



Enabling Your Ideas

# Technical Document

**File name:** TD10198\_Y\_Axis\_Bellows\_Upgrade

**Rev:** 1113B

**Product Identification:** PN 30580 Bellows Upgrade Kit

The bellows upgrade kit is a replacement for the front and rear Y axis protective bellows. This kit may be installed in PCNC 1100 mills with serial numbers 148 and earlier. The kit contains all parts required to convert the Y axis bellows.

## Contents:

- 2 each - Y Axis Cover (PN 30578)
- 1 each - Front Plate
- 2 each - Iron Spacer
- 3 each - Screw M4 x 8
- 9 each - Screw M4 x 12
- 4 each - Screw M6 x 60
- 2 each - Drill 3.3 mm
- 2 each - Drill 5 mm
- 2 each - Tap M4
- 2 each - Tap M6

## Comparison & Comments:

The original bellows were 280 mm wide, just covering the flat section of the Y axis slide. The earlier bellows were made a light coated fabric with a non-woven backing. They had a plastic stiffener for support in every 4th pleat, total of 3 stiffeners. If the backing material got wet, as occurs when the coated fabric becomes worn, it would lose stiffness and the cover would tend to collapse. The problem was aggravated by chips piled on the bellows in combination with a continuous flow of coolant. The rear bellows was an inverted V while the forward bellows was flat.

The upgrade bellows are 320 mm wide, extending beyond the Y axis slide by 20 mm on each side. They are made of a coated fabric and contain no non-woven materials. There is a plastic stiffener on each pleat, 14 total on each bellows, plus a heavier support on the front and back. The same part is used on both front and rear, both are flat.

We believe the upgrade will provide better and longer lasting protection for the Y axis slide. Never the less, bellows remain a wear part and will need to be replaced on occasion. The bellows last longer if operators avoid heavy build up of chips. Future replacement only requires the bellows themselves (PN 30578), not the upgrade kit. The Z axis bellow remains the same.

## Installation:

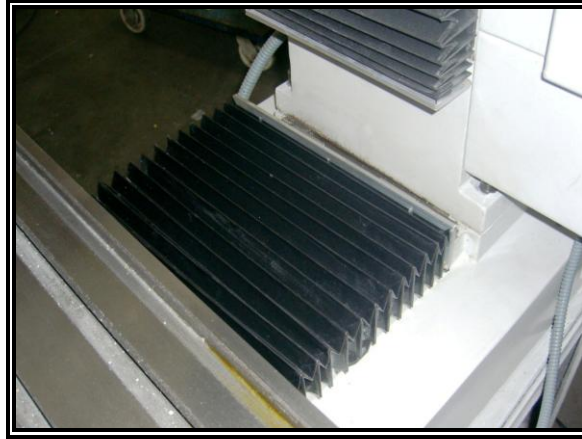
The upgrade requires drilling and tapping in the cast iron base. Forward mount holes can be difficult to access with the stand chip tray in the way. Users may find that removing the tray makes drilling the holes easier. We also recommend users run a bead of silicone between the back edge of the mill table and the mating face of the rear bellows.

## ADDENDUM

Your upgrade kit now includes images and drawings suggesting an alternative mounting. To access these documents, download the files from this link: [http://www.tormach.com/document\\_direct\\_download.html?doc\\_id=729](http://www.tormach.com/document_direct_download.html?doc_id=729). This information comes to us from one of our customers, Jon Byerly of Softronics. It clearly fits into the category of "Things we wish we thought of ourselves". As designed, the bellows upgrade kit requires drilling and tapping holes to fit the form factor of the new improved Y axis bellows. With the machine mounted on the stand it can be difficult to tap and drill these holes. Jon's solution was to design a sub-plate to be used as an adaptor. The sub-plate mounts to the machine in the original holes, while the new bellows mount to the sub-plate instead of directly on the machine. We include this information, with permission from Jon, as an alternative mounting method for those interested.

## Installation Procedure

1. Remove the old Y axis bellows (two pieces in total, front and back) and all of the related parts with suitable tools.
2. Move the mill table to the most front end, place the rear bellows on the guide and keep centered:



3. Press the protective cover tightly onto the column with one hand, scratch the positions of three holes for the cover on the column with a scribe.



4. Using the 3.3mm drill bit and a small hand electric drill (if the electric drill is too big it will interfere with other parts while drilling) and drill the three holes at the scribed positions. See the photo on the next page.



5. Tap the holes with the M4 tap.



6. Use the screw driver to tighten the cover onto the column with the cross slot pan-headed screw M4×12.



7. Fasten the other end of this cover on the slide in the same way:

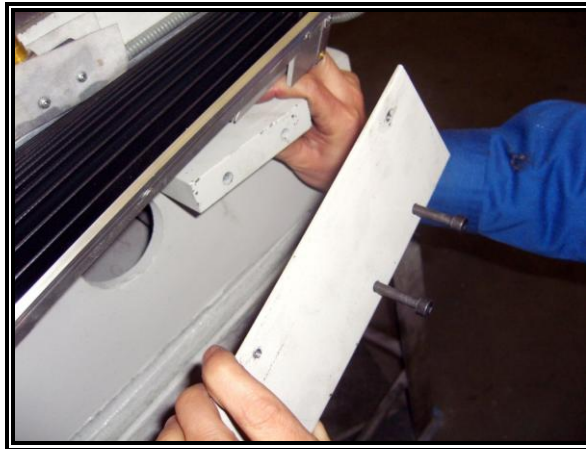


8. In the same way, fasten one end of the front bellows at the front of slide:

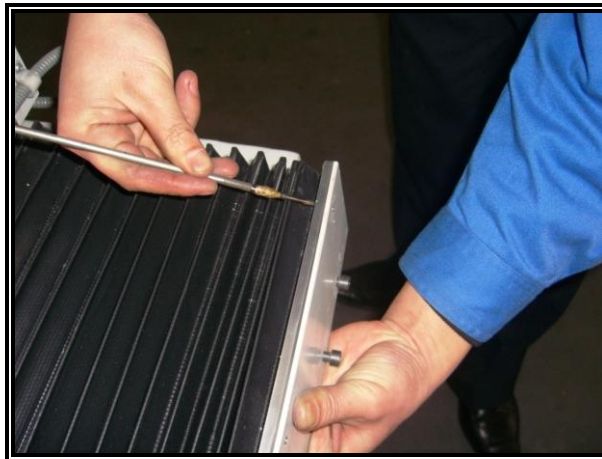


9. Move the table to the back end of mill.

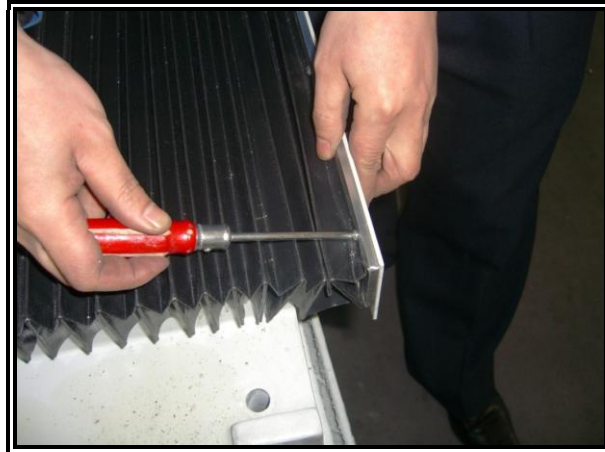
**10. Fasten the pad block and joining plate onto the bed with screw M6X60:**



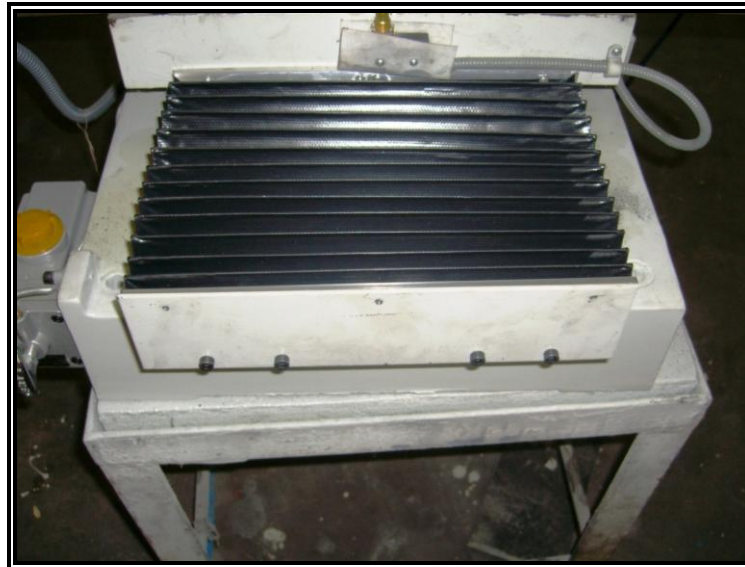
**11. Hold the front end of the bellows tight to the joining plate. Scratch the positions of threading holes, then remove the supporting plate, drill and tap with the 3.3mm drill and M4 tap.**



**12. Fasten the pad block and supporting plate again and tighten the cover onto the joining plate with cross slot pan-headed screw M4X8. See the photo on the next page.**



13. Please see the following photo after installation:



## POINTS FOR ATTENTION UPON INSTALLATION

1. Wear protective items like working clothes, safety goggles, etc. upon installation.
2. When drilling, the hand electric drill should be kept level and the force suffered should be even. After drilling to a certain depth, the hand electric drill should be moved a little backward so as to facilitate the removing of chips and prevent the breaking of bit resulted from chips filling in bit.
3. Pay attention to the depth of tapping and avoid the breaking of tap resulted from tapping too deeply beyond the depth of drilling. The angle of tapping should keep level with the bottom hole, or the tapping torque will increase sharply and break the tap.