



International Association of Penturners

Powermatic PM2014 Lathe Belt Replacement

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1. POWERMATIC PM2014

1.1. Revision Jan 3, 2021

2. BEARINGS

- 2.1. Note, this tutorial does not cover replacing the bearings. However, the following is information regarding the bearings:
 - 2.1.1 Spindle right bearings qty of 2, TPI, 6005LB, bearing push off ID 1.735, 3.7" push off distance.
 - 2.1.2 Spindle left bearing qty 1, TPI, 6004LB, bearing push out OD 1.325".

3. REQUIRED TOOLS

- 3.1. Tools needed, to remove the spindle to replace the belt are listed below (Figure 1). Note, tools needed may vary depending on revision. In this case, all the standard set screws and button head screws use metric hex wrenches.
 - 3.1.1 2mm hex, (standard and extended length)
 - 3.1.2 3mm hex, extended length
 - 3.1.3 6mm hex, extended length
 - 3.1.4 rubber mallet,
 - 3.1.5 #1 Phillips screwdriver,
 - 3.1.6 blue Loctite,
 - 3.1.7 12pt, 19mm box wrench (you will want 12pts)
 - 3.1.8 needle nose vise grips wrapped in duct tape,
 - 3.1.9 Thin 14mm wrench (https://www.amazon.com/Grip-Thin-Wrench-Set-MM/dp/B001PTF9MY/ref=sr_1_3?crid=Q5QV4TJ18B8T&dchild=1&keywords=thin+metric+wrench+set&qid=1609209314&srefix=thin+metric+%2Cap s%2C234&sr=8-3)
 - 3.1.10 Wooden block
 - 3.1.11 Optional magnet (not shown)

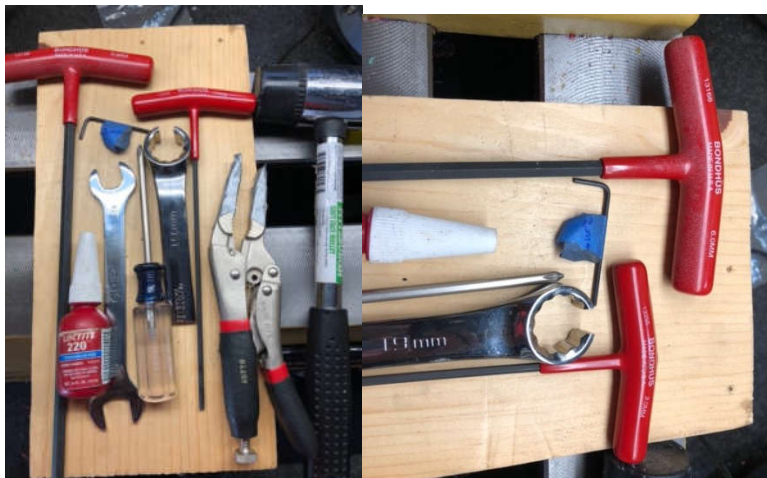


Figure 1. Required Tools

3.2. Custom box wrench (Figure 2):

3.2.1 Cut the box end 19mm wrench to a length of 4.75", with a slit of ~0.35"



Figure 2. Custom 19mm, 12pt box wrench

4. DISASSEMBLY INSTRUCTIONS

4.1. Start by unscrewing the magnetic stop shown below, using a Philipps #1 screwdriver (Figure 3).



Figure 3. Magnetic Stop Removal

4.2. Next unscrew the cover "plate" to the spindle lock, using the 3mm hex (Figure 4).



Figure 4. Spindle Lock Cover "Plate" Removal

- 4.3. Next, engage the spindle lock, rotate spindle until the lock engages as shown in Figure 5.

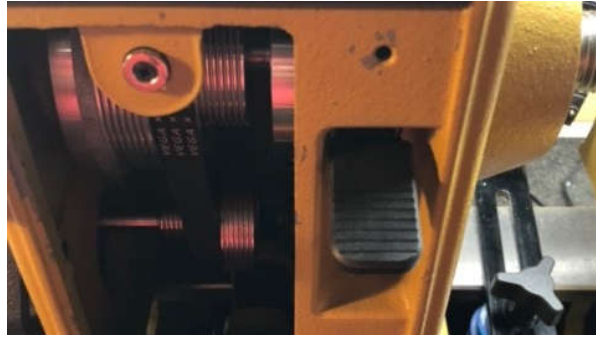


Figure 5. Spindle Lock Engaged

- 4.4. Pull on the plastic spindle lock Pad to remove it (Figure 6).



Figure 6. Spindle Lock Pad Removed

- 4.5. Next, remove the hand wheel, there are 2 set screws to remove, using the 3mm hex (Figure 7). Rotate the handwheel clockwise to remove, it is left hand threaded.



Figure 7. Hand Wheel Set Screw Removal

4.6. Next raise the motor up as high as possible (Figure 8).



Figure 8. Motor In The Up Position

4.7. Remove the chrome handle from the motor (Figure 9).



Figure 9. Chrome Handle Removed

4.8. Next, using the Phillips #1, remove the 4 screws to the "Inverter Lower Box" (Figure 10).



Figure 10. "Inverter Lower Box" Screw Removal

4.9. Below shows the "Inverter Lower Box" lose.

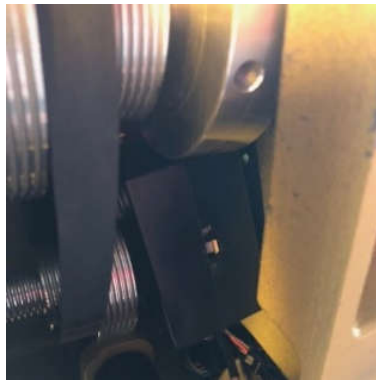


Figure 11. "Inverter Lower Box" Lose

4.10. Next move the belt, so it is free from the motor pulley (Figure 12).

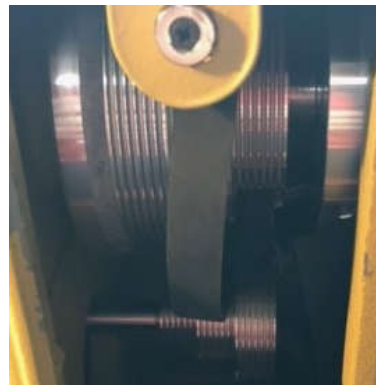


Figure 12. Belt Lose From Motor

4.1. Re-install the Handwheel to make it easy to spin everything.

4.2. Move the belt away from the middle pulley position, and rotate the spindle, until one of the set screws in the Spindle Pulley is visible, remove the set screw, using a 3mm hex. Rotate, 180° and unscrew the 2nd set screw (Figure 13).



Figure 13. Spindle Pulley Set Screw Removal

- 4.3. Next, unscrew, the sensor collar set screw (Figure 14), rotate 180 degrees and remove the 2nd set screw.

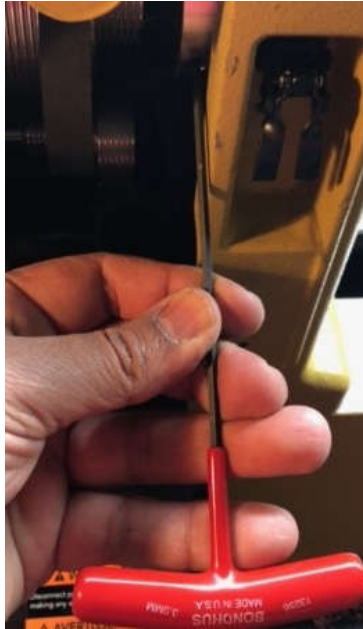


Figure 14. Sensor Collar Set Screw Removal

- 4.4. Slide the pulley, and the Sensor collar to the far left, slide the slit 19mm box wrench up and over the spindle lock pin inside the housing and loosen the nut and washer (Figure 15).



Figure 15. Spindle jam nut and spring washer removal

- 4.5. Below are the jam nut and spring washer that you just removed.



Figure 16. Jam Nut and Spring Washer

4.6. Removal of the spindle lock may be done using needle nose vise grip pliers or a thin 14mm wrench. Below are the 2 options:

4.6.1 Vise Grip Option:

4.6.1.1. Take the needle nose vise grip pliers, and wrap them at least 4x, with duct tape, the more the better (Figure 17).



Figure 17. Needle Nose Vise Grips, wrapped in duct tape

4.6.1.2. Grip the 14mm nut and loosen counter clockwise. Adjust the position of the needle nose as you see fit (Figure 18).



Figure 18. Loosening the nut

4.6.2 Thin Wrench option:

4.6.2.1. Use a thin 14mm wrench if you have one and the nut is not frozen (Figure 19) and loosen counter clockwise.



Figure 19. Nut removal using thin wrench

4.7. Figure 20 is what the Spindle Lock assembly looks like removed.



Figure 20. Spindle Lock Assembly

- 4.8. Using a 2mm hex unscrew the set screw from the stop collar. You may unscrew the set screw by aligning it with the spindle lock hole if you have an extended length 2mm hex, if not you will have to unscrew from inside the housing.
- 4.9. Slide the sensor collar, and the spindle pulley as far left as possible, and push the lock collar to the left and catch the small key (Figure 21).

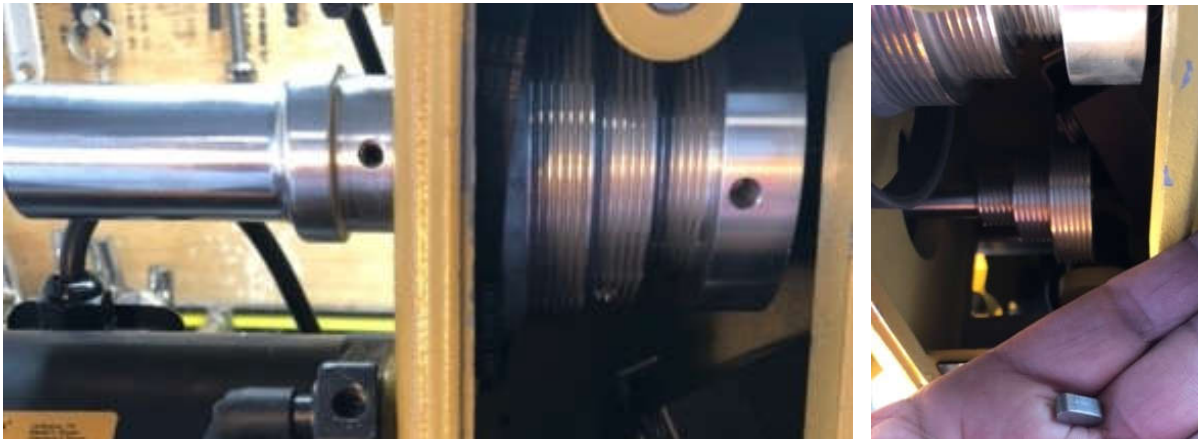


Figure 21. Spindle Pulley, Sensor Collar, and Spindle Lock Collar, pushed far left. Small Key

- 4.10. Ensure you remove the Hand Wheel if it is still on.
- 4.11. Next align all of the key way grooves (Figure 22), so when you tap the spindle out, everything goes smoothly (may or may not be needed). Sorry this picture does not show it.



Figure 22. Key Way alignment

- 4.12. Using the wooden block, and rubber mallet, tap out the spindle to the right. If you go to far, note to catch the long pulley key (Figure 23).



Figure 23. Spindle Pulley Key, long

5. ASSEMBLY

- 5.1. Swap out the old belt for the new belt, Slide spindle back in.
- 5.2. If you have slid the spindle all the way out to replace the bearings, or wanted to check the bearings, reassemble in the following order:
 - 5.2.1 Slide the spindle back into the left.
 - 5.2.2 Then slide on the spindle lock collar through the opening
 - 5.2.3 Then slide on the pulley key
 - 5.2.4 Then slide on the Sensor Collar, slide over the key
 - 5.2.5 Place the belt over the spindle
 - 5.2.6 Then slide on the spindle pulley
 - 5.2.7 Slide on the belt if you have not done so
 - 5.2.8 Then slide together or tap together using a wooden block and mallet
- 5.3. Thread on the Hand Wheel counter clockwise (it is left hand threaded), and install 2 set screws with blue Loctite.
- 5.4. Slide all items left with enough clearance for the pulley to not engage the index pin (Figure 24).

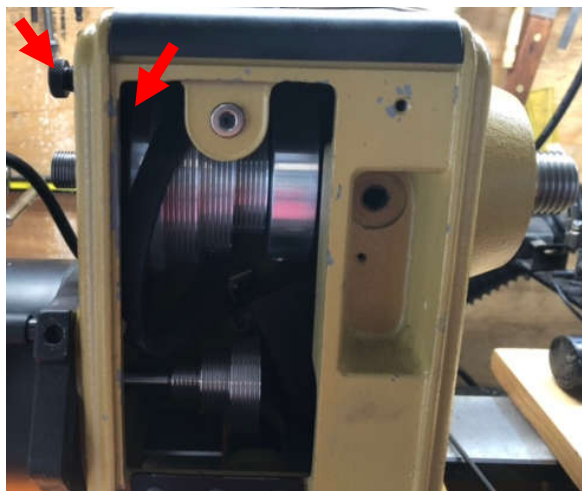


Figure 24. Slide everything left, leaving small gap on left so items rotate

- 5.5. If you have large hands, use a magnet to place the spindle lock short key, once put in place, rotate spindle so key is up (Figure 25).
- 5.5.1 If your hands are too large, you may unmount the motor to provide more room (Figure 26) using the 6mm and 3 mm hex.



Figure 25. Spindle lock short key on magnet



Figure 26. Motor Removal

- 5.6. Then rotate the spindle lock collar until the set screw is up, then using the Sensor Collar push the lock collar over the key.
- 5.7. Align the Spindle Lock Collar centered with the spindle lock hole, apply blue Loctite to the set screw, and insert set screw and tighten. Ensure the key is still in position.
- 5.8. Adjust the spindle lock assembly by backing the nut off several turns to create a gap, this gap will vary from machine to machine (Figure 27). Then assemble through the hole, by screwing in the assembly, then thread on the lock washer and nut. You will need to install the magnetic stop (Figure 28), and the plastic tab to adjust correctly. You will have to adjust with lock collar, and ensure it locks with collar in the up position, and ensure it spins free when in the down position. This can be tedious and requires you to remove/install the plastic tab between adjustments, take your time and make sure it does not rub in the down (unlocked) position. Use the Thin wrench/vise-grips, along with the box wrench to tighten (Figure 29).
- 5.8.1 Ensure you rotate the spindle and listen for any rubbing when done.

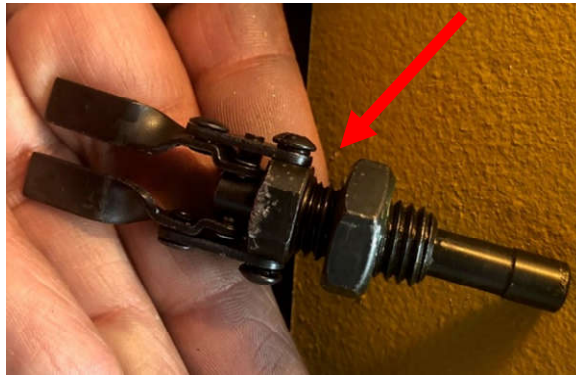


Figure 27. Spindle Lock Assembly with Gap

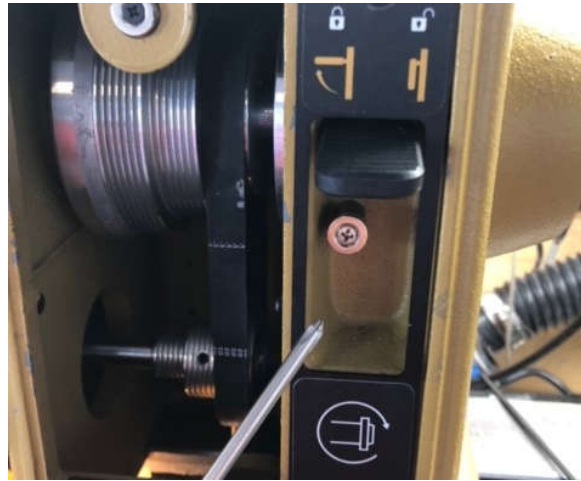


Figure 28. Magnetic Stop



Figure 29. 14mm Thin Wrench, and 19mm box wrench

- 5.9. Next using a light, slide the sensor collar over to the right (it does not have a key), ensure you do not slide too far right. If you can, using the light look into the set screw hole and if you see the shoulder through the set screw hole slide back left until you do not see it anymore. Then insert and tighten the 2 set screws.
- 5.10. Next, install the 4 screws for the "Inverter Lower Box" (Figure 30). Bias the sensor down, and gently nudge upwards while tightening, but ensure the sensor does not touch the collar. Rotate the spindle, and ensure nothing is rubbing, if it is then loosen the screws and reposition and tighten.



Figure 30. Inverter Lower Box screws

- 5.11. Next, place the pulley in the high position (far right), and adjust the spindle pulley as needed to align the belt (Figure 31). Use a straight edge, placed against the far right to the upper and lower pulleys is a good way to ensure alignment. Apply blue Loctite to the set screws, insert and tighten.



Figure 31. Fully Assembled

- 5.12. Lastly install the chrome handle for the motor.