

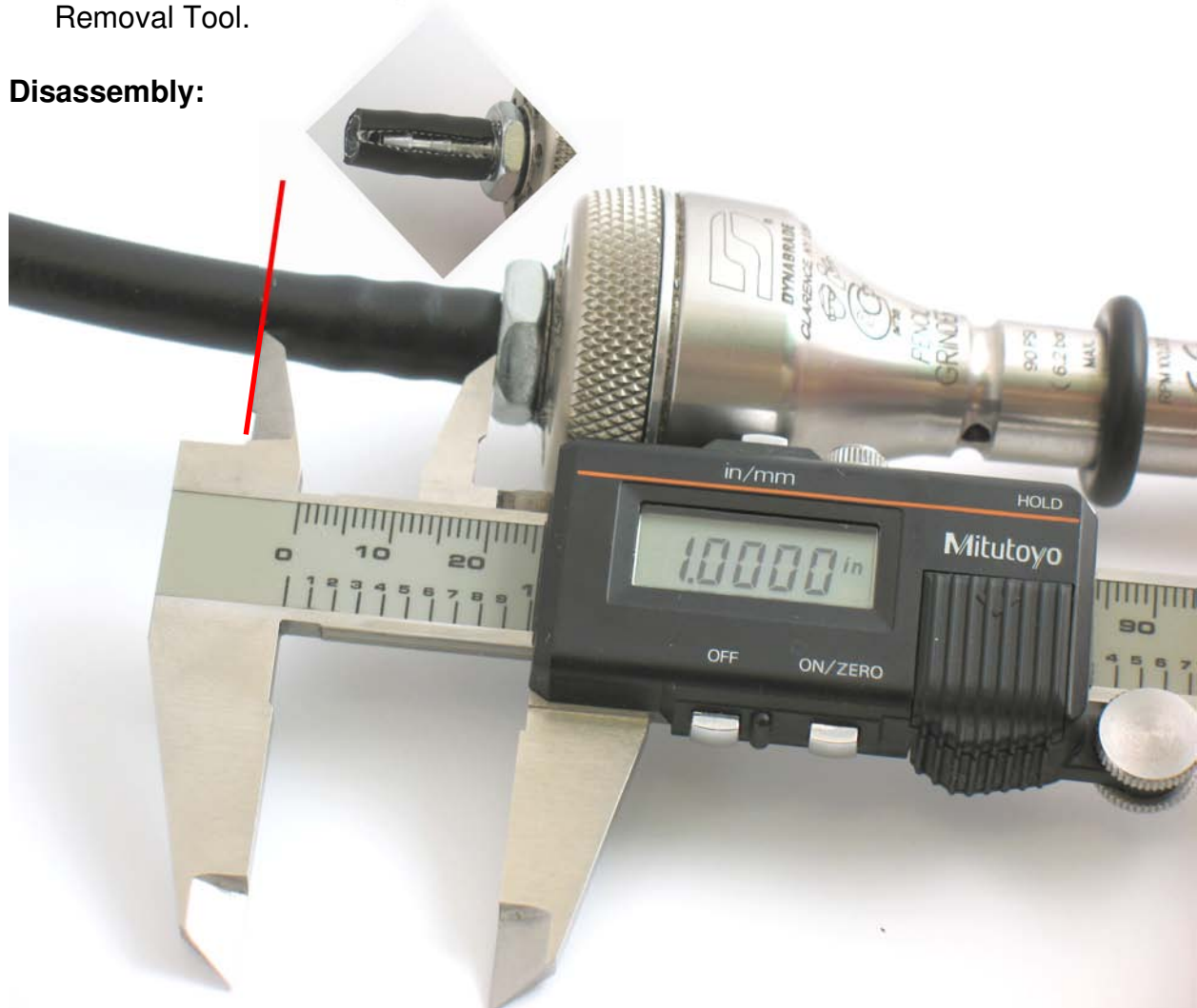
**Disassembly Instructions – 100,000 RPM Turbine, Hand-Held, Pencil Grinder**  
Models: 51810, 51811, 51812, 51813

**Important:** Use these instructions along with tool parts page or manual.

**Notice:** Shut off air supply. Open **53582** ON/OFF Valve to deplete remaining air.

- Disconnect tool from air supply hose.
- Push **51789** O-Ring down to expose housing cross-hole. Use **95731** Wrench (8 mm) and **51694** Pin Wrench to remove accessory from collet.
- Remove **51657** Collet Cap and insert. **Notice:** If needed, use **96486** Collet Insert Removal Tool.

### Disassembly:



1. To remove **53589** Hose from **53581** Turbine Cover, cut hose 1.000" (~25 mm) from **53586** Hex Nut. *Set aside hose until **Assembly Step # 14a**.*
- Cut hose from barb.

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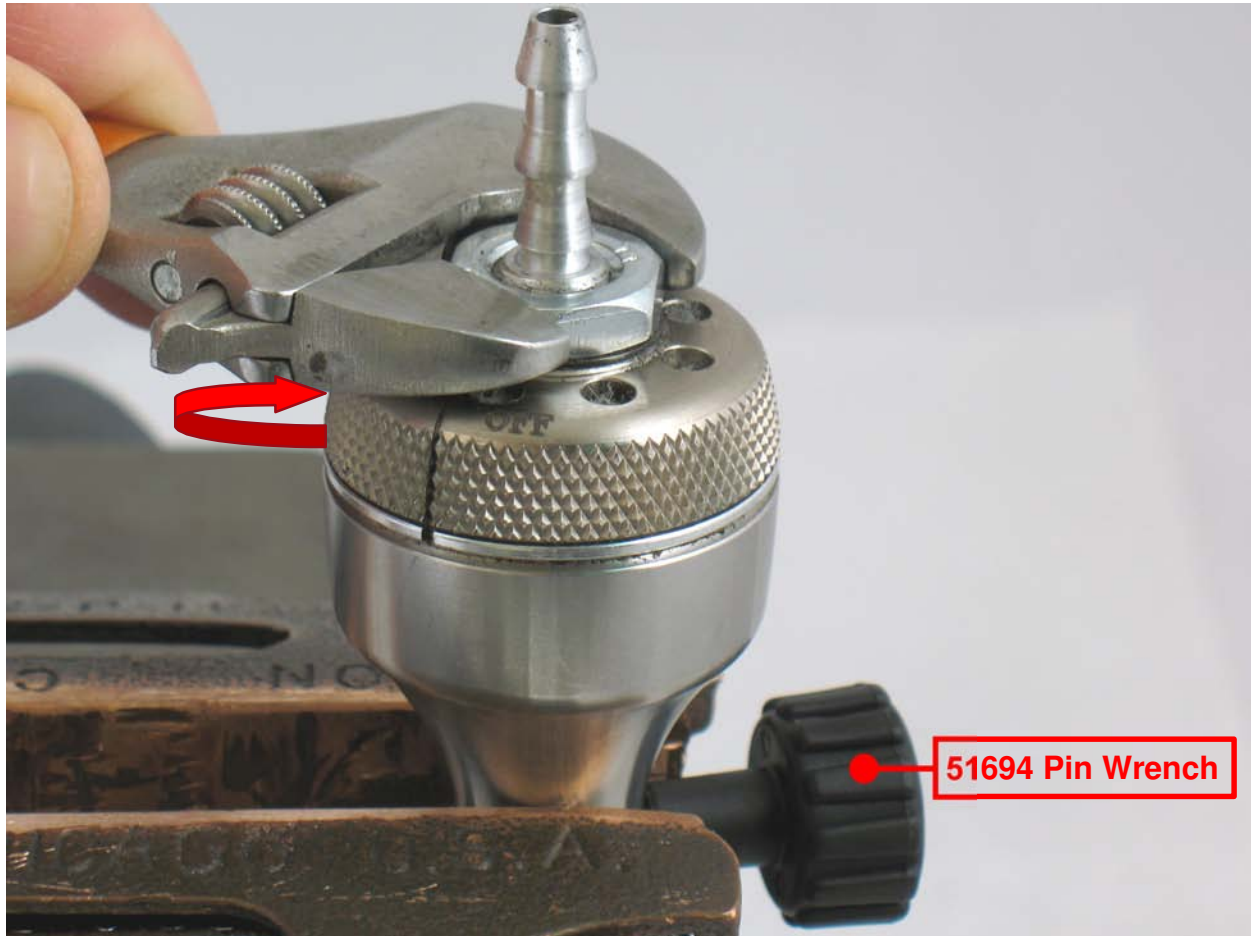
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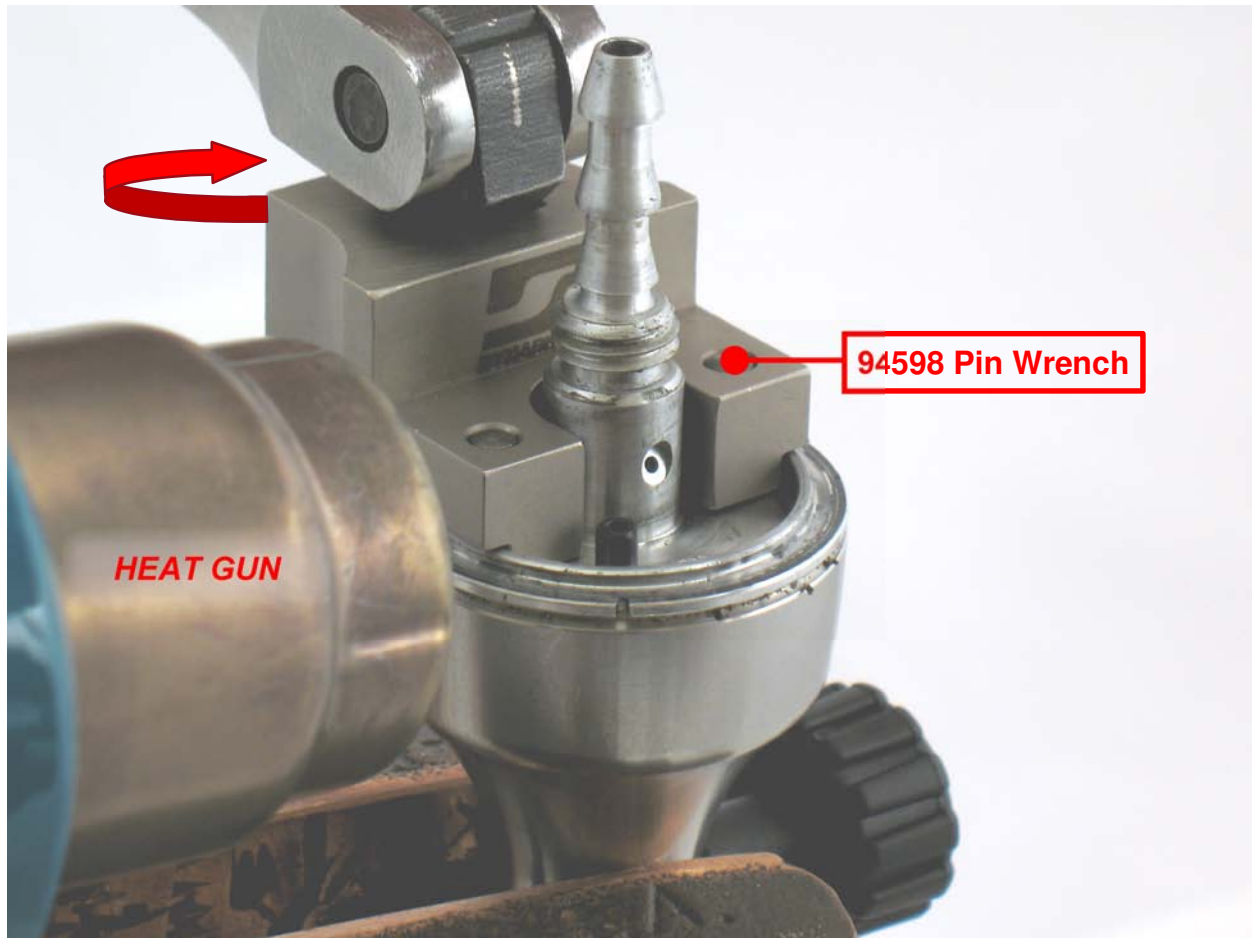
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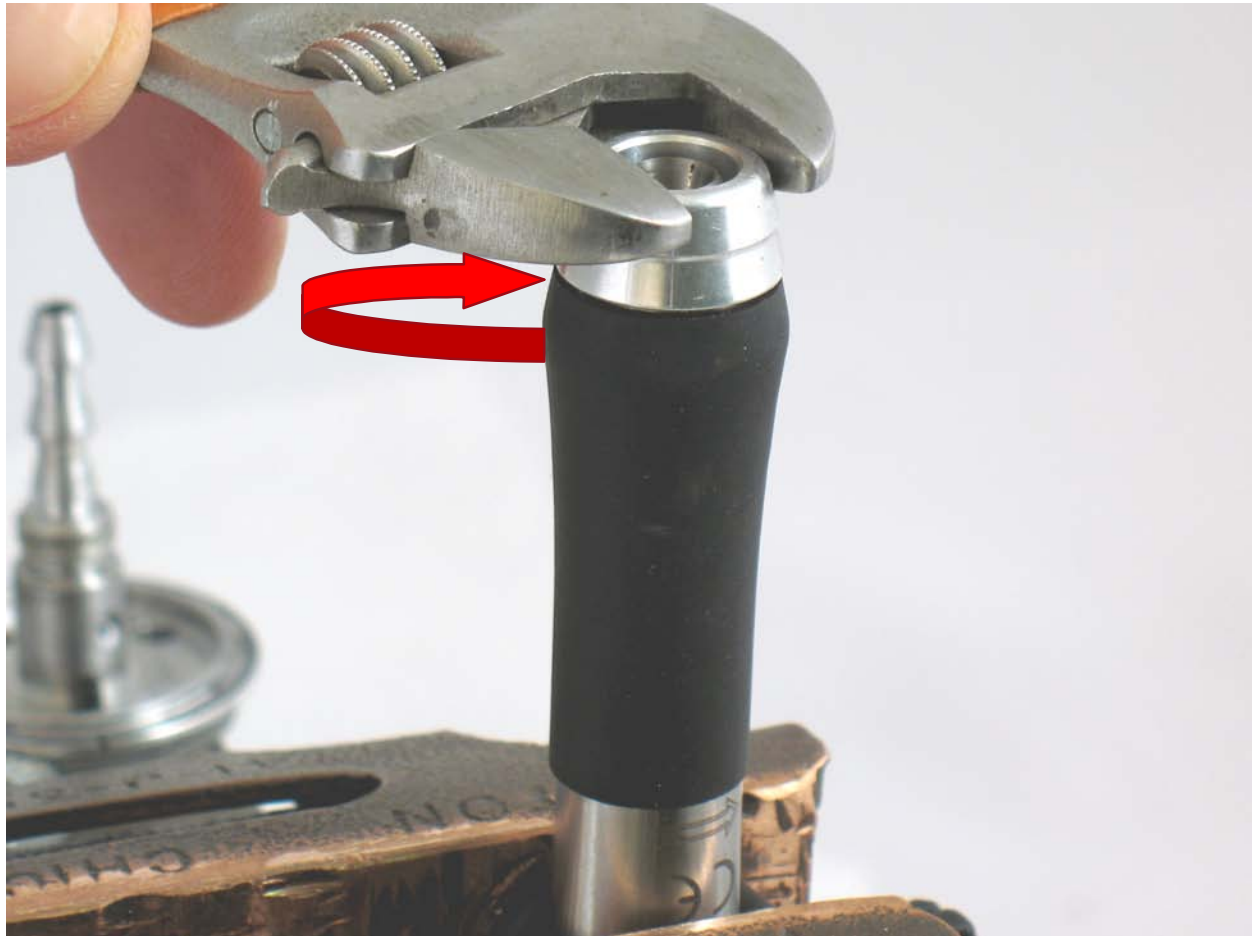
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2. Insert **51694** Pin Wrench through housing and drive shaft cross-holes.
  - Fasten housing in vise with aluminum or bronze jaws.
  - Use an adjustable wrench to remove: **53586** Hex Nut, **53587** Washer, and **53582** On/Off Valve with o-rings and muffler. Turn counterclockwise.



3. Use a "HEAT GUN" to warm **53581** Turbine Cover and soften Loctite sealant.
  - Use **94598** Pin Wrench to remove turbine cover. Turn counterclockwise.



4. Invert pencil grinder in vise. Use an adjustable wrench to remove **53584** Collet Guard. Turn counterclockwise.

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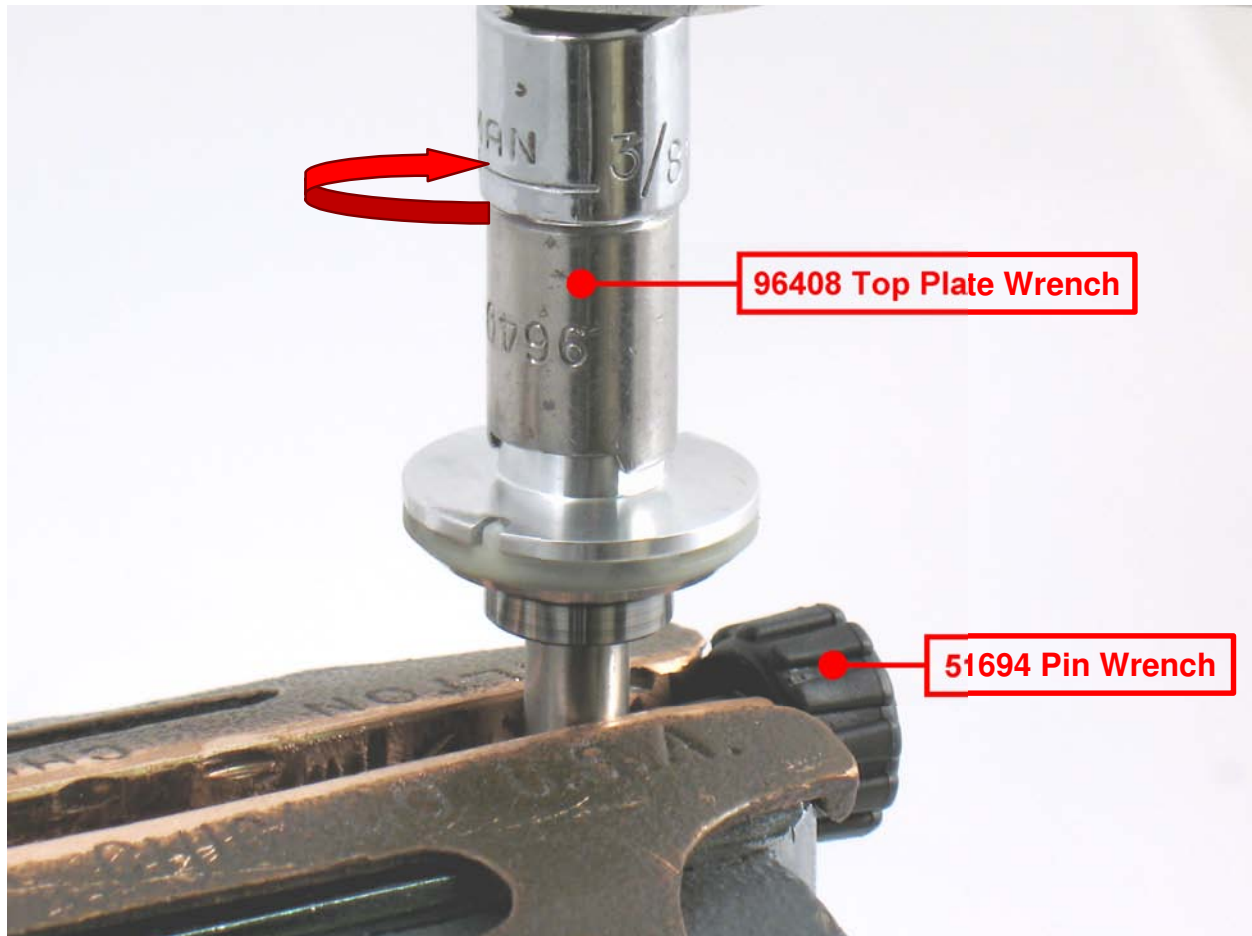


5. Use **96479** Extension Retainer Wrench to remove **51548** Bearing Retainer.  
Turn counterclockwise.

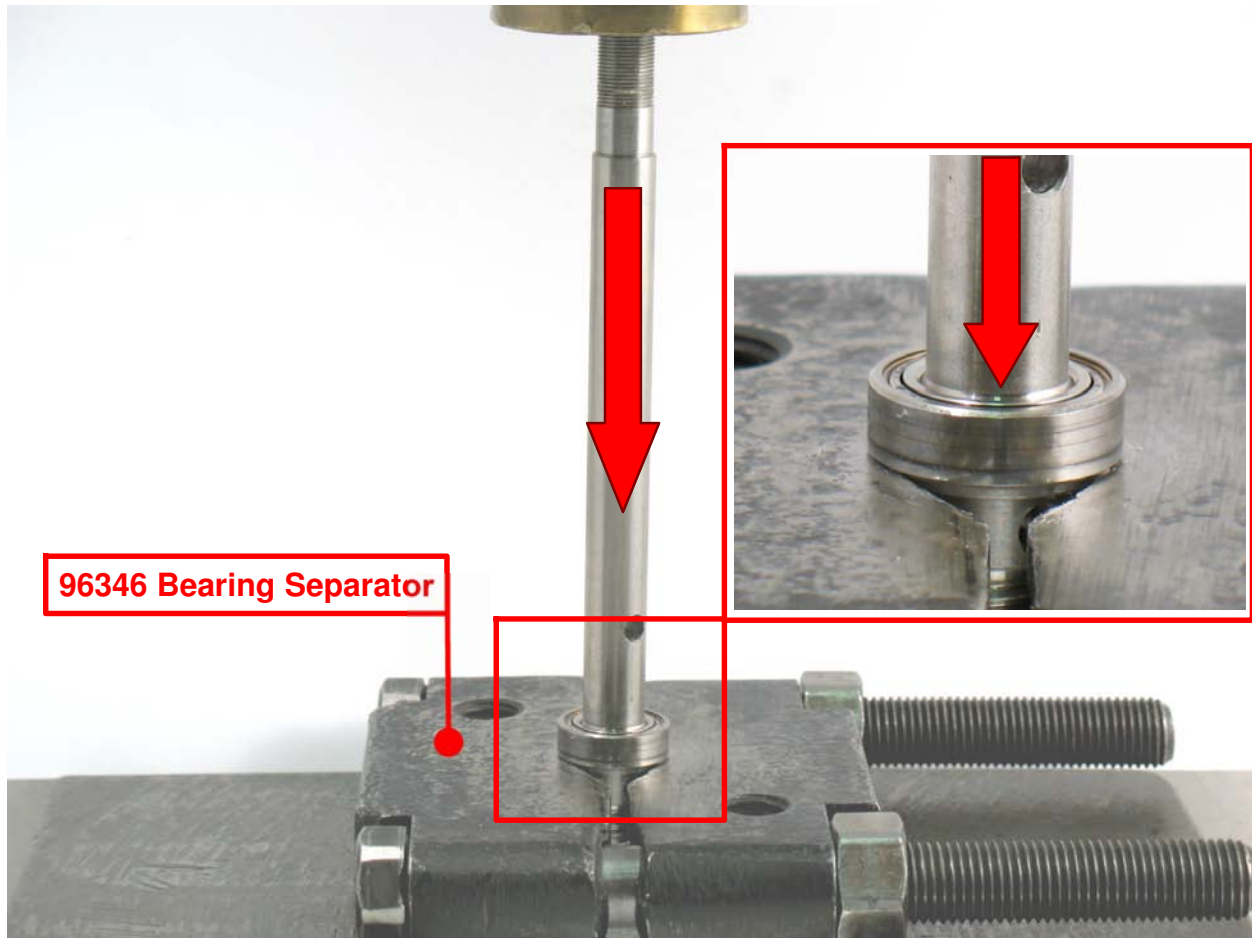
  - Remove housing from vise and remove **94984** Spacer.



6. Use a soft-face hammer to bump **53580** Drive Shaft and remove it from housing.



7. Insert **51694** Pin Wrench through cross-hole in drive shaft.
  - Fasten drive shaft in vise with turbine motor unit pointing up.
  - Use an adjustable wrench or **96408** Top Plate Wrench to remove **51655** Top Plate and turbine motor. Turn counterclockwise.



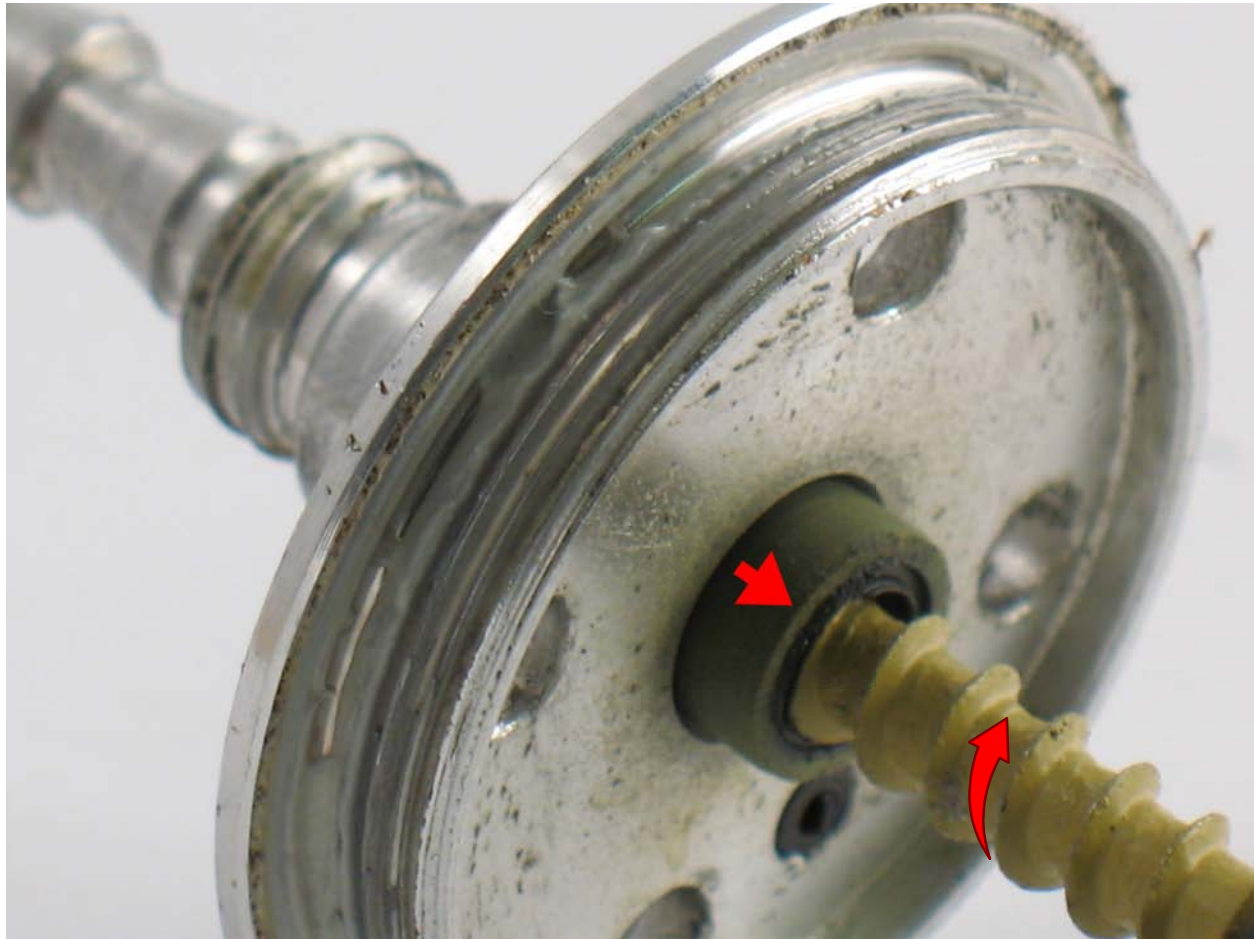
**96346 Bearing Separator**

8. Use **96346** Bearing Separator and **96232** Arbor Press to remove **51686** Bearing.





9. Use **95890** Taper Pin, or a 9 mm (~.354") diameter rod as a ram to remove **51685** Bearing from housing.



10. Use a wood screw to remove **51662** Air Bushing.

**Disassembly Completed.**

**Clean, inspect, and replace worn parts before assembling.**

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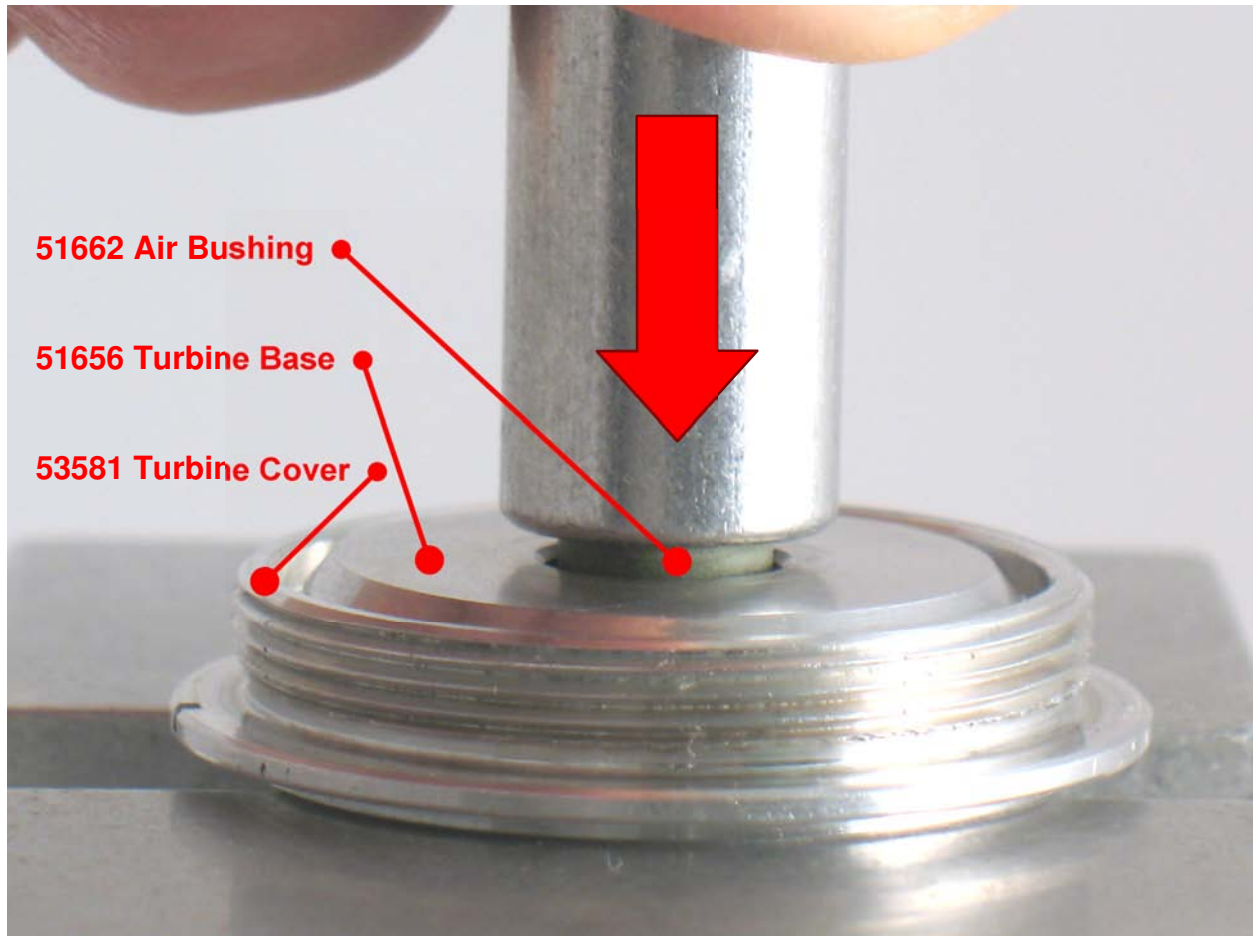
**Assembly Instructions – 100,000 RPM Turbine, Hand-Held, Pencil Grinder**  
Models: 51810, 51811, 51812, 51813

**Important:** Use these instructions along with tool parts page or manual.

### Assembly:



1. Apply Loctite #7649 Primer or equivalent to threads on **53581** Turbine Cover and **53584** Collet Guard.
- **NOTICE:** Provide good ventilation and allow solvent to evaporate until surfaces are completely dry.



2. Press new **51662** Air Bushing into **53581** Turbine Cover.
  - **NOTICE:** Allow 1/16" (~1.5 mm) of bushing to jut out of turbine cover. Use **51656** Turbine Base as "JIG" to preset air bushing depth.
  - *Set aside turbine cover until **STEP # 13**.*





3. Use “RAISED INSIDE DIAMETER” of **96418** Bearing Press Tool, and **96232** Arbor Press to install **51686** Bearing onto drive shaft.



4. Assemble turbine base, turbine and top plate to make the motor unit.
  - Holding motor unit together, apply a small amount of Loctite #222, or equivalent on threads of **51655** Top Plate.
  - Carefully, fasten motor unit onto **53580** Drive Shaft.

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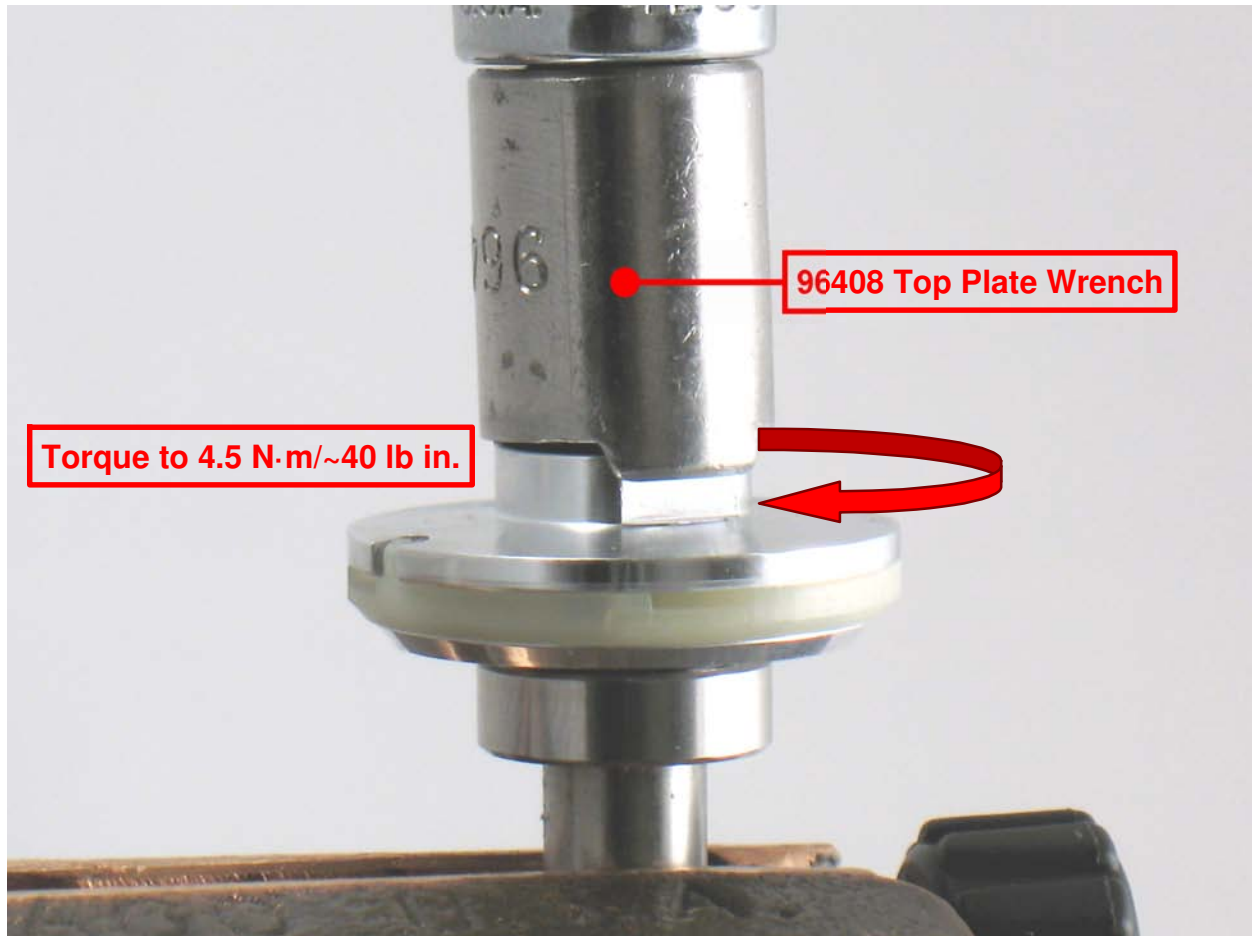
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5. Insert **51694** Pin Wrench through cross-hole in drive shaft.
  - Fasten in vise with aluminum or bronze jaws.
  - Use **96408** Top Plate Wrench and torque wrench to tighten top plate.  
Torque to 4.5 N·m/~40 lb in.



6. Apply a small amount of Loctite #609, or equivalent to outside diameter of **51686** Bearing.
  - Install **51661** Wave Spring and drive shaft assembly into housing.

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7. Place “*RAISED INSIDE DIAMETER*” of **96418** Bearing Press Tool on table of **96232** Arbor Press.
  - Place top plate of motor unit on “*RAISED OUTSIDE DIAMETER*” of **96418** Bearing Press Tool, with threaded end of drive shaft pointing up.



8. Apply a small amount of Loctite #609, or equivalent to outside diameter of **51685** Bearing.
  - Use “*RAISED OUTSIDE DIAMETER*” **96419** Bearing Press Tool and arbor press to install **51685** Bearing.
  - **NOTICE:** Once bearing is installed, invert **96419** Bearing Press Tool with “*RAISED INSIDE DIAMETER*” toward inside race of **51685** Bearing.
  - Apply a slight load on bearings with arbor press. Check fit and rotation of bearings.
  - **NOTICE:** Use a pipe-cleaner  to wipe Loctite from housing threads.



9. Insert **51694** Pin Wrench through cross-holes in housing and drive shaft.
  - Remove assembly from arbor press and fasten in vise, with threaded end of drive shaft pointing up.
  - Install **94984** Spacer, with its larger diameter toward **51685** Bearing.

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10. Apply a small amount of Loctite #222, or equivalent just above **94984** Spacer.
  - Use torque driver and **96479** Extension Retainer Wrench to install **51548** Bearing Retainer.
  - Torque to 2 N·m/~18 lb in.





11. Apply a small amount of Loctite #567, or equivalent to threads **53584** Collet Guard.
  - Use a 14 mm crow-foot and torque wrench to install collet guard onto housing. Torque to 4.5 N·m/~40 lb in.



**12. Install collet insert.**

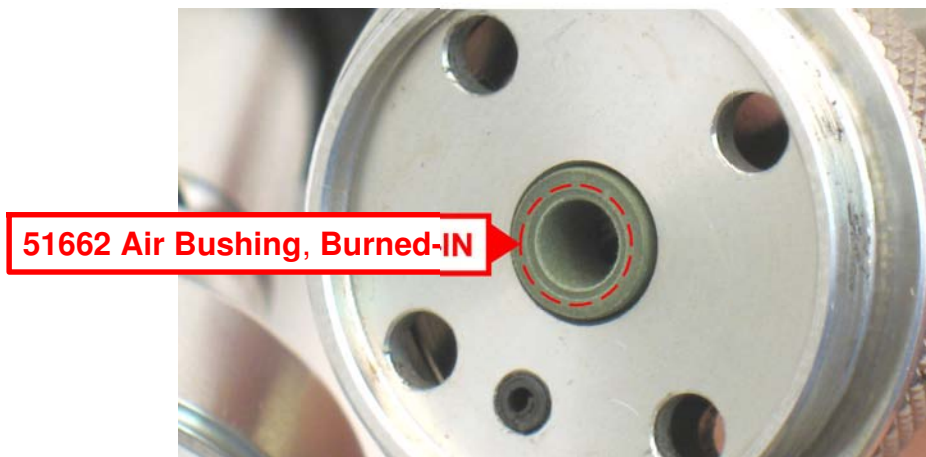
- Use **95731** Wrench (8 mm) to install **51657** Collet Cap.  
**NOTICE: Do not over tighten collet assembly.**
- Remove pencil grinder from vise and remove **51694** Pin Wrench.

### 51662 Air Bushing Burn-In Procedure:



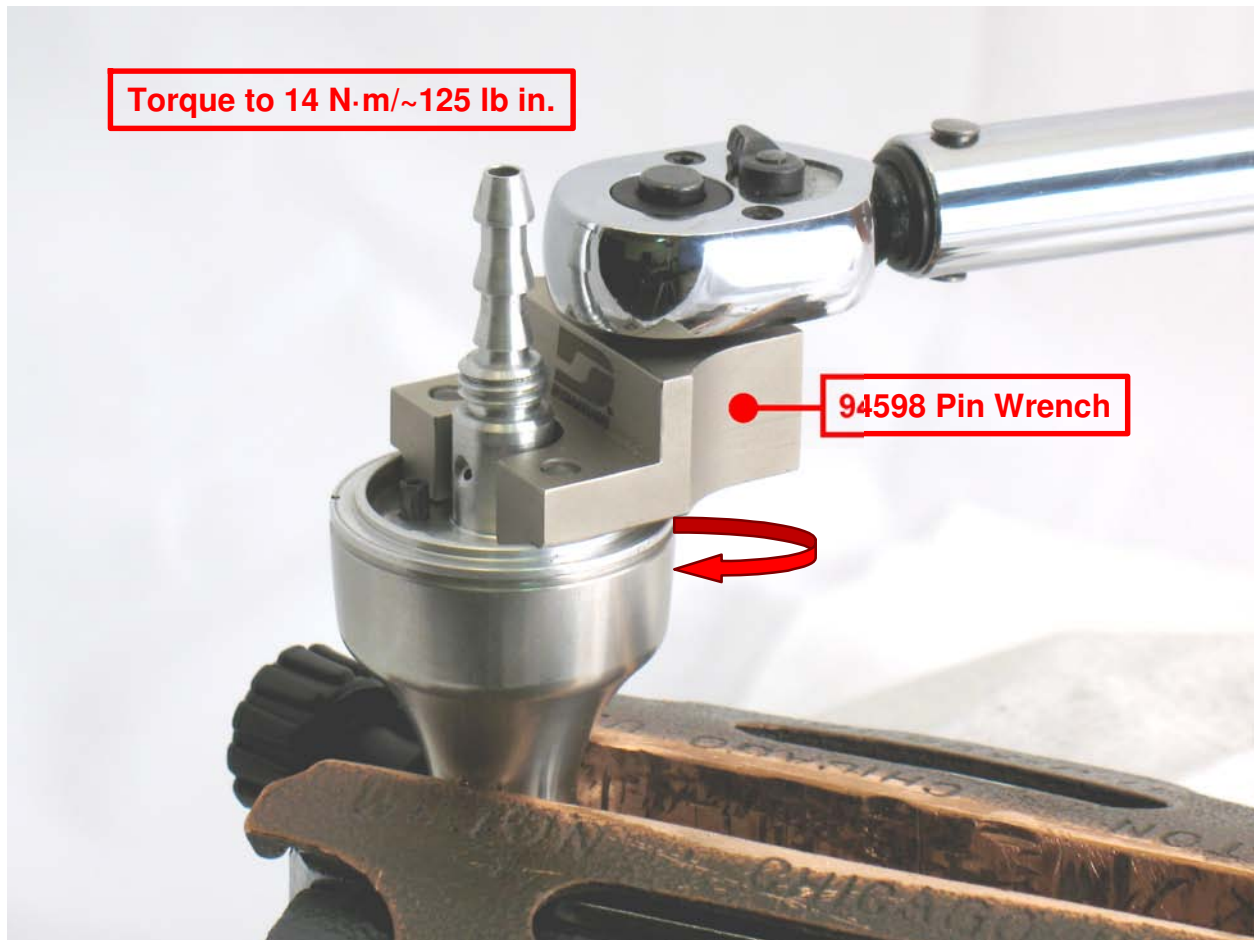
### 13. Turbine Cover, ON/OFF Valve and 96464 Burn-In Manifold Assembly:

- Install **95523** O-Ring around stem of **53581** Turbine Cover.
  - Install **95438** O-Ring into **53582** ON/OFF Valve.
  - Install ON/OFF Valve onto turbine cover and turn valve to the ON position.
  - Install **95523** O-Ring into ON/OFF Valve.
  - Install **53587** Washer onto ON/OFF Valve.
  - By hand, thread **96464** Burn-In Manifold onto turbine cover.
  - Install “Turbine Cover, ON/OFF Valve, and Burn-In Manifold Assembly” onto pencil grinder housing assembly. Tighten both assemblies all the way together by hand.
  - **NOTICE:** Drive shaft will not turn.
  - Connect Burn-In Manifold to air supply.
  - Slowly, loosen turbine cover until drive shaft starts to rotate. **IMPORTANT: DO NOT TOUCH ROTATING COLLET-END OF DRIVE SHAFT!**
  - Continue to slowly loosen and tighten assemblies until maximum RPM is attained.
  - Use **94598** Pin Wrench to tighten assemblies.
- Important: Use a Tachometer to verify maximum RPM.**



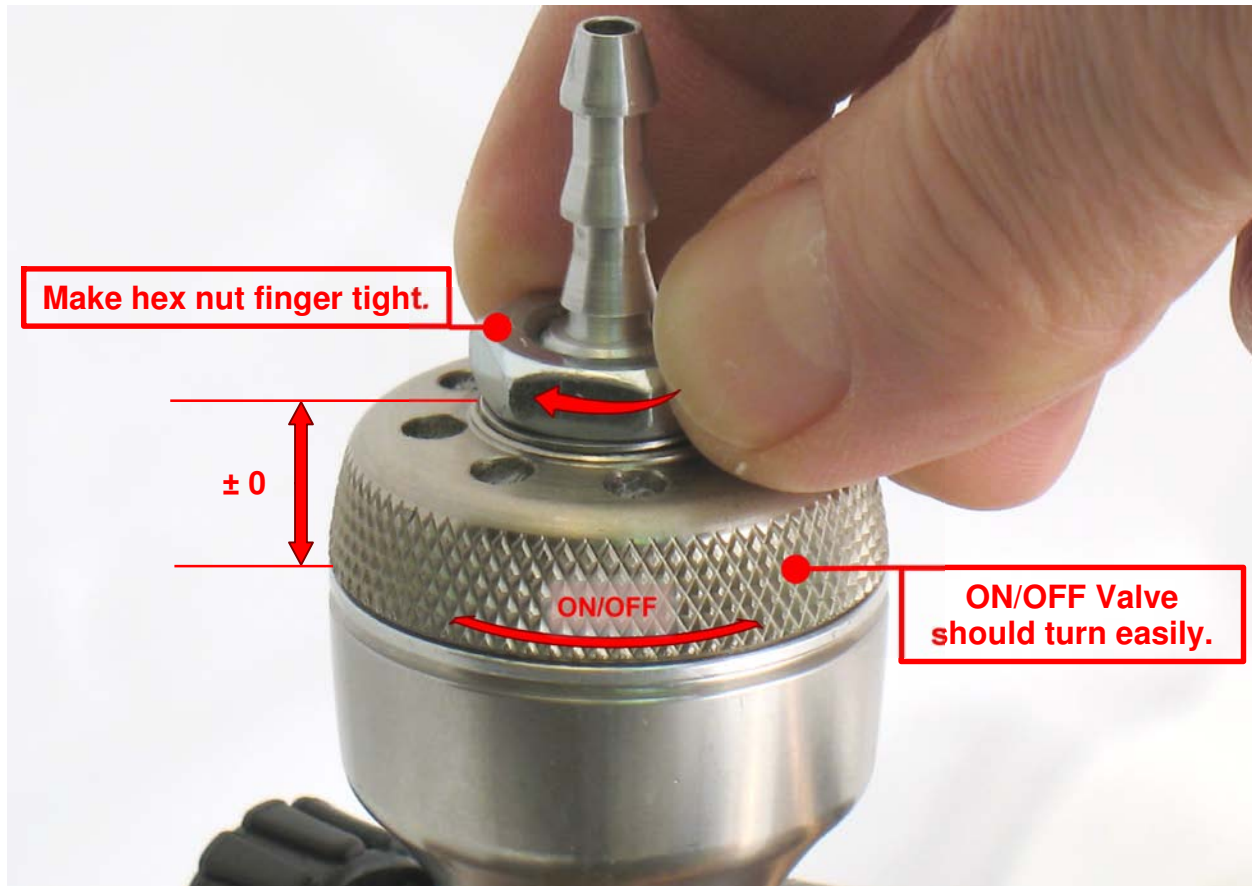


### Final Assembly:



14. Disconnect **96464** Burn-In Manifold from air supply.
  - Insert **51694** Pin Wrench through cross-hole in housing and drive shaft.
  - Fasten assembly in vise with burn-in manifold pointing up.
  - Remove turbine cover, ON/OFF valve and burn-in manifold.
  - Remove **53587** Washer from ON/OFF Valve.
  - Remove **53582** ON/OFF Valve.
  - Remove **95523** O-Ring from turbine cover.
  - Apply a small amount of Loctite #567, or equivalent to threads of turbine cover.
  - Install turbine cover onto housing.
  - Use **94598** Pin Wrench and torque wrench to tighten turbine cover.  
Torque to 14 N·m/~125 lb in.





**14a. NOTICE:** Apply oil to all three o-rings.

- Install **95523** O-Ring around stem of **53581** Turbine Cover.
- Install **53588** Muffler and **95438** O-Ring into **53582** ON/OFF Valve.
- Install ON/OFF Valve onto turbine cover.
- Install **95523** O-Ring into ON/OFF Valve.
- Install **53587** Washer onto ON/OFF Valve.
- Apply a small amount of Loctite #609, or equivalent to turbine cover threads for **53586** Hex Nut.
- Install hex nut finger tight. Turn clockwise. **NOTICE:** Hex nut must stay fixed. ON/OFF Valve should turn easily without any up and down movement.
- Install hose to press firmly against **53586** Hex Nut.

**Important:** Allow Loctite Threadlockers and Retaining Compounds to cure/fixture for 30 minutes before checking RPM. • Supply **90 psig. (6.2 Bar)** maximum operating air pressure at air inlet of tool. • Use tachometer to check maximum operating speed without an accessory in collet.

**Assembly Completed.**

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