

ECON

**ECON FLAILS: Temeside Works, Ludlow, Shropshire SY8 1JL. England.
Telephone: 01584 873131. Facsimile: 01584 876463.**

HEDGEMASTER MK III

Rev. 30.10.07

Operator & Parts Manual

IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION



DEALER WARRANTY INFORMATION & REGISTRATION VERIFICATION

It is imperative that the selling dealer registers this machine with McConnel Limited 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 McConnel Limited web site at www.mcconnel.com, log onto 'Dealer Inside' 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 McConnel Service Department on 01584 875848.

Registration Verification

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 McConnel Limited.

IMPORTANT: During the initial 'bedding in' period of a new machine it is the customer's responsibility to regularly inspect all nuts, bolts and hose connections for tightness and re-tighten if required. New hydraulic connections occasionally weep small amounts of oil as the seals and joints settle in – where this occurs it can be cured by re-tightening the connection – *refer to torque settings chart below*. The tasks stated above should be performed on an hourly basis during the first day of work and at least daily thereafter as part of the machines general maintenance procedure.

TORQUE SETTINGS FOR HYDRAULIC FITTINGS

HYDRAULIC HOSE ENDS		
BSP	Setting	Metric
1/4"	18 Nm	19 mm
3/8"	31 Nm	22 mm
1/2"	49 Nm	27 mm
5/8"	60 Nm	30 mm
3/4"	80 Nm	32 mm
1"	125 Nm	41 mm
1.1/4"	190 Nm	50 mm
1.1/2"	250 Nm	55 mm
2"	420 Nm	70 mm

PORT ADAPTORS WITH BONDED SEALS		
BSP	Setting	Metric
1/4"	34 Nm	19 mm
3/8"	47 Nm	22 mm
1/2"	102 Nm	27 mm
5/8"	122 Nm	30 mm
3/4"	149 Nm	32 mm
1"	203 Nm	41 mm
1.1/4"	305 Nm	50 mm
1.1/2"	305 Nm	55 mm
2"	400 Nm	70 mm

WARRANTY POLICY

WARRANTY REGISTRATION

All machines must be registered, by the selling dealer with McConnell Ltd, before delivery to the end user. On receipt of the goods it is the buyer's responsibility to check that the Verification of Warranty Registration in the Operator's Manual has been completed by the selling dealer.

1. LIMITED WARRANTIES

- 1.01. All machines supplied by McConnell Limited are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.
- 1.02. All spare parts supplied by McConnell Limited are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months.
- 1.03. The manufacturer will replace or repair for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined.
- 1.04. This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads or pneumatic tyres.
- 1.05. Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.
- 1.06. Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.
- 1.07. Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnell Ltd cannot be held liable, and may have safety implications.
- 1.08. Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of McConnell Ltd.
- 1.09. For machine warranty periods in excess of 12 months the following additional exclusions shall apply:
 - 1) Hoses, external seals, exposed pipes and hydraulic tank breathers.
 - 2) Filters.
 - 3) Rubber mountings.
 - 4) External electric wiring.

N.B. Warranty cover will be invalid if any non-genuine parts have been fitted or used. Use of non-genuine parts may seriously affect the machine's performance and safety. McConnell Ltd. cannot be held responsible for any failures or safety implications that arise due to the use of non-genuine parts.

2. REMEDIES AND PROCEDURES

- 2.01. The warranty is not effective unless the Selling Dealer registers the machine, via the McConnel web site and confirms the registration to the purchaser by completing the Verification of Warranty Registration in the operator's manual.
- 2.02. Any fault must be reported to an authorised McConnel dealer as soon as it occurs. Continued use of a machine, after a fault has occurred, can result in further component failure for which McConnel Ltd cannot be held liable.
- 2.03. Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by McConnel Ltd.
- 2.04. All claims must be submitted, by an authorised McConnel Service Dealer, within 30 days of the date of repair.
- 2.05. Following examination of the claim and parts the manufacture will pay, at their discretion, for any valid claim the cost of any parts and an appropriate labour allowance if applicable.
- 2.06. The submission of a claim is not a guarantee of payment.
- 2.07. Any decision reached by McConnel Ltd. is final.

3. LIMITATION OF LIABILITY

- 3.01. The manufacturer disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.
- 3.02. The manufacturer makes no warranty as to the design, capability, capacity or suitability for use of the goods.
- 3.03. Except as provided herein, the manufacturer shall have no liability or responsibility to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the goods including, but not limited to, any indirect, special, consequential, or incidental damages resulting from the use or operation of the goods or any breach of this warranty. Notwithstanding the above limitations and warranties, the manufacturer's liability hereunder for damages incurred by the purchaser or others shall not exceed the price of the goods.
- 3.04. No action arising out of any claimed breach of this warranty or transactions under this warranty may be brought more than one (1) year after the cause of the action has occurred.

4. MISCELLANEOUS

- 4.01. The manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.
- 4.02. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.
- 4.03. Applicable law may provide rights and benefits to the purchaser in addition to those provided herein.

EC DECLARATION OF CONFORMITY

Conforming to EEC Directive 89/392/EEC

We,

McCONNEL LIMITED,

Temeside Works, Ludlow, Shropshire SY8 1JL.

Declare under our sole responsibility that:

The product (type) *Tractor Mounted Hedge/Grass Cutter*.....

Product Code *HM Mk3*.....

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 Directive 89/392/EEC, and AMD 91/368/EEC, AMD 93/44/EEC, AMD 93/63/EEC and conforms with European Norm. BS EN 292.

Part 1: 1991 – Safety of Machinery – Terminology, methodology.

Part 2: 1991 – Safety of Machinery – Technical Specifications.

and other national standards associated with its design and construction as listed in the Technical File.

Signed *John Frank*.....
on behalf of McCONNEL LIMITED *Responsible Person*

Chief Design Engineer..... *October 2003*.....
Status *Date*

CONTENTS

1. WARRANTY CONDITIONS	1
1.1 Prime Movers	1
1.2 Warranty Claims	1
1.3 Service Parts	1
1.4 Service Work	1
2. SAFETY FIRST	2
2.1 Introduction	2
2.3 Safe Working Guidelines	2
2.4 Checks Before Commencing Work	3
3. OPERATING INSTRUCTIONS	4
3.1 Delivery	4
3.2 Transportation	4
3.3 Cutting Head Front Guard	4
3.4 Hydrafloat	4
3.5 Broken Flails	5
3.6 Demounting	5
3.7 Mounting	5
4. FITTING INSTRUCTIONS	8
4.1 Notes on Fitting	8
4.2 Stability and Counterweight	8
4.3 Fitting HM2E & HM3E Using Econ Plain Bracket Kit	8
4.4 Positioning the Underframe	9
4.4.1 Rear Mounting Bracket	9
4.4.2 Front Mounting Bracket - Left Side (Item 11)	10
4.4.3 Mid Mounting Bracket - Right Side (item 3)	10
4.5 Hydraulic Tank and Drive Assembly	10
4.6 Control Box Mounting	10
4.7 Side Lights	10
4.8 Setting Stroke On First Arm	10
5. CONTROLS	11
5.1 Arm Movements	11
5.2 Arm Movements (Hydrafloat)	11
5.3 Arm Lowering - Speed Adjustment	12
6. OPERATING PRINCIPLES	13
7. SERVICE INSTRUCTION - LUBRICATION	14
7.1 Filters	14
8. SERVICING GENERAL	15
8.1 Servicing the Rotor and Rotor Bearings	15
9. SYMPTOM FAULTS	16
9.1 System Checks	17
9.2 Hydraulic System Overheating	18
Method of Fitting Support Legs	19
SERVICE PARTS	20

1. WARRANTY CONDITIONS

The company guarantees all whole machines and optional extras fitted to machines during manufacture for a period of 12 months or 1000 operational hours whichever occurs soonest as detailed below.

We guarantee all parts of our manufacture only where the machine is used solely for the purpose in which it was intended to be used, including cost of parts and substantiated labour charges at ECON's current rate. Items of other manufacture will be covered by the respective manufacturer's warranty. Only genuine ECON service parts supplied by ECON are to be fitted during the warranty period.

However, after six months or 1000 operational hours which ever occurs soonest, we do not cover oil seals or hydraulic connections, bearings, pump diaphragms, 'O' rings, which have probably been contaminated during work and may not have been properly prepared for the stand down period. See our instruction book on correct procedures.

1.1 Prime Movers

As a specialist body - machine manufacturer, all our products are mounted - attached to prime movers of other manufacture. Every effort is made to ensure compatibility but all contingent liabilities for the prime mover are excluded.

1.2 Warranty Claims

Each instruction pack contains a warranty claim form. The ECON invoice number for the supply of the parts fitted must be stated on the claim form.

Please return any components with the form as instructed to enable a prompt investigation of your claim. Further forms available on request.

1.3 Service Parts

Carry no warranty. If a replacement component fails it should be returned with a full explanation of the reason for failure and if, after inspection by ECON and/or component supplier, the component has faulty material or workmanship then the service part would be warranted for three months from the date supplied, provided that the failure was not as a result of incorrect diagnosis of the original component failure.

1.4 Service Work - No warranty

2. SAFETY FIRST

Econ Engineering strongly advise all operators to read this instruction manual before using the machine for the first time.

The intended use of this machine is to cut hedge growth or grass verges only.

2.1 Introduction

Almost all machinery can be classed as potentially hazardous in some way or another. To enable the safe and efficient use under all operating conditions, operators must be aware of potential hazards from this type of machinery. Listed below are a number of known potential hazard areas situated with this particular type of equipment.

The *Hazard Zones* for this machine are:

- above and below the articulated arms.
- within the vicinity of the cutting head, especially when in operation ie; directly to the front or rear of the head.

2.2 Potential Hazards

Incorrect use of the machine by personnel untrained or not authorised to use the machine.

Starting the machine before carrying out safety checks.

Lack of awareness of rotating cutter, cutter head continues to rotate for some time after the power source has been disconnected.

Always check cutting flails for damaged or loose bolts before starting a day's work.

Running the machine with excessive vibration within the cutter assembly.

Always replace broken or damaged flails, use genuine Econ flails to ensure correct rotor balance.

Investigating an obstruction from the cutting head, without first stopping the tractor engine.

Misuse or incorrect use of the controls.

Other personnel unaware of the operating machinery.

Preparing the machine for work or transportation, (fitting/removing transit bar).

Operating with known faults on the machine.

Operating the machine with safety guards omitted, incorrectly fitted or damaged.

Operating the machine with no safety glass fitted.

Poorly maintained equipment, or maintenance by unqualified service personnel.

Incorrect or no personal protective clothing, always wear ear protection.

Possible contact with low overhead cables or other overhead obstruction.

Instability caused by uneven or soft ground surface.

Warning labels damaged, obstructed or removed.

Checks and servicing carried out with the machinery running.

Adjusting the machine without first disengaging PTO and turning off tractor engine.

Operating the machine with an incorrect amount of counter balance weights.

2.3 Safe Working Guidelines

To avoid the possibility of accidents occurring with this machinery, the following working guidelines should be adopted.

- DO NOT operate the machine without the guards fitted.
- DO NOT operate the machine with broken or missing flails, this is apparent with excessive vibration of the cutting head assembly.
- DO NOT operate the machine without safety glass fitted to the cab windows.

- **DO NOT** alter any of the service line relief valves pressure settings.
- **DO NOT** make any adjustments to the hydraulic system without first sitting the cutting head firmly on the ground, disengaging PTO and turning off tractor engine.
- **DO NOT** exceed the 540rpm PTO speed.
- **STOP AT ONCE** if it is suspected that some wire may be wrapped around the rotor shaft.
STOP THE PTO ! STOP THE TRACTOR ENGINE !

Important Note:

The front flap acts to stop most material being discharged from the front of the cutting head. Always keep the guard adjusted as low as possible. Wire with a flapping end can be dangerous, not only to the operator, but possibly to passers by. ALL wire must be removed before re-starting work.

- It is recommended that a wire mesh screen be fitted over the cab window. Please see your distributor.
- Operators are advised to wear ear protectors.
- Operators must ensure that any persons in the vicinity of the machine are aware of the operators intentions, and are away from the hazardous zones.
- **DANGER** - Always keep a sharp look out for overhead obstacles, especially **POWER LINES!!**
- Observe the verge or hedge immediately in front of the cutting head so you and the machine have time to react.
- After finishing work, always fit transit bar before proceeding down the road.

2.4 Checks Before Commencing Work

Check the following before commencing work:

- hydraulic oil level.
- transit bar has been removed.
- cutting flails for damaged or loose bolts.
- ensure there is no wrappage around the rotor or bearings, and grub screws are secure.
- all guards are fitted.
- front flap is fitted correctly and the adjustment bolts are secure.
- all mounting bolts are secure.
- windows are fitted with safety glass, this is standard on all Econ fitted Hedgemasters.
- tractor cab door (near the machine) is fitted and closed, together with all windows.
- Inspect all hedges to be cut, for metal posts and particularly barbed wire. Ensure all wire is removed from hedge before work commences.
- *Do Not* rev the engine and engage the PTO sharply when starting the rotor.
- *Do Not* operate the machine with the breakaway in the breakback position.

3. OPERATING INSTRUCTIONS

3.1 Delivery

In most cases the tractor will be delivered with the Hedgemaster factory fitted. If this is not the case, refer to the relevant section on fitting.

Before using this machine for the first time, *remove the transport locking bar*. It is a good idea to start the tractor and operate the Hedger's in-cab controls for five or ten minutes, just to familiarise yourself with how the Hedger responds. (Refer to the relevant controls section for further information). You should be able to position the cutting head directly where you want it without looking at the controls. When you can do this you are ready to start work.

The machine is started/stopped by means of the tractor PTO. The PTO should be operated at 540 rpm **MAXIMUM**. Do not over-rev.

Run rotor up to speed before starting to cut.

Select a low gear (L1 or L2), set cutting head to top off hedge at required height and start to cut, keep forward speed slow to start off with and allow yourself enough cutting time to operate the controls and adjust the position of the cutting head.

3.2 Transportation

When travelling down the road, the cutting head should be carried with the flails towards the tractor. The first arm should be vertical and the second and third rams should be carefully closed until the skid bears against the ram guard plate on the first arm until the skid bears against the ram guard plate on the first arm and the roller drops into the vee-notch in the footstep. The second ram may have to be extended a small amount until the cutting head skid is just below the footstep to provide adequate ground clearance under the motor guard, but do not jam the skid against the step. You may have to operate the breakaway ram to pull the cutting head back into this position. Fit the transit bar.

When preparing to make the first cut, ensure the transportation locking bar is removed *before* operating the machine.

3.3 Cutting Head Front Guard

The guard is secured by 4 bolts which locate in the notched slots, to change the guard position, loosen the bolts, slide the guard forward out of the notch, move to required position, relocate in notch, retighten bolts.

When cutting heavy growth, the guard should be in the raised position. When verge mowing or cutting light growth, the guard should be in the lowered position.

3.4 Hydrafloat

When verge mowing, hydrafloat must be used. Open taps on the spool valve block and hydrocushion accumulator (turn anti-clockwise). Switch on the float control switch. (Red warning light on) which will allow the cutting head to follow the unevenness of the ground without any resistance from the rams.

The hydracushion causes most of the weight of the arms and cutting head to be carried on the tractor. This ensures that the cutting head follows the ground contours lightly, and does not dig into rises or fail to drop down into depressions.

When hedging, do not use the float position. You will want the cutting head to accurately maintain its set position, ensure both the taps on the valve block and hydracushion accumulator are turned off (*clockwise*).

3.5 Broken Flails

If a flail gets broken, the cutting head will start to vibrate. *Stop the machine immediately* and replace the flail. Under no circumstances should the hedger be operated with broken or missing flails.

3.6 Demounting

Always demount on level ground, demounting is carried out using the Hedger hydraulic system.

With the hedger arms in the transport position, un-hitch the oil tank and park the tractor so that the oil tank is alongside and central to the back wheel. Ensure that both taps for hydracushion are turned off.

Reconnect the pressure and return hoses to the tractor using the extension hoses and connect up the control cable through the left side door or cab window, to allow enough length for the demounting procedure.

Fit the parking legs using the bolts securing the front guard.

Undo the bolts securing socket to underframe, lower head squarely onto the ground close to the tractor, power the socket and arms off the underframe using the cutting head ram.

Fully close 1st ram and fold arms up tight.

Remove hoses from tractor and plug/cap ends. Clean and plug/cap motor hoses and stow away neatly.

3.7 Mounting

Reversal of above.

Make sure the socket has seated squarely on the underframe plugs before re-fitting securing bolts. Check bolts after first hours of operation for security.

KEEP CLEAR OF OVERHEAD POWER LINES!!



Fig 1 - Fitting HM2E & 3E Underframe

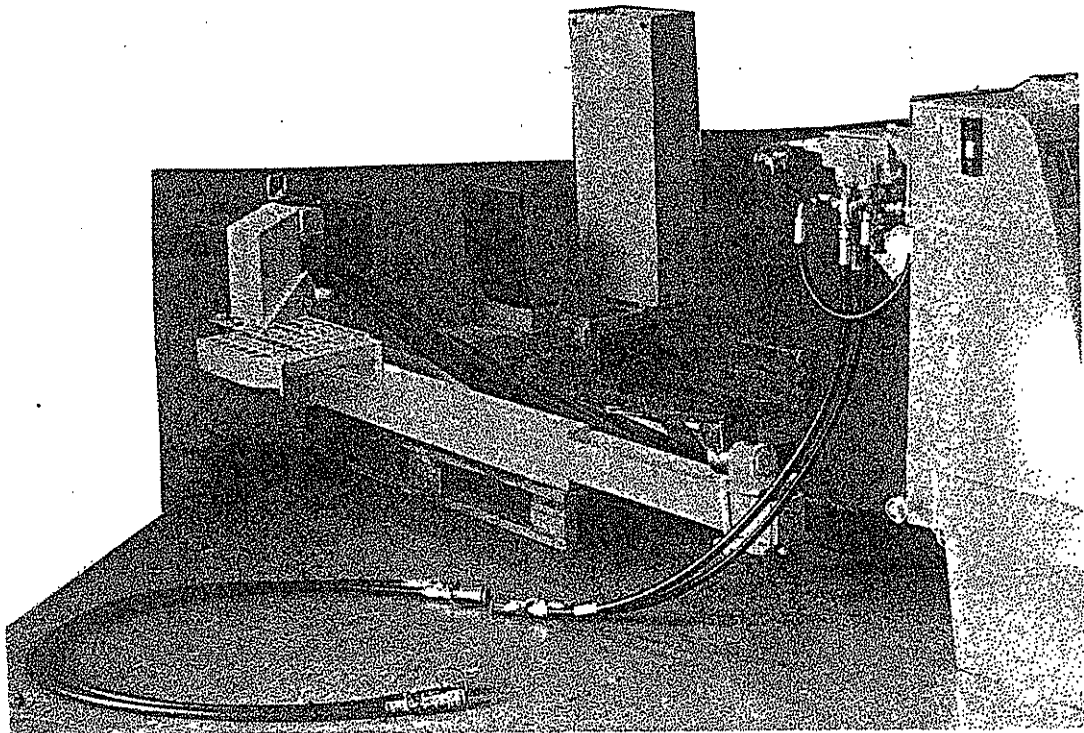
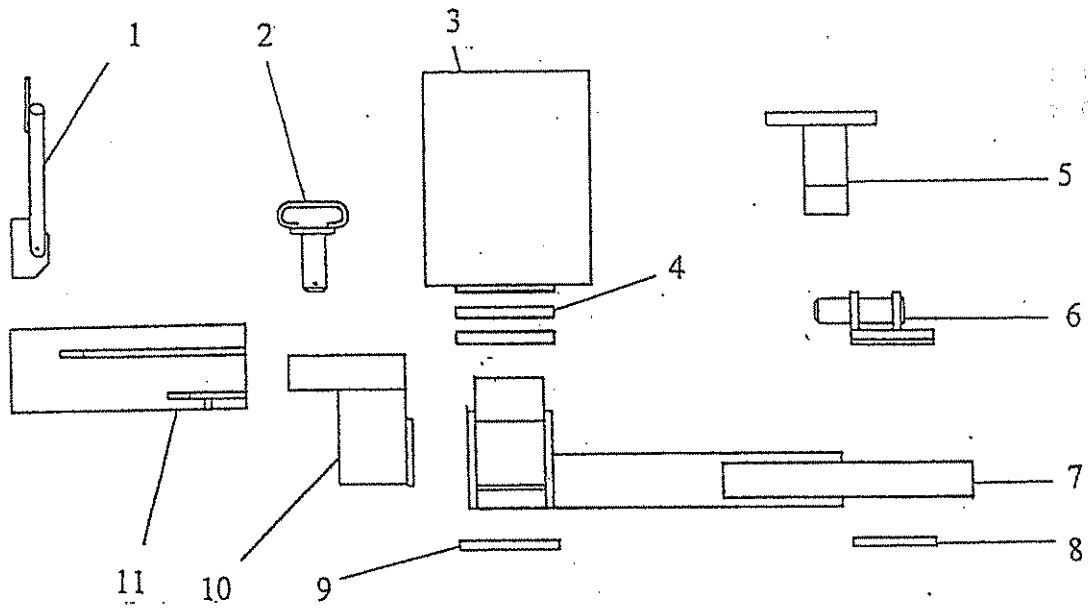
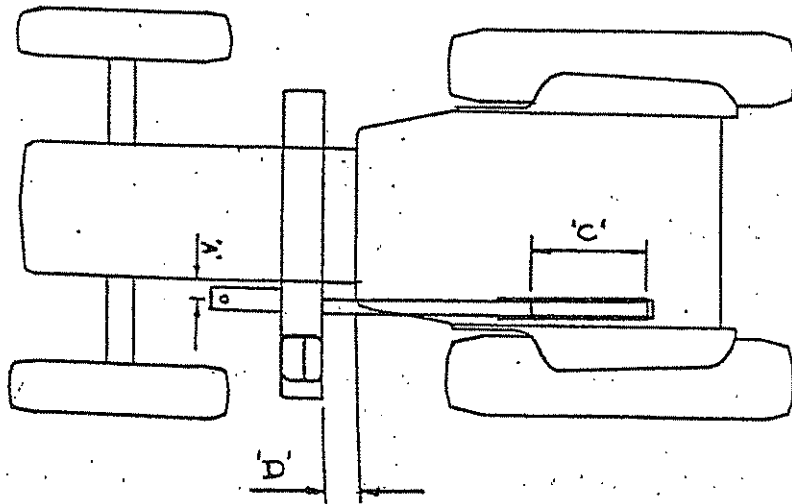
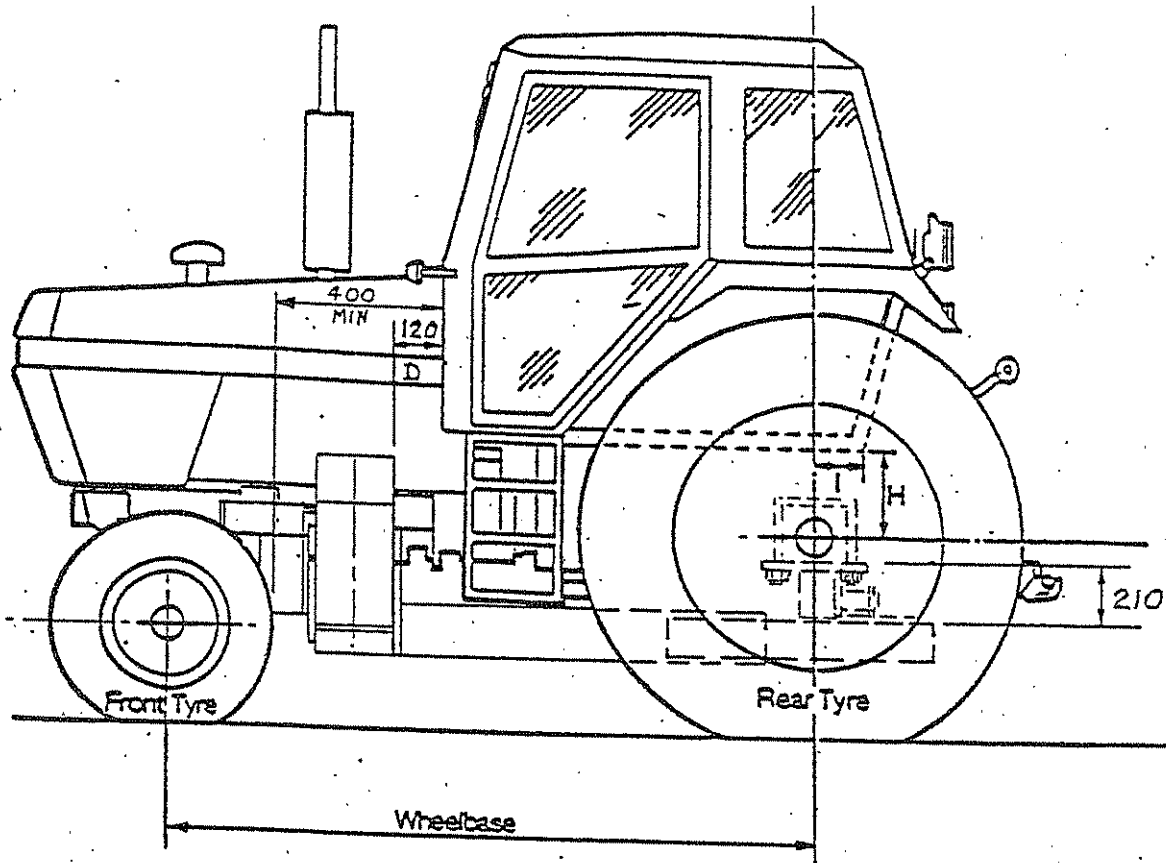


Fig 2 - Fitting HM2E & 3E Underframe



4. FITTING INSTRUCTIONS

4.1 Notes on Fitting

The security and approval of a safety cab depends upon it being attached to the tractor as originally designed by the manufacturer except where specific modifications have been agreed and accepted. When fitting Econ equipment to tractors fitted with safety cabs only those bolts identified in the fitting instructions should be utilised and no other bolts should be touched. If it is not possible to obtain adequate bolt to nut engagement in any circumstances consult the tractor manufacturers before using the equipment.

Extra care should be taken in positioning the pressure, and particularly the return hoses to the hydraulic motor to eliminate any restrictions, specifically with the arms in the folded position. Restriction of the return line will cause the motor seal to leak. All machines are test run to full working pressures and fully checked before leaving the factory. No warranty claim can be considered for leaking motor seals after initial fitting to the tractor.

Mounting bolts **MUST** be checked twice daily until the machine is fully bedded in.

Once the machine has been fitted refer to the relevant section on lubrication and grease all round.

4.2 Stability and Counterweight

As the stability is a major safety factor, considerable care has to be taken.

The HM3E mower would have approximately 500 lbs (225 kilos) of weight added, either as water ballast or the Econ "plug-in" weight assembly; which ever was the better for the particular mower/tractor combination.

Note:

Even if the Econ "Package Deal" states that the weight assembly would be used, sometimes it is better to use tractor wheel weights and/or water ballast, which ever is best would be fitted.

Widening the front wheels does not assist stability.

As a general guide to the correct amount of counter weight, the cutting head should be extended to maximum reach on level ground, and a weight equal to 170lbs (75kg) placed on the cutting head. Provided the opposite side rear wheel is firmly in contact with the ground the machine will be stable to operate on reasonably level conditions.

4.3 Fitting HM2E & HM3E Using Econ Plain Bracket Kit

The kit has three brackets to be attached to the tractor at the following three points.

1. Left side front casting or chassis frame.
2. Right side mid-mounting (usually on the side of the clutch housing or the chassis frame).
3. Left side rear axle.

The brackets supplied in this kit have to be drilled and cut to fit the tractor being used.

The universal underframe is attached to these brackets and can be removed quickly after removing the 4 x M12 bolts and 1 pin.

The distance between the front of the tractor cab and the back of the front tyre should not be less than 400mm to allow the cutting head and arm assembly to be fitted.

4.4 Positioning the Underframe

When reading this section, refer to Figs 1 & 2 as required.

Position the tractor on level ground.

It may be necessary to remove the following parts: left side cab steps and 3 point linkage check chain.

Slide the main frame under the tractor from left hand side between the wheels.

Raise frame close to the underside of tractor leaving 210mm between the bottom of the axle and top of underframe. On four wheel drive tractors ensure it is clear of propshaft etc. Set underframe to 120mm from upright box section to foremost part of cab, (Dimension D Fig 1). Prop the frame, ensure it is true using a spirit level.

Refer to Fig 2 for all item numbers.

Fit front mounting (Item 10) to front of underframe (item 7) use 4 x M16 bolts in the most suitable of the alternative positions, high position - tractors with underslung fuel tank. Set underframe so that centre of 40mm hole in front mounting is 63mm from side of tractor front mounting face, (Dimension A Fig 1).

Ensure the tyre does not catch the underframe when the wheel is articulated. If the wheel interferes with the underframe move the underframe closer to cab until wheel turns freely (minimum dimension D is 70mm).

A minimum of 3 x 16mm bolts are required for attaching each mounting bracket.

4.4.1 Rear Mounting Bracket

The rear mounting bracket (item 5) will need drilling to suit existing mounting points under the axle or alternatively use larger bolts which clamp around the axle.

If the mounting holes are offset to one side of the mounting boss, the bracket will need gusseting to maintain sufficient strength.

Remove excess material from the plate to clear lower link bracket etc. and fit bracket under axle.

The lower part of the rear bracket (item 6) is not drilled to allow it to be offset if required to clear the 3 point linkage. It should be drilled to match the 3 x 16.5mm holes in the clamp plate (item 8), also a piece of plate is supplied for welding to the bottom of the bracket to locate between the side plates of the underframe.

Slide the lower part of rear bracket into hole in upper part from the rear and secure to underframe with clamp plate and 3 x M16 x 150mm bolts.

4.4.2 Front Mounting Bracket - Left Side (Item 11)

This should be drilled to suit the mounting holes on the left side front casting or chassis frame. It is helpful to make a cardboard template to mark out the holes and shape of the plate. Cut off excess material to clear side panels, axle and steering ram.

Bolt on tractor and connect to underframe with 40mm pin (item 2).

4.4.3 Mid Mounting Bracket - Right Side (item 3)

The bracket is to be clamped to the underframe using 4 x M12 bolts and a clamp plate (item 9) underneath. Also packers (item 4) are supplied to adjust the bracket to a suitable height.

The bracket should be drilled and cut to suit mounting holes usually on the side of the bell housing.

On some tractors it may require removal of a spacer on the front cab mounting and inserting the bracket in its place. Spacers may be required between the casting and the bracket.

4.5 Hydraulic Tank and Drive Assembly

Using the tractor 3 point linkage, pick up the whole assembly and connect the free end of both chains to the upper link pin on the tractor, cross the chains as in the illustration. Lower the unit until all the weight is taken by the chains.

Connect hydraulic hoses and PTO drive shaft.

4.6 Control Box Mounting

The rectangular bracket supplied, together with the telescopic floor mounted pedestal should be bolted in a suitable position to allow the control box to be mounted where it is convenient for easy operation.

The control box requires a 12 volt DC 10 Amp continuous supply to the two pin plug and socket supplied. It should be connected positive to the red cable and negative (or earth) to the black cable.

4.7 Side Lights

It may be necessary to relocate the side lights on extension brackets if obscured by the mower arm.

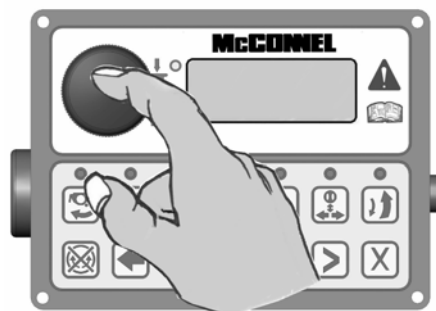
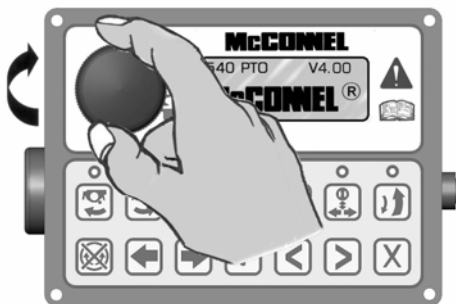
4.8 Setting Stroke On First Arm

Lift arm slowly until approximately 25mm from the cab. Measure ram centres (fully open = 1405mm). From 1405mm subtract actual centres of ram, measured in position on tractor. Select spacer longer than this from 5, 10 or 15mm and fit this in end of ram to stop stroke before arm touches cab. Longest spacer to be used is 15mm.

V4 PROPORTIONAL CONTROLS

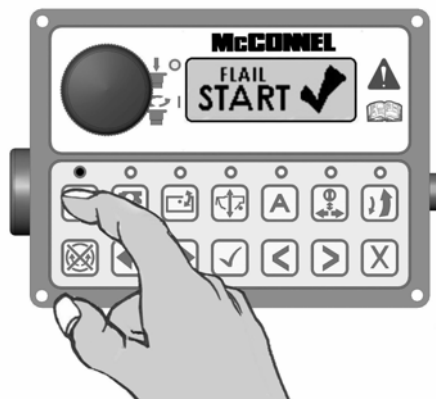
POWER ON / OFF (Emergency Stop)

Rotate Clockwise to Power On – control unit will emit a single beep and screen will display the selected PTO speed, software version and the McConnel name. Press to Power Off.



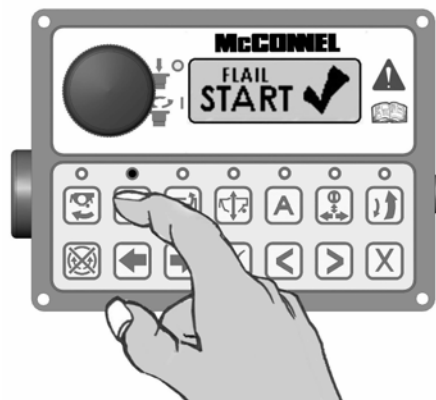
ROTOR START – Uphill Cutting

This button starts the rotor for ‘uphill’ cutting – when the button is pressed the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display ‘FLAIL START ✓’.



ROTOR START – Downhill Cutting

This button starts the rotor for ‘downhill’ cutting – when the button is pressed the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display ‘FLAIL START ✓’.



ROTOR STOP

This button stops the rotor – when the button is pressed the control unit will emit a single beep and the screen will momentarily display ‘FLAIL STOP ✓’ – the LED lights above both rotor start buttons will be illuminated for approximately 10 seconds, during this period the rotor start buttons will be disabled to allow sufficient time for the rotor to power down. When the LED lights go out the rotor direction can be changed or the rotor allowed to stop.

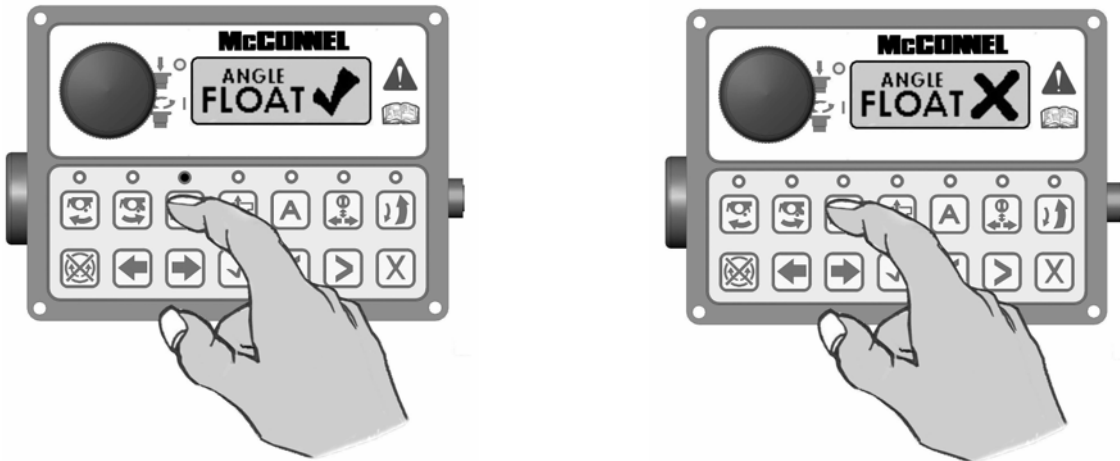
WARNING: The LED lights going out do not indicate that the rotor has stopped rotating, it signifies only that the oil flow to the rotor has ceased sufficient for the direction of rotation to be changed - therefore when stopping a rotor it must be noted that it will continue to freewheel for a considerable length of time after the stop button has been activated, in some case this can be up to 40 seconds.



HEAD ANGLE FLOAT

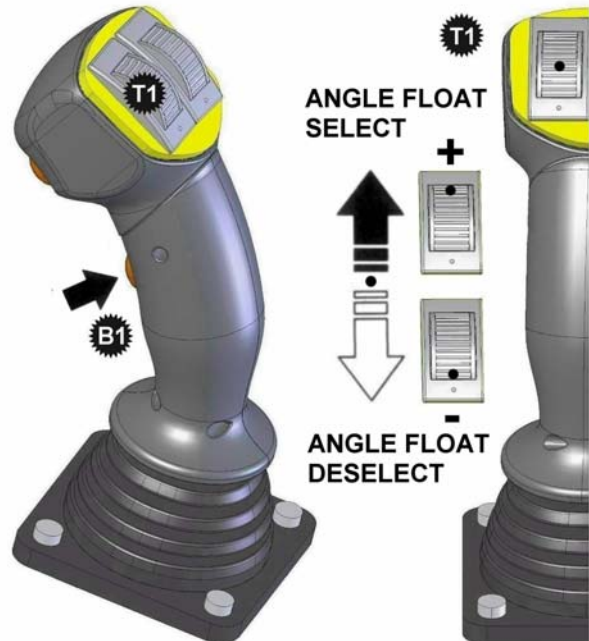
There are 2 methods available for selection and de-selection of this function; activation via the control unit - refer to #1 below, or activation via the joystick controls - refer to #2 below.

1. Pressing the Head Angle Float button – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'ANGLE FLOAT ✓' pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'ANGLE FLOAT X'.



2. Press and hold in the lower frontal button (B1) on the joystick control and roll the left hand thumbwheel (T1) fully forwards – the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'ANGLE FLOAT ✓'.

To deselect press and hold in the lower frontal button (B1) on the joystick control and roll the left hand thumbwheel (T1) fully backwards – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'ANGLE FLOAT X'.

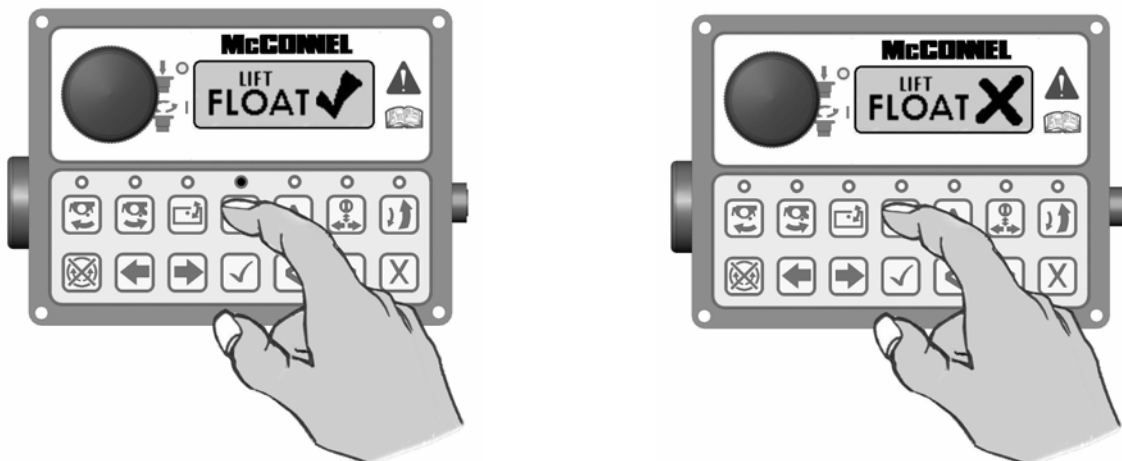


NOTE: When selecting or deselecting the function, the thumbwheel (T1) should be allowed to return to its centre position before releasing the lower frontal button (B1).

EDS FUNCTION (EDS Models) / LIFT FLOAT (Non EDS Models)

There are 2 methods available for selection and de-selection of this function; activation via the control unit - refer to #1 below, or activation via the joystick controls - refer to #2 below.

1. Pressing the EDS / Lift Float button will activate the relevant function – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'LIFT FLOAT ✓'. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'LIFT FLOAT X'.



2. Press and hold in the lower frontal button (B1) on the joystick control and roll the right hand thumbwheel (T2) fully forwards – the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'LIFT FLOAT ✓'. To deselect press and hold in the lower frontal button (B1) on the joystick control and roll the right hand thumbwheel (T2) fully backwards – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'LIFT FLOAT X'.



NOTE: When selecting or deselecting the function, the thumbwheel (T2) should be allowed to return to its centre position before releasing the lower frontal button (B1).

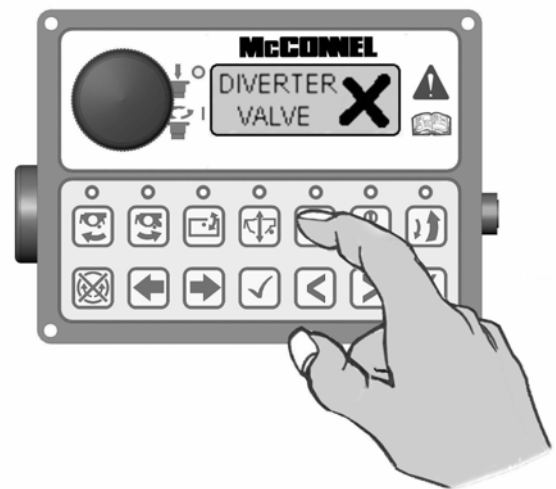
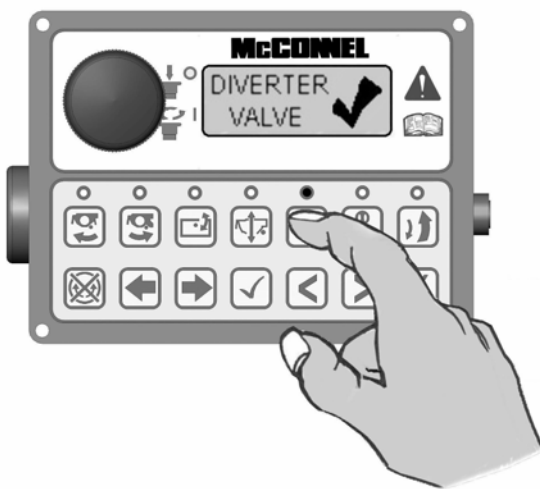
In the case of EDS models once this function is engaged and the rotor is running the EDS settings (SOFT – MED – HARD) will automatically be displayed on the control unit screen and can be scrolled through using button B1 on the joystick or the tick [✓] button on the control unit, if the rotor is not running the EDS settings can manually be viewed on the screen by pressing either [◀] [▶] buttons on the control unit and scrolling to the EDS work screen. When not in the EDS work settings screen, operation of button B1 activates the Slew/Tele swap function.

AUXILIARY FUNCTION CONTROL

This control selects either of the two diverter valves for the operation of additional equipment that may be fitted to the machine such as: Directional Ram, Orbiter Head Kit, Hydraulic Roller etc. There are 2 methods available for selection and de-selection of this function; activation via the control unit - refer to #1 below, or activation via the joystick controls - refer to #2 below.

1. Pressing the button momentarily will select Diverter Valve #1 – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'DIVERTER ON ✓'.
Holding the button in will select Diverter Valve 2.

NOTE: Diverter Valve #2 operates only whilst its selection button is held in – releasing the button will de-activate the valve.



2. Pressing the upper frontal button (B2) on the joystick momentarily will select Diverter Valve #1 – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'DIVERTER ON ✓'.
Holding the button in will select Diverter Valve #2.

NOTE: Diverter Valve #2 only operates whilst its selection button is held in – releasing the button will de-activate the valve.



Button B2 not available on some models.

SLEW / TELE (MIDCUT) SWAP

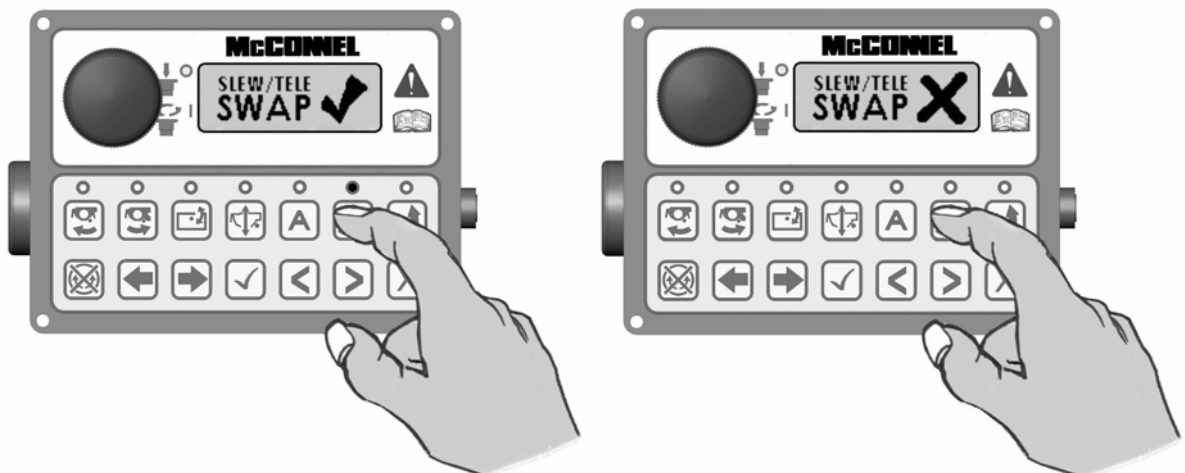
IMPORTANT NOTE RELATING TO THE OPERATION OF PA180 MODELS ONLY:

Where these controls are fitted to PA180 models it must be noted that the default function of the right hand thumbwheel is Forward Extension operation and NOT Slew operation as stated below – therefore for PA180 Models only please read all text references to Slew operation on this page as Forward Extension operation.

This function swaps over the controls used to operate Slew/Tele (Midcut). By default, Slew operation is performed with the right hand thumbwheel (T2) and Tele or Midcut operation with the [◀] [▶] buttons on the control unit - in the swapped mode these will be the opposite way around and the LED on the control unit will be lit to indicate that the swapped mode is selected.

There are 2 methods available for swapping these controls; via the control unit - refer to #1 below, or via the joystick controls - refer to #2 below.

1. Press the swap button once to select swap mode – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'SLEW/TELE SWAP ✓'. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'SLEW/TELE SWAP X'.

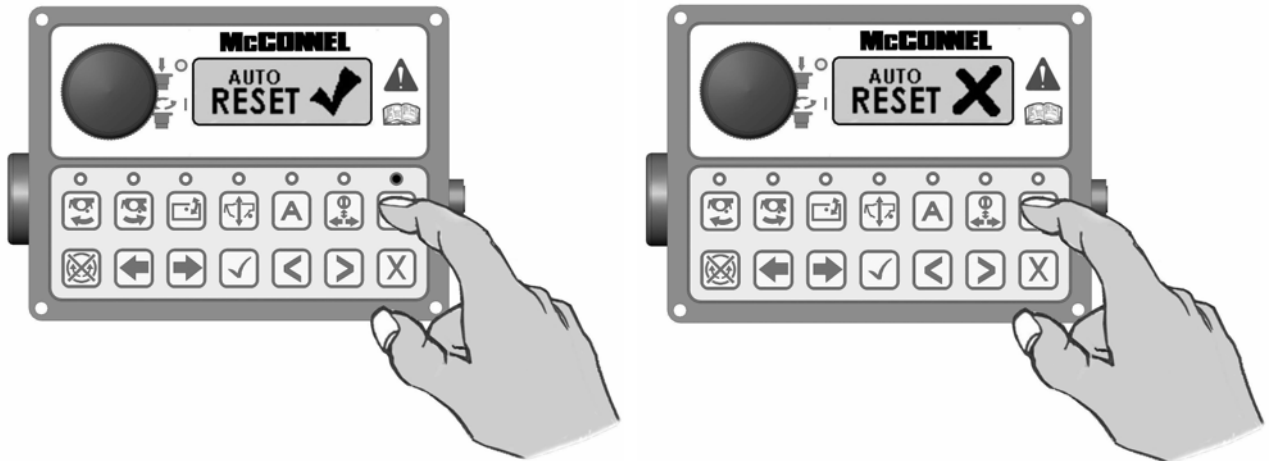


2. Press the joysticks lower frontal button (B1) once to select swap mode – when activated the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'SLEW/TELE SWAP ✓'. De-selection is with subsequent use of the same button - the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'SLEW/TELE SWAP X'.



AUTO RESET

This button is for the selection and de-selection of the Auto Reset function – pressing the button once will activate Auto Reset, the control unit will emit a single beep, the LED light will illuminate and the screen will momentarily display 'AUTO RESET ✓'. Pressing the button again will deselect the function – the control unit will emit a single beep, the LED light will go out and the screen will momentarily display 'AUTO RESET X'.



V4 JOYSTICK CONTROLS - Buttons & Thumbwheels Operation



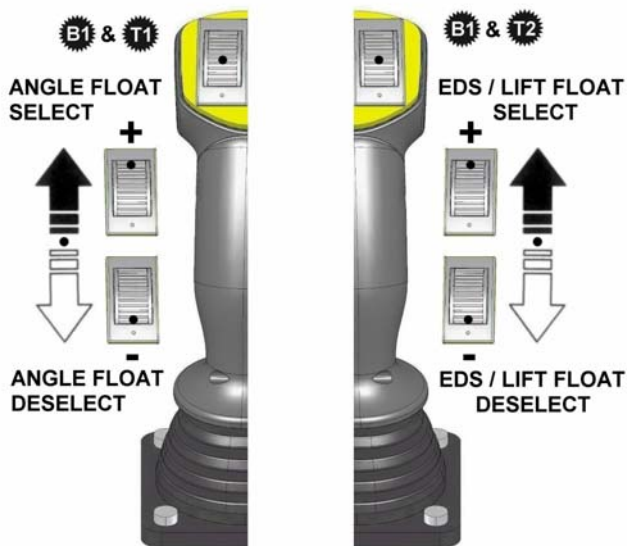
NOTE: By default operation of thumbwheels T1 and T2 in conjunction with button B1 activates Head Angle Float and EDS/Lift Float respectively. These controls can, if required, be swapped over so that the thumbwheels operate the opposing functions – this procedure is performed by accessing the settings menu on the control unit via the screen and menu buttons.

FLOAT SELECTION & DE-SELECTION

Operate thumbwheels to their furthest points (+ or -) to select or deselect float functions.

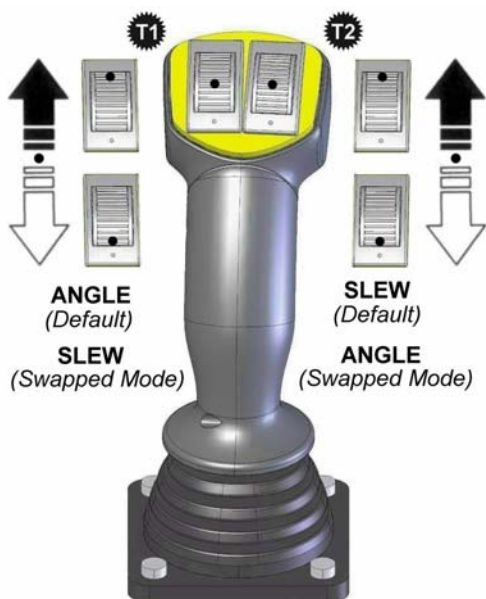
FLOAT ACTIVATION

Hold button B1 in conjunction with Thumbwheel T1 or T2 operation to activate required float mode - thumbwheels must be rotated to their furthest point to select or de-select the feature



ANGLE & SLEW OPERATION

Rotate thumbwheels in required direction.



DIVERTER VALVE SELECTION

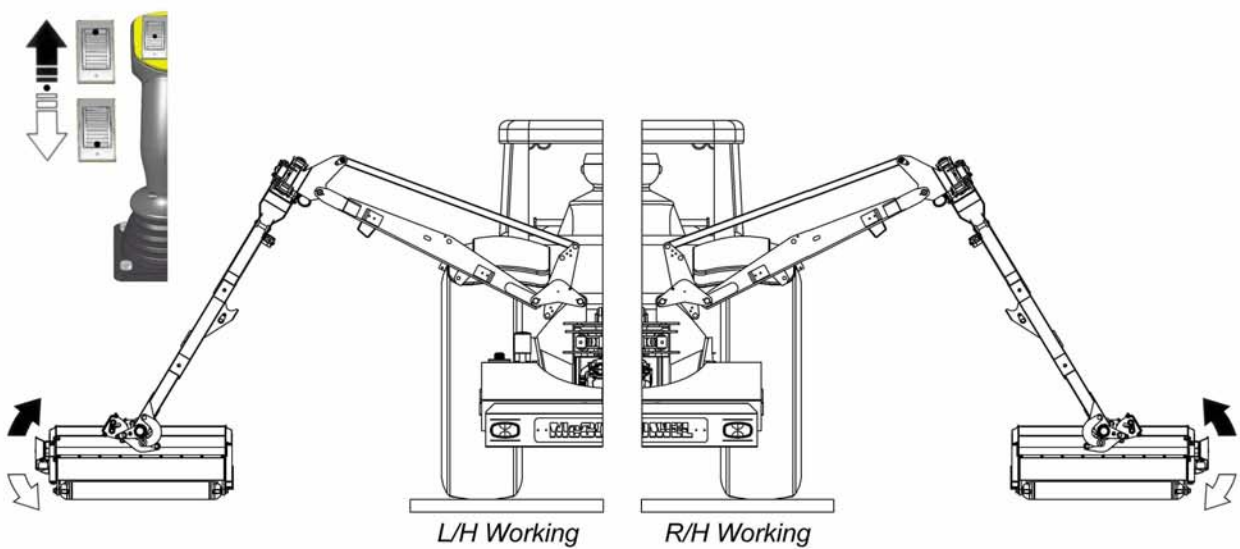
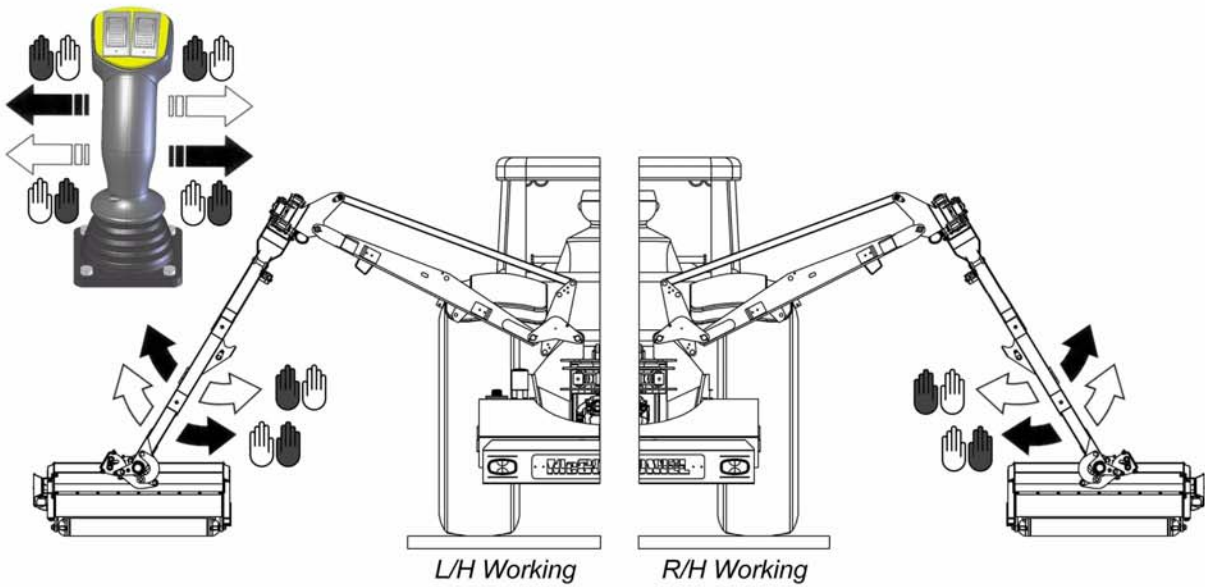
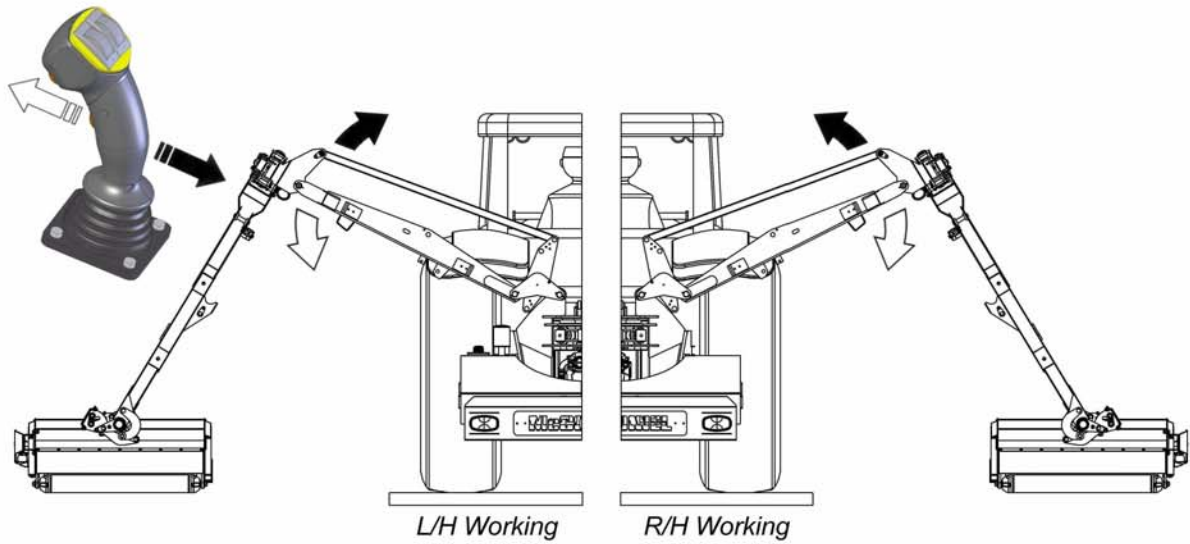
Diverter selection is via button B2

DIVERTER VALVES

Press once to activate DV #1
Press & hold to activate DV #2
(de-activated on release of button)



ARMHEAD OPERATION – JOYSTICK CONTROLS



NOTE: Illustration shows the left hand thumbwheel as the default angle control, this can be swapped within the settings to the right hand thumbwheel if desired.

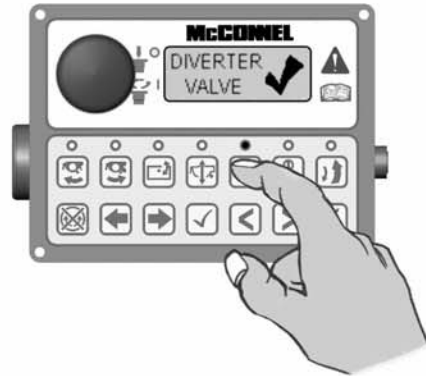
MIDCUT OPERATION – JOYSTICK CONTROLS (Diverted Mode)

DIVERTER VALVE
Press to activate Diverter #1

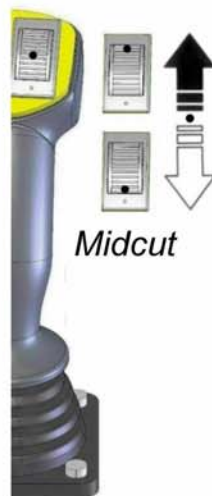
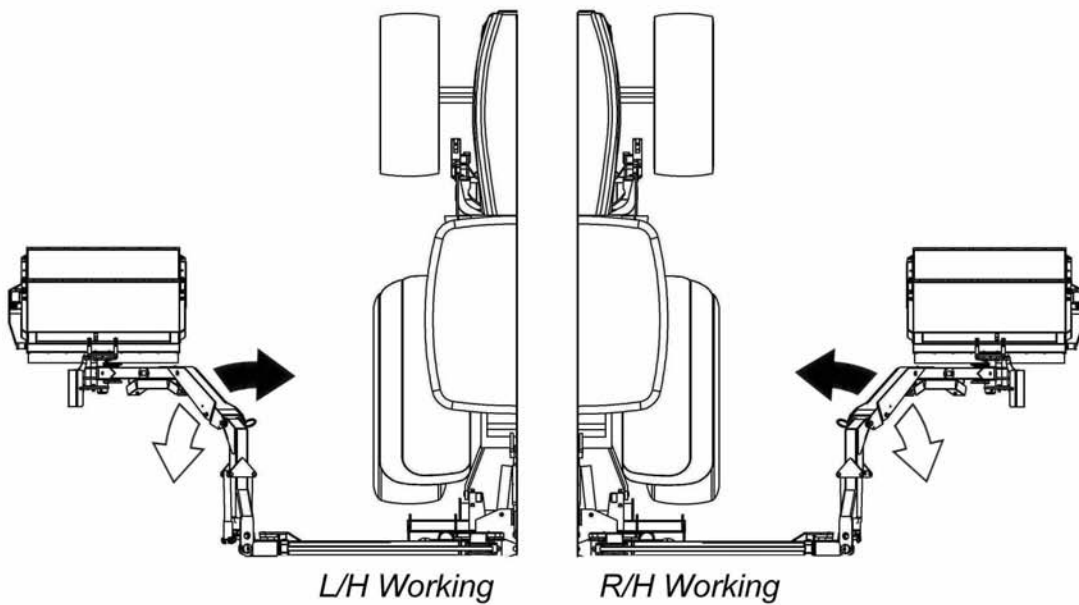


or

Press to activate Diverter #1

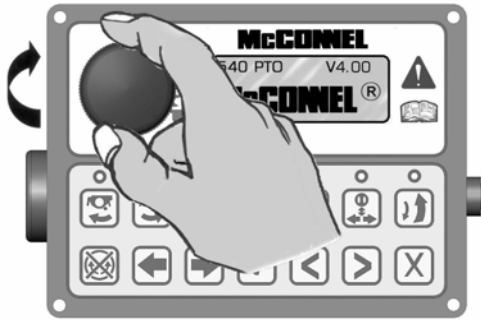


Activate Diverter Valve #1 - Midcut Arm is then operated using the right hand thumbwheel.

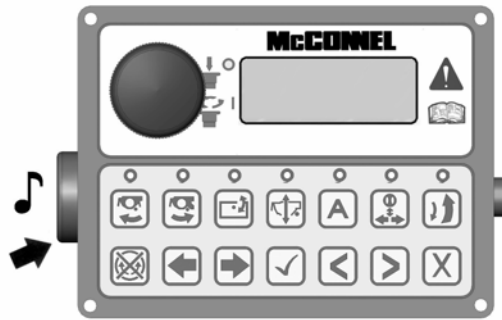


V4 CONTROL UNIT – Screen Access & Menu Buttons

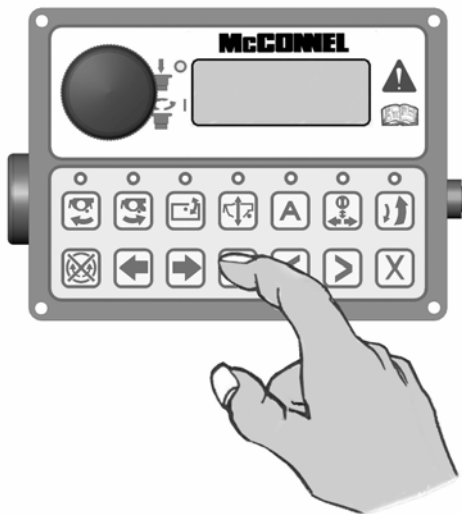
Power on/off switch (E/Stop)



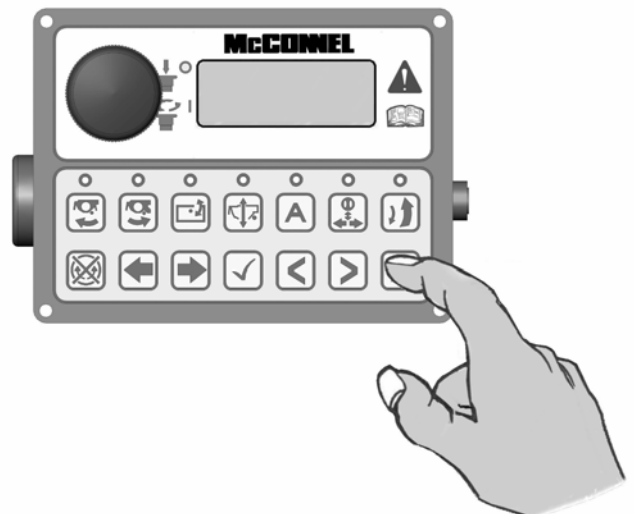
Speaker (audible confirmation)



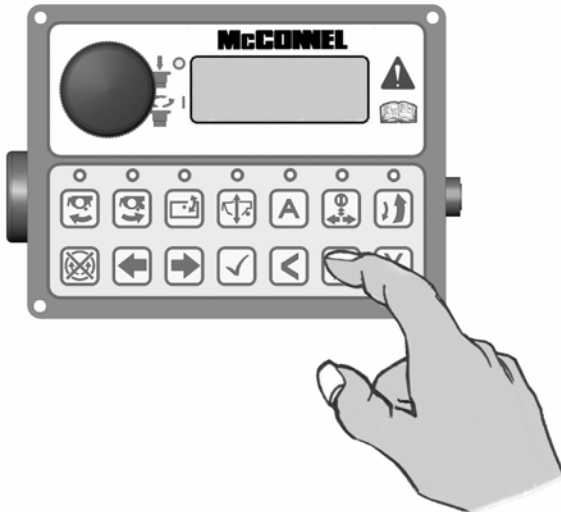
Command Button [✓]



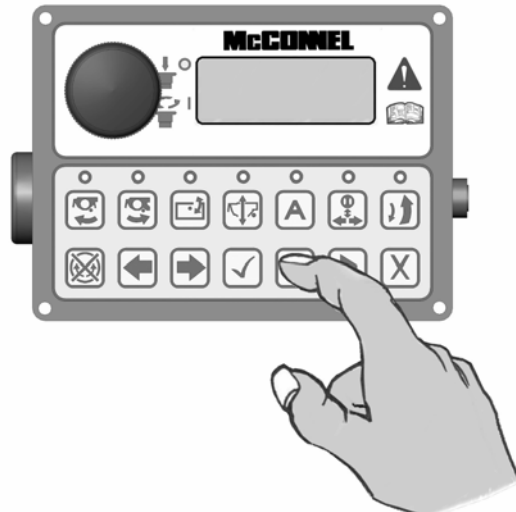
Command Button [X]



Navigate Forward Button [>]



Navigate Back Button [<]

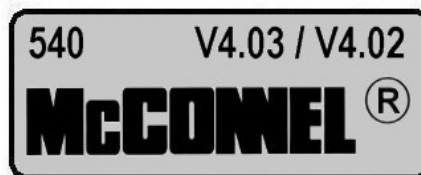


V4 CONTROL UNIT – LED Screen Display & Functions

IMPORTANT: Under no circumstances should a V4 Control Unit be connected to a V3 ACB (Auxiliary Control Box). Dedicated V3.5 & V4 Upgrade Kits are available from McConnel Limited – contact your local dealer or McConnel direct for available options and specific advice on this subject.

Rotate the ON/OFF switch on the control unit clockwise to power up controls - unit will emit a single beep and the LED screen will light up. *Note: 12 Volts at the battery are required for correct function.*

1. Screen will initially display the 'McConnel' name along with the selected PTO speed and the software versions installed on the Armrest and the Control Box respectively.



2. Pressing the scroll forward [▶] button once will display the rotor running times screen. 'TOT' displays the overall total running time of the rotor which is a cumulative total and cannot be reset. 'JOB' is a 'trip' total for the current rotor running time and can be reset to zero by pressing and holding the [X] button for 3 seconds.



3. Pressing either of the 'Rotor On' buttons will activate the 'egg timer' icon and display the rotor on image.



4. Pressing the EDS Lift float button will turn on the EDS (EDS Lift Float machines only). Then SOFT, MED or HARD will be added to the running screen.



5. Pressing the tick [✓] button when EDS is turned on will scroll through the EDS work settings of SOFT, MED or HARD. This may also be operated via button B1 on the joystick.



6. Pressing scroll forward [▶] button will now display the actual Tractor PTO running speed.



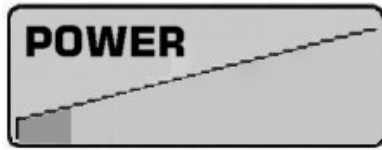
7. Scrolling forward [▶] again displays the Power Monitor screen.



Scrolling backwards [◀] will display the screens in the opposite order.

POWER MONITOR

When displayed the power screen will indicate to the operator the level of power being demanded by the cutting head – an ascending graphic indicates the power demand status from minimum on the left of the screen to maximum on the right.



Power Status – Low Demand



Power Status – High Demand

When the power demand approaches the maximum limit an audible warning will alert the operator to indicate that the rotor is under excess load and at risk of ‘stalling’ – when this audible warning sounds the operator should reduce the forward tractor speed to protect the machine and regain efficient cutting power – the audible warning will cease when the power demand returns to an acceptable level.

In certain cases, cutting materials of extreme density may cause an increase in the power usage to the ‘warning level’ – in these types of conditions raising the cutting head into a less dense area of the material will regain an acceptable power demand. It is advisable that work in problematic high density materials be performed in several passes, lowering the cutting head slightly on each pass until the required cut height is achieved.

ADDITIONAL CONTROL & SCREEN SETTINGS

Additional settings available to the operator can be found within the settings menu of the control unit and accessible via the screen and menu buttons on the control panel.

Access is gained by simultaneously pressing the scroll [◀] [▶] buttons on the control panel until the unit emits a ‘beep’ and the setup screen appears on the LCD - the features can then be ‘scrolled’ to (forwards or backwards) by subsequent operation of either of the scroll [◀] [▶] buttons. When the required screen is reached the tick [✓] button should be pressed to enter the settings menu for that feature.

THUMB (Thumbwheel Switching) – this allows the operator to ‘swap over’ the left and right thumbwheel functions so that they control the opposing features. In most cases this setting will be dictated by the operators’ personal preference and once chosen the operator will keep it in the selected mode.

Options are ‘Normal’ or ‘Swap’ – selection is by ‘highlighting’ the required option using either of the scroll [◀] [▶] buttons – the feature is then activated using the tick [✓] button. Pressing the [X] button exits the screen settings and returns to the normal work screen.

LED (Screen Contrast) - this setting allows the operator to adjust the contrast level of the LED display – the feature affords the option to increase or decrease the contrast level to suit differing lighting conditions; this is particularly useful on dull or sunny days where reduced or increased natural light can affect screen clarity.

Options are ‘Increase Contrast’ or ‘Decrease Contrast’ – selection is by ‘highlighting’ the required option using either of the scroll [◀] [▶] buttons – once selected that particular option can then be adjusted in incremental steps by pressing the tick [✓] button the required number of times to achieve the desired contrast. Pressing the [X] button exits the screen settings and returns to the normal work screen.

CAUTION: Avoid adjusting the contrast level to a state where the screen cannot be viewed as exiting the settings menu in this condition may render the LCD unusable as the ‘on screen’ prompts may no longer be visible to the user.

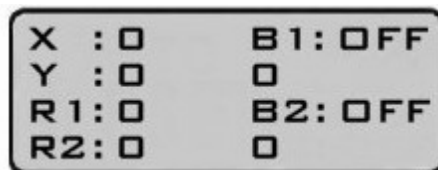
NOTE: Some screen menus are inaccessible to the operator – these are for factory or dealer use only and are password protected to avoid inadvertent changes to specific control settings.

TEST & FAULT FINDING SCREENS

The following screens are available for testing and fault finding purposes, these are:

JOYSTICK TEST SCREEN

This screen reports the status of the CAN (*Controller Area Network*) signal from the joystick during its various functions.



X and Y Display

These report the joystick signal as it travels through its range of movements in its 2 axis – the ‘X’ axis being the ‘Lift’ up and down function and the ‘Y’ axis the ‘Reach’ in and out function.

With the joystick in the central (*neutral*) position both ‘X’ and ‘Y’ on the screen should read 0 (*zero*). When the joystick is moved through a specific axis the relevant readout will increase or decrease depending on the direction and distance of movement up to a maximum of +1000 in the fully forward or fully right position and -1000 in the fully back or fully left position. If the display reports a reading above the + or – 1000 figure at any point of full travel the joystick has developed a fault and should be repaired or replaced.

R1 and R2 Display

These report the signals from the 2 thumbwheels on the top of the joystick and are calibrated to read +1000 in the fully back position and -1000 in the fully forward position. If either of the ‘R’ readings are above the + or – 1000 figure at the point of full travel the thumbwheel has developed a fault and should be repaired or replaced.

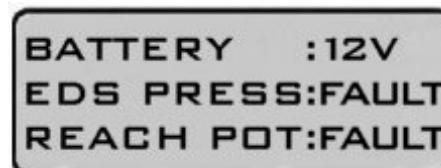
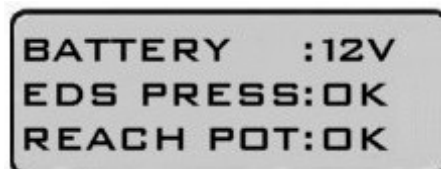
B1 and B2 Display

These report the status of the 2 joystick buttons and will display ‘ON’ when the button is activated or ‘OFF’ when deactivated. The readings below B1 and B2 on the screen record usage of the buttons.

EDS STATUS SCREEN

Although this screen is present on all v4 controls, with the exception of the voltage reading, the information it reports is only actually relevant to machines fitted with EDS.

In addition to the aforementioned voltage reading the screen will report Lift Ram Pressure and Reach Position status – in each case these will display ‘OK’ when the system is working correctly. If ‘FAULT’ is displayed next to one or other feature it means a problem has been detected with that component and it should be investigated further to locate and correct the problem.



NOTE: As the pressure and position features are not present on Non EDS machines by default the screen will display ‘FAULT’ next to the features on these models – this is normal and should be ignored. The voltage reading will be relevant on all models.

REACH FUNCTION SCREEN

This screen displays the status of the joystick reach function and indicates to the operator if the controls are set for correct operation of the machine to the left hand side of the tractor or to the right hand side of the tractor. The hand symbol with a ✓ displayed on it indicates the operating side that is currently active.



L/H Machine Operation



R/H Machine Operation

5. CONTROLS

5.1 Arm Movements

FIRST READ THIS INSTRUCTION STANDING ALONGSIDE THE MACHINE and familiarise yourself with the instruction sheet on the next page, also the marking of the controls on the machine.

When and only when you are sure which lever moves which arm, should you start the engine. Practice operating the machine with the tractor stationary.

Only after having operated the machine for some considerable time so that you know which lever to pull (or push) without having to look at the control marker, can you start to "move off" and operate the arms "on the move" as follows.

Safety First !

1. Ensure no person is standing near the cutting head.
2. Ensure cutting head is clear of all obstructions.
3. The tractor hydraulics valve should be positioned such that the lift linkage does not raise or lower.
4. The cutting head rotor commences to rotate when the **Start - Rotor** switch is engaged with the PTO running. The valve has a soft start facility.
5. When moving forward, always watch the verge or hedge approximately 3 - 4 feet in advance of the cutting head.
6. After approximately 10 minutes use from new, should any sponginess remain in the hydraulic rams, bleed the air from them by partially unscrewing (NOT removing) the hydraulic connection to the ram, operate the appropriate valve with the tractor engine at tick-over and reconnect tightly once all air is removed. Check Hedger hydraulic fluid level and top up if necessary.
7. Ensure that the locking Allen screws for the main rotor bearing are kept secure. Check twice daily. If screws become insecure, damage to motor will occur.

5.2 Arm Movements (Hydrafloat)

The degree of 'float' in the arm (and hence the reduction of drag of the head on the ground) is governed by the arm extension or 'reach' and hydraulic cushioning selected by the operator.

Lower the machine to the ground (having started the rotor) at the desired reach. Select 'float' position in the cutting head and operate the first arm control to raise the machine. This will have the effect of pressurising the 1st ram system.

Keep adjusting the 'hydrafloat' as the machine follows the ground (by short quick pumping actions) on the first arm control level, either forwards (lower) to reduce the pressure or backwards (raise) to increase the pressure.

The best degree of 'float' can be felt by the side pull of the machine on the steering. This 'side pull' must be kept to a minimum so that the correct steering and cutting width can be maintained.

Do Not waste width.

The hydrafloat system is fitted with an on/off tap so that the mower can be set to get immediate response to the controls (removing the float). This should be done when hedge trimming or working on very difficult rough ground or over rocks and stones, for short periods only. For continuous operations adjust the gas pressure in the system (Econ service engineer or other qualified engineer) to harden the system, but retain a small degree of 'float' to remove the 'shocks' from the machine.

5.3 Arm Lowering - Speed Adjustment

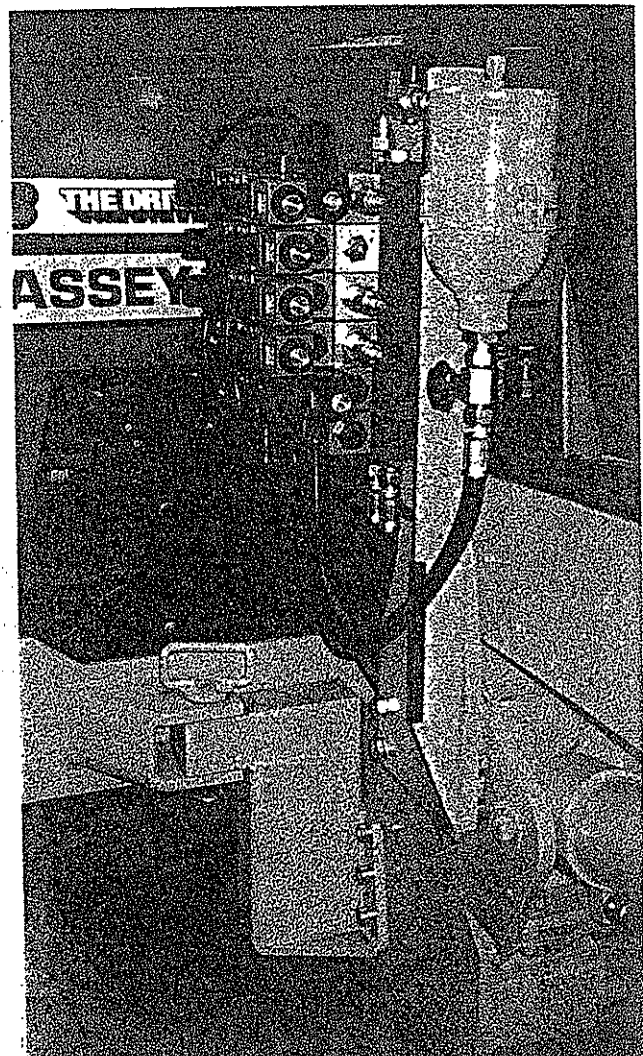
The gas accumulator is fitted adjacent to the Hedgemaster control valve block to enable float positions of the arms. The union on top of the accumulator is used to check and refill the unit with Nitrogen gas and should be maintained within 52-55 bar (750-800 lb in²). However this figure may be increased to a maximum 138 bar (2000 lb in²) if required.

There is an on/off tap fitted to the base of the accumulator to isolate the hydrafloat system.

Fitted at the opposite side of the valve block to the accumulator, are two control valves. These are used to control the rate in which the 1st and second arms will fall, (not the lifting speed). Normally set at position No 1, the lower valve controls the 1st arm, the upper valve controls the 2nd arm.



**Pedestal Mounted
Control Box**



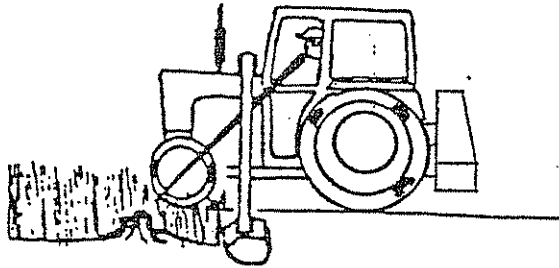
Valve Block & Accumulator

6. OPERATING PRINCIPLES

The mid mounted position of the mower on your tractor gives the operator the best steering response and the most comfortable view of the cutting operation.

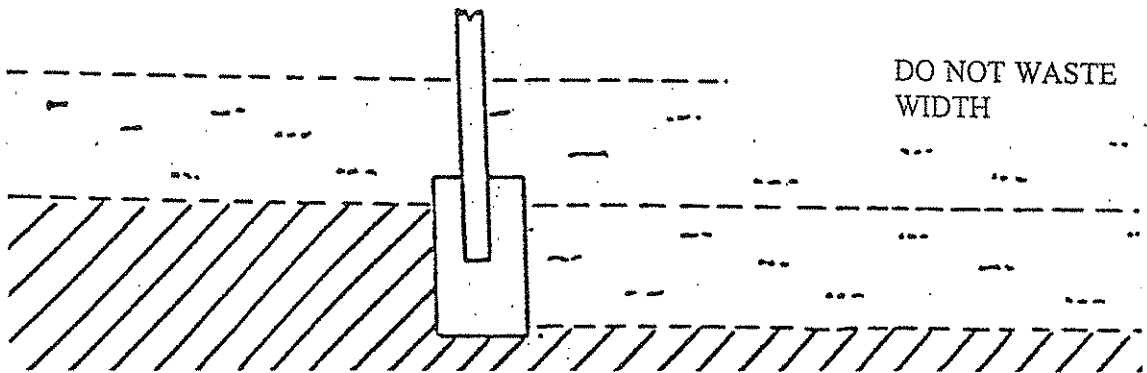
Therefore:

Watch well in front of the cutting head.



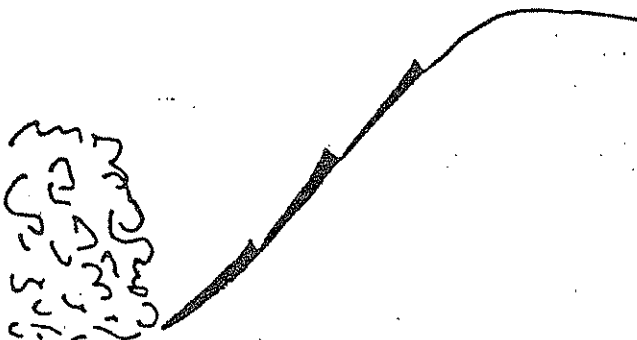
Steer around or lift over obstacles.
Remember you and your machine need reaction time.

Steer to a near full cutting head width to achieve maximum acreage covered.

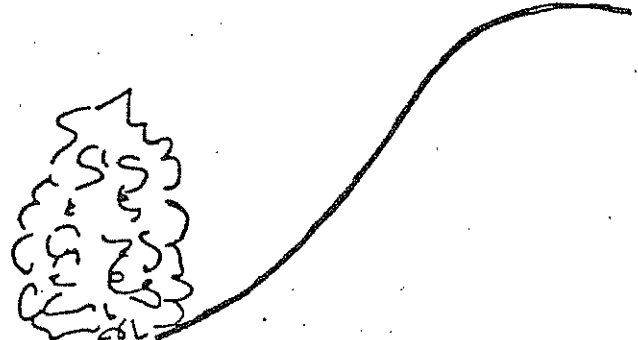


Set the controls to achieve level cutting, particularly on bank work.

NOT THIS



BUT THIS



Travel at the right speed to give a clean cut, no "hairy" pieces stuck up but at a high enough speed to match the high performance capability of the machine.

7. SERVICE INSTRUCTION - LUBRICATION

Item	Description	Lubrication Period	Recommended Lubrication
1.	Roller bearings	4-5 shots daily	BP Energrease EP2G.
2.	Cutting head, ram & arm pivots, breakaway swivel pin, kingpost socket.	Fill weekly until grease exudes from joints	BP Energrease EP2G
3.	Rotor shaft bearings	2-3 shots daily Do not overfill	BP Energrease EP2G
4.	Drive couplings	5-6 shots every week.	BP Energrease EP2G
5.	Ram pivots not fitted with grease nipples.	A few drops of oil daily	Tractor gearbox oil 20
A.	Hydraulic tank	Capacity 227 litres (50 gallons) top up daily to sight gauge on tank. Do not mix grades Use clean oil only and fill through cap filter. Change oil complete every 1000 hours.	BP Energol HLP46 or exact equivalent.
B.	Gearbox section of	Capacity 1½ pints approx. Check daily for oil leaks. If none check oil level every 500 hours - change every 1500 hours.	BP Energrease EP 90
C.	Pump drive shaft	Yoke - grease nipples every 500 hours fill until grease exudes from joints. Sliding shaft - keep well smeared with grease at all times.	BP Energrease EP2G

Check all oil levels and maintain using the correct grade of clean water free lubricant.

7.1 Filters

Change the hydraulic filters after the first 100 hours and then every 750 hours running or when the indicator fitted to the filter housing is in the RED position. There are two filters on the rotor circuit and one on the arm circuit.

8. SERVICING GENERAL

8.1 Servicing the Rotor and Rotor Bearings

In accordance with the service parts drawing cutting head assembly. To dismantle a rotor, rotor bearing and motor assembly, first remove the motor guard and disconnect the hose connections to the motor. It is important to either plug these hoses or connect together using an adaptor - if left open on the ground they will siphon empty the hydraulic tank. KEEP CLEAN.

For easy access now turn the cutting head so that the end opposite the motor stands on the ground, the rotor shaft now being in the vertical position - the end plate should be resting on blocks to give a ground clearance of 4" (100mm) - this allows the bearing bolts to be removed.

Remove the bolts holding the motor and bearing to the end plate - withdraw the motor vertically from the rotor shaft, being careful not to loose the 6 drive rollers which may be sticking to the motor drive adaptor. Turn the rotor shaft until it is possible to unfasten the grubscrews in the bearing collar. (Note: these circular flanges only fitted on certain machines). In 1978 new bearings with additional covers were fitted, there are two holes in the circular flanges at the end of the rotor shaft which allow access for the allen key. Remove bolts from the other bearing through the hole where the motor has been removed, tap the bearing down onto the shaft and withdraw the rotor shaft complete with its bearings from the mainframe.

Remove the circlip from the drive end. The bearing can now carefully be knocked off the rotor shaft using a wood or leather mallet. Check the bearings for excessive wear on the ball race seat, on the spherical ball seat and also check if the seals are intact.

When assembling the rotor, reverse the previous operations to the point of refitting the motor. At this stage the bottom (nearest ground) bearing bolts should be in place but not tightened and the top bearing in line with the holes in the end plate. Locate the six drive rollers in the motor drive adaptor holding them in place with either a thick grease or a rubber band. Line the six rollers up with the mating holes in the end of the rotor shaft and fit carefully together, allowing the motor spigot to locate through the hole in the end plate and into the mating recess in the bearing housing.

Now fit the bolts and "feel" the motor shaft and bearing into a free concentric position before tightening the bolts by moving the rotor end bearing on its loose bolts. The rotor shaft should rotate freely, without tight spots after these bolts are tightly secured. Fasten the bottom bearing bolts, grubscrews in the bearings, hoses and motor guard. In fitting the bearings, do position the grease nipple in an accessible position.

The rotor, whilst dismantled, should be checked for straightness - maximum bow at centre 1/16th of an inch (0.58mm) flail lugs checked for weld fatigue, loss of balance weights from end 10" diameter plates. If there is any undue vibration when the rotor is running, then this is almost certainly caused by unbalance. If you have any doubt, return the rotor minus flails for factory re-balance. Always check that a complete set of flails is fitted, replace broken ones and also ensure that they are free to swing in their attachment.

9. SYMPTOM FAULTS

Hydraulic Circuits - Fault Location & Remedy Test Kit

The test kit comprises the following items:

1. Relief valve
2. High pressure gauge
3. Low pressure gauge
4. Blanking plug

Always disengage PTO drive to pump and stop tractor engine when carrying out physical inspection of cutting head rotor.

Always place cutting head firmly upon the ground, away from loose debris when carrying out performance checks upon the hydraulic circuits.

Symptom

Possible Fault

- | | |
|---|---|
| 1. Rotor does not turn. | <ol style="list-style-type: none">a) Key failure in motor drive coupling indicated if when turning the rotor by hand, no back pressure resistance is felt in the motor.b) Obstruction jamming rotor eg. length of wood or metal, wire wrapped round bearing etc. - remove.c) Trapped or kinked hoses - inspect and straighten or replace as necessary.d) Empty oil tank.e) Faulty pump - see check-out one.f) Faulty motor - see check-out threeg) Faulty relief valve - see check-out one.h) Faulty solenoid valve or power connection. |
| 2. Rotor running too slow. | <ol style="list-style-type: none">a) Faulty relief valve - see check-out one.b) Faulty pump - see check-out one.c) Faulty motor - see check-out three.d) Filter blockage - see check-out two.e) Blocked or kinked hoses - inspect and straighten or replace as necessary.f) Aerated oil - frothiness caused by air being sucked into the oil circuit - check & tighten all connections. Either replace oil or allow oil to settle and separate.g) Faulty solenoid valve. |
| 3. Rotor runs at specified speed but with apparent loss of power. | <ol style="list-style-type: none">a) Faulty relief valve - see check-out one.b) Faulty pump - see check-out one.c) faulty motor - see check-out three. |

- d) Blocked return line filter - see check out two.
 - e) Blocked or kinked hoses - inspect and straighten or replace as necessary.
4. Rotor keeps stalling during cutting operation.
- a)
 - b)
 - c) All as section 3.
 - d)
 - e)
5. Oil leaking from
- a) Motor seal burst caused by excessive back pressure - see check-out two.
 - b) Pipe restricted - inspect and remove restriction or replace pipe.
6. Noisy pump
- a) Loose hose connections allowing air to be drawn into pump - tighten connections.
 - b) Aerated or foaming oil - tighten connections, change oil or allow to settle and oil/air to separate.
 - c) Faulty pump - see check-out one.
 - d) Weld cracked on standpipe - re-weld or replace.
7. Noisy motor
- a) Aerated or foamy oil - tighten all connections, change oil or allow to settle and oil/air mixture to separate.
 - b) Faulty motor - see check-out three.

9.1 System Checks

Check 1

Faulty relief valve or faulty pump.

Fit high pressure gauge to relief valve. Disconnect hose connecting valve to motor at valve connection. Operate valve manually and check pressure, setting should be 2600 lb/in² (179 bar).

Check 2

Faulty filter or blocked return on motor circuit.

Connect low pressure gauge. Start engine, run PTO up to speed and should the gauge reading exceed 30 lb/in² (2.0 bar) then the filter elements should be changed.

If this does not reduce the back pressure the filter should be dismantled and the internal bypass valve cleaned. Check hoses for blockage or kinking. The average gauge reading during operation should be 20 lb/in² (1.4 bar).

Check 3

Faulty Motor.

If the pump is OK and relief valve is OK and there are no leaks in the pressure lines but rotor is running under speed, the motor may be faulty. It will either need a new seal kit, if only a few years old or a new motor. Try replacing the seals first as they are the cheapest to replace.

If no significant improvement is obtained, replace motor.

NOTE:

Absolute cleanliness is vital when doing repairs to hydraulic valves, motors etc. They must be thoroughly cleaned before any attempt to remove them from the machine and be maintained scrupulously clean during assembly. It is best to leave this work o a reputable dealer.

9.2 Hydraulic System Overheating

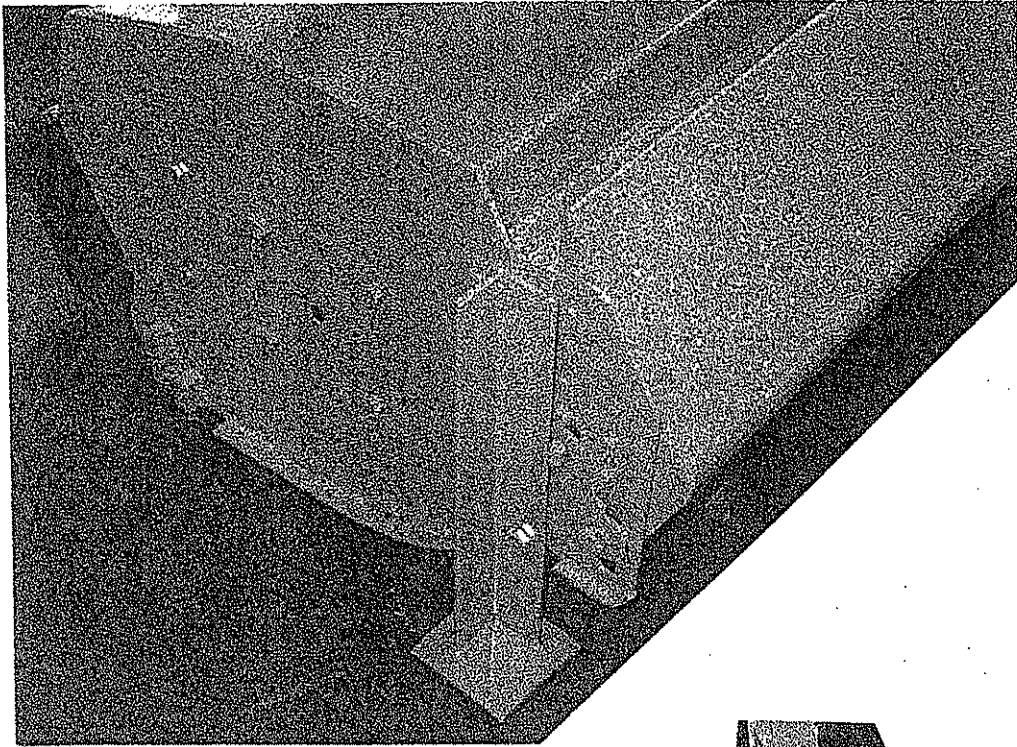
The excessive build up of heat (over 50°C) in any hydraulic system is invariably caused by the blowing off of the relief valve.

The blowing off may well be caused by either wrappage around the rotor bearings, the partial collapse of a hydraulic hose, the partial trapping of a hose, dirt in the relief valve itself so that it does not close or badly worn hydraulic components caused by dirt in the system.

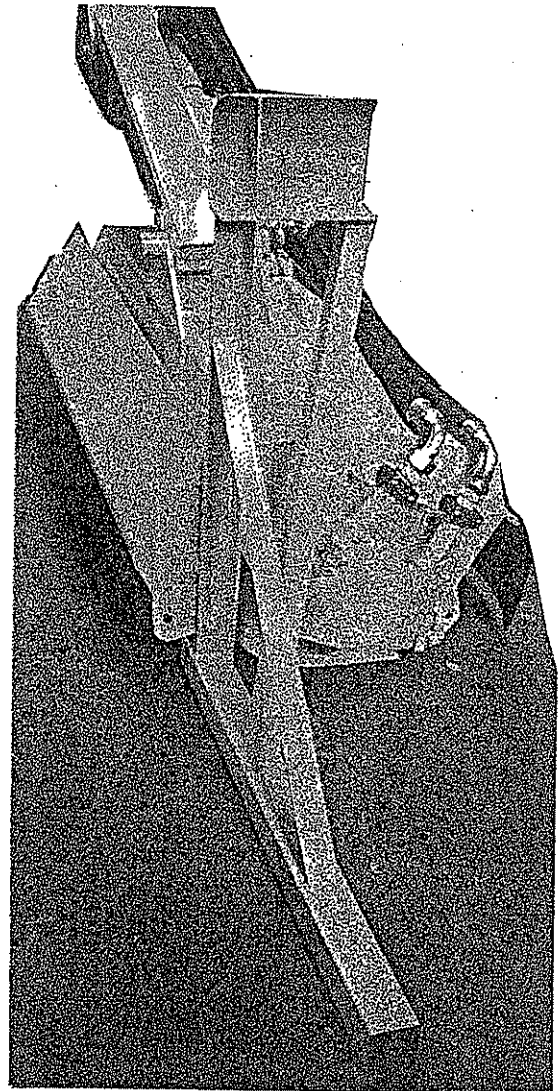
If you require any further assistance or information on the operation of this machine, please contact:

**ECON FLAILS
Temeside Works
Ludlow
Shropshire SY8 1JL
England**

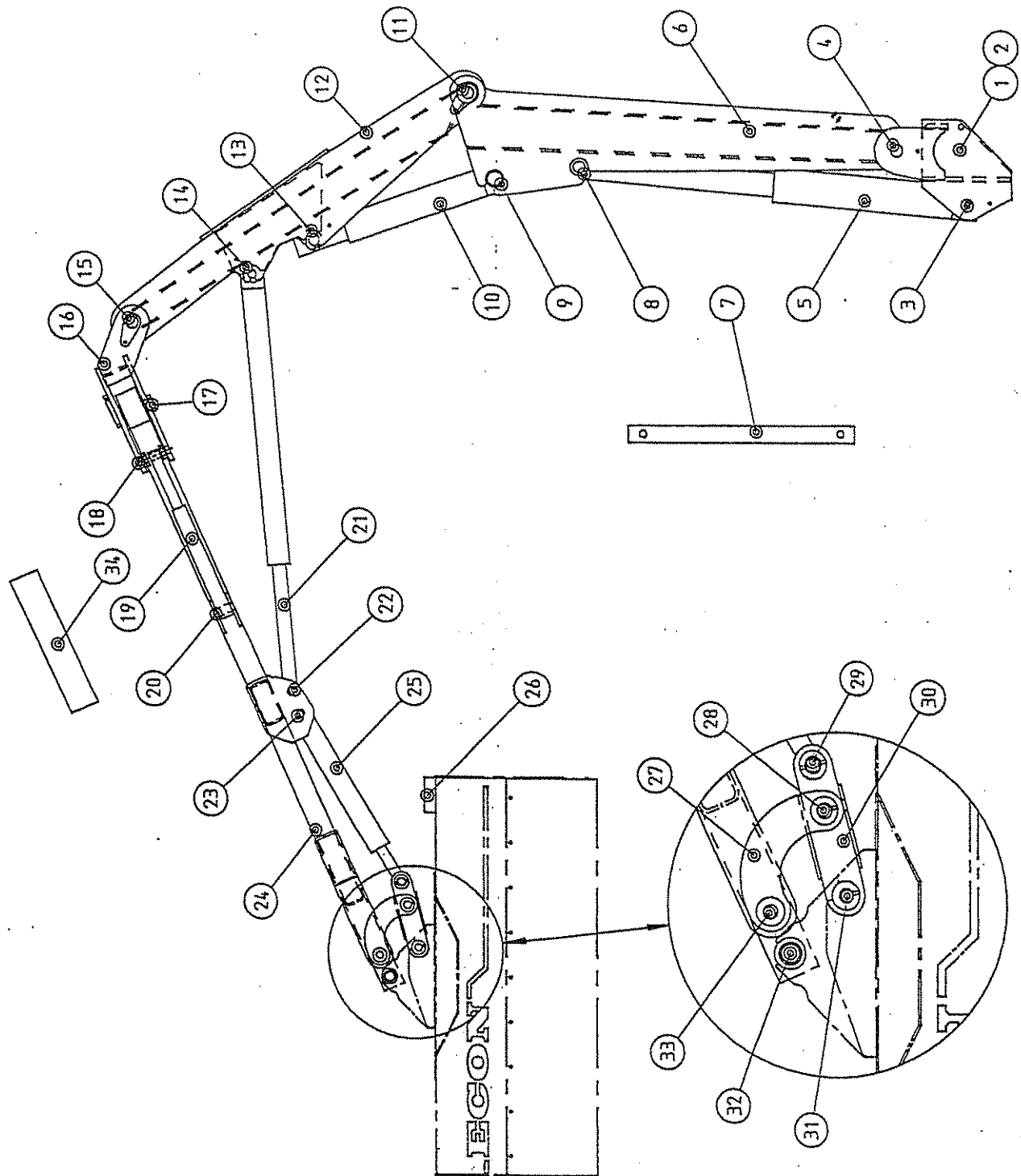
**Telephone: 01584 873131
Facsimile: 01584 876463**



**Method of Fitting Support
Legs After Demounting**

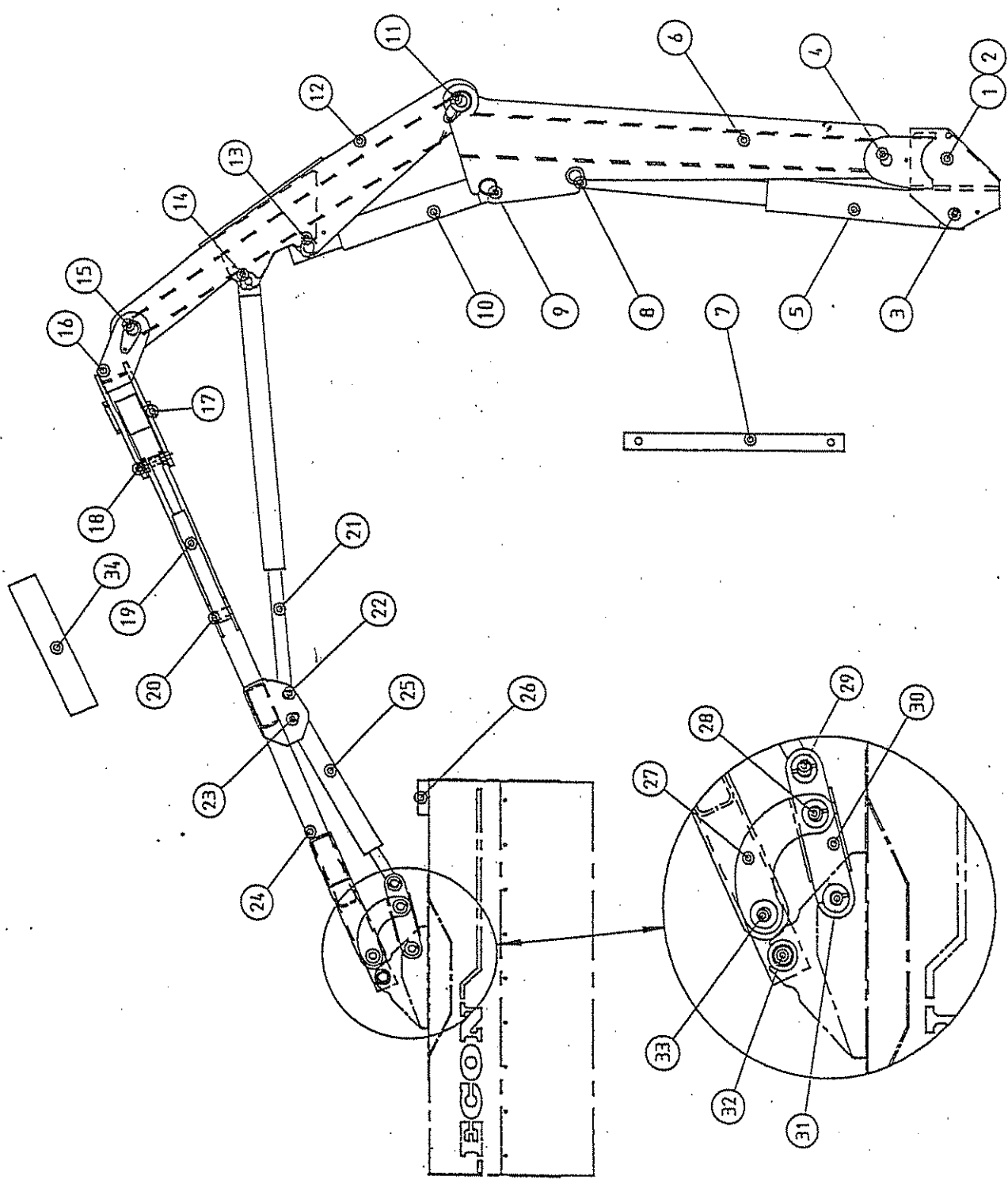


HEDGEMASTER
MK 3E
Parts Manual



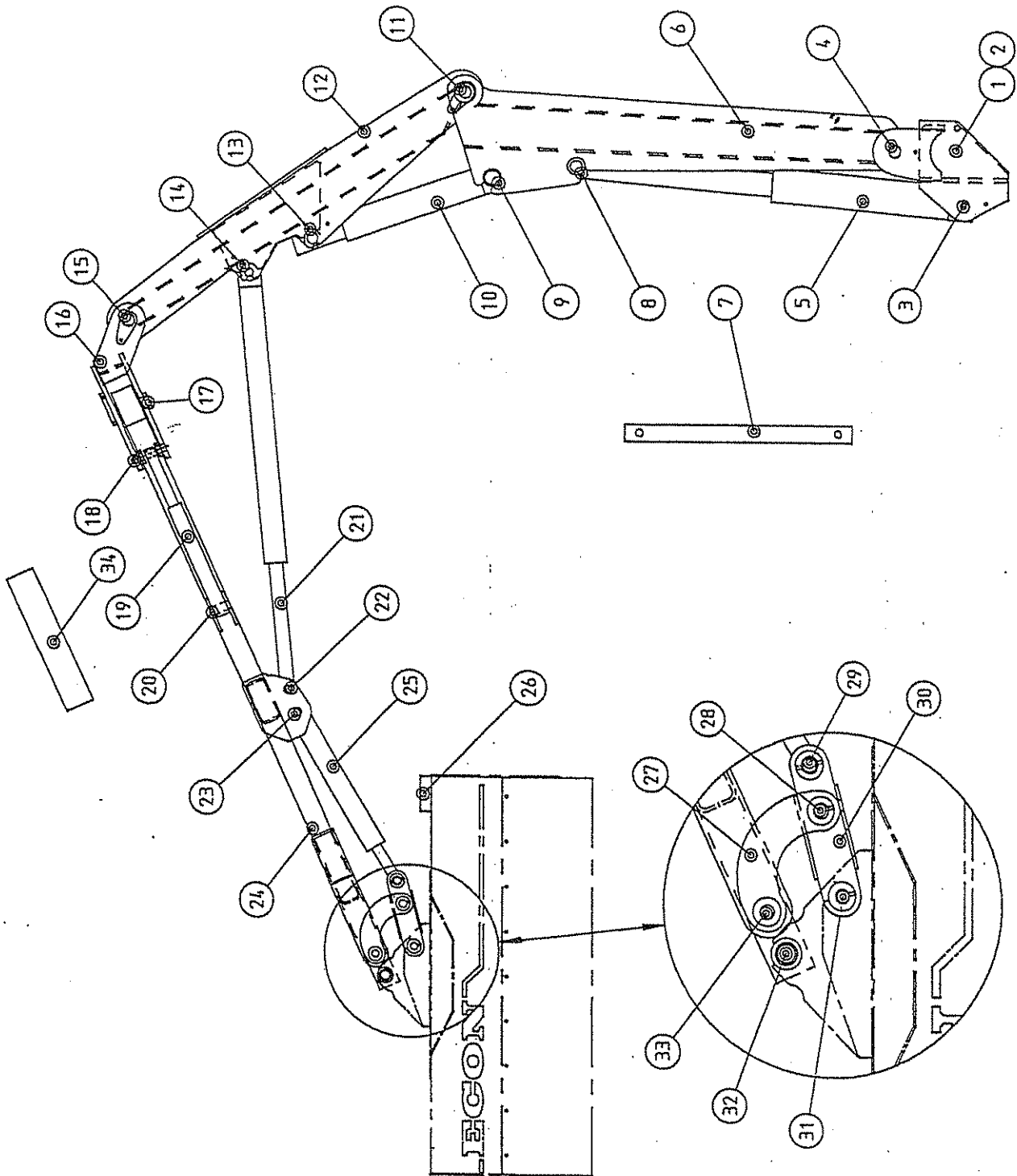
ARM ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	158720	Socket
2.	2	141542	Cone Nut
3.	1	154458	Pin
	1	156450	Spacer
	2	BUO310	Bush
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WM16	Washer
4.	1	154431	Pin
	1	156418	Spacer
	2	BUO310	Bush
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WM16	Washer
5.	1	HR0132	First Ram (Seal Kit No. SK0272) <i>GLAND 41-73</i>
6.	1	158534	1st Arm
7.	1	154547	Transit Bar
8.	1	158690	Pin
	1	156442	Spacer
	2	BU0337	Bush
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WM16	Washer
9.	1	158690	Pin
10.	1	157244	Second Ram (Seal Kit No. SK0221)
11.	1	154431	Pin
	1	159298	Spacer
	2	BU0310	Bush
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WB10	Washer
	1	WM16	Washer
	1	WA10	Washer
12.	1	158542	2nd Arm
13.	1	158682	Pin
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WM16	Washer



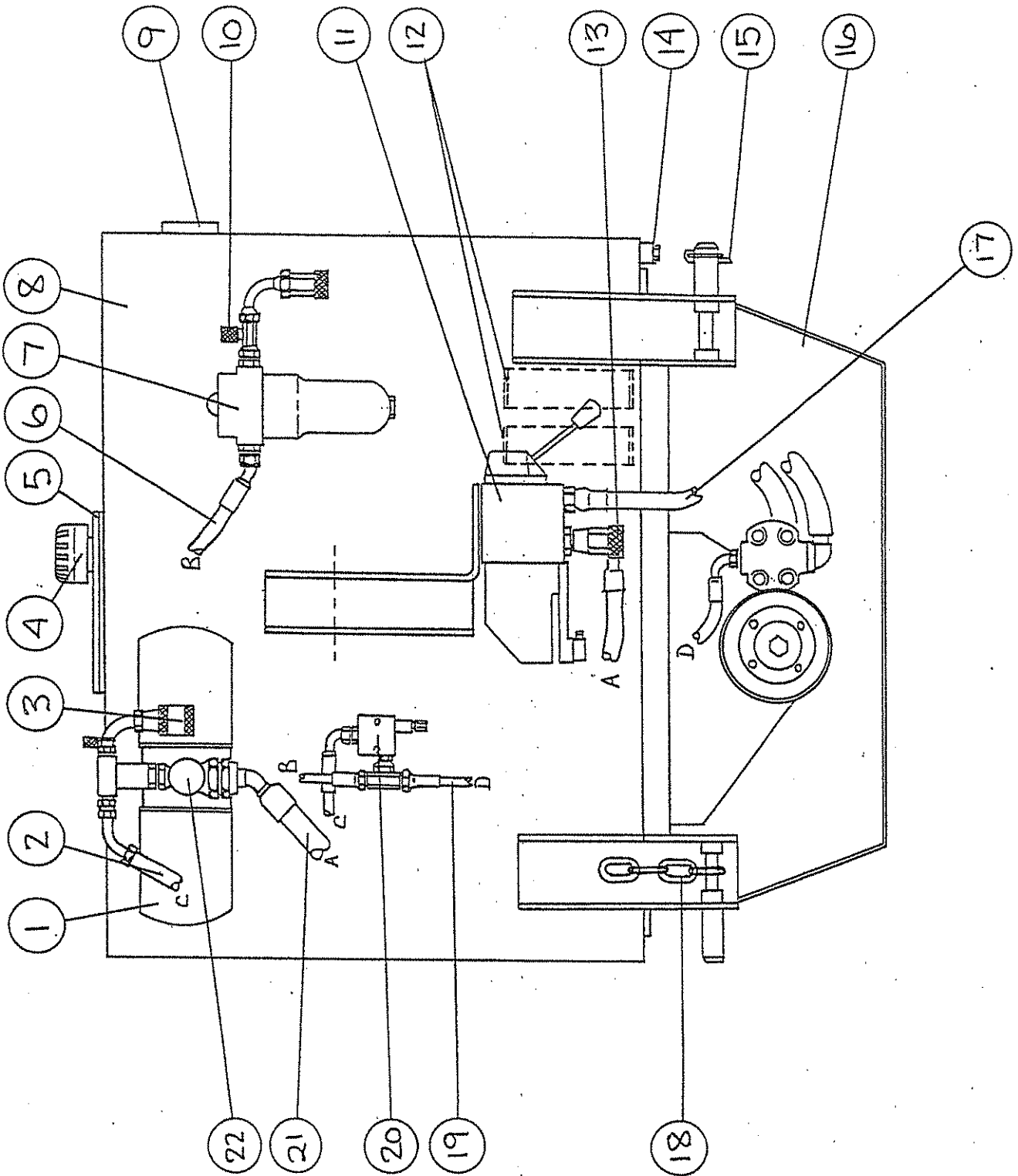
ARM ASSEMBLY Contd.

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
14.	1	158674	Pin
	1	SCA12025	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WA12	Washer
15.	1	154431	Pin
	1	156426	Spacer
	2	BU0310	Bush
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WM16	Washer
16.	1	154229	Breakaway Housing
17.	1	154490	Pin
	2	156469	Spacer
	2	BU0329	Bush
	1	SCA16035	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WM16	Washer
18.	1	154601	Pin
	2	156477	Spacer
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
19.	1	HR0329	Breakaway Ram (Seal Kit No. SK0264)
20.	1	154628	Pin
	2	156477	Spacer
	2	PA05040	Pin
21.	1	HR0310	Third Ram (Seal Kit No. SK0280)
22.	1	154466	Pin
	1	SCA12025	Screw
	1	SCA10025	Screw
	1	WA10	Washer
	1	WB10	Washer
	1	WB12	Washer
23.	1	157694	Pin
	2	BU0221	Bush
	1	NF08	Nut
	1	SCA08070	Screw
24.	1	157600	3rd Arm
25.	1	HR0922	Head Ram (Seal Kit No. SK0264)
26.	1	157295	Rubber Buffer
	1	158178	Buffer Support



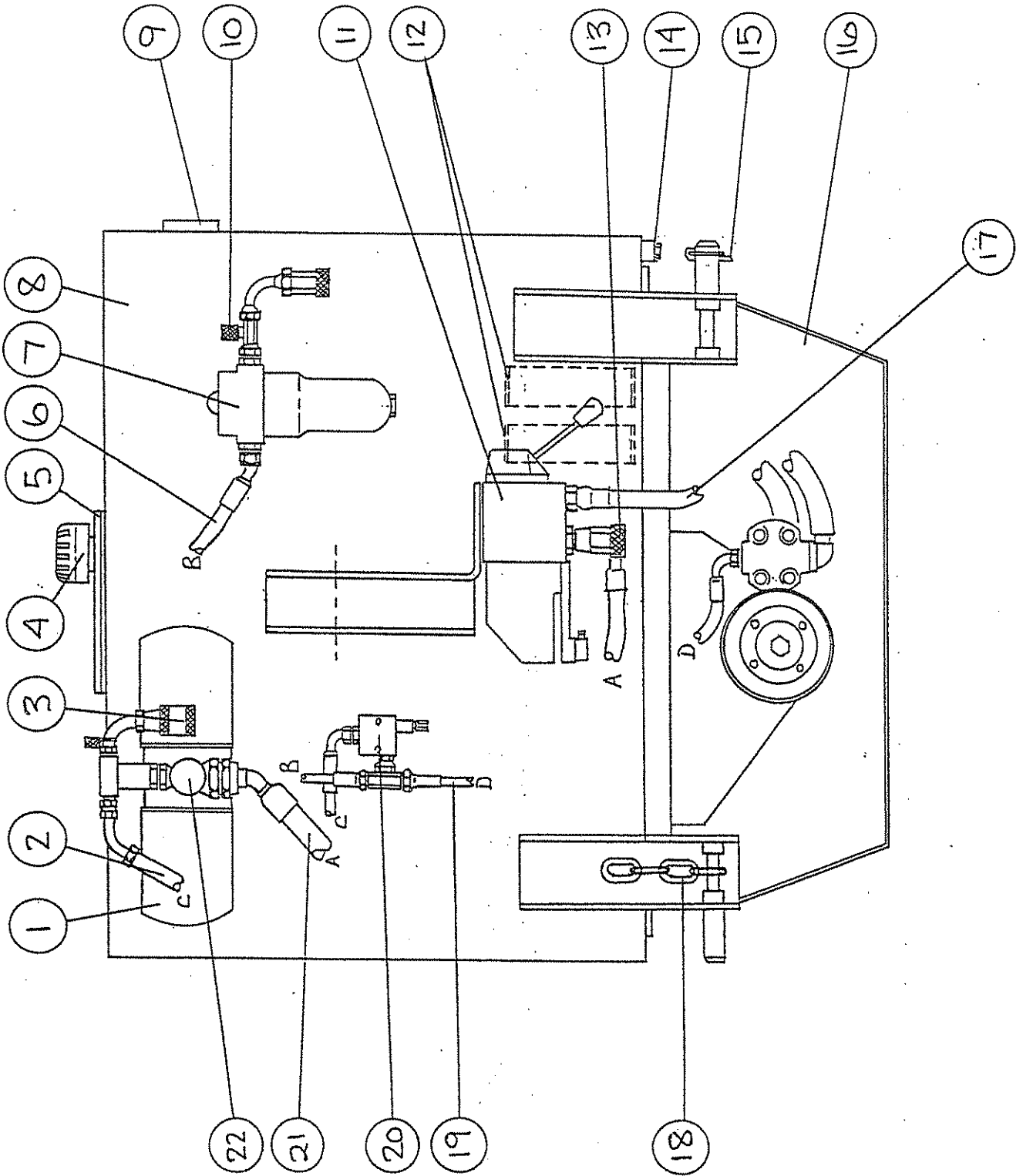
ARM ASSEMBLY Contd.

<u>ITEM</u>		<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
27.	1		158607	Banana Link LH
	1		158615	Banana Link RH
28.	1		157708	Pin
	1		158666	Spacer
	2		BU0221	Bush
	2		SCA08070	Screw
	2		NF08	Nut
29.	1		157678	Pin
	2		BU0221	Bush
			SCA06070	Screw
			NF06	Nut
30.	1		158623	Thrust Link
31.	1		157651	Pin
	1		158658	Spacer
	2		BU0221	Bush
	1		SCA08070	Screw
	1		NF08	Nut
32.	1		158186	Pin
	2		BU0051	Bush
	1		SCA08070	Screw
	1		NF08	Nut
33.	1		157686	Pin
	1		158631	Spacer
	2		BU0221	Bush
	1		SCA08070	Screw
	1		NF08	Nut
34.	1		158712	Hose Guard

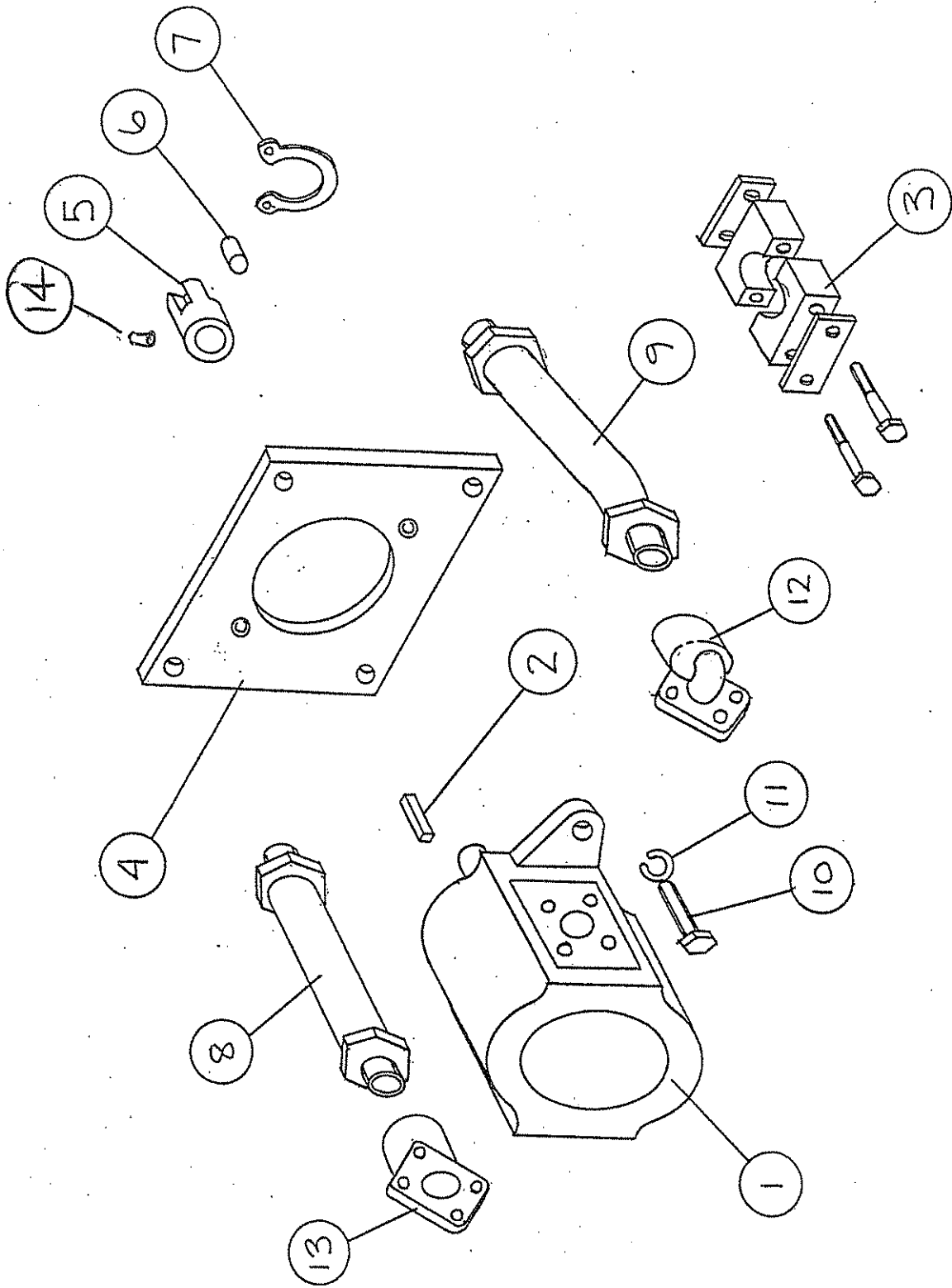


HYDRAULIC TANK ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	
1.	1	HF0132	Return filter complete	
	2	HF0167	Filter element	
	1	FN0051	1 1/2" BSP locknut	
	2	SD0094	1 1/2" BSP seal	
	1	YA0299	1 1/4" x 1 1/2" MM adaptor	
	2.	1	H4C550DC	Hose (relief valve to return filter)
		3.	2	SD0043
	1		YE0809	1/2" MF elbow
	1		YQ0167	1/2" QR coupling female
	1		YQ0175	1/2" dust plug
1	YS0108		1/2" MF adaptor	
1	YT0051		1/2" MMM tee	
1	YT0574		Test point	
4.	1		HT0019	Filler breather
5.	1	144312	Tank lid gasket	
	1	144231	Tank lid	
	6	WB10	Washer	
	6	SCA10020	Screw	
6.	1	H4B700D	Hose (relief valve to pressure filter)	
	1	SD0043	1/2" BSP seal	
	1	YA0159	1/2" x 3/4" MM adaptor	
7.	1	HF0264	Pressure filter	
	1	HF0787	Filter element	
8.	1	158763	Tank	
9.	1	HT0035	Oil level gauge	
10.	2	SD0043	1/2" BSP seal	
	1	YA0159	1/2" x 3/4" MM adaptor	
	1	YE0809	1/2" MF elbow	
	1	YQ0140	1/2" Q.R. coupling male	
	1	YQ0159	1/2" dust cap	
	1	YT0574	Test point	
	11.	1	HV3085	Valve head motor
12.	2	HF0086	Suction strainer	
13.	1	SD0043	1/2" BSP seal	
	1	SD0078	1" Seal	
	1	YA0191	1/2" x 1" MM adaptor	
	1	YQ0256	1" Q.R. coupling female	
	1	YQ0264	1" Dust plug	
14.	1	YP0116	Drain plug	
15.	2	FP0310	Lynch pin	
16.	1	144150	Pump guard	
17.	1	F8B550C	Hose (pump to head valve)	
	1	SD0051	3/4" BSP seal	
	1	YA0159	1/2" x 3/4" MM adaptor	
	①	YS0221	1" x 3/4" MF adaptor	
	18.	2	LC0116	Check chain
4		LA0027	D Shackle	

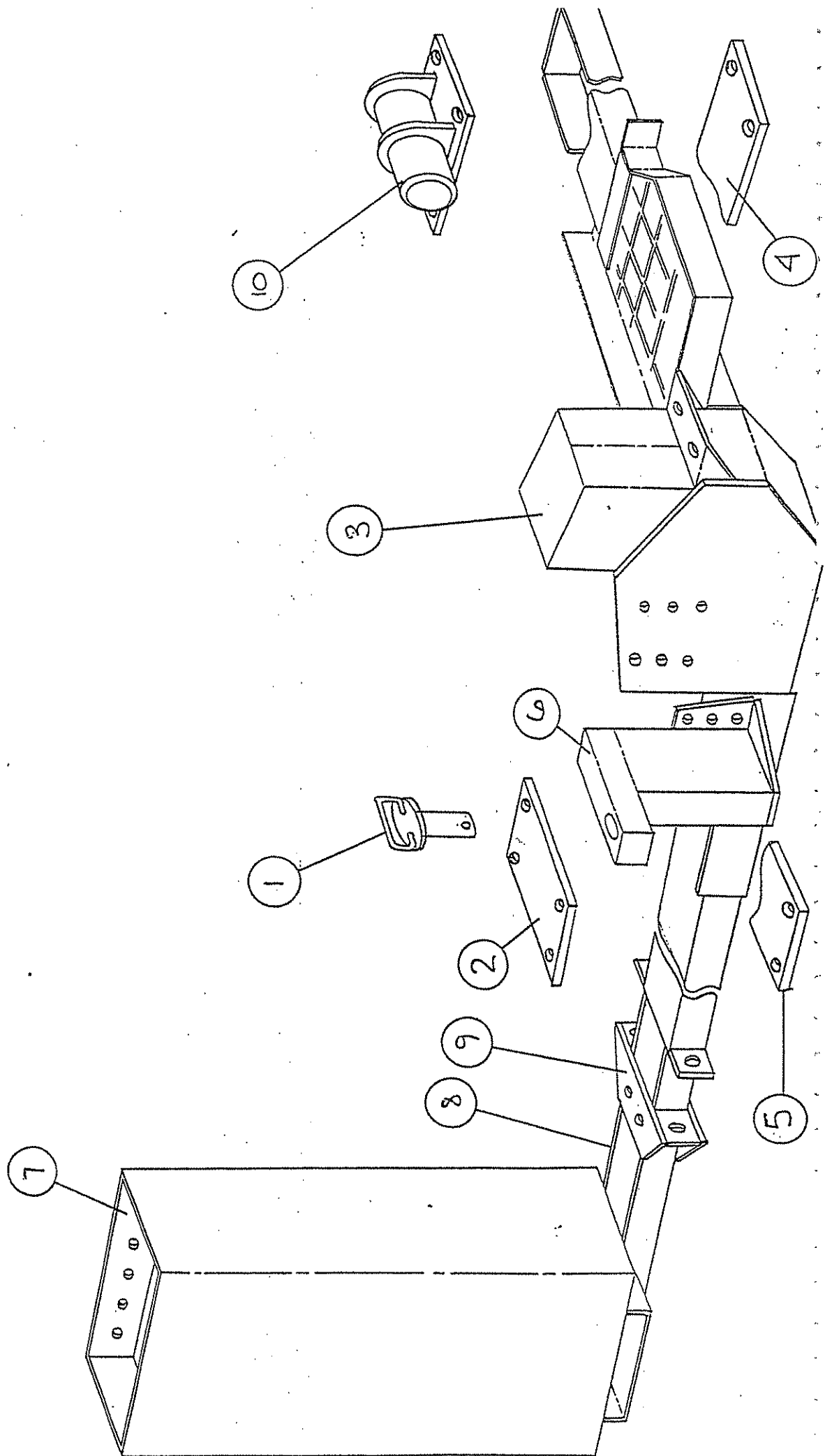


19.	1	H4B700C	Hose (pump to relief valve)
20.	1	HV2895	Relief valve
	2	SD0035	3/8" BSP Seal
	1	YT0051	1/2" MMM tee
	2	YA0116	3/8" x 1/2" MM adaptor
21.	1	F8C650D	Hose (head valve to return filter)
	1	SD0051	3/4" BSP seal
	1	YA0205	3/4" x 1" MM adaptor
	1	YA0256	1" x 1 1/4" MM adaptor
22.	1	158941	Modified tee
	1	YP0396	1 1/4" Blanking cap
	1	YA0264	1 1/4" MM adaptor



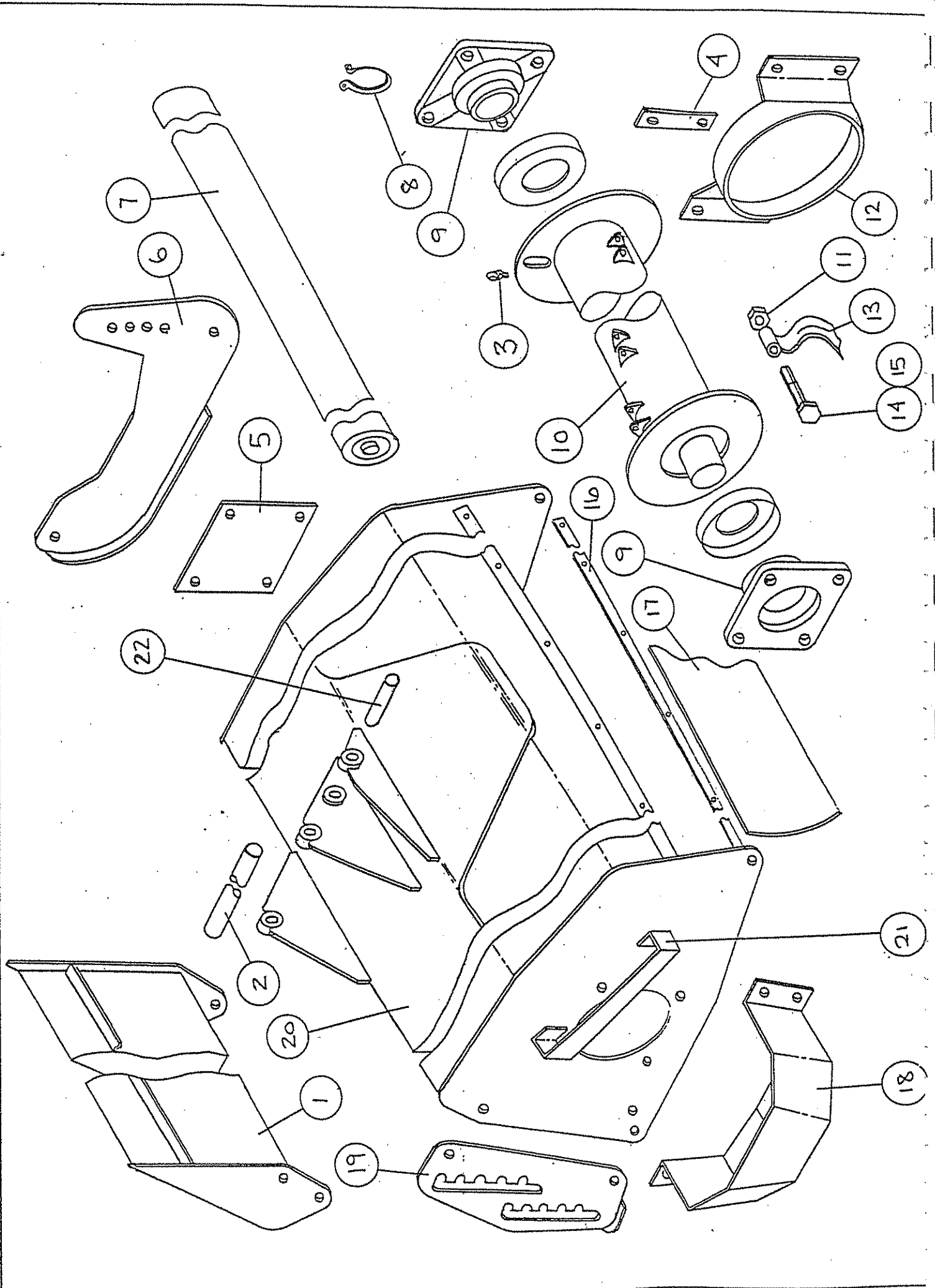
MOTOR ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	EHM0612	Motor
2.	1	10 22 68	Key
3.	2	YC0035	Top Plate Pipe Clamp
	2	YC0108	(Pair) Clamp Jaws 38mm
	4	BCA06090	Bolt
	4	NF16	Nut
	4	159190	Pipe Support Shims
4.	1	158100	Adaptor Plate
5.	1	158445	Drive Adaptor
6.	6	141763	Drive Roller
7.	1	FC0027	Circlip
8.	1	158836	Return Pipe
9.	1	158828	Pressure Pipe
10.	2	FB1732	Bolt
11.	2	FW0035	Washer
12.	1	HP0493	Motor Connector Pressure
	1	YA0205	3/4" x 1" mm Adaptor
	2	SD0078	1" Seal
13.	1	HP0523	Motor Connector Return
14		93 00 110	M6 x 8 GRUB SCREW



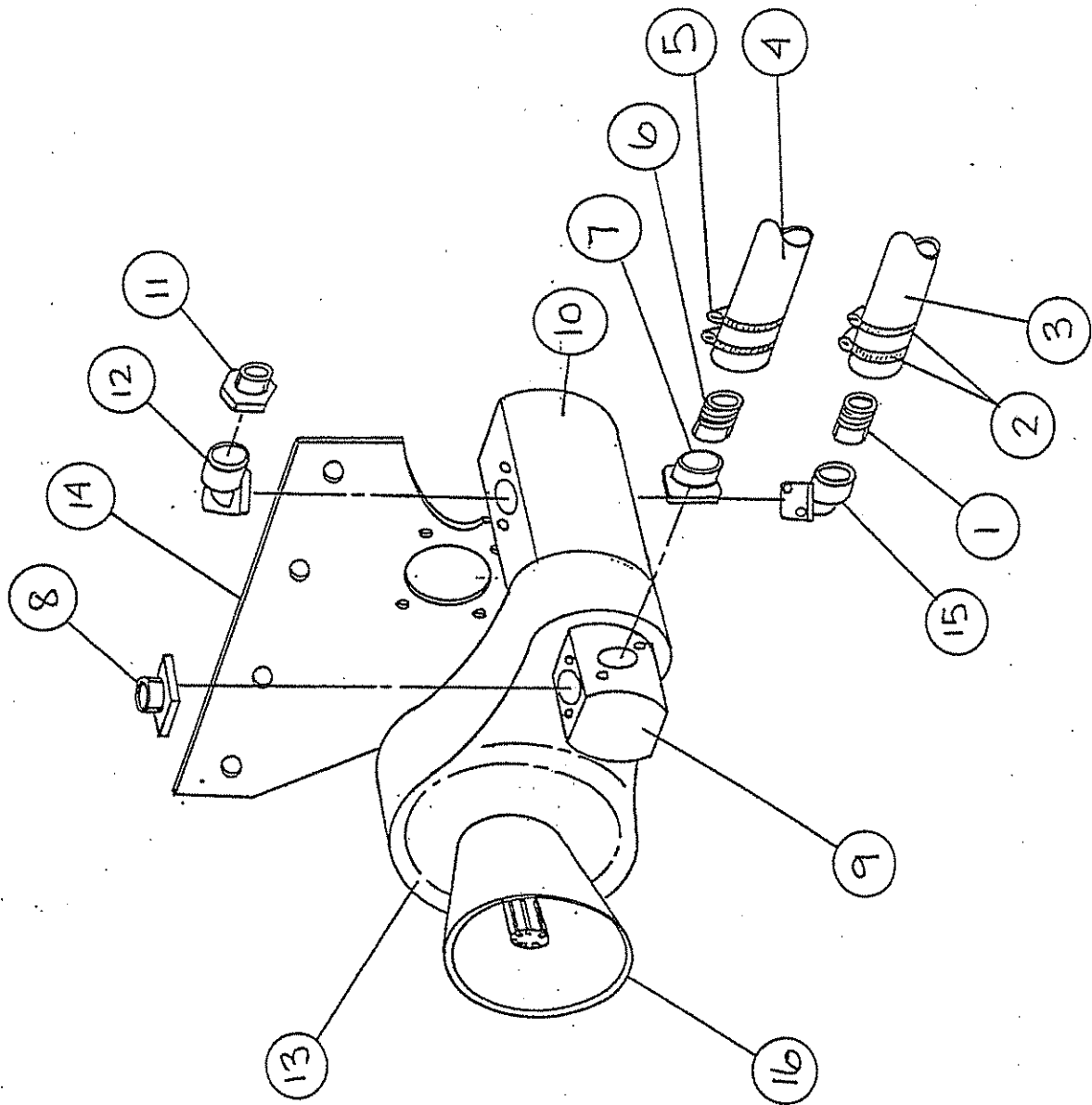
UNDERFRAME & COUNTER WEIGHT ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	156728	Pin
2.	3	157015	Packer
3.	1	154210	Underframe
4.	1	156930	Clamp Plate Rear
5.	1	157023	Clamp Plate Mid
6.	1	156736	Front Mounting
7.	1	158704	Weight Box
8.	1	158771	Weight Frame
9.	1	158798	Clamp Brkt
10.	1	156701	Pick Up Point



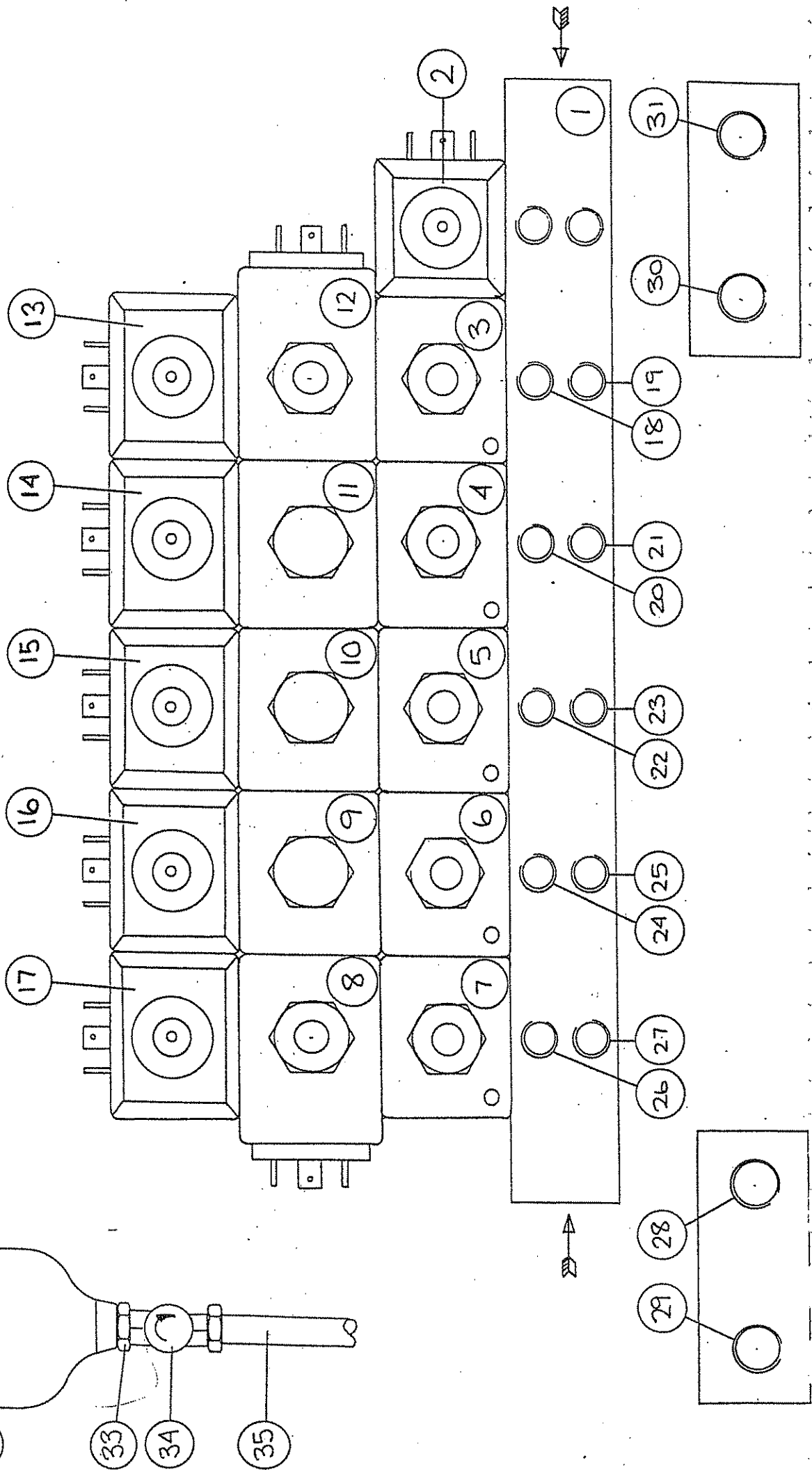
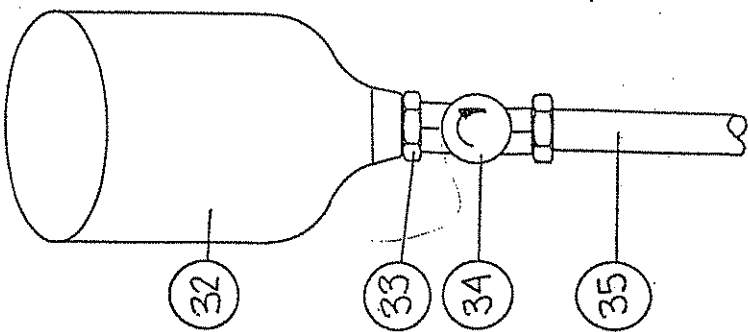
CUTTING HEAD

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	156507	Front Guard
2.	1	158186	Pin, Cutting Head Pivot
	2	BU0051	Bush
3.	1	YN0019	Nipple
4.	12	150355	Wire Guard Shim
5.	1	140767	Blanking Plate
6.	1	154288	Skid RH
	1	154261	Skid LH
7.	1	TD0027	Roller
	2	151858	Tab Washer
	4	NF16	Nut
	2	SCA16045	Screw
	4	SCA16050	Screw
	2	WB16	Washer
8.	1	FC0078	Circlip
9.	2	E015377	Bearing Assy
		EBS0124	Bearing
		E141119	Cap & Collar
10.	1	150312	Rotor
11.	28	150657	Nut
12.	2	150363	Wire Guard
13.	30	150711	Flail
14.	28	150665	Bolt
15.	2	BCA16090	Bolt
	2	NF16	Nut
16.	1	140856	Backing Strip
17.	1	140813	Rubber Flap
18.	1	158887	Motor Guard
19.	2	156515	Adaptor Plate
	4	157392	Adaptor Plate Washers
20.	1	157619	Cutting Head Main Frame
21.	1	159182	Pipe Support Bracket
22.	1	157651	Pin
	2	BU0221	Bush
	1	158658	Spacer
	1	150118	Parking Leg LH (Not Shown)
	1	158038	Parking Leg RH (Not Shown)
	4	157279	Parking Leg Spacers (Not Shown)



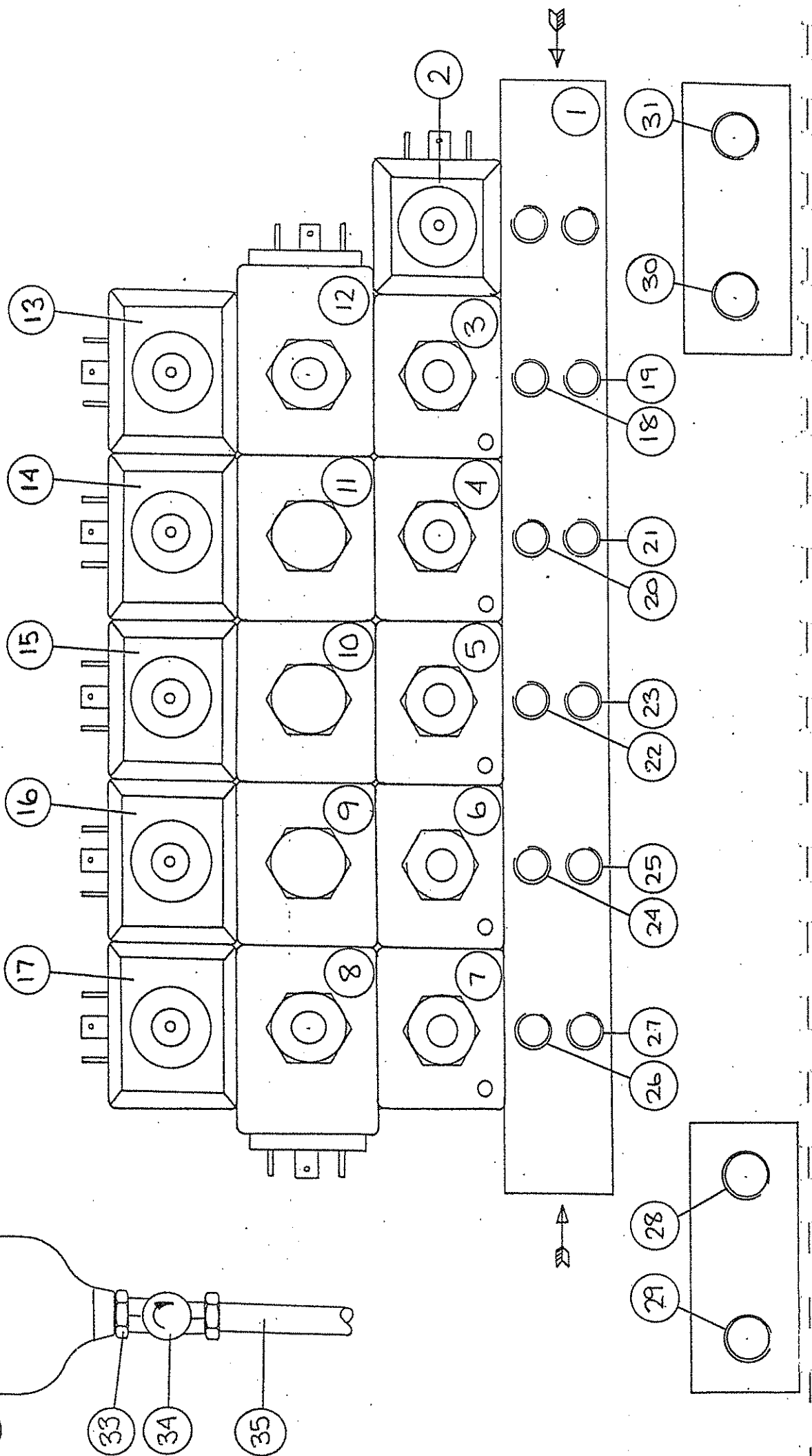
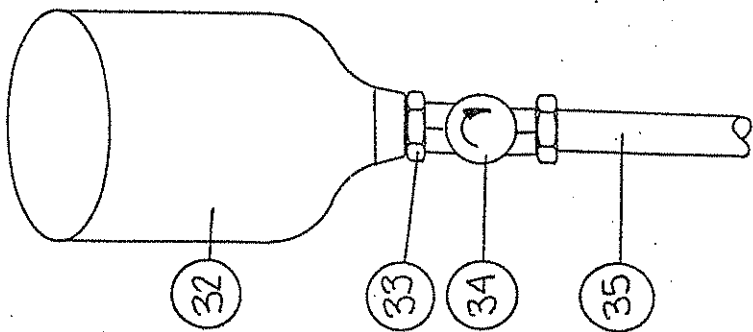
PUMP & GEARBOX ASSY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	105252	Standpipe
2.	4	FJ0140	Clip
3.	1	H309591	Hose 2"
4.	1	H309583	Hose 1½"
5.	4	FJ0094	Clip
6.	1	504025	Standpipe
7.	1	158917	Pump Connector
8.	1	158922	Pump Connector
9.	1	HP1090 SK0086	Pump
10.	1	HP1058 SK0094	Pump
11.	1	YA0213	Adaptor
12.	1	HP0493	Pump Connector
13.	1	TG0523	Gearbox
14.	1	158755	Support Plate
15.	1	HP0507	Pump Connector
16.	1	600644	Guard



VALVE & PIPING ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	HV2534/06	Manifold Block
2.	1	HV2534/14	Directional Solenoid Valve
	1	HV2534/11	Bolt Kit
3.	1	HV2534/05	Slice
	2	HV2534/09	Relief Valve Screw In
4.	1	HV2534/03	Slice
	2	HV2534/09	Relief Valve Screw In
5.	1	HV2534/03	Slice
	2	HV2534/09	Relief Valve Screw In
6.	1	HV2534/03	Slice
	1	HV2534/01	Check Valve Screw In
	1	HV2534/02	Relief Valve Screw In
7.	1	HV2534/03	Slice
	2	HV2534/09	Relief Valve Screw In
8.	1	HV2534/04	Slice
	2	HV2534/10	Solenoid Valve
9.	1	HV2534/12	Check Valve
10.	1	HV2534/12	Check Valve
11.	1	HV2534/12	Check Valve
12.	1	HV2534/12	Check Valve
13.	1	HV2534/13	Directional Solenoid Valve
	1	HV2534/08	Bolt Kit
14.	1	HV2534/13	Directional Solenoid Valve
	1	HV2534/07	Bolt Kit
15.	1	HV2534/13	Directional Solenoid Valve
	1	HV2534/07	Bolt Kit
16.	1	HV2534/15	Directional Solenoid Valve
	1	HV2534/07	Bolt Kit
17.	1	HV2534/13	Directional Solenoid Valve
	1	HV2534/08	Bolt Kit
18.	1	YS0043	3/8" x 1/4" MF Adaptor
	1	YA0078	1/4" x 1/4" MM Adaptor
	①	HV0868	Speed Control Valve
	1	YS0035	1/4" x 1/2" MF Adaptor
	1	YT0051	1/2" x 1/2" x 1/2" MMM Tee
	1	H4B1400C	Hose First Ram Open
	1	H4B750B	Hose To Gas Bottle
19.	1	YS0043	3/8" x 1/4" MF Adaptor
	1	YT0035	1/4" x 1/4" x 1/4" MMM Tee
	1	H2B1700F	Hose First Ram Close
	1	H2B650F	Hose To Tap (item 28)
20.	1	YS0043	3/8" x 1/4" MF Adaptor
	1	YB0035	1/4" BH Fitting
	①	HV0868	Speed Control Valve
	1	YA0078	1/4" x 1/4" MM Adaptor
	1	H2D2600F	Hose Second Ram Open

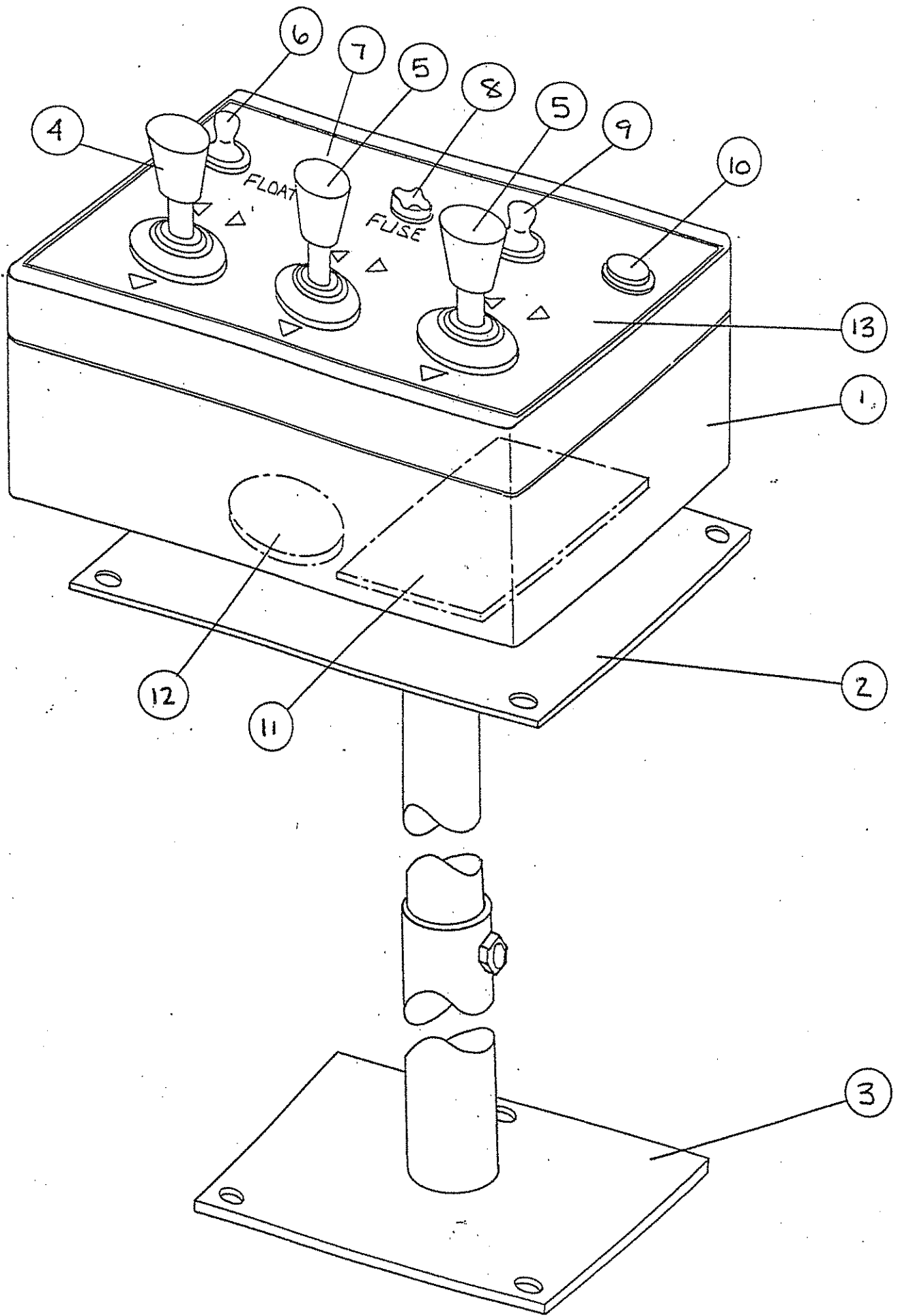


VALVE & PIPING ASSEMBLY Contd.

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
21.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H2D2600F	Hose Second Ram Close
22.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H2D4800F	Hose Third Ram Open
23.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H2D4800F	Hose Third Ram Close
24.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H2D5100F	Hose Breakaway Ram Open
25.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H2D5100F	Hose Breakaway Ram Close
26.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H3D5650D	Hose Head Ram Open
27.	1	YA0086	¼" x ⅜" MM Adaptor
	1	H3D6100C	Hose Head Ram Close
28.	1	YA0124	½" x ½" MM Adaptor
	1	YA0825	½" FF SW Adaptor 90
	1	HV0426	On/Off Tap
	1	YS0035	¼" x ½" MF Adaptor
	1	H2B650F	Hose Tap To Tee (Item 19)
29.	1	YP0078	½" Blanking Plug
30.	1	YA0124	½" x ½" MM Adaptor
	1	H4B4150B	Hose Return From Valve
31.	1	YA0124	½" x ½" MM Adaptor
	1	F4B4000B	Hose Pressure To Valve
32.	1	HA0027	Hydracushion
33.	1	YS0175	Adaptor ¾" x ½" MF
34.	1	HV0426	On/Off Tap
35.	1	H4B750B	Hose To Item 18
36.	1	158747	Valve Cover
37.	1	158801	Valve & Hydracushion Mtg Brkt
38.	1	158933	Valve Mtg Brkt Packer

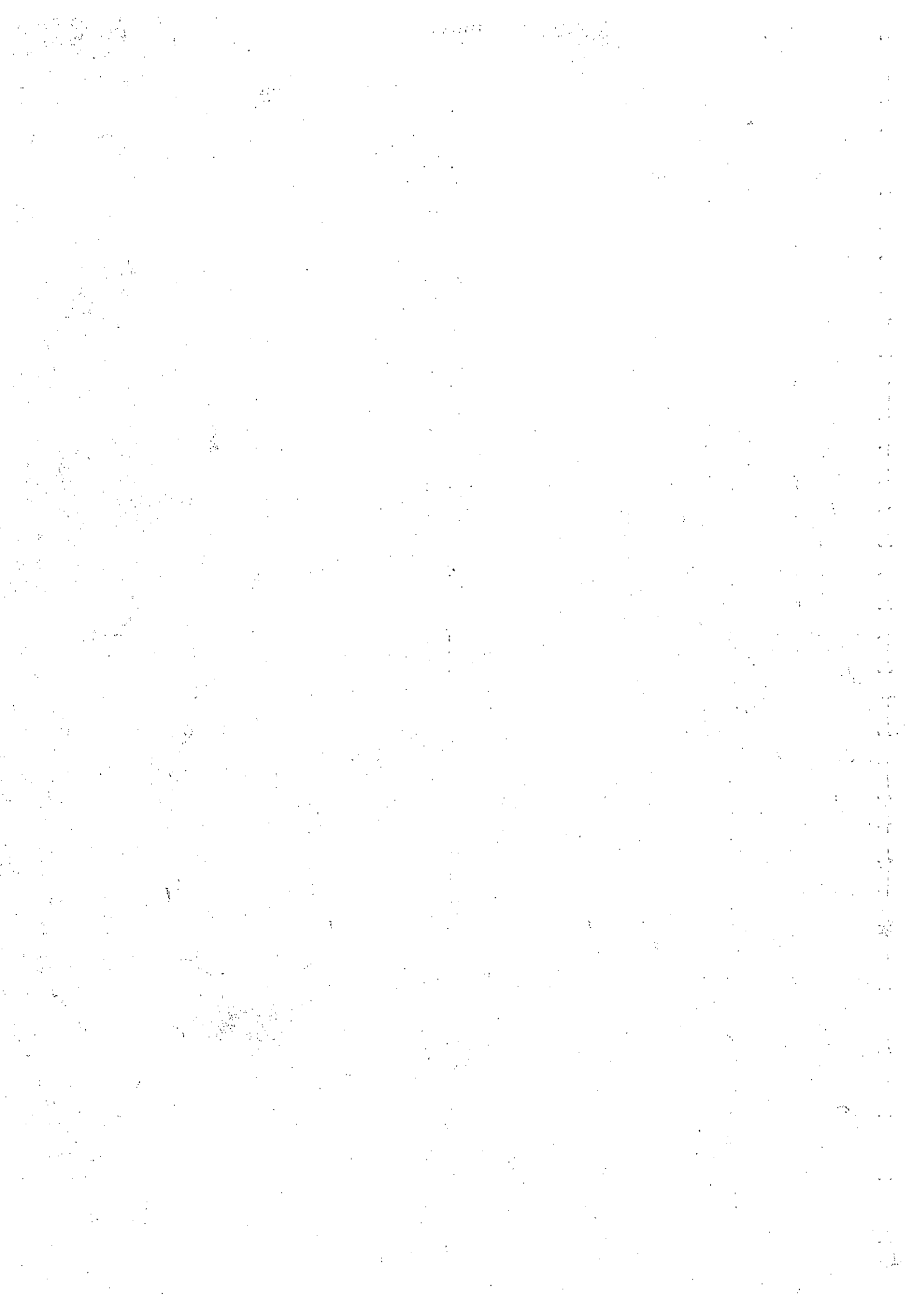
OTHER HOSES

1	H10C10850D	Rotor Return
1	F8B10200C	Rotor Pressure
2	F4B2000B	Demount Hose
2	YQ0140	½" QR Male Demount Hose
2	YQ0167	½" QR Female Demount Hose
4	YA0124	½" x ½" MM Adaptor Demount Hose



CONTROL BOX ASSEMBLY

<u>ITEM</u>	<u>QTY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1.	1	158895	Control Box Complete
2.	1	158860	Cab Pedestal Top
3.	1	158879	Cab Pedestal Bottom
4.	1	ES0752	Joystick 2 Way
5.	2	ES0760	Joystick 4 Way
6.	1	ES0310	Switch Float
	1	ES0191	Rubber Cover
7.	1	EL0604	Red Lamp
8.	1	EF0043	Fuse Holder
9.	1	ES0310	Switch Rotor
	1	ES0191	Rubber Cover
10.	1	EL0418	Green Lamp
11.	1	EC0906	Panel Mounting Base
	1	EC0892	Plug Insert
12.	1	EC0582	Plug 3 Pin
	1	EC0590	Socket 3 Pin
13.	1	XA4189	Label
14.	1	158909	Wiring Loom



NOTE: - IF DIMENSIONS ARE CHANGED ALSO ALTER ON XN0021

DRAWING No.
XN0051

IF IN DOUBT, ASK DO NOT SCALE 3RD ANGLE PROJECTION

NUMBER OF MASTER JOB CARDS

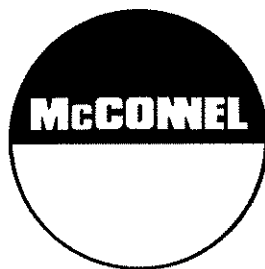
Q _u	A _u	DESCRIPTION	NOTES

PRESSURE SETTINGS

DESCRIPTION	3434B	EFM	HM2E	HM3E
VALVE/RAMS :- ALL PRESSURE SETTINGS TO BE ADJUSTED AT A LOW OIL FLOW SAY 1 GAL/MIN				
PRESSURE RELIEF VALVE	2400 lb/in ²	2400 lb/in ²	2400 lb/in ²	2400 lb/in ²
1 ST RAM.	2100 lb/in ²	2100 lb/in ²	2100 lb/in ²	2100 lb/in ²
2 ND RAM	400 lb/in ²	400 lb/in ²	700 lb/in ²	700 lb/in ²
3 RD RAM	1750 lb/in ²	1750 lb/in ²	2100 lb/in ²	2000 lb/in ²
	1750 lb/in ²	1750 lb/in ²	1750 lb/in ²	2100 lb/in ²
CUTTING HEAD RAM	2300 lb/in ²	2300 lb/in ²	2300 lb/in ²	1750 lb/in ²
BREAKAWAY RAM	2300 lb/in ²	2300 lb/in ²	2300 lb/in ²	2300 lb/in ²
GAS BOTTLE PRESSURE	600 lb/in ²	600 lb/in ²	800 lb/in ²	800 lb/in ²
	450 lb/in ²	450 lb/in ²	700 lb/in ²	700 lb/in ²
ROTOR HYDRAULIC DRIVE :- ADJUST AT FULL FLOW				
PRESSURE RELIEF VALVE	HLP46. HYD. OIL	HLP46. HYD. OIL	HLP46. HYD. OIL	HLP46. HYD. OIL
RUNNING PRESSURE	1750 lb/in ²	1750 lb/in ²	1750 lb/in ²	1750 lb/in ²
MOTOR BACK PRESSURE	500 lb/in ²	500 lb/in ²	500 lb/in ²	500 lb/in ²
	40 lb/in ²	40 lb/in ²	40 lb/in ²	40 lb/in ²
ROTOR SPEED ± 150 R.P.M.	10 lb/in ²	10 lb/in ²	10 lb/in ²	10 lb/in ²
	2150 RPM	2150 RPM	2150 RPM	2150 RPM

DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED ± 0.2 ANGULAR DIMENSIONS ± 0.2 REWORK ALL BLIND AND SHARP EDGES FINISH REWORKED SURFACES SMOOTH REWORKED SURFACES GRIND FINISH REWORKED SURFACES	MANUFACTURING TOLERANCES (Unless Otherwise Stated) Mechanical Parts	40 ± 0.3 75 ± 0.4 100 ± 0.5 150 ± 0.6 200 ± 0.8 300 ± 1.0 400 ± 1.2 500 ± 1.5 600 ± 1.8 700 ± 2.0 800 ± 2.5 900 ± 3.0 1000 ± 3.5 1200 ± 4.0 1500 ± 5.0 2000 ± 6.0 2500 ± 7.0 3000 ± 8.0 4000 ± 10.0 5000 ± 12.0 6000 ± 15.0 8000 ± 20.0 10000 ± 25.0	0.10 ± 0.02 0.15 ± 0.03 0.20 ± 0.04 0.30 ± 0.05 0.40 ± 0.06 0.50 ± 0.08 0.60 ± 0.10 0.80 ± 0.12 1.00 ± 0.15 1.20 ± 0.18 1.50 ± 0.20 2.00 ± 0.25 2.50 ± 0.30 3.00 ± 0.35 4.00 ± 0.45 5.00 ± 0.55 6.00 ± 0.65 8.00 ± 0.80 10.00 ± 1.00	0.10 ± 0.02 0.15 ± 0.03 0.20 ± 0.04 0.30 ± 0.05 0.40 ± 0.06 0.50 ± 0.08 0.60 ± 0.10 0.80 ± 0.12 1.00 ± 0.15 1.20 ± 0.18 1.50 ± 0.20 2.00 ± 0.25 2.50 ± 0.30 3.00 ± 0.35 4.00 ± 0.45 5.00 ± 0.55 6.00 ± 0.65 8.00 ± 0.80 10.00 ± 1.00
	TITLE PRESSURE SETTINGS INSTRUCTION SHEET	BACHUSE USED ON 3434B EFM ASSEMBLY USED ON 019720 019097	QTY HM2E HM3E 019712 018236	QTY 0 0 0
SCALE DRAWING NUMBER XN0051		MODIFICATIONS DATE		





McConnel Limited, Temeside Works, Ludlow, Shropshire SY8 1JL. England.
Telephone: 01584 873131. Facsimile: 01584 876463. www.mcconnel.com