

**IM & PM 1710**



MICROKLIPPA

PART NO 91.118.01 & 91.124.01

**INSTRUCTION & PARTS MANUAL**



# IMPORTANT

## VERIFICATION OF WARRANTY REGISTRATION

*(applies to UK machines only)*

### UK DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with Bomford Turner Ltd within 7 days of delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register machines go to the Bomford Turner Ltd web site at **www.bomford-turner.com**, log on to '**BOMFORD PLUS**' and select the '**Machine Registration Button**' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.

Should you experience any problems registering a machine in this manner please contact the Bomford Service Department on 01789 773383.

#### Registration Verification (UK Machines)

Dealer Name: .....
Dealer Address: .....
Customer Name: .....
Date of Warranty Registration: ...../...../..... Dealer Signature: .....

#### NOTE TO CUSTOMER / OWNER

*Please ensure that the above section above has been completed and signed by the selling dealer to verify that your machine has been registered with Bomford Turner Ltd.*

# EC DECLARATION OF CONFORMITY

*Conforming to EEC Machinery Directive 98/37/EC\**

We,

**Bomford Turner Ltd,**

Station Road, Salford Priors, Evesham, WR11 81SW, England.

*Declare under our sole responsibility that:*

The product (*type*) ..Tractor Mounted Cutterbar Mower.....

.....

Product Code ..SWTR.....

Serial No. & Date ..... Type .....

Manufactured by the above company/\* .....

.....

*(\* insert business name and full address if not stated above)*

Complies with the required provisions of the Machinery Directive 98/37/EC, \* previously Directive 89/392/EEC as amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC.

The machinery directive is supported by;

- BS EN ISO 12100:2003 Safety of Machinery. This standard is made up of two parts; Part 1 Terminology, methodology, Part 2 Technical Specifications.
- BS EN 1050 Safety of machinery - Principles of risk assessment.
- And other national standards associated with its design and construction as listed in the Technical File.

The Machinery Directive is fully implemented into UK law by means of the Supply of Machinery (Safety) Regulations 1992 (SI 1992/3073) as amended by The Supply of Machinery (Safety) (Amendment) Regulations 1994 (SI 1994/2063).

Signed .......

*on behalf of Bomford Turner Ltd*

*Responsible Person*

*Status:* Chief Design Engineer

*Date:* December 2007

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## GENERAL INFORMATION

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Always read this manual before fitting or operating the machine – whenever any doubt exists contact your dealer or the Bomford Service Department for advice and assistance.

### Use only Bomford Genuine Service Parts on Bomford Equipment and Machines

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

#### WARNING

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

#### CAUTION

An operating procedure, technique etc., which –  
can result in damage to either machine or equipment if not observed carefully.

#### NOTE

An operating procedure, technique etc., which –  
is considered essential to emphasis.

#### LEFT AND RIGHT HAND

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

## MACHINE & DEALER INFORMATION

*Record the Serial Number of your machine on this page and always quote this number when ordering parts. Whenever information concerning the machine is requested remember also to state the make and model of tractor to which the machine is fitted.*

Machine Serial Number:	Installation Date:
Machine Model details:	
Dealer Name:	
Dealer Address:	
Dealer Telephone No:	
Dealer Email Address:	

## SAFETY INFORMATION

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

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

- ▲ Where this is used as a rear-mounted implement it will remove weight from the front wheels – this can result in less of steering and risk of overturn. Add front end weight to ensure 20% of tractor original weight is on the front wheels when the boom is in transport position. This will aid steering safety reducing the risk of bodily injury.
- ▲ Always transport slowly on rough surface to prevent ‘bouncing’ of the front wheels causing loss of steering and possible injury.
- ▲ Always set tractor wheel width as wide as possible and add weights to the relevant opposite wheel to counteract the weight of an extended implement.
- ▲ Operate the machine only with a tractor equipped with an approved roll-over-protection system (ROPS). Always wear approved seat belts whenever the tractor or machine is running. Serious injury or death could result from falling off the tractor seat. Do not alter the ROPS structure.
- ▲ Always ensure that check chains/stabilizers are fitted and are in good condition and tight.
- ▲ The operator and all support personnel should wear ‘Safety Shoes’, ‘Hard Hats’, and ‘Safety Glasses’ at all times to protect them against falling objects.
- ▲ Never allow inexperienced or untrained personnel to operate the tractor/cutterbar combination without training or supervision.
- ▲ Always familiarise yourself with the controls in a clear safe area before commencing work.
- ▲ Always familiarise yourself with the local highway regulations and abide by them at all times.
- ▲ The boom and cutterhead change the balance of the machine in transport. Be especially careful when transporting on slopes. Never turn uphill in transport except at very slow speed and a low rate of turn. Never transport or operate this machine on steep slopes. **BE CAREFUL.**
- ▲ Always inspect the work area or hedgerow for wire, steel posts, or other dangerous materials and remove them if possible before commencing work.
- ▲ Always operate the machine at the recommended PTO speed. Never exceed the maximum permitted.
- ▲ When the cutterhead is swung to the side (working position) of the tractor, it exerts a momentum on the tractor causing the tractor to rock from side-to-side. Extreme Care should be taken when operating on slopes, Bodily Harm or Death could result from tractor's tipping over.

- ▲ Never swing the arms of the machine over if the tractor is facing sideways, across or facing down a slope. If swinging over on sloping ground is unavoidable the tractor must always face directly up the slope.
- ▲ Never allow riders on the tractor. Never lift a person with the boom or cutterhead. KEEP BYSTANDERS CLEAR.
- ▲ Inspect the entire machine periodically. Look for loose bolts, worn or broken parts, pinched hydraulic hoses, and leaky or loose fittings. Make sure all pins are secure: Serious injury may occur from not maintaining this machine in good working order.
- ▲ Do not mount tractor when tractor is moving. Avoid serious injury or death from contact with the rotating tyres. Mount and dismount the tractor only when it is completely stopped, do not grasp the control levers when mounting or dismounting the tractor.
- ▲ Always take extreme care when working around overhead obstructions. When working close to overhead power lines consult your electric company for a safe code of operation.
- ▲ The boom is designed only to position the cutterhead which is attached to it. Never attempt to lift, pull, or push other objects with it. Serious injury could result from a structural failure when the boom is used for purposes other than those for which it was designed.
- ▲ The boom on this machine has a safety 'breakback' system with automatic return to the work position, never allow anyone to stand in front of the boom or cutterhead in a position where they could be injured if the boom were to move forward suddenly.
- ▲ Always at all times keep fingers away from the cutter knife as it can be operated by a movement of the crankshaft fly wheel caused by gravity even though the tractor engine is switched off. When clearing any blockage always lay the cutterbar flat on the ground, switch off the tractor, clamp the cutter knife firmly and remove the blockage using a suitable tool.
- ▲ Do not operate the machine with hydraulic oil leaking. Oil is expensive, and its presence could present a hazard. Do not check for leaks with your hand-use cardboard. High-pressure oil can penetrate the skin and cause GANGRENE. If oil does penetrate the skin, have it surgically removed at once by a surgeon knowledgeable in this procedure.
- ▲ Never become complacent and ignore any safety instructions. Always check all nuts, bolts, hoses and other fixings daily for tightness, security and damage. Repair immediately if require Always transport the machine in the recommended position (see instructions in transport section) with the cutterbar guard in position.
- ▲ Never walk or work under any raised boom or cutterhead. The boom could fall and cause serious bodily injury or death. Always lower the boom and cutterhead flat on the ground or support the boom and cutterhead on safety stands. Unload all hydraulic actuators prior to doing any maintenance. Set the cutterhead on the ground, then kill the tractor engine. Push and pull the Control levers in and out several times to remove pressure.
- ▲ Do not work under raised boom or cutterhead unless components are securely blocked up to prevent inadvertent dropping.

- ▲ Always read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers and any other chemical agents.
- ▲ Always maintain the safety decals in good readable condition. If the decals become damaged or unreadable, reorder them immediately.
- ▲ In addition to the design and configuration of this implement, including safety signs and safety equipment, hazard control and accident prevention are dependent upon the awareness, concern prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to safety messages and operation instruction in each of the appropriate sections of the tractor and machine manuals. Pay close attention to the safety signs affixed to the tractor and machine.

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

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## TRACTOR REQUIREMENTS

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Swingtrim machines are specifically designed to be fitted to all tractors with category 1 linkage facility and a minimum weight (*inclusive of ballast*) to manufacturer's specifications of 650 kg (*1430 lbs*).

Check chains/stabiliser bars must be available to hold the machine firmly in position during transport and operation.

The tractor selected must have a relief valve setting of between 2000 – 3000 psi (*110 - 210 Bar*). NOTE: Tractors which operate on a 'closed centre' hydraulic principle are unsuitable e.g. John Deere.

Irrespective of the size of the tractor it must be stable during transport and operation of the machine at all times under all conditions. Due regard must be paid to operating on slopes - front end ballast and rear wheel weights should be added as appropriate to counterbalance overhang of the Cutterbar – *refer to vehicle/tractor preparation page for further information on this subject.*

## VEHICLE / TRACTOR PREPARATION

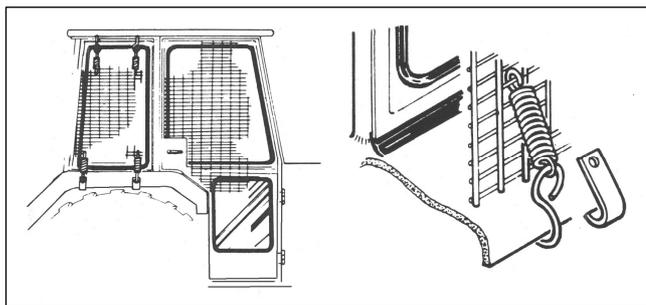
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We recommend vehicles are fitted with cabs using 'safety glass' windows and protective guarding when used with our machines.

Fit Operator Guard (*Part No. 7313324*) using the hooks provided. Shape the mesh to cover all vulnerable areas.

Remember the driver must be looking through mesh and/or polycarbonate glazing

when viewing the cutterhead in any working position - unless the vehicle/ cab manufacturer can demonstrate that the penetration resistance is equivalent to, or higher than, that provided by mesh/polycarbonate glazing. If the tractor has a roll bar only, a frame must be made to carry both mesh and polycarbonate glazing. The operator should also use personal protective equipment to reduce the risk of serious injury such as; eye protection (mesh visor to EN1731 or safety glasses to EN166), hearing protection to EN352, safety helmet to EN297, gloves, filter mask and high visibility clothing.



### Vehicle Ballast

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

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

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

All factors must be addressed in order to match the type and nature of the equipment added to the circumstances under which it will be used.

### Factors that effect stability

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

### Suggestions to increase stability

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

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

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## FITTING THE MACHINE

### Attachment to Tractor

Attachment of the machine to the tractor should be performed on a firm level site.

The procedure for attachment is as follows:

- Unbolt the upper halves of the yoke and fit them either side of the tractors top hitch bracket with the  $\frac{3}{4}$ " UNF nut and bolt provided. *If the tractor has only one top hitch position the bolt will replace the existing top hitch pin.* If more than one location is available mount the yokes through an alternative position as it will make it easier to put the machine on and off the tractor. *Do not tighten the nut at this stage.*
- Attach the machine to the three point linkage and raise to give 200 - 250mm (8" – 9") clearance under the lowest part of the frame.
- Re-bolt the yoke halves together - *it may be necessary to raise or lower the machine on the linkage to achieve hole alignment.*
- Adjust the top link until the main frame is vertical.
- Tighten the nut and bolt securing the upper yoke just enough to eliminate any sideways movement. *Do not over tighten and squeeze the top hitch brackets.*
- Tighten the check chains/stabiliser bars, release its holding chain and position the control valve to suit both tractor and operator - *this is achieved by a combination of height adjustments in the mounting bar abutment and by bending the mounting bar itself.*
- Turn the parking leg upside down and pin in position.
- Couple up the hydraulics – see below.

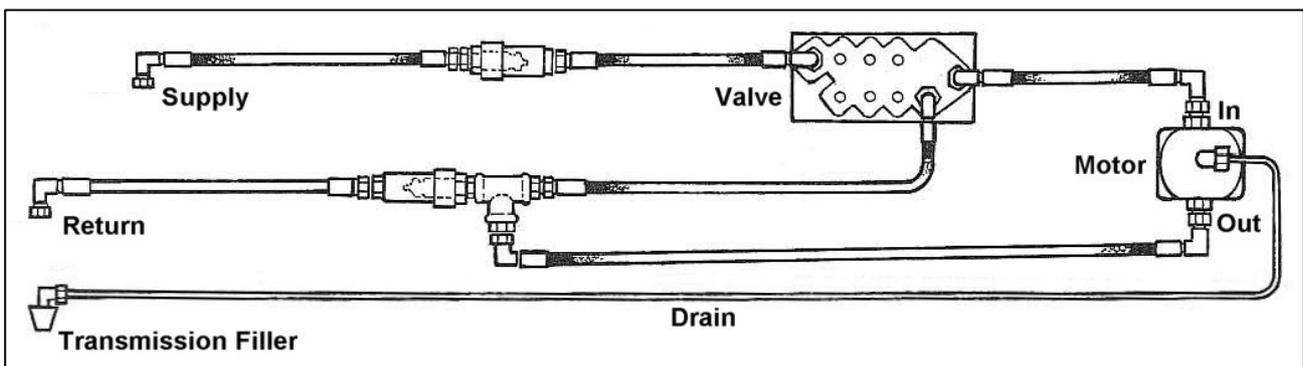
### Coupling up Hydraulics

Consult the tractor's handbook for correct installation of the supply and return connection.

*Note: If the tractor is equipped with one or more quick release hydraulic couplings the swingtrim supply and return hydraulic components may need to be re-arranged to facilitate fitting to a variety of tractors.*

The motor drain line must always be returned to a low pressure position i.e. transmission filler plug. Where no specific return connection is available and the transmission filler plug has to be used, an adaptor must be fitted, which, then allows the motor return and the motor drain to utilise a common return location.

Run up the machine and operate through its complete range of movements including the operation of the cutterbar drive. Check the tractors transmission oil level and top up if necessary. You are now ready to proceed to the worksite.



Microklippa – Hydraulic Connections

## REMOVAL OF THE MACHINE

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Removal of the machine from the tractor should always be performed on a firm level site.

### Removal Procedure

- Replace the stand leg in the park position with foot down.
- Position the arms so that the motor is level with the bottom of the frame.
- Disconnect the supply and return hoses plus the motor drain line from the tractor.
- Raise the tractor linkage to take the weight off the yoke. Where a common top link and yoke position is used the yoke must be unbolted in the middle. If different top link location are used the yoke may be unbolted at the top.
- Lower the machine to the ground and disconnect the three point linkage. Remove top halves of the yoke if still attached to tractor.
- Use chain to tie the hydraulic control valve back to the main arm - *this will make it easier for subsequent coupling up.*
- Blank off hose ends or loop the hoses and join with a coupling if available to protect hose lines from risk of contamination.

### Storage

Ideally, storage of the machine should be in clean dry location where the machine is protected from the elements.

If the machine is to be left standing for an extended period of time lightly coat the exposed portions of the ram rods with grease. *Note: the grease should be removed and the ram rods wiped clean before the rams are next moved as it will, over a period of time, become contaminated with dust and grit.*

Liberally grease the cutterbar and replace the finger and knife guard. Remember to take care and keep fingers away from the knife.

If the machine is to be stored outside lie a piece of tarpaulin or canvas over the control valve - *do not use a plastic bag as this will promote rapid corrosion of components.*

# OPERATION

## Operation Safety

Before commencing operation of the machine all operator's must read this manual fully paying particular attention to the aspects relating to safe use of the machine. The operator is not only responsible for their own safety but also the safety of all other persons who enter into the close proximity of the working machine.

## Cable Control Operation

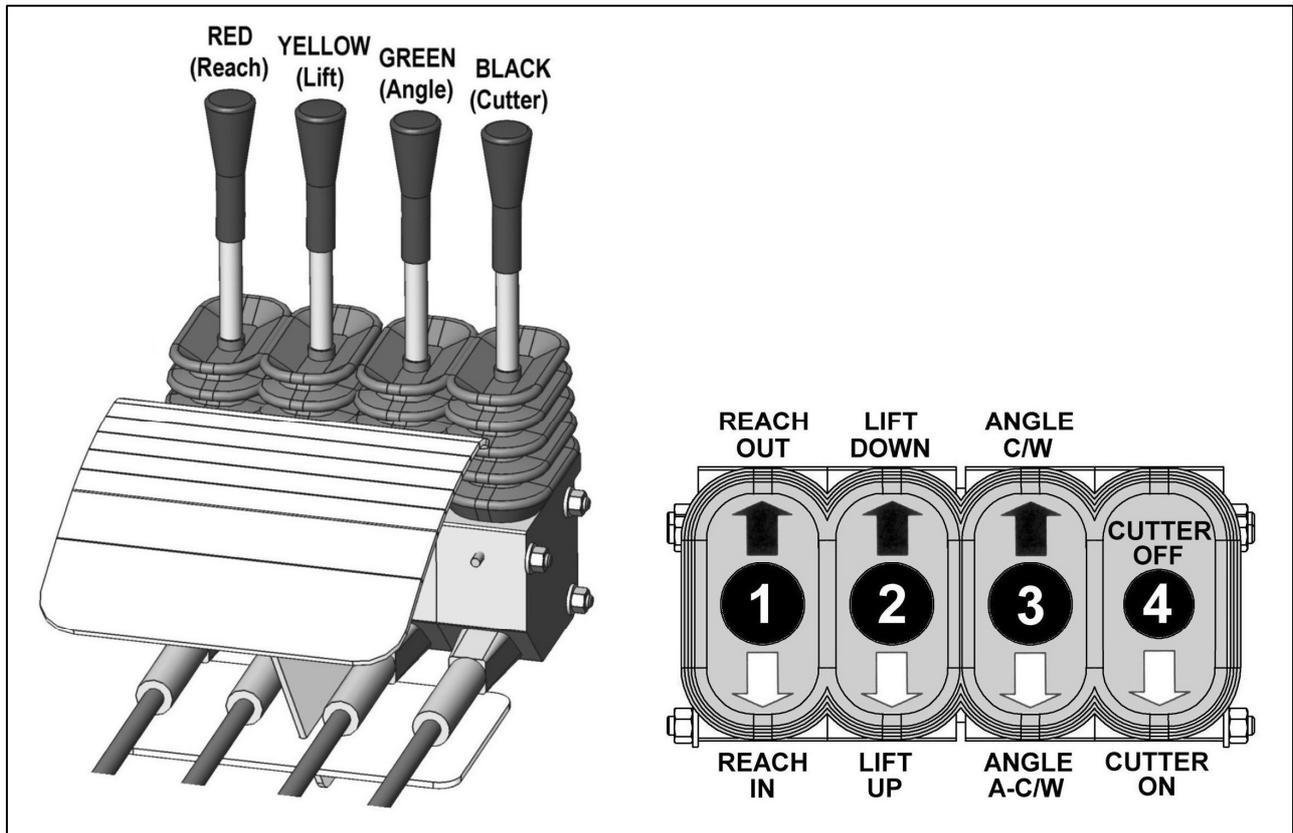
Four levers individually control the operating functions of the machine the knobs of which are colour coded according to use.

The function and operational direction of the levers are as follows where ↑ indicates movement of the lever away from the operator and ↓ indicates movement towards the operator:

## Lever Functions

1. Red - ↑ Reach Out and ↓ Reach In.
2. Yellow - ↑ Lift Down and ↓ Lift Up.
3. Green - ↑ Angle C/W and ↓ Angle A-C/W.
4. Black - ↓ Cutterbar On and ↑ Cutterbar Off.

Note: Lever (4) only operates from the central position rearwards, there is no forward travel from the centre position.



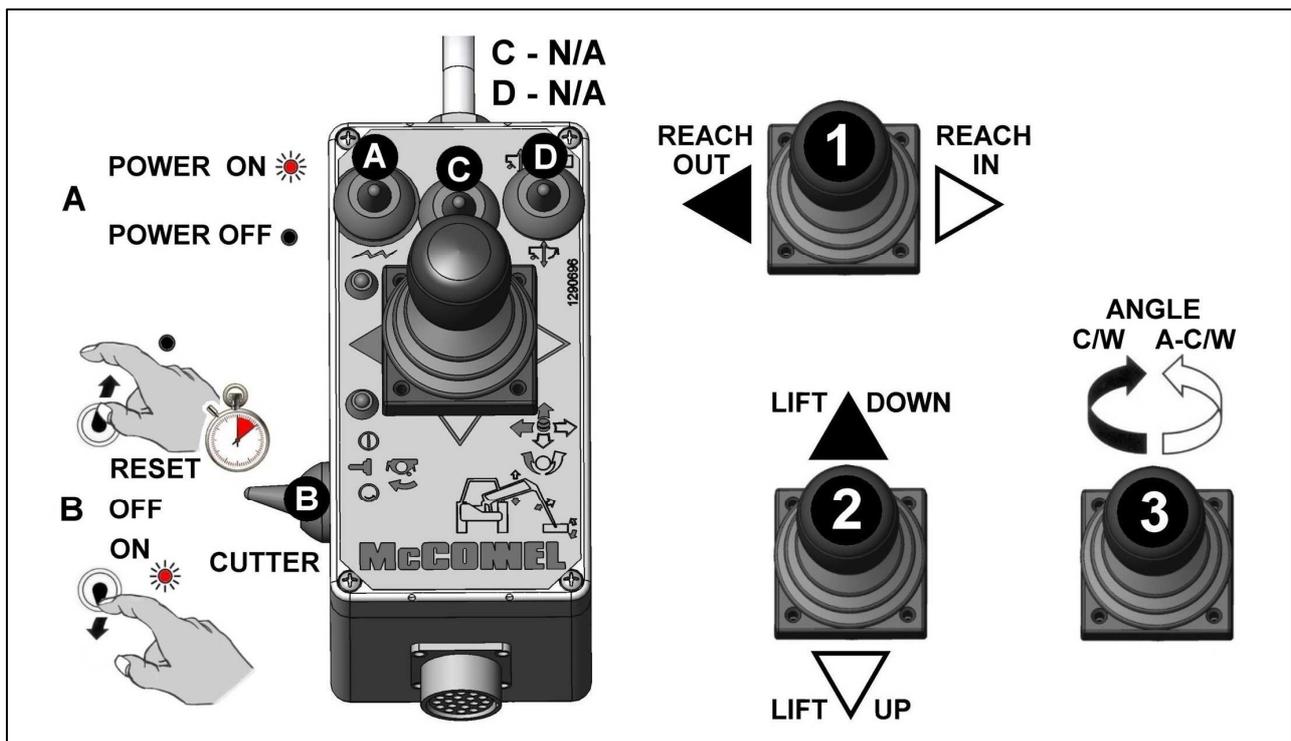
## Proportional Control Operation

On proportional models all operational functions are controlled by a single joystick. With the power switched on via the left hand switch on the control box, forward and rearward operation of the joystick controls Lift Down and Lift Up respectively whilst sideways operation controls Reach In and Reach Out – the particular sideways direction will depend on which side of the tractor the machine is working at the time. Angle function is controlled by rotation of the top of the joystick.

The switch mounted on the left hand side of the control box switches the cutterbar on and off; for safety reasons this switch features a time delay reset to prevent accidental operation of the cutterbar. To start the cutterbar the switch must be held in the forward position for several seconds before switching it to the rearward 'ON' position at which point the cutter will start and the LED light will illuminate. Moving the switch forwards again will switch the cutter 'OFF'.

## Joystick & Switch Functions

1. ⇐ Reach Out and ⇒ Reach In.
2. ↑ Lift Down and ↓ Lift Up.
3. C/W - Angle C/W and A-C/W Angle A-C/W.
  - A. Power On / Off.
  - B. Cutterbar On / Off (Reset).
  - C. N/A
  - D. N/A



Before commencing work it is advisable to find an unobstructed level site and operate the machine through its entire range of movements to familiarise yourself with the controls and the machines response to them. This is a wise precaution for all operators and a must for the inexperienced.

## Performance and Working Geometry

The swingtrim's 'swingover' feature allows it to be operated on both sides of the tractor without any re-building or operator adjustments. However, to achieve the best cutting action the cutterbar mounting is designed to pitch the knife downwards at eight degrees. This is maintained throughout the operating range except when the cutterbar is pointing upwards during operations on the left hand side. In these positions the knife has to operate with its back to the hedge and therefore some deterioration in the quality of cut can be expected. If it is necessary to carry out a considerable amount of work in these positions the topping performance can be improved by shortening the top link, this will tilt the machine forward thus altering the approach angle of the cutterbar.

The geometry also results in considerably less reach being available for ground cutting on the left hand side.

In addition, be aware that the geometry, depending on the length of draft links and the size of the tractor's wheels may allow the cutterbar to foul the tractor tyres; therefore extra care should be taken when positioning the cutterbar for 'close in' ground cuts. Also check carefully that there is clearance between the arms and the tractor's roll bar/cab before executing the 'swing over' manoeuvre,

The operation of the arms takes priority on the oil flow and will cause the knife to slow down during arm movements. If cutting material which is towards the limit of the swingtrim's capabilities avoid making arm adjustments while cutting is taking place as there is a likelihood, that the knife will stall.

## Swingover Prevention Mechanism

During normal arm movements to either side of the tractor a safety mechanism is employed to prevent the machine from accidentally swinging over to the opposing work side when operating the arms in raised positions.

## Swingover Procedure

To swingover the machine for work on the opposing side 'reach out' should be fully operated to its furthest point then 'lift up' to raise the arms into the upright position, by operating angle the cutterbar can be turned to the opposing side – the transfer of weight and operation of 'lift down' will now permit working on the opposing side.

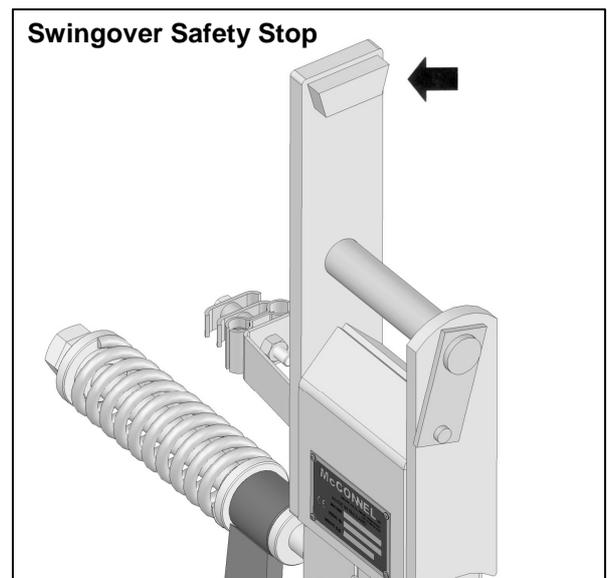
Wherever possible the swingover procedure should be performed on level ground – if swinging over on sloping ground is absolutely unavoidable always carry out the manoeuvre with the tractor facing directly up the slope.

**WARNING: Never attempt the swingover procedure when facing either across or down a slope.**

## Breakaway Protection

A mechanism is built into the lower mounting points to allow 'breakback' of the machine for protection of components in the event of accidental contact with imovable objects. The sprung mechanism works in conjunction with the lift ram base pin allowing the feature to transfer to the whichever side the machine is operating on.

When encountering an obstruction and the tractor continues to move forward the free suspended link will pivot about its mounting bar and allow the complete armhead and frame to move up and back until the obstruction is cleared or the tractor brought to a halt. Resetting of the breakaway is completely automatic with the armhead returning to the work position under gravity.



**WARNING:** It is important to understand that this feature is for component protection in unavoidable circumstances only, the breakaway geometry gives limited movement and therefore should not replace the operator's responsibility to avoid potentially damaging situations.

### **Tractor Control Settings**

Refer to the tractor's hand book to ascertain the correct control settings to suit the type of machine and the hydraulic installation.

### **Operational Limitations**

The Swingtrim is a light hedge trimming tool - attempting to cut unsuitable material will cause the knife to stall resulting in the tractors relief valve blowing and overheated oil.

### **Tractor Engine Speed**

The tractor engine should be run at a speed which will give 2½ - 4½ gpm (12 - 20 litres) of oil flow to the cutterbar motor. Less will be insufficient to do the work; more will result in increasing cutterbar vibration and greatly accelerated wear.

### **Tractor Forward Speed**

This is a matter for common sense and experience. It must be fast enough to maintain the correct oil flow but slow enough to enable the cutterbar to do its job properly.

### **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 (0.8 km) apart. To further promote highway safety the use of headlamps would be beneficial. Hazard warning lamps should not be used as oncoming vehicles could easily misjudge braking distance in presuming the tractor approaching them is stationary.

### **Cutterbar – Unclogging, Checking or Adjusting**

Before leaving the tractor seat select 'Cutterbar Off', switch off tractor engine and remove the starting key. Should the cutterbar become clogged NEVER, NEVER, NEVER clear any debris from the fingers or knife with your hands - use a stick from the hedge or other suitable tools.

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

### **Transport**

Place the cutterbar guard over the knife remembering to keep your fingers away from the knife as it can move even with the tractor engine switched off. Place the machine in the transport position by carrying out the following procedure:

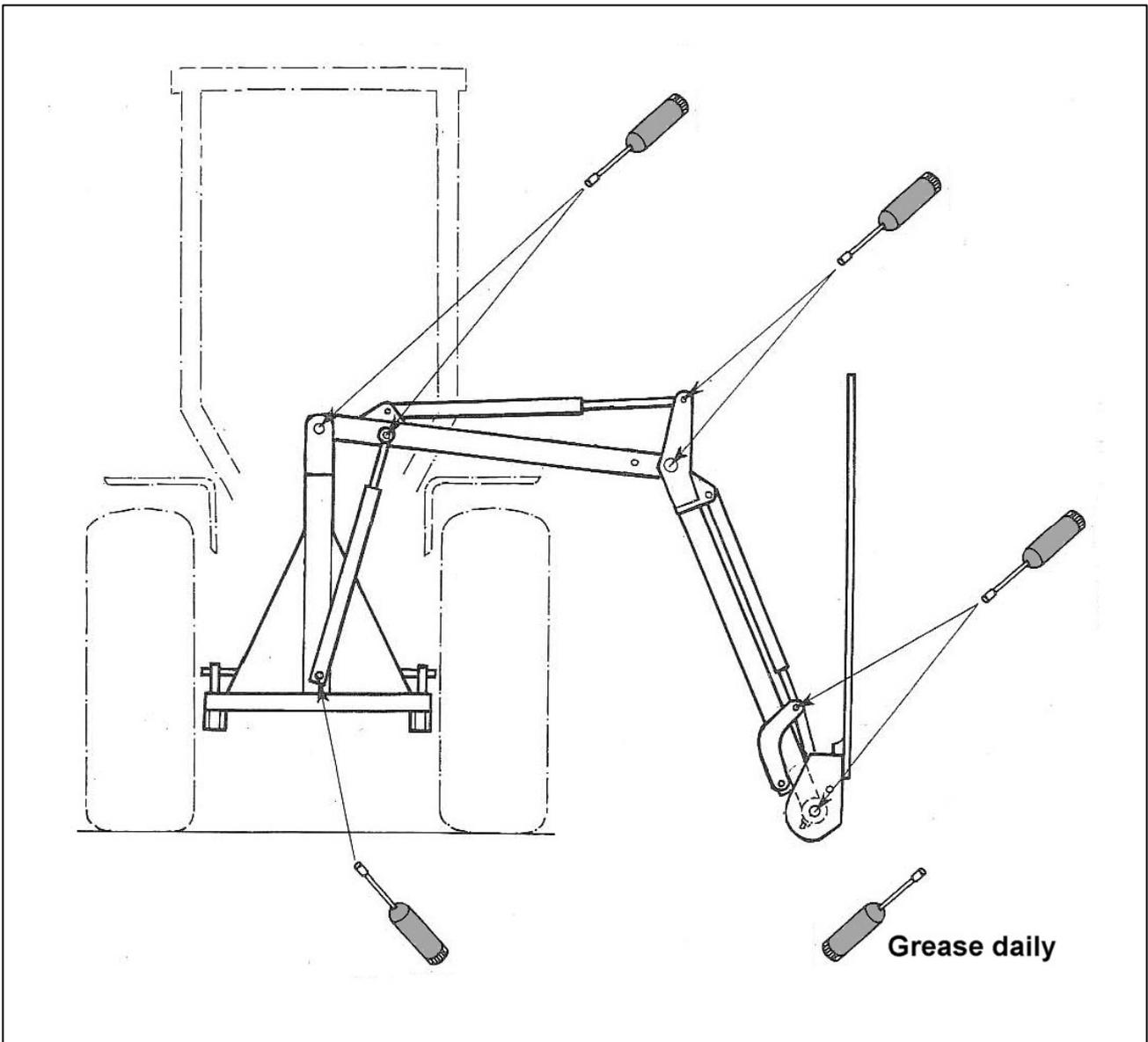
- Position the main arm on the left hand side of the machine.
- Fully retract the angle ram.
- Fully extend the reach ram and operate 'lift up' until the main arm abuts against the transport stop.

### **Optional Extras**

Cuttings Tray – this bolts to the cutterbar and projects to the rear providing a plate which encourages cuttings to slide off the hedge when topping.

Finger Bar - bolted to the cutterbar it deflects the cuttings away from the drive mechanism preventing any likelihood of the drive becoming clogged.

## MAINTENANCE



### **Lubrication**

Refer to the lubrication diagram above and grease daily all points indicated. Remember regular lubrication ensures longer machine life and diminishes service costs. In addition, occasionally oil the con-rod pivots and bushes.

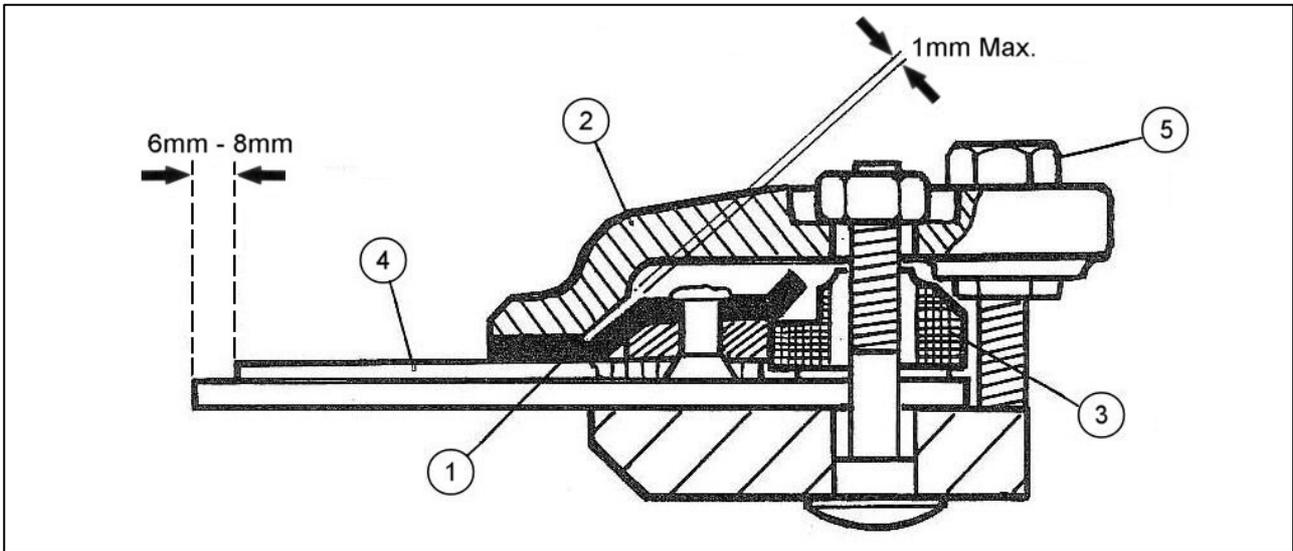
### **Fasteners**

Check on a daily basis that all bolts and nuts are tight, pins are secure and hydraulic connections are not leaking. Regularly inspect the hydraulic hoses and always replace them immediately at the first signs of wear or damage.

# CUTTERBAR

## Adjusting the Knife Guides

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



When adjusted correctly the knife sections (4) lie flush between the fingers and the underside of the knife holder (1) with the fingers projecting 6mm to 8mm in front of the knife tips. In addition there must be a maximum clearance of 1mm between the sloping faces of the knife holder (1) and the guide plate (2). This allows clearance for the knife to move freely and can be checked by placing a 5/8" dia bar into the con rod socket in the knife heel and operating by hand.

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

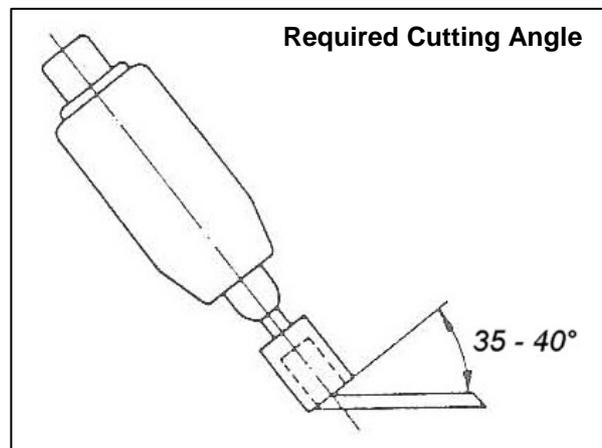
Any play caused by wear between the knife holder (1) and the knife sections (4) is removed by turning the setscrew (5). The knife guide should be adjusted until the mating faces are flush. No downward pressure should be exerted onto the knife as this may impede its free movement.

## Sharpening the knife

After five to twenty operating hours, depending on the work involved, the knives require re-sharpening. It is recommended that the knives be removed from the cutterbar for sharpening. The procedure is as follows:

Switch off tractor and remove the starting key.

- Disconnect the con rod, remove the three setscrews securing the knife heel to the knife and withdraw the knife from the cutterbar.
- Clean the knife and ensure that neither the back nor the knife sections are bent – if required, straighten as necessary.  
A cutting angle of 35° - 40° is required.



A high speed hand grinder should be used, with ideally, a pot shaped pencil grinder of approximately 1" (25mm) diameter by 1 3/8" (35mm) long. Grinding is carried out with the end face of the grinder moving from the base of the knife section up to the points.

It is possible to re-sharpen the knives in situ, the procedure is as follows:

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

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

**DANGER: It is imperative that great care is adopted at all times when working with the cutterbar to avoid injury – the use of safety gloves and safety glasses is recommended at all times when working with this and all associated components.**

## HYDRAULIC RAMS

---

### **General Information**

Whenever possible maintenance work on the rams should be performed with the ram removed from the machine and thoroughly cleaned off prior to dismantling on a clean work bench.

When using a bench vice do not apply excessive pressure to the ram cylinder - use soft metal jaws when grasping the ram rod. Scores and nicks on the ram rod should be removed using a fine oil stone - never use a file or emery cloth as these are too abrasive and will damage the ram rods working surface.

### **Seal Replacement – Standard Ø40mm Reach, Angle & Lift Rams**

To change the seals on the angle, reach and Ø40mm lift rams the following procedure applies:

- Unscrew the gland and withdraw the complete rod assembly.
- Remove piston locking nut and slide the piston and gland housing off the rod.
- Lubricate all new seals prior to assembly.
- Replace gland seals ensuring they are positioned in exactly the same location from which they were removed.
- Carefully place the gland housing complete with seals back on the rod.
- Separate the piston halves and discard rod seals. Rebuild the piston onto the rod fitting a new piston rod 'O' ring.
- The piston seats can be replaced in conjunction with the above operation or alternatively, gently prised into position after the piston and locking nut are reassembled.
- Refit the piston locking nut using 'Permabond A713' or a similar medium strength thread locking compound.
- Reassemble the complete rod into the ram cylinder, screw in gland housing and tighten.

### **Seal Replacement – Alternative Ø50mm Lift Ram**

To change the seals on a Ø50mm lift ram the following procedure applies:

- Unscrew the gland and withdraw the complete rod assembly.
- Slacken piston grub screw, unscrew the piston and slide off the gland housing.
- Replace gland seals as necessary. Ensure seals are replaced in the same position from which they were removed.
- 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.
- Refit gland housing on the rod taking care when easing the wiper seal over the piston rod shoulder.

The piston is locked onto the rod with a medium strength thread locking fluid such as 'Permabond A 113', 'Loctite Nutloc 242', 'Dunlop Nutloc SAS101', 'Tru lock Nutgrade 375' or 'Hermetite Torqueseal M'.

Threads must be cleaned with a suitable solvent to remove oil and thoroughly dried before applying a complete film of the locking fluid to the rod threads. The piston should be screwed on, tightened firmly and left for 30 minutes before filling with oil and 60 minutes before pressurising.

## HYDRAULIC SYSTEM (Machines Equipped with Pump and Tank Kit)

### Oil Requirements

#### Tank

The machine is delivered from the factory without oil. Fill the reservoir with a light hydraulic oil as recommended in the chart below until the oil level is approximately 2" below the top of the tank. The total capacity is approximately 23 litres (5 galls) **Do not overfill.**

For ease of filling when large quantities are involved the strainer basket can be prised from its housing. If filling in this manner make sure that new oil is used and that the area around filler and any filling utensils are clean.

SUPPLIER	COLD OR TEMPERATE CLIMATE	HOT CLIMATE
BP	<i>Bartran 46</i> <i>Energol HLP-HM 46</i>	<i>Bartran 68</i> <i>Energol HLP-HM 68</i>
CASTROL	<i>Hyspin AWH-M 46</i>	<i>Hyspin AWH-M 68</i>
COMMA	<i>Hydraulic Oil LIC 15</i>	<i>Hydraulic Oil LIC 20</i>
ELF	<i>Hydrelf HV 46</i> <i>Hydrelf XV 46</i>	<i>Hydrelf HV 68</i>
ESSO	<i>Univis N 46</i>	<i>Univis N 68</i>
FUCHS (UK/Non UK markets*)	<i>Renolin 46</i> <i>Renolin HVZ 46</i> <i>Renolin CL46/B15*</i> <i>Renolin AF46/ZAF46B*</i>	<i>Renolin 68</i> <i>Renolin HVZ 68</i> <i>Renolin CL68/B20*</i> <i>Renolin AF68/ZAF68B*</i>
GREENWAY	<i>Excelpower HY 68</i>	<i>Excelpower HY 68</i>
MILLERS	<i>Millmax 46</i> <i>Millmax HV 46</i>	<i>Millmax 68</i> <i>Millmax HV 68</i>
MORRIS	<i>Liquimatic 5</i> <i>Liquimatic HV 46</i> <i>Triad 46</i>	<i>Liquimatic 6</i> <i>Liquimatic HV 68</i> <i>Triad 68</i>
SHELL	<i>Tellus 46</i> <i>Tellus T46</i>	<i>Tellus 68</i> <i>Tellus T68</i>
TEXACO	<i>Rando HD 46</i> <i>Rando HDZ 46</i>	<i>Rando HD 68</i> <i>Rando HDZ 68</i>
TOTAL	<i>Equivis ZS 46</i>	<i>Equivis ZS 68</i>

#### 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 cutter 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 'O' 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 of the oil can be reduced by:

- Performing all hydraulic servicing in a clean, dry, dust-free environment.
- Cleaning around the reservoir cap prior to its removal and keeping that area clean.
- Using clean containers when replenishing the system.
- Regular servicing of the filtration system.

## Filtration Maintenance

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

## Return Line Filter

The element should be changed after the first 50 hours of use 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 symotons of filter malfunction will occur to jog your memory.

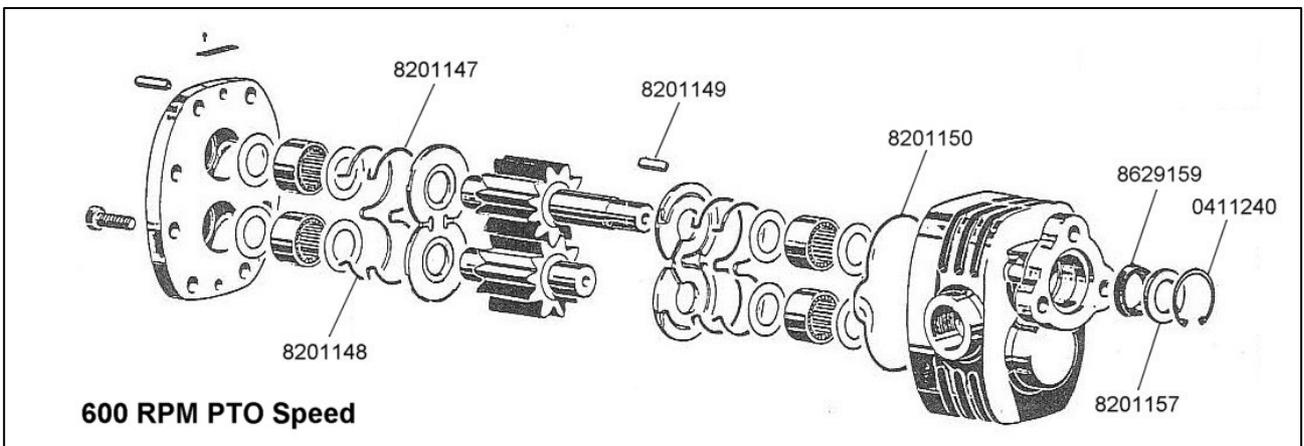
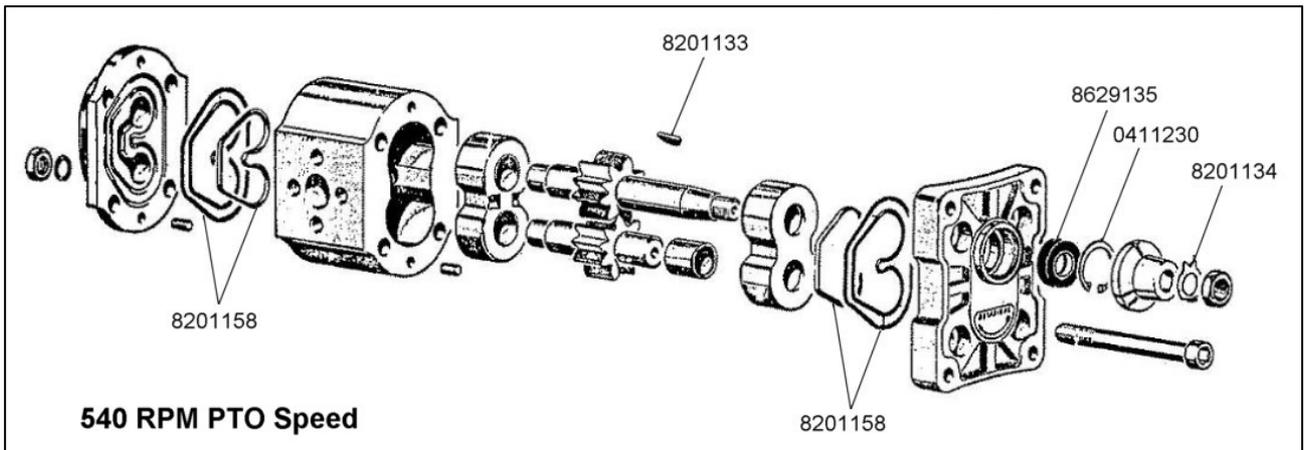
## Hydraulic Pumps

The hydraulic pump complete with its drive coupler is used with all machines with independent hydraulics when used on tractors with high speed PTO shafts. The pump is anti-clockwise in rotation.

No routine maintenance is necessary on the pumps 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. Two hose clips are used on the pump supply hose and their worm-drive barrels should be placed opposing each other at 180°. These clips should regularly be checked for tightness, especially during the first few hours of work, to avoid the possibility of air being drawn into the hydraulic system.

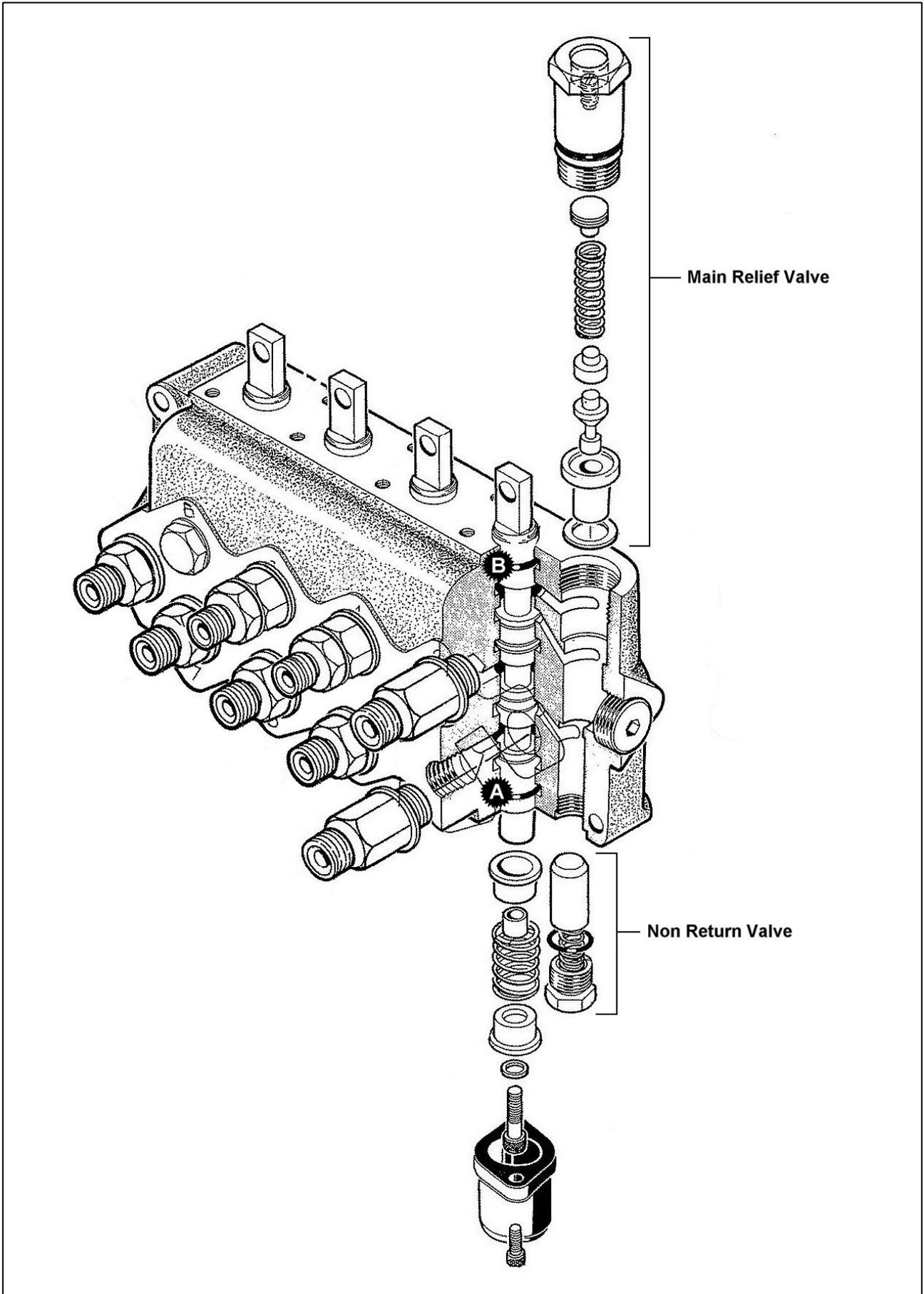
## Hydraulic Pump Seals

The illustrations below show the part numbers of the individual seal kit components for differing pumps.



# CONTROL VALVE

**IMPORTANT:** Any service or maintenance work on hydraulic components must always be performed in a clean dry dust free environment to avoid risk of contamination or damage.



## Non Return Valve

The non return valve prevents the feedback of oil from the service ports. It is unlikely to need attention but if removed for cleaning a new 'O' Ring should be used when refitting.

## Replacing Spool 'O' Rings

Note: Owing to the sharp edges in the design of the spool failure to carry out the following procedure could result in damage to the 'O' rings resulting in external leakage.

- Disconnect cable assembly.
- Remove the cover at the opposite end of the spool and unscrew the return spring or detent assembly whichever is necessary.
- Pull the spool through the block from the handle end until the 'O' ring marked 'A' is accessible - remove the 'O' ring from its groove using a smooth edged hook.
- Completely remove the spool from the block out of the return spring end.
- Remove the 'O' ring marked 'B' and refit the new 'O' ring.
- Lightly oil the spool and replace it in the block from the return spring end pushing it through far enough to clear the 'O' ring groove 'A'.
- Fit new 'O' ring in groove 'A'.
- Push the spool back through from the handle end far enough to re-assemble the return spring or detent assembly plus the cover.
- Attach cable assembly.

## Main Relief Valve

The main relief valve is pressure set at the factory to 1450 PSI (100Bar) and is non adjustable. A sticking relief valve will probably cause overheating and/or loss of power. If this is suspected it should be dismantled and examined for dirt and damage. Undo the large hexagon housing, the relief valve spring, needle and seat can now be withdrawn. If difficulty is experienced in extracting the seat remove the non-return valve at the opposite end of the gallery and drive out with a soft brass drift - *take care not to damage the copper sealing washer positioned between the seat and the locating shoulder in the block.*

Blow out the valve with compressed air and examine the components for damage. These components are specially hardened steel and should only display a seating witness - any further damage will require the complete valve to be replaced.

**CAUTION: Under no circumstances be tempted to add shims into this valve in a misguided attempt to increase the power of the machine. This could damage the tractor and may cause personal injury.**

## HYDRAULIC HOSES

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

### Hose Replacement

Always replace one hose at a time to avoid the risk of wrong connections. It is always advisable to run the new replacement hose alongside the old one prior to removal – this will determine the correct hose path and avoid possible damage caused by incorrect hose routing.

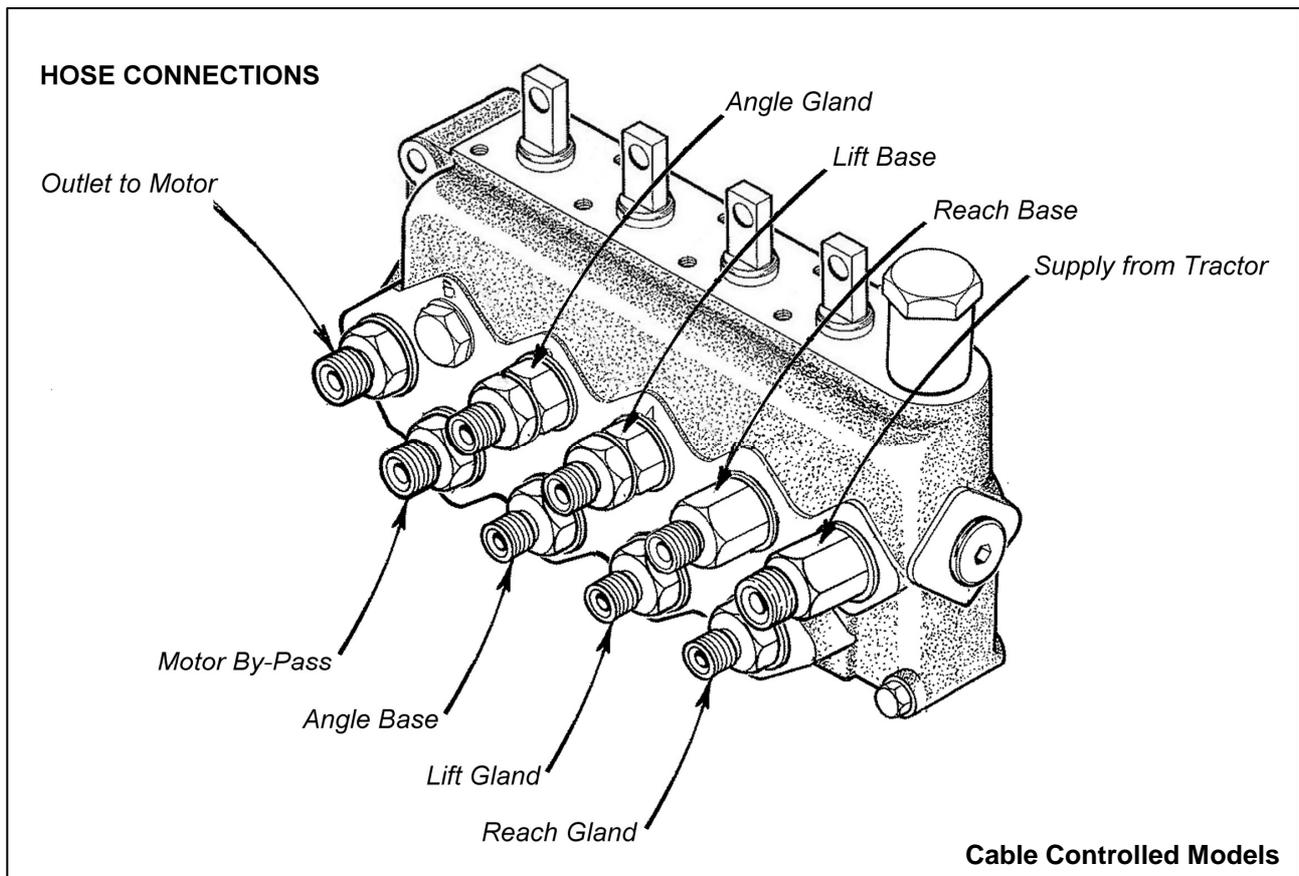
Where a hose is attached to an additional fitting or union, use a second spanner on the union to avoid breaking both seals.

Never use jointing compound on threads.

Avoid twisting hoses and adjust the hose line to ensure freedom from rubbing or trapping before tightening the hose end connections.

### Hose Warranty

Warranty is limited to replacement of hoses that have failed due to faulty manufacture or materials. Warranty will not be considered on hoses that have suffered damage by abrasion, cuts or being pinched or trapped while in work. A claim will not be considered where the hose end has been damaged by a blow or where the threads or unions have been damaged by overtightening.



## PUMP AND TANK KIT

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### Initial Fitting Procedure

- Remove Microklippa from tractor - *refer to removal procedure page for details.*
- Unbolt the valve mounting bracket from the valve mounting bar, place the latter and valve controls in safe place.
- Extract mounting bar to remove bracket and replace with the one provided in the kit. Refit bar with new bracket in position.
- Unbolt the upper halves of the yoke and fit them either side of the tractors top hitch bracket with the  $\frac{3}{4}$ " UNF nut and bolt provided.

If the tractor has only one top hitch position the bolt will replace the existing top hitch pin. If more than one location is available mount the yokes through an alternative position as this will make the machine easier to attach and detach - *Do not tighten the nut at this stage.*

- Attach the machine to the three point linkage and raise it to give 200 - 250 mm (8 - 10") clearance under the lowest part of the frame.
- Re-bolt the yoke halves together - *it may be necessary to raise or lower the machine on the linkage to achieve hole alignment.*
- Position tank so the bottom brackets hook over valve mounting bracket.
- Connect Pump and drive assembly to P.T.O. shaft on tractor.
- Secure the torque chain so that the angle is approximately 90° to the torque arm and is in lateral alignment.
- Fit top link spindle to pass through top bracket of tank and flange on main frame.
- Adjust the top link until the main frame is vertical.
- Tighten the nut and bolt securing the upper yoke just enough to eliminate any sideways movement - *do not over tighten and squeeze the top hitch brackets.*
- Tighten the check chains/stabiliser bars.
- Re-assemble valve mounting bar to bracket.
- Connect up hydraulics – *refer to hydraulic installation diagram on following page.*
- Fill reservoir with required oil (*refer to recommended oils chart*).
- Turn the parking leg upside down and pin in the work position.

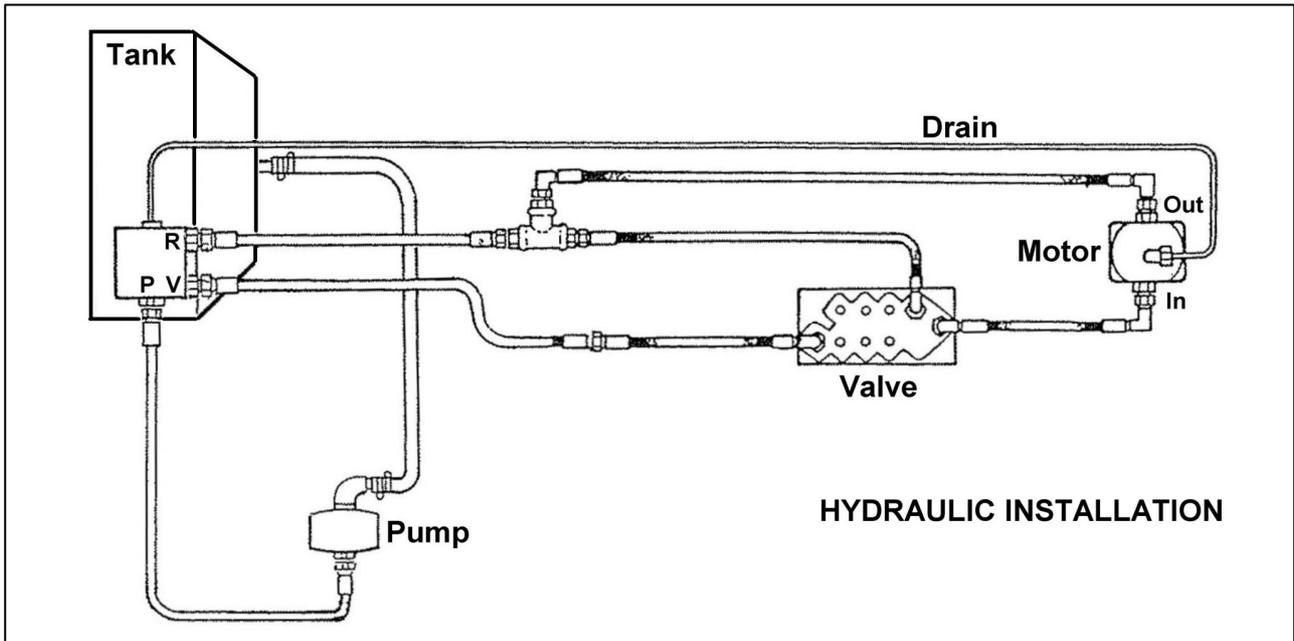
Start tractor and engage PTO drive - allow the pump to work under a 'no load' condition i.e. with operating controls in neutral, for several minutes with tractor engine at a high idle.

Operate the swingtrim through it's complete range of movements including the operation of the cutterbar drive - check the reservoir and top up if necessary.

Before commencing work it is advisable to find an unobstructed level site and operate the machine through its entire range of movements to familiarise yourself with the controls and the machines response to them.

## Pump and Tank Kit – Hydraulic Installation

The diagram below shows the hydraulic installation for the swingtrim pump and tank kit.





## MICROKLIPPA PARTS MANUAL

### **Always Use Genuine Parts**

Bomford Genuine Parts are designed and tested specifically for use on our machines - the use of non-genuine parts is not advisable as this can affect both the performance and warranty on the machine.

### **Parts Ordering**

When ordering parts please quote the following information:

- *Machine Model & Specification.*
- *Machine Serial No.*
- *Make & Model of tractor to which the machine is fitted.*
- *Dealer Order Number.*

This information will speed up the ordering process and ensure that the correct parts for the machine are ordered.

Parts can be ordered direct by:

Telephone: 01789 773383

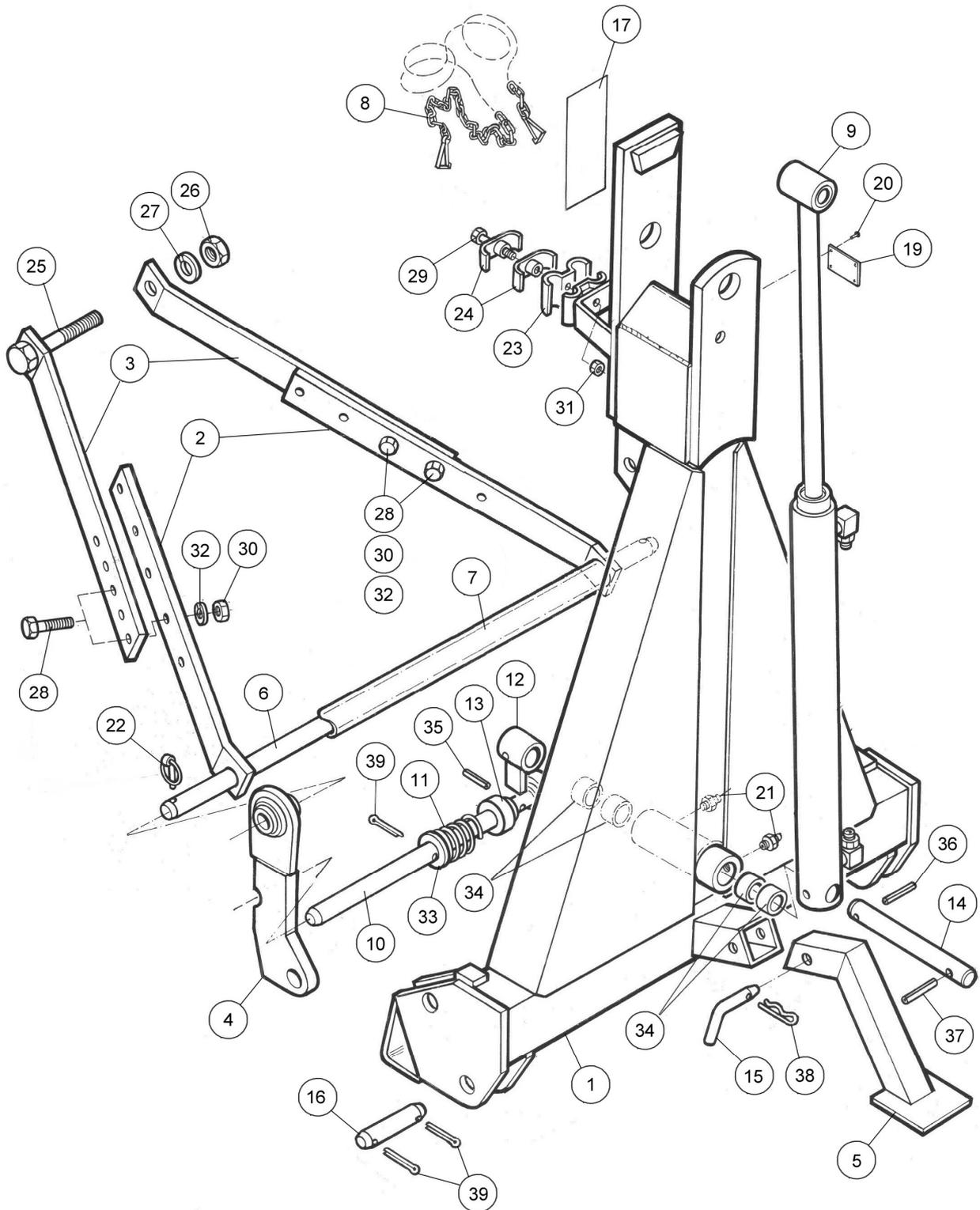
Fax: 01789 773238

Email: [parts@bomford-turner.com](mailto:parts@bomford-turner.com)

Online: [www.bomford-turner.com](http://www.bomford-turner.com)

*We continually strive to better our products in both performance and value through a continual programme of re-design and testing – where applicable, if an existing part has been superseded by an updated version, the latter will always be supplied.*

MICROKLIPPA  
MAINFRAME (REAR MOUNTED)

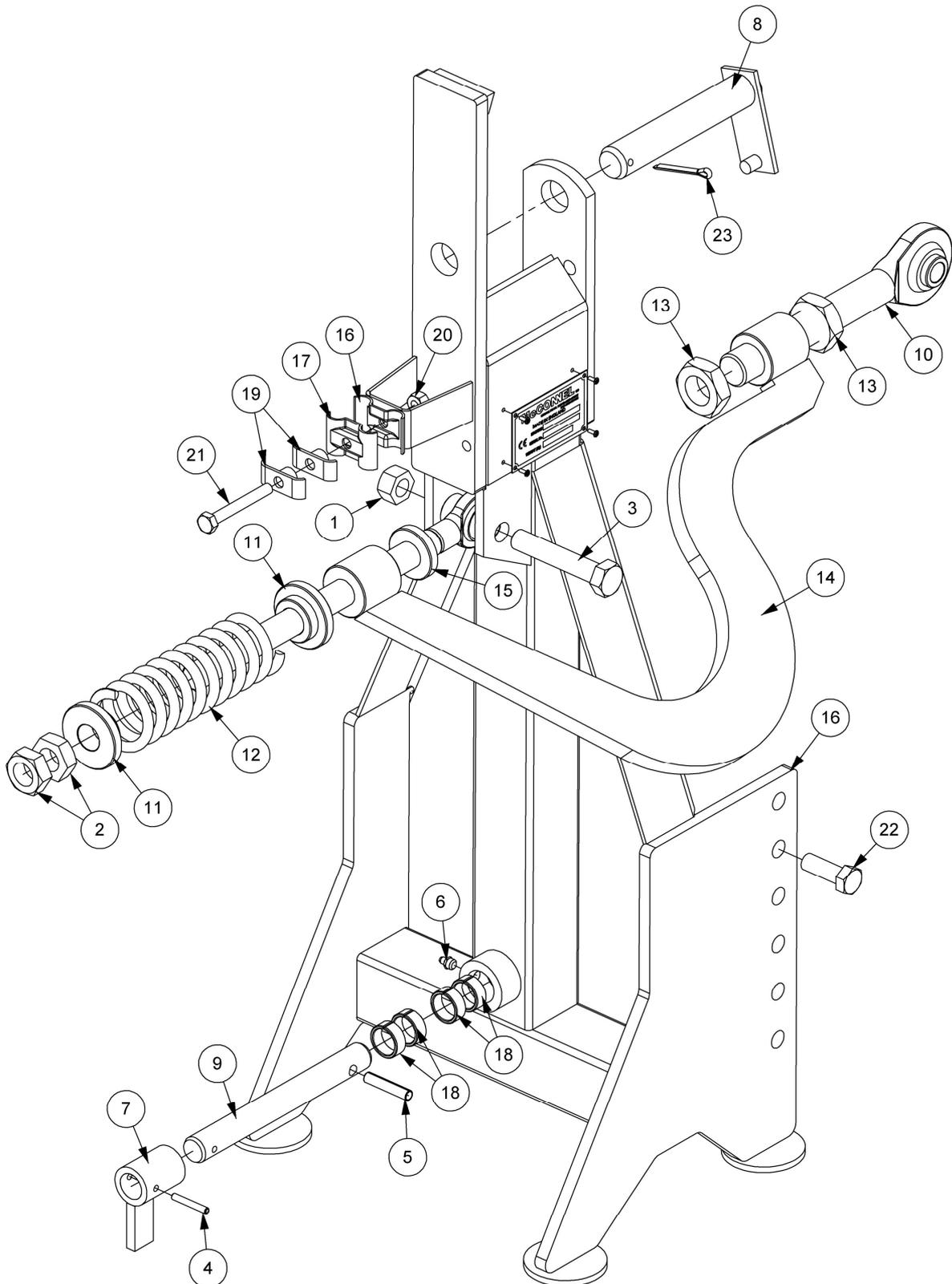


**MICROKLIPPA****MAINFRAME (REAR MOUNTED)**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
			<b>MAINFRAME ASSEMBLY</b>
1	1	1090260	MAIN FRAME
2	2	1090270	STABILIZER - LOWER
3	2	1090269	STABILIZER - UPPER
4	2	1090022	SWING LINK
5	1	1090263	STAND LEG
6	1	1090025	MOUNTING BAR
7	1	1090384	SPACER TUBE
8	1	1090045	STOWAGE CHAIN
9	1	1090305	LIFT RAM ASSEMBLY - BSP Models
	1	1090306	LIFT RAM ASSEMBLY - JIC Models
10	1	1090264	INTERLOCK BAR
11	2	1090050	INTERLOCK SPRING
12	1	1090039	INTERLOCK LEVER
13	2	1090024	INTERLOCK SLEEVE
14	1	1090044	PIN - LIFT RAM BASE
15	1	1090051	PIN
16	2	1090023	PIN
17	1	1290004	DECAL - OPERATIONAL SAFETY
18	1	1290270	DECAL - CONTROL
19	1	1090052	SERIAL No. PLATE
20	4	7103230	POP RIVET
21	2	0901121	GREASER
22	2	0431217	LYNCH PIN
23	1	6012026	HOSE CLAMP
24	2	7114076	HOSE CLAMP
25	1	0211327	BOLT
26	1	0111007	NUT
27	1	0100207	SPRING WASHER
28	4	9313087	SETSCREW
29	1	9213165	BOLT
30	4	9113007	NUT
31	1	9143005	SELF-LOCKING NUT
32	4	9100207	SPRING WASHER
33	2	0100107	PLAIN WASHER
34	4	7012037	BUSH
35	1	0425525	SPRING DOWEL
36	1	0425640	SPRING DOWEL
37	1	0428150	SPRING DOWEL
38	1	0431104	SPRING COTTER
39	6	9501326	SPLIT PIN

MICROKLIPPA  
MAINFRAME (FRONT MOUNTED)

Module:  
1090701



**MICROKLIPPA****MAINFRAME (FRONT MOUNTED)**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090701</b>	<b>FRONT MOUNTED MAINFRAME</b>
1	1	0111007	NUT
2	2	0131009	THIN NUT
3	1	0211327	BOLT
4	1	0425640	SPRING DOWEL
5	1	0428150	SPRING DOWEL
6	2	0901121	GREASE NIPPLE
7	1	1090039	INTERLOCK LEVER
8	1	1090042	PIVOT PIN
9	1	1090044	PIN - LIFT RAM BASE END
10	1	1090141	BALL END - CAT 1
11	2	1090142	SPRING SUPPORT
12	1	1090147	BREAKAWAY SPRING
13	2	1090148	NUT
14	1	1090342	TOP LINK
15	1	1090344	BREAKAWAY ROD
16	1	1090372	MAINFRAME
17	1	6012026	PIPE CLAMP
18	4	7012037	TENSION BUSH
19	2	7114076	HOSE CLAMP - LOWER
20	1	9143005	SELF-LOCKING NUT
21	1	9213165	BOLT
22	2	9313097	SETSCREW
23	1	9501507	SPLIT PIN





**MICROKLIPPA**

**MAIN ARM ASSEMBLY**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090702</b>	<b>FRONT MOUNT MAIN ARM ASSEMBLY</b>
1	1	0100107	FLAT WASHER
2	1	0425522	SPRING DOWEL
3	1	0425540	SPRING DOWEL
4	2	0901121	GREASE NIPPLE
5	1	1090003	INTERLOCK SPRING
6	1	1090040	INTERLOCK BLOCK
7	1	1090041	ARM INTERLOCK BAR
8	2	1090043	RAM PIN
9	1	1090262	MAIN ARM
10	1	1090283	HOSE GUARD
11	2	6012032	BUSH (PLASTIC)
12	4	7012037	TENSION BUSH
13	1	7114076	HOSE CLAMP - LOWER
14	1	9100205	SPRING WASHER
15	1	9143005	SELF-LOCKING NUT
16	1	9213125	BOLT
17	1	9313035	SETSCREW
18	1	9501326	SPLIT PIN

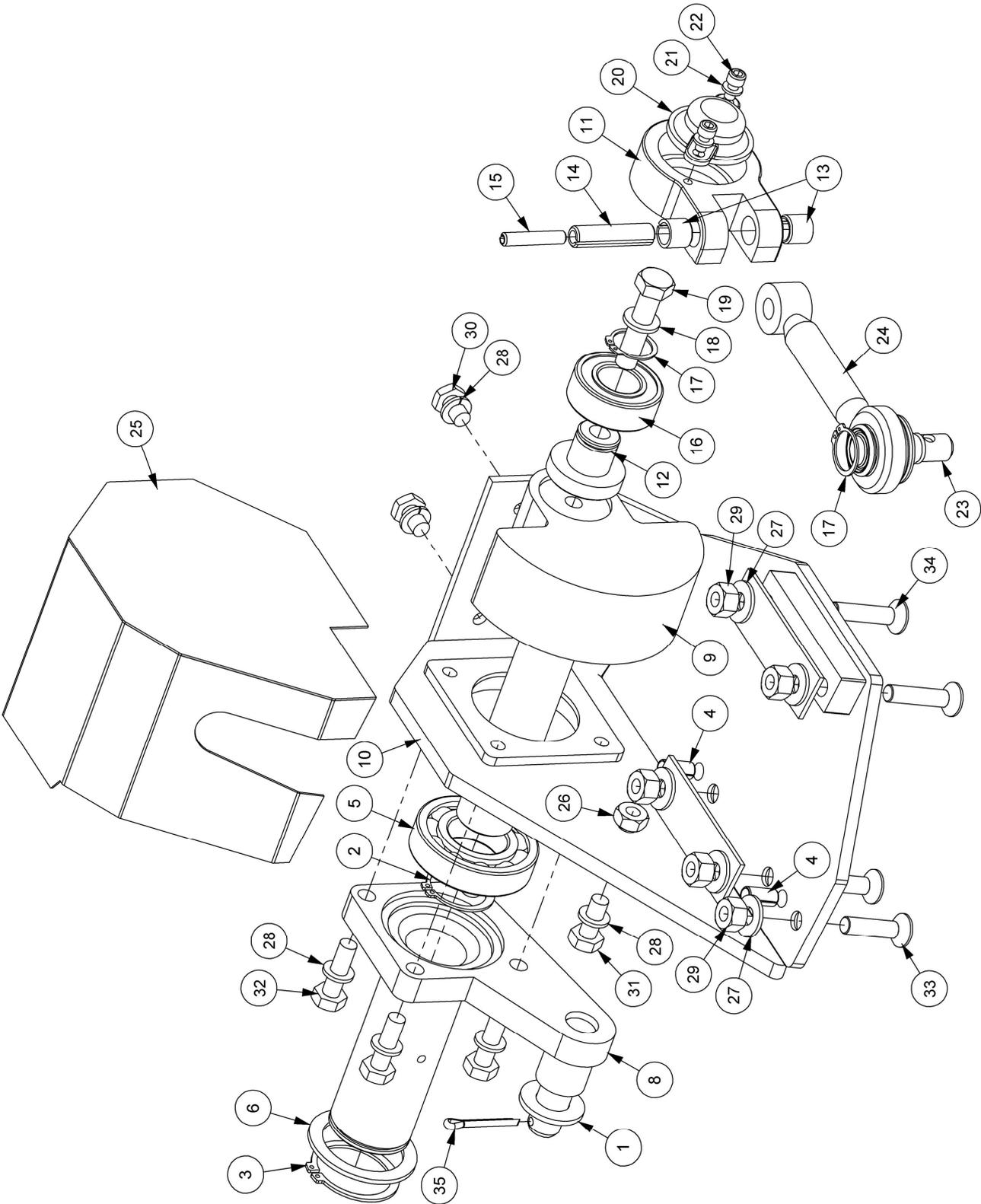


**MICROKLIPPA****DIPPER ARM ASSEMBLY**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090703</b>	<b>FRONT MOUNT DIPPER ARM ASSEMBLY</b>
1	2	0425630	SPRING DOWEL
2	1	0425640	SPRING DOWEL
3	1	0901121	GREASE NIPPLE
4	2	1090001	HINGE BEARING
5	6	1090002	BUSH
6	1	1090038	MOTOR LOCATING RING
7	1	1090043	RAM PIN
8	1	1090046	REACH RAM PIN (ROD END)
9	1	1090047	PIVOT PIN
10	1	1090048	ANGLE RAM PIN (ROD END)
11	1	1090103	PLASTIC TAPERED PLUG
12	1	1090265	DIPPER ARM
13	1	1090282	HOSE GUARD
14	1	1090279	SLAVE LINK
15	1	1090280	RADIUS ARM - FRONT
16	1	1090281	RADIUS ARM - REAR
17	1	7114076	HOSE CLAMP - LOWER
18	2	9100205	SPRING WASHER
19	4	9143004	SELF-LOCKING NUT
20	4	9213104	BOLT
21	1	9313035	SETSCREW
22	1	9313065	SETSCREW
23	3	9501326	SPLIT PIN

**MICROKLIPPA**  
**CUTTERBAR MOUNTING**

**Module:**  
1090704



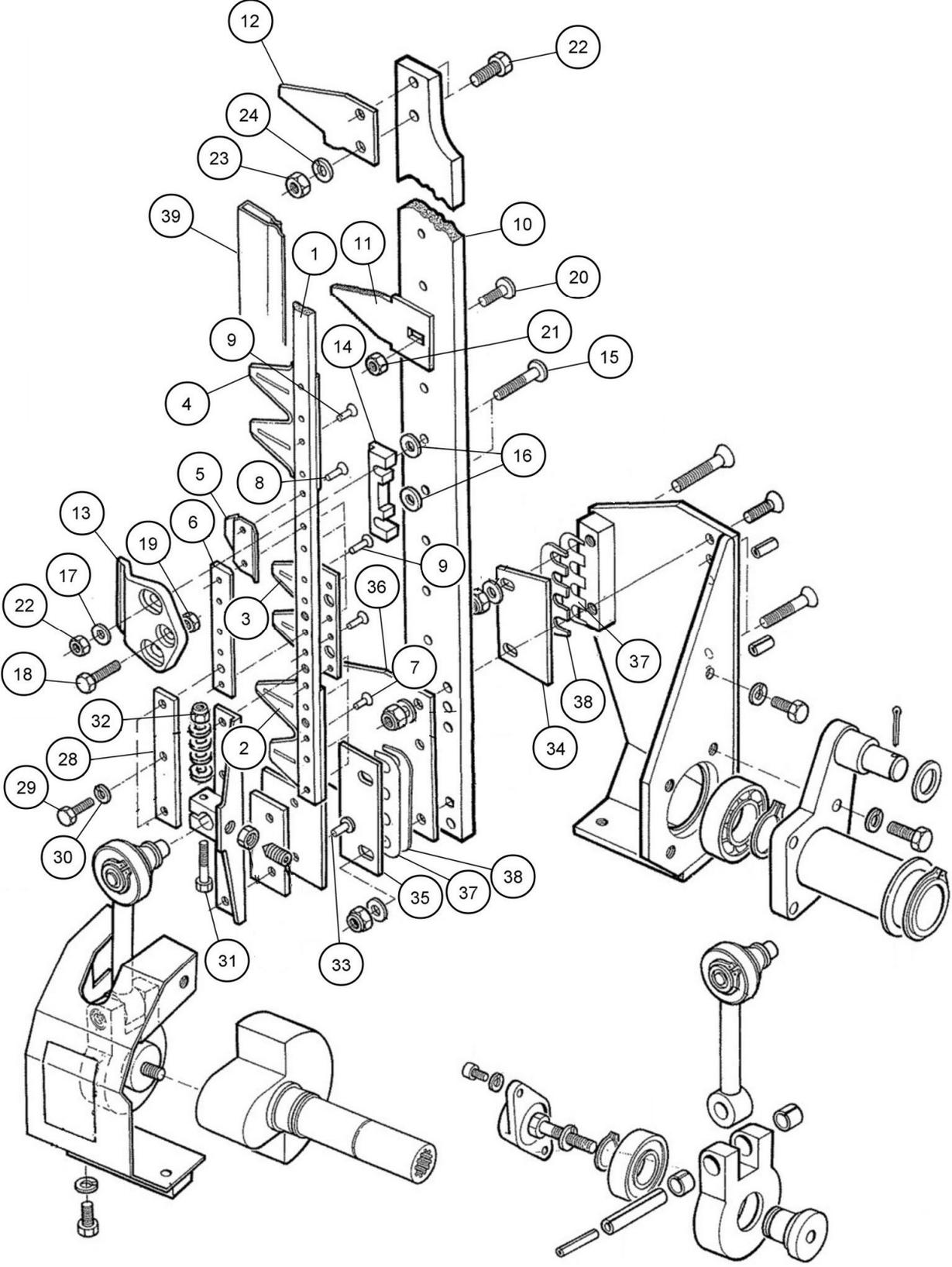
**MICROKLIPPA****CUTTERBAR MOUNTING**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090704</b>	<b>CUTTERBAR MOUNTING ASSEMBLY</b>
1	1	0100107	FLAT WASHER
2	1	0406235	EXTERNAL CIRCLIP
3	1	0406247	EXTERNAL CIRCLIP
4	2	0428120	SPRING DOWEL
5	1	0600073	BALL BEARING
6	1	1090037	RETAINING WASHER
7	2	1090102	SPACER SHIM
8	1	1090277	PIVOT TUBE
9	1	1090278	CRANKSHAFT
10	1	1090284	CUTTERBAR MOUNTING BRACKET
		1090295	CONNECTING ROD ASSEMBLY c/o:
11	1	1090056	BEARING
12	1	1090057	SPIGOT
13	2	1090059	BUSH
14	1	1090060	SPRING DOWEL
15	1	1090061	SPRING DOWEL
16	1	0600074	BEARING
17	2	0401225	EXTERNAL CIRCLIP
18	1	9100206	SPRING WASHER
19	1	9213116	BOLT
20	1	1090054	BEARING CAP
21	2	9100203	SPRING WASHER
22	2	9343023	CAPSCREW
23	1	1090058	SWIVEL
24	1	1090055	CON ROD
25	1	1090308	DRIVE COVER
26	1	9117005	NUT
27	5	9100105	FLAT WASHER
28	7	9100205	SPRING WASHER
29	5	9143005	SELF-LOCKING NUT
30	2	9313035	SETSCREW
31	1	9313055	SETSCREW
32	4	9313075	SETSCREW
33	1	9353085	CAPSCREW
34	4	9353095	CAPSCREW
35	1	9501326	SPLIT PIN

**MICROKLIPPA**

**CUTTERBAR - 122cm (4ft.) Hedge**

**Module:**  
1090290

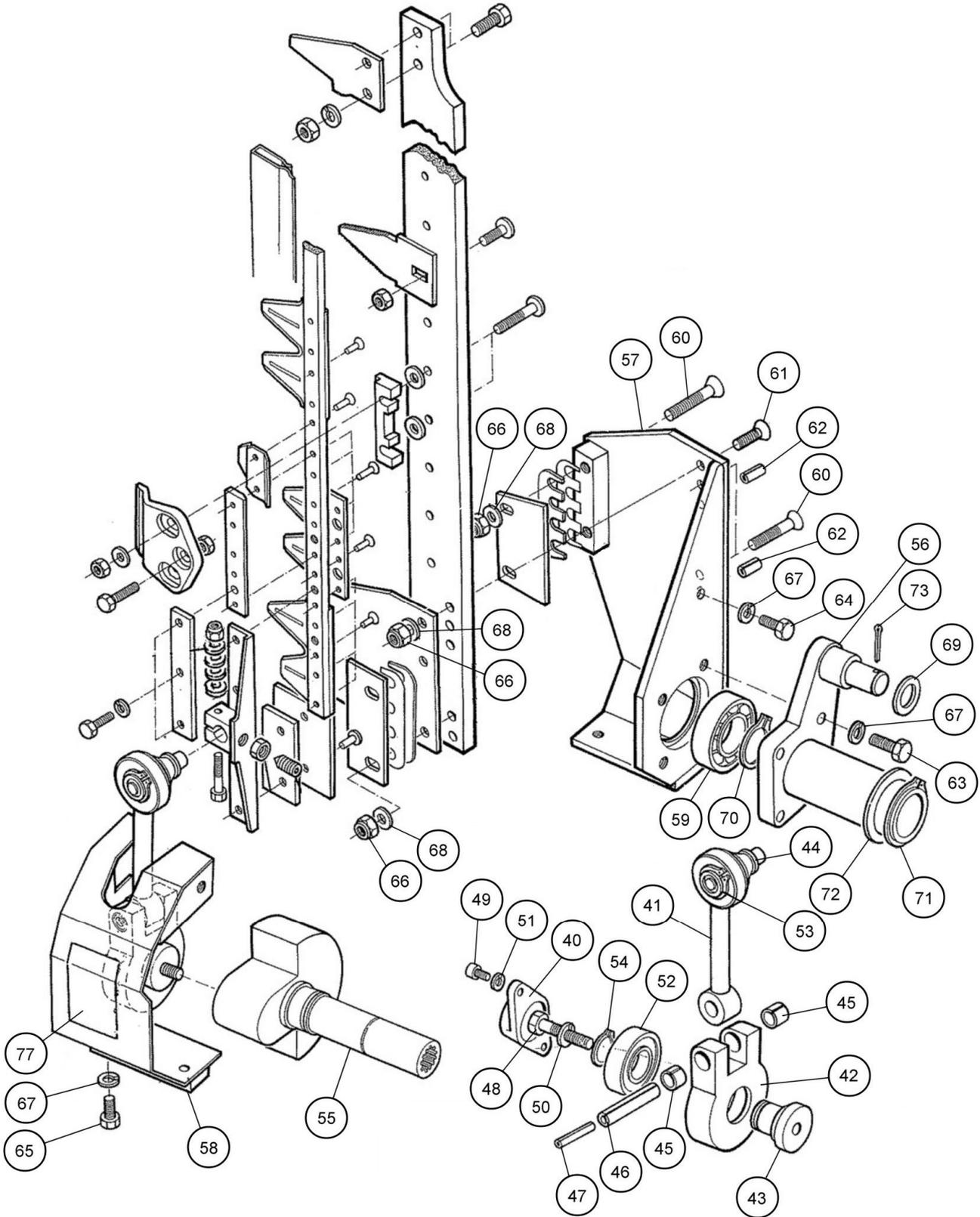


**MICROKLIPPA****CUTTERBAR - 122cm (4ft.) Hedge**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090290</b>	<b>122cm CUTTERBAR ASSEMBLY</b>
		<b>1090291</b>	<b>KNIFE ASSEMBLY - Items 1-24</b>
1	1	1090070	KNIFE BACK
2	1	1090066	KNIFE SECTION
3	1	1090065	KNIFE SECTION
4	10	1090067	KNIFE SECTION
5	4	1090068	ABUTMENT PLATE
6	1	1090069	REINFORCEMENT STRIP
7	5	1090062	RIVET
8	12	1090064	RIVET
9	31	1090063	RIVET
10	1	1090071	BAR
11	22	1090072	FINGER
12	1	1090080	END FINGER
13	4	1090074	KNIFE CLIP
14	4	1090075	ABUTMENT BLOCK
15	8	1090077	DOME HEADED BOLT
16	8	1090078	PLAIN WASHER
17	8	1090079	PLAIN WASHER
18	4	9313054	SETSCREW
19	4	9143004	SELF-LOCKING NUT
20	14	1090073	DOME HEADED BOLT
21	22	9113004	NUT
22	2	9313055	SETSCREW
23	2	9113005	NUT
24	2	9100205	SPRING WASHER
		<b>1090292</b>	<b>KNIFE HEEL ASSEMBLY - Items 25-33</b>
25	1	1090081	KNIFE HEEL
26	1	1090082	WEAR PLATE
27	1	1090083	WEAR PLATE
28	1	1090085	DISTANCE PIECE
29	3	9313044	SETSCREW
30	3	9100104	SPRING WASHER
31	1	9313084	BOLT
32	1	9143004	SELF-LOCKING NUT
33	2	1090084	RIVET
34	1	1090087	GUIDE PLATE - FRONT
35	1	1090088	GUIDE PLATE - REAR
36	1	1090086	SOLE PLATE
37	<i>as req'd</i>	1090089	SHIM
38	<i>as req'd</i>	1090090	SHIM
39	1	1090091	KNIFE GUARD

**MICROKLIPPA**  
**CUTTERBAR DRIVE ASSEMBLY**

**Module:**  
1090290

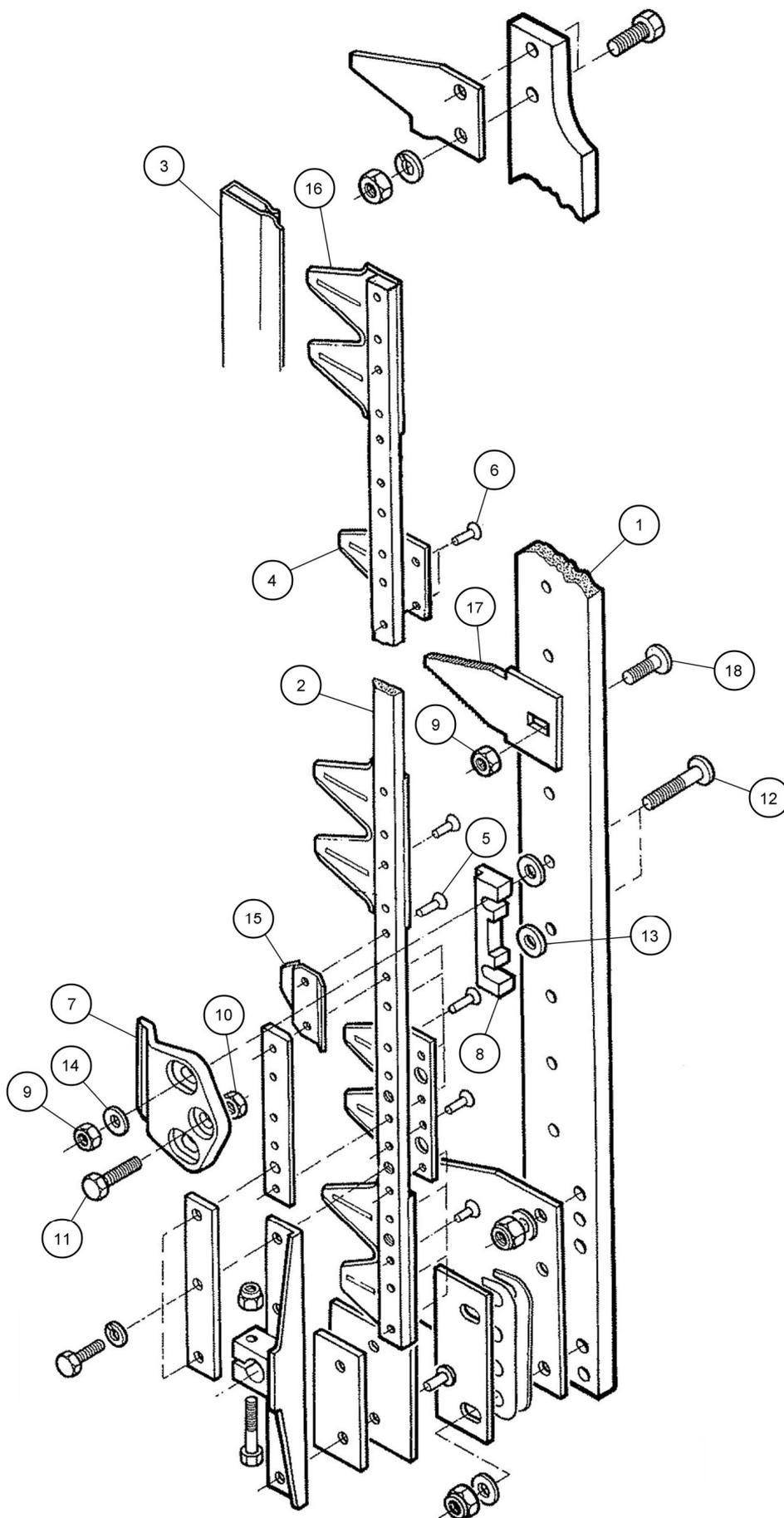


**MICROKLIPPA****CUTTERBAR DRIVE ASSEMBLY**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090295</b>	<b>CON ROD ASSEMBLY - Items 40-54</b>
40	1	1090054	BEARING CAP
41	1	1090055	ROD
42	1	1090056	BEARING HOUSING
43	1	1090057	SPIGOT
44	1	1090058	SWIVEL
45	2	1090059	BUSH
46	1	1090060	SPRING DOWEL
47	1	1090061	SPRING DOWEL
48	1	9213116	BOLT
49	2	9343023	CAPSCREW
50	1	9100206	SPRING WASHER
51	2	9100203	SPRING WASHER
52	1	0600074	BEARING
53	1	0401225	EXTERNAL CIRCLIP
54	1	0401230	EXTERNAL CIRCLIP
55	1	1090278	CRANKSHAFT
56	1	1090277	PIVOT TUBE
57	1	1090284	CUTTERBAR MOUNTING BRACKET
58	1	1090308	DRIVE COVER
59	1	0600073	BEARING
60	4	9353095	COUNTERSUNK SETSCREW
61	1	9353085	COUNTERSUNK SETSCREW
62	2	0428120	SPRING DOWEL
63	4	9313075	SETSCREW
64	1	9313055	SETSCREW
65	2	9313035	SETSCREW
66	5	9143005	SELF-LOCKING NUT
67	7	9100205	SPRING WASHER
68	5	9100105	PLAIN WASHER
69	1	0100107	PLAIN WASHER
70	1	0406235	EXTERNAL CIRCLIP
71	1	0406247	EXTERNAL CIRCLIP
72	1	1090037	RETAINING WASHER
73	1	9501326	SLIT PIN
74	1	9363044	GRUB SCREW
75	1	9113004	PLAIN NUT
76	4	1090119	DISC SPRING
77	1	1290078	SAFETY DECAL ('KEEP FINGERS AWAY')

**OPTIONAL EXTRAS**

		<b>1090318</b>	<b>DEFLECTOR KIT</b>
78	1	1090317	DEFLECTOR FINGER
79	2	9353105	SETSCREW
80	2	9143005	SELF-LOCKING NUT
		<b>1090316</b>	<b>CUTTING TRAY KIT</b>
81	1	1090315	CUTTINGS TRAY
82	2	9213075	BOLT
83	2	9143005	SELF-LOCKING NUT

**MICROKLIPPA****CUTTERBAR - 148cm (5ft.) Hedge****Module:**  
1090326

**MICROKLIPPA****CUTTERBAR - 148cm (5ft.) Hedge**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>1090326</b>	<b>148cm CUTTERBAR ASSEMBLY (without drive)</b>
		<b>1090327</b>	<b>KNIFE ASSEMBLY</b>
1		1090151	BAR
2		1090150	KNIFE BACK
3		1090152	KNIFE GUARD
4		1090149	KNIFE SECTION - SINGLE POINT
5		1090064	RIVET
6		1090063	RIVET
7		1090074	KNIFE CLIP
8		1090075	ABUTMENT BLOCK
9		9113004	PLAIN NUT
10		9143004	SELF-LOCKING NUT
11		9313054	SETSCREW
12		1090077	DOME HEADED BOLT
13		1090078	PLAIN WASHER
14		1090079	PLAIN WASHER
15		1090068	ABUTMENT PLATE
16		1090067	KNIFE SECTION - STD. DOUBLE POINT
17		1090072	FINGER
18		1090073	DOME HEADED BOLT

**NOTE:** Items listed above are components specific to the 148cm cutterbar only, all other parts are common with the 122cm cutterbar - refer to 122cm cutterbar pages for details of those components.

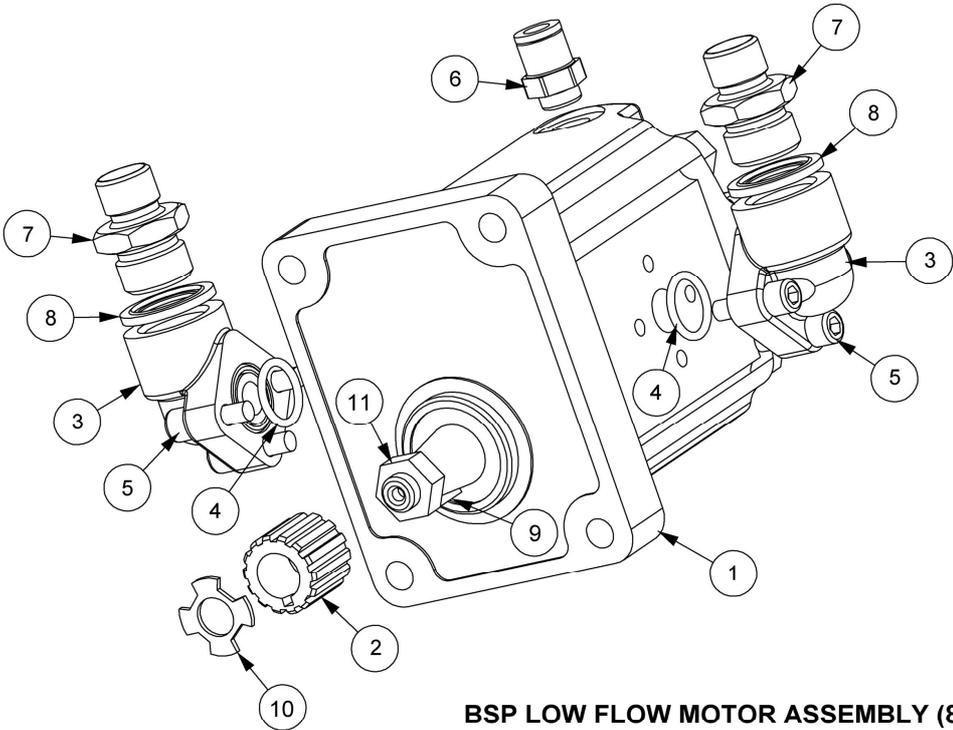
**MICROKLIPPA**

**LOW FLOW MOTOR (20 L/Min)**

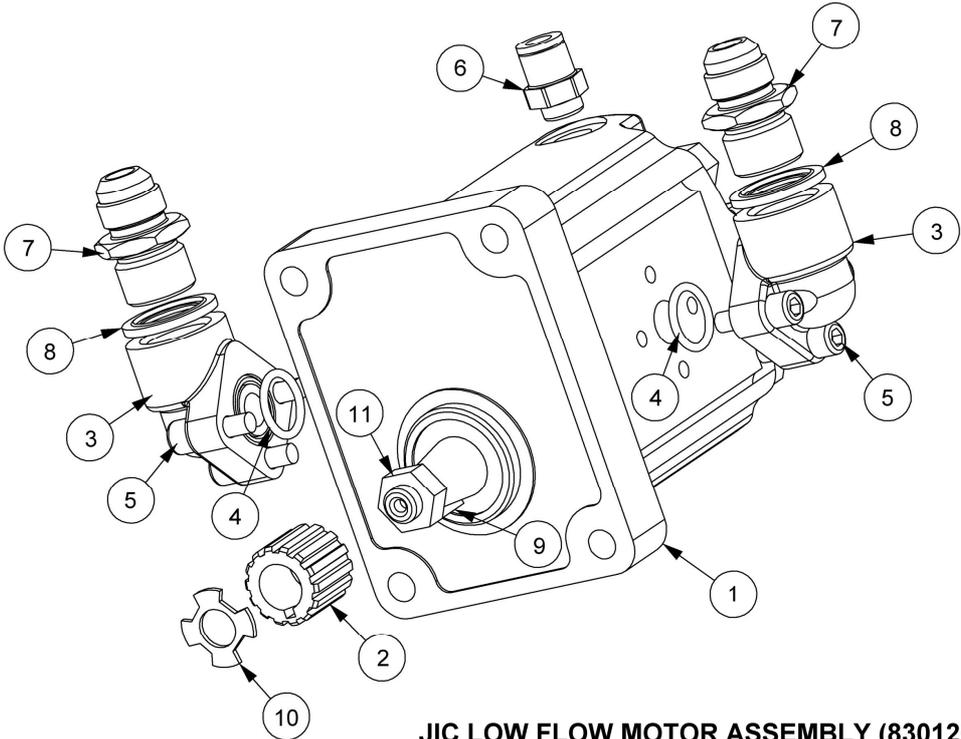
**Modules:**

8301266 – BSP Build

8301267 – JIC Build



**BSP LOW FLOW MOTOR ASSEMBLY (8301266)**



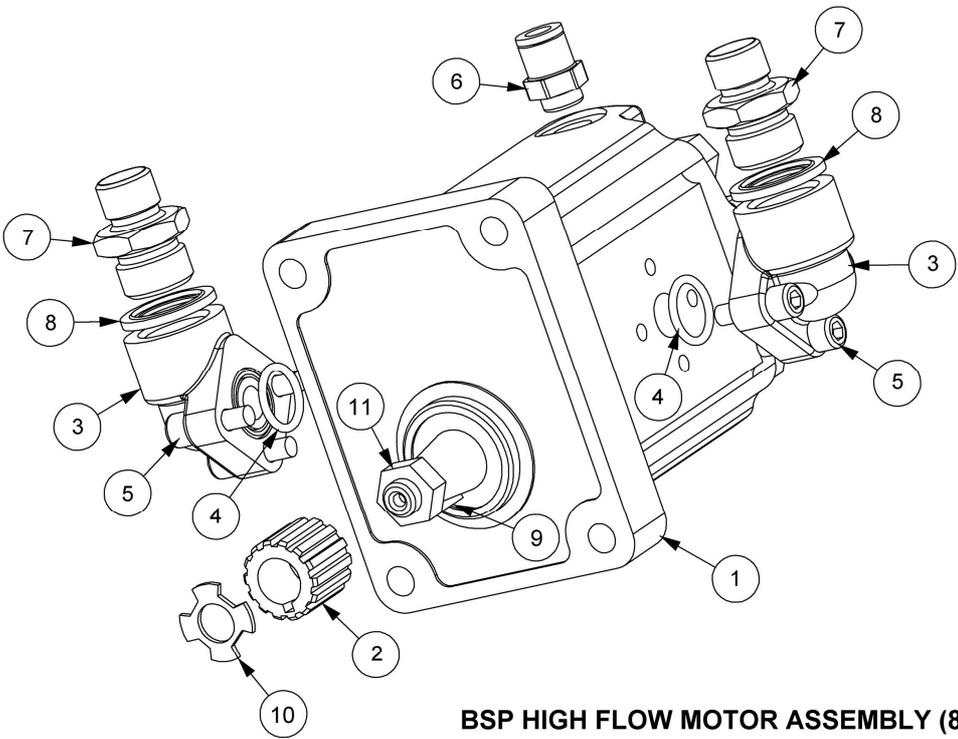
**JIC LOW FLOW MOTOR ASSEMBLY (8301267)**

**MICROKLIPPA****LOW FLOW MOTOR (20 L/Min)**

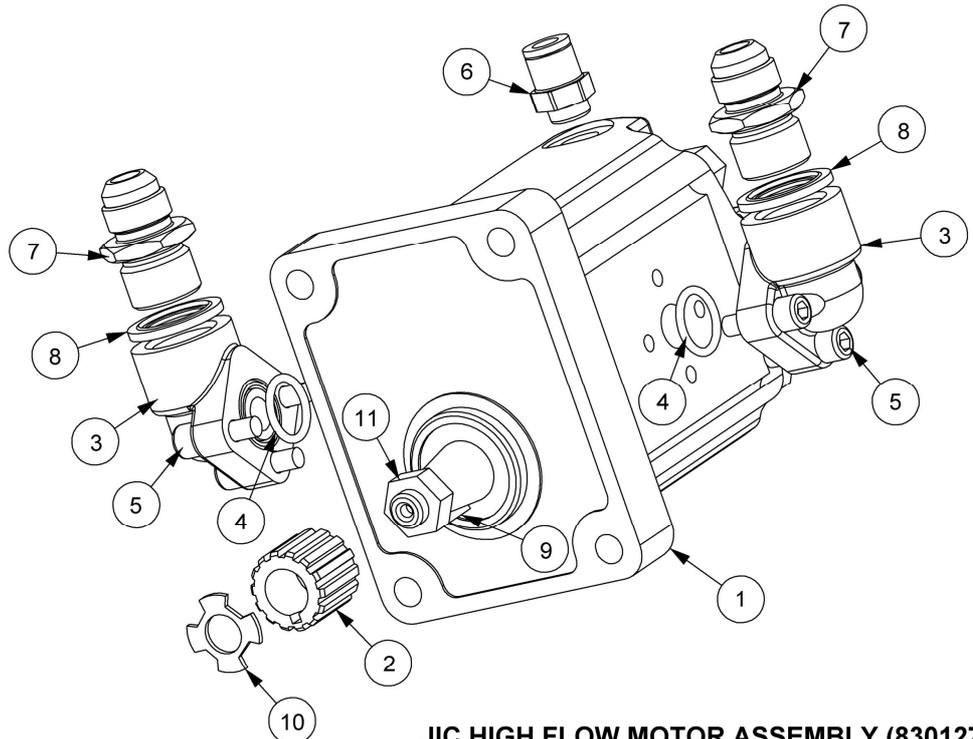
<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>8301266</b>	<b>BSP LOW FLOW MOTOR ASSEMBLY (20 L/Min)</b>
		8301288	LOW FLOW MOTOR & COUPLINGS - <i>consists of:</i>
1	1	8301287	MOTOR
2	1	1090035	SPLINED ADAPTOR
3	2	8301045	ELBOW KIT (Includes O Ring & 3 x Capscrews)
4	2	8600112	O RING
5	6	9343043	CAPSCREW
6	1	8581330	UNION
7	2	6000112	BSP ADAPTOR
8	2	8650104	BONDED SEAL
9	1	8201133	WOODRUFF KEY
10	1	8201134	TAB WASHER
11	1	8201135	SPECIAL THIN NUT
		<b>8301267</b>	<b>JIC LOW FLOW MOTOR ASSEMBLY (20 L/Min)</b>
	1	8301288	LOW FLOW MOTOR & COUPLINGS - <i>consists of:</i>
1	1	8301287	MOTOR
2	1	1090035	SPLINED ADAPTOR
3	2	8301045	ELBOW KIT (Includes O Ring & 3 x Capscrews)
4	2	8600112	O RING
5	6	9343043	CAPSCREW
6	1	8581330	UNION
7	2	8120003	JIC ADAPTOR
8	2	8650104	BONDED SEAL
9	1	8201133	WOODRUFF KEY
10	1	8201134	TAB WASHER
11	1	8201135	SPECIAL THIN NUT
		<b>8699243</b>	<b>SEAL KIT for Low Flow Motor</b>

**MICROKLIPPA**  
**HIGH FLOW MOTOR (30 L/Min)**

**Modules:**  
8301269 – BSP Build  
8301270 – JIC Build



**BSP HIGH FLOW MOTOR ASSEMBLY (8301269)**



**JIC HIGH FLOW MOTOR ASSEMBLY (8301270)**



**MICROKLIPPA**

**HIGH FLOW MOTOR (30 L/Min)**

<b>REF.</b>	<b>QTY.</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
		<b>8301269</b>	<b>BSP HIGH FLOW MOTOR ASSEMBLY (30 L/Min)</b>
1	1	8301297	HIGH FLOW MOTOR
2	1	1090035	SPLINED ADAPTOR
3	2	8301045	ELBOW KIT (Includes O Ring & 3 x Capscrews)
4	2	8600112	O RING
5	6	9343043	CAPSCREW
6	1	8581330	UNION
7	2	6000112	BSP ADAPTOR
8	2	8650104	BONDED SEAL
9	1	8201133	WOODRUFF KEY
10	1	8201134	TAB WASHER
11	1	8201135	SPECIAL THIN NUT
		<b>8301270</b>	<b>JIC HIGH FLOW MOTOR ASSEMBLY (30 L/Min)</b>
1	1	8301297	HIGH FLOW MOTOR
2	1	1090035	SPLINED ADAPTOR
3	2	8301045	ELBOW KIT (Includes O Ring & 3 x Capscrews)
4	2	8600112	O RING
5	6	9343043	CAPSCREW
6	1	8581330	UNION
7	2	8120003	JIC ADAPTOR
8	2	8650104	BONDED SEAL
9	1	8201133	WOODRUFF KEY
10	1	8201134	TAB WASHER
11	1	8201135	SPECIAL THIN NUT
		<b>8699227</b>	<b>SEAL KIT for High Flow Motor</b>

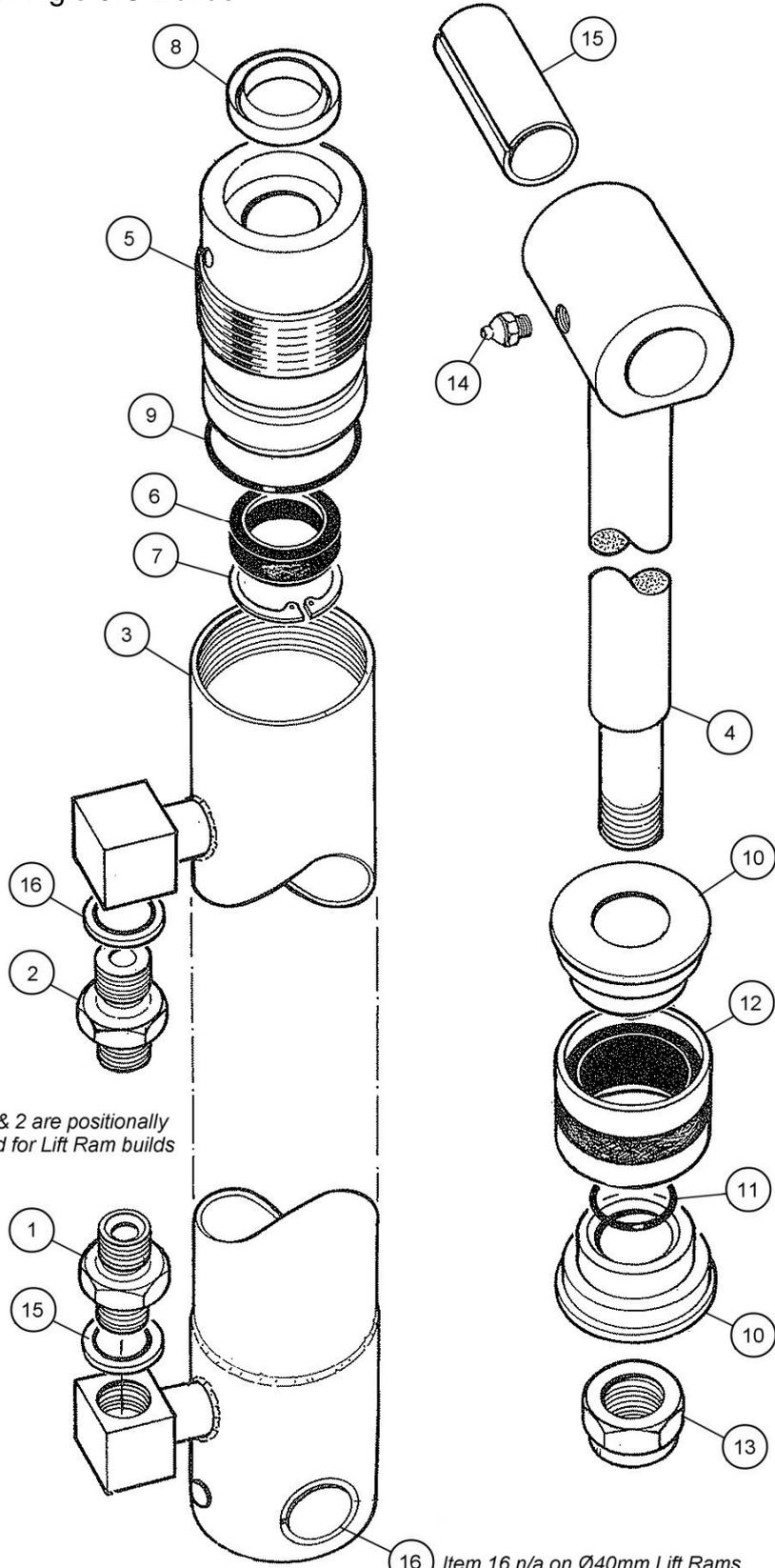


**MICROKLIPPA**

**HYDRAULIC RAMS (Std. Ø40mm)**

**Modules:**

- 1090300 – Lift BSP Builds
- 1090301 – Lift JIC Build
- 1090302 – Reach & Angle BSP Builds
- 1090303 – Reach & Angle JIC Builds



*Items 1 & 2 are positionally swapped for Lift Ram builds*

Item 16 n/a on Ø40mm Lift Rams

*BSP build illustrated*

**MICROKLIPPA**

**HYDRAULIC RAMS (Std. Ø40mm)**

REF.	QTY.	PART NO.	DESCRIPTION
		<b>1090302</b>	<b>REACH &amp; ANGLE RAMS (Ø 40mm) - BSP Build</b>
		<b>1090300</b>	<b>LIFT RAM (Ø 40mm) - BSP Build</b>
1	1	8581145	UNION (BSP)
2	1	8130068	RESTRICTOR UNION (BSP)
3	1	1090272	CYLINDER
4	1	1090031	PISTON ROD
5	1	1090273	GLAND NUT
6	1	8629162	GLAND SEAL
7	1	0416234	CIRCLIP
8	1	8629161	WIPER RING
9	1	8600123	O RING
10	1	1090034	PISTON
11	1	8600112	O RING
12	1	8629160	PISTON SEAL
13	1	0141007	SELF-LOCKING NUT
14	1	0901121	GREASER
15	2	8650103	BONDED SEAL
16	2	1090005	BUSH - <i>n/a on Lift Ram 1090300</i>
		<b>8699202</b>	<b>SEAL KIT</b>

REF.	QTY.	PART NO.	DESCRIPTION
		<b>1090303</b>	<b>REACH &amp; ANGLE RAMS (Ø 40mm) - JIC Build</b>
		<b>1090301</b>	<b>LIFT RAM (Ø 40mm) - JIC Build</b>
1	1	1075115	UNION (JIC)
2	1	8130130	RESTRICTOR UNION (JIC)
3	1	1090272	CYLINDER
4	1	1090031	PISTON ROD
5	1	1090273	GLAND NUT
6	1	8629162	GLAND SEAL
7	1	0416234	CIRCLIP
8	1	8629161	WIPER RING
9	1	8600123	O RING
10	1	1090034	PISTON
11	1	8600112	O RING
12	1	8629160	PISTON SEAL
13	1	0141007	SELF-LOCKING NUT
14	1	0901121	GREASER
15	2	8650103	BONDED SEAL
16	2	1090005	BUSH - <i>n/a on Lift Ram 1090301</i>
		<b>8699202</b>	<b>SEAL KIT</b>

**NOTE: On Ø40mm Lift Ram assemblies 1090300 & 1090301 items 1 & 2 are positionally reversed and item 16 is not applicable. Items 3 - 15 are common to all rams listed on this page.**

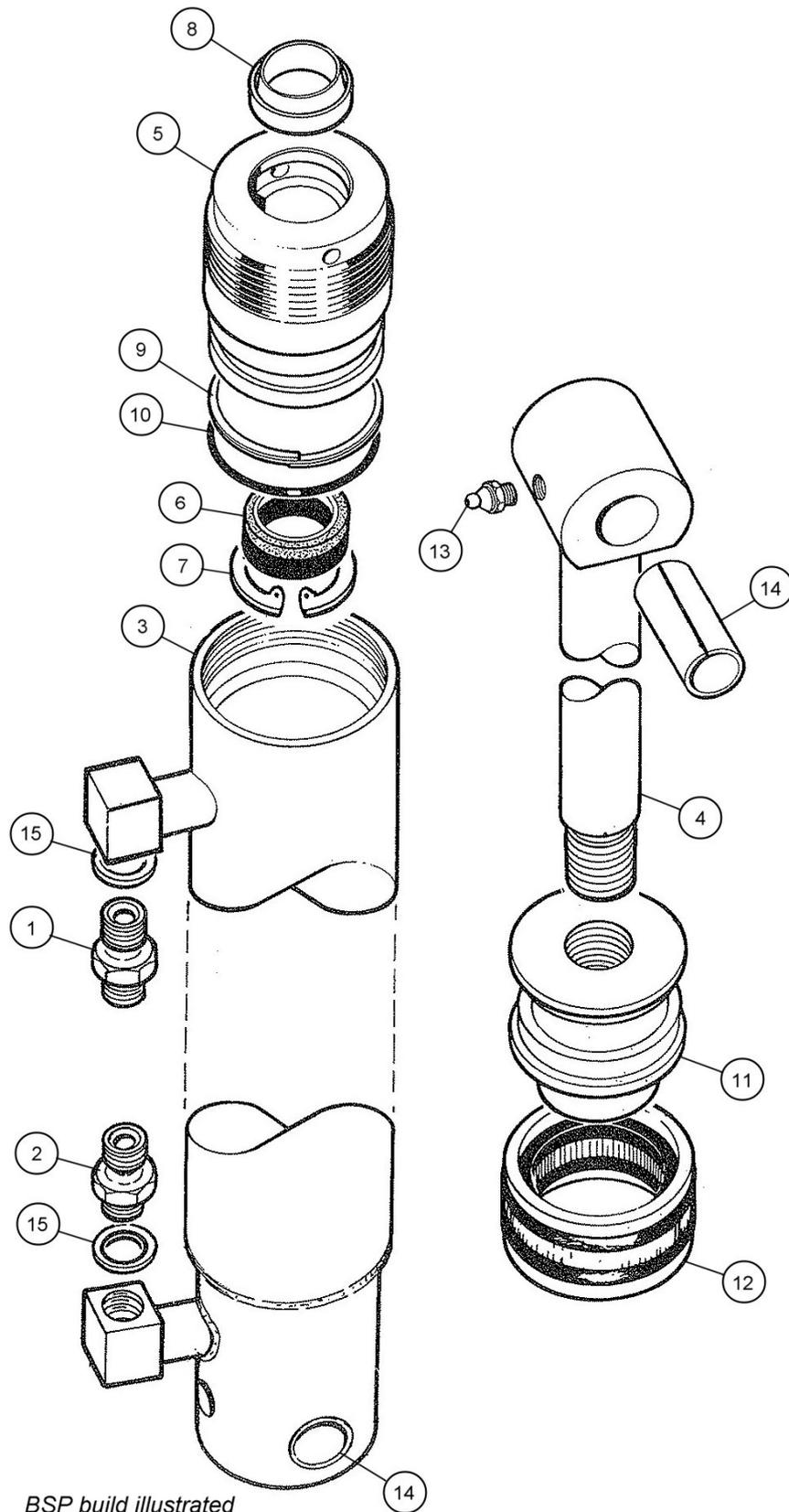
**MICROKLIPPA**

**LIFT RAM (Ø50mm Alternative)**

**Modules:**

1090305 – BSP Build

1090306 – JIC Build



*BSP build illustrated*

**MICROKLIPPA****LIFT RAM (Ø50mm Alternative)**

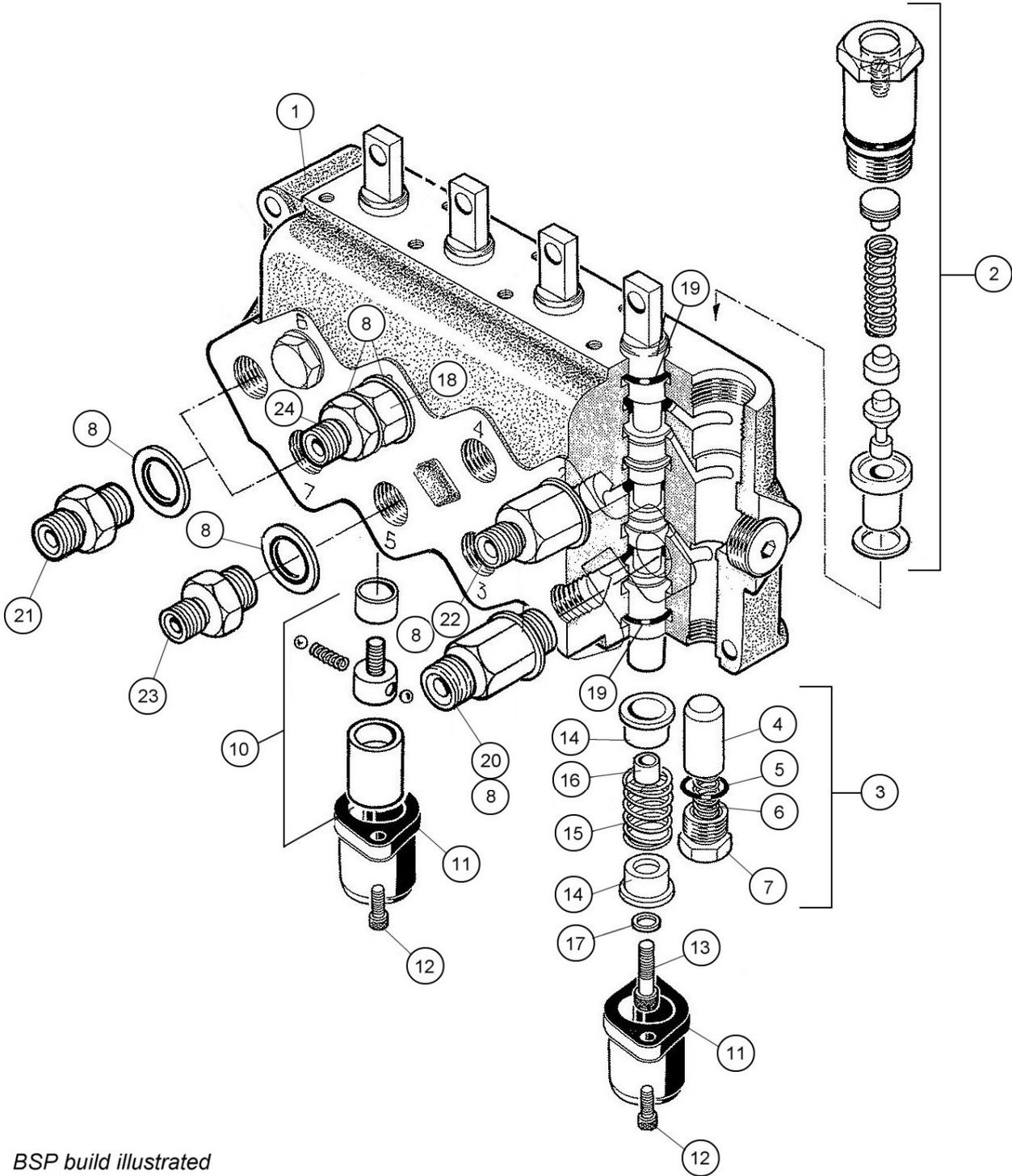
REF.	QTY.	PART NO.	DESCRIPTION
		<b>1090305</b>	<b>LIFT RAM ASSEMBLY - BSP Build</b>
1	1	8581145	UNION (BSP)
2	1	8130068	RESTRICTOR UNION (BSP)
3	1	1090275	CYLINDER
4	1	1090122	PISTON ROD
5	1	7135291	GLAND HOUSING
6	1	8629148	GLAND SEAL
7	1	0416240	CIRCLIP
8	1	8629149	WIPER RING
9	1	8609302	AE RING
10	1	8600302	O RING
11	1	7135008	PISTON
12	1	8638788	PISTON SEAL
13	1	0901121	GREASER
14	2	1090005	BUSH
15	2	8650103	BONDED SEAL
		<b>8699188</b>	<b>SEAL KIT</b>

REF.	QTY.	PART NO.	DESCRIPTION
		<b>1090306</b>	<b>LIFT RAM ASSEMBLY - JIC Build</b>
1	1	1075115	UNION (JIC)
2	1	8130130	RESTRICTOR UNION (JIC)
3	1	1090275	CYLINDER
4	1	1090122	PISTON ROD
5	1	7135291	GLAND HOUSING
6	1	8629148	GLAND SEAL
7	1	0416240	CIRCLIP
8	1	8629149	WIPER RING
9	1	8609302	AE RING
10	1	8600302	O RING
11	1	7135008	PISTON
12	1	8638788	PISTON SEAL
13	1	0901121	GREASER
14	2	1090005	BUSH
15	2	8650103	BONDED SEAL
		<b>8699188</b>	<b>SEAL KIT</b>

**NOTE: Items 3 to 15 are common to both BSP & JIC builds**

**MICROKLIPPA**  
**CABLE CONTROL VALVE**

**Modules:**  
8130358 – BSP build  
8130359 – JIC build



*BSP build illustrated*

**MICROKLIPPA****CABLE CONTROL VALVE**

REF.	QTY.	PART NO.	DESCRIPTION
		<b>8130358</b>	<b>CABLE CONTROL VALVE - BSP Models</b>
		<b>8130359</b>	<b>CABLE CONTROL VALVE - JIC Models</b>
1	1	8130355	BASIC VALVE - <i>complete with:</i>
2	1	8130023	MAIN RELIEF VALVE
3	1	8130022	NON-RETURN VALVE - <i>comprising of:</i>
4	1	8130006	SUPPLY CHECK VALVE
5	1	8600501	O RING
6	1	8130007	SPRING
7	1	8130008	PLUG
8	11	8650103	BONDED SEAL
9	1	8130147	RELIEF VALVE ASSEMBLY
10	1	8130133	DETENT ASSEMBLY
11	4	8130002	CENTRING SPRING COVER
12	8	9343022	CAPSCREW
13	4	9383043	SETSCREW
14	8	8130003	CENTRING SPRING CUP
15	4	8130004	CENTRING SPRING
16	4	8130005	DISTANCE PIECE
17	4	8130020	WASHER
18	2	8581208	RESTRICTOR ADAPTOR
19	8	8600112	O RING

Items 1 - 19 above are common to both BSP and JIC builds, items 20 - 24 below are specific to a particular build. Select items from list 'A' for BSP build or list 'B' for JIC build.

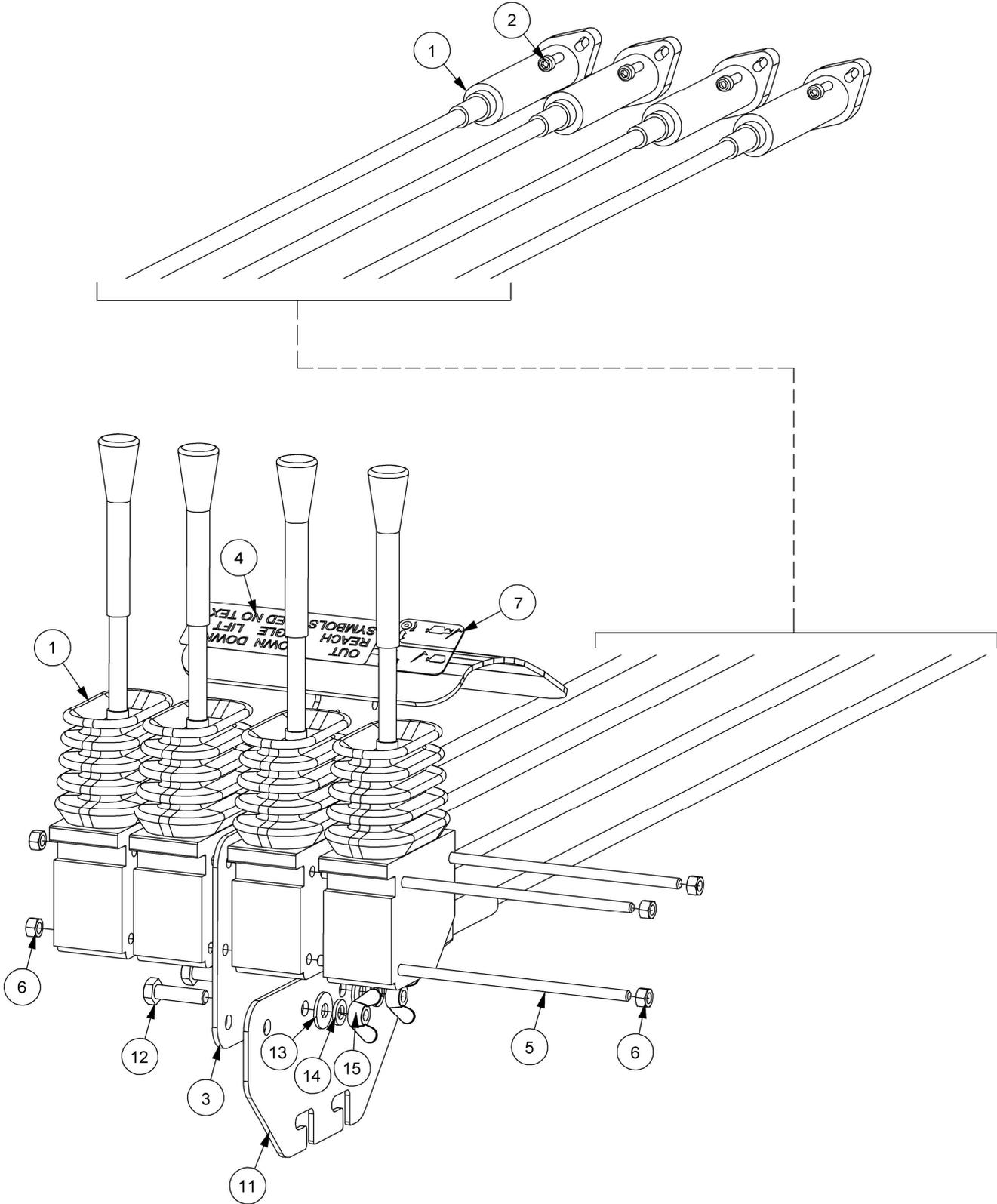
<b>A</b>		<b>8130358</b>	<b>BSP Build</b>
20	1	8581236	UNION ( <i>BSP</i> )
21	2	6000113	UNION ( <i>BSP</i> )
22	1	8581146	UNION ( <i>BSP</i> )
23	3	8581145	UNION ( <i>BSP</i> )
24	2	8130068	RESTRICTOR ( <i>BSP</i> )
<b>B</b>		<b>8130359</b>	<b>JIC Build</b>
20	1	8581235	UNION ( <i>JIC</i> )
21	2	8581217	UNION ( <i>JIC</i> )
22	1	8581218	UNION ( <i>JIC</i> )
23	3	1075115	UNION ( <i>JIC</i> )
24	2	8130130	RESTRICTOR ( <i>JIC</i> )

**MICROKLIPPA**

**CABLE CONTROLS ASSEMBLY**

**Modules:**

Sub-components of 8130358 & 8130359





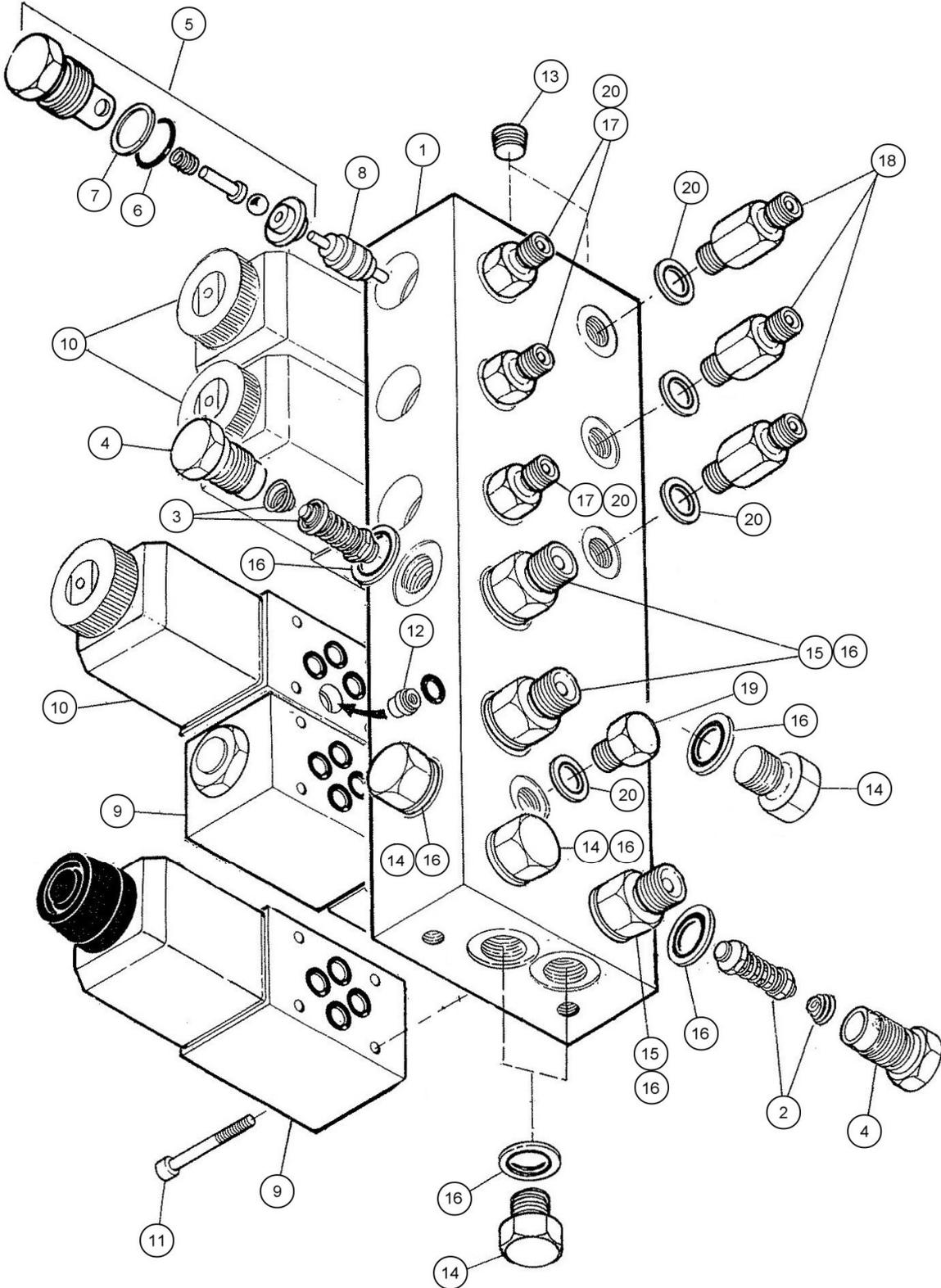
MICROKLIPPA

CABLE CONTROLS ASSEMBLY

REF.	QTY.	PART NO.	DESCRIPTION
Sub-components of:		<b>8130358</b>	<b>CABLE CONTROL VALVE - BSP Models</b>
Sub-components of:		<b>8130359</b>	<b>CABLE CONTROL VALVE - JIC Models</b>
1	4	8017058	CONTROL HEAD & CABLE - 2.5m
2	8	9343032	CAPSCREW
3	1	7650306	ARMREST - 4 LEVER
4	1	1290368	DECAL - CONTROL
5	3	04.282.70	STUD
6	6	9143003	SELF-LOCKING NUT
7	1	1290338	DECAL - ROTOR REVERSE
8	1	09.968.99	KNOB (RED) - <i>Reach Control Lever</i>
9	1	8017068	KNOB (YELLOW) - <i>Lift Control Lever</i>
10	1	8017067	KNOB (GREEN) - <i>Angle Control Lever</i>
11	1	42491.01	CAB MOUNTING BRACKET
12	2	9213064	BOLT
13	2	9100104	FLAT WASHER
14	2	9100204	SPRING WASHER
15	2	9193004	WING NUT

**MICROKLIPPA**  
**PROPORTIONAL VALVE**

**Module:**  
1090360





MICROKLIPPA

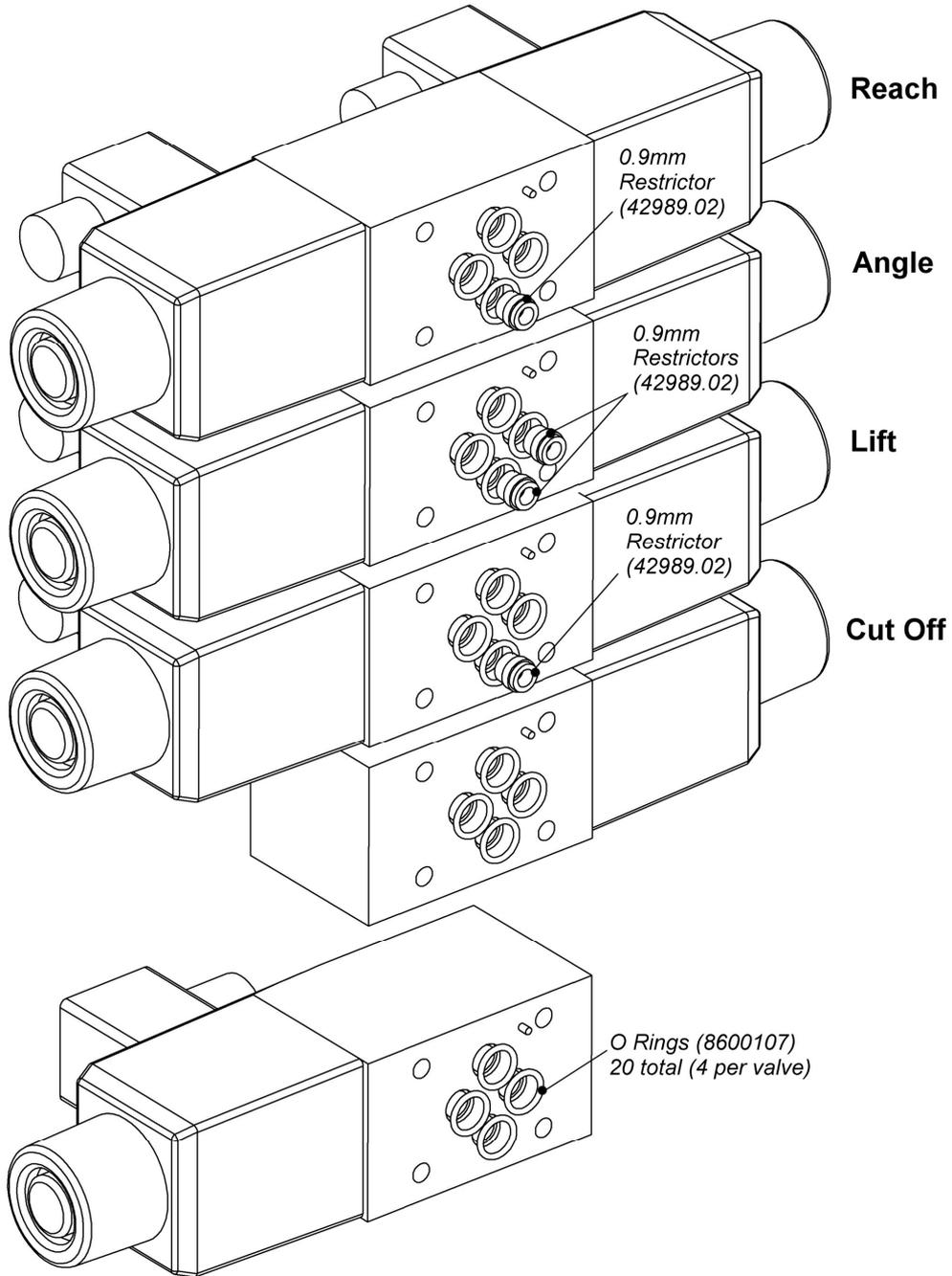
PROPORTIONAL VALVE

REF.	QTY.	PART NO.	DESCRIPTION
		<b>1090360</b>	<b>PROPORTIONAL VALVE ASSEMBLY</b>
1	1	8132276	MANIFOLD BLOCK
2	1	8130151	RELIEF VALVE (100BAR) - <i>Arm Services</i>
3	1	8130151	RELIEF VALVE (100BAR) - <i>Motor</i>
4	2	8130032	RELIEF VALVE CAP
5	6	8130090	CHECK VALVE ASSEMBLY c/w:
6	1	8700644	O RING
7	1	8709644	AE RING
8	3	8130087	ACTUATOR
9	2	8130456	SINGLE SOLENOID VALVE
10	3	41784.48	PROPORTIONAL DOUBLE SOLENOID
11	20	9243062	CAPSCREW
12	4	42989.02	RESTRICTOR INSERT
13	2	8582042	TAPER PLUG
14	6	05.433.01	HEXAGON PLUG
15	4	6000113	UNION
16	11	8650103	BONDED SEAL
17	3	8581169	UNION
18	3	8581279	EXTENDED UNION
19	4	520378	HEXAGON PLUG
20	10	8650102	BONDED SEAL
		<b>8699197</b>	<b>SEAL KIT</b>

Note: Replacement O Rings for Solenoid Valves are Part No. 8600107

**MICROKLIPPA**  
**RESTRICTOR LOCATIONS**

**Module:**  
1090360 Sub-components



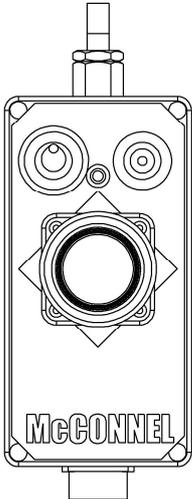
**MICROKLIPPA**



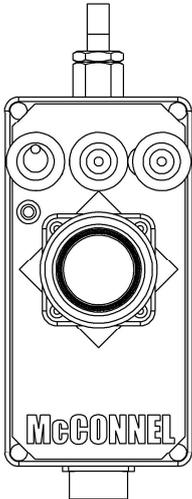
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**MICROKLIPPA**  
**PROPORTIONAL CONTROL UNIT**

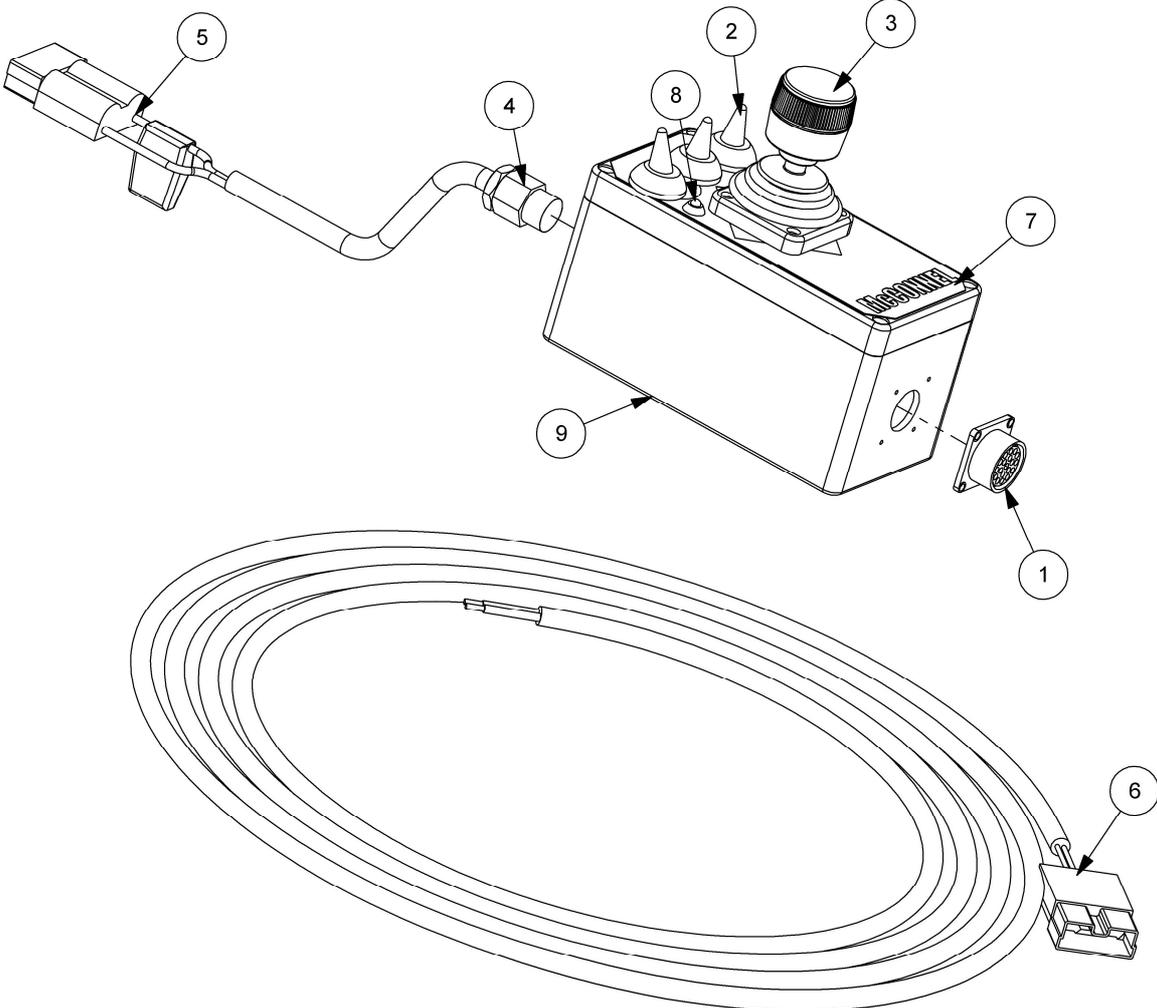
**Module:**  
8402393



8402390 & 8402391



8402392 & 8402393



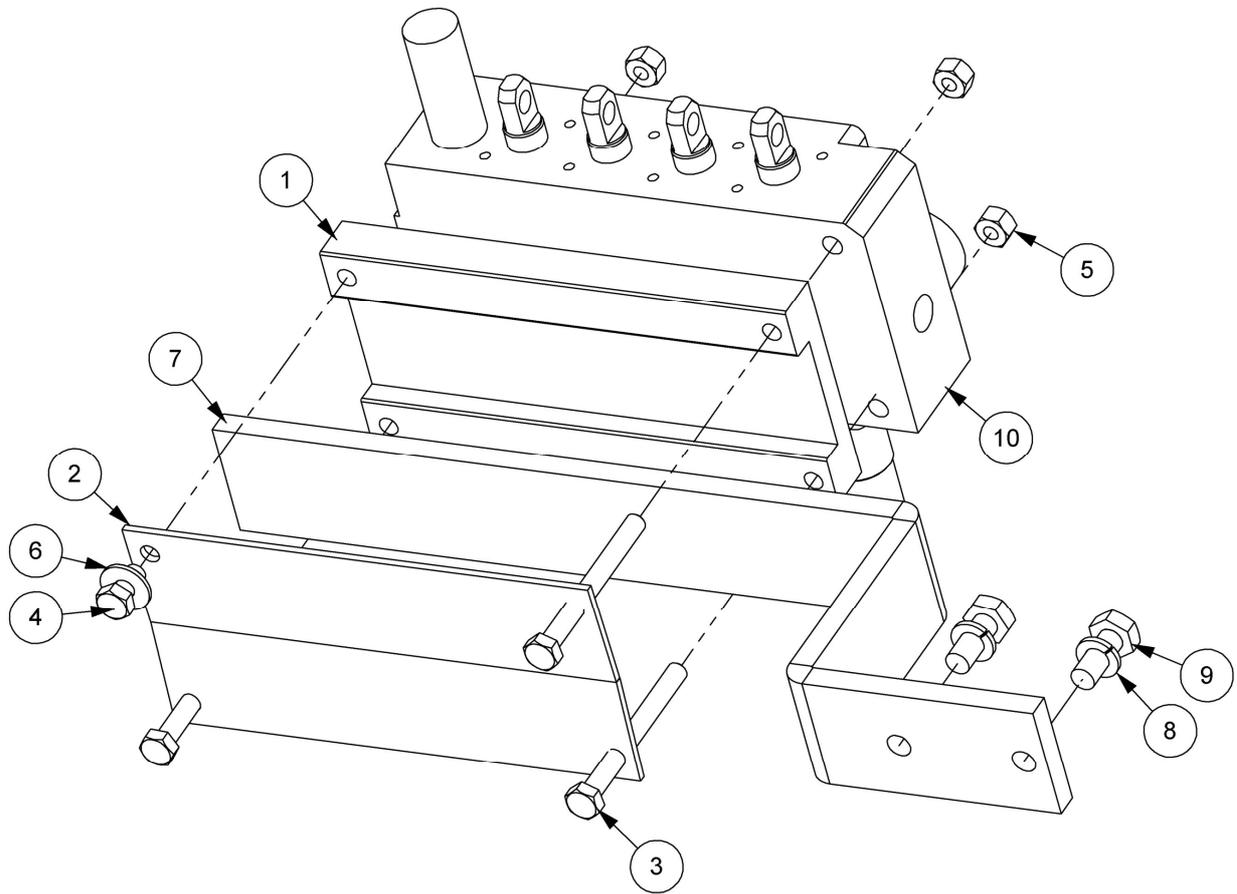


**MICROKLIPPA**

**PROPORTIONAL CONTROL UNIT**

<b>REF.</b>	<b>QTY.</b>	<b>PART No.</b>	<b>DESCRIPTION</b>
		<b>8402393</b>	<b>PROPORTIONAL CONTROL UNIT (3 Switch)</b>
1	1	8402189	PANEL MTG SHELL
2	3	8402024	SWITCH COVER
3	1	8402246	JOYSTICK (4 AXIS)
4	1	8402149	GLAND - PLASTIC
5	1	43022.47	CONNECTOR
6	1	8402237	LOOM POWER SUPPLY
7	1	1290494	DECAL - SWITCH BOX
8	1	41845.41	LED
9	1	8402349	CONTROL BOX
10	1	43034.02	BLADE FUSE - 20 amp

**MICROKLIPPA  
CABLE VALVE MOUNTING**

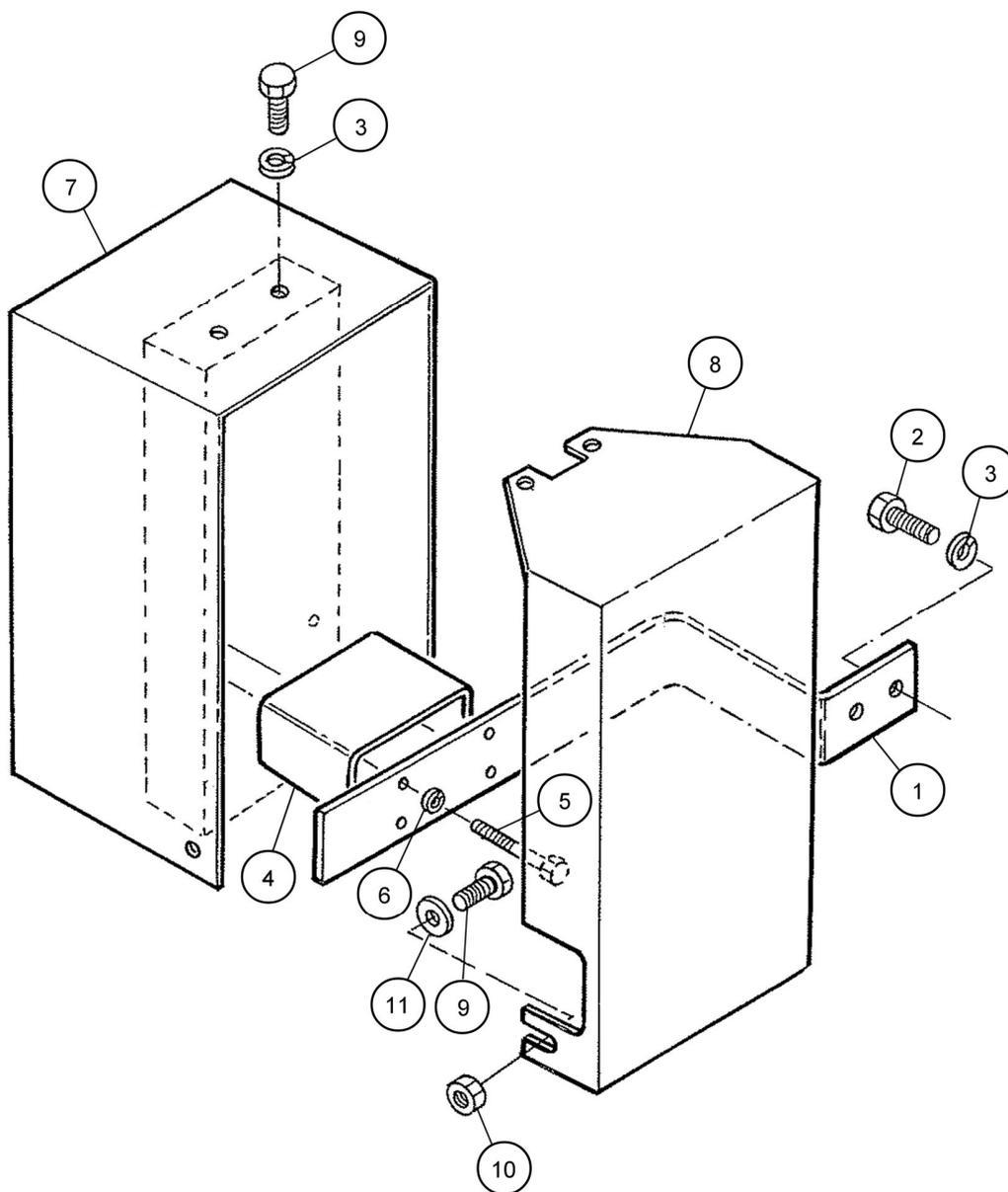


REF.	QTY.	PART NO.	DESCRIPTION
			<b>CABLE CONTROL VALVE MOUNTING</b>
1	1	1090312	VALVE MOUNTING PLATE
2	1	1090313	VALVE MOUNTING CLAMP PLATE
3	3	9213164	VALVE MOUNTING BAR
4	1	9313003	SETSCREW
5	3	9143004	SELF-LOCKING NUT
6	1	9100104	SPRING WASHER
7	1	1090124	VALVE MOUNTING BAR
8	2	9100205	SPRING WASHER
9	2	9313055	SETSCREW
10	1	8130358	CONTROL VALVE ASSEMBLY - BSP Build
	1	8130359	CONTROL VALVE ASSEMBLY - JIC Build

**MICROKLIPPA**

**PROP VALVE MOUNTING/COVER**

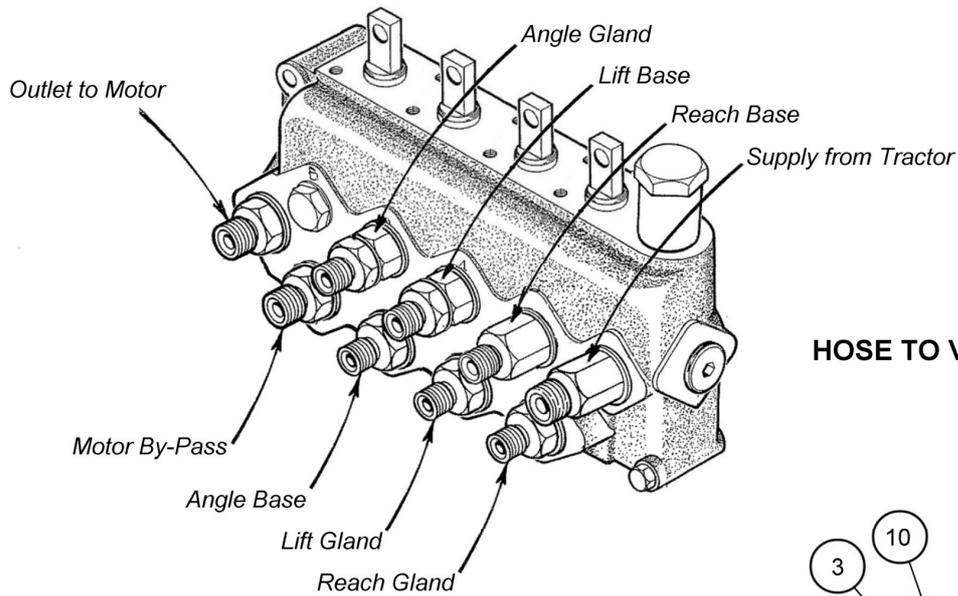
**Module:**



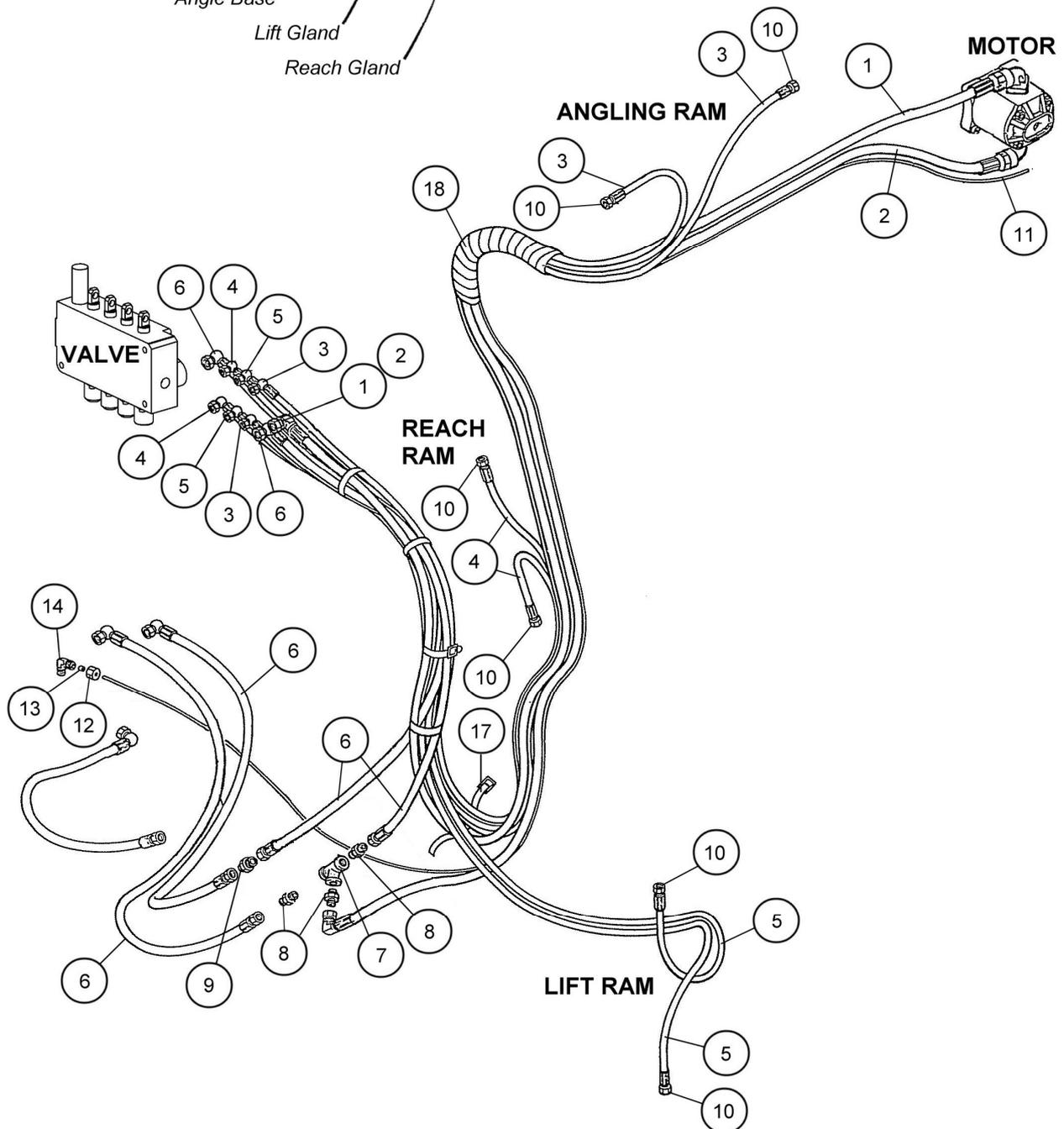
REF.	QTY.	PART NO.	DESCRIPTION
1	1	43087.01	VALVE MOUNTING BAR
2	2	9313055	SETSCREW
3	4	9100205	SPRING WASHER
4	1	43124.01	SPACER
5	4	9213184	BOLT
6	4	9100204	SPRING WASHER
7	1	43086.01	VALVE COVER - MANIFOLD
8	1	43086.02	VALVE COVER - SOLENOIDS
9	4	9313045	SETSCREW
10	2	9143105	SELF-LOCKING NUT
11	2	9100105	PLAIN WASHER



# MICROKLIPPA HOSE INSTALLATION



## HOSE TO VALVE CONNECTION



**MICROKLIPPA  
HOSE INSTALLATION**

REF.	QTY.		PART NO.	DESCRIPTION
	BSP	JIC		
<b>HYDRAULIC HOSE INSTALLATION</b>				
1	1	-	8531363	HOSE - 3/8" BSP x 160" <i>Motor Supply</i>
	-	1	8531038	HOSE - 3/4" JIC x 160" <i>Motor Supply</i>
2	1	-	8531373	HOSE - 3/8" BSP x 130" <i>Motor Return</i>
	-	1	8531048	HOSE - 3/4" JIC x 130" <i>Motor Return</i>
3	2	-	8535122	HOSE - 1/4" BSP x 142" <i>Angling Ram</i>
	-	2	8535017	HOSE - 1/2" JIC x 142" <i>Angling Ram</i>
4	2	-	8535132	HOSE - 1/4" BSP x 100" <i>Reach Ram</i>
	-	2	8535027	HOSE - 1/2" JIC x 100" <i>Reach Ram</i>
5	2	-	8535052	HOSE - 1/4" BSP x 70" <i>Lift ram</i>
	-	2	8535047	HOSE - 1/2" JIC x 70" <i>Lift Ram</i>
6	4	-	8531343	HOSE - 3/8" BSP x 36"
	-	4	8531058	HOSE - 3/4" JIC x 36"
7	1	-	8581073	TEE PIECE (BSP)
	-	1	8581237	TEE PIECE (JIC)
8	3	-	8505007	UNION
9	1	-	6000113	UNION
10	-	6	8120003	UNION - (BSP to JIC ADAPTOR)
11	1	1	8501148	NYLON HOSE - 5000mm
12	1	1	8581200	UNION NUT
13	1	1	8581199	OLIVE
14	1	1	8581198	ELBOW - 90°
15	2	2	8002108	DUST CAP ( <i>not illustrated</i> )
16	2	2	8002109	DUST PLUG ( <i>not illustrated</i> )
17	3	3	7106187	HOSE STRAP
18	1	1	1090053	HOSE SLEEVING - 800mm
19	1	1	7135084	HOSE TIE
20	1	1	1090092	DRAIN LINE ADAPTOR - LARGE
21	1	1	1090093	DRAIN LINE ADAPTOR - SMALL

## MICROKLIPPA

## PUMP & TANK KIT ASSEMBLIES

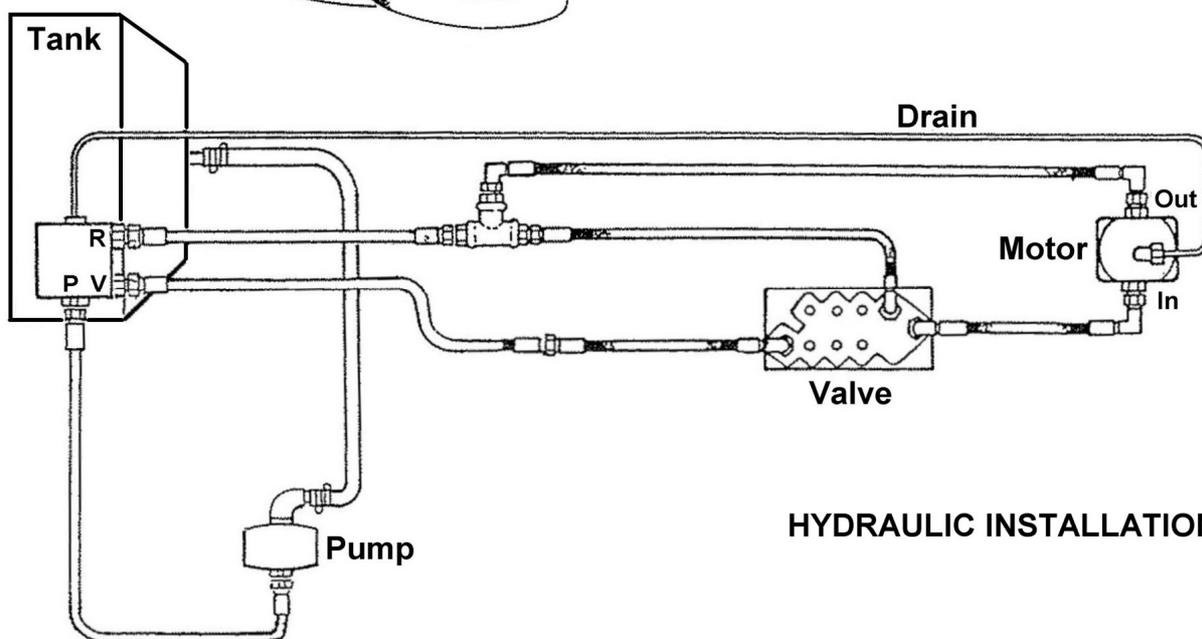
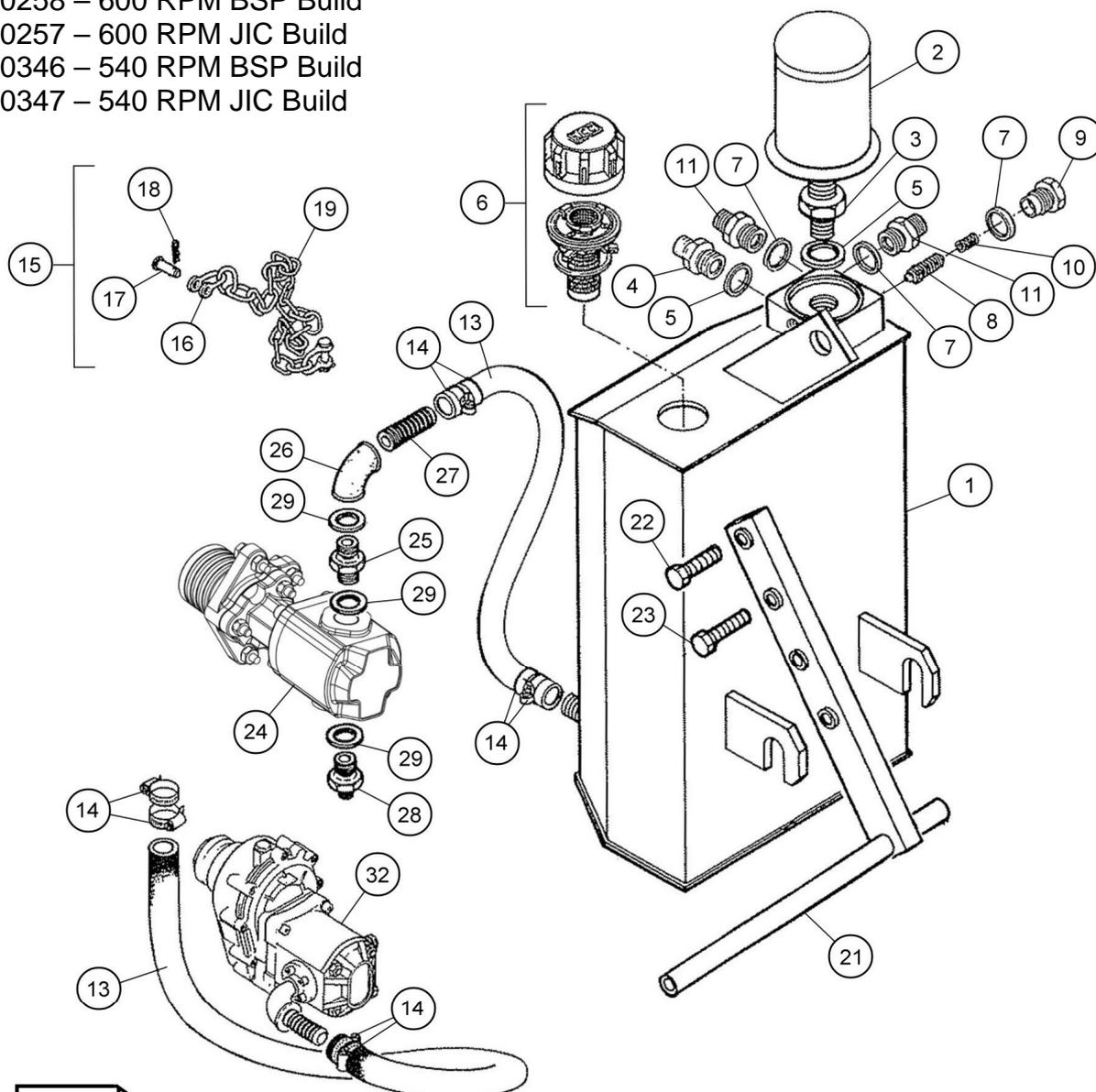
### Modules:

1090258 – 600 RPM BSP Build

1090257 – 600 RPM JIC Build

1090346 – 540 RPM BSP Build

1090347 – 540 RPM JIC Build



HYDRAULIC INSTALLATION

**MICROKLIPPA****PUMP & TANK KIT ASSEMBLIES**

REF.	QTY.	PART NO.	DESCRIPTION
		1090258	<b>PUMP &amp; TANK KIT (600 RPM PTO SPEED) - BSP Build</b>
		1090257	<b>PUMP &amp; TANK KIT (600 RPM PTO SPEED) - JIC Build</b>
		1090346	<b>PUMP &amp; TANK KIT (540 RPM PTO SPEED) - BSP Build</b>
		1090347	<b>PUMP &amp; TANK KIT (540 RPM PTO SPEED) - JIC Build</b>
		1090340	TANK ASSEMBLY (540 & 600 RPM) - <i>BSP Builds</i>
		1090341	TANK ASSEMBLY (540 & 600 RPM) - <i>JIC Builds</i>
1	1	1090339	HYDRAULIC OIL TANK
2	1	8401045	FILTER
3	1	8581174	UNION
4	1	6000112	BSP ADAPTOR - <i>BSP build only</i>
	1	8120003	JIC ADAPTOR - <i>JIC build only</i>
5	2	8650104	BONDED SEAL
6	1	8401050	FILLER / BREATHER ASSEMBLY
7	3	8650103	BONDED SEAL
8	1	8130029	RELIEF VALVE
9	1	8130031	RELIEF VALVE CAP
10	1	8116011	SPRING
11	2	6000113	BSP ADAPTOR - <i>BSP build only</i>
	2	8581170	JIC ADAPTOR - <i>JIC build only</i>
12	1	8531353	HOSE - 3/8" BSP FS/F90 x 22" - <i>BSP build only</i>
	1	8531078	HOSE - 3/4" JIC FS/F90 x 22" - <i>JIC build only</i>

The following items are sub-components of Pump & Drive Assemblies and are common to all builds.

13	1	8500865	SUCTION HOSE - 1" BORE x 36"
14	4	0904106	HOSE CLIP
15	2	6000087	SHACKLE ASSEMBLY c/o:
16	1	6000088	SHACKLE
17	1	6000089	SHACKLE PIN
18	1	0481105	SPRING COTTER
19	1	0902330	REACTION CHAIN
20	1	8013389	TORQUE ARM - <i>600RPM Builds only</i>
	1	8005033	TORQUE ARM - <i>540RPM Builds only</i>
21	1	1090345	VALVE MOUNTING
22	1	9213137	BOLT
23	1	9213147	BOLT

All additional Pump & Drive components are specific to builds and are listed on the following page.

*Continued...*

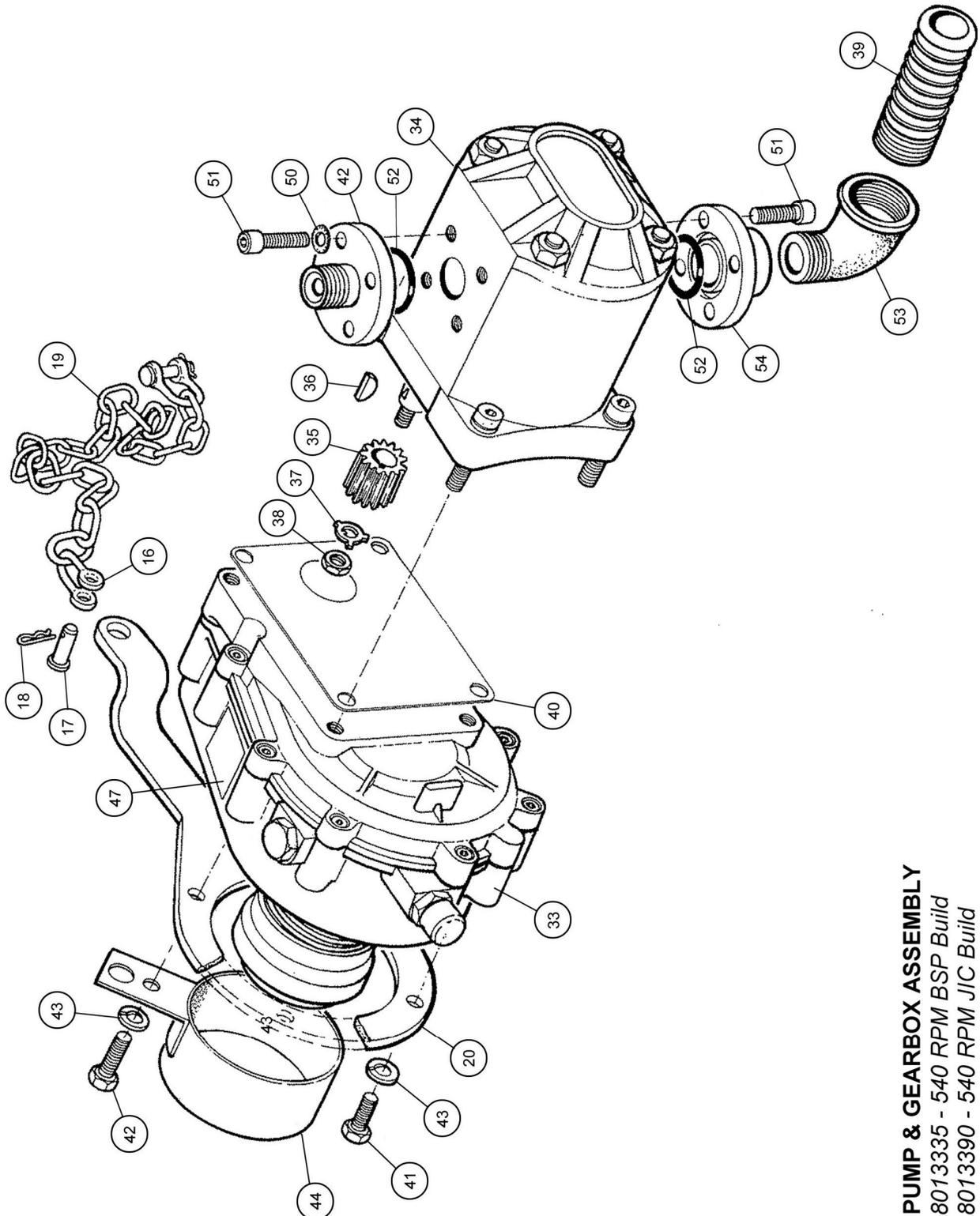
## MICROKLIPPA

## PUMP & TANK KIT ASSEMBLIES

### Modules:

8013335 – 540 RPM BSP Build

8013390 – 540 RPM JIC Build



**PUMP & GEARBOX ASSEMBLY**  
8013335 - 540 RPM BSP Build  
8013390 - 540 RPM JIC Build

**MICROKLIPPA****PUMP & TANK KIT ASSEMBLIES**

REF.	QTY.	PART NO.	DESCRIPTION
		<b>8013420</b>	<b>PUMP &amp; DRIVE SUPPORT - 600 RPM BSP Build</b>
		<b>8013391</b>	<b>PUMP &amp; DRIVE SUPPORT - 600 RPM JIC Build</b>
24	1	8013418	PUMP & DRIVE ASSEMBLY
25	1	8581136	UNION
26	1	8581055	ELBOW - 90°
27	1	8005037	UNION
28	1	8581131	BSP ADAPTOR - <i>BSP build only</i>
	1	8581244	JIC ADAPTOR - <i>JIC build only</i>
29	3	8650106	BONDED SEAL
30	4	9213085	BOLT
31	4	9143005	NUT
		<b>8699230</b>	<b>SEAL KIT FOR PUMP (600 RPM)</b>
		<b>8013335</b>	<b>PUMP, GEARBOX &amp; SUPPORT - 540 RPM BSP Build</b>
		<b>8013390</b>	<b>PUMP, GEARBOX &amp; SUPPORT - 540 RPM JIC Build</b>
32	1	8013323	PUMP & GEARBOX - <i>BSP Build</i>
	1	8013326	PUMP & GEARBOX - <i>JIC Build</i>
33		8013325	GEARBOX
34		8201456	PUMP
35		8201131	PUMP DRIVE COUPLING
36		8201133	WOODRUFF KEY
37		8201134	TAB WASHER
38		8201134	THIN NUT
39	1	8005037	UNION - LOW PRESSURE
40	1	8201132	GASKET
41	3	9313055	SETSCREW
42	1	9313065	SETSCREW
43	4	9100205	SPRING WASHER
44	1	8013268	PTO GUARD
45	4	9243074	CAPSCREW
46	4	9100204	SPRING WASHER
47	1	8013052	INSTRUCTION LABEL
48	1	8005027	BSP PRESSURE CONNECTION ( <i>c/w O Ring &amp; Fittings</i> )
49	1	8005031	JIC PRESSURE CONNECTION ( <i>c/w O Ring &amp; Fittings</i> )
50	8	0100302	SHAKEPROOF WASHER - INTERNAL
51	8	9343044	CAPSCREW
52	2	8600405	O RING
53	1	8581168	ELBOW
54	1	8005036	UNION BASE
55	1	7118243	DECAL - MAX RPM
		<b>8699176</b>	<b>SEAL KIT FOR PUMP (540 RPM) - Pre 1987 models</b>
		<b>8699214</b>	<b>SEAL KIT FOR PUMP (540 RPM) - 1987 onward models</b>



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