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Service Bulletin

PCNC 1100 Spindle Rebuild

Purpose: This document details removal and rebuilding of the PCNC 1100 stock R8 spindle.

Required Tools:

• Pliers	• Rubber Mallet	• Pin Spanner Wrench	• 55-62 mm Hook Spanner
• Metric Hex Wrench Set	• Phillips Screwdriver	• Latex Gloves	• NGLI 2 Bearing Grease
• Hydraulic Press	• Bench Vise	• WD-40® (optional)	• Bearing Packer (optional)

R8 Spindle Removal

NOTE: *Retain all R8 spindle assembly parts removed in this procedure for future re-install.*

1. Jog spindle nose to within 6” of machine table.
2. Power off mill according to *Power Off/On Procedure* below.

WARNING! Electrical Shock Hazard: *Be sure to power off machine before making any electrical modifications. Failure to do so may result in serious injury or death.*

Power Off/On Procedure

Power Off	1. Push red *E-stop* button in
	2. Click *Exit* on screen; when prompted click *OK* to power off
	3. Turn Main Disconnect *Off* (see image at right)

Power On	1. Turn Main Disconnect *On* (see image at right)
	2. After software loads, turn red E-stop clockwise to release
	3. Press green *Start* button
	4. Click *Reset* on screen

3. Remove all tooling, fixtures, workpieces, and/or parts from mill so nothing impedes lowering of spindle later in this document.

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4. Remove Tormach Tooling System (TTS) collet or tool holder from R8 Spindle (see **Figure 1**).

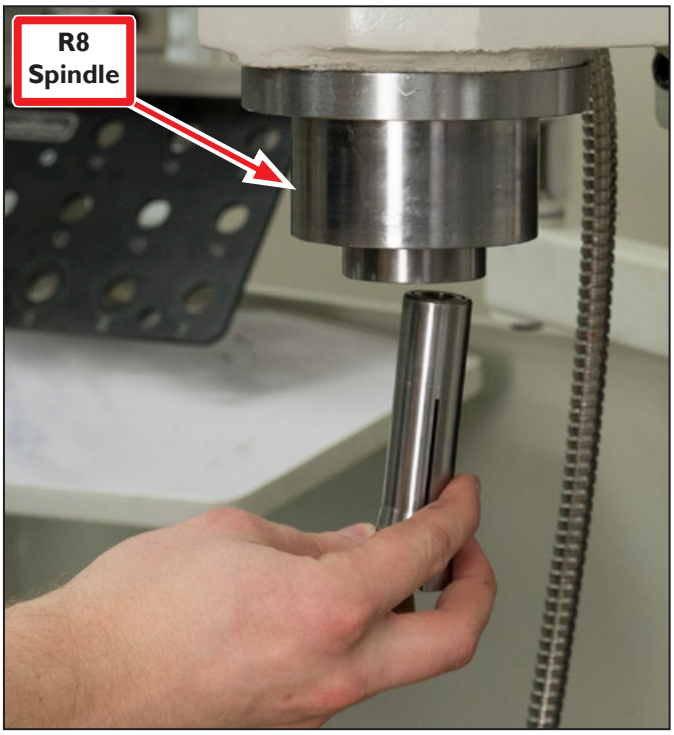

Figure 1

5. Unscrew and remove Drawbar and Thrust Washer from spindle (see **Figure 2**); set aside for future use.

Figure 2

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6. Using a Phillips screwdriver, loosen the Locking Screw on the pulley retention nut (see **Figure 3**).

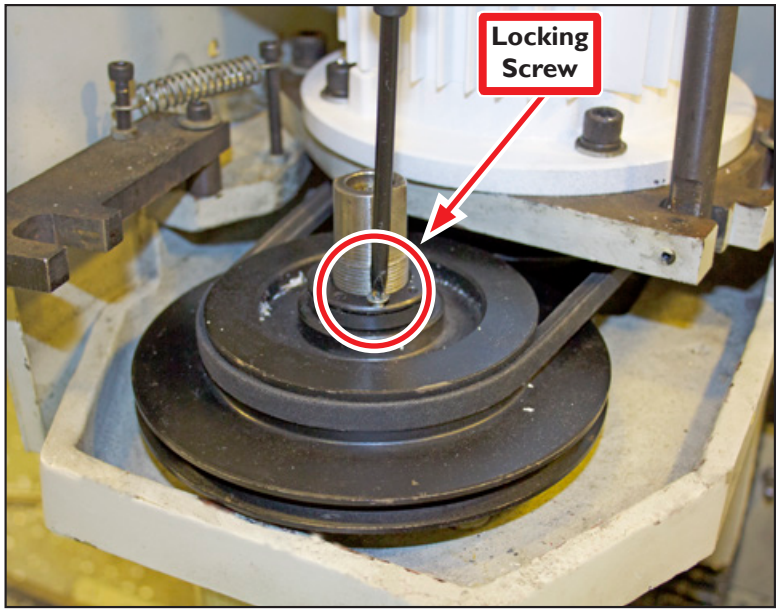

Figure 3

7. With the Spindle Lock in place, use a pin spanner wrench (see **Figure 4**).
8. Move Spindle Lock to side; remove pulley retention nut (see **Figure 4 inset**); set aside for future use.

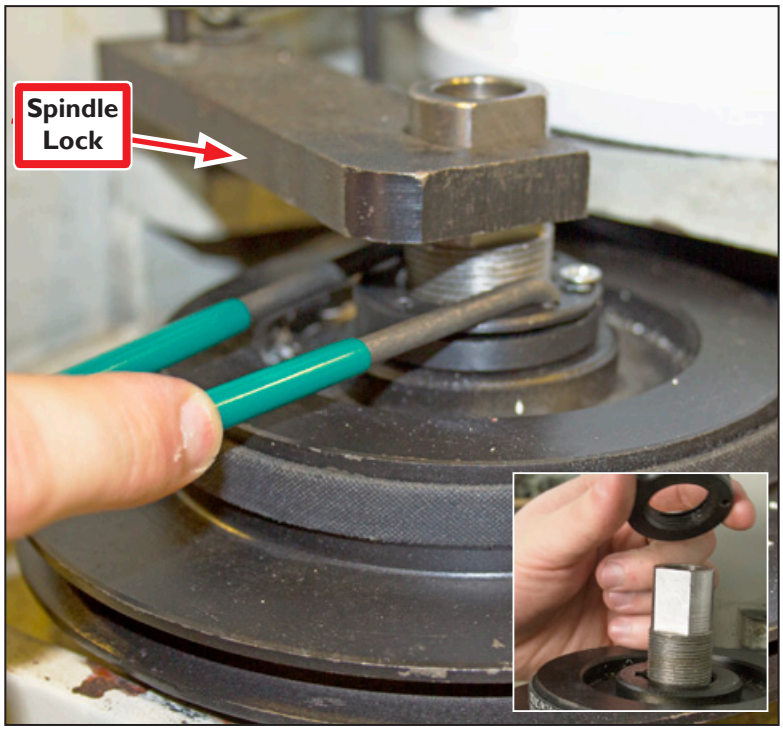

Figure 4

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9. Loosen Pivot Plate Clamp Handle as shown in **Figure 5**. Swing Spindle Motor Handle down and move Spindle Motor Pivot Plate forward to remove spindle belt (see **Figure 5 inset**).
10. Swing Spindle Motor Pivot Plate back to allow spindle belt removal; set aside belt for future use.
11. Hand tighten Pivot Plate Clamp Handle.

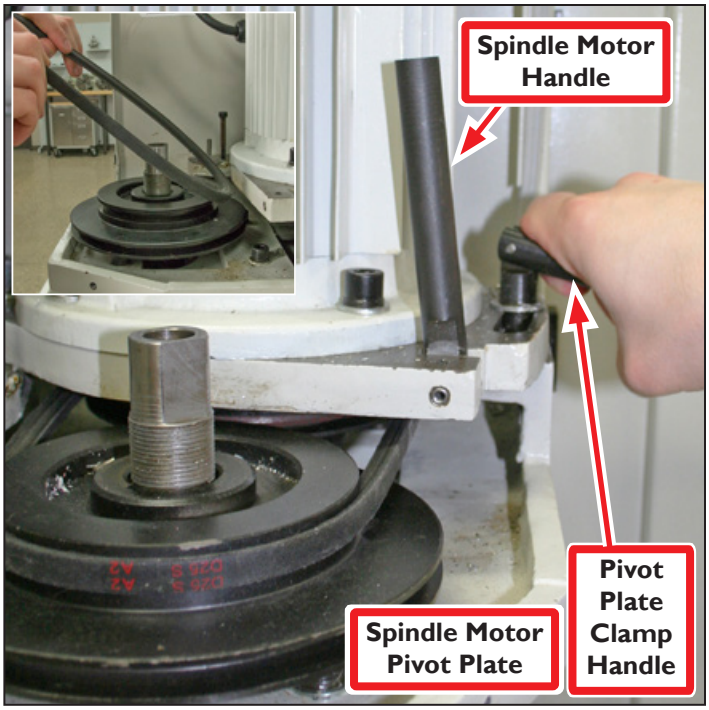

Figure 5

12. Power on mill according to *Power Off/On Procedure* cited earlier in this document.
13. Place wood block(s) under R8 Spindle to prevent damage to both spindle and machine table; lower spindle until contact is made with block(s) as shown in **Figure 6**.

NOTE: *Allow enough space between table and R8 Spindle to allow access to six socket head cap screws (see **Figure 6 inset**).*

14. Using an M6 hex wrench, remove six socket head cap screws; set aside for future use.

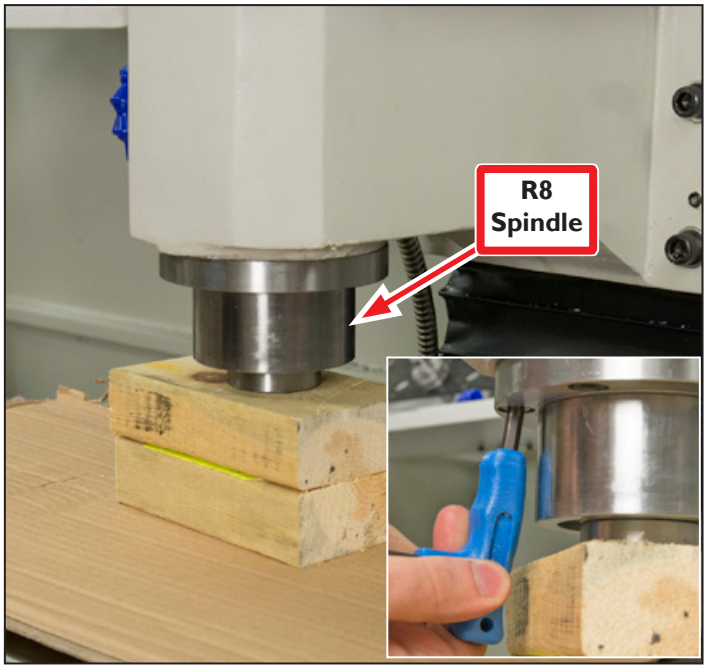

Figure 6

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15. Slowly jog machine up to raise Head Casting just until Spindle Pulley can be removed (see **Figure 7**); set aside for future use.

NOTE: *If pulley is stuck, spray with WD-40® and/or use large gear puller.*

Figure 7

16. Carefully raise Head Casting slowly until R8 Spindle can be removed (see **Figure 8**).

Figure 8

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R8 Spindle Rebuild

1. Using pliers, remove key and set aside for later use (see **Figure 9**).

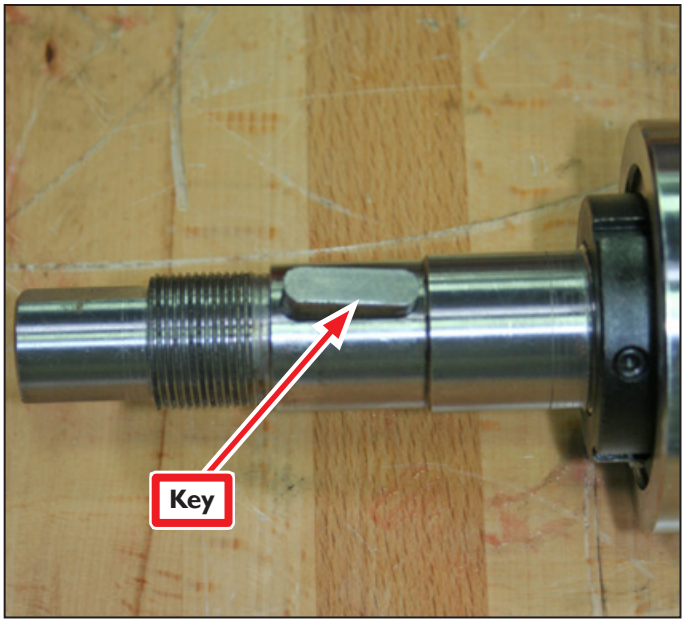

Figure 9

2. Using a 3 mm hex wrench, loosen three set screws on Bearing Preload Nut (see **Figure 10**).

Figure 10

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3. Lock spindle in vise and, using 55-62 mm Hook Spanner, loosen Bearing Preload Nut and remove (see **Figure 11**).

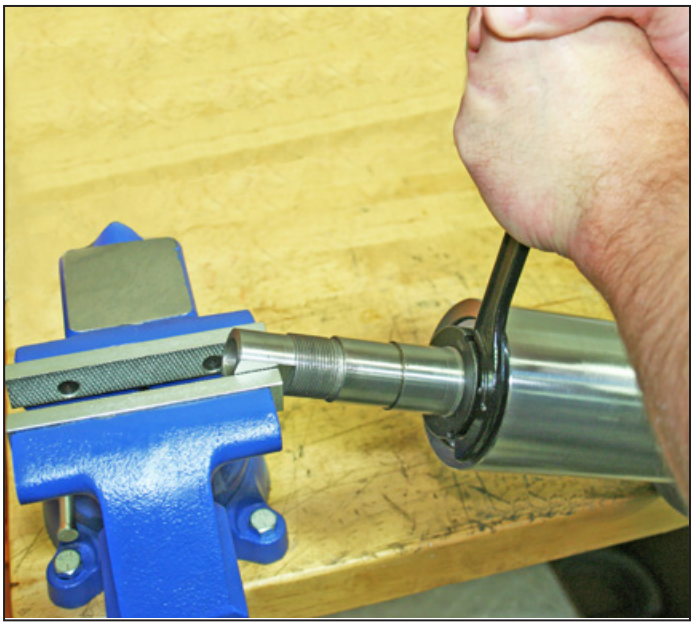

Figure 11

4. Using a hydraulic press, separate R8 Taper Tube from Spindle Housing (see **Figure 12** and **Figure 13**); remove lower bearings.

Figure 12

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5. Insert R8 Taper Tube into opposite end of Spindle Housing and gently tap out upper bearings (see **Figure 13**).
6. Grease new bearings (see table below), two upper and two lower by hand (**Figure 14**) or by using a bearing packer (**Figure 15**); remove excess grease.

IMPORTANT! *When greasing bearings, be sure to wear protective gloves.*

NOTE: *Use general purpose NGLI 2 lithium bearing grease; 2 grams of grease for smaller upper bearings and 2.5 grams for larger lower bearings. Distribute grease uniformly into and through bearings.*

Recommended Bearings	PN
Upper Spindle Bearings (matched pair)	30316
Lower Spindle Bearings (matched pair)	30303

Figure 13


Figure 14

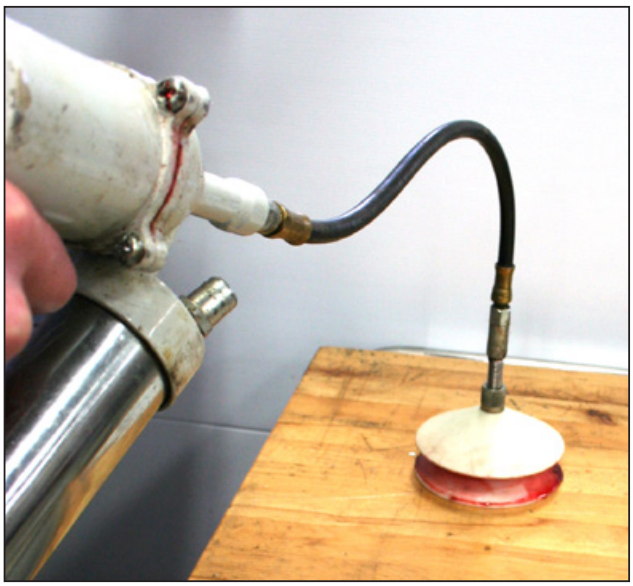
Figure 15

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NOTE: *Correct orientation of upper and lower bearings is crucial (see* ***Figure 16*** and ***Figure 17****).*

7. Slip Bearing Preload Washer onto R8 Taper Tube (see **Figure 18**) and slip on two Lower Bearings. Install two Upper Bearings into top of Spindle Housing (see **Figure 19**).

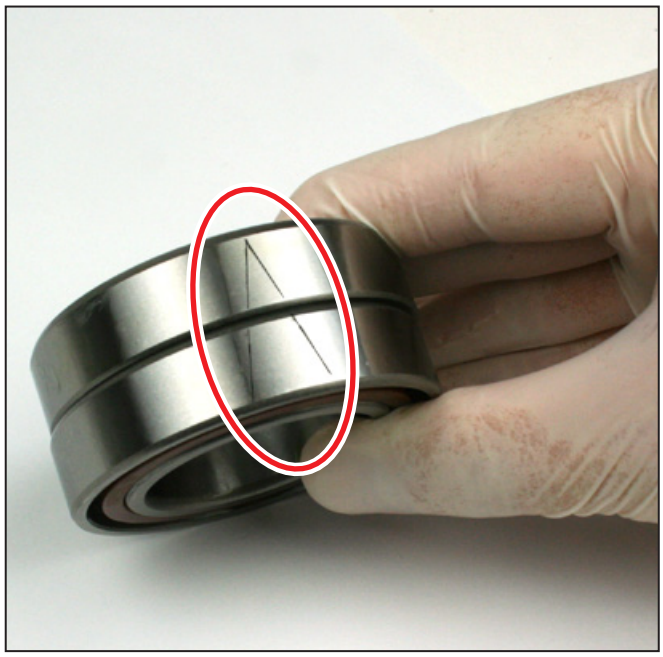

Figure 16

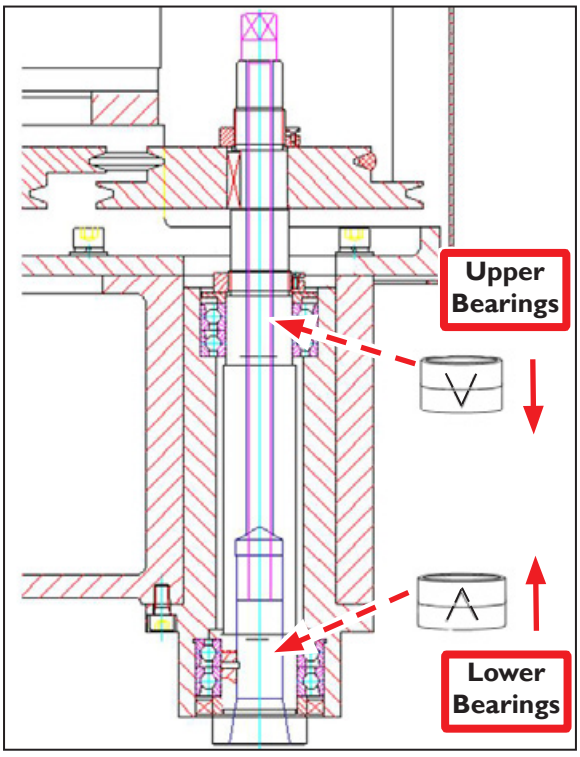

Figure 17

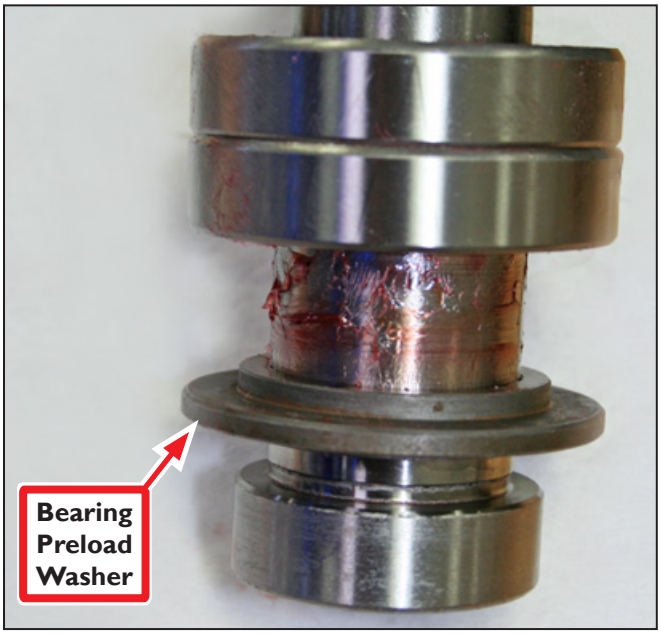

Figure 18

Figure 19

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8. Insert R8 Taper Tube through both Spindle Housing and Upper Bearings (see **Figure 20**).
9. Slip Bearing Preload Washer onto R8 Taper Tube (see **Figure 20 inset**).

Figure 20

10. Screw on Bearing Preload Nut and, using a 55-62 mm Hook Spanner, tighten to seat bearings (see **Figure 21**).
11. Once seated, set bearing preload by loosening Bearing Preload Nut slightly, and then re-tighten until solid contact is made; tighten approximately 5° further.
12. Tighten three set screws on Bearing Preload Nut (see **Figure 10**).
13. Re-insert Key (see **Figure 9**) and tap in place with rubber mallet.

NOTE: *If preload is too tight excessive wear and temperatures above 155° F (70° C) may result. If temperatures at spindle measure above 155° F (70° C), reduce preload.*

14. To re-install rebuilt spindle, reverse all instructions detailed in *R8 Spindle Removal* section.

Figure 21

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