



Avid CNC Rotary Axis Users Guide

v2021Q1.1

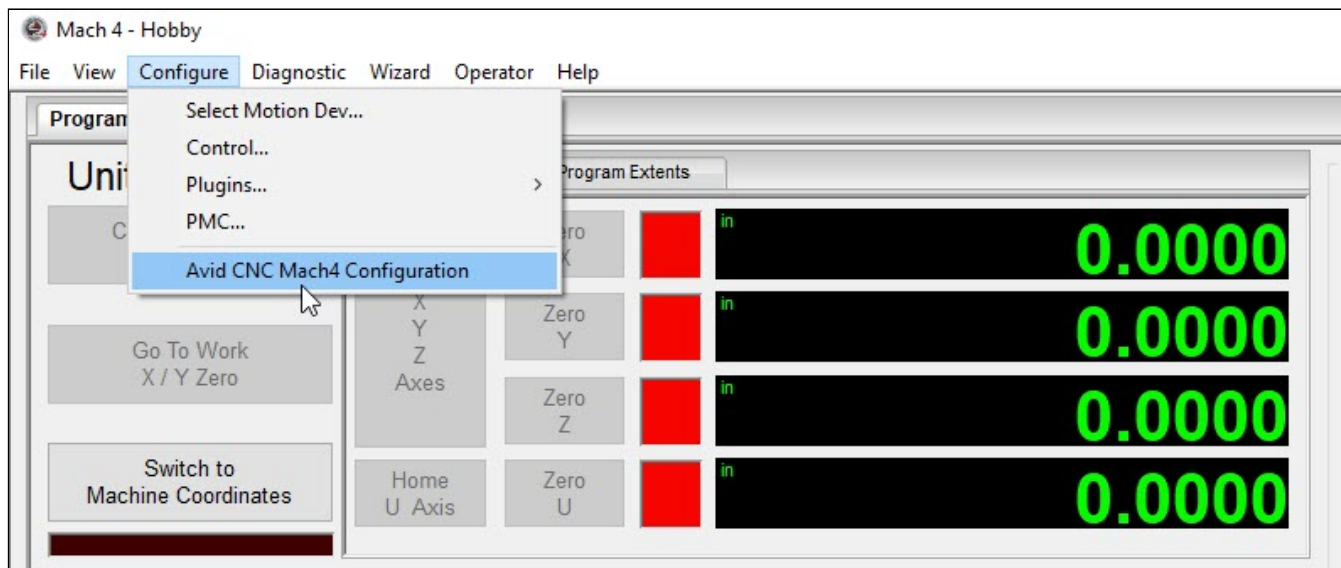
1. Mach4 Control Software

Operation Note

If you have not installed and configured Mach4, follow the instructions in the Mach4 Software Setup Guide (<https://www.avidcnc.com/support/instructions/software/mach4>). The configuration section below is additional steps for setting up Mach4 with rotary that you may have previously completed in the calibration section.

1.1 Configuration

1.1.1



- Navigate to **Avid CNC Machine Configuration**.

1.1.2

Avid CNC Mach4 Configuration

General | **Advanced Options** | Machine Revision | Custom | Warnings | About

Select the options for your machine configuration:

Model: PRO CNC

Machine Width: 48 inches (4 feet)

Machine Length: 96 inches (8 feet)

Z Axis Travel: 8 inches

Electronics Version: CRP800

Motor Type: NEMA 34

Cutting Tool: Spindle

Spindle Type: 3HP Avid spindle

Homing Sensors: X, Y, and Z Axes

4th Axis: Avid CNC Rotary Axis

Rotary Length:

None
Avid CNC Rotary Axis
Other

Save Cancel

- Select the **Avid CNC Rotary Axis** 4th Axis option.

1.1.3

Avid CNC Mach4 Configuration

General | Advanced Options | Machine Revision | Custom | Warnings | About

Select the options for your machine configuration:

Model: PRO CNC

Machine Width: 48 inches (4 feet)

Machine Length: 96 inches (8 feet)

Z Axis Travel: 8 inches

Electronics Version: CRP800

Motor Type: NEMA 34

Cutting Tool: Spindle

Spindle Type: 3HP Avid spindle

Homing Sensors: X, Y, and Z Axes

4th Axis: Avid CNC Rotary Axis

Rotary Length: 39" (1000mm)

39" (1000mm)

49" (1250mm)

61" (1550mm)

72" (1850mm)

84" (2150mm)

112" (2850mm)

Save

- Select the appropriate Rotary Length.

1.1.4

Avid CNC Mach4 Configuration

General | Advanced Options | Machine Revision | Custom | Warnings | About

Select the options for your machine configuration:

Model: PRO CNC

Machine Width: 48 inches (4 feet)

Machine Length: 96 inches (8 feet)

Z Axis Travel: 8 inches

Electronics Version: CRP800

Motor Type: NEMA 34

Cutting Tool: Spindle

Spindle Type: 3HP Avid spindle

Homing Sensors: X, Y, and Z Axes

4th Axis: Avid CNC Rotary Axi:

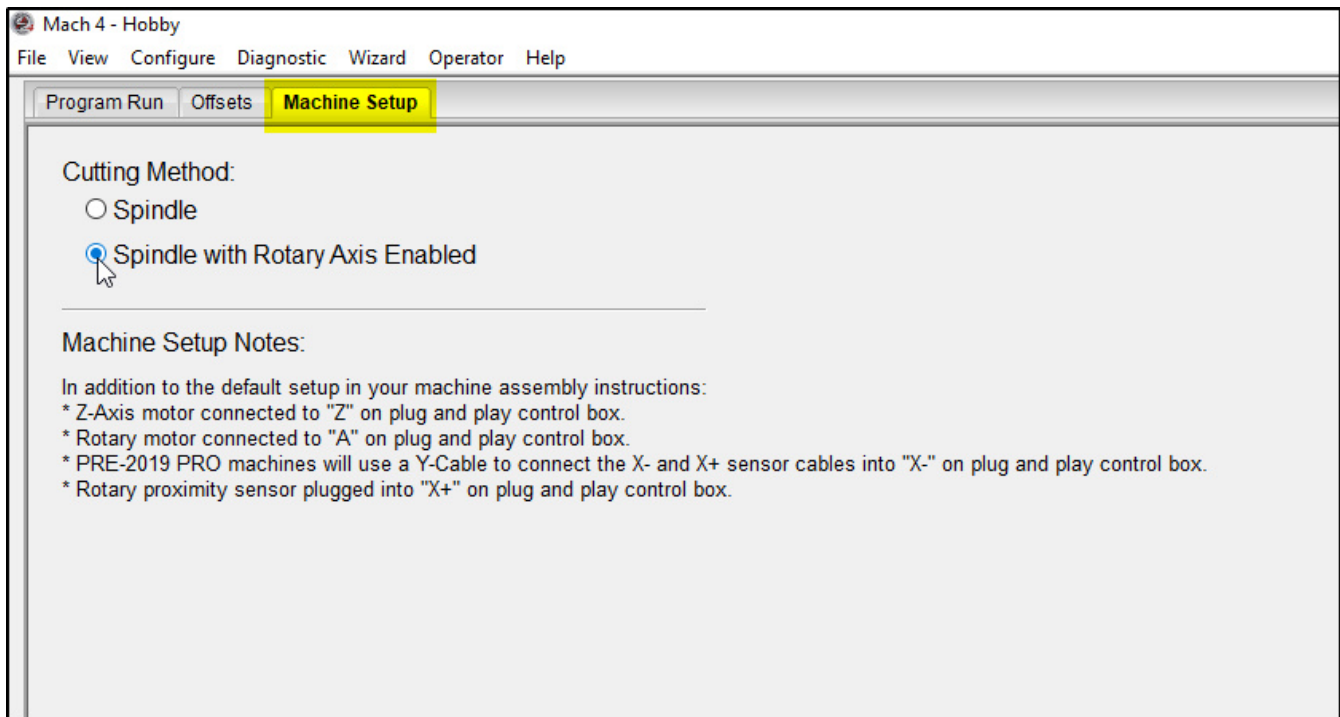
Rotary Length: 39" (1000mm)

Save Cancel

- Save your changes.

1.2 Operation

1.2.1

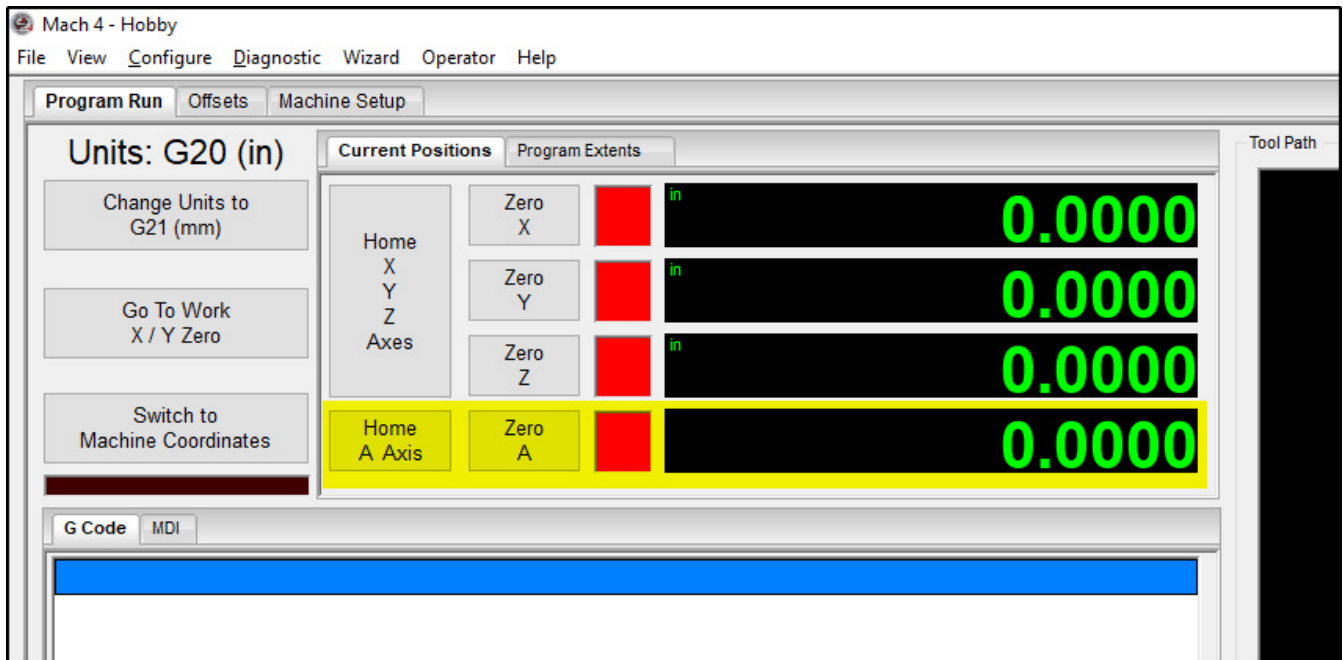


- Navigate to the **Machine Setup** tab.
- Select a "Rotary Axis Enabled" Cutting Method.

Operation Note

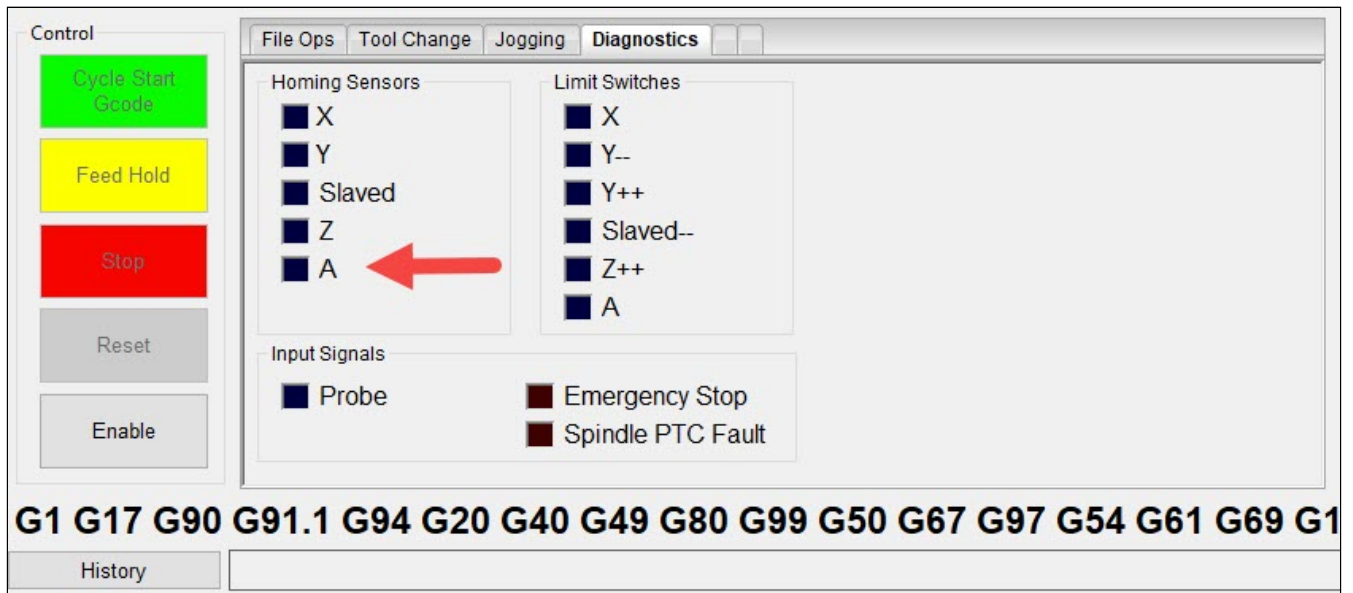
The **Machine Setup Notes** section contains information about control box connections that may need to be changed when switching cutting methods.

1.2.2



- When you enable Mach4, you will now be able to use the **Home A Axis** and **Zero A** buttons.

1.2.3



- The **Diagnostics** tab will now contain an A axis homing sensor LED.

1.3 Homing

The homing sensor installed in Section 1.6.2 of the Rotary Assembly Instructions provides the ability to home your rotary axis. This is a convenient way to rotationally position your workpiece relative to the spindle (or router).

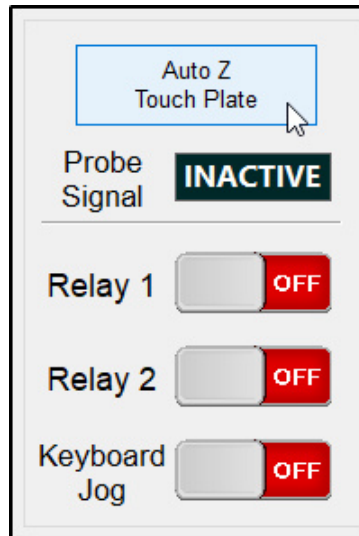
It may be necessary to adjust the home offset to achieve the desired workpiece orientation. This can be done by enabling Custom Homing Settings (<https://www.avidcnc.com/support/instructions/software/mach4Configuration/#3-advanced-settings>) and adjusting the Home Offset (<https://www.avidcnc.com/support/instructions/software/mach4UsersGuide/#homing-and-soft-limits>) value.



1.4 Touch Plate Use

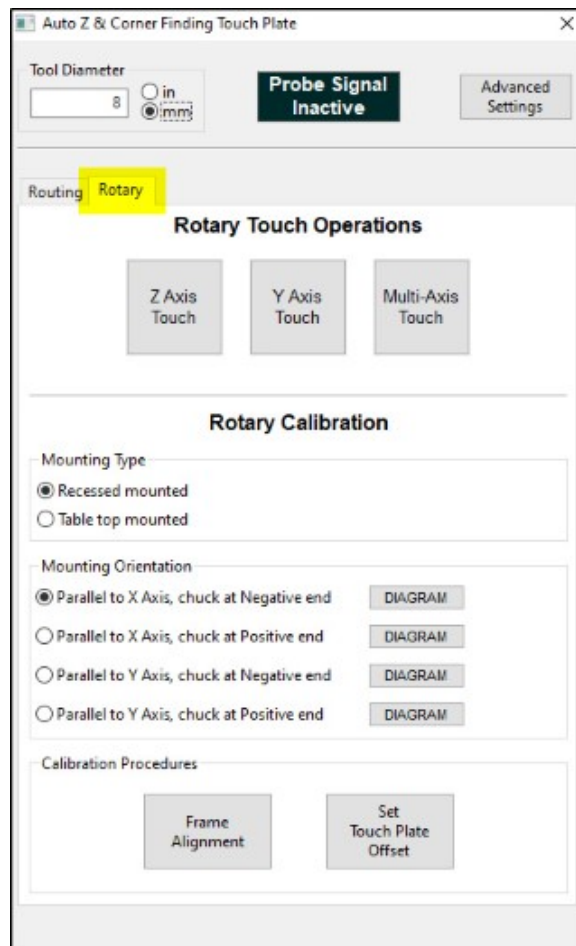
For proper use of the Auto Z Touch Plate, ensure you have completed the "Touch Plate Offset" section in either the Recessed or Table Top Installation and Calibration Instructions.

1.4.1



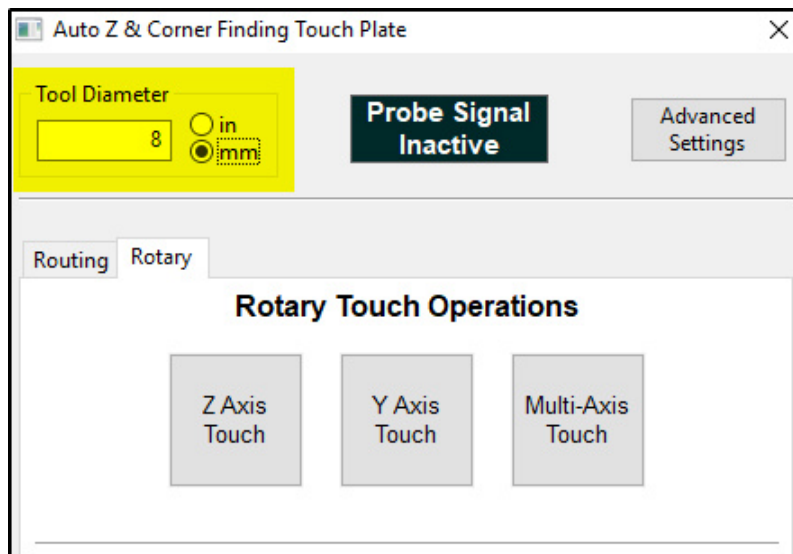
- Enable Mach4 and click the **Auto Z Touch Plate** button.

1.4.2



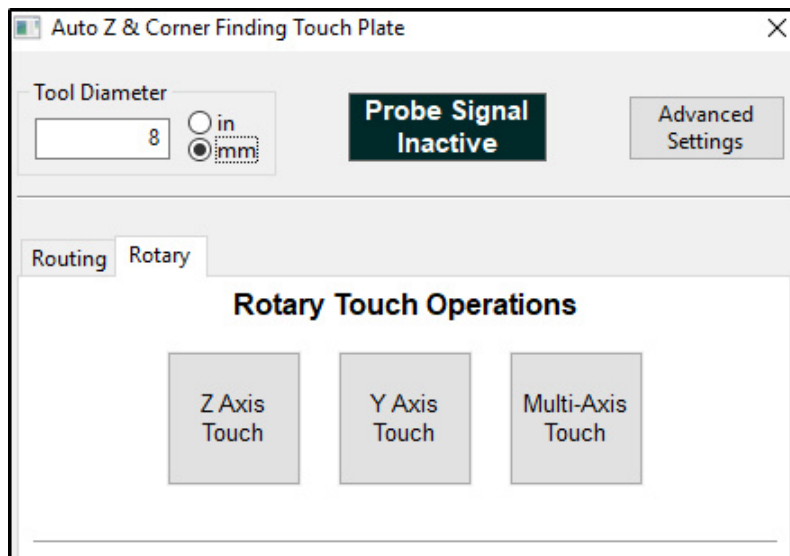
- With a rotary cutting method enabled, you will see a **Rotary** tab.
- This contains the touch plate functions to be used specifically with your rotary axis.

1.4.3



- Ensure you enter the correct tool diameter (not required if only zeroing Z axis).

1.4.4



- The **Rotary Touch Operations** section contains the buttons you will use after your rotary axis is calibrated.
 - **Z Axis Touch:** This will zero your Z axis relative to the center of the chuck.
 - **Y Axis Touch:** This will zero the Y axis (or X axis if your rotary axis is mounted parallel to the Y axis) relative to the center of the chuck.
 - **Multi-Axis Touch:** This is a combination of the above two buttons. It will touch off in the Z and Y (or X) direction.

Operation Note

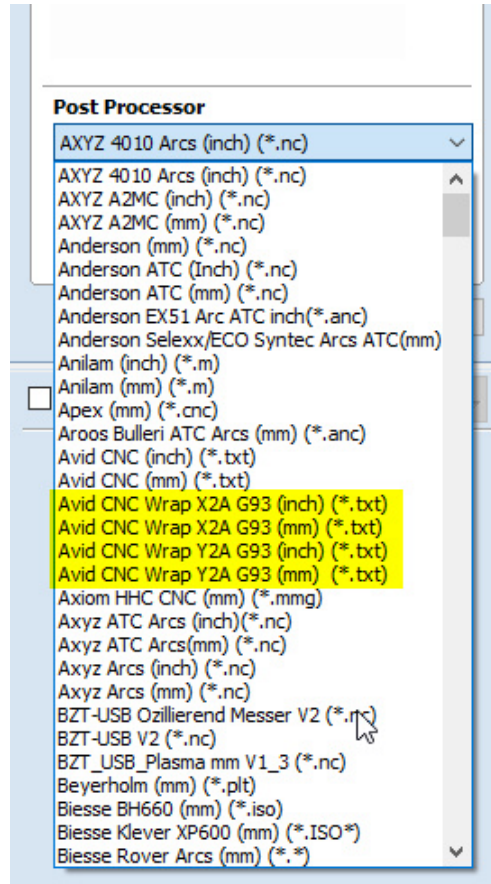
You will need to manually zero the axis parallel to your rotary axis (at the appropriate position based on your workpiece). If your rotary axis is parallel to the X axis, you will need to zero the Y axis. If mounted parallel to the Y axis, you will need to zero the X axis.

2. Post Processors

2.1 Vectric

Avid CNC has created rotary post processors for Vectric software (VCarve Pro and Aspire versions 9.5 and newer). An Avid CNC Posts for Vectric Software (<https://www.avidcnc.com/support/instructions/software/downloads/vectric>) installer is available that will install the new post processors.

After you have installed the post processors, you will see four **Avid CNC Wrap** options used for rotary wrapping:



1. **Avid CNC Wrap X2A G93 (inch)**: G20 (inch) units, wraps X moves to A moves. Toolpaths will be wrapped around the Y axis.
2. **Avid CNC Wrap X2A G93 (mm)**: G21 (mm) units, wraps X moves to A moves. Toolpaths will be wrapped around the Y axis.
3. **Avid CNC Wrap Y2A G93 (inch)**: G20 (inch) units, wraps Y moves to A moves. Toolpaths will be wrapped around the X axis.
4. **Avid CNC Wrap Y2A G93 (mm)**: G21 (mm) units, wraps Y moves to A moves. Toolpaths will be wrapped around the X axis.

2.2 Autodesk Fusion 360

Avid CNC has created rotary post processors for Autodesk Fusion 360 and are available for download (<https://www.avidcnc.com/support/instructions/software/downloads/fusion>). This includes two rotary post processors:

1. **Avid CNC Warp X to A:** Wraps X moves to A moves. Toolpaths will be wrapped around the Y axis. Units (G20 or G21) will be determined from the document units in Fusion.
2. **Avid CNC Warp Y to A:** Wraps Y moves to A moves. Toolpaths will be wrapped around the X axis. Units (G20 or G21) will be determined from the document units in Fusion.

There are two options for how to install the posts:

1. Install post processor to a Cloud library in Fusion 360 (<https://knowledge.autodesk.com/support/fusion-360/learn-explore/caas/sfdcarticles/sfdcarticles/How-to-install-a-cloud-post-in-Fusion-360.html>)
2. Install a personal (locally saved) post processor in Fusion 360 CAM (<https://knowledge.autodesk.com/support/fusion-360/learn-explore/caas/sfdcarticles/sfdcarticles/How-to-add-a-Post-Processor-to-your-Personal-Posts-in-Fusion-360.html>)



3. Rotary Workflow

This section describes the basic steps necessary to get started using your rotary axis. Links are provided to additional information where possible.

3.1 Create G Code

3.1.1

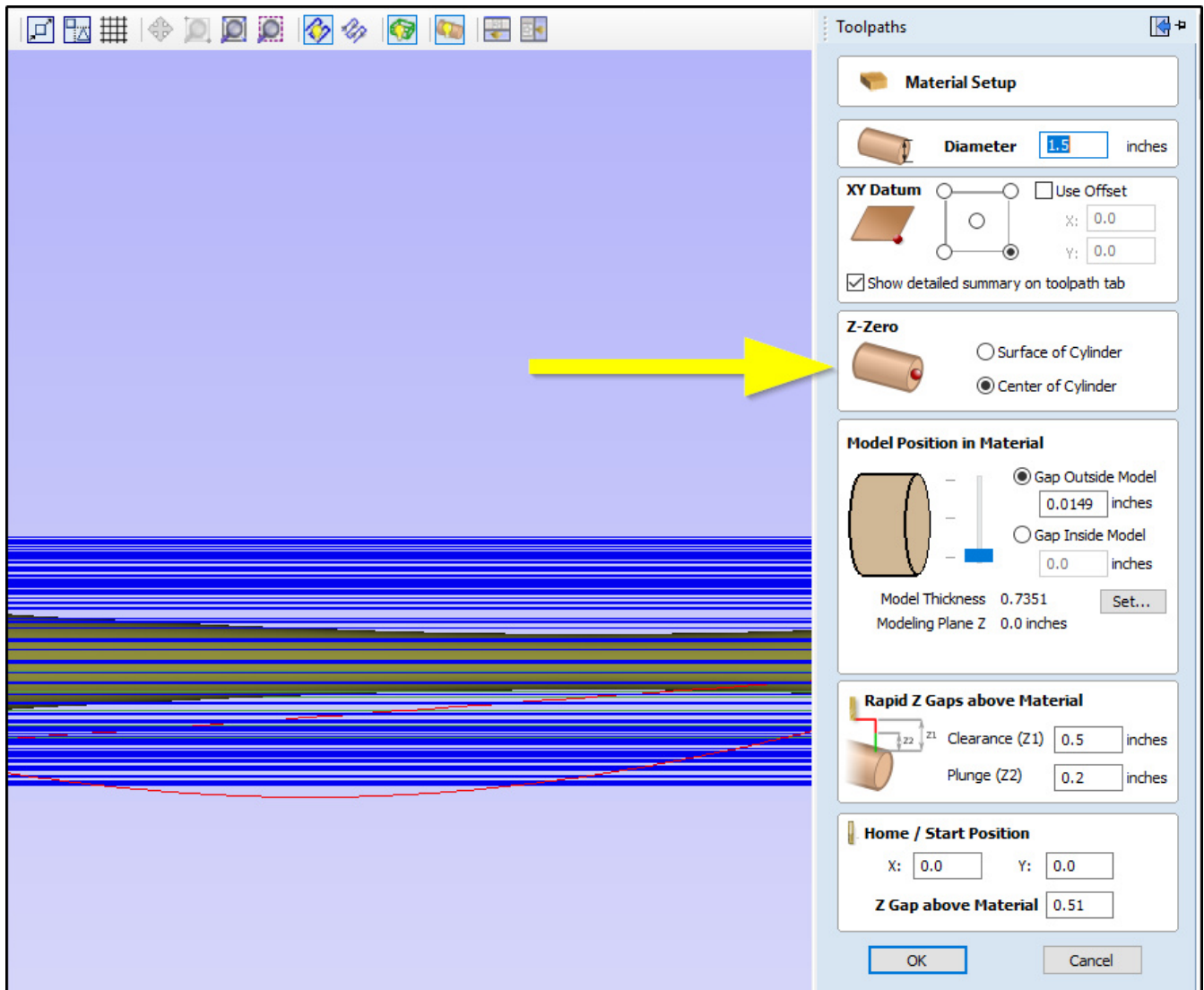
Many of the common CAM software packages with rotary capabilities have documentation for generating tool paths.

- **VCave Pro:** Rotary Machining and Wrapping (<https://docs.vetric.com/docs/V9.5/VCavePro/ENU/Help/UserGuide/Process/Rotary/RotaryMachiningandWrapping.html>)
- **Aspire:** Rotary Machining and Wrapping (<https://docs.vetric.com/docs/V9.0/Aspire/ENU/Help/Toolpaths/RotaryMachiningandWrapping/RotaryMachiningandWrapping.html>)
- **Fusion 360:** 4th Axis Wrap Toolpath (<https://help.autodesk.com/view/fusion360/ENU/?guid=GUID-7FF25192-AED7-4230-92DC-E22ADF15D498>)
 - If you want to perform indexing operations in Fusion 360, you can setup a different tool orientation for each operation within a single setup.

3.1.2

- Ensure you have downloaded and installed the rotary post processors (see section 2) for your CAM software.
- Select the appropriate post processor to wrap either your X axis or Y axis moves to A axis moves.

3.1.3

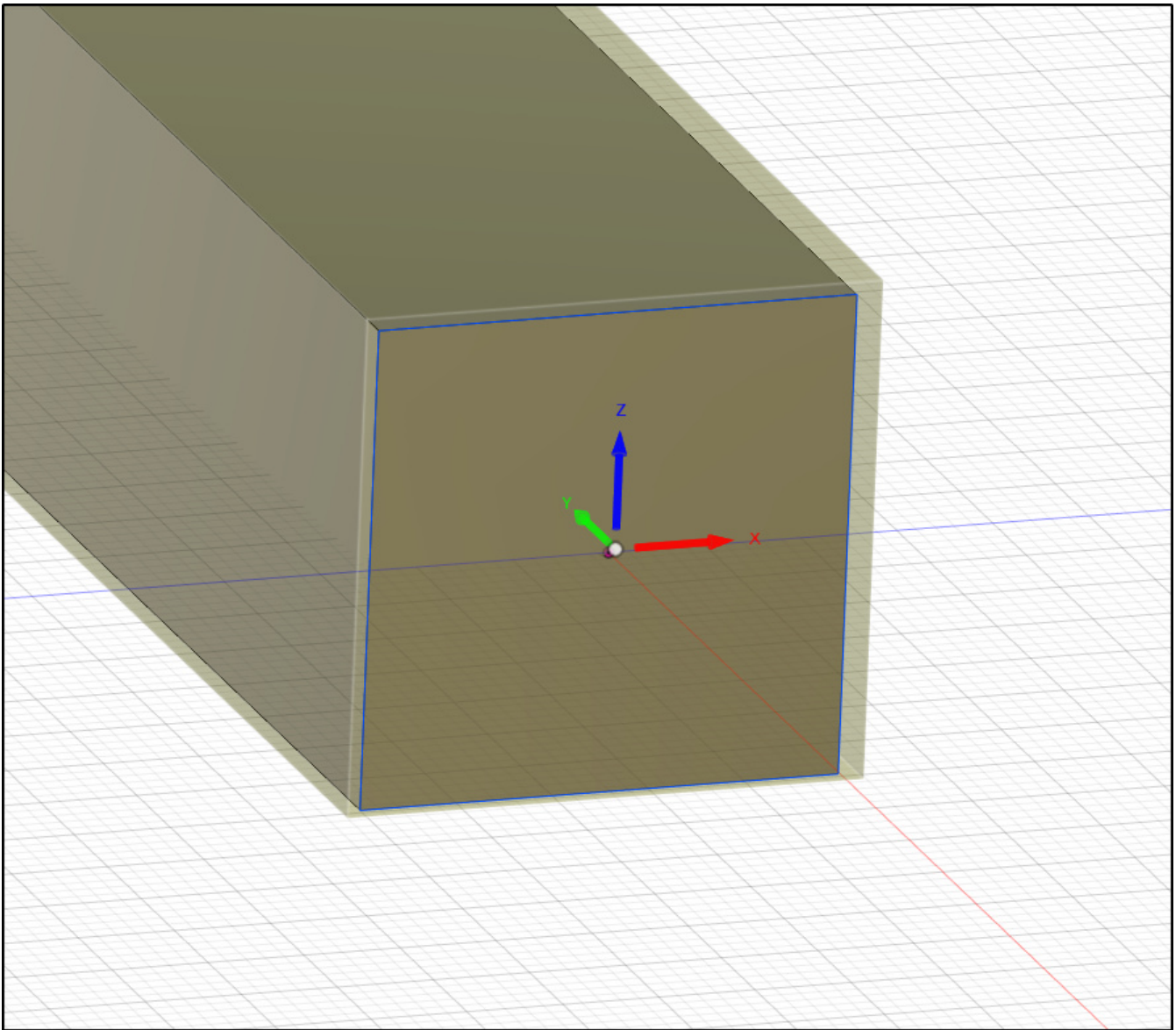


- If using VCarve Pro or Aspire, in your Material Setup settings, ensure your Z-Zero is set to **Center of Cylinder**.

Operation Note

Only use **Surface of Cylinder** if you will be manually setting all work offsets. Using the Auto Z Touch Plate will set work offsets to the center of the cylinder.

3.1.4



- If using Fusion 360, your WCS needs to be located at the center of your part.

Operation Note

Only use a different WCS location if you will be manually setting all work offsets. Using the Auto Z Touch Plate will set work offsets to the center of your workpiece.

3.2 Workpiece Setup

Depending on the length of your workpiece and material used, it is possible to mount your workpiece in the chuck without use of the tailstock. However, in most cases it is recommended to use the tailstock to support the end of your workpiece. The following instructions include use of the tailstock.

3.2.1

Your rotary kit contains two sets of jaws, inside and outside jaws. These provide options to properly secure various workpiece sizes in the chuck. Each jaw is numbered 1, 2, 3, or 4 and correspond to the numbers stamped on the guide slots of the chuck.



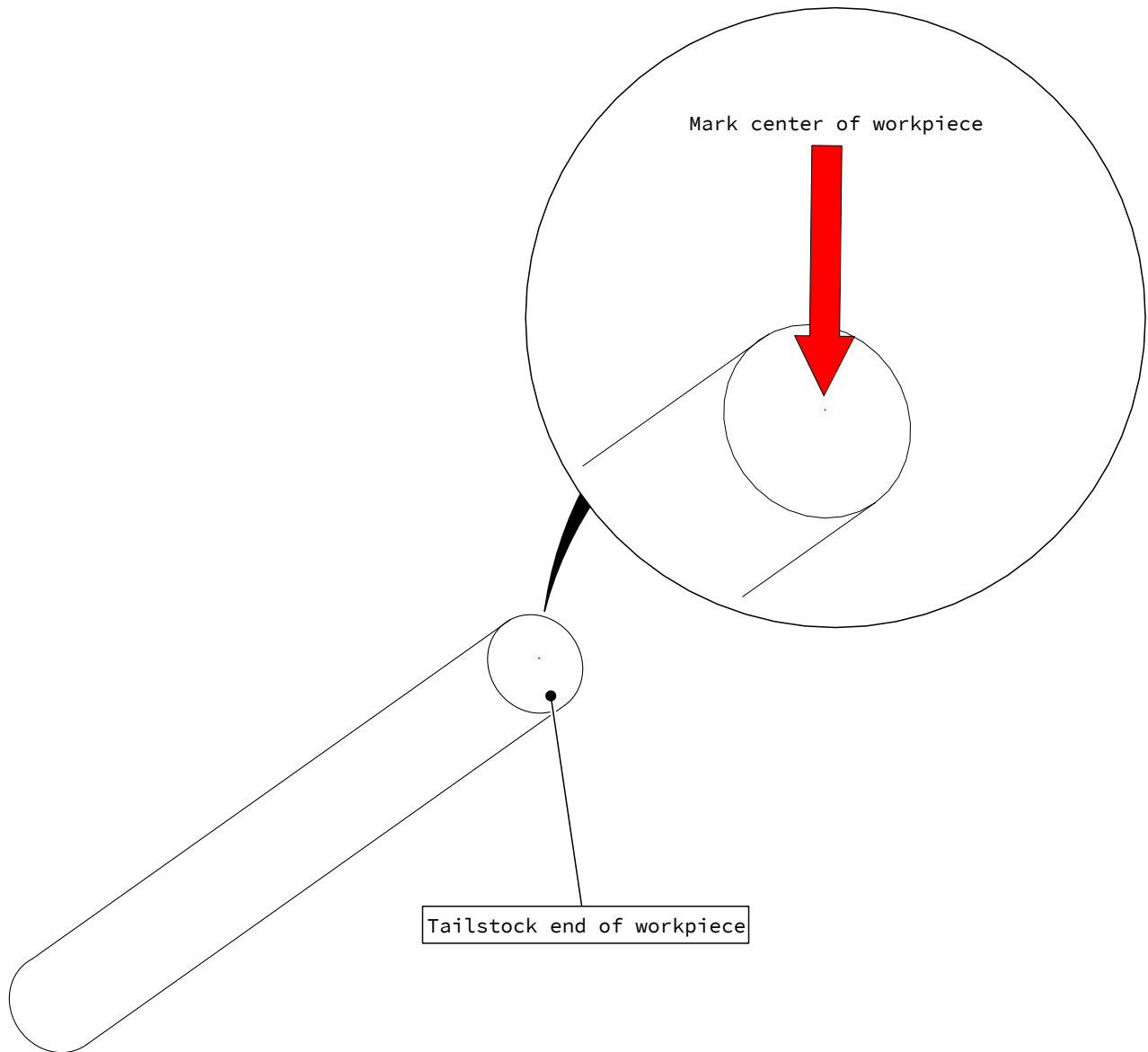
To change jaws, follow the steps below:

1. Use the chuck key to loosen the jaws until you can remove all four from their guide slots.
2. Position the first thread of the scroll gear just to the right of slot 1.
3. Insert the jaw marked "1" into the guide slot.
4. While pressing the jaw inward, turn the chuck key to advance the first thread of the scroll gear just to the right of slot 2.
5. Insert the jaw marked "2" into the guide slot.

6. Repeat the above steps for jaws 3 and 4.
7. When installed properly, all four jaws will meet at the center of the chuck.

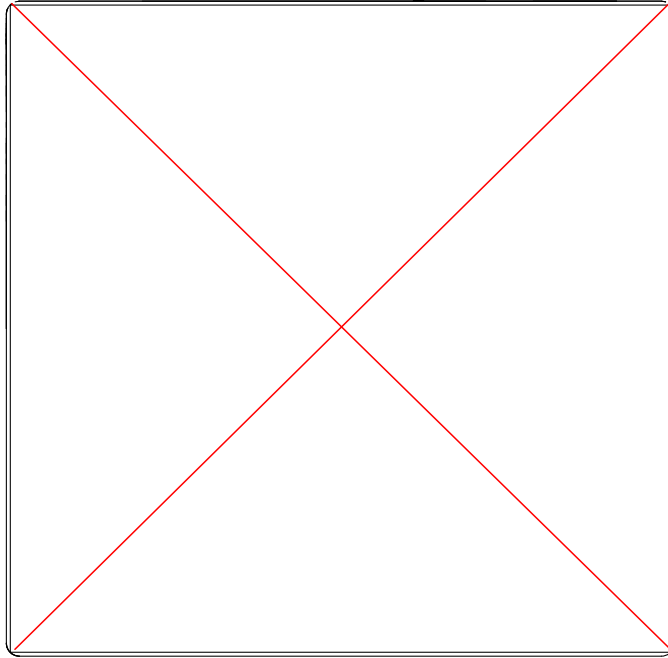


3.2.2



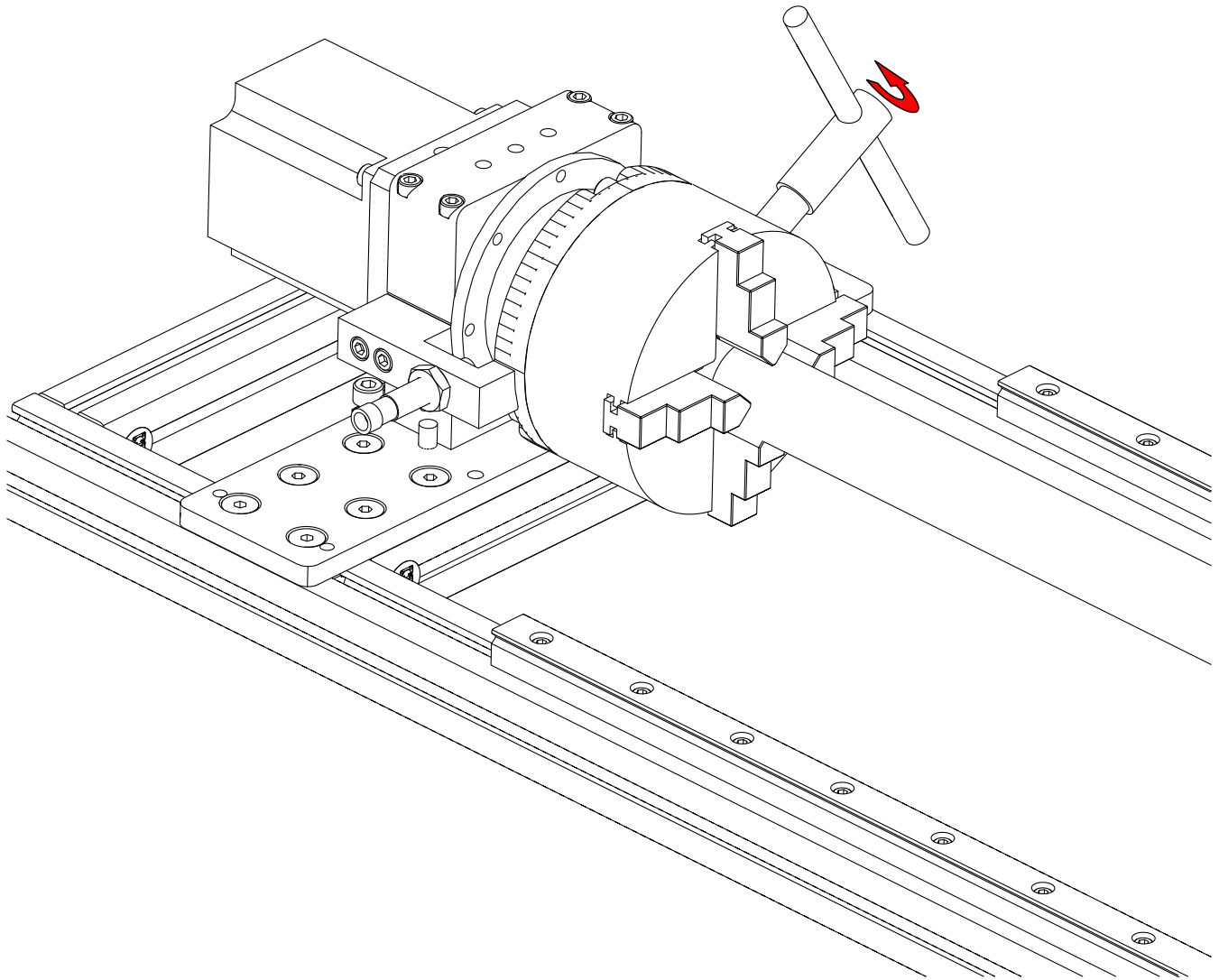
- At the tailstock end of your workpiece, mark the center point.

3.2.3



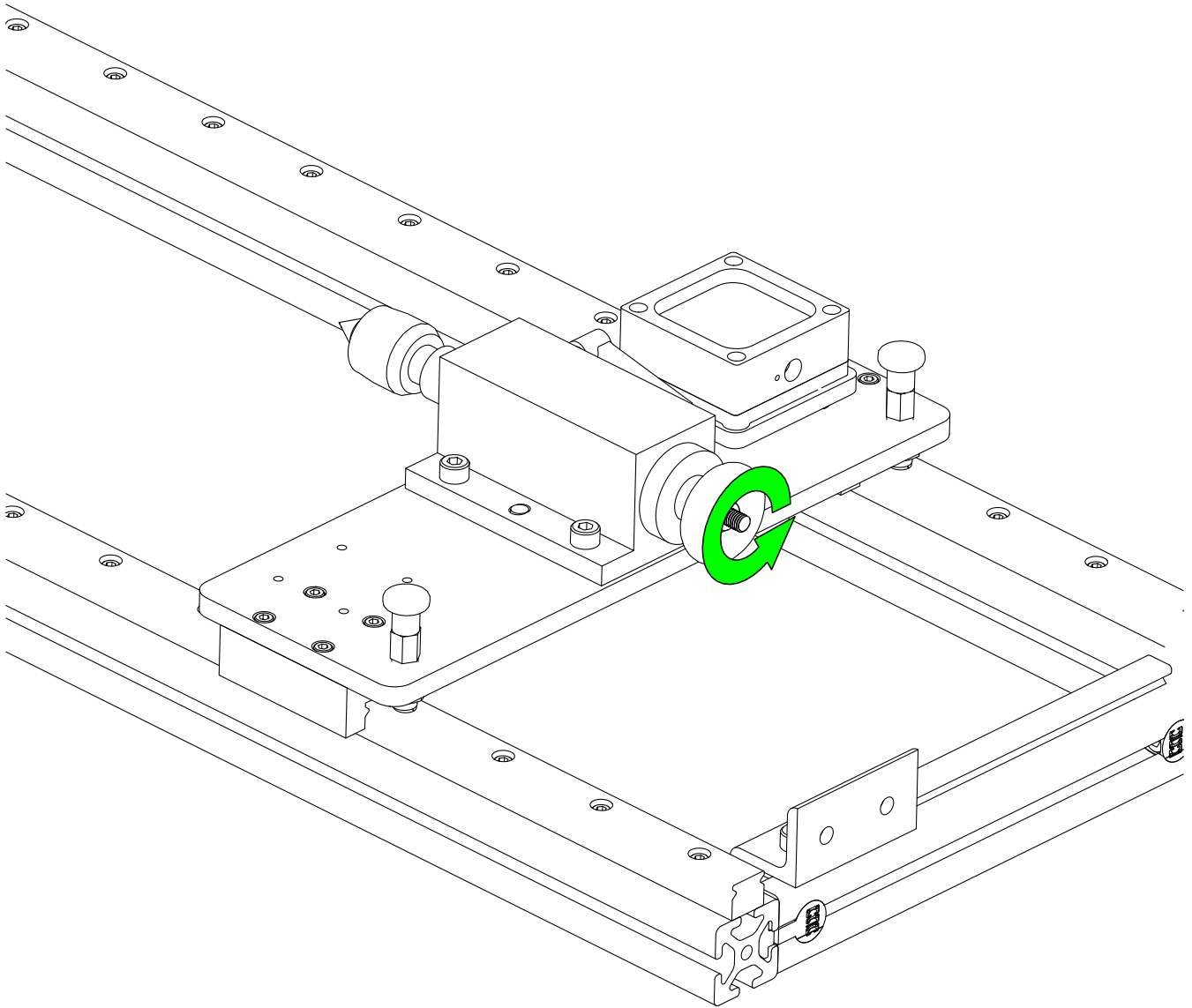
- For square workpieces, draw diagonal lines from each corner to find the center.

3.2.4



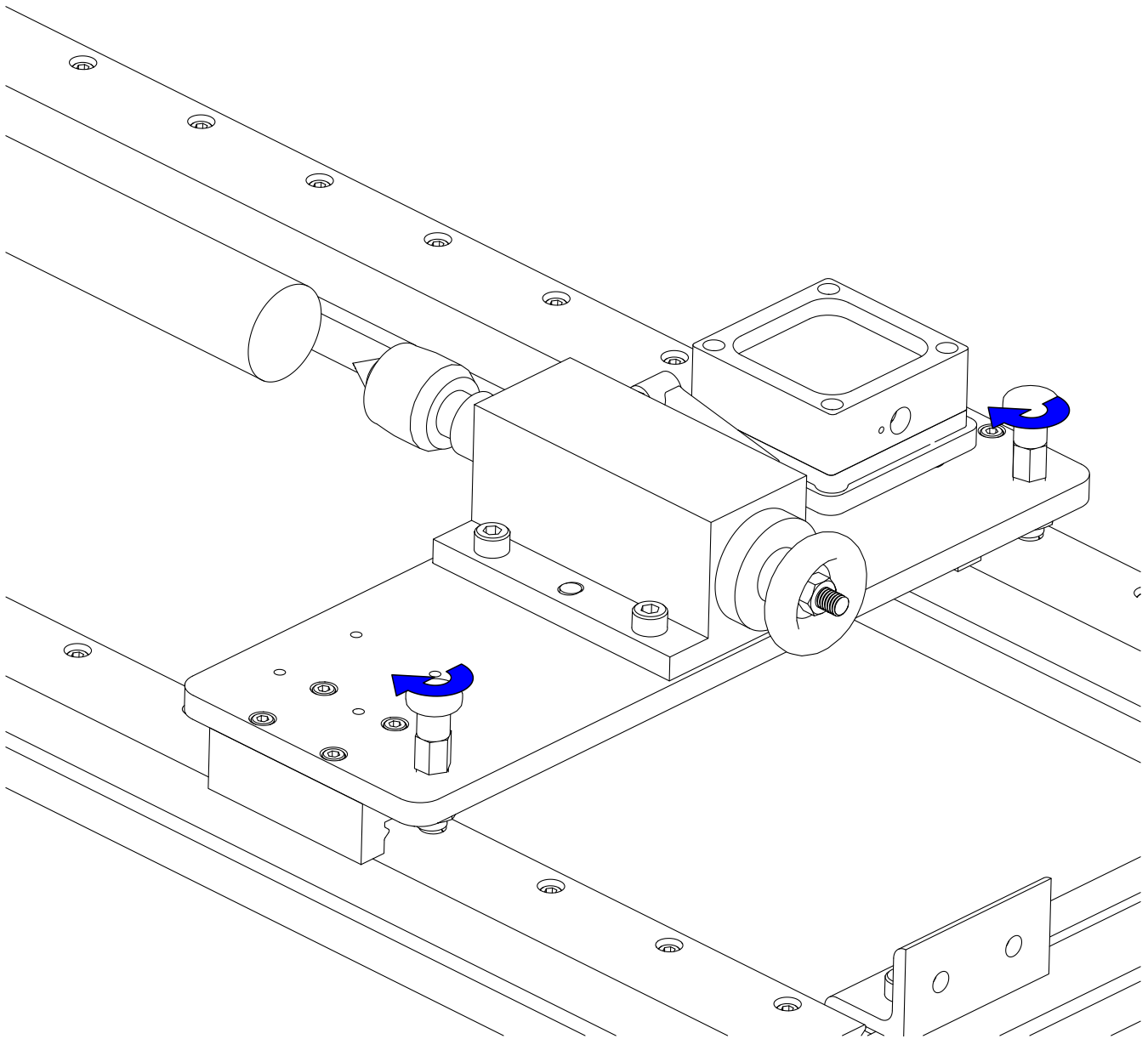
- Insert the workpiece into the chuck and tighten with the chuck key.

3.2.5



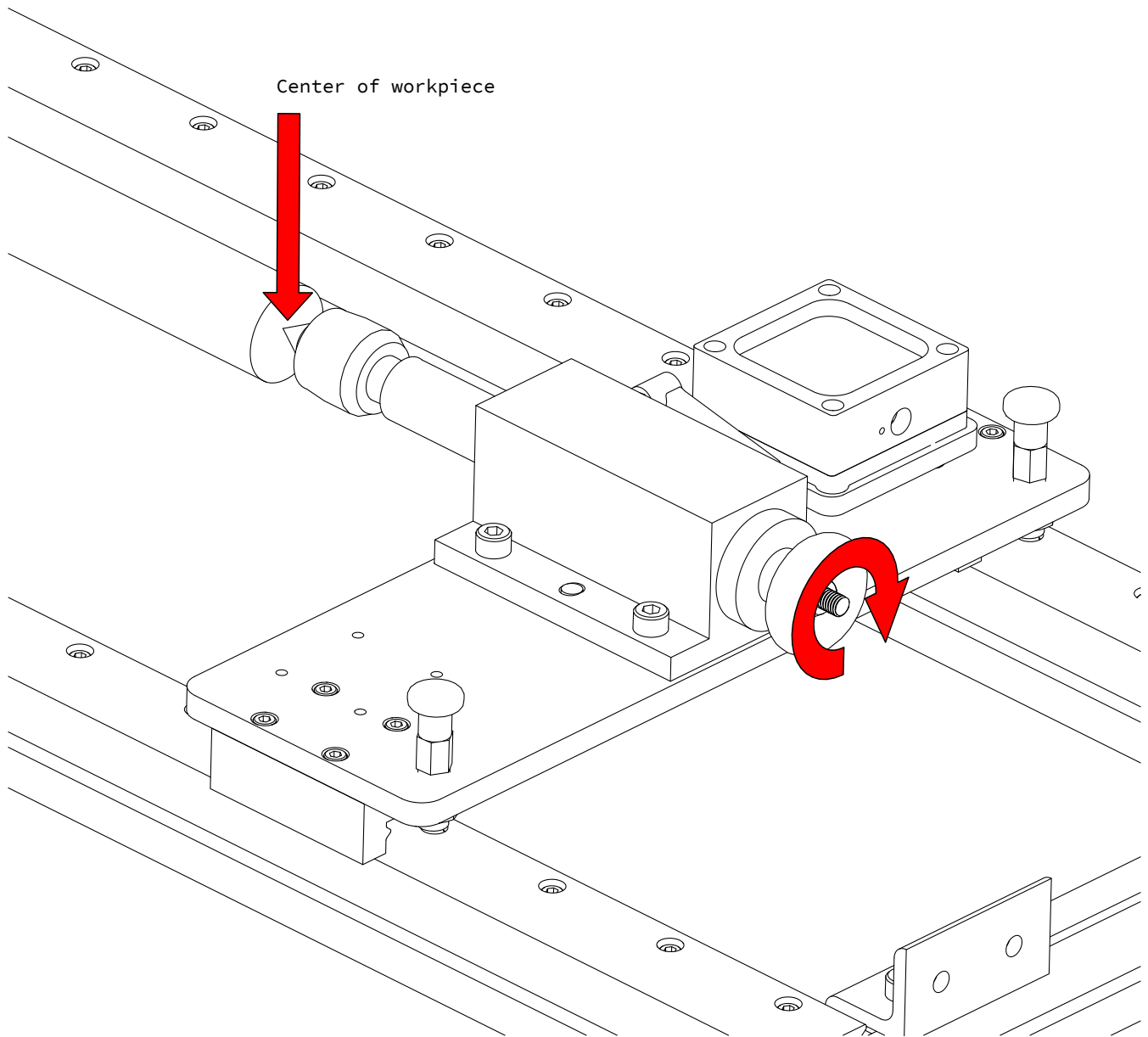
- Fully retract the tailstock's live center.

3.2.6



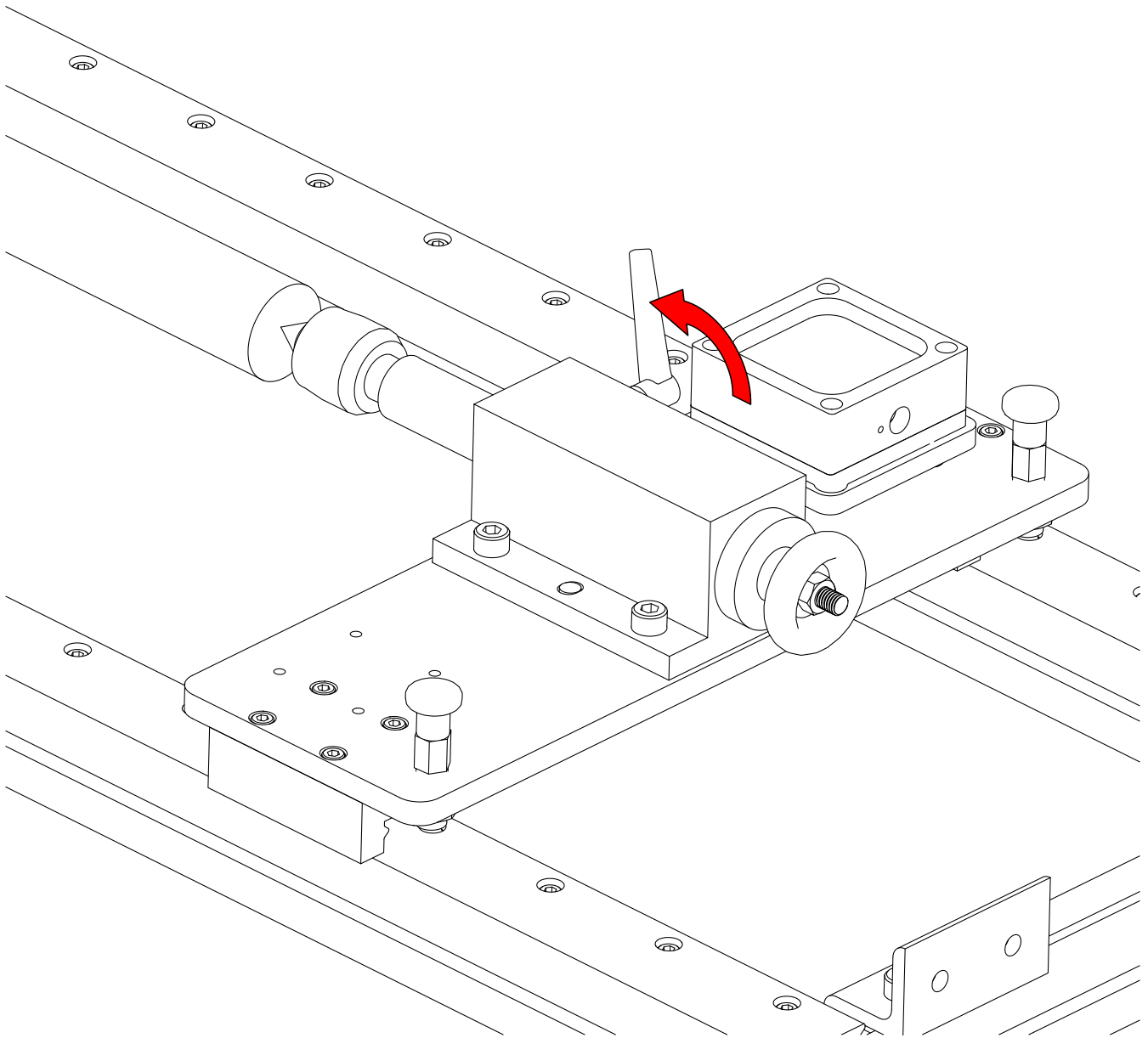
- Move the tailstock to the closest lock position to the workpiece.
- Lock both spring plungers.

3.2.7



- Tighten the live center at the workpiece center point.

3.2.8



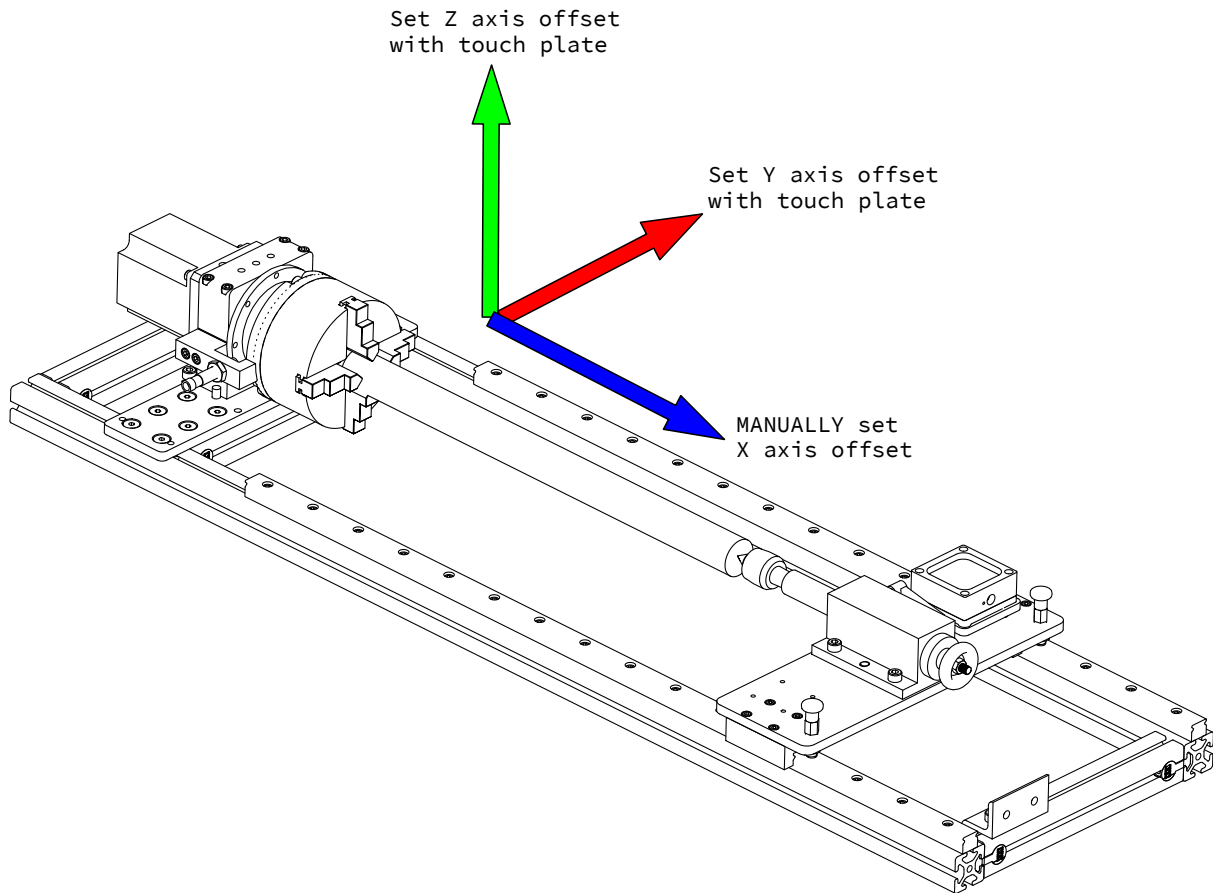
- Tighten the tailstock clamp.

3.3 Work Offsets

Before running your program you will need to use the Auto Z Touch Plate to set your work offsets. Review the Touch Plate section for proper usage of the rotary touch plate functions.

3.3.1

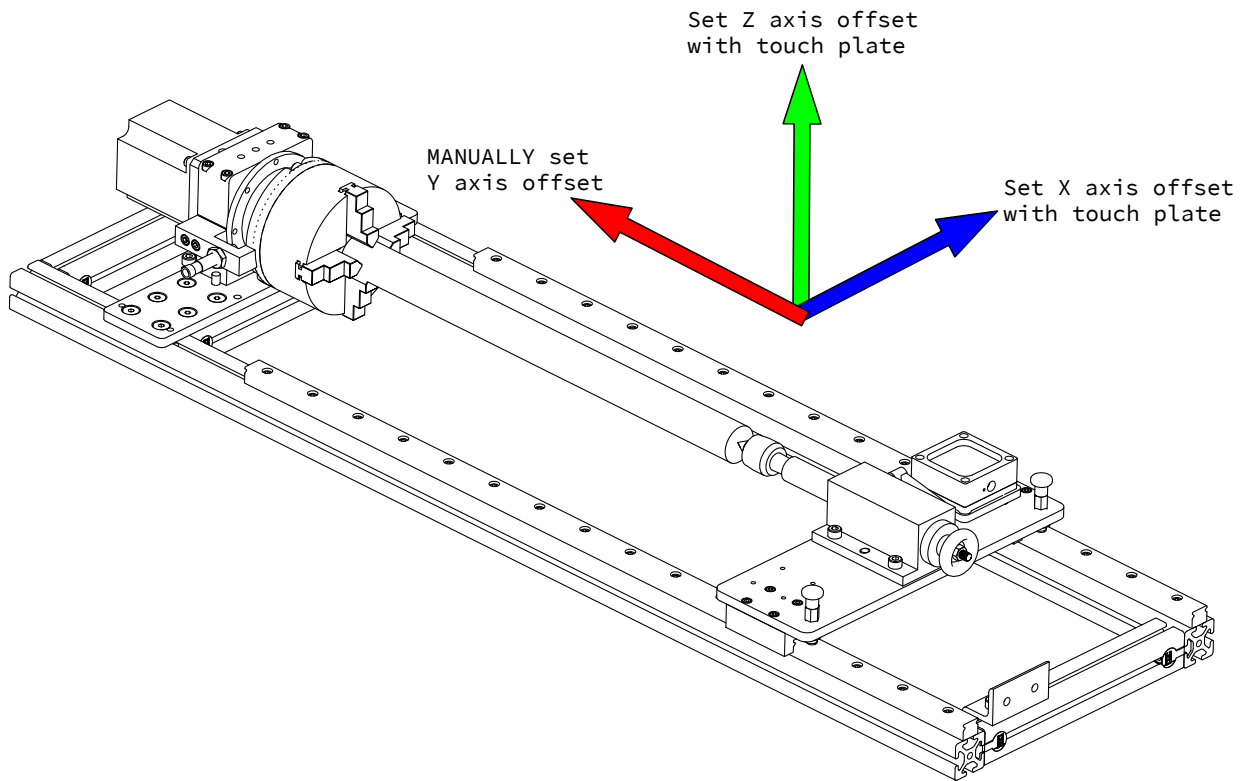
Mounted parallel to X axis



- When your rotary assembly is mounted parallel to the X axis, use the touch plate to set the Z and Y axis offsets.
- You will need to **MANUALLY** set the X axis offset, explained in step 3.3.3.

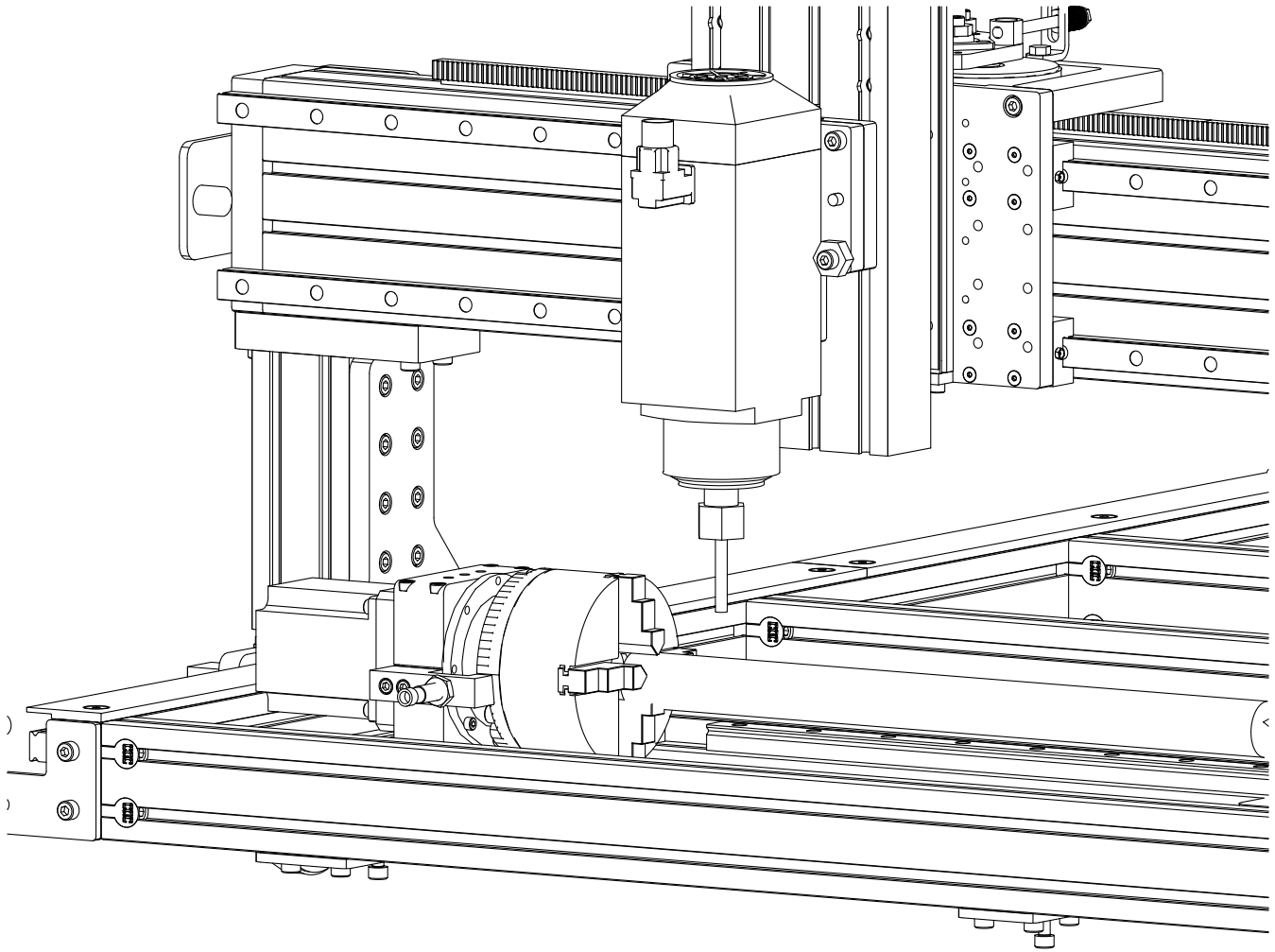
3.3.2

Mounted parallel to Y axis



- When your rotary assembly is mounted parallel to the Y axis, use the touch plate to set the Z and X axis offsets.
- You will need to **MANUALLY** set the Y axis offset, explained in step 3.3.3.

3.3.3



- To set manually set the offset for the third axis (either X or Y, depending on orientation), jog the machine to your desired start position and click the **Zero X** or **Zero Y** button in Mach4.

3.3.4

- If your workpiece requires a specific A axis zero position, use the Home A Axis button. This will square the jaws to your spindle which can then be used as a reference to zero the A axis.

