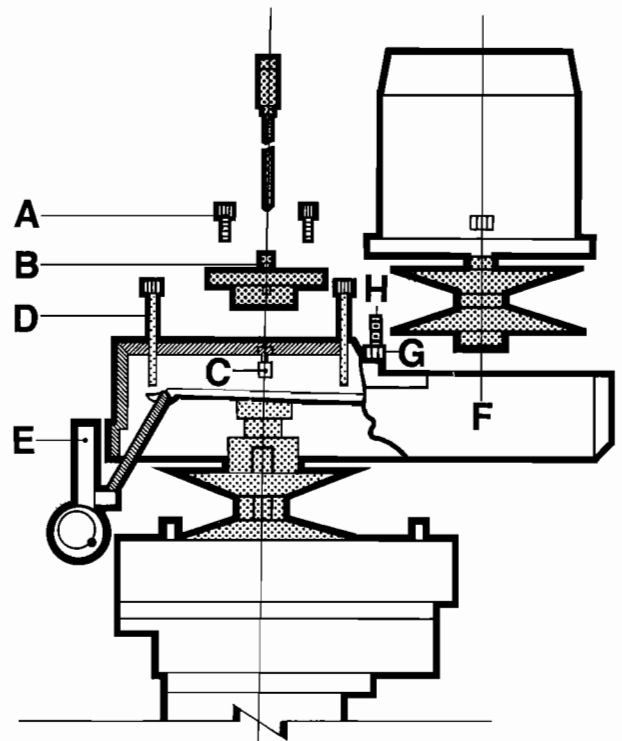


MAINTENANCE

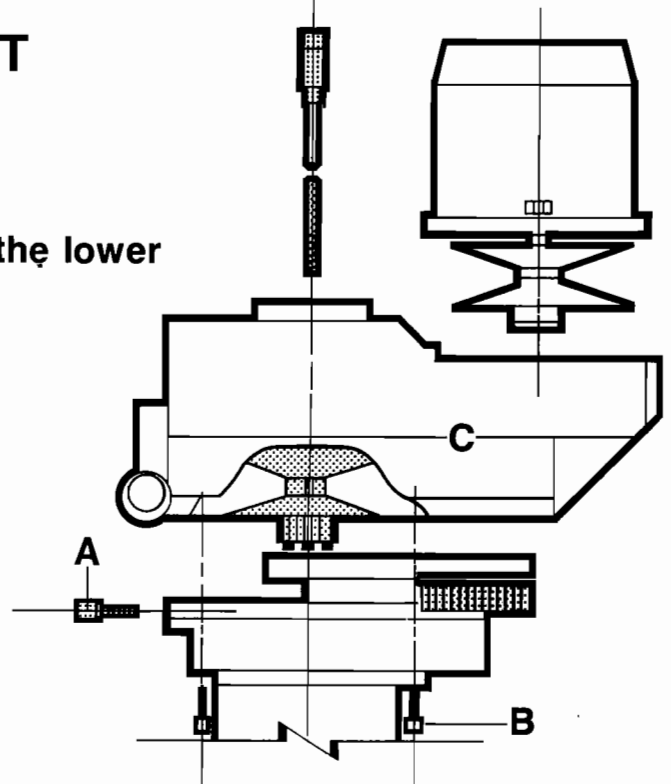
DRIVE BELT REPLACEMENT

1. Remove the motor.
2. Remove the three screws "A", insert into the adjacent tapped holes and withdraw bearing housing "B".
3. Remove four screws "D".
4. Remove screws "E".
5. Remove lock nut "G" and turn speed change plate pivot stud "H" clockwise to remove.
6. Remove top housing "F", tap to clear the dowels.
7. Replace the belt.

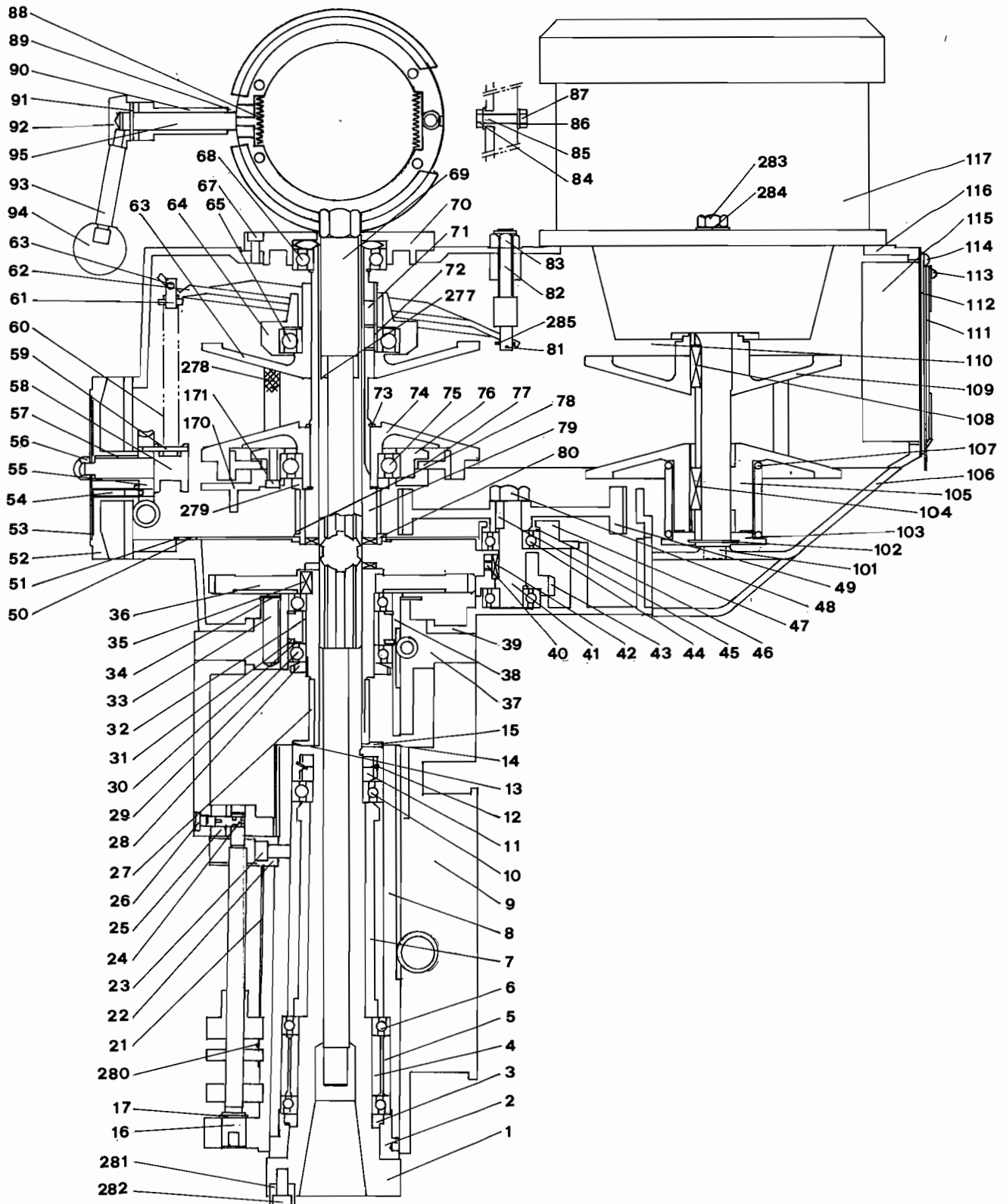


TIMING BELT REPLACEMENT

1. Remove the motor.
2. Lower the quill to full extent.
3. Remove the two screws "A" from the lower speed changer housing.
4. Remove the four screws "B".
5. Remove the top assembly "C" and tap to clear dowels.
6. Replace the belt.



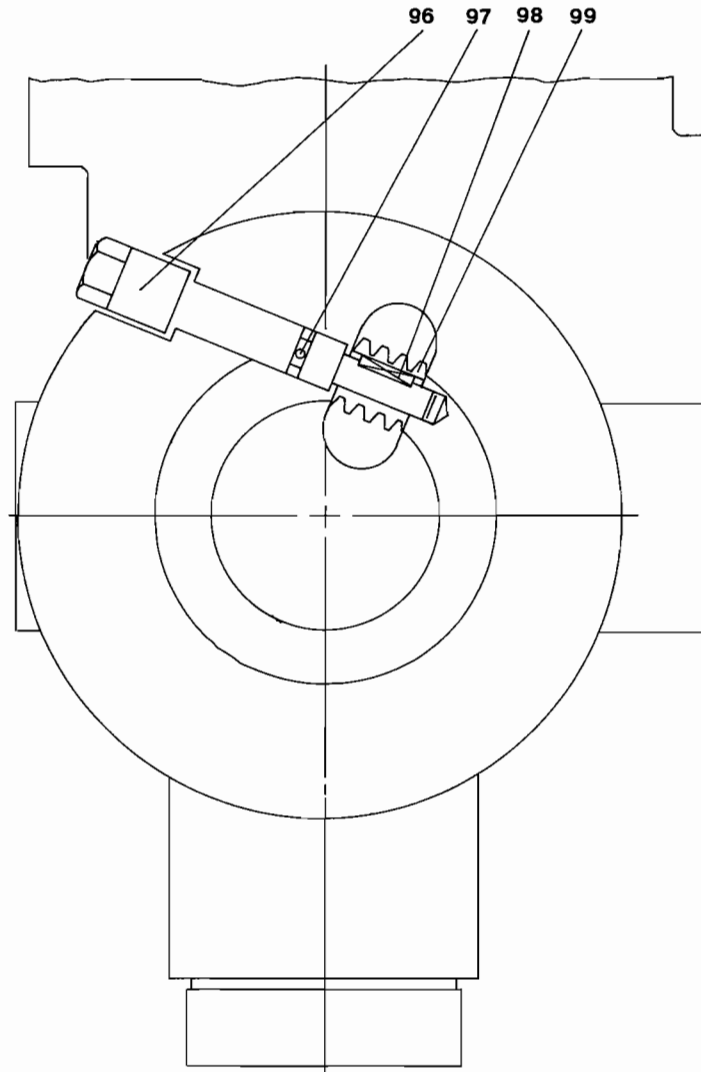
NST #40 HEAD

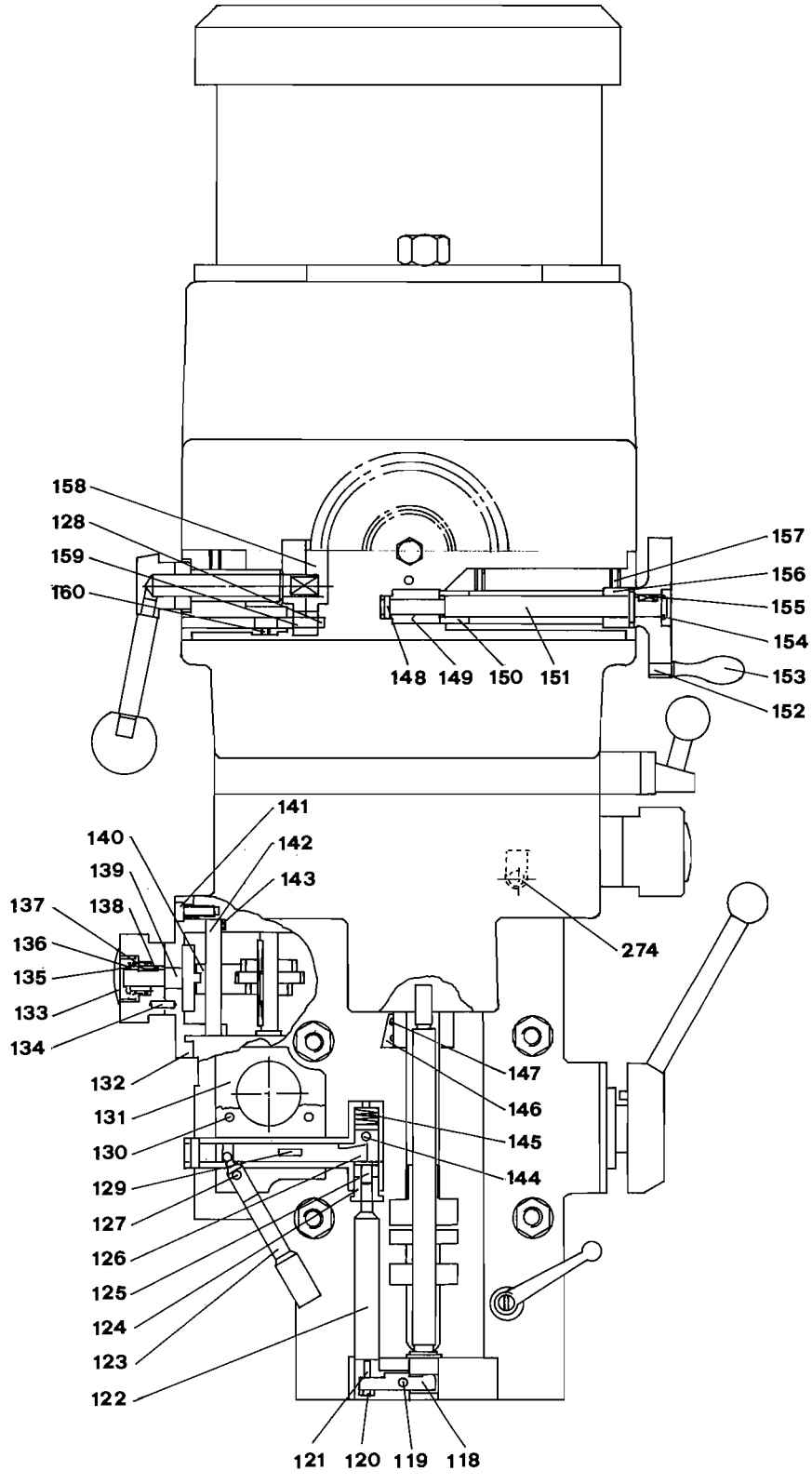


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ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
1	FA-401	Spindle(NST #40)	1	45	630050180	Parallel key (5x5x18)	1
2	FA-402	Quill seal oil	1	46	FB-038	Ware spring washer	2
3	FA-403	Spacer	1	47	FB-031	Pinion bearing cap	1
4	FA-404M	Spindle inner spacer & outer	1	48	615058001	Nut(5/8")	1
6	714719021	Angular ball bearing	2	49	FB-041	Timing belt pulley	1
7	FA-406	Bearing spacer	1	50	606360381	Pan head screw (ϕ 3/16"x3/8")	3
8	FA-058	Spindle quill	1	51	FB-325	Gear housing cover	1
9	FA-300	Head stock	1	52	FB-303	Speed change housing	1
10	701060072	Ball bearing	1	53	403092070	Name plate	1
11	617035000	Lock nut(AN-07)	2	54	FB-085	Full dog	1
12	653035000	Washer(AW-07)	1	55	FB-310	Speed changer gear	1
13	601050100	Hsh cap screw (M5x10)	2	56	FB-056	Hex cap nut	1
14	FA-057	Felt cover	1	57	FB-317	Bush	1
15	FA-422	Felt	1	58	FB-311	Speed change chain drum	1
16	FA-331	Quill stop set screw	1	59	622030030	Spring pin(ϕ 3x30)	1
17	665016000	Outer retaining rings(A-16)	1	60	FB-315	Roller chain	1
	FA-332	Set nut	1	61	FB-059	Speed change chain stud	1
	FA-306	Set nut	1	62	FB-057	Speed change plate	1
	FA-307	Set nut	1	63	622040030	Spring pin(ϕ 4x30)	1
21	403092040	Name plate	1	64	FM-159AM	Pulley	1
22	FA-305	Quill stopper	1	65	FB-014	Spindle pulley bear slide housing	1
23	600100140	Hsh cap screw (M10x14)	1	66	701060104	Bearing(6010-2RS)	1
24	FA-113	Reverse trip ball lever	1	67	600060200	Hsh cap screw (M6x20)	3
25	FA-114	Feed reverse trip plunger	1	68	701060072	Bearing(6007-2Z)	1
26	FA-124	Reverse trip ball lever screw	1	69	FB-409	Draw bar	1
27	FB-401	Spindle output clutch	1	70	FB-006	Top bearing cap	1
28	FB-402	Lock nut	1	71	FB-010A	Key	1
29	701069094	Bearing(6909-2RS)	2	72	606040060	Pan head screw (M4x6)	1
30	FB-403	Wave spring	1	73	665040000	Outer retaining rings(A ϕ 40)	1
31	666068000	Inner ring(B-68)	2	74	FB-012	Stationary driven varidisc	1
32	FB-404	Bearing inner spacer	1	75	701060104	Bearing(6010-2RS)	1
33	FB-024	Spring	3	76	FB-307	Bearing housing cover	1
34	FB-405	Washer	1	77	FB-062	Brake shoes	1
35	635080140	Paraller key(8x8x 14)	1	78	066225110	Timing belt (225L110)	1
36	FB-406	Deceleration gear	1	79	FM-140	Spindle pulley hub	1
37	FB-407	Bush bearing	1	80	FB-017	Timing pulley clutch sleeve	1
38	FB-408	Clutch seat	1	81	633061001	Split pins(1/16"x 1")	1
39	FB-302	Gear box	1	82	FB-318	Screw	1
40	604060080	Hsh cap screw (M6x8)	1	83	615038001	Nut(3/8")	1
41	Fb-039	Pinion shaft	1	84	602041001	Hexagon head (1/4"x1")	1
42	630050180	Parallel key (5x5x18)	1				
43	FB-040A	Pinion	1				
44	701062034	Bearing(6203-2RS)	2				

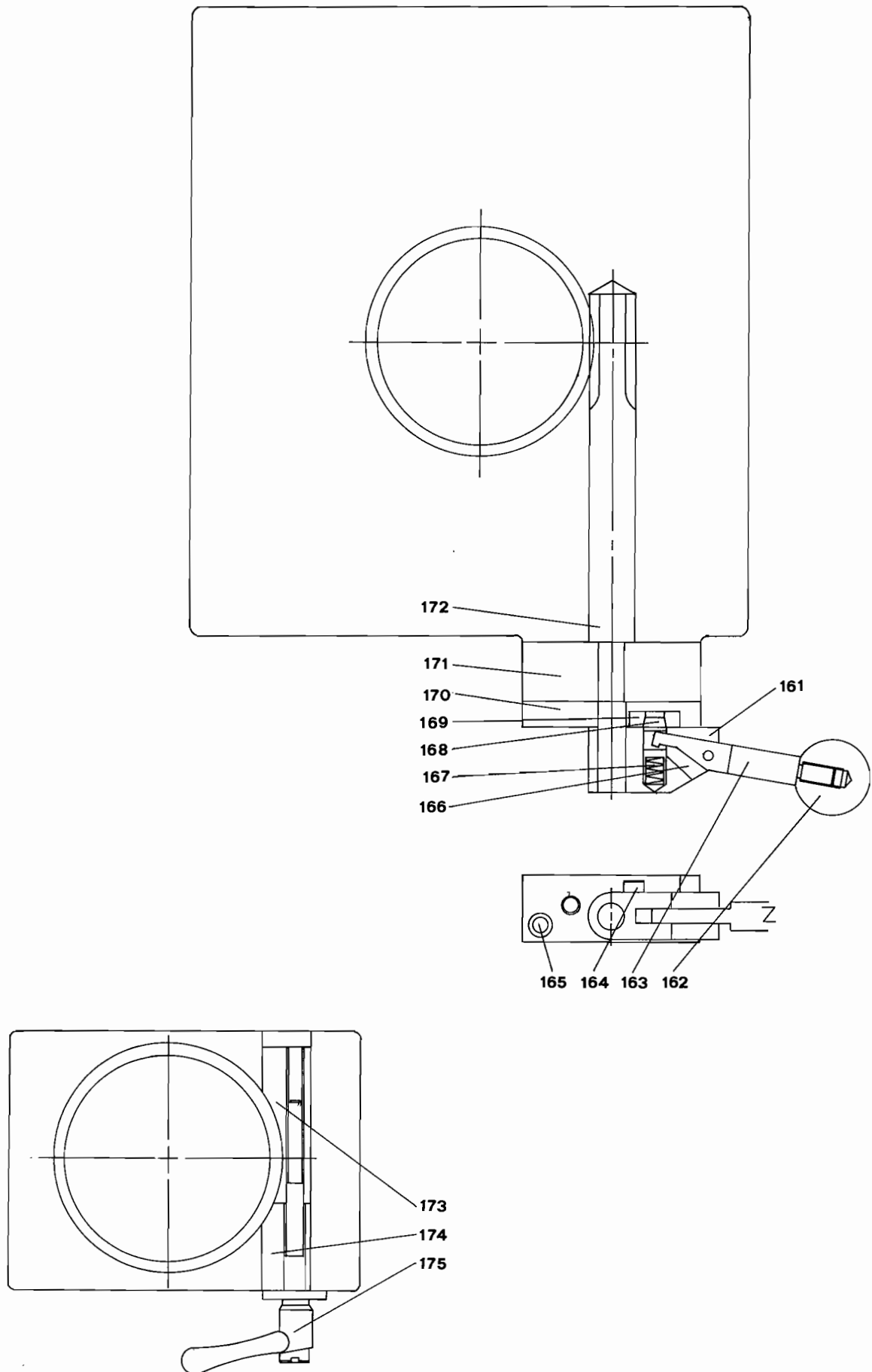
ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
85	FB-069	Brake shoe pivot sleeve	1	102	665024000	Outer retaining rings(A-24)	1
86	652004001	Spring washer(1/4")	1	103	FB-036	Adjust varidisc spring collar	1
87	618004001	Nut(1/4")	1	104	FB-034A	Key	1
88	FB-063	Brake spring	2	105	FB-029AM	Varidisc set	1
89	665012000	Outer retaining rings(A-12)	1	106	FB-305	Cover	1
90	FB-065	Sleeve for brake lock shaft	1	107	FB-035	Spring varidisc motor shaft	1
91	622040024	Spring pin(ϕ 4x24)	1	108	FB-033	Drive key	1
92	FB-319	Brake base	1	109	FB-030	Stationary motor varidisc	1
93	FA-074	Spindle clutch lever	1	110	604060100	Set screw(M6x10)	1
94	AA-039	Ball grip	1	111	FB-088	Iron wire	1
95	FB-313A	Brake lock shaft	1	112	FB-091	Fan plate	1
96	FA-017	Adj worm shaft	1	113	605080581	Round head screws (1/8"x5/8")	4
97	FA-173	Socket set screw	1	114	601050100	Hsh cap screw (M5x10)	4
98	630040180	Parallel key (4x4x18)	1	115	FB-089	Fan	1
99	FA-018	Worm gear	1	116	FB-300	Belt housing	1
100	600080650	Hsh cap screw (M8x65)	2	117	413062156	Motor	1





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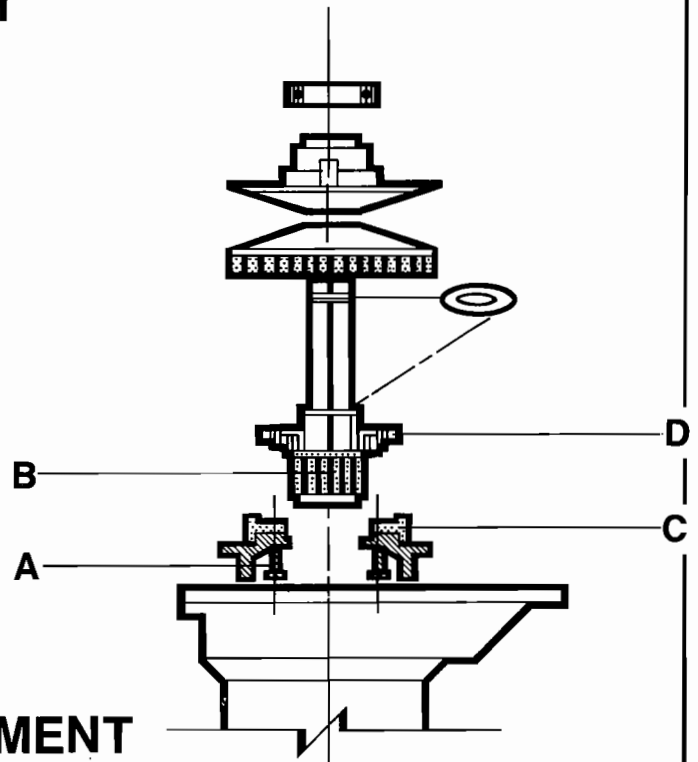
ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
118	FA-098	Feed trip lever	1	161	FB-075	Hi-low pinion	1
119	FA-099	Trip lever pin	1			Block	
120	615004000	Nut(M4)	1	162	FA-006	Black plastic ball	1
121	604040200	Set screw(M4x20)	1	163	FB-070	Hi-low shaft crank	1
122	FA-329	Feed trip plunger	1	164	600040140	Hsh cap screw (M4x14)	2
123	FA-328	Trip handle	1				
124	FA-121	Trip plunger bushing	1	165	600050350	Hsh cap screw (M5x35)	2
125	FA-095	Trip plunger	1	166	622030015	Spring pins(ϕ 3x15)	1
126	FA-091	Cam rod	1	167	FB-072	Spring	1
127	FA-077	Dowel pin	1	168	FB-071	Hi-low petent plunger	1
128	665006000	Outer retaining Rings(A-6)	2	169	FB-073B	Position	1
129	622030008	Spring pins(ϕ 3x8)	1	170	FB-073A	Position block base	1
130	600060200	Hsh cap screw (M6x20)	2	171	FB-324B	Clutch set block	1
131	FA-330	Feed trip bracket	1	172	FB-314	Bull gear shaft	1
132	FA-337	Cluster gear shaft crank	1	173	FA-310	Quill lock sleeve	1
				174	FA-309	Quill lock sleeve	1
133	FA-304	Wheel cover	1	175	FA-088M	Handle	1
134	622040012	Spring pins(ϕ 4x12)	1	176	FA-040	Vertical head fixe nut	12
135	665010000	Outer retaining rings(A-10)	1				
136	FA-327	Spring seat	1	177	FA-042	Fixed washer	4
137	FA-326	Spring	3	178	FA-043	Vertical head fixed bolt	4
138	630030100	Parallel key (3x3x10)	1	179	FA-046	Lower clamping bolt spacer	2
139	FA-311	Cluster gear shaft	1	180	FA-101	Quill pinion shaft	1
140	FA-149	Feed gear shaft fork	1	181	FA-102	Clock spring	1
141	600050100	Hsh cap screw (M5x10)	4	182	FA-101A	Pin	1
142	FA-150	Feed shaft rod	1	183	FA-103	Spring cover	1
143	604050100	Set screw(M5x10)	1	184	FA-105B	Set screw	1
144	622030012	Spring pins(ϕ 3x12)	1	185	FA-105A	Spring	1
145	FA-094	Compression spring	1	186	FA-105	Steel ball support bar	1
146	FA-305A	Indictor	1	187	035036000	Steel ball(ϕ 3/16")	1
147	625020006	Rivet(ϕ 2x6)	2	188	630040180	Parallel key (4x4x18)	1
148	622030012	Spring pins(ϕ 3x12)	1	189	FA-107	Pinion shaft hub screw	1
149	FA-139	Worm	1	190	FA-104	Pinion shaft hub screw	1
150	FB-322	Bush	1	191	FA-106	Back feed handle hub	1
151	FB-309	Worm shaft	1	192	600050120	Hsh cap screw (M5x12)	2
152	FB-308	Speed change handle	1	193	604060120	Set screw(M6x12)	1
153	FB-053	Machine handle	1	194	600040160	Parallel key(M4x16)	3
154	665010000	Outer retaining rings(A-10)	1	195	FA-123	Quill pinion shaft bushing	1
155	630030150	Parallel key (3x3x15)	1	196	FA-122	Pinion shaft worm gear spacer	1
156	FB-316	Bush	1	197	FA-087	Overload clutch worm gear	1
157	604060100	Set screw(M6x10)	2	198	FA-086	Overload clutch ring	1
158	FB-067A	Brake operating finger	2				
159	FB-068	Brake operating finger	1				
160	604060060	Set screw(M6x6)	2				



MAINTENANCE

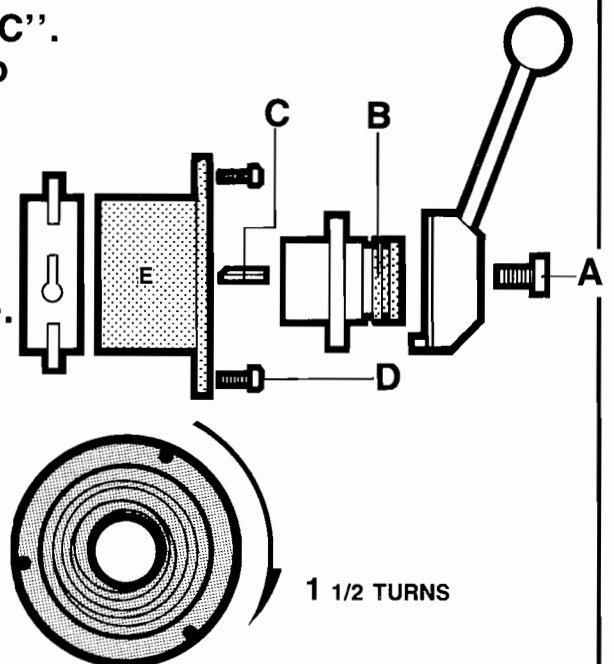
BRAKE SHOE REPLACEMENT

1. Remove the top section.
2. Remove the two screws "A".
3. Remove the clutch hub assembly "B" and "D".
4. Replace the brake shoes "C".



BALANCE SPRING REPLACEMENT

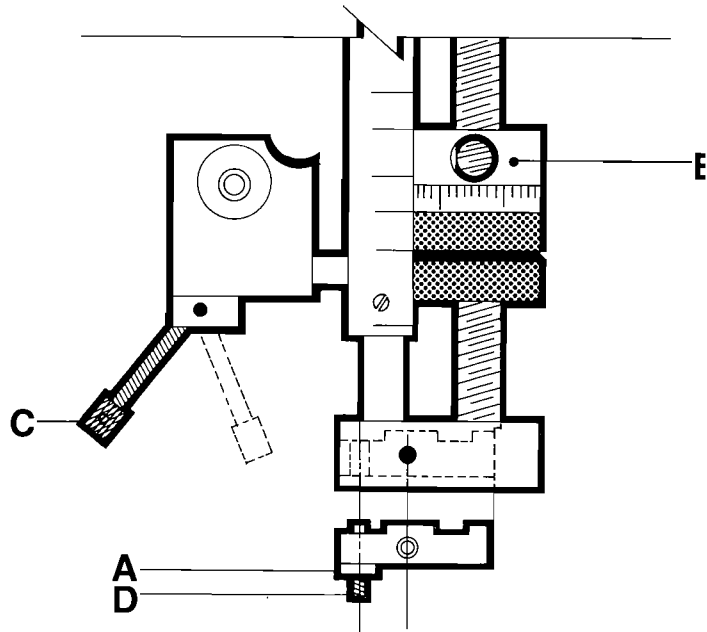
1. With quill at top of movement apply quill lock.
2. Remove screw "A", hub "B", and key "C".
3. Remove screws "D", allowing housing to rotate slowly releasing spring tension.
4. Lift end of spring from peg on the pinion shaft.
5. Rotate housing "E" counter-clockwise from head casting.
6. Remove spring from housing and replace.
7. Refit spring to main housing casting, turning housing clockwise until spring locates on peg in pinion shaft.



MAINTENANCE

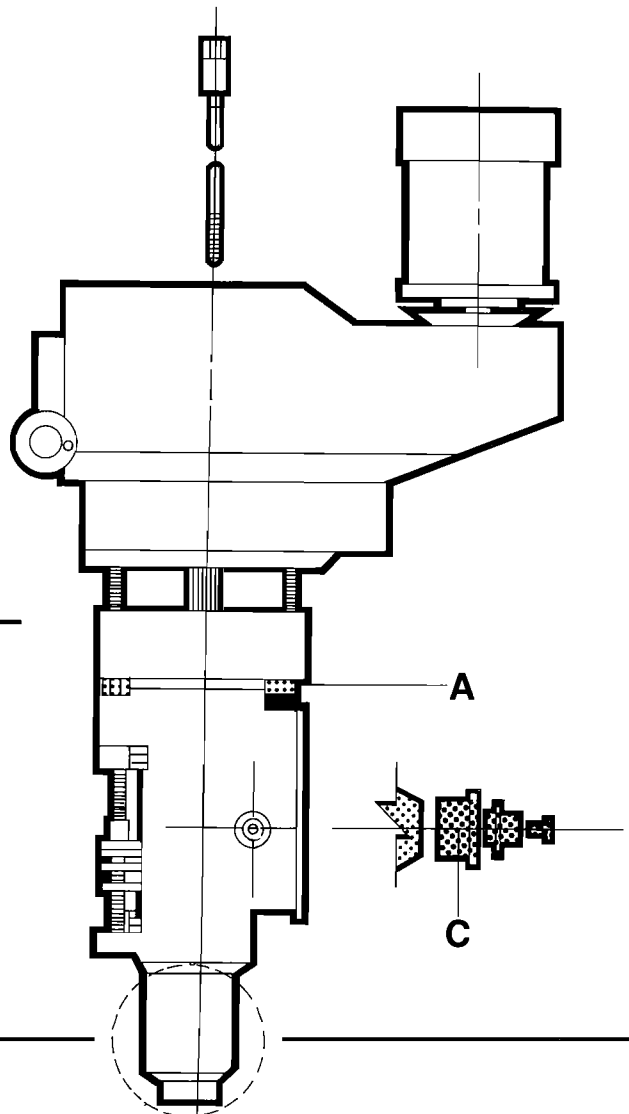
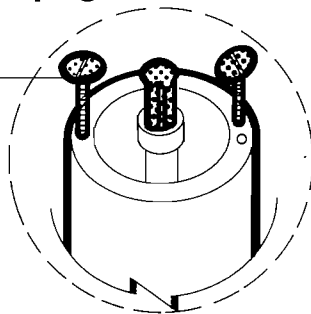
FEED TRIP ADJUSTMENT

1. Release lock nut "A".
2. Engage trip handle "C".
3. Adjust micro nuts against quill stop "B".
4. Slowly turn adjusting screw "D" until lever "C" trips.
5. At this point secure locknut "A".
6. Check that full trip action is obtained.



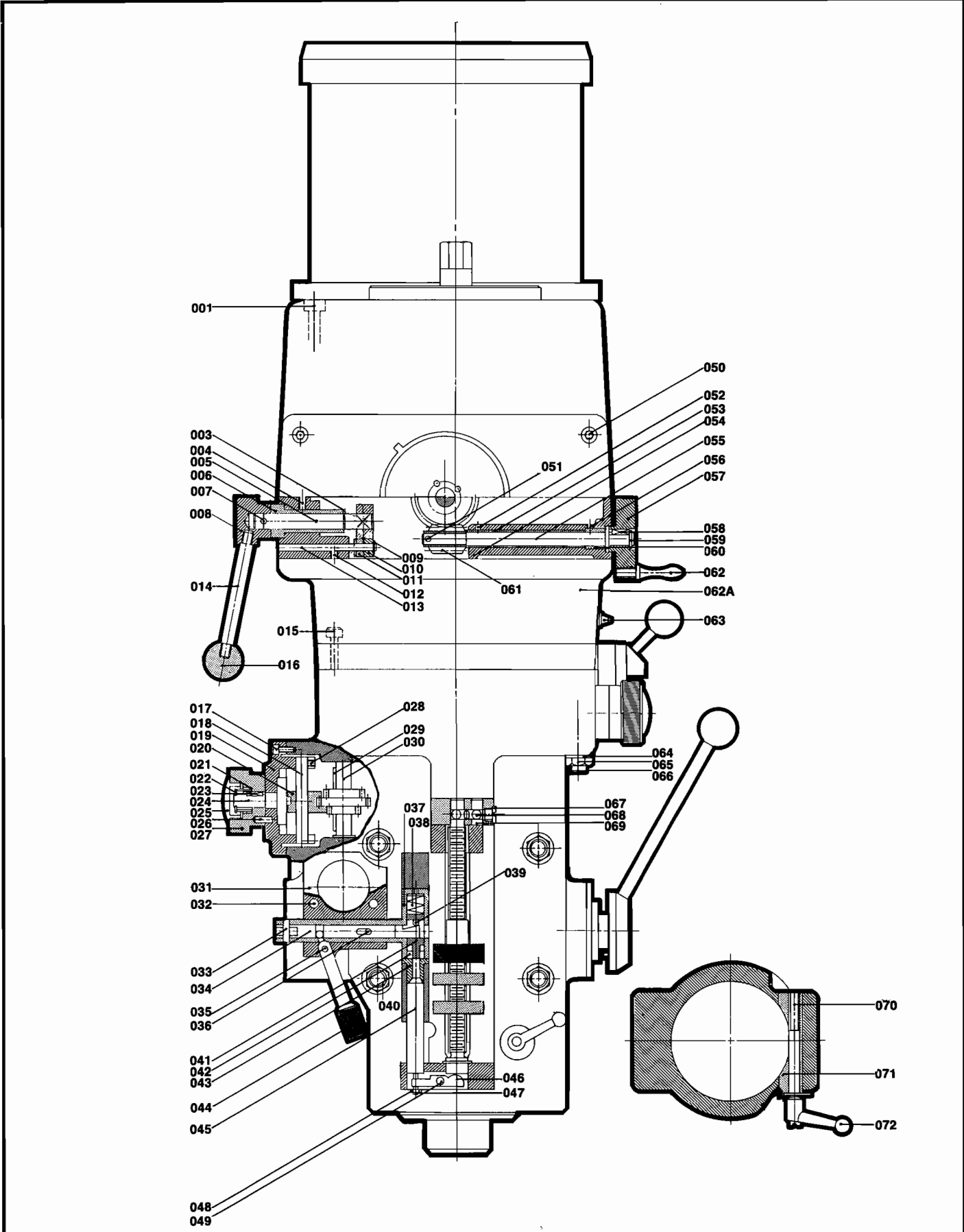
QUILL REMOVAL

1. Disconnect electrical
2. Remove motor.
3. Remove drawbar.
4. Full extend quill fully.
5. Remove four nuts "A".
6. Remove top section completely.
7. Remove two screws "B" from top of quill.
8. Remove clock spring housing "C" — see instruction on page 20 for replacement of spring. B



PARTS LIST

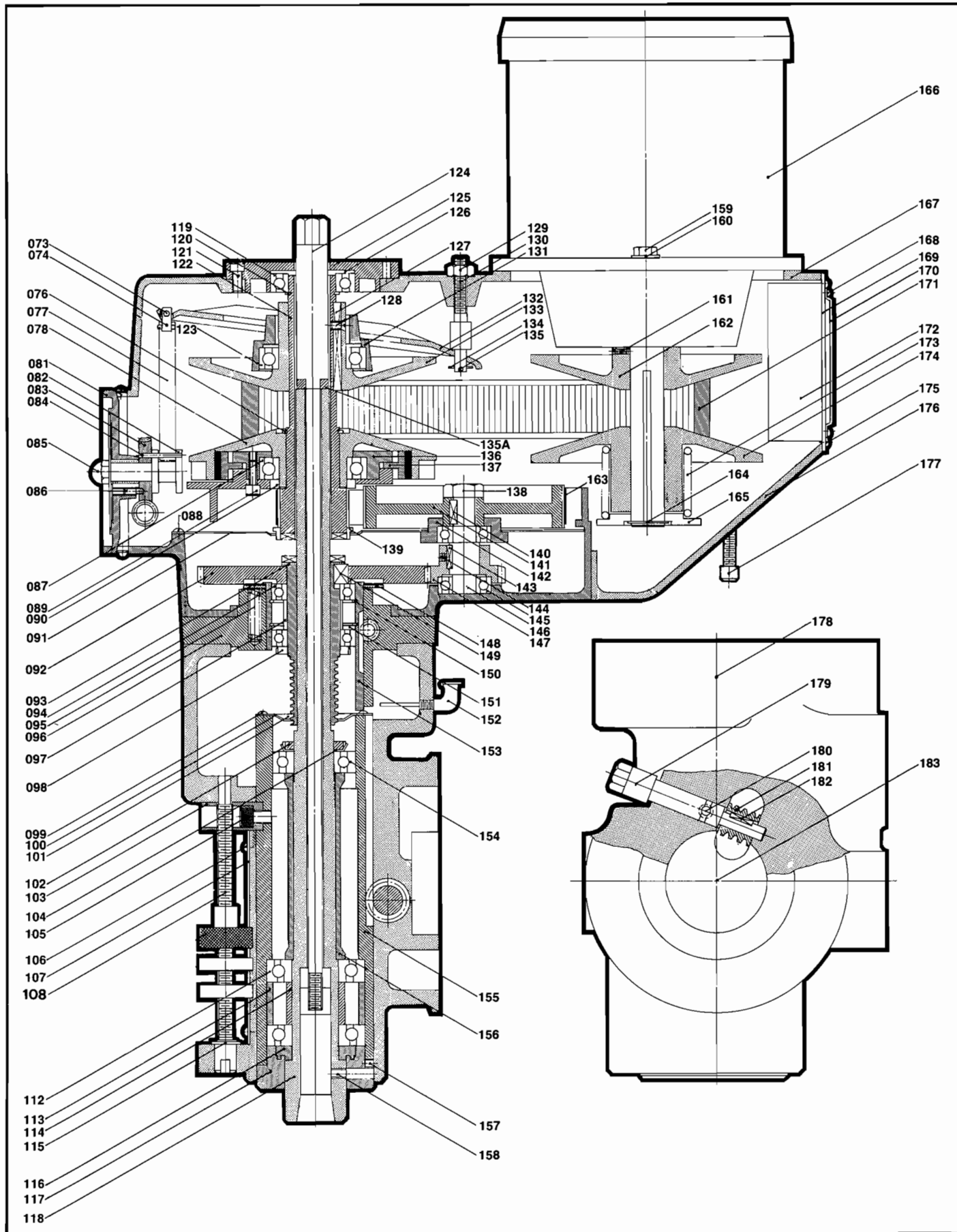
ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
001	600081500	Hex-Socket cap (M8 x 150) screws	4	037	FA - 093	Cam rod sleeve	1
003	665012000	Outer retaining (A-12)	1	038	FA - 094	Compression spring	1
004	604060060	Set screw (M6 x 6)	1	039	622030012	Spring pin (φ3x 12)	1
005	FB - 313A	Brake lock shaft	1	040	FA - 040	Head fixed nuts	4
006	FB - 065	Sleeve for brake lock shaft	1	041	FA - 095	Trip plunger	1
007	622040024	Spring pin (φ4 x 24)	1	042	FA - 096	Pad	1
008	FB - 319	Brake handwheel	1	043	FA - 121	Trip plunger bushing	1
009	665006000	Outer retaining (A-6)	1	044	FA - 328	Trip handle	1
010	FB - 067A	Brake finger pivot stud	1	045	FA - 097	Feed trip plunger	1
011	FB - 067A	Brake finger pivot stud	1	046	FA - 098	Feed trip lever	1
012	604060060	Set screw (M6 x 6)	1	047	604040200	Set screw (M4 x 20)	1
013	FB - 068	Brake operating finger	1	048	615004000	Nut (M4)	1
014	FA - 074	Brake handle	1	049	FA - 099	Trip lever pin	1
015	600080200	Hex-Socket head cap screws (M8 x 20)	4	050	600060300	Hex-Socket head cap screws (M6 x 30)	4
016	AA - 039	Black plastic ball	1	051	622030012	Spring pin (φ3x 12)	1
017	600050100	Hex-Socket head cap screws (M5 x 10)	4	052	604060060	Set screw (M6 x 6)	1
018	FA - 150	Feed shift rod	1	053	FB - 322	Bushing	1
019	FA - 337	Cluster gear cover	1	054	FB - 301	Flange sleeve	1
020	FA - 149	Feed gear shift fork	1	055	FB - 309	Speed control shaft	1
021	FA - 326	Spring	1	056	604060060	Set screw (M6 x 6)	1
022	665010000	A-10 outer retaining ring	2	057	FB - 308	Speed change handw heel	1
023	630030100	3 x 3 x 10 key	2	058	630030120	3 x 3 x 12 key	1
024	FA - 311	Cluster gear shaft	1	059	665010000	A-10 outer retaining ring	1
025	FA - 304	Cover	2	060	FB - 316	Flange sleeve	1
026	622040012	Spring pin (φ4 x 12)	1	061	FA - 139	Worm	1
027	FA - 323	Handwheel	1	062	FB - 053	Speed change handw-heel knob	1
028	604050100	Set screw (M5 x 10)	1	062A	FB - 302	Gear housing	1
029	630030460	Parallel key (3x3x46)	1	063	076008000	1/8"-28 PT nipple	1
030	FA - 143	Cluster gear shaft	1	064	652038001	Spring washer (3/8")	4
031	FA - 330	Feed trip bracket	1	065	615038001	Nut (3/8")	4
032	600060200	Hex-Socket head cap screws (M6 x 20)	2	066	FB - 077	Studs	4
033	FA - 077	Dowel pin	1	067	FA - 124	Reverse trip ball lever screw	1
034	FA - 091	Cam rod	1	068	FA - 113	Reverse trip ball lever	1
035	FA - 077	Dowel pin	1	069	FA - 114	Feed reverse trip plunger	1
036	622030008	Spring pin (φ3 x 8)	1	070	FA - 110	Quill lock sleeve tapped	1
				071	FA - 111	Quill lock sleeve	1
				072	FA - 088M	Handle assembly	1



ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
073	622040030	Spring pin	1	105	600100140	Hex-Socket head cap screw (M10 x 14)	1
074	FB - 059	Speed change chain stud	1	106	625020006	Rivet (Φ2x6)	2
076	665040000	A-40 retaining ring	1	107	403092040	Micrometer scale (Metre)	1
077	FB - 315	Roller chain	1	403092050	Micrometer scale (Inch)	1	
078	FB - 012	Stationary driven varidisc	1	108	FA - 331AM	Quill stop micro screw (Metre)	1
081	FB - 303	Speed changer housing	1	FA - 331BM	Quill stop micro screw (Inch)	1	
082	FB - 311	Speed changer chain drum	1	FA - 307A	Micrometer nut (Metre)	1	
083	FB - 310	Speed changer gear	1	FA - 307B	Micrometer nut (Inch)	1	
084	622030030	Spring pin (Φ3x 30)	1	FA - 306A	Quill micro stop nut (Metre)	1	
085	FB - 056	Hexagon cap screw	1	FA - 306B	Quill micro stop nut (Inch)	1	
086	FB - 085	Full dog	1	111	FA - 332A	Fixed nut (Metre)	1
087	701060104	Bearing (6010 2RS)	1	FA - 332B	Fixed nut (Inch)	1	
088	606360381	Pan head screw (3/16" x 3/8")	3	112	714072075	Bearing (7207C/P4 DB)	2
089	600060150	Hex-Socket head cap screws (M6 x 15)	2	113	FA - 054	Bearing spacer	1
090	FB - 016	Spindle pulley spacer	1	114	FA - 053	Bearing spacer	1
091	FB - 325	Gear housing plate	1	115	665016000	A-16 retaining ring	1
092	FB - 021A	Spindle bull gear	1	116	FA - 052	Spindle dirt shield	1
093	FB - 018	Spindle gear hub	1	117	FA - 051A	Nose-piece (For N.T. #30)	1
094	701069084	Bearing (6908 2RS)	2	FA - 051B	Nose-piece (For R8 taper)	1	
095	FB - 024	Compression springs	3	118	FA - 050A	Spindle (N.T. #30)	1
096	FB - 304	Fixed clutch bracket	1	FA - 050B	Spindle (R8 taper)	1	
097	FB - 027	Bull gear bearing spacer	1	119	701060072	Bearing (6007 2Z)	1
098	FB - 019	Bearing locknut	1	120	665035000	A-35 retaining ring	1
099	601050100	Round head screws (M 5 x 10)	2	121	600060200	Hex-Socket head cap screws (M6 x 20)	3
0100	FA - 057	Oil strainer for quill bearing	1	122	FB - 015	Spindle pulley hub	1
0101	FA - 056	Felt	1	123	701060104	Bearing (6010 2RS)	1
0102	617030000	Lock nut (M30 x 1.5P)	2	124	FA - 213C	Drawbar (N.T. #30, 1/2-12W: standard)	1
0103	FA - 305	Quill stop knob	1	FA - 213E	Drawbar (N.T. #30,	1	
0104	653030000	AW-06 washer	1				

ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
		1/2-13UNC: option)		151	FB - 028	Wave spring	1
	FA - 213D	Drawbar (N.T. #30,	1	152	075008000	Oil cup (1/8''-28PT)	1
		M12-1.75P: option)		152-1	062060000	Pipe (Φ6×100)	1
	FA - 213B	Drawbar (R8,7/16-20	1	153	FB - 306	Bearing sleeve	1
		UNF: option)		154	701062060	Bearing (6206)	1
	FB - 086A	Drawbar (N.T. #30 for	1	155	FA - 058	Quill	1
		RT. angle attach)		156	FA - 055B	Sleeve	1
	FB - 086B	Drawbar (R8 for RT.	1	157	604050060	Set screw (M5 × 6)	1
		angle attach)		158	FA - 172	Special socket set screw (for R8 only)	1
125	FB - 006	Top bearing cap	1	159	602381041	Hexagon head bolts	2
126	FB - 028	Wave spring	1	160	652038001	Spring washers (3/8'')	2
127	FB - 010A	Key	1	161	604060100	Set screw (M6 × 10)	1
128	606040060	Pan head screw (M4×6)	1	162	FB - 030	Stationary motor varidisc	1
129	615038001	Nut (3/8'')	1	163	066225110	Belt (225L, 110)	1
130	FB - 318	Speed change plate	1	164	665024000	A-24 retaining ring	1
		pivot stud		165	FB - 036	Adjust varidisc spring collar	1
131	FB - 014	Spindle pulley bearing	1	166	413062156	Motor (3HP220/440 60cycle)	1
		sliding housing		167	FB - 300	Belt housing	1
132	FB - 057	Speed change plate	1	168	605080581	Round head screws (1/8'' × 5/8'')	4
133	FB - 008M	Varidisc	1	169	FB - 091	Plate	1
134	FB - 084	Washer	1	170	FB - 088	Iron wire	1
135	633061001	Cotter pin (1/16''×1'')	1	171	FB - 082	Belt (383032B-13)	1
135A	FA - 212	Washer (for R8)	1	172	FB - 089	Fan	1
	FA - 212A	Washer (for N.T.#30)	1	173	FB - 035	Compression spring	1
136	FB - 007	Brake bearing cap	1	174	FB - 029	Adjustable motor varidisc	1
137	FB - 307	Brake shoes	1	175	605050100	Round head screws (M 5 × 10)	4
138	615058001	Nut (5/8'')	1	176	FB - 305	Motor pulley cover	1
139	FB - 017	Timing belt clutch sleeve	1	177	600080650	Hex-Socket head cap screws (M8 × 65)	2
140	630050180	Parallel key (5 × 5 × 18)	1	178	FA - 300A	Head	1
141	FB - 041	Timing belt pulley	1	179	FA - 017	Adj. worm shaft	1
142	FB - 031	Pinion bearing cap	1	180	FA - 173	Socket set screw	1
143	630050180	Parallel key (5 × 5 × 18)	1	181	FA - 018	Worm gear	1
144	604060080	Set screw (M6 × 8)	1	182	630040180	Parallel key (4 × 4 × 18)	1
145	701062034	Bearing (6203 2RS)	2	183	FD - 001	Worm wheel gear	1
146	FB - 039	Pinion shaft	1				
147	FB - 040A	Pinion	1				
148	FB - 025	Washer	1				
149	635080140	Parallel key (8 × 8 × 14)	1				
150	666062000	B-62 retaining ring	1				

C



ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.	ITEM NO.	COMP NO.	DESCRIPTION	Q.T.Y.
184	604060060	Set screw	1	205	FA - 142	Bevel gear bushing	1
185	FA - 320	Worm gear cradle	1	206	665016000	A-16 outer retaining ring	1
186	FA - 160	Feed bevel pinion	1		604060120	Set screw (M6 x12)	1
187	FA - 167	Feed engage pin	1	207	604060120	Set screw	1
188	FA - 325	Worm gear cradle throw-out	1	208	FA - 133	Feed worm shaft	1
189	600040100	Hex-Socket head cap screws (M4 x 10)	3	209	622030018	Spring pin (φ3x 18)	1
190	FA - 304	Cover	1	210	FA - 168	Bushing	1
191	FA - 323	Speed select handle	1	211	FA - 139	Worm	1
192	FA - 154	Feed reverse bevel gear	1	212	FA - 138	Feed worm shaft bushing	1
193	600080160	Hex stock cap screw (M8x16)	1	213	FA - 137	Feed worm shaft thrust washer	1
194	FA - 153	Washer	1				
	650008000	Spring washer (M 8)	1				
195	630030080	3 x 3 x 8 key	1	215	FA - 135M	Feed reverse bevel gear	1
197	FA - 171	Set screw	1	216	FA - 163	Worm gear spacer	1
199	FA - 156A	Cluster gear input shaft	1	217	FA - 162	Worm cradle bushing	1
200	630030100	Key 3 x 3 x 10	1	218	FA - 161	Feed worm gear shaft sleeve	1
201	FA - 157	Feed drive gear	1	219	622030016	Spring pin (3 x 16)	1
202	735000660	IKO BA-66 needle bearing	1	220	FA - 164	Feed drive worm gear	1
203	FA - 140A	Feed reverse bevel pinion	1	221	630030200	Key (3 x 3 x 20)	1
204	FA - 141	Bevel gear thrust spacer	1	222	FA - 147	Cluster gear shaft upper bushing	1
				223	FA - 165	Feed drive worm gear shaft	1
				224	604060120	Set screw (M6 x 12)	1

