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KENT
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STARTRITE®

MERCURY

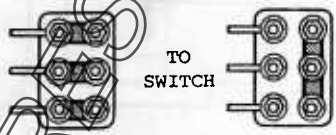
FIVE SPEED DRILLING MACHINE

OPERATING INSTRUCTIONS AND PARTS LIST

CONNECTION TO THE ELECTRICITY SUPPLY.

THREE PHASE :

Machines are usually fitted with dual voltage motors. Before connecting machine to the electric supply, check that terminal linkage inside motor terminal box are linked to suit the operating voltage (see illustrations).



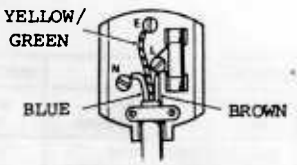
3 links for 220 volts.

2 links for 380-440 volts.

Connect three brown leads to a 10 amp fused supply and the yellow/green lead to earth. Interchange any two brown leads to reverse rotation of motor.

SINGLE PHASE :

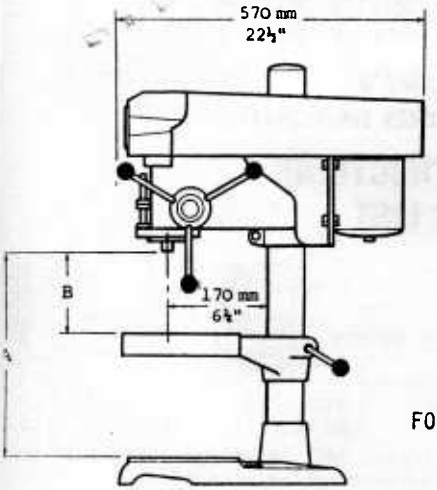
Connect brown lead to 10 amp fused supply, blue lead to neutral and yellow/green lead to earth. Temporary connection can be made to a 13 amp ring main circuit by fitting a standard plug to supply leads.

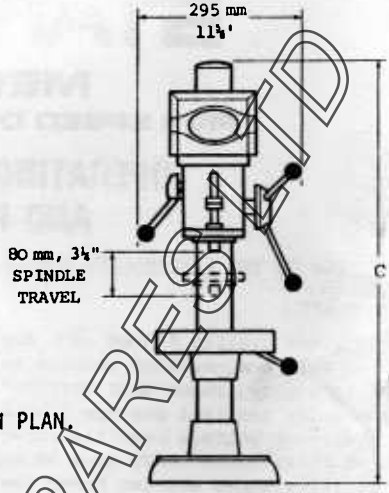


IMPORTANT : THE MACHINE MUST BE EFFECTIVELY EARTHED. IT IS RECOMMENDED THAT THE MACHINE IS CONNECTED TO THE SUPPLY BY AN ELECTRICAL ENGINEER.

OPERATING SAFETY PRECAUTIONS.

Personal injury can occur if this drill is not safely used.
To ensure safety the machine should be firmly bolted down on a level surface.
Before attempting to operate the machine, become familiar with the controls and operating instructions.
It is the users responsibility to ensure that the drill is safely used and that training is given if necessary.
Remove chuck key and set drill guard to cover drill before starting machine.
Position and securely lock the table (remove heavy workpiece before adjusting table). Check that locking collar is clamped before releasing drill head locking control.
Make sure the workpiece is securely held to prevent rotation (do not exceed the maximum table load). It is essential that small pieces are held in a vice or clamped by some means, never hold small pieces by hand.
Beware of entanglement. Secure long hair and loose clothing, and never operate machine when wearing gloves or with bandaged fingers. Wear eye protection.
Do not leave the machine running while unattended, isolate machine before making adjustments or removing swarf.
Ensure that the working area is clean and well lit.
Become familiar with the dangers involved in machining certain materials and take the necessary precautions:-
Materials containing minerals of the asbestos group give off toxic dust and 'The Asbestos Regulations 1969' may require that special precautions are taken when machining these materials. The dust from some other materials, such as the thermosetting phenolics can also create a hazard to health, while other materials may cause personal injury by fire or explosion. In all such cases it is imperative that expert advice is obtained on the correct handling of such materials, and the fitting of any necessary extra equipment needed to achieve the required standard of safety.

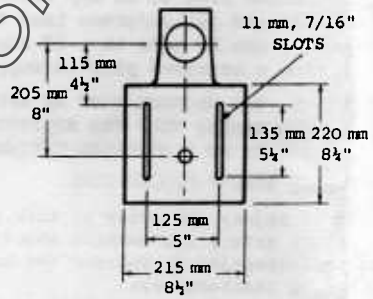




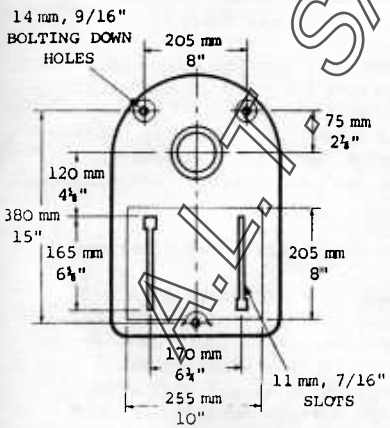
FOUNDATION PLAN.

SPECIFICATIONS	BENCH MODEL	FLOOR MODEL
MAX. DISTANCE FROM CHUCK/SPINDLE TO BASE	490 mm 19¼"	1260 mm 49½"
MAX. DISTANCE FROM CHUCK/SPINDLE TO TABLE	350 mm 13¾"	1080 mm 42⅛"
OVERALL HEIGHT	775 mm 30½"	1535 mm 60½"
NET WEIGHT (APPROX.)	45 kg. 100 lbs.	60 kg. 130 lbs.
MAX. DISTRIBUTED STATIC TABLE LOAD	27 kg. 60 lbs.	27 kg. 60 lbs.

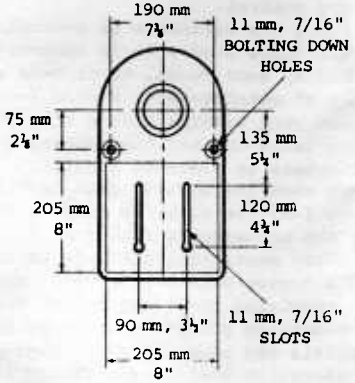
ALL DIMENSIONS APPROXIMATE.



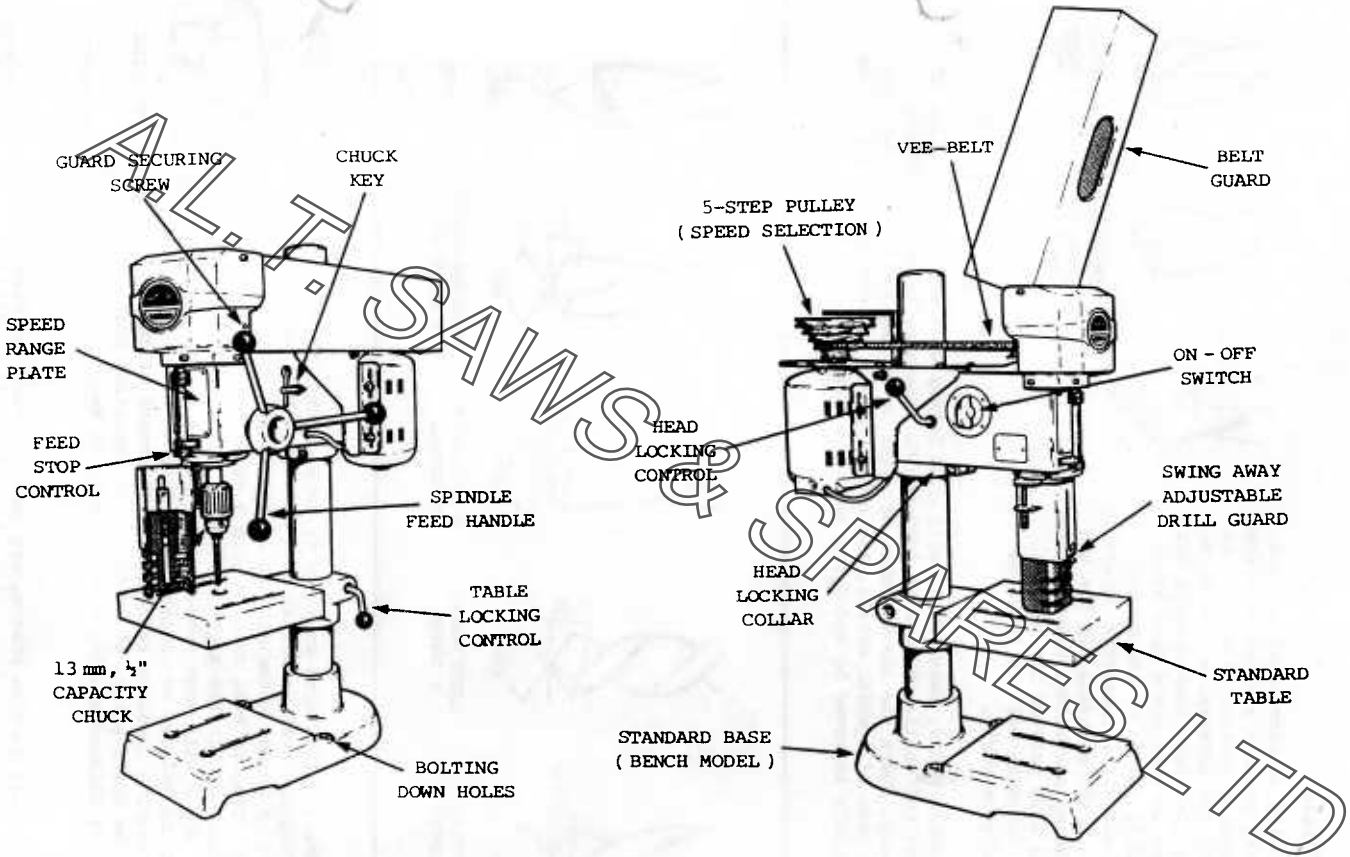
STANDARD TABLE (ALL MODELS)



STANDARD BASE (FLOOR MODEL)



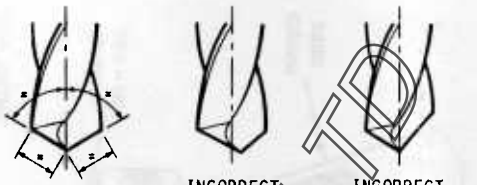
STANDARD BASE (BENCH MODEL)



GENERAL LAYOUT OF DRILLING MACHINE.

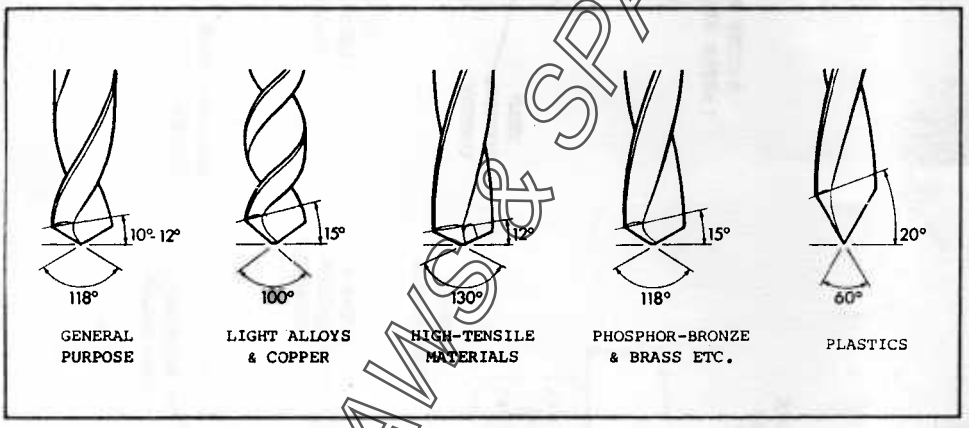
TWIST DRILLS.

A drill with an incorrectly ground point will produce a ragged oversize hole, require greater feed force to penetrate the material and tends to break or jam. Some considerable skill is needed to accurately free hand grind drill points to the correct profile and it is therefore advisable to use a drill grinding jig for the resharpening operation. The grinding jig will also provide the true conical 'backing off' to form the lip clearance angle.

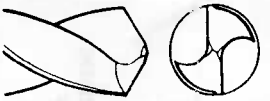


CORRECT | INCORRECT CUTTING EDGES UNEQUAL | INCORRECT ANGLES UNEQUAL

The standard H.S.S. twist drill will cope fairly well with a wide range of materials but drills of special form may be necessary to obtain maximum efficiency. Where the small number of holes to be drilled does not warrant the purchase of special drills, the efficiency of the standard drill can be considerably improved by modifying the point angles.



In general, drills with an acute or more pointed angle are better for soft materials such as soft alloys and plastics. A harder material such as steel, particularly in sheet form, is best drilled with a drill having a more obtuse or flatter angle. Larger drills having the flatter angle will most probably require the drill point to be thinned to assist penetration.
Point thinning involves reducing the thickness of the web at the drill point. It is of course important that the web is thinned equally on both sides to avoid runout.

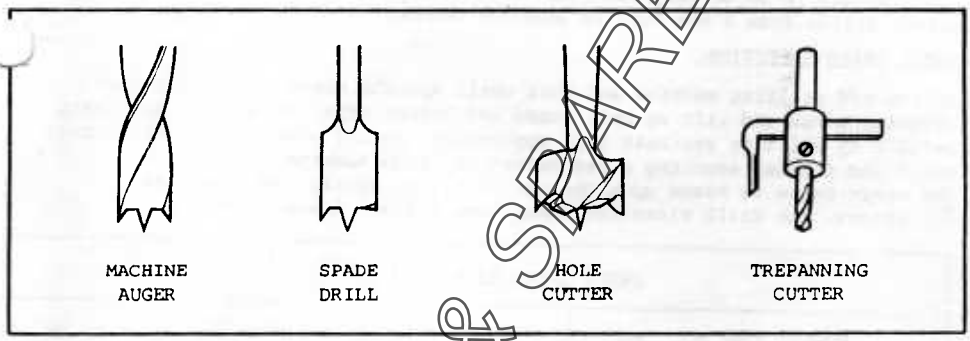


POINT THINNING

Some materials such as bronze, may tend to cause the drill to 'snatch', that is the cutting edges of the drill dig in too deeply and the drill then jams in the hole. The tendency to snatch can be reduced by grinding a small flat to reduce the helix angle of the flute at the cutting edge.

WOOD CUTTING DRILLS.

There are many types of drill bits available for drilling wood, and generally these fall into two main groups. Large holes in sheet materials are best cut with a hole cutter or a trepanning cutter. Extra care is necessary in feeding the trepanning cutter as the single cutting edge is liable to snatch. To avoid a ragged edge on the underside, drill part way through then finish the hole from the reverse side. As an alternative, drill through into a piece of waste material placed under the workpiece. A machine auger or spade drill is used for deep holes. The auger will usually cut a more accurate hole than the spade drill and is more efficient in clearing the wood chips. Small diameter holes can be drilled satisfactorily using a standard twist drill. Many wood cutting bits are made from carbon steel and rapidly lose their cutting edges if allowed to overheat.



OPERATING INSTRUCTIONS.

When setting up the machine make sure the clearance hole in the table is aligned with the drill bit, or place packing under the workpiece to avoid damaging the table.

It is essential that the workpiece is adequately supported so that it cannot wobble or be deflected by the pressure of the drill. A large workpiece may be held by hand against some form of stop to prevent rotation, but small pieces must always be securely held by a vice or clamps. For loads over 9 kg. (20 lbs.) it is advisable to fit a locking collar under the table for extra safey (see ptional Extras). Do not exceed maximum table load (27 kg., 60 lbs.).

The depth of blind holes and counterbores can be accurately controlled by setting the collars of the feed stop control.

When working to marked out lines, provide a positive starting location for the drill by centre punching. This is particularly necessary if the face to be drilled is at an angle to the drill or is curved. Extra accuracy can be achieved by starting the hole with a centre drill, drilling through with a pilot drill (small diameter) and finally using the drill of the desired size.

The rate of feed must be judged by feel and by observing the type of swarf being produced. In mild steel for instance, an extra heavy feed would produce stubby discoloured chips, while a powdery swarf would be the result of a very light feed.

A correctly ground drill operating at an appropriate speed and feed should produce two equal continuous spiral ribbons when drilling mild steel.

When drilling deep holes, the drill should be periodically eased back to assist removal of swarf and prevent it becoming entangled with the drill. Take care to reduce the feed when the drill is about to break through, as this is the most likely moment that the drill will snatch.

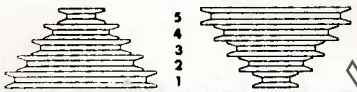
OPERATING INSTRUCTIONS (CONTINUED).

Select a speed that is appropriate to the material and drill size concerned (see Chart below). A very slow drill speed will result in very slow progress and increase the temptation to apply excessive feed pressure. Small drills are very easily broken by this treatment. Running the drill at too high a speed will cause the cutting edges to overheat and rapidly break down. When in doubt as to the correct speed and feed, start off with a slow speed and light feed, and increase speed or feed until best results are obtained.
Brush applied coolant (soluble oil and water mixture) may help when drilling holes in ferrous materials, but cast iron is best drilled dry. The tendency of soft non-ferrous materials to clog the drill can usually be reduced by applying a few drops of paraffin. Water can assist the drilling of deep holes in some thermosetting plastics.
Store drills in an orderly fashion. It is a time wasting business to continually select drills from a box full of assorted sizes.

DRILL SPEED SELECTION.

Switch off drilling machine and wait until spindle comes to rest. Loosen securing screw and lift up belt guard and select required speed (see Chart below) by shifting vee-belt into appropriate pulley step number. Close belt guard and tighten securing screw before starting machine.
The Chart below is based upon the use of H.S.S. drills under average conditions. For drill sizes not shown, use nearest lower speed.

DRILL SPEED SELECTION CHART.

PULLEY STEP No. 	DRILL DIAMETER					
mm	3	5	6	8	10	13
ins	1/8	3/16	1/4	5/16	3/8	1/2
MATERIAL	PULLEY STEP No.					
ALUMINIUM EXTRUDED	5	5	5	4	3	3
BRASS SOFT	5	5	4	4	3	2
BRONZE	5	5	4	3	2	2
CAST IRON	4	3	2	2	2	1
DURALUMIN	5	5	4	3	2	1
MAZAK	5	5	4	4	3	3
PLASTICS SOFT	5	5	5	5	4	4
PLASTICS HARD	5	5	4	4	3	2
STEEL FREE CUTTING	5	4	3	3	2	1
STEEL MILD	4	3	3	2	2	1
STEEL HIGH TENSILE	3	2	2	1		
STEEL STAINLESS FREE CUTTING	3	3	2	1	1	
STEEL STAINLESS	3	2	1			
WOOD SOFT	5	5	5	5	5	4
WOOD HARD	5	5	5	4	4	3

WHEN ORDERING PARTS, PLEASE STATE :-

1. Quantity required.
2. Part No. (where applicable) and description.
   Specify power supply for electrical components.
3. Machine Model and Serial No.

GENERAL ASSEMBLY

ITEM	PART NUMBER	DESCRIPTION
1	696	30" Column (Bench Model)
	2110	40" Column (Bench Model)
	721	60" Column (Floor Model)
2	969	Locking Collar
3	947	Lock Pad (Threaded)
4	948	Lock Pad (Plain)
5		Rd. Hd. Screw Recessed
6	968	Clamp Handle
7		Ball Knob
8	962	Motor Bracket R.H. or L.H. (Motor Shaft
	4052	Motor Bracket R.H. or L.H. (Motor Shaft
9	1850	Rubber Buffer
10		Hex. Hd. Screw
11		Hex. Nut
12		Washer
13		Fibre Washer
14		Hex. Hd. Screw
		Hex. Nut
16		Washer
17		Soc. Set Screw
		Soc. Set Screw
18	2239	Motor Pulley (5/8" Bore)
	2239/1	Motor Pulley (14 mm Bore)
19		Key
		Key
20	5211	Pulley Guard
21	1208	Column Cap
22		Vee-Belt
23	950	Drill Head
24	1011	Spring Attachment Pin
25		Soc. Set Screw
26	980	Spring
27		Soc. Cap Screw
28	983	Spring Cover
29	971	Pinion Shaft
30		Hex. Screw
31		Chuck 13 mm (1/2") Capacity

NOT ILLUSTRATED :

	SP38	Rotary Switch 1 or 3 Phase
	SP95	Shroud
	SP258	Belt Guard

PULLEY - ASSEMBLY No.SP273

40	2240	5-Step Pulley
41	2245	Splined Bush
42		Ball Bearing
43	2243	Outer Spacer
44	2244	Inner Spacer
45		'O' Ring
46		Soc. Set Screw - Dog Point
		Soc. Set Screw - Dog Point
47		Soc. Set Screw
		Soc. Set Screw

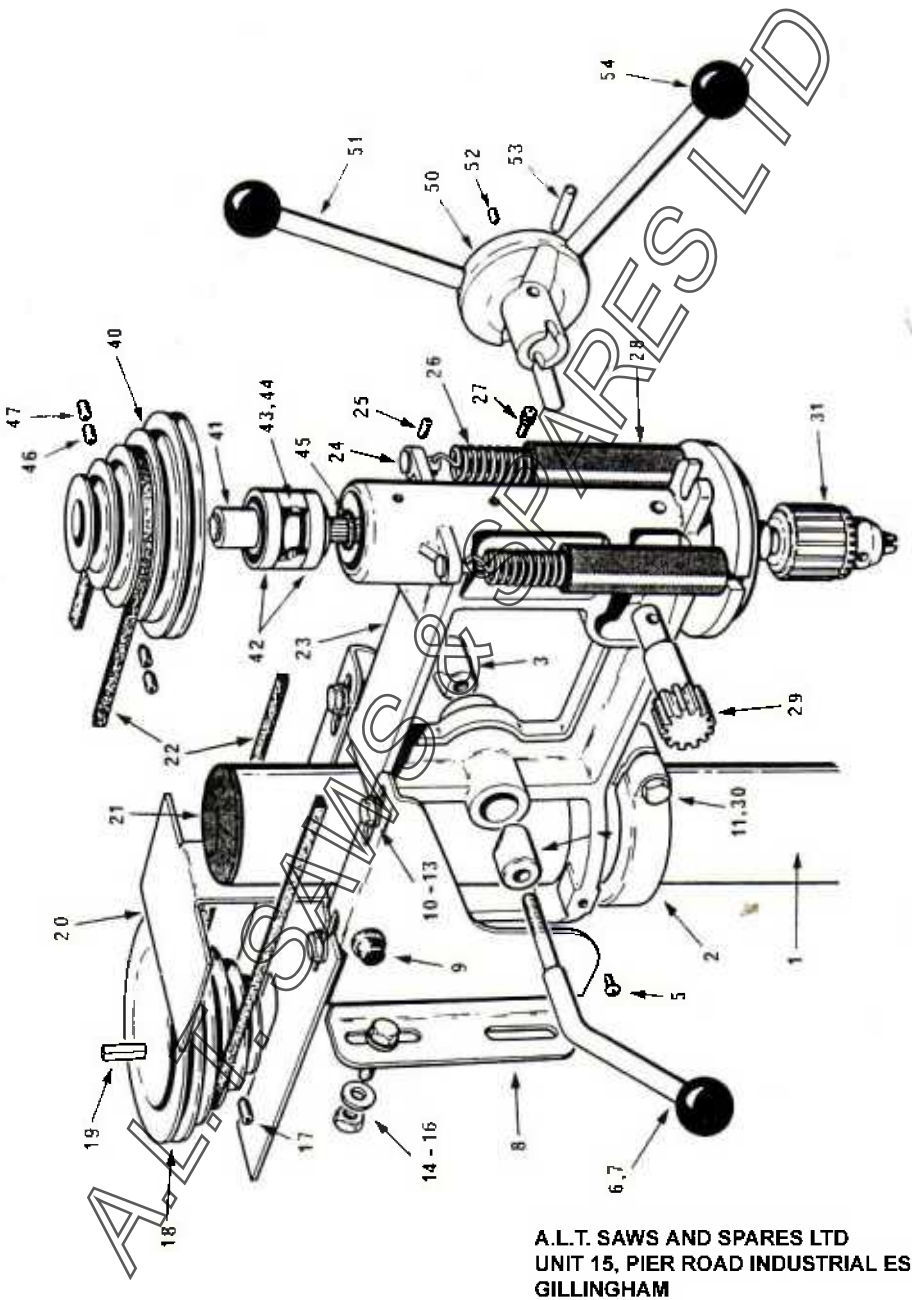
HAND WHEEL - ASSEMBLY No.SP93

50	1715	Hub
51	885	Feed Handle
52		Soc. Set Screw
53	955	Torque Pin
54		Ball Knob

4 SPEED DRILLING MACHINES :

NOTE : ALL MACHINES UP TO SERIAL No.5906 4 SPEED ONLY.

18	972	4-Step Motor Pulley
22		Vee-Belt
40	953	4-Step Pulley
	SP92	4 Speed Pulley Assembly



GENERAL ASSEMBLY

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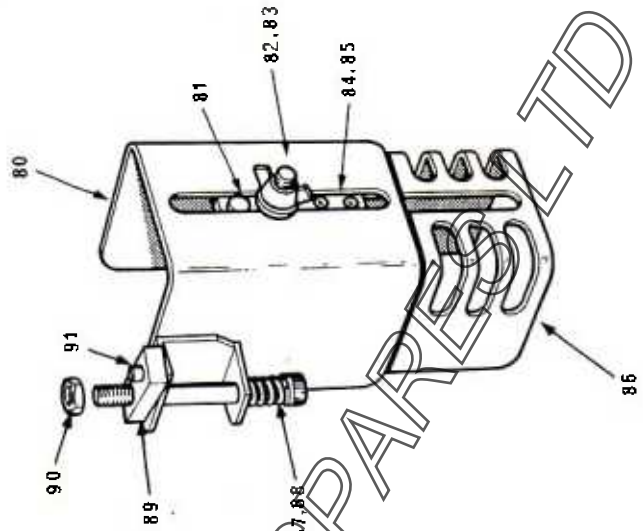
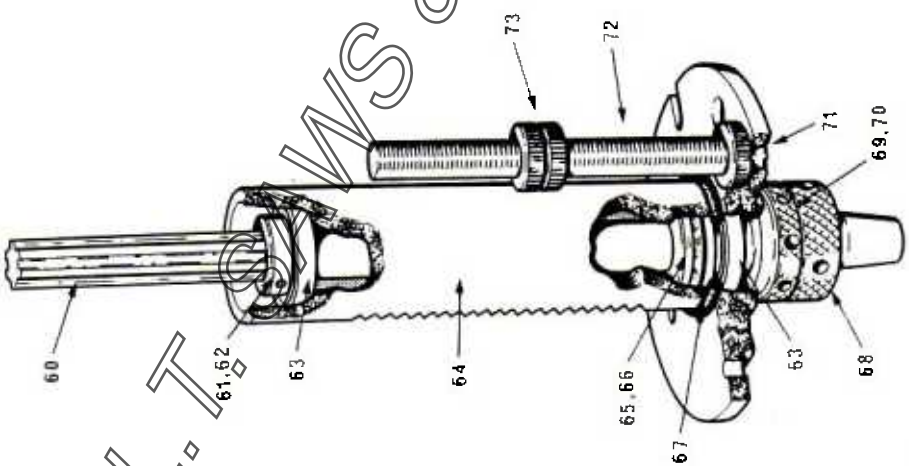


DRILL GUARD



QUILL

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QUILL - ASSEMBLY No.SP60

ITEM	PART NUMBER	DESCRIPTION
60	960	Spindle
61	666	Locking Collar
62		Soc. Set Screw - Cup Point
63		Ball Bearing
64	1071	Quill
65	951	Thrust Race
66	683	Spacer
67		'O' Ring
68	979	Locking Ring
69	978	Spindle Collar
70		Mills Pin
71		Soc. C'sk. Screw
72	965	Depth Stop
73	663	Locking Ring

DRILL GUARD - ASSEMBLY No.SM910

80	SM911	Top Guard
81	5167	Pin
82		Wing Nut
83		Washer
84	SM912	Slide Plate
85	5173	Pin
86	5178	Bottom Guard
87		Soc. Cap Screw
88		Spring
89	5175	Lock Plate
90		Lock Nut
91		Spring Pin

TABLES & BASES :

100	1183	Standard Table (All Models)
101	720	Standard Base (Floor Model)
102	1182	Standard Base (Bench Model)

OPTIONAL EXTRAS :

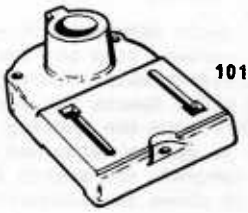
110	SP151	Tilting Table
111	2727	Production Table with Suds Trough
112	SM1387	Pedestal Base & Box Column
113	SM948	Belt Guard Switch Interlock (Includes T.O.N.V.R. Starter)

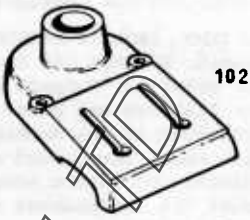
NOT ILLUSTRATED :

969	Locking Collar (Placed under table for heavy loads)
987	No.1 Morse Taper Adaptor
SP150	Mortising Attachment
SP240	Machine Vice
SP868	Kick Stop Switch (Includes T.O.N.V.R. Starter)
	0 - 13 mm Keyless Drill Chuck
	Sanding Drum 2" Dia
	Sanding Disc 6" Dia
	Reversing Switch (3 Phase Only)
	T.O.N.V.R. Push Button Starter
	Lighting Equipment 240 Volts
	Lighting Equipment 24 Volts

MULTI-HEAD DRILL BANKS :

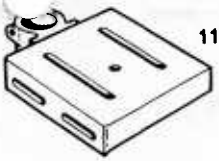
120	SP255/2	2 Station Drill Base
	SP255/3	3 " " "
	SP255/4	4 " " "
	SP255/5	5 " " "
	SP255/6	6 " " "
121	SP320	Head Elevating Mechanism
		Coolant Kit (Not illustrated)





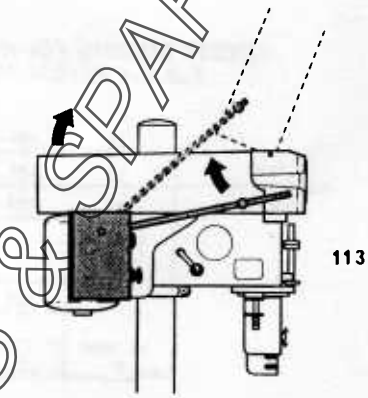
STANDARD TABLES & BASES

OPTIONAL EXTRAS

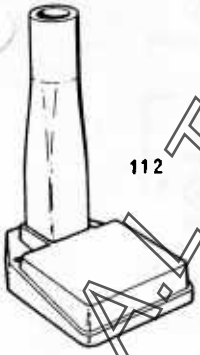


TILTING TABLE

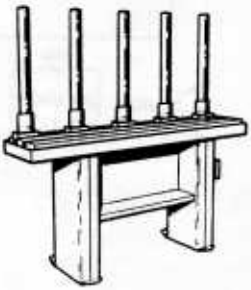
PRODUCTION TABLE



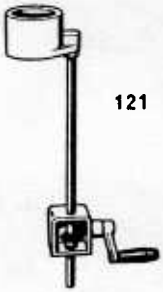
BELT GUARD
SWITCH INTERLOCK



PEDESTAL BASE
& BOX COLUMN



MULTI-HEAD
DRILL BANK

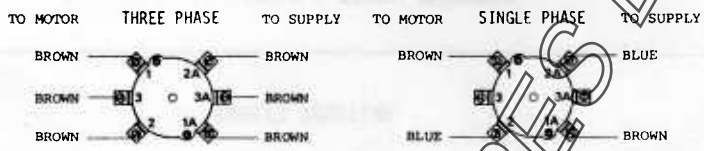


HEAD ELEVATING
MECHANISM

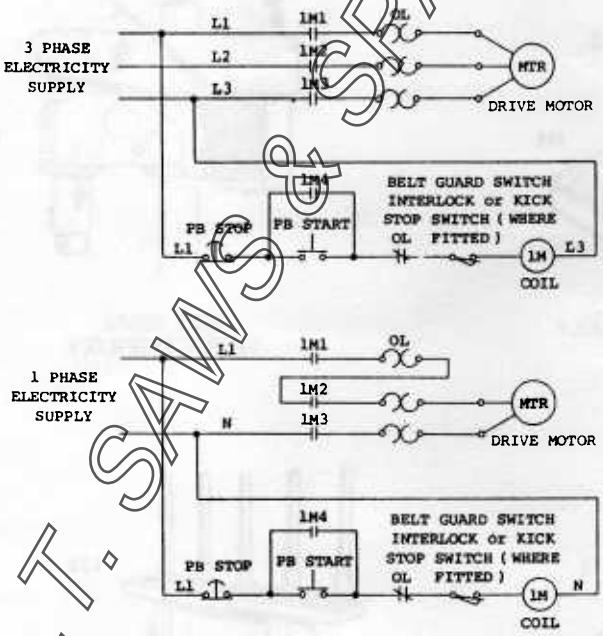
INSTRUCTIONS FOR CHANGING ROTARY SWITCH.

IMPORTANT : ISOLATE MACHINE FROM MAINS SUPPLY. Lift up belt guard and remove vee-belt. Slacken off four hex. screws (Item 10 - see page 8) securing the motor platform. Support motor platform while removing screws and lift off motor platform and place to one side. Remove two screws (Item 5) on the switch side of the machine, then remove the locking handle (Item 6) and the switch knob. The shroud may now be sprung aside and when the two screws retaining the switch have been removed, the switch assembly may be withdrawn. Connect the replacement switch as shown in illustrations below, and re-assemble machine.

ROTARY SWITCH CONNECTIONS.



CIRCUIT DIAGRAMS FOR MACHINES FITTED WITH T.O.N.V.R. PUSH BUTTON STARTER



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