

AXMINSTER

Engineer
SERIES



Code **505115**

SC8 Lathe Milling Attachment



DECLARATION OF CONFORMITY

The undersigned, Galen Chen authorised
by Shanghai SIEG Machinery Co., Ltd.
No.555 Caofeng Rd., South to No. 17 Bridge of Caoan Rd., Shanghai. P.R.China

declares that this product:

SX2

manufactured by Shanghai SIEG Machinery Co. is in compliance with the following standards or
standardisation documents in accordance with Council Directives

EN13128: 2001+A1: 2006 + A2: 2009/AC: 2010
EN61029-1: 2009+A11: 2010

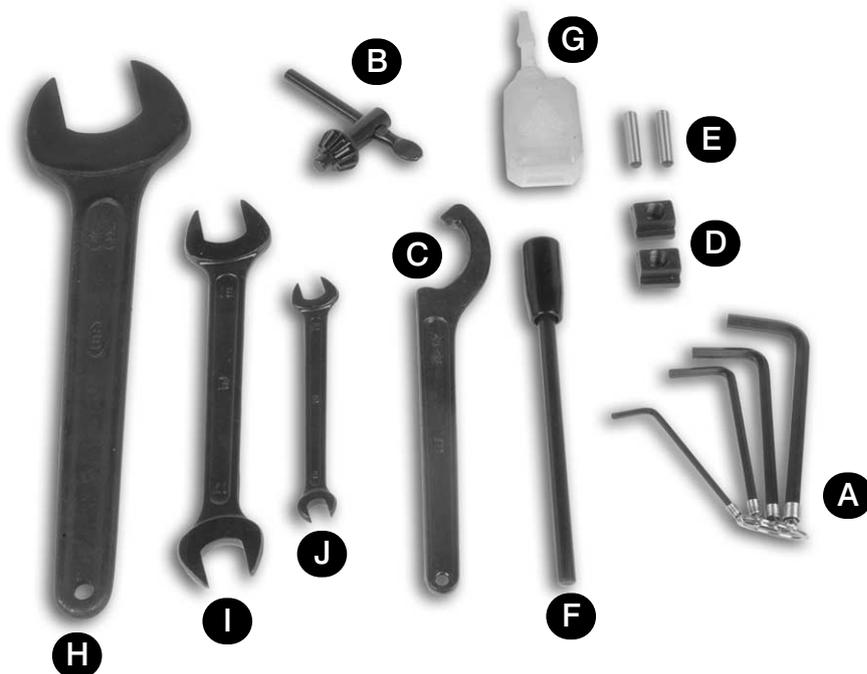
Machinery Directive 2006/42/EC

WHAT'S IN THE BOX

Quantity		Model
1 No.	Mill with Chuck and M12 Draw Bar fitted	SX2

Box containing:-

1 No.	Set of Allen Keys (A)	1 No.	Mill Support Casting
1 No.	Chuck Key (B)	1 No.	Tilt Housing Casting
1 No.	'C' Spanner (C)	1 No.	36mm Nut
2 No.	'T' Slot Keepers (D)	3 No.	M8x30 Caphead bolts and washers
2 No.	Steel Pins (E)	4 No.	M8x35 Caphead bolts and washers
1 No.	Tommy Bar (F)	1 No.	Mill/Drill Table
1 No.	Oiling Bottle (G)	1 No.	M10 Drawbar
1 No.	36mm Spanner (H)	1 No.	3/8" Drawbar
1 No.	19mm Spanner (I)		
1 No.	10mm Spanner (J)		



WHAT'S IN THE BOX



Please read the Instruction Manual prior to using your new machine; as well as the installation procedure, there are daily and periodic maintenance recommendations to help you keep your machine on top line and prolong its life. Keep this Instruction Manual readily accessible for any others who may also be required to use the machine.

Having unpacked your machine and its accessories, please check the contents against the equipment list "What's in the box", if there are any discrepancies, please contact Axminster Tool Centre using the procedures laid down in the catalogue.

Please dispose of the packaging responsibly, much of the material is bio-degradable.

The machine and its accessories will arrive coated with heavy corrosion preventative grease. This will need to be cleaned from the machine, its components and accessories prior to it being set up and commissioned. Use coal oil, paraffin or a proprietary degreaser to remove the barrier grease. Be warned, it will stain if you splash it on clothing etc., wear overalls, coverall et al., rubber gloves are also a good idea, as is eye protection if your cleaning process tends to be a little bit enthusiastic.

After cleaning, lightly coat the exposed metal surfaces of the machine with a thin layer of light machine oil. N.B If you used paraffin/kerosene make sure you apply this thin film sooner rather than later.

SPECIFICATIONS

Code	505115
Motor	230V a.c. 50 Hz. 220V d.c. 350W
Quill Travel	30mm
Spindle Speeds	Low Gear 0-1100rpm (variable) High Gear 0-2500 rpm (variable)
Spindle Taper	No. 3 MT
Draw Bar Threads	M10,3/8"
Drilling Capacity	13mm
End Mill Capacity	16mm
Face Mill Capacity	30mm
Weight	35kg

DEFINITIONS

- 'X' Axis. This is the axis described by the work table as it is moved side to side. Normally, movement that moves the tool to the right in the workpiece is referred to as +ve 'X', and movement that moves the tool to the left in the workpiece is referred to as -ve 'X'. Where the initial position of the tooling and the worktable is designated 0,0. (Horizontal plane only).
- 'Y' Axis. This is the axis described by the work table as it is moved from front to back. (Traverse) Normally movement that moves the tool to the front in the workpiece is referred to as -ve 'Y', and movement that moves the tool to the rear in the workpiece is referred to as +ve 'Y'. Where the initial position of the tooling and the worktable is designated 0,0. (Horizontal plane only).
- 'Z' Axis This is the axis described by the worktable in the vertical plane. (Not possible with this machine). However, to establish a point in space, the co-ordinates can be transferred to the 'tip' of the tooling, whereby, if we assume that the tool and the worktable in their initial positions, where designated 0,0,0, (Horizontal and vertical planes) any point above the tool tip is referred to as +ve 'Z', and any point below the tool tip is referred to as -ve 'Z'

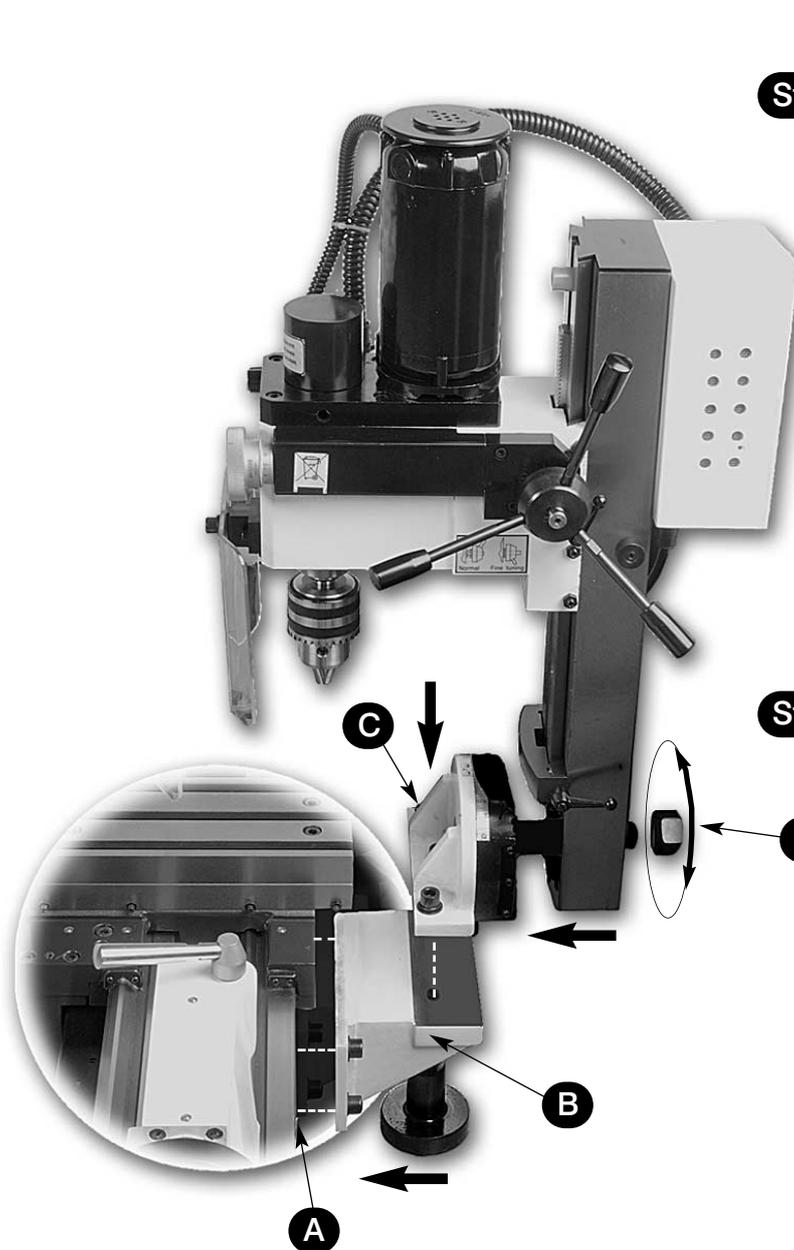
INITIAL ASSEMBLY - MOUNTING THE MILL



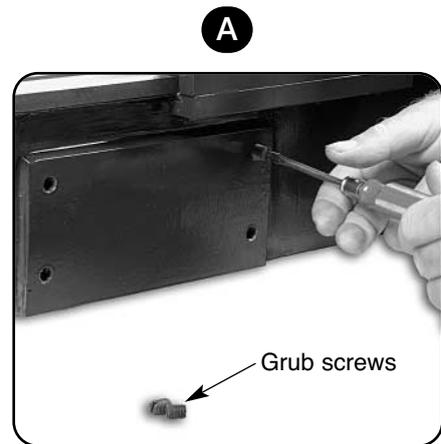
DISCONNECT THE LATHE FROM THE MAINS SUPPLY



When mounting the Mill to the Lathe, we strongly advise you get the assistance of another person because of the weight of the machine.

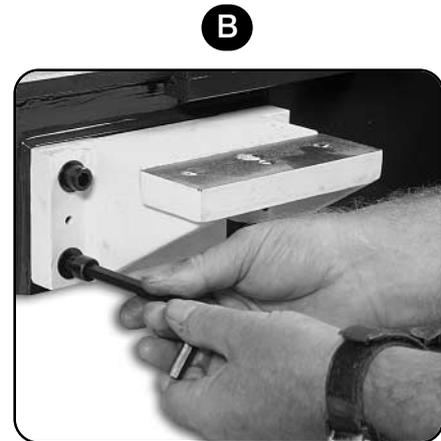


Step 1



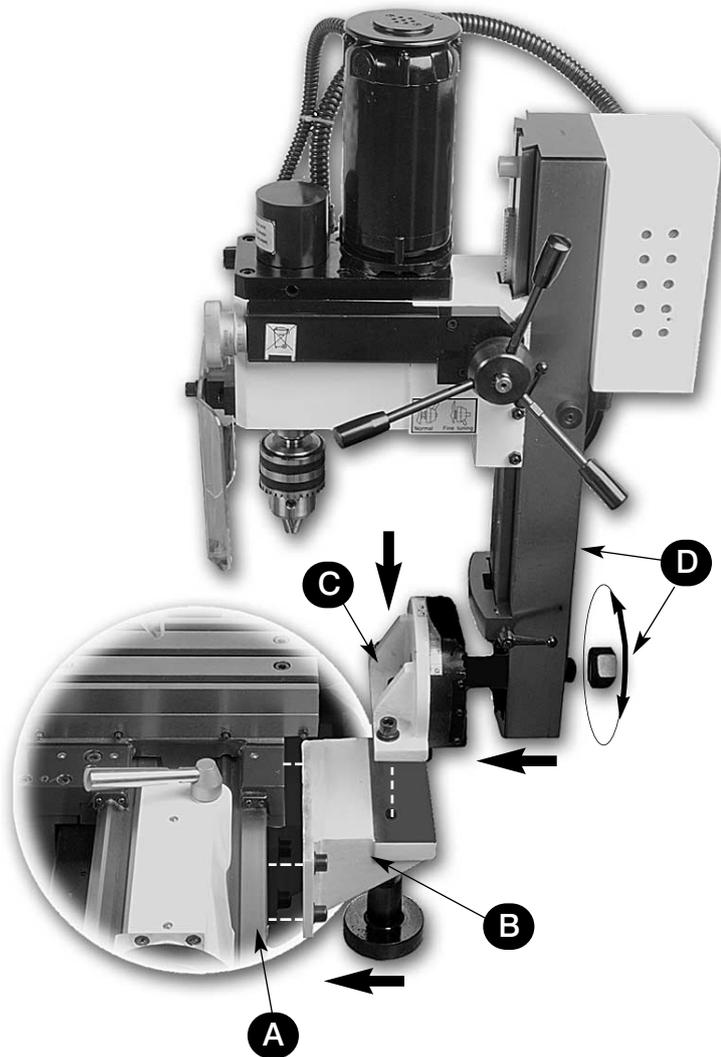
Remove the four grub screws to the side of the lathe bed and place safely aside.

Step 2

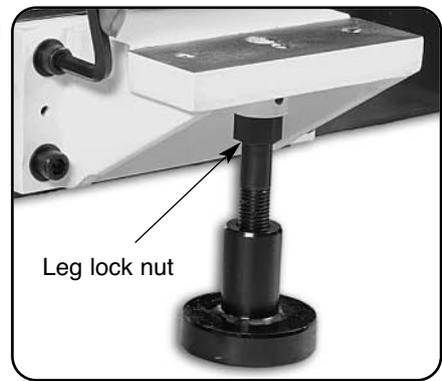


Locate the angle support casting and four M8x35 caphead bolts and washers. Secure the angle support to the side of the lathe bed. **DO NOT OVERTIGHTEN**

INITIAL ASSEMBLY - MOUNTING THE MILL

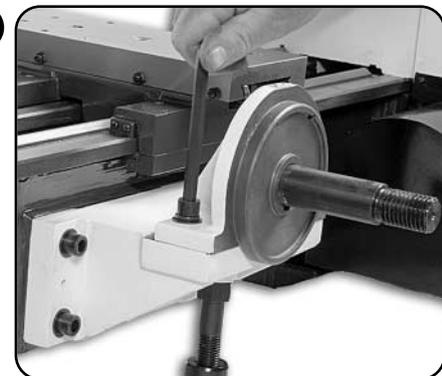


Step 3



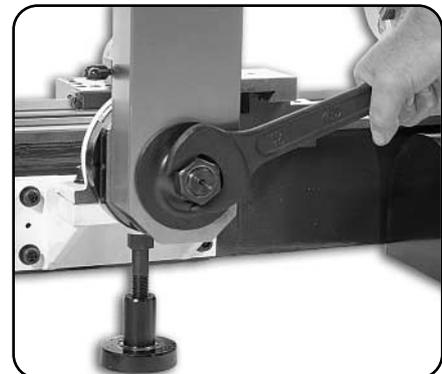
Tip the lathe forward and have your assistant thread the support leg up into the angle support casting. Adjust the support leg until it makes contact with the surface of your bench or stand, tighten the lock nut to lock the leg in position.

Step 4



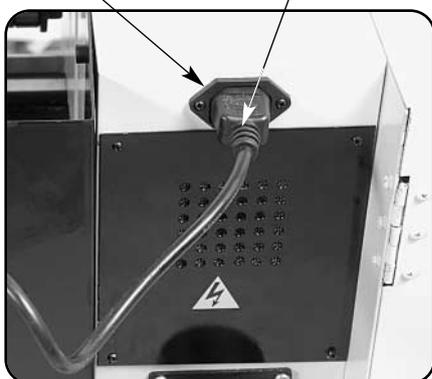
Locate the tilt housing casting and three M8x30 caphead bolts and washers. Offer up the pre-drilled holes with the holes in the support casting and secure in place using the M8 bolts and washers.

Step 5



Lift the mill assembly and slide it over the tilt housing shaft until it is flush against the tilt housing. Locate the 36mm nut and spanner and lock the mill assembly in position. **DO NOT OVER TIGHTEN**

Step 6



Insert the Mill's power plug into the socket in the rear of the lathe as shown.

INITIAL TESTING



Please read the section entitled Identification and Parts description so that you may more easily identify the parts to which reference is made in the text.

Testing

When the Mill is mounted to your satisfaction, proceed as follows:-

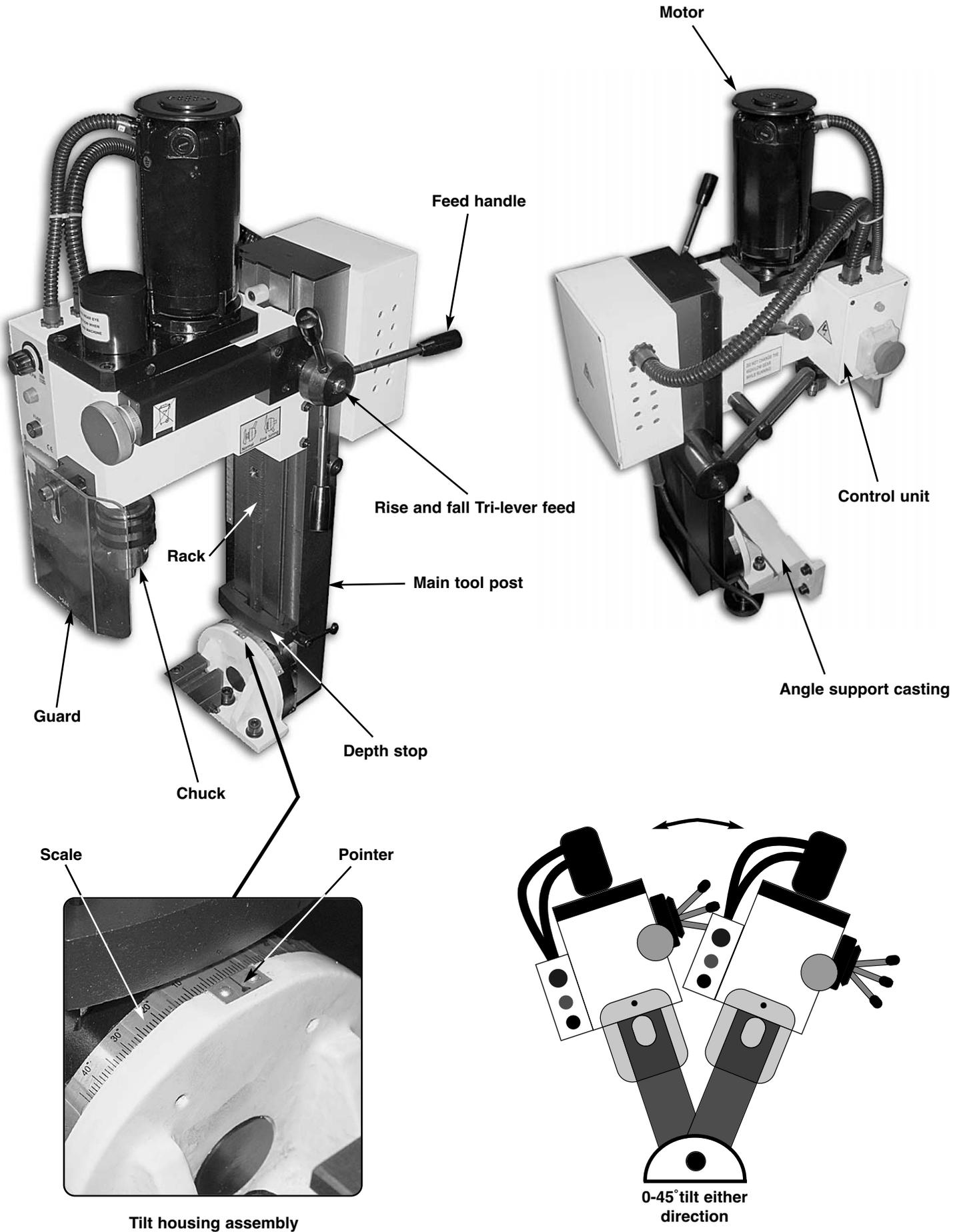
- a) Close the chuck jaws
- b) Check the millhead is 'locked' in position on the column.
- c) Check that all loose items are removed from the worktable.
- d) Set the worktable approximately mid-positioned under the chuck jaws.
- e) Check the speed control is switched OFF (fully anti-clockwise).
- f) Rotate the Lathe/Mill selector switch on the lathe's control panel to the milling position.
- g) Select L (Low) on the gear box.
- h) Connect the machine to the mains supply, open the switch shroud and press the on button (Green), check the green power light comes on, lower the lid of the switch shroud (Do Not Close).
- i) Turn the Speed Control Switch On (Clicks On).
- j) Check the Amber LED (Fault Light) is illuminated and the green light is illuminated.
- k) Turn the Speed Control to Off (Clicks Off), the Amber LED is now Off and the Green light stays on.
- l) Turn the Speed Control Switch On and advance until the Chuck starts to rotate.
- m) While it's running press the Emergency Stop button, check the machine stops, check that the green light and the Amber LED is on. Disengage the Emergency Stop button by opening the switch shroud, turn the Speed Control Switch to Off (All lights are off).
- n) Press the on button, turn the Speed Control On and advance until the chuck starts to rotate.
- o) Over a period of approximately 5 minutes advance the speed in stages to maximum, run at maximum for at least 2 minutes, check that there is nothing untoward, (no excessive vibration, speed progression is smooth etc.). Stop the spindle and change the gear selector to H (High), carry out the previous check.
- p) If all the above checks are correct, stop the spindle, (turn the speed control to zero and press the Off button (Red). Push the Tri-lever feed handle in (if necessary 'joggle' the feed to enable the gears to mesh), exercise the quill up and down, check the movement is smooth and precise.
- q) With the Tri-lever engaged, raise and lower the quill using the fine feed control. Check the movement is smooth and precise, there are no hard spots and the feed doesn't bind up. Disengage the tri-lever by pulling the assembly back.
- r) Ensure the head lock clamp is loosened and exercise the rise and fall, driving the head up and down the tool post. Check the movement is smooth and tight. Leave the head fairly well down the tool post for the next check.
- s) Loosen the 36mm tilt clamp bolt, to the rear of the tool post and tilt the tool post to the left or right, clamp the tool post in an arbitrary position and tighten the bolt. Check that the tool post remains locked in place.
- t) If all the above checks are correct, your mill is now ready for use.

PARTS IDENTIFICATION AND DESCRIPTION

Please take some time to identify the various parts of your machine so that you are familiar with the terminology we will use to enable you to set up and operate your Mill safely and correctly.

Main tool post	This is the column of the mill, it is an 65 x 50 bar with a dovetail slide machined on the front onto which the milling head is mounted, the lower part there is a pre-drilled hole which slides over the tilt housing shaft and secured in place by a 36mm nut. On the left side of the post a scale, graduated in mm's, is mounted to read against a pointer mounted on the head casting.
Rise and fall mechanism	Rise and fall, there is a dovetail slide machined on each side of the the headbox support column which mounts a through shaft. A pinion gear is mounted on the shaft inside the headbox that meshes with a rack on the support column, driving the pinion shaft will cause the headbox to rise and fall up and down the headbox support column. The part of the shaft protruding from the headbox has a hole through it to mount the tri-lever feed assembly.
Tilt housing	The tilt housing is mounted to the base casting using 3 M8x30 caphead bolts and washers. The tool post is mated to the housing and clamped by a 36mm nut. The main tool post can tilt 45° from the vertical either left or right. There is a pointer and a scale mounted on the housing to give an indication of the amount of tilt that has been applied.
Milling head	This is the 'milling machine' and the descriptions of its various parts and components are detailed as follows:-
Milling head casting	The main casting to which all the components are attached. The head has a dovetail housing machined at the rear, which allows the casting to be fitted to the Main Tool Post. The left side of the dovetail slide is fitted with a gybe strip to maintain the fit.
Head clamp	Located to the right side of the main tool post above the gybe strip adjusters and locknuts is a handled bolt that clamps the gybe strip against the slide to effect a locking action for the rise and fall of the head.
Motor and gearbox	The motor and gearbox assembly are mounted above the main head casting at the top of the arbor sleeve. The motor drive is geared through to the spindle with an intermediate 2:1 gearbox.
Gear change lever	The gear change lever allows the selection of the high or low ratio of the gear train. The speed of the spindle is then governed by the speed control on the motor panel. (You may have to 'joggle' the chuck/tool to aid the meshing action).
Motor	A 220V d.c. motor rated at 350W.

MACHINE ILLUSTRATION OF THE MILL



PARTS IDENTIFICATION AND DESCRIPTION

Tri-Lever feed	Three levered handle that is used to drive the quill (and hence the chuck or the tool) up and down. The boss of the handle is fitted to the end of a 'splined' gear shaft. This 'splined' gear is, in turn, engaged in the rack cut into the quill body. The other end of the 'splined' shaft is engaged in a contra-wound spring, this provides counter balance to the weight of the quill, arbor, chuck and drill, giving a more controlled 'feel' during drilling operations. It also retracts the quill when drilling is completed.
Fine feed assembly	The fine feed assembly floats around the splined gear shaft that drives the quill up and down. When the action of the fine feed mechanism is required; pushing the tri-lever feed handle in 'engages' the knob of the fine feed control meshes the gearing (you may have to 'joggle' the feed handle to aid the meshing action) between the splined shaft and the fine feed control shaft; this enables the spindle to be driven by the fine feed control wheel with greater precision. Behind the boss of the fine feed control wheel handle is a graduated ring (thimble) so that the movement of the quill can be measured. The thimble is held to the drive shaft by friction, and can be pre-positioned to establish a predetermined start or stop dimension.
Quill hold pocket	The size of the machine precludes any 'fancy' locking mechanism for the quill. There is a blind pocket on the spindle that accepts the tommy bar supplied in the tool kit, to enable the spindle to be held in position whilst the draw bar is loosened.
Draw bar cover	A moulded plastic cover that clips into the top of the Motor Gearbox assembly, to afford protection from the rotating top of the draw bar, when the quill is at the top of its travel.
Draw bar (unseen)	This is a metal rod, threaded at one end and with an 19mm squared shank and flange machined on the other. It is fitted through the spindle mandrel to hold the fitted tool/tooling hard into the No. 3 MT taper of the spindle shaft.
Motor control panel	<p><u>Power On LED</u> Green LED that indicates that power is available to the motor. i.e. mains is applied, fuse is intact and the Emergency stop switch is not activated.</p> <p><u>Fault LED (marked UN-NORMAL)</u> Amber LED that indicates that there is a fault or an incorrect control sequence. i.e. the chuck guard interlock has been activated or the speed control is activated. The Motor will not run if the fault LED is illuminated. If the safety interlock is activated, the safety interlock will remain in force until the interlock is reset and the start sequence re-initiated.</p> <p><u>Fuse Cap</u> Access cap for the 20mm fuse cartridge (1 Amp 250V) Speed Control Knob Round raised ridge knob connected to the circuit that controls the spindle speed (0-1100 rpm or 0-2500 depending upon the gearbox selection).</p>

MACHINE ILLUSTRATION OF THE MILL

Fault LED



Emergency stop

ON/Off switch & shroud

Speed control knob



Power LED

Fuse cap

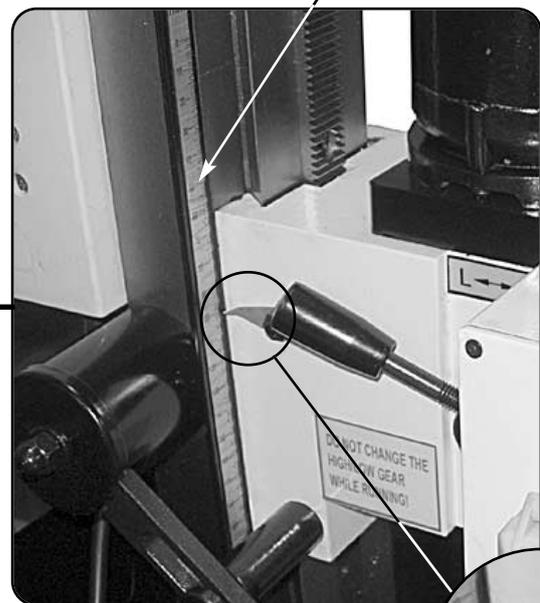
Low ratio

High ratio



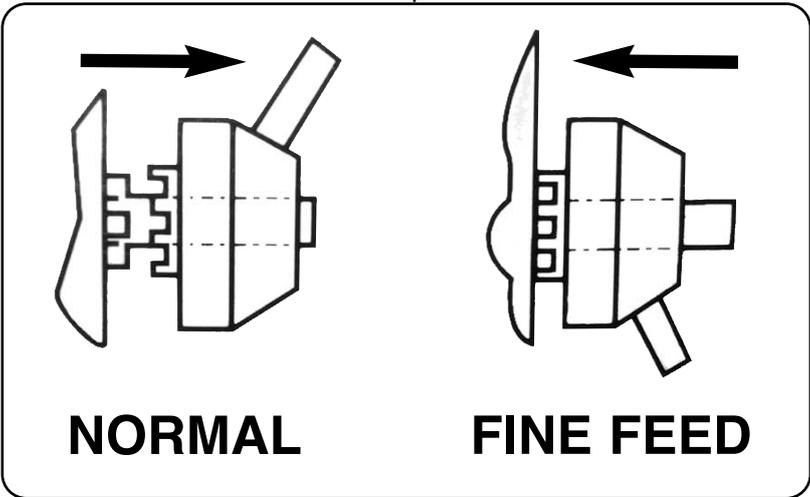
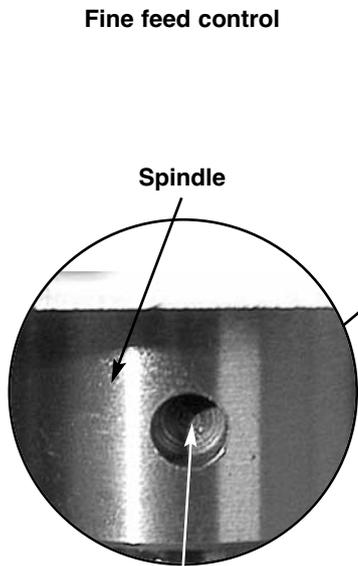
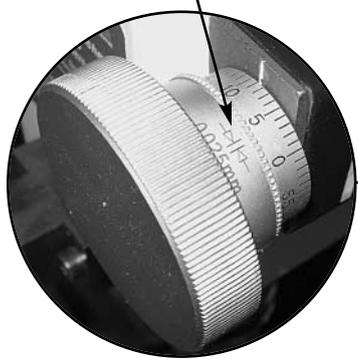
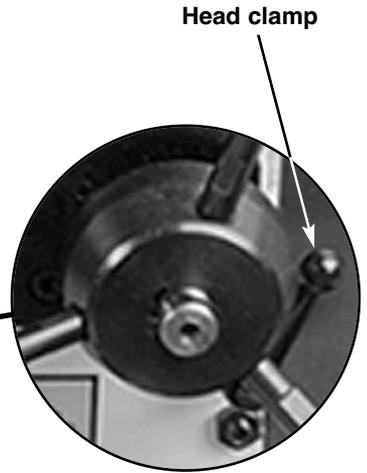
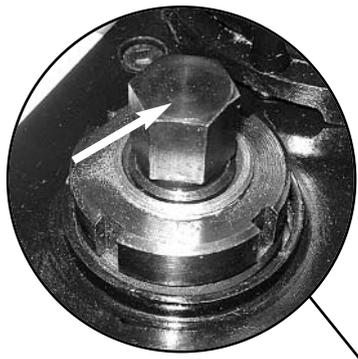
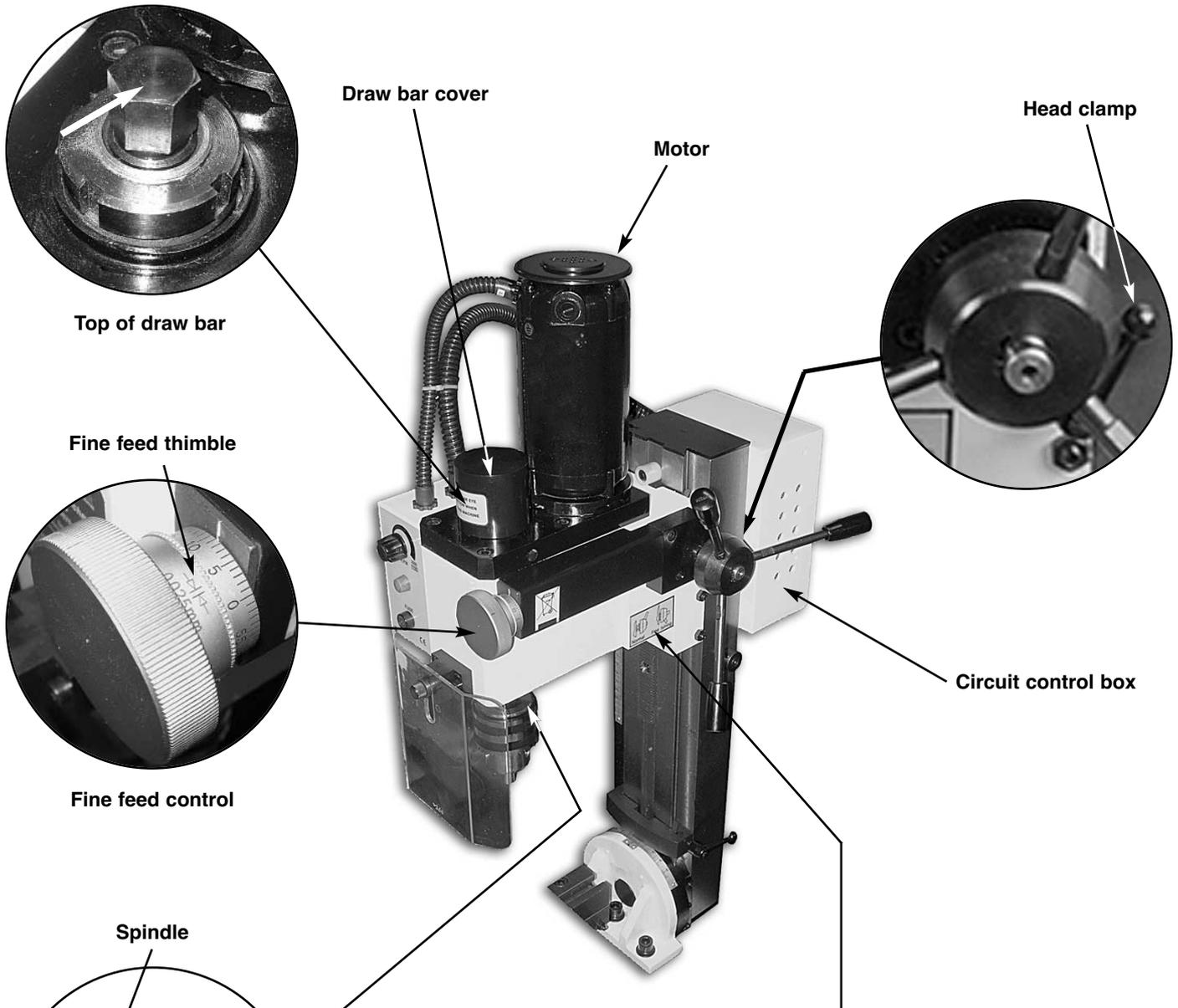
Gear change lever

Scale



Pointer

MACHINE ILLUSTRATION OF THE MILL



To engage the fine feed control push the tri-lever assembly in until it meshes with the bevel gear. Pulling the tri-lever back will disengage the fine feed control.

GENERAL OPERATING INSTRUCTIONS



Warning. Do not operate the mill in any function unless the head clamping lever is tightened.

TOOL CHANGING

Note. The taper socket in the spindle mandrel does not have a 'drive flat' and all tooling, including the drill chuck is secured and driven by the taper lock and the draw bar.

Make sure the power is switched off or better still remove the power from the machine.

Locate and put to hand the 19mm A/F spanner and the tommy bar. Remove the Draw Bar Cover. Hold the quill immovable by inserting the tommy bar into the quill hold pocket and loosen the draw bar. Unscrew two or three turns and then strike sharply with a hammer (preferably a copper face, to prevent the head of the draw bar peining over) this will break the lock between the tool and the spindle tapers .

Unscrew the draw bar from the tool. **Ensure the tool is supported**, i.e. will not fall onto the workpiece/table et al. When it is free put the tool carefully aside, remove the draw bar, check the thread, check the taper and the thread of the new tool are clean and undamaged, introduce the new tool into the taper, re-insert the draw bar and screw into the top of the tool.

Screw in the draw bar finger tight. Hold the quill immovable and tighten with the spanner. **DO NOT OVERTIGHTEN**. Replace the draw bar cover.

Remove all tooling and reconnect the machine. Ensure the tool path is clear, switch on, and check that the tool is correctly seated, is running true etc. If all is O.K, proceed.

GERERAL SAFETY POINTS

Milling (all cases)	Ensure the workpiece is securely clamped to the table.
Along the longitudinal Axis (X)	Ensure that the quill is locked in position before milling is commenced. Ensure the traverse slide lock is tightened.
Along the Traverse Axis (Y)	Ensure that the quill is locked in position before milling is commenced. Ensure the worktable lock is tightened.
Milling or Drilling Vertically (Z)	Ensure the traverse slide and the worktable locks are tightened.

SETTING AND ADJUSTMENTS

Milling head adjustment

The Milling Head is mounted over a dovetail section. In order to maintain the 'tightness' of the fit; between the sloping surface of the component and its mating surface, on the right hand side, a gybe strip has been inserted. To adjust the gybe strip, use the supplied allen key and spanner, release the lock nuts and screw the gybe strip grubscrews clockwise to compensate for any slackness or anti-clockwise to loosen the movement. Check, using the rise and fall drive feed handles, that the head moves smoothly, If not, repeat the adjustments until the movement is smooth and tight over the whole of the travel.

MILL TABLE ASSEMBLY

The Mill/Drill includes a milling table as an accessory. To install the milling table the compound slide must be removed from the cross slide from the lathe bed. Once installed, the milling table can move back and forth with the cross slide. Follow the instruction below to install table.

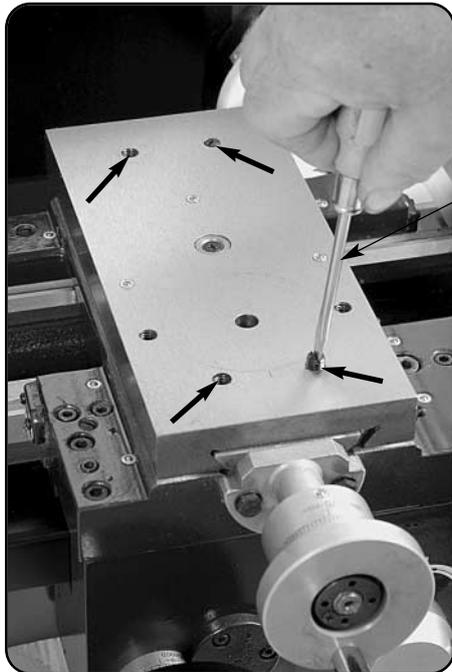
1) Using a 12mm spanner remove the two bolts that secure the compound slide to the cross slide, remove the compound slide and place safely aside. (See fig A)

Fig A



Remove the two bolts using a 12mm spanner, remove the compound slide from the cross slide.

Fig B



Phillips screwdriver

2) Using a Phillips screwdriver remove the four grub screws from the cross slide and place safely aside. (See fig B)

3) Locate the milling table and the supplied caphead bolts. Lower the table onto the cross slide, line up the holes and insert and secure the table using a 6mm allen key. (See fig C)

Fig C



Milling table

MAINTENANCE

Your Mill is a precision tool. In order to maintain this precision and prolong its useful life, it is advised that you follow the recommended daily and periodic maintenance tables printed below.

Daily and Periodic Maintenance

Daily

1. Carry out a visual inspection. Repair any damage immediately. Minor damage to the beds should be taken out with an oilstone.
2. Move the worktable and the traverse feed back and forth by hand, check that the movement is smooth.
3. Spread a light film of oil over the worktable and the traverse slide bed.
4. Oil the end bearings of the drive shafts. Squirt oil onto the slide faces of mating components.
5. Exercise the components to ensure the oil is spread over both visible and obscure surfaces.

Daily after-use

1. Clean all swarf and chips away from the machine bed, slide surfaces, and the tool post.
2. Exercise the slides and ensure no swarf etc., is lodged in the drive shaft tunnels.
If you have been using a coolant make sure the machine is thoroughly dried off.
3. Check the tool, ensure it is usable the next time, if not re-sharpen or replace the tool tip.
4. Lightly oil spray all the machine beds and surfaces.
5. Clean and lightly oil any tools you may have been using (drill chucks, spanners, chuck keys etc), and put them away.
6. Switch off the power supply. Disconnect the plug.
7. Cover the machine over with a dust cloth.

Weekly

1. Move the traverse slide fully back to give access to the tunnel, blow out to make sure all swarf is cleared away and heavily spray oil the tunnel, exercise the slide to work the oil into the drive thread and to lubricate the dog.
2. Spray oil the slide and the worktable bed, exercise the worktable to spread the oil to all surfaces, both hidden and visible.
3. Spray oil the underside of the machine onto the drive screws, exercise to ensure the oil is coating all components.
4. Clean and spray oil the rise and fall drive screw, exercise to ensure all parts are coated.
5. Check the movement of the worktable, the traverse slide and the head, check they are smooth and 'tight', if necessary reset the gybe strips until the movements are smooth and tight.
6. Wipe the quill outer sleeve clean and lightly oil, exercise the quill to spread the oil in the sleeve bushes.

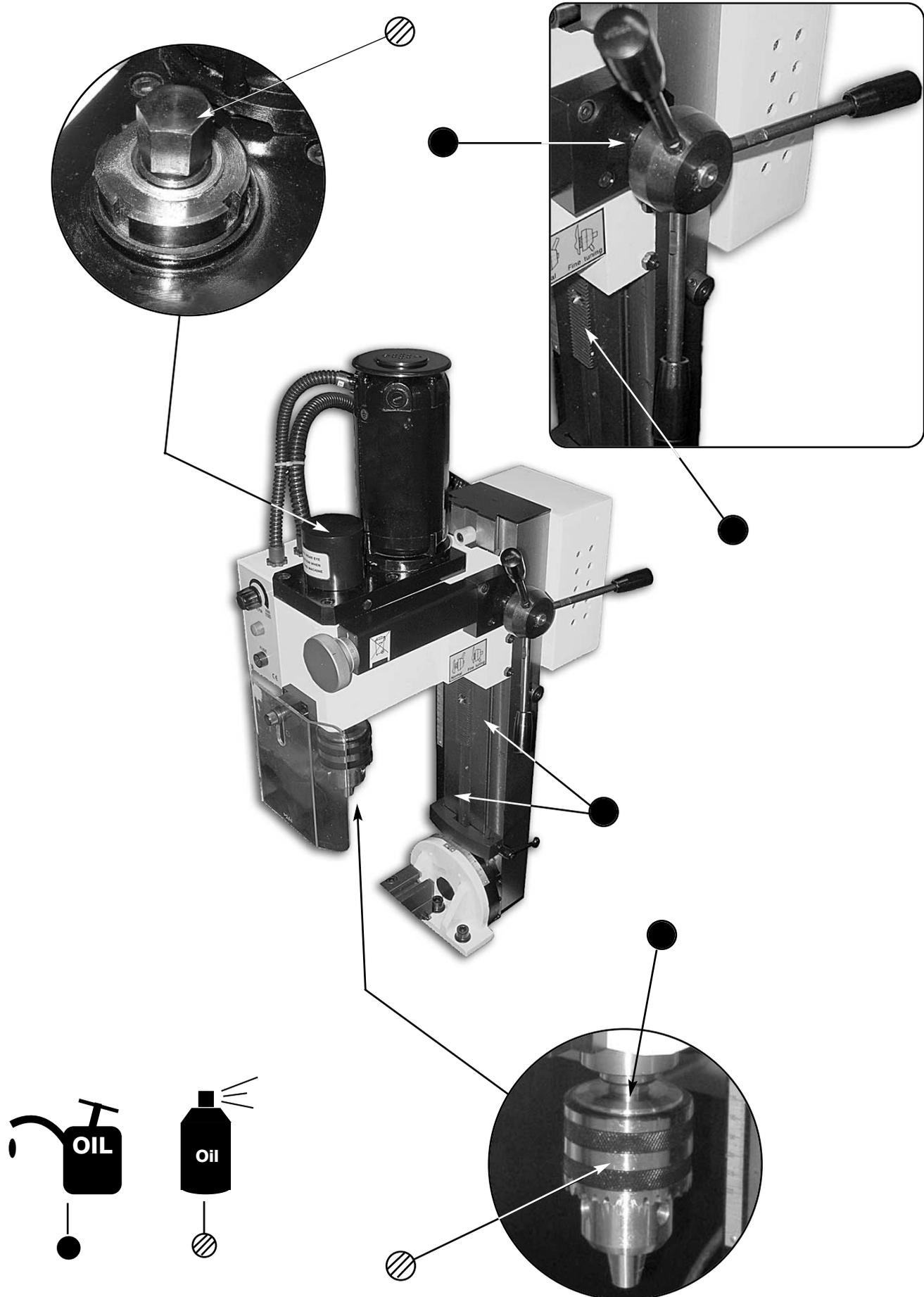
Monthly

- a) Give the motor a good 'blow through' to remove any dust, dirt etc,
- b) Check all the interlocks function correctly.

Accessories

There are numerous accessories for the machine listed in the Axminster catalogue. Some are illustrated at the rear of this manual. (See page 47)

MAINTENANCE OILING POINTS



MILL ACCESSORIES

Rotary Milling Vice for Micro Mill 55mm

Code (100034)



Axminster Micro Mill Collets

#2MT 6mm collet
Code (100023)

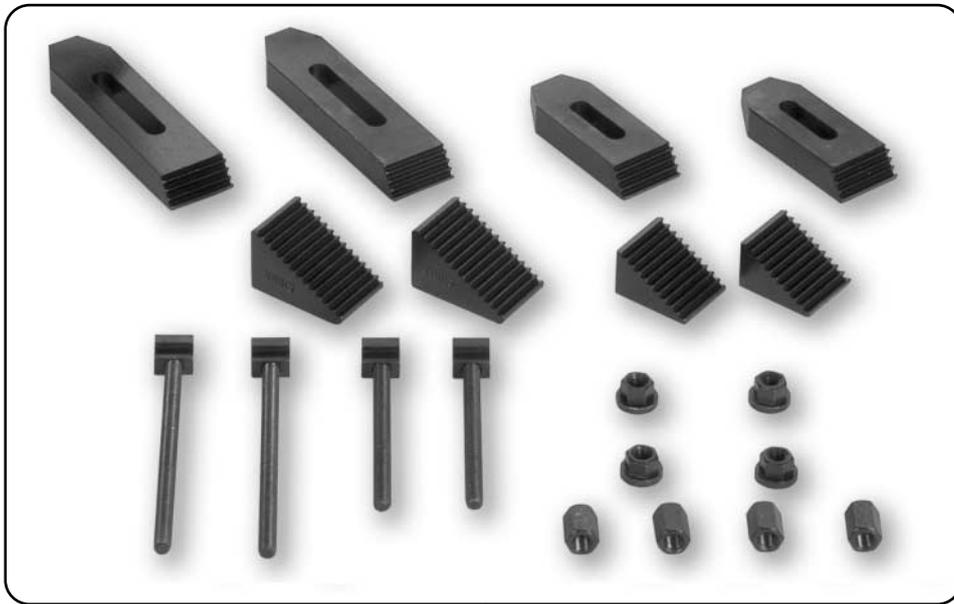


#2MT 10mm collet
Code (100024)



50mm Release Vice

Quick vice 50mm
Code (100022)



Micro Mill Clamping Kit

Clamping kit
Code (100033)

Axminster Bull Nose Slot Drills



Metric Screwed Shank Two Flute Bull Nose Slot Drills

Code	Description
610170	Bull Nose Slot Drill 3mm
610171	Bull Nose Slot Drill 4mm
610172	Bull Nose Slot Drill 6mm
610173	Bull Nose Slot Drill 8mm
610168	Bull Nose Slot Drill 10mm

Axminster HSS End Mills



Metric Screwed Shank Three Flute End Mills.

Code	Description
610177	3mm End Mill
610178	4mm End Mill
610179	6mm End Mill
610180	8mm End Mill
610174	10mm End Mill

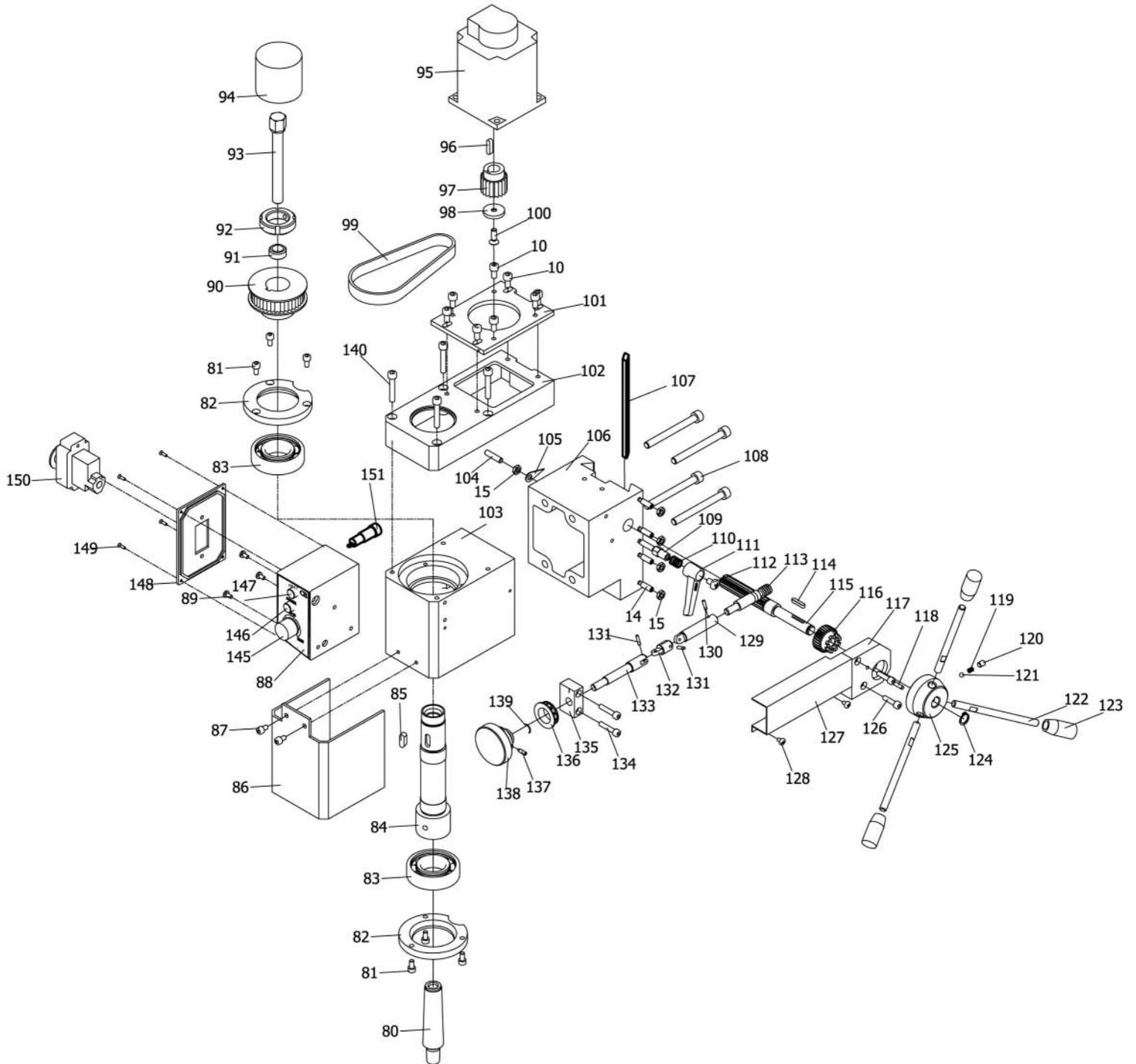
Axminster HSS Slot Drills



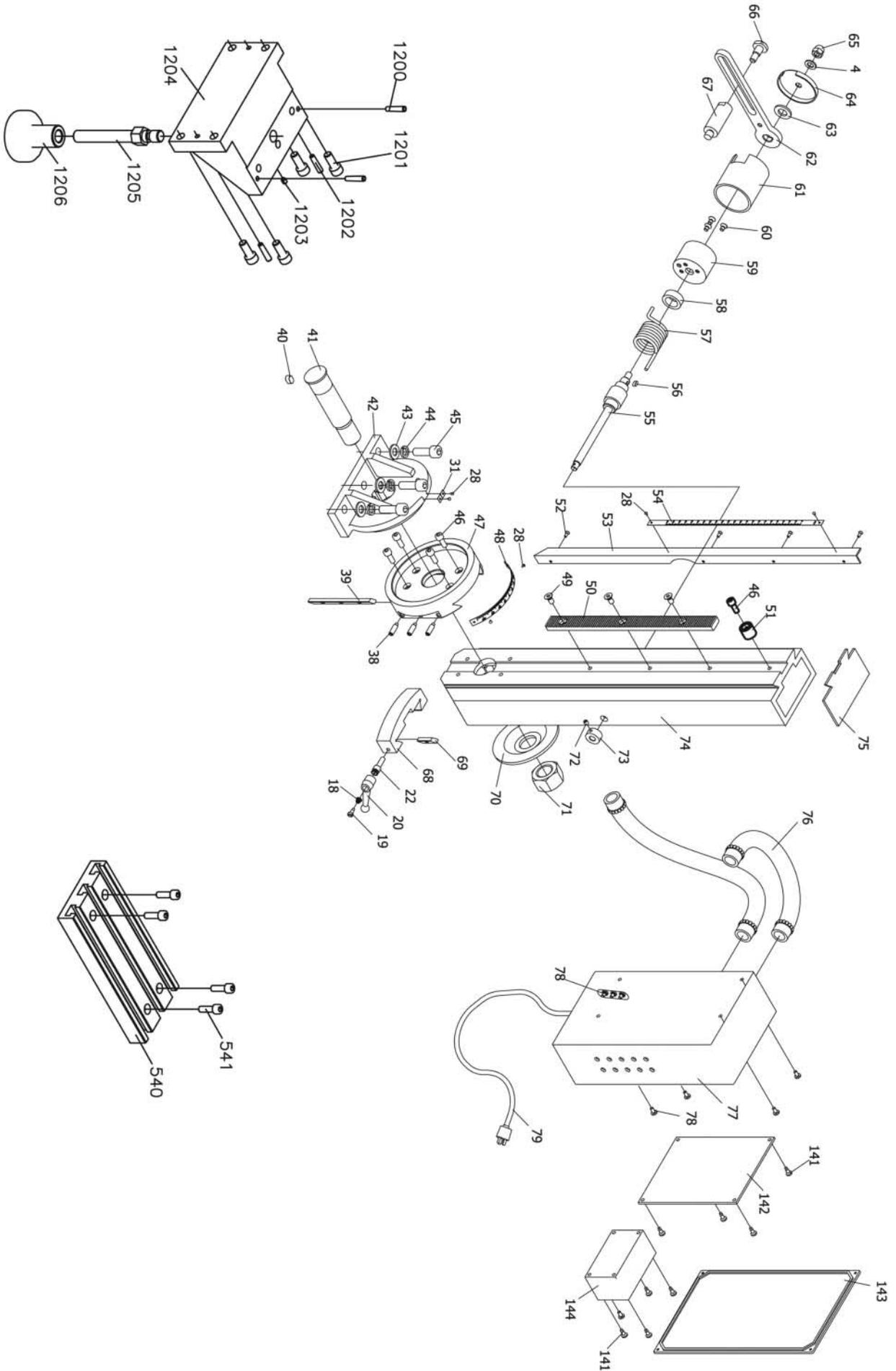
Metric Screwed Shank Two Flute Slot Drills.

Code	Description
610184	Slot Drill 3mm
610185	Slot Drill 4mm
610186	Slot Drill 6mm
610187	Slot Drill 8mm
610181	Slot Drill 10mm

PARTS BREAKDOWN FOR THE MILL



PARTS BREAKDOWN FOR THE MILL



PARTS LIST FOR THE MILL

No.	Description	Qty
4	Washer	1
10	Screw	8
14	Screw	4
15	Nut	5
18	Spring	3
19	Screw	3
20	Handle	1
22	Bolt	3
28	Screw	4
31	Guide finger	1
38	Screw	3
39	Wedge	1
40	Key	1
41	Shaft	1
42	Bracket	1
43	Washer	3
44	Washer	3
45	Screw	3
46	Screw	5
47	Connect tray	1
48	Ruler	1
49	Screw	3
50	Gear	1
51	Fixed sleeve	1
52	Screw	4
53	Bracket	1
54	Ruler	1
55	Shaft	1
56	Key	1
57	Spring	1
58	Washer	1
59	Spring sleeve	1
60	Screw	3
61	Cover	1
62	Support	1
63	Washer	1
64	End cover	1
65	Nut	1
66	Screw	1
67	Support	1
68	Limit block	1
69	Wedge	1
70	Washer	1
71	Nut	1
72	Screw	1
73	Tighten ring	1
74	Colum	1
75	Cover	1
76	Power line	2

No.	Description	Qty
77	Electric box	1
78	Screw	7
79	Plug	1
80	Shank	1
81	Screw	6
82	Oil cover	2
83	Bearing	2
84	Spindle	1
85	Key	1
86	Dustproof	1
87	Screw	2
88	Control box	1
89	Screw	3
90	Spindle pully	1
91	Fixed sleeve	1
92	Spindle nut	1
93	M12 drawbar	1
94	Cover	1
95	Brushless motor	1
96	Key	1
97	Motor pully	1
98	Washer	1
99	Pully	1
100	Screw	1
101	Connected board	1
102	Cover	1
103	Spindle box	1
104	Screw	1
105	Indicator	1
106	Spindle base	1
107	Wedge	1
108	Screw	4
109	Bolt	1
110	Spring	1
111	Small handle	1
112	Screw	1
113	Worm	1
114	Key	1
115	Gear 14T	1
116	Gear 29T	1
117	Worm support	1
118	Pin	1
119	Spring	1
120	Screw	1
121	Ball bearing	1
122	Handle	3
123	Handle sleeve	3
124	Washer	1
125	Handle seat	1

No.	Description	Qty
126	Screw	2
127	Cover	1
128	Screw	2
129	Sleeve	1
130	Pin	1
131	Pin	2
132	Universal joint	1
133	Universal shaft	1
134	Screw	2
135	Bracket	1
136	Dial	1
137	Screw	1
138	Small handle	1
139	Spring	1
140	Screw	4
141	Screw	8
142	PC board	1
143	Cover	1
144	Filter	1
145	Button	1
146	Green lamp	1
147	Yellow lighting pipe	1
148	Cover	1
149	Screw	8
150	Switch	1
1200	Pir	2
1201	Screw M10*25	4
1202	Pir	2
1203	Screw M6*8	1
1204	Angle suppor	1
1205	Bolt	1
1206	Support plat	1
540	Work table	1
541	Screw M8*25	4

ATTACHMENT



Please dispose of packaging for the product in a responsible manner. It is suitable for recycling. Help to protect the environment, take the packaging to the local recycling centre and place into the appropriate recycling bin.

Only for EU countries



Do not dispose of electric tools together with household waste material. In observance of European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.