



HM35 D
Mechanical & Parts Manual

Rev 1
8-27-2013

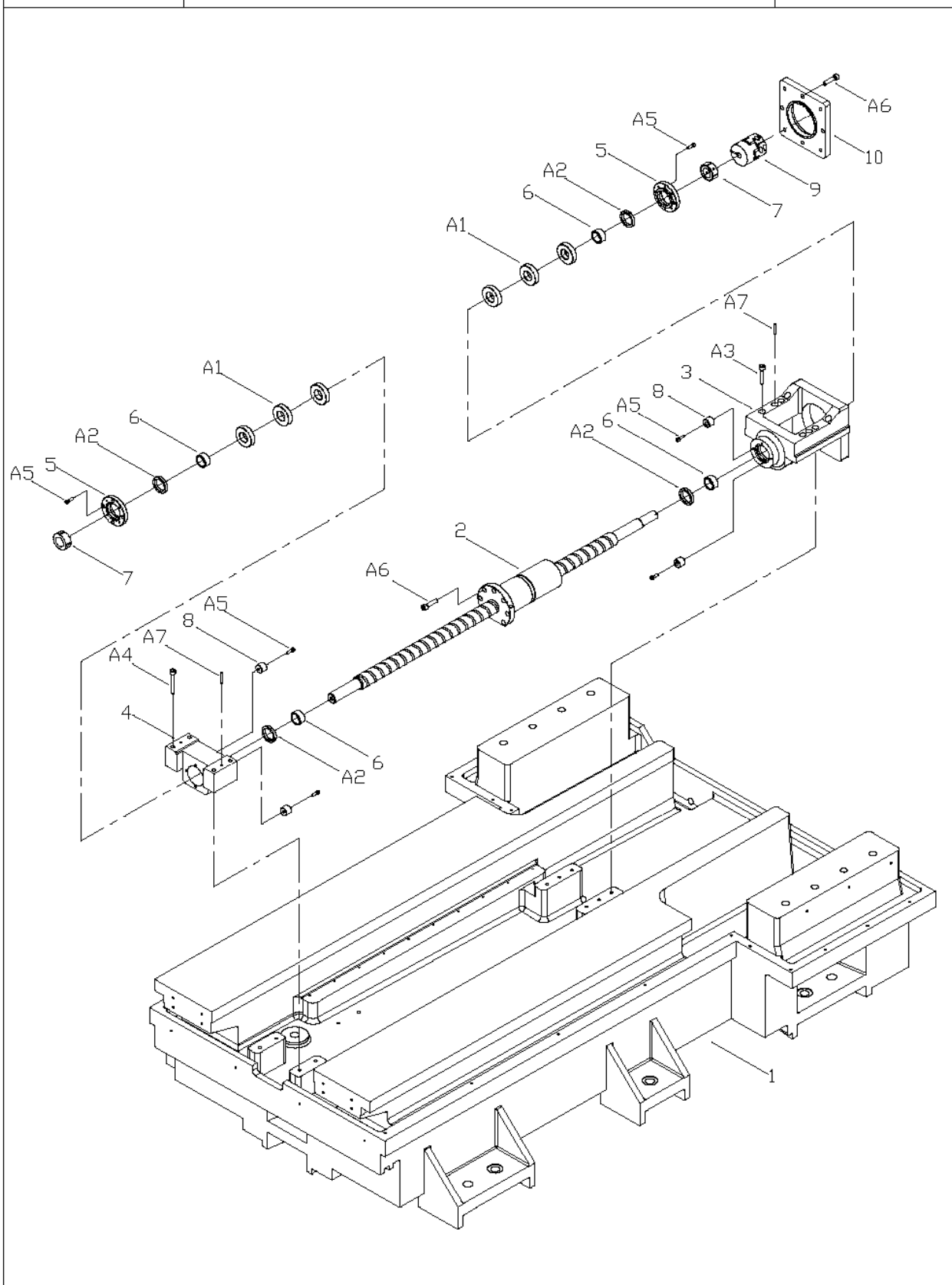
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Manual Discrepancy Sheet

1. Machine uses two position blocked center valves for ATC in/out and ATC door open/close.

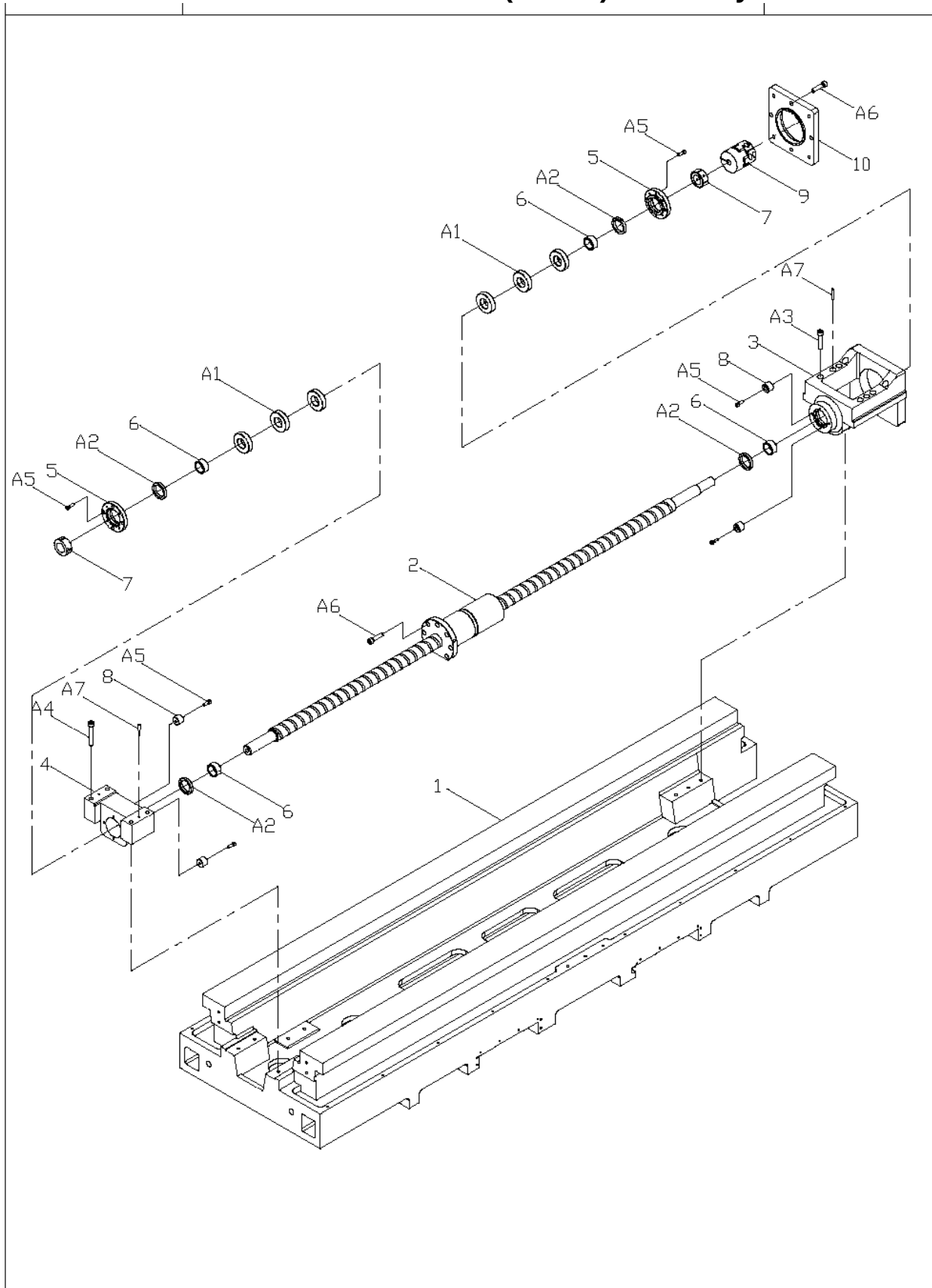
Machine Base (Z-Axis) Assembly



Z-axis Assembly

Item	Part No.	Description	Qty	Specification
1		Base	1	
2	43110-52501	Ballscrew, 50" (40x1272)	1	
3		Nut Bracket	1	
4		Bearing bracket	1	
5	43130-52004	Bearing cap	2	MPH0138
6	43130-52005	Spacer	3	MPH0140
7	43110-51005	Nut, YSRM30x1.5	2	MPH0139
8		Stop bumper	2	
9	43130-52011	Coupling	1	MA00238
10	43130-52008	Motor mounting plate	1	
A1		Bearing, 30TAC 62B	6	BG00047
A2		Oil seal	4	
A3		Hex. Socket screw	2	
A4		Hex. Socket screw	4	
A5		Hex. Socket screw	4	
A6		Screw	14	
A7			8	
	Not shown			
11		Motor, 4.4KW Yaskawa	1	MO00129
12	Option 1	Cable track, open	1.5	MP00483
	Option 2	Cable track, closed	1	MPH0018

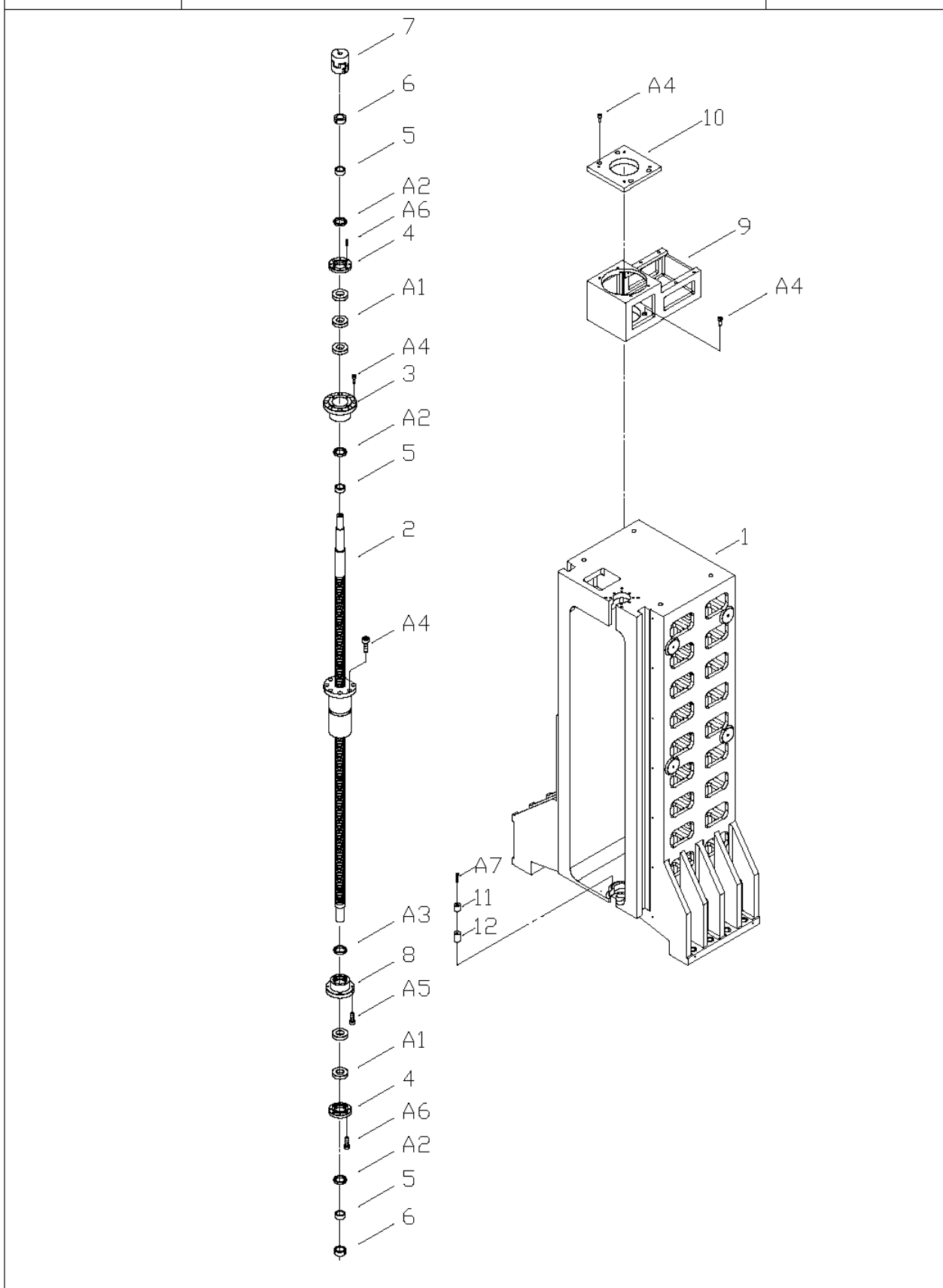
Machine Table/Saddle (X-Axis) Assembly



X-axis Assembly

Item	Part No.	Description	Qty	Specification
1		Saddle	1	
2	43110-51501	Ballscrew, 73" (40x1862)	1	
3		Nut bracket	1	
4		Bearing bracket	1	
5	43130-52004	Bearing cap	2	MPH0138
6	43130-52005	Spacer	3	MPH0140
7	43116-51005	Nut, YSF30xP1.5	2	MPH0139
8		Stop bumper	2	
9	43130-52011	Coupling	1	MA00238
10	43130-52008	Motor mounting plate	1	
A1		Bearing, 30TAC 62B	6	BG00047
A2		Oil seal	4	
A3		Hex. Socket screw	2	
A4		Hex. Socket screw	4	
A5		Hex. Socket screw	4	
A6		Screw	14	
A7			8	
	Not shown	Motor, 4.4KW Yaskawa	1	MO00129

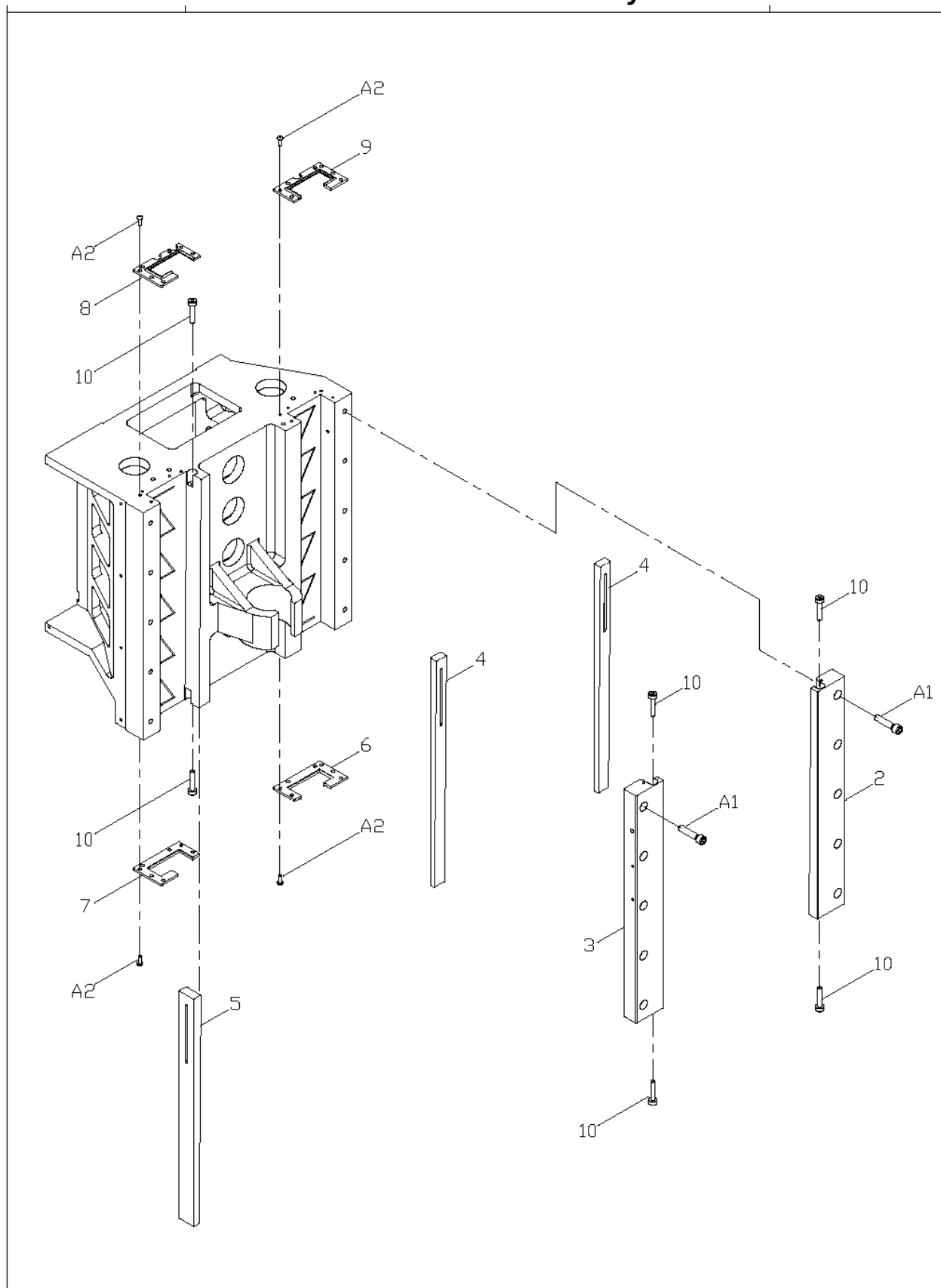
Machine Column (Y-Axis) Assembly



Y-axis Assembly

Item	Parts no.	Description	Q'ty	Specification
1	43130-10001	Column	1	
2	43130-52001	Ballscrew, Dia.40mm P12	1	MPH-121
3	43130-52002	Bearing housing	1	MPH0137
4	43130-52004	Bearing cap	2	MPH0138
5	43130-52005	Spacer	3	MPH0140
6	43116-51005	Nut, YSF 30xP1.5	2	MPH0139
7	43130-52011	Coupling	1	MA00238
8	43130-52010	Bearing housing	1	
9	43130-52007	Motor housing	1	
10	43130-52008	Motor mounting plate	1	
11	43061-51006	Hard stop	1	MPS0368
12	43130-52006	Bracket	1	
A1		Bearing, 30TAC 62B	5	BG00047
A2		Oil seal, 38x50x8	3	MPH0135
A3		Oil seal, 40x50x8	1	
A4		Hex. Socket screw	23	M10x25L
A5		Hex. Socket screw	4	M8x25L
A6		Hex. Socket screw	8	M6x20L
A7		Hex. Socket screw	1	M6x50L
	Not shown			
		Motor, 4.4 KW Yaskawa	1	MO00130
		Cable Track, Links	18	MP001157
		Cable Track, Bracket	1	MP001158
	E-BRAC-00011-01	Bottom way cover	1	MPH0069

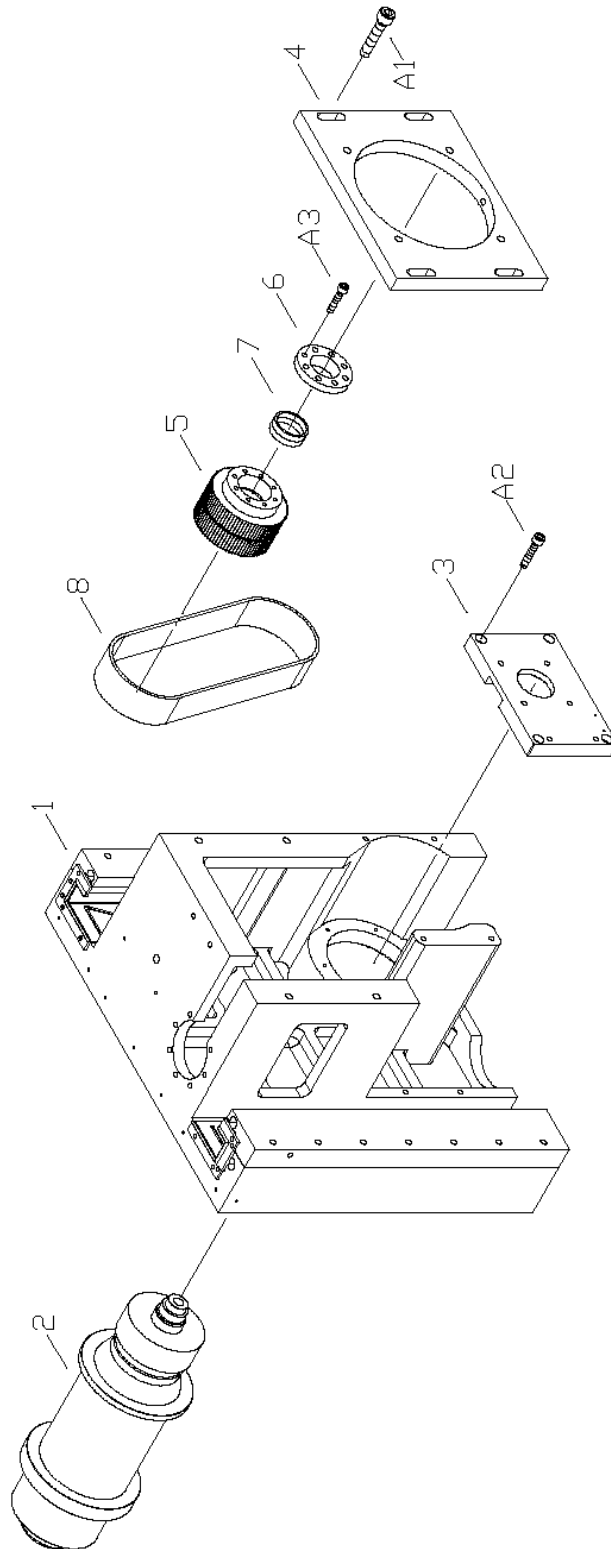
Machine Head Assembly



Head Assembly

Item	Parts no.	Description	Q'ty	Specification
1	43130-00001	Head	1	
2	43130-00011	Clamping plate - left	1	
3	43130-00013	Clamping plate - right	1	
4	43130-00012	Gib	2	
5	43130-00014	Gib	1	
6	43130-00015	Wiper	1	MPH0186
7	43130-00016	Wiper	1	MPH0187
8	43130-00017	Wiper	1	MPH0188
9	43130-00018	Wiper	1	MPH0189
A1		Hex. Socket screw	14	M12x75L
A2		Gib screw	6	M8
A3		Screw	20	M6x16L

Spindle Assembly



Spindle Assembly

Item	Parts no.	Description	Q'ty	Specification
1	43130-00001	Head	1	
2	43130-03001	Spindle	1	
3	43130-03010	Cylinder mounting plate	1	
4	43130-05001	Spindle motor mounting plate	1	
5	43130-05002	Spindle motor pulley	1	
6	43130-05003	Clamping ring	1	
7	43130-05004	Clamping ring	2	
8		Spindle belt, W-896	Or	BT-62
		Spindle belt, W-1000		BT-97
A1		Hex. Socket screw	4	M14x35L
A2		Hex. Socket screw	4	M10x35L
A3		Hex. Socket screw	8	M8x25L

HM / HMC35 Spindle Belt and Pulleys		
	Item	Part number
6-8K RPM	Belt	BT-97
	Spindle motor pulley	PY-192
	Spindle pulley, 70mm	PY-191
	Spindle Pulley, 60mm	PY-197
12-15K RPM	Belt	BT-97
	Spindle motor pulley	PY-188
	Spindle pulley, 70mm	PY-190
	Spindle Pulley, 60mm	PY-189

*Pulley bushings to be selected based on motor size.

Table Assembly

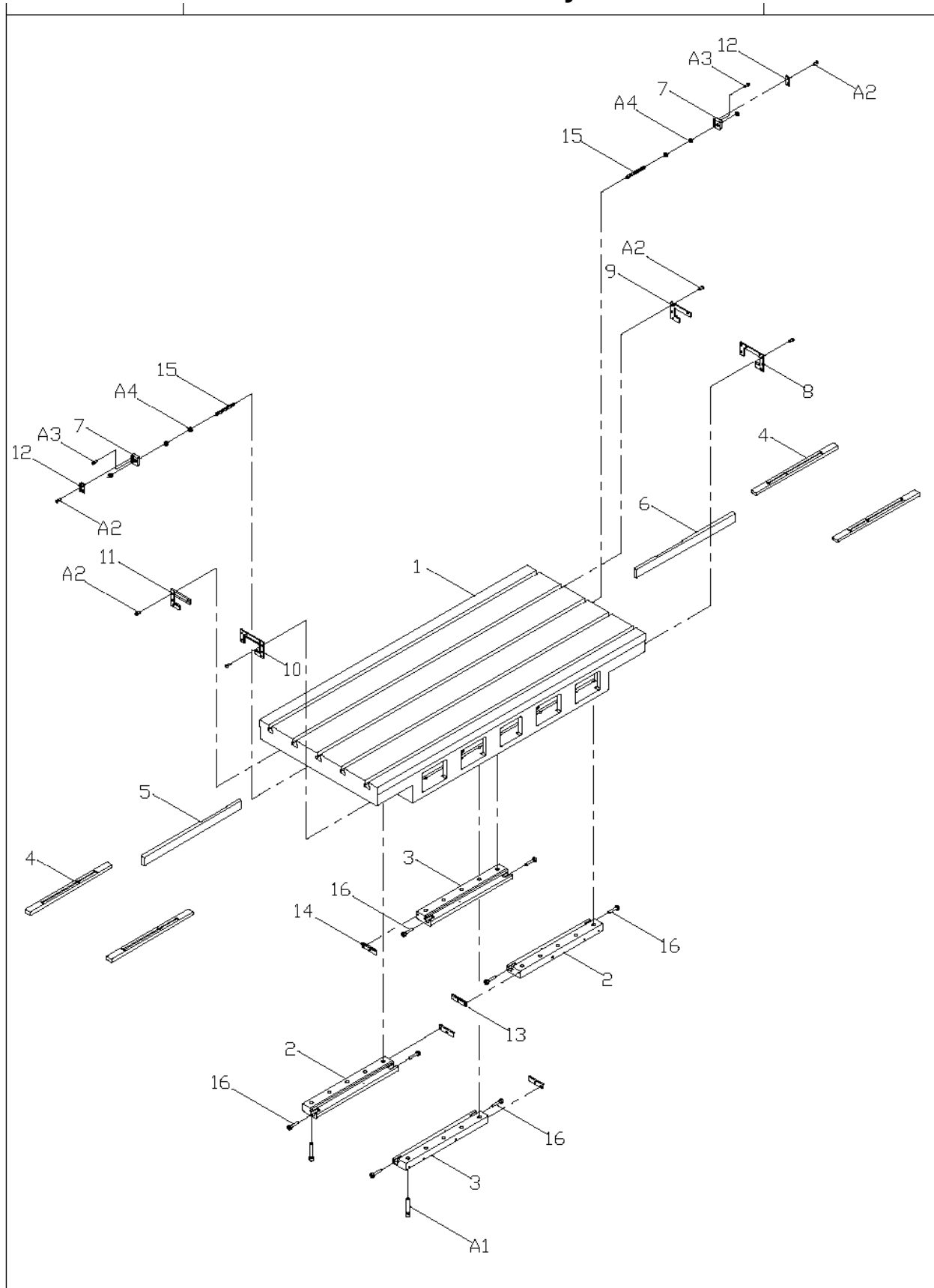
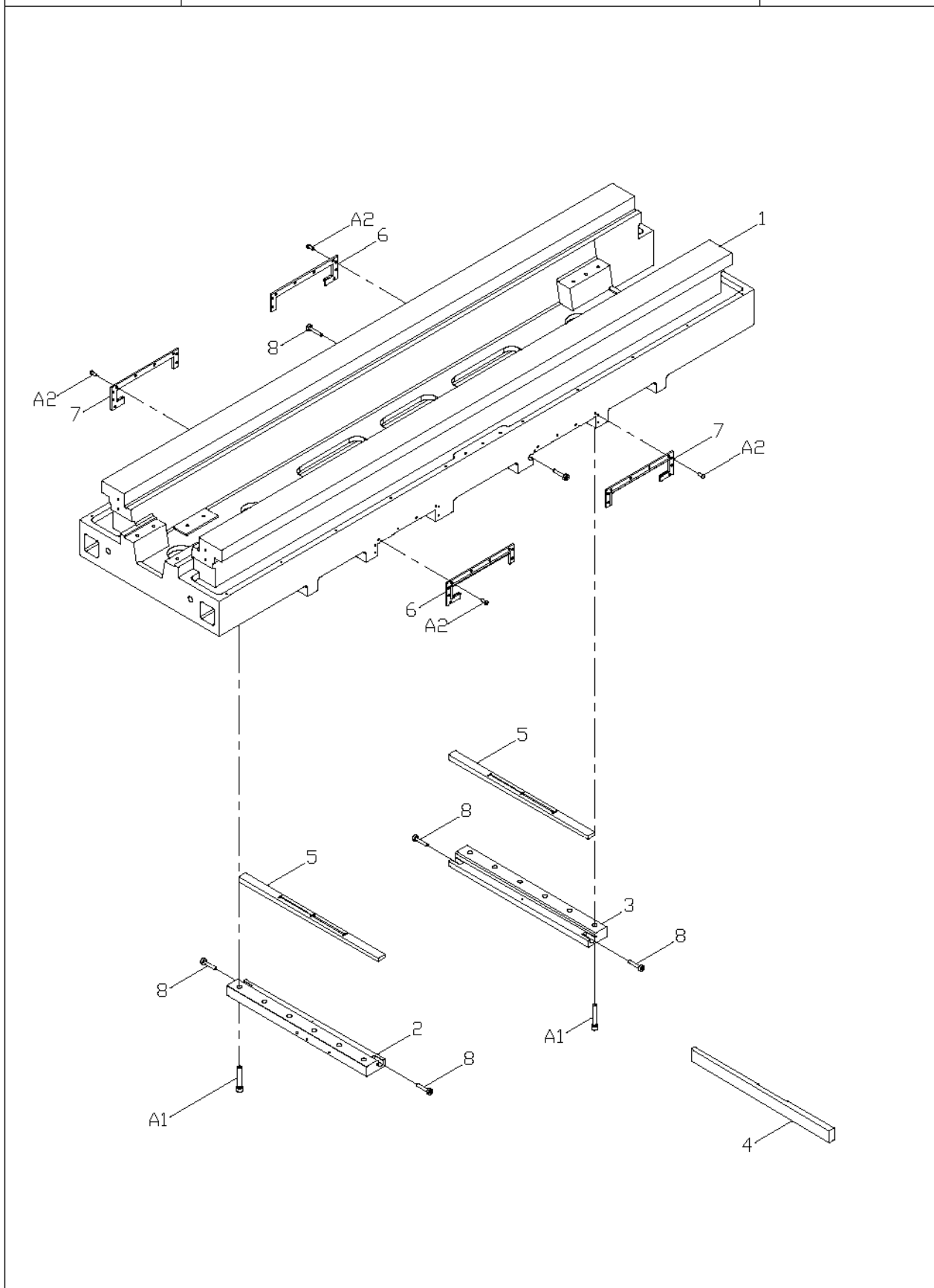


Table Assembly

Item	Part No.	Description	Q'ty	Specification
1		Tale	1	
2		Clamping plate	1	
3		Clamping plate	1	
4		Gib	4	
5		Gib	1	
6		Gib	1	
7		Adjusting block	2	
8	43130-00015	Wiper	1	MPH0186
9	43130-00017	Wiper	1	MPH0188
10	43130-00015	Wiper	1	MPH0186
11	43130-00017	Wiper	1	MPH0188
12		Wiper	2	
13		Wiper	1	
14		Wiper	1	
15		Screw	2	
16		Gib screw	8	
A1		Hex.Socket screw	10	
A2		Hex.Socket screw	22	
A3		Gib screw	2	
A4		Nut	4	

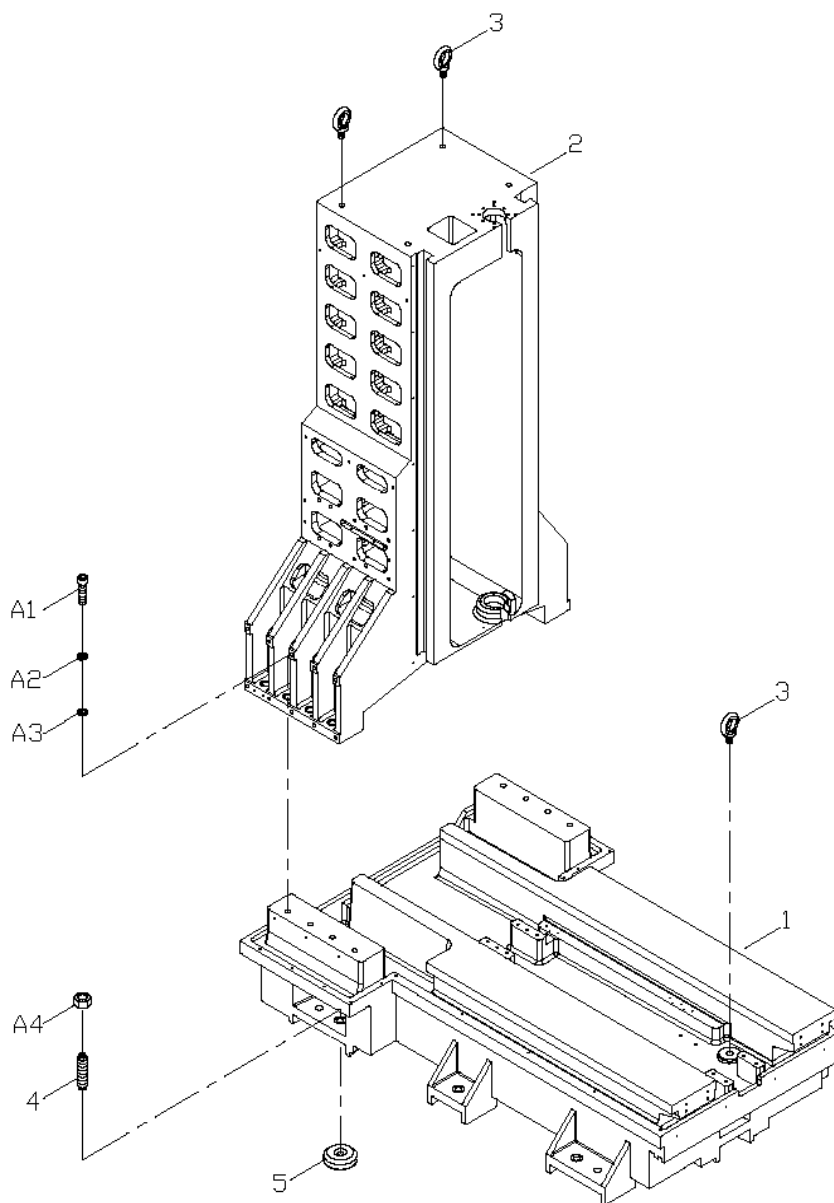
Saddle Assembly



Saddle Assembly

Item	Part No.	Description	Q'ty	Specification
1		Saddle	1	
2		Bracket	1	
3		Bracket	1	
4		Gib	1	
5		Gib	2	
6		Wiper	2	
7		Wiper	2	
8		Hex.Socket screw	6	
A1		Hex.Socket screw	12	
A2		Hex.Socket screw	36	

Column / Base Assembly



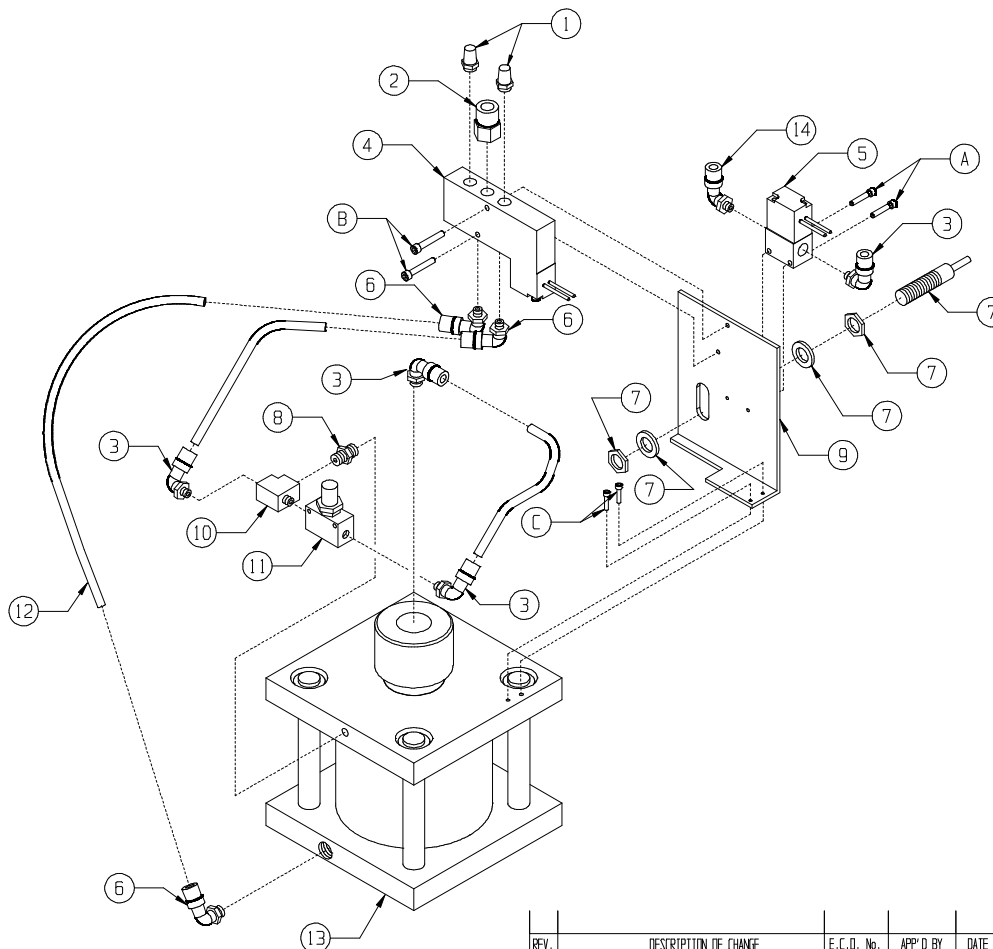
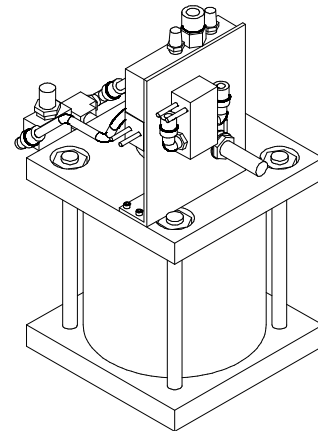
Column / Base Assembly

Item	Part No.	Description	Qty	Specification
1		Base	1	
2	43130-10001	Column	1	
3		Eye bolt	3	
4		Screw & nut	6	MP00889
5		Leveling pad	6	MP00888
A1		Socket screw	2	
A2		Washer	2	
A3		Washer	2	
A4		Nut	6	Included with #4

Drawbar Cylinder Assembly (CTS)

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



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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	+/-			
 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	DWG No. 6-10-018-114	SHEET No. 1 OF 1	SIZE B
DRAWN BY DAHLKE				

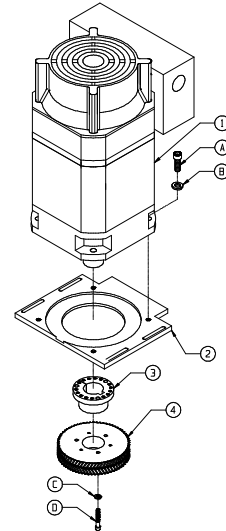
Drawbar Cylinder Assembly (Non-CTS)

Add
Air/oil intensifier MPS0717
Booster cylinder MPS0718
Hose MPS0719



Spindle motor Assembly

SPINDLE MOTORS		
No.	STOCK No.	DESCRIPTION
1	M000121	18 kW UAASKD-19LYA41 - YASKAWA
	M000132	11 kW UAASKD-11LYA41 - YASKAWA
	M000131	7.5 kW UAASKD-08LYA21 - YASKAWA
	M000114	7.5 kW UAASKA-08FZ1 - YASKAWA
	M000150	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 1PH7131-2GF02-OLK0
	SIEMENS	12 kW 1PH7163-2GB03-OLK0
	SIEMENS	16 kW 1PH7167-2GB03-OLK0
	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	M000121 & M000131 & M000132 - YASKAWA 12 kW & 22 kW - FANUC
	MP00587	M000114 & M000150 - YASKAWA (8 kW - FANUC)
	MPB0045	M000114 & M000150 - YASKAWA (BRIDGE MILL ONLY)
	MPB0040	M000131 & M000132 - YASKAWA (BRIDGE MILL ONLY)
	SMN0008	11 kW - SIEMENS
	SMN0061	7.5 kW - SIEMENS & 8 kW - FANUC
	SMN0062	11 kW & 18.5 kW - SIEMENS
	MPTT045	15 kW - FANUC

BUSHINGS		
No.	STOCK No.	DESCRIPTION
3	PY00097	48mm ID SK BUSHING (USED WITH M000121, M000131, M000132, M000150 - YASKAWA) (8 kW & 12 kW - FANUC)
	PY00184	32mm ID SK BUSHING (USED WITH M000114 - 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 M000114	11 kW M000150	7.5 kW M000131	11 kW M000132	18 kW M000121	FANUC	SIEMENS	50 TAPER
4	6K/8K	PY00201	PY00201	PY00192	PY00192	PY00192	PY00192	PY00192	PY00281
	12K/15K	PY00188	PY00188	PY00188	PY00188	PY00188	PY00188	PY00188	-

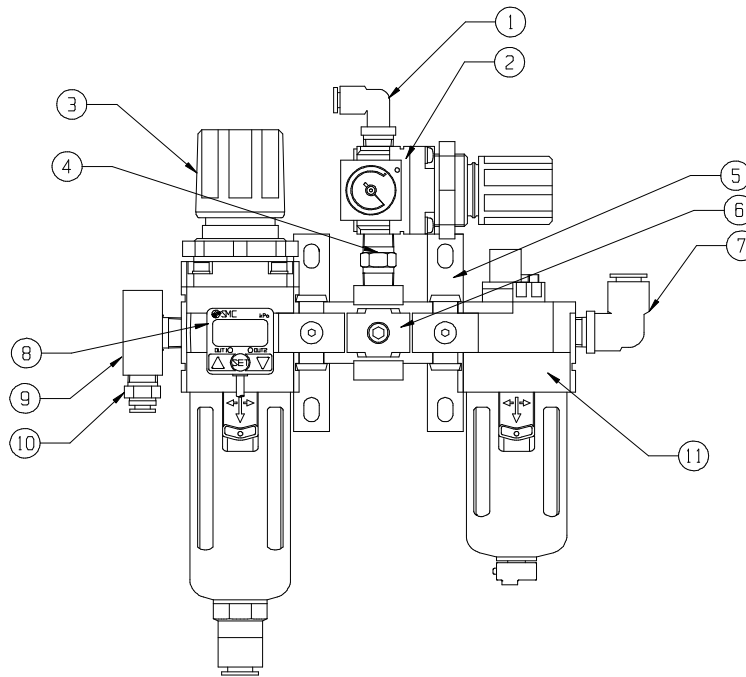
PARTS LIST			
No.	QTY	STOCK No.	DESCRIPTION
1	1	SEE TABLE	SPINDLE MOTORS
2	1	SEE TABLE	MOTOR PLATES
3	1	SEE TABLE	BUSHINGS
4	1	SEE TABLE	SPINDLE MOTOR PULLEYS

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 M000150	5826	N.M.	11/04
F	MODIFY CHART	5697	N.M.	01/04
E	ADD M000121 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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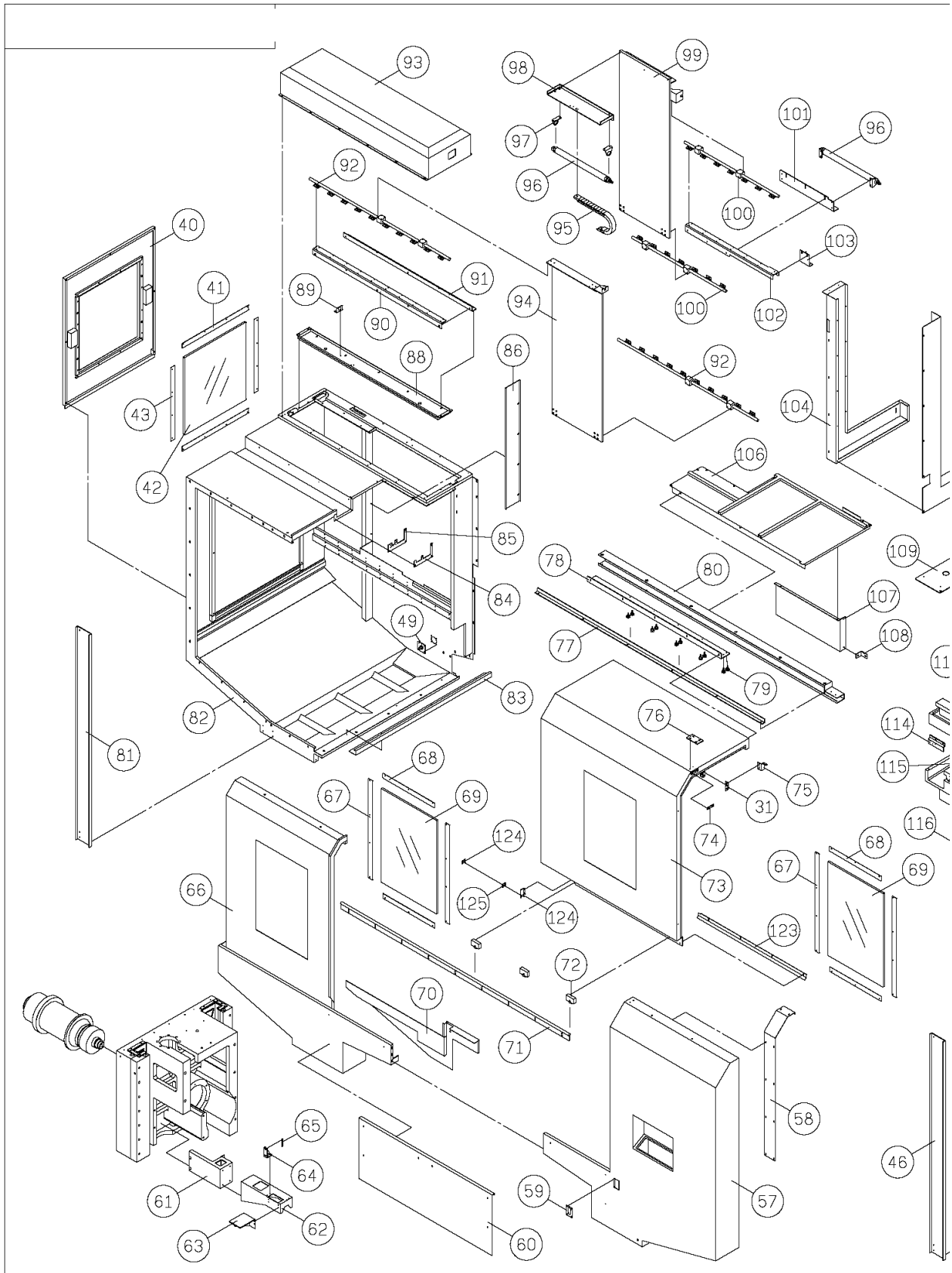
Air Filter / Regulator / Lubricator Assembly

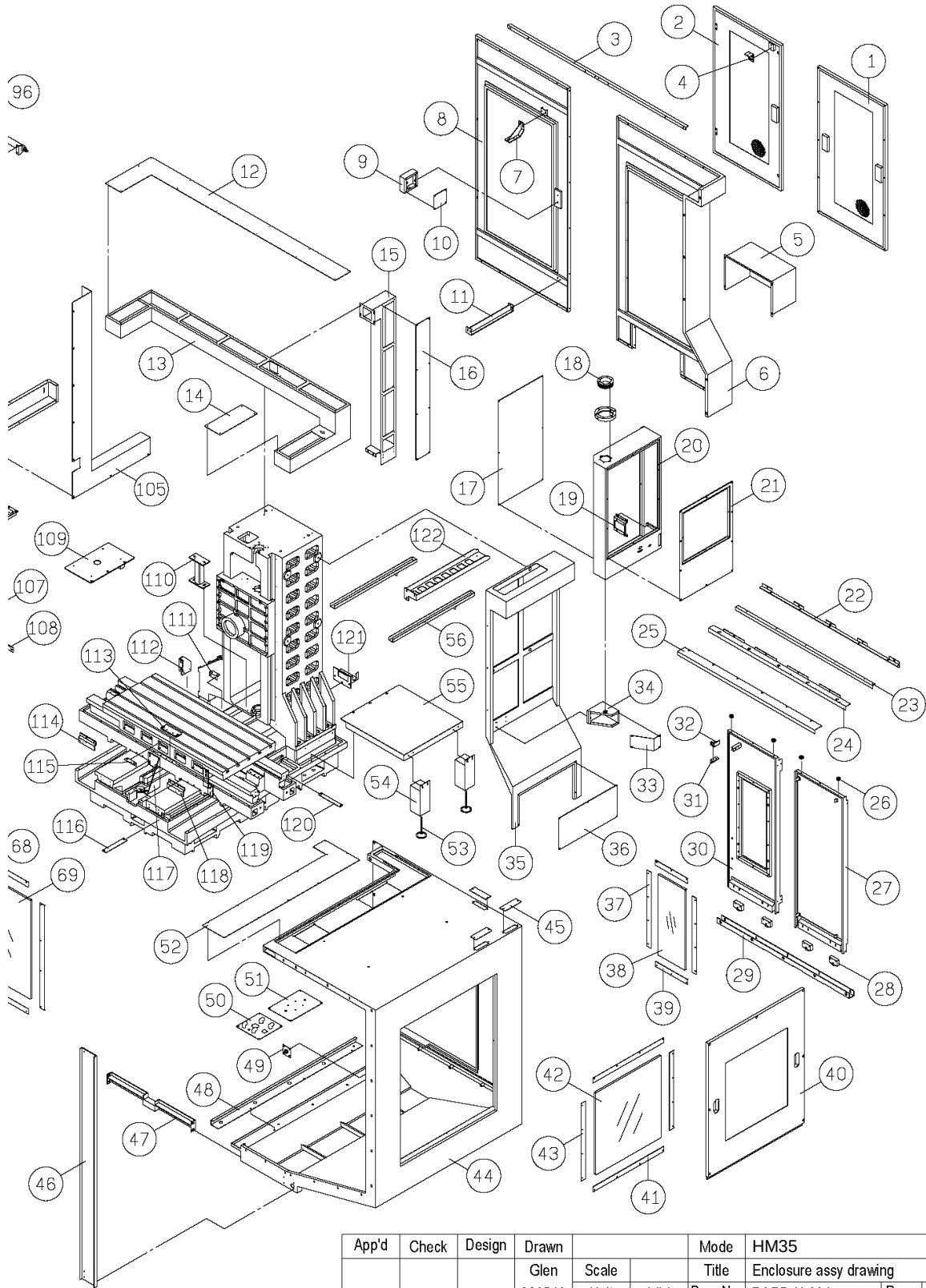
PARTS LIST			
ITEM	QTY	STOCK No.	DESCRIPTION
1	1	NU-199	1/4 NPT 3/8 TUBE SWIVEL ELBOW
2	1	NU-262	LOW PRESSURE REGULATOR W/GAGE
3	1	NU-212	LARGE FILTER/HIGH PRESSURE REGULATOR
4	1	NU-30	1/4 NPT PIPE NIPPLE
5	2	NU-210	LARGE MOUNTING SPACER
6	1	NU-211	LARGE MANIFOLD SPACER
7	1	NU-199	1/4 NPT 3/8 TUBE SWIVEL 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				
X .XXX +/-	TITLE NU-417 FRL ASSEMBLY		APPLICATION GENERAL PRODUCTS	
X .XX +/-	SCALE 3:1		DWG NO. 6-10-018-112	
X .X +/-	DATE 14 APR 08		SHEET NO. 1:1	
ANGLE +/-	DRAWN BY DAHLKE			

Enclosure Assembly (style B) Assembly Drawing





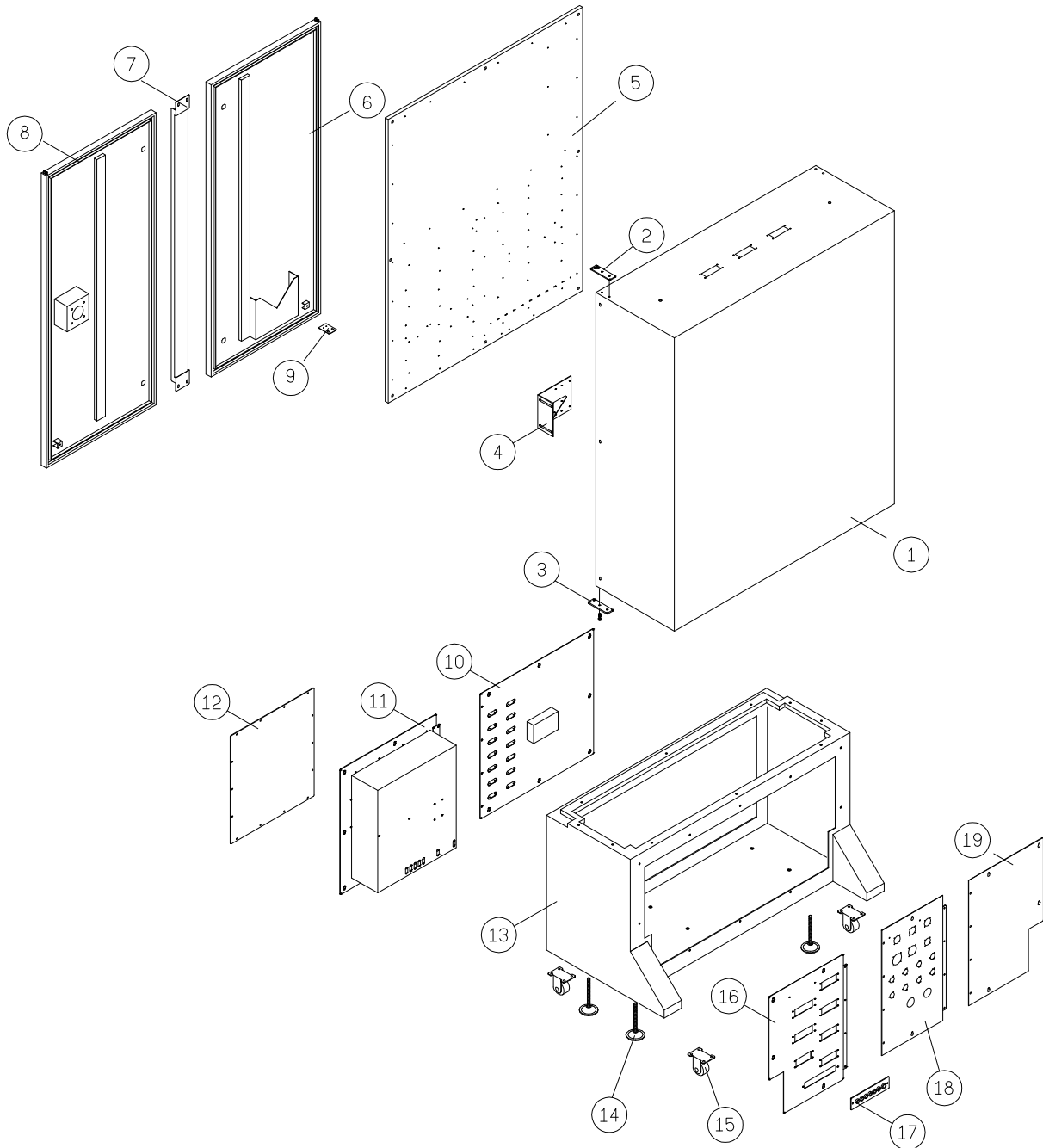
App'd	Check	Design	Drawn	Scale	Mode	HM35
			Glen	Unit	Title	Enclosure assy drawing
			990510	MM	Dwg No.	BARD-N-001
					Page	1/2

Enclosure (Style B) Parts List

Miscellaneous Parts ATC Door Open/Close Cylinder #96E-BRAD-94013-01 Reed switch (CHELIC CS-100)--- Flow valveNU-201 SolenoidNU-441 Cable track #95E-BRAD-94011-03 ATC In/Out CylinderMCQV-11-100-300M Reed switch (LS-BD2-L)SW-235 SolenoidNU-441 ATC Tool Pot Up/Down (in/out) CylinderMCQV-11-50-100M+CA Reed switch (LS-BD2-L)SW-235 SolenoidNU-179					109	Air receiver bracket	E-BRAD-70159-01	SPCC	1	
					108	Fixing plate	E-BRAD-70160-01	SPCC	1	
					107	Top chip tray	E-BRAD-70161-01	SPCC	1	
					106	Top chip tray	E-BRAD-70210-01	SPCC	1	
					105	duct cover	E-BRAD-70164-01	SPCC	1	
					104	cable duct	E-BRAD-70165-01	SPCC	1	
					103	bracket	E-BRAD-70213-01	SPCC	1	
					102	slide base	E-BRAD-70203-01	SPCC	1	
					101	cylinder seat	E-BRAD-70204-01	SPCC	2	
					100	slide base	E-BRAD-94014-01	MPH-219	1	
					99	ATC left sliding door	E-BRAD-70207-01	SPCC	1	
					98	cylinder seat	E-BRAD-70205-01	SPCC	1	
					97	Air cylinder stand	E-BRAD-70178-01	MPH-010	2	
					96	Air cylinder	E-BRAD-94013-01	—	2	
					95	Cable carrier	E-BRAD-94011-03	—	1	
					94	ATC sliding door	E-BRAD-70206-01	SPCC	1	
					93	Top guarding	YT83618	SPCC	1	
					92	slide base	E-BRAD-94015-01	MPH-191	1	
					91	slide base	E-BRAD-70208-01	SPCC	1	
					90	slide base	E-BRAD-70209-01	SPCC	1	
89	Flex cable mount bracket	E-BRAD-70211-01	SPCC	1						
88	Top plate	YT83516	SPCC	1						
87	—	—	—	—						
86	ATC side cover	E-BRAD-70176-01	SPCC	1						
85	plate	E-BRAD-70190-01	rubber	1						
84	Claming plate	E-BRAD-70217-01	SPCC	1						
83	plate	E-BRAD-70216-01	SPCC	1						
82	Left guarding	E-BRAD-70201-01	SPCC	1						
81	Fixing plate	E-BRAD-70188-01	SPCC	1						
80	Guide way bracket	E-BRAD-70112-01	SPCC	1						
79	Wheel	E-BRAD-70114-01	SPCC	10						
78	Wheel bracket	E-BRAD-70113-01	SPCC	1						
77	Sliding door guide way	E-BRAD-70111-01	SPCC	1						
76	Fixing plate	E-BRAD-70219-01	SPCC	1						
75	Adjusting plate	E-BRAD-70158-01	SPCC	1						
74	plate	YT83408D	SPCC	1						
73	Sliding door	E-BRAD-70108-01	SPCC	1						
72	Wheel	E-BRAD-70116-01	—	3						
71	Sliding door guide way	E-BRAD-70115-01	SS41	1						
70	guard against water	E-BRAD-70212-01	SPCC	1						
69	Window	E-BLJC-70011-01	MPH-124	2						
68	Claming plate	E-BRAD-70109-01	SPCC	4						
67	Claming plate	E-BRAD-70110-01	SPCC	4						
66	Left-front guarding	E-BRAD-70103-01	SPCC	1						
65	plate	E-BRAD-00015-01	SPCC	1						
64	Limit switch bracket	E-BRAD-00014-01	SPCC	1						
63	Bracket	E-BRAD-00013-01	SPCC	1						
62	Headstock supporter	E-BRAD-00012-01	SPCC	1						
61	Headstock supporter	E-BRAD-00011-01	SPCC	1						
60	Front cover	E-BRAD-70157-01	SUS304	1						
59	Coolant gun cover	E-BRAD-70154-01	SUS304	1						
58	Cable channel cover	E-BRAD-70153-01	SPCC	1						
57	Right front guarding	E-BRAD-70104-01	SPCC	1						
56	Coolant guide channel	E-BRAD-70202-01	SPCC	2						
55	Foot stand	E-BRAD-70131-01	SPCC	1						
54	foot	E-BRAD-70132-01	SPCC	2						
Item	Description	P/N	Material	Q'ty	Spec	Item	Description	P/N	Material	Q'ty
125	Wiper	E-BRAD-70195-01	rubber	1						
124	Wiper bracket	E-BRAD-70193-01	SPCC	1						
123	plate	E-BRAD-70194-01	SPCC	1						
122	Cable channel	E-BRAD-20011-01	SPCC	1						
121	Conjunction box	E-BRAD-40011-01	SPCC	1						
120	Gib plate	E-BRAD-30015-01	SPCC	1						
119	Fixing plate	E-BRAD-30013-01	SPCC	1						
118	Dog bracket	E-BRAD-30012-01	SPCC	1						
117	Fixing plate	E-BRAD-20013-01	SPCC	1						
116	Gib plate	E-BRAD-20014-01	SPCC	1						
115	Fixing plate	E-BRAD-30014-01	SPCC	1						
114	Dog bracket	E-BRAD-30011-01	SPCC	1						
113	Limit switch bracket	E-BRAD-20012-01	SPCC	1						
112	Limit switch bracket	E-BRAD-20015-01	SPCC	1						
111	Fixing plate	YT30027	SPCC	1						
110	Fixing plate	E-BRAD-00016-01	SPCC	1						

	53	Adjusting stand	E-BRAD-70133-01	SPCC	2					
	52	Cable channel cover	E-BRAD-70148-01	SPCC	1					
	51	Cable channel cover	E-BRAD-70149-01	SPCC	1					
	50	Cable channel cover	E-BRAD-70150-01	SPCC	1					
	49	Connector plate	E-BRAD-70151-01	SPCC	2					
	48	plate	E-BRAD-70152-01	SPCC	1					
	47	guarding bracket	E-BRAD-70156-01	SPCC	1					
	46	Fixing plate	E-BRAD-70189-01	SPCC	1					
	45	Cover	E-BRAD-70147-01	SPCC	5					
	44	Right guarding	E-BRAD-70102-01	SPCC	1					
	43	Clamping plate	E-BRAD-70107-01	SPCC	4					
	42	Window	E-BLJC-70012-01	glass	2	MPH-125				
	41	Clamping plate	E-BRAD-70106-01	SPCC	4					
	40	Right guarding	E-BRAD-70105-01	SPCC	2					
	39	Clamping plate	E-BRAD-70145-01	SPCC	2					
	38	Side window	E-BRAD-70061-01	glass	1	MPH-126				
	37	Clamping plate	E-BRAD-70146-01	SPCC	2					
	36	Column side cover	E-BRAD-70129-01	SPCC	1					
	35	Column side guard	E-BRAD-70127-01	SPCC	1					
	34	bracket	E-BRAD-70215-01	SPCC	1					
	33	cover	E-BRAD-70214-01	SPCC	1					
	32	Adjusting plate	E-BRAD-70144-01	SPCC	1					
	31	Adjusting plate	E-BRAD-70143-01	SPCC	2					
	30	Sliding door	E-BRAD-70140-01	SPCC	1					
	29	sliding guide way	E-BRAD-70142-01	SPCC	1					
	28	Wheel	E-BRAD-70141-01	SPCC	4	MPH-016				
	27	Sliding door	E-BRAD-70139-01	SPCC	1					
	26	Top sliding wheel	E-BRAD-70138-01	SPCC	4					
	25	sliding guide way	E-BRAD-70137-01	SPCC	1					
	24	sliding guide way	E-BRAD-70136-01	SPCC	1					
	23	sliding guide way	E-BRAD-70135-01	SPCC	1					
	22	sliding guide way	E-BRAD-70134-01	SPCC	1					
	21	Operation panel	E-BRAD-70252-01	SPCC	1					
	20	Operation box	E-BRAD-70251-01	SPCC	1					
	19	floppy disk bracket	E-BRAD-70257-01	SPCC	1					
	18	Swivel	L-5903-00001	SPCC	1					
	17	Conjunction box cover	E-BRAD-70256-01	SPCC	1					
	16	Cable channel cover	E-BRAD-70170-01	SPCC	1					
	15	Cable channel	E-BRAD-70169-01	SPCC	1					
	14	Cable channel cover	E-BRAD-70168-01	SPCC	1					
	13	Cable channel	E-BRAD-70166-01	SPCC	1					
	12	Cable channel cover	E-BRAD-70167-01	SPCC	1					
	11	Rear maintenance door	E-BRAD-70076-01	SPCC	1					
	10	Conjunction box cover	E-BRAD-70125-01	SPCC	1					
	9	Conjunction box	E-BRAD-70124-01	SPCC	1					
	8	Left-rear guarding	E-BRAD-70123-01	SPCC	1					
	7	Door pin bracket	E-BRAD-70126-01	SPCC	1					
	6	Right-rear guarding	E-BRAD-70122-01	SPCC	1					
	5	Column rear guarding	E-BRAD-70121-01	SPCC	1					
	4	Pin bracket	E-BRAD-70118-01	SPCC	1					
	3	Rear guard frame	E-BRAD-70117-01	SPCC	1					
	2	ATC maintenance door	E-BRAD-70119-01	SPCC	1					
	1	Rear maintenance door	E-BRAD-70120-01	SPCC	1					
	Item Description		P/N		Material	Q'ty	Spec			
	App'd	Check	Design	Drawn	Mode	HM35				
				Glen	Scale	Title Enclosure assy drawing				
Spec				990510	Unit	MM	Dwg No.	BARD-N-001	Page	2/2

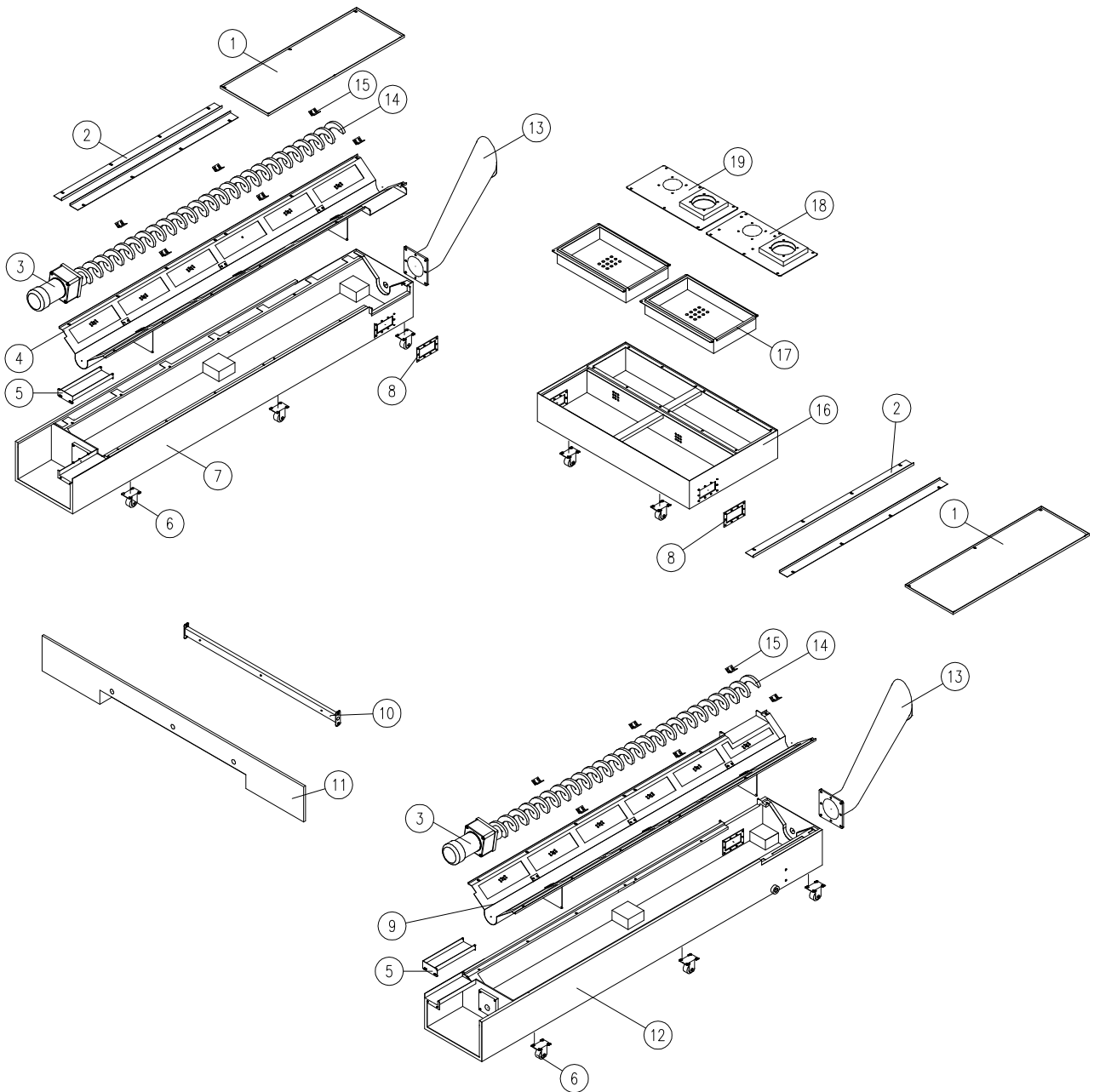
Enclosure Electrical Cabinet Drawing



Enclosure Electrical Cabinet Parts List

Item	Part no.	Description	Q'ty	Remark
1	E-BRAD-73001-01	Electric cabinet	1	
2	E-BRAD-73006-01	Fixing plate-top	1	
3	E-BRAD-73007-01	Fixing plate-bottom	1	
4	E-BRAD-73016-01	Power switch bracket	1	
5	E-BRAD-73018-01	Switch board	1	
6	E-BRAD-73002-01	Left door	1	
7	E-BRAD-73004-01	Connection frame	1	
8	E-BRAD-73003-01	Right door	1	
9	E-BRAD-73005-01	Limit switch bracket	1	
10	E-BRAD-73011-01	Cover	1	
11	E-BRAD-73009-01	Sub electric cabinet	1	
12	E-BRAD-73010-01	Cover	1	
13	E-BRAD-73008-01	Stand	1	
14	E-BRAD-70133-01	Adjusting stand	4	
15	E-ARAK-41008-01	Wheel	4	
16	E-BRAD-73013-01	Connector board	1	
17	E-BRAD-73014-01	Connector board	1	
18	E-BRAD-73015-01	Connector board	1	
19	E-BRAD-73012-01	Cover	1	

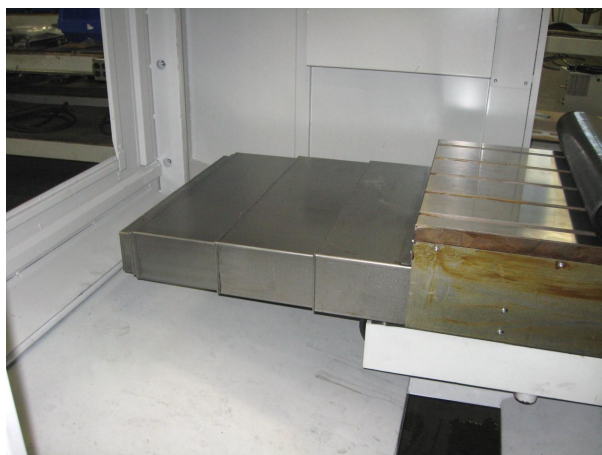
Coolant Tank / Auger Assembly



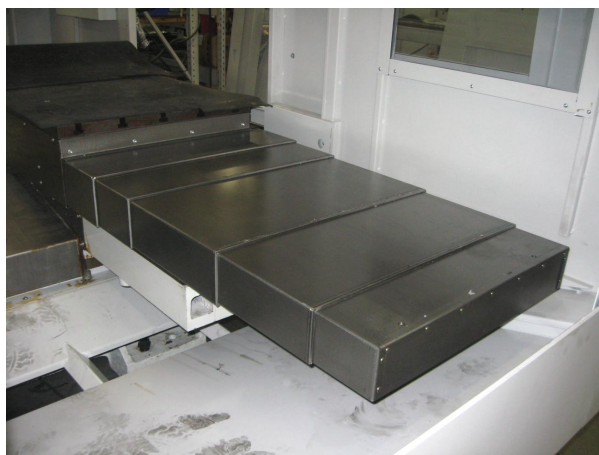
Coolant Tank / Auger Parts List

Item	Part no.	Description	Q'ty	Remark
1	E-BRAD-41104-01	Cover	2	
2	E-BRAD-41105-01	Splash plate	4	
3	FME-22	Auger motor	2	MO00170
4	E-BRAD-41106-01	Left chip auger tank	1	
5	E-BRAD-41108-01	Coolant drip channel	1	
6	E-BRAD-41108-01	Wheel	20	
7	E-BRAD-41101-01	Left coolant tank	1	
8	E-BRAD-41011-01	Plate	2	
9	E-BRAD-41107-01	Right chip auger tank	1	
10	E-BRAD-41110-01	Connection plate	1	
11	E-BRAD-41111-01	Front cover	1	
12	E-BRAD-41102-01	Right coolant tank	1	
13	E-BRAD-41112-01	Auger outlet	2	
14		Auger screw	2	
15	E-BRAD-41113-01	Clamping plate	12	
16	E-BRAD-41103-01	Center coolant tank	1	
17	E-BRAD-41114-01	Filter	2	
18	E-BRAD-41115-01	Pump bracket	1	
19	E-BRAD-41116-01	Pump bracket	1	
	Not shown			
	TPHK2T4-3	Coolant pump,	1	MA-332
	TPHK4T3-3	Washdown pump	2	MA-331

Way Covers



X-axis Operator Side



X-axis ATC Side



Y-axis Lower



Y-axis Upper



Z-Axis Rear (operator)

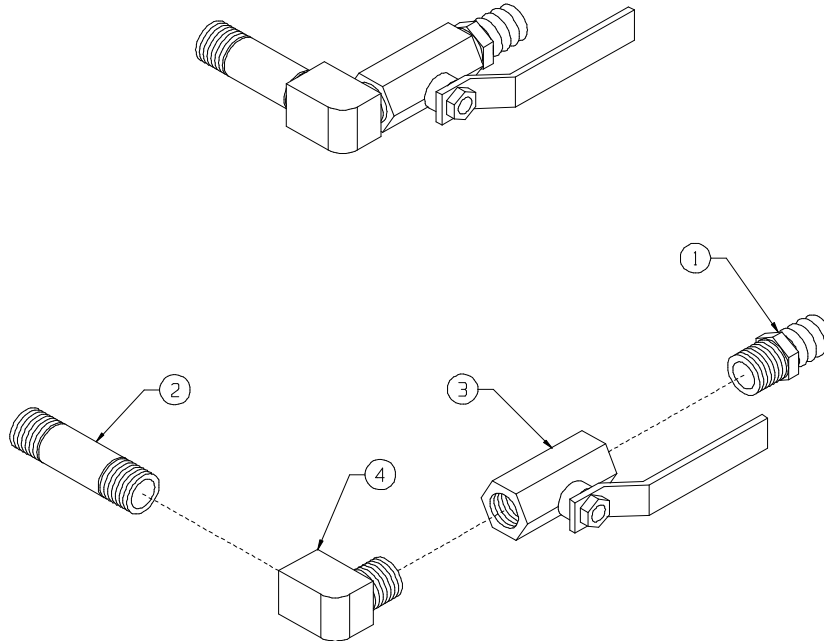


Z-Axis Front



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	477B		11/00
A	CHANGE PIPE NIPPLE	385I	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	±			



Lubrication Specifications

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,	PASS
ASTM D 665, A & B	
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
1	MB/RH LUBRICATION DRAWING	SCALE 15:1	DATE 6-10-032-016	SIZE B
2	SOLID WAYS BED MILL	DATE 20 SEP 00	DRAWN BY DAHLKE	SHEET NO. 1 OF 1

Retention Knob Chart

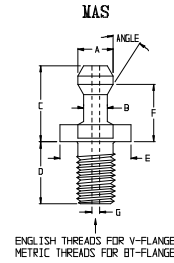
NOTE: STANDARD RETENTION KNOBS FOR 40 TAPER SPINDLES

MAS RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
59	39	1.27	.86	.90	.99	.19	60°	60mm SPINDLE BR50, BR60, BR80, MM18, RH20, RH30, RH33, RH35, RM15, VM15, VM16, VM20, VM22, VM25, VM30, VM2016, VM15, VM16, VM20, VM22, VM25, VM30
								70mm SPINDLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30

MAS RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
59	39	1.38	.99	.90	1.10	.16	60°	60mm SPINDLE BR50, BR60, BR80, MM18, RH20, RH30, RH33, RH35, RM15, VM15, VM16, VM20, VM22, VM25, VM30, VM2016, VM15, VM16, VM20, VM22, VM25, VM30
								70mm SPINDLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30



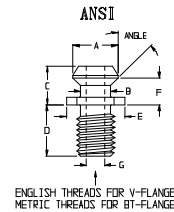
NOTE: STANDARD RETENTION KNOBS FOR 50 TAPER SPINDLES

ANSI RETENTION KNOBS STYLE CT-FLANGE 50 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
1.14	.83	1.00	1.32	1.42	.70	.45	45°	HBM110, RH33XP, RH35XP, TT40XP, VM25XP, VM50XP, TTC40XP, VMC22XP, VMC25XP, VMC30XP

ANSI RETENTION KNOBS STYLE BT-FLANGE 50 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
1.14	.83	1.00	1.32	1.42	.70	.45	45°	HBM110, RH33XP, RH35XP, TT40XP, VM25XP, VM50XP, TTC40XP, VMC22XP, VMC25XP, VMC30XP



NOTE: OPTIONAL RETENTION KNOBS FOR 40 TAPER SPINDLES

ANSI RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
74	.49	.64	.86	.93	.44	.27	45°	SELECTION NOT AVAILABLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30

ANSI RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
74	.49	.75	.86	.90	.55	.28	45°	SELECTION NOT AVAILABLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30

MAS RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
59	39	1.27	.86	.90	.99	.19	45°	SELECTION NOT AVAILABLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30

MAS RETENTION KNOBS STYLE BT-FLANGE 40 TAPER

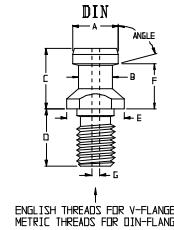
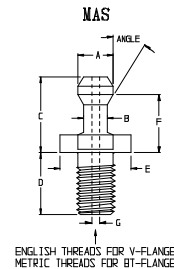
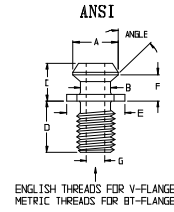
DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
59	39	1.38	.99	.90	1.10	.16	45°	SELECTION NOT AVAILABLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30

DIN 69872 RETENTION KNOBS STYLE CT-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
75	.55	1.02	.86	.90	.79	.24	75°	SELECTION NOT AVAILABLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30

DIN 69872 RETENTION KNOBS STYLE DIN-FLANGE 40 TAPER

DIMENSIONS							MILLTRONICS MACHINE	
A	B	C	D	E	F	G	ANGLE	
75	.55	1.02	.99	.90	.79	.28	75°	SELECTION NOT AVAILABLE BR50, BR60, BR80, MM20, HM35, RH20, RH30, RH33, RH35, TT24, TT40, TT60, TT80, VM16, VM20, VM22, VM25, VM30, VM3224, VM4224, HMC20, HMC35, TTC24, TTC40, TTC60, TTC80, VM16, VM20, VM22, VM25, VM30



- NOTES:**
- FOR SPINDLES OF 8000 RPM AND GREATER YOU MUST USE BALANCED TOOLING TO A G2.5 SPEC. OR IT WILL VOID THE SPINDLE WARRANTY.
 - IN-LINE SPINDLES: IN TAPER RESPECTIVE FRAME SIZE, USE THE SAME RETENTION KNOB AS THE NON IN-LINE SPINDLES
 - ALL DIMENSIONS ARE IN INCHES

J	REMOVE MFG. PART NUMBERS & ADD DIMENSIONS	7749	N.M.	03/13
I	ADD VM2016, VM3224, 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

Maintenance Section

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)

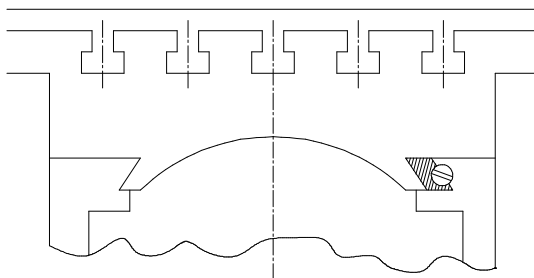


Fig. 1 Table-saddle gib

Adjustment of Saddle Gib

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

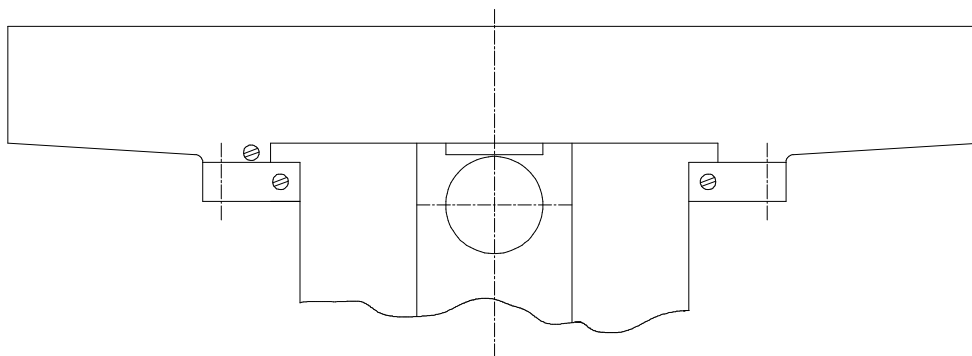


Fig. 2 Saddle-Base Gib

Adjustment of head Bolster gib.

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

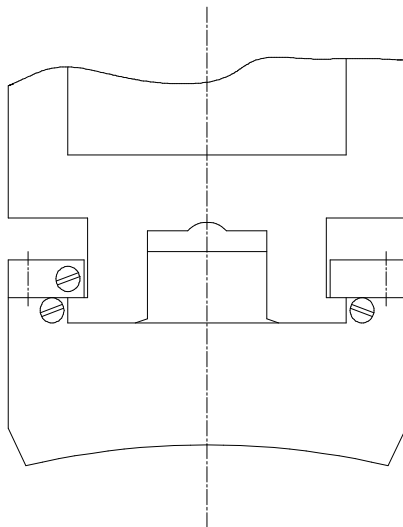


Fig. 3 Bolster Gib

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.

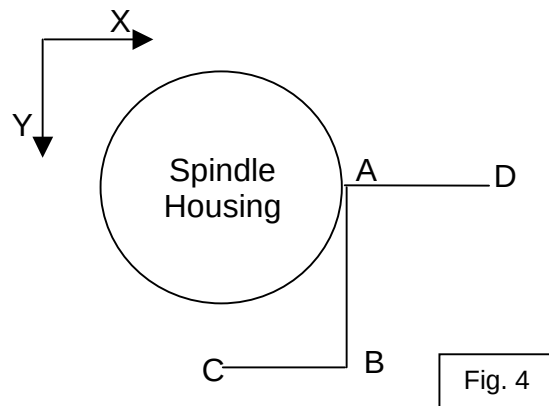
Press the jog key for the desired direction for **A** to move towards **D** *(see Fig. 4)* and then back to **A**, the indicator may have moved, adjust it back to zero and repeat this step until it stays at zero.

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.)

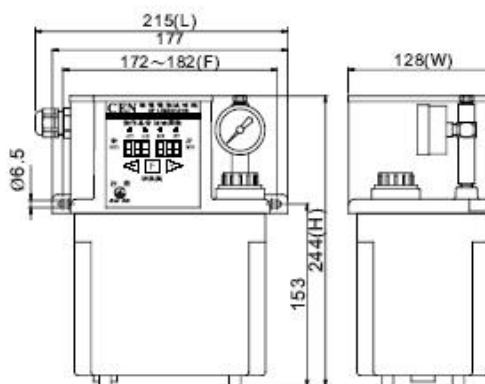


CEN04 (MA-346) Lubrication Unit

- Ensure the way lube reservoir level is maintained (if equipped). (Use Mobil Vactra No. 02, Amoco Waytec No 68, Sunoco Sunwaylube No1180, or equivalent oil, further details about this lubricant can be found in the mechanical manual). Never re-use old way lube.
- Clean the intake filter screen annually
- This unit uses CBD volume type oil distributors (#3 below).

Adjustment

- Set the timer for 10 Seconds ON, and 40 Minute INT operation. Call factory if you feel this provides too much oil. Never reduce the ON time or increase the interval time without consulting the factory.



CEN04-01 Type Standards Externals

◆Features

- 1.CEN04 type has time and the timer controls the operation and interval time. The electronic box has operation, abnormal, feeding and interval indicators.
- 2.The electronic box can automatically save the original operation and interval time while the power is suddenly off. After turning on the power, it would return to the original setting time and start the cycle again.
- 3.CEN04 pressure-relief type has to work with volume distributors. If it is operated with CAB or CBB type volume distributor, it will feed oil during operation time. If it is operated with CDB or T type volume distributor, it will feed oil during interval time.
- 4.The discharge volume is fixed. The lubrication points of volume distributor supply a fixed flow of oil.
- 5.It has shaded-pole type motor with a temperature controller. When the temperature reaches 100 degrees, the motor will shut down 5 minutes to protect the motor.
- 6.It has a pressure switch device and been set up as 8kg/cm², which assures the oil volume of lubrication point and check if the piping works normally. The standard specification is NC (Normal Close) contact, which means if the pressure is abnormal, it will have signal.
- 7.It has a float switch that can detect the volume of oil. It will have abnormal signal automatically when the oil level is lower than the standard.
- 8.It has a buzzer that will alarm when the oil level is lower than the standard
- 9.It has a pressure gauge for checking if the pressure is normal.
- 10.It has a feed-oil button (**[F]** button), press the button and the oil will feed immediately.

Spindle Start up Procedure

Daily Run in procedure

1. Start the flood pump or chiller unit (if equipped) and run coolant throughout coolant passages until the temperature stabilizes.
2. Verify that all auxiliary systems are operating properly.
 - a. If equipped with a Spindle air purge system, the system should have approx. 15 PSI.
 - b. If equipped with the optional Vogel Air Oiler System, verify the reservoir tank has adequate oil supply and proper air pressure.
3. Run-in the spindle at 50% of the maximum RPM for 10 minutes.
Measure temperature at various locations on the front of the spindle cartridge.
Be careful as the spindle is running! If at any time during the spindle run-in procedure the temperature reaches 140 degrees Fahrenheit or 60 degrees Celsius, stop the spindle and allow it to cool to room temperature. Resume the procedure at the point it was halted.

The temperature can be measured with a pyrometer. If a pyrometer is not available, a good indication of excessive temperature is if you cannot hold your hand on the spindle for more than 5 seconds.

4. If the temperature is within normal operation parameters, the machine is ready for operation.

Abbreviated Run-in Procedure for Spindle with ½ -2 hours Idle time

1. Follow Steps 1. and 2. listed under the Daily Run-in Procedure.
2. Run-in the spindle at 50% of the maximum RPM for 3 to 5 minutes.
3. Monitor the temperature at various locations on the front of the spindle cartridge.
Be careful as the spindle is running! If at any time during the spindle run-in procedure the temperature reaches 140 degrees Fahrenheit or 60 degrees Celsius, stop the spindle and allow it to cool to room temperature. Resume the procedure at the point it was halted.

If the temperature is within normal operation parameters, the machine is ready for operation.

