

Super X1L Mill



Dismantling and Reassembly Guide

A picture story book to help you dismantle and reassemble your Sieg Super X1L Mill

PLEASE READ THIS FIRST

The **SIEG Super X1L** Mill is currently one of the most popular small mills available to model engineers today.

SIEG X1 Mill Versions

Super X1L (the machine detailed in this guide): This small bench-top mill is of cast iron construction and has a dovetail column which may be tilted up to 90° each way at it's base. The spindle has an MT2 taper and is driven by a brushed 150w DC motor via a 2 speed gearbox in the head. The motor is electronically controlled to give a fully variable speed range up to 2000 rpm.

The "L" in Super X1L stands for "**Long Table**" and with a table size of 400x145mm, probably the largest table for this class of mill. The SIEG Super X1L Mill is available in both metric and imperial.

This picture story guide is designed to help you dismantle, reassemble, lubricate and make the proper adjustments to your Mill.

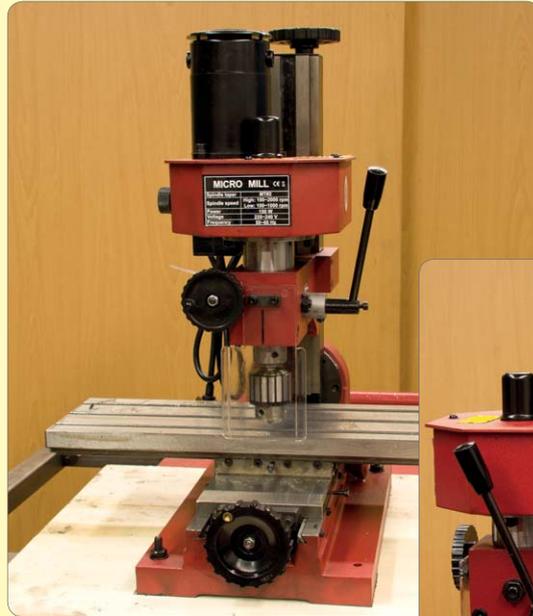
Before dismantling your Super X1L Mill, you should read through the entire guide and assess that you have the required equipment and skills to complete the task.

Although not expressly stated at each stage in this guide, every part is thoroughly cleaned in a paraffin type degreaser before reassembly.

For lubrication, we recommend Molyslip HSB grease, and a good quality lubricating oil such as Rock Oil HLP 32 Hydraulic Oil (ARC code: 170-150-00400). We do not recommend using automotive engine oil or 3-in-1 oil.



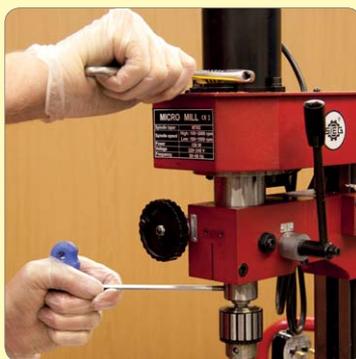
1. The mill out of the box and we are ready to start work.



2. Fit the handles and wind the head to the top of the column.



3. Remove the chuck guard.



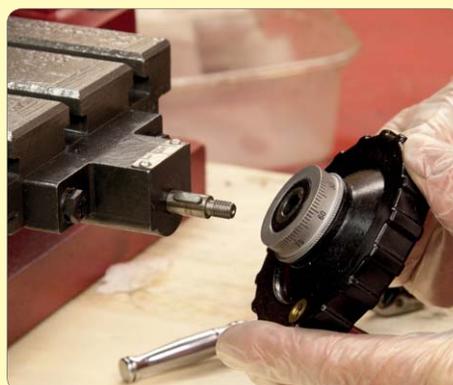
4. Slacken the drawbar.



5. Tap drawbar with a mallet to release and remove chuck and drawbar.



6. Remove Handwheel Locking Nut.



7. Remove Handwheel.



8. Remove Key



9. Undo the leadscrew bracket bolts and remove the bracket.



10. Remove the X-axis leadscrew.



11. Remove the gib screws, slide off the table and remove the gib strip.



12. Remove Handwheel Locking Nut.



13. Remove Handwheel.



14. Remove Key



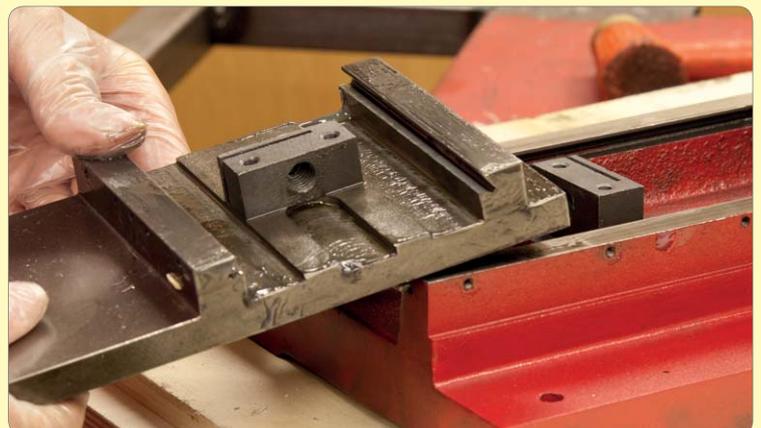
15. Undo the bracket bolts and remove.



16. Remove the Y-axis leadscrew.



17. Remove the gib screws, slide off the saddle and remove the gib strip. Wash all parts removed so far in a paraffin type degreaser.





18. Undo the motor screws and remove the motor.



19. Remove the top cover.



20. Pull out the range change assembly.



21. Remove the spindle circlip.



22. Pull the gears and spacer off the spindle.



23. Remove the two cap head screws securing the control box housing.



24. Lift off the complete control box housing along with the motor.



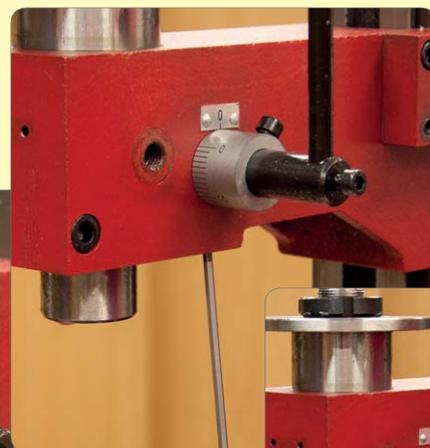
25. Remove the fine feed assembly.



26. Remove the left hand spindle location screw.



27. Remove the right hand location screw.
(Note the eccentric)



28. Undo the handle locating grub screw.



29. Remove the handle assembly.



30. Lift out the spindle assembly.



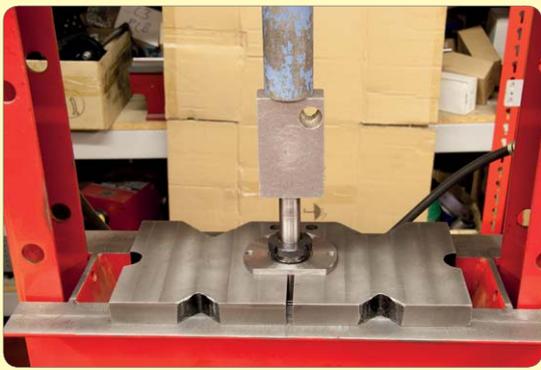
31. Remove the spindle drive key.



32. Tap down the locking washer tab.



33. Unscrew and remove the locking nut and lock-washer.



34. Press out spindle.



35. Spindle and sleeve.



36. Circlip and collar retaining compression spring.



37. Press off nose bearing.



39. Top bearing and sleeve.



40. Spring retaining circlip (top).



41. Fit a bolt and washer through sleeve to compress spring.



38. Press or pull out top bearing.



42. Remove circlip.



43. Spindle assembly sequence.



44. De-burr slots in sleeve if necessary.



45. Check for nice sliding fit in head.



46. Re-fit circlip in top of sleeve.



47. Grease inside of sleeve.



48. Fit spring and rotation collar (checking for correct orientation).



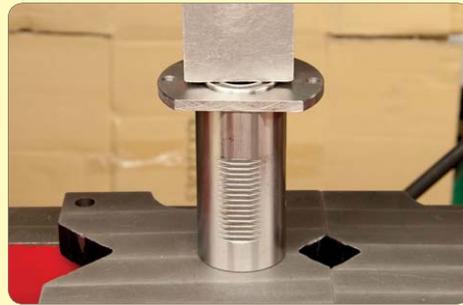
49. Fit spring compressor bolt and compress spring.



50. Re-fit circlip and remove compressor bolt.



51. Press in Nose Bearing.



52. Press in top bearing.



53. Press in spindle.



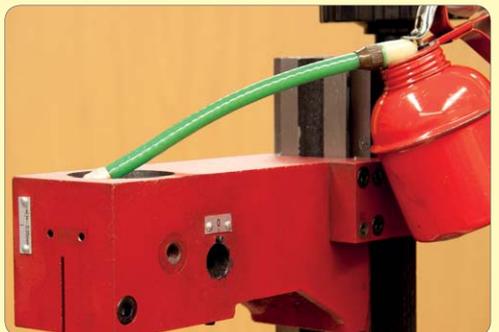
54. Re-fit locking washer and nut.



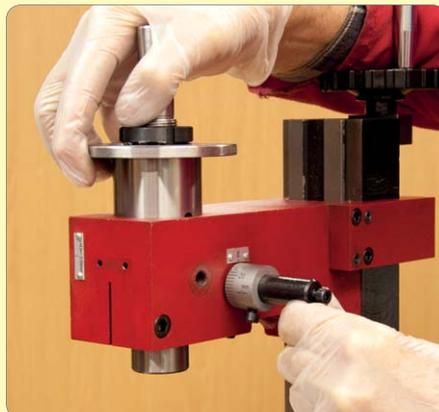
55. Adjust preload and lock tab.



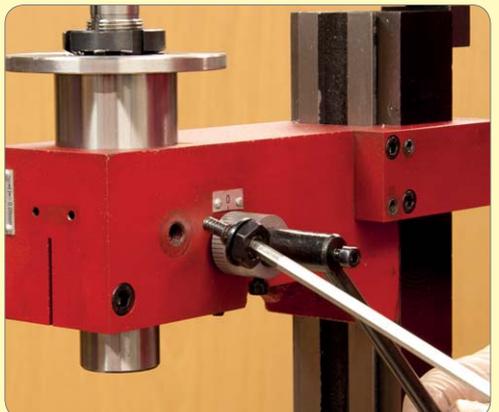
56. Grease handle shaft bore.



57. Lightly oil head bore.



58. Slide in spindle assembly. Grease and fit handle - leave loose.



59. Fit eccentric screw. Screw all the way in and then back off 1/2 a turn. Do not tighten.



60. Fit opposite side location screw and tighten.



61. Adjust eccentric screw to allow a small amount of radial movement and allow spindle to return under spring pressure.



62. Adjust final position of handle to suit and locate with grub screw.



63. Pull out worm gear.



64. Lubricate and re-assemble.



65. If you need to remove the worm shaft, drive out the cross pin shown.



66. Re-fit the fine feed assembly.



67. Check locking plunger slides in and out.



68. Re-fit top housing assembly.



69. Re-fit the spindle gears.



70. Lubricate the range change assembly and make sure it slides freely.



71. Remove gear change knob grub screw, oil and replace screw.



72. Re-fit gear assembly and lightly grease.



73. Re-fit the top cover.



74. Re-fit the motor.



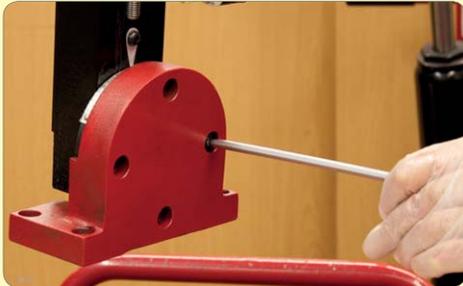
75. Slacken column pivot bolts.



76. Remove column bracket bolts.



77. Lift off column assembly.



78. Remove pivot bolts.



79. Tap column bracket off.



80. Remove bolts from retaining plate.



81. Tap plate assembly off.



The mill will work adequately without carrying out processes 82-95 and 111-114. However, if you wish to improve on the accuracy and only if you are suitably skilled to carry out this process, you may wish to consider doing this.



82. Column base prior to modification.



83. Mill or file out centre to leave 4 pads.



84. Remove Y-axis screw nut.



85. Place saddle on base and check to see if it is sitting flat.



86. Check base on surface plate and scape flat if necessary.



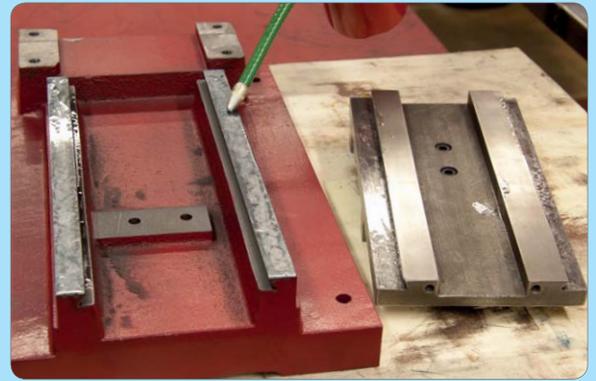
87. Scrape saddle into base if necessary.



88. Check for clearance in corners of dovetails.



89. Dress dovetails with diamond file if necessary.



90. Oil dovetails and assemble.



91. Oil and position gib strip.



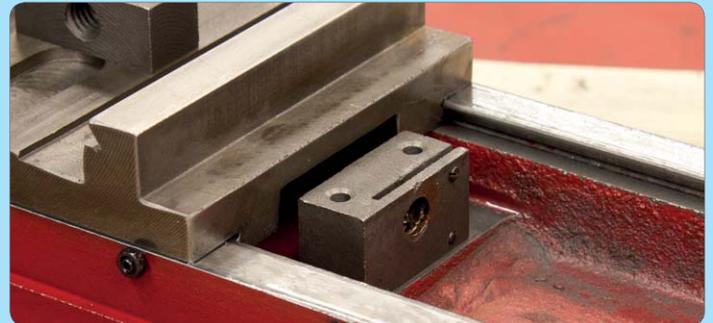
92. Turn a cone point on the gib screws.



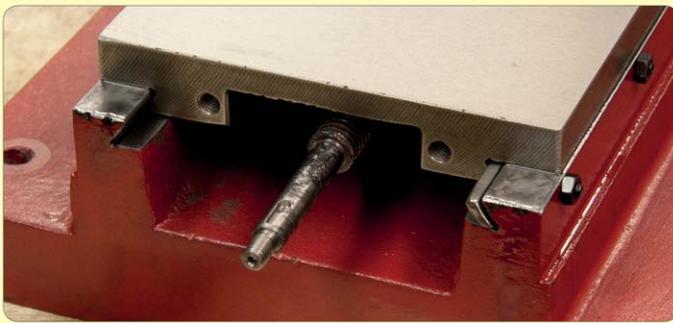
93. Fit a couple of gib screws and check the gib does not foul the saddle.



94. Initial gib adjustment to check free travel over the whole movement. If there are any high spots, remove with a diamond file.



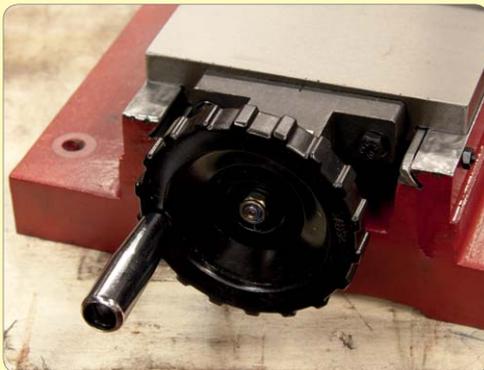
95. Fit Y-axis screw nut and oil or grease thread.



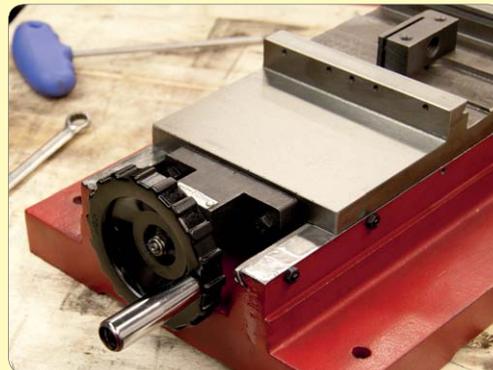
96. Oil or grease the Y-axis screw and assemble.



97. Oil or grease and fit the screw bracket. Do not lock the bolts at this stage.



98. Fit the key and hand wheel assembly. Tighten the nut then back-off 1/4 turn.



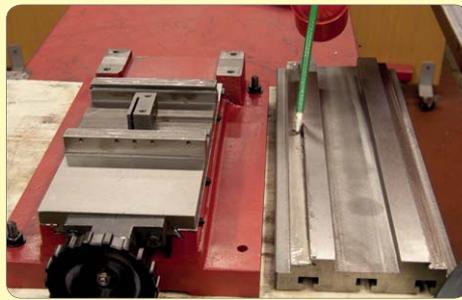
99. Wind saddle in as far as it will go and lock the bracket bolts and screw nut screws.



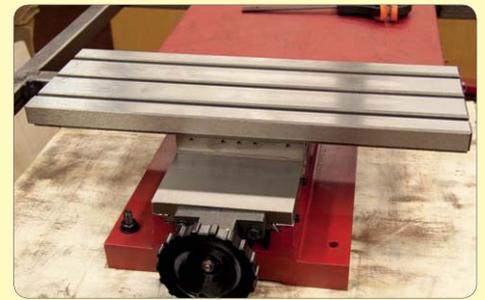
100. Wind saddle in and out to check alignment of screw bracket and screw nut. If tight at either end, slacken and reposition bracket or nut. If this does not work, open out fixing holes to allow more adjustment of the bracket or the screw nut.



101. Final adjustment of handwheel to give free movement with minimal backlash.



103. Oil table sideways...



104. ... and assemble.



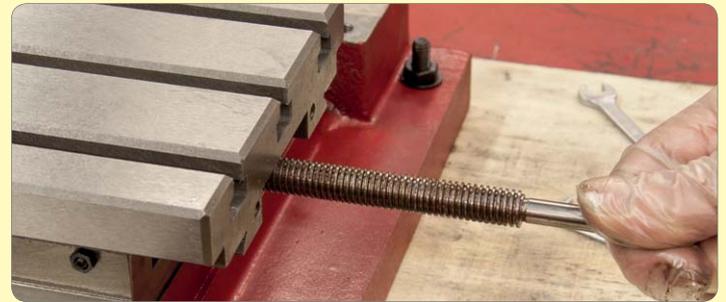
102. Final adjustment of gib to give free travel without side-lash.



105. Fit and lightly adjust gib screws.



106. Slide table to and fro to check for free movement. Dress with a diamond file if necessary.



107. Oil or grease and fit the X-axis screw.



108. Oil or grease and fit the screw bracket. Do not lock the bolts at this stage.



109. Fit the key and hand wheel assembly. Tighten the nut then back-off 1/4 turn.



110. Final adjustment of the gib screws. Wind the table to and fro to check for free movement and no sidelash.



111. Check column bracket base is flat.

112. Place on base and check it sits flat.

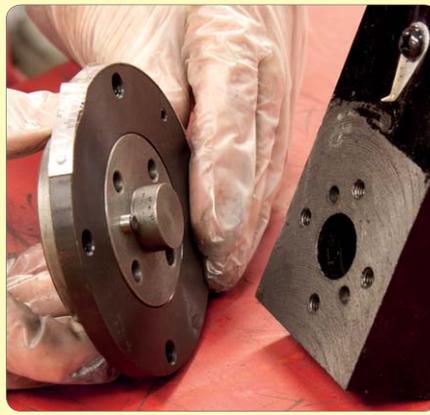
113. If necessary, file base pads until bracket sits flat.

114. Blue bottom of bracket to check contact with base. File or scrape as required.

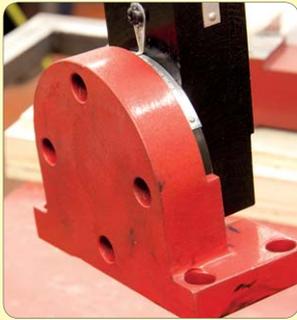




115. Scrape paint off bottom of column.



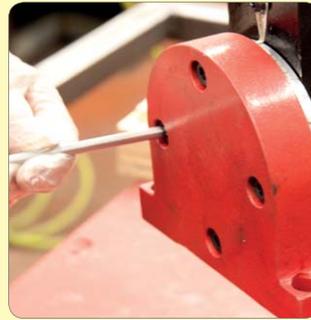
116. Fit retaining plate assembly to column and lock bolts.



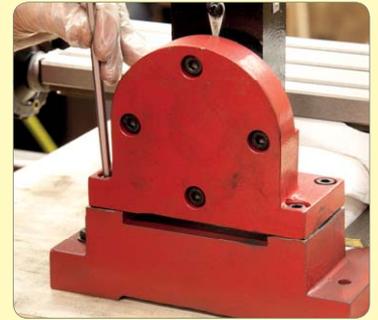
117. Tap on the rear bracket noting down position.



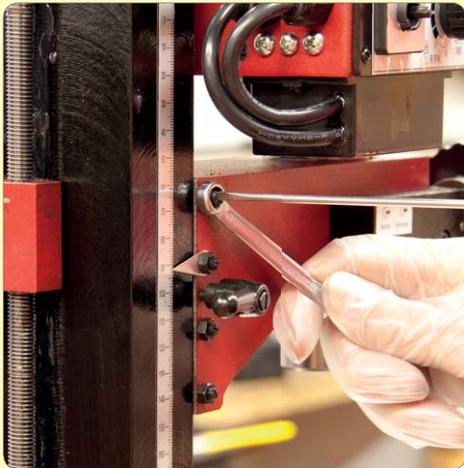
118. The 4 screws used to fix the bracket to the column. Note the long one is used to adjust for/aft tilt on the column. You may wish to replace this with a shorter screw to match the other 3 if you prefer not to use this method.



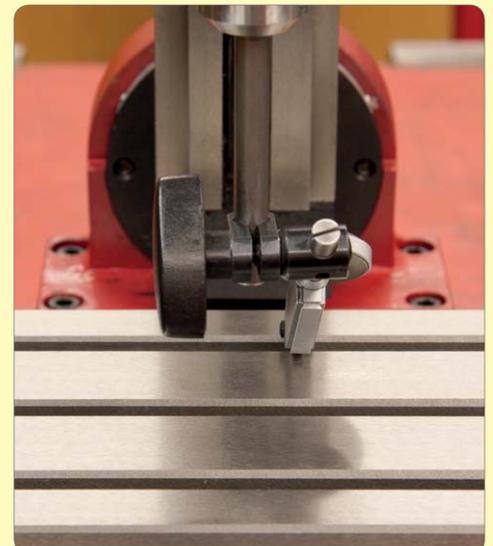
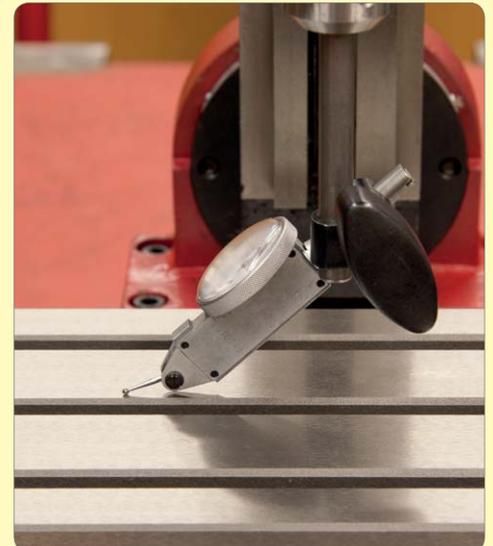
119. Align pointer to 0° on scale and pinch up screws.



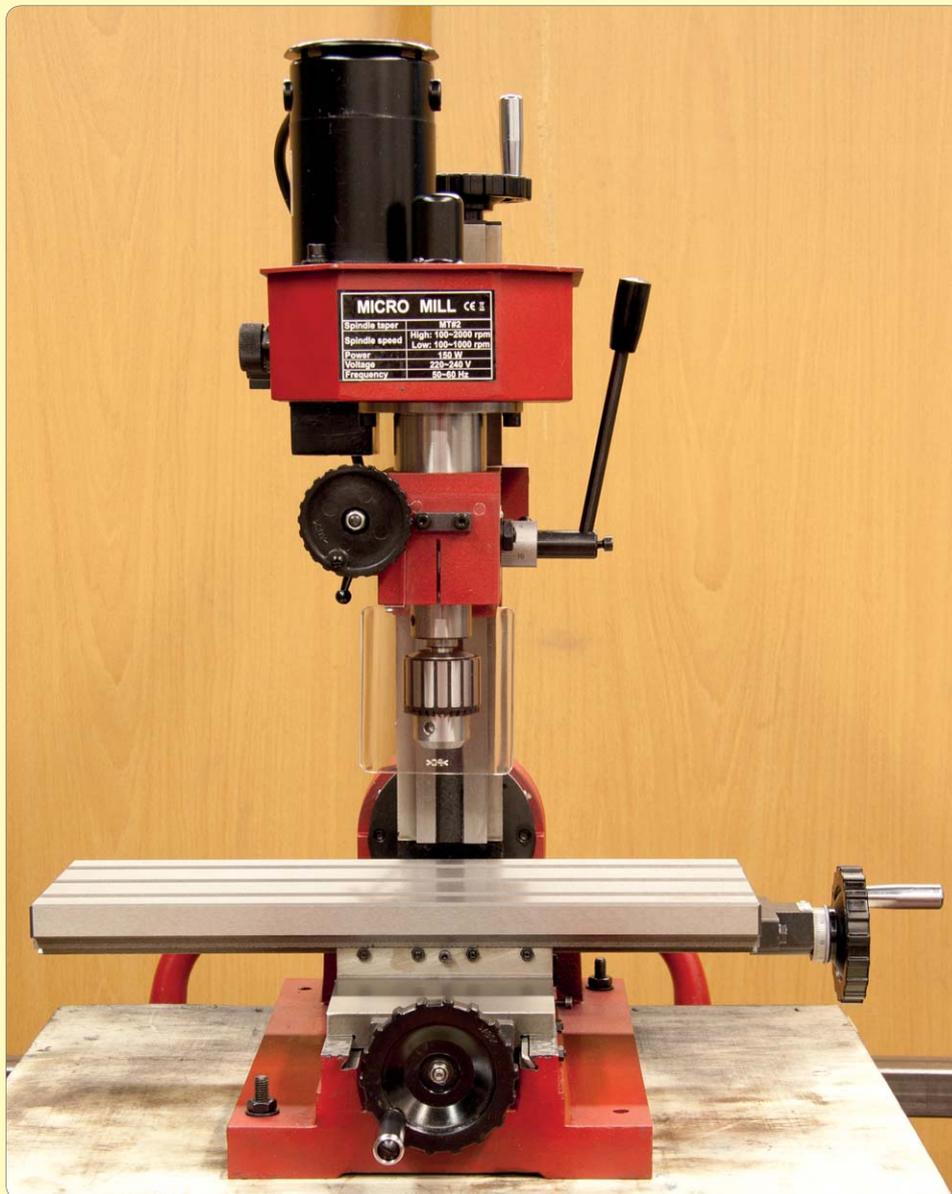
120. Fit column to base and lock down screws.



121. Adjust head gib screws so the head will wind freely up and down the column without free play in the dovetail.



122. Trimming head and column. Fit a dial indicator to a mandrel and mount in the chuck. Take four readings with the DTI (front, back, left and right); they should all be the same. Any left/right deviation can easily be corrected by adjusting the column tilt but front/back deviation will need to be adjusted by removing the column assembly again and filing or scraping the base pads.



123. The Finished Super X1L Mill

Always follow the correct Start-Up Procedure

1. Check everything is switched off -
 - Mains power off
 - Forward/reverse to the centre position (off)
 - Speed control knob turned fully anti-clockwise.
2. Switch on at the mains.
3. Select forward or reverse.
4. Slowly increase the speed by turning the speed control knob.

If the Fault LED lights up and the machine will not run, check that the correct starting sequence has been followed.

Running the spindle for the first time:

1. Follow the Start-Up procedure with low gear selected and the motor running forwards.
2. Run the machine at a low RPM. The machine should run smoothly with minimal noise and vibration. If not turn off the machine and investigate the cause of the problem.
3. Slowly increase the speed and run for 10 minutes at a high RPM.
4. Stop the machine and repeat steps 1-3 above in high gear.
5. Stop the machine and repeat steps 1-4 above in reverse.

This procedure will help to bed the motor brushes in and minimise arcing on the motor commutator.