

Partner 1F Mechanical Manual

12-06-99
Rev 3

All axis thrust bearings BG-01 x 2

All axis radial bearings BG-02

Spindle:

Old short 5HP

Lower thrust BG-22

Upper radial BG-05

Newer 5HP

Lower thrust BG-22

Upper radial BG-05

Top bearing cup BG-12

Newer 7.5 HP

Lower thrust BG-22 and BG-44

Upper thrust BG-45 x 2

Top bearing cup BG-12

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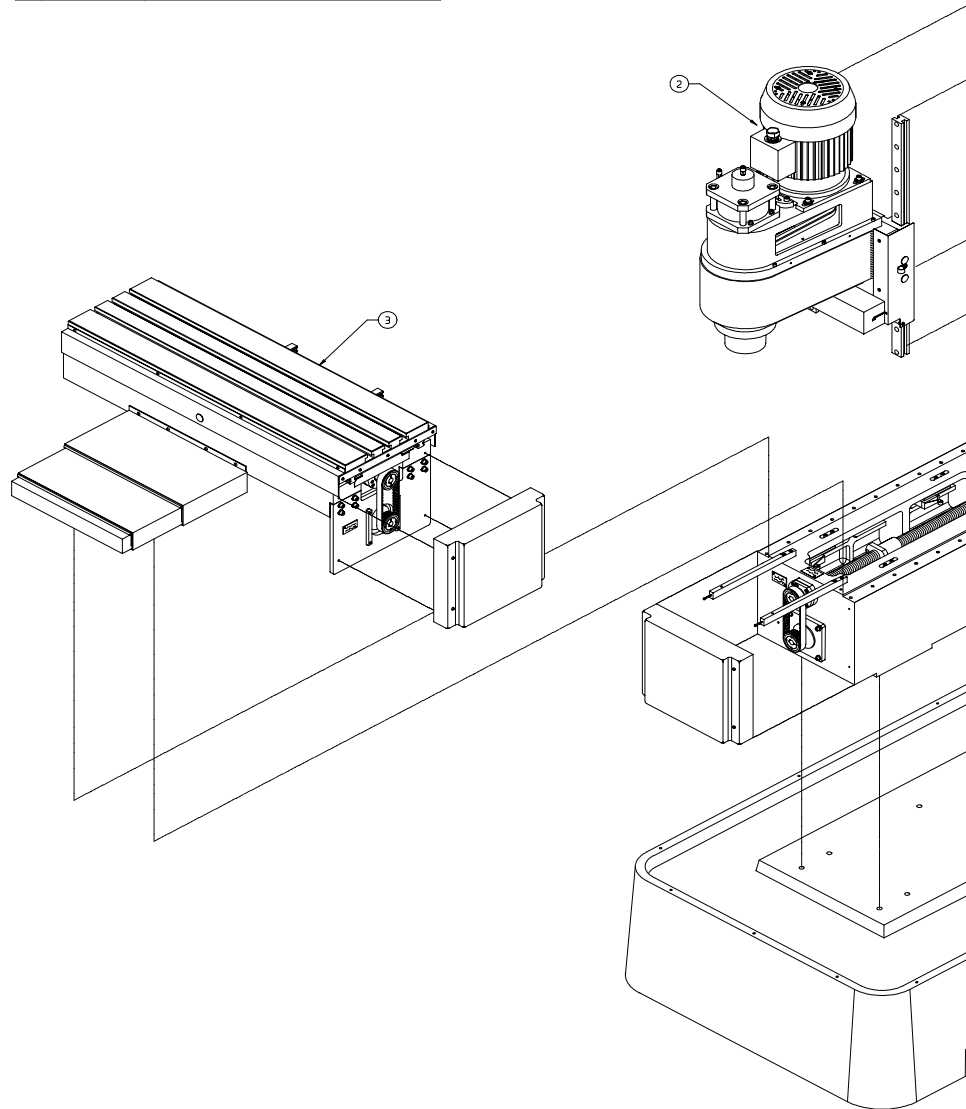
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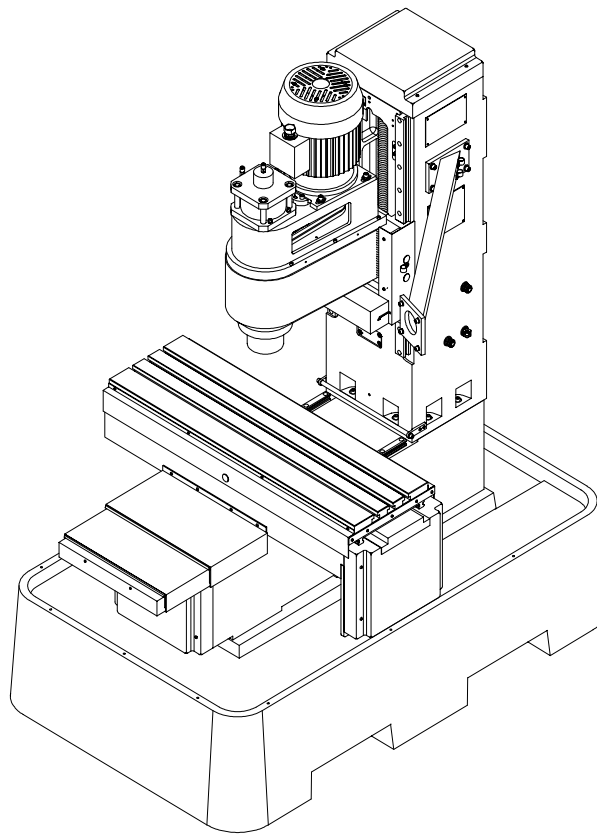
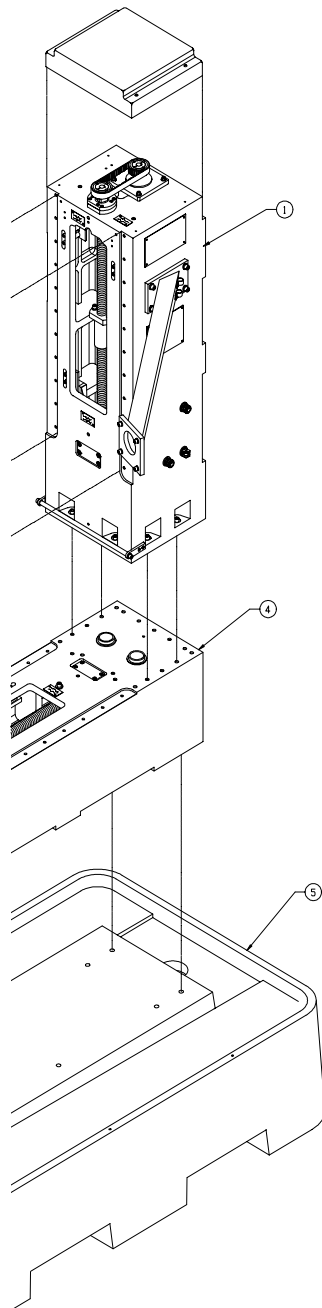
Manual Discrepancy Sheet

1.

Basic Machine Assembly

PARTS LIST		
No.	DRAWING No.	DESCRIPTION
1	6-10-008-020	COLUMN ASSEMBLY - 44" CASTING
2	6-10-008-005	HEAD ASSEMBLY - 44" CASTING
3	6-10-008-021	TABLE & SADDLE ASSEMBLY - 44" CASTING
4	6-10-008-019	BASE ASSEMBLY - 44" CASTING
5	6-01-008-046	MACHINE PEDESTAL - MP1-18

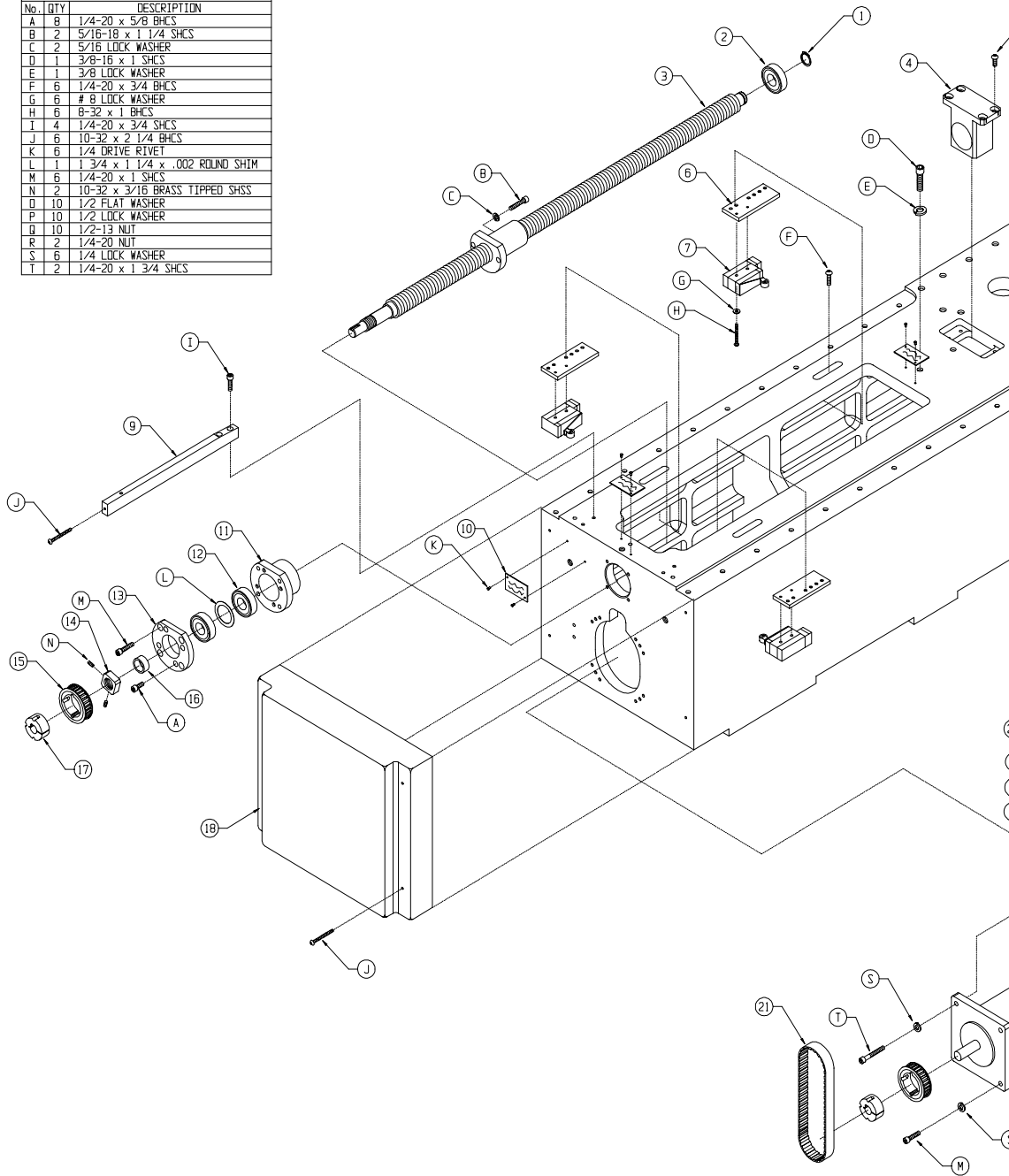


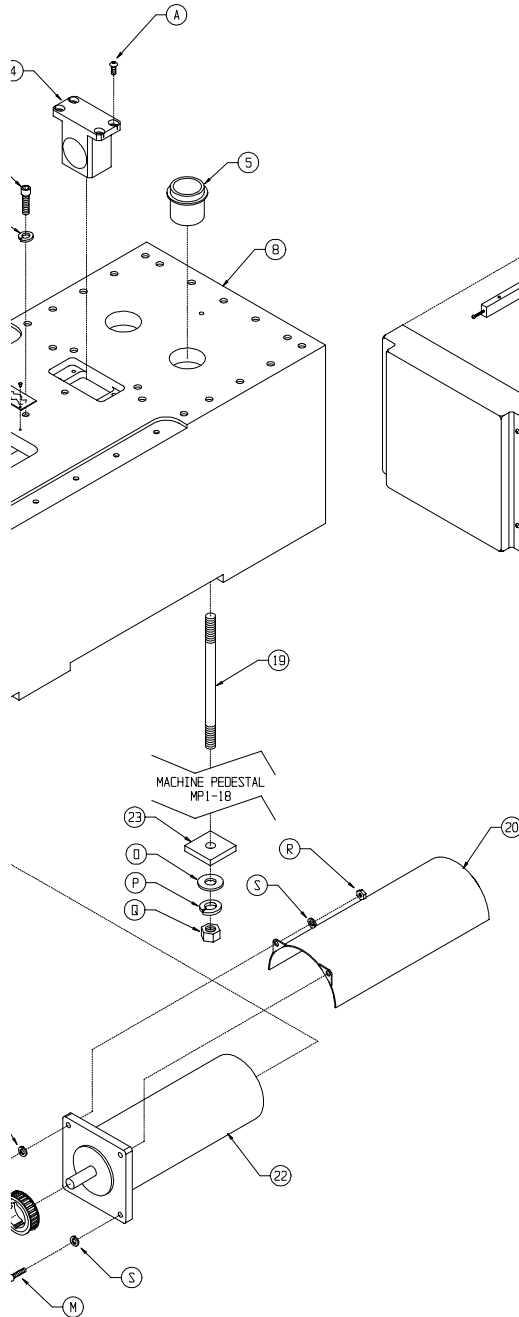


REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
 MILLIRONICS MANUFACTURING 1400 MILL LANE (612) 442-1410 WACONIA, MN 55087				
STOCK/ASSY No.		TITLE MACHINE ASSEMBLY - 44" CASTING		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER I		
X.XXV ± .005		SCALE 8:1		
X.XX ± .010		DWG No. 6-10-008-022		
X.X ± .030		DATE 31 JAN 94		
ANGLE ± 1.0°		DRAWN BY THOMPSON		
		SHEET NO. 1 OF 1		

Machine Base Assembly

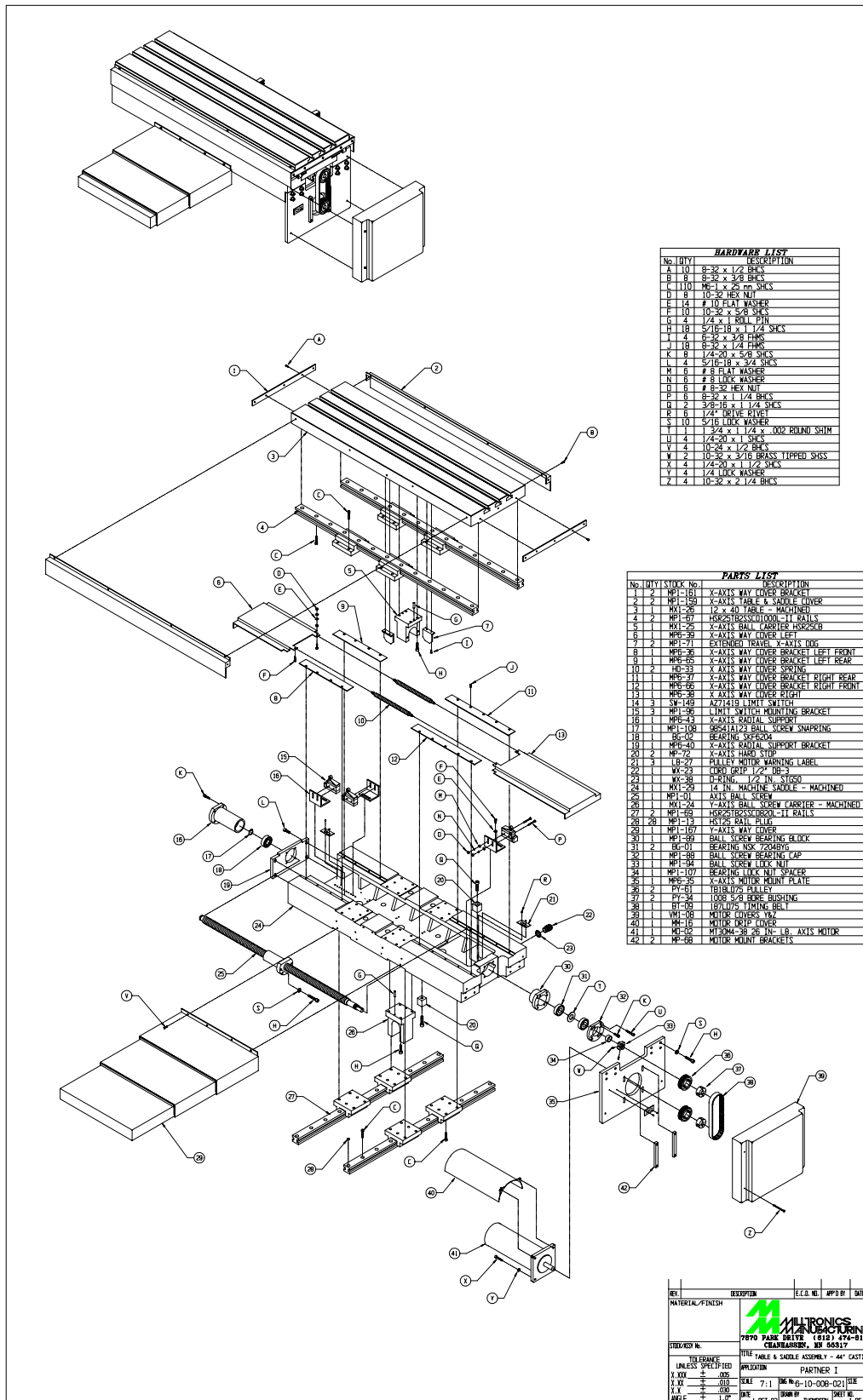
PARTS LIST		
No.	QTY	DESCRIPTION
A	8	1/4-20 x 5/8 BHCS
B	2	5/16-18 x 1 1/4 SHCS
C	2	5/16 LOCK WASHER
D	1	3/8-16 x 1 SHCS
E	1	3/8 LOCK WASHER
F	6	1/4-20 x 3/4 BHCS
G	6	# 8 LOCK WASHER
H	6	8-32 x 1 BHCS
I	4	1/4-20 x 3/4 SHCS
J	6	10-32 x 2 1/4 BHCS
K	6	1/4 DRIVE RIVET
L	1	1 3/4 x 1 1/4 x .002 ROUND SHIM
M	6	1/4-20 x 1 SHCS
N	2	10-32 x 3/16 BRASS TIPPED SHSS
O	10	1/2 FLAT WASHER
P	10	1/2 LOCK WASHER
Q	10	1/2-13 NUT
R	2	1/4-20 NUT
S	6	1/4 LOCK WASHER
T	2	1/4-20 x 1 3/4 SHCS



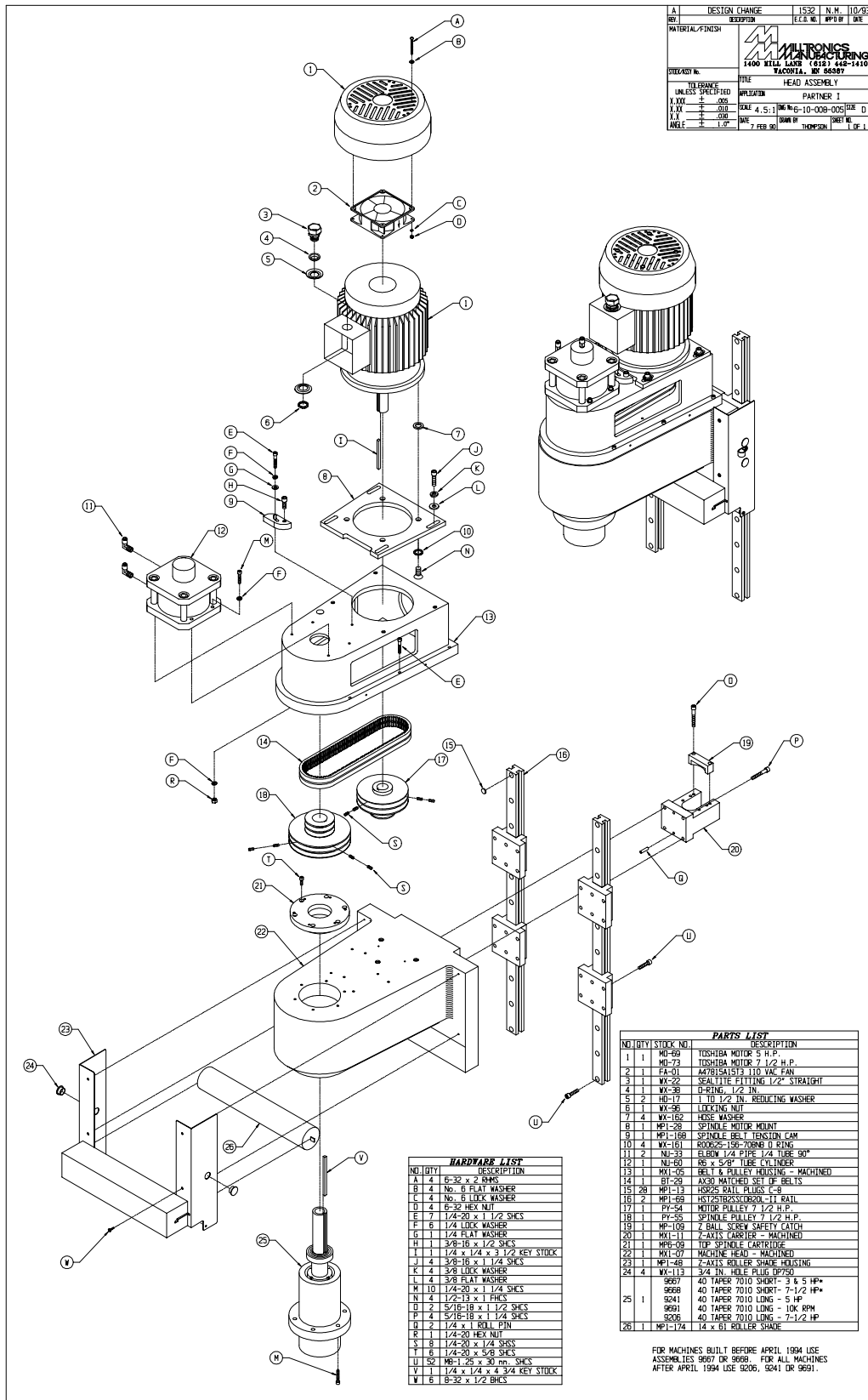


PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	MP1-108	98541A123 BALL SCREW SNAP RING
2	1	BG-02	BEARING SKF6204
3	1	MP1-145	12476 4 TURN BALL SCREW
4	1	MX1-28	Y&Z BALL SCREW RADIAL SUPPORT-MACHINED-44\"
5	2	MP-56	PVC COUPLING
6	3	MP1-77	Y/Z AXIS DTL/GRID SWITCH PLATE
7	3	SW-149	AZ71419 LIMIT SWITCH
8	1	MX1-27	MACHINE BASE - MACHINED - 44 IN. CASTING
9	2	MP1-170	Y-AXIS WAY COVER BRACKET
10	3	LB-27	MOTOR PULLEY WARNING LABEL
11	1	MP1-89	BALL SCREW BEARING BLOCK
12	2	BG-01	BEARING NSK 7204BYG
13	1	MP1-88	BALL SCREW BEARING CAP
14	1	MP1-84	BALL SCREW LOCK NUT
15	2	PY-61	TB18LD75 BALL SCREW PULLEY
16	1	MP1-107	BEARING LOCK NUT SPACER
17	2	PY-34	1008 5/8 BORE BUSHING
18	1	VM1-08	MOTOR PULLEY COVER Y&Z AXIS
19	10	HD-28	1/2 - 13 x 9\"
20	1	MM-16	MOTOR DRIP COVER
21	1	BT-09	187LD75 BELT TIMING
22	1	MD-02	MT30M4-38 26 IN-LB. AXIS MOTOR
23	10	MP-138	PEDESTAL REINFORCING PLATE

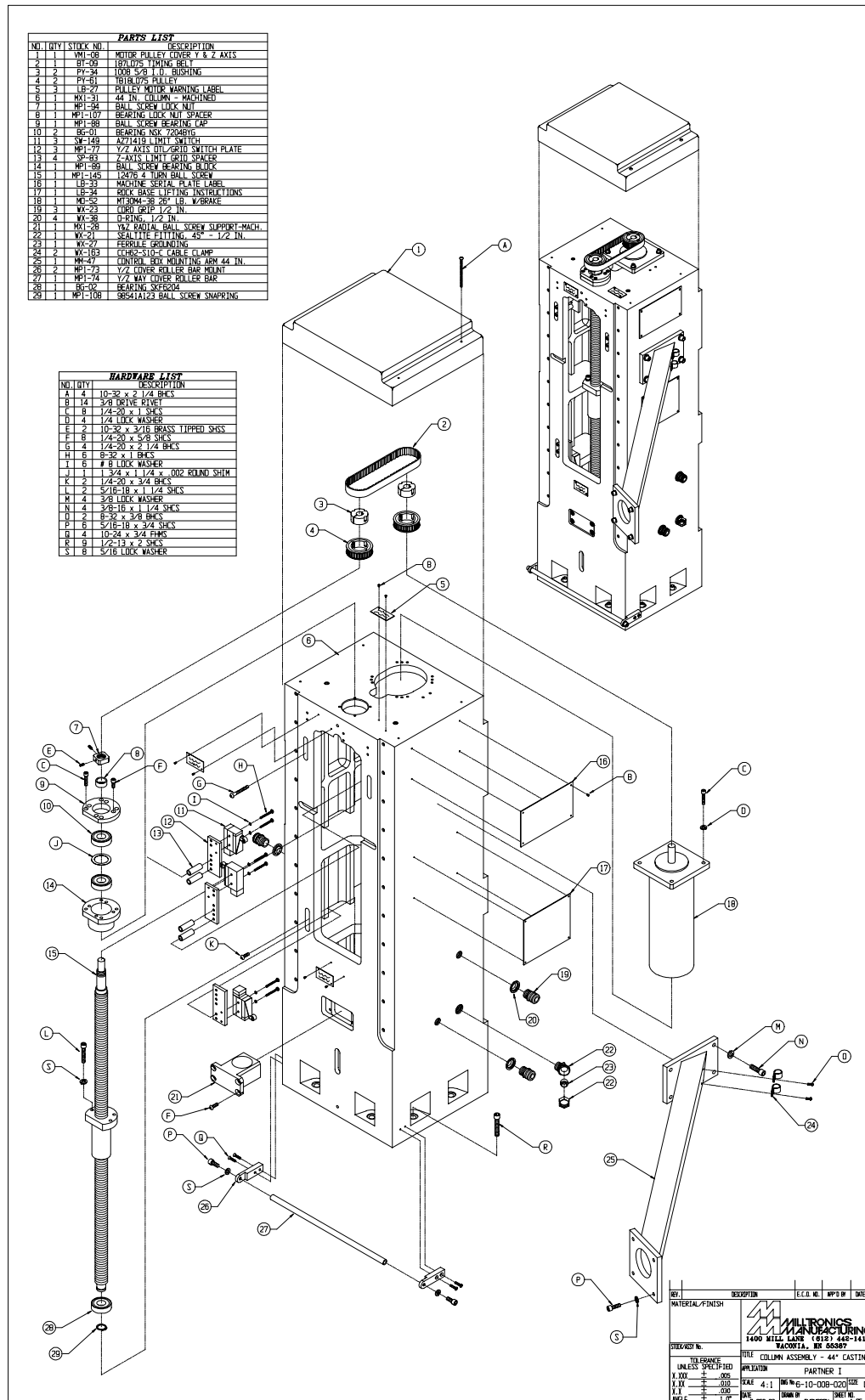
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
	MATERIAL/FINISH			
	STOCK/ISSY No.			
	TOLERANCE UNLESS SPECIFIED			
	X.XXX ± .005			
	X.XX ± .010			
	X.X ± .030			
	ANGLE ± 1.0°			
	TITLE BASE ASSEMBLY - 44\"			
	APPLICATION PARTNER I			
	SCALE 4:1			
	DATE 12 JAN 94			
	DRAWN BY THOMPSON			
	SHEET NO. 1 OF 1			



Machine Head Assembly



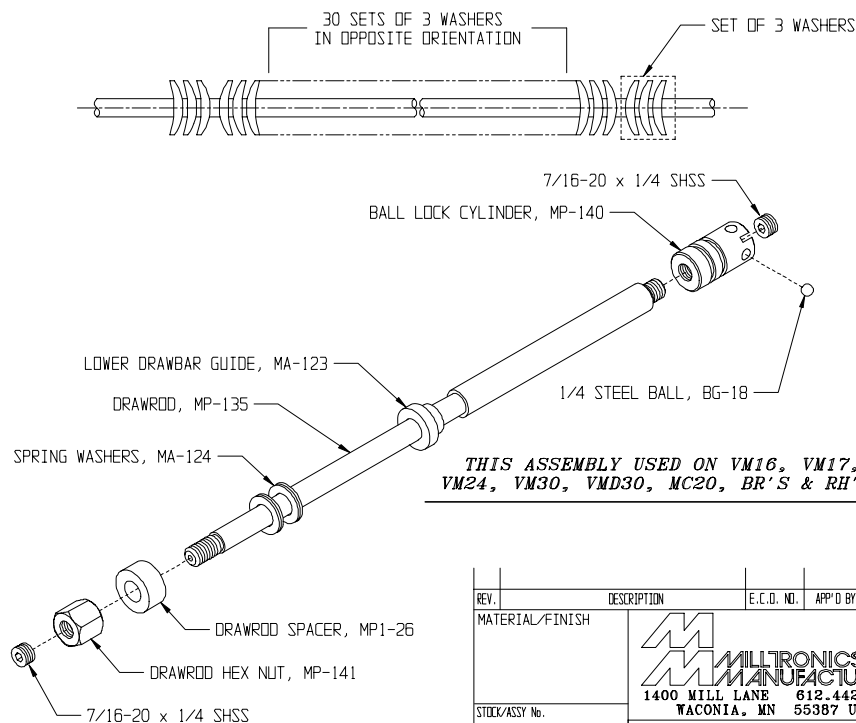
Machine Column Assembly



Power Drawbar Assembly & Instructions

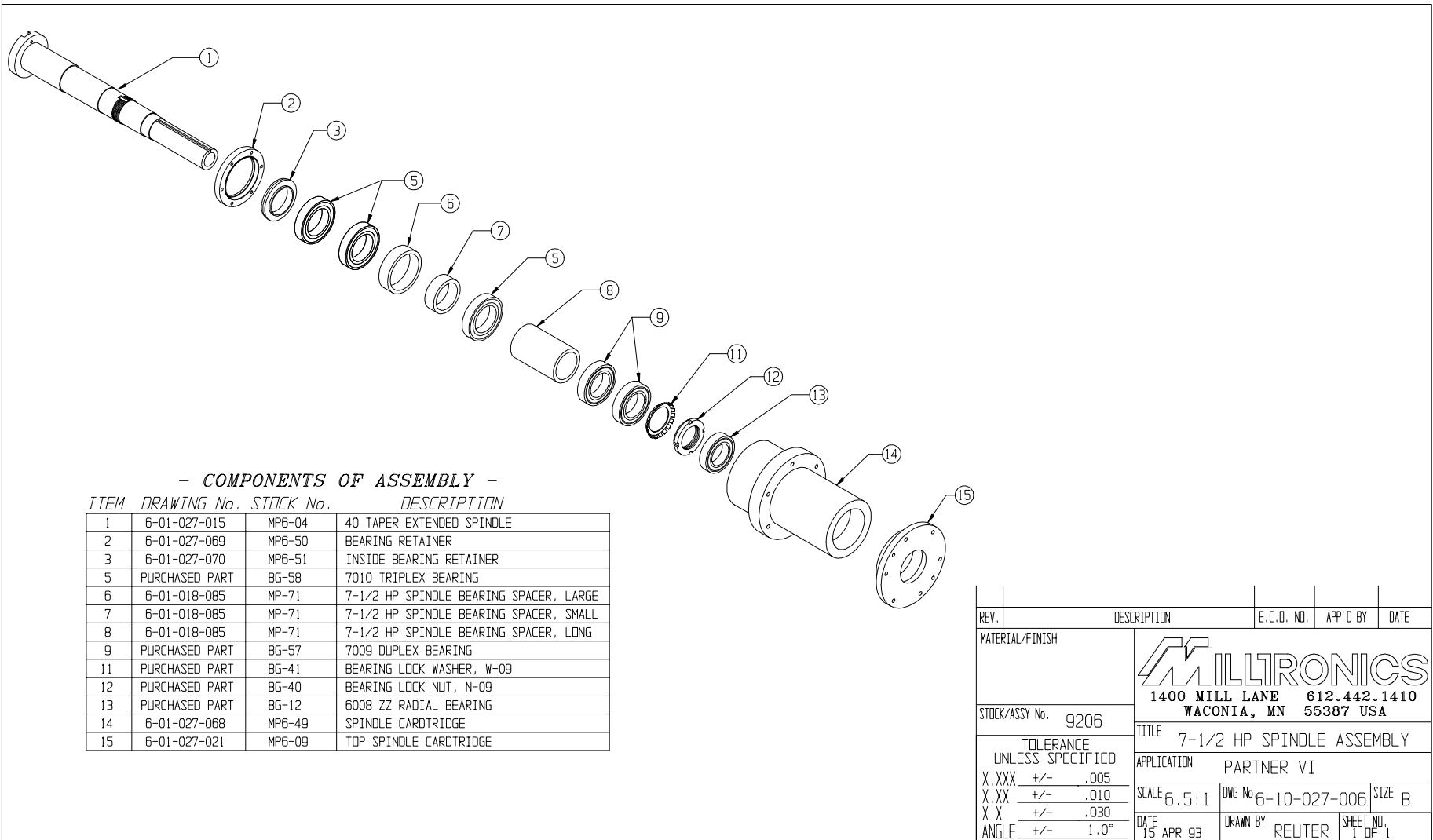
- INSTRUCTIONS FOR ASSEMBLY -

1. EACH SPINDLE VARIES SLIGHTLY IN THE SIZE OF THE DRAWBAR BORE I.D. THE LOWER GUIDE, (MA-123), AND THE DRAWROD SPACER, (MP1-26), MUST FIT IN THE SPINDLE BORE WITH A TOLERANCE OF $-.0005/-0.0010$ TO INSURE THAT OPERATION OF THE DRAWBAR IS MAINTAINED.
2. SLIDE THE LOWER DRAWBAR GUIDE, (MA-123) AND SPRING WASHERS, (MA-124), ON THE DRAWROD, (MP-135), AS SHOWN IN THE ILLUSTRATION. OBSERVE THE ORIENTATION OF THE SPRING WASHERS CLOSELY. SLIDE THE DRAWROD SPACER, (MP1-26), ONTO THE DRAWROD. THEN THREAD THE DRAWROD NUT, (MP-141), TWO FULL TURNS ONTO THE END OF THE DRAWROD AND LOCK IT IN PLACE WITH A 7/16-20 SETSCREW.
3. PREPARE THE BALL LOCK CYLINDER, (MP-140), FOR INSTALLATION. INSERT THE FOUR BALLS, (BG-18), INTO THE POCKETS ON THE BALL LOCK CYLINDER. BE SURE THAT THEY MOVE FREELY IN THE POCKETS. LUBRICATE ALL OF THE BALLS AND FILL THE GROOVES WITH HIGH PRESSURE GREASE.
4. LOWER THE ASSEMBLED PORTION OF THE DRAWBAR DOWN INTO THE SPINDLE BORE.
5. INSERT A 1/8 x 7/8 x 6 PIECE OF BAR STOCK INTO THE SLOTS ON THE END OF THE BALL LOCK CYLINDER AND PUSH IT UP INTO THE SPINDLE. THEN TIGHTEN THE BALL LOCK CYLINDER UNTIL IT LANDS ON THE SHOULDER OF THE DRAWROD. LOCK IT IN PLACE WITH A 7/16-20 SETSCREW. ALUMINUM STOCK IS RECOMMENDED FOR THIS PROCEDURE TO AVOID POSSIBLE DAMAGE TO THE SPINDLE.
6. WHILE HOLDING THE DRAWROD NUT IN PLACE, REMOVE IT'S SETSCREW. HOLD THE BALL LOCK CYLINDER WITH THE BAR STOCK OR WITH A LONG "T-HANDLE" INSERTED INTO THE SETSCREW AT THE BALL LOCK CYLINDER, AND THEN TIGHTEN THE DRAWROD NUT BY HAND UNTIL ALL FREE-PLAY HAS BEEN TAKEN OUT OF THE SPRING WASHERS. THIS CONDITION IS KNOWN AS 'FREE HEIGHT'.
7. ONCE FREE HEIGHT HAS BEEN ESTABLISHED, TIGHTEN THE DRAWROD NUT AN ADDITIONAL 4-1/2 TO 5 TURNS AND REPLACE THE SETSCREW IN THE DRAWROD NUT. THIS WILL SET THE PRELOAD TO THE DRAWBAR ASSEMBLY.
8. INSTALL THE AIR CYLINDER UNIT ON TOP OF THE SPINDLE HOUSING. THE DRAWBAR SHOULD BE FLUSH OR BELOW THE TOP OF THE SPINDLE HOUSING. ADJUST THE STRIKE ON THE CYLINDER SO THAT THE TOOL IS BEING PUSHED OUT OF THE TAPER .030 AND LOCK ADJUSTING NUT IN PLACE.
9. TO TEST THE DRAWBAR FOR PROPER FUNCTION, MEASURE THE HEIGHT OF THE DRAWBAR WITH A TOOL HOLDER IN THE SPINDLE TAPER, AND AGAIN WITHOUT A TOOL HOLDER. THE DIFFERENCE BETWEEN THE TWO MEASUREMENTS MUST BE APROXIMATELY .02 IN.

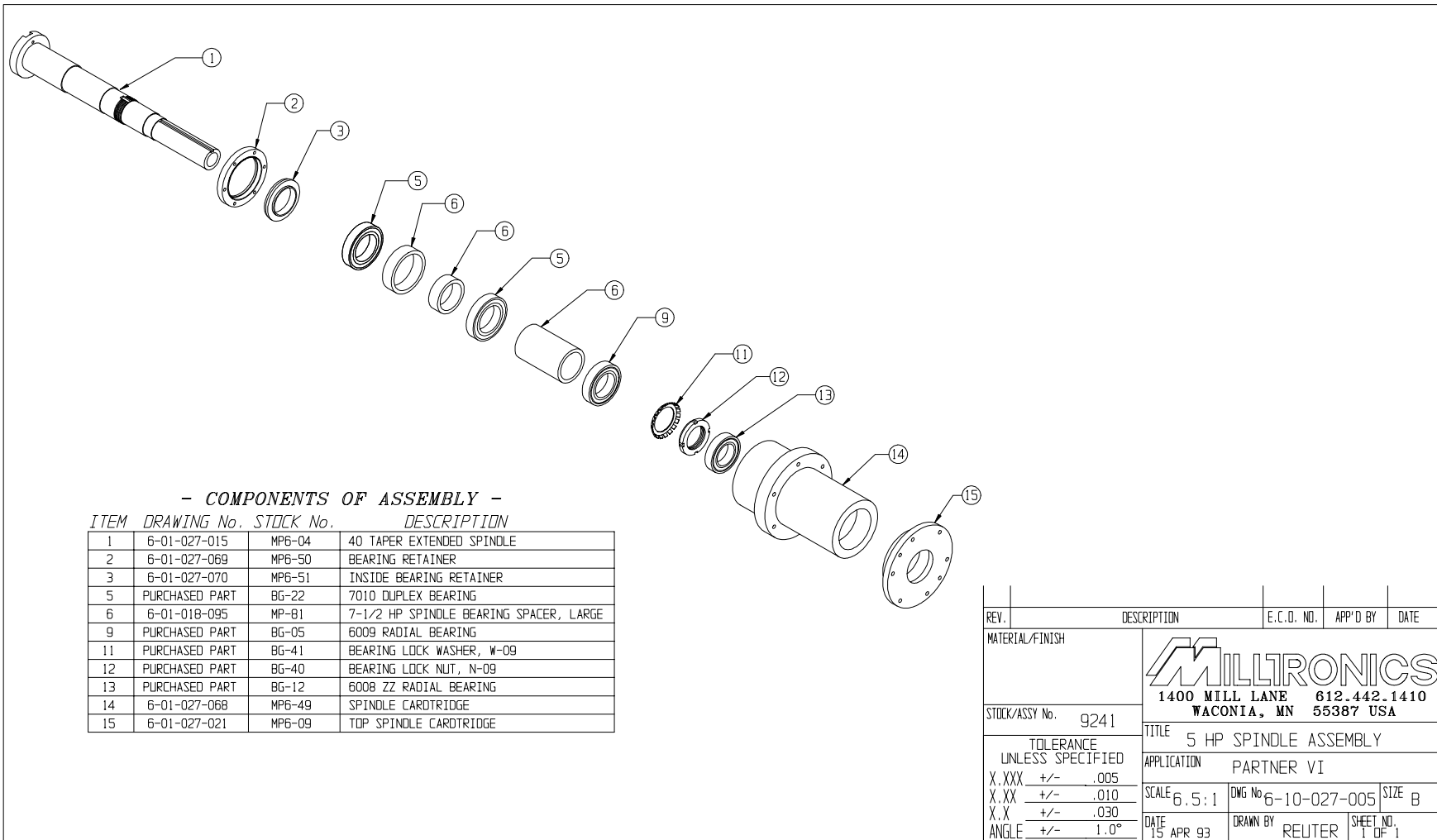


REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLIRONICS MANUFACTURING 1400 MILL LANE 612.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE DRAWBAR W/BLOWOUT ASSEMBLY		
X.XXX ±		APPLICATION PARTNER I		
X.XX ±		SCALE 2:1 DWG No 6-10-008-028 SIZE B		
X.X ±		DATE 13 OCT 94 DRAWN BY THOMPSON SHEET NO. 1 OF 1		
ANGLE ±				

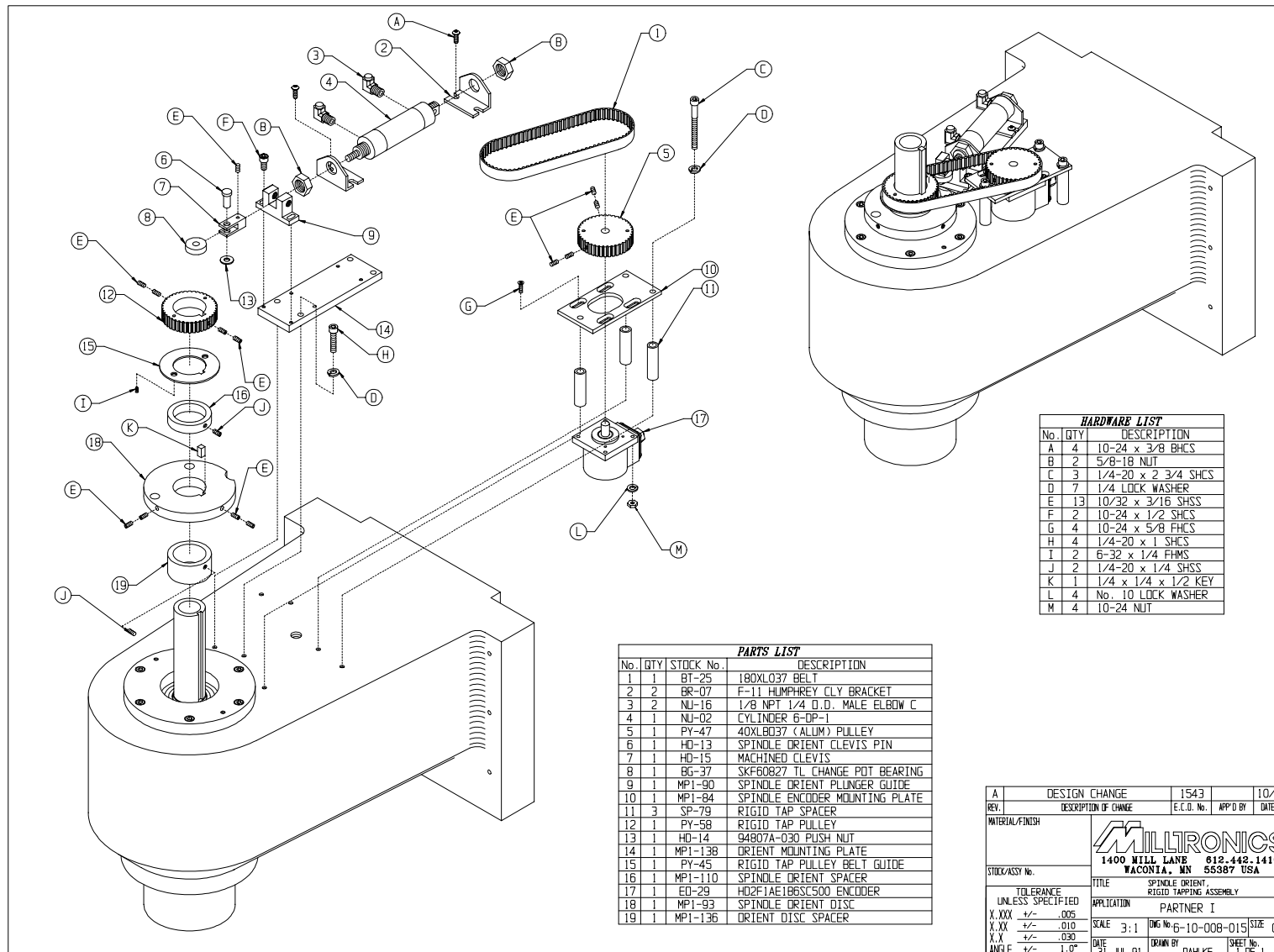
7010 Spindle Assembly



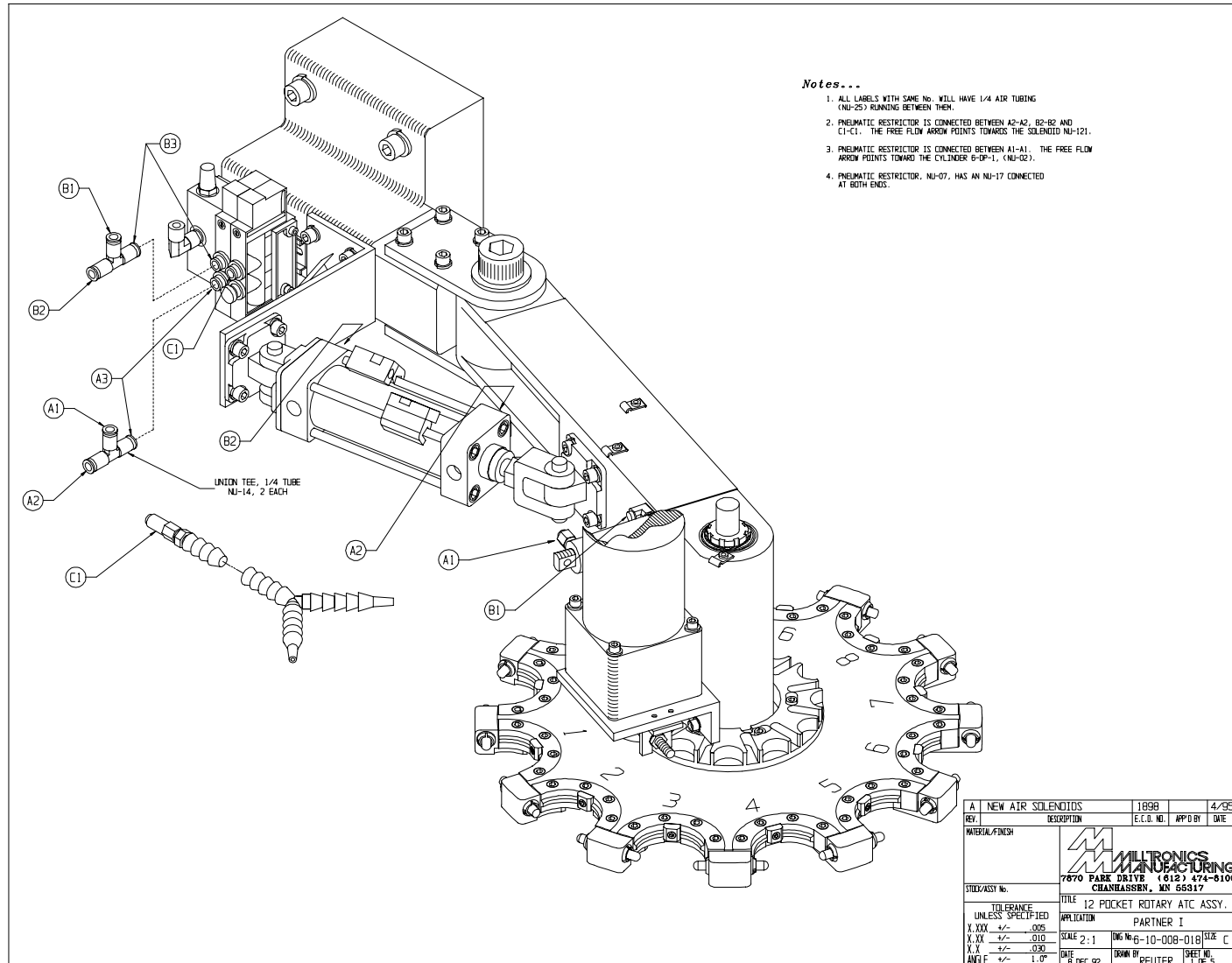
7010 10K Spindle Assembly

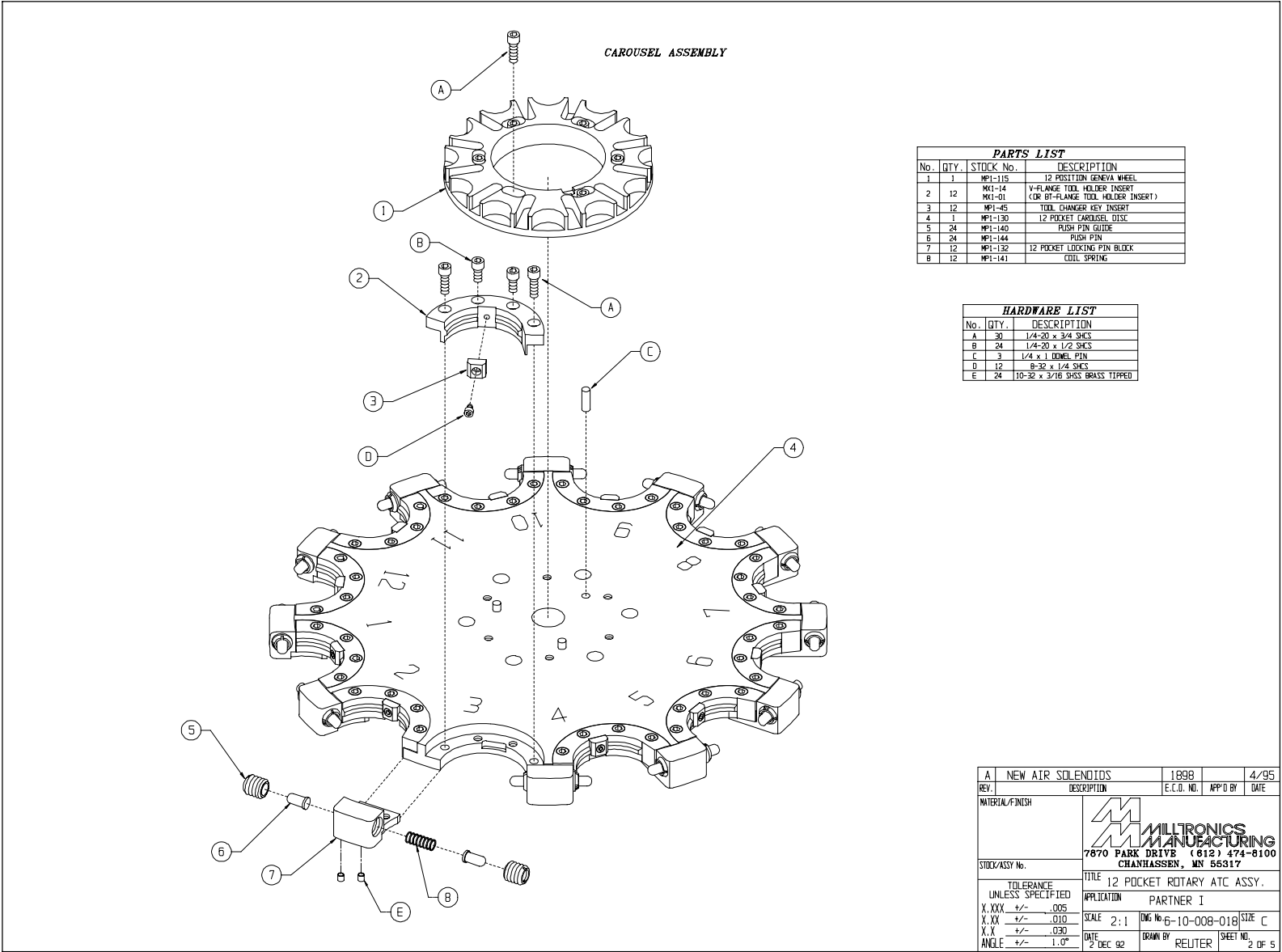


Spindle Orient, Rigid Tap Assembly

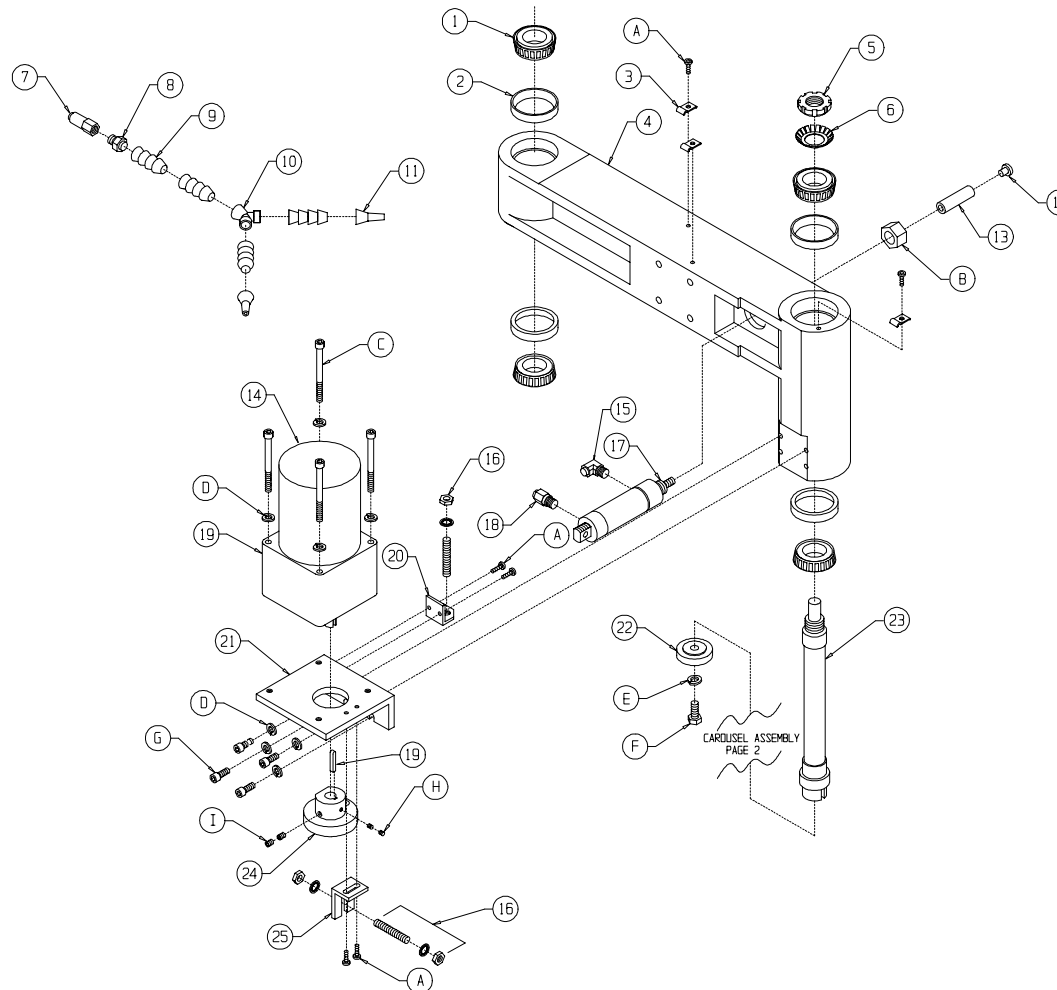


12 Pocket Rotary Tool Changer Assembly





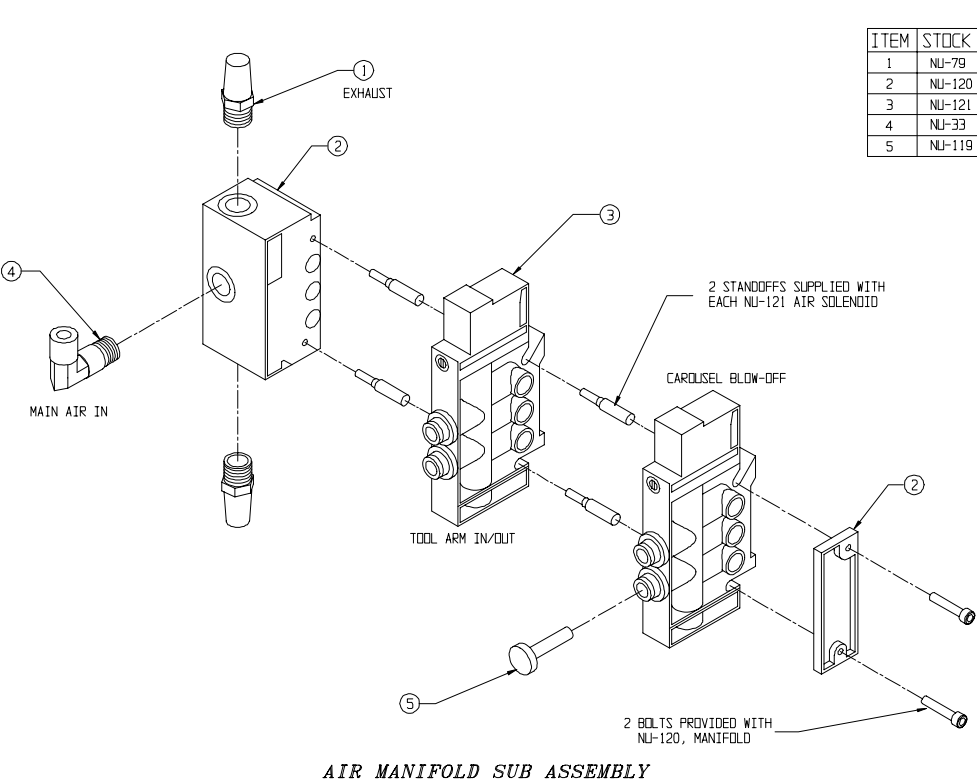
FRONT ARM ASSEMBLY



PARTS LIST			
No.	QTY.	STOCK No.	DESCRIPTION
1	4	BG-33	07100 CONE TAPERED BEARING
2	4	BG-34	07196 CLIP TAPERED BEARING
3	3	NU-36	CLAMP 5/32 OILER
4	1	MX1-03	FRONT ARM SUPPORT MACHINED
5	1	BG-35	N04 BEARING LOCKNUT
6	1	BG-36	N04 BEARING LOCK WASHER
7	1	NU-116	1/8 NPT 1/4 O.D. 56642
8	1	NU-111	1-49425 1/4 LOCKLINK 1/8 NPT
9	52	MA-22	LOCKLINK HOSE 48501
10	1	MA-20	48503 1/4 Y FITTING
11	2	MA-21	1/8 NOZZLE 49423
12	1	KK-159	RUBBER BUMPER TIP ZB 4292
13	1	MP-95	ATC PUSH (PH) BAR - 12 POCKET
14	1	MD-72	SRK40GN-C MOTOR
15	1	NU-16	1/8 NPT 1/4 O.D. MALE ELBOW
16	2	PR-19	SWITCH PROX ES7MB8T110 NPN-NCB
17	1	NU-02	CYLINDER 6-DR-1
18	1	NU-17	1/8 NPT 1/4 O.D. M.S. 56642
19	1	MD-71	5GN3SK GEAR BOX
20	1	MP1-120	ATC HOME PROX BRACKET
21	1	MP1-117	GENEVA WHEEL MOTOR MOUNT
22	1	MD-11	CAROUSEL HARDENED WASHER
23	1	MP1-41	CAROUSEL ROTATION SHAFT
24	1	MX1-02	GENEVA WHEEL DRIVE CAM - MACHINED
25	1	MP1-118	GENEVA WHEEL PROX MOUNT

HARDWARE LIST	
No.	QTY.
A	7
B	1
C	4
D	8
E	1
F	1
G	4
H	2
I	2

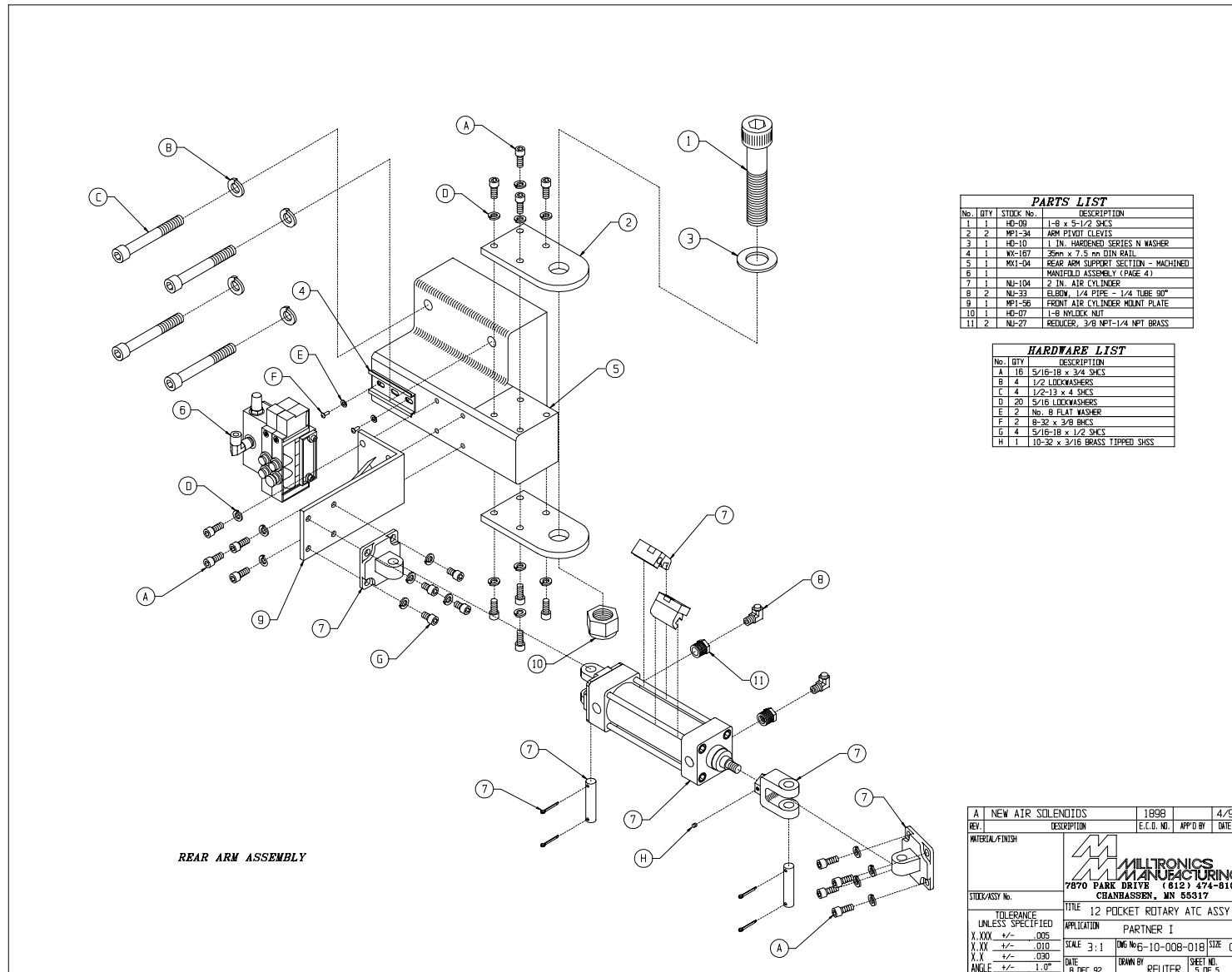
A	NEW AIR SOLENOIDS	1998	4/95
REV	DESCRIPTION	E.C.D. NO.	APP'D BY DATE
MATERIAL/FINISH			
STOCK/ASSY No.			
TOLERANCE UNLESS SPECIFIED			
X.XXX	+/- .005		
X.XX	+/- .010		
X.X	+/- .030		
ANGLE	+/- 1.0°		
TITLE		12 POCKET ROTARY ATC ASSY.	
APPLICATION		PARTNER I	
SCALE		3:1	
DATE		8 DEC 92	
DRAWN BY		REUTER	
SHEET NO.		3 OF 5	



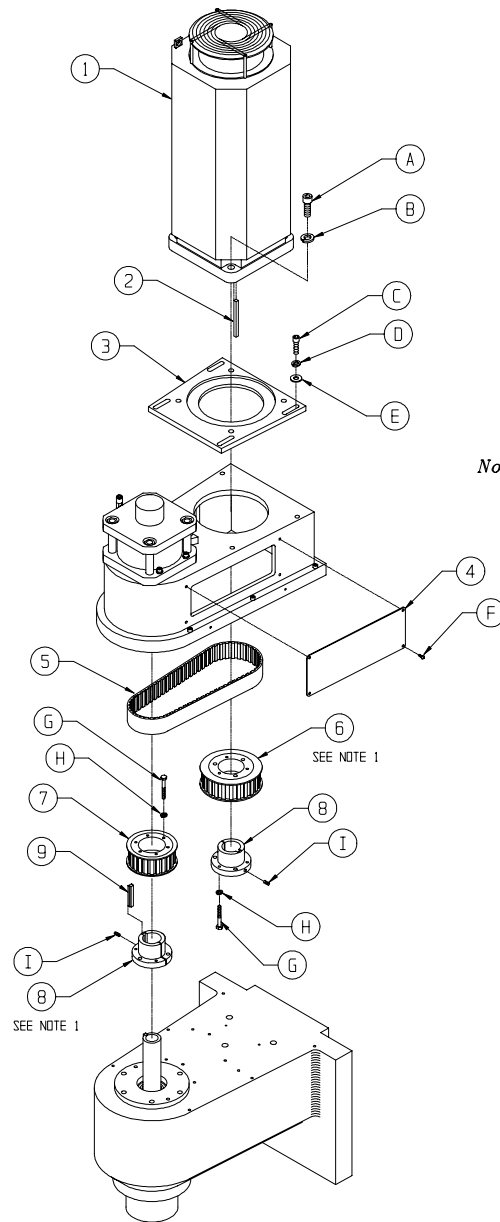
PARTS LIST

ITEM	STOCK No.	QTY.	DESCRIPTION
1	NU-79	2	FLOW MUFFLER ASP-2
2	NU-120	1	START/END PLATE MANIFOLD, PVL-B17197
3	NU-121	2	AIR SOLENOID, PVL-B1216067
4	NU-33	1	1/4 NPT-1/4 TUBE 90° ELBOW, 56944
5	NU-119	1	VALVE PLUG, 5208-4

A	NEW AIR SOLENOIDS	1898		6/94
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.		TITLE 12 POCKET ROTARY ATC ASSY.		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER I		
X.XXX	+/- .005	SCALE 2:1	DWG No 6-10-008-018	SIZE B
X.XX	+/- .010			
X.X	+/- .030			
ANGLE	+/- 1.0°	DATE 8 DEC 92	DRAWN BY REUTER	SHEET NO. 4 OF 5

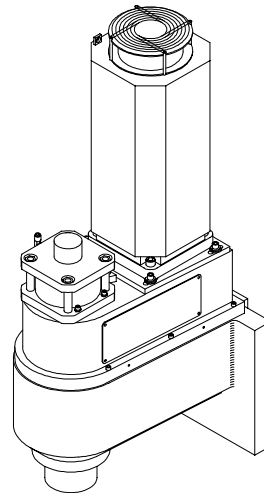


12 HP 4.5k RPM Pulley Assembly



Notes:

1. THIS ARRANGEMENT IS FOR HIGH SPEED RANGE INTERCHANGE ITEMS 6 & 7 FOR LOW SPEED OPERATION.



REV.	CHANGE NOTES	2411	E.C.D. NO.	APP'D BY	DATE
A					9/95
MATERIAL/FINISH					
STOCK/CAST No.					
TOLERANCE UNLESS SPECIFIED					
X.XXX ± .005					
X.XX ± .010					
X.X ± .030					
ANGLE 1.0°					

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

TITLE 12-1/2 H.P. SPINDLE HEAD ASSEMBLY
APPLICATION GENERAL PRODUCTS
SCALE 8:1 DWG No 6-10-018-015 SIZE B
DATE 19 JUN 94 DRAWN BY THOMPSON SHEET NO. 1 OF 1

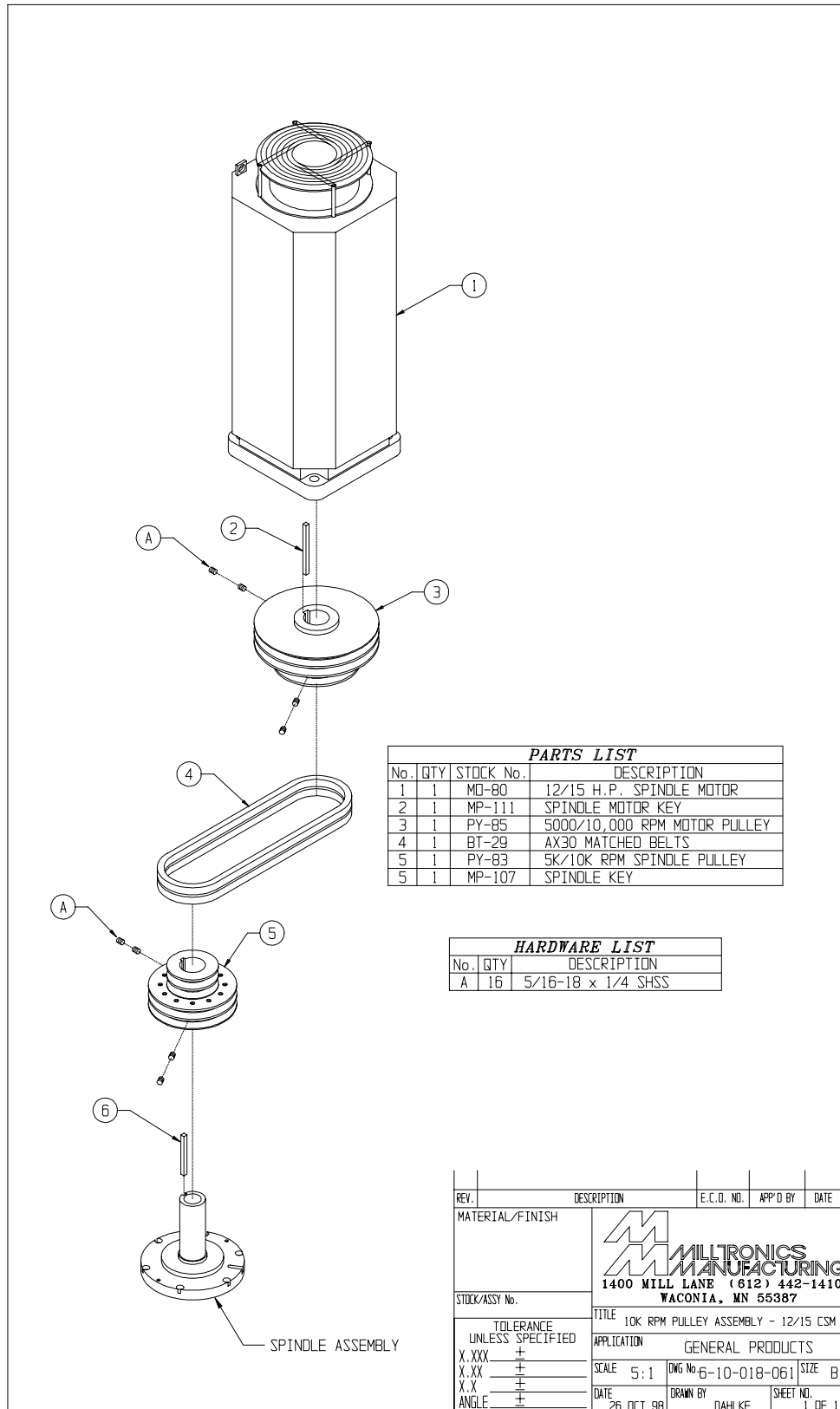
PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	MD-80	12 1/2 H.P. SPINDLE MOTOR NB1902FRM-445
2	1	MP-111	12 1/2 H.P. SPINDLE MOTOR PULLEY KEY
3	1	MP-110	12 1/2 H.P. SPINDLE MOTOR MOUNT
4	2	MP-113	12 H.P. SPINDLE BELT COVER
5	1	BT-31	TIMING BELT 330H150
6	1	PY-63	TIMING PULLEY 30H150 SD
7	1	PY-62	TIMING PULLEY 24H150 SD
8	2	PY-64	1 1/2 I.D. SD BUSHING
9	1	MP-112	12 H.P. SPINDLE PULLEY KEY

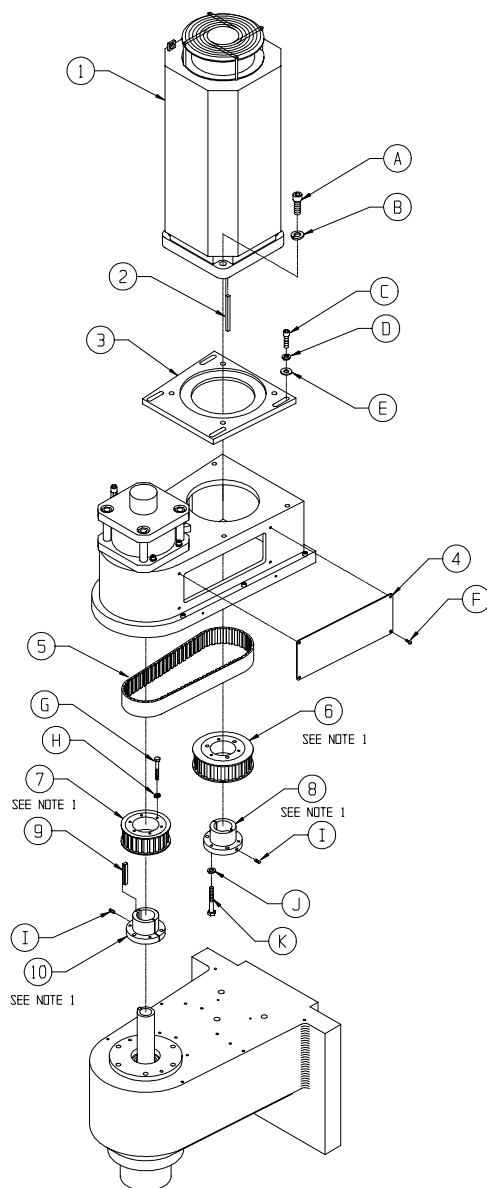
HARDWARE LIST

No.	QTY	DESCRIPTION
A	4	1/2-13 x 1 1/4 SHCS
B	4	1/2 LOCK WASHER
C	4	3/8-16 x 1 1/4 SHCS
D	4	3/8 LOCK WASHER
E	4	3/8 FLAT WASHER
F	8	8-32 x 3/8 BHCS
G	6	1/4-20 x 2 HHCS
H	6	1/4 LOCK WASHER
I	2	1/4-20 x 3/8 SHSS

12 HP 10k RPM Pulley Assembly



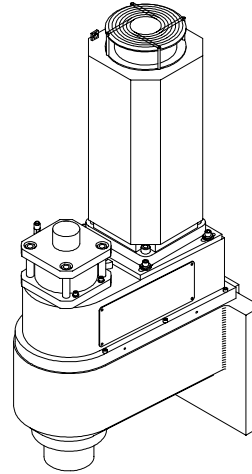
12 HP 6k RPM Pulley Assembly



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	12 1/2 H.P. 6K RPM SPINDLE HEAD		
	APPLICATION	GENERAL PRODUCTS		
	SCALE	8:1	DATE	25 FEB 98
	DWG No.	6-10-018-057	DRAWN BY	THOMPSON
	SIZE	B	SHEET NO.	1 OF 2

NOTES:-

1. THIS ARRANGEMENT IS FOR HIGH SPEED RANGE
INTERCHANGE ITEMS 6 & 7 FOR LOW SPEED
OPERATION.



PARTS LIST

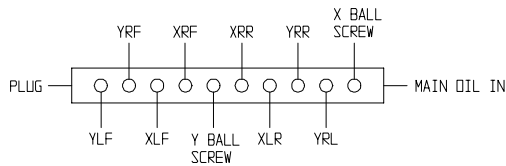
No.	QTY	STOCK No.	DESCRIPTION
1	1	MD-80	12 1/2 H.P. SPINDLE MOTOR
2	1	MP-111	12 1/2 H.P. SPINDLE MOTOR PULLEY KEY
3	1	MP-110	12 1/2 H.P. SPINDLE MOTOR MOUNT
4	2	MP-113	12 H.P. SPINDLE BELT COVER
5	1	BT-31	TIMING BELT 330H150
6	1	PY-75	TIMING PULLEY 32H150 SK
7	1	PY-76	TIMING PULLEY 22H150 SD
8	1	PY-74	1 1/2 I.D. SK BUSHING
9	1	MP-112	12 H.P. SPINDLE PULLEY KEY
10	1	PY-64	1 1/2 I.D. SD BUSHING

HARDWARE LIST

No.	QTY	DESCRIPTION
A	4	1/2-13 x 1 1/4 SHCS
B	4	1/2 LOCK WASHER
C	4	3/8-16 x 1 1/4 SHCS
D	4	3/8 LOCK WASHER
E	4	3/8 FLAT WASHER
F	8	8-32 x 3/8 BHCS
G	3	1/4-20 x 2 HHCS
H	3	1/4 LOCK WASHER
I	2	1/4-20 x 3/8 SHSS
J	3	5/16 LOCK WASHER
K	3	5/16-18 x 2 HHCS

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 12 1/2 H.P. 6K RPM SPINDLE HEAD			
X.XXX +	APPLICATION GENERAL PRODUCTS			
X.XX +	SCALE 8:1 DWG No. 6-10-018-057 SIZE B			
X.X +	DATE 25 FEB 98 DRAWN BY THOMPSON SHEET NO. 2 OF 2			
ANGLE ±				

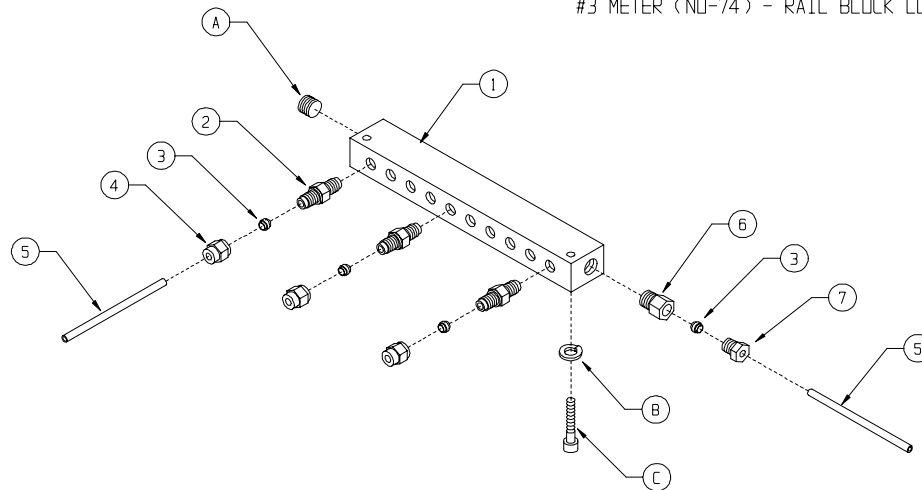
X & Y Axis Autolube Manifold Assembly



OIL LINE DESTINATIONS
SEE NOTE FOR METER SIZE

NOTES:

1. OIL METER SIZES:
#2 METER (NU-63) - BALL SCREW LOCATIONS.
#3 METER (NU-74) - RAIL BLOCK LOCATIONS.



PARTS LIST

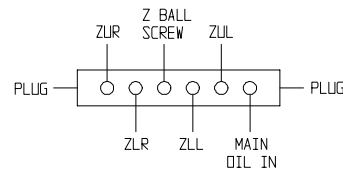
No.	QTY	STOCK No.	DESCRIPTION
1	1	MP1-92	X & Y AXIS OIL MANIFOLD
2	10	----	OIL METER (SEE NOTE FOR SIZE)
3	11	NU-38	B-1061 FERRULE DOUBLE
4	10	NU-45	PAN-4-M COMPRESSION NUT
5	-	NU-81	TUBING 5-32 5C25
6	1	NU-110	15352 1/8 NPT-M8-1 OIL FITTING
7	1	NU-108	15328 COMPRESSION FITTING

HARDWARE LIST

No.	QTY	DESCRIPTION
A	1	1/8-27 PIPE PLUG
B	2	# 10 LOCK WASHER
C	2	10-32 x 1 1/4 SHCS

REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE X & Y AXIS OIL MANIFOLD ASSEMBLY		
X.XXX ± .005		APPLICATION PARTNER I		
X.XX ± .010		SCALE 2.5:1		
X.X ± .030		DWG No. 6-10-008-023		
ANGLE ± 1.0°		SIZE B		
DATE 7 JUN 94		DRAWN BY THOMPSON		
		SHEET NO. 1 OF 1		

Z Axis Autolube Manifold Assembly



OIL LINE DESTINATIONS

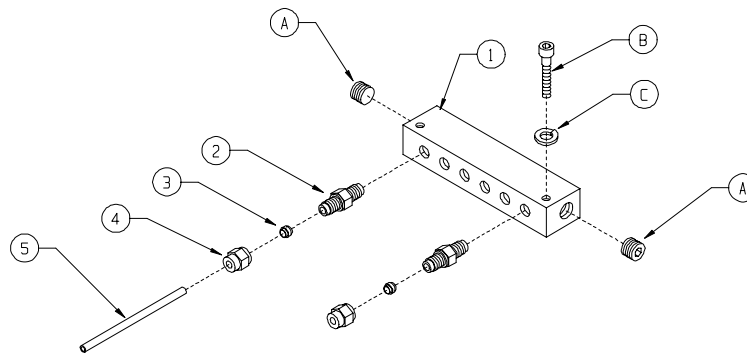
SEE NOTE FOR METER SIZE

NOTES:

1. OIL METER SIZE:
#2 METER (NU-63) - BALL SCREW LOCATION.
#3 METER (NU-74) - RAIL BLOCK LOCATIONS.

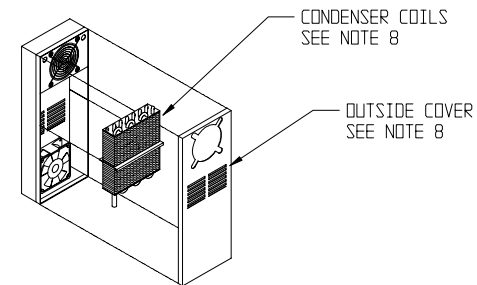
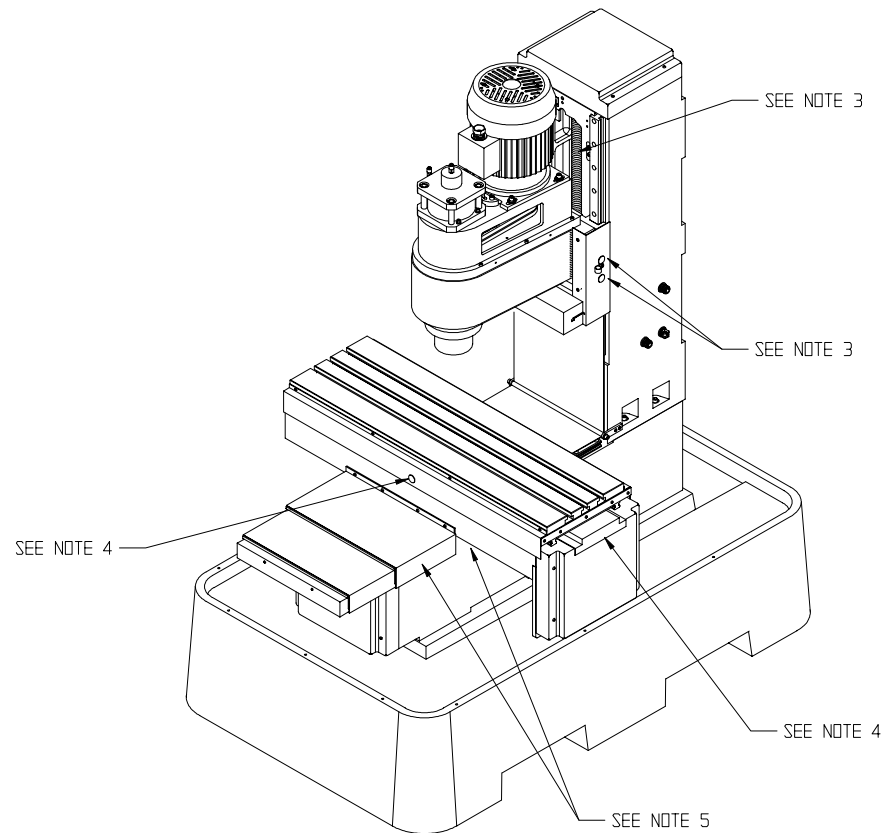
PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	MP1-91	Z-AXIS OIL MANIFOLD
2	6	----	OIL METER (SEE NOTE FOR SIZE)
3	6	NU-38	B-1061 FERRULE DOUBLE
4	6	NU-45	PAN-4-M COMPRESSION NUT
5	-	NU-81	TUBING 5-32 5C25

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	2	1/8-27 PIPE PLUG
B	2	10-32 x 1 1/4 SHCS
C	2	# 10 LOCK WASHER



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.		TITLE Z-AXIS OIL MANIFOLD ASSEMBLY		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER I		
X .XXX ± .005		SCALE 2.5:1		DWG No 6-10-008-024
X .XX ± .010		SIZE B		
X .X ± .030		DATE 7 JUN 94		DRAWN BY THOMPSON
ANGLE ± 1.0°		SHEET NO. 1		OF 1

Machine Lubrication Instructions

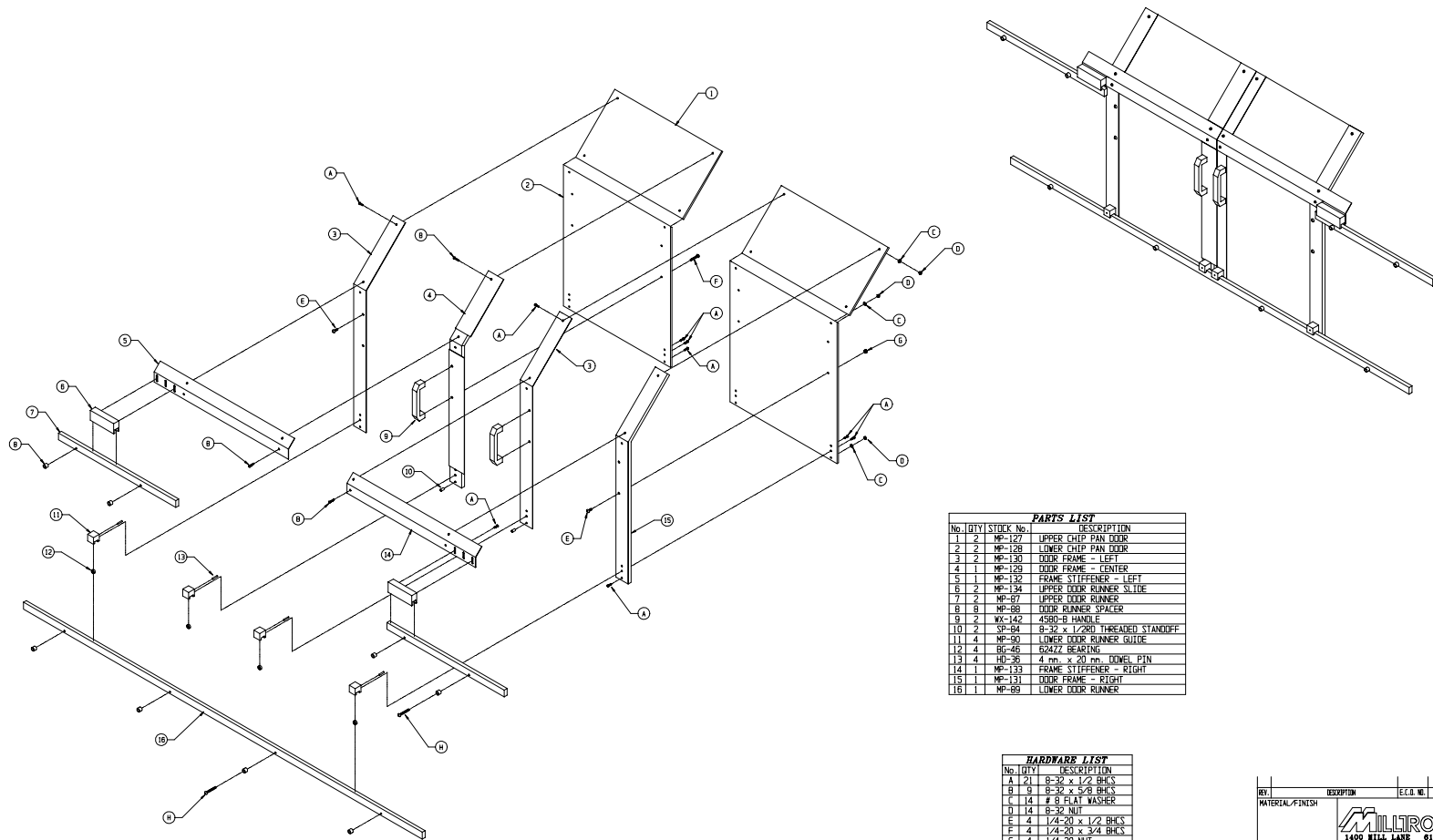


D	UPDATE DRAWING	2298		6/95
C	ADD NOTES	1876	N.M.	6/94
B	ADD NOTES	623	M.F.	10/91
A	REDRAW FILE	341	J.F.	1/91
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE LUBRICATION DRAWING		
X.XXX	± .005	APPLICATION PARTNER I		
X.XX	± .010	SCALE 12:1 DWG No 6-10-008-008 SIZE B		
X.X	± .030	DATE 8 JAN 91		
ANGLE	± 1.0°	DRAWN BY REUTER SHEET NO. 1 OF 2		

1. BE SURE TO CLEAN THE ENTIRE MACHINE BEFORE LUBRICATION TO ENSURE CONTAMINANTS WILL NOT GET INTO THE RAIL BLOCKS AND BALL SCREWS. USE MOBIL 1 SYNTHETIC UNIVERSAL GREASE OR OTHER EQUIVALENT FOR ALL LUBE POINTS.
2. USE THE 12" GREASE GUN EXTENSION TUBE SUPPLIED WITH THE MACHINE TO MAKE THE TASK MUCH EASIER. IT IS ALSO NECESSARY ON THE SAME GREASE GUN TO BEVEL THE EDGE OF THE NOZZLE TO GAIN MORE CLEARANCE BETWEEN THE RAIL BLOCK AND GREASE FITTING.
3. REMOVE HOLE PLUGS (WX-113) FROM THE ROLLER SHADE HOUSING, LEFT AND RIGHT SIDE. THIS WILL ALLOW ACCESS TO THE GREASE FITTINGS ON THE Z RAIL BLOCKS. REPLACE HOLE PLUGS IN THE HOUSING AFTER COMPLETION. TO GREASE Z-AXIS BALL SCREW MOVE THE HEAD DOWN TO THE EXTREME LIMIT AND EMERGENCY STOP THE MACHINE. PUT A GENEROUS AMOUNT OF GREASE IN YOUR HAND AND REACH IN FROM THE FRONT OF THE COLUMN THROUGH THE ACCESS HOLE AND APPLY TO THE BALL SCREW. WHEN COMPLETED CYCLE Z-AXIS FULL TRAVEL FIVE TIMES TO ENSURE THE BALL SCREW IS PROPERLY GREASED TRAVELING NO FASTER THAN 50 ipm.
4. MOVE Y-AXIS TO THE HOME POSITION AND CENTER THE TABLE ON X-AXIS. ON 25" TRAVEL MACHINES REMOVE THE HOLE PLUGS (WX-113) IN THE X-AXIS TABLE AND SADDLE COVER, FRONT AND REAR, FOR ACCESS TO THE GREASE FITTINGS ON X-AXIS RAIL BLOCKS. ON 30", 34", & 45" TRAVEL MACHINES USE THE NOTCHES IN THE FRONT AND REAR TABLE PLATES FOR ACCESS. ALIGN THE HOLE OR NOTCH TO THE GREASE FITTING ON THE LEFT FRONT X-AXIS RAIL BLOCK. INSERT GREASE GUN TIP THROUGH THE HOLE OR NOTCH AND GREASE RAIL BLOCK. BEFORE MOVING THE TABLE GREASE THE LEFT REAR RAIL BLOCK IN THE SAME MANNER. REPEAT PROCEDURE FOR THE RIGHT SIDE RAIL BLOCKS. TO GREASE THE X-AXIS BALL SCREW REMOVE RUBBER WIPER FLAPS MOUNTED ON THE ENDS OF THE TABLE. WITH THE TABLE STILL IN THE CENTER OF TRAVEL PULL THE RIGHT X-AXIS WAY COVER OUT ABOUT 2 INCHES AND PLACE A 2 x 2 x 2 SPACER BETWEEN THE WAYCOVER AND THE BELT & PULLEY COVER. MOVE X-AXIS TO THE HOME POSITION AND EMERGENCY STOP THE MACHINE. THROUGH THE GAP BETWEEN THE X-AXIS WAYCOVER AND THE TABLE APPLY GREASE TO THE BALL SCREW. MOVE X-AXIS BACK TO THE CENTER OF THE TRAVEL AND MOVE THE SPACER FROM THE RIGHT SIDE TO THE LEFT SIDE AND REPEAT PROCESS EXCEPT FOR MOVING THE TABLE TO THE EXTREME RIGHT. WHEN COMPLETED CENTER THE TABLE THEN REMOVE THE SPACER AND CYCLE X-AXIS FULL TRAVEL FIVE TIMES TO ENSURE THE BALL SCREW IS PROPERLY GREASED TRAVELING NO FASTER THAN 50 ipm.
5. MOVE Y-AXIS TO THE CENTER OF THE TRAVEL TO GREASE ALL Y-AXIS RAIL BLOCKS. ACCESS TO THE GREASE FITTINGS ON THE RAIL BLOCKS IS GAINED FROM UNDER THE SADDLE AND IN BETWEEN THE RAIL BLOCKS. TO GREASE THE Y-AXIS BALL SCREW MOVE Y-AXIS INTO THE EXTREME LIMIT OF THE TRAVEL AND EMERGENCY STOP THE MACHINE. REMOVE THE FOUR SCREWS HOLDING THE FRONT Y-AXIS WAY COVER TO THE SADDLE AND SLIDE THE WAY COVER BACK TOWARDS THE CHIP PAN PUT A GENEROUS AMOUNT OF GREASE IN YOUR HAND AND REACH IN FROM THE TOP OF THE BASE THROUGH THE ACCESS HOLE AND APPLY TO THE BALL SCREW. AFTER GREASING MOVE Y-AXIS TO HOME POSITION AND RE-INSTALL THE FRONT Y-AXIS WAY COVER AND CYCLE Y-AXIS FULL TRAVEL FIVE TIMES TO ENSURE THE BALL SCREW IS PROPERLY GREASED TRAVELING NO FASTER THAN 50 ipm.
6. BALL SCREWS NEED ONLY BE GREASED 2 TIMES PER YEAR, RAIL BLOCKS SHOULD BE GREASED EVERY 500 HOURS OR 3 MONTHS WHICH EVER COMES FIRST.
7. CLEAN AND FILL AIR FILTER / REGULATOR / DILER EVERY WEEK FOR PROPER OPERATION OF ALL PNEUMATIC PARTS. FILL WITH MARVEL No. 085, MOBIL ALMO 525 OR OTHER EQUIVALENT QUALITY AIR TOOL OIL.
8. CLEAN THE HEAT EXCHANGER EVERY MONTH BY REMOVING THE MOUNTING HARDWARE ON THE BOTTOM AND REMOVE THE OUTSIDE COVER. REMOVE THE CONDENSER COILS AND CLEAN IT WITH AN AIR NOZZLE AND REASSEMBLE.

D	UPDATE DRAWING	2298		10/95
C	ADD NOTES	1876	N.M.	6/94
B	ADD NOTES	623	M.F.	10/91
A	REDRAW FILE	341	J.F.	1/91
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.		7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
TOLERANCE UNLESS SPECIFIED		TITLE LUBRICATION DRAWING		
X .XXX	± .005	APPLICATION PARTNER I		
X .XX	± .010	SCALE 20:1	DWG No 6-10-008-008	SIZE B
X .X	± .030	DATE 5 JUN 95	DRAWN BY THOMPSON	SHEET NO. 2 OF 2
ANGLE	± 1.0°			

Chip Pan Door Assembly



PARTS LIST	
No.	DESCRIPTION
1	UPPER CHIP PAN DOOR
2	LOWER CHIP PAN DOOR
3	DOOR FRAME - LEFT
4	DOOR FRAME - CENTER
5	FRAME STIFFENER - LEFT
6	UPPER DOOR RUNNER SLIDE
7	UPPER DOOR RUNNER
8	DOOR RUNNER SPACER
9	4580-B HANDLE
10	8-32 x 1/200 THREADED STANDOFF
11	LOWER DOOR RUNNER GUIDE
12	8247/2 BEARING
13	4 mm. x 20 mm. DOWEL PIN
14	FRAME STIFFENER - RIGHT
15	DOOR FRAME - RIGHT
16	LOWER DOOR RUNNER

HARDWARE LIST	
No.	DESCRIPTION
A	8-32 x 1/2 B.H.S.
B	8-32 x 5/8 B.H.S.
C	# 8 FLAT WASHER
D	8-32 NUT
E	1/4-20 x 1/2 B.H.S.
F	1/4-20 x 3/4 B.H.S.
G	1/4-20 NUT
H	1/4-20 x 1 B.H.S.

REV.	DESCRIPTION	E.C.B. NO.	APP'D BY	DATE
MILLIRONICS 1400 WELLS LANE WACONIA, MN 55387 USA				
TITLE METAL FRAME CHIP PAN DOOR - ASSEMBLY APPLICATION GENERAL PRODUCTS SCALE 6:1 DATE 28 JAN 88 DESIGNED BY THOMPSON DRAWN BY THOMPSON CHECKED BY THOMPSON DATE 28 JAN 88 REV. 1 OF 1				

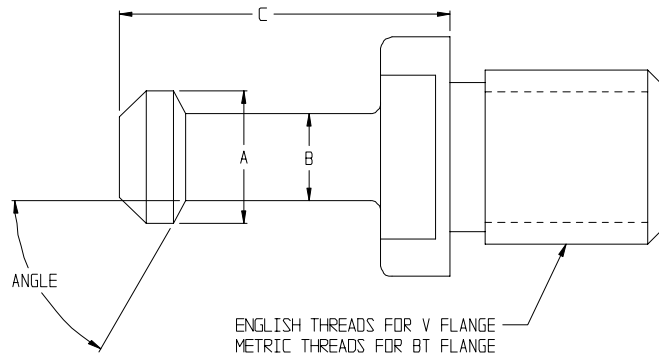
Retention Knob Chart

**RETENTION KNOBS
STYLE V-FLANGE**

V-FLANGE TAPER	DIMENSIONS				MILLIRONICS MACHINE	COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.
40	A	B	C	ANGLE	RH20, RH25, RH30, BR50, BR60, BR80 PARTNER VM15, VM16, VM17, VMG17, VM24, VM25, VM30, VMD30	RB4E-0002	RK31114A	PT-532-60

**RETENTION KNOBS
STYLE BT-FLANGE**

BT-FLANGE TAPER	DIMENSIONS				MILLIRONICS MACHINE	COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.
40	A	B	C	ANGLE	RH20, RH25, RH30, BR50, BR60, BR80 PARTNER VM15, VM16, VM17, VMG17, VM24, VM25, VM30, VMD30	RB4M-0002	RK31113A	PT-444-60



Notes:

1. COMMAND CORPORATION
TEL - 1.800.328.2197
FAX - 1.612.576.6911
2. KENNAMETAL
TEL - 1.800.445.7738
FAX - 1.800.962.4910
3. VALENITE
TEL - 1.800.544.3336
FAX - 1.800.488.0695

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.	TITLE RETENTION KNOB CHART			
TOLERANCE UNLESS SPECIFIED	APPLICATION GENERAL PRODUCTS			
X.XXX +/-	SCALE 1:1			
X.XX +/-	DATE 30 APR 99			
X.X +/-	DRAWN BY DAHLKE			
ANGLE +/-	SHEET NO. 1 OF 1			