

Owner's Guide: Automatic Collet Closer Kit for 15L Slant-PRO

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TD10534: Automatic Collet Closer Kit for 15L Slant-PRO (0218C)

I.1 Purpose

This document gives instructions on installing an Automatic Collet Closer Kit on a 15L Slant-PRO™.



NOTE: The Automatic Collet Closer Kit requires PathPilot® v2.0.2 or later. If you haven't yet done so, use PathPilot® v2.0 Upgrade (PN 38249) to upgrade your PathPilot® controller.

I.2 Product Information

Product: Automatic Collet Closer Kit for 15L Slant-PRO (PN 38690)

The kit includes the items as shown in the following image.



Qty.	Description	PN
1	Adapter Spacer	38253
4	Air Tube	31457
1	Anti-Rotation Bracket	38278
1	Draw Tube	38362
3	Elbow Fitting (Female)	31990
1	Elbow Fitting (Male)	31324
2	M4 x 0.7 - 30 Button Head Cap Screw	38359
6	M5 x 0.8 - 16 Button Head Cap Screw	38360
4	M5 Nut	31201
4	M6 x 1 - 25 Hex Head Screw	32371
4	M6 x 1 - 20 Hex Head Flange Bolt	31779

2	NPT Reducer	38689
1	Pneumatic Cylinder	—
1	Push-To-Connect Fitting	—
2	Rubber Bumper	34618
1	Solenoid Assembly	—
1	Thread Seal Tape	37508



NOTE: If any of these items are missing, we can help.

Email support@tormach.com to contact Tormach Technical Support for guidance on how to proceed.

I.3 Required Tools

Before you begin, make sure you have the following tools and items:

- 3/16-inch hex wrench
- 7/32-inch drill bit
- 9/16-inch box-end wrench
- 11/16-inch box-end wrench
- 2.5 mm hex wrench
- 3 mm hex wrench
- 7 mm wrench
- 8 mm wrench
- 10 mm wrench
- Dead-blow hammers, two (or similar)
- Electric drill
- Machinist's stone (or similar)
- Magnetic dial indicator
- Marker
- Phillips screwdriver
- Safety glasses

I.4 To Install the Automatic Collet Closer Kit for 15L Slant-PRO

Installing the Automatic Collet Closer Kit involves the following steps. Complete them in the order listed:

- **Step 1:** "Assembling the Pneumatic Cylinder" (below)
- **Step 2:** "Removing the Belt Guard Cover" (on the next page)
- **Step 3:** "Installing the Anti-Rotation Bracket" (on the next page)
- **Step 4:** "Installing the Adapter Spacer" (page 5)
- **Step 5:** "Re-Installing the Belt Guard Cover" (page 6)
- **Step 6:** "Installing the Pneumatic Cylinder Assembly" (page 6)
- **Step 7:** "Making Air Connections" (page 7)
- **Step 8:** "Aligning the Automatic Collet Closer Kit with the 15L Slant-PRO™ Spindle" (page 10)

I.4.1 Assembling the Pneumatic Cylinder

1. Locate the draw tube provided. One end of the draw tube has four holes, which are used to secure the draw tube to the pneumatic cylinder.
2. Assemble the draw tube with the pneumatic cylinder so that the draw tube's holes are furthest away from the pneumatic cylinder, as shown in the following image.

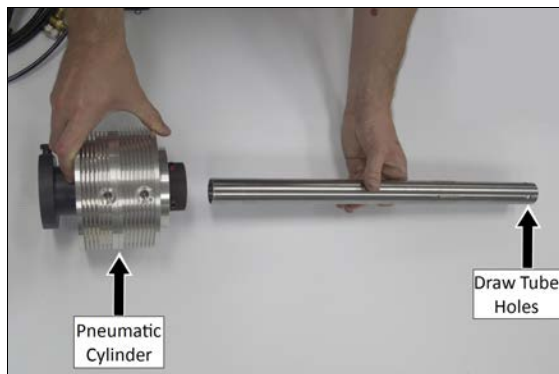


Figure 1-1: Example of a draw tube aligned with a pneumatic cylinder.

3. Insert the draw tube through the pneumatic cylinder until the end of the draw tube is flush with the end of the pneumatic cylinder.

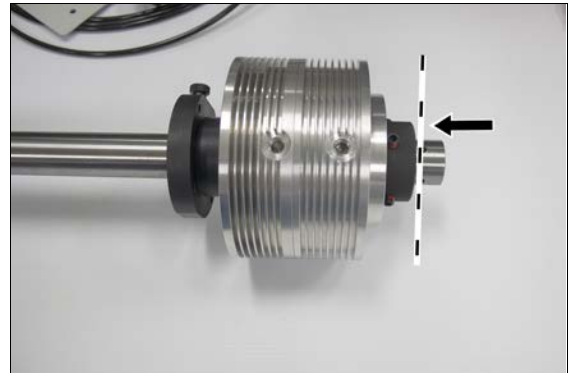


Figure 1-2: Draw tube inserted through the pneumatic cylinder.

4. Use a 3/16-inch hex wrench to tighten the four set screws on the pneumatic cylinder that are aligned with the four holes on the draw tube. The draw tube is now secured in place.
5. Locate the two NPT reducers provided. Use thread seal tape to wrap the threads on both ends of the two NPT reducers.
6. Use a 9/16-inch hex wrench to install two NPT reducers on the pneumatic cylinder.

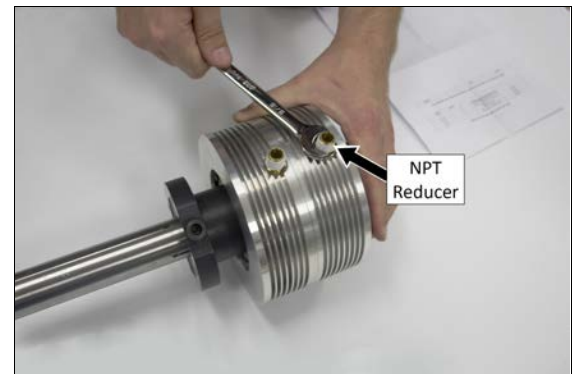


Figure 1-3: NPT reducers installed on the pneumatic cylinder.

7. Use an 11/16-inch wrench to install two elbow fittings (female) to the NPT reducers.

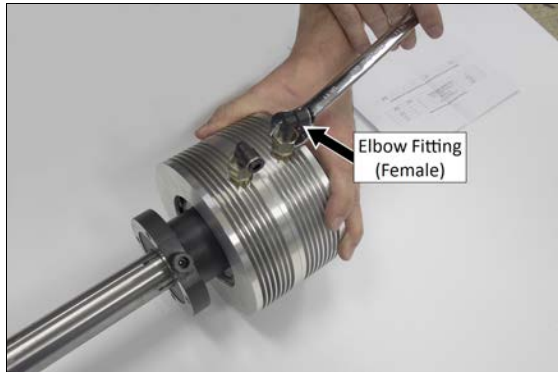


Figure 1-4: Elbow fittings (female) installed on the NPT reducers.

8. Set aside the pneumatic cylinder assembly for later installation.
9. Go to "Removing the Belt Guard Cover" (below).

I.4.2 Removing the Belt Guard Cover

1. Power off the machine and the PathPilot® controller.
 - a. Push in the **Emergency Stop** button on the **Operator Box**, which disables movement of the axes and the spindle.
 - b. From the PathPilot® interface, click **Exit**.
 - c. Turn the **Main Disconnect** switch to **Off** on the right side of the electrical cabinet.
2. Locate the rotary encoder on the belt guard cover.



Figure 1-5: Rotary encoder on the belt guard cover.

3. Disconnect the power connector from the rotary encoder.
4. Locate the encoder cover below the rotary encoder.

5. Use a Phillips screwdriver to remove the encoder cover's three screws, and set aside the encoder cover and its screws.
6. Locate the spindle bore cover above the rotary encoder.



Figure 1-6: Spindle bore cover on the belt guard cover.

7. Use a Phillips screwdriver to remove the spindle bore cover's screws, and discard the spindle bore cover and its screws.
8. Use a Phillips screwdriver to remove the five screws that secure the belt guard cover to the enclosure and the stand, and set aside the belt guard cover and its screws.
9. Go to "Installing the Anti-Rotation Bracket" (below).

I.4.3 Installing the Anti-Rotation Bracket

This procedure gives instructions to drill two holes in the belt guard cover to use for the anti-rotation bracket provided. To do so, you must first identify the hole locations by temporarily installing the anti-rotation bracket.

1. Slide two rubber bumpers on the anti-rotation bracket, as shown in the following image.

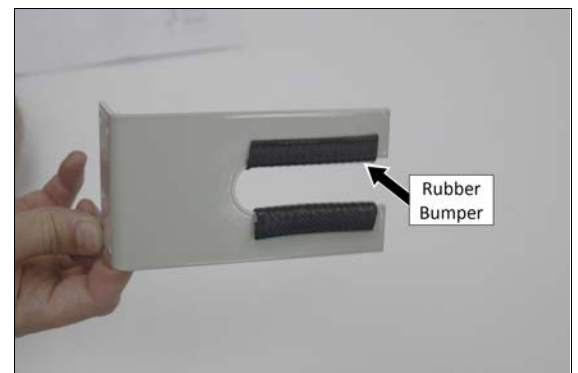


Figure 1-7: Example of installed rubber bumpers on an anti-rotation bracket.

2. Use two M5 x 0.8 - 16 button head cap screws to temporarily attach the anti-rotation bracket to the belt guard cover, as shown in the following image. Make sure that the screws are centered within the slots on the anti-rotation bracket.



Figure 1-8: Example of an anti-rotation bracket installed on a belt guard cover.

3. Use a marker to indicate hole locations on the belt guard cover: Put one mark in the center of each open slot on the anti-rotation bracket.
4. Remove the two M5 x 0.8 - 16 button head cap screws and the anti-rotation bracket.
5. Set aside the anti-rotation bracket and its screws.
6. Use a #1 drill bit to drill holes in the two marked locations on the belt guard cover.
7. Install the anti-rotation bracket on the belt guard cover: Use four M5 x 0.8 - 16 button head cap screws and four M5 nuts.
8. Go to "Installing the Adapter Spacer" (below).

1.4.4 Installing the Adapter Spacer

1. Use a machinist's stone to remove any burrs on the face of the spindle pulley. Burrs could cause runout.

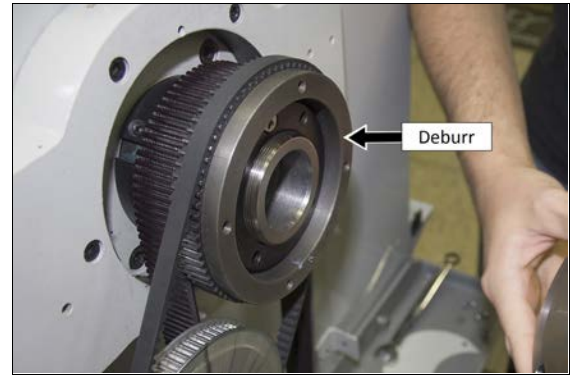


Figure 1-9: Face of the spindle pulley on the left side of the machine.

2. Locate four pilot holes on the spindle pulley as shown in the following image.

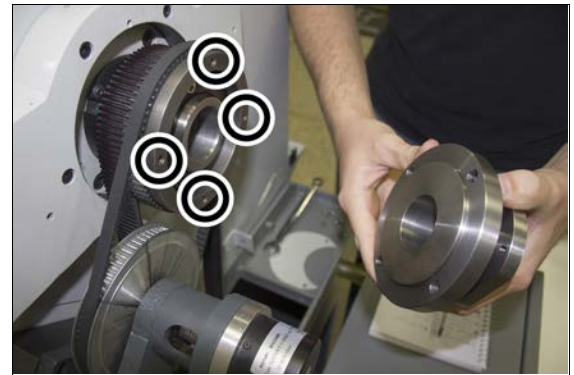


Figure 1-10: Pilot holes on the spindle pulley.

3. Align the four pilot holes on the spindle pulley with the four holes on the adapter spacer.
4. Use a 10 mm wrench and four M6 x 1 - 20 hex head flange bolts to attach the adapter spacer to the spindle pulley.



Figure 1-11: Adapter spacer installed on the spindle pulley.

5. Go to "Re-Installing the Belt Guard Cover" (below).

I.4.5 Re-Installing the Belt Guard Cover

1. Locate the belt guard cover and its five screws that you set aside in "Removing the Belt Guard Cover" (page 4).
2. Use a Phillips screwdriver to attach the belt guard cover to the left side of the lathe.
3. Locate the encoder cover and its three screws that you set aside in "Removing the Belt Guard Cover" (page 4).
4. Use a Phillips screwdriver to attach the encoder cover to the belt guard cover.
5. Connect the power connector to the rotary encoder.
6. Go to "Installing the Pneumatic Cylinder Assembly" (below).

I.4.6 Installing the Pneumatic Cylinder Assembly

1. Locate the pneumatic cylinder assembly that you set aside in "Assembling the Pneumatic Cylinder" (page 3).
2. Slowly slide the assembly into the spindle while making sure its fittings slide into the anti-rotation bracket.



Figure 1-12: Pneumatic cylinder assembly put into the spindle.

3. Locate the thumb screw on the pneumatic cylinder assembly.

4. Make sure that the thumb screw is aligned with the flat edge on the adapter spacer, as shown in the following image.



Figure 1-13: Example of an aligned thumb screw on a pneumatic cylinder assembly.

5. Use four M6 x 1 - 25 hex head screws to tighten by hand the pneumatic cylinder assembly to the adapter spacer. Make sure that the screws are tight, but not tightened completely.



Figure 1-14: Pneumatic cylinder assembly installed on the adapter spacer.

6. Loosen the thumb screw on the pneumatic cylinder assembly. Loosening the thumb screw allows the draw tube to rotate separately from the spindle so that you can thread a collet into the draw tube.

7. Make sure that a 5C insert is installed in the spindle, as shown in the following image.

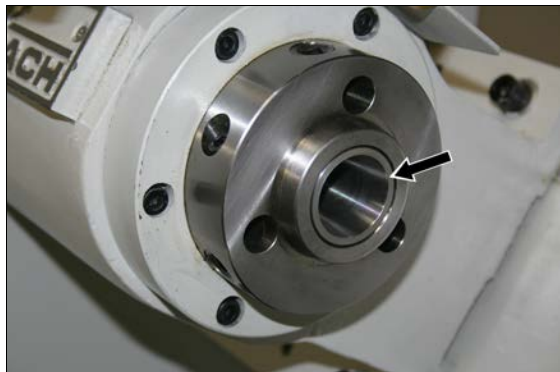


Figure 1-15: Example of a 5C insert installed in a spindle.

8. Install a collet into the 5C insert. You must rotate the collet until its groove aligns in the 5C insert.



Figure 1-16: Collet installed into the 5C insert.

9. Insert a piece of stock into the collet.
10. Hold the collet with one hand and then, from the pneumatic cylinder, use your other hand to turn the draw tube handle.
11. Continue to thread the collet on the draw tube until it is completely threaded.
12. Tighten the thumb screw on the pneumatic cylinder assembly.
13. To prevent the draw tube from turning during operation, you must make sure that the thumb screw is engaged in the draw tube: Turn the draw tube handle counterclockwise until the thumb screw clicks into one of four slots on the draw tube.
The draw tube is now locked into place.
14. Go to "Making Air Connections" (below).

I.4.7 Making Air Connections

You must make sure that air to the solenoid is dry, filtered, and regulated. If it is not, we recommend you use an FRL Filter-Regulator-Lubricator (PN 32457). For an air routing diagram for reference, go to "Pneumatic Schematic" (page 14).

Depending on your air flow, do one of the following:

- If you are using an FRL Filter-Regulator-Lubricator: Go to "Make Air Connections with an FRL Filter-Regulator-Lubricator" (below).
- If you are not using an FRL Filter-Regulator-Lubricator: Go to "Make Air Connections Without an FRL Filter-Regulator-Lubricator" (page 9).

Make Air Connections with an FRL Filter-Regulator-Lubricator

1. Use two M4 x 0.7 - 30 button head cap screws to attach the solenoid behind the anti-rotation plate, as shown in the following image. Make sure that the side with two ports is pointing up.




Figure 1-17: Solenoid behind the anti-rotation plate.

2. Connect the power cord on the solenoid to the outlet marked **Closer** on the power connection panel.
3. Locate the elbow fitting (male) and push-to-connect fitting provided. Use thread seal tape to wrap the threads on the ends of both fittings.
4. Use a 9/16-inch hex wrench to install the elbow fitting (male) to the output port on the FRL Filter-Regulator-Lubricator.
5. Use a 9/16-inch hex wrench to install the push-to-connect fitting to the input port on the FRL Filter-Regulator-Lubricator.

6. Use two M5 x 0.8 - 16 button head cap screws to attach the FRL Filter-Regulator-Lubricator in front of the anti-rotation bracket, as shown in the following image.



Figure 1-18: FRL Filter-Regulator-Lubricator installed in front of the anti-rotation plate.

NOTE: For operating instructions, see the  document included with the FRL Filter-Regulator-Lubricator (PN 32457).

7. Use the medium-length air tubes provided to make air connections in the following order:
 - a. Connect one end of each medium-length air tube to each elbow fitting on the pneumatic cylinder.
 - b. Put the medium-length air tube from the elbow fitting closest to the belt guard cover into port **A** on the solenoid.
 - c. Put the medium-length air tube from the elbow fitting furthest from the belt guard cover into port **B** on the solenoid.



Figure 1-19: Air connections from the pneumatic cylinder to the solenoid.

8. Connect one end of the shortest air tube provided into port **P** on the solenoid.
9. Connect the loose end of the shortest air tube to the output port on the FRL Filter-Regulator-Lubricator.



Figure 1-20: Example of an air connection at the output port on the FRL Filter-Regulator-Lubricator.

10. Use thread seal tape to wrap the threads of the quick-connect fitting provided.
11. Use one 9/16-inch and one 11/16-inch wrench to install the quick-connect fitting into an elbow fitting.



Figure 1-21: Quick-connect fitting installed in the elbow fitting.

12. Connect one end of the longest air tube provided to the elbow fitting.

13. Connect the loose end of the longest air tube to the input port on the FRL Filter-Regulator-Lubricator.

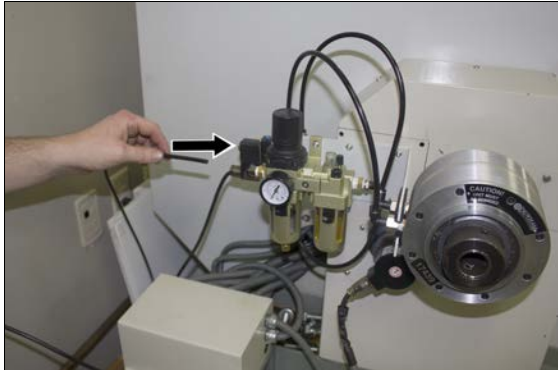


Figure 1-22: Example of an air connection at the input port on the FRL Filter-Regulator-Lubricator.

14. Connect the quick-connect fitting to the air compressor.
15. Go to "Aligning the Automatic Collet Closer Kit with the 15L Slant-PRO™ Spindle" (on the next page).

Make Air Connections Without an FRL Filter-Regulator-Lubricator

1. Use two M4 x 0.7 - 30 button head cap screws to attach the solenoid behind the anti-rotation plate, as shown in the following image. Make sure that the side with two ports is pointing up.



Figure 1-23: Solenoid behind the anti-rotation plate.

2. Connect the power cord on the solenoid to the outlet marked **Closer** on the power connection panel.

3. Use the medium-length air tubes provided to make air connections in the following order:
 - a. Connect one end of each medium-length air tube to each elbow fitting on the pneumatic cylinder.
 - b. Put the medium-length air tube from the elbow fitting closest to the belt guard cover into port **A** on the solenoid.
 - c. Put the medium-length air tube from the elbow fitting furthest from the belt guard cover into port **B** on the solenoid.

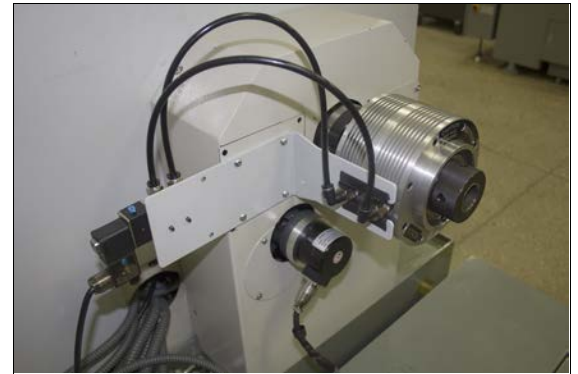


Figure 1-24: Air connections from the pneumatic cylinder to the solenoid.

4. Connect one end of the longest air tube provided into port **P** on the solenoid.



Figure 1-25: Example of an air connection at port P on the solenoid.

5. Use thread seal tape to wrap the threads of the quick-connect fitting provided.

6. Use one 9/16-inch and one 11/16-inch wrench to install the quick-connect fitting into an elbow fitting.



Figure 1-26: Quick-connect fitting installed in the elbow fitting.

7. Connect the loose end of the longest air tube to the elbow fitting.
8. Connect the quick-connect fitting to the air compressor.
9. Go to "Aligning the Automatic Collet Closer Kit with the 15L Slant-PRO™ Spindle" (below).

I.4.8 Aligning the Automatic Collet Closer Kit with the 15L Slant-PRO™ Spindle

1. Put the base of a magnetic dial indicator on the top of the belt guard cover. Make sure that the magnetic dial indicator touches the aluminum of the pneumatic cylinder furthest away from the belt guard cover, as shown in the following image.



Figure 1-27: Example of a magnetic dial indicator put on a pneumatic cylinder.

2. Rotate the spindle clockwise. On the magnetic dial indicator, the needle rises and falls. Continue to rotate the spindle until the needle reaches the highest point on the magnetic dial indicator.
3. Use two dead-blow hammers to gently tap the mounting flange, as shown in the following image.



Figure 1-28: Example of using two dead-blow hammers to align an Automatic Collet Closer Kit.

4. Rotate the spindle clockwise until the needle again reaches the highest point on the magnetic dial indicator.
5. Repeat Steps 2 through 4 until the spindle runout is less than **0.002** inches.

NOTE: If the reading on the magnetic dial indicator remains the same after you tap the mounting flange with the dead-blow hammer, loosen the four M6 x 1 - 25 screws and repeat Steps 3 through 4.

6. Use a 10 mm wrench to tighten the four M6 x 1 - 25 hex head screws on the mounting flange.



Figure 1-29: Tighten the mounting flange on the pneumatic cylinder.

7. Power on the machine and the PathPilot® controller.

You have completed installing the Automatic Collet Closer Kit for 15L Slant-PRO. For operating instructions, go to "Operating the Automatic Collet Closer Kit for 15L Slant-PRO" (page 12).

Operating the Automatic Collet Closer Kit for 15L Slant-PRO

WARNING! Operator Knowledge: You and all other operators must read and understand the 15L Slant-PRO™ operator manual before installing, using, or maintaining the machine.

NOTE: The Automatic Collet Closer Kit requires PathPilot® v2.0.2 or later. If you haven't yet done so, use PathPilot® v2.0 Upgrade (PN 38249) to upgrade your PathPilot® controller.

2.1 To Automatically Operate the Automatic Collet Closer Kit for 15L Slant-PRO

- Use G-code to program the collet closer to open and close:
 - M10 opens the collet closer.
 - M11 closes the collet closer.

2.2 To Manually Operate the Automatic Collet Closer Kit for 15L Slant-PRO

- From the PathPilot® interface, click **Collet Clamped** to toggle the button's green light on and off.

When the **Collet Clamped** button's green light is on, the collet is in the closed (clamped) position.

When the **Collet Clamped** button's green light is off, the collet is in the open (unclamped) position.



Figure 2-1: Example of the Collet Clamped button with the light on.

2.3 To Switch Between ID and OD Clamping

To switch between clamping the **inside** diameter and the **outside** diameter of a workpiece:

- From the PathPilot® interface, on the **Settings** tab, select either the **ID Clamping** or the **OD Clamping** option.

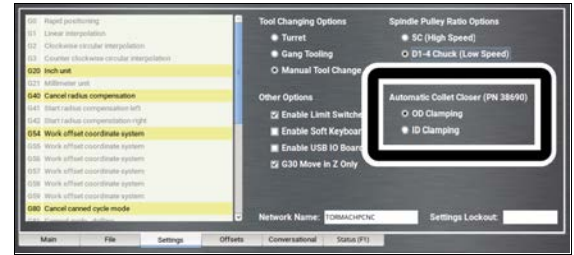


Figure 2-2: Example of the Automatic Collet Closer Kit clamping options.

2.4 To Change the Collet

1. From the PathPilot® interface, click **Collet Clamped** to toggle the button's light off.



Figure 2-3: Example of the Collet Clamped button with the light off.

The collet closer is now in the open position.

2. Loosen the thumb screw on the pneumatic cylinder assembly. Loosening the thumb screw allows the draw tube to rotate separately from the spindle so that you can thread a collet into the draw tube.
3. Make sure that a 5C insert is installed in the spindle, as shown in the following image.

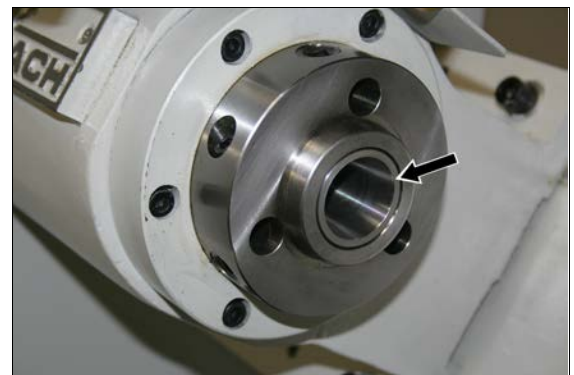


Figure 2-4: Example of a 5C insert installed in a spindle.

4. Install a collet into the 5C insert. You must rotate the collet until its groove aligns in the 5C insert.



Figure 2-5: Collet installed into the 5C insert.

5. Hold the collet with one hand and then, from the pneumatic cylinder, use your other hand to turn the draw tube handle.
6. Continue to thread the collet on the draw tube until it is completely threaded.
7. Tighten the thumb screw on the pneumatic cylinder assembly.
8. To prevent the draw tube from turning during operation, you must make sure that the thumb screw is engaged in the draw tube: Turn the draw tube handle counterclockwise until the thumb screw clicks into one of four slots on the draw tube.

The draw tube is now locked into place, and the collet is ready for the workpiece.

2.5 To Adjust the Holding Force

If needed, you can adjust the holding force using the pressure regulator:

- **Increase** the pressure to increase the holding force.
- **Decrease** the pressure to decrease the holding force.



NOTE: Refer to "Specifications" (below) for information on holding force limits.

We recommend you begin with **40 psi**, and then gradually increase the pressure until the part is sufficiently held.

2.5.1 Specifications

- **Maximum continuous RPM:** 3600 RPM
- **Maximum psi:** 100 psi

- **Pull force:** 1600 lb at 100 psi
- **Push force:** 600 lb at 100 psi

Pneumatic Schematic

