

BR 50,60,80 E Mechanical

1-20-2003
Rev 6

Table Of Contents

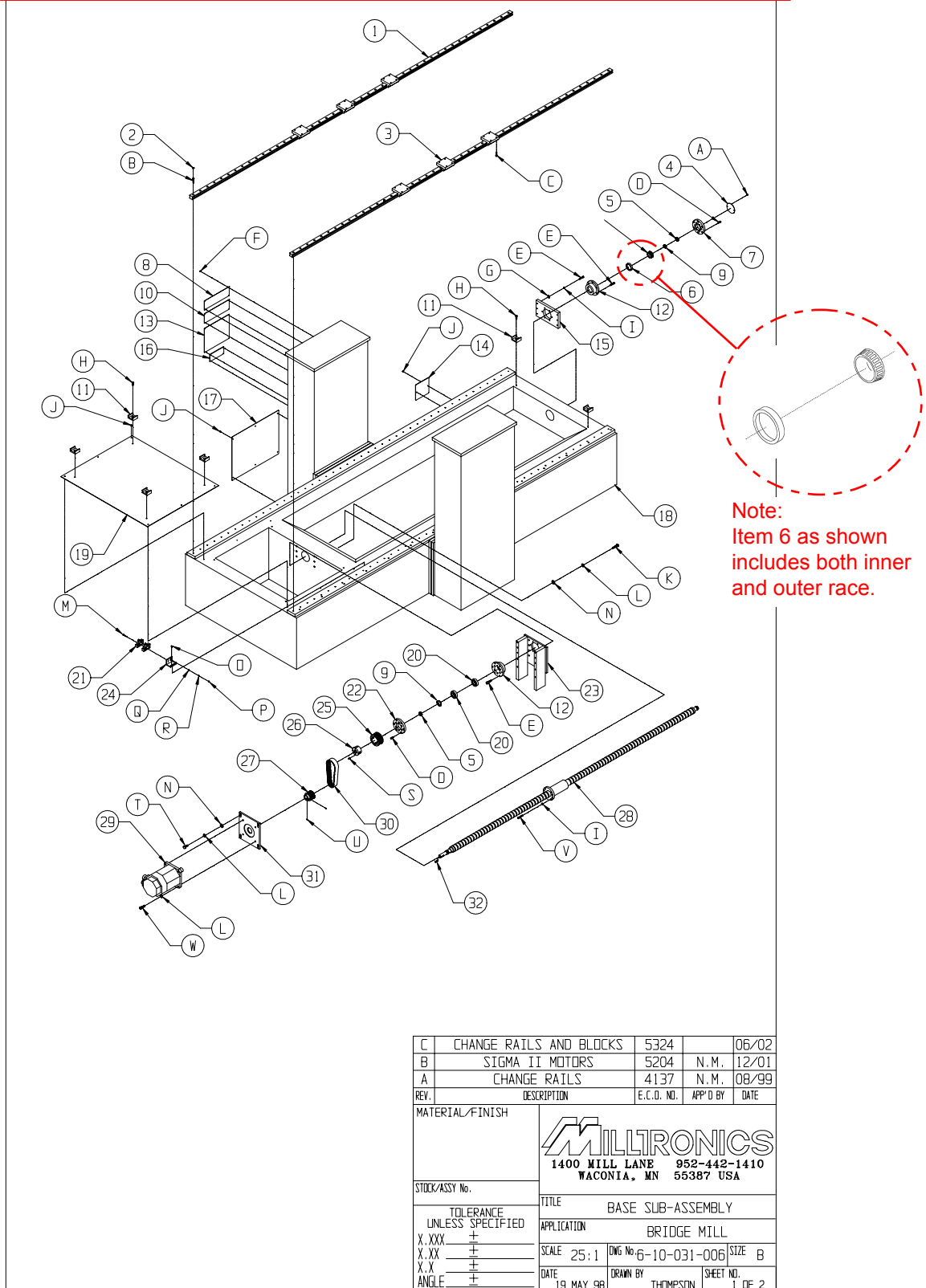
Table Of Contents	iii
Manual Discrepancy Sheet	1
Base Assembly	2
Bridge Assembly	4
Table Assembly.....	6
Head Assembly	8
Z Axis Assembly.....	10
Bearing Cup Assembly.....	12
Drawbar Cylinder Assembly	13
20 pocket ATC Assembly	14
20 pocket Air Cylinder Assembly.....	16
20 Pocket ATC Top Cover Assembly	17
Coolant Trough Assembly	18
Flood Coolant Valve Handle Assembly	19
Leveling Instructions For BR 50	20
Leveling Instructions For BR 60 & 80	22
Pneumatic System Schematic.....	24
Air Filter / Regulator / Lubricator Assembly	25
Machine Lubrication Instructions	26
Retention Knob Chart.....	28

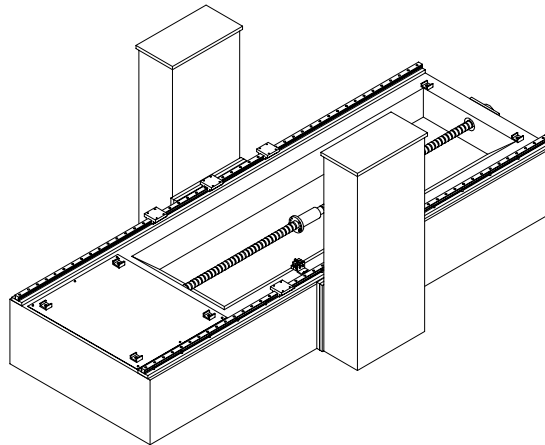
Manual Discrepancy Sheet

1.

Base Assembly

See following pages (drawing rev D) for 150" travel base assembly





BR60/80 X axis
waycover MPB-26

BR50 100/150"
waycover MPB-29

PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	2	SEE TABLE	X-AXIS RAILS
2	92	MP-550	RAIL PLUG
3	6	MP-641	35 mm RAIL BLOCK
4	1	MPT-24	RADIAL BEARING CUP COVER
5	2	BG-50	N06 LOCK NUT
6	1	BG-53	TAPERED ROLLER BEARING
7	1	MPT-06	X-AXIS RADIAL BEARING RETAINER
8	1	LB-82	PARTNER BR50 NAME PLATE
9	2	BG-55	W06 LOCK WASHER
10	1	LB-46	CHIP PAN LOGO
11	6		X-AXIS COVER BAR SUPPORT
12	2	MPT-05	BEARING CUP
13	1	LB-47	CHIP PAN EMBLEM
14	1		SMALL SIDE COVER
15	1		X-AXIS RADIAL SUPPORT PLATE
16	1	LB-01	SAFETY LABEL
17	1		COLUMN ACCESS COVER
18	1		MACHINE BASE
19	1		MOTOR ASSEMBLY COVER
20	2	BG-54	7206BYG NSK BEARING
21	2	SW-149	SWITCH
22	1	MPT-04	BEARING RETAINER
23	1		X-AXIS MOTOR HOUSING
24	1		X-AXIS SWITCH BRACKET
25	1	SEE TABLE	X-AXIS PULLEY
26	1	SEE TABLE	X-AXIS BUSHING
27	1	PY-101	16H150 PULLEY
28	1	SEE TABLE	X-AXIS BALL SCREW
29	1	MD-129	252" lb. MOTOR
30	1	BT-40	240H150 BELT
31	1		X-AXIS MOTOR PLATE
32	1	MPT-17	BALL SCREW KEY

X-AXIS PULLEY TABLE			
ITEM No.	BR50	BR60	BR80
25	PY-102	PY-108	PY-108
26	PY-99	PY-109	PY-109

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	2	8-32 x 3/8 BHCS
B	92	5/16-18 x 1 1/2 SHCS
C	24	5/16-18 x 1 1/4 SHCS
D	12	5/16-18 x 3/4 SHCS
E	18	3/8-16 x 1 1/4 SHCS
F	16	1/4 DRIVE PIN
G	6	3/8 FLAT WASHER
H	6	1/4-20 x 3/4 FHCS
I	14	3/8 LOCK WASHER
J	14	1/4-20 x 1/2 BHCS
K	6	1/2-13 x 2 HHCS
L	14	1/2 LOCK WASHER
M	2	8-32 x 2 BHCS
N	10	1/2 FLAT WASHER
O	2	10-32 x 1/2 BHCS
P	2	8-32 HEX NUT
Q	2	# 8 FLAT WASHER
R	2	# 8 LOCK WASHER
S	2	1/2-13 x 1/2 SHSS
T	4	1/2-13 x 1 1/2 HHCS
U	2	1/4-20 x 1/4 SHSS
V	8	3/8-16 x 1 3/4 SHCS
W	4	1/2-13 x 1 1/4 SHCS

* BR60 & BR80 USE 8 MP-641 RAIL BLOCKS INSTEAD OF 6.

X BALLSCREW TABLE		
MACHINE	PART No.	DESCRIPTION
BR50	MPT-03	X-AXIS BALLSCREW
BR60	MPB-04	X-AXIS BALLSCREW
BR80	MPB-04	X-AXIS BALLSCREW

X-AXIS RAIL TABLE		
MACHINE	PART No.	DESCRIPTION
BR50	MPB-51	35 mm 3658 RAILS
BR60	MPB-52	35 mm 4877 RAILS
BR80	MPB-52	35 mm 4877 RAILS

C	CHANGE RAILS AND BLOCKS	5324		06/02
B	SIGMA II MOTORS	5204	N.M.	12/01
A	CHANGE RAILS	4137	N.M.	08/99
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	±	TITLE BASE SUB-ASSEMBLY		
X.XX	±			
X.X	±			
ANGLE	±			
		APPLICATION BRIDGE MILL		
SCALE 25:1		DWG No 6-10-031-006	SIZE B	
DATE 19 MAY 98		DRAWN BY THOMPSON	SHEET NO. 2 OF 2	

Exploded view diagram of the Milltronics Model 1000 lathe machine. The diagram shows the main frame (10), change rails (11), sigma II motors (12), and various fasteners and sub-assemblies. The components are labeled with letters and numbers as follows:

- 1: Main frame (10)
- 2: Change rails (11)
- 3: Sigma II motors (12)
- 4: Change rails (11)
- 5: Fasteners (13)
- 6: Fasteners (14)
- 7: Fasteners (15)
- 8: Fasteners (16)
- 9: Fasteners (17)
- 10: Main frame (10)
- 11: Change rails (11)
- 12: Sigma II motors (12)
- 13: Fasteners (13)
- 14: Fasteners (14)
- 15: Fasteners (15)
- 16: Fasteners (16)
- 17: Fasteners (17)
- 18: Fasteners (18)
- 19: Fasteners (19)
- 20: Fasteners (20)
- 21: Fasteners (21)
- 22: Fasteners (22)
- 23: Fasteners (23)
- 24: Fasteners (24)
- 25: Fasteners (25)
- 26: Fasteners (26)
- 27: Fasteners (27)
- 28: Fasteners (28)
- 29: Fasteners (29)
- 30: Fasteners (30)
- 31: Fasteners (31)
- 32: Fasteners (32)
- 33: Fasteners (33)
- 34: Fasteners (34)
- 35: Fasteners (35)
- 36: Fasteners (36)
- 37: Fasteners (37)
- 38: Fasteners (38)
- 39: Fasteners (39)
- 40: Fasteners (40)
- 41: Fasteners (41)
- 42: Fasteners (42)
- 43: Fasteners (43)
- 44: Fasteners (44)
- 45: Fasteners (45)
- 46: Fasteners (46)
- 47: Fasteners (47)
- 48: Fasteners (48)
- 49: Fasteners (49)
- 50: Fasteners (50)
- 51: Fasteners (51)
- 52: Fasteners (52)
- 53: Fasteners (53)
- 54: Fasteners (54)
- 55: Fasteners (55)
- 56: Fasteners (56)
- 57: Fasteners (57)
- 58: Fasteners (58)
- 59: Fasteners (59)
- 60: Fasteners (60)
- 61: Fasteners (61)
- 62: Fasteners (62)
- 63: Fasteners (63)
- 64: Fasteners (64)
- 65: Fasteners (65)
- 66: Fasteners (66)
- 67: Fasteners (67)
- 68: Fasteners (68)
- 69: Fasteners (69)
- 70: Fasteners (70)
- 71: Fasteners (71)
- 72: Fasteners (72)
- 73: Fasteners (73)
- 74: Fasteners (74)
- 75: Fasteners (75)
- 76: Fasteners (76)
- 77: Fasteners (77)
- 78: Fasteners (78)
- 79: Fasteners (79)
- 80: Fasteners (80)
- 81: Fasteners (81)
- 82: Fasteners (82)
- 83: Fasteners (83)
- 84: Fasteners (84)
- 85: Fasteners (85)
- 86: Fasteners (86)
- 87: Fasteners (87)
- 88: Fasteners (88)
- 89: Fasteners (89)
- 90: Fasteners (90)
- 91: Fasteners (91)
- 92: Fasteners (92)
- 93: Fasteners (93)
- 94: Fasteners (94)
- 95: Fasteners (95)
- 96: Fasteners (96)
- 97: Fasteners (97)
- 98: Fasteners (98)
- 99: Fasteners (99)
- 100: Fasteners (100)

Assembly Table:

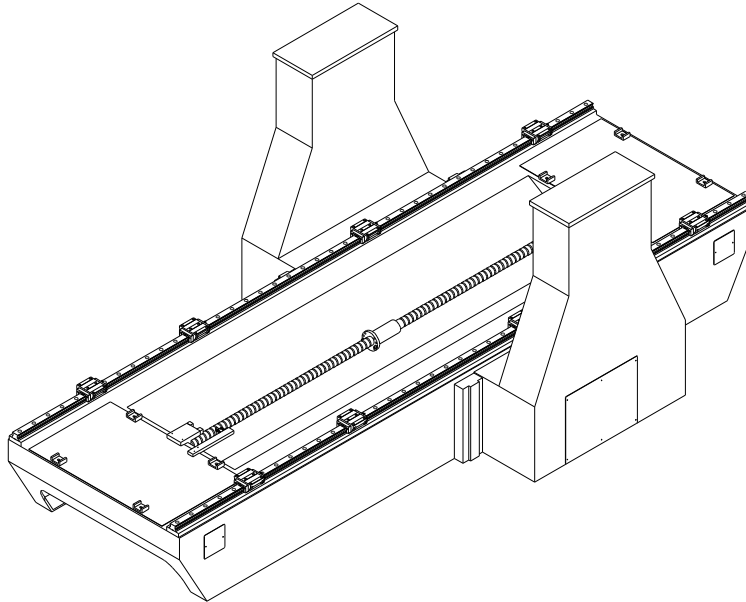
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
D	REDESIGN FRAME	5895		01/05
C	CHANGE RAILS AND BLOCKS	5324	N.M.	06/02
B	SIGMA II MOTORS	5204	N.M.	12/01
A	CHANGE RAILS	4137	N.M.	08/99

MATERIAL/FINISH

MILLTRONICS

D	REDESIGN FRAME	5895		01/05
C	CHANGE RAILS AND BLOCKS	5324	N.M.	06/02
B	SIGMA II MOTORS	5204	N.M.	12/01
A	CHANGE RAILS	4137	N.M.	08/99
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.		TITLE		
TOLERANCE UNLESS SPECIFIED		BASE SUB-ASSEMBLY		
APPLICATION		BRIDGE MILL		
X. XXX +	SCALE 25:1	DWG No	6-10-031-006	SIZE B
X. XX +	DATE	DRAWN BY	SHEET NO.	
X. X +	19 MAY 98	THOMPSON	1 OF 2	
ANGLE +				

This drawing to be used for 150" travel machines only.
For 100" travel machines use the rev C drawing on the previous pages



PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	2	SEE TABLE	X-AXIS RAILS
2	8	SEE TABLE	45 mm RAIL BLOCK
3	1	SEE TABLE	X-AXIS BALL SCREW
4	1	SEE TABLE	X-AXIS HARD STOP BLOCK
5	4	MP-718	PDM HARD STOP BUMPER
6	2	SEE TABLE	BEARING LOCK NUT
7	4		SMALL SIDE COVER
8	2	SEE TABLE	BEARING CUP ASSEMBLY
9	1		X-AXIS RADIAL SUPPORT PLATE
10	1	BR-154	X-AXIS SWITCH MOUNTING BAR
11	1	MP1-387	X-AXIS SWITCH BRACKET
12	1	SW-193	SWITCH
13	1		MACHINE BASE
14	1	SEE TABLE	X-AXIS HARD STOP BLOCK
15	8		X-AXIS COVER BAR SUPPORT
16	2		MOTOR ASSEMBLY COVER
17	1		COLUMN ACCESS COVER
18	1	PY-231	X-AXIS PULLEY
19	2		X-AXIS MOTOR SPACER PLATE
20	1	PY-232	X-AXIS BUSHING
21	1	SEE TABLE	MOTOR PULLEY
22	1	BT-102	720-8M-30 BELT
23	1	SEE TABLE	AXIS MOTOR
24	1		X-AXIS MOTOR PLATE

HARDWARE LIST

No.	QTY	DESCRIPTION
A	32	3/8-16 x 1 1/2 SHCS
B	82	RAIL PLUG
C	86	1/2-13 x 1 1/2 SHCS
D	16	1/2 LOCK WASHER
E	8	1/2-13 x 1 3/4 SHCS
F	1	10mm x 10mm x 30mm KEY
G	4	5/16-18 x 1 1/2 SHCS
H	6	3/8-16 x 1 1/4 SHCS
I	6	3/8 LOCK WASHER
J	6	M5-.8 x 20mm SHCS
K	6	3/8 FLAT WASHER
L	12	5/16-18 x 2 SHCS
M	30	1/4-20 x 1/2 BHCS
N	2	M5-.8 HEX NUT
O	2	M5-.8 x 12mm BHCS
P	2	M5 FLAT WASHER
Q	8	1/4-20 x 3/4 FHCS
R	4	1/2-13 x 3 3/4 SHCS
S	4	1/2 FLAT WASHER
T	2	1/4-20 x 1/4 SHSS
U	4	1/2-13 x 1 1/4 SHCS

MOTOR & PULLEY TABLE

No.	YASKAWA	FANUC	SIEMENS
21	PY-233	PY-233	PY-240
23	MD-144 (2kw)	8Nm A06B-0227-B200	15Nm 1FK7100-5AF71

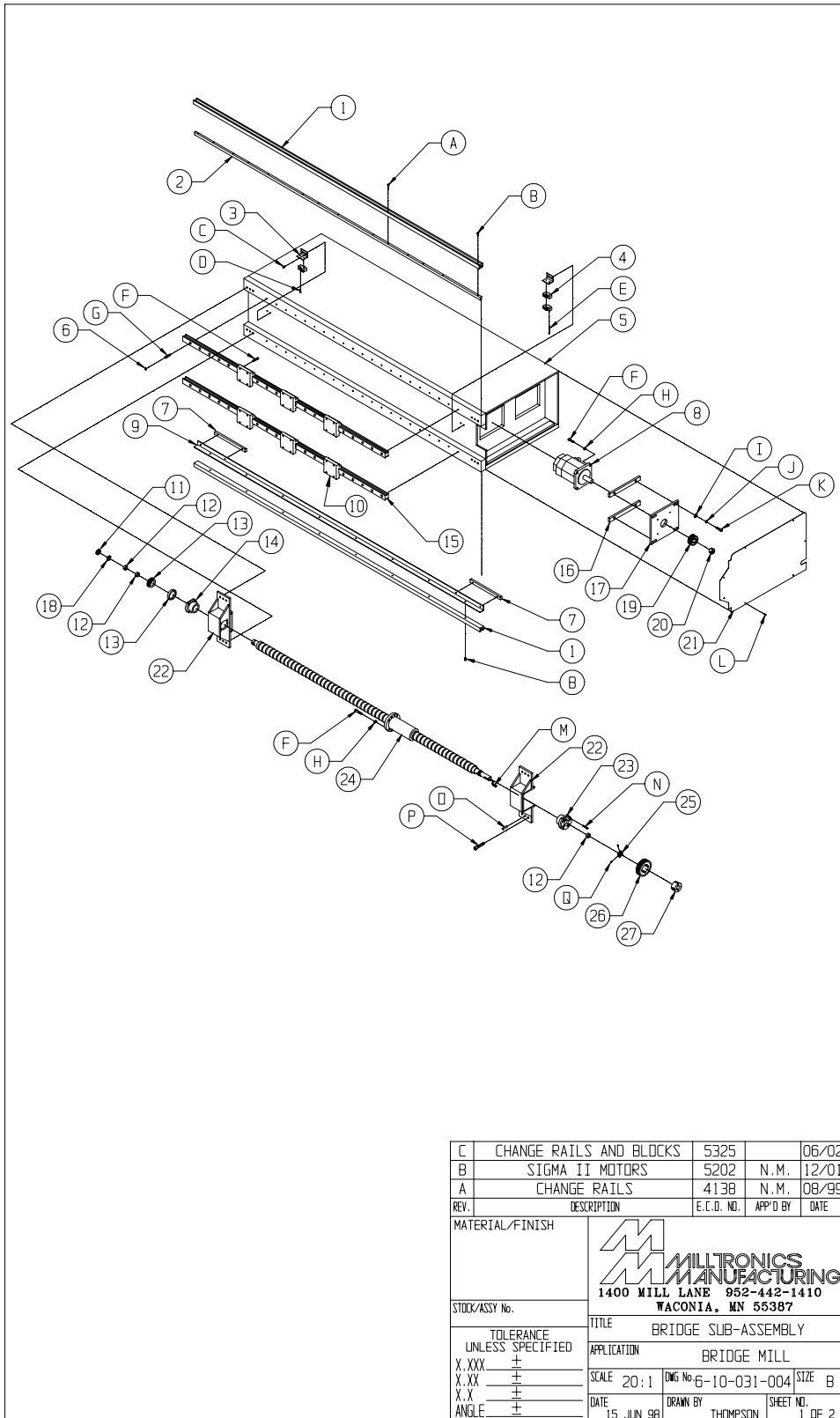
TRAVEL TABLE

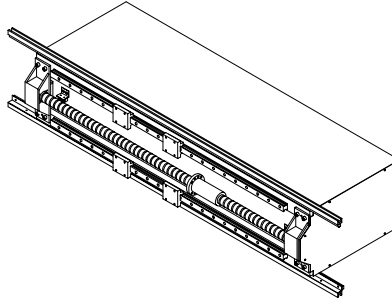
No.	DESCRIPTION	100"	150"
1	BALL RAIL	See note above	MPB-63
	ROLLER RAIL		N/A
2	BALL RAIL BLOCK		MP-728
	ROLLER RAIL BLOCK		N/A
3	BALL SCREW		MPB-66
4	HARD STOP BLOCK		BR-157
6	BEARING LOCKNUT		MPB-56
8	BEARING CUP ASSEMBLY		BG-95
14	HARD STOP BLOCK		BR-156

* 100" REQUIRES 8 FOR X-AXIS
150" REQUIRES 14 FOR X-AXIS

D	REDESIGN FRAME	5895		01/05
C	CHANGE RAILS AND BLOCKS	5324	N.M.	06/02
B	SIGMA II MOTORS	5204	N.M.	12/01
A	CHANGE RAILS	4137	N.M.	08/99
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	±			
X.XX	±			
X.X	±			
X	±			
ANGLE	±			
 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA				
TITLE BASE SUB-ASSEMBLY				
APPLICATION BRIDGE MILL				
SCALE 25:1	DWG No. 6-10-031-006	SIZE B		
DATE 19 MAY 98	DRAWN BY THOMPSON	SHEET NO. 2 OF 2		

Bridge Assembly





PARTS LIST				
No.	QTY	STOCK No.	DESCRIPTION	
1	2		Y WAY COVER RIDER	
2	1		Y WAY COVER RIDER SPACER BAR	
3	2		Y SWITCH BRACKET	
4	3	SW-149	LIMIT SWITCH	
5	1		BRIDGE ASSEMBLY	
6	44	MP-550	RAIL PLUG	
7	2		Y WAY COVER RIDER SPACER - LOWER	
8	1	MD-125	48" MOTOR	
9	1		Y WAY COVER RIDER BRACKET - LOWER	
10	6	MP-641	35 mm RAIL BLOCK	
11	1	BG-35	NO4 BEARING LOCKNUT	
12	3	MP1-107	BEARING LOCKNUT SPACER	
13	1	BG-65	30204 BEARING	
14	1	MP1-89	BEARING BLOCK	
15	2	SEE TABLE	Y-AXIS RAIL	
16	2		Y MOTOR PLATE SPACER	
17	1		Y MOTOR PLATE	
18	1	BG-36	W04 BEARING LOCK WASHER	
19	1	PY-61	TB18L075 PULLEY (1008)	
20	1	PY-95	19 mm. I.D. 1008 BUSHING	
21	1		Y BELT & PULLEY COVER	
22	2		Y BEARING HOUSING	
23	1	6-10-018-029	BEARING CUP ASSEMBLY	
24	1	SEE TABLE	Y BALL SCREW	
25	1	MP1-94	BEARING LOCKNUT	
26	1	PY-100	TB32L075 PULLEY (1610)	
27	1	PY-18	5/8 I.D. 1610 BUSHING	

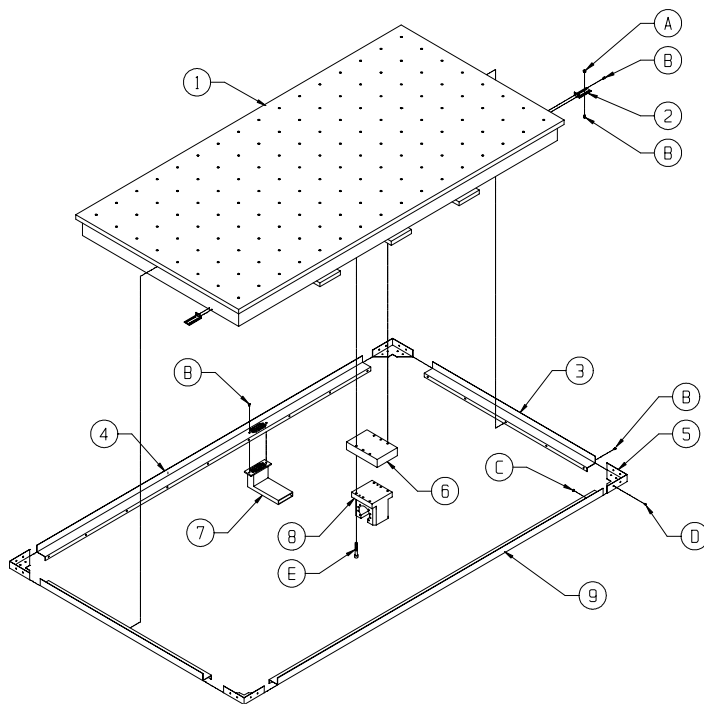
RAIL TABLE		
MACHINE	PART No.	DESCRIPTION
BR50	MPB-48	35 mm 1690 RAIL
BR60	MPB-49	35 mm 1960 RAIL
BR80	MPB-50	35 mm 2520 RAIL

BALL SCREW TABLE		
MACHINE	PART No.	DESCRIPTION
BR50	MPB-01	Y BALL SCREW
BR60	MPB-07	Y BALL SCREW
BR80	MPB-06	Y BALL SCREW

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	4	1/4-20 x 3/4 SHCS
B	18	1/4-20 x 1/2 FHCS
C	4	1/4-20 x 1/2 BHCS
D	2	8-32 x 1 BHCS
E	2	8-32 x 2 BHCS
F	28	5/16-18 x 1 1/4 SHCS
G	44	5/16-18 x 1 1/2 SHCS
H	10	5/16 LOCK WASHER
I	4	3/8 FLAT WASHER
J	4	3/8 LOCK WASHER
K	4	3/8-16 x 1 1/2 SHCS
L	7	10-32 x 1/2 BHCS
M	1	3/16 x 3/16 x 1/2 KEY
N	8	1/4-20 x 1 SHCS
O	4	3/8 x 1 1/2 DOWEL PIN
P	8	1/2-13 x 1 1/2 SHCS
Q	2	10-32 x 1/4 BRASS TIPPED SHSS

C	CHANGE RAILS AND BLOCKS	5325		06/02
B	SIGMA II MOTORS	5202	N.M.	12/01
A	CHANGE RAILS	4138	N.M.	08/99
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE BRIDGE SUB-ASSEMBLY		
X.XXX ±		APPLICATION BRIDGE MILL		
X.XX ±		SCALE 20:1 DWG No 6-10-031-004 SIZE B		
X.X ±		DATE 15 JUN 98 DRAWN BY THOMPSON SHEET NO. 2 OF 2		
ANGLE ±				

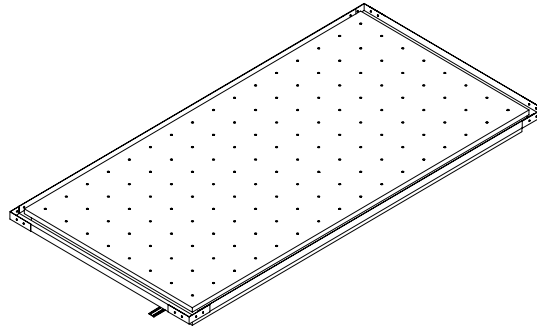
Table Assembly



REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK/ASSY No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XXX ±			
	X.XX ±			
	X.X ±			
	ANGLE ±			
	TITLE			
	APPLICATION			
	SCALE			
	DATE			
	DWG No.			
	DRAWN BY			
	SHEET NO.			

MILLIRONICS
MANUFACTURING
1400 MILL LANE (612) 442-1410
WACONIA, MN 55387

TITLE: TABLE SUB-ASSEMBLY
APPLICATION: BRIDGE MILL
SCALE: 20:1
DATE: 5 JUN 98
DWG No: 6-10-031-005
DRAWN BY: THOMPSON
SHEET NO: 1 OF 2



PARTS LIST

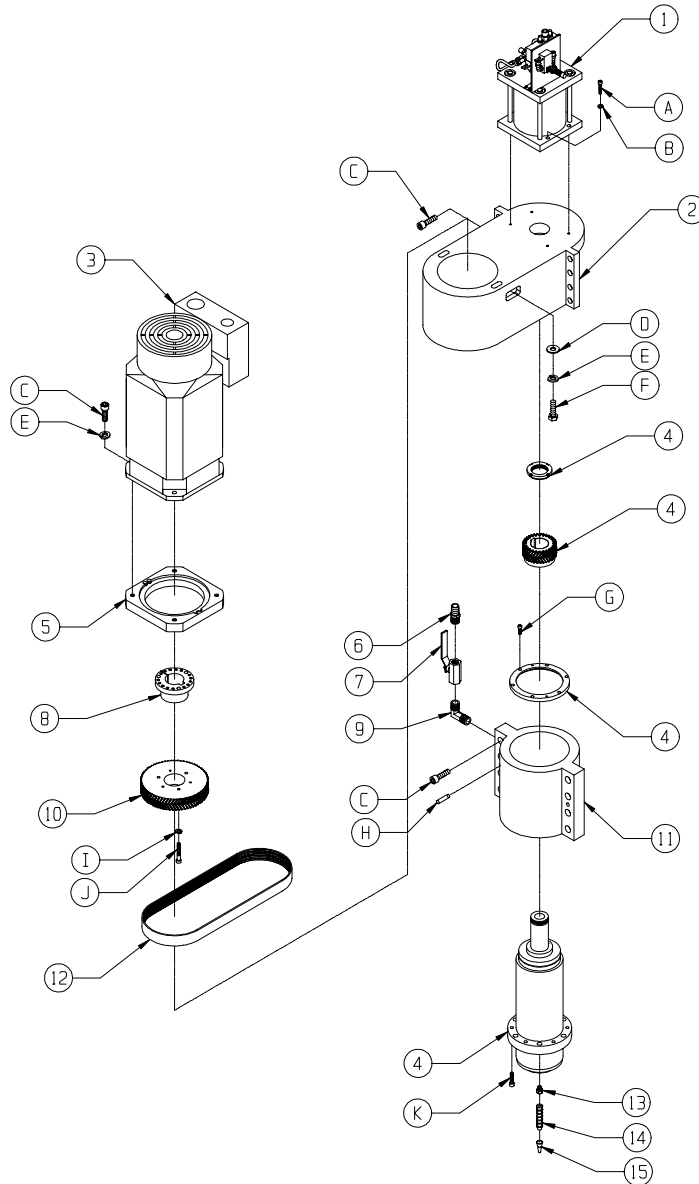
No.	QTY	STOCK No.	DESCRIPTION
1	1		MACHINE TABLE
2	2		SWITCH DOG BRACKET
3	2		TABLE TROUGH - END
4	1		TABLE TROUGH - WITH DRAIN
5	4		TABLE TROUGH - CORNER
6	1		X-AXIS CARRIER SPACER
7	1		TABLE DRAIN CHUTE
8	1	MXT-08	X-AXIS CARRIER - MACHINED
9	1		TABLE TROUGH - WITHOUT DRAIN

HARDWARE LIST

No.	QTY	DESCRIPTION
A	3	1/4-20 NUT
B	54	1/4-20 x 3/8 BHCS
C	32	10-32 NUT
D	32	10-32 3/8 BHCS
E	6	3/8-16 x 4 SHCS

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE (612) 442-1410 WACONIA, MN 55387		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE		
X.XXX	+	TABLE SUB-ASSEMBLY		
X.XX	+	APPLICATION		
X.X	+	BRIDGE MILL		
ANGLE	+	SCALE	20:1	DATE
		DATE	5 JUN 98	DRAWN BY
			THOMPSON	SHEET NO.
				2 OF 2

Head Assembly



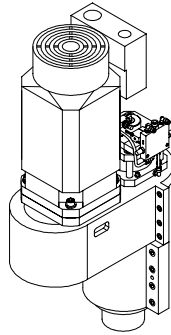
F	NEW DRAW BAR AIR CYLINDER	5438		01/03
E	ADD MD-132 MOTOR	5412	N.M.	10/02
D	CHANGE SPINDLE ASSEMBLY	5245	N.M.	02/02
C	CHANGE SPINDLE	5186	N.M.	11/01
B	CHANGE SPINDLE & MOTOR	5089	N.M.	05/01
A	CHANGE DRAWBAR CYLINDER	3869	N.M.	3/99

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
------	-------------	------------	----------	------

MATERIAL/FINISH	 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA
STOCK/ASSY No.	

CERTAIN INFORMATION CONTAINED HEREIN THE EXCLUSIVE PROPERTY OF MILLIRONICS MFG. CO. IT IS GIVEN IN CONFIDENCE AND IS NOT TO BE USED OR DISCLOSED TO OTHER THAN THE INTENDED RECIPIENT WITHOUT EXPRESSED WRITTEN CONSENT OF MILLIRONICS MFG. CO.

TOLERANCE UNLESS SPECIFIED	TITLE HEAD SUB-ASSEMBLY		
X.XXX	APPLICATION BRIDGE MILL		
X.XX	SCALE 10:1 DWG No 6-10-031-013 SIZE B		
X.X	DATE 04 JUN 98 DRAWN BY THOMPSON SHEET NO. 1 OF 2		
ANGLE			



HARDWARE LIST		
No.	QTY	DESCRIPTION
A	4	1/4-20 x 1 1/4 SHCS
B	4	1/4 LOCK WASHER
C	16	1/2-13 x 1 1/2 SHCS
D	2	1/2 FLAT WASHER
E	6	1/2 LOCK WASHER
F	2	1/2-13 x 1 1/2 HHCS
G	6	1/4-20 x 3/4 SHCS
H	2	3/8 DOWEL PIN
I	3	5/16 LOCK WASHER
J	3	5/16-18 x 2 SHCS
K	6	5/16-18 x 1 1/4 SHCS

PARTS LIST		
No.	QTY	STOCK No. DESCRIPTION
1	1	6-10-018-100 NU-313 DRAWBAR CYLINDER ASSEMBLY
2	1	60mm MACHINE HEAD
3	1	SEE TABLE SPINDLE MOTOR
4	1	SEE TABLE SPINDLE ASSEMBLY
5	1	SEE TABLE MOTOR PLATE
6	1	NU-66 3/4 BARB 1/2 NPT FITTING
7	1	NU-64 BRASS BALL VALVE
8	1	SEE TABLE BUSHING
9	1	NU-140 1/2 NPT MALE ELBOW
10	1	SEE TABLE SPINDLE MOTOR PULLEYS
11	1	60mm CARTRIDGE HOUSING
12	1	BT-62 W896 SPINDLE BELT
13	6	NU-111 1/4 LOCKLINK 1/8 NPT
14	24	MA-22 LOCKLINK HOSE
15	6	MA-216 1/4 NOZZLE

SPINDLE ASSEMBLY		
RPM	10/15 HP 1 SPEED	10/15 & 15/22HP 2 SPEED
6K	9900	9900
8K	9900-1	9900-1
12K	9899-4	9899-4
15K	9899-5	9899-5

SPINDLE MOTORS	
STOCK No.	DESCRIPTION
MD-131	10/15 H.P. TWO SPEED SPINDLE MOTOR - YASKAWA
MD-114	10/15 H.P. SINGLE SPEED SPINDLE MOTOR - YASKAWA
MD-132	15/22 H.P. TWO SPEED SPINDLE MOTOR - YASKAWA

SPINDLE MOTOR PULLEYS	
STOCK No.	DESCRIPTION
PY-188	12,000 RPM & 15,000 RPM
PY-192	6,000 RPM & 8,000 RPM

BUSHINGS	
STOCK No.	DESCRIPTION
PY-97	48mm ID SK BUSHING (USED WITH MD-131 & MD-132 SPINDLE MOTOR)
PY-184	32mm ID SK BUSHING (USED WITH MD-114 SPINDLE MOTOR)

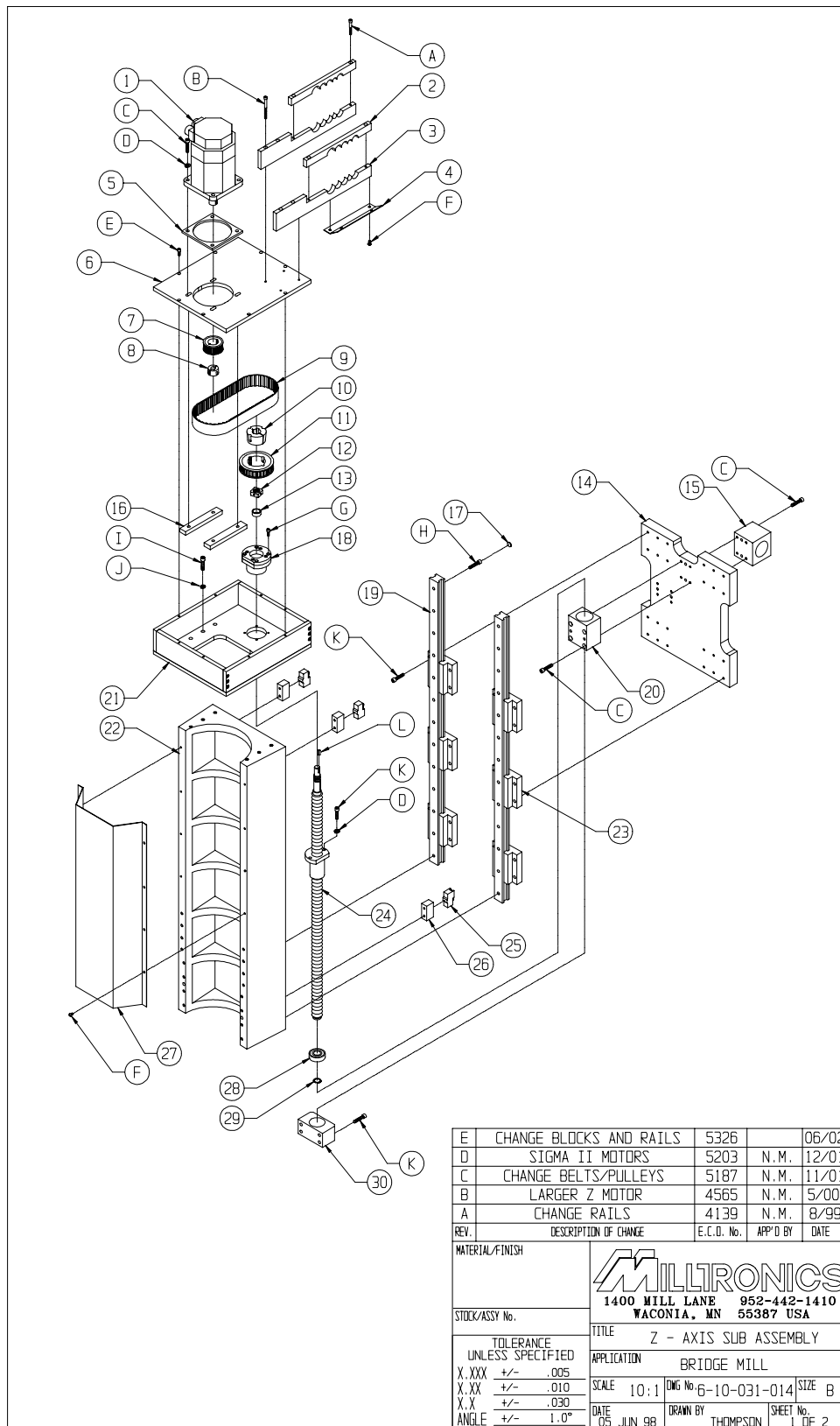
MOTOR PLATES	
STOCK No.	DESCRIPTION
MPB-40	10/15 OR 15/22 H.P. 2-SPEED
MPB-45	10/15 H.P. 1-SPEED

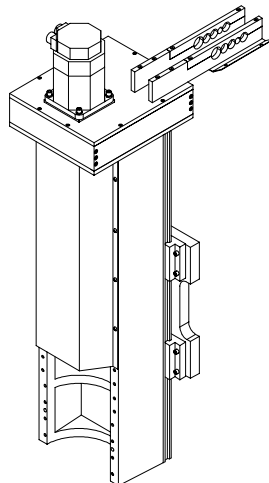
F	NEW DRAW BAR AIR CYLINDER	5438		01/03
E	ADD MD-132 MOTOR	5412	N.M.	10/02
D	CHANGE SPINDLE ASSEMBLY	5245	N.M.	02/02
C	CHANGE SPINDLE	5186	N.M.	11/01
B	CHANGE SPINDLE & MOTOR	5089	N.M.	05/01
A	CHANGE DRAWBAR CYLINDER	3869	N.M.	03/99

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X .XXX +				
X .XX +				
X .X +				
ANGLE +				
 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA				
TITLE HEAD SUB-ASSEMBLY				
APPLICATION BRIDGE MILL				
SCALE 10:1		DWG No. 6-10-031-013		SIZE B
DATE 04 JUN 98	DRAWN BY THOMPSON	SHEET NO. 2 OF 2		

CERTAIN INFORMATION CONTAINED HEREIN IS THE EXCLUSIVE PROPERTY OF MILLIRONICS MFG. CO. IT IS GIVEN IN CONFIDENCE AND IS NOT TO BE USED OR DISCLOSED TO OTHER THAN THE INTENDED RECIPIENT WITHOUT EXPRESSED WRITTEN CONSENT OF MILLIRONICS MFG. CO.

Z Axis Assembly





PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	MD-128	74" 1b. MOTOR W/BRAKE
2	2		CABLE SUPPORT - UPPER
3	2		CABLE SUPPORT - LOWER
4	1		CABLE TRACK BRACKET
5	1	MP-298	YASKAWA BRUSHLESS MOTOR PLATE
6	1		Z-AXIS MOTOR PLATE
7	1	PY-204	P24-8MGT-30 PULLEY
8	1	PY-206	22mm. I.D. 1108 BUSHING
9	1	BT-74	600-8MGT-30 TIMING BELT
10	1	PY-32	5/8 I.D. 1210 BUSHING
11	1	PY-205	P32-8MGT-30 1210 PULLEY
12	1	MP1-94	BALL SCREW LOCK NUT
13	1	MP1-107	BEARING LOCK NUT SPACER
14	1		Y/Z RAIL MOUNTING PLATE
15	1		Y-AXIS BALL SCREW CARRIER
16	1		MOTOR STRAPS
17	26	MP-550	RAIL PLUGS
18	1	6-10-018-029	BEARING CUP ASSEMBLY
19	2	MPB-47	35mm 1000 RAILS
20	1		Z-AXIS BALL SCREW CARRIER
21	1		Z-AXIS MOTOR HOUSING
22	1		Z-AXIS MAIN - MACHINED
23	6	MP-641	35mm RAIL BLOCK
24	1	MPB-02	Z-AXIS BALL SCREW
25	3	SW-172	SWITCH
26	3	SW-173	SWITCH COVER
27	1		Z-AXIS FRONT COVER
28	1	BG-02	BEARING SKF6204 2Z
29	1	MP1-108	BALL SCREW SNAP RING
30	1		Z-AXIS RADIAL SUPPORT

HARDWARE LIST

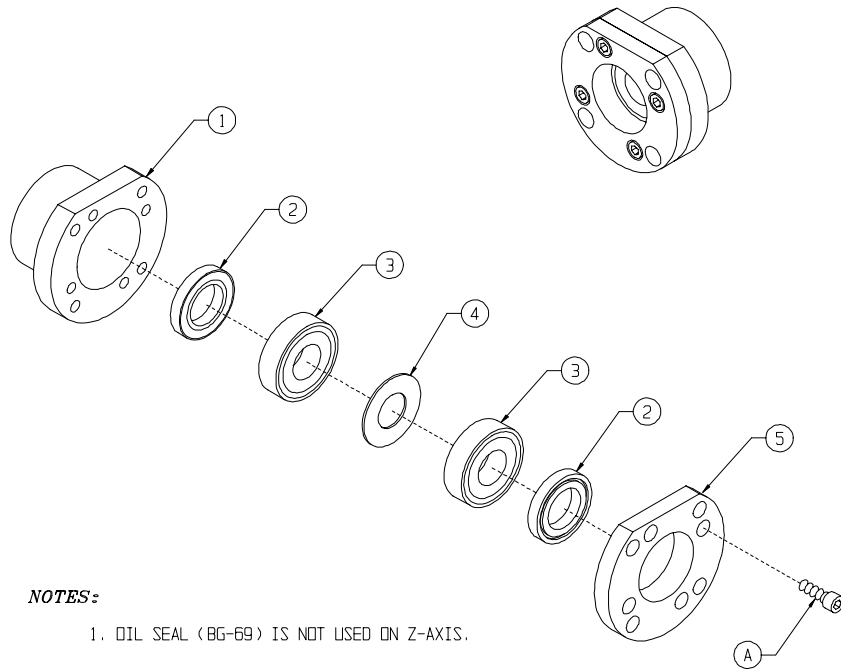
No.	QTY	DESCRIPTION
A	4	1/4-20 x 1 3/4 SHCS
B	4	1/4-20 x 2 3/4 SHCS
C	12	5/16-18 x 1 1/2 SHCS
D	6	5/16 LOCK WASHER
E	8	1/4-20 x 1/2 SHCS
F	10	1/4-20 x 3/8 BHCS
G	4	1/4-20 x 1 SHCS
H	26	5/16-18 x 1 1/2 SHCS
I	6	3/8-16 x 2 SHCS
J	6	3/8 LOCK WASHER
K	22	5/16-18 x 1 1/4 SHCS
L	1	3/16 x 3/16 x 1/2 KEY

E	CHANGE RAILS AND BLOCKS	5326		06/02
D	SIGMA II MOTORS	5203	N.M.	12/01
C	CHANGE BELTS/PULLEYS	5187	N.M.	11/01
B	LARGER Z MOTOR	4565	N.M.	5/00
A	CHANGE RAILS	4139	N.M.	8/99
REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX +/- .005 X.XX +/- .010 X.X +/- .030 ANGLE +/- 1.0°				
		TITLE Z - AXIS SUB ASSEMBLY		
		APPLICATION BRIDGE MILL		
		SCALE 10:1	DWG No 6-10-031-014	SIZE B
		DATE 05 JUN 98	DRAWN BY THOMPSON	SHEET No 2 OF 2

Bearing Cup Assembly

THIS ASSEMBLY USED ON VM16, VM17, & BR'S

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	4	1/4-20 x 5/8 SHCS



NOTES:

1. OIL SEAL (BG-69) IS NOT USED ON Z-AXIS.

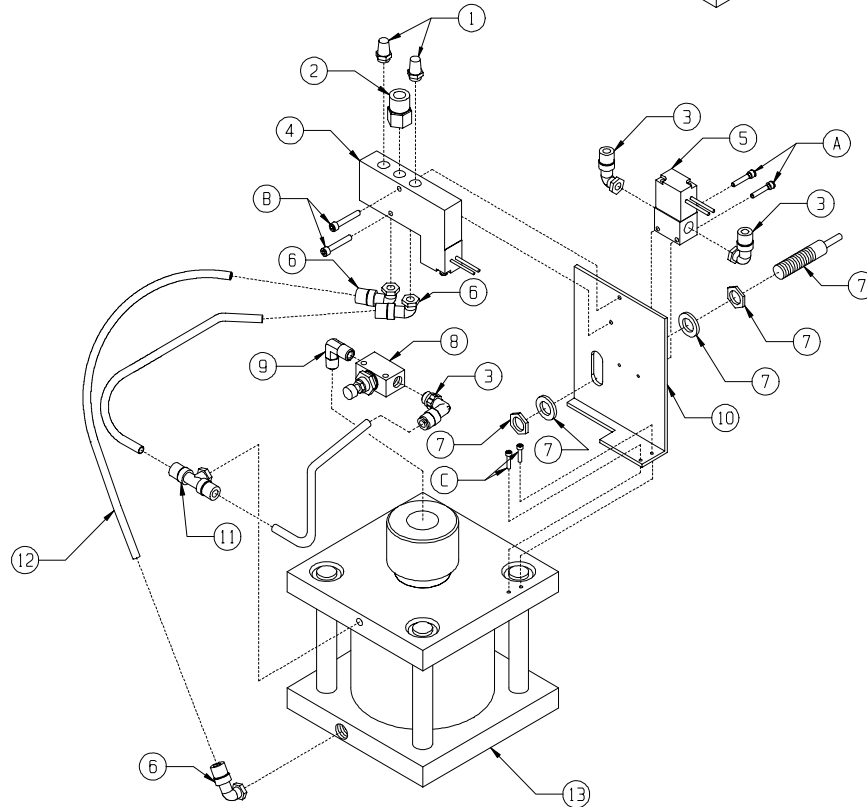
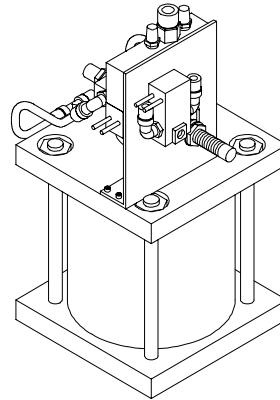
PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	MP1-89	BALL SCREW BEARING BLOCK
2	2	BG-69	091592TB-H BEARING CUP OIL SEAL
3	2	BG-01	BEARING NSK 7204BYG
4	1	HD-46	1 1/4 x 1 3/4 x .002 ROUND SHIM
5	1	MP1-88	BALL SCREW BEARING CAP

REV.	A	ADD OIL SEAL	3344	12/97
		DESCRIPTION	E.C.D. NO.	APP'D BY DATE
MATERIAL/FINISH	 1400 MILL LANE (612) 442-1410 WACONIA, MN 55387			
STOCK/ASSY No.	4450	TITLE BEARING CUP ASSEMBLY		
TOLERANCE UNLESS SPECIFIED	APPLICATION GENERAL PRODUCTS			
X.XXX	±	SCALE 2:1	DWG No 6-10-018-029 SIZE B	
X.XX	±	DATE 22 AUG 95	DRAWN BY THOMPSON	SHEET NO. 1 OF 1
X.X	±			
ANGLE	±			

Drawbar Cylinder Assembly

PARTS LIST			
ITEM	QTY	STOCK No.	DESCRIPTION
1	2	NU-177	1/8 NPT MUFFLER
2	1	NU-95	MALE STRAIGHT 1/4 NPT - 3/8 TUBE
3	3	NU-187	SWIVEL ELBOW 1/8 NPT - 1/4 TUBE
4	1	NU-179	DRAW BAR - AIR VALVE
5	1	NU-320	AIR PURGE - AIR VALVE
6	3	NU-186	SWIVEL ELBOW 1/4 NPT - 1/4 TUBE
7	1	PR-33	DRAWBAR PROX SWITCH
8	1	NU-190	FLOW CONTROL FOR BLOW OUT
9	1	NU-189	MALE ELBOW 1/8 NPT
10	1	BR-145	DRAWBAR PROX SWITCH BRACKET
11	1	NU-321	SWIVEL T CONNECTOR - 1/4 TUBE
12	26"	NU-25	1/4" TUBING
13	1	NU-319	TRIPLE STACK DRAW BAR AIR CYLINDER

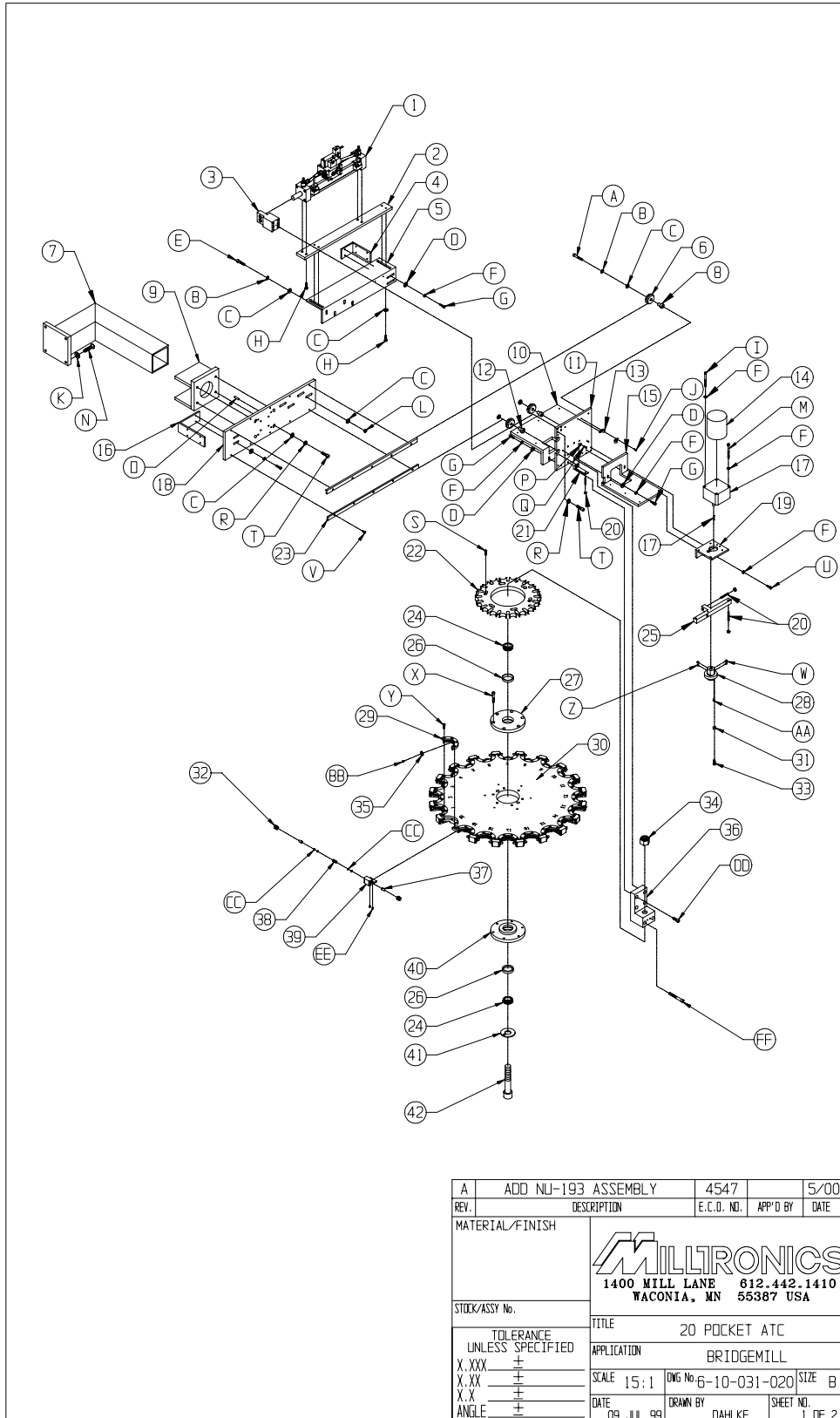
HARDWARE LIST		
ITEM	QTY	DESCRIPTION
A	2	6-32 x 3/4 SHCS
B	2	8-32 x 1 SHCS
C	2	8-32 x 3/8 SHCS

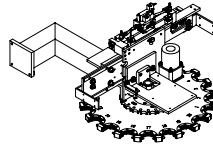


CERTAIN INFORMATION CONTAINED HEREIN IS THE EXCLUSIVE PROPERTY OF MILLIRONICS MFG. CO. IT IS GIVEN IN CONFIDENCE AND IS NOT TO BE USED OR DISCLOSED TO OTHER THAN THE INTENDED RECIPIENT WITHOUT EXPRESSED WRITTEN CONSENT OF MILLIRONICS MFG. CO.

REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.				
1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA TITLE NU-313 DRAW BAR ASSEMBLY APPLICATION GENERAL PRODUCTS SCALE 3:1 DWG No. 6-10-018-100 SIZE B DATE 13 JAN 03 DRAWN BY DAHLKE SHEET No. 1 OF 1				
TOLEANCE UNLESS SPECIFIED X.XXX +/- X.XX +/- X.X +/- ANGLE +/-				

20 pocket ATC Assembly





PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	6-10-018-063	NU-193 9" AIR CYLINDER ASSEMBLY
2	1	MP-426	9 IN. AIR CYLINDER PLATE
3	1	MP-427	9 IN. AIR CYLINDER CLEVIS
4	1	MPB-25	ATC COVER MTG BRKT - BACK
5	1	MPB-22	20 POCKET AIR CYLINDER MOUNTING BRACKET
6	4	MP-143	V-RAIL GUIDE WHEEL
7	1	MPB-19	BRIDGEMILL 20 POCKET ARM
8	2	MP-145	STATIONARY BUSHING
9	1	MPB-20	ATC ARM CLEVIS
10	1	BR-101	REAR CAROUSEL COVER BRACKET
11	1	MP-123	20 POCKET CAROUSEL SLIDING PLATE
12	2	MP-144	ADJUSTABLE BUSHING
13	2	WX-82	3/8 IN. CABLE CLAMP
14	1	MD-72	GENEVA MOTOR
15	1	BR-75	FRONT CAROUSEL COVER BRACKET
16	1	MPB-24	ATC COVER MTG BRKT - FRONT
17	1	MD-71	GEAR BOX W/KEY
18	1	MP-142	V-RAIL PLATE
19	1	MPB-21	GENEVA ATC MOTOR BRACKET
20	3	PR-19	SWITCH PROX.
21	1	BR-130	TOOL CHANGER PROX. SWITCH BRACKET
22	1	MP-120	20 POSITION GENEVA WHEEL
23	2	MX-12	20 POCKET LINEAR V-RAIL MODS.
24	2	BG-33	CONE TAPERED BEARING
25	1	MP-466	HOME/GENEVA PROX BRACKET
26	2	BG-34	CUP TAPERED BEARING
27	1	MP-116	UPPER CAROUSEL BEARING CUP
28	1	MX-10	20 PKT ATC DRIVE CAM - MACHINED
29	20	SEE TABLE	20 POCKET INSERT
30	1	MP-119	20 POCKET CAROUSEL DISK
31	1	HD-39	1/2 x 5/16 DRILL BUSHING
32	40	MP1-140	PUSH PIN GUIDE
33	1	HD-38	5/16 x 3/8 SHOULDER BOLT
34	1	HD-07	1-8 UNC NYLOCK NUT
35	20	SEE TABLE	20 POCKET TOOL CHANGE KEY
36	1	MP-124	20 POCKET CAROUSEL MOUNTING BRACKET
37	40	MP1-144	PUSH PIN
38	20	MP1-141	COIL SPRING
39	20	MP-121	20 ATC LOCKING PIN BLOCK
40	1	MP-115	LOWER CAROUSEL BEARING CUP
41	1	HD-10	1 IN. HARDENED SERIES 'N' WASHER
42	1	HD-09	1-8 x 5 1/2 UNC SHCS BOLT

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	4	5/16-18 x 1 5/8 SHCS
B	8	5/16 LOCK WASHER
C	20	5/16 HARDENED FLAT WASHER
D	9	1/4 FLAT WASHER
E	4	5/16-18 x 1 1/2 SHCS
F	17	1/4 LOCK WASHER
G	9	1/4-20 x 1 SHCS
H	8	5/16-24 x 3/4 BHCS
I	2	1/4-20 x 3 1/2 SHCS
J	2	8-32 x 1/2 BHCS
K	6	1/2 LOCK WASHER
L	4	5/16-18 HEX NUT
M	2	1/4-20 x 3 SHCS
N	6	1/2-13 x 2 SHCS
O	4	1/4 x 1 DOWEL PIN
P	2	#10 FLAT WASHER
Q	2	10-32 x 3/4 BHCS
R	8	3/8 LOCK WASHER
S	6	1/4-20 x 3/4 BHCS
T	8	3/8-16 x 1 1/4 SHCS
U	4	1/4-20 x 7/8 SHCS
V	10	1/4-20 x 5/8 BHCS
W	2	5/16-18 x 1/4 SHSS
X	6	5/16-18 x 1 3/4 SHCS
Y	80	1/4-20 x 3/4 SHCS
Z	2	1/4-20 x 1/4 SHSS
AA	1	8-32 x 1/4 BHCS
BB	20	8-32 x 1/4 SHCS
CC	80	* No. 6 FLAT WASHER
DD	4	3/8-16 x 1 SHCS
EE	40	10-32 x 3/16 BRASS TIPPED SHSS
FF	2	3/8-16 x 3 SHCS

* CC IS REMOVED FOR V-FLANGE OPTION *

20 POCKET TOOL CHANGE KEY CHART	
V-FLANGE	MP1-45
BT	MP1-121

20 POCKET INSERT CHART	
V-FLANGE	MX-11
BT	MX-13

A	ADD NU-193 ASSEMBLY	4547		5/00
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.		TITLE 20 POCKET ATC		
TOLERANCE UNLESS SPECIFIED		APPLICATION BRIDGEMILL		
X .XXX	+	SCALE 20:1	DWG No 6-10-031-020	SIZE B
X .XX	+	DATE 09 JUL 99	DRAWN BY DAHLKE	SHEET NO. 2 OF 2
X .X	+			
ANGLE	+			

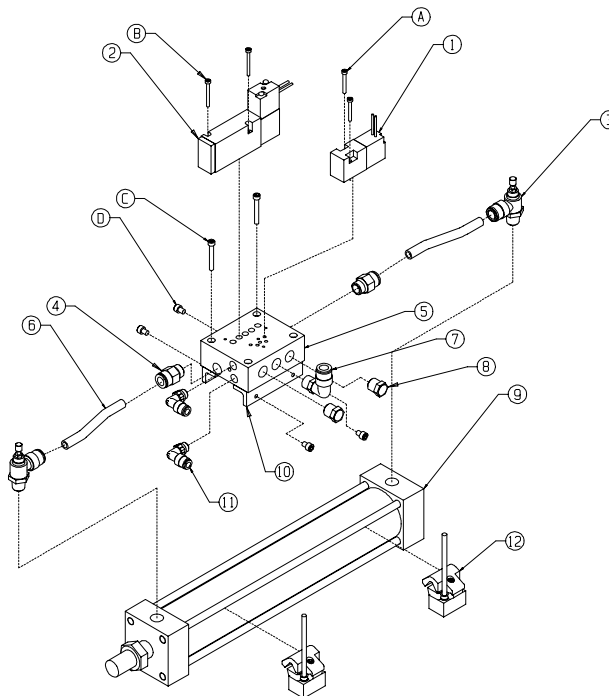
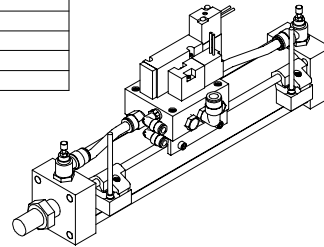
20 pocket Air Cylinder Assembly

PARTS LIST

ITEM	QTY	STOCK No.	DESCRIPTION
1	1	NU-185	AIR VALVE - DOOR - OPEN/CLOSE
2	1	NU-183	AIR VALVE - CAROUSEL - IN/OUT
3	2	NU-180	FLOW CONTROL
4	2	NU-95	MALE STRAIGHT CONNECTOR 1/4 NPT - 3/8 TUBE
5	1	NU-194	MANIFOLD
6	2	NU-78	3/8 NYLON TUBING
7	1	NU-199	SWIVEL ELBOW 1/4 NPT - 3/8 TUBE
8	2	NU-79	MUFFLER
9	1	NU-167	9" AIR CYLINDER
10	2	NU-195	MANIFOLD BRACKET
11	2	NU-187	SWIVEL ELBOW 1/8 NPT - 1/4 TUBE
12	2	SW-158	REED SWITCH

HARDWARE LIST

ITEM	QTY	DESCRIPTION
A	2	M3-.5 x 25mm SHCS
B	2	M3-.5 x 30mm SHCS
C	4	8-32 x 1 1/4 SHCS
D	4	10-32 x 1/4 SHCS

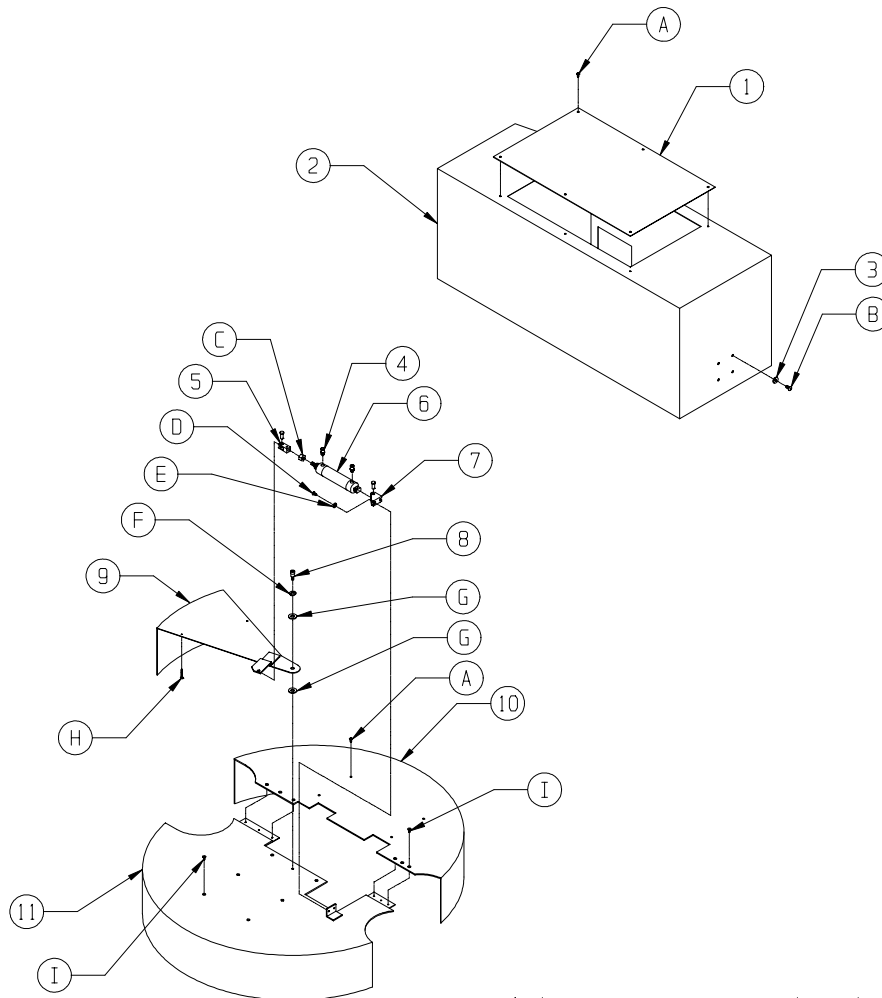


REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MILLIRONICS 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA				
MATERIAL/FINISH		TITLE NU-193 - 9" AIR CYLINDER ASSEMBLY		
STOCK/ASSY No.		APPLICATION GENERAL PRODUCTS		
TOLERANCE UNLESS SPECIFIED		SCALE 4:1	DWG No. 6-10-018-063	SIZE B
X.XXX +/-		DATE 19 FEB 99	DRAWN BY DAHLKE	SHEET NO. 1:1
X.XX +/-				
X.X +/-				
ANGLE +/-				

20 Pocket ATC Top Cover Assembly

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	10	8-32 x 3/8 BHCS
B	8	1/4-20 x 1/2 BHCS
C	1	5/16-24 JAM NUT
D	2	10-32 x 3/8 BHCS
E	2	#10 LOCK WASHER
F	1	5/16 LOCK WASHER
G	2	5/16 FLAT WASHER
H	2	6-32 x 1/8 RHMS NYLON
I	12	8-32 x 3/8 FHCS

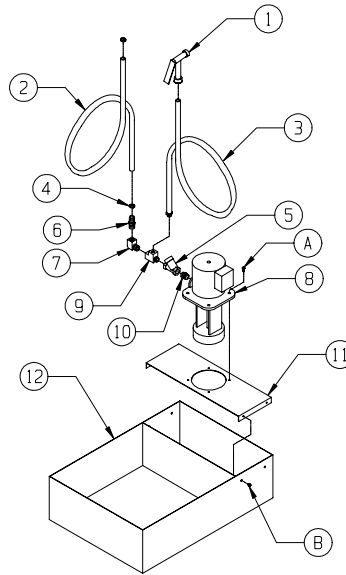
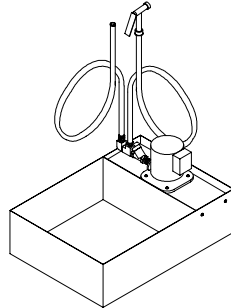
PARTS LIST			
No.	Qty.	PART No.	DESCRIPTION
1	1	MM-60	TOP COVER ACCESS PANEL
2	1	MPB-44	TOP COVER ASSEMBLY
3	8	HD-12	RUBBERIZED WASHER
4	2	NU-201	FLOW CONTROL
5	1	NU-03	CYLINDER CLEVIS AND PIN
6	1	NU-129	AIR CYLINDER 1"x2"
7	1	NU-04	CYLINDER BASE AND PIN
8	1	HD-38	5/16 x 3/8 SHOULDER BOLT
9	1	MPB-41	CAROUSEL DOOR
10	1	MPB-42	CAROUSEL COVER REAR
11	1	MPB-43	CAROUSEL COVER FRONT



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE ATC COVER ASSEMBLY		
X.XXX ±		APPLICATION BRIDGE MILL		
X.XX ±		SCALE 10:1 DWG No 6-10-031-021 SIZE B		
X.X ±		DATE 17 NOV 99 DRAWN BY DAHLKE SHEET NO. 1 OF 1		
ANGLE ±				

Coolant Trough Assembly

*THIS IS USED ON ASSEMBLY
FOR VM15, VM16, VM17.*



PARTS LIST

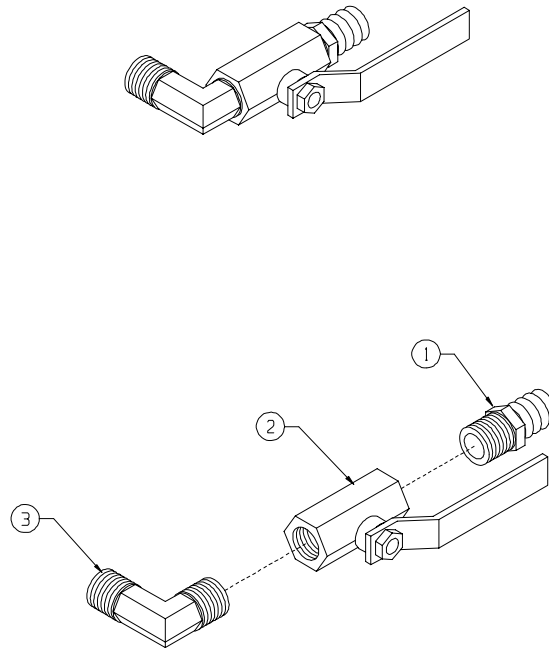
No.	QTY	STOCK No.	DESCRIPTION
1	1	NU-124	WATER HOSE NOZZLE
2	20'	NU-69	3/4" NYLOBRAID HOSE
3	1	NU-130	WASHDOWN HOSE ASSEMBLY
4	2	NU-141	1" HOSE CLAMP
5	1	NU-128	1/2" SWING CHECK VALVE
6	1	NU-66	HOSE BRASS 3/4"
7	1	NU-125	1/2" ELBOW-STREET
8	1	MA-162	FLOOD PUMP 1/4 HP MOTOR
9	1	NU-127	1/2" STREET T
10	1	NU-65	1/2" NIPPLE
11	1	MP1-24	FLOOD PUMP MOUNTING PLATE
12	1	MP1-21	FLOOD CONTAINER

HARDWARE LIST

No.	QTY	DESCRIPTION
A	4	1/4-20 x 5/8 BHCS
B	4	1/4-20 x 3/8 BHCS

REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	+/- .005			
X.XX	+/- .010			
X.X	+/- .030			
ANGLE	+/- 1.0°			
TITLE		COOLANT TROUGH ASSEMBLY		
APPLICATION		PARTNER I		
SCALE	15:1	DWG No.	6-10-008-066	SIZE B
DATE	10 APR 00	DRAWN BY	DAHLKE	SHEET No. 1 OF 1

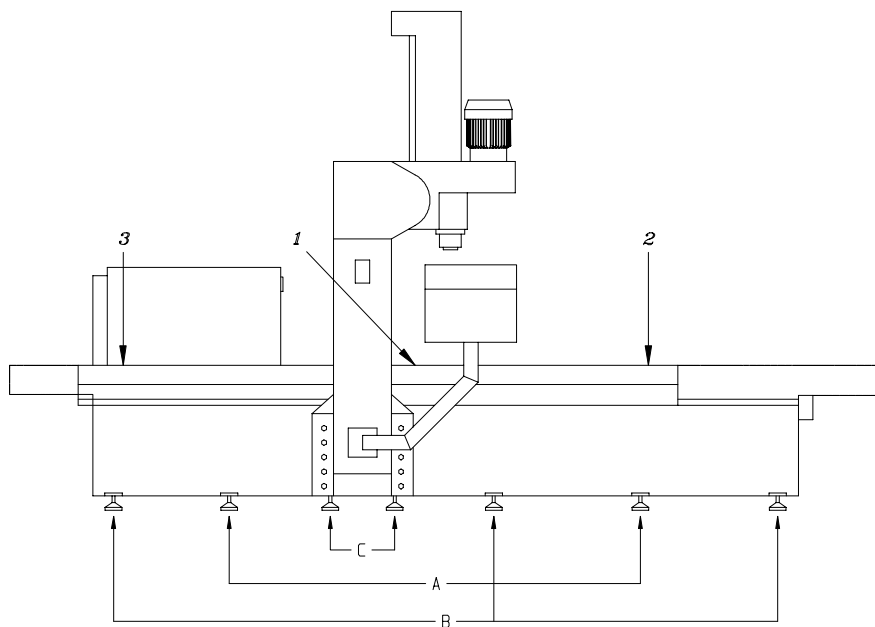
Flood Coolant Valve Handle Assembly



PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	NU-66	BRASS HOSE, 3/4 IN., 125HBL-12-8
2	1	NU-64	BRASS BALL, 1/2 IN., 21-041
3	1	NU-140	1/2 NPT MALE ELBOW

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLIRONICS MANUFACTURING 1400 MILL LANE (812) 442-1410 WACONIA, MN 55387		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE VM16 FLOOD HANDLE SUB-ASSEMBLY		
X. XXX ±		APPLICATION PARTNER VM16		
X. XX ±		SCALE 2:1 DWG No 6-10-008-038 SIZE B		
X. X ±		DATE 29 APR 97		
ANGLE ±		DRAWN BY THOMPSON SHEET NO. 1 OF 1		

Leveling Instructions For BR 50



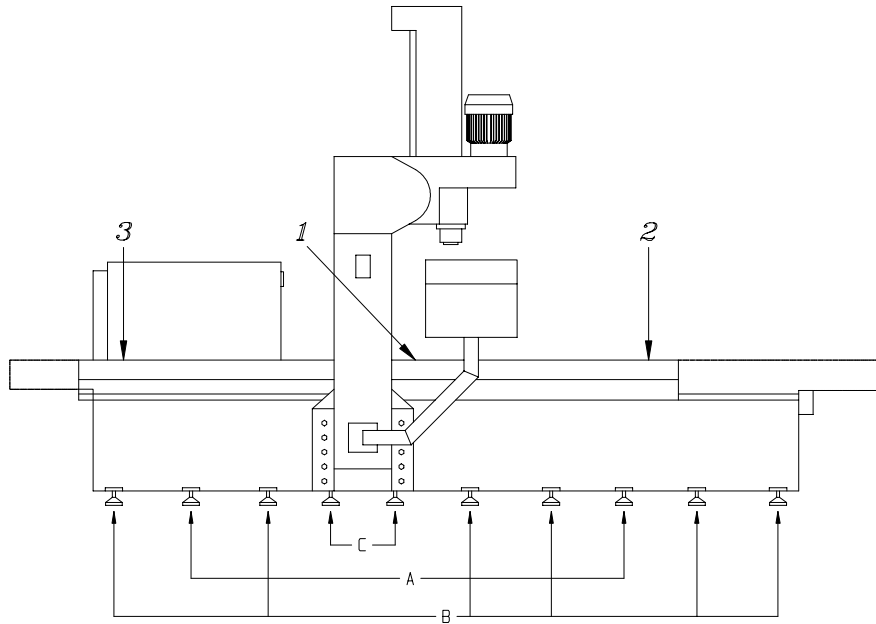
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK/ASSY No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XXX	±		
	X.XX	±		
	X.X	±		
	ANGLE	±		
	TITLE	BR50 LEVELING INSTRUCTIONS		
	APPLICATION	BRIDGE MILL		
	SCALE	20:1	DWG No. 6-10-031-018	SIZE B
	DATE	15 JUN 98	DRAWN BY THOMPSON	SHEET NO. 1 OF 2

NOTES:

1. Center the table in the travel of the X axis.
2. Raise the 4 leveling pads directly under the columns pads "C" most of the way in so they are NOT touching the floor.
3. With the level located in the center of the table (position 1) use pads "A" to level the machine in both X and Y.
4. With the level located at the ends of the table (position 2 and 3) level each end with pads "B" in both X and Y.
5. Double-check the level at all locations.
6. The remaining pads should be threaded approximately 2/3 to 3/4 of the way in and touching the floor. Even pressure should be applied to each of these pads.
7. Lower the 4 leveling pads directly below the columns until they are resting on the floor with even pressure.
8. Spin the locknut for each pad up then secure then in place.
9. Using a magnetic base with a dial indicator sweep the table to check tram. The tram should sweep acceptably (typically .001" over a 10" diameter sweep) if the table surface has been machined at the factory. Adjust the 4 leveling pads below the column to adjust the tram if necessary. At this stage it is more important to be level to tram and NOT level to the precision level.

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH	 MILLIRONICS MANUFACTURING 1400 MILL LANE (612) 442-1410 WACONIA, MN 55387			
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED	TITLE	BR50 LEVELING INSTRUCTIONS		
X.XXX ±	APPLICATION	BRIDGE MILL		
X.XX ±	SCALE	20:1	DWG No	6-10-031-018
X.X ±	DATE	15 JUN 98	DRAWN BY	THOMPSON
ANGLE ±			SHEET NO.	2 OF 2

Leveling Instructions For BR 60 & 80



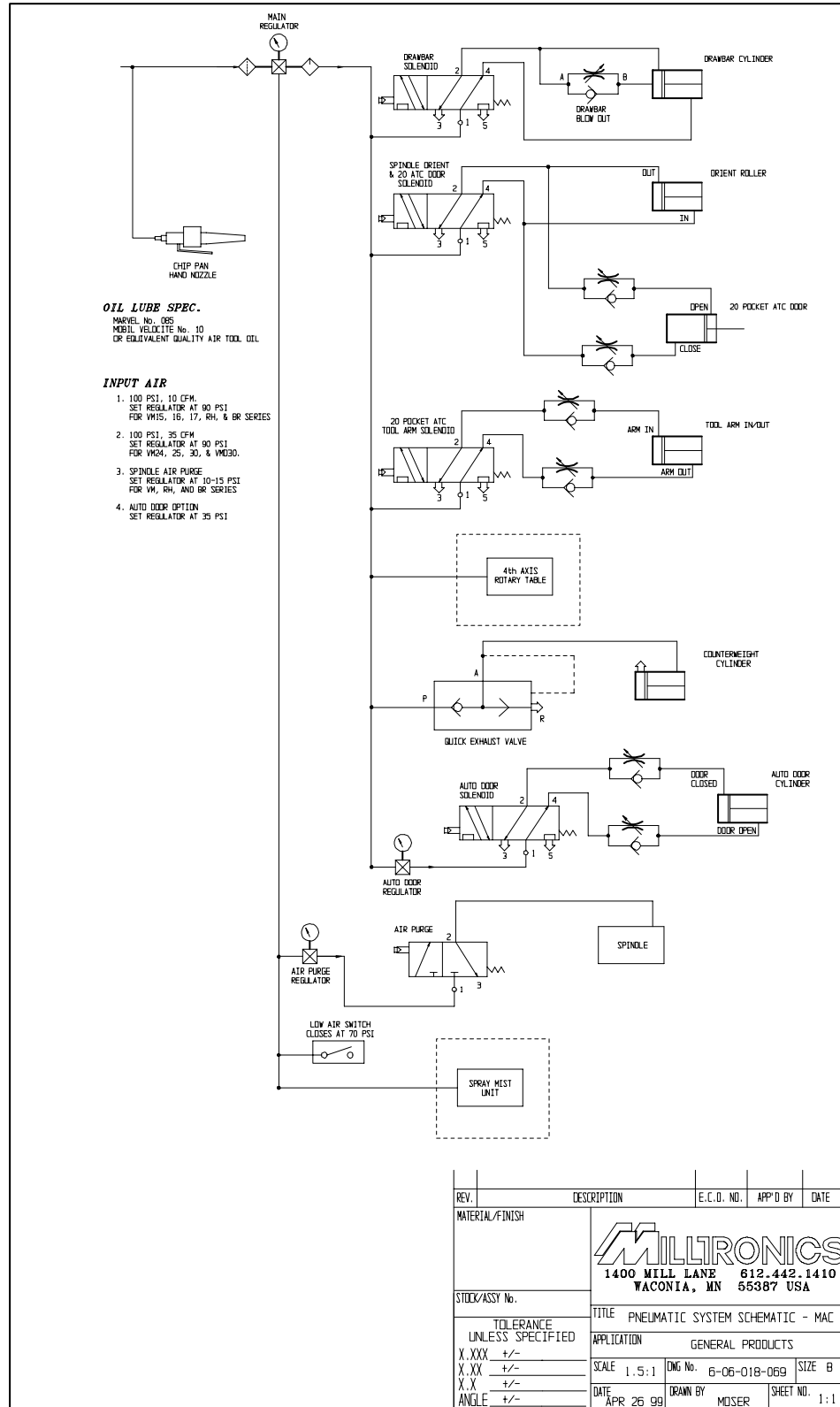
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK/ASSY No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XXX	±		
	X.XX	±		
	X.X	±		
	ANGLE	±		
	TITLE	BR60 & 80 LEVELING INSTRUCTIONS		
	APPLICATION	BRIDGE MILL		
	SCALE	20:1	DWG No. 6-10-031-019	SIZE B
	DATE	15 JUN 98	DRAWN BY THOMPSON	SHEET NO. 1 OF 2

NOTES:-

1. Center the table in the travel of the X axis.
2. Raise the 4 leveling pads directly under the columns pads "C" most of the way in so they are NOT touching the floor.
3. With the level located in the center of the table (position 1) use pads "A" to level the machine in both X and Y.
4. With the level located at the ends of the table (position 2 and 3) level each end with pads "B" in both X and Y.
5. Double-check the level at all locations.
6. The remaining pads should be threaded approximately 2/3 to 3/4 of the way in and touching the floor. Even pressure should be applied to each of these pads.
7. Lower the 4 leveling pads directly below the columns until they are resting on the floor with even pressure.
8. Spin the locknut for each pad up then secure them in place.
9. Using a magnetic base with a dial indicator sweep the table to check tran. The tran should sweep acceptably (typically .001" over a 10" diameter sweep) if the table surface has been machined at the factory. Adjust the 4 leveling pads below the column to adjust the tran if necessary. At this stage it is more important to be level to tran and NOT level to the precision level.

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE (612) 442-1410 WACONIA, MN 55387		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE BR60 & 80 LEVELING INSTRUCTIONS		
X.XXX X.XX X.X ANGLE		APPLICATION BRIDGE MILL		
		SCALE 20:1	CMG NO. 6-10-031-019	SIZE B
		DATE 15 JUN 98	DRAWN BY THOMPSON	SHEET NO. 2 OF 2

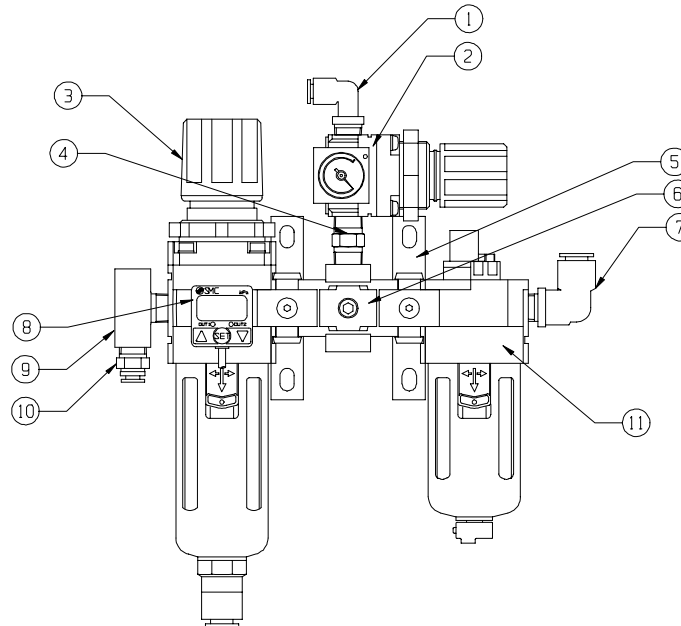
Pneumatic System Schematic



Air Filter / Regulator / Lubricator Assembly

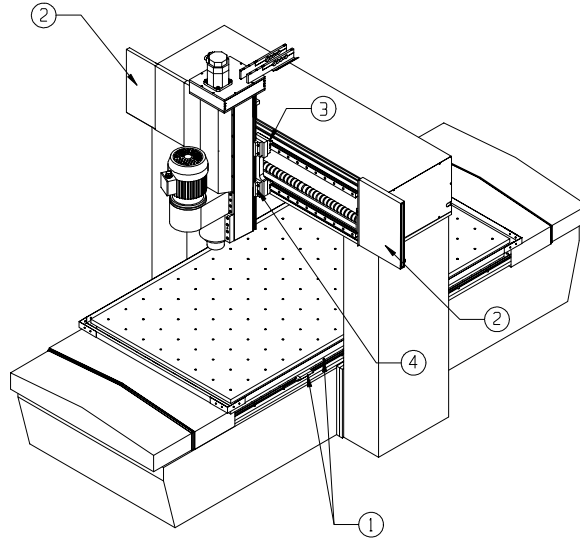
PARTS LIST

ITEM	QTY	STOCK No.	DESCRIPTION
1	1	NU-186	1/4 NPT 1/4 TUBE SWIVEL ELBOW
2	1	NU-262	LOW PRESSURE REGULATOR W/GAGE
3	1	NU-212	LARGE FILTER/HIGH PRESSURE REGULATOR
4	1	NU-30	1/4 NPT PIPE NIPPLE
5	2	NU-210	LARGE MOUNTING SPACER
6	1	NU-211	LARGE MANIFOLD SPACER
7	1	NU-199	1/4 NPT 3/8 TUBE SWIVEL ELBOW
8	1	NU-259	DIGITAL AIR GUAGE WITH PRESSURE SWITCH
9	1	NU-219	1/4 NPT BRANCH TEE
10	1	NU-32	1/4 NPT 1/4 TUBE MALE STRAIGHT
11	1	NU-209	LARGE LUBRICATOR



B	ADD DIGITAL GAGE	4860		12/00
A	CHANGE STOCK NUMBER	4813	N. M.	12/00
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE NU-232 FRL ASSEMBLY		
X .XXX +/-		APPLICATION GENERAL PRODUCTS		
X .XX +/-		SCALE 3:1	DWG No. 6-10-018-085	SIZE B
X .X +/-		DATE 14 JAN 00	DRAWN BY DAHLKE	SHEET NO. 1:1
ANGLE +/-				

Machine Lubrication Instructions



GREASE EVERY 500 HOURS OR SIX MONTHS

1. GREASE THE X-AXIS BEARING BLOCKS, 3 OR 4 ON EACH SIDE, AND THE X-AXIS BALLSCREW
2 PUMPS PER BLOCK.
2. SLIDE THE Y-AXIS WAY COVERS OUT TO ACCESS THE BEARING BLOCKS AND BALLSCREW.
3. GREASE THE 6 BEARING BLOCKS, 3 ON EACH SIDE, AND THE Y-AXIS BALLSCREW
2 PUMPS PER BLOCK AND BALLSCREW.
4. GREASE THE 6 BEARING BLOCKS, 3 ON EACH SIDE, AND THE Z-AXIS BALLSCREW
2 PUMPS PER BLOCK AND BALLSCREW.
5. INSTALL ALL WAY COVERS AND CYCLE MACHINE THE FULL TRAVELS AT 10 IPM MAX. TO
FULLY LUBRICATE THE ENTIRE LENGTH OF THE RAILS AND BALLSCREWS.

REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE BRIDGE MILL GREASE INSTRUCTIONS		
X .XXX +/-		APPLICATION BRIDGE MILL		
X .XX +/-		SCALE 24:1 DWG No. 6-11-031-001 SIZE B		
X .X +/-		DATE 01 FEB 01 DRAWN BY NEW SHEET No. 1 OF 2		
ANGLE +/-				

MOBILITH AW SERIES, MULTIPURPOSE EP GREASE	
PRODUCT NUMBER	64352-B
NLGI GRADE	1
COLOR	GREEN
STRUCTURE	SMOOTH/TACKY
SOAP TYPE	LITHIUM COMPLEX
MINERAL OIL VISCOSITY	
cST AT 40°C	150
cST AT 100°C	13
SUS AT 100°F	750
SUS AT 210°F	70
ISO VISCOSITY GRADE	150
PENETRATION AT 23°C (77°F), WORKED	325
DROPPING POINT, ASTM D 2265, °F	475
TIMKEN OK LOAD, ASTM D 2509, lb	40
FOUR-BALL EP TEST, ASTM D 2596,	
WELD LOAD, kg	250
LOAD WEAR INDEX	40
FOUR-BALL WEAR TEST, ASTM D 2266,	
SCAR DIAMETER, mm, MAX	0.5
CORROSION PREVENTION, ASTM D 1743	PASS
WHEEL BEARING TEST, ASTM D 4290	
MODIFIED, LEAKAGE, GRAM	5

MOBIL VELOCITE OIL No. 10	
PRODUCT NUMBER	60068-4
GRAVITY, API	32.0
POUR, °C (°F), max.	-4 (25)
FLASH, °C (°F), min.	182 (360)
VISCOSITY	
cST AT 40° C	22.0
cST AT 100° C	4.0
SUS AT 100° F	115
SUS AT 210° F	40
ISO VG	22
VISCOSITY INDEX	95
COLOR, ASTM D 1500	2.0
RUST PROTECTION, ASTM D 665	PASS
CINCINNATI MILACRON SPECIFICATION	P-45

MOBIL VACTRA OIL No. 2	
PRODUCT NUMBER	60049-4
SPECIFIC GRAVITY, 60/60F	0.88
POUR POINT, °C (°F), max.	-9 (16)
FLASH POINT, °C (°F), min.	244 (472)
VISCOSITY	
cST AT 40°C	68
cST AT 100°C	8.6
SUS AT 100°F	356
SUS AT 210°F	55
VISCOSITY INDEX	97
ISO VG	68
COLOR, ASTM D 1500	4
FZG, PASS STAGES	11
4 BALL WELD, kg, ASTM D 2783	160
4 BALL WEAR, mm, ASTM D 4172	0.22
COPPER CORROSION, ASTM D 130	1B
RUST, D665A	PASS
VICKERS V-104C, ng D 2882 (MOD)	-
CMCD, P-SPEC, APPROVAL	P-47
BTJUR PT 37-1 APPROVAL	PASS
OKUMA APPROVAL	PASS

MOBIL DTE 24	
PRODUCT NUMBER	60262-3
98 CMCS CODE (DRUM)	98020E
SPECIFIC GRAVITY	0.871
POUR POINT, °C (°F), max	-18 (0)
FLASH POINT, °C (°F), min	200 (392)
VISCOSITY	
cST AT 40°C	32
cST AT 100°C	5.3
SUS AT 100°F	165
SUS AT 210°F	44
ISO VISCOSITY GRADE	32
VISCOSITY INDEX	95
RUST PROTECTION,	
ASTM D 665, A & B	PASS
COLOR, ASTM D1500, max	3.5
FZG GEAR TEST STAGES	12
PASSED DIN 51534	

REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH	 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA			
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED	TITLE BRIDGE MILL GREASE INSTRUCTIONS			
X.XXX +/-	APPLICATION BRIDGE MILL			
X.XX +/-	SCALE 24:1			
X.X +/-	DATE 01 FEB 01			
ANGLE +/-	DRAWN BY NEW			
	SHEET No. 2 OF 2			

Retention Knob Chart

ANSI RETENTION KNOBS STYLE V-FLANGE 50 TAPER

RET. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
N/A	1.14	.83	1.00	45°	RW30B	RC6E-0001	DWG RK11144	N/A	C50-STD

ANSI RETENTION KNOBS STYLE BT-FLANGE 50 TAPER

RET. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
N/A	1.14	.83	1.00	45°	RW30B	RS6M-0105	DWG RK11144A	N/A	N/A

ANSI RETENTION KNOBS STYLE V-FLANGE 40 TAPER

RET. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4836	.74	.49	.64	45°	RH20F, RH25D, RH30D, BR50C, BR60C, BR80C VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RC4E-0001	RK11122	PT-475C	C40-STD

ANSI RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

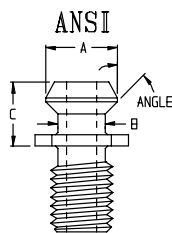
RET. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4837	.74	.49	.75	45°	RH20F, RH25D, RH30D, BR50C, BR60C, BR80C VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RS4M-0115	RK11126A	N/A	B40-FADAL

DIN 69872 RETENTION KNOBS STYLE V-FLANGE 40 TAPER

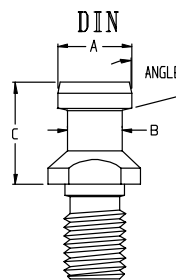
RET. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4838	.75	.55	1.02	75°	RH20F, RH25D, RH30D, BR50C, BR60C, BR80C VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RS4E-0114-C	DWG RK71125	N/A	C40-1500

DIN 69872 RETENTION KNOBS STYLE DIN-FLANGE 40 TAPER

RET. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4839	.75	.55	1.02	75°	RH20F, RH25D, RH30D, BR50C, BR60C, BR80C VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RS4M-0114-C	DWG RK71124	N/A	B40-1500



↑
ENGLISH THREADS FOR V-FLANGE
METRIC THREADS FOR BT-FLANGE



↑
ENGLISH THREADS FOR V-FLANGE
METRIC THREADS FOR DIN-FLANGE

D	ADD RH/RW12 & RH19	5146	09/01
C	ADD RETENTION KNOBS TO CHART	4859	12/00
B	CHANGE 70mm BT-FLANGE CHART	4730	10/00
A	ADD LYNDEX CORP. IN CHART	4351	1/00
REV.	DESCRIPTION	E.C.B. NO.	APP'D BY
MILLTRONICS		SCALE 1:1	DWG No. 6-11-018-054
TITLE RETENTION KNOB CHART		DATE 30 APR 99	DRAWN BY DAHLKE
APPLICATION GENERAL PRODUCTS		SHEET NO. 1 OF 2	SIZE B

MAS RETENTION KNOBS STYLE V-FLANGE 40 TAPER

REF. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4831	.59	.39	1.27	45°	RH20F, RH25D, RH30D, BR50C, BR60C, BR80C, RW20A*, VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RB4E-0001	RK31114	PT-532-45	C40-4500

MAS RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

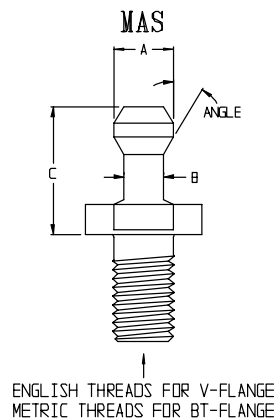
REF. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4832	.59	.39	1.38	45°	RH20F, RH25D, RH30D, BR50C, BR60C, BR80C, RW20A*, VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RB4M-0001	RK31113	PT-444-45	B40-4500

MAS RETENTION KNOBS STYLE V-FLANGE 40 TAPER

REF. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4833	.59	.39	1.27	60°	RH12, RH19, RH20F, RH25D, RH30D, RW12, BR50C, BR60C, BR80C, VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RB4E-0002	RK31114A	PT-532-60	C40-6000

MAS RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

REF. KNOB ASSEMBLY SELECTION	DIMENSIONS				MILLTRONICS MACHINE	COMMAND PART No.	KENAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE						
4834	.59	.39	1.38	60°	RH12, RH19, RH20F, RH25D, RH30D, RW12, BR50C, BR60C, BR80C, VM16G, VM17E, VMG17D, VM24E, VMG24B, VM25C, VM30F, VMD30E	RB4M-0002	RK31113A	PT-444-60	B40-6000



NOTES:

1. FOR SPINDLES OF 8000 RPM AND GREATER YOU MUST USE BALANCED TOOLING TO A G2.5 SPEC. OR IT WILL VOID THE SPINDLE WARRANTY.
2. CHART IS GOOD FOR ALL MACHINE VERSIONS LISTED AND ALL FUTURE VERSIONS.
3. COMMAND CORPORATION
TEL: 1-800-328-2197
FAX: 1-763-576-6911
4. KENAMETAL
TEL: 1-800-446-7738
FAX: 1-800-962-4910
5. VALENITE
TEL: 1-800-544-3336
FAX: 1-800-488-0695
6. LYNDEX CORPORATION
TEL: 1-800-543-6237
FAX: 1-847-509-2909

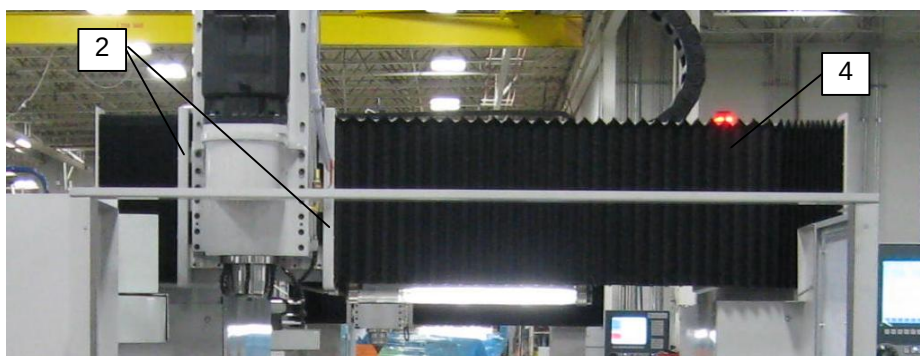
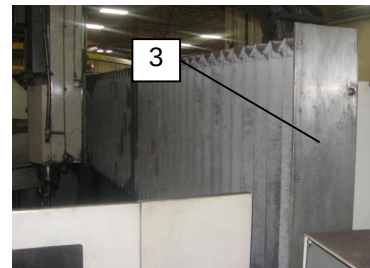
* RW20 ONLY COMES WITH ONE RETENTION KNOB. NO RETENTION KNOB ASSEMBLY SELECTION IS USED.

D	ADD RH/RW12 & RH19	5146		09/01
C	ADD RETENTION KNOBS TO CHART	4859	N.M.	12/00
B	CHANGE 70mm BT-FLANGE CHART	4730	N.M.	10/00
A	ADD LYNDEX CORP. IN CHART	4351	N.M.	1/00
REV.	DESCRIPTION	E.C.O. NO.	APPRO BY	DATE
	MILLTRONICS 1400 STELLA LANE TACOMA, WA 98401-1410	RETENTION KNOB CHART	SCALE 1:1	DWG No. 6-11-018-054
	APPLICATION GENERAL PRODUCTS	DATE 30 APR 99	DRAWN BY DAHLKE	SHEET NO. 2 OF 2

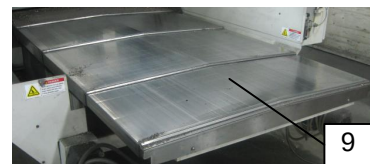
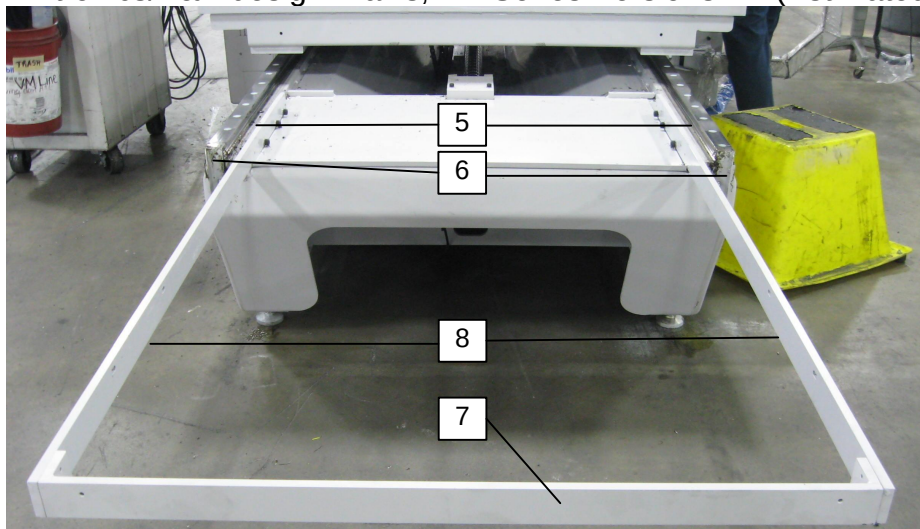
BR Series Way Cover Types

For BR Machine Versions A-K

Milltronics/A&A design Y axis, BR Series Versions I-K (Estimated)



Milltronics/A&A design X axis, BR Series Versions I-K (Estimated)



Item	Part #	Qty	Description
1	MPB-175	4	Y-axis Way cover mount extension – roller rails
	MPB-183		Y-axis Way cover mount extension – ball rails
2	MPB-177	2	Y-axis Way cover mounting bracket – Bellows – left/right
3	MPB-142	2	Y-axis Way cover mounting plate – outside – bellows – left/right
4	MPB-112	2	Y-axis Bellows way cover – Standard BR50 models
	MPB-141		Y-axis Bellows way cover – Standard BR60–80 models
	MPB-245		Y-axis Bellows way cover – BR80 MTS special
	MPB-249		Y-axis Bellows way cover – BR100
5	MPB-179	2	X-axis Spacer for mounting bar
6	MPB-180	2	X-axis Bracket, rail guide
7	MPB-181	1	X-axis Way cover mounting bracket – center
8	MPB-182	2	X-axis Way cover mounting bar – left/right
9	MPB-135	1	X-axis Way cover – 100"
	MPB-136		X-axis Way cover – 150"

Original design Y axis, BR Series Versions A-H (Estimated)



Original design X axis, BR Series Versions A-H (Estimated)



Item	Part #	Qty	Description
1	MPB-27	1	BR50 Left y-axis cover
	MPB-30		BR80 Left y-axis cover
	MPB-28	1	BR50 Right y-axis cover
	MPB-31		BR80 Right y-axis cover
2	JD	2	Y-axis rider brackets and spacers
3	JD	2	X-axis Way cover bar
4	JD	8	X-axis Way cover bar support
5	MPB-29	2	X-axis telescoping cover, BR50 standard travel
	MPB-26		X-axis telescoping cover, BR60/80
	MPB-136		X-axis telescoping cover, BR50-150 extended travel