

Video instructions can be found on YouTube.com at

Part 1: <https://youtu.be/YqVM-aYRNvg>

Part 2: <https://youtu.be/FhaonXmQajg>

SHERLINE PRODUCTS

INCORPORATED 1974

Sherline MB Vise Fixture

P/N 3552, 3553

About the Sherline MB Vise Fixture

For many years our customers have been asking if we offer a larger mill vise for our machine than our standard milling vise (P/N 3551). Many of our customers have purchased larger "toolmaker vises." Toolmaker vises work, but they weigh almost as much as our machine and are too large for our mill. Other customers have designed different vises that will accommodate large parts, and although their designs are good, they didn't fit all of our criteria. We have been trying to find something that offers the most versatility at a size and weight that fits our milling machines. We finally found what we were looking for when considering using "Mitee-Bite fixture clamps" as part of our vise fixture design.

Mitee-Bite Products LLC, founded in 1986, is the innovator of compact, low-profile edge clamps, and their products have become an industry-standard because of their products' benefits and quality.

Mitee-bite fixture clamps are designed for industrial use. They can exert up to 600 ft/lbs. of clamping force while only holding onto .060"-.130" of material (see **Additional Notes** at the end of this document for set-up information).

Our Sherline MB vise fixture is designed to locate on the T-slots in our mill table and our tooling plates. By using the T-slots to locate the fixed and movable jaw, your mill table or tooling plate becomes the base for the vise fixture. This allows the entire table length of your mill to be used. You can now hold and machine parts that are much larger and have various different shapes and sizes.

Holding Stock in the Vise Fixture

Our vise fixture allows you to hold virtually any stock or part shape by offering two different sets of top jaws.

Our standard Sherline MB Vise Fixture (P/N 3552) comes with a fixed base plate (P/N 35521) and a movable base plate (P/N 35520), along with two of our top jaws (P/N 35522). You can use this top jaw with either the Talon Grip Vise Jaw Inserts (P/N 35526) made by Mitee-Bite or the Reversible Jaw Inserts (smooth/serrated, P/N 35524) made by Saunders. These top jaws hold square and rectangular stock (see the exploded view on page 2).

We also offer our the MB Versagrip Top Jaws (P/N 35535), used with the same fixed and movable base plates. These top jaws use the MB Versagrip Vise Jaw Inserts (P/N 35529) made by Mitee-Bite. You can place these jaw inserts into any insert pockets in the MB Versagrip top jaws (P/N 35535) to accommodate round material and different shaped parts. These jaw inserts are 3/4" round and can be rotated to match the part shape you wish to hold (see the exploded view on page 3).

Jaw Features and Specifications

The overall assembled dimensions for the fixed jaw assembly is 4.0" (101mm) wide x 1.983" (50.36mm) deep x 1.0" (25.4mm) high.

The overall assembled dimensions for the movable jaw assembly is 4.0" (101mm) wide x 1.783" (45.28mm) deep x 1.0" (25.4mm) high.

If you substitute the top jaw (P/N 35535) onto the assembly, the height of each assembly changes to 1.175" (29.5mm). The depth of the fixed jaw assembly is 2.120" (53.8mm) and the depth of the movable jaw assembly is 1.9" (48.26mm).

The part locating surface on both of the top jaws (P/N 35522) is 1/8" (3.175mm) wide, which will allow the user to hold smaller parts as well as larger parts.

The dimension from the top of the jaw locating surface to the top of the insert (P/N 35526) is .072" (2.85mm). The dimension from the top of the jaw locating surface to the top of reversible jaw insert (P/N 35524) is .162" (4.12mm).

These inserts will allow you to hold .072" or .162" of your material tight enough to machine your part without it being pulled out of the fixture. This will also allow you to make most parts in two operations. On the first operation, you can rough and finish machine the majority of your part, leaving only .072" or .162" of material to remove when you turn the part over to machine the second operation.

The Talon Grip Vise Jaw Insert (P/N 35526) is serrated on both sides and designed to hold raw stock. The serrated edge is part of the insert's gripping design and strength (comes as 2 inserts w/2 screws).

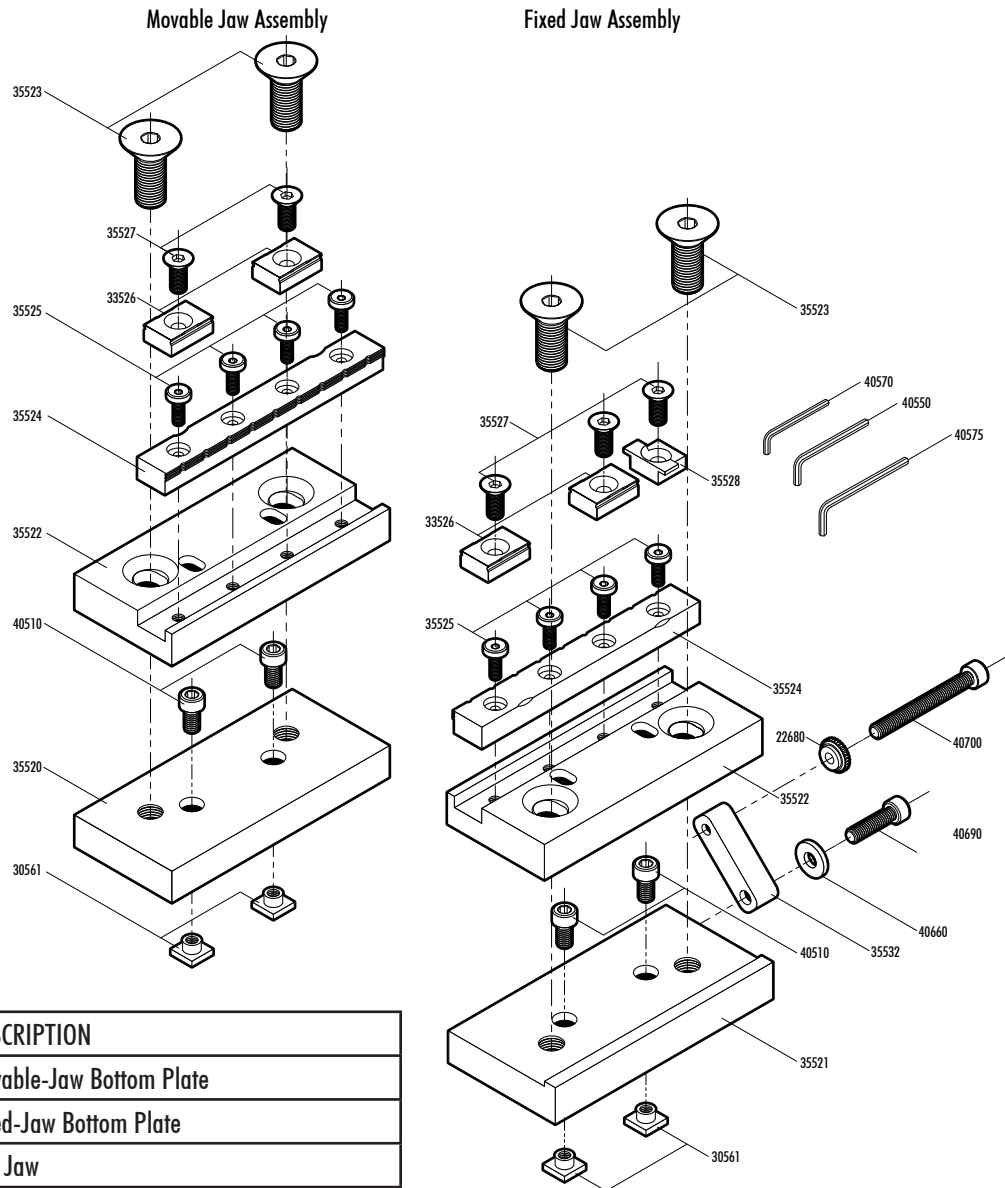
The **Reversible Jaw Insert (P/N 35524)** has a serrated side and a smooth side. The serrated side is used for raw stock, just as P/N 35526 noted above. The smooth side is used to hold parts by their finished surface, leaving virtually no marks. This insert can be turned from the serrated side to the smooth side in the top jaw easily (comes as 1 insert w/4 screws).

The **MB Versagrip Vise Jaw (P/N 35529)** also has two serrated sides, which hold onto raw material. These will also bite into the part surface (comes as 2 inserts w/2 screws).

NOTE: You can use the serrated side of these inserts to hold finished parts without damaging the part surface if you use light clamping pressure and only if you are taking very light cuts or engraving.

Have fun making chips,
Sherline Products Inc.

P/N 3552 MB Vise Exploded View



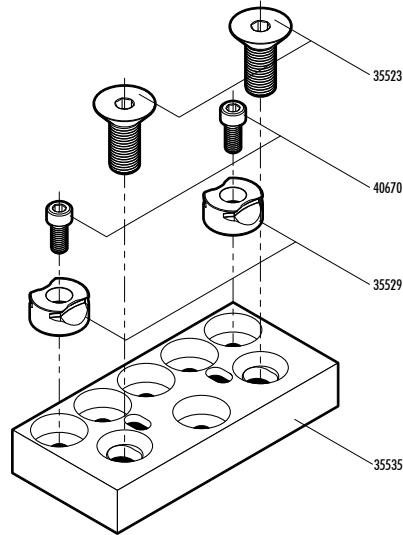
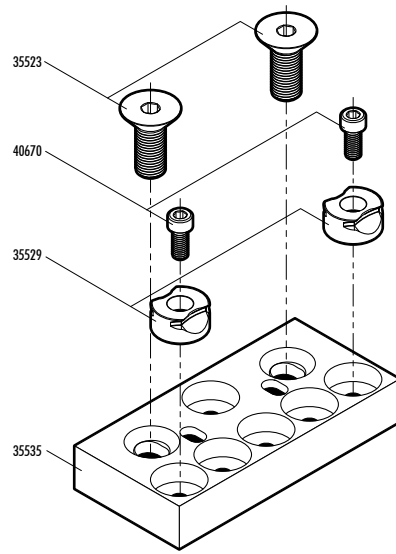
NO. REQ.	PART NO.	DESCRIPTION
1	35520	Movable-Jaw Bottom Plate
1	35521	Fixed-Jaw Bottom Plate
2	35522	Top Jaw
4	35523	82° Clamp Screw (3/8-24 x 1" Flat Head Screw)
2	35524	Reversible Jaw Insert (Smooth/Serrated), each insert includes 4 screws
8	35525	10-32 x 3/8" SHCS with a low profile head
4	35526	Talon Grip Vise Jaws, comes as 2 inserts with 2 screws
5	35527	Talon Grip Replacement Screws
1	35528	MB Hard Stop

1	35532	Stop Arm
6	30561	T-Nut (2 extra)
4	40510	10-32 x 3/8" SHCS (for T-nuts)
1	40690	10-32 x 3/4" SHCS
1	40660	#10 washer
1	22680	QC Knurled Lock Nut
1	40700	10-32 x 1-3/4" SHCS

P/N 3553 MB Vise Exploded View

Movable Jaw Assembly

Fixed Jaw Assembly



NO. REQ.	PART NO.	DESCRIPTION
4	35523	82° Clamp Screw (3/8-24 x 1" Flat Head Screw)
4	35529	MB Versagrip Vise Jaw 3/4", comes as 2 inserts with 2 screws
2	35535	MB Versagrip Top Jaw
4	40670	10-32 x 1/2" SHCS

INSTRUCTIONS

Sherline MB Vise Fixture Parts and Tools

Our Sherline/MB Vise Fixture (P/N 3552) has four main parts:

- P/N 35520 Movable Bottom Plate (MBP)
- P/N 35521 Fixed Bottom Plate (FBP)
- P/N 35522 Top Jaw
- Jaw Inserts and clamps (see exploded views on pages 2 and 3 for part number details)

Use the three included hex keys to assemble and operate this Vise Fixture:

- P/N 40575 7/32" (for the 82° clamping screws, P/N 35523)
- P/N 40550 5/32" (for the T-nut screws and hard stop parts)
- P/N 40570 3/32" (for all of the insert mounting screws)

Part Size and Clamping Force Restrictions

These clamping inserts are capable of exerting 600 ft./lbs. of torque. This amount of torque far exceeds the torque that is needed to hold your part securely. It also exceeds the amount of torque that our mill table and T-nuts can withstand without failure or damage.

If you are using the vise fixture mounted directly on the mill table, and you are clamping parts that are thicker than our mill table, the maximum part length that you can hold securely without stressing (bending) the mill table is approximately 4" (110mm). Beyond 4" (110mm), excessive clamping force will begin to make either the part, or the mill table bend. If the part is thicker than the mill table, then the mill table will bend because it is the thinner / weaker part. If your mill table becomes harder to move after you have clamped your part, this indicates that your clamping force is too high and the mill table is starting to bend.*

You can still clamp parts that are longer than 4" (101mm) on your mill table. However, you will need to use less clamping force. Certain larger part sizes will not be able to be clamped sufficiently on our mill table without ill effects on the mill table. There are limits to every machine and every design.

Ideally the vise fixture performs best, if you are using the vise fixture with our tooling plate. With the added thickness and structural integrity of the tooling plate, mounted on our mill table. Thicker parts, and parts that exceed 4" (110mm) can be held and machined without any problems. You should still not exceed the ¼ to ½ turn of the clamping screws as recommended previously.

*A note on clamping force and machining flat surfaces when using this vise fixture:

Excessive clamping force when holding thinner material (especially if they are long parts) will cause the part to bow. This is especially true with plate material that is thinner than 1/2" (12.7mm). If your clamping force is too high, thinner material will bow (bend up) in the middle. When you use a fly cutter to machine the top of the part flat, the part surface "while it is in the vise fixture" will be flat. However, when you release the clamping pressure the part will flex back to its original state and the surface that you machined will now be bowed in the opposite direction.

In our manufacturing facility, when we are making the parts for our Sherline machines, we use torque wrenches on the mill vises to ensure that our clamping force is not high enough to make the parts bow. This use to be done by the machinist who had acquired a feel for how much to tap the vise handle when they loaded the parts in the vise.

On the vise fixture, you will need to acquire a feel for how much to turn the clamping screws. Especially on odd shape parts where you have several clamps located on different sides of the part. To help you to get a feel for your clamping pressure, you can use an indicator mounted in your headstock. Then zero the indicator on the top center area of the part before you clamp it (see Figure 1). Then measure how much the center of the part raises as you begin the turn the clamping screws. The clamping inserts are designed to pull the part down when you use them. Therefore, the rise that your indicator is showing when you clamp the part is not the part lifting out of the clamping inserts, it is the amount that the part is actually bending.

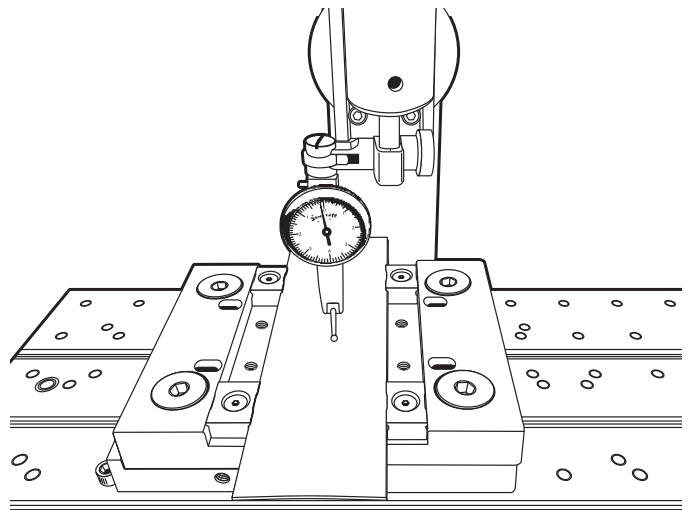


FIGURE 1

Vise Fixture Assembly Instructions

Start with the fixed jaw assembly since this assembly will remain assembled and this is the jaw that will be used to set up your part location on the mill.

1. Insert the (2) 10-32 x 3/8" SHCS P/N 40510 into the FBP P/N 35521 and thread on the (2) T-nuts P/N 30561 (see Figures 2 and 3). Put a dab of grease on the top of the FBP shown with a dashed line in Figure 2. We recommend our Super Lube Grease (P/N 7550).

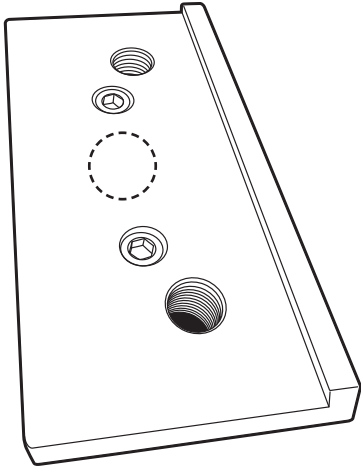


FIGURE 2—Top view of the FBP with the socket head cap screws. The dashed line indicates the area to place the dab of grease.

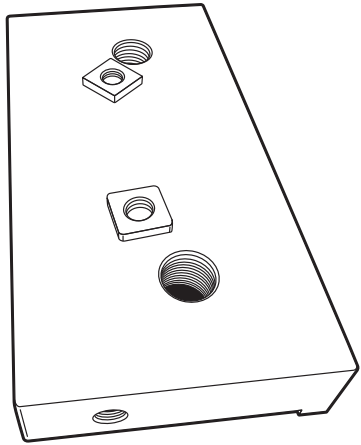


FIGURE 3—Bottom view of the FBP with the T-nuts threaded onto the socket head cap screws.

2. Mount the top jaw (P/N 35522) onto the FBP. First make sure that all of the mating surfaces of the top jaw and bottom plate are clean. It is recommended that you wipe a thin layer of grease, or Anti-seize onto the threads and the 82° taper of the 82° clamping screws P/N 35523. Mount the top jaw onto the top of the FBP with the insert slot of the top jaw on the side opposite of the step on the FBP (see Figure 4).

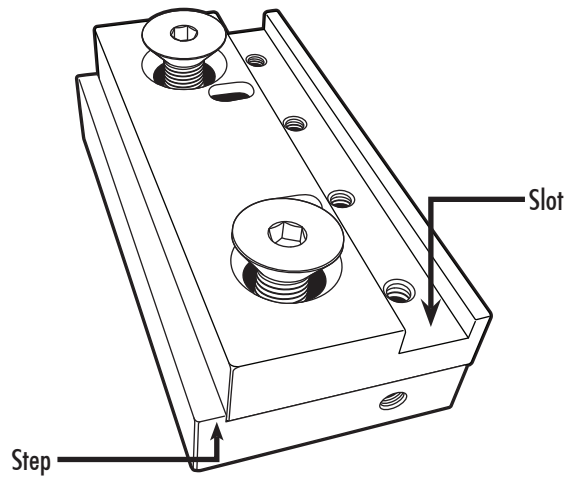


FIGURE 4

3. Thread the two 82° screws into the FBP. Alternate between screws as you tighten them completely (see Figure 5).

NOTE: The force of the 82° screws will pull the top jaw both down, and against the lip on the FBP.

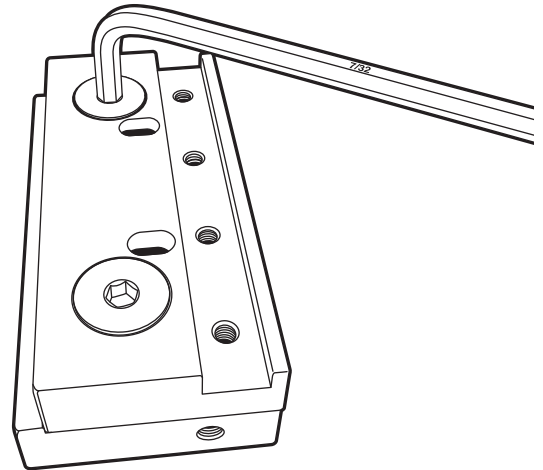


FIGURE 5—Use a 7/32" hex key for the 82° clamping screws.

4. Align the T-nuts on the T-slots of your mill table or tooling plate. Then position the fixed jaw assembly in the desired location (see Figure 6).

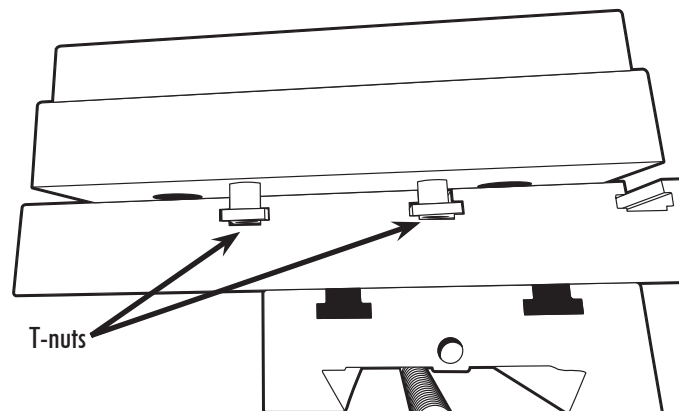


FIGURE 6—The T-nuts are aligned with the T-slots in the tooling plate.

- Align the fixed jaw squarely on your table or tooling plate and tighten the rear T-nut screw (the screw closest to the milling column, see Figure 7).

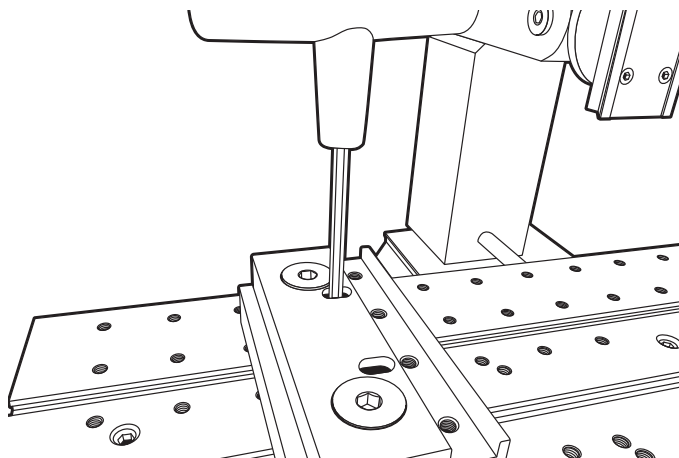


FIGURE 7

- You can use a combination square or the mounting holes in your tooling plate to get your fixed jaw “basically square.”

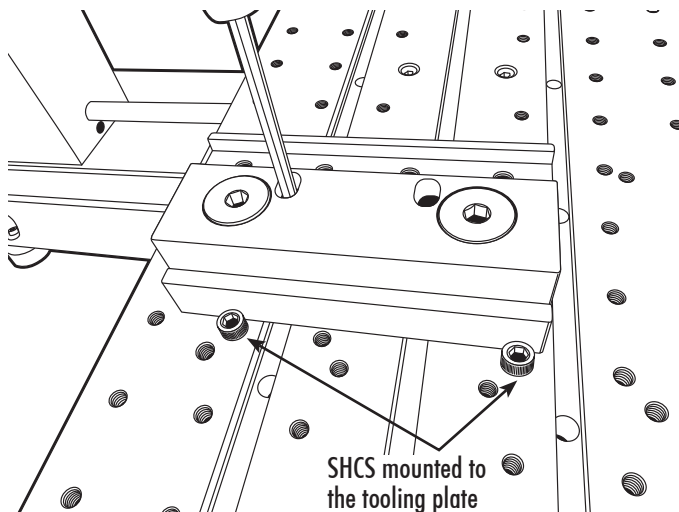


FIGURE 8—You can use two SHCS mounted on the tooling plate to get the FBP close to square.

- Use an indicator on the front edge of the top jaw to indicate your fixed jaw assembly in perfectly.

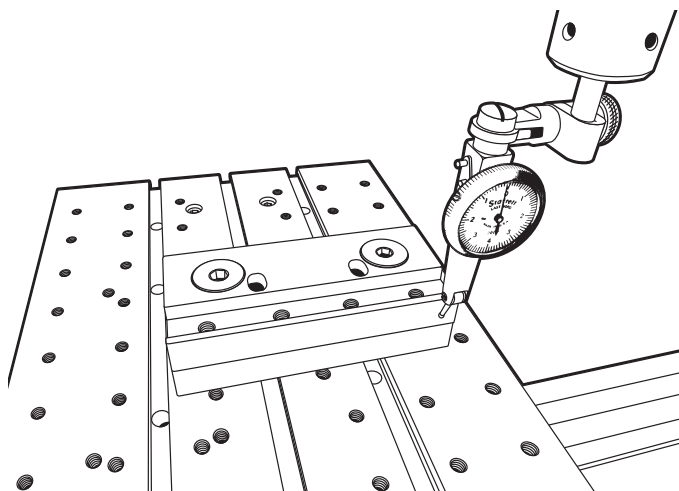


FIGURE 9—The indicator is mounted on the headstock spindle.

Once the jaw is square in the Y-axis, tighten the front T-nut screw and indicate again.

NOTE: The torque on the T-nut screw should not be extreme or you will either break the T-nut or damage the T-nut slot. Basic rule of thumb for the T-nut torque is a 1/4 turn past snug (half turn max).

- Mount the clamping insert of your choice into the slot on the top jaw. The top jaw is designed to accept both inserts P/N 35526 and P/N 35524. When you mount the insert in the slot, push the insert down and back against the backside of the insert slot as you tighten the insert screws. Again, adding a thin coat of grease or anti-seize to the threads of the insert clamping screws is recommended (see Figure 10).

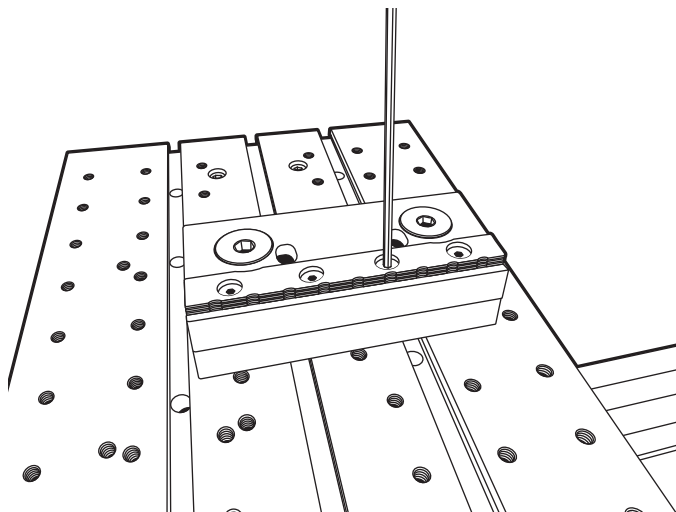


FIGURE 10—The serrated jaws

Now assemble and position the movable jaw assembly.

- Insert the T-nuts and screws into the Movable Bottom Plate (P/N 35520) as you did on the FBP.
- Using the T-slots, position the MBP in the approximate desired position on the table. The MBP should be orientated so the T-nut holes are toward the fixed jaw assembly (see Figure 11). Leave the T-nut screws loose for the next steps of the instructions.

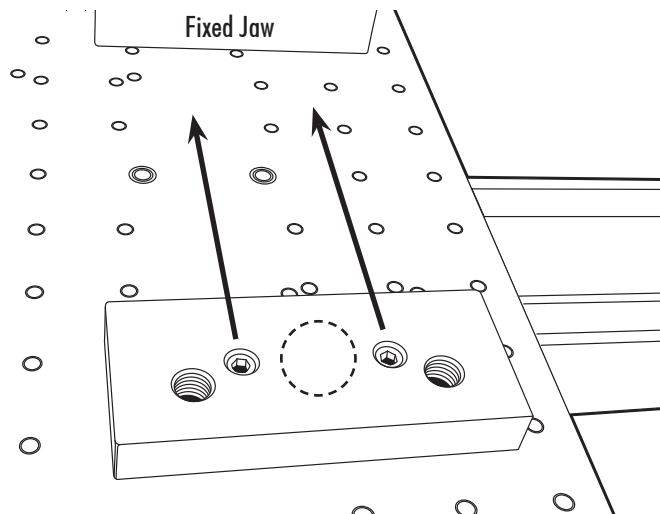


FIGURE 11

9. Mount the second top jaw (P/N 35522) onto the MBP with two 82° screws using the same method and precautions as we did with the fixed jaw assembly. Grease or anti-seize is highly recommended on the 82° screws of this assembly. A dot of grease or anti-seize, on the MBP where shown by the dashed line circle on the picture above is also recommended. Be sure that the grease is clean. Refer to Figure 2 for grease placement on the MBP.

NOTE: If you are using the vise fixture on a regular basis, apply a thin coat of grease to the taper on the 82° clamping screws periodically. This will ensure that the counter sink surface of the top jaw does not wear out prematurely.

When you mount the top jaw to the MBP, alternate between each 82° screw (P/N 35523) as you tighten them to locate the top jaw square on the MBP. Tighten these screws “just snug.” Do not fully tighten as we did on the fixed jaw assembly.

10. Mount the desired jaw inserts into the insert slot on the top jaw. Use the same method used on the fixed jaw.

NOTE: In these instructions, we are mounting different jaw inserts onto the movable jaw just as an example. You can use jaw insert sets, or mix and match as desired (see Figure 12).

The assembled height of the Talon Grip vise jaws (P/N 35526) is lower than the reversible jaw inserts (P/N 35524). P/N 35526 extends .072" (1.84mm) above the top surface of the “part location step.” P/N 35524 extends .163" (4.13mm) above the top of the step.

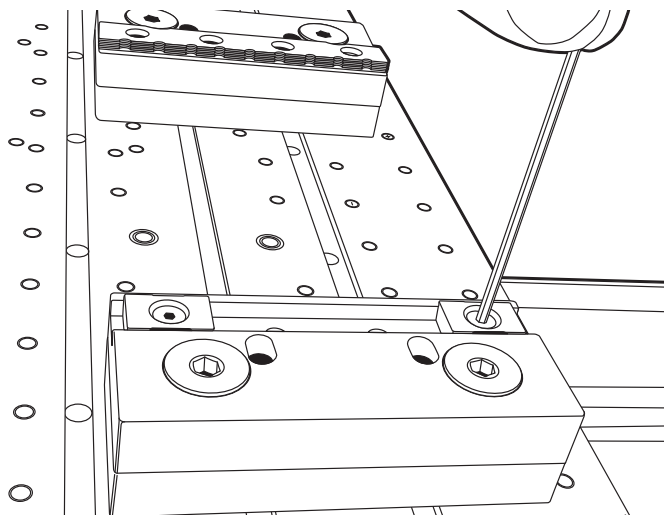


FIGURE 12

11. Place your stock on the “part locating step” of the fixed jaw. Then move the movable jaw assembly in until the stock is resting on the movable jaw locating step. Then push the movable jaw assembly in until the face of the clamping insert makes contact with the side of the part (see Figure 13).

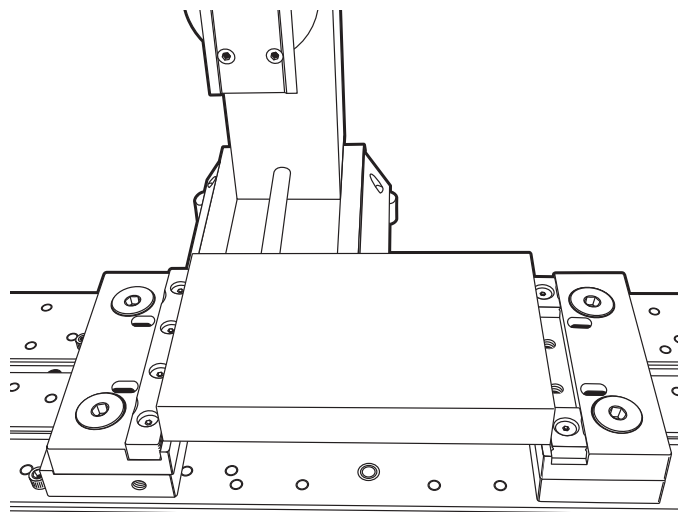


FIGURE 13

12. With the movable jaw assembly in position on the part, turn out both of the 82° screws one full turn CCW.

Now while holding the part down, push the MBP in toward the part. The MBP should move in and the top jaw should stay located against the part (see Figure 14).

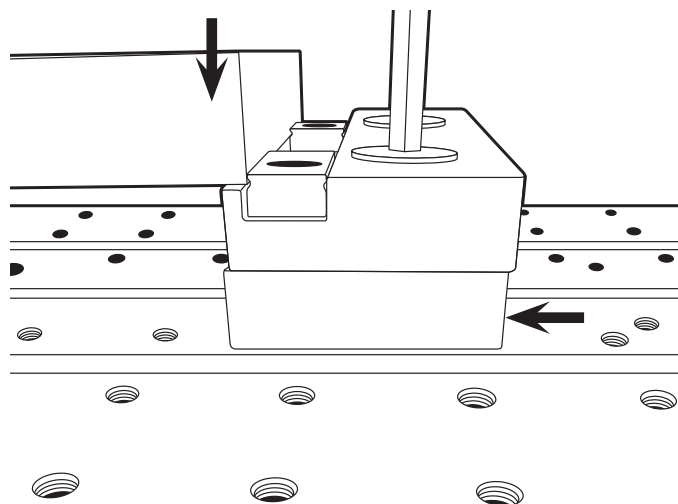


FIGURE 14—Push the part down while pushing the MBP in toward the part as indicated by the arrows.

13. Now with the top jaw inserts against the part and the MBP pushed in toward the part, hold the part down lightly. Then tighten the two T-nut screws to lock down the MBP in its current position (see Figure 14). Use the same torque specifications as with the fixed jaw assembly (see Figure 15 on the following page).

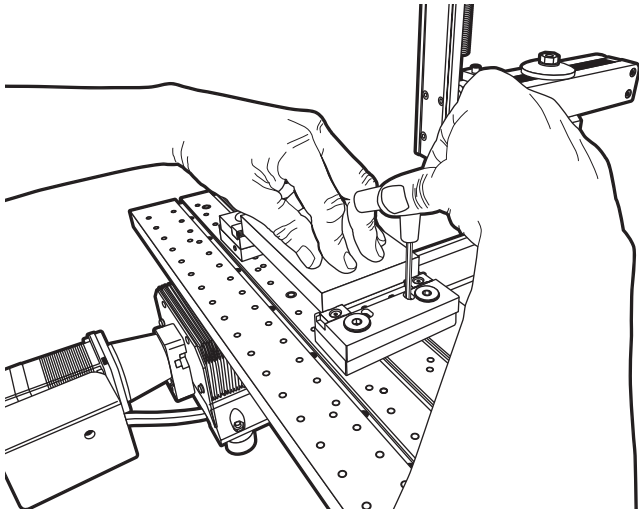


FIGURE 15

14. With your movable jaw assembly locked down in this orientation, a 1/4 turn CW of the 82° screw will secure the part. One full turn of the 82° screw CCW will release the part (see Figure 16).

A. When you tighten the 82° clamping screw, tighten each one slowly and alternate from one screw to the other. This will ensure that the movable jaw is making even contact with the part on both inserts (or the full length of the “smooth/reversible” insert). If you tighten one screw entirely first, and then tighten the second screw, this will make your movable jaw out of square. After you have tightened both screws, retighten them so the clamping pressure feels the same on both screws and that both inserts are biting into the part fully. The part will be squared up by the clamping force against the fixed jaw.

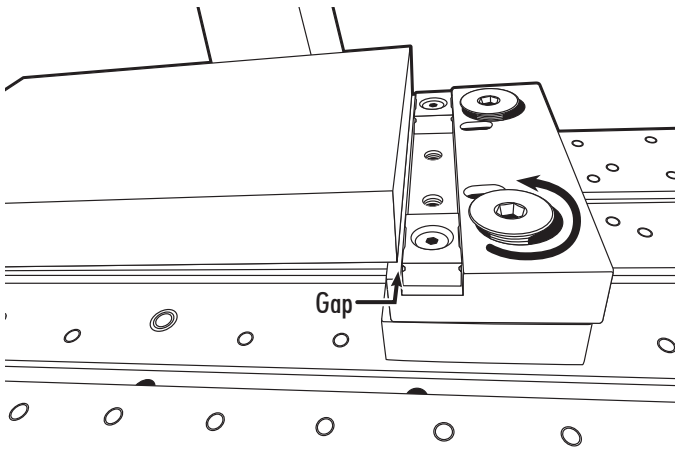


FIGURE 16

B. If you exceed a 1/2 turn CW after the clamping inserts make contact with the part, you will be on the verge of exceeding the clamping tolerance of the T-nut and the 10-32 T-nut screw. A 1/4 to 1/2 turn CW will yield all of the clamping pressure that is needed to hold your part securely.

Adjustable and Hard Stop Features

Our vise fixture comes with an adjustable stop. We suggest that you mount the fixed jaw assembly on the left side of your table so the stop will be facing out toward you and not on the column side of the table (see Figure 17).

1. This adjustable stop is easy to use. The part locating screw can be used with the threaded end toward the stock for parts that are close to the edge of the vise fixture, or it can be turned around with the head of the screw facing the stock if your part is located farther away. The part locating screw is easily locked in place with the brass locking nut.

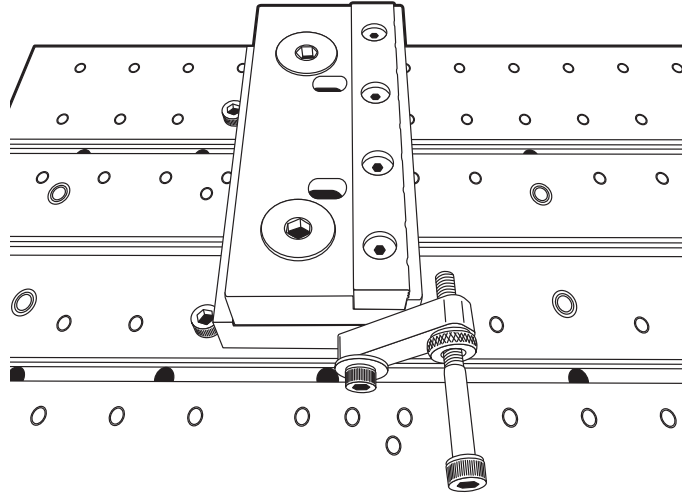


FIGURE 17

2. As an option to the adjustable stop that comes with the 3552, you can also purchase the low profile hard stop (P/N 35528). This hard stop is designed to fit in the same insert slot on the fixed jaw and it is used in conjunction with the Talon Grip Jaw Inserts (P/N 35526). It can be mounted on any of the holes for the jaw inserts, and it can be mounted in the forward or reverse orientation (see Figures 18 and 19).

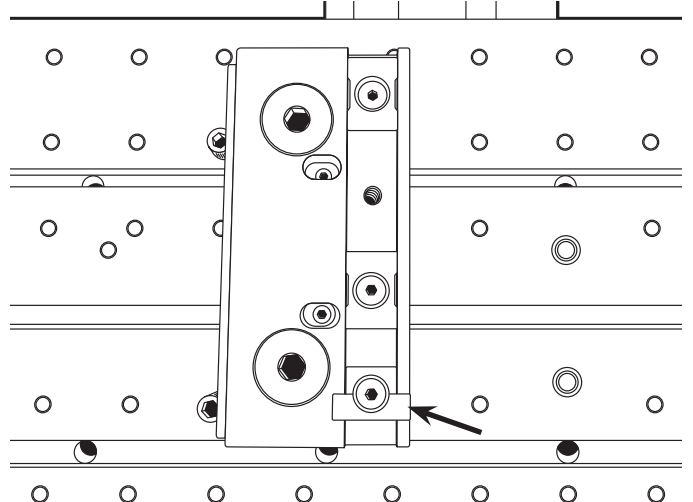


FIGURE 18—The low profile hard stop in the forward orientation.

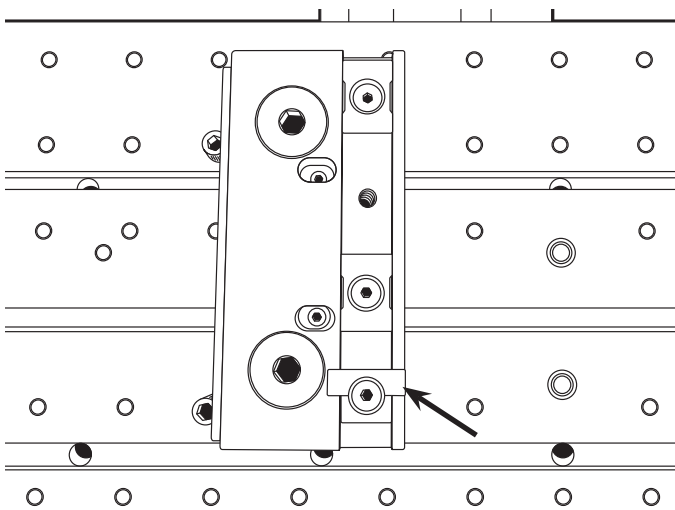


FIGURE 19—The low profile hard stop in the reverse orientation.

3. The access slot that is in the top jaw for the T-nut screw will fill up with small chips which may be hard to remove. We had designed a plug for the slot to keep the chips out, but found that this created other problems. We suggest that you place a wad of cotton from a cotton ball into each access slot before you begin machining. This is an inexpensive and easy solution to the chip build up problem. Whenever you need to move your vise fixture, just pull out the cotton along with the chips and loosen the T-nut screws (see Figure 20).

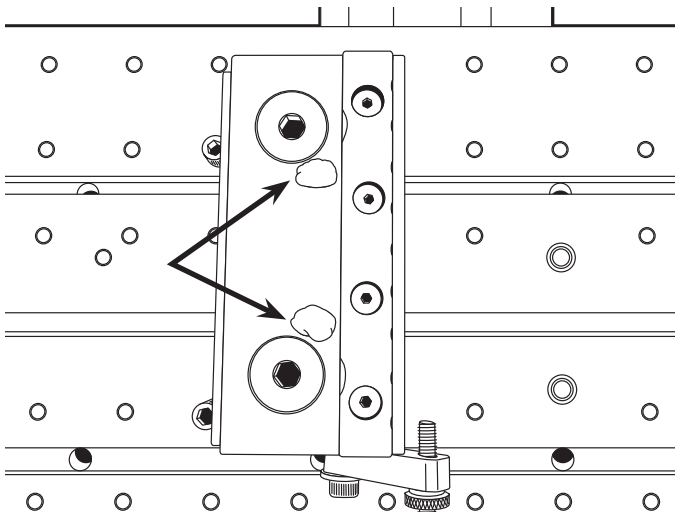


FIGURE 20—Place cotton wads in the T-nut screw slots as indicated by the arrows.

Using the Sherline MB Versagrip Top Jaws

The Versagrip jaws (P/N 35535) are designed to hold round parts and odd shape parts. There are (6) 3/4" insert pockets on each jaw which will offer many different insert location options for holding your parts. We made the countersink larger on these jaws because your part will locate on the top of the jaw. the larger countersink will allow the top of the 82° clamping screw to be below the top surface of the

fixed jaw when it is assembled. On the movable jaw, the screw can be below the top surface. However, you will need to adjust the location of the movable jaw in order for this to happen when the part is clamped. The top of the clamping insert (P/N 33529) is .075" (1.9mm) above the top of the jaw. This is the amount of material that the insert will be clamping. We recommend clamping with three evenly spaced inserts when you are holding round parts. One on the fixed jaw, and two on the movable jaw. Be sure to choose insert pockets on the movable jaw that will allow you to have access to the T-nut slots.

1. The 35535 top jaw mounts the same way as the 35522 top jaw. Make sure that the (5) 3/4" insert pockets are at the front of the bottom plate and facing the part when you mount it. If the top jaw orientation is correct, the back of the top jaw will be even with the back of the movable bottom plate when the clamping screws are tightened all the way (see Figure 21).

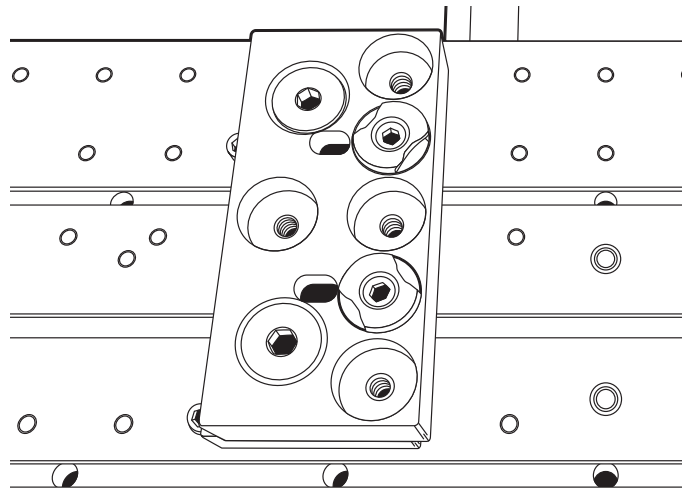


FIGURE 21

2. The top jaw will be forced down and back against the lip on the fixed bottom plate when it is assembled just as the 35522 top jaw (see Figure 22).

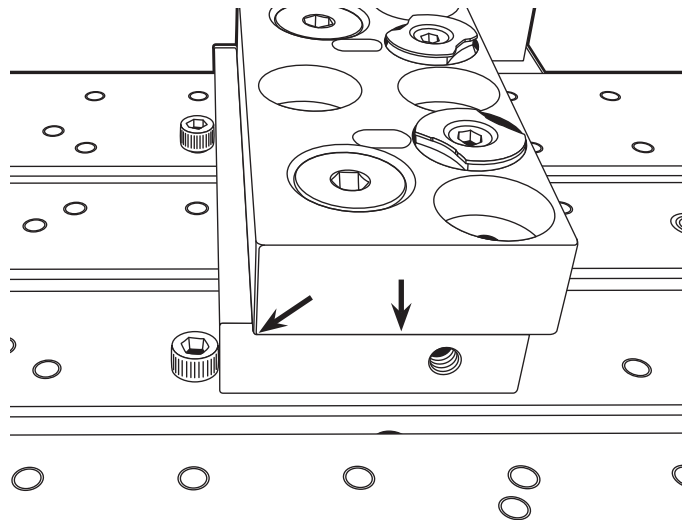


FIGURE 22

- Both top jaws will extend over the front of the bottom plates slightly (see Figure 23).

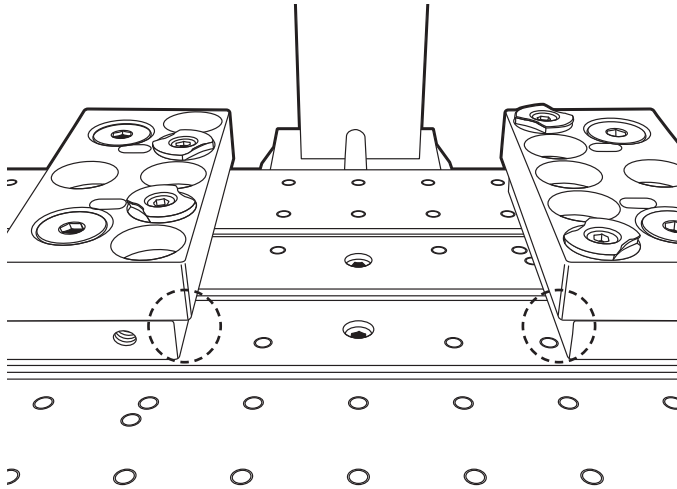


FIGURE 23—The dashed lines show the overlap of the top jaws and the bottom plates.

- After you have chosen the insert pockets that you are going to use, place the insert into the pocket. Then tighten the insert screw all the way. Then back off the insert screw 90 degrees (1/4 turn). This will allow the insert to turn and properly locate the clamping edge against the part. Figure 24 indicates the clamping area of the insert.

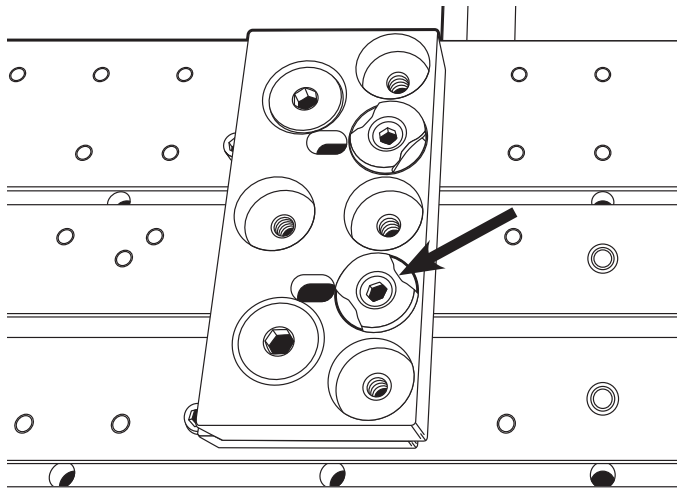


FIGURE 24

- With all of the insert screws slightly loosened and the clamping screws on the movable jaw tight, place your part in position on the fixed jaw. Then move the movable jaw in until the part makes contact with the inserts on the movable jaw. Now rotate the inserts slightly so the entire clamping area of the inserts are making contact with the part (see Figure 25).

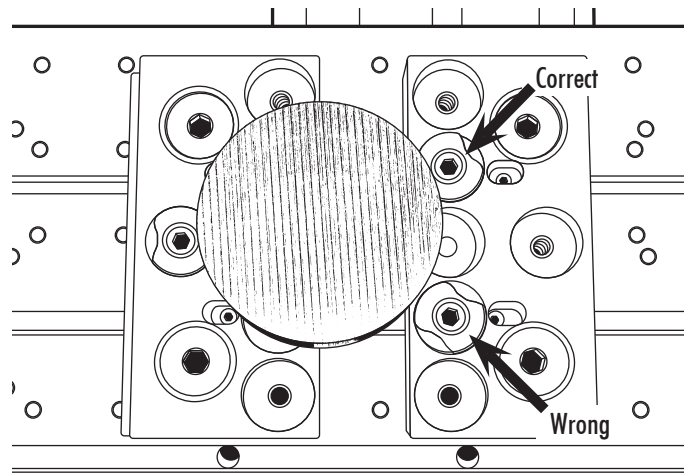


FIGURE 25—Note the correct orientation of the Versagrip jaws.

- Now push the movable jaw in toward the part and do any fine adjustments that are needed to the inserts. On round parts these fine adjustments may not be needed. However, on odd shaped parts, adjusting the inserts on the movable jaw specifically and the positioning of the movable jaw assembly, can change the part orientation in the X and Y axis. The jaws should be parallel to each other.

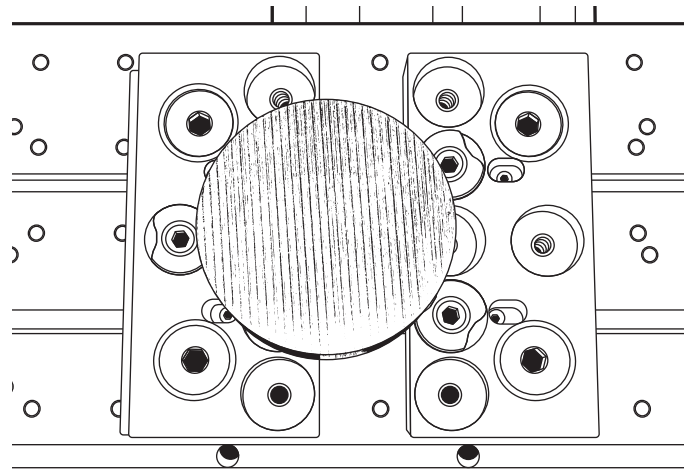


FIGURE 26—Correct.

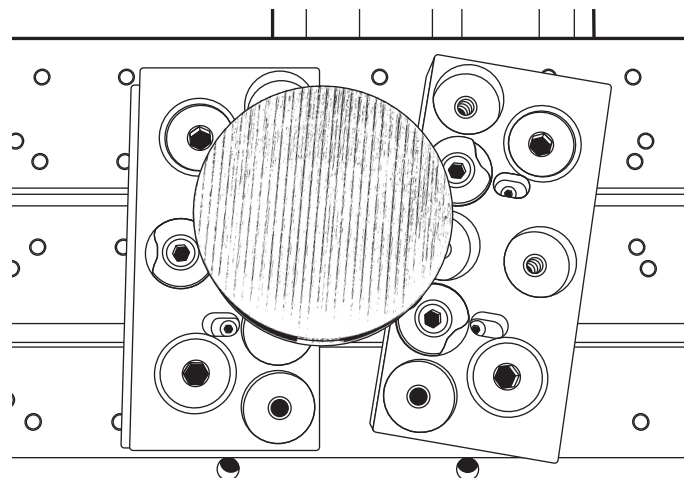


FIGURE 27—Incorrect.

7. With the inserts adjusted, hold the part down and loosen the two clamping screw on the movable jaw by (one full revolution, CCW). Then push the movable bottom plate (P/N 35520) in toward the part. On odd shaped parts, you may need to rotate the movable jaw assembly slightly to orientate the part into the correct position. Now tighten the two T-nut screws This will lock the movable bottom plate in place.

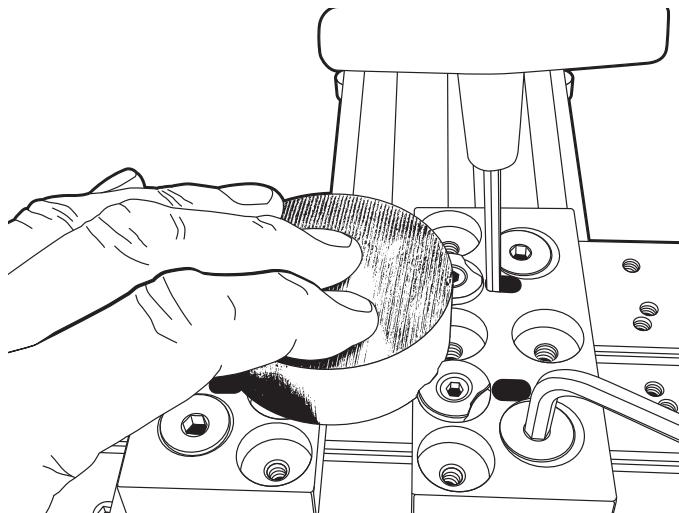


FIGURE 28

CAUTION: At this stage, the insert screws are not fully tightened. If you clamp the part with full force at this time, you can force the clamping inserts to cock slightly in the insert pocket and they may get stuck in the pocket. This may also lead to damage of the inner surface of the insert pocket.

8. Tighten the clamping screws **SLIGHTLY**. Alternate tightening each of them a bit at a time until they are exerting minimal force on the part.

Now tighten all of the insert screws.

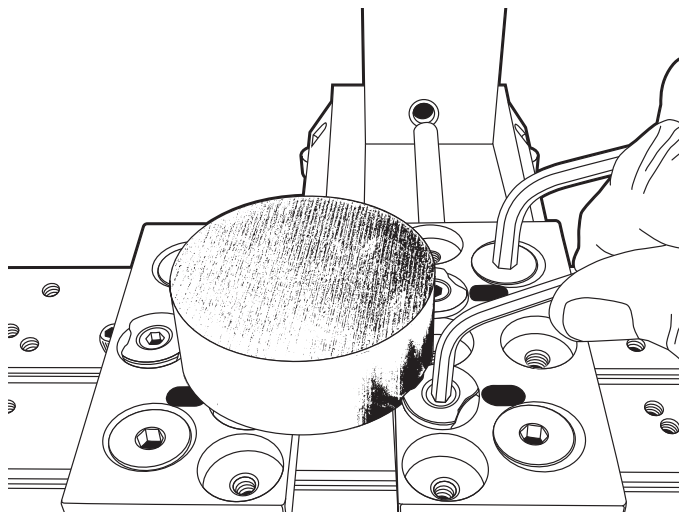


FIGURE 28

9. Now tighten the clamping screws 1/4 to 1/2 turn, CW from this “contact point” with the part. Because these inserts are making contact at tangent points that are not directly opposite each other, the clamping screws will generally need to be turned 1/2 turn or just a bit more to get the needed clamping pressure on the part.

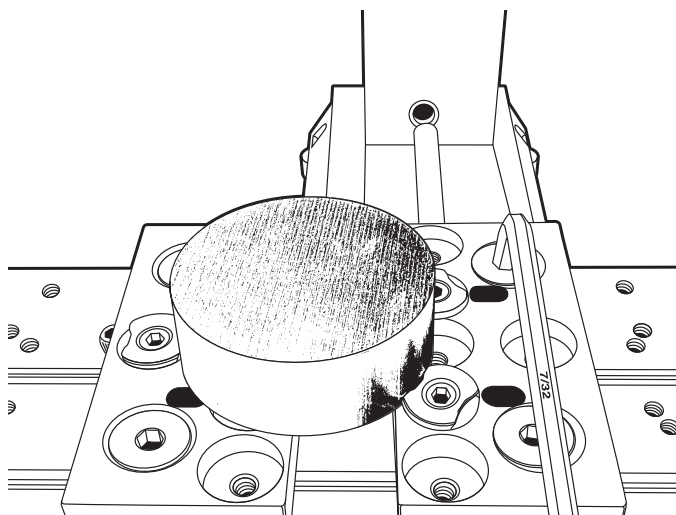


FIGURE 30

Now you are ready to go. Indicate your part and start machining.

Additional Notes

1. The clamping force that can be exerted by the 82° clamp screws (P/N 35523) when you tighten the movable jaw onto the part can exceed the clamping force of the hold-down screws (P/N 40510) and the T-nuts (P/N 30561) that are used to hold the fixed jaw in place. Using excessive force to clamp your part can actually move the fixed jaw. We recommend using two hold-down clamps on the backside of the fixed jaws after you have indicated it square to help prevent the fixed jaw from moving (see Figures 1 and 2).
 - A. You want the step-block clamps at an angle with the tip lower than the back. This will transfer the clamping force to the lower end that is against the back of the fixed jaw (see Figure 1).
 - B. You want the clamping screw as close to the front of the hold down as possible (see Figures 1 and 2).
 - C. If you are using one of our tooling plates, you can also insert (2) 10-32 screws into the tooling plate to locate against the backside of the fixed jaw (see Figures 31 and 32).

NOTE: These screws may not offer perfect alignment of the fixed jaw, so you will still need to indicate the fixed jaw.

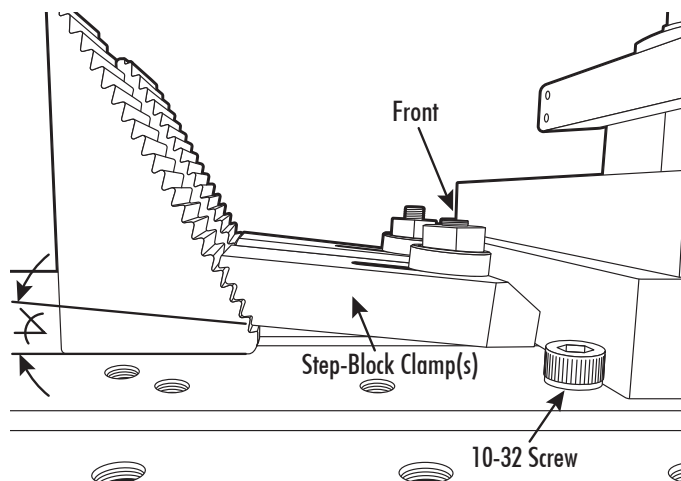


FIGURE 31—Side view.

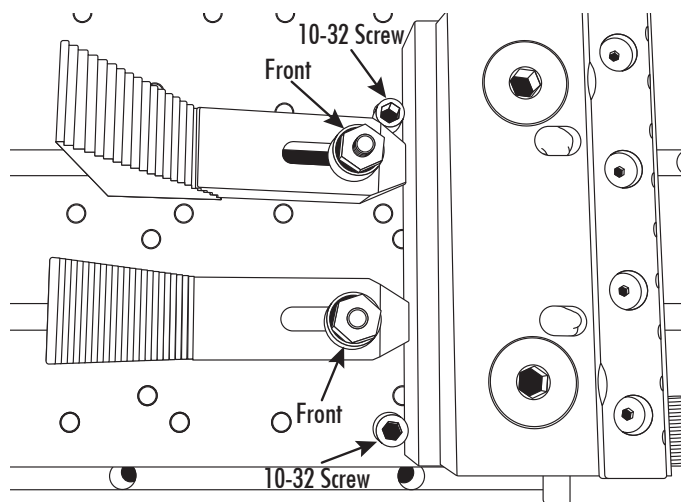


FIGURE 32—Top view.

2. Additionally, we also recommend periodically indicating your fixed jaw to check for any movement (this is a standard practice in the machinist trade).

Sherline MB Vise Fixture Tips

Holding your part securely—On large parts, it is very easy to clamp the part with the movable jaw square (parallel) to the fixed jaw and to the part. On smaller parts, it is a bit more of a challenge. If you are having a problem with parts coming out of your vise fixture, do the following:

Before you tighten the 82-degree screws, push on the back of the movable jaw with your thumb to locate the jaw square to the part. While maintaining thumb pressure, lightly tighten the two 82° screws (alternating from one to the other). As you are tightening the 82° screws, you will be able to feel if the movable jaw is being pulled too

far on one side of the part (see Figure 33). If this happens, back it off and readjust both 82° screws until the pressure is even. Then tighten the screws to their final torque. As a last check, try pulling the part up and out of the vise fixture.

We have also found the Talon Grip inserts will sometimes work better on smaller parts.

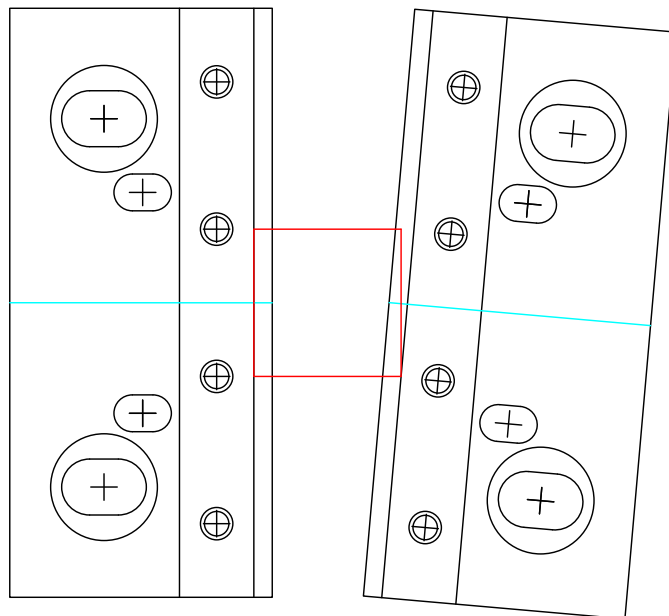


FIGURE 33—Out-of-square exaggeration.

We feel that the versatility our vise fixture offers our customers will truly enhance the overall ability and functionality of our machine.

Have fun making chips,
Sherline Products Inc.