



Automatic Power Drawbar Assembly

Operating Instructions Manual



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Drawbar Data

Use this to fill out information about your drawbar for quick reference.

Purchase Date: _____ - _____ - _____

Purchase Order: _____

Purchased From: _____

Delivery Date: _____

Serial No.: _____

Note:

Make sure to register your warranty online at kurtworkholding.com

Introduction

Thank you for purchasing a Kurt Power Drawbar tool-changer. They are adaptable to most manual and CNC mills that have standard collet holders. This product will last for many years when used and maintained properly. The Kurt Power drawbar units are backed by a limited one year warranty

NOTE:

If you have purchased an Automatic Drawbar assembly that has a premade drawbar, continue to page 4 for the installation instructions.

If you have purchased an Automatic Drawbar assembly that has a “Do It Yourself” drawbar kit in it, please refer to page 13 for instructions on how to make the drawbar using the kit.

INSTALLATION

Prior to installation, make sure that:

- Power source to machine has been turned off and locked out
- The quill or spindle is locked in the fully retracted position
- Air supply to the machine is at least 90 PSI
- Air line is free of moisture
- No parts are missing (review Bill of Material)

Installing the Drawbar

1. Remove the existing drawbar from the machine. Some machines use a hardened washer under the head of the drawbar. If the machine has one, remove this hardened washer and keep it. It will be used later.
2. Lay the existing drawbar next to the new drawbar. They should both be the same length from the shoulder where the hardened washer rests to the end of the threaded rod. The length of the upper body may vary depending on whether or not risers are used for your application.
Note: If installing a unit with a "Do It Yourself" drawbar rod, see the instructions on page 13 for making the drawbar rod.
3. Apply molybdenum disulfide grease found in the hardware package (white tube) to threads, spline, and area where washer will sit.
4. Install drawbar into machine. Remember to install the hardened washer back onto the drawbar if it was removed in step 1.
5. At the top of the machine, where the drawbar was inserted into the machine, is the machine bearing plate. The spline of the new drawbar should be protruding just above the bearing plate 1.000 +.000/-.050. The shoulder just below the spline should be .050 to .100 below the top of the bearing plate. If it is short, double-check to make sure the quill is locked in the fully retracted position. (see FIGURE 1)
Note: In some cases, risers are used to raise the power head assembly above the machine bearing plate. See information on page 12 for information about installing with risers.
6. Insert a tool holder into the spindle and hand tighten. This will be a check to see if the drawbar is too long or too short. If the drawbar is too long, the tool holder will not fully seat. To check for proper thread engagement, count the number of turns it takes to seat the tool after the thread is first engaged. In most cases, this will be approximately 8-13 turns.

NORMAL SETUP CONFIGURATION

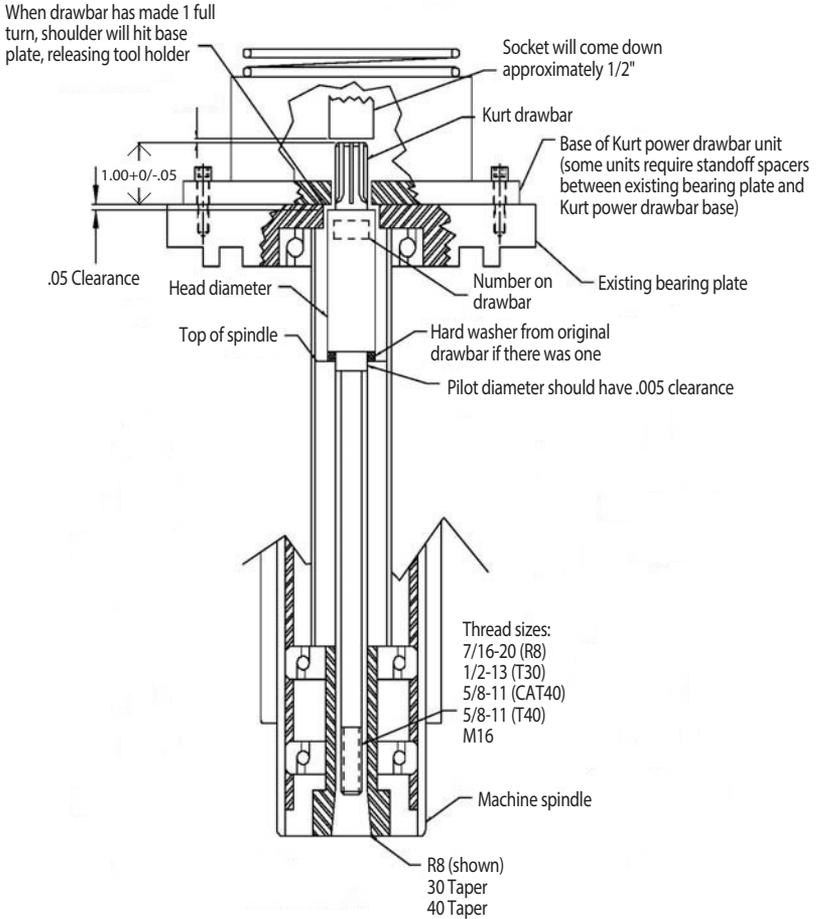


Figure 1

Installing the Power Head Assembly

1. A tool holder should be in the spindle, hand tightened from step 6. This allows the drawbar to center itself in the spindle.
2. Place the pneumatic motor assembly on top of the bearing plate of the machine. Make sure that the air regulator on the motor is facing the operator. Check to make sure that the regulator on the motor is full open, which is (8) on the dial.
Note: Some installations will require drilling and tapping 1/4"-20 holes in the bearing plate. See page 12 for riser installation.
3. Align the mounting slots in the base of the assembly with the existing threaded holes in the bearing plate of the machine. Install the (3) 1/4"-20 X 3/4" or M6 X 20mm with lock washers. Snug bolts lightly by hand.
Note: Some installations will require drilling and tapping 1/4"-20 holes in the bearing plate.
4. Push down lightly on the motor until it engages with the spline of the drawbar. Engage and disengage the motor several times to make sure the unit goes up and down freely. Then, hold down on the motor and tighten the (3) 1/4" or M6 bolts around the base. Check again after tightening to make sure operation is still free.

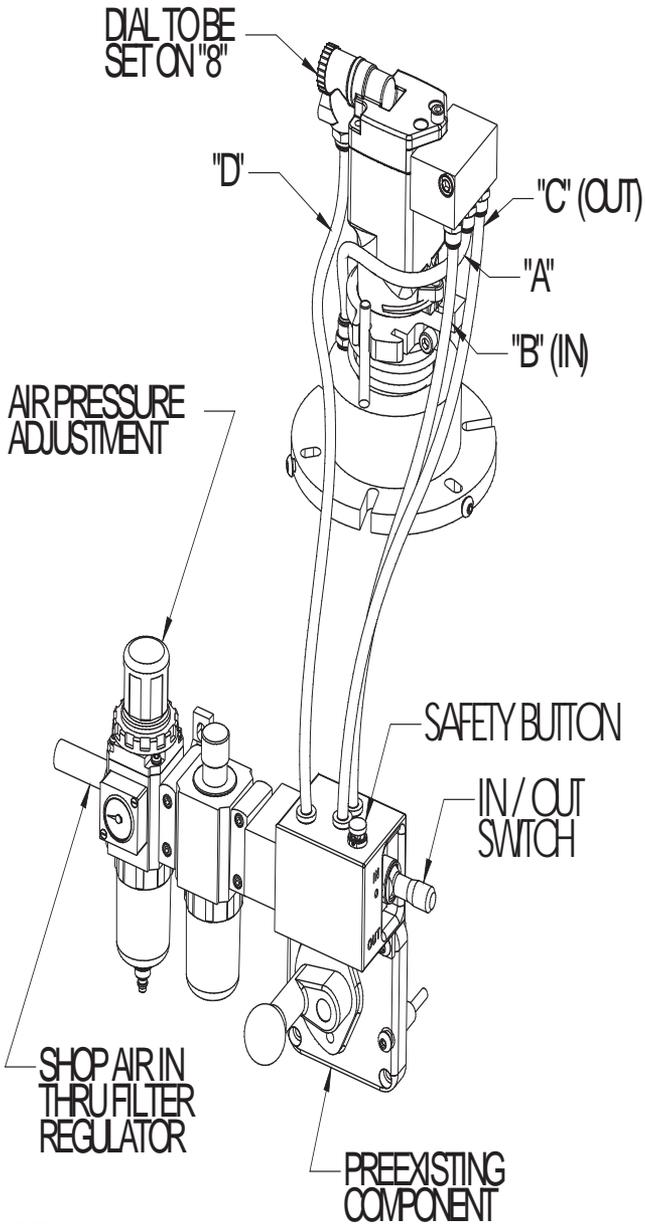
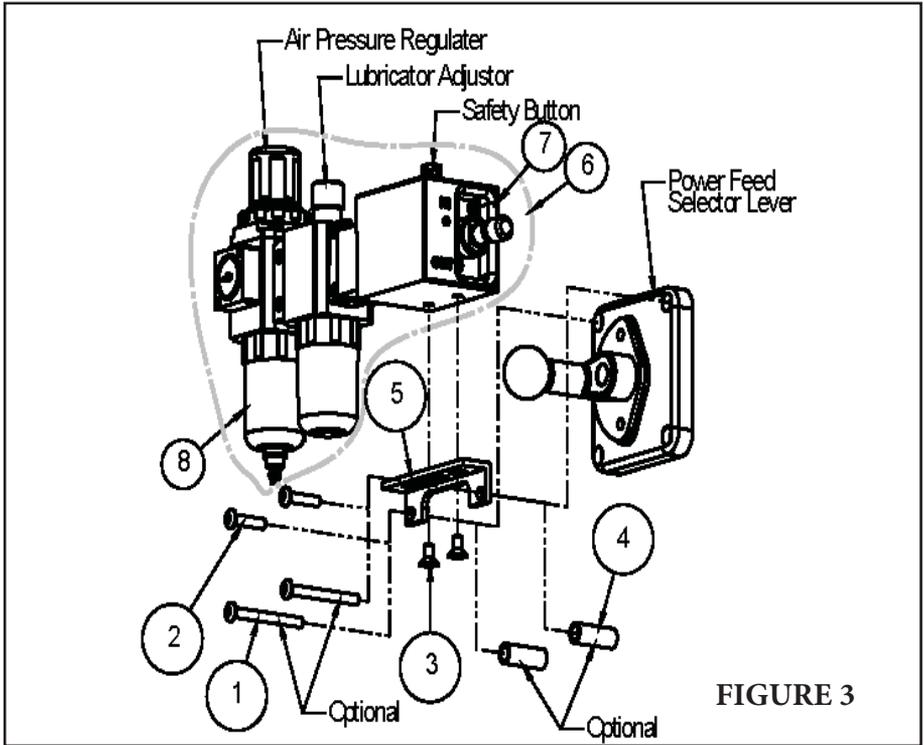


FIGURE 2

Installing the IN-OUT Safety switch

1. Attach the mounting bracket to the bottom of the IN-OUT Safety switch using (2) #10-32 X 3/8 flat head cap screws.
2. Mount the IN/OUT safety switch with attached FRL (filter/regulator lubricator) to your machine. In most cases, this would be on the left-hand side of the machine where the power feed selector lever is located.
 - Remove the (2) upper SHCS from the power-feed selector cover on your machine. Install (2) #10-24 x 7/8 or M5X 20mm BHCS through the mounting bracket, feed selector cover, and into the machine.
 - On some machines, it may be necessary to space the IN/OUT safety switch away from the machine. Included in the hardware kit are (2) optional 1.00" spacers and (2) #10-24 X 1-7/8" or M5 x 45mm BHCS. (see FIGURE 3)
3. Hook up the air lines from the switch to the air motor and from the FRL as required. (see FIGURE 2)
4. Fill the oil sight glass on the FRL with the air tool oil provided in the kit. **Note:** Only air tool oil should be used in the FRL.
5. The collet drive pin in the R8 spindle or drive keys on 30 and 40 taper spindles must be in place. This prevents the tool from turning during the "IN" and "OUT" operation. **Caution:** Serious injury could occur if the tool is allowed to rotate while being held.
6. Before hooking up the air supply to the machine, make sure it is free of condensation. Also, make sure the air supply to the machine is at 90 PSI. During a tool change, the air pressure must not drop below 80 PSI.
7. Connect the FRL to the air supply (fitting not included) and turn up to no less than 90-PSI on the gage. Close the oil supply knob completely. While cycling the unit, slowly open the supply knob until there is 1-2 drops of oil per every 5 to 10 tool change cycles. **Note:** One cycle is equal to a tool in and out one time.
8. When the power drawbar unit is functioning properly, install the top cover onto the air motor assembly. Tighten the three button head cap screws on the lower part of the cover. The unit is now ready for use.
9. Turn the main power back on for the machine.

Power Drawbar Pneumatic Switch Assembly



Automatic Power Drawbar Pneumatic Switch Assembly Parts List

ITEM#	PART#	DESCRIPTION	QTY.
1	03-0132	SBHCS 10-24 x 1.875 LG	2
2	03-0123	SBHCS 10-24 x .875 LG	2
3	03-0021	FHCS 10-32 x .375 LG	2
4	398-03	Spacer	2
5	309-00	Mounting Bracket	1
6	102-01A	In-Out Saftey switch assembly w/FRL	1

In/Out Saftey Switch Assembly Components (Item 6)

ITEM#	PART#	DESCRIPTION	QTY.
7	102-04A	Pnumatic Switch	1
8	312-06	Air Pressure Regulator with Lubricator Adjustor	1

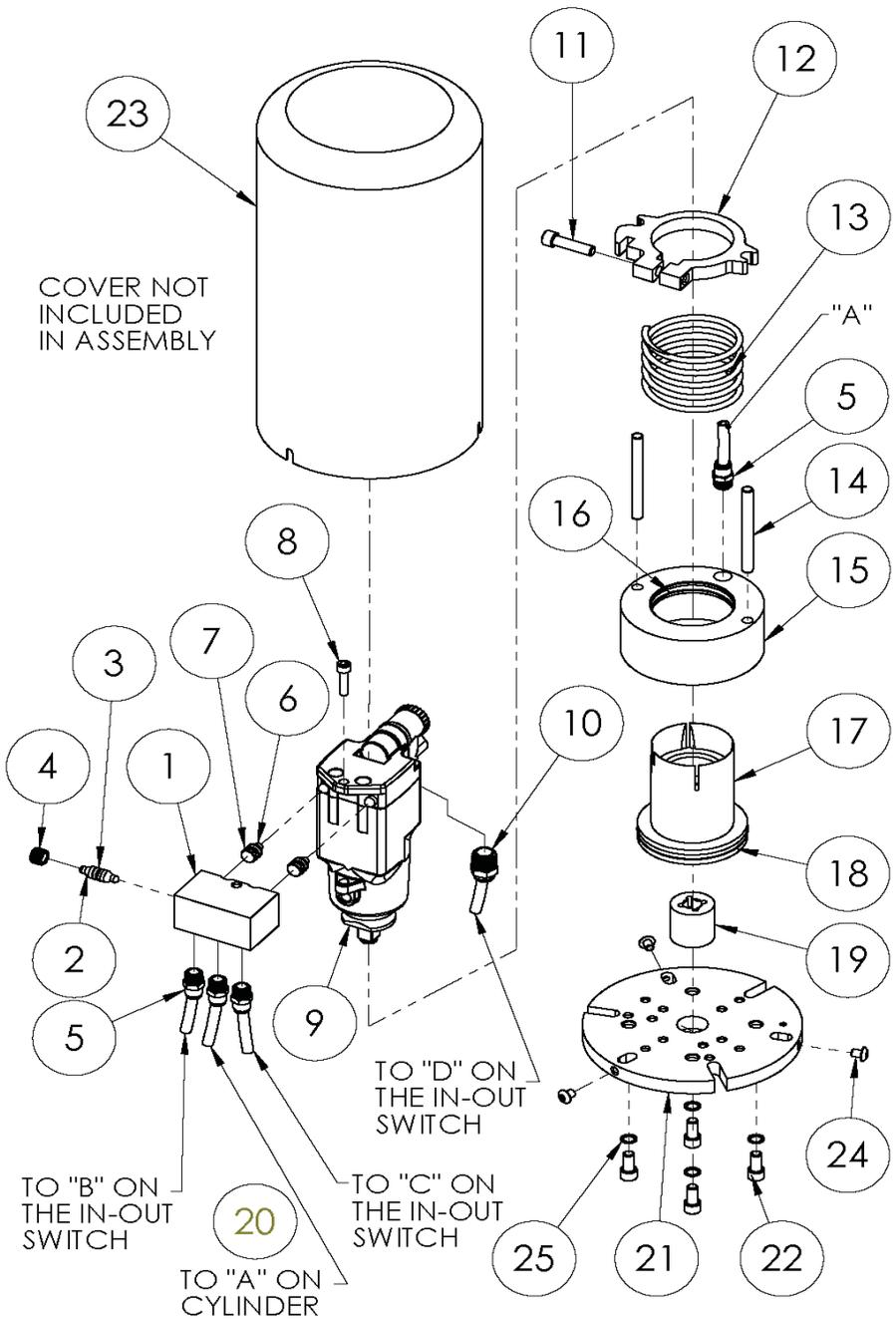
Power Drawbar 101-02 Parts List

ITEM#	PART#	DESCRIPTION	QTY.
1	202-03	Upper Block	1
2	201-00	Shuttle Piston	1
*3	225-01	O-Ring, #008, 70 BN, Moly	2
4	227-02	Plug, 1/8 NPT Brass	1
5	226-01	Fitting, 1/8 NPT (PUSH IN)	4
6	224-02	Slave Piston	2
*7	325-01	O-Ring, #010, 50 BN, Moly	4
8	00-0259	SHCS, #10-32 X 3/4	1
9	212-1000	Impact Wrench	1
10	226-02	Fitting, 1/4 NPT (PUSH IN)	1
11	00-1293	SHCS, 1/4-20 X 1.00 Long	1
12	204-01	Clamp	1
13	210-00	Piston Spring	1
14	04-0049	Guide Rod	2
15	205-01	Cylinder	1
*16	225-03	O-Ring, -225, 70 BN	1
17	203-01	Piston	1
*18	225-04	O-Ring, -228, 70 BN	1
19	208-00	Socket	1
20	219-0075	Air Tube, 7.5 in. Long	1
21	400-10	Universal Base	1
22	00-1286	SHCS 14-20 x .50 LG	4
**23	502-01	Cover, One Piece	1
24	03-0123	Screw, BHCS 10-24 x 1/4	3
25	06-3010	Lock Washer	4

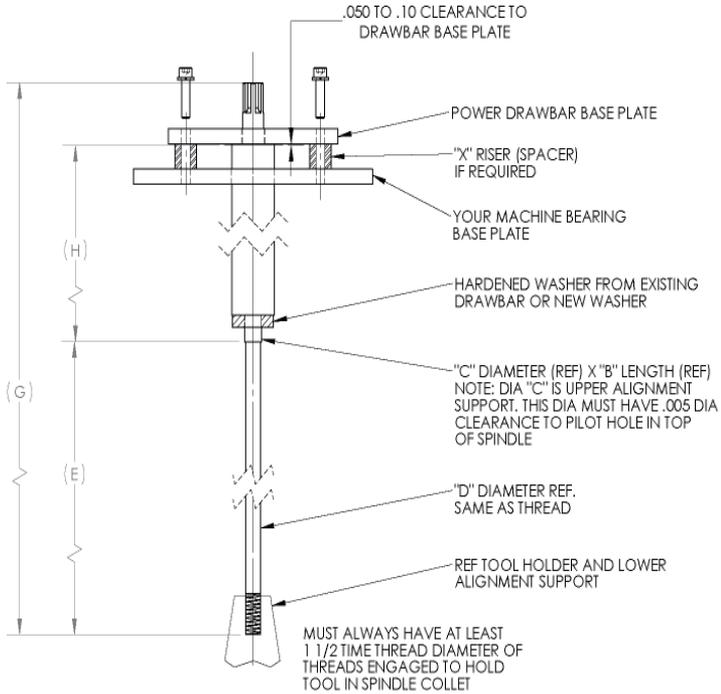
*Not shown in drawing.

** Cover not included in Assembly.

Power Drawbar 101-02 Drawing



Riser installation requirements



NOTES:

1. .050 DIM APPLIES WHEN QUILL IS ALL THE WAY UP OR IN THE TOOL CHANGE POSITION
2. WHEN MOUNTING BASE PLATE TO THE BEARING PLATE, HAND TIGHTEN A TOOL IN THE SPINDLE, THIS WILL STRAIGHTEN UP THE BAR THEN LOOSEN THE 3 CAP SCREWS AND PUSH THE ASSEMBLY UP AND DOWN UNTIL THE UNIT FEELS CENTERED TO DRAWBAR. THEN TIGHTEN UP THE 3 SHCS
3. AIR PRESSURE MUST BE AT 80 PSI DURING TOOL CHANGE
4. SET OIL DROP TO ONE DROP PER (5-10) TOOL CHANGES (TOOL CHANGE = IN AND OUT ONE TIME.
5. APPLY GREASE (WHITE MOLY) FROM HARDWARE KIT AND TO HARDENED WASHER, SOCKET END AND THREADS BEFORE USE.
6. IN SOME CASES YOU WILL WANT TO TURN THE BRAKE LEVER UP GETTING IT OUT OF THE WAY. (REMOVE PIN IN BRAKE HANDLE AND TURN 180 DEGREES AND REPLACE PIN TO HOLD BRAKE)

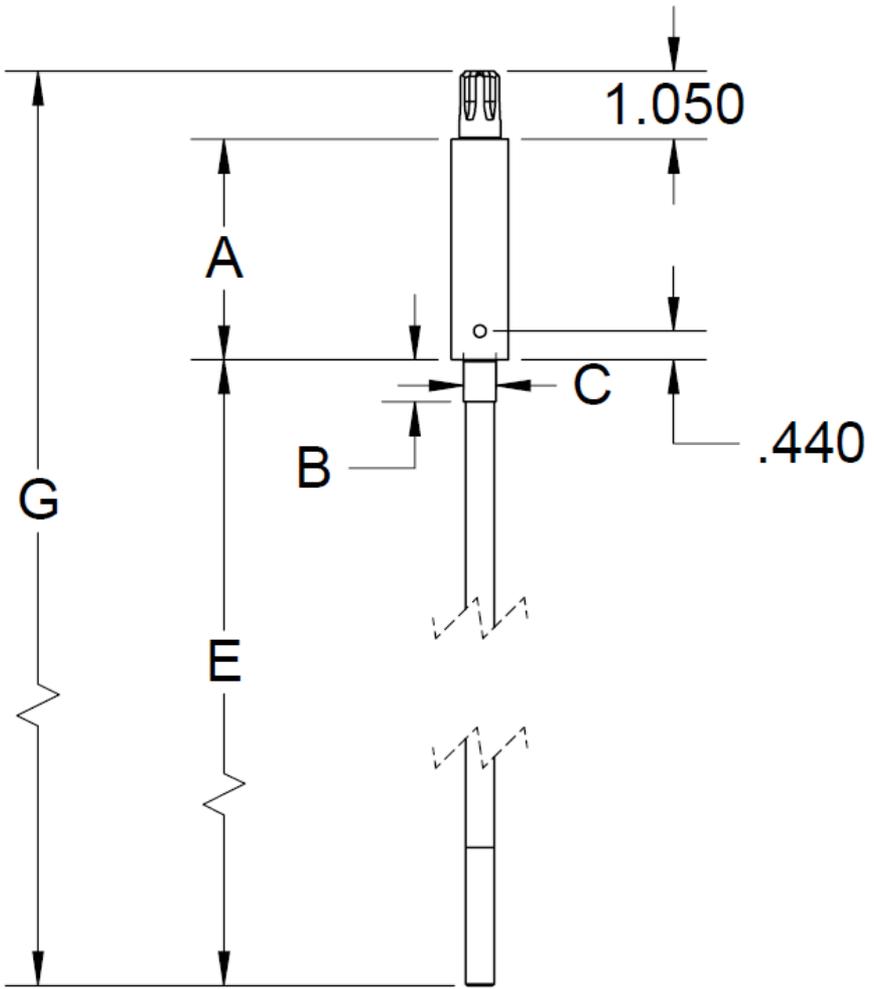


Figure 3

Do It Yourself instruction for Drawbar Rod Assembly

Parts included in the kit:

Drawbar head blank:

601-96 1.06" dia. X 11.100" long

OR

601-99 .875" dia. X 11.100" long

Drawbar rod blank, which will be one of the following:

602-96 .438" dia. X 22.00" long (R8)

602-98 .500" dia. X 29.00" long (T30)

602-99 .625" dia. X 30.70" long (T40)

Hardened grooved pin:

604-02 3/16" dia. X 3/4" long

The “Do It Yourself” drawbar kit will have the necessary items to create the drawbar that is required. The head blank will have the machined and hardened spline end. The rod blank will be the specified thread size for the tooling. Also included is a hardened and grooved pin to pin the rod and head together after they are machined.

Measuring Your Machine

The following steps are required to get the necessary information to make the drawbar assembly fit correctly.

1. Move the quill of the machine to the fully retracted position. (If this is a CNC/NC machine, move the quill up to the normal Z-home position.) Lock the quill in this position.
2. Scribe a line on the existing drawbar head, flush with the bearing retainer plate on the top of the machine head.
NOTE: It is very important that this is exactly flush. (If the machine does not have a drawbar now, measure the distance from the top of the bearing retainer plate to top of the spindle, where a drawbar would normally sit, using a depth mic or dial caliper.)
3. Remove the drawbar from the machine. If there is one, remove the washer and save it for later use.
4. Measure the distance from the scribe line on the drawbar head to the end of the drawbar head, where it was resting on the top of the spindle, or washer. Do not include the thickness of the washer in this dimension. Record this length as the “H” dimension.
5. Next, measure the pilot diameter of the existing drawbar, and record this as the “C” diameter. Measure the length of the pilot diameter and record it as the “B” dimension. (It is possible that the machine does not have a pilot diameter, below the drawbar head, where the rod portion of the drawbar goes into the spindle. If this is the case, record the “B” length as zero.)
6. Finally, measure the length of the long end of the drawbar from the end of the thread to the end of the drawbar head again without the washer. Record the length as the “E” dimension.

(See FIGURE 4 for clarification on where to measure on the rod)

Drawbar Head Manufacturing

1. Calculate the overall length of the head by adding the following:

"A" length: _____

+

"B" length: _____

+

Spline head: 1.0 (allows for .050 clearance)

TOTAL: _____ +/- .010 (Overall Length)

2. Cut off the lead length to the dimension calculated above with a +/- .010 tolerance.
3. Drill, bore, and ream a hole in the end of the blank. Holding the depth to 1.81 minimum, holding the dia. to .4220 +/- .0005 for the R8 and 30 Taper drawbars and .4990 +/- .0005 for the 40 Taper drawbars.
NOTE: If the overall head length is shorter than 3.250, please contact the factory.
4. Turn the pilot diameter to the same size as the existing drawbar "C" dia. to length "B". There should be a .005/.015 radius in the corner.
5. Deburr all sharp corners and edges.

Drawbar Rod Machining

1. Calculate the overall length of the rod by adding the following:

"E" length: _____

-

"B" length: _____

+

Press fit length: 1.750

TOTAL: _____ +/- .010 (overall length)

2. Cut off the unthreaded end of the rod to the rod length dimension calculated above with a +/- .010 tolerance.

Note: If the overall length of the drawbar head was shorter than 3.250, the turned length will be shorter. Please consult the factory before cutting and turning this part.

3. Turn a portion of the end that was cut off to .0007/.0013 larger than the hole that was put in the drawbar head to a length of 1.750 +/- .010. The radius of the tool used to turn this should be .005-.015. The amount of press fit is very important. If there is too much press, the drawbar rod will not go fully into the head with out bending something. If there is too little press, the rod will break at the pin or the pin itself will shear. It is usually desirable to turn the first 1/4" to .002/.004 smaller than the hole to permit easier assembly by aligning the parts to be assembled.
4. Deburr all sharp corners and edges.

Drawbar Assembly

1. Press the drawbar rod into the drawbar head until the end of the head pilot diameter is even with the turned portion of the drawbar rod.
2. Measure up 7/16 (.44) from the end of the drawbar head that the rod was pressed into. Using a center drill, cross drill and ream a 3/16 (.1875) diameter hole through the assembly in the 7/8 diameter portion of the head.
3. Deburr the hole on both sides
4. Press the 604-02 hardened grooved pin into the 3/16 diameter hole, small end first, until the head of the pin is flush to slightly below the surface of the rod.

Troubleshooting Guide

Motor does not run:

1. Is the main air supply to the machine turned on and at least 90 PSI?
2. Is the air regulator set to at least 80 PSI?
3. Is the dial on the motor set to all the way open (8)? If not, turn counterclockwise to open.
4. If the air motor is oil locked:
 - A) Disconnect the air supply.
 - B) One at a time, remove the air hoses to blow them out.
 - C) Disassemble the upper control block, removing the excess oil before reassembling.
 - D) Run the motor manually by pressing the buttons on the motor manually. (Be careful when doing this, as the plungers are not retained in the motor in any way, so sometimes air pressure can cause the plungers to fly off.)
 - E) Reconnect the air supply and turn on the air.
 - F) Adjust the lubricator for minimum oil flow, which is about 1-2 drops every 5-10 cycles. (One cycle is in and out once.)
5. Is the green safety button being pressed all the way?

Drawbar turns, but tool does not tighten properly:

1. Does air supply to motor stay above 80 PSI while making tool change?
2. Is there a washer between the drawbar and spindle and is there grease on the washer and the drawbar threads?
3. Is the shear pin in the drawbar rod broken or missing?
4. Are the threads in the collet or on the drawbar stripped?
5. Is the switch being held for 3 seconds after the tool seats?
6. With soapy water, check the airlines for leaks. Sometimes, an airline will get pinched and a small hole will be cut in the airline. Be sure the airline and fittings are checked.
7. Make sure the drawbar rod did not bottom out in the tool holder.

Motor runs all the time:

1. Airline from the FRL is connected to the wrong fitting.
2. Sometimes, one of the plungers on the air motor will stick in the in position.

Tool sticking or stuck in spindle:

1. Make sure threads and washer have grease on them.
2. Is there .050" to .100" space between drawbar and motor mounting plate?
3. Check the air pressure to the machine. There should be at least 90 PSI going into FRL and at least 80 PSI going out of FRL.
4. The upper control block may need to be cleaned. Turn off air supply and remove from motor to clean thoroughly. **Note:** Stud on piston goes to motor. O-rings are 50 durometer if they need to be replaced.
5. Too much or too little oil going to the motor could also cause tool to stick as the motor loses power.
6. Inspect the switch assembly, checking for leaks or blockages.

Miscellaneous information:

1. If Drawbar rod does not fit through the top of the machine, it may need to be turned to .875" dia. On some machines, the 1.060" dia. is too large.
2. Always use a synthetic air tool oil in the FRL.
3. Always have pin in spindle on R8 collet machines to keep collet from turning.
4. General maintenance once a month should include greasing threads on drawbar and area where washer rests. Make sure the FRL is working properly with 1-2 drops every 5-10 cycles. (One cycle is in and out once.) Also, check to make sure that no screws have vibrated loose. Tighten as needed.



**Thank you for your purchase!
If you have any feedback or questions.**

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