



KURT WORKHOLDING

HDL4 MANUAL ASSEMBLY

Operating Instruction Manual
HDL4 (English) & HDLM4 (Metric)



ENGLISH

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WISE 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 KURTHOLDING.COM

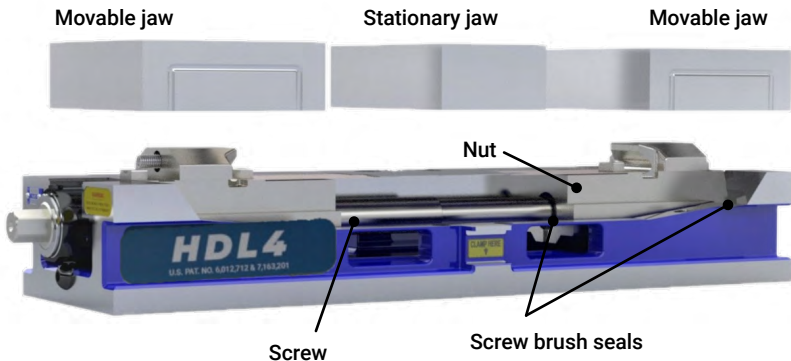
INTRODUCTION

Thank you for purchasing a Kurt HDL4 vise. 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 ½ pound of force downward which minimizes the jaw lift and increases accuracy (Fig.1). 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 cutting pressure.

TORQUE/CLAMPING FORCE TABLES

HDL4 / HDLM4	
TORQUE FT-LBS	FORCE IN LBS.
10	1,000
20	2,100
30	3,100
40	4,000
50	4,950
60	5,850

WISE 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 13-14 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 10mm 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.

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.

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.2 on next page)

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.

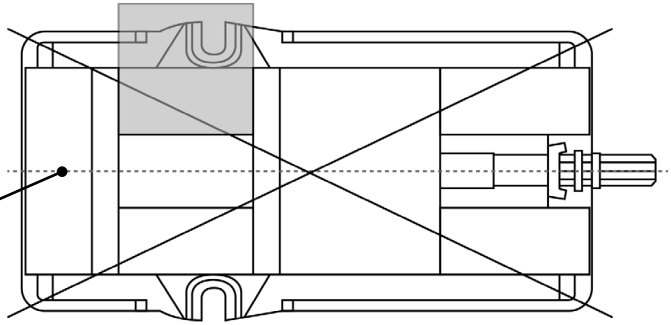
Always use jaw plates for clamping. If jaw plates are not used, damage to the mounting surface of the movable and stationary jaw will occur. This will result in reduced clamping accuracy and repeatability.

Fig.2

Sketch #2A

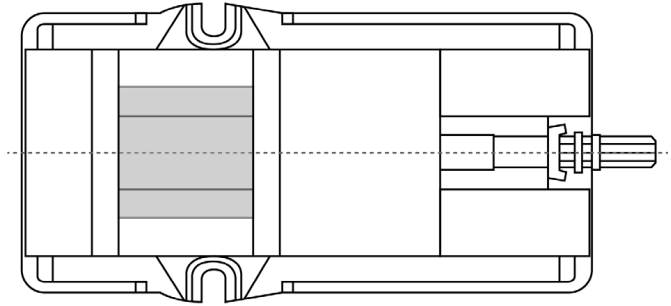
Incorrect part
clamping.

Vise width
centerline



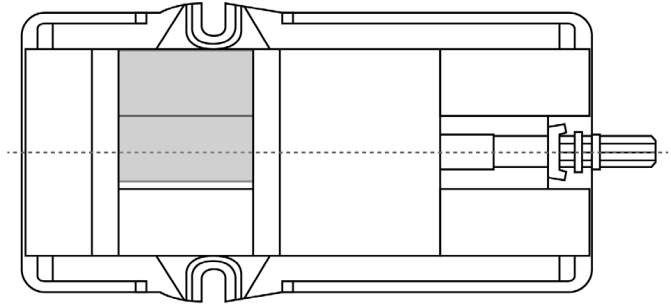
Sketch #2B

Correct part
clamping



Sketch #2C

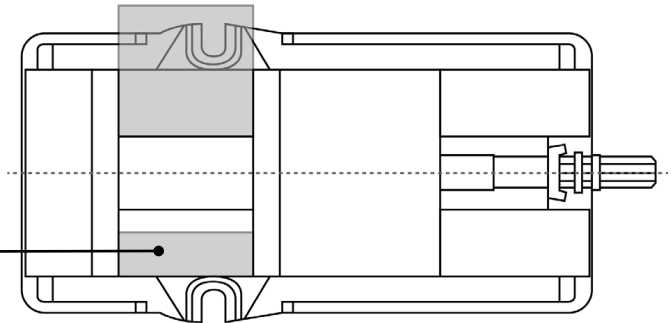
Correct part
clamping



Sketch #2D

Correct part
clamping

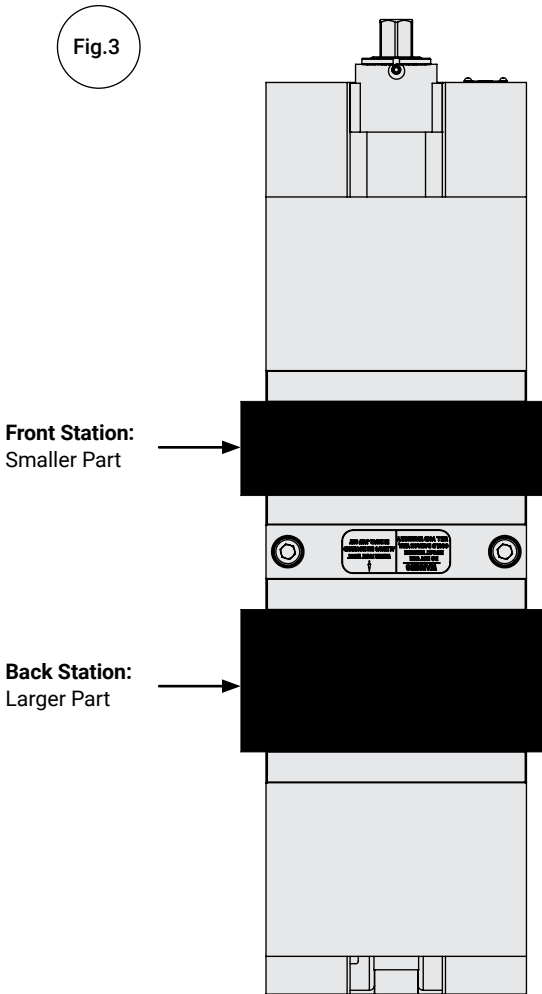
Dummy
spacer



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.3 below.

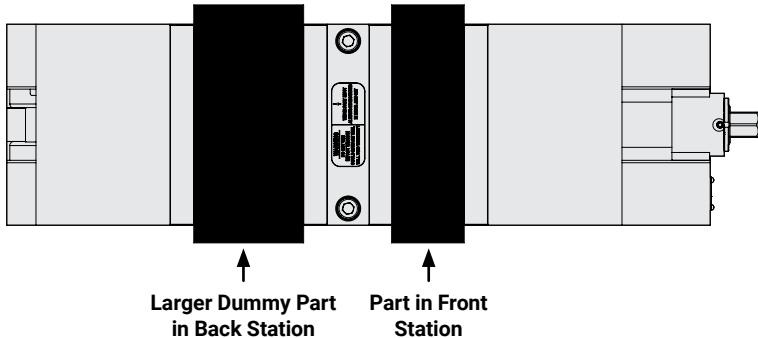


OPERATING INSTRUCTIONS

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.4 below.

Fig.4



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.5 below.

Fig.5



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.7 and Fig.8 on pages 11-12.

Aluminum Carvable/Machinable Jaws:

The Aluminum Carvable jaws come in two different jaw heights - 1.40" and 1.90". These jaws can be machined in the carvable regions of the jaw (See carvable region in Fig.6) 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 1.40".

Fig.6

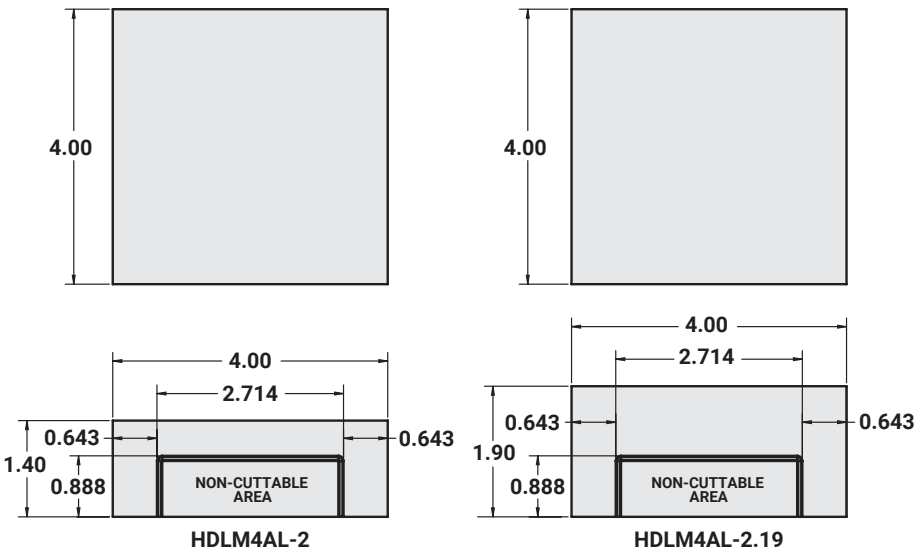


Fig.7

JAW POSITIONING

Note: Dimensions below are in inches unless specified.

AA	2.984
BB	6.437
CC	4.781
DD	7.687

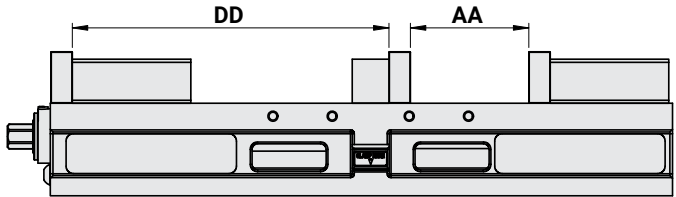
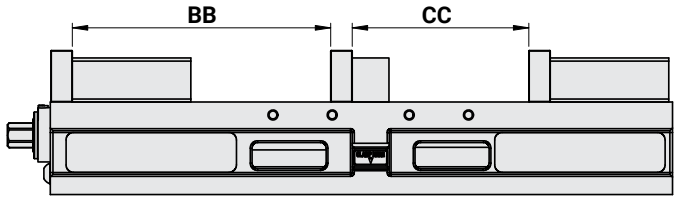
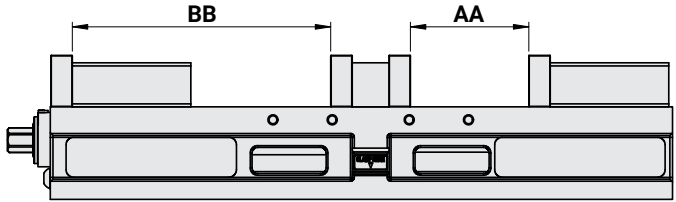
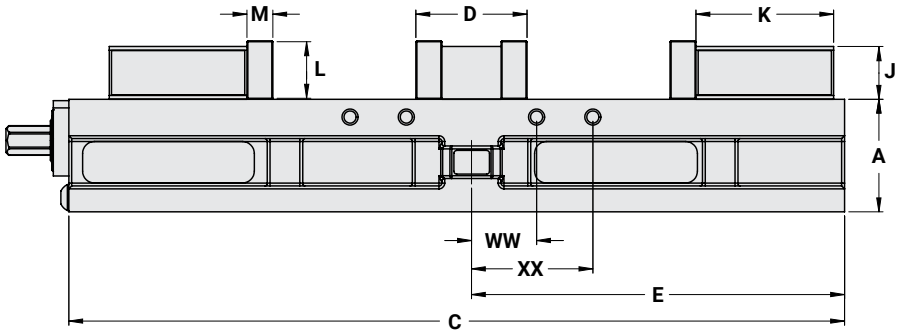


Fig.8

SIDE & END VIEW

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
FF Max	3.00
WW	1.375
XX	2.563

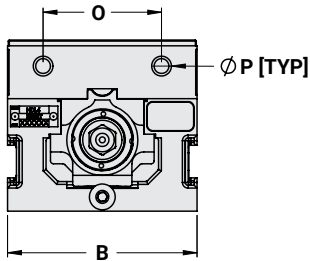
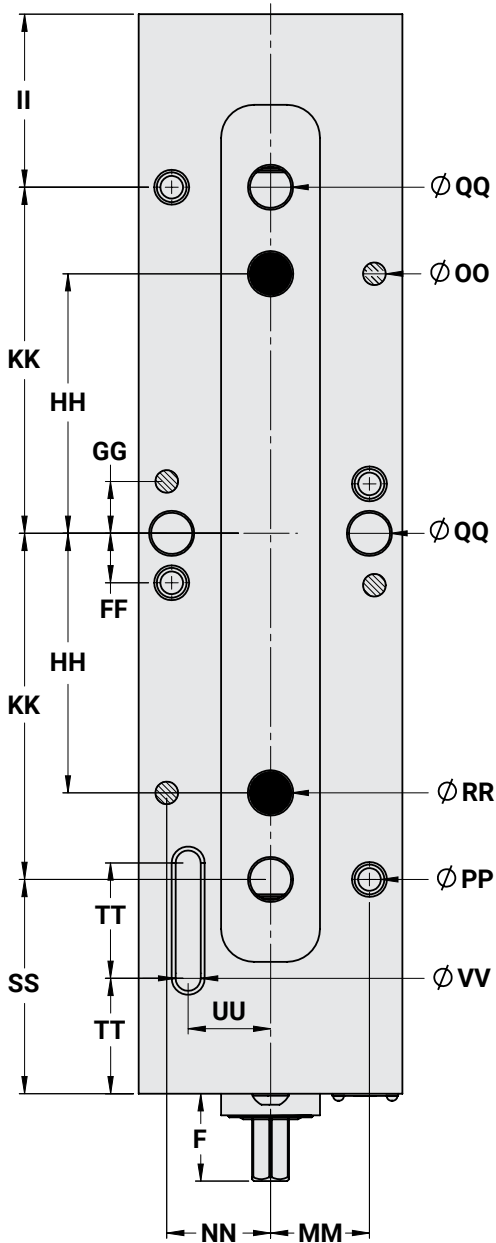


Fig.9

MOUNTING LOCATIONS

Note: Dimensions below are in inches unless specified.

F	1.33
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



SURFACE MOUNT USING SINE KEYS

Locating the HDL4 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 HDL4 can be properly located using (2) of the four English sine key holes indicated by dimension QQ in Fig.9 (page 13). The HDL4 can be bolted down using the four English 1/2" bolt holes indicated in Fig.9 by dimension PP. The HDL4 vise can also be clamped on the sides using toe clamps.

Metric Mounting:

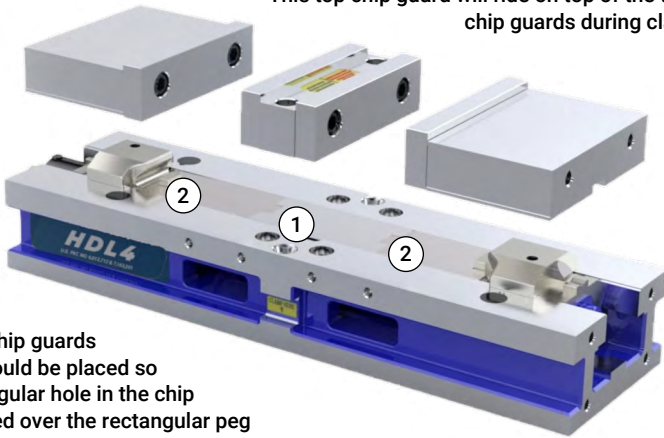
The HDL4 can be properly located using the two Metric sine key holes indicated by Dimension RR in Fig.9. The HDL4 can be bolted down using the four Metric M8 bolt holes indicated in Fig.9 by OO.

PROPER CHIP GUARD INSTALLATION AND USAGE

The chip guard is provided to keep chips out of the nut and screw assembly.

Fig.10

The center chip guard (#1 Fig.10) 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.



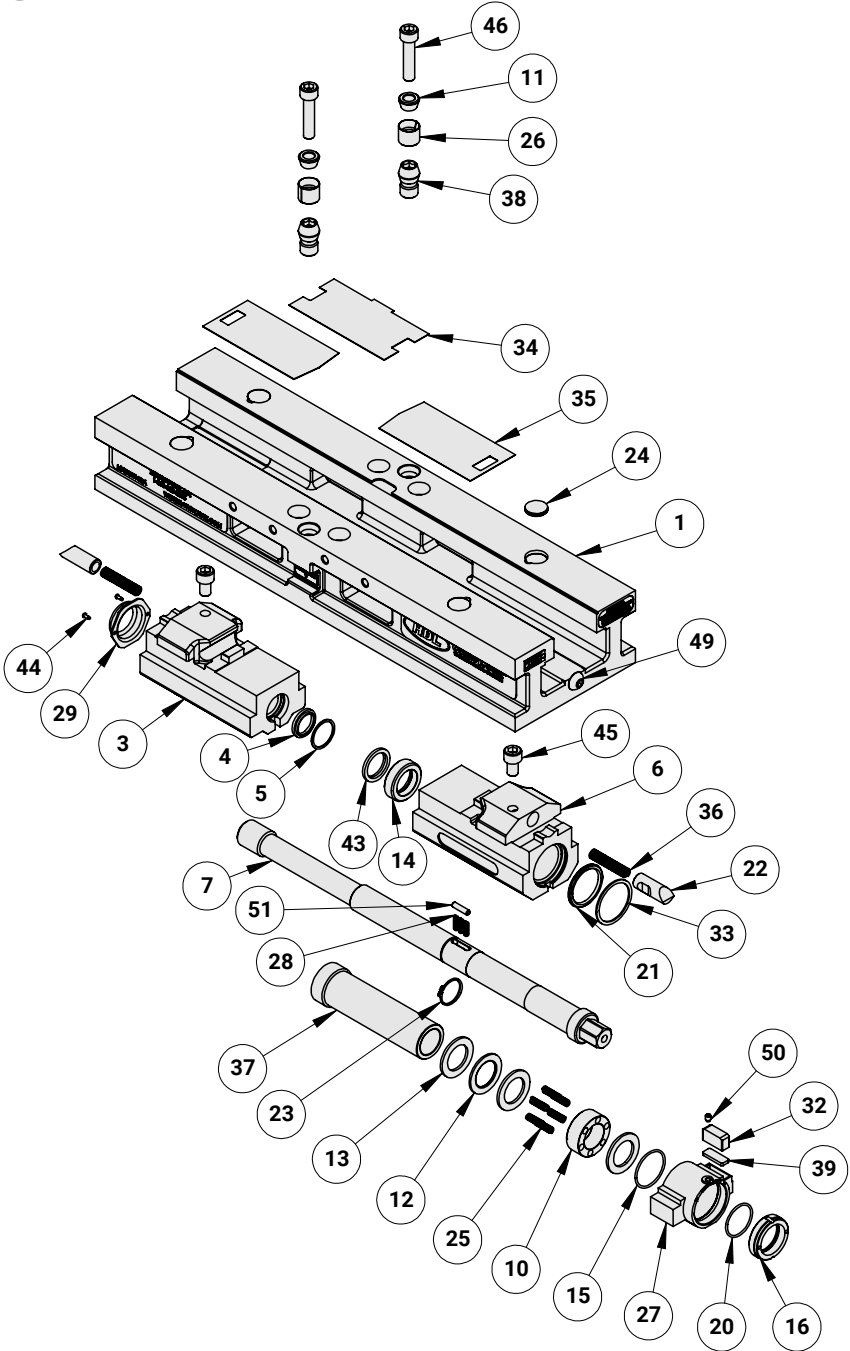
The two side chip guards (#2 Fig.10) should be placed so that the rectangular hole in the chip guards is placed over the rectangular peg on the nut.

HDL(M)4 PARTS LIST

ITEM#	PART#	DESCRIPTION	QTY.
1	HDLM4-1	BODY, MACHINED	1
3	HDLM6-3R-SA	REAR NUT ASSEMBLY	1
4	DL430-97	WIPER RING	1
5	DL430-217	RETAINING RING	1
6	HDLM4-3F-SA	FRONT NUT ASSEMBLY	1
7	HDLM4-5	SCREW	1
10	DL430-8A	COLLAR	1
11	HDLM4-35	CLAMP, STATIONARY JAW	2
12	D40-41	THRUST BEARING	1
13	DL400-42A	THRUST WASHER	3
14	HDLM4-61	SPACER, THREADED	1
15	DL430-68	O-RING #28	1
16	DL430-91-P	COLLAR, THREADED	1
20	DL430-128	O-RING #025	1
21	DL430-129	O-RING, METRIC	1
22	HDLM4-142	SPRING GUIDE	2
23	DL430-147A	SNAP RING	1
24	HDLM4-191-SA	PROTECTIVE PLUG ASSEMBLY	4
25	DL430-197	SPRING	8
26	HDLM4-209	CLAMP SLEEVE	2
27	HDLM4-212A	HOLDING BLOCK	1
28	DL640-215	CLUTCH SPRING	3
29	DL400-218	END CAP	1
32	HDLM4-225	FRICTION CLAMP	1
33	DL430-231	RETAINING RING	1
34	HDLM4-248	STATIONARY CHIP GUARD	1
35	HDLM4-249	MOVABLE CHIP GUARD	2
36	HDLM4-197	SPRING, (RED) MANUAL	2
37	DL430-273A	CLUTCH	1
38	HDL4-277 English	Locating Pin, Stationary Jaw (ENGLISH)	2
38	HDLM4-277 Metric	Locating Pin, Stationary Jaw (METRIC)	2
39	HDLM4-311	SPRING, PRE-LOAD	1
40	HDLM4-313F	STICKER, LEFT FRONT	1
41	HDLM4-313R	LABEL, LEFT REAR	1
42	HDLM4-314R	LABEL, RIGHT REAR	1
43	DL430-97	WIPER RING	1
44	07-0230	U-TYPE DRIVE SCREW #2 X 1/4 L	2
45	26-0050	SHCS M5 X 0.8 X 6MM LG	2
46	HDL4-18 English	SHCS 5/16-18 UNC (ENGLISH)	2
46	HDLM4-18 Metric	SHCS M8 X 1.25 (METRIC)	2
49	03-0141 English	BHCS, 5/16-18 X 1/2	1
49	29-0168 Metric	BHCS M8 X 1.25 X 12 (METRIC)	1
50	28-1094	SET SCREW, M4 X 0.7 X 6MM LG	1
51	04-0030	DOWEL PIN, 3/16 X 0.75 LG	1

Fig.11

HDL(M)4 MECHANICAL DRAWING



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.

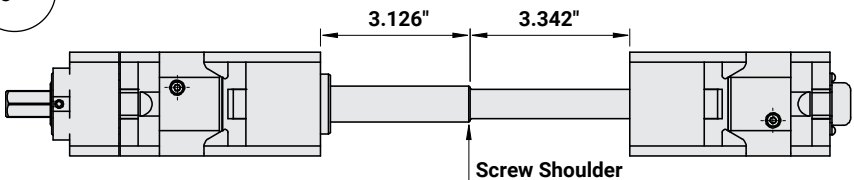
3 to 6 months

1. On the HDLM4 (manual-long) model, start by removing the M8 button head cap screw (#49-Fig.11) located under the holding block and threaded into the vise body. (See page 16 for parts list)
2. Remove rear station movable jaw.

MAINTENANCE SCHEDULE

3. Place a 3.25" thick spacer in the front station, and start closing the vise and this will drive the holding block (#27 in Fig.11) out of the vise body.
4. Once the holding block is clear of the body, reverse the screw rotation, so the spacer can be removed.
5. Remove the stationary and front movable jaws from the vise.
6. Remove the chip guards
7. The nut and screw assembly can now be slid out freely from the vise.
8. Thoroughly clean and oil the nut and screw assembly, vise body, and jaws so there are no chips or debris left.
9. Now it's time to reset the timing. Turn the rear nut counter clockwise until you can feel resistance. Turn the nut back the other way until the front and rear front are in line with one another. This sets the timing of the front and rear nut. (See Fig.12 below)
10. Slide the nut and screw assembly, rear nut first, into the vise body up to the holding block. See Fig.11 for holding block identification.
11. Install stationary and rear movable jaws. Place a 3.25" spacer in the rear station and start closing (clockwise rotation) the vise. You may have to help get the friction clamp (rectangle piece with tapered ends) started into the body by using a pair of pliers to help compress the spring material.
12. Once the holding block is inside the body, reinstall the M10 button head cap screw in the end of the body. Install front movable jaw.
13. Your vise is now ready to use.

Fig.12



Rotate Nuts until dimensions are achieved

TROUBLESHOOTING TIPS

If properly maintained, the Kurt HDL4 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.

Problem: My vise is stiff when clamping on a part or is difficult to back off a part.

Tip: The vise's thrust bearing pack may need to be replaced.

Problem: My vise is not clamping at a high clamping force.

Tip: The vise's thrust bearing pack may need to be replaced.

Problem : My vise is clamping at a low clamp force or it comes to a stop when clamping on a part.

Tip: The vise's clutch pin could be in what is called the over travel position

Tip: To get your vise out of over travel, open your vise to it's most open position. This will reset the clutch pin and you may hear a click.

All Kurt Manufacturing Company industrial workholding products and parts with the exceptions noted below, are warranted against defects in material and workmanship for the life of the product or part. (The life of the product is defined as that point in time when such item no longer functions due to normal wear and tear.) 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 inconsistent 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 or any authorized service center, 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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