

Partner 2D

Electrical and Mechanical Manual

Milltronics Manufacturing Company

1400 Mill Lane
Waconia, MN USA 55387

952-442-1410

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	(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

WARNING

USE ONLY

MOBIL VACTRA no.2

AMOCO WAYTAC no.68

SUNOCO SUNWAYLUBE no.1180

OR EQUIVALENT

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 BG-14	1
8	204	RADIAL BALL BEARING BG-02	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

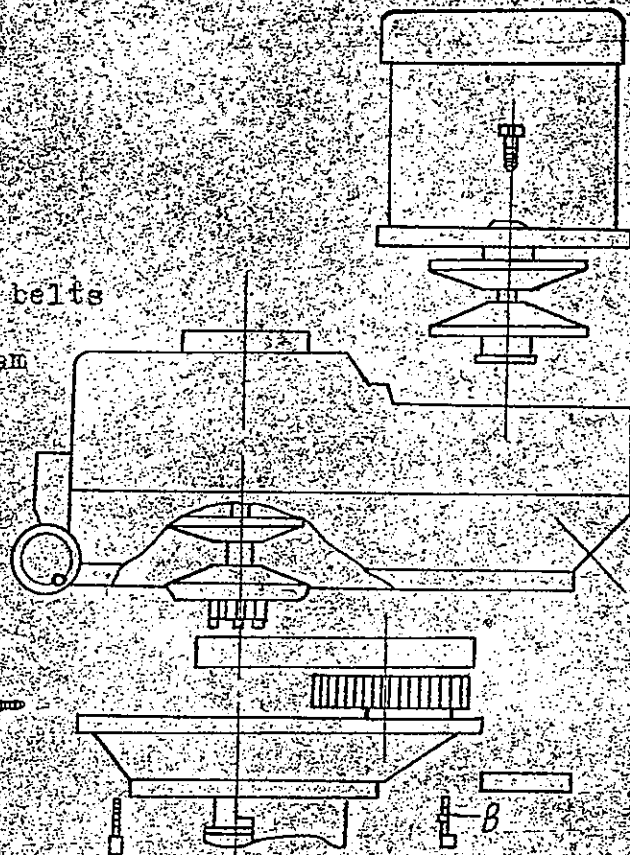
Upper Radial bearing (6007) BG-03
Front Sliding pulley bearing (6010) BG-11
Front bottom pulley bearing (6010) BG-11
Back gear bearing(6203) BG-13 x 2
Spindle Hub Pulley (6008) BG-12 x 2
Motor upper bearing(6204) BG-02
Motor lower bearing (6206) BG-14
Spindle thrust bearing(Fafnir JM 207K) BG-15
Spindle radial (6206) BG-14 x 2

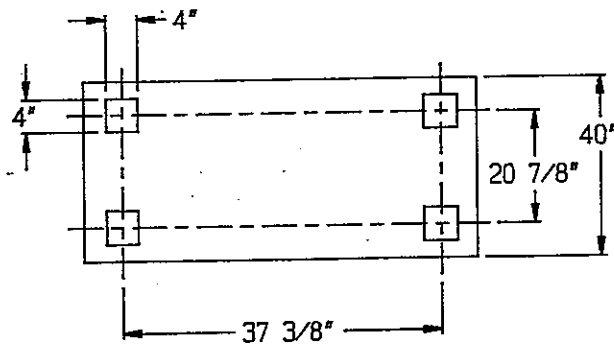
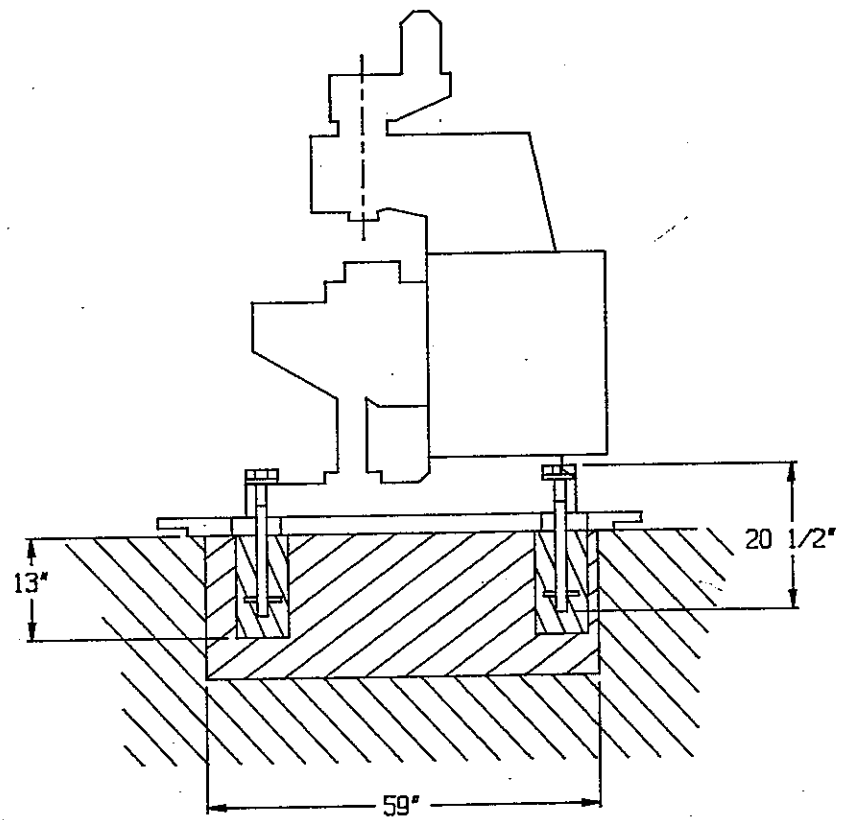
X and Y axis thrust(7204) BG-01 x 2
Z axis thrust 103KRD x 2
X axis radial (07097) BG-28 x 2
race(07205) for BG-28 is BG-27 x 2
Y axis radial (05079)BG-25 x 2 and the
race for BG-25 is BG-26

REPLACEMENT OF TIMING BELT (FIG. 13-B)

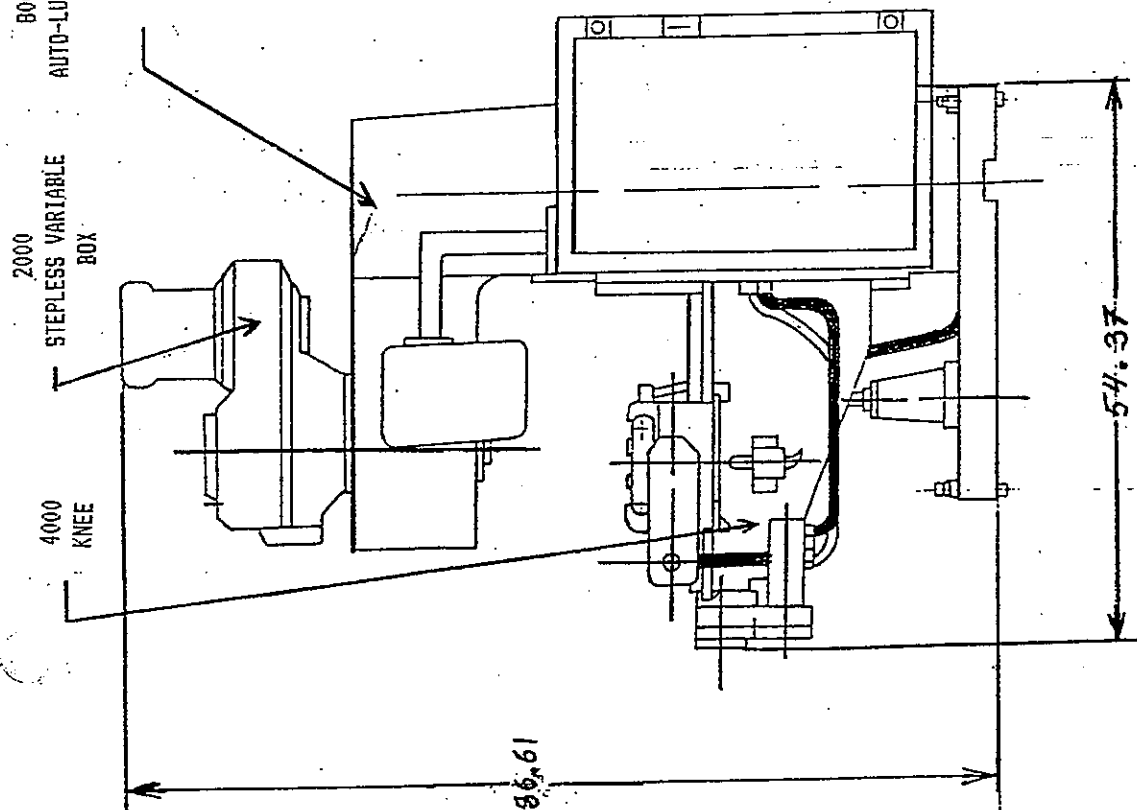
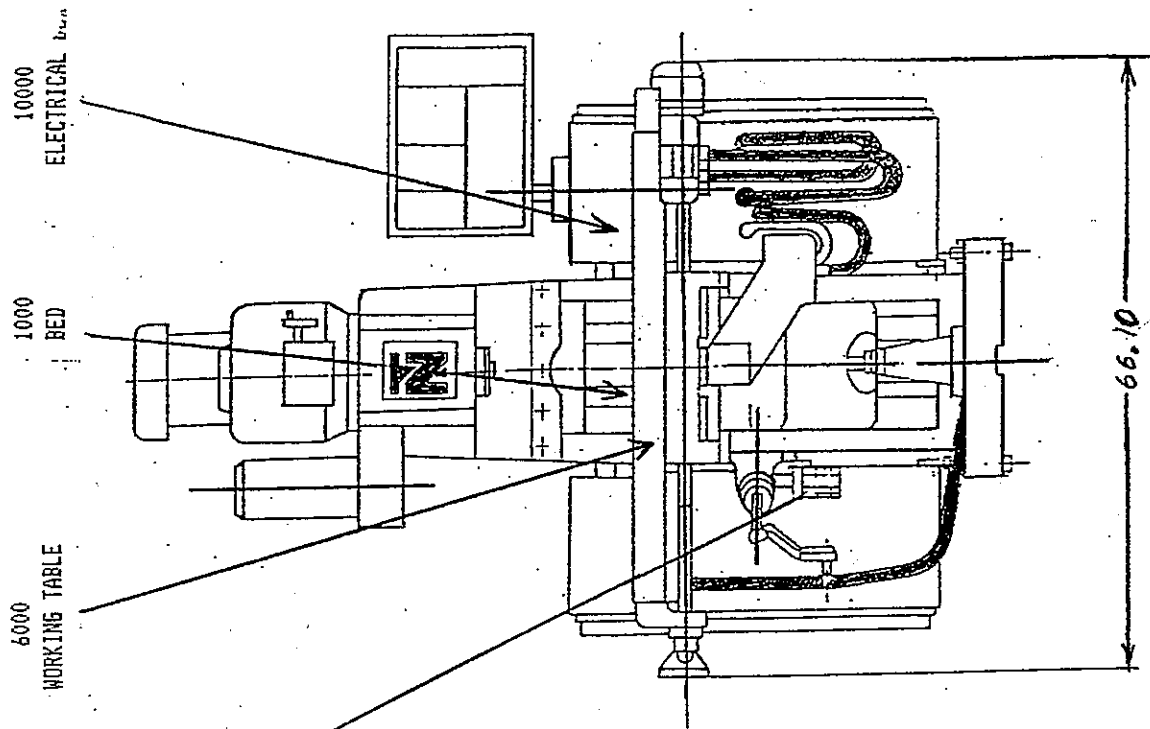
- 1) REMOVE THE MOTOR
- 2) LOWER THE QUILL TO THE LIMITED POSITION
- 3) REMOVE 2 SCREWS "A" WHICH ARE USED TO CONNECT HOUSING TO BOTTOM.
- 4) REMOVE 4 SCREWS "B".
- 5) TAP THE BOX SLIGHTLY FOR REMOVING 2 PINS, THEN REMOVE THE UPPER PART "C".

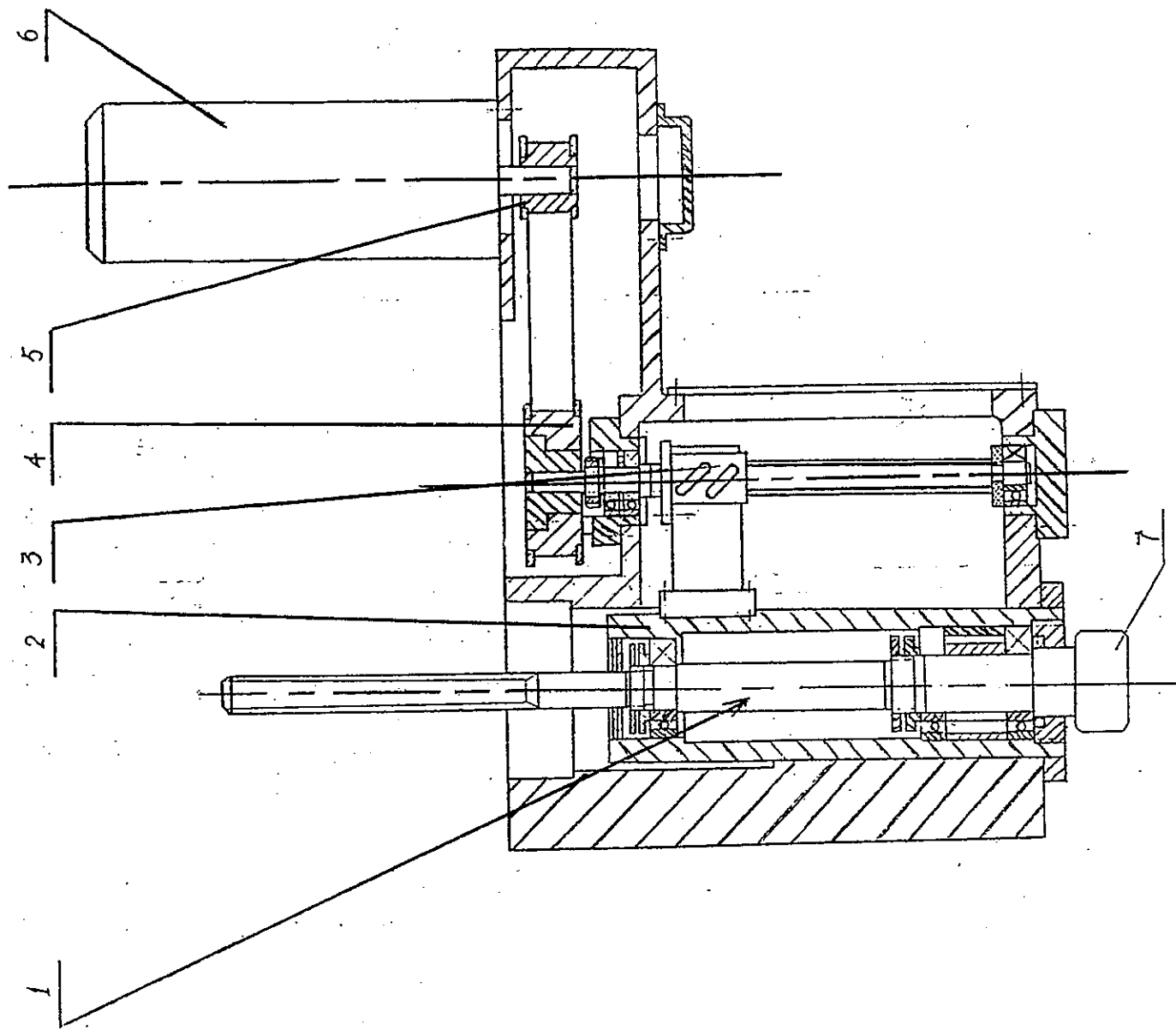
Fig. 13b Timing belts
replacement diagram





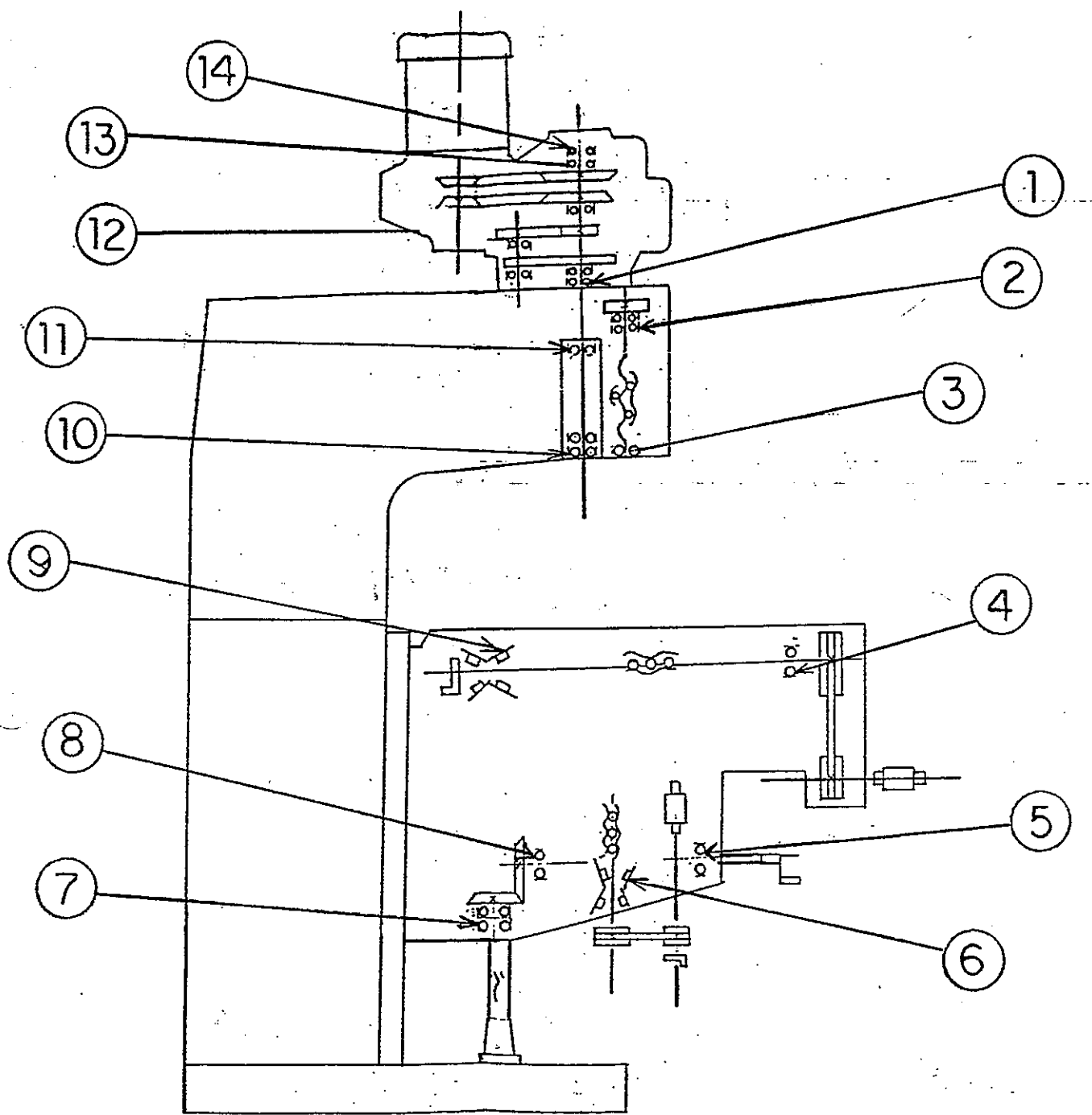
FOUNDATION DRAWING



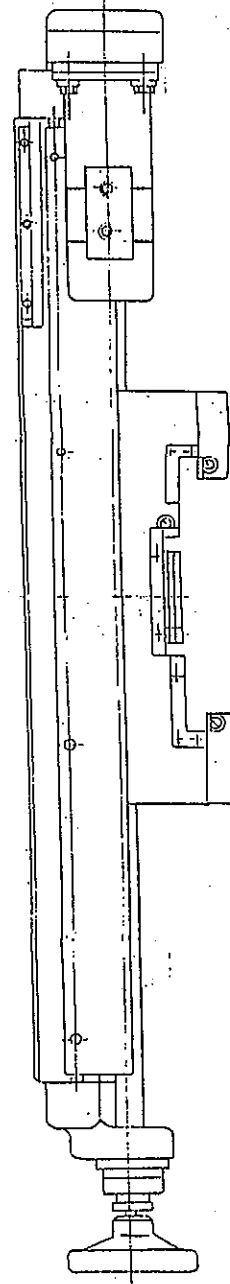
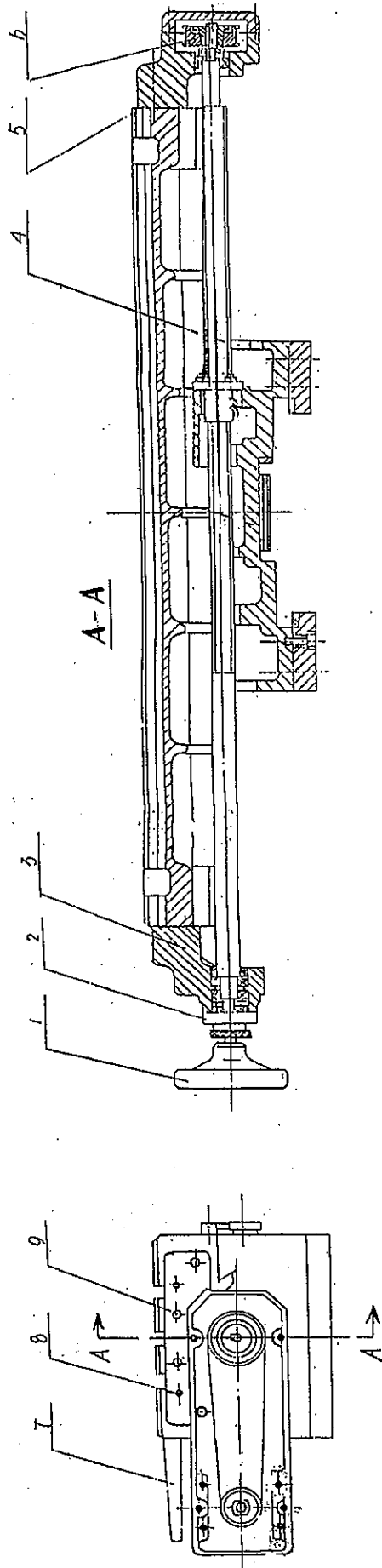


MILLING HEAD ASSY.

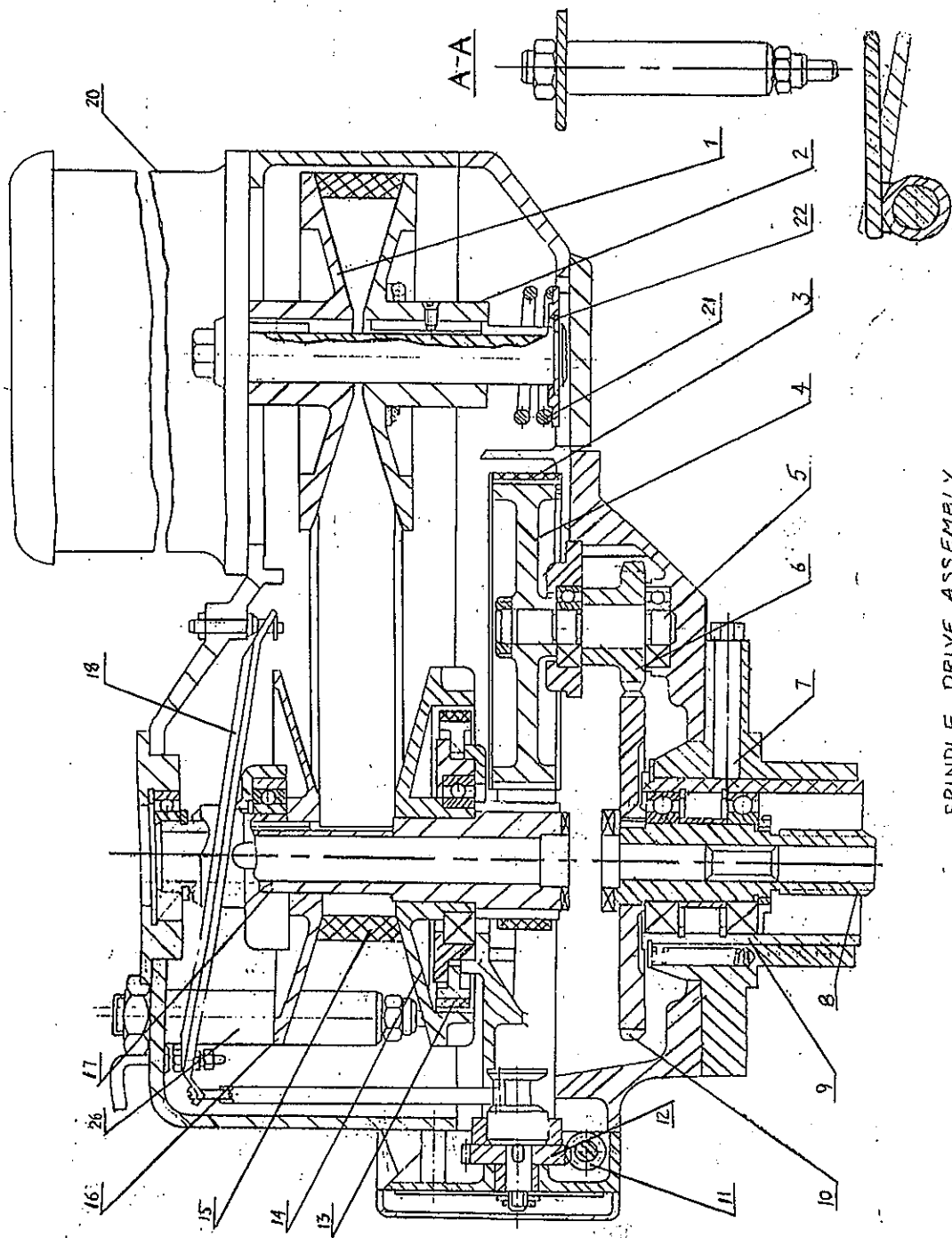
1. SPINDLE
2. QUILL
3. Z-AXIS BALL SCREW
4. TIMING PULLEY
5. Z-AXIS SERVO MOTOR
6. TOOL CHANGE NUT



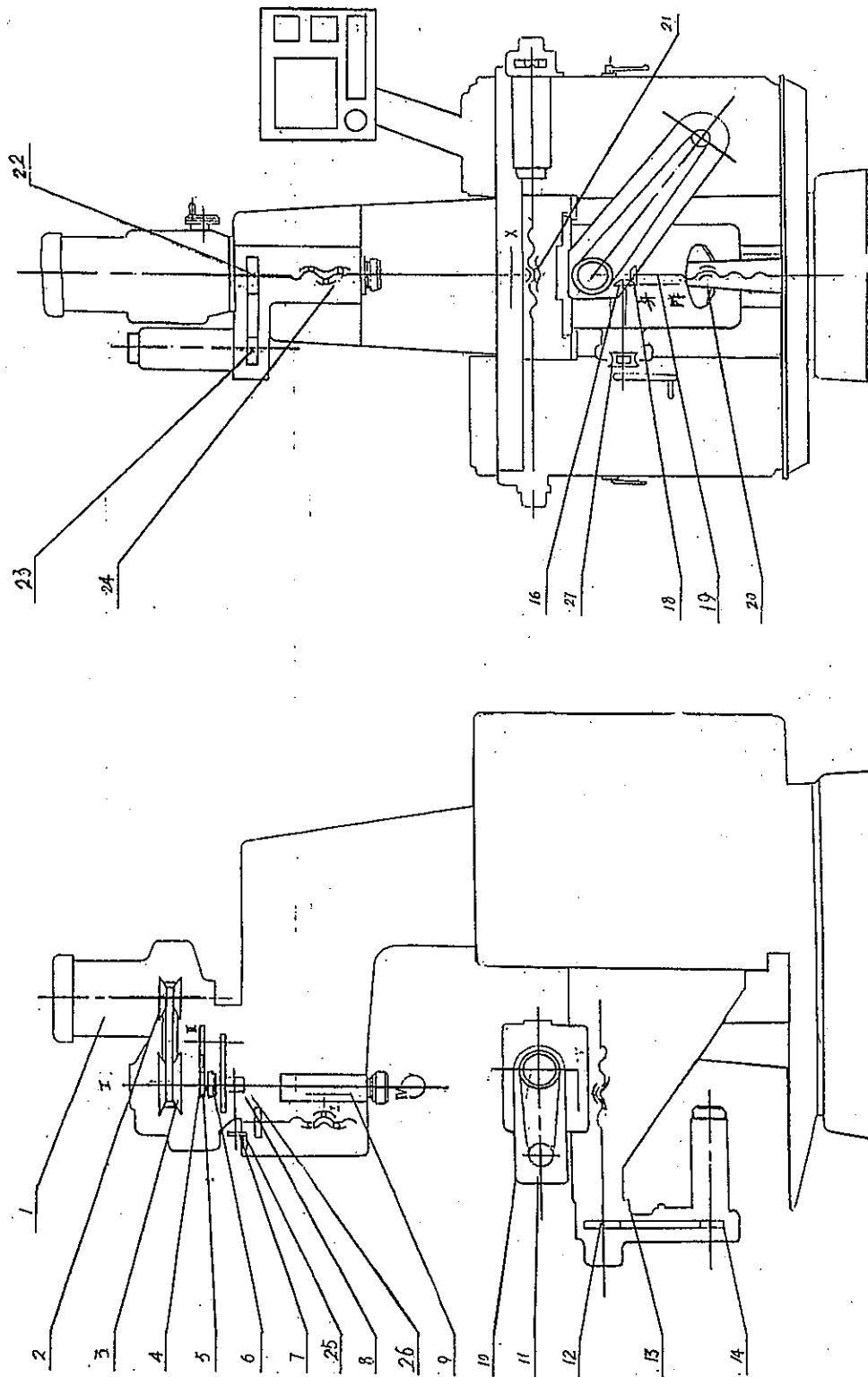
ROLLER BEARING LOCATIONS.



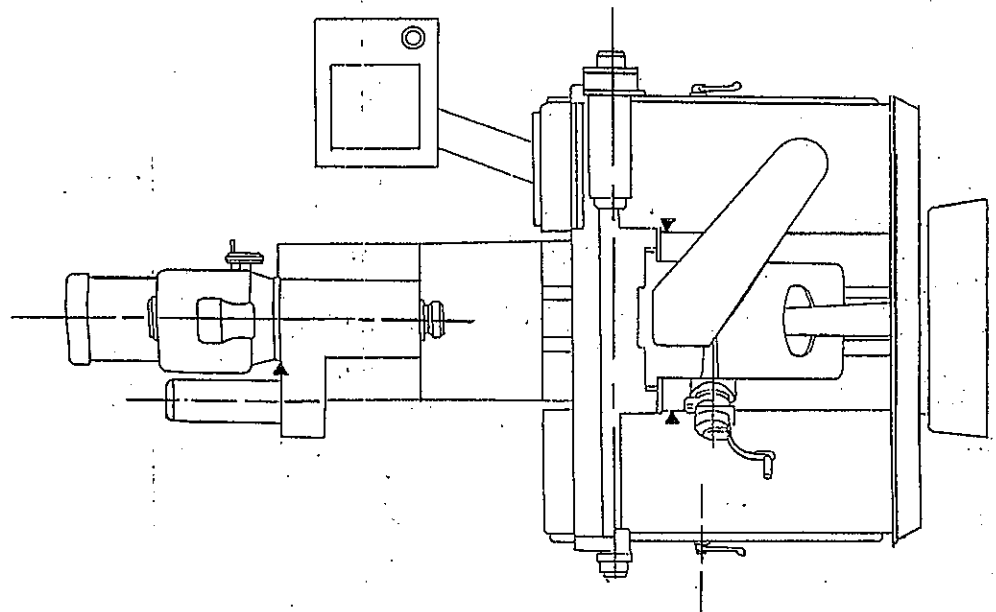
SADDLE & TABLE ASSEMBLY



SPINDLE DRIVE ASSEMBLY

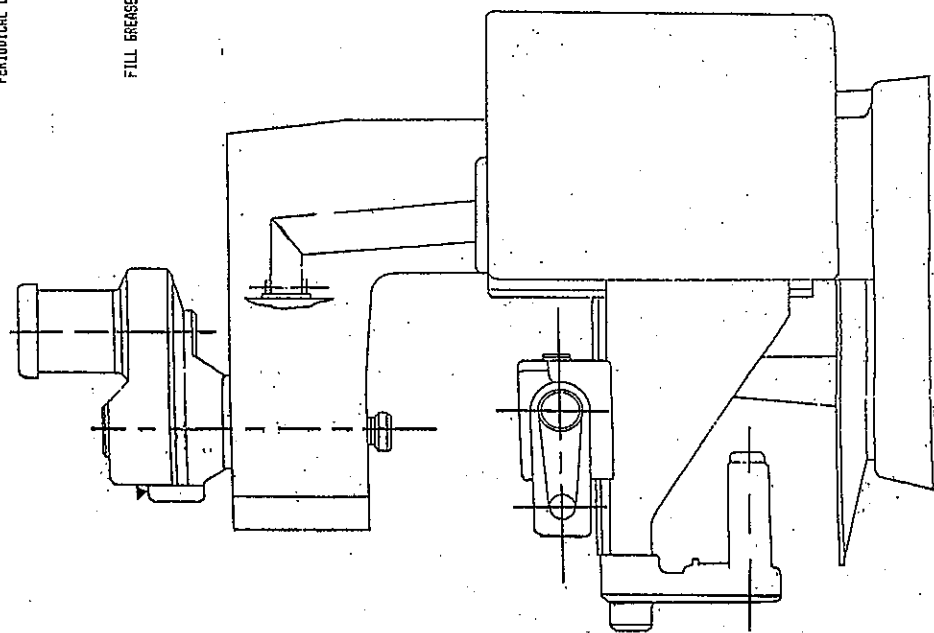


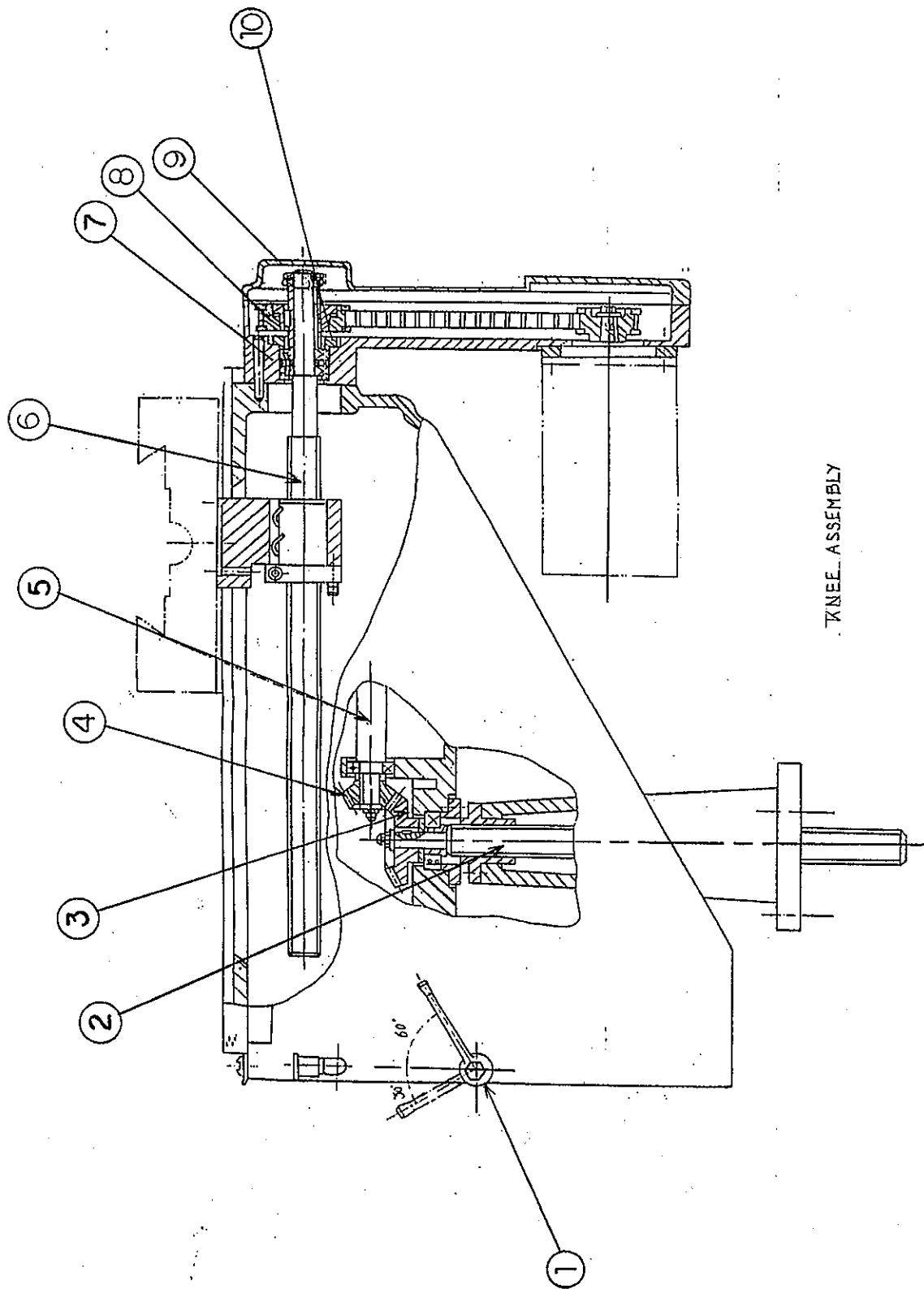
MACHINE DRIVE SYSTEMS



PERIODICAL LUBRICATION POINTS

FILL GREASE ONCE OR TWICE A WEEK





KNEE ASSEMBLY

ELECTRICAL PRINTS FOR PARTNER 2D

INSTRUCTIONS

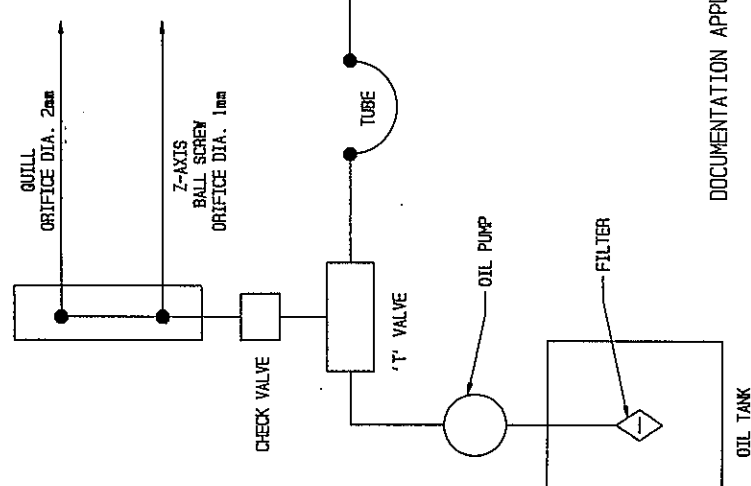
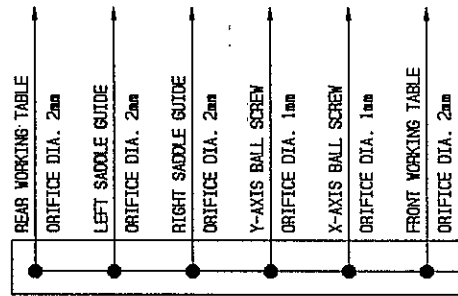
- 1) ALL INTERCONNECT DIAGRAMS HAVE A SCALE ON THE LEFT SIDE OF THE PAGE TO HELP LOCATE RELAY CONTACTS. LOCATION NUMBERS OF EACH CONTACT ARE NUMBERED NEXT TO THE RELAY COIL.
EXAMPLE: (2,12) 2=PAGE NUMBER 12= SCALE NUMBER

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

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		DESCRIPTION
PIN	X INPUTS	DESCRIPTION	X OUTPUTS	
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)

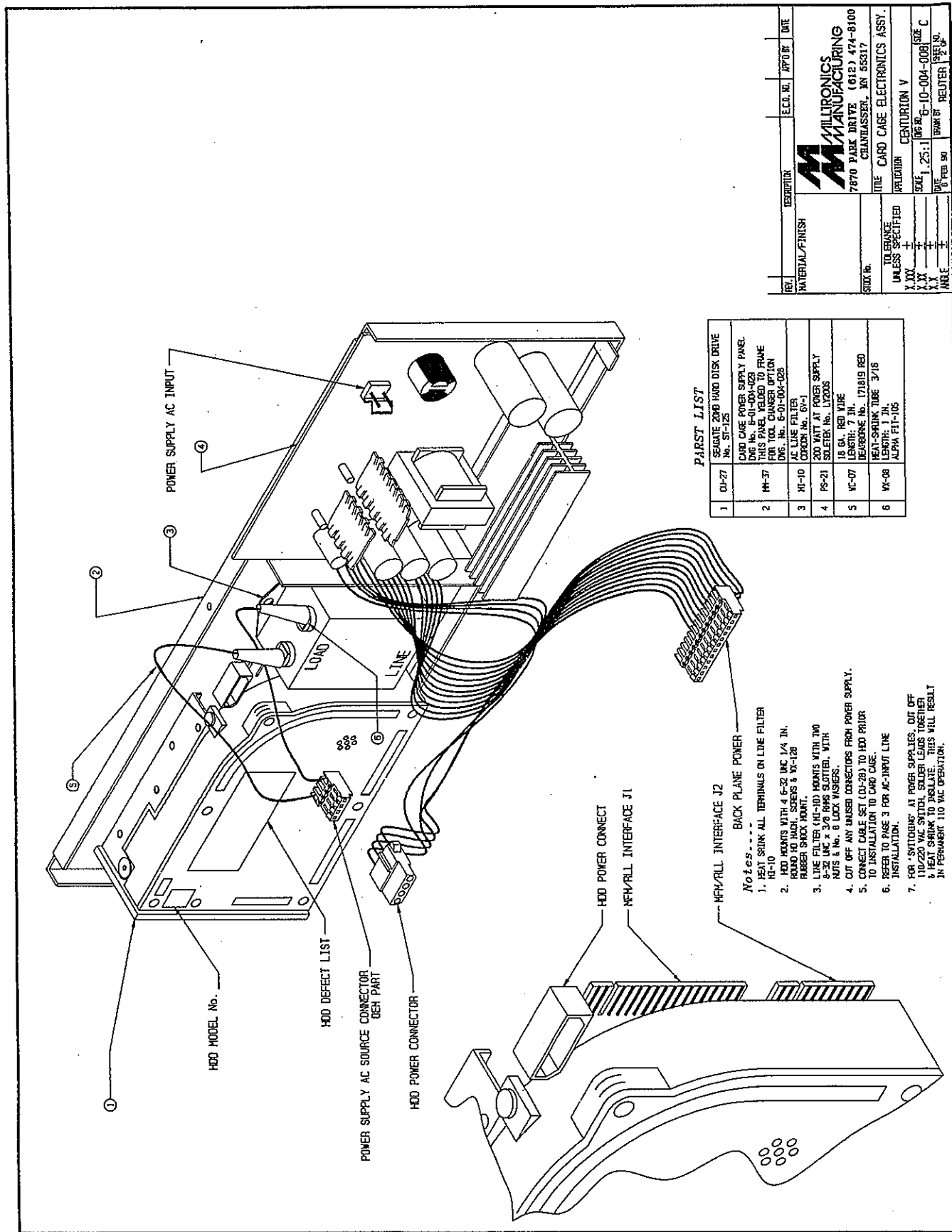


DOCUMENTATION APPLIES TO PARTNER II-D

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XX			
	X.XX			
	X.X			
	ANGLE			
	TITLE			
	APPLICATION			
	SCALE			
	DATE			
	DRAWN BY			
	CHECKED BY			
	REVIEWED BY			
	SHEET NO.			
	OF			

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

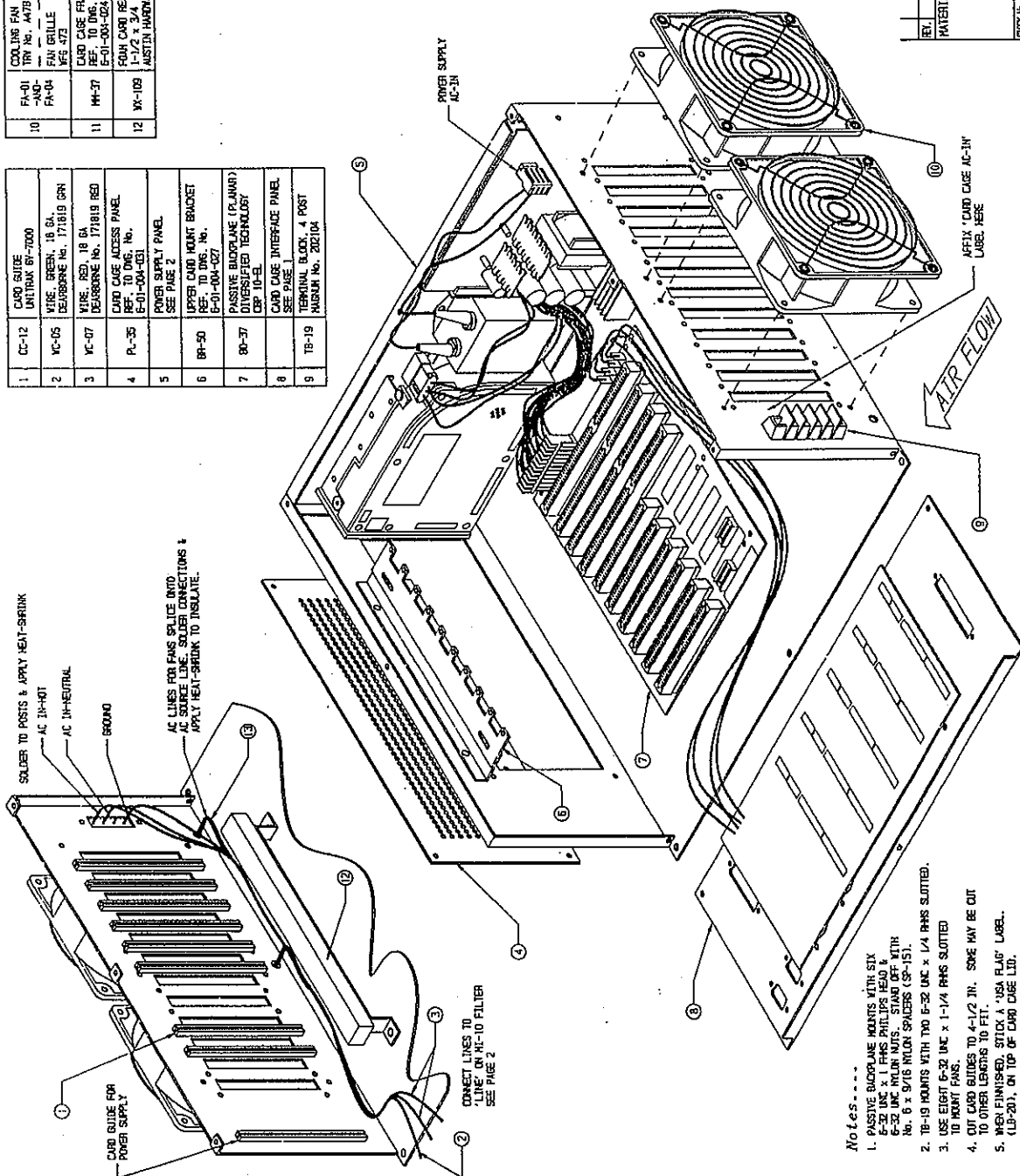
7870 PARK DRIVE (612) 474-8100
 CHANHASSEN, MN 55317
 TITLE LUBE LINE MAP
 APPLICATION PARTNER II
 SCALE 1:1
 DATE 6 FEB 90
 DRAWN BY REUTER
 SHEET NO. 1 OF 1



10	FA-01 -AND- FA-04	COOLING FAN TRY NO. A47B15A1573 FAN GRILLE VFS 473	CARD CASE FRAME REF. TO DWS, No. E-01-003-024
11	HA-37		
12	XA-109		FOUR CARD REST 1-1/2 x 3/4 AUSTIN HARDWARE NO. 98500

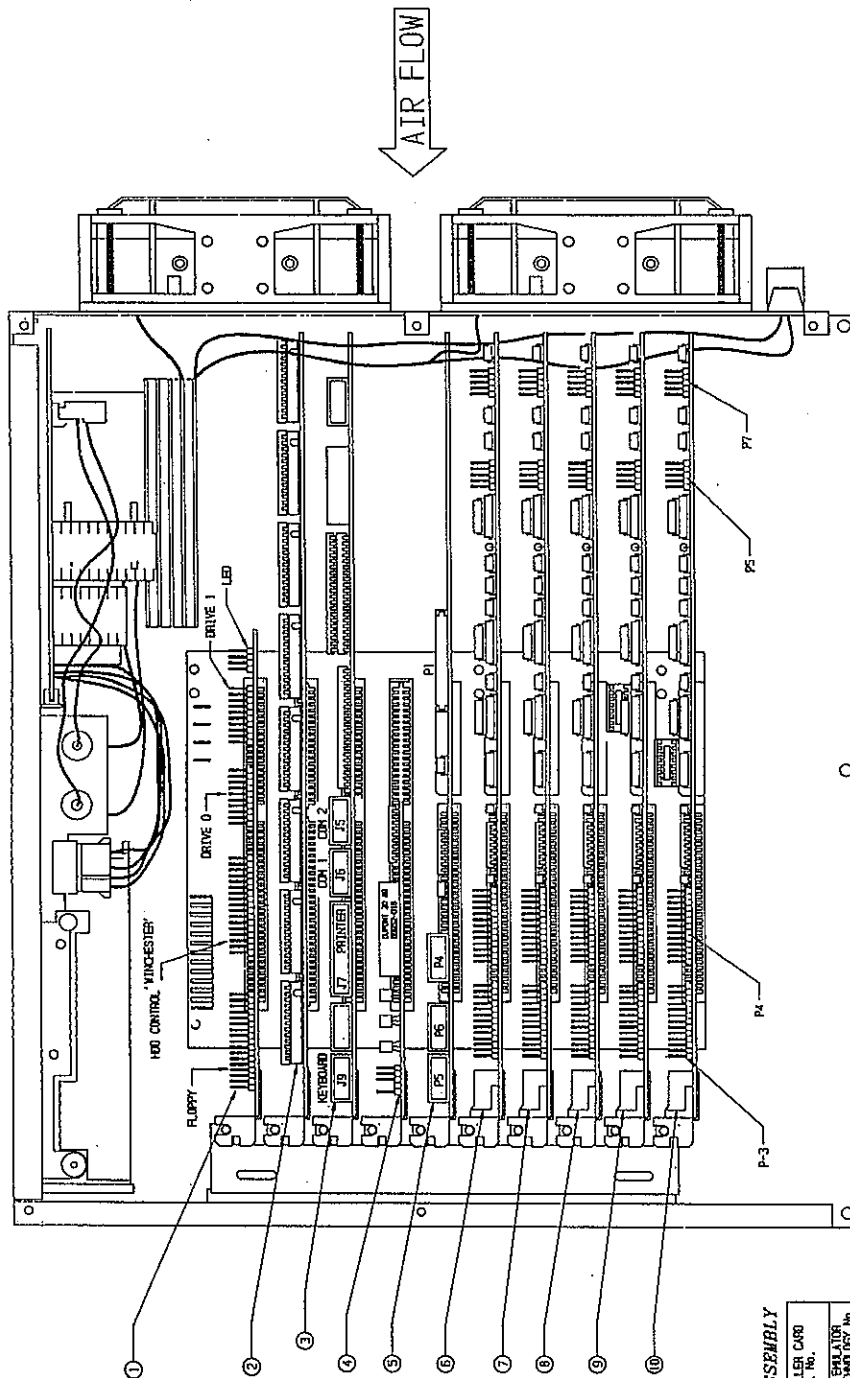
10	FA-01 -AND- FA-04	COOLING FAN TRY NO. A47B15A1573 FAN GRILLE VFS 473	CARD CASE FRAME REF. TO DWS, No. E-01-003-024
11	HA-37		
12	XA-109		FOUR CARD REST 1-1/2 x 3/4 AUSTIN HARDWARE NO. 98500

1	CC-12	CARD ROUTE UNITARY BR-7000
2	VC-05	WIRE GREEN, 18 GA. DETERMINE NO. 171819 GRN
3	VC-07	WIRE, RED, 18 GA DETERMINE NO. 171819 RED
4	PL-35	CARD CASE ACCESS PANEL REF. TO DWG. NO. 6-01-004-031
5		POWER SUPPLY PANEL SEE PAGE 2
6	BR-50	UPPER CARD MOUNT BRACKET REF. TO DWG. NO. 6-01-004-027
7	BC-37	PASSIVE BUCKLE (PLANNED) OVERSPECTRUM TECHNOLOGY EXP 10-E
8		CARD CASE INTERFACE PANEL SEE PAGE 1
9	TS-19	TERMINAL BLOCK, 4 POST MAGNUM NO. 202104



1. PASSIVE BUCKLE AND MOUNT WITH SIX 6-32 UNC. 1/4" PHILIPS HEAD LUGS.
2. 6-32 UNC. MOUNT STAND OFF WITH 6-32 UNC. NUTLON NUTS (SP-15).
3. 16-19 POINTS WITH TWO 6-32 UNC. 1/4" PHILIPS LUGS.
4. USE EIGHT 6-32 UNC. 1-1/4" PHILIPS LUGGED MOUNT PANS.
5. CUT CORD BUNDLES TO 4-1/2 IN. SOME MAY BE CUT TO OTHER LENGTHS TO FIT.
6. MEN FINISHED, ATTACH A "USA FLAG" LABEL. (LIP-20), ON TOP OF CORD CAGE.
7. USE WIRE TIES (WK-01) TO HARNESSE CORDS Wires IN THE CORD CAGE.
8. CORDS MOUNT ON UPPER CORD MOUNT BRKT. WITH 6-32 UNC. 3/4" PHILIPS LUGS.
9. ACCESS PANEL INTERFACE PANEL & LID MOUNT WITH 6-32 UNC. LUGS.

REV.	DESCRIPTION	E.C.D. NO.	APPRO BY	DATE
MATERIAL/FINISH	 MILLIRONICS MANUFACTURING 7870 PARK DRIVE (SIC) 474-8100 CHANLASSSEN, MN 55317			
SPEC. NO.	TITLE CARD CAGE ELECTRONICS ASST.	PREDICTION	CENTURATION V	
UNLESS SPECIFIED				
X NON	±	SCALE	2.125:1	SIZE C
X YES	+		06 AD	6-10-004-008
X YES	-	USE FOR ON	0040 RT	REITER
X YES	-			(SEE P. 9)
X YES	-			



COMPONENTS OF ASSEMBLY

1	HOD-200 CONTROLLER CARD WESTERN DIGITAL No.
2	800-38 DISK DRIVE DIVERSIFIED TECHNOLOGY No. OR 804
3	800-36 256-1048 CPU CARD DIVERSIFIED TECHNOLOGY No. OR 500
4	800-35 800-35 GRAPHICS ADAPTER PARADISE AUTOSYSTEM EIA 350
5	800-33 800-33 CONTROLLER PC-AUTOM-01 VER. 1.0 E-07-001-003
6	800-22 800-22 X-Y-Z AXIS COMPUTER PC-AUT-104-03
7	800-22 800-22 X-Y-Z AXIS COMPUTER PC-AUT-104-03
8	800-22 800-22 X-Y-Z AXIS COMPUTER PC-AUT-104-03
9	800-22 800-22 X-Y-Z AXIS COMPUTER PC-AUT-104-03
10	800-22 800-22 X-Y-Z AXIS COMPUTER PC-AUT-104-03 TOOL CHANGER OPTION

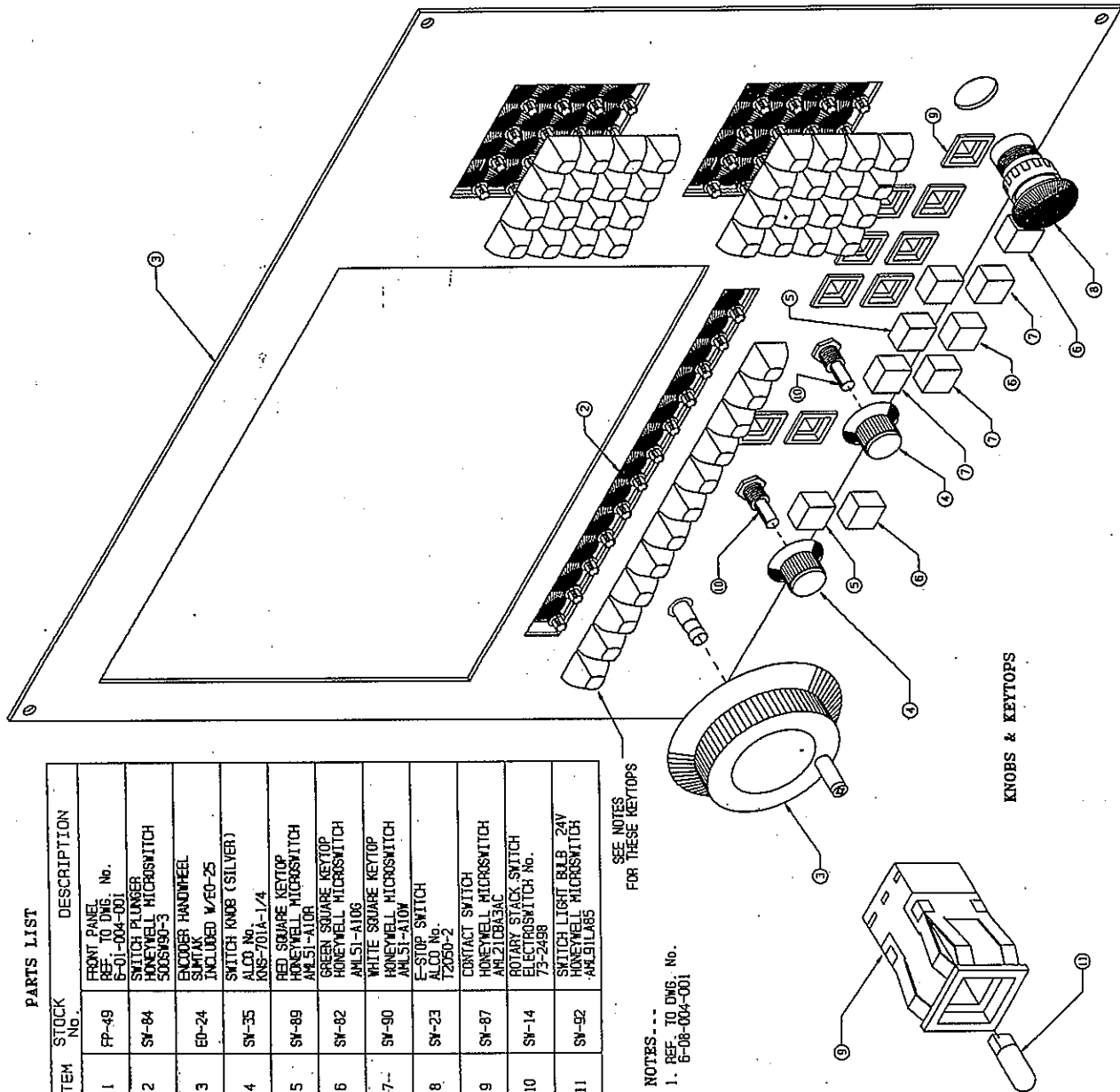
REV.	DESCRIPTION	E.C.O. NO.	APPROV.	DATE
MILLERONICS MANUFACTURING 7870 PARK DRIVE (812) 474-8100 CHANNASSEN, MN 55317				
MATERIAL/FINISH		TITLE CARD CAGE ELECTRONICS ASSY. SCALE 1:5:1 DATE 21 FEB 90 DESIGNER REUTER		
TOLERANCE UNLESS SPECIFIED		DECIM. ± FRACTION ± ANGLE ±		
STOCK NO.		10610-004-008 SIZE C SHEET NO. 1 OF 3		

PARTS LIST

ITEM	STOCK NO.	DESCRIPTION
1	FP-49	FRONT PANEL REF. TO DWG. No. 6-01-004-001
2	SV-84	SWITCH PLUNGER HONEYWELL MICROSWITCH 500S900-3
3	ED-24	ENCODER HANDWHEEL SUMITAK INCLUDED W/EO-25
4	SV-35	SWITCH KNOB (SILVER) ALCO No. KNS-701A-1/4
5	SV-89	RED SQUARE KEYTOP HONEYWELL MICROSWITCH AMLS1-A10R
6	SV-82	GREEN SQUARE KEYTOP HONEYWELL MICROSWITCH AMLS1-A10G
7	SV-90	WHITE SQUARE KEYTOP HONEYWELL MICROSWITCH AMLS1-A10W
8	SV-23	E-STOP SWITCH ALCO No. T2050-2
9	SV-87	CONTACT SWITCH HONEYWELL MICROSWITCH AMLS10B3AC
10	SV-14	ROTARY STACK SWITCH ELECTROSWITCH No. 75-2498
11	SV-92	SWITCH LIGHT BULB 24V HONEYWELL MICROSWITCH AMLS1A85

NOTES:--
1. REF. TO DWG. No.
6-06-004-001

SEE NOTES
FOR THESE KEYTOPS

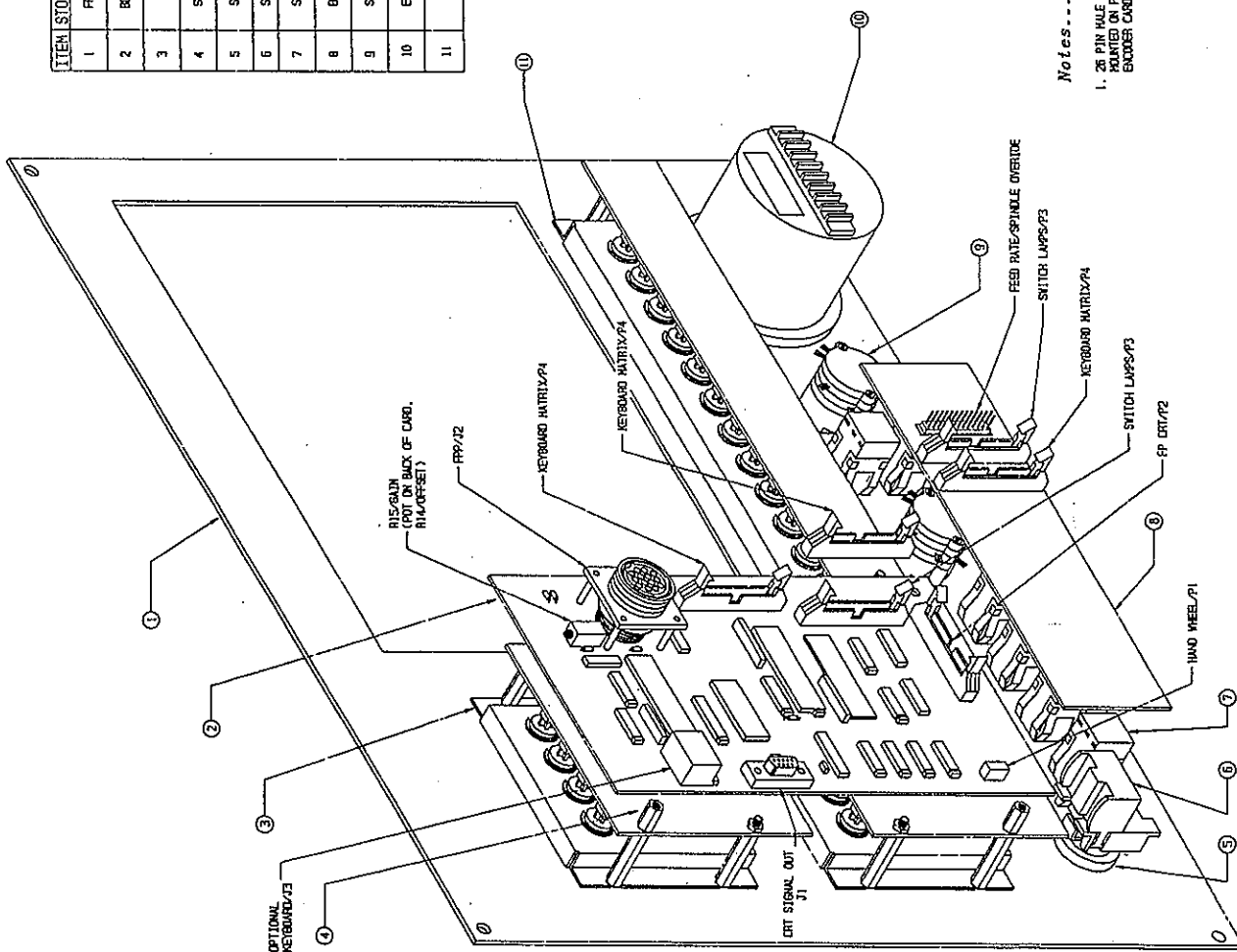


KNOBS & KEYTOPS

REF.	DESCRIPTION	E.C.O. NO.	APPROVED BY	DATE
MILLITRONICS MANUFACTURING 7670 PARK DRIVE (812) 474-8100 CHAMPAIGN, ILL. 61817				
STOCK NO.		TITLE / NT PANEL SW. & CONT. / INT		
TO EXAMINE		APPLICATION CENTURION V		
UNLESS SPECIFIED		SCALE 1.5:1		
X.XX		Dwg No. 6-10-004-001		
X.XX		DATE		
X.XX		DRAWN BY		
X.XX		CHECKED BY		
X.XX		DESIGNED BY		
X.XX		SHEET NO.		
X.XX		TOTAL SHEETS		

PARTS LIST

ITEM STOCK No.	DESCRIPTION
1	CENTURION V FRONT PANEL REF. TO DWG. No. P-10-004-001
2	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
3	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
4	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
5	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
6	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
7	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
8	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
9	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
10	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001
11	25 PIN MALE RIBBON CABLE CONNECTOR P-10-004-001



Notes---

- 25 PIN MALE RIBBON CABLE CONNECTOR
P-10-004-001

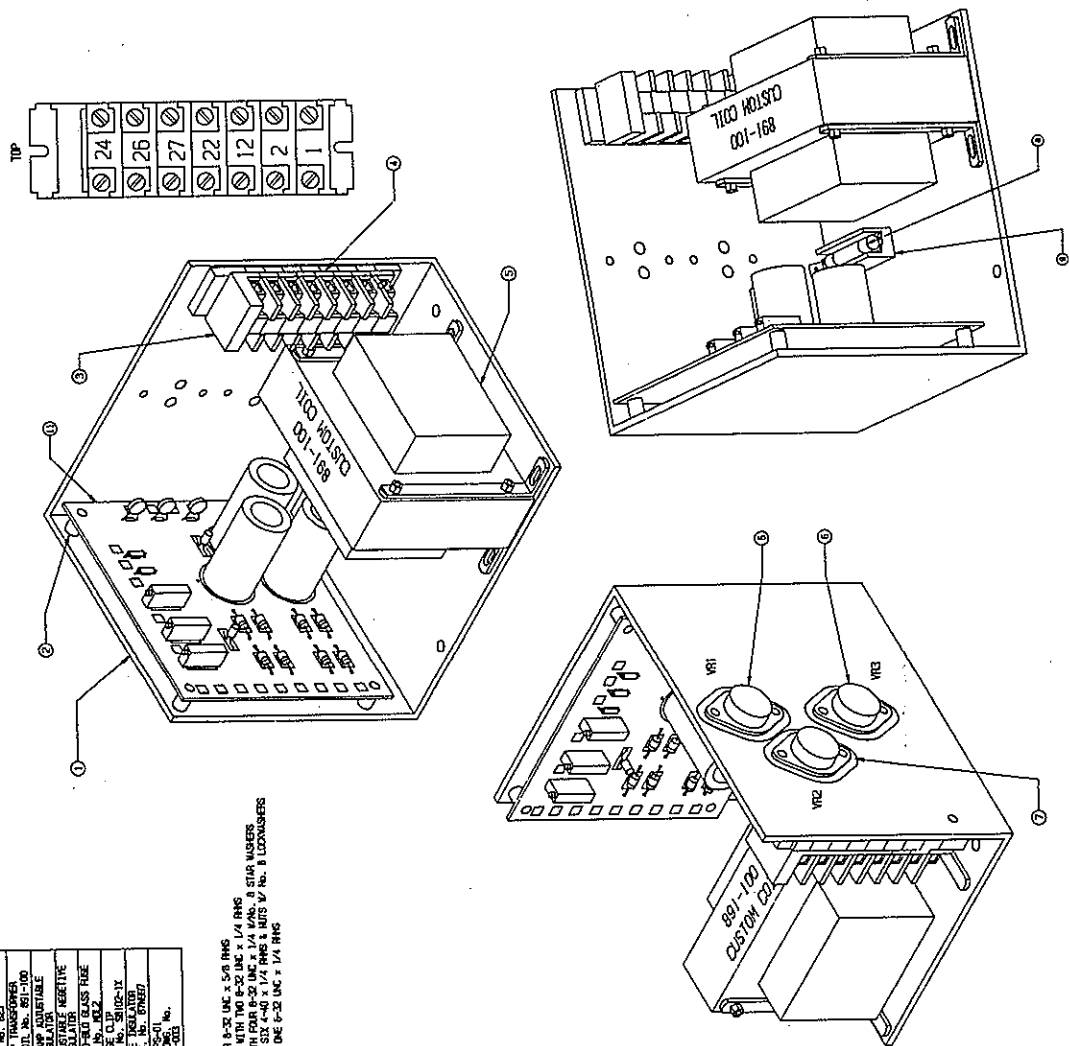
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
1	MATERIAL/FINISH			
MILLITRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHAMBERLAIN, MN 55317				
TITLE: FMT PANEL SW. & CONT. REV. APPLICATION: CENTURION V				
SCALE: 1.5:1 DWG NO: 5-10-004-002 SIZE: C				
DATE: 27 NOV 89 DESIGNED BY: REUTER DRAWN BY: [blank]				
STOCK No. TOLERANCE UNLESS SPECIFIED X.XX ± X.XX ± X.XX ± X.XX ± X.XX ±				

-PARTS LIST-

ITEM STOCK NO.	DESCRIPTION
1 BR-57	SWITCH P.S. BUDDH
2 99-25	WIND SHIELD, No. 6-2715
3 18-02	TERMINAL BLOCK 100 PINS
4 18-01	TERMINAL BLOCK
5 18-30	ALL-TOP TRANSFORMER
6 18-09	LOCK 5 AMP ADJUSTABLE
7 18-04	LOCK 5 AMP ADJUSTABLE
8 18-28	2 AMP 10-0-10 BIAS FUSE
9 18-09	BUSSBAR No. 50102-11
10 15-10	SP. HOUS. No. 50107
11 18-42	PC-15-005-41

Notes...

1. 18-42 MOUNTS WITH FOUR 6-32 UNC. x 1/4 ING.
2. 18-42 MOUNTS WITH TWO 6-32 UNC. x 1/4 ING.
3. TRANSFORMER MOUNTS WITH FOUR 6-32 UNC. x 1/4 ING. 8 STAR MARKERS
4. REGULATOR MOUNTS WITH SIX 4-40 x 1/4 ING. & NUTS W/ No. 8 LOCKWASHERS
5. FUSE CLIP MOUNTS WITH ONE 6-32 UNC. x 1/4 ING.



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MILLITRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHATELAIN, MN 55317				
STOCK NO. 1524PS-01 ASSY.				
TOLERANCE UNLESS SPECIFIED X .XX ± X .XX ± X .XX ± X .XX ± X .XX ±				
SCALE 1.5:1 DIM IN 6-10-018-003 SIZE C				
DATE 25 MAR 50 DRAWN BY REUTER SHEET 1 OF 2				

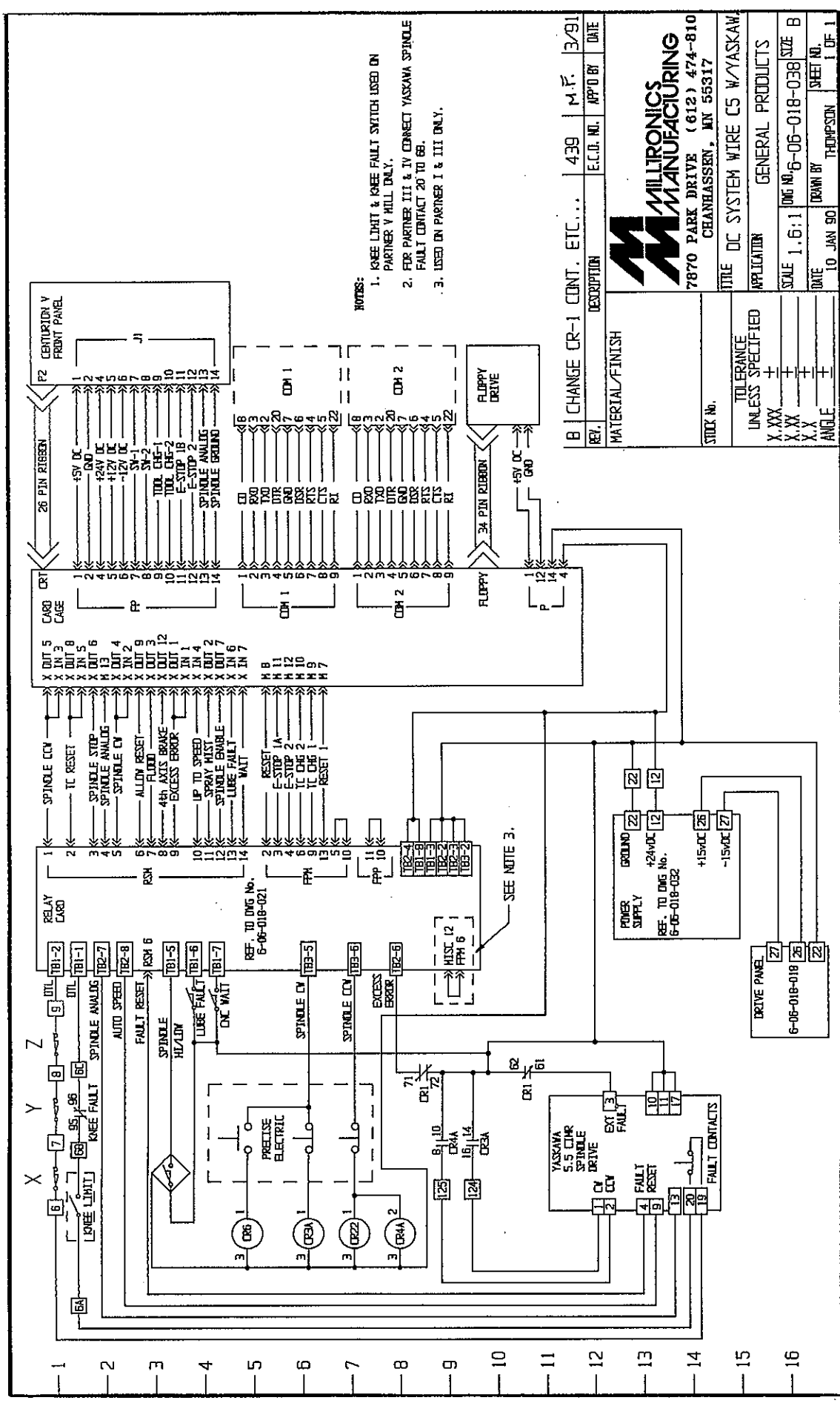
RELAYS

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 PMR. 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 PMR. SUPPLY
26. +15 VOC FROM PMR. SUPPLY
27. -15 VOC FROM PMR. 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

- CR1. RESET
- CR1A. EXCESS ERROR
- CR1B. DRIVE DISABLE
- CR1C. DRIVE RESET
- CR2. TOOL CHANGE RESET
- CR3. SPINDLE CLOCKWISE
- CR3A. SPINDLE CW YASKAWA
- CR4. SPINDLE COUNTERCLOCKWISE
- CR4A. SPINDLE CCW YASKAWA
- CR5. SPINDLE STOP
- CR5A. SPINDLE SAFETY
- CR7. SPRAY MIST
- CR8. FLOOD COOLANT
- CR9. SPINDLE HI/LO
- CR10. SPINDLE ENABLE
- CR10A. SPINDLE SAFETY
- CR11. AUXILIARY RELAY
- CR12. AUXILIARY RELAY
- CR22. 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)

REV. A	FORMERLY 6-04-015-102	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
 MILLITRONICS MANUFACTURING 7870 PARK DRIVE (812) 474-8100 CHANHASSEN, MN 55317				
TITLE: TERMINAL BLOCK DES.				
APPLICATION: GENERAL PRODUCTS				
SCALE: 1:1				
DATE: 14 MAY 90				
DRAWN BY: THOMPSON				
SHEET NO. 1 OF 1				
STOCK NO. TOLERANCE UNLESS SPECIFIED X.XXX ± X.XX ± X.X ± ANGLES ±				



REV.	DESCRIPTION	E.C.O. NO.	APPRO BY	DATE
B	CHANGE CR-1 CONT. ETC...	439	M.F.	3/91

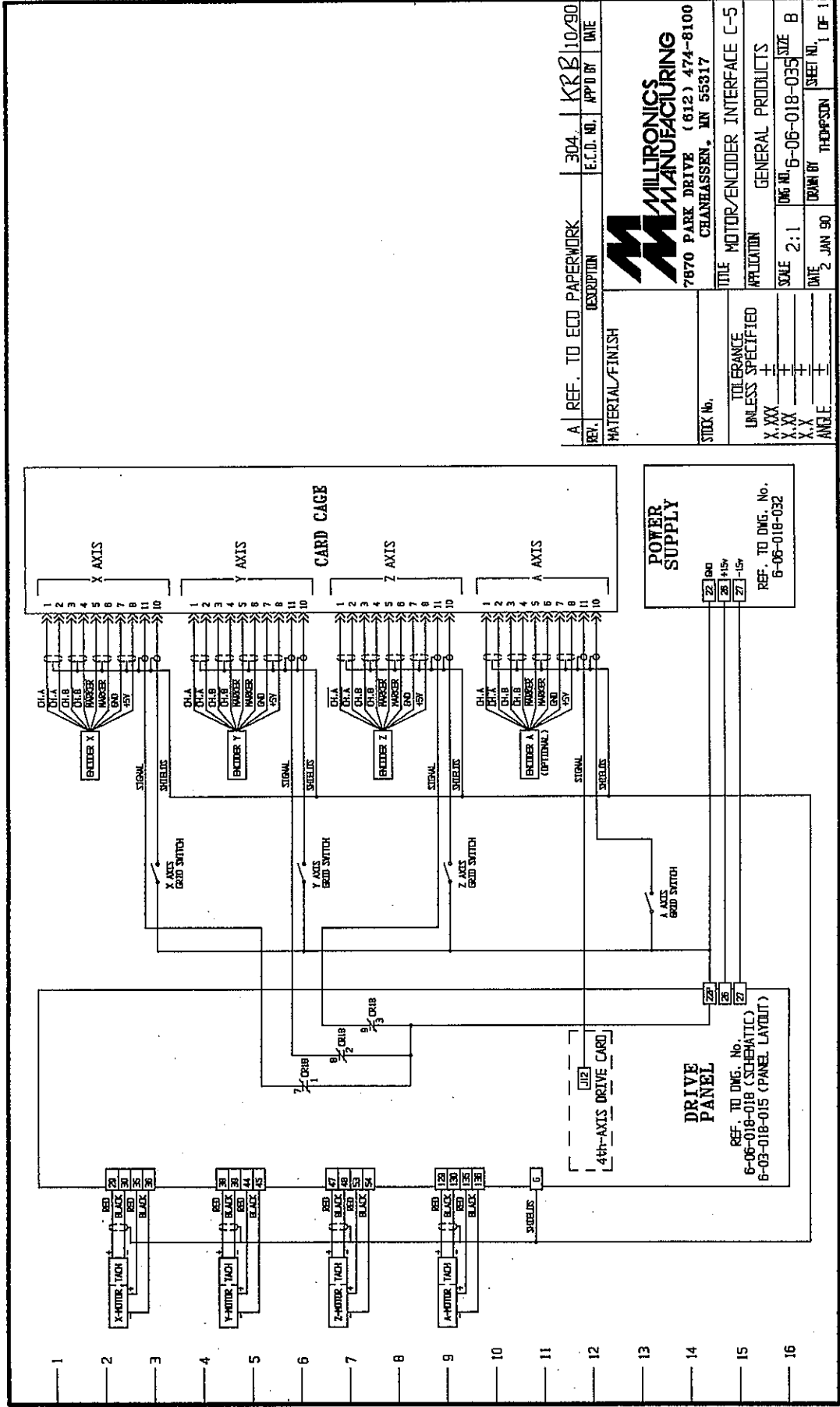
MATERIAL/FINISH	
UNLESS SPECIFIED	GENERAL PRODUCTS
X.XXX	±
X.XX	±
X.X	±
ANGLE	±

TOLERANCE	
UNLESS SPECIFIED	GENERAL PRODUCTS
X.XXX	±
X.XX	±
X.X	±
ANGLE	±

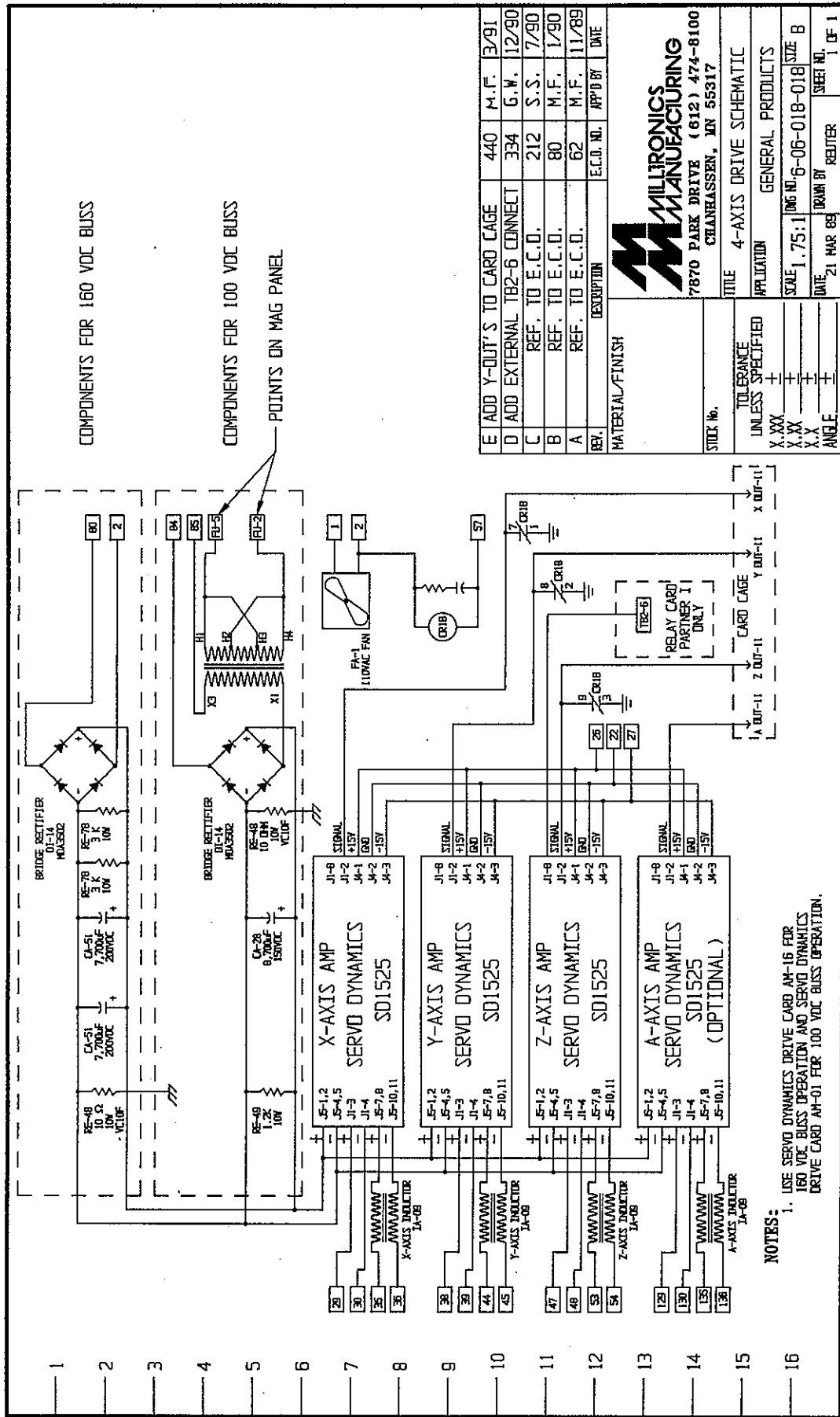
TITLE	
DC SYSTEM WIRE C5 W/YASKAWA	GENERAL PRODUCTS
7870 PARK DRIVE (612) 474-810	SCALE 1.6:1
CHANHASSEN, MN 55317	DWG NO. 6-06-018-038
	DATE 10 JAN 90
	DRAWN BY THOMPSON
	SHEET NO. 1 OF 1



MILLIRONICS MANUFACTURING
 7870 PARK DRIVE (612) 474-810
 CHANHASSEN, MN 55317

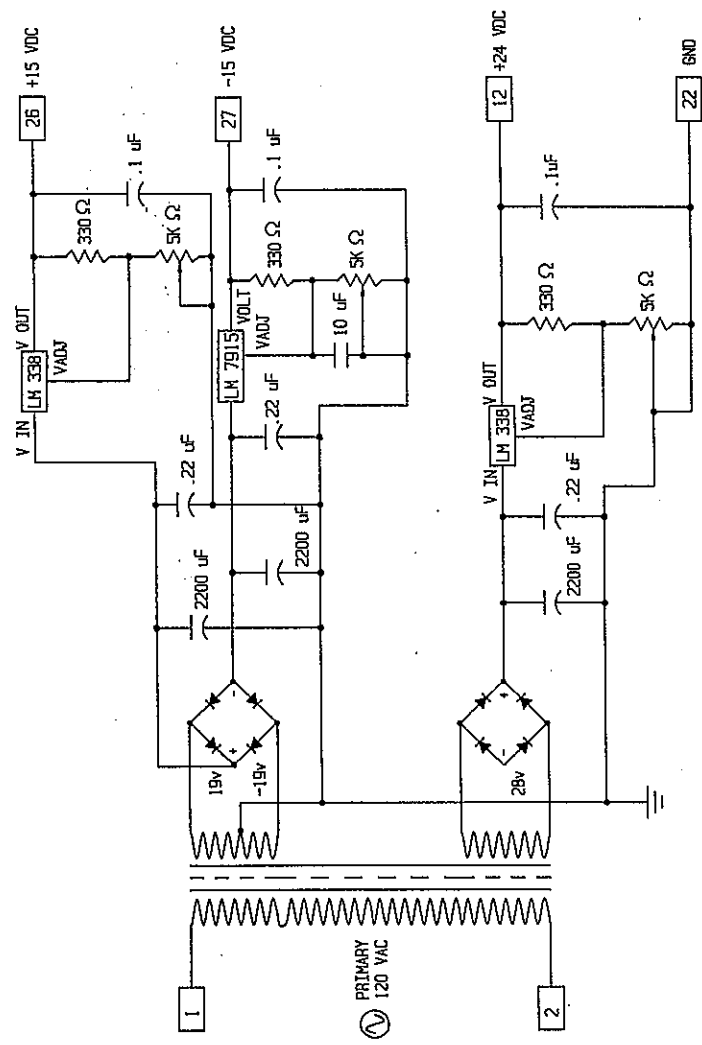


A REF. TO ECO PAPERWORK		304	KRB	10/90
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH				
MILLITRONICS MANUFACTURING				
7870 PARK DRIVE (612) 474-8100 CHANEASSEN, MN 55317				
TITLE MOTOR/ENCODER INTERFACE C-5				
APPLICATION GENERAL PRODUCTS				
TOLERANCE UNLESS SPECIFIED				
X.XX ±				
X.XX ±				
X.X ±				
ANGLE ±				
SCALE 2:1		DWG NO. 6-06-018-035		SIZE B
DATE 2 JAN 90		DRAWN BY THOMPSON		SHEET NO. 1 OF 1



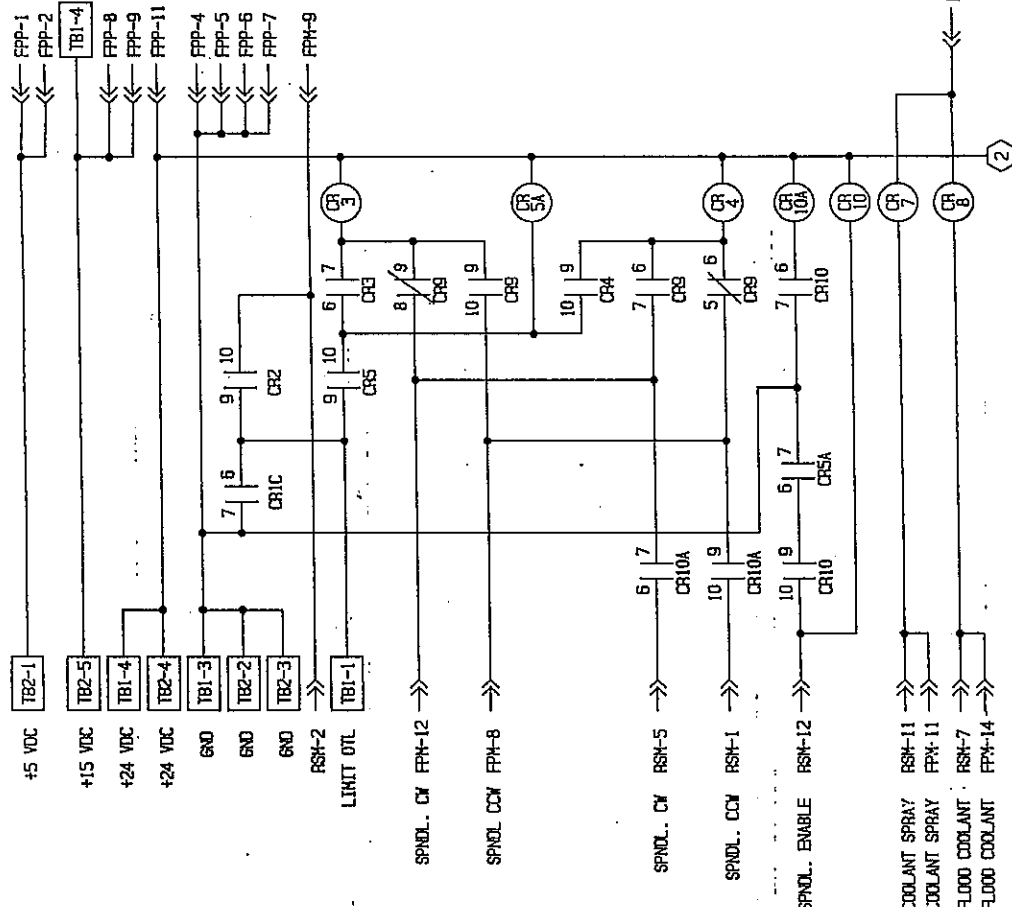
E	ADD Y-OUT'S TO CARD CAGE	440	M.F.	3/91
D	ADD EXTERNAL TB2-6 CONNECT	334	G.W.	12/90
C	REF. TO E.C.D.	212	S.S.	7/90
B	REF. TO E.C.D.	80	M.F.	1/90
A	REF. TO E.C.D.	62	M.F.	11/89
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX ±				
X.XX ±				
X.X ±				
X ±				
ANGLE ±				
TITLE 4-AXIS DRIVE SCHEMATIC				
APPLICATION GENERAL PRODUCTS				
SCALE 1.75:1				
DATE 21 MAR 88				
DRAWN BY REITER				
SHEET NO. 1 OF 1				

MILLITRONICS MANUFACTURING
 7870 PARK DRIVE (812) 474-8100
 CHANHASSEN, MN 55317

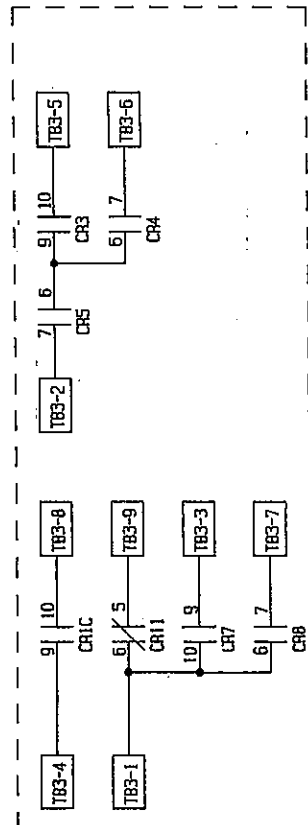
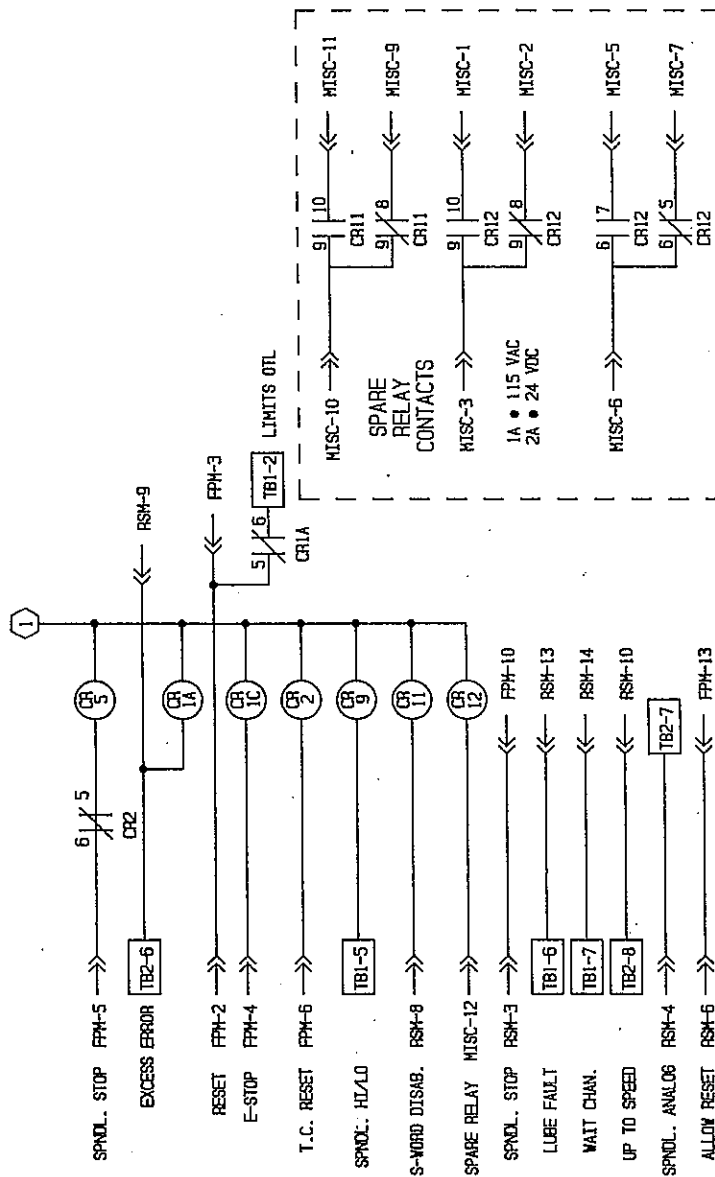


ALL DIODES 1N4005

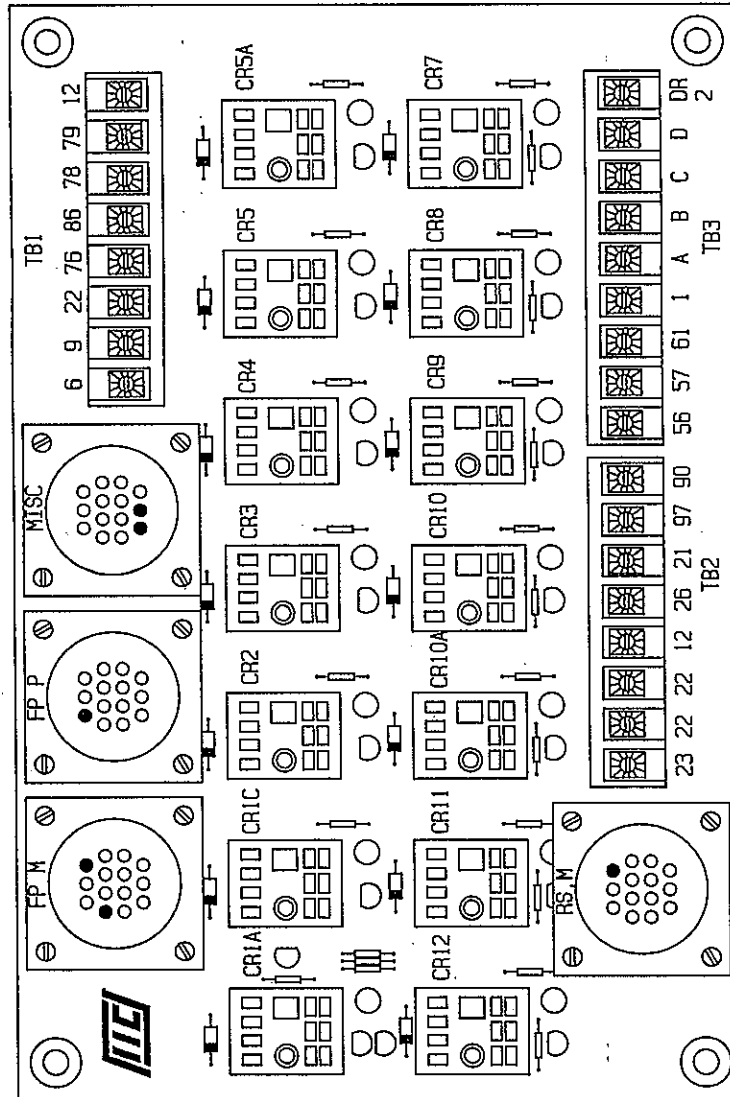
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
MILLITRONICS MANUFACTURING 7870 PARK DRIVE (812) 474-8100 CHANHASSEN, MN 55317				
STOCK NO.:				
TITLE 24VDC, +/-15VDC POWER SUPPLY				
TOLERANCE UNLESS SPECIFIED				
X.XXX ±				
X.XX ±				
X.X ±				
ANGLE ±				
APPLICATION GENERAL PRODUCTS				
SCALE 1.25:1 (ING NO. 6-06-018-032) SIZE B				
DATE 31 OCT 89 DRAWN BY THOMPSON SHEET NO. 1 OF 1				



REV.	DESCRIPTION	E.C.O. NO.	AP'D BY	DATE
	TOLERANCE UNLESS SPECIFIED			
	X.XXX ±			
	X.XX ±			
	X.X ±			
	ANGLE ±			
	WIREMAN/FINISH			
 GENERAL PRODUCTS 7070 PARK DRIVE CHICAGO, IL 60637				
TITLE: PC-REL-1B SCHEMATIC APPLICATION: GENERAL PRODUCTS				
SCALE 1:1				SIZE B
DATE: 6 MAR 89				SHEET NO. 1 OF 3
DRAWN BY: REUTER				



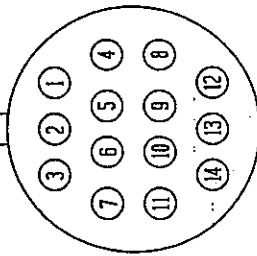
REL.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE:
TOLERANCE UNLESS SPECIFIED				
X.XXX	: ±			
X.XX	: ±			
X.X	: ±			
ANGLE	: ±			
MATERIAL/FINISH				
INDUSTRIAL INFORMATION CONTROLS				
7070 PARK DRIVE				
CINCINNATI, OH 45217				
TITLE: PC-REL-1B SCHEMATIC				
APPLICATION: GENERAL PRODUCTS				
SCALE 1:1				
JOB NO. 6-06-018-021				
SIZE B				
DATE: 7 MAR 89				
DRAWN BY: REUTER				
SHEET NO. 2 OF 3				



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
	TOLERANCE UNLESS SPECIFIED			
	X.XXX ±			
	X.XX ±			
	X.X ±			
	ANGLE ±			
	MATERIAL/FINISH			
	SCALE 1:1			
	DATE: 15 NOV 88			
	DRAWN BY: REUTER			
	SHEET NO. 1 OF 1			


INDUSTRIAL INFORMATION CONTROLS
 7070 PARK DRIVE
 CHANESBORO, MA 01531
 TITLE: PC-REL-1B PANEL ASSY.
 APPLICATION: GENERAL PRODUCTS
 SIZE B
 Dwg No. 6-03-018-000

FEMALE AMP PLUG



TERMINAL BLOCK

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

F.P.M.

PIN No.	FUNCTION	INT. DEST.
1	KEY	
2	RESET	CR1A-5
3	E STOP	PPM-2
4	E STOP	CR1C
5	SPINDLE STOP	CR2-5
6	TOOL CHANGE	CR2
7	KEY	
8	SPINDLE COV	CR1A-8
9	TOOL CHG RESET	PPM-2
10	SPINDLE STOP	PPM-3
11	COOLANT SPRAY	CR-7
12	SPINDLE CH	CR1A-5
13	RESET	PPM-6
14	COOLANT FLOOD	CR8

F.P.P.

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

MISC.

PIN No.	FUNCTION	INT. DEST.
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 COV	CR1A-10
2	TOOL CHG RESET	PPM-2
3	SPINDLE STOP	PPM-10
4	SPINDLE ANALOG	TRZ-7
5	SPINDLE CH	CR1A-6
6	RESET ALLOW	PPM-13
7	COOLANT FLOOD	CR8
8	9-WORD DISABLE	CR11
9	EXCESS ERROR	TRZ-6
10	UP TO SPEED	TRZ-8
11	COOLANT SPRAY	CR7
12	SPINDLE ENABLE	CR1A-8
13	LUBE FAULT	TR1-6
14	WALT CHANNEL	TR1-14

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	CR1A
2 (9)	OVER TRAVEL LIMITS	CR1A
3 (22)	6V	
4 (76)	+15V	
5 (86)	SPINDLE HE/LDW	CR8
6 (78)	CNC AUTO LUBE	CR8
7 (79)	CNC WALT CHANNEL	RSM-13
8 (12)	+24V	RSM-14

T.B. 2

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

T.B. 3

T.B. No.	FUNCTION	INT. DEST.
1 (56)	AC MAGNETICS	CR1A
2 (57)	AC MAGNETICS	CR5-7
3 (61)	AC MAGNETICS	CR7-9
4 (11)	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 (D2)	AC MAGNETICS	CR11-5

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
INDUSTRIAL INFORMATION CONTROLS 7870 PARK DRIVE CHUBBASS, MI 48817 TOLERANCE UNLESS SPECIFIED X.XXX ± .01 X.XX ± .005 X.X ± .001 ANGLE ± .01 TITLE: PC REL. 1B 1/0 PLUS DEF. APPLICATION: GENERAL PRODUCTS SCALE 1:1 DATE: 11 AUG 88 DRAWN BY: REITER SHEET NO. 1 OF 1				

