KURT WORKHOLDING

HDHL4 MANUAL HYDRAULIC ASSEMBLY

Operating Instruction Manual
HDHL4 (English) & HDHLM4 (Metric)

ENGLISH

TABLE OF CONTENTS

VISE 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

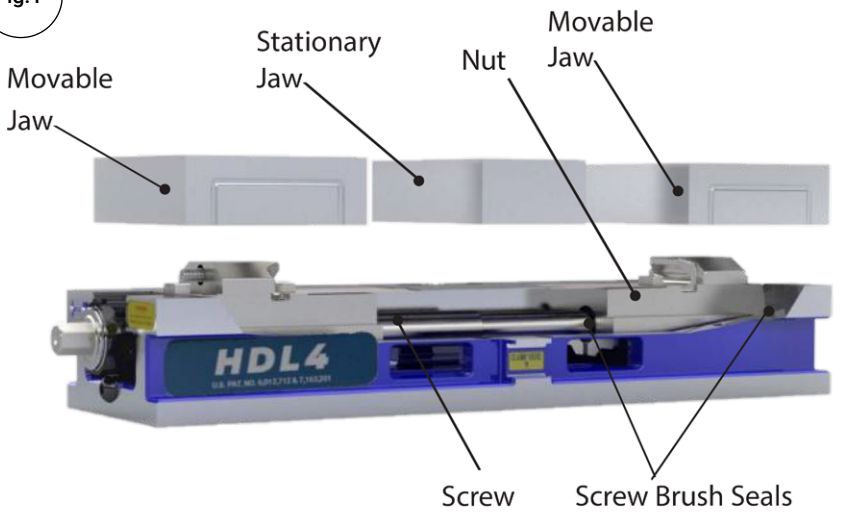
INTRODUCTION

Thank you for purchasing a Kurt HDHL4. You have just purchased one of the best machine vises in the industry. The outstanding accuracy of this product is second to none. Backed by a lifetime warranty against workmanship and material defects, this product is built to last when used and maintained properly.

The original Kurt AngLock vises are designed for precision clamping on basic machine tools such as knee-type mills, and machining centers. They can be used for, but are not limited to, operations like precision boring, drilling, tapping, & finishing.

The patented AngLock design allows the movable jaw to advance in such a way that each pound of force forward induces a 1/2 pound of force downward which minimizes the jaw lift and increases accuracy. This, combined with the needle bearings, increases jaw clamping pressure. Other features include: 80,000 psi ductile iron body, hardened vise bed & jaw plates, and a semi- hard steel screw.

Fig.1



SET-UP INSTRUCTIONS

Now that you have your new Kurt Vise, it's time to set-up and begin using it. You will see that your new vise comes with a Kurt swivel handle. The handle is specifically designed to provide maximum torque to your vise (clamping force provided below). Your vise should be mounted to a clean, flat surface. The surface and the vise must be free of any chips, dirt, or debris of any kind. The mounting surface can be honed if necessary. Clean the bottom of the vise with solvent or another cleaner if needed.

To minimize vise bed deflection, clamp your Kurt vise to your machine table, pallet, or sub-plate using the built-in clamping slots or through the body holes provided.

Additional clamping can be used, but may not be necessary. Please be sure to exercise good judgment when securing your vise to the mounting surface. Be sure your vise is secured and will not move when applying the machine pressure.

TORQUE/CLAMPING FORCE TABLES

MANUAL	
TORQUE FT-LBS	FORCE IN LBS.
10	1,050
20	2,100
30	3,150
40	4,000
50	5,000
60	5,850

HYDRAULIC	
HYDRAULIC PSI	FORCE IN LBS.
1,000	750
1,500	1,450
2,000	1,900
2,500	2,550
3,000	3,100
3,500	3,700
4,000	4,200
4,500	4,800

VISE INSTALLATION INSTRUCTIONS

CAUTION

Do not attempt to lift the vise by attaching to any of the jaws or injury may result. Always attach lifting device to the vise base frame.

1. Position vise on your machine table, pallet or tombstone using the 0.625" or 16 mm (0.6299") locating holes found on the bottom of the vise. We recommend using the holes that are the farthest apart for better accuracy.
2. Bolt in place using strap clamps placed on the clamping ledge as indicated by “Clamp Here” sticker or by bolting directly through the vise body. When bolting through the body, the stationary jaw must be removed to gain access to those holes. The outboard holes have plugs to keep debris out and must be removed if you wish to use those holes as well. Replace plugs after bolts are secured.

NOTE: Some of the clamp holes are at inch locations and some are at metric. For exact hole locations, go to pages 17-18 in this manual.

3. After the vise is mounted in place, add the vise jaws to the base assembly. See jaw installation instructions that came with the jaw kit. If a hard jaw kit “J style” was installed, tram the stationary jaw for straightness prior to using. If it exceeds 0.0006" in six inches, remove stationary jaw and disassemble the 10 mm bolt, the tapered top clamp and 0.750 dia. split sleeve and clean with solvent and a clean cloth. Do Not apply grease or oil to these components. Re-assemble and retest. This should not be necessary when using the carvable type unless a high degree of accuracy is required and you are not recutting the jaw contour.

HYDRAULIC SET-UP

The HDHL4 Series Hydraulic vises can be paired with one of Kurt's Hydraulic pumps. You can find all our pump solutions at kurtworkholding.com.

Here are instructions for plumbing the HDHL4 vise with the KHP3 air over hydraulic pump:

1. Remove plastic caps from pressure and release ports on Hydraulic pump. Install fittings to the input and output ports (See Fig.4).
2. Remove plastic caps from pressure and release ports on hand or foot valve. Install straight fitting.
3. Install a SAE 4 straight fitting into the 7/16-20 port found on one end of the vise screw (See Fig.2).
4. A filter-regulator-lubricator combination (See Fig.4) is recommended to insure clean air coming into the unit. See clamping force chart (Page 4) for air pressure required to attain desired clamping force.
5. Connect the FRL to the input air line (See Fig.4).
6. Connect the hydraulic line to the hydraulic unit on the HDHL6 vise and then to the output side of the hydraulic pump (Fig.2 & 4).
7. If using a hand or foot valve connect the 3-line color-coded air line cluster to the same color ports on the KHP3 pump and valve (Fig.3 & 4).
8. Apply air pressure (80 PSI maximum) to system. Loosen swivel fitting at vise and bleed air. Tighten fitting. Release air pressure.
9. Repeat previous step until all air is purged
10. The KHP3 hydraulic pump will come pre-filled with oil (use #13 or DTE lite if needed)
11. System is now ready for use.

NOTE: For multiple vise hook-ups, call factory for recommendations

Fig.2

Single Acting with Spring Return

Hydraulic Port Sizing:
SAE - 4
7/16 - 20 UNF
O-Ring Port

HYDRAULIC SET-UP

NOTE: The following set-up is specifically for the KHP3 pump.

Fig.3

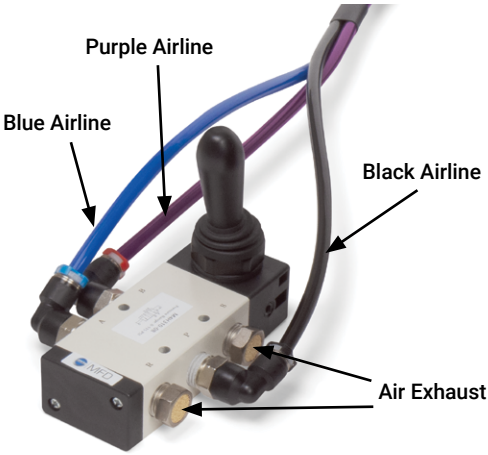
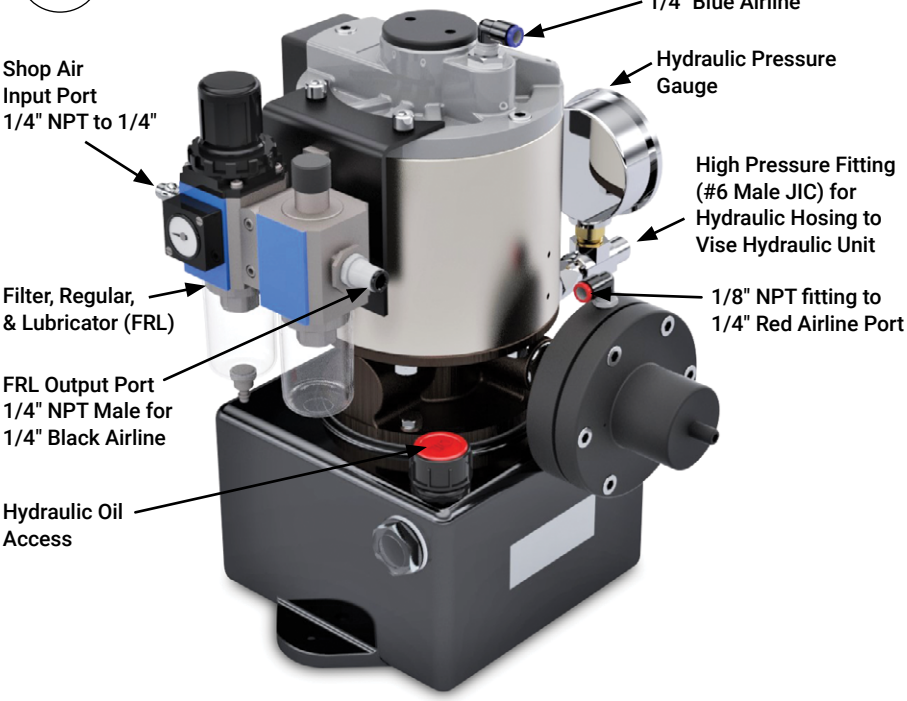
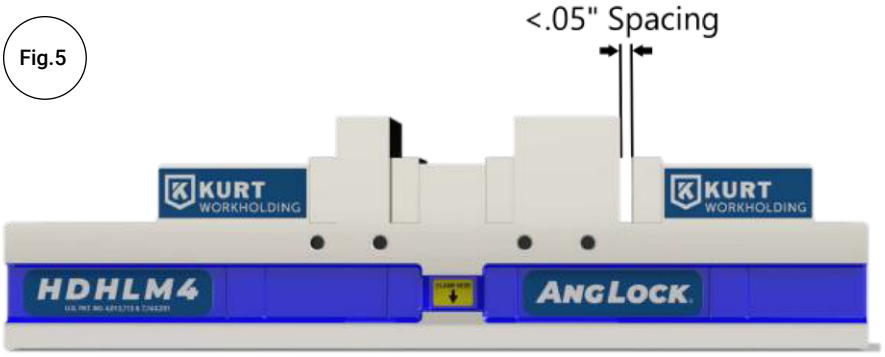


Fig.4



HYDRAULIC SET-UP

Fig.5



Jaw Positioning:

Once all plumbing is set up, it time to position jaws for hydraulic clamping.

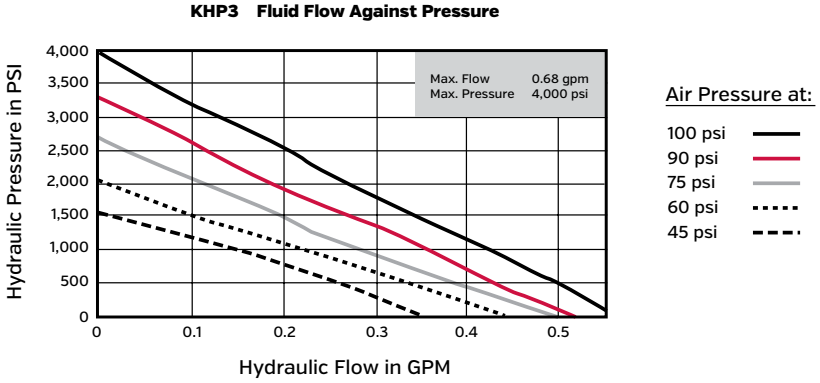
1. Position jaws less than 1/4 inch from the part being clamped as is shown in Fig.5 above. This is done manually by putting the handle onto the hex end and turning the screw until the jaws are in position.
2. Make sure the jaws are less than 1/4 inch from the part since the hydraulic unit has only a 1/4 inch stroke.
3. The vise is now ready to have the hydraulics engaged for clamping the part.

HYDRAULIC OPERATING INSTRUCTIONS

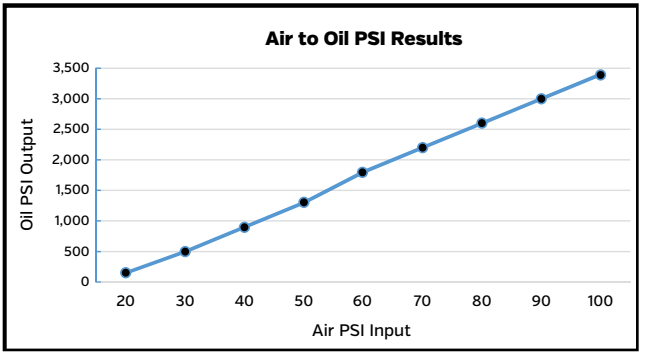
Air Pressure Input to Hydraulic Pressure Output for Kurt Hydraulic Pump, KHP3

Fig.6

Flow and Pressure Performance Guides



AIR PSI INPUT	OIL PSI OUTPUT
20	150
30	500
40	900
50	1,300
60	1,800
70	2,200
80	2,600
90	3,000
100	3,400



OPERATING INSTRUCTIONS

For proper vise operation, insert the handle on to the hex end of the vise. Rotate clockwise to clamp and counterclockwise to unclamp your vise. This handle, combined with the correct amount of torque will provide you with all the clamping force you will need to machine your parts.
DO NOT use any other type of pressure to open or close your vise.

The uses of handle extensions, air impact wrenches, breaker bars, or hammer strikes are not recommended and will void the warranty if used. This will also cause damage to the thrust bearing and screw threads. If you need more clamping force, you may require a larger vise. A torque wrench may be used if set within the torque limits shown in the tables on page 4.

One-Sided Clamping:

To properly clamp a part in your Kurt double-station vise, you should place the parts in the center of the jaws resting on the ways of the vise. Clamping only on one side or above the movable and stationary jaws can result in jaw lift or loss of accuracy. (See Fig.7 on page 11)

If one-sided clamping is necessary, you MUST use a dummy part on the other side. When using parallels or step jaws, you must select a size that keeps the bottom of the clamped part at or below the top of the movable and stationary jaws.

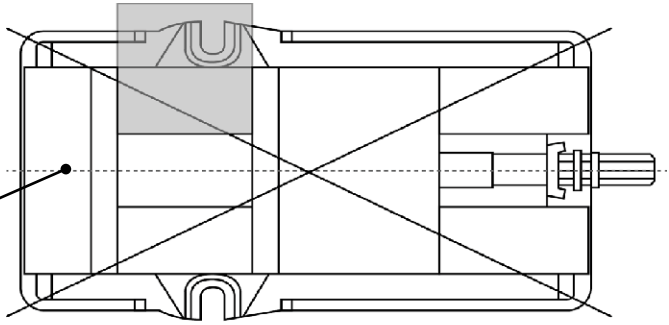
Always use jaw plates for clamping. If jaw plates are not used, damage to the mounting surface of the movable and stationary jaw will occur. This will result in reduced clamping accuracy and repeatability.

Fig.7

Sketch #2A

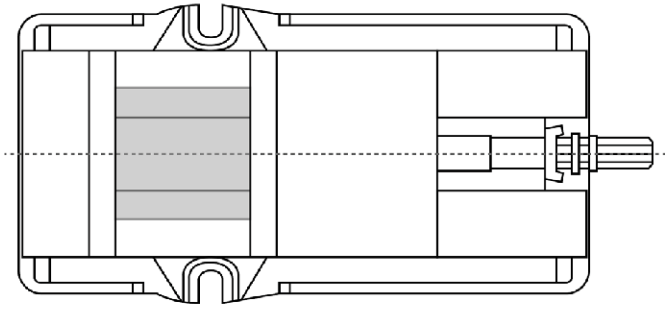
Incorrect part clamping.

Vise width centerline



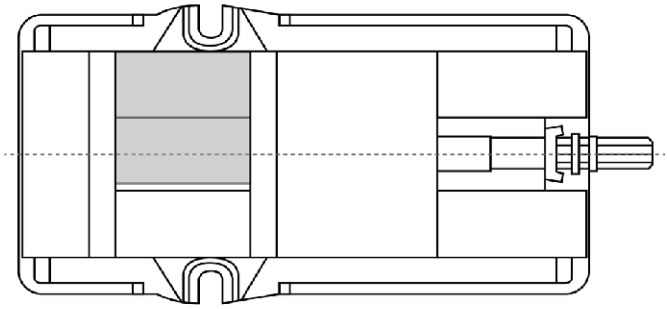
Sketch #2B

Correct part clamping



Sketch #2C

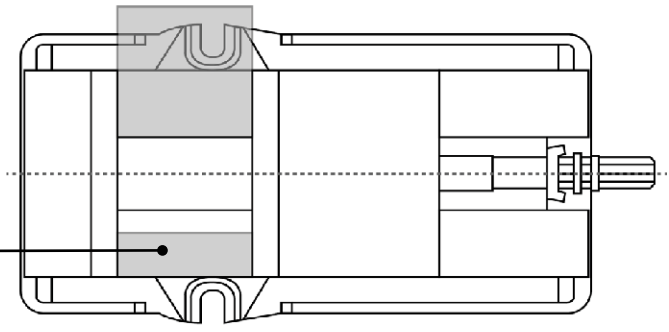
Correct part clamping



Sketch #2D

Correct part clamping

Dummy spacer

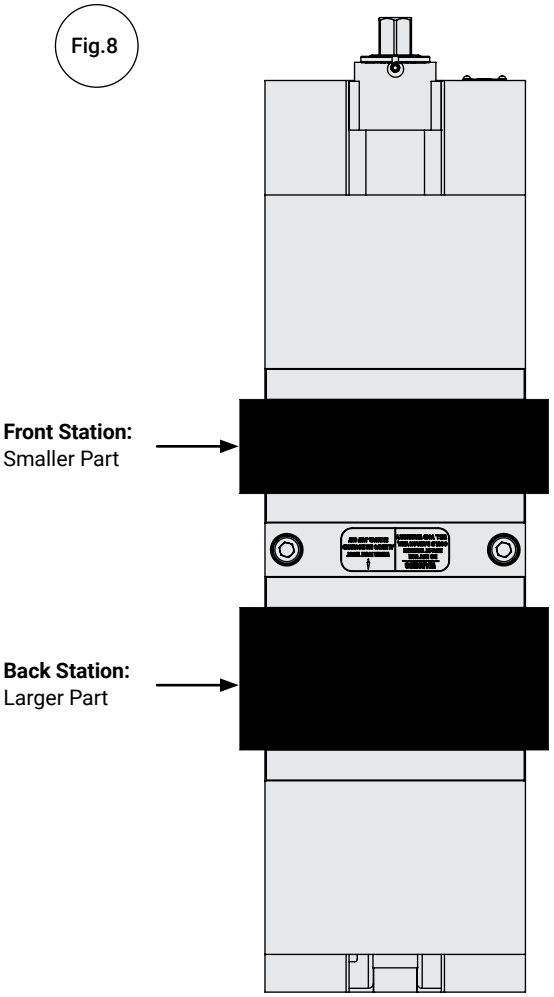


OPERATING INSTRUCTIONS

Clamping with Different Sized Parts:

If clamping parts of different sizes, place the smaller part in the front station and the larger part in the back station as shown in Fig.8 below.

Fig.8

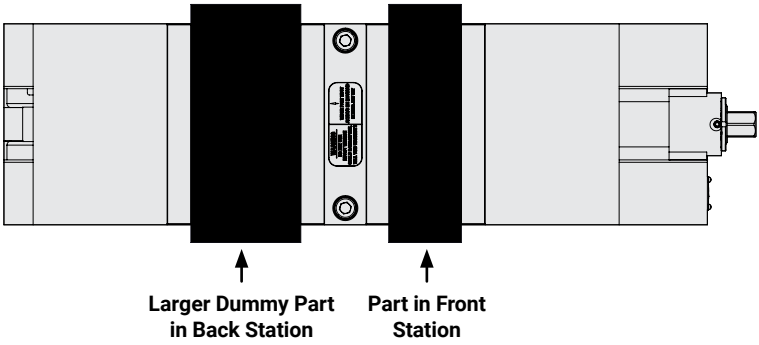


OPERATING INSTRUCTIONS

Clamping Using Only 1 Station:

If desiring to use only one side of the double-station vise, you must use a dummy block in the other station as shown in Fig.9 below.

Fig.9



Converting to a Single Station Vise:

If desiring to convert your double station vise to a single station, you will need to get a Kurt conversion kit through our website, kurtworkholding.com. This kit includes a mounting plate that bolts to the rear of the vise and holds the back jaw in place. The center stationary jaw will need to be removed as well. See Fig.10 below.

Fig.10

STANDARD JAW OPTIONS

Standard J-Style Hard Jaws:

The standard J-style hard jaws are made of ductile iron and are paired with Kurt standard jaw plates. For dimensional information and jaw positioning, see Fig.12 and Fig.13 on pages 15-16.

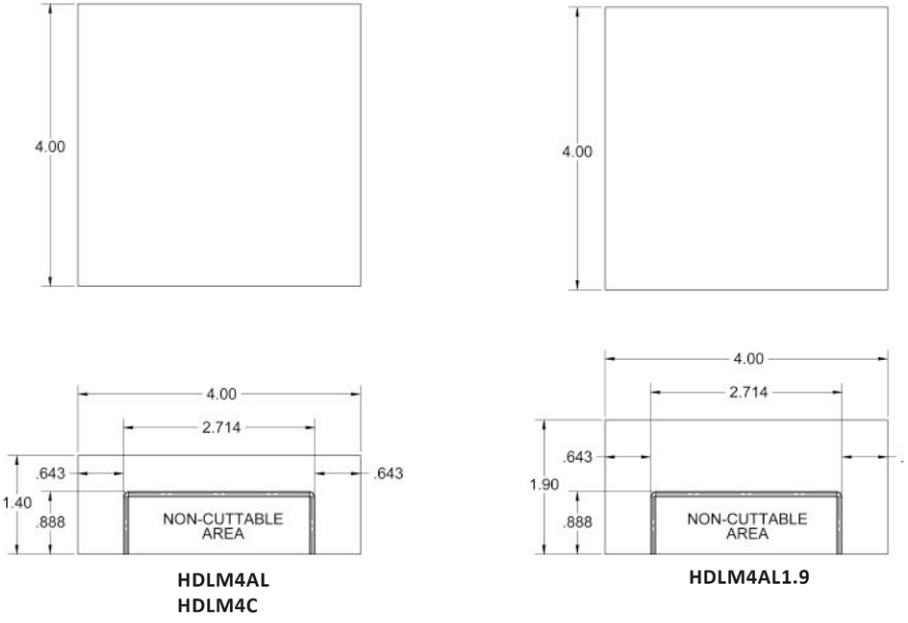
Aluminum Carvable/Machinable Jaws:

The Aluminum Carvable jaws come in two different jaw heights - 1.40" and 1.90". These jaws can be can be machined in the carvable regions of the jaw (See carvable region in Fig.11) to hold curved and contoured shaped parts. **DO NOT** cut into the non-carvable region.

Cast Carvable/Machinable Jaws:

The cast ductile iron carvable jaws have a jaw height of 1.4".

Fig.11

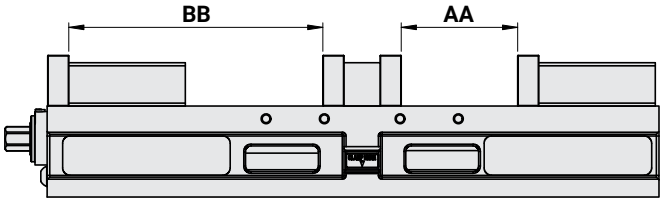


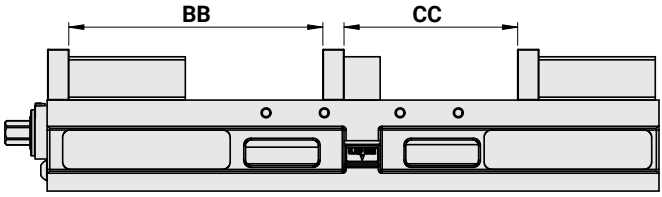
JAW POSITIONING

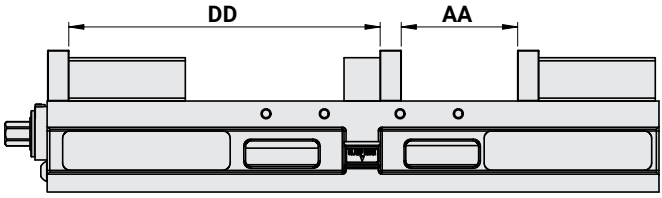
Fig.12

Note: Dimensions below are in inches unless specified.

AA	4.00
BB	8.72
CC	5.96
DD	10.69



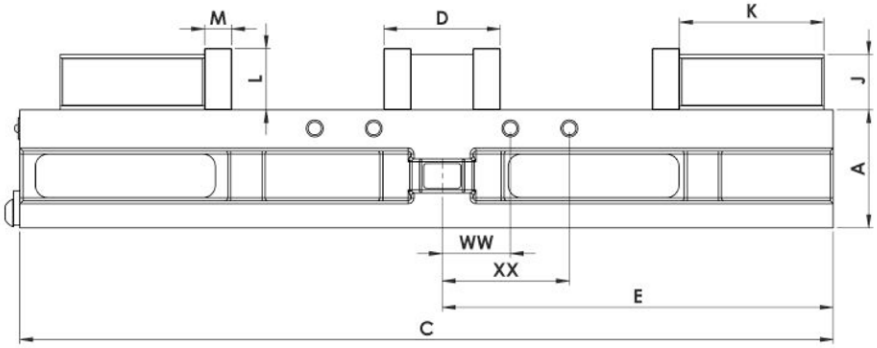




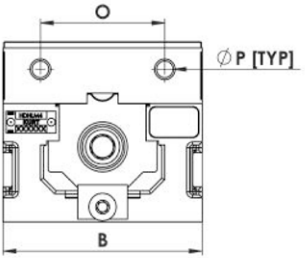
SIDE & END VIEW

Fig.13

Note: Dimensions below are in inches unless specified.



A	2.375
B	4.000
C	16.375
D	2.344
E	7.875
F	1.326
J	1.115
K	2.906
L	1.235
M	0.547
O	2.500
P	M8 X 1.25
WW	1.375
XX	2.563

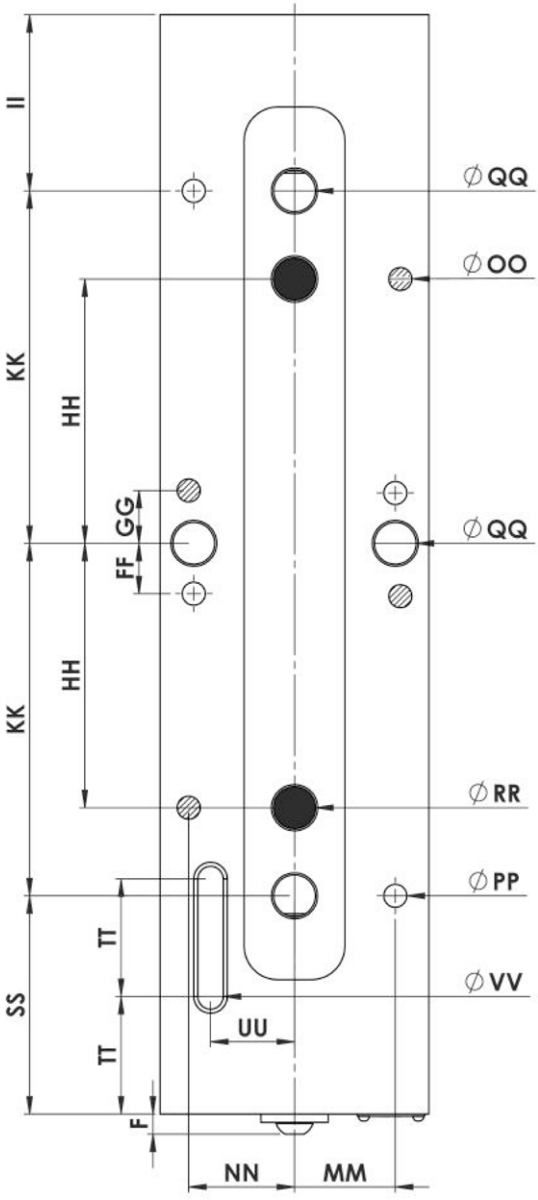


MOUNTING LOCATIONS

Note: Dimensions below are in inches unless specified.

Fig.14

F	0.298
FF	0.75
GG	0.787
HH	100 mm
II	2.625
KK	5.25
MM	1.5
NN	40 mm
OO	M8 SHCS
PP	5/16 SHCS
QQ	0.625
RR	16 mm
SS	3.25
TT	1.75
UU	1.25
VV	0.38



MOUNTING THE HDHL4

Locating the HDHL4 with keys requires the use of sine keys instead of standard keys. Sine Keys are available in several different sizes that are listed on our website at www.kurtworkholding.com. The keys are sold in sets of 2 per package.

English Mounting:

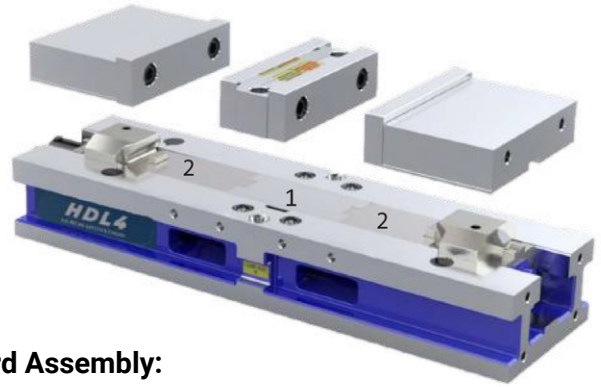
The HDHL4 can be properly located using the four English sine key holes indicated by dimension QQ in Fig.14 on page 17. The HDHL4 can be bolted down using the four English 5/16" bolt holes indicated in Fig.14 by dimension PP. The HDHL4 vise can also be clamped on the sides using toe clamps.

Metric Mounting:

The HDHL4 can be properly located using the two Metric sine key holes indicated by Dimension RR in Fig.14 above. The HDHL4 can be bolted down using the four Metric M8 bolt holes indicated in Fig.14 by OO.

PROPER CHIP GUARD INSTALLATION AND USAGE

Fig.15



Chip Guard Assembly:

The Chip Guard shown above is provided to keep chips from the nut and screw assembly.

The two side chip guards (#2 Fig.15) should be placed so that the rectangular hole in the chip guards is placed over the rectangular peg on the nut.

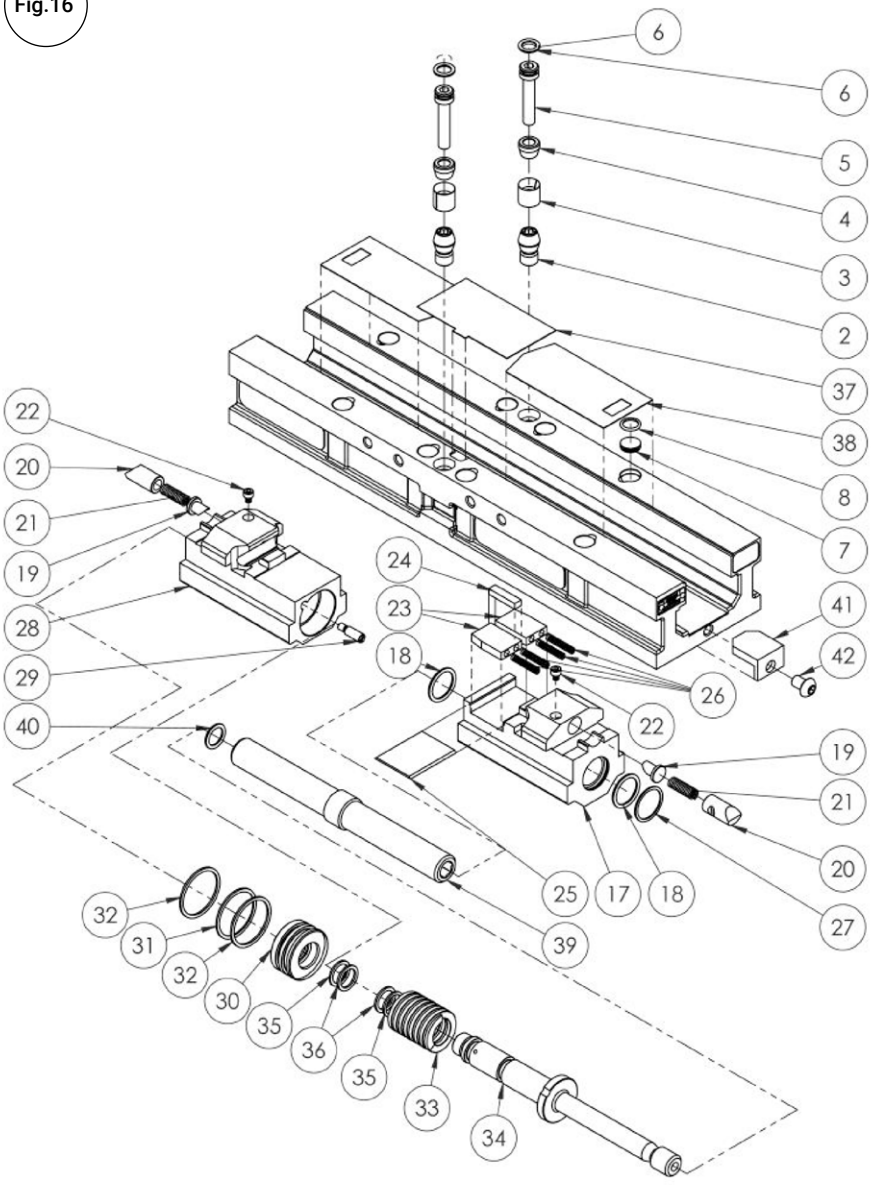
The center chip guard (#1 Fig.15) can be inserted so the key part of the chip guard is inserted into the notched area of the vise bed. This top chip guard will ride on top of the two side chip guards during clamping.

HDHL(M)4 PARTS LIST

ITEM#	PART#	DESCRIPTION	QTY.
1	HDLM4-1	BODY MACHINED	1
2	HDLM4-277	LOCATING PIN	2
3	HDLM4-209	CLAMP SLEEVE	2
4	HDLM4-35	CLAMP	2
5	HDLM4-18	SHCS M8x1.25 X 40MM LG (ALTERED)	2
6	360AU-99B	O-RING #110 3/Bl.D X 9/16 O.D. X 3/32 C.S. (70 DUROMETER)	2
7	HDLM4-191	PROTECTIVE PLUG	8
8	MT4-96	O-RING #013 7/16 I.D. X 9/16 O.D. X 1/16 C.S. (70 DUROMETER)	8
9	07-0230	U-TYPE DRIVE SCREW #2 X 1/4 LG	2
10	HDLM4-223	CAUTION STICKER	1
11	HDLM4-111	CLAMP LOCATION STICKER	2
12	HDLM4-313F	VISE BODY STICKER (LEFT FRONT)	1
13	HDLM4-313R	VISE BODY STICKER (LEFT REAR)	1
14	HDLM4-314R	VISE BODY STICKER (RIGHT REAR)	1
15	HDHLM4-102	SERIAL TAG	1
16	HDHLM4-314F	VISE BODY STICKER (RIGHT FRONT)	1
17	HDHLM4-3F	FRONT NUT	1
18	3600V-99	O-RING, #117	2
19	HDHLM4-334	PRE-LOAD PLUNGER	2
20	HDHLM4-142	SPRING GUIDE	2
21	HDLM4-267	LEE COMPRESSION SPRING #LC-038D-17S (STAINLESS) 0.300 O.D. X 0.0380 X 2" FREE LGTH (RATE 9.5LBS)	2
22	26-0050	SHCS M4x.7 X 5MM LG	2
23	HDHLM4-225	FRICTION CLAMP	2
24	HDHLM4-311	SPRING (PRELOAD) RECTANGULAR	1
25	HDHLM4-53	COVER	1
26	HDHLM4-169	LEE COMPRESSION SPRING # LC-035B-135 (STAINLESS) 0.180 O.D. X 0.0350 X 1.250 FREE LGTH (RATE 35.98#)	4
27	HDHLM44-147	SMALLEY MEDIUM DUTY RETAINING RING #WH-100	1
28	HDHLM4-3R	REAR NUT	1
29	HDHLM4-25	TIMING PIN	1
30	HDHLM4-93	PISTON / RETAINING RING	1
31	HDHLM4-188	PARKER PARBAK #125 (8-125-N300-90)	1
32	HDHLM4-96	O-RING #125 1 5/16 I.D. X 1 1/2 O.D. X 3/32 C.S. 90 DUROMETER	2
33	4THU-87	COMPRESSION SPRING	1
34	HDHLM4-89A	PISTON SCREW	1
35	HDHLM4-187	PARKER PARBAK #113 (8-113-N300-90)	2
36	HDHLM4-68	O-RING #113 9/16 I.D. X 3/4 O.D. X 3/32 C.S. 90 DUROMETER	2
37	HDLM4-248	STATIONARY CHIP GUARD	1
38	HDLM4-249	MOVABLE CHIP GUARD	2
39	HDHLM4-5A	SCREW EXTENSION	1
40	360AU-99B	O-RING #110 3/8I.D X 9/16 O.D. X 3/32 C.S. (70 DUROMETER)	1
41	HDHLM4-61	SPACER	1
42	29-0168	SBHCS M8 X 1.25 X 12 LG.	1

HDHL(M)4 MECHANICAL DRAWING

Fig.16



MAINTENANCE SCHEDULE

It is very important to perform regular maintenance on your Kurt vise to ensure proper operation. Improper maintenance will result in poor vise performance and may void your warranty.

Daily/ Weekly

1. Remove chips from surface of vise.
2. Visually inspect seals for damage and cleanliness.
3. Visually inspect for chip entrapments and remove when necessary.
4. Air-dry and apply rust inhibiting oil to the machined surface of the vise.

Monthly

1. Open the vise to the maximum opening.
2. Slide the Jaw slightly toward the stationary jaw and lift up to remove the jaw from the “beak” of the nut.
3. Turn the movable jaw over and clean the inside cavity.
4. Remove chips, clean and apply a light coat of machine oil to the machined surface of the following item:
   a. Nut & Screw assembly (clean exposed threads on the screw)
   b. Bed of vise (top of “rails”)
   c. Inside of the vise between the center ways.
5. To re-assemble the movable jaw, press down on each of the quick jaws to lock into place
6. Your vise is now ready for use. Open and close your vise to check for proper operation. Center the part to be clamped in the vise and close. Your parts should be centered from side to side to ensure proper clamping.

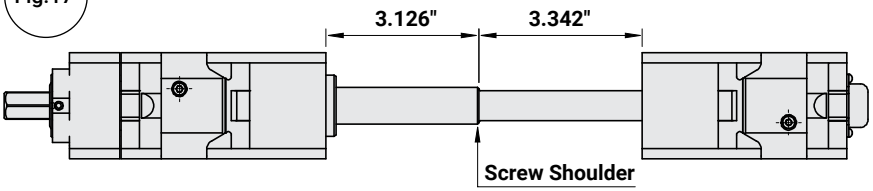
DISASSEMBLY INSTRUCTIONS

1. On the HDHL(M)4 (manual-long) model, start by removing the rear movable jaw and rotating the lead screw clockwise to close the vise.
2. Removing the M8 button head cap screw (#42 - Fig.16 on Page 20) and the "L" shaped bracket (#41 - Fig.16) located by the internal hex of the lead screw.
3. Remove the stationary and front jaws. Place a 4-3/4" long x 3/4" wide x 3/16" thick piece of stock between the rear nut and the positive stop on the machined nut rail support surface found on the inside floor of the body.
4. Turn the lead screw counter-clockwise to open the vise as this will push the front nut out of the vise body.
5. The nut and screw assembly can now be completely removed from the vise body.

ASSEMBLY INSTRUCTIONS

1. On the HDHL(M)4 (manual-long) model, start by double checking the nut timing position before installing the nut and screw assembly into the vise body (See Fig.17 below).
2. Slide the nut and screw assembly into the vise body up to the friction clamps (#23 - Fig.16) on the front nut. Place the pull bar that came with the vise into the counter bored holes and start closing (Turn the screw clockwise) the vise.
3. Once the friction clamps are inside the vise body, continue closing until there is room to install the "L" shaped bracket spacer and M10 button head cap screw (Items #41 & #42 - Fig.16).
4. Open the vise to free up the pull bar and remove it. Remount the jaws. The vise is now read for use.

Fig.17



Rotate Nuts until dimensions are achieved

TROUBLESHOOTING TIPS

If properly maintained, the Kurt HDHL4 Series vise will operate trouble free for many years. In some cases it will be necessary to troubleshoot. Use the information below to help in the process.

Problem: My vise turns hard.

Tip: As a new vise the brush seal could be stiff. Allow for break-in of vise.

Tip: As a used vise, it could be filled with chips and threads could be jammed. Properly clean and grease vise.

Problem: My vise will not turn in either direction.

Tip: The vise is jammed with debris. Disassemble and clean as needed.

Problem: My vise won't hold tolerance.

Tip: You may be experiencing jaw lift from clamping too high or on one side of the jaw. Lower the part in the vise jaw and clamp more material.

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KURT WORKHOLDING

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