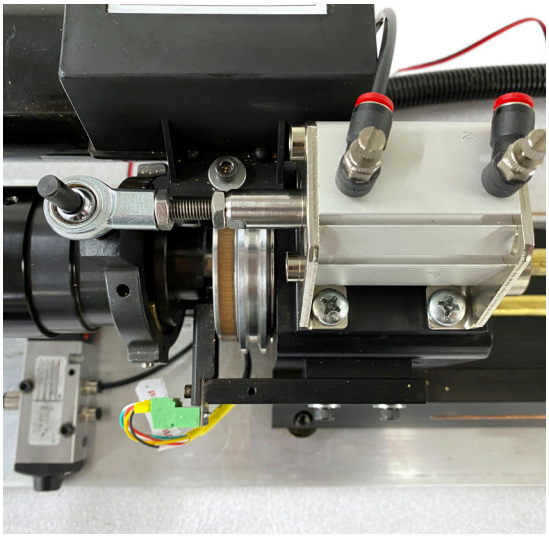


PLEASE REFER TO
Pneumatic Bar Feeder Assembly Instructions (P/N 8825)
for setting up the Pneumatic Bar Feeder Components

SHERLINE PRODUCTS
INCORPORATED 1974

Bar Feeder: Pneumatic Cylinder and Component Instructions

P/N 8815

This bar feeder is designed to work with our machines with our lever collet closer.

Table of Contents

Specifications

1. Air supply maximum is 80 PSI.
2. Air pressure for the air cylinder (P/N 88040) is 70 PSI, maximum. However, we recommend 40 PSI. This is controlled by the air supply.
3. Air pressure for the bar feeder is 20-30 PSI. This is controlled by the bar feeder air regulator (P/N 88054). **CAUTION: DO NOT EXCEED 30 PSI!**
4. Lubrication for the bar feeder tube and the lever collet closer. We recommend a light machine oil such as "3-in-1 Oil," or sewing machine oil.
5. Base dimensions: Our base (P/N 88323) is 6' x 8" x 3/4". If you are mounting the bar feeder on a different work surface, the surface must be at least 6' long.

Setting up the Pneumatic Cylinder and Components (P/N 8815) with the Lever Collet Closer (P/N 1150 or P/N 3025)

The following instructions cover the assembly of the pneumatic air cylinder and installation. If you have purchased a complete machine system, skip ahead to sections ***How the Lever Collet Closer Works*** (page 6), and ***Activating the Air Cylinder*** (page 9).

1. Lay out all of the parts to make sure that you have all of them (see Figure 1).

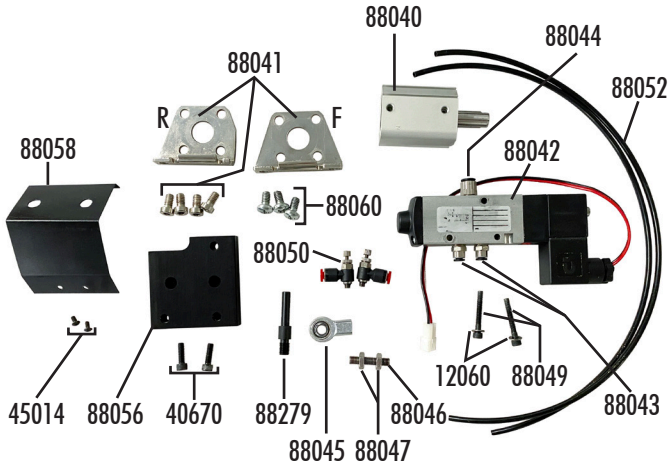


FIGURE 1—Parts list for the LCC pneumatic cylinder (P/N 8815). Includes a 6' length of the 5/32" (4 mm) air line. See page 11 for a detailed list.

2. Adjusting the lever collet closer and collet prior to installation of the pneumatic parts.
   A. Place a collet in the headstock.
   B. Place a piece of stock in the collet.
   C. Adjust the lever collet closer draw bar so the stock is still loose with the lever collet closer (hereafter defined as "LCC") in the "collet closed position."

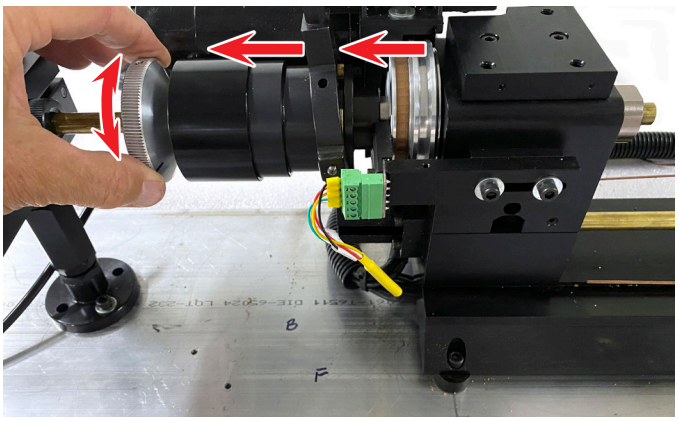


FIGURE 2

D. Close the collet down until it makes contact with the stock (with the LCC in the closed position).

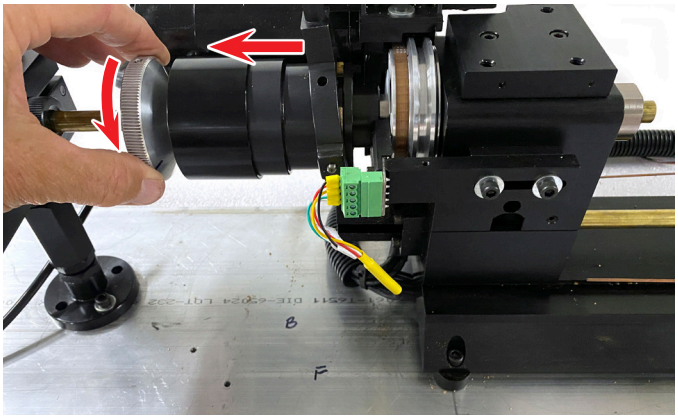


FIGURE 3

E. Open the LCC by pushing the engagement lever forward toward the headstock, so the collet is open.

F. Now, with the collet open, turn the draw bar knob (P/N 30018) clockwise (8) "clicks" (see Figure 4).

NOTE: There is a retention ball in the LCC that makes a clicking noise each time the draw bar knob is turned one increment.

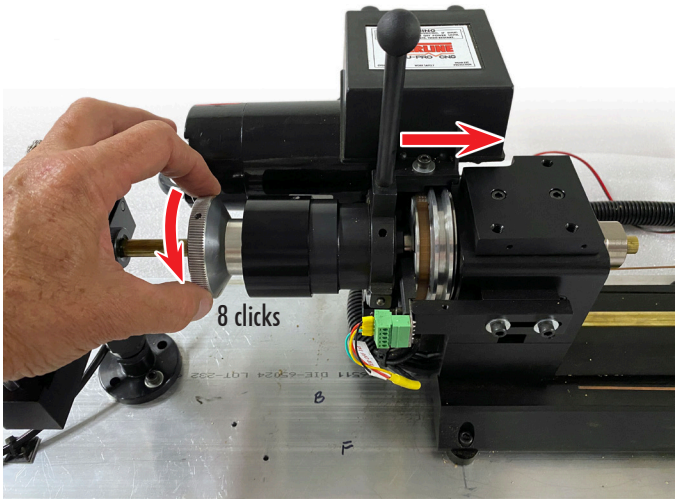


FIGURE 4

G. Now close the collet by pulling the engagement lever back. The stock should be held securely in the collet now and the engagement lever should be in the closed position. If not, open the collet, turn the draw bar knob (2) more clicks CW, and close the collet again until the collet closes securely on the stock.

3. Now you are ready to assemble the pneumatic components. Remove the engagement lever (P/N 11501) from the lever collet closer (see Figure 5).

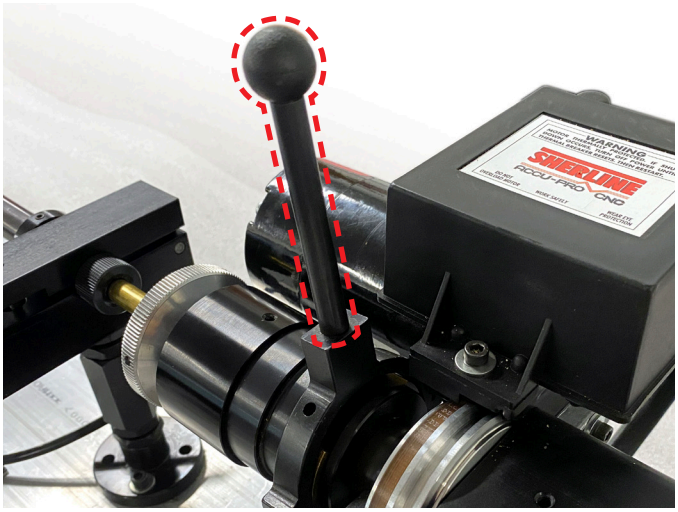


FIGURE 5

4. Insert the Lever Collet Closer "Stud" (P/N 88279) into the LCC "Yoke" in place of the engagement lever (see Figure 6). Use a drop of Loctite # 242 or # 262 on the threads and tighten the stud so it will not unthread when used.

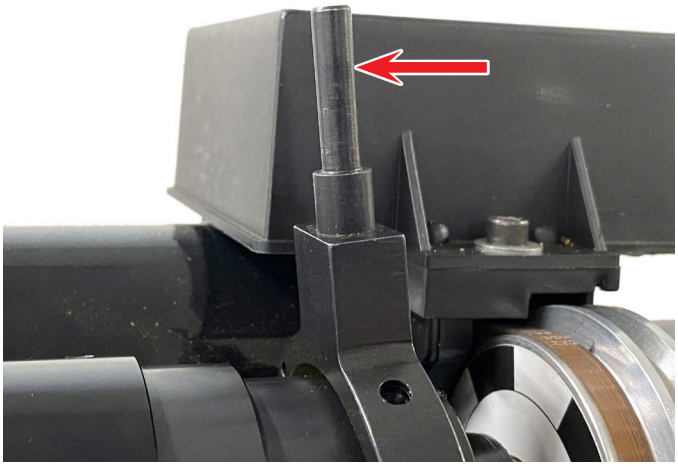


FIGURE 6—The red arrow is showing P/N 88279 installed onto the LCC yoke.

5. Installing the "Air Cylinder to Headstock Mounting Plate" (P/N 88056).

A. There are two existing 10-32 holes in the top of the 3C Headstock (see Figure 7).

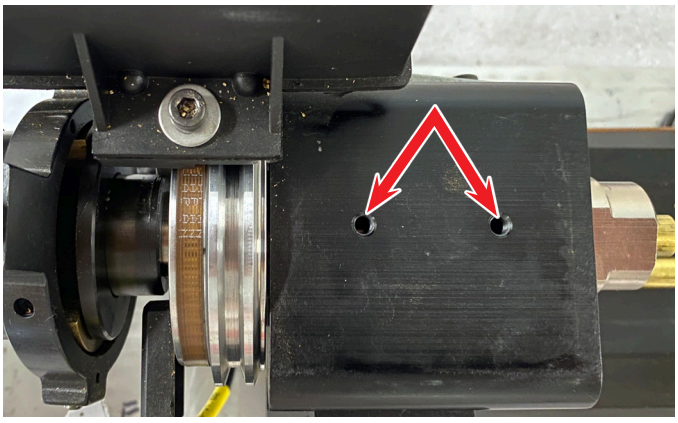


FIGURE 7

NOTE: If this is for an older machine that does not have these holes drilled and tapped, you will need to drill and tap them in the positions shown below on the print copy. The area where the holes will break through is an open cavity inside of the headstock, so there is no chance of any damage to the bearings or other parts (see Figure 8 and 9).

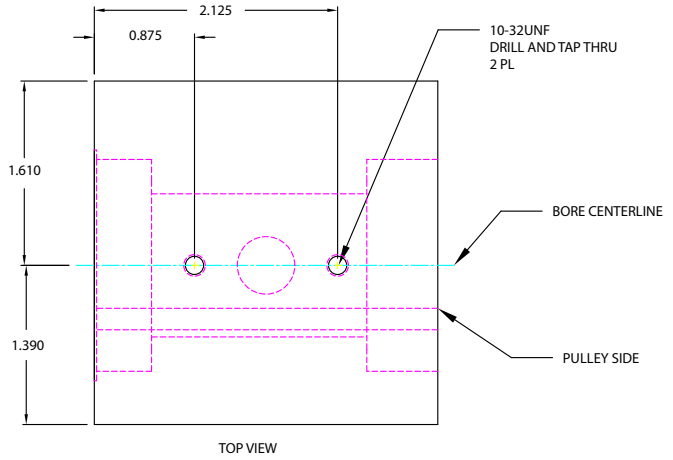


FIGURE 8—3C Headstock (P/N 40105).

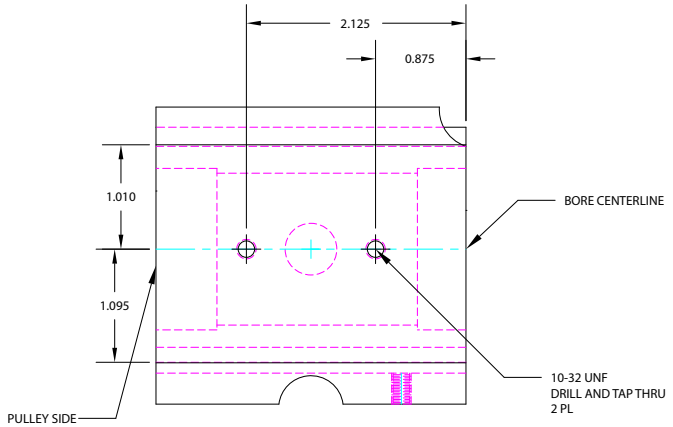


FIGURE 9—Standard Headstock (P/N 40100).

B. Use the (2) 10-32 x 1/2" SHCS (P/N 40670) to mount P/N 88056 to the top of the headstock as shown below (Note that the cut out must be toward the speed control unit. See Figure 10).

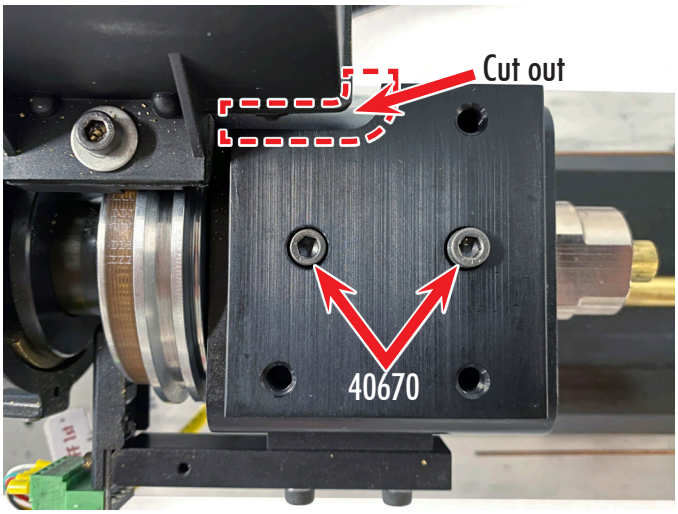


FIGURE 10

6. Air Cylinder "Foot Brackets" (P/N 88041). Note that the rear bracket has the side machined off to avoid interference with the speed control.

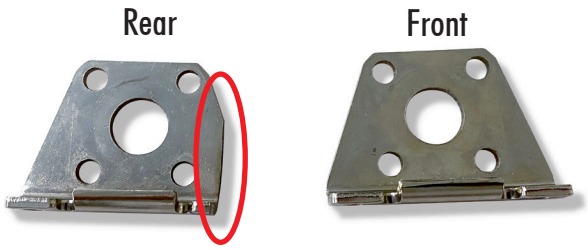


FIGURE 11

A. Air Cylinder (P/N 88040) orientation with foot brackets (see Figures 12-14).

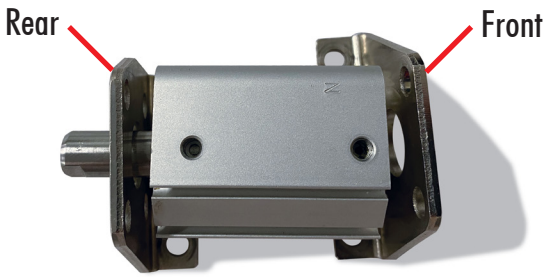


FIGURE 12—Top view.

FIGURE 13—Rear view.

FIGURE 14—Front view.

B. Loosely insert the (4) bracket screws (see Figures 15-16).

FIGURE 15—Back view.

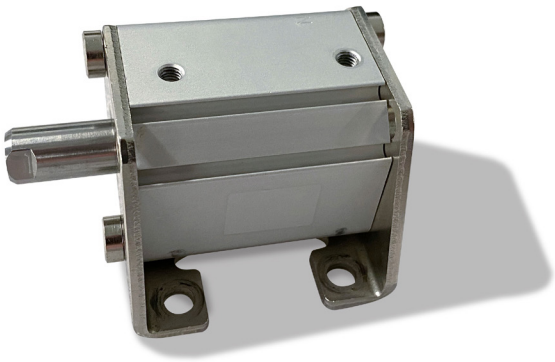


FIGURE 16—Side view.

C. Install the Air Cylinder/Bracket assembly on top of the mounting plate (P/N 88056).

D. Insert the (3) 1/4-20 Phillips head screws (P/N 88060) and tighten them only finger tight to the mounting plate (see Figure 17).

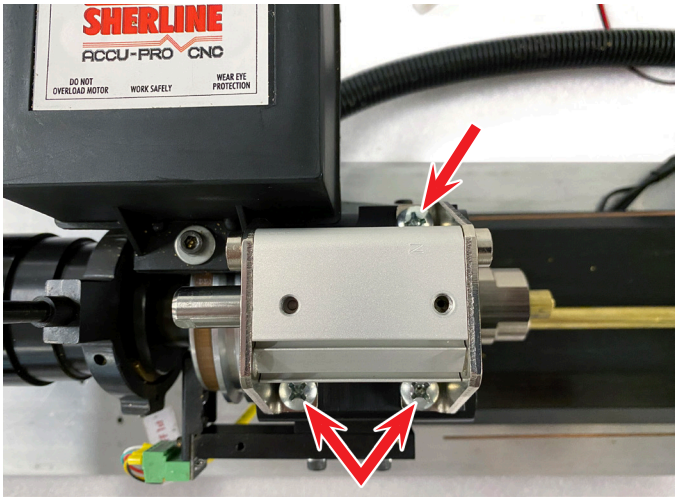


FIGURE 17

E. With the assembly mounted to the mounting plate, remove one of the "bracket-to-air-cylinder" screws at a time. Apply "Removable" Loctite to the threads. Then insert the screw and tighten it. Do this to one screw a time until all of them are tight (see Figures 18 and 19).

FIGURE 18—Adding removeable Loctite to the screw threads.

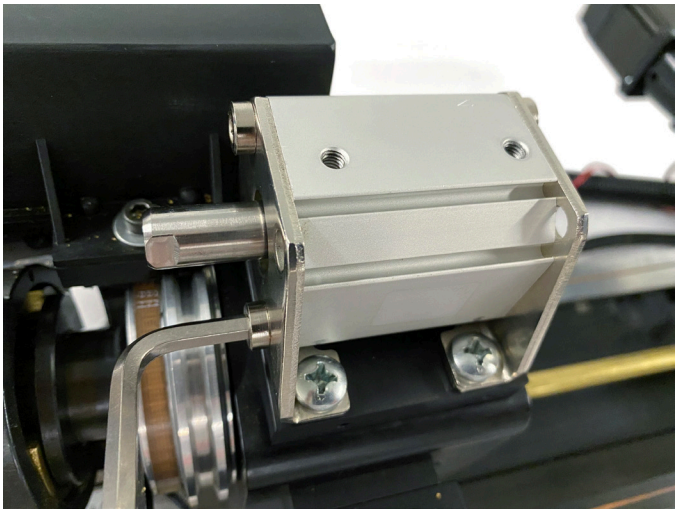


FIGURE 19

F. Now remove the (3) mounting screws (P/N 88060) and pull the assembly off.

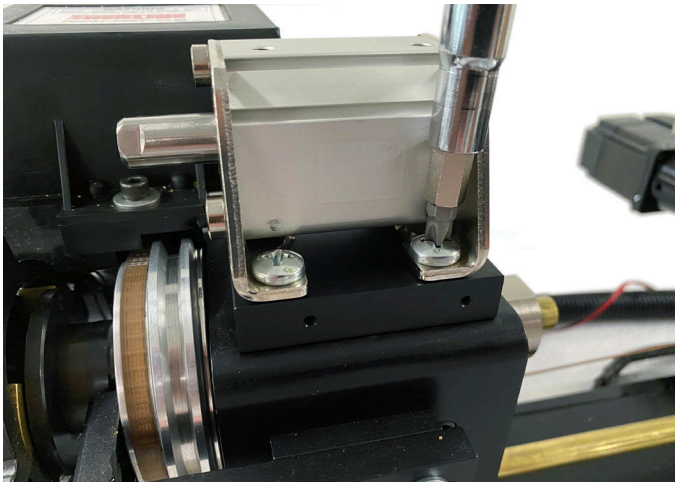


FIGURE 20

7. Assembly of the heim joint (P/N 88045), 1/4-28 SS threaded rod (P/N 88046), & the jam nuts (P/N 88047).

   A. Thread the jam nuts onto the threaded rod about (10) full turns from each end so there is about .28" (7 mm) of thread exposed on each end of the threaded rod.

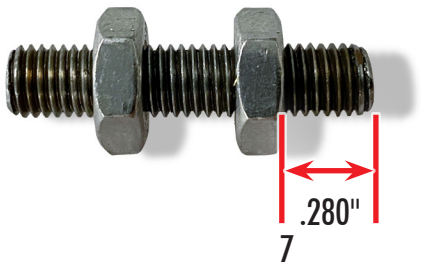


FIGURE 21

   B. Pull the air cylinder shaft out until fully extended.

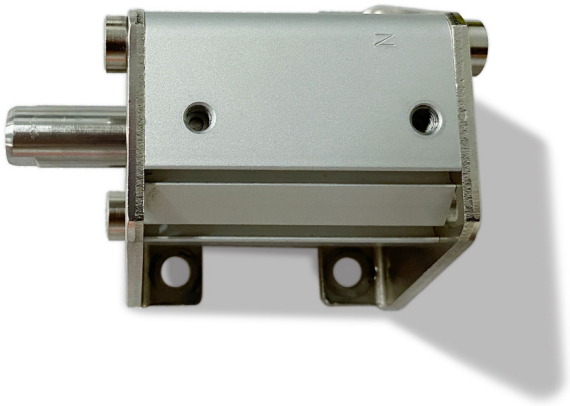


FIGURE 22

   C. Thread P/N 88046 into the cylinder shaft 4-6 turns.

   D. Thread the heim joint (P/N 88045) onto the other end of P/N 88046, 4-6 turns.

      The distance from the end of the air cylinder shaft to the center hole of the heim joint should be approximately 1.65" (42 mm) (see Figure 23).

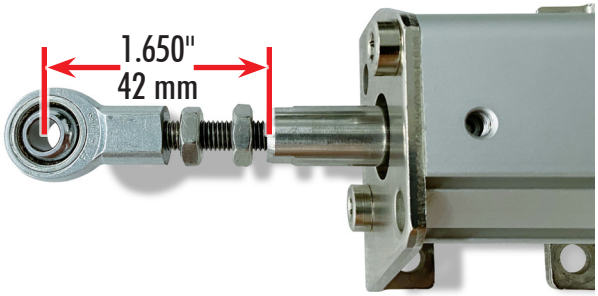


FIGURE 23

   E. Before assembling the air cylinder to the top of the headstock, move the LCC yoke (P/N 11522C) back and forth while it is in the “collet closed” position to see how much movement there is when the yoke shoes are in the “closed neutral” position.

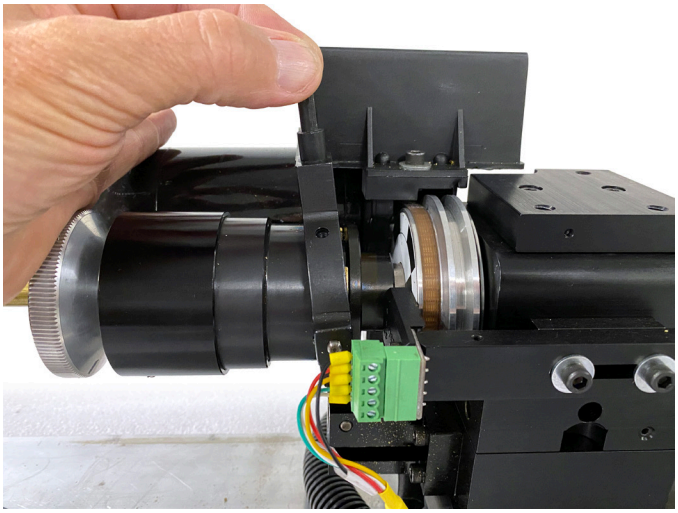


FIGURE 24

   F. Locate the air cylinder assembly over the headstock mounting plate. Lower it down so the LCC “Stud” (P/N 88279) is inside the 1/4" hole of the heim joint. Then lower the assembly all the way down onto the mounting plate and check the bracket hole alignment with the threaded holes in the mounting plate (see Figure 25).

      If they are not aligning, remove the assembly and adjust the length of the heim joint assembly.

NOTE: each full turn of the heim joint or the threaded rod will change the overall length of the assembly by .036" (.9 mm).

FIGURE 25

G. Once the heim joint assembly length has been adjusted, place the (3) mounting screws (P/N 88060) into the holes in the mounting bracket. Then lower the assembly back onto the headstock mounting plate and the LCC stud (see Figure 26).

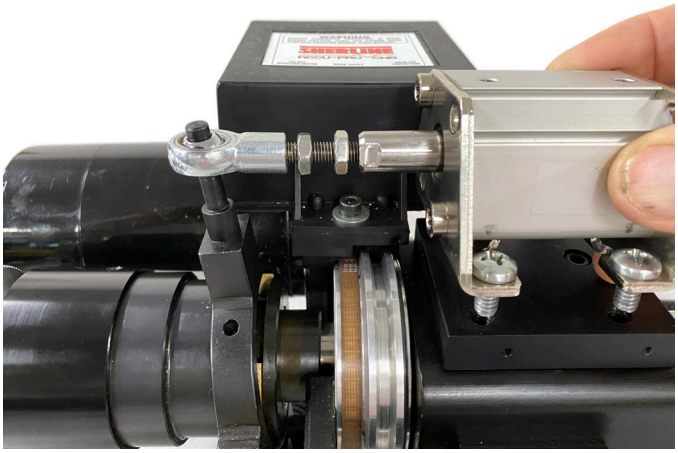


FIGURE 26

H. Hold the air cylinder assembly above the mounting plate in order to start threading in each of the mounting screws (P/N 88060). Get all three of the screws started first. If all is good, tighten the three mounting screws. (**NOTE:** if the alignment is correct, these screws should thread in without any resistance.)

How the Lever Collet Closer Works

Before we continue, we need to explain how the locking mechanics of the lever collet closer works when the yoke and shoes are in the collet closed position.

The way the LCC is designed, the locking balls and thrust collars inside of the LCC are activated when the yoke assembly (P/N 11522C) pushes the LCC cam (P/N 11514C) back (away from the headstock). As the cam engages with the ball assembly, it both closes the collet and locks the LCC in the closed position. The actual lock effect happens before the yoke and shoes move to their full travel point. This allows the shoes, which are held in the yoke to settle into a "neutral clamping area," to float free within the outer groove of the cam. This design allows the spindle and LCC to rotate without having any shoe contact with either side of the outer groove of the cam.

I. Why the heim joint assembly length is "Critical!"

i. If the heim joint assembly length is too long, when the air cylinder is extended out to the full length of travel, the LCC yoke and shoes will be forced beyond the "neutral clamping area" described above. This will cause the shoes (P/N 11518C) to be forced against the back side of the cam groove. This will cause the shoes to act as brakes on the LCC and spindle. Any time the shoes make contact with the side of the cam groove there will be friction between the two parts. Light to medium pressure of the shoes will generate heat and make the LCC very hot. This excessive heat will damage the LCC and cause additional strain on the DC motor. Excessive force, will stop the LCC and spindle from turning at all.

ii. As the yoke and shoes push the cam back toward the end of travel when you close the collet, you will hear a slight clicking noise before the full travel distance is complete. That clicking noise is the position where the collet is fully closed and the LCC is locked.

iii. You want to have your heim joint length set so that when the air cylinder piston is fully extended the yoke and shoes are past the collet closed area, and resting in the "neutral clamping area" where the shoes are not rubbing on either side of the outer cam groove.

J. Once the heim joint assembly length is correct, retighten the three bracket mounting screws (P/N 88060).

i. With the mounting screws tight, push the yoke forward to the "collet open position."

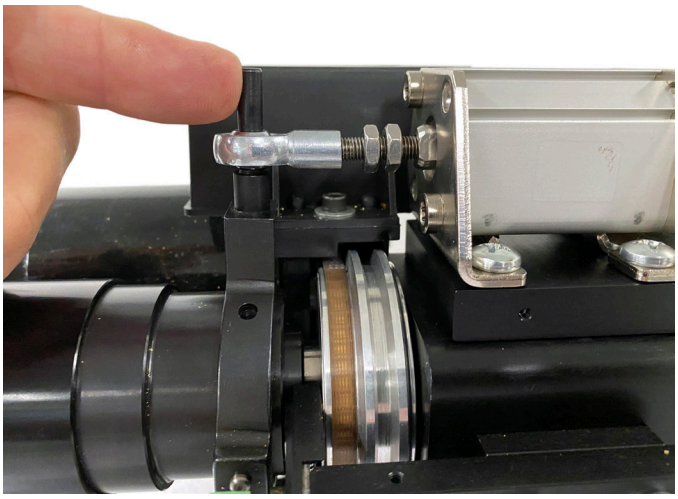


FIGURE 27

ii. Then pull it back to the "collet closed positions" with the air cylinder piston fully extended (see Figue 28).

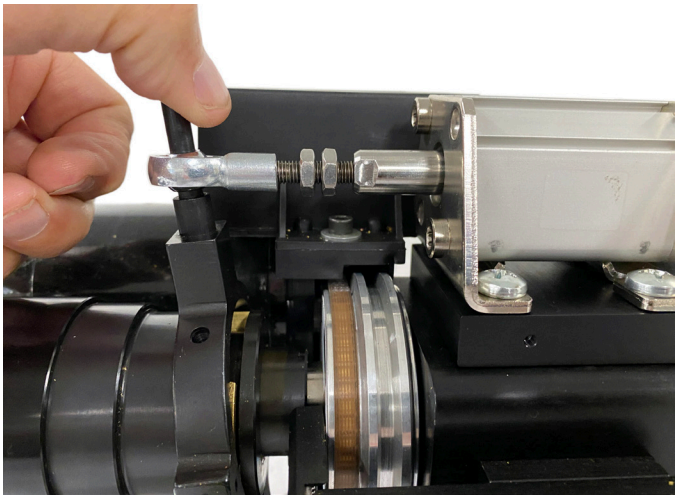


FIGURE 28

iii. With the yoke in this position, the shoes should be in the neutral position inside the cam groove. If not, adjust the length of the heim joint assembly.

K. The heim joint assembly length can be changed with the air cylinder assembly in place. There is no need to remove it.

i. The wrench sizes for the heim joint assembly are as follows:

Jam nut (P/N 88047) = 7/16" (11.11 mm)

Heim Joint (P/N 88045) = 3/8" (9.53 mm)

Flats on air cylinder piston = .390" (10 mm)

iii. Tighten the jam nut on the heim joint by holding the heim joint in place with a 3/8" wrench, while the heim joint flats are parallel to the base. Then tighten the jam nut against the heim joint (see Figure 29).

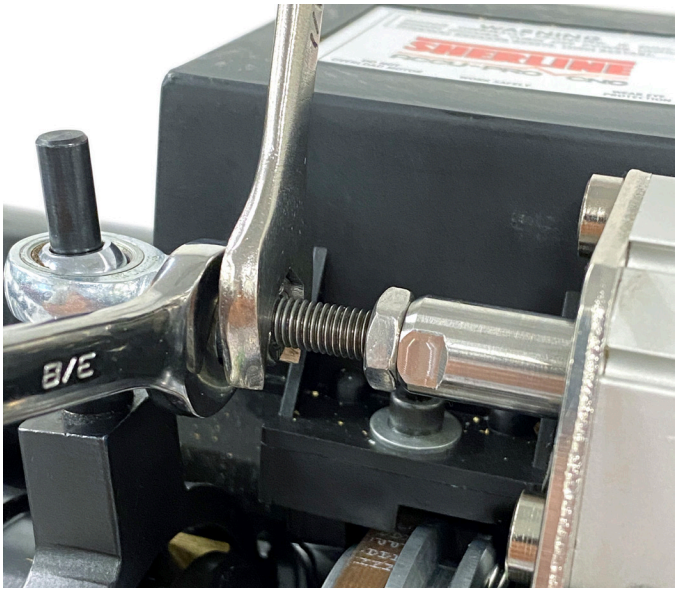


FIGURE 29

iii. Now, with the jam nut loose on the piston side, hold the heim joint in the correct orientation with the 3/8" wrench. Then turn the air cylinder piston CW or CCW to either decrease or increase the length of the heim joint assembly (see Figure 30).

HELPFUL NOTE: The threaded rod is a 1/4-28 thread. Therefore, each full turn of the heim joint or the air cylinder piston will result in a length change of .036"(.90 mm).

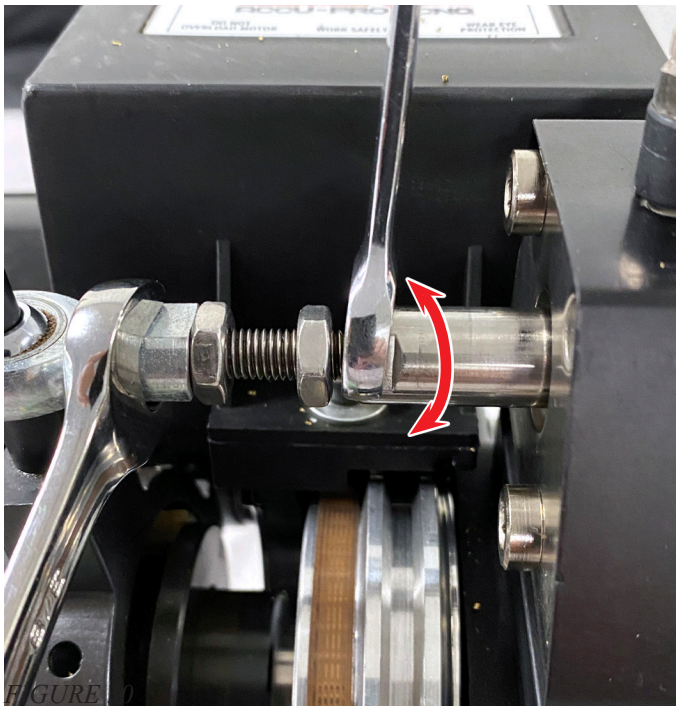


FIGURE 30

Then tighten the jam nut to the air cylinder piston, again, with the heim joint orientation correct (see Figure 31).

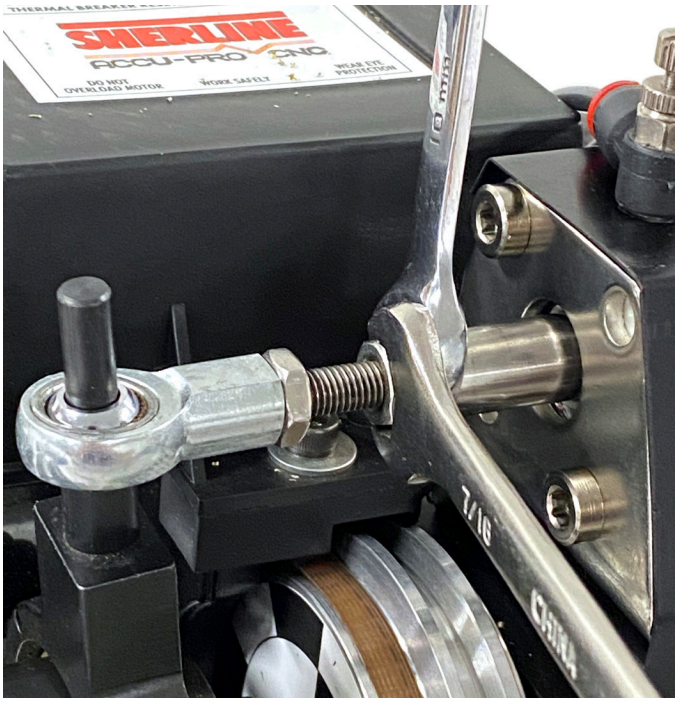


FIGURE 31

8. Air Directional Control Valve (P/N 88042).

   A. Mount the control valve assembly, as shown, onto the base using the (2) 8-32 x 1-1/4" SHCS (P/N 88049) along with the #8 washers (P/N 12060, see Figure 32).

      NOTE: The actual location of the mounting holes in the base may change, or you can change it to fit your needs.

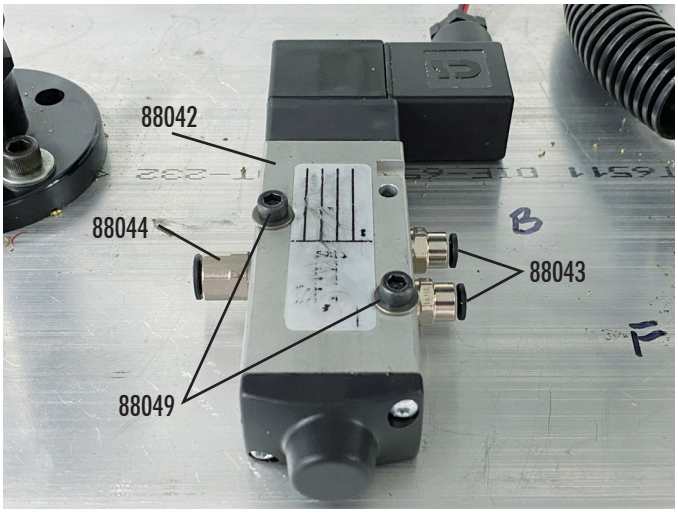


FIGURE 32

   B. Mount the control valve with the 1/4" push connector fitting (P/N 88044) toward the rear, and the two 5/32" connectors (P/N 88043) toward the machine.

      The 1/4" is incoming air into the control valve. The two 5/32" are outgoing air to the air cylinder.

   C. Don't cut the 5/32" air lines to length until the control valve is mounted. Cut the 5/32" air line with some extra length.

9. Connecting the air supply from the control valve (P/N 88042) to the air cylinder (P/N 88040).

   A. Connect the incoming air to the control valve using the 6' length of 5/32" (4 mm) air line (P/N 88052).

   B. Install the (2) flow controls (P/N 88050) into the two threaded holes on the top of the air cylinder with the air line ports to the backside of the headstock. These fittings have a small O-ring above the threads to avoid air leaks. Thread them in "finger tight" using the hex nut (not the knurled screw on top). The knurled screw on top is an air regulating screw for the amount of air flow. To adjust the air flow screw, thread it down all the way. Then turn it back out 4 or 5 full turns. Then lock it in place with the knurled lock nut (see Figure 33)

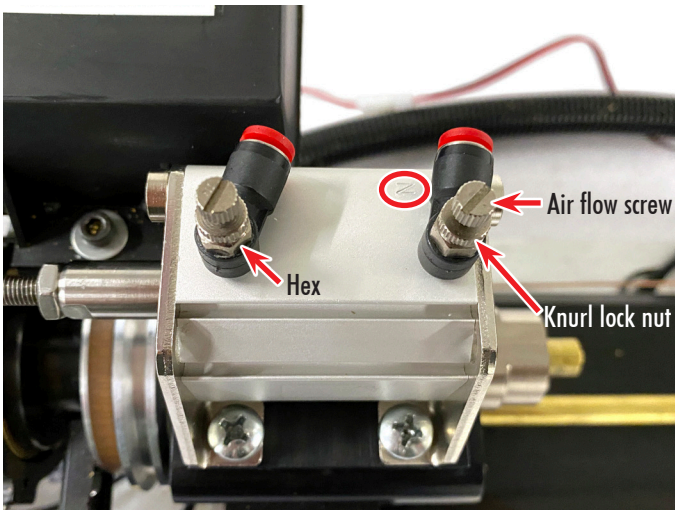


*FIGURE 33—***NOTE:** *There is an (N) stamped near the air access hole on the top of the air cylinder (shown in the red oval). The air line from the connection marked "F" in the following pictures, goes to the flow control at (N) on the air cylinder above.*

   C. Connect the first 5/32" air line from the outgoing control valve marked with "B" in the picture to the rear flow control on the air cylinder (see Figures 34 and 35).

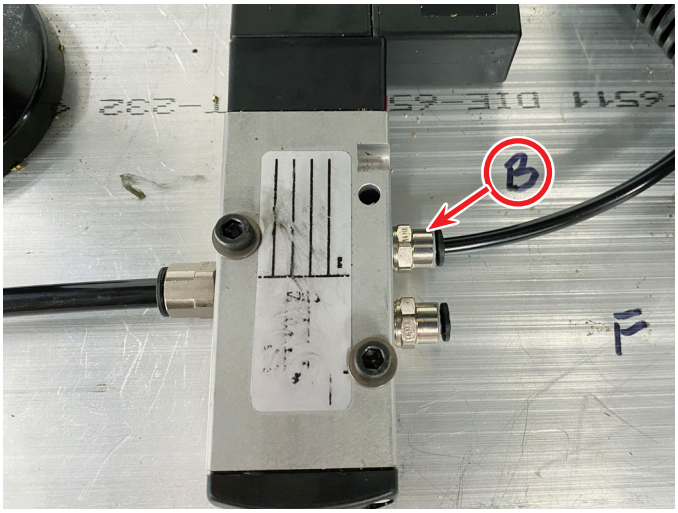


FIGURE 34

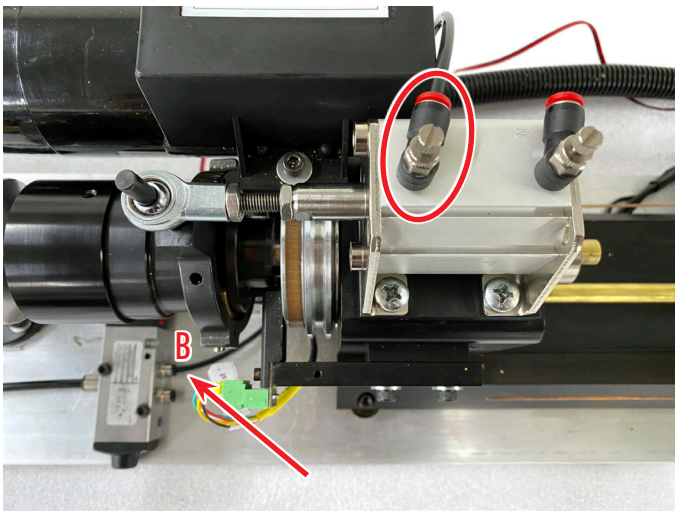


FIGURE 35

D. Connect the second 5/32" air line from the outgoing control valve marked “F” in the picture to the flow control with the (N) stamp on the air cylinder (see Figure 36).

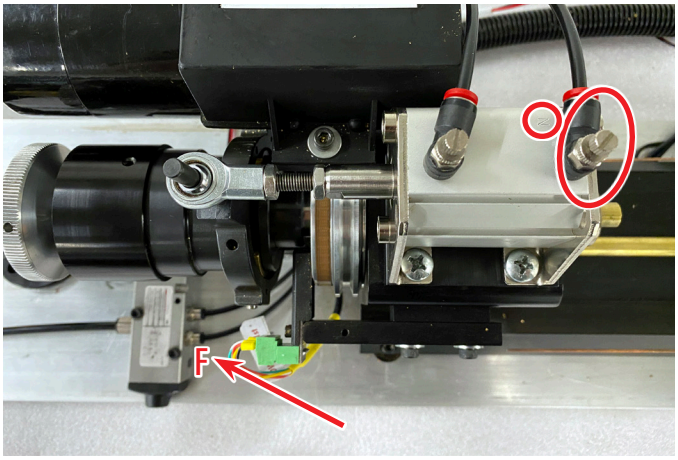


FIGURE 36

Activating the Air Cylinder (P/N 88040)

NOTE: The following instructions are for use with the MASSO control. If you are installing this system and using a different control, the process is the same. However, the connections to your control and your choice of M-codes to use in order to open and close the collet will be dictated by you and your control settings.

1. With air connected to the control valve (40 PSI Max), and the air connected from the control valve to the air cylinder, we are ready to check the system.
2. Activate “Clamp/Unclamp” to check the stroke and alignment of the air cylinder.

   With the MASSO control, we are using the M-codes M10 for “Clamp” (collet closed), and M11 “Unclamp” (for collet open).
3. First go to the F1 Setup screen on the MASSO control and make sure that “Output 13 is set to “Chuck Clamp M10/M11” (see Figure 37).

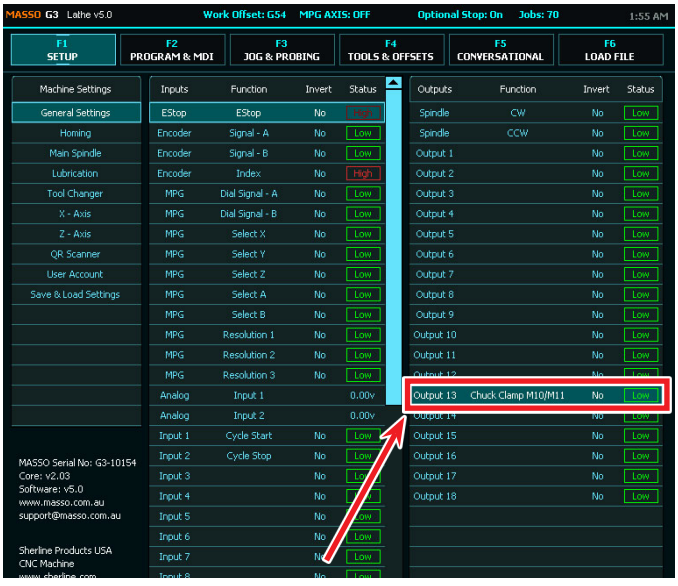


FIGURE 37—The red arrow is pointing to line Output 13.

4. Go to the F2 Program MDI screen. Click on “MDI CRTL+M” to open the MDI Command page (see Figure 38).

FIGURE 38—The MDI control page.

5. At this time the air cylinder piston should be fully extended (Clamp/Collet Closed).
6. On the MDI Command page enter “M11” to unclamp (collet open).
7. The air cylinder should be activated and the cylinder piston should retract (collet open, see Figure 39).

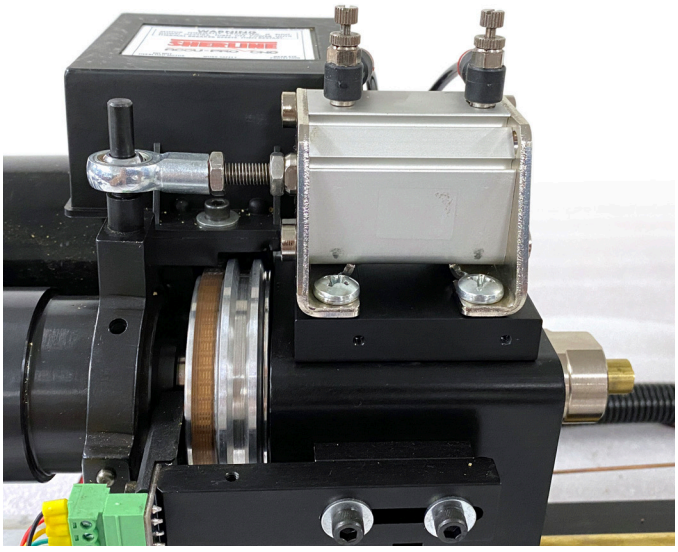


FIGURE 39

8. Now enter “M10” (collet closed). The air cylinder piston should be fully extended and the collet closed (see Figure 40).

FIGURE 40

NOTE: At this time, if the heim joint assembly length is correct:

9. The collet should be closed with adequate force to clamp the stock.
10. The yoke and shoes of the LCC should be in the neutral clamping position inside the cam groove, and the shoes should not be making contact with the side of the cam groove.
11. At this time, turn the LCC body by hand. It should turn freely if the shoes are in the correct position (see Figure 41).

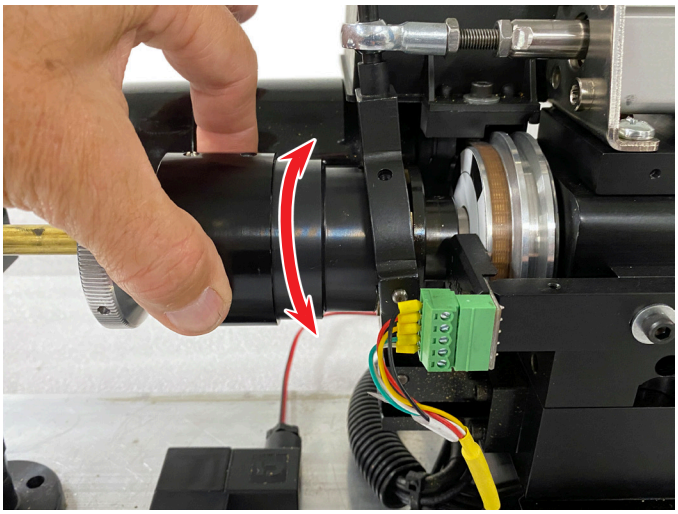


FIGURE 41

12. If the LCC body turns freely, the length of the heim joint assembly along with the max stroke of the air cylinder piston are correct.
13. If the LCC body does not turn, the stroke length is too long and the shoes are pushing against the back side of the cam groove. Go back to the previous steps and shorten the heim joint assembly length.

IMPORTANT NOTES:

A. We recommend tightening the LCC draw bar knob (8) clicks after the collet has closed down on the stock (with the LCC in the “collet closed position”). See #2 at the beginning of these instructions.

B. If you tighten the draw bar knob too much, it will be physically impossible for the air cylinder (or manually) to close the collet with the LCC Yoke. This holds true for any collet closer on any machine.

C. If your draw bar tension is too high, the air cylinder will push the yoke as far as it can, but it will not be able to apply the adequate force needed to fully close the collet and then move into the neutral area. This scenario will result in having the shoes pressed hard against the back side of the cam groove. This will either impede the spindle motion or not allow the spindle to turn at all. In this case, you will need to open the collet and reduce the draw bar knob tension (turn the draw bar knob CCW a few clicks).

Installing the Air Cylinder Cover (P/N 88058)

1. At this time we suggest leaving the cover off until you have used the system for a while. Any fine adjustments that may be needed, will be easier to make with the cover off.
2. Once you are satisfied with the adjustments that you have made, install the cover with the following steps.

A. Disconnect the incoming air lines from the (2) flow controls (P/N 88050).

B. Mark the air lines so you can connect them to the correct flow control.

C. Unthread both of the flow controls (P/N 88050) from the headstock.

D. Place the cover over the headstock and air cylinder. Align the flow control holes on top and the side holes on the front (see Figure 42).

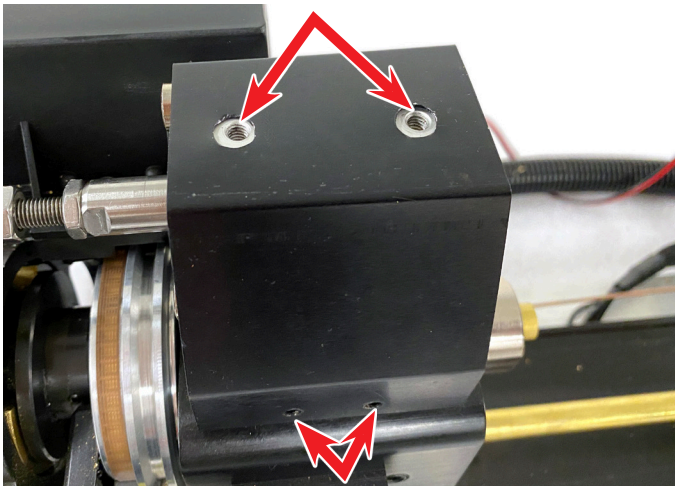


FIGURE 42

E. Thread the flow controls back in (finger tight).

F. Thread the two 5-40 x 3/8" button head screws (P/N 45014) into the front.

G. Once all of the threads have been started, tighten the two flow controls on top (tight, but not too tight or you will damage the O-rings). Then tighten the 8-32 screws on the front of the cover.

H. Reconnect the two air lines ("F" line from the control valve goes to the front flow control).

You should be ready to start using your pneumatic collet closer.

Programming Note

When using the pneumatic cylinder with our lever collet closer, the spindle must come to a complete stop before the lever collet closer is opened. Using a dwell code in your program after the "M05" (spindle stop) command is given will allow the spindle to come to a complete stop before the lever collet closer opens. The problem that occurs when the LCC opens while the spindle is winding down to a complete stop is the LCC shoes will act as a break and stop the LCC from turning. However, the LCC draw bar knob still has Clockwise Inertia as it winds down and it will rotate one increment each time the LCC is stopped. This incremental rotation is actually increasing the closing force on the collet and making it harder for the LCC to move into the neutral closed position. The drawbar knob will continue to increase the clamping pressure until it reaches a point where the LCC yolk cannot close the collet. At this point the LCC shoes will act as a break and will not allow the LCC to turn when the motor turns on.

TIP: If you insert the M05 before the machine moves to a clearance position, the spindle will have time to slow down while the machine is moving to the position. This will allow you to have a shorter dwell time at the end of the move, prior to opening the collet.

Example code:

M05 (Spindle stop)

G90 G00 X1.0 Z3.0 (Move to clearance position)

G04 P2000 (Dwell of 2 seconds)

M11 (Collet open)

Maintenance Tips

1. Check the temperature of the LCC periodically and after collet changes. The LCC will get warm, but it SHOULD NOT GET HOT. If it gets hot, check the shoe position when the collet is closed and adjust it if necessary.
2. Add a couple drops of 3-in-one oil, or light sewing machine oil to the oiler hole on the yoke. This is where you oil the shoes on the LCC (see Figure 43).

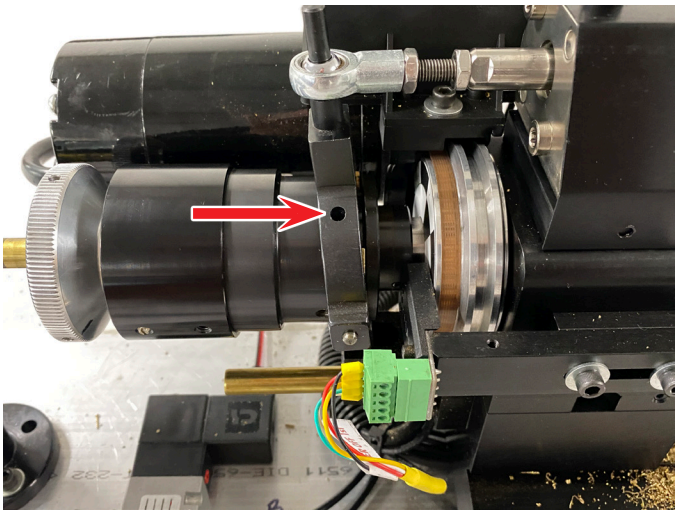
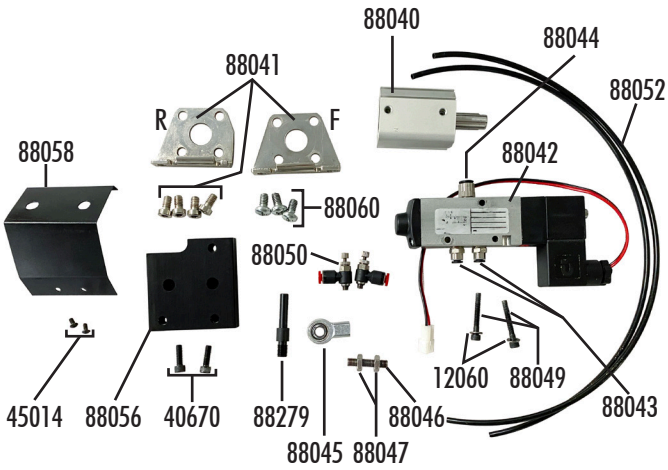


FIGURE 43—The red arrow shows the location of the oiler hole on the LCC yoke.

Thank you,
Sherline Products Inc.



LCC Pneumatic Cylinder Parts List (P/N 8815)

NO. REQ.	PART NO.	DESCRIPTION
2	12060	#8 Washer
2	40670	10-32 x 1/2" SHCS
2	45014	5-40 x 3/8" Button Head socket cap screw
1	88040	Air cylinder
1	88041	Air cylinder foot brackets (R & F) w/4 SS SHCS
1	88042	Air directional control valve
2	88043	5/32" Connector fitting
1	88044	1/4" Connector fitting
1	88045	Heim joint
1	88046	1/4-28 SS threaded rod
2	88047	1/4-28 Jam nut
2	88049	8-32 x 1-1/4" SHCS
2	88050	Flow control valve
2	88052	5/32" (4 mm) air line (6' length)
1	88056	Air cylinder mounting plate
1	88058	Air cylinder cover
3	88060	1/4-20 Phillips head screw
1	88279	LCC Stud