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OPTICAL DRILLING MACHINES
19,000 rpm & 35,000 rpm
Mega parts : 27-18046 & 27-26020

INSTALLATION

1. Remove the two transit wood screws securing the front of the steel base plate to the tabletop.

2. Connections to the mains supply

   This equipment is designed to safety class1. Before connecting this equipment to the mains electricity supply, examine the information on the apparatus-rating label. Ensure that the mains supply is single-phase alternating current (a.c.) of the stated frequency (Hz), with neutral nominally at earth potential. Check the supply voltage is within the stated range.
   The equipment rating label states the value of the fuse fitted to the apparatus itself. Ensure that the plug or supply circuit is fitted with an appropriate fuse of higher value.

   WARNING THIS APPARATUS MUST BE EARTHED

The wires in the mains lead are coloured in accordance with the following code:

Green/ Yellow - Earth (E)
Blue - Neutral (N)
Brown - Live (L)

If the mains plug is to be replaced connect the wires to a non-reversible 3-pin plug as follows:
Green/ Yellow wire to terminal marked: E (earth)
or G (ground) or coloured Green or coloured Green/ Yellow.

Blue wire to terminal marked: N (neutral) or Common or coloured blue.

Brown wire to terminal marked: L (live) or Phase or coloured Brown.

3. Switch the machine on with the mains switch situated on the right side of the projector body, at this point the two projector illuminating lamps should focus light onto the base plate in and around the clamp, these can be adjusted by means of the two shafts situated either side of the projector head casting. If no light or only one lamp working remove the lamp plate and check the lamp plug is still attached to the lamp pins as these may have worked loose during transport.

4. Connect via the hose tail connector situated on the left side of the base stand a 90 psi or 6.5 bar air line with a through put of 10 cu/ft air per minute or 250 litre of air per minute.

5. Attach at the rear of the machine a swarf removal unit if supplied, but if not purchased a domestic type vacuum cleaner may be attached and switched on for 1 minute every hour to remove and swarf accumulated within the drill bellows area.

6. Place onto the base plate under the clamp a printed circuit board of the same thickness as will be drilled and by rotating the projector lens focus the screen to the sharpest image.

OPERATION

1. Ensure both air and power is **OFF**

2. Unlock the left and right hand draw bolts at the back of the table top, and pivot the projector head and base plate backwards and lock in the " Tilt Back Position " with the left hand draw bolt.

3. Unclamp the four magnets on the bellows to expose the spindle chuck, fit the required drill size into the spindle and lock in position approximately 4 mm (1/8 inch) below the bottom of the base plate. Care should be taken during this operation, as carbide drills are very brittle and easily broken.

4. Move the spindle manually slowly upwards so that the carbide drill moves through the base plate and appears the clamp side and stops moving upwards, adjust the " stroke adjusting screw " (see drawing page 8 item No 12) so that the highest position of the drill point is about 4 mm (1/8 inch) above the top side of the base plate

5. Switch the air to the machine ON, and also switch the machine electrics ON, care should be taken when switching the machine on as the spindle may traverse upwards to make one cycle to reset itself to the start position, as per the warning on the blue visor on the machine " CAUTION when switching on this machine will make one cycle to reset "

6. The clamp foot is set for normal 1.5mm thick circuit board material, if need be this height can be re-set using the lock lever on the right of the clamp.

7. the "X" and "Y" axis alignment of the projector screen target can now be set if necessary by the two adjusting screws on the front of the optical head until the screen cross lines and rings line up with the centre of the drill bush adapter ring , the screws then should be locked in position. Focusing at this stage should be checked and adjusted if necessary.

8. The machine up feed now needs to be set using the " Feed control Knob " situated on the drill spindle valve block (See page 8 item 6) This dial is numbered 1 – 12, Number 12 is very slow, Number 1 is very fast, usually No 10 is used for small diameter drills and No 8 for larger diameter drills, but usually this is operator preference.

9. The machine is now ready for use, slight downward pressure on the foot switch will activate the clamp only, this allows the operator to check the alignment of the screen to the pad on the circuit board, further pressure then will start the drill cycle and the foot switch now has to be released fully, and the machine will automatically continue clamping the circuit board until the hole has been drilled and the spindle returns to the start position ready for the next hole. Before moving the circuit board it is a good idea to double check the screen alignment to the drilled hole on the circuit board and the screen re-adjusted if necessary.

MAINTAINANCE

1. Periodically drain the air filter bowl (unit bowl below the air pressure gauge. Page 8 item 23), to remove any water or fine particles accumulated, if this has water 1/3 full over one week of use then the air supply to the machine needs to be checked as this is too much air line moisture for the drilling machine and the compressor supplying the air will need better water filtration

2. The air lubrication oil reservoir bowl (see drawing page 8 item No 25) should be checked weekly and filled regularly with air line lubricating oil average viscosity S.A.E. 10, but not heavier than S.A.E. 20. Please note that the regulation of this item is important, the adjusting knob on the top of this unit must be adjusted to use one bowl of oil to 30 hours of use.

3. A watchful eye must be kept on the lamps cooling fan at the rear of the machine projector head, ensure that the fan is not covered over and is operating at all times. In the event of failure the machine must not be used, as overheating of the lamp will cause premature failure.

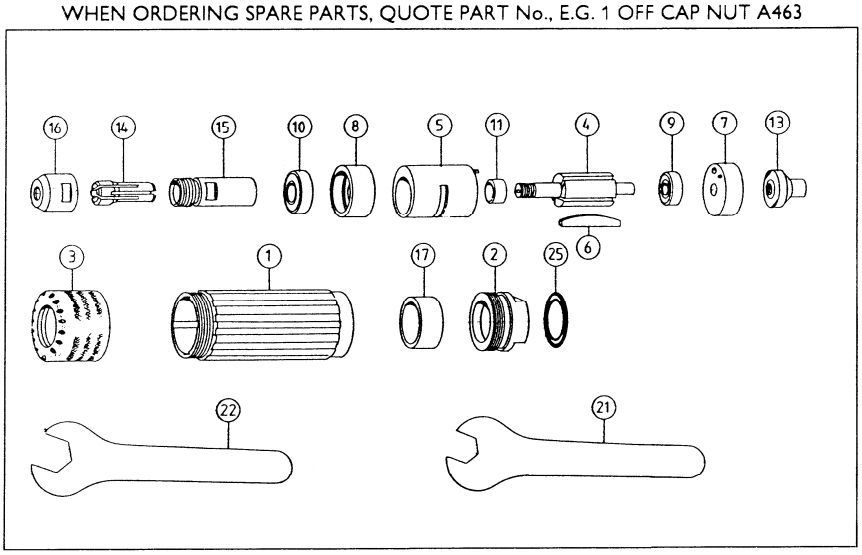
4. From time to time the projector lamps will fail as with most halogen lamps and will need to be replaced. Access to the lamps for changing is via the two round plates situated either side of the projector head with the lamp adjusting shaft protruding, the two springs secure the lamp reflector glass securely in the clip and the power plug lead is pushed onto the lamp pins. Upon replacement each lamp will need to be re-set for maximum light intensity on the base plate of the machine by movement in/out and rotation. Please note below:-

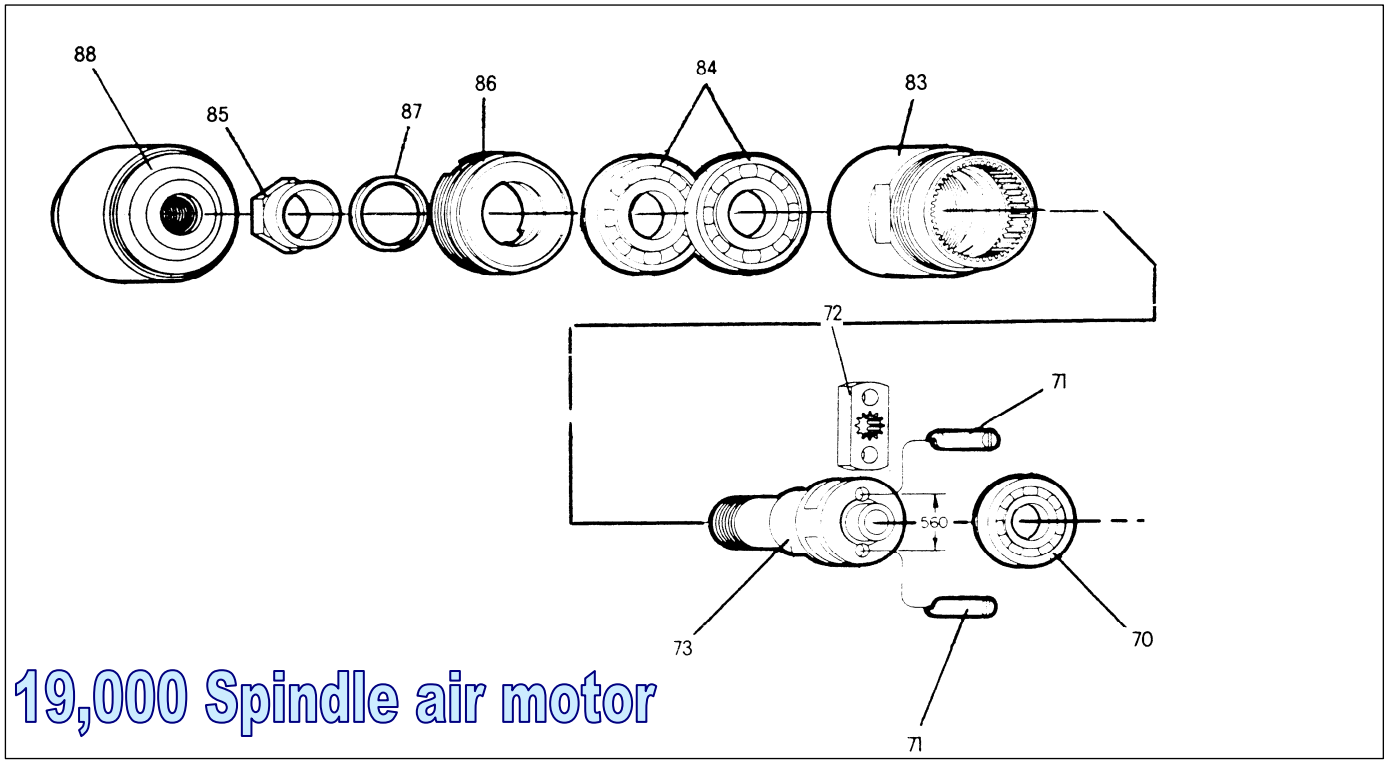
TAKE CARE NOT TO TOUCH THE GLASS ENVELOPE OF THE BULB AS THIS WILL IMPARE THE CHEMICAL PROCESS WITHIN THE ENVELOPE AND RENDER THE BULB IN-OPERATIVE THE LAMPS ARE 15 VOLT 150 WATTS OPERATION EACH

35,000 Spindle air motor

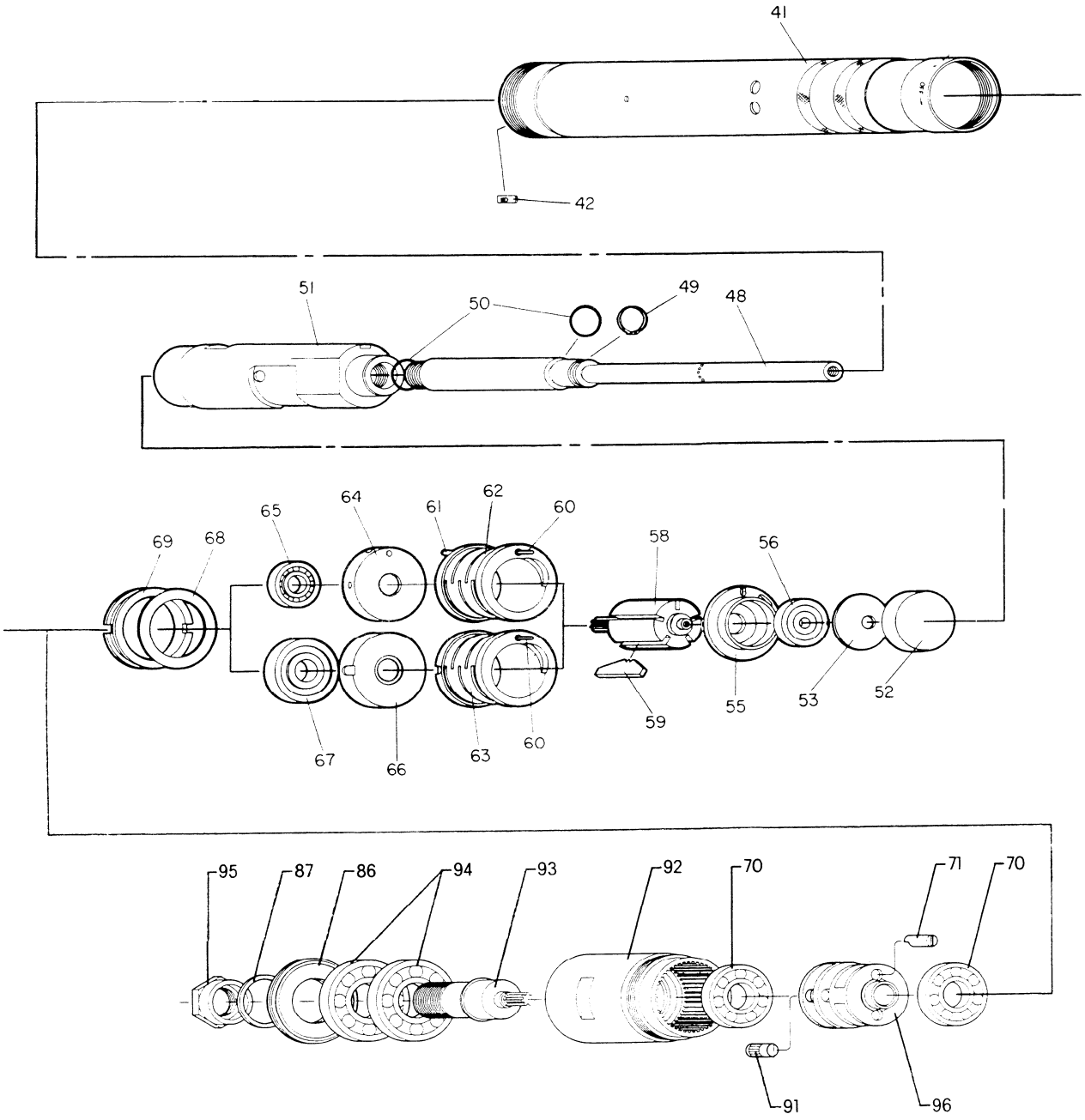
DRG No.	Description	S37	DRG No.	Description	S37
1	Motor Housing	A478	14	Collet (state size)	A503
2	Back End Cap	A400	15	Chuck	A363
3	Front End Cap	A477	16	Cap Nut	A463
4	Rotor	A377	17	Rear Spacer	A427
5	Cylinder	A602	21	Spanner (Chuck)	A462
6	Vanes (3) S25 (4)	A402	22	Spanner (Cap Nut)	A611
7	Rear Bearing Housing	A403	25	'O' Ring	
8	Front Bearing Housing	A358			
9	Bearing	A405			
10	Bearing	A603			
11	Rotor Spacer	A258			
13	Governor Assembly	N/A			

WHEN ORDERING SPARE PARTS, QUOTE PART No., E.G. 1 OFF CAP NUT A463



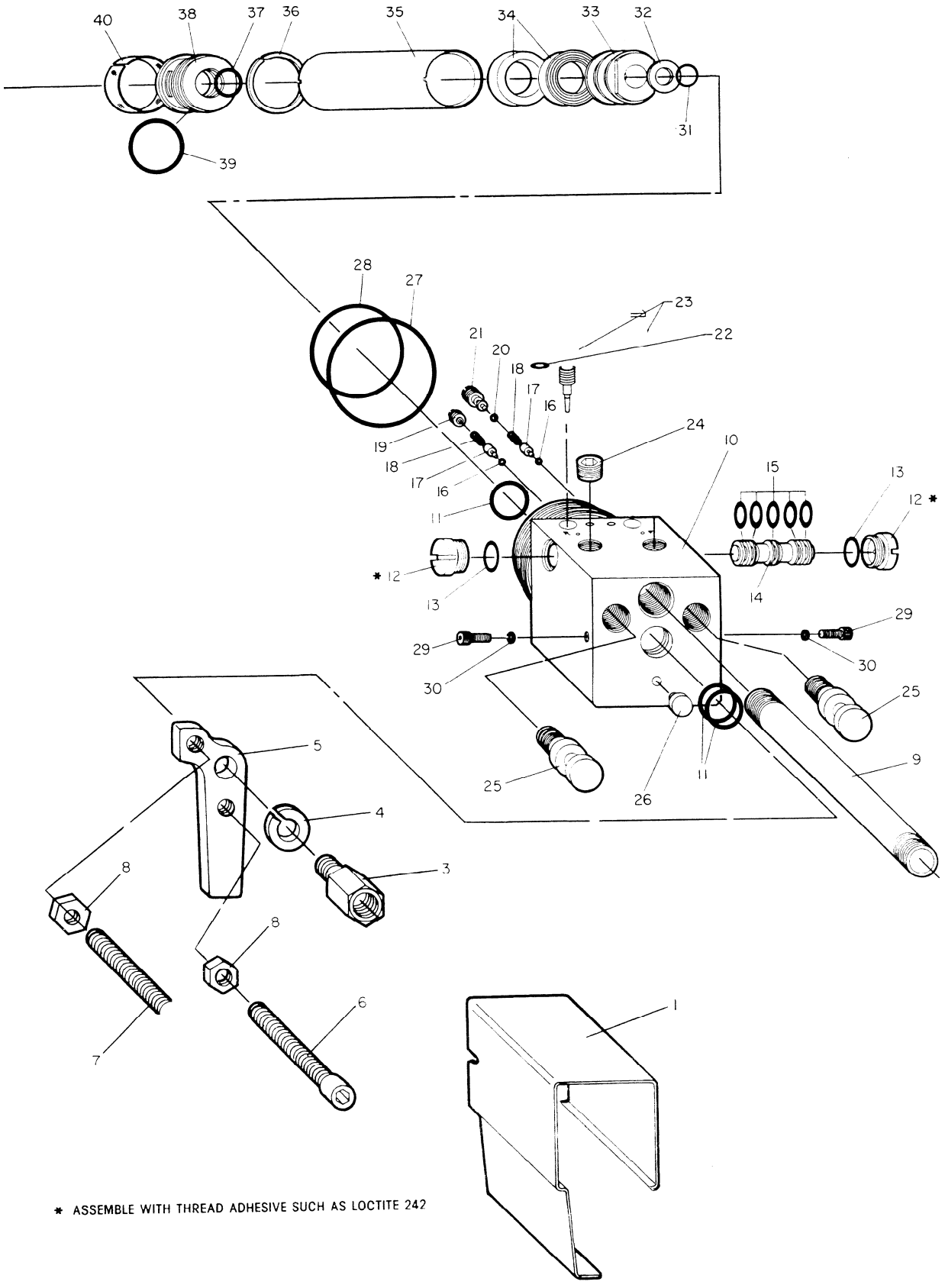


19,000 Spindle air motor



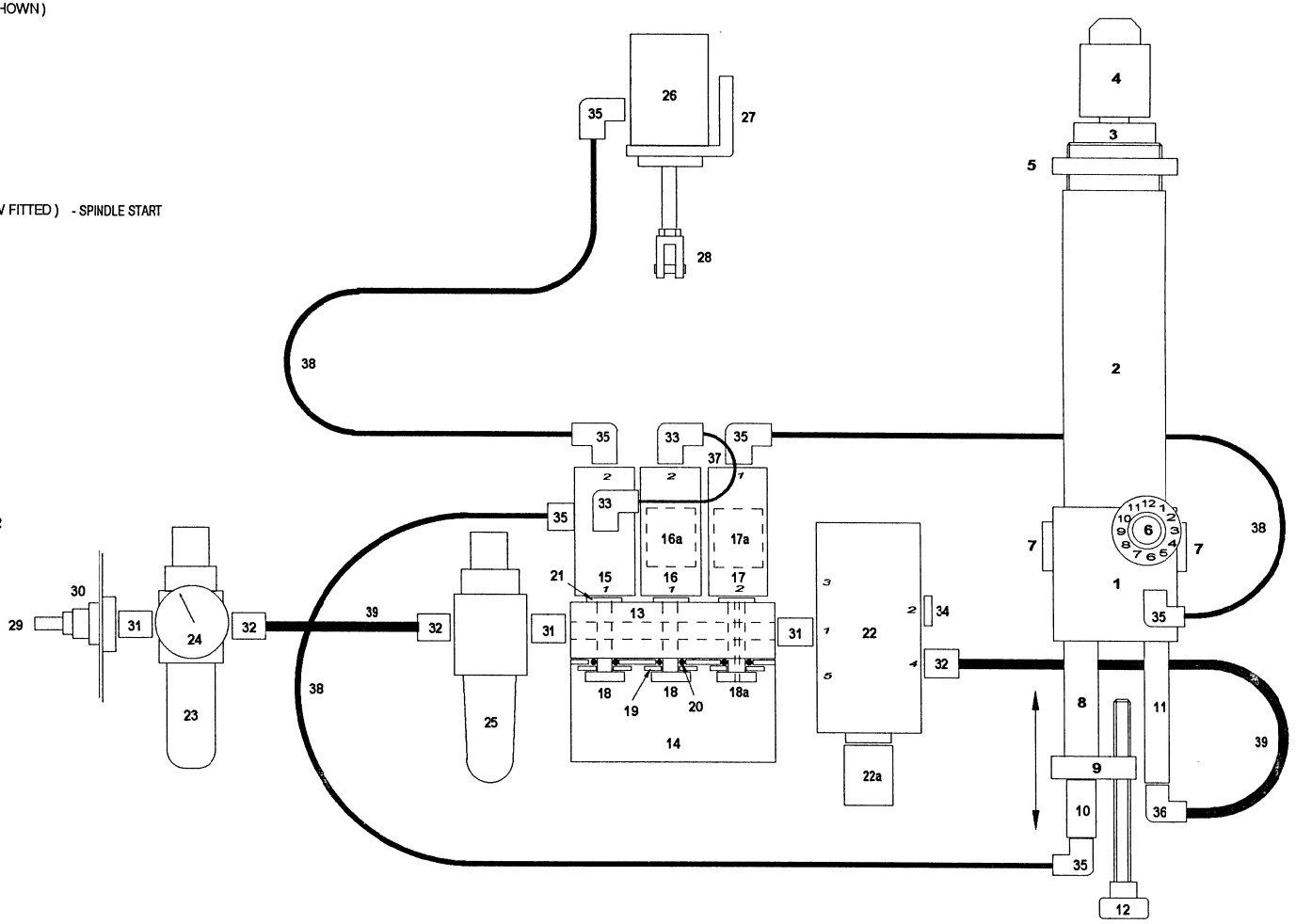
		PART NUMBER FOR ORDERING				PART NUMBER FOR ORDERING
	Drive Gearing Ass'y (8:1) includes items 70, 71 (2 req'd), 73, 74 (2 req'd) and 83 thru 87	39479			Drive Gearing Ass'y (1.88:1) includes items 69, 70 (2 req'd), 71 (2 req'd), 74 (2 req'd), 86, 87, 89, 90 (2 req'd), 91 (2 req'd), 92, 93, 94 (2 req'd), 95 and 96	48117-1
88	Chuck	33906		97	Plate	48440-1
89	Sun Gear (7 interior – 15 exterior teeth)	48112-1		98	Screw (2 req'd)	Y211-1
90	Gear (2 req'd) 16 teeth	48111-1		99	Spindle	38723
91	Shaft (2 req'd) (includes 15 needle bearings per shaft)	33686		100	Ring Gear	38248-1
92	Ring Gear (includes grease fitting 35967)	48116-1		101	Lock Ring	38719
93	Spindle	48114-1		102	Seal	38720
94	Bearing (2 req'd)	48305–1		103	Bearing Lock Nut	38718
95	Spindle Nut	38893-1		104	Collet	31812-8
96	Spindle	48115-1		105	Collet Nut	38721

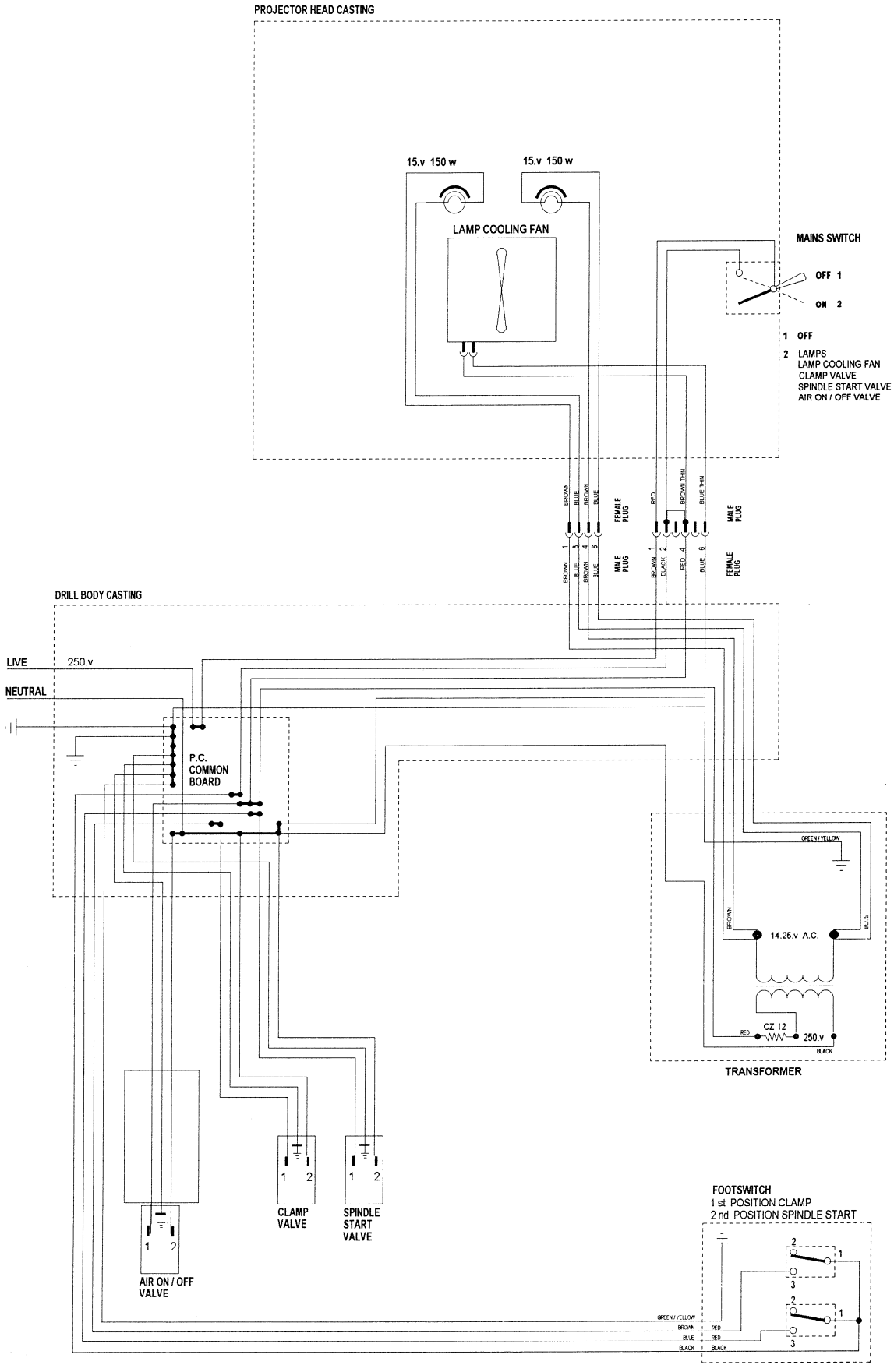
1	Cover	40294-1
2	Pipe Plug	Y227-2-L
3	Adapter	44883
4	Lock Washer	Y14-616
5	Trip Bracket	41713-1
6	Adjustment Screw "A"	
7	Adjustment Screw "B"	40292-1
8	Nut	Y11-4-C
9	Pipe Nipple	40857-5-1 40857-7-1
10	Valve Housing	40285 40799 41298-1
11	"O" Ring (3 req'd)	34276
12	Cap (2 req'd)	46696
13	"O" Ring only)	Y325-12
14	Valve Body	40287
15	"O" Ring only)	41082
16	"O" Ring	Y325-2
17	Check Valve	39587
18	Spring	35733
19	Screw Plug	39652
20	"O" Ring	Y325-3
21	Screw Plug	38863
22	"O" Ring	Y325-7
23	Needle Valve	48441-1
24	Pipe Plug (2 req'd)	Y227-2-L
25	Button Bleed Valve	24130
26	Stud	46558
27	"O" Ring	Y325-26
28	"O" Ring	Y325-24
29	Screw (2 req'd)	Y154-19
30	Washer (2 req'd)	Y14-4
	Housing and Valve Assembly (includes items 10 thru 30, 97 and 98	40813-1
	includes items 10, 11, 16, 17, 18, 20 thru 24, 26 thru 30, 97 and 98	40813-2
31	"O" Ring	41534
32	Bearing Race	42364
33	Piston	39459-1
34	Seal (2 req'd)	35922
35	Air Cylinder	39458-1 39458
36	Retaining Ring	39471
37	"O" Ring	Y325-16
38	Muffler Cap	39456
39	"O" Ring	Y325-24
40	Screen	39461
41	Outer Sleeve	40295
42	Torque Pin	40297-1
43	Muffler	43551-2
44	Manifold (includes items 45 and 46)	41204
45	Set Screw	Y29-82
46	"O" Ring (2 req'd)	Y325-29
47	Thread Guard	35912
48	Piston Rod	40293-1
49	Retaining Ring	Y145-20
50	"O" Ring (2 req'd)	Y325-13
51	Motor Housing	40296
52	Cap	
53	Shield	39465
55	Rear End Plate	33096
56	Bearing	38232
58	Rotor 7 teeth, used with motor ass'y 33654-2 12 teeth, used with motor ass'y 34746-2	33026-1 34734-1
59	Blade (5 req'd)	32860
60	Roll Pin	33416
61	Roll Pin	Y178-1
62	Cylinder (includes items 60 and 61)	33397
63	Cylinder (includes item 60)	34747
64	Front End Plate, used with motor 33654-2	33024
65	Bearing	32851
66	Front End Plate, used with motor 34746-2	34742
67	Bearing	Y65-8
		34746-2
68	Spacer	34737
69	Spacer	33018
70	Bearing	32850
71	Shaft (2 req'd)	38251
72	Spline Driver	38108
73	Spindle	39467
74	Gear (2 req'd) 20 teeth	33048
75	Shaft (2 req'd)	38722
76	Spindle	39468
77	Gear (2 req'd) 17 teeth	34745
78	Shaft (2 req'd)	34735
79	Spindle	35915
80	Spacer	34736
81	Ring Gear	35914
82	Retaining Ring	35900
83	Ring Gear (includes grease fitting 35967) used with 4.83:1 and 23.3:1 gearing (46 teeth) used with 1:1 and 8:1 gearing (49 teeth)	39481 39482
84	Bearing (2 req'd) used with 4.83:1 and 8:1 gearing used with 1:1 gearing	48305-1 34682
85	Spindle Nut	38893-1
86	Lock Nut	38250
87	Seal	38895
	Auxiliary Gearing Ass'y (4.83:1) includes items 70 (2 req'd), 77 (2 req'd), 78 (2 req'd), 79, 80, 81 and 82	36017
	Drive Gearing Ass'y (1:1) includes items 70, 71 (2 req'd), 72, 84 (2 req'd) and 99 thru 105	38724-2
	Drive Gearing Ass'y (4.83:1) includes items 70, 75 (2 req'd), 76, 77 (2 req'd) and 83 thru 87	39478



* ASSEMBLE WITH THREAD ADHESIVE SUCH AS LOCTITE 242

1 VALVE HOUSING
2 OUTER SLEEVE
3 MOTOR HOUSING
4 JACOBS CHUCK 19,000 / COLLET CHUCK 40,000 (NOT SHOWN)
5 SPINDLE LOCK NUT
6 FEED CONTROL KNOB
7 SHUTTLE VALVE RETAINING SCREW
8 PISTON ROD
9 TRIP BRACKET
10 ADAPTOR
11 PIPE
12 STROKE ADJUSTING SCREW
13 MANIFOLD
14 BRACKET
15 3 / 2 VALVE - AIR OPERATION
16 3 / 2 VALVE - ELECTRIC OPERATION - CLAMP
16a COIL
17 3 / 2 VALVE - ELECTRIC OPERATION (EXHAUST SCREW FITTED) - SPINDLE START
17a COIL
18 1/8" B.S.P. BANJO
18a 1/8" B.S.P. BANJO (DRILLED)
19 WASHER
20 O RING
21 DOWTY SEAL
22 5 / 3 VALVE - ELECTRIC OPERATION - AIR ON / OFF
22a COIL
23 FILTER / REGULATOR
24 PRESSURE GAUGE
25 LUBRICATOR
26 AIR PISTON
27 BRACKET
28 CLEVIS
29 1/4" B.S.P. HOSE CONNECTOR
30 20 m m BULK HEAD CONNECTOR
31 1/4" B.S.P. - 1/4" B.S.P. CONNECTOR
32 1/4" B.S.P. - 8 m m PIPE STRAIGHT CONNECTOR
33 1/8" B.S.P. - 5 m m PIPE ELBOW CONNECTOR
34 1/4" B.S.P. PLUG CONNECTOR
35 1/8" B.S.P. - 6 m m PIPE ELBOW CONNECTOR
36 R.S. 1/8" B.S.P. (FEMALE) - 8 m m PIPE ELBOW CONNECTOR
37 5 m m NYLON PIPE
38 6 m m NYLON PIPE
39 8 m m NYLON PIPE




PROJECTOR HEAD CASTING
15.v 150 w
15.v 150 w
LAMP COOLING FAN
MAINS SWITCH
OFF 1
ON 2
1 OFF
2 LAMPS
LAMP COOLING FAN
CLAMP VALVE
SPINDLE START VALVE
AIR ON / OFF VALVE
FEMALE PLUG
MALE PLUG
MALE PLUG
FEMALE PLUG
DRILL BODY CASTING
LIVE
250 v
NEUTRAL
P.C. COMMON BOARD
14.25.v A.C.
CZ 12
250.v
TRANSFORMER
AIR ON / OFF VALVE
CLAMP VALVE
SPINDLE START VALVE
FOOTSWITCH
1 st POSITION CLAMP
2 nd POSITION SPINDLE START