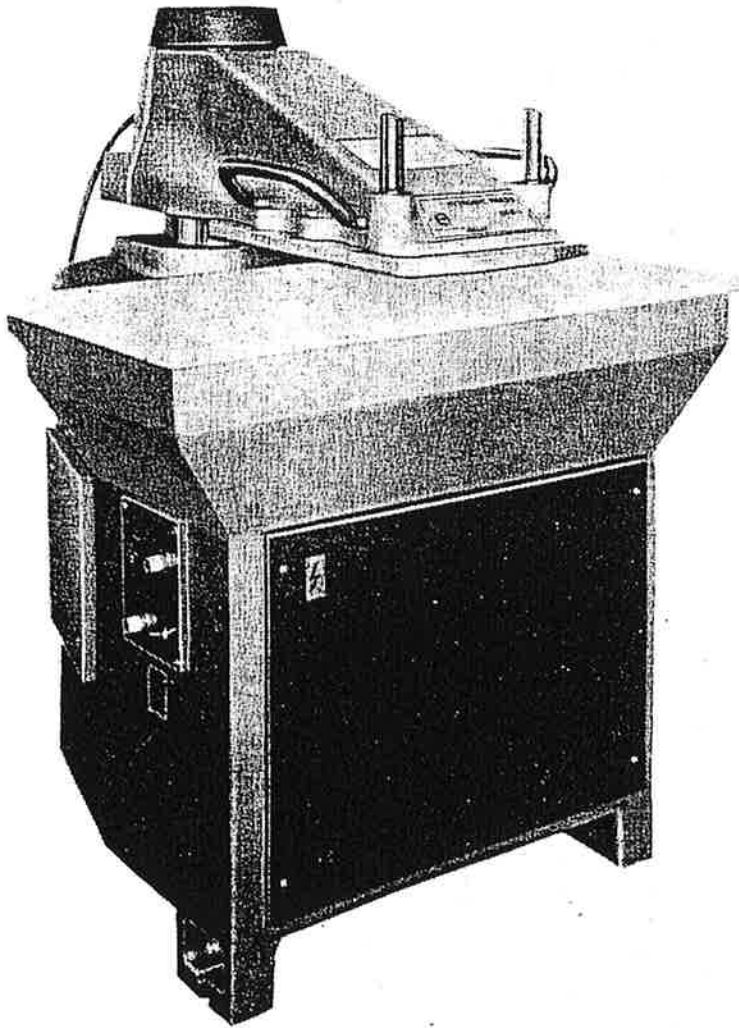


Technical Manual

Taiwan
2/21

Hytronic Press Model GSB-3



UNITED MACHINERY GROUP.

July 1987

SAFETY INSTRUCTIONS

Important. These instructions are relevant information and advice relating to the use of the Hytronic Press Model GSB-3. Any departure from the instructions and procedures is at the sole risk of the customer.

1. Electricity Supply

Connect the Machine Mains Lead to a three phase electricity supply through a fused Isolating Switch. Check that the Motor fitted to the machine is the correct one for the supply voltage being used. Ensure that there is earth continuity and check visually that the earth wire and its connections are secure and are not damaged. When the machine is switched on, ensure that the Motor Flywheel rotates in a clockwise direction looking from the front of the machine.

2. Operating the Machine

The machine is to be used for cutting components from flexible plastic sheet material, leather, fabric or other similar materials.

Do not operate the machine if any of the Safety Devices and Guards listed in Paragraph 4 below are removed, mal-adjusted, modified or by-passed. Before tripping the machine, always ensure that the Swinging Beam completely covers the knife. Do not lean on the machine with any part of the body contacting the Touch Buttons. Keep personnel clear of the Beam Spindle area of the machine. Switch off the Motor before leaving the machine unattended.

3. Servicing the Machine

Isolate the machine when servicing unless it is necessary to have power available for testing, etc. Do not leave the machine unattended while it is still connected to the power supplies or with the guards or covers removed.

4. Safety Devices and Guards

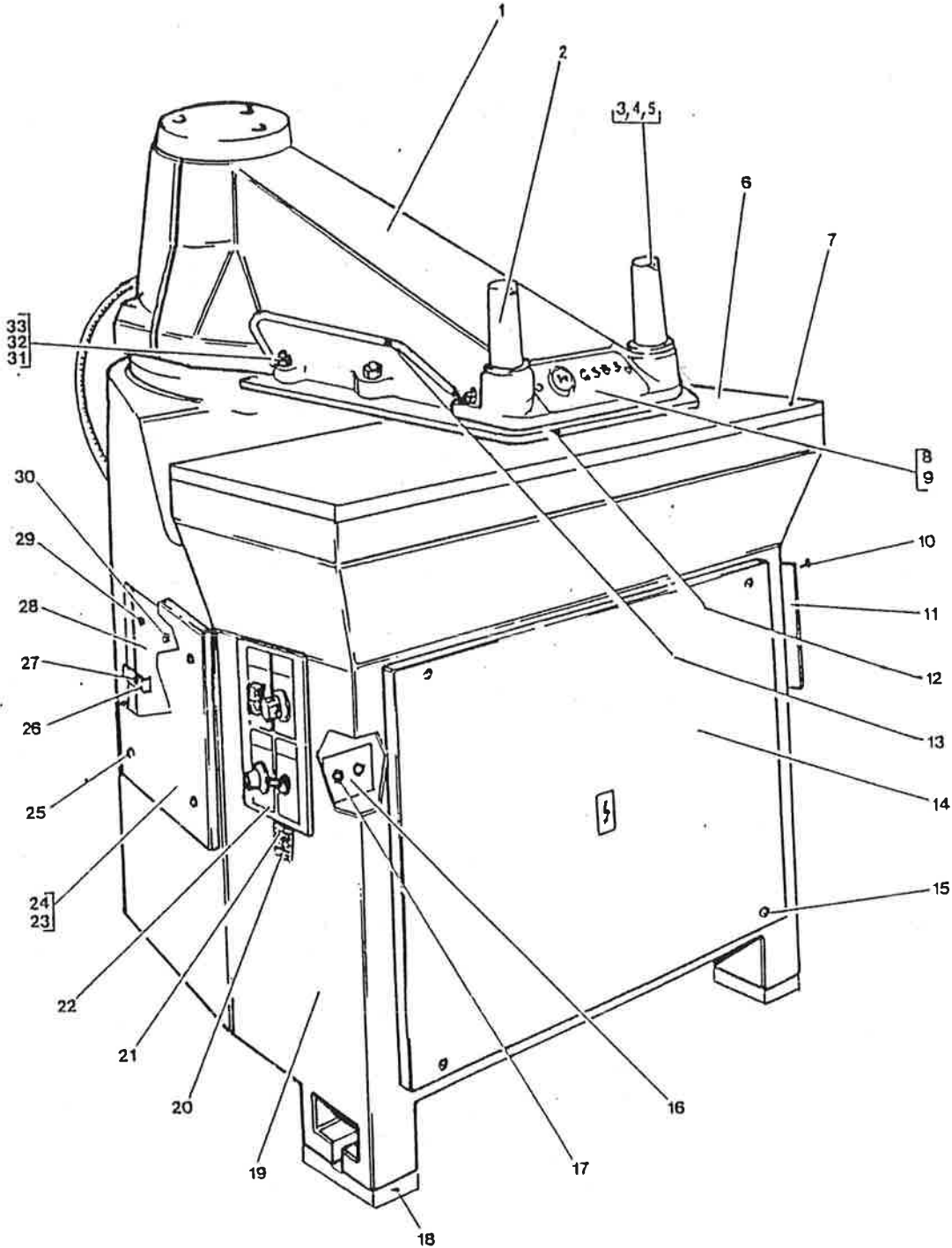
Two Hand Trip Mechanism Cpte	
Front Cover	GSB-3093
Side Aperture Cover (R.H.)	GSB-3079+
Side Aperture Cover (L.H.)	GSB-3079+
Motor Starter	ED-6080E
Low Pressure/High Pressure Switch	ED-4348E
Trip Rod Bracket Cover	GSB-3109
Beam Top Cover	GSB-3056
Electrical Bracket Cover	GSB-3131
Beam Cover Plate Facia Plate	GSB-3144
Electrical Facia Plate	GSB-3064
Blanking Plate	GSB-3096

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Fig.1

MACHINE BASE



SECTION 1

MACHINE BASE

DESCRIPTION (See Fig.1)

When both Buttons 3 are touched an electric circuit is completed and the Beam 1 descends and forces the knife through the work.

Access to the electrical components is obtained by removing the Front Cover 14. Access to the oil chamber is obtained by removing the Side Covers 23 and Deflector Plates 28, the Screw 30 being used to hold the Plate while removing or re-fitting it.

DISMANTLING PARTS (See Fig.1)

1. Trip Handles

Safety. When using Bostik M890 adhesive avoid contact with adhesive, use Bostik Barrier Cream on hands. Use with adequate ventilation, avoid prolonged breathing of vapours.

The Handles 2 are attached to the machine by Bostik M890 adhesive. Should they need replacing, ensure that the surfaces to be joined are free from dust and dirt. Thread the Touch Button Leads through the Handles. Then spread the Bostik M890 Adhesive on the Beam surface and paint the base of the Handles with Activator. Place the Handles in position as quickly as possible; then lightly clamp them in place for a few minutes. After 1 hour the bond reaches approximately 90% of its final strength. Connect the Touch Buttons 3 to the Leads and drop them into the Handles.

ITEM	DESCRIPTION	QTY.	PART No.
1	Beam	1	GSB-2006
1	Beam (53cm Wide)(To Order)	1	GSB-2070
2	Handle	2	GSB-2012
3	Touch Button	2	GSB-3114
4	Insulating Plug	2	GSB-3161
5	Lead Screw	2	SL-1129ME
6	Cutting Pad (To Order)	1	S MDF-138
7	Locating Pin	2	PL-203ME
8	Facia Plate	1	HP-4186
9	Screw	2	SL-1090ME
10	Screw	4	SL-1090ME
11	Blanking Plate	1	GSB-3096
12	Striker Plate (35cm Wide)	1	GSB-3158A
12	Striker Plate (61cm)(53cm Wide Beam)(To Order)	1	GSB-3160A
12	Striker Plate (45cm Wide)(To Order)	1	GSB-3159A
13	Hand Rail	2	GSB-3068A
14	Front Cover	1	GSB-3093
15	Screw	4	SL-1090ME
16	Internal Conduit Plate	1	GSB-3140
17	Grip Gland	2	ED-205ME
17	Nut	2	ED-206ME
*18	Base Foot	3	GSB-3135
18	Foot Pad	3	TZH-010
18	Nut	3	NL-9ME
18	Screw	3	SL-271ME
18	Washer	3	WL-166ME
19	Base	1	GSB-3227A
20	Electrical Caution Plate	1	TZH-016
21	Rivet	4	ZH-9070T
22	Electrical Facia Plate	See Item 38, Fig.5	
23	Side Cover Ass'd	2	GSB-3079+
23	Cover	2	GSB-3079
24	Seal	8	GSB-3080
25	Screw	8	SL-1111ME
26	Bracket	4	GSB-3082
27	Screw	4	SL-1111ME
28	Oil Deflector Plate Ass'd	2	GSB-3081+
28	Plate	2	GSB-3081
29	Nutsert	14	NL-75ME
30	Screw	1	SL-1090ME
31	Stud	6	GSB-2078ET
31	Stud (53cm Wide Beam & 61cm Striker Plate)(To Order)	6	GSB-3139T
32	Washer	6	WL-7ME
33	Nut	6	NL-7ME

On machines with 53cm Wide Beams the Hand Rails 13 are removed and 4 extra Studs fitted:

Stud (61cm Striker Plate) 4 GSB-2078ET
(To Order)

This option requires:

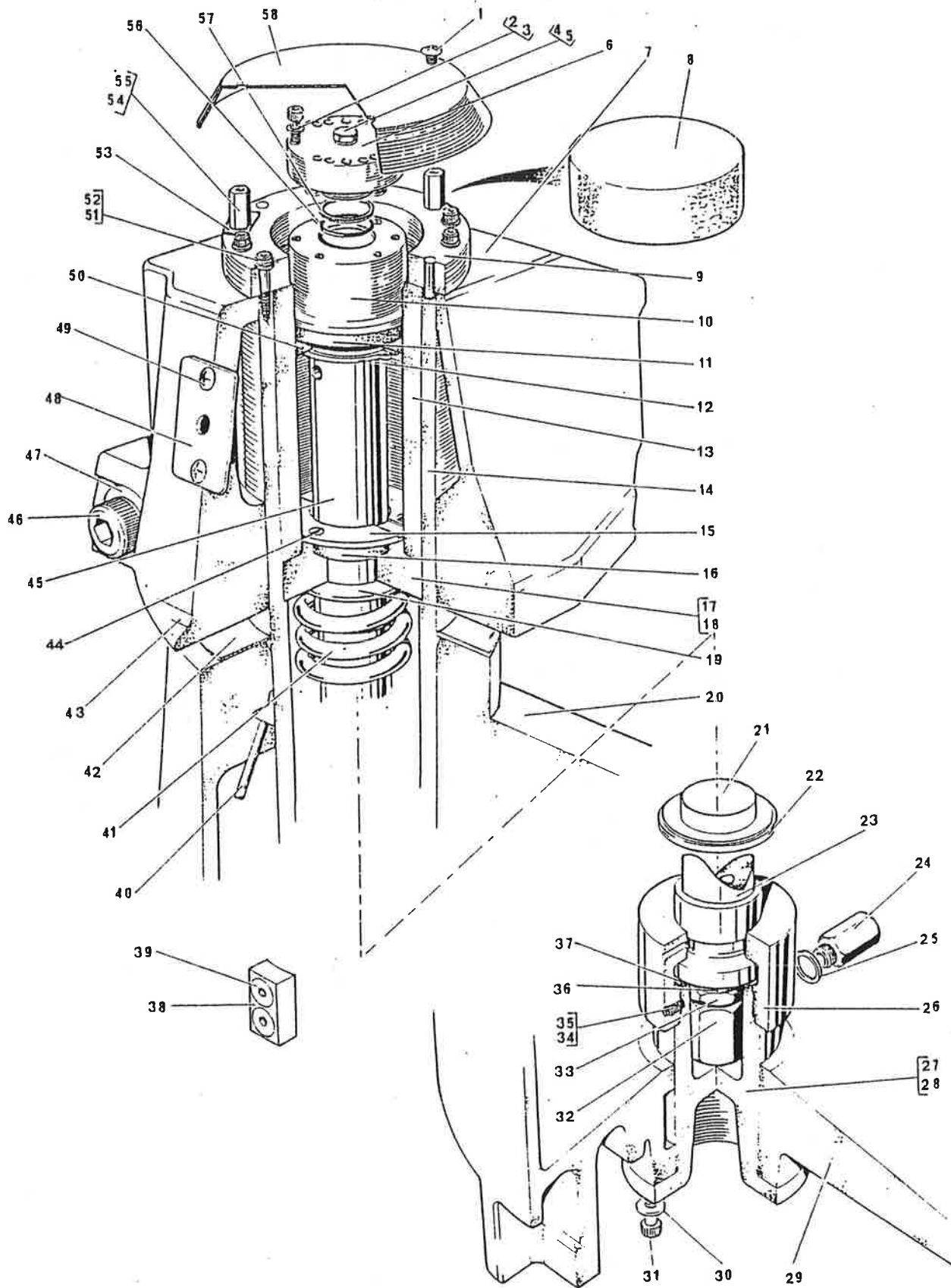
Washer 4 WL-7ME
Nut 4 NL-7ME

* To provide increased table height, Packing Feet (To Order) can be added to Base Feet 18:
Packing Foot (To Order) 3 GSB-3135

Screw SL-271ME is replaced by SL-277ME(3)

Fig.2

BEAM AND COLUMN



DESCRIPTION (See Fig.2)

The Beam 7 is clamped to the Column 14 which slides up and down in the Base 20. When the Buttons 3, Fig.1, are touched oil is pumped, via the Rotary Coupling 32, through the hollow Piston Rod 23 into the Cylinder 13. Since the Piston Rod is secured to the Base of the machine by the Retainer Nut 26 the oil entering the Cylinder forces the Beam to descend, compressing the Springs 41, and pressing the Knife through the work. When the Beam is fully down the oil pressure is removed and the Springs 41 extend, lifting the Beam and forcing the oil from the Cylinder. After the set time delay, Valve F 14, Fig.4, closes and prevents oil from leaving the Cylinder. This halts the upward motion of the Beam.

The Beam assembly is supported on the Bearing 37 which allows the Beam to be swung freely from side to side, excessive movement being prevented by the Stop Block 38. The Column 14 is lubricated via the Oil Tube 40. The Breather 8 prevents dirt etc. from entering the Cylinder whilst allowing air to pass through as the Beam moves up and down.

DISMANTLING PARTS (See Fig.2)

Safety. Switch off the machine and isolate it from the electricity supply before dismantling any parts.

1. Beam

Lift the Touch Buttons from the Handles using something sticky (e.g. plasticine) to grip them with. Loosen the Lead Screws and remove the Buttons from the Leads. Tie suitable lengths of string (approximately 2m) to the Leads. Remove the two Screws 49 and the Plate 48 together with the Conduit, and pull the Leads from the Beam, leaving the strings in the Beam.

Warning: Do not cut and re-splice the Leads as this could result in the circuit being completed and the Beam being lowered accidentally.

Place a suitable support block under the Beam 7 then remove the Screws 46 and lift off the Strap 43.

On re-assembly, place the Beam on the Table and feed the two strings left in the Beam through the Strap 43. Then loosely fasten the Beam on to the Column with the Strap 43 and align it with the Top Cap 9 so that the Stud 54 in the middle of the group of four Screws 51 is in the centre of the Beam. This ensures that the Beam can be swung the same amount to either side. Set the Switch 43, Fig.5, down. Connect the machine to the electricity supply and switch it on.

Connect the Trip Button Leads together to lower the Column at low pressure. When the Column is fully down tighten the Screws 46 with a torque of 1600NM (1200 lb/ft). Separate the Leads and switch off the machine; the Beam will rise. Pull the Touch Button Leads through the Beam using the strings left in position on dis-assembly. Connect the Touch Buttons to their Leads and drop them into the Handles. Replace the Plate 48.

2. Piston

Undo the Screws 1, lift off the Top Cover 58 and remove the Breather 8. Remove the Screws 28, Fig.1, and the Side Cover 26, Fig.1. Loosen the Screws 30, Fig.1, and lift out the Plate 31, Fig.1. Undo the Screws 10, Fig.3, and take off the Cover 7, Fig.3. Move the Cut/Set Selector Switch 43, Fig.5, down to put the machine in the setting-up mode. Connect the machine to the electrical supply and switch on. With the Beam positioned centrally and the Daylight Adjustment Potentiometer 44, Fig.5, turned down to zero, touch both Push Buttons to lower the Beam onto the Cutting Pad. Then switch off the machine and disconnect it from the electrical supply.

Remove the three Screws 43, Fig.3, and move the complete Beam Read-out Assembly to one side, to gain access to the rear aperture in the Base 20. Then reach through the aperture to remove the Screws 39 and the Stop Block 38. Use the Screws 39 to fasten the Packing Block GSB-3213 to the Column, in place of the Stop Block. Next unscrew the Solenoid Valve (SV3) 13, Fig.4., a couple of turns (but do not remove), so that the Beam is raised until it is halted when the Packing Block contacts the Base.

Retighten the Solenoid Valve into the Valve Plate 73, Fig.4. - see Section 4, Dismantling Parts 1. The Piston is now high enough up the Cylinder 13 to be conveniently dismantled.

Pump oil from the Base until the flats on the Piston Rod 23 just below the Washer 22 are revealed. Place an open-ended spanner across the flats to prevent the Piston Rod from turning when unscrewing the Piston. There should be no need to hold the spanner as the Piston Rod will not be able to turn any further once the spanner meets the casting.

Remove the Bleed Screw 4 and the Binding Screws 2. Screw the threaded portion of the Tee Bar GSB-3214 into the hole vacated by the Bleed Screw, and pull the Cap 6 away from the Piston 10. Then invert the Tee Bar and fasten it to the Piston using a couple of the Screws 2 in the appropriate holes. With a spanner across the stem of the Tee Bar unscrew the Piston from the Piston Rod 45. Replace the Seal 56 and the Seal Backer 57. Use circlip pliers to remove the Circlip 12. Then take off the Seal Cap 50 and replace the Seal 11.

On replacing the Seals, ensure that the inside of the Cylinder 13 is perfectly clean. Then hand-tighten the Piston 10 onto the Piston Rod 45 with the aid of the Tee Bar GSB-3214. Screw the Bleed Screw 4 fully into the Cap 6, and replace the Cap on the Piston. Tighten the Screws 2 to a torque rating of 31 Nm (24 lb.ft.)

Remove the open ended spanner from the Piston Rod 45, and refill the Base 20 with oil. Then connect the machine to the electrical supply, and switch on. With the Switch 43, Fig.5., down as before touch both Push Buttons to lower the Beam onto the Cutting Pad. Remove the Packing Block GSB-3213 and replace the Stop Block 38. Replace the Beam Read-out Assembly. Switch off the Motor and unscrew the Bleed Screw 4 approximately 4 turns (do not remove) to allow trapped air to escape. Then tighten the Bleed Screw, and replace the Breather 8 and the Top Cover 58. Replace the Plate 31, Fig.1., and re-assemble the Covers 26, Fig.1., and 7, Fig.3.

3. Cylinder Seal

To replace the Piston Rod Seal 16, remove the Piston Assembly as described in Dismantling Parts 2 above. Then remove the Screws 44 with the aid of the Extension Allen Key GSB-3213-Cpte. Screw the Lift Rod GSB-3229 into the threaded hole in the Seal Plate 15, and lift out the Seal Plate. Use the Extractor Screw GSB-3216 to hook the Seal 16 out of the recess and remove the Seal. Fit the replacement Seal, taking care not to damage it when moving it over the thread of the Piston Rod 45. Replace parts in reverse order to their removal, and bleed the hydraulic system as described in Dismantling Parts 2.

4. Cylinder and Springs

Safety. The Return Springs 41 are held compressed on the Piston Rod 23 and great care must be taken to control the release of the Springs. The special Spring Compression Kit must be used.*

Remove the Piston as described in Dismantling Parts 2 above. Feed the Rod (910-3-154A) (short screw-threaded end first) down the centre of the Piston Rod 45, and screw it fully into the Adaptor 33 - see Fig.2a. Remove the three Studs 54 and Washers 55 (do not remove any of the Screws 51 at this point).

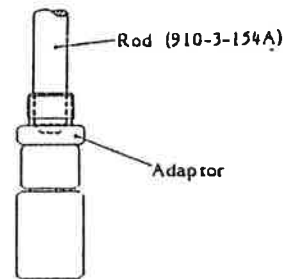
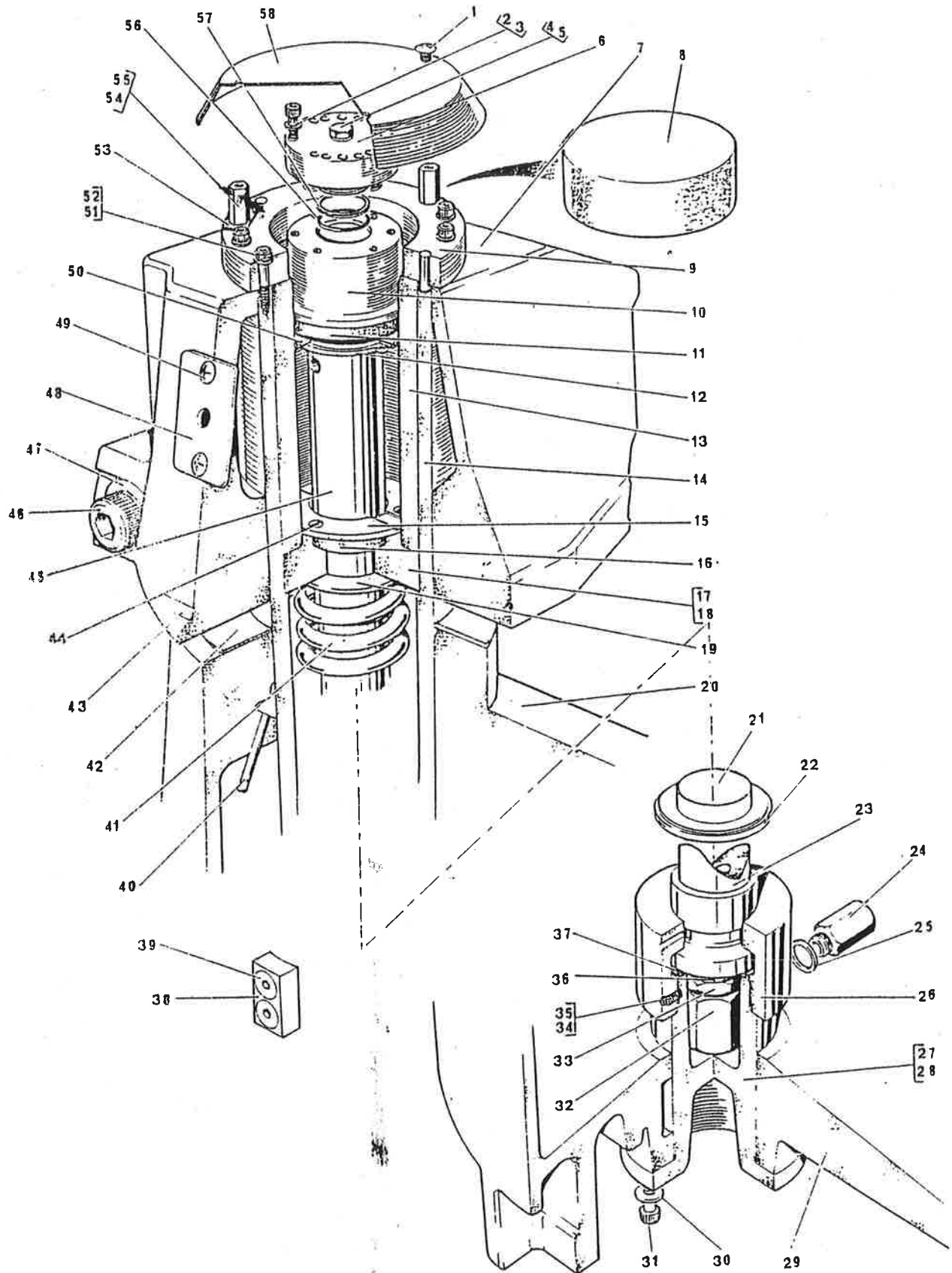


Fig 2a

Fig.2

BEAM AND COLUMN



DISMANTLING PARTS (See Fig.2) - Continued

Fit the Clamping Bar (910-3-156) over the Rod (recess uppermost) to rest on the Top Cap 9, place the Thrust Race (RHP-51105) on the Clamping Bar and then screw the handle Nut (910-3-155A) down on the Rod until the Clamping Bar is held tight against the Top Cap.

Place suitable wooden blocks between the Beam and Table to support the Beam and below the Column to prevent it slipping into the Base. Then loosen the Screws 46.

Remove the Screws 51. Then release the Spring pressure by unscrewing the Nut from the Rod, using a wrench on the square end of the Rod to prevent it turning and disengaging from the Adaptor 33. The Cylinder 13 and End Cap 17 will be forced from the Column 14. When all the Spring pressure is removed unscrew the Rod from the Adaptor, and remove the Cylinder 13 and End Cap 17. Remove the Screws 44 and take out the Seal Plate 15 for access to Seal 16.

On re-assembly do not replace the Seal 16 until the Springs 41 have been compressed using the compressing tool and the Top Cap 9 fastened down with the Screws 51 tightened to a torque of 31 Nm (24lb-ft). This is to prevent damage to the Seal 16 by the thread on the Piston Rod 45. Re-fasten the Beam to the Column as described in Dismantling Parts 1 above.

WARNING WHEN REPLACING SCREW 51 THE FOLLOWING INSTRUCTIONS MUST BE FOLLOWED. FAILURE TO DO SO COULD RESULT IN PERSONAL INJURY.

- Re-assemble only with new Screw 51 P/N GSB-3204 supplied by USM only.
- Screw 51 should be tightened to a torque of 31 Nm (320 Kg-cm or 24 lb-ft) with ± 1 Nm tolerance.
- Tightening sequence for twelve Screws 51 should be balanced in all directions. Half-tighten (say 20 Nm) Screws first; then fully tighten to the specified torque of 31 Nm.

5. Beam and Column

Before switching off the machine take off the Cover 26, Fig.1, and remove the Screws 39 and Stop Block 38. Then switch off the machine and disconnect it from the power supply. Pump the oil from the Base and disconnect the Hose 64, Fig.4, from the Adaptor 24. Loosen the Lock Screw 34. Then, using a suitable screw in the other tapped hole as a lever, unscrew the Retainer Nut 26 from the Tension Bush 27.

Disconnect the Touch Buttons and pull the leads from the Beam as described in Dismantling Parts 1 above. Using suitable lifting equipment remove the Beam and Column assembly from the machine.

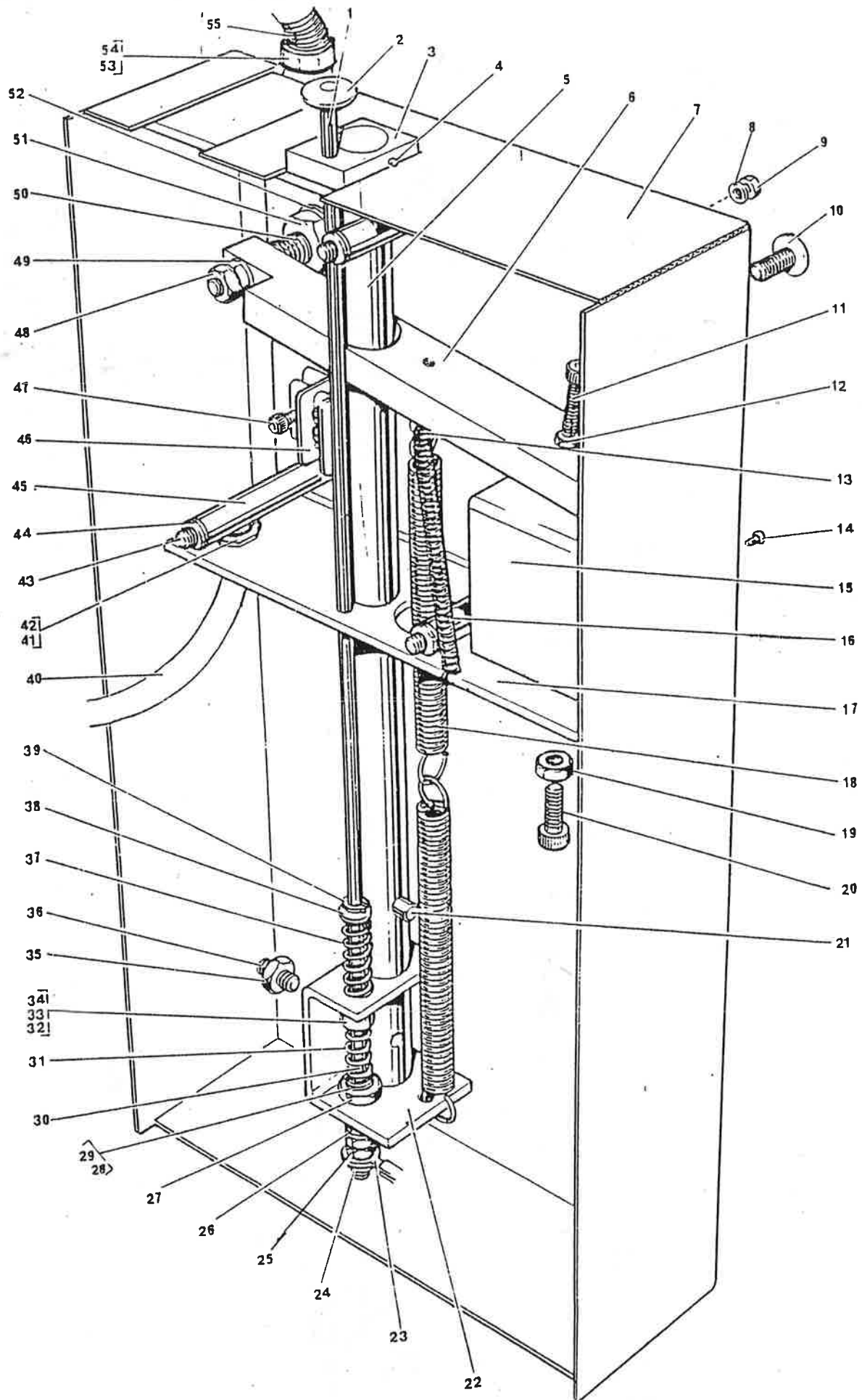
• Spring Compression Kit for use by Service Department personnel:

Rod	910-3-154A
Clamping Bar	910-3-156
Nut	910-3-155A
Thrust Race	RHP-51105

ITEM	DESCRIPTION	QTY.	PART No.
1	Screw	3	SL-1090ME
2	Screw	6	SL-556ME
3	Washer	6	WL-170ME
4	Wood Screw	1	SL-2455E
5	Washer	1	ZH-1476
6	Cap	1	GSB-3163T
7	Beam	See Item 1, Fig.1	
8	Breather	1	GSB-3058
9	Top Cap	1	GSB-3193
10	Piston	1	GSB-3162A
11	Piston Seal	1	GSB-3008
12	Circlip	1	GSB-3010
13	Cylinder	1	GSB-3169T
14	Column	1	GSB-3168
15	Seal Plate	1	GSB-3016A
16	Rod Seal	1	GSB-3015
17	End Cap	1	GSB-3170
18	Cap Seal	1	GSB-3156
19	Guide Bush	4	GSB-3017A
20	Base	See Item 18, Fig.1	
21	Guide Bush	See Item 19	
22	Guide Washer	1	GSB-3134
23	Piston Rod	1	GSB-3175T
24	Inlet Adaptor	1	GSB-3173T
25	Washer	1	ZH-1478
26	Retainer Nut	1	GSB-3091A
27	Tension Bush	1	GSB-3171
28	Loctite Multi Gasket No.574		
29	Base	See Item 18, Fig.1	
30	Washer	4	WL-7ME
31	Screw	4	SL-1128ME
32	Rotary Coupling	1	GSB-3172T
33	Adaptor	1	GSB-3022T
34	Lock Screw	1	SL-98ME
35	Seating	1	WL-238E
36	Washer	2	ZH-1478
36	Packing Washer	1	GSB-3182
37	Bearing	1	GSB-3092
38	Stop Block	1	GSB-3185B
39	Screw	2	GSB-3223
40	Oil Tube	See Item 29, Fig.4	
41	Column Spring	2	SPGL-1013M
42	Seal	1	GSB-3221T
43	Retaining Strap	1	GSB-2009EA
44	Screw	3	SL-1179ME
45	Piston Rod	See Item 23	
46	Screw	2	GSB-3201
47	Washer	2	WL-176ME
48	Conduit Plate	1	GSB-2043
49	Screw	2	SL-1090ME
50	Seal Cap	1	GSB-3009
51	Screw	12	GSB-3204
52	Washer	12	WL-170ME
53	Warning Label	1	GSB-3195
54	Stud	3	GSB-3194
55	Washer	3	WL-6ME
56	Seal	1	ZH-200M
57	Seal Backer	1	GSB-3167
58	Top Cover	1	GSB-3165

Fig.3

BEAM POSITION READ-OUT PARIS - GSB-3252 Cpte

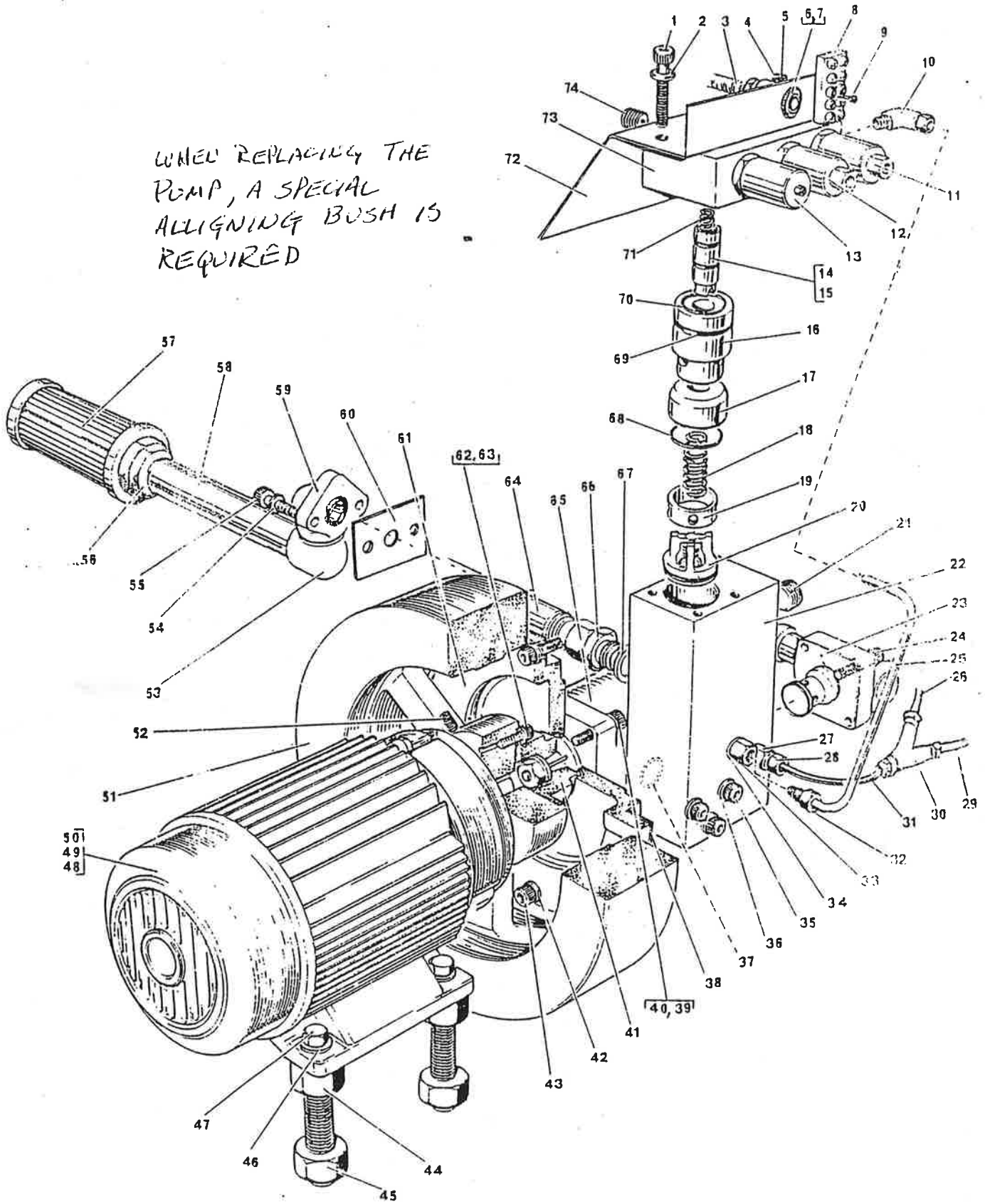


DESCRIPTION (See Fig.3)	ITEM	DESCRIPTION	QTY.	PART No.
With the Switch 34, Fig.5, set down and the Trip Buttons touched, the Beam descends under low pressure. At the same time the Solenoid 15 extends releasing the Lock Bar 6; the Springs 18 then raise the Rod 5 together with the Trip Rod Assembly. The upward movement of the Rod 5 is halted when the Cap 2 contacts the underside of the Beam. The Trip Rod 1 is depressed until it makes contact with the Plunger 30. The Beam then pushes the Rod 5 down as it continues to descend, until it comes to rest on the Knife.	1	Trip Rod Ass'd	1	GSB-3100+
	2	Trip Rod	1	GSB-3100
	3	Cap	1	GSB-3101T
	4	Plate	1	GSB-3107
	5	Pin	1	PL-663ME
	6	Lock Rod	1	GSB-3105
	7	Lock Bar	1	GSB-3047
	8	Cover	1	GSB-3109A
	9	Washer	4	WL-2ME
	10	Nut	2	NL-2ME
When the Trip Buttons are released the Solenoid 15 retracts and the Spring 16 pulls the Lock Bar 6 down to lock the Rod 5 in the Beam down position. When the Beam descends on a cutting stroke it pushes the Trip Rod 1 into contact with the Plunger 30 which signals the control circuit to return the Beam.	11	Screw	2	SL-1093ME
	12	Stop Screw	1	SL-520ME
	13	Nut	1	NL-3ME
	14	Hook	1	SL-734ME
	15	Screw	2	SL-695ME
	16	Solenoid	1	GSB-3051T
	17	Spring	1	GSB-3049
	18	Bracket	1	GSB-3104BT
	19	Spring	2	SPGL-1040ME
	20	Locknut	1	NL-5ME
1. Lock Bar Pivot Release the Nuts 48. Tighten the inner Nut up to the Lock Bar 6 sufficiently to allow the Bar to move freely but without play, then lock the outer Nut against the inner. Loosen the two Nuts 51. Then with the inside Nut 51 held against the Bracket 17 screw the Pivot 50 into or out of the Nut until the Lock Bar 6 moves freely on the Rod 5. Tighten the outer Nut 51 to secure the setting.	21	Stop Screw	1	SL-80ME
	22	Stop Pin	1	PL-667ME
	23	Bracket	1	GSB-3106A
	24	Ring Terminal	1	ED-5737E
	25	Nut	1	NL-4ME
	26	Locknut	2	NL-4ME
	27	Washer	3	WL-4ME
	28	Locknut	1	NL-7MET
	29	Plunger Bush	1	GSB-3186
	30	Insulating Washer	2	GSB-3187
2. Stop Screw Release the Nut 12 and adjust the Stop Screw 11 so that when the Lock Bar 6 is raised until the Stop Screw contacts the Bracket 17 the Rod 5 is fully released by the Lock Bar 6. Ensure that there is a clearance, not exceeding 1.8 mm, between the Solenoid Core and the Lock Bar 6. Tighten the Nut 12 to secure the setting.	31	Plunger	1	GSB-3102T
	32	Spring	1	SPGL-1024ME
	33	Plunger Circlip	1	ZH-772M
	34	Spring Washer	1	WL-4ME
	35	Shroud	1	GSB-3141A
	36	Nut	1	NL-5ME
	37	Screw	1	SL-80ME
	38	Spring	1	SPGL-1024ME
	39	Washer	1	WL-4ME
	40	Circlip	2	ZH-772M
3. Solenoid Adjust the Solenoid Stop Screw 20 when the Lock Bar 6 is in its lowest (locked) position. Make adjustment so that the Solenoid Core just touches the underside of the Lock Bar without raising it. Tighten the Lock Nut 19.	41	Conduit (12 mm O.D. Nylon Tube, 870 mm long)	1	ED-205ME
	42	Grip Gland	1	ED-8ME
	43	Grip Gland Nut	1	ED-8ME
	44	Screw	3	SL-1141ME
	45	Washer	3	WL-5ME
	46	Spacer	3	CL-160ME
	47	Terminal Block	1	ED-6917ET
	48	Screw	2	SL-504ME
	49	Nut	2	NL-5ME
	50	Washer	1	WL-5ME
4. Plunger Screw the top Locknut 25 onto the Plunger 30 and check that the Plunger is just no longer in contact with the Trip Rod 1. Test by depressing the Cap 2. The Rod 1 should move a small amount (0.1 to 0.3 mm) before contacting the Plunger (insert extra Washers 26 between the Nut 25 and Bush 28 if necessary). Tighten the second Locknut 25 against the top one to secure the setting; then attach the Terminal 23 with the Nut 24.	51	Pivot	1	GSB-3108
	52	Nut	2	NL-17ME
	53	Washer	2	WL-1097E
	54	Elbow	1	ED-376ME
	55	Nut	2	ED-206ME
	56	Conduit	1	ED-378ME-650

Fig.4

HYDRAULIC COMPONENTS

WHEN REPLACING THE
PUMP, A SPECIAL
ALIGNING BUSH IS
REQUIRED



DESCRIPTION (See Fig.4)

The Motor 48 drives the Pump 65 via the Flywheel 51 and Coupling 41. The Pump is situated in the oil sump in the rear compartment of the machine base and draws in oil through the Strainer 57. The oil is pumped to the Beam Cylinder via the Hose 64. The Relief Valve 23 limits the oil pressure in the system, and the Beam is controlled by the action of the Solenoid Valves (SV1) 11, (SV2) 12 and (SV3) 13.

ADJUSTMENTS (See Fig.4)

1. Motor Level

When the machine is built the Motor 48 is aligned with the Pump 65 in the following manner. The Pump 65 is mounted in the machine using the Screws 39. A special Aligning Bush and Bracket is assembled to the Pump Shaft then the Support Screws 44 are adjusted to touch the underside of the Aligning Bracket. The Nuts 45 are then tightened to secure the setting. This setting should not be disturbed.

The Motor 48 and Flywheel 51 are placed on the Support Screws 44 and the Coupling 41 engaged. Then, with the aid of packing strips between the Pump Flange 61 and the Flywheel 51, the Motor is set square to the Pump and secured in place by Screws 47. Check that the Motor is correctly aligned by listening to the coupling at low rpm. When the Motor is out of alignment the Coupling makes a clicking noise.

2. Relief Valve

The Valve 23 is set on assembly to operate at 220 Bars (3200 psi) and should not require adjustment.

DISMANTLING PARTS (See Fig.4)

Safety. Switch off machine and disconnect it from the electricity supply before dismantling any part

1. Solenoid Valves SV1, SV2 and SV3

If a Valve is suspected of having a mechanical fault (i.e. its coil appears to be energized at the correct time but the Valve is not functioning) test its action by inserting a thin pin through the hole in the rear of the Valve. The Valve Spool should be felt to move approximately 2 mm when the Valve is energized.

Note. The Solenoid Valve Spools have very small clearances (less than 0.005 mm) and are thus a tight fit and great care must be taken with their assembly. If any damage is suspected the Valve should be replaced.

To remove the Valves 11, 12 and 13 take off the cover and solenoid coil; then unscrew the Valve using a suitable hollow box spanner.

On re-assembly, screw the Valve in by hand using the box spanner until the O-ring under the hexagonal nut is felt to compress. Then use a tommy bar in the spanner to turn the nut another 10 to 20 degrees; alternatively, tighten the nut to a maximum torque of 5 ft-lbs (6.8 Nm) using a torque wrench. Replace the coil and cover.

If oil leaks from the hexagonal head of the Valve (SV3) 13, remove the Valve and replace the larger of the two O-rings with O-ring ZH-2117 which has a greater cross-section. If the smaller O-ring is damaged its replacement is ZH-2113.

2. Manifold Block

Ensure that the Beam is fully raised so that oil is not held under pressure in the Cylinder 13, Fig.2. Remove the Side Cover 26, Fig.1, and the Plate 31, Fig.1; then pump the oil from the Base. Disconnect the Lubrication Tube 31 from the Block 22. Unscrew the retaining nuts from the Solenoid Valves 11, 12 and 13, and pull the solenoid coils from the Valves leaving the coils connected to the Terminal Block 8. Remove the rear two Screws 1, releasing the Deflector Plate 72 (with attached Conduit 3 and Solenoid Coils) from the Valve Plate 73.

Remove the Screws 35 and lift the Manifold Block assembly into the access aperture. Disconnect the Hose 64 from the Adaptor 66 then remove the Block from the machine. Check that the O-ring 37 is attached to the Block.

Remove the Pipe 25 and the remaining two Screws 1 and take off the Valve Plate 73. The Upstroke Valve (Valve F) 14 and Check Valve 20 can then be removed using a small hook to pull the components out against the resistance of the O-rings.

Replace parts in reverse order to their removal making sure the O-ring 37 is correctly positioned between the Pump 65 and Block 22.

Note The low-pressure Restrictor 74 is selected on assembly to control the setting-stroke pressure, and should not be changed. If the setting pressure seems too high, check that the 0.6mm hole is not obstructed.

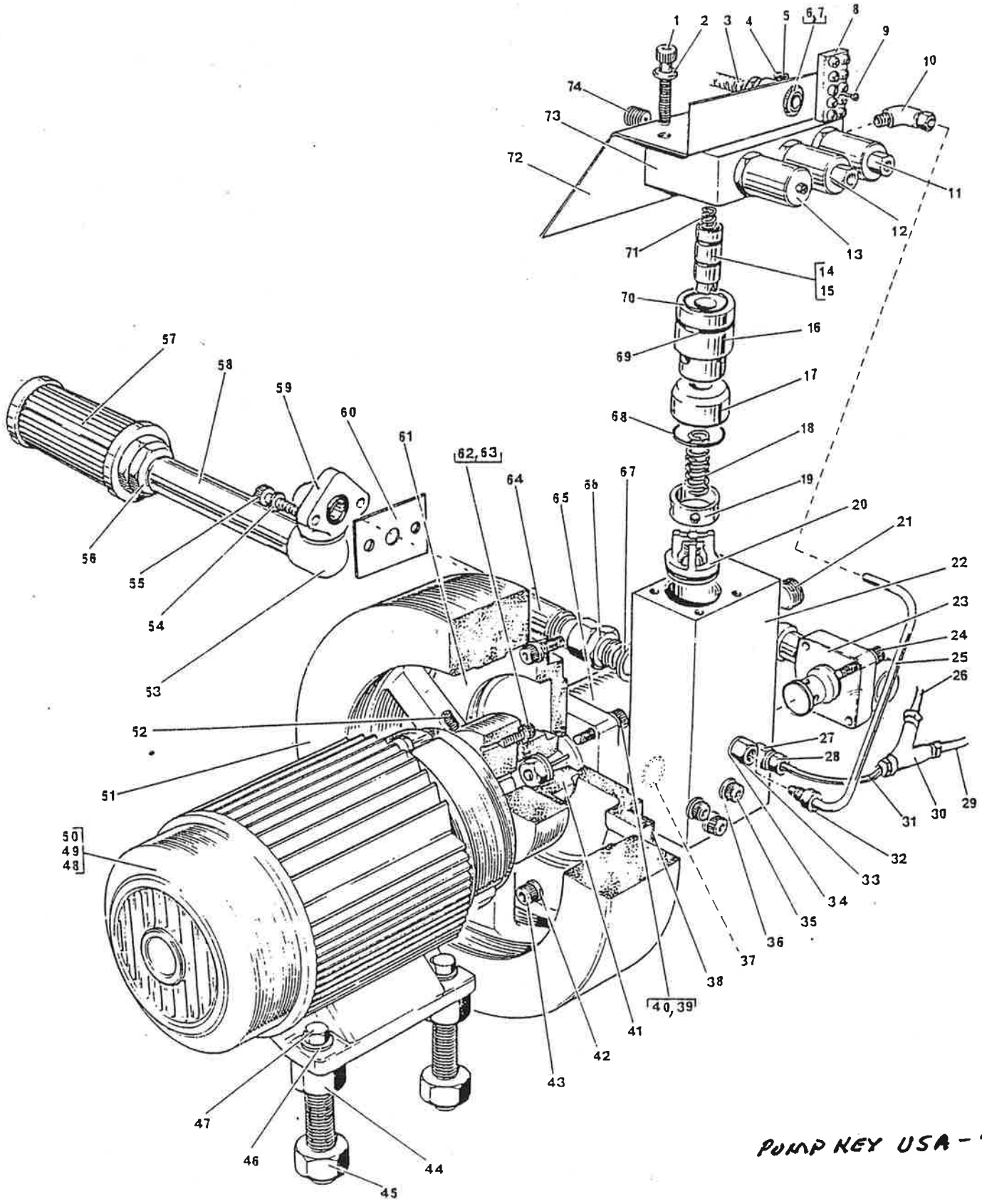
3. Pump

Remove the Front Cover 15, Fig.1. Remove the Screws 47 (do not disturb the Support Screws 44) and pull the Motor 48 and Flywheel 51 from the Pump Coupling 41. Remove the Manifold Block from the Pump as described in Paragraph 2 above. Unscrew the three Screws 43 then pull the Flange 61 (with the Pump mounted on it) from the Base.

Replace parts in reverse order to their removal using Loctite Sealant No.542 to seal the Pump to the Flange and the Screws 43 and Flange 61 to the Base. Re-align the Motor as described in Adjustments, Paragraph 1.

Fig.4

HYDRAULIC COMPONENTS



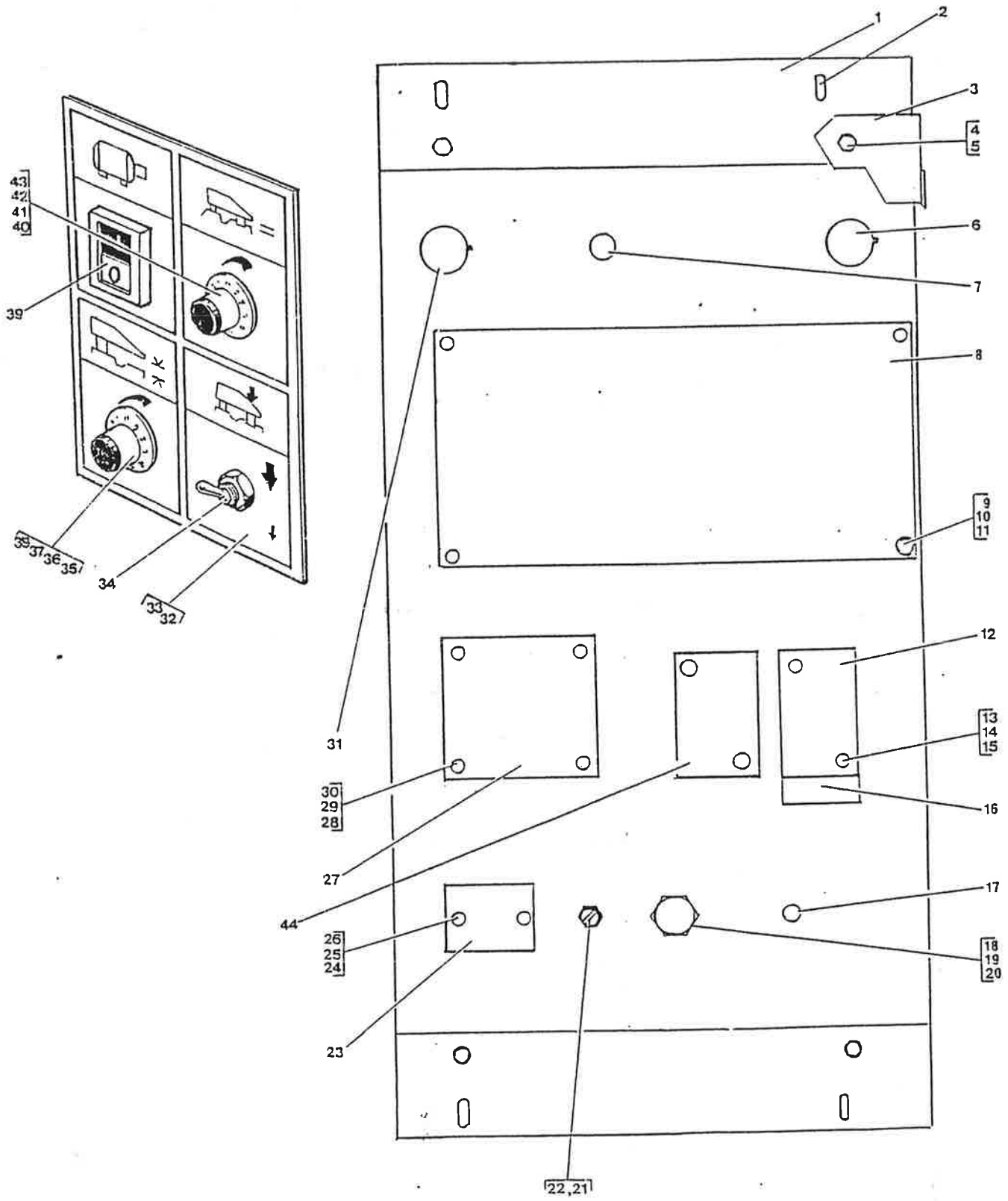
PUMP KEY USA-71

SECTION 4

HYDRAULIC COMPONENTS

ITEM	DESCRIPTION	QTY.	PART No.	ITEM	DESCRIPTION	QTY.	PART No.
1	Screw	4	SL-558ME	68	O-ring	1	ZH-292M
2	Washer	4	WL-170ME	69	O-ring	1	GSB-3023
3	Conduit (12 mm O.D. Nylon Tube, 600 mm long)			70	O-ring	1	ZH-292M
4	Nut	2	NL-2ME	71	Spring	1	SPGL-3379
5	Washer	2	WL-2ME	72	Deflector Plate	1	GSB-3078T
6	Grip Gland	1	ED-205ME	73	Valve Plate	1	GSB-3025AT
7	Nut	1	ED-206ME	74	Low Pressure Restrictor	1	GSB-3038T
8	Connector Block	1	ED-9313ET	Replacement O-Rings for Solenoid Valve SV3			
9	Screw	2	SL-691ME				
10	Elbow	1	ZH-637MT	O-Ring (large)	1	ZH-2117	
11	Solenoid Valve SV1	1	GSB-3036	O-Ring (small)	1	ZH-2113	
12	Solenoid Valve SV2	1	GSB-3036				
13	Solenoid Valve SV3	1	GSB-3132				
14	Upstroke Valve Ass'd (Valve F)	1	GSB-3183+				
15	Valve Spool	1	GSB-3087				
16	Spool Sleeve	1	GSB-3183				
17	Sleeve Seating	1	GSB-3134				
18	Spring	1	SPGL-1060ME				
19	Sleeve	1	GSB-3232				
20	Check Valve	1	GSB-3231				
21	Plug	1	SL-3431ET				
22	Block	1	GSB-3024BT				
23	Relief Valve	1	GSB-3032				
24	Screw	4	SL-555ME				
25	Restrictor Pipe	1	GSB-3034				
26	Oil Tube	1	GSB-2004E				
27	Adaptor	1	ZH-597MT				
28	Nut	1	ZH-474M				
28	Olive	1	ZH-475M				
29	Oil Tube (to Reservoir)	1	GSB-3234				
30	Y-Connector	1	ZH-749M				
30	Nut	3	ZH-474M				
30	Olive	3	ZH-475M				
31	Oil Tube	1	GSB-3233				
32	Nut	2	ZH-474M				
32	Olive	2	ZH-475M				
33	Restrictor	1	GSB-3035T				
34	Seal Washer	1	ZH-1474				
35	Screw	3	SL-563ME				
36	Washer	3	WL-170ME				
37	O-ring	1	ZH-784M				
38	Loctite Multi-Gasket No.574						
39	Screw	4	SL-1136ME				
40	Washer	4	WL-6ME				
41	Drive Coupling	1	GSB-3143				
42	Washer	3	WL-7ME				
43	Screw	3	SL-1135ME				
44	Support Screw	4	GSB-2058T				
45	Nut	4	NL-10ME				
46	Washer	4	WL-6ME				
47	Screw	4	SL-1139ME				
48	Motor (208/230/460V, 60Hz)	1	ED-367ME				
48	Motor (220/380V, 50Hz) (To Order)	1	ED-84ME				
48	Motor (375V, 60Hz) (To Order)	1	ED-368ME				
49	Insulating Bush	1	ED-17ME				
50	Bush Nut	1	ED-206ME				
51	Flywheel	1	GSB-3142A				
52	Screw	1	SL-1132ME				
53	Elbow	1	ZH-1159				
54	Washer	Part of Item 59					
55	Screw	Part of Item 59					
56	Reducing Bush	1	GSB-3226T				
57	Strainer	1	GSB-3225T				
58	Inlet Pipe	1	GSB-3111T				
59	Inlet Elbow	1	GSB-3127T				
60	Restrictor Plate	1	GSB-3197				
61	Flange	1	GSB-2031E				
62	Screw	6	SL-1140ME				
63	Washer	6	WL-5ME				
64	Hose	1	GSB-3065T				
65	Pump	1	GSB-3126				
66	Outlet Adaptor	1	GSB-2053T				
67	Seal Washer	1	ZH-1655				

SPIDER ONLY → GSB 3124



DISMANTLING PARTS (See Fig.5)

Safety. Switch off the Machine and isolate it from the electricity supply

1. Potentiometers

To remove one of the Potentiometers 44 or 49 prise off the Knob Cap 37 or 42. Then loosen the exposed screw and pull off the Knob 36 or 41. Remove the Screws 33 and pull forward the Plate 41; then remove the Potentiometer Mounting Nut and pull the Potentiometer 35 or 40 from the Plate. On re-assembly turn the Potentiometers fully anti-clockwise; then fit the Knobs with the '0' at the top.

2. Printed Circuit Board

Caution:

The Integrated Circuit Components of the Board 8 can easily be damaged by incorrect use of a voltmeter, or, in conditions of low humidity, by handling. The Board 8 should therefore be replaced if a fault is suspected and the old Board returned to an authorised facility. All Boards removed from the machine must be stored and returned in an anti-static bag.

Before replacing a Board perform the following tests to establish that the Board is faulty.

1. Remove the right hand Side Cover to gain access to the Solenoid Valves. Unscrew their coil mounting nuts and slide the coils back approximately 3 mm (1/8"). If the coils are pulled back on to the Valves when the machine operates then the electric circuit is not the cause of the fault.

2. Test the voltage across the Solenoid Valve Coils with a meter - the reading should be 24 volts when the appropriate coil is due to be energized.

If the correct voltage is not observed:

3. Check the two 5 amp fuses on the Board.
4. Check the mains input to the Transformer, then check the output from the secondary (23-0-23 V A.C.).
5. Check that this voltage reaches the Board.
6. Test the Touch Button Leads.
7. Check that the Beam Position Sensing Mechanism Plunger ✓ 30, Fig.3, is not earthed.
8. Check the action of the Board Relays with the Switch 34 down to 'Set'.
 - (a) Touch the left hand Touch Button and the machine frame - Relay RL1 (on left of Relays) should operate.
 - (b) Repeat for right hand Touch Button - Relay RL2 (next to RL1) should operate.
 - (c) Ensure that it is safe to lower the Beam then touch both Touch Buttons.

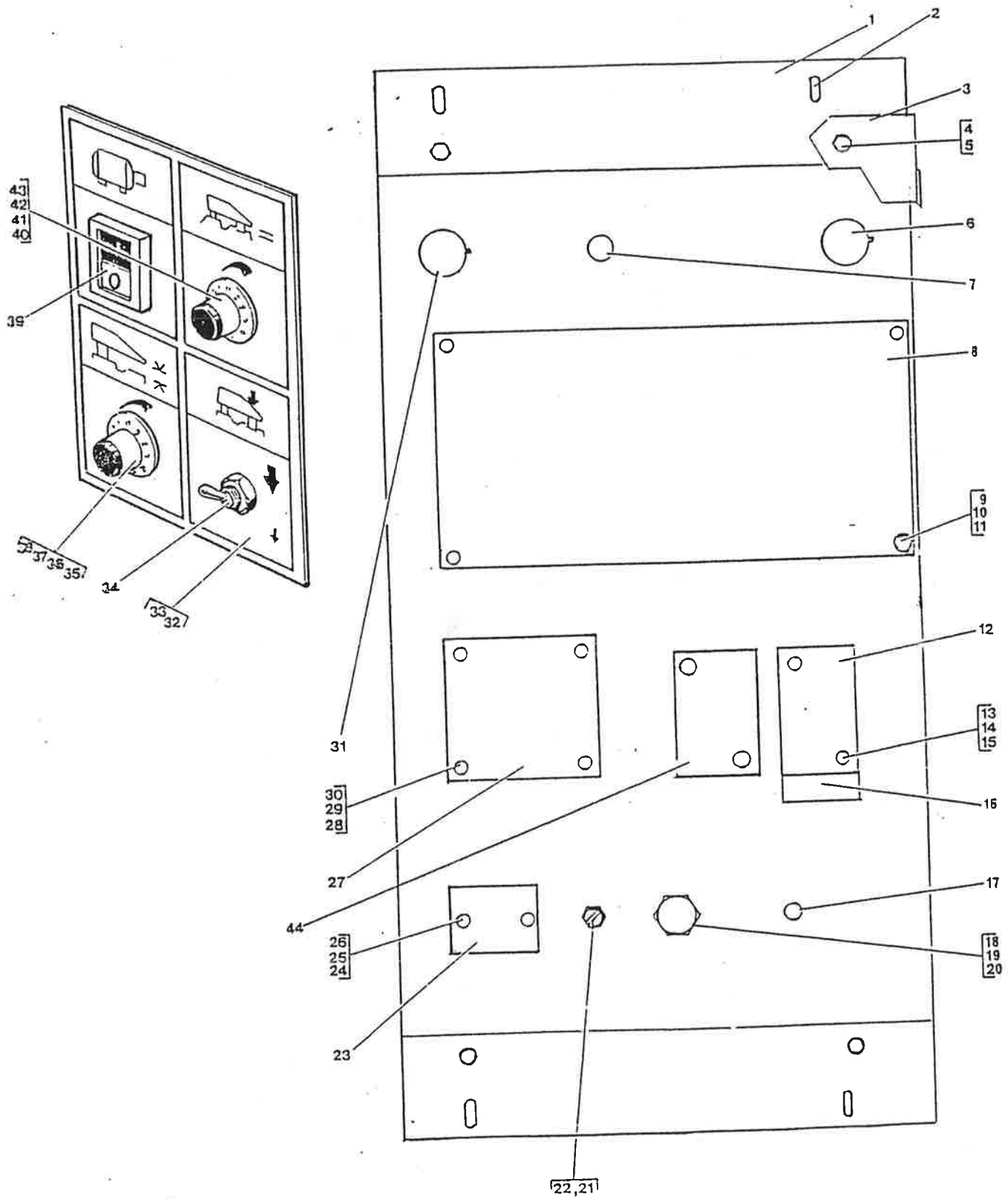
Relays RL1 and RL2 should operate followed by Relay RL3 (next to RL2) and Relay RL4, the Beam descends.
 - (d) Release the Touch Buttons, Relays RL1, RL2 and RL3 should reset immediately. The Beam rises then Relay RL4 resets.

To remove the Board, remove the Screws 15, Fig.1, and the Cover 14, Fig.1. Then remove the Screws 4 and take off the Bracket Cover 3. Undo the clamping Screws 8 and remove the Retainer 8, before pulling the two connector sockets from the pins on the Board. Undo the four Nuts 10 above the Board, along with the long Nuts 8. The Board can now be lifted from the Mountings 9. On re-assembly ensure that the connector sockets are plugged onto the correct Pins on the Board.

After changing a Board, it is necessary to reset the Potentiometer R33 which is mounted on the Board. To do this, connect the machine to the electricity supply and switch on. Move the Switch 34 up for the cutting (high pressure) mode. With both Potentiometer R33 and the Stroke Adjustment Potentiometer 40 set to a minimum, touch the Push Buttons to lower the Beam. Note the height between the Beam and the Table when the Beam reaches its lowest position. Then turn the knob of the Potentiometer 40 fully clockwise to the maximum setting. Touch the Push Buttons to lower the Beam again, and once more note the distance between the Beam and the Table at the bottom of the stroke. The difference between the two results is the amount of 'overtravel'. For successive small increments of the Potentiometer (R33) setting, downstroke the Beam until overtravel of 6-8mm is obtained; this normally occurs at the mid-setting of the Potentiometer. Then replace the Bracket Cover 3 and the Cover 14, Fig.1.

Fig.5

ELECTRICAL COMPONENTS



ITEM	DESCRIPTION	QTY.	PART No.
1	Bracket	1	GSB-3130AT
2	Screw	4	SL-1142ME
3	Bracket Cover	1	GSB-3131
4	Screw	2	SL-696ME
5	Washer	2	WL-3ME
6	Grommet	1	TBUVP-002
7	Grommet	1	BUVP-1570
8	Controller	1	ED-9157E ← PCBA-6-A1
8	Replacement Fuse Link (5A)	2	ED-5252E
8	Retainer	1	GSB-3200
8	Screw	2	SL-694ME
8	Washer	2	WL-3ME
8	Nut	2	NL-235MET
8	Washer	4	WL-3ME
8	Rail	2	GSB-3198
8	Screw	2	SL-697ME
8	Nut	4	NL-3ME
8	Washer	4	WL-3ME
9	Mounting	4	GSB-3199
10	Nut	8	NL-3ME
11	Washer	8	WL-19ME
12	Motor Contactor (110V, 50/60Hz)	1	ED-379MET ✓
13	Screw	2	SL-699ME
14	Washer	2	WL-3ME
15	Nut	2	NL-3ME
16	Contactor Overload Relay (415/460V)	1 as Ord'd	ED-5972ET1
16	Contactor Overload Relay (575V)		ED-5972ET2
16	Contactor Overload Relay (208V/220V/230V)		ED-5870ET1 ✓
16	Contactor Overload Relay (380V)		ED-5870ET2
17	Grommet	1	BUVP-1570
18	Grip Gland	1	ED-247ME
19	Nut	1	ED-248ME
20	Mains Lead	1	ED-5862E-144
21	Earth Terminal Screw	1	SL-697ME
22	Washer	1	WL-3ME
23	Mains Terminal Block	4	ED-253MET
24	Screw	2	SL-504ME
25	Washer	2	WL-2ME
26	Nut	2	NL-2ME
27	Transformer	1	TED-002
28	Screw	4	SL-696ME
29	Nut	4	NL-3ME
30	Washer	4	WL-3ME
31	Grommet	1	TBUVP-001
32	Electrical Facia Plate	1	GSB-3064
33	Screw	4	SL-1090ME
34	Cut/Set Selector Switch	1	ED-4848E ✓
35	Daylight Adjustment Potentiometer (250K)	1	ED-9344E ✓
35	Resistor (R37)(470K)	1	ED-9345E
36	Knob	1	ED-7741E
37	Knob Cap	1	ED-7742E
38	Dial	1	ED-7743E
39	Button	1	ED-6080ET
40	Stroke Adjustment Potentiometer (100K)	1	ED-9231E ✓
41	Knob	1	ED-7741E
42	Knob Cap	1	ED-7742E
43	Dial	1	ED-7743E
44	Relay	1	ED-379MET1

Note: All PCB's removed from machine must be stored in an anti-static bag.

Switch On

Depress the Start Button PBS2. This energizes Contactors CON and RX. Contacts CON/4 close and maintain the circuit to the Contactors when the Start Button is released. Contacts CON/1, 2 & 3 close and energize the Motor IM while Contacts RX/1, 2 close to supply power to the Printed Circuit Board. The 25-0-25 volt output from T1 is rectified by Diodes D1 and D2 to provide a 30V supply used to operate the Relays. The Diode D4 provides a 12V supply to power the Integrated Circuits IC 1, 2 & 3. The same output from Transformer T1 is also fed to Transformer T whose output is rectified by the Bridge Rectifier D5 to provide a +6 and -6 Volt supply to power the Trip Button circuit.

Set Stroke Length

Set the Switch SS to 'Set', this isolates the Return Switch SR and Solenoid Valve SV2 from the circuit, and connects the Bar Lock Solenoid SOL to the circuit. Turn the Pressure Setting Potentiometer RP and the Daylight Setting Potentiometer RD to zero. With the Cutting Die on the Pad, swing the Beam over the Die and touch both Trip Buttons. A circuit is completed through the operator which turns on Transistor TR3 which turns on Transistor TR4 energizing Relay RL1. Similarly Transistor TR2 turns on Transistor TR5 and TR6 to energize Relay RL2.

Contacts RL1/1, RL1/2, RL2/1 and RL2/2 move over and Capacitor C7 (charged up to 30V via R17 and R36) discharges via RL2/2, RL1/2 and Relay RL3 causing Relay RL3 to pull in. Relay RL3 is then held in by current from the 12V Supply via Resistor R32, Diode D11, RL2/2 and RL1/2. Contacts RL3/1 close and energize Relay RL4, Contacts RL4/2 close but have no effect at this time since Transistor TR10 is 'off'. Contacts RL3/2 and RL4/1 close and turn on Transistor TR9 via Resistor R30, this energizes Solenoid SOL and Solenoid Valve SV1.

Solenoid SOL releases the Bar Lock on the Beam Position Sensing Device and its Trip Rod is raised by the Springs into contact with the Beam. Solenoid Valve SV1 operates and blocks the free return of oil to the Sump. This forces the oil to pass through the Restrictor R on Solenoid Valve SV2 which causes the oil pressure to rise (to 200-500psi). This pressure is sufficient to lower the Beam gently on to the Cutting Die.

When the Beam is fully down on the Die release the Touch Buttons. This switches off Transistors TR1 and TR2 which de-energize the Relays RL1 and RL2. Contacts RL1/1, RL1/2, RL2/1 and RL2/2 move over de-energizing Relay RL3 and switching off Opto Isolator ML1. When Opto Isolator ML1 switches off the input to Pin 13 of IC1 drops to zero. This signal is inverted twice then fed to Pin 5 of IC2, where it is again inverted twice (providing Line 17 is not earthed and the timer is not already running) and fed to Pin 2 of the Timer IC3. This negative going pulse on Pin 2 of IC3 starts the Timer. IC3 gives a 12V output on Pin 3 for a length of time set by the Daylight Setting Potentiometer RD.

The output from IC3 :

- (i) turns on Transistor TR8 which turns off Transistor TR9. This de-energizes the Solenoid SOL and Solenoid Valve SV1.
- (ii) holds in Relay RL4 as Contacts RL3/1 open.
- (iii) prevents Relay RL3 from being energized if the Trip Buttons are touched again before the Timer times out.
- (iv) turns on Transistor TR10 which energizes Solenoid Valve SV3.

Solenoid SOL releases the Bar Lock on the Position Sensing Device and the Trip Button is locked in position. Solenoid Valve SV1 resets and removes the operating pressure from the hydraulic system. Solenoid Valve SV3 operates and allows Valve F to open. Oil from the Cylinder passes through Valve F to the Sump. The Beam is then raised by its Springs.

When Timer IC3 times out the output from Pin 3 goes to zero. This switches off Transistor TR10 (and de-energizes Relay RL4) which de-energizes Solenoid Valve SV3. Valve SV3 resets and closes Valve F stopping oil leaving the Cylinder and thus halting the upward movement of the Beam. The height of the Beam above the work can be adjusted by means of the Potentiometer RD which alters the delay provided by IC3.

Cutting Stroke

Set the Switch SS up to 'High Pressure', this connects Solenoid Valve SV2 and the Return Switch SR to the circuit and isolates the Lock Bar Solenoid SOL. Place the work on the Pad, and put the Cutting Die on the work. Swing the Beam over the Die and touch both Trip Buttons.

The circuit behaves similarly to the Stroke Setting Sequence until Relay Contacts RL3/2 close, turning on Transistor TR9. This energizes Solenoid Valves SV1 and SV2 which operate and block the oil's path to the Sump. The oil pressure rises and drives the Beam downwards. If the oil pressure goes above 3200 psi Valve B opens and relieves the operating pressure.

The Beam forces the Die through the work then contacts the Position Sensing Device and closes the Return Switch SR. This connects Line 17 to earth and triggers the input at Pin 1 of IC1. This input signal is delayed by the RC-Network R33, RP and C9, the delay can be adjusted by the Pressure Setting Potentiometer RP to allow for greater Beam deflection with heavy work.

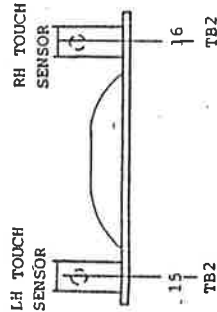
After the delay the signal is fed via IC2 to the Timer IC3. This causes IC3 to give a 12V output on Pin 3 which :

- (a) holds on Relay RL4 when Relay RL3 opens.
- (b) switches on Transistor TR8. This switches off Transistor TR9, de-energizing Solenoid Valves SV1 and SV2 which reset and remove the operating pressure.
- (c) stops the current flowing through Relay RL3 which opens.
- (d) switches on Transistor TR10 which energizes Solenoid Valve SV3.

Valve SV3 operates opening Valve F and allowing oil to leave the Cylinder. The Beam is returned upwards by its Springs. The Trip Buttons should now be released, but if they are not the machine cannot begin a new cycle since the Capacitor C7 must be charged up to 30V before Relay RL3 can be energized. The output from Pin 3 of IC3 is also fed to Pin 5 of IC1 which inverts it to logic 0. This 0 is input to IC2 and prevents the Timer being re-triggered whilst still running.

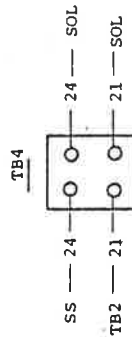
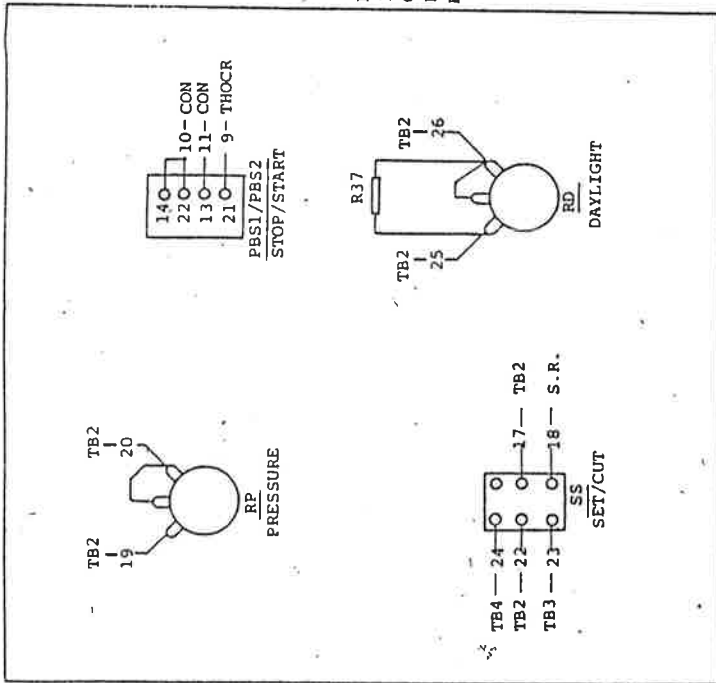
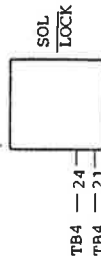
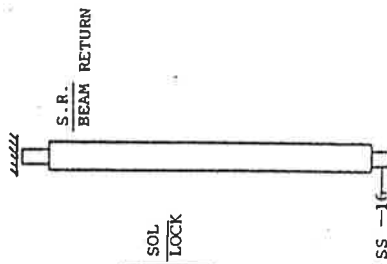
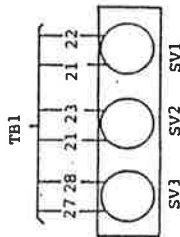
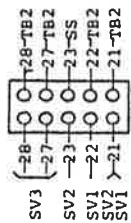
After the delay set by the Daylight Setting Potentiometer RD the Timer IC3 switches the output on Pin 3 to 0V. This switches off Transistor TR10 which de-energizes Solenoid Valve SV3. Valve SV3 resets and closes Valve F to prevent oil leaving the Cylinder, this halts the upward movement of the Beam.

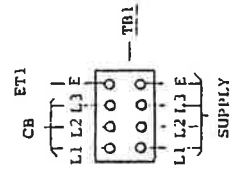
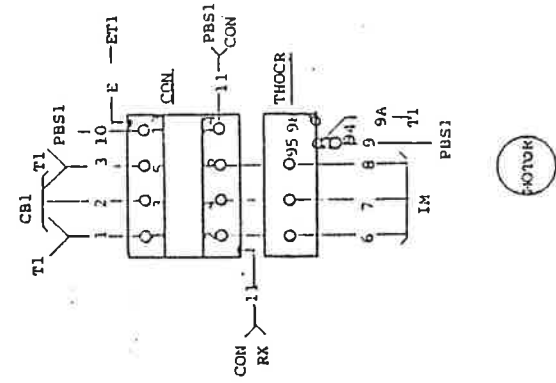
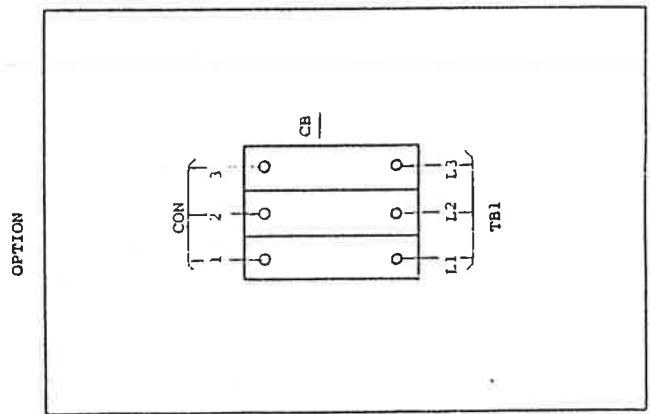
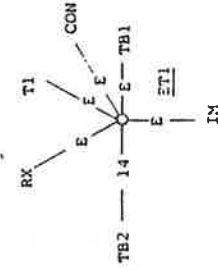
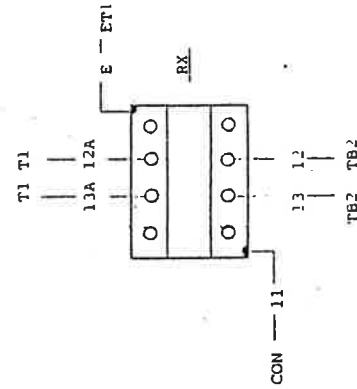
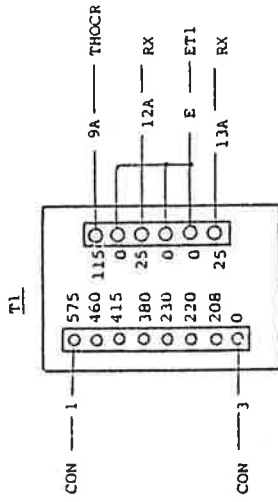
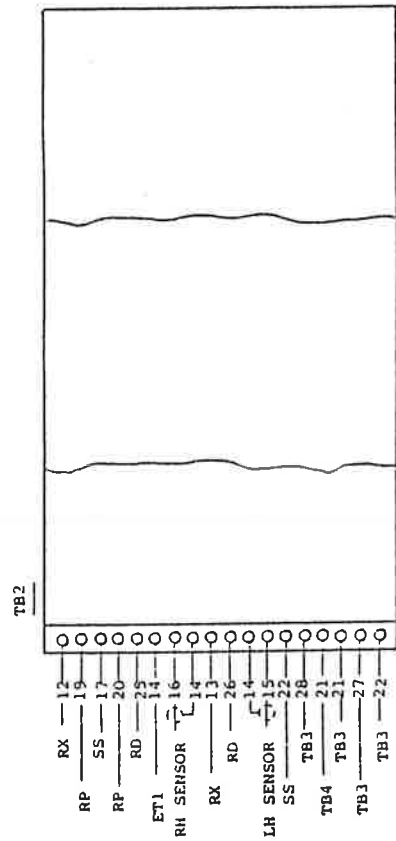
Note: All PCB's removed from machine, must be stored in an anti-static bag.



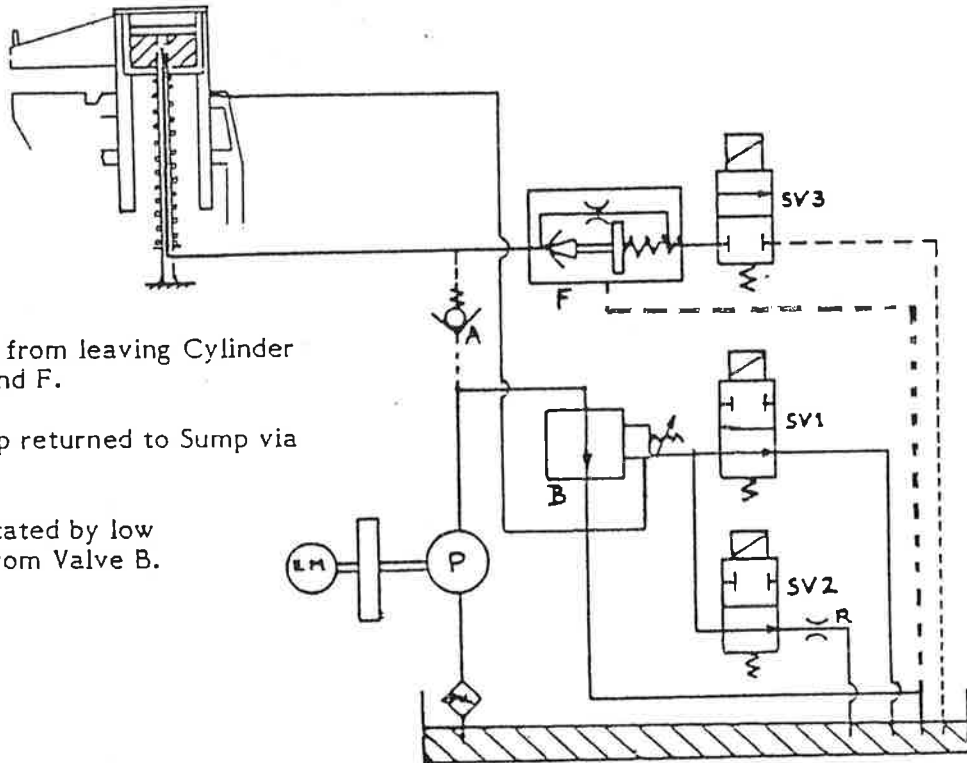
NOTE: USE 7/.2 SINGLE CORE
SCREENED AND INSULATED
CONNECT SCREEN AT TB2
END ONLY
CUT SCREEN BACK 10MM
AND SLEEVE.

LEADS L1, L2, L3, 1, 2, 3, 4, 5, 6, 7, 8
14 AWG BLACK BRAND REX AWM STYLE 1015 (UL)
600V
EARTH LEADS 50/.25 GREEN/YELLOW
REMAINDER PVC INSULATED 300/500V GRADE 1MM² BLACK





MACHINE IDLING

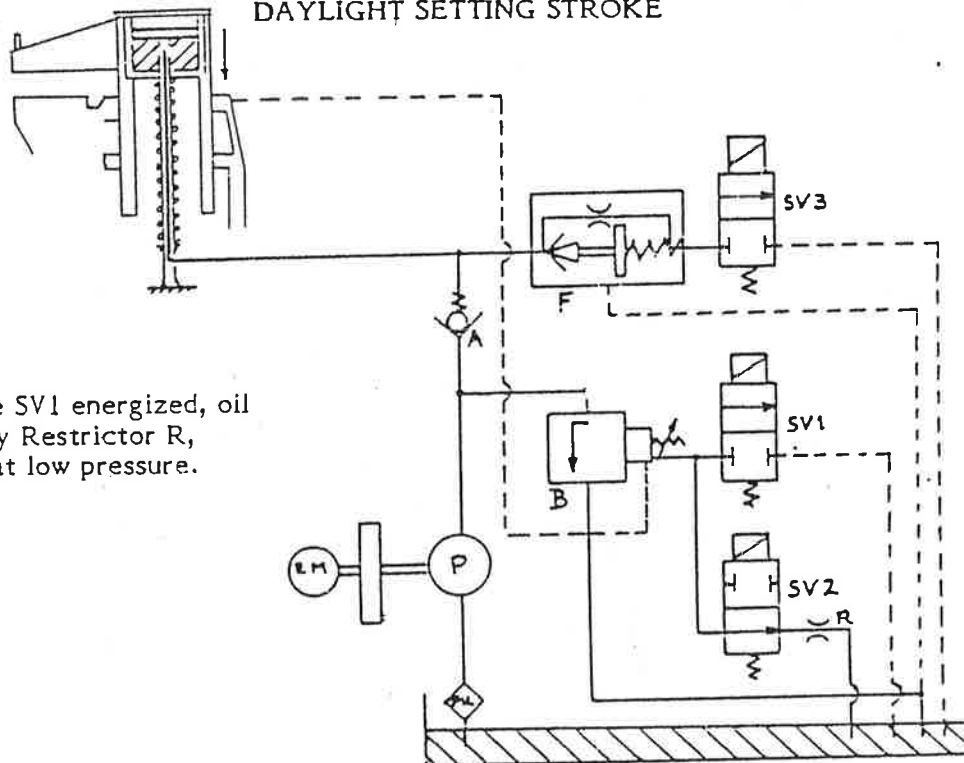


Oil prevented from leaving Cylinder by Valves A and F.

Oil from Pump returned to Sump via Valve B.

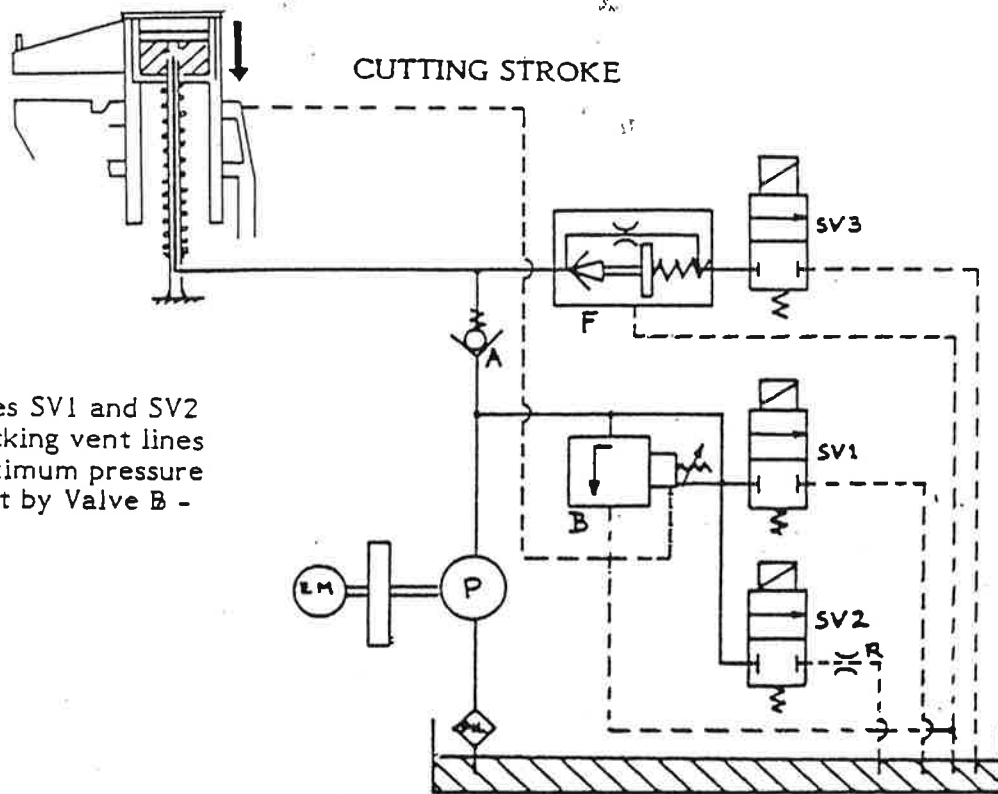
Column lubricated by low pressure oil from Valve B.

DAYLIGHT SETTING STROKE

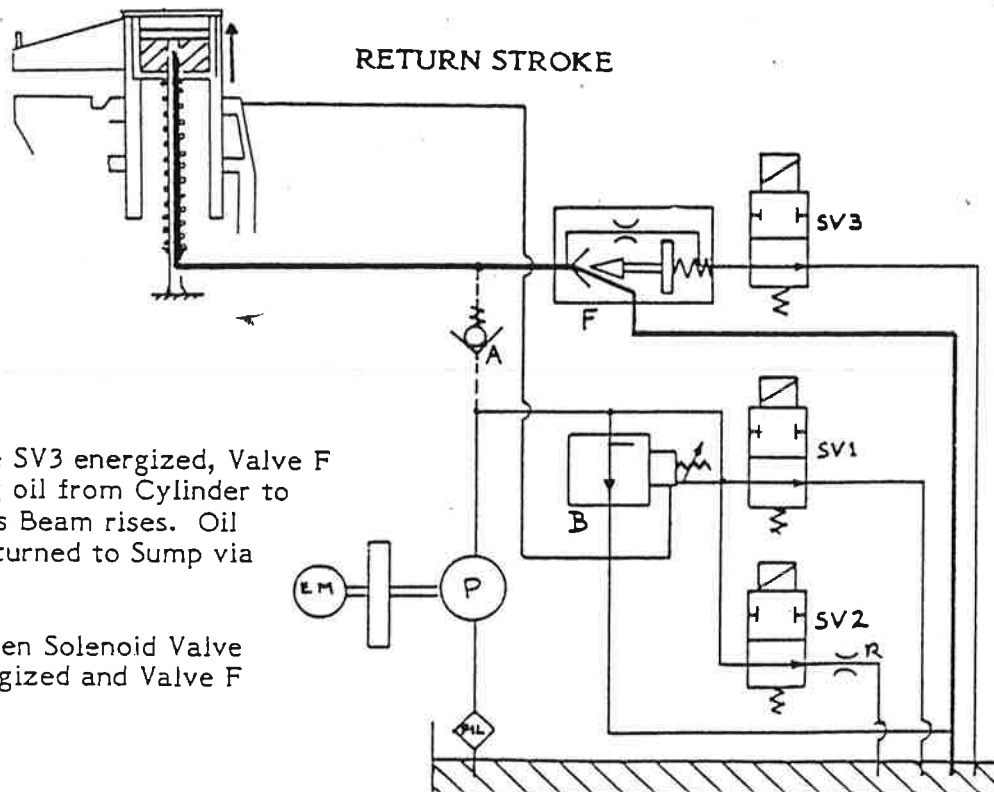


Solenoid Valve SV1 energized, oil pressure set by Restrictor R, Beam lowers at low pressure.

Key: Lines with oil flow ———
 Lines with no oil flow - - - - -



Solenoid Valves SV1 and SV2 energised blocking vent lines to Sump. Maximum pressure to Cylinder set by Valve B - 3, 200 psi.



Solenoid Valve SV3 energized, Valve F opens allowing oil from Cylinder to return Sump as Beam rises. Oil from Pump returned to Sump via Valve B.

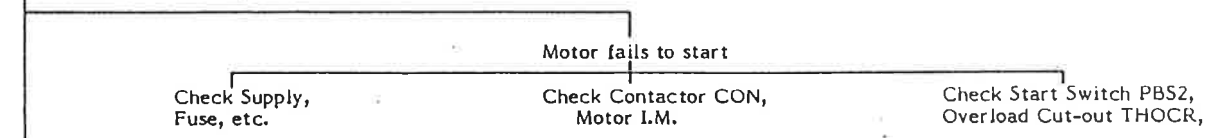
Beam halts when Solenoid Valve SV3 is de-energized and Valve F closes.

Key: Lines with oil flow ———
Lines with no oil flow - - - -

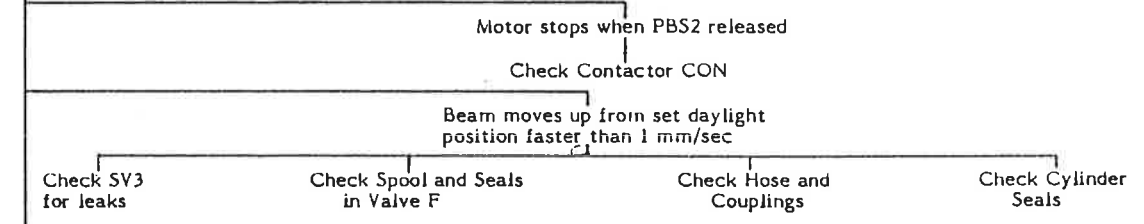
Setting Up

Connect Machine to Power Supply

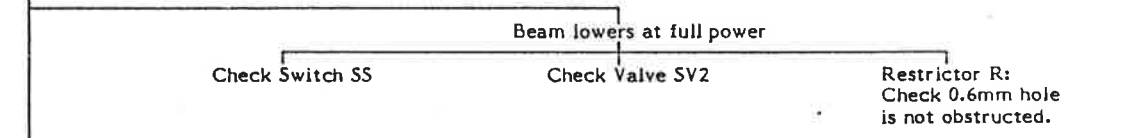
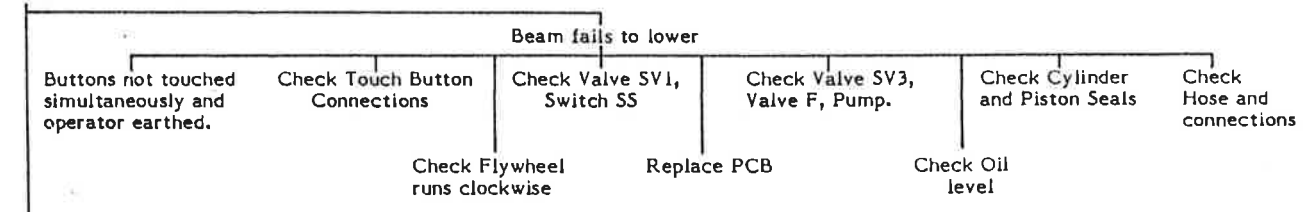
Press Start Button PBS1



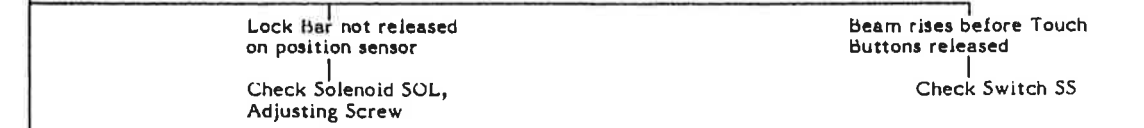
Motor starts



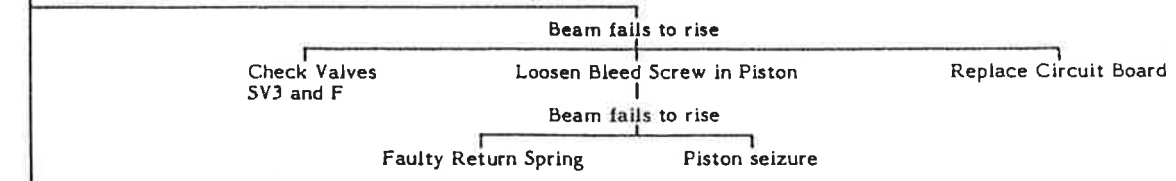
Set Switch SS down to 'set'.
Swing Beam over Knife.
Touch both. Touch Buttons



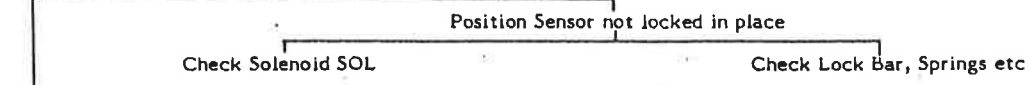
Beam lowers gently



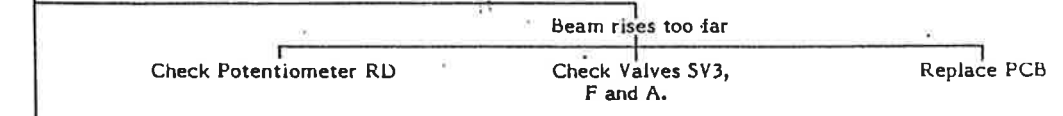
Release Touch Buttons



Beam rises



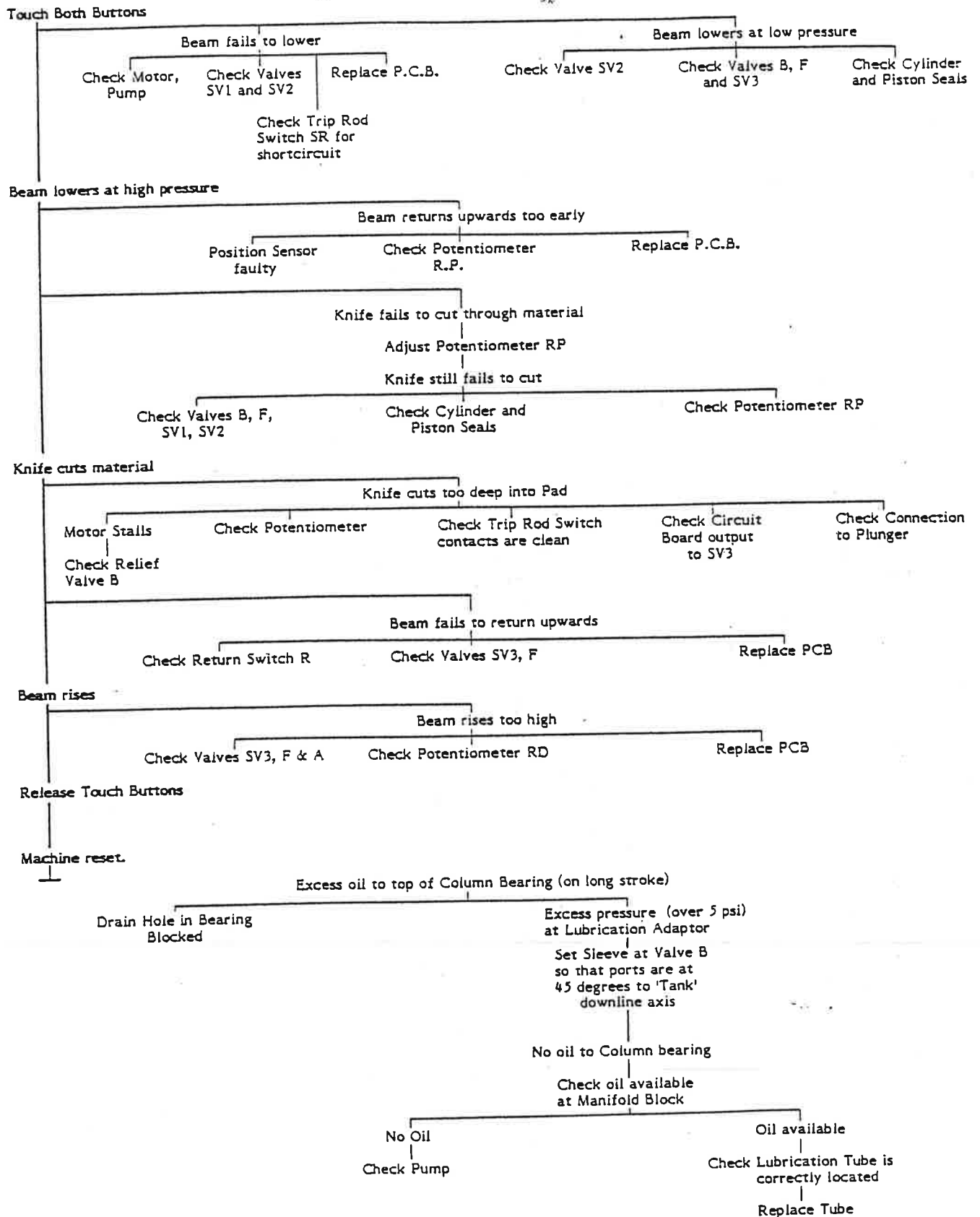
Beam halts in standard daylight position



Set Switch SS up to 'Cut'.

Cont'd.

Cutting



Note: All PCB's removed from machines must be stored in an anti-static bag.

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