

Operations Manual Partner 7D

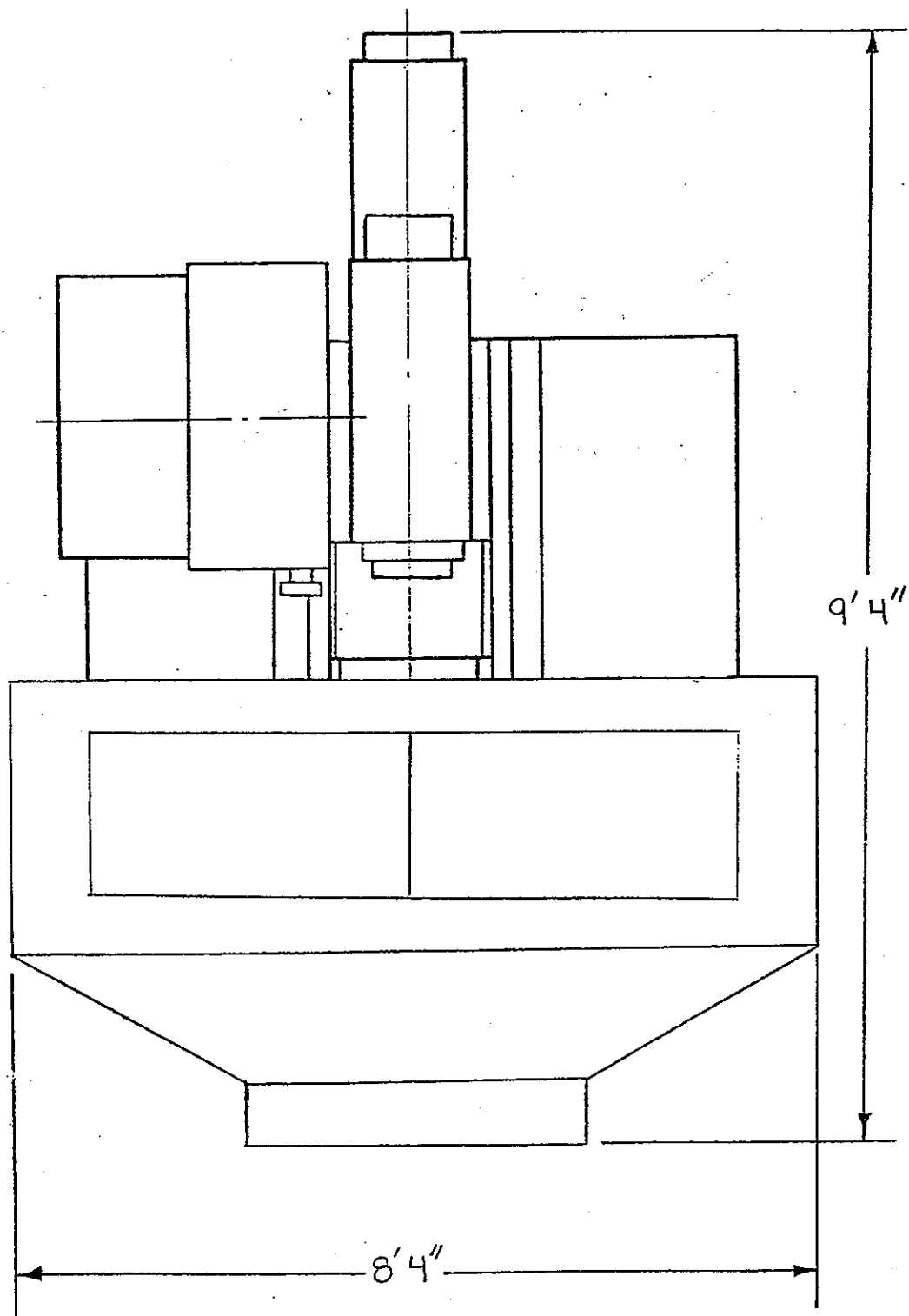
Milltronics Manufacturing Company

*1400 Mill Lane
Waconia, MN 55387*

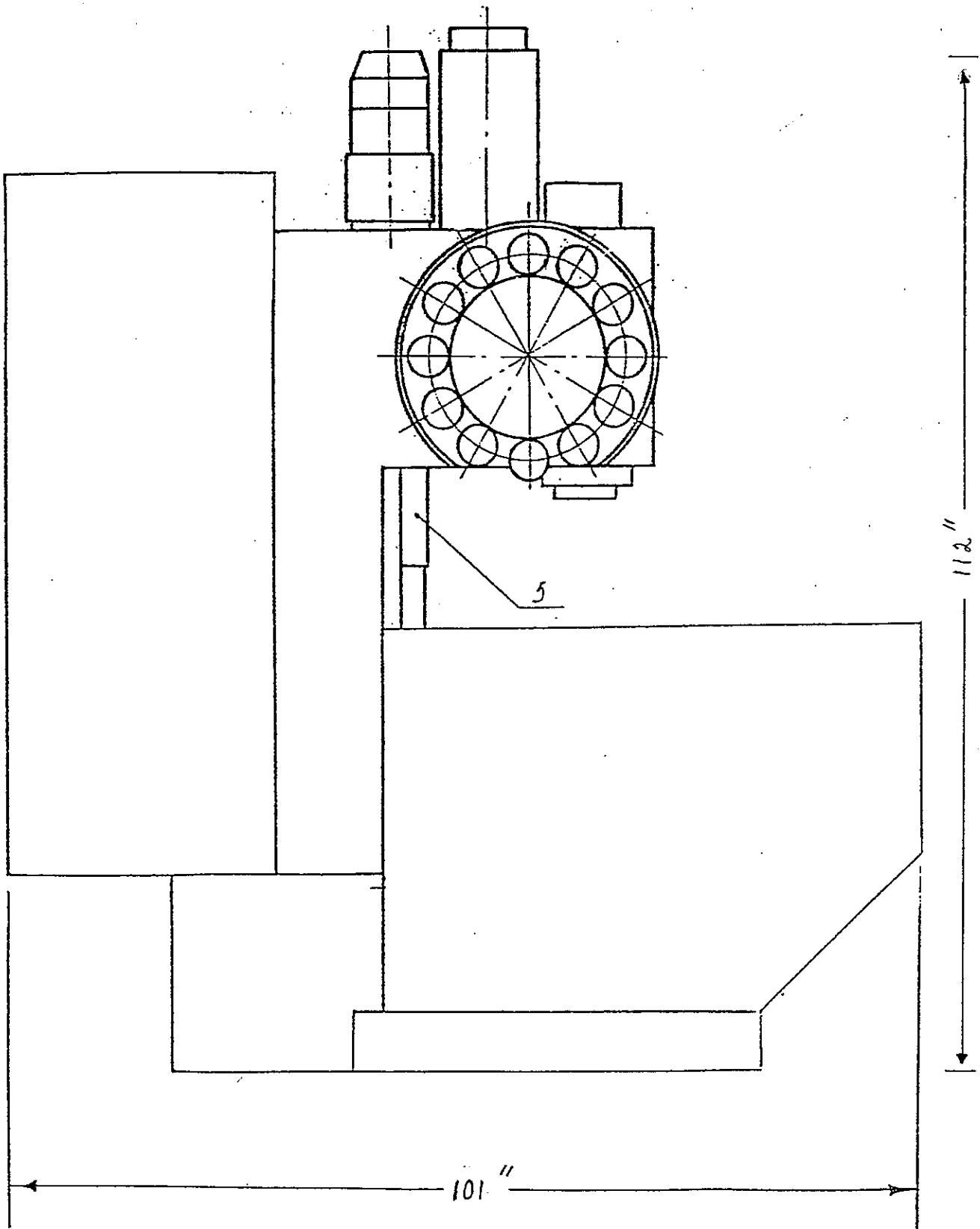
952-442-1410

Spindle thrust bearing (7017 C HH) x 3
Spindle radial bearing (7015) x 2
All axis thrust and radial (7306) BG-16 x 4 per
axis

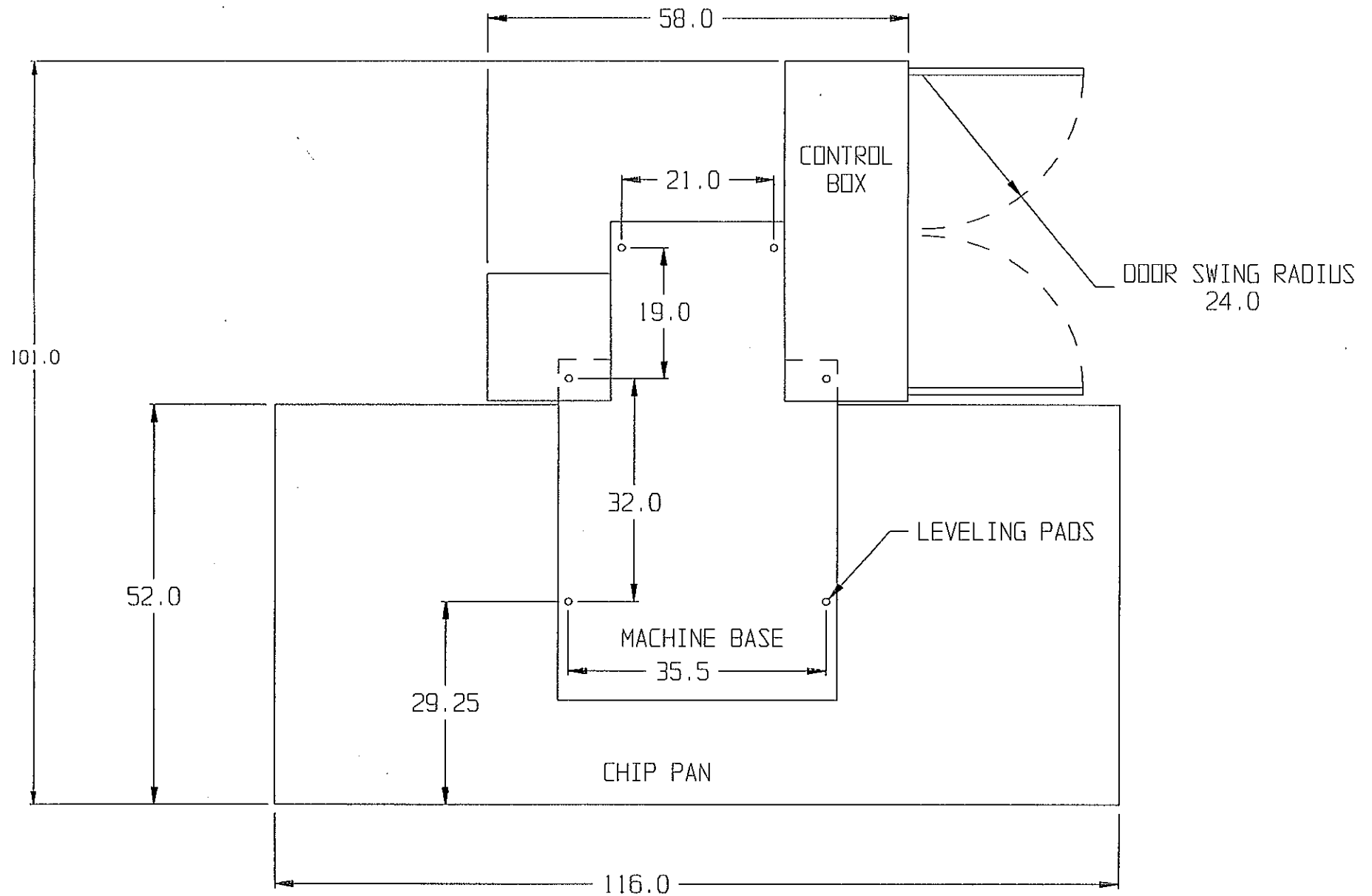
PARTNER VII OVERALL DIMENSIONS



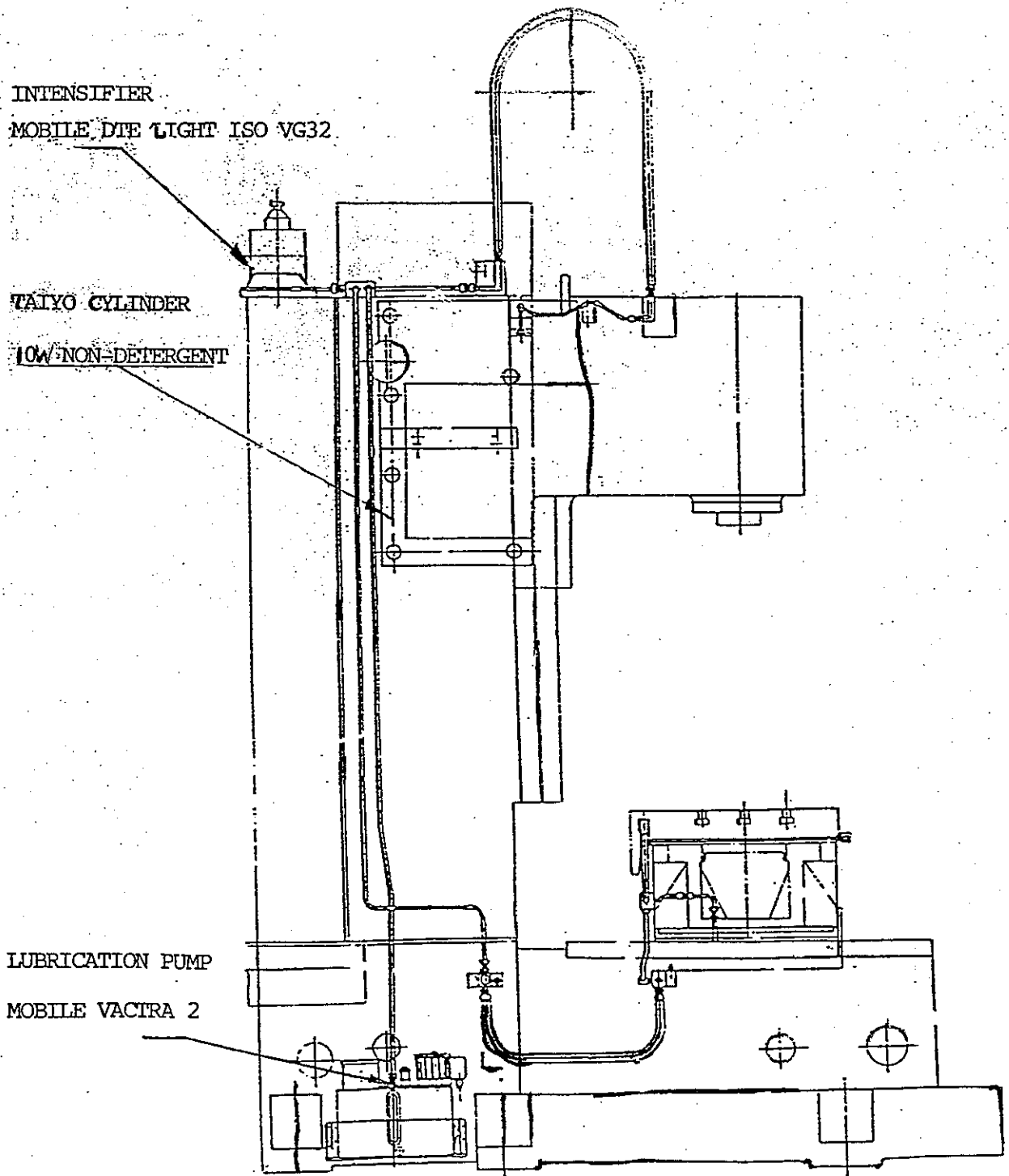
PARTNER 7 OVERALL DIMENSIONS



PARTNER 7 PAD DIMENSIONS



4. LIST OF RECOMMENDED LUBRICATING OILS



1. INSTALLATION

1) INSTALLATION SITE

Do not install the machine where it is exposed to direct sunlight, chips or other refuse, water, oil etc. and foreign vibration.

Ambient temperature: 0 — 45°

Humidity: 10 — 90% RH

2) INPUT POWER

Electrical systems should be shielded against noises caused by electric welders, electrospark machining equipment, etc.

Excessive voltage drops resulting from insufficient capacity of plant power lines can cause malfunctioning of the NC unit. As a general rule, the machine should be wired independently from the main plant power source.

- * Input power source capacity: 19 KVA
23 KVA

- * Current capacity:
$$A = \frac{\text{KVA} \times 1000}{V \times \sqrt{3}}$$

With 200V input voltage A = 55 ampere

With 220V input voltage A = 50 ampere

- * Permissible input voltage fluctuation: AC 200/220V $\pm 10\%$, 50/60 Hz
- * Electric wire for input power source: 220V, 14 — 22 mm² (in case of metal piping)

3) GROUNDING*

Ground the machine singularly as much as possible. When grounding use as short and thick (8mm²) grounding wire as possible. Class 3 grounding with grounding resistance of 100 Ω or less.

4) INSTALLATION PROCEDURE

4.1) Transporting the Machine

Lift the machine following the procedures below:

- (1) Move the head to the lowest position.
- (2) Move the table to the middle position of X-axis then move the saddle to the nearest position to column.
- (3) Turn off the power, and disconnect the power wires.
- (4) Remove the coolant pump, then remove the coolant tank.
- (5) remove the chip pan, use two bars through the lifting holes to lift the machine.
- (6) lift the machine carefully.

4.2) Foundation and Leveling

Place 8 leveling plates on the solid floor and install the machine with the leveling adjust bolts on the plates. Use a precision level dial with a sensitivity of about 0.02mm/m (0.0008"/40") to level the machine. For longitudinal and cross directions the level dial should be fall within 0.04mm/m (0.0016"/40").

- * Precautions in installation

(1) Maintenance area

There must be no obstacles impeding opening / closing of the electric control board door.

(2) Check for obstacles within the table travel range.

(3) Open space for coolant tank removal.

5) CHECK BEFORE TURNING POWER ON

- (1) Check bolts for tightness.
- (2) Check electric connectors for tightness.
- (3) Make sure that air hoses or pipes are completely connected.
- (4) Input power supply
Voltage, R/S/T phases

Check the above items and then turn power on.

Make sure that there are no interfering object.

6) CHECK AFTER THE INITIAL START-UP

- (1) Check the oil level.
- (2) Warm up the spindle as follows.
At 1000 rpm for 30 minutes.
At 2000 rpm for 30 minutes.
(Also warm up the spindle when the machine has not been used for a long period of time.)
- (3) Operate the X, Y and Z axes at a low speed for 30 minutes so that the lubricant fits well with their slide ways.
- (4) Check that all functions work properly.

2. LUBRICATION

1) AUTOMATIC LUBRICATION UNIT

Oil for lubricating the slide ways and ball screws is supplied automatically and intermittently by the lubricating system installed at the back side of the column. When oil in the tank is used up, a buzzer warning is given automatically, in this case, replenish oil promptly. When replenishing, use clean containers so as not to admit foreign matter. In addition, before starting the day's operation, run the machine the full stroke of each axis so that oil permits into all sliding surface points.

2) AIR UNIT

Compressed air is used for the following:

- * Air blow: Air is blown from the inside the spindle to the tool shank and from outside the spindle to the tool magazine side to remove dust when tools are automatically replaced.
 - * Tool clamp/unclamp: Used for the cylinder to clamp and unclamp tools.
 - * Tool : arm up/down: Used for the cylinder to move the tool magazine up/down.
 - * Tool : arm left/right: Used for the cylinder to move the tool magazine left/right.
- The required air pressure is 6 – 6.5 kg/cm², 85psi

3) COOLANT UNIT

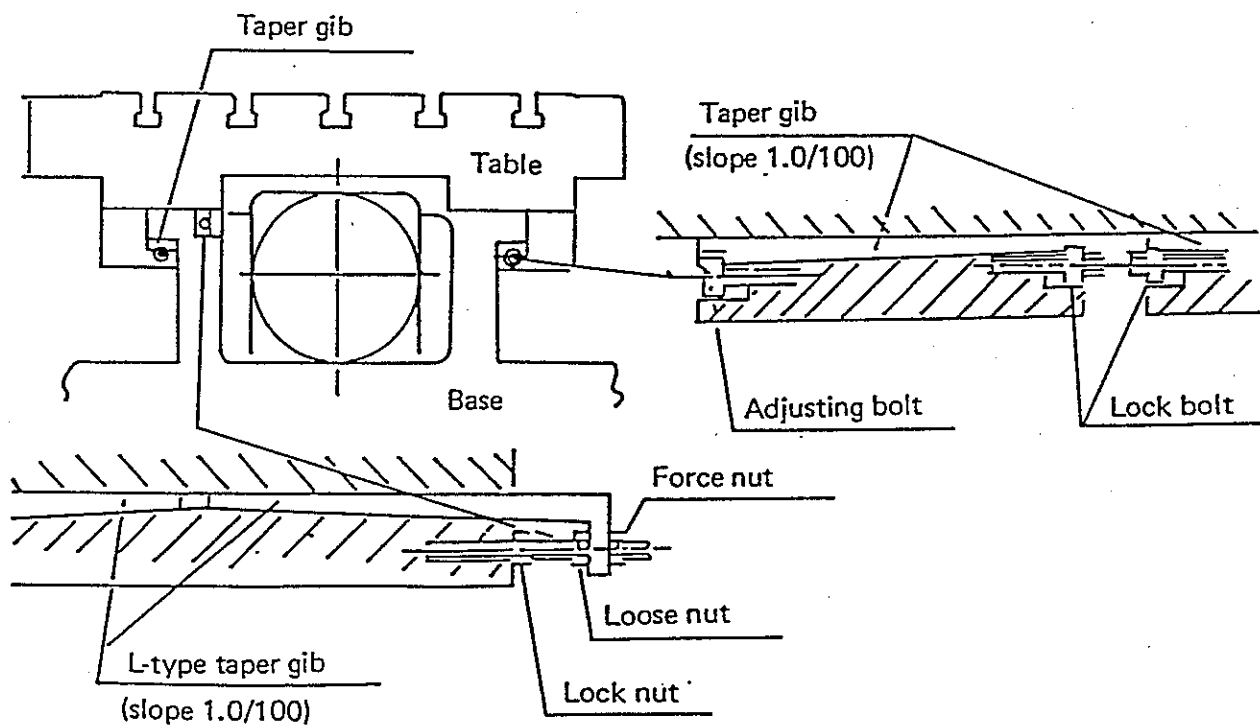
The coolant tank is separately installed to facilitate cleaning the tank interior and supplying coolant. Choose proper coolant, selected according to the kind of workpiece.

3. ADJUSTING OF GIBS

The guide surfaces are ground after being hardened, and the opposite sliding surfaces are lined with Turcite B and lubricated automatically to keep the wear of sliding surfaces to a minimum. As a means of further adjusting for wear and assuring proper sliding, taper gibs are provided. When adjusting, if the gib is tightened too firmly, the oil film may be broken and the sliding surfaces may be worn. Therefore, always tighten the gibs properly to assure the best operating conditions.

1) Table Gib Adjustment

- 1) Loosen the lock bolt in the middle end of the table. (only for VMC 980, 1000) Tighten the adjusting bolt in the both end of the table until the taper gib is fully tightened; then loosen the screw approx. one turn. Firmly tighten the lock bolt.
- 2) L-type taper gib turn loose nut back. Turn force nut forward until the taper gib is fully tightened; then turn back the force nut approx. one turn. Firmly tighten the loose nut.

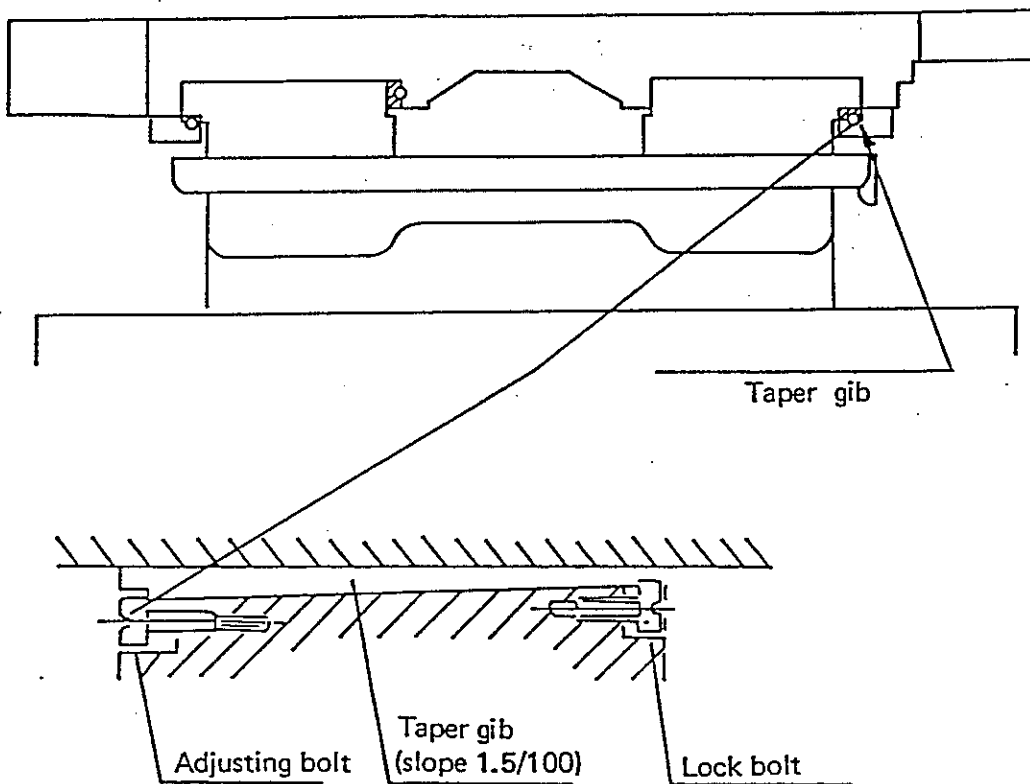


2) Saddle Gib Adjustment

Remove the slide cover for protection of the saddle front sliding parts.

Then adjust the gib following the procedure below:

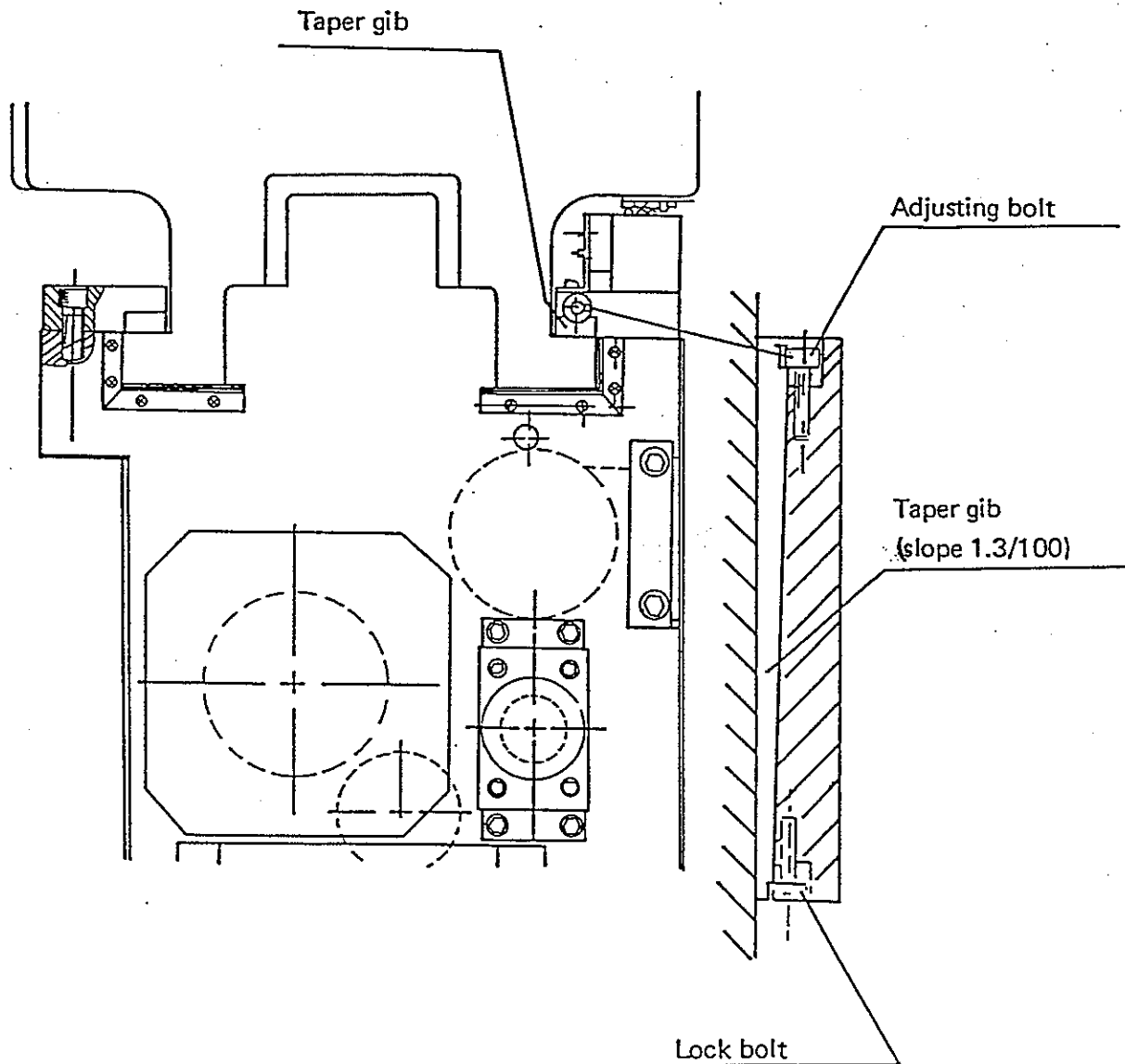
- 1) Loosen the lock bolt of the saddle rear part.
- 2) Tighten the adjusting bolt of the saddle front part until the taper gib is fully tightened; then loosen the screw approx. one turn.
- 3) Firmly tighten the lock bolt of the saddle rear part.



3) Head Gib Adjustment

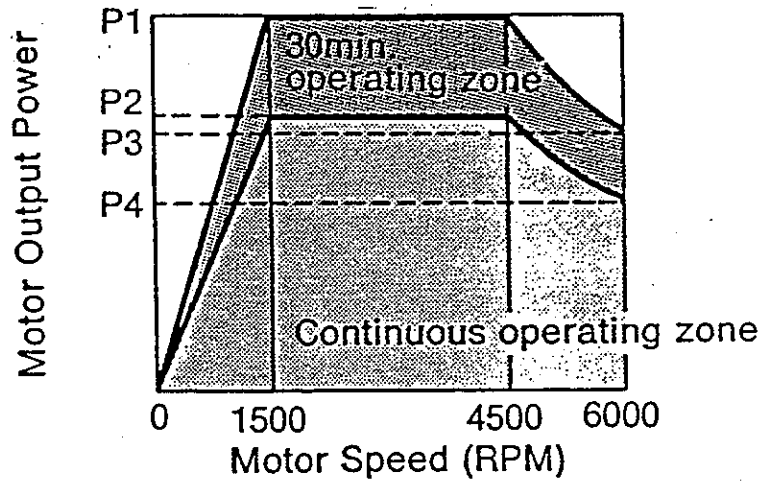
Adjust the gib following the procedure below:

- 1) Lower the spindle head about 8" (200 mm) from the home position.
- 2) Loosen the lock bolt of the spindle head lower part.
- 3) Tighten the adjusting bolt of the spindle head upper part until the taper gib is tightened fully; then loosen the screw approx. one turn.
- 4) Firmly tighten the lock bolt of the spindle head lower part.



Output Power P1/P2/P3/P4

SJ-11A
11/7.5/8/5.5 (kw)
15/10/10/7 (HP)



PARTNER VII DRIVE BUSS TRANSFORMERS SETTINGS

04 January 1991

CUSTOMER INPUT VOLTAGE	TRANSFORMER	PRIMARY INPUT BUSS VOLTAGE	SECONDARY OUTPUT BUSS VOLTAGE
208 VAC	4404 5KVA	H1-H2 208	X1-X2 110
240 VAC	4404 5KVA	H1-H2 240	X1-X2 110
480 VAC	4404 5KVA	H1-H3 480	X1-X2 110

PARTNER VII SYSTEM 110 TRANSFORMER SETTING

CUSTOMER INPUT VOLTAGE	TRANSFORMER	PRIMARY INPUT BUSS VOLTAGE	SECONDARY OUTPUT BUSS VOLTAGE
208 VAC	3358 1.5KVA	H1-H2 208	X1-X2 110
240 VAC	3358 1.5KVA	H1-H2 240	X1-X2 110
480 VAC	3358 1.5KVA	H1-H3 480	X1-X2 110

MEASURING POWER SUPPLY AND BUSS VOLTAGE USING A DC VOLT METER

- 1) CONNECT COMMON LEAD OF THE DC VOLT METER TO TERMINAL BLOCK BLOCK 22 (DC GROUND) AND THE OTHER LEAD TO TERMINAL BLOCK BEING CHECKED SEE TABLE (1.1)

TABLE 1.1 POWER SUPPLY TERMINAL BLOCK

TERMINAL BLOCK	VOLTAGE
12	24 VDC
23	5.1 VDC
26	14.9 VDC
27	-14.9 VDC

- 2) TO CHECK BUSS VOLTAGE SET DC VOLT METER TO ABOUT THE 200 VOLT RANGE. CONNECT THE COMMON LEAD TO THE NEGATIVE TERMINAL OF THE CAPACITOR ON DRIVE PLATE THE OTHER LEAD TO THE POSITIVE TERMINAL. BUSS VOLTAGE SHOULD READ APPROXIMATELY 160 VOLTS.

PROCEDURE TO CHANGE YASKAWA PARAMETERS

1. Depress DRIVE/PRG to select program mode. (Drive light turns off.)
2. Depress FWD/REV/MODE to select system constant (Sn) or control constant (Cn).
3. RESET moves flashing digit to appropriate digit to be changed.
4. ^ changes digit from zero thru nine.
5. Depress RUN/DATA to indicate internal data.
6. If data is correct, goto Step 2; if data needs to be changed, proceed to Step 7.
7. Use RESET and ^ keys to change internal data. (Steps 3, 4)
8. Depress STOP/SET key to temporarily store changed data.
9. Depress JOB/NO. to indicate constant, that internal data was changed.
10. Depress DSPL/ENTR to store data; should display "END".
11. GOTO Step 2.
12. If finished depress DRIVE/PRG; remote light should come on.

PARTNER 7 YASKAWA PARAMETERS
G3 Inverter

<u>PARAMETER</u>	<u>DESCRIPTION</u>	<u>DATA</u>
SN-01	KVA Selection	07
SN-02	V/F Pattern Selection	0F
SN-03	Operator Status	1010
SN-04	Operation Mode Select 1	0000
SN-05	Operation Mode Select 2	0000
SN-06	Operation Mode Select 3	1001
SN-07	Operation Mode Select 4	0101
SN-08	Operation Mode Select 5	0000
SN-09	Operation Mode Select 6	0000
SN-10	Select Stall Prevention	0000
SN-11	Momentary Power Loss Protection	0000
SN-12	External Fault Signal Input (3)	0000
SN-13	Not Used	0000
SN-14	Motor Protection	0000
SN-15	Soft Input Terminal 5	03
SN-16	Soft Input Terminal 6	04
SN-17	Soft Input Terminal 7	06
SN-18	Soft Input Terminal 8	08
SN-19	Multi Function Analog Input	00
SN-20	Soft Output Terminals	01
SN-21	Soft Output Terminals	01
SN-22	Soft Output Terminals	02
SN-23	Not Used	00
SN-24	Not Used	00
SN-25	Analog Speed Setter	0000
SN-26	Digital Speed Setter	0000
SN-27	Digital Pulse Monitor Option	0000
SN-28	Analog Output Monitor Option	0100
BN-01	Acceleration Time #1	1.0
BN-02	Deceleration Time #1	1.0
BN-03	Acceleration Time #2	10.0
BN-04	Deceleration Time #2	10.0
BN-05	Frequency Reference Gain	100.0
BN-06	Frequency Reference Bias	0
BN-07	Torque Compensation Gain	1.0
BN-08	Motor Rated Slip	2.0
BN-09	Energy Saving Level Gain	80
BN-10	Monitor Mode at Power-up	1
BN-11	Soft Analog Output Gain	1.00
BN-12	Soft Analog #2 Output Gain	1.00
AN-01	Digital Reference #1	0.00
AN-02	Digital Reference #2	0.00
AN-03	Digital Reference #3	0.00
AN-04	Digital Reference #4	0.00
AN-05	Digital Reference #5	0.00
AN-06	Digital Reference #6	0.00
AN-07	Digital Reference #7	0.00
AN-08	Digital Reference #8	0.00
AN-09	Jog Frequency Reference	1.0

PARTNER 7 YASKAWA PARAMETERS

G3 Inverter

Page 2

<u>PARAMETER</u>	<u>DESCRIPTION</u>	<u>DATA</u>
CN-01	Motor Rated Input Voltage	230.0
CN-02	Maximum Output Frequency	200.0
CN-03	Maximum Output Voltage	230.0
CN-04	Maximum Voltage Frequency	60.0
CN-05	Breakpoint Frequency	20.0
CN-06	Breakpoint Voltage	91.0
CN-07	Minimum Frequency	1.5
CN-08	Minimum Voltage	11.0
CN-09	Motor Rated Current	38.5
CN-10	DC Injection Braking Start Frequency	20.0
CN-11	DC Braking Current	70
CN-12	DC Injection Time at Stop	0.5
CN-13	DC Injection Time at Start	0.0
CN-14	Frequency Reference Upper Limit	100
CN-15	Frequency Reference Lower Limit	0
CN-16	Prohibited Frequency Points	0
CN-17	Prohibited Frequency Points	0
CN-18	Prohibited Frequency Points	0
CN-19	Prohibited Frequency Deadband	1.0
CN-20	Operator Display Mode	00000
CN-21	Speed Comparator Reference	0.0
CN-22	Comparator Hysteresis	2.0
CN-23	Carrier Frequency Upper Limit	2.5
CN-24	Carrier Frequency Lower Limit	0.4
CN-25	Carrier Frequency Gain	6
CN-26	Overtorque Detection Level	160
CN-27	Overtorque Detection Time	0.1
CN-28	Stall Prevention Level During Accel	170
CN-29	Stall Prevention Limiter	30
CN-30	Stall Prevention Level at Set Speed	160
CN-31	Motor Line to Line Resistance	.250
CN-32	Motor Iron Loss	245
CN-33	Torque Compensation Limiter	50
CN-34	Motor No Load Current	30
CN-35	Slip Compensation Delay Time	1.0
CN-36	No. of Auto-reset Attempts	0
CN-37	Power Loss Ride Through Time	0.0
CN-38	Speed Search Deactivation Level	160
CN-39	Speed Search Decel Time	2.0
CN-40	Minimum Base Block Time	0.5
CN-41	V/F Pattern Speed Search	100
CN-42	Voltage Recovery Time	0.3

CENTURION V MILL INTERFACE PLUGS DESIGNATION
PC-INTF-01 29-Jan-91

14 PIN AMP PLUGS

Pin No.	MISC.	FRONT PANEL	POWER PLUG	ENCODER PLUG
1	N.C.	+5VDC	+5VDC	+CH. A
2	N.C.	GND	+5VDC	-CH. A
3	N.C.	KEY	+5VDC	+CH. B
4	N.C.	+24VDC	+24VDC	-CH. B
5	KEY	+12VDC	N.C.	+MARK
6	GND	-12VDC	+12VDC	-MARK
7	RESET 1	RESET 1	-12VDC	GND
8	RESET 2	RESET 2	N.C.	+5VDC
9	TCHNG 1	TCHNG 1	KEY	GND
10	TCHNG 2	TCHNG 2	GND	GRID
11	ESTOP 1A	ESTOP 1B	GND	SIGNAL
12	ESTOP 2	ESTOP 2	GND	GND
13	SP. ANA.	SP. ANA.	GND	GND
14	GND	GND	GND	KEY

PIN	X INPUTS	DESCRIPTION	X OUTPUTS	DESCRIPTION
1	IN. 1	E-STOP	OUT. 1	EXCESS ERROR
2	IN. 2	SPINDLE CW	OUT. 2	SPRAY MIST
3	IN. 3	SPINDLE CCW	OUT. 3	FLOOD
4	IN. 4	UP TO SPEED	OUT. 4	SPINDLE CW
5	IN. 5	IN TOOL CHANGE	OUT. 5	SPINDLE CCW
6	IN. 6	LUBE FAULT	OUT. 6	SPINDLE STOP
7	IN. 7	WAIT CHANNEL	OUT. 7	SPINDLE ENB.
8	IN. 8	ZERO SPEED	OUT. 8	TCH RESET
9	IN. 9	SPARE	OUT. 9	ALLOW RESET
10	IN. 10	SPINDLE REVERSE	OUT. 10	M-10 (PULSE)
11	IN. 11	DIGITIZING	OUT. 11	M-11 (PULSE)
12	KEY	(Set M-10, Clear M-11)	OUT. 12	4TH AXIS BRAKE
13	N/O CONTACT	ACROLOOP(P2)	KEY	
14	N/C CONTACT	ACROLOOP(P2)	CONTACT COM.ACROLOOP(P2)	

For Manual/Avanti Tool Changer Milling Machines
January 8, 1991

Output Plug Definitions

				<u>SET</u>	<u>CLEAR</u>
Yout01	1	M20	output pulsed	M60	M70
Yout02	1	M21	output pulsed	M61	M71
Yout03	1	M22	output pulsed	M62	M72
Yout04	1	M23	output pulsed	M63	M73
Yout05	1	M24	output pulsed	M64	M74
Yout06	1	M25	output pulsed	M65	M75
Yout07	1	M26	output pulsed	M66	M76
Yout08	1	M27	output pulsed	M67	M77
Yout09	1	M28	output pulsed	M68	M78
Yout10	1	M29	output pulsed	M69	M79

Input Plug Definitions

Yin01	1	M20	waiting
Yin02	1	M21	waiting
Yin03	1	M22	waiting
Yin04	1	M23	waiting
Yin05	1	M24	waiting
Yin06	1	M25	waiting
Yin07	1	M26	waiting
Yin08	1	M27	waiting
Yin09	1	M28	waiting
Yin10	1	M29	waiting

Partner VII Tool Changer

Input Plug Definitions

January 8, 1991

Yin01 0 Tool Change
Yin02 0 In Tool Change
Yin03 0 Spindle Orient
Yin04 0 Zero Speed
Yin05 0 Estopped
Yin07 0 Manual/Auto
Zin01 0 Pot up
Zin02 0 Pot down
Zin03 0 Arm up
Zin04 0 Arm down
Zin05 0 In 75
Zin06 0 Out 75
Zin07 0 In 180
Zin08 0 Out 180
Zin09 0 Begin Change
Zin11 0 Estopped

Output Plug Definitions

January 8, 1991

Yout01 0 Spindle CW
Yout02 0 CR2
Yout03 0 Creep Speed
Yout04 0 Orient Pin
Yout05 0 Begin Change
Yout06 0 Changing ??
Yout07 0 M60/M70 out
Yout08 0 M61/M71 out
Yout09 0 -- spare --
Yout10 0 M62/M72 out
Yout11 0 M63/M73 out
Yout12 0 M64/M74 out

Zout01 0 Solenoid
Zout02 0 Pot Down
Zout03 0 Arm Down
Zout04 0 75 Out
Zout05 0 180 In
Zout06 0 Drawbar
Zout07 0 M65/M75 out
Zout08 0 M66/M76 out
Zout09 0 In Progress
Zout10 0 M67/M77 out
Zout11 0 M68/M78 out
Zout12 0 M69/M79 out

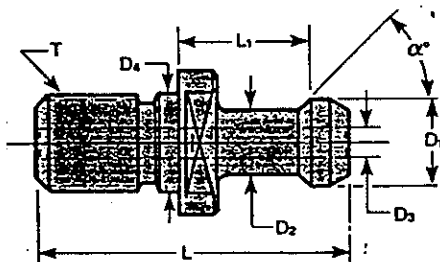
MECHANICAL DRAWINGS

CONTENTS:

1. Bed and Table	D-3.....D11
2. Column	D12.....D17
3. X Axis Ball Screw	D18.....D19
4. Y Axis Ball Screw	D20..... D21
5. Z Axis Ball screw	D22.....D23
6. Spindle Head	D24.....D30
7. Automatic Tool Changer	D31.....D38
8. Lubricating Piping diagram	D39..... D40

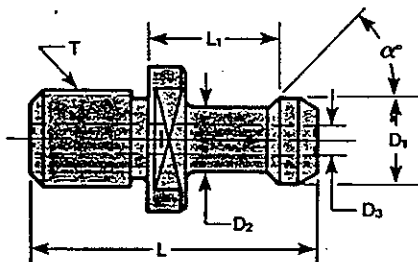
RETENTION KNOBS

BT - 40



D_1	D_2	D_3	D_4	L	L_1	α
.59	.39	—	.669	2.36	1.102	45°

CT - 40



D_1	D_2	D_3	D_4	L	L_1	α
.59	.39	—	—	2.27	1.000	45°

1. BED AND TABLE			
NO.	NAME	Q'TY	REMARKS
1	Protecting case	1	
2	Cushion	1	
3	Bed	1	
4	Saddle	1	
5	Table	1	
6	Dog Seat	1	
7	Dog	4	
8	Dog Seat	1	
9	Dog	2	
10	Protecting case	1	
11	Gib	1	
12	Strike-off Board	4	
13	Plate	1	
14	Adjustable Screw	3	
15	Plate	1	
16	Gib	2	
17	Plate	1	
18	Strike-off board	4	
19	Plate	1	
20	Strike-off board	5	
21	Strike-off board	1	

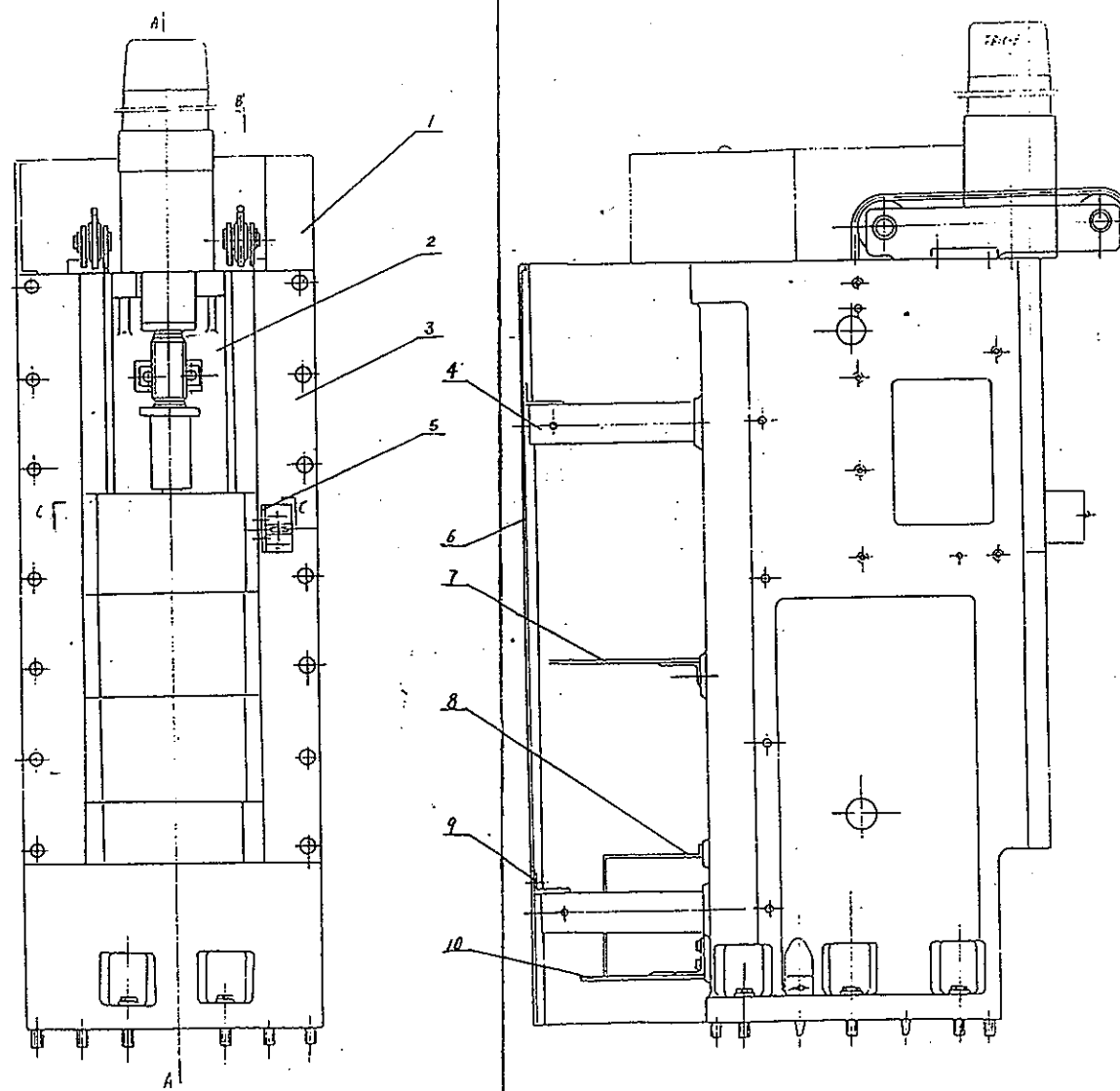
NO.	NAME	Q'TY	REMARKS
22	Strike-off board	8	
23	Cradle	1	
24	Cushion	1	
25	Apron	1	
26	Platen	2	
27	Platen	2	
28	Oil cover	1	
29	Steel Wire Mesh	1	
30	Strike-off board	4	
31	Strike-off board	4	
32	Jointed body	1	
33	Lid	2	
34	Cushion	1	
35	Oil Nozzle	1	
36	Pin	2	
37	Scrape Chip board	2	
38	Hinge axis	2	
39	Hinge	4	
40	Down Chip Carriage	1	
41	Chip Carriage plate	1	
42	Upper chip carriage plate	1	
43	Shaft	2	
44	Support	2	

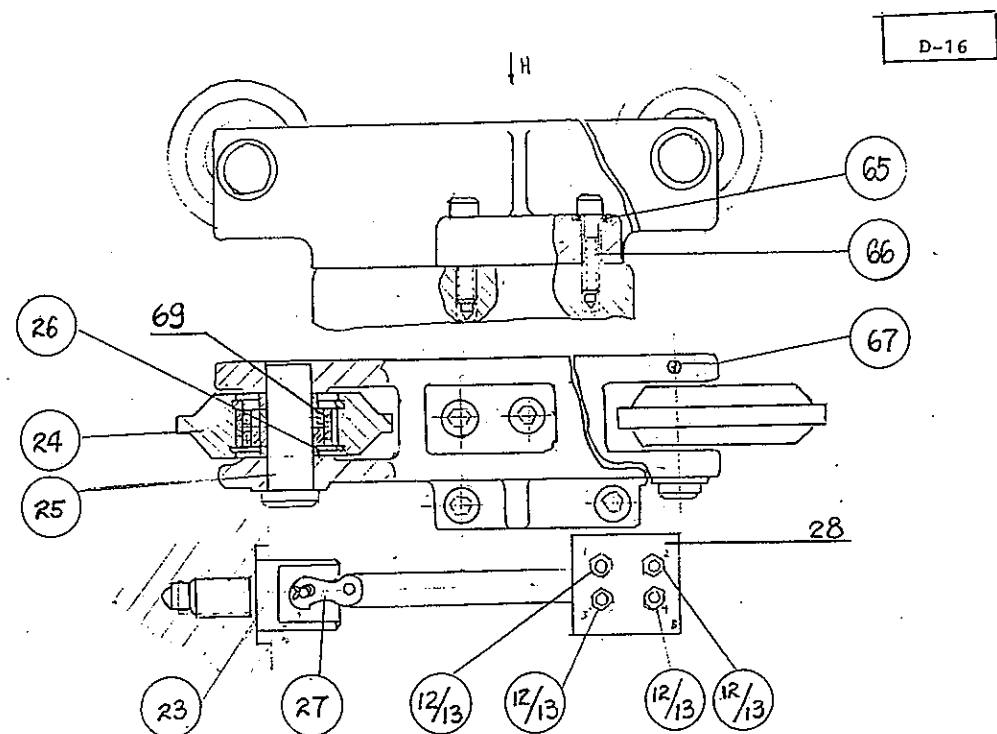
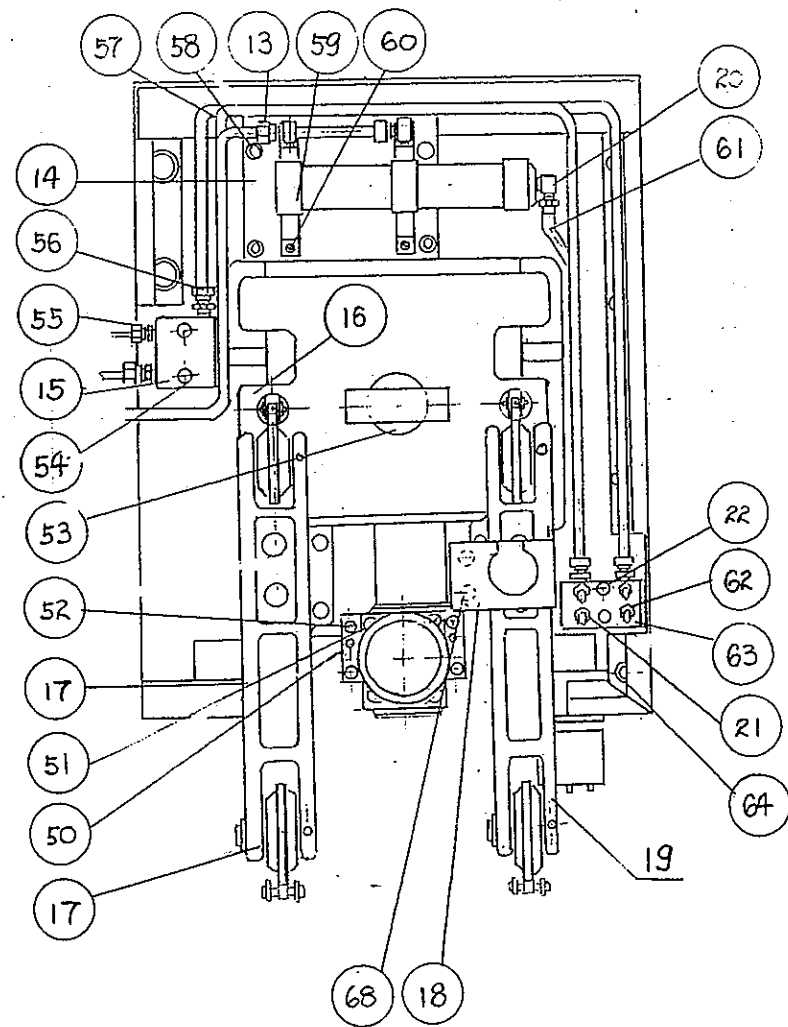
NO.	NAME	Q'TY	REMARKS
45	Lever	4	
46	Lever	2	
47	Lever	2	
48	Lever	4	
49	Left Pedestal	1	
50	Right Pedestal	1	
51	Pedestal for oil tank	1	
52	Jointed body	1	
53	Jointed Body	1	
54	Stop	1	
55	Motor seat	1	
56	Pad	2	
57	Cover Plate	3	
58	Screw Seat	2	
59	X axis Ball Screw*	1 set	
60	Stop	2	
61	Guide brace	2	
62	Small Plate	2	
63	Foot Step	1	
64	Chip Cover	2	
65	Chip Cover	2	
66	Washer	2	
67	Apron	1	

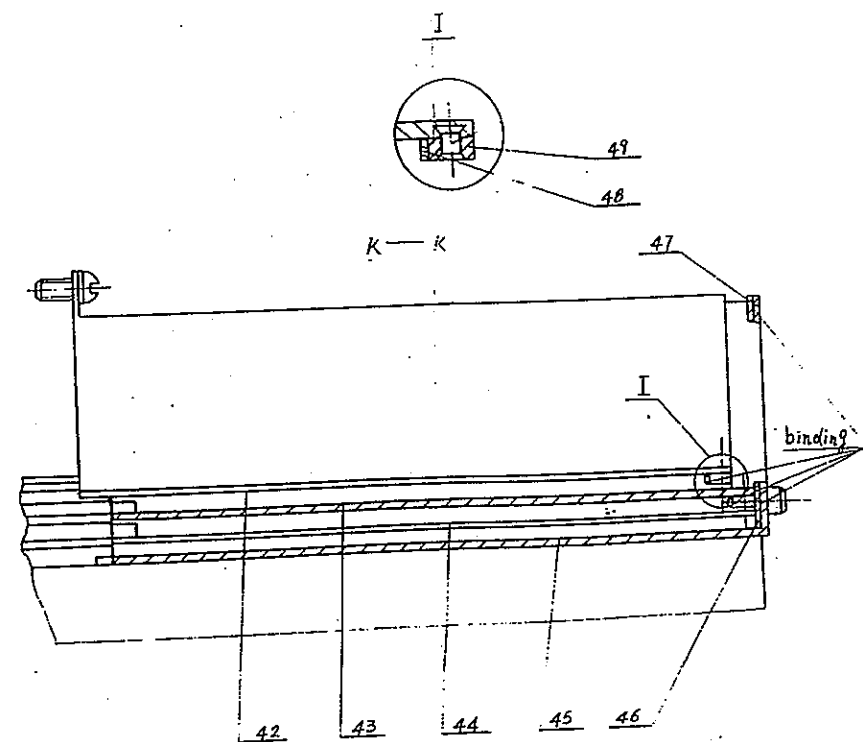
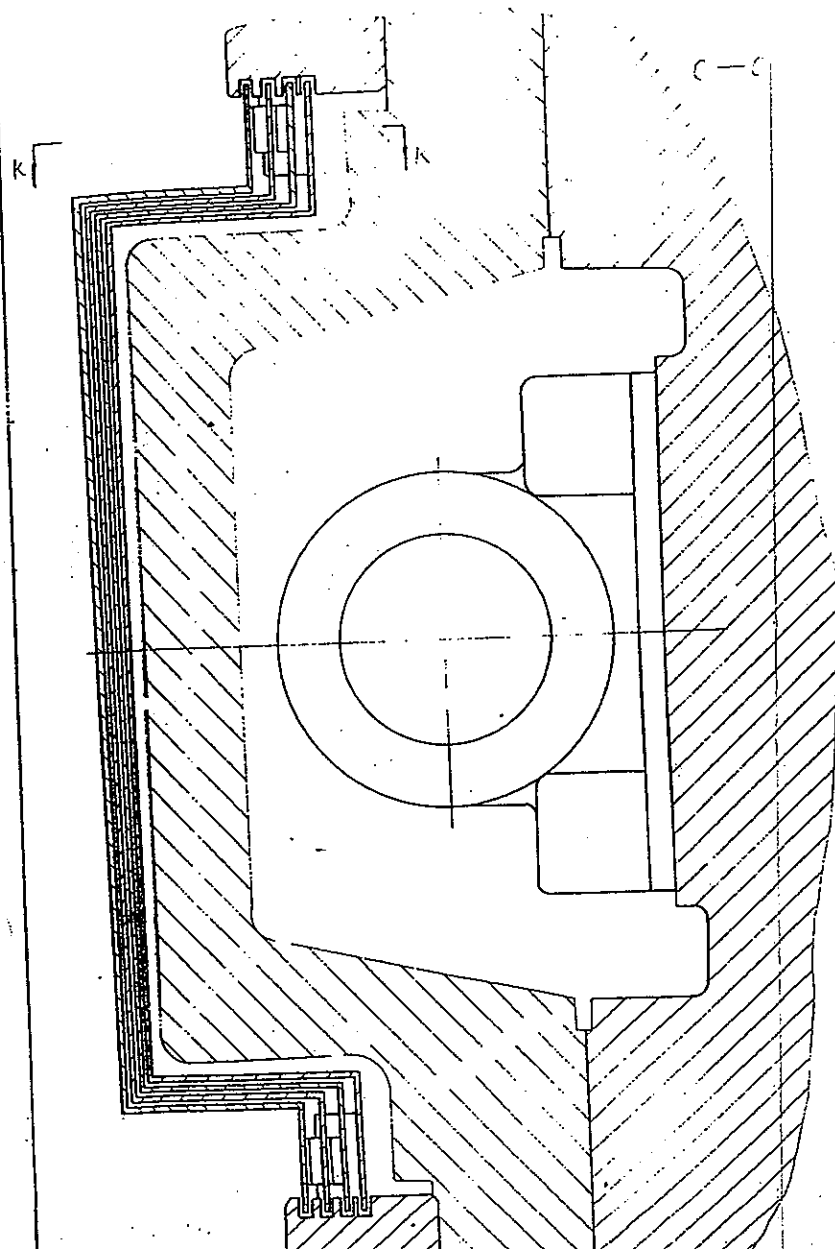
NO.	NAME	Q'TY	REMARKS
68	Spacer Washer	2	
69	Left plate	1	
70	Left sleeve	1	
71	Middle sleeve	1	
72	Washer	1	
73	Right Sleeve	1	
74	Washer	1	
75	Cushion	1	
76	Cushion	1	
77	Cover Sheet	1	
78	Guard sheet	1	
79	Support	1	
80	Foot Step	1	
81	Lid	2	
82	Bearing	2	
83	Y axis Ball screw set	1 set	
84	Ball screw Pedestal	1	
85	Right plate	1	
86	Lid	1	
87	Cushion	1	
88	Oil space	1	
89	Flange	1	
90	Nut	2	

NO.	NAME	Q'TY	REMARKS
91	Motor base	1	
92	Nut	2	
93	Connecting Bar	1	
94	Coupling	2 sets	
95	Flange	1	
96	M6 x 30 screw	4	
97	Oil Seal	4	
98	Oil Cap	1	
99	M12 x 35 Hex Screw	12	
100	Key 8 x 40	1	
101	Oil Cap	1	
102	Oil line o4	1 set	
103	Screw		
104	Oil Line o4	1 set	
105	M12x35 Hex Screw*	4	
106	Tap Pin o8 x 50	1	
107	M6 x 12 Hex screw	1	
108	Half round screw M6 x12	6	
109	Flat head screw M6 x 12	2	
110	M8 Hex screw	4	
111	Bearing 30x72x38	2	
112	Angle Plate	1	
113	Angle Plate	1	
114	Servo Motor	1	

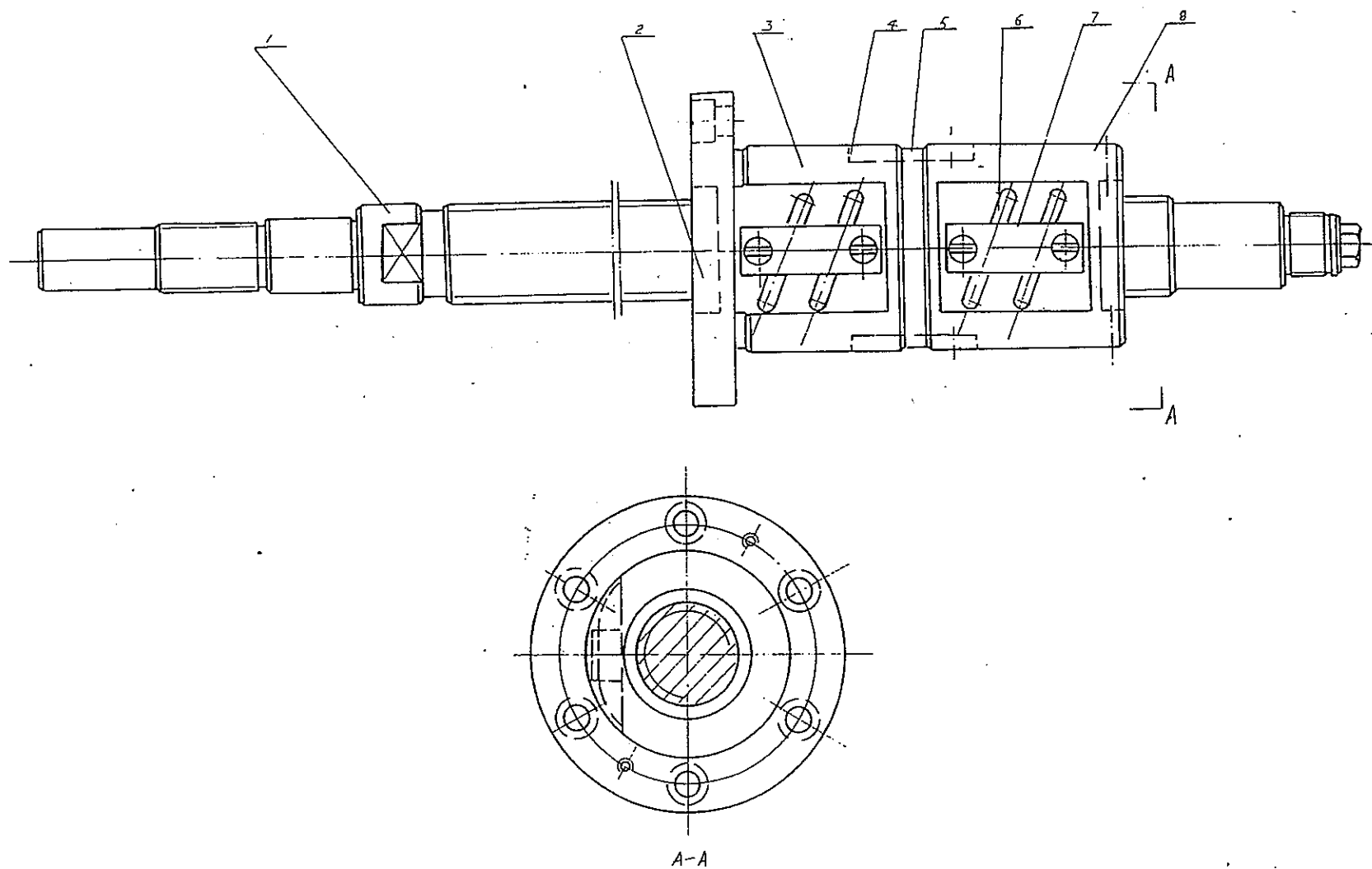
115	Mrox45 Hex Screw	4
116	Spring Washer o10	4
117	Coupling Assembly	1 set
118	Coupling Assembly	1 set
119	Screw	1
120	Chip Wiper Arm	3
121	Protection cover	1
122	Screw	4
123	End cover	1
124	Screw	4

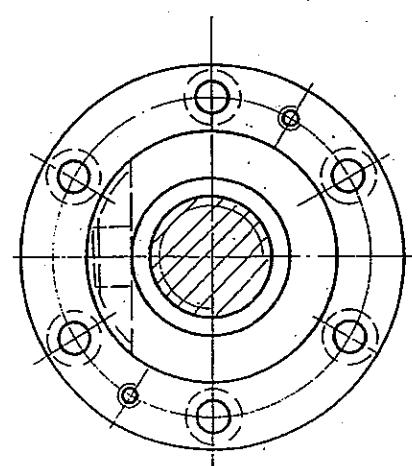
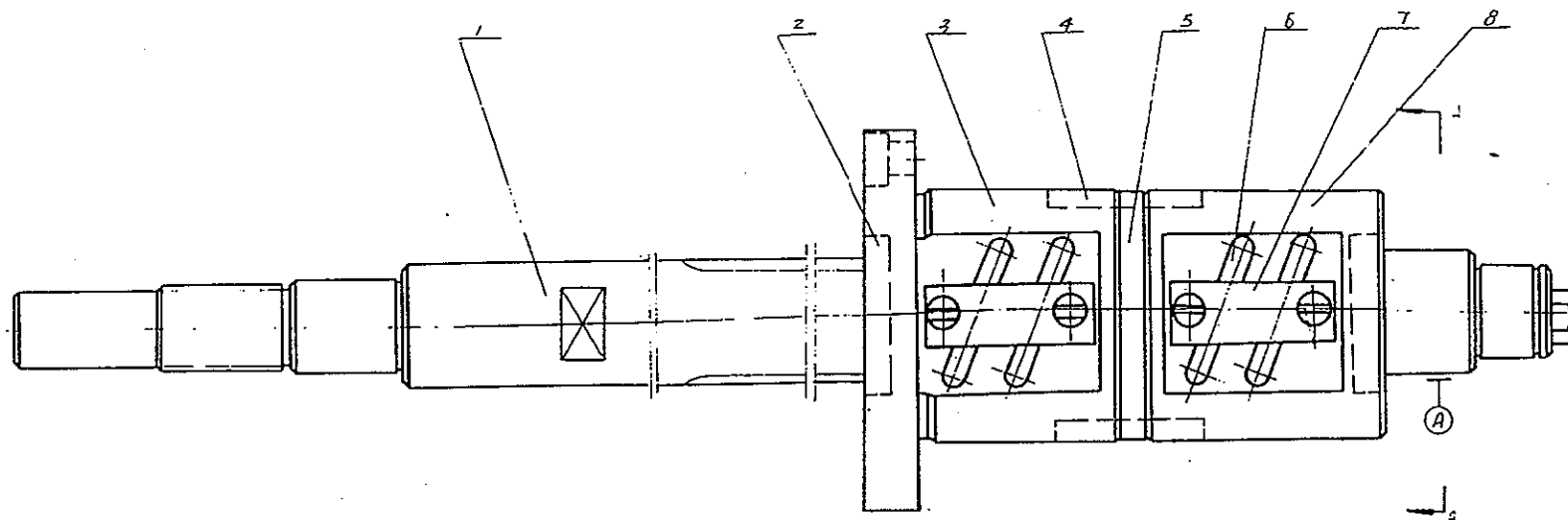






3. X AXIS BALL SCREW				
NO.		NAME	Q'TY	REMARKS
1	12301	X asis ball screw	1	
2	12801	Seal ring	2	
3	12302	Ball nut	1	
4	12307	Key	2	
5	11305	Adjust cushion	1	
6	12304	Return tube	2	
7	12306	Platen	2	
8	12303	Ball nut	1	

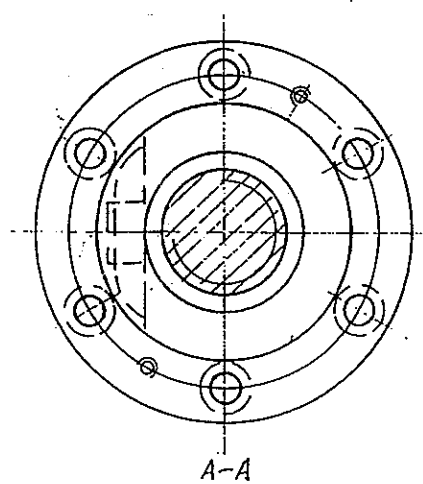
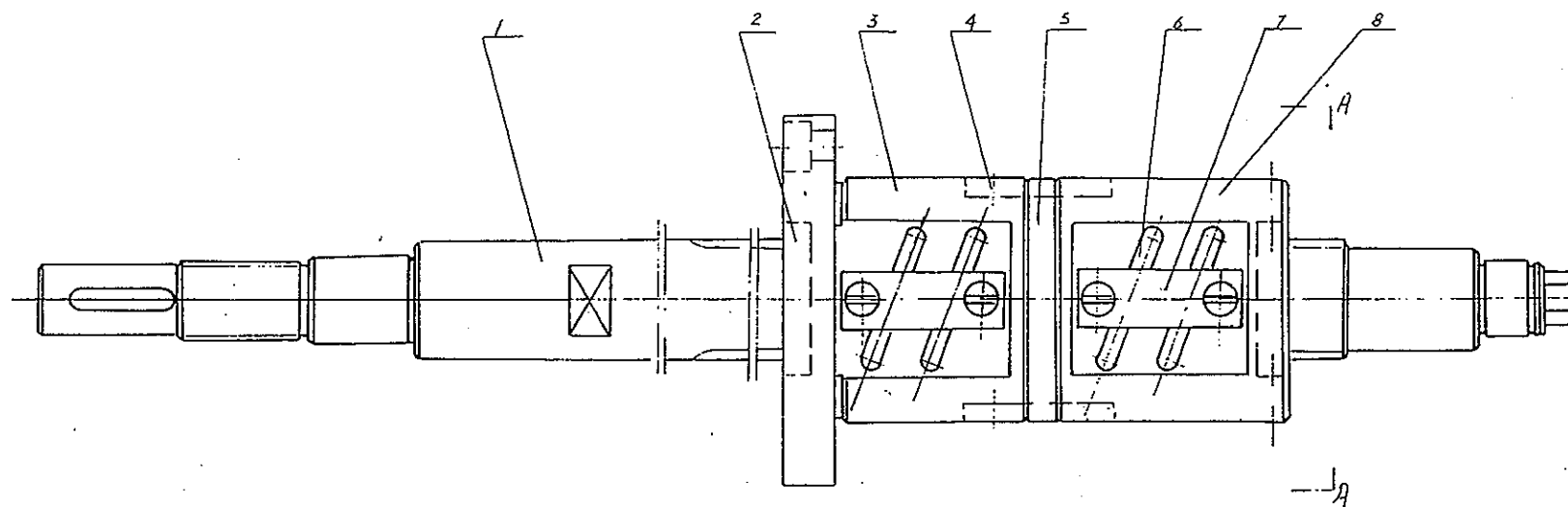




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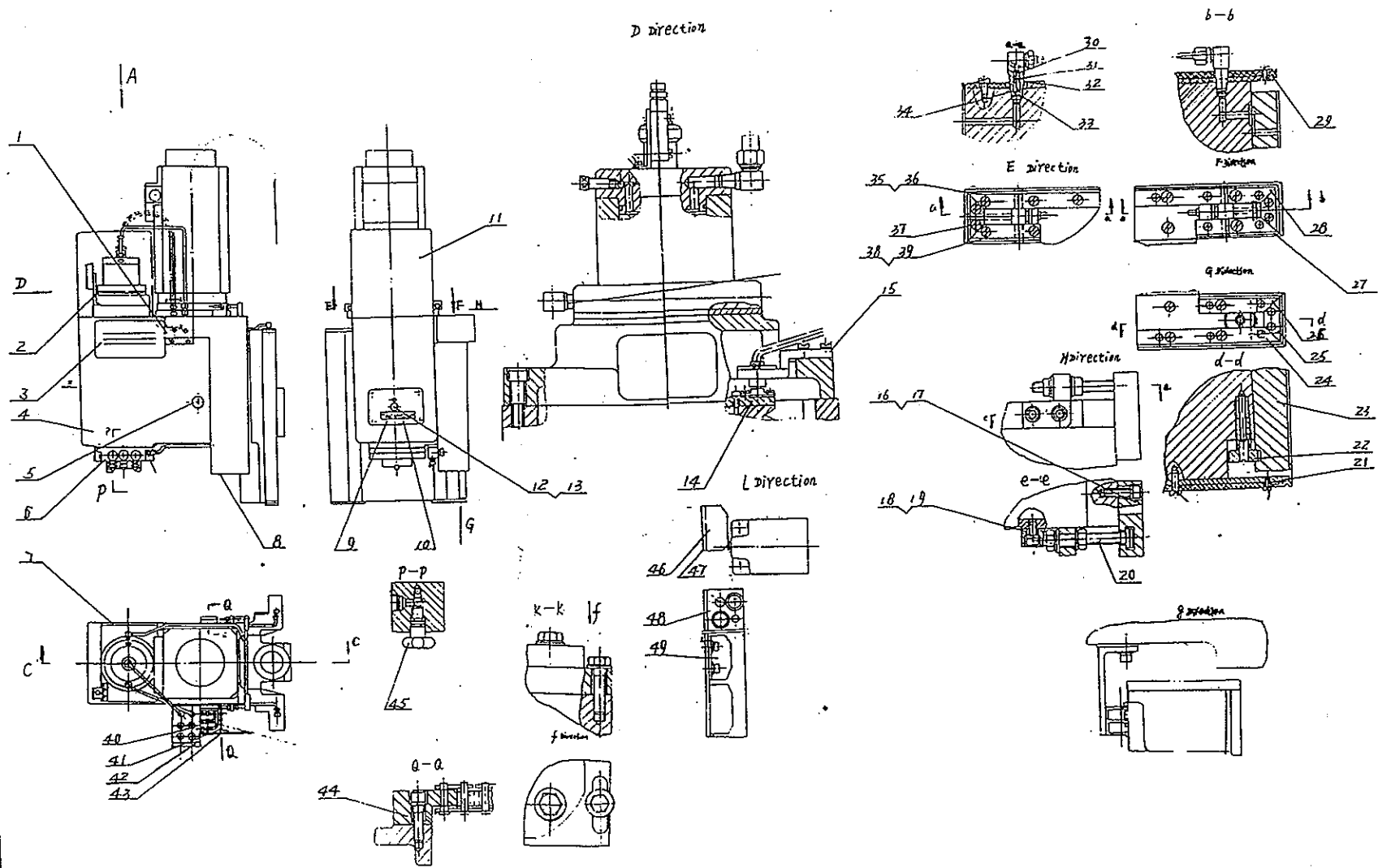
4. Y AXIS BALL SCREW				
NO.		NAME	Q'TY	REMARKS
1	13301	Y axis ball screw	1	
2	12801	Seal ring	2	
3	12302	Ball Nut	1	
4	12307	Key	2	
5	11305	Adjust cushion	1	
6	12304	Return tube	2	
7	12306	Platen	2	
8	12303	Ball nut	1	

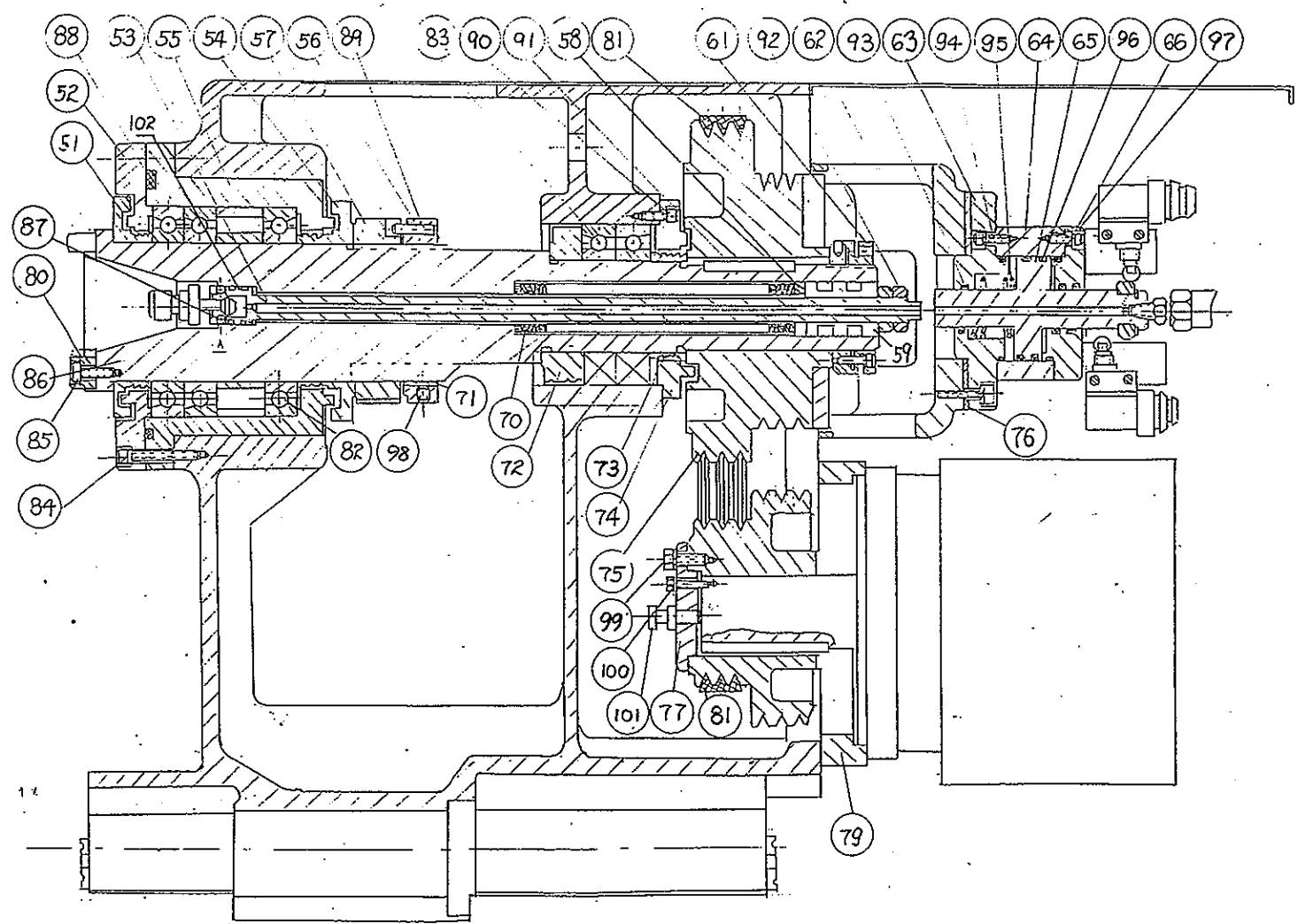
5. Z AXIS BALL SCREW				
NO.		NAME	Q'TY	REMARKS
1	13301	Y axis ball screw	1	
2	12801	Seal ring	2	
3	12302	Ball Nut	1	
4	12307	Key	2	
5	11305	Adjust cushion	1	
6	12304	Return tube	2	
7	12306	Platen	2	
8	12303	Ball nut	1	



6. SPINDLE HEAD			
NO.	NAME	Q'TY	REMARKS
1	Cuent diverter	1	
2	Supporting plate	1	
3	Louver	1	
4	Spindle case	1	
5	Lid	2	
6	Cooling seal	1	
7	Louver	4	
8	Plate	1	
9	Label of button	1	
10	Lid	1	
11	Cover	1	
12	Supporting plate	1	
13	Resistance fixed plate	1	
14	Bearing Plate	1	
15	Supporting plate	1	
16	Supporting plate	1	
17	Supporting plate	1	
18	Small Pedestal	1	
19	Small Pedestal	1	
20	T-Slot screw	2	
21	Bearing plate	1	
22	Adjust nut	1	

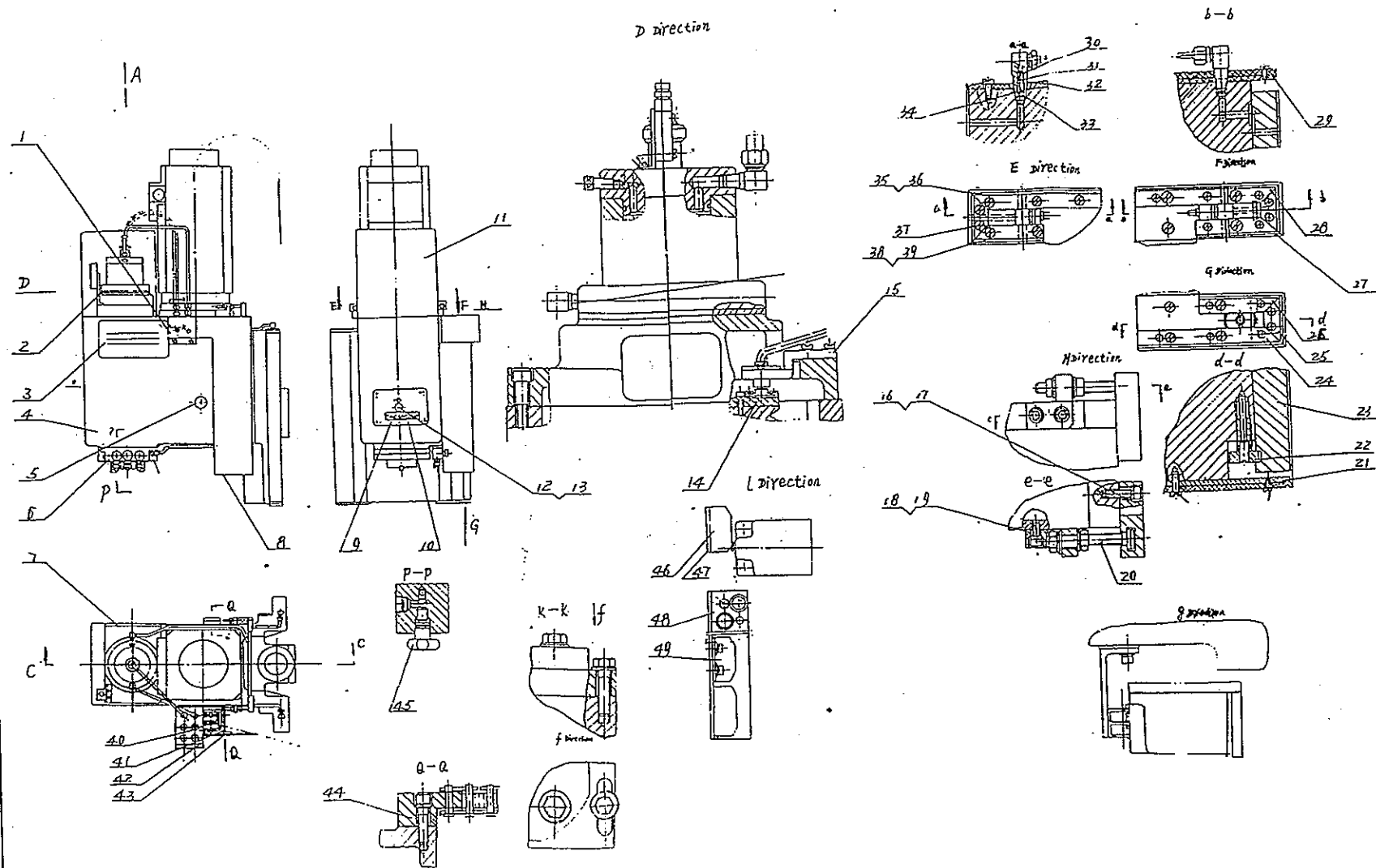
NO.	NAME	Q'TY	REMARKS
23	Gib	1	
24	Strike-off board	1	
25	Strike-Off board	1	
26	Strike-off board	1	
27	Strike-off board	1	
28	Strike-off board	1	
29	Bearing plate	1	
30	Plug	2	
31	O-ring Seat	2	
32	Protecting sheet	2	
33	Plug	2	
34	Pipe coupling	2	
35	Strike- off board	1	
36	Strike- off board	1	
37	Strike- off board	2	
38	Strike- off board	1	
39	Strike- off board	1	
40	Straight pipe coupling	1	
41	Support	1	
42	Plate	1	
43	Plate	1	
44	Chain supporting plate	2	
45	Handle	3	
46	Overtravel bag	2	





NO.	NAME	Q'TY	REMARKS
70	Spring	108	
71	Pressure block	1	
72	Seal Bush	1	
73	Sleeve	1	
74	Flange	1	
75	Bell pulley	1	
76	Adjust cushion	1	
77	Flange	1	
78	Bell pulley	1	
79	Motor base	1	
80	Positioning key	1	
81	Ban Flexscrum Type#SE/ 8M1040 TIMING BELT	1	
82	Bearing 80x130x116	3	
83	Bearing 75x115x40	2	
84	M10x25 Hex Screw	6	
85	M15x25 Hex Screw	1	
86	Spindle	1	
87	Steel Ball 0.125 o1/4	4	
88	Fillet	1	
89	Pin o5x20	1	
90	Screw M8	6	
91	Key 12x80	1	

92	Nut M16x1.5	2
93	O-Ring	1 set
94	Screw M8 x 25	4
95	Spring	1
96	O-Ring	1 set
97	Half round screw M6x12	4 pcs
98	Set Screw M6 x 10	1
99	Hex screw M6 x 15	4
100	Hex screw M5 x30	3
101	Screw Nut M8 x25	1 set

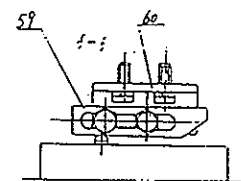
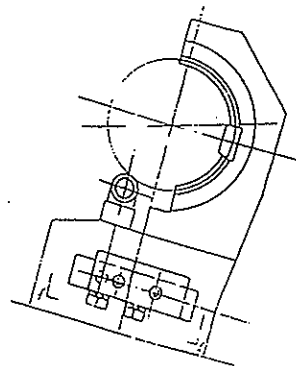
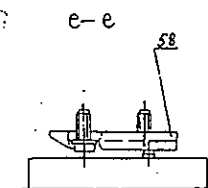
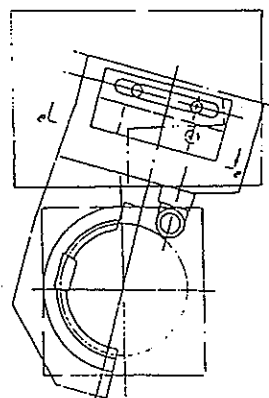


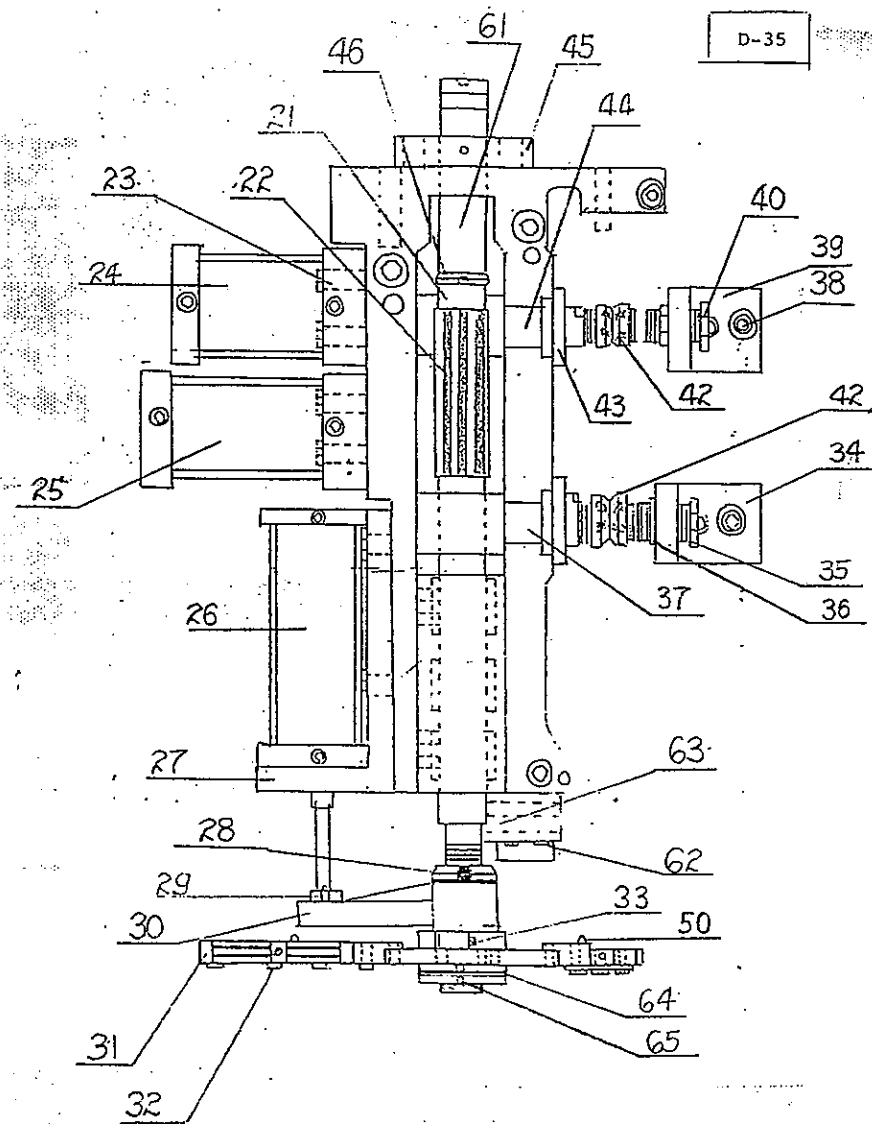
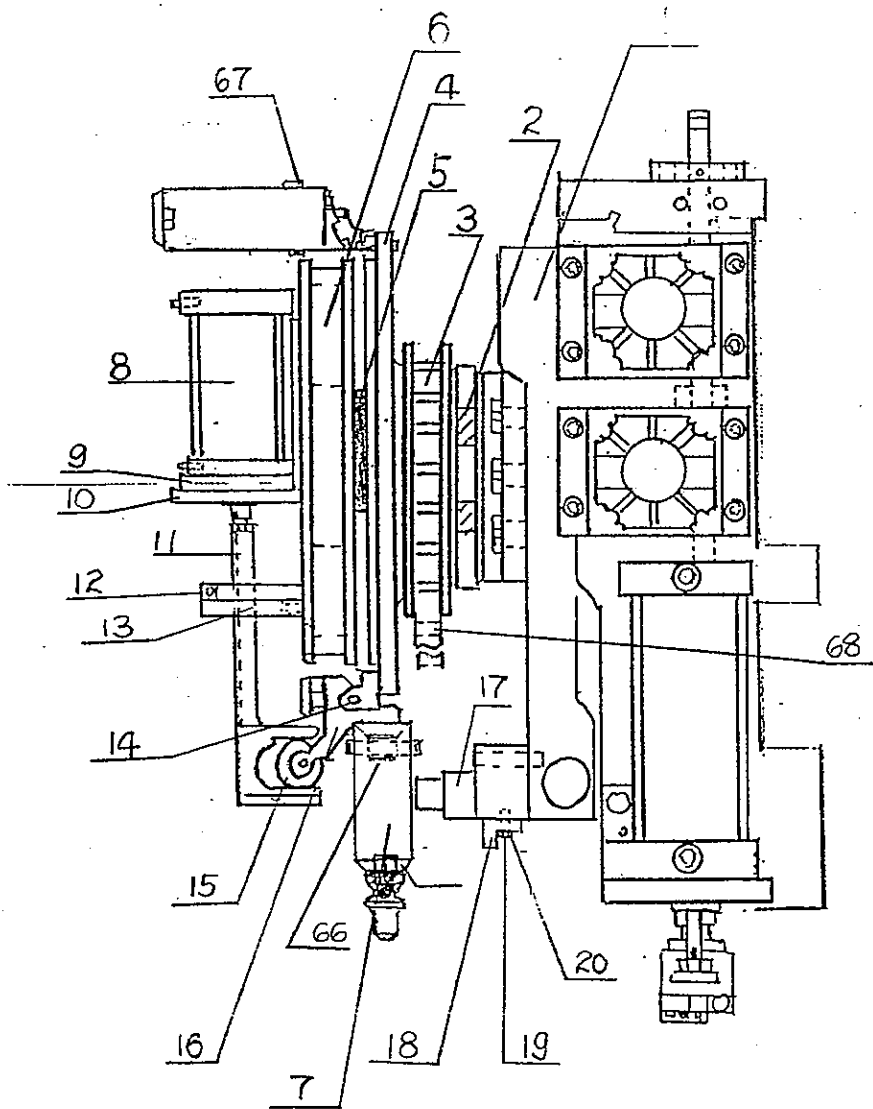
7. AUTOMATIC TOOL CHANGER			
NO.	NAME	Q'TY	REMARKS
1	Foundation Mounting	1	
2	Screw	8	
3	Pully	1	
4	Rotating Plate	1	
5	Adjustment Plate	1	
6	Alignment Plate	1	
7	Tool Pot	20	
8	Tool Pot Air Cylinder	4	
9	Adjusting Plate	1	
10	Air Cylinder Mounting Base	1	
11	Shaft	1	
12	Supporting Plate	2	
13	Supporting Plate	1	
14	Hinge	1	
15	Roller	1	
16	Guide Plate	1	
17	Guide Plate	1	
18	Dog	2	
19	Guide Plate	2	
20	Screws M6 x 20 & M6 x 35	2 each	
21	Sleeve	1	

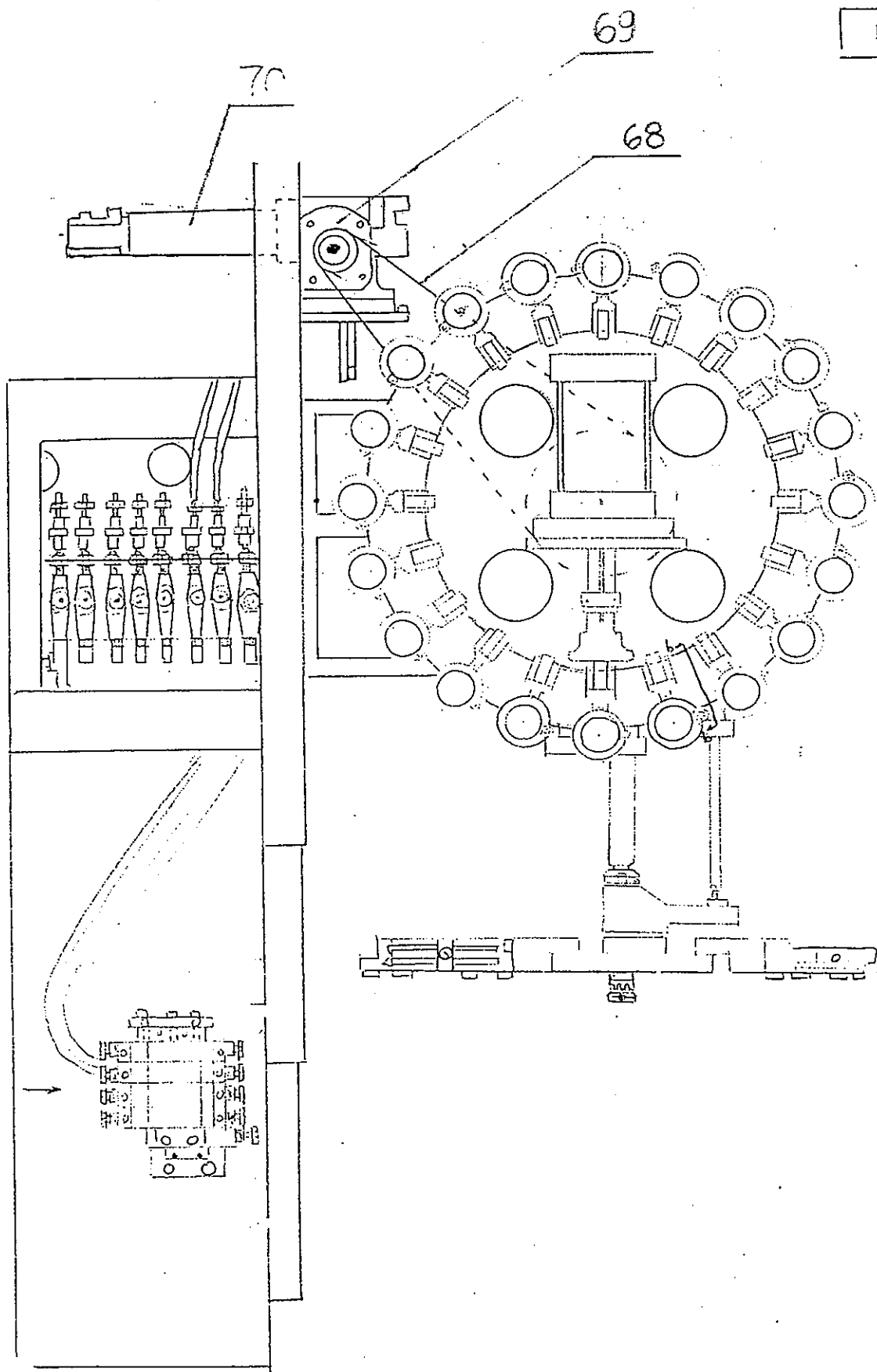
NO.	NAME	Q'TY	REMARKS
22	Gear	2	
23	Screw M10 x 15	4	
24	Air cylinder for 75 degrees	1	
25	Air Cylinder for 180 degrees	1	
26	Arm Up/down air cylinder	1	
27	Supporting plate	1	
28	Nut	1	
29	Hex Nut	4	
30	Support Block	1	
31	Jaw Block	1	
32	screw M6 x16	6	
33	Screw	1	
34	180 degrees stopper	1	
35	180 degrees stopper adj screw	1	
36	Nut	1	
37	180 degrees gear rack	1	
38	Hex screw M12 x 40	4	
39	75 degrees stopper	1	
40	75 degrees stopper adj screw	3	
41	Nut	2	
42	Nut	1	
43	Gear rack supporting block	1	

NO.	NAME	Q'TY	REMARKS
44	75 degrees Gear rack	3	
45	Alignment lock nut	3	
46	Nut and set screw	1 set	
47	Jaw	2	
48	Key	2	
49	Arm	1	
50	Top pin	2	
51	Gland	2	
52	Pin	2	
53	Roller	4	
54	Washer	4	
55	Shaft	2	
56	Circlip with shaft	2	
57	Jaw block	2	
58	Dog	1	
59	Dog	1	
60	Guide plate	1	
61	ATC spindle	1	
62	Screw M6x20, M6x35	2 each	
63	Dog	1	
64	Lock washer	1	
65	Lock Nut	2	
66	Sleeve	1	

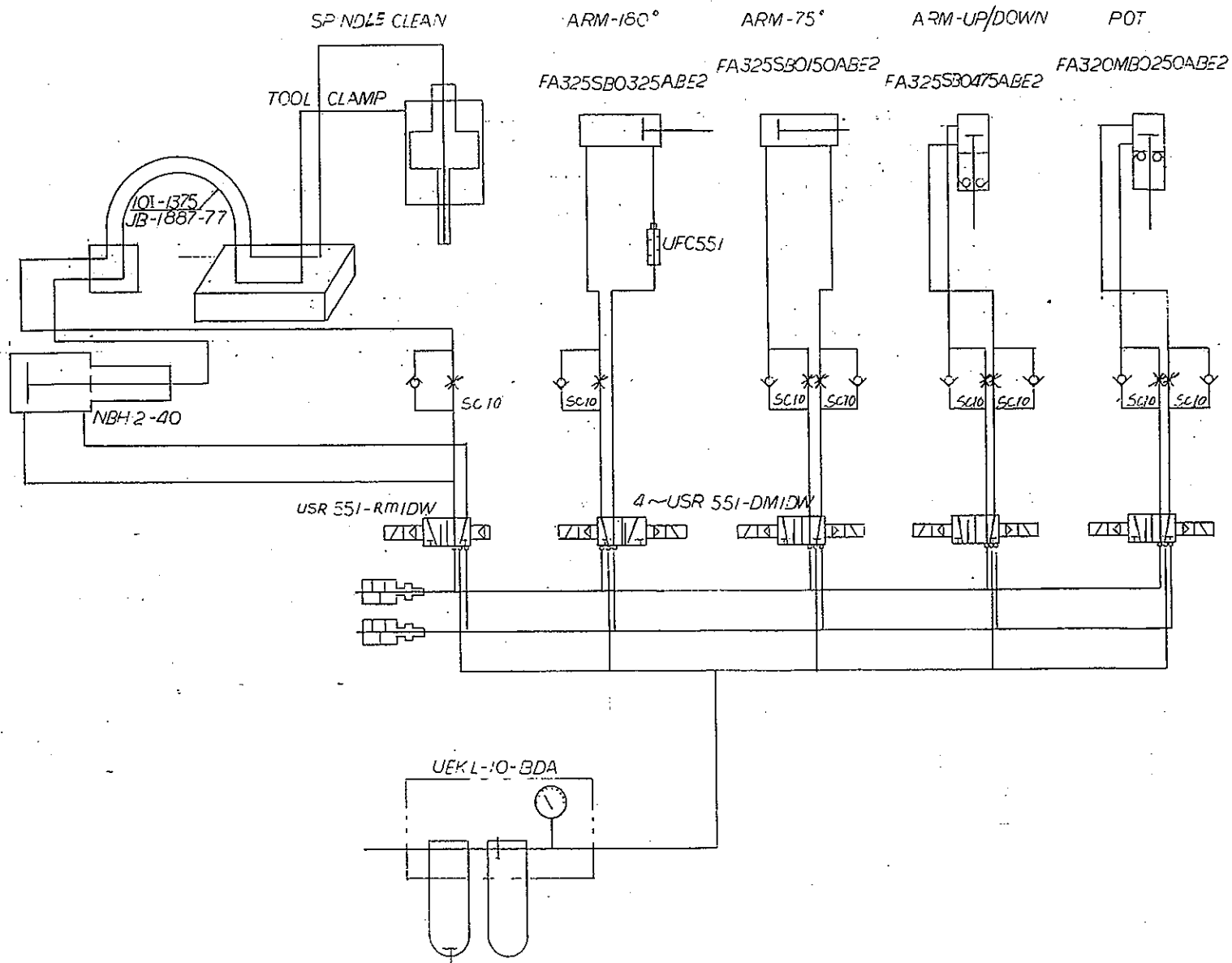
NO.	NAME	Q'TY	REMARKS
67	Adjusting screw	1	
68	Timing Belt	1	
69	Gear Box	1	
70	Servo Motor	1	

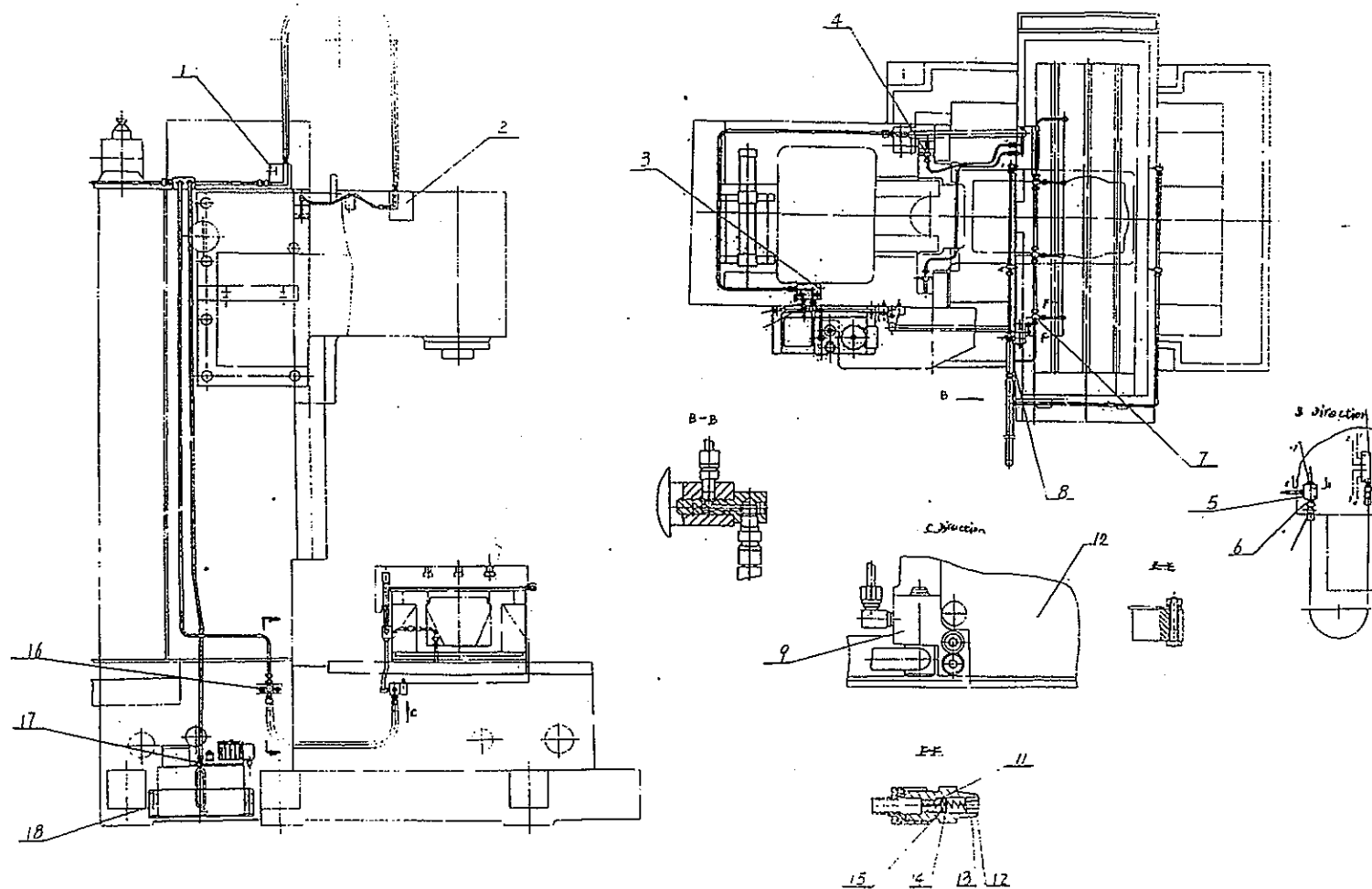






.8 LUBRICATING PIPING DIAGRAM			
NO.	NAME	Q'TY	REMARKS
1	Oil separator	1	
2	Current divider	1	
3	Oil separator	1	
4	Pipe coupling	2	
5	Oil separator	1	
6	Pipe coupling	2	
7	Three-way pipe coupling	3	
8	Bottom plate	1	
9	Fitting	1	
10	Guide strip	2	
11	Plug	4	
12	Plug	4	
13	pipe coupling	4	
14	Protecting sheet	4	
15	O-ring seat	4	
16	Fitting	1	
17	pipe coupling	1	
18	Support of oil box	1	



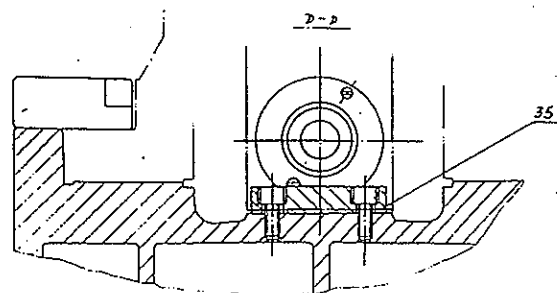
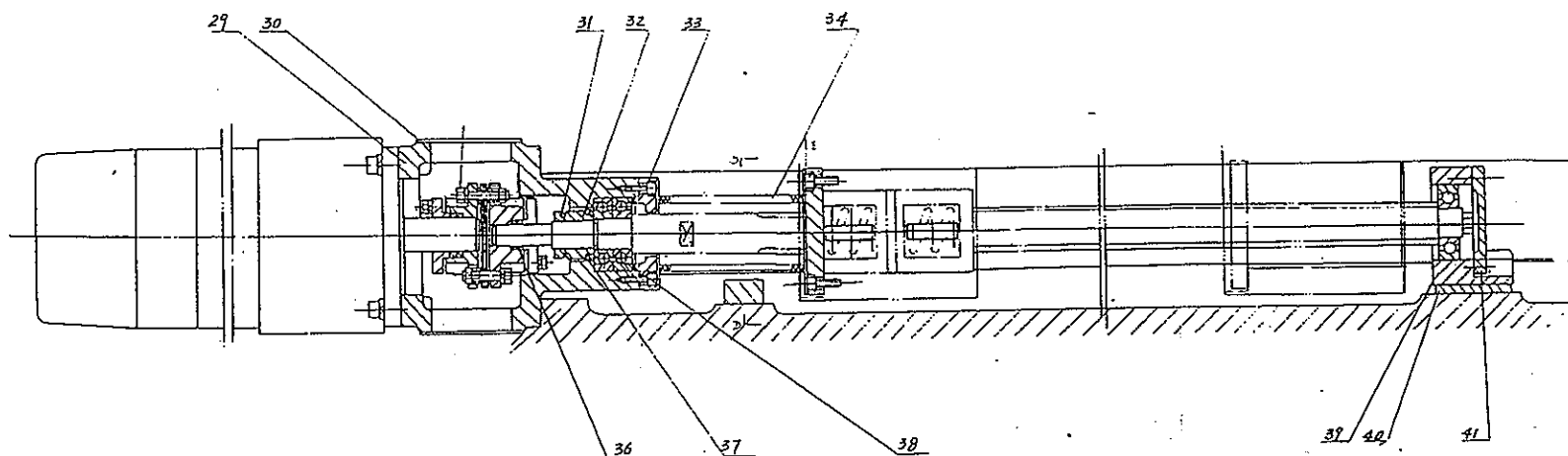


2. COLUMN			
NO.	NAME	Q'TY	REMARKS
1	Top cover	1	
2	Column	1	
3	Platen	1	
4	Supports	4	
5	Switch stock	1	
6	Back gland plate	1	
7	Upper foot-treadle	1	
8	Lid for Line Feed	1	
9	Press brake	4	
10	Down foot treadle	1	
11	Angle conical pipe coupling	2	
12	Jointed sleeve	3	
13	Nut	3	
14	Bottom plate	1	
15	Oil seperator	1	
16	Counter weight	1	
17	Left weight support	1	
18	Box for line feed	1	
19	Right weight support	1	
20	Angle Pipe coupling	1	
21	Angle Pipe coupling	1	

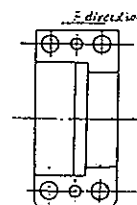
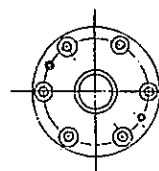
NO.	NAME	Q'TY	REMARKS
22	Oil seperator	1	
23	screw	2	
24	Chain wheel	4	
25	Chain wheel	4	
26	Spacer bush	8	
27	Pivot	4	
28	Angle corical pipe coupling	1	
29	Case	1	
30	Lid	2	
31	Nut	1	
32	Nut	1	
33	Flange	1	
34	Extensible cover set	1	
35	Dog	1	
36	Coupling	1 set	
37	Sketeton type rubber oil	1	
38	Spacer washer	1	
39	Bearing bracket	1	
40	Adjustable cushion	1	
41	Flange	1	
42	Plate guard		
43	plate guard	1	
44	Plate guard	1	

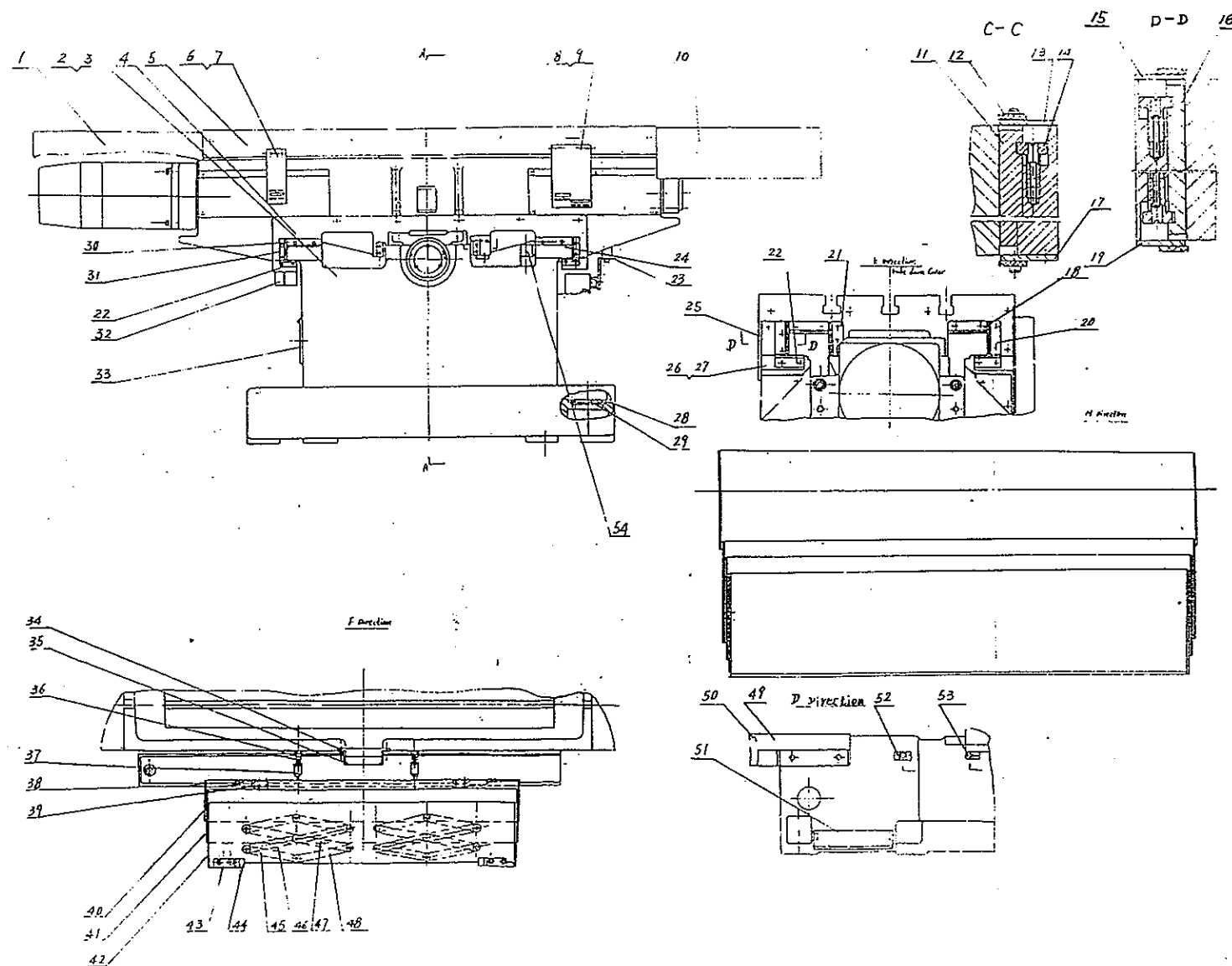
NO.	NAME	Q'TY	REMARKS
45	Plate guard	1	
46	Rubber strip	1	
47	Rubber strip	2	
48	Rubber strip	4	
49	Plate guard with block	8	
50	Motor Seat	1	
51	Screw	4	
52	Screw	4	
53	Counter Balance Weight	1	
54	Screw	2	
55	Pipe Line Connector	2	
56	Pipe Line connector	1	
57	Pipe Line	1 set	
58	Screw	4	
59	Clamp	2	
60	Screw	4	
61	Pine Line	1 set	
62	Pine line connector	1	
63	Oil regulating distributor	1	
64	Dust Cover	1	
65	Spring Washer	2	
66	Screw	4	
67	Oil filling	2	
68	Connector	2	

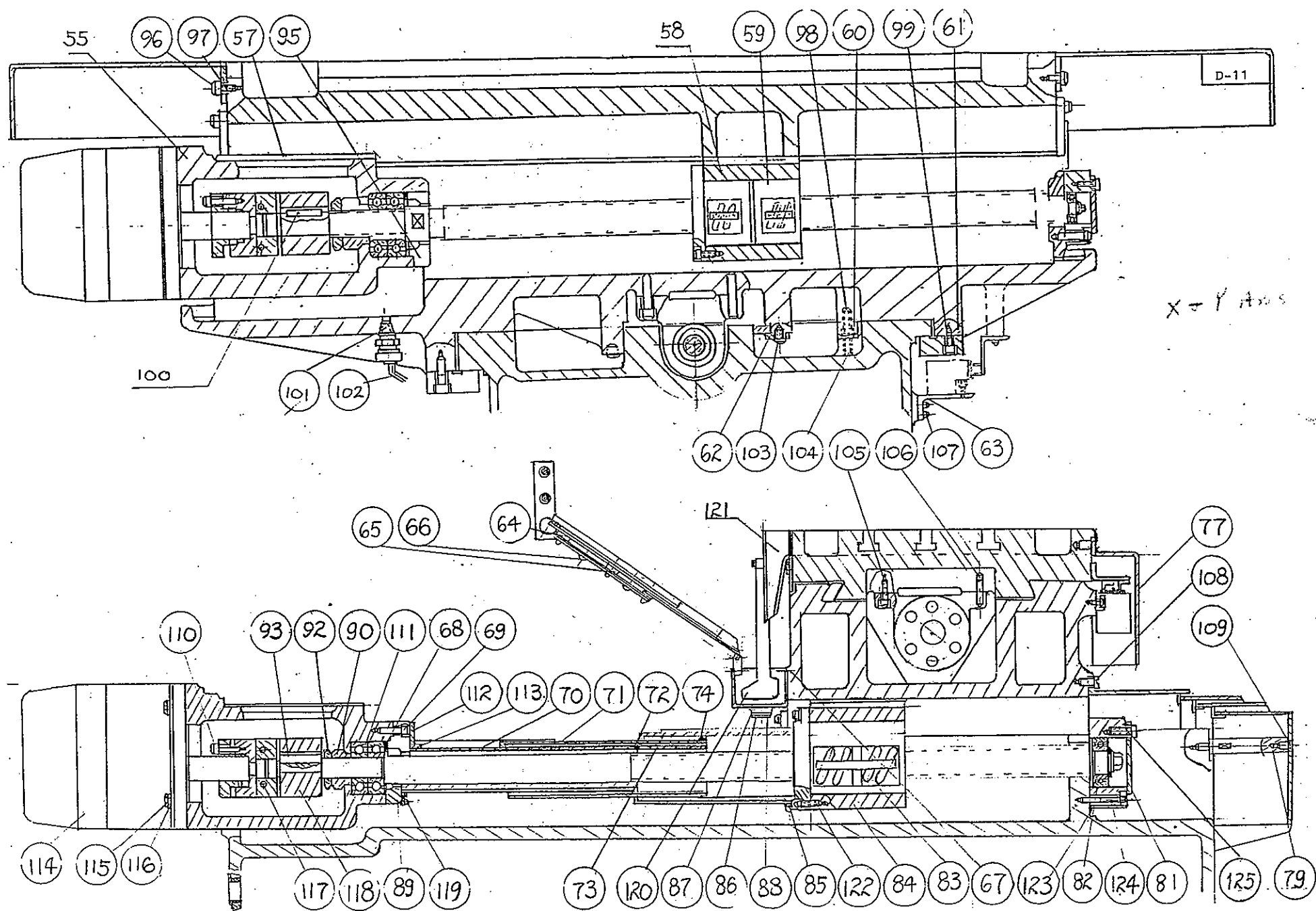
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E-E







PARTNER 7

ELECTRICAL DRAWINGS

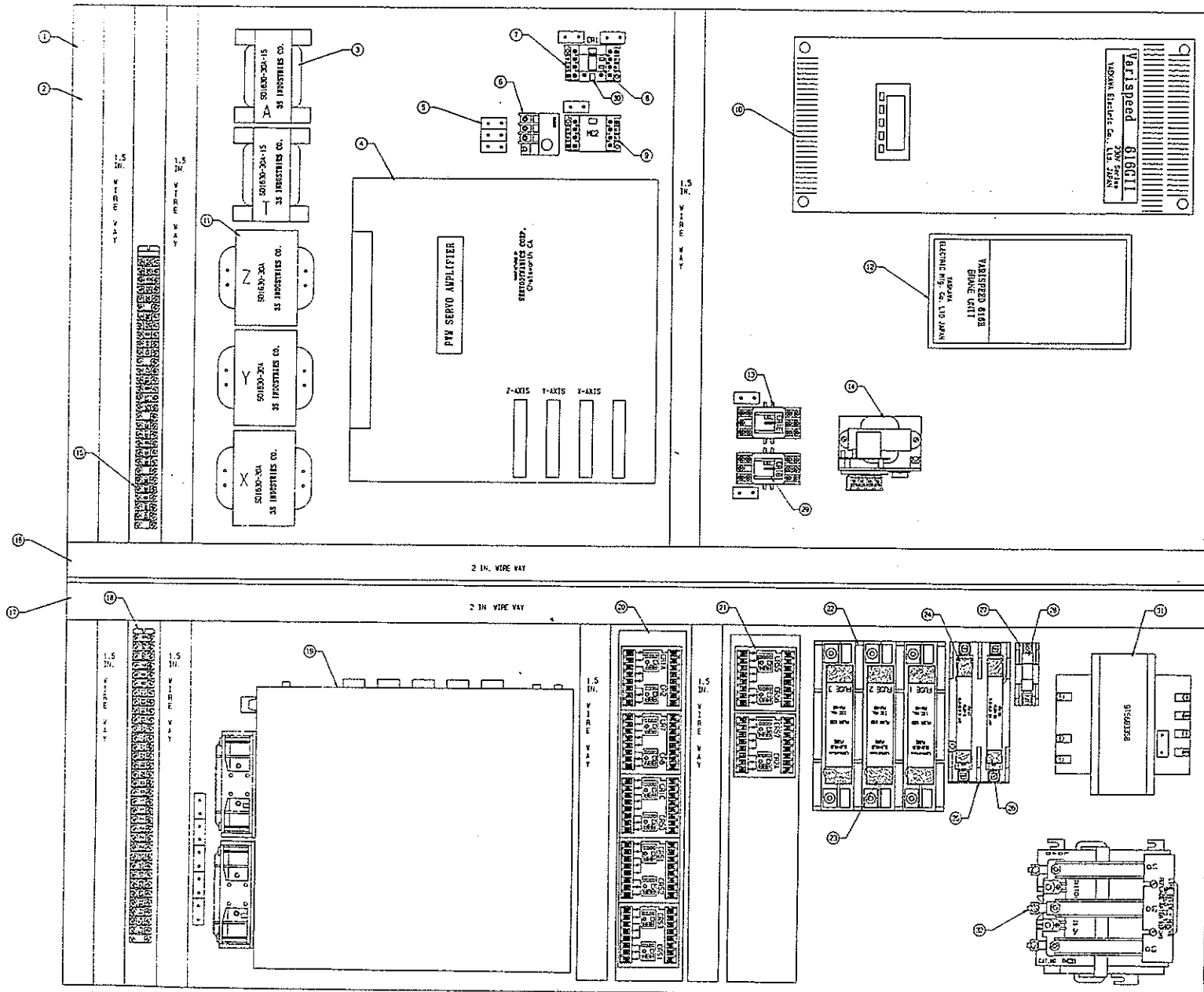
Partner 7D Manual Drawing Index
04 January 1991

<u>P7cm</u>	<u>Drawing #</u>	<u>Pg</u>	<u>Rv</u>	<u>Description</u>
2,001	6-03-020-002	0	0	Mag Panel Assy
2,002	6-06-020-033	0	0	AC System Wire C5
2,003	6-06-020-034	1	A	DC System Wire C5
2,004	6-06-020-034	2	A	DC System Wire C5
2,005	6-06-020-012	0	A	Motor Encoder Interface
2,006	6-06-020-017	1	D	Rem Tool Change Panel Assy
2,007	6-06-020-018	0	B	SD4-3060 3 Axis Drive Amp
2,008	6-06-020-002	1	0	Solenoid Loc./Air Line Map
2,009	6-04-020-001	2	A	Interconnect Box Cable-Table
2,010	6-02-020-000	0	0	Axis Servo Motor Assy
2,011	6-02-020-002	0	0	Tool Changer Motor Assy
2,012	6-06-018-030	0	0	24 VDC Power Supply
3,001	6-10-004-008	2	0	Card Cage Electronics Assy
3,002	6-10-004-008	3	0	Card Cage Electronics Assy
3,003	6-10-004-008	4	0	Card Cage Electronics Assy
3,004	6-10-004-008	5	0	Card Cage Electronics Assy
3,005	6-10-004-001	0	0	Fnt Panel SW. & Cont /FNT
3,006	6-10-004-002	0	0	Fnt Panel SW. & Cont /REV
4,001	6-00-018-030	0	0	Bt-Flange Retention Knob
4,002	6-00-018-031	0	A	V-Flange Retention Knob

PARTNER 7 TERMINAL BLOCK LISTING

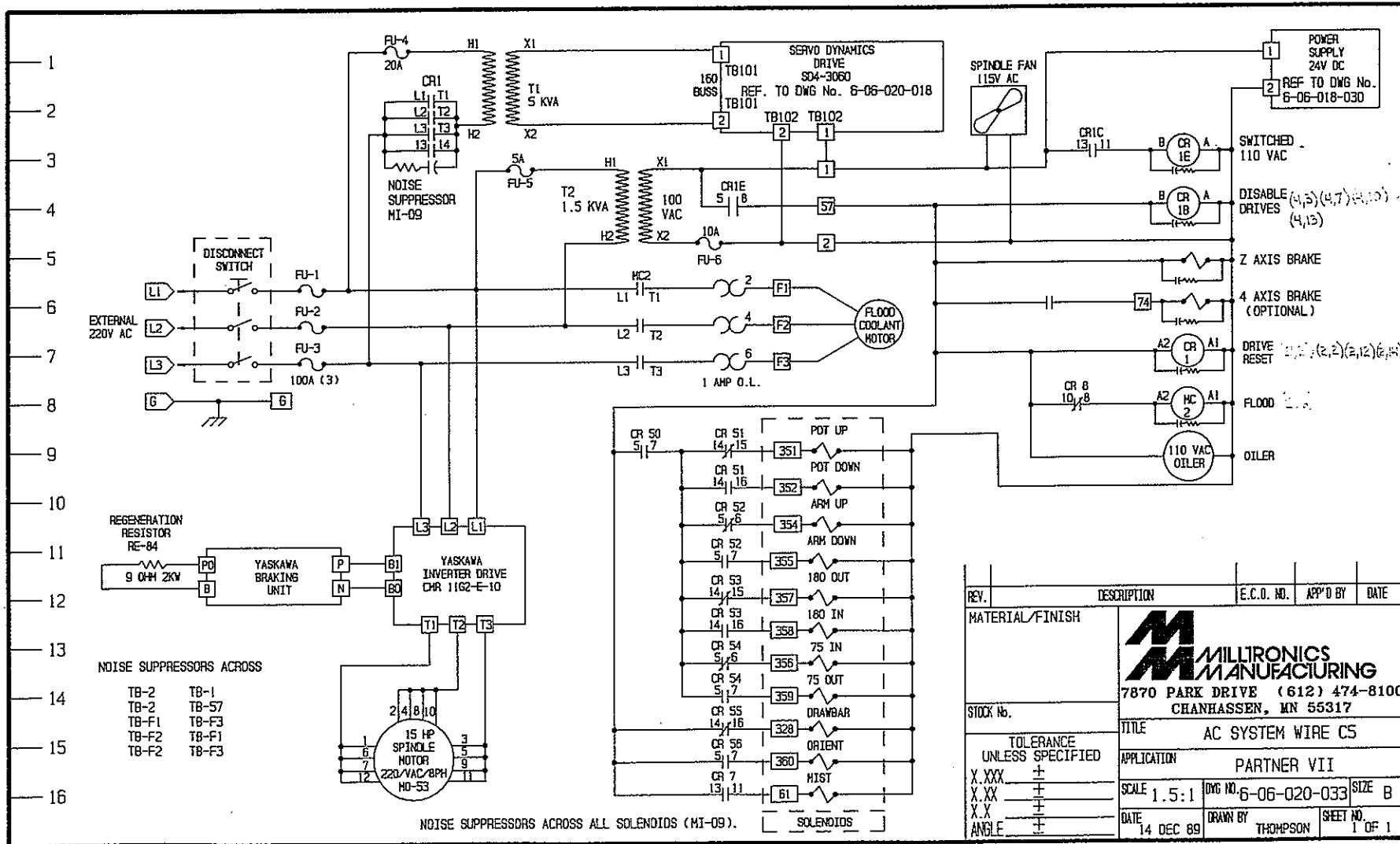
NUMBER	DESCRIPTION
G	CHASSIS GROUND
F1	3 PHASE FLOOD PUMP
F2	3 PHASE FLOOD PUMP
F3	3 PHASE FLOOD PUMP
1	110VAC HOT
2	110VAC RETURN
6	X-AXIS OTL/SPINDLE FAULT CONTACTS
6A	SPINDLE FAULT CONTACTS/FLOOD FAULT CONTACTS
6B	FLOOD FAULT CONTACTS/AIR LOSS CONTACTS
6C	AIR LOSS CONTACTS/REMOTE E-STOP
6D	REMOTE E-STOP
7	X-AXIS OTL/Y-AXIS OTL
8	Y-AXIS OTL/Z-AXIS OTL
9	Z-AXIS OTL
12	24VDC
13	CONTACT COMMON SPARE M-FUNCTION
14	N.O. CONTACT SPARE M-FUNCTION
15	N.C. CONTACT SPARE M-FUNCTION
22	DC GROUND
29	X-AXIS TACH (+)
30	X-AXIS TACH (-)
35	X-AXIS ARMATURE (+)
36	X-AXIS ARMATURE (-)
38	Y-AXIS TACH (+)
39	Y-AXIS TACH (-)
44	Y-AXIS ARMATURE (+)
45	Y-AXIS ARMATURE (-)
47	Z-AXIS TACH (+)
48	Z-AXIS TACH (-)
53	Z-AXIS ARMATURE (+)
54	Z-AXIS ARMATURE (-)
57	SWITCHED 110VAC
61	SPRAY MIST SOLENOID
74	4TH AXIS BRAKE OPTION
129	CARROUSELL TACH (+)
130	CARROUSELL TACH (-)
135	CARROUSELL ARMATURE (+)
136	CARROUSELL ARMATURE (-)
138	4TH AXIS TACH (+)
139	4TH AXIS TACH (-)
144	4TH AXIS ARMATURE (+)
145	4TH AXIS ARMATURE (-)

NUMBER	DESCRIPTION
328	INTERCONNECT BOX (DRAWBAR SOLENOID)
351	INTERCONNECT BOX (TOOL POT UP SOLENOID)
352	INTERCONNECT BOX (TOOL POT DOWN SOLENOID)
354	INTERCONNECT BOX (TOOL ARM UP SOLENOID)
355	INTERCONNECT BOX (TOOL ARM DOWN SOLENOID)
356	INTERCONNECT BOX (ARM 75 IN SOLENOID)
357	INTERCONNECT BOX (ARM 180 OUT SOLENOID)
358	INTERCONNECT BOX (ARM 180 IN SOLENOID)
359	INTERCONNECT BOX (ARM 75 OUT SOLENOID)
360	INTERCONNECT BOX (ORIENT PIN SOLENOID)
375	INTERCONNECT BOX (TOOL POT UP LIMIT)
376	INTERCONNECT BOX (TOOL POT DOWN LIMIT)
377	INTERCONNECT BOX (TOOL ARM UP LIMIT)
378	INTERCONNECT BOX (TOOL ARM DOWN LIMIT)
379	INTERCONNECT BOX (ARM 75 OUT LIMIT)
380	INTERCONNECT BOX (ARM 75 IN LIMIT)
381	INTERCONNECT BOX (ARM 180 IN LIMIT)
382	INTERCONNECT BOX (ARM 180 OUT LIMIT)

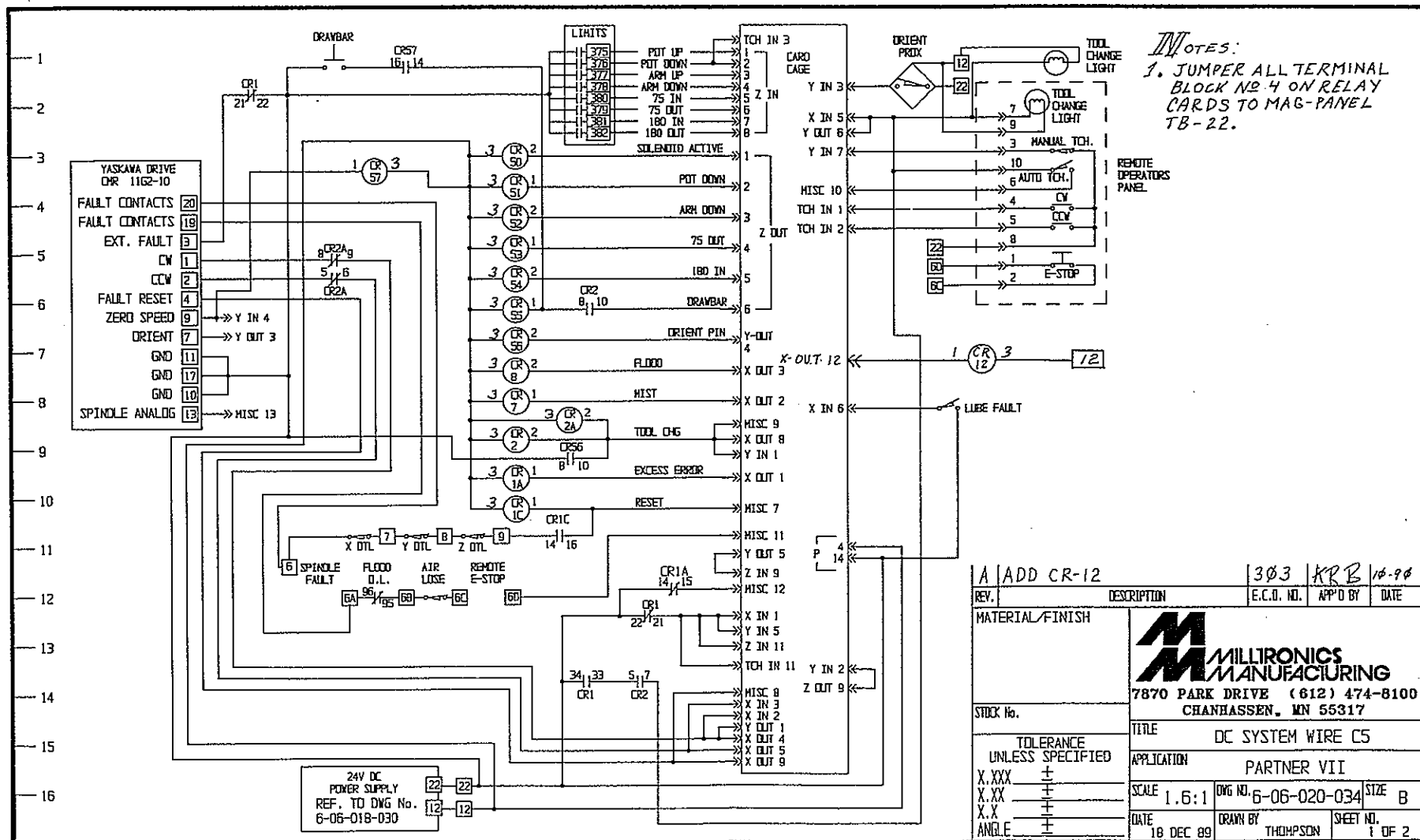


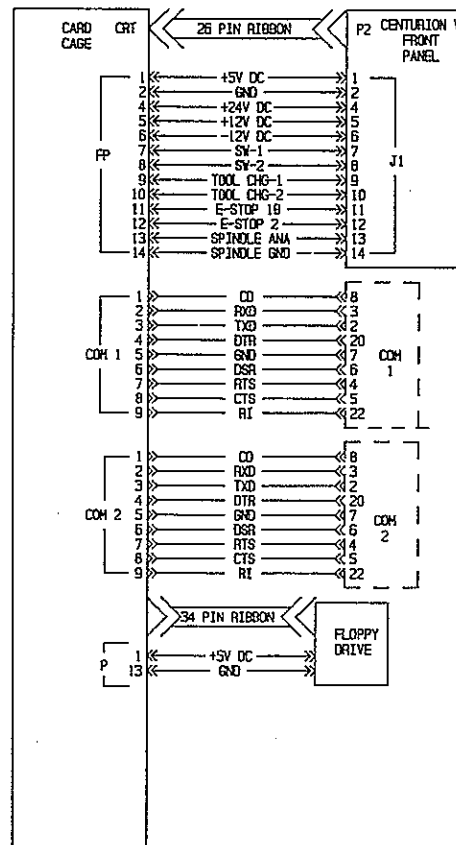
No.	QTY	STOCK No.	DESCRIPTION
1	3	W-101	WIRE TRACT 11.5 x 11.5 LG 6
2	3	W-102	WIRE TRACT 11.5 x 11.5 LG 6
3	1	14-12	RELAY-15 100V/15 AMP
4	1	AP-21	AMP 21 20/50/100/200
5	14	AL-02	AL-02 SUPPLY 220 V
6	1	RL-46	RELAY OVERLOAD 3 AMP CHANCE
7	1	RL-24	CONTACTOR AMP CHANCE
8	1	RL-30	CONTACTOR AMP CHANCE
9	1	RL-23	CONTACTOR AMP CHANCE
10	1	PS-15	POWER SUPPLY 15T-37-120
11	3	14-10	RELAY-10 100V/10 AMP
12	1	PS-18	YACAMA BRKING MOD. CH-15H
13	2	RL-05	RELAY BRKING MOD. CH-15H
14	1	RL-05	24V POWER SUPPLY
15	57	TR-01	TERMINAL BLOCK 1000
16	8	W-103	WIRE TRACT 11.5 x 11.5 LG 6
17	8	W-104	WIRE TRACT 11.5 x 11.5 LG 6
18	2	TR-02	TERMINAL BLOCK 1000
19	1	RL-02	RELAY BRKING MOD. CH-15H
20	2	RL-34	CONTACTOR 10-248
21	7	RL-07	RELAY BRKING MOD. CH-15H
22	1	RL-48	10-1000V FUSE BLOCK 3 POS.
23	1	RL-49	10-100V FUSE BLOCK 3 POS.
24	1	RL-47	10-100V FUSE BLOCK 3 POS.
25	1	RL-15	10-100V FUSE BLOCK 3 POS.
26	1	RL-36	10-100V FUSE BLOCK 3 POS.
27	1	RL-45	10-100V FUSE BLOCK 3 POS.
28	1	RL-02	RELAY BRKING MOD. CH-15H
29	2	RL-05	RELAY BRKING MOD. CH-15H
30	1	RL-29	CONTACTOR AMP CHANCE
31	1	RL-05	RELAY BRKING MOD. CH-15H
32	1	RL-21	10-100V FUSE BLOCK 3 POS.
33	1	RL-64	10-100V FUSE BLOCK 3 POS.

REV.	DESCRIPTION	DATE	BY
MATERIAL FINISH			
MILITRONICS MANUFACTURING			
7070 PARK DRIVE 10121 474-6100			
CHANDLER, IN 45517			
ITEM No.	DESCRIPTION	DATE	BY
1	PAG PANEL ASSY		
2	PARITER VII		
3	SCALE 1:1		
4	DATE 20 MAR 90		
5	DESIGNER		
6	DRWING		
7	1 OF 1		

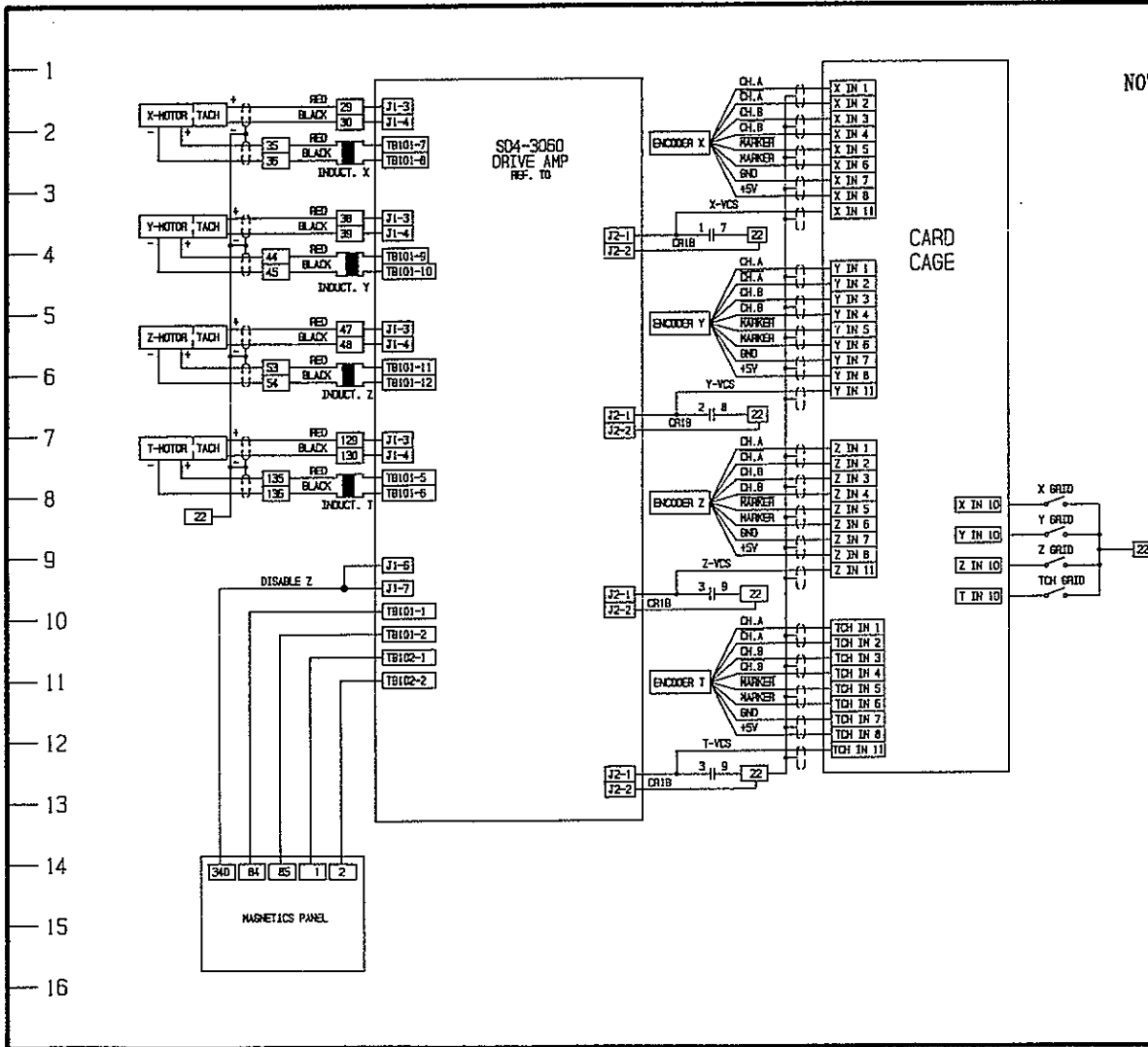


REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XXX ±			
	X.XX ±			
	X.X ±			
	ANGLE ±			
	MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317			
	TITLE	AC SYSTEM WIRE CS		
	APPLICATION	PARTNER VII		
	SCALE 1.5:1	DWG NO. 6-06-020-033	SIZE B	
	DATE 14 DEC 89	DRAWN BY THOMPSON	SHEET NO. 1 OF 1	



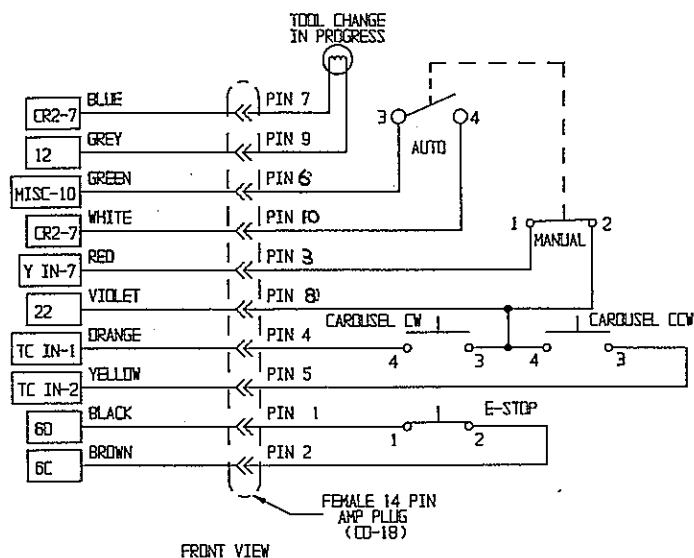


A ADD CR-12		303	KB	10/90
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK No.		TITLE DC SYSTEM WIRE CS		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER VII		
X.XXX	±	SCALE 1.6:1		DWG NO. 6-06-020-034
X.XX	±	DATE 18 DEC 89		SHEET NO. 2 OF 2
X.X	±	DRAWN BY THOMPSON		
ANGLE	±			

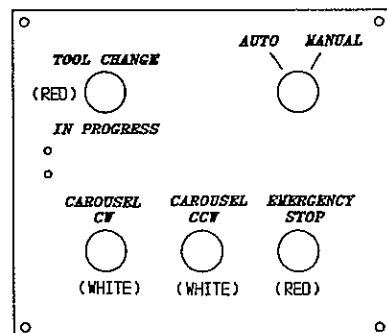


NOTES:
1. TOOL CHANGE SERVO DRIVE USE
1525/10 160 VDC DRIVE CARD.

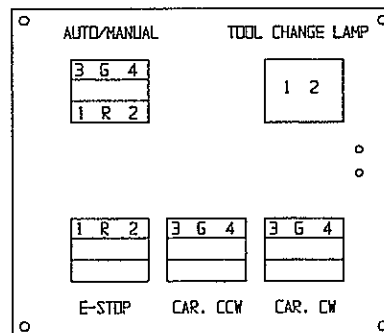
A	REF. TO E.C.O.	135	M.F.	3/90
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLIRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK No.		TITLE MOTOR/ENCODER INTERFACE		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER VII		
X.XXX	±	SCALE 2:1		DWG NO. 6-06-020-012
X.XX	±	DATE 6 FEB 89		SIZE B
X.X	±	DRAWN BY REUTER		SHEET NO. 1 OF 1
ANGLE	±			



FRONT VIEW



BACK VIEW



Notes...

1. REF. TO DWG No. 6-10-020-004 FOR ASSEMBLY INSTRUCTIONS.
2. USE 18 GA. WIRE FOR SWITCH INTERCONNECT.

D REF. TO E.C.O. 297 K.R. 10/90

C	DRAWING ENHANCEMENTS	264	M.F.	8/90
B	REFERENCE TO ECO PAPERWORK	131	M.F.	3/90
A	REGENERATE TO CAD		M.F.	2/89
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE

MATERIAL/FINISH

MILLITRONICS MANUFACTURING
7870 PARK DRIVE (612) 474-8100
CHANHASSEN, MN 55317

STOCK No.

TITLE REM. TOOL CHANGE PANEL ASSY.

TOLERANCE
UNLESS SPECIFIED

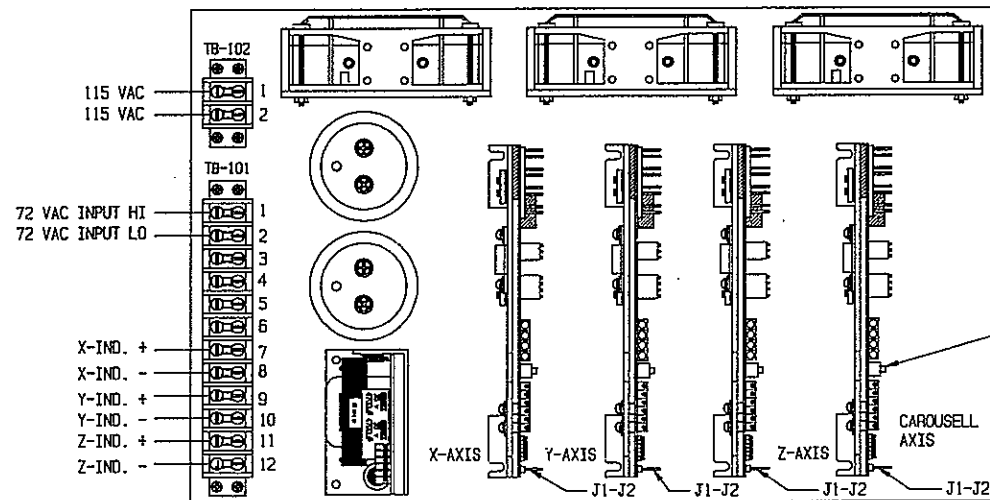
X.XXX ±
X.XX ±
X.X ±
ANGLE ±

APPLICATION PARTNER VII

SCALE 1:1 DWG NO. 6-06-020-017 SIZE B

DATE 3 JUNE 88 DRAWN BY REUTER SHEET NO. 1 OF 1

SERVODYNAMICS AXIS AMPLIFIER
SD4-3060
INTERIOR VIEW



ADDITIONAL DRIVE CARD
FOR CAROUSELL AXIS
SERVODYNAMICS 1525-10
STOCK No. AM-01

DRIVE INSTALLATION DATA

1	1	DIFFERENTIAL INPUT 1
2	2	DIFFERENTIAL INPUT 2
3	1	AUXILLIARY
4	2	SIGNAL
5	3	TACH.
6	4	SIG. COMMON
7	5	CURRENT MONITOR
8	6	N.O. RT. LIMIT SW.
9	7	N.O. LT. LIMIT SW.
10	8	REMOTE SHUTDOWN
11	9	COMMON
12	10	+15 VDC
13	11	COMMON
14	12	-15 VDC
15	13	REMOTE RESET
16	14	N.C. RT. LIMIT SW.
17	15	N.C. LT. LIMIT SW.

	RESISTANCE READINGS ON SERVO AMPLIFIER BOARDS
X-AXIS:	SIGNAL-3.36K TACH-4.78K COMPENSATION-685K
Y-AXIS:	SIGNAL-3.33K TACH-5.31K COMPENSATION-635 Ω
Z-AXIS:	SIGNAL-5K TACH-7K COMPENSATION-777 Ω
CAROUSELL AXIS	SIGNAL-7.7K TACH-5.3K COMPENSATION-1.13K

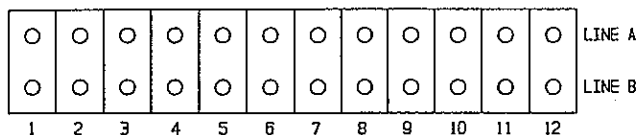
NOTES: 'A/B' JUMPER MUST BE IN 'B' POSITION
FOR DIFFERENTIAL VELOCITY INPUT
STOCK No. AM 2

- 18 PIN MOLEX

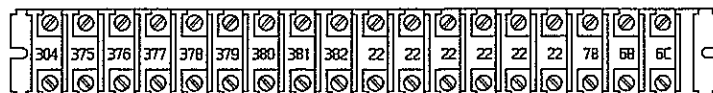
B	ADD CAROUSELL AXIS	136	M.F.	4/90
A	REGENERATE TO CAD		M.F.	2/89
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLIRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK No.		TITLE SD4-3060 3 AXIS DRIVE AMP		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER VII		
X.XXX	±	SCALE 3:1	DWG NO. 6-06-020-018	SIZE B
X.XX	±	DATE 31 MAY 88	DRAWN BY REUTER	SHEET NO. 1 OF 1
X.X	±			
ANGLE	±			

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE:
TOLERANCE UNLESS SPECIFIED		 INDUSTRIAL INFORMATION CONTROLS 7870 PARK DRIVE CHLAUGASSEN, MN 55317 (612-474-8100)		
X.XXX	±	TITLE: SOLENOID LOC./AIR LINE MAP APPLICATION: PARTNER VII		
X.XX	±			
X.X	±			
ANG F	±			
MATERIAL/FINISH		SCALE 1.75:1	DWG NO. 6-06-020-002	SIZE B
		DATE: 23 DEC 88	DRAWN BY REUTER	SHEET NO. 1 OF 1

NOISE SUPPRESSORS (MI-09)



TERMINAL BLOCKS (MP-1) UPPER ROW



TERMINAL BLOCKS (MP-2) BOTTOM ROW

TERMINAL BLOCK INTERCONNECT

TB No. LABEL	CABLE SIGNAL	TB No. LABEL	CABLE SIGNAL
328	POWER DRAWBAR SOL.	304	CARDUSEL GRID
351	TOOL POT UP SOL.	375	TOOL POT UP LIMIT SW.
352	TOOL POT DOWN SOL.	376	TOOL POT DOWN LIMIT SW.
360	SPDL ORIENT SOL.	377	ARM UP LIMIT SW.
354	ARM UP SOL.	378	ARM DOWN LIMIT SW.
355	ARM DOWN SOL.	379	ARM 75° OUT LTH. SW.
2	110 VAC LOW (COM)	380	ARM 75° IN (RETURN) L.S.
357	ARM 180° OUT	22	24 VDC (COM) LIMIT SW.
358	ARM 180° IN (RETURN)	382	ARM 180° OUT LIMIT SW.
359	ARM 75° OUT	381	ARM 180° IN (RETURN) L.S.
356	ARM 75° IN (RETURN)	68	LID AIR PRESS. L.S. N/C
61	SPRAY MIST	6C	LID AIR PRESS. L.S. N/C
57	AUTO-LUBE PUMP	78	LUBE FAULT LIMIT SW.
74	4th-AXIS SILENCIO		

NOISE SUPPRESSOR INTERCONNECT

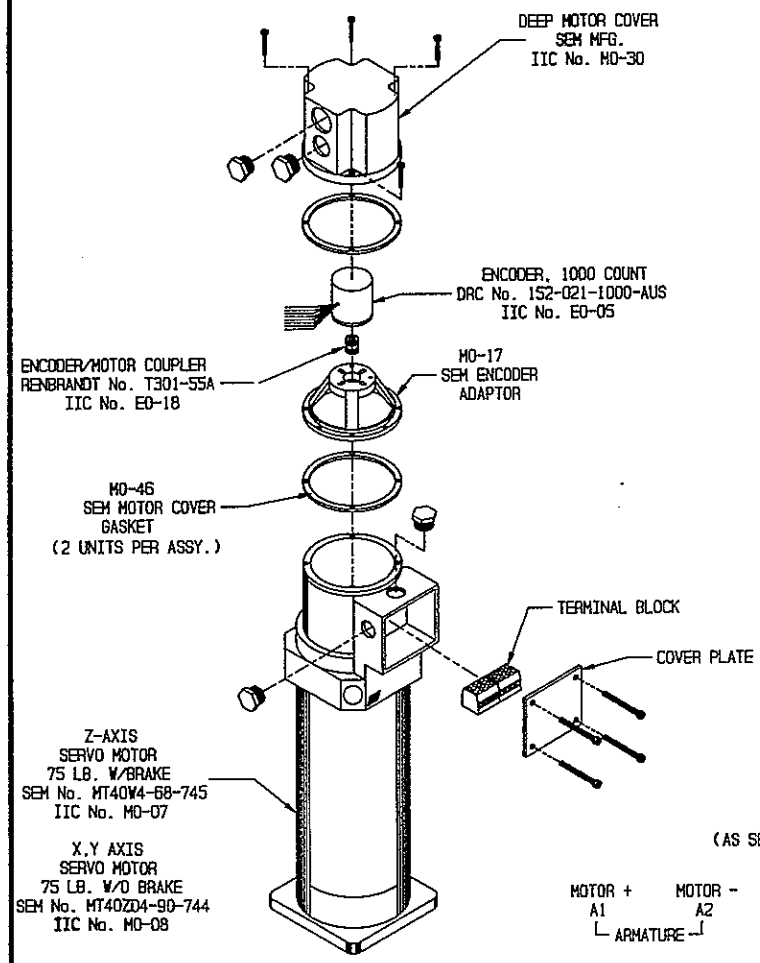
No./LINE B	TB No.
1	328
2	351
3	352
4	354
5	355
6	356
7	357
8	358
9	359
10	360
11	361
12	74

BUSS LINE A TO TB-2
ALL NOISE SUPPRESSORS

NOTES...

1. NOISE SUPPRESSOR No 12 IS FOR 4th-AXIS OPTION.

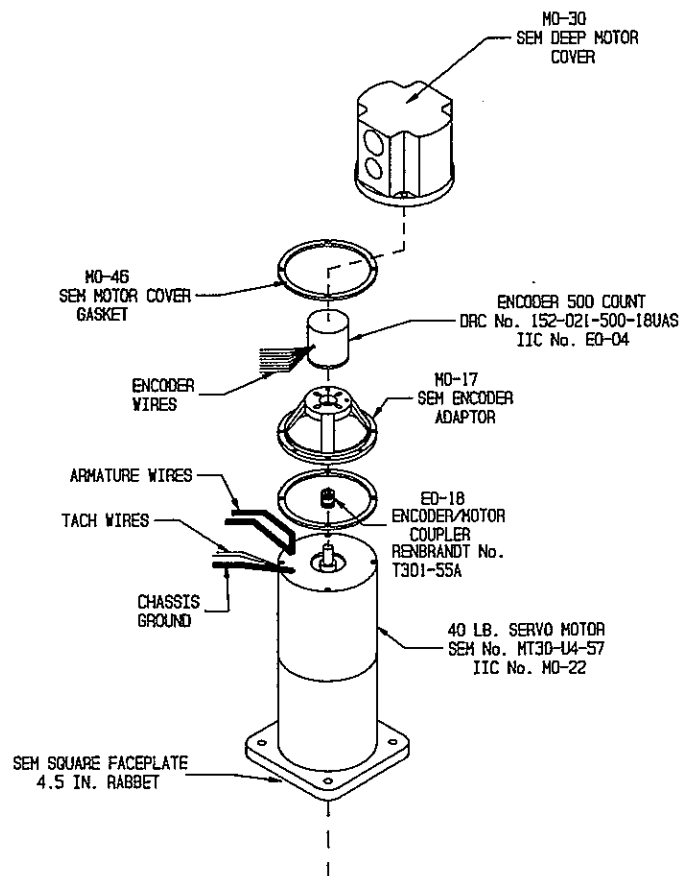
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
A	REF TO ECO	133	M.F.	3/90
MATERIAL/FINISH		 MILLIRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK No.		TITLE INTERCONNECT BOX CABLE-TABLE		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER VII		
X.XXX	±	SCALE 1.5:1	DWG NO. 6-04-020-001	SIZE B
X.XX	±	DATE 10 SEP 88	DRAWN BY REUTER	SHEET NO. 2 OF 2
X.X	±			
ANGLE	±			



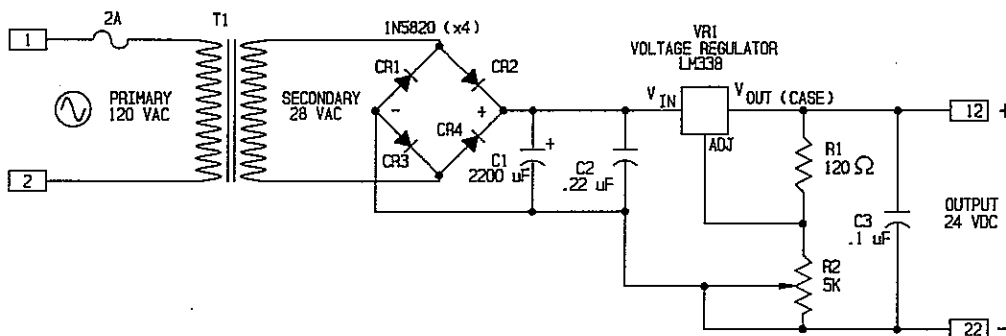
TERMINAL BLOCK LEGEND
(AS SEEN ON INSIDE OF COVER PLATE)
CW ROTATION DRIVE END

MOTOR +	MOTOR -	TACH +	TACH -		BRAKE +	BRAKE -
A1	A2	T1	T2	K1 K2	B1	B2
└ ARMATURE ─┘		└ TACH ─┘		└ T/O ─┘	└ BRAKE ─┘	

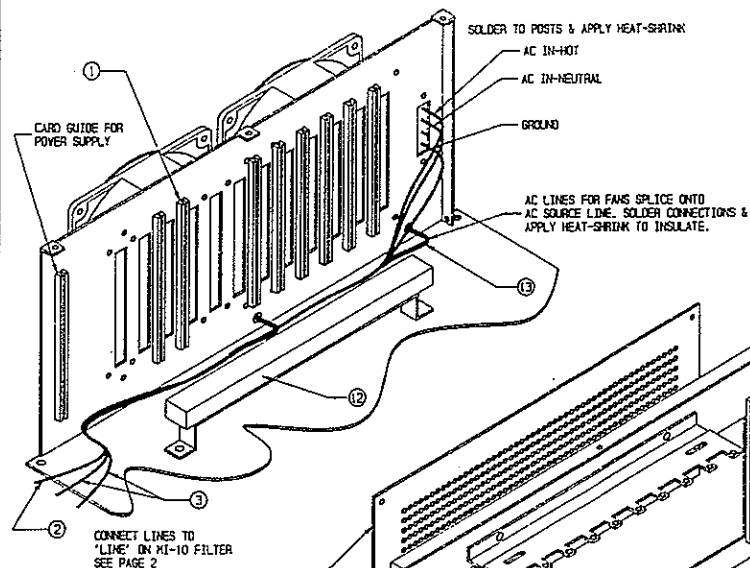
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE:
TOLERANCE UNLESS SPECIFIED		 INDUSTRIAL INFORMATION CONTROLS 7070 PARK DRIVE CHARLSTON, NH 05517 (612-474-8100)		
X.XXX	±			
X.XX	±			
X.X	±			
ANGLE	±			
TITLE:		AXIS SERVO MOTOR ASSY.		
APPLICATION:		PARTNER VII		
MATERIAL/FINISH		SCALE	DWG NO.	SIZE
		5:1	6-02-020-000	B
		DATE: 20 FEB 89	DRAWN BY REUTER	SHEET NO. 1 OF 1



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE:
TOLERANCE UNLESS SPECIFIED X.XXX $\pm$ X.XX $\pm$ X.X $\pm$ ANGLE $\pm$				
INDUSTRIAL INFORMATION CONTROLS 7870 PARK DRIVE CHARLASSON, NH 05517 (612-474-8100)				
TITLE: TOOL CHANGER MOTOR ASSY.				
APPLICATION: PARTNER VII				
MATERIAL/FINISH		SCALE 5:1	DWG NO. 6-02-020-002	SIZE B
		DATE: 21 FEB 89	DRAWN BY: REUTER	SHEET NO. 1 OF 1



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK No.				
TOLERANCE UNLESS SPECIFIED		TITLE 24 VDC POWER SUPPLY		
X.XXX ±		APPLICATION GENERAL PRODUCTS		
X.XX ±		SCALE 1:1	DWG NO. 6-06-018-030	SIZE B
X.X ±		DATE 29 SEP 89	DRAWN BY REUTER	SHEET NO. 1 OF 1
ANGLE ±				



COMPONENTS OF ASSEMBLY

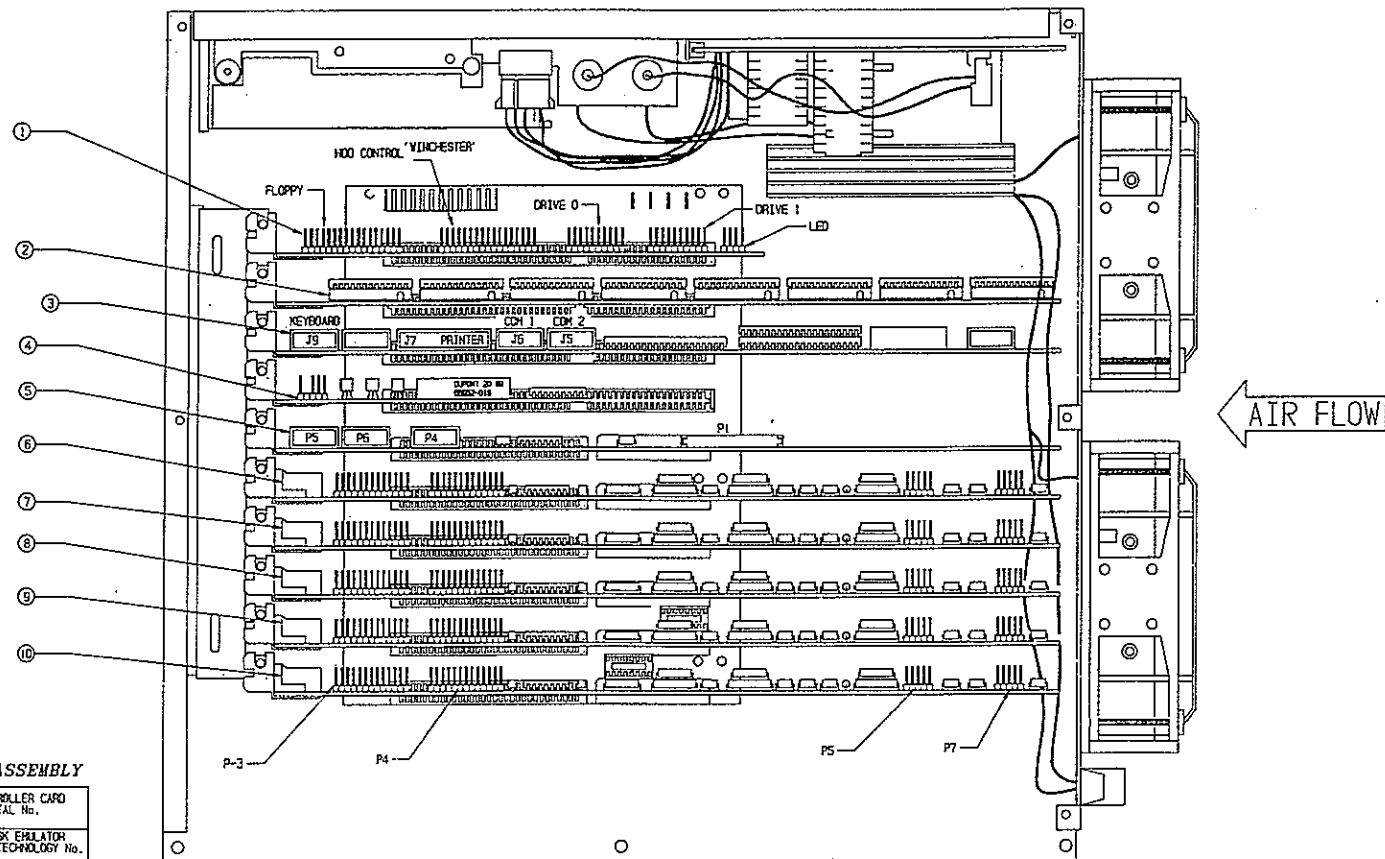
1	CC-12	CARD GUIDE UNITRAX GV-7000
2	VC-05	WIRE, GREEN, 18 GA. DEARBORNE No. 171819 GRN
3	VC-07	WIRE, RED, 18 GA. DEARBORNE No. 171819 RED
4	PL-35	CARD CAGE ACCESS PANEL REF. TO DWS. No. 6-01-004-021
5		POWER SUPPLY PANEL SEE PAGE 2
6	BR-50	UPPER CARD MOUNT BRACKET REF. TO DWS. No. 6-01-004-027
7	BD-37	PASSIVE BACKPLANE (PLANAR) DIVERSIFIED TECHNOLOGY COP 10-EL
8		CARD CAGE INTERFACE PANEL SEE PAGE 1
9	TB-19	TERMINAL BLOCK, 4 POST HARSHEN No. 202104

10	FA-01 -AND- FA-04	COOLING FAN TRW No. A47815A1S3 FAN GRILLE VFG 473
11	WH-37	CARD CAGE FRAME REF. TO DWS. No. 6-01-004-024
12	WX-109	FOAM CARD REST 1-1/2 x 3/4 AUSTIN HARDWARE No. P8500

Notes.....

- PASSIVE BACKPLANE MOUNTS WITH SIX 6-32 UNC x 1 PHMS PHILIPS HEAD & 6-32 UNC NYLON NUTS. STAND OFF WITH No. 6 x 9/16 NYLON SPACERS (SP-151).
- TB-19 MOUNTS WITH TWO 6-32 UNC x 1/4 PHMS SLOTTED.
- USE EIGHT 6-32 UNC x 1-1/4 PHMS SLOTTED TO MOUNT FANS.
- CUT CARD GUIDES TO 4-1/2 IN. SOME MAY BE CUT TO OTHER LENGTHS TO FIT.
- WHEN FINISHED, STICK A 'USA FLAG' LABEL. (L8-20), ON TOP OF CARD CAGE LID.
- USE WIRE TIES (WX-01) TO HARNESS LOOSE WIRES IN THE CARD CAGE.
- CARDS MOUNT ON UPPER CARD MOUNT BRKT. WITH 6-32 UNC x 3/8 PHMS.
- ACCESS PANEL, INTERFACE PANEL & LID MOUNT WITH 6-32 UNC BMS.
- UPPER CARD MOUNT BRACKET MOUNTS WITH TWO 6-32 UNC PHMS SLOTTED & No. 6 INT. STAR WASHERS.

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MILLERONICS MANUFACTURING 7870 PARK DRIVE (812) 474-8100 CHANBASSEN, MN 55317				
STOCK NO.				
TITLE CARD CAGE ELECTRONICS ASSY.				
APPLICATION CENTURION V				
SCALE 2.125:1				
DATE 15 FEB 90				
DRAWN BY REUTER				
SHEET NO. 3 OF 3				

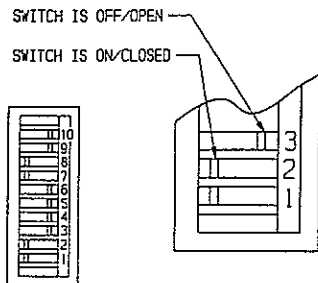


COMPONENTS OF ASSEMBLY

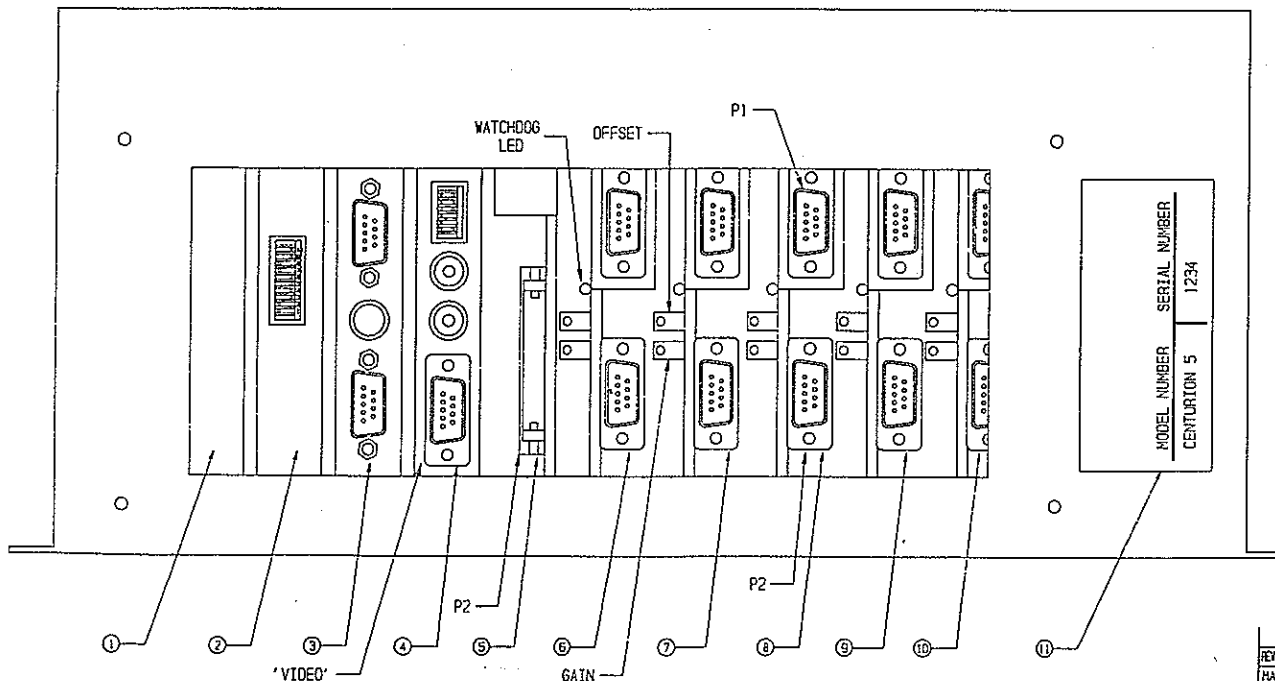
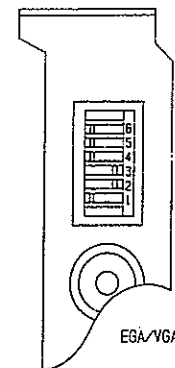
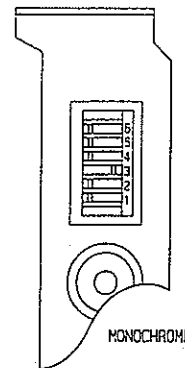
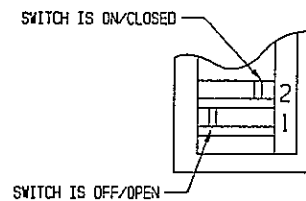
1	80-39	HDD/FDD CONTROLLER CARD WESTERN DIGITAL No. WD-10039-952
2	80-38	CDIS HARD DISK EMULATOR DIVERSIFIED TECHNOLOGY No. DPR 804
3	80-36	286-18MHz CPU CARD DIVERSIFIED TECHNOLOGY No. CAT 200
4	80-35	ENHANCED GRAPHICS ADAPTOR PARADISE AUTOSWITCH EGA 250
5	80-33	ACROLOOP CONTROLLER PC-ACR-01 VER. 1.0 6-07-004-003
6	80-22	ACROLOOP AXIS COMPUTER PC-ACR-184-03 X-AXIS
7	80-22	ACROLOOP AXIS COMPUTER PC-ACR-184-03 Y-AXIS
8	80-22	ACROLOOP AXIS COMPUTER PC-ACR-184-03 Z-AXIS
9	80-22	ACROLOOP AXIS COMPUTER PC-ACR-184-03 4th-AXIS OPTION
10	80-22	ACROLOOP AXIS COMPUTER PC-ACR-184-03 TOOL CHANGER OPTION

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH				
 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317				
STOCK No.				
TITLE CARD CAGE ELECTRONICS ASSY.				
APPLICATION CENTURION V				
SCALE 1.5:1 (Dwg No. 6-10-004-008) SIZE C				
DATE 21 FEB 90 (SHEET NO. 4 OF 5)				
DRAWN BY REUTER				

DIP SWITCH SETTINGS FOR CMOS DISK EMULATOR CARD



DIP SWITCH SETTINGS FOR PARADISE EGA AUTOSWITCH 350



COMPONENTS OF ASSEMBLY

1	80-39	HDD/FDD CONTROLLER CARD WESTERN DIGITAL No. WD-1003V-HSC
2	80-38	CMOS HARD DISK EMULATOR DIVERSIFIED TECHNOLOGY No. DHT 804
3	80-36	280-18MHz CPU CARD DIVERSIFIED TECHNOLOGY No. CAT 900
4	80-35	ENHANCED GRAPHICS ADAPTOR PARADISE AUTOSWITCH EGA 350
5	80-33	ACROLOOP CONTROLLER PC-ACRCON-01 VER. 1.0 6-07-004-003
6	80-22	ACROLOOP AXIS COMPUTER PC-ACR-18H-03 X-AXIS
7	80-22	ACROLOOP AXIS COMPUTER PC-ACR-18H-03 Y-AXIS
8	80-22	ACROLOOP AXIS COMPUTER PC-ACR-18H-03 Z-AXIS
9	80-22	ACROLOOP AXIS COMPUTER PC-ACR-18H-03 4th-AXIS OPTION
10	80-22	ACROLOOP AXIS COMPUTER PC-ACR-18H-03 TOOL CHANGER OPTION
11	18-03	SERIAL No./MODEL No. TAG

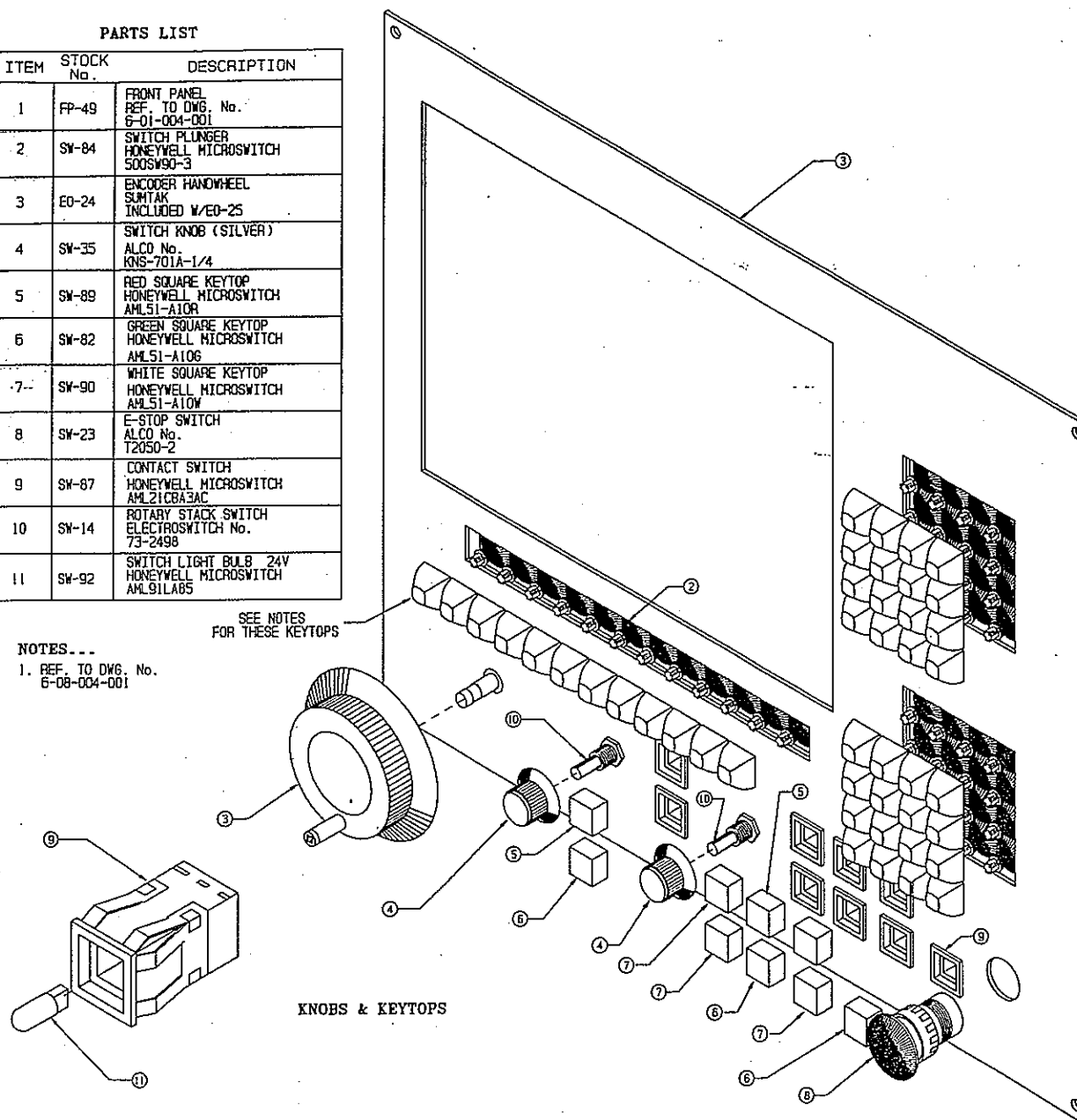
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CBANABASSEN, MN 55317				
STOCK No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	+			
X.XX	+			
X.X	+			
ANGLE	±			
TITLE CARD CAGE ELECTRONICS ASSY.				
APPLICATION CENTURION V				
SCALE 1:1	DWG NO. 6-10-004-008	SIZE C		
DATE 21 FEB 90	DRAWN BY REUTER	SHEET NO 5 OF 5		

ITEM	STOCK No.	DESCRIPTION
1	FP-49	FRONT PANEL REF. TO DWG. No. 6-01-004-D01
2	SW-84	SWITCH PLUNGER HONEYWELL MICROSWITCH 500SW90-3
3	EO-24	ENCODER HANDWHEEL SUMITAK INCLUDED W/EO-25
4	SW-35	SWITCH KNOB (SILVER) ALCO No. KNS-701A-1/4
5	SW-89	RED SQUARE KEYTOP HONEYWELL MICROSWITCH AHL51-A10R
6	SW-82	GREEN SQUARE KEYTOP HONEYWELL MICROSWITCH AHL51-A10G
7	SW-90	WHITE SQUARE KEYTOP HONEYWELL MICROSWITCH AHL51-A10W
8	SW-23	E-STOP SWITCH ALCO No. T2050-2
9	SW-87	CONTACT SWITCH HONEYWELL MICROSWITCH AML21CBA3AC
10	SW-14	ROTARY STACK SWITCH ELECTROSWITCH No. 73-2498
11	SW-92	SWITCH LIGHT BULB 24V HONEYWELL MICROSWITCH AHL91LAB5

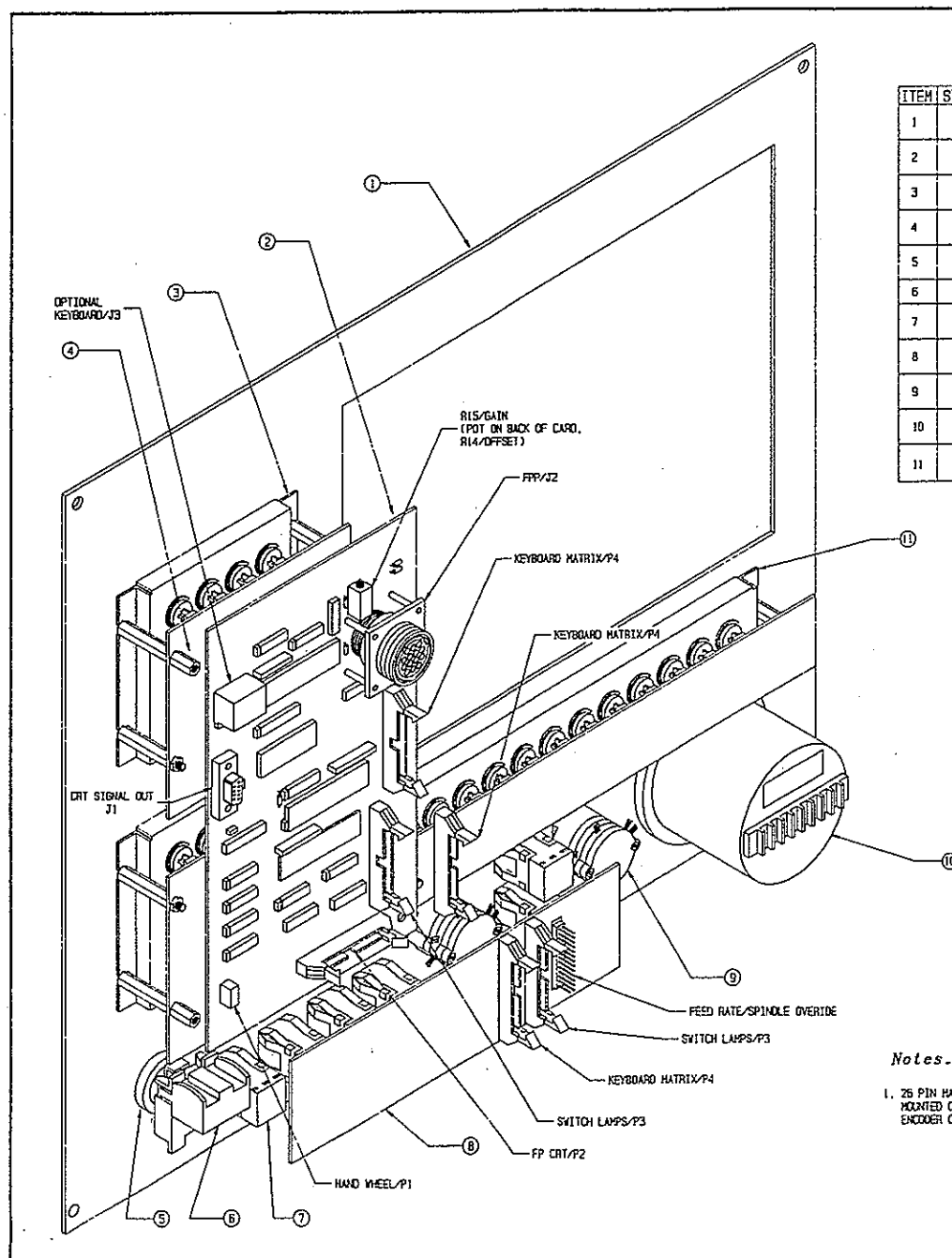
ITEM	STOCK No.	DESCRIPTION
1	FP-49	FRONT PANEL REF. TO DWG. No. 6-01-004-D01
2	SW-84	SWITCH PLUNGER HONEYWELL MICROSWITCH 500SW90-3
3	EO-24	ENCODER HANDWHEEL SUMITAK INCLUDED W/EO-25
4	SW-35	SWITCH KNOB (SILVER) ALCO No. KNS-701A-1/4
5	SW-89	RED SQUARE KEYTOP HONEYWELL MICROSWITCH AHL51-A10R
6	SW-82	GREEN SQUARE KEYTOP HONEYWELL MICROSWITCH AHL51-A10G
7	SW-90	WHITE SQUARE KEYTOP HONEYWELL MICROSWITCH AHL51-A10W
8	SW-23	E-STOP SWITCH ALCO No. T2050-2
9	SW-87	CONTACT SWITCH HONEYWELL MICROSWITCH AML21CBA3AC
10	SW-14	ROTARY STACK SWITCH ELECTROSWITCH No. 73-2498
11	SW-92	SWITCH LIGHT BULB 24V HONEYWELL MICROSWITCH AHL91LAB5

1. REF. TO DWG. No.
6-08-004-001

1. REF. TO DWG. No.
6-08-004-001



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CRYSTAL SPRING, MN 55317		
STOCK NO.	TITLE <i>INT PANEL SW. & CONT./INT</i> APPLICATION <i>CENTURION V</i>			
TOLERANCE UNLESS SPECIFIED		SCALE <i>1.5:1</i> DWG NO. <i>6-10-004-001</i> SIZE <i>C</i> DATE <i>28 SEP 81</i> DRAWN BY <i>REUTER</i> SHEET NO. <i>1 OF 1</i>		
X .XXX	±			
X .XX	±			
X .X	±			
X .X	±			
ANGLE	±			



PARTS LIST

ITEM	STOCK No.	DESCRIPTION
1	FP-49	CENTURION V FRONT PANEL REF. TO DWG. No. 6-01-004-001
2	BD-40	PC-AT85K-01 P.C. BOARD REF. TO DWG. No. 6-07-004-001
3		16x16 KEYPAD ASSY. REF. TO DWG. No. 6-10-004-000
4	SP-73	6-32 UNC 1/2 IN. HEX STANDOFF FEMALE/FEMALE KEYSTONE No. 2210
5	SV-23	E-STOP SWITCH ALCO No. 12050-2
6	SV-39	E-STOP CONTACT BLOCK, A/C ALCO No. V-40
7	SV-87	CONTACT SWITCH, LIGHTED HONEYWELL HYDROSWITCH No. AM21C8A31C
8	BD-34	PC-FPSY-01 P.C. BOARD REF. TO DWG. No. 6-07-004-000
9	SV-14	STACK POLE ROTARY SWITCH ELECTROSWITCH No. 73-2498
10	EO-25	HANDWHEEL ENCODER SUNIAK No. MON-100-S1-L
11		F-KEY KEYPAD ASSY. REF. TO DWG. No. 6-10-004-003

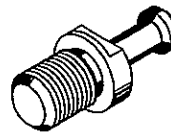
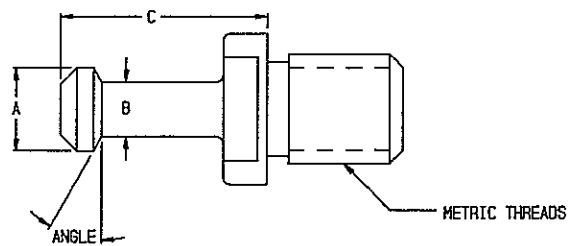
Notes...

- 26 PIN MALE RIBBON CABLE CONNECTORS MOUNTED ON PC-16x16-01 UNDER KEYBOARD ENCODER CARD ARE KEYBOARD MATRIX/P4.

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH	 MILLIRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANDLER, MN 55317			
STOCK No.	7870 PARK DRIVE (612) 474-8100 CHANDLER, MN 55317			
TOLERANCE UNLESS SPECIFIED	1.5:1			
SCALE	1.5:1			
DATE	27 NOV 83			
DRAWN BY	REUTER			
SHEET NO.	1 OF 1			

**COMMAND RETENTION KNOBS
STYLE BT-FLANGE
JAPANESE**

BT-FLANGE TAPER	PART No.	DIMENSIONS				MILLTRONICS MACHINE
		A	B	C	ANGLE	
40	RB4M-0001				45°	PARTNER VII
	RB4M-0002	.59	.39	1.38	60°	PARTNER IV & V
45	RB5M-0001	.75	.55	1.57	45°	PARTNER VII

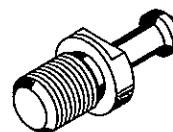
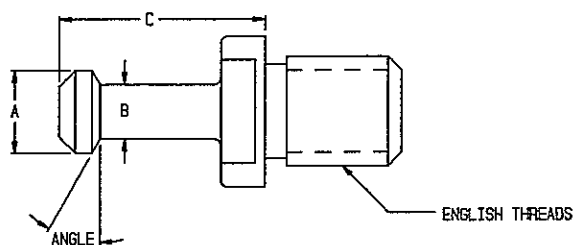


NOTES:
COMMAND CORPORATION
TEL: 1-(800)-328-2197
FAX: 1-(612)-755-1116

REV.	DESCRIPTION		E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317			
STOCK No.		TITLE BT-FLANGE RETENTION KNOB			
TOLERANCE UNLESS SPECIFIED		APPLICATION GENERAL PRODUCTS			
X.XXX	±	SCALE 1:1		DWG NO. 6-00-018-030	SIZE B
X.XX	±	DATE 1 FEB 89		DRAWN BY REUTER	SHEET NO. 1 OF 1
X.X	±				
ANGLE	±				

RETENTION KNOBS
STYLE V-FLANGE
JAPANESE

V-FLANGE TAPER	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENNMETAL PART No.	VALENITE PART No.
	A	B	C	ANGLE				
40	.59	.39	1.27	45°	PARTNER VII	RB4E-0001		
				60°	PARTNER IV & V	RB4E-0002	RK31114A	PT-532-60
30	DWG. No. 6-01-018-010				PARTNER III	MA-129		



NOTES:

COMMAND CORPORATION
TEL: 1-(800)-328-2197
FAX: 1-(612)-755-1116

30-TAPER RETENTION KNOB
IS A PRODUCT OF IIC/MILLTRONICS
REORDER PART No. MA-129

A	ADD PART #	49	M.F.	8/89
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK No.		TITLE V-FLANGE RETENTION KNOB		
TOLERANCE UNLESS SPECIFIED		APPLICATION GENERAL PRODUCTS		
X.XXX	±	SCALE 1:1	DWG NO. 6-00-018-031	SIZE B
X.XX	±	DATE 1 FEB 89	DRAWN BY REUTER	SHEET NO. 1 OF 1
X.X	±			
ANGLE	±			