

multico

**MORTISING MACHINE
MODEL 'M'**

INSTRUCTION BOOK

MULTICO LIMITED

**BRIGHTON ROAD, SALFORDS
REDHILL, SURREY, RH1 5ER
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Code 02934**

TAKE CARE OF THIS BOOK – YOU MAY NEED IT

13788

ALWAYS QUOTE SERIAL NO.
OF MACHINE WHEN
ORDERING SPARES

GENERAL INSTRUCTIONS FOR USE OF MULTICO MORTISING MACHINE MODEL "M"

1. To remove carton, lay machine on its back, open top of carton and cut down the four corners. Remove packing pieces.
2. The cabinet stand is delivered packed in the same carton as the machine and is in kit form ready for assembly. Refer to drawing and assemble as follows:—
 - (a) Bolt cabinet ITEM No. 133 to base of Mortiser with the four M8 screws and washers provided. Note before fully tightening the screws check that holes in panel ITEM No. 134 match tapped holes in ITEM No. 133, spring sides of ITEM No. 133 if necessary to match holes.
 - (b) Fit panel ITEM No. 134 with six M5 screws provided.

The machine may now be lifted to a vertical position and the two transit screws removed (one at lower front of column just below rack and one on left hand side of column. These screws hold weight steady in transit.
3. Clean off anti-rust protection by using a suitable solvent.
4. Connect mains supply to switch, checking that voltage etc. as shown on motor plate corresponds with supply. Should direction of three phase motor be wrong, correct by changing over any two leads of supply (colour brown). The motor spindle should run in a clockwise direction.

FITTING AND CHANGING OF HOLLOW SQUARE CHISEL

The Multico Mortiser has been designed to take chisels ranging from $\frac{1}{4}$ " to $\frac{3}{4}$ ". Also available metric chisels and bits—in the following range:— 6.0mm, to 19.0mm, and the notes which follow apply to all these sizes. The machine is supplied with four bushes to suit the various drill shank diameters. These four bushes will suit the complete range of chisels. Use only MULTICO chisels and bits.

Tools required for fitting chisels are:—

One 4mm A/F Allen Key.

One M6/M8 Spanner.

TO FIT CHISELS

1. Select the correct bush K24, for the drill shank of the required chisel and assemble into the coupling K21/M1 or M202/1. Press the bush up as far as it will go, checking that the hole in the side of the bush lines up with the grub screw. Screw in this grub screw until it enters the hole in the side of the bush, far enough to prevent the bush from falling out.
2. Assemble the chisel, drill, chisel bush K31 and adjusting collar K32/1. Set the adjusting collar K32/1 low on the thread.
3. Remove clamping pads 61-790 and bolt completely from the headstock. Insert the whole of the chisel assembly into the head, then, holding the chisel up, align the flat on the drill shank with the grub screw in coupling and push up until it butts hard against the cross pin in the coupling. Holding drill up firmly, lock up grub screw with allen key. (If drill shank is not butted against cross pin it may push up when in use and ruin chisel). Replace the two clamping pads in headstock one from either side, so that they pass through the slot in the chisel bush, and the angled faces contact the chisel shank. Replace the bolt, but do not tighten. The chisel should now be resting on the flared end of the drill. Adjust the knurled collar K32/1 until there is approximately 1.5mm (the thickness of a penny is a good guide) clearance between the top collar and the head casting. Push the chisel up as far as the collars will allow thus transferring the clearance to between chisel end and drill point. Set chisel square to inside table back, with lower clearance slots to the side, and tighten bolt through clamping pads firmly.
Rotate coupling by hand to check that everything is running freely. Lock collar K32/1.
The clearance of 1mm/2mm may be varied to suit type of wood and size of chisel. Generally the larger chisels require greater clearance.

4. Keep Chisels Sharp, blunt tools do not cut.

To change chisel, slacken bolt on clamping pads and grub screw on coupling and withdraw chisel and bit. Undo grub screw until drill bush can be withdrawn. It is usually unnecessary to remove the chisel bush, but remember to reset the adjusting collar. A piece of wood placed on the table will avoid damage to the chisel should it drop during removal.

Sets of chisel-sharpening tools are readily available ex stock.

IMPORTANT. It is unnecessary at any time to unscrew the grub screw at the top of the coupling. This locks the coupling onto the motor shaft.

FITTING DRILL CHUCK (Optional Accessory)

Remove clamping pads and bolt from headstock and push drill adaptor bush into place in bottom of headstock. Replace clamping pads ensuring that the angled faces are in contact with bush and lightly tighten the bolt. Pass drill chuck adaptor shaft through bush and into coupling, checking that the flat on the shaft lines up with the grub screw. Push up drill chuck as far as it will go and tighten grub screw securely. Tighten clamping bolt sufficiently to prevent the bush from rotating in the headstock. Drop a little oil round the shaft at the top of the bush. This should be done periodically during operation, as the shaft rotates at highspeed in the bush and adequate lubrication is essential.

(Write for particulars of saw tooth centre bits which drill up to 50mm)

DO NOT OVERLOAD. The Motor switch is fitted with a thermal overload cut-out, and if the motor is overloaded will automatically switch itself off. If this occurs, check the rotating parts are running freely, and lubricate if required. If all is free then it may be necessary to reduce drilling pressure slightly, i.e. operate at a slower rate of feed.

OPERATING INSTRUCTIONS

When clamping timber ensure that the clamp bracket pin locates in the nearest hole in the table as possible to the job, therefore reducing the amount of thread to be used, this also reduces the strain on the clamp mechanism and increases the rate of operation.

If a mortice or hole is required to a definite depth, bring chisel or drill down to the surface of the work. Set the lower stop M320/4 by loosening the screw with the allen key provided and sliding up until the distance between this stop and the peg M263 on the headstock is the depth required, then tighten screw. Two depths may be obtained by setting the upper stop M320/2/M320/3 in the same way. This will give one depth and by moving the upper stop to the left, the lower stop becomes effective for the second depth. When cutting a mortice or drilling right through a piece of timber set the lower stop so that chisel does *not* touch the table at its lowest position. Place a piece of wood on the table thicker than the clearance between chisel and table and clamp the work piece on top of this.

When cutting a deep mortice it is advisable to take the chisel down in stages of about 25mm, moving the table along for each successive cut. This enables the chisel to clear itself of chips, and avoid subsequent overheating, particularly when cutting hard or green wood.

When morticing long or heavy timbers, the main bulk should be supported off the table.

A mortice distance bar is available as an accessory if required for spacing mortices in long timber.

Operating handle can be set at any convenient position to suit the height of timber being morticed, by releasing locking star wheel 33-553 and adjusting on serrations.

A locking lever is fitted on the left hand side of the cross travel slide for locking the cross slide in position during repetition work. Side stops are also fitted for limiting the extent of the table movement as required.

Should, after long use, the tables or the headstock develop a degree of side play, this can be rectified by slackening slightly the three retaining bolts on the slide concerned, and tapping the slide until side play is eliminated, but taking care not to interfere with normal movement. Tighten retaining bolts firmly after adjustment.

ELECTRICAL INSTALLATION

To avoid possible operating problems certain factors must be recognised when a machine is to be run off a **SINGLE PHASE SUPPLY** (usually 240 volts).

The electrical supply voltage at the motor terminal block must be within the voltage band indicated on the motor or within plus or minus 6% if a "spot voltage" is indicated.

An unacceptably low voltage is the most common problem; this generally being due to an inadequate cable size coupled possibly with an excessive cable run from service supply point to the machine.

RECOMMENDATIONS:—

Cable Size Sq. m.m.	CABLE RUN	
	Up to 50 metres max., power	50 to 100 metres max., power
1	.37 kw. (.5 hp.)	—
1.5	.55 kw. (.75 hp.)	—
2.5	.75 kw. (1 hp.)	.37 kw. (.5 hp.)
4.0	1.10 kw. (1.5 hp.)	.55 kw. (.75 hp.)
6	1.50 kw. (2 hp.)	.75 kw. (1 hp.)
10	{ 2.20 kw. (3 hp.) 3.0 kw. (4 hp.)	1.10 kw. (1.5 hp.)
16		1.5 kw. (2 hp.)
		2.2 kw. (3 hp.)
		3.0 kw. (4 hp.)

The above cable sizes will ensure there is no more than 2.5% voltage drop on full load.

Other machines running off the same supply line and at the same time should be taken into account to establish the total load on the line before verifying cable size.

Excessive voltage drop prevents the motor reaching operating speed in sufficient time (within 5 secs.) to avoid damage to the capacitors and motor windings. Expensive repair costs arising from motor failure under these circumstances must be excluded from any claim under warranty and furthermore our right must be reserved to charge for time spent in identifying this type of problem.

In general terms Single Phase Motors should not be started more frequently than once every 10 minutes — otherwise failure can occur as described for low voltage conditions. Continuous running will not in anyway be detrimental.

A standard 13 amp. socket should not be used above .75kw (1HP) or F/L amp. rating of 7.2. This important limitation is due to an initial *starting* current of F/L amps. x 4.5 i.e. 32 amps. A 13 amp. *Fused* socket will only carry 32 amps. for approx. 2 seconds.

It should be mentioned that the No-Volt and Overload Release Starter provided with the majority of machines cannot offer motor protection under low voltage supply conditions.

The Starter is correctly set at the factory to correspond with the F/L amp. rating indicated on the motor – re-adjustment should not be necessary.

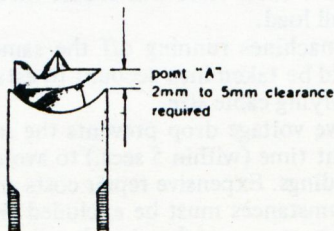
When a machine is supplied without a NVOR Starter as standard equipment, Electrical Regulations require that such a starter is installed to operate the machine in a position convenient to the Operator. A suitable Starter can be supplied on request (setting may be necessary).

Three Phase supply (usually 415 volts). Electrical installation is less critical than with Single Phase supply. Attention is however drawn to the need for cable sizes to comply with I.E.E. Regulations and also for mains fuses to be able to *carry* six times the full load current for the starting period. Otherwise “single phasing” can occur resulting in expensive damage to one or two of the motor windings.

IF IN DOUBT CONSULT A QUALIFIED INDUSTRIAL ELECTRICIAN.

Before despatch from the factory every machine is test run and therefore assuming correct electrical installation, and excluding possible damage in transit, everything possible has been done to ensure no operating problems. If problems do arise, operating procedures should be carefully investigated.

CORRECT USE OF HOLLOW SQUARE CHISELS AND BITS



How to adjust chisel and bit in machine.

You can expect excellent service from STAR-M tools if proper care is taken in using them. Before you set the chisel and bit, be sure to check the following points.

*Always keep the tip of chisel and bit sharp and correctly shaped.

*If you use a badly worn bit, chip clearance will be difficult leading to breakage of the chisel, but if you use the bit correctly shaped then the chisel will last longer and give excellent service.

*Replace the worn bit with a new one. Breakage of the chisel invariably occurs from using a damaged bit.

Adjustment of chisel and bit in machine.

1. Fit correct size bit through chisel shank as far as it will go.
2. Raise entire assembly up into the machine socket, and secure bit shank firmly in this position.
3. Push the chisel firmly home into the socket and hold shank tightly.
4. Make sure the entire assembly is correctly held with proper clearance of 2mm-5mm at point "A". Correct clearance at this point should be maintained in any case. If there is no clearance and bit nose comes in contact with the cutting bevel of the chisel, friction occurs which finally causes the chisel to break.
5. Start the machine slowly to see if the bit rotates smoothly and if so, the entire assembly is correctly set.
6. Always secure the chisel and bit firmly. Breakage of the chisel, in most cases, occurs when there is not enough clearance at point "A".

Abrasion of Chisel and Bit.

The hollow chisel and bit is completely different to other tools and performs the boring, wood cutting, and ejecting of chips from the opening of the chisel all at the same time. The chips are conveyed in the twist of bit through the hollow of the chisel and ejected from the opening. Abrasion will be seen where excess friction occurs in chip clearance.

Bit Abrasion.

Examining the bit nose. You will see the tips of the brad point, spur and cutting lip dulled when abrasion begins. Sharpen these points with a square or flat smooth file of suitable size, but always file the inside of spur, or cutting lip from below in the throat of the bit. Never file the outside of the spur. Never grind the bit nose. When sharpening please try to maintain the original shape.

Then examine the twist. If you see any signs of wear in the twist such as irregular grooves or hollows on the external surface of the twists, the bit is badly worn and impossible to reform in any way, and replacement is necessary.

Abrasion of the bit usually occurs thrice as much as that of the chisel. That is, the chisel is three times as durable as the bit, and if you replace a badly worn bit, the chisel will again outlast it.

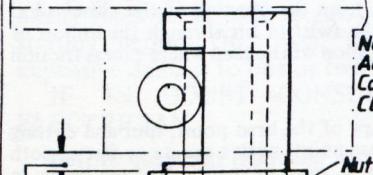
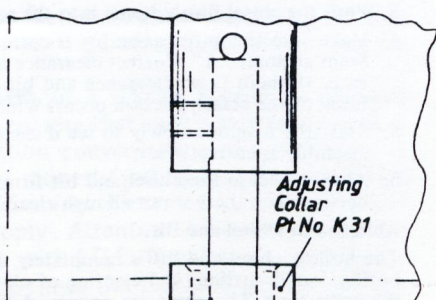
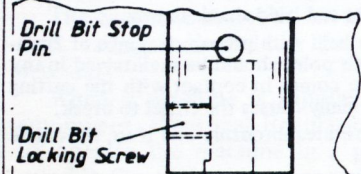
Chisel Abrasion.

Look downward into the hollow of the chisel from the angle of the blade tip. When the four angles of the inside blade bevel, at the point of turning into the round hollow are dulled, or the square cut corners become round, the angles or the corners should be filed to regain the original shape.

When abrasion occurs to the extent of making the thickness of the entire blade noticeably thin, the blade will be liable to break in operation. When you see excessive abrasion, it is advisable to replace the chisel with a new one.

How to avoid the breakage of the chisel.

Breakage will occur from excessive abrasion. In most case, abrasion is seen in the bit. Replace the bit immediately when you find the strokes heavy, or see the morticed hole has a very rough surface, or in the case of binding chip clearance.



Note: Slot in Adjusting Collar Must Clear Lock Pad

Adjust Nut To Obtain Chisel Clearance 'A' As Shown in Fig. 2.

Correct Clearance Can Be Measured By Pushing Chisel and Nut Up To Face 'F'. When Correct, Fix Position With Lock Pad Through Hole 'H'.

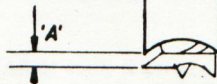
FACE 'F'

There Should Be No Gap Between Top Of Nut and Casting Face 'F'.

FIG. 1.

FIG. 2.

Clearance $A = 2 \pm 0.5 \text{ mm}$



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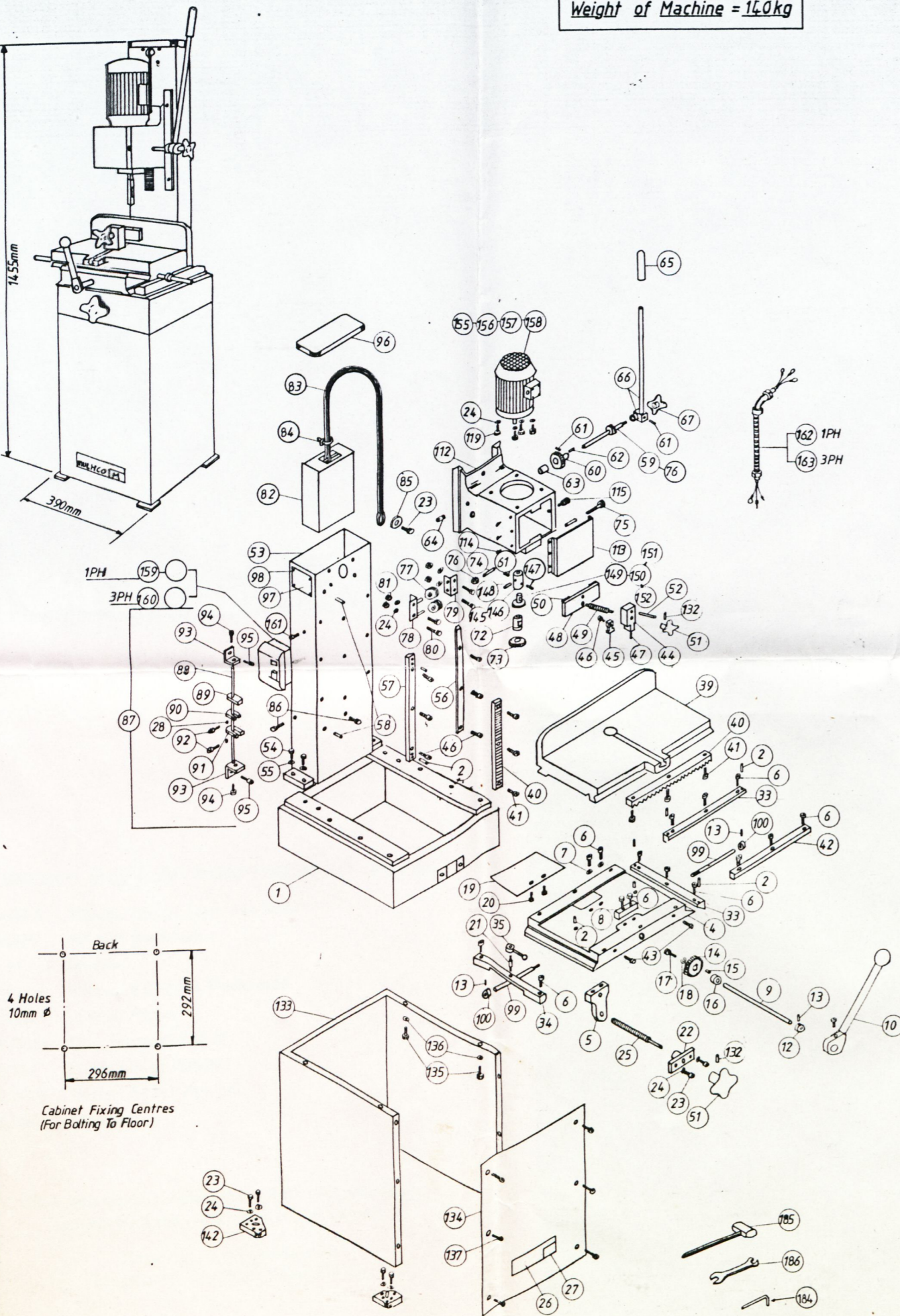
BRIGHTON ROAD — SALFORDS — MR REDHILL
SURREY — RH1 5ER. Tel: — Horley 2444

Date $\frac{1}{10}$ 85 M Serial No 12961

Drw. No. 62-2351

Title CHISEL & BIT
ADJUSTMENT

Weight of Machine = 140kg



ITEM No	PART No	DESCRIPTION	No OFF	ITEM No	PART No	DESCRIPTION	No OFF
1	M1948	Base Assy	1	101			
2	SP1147	Spring Pin	9	102			
3				103			
4	M57	Cross Slide	1	104			
5	M58	Cross Travel Bracket	1	105			
6	14-161	M8 x 20lg. cap Hd. Screw	15	106			
7	16-144	M8 Plain Washer	8	107			
8	M67	Side Stop Anchor Block	1	108			
9	M71-1	Pinion Shaft	1	109			
10	32-2370	Lever Handle Assy	1	110			
11				111			
12	M76	Pinion Shaft Collar	1	112	M191	Headstock	1
13	14-145	Grub Screw M8 x 8 lg	3	113	M193-3	" Cover Assy	1
14	M80	Side Travel Pinion	1	114	02-728	M3 x 5lg. Pozidriv Hd. Screw	3
15	SP1125	Woodruff Key	1	115	32-2328	Knurled Plastic Knob	1
16	M80-1	Spacer	1	116	M202	Motor Sleeve Assy	1
17	14-148	M8 x 16lg. Hex Hd. Screw	1	117	M202-1	" Sleeve	1
18	16-558	M8 Plain Washer	1	118	29-208	Dowel 6Ø	1
19	M1949	Base Cover Plate	1	119	11-1286	M6 x 20lg. Hex Hd. Screw	4
20	SP1094	No 4 Drive Screw	2	120	54-668	Motor 1ph. 0.75Kw. 240v. 50Hz	1
21	M93	Side Clamp Stud	1	121	54-667	" " 200-220v. 50Hz	1
22	M95	Cross Travel Screw Plate Assy	1	122	54-668	" " 3ph. 0.75Kw. 220-380-420v. 50Hz	1
23	11-126	M6 x 12lg. Hex Hd.	10	123			
24	13-139	M6 Plain Washer	10	124	53-851	Autowest Starter 1ph. 220-250v. 50Hz	1
25	M95-3	Cross Travel Screw	1	125	53-852	Thermal Overload 2.75-4.25 Amps	1
26	49-2028	Multico Name Plate	1	126	52-334	Link Wire 1ph Only	1
27	49-2031	" " " " " "	1	127	53-852	Autowest Starter 3ph. 380/440v. 50Hz	1
28	10-117	M5 Plain Washer	2	128	53-858	Thermal Overload 1.2-2.9 Amps	1
29				129	08-115	M5 x 10lg. Ch Hd. Screw	1
30				130	M219	Motor Cable Assy 1ph	1
31				131	M219	" " " " 3ph	1
32	22-189	M12 Plain Washer	1	132	30-1795	Spring Pin	2
33	M112	Slide R.H. & Rear	2	133	M1946	Cabinet	1
34	M113	Slide L.H.	1	134	M1947	" Cover	1
35	M119	Cross Travel Side Clamp Assy	1	135	14-1045	M8 x 12lg. Hex Hd. Screw	4
36				136	16-144	M8 Washer	4
37				137	08-1183	M6 x 10lg. S.Hd. Screw (BUTTON)	6
38				138			
39	M130	Work Table	1	139			
40	M131	Rack	2	140			
41	11-131	M6 x 8lg. Cap Hd. Screw	6	141			
42	M134	Slide Front	1	142	61-789	Foot	4
43	11-595	M6 x 12lg. Pan Hd	2	143			
44	M150-1	Wood Clamp Body (complete clampassy=M150)	1	144			
45	M150-2	" " Guide	1	145	M2690	Motor Sleeve Assy	1
46	14-568	M8 x 16lg. Cap Hd	7	146	M2691	Motor Sleeve	1
47	29-212	8mm Ø Dowel	1	147	14-572	" " Tool Clamp Screw M8 x 12L	1
48	M156-1	Wood Clamp Screw Plate	1	148	29-376	" " Dowel 6mm Dia x 35L	1
49	M161	" " Screw & Boss Assy	1	149	M2693A	Drill Locking Bush (to fit Chisels 6mm-8mm)	1
50	M156-3	" " Pad	1	150	M2693B	" " " " " " 9.5mm-11mm	1
51	33-554	Handwheel	2	151	M2693C	" " " " " " 12.5mm-14.5	1
52	M166	Wood Clamp Guide Rod	1	152	M2693D	" " " " " " 16mm-19mm	1
53	M176	Column & Feet Assy	1	153			
54	17-170	M10 x 30lg. Hex Hd	4	154			
55	19-181	M10 Plain Washer	4	155	54-2698	Motor 1Ph. 0.75Kw. 220/240V 50Hz P180AC	1
56	M182	Column Slide R.H.	1	156	54-2699	" " " " " " 200/220V " " " "	1
57	M183	Column Slide L.H.	1	157	54-2700	" " " " " " 220-380-420V 50Hz P180AC	1
58	30-816	Spring Pin	2	158	54-2701	" " " " " " 220V 60Hz	1
59	M256	Headstock Shaft Assy	1	159	532703	Starter 1Ph 220/240V 50Hz Brook	1
60	M259	" " Pinion	1	160	53-2704	" " " " " " 3Ph 380/415V " " " "	1
61	14-607	M8 x 10lg. Grub Screw	3	161	05-110	" " " " " " Screw M6 x 10L Cheese Hd.	2
62	44-2466	Key 5mm SQR	1	162	M2705	Motor Cable 1 Ph	1
63	M262	Headstock Pinion Spacer	1	163	M2709	" " " " 3Ph	1
64	M263	" " Depth Stop Peg	1	164			
65	32-2361	Plastic Grip	1	165			
66	M2369	Lever Arm & Block Assy	1	166			
67	33-553	Handwheel	1	167			
68	K24A	Drill Locking Bush (to fit chisels 6mm-8mm)	1	168			
69	K24B	" " " " " " 9.5mm-11mm	1	169			
70	K24C	" " " " " " 12.5mm-14.5mm	1	170			
71	K24D	" " " " " " 16mm-19mm	1	171			
72	K31	Chisel Adjusting Collar	1	172			
73	K32-1	" " Nut	1	173			
74	61-790	Adjusting Collar Locking Pad	2	174			
75	14-337	M8 x 90lg. Hex Hd. Bolt	1	175			
76	M2467	Shaft & Key Assy	1	176			
77	M296-9	Weight Pulley & Bush Assy	2	177			
78	M296-8	" " " " L.H. Bracket Assy	1	178			
79	M296-7	" " " " R.H. Bracket	1	179			
80	11-608	M6 x 16lg. Csk Hd. Screw	4	180			
81	12-137	M6 Hex Nut	12	181			
82	M308	Weight	1	182			
83	M309	" Cable	1	183			
84	01-609	" " " " U' Clamp	1	184	40-248	Allen Key 3mm A/E	1
85	M2291	Clamp Washer	1	185	40-249	Allen Key "T" Handle Type. 4mm A/E	1
86	14-153	M8 x 40lg. Hex Hd. Screw	2	186	41-474	Double Ended Spanner 10mm x 13mm A/F	2
87	M320	Depth Stop Assy	1	187	42-570	Instruction Book	1
88	M320-1	" " Rod	1	188	42-267	Envelope	1
89	M320-2	" " Top Stop	1	189	42-266	Guarantee Card	1
90	M320-3	" " Top Stop Clamp	1	190	SP2056	Cotton Bag	1
91	M320-4	" " Lower Stop	1	191			
92	08-611	M5 x 20lg. Cap Hd. Screw	2	192			
93	M320-5	" " Stop Angle	2	193			
94	08-610	M5 x 12lg. Csk Hd. Screw	2	194			
95	11-132	M6 x 12lg. Cap Hd. Screw	2	195			
96	M344	Column Top Cover	1	196			
97	SP1237	Serial Plate	1	197			
98	SP1094	No 4 x 1/4" lg. Rd Hd. 'U' Type Screw	4	198			
99	M369	Side Stop Bar	2	199			
100	M369-1	" " " " Collar	2	200			

FOR MACHINES SERIAL NUMBER
FROM 13701 TO SEE MODIFICATIONS



Dimensions in Millimetres DO NOT SCALE Angle Projection:
Used On. Type. Assy.
MULTICO COMPANY LTD
BRIGHTON ROAD - SALFORDS - NR REDHILL - SURREY - RH1 5ER

13701	11	Items 68 to 71, 116, 117, 121, 122, 124 to 131 Deleted. Items 145 to 163 Added.	17/2/85
13591	10	Item 184 Added. Item 137 was 08-115	1/11/84
13110	9	Redrawn & Updated	4-84
From Serial No	Issue	Modification	Date
Matt.			
Gen. Tol. ±		Scale.	
Drawn.		Date 3-4-84	
Title. MORTISER			
Drg. No. Model 'M'		Issue 11	