

OPERATIONS MANUAL PARTNER MB19 CNC MILLING MACHINE

ELECTRICAL AND MECHANICAL DRAWINGS

MB19 was a 5HP head

Milltronics Manufacturing Company

1400 Mill Lane
Waconia, MN 55387

952-442-1410

MB19A Rev 1
24v power supply
replacement
9800-185

Oil line tubing
NU-117

Wiper Kit MPS-671

Rev C AC encoder
cable: 8850-15

Z axis AC motor MO-95

MB19 Base Assembly

Drawing No. 6-11-032-008

Y axis

Item	Part Description	Milltronics #	Quantity
41	Base		1
42	Cover bracket		2
43	Ball screw	MPS-484 (with handwheels), MBB-003 (without handwheels)	1
44	Gear box		1
45	Screw		4
46	Bearing	BG-67 or BG-01 Thrust	2
47	Spacer		1
48	Spacer		1
49	Sleeve		1
50	Bearing cap		1
51	Pulley	Ball screw (PY-31)(PY-106)	1
52	HTD belt	(BT-11)	1
53	Set screw		1
54	Nut		1
55	Cover	MPS-214	1
56	Servo motor	(MO-02)	1
57	Motor bracket		1
58	Pulley	Motor (PY-21)(PY-34)	1
59	Bearing, type 6205 ZZ	Radial (BG-24)	2
60	Screw		4
107	Screw		6
108	Screw		4
109	Leveling screw		6
111	Block-foundation		6
115	C-Snapring		1
116	Bearing seat		1
117	Screw		4
122	Ball screw nut	(Sold with item 43)	1
126	Nut bracket		1

Limit Switch - SW-259(replaces SW-80)

DC drive card AM-25

DC Motor - 9800-225

Y axis rear waycover

MPS-75(steel)

MPS-74(rubber)

DC motor cable - 9711

Y axis front waycover

MPS-56(steel) MPS-73

(rubber)

MB19 Column Assembly

Drawing No. 6-11-032-009

Item	Part Description	Milltronics #	Quantity
1	Servo motor	(MO-70)	1
2	Motor flange		1
3	Pulley Motor	(PY-135) PY-34	1
4	HTD belt	(BT-13)	1
5	Screw		4
6	Nut MBC-09		1
7	Pulley Ball screw	(PY-136)(PY-133)	1
8	Spacer		1
9	Nut		1
10	Gear box		1
11	Chain, 5/8 x 86 P		2
12	Bolt		2
13	Head slider		1
14	Clamp plate		1
15	Gib MPS-534		1
16	Screw MPS-630		2
17	Clamp plate		1
18	Nut bracket		1
19	Screw		4
20	Bearing cap MBC-159		1
21	Spacer		1
22	Bearing BG-67		2
23	Bearing seat MBC-162		1
24	Ball screw MPS-485		1
25	Screw hood bracket		1
26	Screw hood MPS-607		1
27	Screw hood bracket		1
28	Bearing BG-06 or BG-24		2
29	Screw		4
30	Bearing seat		1
31	C-Snapring		1
32	Chain wheel bracket		1
33	Chain wheel MBC-172		4
34	Needle bearing, type RNA4902 BG-83		4
35	Chain wheel shaft MBC-174		4
36	Screw, M8 x 181		4
37	Screw, M12 x 501		10
38	Chain wheel bracket		1
39	Bolt MHVS-247		2
40	Column		1
110	Gib		1
118	Screw		7
120	Ball screw nut	(Sold with item 24)	1
127	Sleeve		1
123	Worm Gear Bracket		1
128	Counter balance block		1

**Z axis Cabletrack
MP-443**

**Z axis switch
bracket MPS-70**

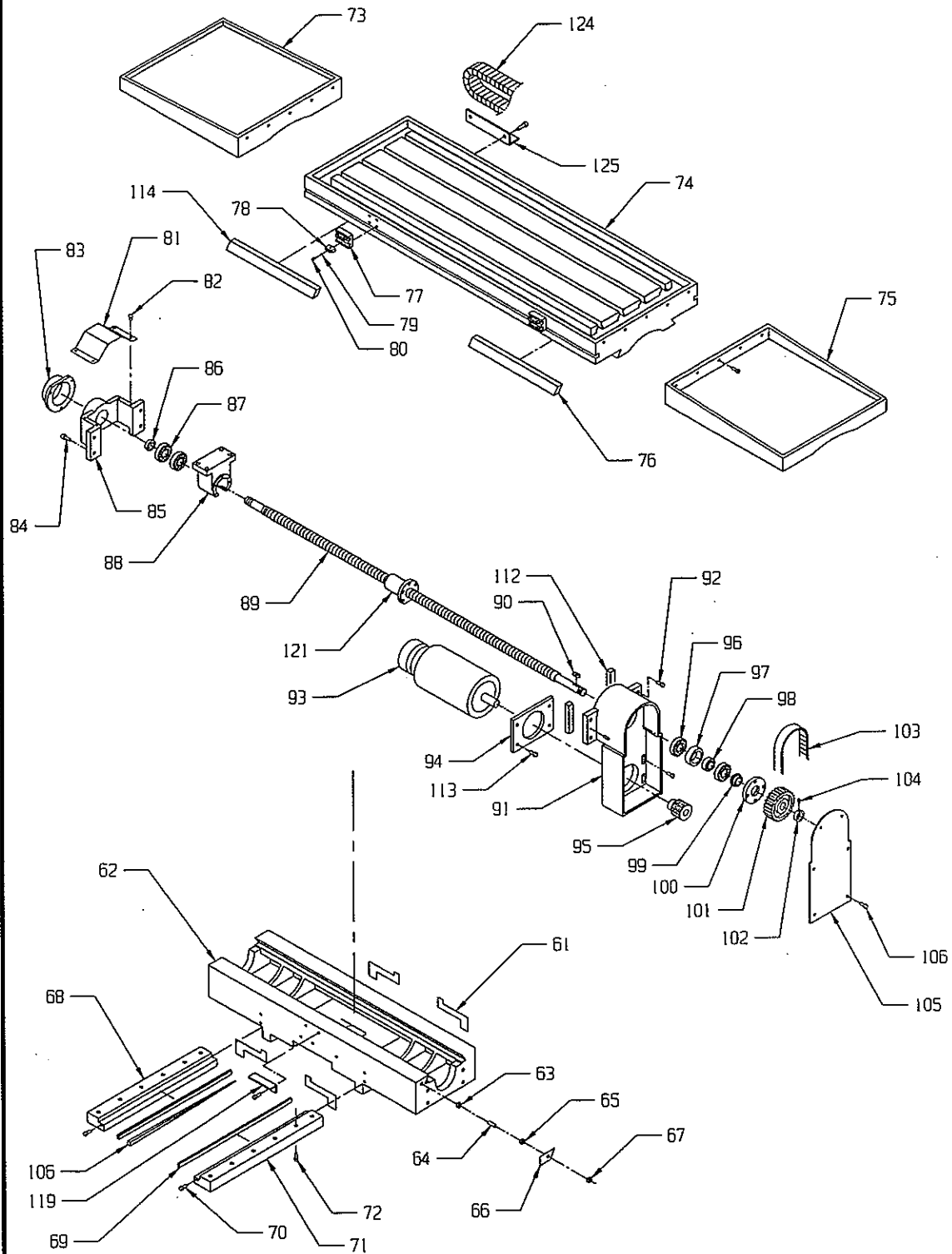
DC drive card AM-25

#61 wiper MBT-125

**Limit switch -
SW-259(repl
aces SW-80)**

**DC motor w/brake
9800-226**

**DC axis motor
cable 9711**



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE MB19 TABLE/SADDLE ASSEMBLY		
X.XXX +/- .005		APPLICATION SOLID WAYS BED MILL		
X.XX +/- .010		SCALE 1:1 DWG No. 6-11-032-010 SIZE B		
X.X +/- .030		DATE 18 MAR 98 DRAWN BY REUTER SHEET NO. 1 OF 1		
ANGLE +/- 1.0°				

MB19 Table/Saddle Assembly X axis

Drawing No. 6-11-032-010

Item	Part Description	Milltronics #	Quantity
61	Wiper		2
62	Saddle		1
63	Nut		2
64	Screw		2
65	Nut		2
66	Fixed plate		2
67	Nut		2
68	Clamp plate		1
69	Gib		1
70	Screw MPS-450		6
71	Clamp plate		1
72	Screw, M12 metric		12
73	Tool tray MBT-137(left)		1
74	Table		1
75	Tool tray		1
76	Gib		1
77	Bracket-dog		6
78	Dog		9
79	Steel		6
80	Set screw		6
81	Cover MPS-213		1
82	Screw		4
83	Bearing cap		1
84	Screw		4
85	Bearing housing		1
86	Nut		1
87	Bearing BG-67 Radial		2
88	Nut bracket		1
89	Ball screw MBT-29 (without handwheels) or MPS-483 (with handwheels)		1
90	Key		1
91	Gear box MBT-64		1
92	Screw		4
93	Servo motor	(MO-02)	1
94	Motor flange		1
95	Pulley Motor	(PY-21)(PY-34)	1
96	Bearing BG-01thrust		2
97	Spacer		1
98	Spacer		1
99	Spacer		1
100	Bearing cap MHVS-272		1
101	Pulley Ballscrew	(PY-31)(PY-106)	1
102	Nut		1
103	HTD belt	(BT-11)	1
104	Set screw		1
105	Cover		1
106	Gib		2
112	Block		2
114	Gib		1
119	Bracket-limit switch		1
121	Ball Screw Nut	(Sold with Item 89)	1
124	Cable Chain MPS132 Oil Track		1
125	Cable Chain Bracket		1

Limit switch mount
block MPS-169

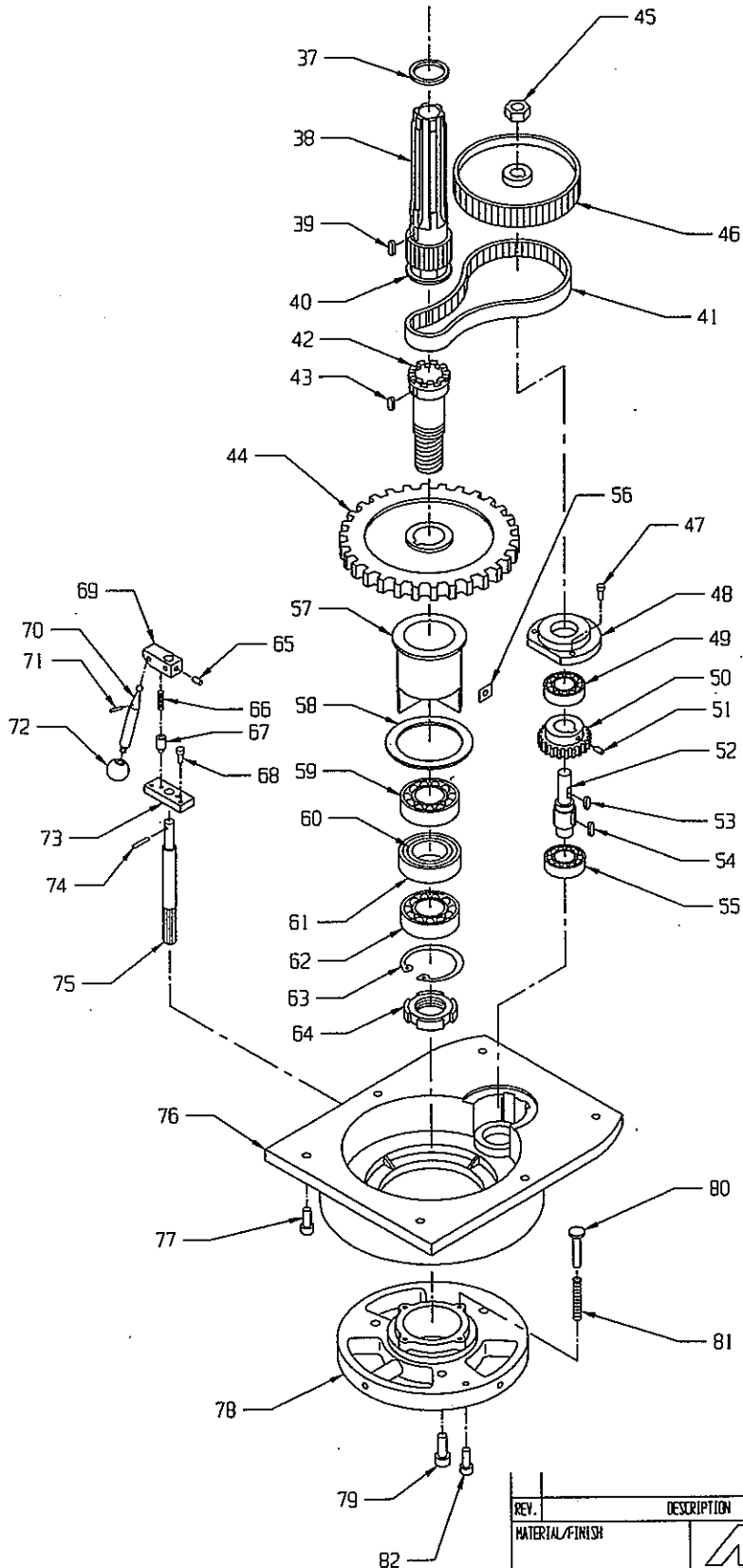
Limit switch SW-259

Limit switch bracket MPS-69

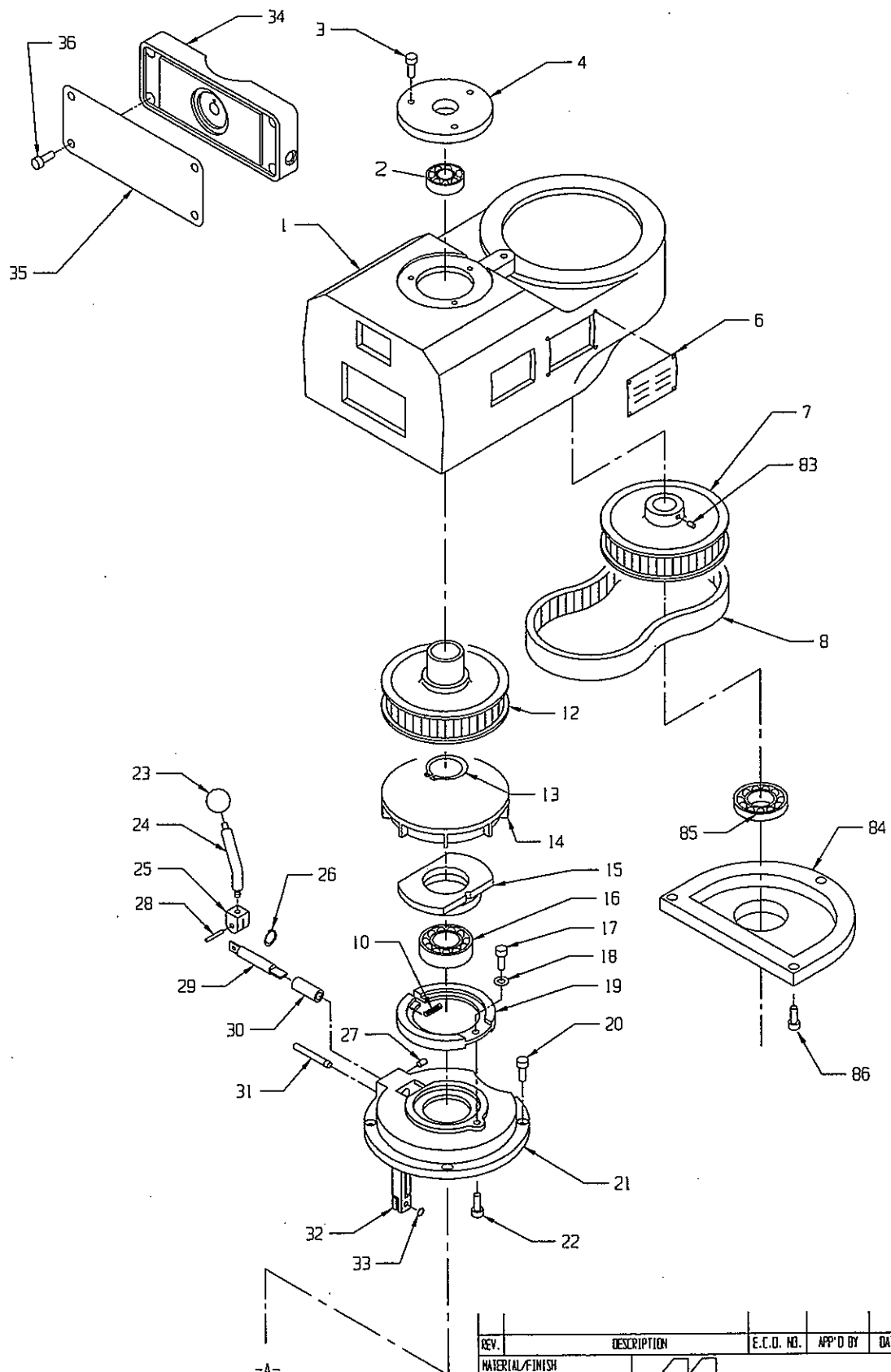
MP-483 Cabletrack

DC drive card AM-25

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CONT. FROM PAGE 1



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK/ASSY No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XXX +/- .005			
	X.XX +/- .010			
	X.X +/- .030			
	ANGLE +/- 1.0°			
	MILLTRONICS MANUFACTURING 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA			
	TITLE DIRECT DRIVE HEAD ASSEMBLY			
	APPLICATION SOLID WAYS BED MILL			
	SCALE 1:1	DWG No. 6-11-032-021	SIZE B	
	DATE 19 MAR 98	DRAWN BY REUTER	SHEET NO. 2 OF 2	



-A-
CONT. ON PAGE 1

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH	 MILLTRONICS MANUFACTURING 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA			
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED	TITLE DIRECT DRIVE HEAD ASSEMBLY			
X.XXX +/- .005	APPLICATION SOLID WAYS BED MILL			
X.XX +/- .010	SCALE 1:1 DWG No. 6-11-032-021 SIZE B			
X.X +/- .030	DATE 19 MAR 98 DRAWN BY REUTER SHEET NO. 1 OF 2			
ANGLE +/- 1.0°				

Direct Drive Head Assembly

Drawing No. 6-11-032-021

Item	Part Description	Milltronics #	Quantity
1	Gear Box MBB-105		1
2	Bearing 6009	(BG-05)	1
3	Screw		3
4	Top Bearing Cap MPM-93		1
6	Cover		1
7	Timing Pulley MHVS-68		1
8	Belt 2430v34 BT-77/BT-34	800-8YU	1
10	Spring		1
12	Pulley MHVS-67		1
13	C-Snapring		1
14	Brake Housing		1
15	Bearing Housing		1
16	Bearing 6012	(BG-68)	1
17	Screw		1
18	Washer		1
19	Brake Unit MPM-59		2
20	Screw		4
21	Belt Housing Base		1
22	Screw		1
23	Knob		1
24	Lever		1
25	Block		1
26	C-Snapring		1
27	Set Screw		1
28	Pin		1
29	Link		1
30	Brake Lock Cam MHVS-19		1
31	Handle		1
32	Bracket		1
33	Ring		1
34	Housing		1
35	Cover		1
36	Screw		4
37	Ring		1
38	Pulley Shaft MHVS-218		1
39	Key		1
40	Clutch Sleeve		1
41	Timing Belt 5608m30	(BT-73)	1
42	Spindle Gear Hub MPS-584		1
43	Key MPS-687		1
44	Gear MPS-587		1
45	Nut		1
46	Pulley PY-287		1
47	Screw MPS-578		4
48	Bearing Cap BG-207		1
49	Bearing	(BG-08) Or BG-13	1

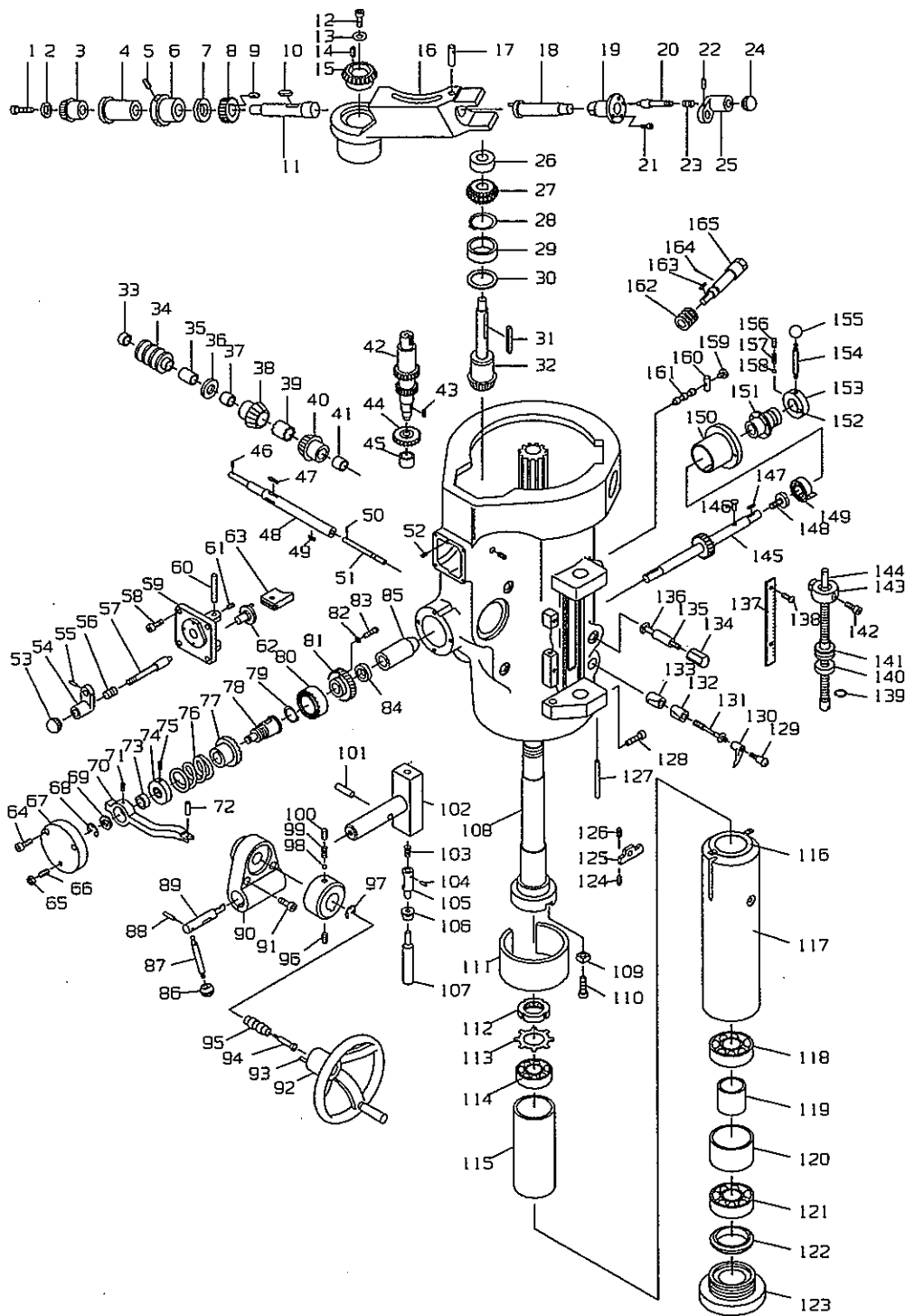
9950-4 assy

9950-4
kit(cont.)

9950-5
assy(cont.)

9950-3
assy(cont.)

9950-3 kit(cont.)	50	Gear	MPS-588	1
	51	Set Screw		1
	52	Shaft	MPS-626	1
	53	Key		1
	54	Key		1
	55	Bearing 6910	(BG-08)	1
	56	Key		1
	57	Bearing Housing	MHVS-291	1
	58	Sleeve		1
	59	Bearing 6203	(BG-08)	1
9950-5kit (cont.)	60	Spacer		1
	61	Spacer		1
	62	Bearing 6203	(BG-13)	1
	63	C-Snapping		1
	64	Nut	MBC-145 (verify size)	1
MPS-516	65	Set Screw	MPS-589	1
	66	Spring		1
	67	Pin	#66 MPS-590	1
	68	Screw	#67 MPS-689	2
	69	Block	#69 MPS-690	1
	70	Lever	# 70 MPS-691	1
	71	Pin	#71 MPS-692	1
	72	Knob	#72 only MPS-693	1
	73	Hi-Low Plate		1
	74	Pin		1
	75	Shaft Pinion	MHVS-295	1
	76	Gear Housing		1
	77	Screw		6
	78	Bearing Housing		1
	79	Screw		4
MPM-96	80	Pin	MPS-694	4
	81	Spring	MPS-629	4
	82	Screw		4
	83	Set Screw		2
	84	Spindle Shaft Base		1
	85	Bearing	(BG-02)	1
	86	Screw		3



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 1400 MILL LANE 812.442.1410 WACONIA, MN 55387 USA		
X				
STOCK/ASSY No. X		TITLE SPINDLE QUILL FOR 1654 HEAD		
TOLERANCE UNLESS SPECIFIED		APPLICATION SOLID WAYS BED MILL		
X.XXX +/- .005		SCALE X:1	DWG No. X	SIZE B
X.XX +/- .010				
X.X +/- .030		DATE 4 NOV 98	DRAWN BY HEURING	SHEET NO. 1 OF 1
ANGLE +/- 1.0°				

Lower Head Assembly

Item	Description	Q'ty	Remarks
1	Screw	1	
2	Washer	1	
3	Bevel gear	1	
4	Sleeve	1	
5	Set screw	1	
6	Bushing	1	
7	Spacer	1	
8	Gear	1	
9	Key	1	
10	Key	1	
11	Shaft	1	
12	Screw	1	
13	Washer	1	
14	Key	1	
15	Bevel gear	1	9950-7
16	Worm gear cradle	1	
17	Pin	1	
18	Shaft	1	
19	Shift sleeve	1	
20	Shaft	1	
21	Set screw	1	
22	Pin	1	
23	Set screw	1	
24	Knob	1	
25	Crank	1	
26	Bushing	1	
27	Gear	1	
28	C-snap	1	
29	Bushing	1	
30	Spacer	1	

[SS87C1]

Item	Description	Q'ty	Remarks
31	Key	1	
32	Bevel gear	1	
33	Bushing	1	
34	Worm	1	
35	Bushing	1	
36	Washer	1	
37	Bushing	1	
38	Bevel gear	1	
39	Feed reverse clutch	1	
40	Bevel gear	1	
41	Bushing	1	
42	Feed driving gear	1	9950-7 (cont)
43	Key	1	
44	Gear	1	
45	Bearing	1	
46	Pin	1	
47	Key	1	
48	Worm shaft	1	
49	Key	1	
50	Pin	1	
51	Rod	1	
52	Screw	5	
53	Knob	1	
54	Crank	1	
55	Pin	1	
56	Set screw	1	
57	Shaft	1	
58	Screw	4	
59	Cover	1	
60	Rod	1	

Lower Head Assembly

Item	Description	Q'ty	Remarks
61	Set screw	1	
62	Shifter	1	
63	Shift fork	1	
64	Screw	2	
65	Nut	1	
66	Set screw	1	
67	Cover	1	
68	C-snap	1	
69	Ring	1	
70	Trip lever	1	VKD-162
71	Set screw	1	
72	Pin	1	
73	Ring	1	
74	Nut	1	
75	Set screw	1	
76	Spring	1	VMMK-40
77	Overload clutch	1	VMMK-41
78	Clutch sleeve	1	VMMK-38
79	C-snap	1	
80	Overload clutch	1	
81	Worm gear	1	MHVS233
82	Wahser	1	
83	Screw	1	MHVS246
84	Spacer	1	
85	Bushing	1	
86	Knob	1	
87	Lever	1	
88	Pin VMMK-43	1	9950-10
89	Link	1	
90	Trip bracket	1	

[SS87C1]

Item	Description	Q'ty	Remarks
91	Screw	2	9950-10
92	Handwheel	1	
93	Pin	1	
94	Screw	1	
95	Shaft	1	
96	Set screw	1	
97	C-snap	1	
98	Block-gear box	1	9950-10 (cont)
99	Set screw	1	
100	Set screw	1	
101	Pin	1	
102	Cam rod sleeve	1	
103	Spring	1	
104	Pin	1	
105	Trip plug	1	
106	Bushing	1	
107	Rod	1	
108	Spindle	1	MPZ-163
109	Driver key	2	
110	Screw	2	
111	Sleeve	1	
112	Nut	1	
113	Washer	1	
114	Bearing	1	BG-12
115	Sleeve	1	
116	Cover	1	
117	Quill	1	
118	Bearing	1	BG-22
119	Spacer	1	
120	Spacer	1	

MHVS-719

MHVS-720

Lower Head Assembly

Item	Description	Q'ty	Remarks
121	Bearing	1	BG-22
122	Spacer	1	
123	Bearing cap	1	
124	Screw	1	
125	Plate	1	
126	Screw	1	
127	Rod	1	
128	Quill skirt	1	MHVS-196
129	Screw	1	MPM0073
130	Handle	1	
131	Bolt	1	
132	Clamp block	1	
133	Clamp block	1	
134	Nut	4	MHVS-763
135	Bolt	4	MHVS-764
136	Nut	1	
137	Scale	1	
138	Screw	2	
139	C-snap	1	MHVS-745
140	Micro-stop nut	1	MHVS718
141	Micrometer nut	1	
142	Screw	1	
143	Quill stop knob	1	
144	Leadscrew	1	
145	Pinion shaft	1	
146	Pin	1	
147	Key	1	
148	Screw	1	
149	Clock spring	1	MPM0078
150	Spring cap	1	Part of MPM-78

[SS87C1]

Item	Description	Q'ty	Remarks
151	Pinion shaft hub	1	
152	Pin	1	MPM0067
153	Block	1	
154	Lever	1	
155	Knob	1	
156	Set screw	1	
157	Set screw	1	
158	Steel ball	1	
159	Screw	1	VKD-160
160	Stud	1	
161	Shaft MHVS-484	1	
162	Worm gear	1	MHVS716
163	key	1	
164	Set screw	1	
165	Shaft	1	
166			
167			
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180			

Drawbars:

BT40 : MA-189

CT40 : MA-190

NST/NMTB-40 :

MA-173

Drawbar cylinder

NU-506

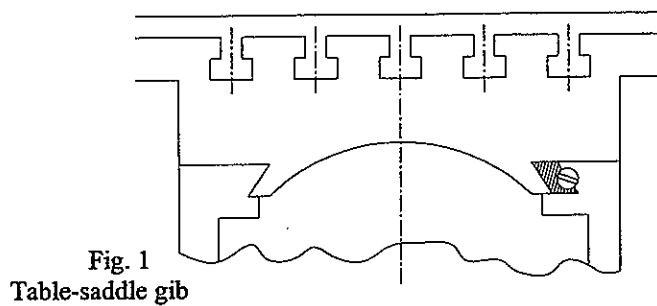
Machine Maintenance

- **Adjusting Gibs**
- **Checking and Adjusting Backlash**
- **Machine Lubrication**
- **Machine Lifting Instructions**

Adjusting Gibs

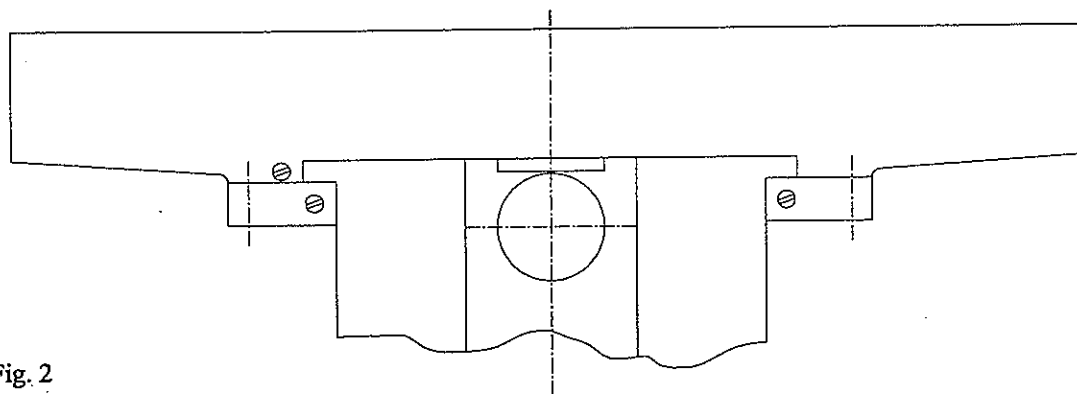
Adjusting Table Gib

The table gibs adjusting screw is on the left side. To take up the gib, tighten the large screw slightly until a slight drag is felt when moving the table by hand. (Fig. 1)



Adjustment of Saddle Gib

Tighten gib using the same method as above however, the chip wiper must be removed first. (Fig. 2)



Saddle-Base Gib

Adjustment of head Bolster gib.

Remove Chip wiper and adjust screw until smooth movement is attained. (Fig. 3)

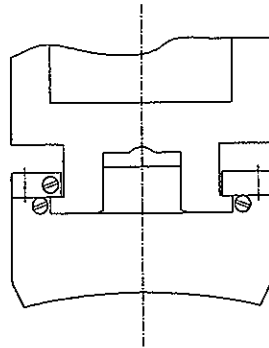


Fig. 3

Bolster Gib

Checking and Adjusting Backlash

Use a good solid magnetic base and a .0005 Inch indicator. Install the magnetic base on the machine table in close proximity to the spindle. Clean the area that the indicator will be in contact with.

Go into PARAMETERS/AXIS arrow down to BACKLASH press F1 EDIT and set X, Y and Z to zero. *(Before setting them to zero note original settings)*

Find the high spot on the spindle by moving the indicator back and forth and set indicator to zero. *(See point A on Fig. 4)*

The next step is easiest if done in jog mode. *(Select distance and 1 inch increments)*
You may have to press the jog key several times for the desired direction to clear the spindle.

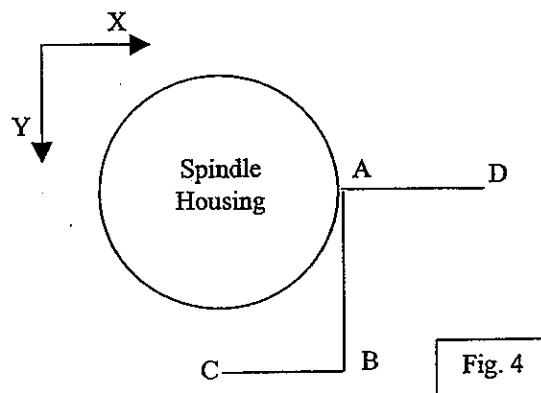
Press the jog key for the desired direction for A to move towards D *(see Fig. 4)* and then back to A, the indicator may have moved, adjust it back to zero and repeat this step until it stays at zero.

Jog the desired axis or tool *(see Fig. 4)* from point A to B to C back to B then back to the start point A. The reading on the indicator is backlash and should be put into the backlash parameter under PARAMS-SETUP-AXIS.

After putting the backlash into the table, repeat the procedure to ensure the numbers took affect. If the indicated error seems to increase this is addlash, and you may have to subtract the indicated number from the backlash chart.

*The X axis procedure is shown, repeat procedure for Y and Z.
Remember to save these new changes to your parameter disk.*

(The diagram below is an example of checking your backlash in the X-axis.)



Lubricating MB Machines:

Head:

Using Mobillex EP lubricant grease the head monthly. There is a grease fitting on the right side of the head near the High/Low gear and on the left side of the head near the quill feed selector. The *oil cups* can be filled periodically. One oil cup can be found on the front of the head, the other cup is near the High/Low gear.

AUTO LUBRICATOR:

The auto oiler should be checked weekly. Make sure the oiler is filled and is working properly.

DISCHARGE VOLUME PER CYCLE:

Adjustable from 2.5 CC minimum to 5.0 CC maximum. To reduce oil delivery remove the lock screw, measure A (Fig. 5), turn Adjusting screw clockwise increasing dimension A in the increment (corresponding to the desired discharge) as shown. (Table 1)

IN.	DISCHARGE	NOTES:
.400	2.5 c.c.	
.320	3.0 c.c.	
.240	3.5 c.c.	
.160	4.0 c.c.	
.080	4.5 c.c.	
0.00	5.0 c.c.	Break in setting

Table 1

DISCHARGE PRESSURE: 60 psi Maximum.

Peak system Pressure will decrease when:

- (a) discharge volume decreases,
- (b) number of Meter-Units in system increases,
- (c) oil viscosity decreases.

OIL VISCOSITY RANGE: See specification sheet

RECOMMENDED OIL: Mobil Vactra Oil No. 2

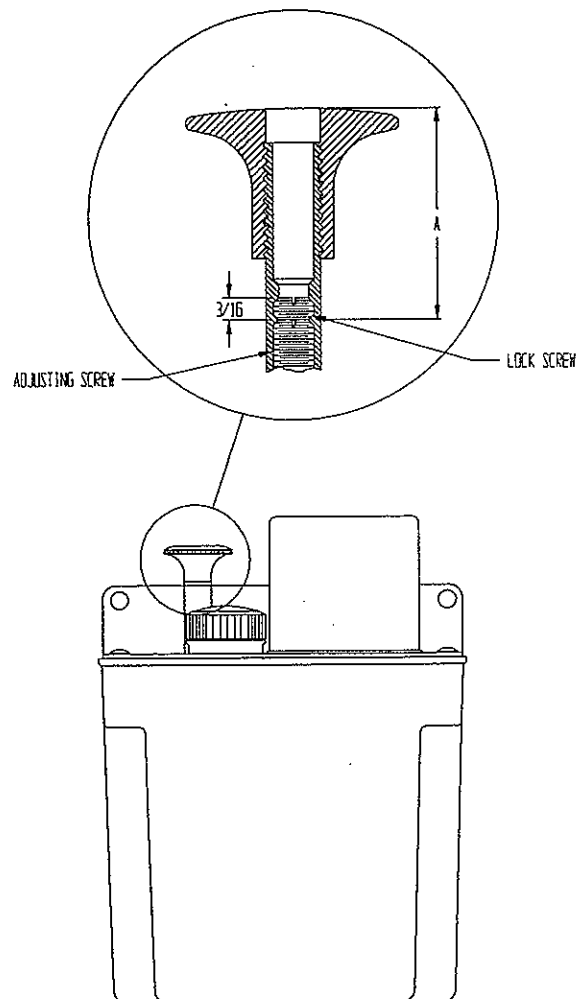


Fig. 5

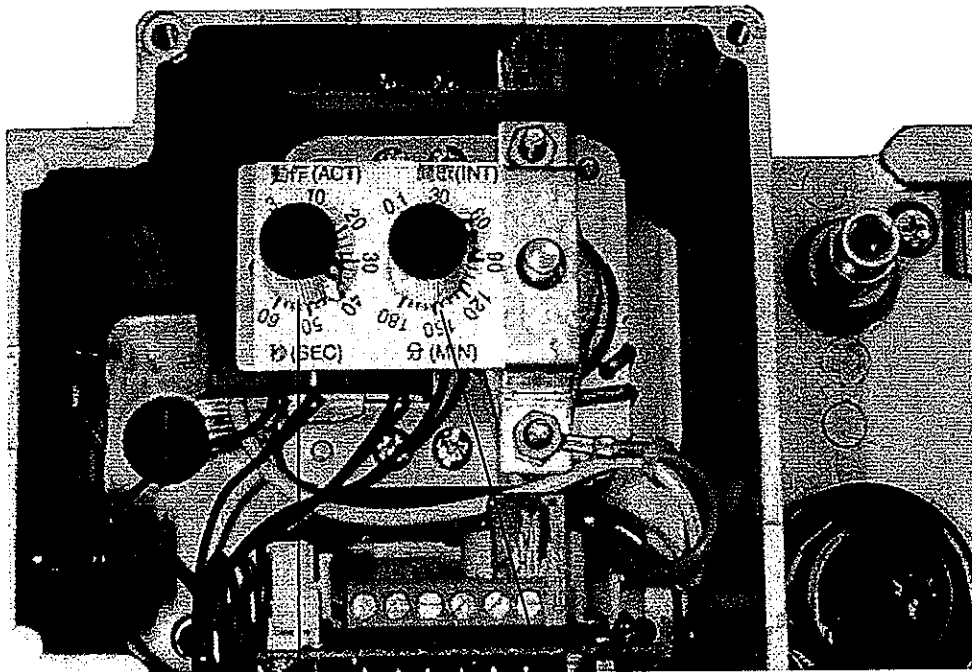
Procedure to adjust CESD (MA-219) Lubrication Unit

As long as the machine is reset the oiler will be pumping. In the event that the tank falls below the **MIN** line on the tank an audible alarm will sound. The machine will not let a program start with a low lube alarm (**451 Low Lube Fault**)

The **MA-219** has the ability to set the time between each pump cycle. It will pump the same amount of way lube (**.13 Liters/Min**) each pump cycle. We are not varying the amount of oil but the interval between each pump cycle. A new machine shipped from Milltronics will have the oiler pumping Aprox. 5 seconds every 25 to 30 minutes. Adjusting the Seconds knob (left) will change the length of time in seconds the pump cycle for (.13 Liters/Min). Adjusting the Minute knob (right) will change the time between each pump interval. It will always pump the same amount

To adjust the intervals between each cycle of the pump:

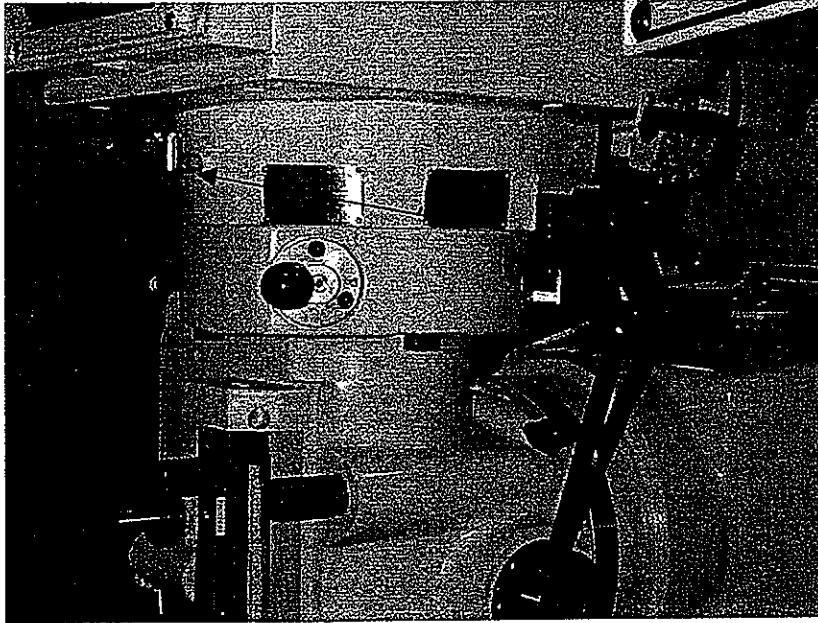
1. Remove the 4 screws holding the top cover.
2. Adjust the two knobs shown below.
3. The dials are very sensitive. Turn them very slowly.



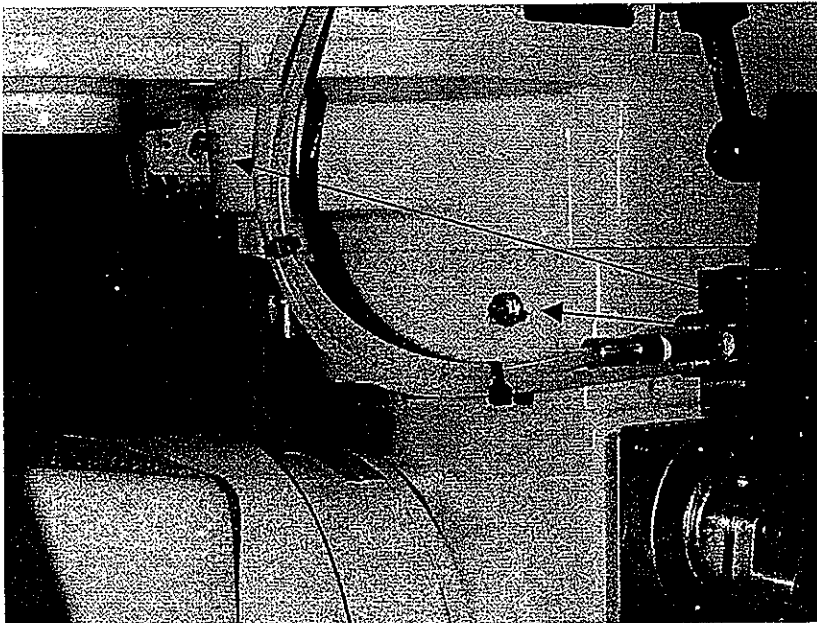
Turn this dial to vary the seconds that it pumps for each minute interval.

Turn this dial to vary the minutes between each pump cycle.

MB19/20 Automatic Spindle Head Lubrication



Oil Cups (A few drops weekly)



Grease Fitting for Head
(Use Multipurpose EP Monthly)

USE MOBILITH AW SERIES MULTIPURPOSE EP GREASE OR OTHER EQUIVALENT FOR ALL LUBE POINTS.

MOBILITH AW SERIES, MULTIPURPOSE EP GREASE	
PRODUCT NUMBER	64352-8
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

MACHINES WITH 15,000 RPM AIR/OIL OPTION
USE MOBIL OIL DTE 24, OR EQUIVALENT
QUALITY SPINDLE OIL.

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	

MACHINES WITH AUTOLUBE OPTION USE MOBIL OIL
VACTRA 2, AMOCO WAYTAC No. 68, SUNOCO SUNWAY
LUBE No. 1180, OR EQUIVALENT QUALITY WAY OIL.

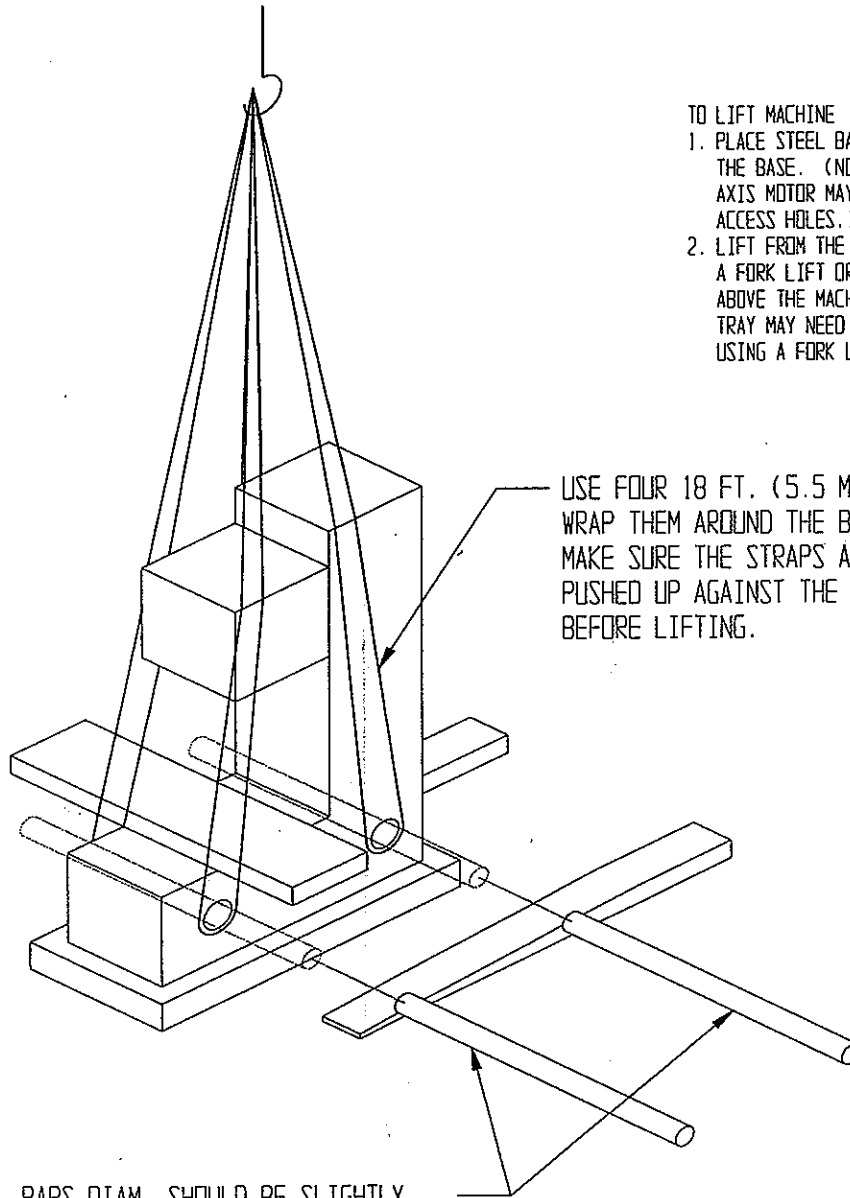
MOBIL VACTRA OIL No. 2	
PRODUCT NUMBER	60049-4
SPECIFIC GRAVITY, 60/60F	0.88
POUR POINT, °C (°F), max.	-9 (16)
FLASH POINT, °C (°F), min.	244 (472)
VISCOSITY	
cST AT 40°C	68
cST AT 100°C	8.6
SUS AT 100°F	356
SUS AT 210°F	55
VISCOSITY INDEX	97
ISO VG	68
COLOR, ASTM D 1500	4
FZG, PASS STAGES	11
4 BALL 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, mg D 2882 (MOD)	-
CMCO, P-SPEC, APPROVAL	P-47
BIJUR PT 37-1 APPROVAL	PASS
OKUMA APPROVAL	PASS

CLEAN AND FILL AIR FILTER / REGULATOR / OILER EVERY
WEEK FOR PROPER OPERATION OF ALL PNEUMATIC PARTS
FILL WITH MOBIL VELOCITE No. 10 OR OTHER EQUIVALENT
QUALITY AIR TOOL OIL.

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

REV.	DESCRIPTION		E.C.O. NO.	APP'D BY	DATE
 1400 HILL LANE VACONIA, MI 48387 USA	TITLE	MB/RH LUBRICATION DRAWING	SCALE 15:1	DWG No. 6-10-032-016	SIZE B
	APPLICATION	SOLID WAYS BED MILL	DATE 20 SEP 00	DRAWN BY DAHLKE	SHEET NO. 1 OF 1

LIFTING INSTRUCTIONS:



TO LIFT MACHINE

1. PLACE STEEL BARS THROUGH THE HOLES IN THE BASE. (NOTE: FLOOD PUMP AND/OR AXIS MOTOR MAY NEED TO BE REMOVED TO ACCESS HOLES.)
2. LIFT FROM THE BACK OF THE MACHINE WITH A FORK LIFT OR LIFT WITH 4 STRAPS FROM ABOVE THE MACHINE. (NOTE: METAL CHIP TRAY MAY NEED TO BE REMOVED WHEN USING A FORK LIFT.)

USE FOUR 18 FT. (5.5 M) STRAPS.
WRAP THEM AROUND THE BAR.
MAKE SURE THE STRAPS ARE
PUSHED UP AGAINST THE BASE
BEFORE LIFTING.

STEEL BARS DIAM. SHOULD BE SLIGHTLY
SMALLER THEN THE DIAM. OF THE HOLES
IN THE BASE. MIN DIAM. OF THE BARS IS
1.5 IN. (3.81 CM)

REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
MATL:				
FIN:				
STOCK/ASSY No. MP-		TITLE MB LIFTING INSTRUCTIONS		
TOLERANCE UNLESS SPECIFIED		APPLICATION GENERAL PRODUCTS		
X.XXX	+/- .005	SCALE 1:1		DWG No. 6-11-032-022
X.XX	+/- .010	DATE 13 JAN 99		SIZE B
X.X	+/- .030	DRAWN BY HEURING		SHEET No. 1 OF 1
ANGLE	+/- 1.0°			

