

Operation Manual

Partner 2D & E

Milltronics
1400 Mill Lane
Waconia, MN 55387

www.milltronics.net

UNCRATING:

Carefully remove protective crating so that machine and parts are not marred or damaged. In the event of damage in transit, IMMEDIATELY notify the distributor from whom the machine was purchased, as well as the transportation company making delivery.

SHORTAGES:

Check shipment carefully against the itemized packing list. In case of shortages, report them IMMEDIATELY to the distributor from whom the machine was purchased.

CLEANING:

Thoroughly clean protective coating from the machine with a suitable cleaning solution.

WARNING

IT IS NOT RECOMMENDED THAT GASOLINE OR ANY OTHER HIGHLY INFLAMMABLE CLEANING AGENT BE USED.

Do not move the table, knee, saddle or ram until all ways have been well cleaned and lubricated. Then move table, saddle, and knee to limit stop in one direction. Clean and lubricate the exposed ways and then move each unit to the opposite limit stop and similarly clean and lubricate the exposed ways.

RECOMMENDATIONS

Use 2, 3, or 4 flute end mills. Eight flute end mills are usually not as satisfactory for general milling. When using shell mills, face mills, or any other tooling, proper machining practice should be observed.

CAUTION

DO NOT TRY TO CHANGE SPINDLE SPEED ON VARI-DRIVE HEAD UNTIL MOTOR IS RUNNING. THIS COULD CAUSE PARTS BREAKAGE.

Spindle Feeds are adjusted by turning speed change handwheel on the front of the belt housing. There are two ranges shown: 60 to 500, and 500 to 4200.

60 - 500 RPM is obtained through the back-gear drive and is referred to as low range. To engage the back-gears, use the lever marked Hi-Neutral-Lo on the right side of the head. Move this lever to the "LO" position and use low range on the variable speed dial.

When shifting to "LO," DO NOT FORCE THE LEVER if the back gears do not mesh. Hold the lever so that the gears are clear of one another, rotate the spindle nose by hand until the gears line up, and then put the unit in "LO" (back gear).

500 - 4200 RPM is direct drive and is the high range. The same procedure as previously described is used to select this range except the Hi-Neutral lever is set in the Hi position.

Wear on the vari-drive belt will cause a slight change in the speeds to that shown in windows on the dial. This can be corrected as follows. Crank the speed change handwheel snugly against the high speed stop. (This will be near the 4200 reading on the dial.) Use a tachometer to determine the spindle speed, then turn the pivot stud, after loosening the jam nut, until the spindle speed registers 4200 on the tachometer; tighten the jam nut.

Now reposition the speed dial plate to match the tachometer reading. This is done by loosening the Hex nut until the spindle speed registers 4200 on the tachometer; tighten the jam nut.

DO NOT LOOSEN THE 3 HEX NUTS on the upper part of the Quill Housing. These are set at the factory and are used only for alignment.

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. USE TABLE (1.2) FOR CORRECT BUSS VOLTAGE READINGS.

TABLE 1.2 BUSS VOLTAGE FOR MILLS

MILL	BUSS VOLTAGE
2, 3, 4	95 - 105
5	150 - 160

- 3) TO CORRECT BUSS VOLTAGE MOVE THE SECONDARY TAP TO ADJUST VOLTAGE HIGHER OR LOWER ACCORDING TO DRIVE BUSS TRANSFORMER SETTINGS ON PAGE 1.

DRIVE BUSS TRANSFORMERS SETTINGS

CUSTOMER INPUT VOLTAGE	TRANSFORMER	PRIMARY INPUT BUSS VOLTAGE	SECONDARY OUTPUT BUSS VOLTAGE
110 VAC	3356 1KVA	H1-H2 110	X1-X2 68 X1-X3 72 X1-X4 79
220 VAC (NOTE NEED TO JUMP H1 TO H3 & H2 TO H4)	3357 1KVA	H1-H2 220	X1-X2 68 X1-X3 72 X1-X4 79
440 VAC (NOTE NEED TO JUMP H2 TO H3 & H1 TO H4)	3357 1KVA	H2-H4 220	X1-X2 68 X1-X3 72 X1-X4 79
208 VAC	3358 1.5KVA	H1-H2 208	X1-X2 110
240 VAC	3358 1.5KVA	H1-H3 240	X1-X2 110
480 VAC	3358 1.5KVA	H1-H4 480	X1-X2 110

SYSTEM 110 TRANSFORMER SETTING

CUSTOMER INPUT VOLTAGE	TRANSFORMER	PRIMARY INPUT BUSS VOLTAGE	SECONDARY OUTPUT BUSS VOLTAGE
208 VAC	3263 .5KVA	H1-H2 208	X1-X2 110
240 VAC	3263 .5KVA	H1-H3 240	X1-X2 110
480 VAC	3263 .5KVA	H1-H4 480	X1-X2 110

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		OUT. 12	4TH AXIS BRAKE
		(Set M-10, Clear M-11)		
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

WARNING USE ONLY

MOBIL VACTRA No. 2
AMOCO WAYTAC No. 68
SUNOCO SUNWAYLUBE No. 1180
OR EQUIVALENT OIL

REV.	DESCRIPTION	ECO. NO.	M.F.	APPD BY	DATE
MATERIAL/FINISH MATL: 22 GA. BRUSHED ALUMINUM		MILLTRONICS MANUFACTURING COMPANY 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317			
STOCK No. LB-02		TITLE LUBE DECAL			
TOLERANCE UNLESS SPECIFIED		APPLICATION GENERAL PRODUCTS			
XXXX $\pm$		SCALE .5:1		DWG NO. 6-08-018-009 SIZE D	
XX $\pm$		DATE 17 APR 91		DRAWN BY REUTER SHEET NO. 1 OF 1	
XX $\pm$					
ANGLE $\pm$					

BASIC MACHINE SPECIFICATIONS

RANGE

TABLE TRAVEL (X AXIS).....30in.
SADDLE TRAVEL (Y AXIS).....15in.
QUILL TRAVEL (Z AXIS).....5in.
KNEE TRAVEL.....15in.
RAM TRAVEL.....RIGID
MAX. WEIGHT OF WORKPIECE.....500lbs.

TABLE

OVERALL SIZE.....55x60x80
T-SLOTS.....3 on 2 9/16in. CENTER
T-SLOT SIZE.....5/8in.
HEIGHT ABOVE FLOOR (MAX.).....49in.

MILLING

FEED RATE.....0.1 to 200 IPM

SPINDLE

SPINDLE HOLE TAPER.....30# QUICK CHANGE
HIGH RANGE.....500 to 4000rpm
LOW RANGE.....0 TO 500rpm

SPACE AND WEIGHT

FLOOR AREA.....7x10ft.
HEIGHT.....87in.
NET WEIGHT.....4600lbs.
SHIPPING WEIGHT.....4800lbs.

POWER

ELECTRICAL POWER.....60hz. 3 PHASE 220/230/440/460 VOLTS
SPINDLE MOTOR.....3hp 60hz. 3 PHASE 220/230/440/460 VOLTS
COOLANT PUMP MOTOR.....60hz. 1 PHASE 110vac
LUBE PUMP MOTOR.....60hz. 1 PHASE 110vac

MECHANICAL PARTS (FIG. 2)

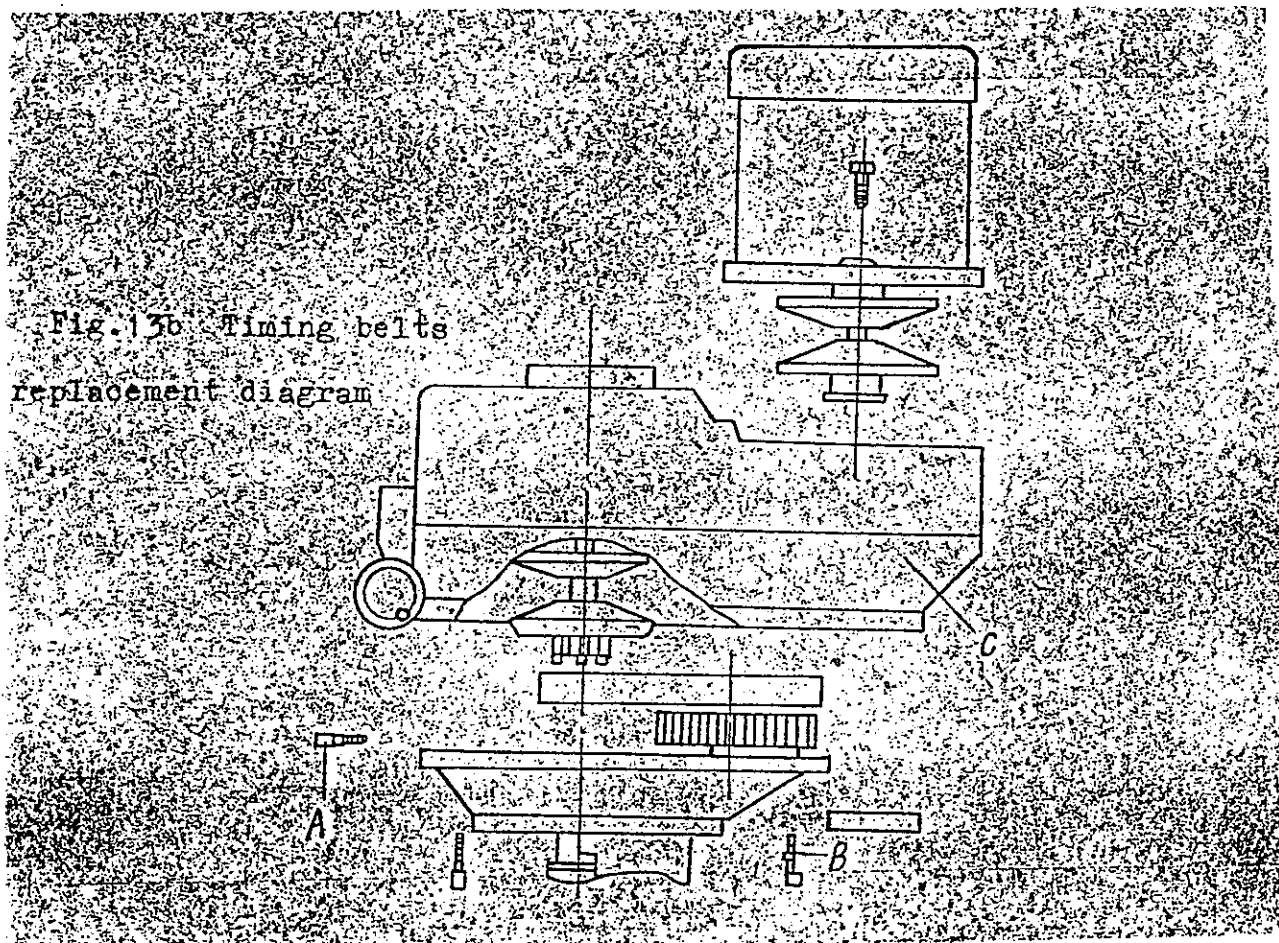
ITEM	TYPE	DESCRIPTION
1		MOTOR 1720rpm 60hz
2	XU6325-2009C -2008C	MOTOR PULLEY TOP MOTOR PULLEY BOTTOM
3	XU6325-2003C -2004C	SPINDLE PULLEY BOTTOM SPINDLE PULLEY TOP
4	XU6325-2309B	TIMING PULLEY
5	XU6325-2109B	COUPLING SHAFT
6	XK5025-2118	DOWN COUPLING SHAFT
7	XU6325-2115B	BIG GEAR
8	XU6325-2122	SMALL GEAR
9	XK5025-22101	SPINDLE
10	NT-J320A-2121	X BALLSCREW PULLEY
11	13L100	X MOTOR PULLEY
12	XK5025-6115	Y BALLSCREW PULLEY
13	GS272-A1	Y-AXIS BALLSCREW SET T=0.2"
14	15L100	Y MOTOR PULLEY
16	X6325-4102	SPIRAL BEVEL GEAR M=2.5 Z=40
18	X6325-4104	SPIRAL BEVEL GEAR M=2.5 Z=20
19	X6325-4103-2	LEAD SCREW
20	J325-4301	NUT
21	XK5025-7002B	X-AXIS BALLSCREW SET T=0.2"
22	NT-J330-2121	Z AXIS BALLSCREW PULLEY
23	15L100	Z AXIS MOTOR PULLEY
24	7230-23002B	Z AXIS BALLSCREW SET
25	XK5030-2135A	HANDLE SHAFT
26	XU6325-2118 -2146	DOWN COUPLING SHAFT GEAR SHAFT

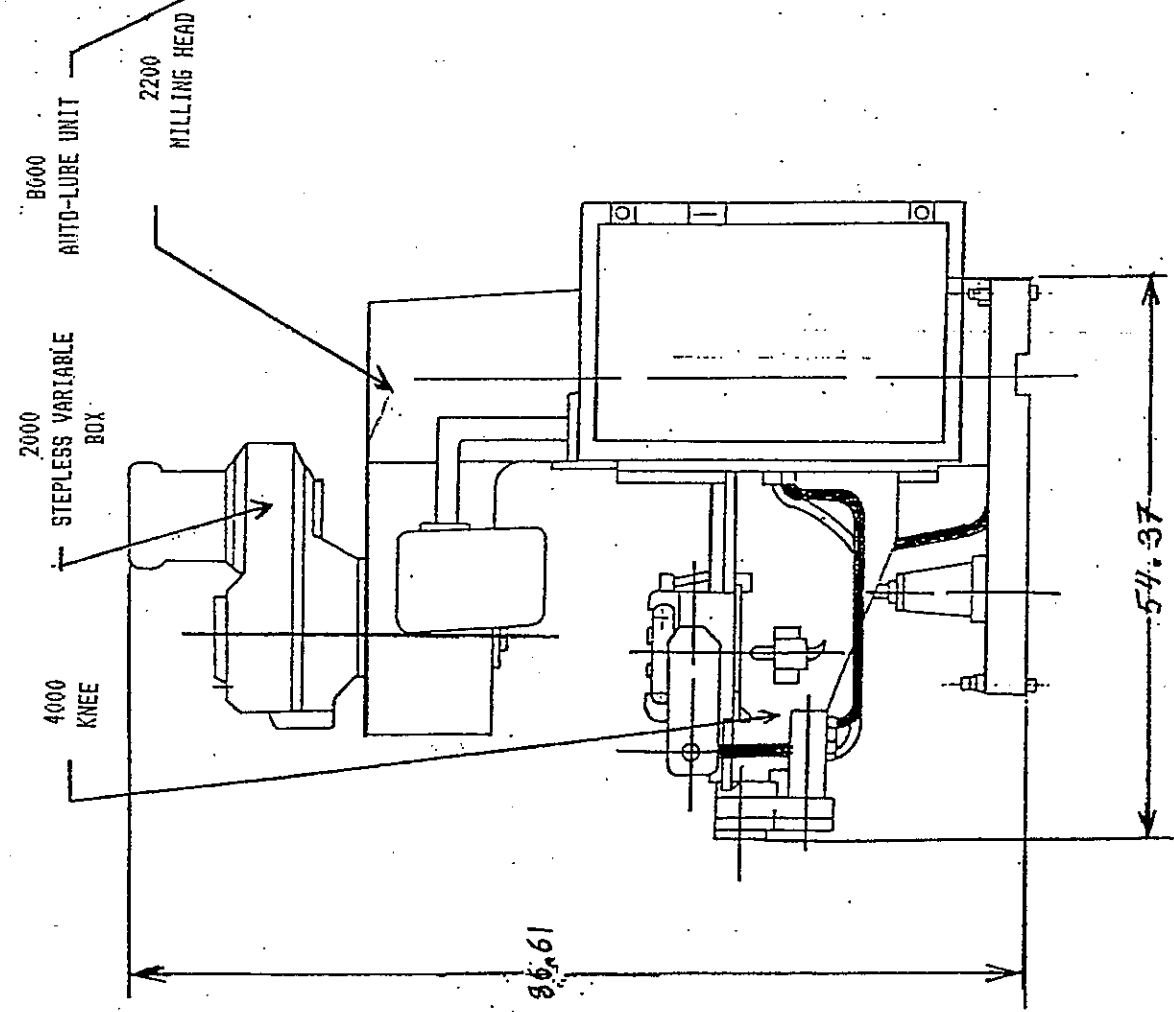
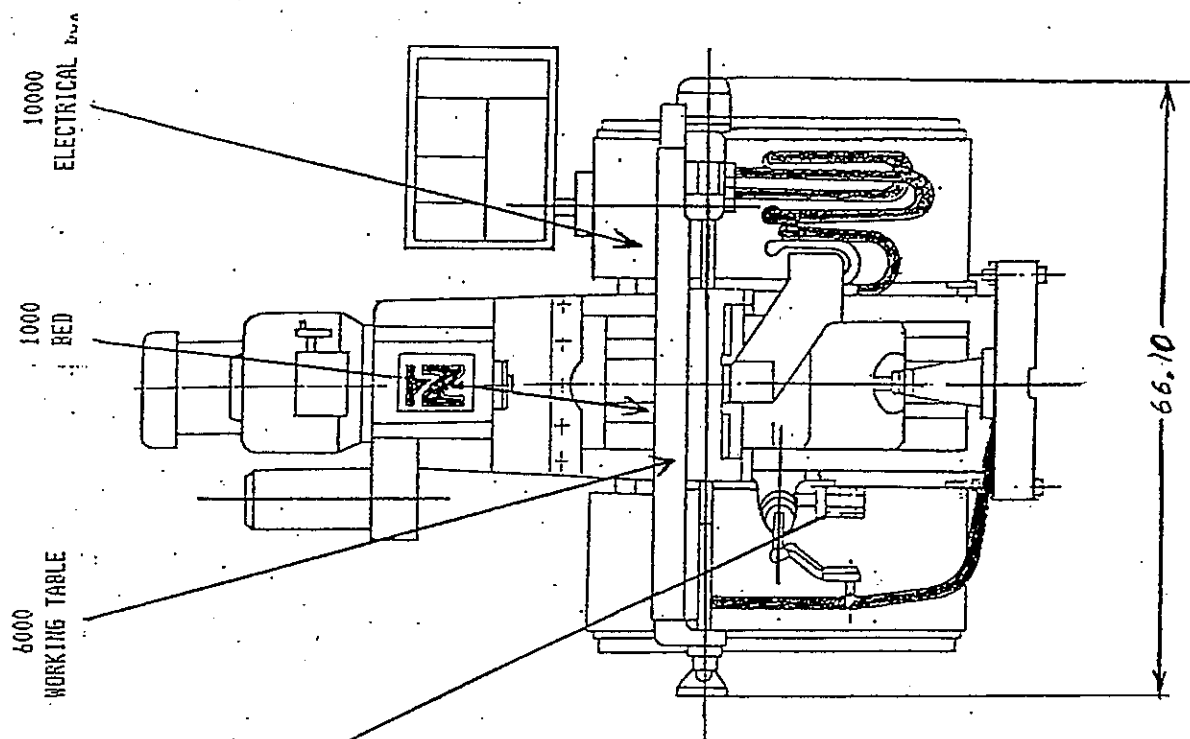
BEARING LIST

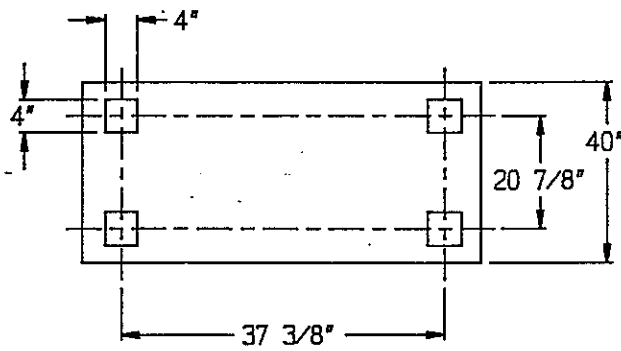
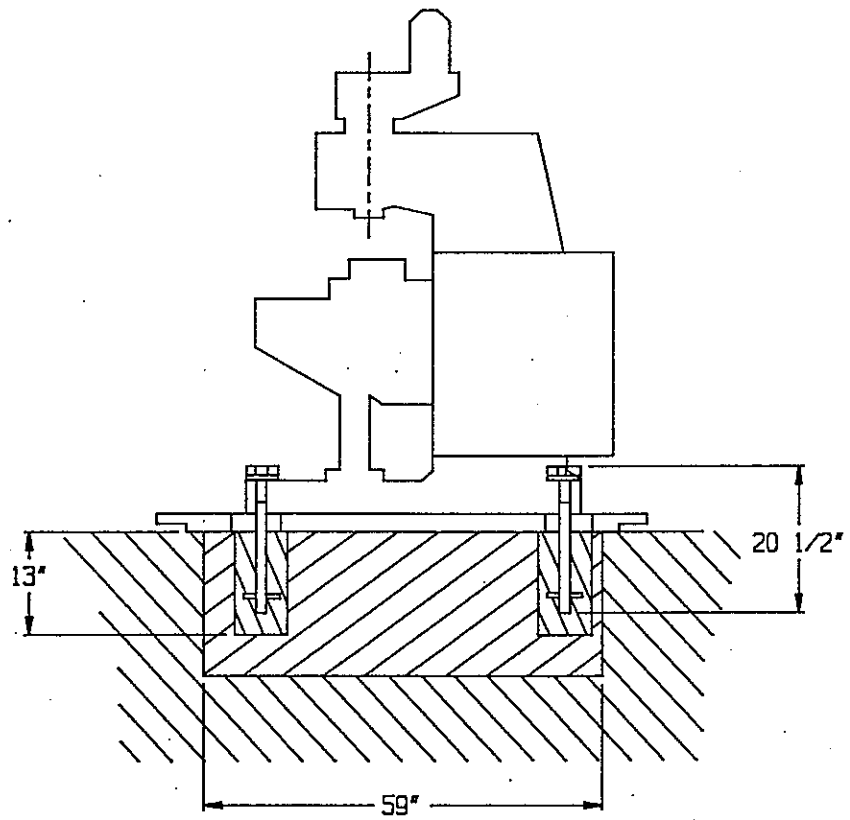
ITEM	TYPE	DESCRIPTION	QTY.
1	180108	SEALED RADIAL BALL BEARING	2
2	C46103	RADIAL THRUST BALL BEARING	2
3	206	RADIAL BALL BEARING	1
4	80205	RADIAL BALL BEARING WITH DUST CAP	1
5	204	RADIAL BALL BEARING	1
6	05185 or 05079	TAPERED ROLLER BEARING	2
7	206	RADIAL BALL BEARING	1
8	204	RADIAL BALL BEARING	2
9	D7205	TAPERED ROLLER BEARING	2
10	NDH #00L JPR #00L 08-DTL7A	RADIAL THRUST BALL BEARING	1
11	80206	SEALED RADIAL BALL BEARING	1
12	180203	SEALED RADIAL BALL BEARING	2
13	180110	RADIAL BALL BEARING	2
14	180107	RADIAL BALL BEARING	1

REPLACEMENT OF TIMING BELT (FIG. 13-B)

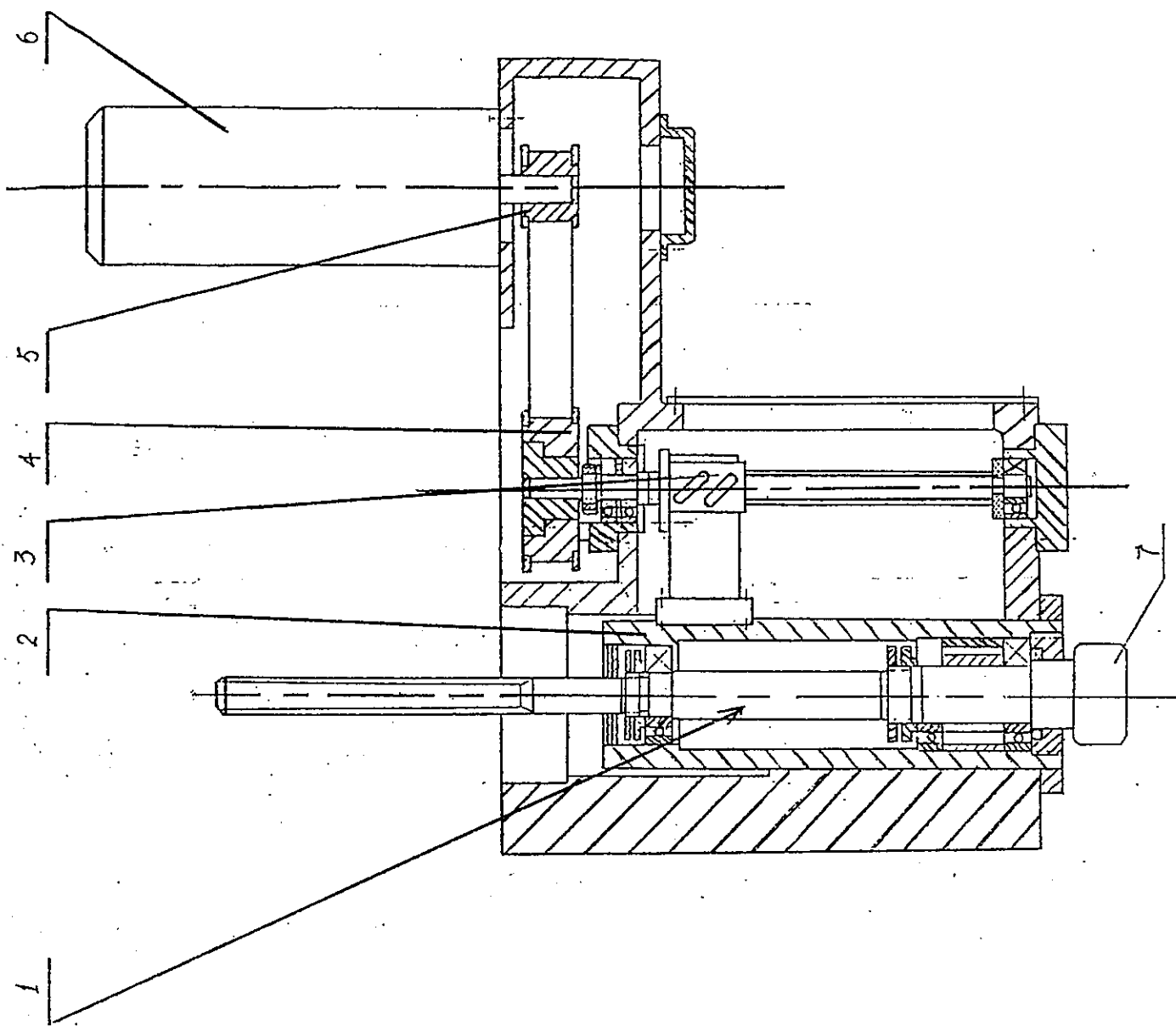
- 1) REMOVE THE MOTOR
- 2) LOWER THE QUILL TO THE LIMITED POSITION
- 3) REMOVE 2 SCREWS "A" WHICH ARE USED TO CONNECT HOUSING TO BOTTOM.
- 4) REMOVE 4 SCREWS "B".
- 5) TAP THE BOX SLIGHTLY FOR REMOVING 2 PINS, THEN REMOVE THE UPPER PART "C".





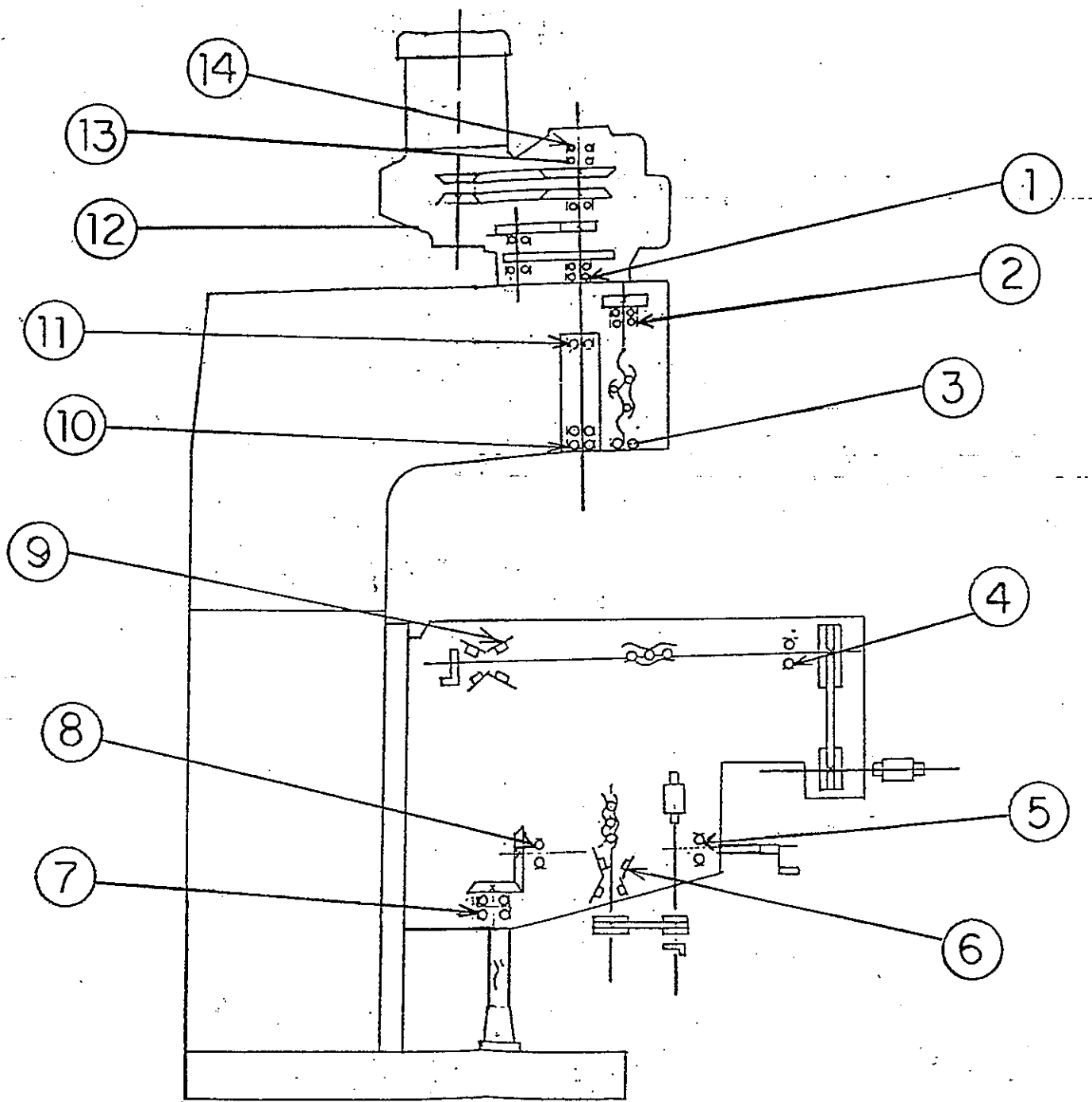


FOUNDATION DRAWING

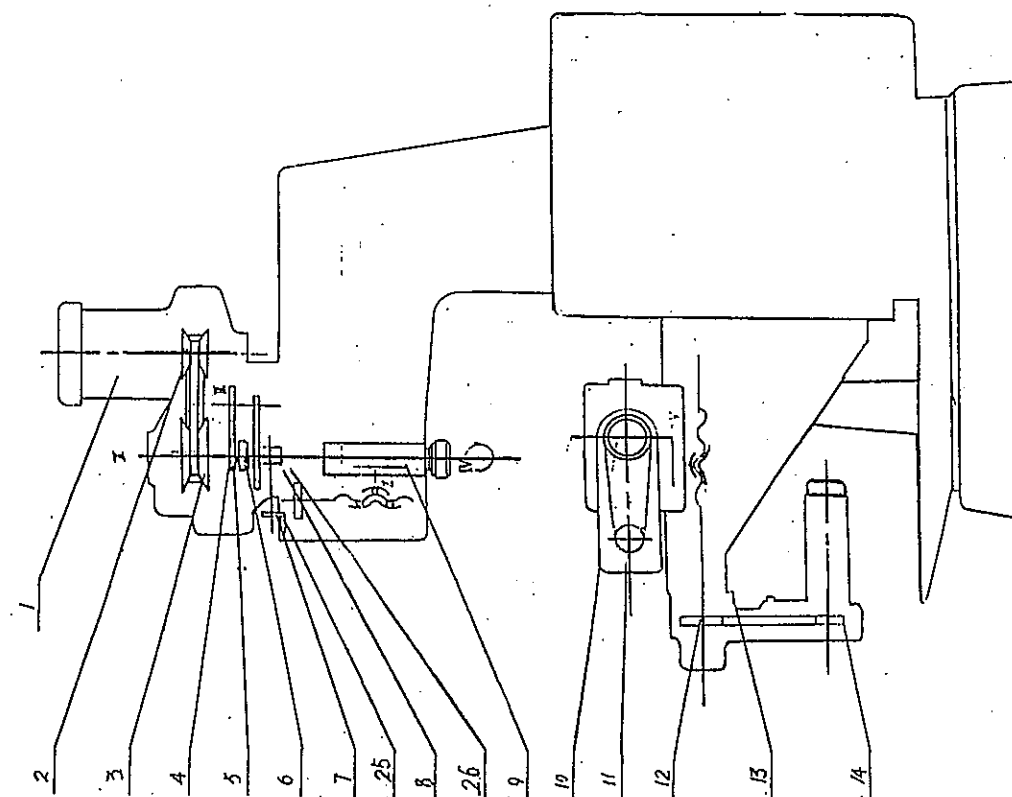
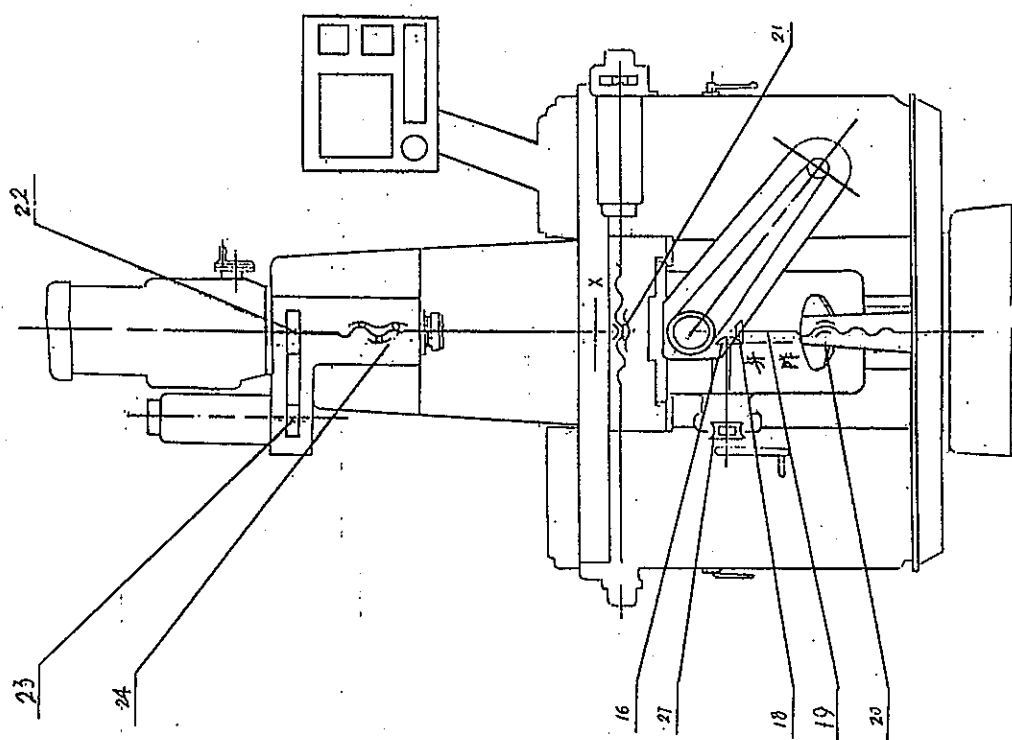


MILLING HEAD ASSY

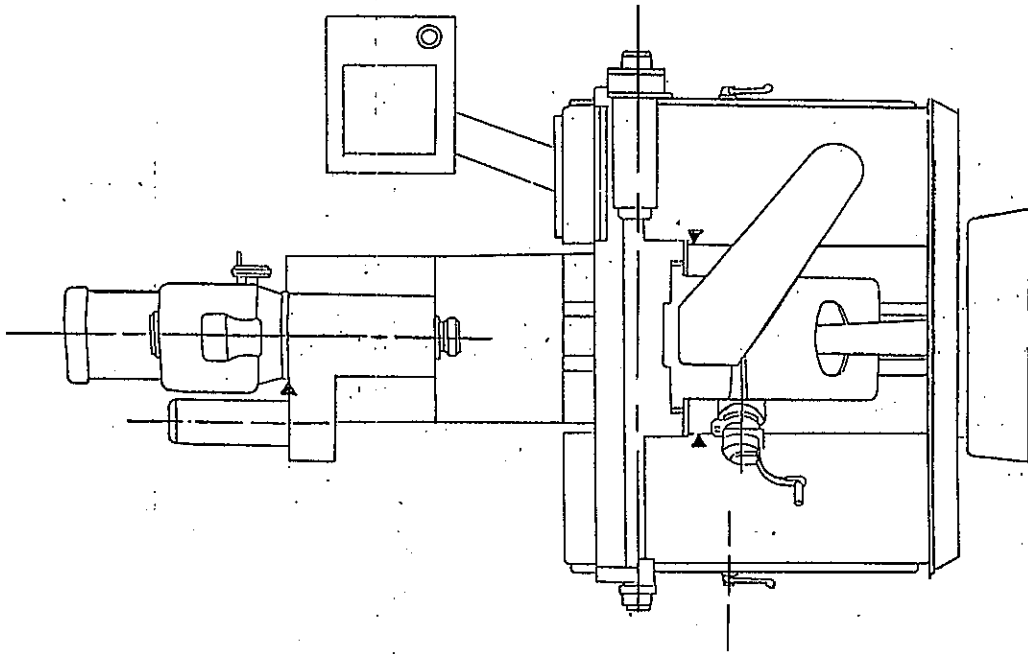
1. SPINDLE
2. QUILL
3. Z-AXIS BALL SCREW
4. TIMING PULLEY
5. Z-AXIS SERVO MOTOR
6. TOOL CHANGE NUT



ROLLER BEARING LOCATIONS

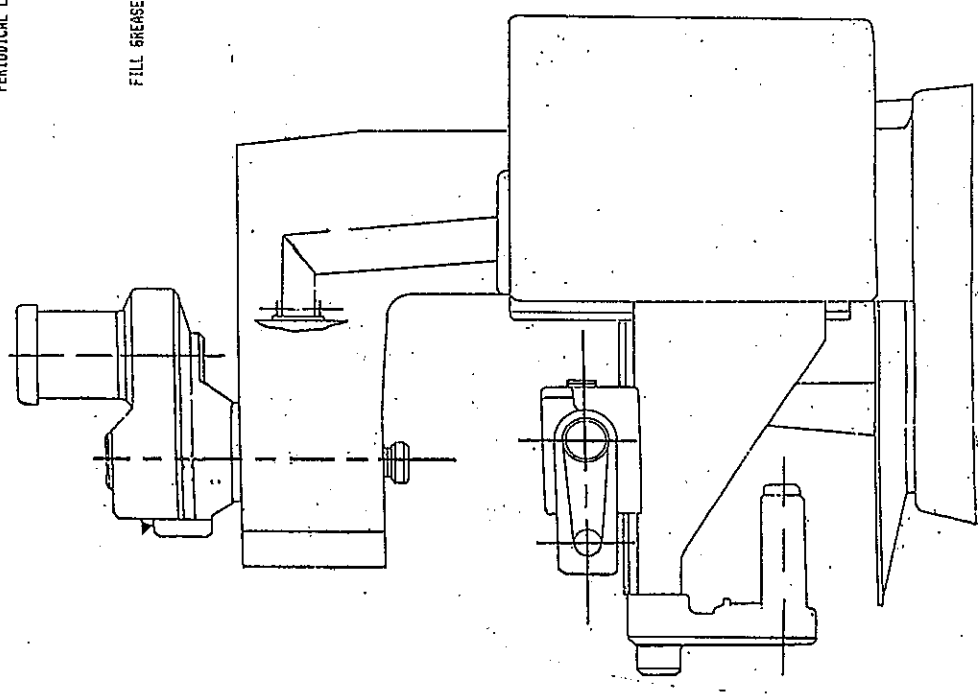


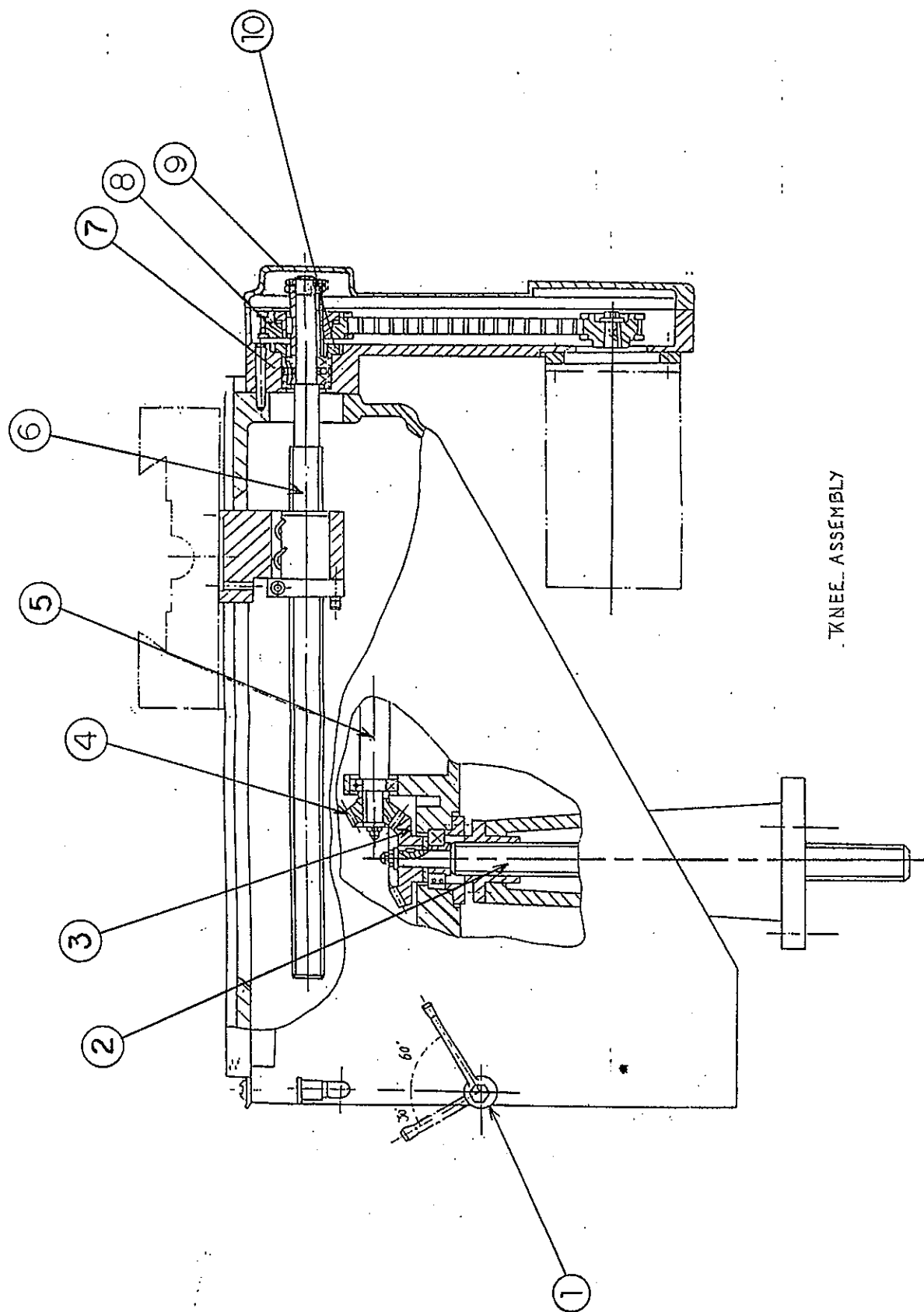
MACHINE DRIVE SYSTEMS



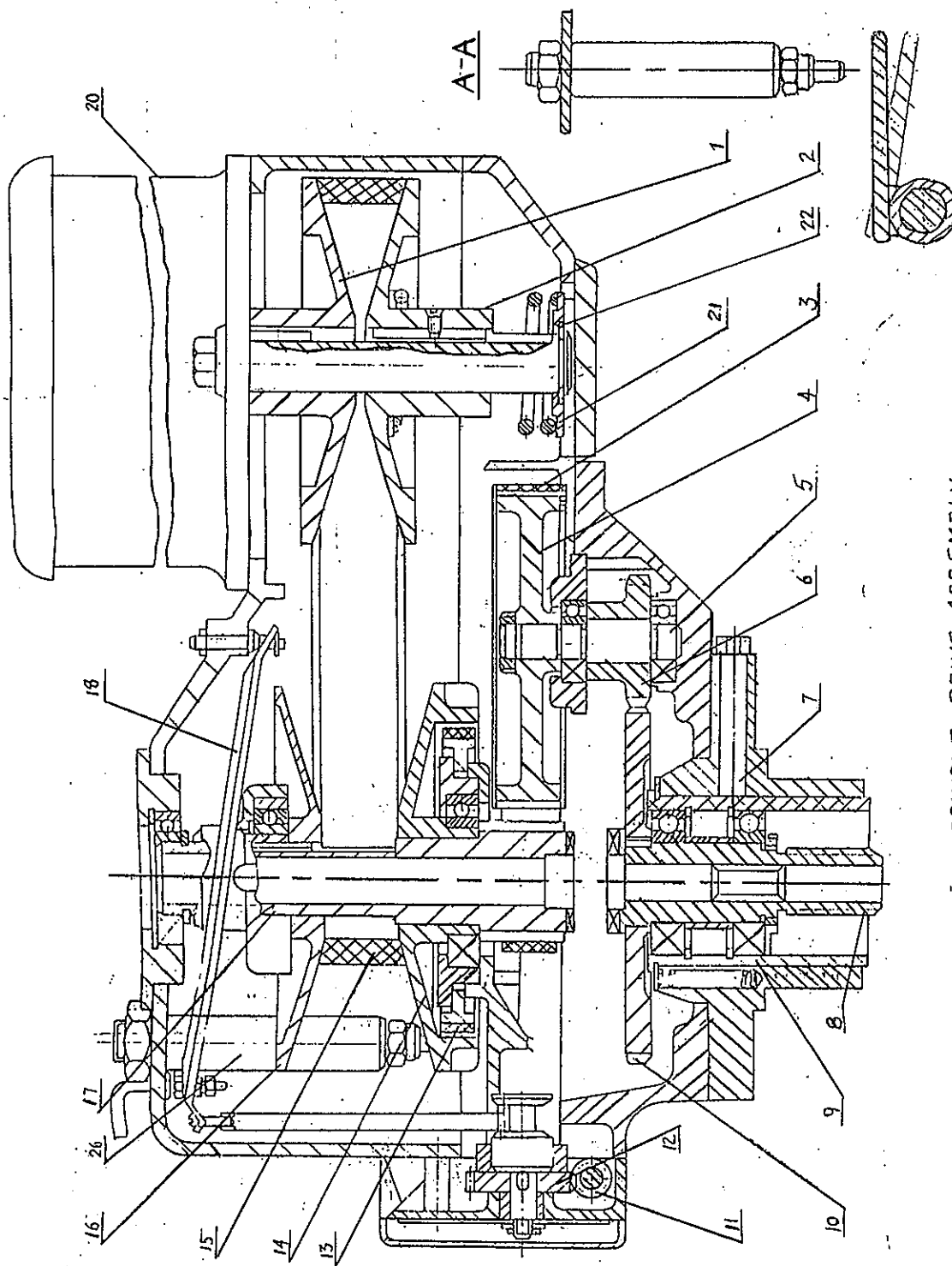
PERIODICAL LUBRICATION POINTS

FILL GREASE ONCE OR TWICE A WEEK

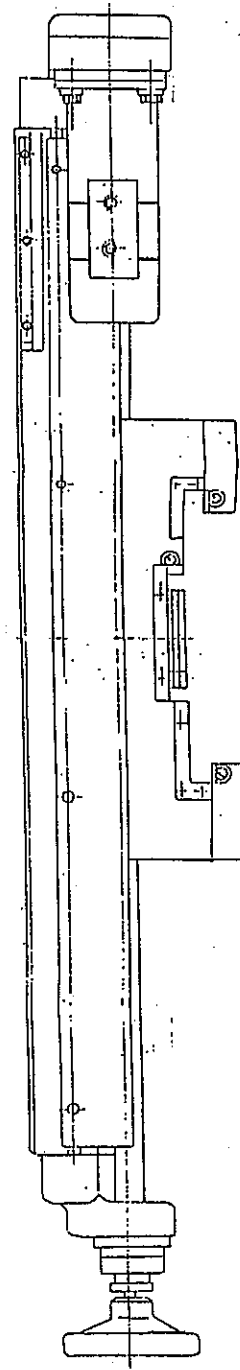
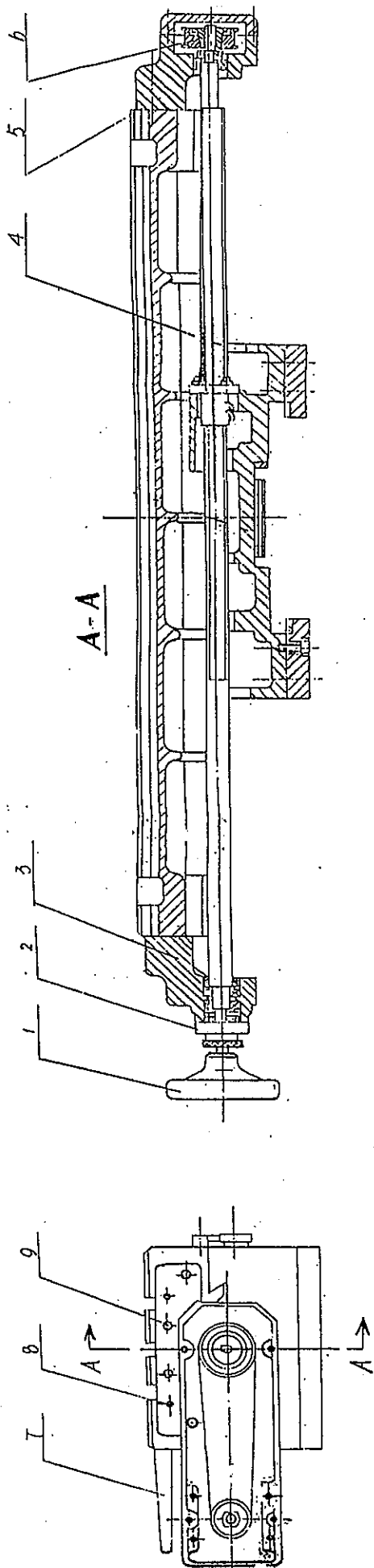




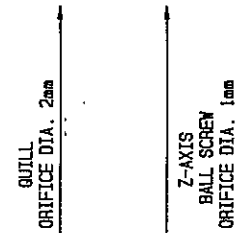
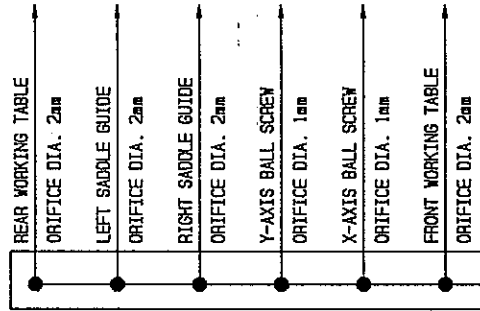
KNEE ASSEMBLY



SPINDLE DRIVE ASSEMBLY



SADDLE & TABLE ASSEMBLY



CHECK VALVE

'T' VALVE

TUBE

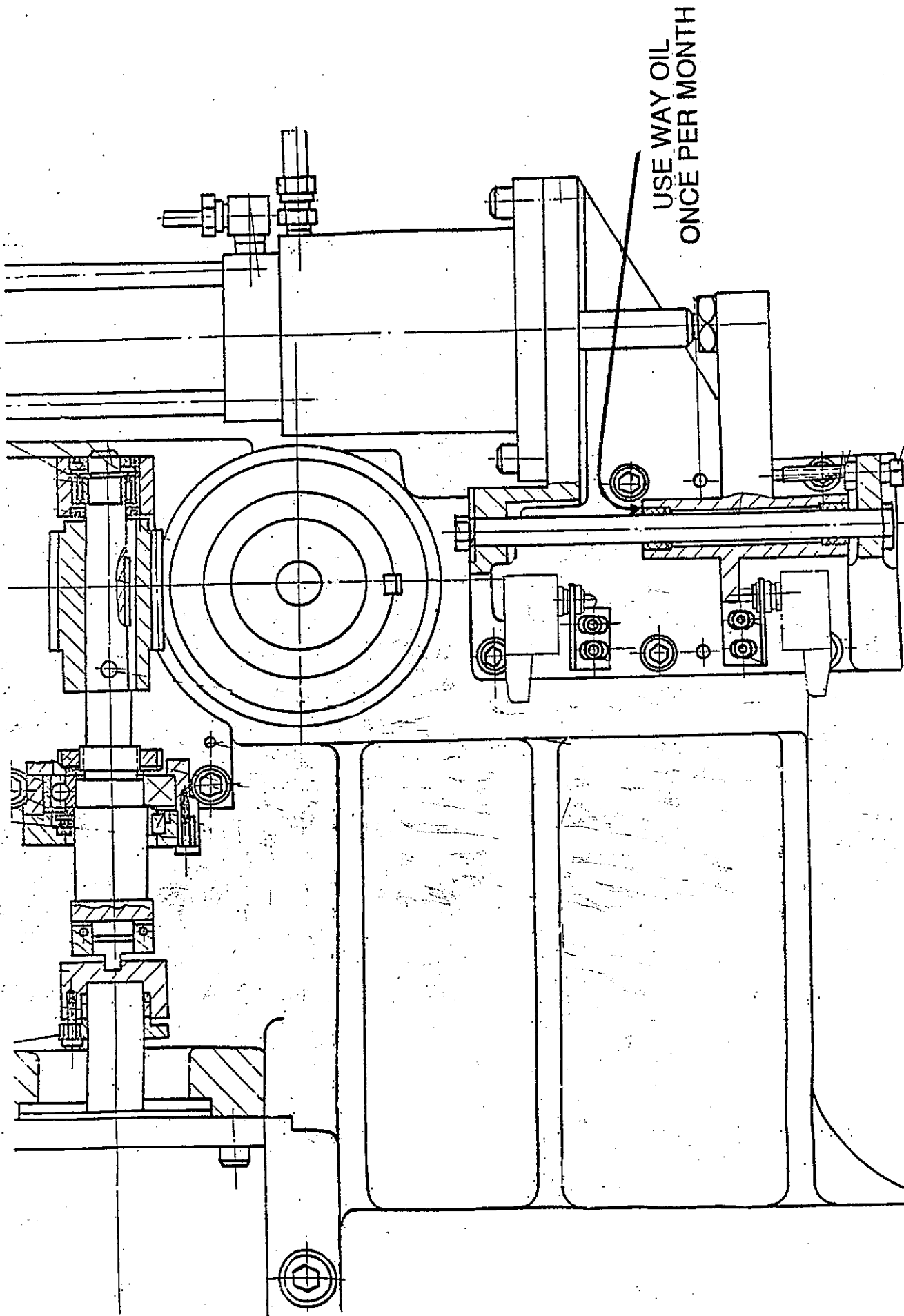
OIL PUMP

FILTER

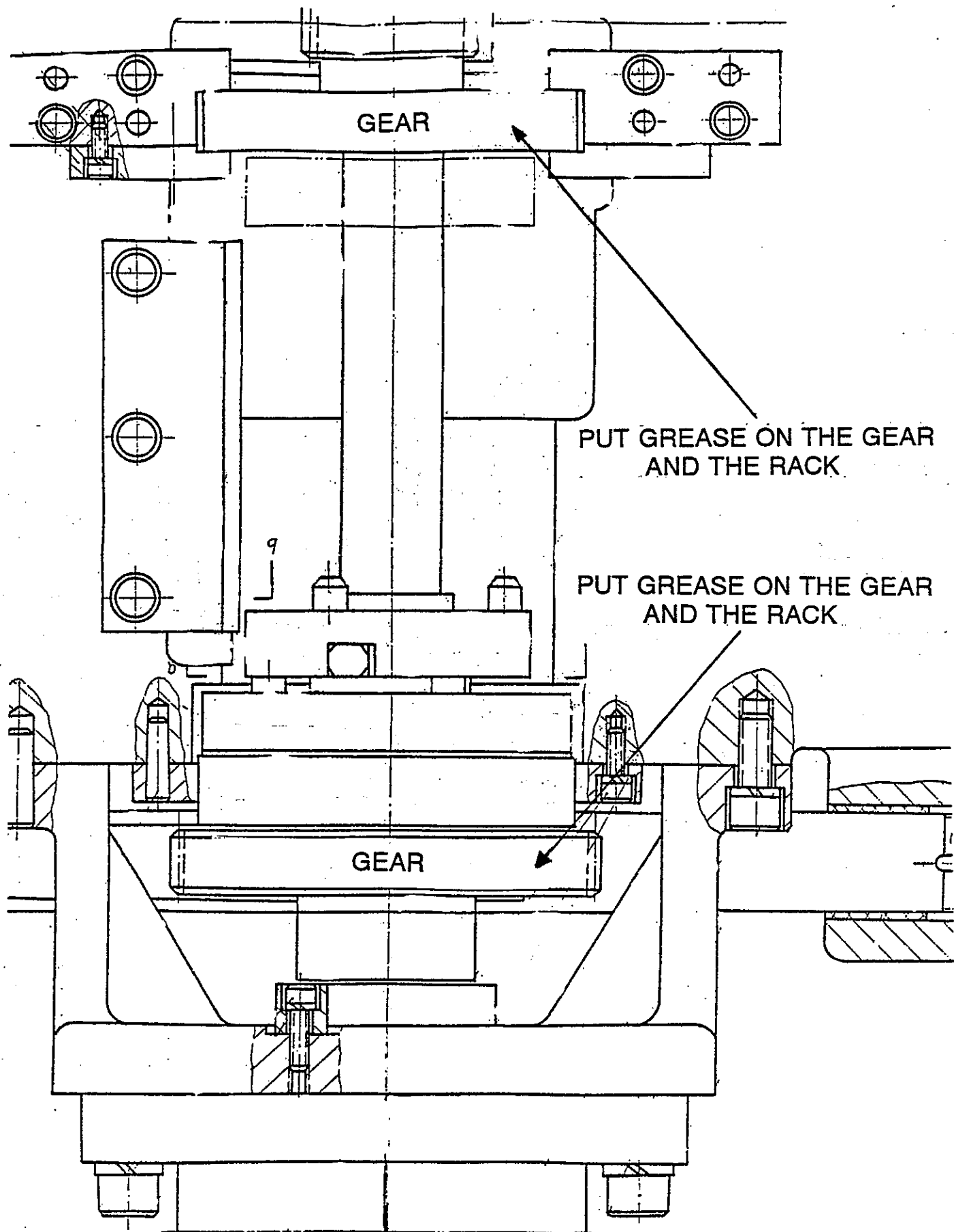
OIL TANK

DOCUMENTATION APPLIES TO PARTNER II-D

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
 MILLIRONICS MANUFACTURING 7870 PARK DRIVE (S12) 474-8100 CHANHASSEN, MN 55317				
TOLERANCE UNLESS SPECIFIED X.XXX ± X.XX ± X.X ± ANGLE ± STOCK No. TITLE LUBE LINE MAP APPLICATION PARTNER II SCALE 1:1 DATE 6 FEB 90				
DRAWN BY REUTER				SHEET NO. 1 OF 1

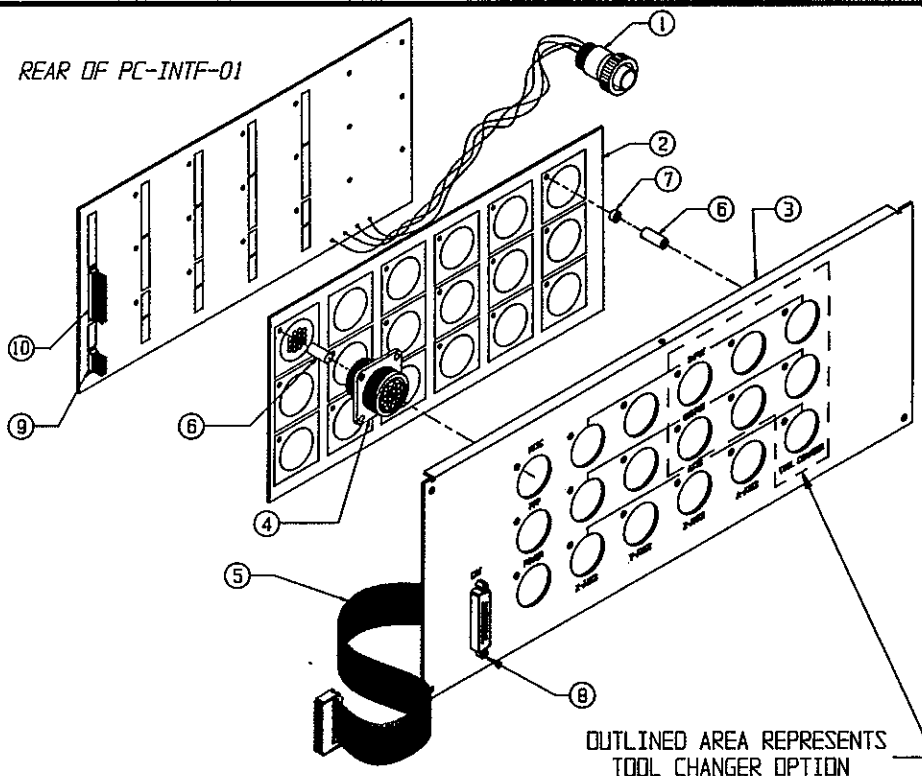


DRAWING 2



DRAWING 3

REAR OF PC-INTF-01



OUTLINED AREA REPRESENTS
TOOL CHANGER OPTION

- INTERFACE PANEL ASSEMBLY -

- PARTS LIST -

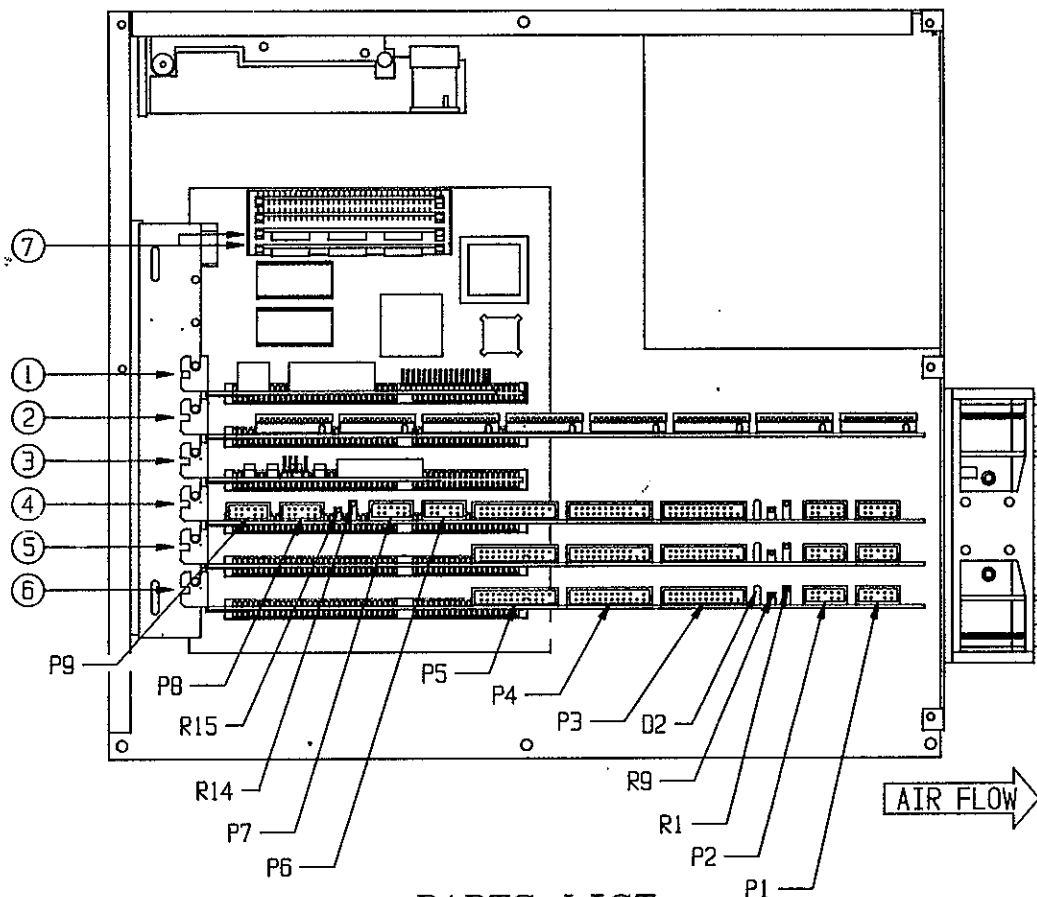
ITEM	STOCK No.	DESCRIPTION	QTY. 7500	QTY. 7510
1	CD-57	CONNECTOR, MALE, 4 PIN AMP No. 206429-1	1	1
	CD-31	CONTACT PIN FOR CD-57, MALE AMP No. 66098-9	4	4
2	BD-32	P.C. BOARD, CARDCAGE INTERFACE MMC No. PC-INTF-01 MMC DWG No. 6-07-004-002	1	1
3	PL-34	CARD CAGE INTERFACE PANEL - STANDARD MMC DWG No. 6-01-004-029	1	0
	PL-37	CARD CAGE INTERFACE PANEL - TOOL CHANGER MMC DWG No. 6-01-004-028	0	1
4	CD-123	CONNECTOR, FEMALE, 14 PIN AMP No. 206043-1	11	18
	CD-19	KEYING PIN FOR CD-18 AMP No. 200821-1	11	18
5		CABLE ASSEMBLY, VIDEO OUTPUT MMC DWG No. 6-04-004-004	1	1
6	SP-15	SPACER, NYLON, No. 6 x 9/16 MICRO PLASTICS No. SP61	12	18
7	USE SCRAP	SPACER, NYLON, No 6 x 1/8	12	18
8	CD-53	JACK SCREW ASSEMBLY, 4-40 UNC TRW No. D-20418-2	1	3
9	CD-93	P.C. HEADER, 10 PIN BERG No. 1-103026-5 CUT 30 PIN HEADER INTO 3 PARTS	3	4
10	CD-51	P.C. HEADER, 26 PIN BERG No. 1-103026-3	6	10

Notes...

1. ASSEMBLY No. 7500 IS FOR THE STANDARD VERSION.
ASSEMBLY No. 7510 IS FOR THE TOOL CHANGER VERSION.

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
			AR	
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.		TITLE CARD CAGE ELECTRONICS ASSY.		
TOLERANCE UNLESS SPECIFIED		APPLICATION CENTURION V		
X.XXX	+/- .005	SCALE 3:1	DWG No. 6-11-004-024	SIZE C
X.XX	+/- .010	DATE 28 FEB 94	DRAWN BY REUTER	SHEET NO. 1 OF 5
X.X	+/- .030			
ANGLE	+/- 1.0°			

DIAGRAM SHOWN FOR 3-AXIS STANDARD SYSTEMS

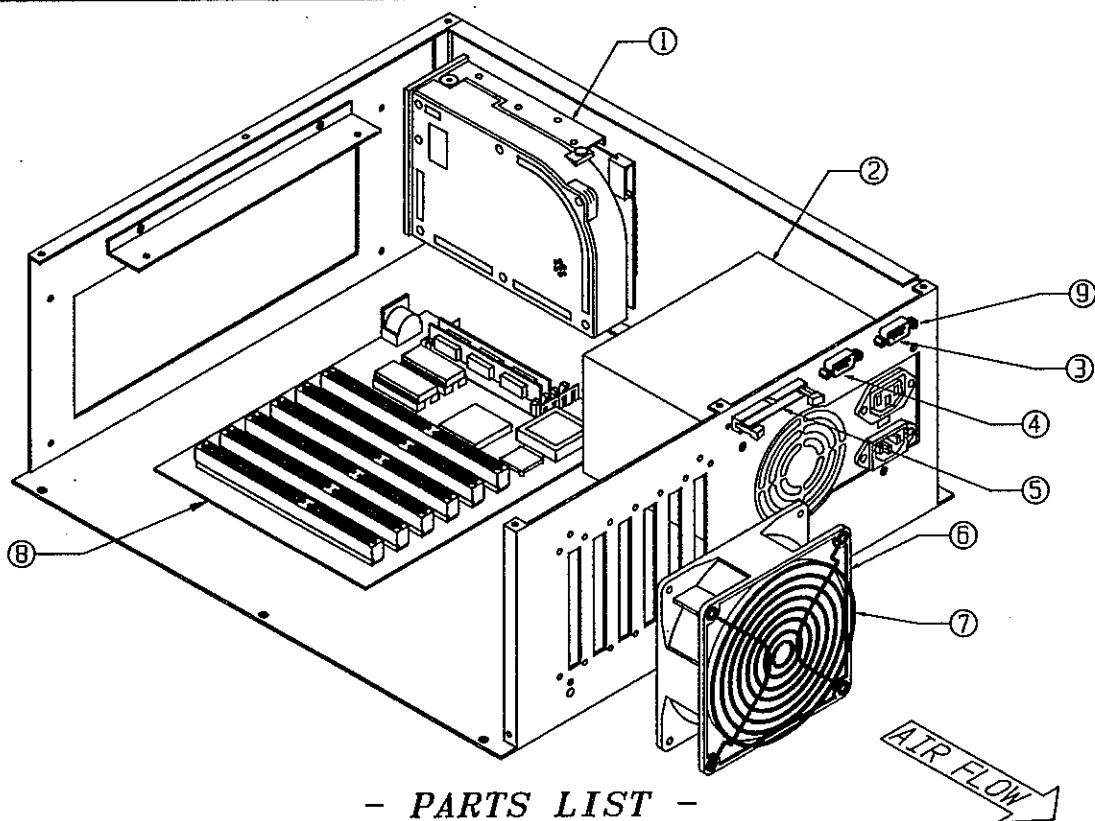


- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	BD-52	IDE HDD/FDD CONTROLLER & I/O PORTS
2	BD-49	VIDEO GRAPHICS ARRAY (VGA) CARD
3	ASSY No. 7205	SIMDISK HARD DRIVE EMULATOR BOARD MILLTRONICS MANUFACTURING COMPANY PC-SIMDISK-01
4	ASSY No. 7000	ACROLOOP X-AXIS COMPUTER CONTROLLER MILLTRONICS MANUFACTURING COMPANY PC-ACRON-02 (FULL BOARD)
5	ASSY No. 7005	ACROLOOP AXIS COMPUTER - Y-AXIS MILLTRONICS MANUFACTURING COMPANY PC-ACRON-02 (AXIS ONLY)
6	ASSY No. 7005	ACROLOOP AXIS COMPUTER - Z-AXIS MILLTRONICS MANUFACTURING COMPANY PC-ACRON-02 (AXIS ONLY)
7	BD-55	MOTHERBOARD MEMORY, 1 MEG SIMM (2 EA.)

P1 AXIS ENCODER INPUT
 P2 AXIS DRIVE ANALOG INPUT
 R1 AXIS GAIN ADJUST
 R9 AXIS OFFSET ADJUST
 D1 WATCHDOG LED
 P3 AXIS OUTPUT
 P4 AXIS INPUT
 P5 MACHINE AXIS INTERFACE
 P6 SPINDLE ENCODER INPUT
 P7 SPINDLE LOAD METER/ANALOG OUTPUT
 R14 SPINDLE OFFSET ADJUST
 R15 SPINDLE GAIN ADJUST
 P8 KEYBOARD INPUT
 P9 VIDEO OUTPUT (EGA ONLY)

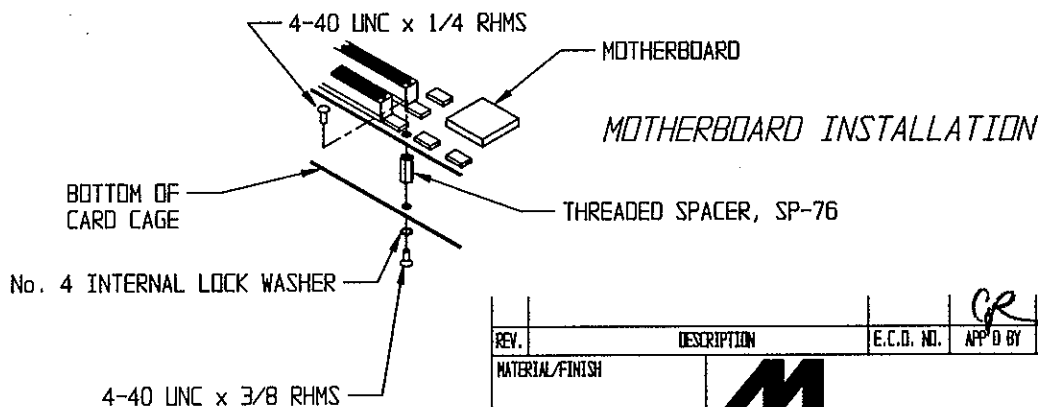
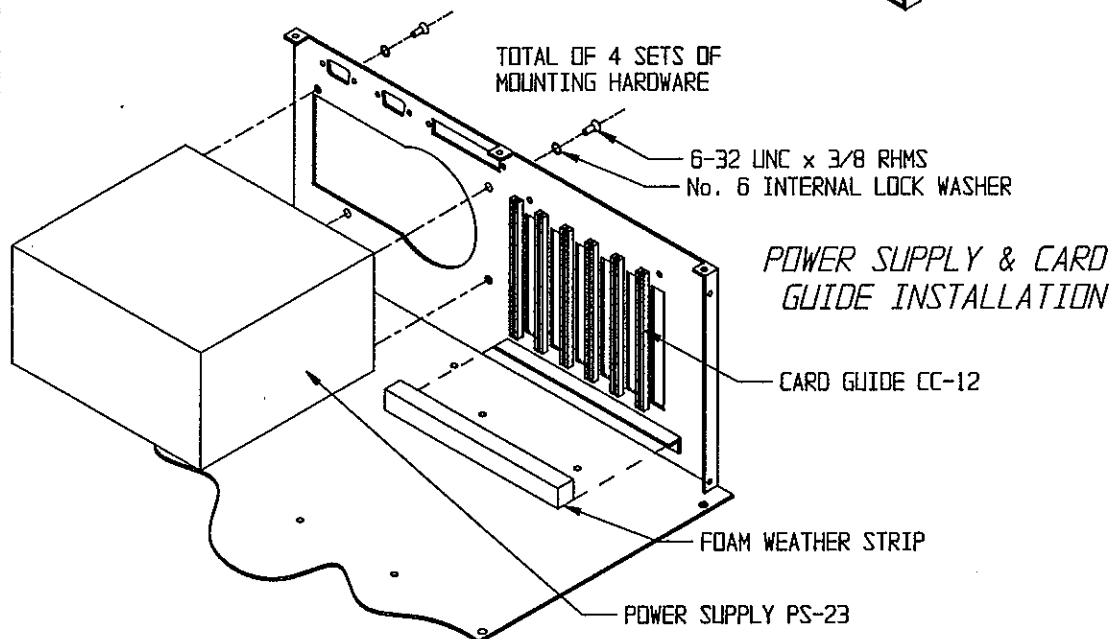
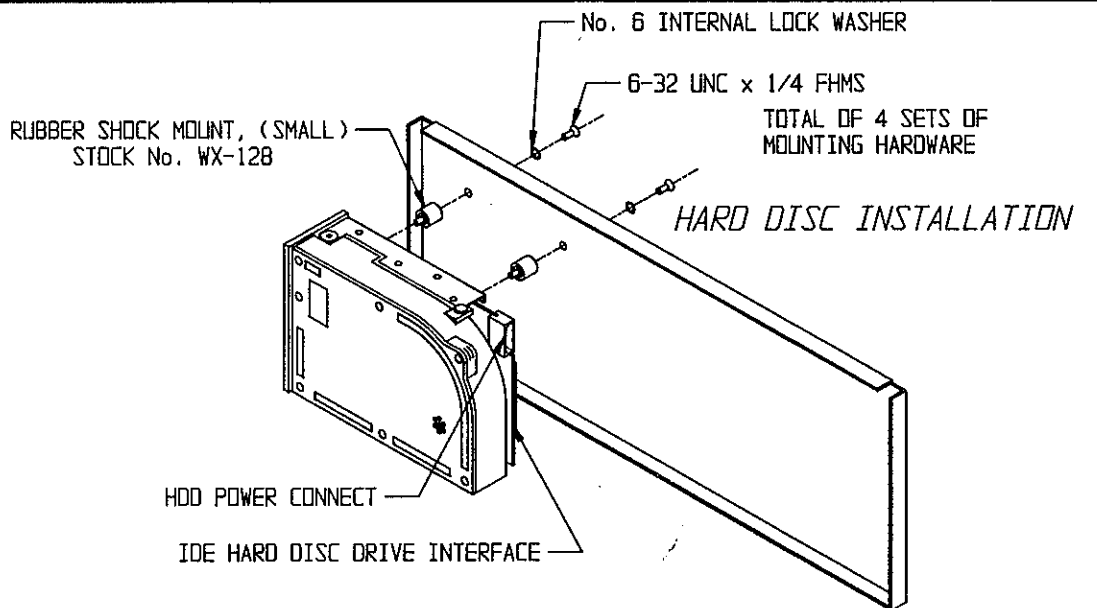
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE CARD CAGE ELECTRONICS ASSY.		
X.XXX +/- .005		APPLICATION CENTURION V		
X.XX +/- .010		SCALE 2.5:1		
X.X +/- .030		DATE 2 MAR 94		
ANGLE +/- 1.0°		DRAWN BY REITER		
		SHEET NO. 2 OF 5		



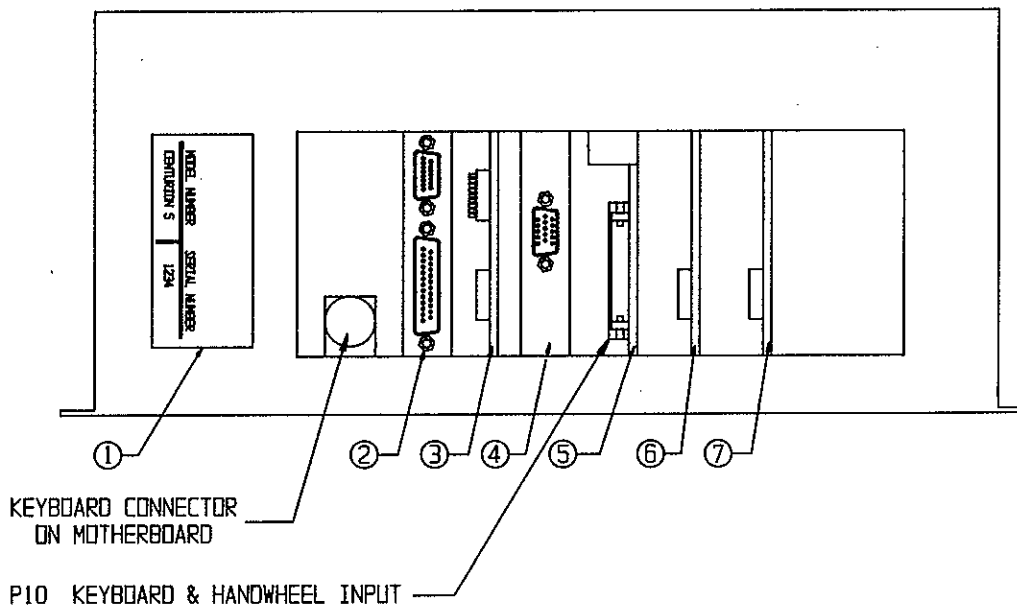
- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	CU-39	HARD DISC DRIVE, IDE, 40 MB SEAGATE TECHNOLOGIES No. ST-157/A
2	PS-23	POWER SUPPLY, BABY AT, 200 W
3		PERIPHERAL PORT, SERIAL, 'COM-1' (CABLE NOT SHOWN), REF. TO CABLE DRAWING No. 6-04-004-006
4		PERIPHERAL PORT, SERIAL, 'RIGID TAPPING' (CABLE NOT SHOWN), REF. TO CABLE DRAWING No. 6-04-004-006
5		PERIPHERAL PORT, FLOPPY DISC DRIVE (CABLE NOT SHOWN), REF. TO CABLE DRAWING No. 6-04-004-003
6	FA-1	FAN, COOLING, 110 VAC TRW No. A47B15A15T3 POWER CABLE, (FA-03), NOT SHOWN
7	FA-04	FAN GRILLE FOR FA-01 WFG 473
8	BD-43	MOTHERBOARD, IBM AT/386SX, 40 MHz
9	CD-53	JACK SCREW ASSY, 4-40 UNC THREAD TRW No. D-20418-2

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX +/- .005 X.XX +/- .010 X.X +/- .030 ANGLE +/- 1.0°				
TITLE		CARD CAGE ELECTRONICS ASSY.		
APPLICATION		CENTURION V		
SCALE 3:1		DWG No 6-11-004-024	SIZE B	
DATE 2 MAR 94		DRAWN BY REUTER	SHEET NO. 3 OF 5	



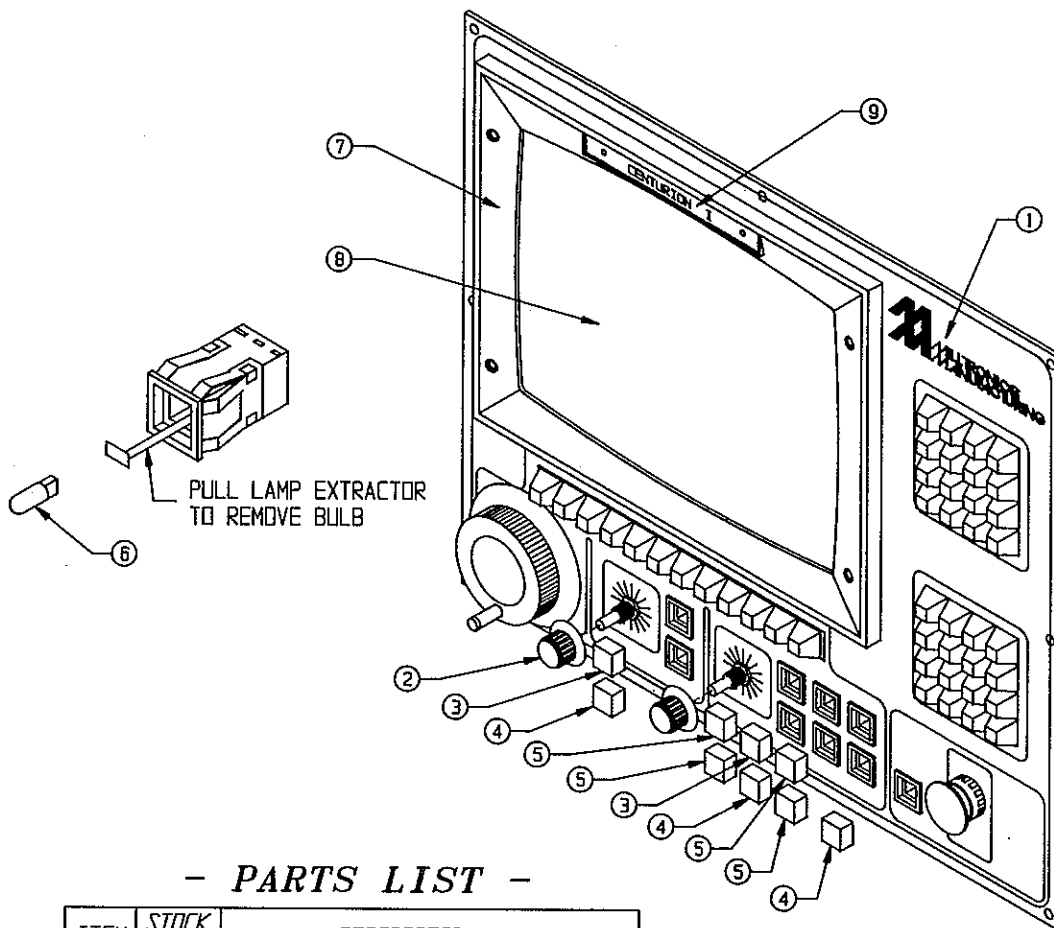
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
			CR	
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.		TITLE CARD CAGE ELECTRONICS ASSY.		
TOLERANCE UNLESS SPECIFIED		APPLICATION CENTURION V		
X.XXX	+/- .005	SCALE 3:1		
X.XX	+/- .010	DWG No 6-11-004-024		
X.X	+/- .030	SIZE B		
ANGLE	+/- 1.0°	DATE 2 MAR 94		
		DRAWN BY REUTER		SHEET NO. 4 OF 5



- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	LB-03	SERIAL No./MODEL No. TAG
2	BD-52	IDE HDD/FDD CONTROLLER & I/O PORTS
3	ASSY 7205	SIMDISK HARD DRIVE EMULATOR CARD MMC PC-SIMDISK-01
4	BD-49	VIDEO GRAPHICS ARRAY (VGA) CARD
5	ASSY 7000	ACROLOOP X-AXIS COMPUTER CONTROLLER MMC PC-ACRCN-02 (FULL)
6	ASSY 7005	ACROLOOP AXIS COMPUTER Y-AXIS MMC PC-ACRCN-02 (PARTIAL)
7	ASSY 7005	ACROLOOP AXIS COMPUTER Z-AXIS MMC PC-ACRCN-02 (PARTIAL)

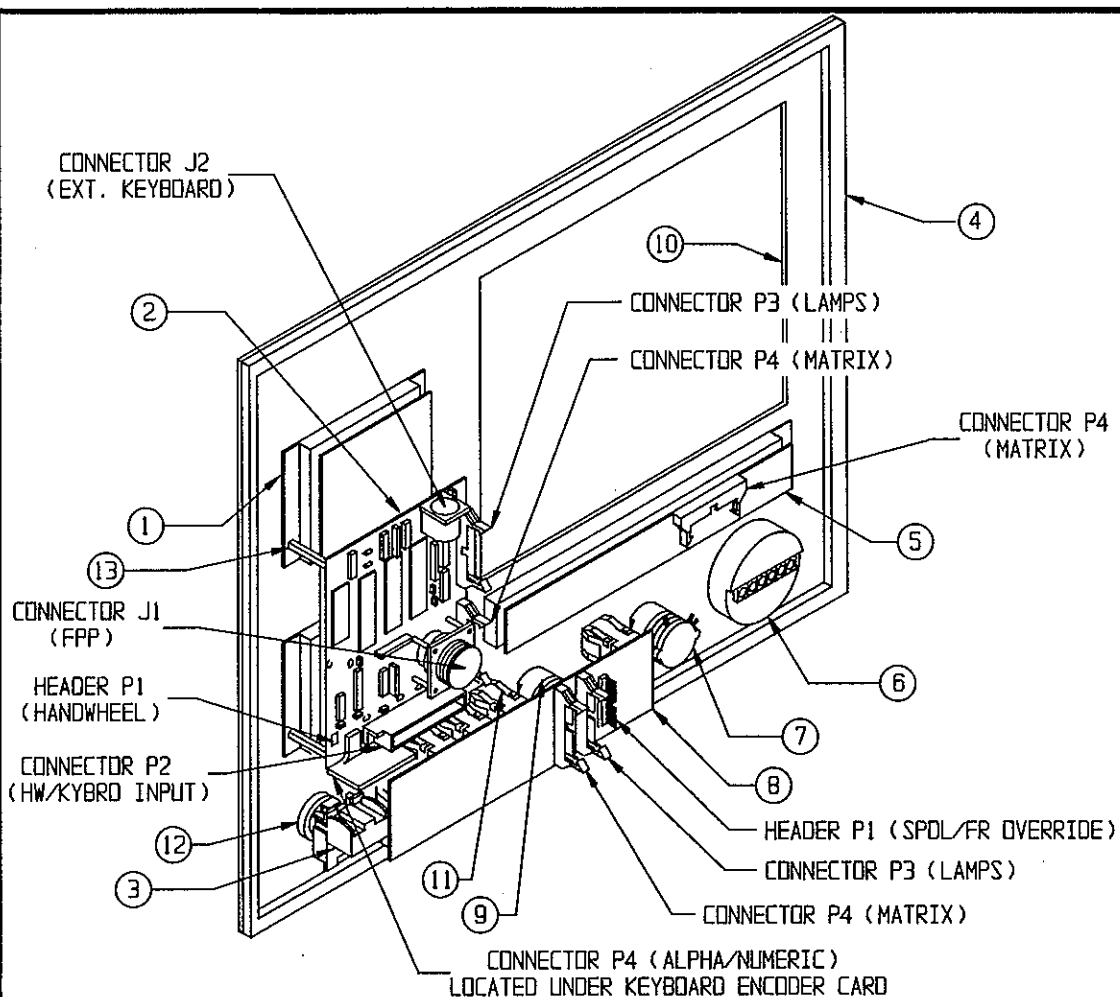
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY <i>CR</i>	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE CARD CAGE ELECTRONICS ASSY.		
X.XXX +/- .005		APPLICATION CENTURION V		
X.XX +/- .010		SCALE 2:1	DWG No. 6-11-004-024	SIZE B
X.X +/- .030		DATE 2 MAR 94	DRAWN BY REUTER	SHEET NO. 5 OF 5
ANGLE +/- 1.0°				



- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	FP-58	14 IN. CRT FRONT PANEL OVERLAY 6-08-004-003
2	SW-35	SWITCH KNOB, COMPOSITE BLACK ALCOKNOB PKA-P708-1/4
3	SW-89	SQUARE KEYTOP, RED HONEYWELL MICROSWITCH AML51A10R
4	SW-82	SQUARE KEYTOP, GREEN HONEYWELL MICROSWITCH AML51A10G
5	SW-90	SQUARE KEYTOP, WHITE HONEYWELL MICROSWITCH AML51A10W
6	SW-92	SWITCH INDICATOR LAMP, 24 VDC HONEYWELL MICROSWITCH AML91LA85
7	FP-57	14 IN. CRT BEZEL MMC 6-01-004-057
8	FP-59	14 IN. CRT LEXAN WINDOW, SMOKED MMC 6-01-004-054
9	LB-40	CENTURION V NAMEPLATE MMC 6-08-004-004

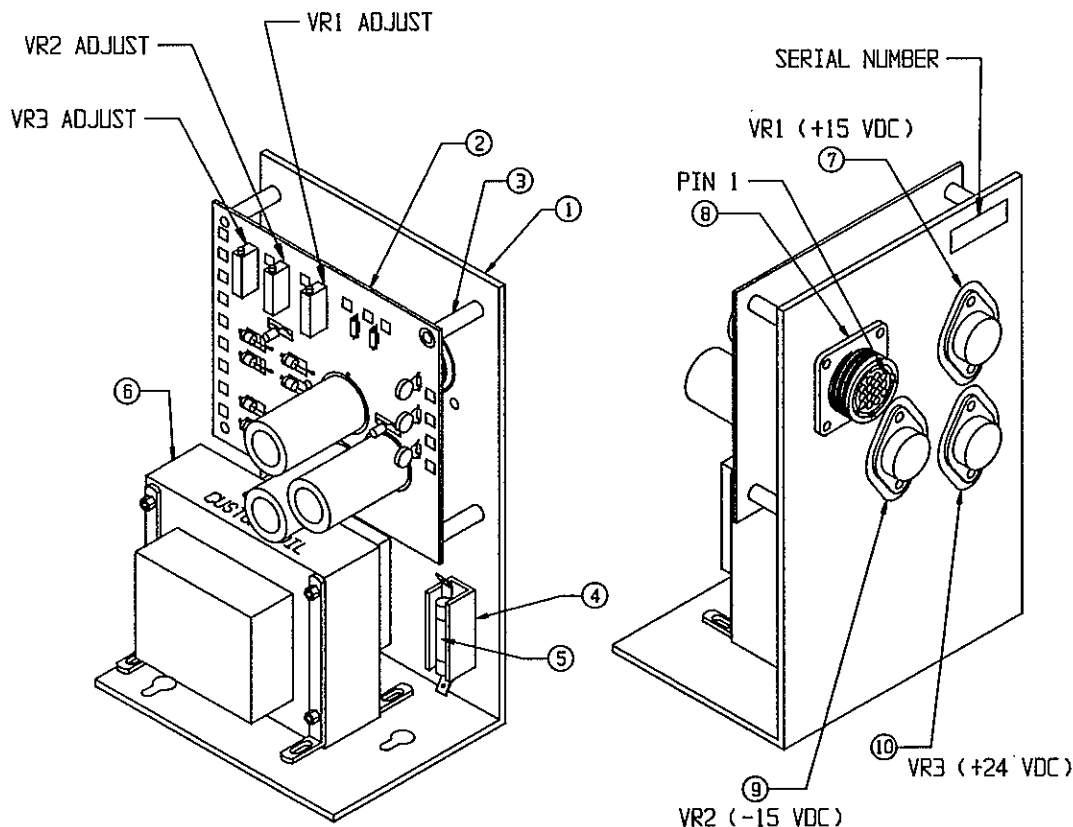
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE FRONT PANEL ASSEMBLY - FRONT		
X.XXX	+/- .005	APPLICATION CENTURION V		
X.XX	+/- .010	SCALE 3:1	DMG No 6-11-004-001	SIZE B
X.X	+/- .030	DATE 25 FEB 93	DRAWN BY REUTER	SHEET NO. 1 OF 1
ANGLE	+/- 1.0°			



- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	B0-51	KEYPAD ASSY. ALPHA/NUMERIC DIGITRAN No. KC0246-01
2	7315	KEYBOARD ENCODER CARD PC-KYBENC-02 MMC DWG. 6-07-004-011
3	SW-39	SWITCH CONTACT BLOCK, N/C, DEM No. V-40
4	FP-51	FRONT PANEL GASKET, MMC 6-01-004-007
5	B0-50	KEYPAD ASSY. FUNCTION KEYS DIGITRAN No. KC0245-01
6	ED-30	HANDWHEEL ENCODER, 100 COUNT SUHTAK No. LGS-022-100
7	SW-14	ROTARY SWITCH (FEEDRATE) ELECTROSWITCH No. 74-0246
8	7300	FRONT PANEL SWITCH BOARD PC-FPSW-01 MMC DWG. 6-07-004-006
9	SW-14	ROTARY SWITCH (SPINDLE) ELECTROSWITCH No. 74-0246
10	FP-60	14 INCH CRT FRONT PANEL 6-01-004-053
11	SW-87	SWITCH, MOMENTARY CONTACT, DPDT HONEYWELL MICROSWITCH AML21CBA3AC
12	SW-23	SWITCH ACTUATOR, RED MUSHROOM TOP ALCO T2050-2
13	SP-72	HEX SPACER, 6-32 UNC M/F x 1.25

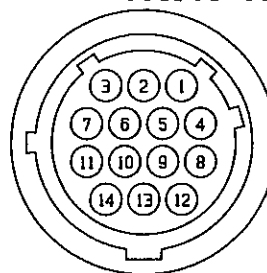
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX +/- .005 X.XX +/- .010 X.X +/- .030 ANGLE +/- 1.0°				
TITLE		FRONT PANEL ASSEMBLY - REAR		
APPLICATION		CENTURION V		
SCALE	3:1	DWG No	6-11-004-000	SIZE B
DATE	4 FEB 93	DRAWN BY	REUTER	SHEET NO. 1 OF 1



- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION
1	BR-57	+/-15 VDC - 24 VDC P.S. BRKT DWG No. 6-01-018-050
2	BD-42	PRINTED CIRCUIT BOARD PC-15/24 PS-01 PARTS L/D - 6-03-018-013
3	SP-56	NYLON SPACER, No. 6 x 1-1/4 CATAMOUNT No. SPNY-089
4	FJ-09	FUSE CLIP, BUSSMAN No. SB102-1X
5	FJ-28	FUSE, GLASS, 2 AMP SLO-BLD BUSSMAN No. MDL2
6	TR-30	TRANSFORMER, IRON CORE, MULTI-TAP CUSTOM COIL No. B91-100
7	TS-09	VOLTAGE REGULATOR, LM338
8	CD-18	CONNECTOR, 14 PIN, ROUND, FEMALE AMP No. 206043-1
9	RG-04	VOLTAGE REGULATOR, LM337
10	RG-10	VOLTAGE REGULATOR, LM338

- OUTPUT CONNECTOR PINS -



1	110 VAC INPUT
2	110 VAC INPUT
3	NO CONNECT
4	+24 VDC
5	+24 VDC
6	NO CONNECT - KEY
7	+15 VDC
8	+15 VDC
9	-15 VDC
10	-15 VDC
11	GROUND
12	GROUND
13	GROUND
14	GROUND

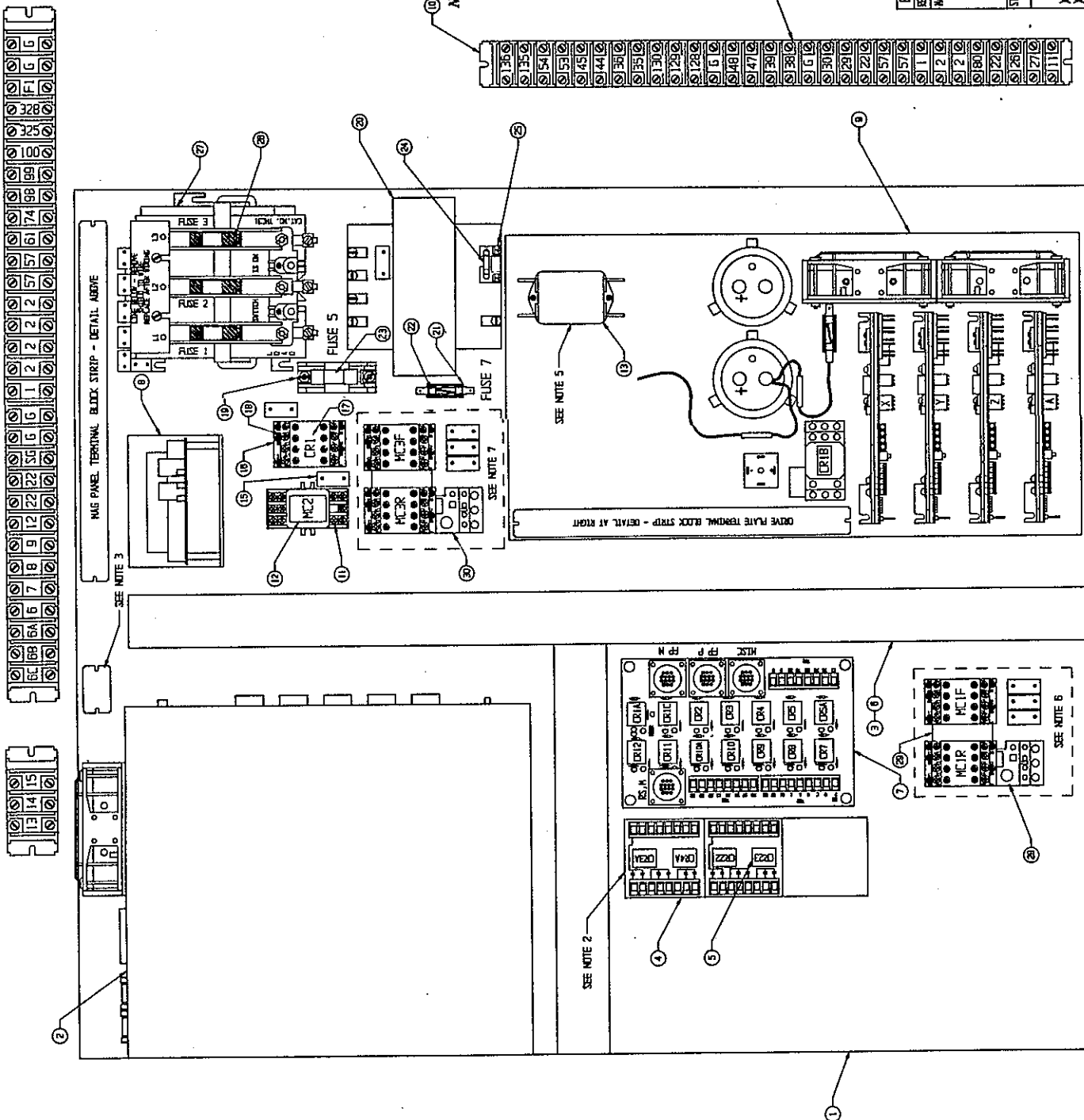
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX +/- .005				
X.XX +/- .010		TITLE 15/24 VDC POWER SUPPLY ASSY.		
X.X +/- .030		APPLICATION GENERAL PRODUCTS		
ANGLE +/- 1.0°		SCALE 1.5:1	DWG No 6-11-018-001	SIZE B
		DATE 4 FEB 94	DRAWN BY REUTER	SHEET NO. 1 OF 1

PARTS LIST

[illegible]

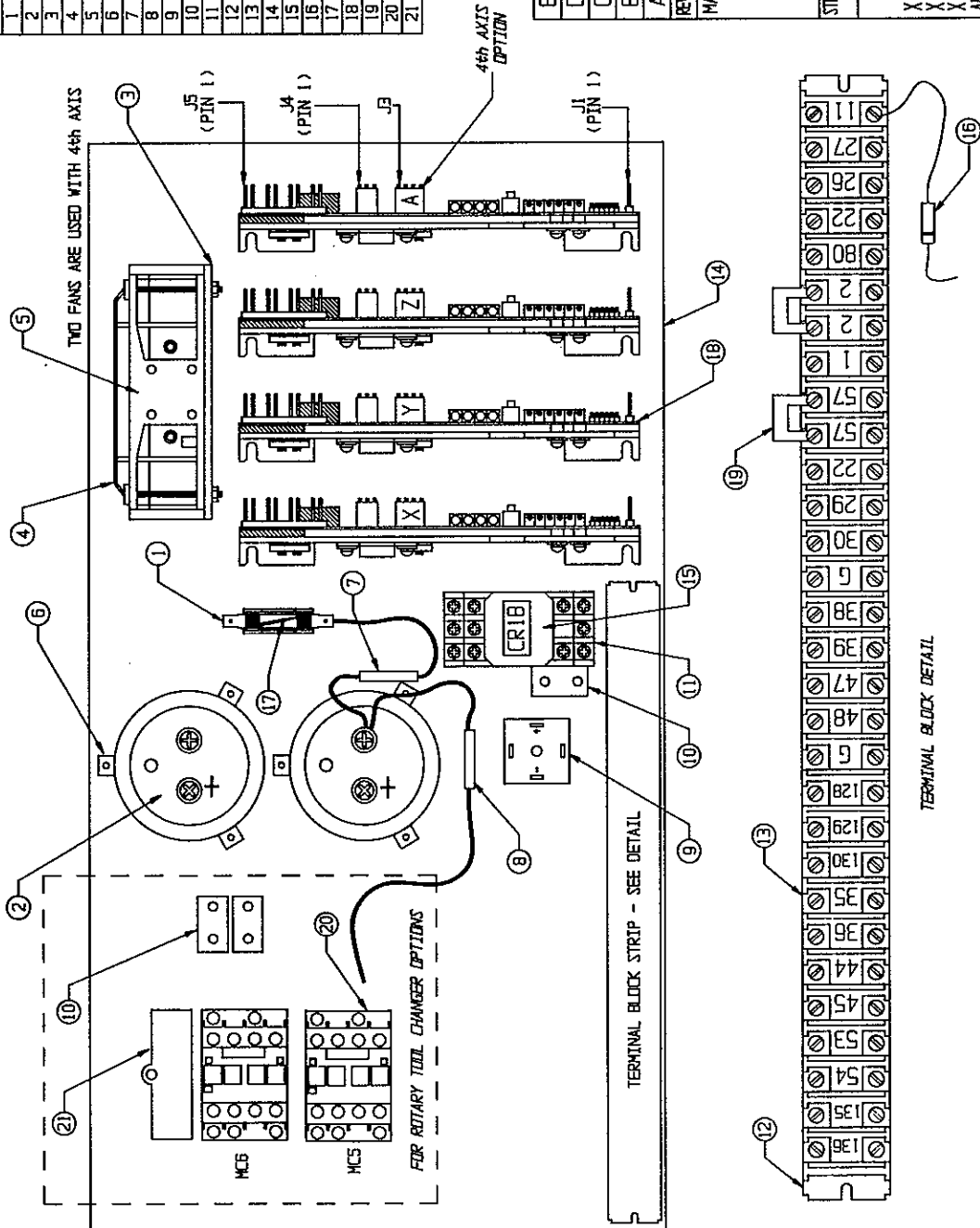
ES.
1. REF. TO DWS. No. 6-03-018-015 FOR COMPLETE DRAWING OF
THE DRIVE PLATE. SHOWN WITH ALL 4 AXES INSTALLED.

2. CONTROL RELAYS FOR AC SPINDLE INVERTER.
3. AND 1 (TB-02) & 3 (TB-01) FOR OPTIMAL M-FUNCTION.
4. PART QUANTITIES ARE FOR MAG PANEL ASSEMBLY ONLY.
REF. TO SUB-ASSEMBLY DRAWINGS FOR OTHER PART QUANTITIES.
PART QUANTITIES INCLUDE OILING.
5. LINE FILTER BOM IN THIS LOCATION WHEN PARTNER V KEE
OPTIONS ARE INSTALLED. OTHERWISE LINE FILTER IS
PLACED WHERE KCF & MCB ARE LOCATED.
6. CONTACTORS KCF & MCB AND ASSOCIATED COMPONENTS ARE FOR
PARTNER V REMOTE DRIVE. (NO AC SPINDLE INVERTER).
7. CONTACTORS MCB & KCF AND ASSOCIATED COMPONENTS
ARE FOR THE PARTNER V POWER KEE OPTION.

[illegible]

- PARTS LIST -

No.	QTY	STOCK No.	DESCRIPTION
1	1	FU-09	FUSE CLIP, SINGLE MOL.
2	2	CA-51	CAPACITOR, .7700 uFD 200 VDC
3	1 or 2	BR-09	FAN BRACKET
4	1 or 2	FA-04	FAN GUARD WFG 473
5	1 or 2	FA-01	FAN A47B15A153
6	2	CA-30	CAPACITOR MOUNTING RING VR-12
7	1	RE-48	RESISTOR 10 OHM 10 W 5% VCI OF
8	1	RE-90	RESISTOR - 500 OHM/10W
9	1	DI-14	NOISE SUPPRESSOR 220V
10	1 or 3	HI-09	NOISE SUPPRESSOR 220V
11	1	RL-06	RELAY SOCKET BASE SL711
12	1	TR-02	TERMINAL BLOCK END PIECE No. 630
13	30	TR-01	TERMINAL BLOCK No. 625
14	1	PL-39	160 VDC DRIVE PLATE
15	1	RI-05	RELAY TPOT 20308-84
16	1	DI-04	ZENER DIODE - 1N4745
17	1	FU-46	FUSE, 1A, SLO-BLD, MOL GLASS
18	3 or 4	AM-25	AXIS SERVO DRIVE AMP, GLENTEK GA370-3
19	2	TR-16	TERMINAL BLOCK JUMPER, 2 POSITION
20	2	RL-56	CONTACTOR RELAY, 3 HP
21	1	MD-72	MOTOR START CAPACITOR, 3.5uF 400 VAC



REV.	DESCRIPTION	E.C.D. NO.	APPRO BY	DATE
E	FILE UPDATE, SERIES F	1725	CR	2/94
D	REM. INDUCTORS, ETC...	658	T.W.	10/91
C	ADD CONNECTOR I.D.	345	T.W.	12/90
B	ADD TB-57	305	K.R.B.	10/90
A	REFERENCE TO E.C.D.	296	K.R.B.	10/90

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

STOCK/ASY No. 8205
 TOLERANCE UNLESS SPECIFIED
 X.XXX ± .005
 X.XX ± .010
 X.X ± .030
 ANGLE ± 1.0°

TITLE 160 VDC DRIVE PLATE
 APPLICATION GENERAL PRODUCTS
 SCALE 2.5:1
 DATE 19 JAN 90
 DRAWN BY THOMPSON
 SHEET NO. 1 OF 2

CENTURION V MILL INTERFACE PLUG DESIGNATION
PC-INTF-01

		14 PIN AMP PLUGS		
MISC. PIN		FRONT PANEL	POWER PLUG	ENCODER PLUG
1		+5VDC	+5VDC	+CH. A
2		GND	+5VDC	-CH. A
3		KEY	+5VDC	+CH. B
4		+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

14 PIN AMP PLUG				
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	SPARE	OUT. 8	TCH RESET
9	IN. 9	SPARE	OUT. 9	ALLOW RESET
10	IN. 10	SPARE	OUT. 10	M 10
11	IN. 11	SPARE	OUT. 11	M 11
12	KEY		OUT. 12	M 12
13	N/O CONTACT	ACROLOOP (P2)	KEY	
14	N/C CONTACT	ACROLOOP (P2)	CONTACT COM.	ACROLOOP (P2)

ELECTRICAL PRINTS FOR PARTNER 2D

INSTRUCTIONS

- 1) ALL INTERCONNECT DIAGRAMS HAVE A SCALE ON THE LEFT SIDE OF THE PAGE TO HELP LOCATE RELAY CONTACTS. LOCATION NUMBERS OF EACH CONTACT ARE NUMBERED NEXT TO THE RELAY COIL.
EXAMPLE: (2,12) 2=PAGE NUMBER 12= SCALE NUMBER

PAGE	DRAWING #	TITLE
0	6-04-018-019	TERMINAL BLOCK DESIGNATION
1	6-06-013-104	AC SYSTEM WIRING C5
2	6-06-018-037	DC SYSTEM WIRE C5
3	6-06-018-035	MOTOR/ENCODER INTERFACE C5
4	6-06-018-018	4-AXIS DRIVE SCHEMATIC
5	6-06-018-032	24V +/-15VDC POWER SUPPLY
6	6-06-018-021	PC-REL-1B SCHEMATIC
7	6-06-018-021	PC-REL-1B SCHEMATIC
8	6-03-018-000	PC-REL-1B BOARD LAYOUT
9	6-04-018-005	PC-REL-1B I/O PLUG DEFINITIONS

TERMINAL BLOCK DESIGNATORS

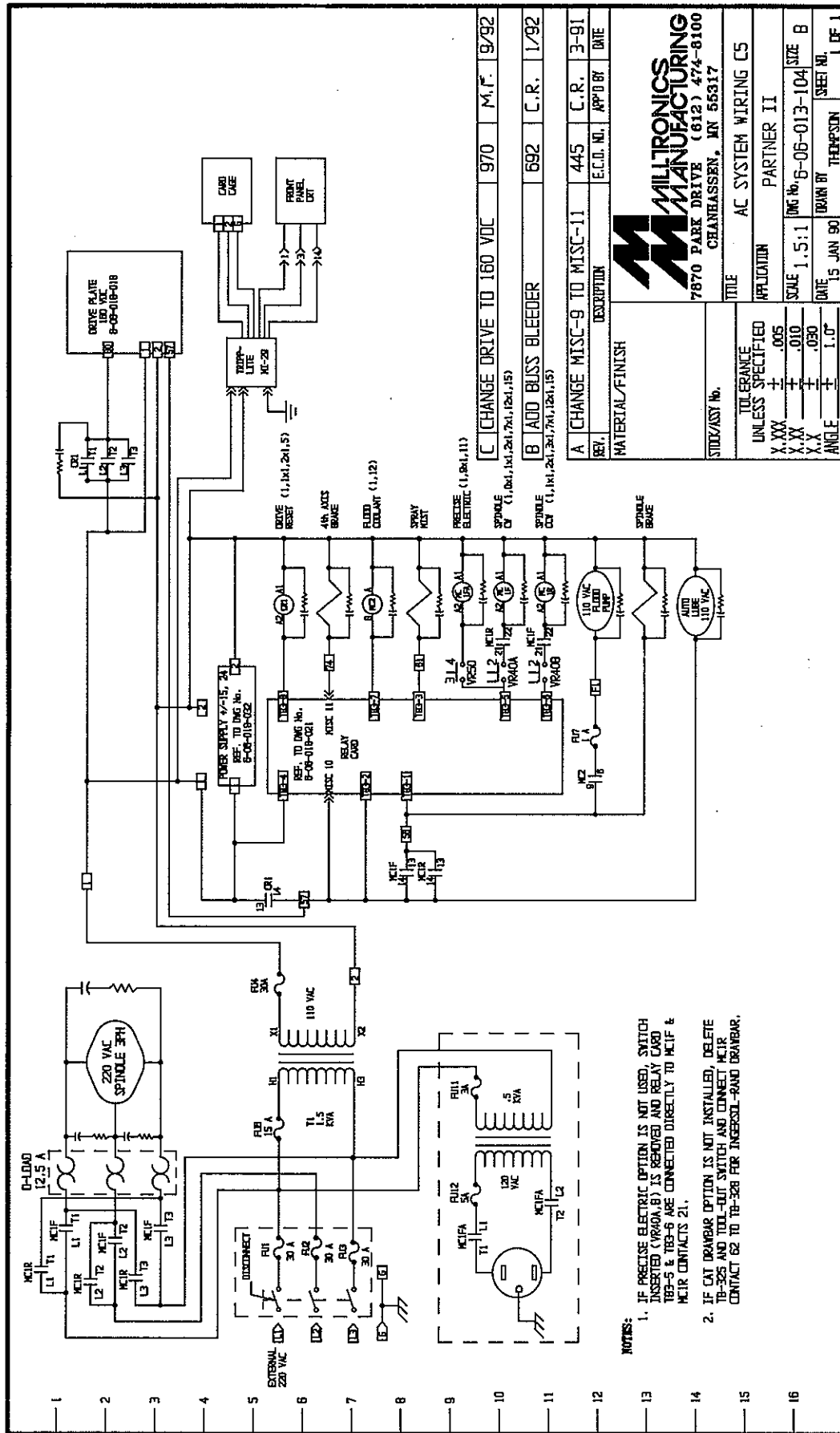
1. 115 VAC HOT
2. 115 VAC COMMON
6. X DTL SW. OUT
- 6A. SPINDLE FAULT
7. Y DTL SW. OUT/X DTL SW. IN
8. Z DTL SW. OUT/Y DTL SW. IN
9. Z DTL SW. IN
12. +24 VOC FROM PWR. SUPPLY
13. M-FUNC. COMMON
14. M-FUNC. N/O
15. M-FUNC. N/C
16. 2nd M-FUNC. COMMON
17. 2nd M-FUNC. N/O
18. 2nd M-FUNC. N/C
22. GROUND FROM PWR. SUPPLY
26. +15 VOC FROM PWR. SUPPLY
27. -15 VOC FROM PWR. SUPPLY
29. X-MOTOR TACH +
30. X-MOTOR TACH -
35. X-MOTOR +
36. X-MOTOR -
38. Y-MOTOR TACH +
39. Y-MOTOR TACH -
44. Y-MOTOR +
45. Y-MOTOR -
47. Z-MOTOR TACH +
48. Z-MOTOR TACH -
53. Z-MOTOR +
54. Z-MOTOR -
56. SPINDLE ENABLE
57. SW. 115 VAC HOT
61. 115 VAC FOR SPRAY
63. +24V. (POWER KNEE X PARTNER V ONLY)
64. DC. COMMON (POWER KNEE X PARTNER V ONLY)
65. SW. 220 VAC FOR AUTOLUBE
66. 220 VAC FOR AUTOLUBE
74. SW. 115 VAC FOR 4TH-AXIS BRAKE
80. 120 VAC FOR BUSS
98. KNEE UP (PARTNER V ONLY)
99. KNEE DOWN (PARTNER V ONLY)
100. Z AXIS DISABLE (AVANTI ATC)
102. Z AXIS DISABLE (AVANTI ATC)
129. A-MOTOR TACH +
130. A-MOTOR TACH -
135. A-MOTOR +
136. A-MOTOR -
325. TOOL OUT
328. POWER DRAWBAR
- F1. SW. 115 VAC TO FLOOD COOLANT
- G. CHASSIS GROUND

RELAYS

- CR1. RESET
- CR1A. EXCESS ERROR
- CR1B. DRIVE DISABLE
- CR1C. DRIVE RESET
- CR2. TOOL CHANGE RESET
- CR3. SPINDLE CLOCKWISE
- CR3A. SPINDLE COUNTERCLOCKWISE
- CR4. SPINDLE CCW YASKAWA
- CR4A. SPINDLE STOP
- CR5. SPINDLE SAFETY
- CR5A. SPRAY MIST
- CR7. FLOOD COOLANT
- CR8. SPINDLE HI/LO
- CR9. SPINDLE ENABLE
- CR10. SPINDLE SAFETY
- CR10A. AUXILIARY RELAY
- CR11. AUXILIARY RELAY
- CR12. DRAWBAR
- CR23. DRAWBAR (PARTNER I ATC)
- CR24. TOOL OUT/IN (PARTNER I ATC)
- CR25. CAROUSEL CW (PARTNER I ATC)
- CR26. CAROUSEL CCW (PARTNER I ATC)
- CR30. CW (AVANTI ATC)
- CR31. CCW (AVANTI ATC)
- CR32. HOME (AVANTI ATC)
- CR33. ZERO SPEED (AVANTI ATC)
- CR34. TOOL OUT (AVANTI ATC)
- CR35. TOOL IN (AVANTI ATC)
- CR36. DISABLE ATC (AVANTI ATC)
- CR64. 220 FOR AUTO LUBE
- MC1F. SPINDLE CW. (AC)
- MC1R. SPINDLE CCW (AC)
- MC2. FLOOD COOLANT (AC)
- MC3F. POWER KNEE FORWARD (PARTNER V ONLY)
- MC3R. POWER KNEE REVERSE (PARTNER V ONLY)

A. FORMERLY 6-04-015-102		E.C.O. NO.	APP'D BY	DATE
DESCRIPTION		MATERIAL/FINISH		
STOCK NO.		TOLERANCE UNLESS SPECIFIED		
		X.XXX ±		
		X.XX ±		
		X.X ±		
		ANGLE		
TITLE		TERMINAL BLOCK DES.		
APPLICATION		GENERAL PRODUCTS		
SCALE		1:1		
DATE		14 MAY 90		
DRAWN BY		THOMPSON		
SHEET NO.		1 OF 1		

MILLIRONICS MANUFACTURING
7870 PARK DRIVE (812) 474-8100
CHANEASSEN, MN 55317



- NOTES:**
- IF PRECISE ELECTRIC OPTION IS NOT USED, SWITCH INSERTED (WIRING B) IS REMOVED AND RELAY CABO TB3-5 & TB3-6 ARE CONNECTED DIRECTLY TO MCIF & MCIR CONTACTS 21.
 - IF CAT DRAWBAR OPTION IS NOT INSTALLED, DELETE TB3-5 AND TOOL-OUT SWITCH AND CONNECT MCIR CONTACT 62 TO TB3-26 FOR INKROLL-RAND DRAWBAR.

C CHANGE DRIVE TO 160 VDC 970 M.F. 9/92

B ADD BUSS BLEEDER 692 C.R. 1/92

A CHANGE MISC-9 TO MISC-11 445 C.R. 3-91

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
A	CHANGE MISC-9 TO MISC-11	445	C.R.	3-91
B	ADD BUSS BLEEDER	692	C.R.	1/92
C	CHANGE DRIVE TO 160 VDC	970	M.F.	9/92

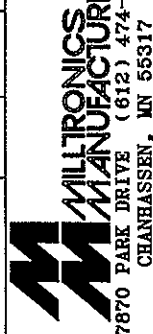
MATERIAL/FINISH

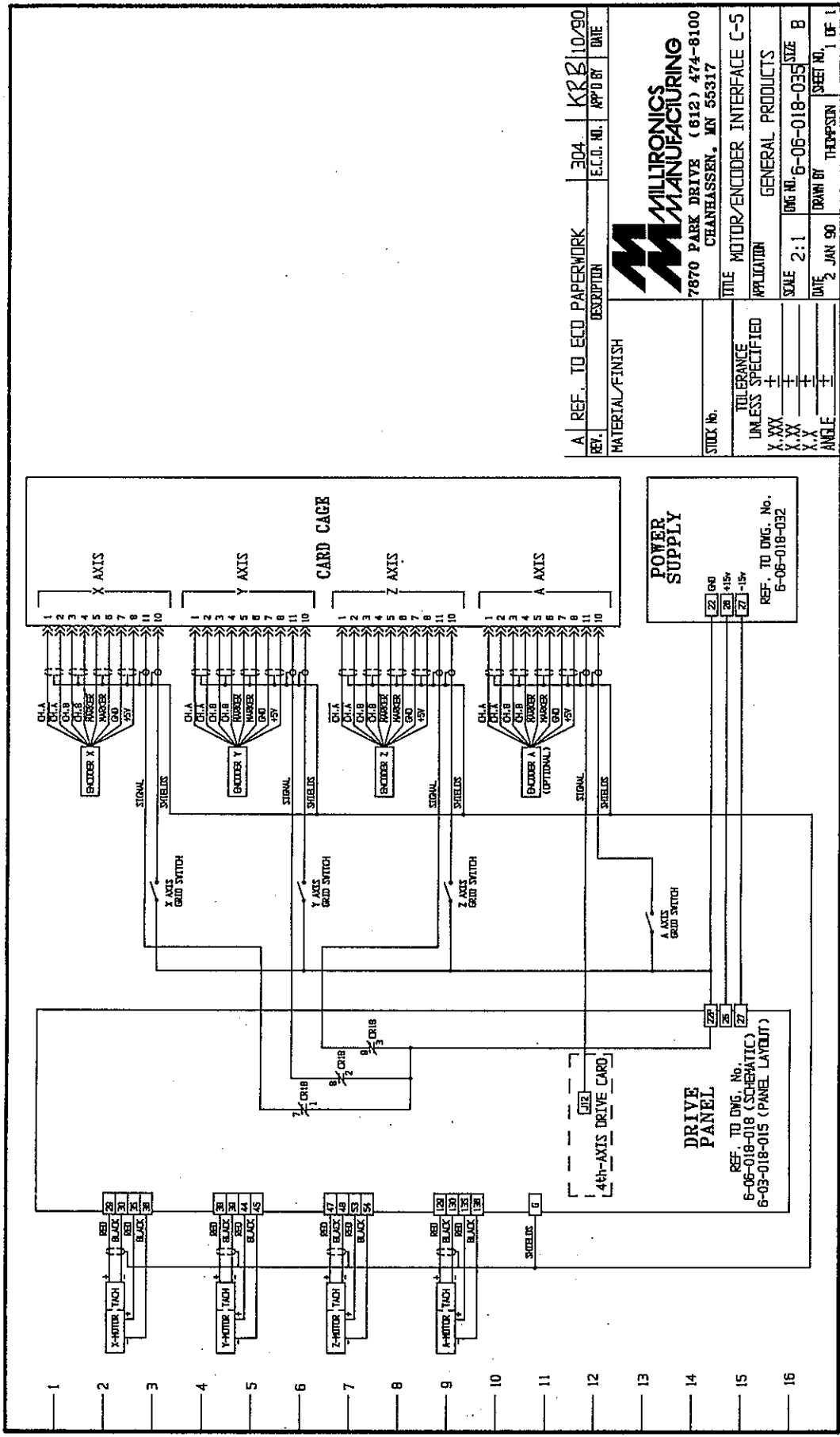
MILLITRONICS MANUFACTURING
7870 PARK DRIVE (612) 474-8100
CHAMBERS, MN 55317

TOLERANCE UNLESS SPECIFIED	SCALE	DATE	BY	CHK'D BY	DATE
X.XX ± .005	1.5:1	15 JAN 90	THOMPSON		
X.XX ± .010					
X.XX ± .030					
ANGLE ± 1.0°					

TITLE AC SYSTEM WIRING C5
APPLICATION PARTNER II

STUD/ASSY No.
UNLESS SPECIFIED
SCALE 1.5:1
DATE 15 JAN 90
BY THOMPSON
CHK'D BY



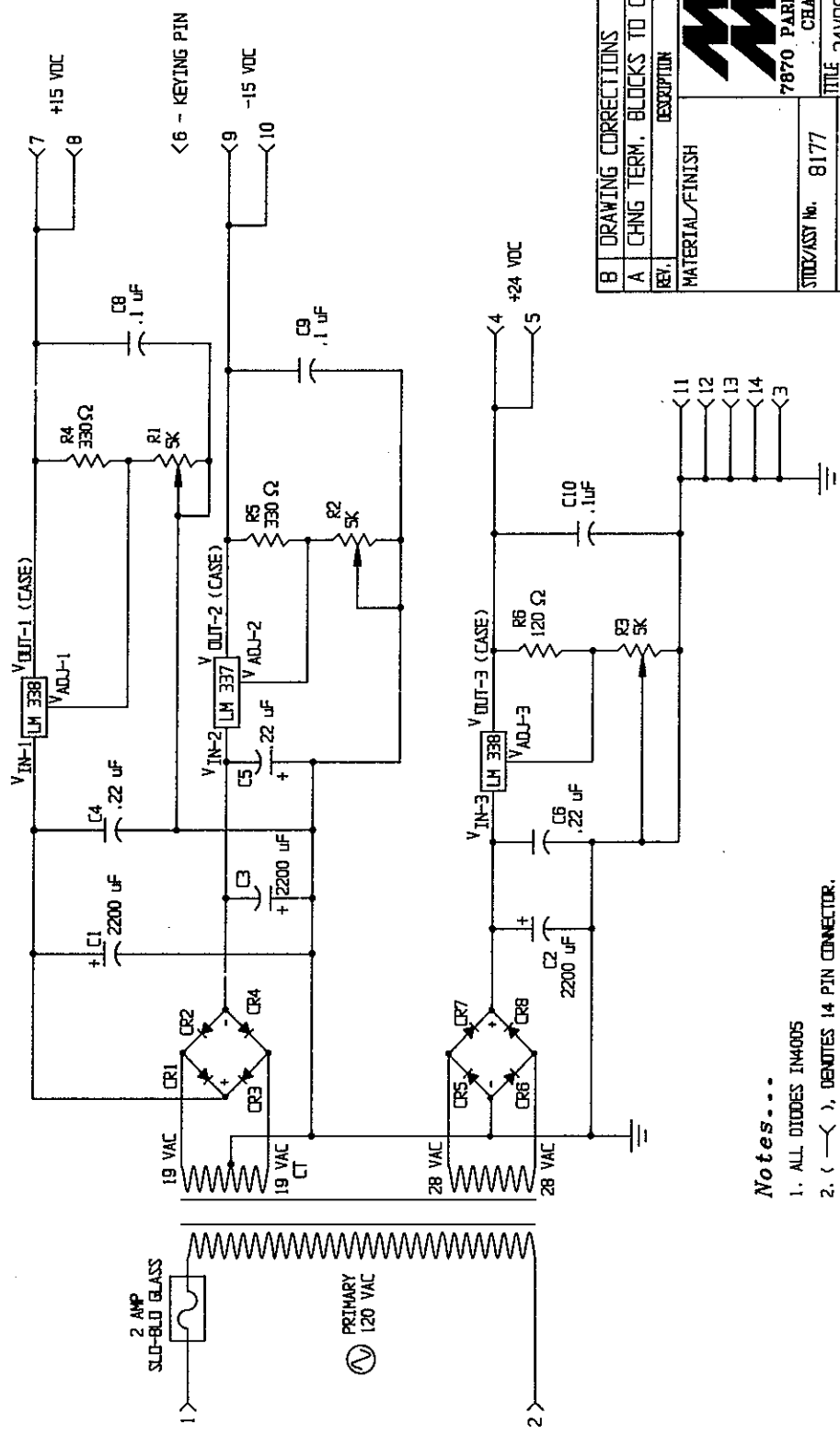


A REF. TO ECO PAPERWORK		304	KR2	10/90
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
7870 PARK DRIVE (812) 474-8100 CHANHASSEN, MN 55317				
TITLE MOTOR/ENCODER INTERFACE C-5				
APPLICATION GENERAL PRODUCTS				
SCALE 2:1				
DATE 2 JAN 90				
DRAWN BY THOMPSON				
SHEET NO. 1 OF 1				
STOCK NO. TOLERANCE UNLESS SPECIFIED X.XXX ± X.XX ± X.X ± ANGLE ±				

POWER SUPPLY
 REF. TO DNG. No.
 6-06-018-032

DRIVE PANEL
 REF. TO DNG. No.
 6-06-018-018 (SCHEMATIC)
 6-03-018-015 (PANEL LAYOUT)

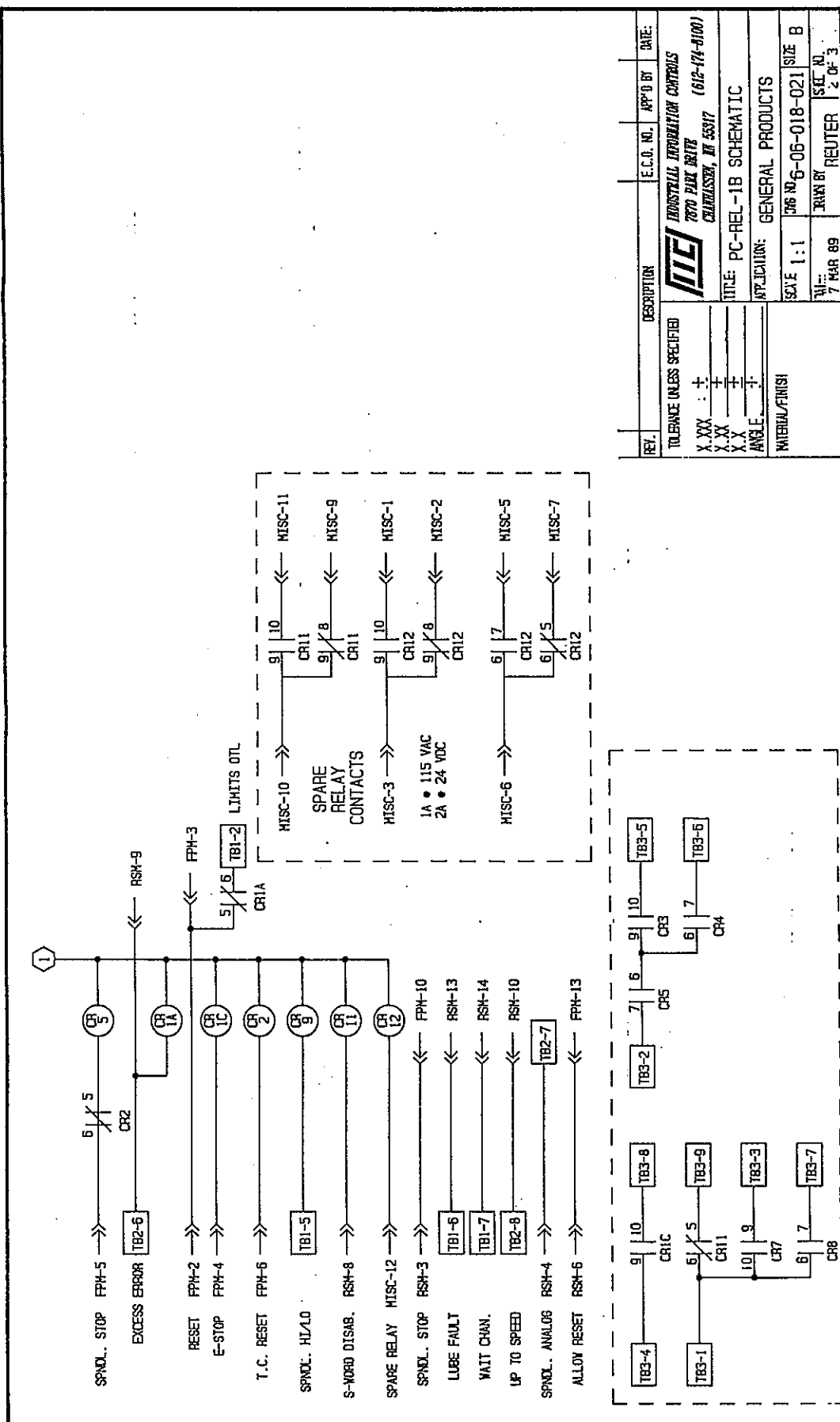
4th-AXIS DRIVE CARD

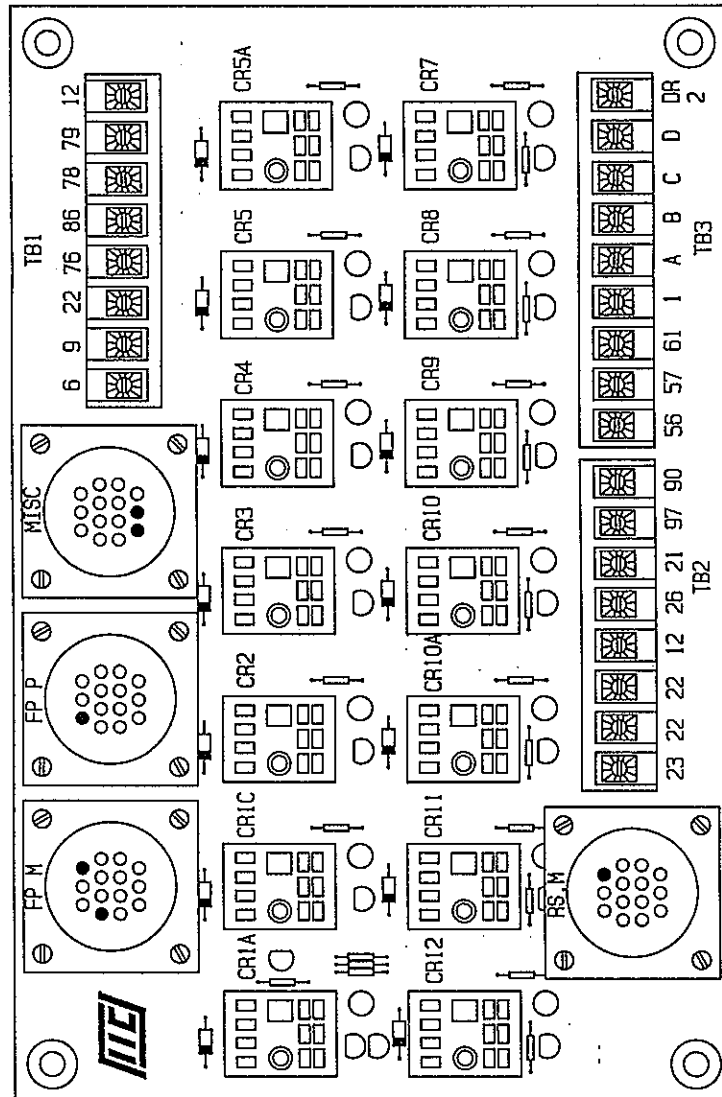


- Notes...**
1. ALL DIODES 1N4005
 2. (—) , DENOTES 14 PIN CONNECTOR.
 3. REF. TO DWG. 6-10-018-003 FOR POWER SUPPLY ASSEMBLY.

DRAWING CORRECTIONS		1470	EL.	10/93
A CHNG TERM. BLOCKS TO C018		1147	C.R.	2/93
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STUD/ASSY No. 8177				
TOLERANCE UNLESS SPECIFIED				
X.XXX ± .005				
X.XX ± .010				
X.X ± .030				
ANGLE ± 1.0°				
TITLE 24VDC, +/-15VDC POWER SUPPLY				
APPLICATION GENERAL PRODUCTS				
SCALE 1, 25:1 DWG No. 6-06-018-032 SIZE B				
DATE 31 OCT 85 DRAWN BY THOMPSON SHEET NO. 1 OF 1				

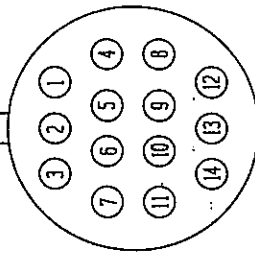
MILLITRONICS MANUFACTURING
 7870 PARK DRIVE (612) 474-8100
 CHANHASSEN, MN 55317





REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
	TOLERANCE UNLESS SPECIFIED			
	X.XXX : ±			
	X.XX : ±			
	X.X : ±			
	ANGLE : ±			
	MATERIAL/FINISH			
	 INDUSTRIAL INFORMATION CONTROLS 7070 PARK DRIVE CHENNAI, IN 5317			
	TITLE: PC-REL-1B PANEL ASSY.			
	APPLICATION: GENERAL PRODUCTS			
	SCALE 1:1	DWG NO. 6-03-018-000	SIZE B	
	DATE: 15 NOV 88	DRAWN BY: REUTER	SHEET NO. 1 OF 1	

FEMALE AMP PLUG



TERMINAL BLOCK

1	2	3	4	5	6	7	8
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F.P.M.

PIN No.	FUNCTION	INT. DEST.
1	KEY	
2	RESET	CR1A-5
3	E STOP	FPW-2
4	E STOP	CRIC
5	SPINDLE STOP	CR2-6
6	TOOL CHANGE	CR2
7	KEY	
8	SPINDLE CV	CR4-10
9	TOOL CHG RESET	RSW-2
10	SPINDLE STOP	RSW-3
11	COOLANT SPRAY	CR-7
12	SPINDLE CV	CR4-10
13	RESET	RSW-6
14	COOLANT FLOOD	CR8

F.P.P.

PIN No.	FUNCTION
1	+5VCC
2	+5V
3	KEY
4	GND
5	GND
6	GND
7	GND
8	+15V
9	+15V
10	SWITCHED 24V
11	24V
12	SPARE
13	SPARE
14	SPARE

MISC.

PIN No.	FUNCTION
1	CR 12-10
2	CR 12-8
3	CR 12-9
4	N/A
5	CR 12-7
6	CR 12-6
7	CR 12-5
8	SPARE
9	CR 11-8
10	CR 11-9
11	CR 11-10
12	CR 12 COIL
13	KEY
14	KEY

RSM (CNC)

PIN No.	FUNCTION	INT. DEST.
1	SPINDLE CV	CR10A-10
2	TOOL CHG RESET	CR4-10
3	SPINDLE STOP	FPW-10
4	SPINDLE ANALOG	TR2-7
5	SPINDLE CV	CR10A-6
6	RESET ALLOW	FPW-13
7	COOLANT FLOOD	CR8
8	S-WRD DISABLE	CR11
9	EXCESS ERROR	TR2-6
10	UP TO SPEED	TR2-8
11	COOLANT SPRAY	CR7
12	SPINDLE ENABLE	CR4-10
13	LUBE FAULT	TBI-6
14	WAIT CHANNEL	TBI-14

NOTES:

1. TABLES REFERENCE TO PC REL. 1B 1/0 BOARD ONLY

T.B. 1

T.B. No.	FUNCTION	INT. DEST.
1 (6)	OVER TRAVEL LIMITS	CR4 CR4-4
2 (9)	OVER TRAVEL LIMITS	CR1A
3 (22)	GND	
4 (76)	+15V	
5 (86)	SPINDLE ANALOG	
6 (78)	DNC AUTO LUBE	CR9
7 (79)	DNC WAIT CHANNEL	RSW-13
8 (12)	+24V	RSW-14

T.B. 2

T.B. No.	FUNCTION	INT. DEST.
1 (23)	+5V	
2 (22)	GND	
3 (22)	GND	
4 (12)	+24V	
5 (26)	+15V	
6 (21)	EXCESS ERROR	CR1A
7 (97)	SPINDLE ANALOG	RSW-4
8 (90)	AUTO SPEED	RSW-10

T.B. 3

T.B. No.	FUNCTION	INT. DEST.
1 (56)	AC MAGNETICS	CR4 CR4-4
2 (57)	AC MAGNETICS	CR5-7
3 (61)	AC MAGNETICS	CR7-9
4 (1)	AC MAGNETICS	CR1C-9
5 (A)	AC MAGNETICS	CR3-10
6 (B)	AC MAGNETICS	CR4-7
7 (C)	AC MAGNETICS	CR8-7
8 (D)	AC MAGNETICS	CR1C-10
9 (R2)	AC MAGNETICS	CR11-5

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
INDUSTRIAL INFORMATION CONTROLS 7870 PARK DRIVE CHICAGO, IL 60637 TITLE: PC REL. 1B 1/0 PLUS DEF. APPLICATION: GENERAL PRODUCTS SCALE: 1:1 DIMS NO. 6-04-018-005 SIZE B DATE: 11 AUG 88 DRAWN BY: REITER SHEET NO. 1 OF 1				