



MILLTRONICS
C N C M A C H I N E S

VM22D Mechanical

12-3-2012
Updated 2-7-2013
Rev 2

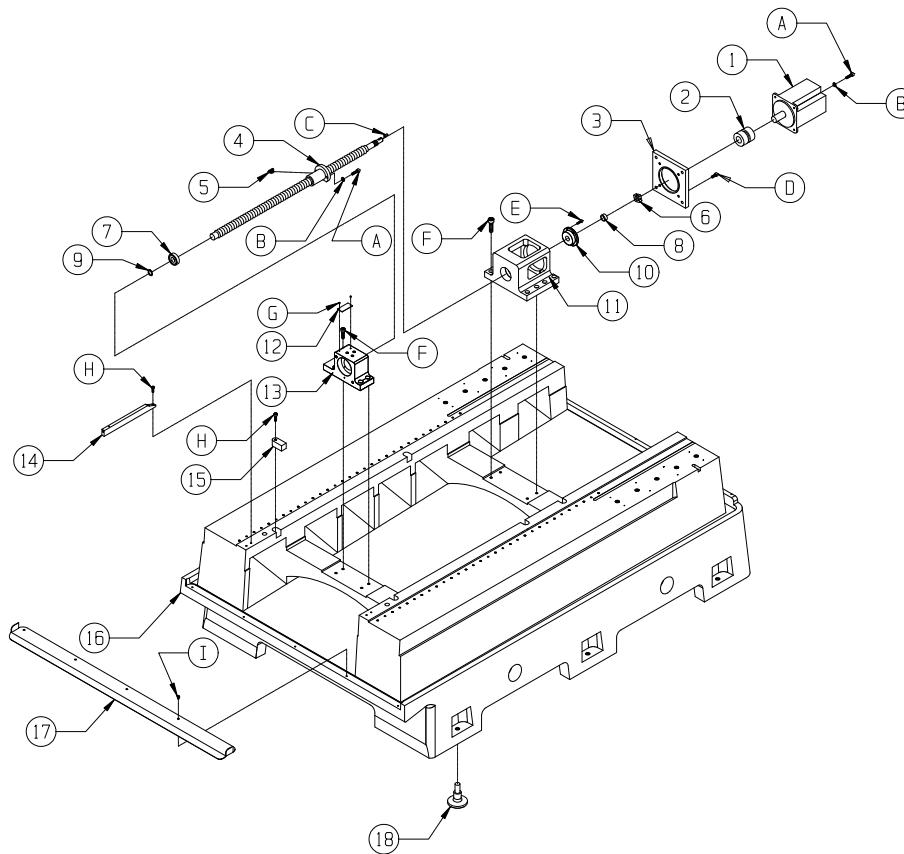
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Manual Discrepancy Sheet

1. On page 11 #9 kit numbers for 12 & 15K RPM are as shown.
2. On page 27 #9 quantity is 2 as shown.

Machine Base Assembly



D	ADD 2kw MOTOR	6481		02/08
C	ADD MITSUBISHI TO LIST	6269	N.M.	02/07
B	ADD BALL SCREW TABLE	5904	N.M.	02/05
A	ADD MOTOR, COUPLER CHART	5724	N.M.	03/04
REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE

MATERIAL/FINISH

STOCK/ASSY No.


 1400 MILL LANE 952-442-1410
 WACONIA, MN 55387 USA

TITLE VM22 PEDESTAL SUB-ASSEMBLY

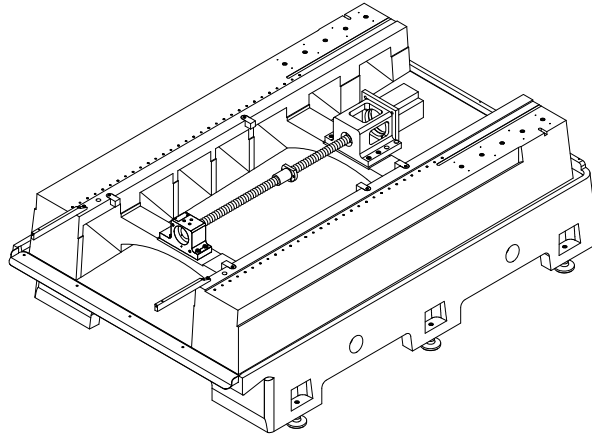
APPLICATION PARTNER VI

SCALE 16:1 DWG No. 6-10-027-028 SIZE B

DATE 16 JUN 03 DRAWN BY DAHLKE SHEET No. 1 OF 2

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TOLERANCE
 UNLESS SPECIFIED
 X.XXX +/-
 X.XX +/-
 X.X +/-
 ANGLE +/-


PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	SEE TABLE	AXIS MOTOR
2	1	SEE TABLE	MOTOR COUPLER
**	1	MP6-231	MOTOR PLATE
4	1	SEE TABLE	Y - AXIS BALL SCREW
5	1	NU-161	1/8 NPT 4mm SWIVEL ELBOW
6	1	MP1-94	BALL SCREW LOCK NUT
7	1	BG-02	BEARING 6204 ZZ
8	1	MP1-107	BEARING LOCK NUT SPACER
9	1	MP1-108	BALL SCREW SNAP RING
10	1	BG-94	BALL SCREW SUPPORT BEARING
11	1	SEE TABLE	Y - AXIS REAR MOTOR MOUNT
12	1	LB-27	PULLEY MOTOR WARNING LABEL
13	1	MX-64	FRONT BALL SCREW RADIAL MOUNT
14	2	SEE TABLE	Y - AXIS FRONT WAY COVER BRACKET
15	5	MP-707	HARD STOP BLOCK
16	1	MX6-40	PEDESTAL - MACHINED
17	1	MP6-252	PEDESTAL DRIP LIP
18	6	MP1-29	LEVELING PAD

BALL SCREW TABLE

No.	DESCRIPTION	PART No.
4	STANDARD RAPID	MPB-02
	HIGH SPEED RAPID	MP-801

FRONT WAY COVER BRACKET

No.	DESCRIPTION	PART No.
14	BALL RAIL	MP6-228
	ROLLER RAIL	MP6-250

MOTOR & COUPLER LIST

No.	YASKAWA	FANUC	SIEMENS	MITSUBISHI
1	MD-125 (.9kw) MD-127 (1.5kw) MD-144 (2kw)	8Nm A06B-0227-B200	11Nm 1FK7063-5AF71-1EAO 16Nm 1FK7083-5AF71-1EAO	MD-184 (1.5kw)
2	MA-242 (.9kw) MA-241 (1.5kw) MA-248 (2kw)	MA-242	MA-260 (11Nm) MA-261 (16Nm)	MA-260
11	MX-51	MX-51	MX-51 (11Nm) MXS-03 (16Nm)	MX-51

HARDWARE LIST

No.	QTY	DESCRIPTION
*	6	M8-1.25 x 30mm SHCS
*	6	M8 LOCK WASHER
**	1	3/16 x 3/16 x 1/2 KEY
	4	M8-1.25 x 20mm SHCS
	6	M6-1 x 25mm SHCS
	8	M10-1.5 x 30mm SHCS
	2	1/4 DRIVE PIN
	9	M6-1 x 20mm SHCS
	5	M6-1 x 10mm BHCS

* 16Nm SIEMENS MOTOR USES (4)
M10-1.5 x 30 SHCS & (4) M10 LOCK WASHERS.
2kw MOTOR USES (4) M12-1.75 x 35mm
SHCS & M12 LW.

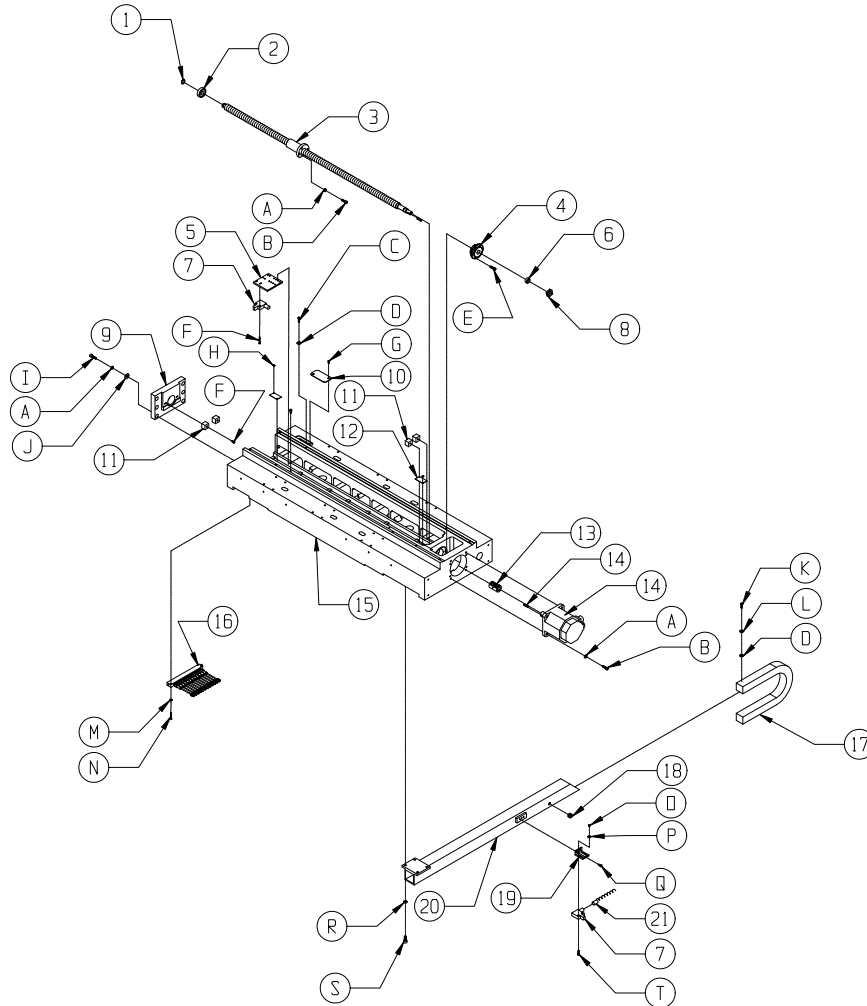
** NOT USED WITH .9kw OR 1.5kw MOTOR.

D	ADD 2kw MOTOR	6481		02/08
C	ADD MITSUBISHI TO LIST	6269	N.M.	02/07
B	ADD BALL SCREW TABLE	5904	N.M.	02/05
A	ADD MOTOR, COUPLER CHART	5724	N.M.	03/04
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.	TITLE VM22 PEDESTAL SUB-ASSEMBLY			
TOLERANCE UNLESS SPECIFIED	APPLICATION PARTNER VI			
X.XXX +/-	SCALE 16:1 DWG No. 6-10-027-028 SIZE B			
X.XX +/-	DATE 16 JUN 03 DRAWN BY DAHLKE SHEET No. 2 OF 2			
X.X +/-				
ANGLE +/-				

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Machine Saddle Assembly



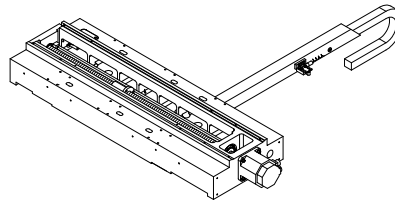
C	ADD MITSUBISHI TO LIST	6274		02/07
B	ADD BALL SCREW TABLE	5905	N.M.	02/05
A	ADD MOTOR, COUPLER TABLE	5726	N.M.	03/04
REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE

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

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TOLERANCE UNLESS SPECIFIED	TITLE VM22 SADDLE SUB-ASSEMBLY		
X.XXX +/-	APPLICATION PARTNER VI		
X.XX +/-	SCALE 20:1	DWG No. 6-10-027-032	SIZE B
X.X +/-	DATE 07 JUL 03	DRAWN BY DAHLKE	SHEET No. 1 OF 2
ANGLE +/-			

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	12	M8 LOCK WASHER
B	6	M8-1.25 x 30mm SHCS
C	2	M6-1 x 25mm BHCS
D	6	M6 FLAT WASHER
E	6	M6-1 x 25mm SHCS
F	6	M5-.8 x 16mm SHCS
G	2	M4-.7 x 10mm FHCS
H	4	1/4 DRIVE PIN
I	6	M8-1.25 x 40mm SHCS
J	6	M8 FLAT WASHER
K	4	M6-1 x 16mm BHCS
L	4	M6 LOCK WASHER
M	2	M5 LOCK WASHER
N	2	M5-.8 x 30mm SHCS
O	2	M5 HEX NUT
P	2	M5 FLAT WASHER
Q	2	M5-.8 x 10mm BHCS
R	4	M10 LOCK WASHER
S	4	M10-1.5 x 30 SHCS
T	2	M5-.8 x 20mm SHCS



PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	MP1-108	SNAP RING
2	1	BG-02	6204 BEARING
3	1	SEE TABLE	X BALL SCREW
4	1	BG-94	BALL SCREW SUPPORT BEARING
5	1	MP-309	X AXIS SWITCH PLATE
6	1	MP1-107	BEARING LOCKNUT SPACER
7	2	SW-193	LIMIT SWITCH
8	1	MP1-94	BALL SCREW LOCKNUT
9	1	MP6-230	VM RADIAL SUPPORT PLATE
10	1	MP-236	Y AXIS SWITCH SLOT COVER
11	4	MP-718	PDM HARD STOP BLOCK
12	2	LB-27	PULLEY MOTOR WARNING LABEL
13	1	SEE TABLE	MOTOR COUPLER
14	1	SEE TABLE	AXIS MOTOR
15	1	MX6-42	VM SERIES SADDLE - MACHINED
16	1	SEE TABLE	X & Y MANIFOLD ASSEMBLIES
17	1	MP6-220	Y AXIS CABLE TRACK
18	1	WX-287	RUBBER GROMMET
19	1	MP1-387	Y AXIS LIMIT SWITCH MOUNTING BRACKET
20	1	MP6-223	Y AXIS CABLE CARRIER
21	2	SW-191	Y AXIS SWITCH CORD

MANIFOLD ASSEMBLY	
DRAWING No.	DESCRIPTION
6-10-008-058	X & Y AIR/OIL MANIFOLD ASSEMBLY
6-10-018-049	VM X & Y AXIS OIL MANIFOLD ASSEMBLY

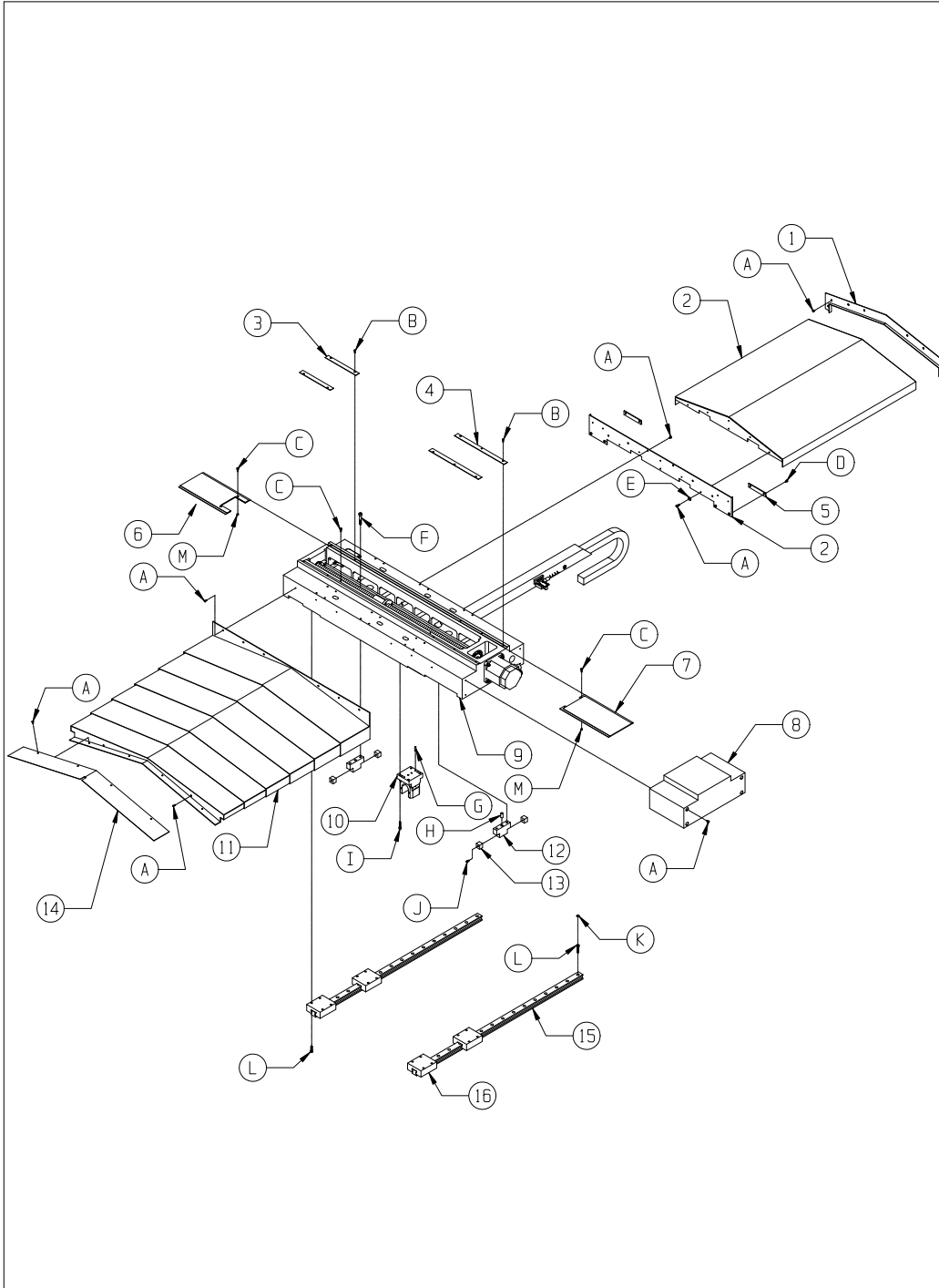
MOTOR & COUPLER LIST				
No.	YASKAWA	FANUC	SIEMENS	MITSUBISHI
13	MA-242 (.9kw)	MA-242	MA-260	MA-260
	MA-241 (1.5kw)			
14	MD-125 (.9kw)	8Nm A06B-0227-B200	11Nm 1FK7063-5AF71-1EA0	MD-184 (1.5kw)
	MD-127 (1.5kw)			

BALL SCREW TABLE		
No.	DESCRIPTION	PART No.
3	STANDARD RAPID	MP-570
	HIGH SPEED RAPID	MP-821

C	ADD MITSUBISHI TO LIST	6274		02/07	
B	ADD BALL SCREW TABLE	5905	N.M.	02/05	
A	ADD MOTOR, COUPLER TABLE	5726	N.M.	03/04	
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.		TITLE VM22 SADDLE SUB-ASSEMBLY			
TOLERANCE UNLESS SPECIFIED X .XXX +/- X .XX +/- X .X +/- ANGLE +/-		APPLICATION PARTNER VI			
		SCALE 20:1		DWG No. 6-10-027-032	SHEET B
		DATE 07 JUL 03		DRAWN BY DAHL KE	SHEET No. 2 OF 2

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Saddle & Way Cover Assembly



C	UPDATE RAIL BOLT & PART No.	7486		03/12
B	ADD ROLLER RAIL TABLE	5906	N.M.	02/05
A	RAIL BLOCK WITH NBR SEAL	5662	N.M.	11/03
REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE

MATERIAL/FINISH

STOCK/ASSY No.

TOLERANCE

UNLESS SPECIFIED

X.XXX +/-

X.XX +/-

X.X +/-

ANGLE +/-



TITLE VM22 SADDLE ASSEMBLY

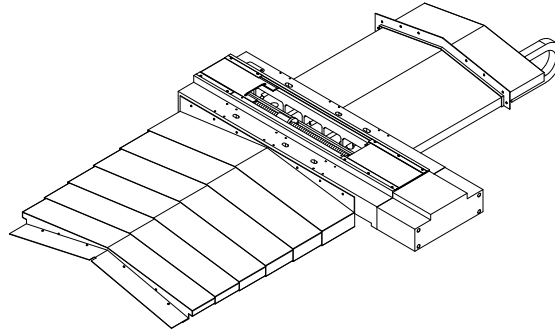
APPLICATION PARTNER VI

SCALE 20:1 DWG No. 6-10-027-031

DATE 08 AUG 03 DRAWN BY DAHLKE

SHEET No. 1 OF 2

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PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	MP60216	REAR WAY COVER WIPER
2	1	MP60215	Y AXIS REAR COVER
3	2	MP00311	X AXIS WAY COVER BRACKET - LEFT
4	2	MP00289	X AXIS WAY COVER BRACKET - RIGHT
5	2	MP10247	SADDLE WIPER
6	1	MP00287	X AXIS BALL SCREW COVER - LEFT
7	1	MP00288	X AXIS BALL SCREW COVER - RIGHT
8	1	MP60227	X AXIS MOTOR COVER
9	1	10027032	VM22 SADDLE SUB-ASSEMBLY
10	1	MX00018	VM SERIES CARRIER - MACHINED
11	1	MP60213	Y AXIS FRONT WAY COVER
12	2	MP10410	SADDLE HARD STOP BLOCK
13	4	MP00718	PDM HARD STOP BLOCK
14	1	MP60239	Y AXIS FRONT WAY COVER EXT.
15	2	SEE TABLE	35mm RAIL
16	4	SEE TABLE	35mm RAIL BLOCK

HARDWARE LIST

No.	QTY	DESCRIPTION
A	40	M6-1 x 10mm BHCS
B	10	M4-.7 10mm FHCS
C	8	M5-.8 x 10mm SHCS
D	4	M5-.8 x 16mm BHCS
E	6	M6 LOCK WASHER
F	4	M10-1.5 x 40mm SHCS
G	2	1/4 x 1 DOWEL PIN
H	2	12mm x 25mm DOWEL PIN
I	6	M8-1.25 x 40mm SHCS
J	4	M5-.8 x 16mm SHCS
K	32	RAIL PLUG - BALL RAIL
	62	RAIL PLUG - ROLLER RAIL
L	48	M8-1.25 x 30mm SHCS - BALL RAIL
	78	M8-1.25 x 35mm SHCS - ROLLER RAIL
M	2	M5-.8 HEX NUT

BALL & ROLLER RAIL TABLE

No.	DESCRIPTION	PART No.
15	BALL RAIL	MP00642
	ROLLER RAIL	MP00829
16	BALL RAIL BLOCK	MP00641
	ROLLER RAIL BLOCK	MP00815

C	UPDATE RAIL BOLT & PART No.	7486		03/12
B	ADD ROLLER RAIL TABLE	5906	N.M.	02/05
A	RAIL BLOCK WITH NBR SEAL	5662	N.M.	11/03
REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE

MATERIAL/FINISH

STOCK/ASSY No.

TOLERANCE UNLESS SPECIFIED
X.XXX +/-
X.XX +/-
X.X +/-
ANGLE +/-



TITLE VM22 SADDLE ASSEMBLY

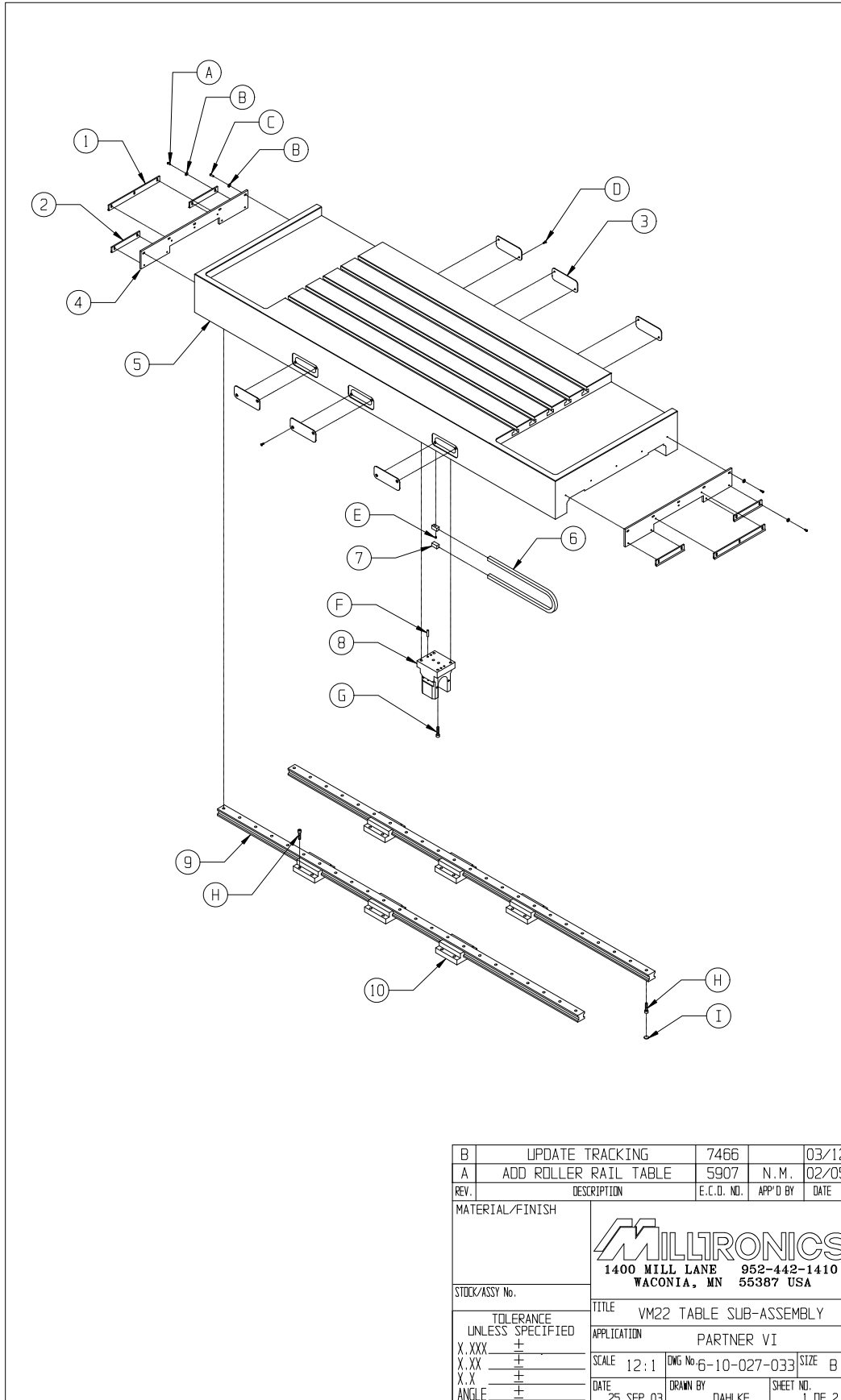
APPLICATION PARTNER VI

SCALE 20:1 DWG No. 6-10-027-031 SIZE B

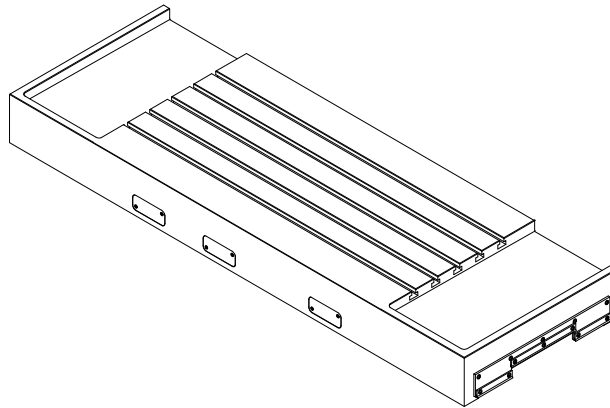
DATE 08 AUG 03 DRAWN BY DAHLKE SHEET No. 2 OF 2

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Milling Table Assembly



B	UPDATE TRACKING	7466		03/12
A	ADD ROLLER RAIL TABLE	5907	N. M.	02/05
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 ±				
 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA				
TITLE VM22 TABLE SUB-ASSEMBLY				
APPLICATION PARTNER VI				
SCALE 12:1		DWG No. 6-10-027-033		SIZE B
DATE 25 SEP 03		DRAWN BY DAHLKE		SHEET NO. 1 OF 2


PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	2	MP00323	TABLE/SADDLE WIPER - UPPER
2	4	MP00324	TABLE/SADDLE WIPER - LOWER
3	6	MP00315	TABLE SLOT COVER
4	2	MP00310	TABLE/SADDLE WIPER PLATE
5	1	MX00019	VM SERIES 71 x 24 TABLE - MACHINED
6	1	MA00844	X AXIS OIL/ CABLE TRACK - 55 LINKS
7	1	MA00845	CABLE TRACK - END SET
8	1	MX00018	VM SERIES CARRIER - MACHINED
9	2	SEE TABLE	35mm 1800 RAILS
10	6	SEE TABLE	35mm RAIL BLOCK

RAIL & BLOCK TABLE

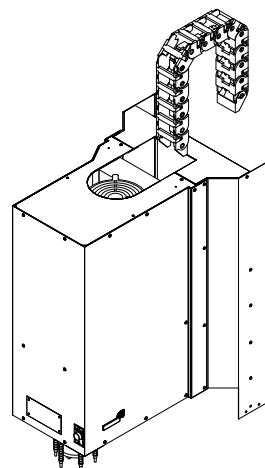
No.	DESCRIPTION	PART No.
9	BALL RAIL	MP60202
	ROLLER RAIL	MP00830
10	BALL RAIL BLOCK	MP00641
	ROLLER RAIL BLOCK	MP00815

HARDWARE LIST

No.	QTY	DESCRIPTION
A	14	M5-.8 x 10mm BHCS
B	24	M5 FLAT WASHER
C	10	M5-.8 x 15mm BHCS
D	12	M4-.7 x 8mm FHCS
E	4	M3-.5 x 5mm BHCS
F	2	1/4 x 1 DOWEL PIN
G	6	M8-1.25 x 40mm SHCS
* H	70	M8-1.25 x 30mm SHCS
** I	46	RAIL PLUGS

* ROLLER RAILS USE: (114) M8-1.25 x 35mm SHCS
 ** ROLLER RAILS USE: (44) ADDITIONAL RAIL PLUGS

B	UPDATE TRACKING		7466		03/12
A	ADD ROLLER RAIL TABLE		5907	N.M.	02/05
REV.	DESCRIPTION		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			TITLE VM22 TABLE SUB-ASSEMBLY		
X .XXX	±	APPLICATION PARTNER VI			
X .XX	±	SCALE 12:1		DWG No. 6-10-027-033	
X .X	±	DATE 25 SEP 03		SIZE B	
ANGLE	±	DRAWN BY DAHLKE		SHEET NO. 2 OF 2	



PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	MP00760	SPINDLE CABLE TRACK
2	1	10018089	SPINDLE MOTOR ASSEMBLY
3	1	MP00664	VM SPINDLE CABLE SUPPORT BRACKET
4	1	MP60218	VM22 HEADCOVER - TOP
5	1	SEE TABLE	SPINDLE BELT
6	1	10018114	TRIPLE STACK DRAWBAR CYLINDER ASSEMBLY
7	1	MP00639	UNIVERSAL HEADCOVER - TOP
8	1	MP00284	PDB AIR CYLINDER MOUNT PLATE
9	1	SEE TABLE	SPINDLE ASSEMBLY
10	1	MP60219	VM22 HEADCOVER - LEFT
11	1	SEE TABLE	O' RING REAR SEAL
12	1	MP60217	VM22 HEADCOVER - RIGHT
13	1	SEE TABLE	HEAD - MACHINED
14	1	10008039	VM17 FLOOD HANDLE SUB-ASSEMBLY
15	1	LB00001	SAFETY STICKER
16	1	MP00635	UNIVERSAL HEADCOVER
17	1	SW00067	TOOL OUT SWITCH
18	1	LB00181	BOLT ON TOOL OUT LABEL
19	6	NJ00111	1/4 LOCKLINK 1/8 NPT
20	6	MA00216	1/4 NOZZLE
21	24	MA00022	LOCKLINK HOSE

HARDWARE LIST			
No.	QTY	DESCRIPTION	
A	2	M8 FLAT WASHER	
B	14	M8 LOCK WASHER	
C	2	M8-1.25 x 16mm BHCS	
D	4	M6 FLAT WASHER	
E	14	M8-1.25 x 30mm SHCS	
F	2	M6-1 x 20mm BHCS	
G	8	M6-1 x 20mm SHCS	
H	6	M6 LOCK WASHER	
I	2	M6-1 NYLOCK NUT	
J	8	M8 HARDENED FLAT WASHER	
K	4	M6-1 x 30mm SHCS	
L	44	M6-1 x 10mm BHCS	
M	4	M8-1.25 x 45mm SHCS	
N	8	3/4 LOCK WASHER	
O	8	3/4-10 x 2 1/2 SHCS	
P	4	M3-.5 x 6mm BHCS	
Q	2	M4-.7 x 8mm BHCS	

SPINDLE BELT		
No.	STOCK No.	DESCRIPTION
5	BT00062	W-896
	BT00070	800-5GT-30

O-RING SEAL		
No.	STOCK No.	DESCRIPTION
11	WX00182	60mm SPINDLE
	WX00270	70mm SPINDLE

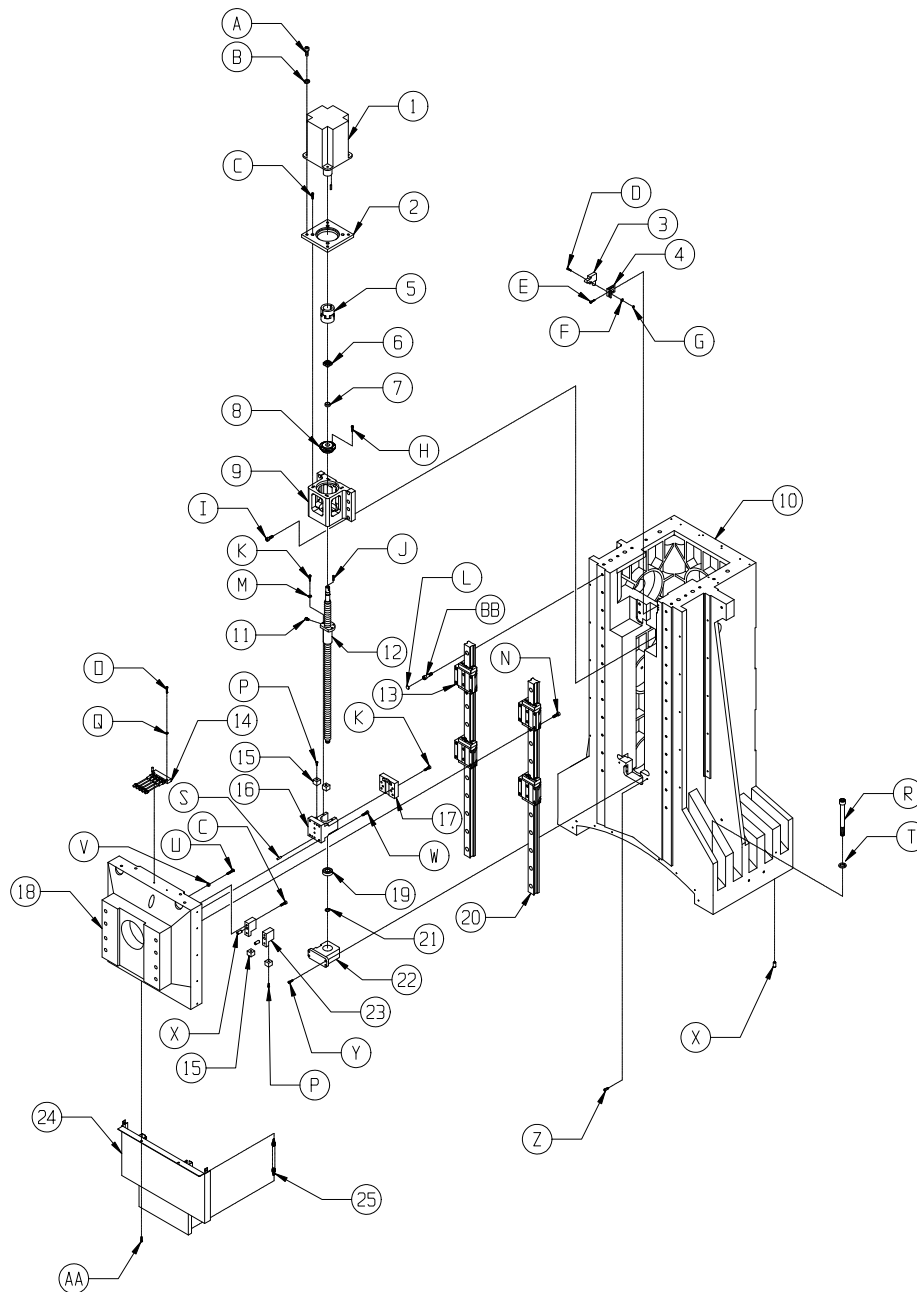
MACHINED HEADS		
No.	STOCK No.	DESCRIPTION
13	MX00054	60mm HEAD
	MX00043	70mm HEAD

SPINDLE ASSEMBLY SELECTION									
No.	HP	RPM	60mm SPINDLE				70mm SPINDLE		
			6000	8000	12000	15000	6000	8000	12000
9	7.5kw SINGL SPEED	9897	9897-1	9899-4	9899-5	9899	9899-1	9899-2	9899-3
	11kw SINGL SPEED	9897	9897-1	9899-4	9899-5	9899	9899-1		
	7.5kw DUAL SPEED	9900	9900-1	9899-4	9899-5	9899	9899-1		
	11kw DUAL SPEED	9900	9900-1	9899-4	9899-5	9899	9899-1		
	21kw DUAL SPEED	9900	9900-1	9899-4	9899-5	9899	9899-1		

B	CHANGE DRAWBAR	6912		03/10
A	CHANGE SPINDLE TABLE	5908	N. M.	02/05
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MILLTRONICS 1400 MILL LANE VACONIA, MN 55387 USA		TITLE VM22 HEAD SUB-ASSEMBLY		SCALE 15:1
APPLICATION PARTNER VI		DATE 28 AUG 03	DRAWN BY DAHLKE	SHEET NO. 2 OF 2

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Machine Column Assembly



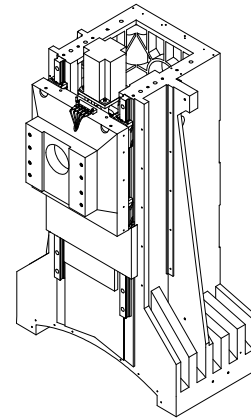
D	UPDATE RAIL BOLT & PART No.	7485	N.M.	03/12
C	ADD MITSUBISHI TO LIST	6275	N.M.	02/07
B	ADD ROLLER RAIL TABLE	5909	N.M.	02/05
A	ADD MOTOR, COUPLER TABLE	5725	N.M.	03/04
REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE

MATERIAL/FINISH	 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA			
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED	TITLE VM22 COLUMN SUB-ASSEMBLY			
X .XXX +/-	APPLICATION PARTNER VI			
X .XX +/-	SCALE 20:1 DWG No. 6-10-027-030 SIZE B			
X .X +/-	DATE 07 JUL 03 DRAWN BY DAHLKE SHEET No. 1 OF 2			
ANGLE +/-				

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PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	SEE TABLE	AXIS MOTOR
2	1	SEE TABLE	Z-AXIS MOTOR PLATE
3	1	SW00193	LIMIT SWITCH
4	1	MP10387	X & Z LIMIT SWITCH MOUNTING BRACKET
5	1	SEE TABLE	MOTOR COUPLER
6	1	MP10094	BALL SCREW LOCK NUT
7	1	MP10107	BEARING LOCK NUT SPACER
8	1	BG00094	VM BEARING CUP ASSEMBLY
9	1	MX00051	REAR MOTOR MOUNT Y/Z - AXIS
10	1	MX60039	VM SERIES COLUMN - MACHINED
11	1	NU00154	1/8 NPT 4mm TUBE M/S
12	1	SEE TABLE	Z BALL SCREW
13	4	SEE TABLE	45mm RAIL BLOCKS
14	1	SEE TABLE	Z - AXIS MANIFOLD ASSEMBLY
15	4	MP00718	PDM HARD STOP BUMPER
16	1	MX00018	VM SERIES CARRIER - MACHINED
17	1	MP60229	Z - AXIS BALL SCREW SAFETY CATCH
18	1	MX60041	VM22 HEAD EXTENSION - MACHINED
19	1	BG00002	6204 BEARING
20	2	SEE TABLE	45mm RAILS
21	1	MP10108	SNAP RING
22	1	MP00248	VM BALL SCREW SUPPORT
23	2	MP60237	VM22 HEAD EXTENSION HARD STOP BLOCK
24	1	MP60214	Z - AXIS WAYCOVER
25	2	HD00062	WAYCOVER SPRING


MOTOR, COUPLER & MOTOR PLATE LIST

No.	YASKAWA	FANUC	SIEMENS	mitsubishi
1	MD00138 (3.0kW)	22Nm A06B-0247-B500	18Nm 1FK7100-5AF71-1EB0	MD00186 (3.5kW)
	MD00130 (4.4kW)	30Nm A06B-0253-B500	27Nm 1FK7101-5AF71-1EB0	MD00188 (5.0kW)
2	MP60231	MP60231	SMN0009	MP60231
5	MA00248	MA00248	MA00288	MA00248

HARDWARE LIST

No.	QTY	DESCRIPTION
A	4	M12-1.75 x 35mm SHCS
B	4	M12 LOCK WASHER
* C	8	M8-1.25 x 20mm SHCS
D	2	M5-.8 x 20mm SHCS
E	2	M5-.8 x 16mm BHCS
F	2	M5 FLAT WASHER
G	2	M5-.8 HEX NUT
H	6	M6-1 x 25mm SHCS
I	8	M10-1.5 x 30mm SHCS
J	1	3/16 x 3/16 x 1/2 BALL SCREW KEY
K	8	M8-1.25 x 30mm SHCS
L	24	RAIL PLUG MP00727 BALL RAIL
	48	RAIL PLUG MP00818 ROLLER RAIL
M	2	M8 LOCK WASHER
N	24	M10-1.5 x 35mm SHCS
O	2	M5-.8 x 30mm SHCS
P	4	M5-.8 x 16mm SHCS
Q	2	M5 LOCK WASHER
R	10	3/4-10 x 7 1/2 SHCS
S	2	1/4 x 1 DOWEL PIN
T	10	3/4 LOCK WASHER
U	1	M8-1.25 x 40mm BHCS
V	1	M8-1.25 HEX NUT
W	6	M8-1.25 x 40mm SHCS
X	4	12 x 26mm DOWEL PIN
Y	4	M6-1 x 20mm SHCS
Z	2	M6 SHOULDER BOLT
AA	4	M6-1 x 10mm BHCS
BB	24	M12-1.75 x 40mm SHCS BALL RAIL
	48	M12-1.75 x 40mm SHCS ROLLER RAIL

*18Nm & 27Nm MOTORS USE M8-1.25 x 30mm SHCS.

Z-AXIS MANIFOLD ASSEMBLIES

No.	DRAWING No.	DESCRIPTION
14	10018050	VM Z-AXIS OIL MANIFOLD ASSEMBLY
	10008059	Z-AXIS AIR/OIL MANIFOLD ASSEMBLY

BALL SCREW TABLE

No.	DESCRIPTION	PART No.
12	STANDARD RAPID	MPB0002
	HIGH SPEED RAPID	MP00801

RAIL & BLOCK TABLE

No.	DESCRIPTION	PART No.
13	BALL RAIL BLOCK	MP00728
	ROLLER RAIL BLOCK	MP00819
20	BALL RAIL	MP00727
	ROLLER RAIL	MP00818

D	UPDATE RAIL BOLT & PART No.	7485	N.M.	03/12
C	ADD MITSUBISHI TO LIST	6275	N.M.	02/07
B	ADD ROLLER RAIL TABLE	5909	N.M.	02/05
A	ADD MOTOR, COUPLER TABLE	5725	N.M.	03/04
REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE

MATERIAL/FINISH

STOCK/ASSY No.

TOLERANCE
UNLESS SPECIFIED
X .XXX +/-
X .XX +/-
X .X +/-
ANGLE +/-

MILLTRONICS
1400 MILL LANE 952-442-1410
WACONIA, MN 55387 USA

TITLE VM22 COLUMN SUB-ASSEMBLY

APPLICATION PARTNER VI

SCALE 20:1 DWG No. 6-10-027-030 SIZE B

DATE 07 JUL 03 DRAWN BY DAHLKE SHEET No. 2 OF 2

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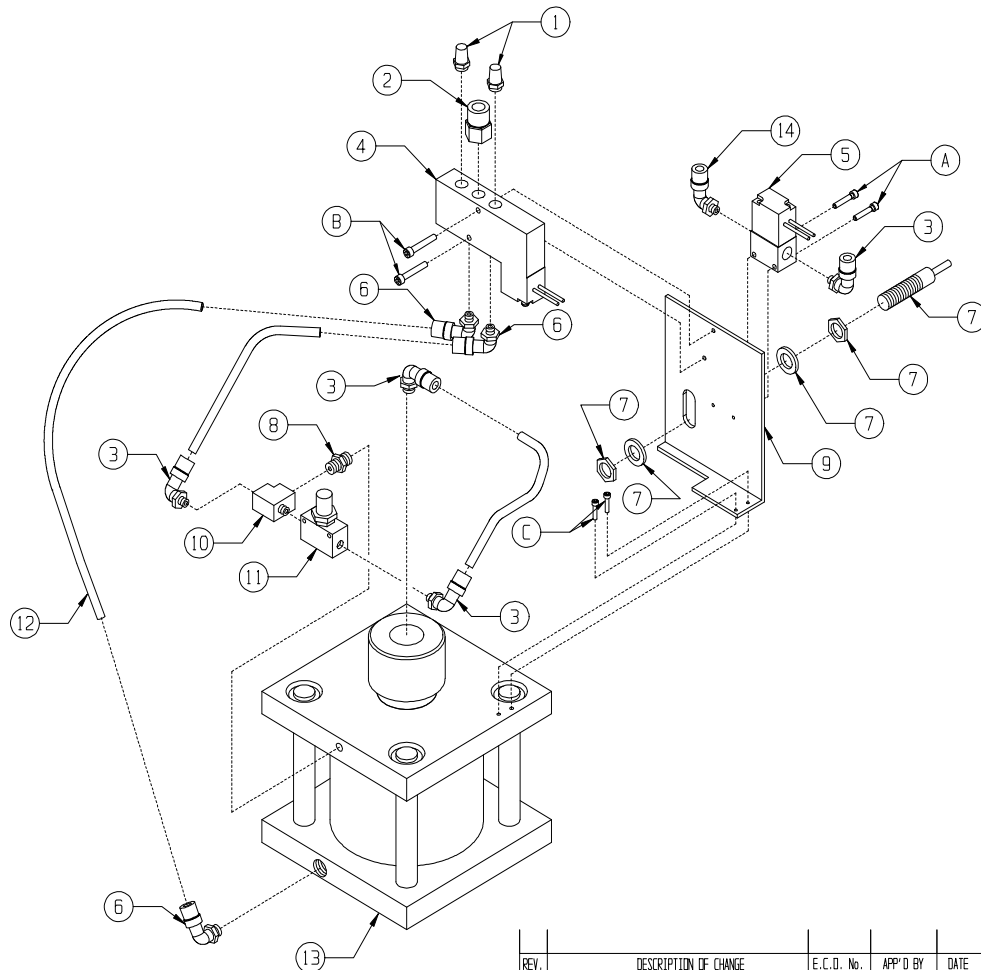
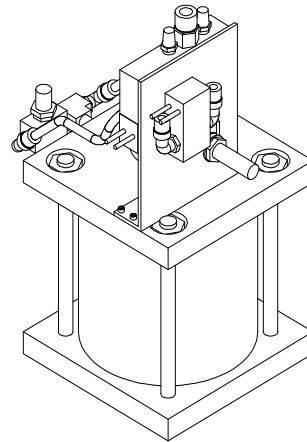
Power Drawbar Cylinder Assembly

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	4	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-58	DRAWBAR PROX SWITCH
8	1	NU-394	1/8 NPT - 1/4 NPT REDUCING NIPPLE
9	1	BR-145	DRAWBAR PROX SWITCH BRACKET
10	1	NU-395	1/8 NPT STREET TEE
11	1	NU-190	FLOW CONTROL FOR BLOW OUT
12	26"	NU-25	1/4" TUBING
13	1	NU-319	TRIPLE STACK DRAW BAR AIR CYLINDER
14	1	NU-474	SWIVEL ELBOW 1/8 NPT - 3/8 TUBE

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



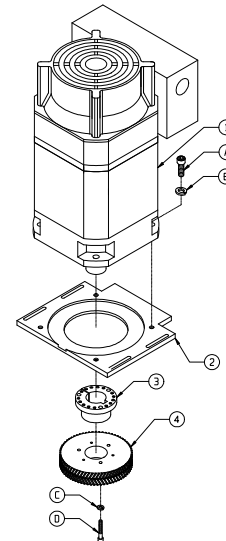
REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.				
 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA				
TITLE: NU-418 DRAW BAR ASSEMBLY				
APPLICATION: GENERAL PRODUCTS				
SCALE: 3:1				
DATE: 14 OCT 08				
DRAWN BY: DAHLKE				
SHEET No. 1 OF 1				

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TOLERANCE UNLESS SPECIFIED
X.XXX +/-
X.XX +/-
X.X +/-
ANGLE +/-

Spindle Motor and Pulley Assembly

SPINDLE MOTORS		
No.	STOCK No.	DESCRIPTION
1	MD00121	18 kW UAASKD-19LYA41 - YASKAWA
	MD00132	11 kW UAASKD-11LYA41 - YASKAWA
	MD00131	7.5 kW UAASKD-08LYA21 - YASKAWA
	MD00114	7.5 kW UAASKA-08FZ1 - YASKAWA
	MD00150	11 kW UAASKA-11LYA31 - YASKAWA
	FANUC	8 kW A06B-1407-B103
	FANUC	12 kW A06B-1428-B103
	FANUC	22 kW A06B-1451-B113
	FANUC	8 kW A06B-1477-B133
	FANUC	15 kW A06B-1479-B133
	SIEMENS	11 kW 1PH7131-2QF02-OLKO
	SIEMENS	12 kW 1PH7163-2QB03-OLKO
	SIEMENS	16 kW 1PH7167-2QB03-OLKO
	SIEMENS	7.5 kW 1PM6105-2LF81-1AR1-Z
	SIEMENS	11 kW 1PM6133-2LF81-1AR1-Z
	SIEMENS	18.5 kW 1PM6137-2LF81-1AR1-Z



MOTOR PLATES		
No.	STOCK No.	DESCRIPTION
2	MP00548	MD00121 & MD00131 & MD00132 - YASKAWA 12 kW & 22 kW - FANUC
	MP00587	MD00114 & MD00150 - YASKAWA (8 kW - FANUC)
	MPB0045	MD00114 & MD00150 - YASKAWA (BRIDGE MILL ONLY)
	MPB0040	MD00131 & MD00132 - YASKAWA (BRIDGE MILL ONLY)
	SMN0008	11 kW - SIEMENS
	SMN0061	7.5 kW - SIEMENS & 8 kW - FANUC
	SMN0062	11 kW & 18.5 kW - SIEMENS
	MPIT045	15 kW - FANUC

BUSHINGS		
No.	STOCK No.	DESCRIPTION
3	PY00097	48mm ID SK BUSHING(USED WITH MD00121, MD00131, MD00132, MD00150 - YASKAWA) (8 kW & 12 kW - FANUC)
	PY00184	32mm ID SK BUSHING(USED WITH MD00114 - YASKAWA)
	PY00215	55mm ID SK BUSHING(USED WITH 16 kW - SIEMENS & 22 kW - FANUC)
	PY00216	38mm ID SK BUSHING(USED WITH 7.5 kW - SIEMENS & 8 kW - FANUC)
	PY00217	42mm ID SK BUSHING(USED WITH 11 kW & 18.5 kW - SIEMENS)
	PY00280	TLK 110-48-62 BUSHING (USED ON 50 TAPER MACHINES)

SPINDLE MOTOR PULLEYS									
No.	RPM	7.5 kW MD00114	11 kW MD00150	7.5 kW MD00131	11 kW MD00132	18 kW MD00121	FANUC	SIEMENS	50 TAPER
4	6K/8K	PY00201	PY00201	PY00192	PY00192	PY00192	PY00192	PY00192	PY00281
	12K/15K	PY00188	PY00188	PY00188	PY00188	PY00188	PY00188	PY00188	-

PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	SEE TABLE	SPINDLE MOTORS
2	1	SEE TABLE	MOTOR PLATES
3	1	SEE TABLE	BUSHINGS
4	1	SEE TABLE	SPINDLE MOTOR PULLEYS

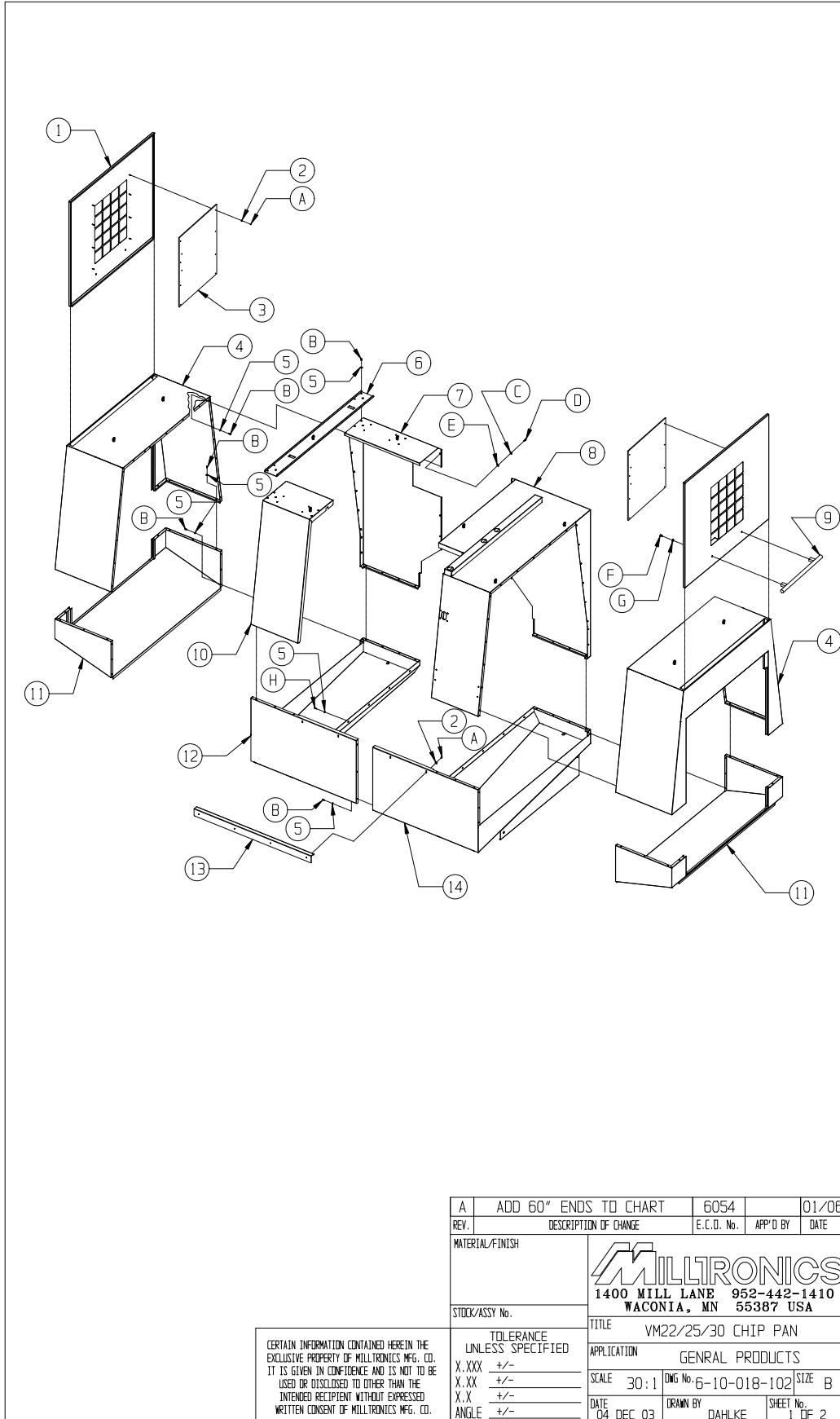
HARDWARE LIST		
No.	QTY	DESCRIPTION
A	4	1/2-13 x 1 1/4 SHCS
B	4	1/2 LOCK WASHER
C	3	5/16 LOCK WASHER
D	3	5/16-18 x 2 SHCS

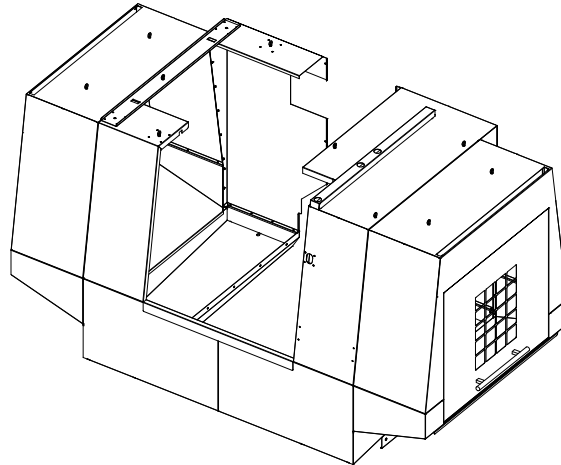
J	ADD 50 TAPER TO CHART	7078		05/11
I	ADD FANUC/SIEMENS TO CHART	6314	N.M.	03/07
H	EDIT CHART	5953	N.M.	05/05
G	ADD MD00150	5826	N.M.	11/04
F	MODIFY CHART	5697	N.M.	01/04
E	ADD MD00121 MOTOR	5509	N.M.	03/03
D	CHANGE 15 HP SPINDLE MOTOR	5257	N.M.	02/02
C	CHANGE MOTOR/PULLEY CHARTS	5251	N.M.	02/02
B	CHANGE 6K & 8K MOTOR PULLEY	5197	N.M.	12/01
A	ADD MOTOR PLATE TO CHART	5058	N.M.	04/01
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.		TITLE GOODYEAR MOTOR AND PULLEY ASSEMBLY APPLICATION GENERAL PRODUCTS SCALE 10:1 DWG No. 6-10-018-089 SIZE B DATE 04 AUG 00 DRAWN BY DAHLKE SHEET NO. 1 OF 1		

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

Chip Pan Assembly




PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	2	MP-749	SIDE DOOR
2	20	HD-58	M5 RUBBERIZED WASHER
3	2	MP6-163	LEXAN
4	2	SEE TABLE	ENCLOSURE END - TOP
5	97	HD-12	M6 RUBBERIZED WASHER
6	1	MP-742	TOP STIFFENER
7	1	MP-741	REAR PANEL - LEFT
8	1	MP-738	TOP PAN - RIGHT
9	2	WX-297	HANDLE
10	1	MP-740	FRONT PANEL - LEFT
11	2	SEE TABLE	ENCLOSURE END - BOTTOM
12	1	MP-739	BOTTOM PAN - LEFT
13	1	MP-754	FRONT DOOR LEDGE
14	1	MP-737	BOTTOM PAN - RIGHT

HARDWARE LIST

No.	QTY	DESCRIPTION
A	20	M5-.8 NYLOCK NUT
B	87	M6-1 x 12mm BHCS
C	8	M6 LOCK WASHER
D	8	M6-1 x 20mm SHCS
E	8	M6 FLAT WASHER
F	4	M8-1.25 x 20mm BHCS
G	4	M8 FLAT WASHER
H	10	M6-1 x 16mm BHCS

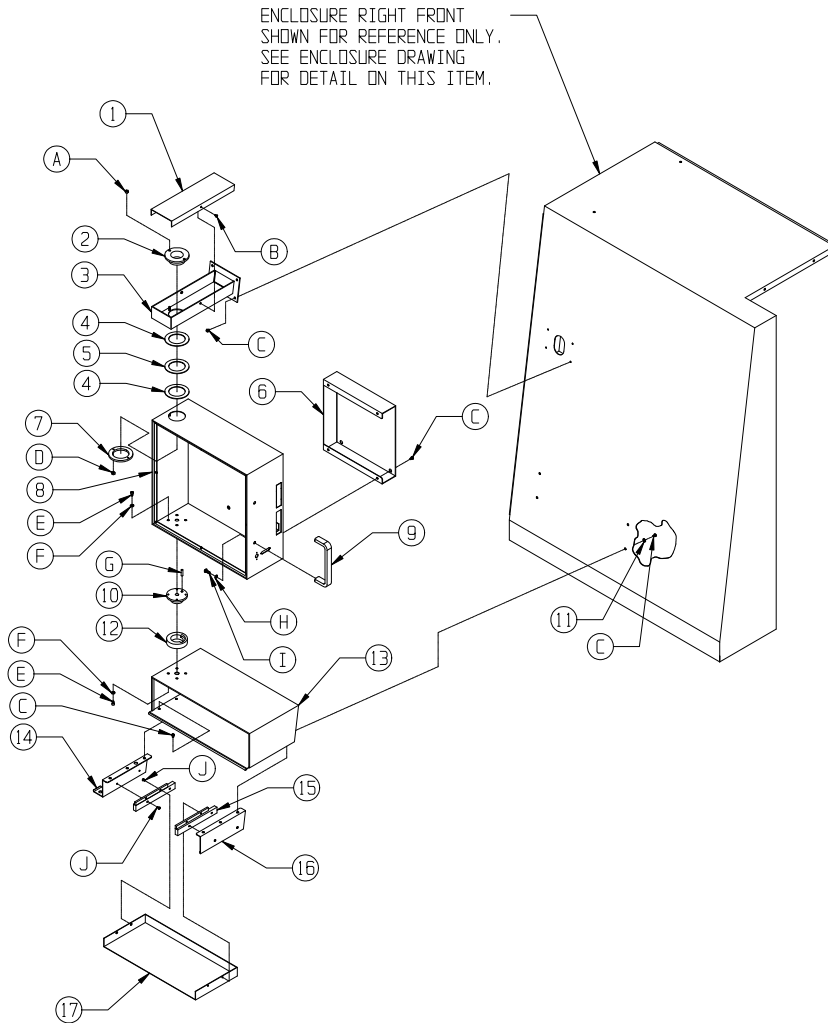
ENCLOSURE END TABLE

No.	VM22	VM25/30 (50"X)	VM25/30 (60"X)			
			TOP	LEFT	RIGHT	END
4	MP6-235	MP-744	MP7-88	MP7-90	MP7-91	MP7-92
11	MP6-236	MP-743	MP7-89			

A	ADD 60" ENDS TO CHART	6054		01/06
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		TITLE VM22/25/30 CHIP PAN		
X.XXX +/-		APPLICATION GENRAL PRODUCTS		
X.XX +/-		SCALE 30:1		DWG No. 6-10-018-102 SIZE B
X.X +/-		DATE 04 DEC 03		
ANGLE +/-		DRAWN BY DAHLKE		SHEET No. 2 OF 2

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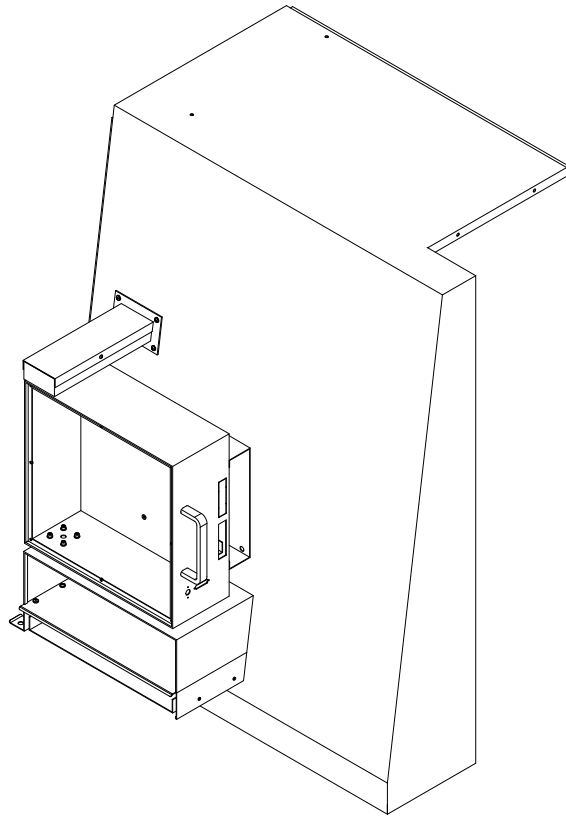
Chip Pan Swivel Monitor Assembly



D	ADD ARM & COVER TABLE	5673		12/03
C	UPDATE CONTROL BOX	5497	N.M.	02/03
B	CHANGE TO METRIC HARDWARE	5418	N.M.	11/02
A	ADD WAVE SPRING & WASHER	5303	N.M.	11/02
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.				
TITLE		SWIVEL MONITOR ASSEMBLY		
APPLICATION		GENERAL PRODUCTS		
TOLERANCE UNLESS SPECIFIED				
X.XXX	+/-			
X.XX	+/-			
X.X	+/-			
ANGLE	+/-			
DATE		DRAWN BY		SHEET No.
30 MAR 01		DAHLKE		11 OF 2

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TOLERANCE UNLESS SPECIFIED
X.XXX +/-
X.XX +/-
X.X +/-
ANGLE +/-


PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	SEE TABLE	COVER SWIVEL MONITOR UPPER SUPPORT ARM
2	1	MP-663	FLANGED BUSHING - SWIVEL MONITOR
3	1	SEE TABLE	UPPER SUPPORT ARM - SWIVEL MONITOR
4	2	WX-295	WASHER - SWIVEL MONITOR
5	1	MP3D-12	WAVE WASHER
6	1	MP-653	3-RING BINDER POCKET - SWIVEL MONITOR
7	1	MP-647	COLLAR - SWIVEL MONITOR
8	1	SEE TABLE	SWIVEL MONITOR BOX
9	1	WX-230	HANDLE
10	1	MP-648	SWIVEL PIVOT BUSHING
11	4	HD-12	RUBBERIZED WASHER
12	1	MP-649	SWIVEL PIVOT BASE
13	1	MP-624	SWIVEL MONITOR BASE
14	1	MP-651	UTILITY TRAY - SWIVEL MONITOR
15	1	MP-654	8" FULL EXTENSION ACCURIDE SLIDE
16	1	MP-652	BRACKET - SWIVEL MONITOR DRAWER OPTION
17	1	MP-626	TRAY - KEYBOARD PULL-OUT

PARTS LIST

No.	QTY	DESCRIPTION
A	2	M6-1 NYLOCK NUT
B	2	M5-.8 X 10mm BHCS
C	18	M6-1 X 10mm BHCS
D	2	M5-.8 NYLOCK NUT
E	8	M6-1 X 10mm SHCS
F	8	M6 LOCK WASHER
G	1	1/4 x .5 DOWEL PIN
H	2	M8 FLAT WASHER
I	2	M8-1.25 x 20mm BHCS
J	8	M3-.5 X 10mm BHCS

UPPER SUPPORT ARM & COVER TABLE

No.	VM15,16,17	VM22,25,30	INT. CONTROL
1	MP-650	MP-650	MPIC-01
3	MP-646	MP6-232	MPIC-02

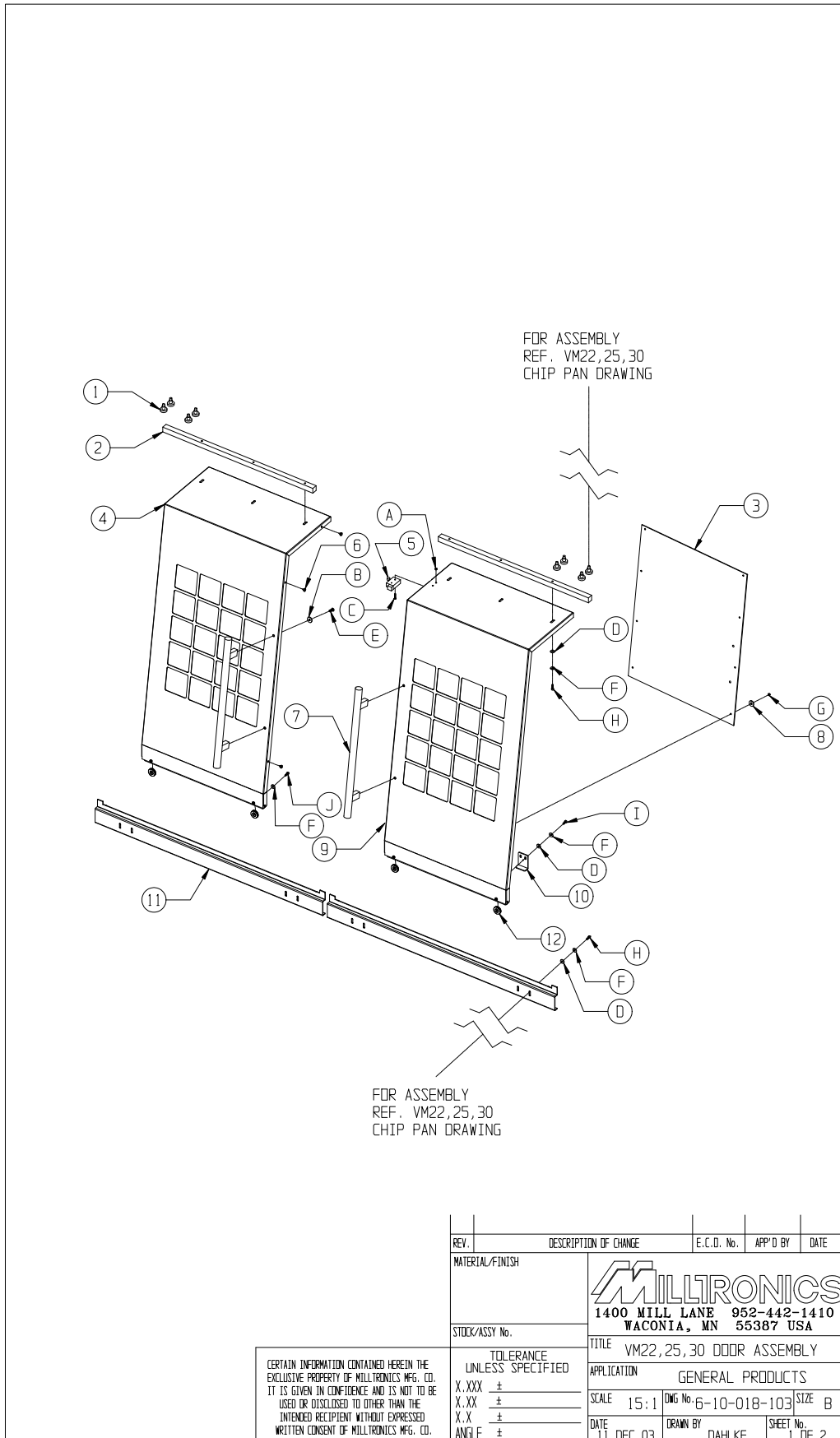
SWIVEL BOX TABLE

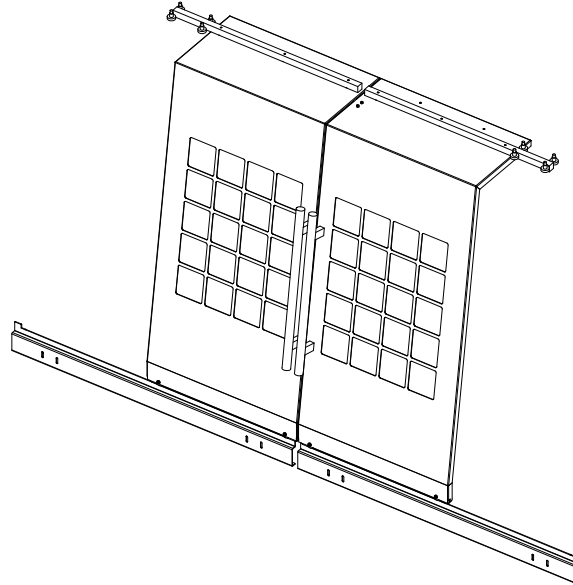
No.	CENT. 7	INT. CONTROL
8	MM-80	MPIC-03

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D	ADD ARM & COVER TABLE	5673		12/03
C	UPDATE CONTROL BOX	5497	N.M.	02/03
B	CHANGE TO METRIC HARDWARE	5418	N.M.	11/02
A	ADD WAVE SPRING & WASHER	5303	N.M.	05/02
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 SWIVEL MONITOR ASSEMBLY		
X .XXX X .XX X .X ANGLE		APPLICATION GENERAL PRODUCTS		
+/- +/- +/- +/-		SCALE 10:1 DWG No. 6-10-018-098 SIZE B		
		DATE 30 MAR 01 DRAWN BY DAHLKE SHEET No. 2 OF 2		

Chip Pan Door Assembly




PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	8	BG-100	CHIP PAN BEARING
2	2	MP6-224	UPPER DOOR RAIL
3	2	MP6-163	LEXAN
4	1	MP-746	LEFT FRONT DOOR
5	1	SW-194	NON-LOCKING AUGER SWITCH
6	3	WX-310	BUMPER
7	2	WX-297	HANDLE
8	16	HD-58	M5 RUBBERIZED WASHER
9	1	MP-745	RIGHT FRONT DOOR
10	4	MP-748	DOOR STOP
11	2	MP-747	LOWER TRACK
12	4	BG-56	ROLLER BEARING

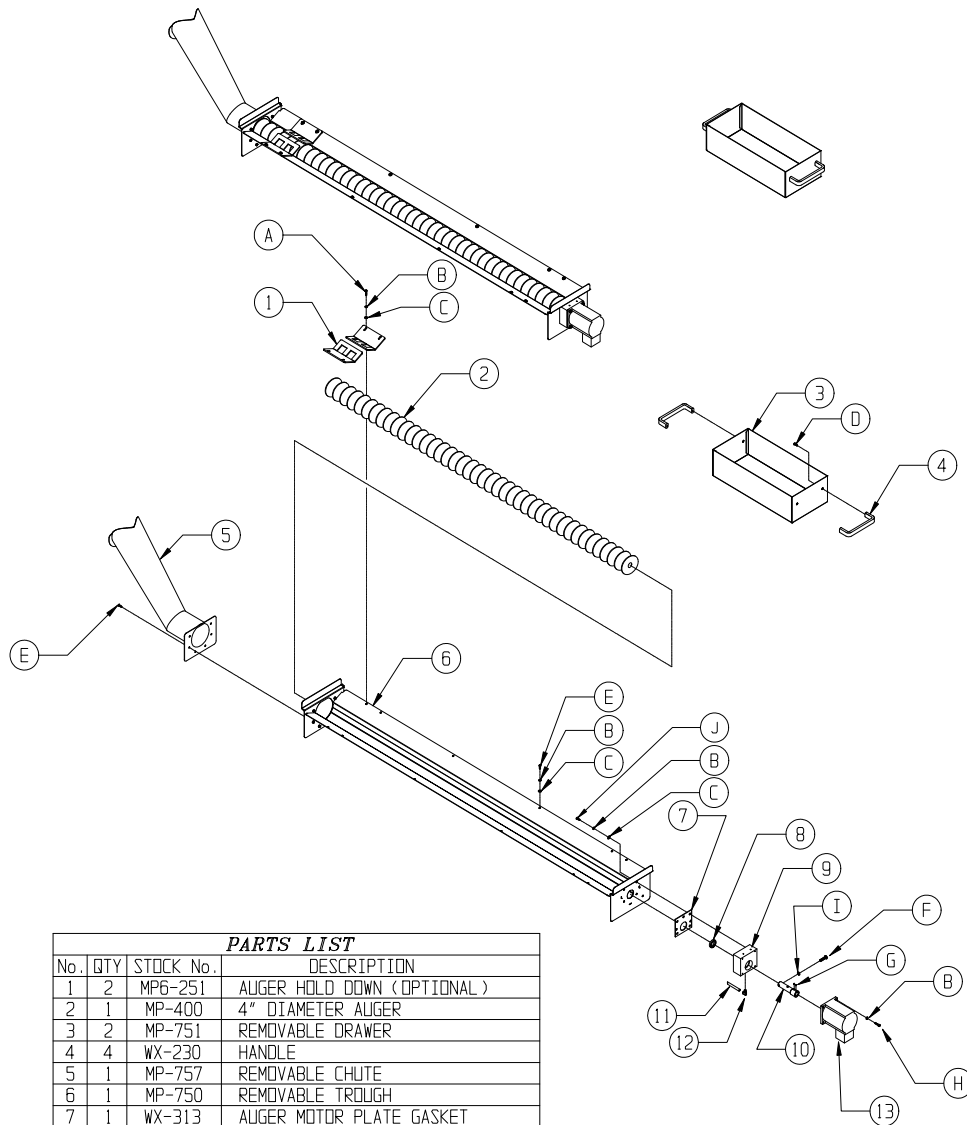
HARDWARE LIST

No.	QTY	DESCRIPTION
A	2	M4 NYLOCK NUT
B	4	M8 FLAT WASHER
C	2	M4-.7 x 30mm BHCS
D	26	M6 FLAT WASHER
E	4	M8-1.25 x 20mm BHCS
F	30	M6 LOCK WASHER
G	16	M5 NYLOCK NUT
H	14	M6-1 x 20mm SHCS
I	12	M6-1 x 16mm BHCS
J	4	M6-1 x 20mm 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		TITLE VM22,25,30 DOOR ASSEMBLY		
X .XXX ±		APPLICATION GENERAL PRODUCTS		
X .XX ±		SCALE 15:1		
X .X ±		DATE 11 DEC 03		
ANGLE ±		DRAWN BY DAHLKE		
		SHEET No. 2 OF 2		

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Chip Auger Assembly



PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	2	MP6-251	AUGER HOLD DOWN (OPTIONAL)
2	1	MP-400	4" DIAMETER AUGER
3	2	MP-751	REMOVABLE DRAWER
4	4	WX-230	HANDLE
5	1	MP-757	REMOVABLE CHUTE
6	1	MP-750	REMOVABLE TROUGH
7	1	WX-313	AUGER MOTOR PLATE GASKET
8	1	BG-69	BEARING CUP OIL SEAL
9	1	MP-440	BROTHER AUGER MOTOR MTG BRACKET
10	1	MP-441	BROTHER AUGER DRIVE SHAFT
11	1'	NU-25	1/4" NYLON TUBING
12	1	NU-171	MALE ELBOW 1/8 NPT 1/4 TUBE
13	1	MD-120	AUGER MOTOR

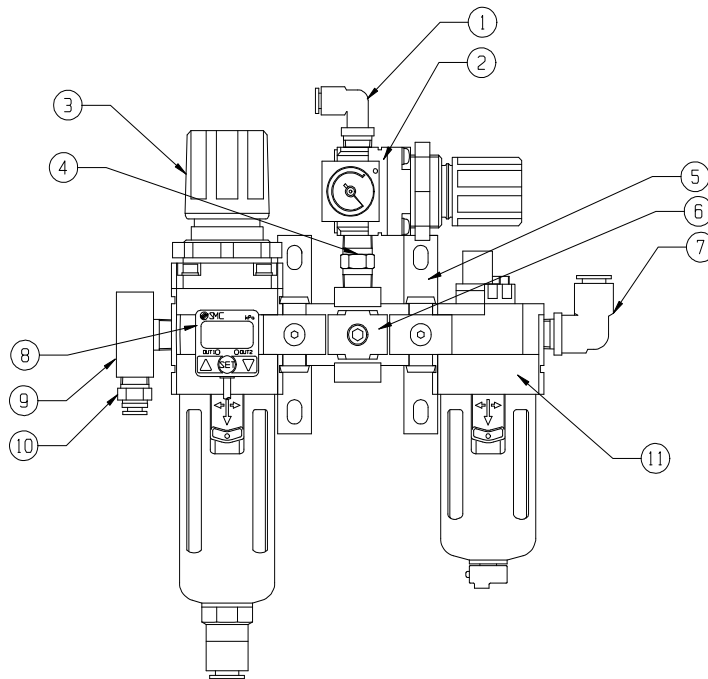
HARDWARE LIST

No.	QTY	DESCRIPTION
A	4	M6-1 x 16mm BHCS
B	20	M6 LOCK WASHER
C	16	M6 FLAT WASHER
D	8	M8-1.25 x 16mm BHCS
E	14	M6-1 x 12mm BHCS
F	2	M10-1.5 x 40mm BHCS
G	2	10-32 x 1/4 SHSS
H	4	M6-1 x 25mm SHCS
I	2	M10 LOCK WASHER
J	4	M6-1 x 20mm SHCS

D	CHANGE AUGER BOLTS	6754		03/09
C	CHANGE AUGER BOLTS SIZE	6752	N.M.	03/09
B	UPDATE HARDWARE LIST	6257	N.M.	01/07
A	ADD AUGER HOLD DOWN	6141	N.M.	07/06
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.		TITLE VM22, 25, 30 DRAWER/AUGER ASSEMBLY APPLICATION GENERAL PRODUCTS		
TOLERANCE UNLESS SPECIFIED X.XXX +/- X.XX +/- X.X +/- ANGLE +/-		SCALE 20:1 DATE 01 DEC 03	DWG No. 6-10-018-101 DRAWN BY DAHLKE SHEET No. 1 OF 1	SIZE B

Air Filter / Regulator / Lubricator Assembly

PARTS LIST			
ITEM	QTY	STOCK No.	DESCRIPTION
1	1	NU-199	1/4 NPT 3/8 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-430	DIGITAL AIR GAUGE 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



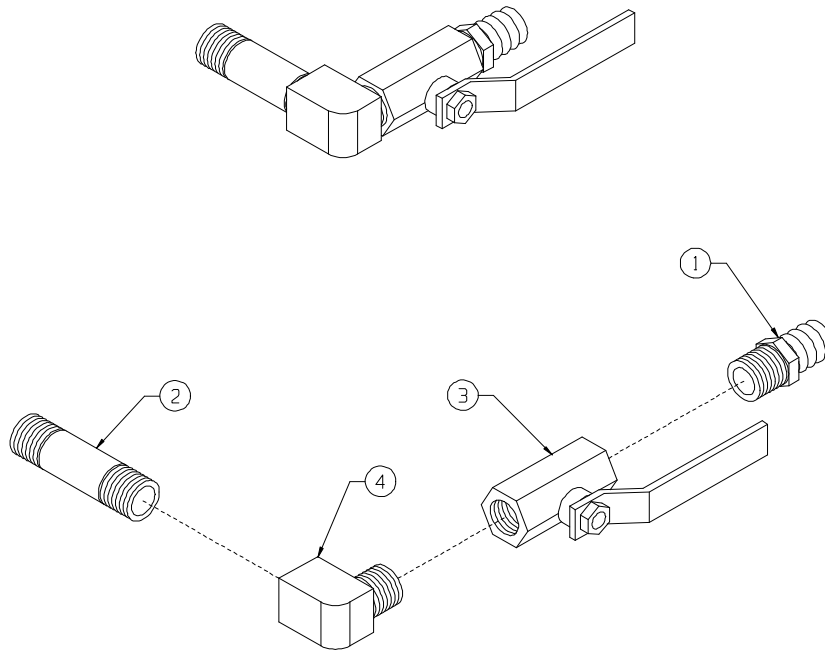
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE NU-417 FRL ASSEMBLY		
X .XXX +/-		APPLICATION GENERAL PRODUCTS		
X .XX +/-		SCALE 3:1 DWG No. 6-10-018-112 SIZE B		
X .X +/-		DATE 14 APR 08 DRAWN BY DAHLKE SHEET NO. 1:1		
ANGLE +/-				

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Flood Coolant Valve Handle Assembly

THIS ASSEMBLY USED ON VM16, VM17, VM24, VM30, VMD30, & MC20

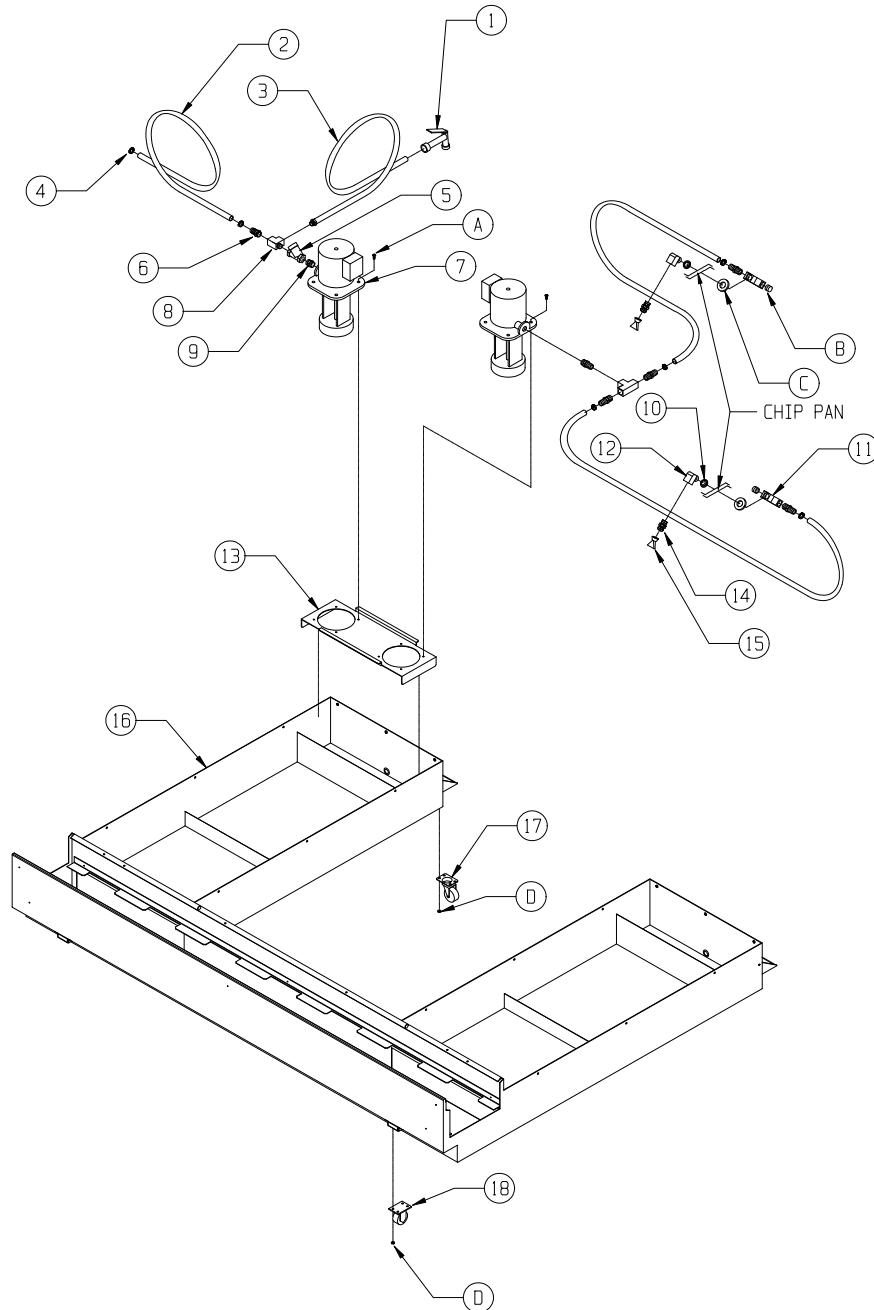


PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	NU-66	3/4" BARB FITTING
2	1	NU-257	3 IN. PIPE NIPPLE
3	1	NU-64	1/2" BRASS BALL VALVE
4	1	NU-125	STREET ELBOW

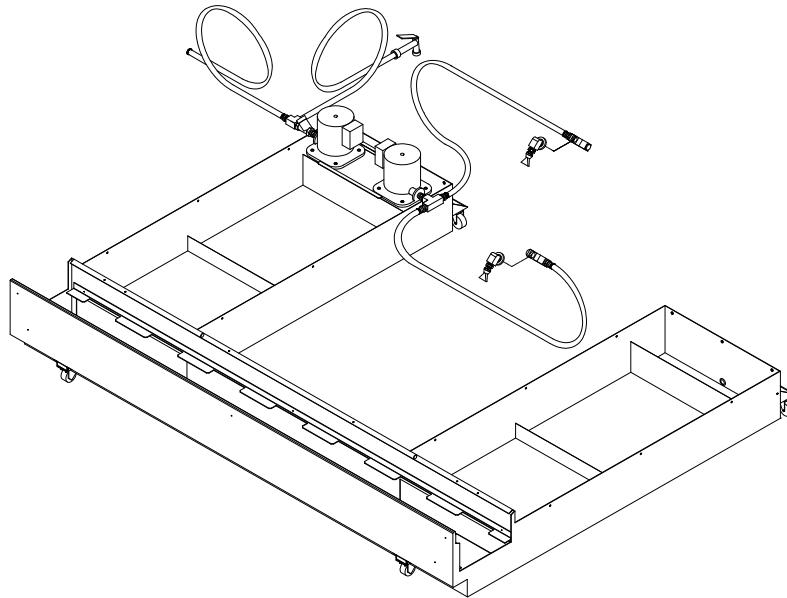
B	CHANGE PIPE NIPPLE	4778		11/00
A	CHANGE PIPE NIPPLE	3851	N. M.	2/99
REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED		TITLE VM17 FLOOD HANDLE SUB-ASSEMBLY		
X .XXX ±		APPLICATION PARTNER I		
X .XX ±		SCALE 2:1 DWG No 6-10-008-039 SIZE B		
X .X ±		DATE 29 APR 97 DRAWN BY THOMPSON SHEET NO. 1 OF 1		
ANGLE ±				

Coolant Tank With Washdown Assembly



A	ONE PIECE COOLANT TANK	6017		11/05
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		TITLE VM22, 25, 30 FLOOD TANK W/WASHDOWN ASSEMBLY		
X .XXX ±		APPLICATION GENERAL PRODUCTS		
X .XX ±		SCALE 15:1 DWG No. 6-10-018-104 SIZE B		
X .X ±		DATE 18 DEC 03 DRAWN BY DAHLKE SHEET No. 1 OF 2		
ANGLE ±				

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PARTS LIST

No.	QTY	STOCK No.	DESCRIPTION
1	1	NU-124	WATER HOSE NOZZLE
2	30'	NU-69	3/4" NYLOBRAID HOSE
3	1	NU-130	WASHDOWN HOSE ASSEMBLY
4	6	NU-141	1" HOSE CLAMP
5	1	NU-128	1/2" SWING CHECK VALVE
6	5	NU-66	1/2 NPT - 3/4 BARB FITTING
7	2	MA-162	FLOOD PUMP 1/4 HP MOTOR
8	1	NU-127	1/2" STREET T
9	2	NU-65	1/2" NIPPLE
10	2	WX-38	O' RING
11	3	NU-61	1/2" FEMALE T
12	2	NU-125	1/2" STREET ELBOW
13	1	MP-755	COOLANT PUMP MOUNTING PLATE
14	2	NU-176	1/2" CONNECTOR
15	2	NU-175	1 1/4" FLARE NOZZLE
16	1	MP-808	COOLANT TANK
17	4	EL-88	CASTER - SWIVEL
18	2	EL-98	CASTER - RIGID

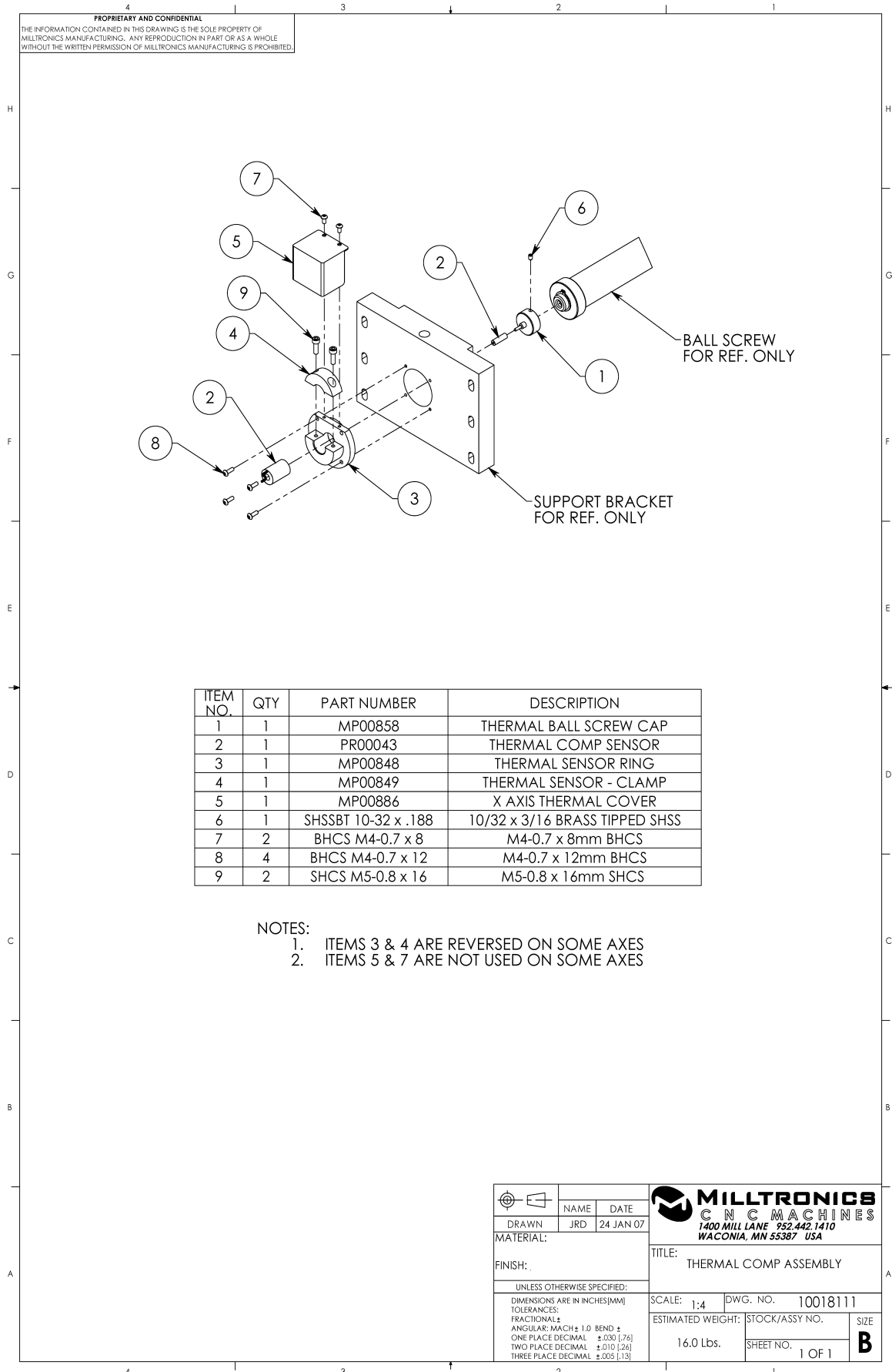
HARDWARE LIST

No.	QTY	DESCRIPTION
A	8	M6-1 x 12mm BHCS
B	2	1/2-14 NPT SHPP
C	2	7/8 FLAT WASHER 3/8 THICK
D	12	M6-1 NYLOCK HEX NUT

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A	ONE PIECE COOLANT TANK	6017		11/05
REV.	DESCRIPTION OF CHANGE	E.C.D. No.	APP'D BY	DATE
MATERIAL/FINISH	 MILLTRONICS 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA			
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED	TITLE VM22, 25, 30 FLOOD TANK W/WASHDOWN ASSEMBLY			
X .XXX ±	APPLICATION GENERAL PRODUCTS			
X .XX ±	SCALE 15:1 DWG No. 6-10-018-104 SIZE B			
X .X ±	DATE 18 DEC 03 DRAWN BY DAHLKE SHEET No. 2 OF 2			
ANGLE ±				

Thermal Compensation Assembly



Waylube Pump MA00458

The on time and off time can be adjusted using MISC control parameters “Way Lube ON time (sec)”, and “Way Lube OFF time (min)”.

Oiler Comparison

	Old style	New style
Model #	CESD	CEN01
Part #	MA00219	MA00458
Timer function ON/OFF	Built-in controls	Via CNC #66
Audible alarm	YES	NO
Oil pressure gauge	NO	YES
Manual override button	YES	YES

Software & control

All 8200 versions have the functionality. 7200 version 77401 or higher is required to have the functionality.

The oiler timer is functional only when the “Grease Cycle Time” parameter is set to Zero, and the Way Lube ON and OFF time parameters are non-zero.

Pictures of MA00458

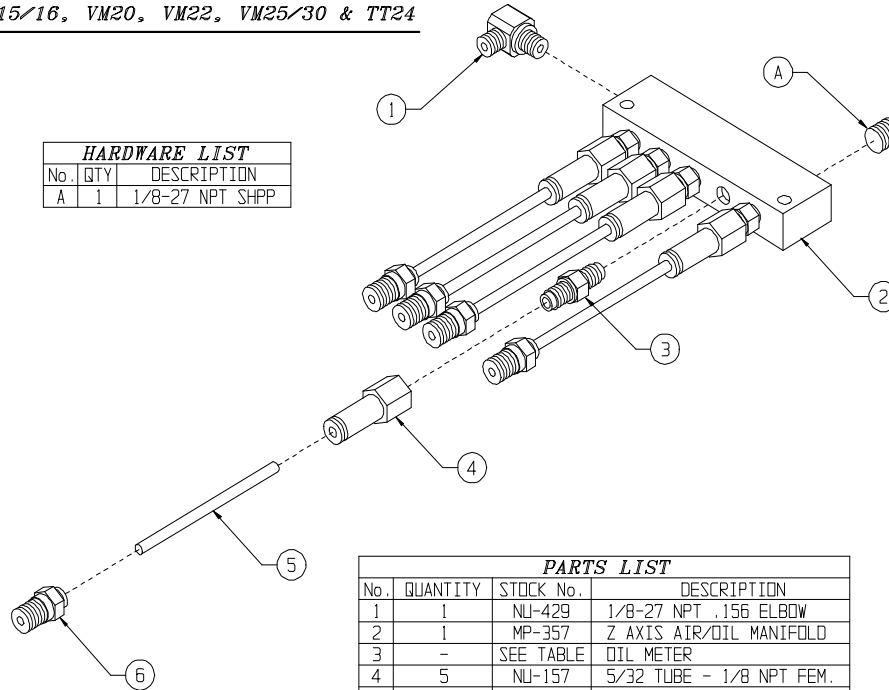


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Z-Axis Autolube Manifold Assembly

THIS ASSEMBLY USED ON
 VM15/16, VM20, VM22, VM25/30 & TT24

HARDWARE LIST		
No.	QTY	DESCRIPTION
A	1	1/8-27 NPT SHPP



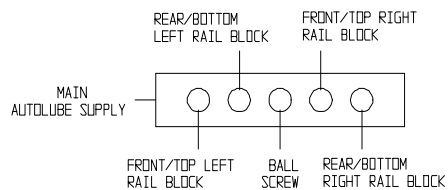
PARTS LIST			
No.	QUANTITY	STOCK No.	DESCRIPTION
1	1	NU-429	1/8-27 NPT .156 ELBOW
2	1	MP-357	Z AXIS AIR/OIL MANIFOLD
3	-	SEE TABLE	OIL METER
4	5	NU-157	5/32 TUBE - 1/8 NPT FEM.
5	SEE TABLE	NU-117	5/32 NYLON TUBING
6	5	SEE TABLE	5/32 TUBE-1/8 NPT M/S

NU-117 TUBING LENGTH						OIL METER
CONNECTION	VM15/16	VM20	VM22	VM25/30	TT24	
FRONT/TOP LEFT RAIL BLOCK	18	20	30	30	10	No.3 (NU-156)
REAR/BOTTOM LEFT RAIL BLOCK	35	14	42	42	20	No.3 (NU-156)
BALL SCREW	24	15	30	30	8	No.2 (NU-155)
REAR/BOTTOM RIGHT RAIL BLOCK	35	8	42	42	20	No.3 (NU-156)
FRONT/TOP RIGHT RAIL BLOCK	18	11	30	30	10	No.3 (NU-156)

ALL MEASUREMENTS ARE IN INCHES

No.	DESCRIPTION	VM15/16	VM20	VM22	VM25/30	TT24
6	ROLLER RAIL	NU-315	NU-315	NU-315	NU-315	NU-315
	BALL RAIL	NU-315 NU-154	NU-315	NU-315	NU-315	NU-315

AUTOLUBE LINE DESTINATIONS



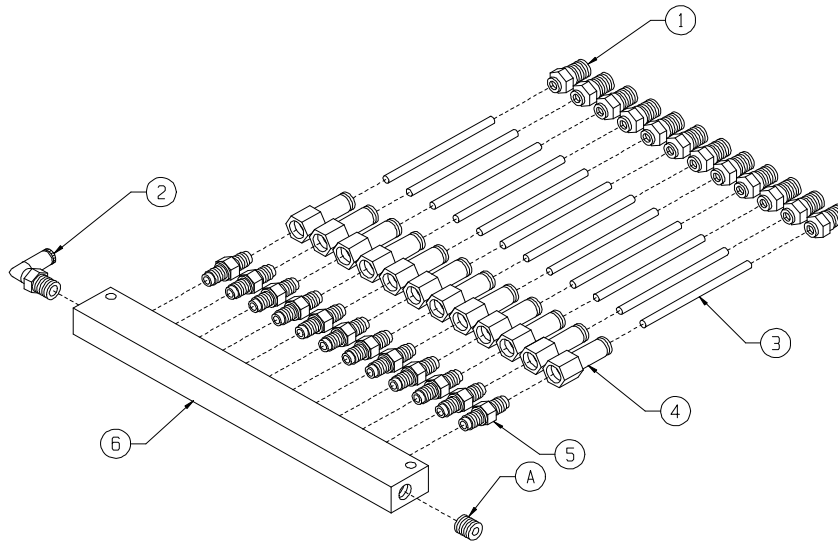
NOTES:

1. USED ON ASSEMBLY No.

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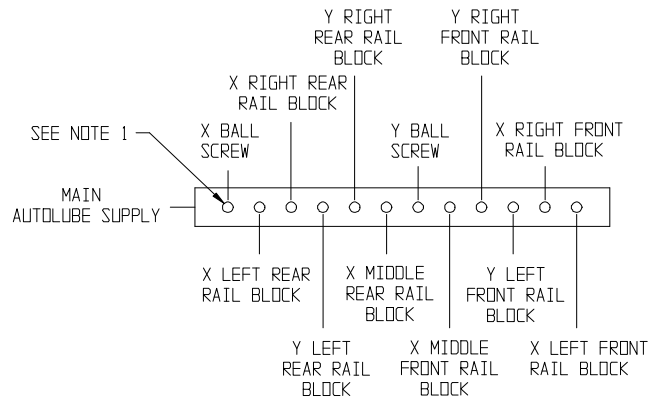
B	ADD TT24	6750		03/09
A	ADD FRAMES TO CHART	6001	N. M.	08/05
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952.442.1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.		TITLE 5 PORT AUTOLUBE MANIFOLD ASSEMBLY		
TOLERANCE UNLESS SPECIFIED		APPLICATION GENERAL PRODUCTS		
X. XXX	±	SCALE 1.5:1		DWG No. 6-10-018-050
X. XX	±	DATE 20 AUG 97		SIZE B
X. X	±	DRAWN BY THOMPSON		SHEET NO. 1 OF 1
ANGLE	±			

X & Y Axis Autolube Manifold Assembly



NOTES:

1. X MIDDLE RAILBLOCK PORTS, FRONT AND REAR ARE PLUGGED IF NOT USED.

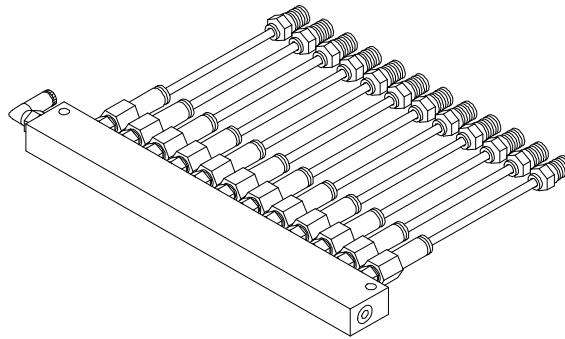


AUTOLUBE LINE DESTINATIONS

B	UPDATE OIL METER FITTINGS	6760		03/09
A	ADD FRAMES TO CHART	5996	N.M.	08/05
REV.	DESCRIPTION	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		TITLE X & Y AXIS AUTOLUBE MANIFOLD ASSEMBLY		
X, XXX ±		APPLICATION GENERAL PRODUCTS		
X, XX ±		SCALE 2:1 DWG No 6-10-018-049 SIZE B		
X, X ±		DATE 25 JUL 97 DRAWN BY THOMPSON SHEET NO. 1 OF 2		
ANGLE ±				

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*THIS ASSEMBLY IS USED ON
 VM15, VM16, VM20, VM25 & VM30*



PARTS LIST

No.	QUANTITY	STOCK No.	DESCRIPTION
1	12	NU-154	5/32 TUBE 1/8 NPT M/S
2	1	NU-161	1/8 NPT-.156 SWIVEL FITTING
3	SEE TABLE	NU-117	5/32 NYLON TUBING
4	12	NU-157	5/32 TUBE-1/8 NPT FEM.
5	-	SEE TABLE	OIL METER
6	1	MP-356	X & Y AIR/OIL LUBE MANIFOLD

NU-117 TUBING LENGTH

CONNECTION	VM15-16	VM20	VM22	VM25/30(50)	OIL METER
X LEFT REAR RAIL BLOCK	20	20	24	24	#3 (NU-156)
X RIGHT REAR RAIL BLOCK	27	27	44	44	#3 (NU-156)
Y LEFT REAR RAIL BLOCK	12	12	24	24	#3 (NU-156)
Y RIGHT REAR RAIL BLOCK	24	30	44	44	#3 (NU-156)
X MIDDLE REAR RAIL BLOCK	-	-	38	38	#3 (NU-156)
Y BALL SCREW	26	32	39	39	#2 (NU-155)
X MIDDLE FRONT RAIL BLOCK	-	-	38	38	#3 (NU-156)
Y RIGHT FRONT RAIL BLOCK	24	30	44	44	#3 (NU-156)
Y LEFT FRONT RAIL BLOCK	12	12	24	24	#3 (NU-156)
X RIGHT FRONT RAIL BLOCK	27	27	44	44	#3 (NU-156)
X LEFT FRONT RAIL BLOCK	20	20	24	24	#3 (NU-156)
X BALL SCREW	40	40	60	60	#2 (NU-155)

ALL MEASUREMENTS ARE IN INCHES

HARDWARE LIST

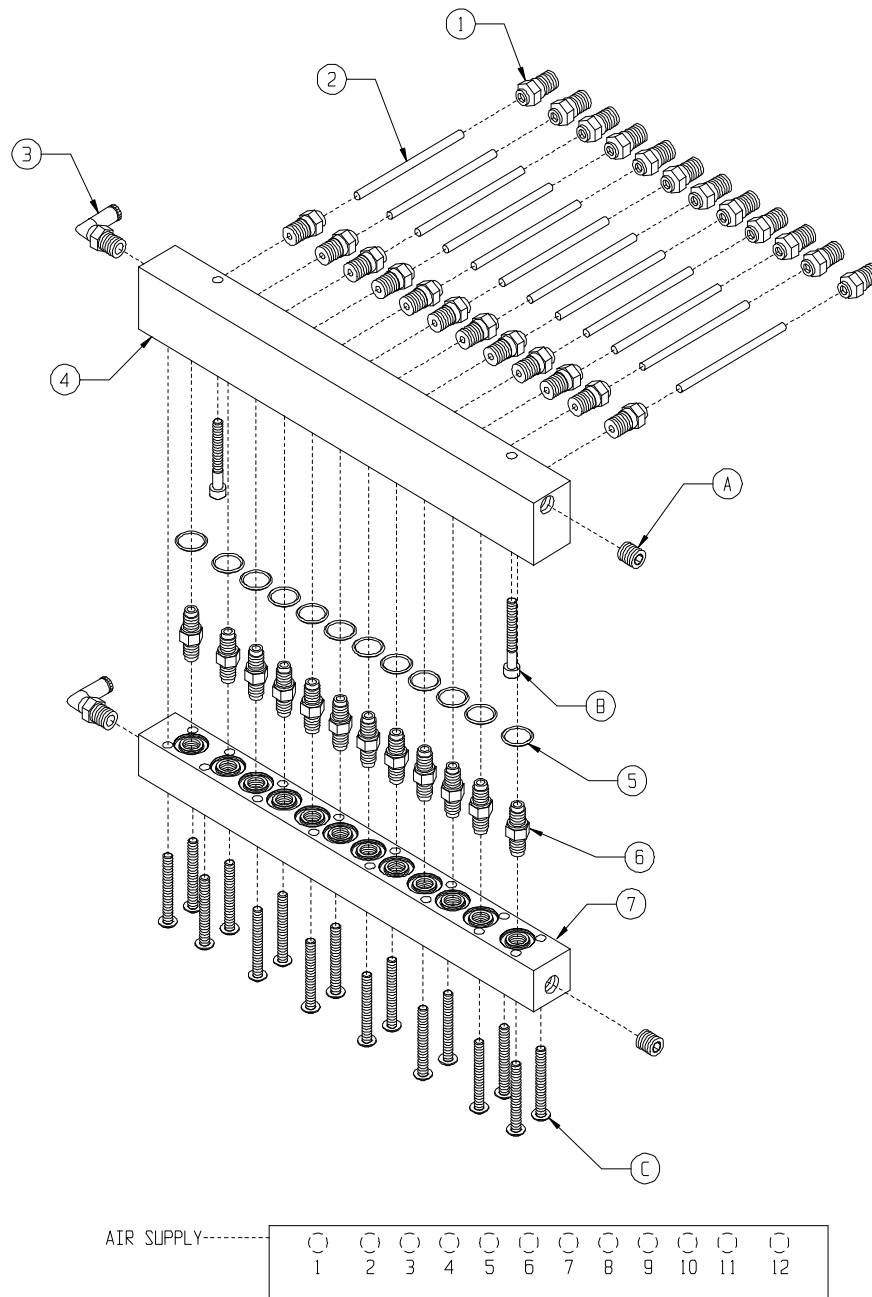
No.	QTY	DESCRIPTION
A	1	1/8-27 NPT SHPP

B	UPDATE OIL METER FITTINGS	6760		03/09
A	ADD FRAMES TO CHART	5996	N.M.	08/05
REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.				
 1400 MILL LANE 952.442.1410 WACONIA, MN 55387 USA				
TITLE X & Y AXIS AUTOLUBE MANIFOLD ASSEMBLY				
APPLICATION GENERAL PRODUCTS				
SCALE	2:1	DWG No.	6-10-018-049	SIZE B
DATE	25 JUL 97	DRAWN BY	THOMPSON	SHEET NO. 2 OF 2

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

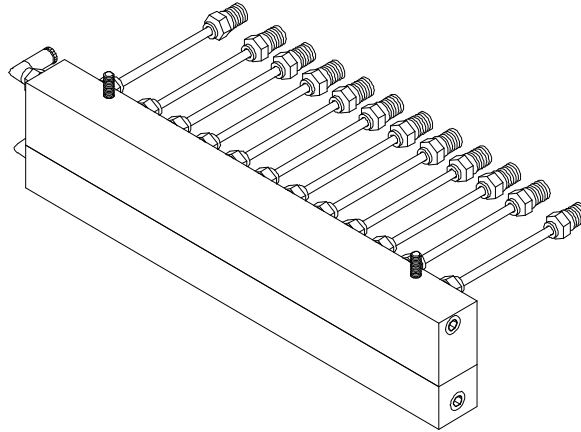
X & Y Axis Air/Oil Manifold Assembly



AIR/OIL LINE DESTINATIONS	
No.	RAIL BLOCK/BALL SCREW
1	X BALL SCREW
2	X LEFT REAR RAIL BLOCK
3	X RIGHT REAR RAIL BLOCK
4	Y LEFT REAR RAIL BLOCK
5	Y RIGHT REAR RAIL BLOCK
6	X MIDDLE REAR RAIL BLOCK
7	Y BALL SCREW
8	X MIDDLE FRONT RAIL BLOCK
9	Y RIGHT FRONT RAIL BLOCK
10	Y LEFT FRONT RAIL BLOCK
11	X RIGHT FRONT RAIL BLOCK
12	X LEFT FRONT RAIL BLOCK

E	CHANGE TABLE	6060		01/06	
D	ADD FRAMES	5995	N.M.	08/05	
C	CHANGED METERS	4988	D.H.	2/01	
B	ADD VMG17 TO NOTE	4729	N.M.	10/00	
A	ADD VMG24 TO NOTE	4327	N.M.	12/99	
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		TITLE X & Y AXIS AIR/OIL MANIFOLD ASSEMBLY			
APPLICATION		PARTNER I			
X.XXX	+/- .005	SCALE 2:1		DWG No. 6-10-008-058	SIZE B
X.XX	+/- .010	DATE 10 JUN 99		DRAWN BY HERME	SHEET No. 1 OF 2
X.X	+/- .030				
ANGLE	+/- 1.0°				

THIS ASSEMBLY IS USED ON VM15, VM16, VM17, VM20, VM22, VM25/30(50)



PARTS LIST

No.	QUANTITY	STOCK No.	DESCRIPTION
1	32	NU-154	5/32 TUBE 1/8 NPT M/S
2	SEE TABLE	NU-117	5/32 NYLON TUBING
3	2	NU-161	ELBOW - SWIVEL 5/32 TUBE 1/8 NPT
4	1	MP6-183	X & Y AIR/OIL MANIFOLD - AIR
5	16	WX-248	O-RING BUNA 1/2 ID x 5/8 OD
6	-	SEE TABLE	OIL METER
7	1	MP-661	16 PORT 1/8 NPT MANIFOLD - OIL

NU-117 TUBING LENGTH

	VM15/16	VM20	VM22	VM25/30(50)	OIL METER
X LEFT REAR RAIL BLOCK	20	20	24	24	#3 (NU-156)
X RIGHT REAR RAIL BLOCK	27	27	44	44	#3 (NU-156)
Y LEFT REAR RAIL BLOCK	13	12	24	24	#3 (NU-156)
Y RIGHT REAR RAIL BLOCK	33	30	44	44	#3 (NU-156)
X MIDDLE REAR RAIL BLOCK	-	-	38	38	#3 (NU-156)
Y BALL SCREW	26	32	39	39	#2 (NU-155)
X MIDDLE FRONT RAIL BLOCK	-	-	38	38	#3 (NU-156)
Y RIGHT FRONT RAIL BLOCK	30	30	44	44	#3 (NU-156)
Y LEFT FRONT RAIL BLOCK	12	12	24	24	#3 (NU-156)
X RIGHT FRONT RAIL BLOCK	27	27	44	44	#3 (NU-156)
X LEFT FRONT RAIL BLOCK	20	20	24	24	#3 (NU-156)
X BALL SCREW	40	40	60	60	#2 (NU-155)

ALL MEASUREMENTS ARE IN INCHES

NOTES:

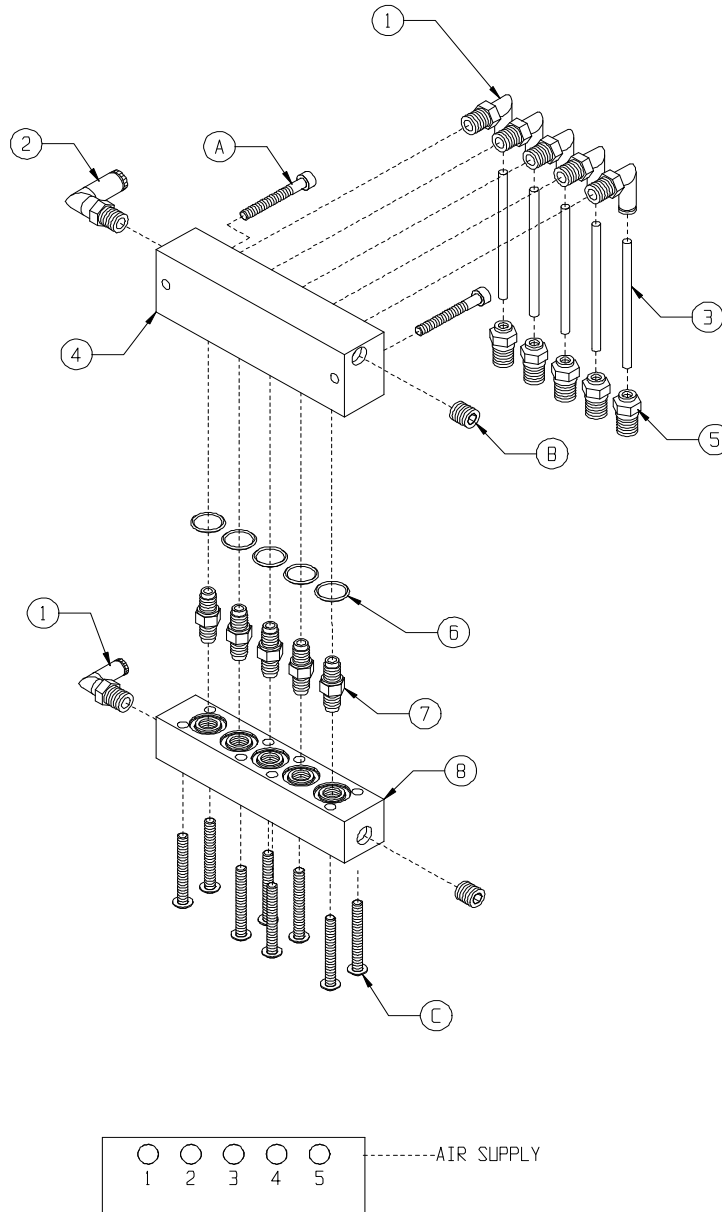
- IF REFERENCED WITH A (-) PLUG
AIR/OIL LINE HOLE AND OIL METER
HOLE IN MANIFOLD WITH 1/8 NPT PLUG.

HARDWARE LIST

No.	QTY	DESCRIPTION
A	2	1/8-27 NPT SHPP
B	2	10-32 x 1 1/2 SHCS
C	20	10-32 x 1 1/4 BHCS

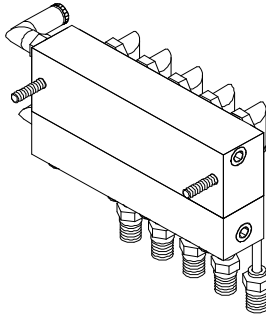
E	CHANGE TABLE	6060		01/06
D	ADD FRAMES	5995	N.M.	08/05
C	CHANGED METERS	4988	D.H.	02/01
B	ADD VMG17 TO NOTE	4729	N.M.	10/00
A	ADD VMG24 TO NOTE	4327	N.M.	12/99
REV.	DESCRIPTION OF CHANGE	E.C.O. No.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.		TITLE: X & Y AXIS AIR/OIL MANIFOLD ASSEMBLY		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER I		
X, XXX	+/- .005	SCALE 2:1		DWG No. 6-10-008-058
X, XX	+/- .010	DATE 10 JUN 99		SIZE B
X, X	+/- .030	DRAWN BY HERME		SHEET No. 2 OF 2
ANGLE	+/- 1.0°			

Z-Axis Air/Oil Manifold Assembly



AIR/OIL LINE DESTINATIONS	
No.	RAIL BLOCK/BALL SCREW
1	Z RIGHT UPPER RAIL BLOCK
2	Z RIGHT LOWER RAIL BLOCK
3	Z BALL SCREW
4	Z LEFT LOWER RAIL BLOCK
5	Z LEFT UPPER RAIL BLOCK

D	CHANGE TO ALL FRAMES	6002		11/05
C	REMOVED VMG24	4987	N.M.	2/01
B	ADD VMG24 NOTE	4338	N.M.	1/00
A	UPDATED TUBE LENGTHS	4077	N.M.	7/99
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		TITLE Z AXIS AIR/OIL MANIFOLD ASSEMBLY		
X.XXX +/- .005		APPLICATION PARTNER I		
X.XX +/- .010		SCALE 2:1	DWG No. 6-10-008-059	SIZE B
X.X +/- .030		DATE 11 JUN 99	DRAWN BY HERME	SHEET No. 1 OF 2
ANGLE +/- 1.0°				



PARTS LIST

No.	QUANTITY	STOCK No.	DESCRIPTION
1	6	NU-161	ELBOW-SWIVEL 5/32 TUBE 1/8 NPT
2	1	NU-171	ELBOW - SWIVEL 1/4 TUBE 1/8 NPT
3	SEE TABLE	NU-117	5/32 NYLON TUBING
4	1	MP1-301	Z AIR/OIL MANIFOLD - AIR
5	5	NU-154	5/32 TUBE 1/8 NPT M/S
6	5	WX-248	O-RING BUNA 1/2 ID x 5/8 OD
7	-	SEE TABLE	OIL METER
8	1	MP-660	Z AIR/OIL MANIFOLD - OIL

NU-117 TUBING LENGTH

CONNECTION	ALL FRAMES	OIL METER
Z LEFT UPPER RAIL BLOCK	37	#3 (NU-156)
Z LEFT LOWER RAIL BLOCK	31	#3 (NU-156)
Z RIGHT UPPER RAIL BLOCK	29	#3 (NU-156)
Z RIGHT LOWER RAIL BLOCK	23	#3 (NU-156)
Z BALL SCREW	26	#2 (NU-155)

ALL MEASUREMENTS ARE IN INCHES

HARDWARE LIST

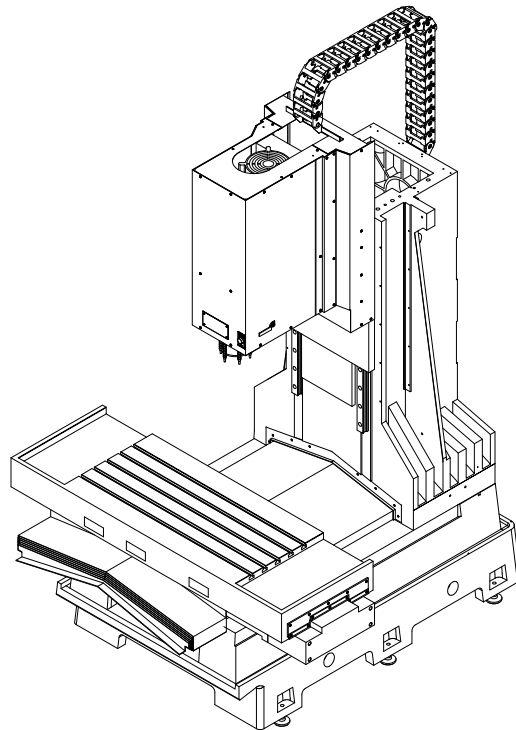
No.	QTY	DESCRIPTION
A	2	10-32 x 1 1/2 SHCS
B	2	1/8-27 NPT SHPP
C	8	10-32 x 1 1/2 BHCS

D	CHANGE TO ALL FRAMES	6002		11/05
C	REMOVED VMG24	4987	N.M.	2/01
B	ADD VMG24 NOTE	4338	N.M.	1/00
A	UPDATED TUBE LENGTHS	4077	N.M.	7/99
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		TITLE Z AXIS AIR/OIL MANIFOLD ASSEMBLY		
X.XXX +/- .005		APPLICATION PARTNER I		
X.XX +/- .010		SCALE 2:1 DWG No. 6-10-008-059 SIZE B		
X.X +/- .030		DATE 11 JUN 99		
ANGLE +/- 1.0°		DRAWN BY HERME SHEET No. 2 OF 2		

Machine Lubrication Instructions

NOTES:

1. USE MOBILITH AW SERIES MULTIPURPOSE EP GREASE OR OTHER EQUIVALENT FOR ALL LUBE POINTS. MACHINE SHOULD BE SERVICED ONCE A MONTH FOR PROPER OPERATION AND ACCURACY OF MACHINE. SEE PAGE TWO FOR SPECIFICATIONS.
2. CLEAN AND FILL AIR FILTER / REGULATOR / DILER EVERY WEEK FOR PROPER OPERATION OF ALL PNEUMATIC PARTS FILL WITH MARVEL No. 085, MOBIL VELOCITE No. 10 OR OTHER EQUIVALENT QUALITY AIR TOOL OIL. SEE PAGE TWO FOR SPECIFICATIONS.
3. MACHINES WITH AUTOLUBE OPTION USE MOBIL OIL VACTRA 2, AMOCO WAYTAC No. 68, SUNOCO SUNWAY LUBE No. 1180, OR EQUIVALENT QUALITY WAY OIL SEE PAGE TWO FOR SPECIFICATIONS.
4. MACHINES WITH 15,000 RPM AIR/OIL OPTION USE MOBIL OIL DTE 24, OR EQUIVALENT QUALITY SPINDLE OIL.



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 LUBRICATION DRAWING		
X.XXX ±		APPLICATION PARTNER VI		
X.XX ±		SCALE 20:1 DWG No 6-11-027-004 SIZE B		
X.X ±		DATE 17 DEC 03 DRAWN BY DAHLKE SHEET NO. 1 OF 2		
ANGLE ±				

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

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, mg D 2882 (MOD)	-
CMCO, P-SPEC, APPROVAL	P-47
BIJUR 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	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH		 1400 MILL LANE 952-442-1410 WACONIA, MN 55387 USA		
STOCK/ASSY No.		TITLE LUBRICATION DRAWING		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER VI		
X.XXX	±	SCALE 15:1	DWG No. 6-11-027-004	SIZE B
X.XX	±			
X.X	±			
ANGLE	±	DATE 17 DEC 03	DRAWN BY DAHLKE	SHEET NO. 2 OF 2

Retention Knob Chart

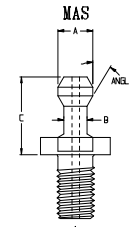
NOTE: STANDARD RETENTION KNOBS FOR 40 TAPER SPINDLES

MAS RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
59.39	1.27	60°		BR50, BR60, BR80, MM18, RH20, RH30, RH33, RH35, RW15, VM15, VM16, VM20, VM22, VM25, VM30, VM2016, VM15, VM16, VM20, VM22, VM25, VM30	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RB4E-0002	RK31114A	PT-532-60	C40-6000

MAS RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
59.39	1.38	60°		BR50, BR60, BR80, MM18, RH20, RH30, RH33, RH35, RW15, VM15, VM16, VM20, VM22, VM25, VM30, VM2016, VM15, VM16, VM20, VM22, VM25, VM30	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RB4M-0002	RK31113A	PT-444-60	B40-6000



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

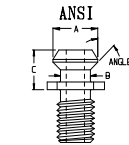
NOTE: STANDARD RETENTION KNOBS FOR 50 TAPER SPINDLES

ANSI RETENTION KNOBS STYLE CT-FLANGE 50 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
1.14	.83	1.00	45°		HBM110, RH33XP, RH35XP, TT40XP, VM22XP, VM25XP, VM30XP, TTC40XP, VM22XP, VM25XP, VM30XP	RCBE-0001	DWG RK11144	N/A	C50-STD

ANSI RETENTION KNOBS STYLE BT-FLANGE 50 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
1.14	.83	1.00	45°		HBM110, RH33XP, RH35XP, TT40XP, VM22XP, VM25XP, VM30XP, TTC40XP, VM22XP, VM25XP, VM30XP	RSBM-0105	DWG RK11144A	N/A	N/A



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

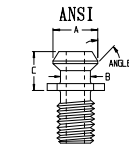
NOTE: OPTIONAL RETENTION KNOBS FOR 40 TAPER SPINDLES

ANSI RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
74.49	.64	45°		SELECTION NOT AVAILABLE	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RC4E-0001	RK11122	PT-475C	C40-STD

ANSI RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
74.49	.75	45°		SELECTION NOT AVAILABLE	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RS4M-0115	RK11126A	N/A	B40-FADAL



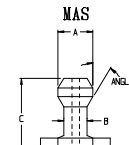
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ENGLISH THREADS FOR V-FLANGE
METRIC THREADS FOR BT-FLANGE

MAS RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
59.39	1.27	45°		SELECTION NOT AVAILABLE	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RB4E-0001	RK31114	PT-532-45	C40-4500

MAS RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
59.39	1.38	45°		SELECTION NOT AVAILABLE	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RB4M-0001	RK31113	PT-444-45	B40-4500



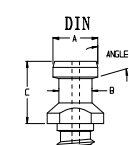
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ENGLISH THREADS FOR V-FLANGE
METRIC THREADS FOR BT-FLANGE

DIN 69872 RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
75.55	1.02	75°		SELECTION NOT AVAILABLE	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RS4E-0114-C	DWG RK71125	N/A	C40-1500

DIN 69872 RETENTION KNOBS STYLE DIN-FLANGE 40 TAPER

DIMENSIONS				MILLTRONICS MACHINE		COMMAND PART No.	KENNAMETAL PART No.	VALENITE PART No.	LYNDEX PART No.
A	B	C	ANGLE	60mm SPINDLE	70mm SPINDLE				
75.55	1.02	75°		SELECTION NOT AVAILABLE	BR50, BR60, BR80, HM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM324, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30	RS4M-0114-C	DWG RK71124	N/A	B40-1500



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

NOTES: 1. FOR SPINDLES OF 6000 RPM AND GREATER YOU MUST USE BALANCED TOOLING TO A G2.5 SPEC. OR IT WILL VOID THE SPINDLE WARRANTY.
2. IN-LINE SPINDLES, IN THEIR RESPECTIVE FRAME SIZE, USE THE SAME RETENTION KNOB AS THE NON IN-LINE SPINDLES

I	ADD VM2016, VM3224, VM4224, TT60, TT80, TT40XP, TTC24, TTC40, TTC40XP, HBM110	7573	N.M.	07/12
H	ADD VM22XP, RH33XP FRAMES TO 50 TAPER	6715	N.M.	01/09
G	ADD MM18 AND MOVE HMC70 FRAMES TO 50 TAPER	6193	N.M.	10/06
F	ADD VMC, TT, AND HMC FRAMES	6175	N.M.	09/06
E	UPDATE CHART	5992	N.M.	08/05
D	ADD RH/RW12 & RH19	5146	N.M.	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.	APP'D BY	DATE
	RETENTION KNOB CHART	SCALE 1.75:1	DWG No. 6-11-018-054	SIZE B
	APPLICATION GENERAL PRODUCTS	DATE 30 APR 99	DRAWN BY DAHLKE	SHEET NO. 1 OF 1

