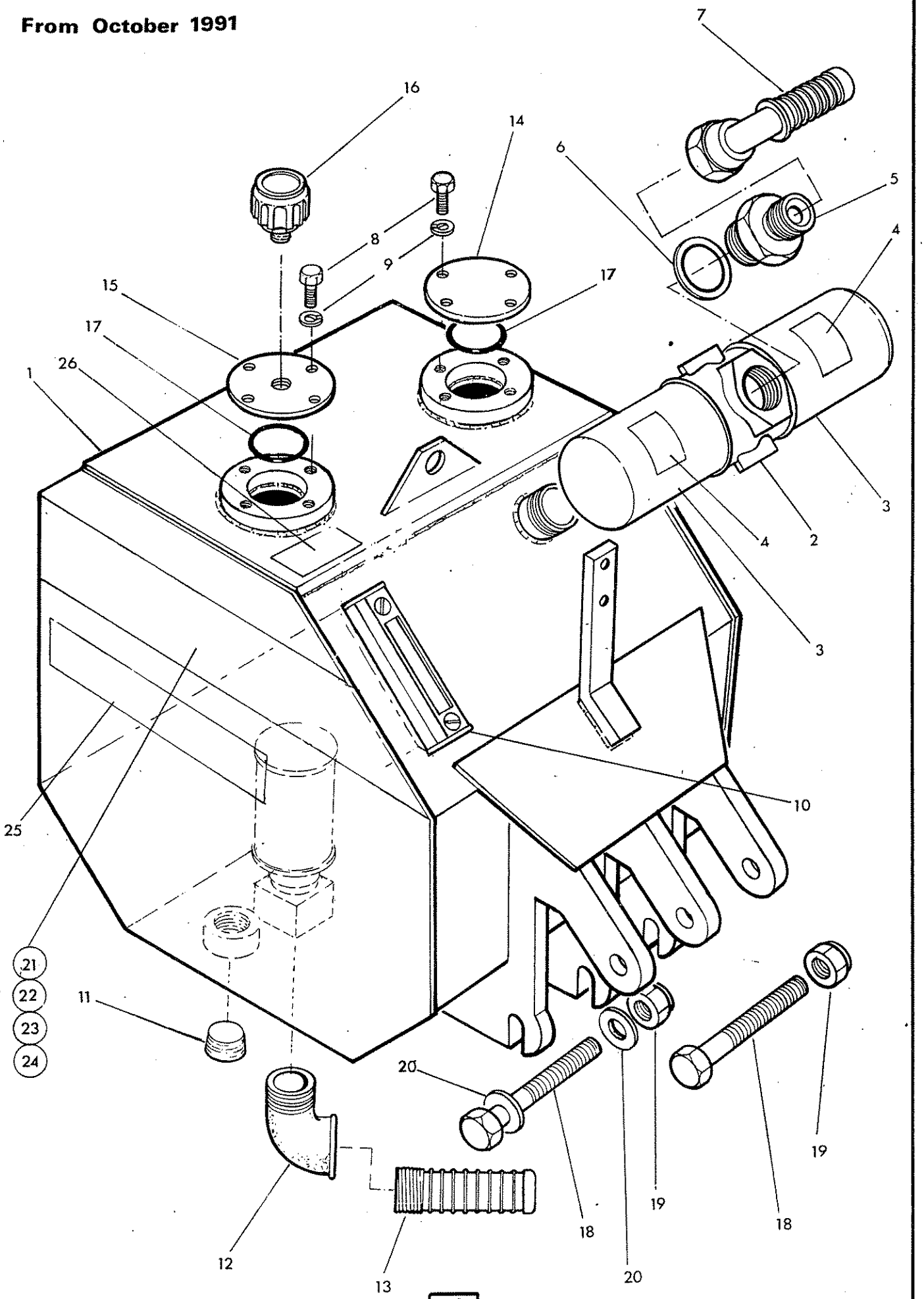


Ref.	Part No.	Qty.	Description
			HYDRAULIC TANK
	71 96 317		Oil tank assembly compr:-
1	71 96 314	1	Oil tank
2	84 01 060	1	Filter body
3	84 01 062	2	Filter element
4	12 90 023	2	Oil filter sticker
5	85 81 291	1	Adaptor 1 1/2" BSP - 1" BSP MM
6	86 50 224	1	Bonded seal
7	71 14 005	1	Swept elbow 1" BSP-F- 1" low pressure
8	71 96 036	2	Access cover
9	71 96 037	2	Clamp bar
10	92 13 064	2	Setscrew M8 x 30
11	91 00 204	2	Spring washer dia 8
12	84 01 048	1	Oil level gauge
13*	85 81 203	1	Drain plug
14*	85 81 261	1	Elbow 1 1/4" BSP MF
15*	85 81 260	1	Suction connection 1 1/4" BSP-1½" low pressure
	84 01 014	1	Filler breather compr:-
16	84 01 015	1	Cap & neck
17	84 01 016	1	Strainer basket
18	84 01 017	1	Gasket
19	03 00 032	6	Self tapping screw 3/16" dia x 1/2" long
			TANK ANCILLIARIES
20	92 13 307	2	Bolt M16 x 150
21	91 43 007	2	Self locking Nut M16
22	91 00 107	2	Plain washer M16 dia
23	12 90 279	1	Sticker PA96 R. Hand only
24	12 90 281	1	Sticker PA97 R. Hand only
25	12 90 280	1	Sticker PA96 L. Hand only-not illus
26	12 90 282	1	Sticker PA97 L. Hand only - not illus
27	12 90 253	1	Sticker 'McConnel'
28	12 90 023	1	Sticker 'Oil filter'

* Assembly note
Items 13,14, and 15 to be fitted using PTFE tape, Permabond A121 or similar.

McCONNEL

From October 1991



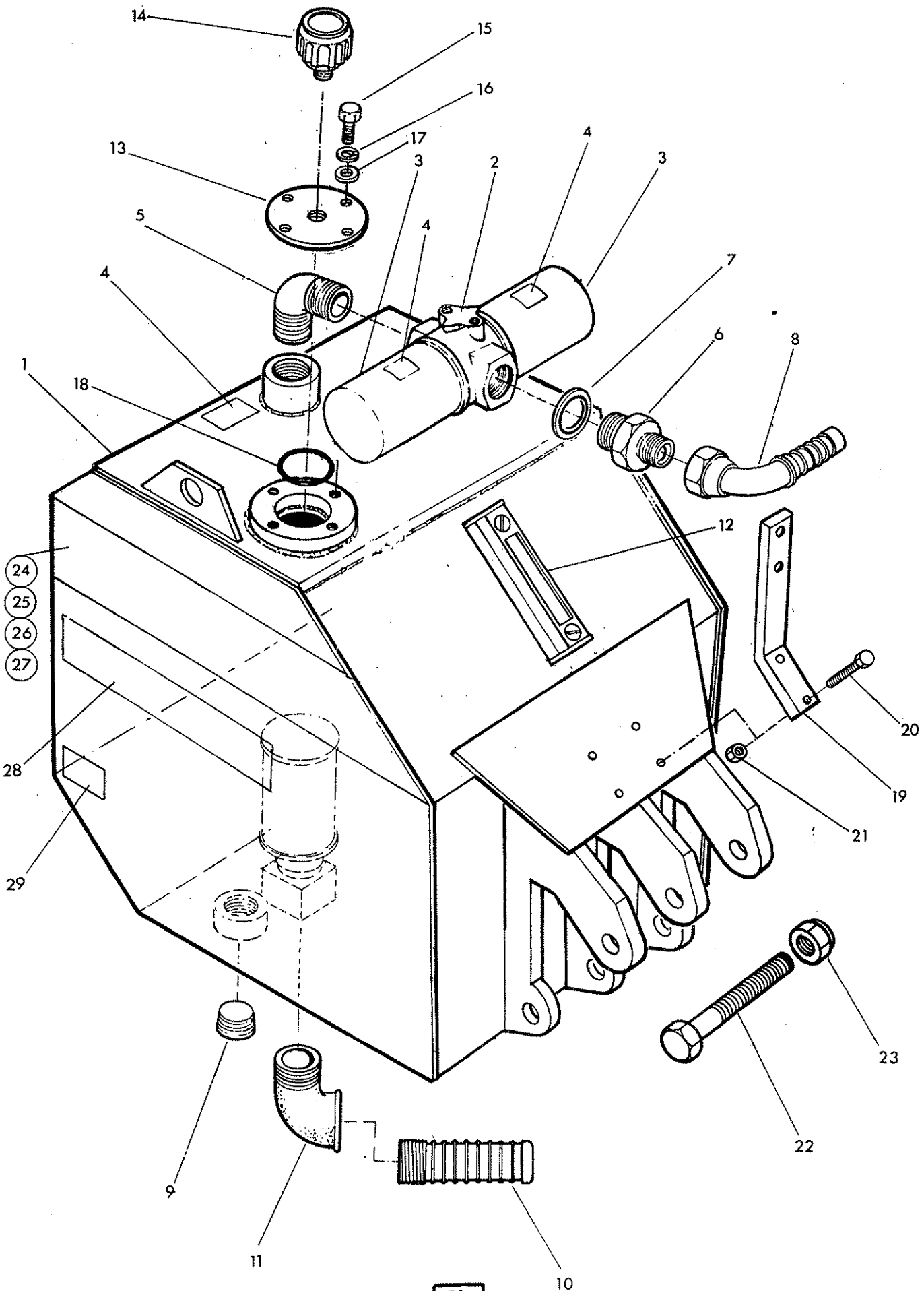
Ref.	Part No.	Qty.	Description
			HYDRAULIC TANK
	71 96 317		Oil tank assembly compr:-
1	71 96 314	1	Oil tank
2	84 01 060	1	Filter body
3	84 01 062	2	Filter element
4	12 90 023	2	Oil filter sticker
5	85 81 291	1	Adaptor 1 1/2" BSP - 1" BSP MM
6	86 50 224	1	Bonded seal
7	71 14 005	1	Swept elbow 1" BSP-F-1" low pressure
8	92 13 054	8	Setscrew M8 x 25
9	91 00 204	8	Spring washer dia 8
10	84 01 048	1	Oil level gauge
11*	85 81 203	1	Drain plug
12*	85 81 261	1	Elbow 1 1/4" BSP MF
13*	85 81 260	1	Suction connection 1 1/4" BSP-1 1/2"low pressure
14	71 92 062	1	Cover-plain
15	71 92 063	1	Cover-tapped
16	84 01 063	1	Breather
17	86 00 151	2	'O' ring
			TANK ANCILLIARIES
18	92 13 307	2	Bolt M16 x 150
19	91 43 007	2	Self locking Nut M16
20	91 00 107	2	Plain washer M16 dia
21	12 90 279	1	Sticker PA96 R. Hand only
22	12 90 281	1	Sticker PA97 R. Hand only
23	12 90 280	1	Sticker PA96 L. Hand only-not illus
24	12 90 282	1	Sticker PA97 L. Hand only - not illus
25	12 90 253	1	Sticker 'McConnel'
26	12 90 023	1	Sticker 'Oil filter'

*** Assembly note**

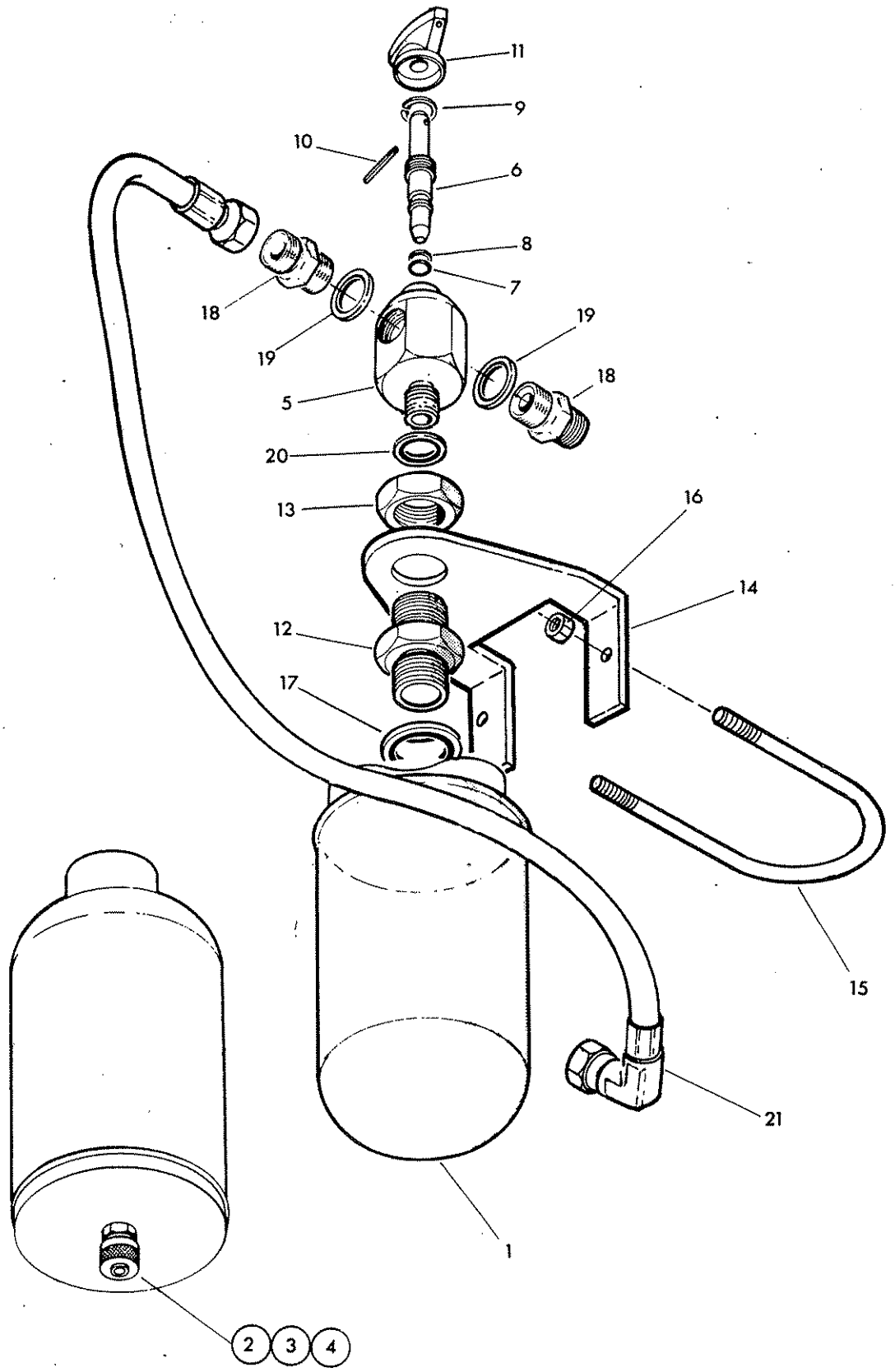
Items 11, 12, and 13 to be fitted using PTFE tape, Permabond A121 or similar.

McCONNEL

From Feb 1992



Ref.	part No.	Qty.	Description
			ENDURO HYDRAULIC TANK _ From February 1992
	71 96 321	1	Hydraulic tank assembly compr :-
1	71 96 322	1	Hydraulic tank
2	84 01 060	1	Filter body
3	84 01 062	2	Filter element
4	12 90 023	3	Label - oil filter
5	85 81 292	1	Elbow 1 1/2" BSP MM
6	85 81 291	1	Adaptor 1 1/2" BSP - 1" BSP MM
7	86 50 224	1	Bonded seal 1 1/2" BSP
8	71 14 005	1	Swept elbow 1" BSP F - 1" low pressure
9	85 81 203	1	Drain plug
10	86 81 260	1	Suction connection
11	85 81 261	1	Elbow 1 1/4" BSP MF
12	84 01 048	1	Oil level guage
13	71 92 063	1	Cover
14	84 01 063	1	Breather
15	93 13 054	4	Setscrew M 8x25
16	91 00 204	4	Spring washer dia 8
17	91 00 104	4	Plain washer
18	86 00 151	1	O ring
19	71 96 061	1	Valve mounting bracket
20	93 13 065	2	Setscrew M 10 x 25
21	91 43 005	2	Self locking nut M 10
			TANK ANCILLIARIES
22	92 13 457	2	Bolt M 16 x 225
23	91 43 007	2	Self locking nut
24	12 90 279	1	Sticker PA 96 R hand only
25	12 90 281	1	Sticker PA 97 R hand only
26	12 90 280	1	Sticker PA 96 L hand only
27	12 90 282	1	Sticker PA 97 L hand only
28	12 90 253	1	Sticker - McConnel
29	12 90 053	1	Sticker - Enduro tank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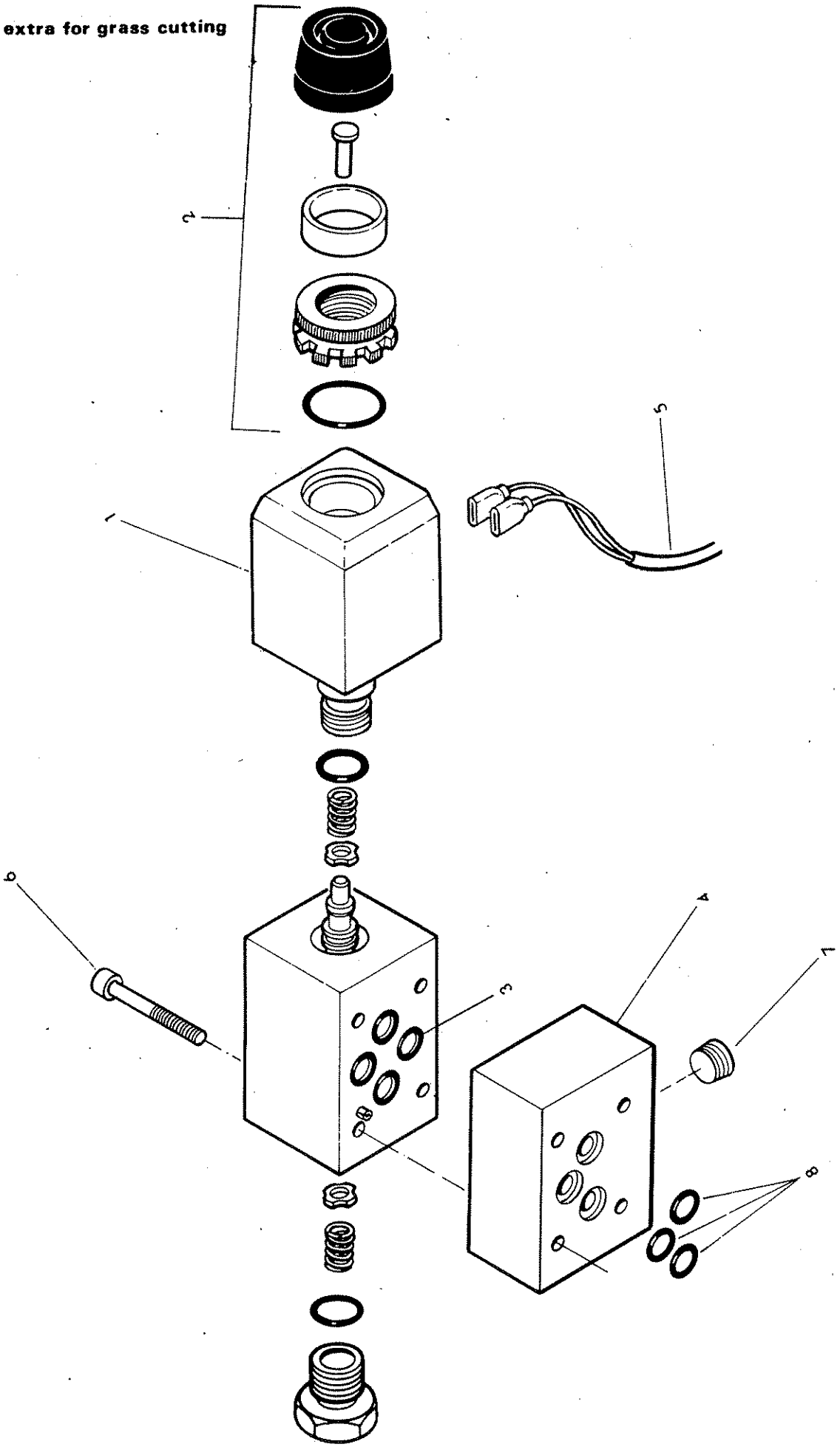
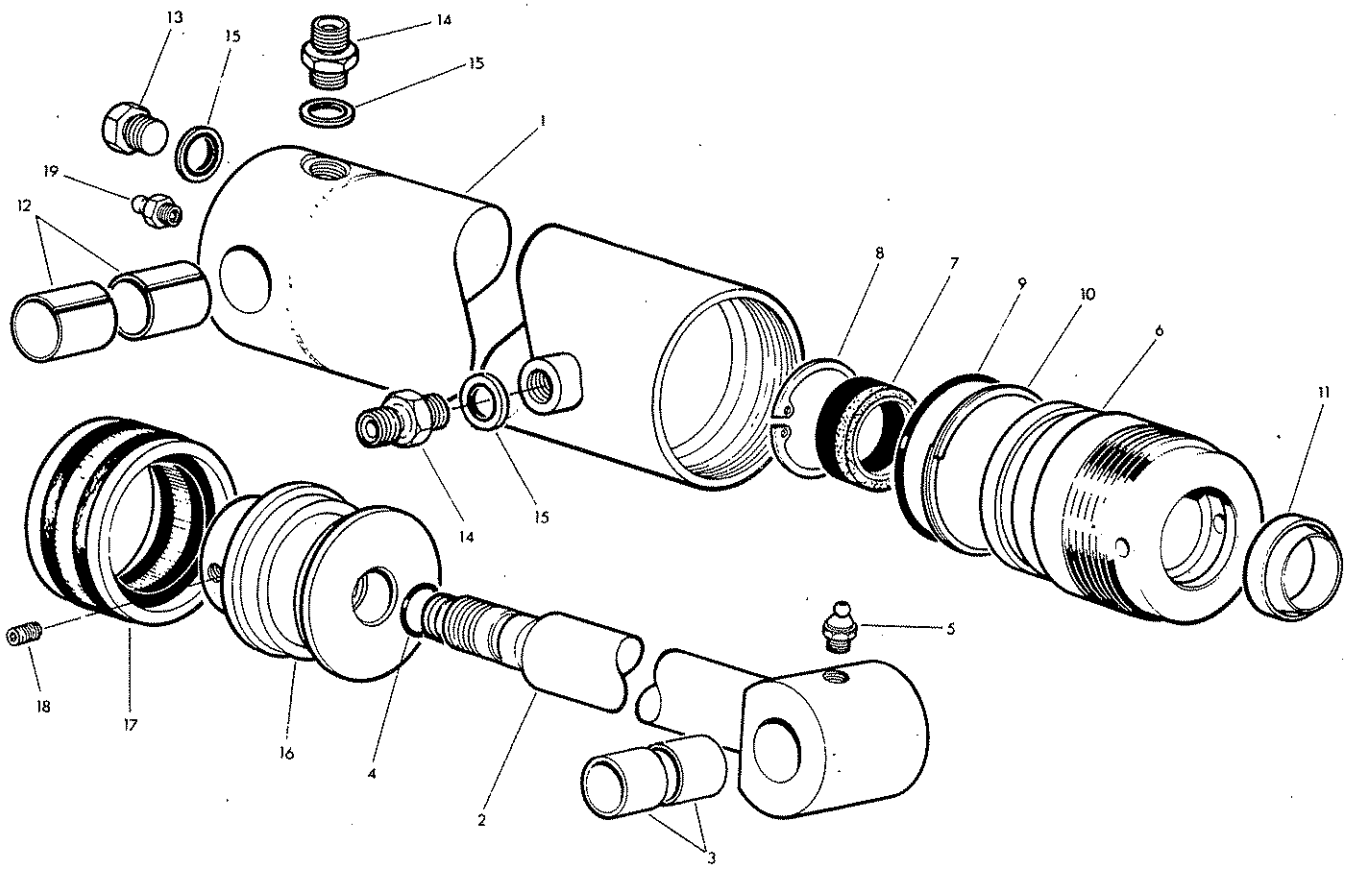
Ref.	Part No.	Qty.	Description
	81 26 273		LIFT FLOAT KIT
1	81 26 271	1	Accumulator (600 psi)
2	81 26 015	1	Charge valve assembly c/w 'O' ring
3	81 26 016	1	Charge valve core
4	86 00 103	1	'O' ring
	71 35 007	1	Tap assembly compr:-
5	71 35 294	1	Tap body
6	71 35 006	1	Tap spindle
7	86 00 107	1	'O' ring
8	86 09 107	1	Anti extrusion ring
9	04 16 110	1	Internal circlip
10	04 20 820	1	Spring dowel
11	81 08 006	1	Knob
12	85 81 205	1	Adaptor
13	85 81 151	1	Back nut
14	81 26 277	1	Bracket
15	81 26 031	1	'U' bolt M8
16	91 43 004	2	Self locking nut M8
17	85 50 106	1	Bonded seal ¾" BSP
18	85 81 115	2	Adaptor 3/8 BSP ¼" BSP M-M
19	86 50 103	2	Bonded seal 3/8 BSP
20	85 50 102	1	Bonded seal 1/4" BSP
21	85 35 062	1	Hose ¼" BSP SF-90°F x 15" long

McCONNEL

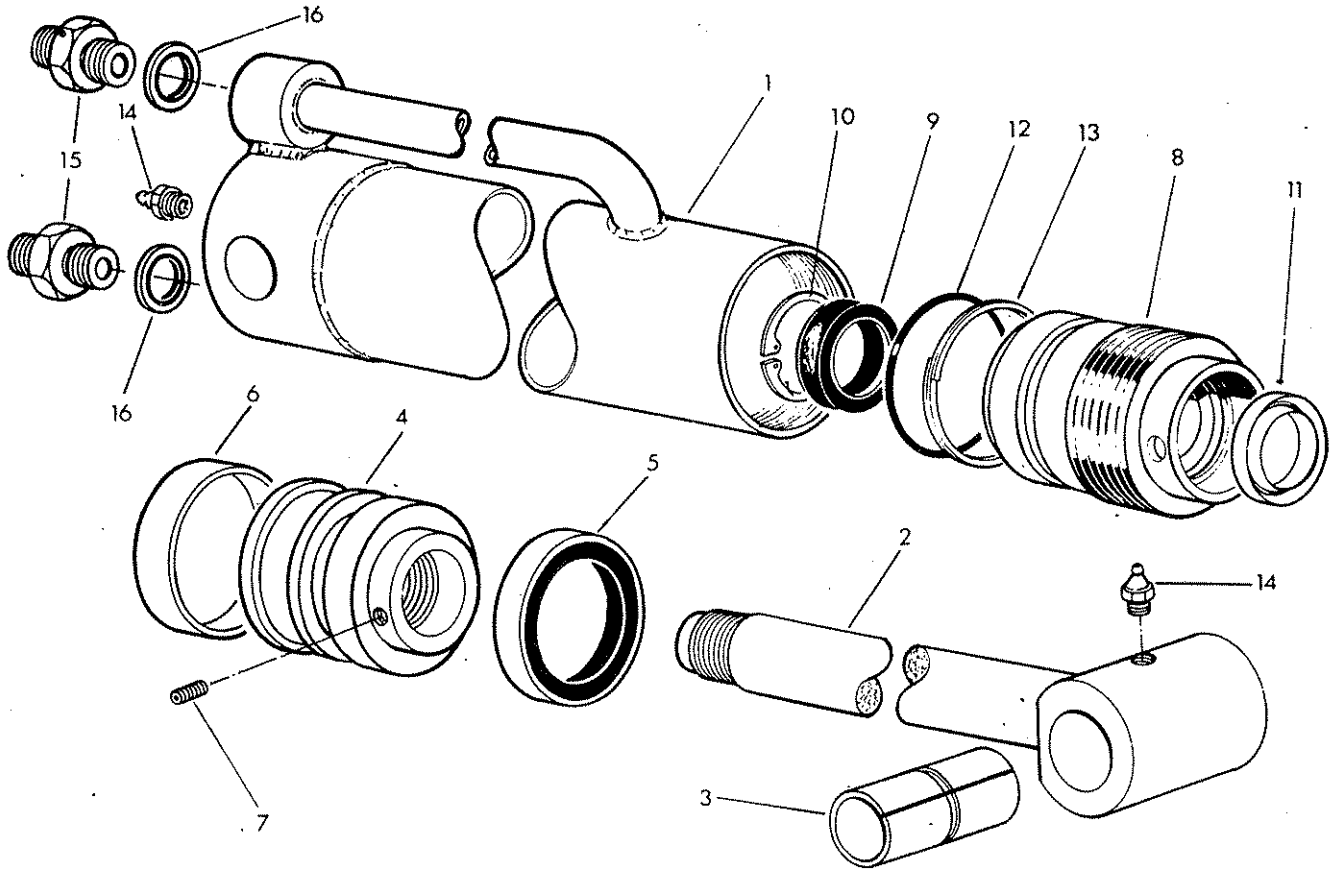
Optional extra for grass cutting



Ref.	Part No.	Qty.	Description
	81-26-281		**ANGLE FLOAT KIT . Optional extra for ground cutting**
	81-30-457	1	Single solenoid valve compr:-
1	81-30-175	1	Coil
2	81-30-176	1	Manual overide kit
3	87-00-511	4	O ring
4	81-26-280	1	Bridging plate
5	84-02-059	1	Wiring harness
6	92-43-102	4	Capscrew - socket headed M5 x 50
7	85-82-041	1	Plug 1/8 BSPT
8	87-00-511	3	'O' ring
	86-99-224		**SOLENOID SEAL KIT**



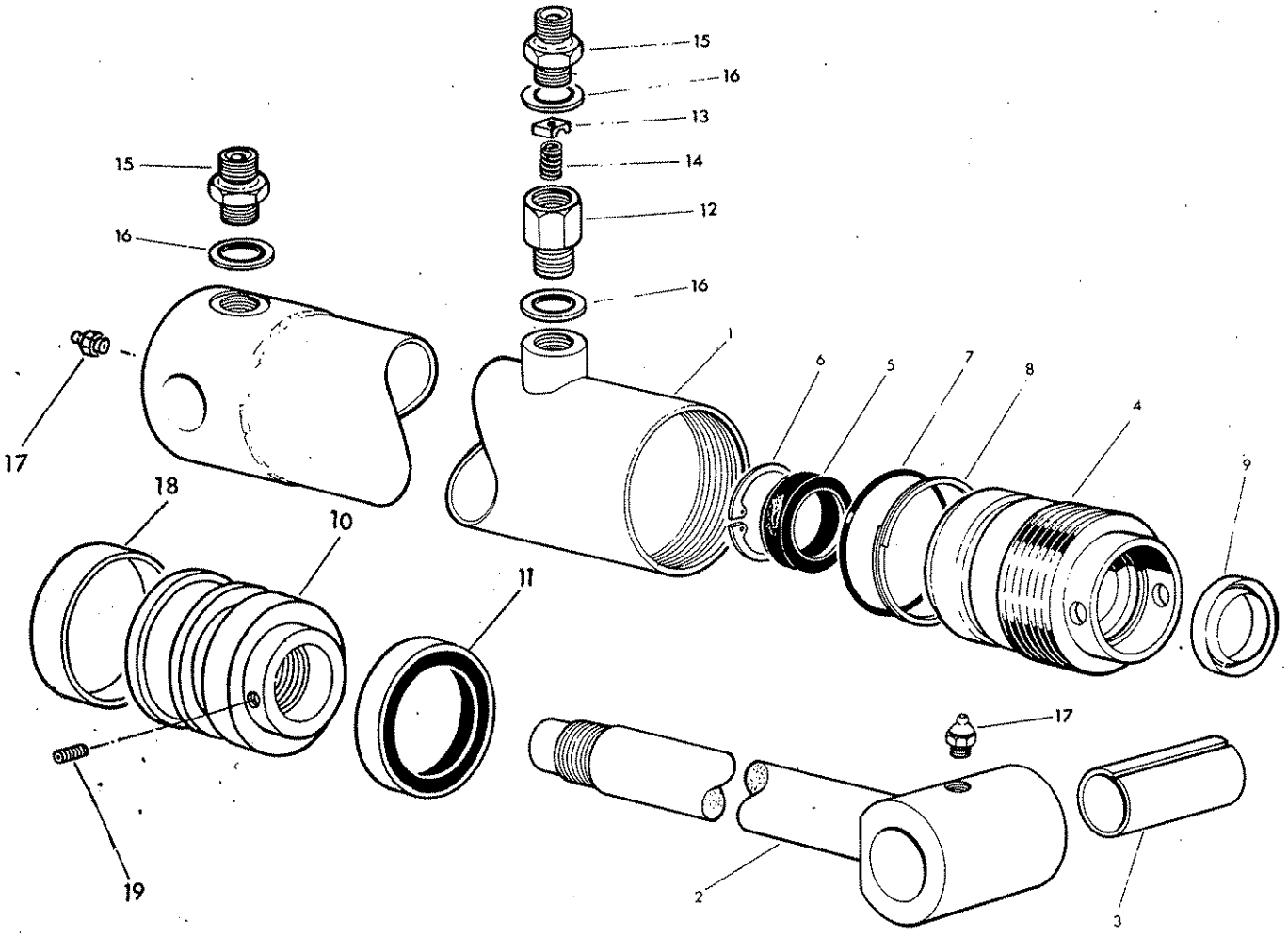
Ref	Part No.	Qty	Description
	71 36 270		LIFT AND REACH RAM ASSEMBLY
1	71 36 271	1	Ram cylinder.
2	71 36 333	1	Piston rod c/w. bush etc.
3	60 12 032	2	Bush
4	86 00 119	1	'0' ring.
5	09 01 121	1	Greaser 1/8 BSP straight.
6	71 35 282	1	Gland housing c/w seals etc.
7	86 22 127	1	Gland seal.
8	04 11 132	1	Internal circlip
9	87 00 740	1	'0' ring.
10	87 09 740	1	Anti extrusion ring.
11	86 29 147	1	Piston rod wiper ring.
12	71 01 134	2	Bush
13	80 03 001	1	Plug
14	85 81 115	2	.Union ¼ BSP - 3/8 BSP M-M
15	86 50 103	3	.Bonded seal 3/8 BSP
16	71 35 004	1	.Piston c/w seal and grub screw.
17	86 38 740	1	..Piston seal.
18	93 00 110	1	.. Grub screw M6 x 8 socket headed.
19	09 01 121	1	Greaser 1/8 BSP straight.
	86 99 187		SEAL KIT



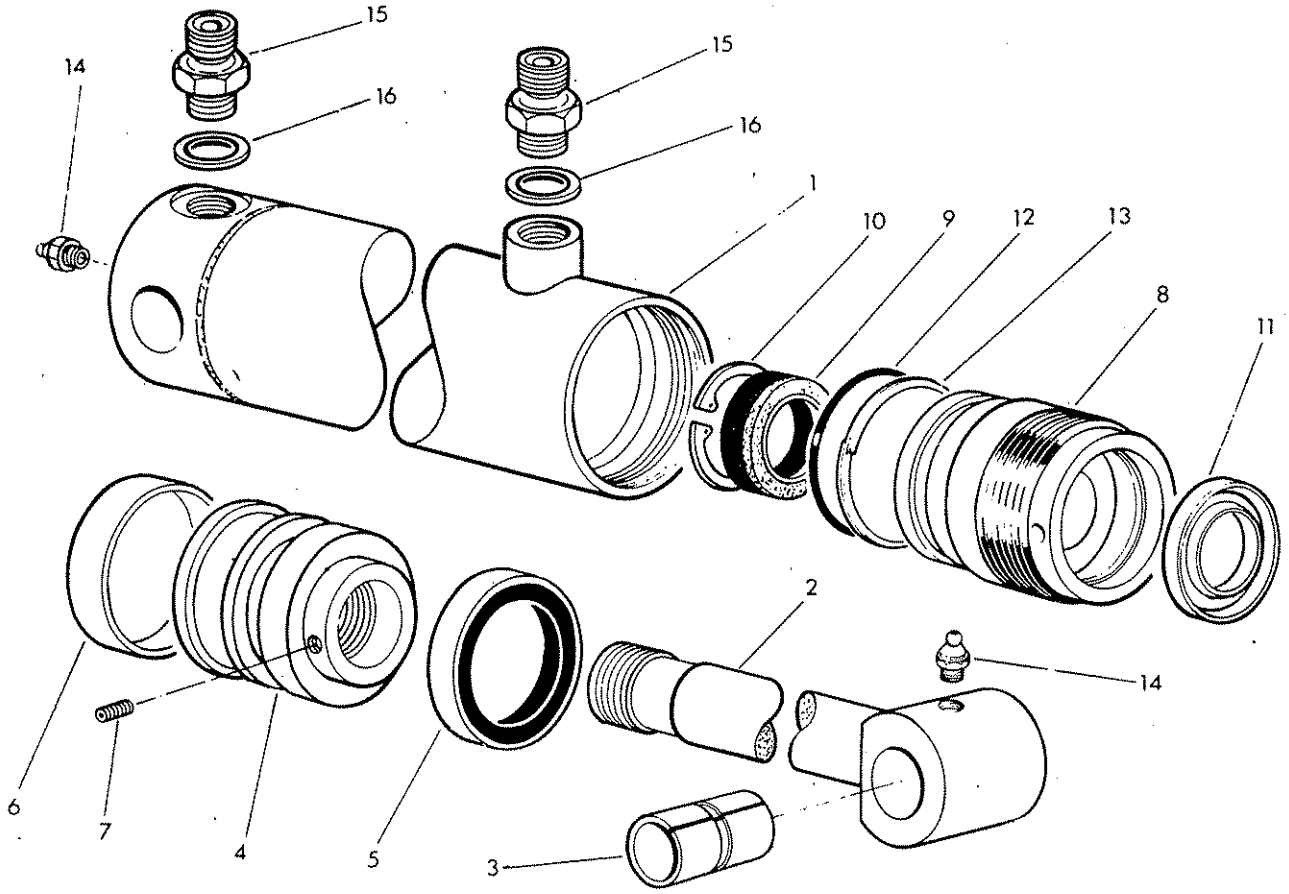
Ref.	Part No.	Qty.	Description
	75-60-344		**ANGLING RAM ASSEMBLY**
1	71-35-292	1	Cylinder
2	71-35-009	1	Rod
3	71-05-050	1	Bush
4	75-60-095	1	Piston
5	86-29-187	1	Piston seal
6	86-29-188	1	Bearing ring
7*	93-63-023	1	Grub screw scoket head M6 x 12
8	71-35-291	1	Gland housing
9	86-29-148	1	Gland seal
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 1/4 BSP MM
16	86-50-102	2	Bonded seal 1/4" BSP
	86-99-188		**SEAL KIT**

*** Assembly note**

Tighten fully and centre punch edge of hole to secure.



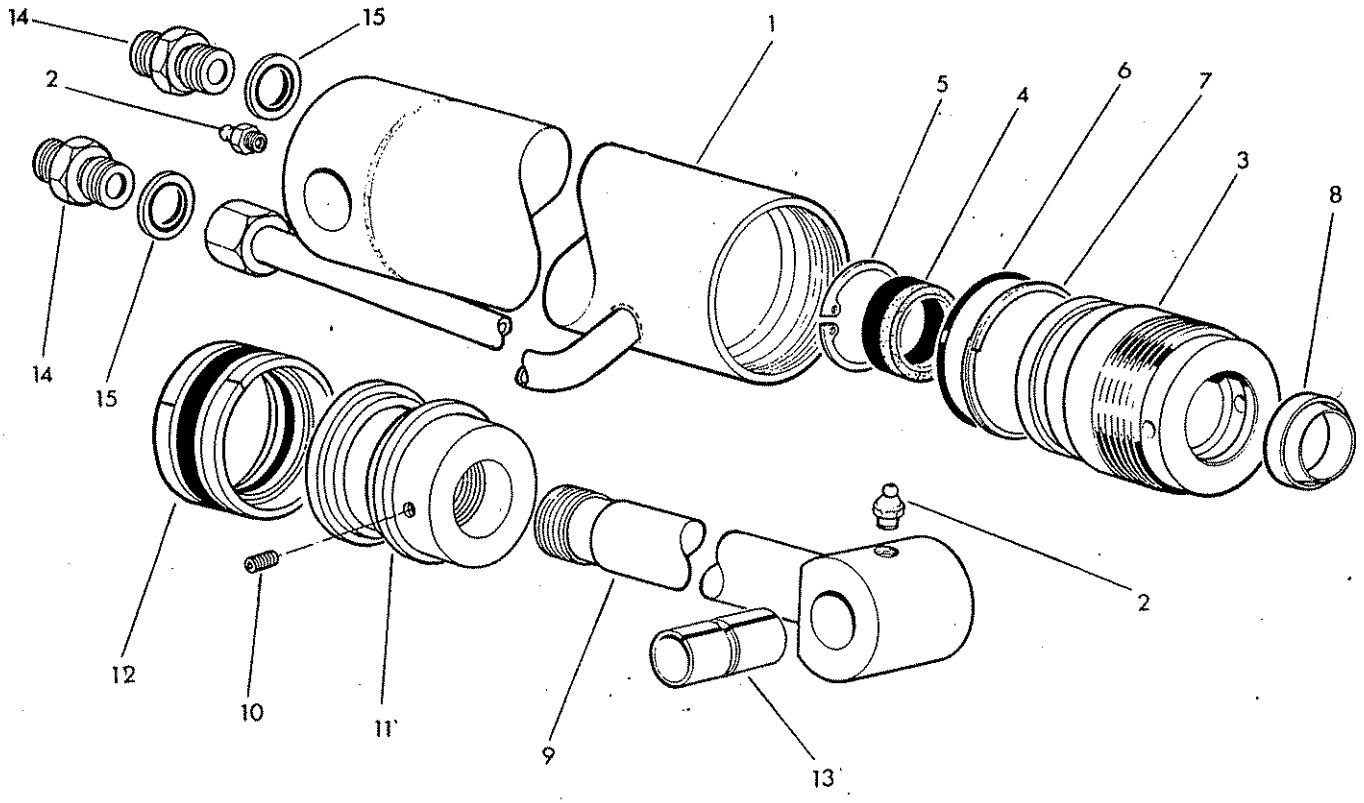
Ref	Part No.	Qty	Description
	71 36 274		SLEW/BREAKAWAY RAM ASSEMBLY
	71 36 061	1	Ram assembly
1	71 36 065	1	Ram barrel
2	71 36 062	1	Piston rod
3	71 05 050	1	Bush
4	71 36 312	1	Gland housing
5	86 29 148	1	Gland seal
6	04 16 240	1	Internal circlip
7	86 00 306	1	'O' ring
8	86 09 306	1	Anti extrusion ring
9	86 29 149	1	Rod wiper ring
10	71 20 368	1	Piston
11	86 29 156	1	Piston seal
12	85 81 208	1	Restrictor body
13	81 23 047	1	Restrictor disc-green and white
14	81 16 011	1	Spring
15	85 81 145	2	Union 3/8 BSP - 1/4 BSP MM
16	86 50 103	3	Bonded seal 3/8 BSP
17	09 01 121	2	Greaser 1/8 BSP - straight
18	86 29 157	1	Guide ring
19	93 63 023	1	Grubscrew socket headed M6 x 12
	86 99 190		SEAL KIT



Ref.	Part No.	Qty.	Description
	71-95-318		**COMPENSATOR RAM ASSEMBLY**
1	71-95-305	1	Cylinder
2	71-95-012	1	Rod
3	70-12-03*	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	Grubscrew socket head M6 x 12
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 1/4 BSP MM
16	86-50-102	2	Bonded seal 1/4" BPP
	86-99-188		**SEAL KIT**

*** Assembly note**

Tighten fully and centre punch edge of hole to secure.



Ref	Part No	Qty	Description
	71-36-275		**PA 97 'TELE' RAM ASSEMBLY**
1	71-36-276	1	Ram cylinder
2	09-01-121	2	Greaser 1/8 BSP-straight
3	71-35-291	1	Gland housing
4	86-29-148	1	Gland seal
5	04-16-240	1	Internal circlip
l6	86-00-302	1	'O' ring
7	86-09-302	1	Anti extrusion ring
8	86-29-149	1	Piston rod wiper seal
9	71-36-104	1	Piston rod
10	93-63-023	1	Grubscrew - socket headed M6x12
11	71-35-008	1	Piston
12	86-38-788	1	Piston seal
13	71-05-050	1	Bush
14	85-81-169	2	Union 1/4 BSP MM
15	86-50-102	2	Bonded seal 1/4 BSP
	86-99-188		**SEAL KIT**

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