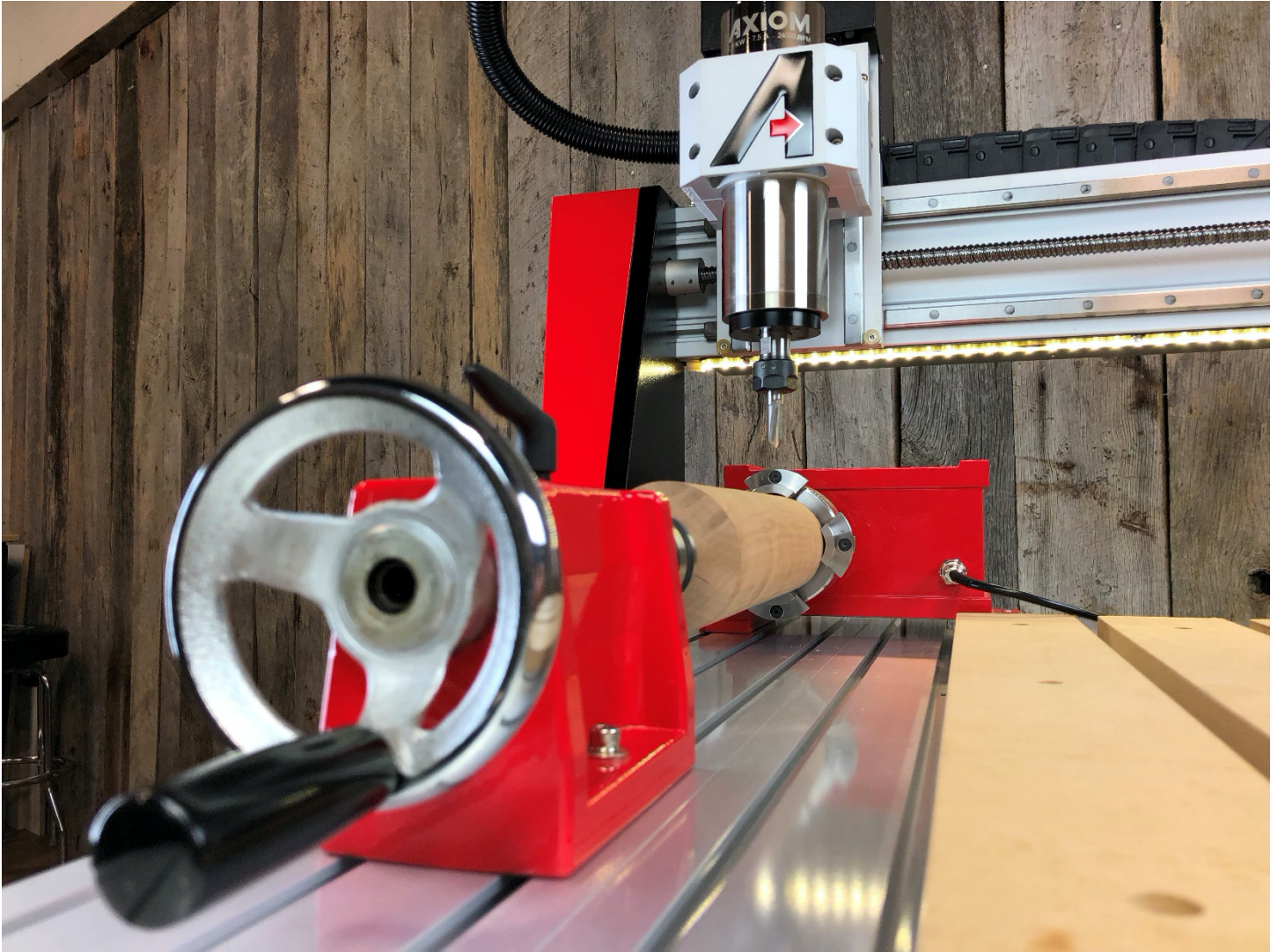


# AXIOM

P R E C I S I O N



## 4<sup>th</sup> Axis Rotary Index Manual

This manual covers the installation of the Axiom Precision 4<sup>th</sup> Axis Rotary accessory.

As a Rotary Index, this accessory rotates or indexes material in small increments for CNC machining applications. Depending on the toolpath design, continuous rotation is also possible.

Design of 4<sup>th</sup> Axis models and tool-paths is covered in more depth by Vectric tutorial videos. Additional training may be found by attending one of our Level 2 CNC Training Classes.

For more information on attending a training class, please visit: <https://www.axiompsonrecision.com/vectric-axiom-cnc-training-class.html>

Install videos for this and other accessories can be found by visiting the “Axiom Tool Group” YouTube channel at: [https://www.youtube.com/channel/UCQ8U81z1iM\\_fvE92uGDFAuQ/videos](https://www.youtube.com/channel/UCQ8U81z1iM_fvE92uGDFAuQ/videos)

### **Important Post Processor Information:**

With the purchase of the 4<sup>th</sup> Axis Rotary accessory, there will also be a new 4<sup>th</sup> Axis Post Processor that will need to be installed into the VCarve or Aspire software.

Customers should receive along with the tracking information for their order...a link to download the 4<sup>th</sup> Axis post processor and instructions from the website.

Be sure when saving the new files to use with the 4<sup>th</sup> Axis that the correct post processor is being selected.

If you have not received this file, please contact Axiom Tool Group by calling 844-642-4902, or by email: [support@axiomtoolgroup.com](mailto:support@axiomtoolgroup.com)

Or simply download any of our available post processors by visiting: [www.axiompsonrecision.com/post](http://www.axiompsonrecision.com/post)

AR4/6/8 Pro+ series machines:

Axiom\_HHC\_CNC => Normal 3-Axis operation of standard VCarve/Aspire tool-paths files.

Axiom\_HHC\_4<sup>th</sup> => Required for 4<sup>th</sup> Axis machining.

Axiom Elite AR8/AR16 machines:

Axiom\_Elite\_CNC => Normal 3-Axis operation of standard VCarve/Aspire tool-path files.

Axiom\_Elite\_4<sup>th</sup> => Required for 4<sup>th</sup> Axis machining.

To load these Post Processor files: (VCarve or Aspire)

Open the software, click File and select to Open “Application Data Folder”.

Click and drag, or copy (Ctrl+C) and paste (Ctrl+V) the files into the PostP folder.

Once you have moved the file ...if the software is currently running you will need to close and restart it before it will appear in the Post Processor list when saving your toolpath/s.

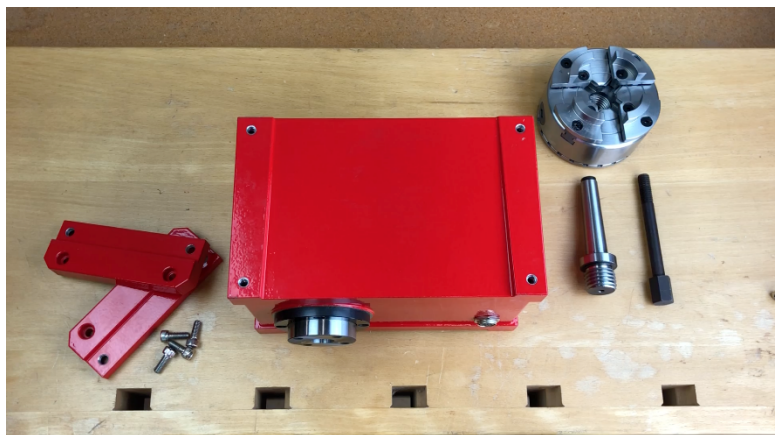


## Unboxing and Assembly:

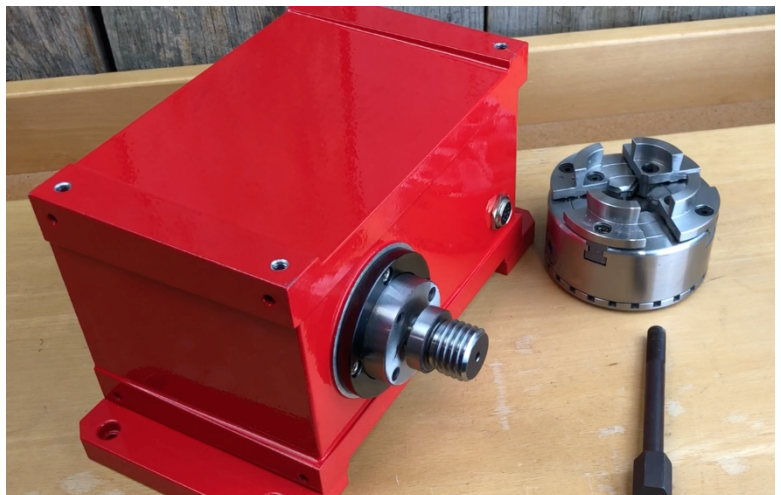
1. Unbox all items



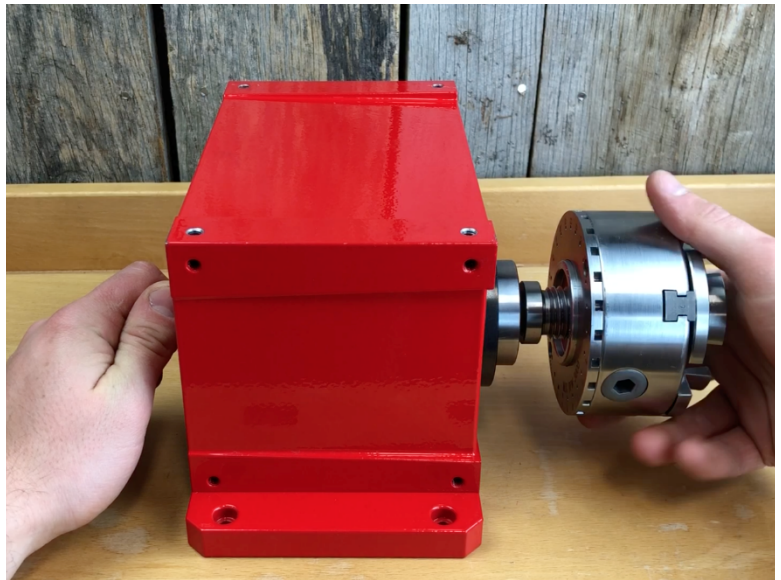
2. Locate the following:
  - a. Head-Stock Body
  - b. Mounting Plates and hardware
  - c. 4-Jaw Chuck
  - d. 1"-8 Taper and Drawbar



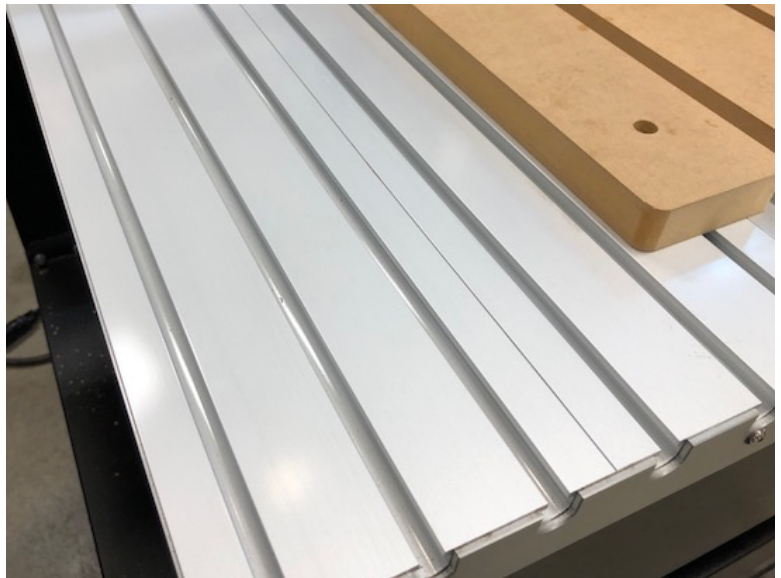
3. Attached the mounting plates using the included hardware.
4. Insert the 1"-8 taper through the front of the Head-Stock



5. Insert the Drawbar through the rear of the Head-Stock and tighten.
6. Attach the 4-Jaw chuck onto the threads and rotate by hand until tight.

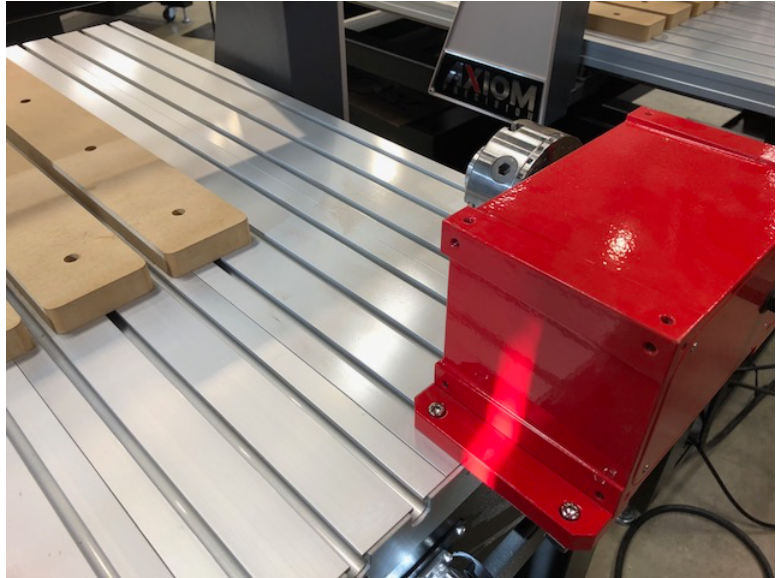


7. At the machine, remove the left-most two spoil board strips.
  - a. To remove, loosen all the cap screws and slide the strip off the table

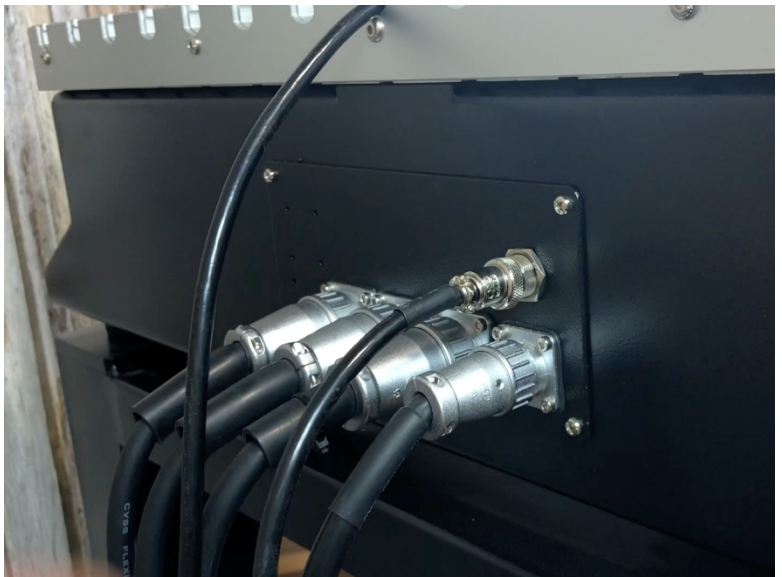




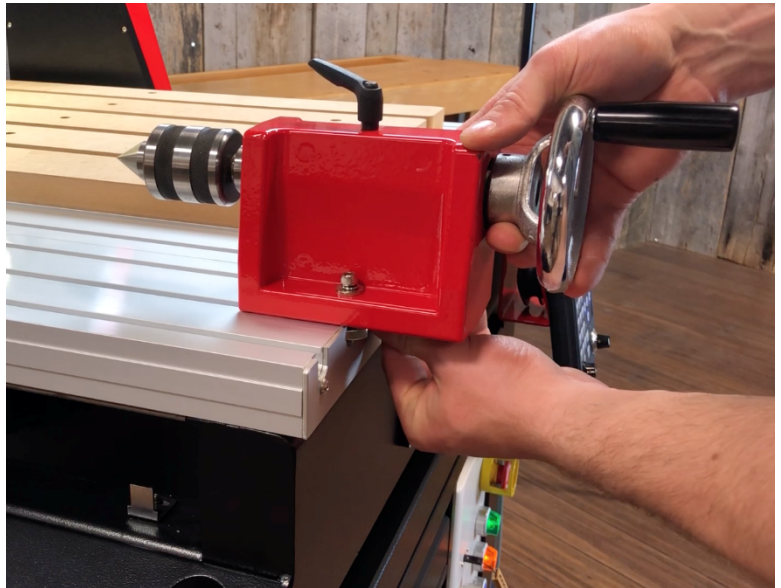
8. Install the included cap screws and square nuts onto the mounting plates of the Head-Stock and slide on to the rear of the table
  - a. Line the Head-Stock up with the space left behind by the removed spoil boards.
  - b. Leave the cap screws loose for the time being.



9. Install the 4<sup>th</sup> Axis control wire to the Head-Stock.
  - a. One end of this wire will plug into the front of the Head-Stock
  - b. The opposite end will plug into the rear base of the machine, next to other existing connections



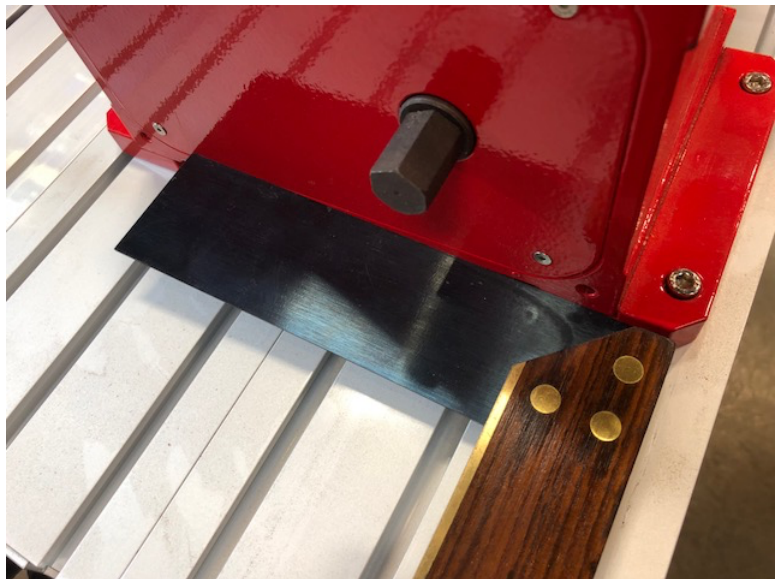
10. Locate the Tail-Stock with Live Center
  - a. Install on to the front of the machine table using the included cap screws and square nuts.



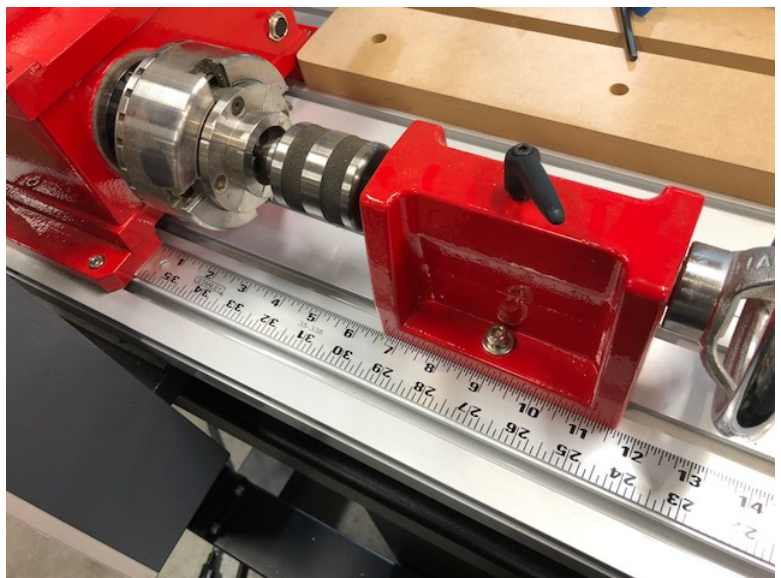
### **Squaring and Job Setup:**

Now that all the components are lightly mounted to the table, it's time to square them to the machine and setup for the job.

1. Start with the Head-Stock
  - a. Using a square to align the body of the Head-Stock with the t-track found on the table.
  - b. Once positioned, tighten the cap screws locking the unit in place.

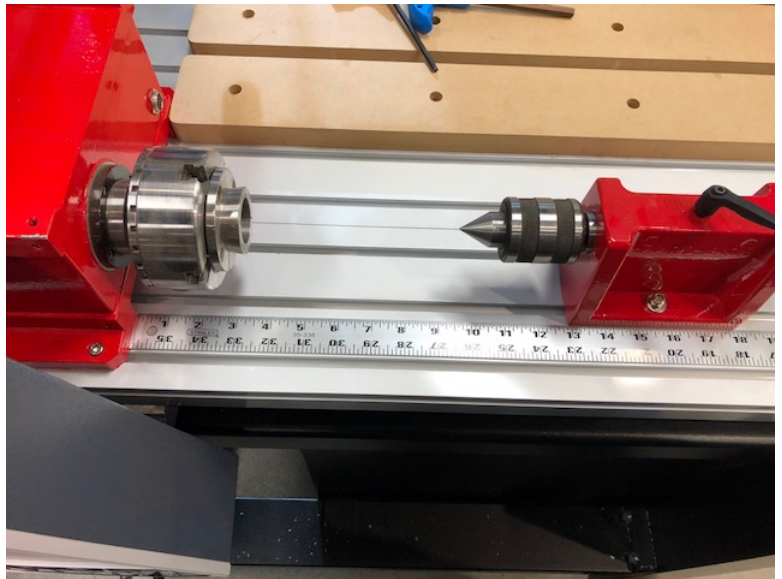


2. Use the included T-handle wrench to close the jaws of the Chuck all the way.
3. Then slide the Live Center of the Tail-Stock into the Chuck.
4. This will allow you to center the Tail-Stock and align it to the centerline of the Chuck.





5. Use a straight edge to act as a fence to guide the Tail-Stock, maintaining the alignment as it is positioned for the length of material being used.
6. Once in place, tighten the cap screws on the Tail-Stock and lock the unit in place.



7. Draw center marks on the material being used. \*Centerline templates are available at wood working specialty stores\*
  - a. Open the Jaws of the Chuck
  - b. Loosely, insert the material into the Chuck.



8. Align the centerline with the Live Center.
  - a. Spin the wheel to extend the Live Center onto the material
  - b. Tighten the set screw lever.
9. Then tighten the Chuck.





10. The recommended setup will use an XY Origin in the center of the material.
  - a. For ease of setup, the set screw for the Tail-Stock is in line with the center of the axis.
  - b. Line the bit up with this set screw, then move along the Y axis until in line with the center of the material.
    - i. Press XY-0 to set the Origin
11. The location of the Z-0 is two parts.
  - a. Move along the X axis so the bit is directly above the aluminum table top.
  - b. Use the Touch-Off device to set the Z-0 to the metal surface of the table top.
    - i. For details on how to use this device, refer to the machine operation manual.
  - c. Once the Z-0 is set to the table top, raise the Z to 75.00
  - d. Then use the Z-0 button to manually set the Z Origin in this location.

To clarify...the reason for doing this is to allow the Z-0 to be set at the center line of the material.

This is the recommended location for the best operation. Since the Live Center and subsequent center line of the material are roughly 75.00mm above the table surface... this two-step process will be one of the easiest methods of setting the Z-0 to that desired location.

Once the Origin is completely setup and the following controller changes have been made, the 4<sup>th</sup> axis files should be able to run.

When in doubt about an operation, try setting the XY-0 location 8-10 inches to the side of the Rotary axis. This will allow you to watch the tooling as it goes through the motions to make sure that everything appears to be operating correctly, before the bit contacts the material.

## **Controller Changes: (B18 Controllers Only)**

Before going much further, there are a few changes that must be made to the controllers.

For the Pro+ Series machines, the 4<sup>th</sup> Axis will need to be added to the HOME operation.

To do this:

1. First turn the machine ON
2. Once the Home Type screen has loaded
  - a. Press the Stop/Cancel button to bypass this for now.
3. From the main coordinate screen, press MENU
4. Select the Machine Setup.
5. Scroll down and select Home Setup.
6. Then select the Home Order option.
7. Currently, the setting is Z, X & Y (Meaning that the machine moves Z first, then X & Y together).
8. To include the A-axis, scroll through the list and select Z, XY, A.

This will setup the HOME operation to move the Z first, then X & Y together and then finally the A. There will however, be some difficulties when the A-Axis is removed from the machine to allow for larger jobs.

When these times come up, just scroll down the list of the Home Type screen and you will see a XYZ only option.

With this option the controller will not look for the A-axis.

Beyond the changes to HOME, the new axis will be bringing much higher working surfaces to the machine.

The current safe height may be default to 40mm above the programmed Z-0 location.

For the 4<sup>th</sup> Axis, the preferred Z-0 location will be the centerline of the material. In most cases the 40mm height will need to be increased.

To adjust this:

1. From the main coordinate screen, press MENU
2. Select the Auto Pro Setup
3. Scroll down and select the Safe Height
4. Highlight the setting and use the Delete button to remove.
5. Enter the new number (i.e. 75mm) and press OK.
6. Go back to the main coordinate screen.

For accurate rotation limits, the Pulse/mm settings for the A-axis should be verified.

The check this parameter:

1. From the main coordinate screen, press MENU
2. Select the Machine Setup
3. Select the Pulse Equiv.
4. Scroll down to find the A-axis setting.
5. Verify that the current setting is 355.556
6. If necessary, highlight this setting and use the Delete key to remove the incorrect setting.
7. Enter the correct setting and press OK.

## **Controller Changes: (Elite Model Hust Controllers)**

The changes with this controller are very similar to the B18 found on the Pro+ model machines.

To begin with, the A-axis will need to be activated so that the HOME operation can be completed and the ORIGIN for the A-axis can be accurately set.

To make this initial change:

1. After turning the machine ON, rotate the selection dial to OTHER.
2. On the OTHER screen, press the Function F5 key (USER) to enter the user defined settings.
3. Scroll down to highlight the HOME AB option.
  - a. Default setting here is "0" for None.
  - b. Using the number pad, enter "1" and press ENTER.
  - c. This will change the HOME operation to include the A only.
4. The HOME operation will now move the A-axis, to find its HOME while simultaneously moving the other axes.

The other axes should still HOME in the proper order...Z first, then X and Y together.

Again, exactly the same as the other controllers, the new axis will be bringing much higher working surfaces to the machine.

The current safe height may be default to 40mm above the programmed Z-0 location.

For the 4<sup>th</sup> Axis, the preferred Z-0 location will be the centerline of the material. In most cases the 40mm height will need to be increased.

To adjust this:

1. Rotate the selection dial to OTHER.
2. On the OTHER screen, press the Function F5 key (USER) to enter the user defined settings.
3. Scroll down to the Height of Safe Z
  - a. This setting is always in reference to the Machine Coordinates, where Z= 0.00 at its highest elevation.
  - b. Therefore, the Safe Z settings will always be a negative number.
4. We suggest starting with -75.00 (longer bits/thicker materials may require higher Safe Z)
  - a. Type the new number using the number pad, press ENTER to make the change.
5. The Safe Z also influences how the machine sets the Z-0 when using the Touch-Off Device
  - a. During this operation, the machine lowers to the Safe Z location rapidly
  - b. Then slowly lowers further from there
    - i. Only during this slower operation will the controller be looking for a signal from the device.

Currently, a machine with factory settings may experience a miscommunication between how the controller recognizes the tool-path data and the format of the 4<sup>th</sup> Axis data. Wherein, the software uses a circumference rotation of distance in metric (mm), while the controller is looking for that data to be in degrees of rotation.

To correct this:

1. Rotate the selection dial to OTHER.
2. Press the Function F3 key (SYSTEM) to enter the password protected system settings.
  - a. Enter the password, '9999' and press ENT.
3. On the system parameter screen, scroll down to locate the following parameters (making any necessary adjustments).



Required parameter changes:

PA247 = 512000

PA248 = 360000

PA747 = 360000

PA748 = 512000

PA784 = 1

To make navigation easier when on this screen.... the Up/Down arrows will move one line at a time, Pg Up/Pg Down obviously move one page at a time...but the Left/Right arrows will move you 100 lines at a time.

If you need to make changes, highlight the line.... type the new number which will appear in the lower left corner of the screen and press ENT.

Once all the above parameters are set correctly, just turn the dial to leave that screen.

# Contact Us:

For software related inquiries, training videos, software updates, free projects and more...visit Vectric Ltd directly at:

<http://support.vectric.com>

Axiom Post Processors can be downloaded from the link below.

<https://www.axiomprecision.com/post>

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Visit us online at:

[www.axiomprecision.com](http://www.axiomprecision.com)

Need Assistance? The Axiom Precision CNC Support Team can be reached at:

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For machine and accessory orders, the Axiom Precision Sales Team can be reached at:

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