Operating Instructions and Parts Book for

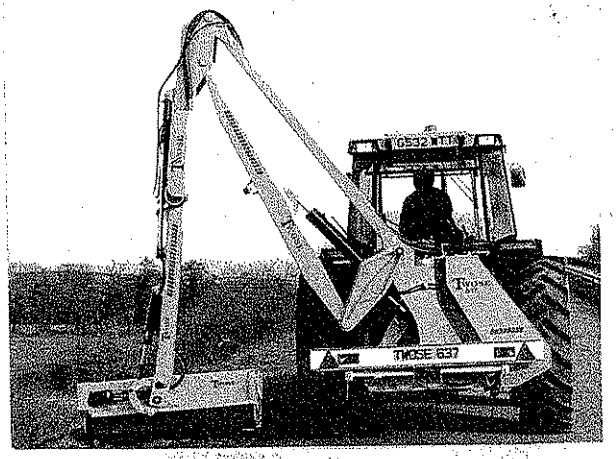
FLAIL TRIMMERS -

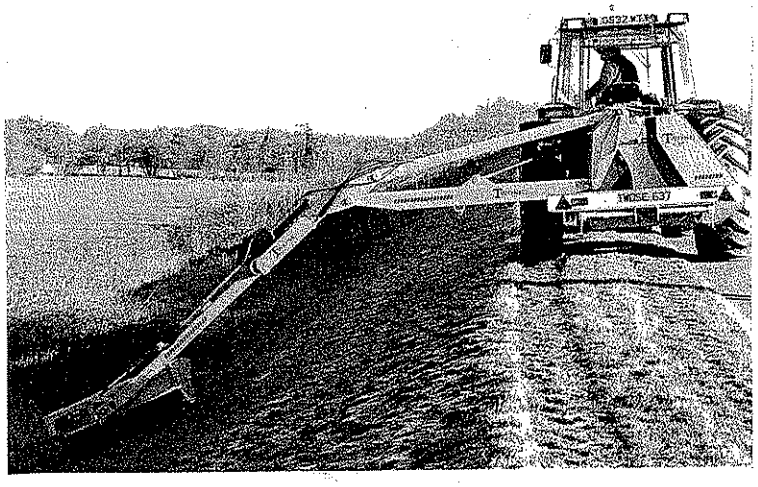
600 AND 637

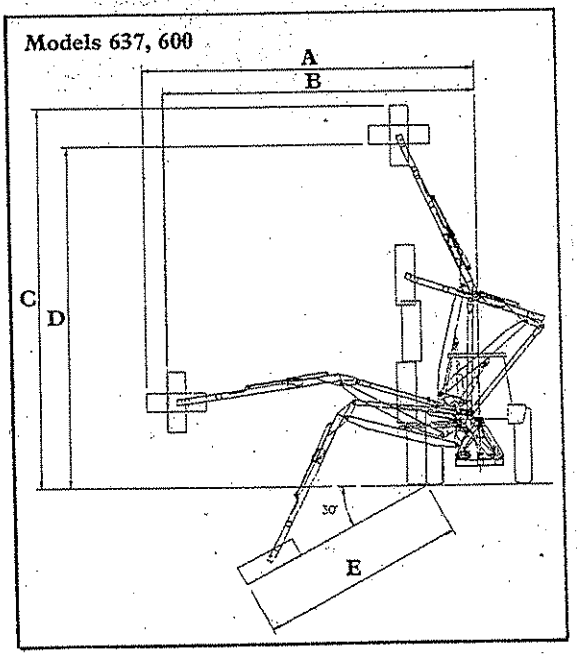
Edition No: 7921-09-99

MODELS 637 AND 600
Standard features include:

- Parallel linkage boom movement with 90° power slew.
- Unique electro hydraulic powered boom and head flotation.
- DS Double Skin Cutter Head 1.25m (50") fitted as standard, 1.2m (48") Optional.
- Flail head can rotate through 245°.
- Safety breakback and break forward.
- Heavy duty reversible lump flails fitted as standard, other flails for grass and Hedgecutting available to fit same rotor.
- Right or left hand cut.
- Rear lighting board with reflector, stop, tail, indicator and number plate light.
- Suitable for 80hp + tractor.
- Drive-in latch system for quick rigid hitch, all brackets supplied. Please state make and model of tractor.
- Oil tank capacity 241 litres (53 gals).







Cutting Dimensions (m/ft)			637	600
SIDE REACH	Head Horizontal	A	7.0 (22'11")	6.0 (19'8")
	Head Vertical	B	6.6 (21'8")	5.6 (18'5")
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	Head Horizontal	D	7.4 (24'3")	6.4 (21')
DOWNWARD REACH		E	4.4 (14'5")	3.4 (11'2")

TWOSE OF TIVERTON LIMITED
BLUNDELLS ROAD
TIVERTON
DEVON, ENGLAND, EX16 4JT
TELEPHONE: (01884) 253691 FAX: (01884) 255189

THIS MANUAL IS TO BE HANDED TO THE CUSTOMER BEFORE THE MACHINE IS USED FOR THE FIRST TIME.

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All dimensions and capacities mentioned in this book are approximate. In pursuance of the company's policy of constant development, the right is reserved to depart, without notice, from any detail illustrated or specified in this book, without incurring the obligation to provide such modifications on machines previously delivered.

No responsibility will be accepted by Twose Of Tiverton Limited for any injury, damage or loss arising from the improper use or lack of maintenance to any machine supplied by them or for any failure of the user to comply with all instructions published by Tractor or Loader Manufacturers, particularly with regard to maximum load capacities, tyre pressures and stability, or with instructions and regulations pertaining to Tractor Cabs.

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INDEX CONTINUED

GENERAL

SPECIFICATIONS

637 Machine

Overall Height (machine folded for transport)	3.45m
Overall Width (machine folded to narrowest, head vertical and on floor taken from tractor's centre-line)	1.57m
Overall Length of machine (from centre-line of tractor rear wheel, approx. dia)	3.17m
Total Weight of machine	2T

600 Machine

Overall Height (machine folded for transport)	3.47m
Overall Width (machine folded for transport - taken from tractor's centre-line)	1.57m
Overall Length of machine (less PTO shaft)	3.17m
Total Weight of machine	T

Note - Dimensions are approximate and will vary from tractor to tractor.

AIRBORNE NOISE EMISSIONS

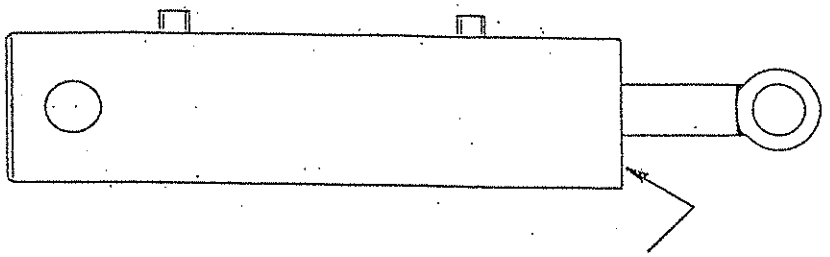
The equivalent continuous A - weighted sound pressure level at the workstation (tractor seat) does not exceed 74dB (A). This value was achieved cutting hedges using a Dawe 1405C Sound Meter (BS 3489) on a 3090 Massey Ferguson Tractor complete with M/F Safety Cab.

RAM IDENTIFICATION

When ordering SEAL SETS, RAM PARTS ETC,, please follow the simple guidelines below to ensure receipt of COMPATIBLE PARTS.

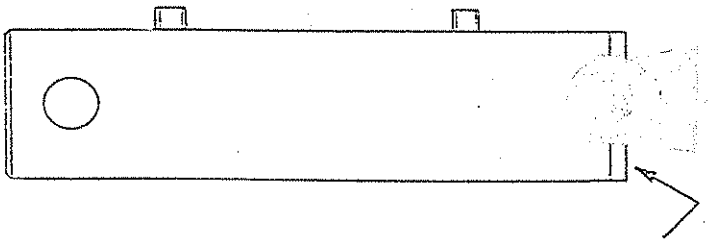
Examine the Ram in question at the GLAND NUT.. It will be one of THREE TYPES.

TYPE 'A'



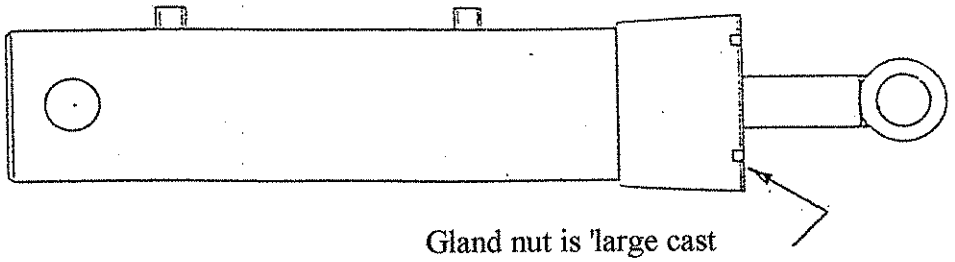
Gland nut internal and flush

TYPE 'B'



Gland nut exterior and same diameter as cylinder

TYPE 'C'



Gland nut is 'large cast Collar type'

WHEN ORDERING PARTS STATE WHETHER TYPE 'A', 'B' OR 'C'

This does NOT apply when a COMPLETE RAM is required, since all ram types are FULLY INTERCHANGEABLE.

GENERAL INFORMATION

NOTE:- The provision of this information is a requirement of the Health & Safety at Work Act 1974.

NOTE:- This handbook has been designed to help the operator and service engineer/mechanic to use and understand the machine fully, safely and efficiently. It is written bearing in mind the Health & Safety requirements and the new CE requirements which came into force from January 1st 1995.

NOTE:- The handbook/manual is supplied in a waterproof plastic outer cover to prevent damage from rain, condensation etc. The cover of the handbook includes its own part number, which includes information as to the type of machine and issue date of manual in question.

DANGER
NOTE:- It is very important that the handbook/manual is read thoroughly - throughout, and is completely understood before attempting to attach, use or maintain the machine in any way.

NOTE:- Further copies of this handbook/manual can be obtained from:-

TWOSE OF TIVERTON LIMITED
BLUNDELLS ROAD
TIVERTON
DEVON
EX16 4JT

TEL: 01884 253691
FAX: 01884 255189

SAFETY NOTES AND WARNINGS

Throughout the handbook the following sub headings are used to draw attention to various points of importance.

DANGER
WARNING

This is used to draw attention to very important instructions which MUST be followed precisely to avoid injury or death.

CAUTION

This is used to draw attention to instructions which MUST be followed to avoid damage to operator, machine, process or the environment.

NOTE:-

This is used to highlight points used for supplementary information.

ABOUT THIS MACHINE

This is a Hedgetrimmer of the type known throughout the agricultural industry as a "Flail type Hedgetrimmer".

It is intended to be attached to an agricultural vehicle by a system which allows for a drive in couple-up via fitted vehicle axle brackets 'quick' latch on brackets, giving a firm/solid and approved 'axle-lock' system.

A Category '3' top link system is used to support trimmer on tractor and to allow adjustment and ensure unit can be positioned correctly according to tractor size.

The purpose for its production and its sole intention is to cut/trim hedges, banks and verges etc.

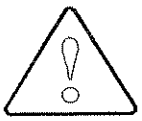
AT NO TIME must these machines be used for anything other than, or to do any job other than that for which they have been designed (see note above).

"NEVER USE JIB ARMS AS A CRANE!"

HEALTH AND SAFETY POINTS

DANGER
WARNING

Contact your dealer should you need advice, assistance, or if you do not understand any part of the manual or machine.
NEVER ASSUME - if you are not sure - ASK.



DANGER
WARNING

Never attempt to assemble, couple up, or operate machinery until you understand fully the functions, controls and safety precautions required, as shown in the operators manual.

DANGER
WARNING

Always follow tractor safety operations and instructions VERY carefully.

NEVER TAKE RISKS

DANGER
WARNING

NEVER LEAVE TRACTOR SEAT WHILST ENGINE - OR MACHINE IS RUNNING

DANGER
WARNING

NEVER USE HEDGETRIMMER BOOM ARMS AS A CRANE IN ANY FORM.

CAUTION -

It may be necessary to stabilize the whole unit once coupled up - by ballasting tractor's rear wheels and/or fitting counterbalance weights to tractor.

Tractor rear wheels could also be set out to a wider track setting as a further method of increasing stability. (Check with agent).

CAUTION -

Be aware of all warning and instruction stickers on the machine as care must be taken and instructions obeyed.

CAUTION -

A machine MUST NOT be altered or modified in any way without permission.
No liability will be accepted in respect of a machine which has been modified without the manufacturers permission.

DANGER
WARNING

Never drive machinery at speeds that could cause danger to other persons or properties, or in a manner that may cause accidents.

DANGER
WARNING

Never attempt to service/work on/adjust in any way any machinery that is in an unsupported or poorly supported state.

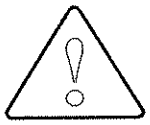
For example:

Any three point linkage mounted machinery
Front Loaders
Digger Booms
Hedge trimmer booms
etc.

Always ensure that machinery is safely supported and propped in position.

DANGER
WARNING

Always ensure that the wheels of any wheeled implement or machine are chocked firmly and that the implement will not move, before attempting to service or work on the implement/machine in any way or form.



DANGER
WARNING

Always SWITCH OFF tractor engine before attempting to carry out adjustments, service repairs or inspections on machinery.

DANGER
WARNING

Always be aware of your surroundings, and operate machinery accordingly. Beware of confined or tight areas and restricted height due to buildings, overhangs, etc. Drive and operate machines with weather conditions in mind; such as sun, rain, ice, snow, wind, etc. **Make allowances for all situations.**

CAUTION

Never operate machine in a reckless or uncaring manner. Respect other road users and be patient.

HIGHWAY USE

When operating machinery on the Highways the operator should consult the local Highways Department regarding notification and approval, as rules and regulations will vary from local authority area to area. The Highways Department regulations must be followed.

NOTE:-

In general it is expected that the tractor/implement will follow (go with) the flow of traffic - but this should be confirmed by consulting the local Highway Authority rules.

Always use 'STOP/GO' boards or whatever system the local Highways Department advise and ensure that these are positioned correctly in relation to the machine's operating area.

Have respect for passing traffic and keep any passing lane free from obstruction.

Allow time for walkers and cyclists to clear the site. Consult the Lighting Regulations for correct procedures when using or travelling on the highway.

CAUTION

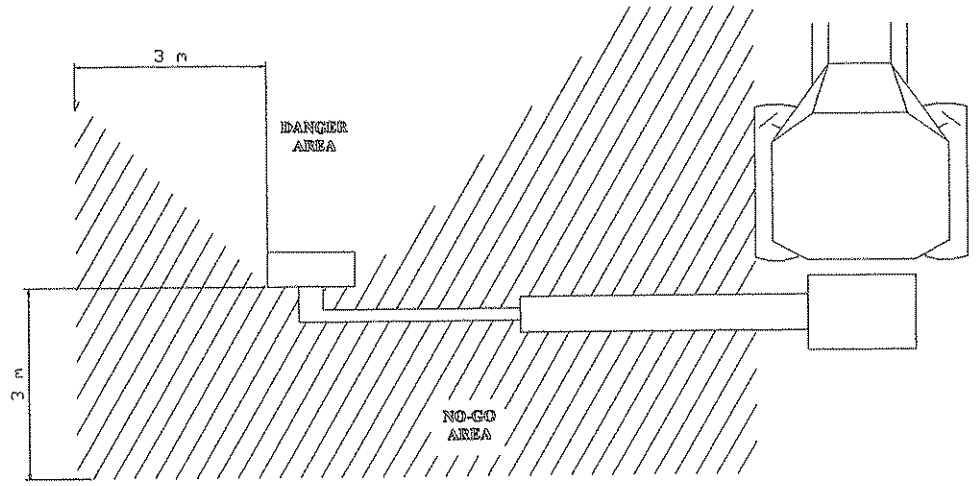
Never carry passengers on machinery or on tractors.

Ensure bystanders/onlookers are kept well away from the operational area of the machine.

NOTE:-

NEVER ALLOW ONLOOKERS/BYSTANDERS TO STAND IN FRONT OF CUTTER HEAD OR IN LINE WITH FLYING DEBRIS.

A sideways and rearward NO-GO area should be kept:



CAUTION - **Never** operate cutting rotor with blades looking towards operator or towards others.
Cutters must always be operated towards hedge or bank/verge etc.

CAUTION - Never walk underneath the machine for any reason, especially if unit is still operating.

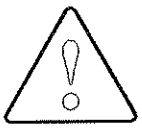
PARKING MACHINE.

When machine is being removed from tractor linkage and being 'parked up' it is essential that a good firm base and level site be found.

CAUTION Never allow children to play on, or around, parked machinery.

CAUTION Never wear loose fitting or ragged clothing which could get caught in machinery or controls.

CAUTION Always chock and prop machine to ensure a good firm position for parking. Ensure that stand legs of machine are correctly locked into position.



DANGER
WARNING

Always ensure safety screens are fitted into position to protect operator from flying debris.

CAUTION

Ensure visibility is clear through cab-screens at all times.

CAUTION

Ensure workstation controls, joysticks, cable levers etc. are positioned correctly to suit operator, and not obstructing other driving functions.
Controls MUST not obstruct entry and exit to cab.

Worn-out and spent waste oil, grease and other noxious substances must always be disposed of in suitable and legally approved dumping containers suitable for the waste in question.

CAUTION

Always dispose of discarded or worn out parts thoughtfully - by disposing of them in an approved and specified legal scrap site, bin or skip.

CAUTION

Ensure booms are folded onto the rubber buffers fitted and that the whole machine is folded in as close to the tractor as possible for transportation.

CONTROL LEVERS (CABLE MACHINES)
(AUTOMATIC SAFETY).

The control levers which operate the hydraulic boom cylinders on cable control machines will automatically centralise themselves in the "CENTRE-OFF" position as soon as control lever is released. This reduces the chance of unwanted movement or overrun of booms.

JOYSTICK CONTROL (ELECTRIC MACHINE)
(AUTOMATIC SAFETY

The electronic-proportional control model of Hedgetrimmer, which has a single joystick as controller, will also go automatically to the "CENTRE-OFF" position immediately the joystick is released - cancelling all functions.

(JOYSTICK IS NATURALLY SPRUNG LOADED TO NEUTRAL - CENTRE OFF POSITION)

NOTES

AMENDMENT	DATE	DETAILS

GENERAL INSTRUCTIONS

DANGER
WARNING

1. Before attaching any machine to a tractor or loader ensure that implement is still standing firmly on a good solid level site. (This will depend of course on how well the site was chosen previously).
Check that any wheels are chocked correctly and that supports/props are in position where necessary to prevent booms, etc. from dropping.

2. Before and during the manoeuvring of the tractor or vehicle to attach machinery/implements, make sure that No other persons are in the vicinity. Keep other persons well clear and make known your intentions, all the while keeping a sharp lookout whilst reversing and aligning machines for coupling up.

3. Always ensure that brakes are applied correctly to secure the tractor into the selected position. This will prevent the vehicle from moving off on its own to cause injury and damage.

4. Make sure that the lift arms and top link ball ends of the tractor are properly fitted to the machine/implement by using correct adapter sleeves where necessary. Retaining pins of the correct type should be used on all three point linkage points. Secure pins with relevant pin and ring assembly.

5. If the machine is of the drawbar type - check that the hitch on the tractor is in good condition and that the hitch pin used is of the correct size and type, and is properly secured when fitted.

6. Should it become necessary to make any adjustments or service the machine while raised on the tractor linkage, or raised on a front end loader, trestles or suitable supports MUST be positioned to support machine to prevent accidental dropping of lift arms, loader arms or mechanical failure.
[MACHINE MUST ALWAYS BE PROPPED AND CHOCKED]

7. Never attempt to work on, adjust or service/repair machinery of any kind whilst it is still running or working. Always stop the machine and STOP THE TRACTOR ENGINE before any adjustments/service/repairs begin.
(SWITCH OFF TRACTOR ENGINE BEFORE LEAVING TRACTOR SEAT)

8. In transit always use transport stays or locking devices where provided.
If, as in the case of some longer machines, the unit is transported lengthways, make sure that the front of the tractor is suitably ballasted to maintain stability.
A method of achieving this is to add suitable weights to a correctly specified and fitted front weight frame.

9. Always use machines in a sensible and reasonable manner and do not attempt to use them for work for which they are not intended. Avoid overloading and abusing them as this can cause damage to machine and tractor and can be very dangerous.

10. When unhitching/detaching a machine from a three point linkage or from a front end loader ensure that any stands or legs are securely positioned. The machine must be parked where it will not be a safety hazard or cause annoyance to others.
Make sure that chosen parking site is firm and level.

11. Carry out regular periodic maintenance, always with safety in mind.

12. Ensure regular maintenance procedures are maintained for the lifetime of the machine.

13. **HEALTH AND SAFETY RULES AND REGULATIONS <u>MUST</u> BE ADHERED TO IN ALL AGRICULTURAL RESPECTS.**

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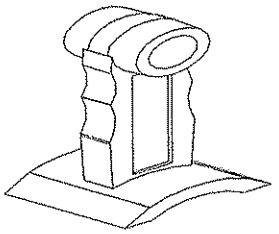
INTRODUCTION

1. The Twose range of Boom Flail Trimmers has been designed with both the farmer and the contractor in mind - which has resulted in a boom flail with a very high specification - with many features not found on other machines.

2. The construction is of welded steel fabricated assemblies - with many and varied options available covering such things as controls, hydraulics, heads, booms etc. The cutting head is of a 'double skin' construction.

3. The cutting flail blades offered are:-

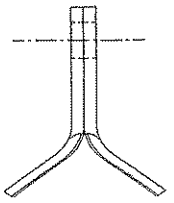
(a) Heavy, double-edged design, one piece.



- For UP or DOWN cutting

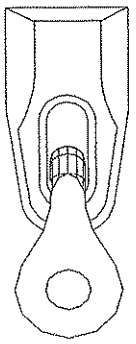
- Suitable for all types of conditions and growth.

(b) Back to back rigid, one piece blade, in pairs.



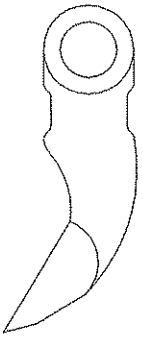
- For UP or DOWN cutting, grass mowing and trimming.

(c) Back to back on shackle, in pairs.



- For UP or DOWN cutting of grass and mowing.

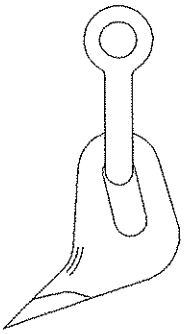
(d) Heavy single edge blade flail (twisted pattern).



- For grass cutting and hedge trimming

- Cuts one direction only

(e) Boot Flail (on shackle).



- For grass cutting and hedge trimming

- Cuts one direction only.

4. The cutter head design is of a double skin construction for greater strength and longer life. The drive is by vee belts from the hydraulic motor to the rotor.

5. Twin vee belts take the drive from motor to rotor; giving the reliability and shock protection that a belt drive system provides.

6. A hydraulically powered break back system is built into all models. This protects components when encountering obstructions, but can also act as an aid when cutting in difficult and awkward corners.

7. Four parking stand-legs are fitted to machine - 2 of which are screw adjustable for height variation, these are situated at the rear of machine on arms just out board of lighting board channel. These 2 legs pivot through 90° for storage during work/operation periods. The front 2 stands are positioned on the actual attachment arms (which are the members that couple machine to axle brackets). These legs are adjustable to give various height options by means of pins through a range of hole options.

ON CABLE OPERATED MACHINES.

8. A float system is included for the cutter head - to allow unit to follow the ground contours when bank/verge mowing. The float position is found simply by putting control valve into 'detent' position.

9. Hydraulic hoses on machines have been kept as unobtrusive as possible - few are visible. The booms have been designed to allow the hoses to run through them.

10. Forward looking booms are available for some models, as options to give a mid-cut position (alongside tractor) as opposed to the in line geometry of standard booms.

11. Float control - Cable operated Machines.

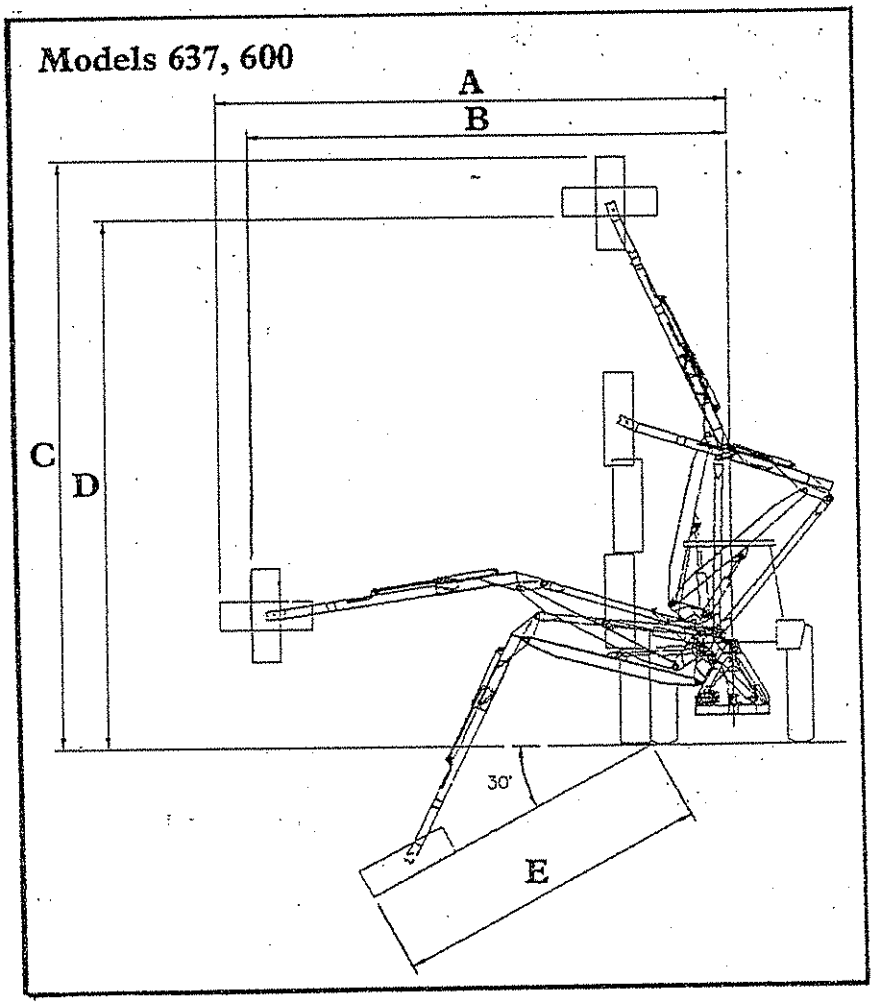
These machines have a relief valve in system to main primary ram which prevent units being powered into floor, causing undue pressures. This acts as a safety feature for the whole machine - useful when cutting verges, banks etc. (Relief only the drop side of cylinder).
Hydraulic 'head-float' also controlled by ON-OFF toggle switch.
The control valve contains a pre-set relief on head rotation slice - allowing head to move once a certain pressure is reached, this is a safety protection.
The same valve slice also has a detent facility for head flotation.

Float control - Electric Machine

The electric machines have a relief valve in the system to the main primary ram which prevents unit being powered down into the floor causing undue pressure.
(Relief only on the drop side of cylinder).
Hydraulic 'head-float' also controlled by ON-OFF toggle switch.
Also these machines have a float system which is switched ON-OFF by means of a simple toggle switch.
The float pressure is variable over a controlled range, setting is by a rotary potentiometer.

12. Machine operation is controlled remotely by either cable via lever, or electronically through a proportional valve system - with single joystick controller. On all fully independent machines direction of cutter head rotor is controlled by a cable.

13. Never attempt to unfold or operate booms whilst machine is looking directly in line with tractor. This would put unrealistic loads on pivots, especially the 'top link'. The only time booms can and should be opened to full reach - extent is when in cutting mode (at 90° to the tractor) and this should be the only position when full reach may be required. Only when in the transport position, should booms lie in line with tractor - but on these occasions the actual booms should lie over cab and therefore undue loading would not occur.



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DOWNWARD REACH		E	4.4(14' 5'')	3.4(11'2'')

TRACTOR SELECTION FOR 637 AND 600 FLAIL HEDGETRIMMERS

Tractor size must be a minimum of 67kW (90 HP)

The tractor must be equipped with a power take off shaft which must be run at 450 R.P.M during operation.

The P.T.O shaft should run clockwise when looking at the rear of tractor and ideally should be 1 3/8" S.A.E - 6 spline type enabling a standard P.T.O shaft to be fitted.

Tractor must have counterbalance weights fitted if necessary (on approved mountings) and/or ballasted wheels may be found an advantage to ensure unit is stable.
Tractor rear wheels could also be set at a wider track setting to cure stability problem - contact agent for advice.

Four wheel drive tractors, with their extra weight, larger front wheels and better grip tend to be more stable when operating these machines.

ATTACHING MACHINE TO TRACTOR

We assume here that machine is standing on a good level and firm base, as this is the requirement for when it was last parked.

Ensure area for attaching machine to tractor is free from any bystanders or onlookers.

READ AND UNDERSTAND the general and Health and Safety instructions given in this manual.

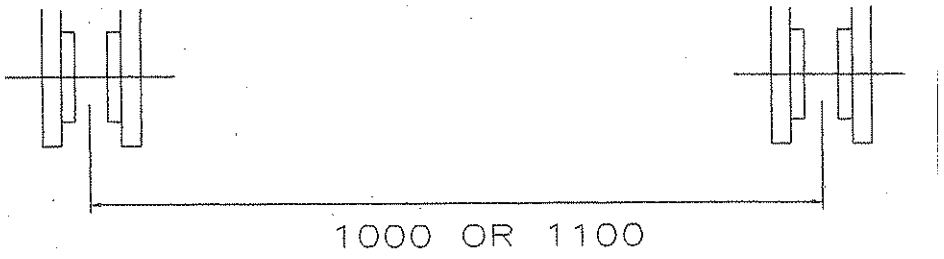
(Sub-frame Mounted Machine Only).

1. Fit rear axle brackets to the tractor (Technorton).

The brackets supplied will only be suitable for the model of tractor to which the hedge trimmer is to be fitted as they are made specifically to suit individual makes and models. For this reason it is important that the correct make and model of tractor was specified when the sub-frame kit was ordered.

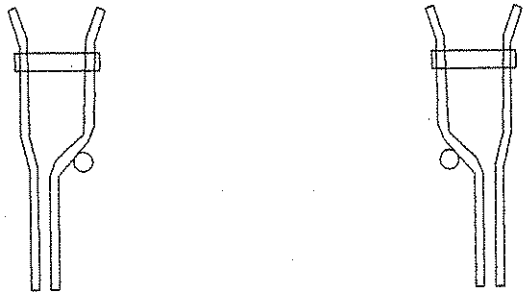
A complete set of fitting instructions will accompany each set of axle brackets supplied. These instructions are supplied by the approved bracket manufacturer.

The brackets can either be fitted at 1000 or 1100 centres as shown below :



2. Setting sub-frame to suit tractor **(To be carried out by the dealer).**

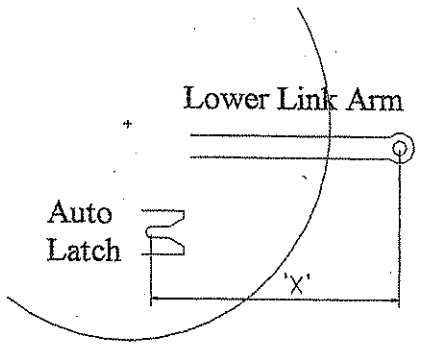
The width of the brackets first needs to be set to suit the width at which the axle brackets were fitted, either 1000 or 1100 centres. This is shown in the diagram below.



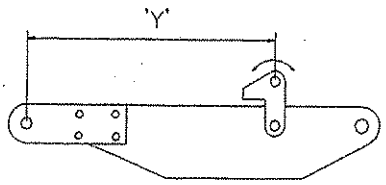
Cranked jaw assemblies set for 1000 centres.

Cranked jaw assemblies now opposite and set for 1100 centres.

2.1 The overall length of the sub-frame now needs to be set



First set tractor link arm so that it is horizontal, then measure the horizontal distance between the centre of the lower link eye and the centre of the Auto latch, distance 'X'.



The cranked jaw assemblies must now be bolted to the sub-frame using the bolts supplied ensuring that the correct width is selected and that length 'Y' is the same as length 'X' (to within 50mm).

If this not achievable using the pre drilled holes, extra holes may need drilling.

The correct width and length should now be set.
To check the settings are correct :

a) Attach sub-frame to axle bracket latches making sure that they are 'home'.
b) With the rear of the sub-frame resting on the floor attach the lower link arms to the swinging links on the sub-frame ensuring this can be easily achieved within the arc movement of the link.
c) The sub-frame should now be carefully raised until horizontal ensuring at all times that the frame does not catch anything or that the swinging link on the sub-frame never reaches the end of its arc movement (adjust if necessary).
d) Now that the correct position of the cranked jaw assemblies has been achieved these jaw assemblies must now be welded to the sub-frame **100%** by a **QUALIFIED WELDER.**

Note :
The sub-frame must be welded complete before attaching to the hedge trimmer.

Now follow instructions from Item 4 Page 30.

1. Fit rear axle brackets to tractor

Note:- Brackets supplied will be suitable for your model tractor only - as they are made especially to suit individual models. Hence the requirement to specify tractor - model/type when ordering machine from new.

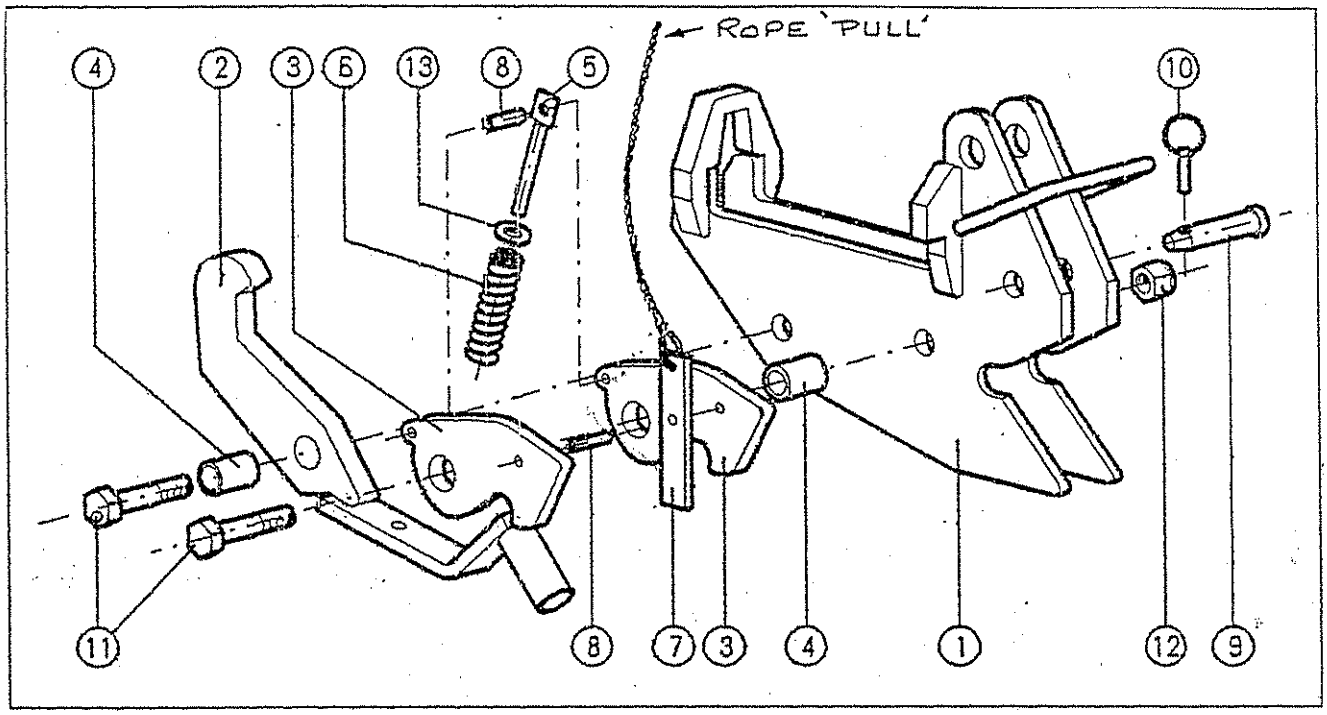
A complete set of fitting instructions will accompany each and every set of rear axle brackets supplied. These are prepared and supplied by the approved axle bracket Manufacturers.

As an example and for 'reference only' we show below fitting instructions as supplied for "Ford 10 Series - Force II and III tractors" only.

IMPORTANT IT MUST BE UNDERSTOOD THAT THIS IS A SAMPLE SET OF INSTRUCTIONS ONLY - and shown only to help acquaint customers/fitters with basic fitting ideas and procedures.

TRACTOR FITTINGS
CAT II DRIVE-IN HITCH ASSEMBLY

WARNING: These hitches must NOT be used on tractors of less than 56kW (75 HP)



PARTS LIST FOR DRIVE-IN HITCH No. 20-XXA-001

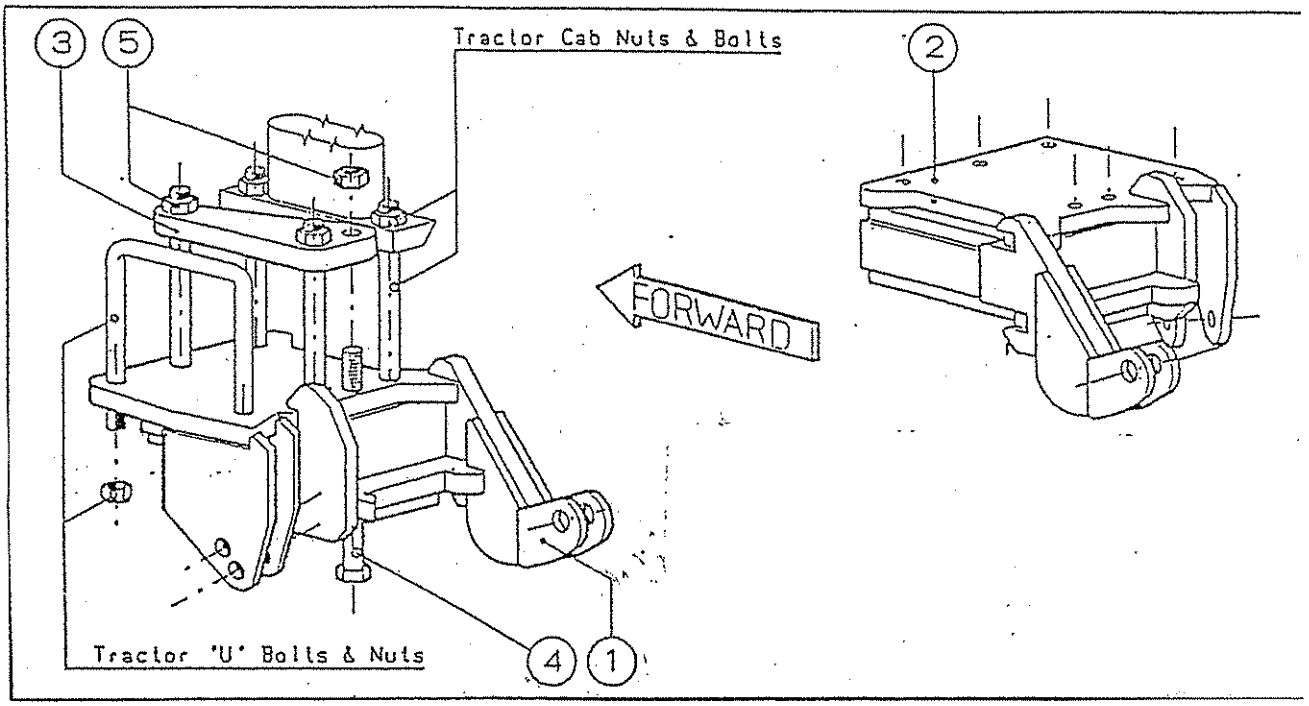
ITEM	PART NO	DESCRIPTION	QTY/ASSY
1	20-XXA-002	Hitch Body W/A	1
2	20-XXA-003	Plate Latch W/A	1
3	20-XXA-004	Hitch Hook	2
4	20-XXA-005	Hook Pivot Sleeve	2
5	20-XXA-008	Spring Guide	1
6	20-XXA-009	Hitch Spring	1
7	20-XXA-010	Hook Release	1
8	20-XXA-011	Pivot Pin	2
9	20-XXB-016	Safety Lock Pin	1
10		6mm Lynch Pin	1
11		M20 x 90 H.T Bolt	2
12		M20 Nyloc Nut	2
13		M12 Plain Washer	As req'd

ASSEMBLY INSTRUCTIONS

Assemble components as shown. Fit items 13 as required to give maximum compression of item 6 when item 2 is operated to full travel.

Tighten items 11 & 12 to 250NM (185lb ft) torque

TRACTOR FITTINGS
FITTING INSTRUCTIONS FOR CAT II Axle Plates to:-
FORD 10 SERIES, FORCE II AND III TRACTORS



PARTS LIST FOR SET NO. 21-FDC-001

ITEM	PART NO	DESCRIPTION	QTY/ASSY
1	21-FDC-010	Axle Plate - L.H	1
2	21-FDC-011	Axle Plate - R.H	1
3	21-FDC-012	Clamp Plate	2
4	M20 x 230 Long H.T Bolt		6
5	M20 Nyloc H.T Nut		6

INSTRUCTIONS

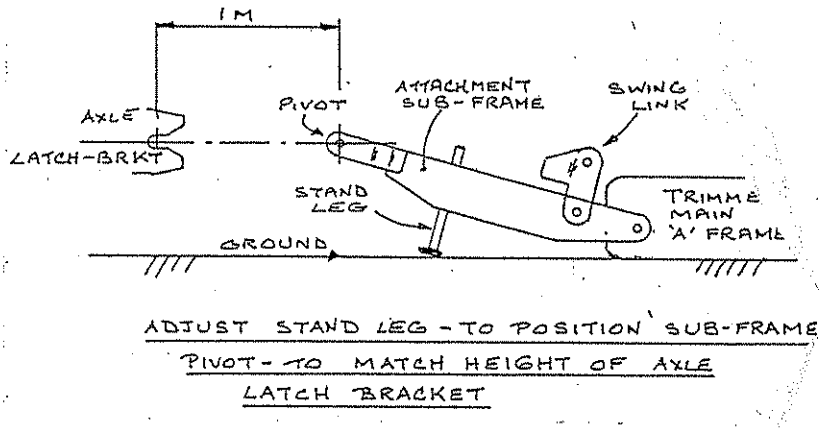
1. Remove both linkage stabilisers and/or assister ram brackets, and clean off underside of axle casings.
2. Remove both cab mounting bolts on each side and re-fit heads downward through inner pairs of holes in axle plates. Do NOT tighten fully at this stage.
3. Re-fit tractor 'U' bolts and nuts in outer pairs of holes in axle plates, and use remaining holes to fit items 3, 4 and 5.
4. Check that hitch jaws of axle plates are equally spaced about tractor centre line at 1.0m centres, and tighten cab mounting bolts to 250-300 N.M (185-220Lb.ft.) torque.
5. Tighten tractor 'U' bolts to 237 N.M (175Lb.ft) torque.
6. Tighten items 4 and 5 to 476 N.M (350 Lb. ft) torque.
7. Re-fit linkage assister rams and secure pivots.

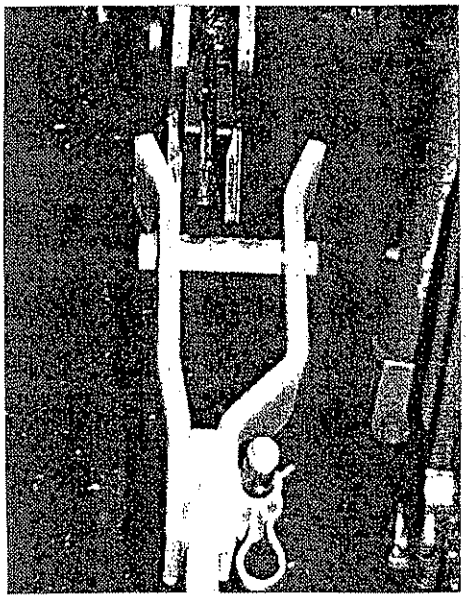
2. Note:-

If machine is being fitted to tractor for the first time - such as 'if machine is just delivered from supplier', the "sub-frame" will need to be positioned before any coupling can be attempted.

3. Reverse tractor - towards 'parked' trimmer, and stop when achieving approximately 1 metre between 'pivot pin' on sub frame and tractor axle bracket latch pin position.

Ensure axle bracket latch-on crooks are aligned with jaw-arms on tractor end of sub frame.





4. Measure from floor to centre of latch pin - position on tractor and note dimension.

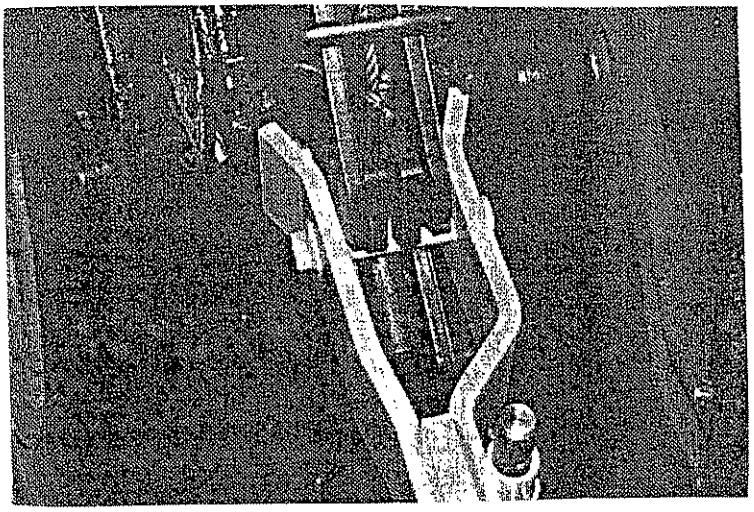
Raise sub-frame/attachment assembly at front - (tractor end) to give a height of attachment pin which is equal to, or slightly below (up to 25mm) measured dimension of latch pin.

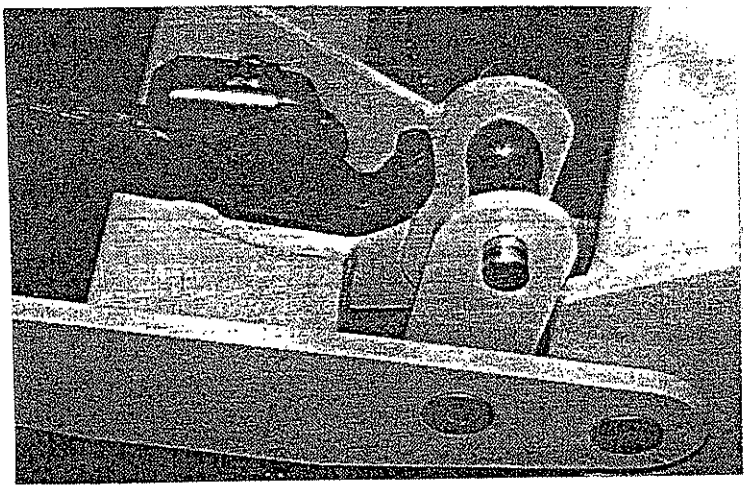
The sub frame should be held at this height position by setting the stand leg to suit. The 'R' Clip will need to be removed for this adjustment - and replaced to lock, once height is set.

5. Fit ball eye over lower link pin in 'top' of swing link bracket if tractor is fitted with automatic lower link coupling.

Reverse tractor towards trimmer - lowering the lower link arms as so doing, ensure link arms go over the top of the 'cross' tube (between side plates) of the sub frame.

Continue reversing until sub frame front jaws engage into axle brackets and latches are automatically tripped and locked.





6. The lower link arms of tractor will automatically be guided between jaws of the pair of swinging link brackets, by their own guide plate.

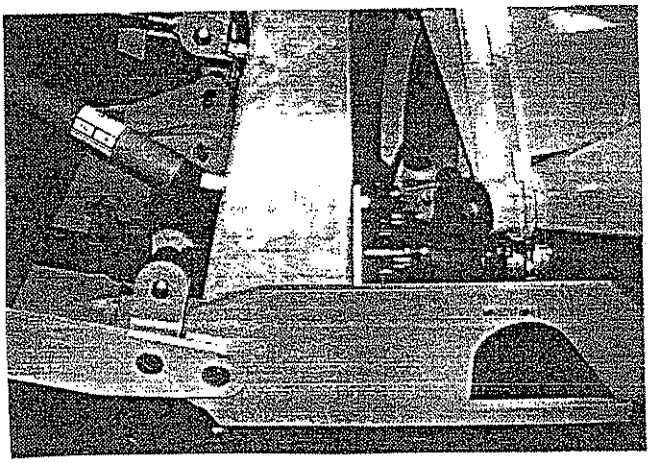
7. Couple Top-link assembly to Hedgetrimmer, using pin and linch pin supplied - then couple top-link to tractor top link position, using pin and linch pin.

8. Raise lower linkage arms to engage over ball eye on lower link pin (at top of 'swing link' bracket).

(AUTO QUICK HITCH ONLY)

- Or locate lift pin through pin eye ball and through hole in top of swing link bracket. (According to tractor design.

Secure pin with linch pin as standard.



9. The trimmer should now be raised by operating the tractor three point linkage to a height where the P.T.O drive is approximately level.

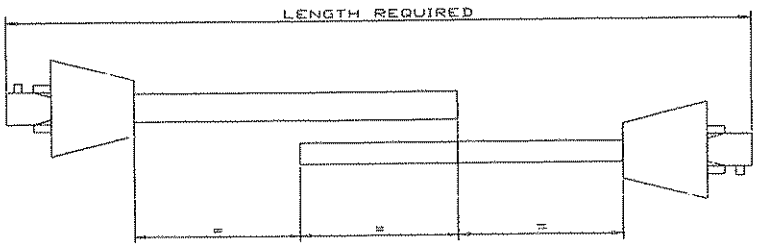
10. On tractor quadrant lever control - the control lever should be locked at this position NOW - with positioning lock.

11. STOP TRACTOR ENGINE at this point and ensure hand brake is 'ON'

12. Stand leg in attachment - sub frame should not be raised to its uppermost position, by removing 'R' Clip and sliding leg up before replacing 'R' Clip to secure.

13. Fill Hydraulic oil tank to 1/2 way up sight level gauge using hydraulic oil grade HLP 46 (Tank capacity - 241 litres).

14 Check the P.T.O shaft length - and cut to suit. When connected from tractor to machine it should engage by 1/2 of the total shaft length, i.e male port should be halfway from the end to fully bottomed out. Do not use the machine until this has been cut to correct length.



15. Fit the P.T.O shaft.

Ensure the shaft is correctly fitted to the correct splines at both ends.

Fit the anti-spin chains of PTO guard to a rigid non-turning assembly.

16. Fit controls into Cab:- Cable Machine

Fix valve control handles into position:-

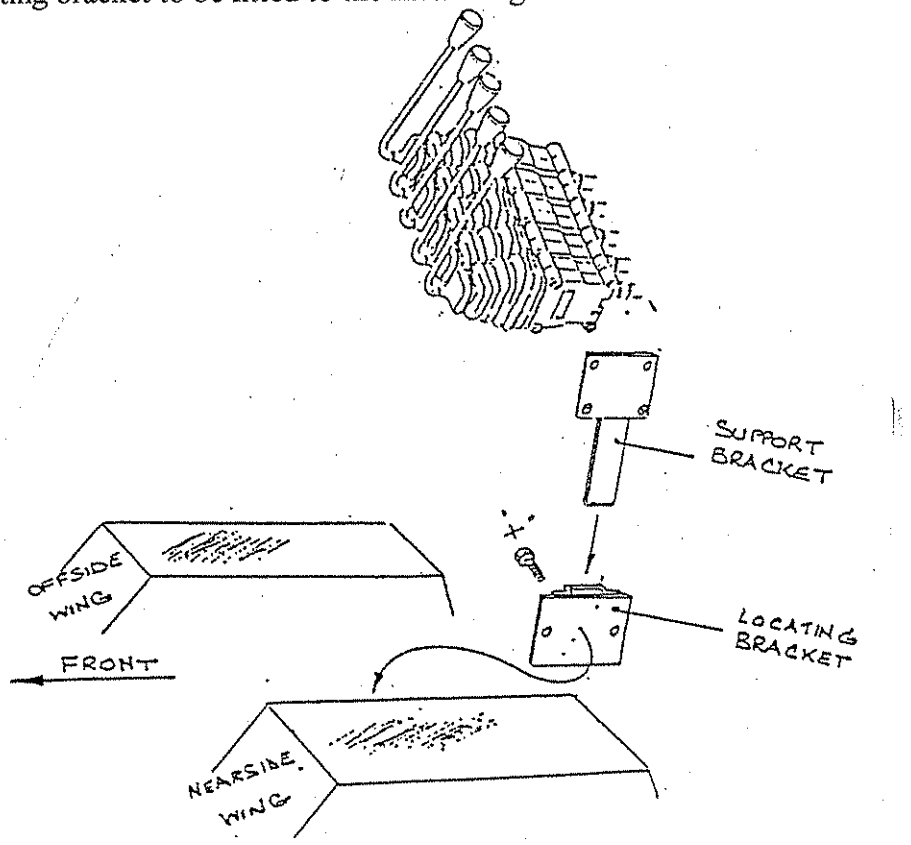
Control levers are supplied bolted together as a unit complete with a support leg to slot into a bracket supplied for fitting to the tractor.

Depending on model there may be 4, 5 or even only one controller in the set. The locating bracket should be positioned on the inner wing face of the tractor cab in a suitable position for easy operation. Bolts, nuts and washers are supplied for fixing.

It is suggested that for four and five bank controller sets the bracket is fitted to the left-hand wing for left hand cut machines and right-hand wing for right-hand cut machines.

In the case of single-bank controllers, it is suggested that the bracket is fitted to the opposite side for the control of the cutting direction and that the joystick mounting bracket is fitted to the cutting side (both brackets are however the same). Once the bracket is fitted to the cab side the controller unit can be lowered into the brackets slot and secured by tightening screw 'X' (Clockwise).

Drawing shows a bank of five controllers to be fitted to a support leg and to be fitted to a locating bracket to be fitted to the inner wing for left-hand cut machines.



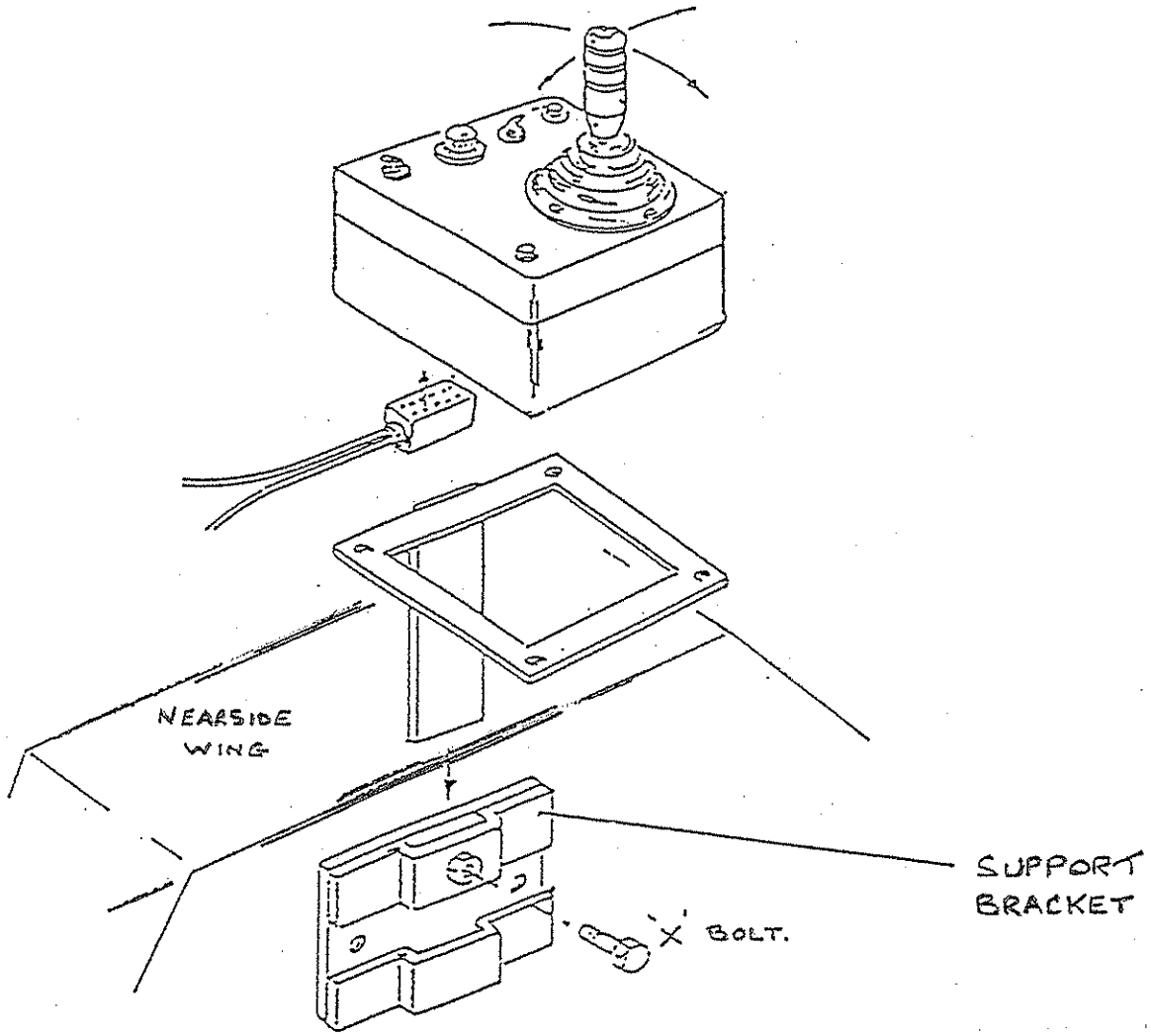
17 Fit controls into cab:- Electric Machine

Note:- The electric joystick control lever box is supplied from the factory 'as a complete assembly' which will be already bolted to its mounting stand.

First - the control box locating bracket should be positioned to inner wing face at a suitable position to suit operator/lever operation. Secure support bracket to wing in chosen/selected position with bolts. Fixing of this bracket will depend on whether machine is L.H or R.H cut.

- For left hand cut machines - fit support bracket to inner face of nearside wing.
- For right hand cut machines - fit support bracket to inner face of offside wing.

With support bracket secured into position (to inner wing) - the control box mounting leg should be lowered into slot of locating bracket (see drawing below) and secured by tightening screw 'X' clockwise.



Drawing shows layout of electrical control box fitted to inner nearside wing - to suit a left-hand cut machine.

18. The 7 pin electric plug on the end of Hedgetrimmer lead must be connected into the 7 pin electric socket - fitted to the majority of tractors.

Tractors without such a socket MUST have a unit installed.

19. The other attached 7 pin (in line) connector on fly lead must be coupled up to the mating half on the lighting board.

20. The multi plug should now be connected to its matching socket situated at base of joystick control box/enclosure, and secured into position by its own lock/clamps.

21. Safety screen mesh panels should now be fitted.

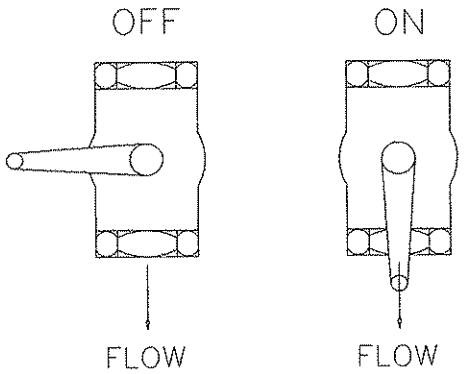
DANGER
WARNING

The mesh safety screens should now be cut and fitted. They are designed to be fitted to the cutting head side of tractor cab (i.e for left-hand cut machines to left hand side of cab). Bolts, nuts and washers are supplied for fixing purposes.

- All glass screens on the relevant side of cab must be protected.

22. Turn on oil ball valve at base of hydraulic tank.

IMPORTANT Ensure the ball valve at the base of the tank is in its 'ON' position.



CAUTION.

Never in any circumstances try to run the PTO shaft of the Hedge Cutter with the ball valve in the Off position.

23. Tractor engine can now be started up.

24. Turn on Tractor side lights - this is to supply system with electric power.

25. Tractor P.T.O engage.

DANGER
WARNING

The tractor power take off can now be engaged CAREFULLY. Check that P.T.O. is running correctly and that the guard is not spinning.

Oil will now be pumping within the hydraulic system.

26. Cable control lever operation.

DANGER
WARNING

Test the hydraulic valves by operating the control handles or Joystick. This should be done with great care until the operator gets a good 'feel' for the controls and feels competent.

Each control lever top is individually labelled as to which operation it controls.

27.

ELECTRIC CONTROLS

DANGER
WARNING

JOYSTICK LEVER OPERATION

Test the hydraulic control systems of machine by operating the joystick control lever. This should be done with great care to ensure smooth and gentle movements of booms and rams etc. The controls should be operated and tested until operator gets a good feel for all operational movements.

MAIN FLOAT (RED LAMP) (Only required when Bank/verge cutting)

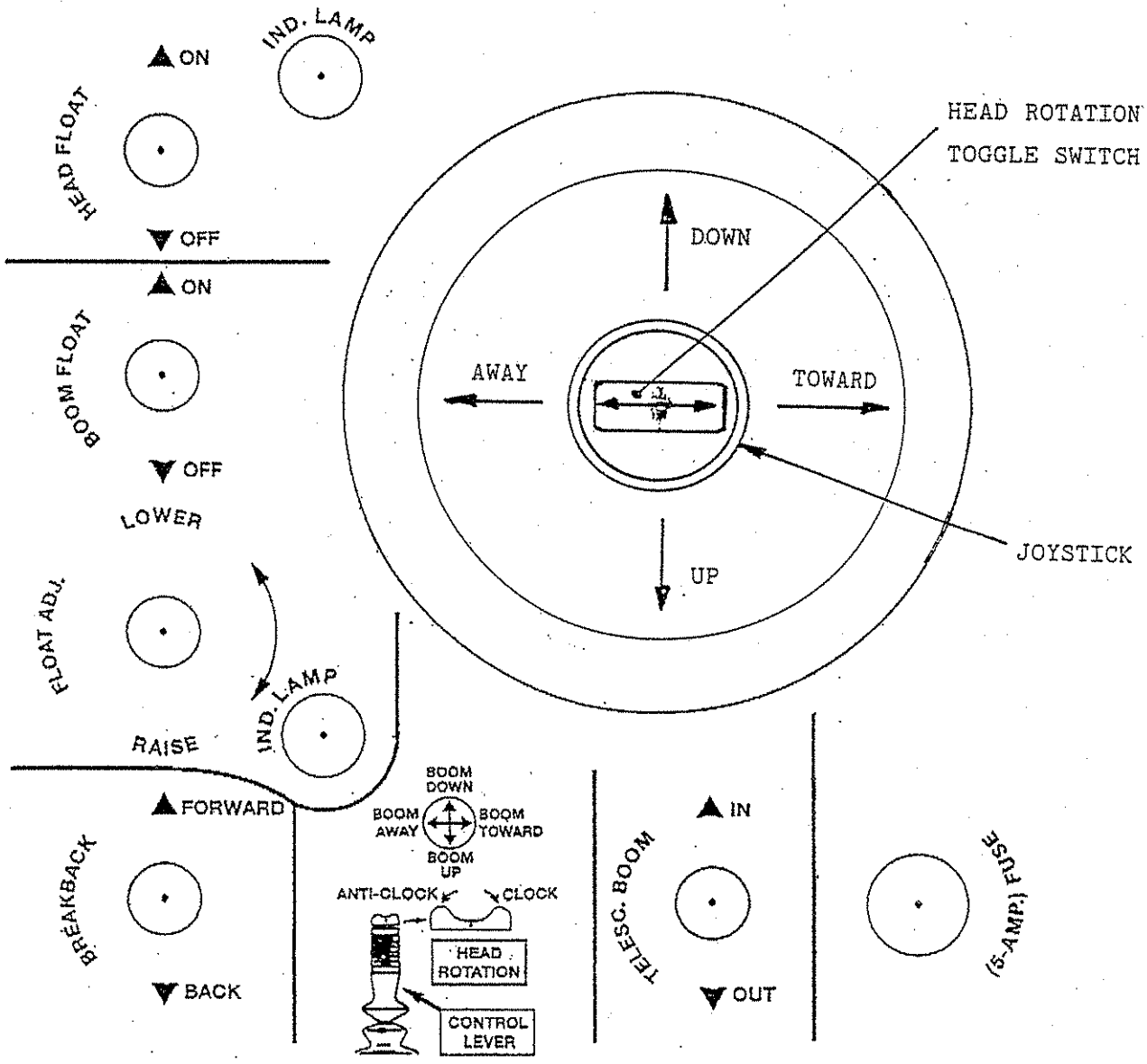
1. Ensure head is resting on floor.

2. Switch float ON (Red light will show) see drawing below for ref. to switch and lamp.

3. Adjust float pressure by turning potentiometer knob either clockwise for lighter/raise, or anti-clockwise for heavier/down pressure.
(Drawing below indicates float control section.)

HEAD FLOAT

Head float should be used in conjunction with Main Float and is operated by switch and indicated by blue lamp.



IMPORTANT

Note ensure setting of float gives a 'JUST HEAVY' position to prevent machine rising from work. By turning clockwise to find where machine rises and then turning anti clock to lower machine back to floor and then - add just a little more anti clock to settle (approximately 1/2 of a turn).
(Final tuning must always be down to the individual operator.)

Float can be overridden by moving joystick handle to raise or lower position. On returning joystick back to its neutral - central position the float will automatically come back into position.

NOTE:- If head is raised from the ground '(with float switch ON') and handle is returned to neutral position - the head will gradually return to the floor, at this time normal float conditions will resume.

VERY IMPORTANT

Float switch must be in 'OFF' position if float not required.

HEAD FLOAT (Blue Lamp)

Switch head float switch ON - (Blue lamp will show)
see Drawing Page

This float allows head only to float about its centre pivot axis.

Note: After prolonged use of float usage on banks/verges etc., a slight delay may occur when joystick top rocker switch is energised for head rotation (to recharge system).

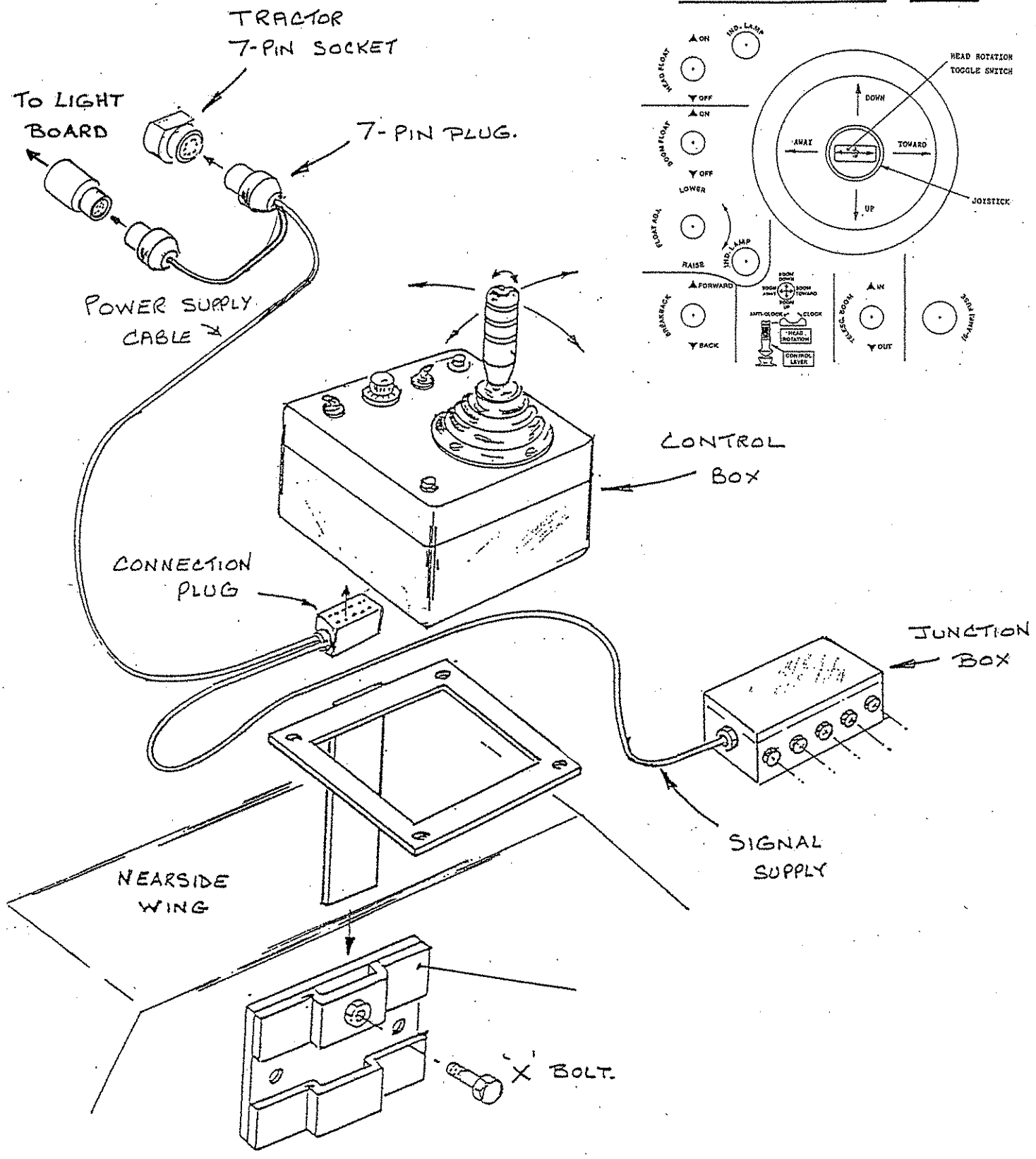
VERY IMPORTANT

Float switch must be 'OFF' if float not required.

FUSE

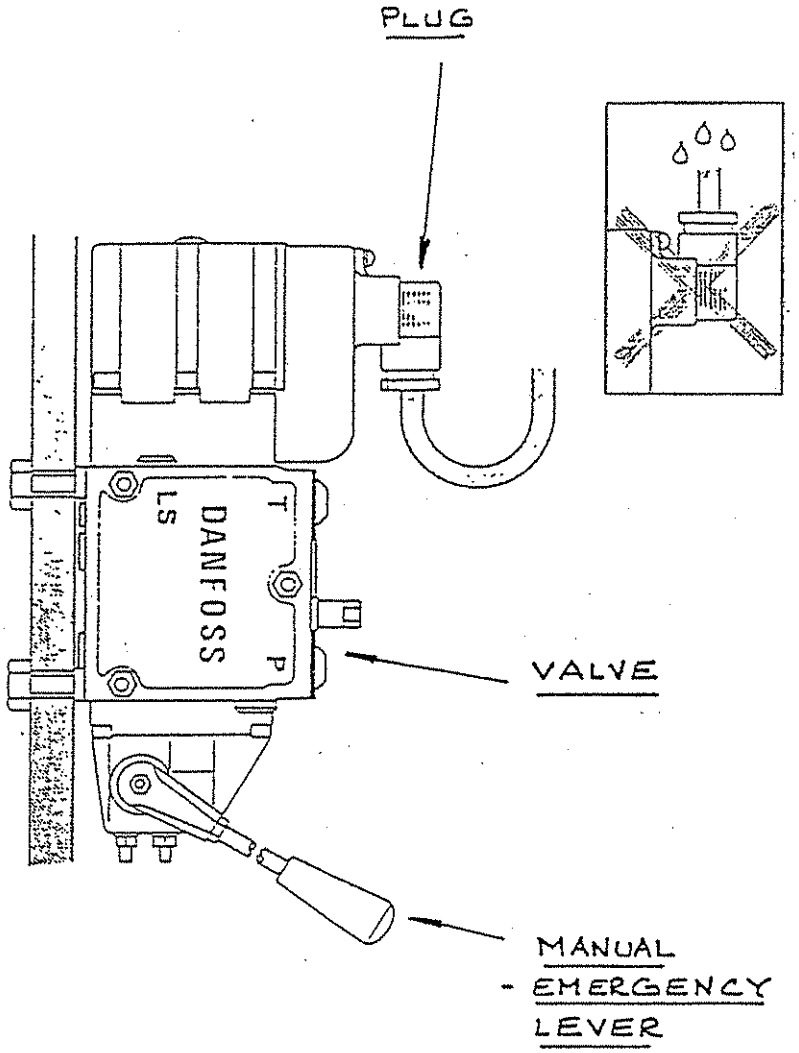
Electrical system is protected by a 5 amp fuse (1" x 1/4") BS1362

BOXTOP TRANSFER (1860111)



EMERGENCY - MANUAL CONTROL LEVER (ELECTRIC MACHINE)

The Hydraulic Proportional Valve has a manual - control lever (included with every Electric Control Trimmer) which can be used should the Electronic System fail and not function. This manual option enables user/operator to operate hydraulics and fold machine in order to move from site.



Note: This Emergency valve lever will only function and operate machine provided Hydraulic system is working.

REMOVING HEDGETRIMMER FROM TRACTOR (ELECTRIC MACHINE)

1. Ensure that the Trimmer is parked in its working position i.e arms/booms at 90 degrees to tractor, with cutting head and main frame totally on the floor.

2. Ensure site is clear of all onlookers/bystanders etc.

3. Cutting head should be positioned onto the ground (horizontally) at approx. 2m from tractor wheel.

4. Disengage P.T.O drive.

5. Turn off side lights.

6. Switch off (STOP) engine.

7. Ensure tractor brakes are 'ON'

8. Disconnect electric leads from control box and trailer socket.

9. Disconnect 'rotor-cut' lever from tractor.

10. Start tractor - (keep brakes 'ON' .)

11. Lower tractor three point linkage until Trimmer Main 'A' frame is sitting on to floor.

    Release automatic catches (if fitted) to lower link arms of tractor - or - for pin type lower links - remove link pin of lower link arm swing link.

Lift arms can now (in the case of auto-hitch lower link) be dropped slightly to clear pin - or - in the case of ('pin connect') type linkage will now be clear as pin is removed.

Set stand leg down to a position just off the ground by first removing 'R' clip and once positioned replace 'R' clip to secure.

12. Remove top link assembly.

13. Disconnect P.T.O shaft, from tractor.

14. Lower front 'slide-adjust' stands down to "just clear of the ground", and secure with pin and 'R' clip.

15. Lower rear of machine by screwing 2 rear jacks until all 4 stands are contacting the ground.

16. Start tractor engine.

17. Pull ropes (on latch) to release latch-catch from Hedgetrimmer arms.

18. Release brakes of tractor.

19. Tractor is now completely disconnected.

Release brakes of tractor.

Drive tractor slowly and carefully away from trimmer making sure that leads, cables etc. are totally clear.

REMOVING HEDGETRIMMER FROM TRACTOR (CABLE CONTROL MACHINE)

1. Make sure that the Trimmer is parked in its working position i.e booms at 90 degrees to tractor and with cutting head and main frame totally on the floor.

2. Ensure site is clear of all onlookers/bystanders etc.

3. Cutting head should be positioned onto the ground (horizontally) at approx. 2m from tractor wheel.

4. Disengage P.T.O drive.

5. Switch off (STOP) engine.

6. Ensure tractor brakes are 'ON'.

7. Disconnect all control levers from cab.

8. Rear screw jacks should be swung from horizontal lie to vertical - upright position with base downwards. This change will necessitate removal and the reinstatement of the screw jack stay.

9. Screw rear pair of adjustable legs until legs reach the floor. Continue winding (in the same direction), until Top Link pins become slack.

10. Start tractor - (keep brakes 'ON'.)

11. Lower tractor three point linkage until Trimmer Main 'A' frame is sitting on to floor.

    Release automatic catches (if fitted) to lower link arms of tractor - or - for pin type lower links - remove link pin of lower link arm swing link.

Lift arms can now (in the case of auto-hitch lower link) be dropped slightly to clear pin - or - in the case of ('Pin connect') type linkage will now be clear as pin is removed.

Set stand leg down to a position just off the ground by first removing 'R' clip and once positioned replace 'R' clip to secure.

12. Remove top link assembly.

13. Disconnect P.T.O shaft, from tractor.

14. Lower front 'slide-adjust' stands down to "just clear of the ground", and secure with pin and 'R' clip.

15. Lower rear of machine by screwing 2 rear jacks until all 4 stands are contacting the ground.

16. Start tractor engine.

17. Pull ropes (on latch) to release latch-catch from Hedgetrimmer arms.

18. Release brakes of tractor.

19. Tractor is now completely disconnected.

Release brakes of tractor.

Drive tractor slowly and carefully away from trimmer making sure that leads, cables etc. are totally clear.

VERY IMPORTANT

FLAIL TRIMMER
- OPERATION INFORMATION

The vehicle driver should be conversant with all tractor controls and capabilities.

It is always advisable for the tractor driver to practice the controls and operations of the Flail Trimmer prior to setting off into work.

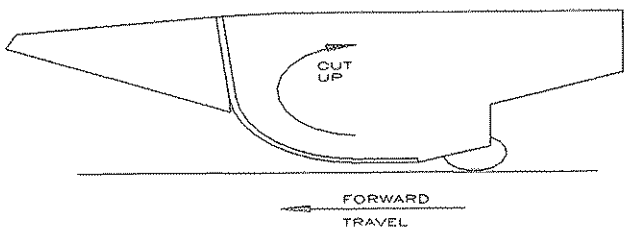
The speed of operation of Trimming will depend on the size, quantity, and type of growth to be cut. A slow speed to suit the conditions, should be selected, ensuring that engine speed gives a P.T.O speed of 450 r.p.m for general use.
This 450 r.p.m (P.T.O) is recommended for best trimming results and performance.

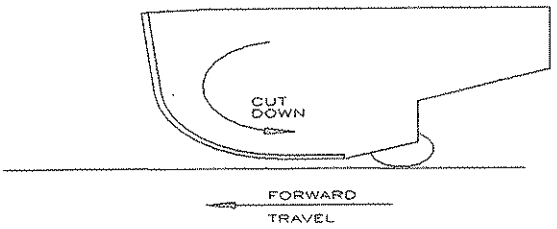
Variation from this recommended R.P.M should be kept to a minimum and never at any time should P.T.O R.P.M exceed 540 R.P.M.

ROTOR ROTATION - DIRECTION:-

Depending on the type of hedge to be cut, an option of rotation direction is offered. The 'upward' cut is recommended for trimming grass, light growth such as one/two years growth.

DOWNWARD CUTTING IS NOT RECOMMENDED - and should only be considered for really heavy - large diameter growth cutting. Even then, it is important that down cutting be limited to minimum, very short periods only.





DANGER

VERY IMPORTANT

It is very important that motor spool and motor spool control lever works one direction, from centre 'OFF' position to selected 'rotor cut' direction 'ON' position. Giving rotor - one direction of cut only, and an 'OFF' setting. Thus eliminating chance of going from cut-up to cut-down in one movement of controller and blowing the system.

Only by altering LOCK-LEVER setting can direction of control lever be changed.

VERY IMPORTANT (DANGER)

DANGER NEVER CHANGE DIRECTION OF ROTOR CUT WHILST ROTOR IS STILL TURNING.

DANGER ALWAYS ALLOW ROTOR TO STOP SPINNING COMPLETELY BEFORE CHANGING CUT ROTATION (DIRECTION)

IMPORTANT

When leaving factory the machine will be set for 'standard' 'upward' rotor cutting - unless specifically requested.

DANGER

IMPORTANT

In heavy going - cutting large diameter growth with front cowling removed, the rotor MUST ALWAYS CUT DOWNWARDS AT FRONT. At no time should the rotor be cutting upwards at front with front cowling removed.

ROTOR CUT DIRECTION MUST NEVER BE CHANGED IN ONE MOVEMENT

The controller lever head for motor spool control is designed with a "LOCK-ARM LEVER" which must be operated as follows:-

NOTE:- FOR MORSE CONTROLLERS ONLY (RED CABLES)

FOR DOWNWARD CUTTING OF ROTOR

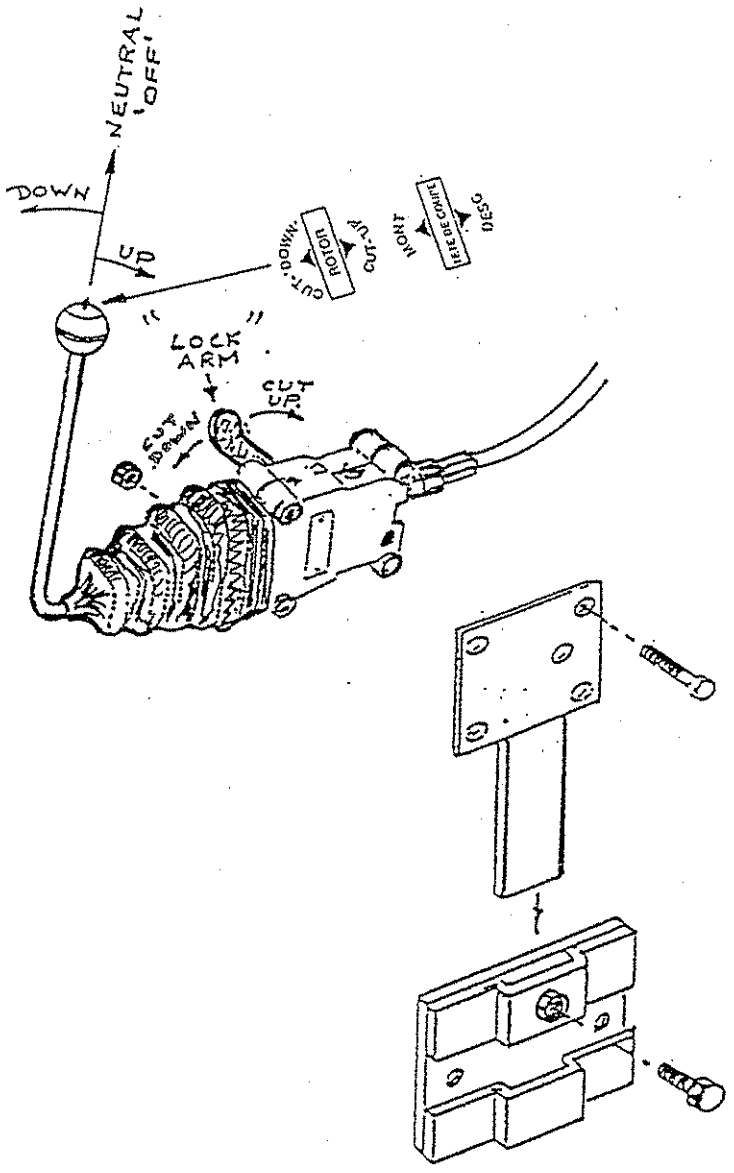
Position "LOCKARM" forwards and downwards (see drawing Page 44). Control lever will now only move from neutral 'OFF' position to 'AWAY', down position only.

To change to UPWARD CUTTING OF ROTOR

ENSURE ROTOR IS NOT ROTATING AT ALL - MUST BE TOTALLY STOPPED.

Move 'LOCK-ARM' rearward - fully (see drawing below).

Control lever will only move from neutral - OFF position to 'TOWARDS' up cut position only.



NOTE:- FOR T.M.C CONTROLLERS ONLY (GREY CABLES)

(- FOR DOWNWARD CUTTING OF ROTOR)

Position long end of pin through "rotary control spindle" forwards and downwards. (See drawing following this text).

Control lever will now only move from NEUTRAL 'OFF' position to 'AWAY' - down position only, thus giving a down-cut system.

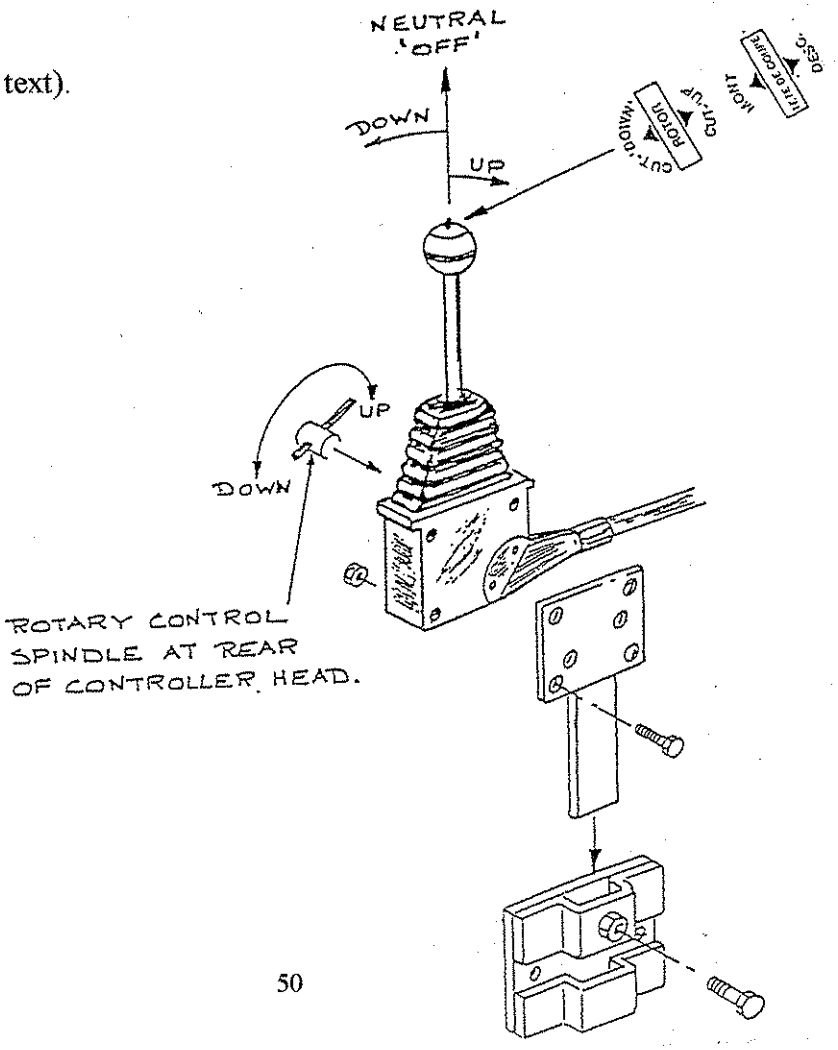
- - - * - - -

To change to UPWARD CUTTING OF ROTOR

ENSURE ROTOR IS NOT ROTATING AT ALL - MUST BE TOTALLY STOPPED (AT A STANDSTILL)

Turn rotary control spindle via - pin through shaft to a position where long end of pin is rearwards - horizontally. This will permit lever to travel from NEUTRAL-'OFF' position to 'TOWARDS' - up cut only.

(See drawing following this text).



HYDRAULIC CONTROLS - CUTTING POSITION

The cutting head must at all times be lowered gently into cut position. Never drop head into hedge at speed.

When cutting at ground level (grass etc.) the head must be lowered gently to give a slight contact pressure of roller to ground.

IMPORTANT: Ensure rotor and roller do not get involved in high obstacle forces such as rocks, stones, stumps etc. Keep rotor away and free from wire, as to entangle wire into rotor is very dangerous and very costly.

Should large obstacles be encountered or wire caught in rotor STOP IMMEDIATELY. Reset or clear before starting.

Normal obstacles and level variations should be overcome by operator by slowing 'forward motion' and raising/lowering the booms of trimmers to suit.

CUTTING HEAD

The cutting head rotor has been balanced prior to fitting, this will ensure a vibration free cutting unit.

Should the rotor become blocked for any reason, hit an obstacle, loose a blade or blades, the rotor may be put into a state of unbalance. This will result in vibration from the rotor being transmitted through the head.

Should this happen STOP IMMEDIATELY, as to continue could have serious consequences.

Once stopped clean rotor and check for loss of blades and bolts, replace as required.

Insecure causes and as a result of hitting solid objects with serious force the rotor can be bent, this will obviously cause vibrations. In such cases the only answer will be to get rotor repaired/rebalanced or replaced.

TRANSPORTING

To put machine into 'transport' position the following procedure should be followed:-

1. With machine at 90 degrees to tractor (as for working - fold booms together as close as possible - with head approx. 1.5mm off floor, and extending boom fully retracted.)

2. Close head angling ram totally.

3. Swing whole trimmer assembly now through 90 degrees so as booms are in line with tractor.

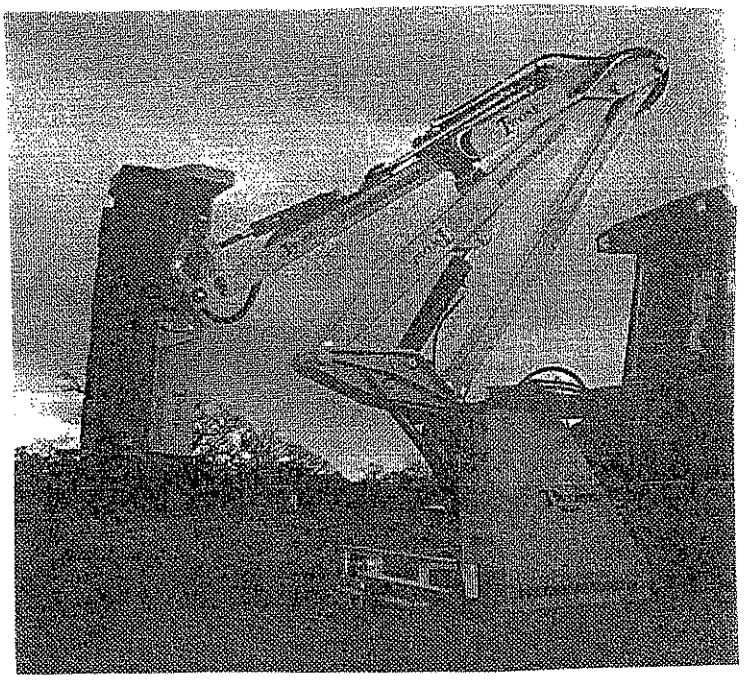
4. Close 2nd ram to bring 1st and 2nd booms together until fully closed and contacting buffer.

5. Extend 1st ram until tie arm is approx. 300mm from cab roof.

6. Rotate cutting head until unit is vertical.

7. Disengage P.T.O drive.

8. Cooler fan could also be switched off.



Machine now in transport position.

Always transport machines at a speed that is sensible - too fast a speed can cause problems.

FLAIL HEAD

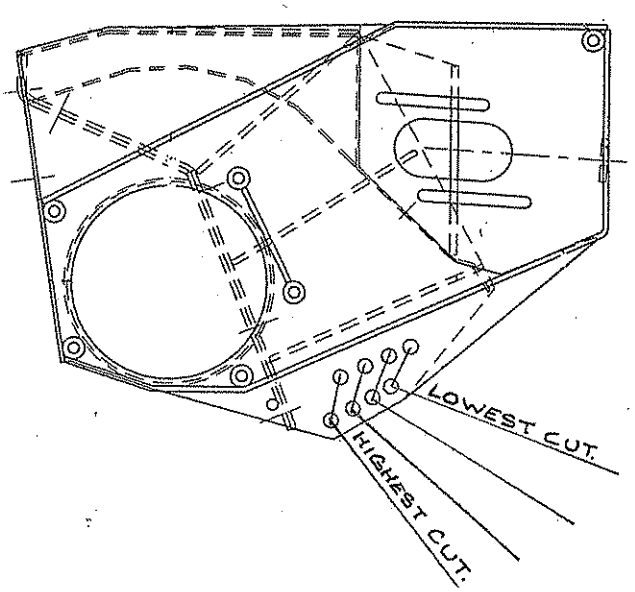
Keep the cutting blades VERY SHARP: this should be inspected daily. Bolts and nuts holding flails to rotor should be checked frequently and kept **tight.** Missing or broken flails should be replaced immediately, as the imbalance will rapidly harm bearings and structure. When a flail is renewed its opposing pair should be renewed also to maintain balance.

Check vee belt tension on cutter head daily: a load of 5 Kgs (10lbs) should give a deflection of 9mm at these pulley centres. Access to the belts is by removing the guard panel on the side of the drive end. Tension is adjusted by first slackening the bolts mounting the motor (nuts are held from turning on the inside). The nuts on the threaded adjuster can now be turned to give the required tension and then re-tightened and the motor mounting bolts then tightened also.

TO ADJUST ROLLER HEIGHT

The flail head cutting height control roller has various height setting options.

See diagram below:- showing four height settings, ranging from lowest cut through to highest cut.



To alter roller position the pair of end brackets and relative securing bolts will need to be positioned at either of the four position height options offered.

NOTE:- Roller generally only required when bank/verge mowing and not when hedgetrimming.

HYDRAULIC OIL

The hydraulic system will have been run-up and checked at factory prior to the machine being dispatched.

The hydraulic tank will be fitted with EXCELUBE ULTRA 46 hydraulic oil when the machine is delivered.

Tank capacity is (43 Gallons) 195 Litres.

NOTE: The filler/breather on the top of the tank is equipped with a strainer to ensure all oil is strained on entering the tank. For this reason the strainer basket should never be removed and all hydraulic oil filling must be done through the strainer.

It is advisable NEVER to mix hydraulic oils, but if another suppliers' oil is to be used, then one that is known to be compatible must be chosen (Check with oil supplier).

A bypass will operate should the return filter becomes excessively clogged. Though this protects the operator and other personnel it does mean that filtration then ceases. It is important therefore that:-

THE OIL FILTER MUST BE CHANGED AT 50 HOURS INITIALLY AND EVERY 250 HOURS THEREAFTER.

The oil level in the tank should be checked daily, using the sight glass near to the return filter.

Contamination of the oil will necessitate it being changed: this is indicated by a darkening in its colour and/or it smelling 'burnt'.

Keeping the area around the filler cap clean (particularly when removing the cap), changing filters on time and using clean containers will all help to reduce oil contamination.

GEARBOX FOR HYDRAULIC PUMP

The gearbox powering the hydraulic pump(s) will be pre-filled to the correct volume of 0.5 litres, with S.A.E EP 90 gear oil. This grade must be used when topping up. Level should be checked every few months using the sight glass on the gearbox and the oil should be replaced every 2 years.

ROUTINE MAINTENANCE AND LAYING UP

DAILY

- Check oil level in main system oil tank
- Grease pivot points regularly
- Keep the cutting blades VERY SHARP - daily inspection is required here.

WEEKLY

- Check all hydraulic fittings and hoses.
- Check vee belt tension on cutter head drive.

LAYING-UP

- Clean the machine and note any damage or repairs needed. Arrange for spares and repairs as required. Prepare for next season.
- Fully lubricate the machine totally.
- Store machine in dry - undercover conditions.
- Check vee belt tension on cutter head drive.

OBSERVE THE FOLLOWING HEDGE CUTTING OPERATIONS

WARNING P.T.O speed to be 450 RPM

DANGER
WARNING

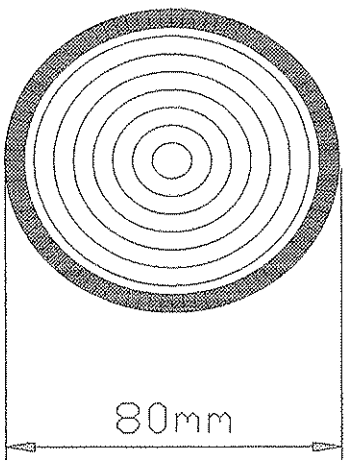
Cutting head should be kept as close to tractor as conditions and cutting position permit. This ensures the maximum stability of the unit.

DANGER
WARNING

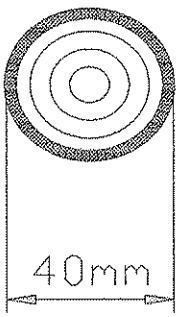
Never operate rotor with cutter flails directly towards operator, i.e., underside of head towards operator.

CUTTING THICKNESS LIMIT.

SOFTWOOD



HARDWOOD



ROTOR ROTATION DIRECTION

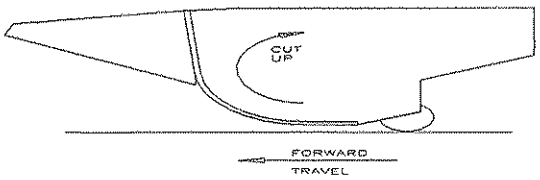
A choice of rotation direction is offered on fully-independent machines only.

The 'upward' cut is recommended for trimming grass and one to two years' growth of hedge. The 'downward' cut is NOT RECOMMENDED and should only be considered by really heavy cutting of large diameter growth. Even then, it is important that down cutting be limited to a minimum and only for very short periods.

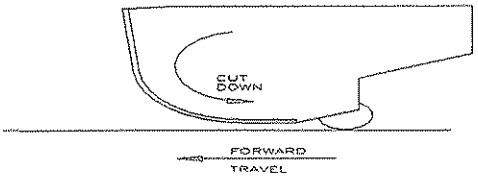
There is a risk of serious damage to the hydraulic system should the rotor direction be reversed without it first coming to rest.

NEVER CHANGE DIRECTION OF CUT WHILST ROTOR IS STILL TURNING.

On leaving the factory the machine will be set for upward rotor cutting.



IN PLACE - CUT UPWARDS AS INDICATED BY ARROW. (FOR GENERAL HEDGE-TRIMMING AND VERGE WORK)



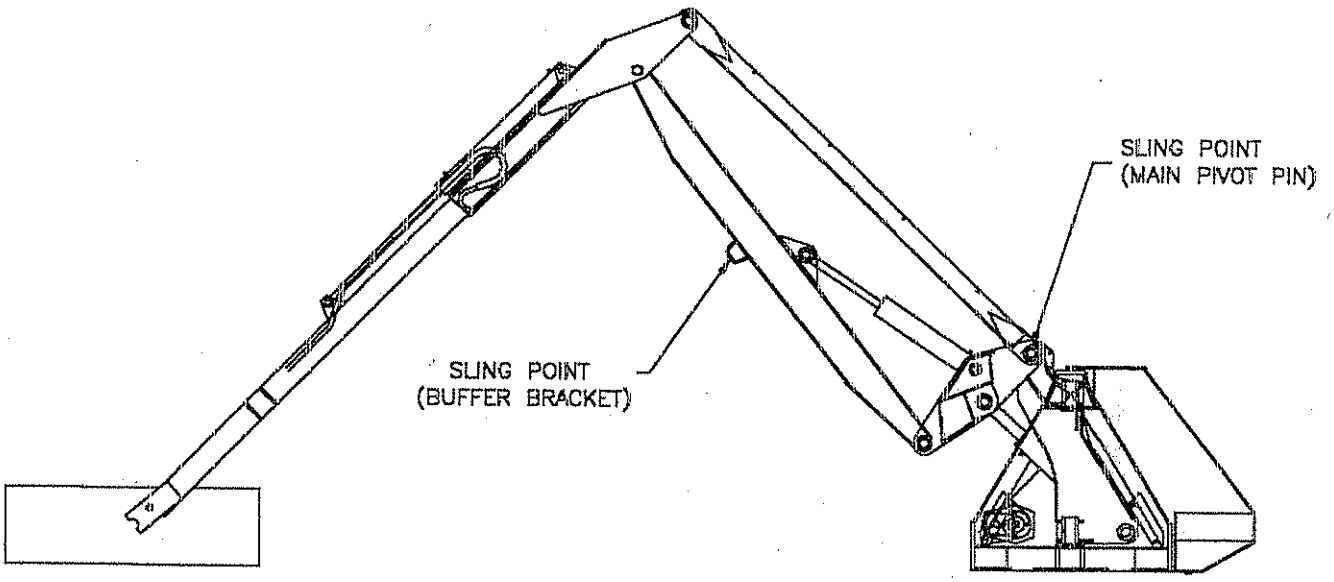
REMOVED - CUT DOWNWARDS AS INDICATED BY ARROW. (FOR HEAVY CUTTING ONLY)

DANGER WARNING

At NO TIME should the rotor be cutting upwards at front with front cowling removed.

HANDLING & TRANSPORTATION OF MACHINERY

In order to move this machinery safely, the trimmer must come to rest in the position indicated below.



The unladen weight of each Trimmer is given in the specification sheet of this book.

A form of lifting gear is required in order to move or handle this machinery safely. The lifting gear can be attached using a chain, rope or strap of sufficient strength, to the positions showN above.

Once the machinery has been moved, ensure that it comes to rest in a safe position. supports or stay bars may be necessary to ensure stability of the machinery. Make sure the supports/stay bars are used whenever the machinery is transported.

PARTS LIST

Always order **Twose** genuine spare parts for your machine. They are designed and manufactured to give the best operational results In some cases parts will be of a higher specification than their usual counterparts and this will not be immediately apparent.

ORDERING SPARE PARTS

In order for both Twose and your dealer to give the best possible service when ordering spare parts, please specify:-

(a) Machine type and Serial No.
(b) Part no. of component(s)
(c) Description of component(s)
(d) Quantity required
(e) Full address to which spares are to be sent
(f) Method of delivery required

In the absence of specific instructions consignments will be sent by post or carrier, if it is not possible to deliver by our own transport.

Please double-check that you have ordered the correct parts and a sufficient quantity to complete the job.

Twose have a policy of continuous improvement which means that parts may be modified/replaced in the course of time due to the introduction of new materials, or improved design. The latest parts, if compatible, will be supplied whenever possible.

Should it become necessary to return any item for exchange or credit please state the number of our invoice or sales slip and the reason for the return.

WARRANTY AND SPARE PARTS

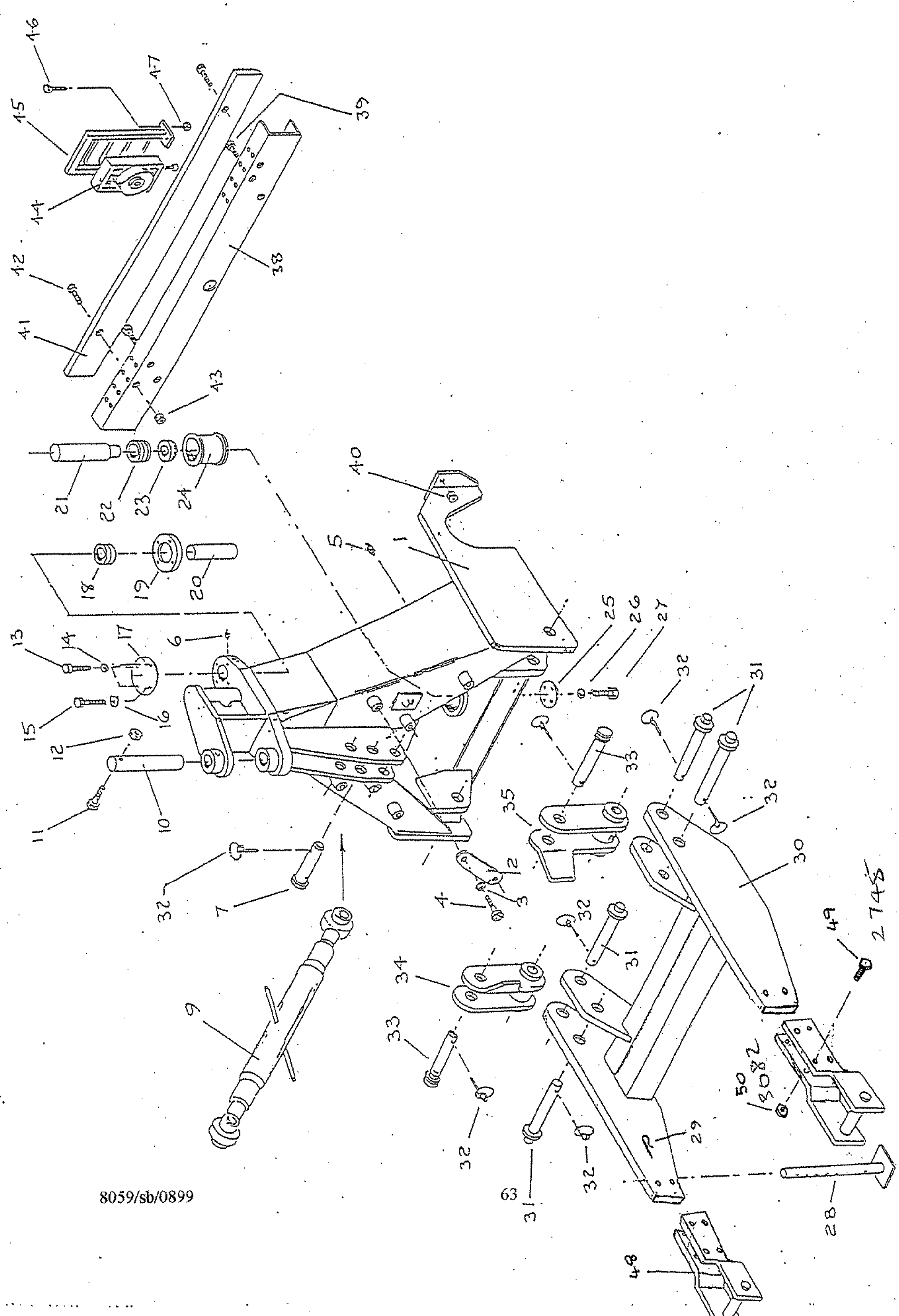
Enquiries regarding these machines and orders for spare parts should be addressed to:-

TWOSE OF TIVERTON LIMITED
BLUNDELLS ROAD
TIVERTON
DEVON
EX16 4JT

TELEPHONE (01884) 253691
FAX (01884) 255189

MAIN 'A' FRAME AND ATTACHMENT SUB FRAME

ITEM	PART NO.	DESCRIPTION	QTY
1	186.167	'A' - Frame	1
2	186.054	Hose Clamp	1
3	2729	Spring Washer M12	2
4	2712	Setscrew M12 x 25	2
5	2923	Grease Nipple M10	1
6	6956	Grease Nipple M6	1
7	7887	Top Link Pin (Cat 3)	1
9	6247	Top Link Assembly (Cat 3)	1
10	186.108	Pin	1
11	5383	Bolt M8 x 80	1
12	3182	Stiffnut M8 Nyloc	1
13	3227	Bolt M12 x 65	3
14	2729	Spring Washer M12	3
15	5173	Bolt M12 x 75	1
16	2729	Spring Washer M12	1
17	186.070	Cover Plate	1
18	7883	Bearing GE60ES	1
19	186.069	Lower retainer	1
20	186.080	Top Shaft	1
21	186.074	Lower Shaft	1
22	7883	Bearing GE60ES	1
23	7884	Thrust race bearing (51308)	1
24	186.073	Bottom bearing housing	1
25	186-100-	Lower Cover plate	1
26	2728	Spring washer M10	4
27	3059	Setscrew M10 x 35	4
28	186.166	Stand leg	1
29	0806	'R' Clip	1
30	186.165	Sub Frame	1
31	186.172	Pin	4
32	0832	7/16" Linch Pin	7
33	7482	Lift Pin	2
34	186.164L	Swing-Link Bracket	1
35	186.164R	Swing-Link Bracket	1



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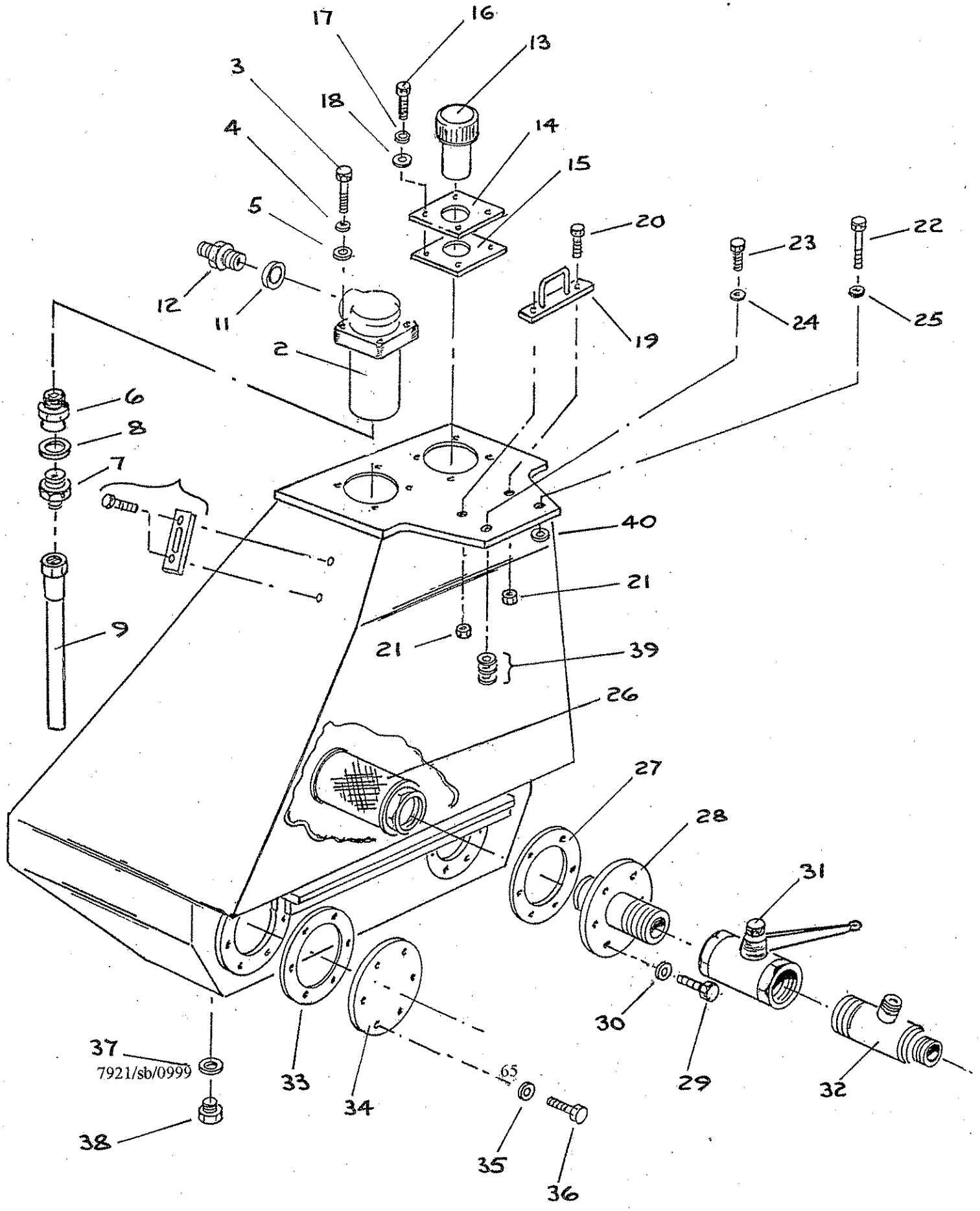
MAIN 'A' FRAME AND ATTACHMENT SUB FRAME CONTINUED

ITEM	PART NO.	DESCRIPTION	QTY
38	186.154	Channel - for lighting board	1
39	3059	Setscrew M10 x 35	4
40	4421	Stiffnut M10	4
41	7888	Lighting board	1
42	3136	Bolt M10 x 60	2
43	4421	Stiffnut M10	2
44	7885	Cooler-fan c/w mounting screws	1
*	4785	Mounting screws M8 x 16 Caphead (Spares only)	
45	186.186	Cooler 'guard frame'	1
46	2793	Setscrew M8 x 20	4
47	3182	Stiffnut M8	4
48	186.178	Subframe attach brackets	2
*	7949	Switch for cooler DP/DT Centre off	1
*	7602	Rubber toggle cover (for 7906)	1
*	2450	Adaptor 1" BSP x 1" BSP) lower-IN-	1
*	1934	Seal 1" BSP) port of cooler	1
*	2450	Adaptor 1" BSP x 1" BSP) Upper-OUT	1
*	1934	Seal 1" BSP) port of cooler	
*	1860127	Transfer <-OFF -> Clear Work (for cooler switch 7949)	1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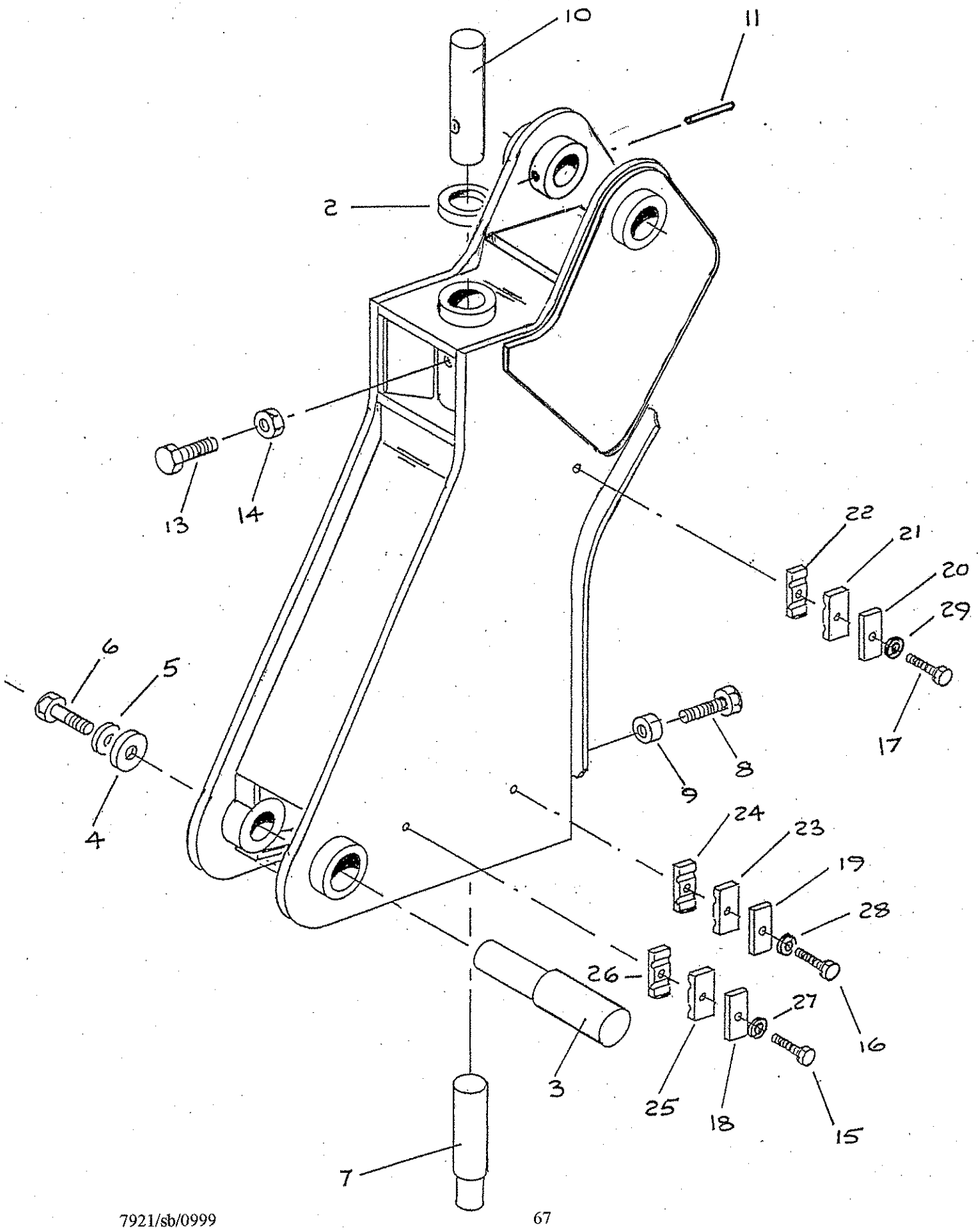
TANK ASSEMBLY

ITEM	PART NO.	DESCRIPTION	QTY
1	186.090	Tank	1
2	7761	Filter-return	1
*	7761.1	Element for 7761 'spares'	
3	3110	Setscrew M8 x 30	4
4	3001	Spring Washer M8	4
5	3111	Washer flat M8 (form A)	4
6	7752.2	Bayonet fitting	1
7	5241	Adaptor 1 1/4" BSP x 1" BSP	1
8	3155	Seal 1 1/4" Dowty Bonded	1
9	004.496	Hose	1
10	5371	Level gauge (complete)	1
11	3155	Seal 1 1/4" Dowty Bonded	1
12	5241	Adaptor 1 1/4" BSP x 1" BSP	1
16	6334	Filler Cap	1
14	186.106	Mounting Plate for filler cap	1
15	1860107	Gasket	1
16	3110	Setscrew M8 x 30	4
17	3001	Spring Washer M8	4
18	3111	Flatwasher M8 (Form A)	4
19	186.053	Hose guide bracket	1
20	3059	Setscrew M10 x 35	2
21	4421	Stiffnut M10 Nyloc	2
22	2703	Bolt M12 x 70	1
23	2962	Setscrew M12 x 35	1
24	2729	Spring Washer M12	1
25	2729	Spring Washer M12	1
26	3717	Strainer-suction 1 1/2" BSP UC-SE 1324	1
27	1840402	Gasket	1
28	186.105	Strainer top bracket	1
29	2917	Setscrew M10 x 25	6
30	2728	Spring Washer M10	6
31	7619	Ball Valve	1
32	184.147	Tee 1/2" BSP x 1" BSP x 3/4" BSP	1
33	1840402	Gasket	1
34	186.104	Blanking Cover	1
35	2728	Spring Washer M10	6
36	2709	Setscrew M10 x 20	6
37	0909	Seal 1/2" BSP	2
38	7753	Plug 1/2" BSP	2
39	3192	Flatwasher M12 (Form C)	3
40	3192	Flatwasher M12 (Form C)	1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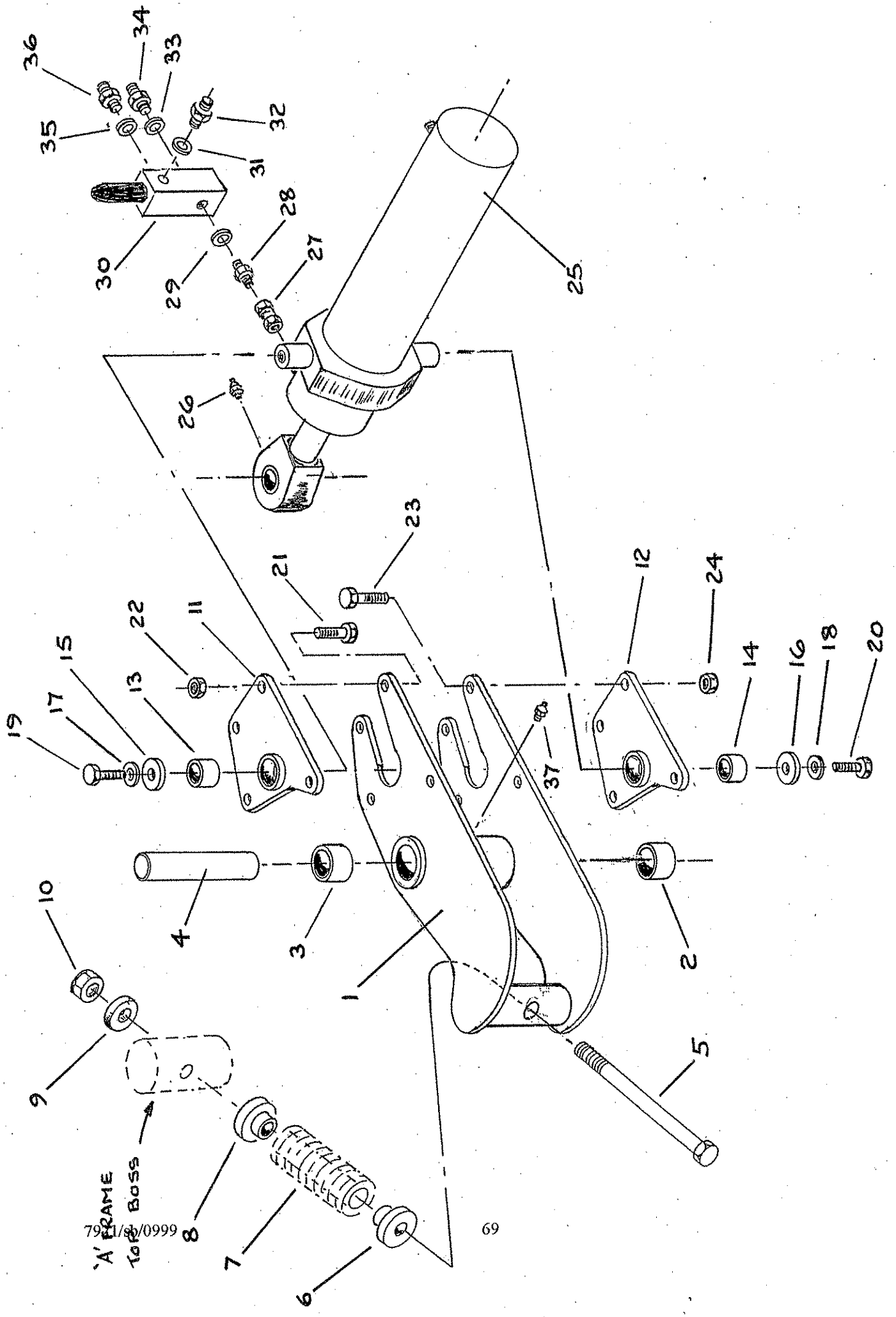
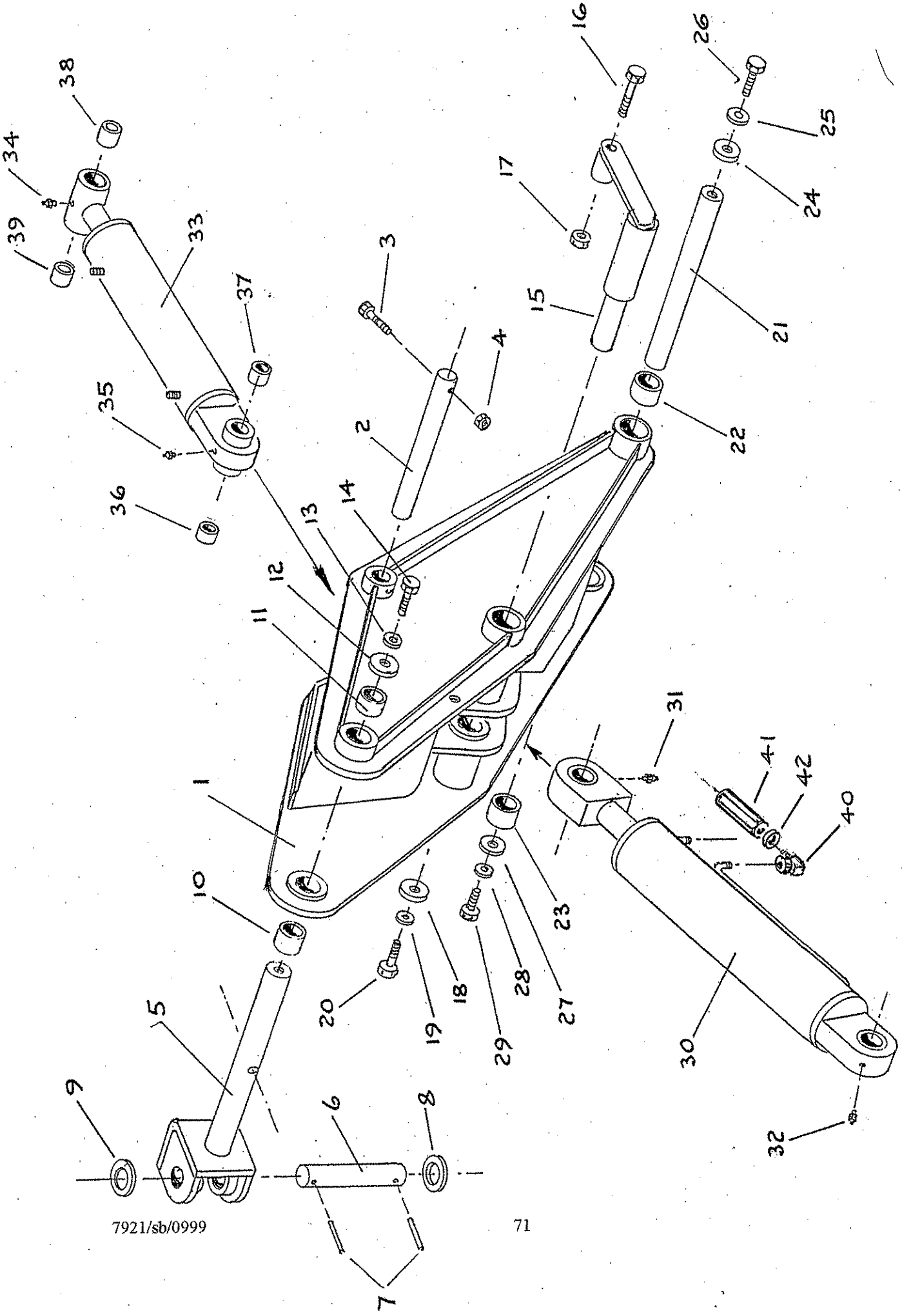
SPINE ASSEMBLY

ITEM	PART NO.	DESCRIPTION	QTY
1	186.160	Spine	1
2	186.123	Top Spacer	1
3	186.077	Lower Pin (1st ram anchor)	1
4	186.071	Washer (to 186.077)	1
5	2729	Spring Washer M12	1
6	2962	Setscrew M12 x 35	1
7	186.074	Lower Pivot Pin	1
8	2950	Setscrew M12 x 30	1
9	2736	Locknut M12	1
10	186.080	Upper pivot pin	1
11	8013	Spiral pin M12 x 90	1
13	2950	Setscrew M12 x 30	1
14	2736	Locknut M12	1
15	3548	Bolt M8 x 50	1
16	3548	Bolt M8 x 50	1
17	3548	Bolt M8 x 50	1
18	5351.1	Cover plate for hose clamp	1
19	5351.1	Cover plate for hose clamp	1
20	5351.1	Cover plate for hose clamp	1
21	5351.2	Hose Clamp (Jaw only)	1
22	5351.2	Hose Clamp (Jaw only)	1
23	5351.2	Hose Clamp (Jaw only)	1
24	5351.2	Hose Clamp (Jaw only)	1
25	5351.2	Hose Clamp (Jaw only)	1
26	5351.2	Hose Clamp (Jaw only)	1
27	3001	Washer-spring M8	1
28	3001	Washer-spring M8	1
29	3001	Washer-spring M8	1


'A' FRAME
TOP BOSS

BREAKBACK

ITEM	PART NO.	DESCRIPTION	QTY
1	186.099	Breakback pivot bracket	1
2	7900	Bush 5040	1
3	7900	Bush 5040	1
4	186.108	Pin	1
5	7875	Bolt M24 x 355 (special)	1
6	186.103	Stepped spacer	1
7	7710	Spring - Die blue	1
8	186.103	Stepped spacer	1
9	186.102	Special Washer	1
10	2992	Stiffnut M24 Nyloc	1
11	186.098A	Breakback ram anchor bracket	1
12	186.098B	Breakback ram anchor bracket	1
13	6257N	Bush 4040M	1
14	6257N	Bush 4040M	1
15	186.125	Special Washer	1
16	186.125	Special Washer	1
17	2728	Spring Washer M10	1
18	2728	Spring Washer M10	1
19	2917	Setscrew M10 x 25	1
20	2917	Setscrew M10 x 25	1
21	2748	Setscrew M12 x 40	4
22	3082	Stiffnut M12	4
23	2748	Setscrew M12 x 40	4
24	3082	Stiffnut M12	4
25	1860088	Breakback Ram	1
*	1860088.1	Seal Kit for (spares only)	
26	2923	Grease Nipple M10	1
27	6943	Adaptor 1/4" BSP F/M x 1/4" BSP F/M	1
28	1823	Adaptor 1/4" BSP x 1/4" BSP	1
29	1181	Seal 1/4" BSP	1
30	7484 (R2000)	Relief valve block (@2000PSI)	1
31	1181	Seal 1/4" BSP	1
32	1823	Adaptor 1/4" BSP x 1/4" BSP	1
33	1181	Seal 1/4" BSP	1
34	1823	Adaptor 1/4" BSP x 1/4" BSP	1
35	1181	Seal 1/4" BSP	1
36	1823	Adaptor 1/4" BSP x 1/4" BSP	1
37	2923	Grease Nipple M10 Straight	1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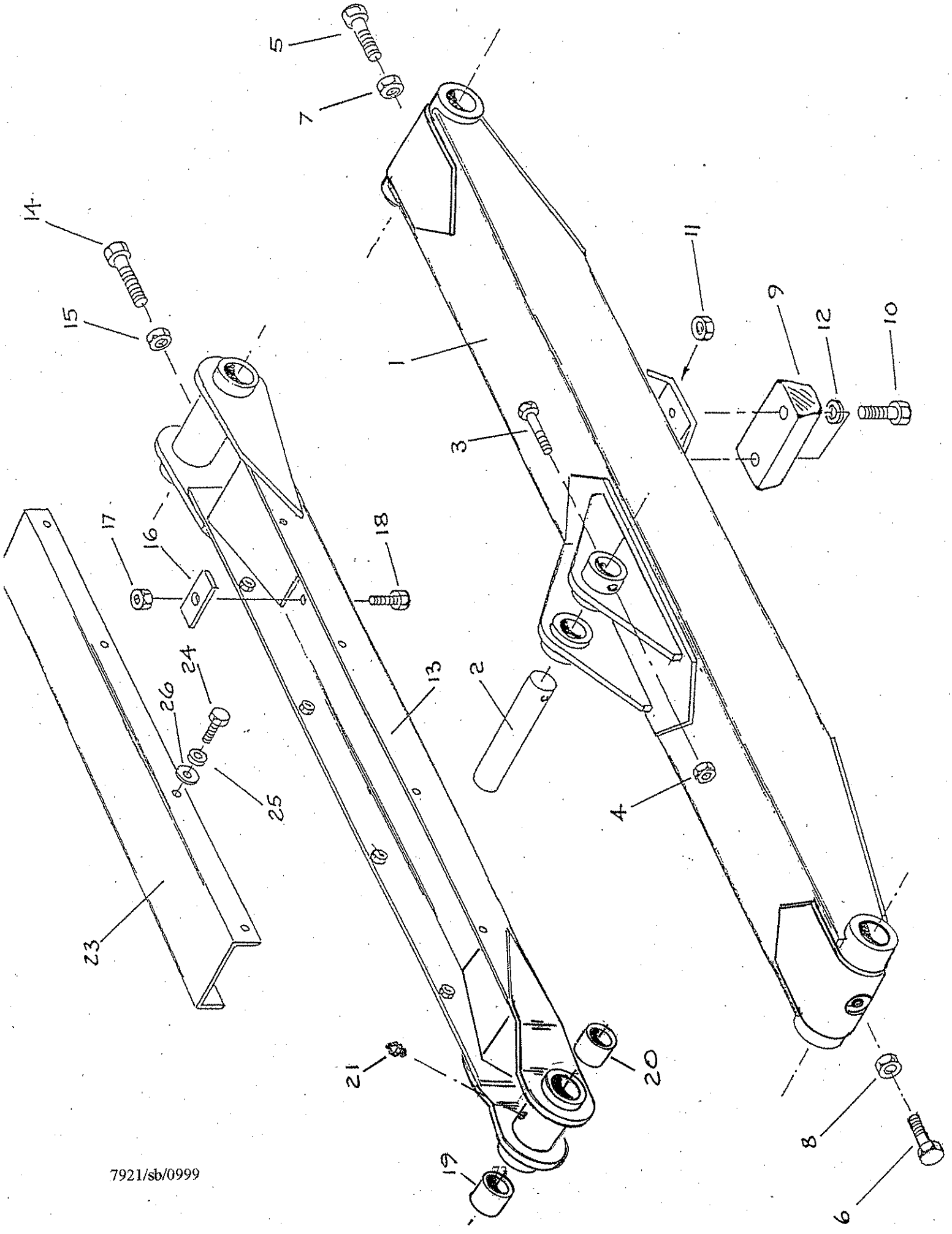
ROCKER

ITEM	PART NO.	DESCRIPTION	QTY
1	186.082	Rocker	1
2	186.079	Pin (second ram anchor end)	1
3	2765	Bolt M8 x 70	1
4	3182	Stiffnut M8	1
5	186.163	Main pivot pin	1
6	186.114	Breakback ram anchor pin	1
7	3714	Spring pin M10 x 60	2
8	6541	Washer M40	1
9	6541	Washer M40	1
10	7881	Bush 6070 DX	1
11	7881	Bush 6070 DX	1
12	186.068	Washer	1
13	2730	Spring Washer M16	1
14	2901	Setscrew M16 x 35	1
15	186.075	Pin 1st ram (rod end)	1
16	2702	Bolt M12 x 60	1
17	3082	Stiffnut M12	1
18	186.071	Washer	1
19	2729	Spring Washer M12	1
20	2962	Setscrew M12 x 35	1
21	186.076	Pin (to first boom)	1
22	7882	Bush 5060	1
23	7882	Bush 5060	1
24	186.071	Washer	1
25	2729	Spring Washer M12	1
26	2962	Setscrew M12 x 35	1
27	186.071	Washer	1
28	2729	Spring Washer M12	1
29	2962	Setscrew M12 x 35	1
30	1860086	1st (Primary ram)	1
*	1860086.1	Seal set (for 1860086) (Spares only)	
31	2944	Grease Nipple M10 x 90	1
32	2923	Grease Nipple M10 Straight	1
33	1860087	Secondary ram	1
*	1860087.1	Seal Set for 1860087 (Spares only)	
34	2923	Grease Nipple M10	1
35	2923	Grease Nipple M10	1
36	6542	Bush 4050M	1
37	6542	Bush 4050M	1
38	6257N	Bush 4040M	1
39	6257N	Bush 4040M	1
40	6948	Adaptor 1/4" BSP M-FLN 91	1
41	8020	Valve Hose Burst 1/4"	1
42	1181	Seal 1/4" BSP	1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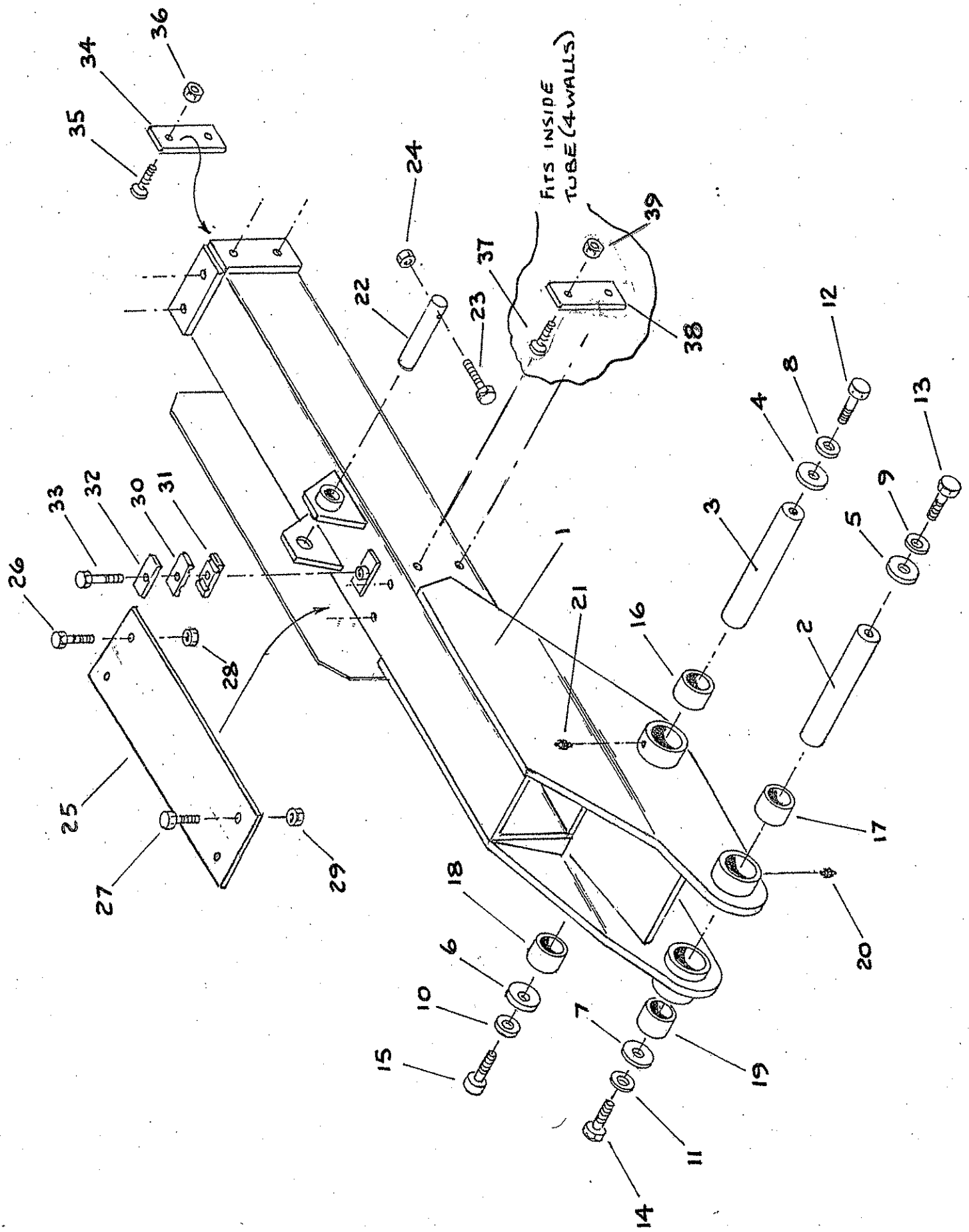
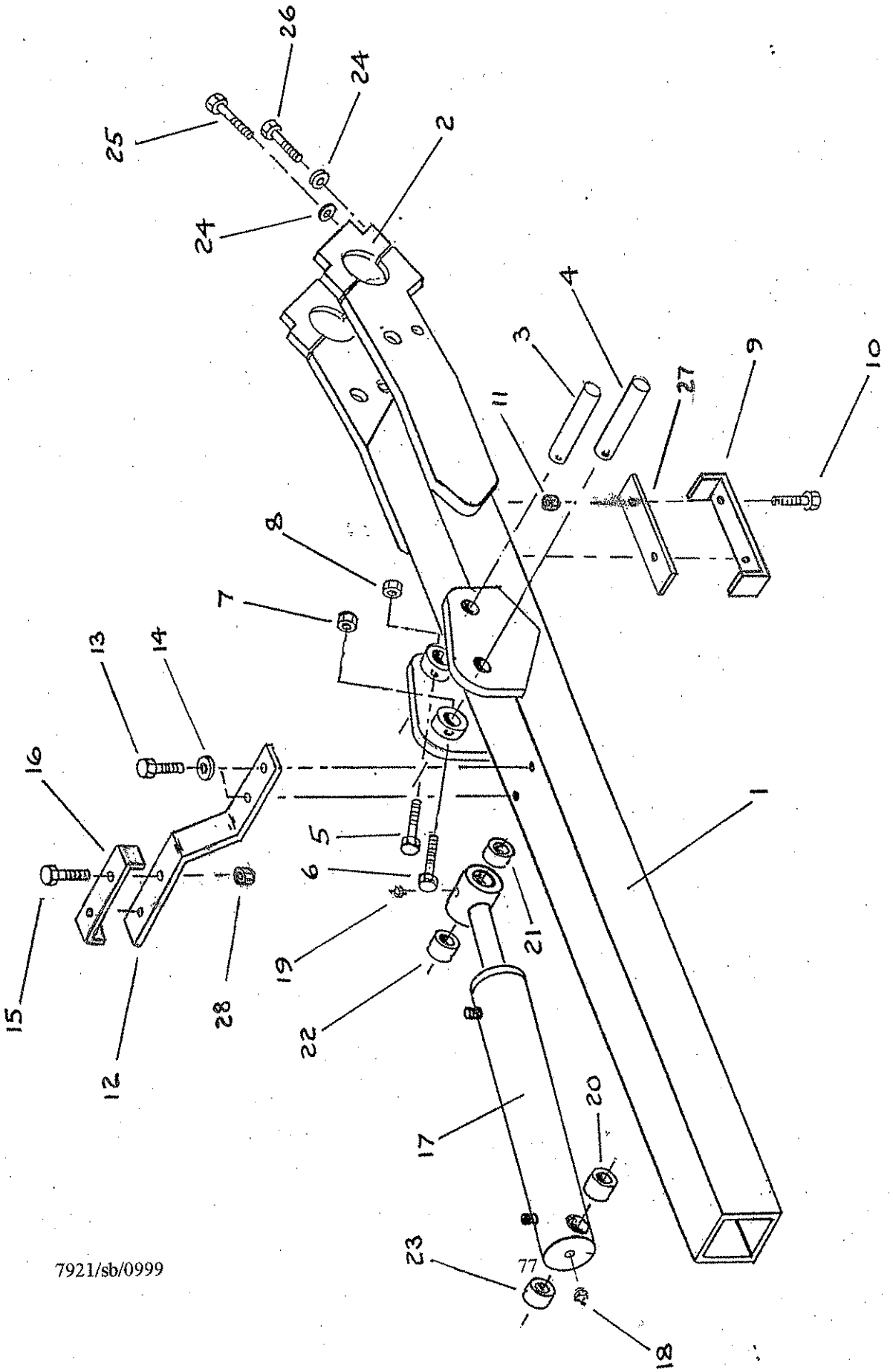
FIRST BOOM AND TIE ARM

ITEM	PART NO.	DESCRIPTION	QTY
1	186.093	First Boom	1
2	186.078	Pin, 2nd ram to 1st boom	1
3	5383	Bolt M8 x 80	1
4	3182	Stiffnut (Nyloc) M8	1
5	2950	Setscrew M12 x 30	1
6	2950	Setscrew M12 x 30	1
7	2736	Locknut M12	1
8	2736	Locknut M12	1
9	7879	Rubber Buffer	1
10	2698	Bolt M10 x 40	2
11	4421	Stiffnut M10 'Nyloc'	2
12	3219	Flatwasher M10 'Form A'	2
13	186.159	Tie arm	1
14	2950	Setscrew M12 x 30	1
15	2736	Locknut M12	1
16	186.122B	Hose Clamp Plate	1
17	4421	Stiffnut M10 'Nyloc'	1
18	3137	Bolt M10 x 50	1
19	6935	Bush	1
20	6935	Bush	1
21	2923	Grease Nipple	1
22			
23	186.092	Cover for tie arm	1
24	2793	Setscrew M8 x 20	8
25	3001	Spring Washer M8	8
26	3111	Flatwasher M8	8


FITS INSIDE TUBE (4 WALLS)

SECOND BOOM

ITEM	PART NO.	DESCRIPTION	QTY
1	186.182	Second Boom	1
2	186.076	Pivot Pin	1
3	186.076	Pivot Pin	1
4	186.071	Clamp-washer	1
5	186.071	Clamp-washer	1
6	186.071	Clamp-washer	1
7	186.071	Clamp-washer	1
8	1712	Spring Washer M12	1
9	1712	Spring Washer M12	1
10	1712	Spring Washer M12	1
11	1712	Spring Washer M12	1
12	2962	Setscrew M12 x 35	1
13	2962	Setscrew M12 x 35	1
14	2962	Setscrew M12 x 35	1
15	2962	Setscrew M12 x 35	1
16	7882	Bush	1
17	7882	Bush	1
18	7882	Bush	1
19	7882	Bush	1
20	2923	Grease Nipple M10 Straight	2
21	2923	Grease Nipple M10 Straight	2
22	186.072	Ram Pin	1
23	3262	Bolt M8 x 60	1
24	3182	Stiffnut M8 Nyloc	1
25	186.095	Clamp plate for steel pipes	1
26	2935	Bolt M10 x 45	2
27	2935	Bolt M10 x 45	2
28	4421	Stiffnut M10 Nyloc	2
29	4421	Stiffnut M10 Nyloc	2
30	5351.3	Hose Clamp half-plastic	1
31	5351.3	Hose Clamp half-plastic	1
32	5351.1	Hose Clamp cover	1
33	6393	Bolt	1
34	186.097	Nylon guide strips	4
35	7910	C/sk socket screw M10 x 35 (fits inside tube at outer end of boom)	8
36	4421	Stiffnuts M10 Nyloc	4
37	7886	C/sk socket screw M10 x 25 (fits inside tube at pivot end of boom)	8
38	186.097	Nylon guide strip	4
39	4421	Stiffnuts M10 Nyloc	8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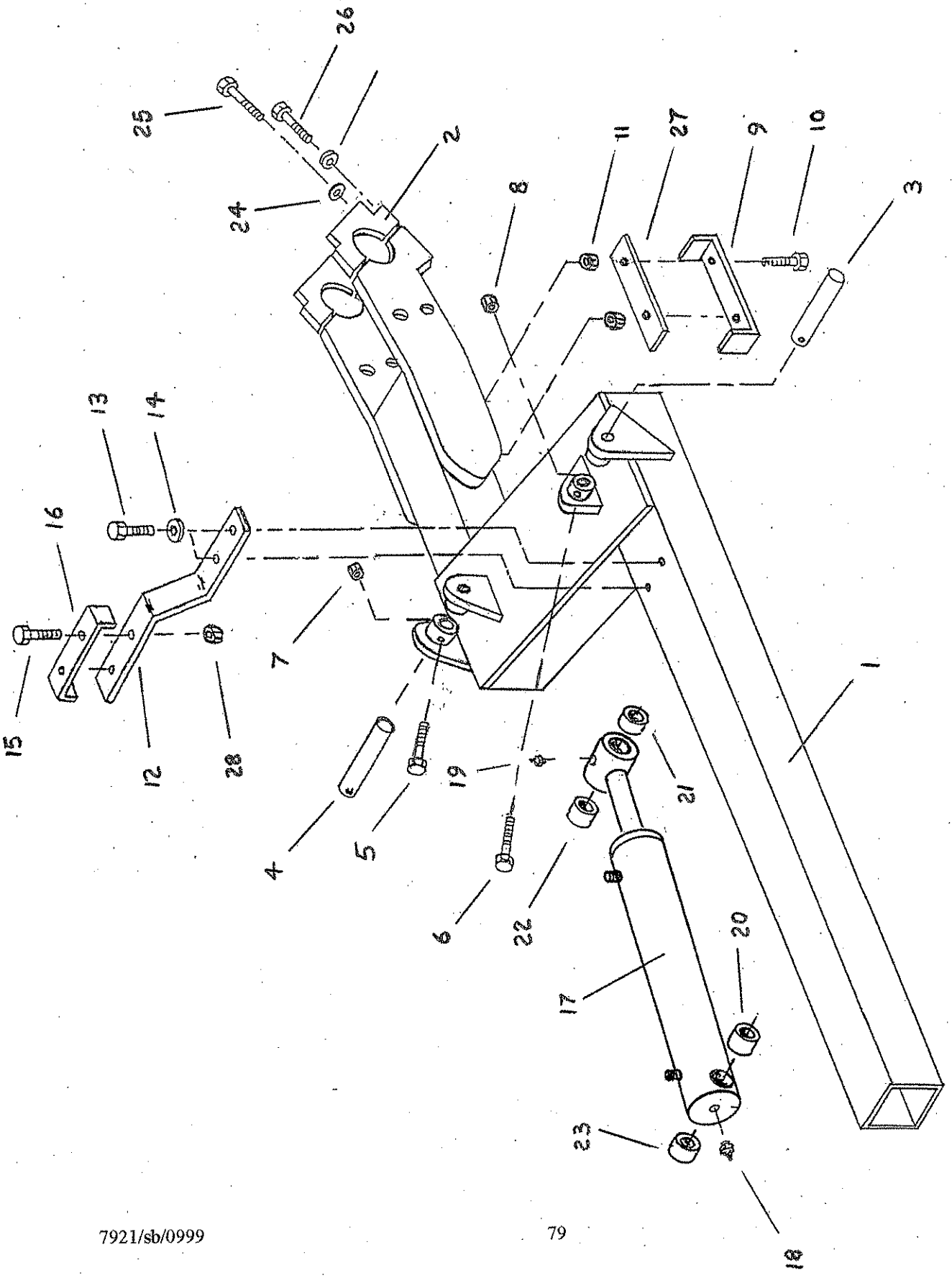
OUTER BOOM

ITEM	PART NO.	DESCRIPTION	QTY
1	186.096	Outer Boom (extending)	1
2	184.088.100	Clamp plate (spares only)	2
3	184.492C	Pin for head angle ram	1
4	186.072	Pin for boom ext. ram	1
5	3548	Bolt M8 x 50	1
6	3262	Bolt M8 x 60	1
7	3182	Stiffnut M8 Nyloc	1
8	3182	Stiffnut M8 Nyloc	1
9	186.148	Pipe clamp plate	1
10	2935	Bolt M10 x 45	2
11	4421	Stiffnut M10 Nyloc (inside tube)	2
12	188.102	Steel pipe support bracket	1
13	2836	Setscrew M8 x 20	2
14	3001	Spring Washer M8	2
15	3137	Bolt M10 x 50	2
16	186.056	Clamp plate for steel pipes	1
17	186.089	Boom extend ram	1
18	2923	Grease Nipple M10	1
19	2923	Grease Nipple M10	1
20	5178	Bush	1
21	5178	Bush	1
22	5178	Bush	1
23	5178	Bush	1
24	7530	Tab Washers (M12)	8
25	2986	Bolt M12 x 80	4
26	2702	Bolt M12 x 60	4
27	186.146	Spacer - 30 x 10MS x 128	1
28	4421	Stiffnut M10 Nyloc	2
	186.061.001AB/LR	Steel pipes	1A&1B (LH or RH)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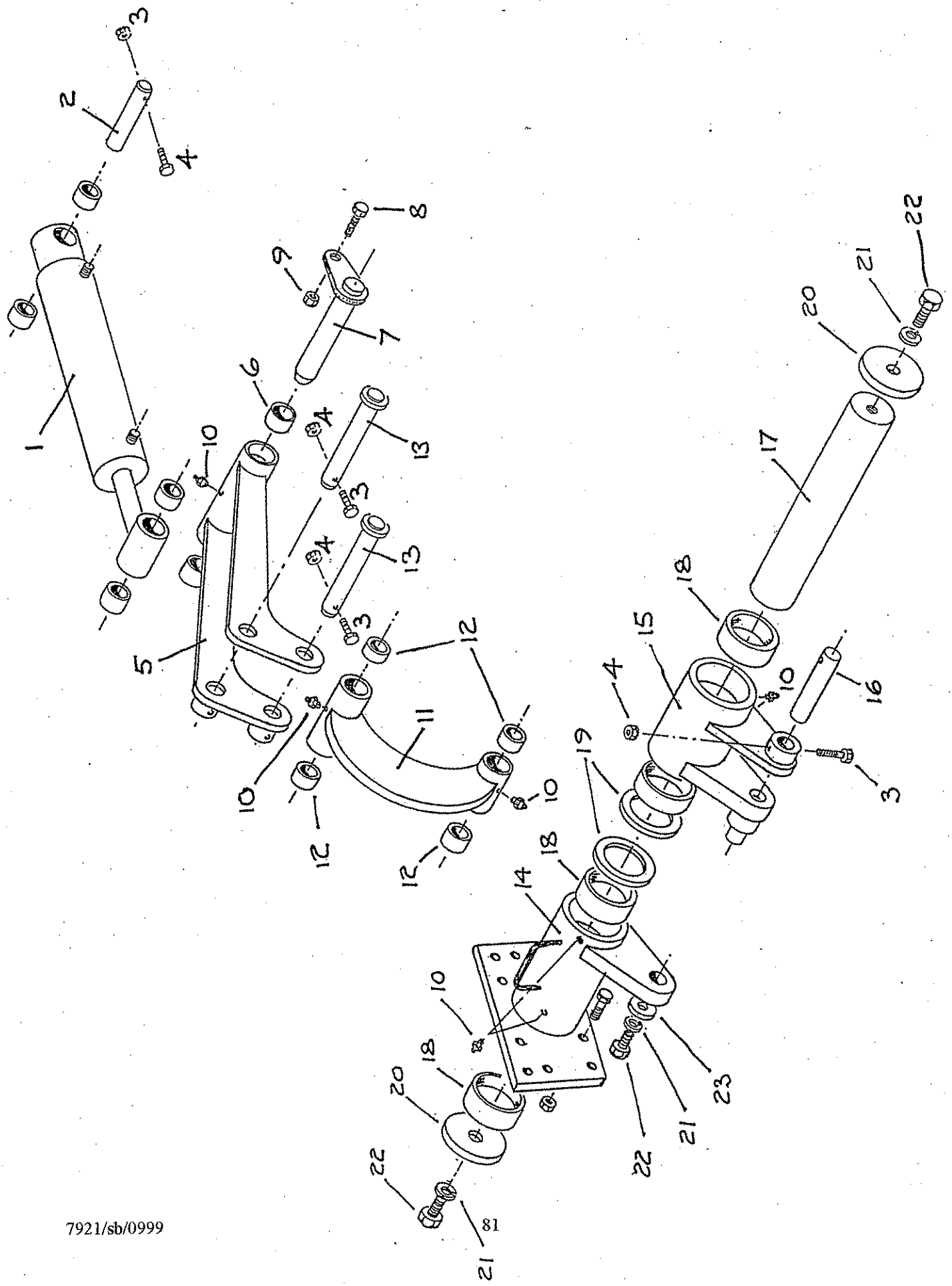
OUTER FORWARD BOOM

ITEM	PART NO.	DESCRIPTION	QTY
1	186.147	Outer Forward Boom	1
2	184.088.100	Clamp Plate (Spares only)	2
3	184.492C	Pin for head angle ram	1
4	186.072	Pin for boom ext. ram	1
5	3548	Bolt M8 x 50	1
6	3262	Bolt M8 x 60	1
7	3182	Stiffnut M8 Nyloc	1
8	3182	Stiffnut M8 Nyloc	1
9	186.056	Pipe clamp plate	1
10	2935	Bolt M10 x 45	2
11	4421	Stiffnut M10 Nyloc (inside tube)	2
12	186.055	Steelpipe support bracket	1
13	2836	Setscrew M8 x 20	2
14	3001	Spring Washer M8	2
15	3137	Bolt M10 x 50	2
16	186.056	Clamp plate for steel pipes	1
17	186.089	Boom extend ram	1
18	2923	Grease Nipple M10	1
19	2923	Grease Nipple M10	1
20	5178	Bush	1
21	5178	Bush	1
22	5178	Bush	1
23	5178	Bush	1
24	7530	Tab Washers (M12)	8
25	2986	Bolt M12 x 80	4
26	2702	Bolt M12 x 60	4
27	186.146	Spacer - 30 x 10MS x 128	1
28	4421	Stiffnut M10 Nyloc	2
*	186.149	Steel pipe (Fwd boom short)	1
*	186.150	Steel pipe (Fwd boom long)	1

* Denotes not illustrated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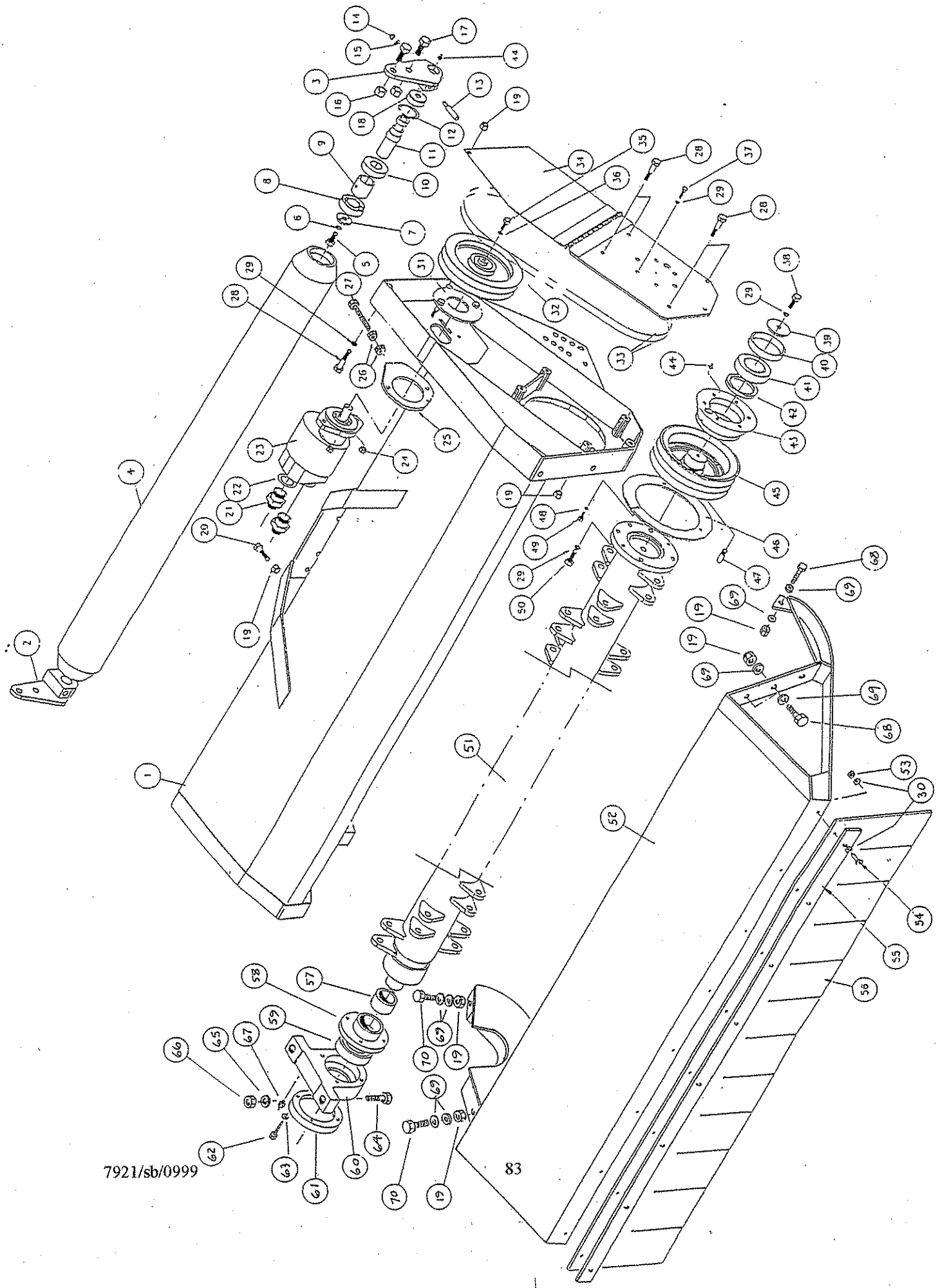
HEAD PIVOT LINKAGE

ITEM	PART NO.	DESCRIPTION	QTY
1	1840493	Crowd Ram (c/w bushes) (Head Pivot)	1
*	1840493.1	Seal Set Complete	1
*	1840493.2	Rod Complete	1
*	1840493.3	Gland Nut	1
*	7606	Bush (2025m) Wrapped	4
2	184.492C	Pin	1
3	3548	Bolt M8 x 50	4
4	3182	M8 Nyloc Stiffnut	4
5	184.486	Double Link	1
6	5178	Bush	2
7	184.483	Pin	1
8	2698	Bolt M10 x 40	1
9	4421	M10 Nyloc Stiffnut	1
10	2923	Grease Nipple	7
11	184.491	Banana Link	1
12	7854	Bush	4
13	184.492A	Pin	2
14	184.494L/RA/B	Head Bracket (see below)	1
15	184.485	Head Angle Bracket	1
16	184.492B	Pin	1
17	184.487 A/B	Pivot Shaft	1a or b
18	6935	Bush	4
19	184.353	Washer D.X	2
20	184.488	Special Washer	2
21	2730	Washer Spring	3
22	2892	Setscrew	3
23	185.096	Washer	1

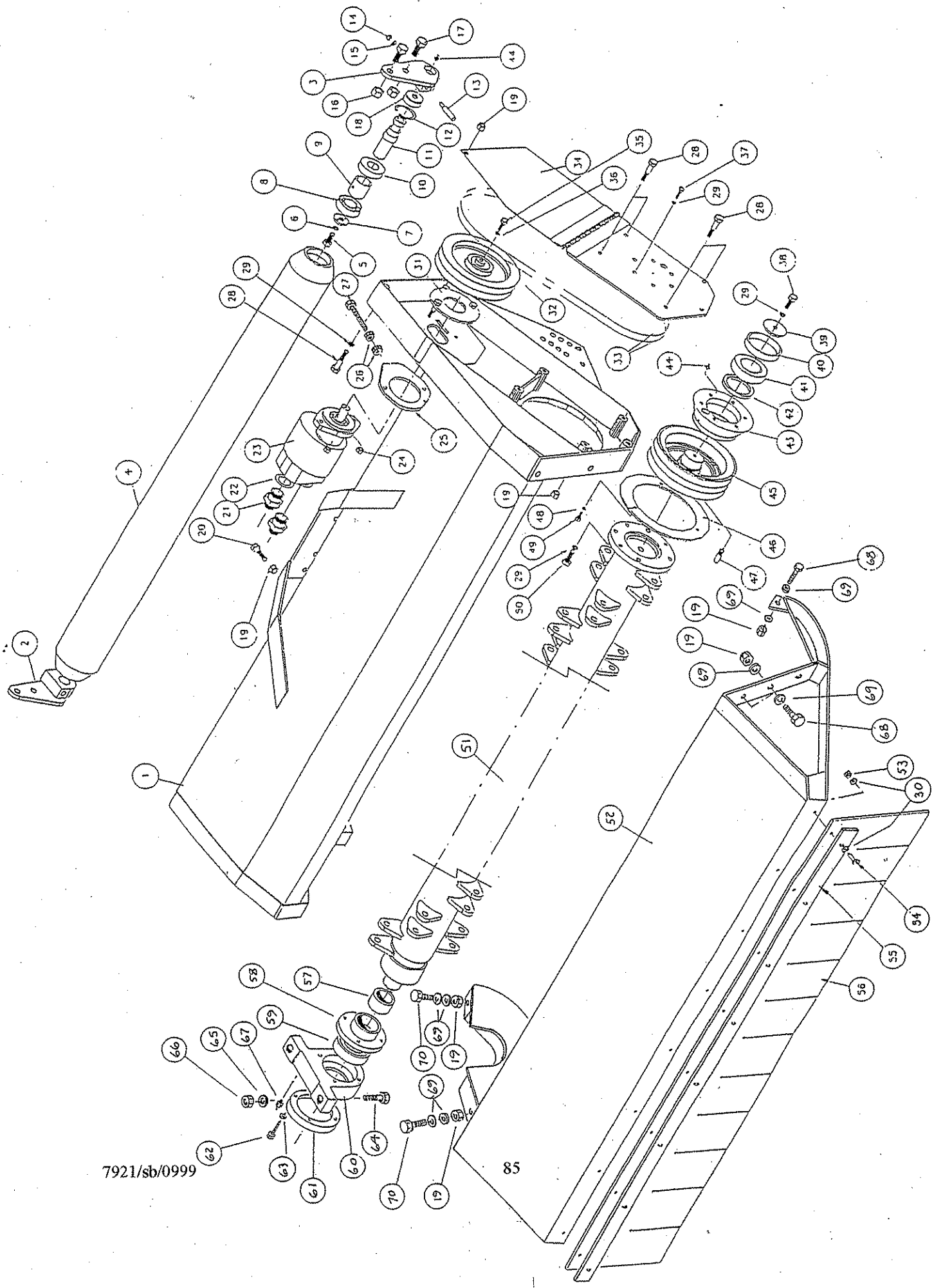
NOTE:- (Ref Item 14)

184.494L/A = L/H Machine
184.494R/A = R/H Machine



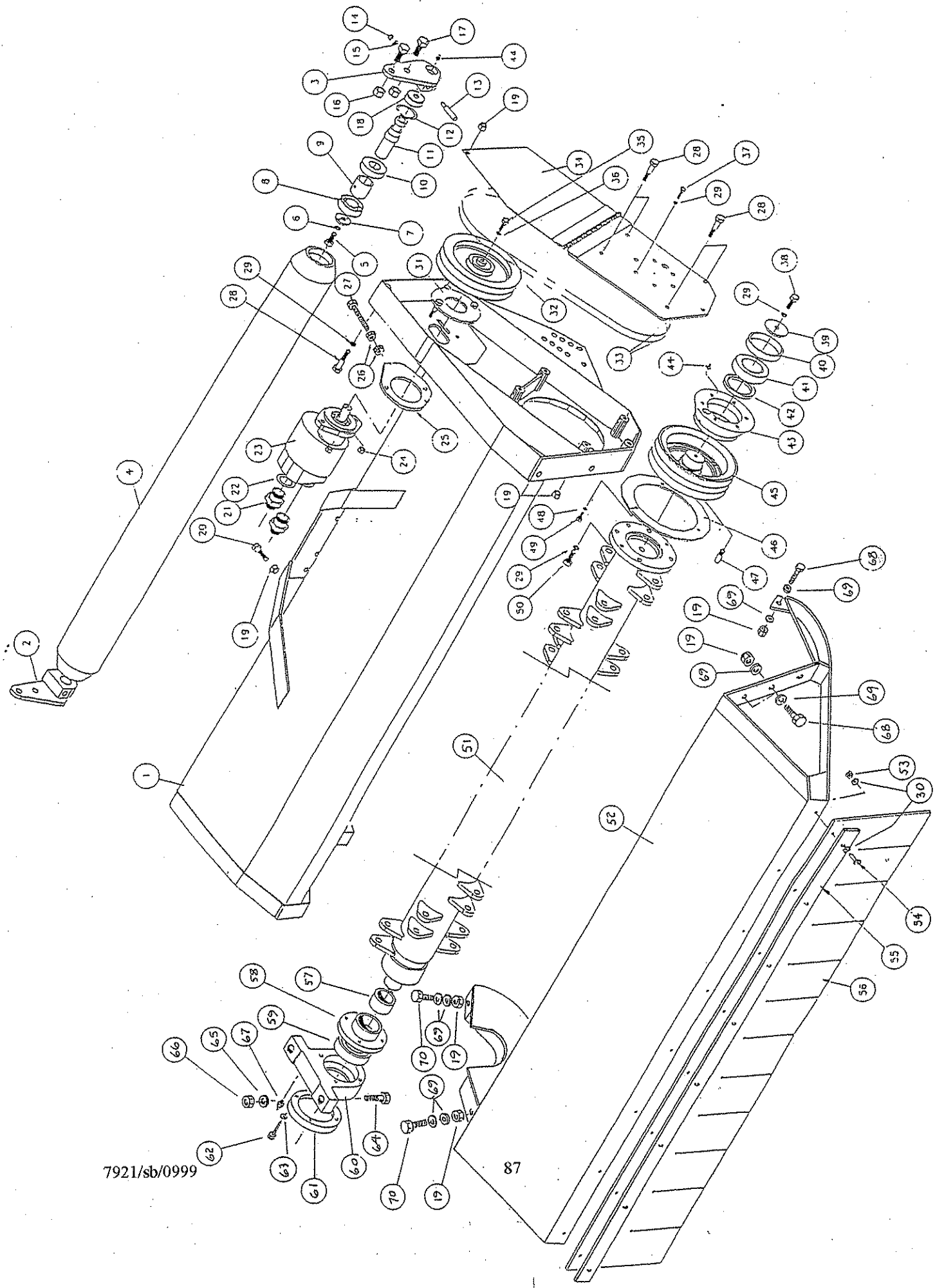
HEAD ASSEMBLY
1.2M AND 1.52M

ITEM	PART NO.	DESCRIPTION	QTY
1	184.615A	Head 1.2m Weld Assy	1
or	184.615B	Head 1.52m Weld Assy	1
2	184.622R	Bracket Roller RH	1
3	184.622L	Bracket Roller LH	1
4	184.621A	Roller Assy 1.2m	1
or	184.621B	Roller Assy 1.52m	1
5	2711	Setscrew M12 x 20 (8.8)	2
6	2729	Washer M12 Spring	2
7	174.006	Washer M12 Special	2
8	8029	Bearing	2
9	184.589	Spacer	2
10	7898	Bearing	2
11	184.588	Shaft Stub Roller	2
12	8030	Circlip	2
13	1840591	Cotter Pin Special ⅛"	2
14	3182	Stiffnut M8 Nyloc	2
15	3111	Washer M8 Form A	2
16	3747	Stiffnut M16 Nyloc	4
17	2901	Setscrew M16 x 35 (8.8)	4
18	184.587	Spacer 30id	2
19	3082	Stiffnut M12 Nyloc	14
20	2733	Bolt M12 x 40 (8.8)	8
21	0935	Adapter 3/4 BSP	2
22	0934	Seal 3/4"	2
23	8027	Motor Gear Type for H/T	1
24	4421	Stiffnut M10 Nyloc	2
25	184.625	Motor plate assembly	1
26	2799	Fullnut M10	2
27	8172	Setscrew M10 x 80 (8.8)	1
28	2986	Bolt M12 X 80 (8.8)	6
29	2729	Washer M12 Spring	11
30	3111	Washer M8 Form 'A' for 1.2m Head	32
or	3111	Washer M8 Form 'A' for 1.52m Head	40
31	184.463	Motor Fixing Ring	1



HEAD ASSEMBLY
(1.2M AND 1.52M)
CONTINUED

ITEM	PART NO.	DESCRIPTION	QTY
32	184.445	Pulley Motor 242 PCD	1
33	7692	Belt Vee	2
34	184.623	Drive Plate	1
35	7491	Bolt 3/8" UNF x 1"	1
36	0872	Washer Imp 3/8 Spring	1
37	2711	Setscrew M12 x 20 (8.8)	6
38	2950	Setscrew M12 x 30 (8.8)	4
39	184.461	Washer M12 Special	1
40	184.464	Spacer for Bearing	1
41	7840	Bearing	1
42	7790	Oil Seal	1
43	184.448	Bearing Housing	1
44	2923	G/Nipple M10 x 1.5	4
45	184.446	Pulley Rotor 200 PCD	1
46	184.636	Grass Ring	1
47	184.489	Dowel Pin	1
48	3001	Washer M8 Spring	3
49	2793	Setscrew M8 x 20 (8.8)	3
50	7855	Setscrew M12 x 35 FINE	4
51	184.618A	Rotor 1.2m Balanced - No flails, shackle type	1
or	184.618B	Rotor 1.52m Balanced - No flails, shackle type	1
or	184.619A	Rotor 1.2m Balanced - No flails, standard flails	1
or	184.619B	Rotor 1.52m Balanced - No flails, standard flails	1
or	184.620	Rotor 1.2m Rollicoupe Type	1
52	184.616A	Nose Weld Assy 1.2m	1
or	184.616B	Nose Weld Assy 1.52m	1
53	3182	Stiffnut M8 (for 1.2m head)	16
or	3182	Stiffnut M8 for (1.52m head)	20
54	2987	Setscrew M8 x 25 (8.8) (for 1.2m Head)	16
or	2987	Setscrew M8 x 25 (8.8) (for 1.52m Head)	20
55	184.617A	Clamp Strip for 1.2m Head	2
or	184.617B	Clamp Strip for 1.52m Head	2
56	1840476F	Curtain for 1.2m Head	2
or	1840581	Curtain for 1.52m Head	2

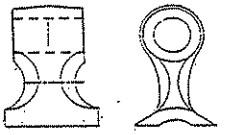


HEAD ASSEMBLY (1.2M AND 1.52M) CONTINUED

ITEM	PART NO.	DESCRIPTION	QTY
57	192.046	Spacer for bearing	1
58	192.026	Shield for Bearing	1
59	7941	Bearing	1
60	192.024	Housing for bearing	1
61	192.025	Cap for Bearing	1
62	6985	Setscrew-Socket M6 x 45 Cap	4
63	2731	Washer Spring M6	4
64	2878	Bolt M16 x 55 (8.8)	2
65	3747	Washer M16 Form 'A'	4
66	2867	Stiffnut M16	2
67	6956	Grease Nipple M6	1
68	2950	Setscrew M12 x 30 (8.8)	3
69	3192	Washer M12 Form 'C'	10
70	2962	Setscrew M12 x 35	2

PARTS LIST FOR DS HEAD

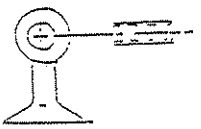
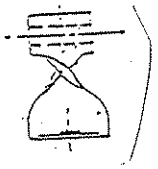
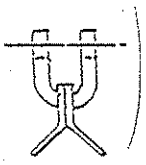
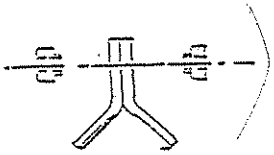
for 184.620 Rollicoupe Rotor

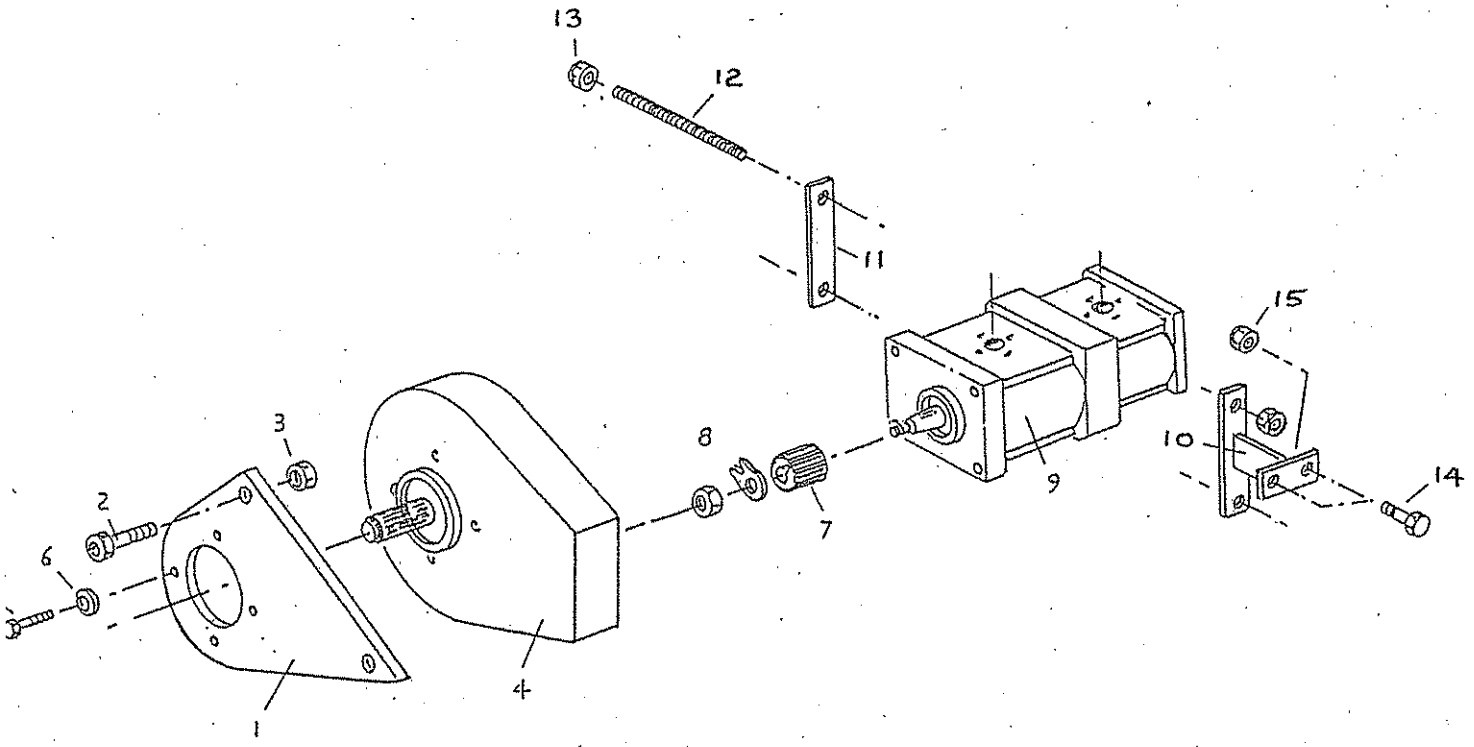
184571	Spacer (1" O.D) 16.5i.d x 52 long		20
1840572	Flail		20
3747	Stiffnut M16 nyloc		20
8092U	Bolt M16 x 110 (10.9)		20

NOTE: ROTOR'S BALANCED BARE

Flail type options A,B,C,D,E or F see page 93.

PARTS LIST FOR DS HEAD

Flails, spacers, bolts and nuts:			184.619A	184.619B
For 184.619A & B Rotors	(A) -			
184.106	Spacer 16.5id 1" Dia EN8 x 40		24	30
1840093	Flail Heavy Duty		24	30
7942	Stiffnut M16 Nyloc		24	30
7943	Bolt M16 * 80 (10.9) Structural		24	30
For 184.619A & B Rotors	(C) -			
184.106	Spacer 16.5id		24	30
1840330	Flail Grass Heavy Duty		24	30
7942	Stiffnut M16 Nyloc		24	30
7943	Bolt M16 * 80 (10.9) Structural		24	30
For 184.618 A & B Rotors	(D) -		184.618A	184.618B
1840455	Shackle for H/T Rotor		30	36
1840480	Blade for Shackle		60	72
7942	Stiffnut M16 Nyloc		30	36
7943	Bolt M16 * 80 (10.9) Structural		30	36
184.570	Spacer		30	36
For 184.619A & B Rotors	(E) -		184.619A	184.619B
184.500	Bush 50 Dia EN8 x 20		48	60
1840497	Back to back flail		48	60
7942	Stiffnut M16 Nyloc		24	30
7943	Bolt M16 * 80 (10.9) Structural		24	30
For 184.618A & B Rotors	(F) -		184.618A	184.618B
1840455	Shackle		30	36
7943	Bolt M16 x 80 (10.9)		30	36
7942	Stiffnut M16 Nyloc		30	36
1840605	Boot Flail		30	36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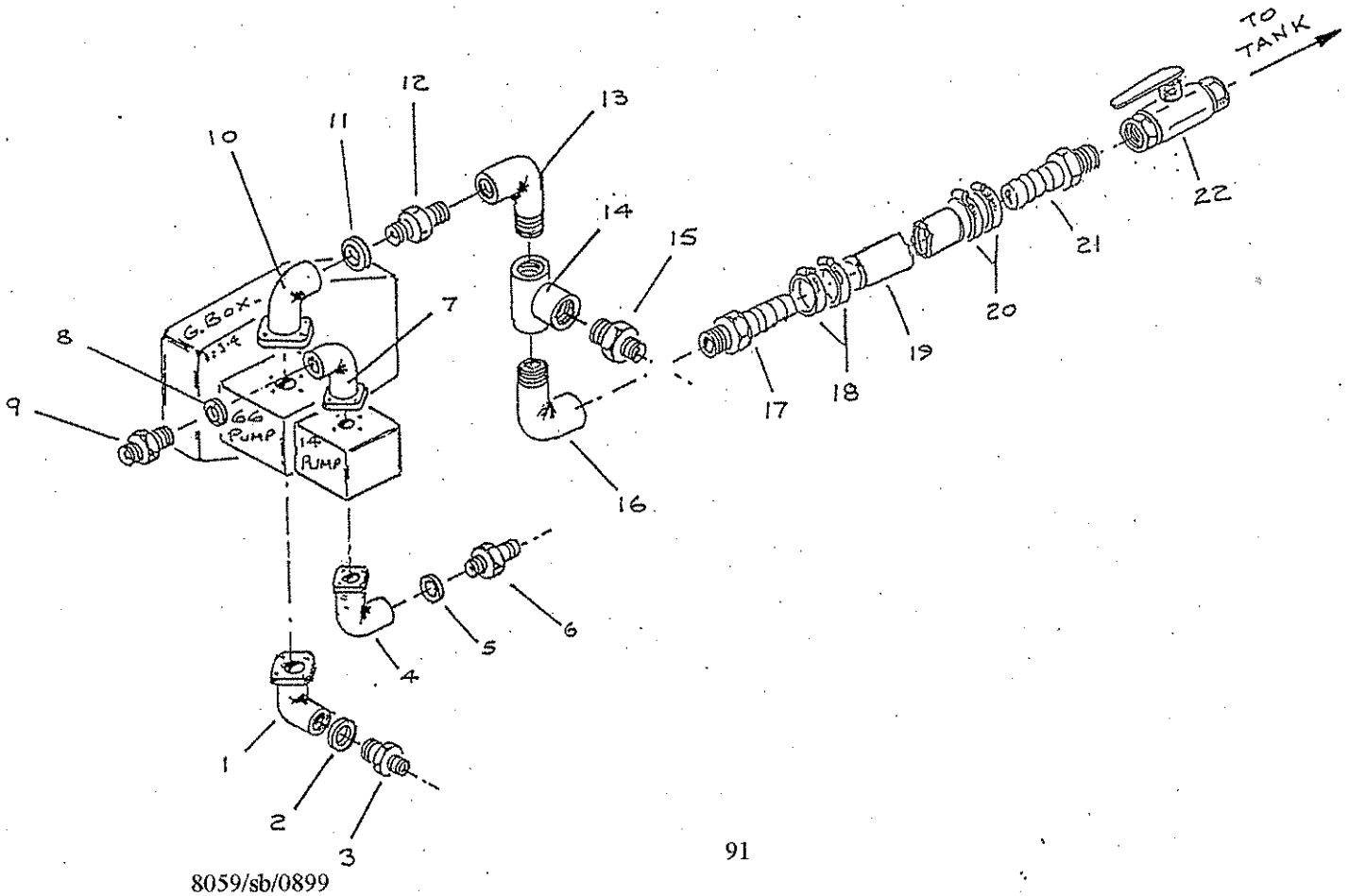
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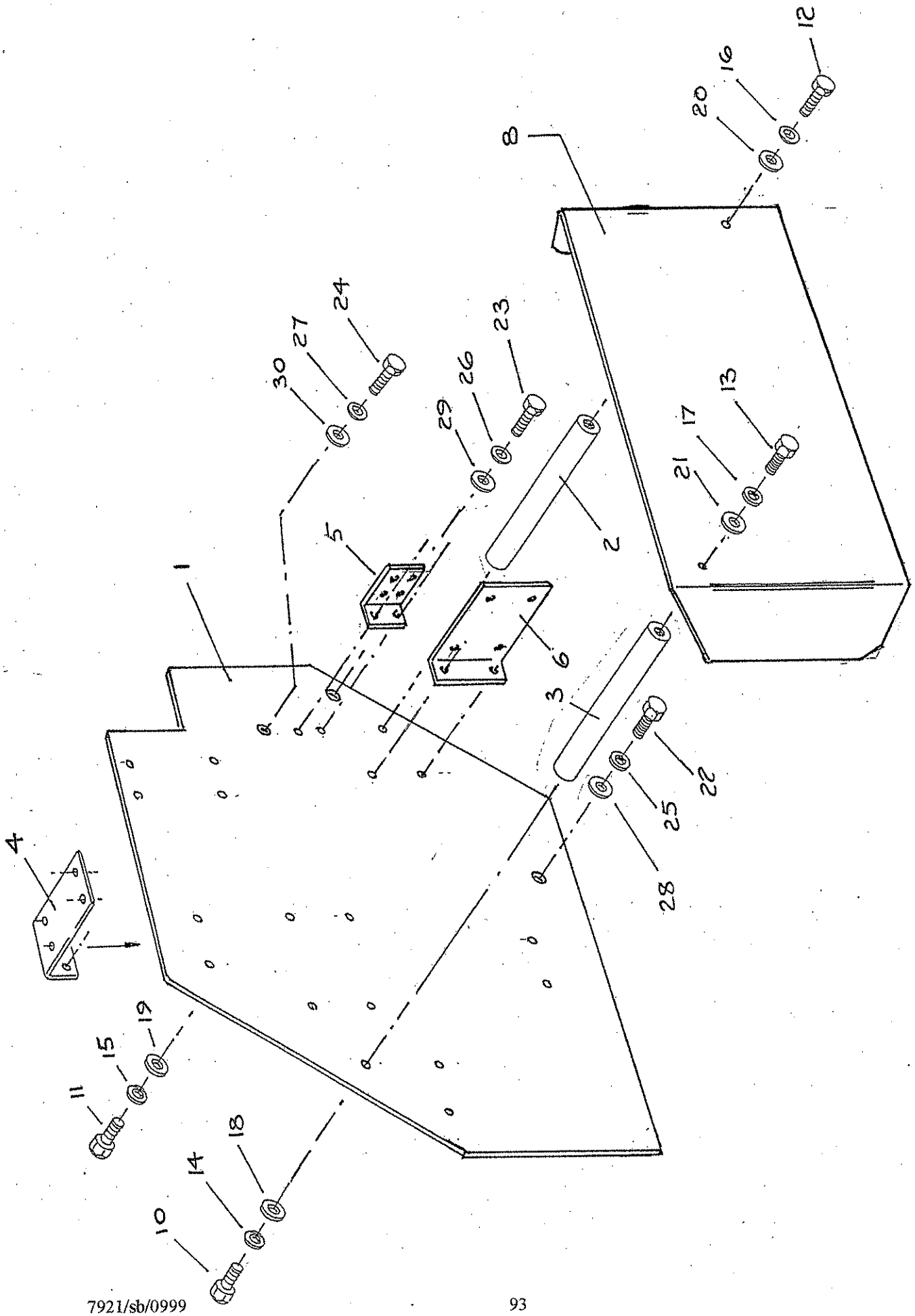
P.T.O. GEARBOX AND PUMPS

ITEM	PART NO.	DESCRIPTION	QTY
1	186.081	Gearbox Mounting plate	1
2	2733	Setscrew M12 x 40	2
3	3082	Stiffnut M12 Nyloc	2
4	7973	Gearbox ML52 1:3.6	1
5	2950	Setscrew M12 x 30	4
6	2729	Spring Washer M12	4
7	7551	Drive Coupling GR3 Taper/1	1
8	7762	Kit of - nut, tabwasher, key	1
9	8098(52,19)	Pumps dual commercial P350A Series	1
*	7925	Sandwich plate (ref RCO196)	1
*	7924	Seal kit-Seal (ref RC0197)	1
*		Seal (Ref RCO195)	1
*	7923	Drive quill shaft (ref RCO193)	1
10	186.194	Pump stay bracket	1
12	186.130	Studding (M8 x 150)	2
13	3182	Stiffnut M8 Nyloc	4
14	2698	Bolt M10 x 40	2
15	4421	Stiffnut M10 Nyloc	2

PUMP FITTINGS/SUCTION LINE

1	7939.E08	1" Elbow T51/27 c/w 'O' Ring & M10 Screws	1
2	1934	Seal 1" BSP	1
3	1836	Adaptor 1" BSP x 3/4" BSP	1
4	7552	1/2" elbow T30/13.5 c/w 'O' ring & M8 Screws	1
5	0909	Seal 1/2" BSP	1
6	1826	Adaptor 1/2" BSP x 1/2" BSP	1
7	7553	3/4" Elbow T40/20 c/w 'O' ring & M8 Screws	1
8	0934	Seal 3/4" BSP	1
9	0935	Adaptor 3/4" BSP x 3/4" BSP	1
10	7850-E10	1 1/4" Elbow c/w 'O' ring & M12 screws	1
11	3155	Seal 1 1/4" BSP	1
12	8011	Adaptor 1 1/4" BSP x 1 1/2" BSPT	1
13	8002	Elbow 1 1/2" BSP M/FM	1
14	8001	Tee 1 1/2" BSP F/F/F	1
15	8010	Adaptor 1 1/2" BSPT x 3/4" BSP	1
16	8002	Elbow 1 1/2" BSP M/FM	1
17	7999	Hose tail 1 1/2" BSP (Male) x 1 1/2" Hose	1
18	7455	Hose Clips	2
19	8000	Suction Hose (1 1/2") x 550	1
20	4455	Hose Clips	2
21	7999	Hose tail 1 1/2" BSP (Male) x 1 1/2" Hose	1
22	7619	Top (To tank) 1 1/2" BSP	1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VALVE PLATE AND VALVE MOUNTING BRACKETS

ITEM	PART NO.	DESCRIPTION	QTY
1	186.168	Valve Plate	1
2	186.047	Spacer for guard	1
3	186.047	Spacer for guard	1
4	186.049	Junction box support bracket	1
*	2793	Setscrew M8 x 20 (186.049 to 186.048)	2
*	3182	Stiffnut M8 Nyloc (186.049 to 186.048)	2
5	186.051	ON-OFF and PROP valve bracket	1
*	2987	Setscrew M8 x 25 (186.051 to 186.048)	2
*	3182	Stiffnut M8 Nyloc (186.051 to 186.048)	2
6	186.050	VMA valve bracket	1
*	2987	Setscrew M8 x 25 (186.050 to 186.048)	2
*	3182	Stiffnut M8 Nyloc (186.050 to 186.048)	2
7			
8	186.171	Cover panel (L.H m/c only)	1
9			
10	2793	Setscrew M8 x 20	1
11	2793	Setscrew M8 x 20	1
12	2793	Setscrew M8 x 20	1
13	2793	Setscrew M8 x 20	1
14	3001	Spring Washer M8	1
15	3001	Spring Washer M8	1
16	3001	Spring Washer M8	1
17	3001	Spring Washer M8	1
18	3111	Flatwasher M8	1
19	3111	Flatwasher M8	1
20	3111	Flatwasher M8	1
21	3111	Flatwasher M8	1
22	2712	Setscrew M12 x 25	1
23	2712	Setscrew M12 x 25	1
24	2712	Setscrew M12 x 25	1
25	2729	Spring Washer M12	1
26	2729	Spring Washer M12	1
27	2729	Spring Washer M12	1
28	2716	Flatwasher M12	1
29	2716	Flatwasher M12	1
30	2716	Flatwasher M12	1

* Denotes - not illustrated

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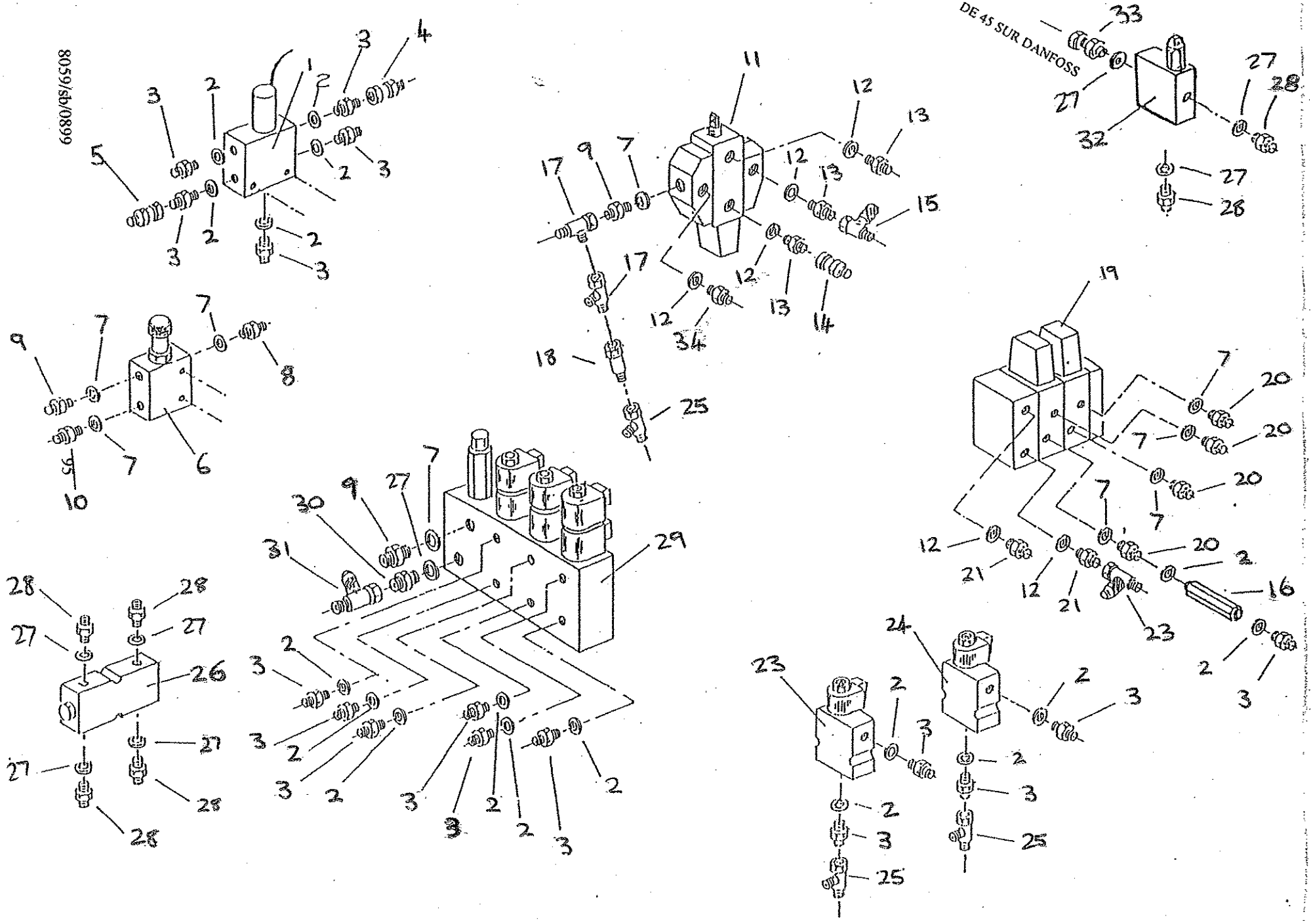
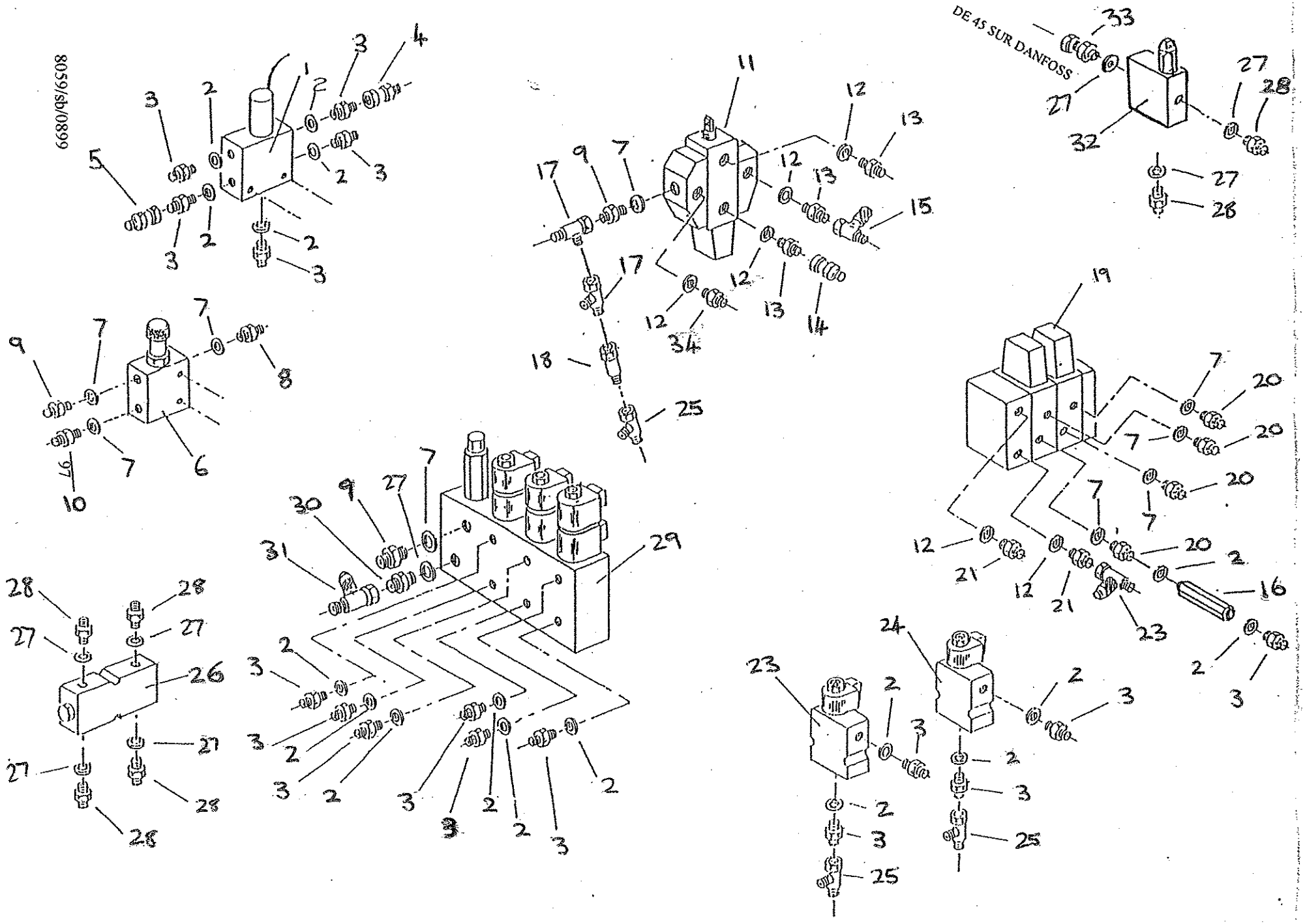
DE 45 SUR DANFOSS



HYDRAULIC VALVES AND FITTINGS

ITEM	PART NO.	DESCRIPTION	QTY
1	7859	Headfloat Valve R3605C	1
*	6981	Bolt M6 x 50	2
*	4776	Stiffnut M6 Nyloc	2
2	1181	Seal 1/4" B.S.P	11
3	1823	Adaptor 1/4" BSP x 1/4" BSP	16
4	6988	Adaptor 3/8" BSP M/FLN 90	1
5	7075	Adaptor 1/2" BSP M/FLN 90	1
6	7878	Flow divider	1
*	2916	Bolt M6 x 65 (7878 to Valve Plate)	2
*	4776	M6 Nyloc (7878 to Valve Plate)	2
*	2715	Flatwasher M6 (7878 to Valve Plate)	2
7	0909	Seal 1/2" Dowty Bonded	9
8	4928	Adaptor 1/2" BSP x 3/8" BSP (M-FLN)	1
9	1826	Adaptor 1/2" x 1/2" BSP	3
10	0914	Adaptor 1/2" BSP x 3/8" BSP	1
11	7542	Motor Spool Valve Block V3 c/w Relief Valve	1
*	3183	Bolt M8 x 45 (7542 to Valve Plate)	3
*	3111	Flatwasher M8 (7542 to Valve Plate)	3
*	3182	Stiffnut M8 Nyloc (7542 to Valve Plate)	3
12	0934	Seal 3/4" B.S.P	6
13	0935	Adaptor 3/4" BSP x 3/4" BSP	3
14	7905	Adaptor 3/4" BSP M-FLN	1
15	7810	Test point 3/4" BSP	1
16	7813	Restrictor One way FPR 1/4 0.5 1.8	1
17	5002	Tee 1/2" BSP FM,M,M	2
18	7832	Adaptor 1/2" BSP F/M x 1/4" BSP M	1
	7542.1	Relief Valve cartridge (V3028) pilot operated adjustable (set at 2500 PSI) (170 Bar)	1
*	7542.2	Seal Kit (Slice) V3000	
*	7542.3	Seal Kit (end cover) V3000	
19	7577	Danfoss PVG32 Proportional Valve	1
20	1825	Adaptor 1/2" BSP x 1/4" BSP	4
21	1834	Adaptor 3/4" BSP x 1/2" BSP	2
22	7811	Test Point 1/2" BSP	1
23	7583	Proportional valve ERV1-10-25 2G 12 DG	1
24	7584	ON-OFF, Valve SV4-10C 2G 12 DG	1
25	7323	Tee 1/4" BSP M-F-M	3
*	184.408	Studding (to Valve plate)	2
*	2715	Flatwasher M6 (to Valve plate)	4
*	4776	Stiffnut M6 Nyloc (to Valve plate)	4
26	7716	Check Valve (double pilot)	3
*	186.173	Fixing Plate	1
*	186.174	Studding (to Valve plate)	2
*	4776	Stiffnut M6 Nyloc	4


DE 45 SUR DANFOSS

HYDRAULIC VALVES AND FITTINGS (CONT'D)

ITEM	PART NO.	DESCRIPTION	QTY
*	2715	Flatwasher M6	4
27	0670	Seal 3/8" BSP	14
28	1180	Adaptor 1/4" BSP x 3/8" BSP	13
29	7706B	Valve block VMA1035 (x3) SV9-10-A	1
* includes	7580	Relief Cartridge set at 170 bar	
30	0665	Adaptor 3/8" BSP x 3/8" BSP	1
31	7815	Test Point 3/8" BSP	1
*	3731	Setscrew M8 x 16 (7706B to Valve plate)	2
*	3001	Spring Washer M8 (7706B to Valve plate)	2
*	3731	Setscrew M8 x 16 (8.8) (7577 to Valve plate)	3
*	3001	Spring Washer M8 (7577 to Valve plate)	3
32	4135 R400	Relief Valve	1
33	7833	Adaptor 1/4" F/M x 3/8" M	1
*	6981	Bolt M6 x 50 (8.8) (7716 to Valve plate)	2
*	2715	Washer M6 Form A (7716 to Valve plate)	2
*	2731	Washer M6 Spring (7716 to Valve plate)	2
34	1836	Adaptor 3/4" BSP x 1" BSP	1

SET OF HOSES FOR 637 LEFT HAND CUT

COMPONENT	DESCRIPTION	QTY PER ITEM
004.370	Hose 1/4 90 x 90 x 290	2
	--- 9 - E2 & 10 - D2	
004.438	Hose 3/8 ST x 91 x 1210	1
	--- Tel tube to bulk head	
004.496	Hose 1 ST x NE(No end) x 300	1
	--- Ret filter discharge	
004.689	Hose 1/4 ST x 90 x 280	2
	--- Tele tubes- bulk head	
004.763	Hose 1/2 ST x 90 x 280	1
	--- T - 6	
004.764	Hose 1/2 ST x 90 x 230	1
	--- S - 7	
004.765	Hose 1/2 90 x 90 x 200 @135	1
	--- BYP - 8	
004.766	Hose 1/4 90 x 90 x 1700 @000	1
	--- E1 - 1ST Ram rod	
004.767	Hose 1/4 90 x 90 x 1650 @000	1
	--- D1 - 1st Ram anchor	
004.768	Hose 3/8 ST x ST x 1275	1
	--- Top tube to rod	
004.769	Hose 1/4 90 x 90 x 2060 @180	1
	--- Dan top-2nd ram rod	
004.770	Hose 1/2 90 x 90 x 1580 @ 180	1
	--- Dan.bottom-2nd ram rod	
004.771	Hose 1/4 90 x 90 x 1000 @000	1
	--- B1-Rod (Brake back)	
004.772	Hose 1/4 90 x 90 x 1100 @270	1
	--- B2-Anchor (Brake back)	
004.773	Hose 3/4 ST x 90 x 4900	2
	--- V3-tele steel tubes	
004.774	Hose 3/8 ST x 90 x 5366	2
	--- A1-Rod HA & A2-Anchor HA	
004.775	Hose 3/8 ST x ST x 4900	1
	--- V3 Ret-tele steel tube	
004.776	Hose 3/8 ST x 90 x 5450	1
	--- C2-Anchor tele ram	
004.777	Hose 3/8 ST x 90 x 6250	1
	--- C1 - rod tele ram	

SET OF HOSES FOR 637 LEFT HAND CUT CONTINUED

COMPONENT	DESCRIPTION	QTY PER ITEM
004.778	Hose 1 90 x 90 x 760 @180 --- V3-Bott. of cooler inlet	1
004.779	Hose 1 90 x 90 x 170 --- Top of cooler-filter return	1
004.861	Hose 3/4 ST x ST x 1820 --- Tele tube-Motor Drive/Bleed	2
004.862	Hose 3/8 ST x ST x 1860 --- Bottom tube to anchor	1
186.059	Steel Hyd Pipe --- Cooler - Filter	1
186.175	Steel Hyd Pipe --- V3 - Cooler	2

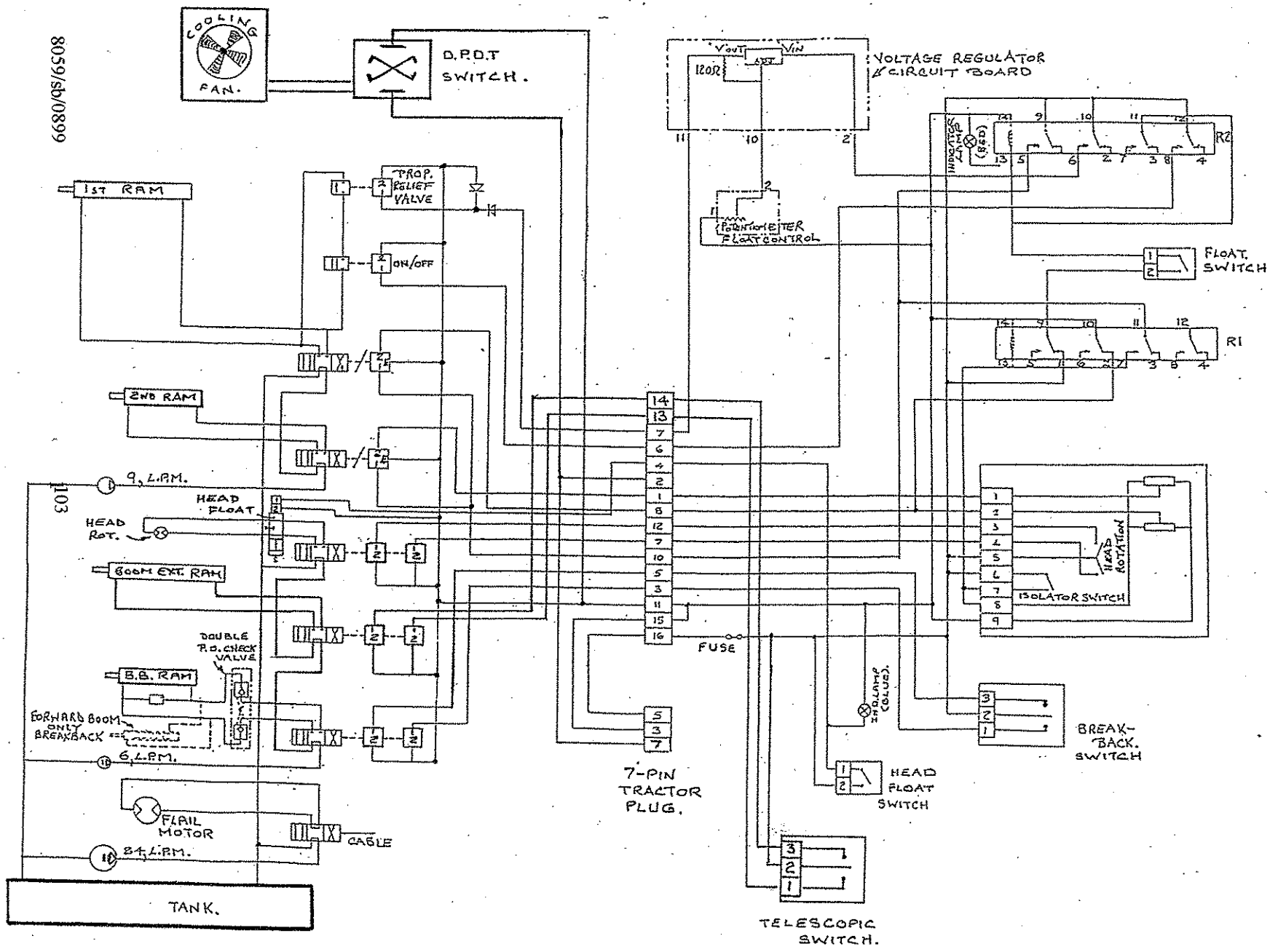
SET OF HOSES FOR 637 LEFT HAND CUT CRANKED BOOM

COMPONENT	DESCRIPTION	QTY PER ITEM
004.370	Hose 1/4 90 x 90 x 290 --- 9 - E2 & 10 - D2	2
004.438	Hose 3/8 ST x 91 x 1210 --- Tel tube to bulk head	1
004.496	Hose 1 ST x NE(No end) x 300 --- Ret filter discharge	1
004.689	Hose 1/4 ST x 90 x 280 --- Tele tubes- bulk head	2
004.763	Hose 1/2 ST x 90 x 280 --- T - 6	1
004.764	Hose 1/2 ST x 90 x 230 --- S - 7	1
004.765	Hose 1/2 90 x 90 x 200 @135 --- BYP - 8	1
004.766	Hose 1/4 90 x 90 x 1700 @000 --- E1 - 1ST Ram rod	1
004.767	Hose 1/4 90 x 90 x 1650 @000 --- D1 - 1st Ram anchor	1
004.768	Hose 3/8 ST x ST x 1275 --- Top tube to rod	1
004.769	Hose 1/4 90 x 90 x 2060 @180 --- Dan top-2nd ram rod	1
004.770	Hose 1/2 90 x 90 x 1580 @ 180 --- Dan.bottom-2nd ram rod	1
004.771	Hose 1/4 90 x 90 x 1000 @000 --- B1-Rod (Brake back)	1
004.772	Hose 1/4 90 x 90 x 1100 @270 --- B2-Anchor (Brake back)	1
004.773	Hose 3/4 ST x 90 x 4900 --- V3-tele steel tubes	2
004.774	Hose 3/8 ST x 90 x 5366 --- A1-Rod HA & A2-Anchor HA	2
004.775	Hose 3/8 ST x ST x 4900 --- V3 Ret-tele steel tube	1
004.776	Hose 3/8 ST x 90 x 5450 --- C2-Anchor tele ram	1
004.777	Hose 3/8 ST x 90 x 6250 --- C1 - rod tele ram	1

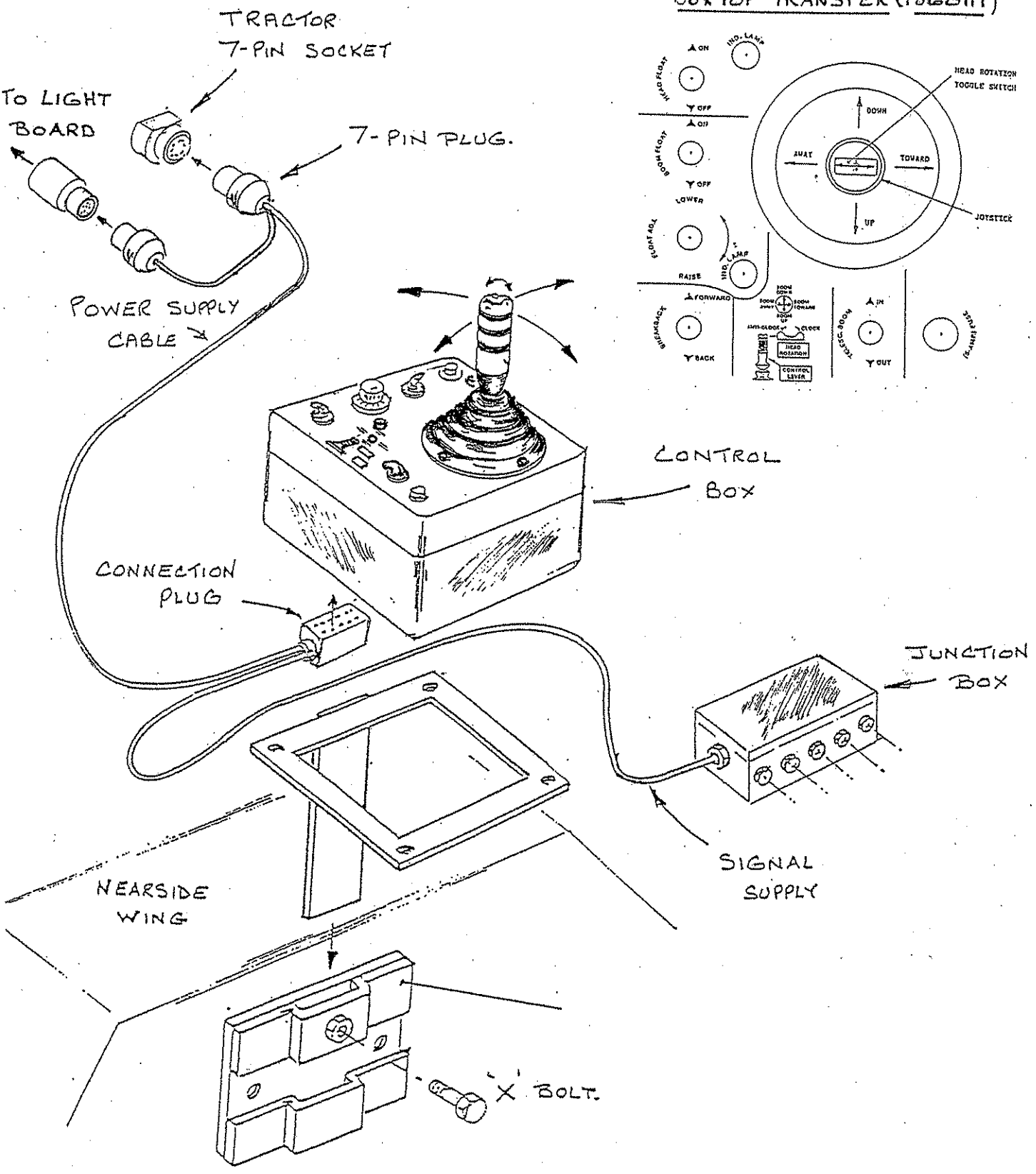
SET OF HOSES FOR 637 LEFT HAND CUT CRANKED BOOM - CONTINUED

COMPONENT	DESCRIPTION	QTY PER ITEM
004.778	Hose 1 90 x 90 x 760 @180 --- V3-Bottom of cooler inlet	1
004.779	Hose 1 90 x 90 x 170 --- Top of cooler-filter return	1
004.780	Hose 3/4 ST x ST x 2600 --- Tele tube-Motor Drive/Bleed	2
075.133	Hose 3/8 ST x ST x 970 --- Bottom tube to anchor	1
186.059	Steel Hyd Pipe --- Cooler - Filter	1
186.175	Steel Hyd Pipe ---V3 - Cooler	1

HYDRAULIC AND ELECTRICAL CIRCUIT 637 H.I.T.



BOXTOP TRANSFER (1860111)



ELECTRIC MACHINE - CONTROL COMPONENTS

ITEM	PART NO	DESCRIPTION	QTY
	186.116	Wiring Harness (Mch Side)	1
	186.117.100	Control Box (Tractor Side)	1

FAULT FINDING CHART

BREAKBACK RAM NOT OPERATIVE	CHECK FOR 12V ON PLUGS 3 & 4	FAULTY HYDRAULIC VALVE FAULTY WIRING OR SWITCH
BREAKBACK GIVES TO EASILY	RESET RELIEF VALVE ON RAM (SHOULD BE SET TO 2000 P.S.I)(136 BAR)	
NO HEAD ROTATION	CHECK FOR 12V ON PLUGS 5 & 6	FAULTY HYDRAULIC VALVE FAULTY WIRING OR DANFOSS SWITCH
SLOW HEAD ROTATION OR <360°	RELIEF VALVE NEEDS RE-SETTING (SHOULD BE SET TO 2250PSI) (153 BAR)	
SECOND RAM INOPERATIVE	CHECK FOR 12V ON PIN 1 AND 3-9V ON PIN 2 OF PLUG 7	FAULTY HYDRAULIC VALVE FAULTY WIRING OR DANFOSS CONTROL HANDLE
MAIN RAM INOPERATIVE	CHECK FOR 12V ON PIN 1 AND 3-9V ON PIN 2 OF PLUG 8	FAULTY HYDRAULIC VALVE FAULTY WIRING OR DANFOSS CONTROL HANDLE
	FLOAT ON/OFF VALVE STUCK IN OPEN POSITION - SEE FLOAT SYSTEM	

FAULT FINDING CHART CONTINUED

NO FLOAT LAMP ON	PROPORTIONAL RELIEF VALVE NOT WORKING - CHECK VOLTAGE ON PLUG 1. SHOULD RANGE FROM OV TO 9V AS FLOAT CONTROL KNOB IS TUNED	IS HYDRAULIC ON/OFF VALVE 2 OPERATING.		FAULTY PROPORTIONAL RELIEF VALVE
		IF MACHINE AND TRACTOR SETTLE WHEN FLOAT SWITCH IS OPERATED THEN THIS VALVE IS WORKING	CHECK 12V ON PLUG 2	FAULTY HYDRAULIC VALVE
				FAULTY WIRING
		CHECK OUTPUT ON TERMINAL 11 ON VOLTAGE REGULATOR BOARD. (SHOULD BE 0V TO 9V)		FAULTY WIRING
				FAULTY BOARD OR POTENTIO-METER
	DANFOSS VALVE NOT OPERATING CHECK FOR 12V ON PLUG 8		FAULTY VALVE	
	NOTE:- THIS VALVE CAN BE VISUALLY CHECKED BY FITTING AN OPERATING LEVER & "MANUAL OPERATE" LOOKING FOR MOVEMENT.		FAULTY WIRING	
NO FLOAT LAMP OPER-ATE	FLOAT SWITCH FAULTY PS1 OR/AND PS2 CONTACTS NOT CLOSED - CHECK CONTINUITY ACROSS TERMINALS WHEN NO PRESSURE IN ANCHOR END OF MAIN RAM I.E HEAD RESTING ON GROUND. IF CONTACTS NOT CLOSED WITH ABOVE CONDITIONS THEN PS1 OR/AND PS2 REQUIRE REPLACING OR RESETTING.			