1 YEAR LIMITED WARRANTY

On all Kurt® Power Drawbar Products

All Kurt Manufacturing Company industrial workholding products and parts with the exceptions noted below, are warranted against defects in material and workmanship for the 1 year of the product or part. Failure to properly maintain and/or properly operate the product or part that has been worn out, abused heated ground or otherwise altered, used for a purpose other than that for which it was intended, or used in a manner in consistent with any instructions regarding its use. The sole obligation of Kurt Manufacturing Company, Inc. (Kurt) and the purchaser's SOLE AND EXCLUSIVE REMEDY hereunder, shall be limited to the replacement or repair of any Kurt product or part (by an authorized Kurt technician) which are returned to Kurt Manufacturing Company's place of business, transportation, shipping and postal charges prepaid, and there determined by Kurt Manufacturing Company to be covered by the warranty contained herein.

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Mechanical Power Drawbar Assembly

Operating Instructions Manual

ENGLISH

Table of Contents

Drawbar Data

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

Purchase Date: _____-_____-_____
Purchase Order: _____
Purchased From: _____
Delivery Date: _____
Serial Number: _____

KURT 360° Advantage

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

Please contact us at:
workholding@kurt.com
or
1-877-226-7823

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Maintenance Log/Notes:

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 a Mechanical Drawbar assembly that has a premade drawbar, continue to page 4 for the installation instructions.

If you have purchased a Mechanical 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.

Maintenance Log/Notes:

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.
   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, too.
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. **NOTE:** This amount of press fit is very important. If there is too much press, the Drawbar rod will not go fully into the head without bending something. If there is too little press, the rod will rotate inside the head and prematurely fail, as either the rod will break at the pin or the pin itself will shear. It is usually desirable to turn the first ¼ inch to .002/.004 smaller than the hole to permit easier assembly by aligning the parts to be assembled.
4. Deburr all sharp corners/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. Centerdrill, drill, and ream a 3/16 (.1875) diameter cross-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 grooved pin into this hole, small end first, until the head of the pin is flush to slightly below the surface of the rod.

The Drawbar Assembly is finished. See the installation instructions in the booklet that accompanied the kit for the rest of the information needed to complete the installation.

NORMAL SETUP CONFIGURATION

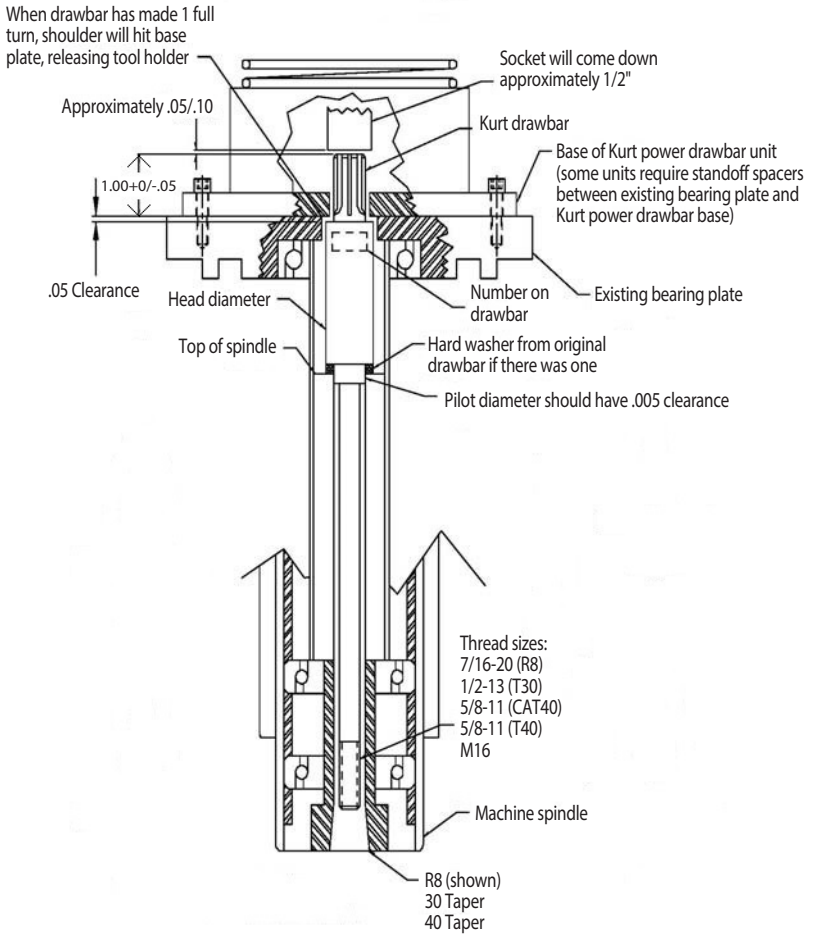


Figure 1

Installing the Power Head Assembly & FRL

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 tomes 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.
5. Mount the FRL (filter/regulator/lubricator). In most cases, this would be on the left side of the machine. However, it may be mounted on the most convenient place for the operator.
6. Fill the oil sight glass on the FRL with the air tool oil provided in the kit. Only use air tool oil in the FRL.
7. The collet drive pin in an R8 spindle or drive keys on 30 and 40 taper spindles must be in place. This prevents the tool from turning during the operation of the power drawbar unit.
8. Make sure the air line is free from condensation and the pressure is at least 90 PSI. Pressure must be at least 80 during tool change.
9. Connect the FRL to air supply and turn the regulator up to 90 PSI on the gage. Close the oil knob completely. While cycling the unit, slowly open the oil knob until there is 1-2 drops of oil for every 5-10 tool change cycles (one cycle is in and out one time).
10. When the power drawbar is functioning properly, place the air motor cover back onto the assembly.
11. Turn the main power back on for the machine.

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 your 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).

   "C" diameter: _____

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 without the washer. Record this length as "E". (on page 14)

Drawbar Head Manufacturing *All callouts refer to Figure 1 on page 16

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 head length to the dimension calculated above.
3. Drill, bore, and ream a hole in the end of the blank. Holding the depth to 1.81 minimum, holding the diameter to .4220+/-.0005 (for the R-8 and 30 Taper drawbars) or to .4990+/-.0005 (for the 40 Taper drawbars).
4. NOTE: If the overall head length is shorter than 3.250, please contact the factory.
5. Turn the pilot diameter to the same size as the existing drawbar "C" diameter, to length "B". There should be a .005/.015 radius in the corner.
6. Deburr all sharp corners/edges.

Do It Yourself (DIY) Instructions

Parts List
Each kit consists of:
Drawbar Head: #601-96 1.06 Diameter X 11.100 Long

OR

#601-99 .875 Diameter X 10.100 Long

Each kit will also have a Drawbar rod, which will be one of the following:

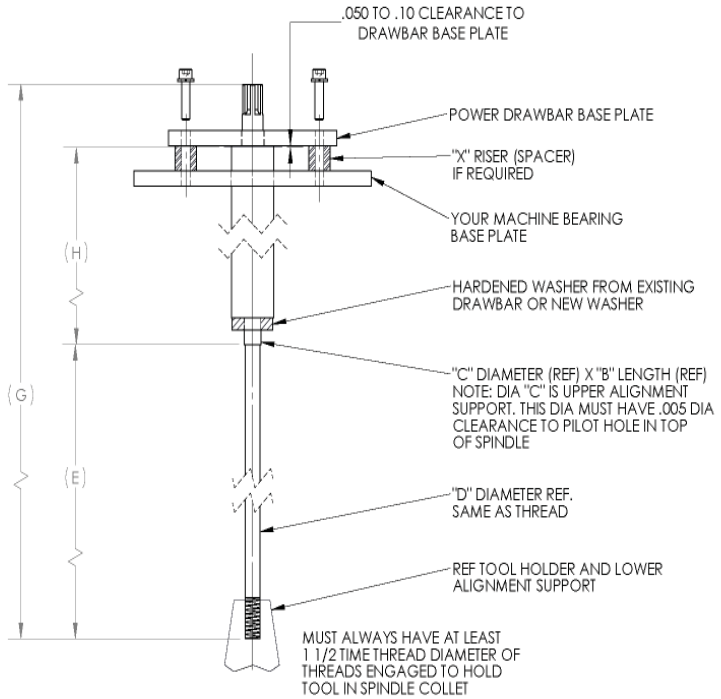
#602-96	.438 Dia X 22.000 Long (7/16-20, R-8)
#602-98	.500 Dia X 29.000 Long (1/2-12, T-30)
#602-99	.625 Dia X 30.700 Long (5/8-11, T-40)
#602M-99	M16 X 2.00 X 30.700 Long(T-40)

Each kit will also have a hardened grooved pin:
Grooved Pin #604-02 3/16 Diam er X ¾ Long

Measuring Your Machine
These parts will allow a Drawbar to be made for the machine that the Power Drawbar is being fitted to. The next steps are necessary to get the information required to make the Drawbar assembly for a correct fit.

1. Move the quill of the machine to the fully retracted position. (If this is an NC/CNC 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. 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 the top of the spindle, where a Drawbar would normally sit, using a depth mic or dial caliper)
3. Remove the Drawbar from the machine with the washer (if there is one). Remove the washer and save for later use.
4. Measure the distance from the scribed 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 "A" dimension.

Riser installation requirments

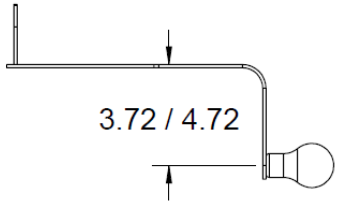


NOTES:
1. .050 DIM APPLIES WHEN QUILL IS ALL THE WAY UP OR IN THE TOOL CHANGE POSITION
2. WHEN MOUNTING BASE PLATE TO THE BEARING PLATE. HAND TIGHTEN A TOOL IN THE SPINDLE, THIS WILL STRAIGHTEN UP THE BAR THEN LOOSEN THE 3 CAP SCREWS AND PUSH THE ASSEMBLY UP AND DOWN UNTIL THE UNIT FEELS CENTERED TO 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 2

Mechanical Parts List

ITEM#	PART#	DESCRIPTION	QTY.
1	700-31	Base Assembly, Universal	1
2	700-02*	Pivot Plate Assembly	1
3	700-003	Trip Lever	1
4	700-04-2	Slide	1
5	700-05	Roller, Guide	2
6	700-06	Knob, Mechanical Drawbar	1
7	700-07	Washer, Holding, Brass	4
8	208-00	Socket Drawbar	1
9	03-0525	BHCS #10-24 x 1/2 Lg.	4
10	04-0077	Pin, Dowel 3/8 DIA x 3.0	2
11	01-3264	Screw, SHSS #10-32 x 1/2 Lg.	3
12	700-15	Spring, Compression	2
13	03-2100	Screw, SHLDR 1/4 x 1/4	2
14	03-2125	Screw, SHLDR 3/8 1-1/2	1
15	212-6000	FP-720B Impact Wrench, Mech	1
16	(Call factory for part #)	Drawbar Rod	1
17	03-0105	BHCS, 3/8-16 x 3/4 Lg.	1
18	700-08-SA	Cover	1
19	700-32	Pivot Plate, Universal	1
20	04-4242	Pin, Roll, 3/16 DIA x 3/8	2
21	225-01	O-Ring, 3/16 10 x 5/16	2
*Knob is 3.72" below plate on short(700-02), 4.72" on long(701-02) (see below)			



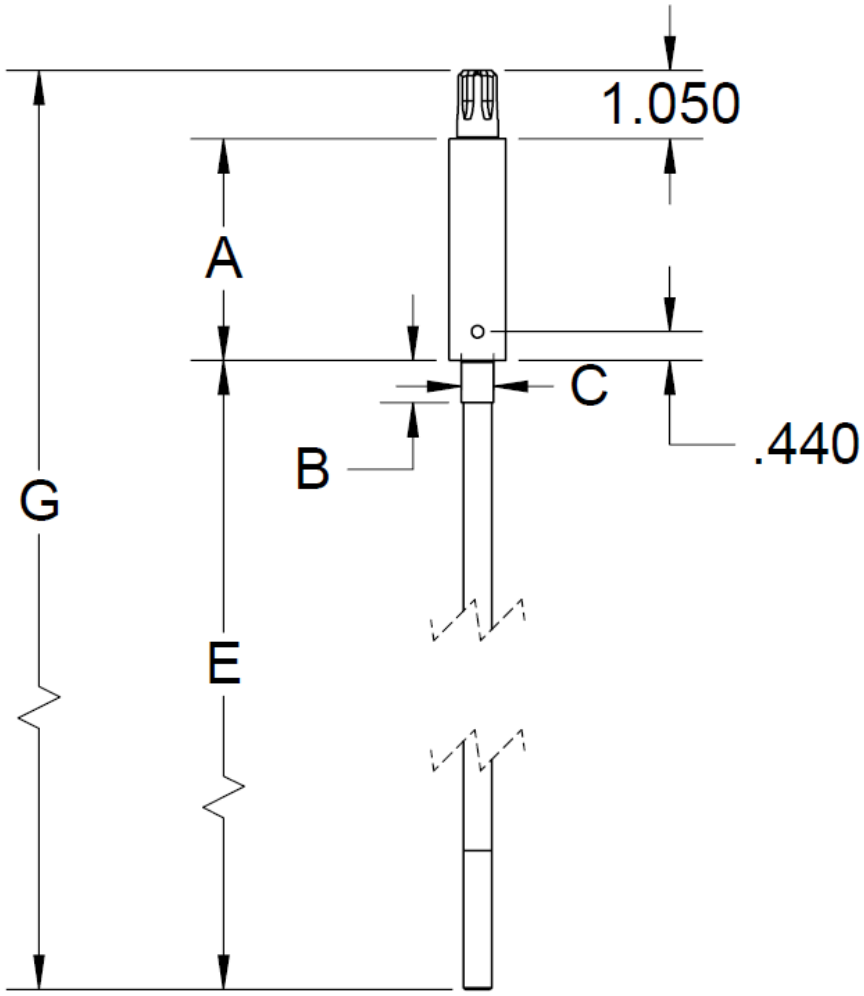


Figure 3

Motor runs all the time:

1. Butterfly has skipped past roll pin on arm of Mechanical Drawbar.
2. Plungers in motor may be stuck at the "in" position.

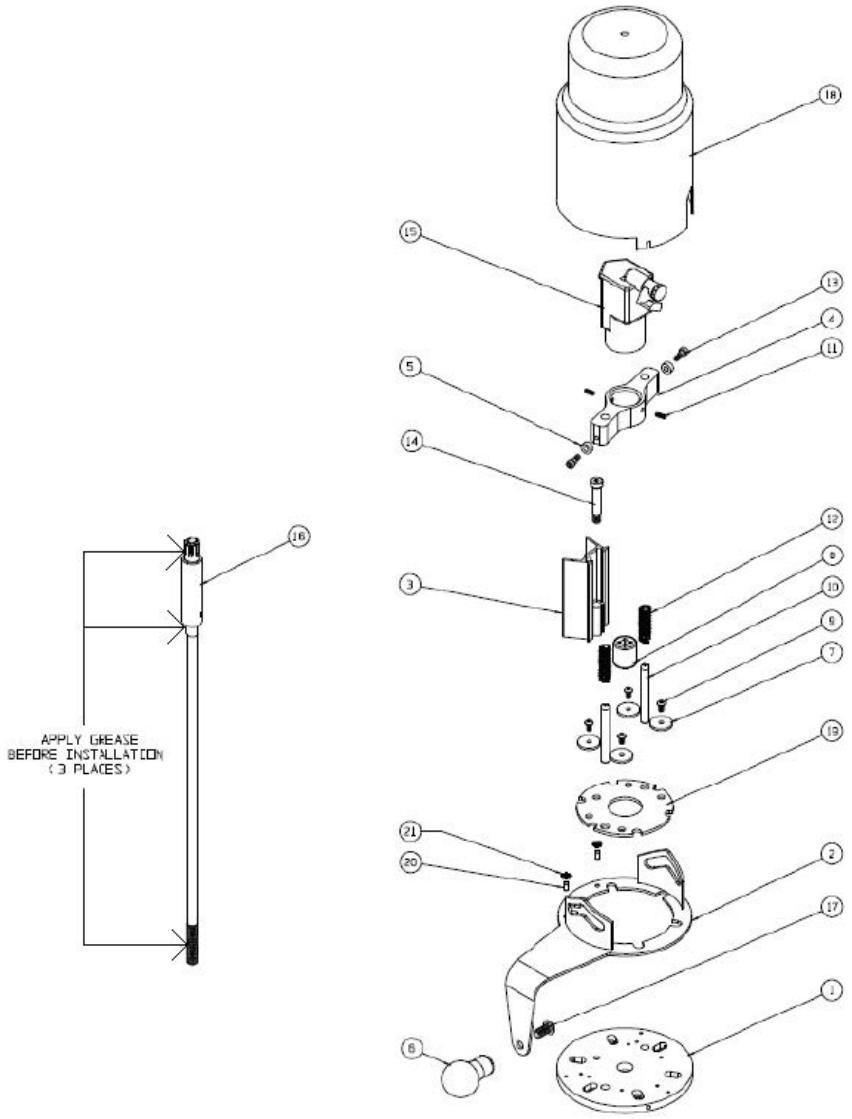
Tool seems to be sticking or stuck in spindle:

1. Make sure threads and washer have grease on them.
2. Check for .050 to .100 space between Drawbar and motor mounting plate.
3. Check air pressure to machine. There should be 90 PSI minimum into FRL and 80 PSI minimum out of FRL.
4. Motor over or under oiled could also cause tool to stick as motor loses power.

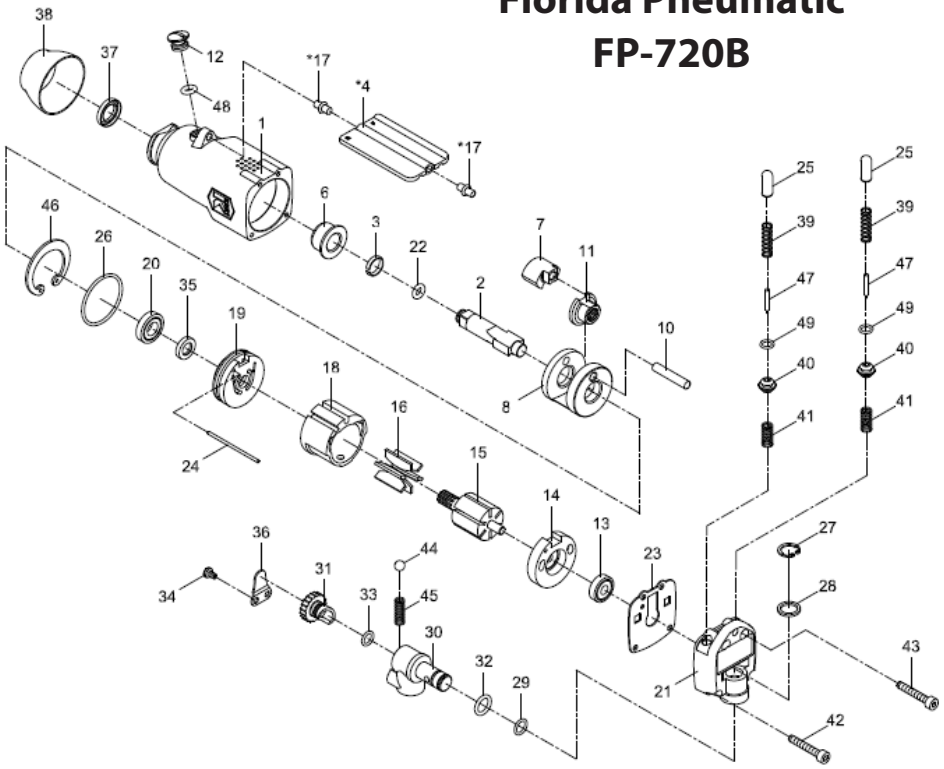
Miscellaneous information:

1. If drawbar rod does not fit through the top of the machine, it may need to be turned to .875 diameter. On some machines, the 1.060 diameter is too large.
2. Always use synthetic air tool oil in the FRL. (Marvel Air Tool Oil or similar is suggested.)
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 the washer rests. Make sure FRL is working properly with 1-2 drops every 5-10 cycles. One cycle is in and out once. Also, check to make sure no screws have vibrated loose. Tighten any that have as needed.

Mechanical Drawing



Florida Pneumatic
FP-720B



Index No.	Parts No.	Description	Index No.	Parts No.	Description
1	40101	Motor Housing	27	40128	Snap Ring (ISTW-12)
2	40102-14	Anvil	28	40129	Washer
3	40103	Retaining Ring	29	40130	O-Ring (8.8x1.7)
*4	40104	Throttle Lever	30	40131	Air Inlet Block
6	40106	Anvil Bushing	31	40132	Regulator
7	40107-12	Hammer	32	40133	O-Ring (P11)
8	40108-12	Hammer Cage	33	40134	O-Ring (7,65x1,78)
10	40110-12	Hammer Pin (6x32L)	34	40135	Screw (2) (M4x6L)
11	40111	Cam	35	40136	Oil Seal
12	40112	Oil Screw	36	40137	Retainer Plate
13	030113	Ball Bearing (626ZZ)	37	40138	Oil Seal
14	40114	Rear End Plate	38	40139	Rubber Nose Guard
15	40115	Rotor	39	40140	Plunger Spring (2)
16	40116	Rotor Blade (6)	40	40141-12	Valve Seat (2)
*17	40117	Throttle Pin (2)	41	40142	Valve Spring (2)
18	40118	Cylinder	42	40143	Short Cap Screw (2) (M4x20L)
19	40119	Front End Plate	43	40144	Long Cap Screw (2) (M4x25L)
20	040120	Ball Bearing (EE3)	44	40145	Steel Ball (1/8")
21	40121	Back Cap	45	40146	Spring
22	30107	O-Ring (P4)	46	40149	Snap Ring (RTW-39)
23	40123	Back Cap Gasket	47	40127	Valve (2)
24	40124	Motor Pin (2x54L)	48	70107	O-Ring (P5)
25	40125	Plunger (2)	49	OR00400105	O-Ring (2) (4x1.5)
26	40126	O-Ring (S36)			

Troubleshooting

Motor does not run:

1. Is main air supply to machine turned on and at least 90 PSI?
2. Is air regulator set to at least 80 PSI?
3. Is dial on motor set to (8) all the way open? Turn C.C.W. to open.
4. If the air motor is oil locked, do the following:
   A) Disconnect air supply.
   B) One at a time, remove air hoses, blow out, & replace. Make sure hoses are pushed securely back into fittings.
   C) Run motor manually by depressing buttons on motor or using butterfly.
   D) Re-connect the air supply and turn on the air.
   F) Adjust the Lubricator for minimum oil flow. You should just be able to see a drop forming during operation, to allow 1-2 drops per 5-10 cycles. (1 cycle is all the way in and out once)
5. Did the butterfly skip past the roll pin?

Motor turns, but nothing happens to Drawbar:

1. Is the spindle all the way up and in the locked position or at machine home?
2. Has socket fallen off end of motor?
3. Are splines broken or stripped from end of Drawbar?

Drawbar turns, but tool does not tighten properly:

1. Air supply to motor should stay above 80 PSI while making tool change.
2. Is there a washer between the Drawbar and spindle? Are the washer and Drawbar threads well-greased? Friction can reduce clamping forces if they are not.
3. Is shear pin in Drawbar broken or missing?
4. Are threads in collet or on Drawbar stripped?
5. Is the handle being held for three seconds after tool seats?
6. With soapy water, check air lines for leaks. Sometimes an air line will get pinched and a small hole will be cut in the air line. Be sure air line and fittings are checked.
7. Make sure Drawbar rod did not bottom out in tool holder.