

# STARTRITE®

## MERCURY TEN SPEED DRILLING MACHINE

### OPERATING INSTRUCTIONS AND PARTS LIST

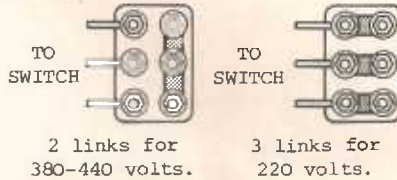
#### CONNECTION TO THE ELECTRICITY SUPPLY.

##### THREE PHASE :

Machines are usually fitted with dual voltage

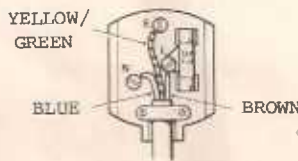
Before connecting machine to the electric supply, check that terminal linkage inside motor terminal box are linked to suit the operating voltage (see illustrations).

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 rotating control.

Ensure 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.

**A.L.T. Saws & Spares Ltd**

**Startrite Machine Specialist**

Unit 15, Pier Road Industrial Estate

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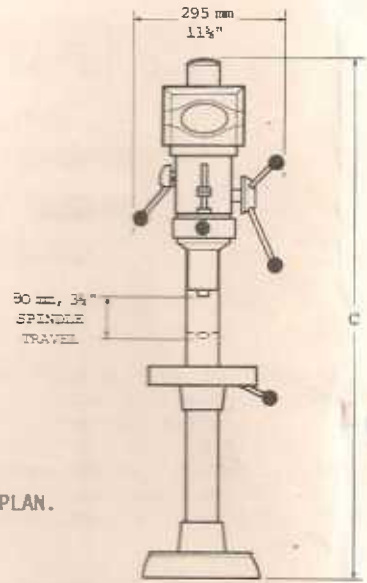
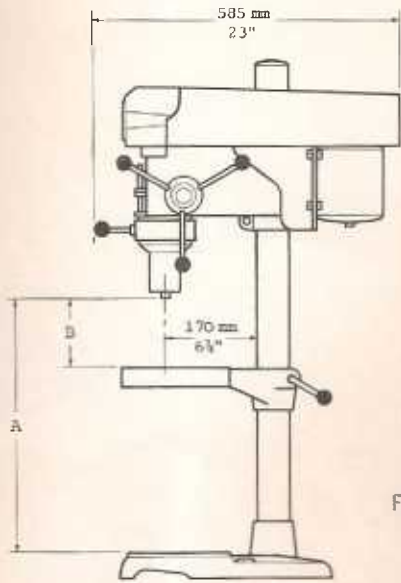
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lee@altsawsandspares.com

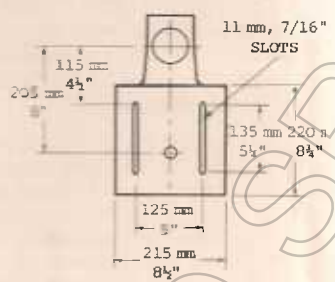
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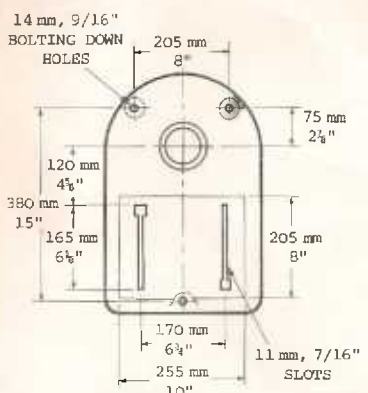
FOUNDATION PLAN.

SPECIFICATIONS	BENCH MODEL	FLOOR MODEL
A MAX. DISTANCE FROM CHUCK/SPINDLE TO BASE	690 mm 27 1/4"	1205 mm 47 1/2"
B MAX. DISTANCE FROM CHUCK/SPINDLE TO TABLE	555 mm 21 3/4"	1030 mm 40 1/2"
C OVERALL HEIGHT	1030 mm 40 1/2"	1535 mm 60 1/2"
NET WEIGHT (APPROX.)	50 kg. 108 lbs.	65 kg. 138 lbs.
MAX. DISTRIBUTED STATIC TABLE LOAD	27 kg. 60 lbs.	27 kg. 60 lbs.

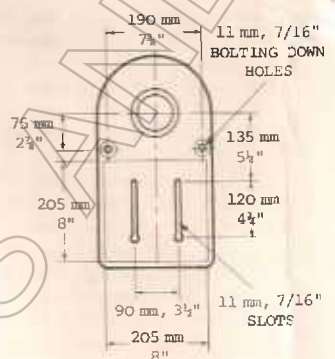
ALL DIMENSIONS APPROXIMATE.



STANDARD TABLE ( ALL MODELS )



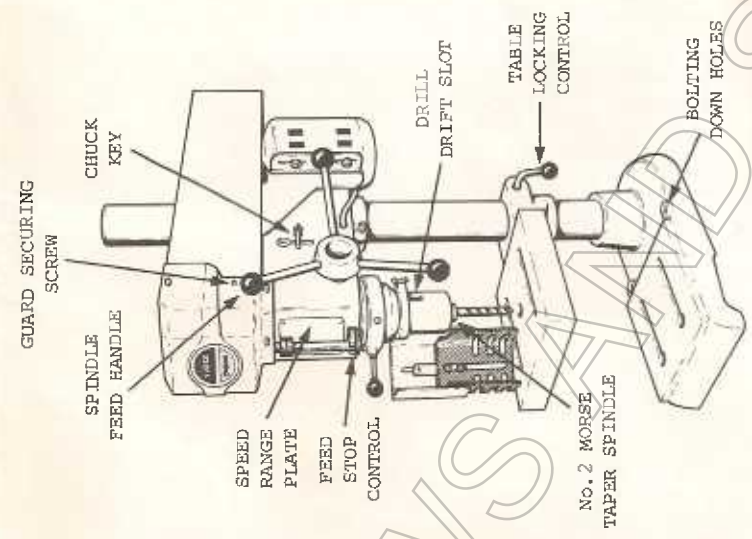
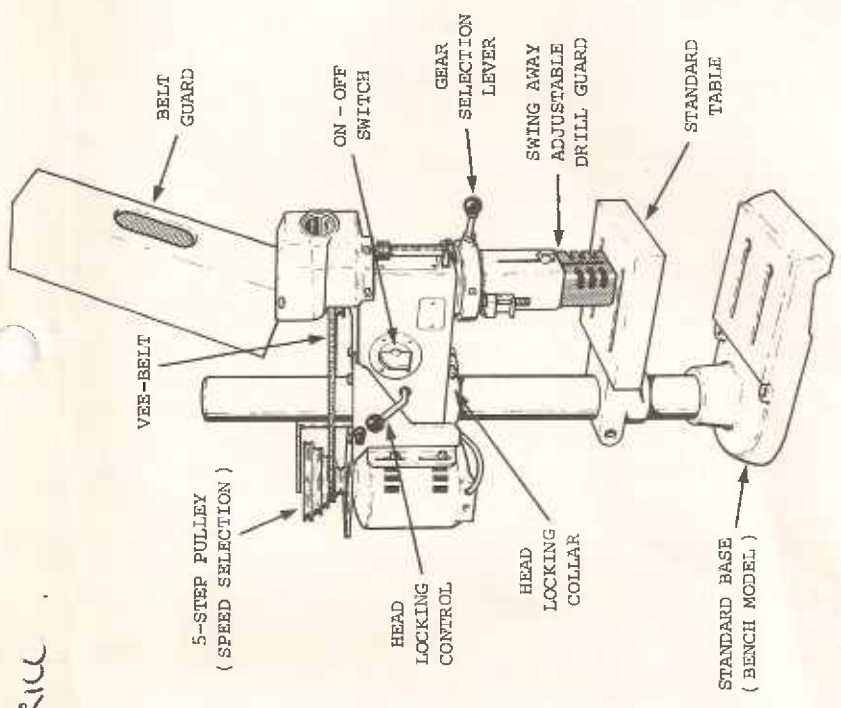
STANDARD BASE ( FLOOR MODEL )



STANDARD BASE ( BENCH MODEL )

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10 SPEED  
DRILL



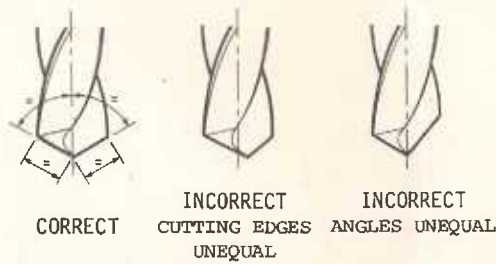
GENERAL LAYOUT OF DRILLING MACHINE.

A.L.T. SAINI

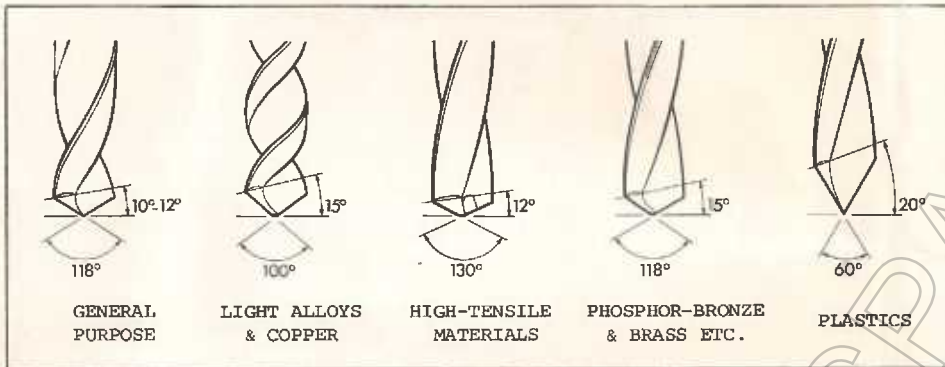
SPARES LTD

## 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.



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.

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.

POINT THINNING



## OPERATING INSTRUCTIONS.

Before inserting the appropriate drill into the Morse Taper Socket make sure that the drill shank is clean and undamaged. Unless the shank is a good fit in the socket the drill may not run true or may work loose during withdrawal of the drill from the workpiece. On no account should the point of the drill be hammered to wedge the shank in the socket. Under normal circumstances the drill will be firmly pressed home by bringing it down onto a piece of wood or soft material placed on the machine table.

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## OPERATING INSTRUCTIONS ( CONTINUED ).

The drill can be removed by turning the drill spindle to line up with drift slots and lightly tapping in a drift ( see illustration ). Before extracting a drill, place a piece of wood under the point to prevent the drill striking the table as it is ejected from the spindle. Always use correct size drifts as make-shift methods such as using a file tang may damage both drill and machine.



REMOVING DRILL

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 safety ( see Optional 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 the workpiece, as this is the most likely moment that the drill will snatch. Select a speed that is appropriate to the material and drill size concerned ( see Chart on page 6 ). 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.

Fresh 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.

## TAPPING AND REAMING.

Both of these operations should be carried out with the drilling machine running at low speed.

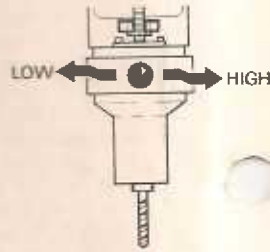
A pilot hole 0.4 mm ( 0.15" ) smaller than the reamer diameter will produce the correct machining allowance for most applications, but it may be necessary to reduce the allowance where tough materials or small holes are involved. To produce a well finished hole use a sharp end-cutting machine reamer applied with a gentle feed. Forcing the feed will produce score marks or even cause the reamer to seize in the hole.

**TAPPING AND REAMING ( CONTINUED ).**

For efficient tapping operations the machine should be fitted with a tapping head. Some tapping is possible without this attachment providing that the machine is fitted with a reversing switch. Machine taps should be used as the design of hand taps will generally cause them to clog with swarf. In the case of tapping and reaming steel, lubricate the tool with brush applied neat or soluble oil, aluminium or die cast alloys with paraffin. Brass, most bronzes and cast iron are usually machined without lubricant.

**DRILL SPEED SELECTION.**

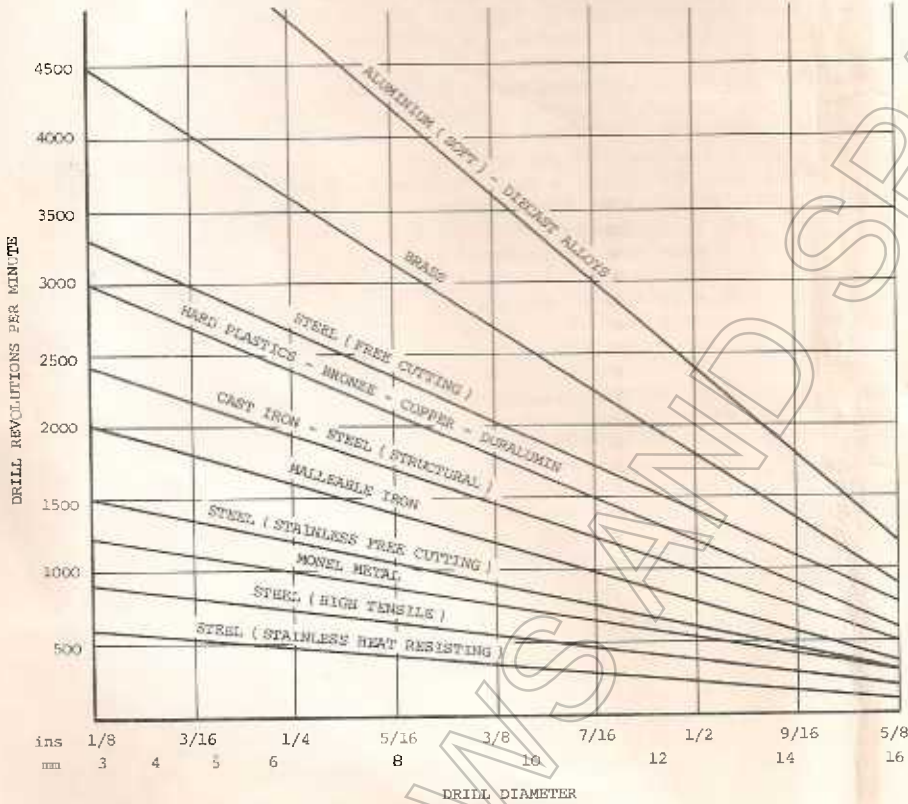
Switch off the drilling machine and wait until spindle comes to rest. Loosen securing screw and lift up belt guard and select required speed ( see Chart below ) by shifting the vee-belt into appropriate pulley grooves. The gearshift lever must be fully engaged for either HIGH gear or LOW gear ( see illustration ) before starting machine. Turning drill spindle by hand will help the gears engage. Close belt guard and tighten securing screw before starting machine. **IMPORTANT:** Always switch off machine and allow the spindle to stop before operating gearshift lever.



CHANGING GEAR

**DRILL SPEED SELECTION CHART.**

Based upon the use of H.S.S. drills under average conditions.



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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.

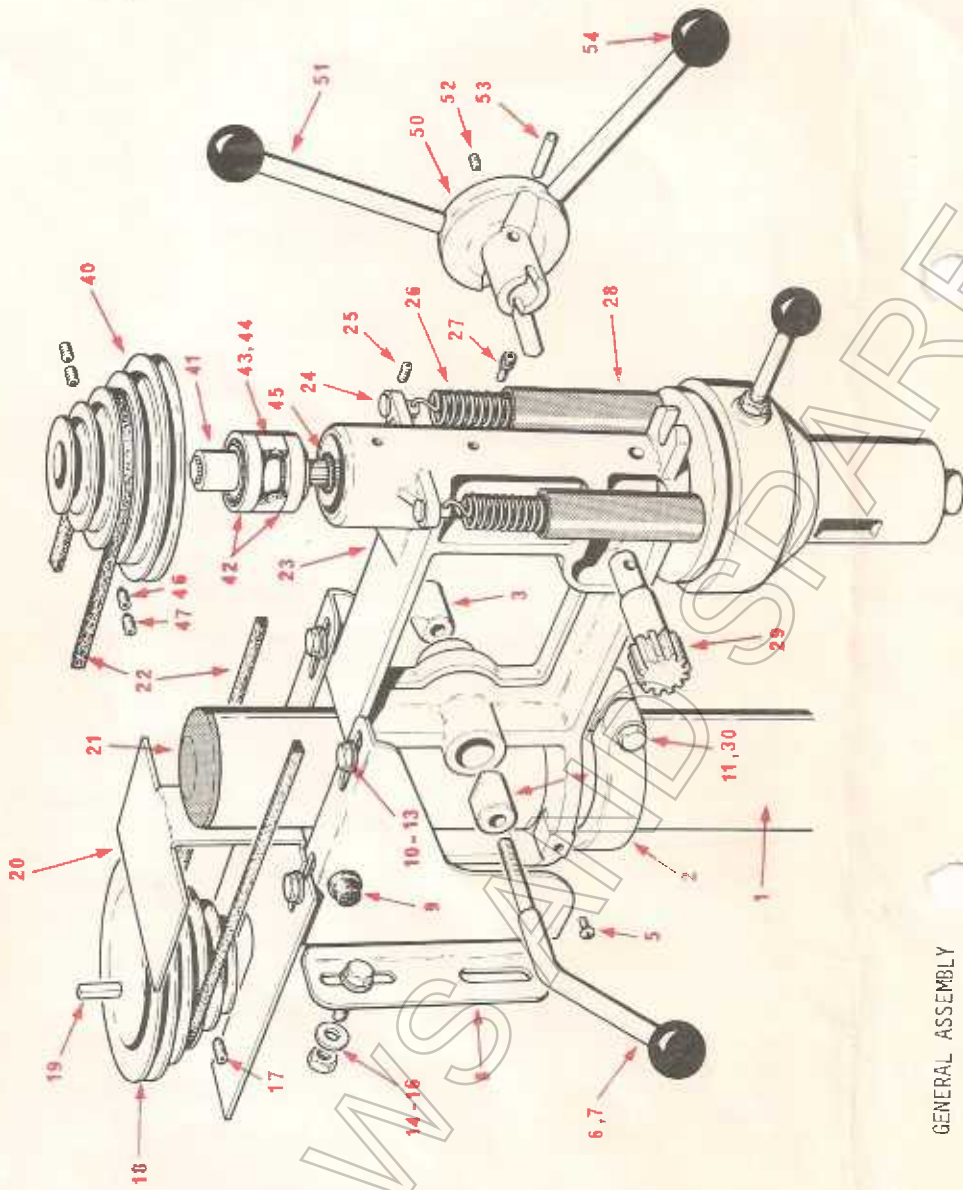
ITEM	PART NUMBER	DESCRIPTION			
		GENERAL ASSEMBLY	29	971	Pinion Shaft
			30		Hex. Screw
					NOT ILLUSTRATED :
1	2110	40" Column ( Bench Model )		SP38	Rotary Switch 1 or 3 Phase
	721	60" Column ( Floor Model )		SP95	Shroud
2	969	Locking Collar		SP258	Belt Guard
3	947	Lock Pad ( Threaded )			
4	948	Lock Pad ( Plain )			
5		Rd. Hd. Screw Recessed			
6	968	Clamp Handle	40	2240	5-Step Pulley
7		Ball Knob	41	2245	Splined Bush
8	962	Motor Bracket R.H. or L.H. ( Motor Shaft 5/8" Dia )	42		Ball Bearing
	4052	Motor Bracket R.H. or L.H. ( Motor Shaft 14mm Dia )	43	2243	Outer Spacer
9	1850	Rubber Buffer	44	2244	Inner Spacer
10		Soc. Set Screw	45		'O' Ring
11		Hex. Nut	46		Soc. Set Screw - Dog Point
12		Washer			Soc. Set Screw - Dog Point
13		Fibre Washer	47		Soc. Set Screw Soc. Set Screw !
14		Hex. Hd. Screw			
15		Hex. Nut			
16		Washer			
17		Soc. Set Screw	50	1715	Hub
		Soc. Set Screw	51	885	Feed Handle
18	2239	Motor Pulley	52		Soc. Set Screw - Cup Point
	2239/1	Motor Pulley	53	955	Torque Pin
19		Key 3/16" Sq	54		Ball Knob
		Key 5mm Sq			
20	5211	Pulley Guard			
21	1208	Column Cap			
22		Vee-Belt			
23	950	Drill Head			
24	1011	Spring Attachment Pin	18	972	4-Step Motor Pulley
25		Soc. Set Screw	22		Vee-Belt
26	2109	Spring	40	953	4-Step Pulley
27		Soc. Cap Screw		SP92	4 Speed Pulley Assembly
28	983	Spring Cover			

HAND WHEEL - ASSEMBLY No.SP93

8 SPEED DRILLING MACHINES :

NOTE : ALL MACHINES UP TO SERIAL  
No.5906 8 SPEED ONLY.

2



GENERAL ASSEMBLY

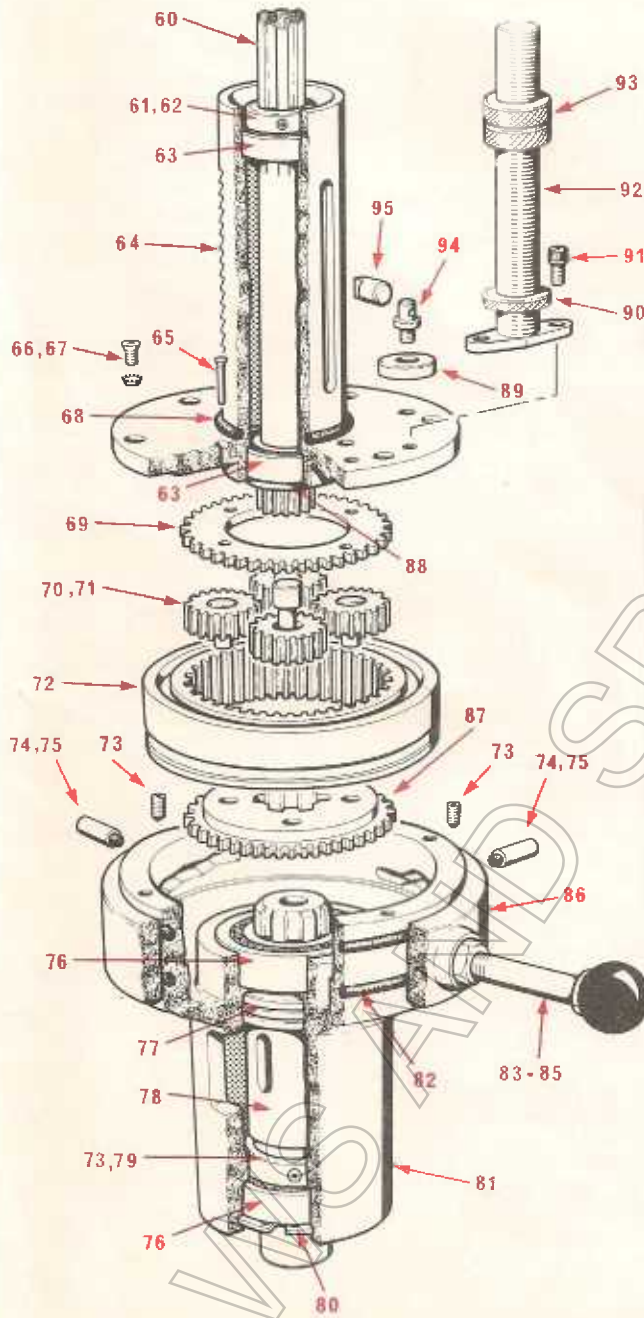
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2



GEARBOX QUILL

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GEARBOX QUILL - ASSEMBLY No.SP390

DRILL GUARD - ASSEMBLY No.SM954

ITEM	PART NUMBER AND DESCRIPTION
60	3098 Spindle
61	666 Spindle Locking Collar
62	Soc. Set Screw
63	Bo2000 Ball Bearing
64	3097 Quill
65	C'sk. Hd. Rivet
66	Soc. Hd. C'sk. Screw
67	C'sk. Shakeproof Washer
68	'O' Ring
69	988 Static Gear
70	998 Planet Pinion
71	994 Planet Pinion Pin
72	1092 Special Ball Bearing
73	Soc. Set Screw
74	1008 Gear Shift Pin
75	2104 Neoprene Plug
76	Bo2006 Ball Bearing
77	Bo2007 Thrust Bearing
78	2853 Spindle Nose
79	2852 Collar
80	Circlip Internal
81	2850 Gearbox Housing
82	'O' Ring
83	1867 Gear Shift Lever
84	Ball Knob
85	Lock Nut
86	1001 Gear Shift Annulus
87	2854 Planet Pinion Carrier
88	683 Ball Race Spacer
89	2052 Collar
90	3600 Locking Ring
91	Soc. Hd. Cap Screw
92	SP252 Depth Stop
93	663 Locking Ring
94	1022 Spring Anchor
95	1010 Quill Key

100	SM955 Top Guard
101	5167 Pin
102	Wing Nut
103	Washer
104	SM912 Slide Plate
105	5173 Pin
106	5360 Bottom Guard
107	Soc. Cap Screw
108	Spring
109	Lock Nut
110	Spring Pin
111	Stud
112	5362 Clamp Bar
113	5358 Guard Adaptor

NOTE : When ordering drill guard state whether guard is for use on 8 or 10 speed drills.

TABLES & BASES :

120	1183 Standard Table ( All Models )
121	720 Standard Base ( Floor Model )
122	1182 Standard Base ( Bench Model )

OPTIONAL EXTRAS :

130	SP151 Tilting Table
131	2727 Production Table with Suds Trough
132	SML387 Pedestal Base & Box Column
133	SM948 Belt Guard Switch Interlock ( Includes T.O.N.V.R. Starter )

NOT ILLUSTRATED :

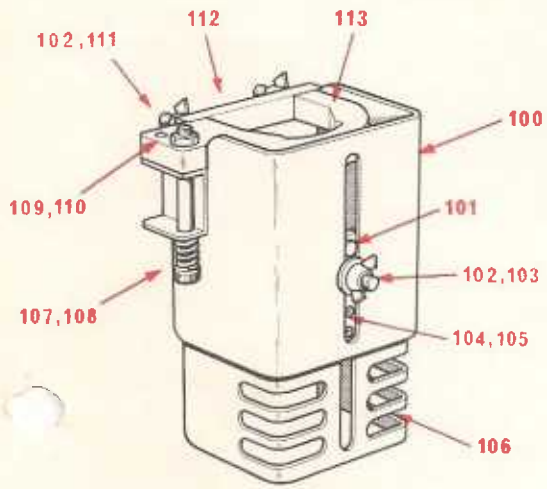
969	Locking Collar ( Placed under table for heavy loads )
SP240	Machine Vice
SP868	Kick Stop Switch ( Includes T.O.N.V.R. Starter )
	1/2" Capacity Chuck & No.2 M.T. Arbor
	Sanding Drum 2" Dia
	Sanding Disc 6" Dia
	Reversing Switch ( 3 Phase Only )
	T.O.N.V.R. Push Button Starter
	Lighting Equipment 240 Volts
	Lighting Equipment 24 Volts

MULTI-HEAD DRILL BANKS :

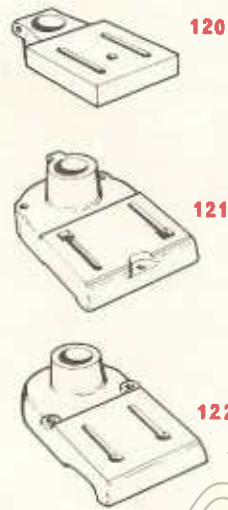
140	SP255/2 2 Station Drill Base
	SP255/3 3 " " "
	SP255/4 4 " " "
	SP255/5 5 " " "
	SP255/6 6 " " "
141	SP320 Head Elevating Mechanism
	Coolant Kit ( Not illustrated )

GEARBOX MAINTENANCE.

All bearings within the gearbox are sealed-for-life and do not require further lubrication. Should the gearbox be dismantled for any reason, a smear of ROCOL MTS 1000 grease should be applied to all bearings and gears before re-assembling.



DRILL GUARD



STANDARD TABLES & BASES

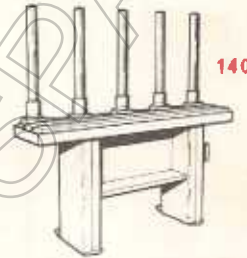
OPTIONAL EXTRAS



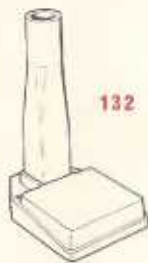
TILTING TABLE



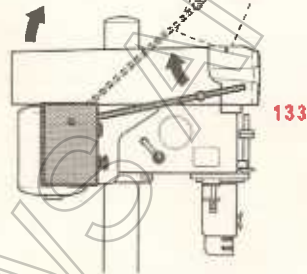
PRODUCTION TABLE



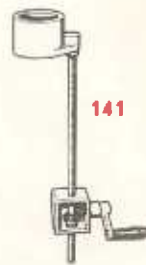
MULTI-HEAD DRILL BANK



PEDESTAL BASE & BOX COLUMN



BELT GUARD SWITCH INTERLOCK



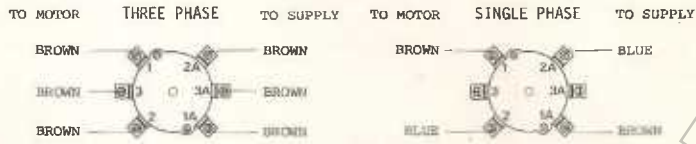
HEAD ELEVATING MECHANISM

A.L.T. SAMVIR SINGH & CO. PVT. LTD.

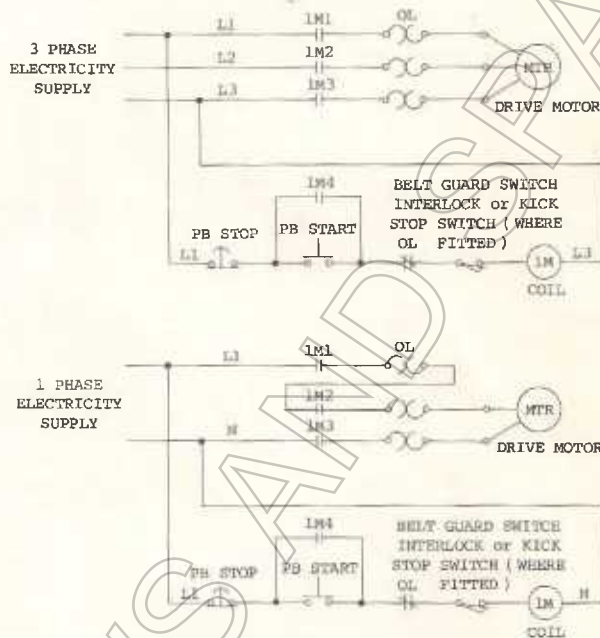
**INSTRUCTIONS FOR CHANGING ROTARY SWITCH.**

**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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