



Mechanical Power Drawbar Assembly

Operating Instructions Manual
Manual de instrucciones de operación



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Drawbar Data

Use this to fill out information about your vise 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. These units are available in a Automatic or Mechanical style. 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.

INSTALLATION

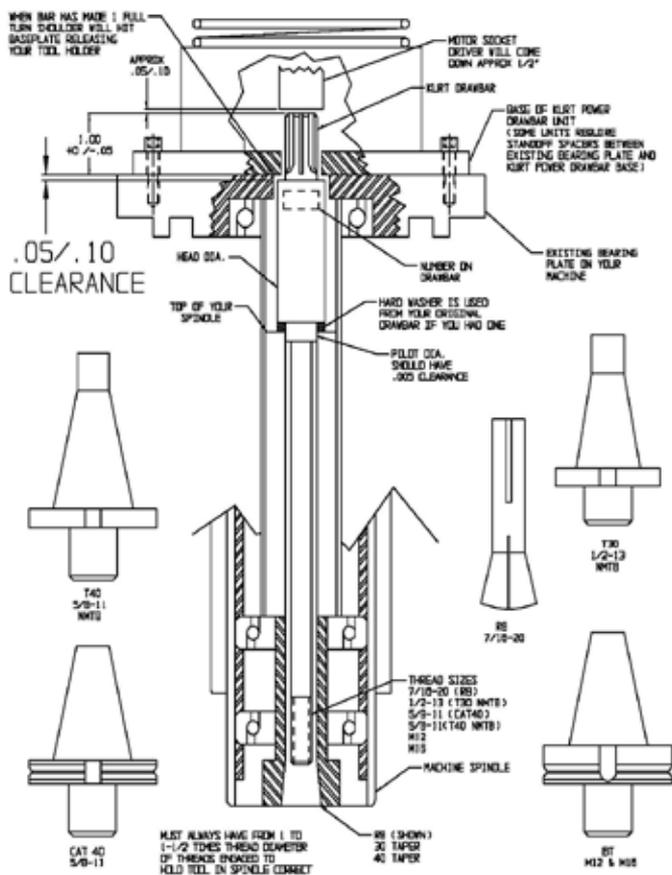
- Prior to installation make sure that:
 - Power source to machine has been turned off and locked.
 - Quill or Spindle is fully retracted and locked.
 - Review Bill of Material to make sure you are not missing any parts.
 - Air supply to machine is at least 90 PSI and free of moisture in line.
1. Remove old Drawbar from your machine if you have one. Make sure hardened washer did not stay in machine as it may fall off Drawbar. Keep harden washer, as it will be used later unless kit came with a new washer to use.
 2. Lay old Drawbar next to new Drawbar and they should both be the same length. From shoulder where hardened washer rests to end of the threaded rod. The length of upper body may vary depending on weather or not risers are used for your application.
 3. Apply molybdenum disulfide grease found in the hardware package (whitetube) to threads, spline, and area where washer will sit.
 4. Place washer onto new Drawbar and place back into machine.
 5. On top where you just put Drawbar into machine is the machine bearing plate. The new Drawbar should be sticking out of plate $1.000 +.000/-.050$ if no risers are needed. If risers are used add riser length to the 1.000 and again tolerance will be $+.000/-.050$ from that length. (If you are short double check to make sure quill is in fully retracted position).
 6. Insert a tool holder into spindle and hand tighten. This will be a check to see if Drawbar is to long or to short, and align bar in spindle for step 8. If bar is to long tool holder will not seat. To check for to short count the number of turns it takes to seat the tool after thread is first engaged. In most cases this will be approximately 8 to 13 turns.
 7. Remove the three button head screws holding the cover on air motor assembly and remove cover. Place the Pneumatic Motor Assembly on top of the bearing plate of machine, or on top of risers if needed. Make sure the air regulator on motor is facing the operator. Check to see that the regulator on motor is fully open which is (8) on dial.
 8. Align the mounting holes in the base of the assembly with the existing threaded holes in the bearing plate. Note: In some cases you may have to drill and tap your own $\frac{1}{4}$ -20 holes in bearing plate. Only snug the bolts at this time.

9. Push down lightly on the motor until it engages with the spline of the Drawbar. Engage and disengage this way several times to make sure unit goes up and down freely. Now hold down and tighten bolts. Recheck after tightening to make sure operation is still free.
10. Mount the "FRL"(filter/regulator/lubricator) and tool (IN/OUT safety block is only on automatic models). In most cases this would be on the left-hand side of machine; however you may mount it on the most convenient place for the operator. Hook up air lines from switch to motor and from "FRL" as required.
11. Fill the oil sight glass on "FRL" with the air tool oil provided with your kit. Always use air tool oil only.
12. The collet drive pin in R-8 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.
13. 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. At tool change the air pressure must stay at 80-PSI or above.
14. Connect "FRL" to air supply and turn up to no less that 90-PSI on gage. Open oil supply if it is not already set at max. (One full turn is fully open and one turn back to close). Run IN/OUT buttons until you see oil mist in the motor exhaust and then close. Cycle unit several times and then slowly open until you have one drop per 5 to 10 cycles.

NOTE: One cycle is equal to tool in and out one time.

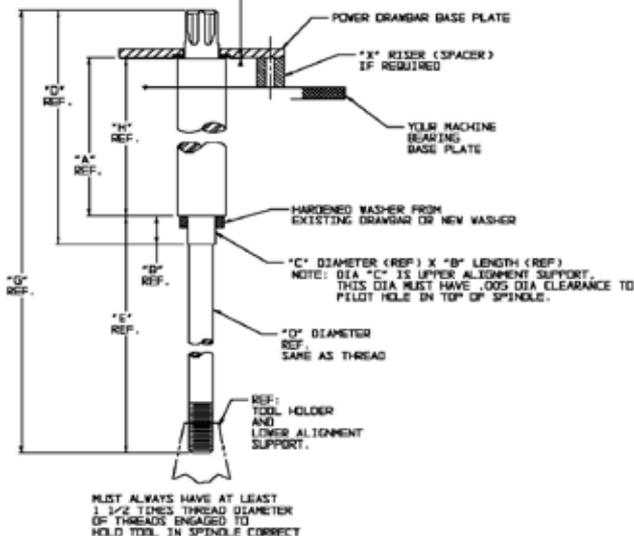
15. When the Power Drawbar is functioning properly, replace the cover onto air motor assembly with the three button head cap screws. You are now ready to run.
16. Turn main power back on the machine.

MANUAL OR AUTOMATIC MODELS
NORMAL SET-UP CONFIGURATION



CONFIGURATION IF
RISER PAD IS NEEDED

.05/.10 CLEARANCE TO THRUST
WASHER OR PLATE IS RECOMMENDED



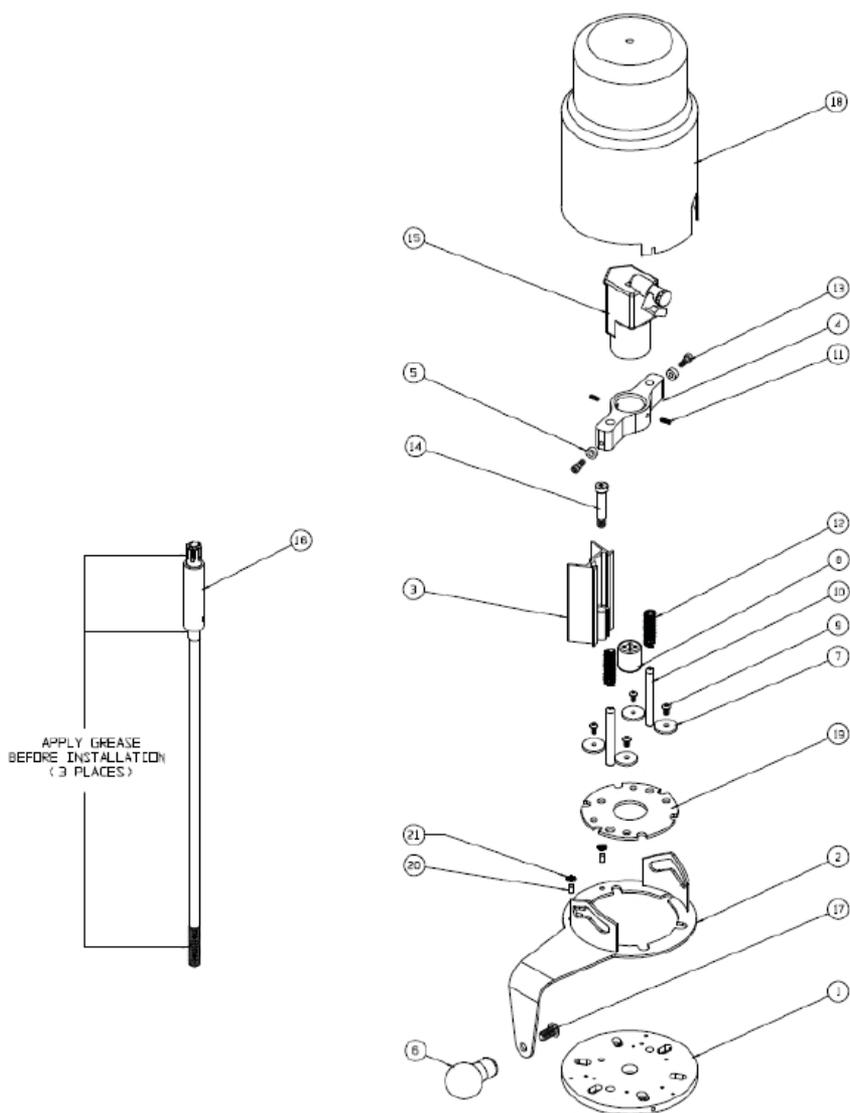
NOTES:

- 1) .050 DIA. APPLIES WHEN QUILL IS ALL THE WAY UP OR IN THE TOOL CHANGE POSITION.
 - 2) WHEN MOUNTING BASEPLATE 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 THE (.3) SCS.
 - 3) AIR PRESSURE MUST BE AT 80 PSI DURING A TOOL CHANGE.
 - 4) SET OIL Drip TO ONE DROP PER (5-10) TOOL CHANGES. (TOOL CHANGE-IN AND OUT ONE TIME).
 - 5) APPLY GREASE (WHITE TUBE) FROM HARDWARE KIT TO HARDENED WASHER, SOCKET END, & THREADS BEFORE USE.
- B) IN SOME CASES YOU WILL WANT TO TURN THE BRAKE LEVER UP GETTING IT OUT OF THE WAY. (REMOVE PIN IN BRACE HANDLE REMOVE HANDLE AND TURN 180 DEGREES AND REPLACE PIN TO HOLD BRAKE.

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	Roler, 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	CP-722 Impact wrench, Mech	1
16	*600-XX	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
*Item 2 changes to 701-02 for long handle.			

Mechanical Drawing



Troubleshooting Guide

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 you think the air motor is oil locked do the following.
 - A) Disconnect air supply.
 - B) One at a time, remove air hose's, blow out & replace. Make sure hose's are pushed securely back into fittings.
 - C) Disassemble upper control block (on automatic only) and remove excess oil and re-assemble.
 - D) Run motor manually by depressing buttons on motor or using butterfly.
 - E) Re-connect the air supply and turn on air.
 - F) Adjust the Lubricator for minimum oil flow. You should just be able to see a drop forming during operation, to allow 1 drop per 5-10 cycles. 1 cycle is equal to 1 in and 1 out.
5. Did you remember to push in on the green safety button on side of switch?
6. On manual model did the butterfly skip past the roll pin?

Motor turns but nothing Happens to Drawbar:

1. Is 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 proper:

1. Does air supply to motor stay above 80PSI while making tool change.
2. Do you have a washer between Drawbar and spindle and is it well greased a washer and on Drawbar threads. This is very important due to friction reducing clamping forces.
3. Is sheer pin in Drawbar broken or missing?
4. Are threads in Collet or on Drawbar stripped?
5. Are you holding Arm or Push Buttons in for three seconds after tool seats?
6. With soapy water check airlines for leaks. Sometimes an airline will get pinched and a small hole will be cut in airline. Be sure airline and fittings are checked.
7. If you are using a R8 collet and tool slips in the holder hold the IN button for 3 seconds to allow tool to tighten in spindle.
8. Make sure Drawbar Rod did not bottom out in tool holder.

Motor runs all the time:

1. Airline from FRL is connected to wrong fitting on Automatic Drawbar.
2. Butterfly has skipped past roll pin on arm. Manual Drawbar only.
3. Sometimes one of the plungers in motor will stick in the in position.

Tool seems to be sticking or stuck In spindle:

1. Make sure threads and washer have grease on them.
2. Have you got .050 to .100 space between Drawbar and motor mounting plate?
3. Check air pressure to machine. 90 PSI min. into FRL and 80 PSI min. out FRL.
4. On Automatic the Upper Control block may need to be cleaned. Turn off air supply and remove from motor. Clean thoroughly and replace. Note: Stud on piston goes to motor. O-rings are made of 50 Buna if you need to replace them.
5. Motor over or under oiled could also cause tool to stick as motor loses power.
6. On Automatic model try reversing the airline into IN/OUT ports to see if it makes any difference. If it does a O-ring may have been cut or a chip may have gotten into the
7. IN/OUT block. A disassemble and cleaning of IN/OUT block may be necessary.

Miscellaneous information:

1. If Drawbar rod does not fit thru top of your 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 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 FRL is working properly with 1-2 drops every
5. 5 to 10 cycles. One cycle is in and out once. Also check to make sure no screws have vibrated loose. If any have retighten as needed

Do It Yourself (DIY) Instructions

Parts List

This "KIT" consists of a drawbar head blank, with the spline pre-machined and hardened, and a drawbar rod blank, with a hardened grooved pin, to pin the head and rod together, after they are machined by you.

Each kit will have a drawbar head, as shown below:

Drawbar Head: #601-96 1.06 Diameter X 11.100 Long
#601-99 .875 Diameter X 10.100 Long

Each kit will also have a drawbar rod, 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 Diameter X ¾ Long

Measuring Your Machine

These parts will allow you to make a drawbar for the machine that you are fitting a Power Drawbar 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 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 your 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 "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 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).
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 this length as the "E".

Drawbar Head Manufacturing

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

"H" length: _____

+

"B" length: _____

+

Spline head: _____

(1.0 allows for .050 clearance)

TOTAL _____ (Overall Length)

2. Cut off the lead length to 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 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.

**All call outs refer to Fig. 1 on page 15.*

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 _____ (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 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 max. 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.

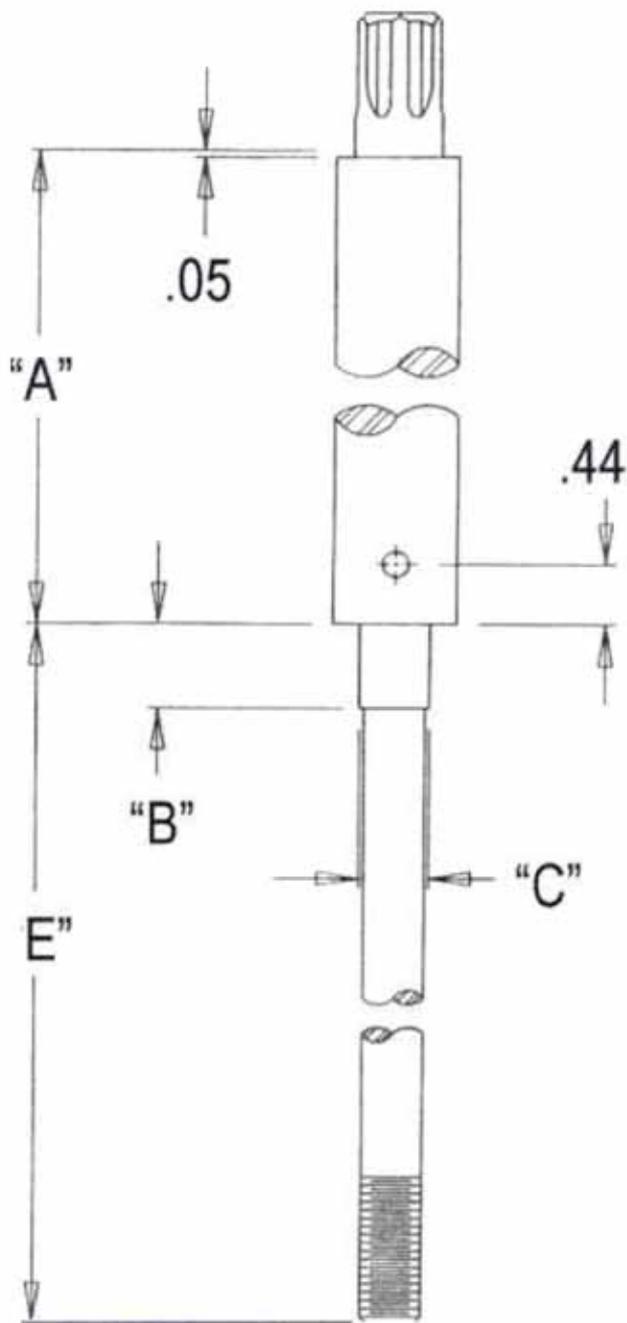
Drawbar Assembly

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 thru the assembly, in the 7/8 diameter portion of the head.
3. Deburr the hole 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.

**All call outs refer to Fig. 1 on page 15.*

Fig.1





**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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9445 East River Road NW
Minneapolis, MN 55433

Phone: 877-226-7823
Fax: 877-226-7828

kurtworkholding.com

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