

OMIO CNC Tube Fixture - User Guide

(Rev 1)

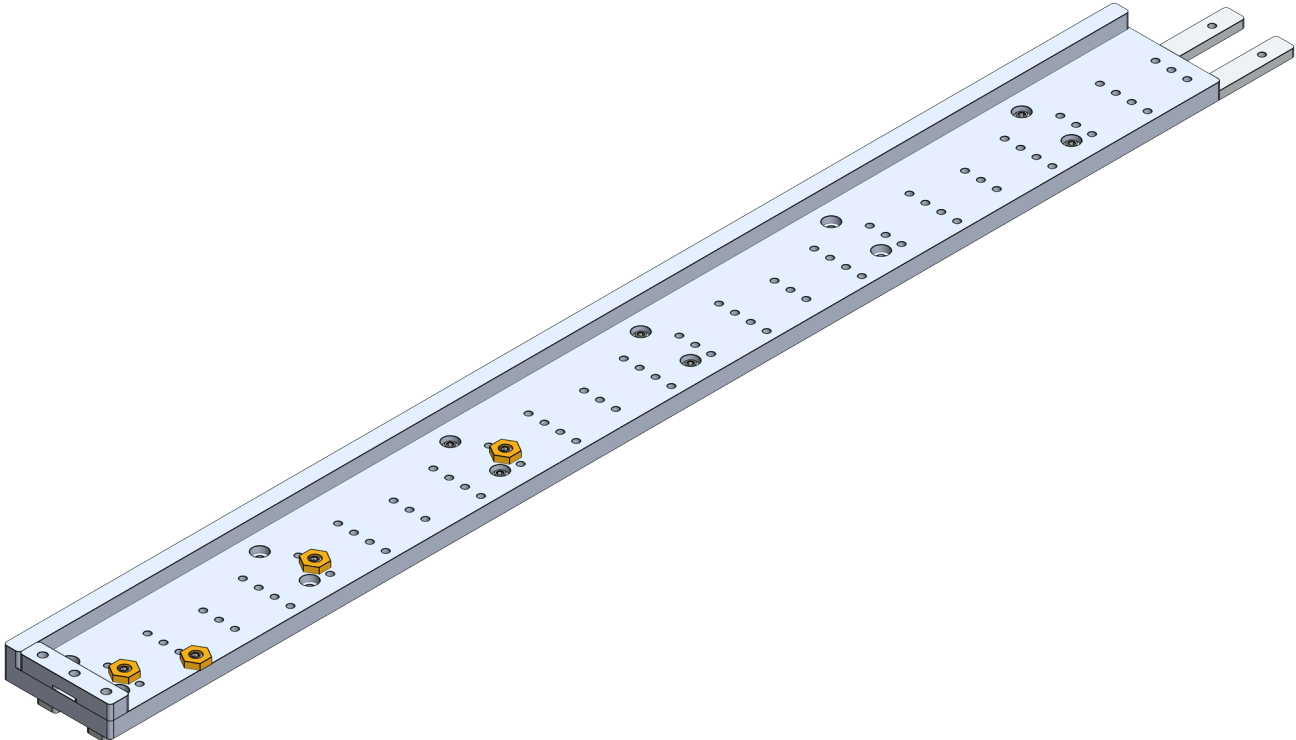




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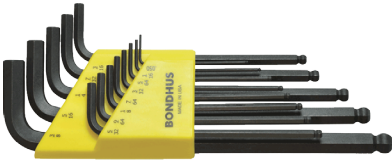


What is the OMIO CNC Tube Fixture?

The OMIO CNC Tube Fixture is designed to give people the ability to machine tubing on the OMIO CNC router or other similar machines. This allows for the manufacturing of custom features into common tubing sizes ranging from 0.75" to 2.25". The one piece design simplifies the alignment process as well since multiple vises no longer need to be aligned to each other.



Recommended Tools

Picture	Name
	Dial Test Indicator (.001" Minimum, .0005" Recommended)
	Magnetic Indicator Holder (Noga DG10533)
	Dead Blow Hammer
	Allen Set

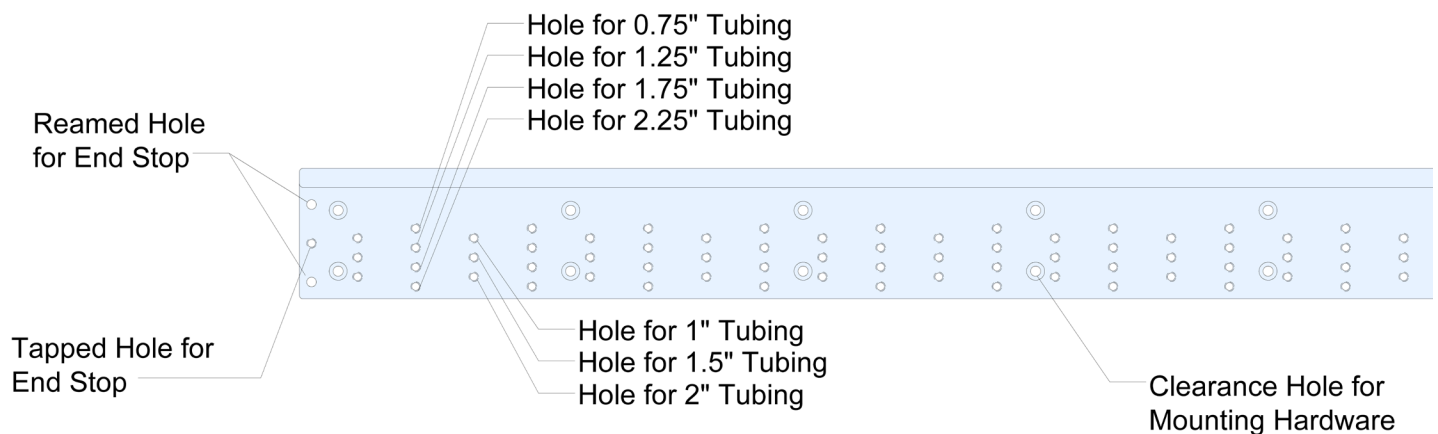


Hole Breakdown

There are two different sets of tapped holes for the MiteeBite clamps.

Supported tubing sizes:

- 0.75"
- 1"
- 1.25"
- 1.5"
- 1.75"
- 2"
- 2.25"





Installation

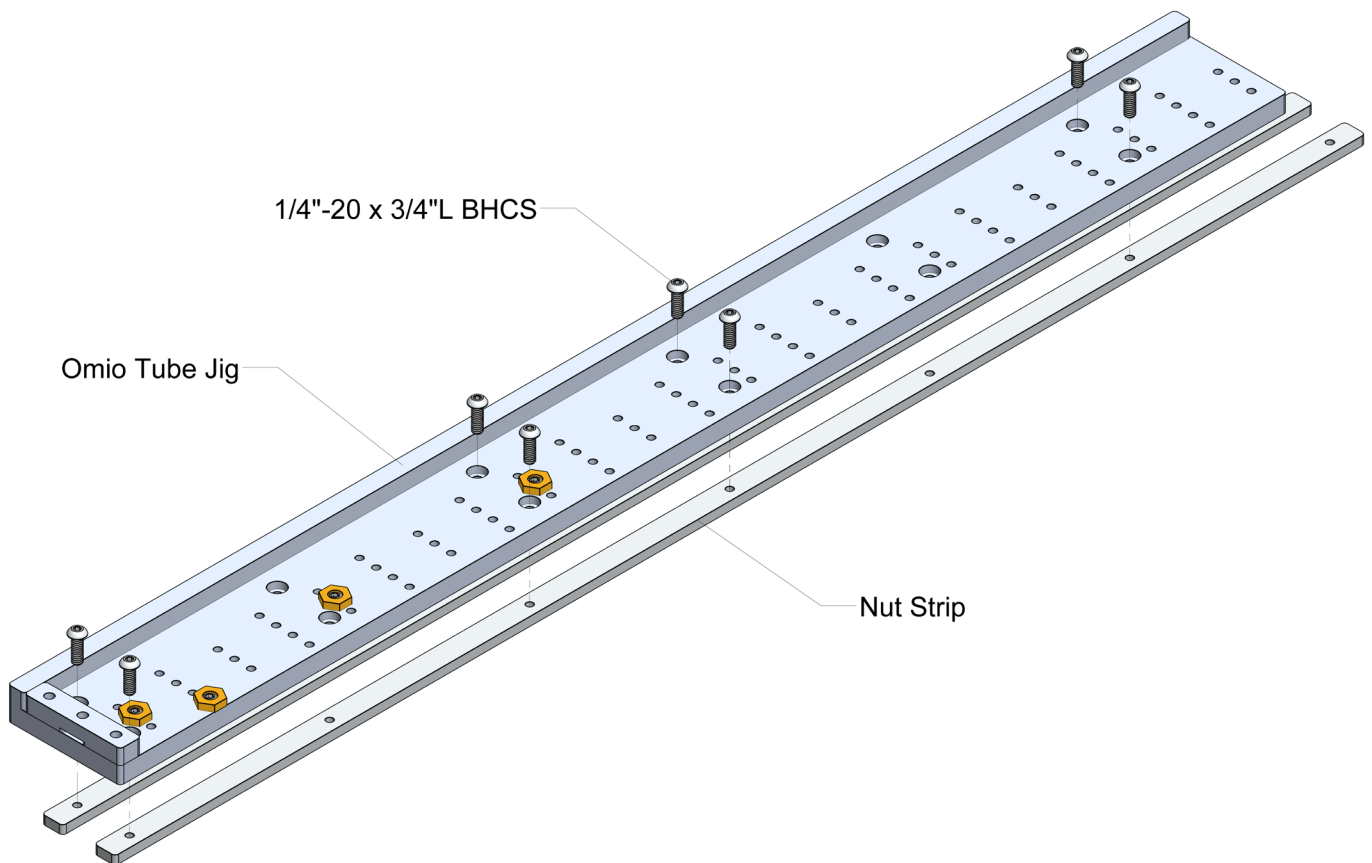
The following steps will cover the basic installation and setup of the OMIO CNC Tube Fixture. These steps will ensure that the OMIO CNC Tube Fixture is aligned with the machine travel and will produce the best possible accuracy for your machine.



Step 1

Install both Nut Strips with the desired amount of 1/4"-20 bolts. It is recommended to use the holes at both ends of the Tube Fixture and then a few in the middle. Not all holes are required to be used.

If being installed on a machine other than the OMIO Router, both Nut Strips may not align with the machines T Slot spacing. If this is the case then only use one Nut Strip.



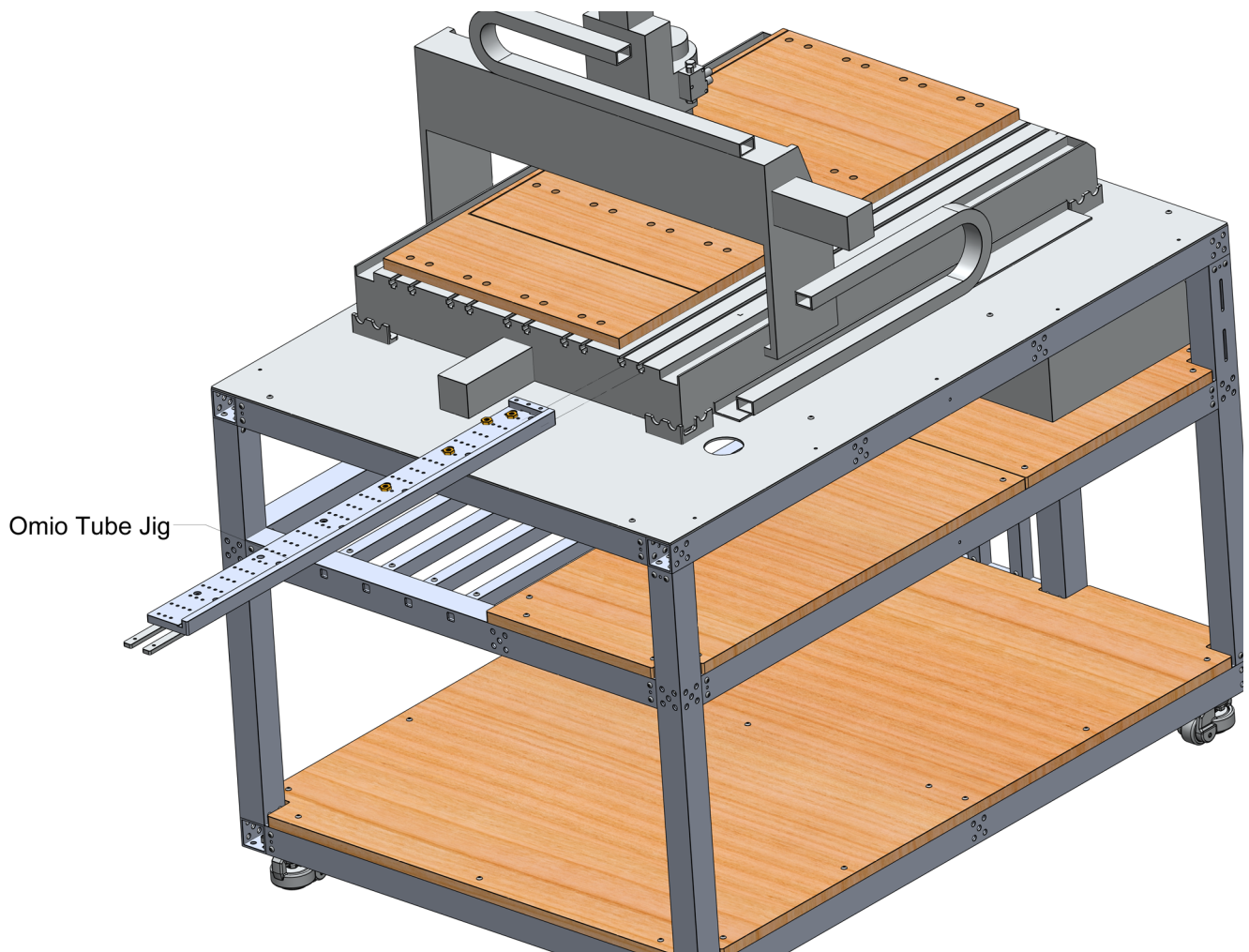


Step 2

Slide the OMIO CNC Tube Fixture with Nut Strips into the desired T Slots in the machine bed. The recommended location for the Tube Fixture can be seen below as this will maximize the usable space on the table.

Once the OMIO CNC Tube Fixture is in the desired location. Snug up all the bolts that connect with the Nut Strips. The Tube Fixture will still need to be bumped around to align with the machine so DO NOT fully tighten.

Roughly align the OMIO CNC Tube Fixture with the machine by bumping it all the way to the left or right of the T Slots. This will help for the final alignment in the next steps.



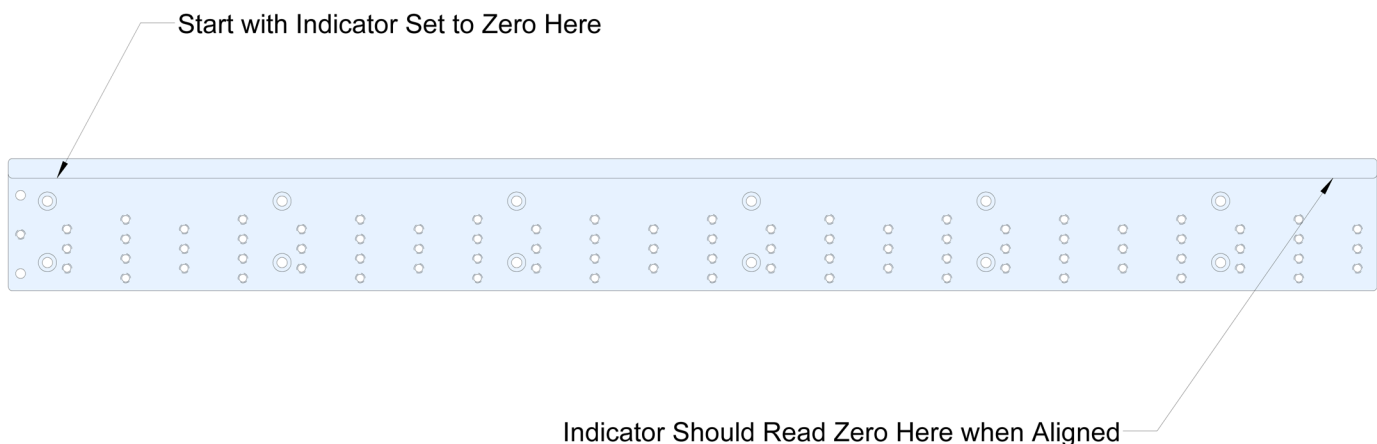


Step 3

Set up the dial test indicator on the gantry of the machine. Begin at the front of the machine and set the indicator to zero on the inside face of the Tube Fixture, as shown below. Now jog to the back of the machine using only the Y axis. DO NOT move in the X axis. There will most likely be some deviation between the front and back of the machine. Bump the OMIO CNC Tube Fixture around using a dead blow hammer or something similar.

Repeat this process until both ends of the OMIO CNC Tube Fixture read the same value on the indicator.

Note: The middle of the OMIO CNC Tube Fixture may not read the same value as the ends. This is fine and will be corrected in a following step.





Step 4

Tighten all bolts that pass through into the Nut Strips and reverify that both ends still read the same value on the OMIO CNC Tube Fixture.

If this is the case, proceed to the next step. If not, go back to Step 3 and repeat the process until the indicator reads the same value on both ends of the OMIO CNC Tube Fixture.

Note: A .0005"-.0015" variance between both ends is an acceptable range as the next step will correct for any variance.



Step 5 - Optional

Note: This step is optional if the straightness of the machine and Tube Fixture are acceptable. If the max precision is desired then it is recommended to take this skim cut.

Remove the End Stop Block from the OMIO CNC Tube Fixture if it is still installed. Install a 6mm or similarly sized end mill into the spindle. The end mill should have at least .500" of flute length. Jog the end mill to the approximate location indicated below. This should be about .030" from the side wall and the bottom of the OMIO CNC Tube Fixture. Turn the spindle on to the desired RPM for the end mill being used. Jog the machine in the X direction towards the side wall of the OMIO CNC Tube Fixture until the end mill just begins to cut. It is recommended to put the machine into incremental mode and step over at .001". Once the end mill touches, jog the machine in the Z direction until the end mill just touches the fixture. Put the machine back into continuous mode and jog the machine in the Y direction at the desired speed for the full length of travel of the machine.

This will perfectly align the OMIO CNC Tube Fixture with the OMIO axis'. If it appears that there was no material removed in certain areas of the OMIO CNC Tube Fixture, this step may be repeated.

Warning: DO NOT remove more than .01" of material as this will affect the clamps. Any more material removal may prevent the clamps from working effectively.





Step 6

To verify that the OMIO CNC Tube Fixture is now properly aligned. Set up the indicator once again on the gantry of the machine. All portions of the tube jig should now read the same value across the travel of the machine.



Mitee Bite Clamp Instruction

Select the desired set of holes that corresponds with the tubing size to be used. Thread the Mitee Bite Clamp all the way down. Begin to unthread the clamp until the tube will slip between the clamp and the wall of the OMIO CNC Tube Fixture. DO NOT loosen more than one full turn. Once all clamps are loosened slide in the part to be machined and tighten all clamps.

The recommended placement for the clamps is one in the closest hole to the front of the part to be machined as well as one closest to the end of the part to be machined. Depending on the length of the part, a one or two clamps may need to be added evenly spaced in the middle of the part.

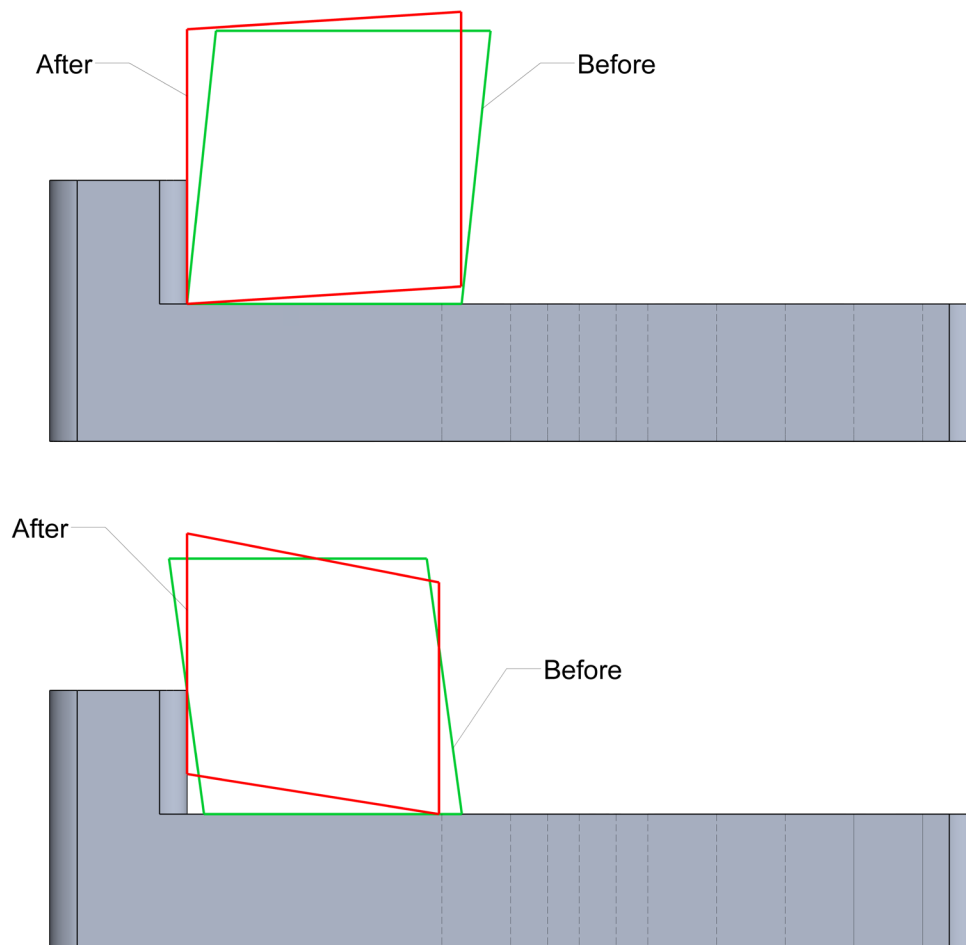
Note: The Mitee Bite clamps used are P/N 10204 and more information can be found [about them here](#).



Common Tubing Issues

A common issue in extruded aluminum tubing is that the outside will not be perfectly square on all four corners. This can lead to lifting of the part when it is clamped into the Tube Fixture or to possible errors in feature location when the parts are machined. This can be seen in the diagrams below. Depending on the issue and the tolerances that are being held, this may or may not need to be corrected. Some tubing will also not have this issue so it does not need to be taken into consideration.

A general solution that will work for all instances, whether the issue is present or not, is to set the location for the program after clamping the tube into the Tube Fixture. Setting all zero's after guarantees that the part is in the correct location when machining.





WCP Production Testing Procedure

All OMIO CNC Tube Fixture are tested for straightness on two machines before being send out. All jigs will have a straightness of $\pm 0.0025''$.

The OMIO CNC Tube Fixture are not clamped down so as to not influence the straightness of the jig due to bolting down.



Kit Contents

Picture	Name	QTY	Kit
	OMIO CNC Tube Fixture Base	1	Base Kit
	OMIO CNC Tube Fixture End Stop	1	Base Kit
	OMIO CNC Nut Strip	2	Base Kit
	Mitee Bite Clamps (10204)	3	Base Kit
	1/4"-20 x 3/4"L Bolts	9	Base Kit



Optional Spare Parts

Picture	Name	QTY
	OMIO CNC Tube Fixture Clamps (5-Pack)	1



FAQ

Q: Is a skim cut **NECESSARY**?

A: Taking a skim cut is not necessary for the OMIO CNC Tube Fixture to function. It is however a recommended step to take to have the highest possible accuracy when machining features. The skim cut will guarantee that the OMIO CNC Tube Fixture and the machine axis is aligned across the full travel of the machine. On OMIO's we have seen a deviation on ± 0.005 " between the travel of the axis and the Tube Fixture. There has been extra material added along the stop of the Tube Fixture to allow this cut to be taken and not affect the function of the clamps.

Q: Is an additional skim cut required if the fixture is removed from the machine?

A: An additional skim cut may or may not be required. If the fixture is removed and then placed in the same location, the additional skim cut will most likely not be needed. It is always good practice to use an indicator to verify this though. If the values are within an acceptable value for your use, then this additional cut is not needed.

Trouble Shooting

Issue: Part will not fit between clamp and side wall of the Tube Fixture.

Possible Solutions:

- Tighten the fixture clamps being used fully. Then loosen them up to 1 full turn. As the fixture clamp is being loosened it will cam open and the tube will slip into place.
- Verify that the tubing is the correct size for the fixture clamp locations chosen. Reposition if necessary.



Revision Table

Revision Date	Revision #	Description
2/12/2021	1.0	First revision created.
3/9/2021	1.1	Minor fixes and clarifications.
5/24/2021	1.2	Updated tolerance on straightness.