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Part No.
71-35-850

# POWER ARM 35

## Operator & Spares manual

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## GENERAL INFORMATION

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

Use only McConnel spare parts on McConnel equipment and machines. This manual includes an illustrated spare parts breakdown and the interpretation which precedes it should be read before ordering replacement components.

### DEFINITIONS

The following definitions apply throughout this manual:

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

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

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

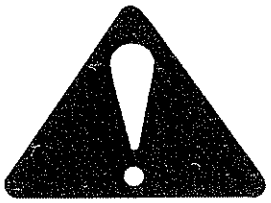
### Left and Right-Hand

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

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

**SECTION 1**

**SAFETY PRECAUTIONS**



# WARNING

NEVER ... permit inexperienced personnel to operate the machine without supervision.

... stand under the raised flail head.

... cut over the far side of a hedge with the flail cutting towards the operator.

... continue to operate the flail when wire has wrapped around the rotor.

... leave the tractor seat with the flail still rotating.

... operate the flail without the correct hood properly fitted in position.

... exceed 540 rpm on the pto shaft.

... stop the engine with the pto engaged.

... operate the machine without a cab safety guard.

... operate the machine without the pto shaft guard in position.

ALWAYS ... inspect the work area or hedgerow for wire, steel posts, large stones, bottles and other dangerous materials and remove them before starting work.

... ensure bystanders are kept away from the machine during all flailing operations.

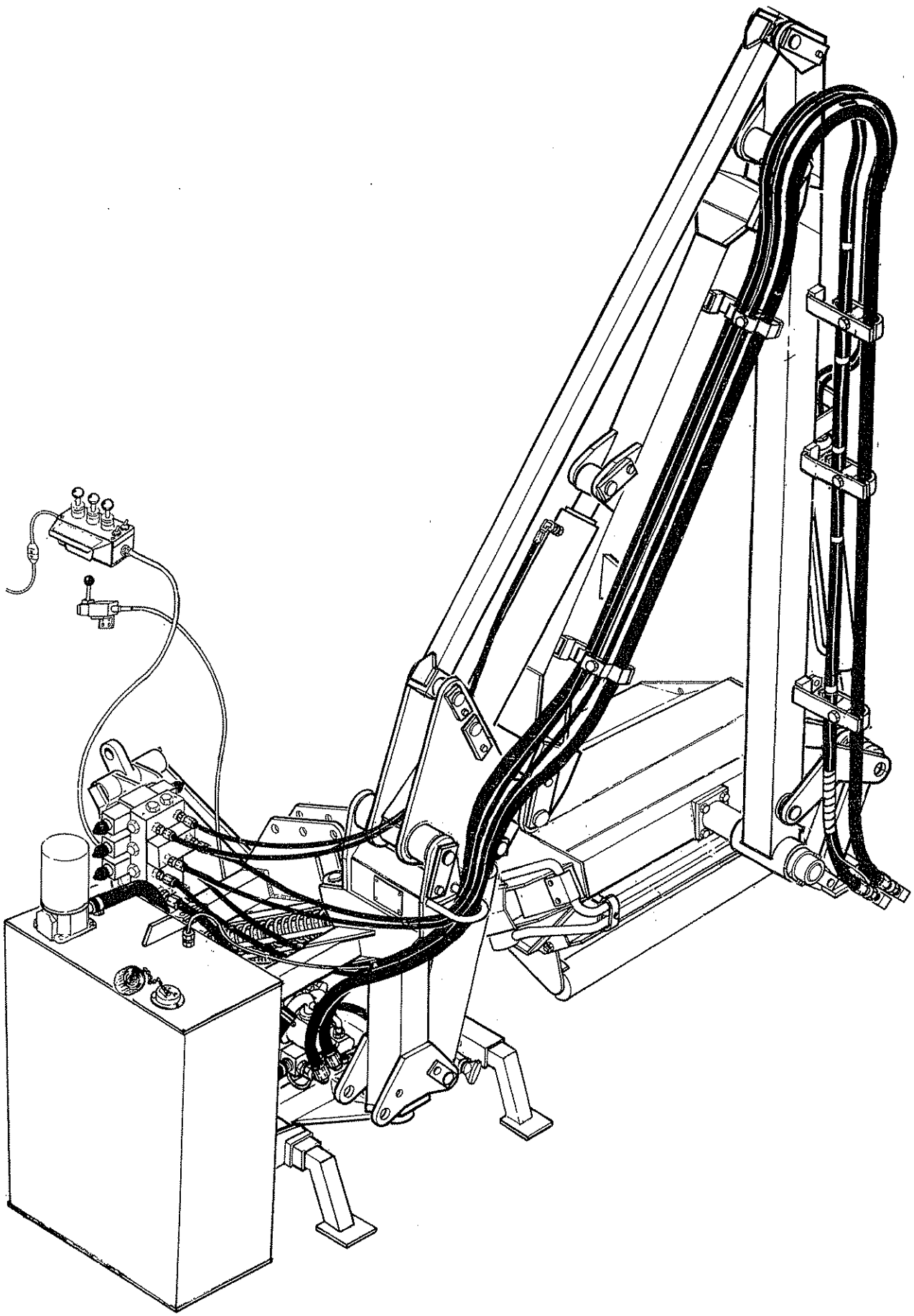
... check frequently, nuts and bolts for tightness and also check roll pins, shackles and flails for security.

... replace missing or damaged flails as soon as possible to avoid vibration and damage to the machine.

... disengage the pto and stop the tractor engine before making any adjustments.

CAUTION: One of the features of the Power Arm 35 is the ability to cut close to the tractor in confined spaces. This means that in some instances the flail head casing can be made to foul the tractor if reasonable care is not observed.

## GENERAL VIEW



## INTRODUCTION

The Power Arm 35 is a fully independent hydraulically driven flail and can be supplied in two farms, hedge or grass. It has been designed to fit on the three point linkage of the great majority of tractors without having to use extra brackets or fittings.

All power for operation of the flail rotor and for 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 30 gallon (136 litre) oil reservoir which incorporates an oil strainer and a 10 micron return flow filter.

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

The flail head is despatched with the flails to cut in an upward motion and is equipped with an adjustable 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 and 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 a spring assisted automatic self resetting gravity breakaway system which allows the flail head to pivot up and back. On resetting a rubber damper absorbs any shock loads. The breakaway geometry also allows the complete flail to be folded compactly for travel on the highway.

An in built stand is supplied to aid stability when the machine is unhitched from the tractor.

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

## Tractor selection

The Power Arm 35 will fit almost all tractors equipped with Category 2 linkage.

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

## Draft control

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

## Linkage isolation

Linkage isolation is not required as all tractor hydraulic controls should be neutralized.

## Check chains/stabilizer bars

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

## Ballast weight

Irrespective of the size of the tractor, it must be stable whilst operating the Power Arm 35 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 on the counterweight afforded by the oil reservoir.

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

## ASSEMBLY INSTRUCTIONS

Fitting operator guard

Power arm 35 is 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.

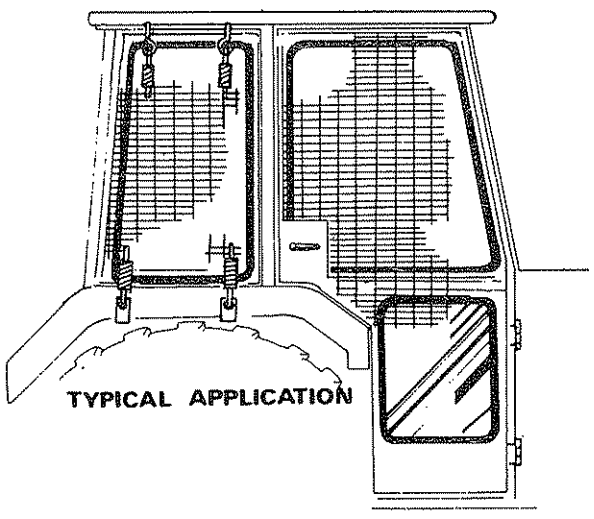
Where the flail is operated on a tractor that is equipped with a safety frame or roll bar only, then an additional frame must be made and fixed to the tractor on to which the guard mesh can be secured. In addition to the guard mesh, a sheet of Polycarbonate transparent glazing must be fitted to the frame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

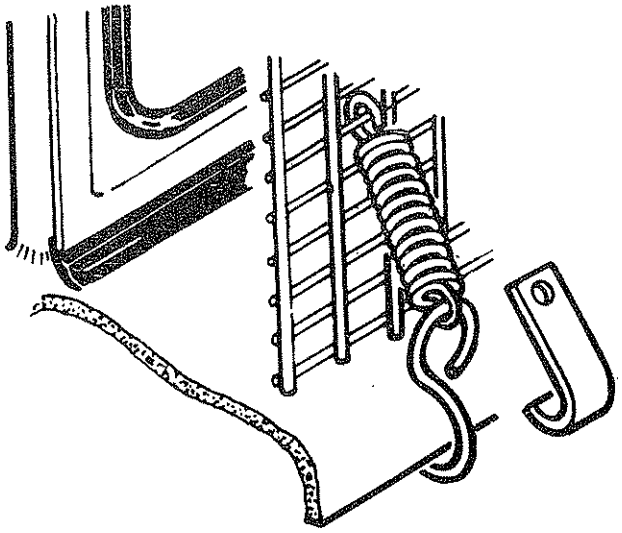
Polycarbonate transparent sheeting is an impact resistant material which can be readily sawn and shaped to requirements. Unfortunately it is susceptible to surface damage and scratching, therefore it is advisable to place the material on the inside of the window for protection. No attempt should be made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

**CAB GUARD**



## Attachment to tractor

Procedure is much easier if carried out on a hard flat surface.

* Fit hydraulic tank over the leg housing and secure with leg pin and stabilizer tank strap. Connect hoses and secure tightly.
* Fill the reservoir to capacity to increase the stability of the machine.
* Remove and discard the 'T' shaped transport strap connecting the flail head and frame.
* Remove the base end pin of the angling ram.
* Remove the rod end pin of the reach ram.
* With the aid of a crowbar prise the flail head sideways until there is sufficient clearance to allow the tractor to be reversed up and the draft links connected.

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

Adjust tractor drop arms to enable the draft links to lower within 300mm (12") of the ground.

Remove the top link and machine yoke completely.

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

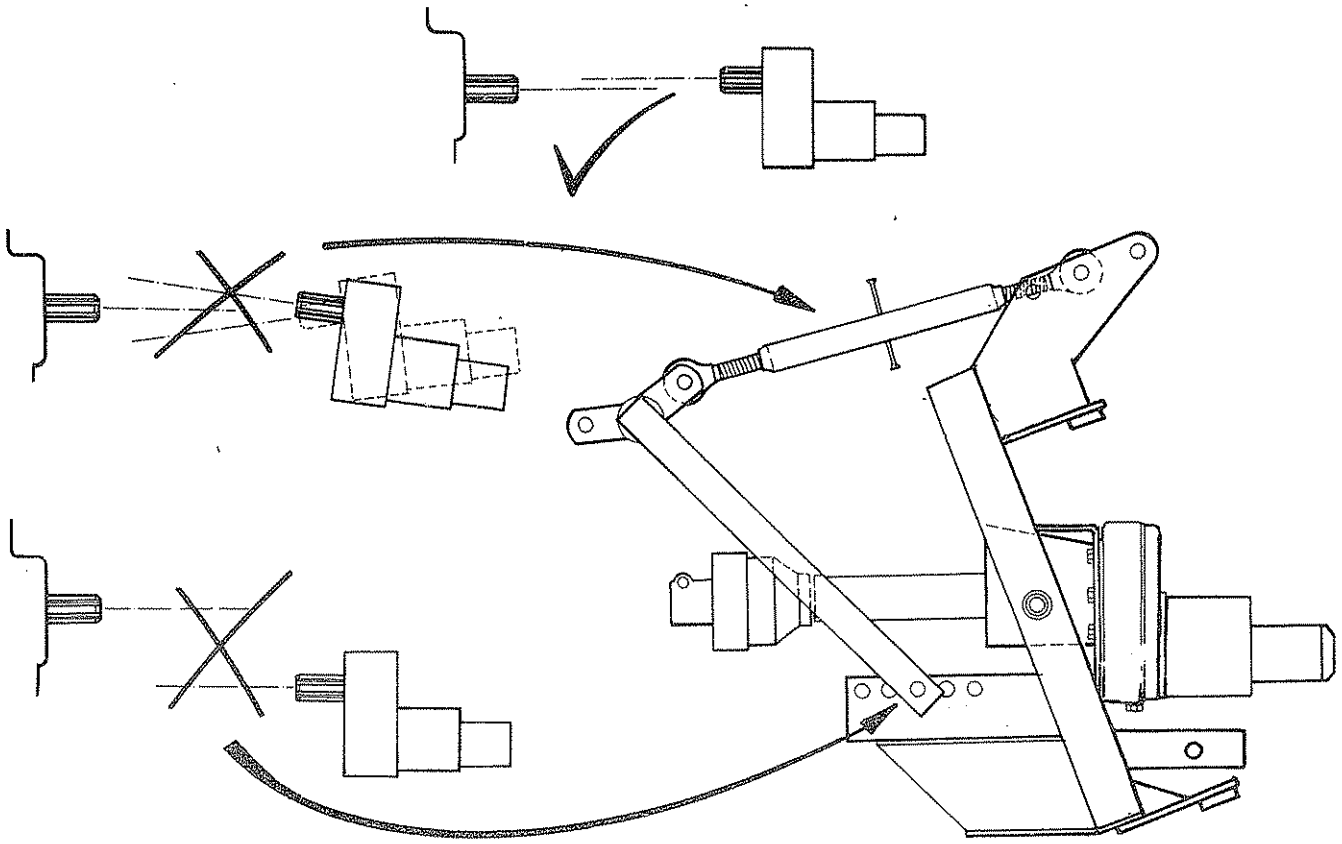
Attach yoke to the top hitch position on tractor ensuring lug for the top link is uppermost.

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

Raise the machine on the tractor linkage to enable the lower yoke pins to be assembled in the main frame. Select a hole position , so that when the weight is taken by the yoke, the pillar is approximately upright and level.

Lower quadrant lever so that the machine's weight is taken by the tractor.

Install the P.T.O. drive shaft to the tractor. 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 of 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.



Ideally the tractor stub shaft and the gearbox shaft should be in a straight line.

The greater the misalignment, the shorter will be the expected working life of the powershaft points . Parallel adjustment is affected by the top link and vertical alignment is adjusted by the hole selection between the yoke and the mainframe.

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

Unlimber the electric Switchbox from its storage position and fit into the tractor cab (see page 10)

* Check that the rotor control lever is in the "stop" position . Unscrew the white tap on the lift ram, operate the hydraulics and lower flail head to the ground. Select reach and angle to reconnect the reach rod and angle base pins.

* Remove the rope arrestor loop.

Final adjustment of the top link to bring the pillar upright,and of the tractor lift arm levelling box to bring the main frame horizontal should be further checked when the armhead weight is taken by the frame.

Tighten up the check chains or adjustable stabilizers to hold the machine rigid without side sway.

Remove parking feet, turn through 180$^{o}$ and re-locate in their housings.

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

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

## Installation of cab controls

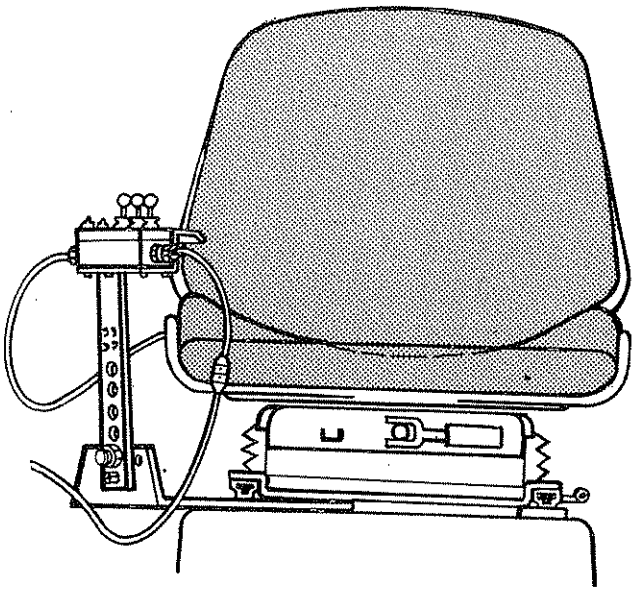
The electrically operated control box eliminates the presence of any hydraulic equipment within the cab. Instead a single multicore cable which can be easily routed to the implement behind simplifies the task of hitching and demounting.

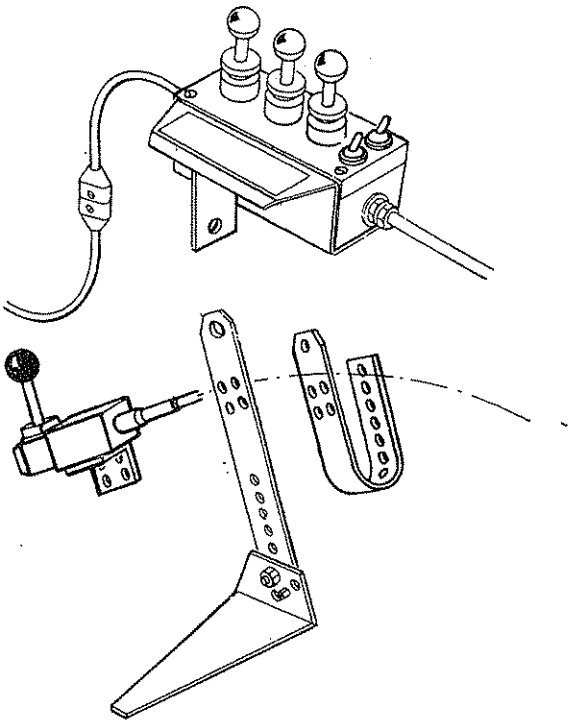
The control box is mounted as required in the cab on a seat bracket and stalk which can be bent to achieve a good operator position.

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.

## Removal.

Select a firm level site for parking the machine.

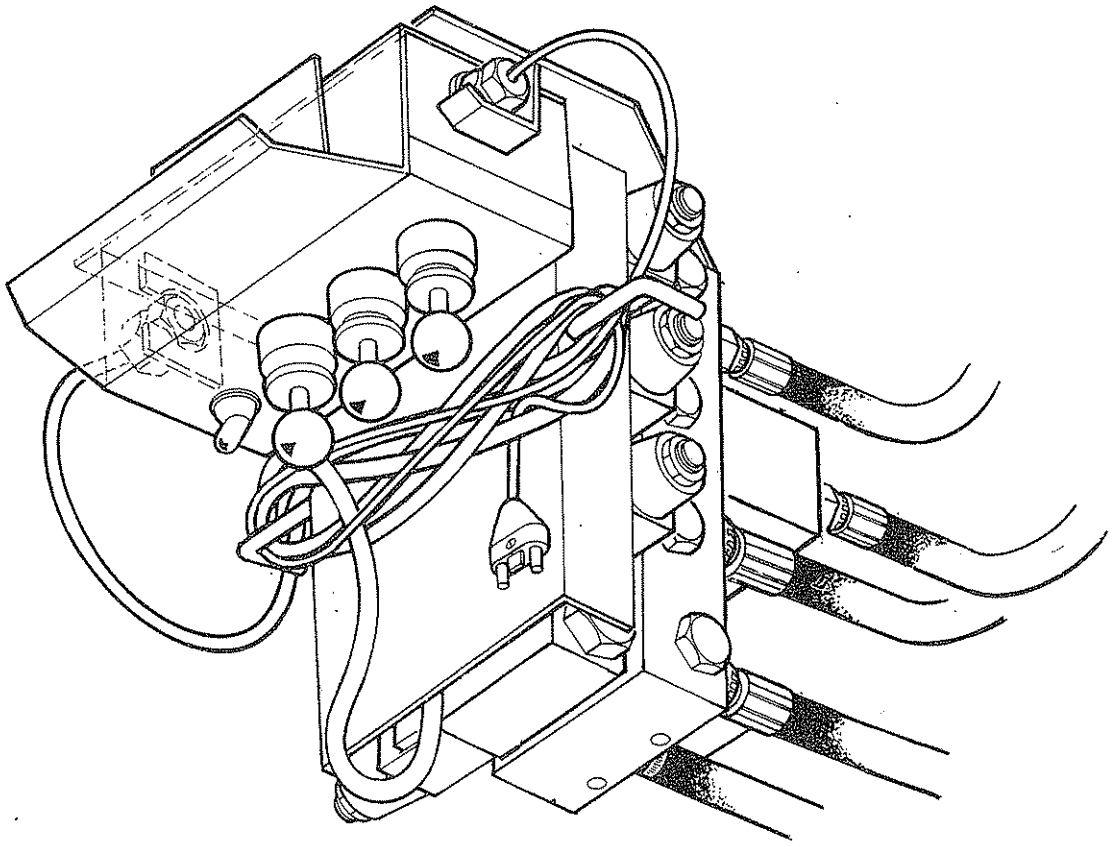
Remove parking feet, turn through 180° and re-locate in their housings.

With the machine in the normal working position operate reach and angle rams until the flail head roller is horizontal and level with the feet on the main frame.

Disengage tractor P.T.O. and remove.

Disconnect stabiliser bars or loosen check chains as applicable.

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



Disconnect electrical plug within cab and unhook the control box from its mounting. Coil the cables around the storage spigots on the armhead valve and turn the box upside down and lift into place in the cradle brackets beneath the protective shroud.

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

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

## STORAGE

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

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

## Hydraulic installation

i) The Power Arm 35 is delivered from the factory without oil. Fill the reservoir with a light hydraulic oil as recommended in the chart until the oil level is approximately 6" below the top of the tank. The total capacity is approximately 135 litres (30 galls). Do not overfill.

| 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 |

ii) 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 E.P. 90 lubricant. The gearbox is normally despatched filled with oil.

iii) 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.

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

v) 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.

vi) 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.

**Section 3**

## OPERATION

### Limitation

The Power Arm 35 has been designed as a light to medium weight hedgetrimmer; is ideal for work on hedges that have been regularly maintained and is capable of making a reasonable job in up to two years growth. The machine can be operated on either side of the tractor and the rotor has been designed to cut in either direction. Heavily overgrown or badly neglected hedges should be tackled with a shapesaw.

### Highway working

If it is intended to cut roadside hedges or to work in the vicinity where the public have access, it is a statutory requirement that suitable warning signs are placed at both ends of the work area. These signs should not be more than ½ mile apart (.8 Km). To further promote highway safety, the use of headlamps and a flashing beacon on the cab roof would be beneficial. Hazard warning lamps should not be used since an oncoming vehicle could easily misjudge braking distance in presuming the tractor approaching them is stationary.

### Operator guard

Owners are reminded that it is illegal to use a flail without an efficient operator guard. The guard supplied as standard equipment with each machine attaches to the tractor cab with spring loaded hooks.

### Preparation

Before commencing work, the operator should read the instruction manual thoroughly, paying particular attention to the SAFETY PRECAUTIONS printed in the front of the manual. It is the operator's responsibility to ensure that a safe code of practise is followed.

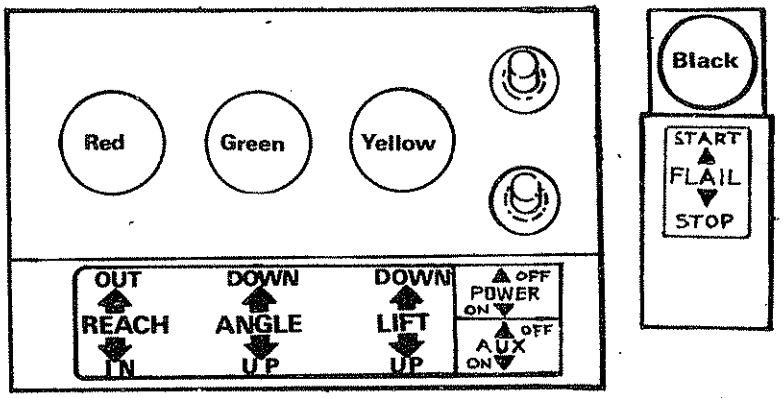
If the operator is unfamiliar with the control levers and thus the reach, height and angling of the flail head, a worthwhile exercise is to make a dummy run alongside a hedgerow with the rotor stationary.

The work area or hedgerow should be carefully inspected for wire, steel posts, large stones, bottles and other dangerous materials and removed. The position of any immovable objects should be particularly noted or identified i.e. with a fragment of plastic sack to avoid running into them with the flail. Should the rotor accidentally strike anything of a hazardous nature, the machine should be immediately stopped and the rotor examined for damaged or missing flails which should be replaced to retain rotor balance. Continuing to work the flail head with the rotor out of balance will cause vibration which can rapidly damage the rotor bearings and break up the flail casing.

### CAUTION

The ability for the flail head to work closely alongside the tractor wheel in narrow lanes and for transport to fold within the overall tractor width can present a possible hazard for the flail head to contact the mudwing, rear lamp cluster etc, and cause damage.
Caution should be exercised when operating under these conditions and particularly when folding within the tractors width for transport.

## Machine Controls.




## Transport Position

When transporting on the highway the flail head and arms should be latched securely in the broken back position and the white tap on the lift ram screwed fully in.

## Moving from Transport to Working Position

Unscrew the lift ram tap fully. Lower the flail head flat to the ground and release the transport latch, if it does not release take the weight off the latch by easing the tractor forward slightly. The working position can be achieved by either reversing the tractor or by operating the lift ram to raise the head which allows the breakaway mechanism to position the flail head for work.
To revert back to the transport position angle the flail head and place one corner of it on the ground. Raise the latch, drive forward and simultaneously select 'lower' until the arms are fully broken back. Release the latch and raise the machine. Screw the lift ram tap in fully to prevent droop and any consequent damage to the tractor tyre or mudwing.

## Engaging drive

Ensure that the rotor control lever is moved to the "STOP" position before engaging the pto shaft. Allow the oil to circulate for a minute or so before operating the armhead levers. Position the flail head in a safe position, increase engine speed to high idle and move rotor control lever to "START". After initial surging the rotor will run at an even speed. Starting the rotor in this way reduces starting loads imposed on the hydraulic motor and drive splines.

## Operating speed

Do not exceed 540 rpm. P.T.O. speed.
The machine should be run at a speed no higher than is needed to make a clean cut with no fall off in rotor speed. This also allows better control of the tractor and reduces the tendency of the operator to "ride the clutch pedal".

It is recommended to run the tractor engine to give a p.t.o. speed of 400–420 rpm.

This will give a corresponding rotor speed of 2350 – 2450 rpm.

To achieve these rotor speeds on a machine after April 1986 when a lower ratio gearbox was fitted a PTO speed of 540 rpm is recommended.

## Forward speed

Tractor ground speed is determined by common sense and experience. It should be slow enough to allow sufficient time for the flails to cut the work without overloading. It is obviously better to make a second pass or more in heavier growth to avoid undue strain.

## Tractor position

The position of the tractor in relation to the hedgerow will again be determined by experience. For a normal straight forward hedgerow the position should be such as to allow the reach ram to be in mid-stroke. This effectively allows the reach to be adjusted in either direction without altering the tractor's position.

## Hedge-shape

Local practice and customs as well as the requirement; be it a stockproof barrier, a windbreak to resist soil erosion or as a sanctuary to protect wild life will each have their part to play in influencing the desired finished shape of the hedgerow.

A hedge cut in the shape of an 'A' although rather wider and so taking up more ground will be encouraged to send out new growth from the bottom. The stubbly ends from the ground to the top can further discourage stock and the wide dense bottom will promote conservation of wild life.

A hedge with vertical sides and an apex top is an alternative which has found favour in many parts of the country. The sloping top encourages light to penetrate and promote growth in the lower regions of the hedge. The sloping top also assists to shed heavy falls of snow which can accumulate and break a hedge down.

Although a box-shaped hedge, flat across the top and with square corners may look very tidy in its early stages it is prone to dying off in the bottom while being encouraged to grow in the top. After a few years this type of hedge can become 'buck-headed' and is always susceptible to damage by snow.

## Cutting sequence

Operator preference will ultimately decide on the order of cutting. Where it is difficult to determine the original hedge line because of overgrowth, a recommended method is to start by siding up the hedge first, if necessary making more than one pass.

A second cut should then be taken at an incline along the hedge top and again if there is prolific growth it may be necessary to make more than one pass until the hedge is reduced to the height and contour required.

Finally, finish with a ground cut and for this, the roller should be lowered. This ground cut defines the base line of the hedge, severs brambles and rubbish that encroach out from the bottom, and further mulches the toppings that have fallen.

Note: Flails are more prone to accidental damage and blunting by stones on a ground cut. Therefore when convenient this should be left to the last.

Where the hedge has been well maintained in the past it may be found better to cut the top before siding up.

> **WARNING**
>
> Do not be tempted to make a vertical cut on the far side of the hedge. This would entail cutting 'blind' and the rotating flail would be capable of throwing debris through the hedgerow in line with the operator.

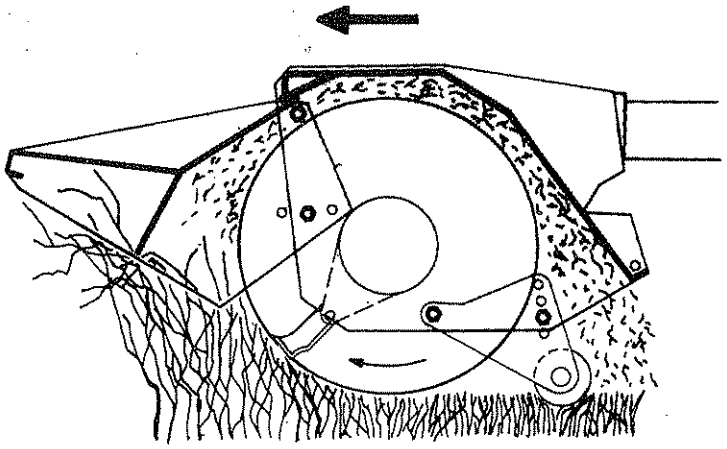
Before raising the load check that there are no overhead obstructions, this is especially important when working in the vicinty of over-head cables.

> **WARNING**
>
> To avoid the possibility of flashover in the vicinity of high voltage overhead power lines never work closer than 1·5 metres minimum. If in any doubt consult the local electricity board way leave officer for advice on a safe plan of working.

Where both sides of a roadside hedge are to be cut, always cut the field side first. The uncut roadside helps to reduce the amount of debris being flung through the hedge into the road. Also by sloping the vertical cut to give an 'A' shape, debris is thrown down into the hedge bottom and the spread of material is reduced.

## Upward Cutting

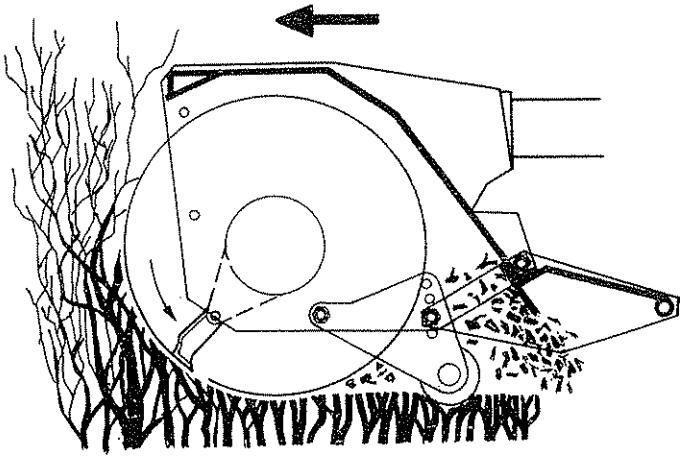
The flail head is assembled at the factory for the flails to cut with an upward motion . Upward cutting produces a cleaner finish, minimises split stems and is ideal for a light hedge that has been regularly maintained.



## Optional Downward Cutting

It is possible to reverse the rotation of the flail for downward cutting in heavy growth. This chopping action subjects the rotor to violent usage and should therefore be avoided whenever possible.

For downward cutting a rear hood is necessary and should be obtained under Part No. 71 14 336 . It is permissable to remove the front hood to allow larger material to pass under the flail head.



## Reversing rotation

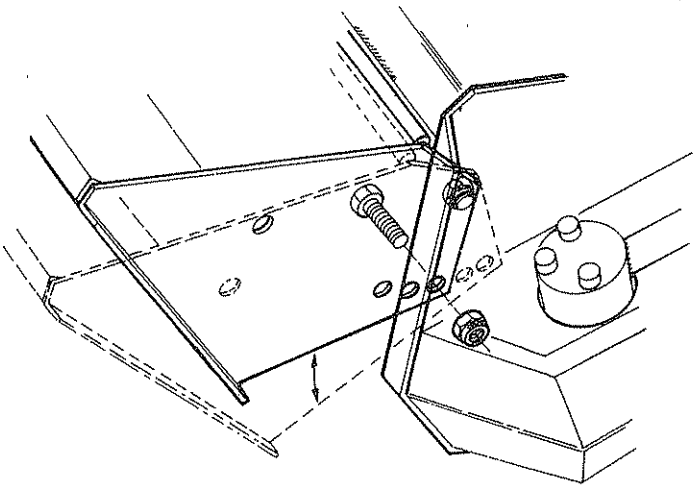
Fully extend the armhead and lower flail to the ground to minimise oil loss. Release the hoses from the flail motor rigid pipes and interchange the two flail hoses. It will provide a tidier hose run with less chance of snagging if the hoses are crossed over higher up the dipper i.e., above the last hose bracket. Hedging flails mounted on the rotor must also be individually turned round by releasing the locknut and withdrawing the flail pivot bolt. The flail may then be reversed. On re-assembly, tightening torque of the locknut is 135Nm or 100 ft.lbs.

**WARNING**

If any wire is picked up by the rotor, the machine should be stopped immediately and the rotor cleared before proceeding.

## Flail hoods

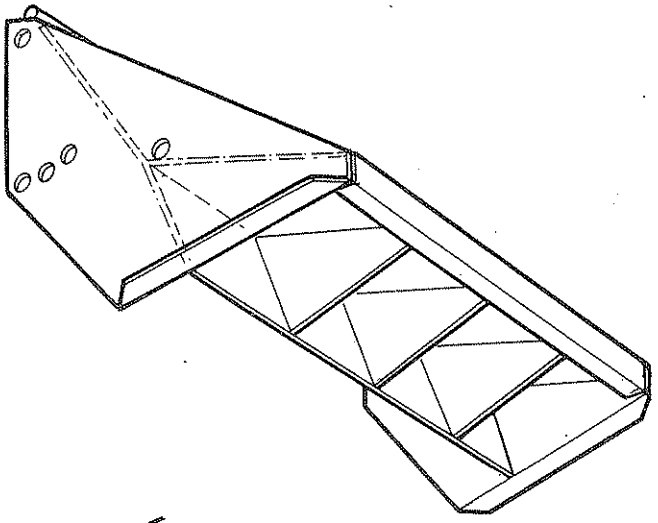
Both the flail hoods are hinge mounted by bolts to the front and rear of the head and provision is made for the front hood to be adjusted in three working positions. To minimise the throwing of debris particularly when roadside working the hood should be adjusted to its lowest position. When the front hood is fully raised, larger growth can pass underneath but with the greater tendency for material to be thrown.
The front hood must always be in place for upward cutting and the rear hood must always be in place for downward cutting.



Note: The two hoods are not interchangeable on the flail head.

## Wire trap

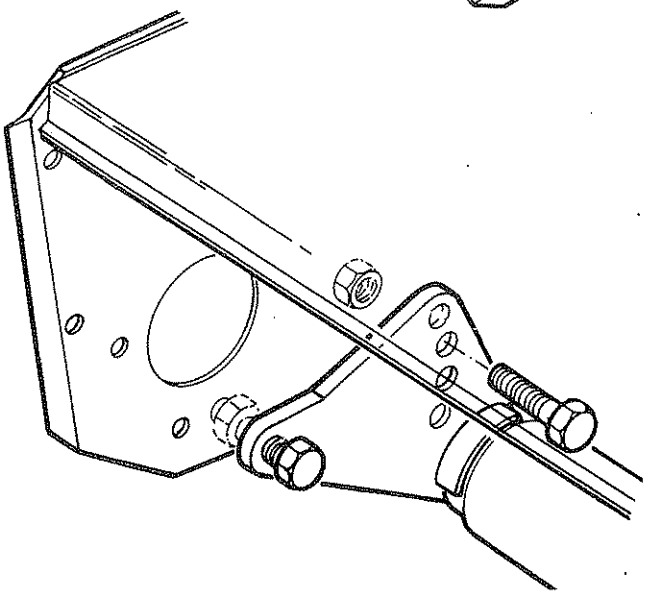
Both flail hoods are equipped with a wire trap. The trap consists of a steel plate welded across the underside. Any loose ends of wire which are picked up and carried round by the rotor are cut by the edge of the metal plate and fall harmlessly to the ground. This plate should not be interfered with or modified in any way.



Furthermore this wire trap does not relieve the operator of the responsibility of checking and cleaning the flail when it is suspected that wire has caught in the rotor.

## Roller

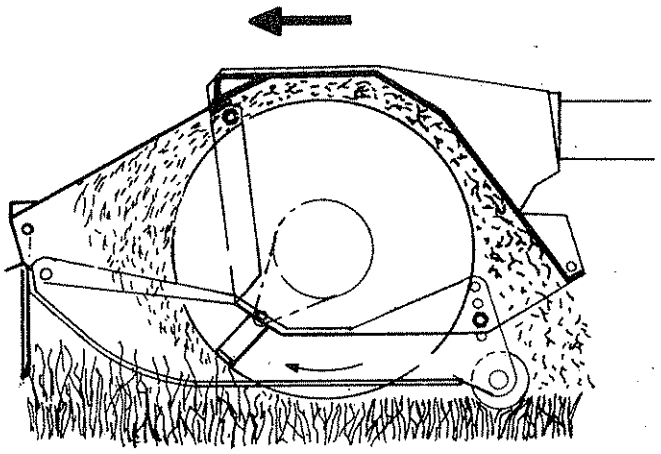
The roller is adjustable vertically to four positions, when hedge cutting the roller should be set higher than the flails. The roller helps to prevent the flail head from bouncing and sinking into the hedge and so assists in maintaining a level cut.
For making a ground cut the roller should be lowered below the cutting level of the flails. This helps prevent 'scalping' the ground and picking up stones which are injurious to the flails.



Never attempt to operate the flail without the roller in position. It shields the flails, acts as a chopping bar and eliminates the chances of long lengths of cut material being thrown.

## Grass Cutting

The flail must rotate in an upward motion for grass cutting. The vacuuming effect created by the rotating flails causes the grass to stand erect. The grass cutting cowl which consists of a number of hinged flaps is always mounted on the front of the flail head. It completely shields the rotor at the front and directs all cut material up under the hood discharging it down on to the ground at the rear.



## Grass roller adjustment

When grass cutting, the weight of the flail head will be carried by the roller for much of the time. It is therefore necessary for the rollers to be reinforced for increased stability. For this reason, a tie-bar passes right through the roller and is secured to the grass skids at either side. The skids are hinged at the front of the flail hood and a three position bolt mounting at the rear allows the roller to be adjusted vertically to control height of cut. Whenever possible the roller should be set in its lowest position to avoid the flails 'scalping' the ground as well as suffering damage from stones etc.

## Breakaway

An automatically resetting, spring assisted, gravity breakaway system protects the machine when an obstruction is encountered. The spring unit assists the breakaway reset when working close in and at height. The spring pre-load is factory set and non adjustable

Breakaway reset forces are absorbed by a pre-tensioned hollow rubber spring unit.

The breakaway geometry is such that there is a possibility of an unstable condition occurring when in the broken back position at full height. To prevent this the transport latch also acts as an abutment stop, which physically stops the flail head going over centre in the breakaway position. When operating in conditions where there is any likelihood of this happening e.g. when cutting high hedges on sloping ground the latch must always be in the lowered position.

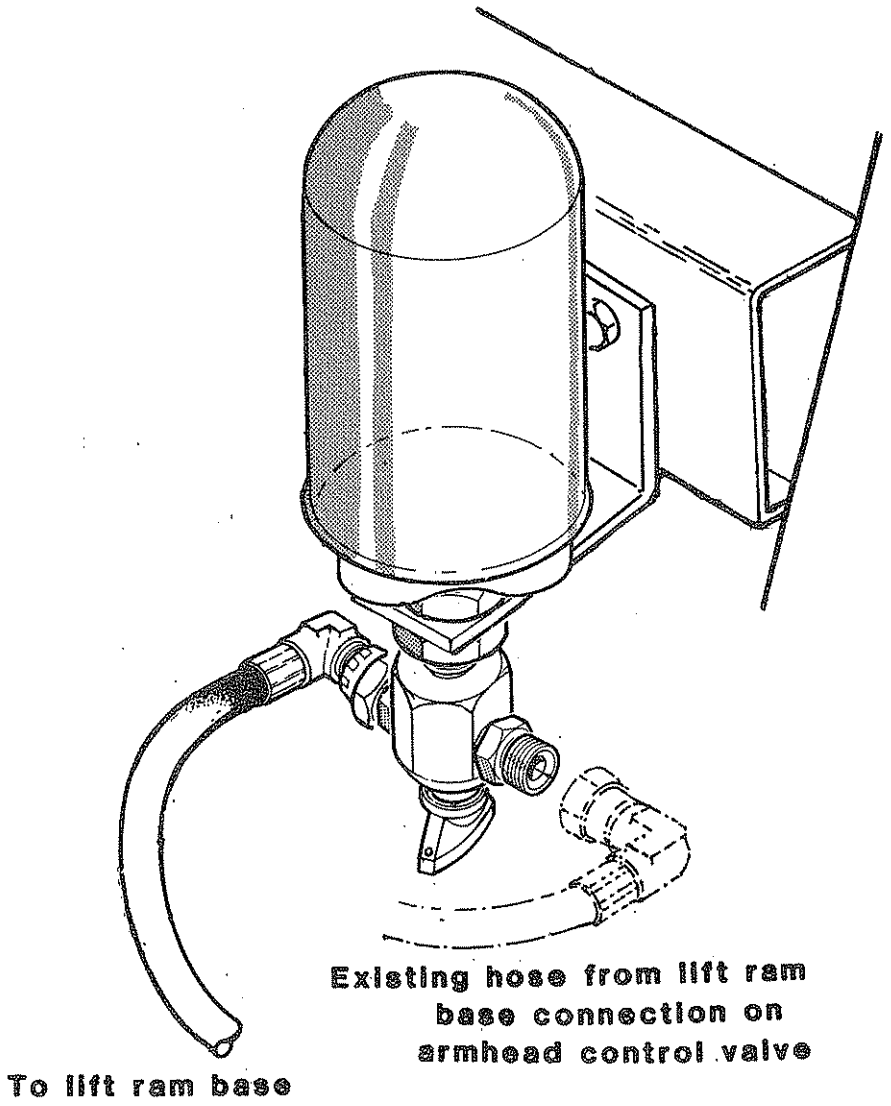



**ILLUSTRATION SHOWS R. HAND INSTALLATION**

Lift Float Kit (Optional Extra)

Grass flailing can be a slow tedious task requiring a high degree of operator concentration especially when working on rough or undulating ground.
A Hydraulic float kit is available which is mounted as shown in the vertical position using the outermost hole of the alternative gearbox mounting position. The above illustration shows the float kit fitted to a machine which has been built to cut on the right hand side of the tractor.

In work, with the stop tap open the flail runs along the ground automatically lifts and rides over any bumps. Any shock loads are absorbed by the accumulator which is pre-charged with nitrogen to 500 p.s.i.

To obtain optimum working performance the lift control should be operated to take approx. fifty per cent of the flail head weight off the flail roller. This is important as with too little weight on the roller the flail head will tend to remain in the air after riding over a bump and leave uncut areas of grass while with too much weight on the roller the float will be inoperative; the ground will be scalped in places and increased flail wear,, loss or damage to flails could occur.

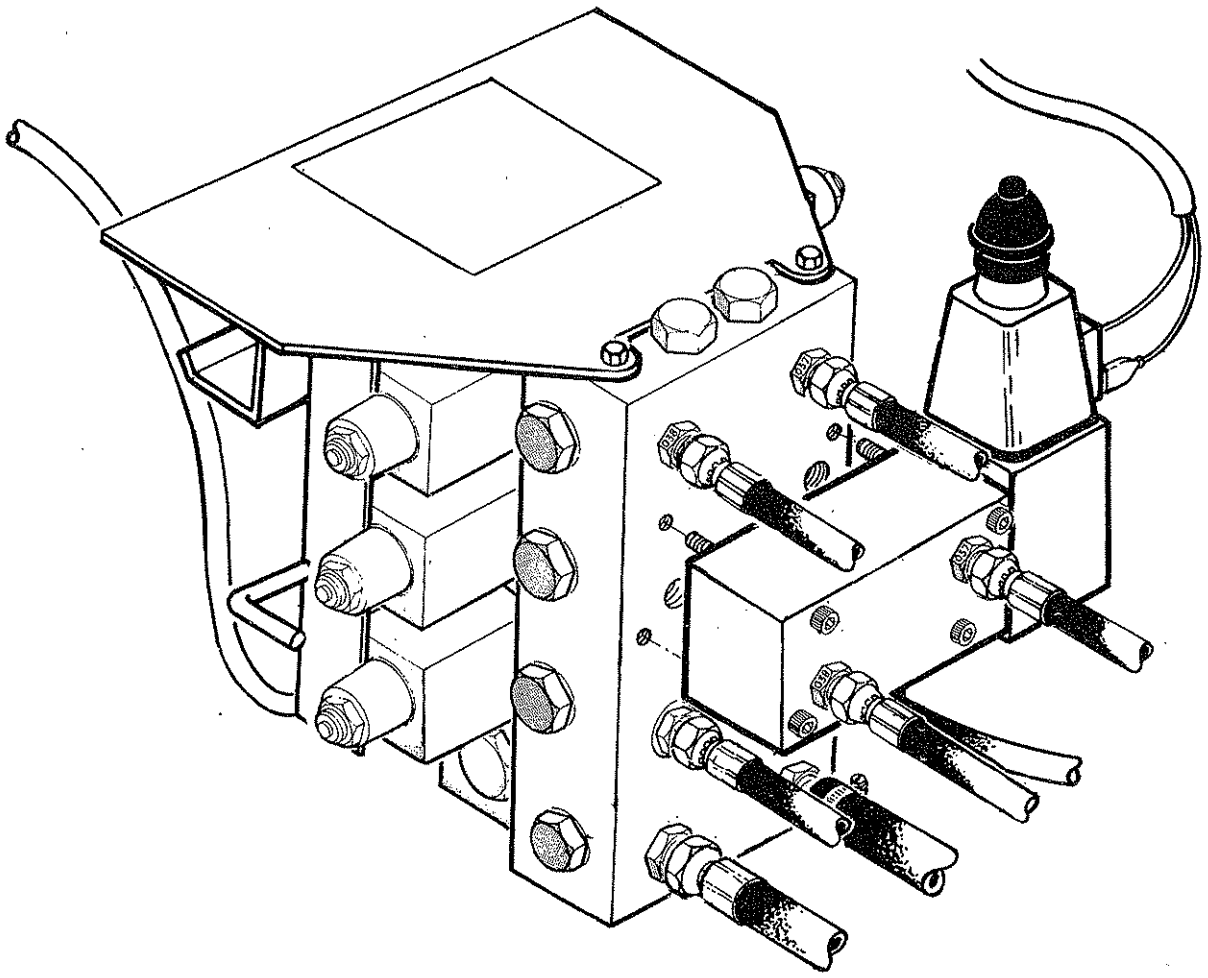
To revert to hedge cutting or to use the flail without it running along the ground the stop tap should be closed to isolate the accumulator.

Floating head angle facility (Optional extra for grass flails)

A kit is available part No. 81 26 261 which will allow the flail head to angle itself automatically to suit the contours of the ground.

The kit is bolted to the manifold block in place of the hose plate using existing M5 x 40 cap screws.

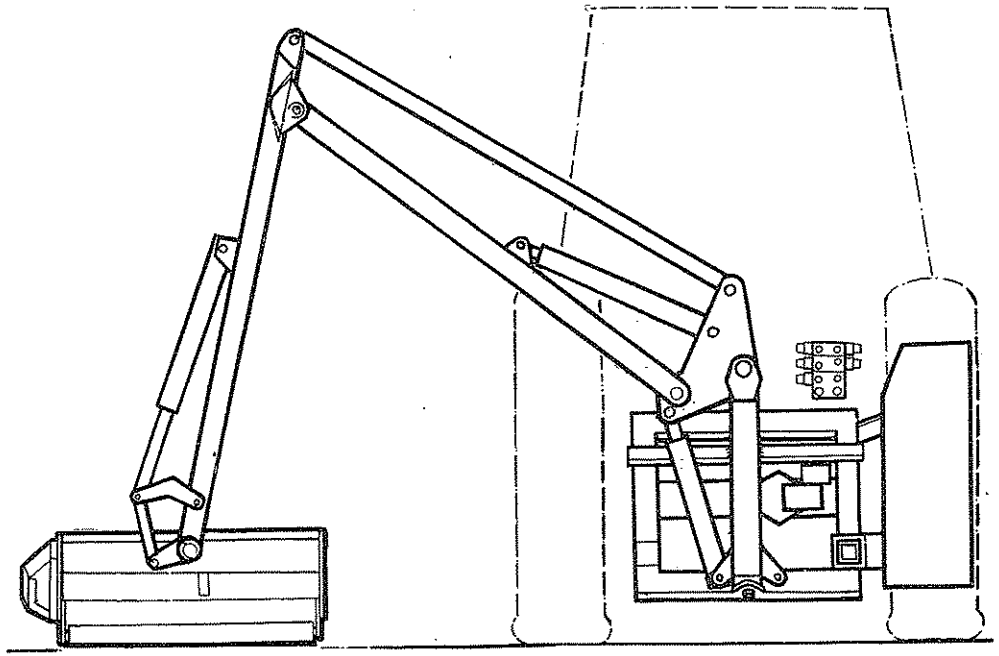
The two core cable is connected from the solenoid to the common link harness and connection 9 on the main harness and is controlled by the auxiliary switch on the control box.



Right or Left Hand.

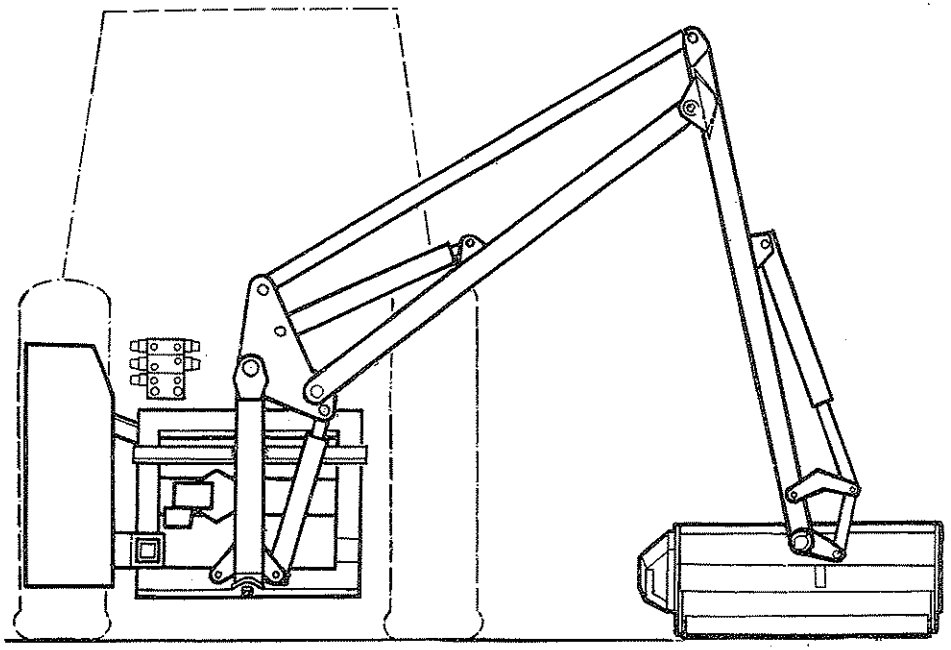
The machine is supplied in either specification to order and has been designed such that conversion can be carried out with only the minimum of special handed components, i.e., left handed upper and lower flail head rigid pipes. However it must be stressed conversion is a major rebuild and not an in field adjustment. A workshop with overhead lifting tackle is necessary.

Before commencing drain the hydraulic system and empty the reservoir.
Study the drawings carefully paying particular attention to the Gearbox-Pump-Rotor control valve, its position and the positions of the filler, breather and level plug. Note also that the rotor on the flail head is not touched and is therefore inboard when right hand cutting and outboard when left. New rigid pipes for the flail head will be required see parts list.



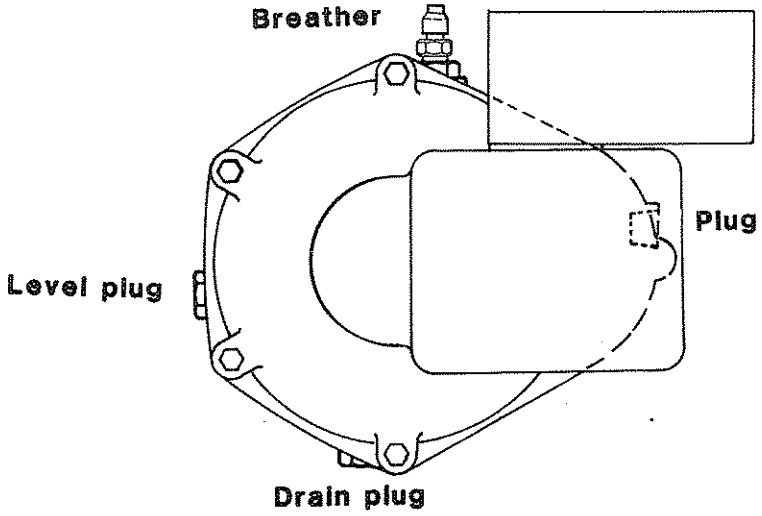
FLAIL HEAD
Motor outboard
Forward extension removed
and rotated to suit

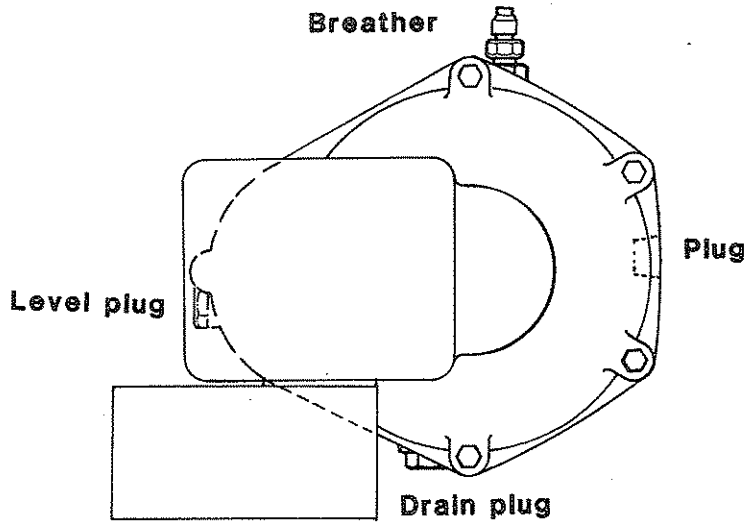
**LEFT HAND**



**RIGHT HAND**

FLAIL HEAD
Motor inboard.
Forward extension removed
and rotated to suit



## Section 4

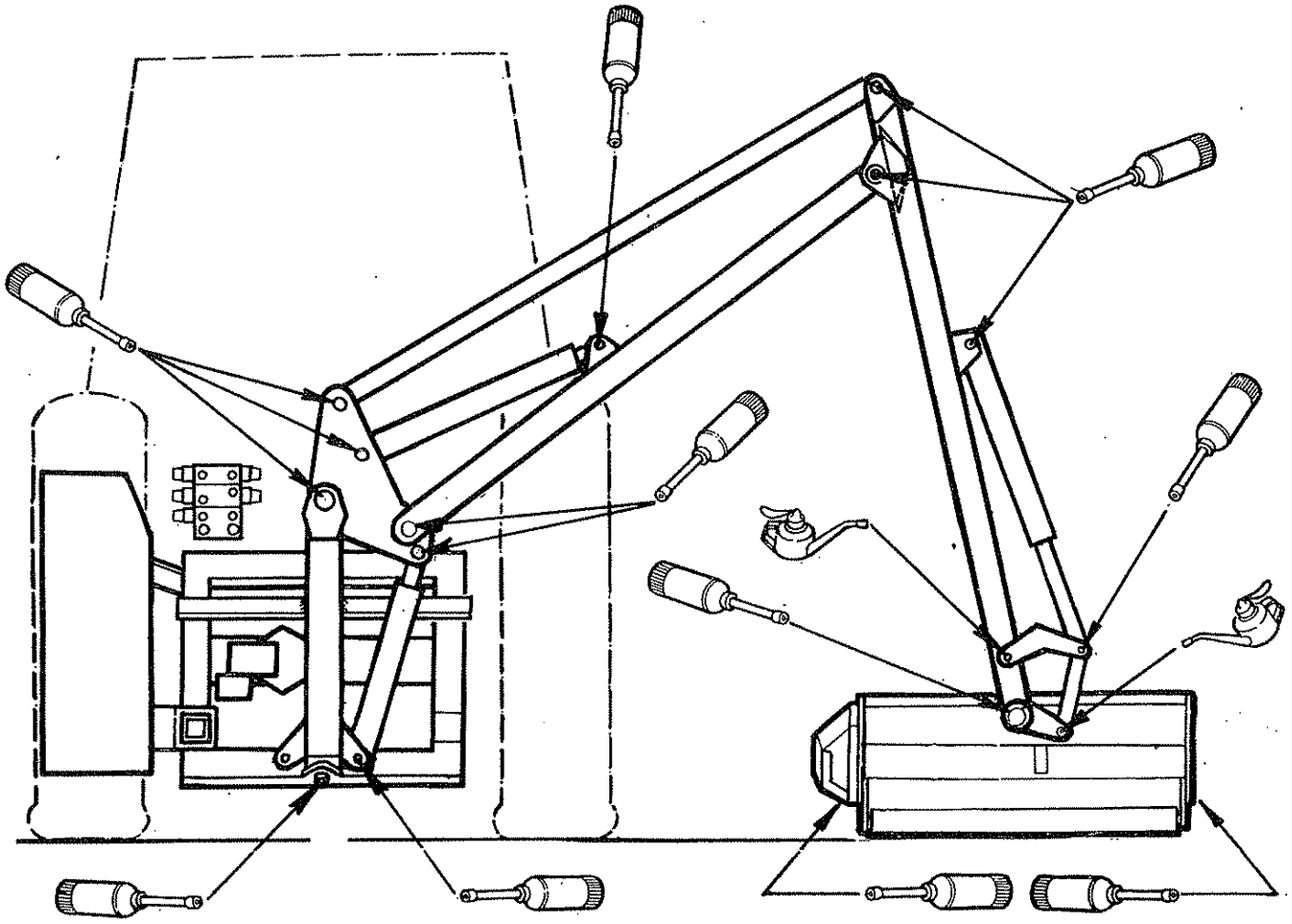
## MAINTENANCE

The Power Arm 35 has been designed to reduce servicing and maintenance to a minimum although any work specified in the section should be carefully carried out.

1. Lubrication.

a) General.

Refer to the lubrication diagram and grease daily all points shown. Use an oil can once weekly where indicated at other pivot points.



b) Power take-off shaft

The PTO shaft should be regularly examined to ensure that it is in good condition together with the guards. 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.

c) Roller bushes

Do not attempt to oil or grease the roller bushes. They should be left dry. The case-hardened bearing surfaces of the roller brackets run within spring steel bushes. Any lubricant will attract dust and grit into the bearing surfaces and accelerate wear by a grinding paste action.

2. Hydraulic system

a) Oil supply

Check daily the oil level in the reservoir.

No fixed time period can be quoted for oil changes as operating conditions and maintenance standards vary so widely. Although the oil does not wear out, it does eventually break down through contamination, oxidation and condensation. Continual operation of the machine beyond its rated capacity to almost the stall point of the rotor can cause overheating which produces insoluble gums, sludge, varnish and acids. Overheated oil thins to give a sluggish performance and causes earlier failure of seals and '0' rings. 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 contamination is a progressive factor.

Contamination can be reduced by :-

i) Carrying out all hydraulic servicing in clean, dust-free surroundings.
ii) Cleaning off around the reservoir cap before removal, and keeping that area clean.
iii) Using clean containers when replenishing the system.
iv) Regular servicing of the filtration system.

b. Filtration Maintenance

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

i) Suction strainer.
The strainer is fixed in position within the reservoir.
Should symptons of pump cavitation or spongy intermittent operation occur the tank must be drained and flushed out with a suitable cleaning agent e.g. clean diesel oil

ii) 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 the filter becomes blocked an internal by-pass within the canister will operate and no symptons of filter malfunction will occur to jog your memory.

## 3. Hydraulic pumps

All pumps are clockwise rotation. No routine maintenance is necessary other than a periodical check for tightness of the mounting bolts and a visual check for oil leakage especially around the pump supply and pressure unions. Where two hose clips are used on the pump supply hose, their worm drive barrels should be placed opposite each other at 180°. When fitted with tandem pump assembly do not attempt to operate the armhead rams without the 1" BSP flail hoses being interconnected. The tandem pumps share a common seal drain and both circuits must be intact before the pumps are run.

Pump servicing is limited to replacing seals, gaskets and '0' rings. Servicing should take place under clean dust free conditions. Pumps should be thoroughly washed and their end plates and body lightly identified with scribe marks to ensure correct re-assembly.

When re-assembling, lubricate all components with clean oil and tighten down the securing bolts in a diagonal sequence to pull the pumps squarely together, finally tightening to a torque load of 4 - 5 Kgm (30-37 lbs/ft) M10 Setscrew
2½-3 Kgm (18-22 lbs/ft) M8 Setscrew

Check for freedom of rotation. The pumps should turn freely under a hand load applied on a 6" radius arm. If tight, the lobe seals and/or backing washers have been trapped and the unit must be dismantled to rectify this.

After installation, the serviced pumps should be run for several minutes under a 'no load' condition before load is gradually applied. During this time frequent checks should be made of the pump casing temperature. An excessive temperature rise will indicate that the pump has been assembled incorrectly.

Generally it is unwise to replace major components since they have to be matched in sets. Unless this is done the pump will be inefficient, resulting in overheating and power loss. No detailed parts breakdown is shown, but factory reconditioned units are available within our service exchange scheme.

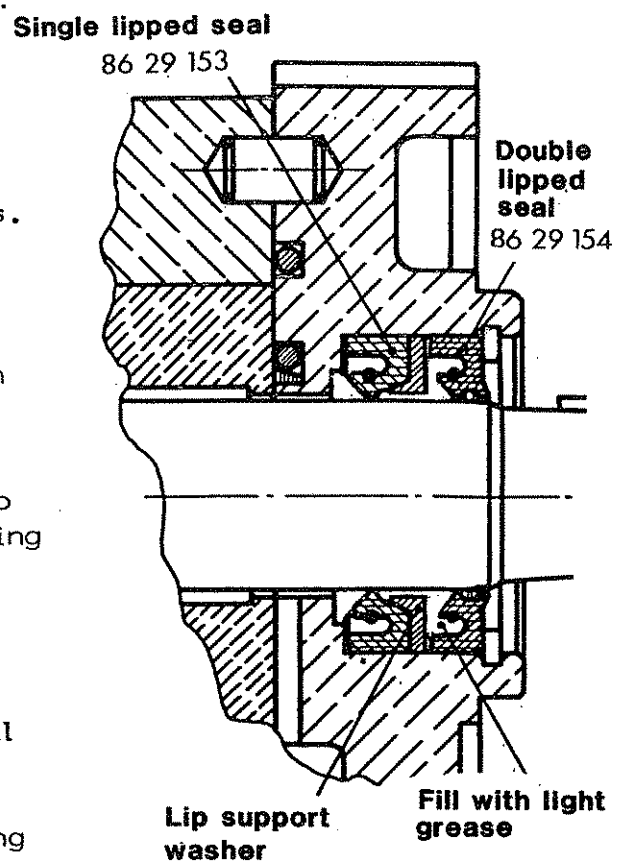
## 4. HYDRAULIC MOTOR

Servicing of the hydraulic motor should be limited to replacing seals, gaskets and O rings. Components of the motor are matched to close tolerancesand are therefore not replaceable as individual parts.

The torque setting of the cap screws is 6-7Kgm ( 40 - 47 lbs ft )

To remove the drive coupling from the shaft use a tool of the sprocket type to remove it. Do not attempt to remove the coupling by hammering or leverage as this will damage the motor internally.

Replacing shaft seals
The double shaft seal assembly must be assembled with the 7 m.m. wide single lip seal fitted first with the 1m.m. thick lip support washer on top. The back of the double lip seal should be filled with a light grease before fitting with the wiper lip outermost.



5. Hydraulic rams

a) Ram seal replacement - general information.

i) Whenever possible the ram should be removed from the machine and cleaned-off before dismantling on a clean work-bench.

ii) When using a bench vice do not apply excessive pressure to the ram cylinder - use soft metal jaws when grasping the ram-rod.

iii) Remove scores and nicks on the ram-rod by using a fine oil stone.

Do not use a file or emery cloth.

b) Lift; Reach ram and angling ram.

Unscrew the gland and withdraw the complete rod assembly. Slacken piston grub screw, unscrew the piston and slide off the gland housing.

Gland Seals.
Replace as necessary. Ensure seals are replaced in the position from which they were removed.

Piston Seal.
Remove split members of the piston seal and then, using a soft lever which will not scratch the piston lift the remaining seal components from the piston. Replace with new seals in reverse order.

Renew the '0' ring on the piston rod.

Lubricate all new seals prior to assembly.

Refit gland housing on the rod taking care when easing the wiper seal over the piston rod shoulder.

Screw the piston firmly back onto the rod, re-tighten the grub screw and centre pop the access hole to secure.

Fitting new piston on angling rams after machine serial No. 04 GG 77.

The locking grub screw on the angling ram is longitudinal; it fits into the pre drilled hole in the piston and keys into mating threads on the rod. On fitting a new piston it is unlikely the holes will be in line and a new mating thread will have to be formed on the ram rod. Tighten the piston and using the pre drilled hole as a jig, run down with an M6 plug tap until the tap bottoms. Remove any swarf from the hole and lock the piston in place with M6 grub screw.

c) Lift Ram Tap

Should an external leak appear dismantle the tap and renew the '0' ring and anti-extrusion ring again taking care to replace them in the position from which they came.

6. FLOAT KIT ACCUMULATOR TEST

If a leak of Nitrogen is suspected a test with soapy water around the valve thread and core area should be carried out.
A replacement charge valve assembly can be fitted after the accumulator has been fully discharged. It is essential that this work is carried out by the dealer or distributor who must have the facilities for recharging.
The accumulator can be removed for this purpose.
If oil is leaking from the area of the charge valve then the internal butyl bag is damaged and the accumulator is scrap.

7. 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.

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.

8. Rotor control valve

No servicing is required of the rotor control valve other than a periodic check for oil leaks. The relief valve assembly within the block is calibrated by shims to give a setting of 193-207 $Kg/cm^2$ (2800 - 3000 PSI) On no account should this pressure be exceeded.

The operating spool and block are selectively assembled and cannot be supplied as separate components.

9. 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 ( ½ pints) S.A.E. 30/50 Tractor universal oil

10. Flail Head

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 and ensure that the spring washer is in good condition. Check the flail pivot bushes for possible damage or wear. They do not require oil.

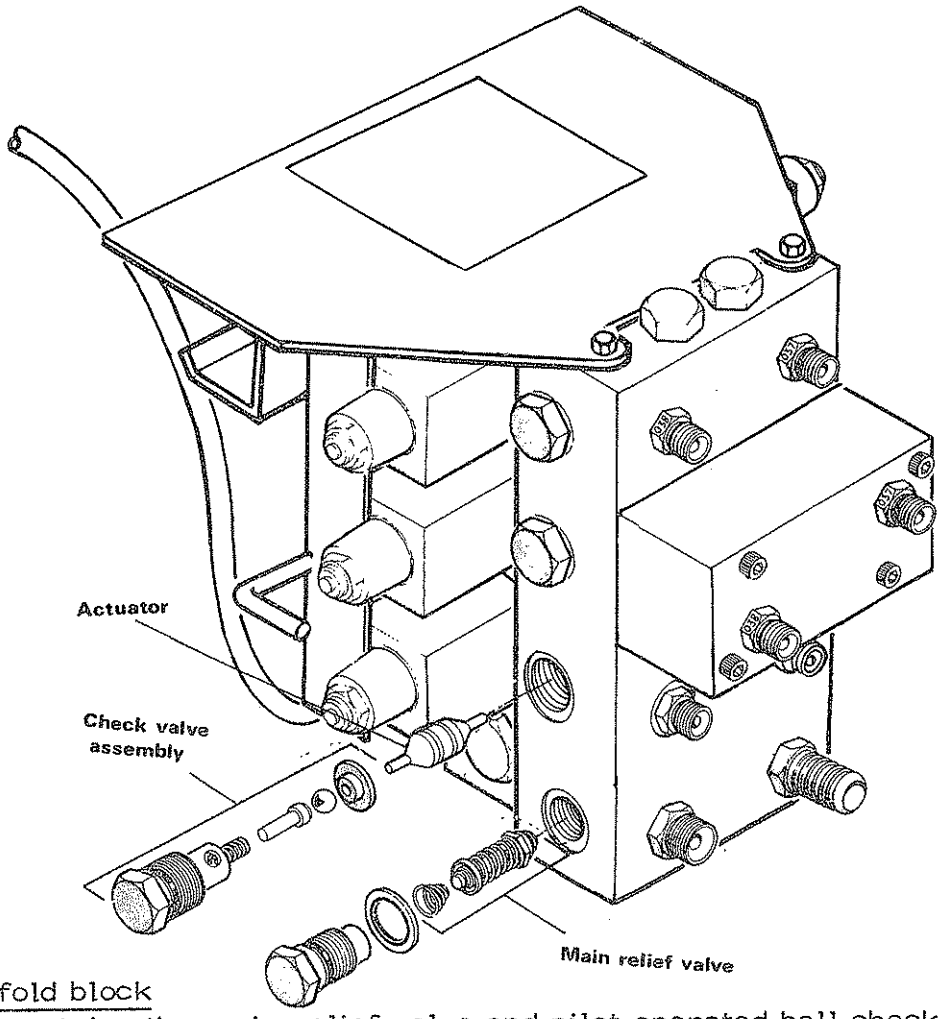
Do not attempt to run the rotor with flails missing. Im-balance will cause severe vibration and can rapidly damage the rotor shaft bearings. As an emergency measure if a flail is broken off or lost, remove another on the opposite side of the rotor to retain balance. Always replace flails in opposite 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 motor mounting nuts and bolts are kept tight. They should be checked during servicing.

11 Armhead control valve assembly

This valve assembly consists of three separate sections bolted together and comprise the solenoid operated valves, a manifold block and a hose plate for the angling section. In some cases this hose plate could be replaced by the float valve block where angling float is fitted.




a. Manifold block

This contains the main relief valve and pilot operated ball check valves. The main relief valve is pre-calibrated to 1800 psi (125 Bar) and is non-adjustable.

The ball check valves which are opened by a double ended sliding actuator allow the oil to flow from the ram whenever pressure oil is being supplied to the alternative port.

The check valves are all identical, no selective assembly is used in their construction and individual components can be supplied as separate spares as well as the valve in its entirety. A new seat will need to be impacted with the steel ball to form the seal.

Removal of a check valve invariably damages the '0' ring which seals it. It is essential that a new '0' ring is installed if the check valve is removed for inspection and cleaning.

Hoses to the reach and angling rams are connected at special restrictor unions to control speed of arm movement. For identification, restrictor stamped 'S' on its hexagon has an internal drilled diameter of 1.15mm, restrictor stamped 'L' has a diameter of 1.4mm and restrictor 'T' a diameter of 0.9mm. The restrictors should not be interchangeable in the block.

'Creep' of the rams could be caused by a loose check valve, dirt in the check valve, damaged or badly worn ball seat, or damage to the check valve seating in the manifold body.

b. Solenoid operated valves.

The valves are fastened to the manifold block by four cap screws. Each consists of a cast iron body with a hardened spool. The 12 volt 28 watt solenoids push the spool to give flow out of the port furthest from the solenoid. The spool is returned to its central neutral position by a spring. The valves are double-acting on the lift, reach and angle circuits and connect the supply to and from the appropriate ram. A separate single acting valve operates a 'cut-off' simultaneously with the directional valves and closes the normal free return line back to the reservoir.

A 'push-pin' in the end of the solenoid armature allows manual operation of the valve in the event of failure of electrical supply. When investigating power failure the 'push-pin' can be operated to ascertain that the hydraulic system is working correctly, and a 12 v bulb wired across the terminals will show whether the fault is an electrical one.

Note: Sparking the leads could blow the fuse

For spares purposes, the valve bodies and spools are supplied as matched components only. Solenoids can also be individually replaced. To release the solenoid from the valve-block undo the lock nut and slide the solenoid off the armature tube which is screwed into the block. If the armature tube is also removed, ensure that the hexagon push rod and spring are in place and the '0' ring in position on re-assembly. Caution should be exercised that the minimum of force is used in screwing the armature tube back into place. Likewise when re-assembling the solenoid ensure the rubber sealing gasket is in place and do not overtighten the locking nut.

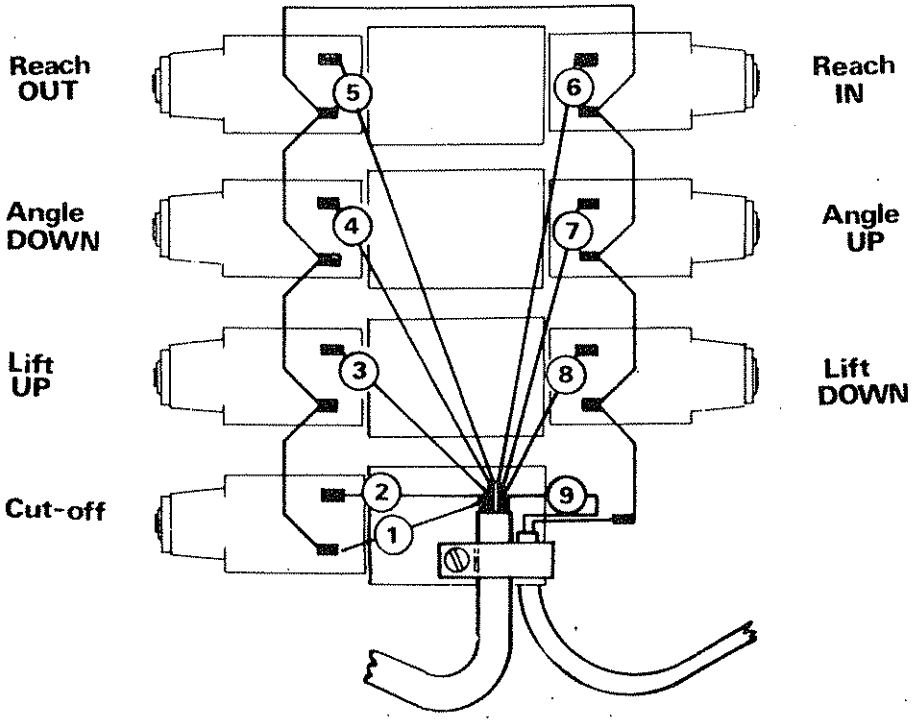
On reassembly the following torque settings apply:-

Tightening solenoid tube into body 2.5kg-M (18 lbs.ft)
Tightening nut onto tube 1.2kg M (9lbs.ft)

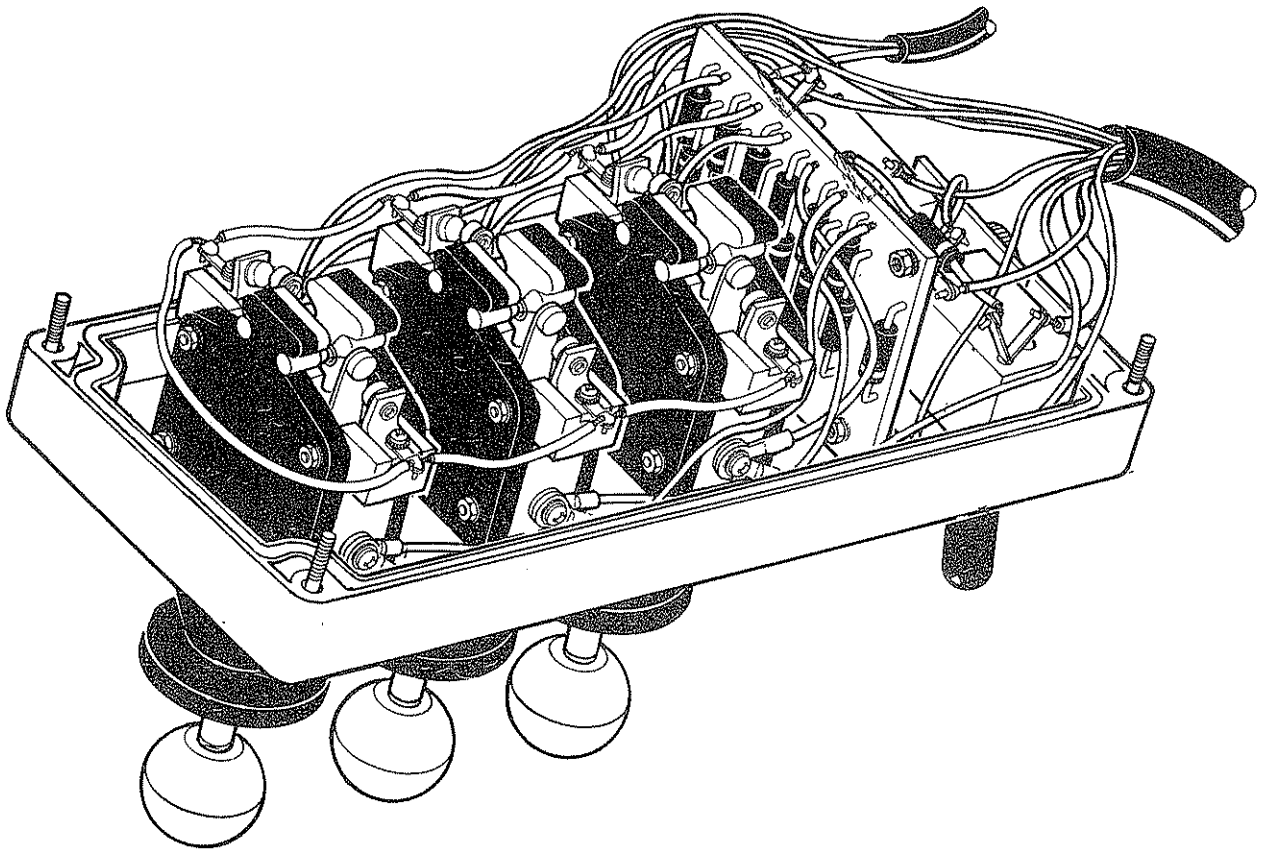
Wiring circuit

A common earth lead identified by a number 1 on its sleeve is wired in parallel to all the solenoids. The individual circuit leads are similarly identified with numbered sleeves.

For carrying out maintenance work on the machine when the protective cover is removed, disconnect the power supply at the jack plug on the electric control box. This will avoid any accidental short circuiting and possible fuse failure.



## 12 Electric Control Unit



The control unit contains three lever switch units each comprising two contact breaker assemblies. Little maintenance should be required other than light cleaning of the contact points with a suitable points cleaning file if switching should become intermittent after a prolonged period of use.

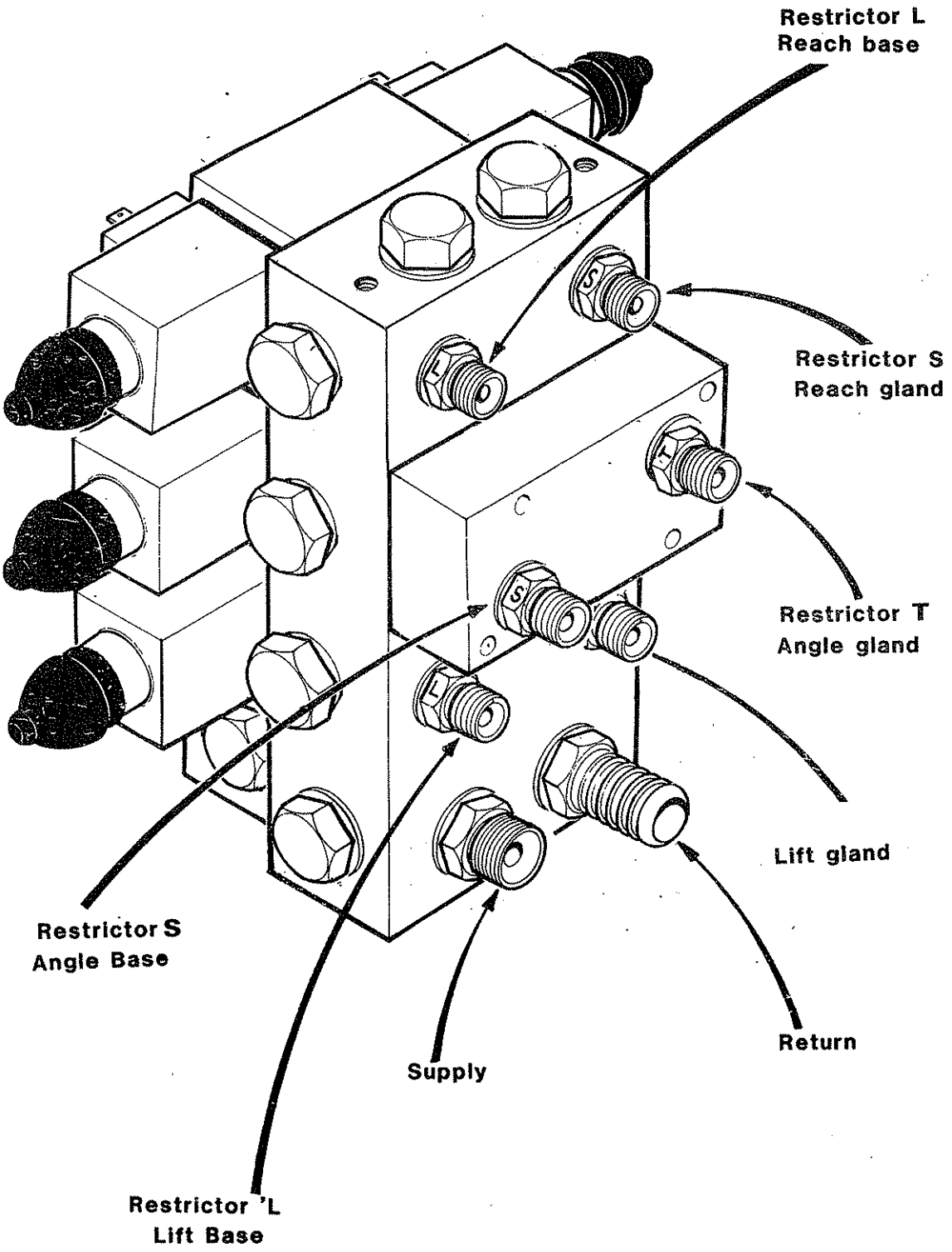
Access can be gained to the inside of the box by unscrewing the lid securing screws and carefully raising the lid. It may be necessary to loosen the larger of the two cable clamps to do this. On completion the six contact assemblies are easily accessible.

In addition the unit is equipped with two toggle switches, a power isolator switch and an auxiliary service switch. The latter is used for activating the automatic head angling float if fitted.

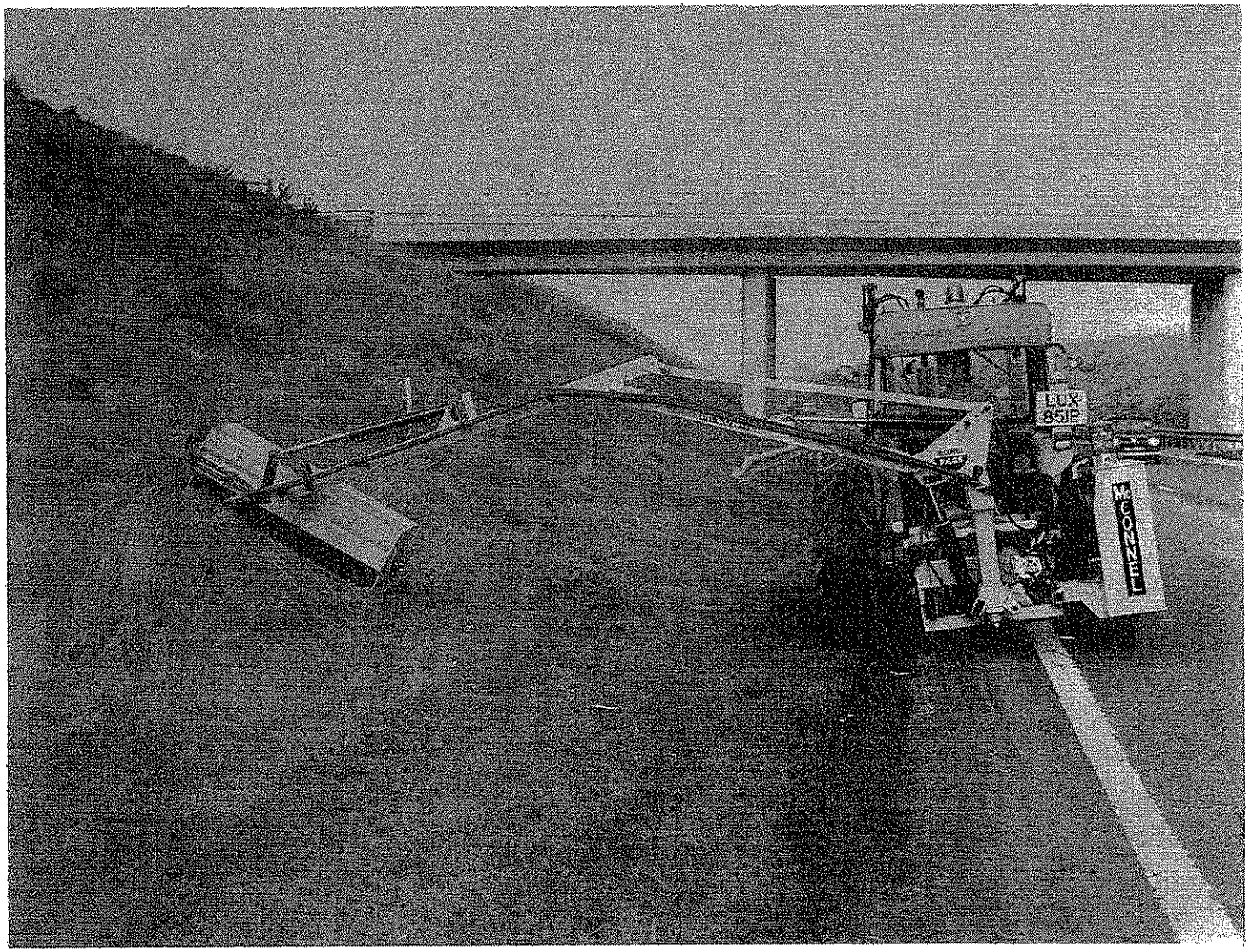
The complete assembly is protected by a 10 amp. fuse in the power supply cable.

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, remembering that the cut-off solenoid pin must also be operated at the same time. A 12 volt. 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.

## HOSE CONNECTIONS



# SPARE PARTS MANUAL




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.

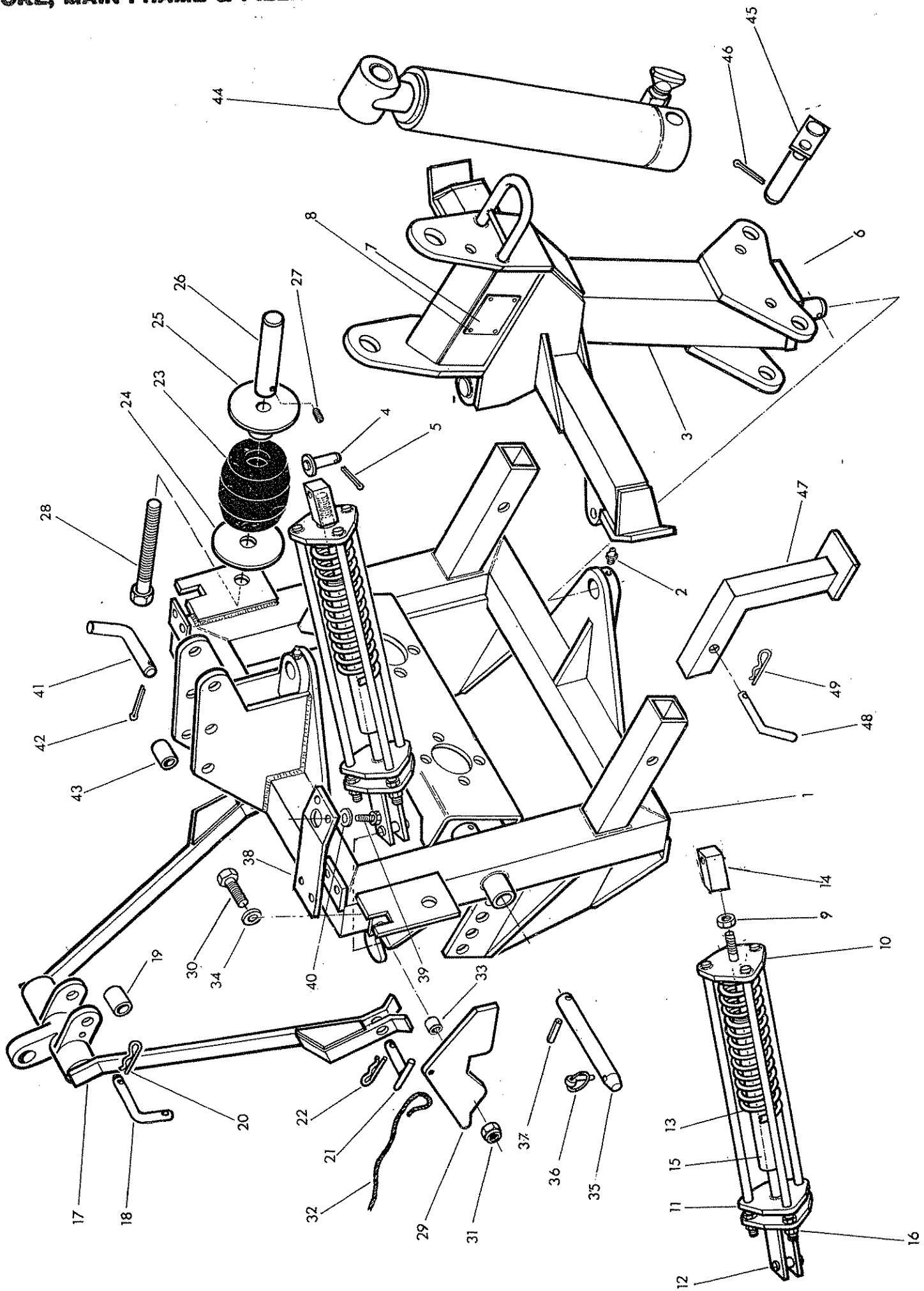
Always quote machine type and serial number as well as the part number.

Design improvements 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.

THE DOT SYSTEM

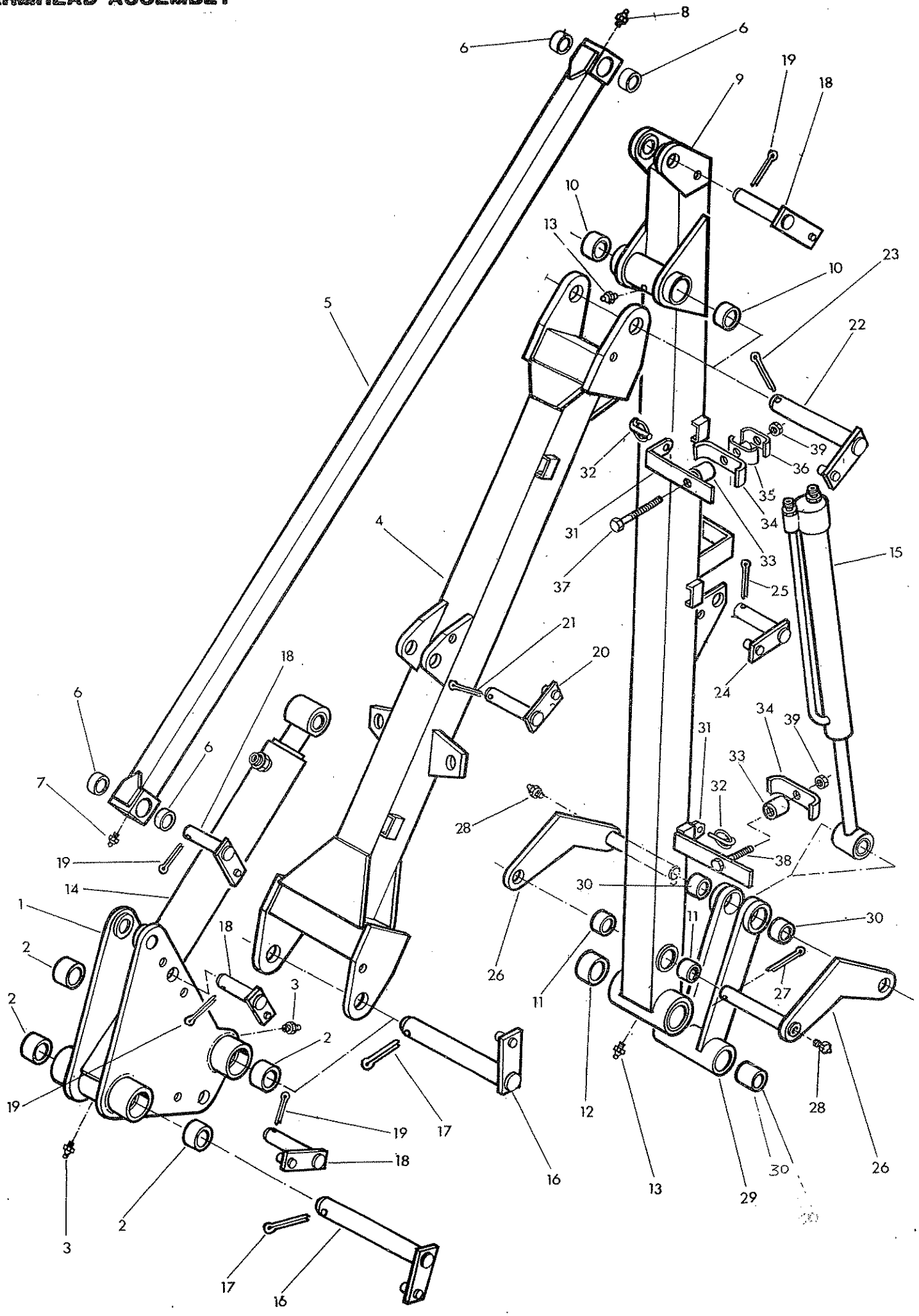
Many spares are supplied as Assemblies or as Sub-assemblies and, to help the customer determine the composition of an Assembly, the Dot System is used. The Main Assembly will not show a dot preceding its description and is printed in BLOCK CAPITALS. Subsequent listed parts are preceded by one or more dots until the next major assembly is reached. An increase in the number of preceding dots indicates that the item is an associated part of the preceding item. Whenever the number of dots are decreased by one this indicates the termination of an assembly.

# YOKE; MAIN FRAME & PILLAR



| Ref | Part No. | Qty | Description |
|---|---|---|---|
| | | | POWER ARM 35 FLAIL |
| 1 | 71 35 265 | 1 | .Main Frame c/w greaser |
| 2 | 09 01 121 | 2 | ..Greaser 1/8 BSP - straight |
| 3 | 71 35 285 | 1 | .Pillar c/w pins etc |
| 4 | 71 35 067 | 1 | ..Anchor pin c/w split pin |
| 5 | 95 01 406 | 1 | ...Split pin Ø 5 x 40 |
| 6 | 04 21 832 | 1 | ...Spring dowel ¼" dia x 2" long. |
| 7 | 71 35 052 | 1 | ..Serial plate |
| 8 | 71 03 230 | 4 | ..Pop rivet 1/8" diameter |
| | 71 35 314 | 1 | .Breakaway assistor spring assy. Compr:- |
| 9 | 01 11 006 | 1 | ..Nut 5/8 UNF |
| 10 | 71 35 315 | 1 | ..Spring cage. |
| 11 | 71 35 316 | 1 | ..Tie rod |
| 12 | 71 35 317 | 1 | ..Jaw End. |
| 13 | 71 35 298 | 1 | ..Spring. |
| 14 | 71 35 081 | 1 | ..Pinned end. |
| 15 | 71 35 082 | 1 | ..Spacer |
| 16 | 01 11 003 | 6 | ..Nut 3/8 UNF |
| 17 | 71 35 335 | 1 | .Stabilizer c/w pins etc. |
| 18 | 14 67 049 | 1 | ..Top link pin c/w sleeve |
| 19 | 14 67 063 | 1 | ...Sleeve |
| 20 | 04 31 105 | 1 | ...Spring cotter. |
| 21 | 71 11 007 | 2 | ...Stabilizer pin c/w spring cotter. |
| 22 | 04 31 105 | 1 | ...Spring cotter |
| 23 | 71 35 033 | 1 | .Breakaway buffer. |
| 24 | 71 35 035 | 1 | .Buffer disc. |
| 25 | 71 35 034 | 1 | .Buffer locating disc |
| 26 | 71 35 289 | 1 | .Buffer abutment c/w grub screw |
| 27 | 93 63 034 | 1 | ..Grub screw - cup point M8 x 16 |
| 28 | 71 35 293 | 1 | .Buffer bolt |
| 29 | 71 35 299 | 1 | .Latch c/w nut, bolt , cord, spacer and washer |
| 30 | 92 13 126 | 1 | ..Bolt M12 x 60 |
| 31 | 91 43 006 | 1 | ..Self locking nut M12 |
| 32 | 71 35 036 | 1 | ..Operating cord. |
| 33 | 71 35 097 | 1 | ..Spacer |
| 34 | 01 00 105 | 1 | ..Plain washer. |
| 35 | 71 35 039 | 2 | .Linkage pin c/w dowel & pin |
| 36 | 04 31 217 | 1 | ..Linch pin |
| 37 | 04 22 628 | 1 | ..Spring dowel 3/8" dia. x 1 3/4" long. |
| 38 | 71 35 079 | 1 | .Valve mounting bracket c/w screw etc. |
| 39 | 93 13 054 | 2 | ..Setscrew M8 x 25 |
| 40 | 91 00 204 | 2 | ..Spring washer Ø8 |
| 41 | 14 67 049 | 1 | .Top link pin c/w spring cotter, sleeve |
| 42 | 04 31 105 | 1 | ..Spring cotter. |
| 43 | 14 67 063 | 1 | ..Sleeve |
| 44 | 71 35 278 | 1 | .Lift Ram assembly (see page 64) |
| 45 | 71 35 028 | 1 | .Base end pin - lift ram c/w split pin |
| 46 | 05 03 166 | 1 | ..Split pin ¼" dia. x 2" long. |
| 47 | 71 35 288 | 2 | .Leg c/w pin |
| 48 | 71 09 060 | 1 | ..Leg pin c/w spring cotter. |
| 49 | 04 31 105 | 1 | ...Spring cotter. |
| | 71 14 289 | 1 | .P.T.O. shaft assembly - not illustrated. |

# ARMHEAD ASSEMBLY

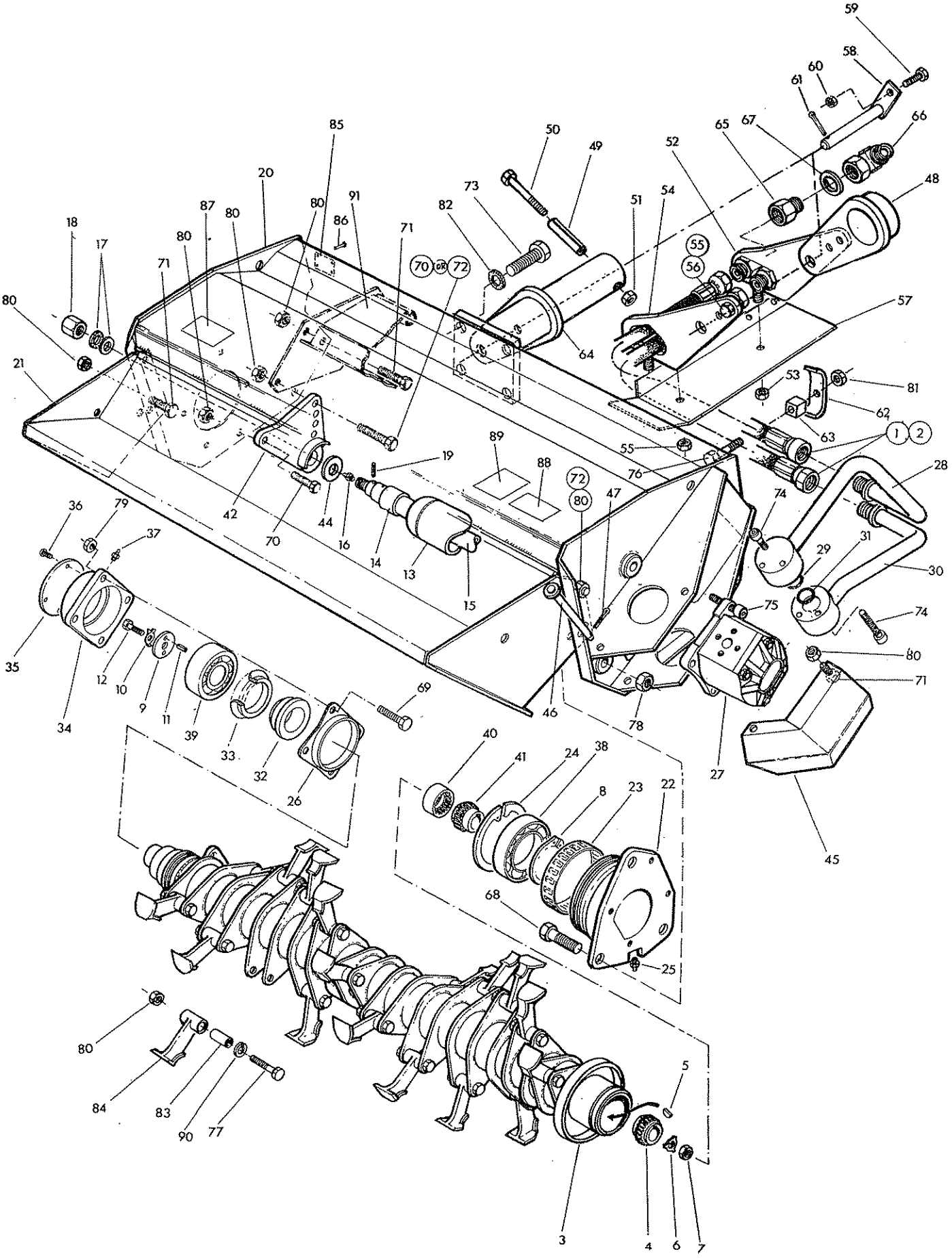


| Ref | Part No. | Qty | Description |
|---|---|---|---|
| | | | POWER ARM 35 FLAIL (Continued) |
| 1 | 71 35 273 | 1 | .Rocker c/w bushes and greaser. |
| 2 | 72 13 023 | 4 | ..Bush |
| 3 | 09 01 121 | 2 | ..Greaser 1/8"BSP - straight. |
| 4 | 71 35 270 | 1 | .Main Arm. |
| 5 | 71 35 272 | 1 | .Tension link c/w bushes and greaser. |
| 6 | 60 12 032 | 4 | ..Bush |
| 7 | 09 01 121 | 1 | ..Greaser 1/8BSP- straight. |
| 8 | 09 01 124 | 1 | ..Greaser 1/8BSP - 67½° |
| 9 | 71 35 271 | 1 | .Dipper arm c/w bushes and greaser. |
| 10 | 72 13 023 | 2 | ..Bush |
| 11 | 71 01 083 | 2 | ..Bush |
| 12 | 71 11 175 | 2 | ..Bush |
| 13 | 09 01 121 | 2 | ..Greaser 1/8 BSP - straight. |
| 14 | 71 35 279 | 1 | .Reach ram assembly (see page 65) |
| 15 | 71 35 290 | 1 | .Angling ram assembly (see page 66) |
| 16 | 71 35 025 | 2 | .Main arm and rocker pivot pin c/w split pin |
| 17 | 95 01 509 | 1 | ..Split pin Ø10 x 50 |
| 18 | 71 35 028 | 4 | .Pivot pin c/w split pin - tension link Reach ram base, Lift ram rod. |
| 19 | 05 03 166 | 1 | ..Split pin ¼" dia x 2" long. |
| 20 | 71 35 027 | 1 | .Reach ram rod pin c/w split pin |
| 21 | 05 03 166 | 1 | ..Split pin ¼" dia x 2" long |
| 22 | 71 35 026 | 1 | .Dipper pivot pin c/w split pin |
| 23 | 95 01 509 | 1 | ..Split pin Ø10 x 50 |
| 24 | 71 35 029 | 1 | .Angle ram base pin c/w split pin |
| 25 | 05 03 126 | 1 | ..Split pin ¼" dia. x 1½" long. |
| 26 | 71 11 053 | 2 | .Radius arm c/w split pin |
| 27 | 95 01 406 | 1 | ..Split pin Ø5 x 40 |
| 28 | 09 01 121 | 1 | ..Greaser 1/8" BSP straight. |
| 29 | 71 14 340 | 1 | .Slave link c/w bushes. |
| 30 | 71 01 083 | 4 | ..Bush |
| 31 | 71 09 073 | 5 | .Hose bracket c/w linch pin |
| 32 | 04 31 217 | 1 | ..Linch pin |
| 33 | 71 35 093 | 5 | .Spacer. |
| 34 | 71 35 092 | 5 | .Hose clip upper - large |
| 35 | 71 14 076 | 3 | .Hose clip lower - small |
| 36 | 71 14 075 | 3 | .Hose clip upper - small |
| 37 | 92 13 165 | 3 | .Bolt M10 x 80 |
| 38 | 92 13 125 | 2 | .Bolt M10 x 60 |
| 39 | 91 43 005 | 5 | .Nut M10 |

# 1·2 METRE HEDGE FLAIL (Sheet 1 of 2 )

FOR MACHINES AFTER APRIL 1986

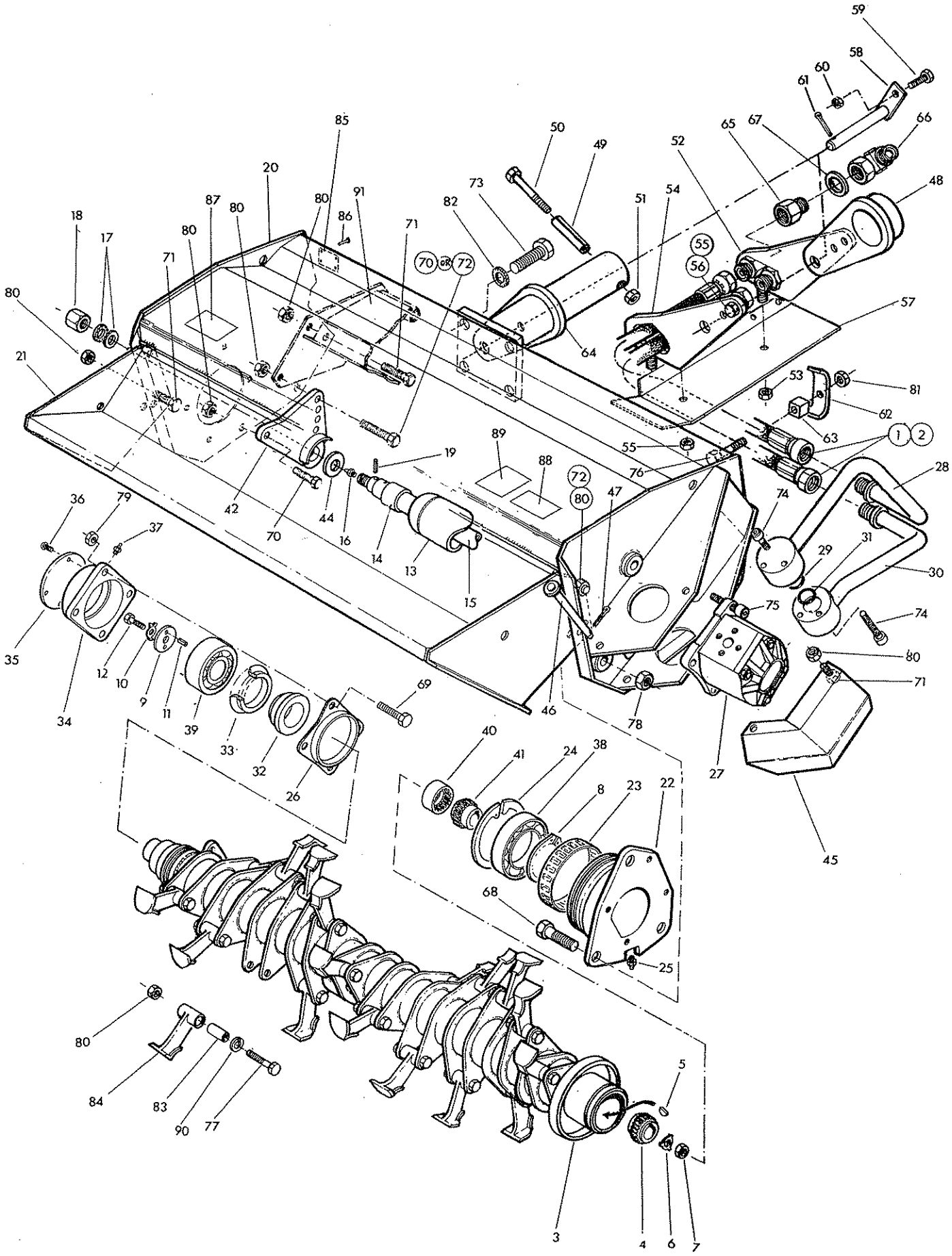
For machines pre April 1986 see pages 68 - 71 inclusive.



| | Ref | Part No | Qty | Description |
|---|---|---|---|---|
| | | 71 35 320 | | 1.2 METRE HEDGE FLAIL R. HAND |
| | 1 | 85 18 055 | | .Hose 3/4 BSP SF - SF x 42" long |
| | | 71 35 322 | | 1.2 METRE HEDGE FLAIL L. HAND |
| | 2 | 85 18 045 | | .Hose 3/4 BSP SF - SF x 25" long |
| | | The remaining items are common to both 1.2 metre hedge flails | | |
| | 3 | 71 14 485 | 1 | .Rotor c/w coupling half, nuts etc |
| * | 4 | 71 14 104 | 1 | ..Coupling half |
| | 5 | 83 01 010 | 1 | ..Woodruff key |
| | 6 | 82 01 139 | 1 | ..Tab washer Ø 14 |
| | 7 | 91 00 015 | 1 | ..Hexagon nut M14 |
| | 8 | 04 01 290 | 1 | ..External circlip Ø 90 |
| | 9 | 71 40 005 | 1 | ..Bearing clamp washer |
| | 10 | 71 14 179 | 1 | ..Tab washer Ø 12 |
| | 11 | 04 25 522 | 1 | ..Spring dowel Ø 5 x 22 |
| | 12 | 93 13 066 | 1 | ..Setscrew M12 x 30 |
| | 13 | 71 14 095 | 1 | .Roller c/w bush |
| | 14 | 72 13 023 | 2 | ..Bush |
| | 15 | 71 14 377 | 1 | .Roller tie rod c/w spring dowel, greaser etc |
| | 16 | 09 01 121 | 1 | ..Greaser 1/8 BSP - straight |
| | 17 | 71 14 177 | 2 | ..Cam washer |
| | 18 | 71 14 176 | 1 | ..Special roller nut |
| | 19 | 04 21 808 | 1 | ..Spring dowel 1/4" dia x 1/2" long |
| | 20 | 71 14 325 | 1 | .Flail casing |
| | 21 | 71 14 335 | 1 | .Front hood - for upward cutting |
| | 22 | 71 14 298 | 1 | .Bearing housing (motor end) c/w tolerance ring etc |
| | 23 | 71 14 042 | 1 | ..Tolerance ring |
| | 24 | 71 14 043 | 1 | ..Internal circlip Ø 140 |
| | 25 | 09 01 125 | 1 | ..Greaser 1/8 BSP 45° |
| | 26 | 71 14 464 | 1 | .Shroud ring |
| | 27 | 83 01 263 | 1 | .Hydraulic motor |
| | 28 | 71 14 487 | 1 | .Rigid pipe upper c/w 'O' ring |
| | 29 | 86 00 121 | 1 | .'O' ring |
| | 30 | 71 14 488 | 1 | .Rigid pipe lower c/w 'O' ring |
| | 31 | 86 00 121 | 1 | ..'O' ring |
| | 32 | 71 40 006 | 1 | .Seal carrier |
| | 33 | 86 29 163 | 1 | .V seal |
| | 34 | 71 40 273 | 1 | .Bearing housing (free end) c/w cover etc |
| | 35 | 71 40 007 | 1 | ..End cover |
| | 36 | 93 00 125 | 4 | ..Capscrew domed socket hd. M6 x 16 |
| | 37 | 09 01 121 | 1 | ..Greaser 1/8 BSP - straight |
| | 38 | 06 00 043 | 1 | .Ball bearing - motor end (6018Z) |
| | 39 | 06 00 072 | 1 | .Ball bearing - self aligning - free end |
| * | 40 | 71 14 103 | 1 | .Coupling sleeve |
| * | 41 | 71 14 104 | 1 | .Coupling half |
| | 42 | 71 14 483 | 1 | .Roller bracket - R Hand |
| | | 86 99 106 | | SEAL KIT FOR HYDRAULIC MOTOR |

* Spares note:- Items 4, 40 and 41 are available as a complete drive coupling assembly part No. 71 14 105

# 1-2 METRE HEDGE FLAIL - Continued

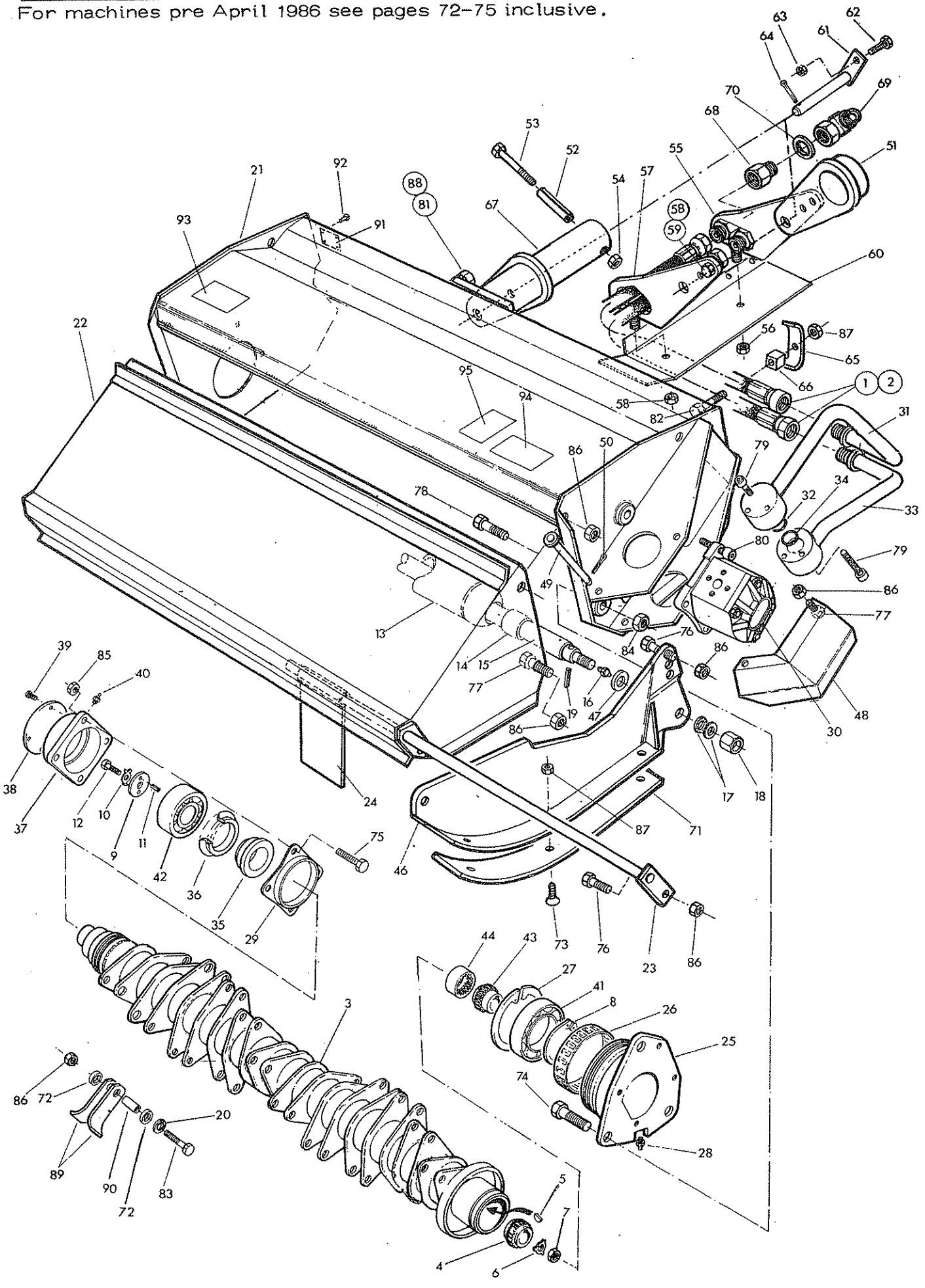


| Ref | Part No | Qty | Description |
|---|---|---|---|
| | | | 1.2 METRE HEDGER FLAILS (Continued) |
| 43 | 71 14 484 | 1 | .Roller bracket L. Hand - not illus |
| 44 | 60 01 136 | 2 | .Thrust washer |
| 45 | 71 14 337 | 1 | .Motor cover |
| 46 | 71 14 049 | 1 | .Motor cover mounting pin c/w split pin |
| 47 | 05 03 095 | 1 | ..Split pin 3/16" dia x 1 1/8 |
| 48 | 71 14 109 | 1 | .Jaw plate c/w nut bolt etc |
| 49 | 04 23 548 | 1 | ..Spring dowel 5/8 dia x 3" long |
| 50 | 92 13 185 | 1 | ..Bolt M10 x 90 |
| 51 | 91 43 005 | 1 | ..Self locking nut M10 |
| 52 | 71 14 489 | 1 | .Hose bracket c/w nut |
| 53 | 01 41 005 | 1 | ..Self locking nut 1/2" UNF |
| 54 | 71 14 491 | 1 | .Hose guard support bracket c/w nuts etc |
| 55 | 01 41 005 | 2 | ..Self locking nut |
| 56 | 03 11 105 | 1 | ..Setscrew 1/2" UNF x 1 1/4" long |
| 57 | 71 14 492 | 1 | .Hose guard tray |
| 58 | 71 36 076 | 1 | .Slave link pin c/w nut bolt etc |
| 59 | 93 13 106 | 1 | ..Bolt M12 x 50 |
| 60 | 91 43 006 | 1 | ..Self locking nut M12 |
| 61 | 95 01 406 | 1 | ..Split pin Ø 5 x 40 |
| 62 | 71 35 092 | 1 | .Pipe clamp |
| 63 | 71 35 093 | 1 | .Clamp spacer |
| 64 | 71 14 341 | 1 | .Forward extension |
| 65 | 85 81 224 | 1 | .Extension adaptor 3/4 BSP M-F |
| 66 | 85 81 160 | 2 | .90° swivel elbow 3/4 BSP M-F |
| 67 | 86 50 106 | 1 | .Bonded seal 3/4 BSP |
| 68 | 73 14 146 | 3 | .Special bolt M16 x 50 |
| 69 | 03 11 146 | 4 | .Setscrew 5/8 UNF x 1¾" long |
| 70 | 03 11 105 | 4 | .Setscrew 1/2" UNF x 1¼" long |
| 71 | 03 11 085 | 4 | .Setscrew 1/2" UNF x 1" long |
| 72 | 03 11 125 | 2 | .Setscrew 1/2" UNF x 1½" long |
| 73 | 03 11 106 | 4 | .Setscrew 5/8 UNF x 1¼" long |
| 74 | 93 00 014 | 6 | .Capscrew - socket hd. 'Wedglok' M10 x 30 |
| 75 | 93 00 104 | 4 | .Capscrew - socket hd. 'Wedglok' M10 x 40 |
| 76 | 92 13 125 | 1 | .Bolt M10 x 60 |
| 77 | 71 14 032 | 24 | .Special bolt ½" UNF |
| 78 | 91 43 007 | 3 | .Self locking nut M16 |
| 79 | 01 41 006 | 4 | .Self locking nut 5/8 UNF |
| 80 | 01 41 005 | 32 | .Self locking nut ½" UNF |
| 81 | 91 43 005 | 1 | .Self locking nut M10 |
| 82 | 01 00 406 | 4 | .External serrated washer 5/8" dia |
| 83 | 71 14 159 | 24 | .Flail pivot bush |
| 84 | 71 14 312 | 24 | .Flail F12H |
| 85 | 73 14 087 | 1 | .Serial No. plate |
| 86 | 71 03 230 | 4 | .Pop rivet 1/8" dia |
| 87 | 71 14 481 | 1 | .Safety sticker - Bolt tightness |
| 88 | 73 14 399 | 1 | .Safety sticker - Rotating cutters |
| 89 | 12 90 006 | 1 | .Safety sticker - Rotor speed |
| 90 | 01 00 205 | 24 | .Spring washer ½" dia |
| | OPTIONAL EXTRA | | |
| 91 | 71 14 336 | 1 | Rear hood for downward cutting |
| | 03 11 125 | 2 | Bolt ½" UNF x 1½" long - bottom ) not illus |
| | 03 11 085 | 2 | Bolt ½" UNF x 1" long - top ) |
| | 01 41 005 | 2 | Self locking nut ½ UNF |

# 1·2 METRE GRASS FLAIL (Sheet 1 of 2)

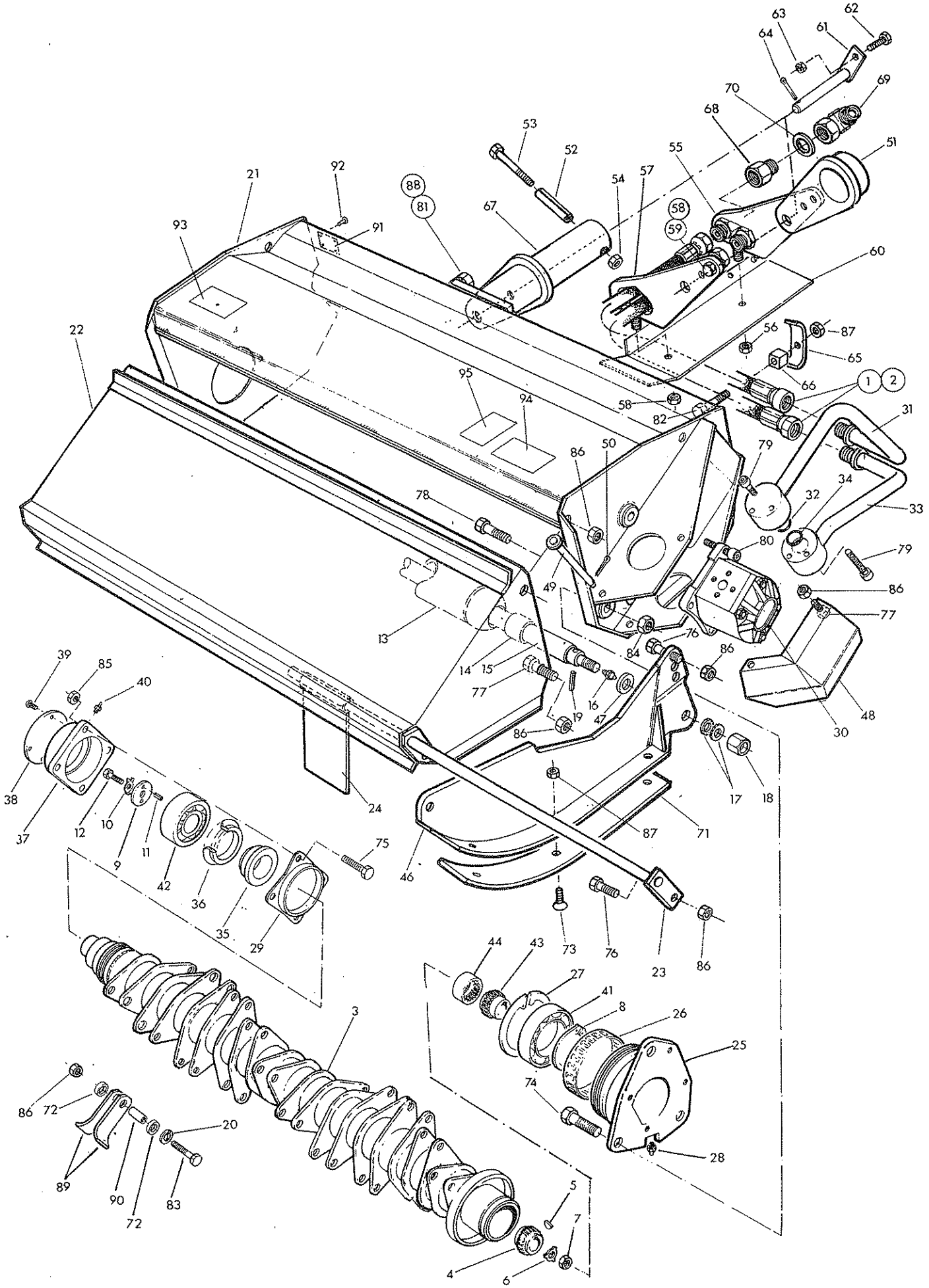
FOR MACHINES AFTER APRIL 1986

For machines pre April 1986 see pages 72–75 inclusive.



| | Ref | Part No. | Qty | Description |
|---|---|---|---|---|
| | | 71 35 321 | | 1.2 METRE GRASS FLAIL R HAND |
| | 1 | 85 18 055 | 2 | .Hose 3/4 BSP x 42" long |
| | | 71 35 323 | | 1.2 METRE GRASS FLAIL L HAND |
| | 2 | 85 18 045 | 2 | .Hose 3/4 BSP x 25" long |
| | 3 | 71 14 485 | 1 | .Rotor 1.2M c/w coupling half nuts etc. |
| | | Items 4 - 12 inclusive are common to both rotor assemblies | | |
| * | 4 | 71 14 104 | 1 | ..Coupling half |
| | 5 | 83 01 010 | 1 | ..Woodruff key |
| | 6 | 82 01 139 | 1 | ..Tab washer Ø 14 |
| | 7 | 91 00 015 | 1 | ..Hexagon nut M 14 |
| | 8 | 04 01 290 | 1 | ..External circlip Ø90 |
| | 9 | 71 40 005 | 1 | ..Bearing clamp washer |
| | 10 | 71 14 179 | 1 | ..Tab washer Ø 12 |
| | 11 | 04 25 522 | 1 | ..Spring dowel Ø 5 x 22 |
| | 12 | 93 13 066 | 1 | ..Setscrew M12 x 30 |
| | 13 | 71 14 096 | 1 | .Roller 1.2M c/w bush |
| | 14 | 72 13 023 | 2 | ..Bush |
| | 15 | 71 14 377 | 1 | .Roller tie rod 1.2M c/w spring dowel and greaser etc |
| | 16 | 09 01 121 | 1 | ..Greaser 1/8 BSP - straight |
| | 17 | 71 14 177 | 2 | ..Cam washer |
| | 18 | 71 14 176 | 1 | ..Special roller nut |
| | 19 | 04 21 808 | 1 | ..Spring dowel 1/4" dia x 1/2" long |
| | 20 | 01 00 205 | 24 | .Spring washer - 5/8 dia |
| | 21 | 71 14 325 | 1 | .Flail casing 1.2M |
| | 22 | 71 14 374 | 1 | .Grass hood 1.2M |
| | 23 | 71 14 119 | 1 | .Flap bar 1.2M |
| | 24 | 71 14 378 | 8 | .Flap |
| | 25 | 71 40 270 | 1 | .Bearing housing motor end c/w tolerance ring and circlip etc |
| | 26 | 71 14 042 | 1 | ..Tolerance ring |
| | 27 | 71 14 043 | 1 | ..Internal circlip Ø 140 |
| | 28 | 09 01 125 | 1 | ..Greaser 1/8" BSP - 45° |
| | 29 | 71 14 464 | 1 | .Shroud ring |
| | 30 | 83 01 263 | 1 | .Hydraulic motor |
| | 31 | 71 14 487 | 1 | .Rigid pipe upper c/w 'O' ring |
| | 32 | 85 00 121 | 1 | ..'O' ring |
| | 33 | 71 14 488 | 1 | .Rigid pipe lower c/w 'O' ring |
| | 34 | 86 00 121 | 1 | ..'O'ring |
| | 35 | 71 40 006 | 1 | .Seal carrier |
| | 36 | 85 29 163 | 1 | .'V' seal |
| | 37 | 71 40 273 | 1 | .Bearing housing - free end c/w cover etc |
| | 38 | 71 40 007 | 1 | ..End cover |
| | 39 | 93 00 125 | 4 | ..Capscrew - domed - socket headed M6 x 16 |
| | 40 | 09 01 121 | 1 | ..Greaser 1/3 BSP - straight |
| | 41 | 05 00 043 | 1 | .Ball bearing - motor end (6018Z) |
| | 42 | 06 00 072 | 1 | .Ball bearing - self aligning - free end |
| * | 43 | 71 14 103 | 1 | .Coupling sleeve |
| * | 44 | 71 14 104 | 1 | .Coupling half |
| | | 86 99 166 | | SEAL KIT FOR HYDRAULIC MOTOR |

*Spares note:- Items 4, 42 and 43 are available as a complete drive coupling assembly part number 71 14 105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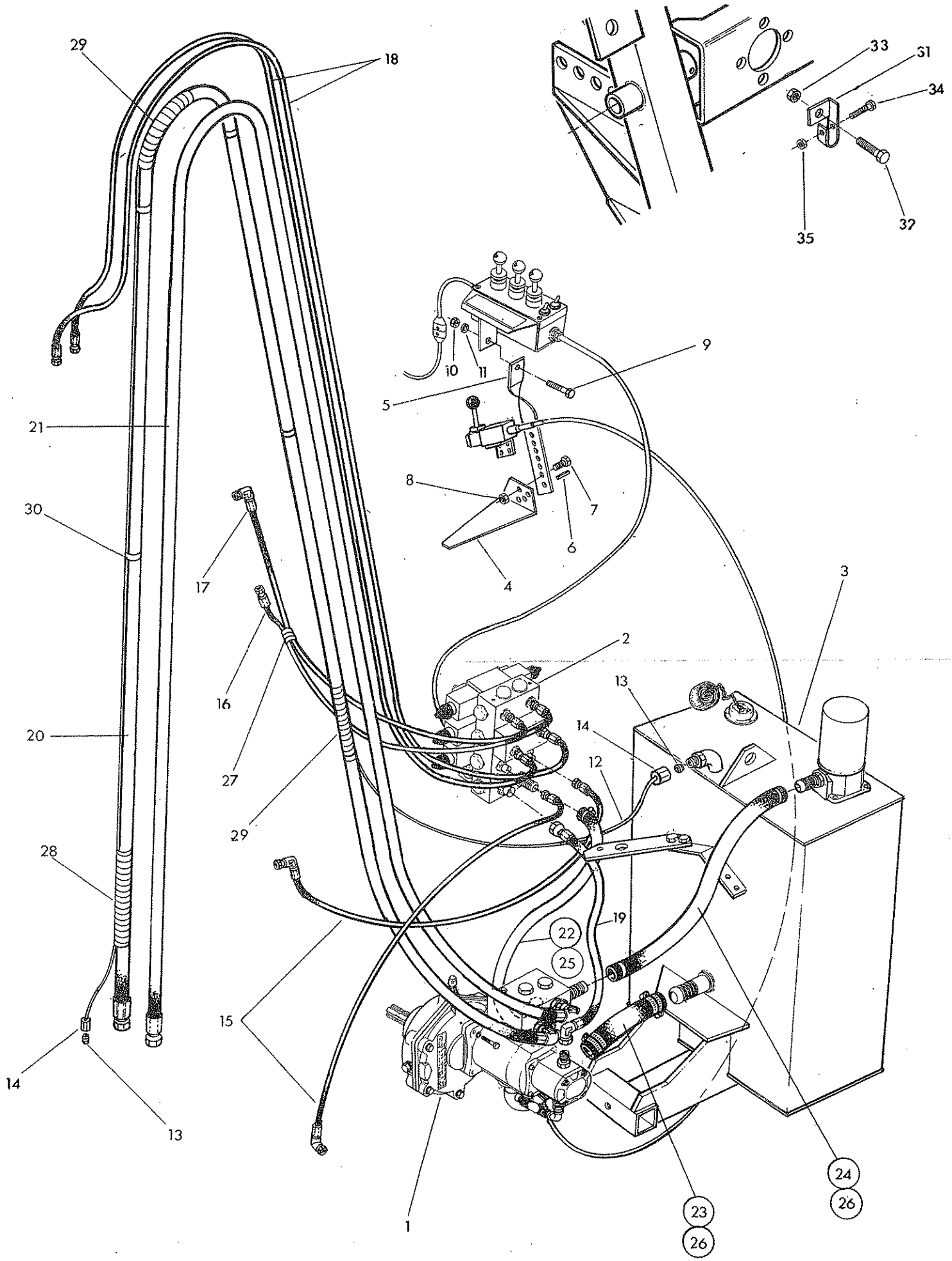
## 1.2METRE GRASS FLAILS (Continued)

| | | | |
|---|---|---|---|
| 45 | 71 14 376 | 1 | .Skid - L Hand |
| 46 | 71 14 375 | 1 | .Skid - R Hand - not illustrated |
| 47 | 60 01 136 | 2 | .Thrust washer |
| 48 | 71 14 337 | 1 | .Motor cover |
| 49 | 71 14 049 | 1 | .Motor cover mounting pin c/w split pin |
| 50 | 05 03 095 | 1 | .Split pin 3/16" dia x 1 1/8" long |
| 51 | 71 14 109 | 1 | .Jaw plate c/w nut bolt etc |
| 52 | 04 23 548 | 1 | ..Spring dowel 5/8" dia x 3" long |
| 53 | 92 13 185 | 1 | ..Bolt M10 x 90 |
| 54 | 91 43 005 | 1 | ..Self locking nut M10 |
| 55 | 71 14 489 | 1 | .Hose bracket c/w nut |
| 56 | 01 14 005 | 1 | ..Self locking nut ½" UNF |
| 57 | 71 14 491 | 1 | .Hose guard support bracket c/w nuts and bolts |
| 58 | 01 41 005 | 2 | ..Self locking nut ½" UNF |
| 59 | 03 11 105 | 1 | ..Setscrew ½" UNF x 1¾" long |
| 60 | 71 14 492 | 1 | .Hose guard tray |
| 61 | 71 36 076 | 1 | .Slave link pin c/w nut bolt etc |
| 62 | 93 13 106 | 1 | ..Bolt M12 x 50 |
| 63 | 91 43 005 | 1 | ..Self locking nut M12 |
| 64 | 95 01 406 | 1 | ..Split pin Ø 5 x 40 |
| 65 | 71 35 092 | 1 | .Pipe clamp |
| 66 | 71 35 093 | 1 | .Clamp spacer |
| 67 | 71 14 341 | 1 | .Forward extension |
| 68 | 85 81 224 | 1 | .Extension adaptor 3/4 BSP M - F |
| 69 | 85 81 160 | 2 | .90° elbow 3/4 BSP - M - F |
| 70 | 86 50 106 | 1 | .Bonded seal 3/4" BSP |
| 71 | 73 14 323 | 2 | .Skid runner |
| 72 | 71 14 121 | 48 | .Flail spacer |
| 73 | 93 33 065 | 6 | .Countersunk set screw M10 x 30 |
| 74 | 73 14 146 | 3 | .Special Bolt M16 x 50 |
| 75 | 02 11 145 | 4 | .Setscrew 5/8 UNF x 1¾" long |
| 76 | 03 11 105 | 4 | .Setscrew ½" UNF x 1¼" long - (roller) |
| 77 | 03 11 085 | 4 | .Setscrew ½" UNF x 1" long |
| 78 | 03 11 125 | 2 | .Setscrew ½ UNF x 1½" long |
| 79 | 93 00 014 | 6 | .Capscrew - socket hd 'wedglok' M10 x 60 |
| 80 | 93 00 104 | 4 | .Capscrew - socket hd 'wedglok' M10 x 40 |
| 81 | 03 11 106 | 4 | .Setscrew 5/8 UNF x 1¼" long |
| 82 | 92 13 125 | 1 | .Bolt M10 x 60 |
| 83 | 71 14 082 | 24 | .Special Bolt F½" UNF |
| 84 | 91 43 007 | 3 | .Self locking nut M16 |
| 85 | 01 43 005 | 4 | .Self locking nut 5/8 UNF |
| 86 | 01 41 005 | 36 | .Self locking nut ½" UNF |
| 87 | 91 43 005 | 7 | .Self locking nut M10 |
| 88 | 01 00 406 | 4 | .External serrated washer 5/8" dia |
| 89 | 71 14 120 | 48 | .Grass Flail F12 H |
| 90 | 71 14 159 | 24 | .Flail pivot bush |
| 91 | 73 14 087 | 1 | .Serial No. plate |
| 92 | 71 03 230 | 4 | .Pop rivet 1/8" dia |
| 93 | 71 14 481 | 1 | .Safety sticker - Bolt tightness |
| 94 | 73 14 399 | 1 | .Safety sticker - Rotating cutters |
| 95 | 12 90 006 | 1 | .Safety Sticker - Rotor Speed |

# HYDRAULIC INSTALLATION

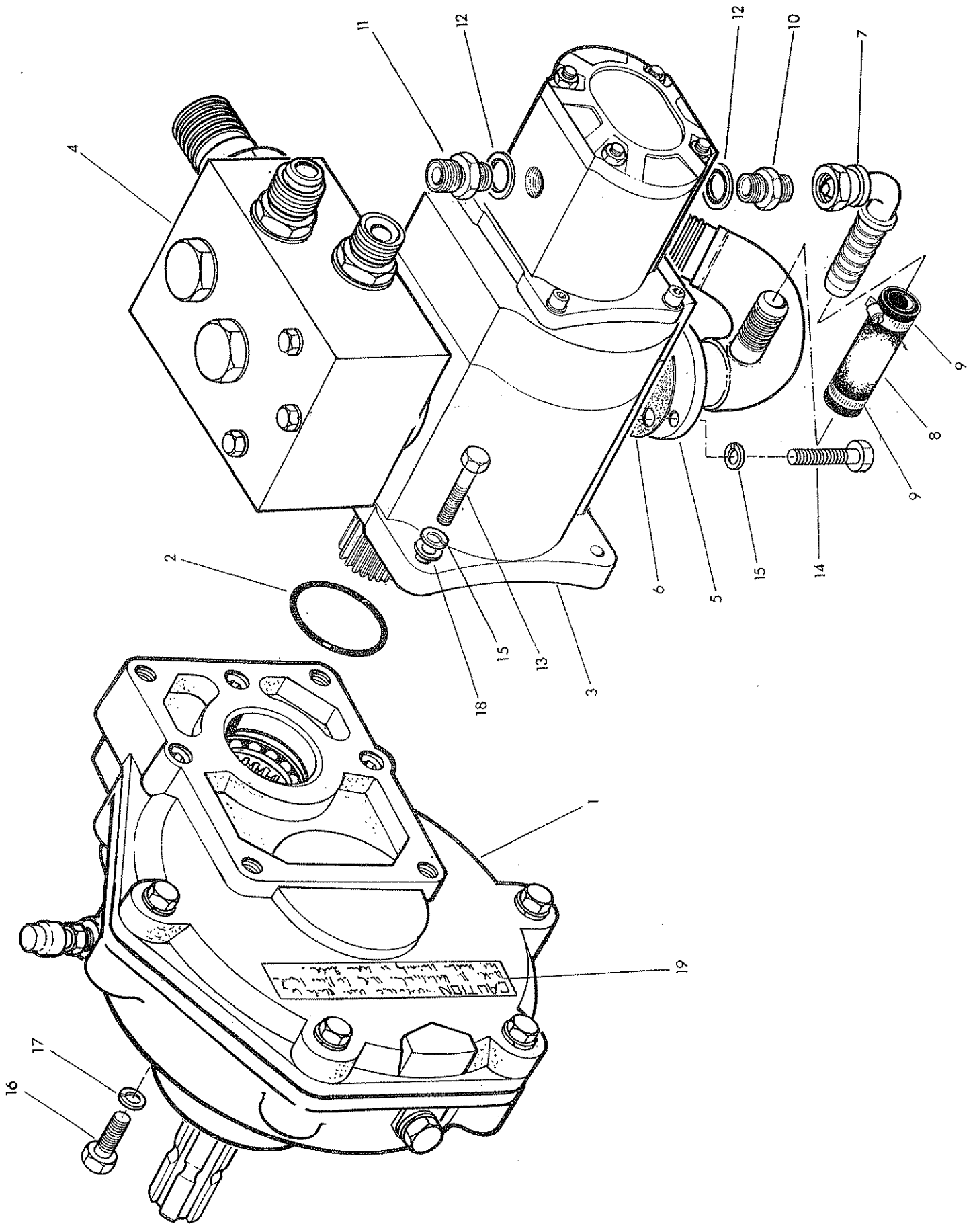
## Left hand build illustrated



| Ref | Part No. | Qty | Description |
|---|---|---|---|
| | 80 17 370 | | HYDRAULIC INSTALLATION |
| 1 | 80 13 364 | 1 | .Gearbox/Pump/Rotor control valve (see page 46 ) |
| 2 | 81 30 327 | 1 | .Electric control pack (see page 52 - 57 ) |
| 3 | 71 35 305 | 1 | .Hydraulic tank assembly (see page 58 ) |
| | 71 09 319 | 1 | .Valve mounting plate & pillar compr:- |
| 4 | 71 09 320 | 1 | ..Sandwich plate |
| 5 | 71 09 146 | 1 | ..Pillar c/w spring dowel. |
| 6 | 04 22 816 | 1 | ...Spring dowel. |
| 7 | 93 13 066 | 1 | ..Setscrew M12 x 30 |
| 8 | 91 13 006 | 1 | ..Plain nut M12 |
| 9 | 03 11 086 | 1 | ..Setscrew 5/8 UNF x 1" long |
| 10 | 01 11 006 | 1 | ..Plain nut 5/8 UNF |
| 11 | 01 00 206 | 1 | ..Spring washer 5/8" dia. |
| * 12 | 85 01 127 | 1 | .Nylon motor drain tube 5.6m long. |
| * 13 | 85 81 199 | 2 | .Brass olive Ø8 |
| * 14 | 85 81 200 | 2 | .Female nut. |
| 15 | 85 35 022 | 2 | .Hose ¼" BSP St.- 90° x 48" long - lift. |
| 16 | 85 15 052 | 1 | .Hose ¼ BSP -St -St x 40" long - Reach base |
| 17 | 85 35 072 | 1 | .Hose ¼ BSP St - 90° x 60" long - Reach gland. |
| 18 | 85 15 012 | 2 | .Hose ¼ BSP St - St x 156" long - Angle. |
| 19 | 85 31 303 | 1 | .Hose 3/8 BSP St - 90° x 42 " long - supply |
| 20 | 85 01 116 | 1 | .Hose 3/4" BSP St - 90° x 205 long - motor supply |
| 21 | 85 01 121 | 1 | .Hose 3/4 BSP St x 1 1/16 JIC 90° x 205 long-motor return. |
| 22 | 85 01 129 | 1 | .Hose 5/8 bore x 35" long - return to R.C . valve. |
| 23 | 85 01 122 | 1 | .Hose 1½" bore x 11 3/4long - suction from tank. |
| 24 | 85 01 130 | 1 | .Hose 1¼" dia. x 46" long - return to tank |
| 25 | 09 04 204 | 2 | .Hose clip for 5/8 bore hose. |
| 26 | 09 04 107 | 6 | .Hose clip (4 for 1½ bore, 2 for 1¼ bore hose) |
| 27 | 71 35 090 | 1 | .Hose armour 50mm long. |
| * 28 | 71 35 091 | 1 | .Hose armour 700mm long. |
| * 29 | 71 15 173 | 2 | .Hose armour 300mm long. |
| * 30 | 71 35 084 | 6 | .Nylon tube tie. |
| 31 | 71 35 094 | 1 | .Rotor cable clamp c/w nuts bolts. |
| 32 | 93 13 046 | 1 | ..Setscrew M12 x 20 |
| 33 | 91 43 006 | 1 | ..Self locking nut |
| 34 | 93 13 054 | 1 | ..Setscrew M8 x 25 |
| 35 | 91 43 004 | 1 | ..Self locking nut. |

* SPARES NOTE
On machines after April 1986 items 12,13,14,28 29 and 30 are deleted,

# GEARBOX-PUMP-ROTOR CONTROL VALVE ASSEMBLY



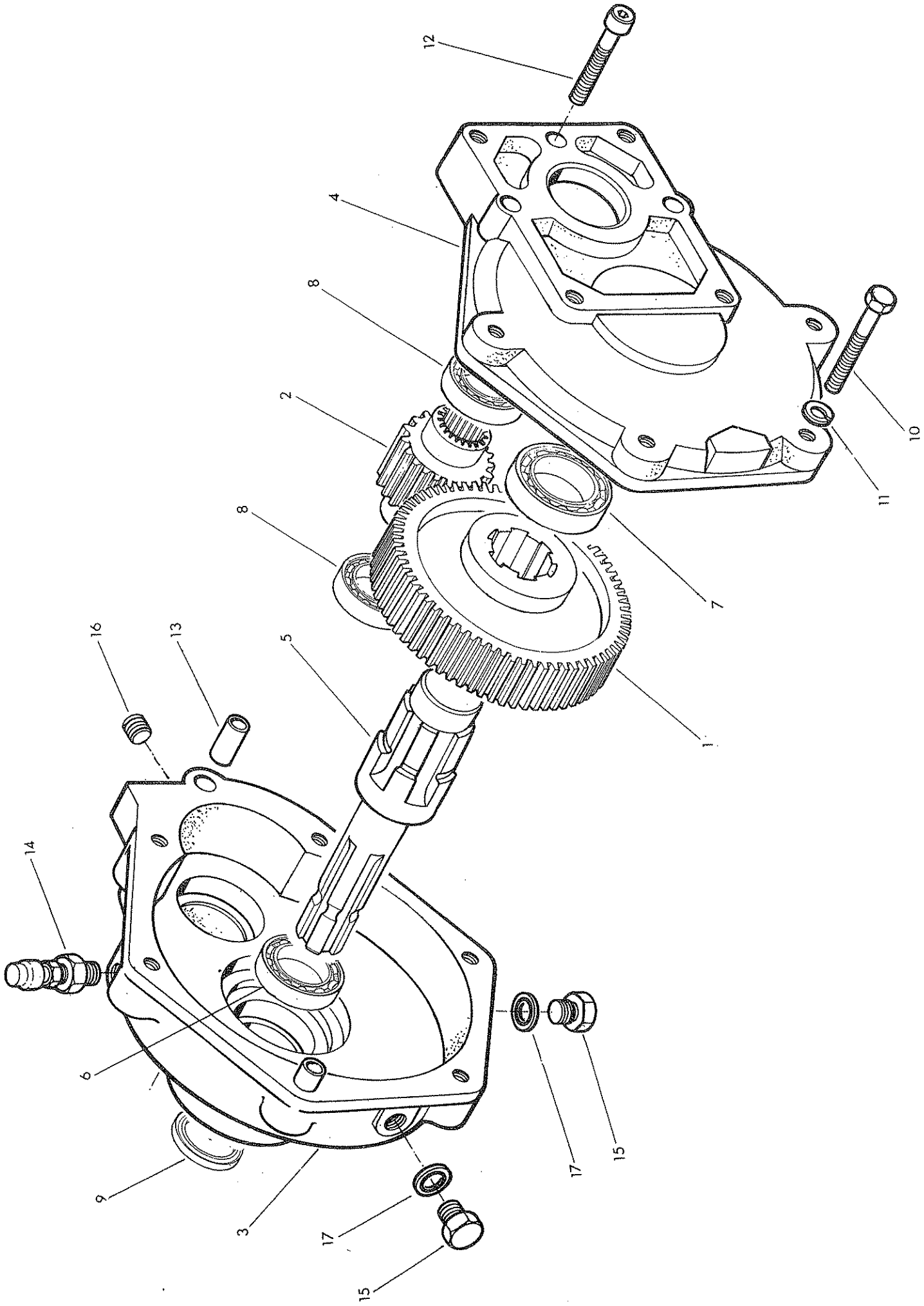
| | Ref | Part No. | Qty. | Description |
|---|---|---|---|---|
| | | 80 13 364 | | GEARBOX - PUMP - ROTOR CONTROL VALVE |
| | 1 | 80 13 360 | 1 | .Gearbox 4.94:1 (see page 48 ) |
| | 2 | 86 00 523 | 1 | .'0' ring. |
| * | 3 | 82 01 462 | 1 | .Tandem pump CPL 33/6.2 |
| | 4 | 81 25 332 | 1 | .Rotor control valve (see page 50 ) |
| | 5 | 71 35 296 | 1 | .Suction Union |
| | 6 | 80 13 023 | 1 | .Gasket |
| | 7 | 85 81 173 | 1 | .Swept elbow connection. |
| | 8 | 85 01 103 | 1 | .Connecting hose |
| | 9 | 09 04 204 | 2 | .Hose clip |
| * | 10 | 85 81 180 | 1 | .Union ½"BSP - 5/8" BSP M-M |
| | 11 | 60 00 112 | 1 | .Union ½" BSP 3/8" BSP M-M |
| | 12 | 86 50 104 | 2 | .Bonded seal |
| | 13 | 92 13 094 | 4 | .Bolt M8 x 45 |
| | 14 | 93 13 044 | 4 | .Setscrew M8 x 20 |
| | 15 | 91 00 204 | 8 | .Spring washer Ø 8 |
| | 16 | 93 13 056 | 4 | .Setscrew M12 x 25 |
| | 17 | 91 00 206 | 4 | .Spring washer Ø12 |
| | 18 | 91 00 104 | 4 | .Plain washer Ø8 |
| | 19 | 80 13 081 | 1 | .Gearbox label. |

* Spares Note.

For machines after serial No. 02 GH 86 items 3 & 10 will be as follows.

| | | | |
|---|---|---|---|
| 3 | 82 01 466 | 1 | .Tandem pump CPL33/5.7 |
| 10 | 85 81 206 | 1 | .Union 1/2" BSP- 5/8 BSP M-M |

# GEARBOX ASSEMBLY



| | 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 |
| | | 80 13 360 | | GEARBOX ASSEMBLY (4.94:1) |
| * | 1 | 80 13 372 | 1 | .Gear 79 teeth |
| * | 2 | 80 13 373 | 1 | .Pinion 16 teeth |

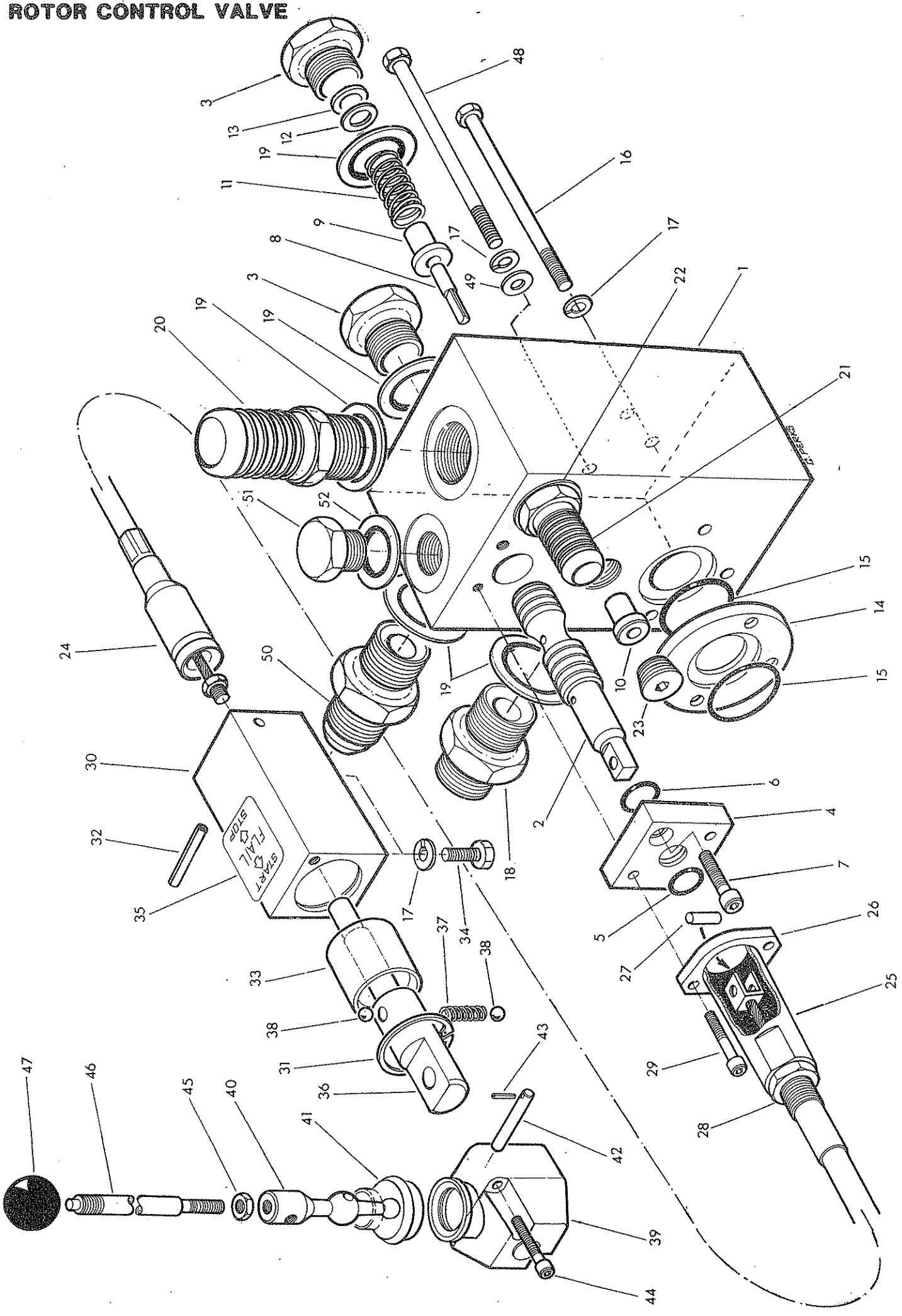
The following items are common to both gearbox assemblies.

| | | | |
|---|---|---|---|
| 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 1/2" |
| 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 ¼BSPT |
| 17 | 86 50 102 | 2 | .Bonded seal ¼" BSP |

* Service and spares note

Before ordering or replacing these components check carefully that you have correctly identified the item required. To assist in correct gearbox identification the 4.59:1 ratio gearbox assembly will have an identification tab trapped under the head of one of the cap screws and be stamped 4.6

# ROTOR CONTROL VALVE



| | Ref | Part No. | Qty | Description |
|---|---|---|---|---|
| | | 81 25 332 | | ROTOR CONTROL VALVE |
| | 1 | 81 25 074 | 1 | .Valve body c/w spool (not supplied separately) |
| | 2 | | 1 | Spool (reference only) |
| | 3 | 81 25 031 | 2 | .Spool or Relief valve cap |
| | 4 | 81 25 039 | 1 | .Control plate c/w '0' rings |
| | 5 | 86 00 502 | 1 | ..'0' ring. |
| | 6 | 86 00 503 | 1 | ..'0' ring. |
| | 7 | 93 43 023 | 2 | .Capscrew M6 x 12 |
| | 8 | 81 25 081 | 1 | .Relief valve needle ) Supplied assembled 81 25 083 |
| | 9 | 81 25 082 | 1 | .Spring register ) |
| | 10 | 81 25 084 | 1 | .Drill bush Ø5 |
| | 11 | 81 10 003 | 1 | .Relief valve spring |
| | 12 | 60 01 232 | As reqd. | .0.4 Shim washer |
| | 13 | 01 00 102 | " " | .5/16" dia bright washer |
| | 14 | 81 25 045 | 1 | .Spacer |
| | 15 | 86 00 119 | 2 | .'0' ring. |
| | 16 | 92 13 184 | 1 | .Bolt M8 x 90 |
| | 17 | 91 00 204 | 5 | .Spring washer Ø8 |
| | 18 | 85 81 136 | 1 | .Union ¾" BSP M-M |
| | 19 | 86 50 106 | 5 | .Bonded seal ¾" BSP |
| | 20 | 81 25 061 | 1 | .Return connection ¾ BSP |
| | 21 | 81 25 008 | 1 | .Low pressure connection 3/8 BSP |
| | 22 | 86 50 103 | 1 | .Bonded seal 3/8 BSP |
| | 23 | 85 82 044 | 1 | .Taper plug ½" BSPT |
| * | 24 | 81 25 046 | 1 | .Cable assembly c/w sleeve, flange, etc. |
| | 25 | 71 15 162 | 1 | ..Sleeve |
| | 26 | 81 25 050 | 1 | ..Flange |
| | 27 | 71 15 160 | 1 | ..Pin |
| | 28 | 01 31 006 | 1 | ..Thin locknut 5/8 UNF |
| | 29 | 93 43 022 | 2 | .Capscrew M5 x 12 |
| | 30 | 71 14 069 | 1 | .Control block c/w spring dowel and circlip |
| | 31 | 04 11 118 | 1 | ..Internal circlip |
| | 32 | 04 25 540 | 1 | ..Spring dowel Ø5 x 40 |
| | 33 | 71 14 067 | 1 | .Detent cage |
| | 34 | 93 13 034 | 2 | .Setscrew M8 x 16 |
| | 35 | 71 14 073 | 1 | .Instruction label |
| | 36 | 71 14 070 | 1 | .Spindle |
| | 37 | 71 14 068 | 1 | .Spring |
| | 38 | 09 05 108 | 2 | .Steel ball ¼" diameter |
| | | 81 30 065 | 1 | .Lever pivot box assembly comprising:- |
| | 39 | 81 30 107 | 1 | ..Lever pivot box. |
| | 40 | 81 30 019 | 1 | ..Lever |
| | 41 | 81 30 106 | 1 | ..Lever weather gaiter |
| | 42 | 81 30 009 | 1 | ..Lever pivot |
| | 43 | 81 30 021 | 1 | ..Spring dowel |
| | 44 | 93 43 072 | 2 | .Capscrew M5 x 35 |
| | 45 | 91 13 004 | 1 | .Thin hexagon nut M8 |
| | 46 | 71 14 072 | 1 | .Lever handle |
| | 47 | 09 03 121 | 1 | .Knob - black |
| | 48 | 92 13 204 | 2 | .Bolt M8 x 100 |
| | 49 | 81 25 068 | 2 | .Special washer |
| | 50 | 85 81 167 | 1 | .Union ¾BSP - 1 1/16 J.I.C. M-M |
| | 51 | 81 03 001 | 1 | .Blank plug ½" BSP |
| | 52 | 86 50 104 | 1 | .Bonded seal. |

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

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

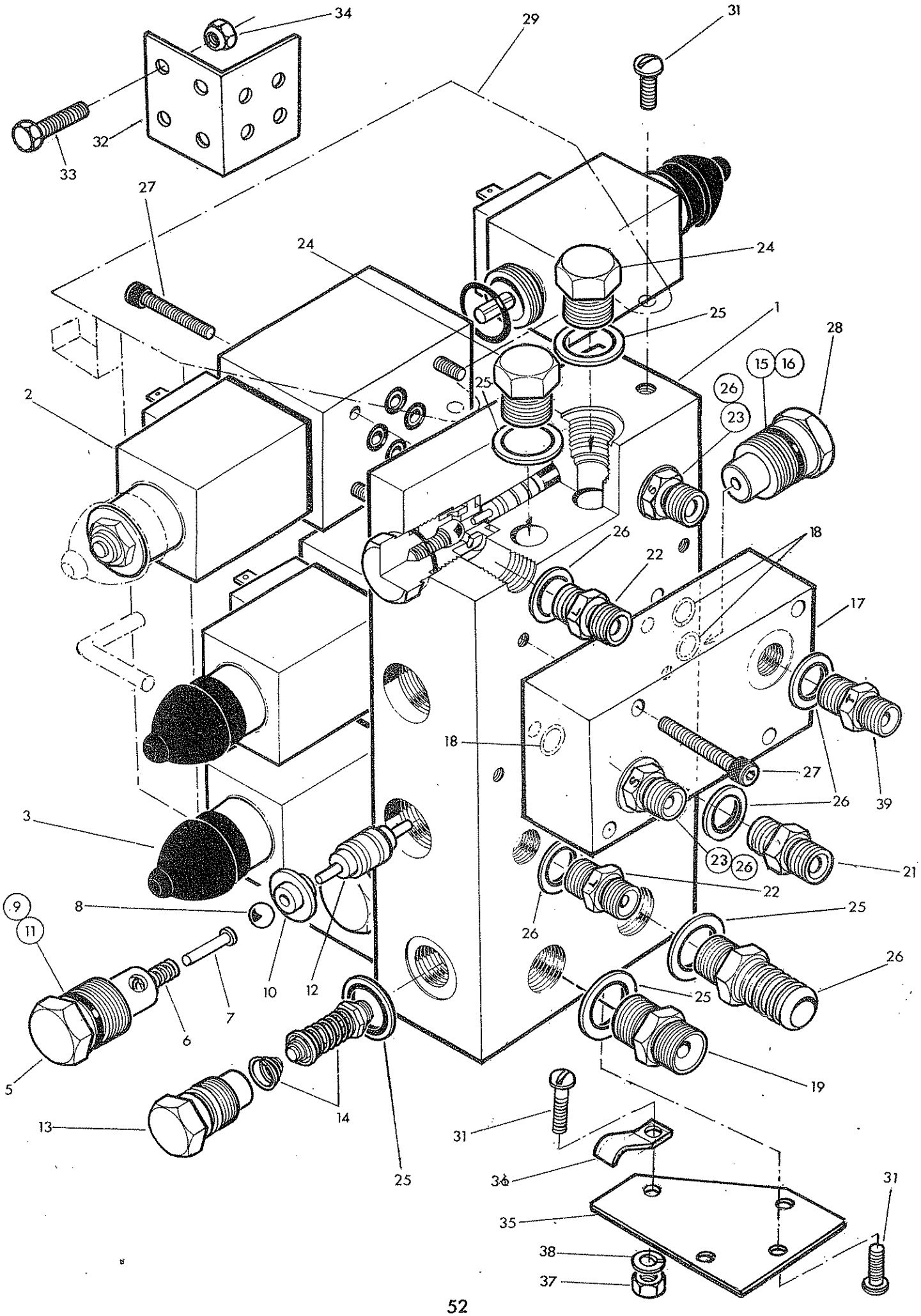
Individual cable components are not interchangeable thus before ordering spares the cable must be correctly identified.

The cable listed above is manufactured by "BOWDEN" and is BLACK

The alternative cable manufactured by "TELEFLEX MORSE" is RED.and consists of

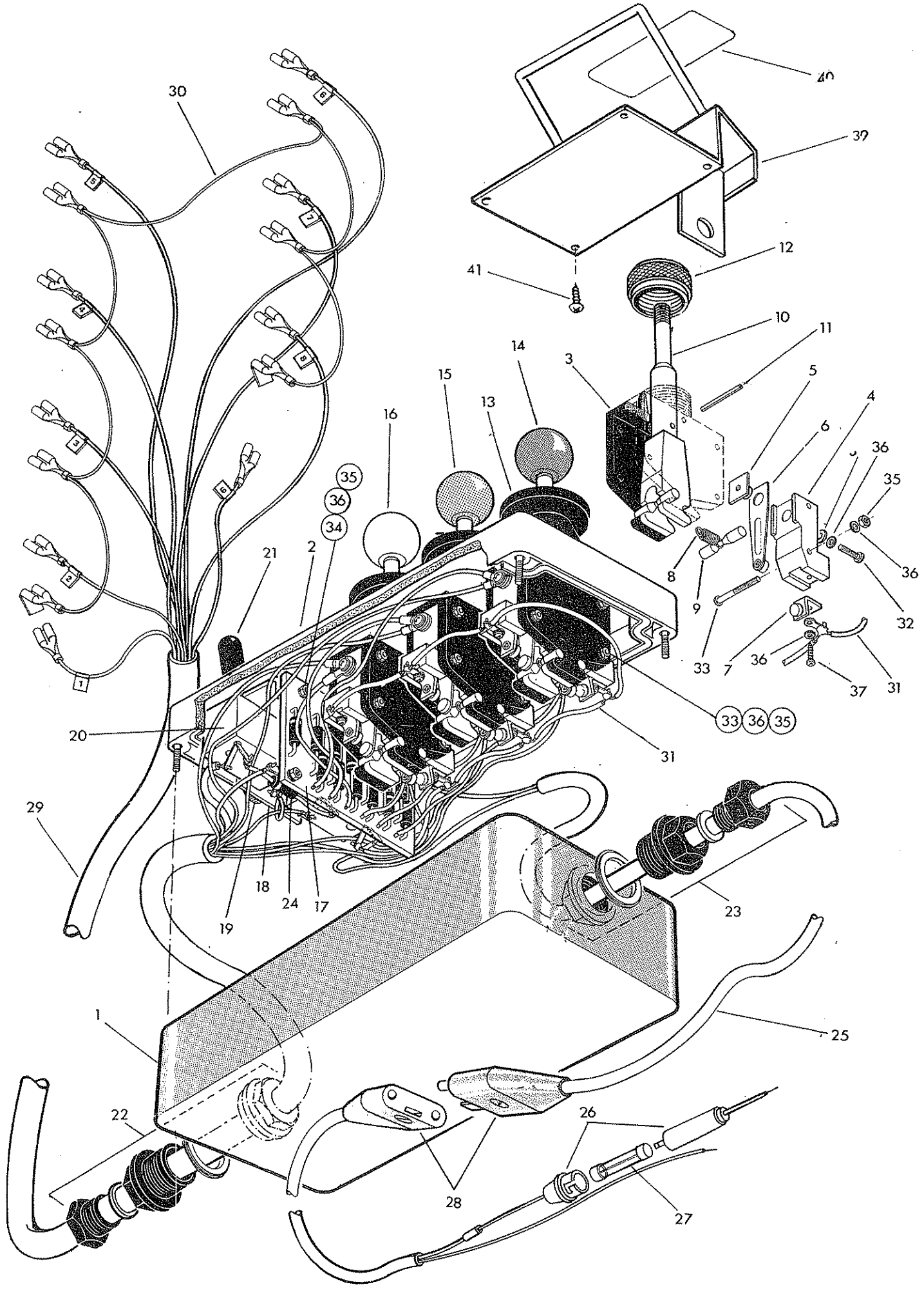
| | | | |
|---|---|---|---|
| 24 | 81 25 046 | 1 | .Cable assembly c/w sleeve, flange etc |
| 25 | 81 25 049 | 1 | .Cable sleeve |
| 26 | 81 25 050 | 1 | .Flange. |
| 27 | 81 25 051 | 1 | .Pin |
| 28 | 91 00 016 | 1 | .Thin locknut Ø16 x 1.5 pitch. |

# SOLENOID/MANIFOLD VALVE ASSEMBLY



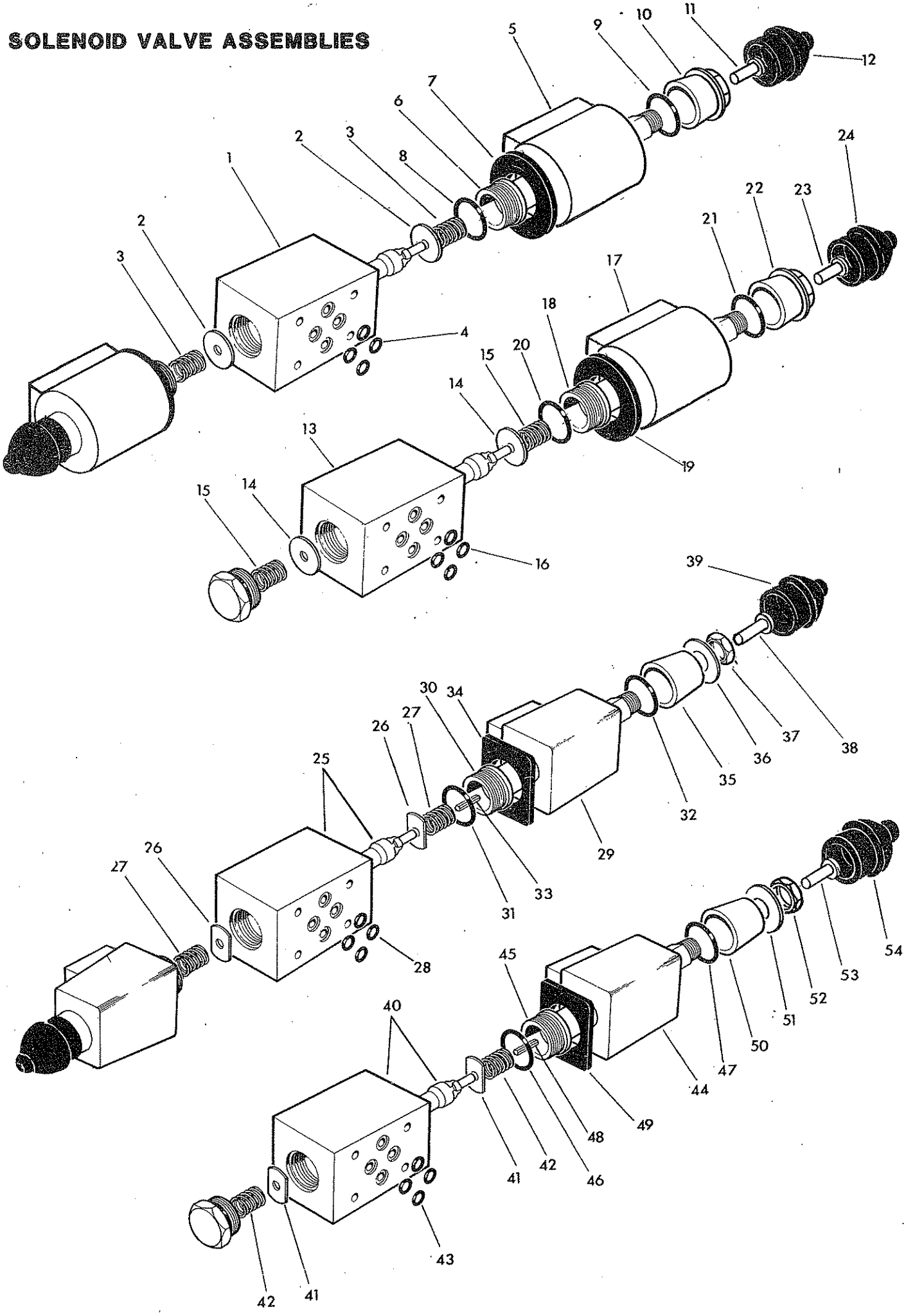
| Ref | Part No. | Qty | Description |
|---|---|---|---|
| | 81 30 327 | | ELECTRIC CONTROL PACK |
| | 81 30 318 | | . Solenoid/manifold assembly compr. |
| 1 | 81 30 321 | 1 | ..Manifold block |
| 2 | 81 30 301 | 3 | ..Double solenoid valve See Page |
| 3 | 81 30 302 | 1 | ..Single solenoid valve |
| 4 | 81 30 090 | 5 | ..Check valve assembly compr:- |
| 5 | 81 30 025 | 1 | ...Check valve cap |
| 6 | 81 14 045 | 1 | ...Spring |
| 7 | 81 30 089 | 1 | ...Spring guide |
| 8 | 09 05 509 | 1 | ...Steel ball Ø9 |
| 9 | 87 00 644 | 1 | ...'0' ring |
| 10 | 81 30 088 | 1 | ...Check valve seat |
| 11 | 87 09 644 | 1 | ...Anti extrusion ring. |
| 12 | 81 30 087 | 3 | ..Actuator |
| 13 | 81 30 032 | 1 | ..Relief valve cap. |
| 14 | 81 30 108 | 1 | ..Relief valve c/w spring |
| 15 | 87 09 644 | 1 | ..Anti extrusion ring |
| 16 | 87 00 644 | 1 | ..'0' ring |
| 17 | 81 30 322 | 1 | ..Hose plate c/w '0' rings |
| 18 | 87 00 511 | 3 | ...'0' ring. |
| 19 | 60 00 113 | 1 | ..Union 3/8 BSP - MM |
| 20 | 81 25 008 | 1 | ..Return connection |
| 21 | 80 02 117 | 1 | ..Union ¼BSP - ¼" BSP M-M |
| 22 | 81 30 038 | 2 | ..Restrictor Union 'L' ¼" BSP M-M |
| 23 | 81 30 037 | 2 | ..Restrictor union 'S' ¼" BSP M-M |
| 24 | 80 03 001 | 2 | ..Plug 3/8" BSP |
| 25 | 86 50 103 | 5 | ..Bonded seal 3/8 BSP |
| 26 | 86 50 102 | 5 | ..Bonded seal ¼" BSP |
| 27 | 92 43 082 | 20 | ..Socket headed setscrew M5 x 40 |
| 28 | 81 30 078 | 1 | ..Check valve gallery plug |
| 29 | 71 09 318 | 1 | .Solenoid protection cover c/w label. |
| 30 | 71 09 143 | 1 | ..Instruction label (not illustrated) |
| 31 | 93 00 117 | 4 | .Setscrew slotted head M8 x 12 |
| 32 | 81 25 070 | 1 | .Flail on/off lever mounting bracket. |
| 33 | 93 13 044 | 2 | .Setscrew M8 x 20 |
| 34 | 91 43 004 | 2 | .'Clevelok' nut M8 |
| 35 | 81 30 095 | 1 | .Cable bracket. |
| 36 | 71 09 151 | 1 | .Cable clamp |
| 37 | 91 13 004 | 1 | .Hexagon plain nut M8 |
| 38 | 91 00 204 | 1 | .Spring washer Ø8 |
| 39 | 81 30 103 | 1 | .Restrictor union 'T' ¼ BSP M-M |
| | 86 99 185 | | SEAL KIT |

# SWITCHBOX ASSEMBLY



| Ref | Part No. | Qty. | Description |
|---|---|---|---|
| | 81 30 327 | | ELECTRIC CONTROL PACK continued |
| | 84 02 280 | | .Switch box assembly compr:- |
| | 84 02 281 | 1 | ..Box assembly |
| 1 | 84 02 263 | 1 | ...Box body |
| 2 | 84 02 282 | 1 | ...Box lid c/w screws |
| 3 | 84 02 285 | 3 | ..Body |
| 4 | 84 02 106 | 6 | ..Contact holder |
| 5 | 84 02 109 | 6 | ..Spring contact retainer |
| 6 | 84 02 113 | 6 | ..Spring contact |
| 7 | 84 02 108 | 6 | ..Fixed contact. |
| 8 | 84 02 101 | 3 | ..Spring |
| 9 | 84 02 111 | 6 | ..Bar |
| 10 | 84 02 256 | 3 | ..Lever |
| 11 | 04 25 320 | 3 | ..Spring dowel Ø 3 x 20 |
| 12 | 84 02 051 | 3 | ..Bezel ring. |
| 13 | 84 02 022 | 3 | ..Lever gaiter |
| 14 | 84 02 026 | 1 | ..Knob red. |
| 15 | 84 02 027 | 1 | ..Knob green |
| 16 | 84 02 028 | 1 | ..Knob yellow |
| 17 | 84 02 115 | 1 | ..Printed circuit board assembly |
| 18 | 84 02 110 | 1 | ..Bracket c/w diode |
| 19 | 84 02 281 | 1 | ...Diode |
| 20 | 84 02 023 | 2 | ..Toggle switch |
| 21 | 84 02 024 | 2 | ..Switch cover |
| 22 | 84 02 029 | 1 | ..Gland assembly - large |
| 23 | 84 02 042 | 1 | ..Gland assembly - small |
| 24 | 84 02 025 | 1 | ..Diode BY 255 |
| 25 | 84 02 284 | 1 | ..Power supply harness compr:- |
| 26 | 84 02 114 | 1 | ...Fuse Holder |
| 27 | 84 02 037 | 1 | ...Fuse - 10amp |
| 28 | 84 02 062 | 1 | ...Plug/socket |
| 29 | 84 02 283 | 1 | ..Main harness c/w common link |
| 30 | 84 02 058 | 1 | ...Common link harness |
| 31 | 84 02 116 | 1 | ..Common link - switchbox |
| 32 | 92 00 005 | 6 | ..Screw-posidrive pan-head M3 x 12 |
| 33 | 92 00 006 | 12 | ..Screw-posidrive pan-head M3 x 25 |
| 34 | 92 00 007 | 3 | ..Screw-posidrive pan-head M3 x 10 |
| 35 | 91 00 013 | 15 | ..Hexagon nut-plated M3 |
| 36 | 91 00 400 | 27 | ..External serrated washer Ø 3 |
| 37 | 84 02 119 | 6 | ..Self tapping screw No.4 type 'B' x 10m/m long. |
| 38 | 84 02 280 | 6 | ..Plain washer Ø 3 |
| 39 | 84 02 260 | 1 | .Switch box mounting bracket c/w label. |
| 40 | 84 02 117 | 1 | ..Instruction label. |
| 41 | 28 00 203 | 4 | ..Self tapping screw No.10 x ½" long. |

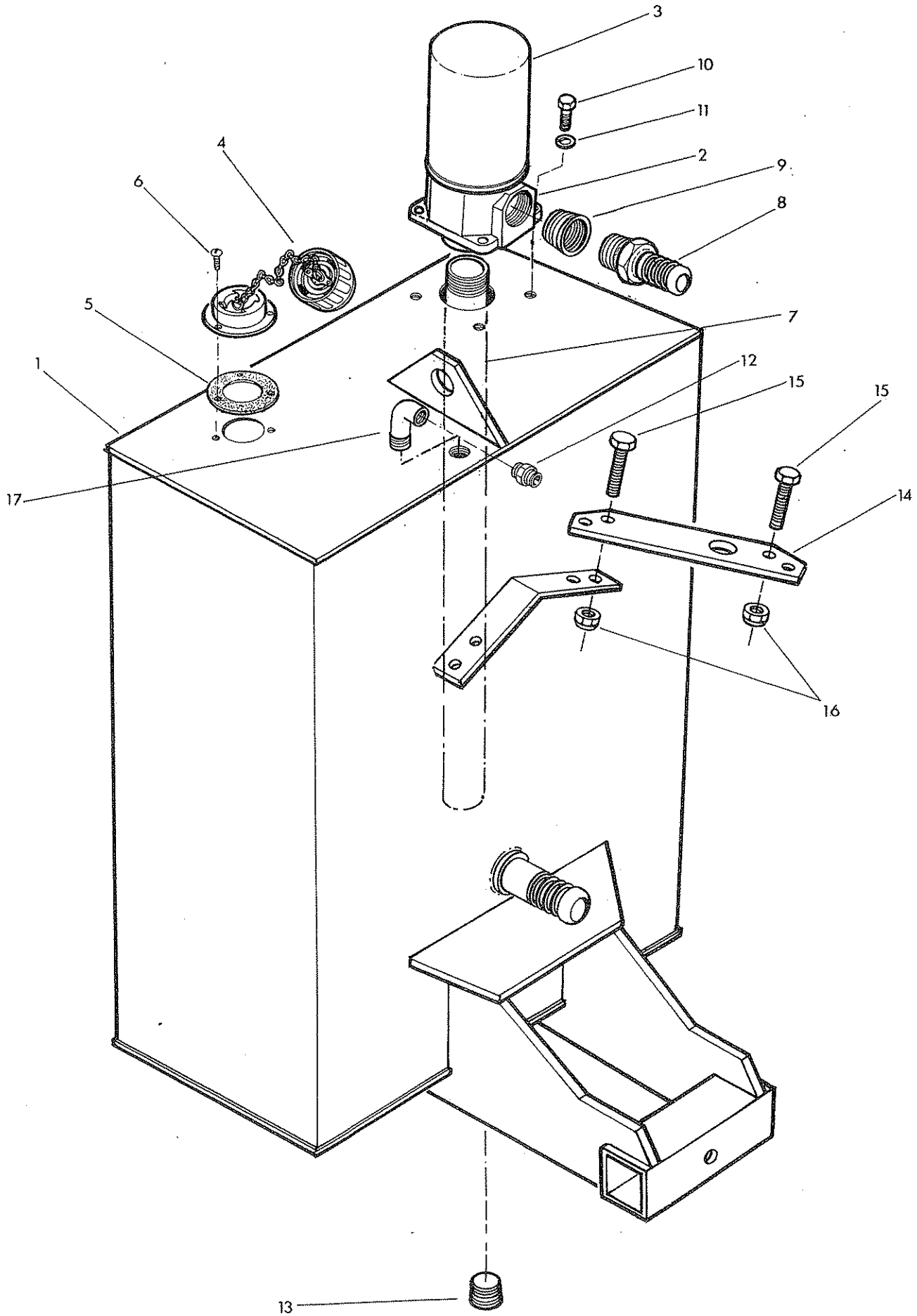
# SOLENOID VALVE ASSEMBLIES



Two different types of solenoid assemblies are fitted depending on supply availablility. Both assemblies are directly interchangeable on the manifold block and have the same assembly part number. Individual spares for a particular solenoid are not interchangeable and care should be taken in identifying the correct one.

| Ref | Part No. | Qty | Description. |
|---|---|---|---|
| | 81 30 320 | | SOLENOID MANIFOLD ASSEMBLY |
| | The solenoid assemblies supplied will be either:- | | |
| | 81 30 301 | 3 | .Double solenoid valve compr:- |
| 1 | 84 02 072 | 1 | ..Block c/w spool |
| 2 | 84 02 123 | 2 | ..Washer. |
| 3 | 84 02 124 | 2 | ..Spring. |
| 4 | 87 00 511 | 4 | .. '0' ring. |
| | 84 02 125 | 2 | ..Solenoid compr:- |
| 5 | 84 02 126 | 1 | ...Coil |
| 6 | 84 02 127 | 1 | ...Solenoid tube |
| 7 | 84 02 128 | 1 | ...Gasket. |
| 8 | 86 00 507 | 1 | ...'0' ring. |
| 9 | 84 02 088 | 1 | ...'0' ring. |
| 10 | 84 02 129 | 1 | ...Shroud nut. |
| 11 | 84 02 086 | 1 | ...Push pin |
| 12 | 84 02 087 | 1 | ...Weather gaiter. |
| | 81 30 302 | 1 | .Single solenoid valve compr:- |
| 13 | 84 02 073 | 1 | ..Block c/w spool. |
| 14 | 84 02 123 | 2 | ..Washer |
| 15 | 84 02 124 | 2 | ..Spring. |
| 16 | 87 00 511 | 4 | .. '0' ring. |
| | 84 02 125 | 1 | ..Solenoid compr:- |
| 17 | 84 02 126 | 1 | ...Coil |
| 18 | 84 02 127 | 1 | ...Solenoid tube |
| 19 | 84 02 128 | 1 | ...Gasket |
| 20 | 86 00 507 | 1 | ... '0' ring. |
| 21 | 84 02 088 | 1 | ...'0' ring. |
| 22 | 84 02 129 | 1 | ...Shroud nut. |
| 23 | 84 02 086 | 1 | ...Push pin |
| 24 | 84 02 087 | 1 | ...Weather gaiter. |
| | or:- | | |
| | 81 30 301 | 3 | .Double solenoid valve compr: |
| 25 | 84 02 072 | 1 | ..Block c/w spool |
| 26 | 84 02 069 | 2 | ..Washer. |
| 27 | 84 02 070 | 2 | ..Spring. |
| 28 | 87 00 511 | 4 | ..'0' ring. |
| | 84 02 060 | 2 | ..Solenoid compr:- |
| 29 | 84 02 068 | 1 | ...Coil |
| 30 | 84 02 074 | 1 | ...Solenoid tube |
| 31 | 86 00 507 | 1 | ...'0' ring. |
| 32 | 84 02 088 | 1 | ...'0' ring. |
| 33 | 84 02 061 | 1 | ...Push Rod |
| 34 | 84 02 071 | 1 | ...Gasket |
| 35 | 84 02 092 | 1 | ...Solenoid cap |
| 36 | 84 02 084 | 1 | ...Washer |
| 37 | 84 02 085 | 1 | ...Nut |
| 38 | 84 02 086 | 1 | ...Push pin |
| 39 | 84 02 087 | 1 | ...Weather gaiter. |
| | 81 30 302 | | .Single solenoid valve compr:- |
| 40 | 84 02 073 | 1 | ..Block c/w spool |
| 41 | 84 02 069 | 2 | ..Washer |
| 42 | 84 02 070 | 2 | ..Spring |
| 43 | 87 00 511 | 4 | ..'0' ring. |
| | 84 02 060 | 1 | ..Solenoid compr:- |
| 44 | 84 02 068 | 1 | ...Coil |
| 45 | 84 02 074 | 1 | ...Solenoid tube. |
| 46 | 86 00 507 | 1 | ...'0' ring. |
| 47 | 84 02 088 | 1 | ...'0' ring. |
| 48 | 84 02 061 | 1 | ...Push rod |
| 49 | 84 02 071 | 1 | ...Gasket |
| 50 | 84 02 092 | 1 | ...Solenoid cap |
| 51 | 84 02 084 | 1 | ...Washer |
| 52 | 84 02 085 | 1 | ...Nut |
| 53 | 84 02 086 | 1 | ...Push pin |
| 54 | 84 02 087 | 1 | ...Weather gaiter. |

# HYDRAULIC TANK ASSEMBLY



| | Ref | Part No. | Qty | Description, |
|---|---|---|---|---|
| | | 71 35 305 | | HYDRAULIC TANK ASSEMBLY |
| | 1 | 71 35 306 | 1 | .Oil tank |
| | 2 | 84 01 040 | 1 | .Filter c/w element |
| | 3 | 84 01 041 | 1 | ..Canister filter element. |
| | | 84 01 014 | 1 | .Filler/breather assembly compr:- |
| | 4 | 84 01 015 | 1 | ..Filler cap and neck |
| | 5 | 84 01 017 | 1 | ..Gasket |
| | 6 | 03 00 082 | 3 | ..Screw self tapping 3/16 dia. x 1½ long. |
| | 7 | 71 23 026 | 1 | .Return pipe |
| ◒ | 8 | 81 21 051 | 1 | .Return connection |
| ◒ | 9 | 85 81 202 | 1 | .Adaptor 1½ BSPT M - 1" BSP F |
| | 10 | 93 13 054 | 4 | .Setscrew M8 x 25 |
| | 11 | 91 00 204 | 4 | .Spring washer |
| * ◪ | 12 | 85 81 201 | 1 | .Special union ¼ BSP |
| | 13 | 85 81 203 | 1 | .Drain plug 1" BSP |
| | 14 | 71 35 077 | 1 | .Tank strap |
| | 15 | 93 13 065 | 4 | .Setscrew M10 x 30 |
| | 16 | 91 43 005 | 4 | .Self locking nut M10 |
| | 17 | 85 81 204 | 1 | .Elbow |

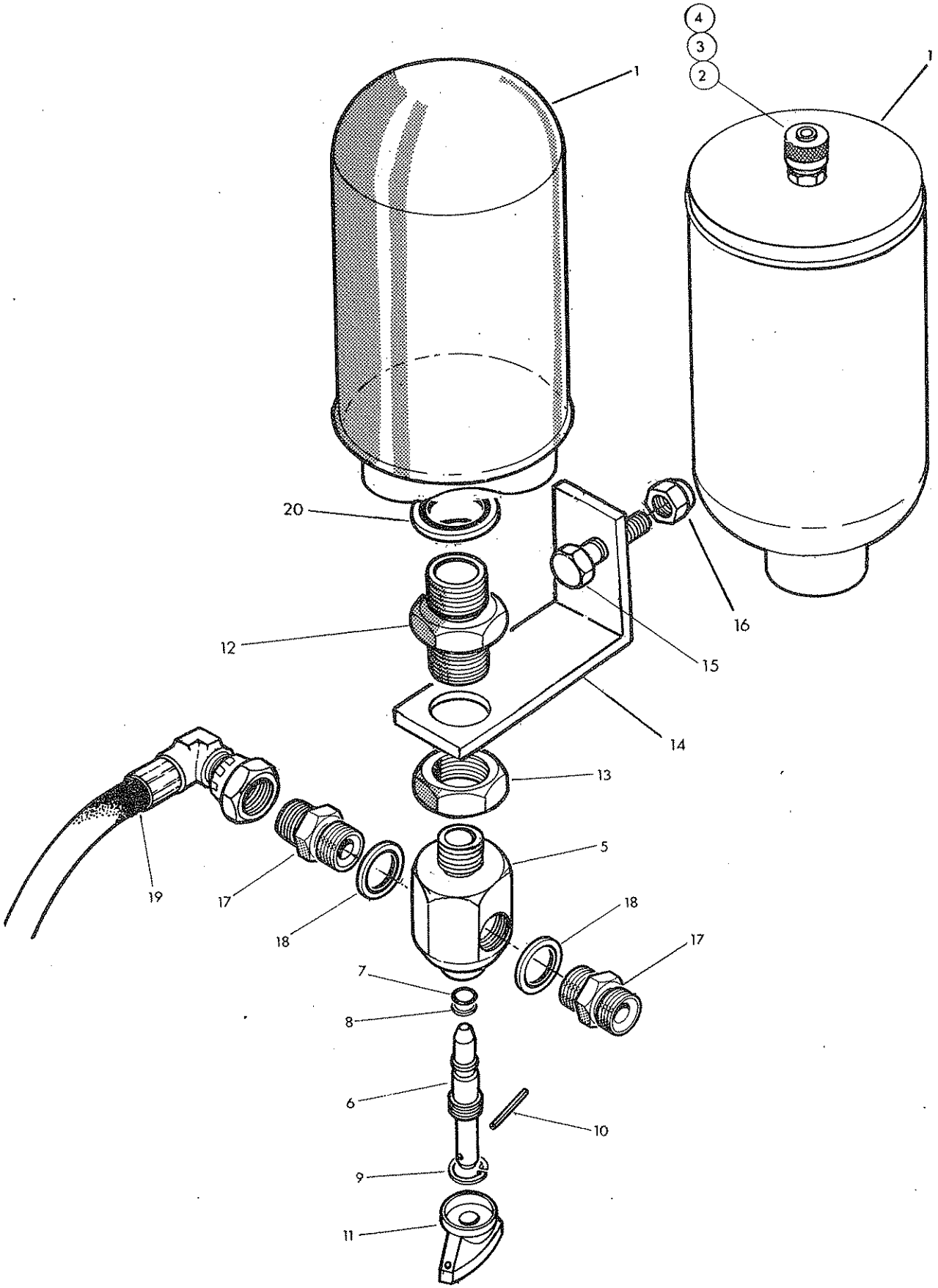
Assembly note.

* Special union assembled onto tank using 'Permabond A121' or similar sealing compound.

◒ Adaptor assembled into filter and return connection into adaptor using Permabond 'A' 121 or similar sealing compound.

◪ SPARES NOTE
On machines after April 1986 items 12 and 17 are deleted.

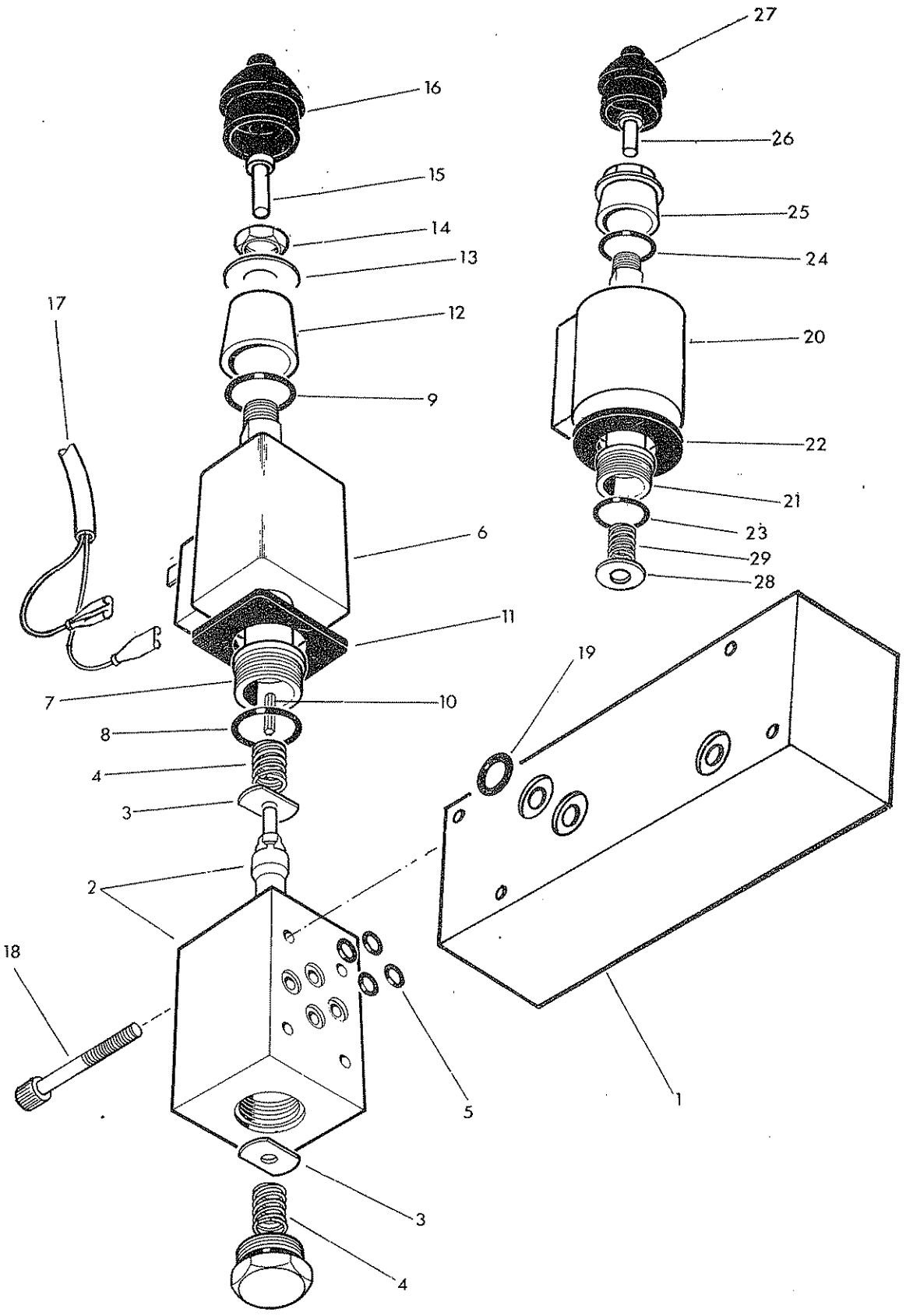
## LIFT FLOAT KIT (Optional extra)



| Ref | Part No. | Qty | Description |
|---|---|---|---|
| | 81 26 264 | | LIFT FLOAT KIT |
| 1 | 81 26 254 | 1 | .Accumulator (500psi) |
| 2 | 81 26 015 | 1 | ..Charge valve assembly c/w '0' ring |
| 3 | 81 26 016 | 1 | ...Charge valve core. |
| 4 | 86 00 103 | 1 | ...'0' 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 | ..'0' 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 | 71 35 096 | 1 | .Mounting bracket. |
| 15 | 93 13 056 | 1 | .Setscrew M12 x 25 |
| 16 | 91 43 006 | 1 | .Self locking nut M12 |
| 17 | 85 81 145 | 2 | .Union 3/8 BSP - ¼BSP M-M |
| 18 | 86 50 103 | 2 | .Bonded seal 3/8 BSP |
| 19 | 85 35 062 | 1 | .Hose ¼"BSP SF-90°F x 15" long. |
| 20 | 86 50 106 | 1 | .Bonded seal 3/4" BSP |

Two alternative accumulators may be supplied depending on supply availability. The two accumulators are directly interchangeable and have a common charge valve assembly.

## HEAD ANGLE FLOAT KIT (Optional extra for grass flails)

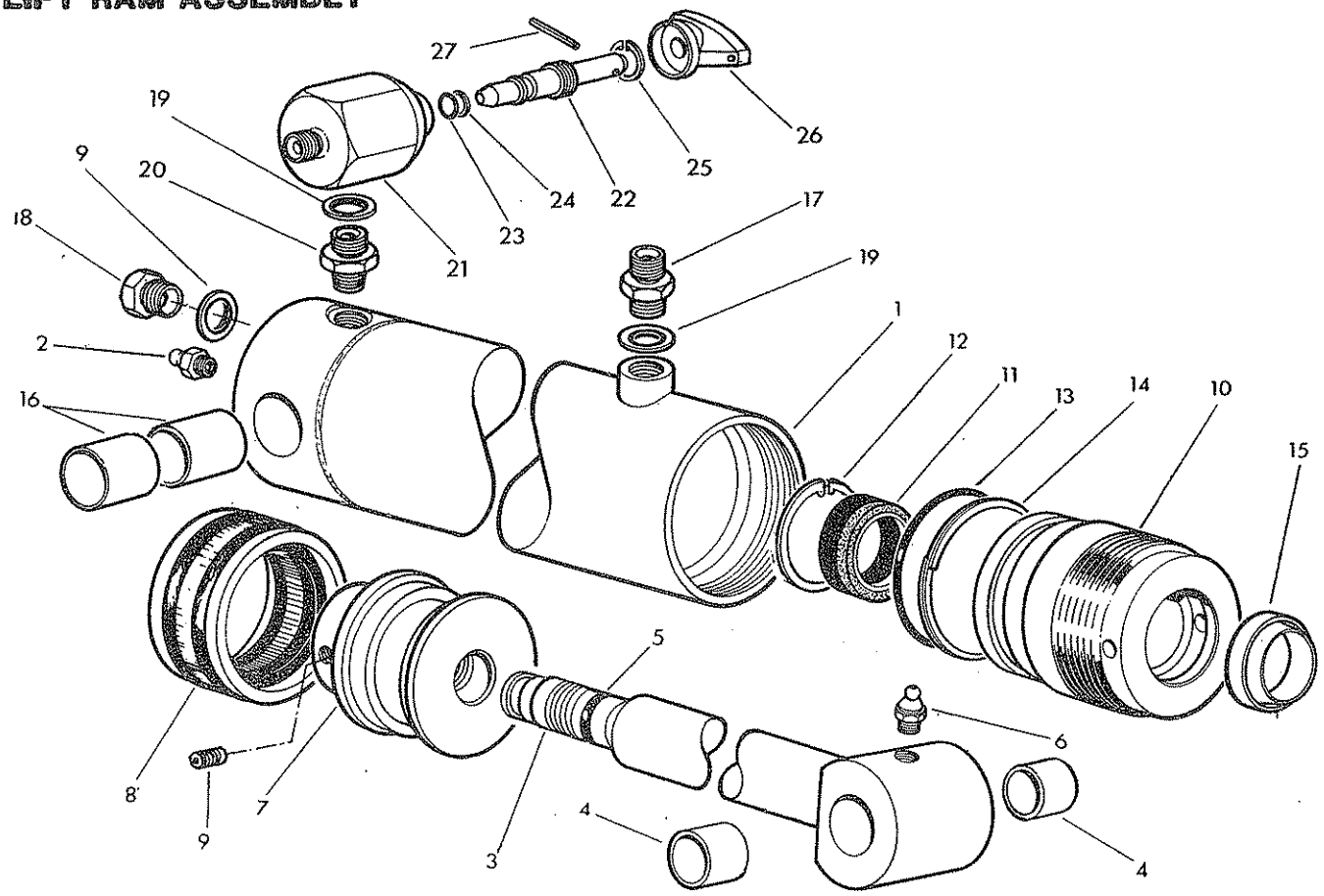


| | Ref | Part No. | Qty | Description |
|---|---|---|---|---|
| | | 81 26 261 | | ANGLE FLOAT KIT |
| | 1 | 81 30 323 | 1 | .Float valve block. |
| | | 81 30 314 | 1 | .Angle float solenoid compr:- |
| | 2 | 81 30 091 | 1 | ..Block c/w spool |
| * | 3 | 84 02 069 | 2 | ..Washer |
| * | 4 | 84 02 070 | 2 | ..Spring. |
| | 5 | 87 00 511 | 4 | ..'0' ring |
| * | | 84 02 060 | 1 | ..Solenoid compr: |
| | 6 | 84 02 068 | 1 | ...Coil |
| | 7 | 84 02 074 | 1 | ...Solenoid tube |
| | 8 | 86 00 507 | 1 | ...'0' ring. |
| | 9 | 84 02 088 | 1 | ...'0' ring. |
| | 10 | 84 02 061 | 1 | ...Push rod |
| | 11 | 84 02 071 | 1 | ...Gasket |
| | 12 | 84 02 092 | 1 | ...Solenoid cap |
| | 13 | 84 02 084 | 1 | ...Washer |
| | 14 | 84 02 085 | 1 | ...Nut |
| | 15 | 84 02 086 | 1 | ...Push pin |
| | 16 | 84 02 087 | 1 | ...Weather gaiter |
| | 17 | 84 02 059 | 1 | .Connecting wire. |
| | 18 | 92 43 082 | 4 | .Set screw socket headed M5 |
| | 19 | 87 00 511 | .3 | .'0' ring. |

* Alternative solenoid assembly:-

| | | | |
|---|---|---|---|
| | 84 02 125 | 1 | ..Solenoid compr:- |
| 20 | 84 02 126 | 1 | ...Coil |
| 21 | 84 02 127 | 1 | ...Solenoid tube |
| 22 | 84 02 128 | 1 | ...Gasket |
| 23 | 86 00 507 | 1 | ...'0' ring. |
| 24 | 84 02 088 | 1 | ...'0' ring. |
| 25 | 84 02 129 | 1 | ...Shroud nut |
| 26 | 84 02 086 | 1 | ...Push pin |
| 27 | 84 02 087 | 1 | ...Weather gaiter |
| 28 | 84 02 069 | 2 | ..Washer |
| 29 | 84 02 070 | 2 | ..Spring. |

# LIFT RAM ASSEMBLY



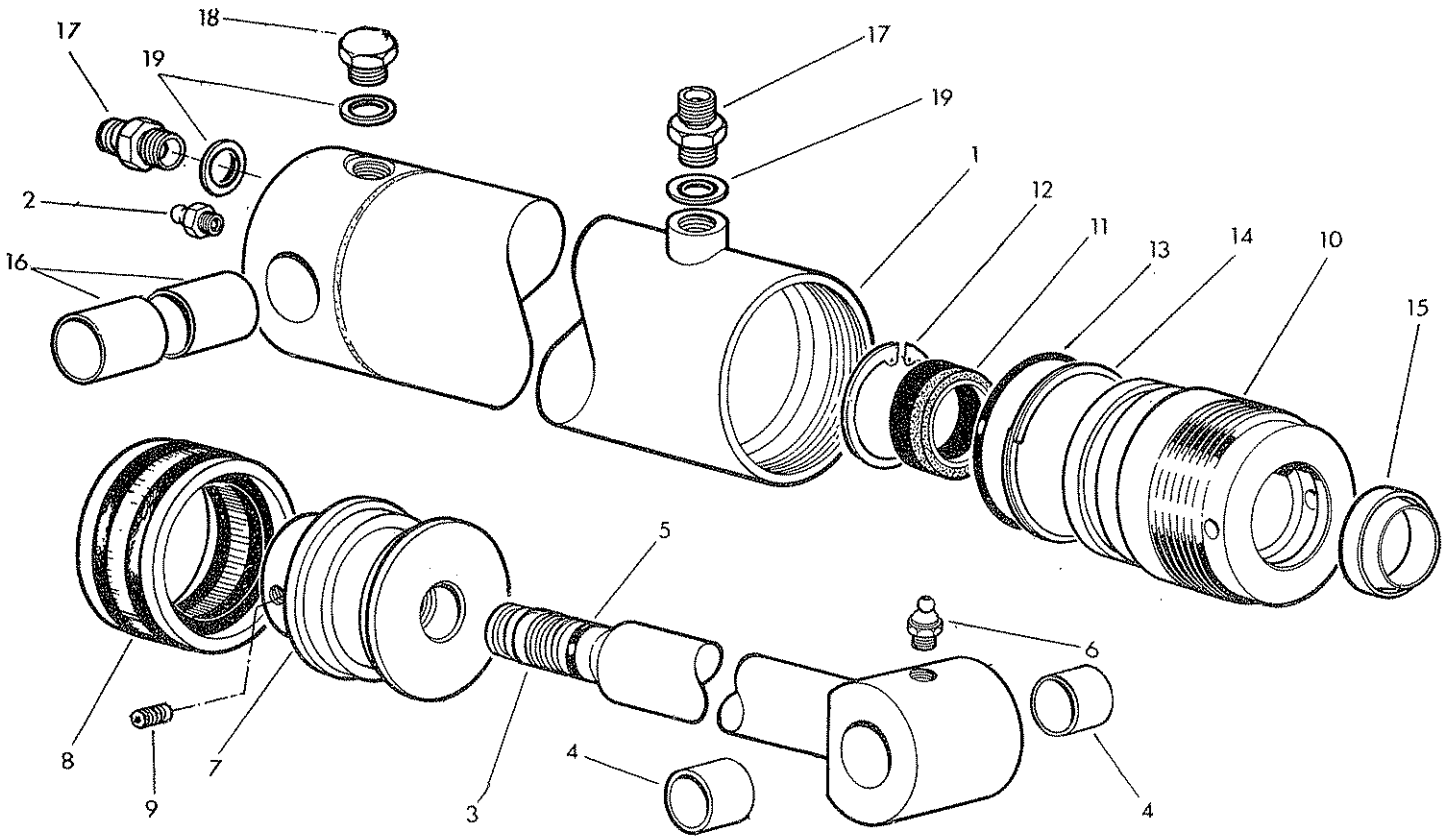

| | Ref | Part No. | Qty | Description |
|---|---|---|---|---|
| | | 71 35 278 | | LIFT RAM ASSEMBLY |
| | | 71 35 280 | | .Ram basic compr:- |
| | 1 | 71 35 283 | 1 | ..Ram cylinder c/w greaser. |
| | 2 | 09 01 121 | 1 | ...Greaser 1/8 BSP - straight |
| ◪ | 3 | 71 35 304 | 1 | .. Piston rod c/w bush, 'O' ring and greaser. |
| | 4 | 60 12 032 | 2 | ...Bush |
| | 5 | 86 00 119 | 1 | ...'0' ring. |
| | 6 | 09 01 121 | 1 | ...Greaser 1/8" BSP - straight. |
| ◪ | 7 | 71 35 004 | 1 | ..Piston c/w seal and grub screw. |
| | 8 | 86 38 740 | 1 | ... Piston seal. |
| | 9 | 93 00 110 | 1 | ...Grub screw M6 x 8 socket headed. |
| | 10 | 71 35 282 | 1 | ..Gland housing c/w seals etc. |
| | 11 | 86 22 127 | 1 | ...Gland seal. |
| | 12 | 04 11 132 | 1 | ...Internal circlip |
| | 13 | 87 00 740 | 1 | ...'0' ring. |
| | 14 | 87 09 740 | 1 | ...Anti extrusion ring |
| | 15 | 86 29 147 | 1 | ...Wiper |
| | 16 | 71 01 134 | 2 | ..Bush - ram base. |
| | 17 | 85 81 115 | 1 | .Union ¼ BSP - 3/8 BSP M-M |
| | 18 | 80 03 001 | 1 | .Plug 3/8 BSP |
| | 19 | 86 50 103 | 3 | .Bonded seal 3/8 BSP |
| * | 20 | 80 05 007 | 1 | .Taper adaptor 3/8 BSPT |
| | | 71 35 005 | 1 | .Lock tap assembly compr:- |
| | 21 | 71 35 284 | 1 | ..Tap body. |
| | 22 | 71 35 006 | 1 | ..Tap spindle. |
| | 23 | 86 00 107 | 1 | ..'0' ring. |
| | 24 | 86 09 107 | 1 | ..Anti extrusion ring. |
| | 25 | 04 16 110 | 1 | ..Internal circlip. |
| | 26 | 81 08 006 | 1 | ..Tap knob |
| | 27 | 04 20 820 | 1 | ..Spring dowel 1/8" dia x 1¼" long. |
| | | 86 99 187 | | SEAL KIT |

* Taper adaptor to be assembled into ram cylinder using 'Permabond' A121 or other suitable sealant.

◪ when replacing a piston or a piston rod on machines prior to serial No 04 GG 77 a complete piston/ piston rod assembly is necessary, Part No 71 35 105.

Assembly note. Piston is assembled onto piston rod using ' Permabond A 113 or other similar thread locking compound.

# REACH RAM ASSEMBLY

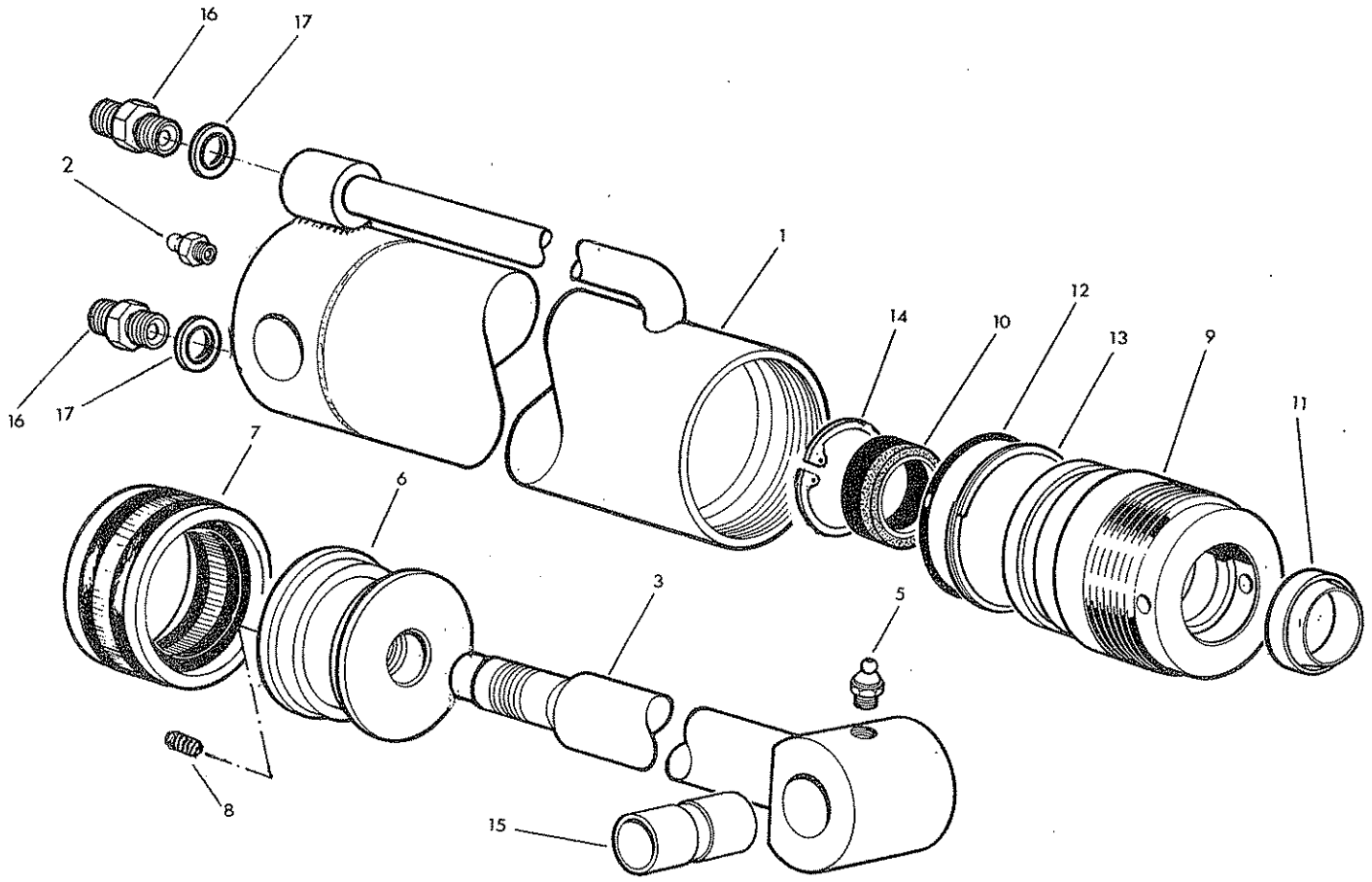



| | | | | |
|---|---|---|---|---|
| | | 71 35 279 | | REACH RAM ASSEMBLY |
| | | 71 35 280 | | .Ram basic compr:- |
| | 1 | 71 35 283 | 1 | ..Ram cylinder c/w greaser |
| | 2 | 09 01 121 | 1 | ...Greaser 1/8 BSP- straight |
| * | 3 | 71 35 304 | 1 | ..Piston rod c/w bush '0' ring & greaser |
| | 4 | 60 12 032 | 2 | ...Bush |
| | 5 | 86 00 119 | 1 | ...O ring |
| | 6 | 09 01 121 | 1 | ...Greaser 1/8 BSP - straight. |
| * | 7 | 71 35 004 | 1 | ..Piston c/w seal & grub screw |
| | 8 | 86 38 740 | 1 | ...Piston seal |
| | 9 | 93 00 110 | 1 | ...Grub screw M6 x 8 socket headed |
| | 10 | 71 35 282 | 1 | ..Gland housing c/w seals etc |
| | 11 | 86 22 127 | 1 | ...Gland seal. |
| | 12 | 04 11 132 | 1 | ...Internal circlip |
| | 13 | 87 00 740 | 1 | ...'0' ring. |
| | 14 | 87 09 740 | 1 | ...Anti extrusion ring. |
| | 15 | 86 29 147 | 1 | ...Wiper |
| | 16 | 71 01 134 | 2 | ..Bush - ram base |
| | 17 | 85 81 115 | 2 | .Union ¼ BSP - 3/8BSP M-M |
| | 18 | 80 03 001 | 1 | .Plug 3/8 BSP |
| | 19 | 86 50 103 | 3 | .Bonded seal 3/8 BSP |
| | | 86 99 187 | | SEAL KIT |

* when replacing a piston or a piston rod on machines prior to serial No 04 GG 77 a complete piston/ piston rod assembly is necessary, Part No 71 35 105.

Assembly note. Piston is assembled onto piston rod using ' Permabond A 113 or other similar thread locking compound.

# ANGLING RAM ASSEMBLY

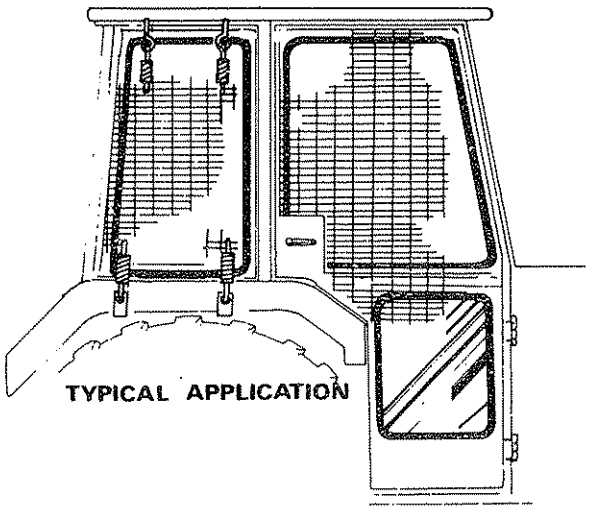


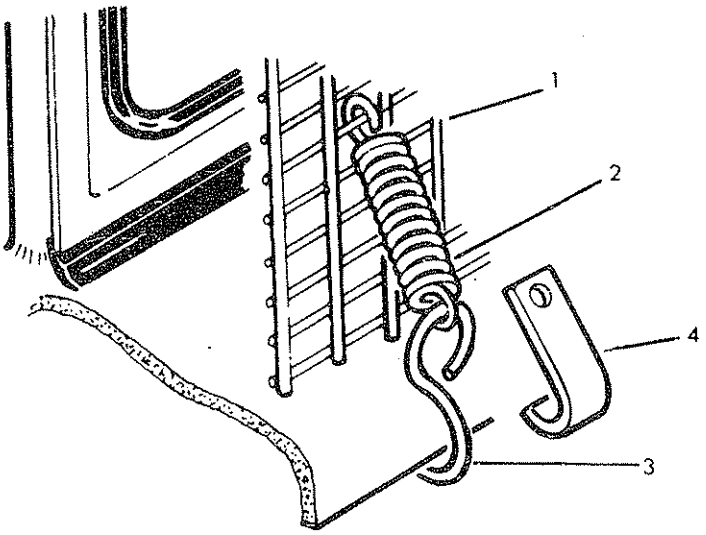

| Ref | Part No. | Qty. | Description |
|---|---|---|---|
| | 71 35 290 | | ANGLING RAM ASSEMBLY |
| 1 | 71 35 292 | 1 | .Ram Cylinder c/w greaser |
| 2 | 09 01 121 | 1 | ..Greaser 1/8 BSP-straight |
| * 3 | 71 35 009 | 1 | .Piston rod c/w greaser |
| 5 | 09 01 121 | 1 | .Greaser 1/8 BSP-straight. |
| * 6 | 71 35 008 | 1 | .Piston c/w seal & grub screw |
| 7 | 86 38 788 | 1 | ..Piston seal |
| 8 | 93 63 033 | 1 | ..Grub screw M6 x 16 socket headed. |
| 9 | 71 35 291 | 1 | .Gland housing c/w seals etc. |
| 10 | 86 29 148 | 1 | ..Gland seal |
| 11 | 86 29 149 | 1 | ..Piston rod wiper seal. |
| 12 | 86 00 302 | 1 | ..'0' ring. |
| 13 | 86 09 302 | 1 | ..Anti extrusion ring |
| 14 | 04 16 240 | 1 | ..Internal circlip |
| 15 | 71 05 050 | 1 | .Piston rod bush |
| 16 | 85 81 169 | 2 | .Union ¼ BSP M-M |
| 17 | 86 50 102 | 2 | .Bonded seal ¼BSP |
| | 86 99 188 | | SEAL KIT |

* When replacing a piston rod or a piston on machines prior to serial No 04 GG 77 a complete piston/piston rod assembly is necessary Part No. 71 35 106.

Assembly note. Piston is assembled onto the rod using ' Permabond A121 or other thread sealer of similar specification.

## CAB GUARD

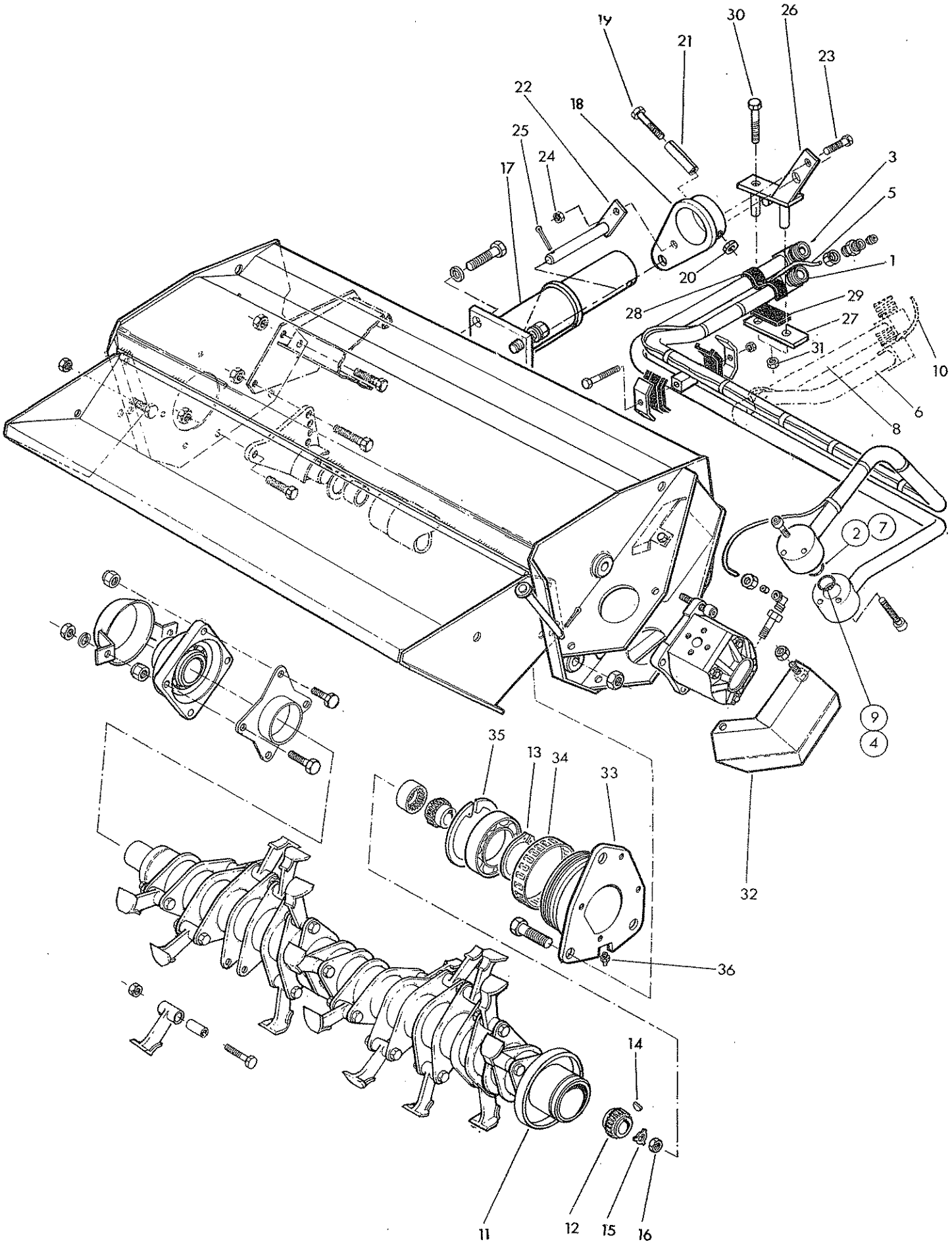



| Ref | Part No | Qty | Description |
|---|---|---|---|
| | 73 13 324 | 1 | CAB GUARD KIT comprising:- |
| 1 | 73 13 049 | 1 | .Guard panel large |
| 1 | 73 13 050 | 1 | .Guard panel small |
| 2 | 60 01 064 | 12 | .Spring |
| 3 | 60 01 065 | 6 | .Hook |
| 4 | 73 13 051 | 6 | .Hook |

# 1.2 METRE HEDGE FLAIL

**Sheet 1 of 2**



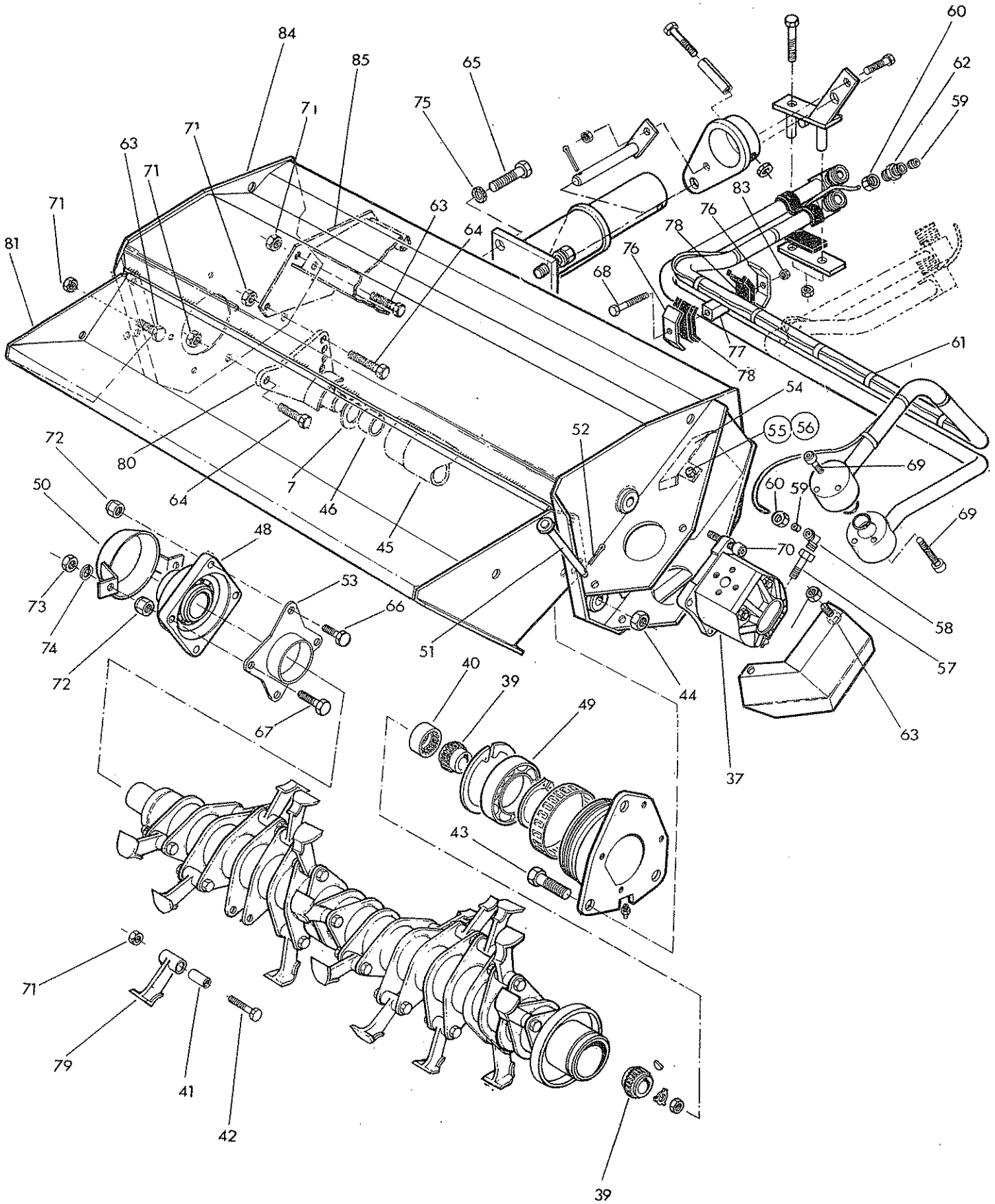
| Ref | Part No. | Qty | Description. |
|---|---|---|---|
| | 71 35 320 | | 1.2 METRE HEDGE FLAIL HEAD R. HAND. |
| 1 | 71 35 300 | 1 | .Rigid pipe upper c/w '0' ring. |
| 2 | 86 00 121 | 1 | .. '0' ring |
| 3 | 71 35 301 | 1 | .Rigid pipe lower c/w '0' ring. |
| 4 | 86 00 121 | 1 | .. '0' ring. |
| 5 | 85 01 123 | 1 | .Nylon tube 1900mm long. |
| | 71 35 322 | | 1.2 METRE HEDGE FLAIL HEAD L. HAND. |
| 6 | 71 35 302 | 1 | .Rigid pipe upper c/w '0' ring. |
| 7 | 86 00 121 | 1 | .. '0' ring. |
| 8 | 71 35 303 | 1 | .Rigid pipe lower c/w '0' ring. |
| 9 | 86 00 121 | 1 | .. '0' ring. |
| 10 | 85 01 125 | 1 | .Nylon tube 482mm long. |

The remaining items are common to both hedge flail assemblies.

| | | | |
|---|---|---|---|
| 11 | 71 14 434 | 1 | .Flail rotor c/w coupling half, nut etc. |
| 12 | 71 14 104 | 1 | ..Coupling half. |
| 13 | 04 01 290 | 1 | ..External circlip Ø90 |
| 14 | 83 01 010 | 1 | ..Woodruff key. |
| 15 | 82 01 139 | 1 | ..Tab washer Ø14 |
| 16 | 91 00 015 | 1 | ..Nut M14 |
| 17 | 71 14 341 | 1 | .Forward extension |
| 18 | 71 14 109 | 1 | .Jaw plate c/w nut bolt & spring dowel. |
| 19 | 92 13 185 | 1 | ..Bolt M10 x 90 |
| 20 | 91 43 005 | 1 | ..Self locking nut M10 |
| 21 | 04 23 548 | 1 | ..Spring dowel 5/8" dia. x 3" long. |
| 22 | 71 14 099 | 1 | .Slave link pin c/w split pin, nut & bolt. |
| 23 | 92 13 085 | 1 | ..Bolt M10 x 40 |
| 24 | 91 43 005 | 1 | ..Self locking nut M10 |
| 25 | 95 01 406 | 1 | ..Split pin Ø5 x 40 |
| 26 | 71 35 089 | 1 | .Pipe mounting bracket. |
| 27 | 71 35 085 | 1 | .Clamp plate. |
| 28 | 71 35 087 | 1 | .Clamp strip - long. |
| 29 | 71 35 088 | 1 | .Clamp strip - short. |
| 30 | 92 13 124 | 2 | .Bolt M8 x 60 |
| 31 | 91 43 004 | 2 | .Self locking nut M8 |
| 32 | 71 14 337 | 1 | .Hydraulic motor cover. |
| 33 | 71 14 298 | 1 | .Bearing housing c/w tolerance ring, circlip & greaser |
| 34 | 71 14 042 | 1 | ..Tolerance ring. |
| 35 | 71 14 043 | 1 | ..Internal circlip Ø140 |
| 36 | 09 01 125 | 1 | ..Greaser 1/8 BSP - 45° |

Continued overleaf.

# 1.2 METRE HEDGE FLAIL continued



| Ref | Part No. | Qty | Description. |
|---|---|---|---|
| | | | 1.2 METRE HEDGE FLAIL (Continued) |
| 37 | 83 01 261 | 1 | .Hydraulic motor. |
| 38 | 71 14 105 | 1 | .Coupling assembly compr:- |
| 39 | 71 14 104 | 2 | .. Drive coupling half. |
| 40 | 71 14 103 | 1 | .. Coupling sleeve. |
| 41 | 71 14 159 | 24 | .Flail pivot bush. |
| 42 | 71 14 082 | 24 | .Special bolt. |
| 43 | 73 14 146 | 3 | .Special bolt. |
| 44 | 91 43 007 | 3 | .Self locking nut M16 |
| 45 | 71 14 096 | 1 | .Roller c/w bushes. |
| 46 | 72 13 023 | 2 | .Bush |
| 47 | 60 01 136 | 2 | .Thrust washer. |
| 48 | 06 00 062 | 1 | .Flange bearing. |
| 49 | 06 00 043 | 1 | .Bearing 6018-Z |
| 50 | 71 14 339 | 1 | .Bearing cover. |
| 51 | 71 14 049 | 1 | .Motor cover pin c/w split pin |
| 52 | 05 03 095 | 1 | ..Split pin 3/16" dia x 1 1/8" long. |
| 53 | 71 14 464 | 1 | .Shroud. |
| 54 | 71 35 083 | 1 | .Drain line cover c/w nut & screw. |
| 55 | 93 00 114 | 1 | .Setscrew M8 x 20 |
| 56 | 91 43 004 | 1 | .Self locking nut M8 |
| 57 | 71 35 086 | 1 | .Adaptor - drain line. |
| 58 | 85 81 198 | 1 | .Elbow - drain line. |
| 59 | 85 81 199 | 1 | .Olive Ø8 |
| 60 | 85 81 200 | 1 | .Female nut. |
| 61 | 71 35 084 | 10 | .Hose tie. |
| 62 | 85 81 201 | 1 | .Special union |
| 63 | 03 11 085 | 6 | .Setscrew ½" UNF x 1" long. |
| 64 | 03 11 105 | 4 | .Setscrew ½" UNF x 1¼" long. |
| 65 | 03 11 106 | 4 | .Setscrew 5/8 UNF x 1¼" long. |
| 66 | 03 11 146 | 2 | .Setscrew 5/8 UNF x 1¾" long. |
| 67 | 02 11 186 | 2 | .Bolt 5/8 UNF x 2¼" long. |
| 68 | 92 13 135 | 1 | .Bolt M10 x 65 |
| 69 | 93 00 014 | 6 | .Capscrew ' wedglok' M10 x 60 |
| 70 | 93 00 104 | 4 | .Capscrew - 'wedglok' M10 x 40 |
| 71 | 01 41 005 | 34 | . Self locking nut ½" UNF |
| 72 | 01 41 006 | 4 | .Self locking nut 5/8 UNF |
| 73 | 01 31 006 | 2 | .Thin plain nut 5/8 UNF |
| 74 | 01 00 206 | 2 | .Plain washer 5/8" dia. |
| 75 | 01 00 406 | 2 | .External serrated washer 5/8" dia. |
| 76 | 71 35 092 | 2 | .Rigid pipe clamp - *use Clamp Plate 06.418.05* |
| 77 | 71 35 093 | 1 | .Clamp spacer - *not required if 06.418.05 & 7198078 is used* |
| 78 | 71 14 048 | 2 | .Clamp strip - *use Pipe Clamp 7198078* |
| 79 | 71 14 312 | 24 | .Hedge flail - F12H |
| 80 | 71 11 090 | 1 | .Roller bracket R .Hand. |
| 81 | 71 14 335 | 1 | .Hedge hood front. |
| 82 | 71 11 091 | 1 | .Roller bracket L.hand not illustrated. |
| 83 | 91 43 005 | 1 | .Self locking nut M10 |
| 84 | 71 14 325 | 1 | .Flail Casing |
| | 86 99 166 | | SEAL KIT HYDRAULIC MOTOR. |

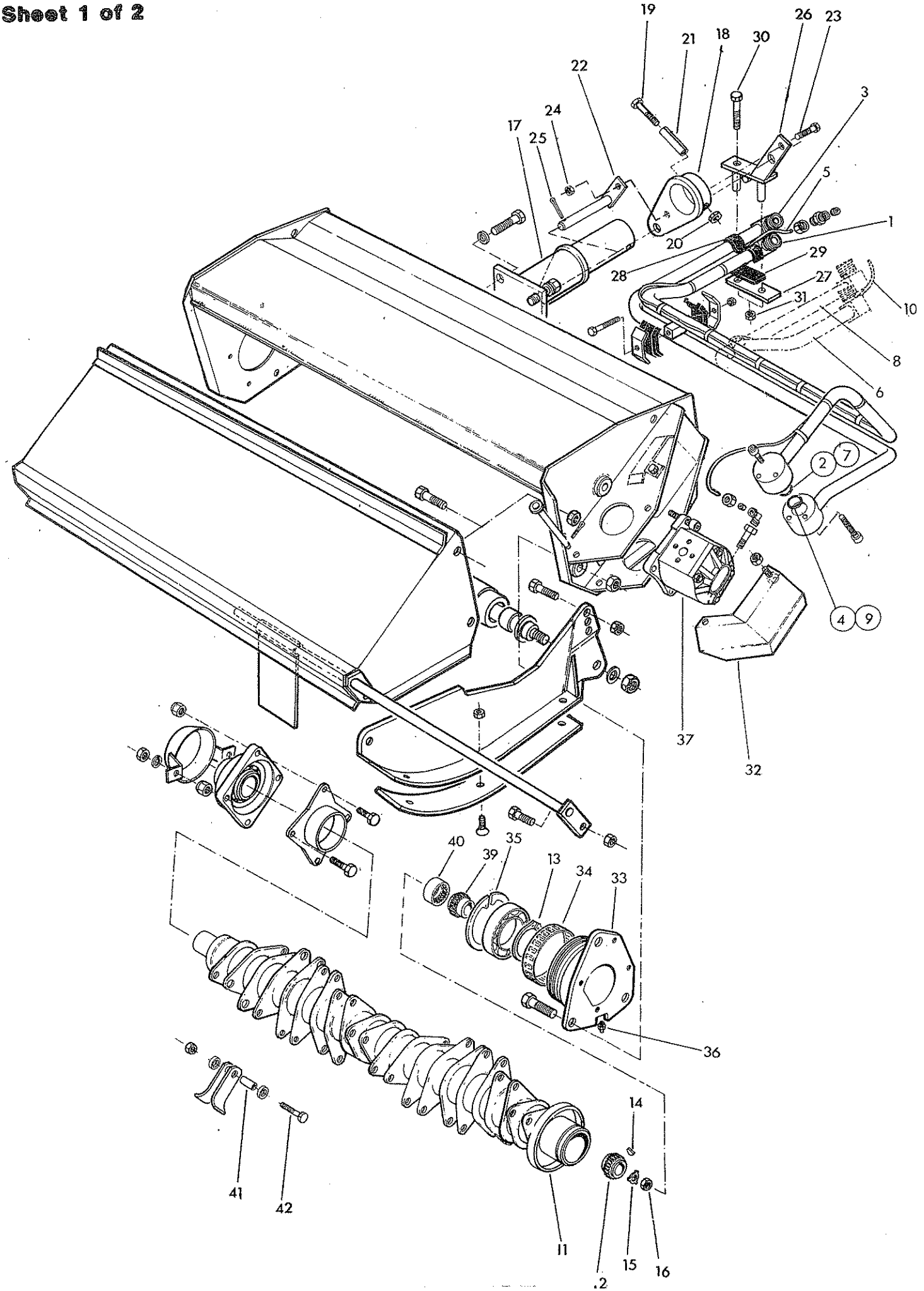
OPTIONAL EXTRA

The flails may be reversed to cut with a downward chopping action, if this is done the following is necessary.

| | | |
|---|---|---|
| 85 | 71 14 336 | Rear hedge hood. |

# 1.2 METRE GRASS FLAIL

**Sheet 1 of 2**

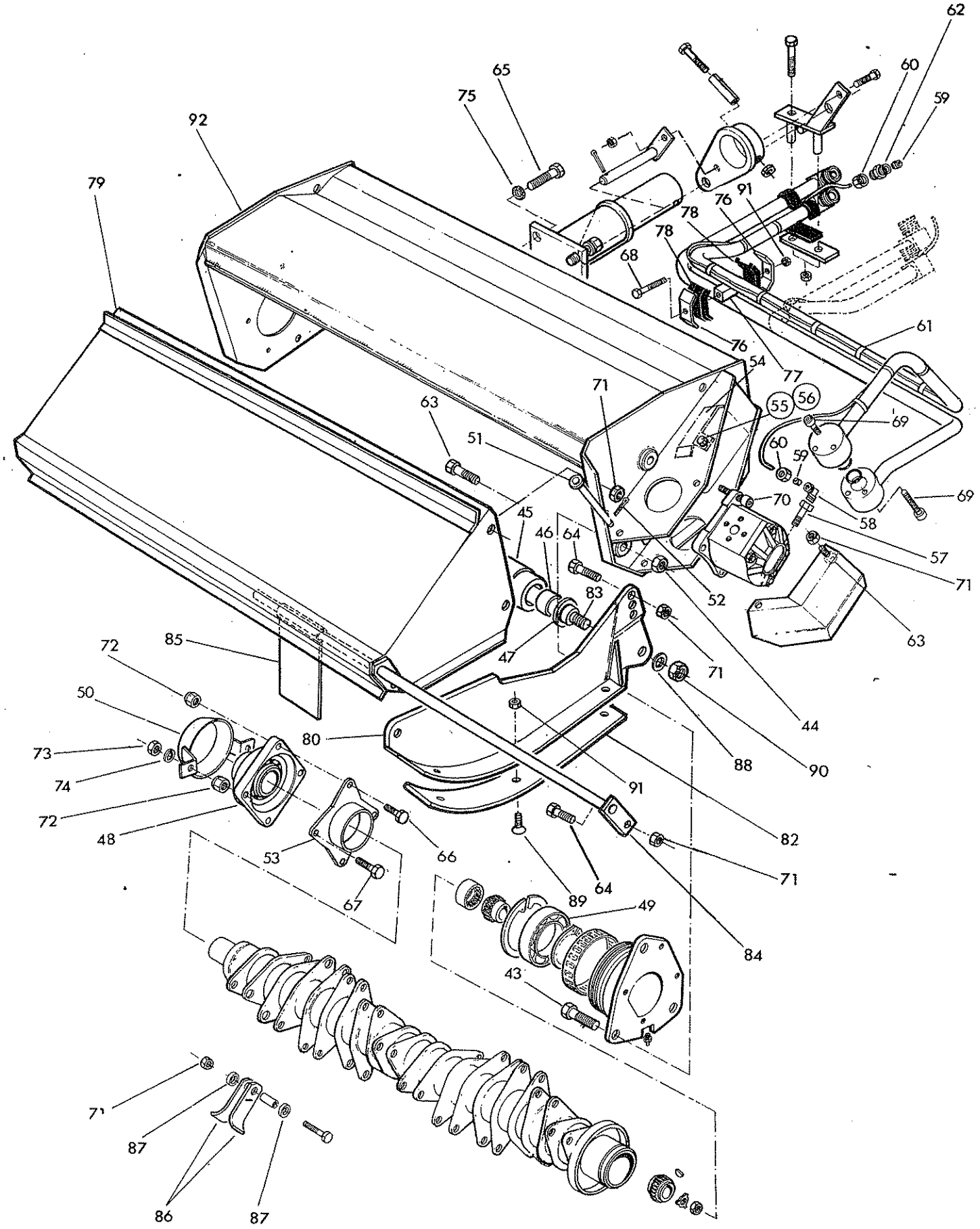


| Ref | Part No. | Qty | Description |
|---|---|---|---|
| | 71 35 321 | | 1.2 METRE GRASS FLAIL HEAD R. HAND. |
| 1 | 71 35 300 | 1 | .Rigid pipe upper c/w '0' ring. |
| 2 | 86 00 121 | 1 | ..'0' ring |
| 3 | 71 35 301 | 1 | .Rigid Pipe lower c/w '0' ring. |
| 4 | 86 00 121 | 1 | ..'0' ring |
| 5 | 85 01 123 | 1 | .Nylon tube 1900mm long. |
| | 71 35 323 | | 1.2 METRE GRASS FLAIL HEAD L. HAND |
| 6 | 71 35 302 | 1 | .Rigid pipe upper c/w '0' ring. |
| 7 | 86 00 121 | 1 | ..'0' ring. |
| 8 | 71 35 303 | 1 | .Rigid pipe lower c/w '0' ring. |
| 9 | 86 00 121 | 1 | ..'0' ring. |
| 10 | 85 01 125 | 1 | .Nylon tube 482 mm long. |

The remaining items are common to both grass flail assemblies.

| | | | |
|---|---|---|---|
| 11 | 71 14 434 | 1 | .Flail rotor c/w coupling half, nut etc |
| 12 | 71 14 104 | 1 | ..Coupling half |
| 13 | 04 01 290 | 1 | ..External circlip Ø90 |
| 14 | 83 01 010 | 1 | ..Woodruff key |
| 15 | 82 01 139 | 1 | ..Tab washer Ø14 |
| 16 | 91 00 015 | 1 | ..Nut M14 |
| 17 | 71 14 341 | 1 | .Forward extension |
| 18 | 71 14 109 | 1 | .Jaw plate c/w nut bolt and spring dowel. |
| 19 | 92 13 185 | 1 | ..Bolt M10 x 90 |
| 20 | 91 43 005 | 1 | ..Self locking nut M10 |
| 21 | 04 23 548 | 1 | ..Spring dowel 5/8" dia. x 3" long. |
| 22 | 71 14 099 | 1 | .Slave link pin c/w split pin, nut & bolt. |
| 23 | 92 13 075 | 1 | ..Bolt M10 x 35 |
| 24 | 91 43 005 | 1 | ..Self locking nut M10 |
| 25 | 95 01 406 | 1 | ..Split pin Ø5 x 40 |
| 26 | 71 35 089 | 1 | .Pipe mounting bracket. |
| 27 | 71 35 085 | 1 | .Clamp plate |
| 28 | 71 35 087 | 1 | .Clamp strip - long. |
| 29 | 71 35 088 | 1 | .Clamp strip - short |
| 30 | 92 13 124 | 2 | .Bolt M8 x 60 |
| 31 | 91 43 004 | 2 | .Self locking nut M8 |
| 32 | 71 14 337 | 1 | .Hydraulic motor cover |
| 33 | 71 14 298 | 1 | .Bearing housing c/w tolerance ring, circlip & greaser. |
| 34 | 71 14 042 | 1 | ..Tolerance ring. |
| 35 | 71 14 043 | 1 | ..Internal circlip Ø140 |
| 36 | 09 01 125 | 1 | ..Greaser 1/8 BSP - 45° |
| 37 | 83 01 261 | 1 | .Hydraulic motor |
| 38 | 71 14 105 | 1 | .Coupling assembly compr: |
| 39 | 71 14 104 | 2 | .. Drive coupling half. |
| 40 | 71 14 103 | 1 | .. Coupling sleeve. |
| 41 | 71 14 159 | 24 | .Flail pivot bush |
| 42 | 71 14 082 | 24 | .Special bolt. |

Continued overleaf.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| Ref | Part No. | Qty | Description. |
|---|---|---|---|
| | | | 1.2 METRE GRASS FLAIL (Continued) |
| 43 | 73 14 146 | 3 | .Special bolt |
| 44 | 91 43 007 | 3 | .Self locking nut M16 |
| 45 | 71 14 096 | 1 | .Roller c/w bushes |
| 46 | 72 13 023 | 2 | .Bush |
| 47 | 60 01 136 | 2 | .Thrust washer. |
| 48 | 06 00 062 | 1 | .Flange bearing. |
| 49 | 06 00 043 | 1 | .Bearing 6018-Z |
| 50 | 71 14 339 | 1 | .Bearing cover |
| 51 | 71 14 049 | 1 | .Motor cover pin c/w split pin |
| 52 | 05 03 095 | 1 | ..Split pin 3/16" dia. x 1 1/8" long |
| 53 | 71 14 464 | 1 | .Shroud. |
| 54 | 71 35 083 | 1 | .Drain line cover c/w nut & screw. |
| 55 | 93 00 114 | 1 | .Setscrew M8 x 20 |
| 56 | 91 43 004 | 1 | .Self locking nut M8 |
| 57 | 71 35 086 | 1 | .Adaptor - drain line. |
| 58 | 85 81 198 | 1 | .Elbow - drain line |
| 59 | 85 81 199 | 2 | .Olive Ø8 |
| 60 | 85 81 200 | 2 | .Female nut. |
| 61 | 71 35 084 | 10 | .Hose tie. |
| 62 | 85 81 201 | 1 | .Special union |
| 63 | 03 11 085 | 6 | . Setscrew ½" UNF x 1" long |
| 64 | 03 11 105 | 4 | .Setscrew ½" UNF x 1¼" long. |
| 65 | 03 11 106 | 4 | .Setscrew 5/8 UNF x 1¼" long. |
| 66 | 03 11 146 | 2 | .Setscrew 5/8 UNF x 1¾" long. |
| 67 | 02 11 186 | 2 | .Bolt 5/8 UNF x 2¼" long. |
| 68 | 92 13 135 | 1 | .Bolt M10 x 65 |
| 69 | 93 00 014 | 6 | .Capscrew ' wedglok' M10 x 60 |
| 70 | 93 00 104 | 4 | .Capscrew 'wedglok' M10 x 40 |
| 71 | 01 41 005 | 34 | .Self locking nut 1/2 UNF |
| 72 | 01 41 006 | 4 | .Self locking nut 5/8 UNF |
| 73 | 01 31 006 | 2 | .Thin plain nut 5/8 UNF |
| 74 | 01 00 206 | 2 | .Plain washer 5/8" dia. |
| 75 | 01 00 406 | 2 | .External serrated washer 5/8" dia. |
| 76 | 71 35 092 | 2 | .Rigid pipe clamp - *use Clamp Plate 06.418.05* |
| 77 | 71 35 093 | 1 | .Clamp spacer - *not required if 06.418.05 & 7198078 is used* |
| 78 | 71 14 047 | 2 | .Clamp strip - *use Pipe Clamp 7198078* |
| 79 | 71 14 374 | 1 | .Grass Hood |
| 80 | 71 14 376 | 1 | .Skid - L.Hand |
| 81 | 71 14 375 | 1 | .Skid - R.Hand not illustrated. |
| 82 | 73 14 323 | 2 | .Skid runner. |
| 83 | 71 14 377 | 1 | .Roller tie rod. |
| 84 | 71 14 119 | 1 | .Flap bar. |
| 85 | 71 14 378 | 8 | .Flap |
| 86 | 71 14 120 | 48 | .Grass flail F126 |
| 87 | 71 14 121 | 48 | .Flail spacer. |
| 88 | 91 00 108 | 2 | .Plain washer Ø20 |
| 89 | 93 33 065 | 6 | .Counter sunk setscrew M10 x 30 |
| 90 | 91 43 008 | 2 | .Self locking nut M20 |
| 91 | 91 43 005 | 7 | .Self locking nut M10 |
| 92 | 71 14 325 | 1 | .Flail Casing. |
| | 86 99 166 | | SEAL KIT HYDRAULIC MOTOR |


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