Mach4 Configuration Guide

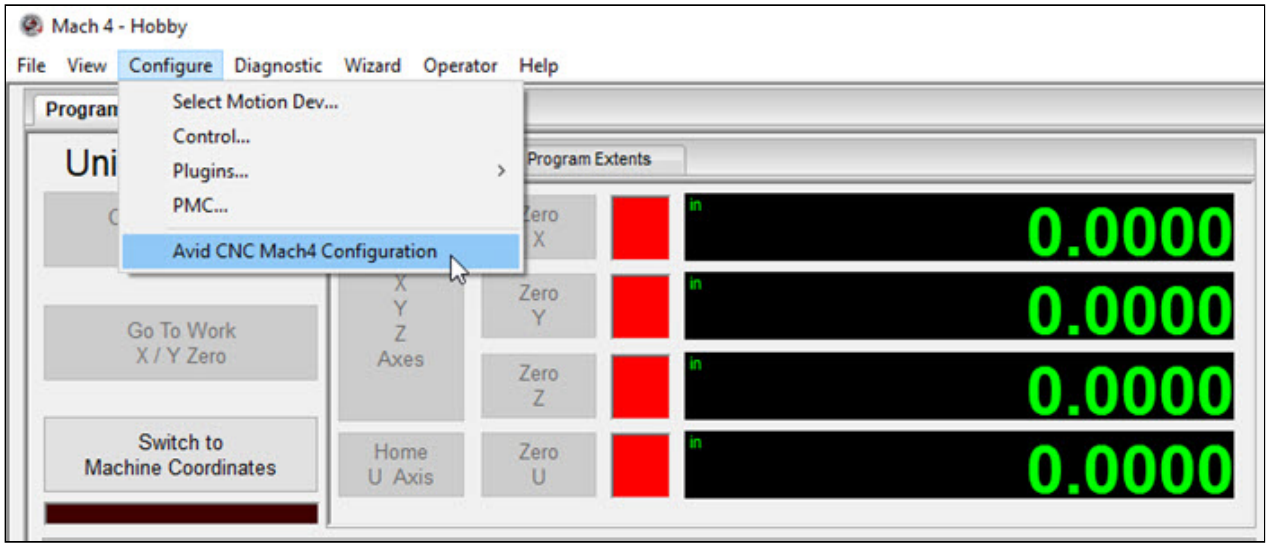
v2023Q1.1

Mach4 Configuration

Follow the instructions below to configure Mach4 for your specific machine. Instructions to license your Mach4 software will follow this Mach4 Configuration guide. You can configure and run Mach4 in demo mode prior to licensing the software

1. Open Mach4

- With your Plug and Plug Electronics control box powered on and connected to your PC, open Mach4 using the **Avid CNC** shortcut on your desktop.



- Open the "**Avid CNC Mach4 Configuration**" window located in the Configure tab.

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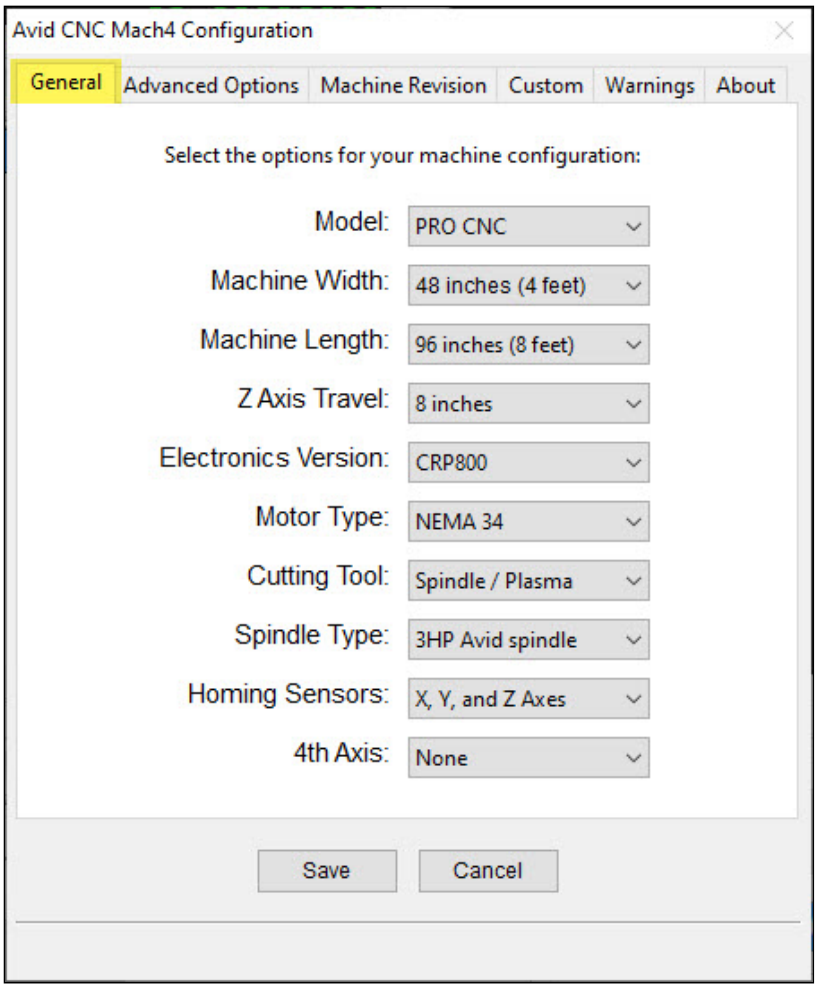
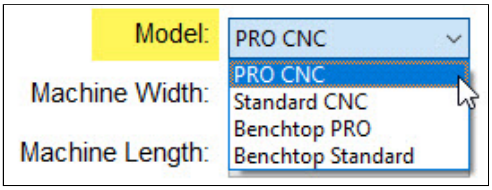
2. General Settings



The **General** tab contains options to help setup Mach4 based on your machine's configuration. For each item, choose the appropriate selection (selection options will vary depending on machine model). When you click **"Save"**, this will reconfigure Mach4 with your new settings. You can click **"Cancel"** to exit without reconfiguring Mach4 and any selections you may have changed will not be saved.



Model: Select the model of your machine.

> **Selection Note**
>
> "PRO CNC" and "Standard CNC" are large-format machines. If you have a benchtop machine, be sure to select the appropriate benchtop model.

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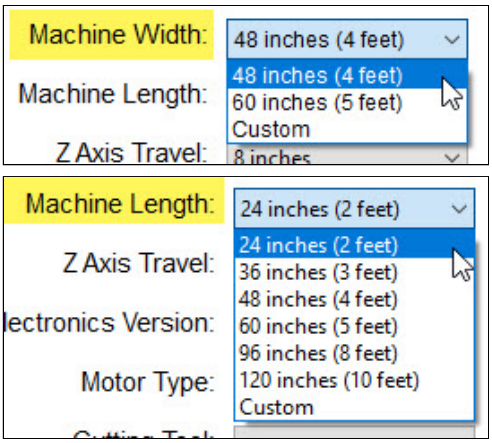
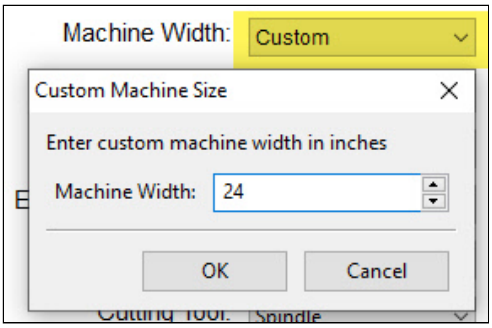


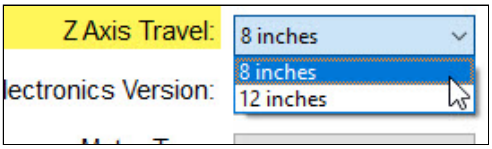
Machine Width: Select the width of your machine.

Machine Length: Select the length of your machine.

> **Selection Note**
>
> If you have a custom sized PRO CNC machine there is an option for "Custom" Length and Width, described below.



Custom Width or Length: Enter the appropriate width or length dimension of your machine, in inches. Click **"OK"** to save this custom value.



Z-Axis Travel: Select the travel of your Z-Axis. The default Z-Axis travel is 8 inches unless you specifically ordered your PRO CNC or Standard CNC machine with 12 inch Z-Axis travel.

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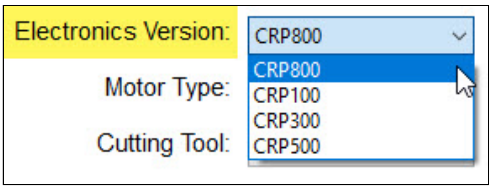
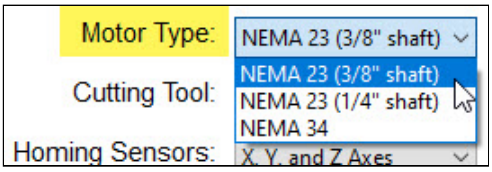


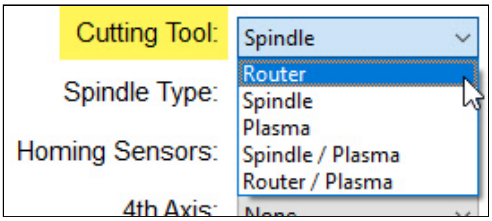
Electronics:

- **CRP800:** Avid CNC Plug and Play control systems (either NEMA 23 or NEMA 34).
- **CRP100:** DIY packages with our NEMA 23 motors and an MX3660, MX4660, or G540 stepper drives.
- **CRP300:** Control systems with our NEMA 34 motors, Gecko G201X or G203V drivers, and PMDX-126 breakout board.
- **CRP500:** Older versions of Avid CNC plug and play control systems, built prior to February 2015, using our NEMA 23 motors paired with our CRP5042 digital drivers and breakout board.



Motor Type: Select the type of motors your machine has.

> **Selection Note**
>
> The default shaft size for NEMA 23 motors is 3/8". You will only have NEMA 23 (1/4" shaft) motors if you specifically ordered this option.



Cutting Tool: Select the type of cutting tool your machine has. If your machine has both milling and plasma cutting tools, select either "Spindle / Plasma" or "Router / Plasma". The Mach4 Users Guide will describe how to switch between cutting methods.

> **Selection Note**
>
> If you select "Spindle / Plasma" or "Router / Plasma" you will see a screen appear to select the layout of your dual Z axes. This is used to set the correct X axis home offsets.

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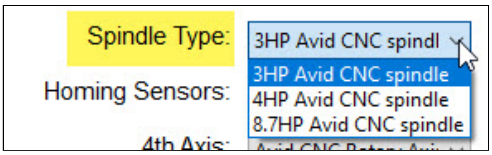
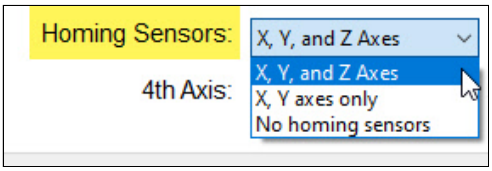
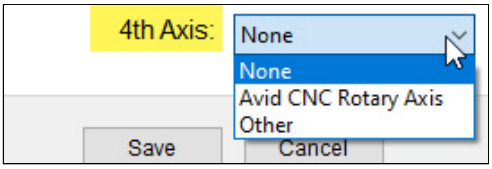


Spindle Type: If you selected a "Spindle" or "Spindle / Plasma" cutting tool, you will have the option to select which spindle you are using.



Homing Sensors: Select the axes on your machine which have homing sensors. The current **Avid CNC Proximity Sensor Kits** include homing sensors for X, Y, and Z axes.



4th Axis: If your machine has an additional 4th Axis, select the appropriate option. "Custom" will allow you to enter your own motor tuning parameters for the motor controlling your 4th axis. This is described in more detail below.

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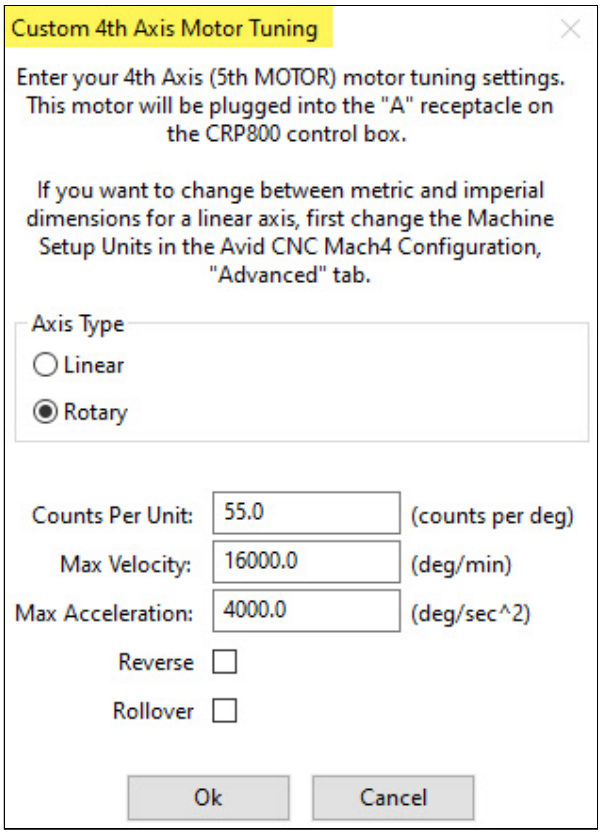
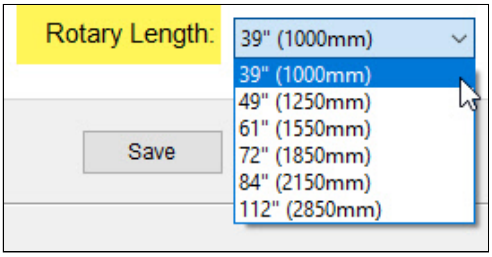


Custom 4th Axis: If you selected "Other" for the 4th Axis option, you will be able to specify the parameters listed below for motor tuning. If you want to use different units for motor tuning, first change the "Machine Setup Units" in the Advanced Settings tab.

- **Axis Type:** Select if this is a linear or rotary axis.
- **Counts Per Unit:** Enter the number of steps per unit of your stepper motor.
- **Max Velocity:** Enter the maximum velocity in the units shown.
- **Max Acceleration:** Enter the maximum acceleration in the units shown.
- **Reverse:** Select this checkbox to reverse the motion of the motor.
- **Rollover:** Select this checkbox to enable as a rollover axis. This can be only be selected with a "Rotary" axis type.



Rotary Length: If you selected an "Avid PRO CNC Rotary Axis" 4th Axis, you will have an option to specify the overall rotary length.

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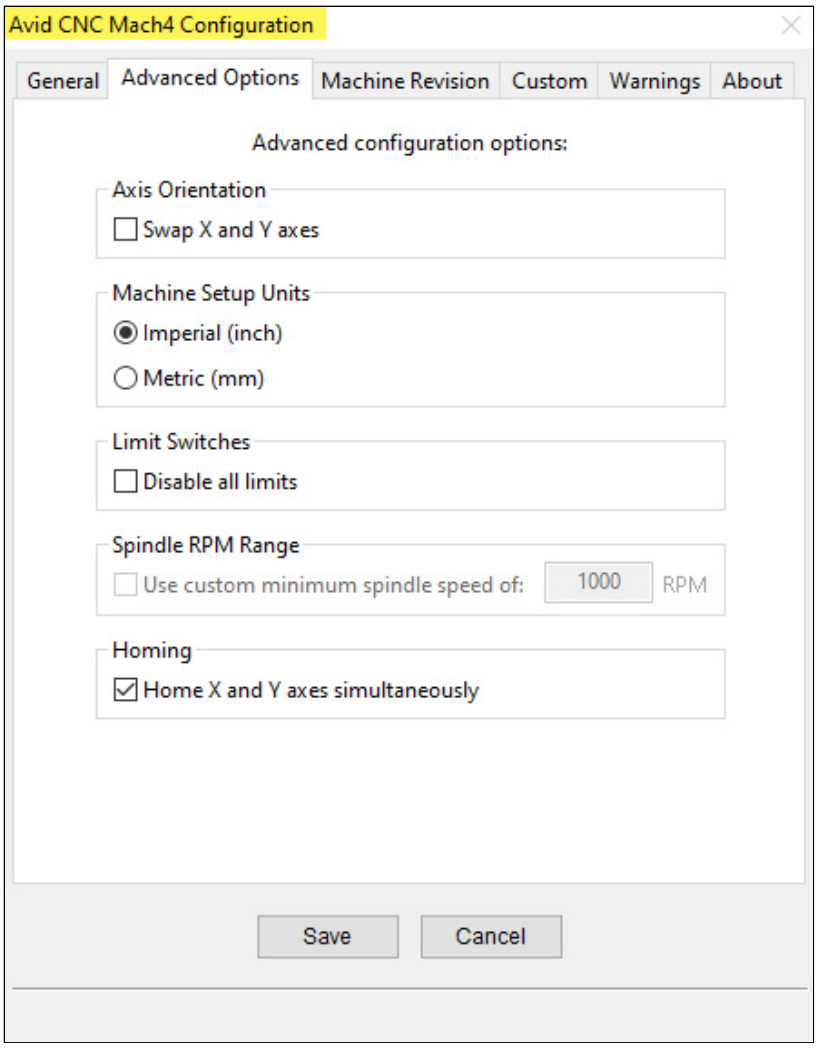
3. Advanced Settings



The **Advanced Settings** tab contains additional options for configuring Mach4.

- **Swap X and Y axes:** Enabling this option will swap the orientation of the X and Y axes. The table axis will be the X axis and the gantry axis will be the Y axis. Motor directions are changed to maintain right-handed coordinate system.
- **Machine Setup Units:** You can chose between metric or imperial dimensions for the machine setup units. These are the units used for parameters such as motor tuning. If you are using custom 4th axis motor tuning, those values will use the machine setup units you have selected here.
- **Disable all limits:** Enabling this option will disable ALL limit switches. Homing sensors will still be active. ***Only use this option after consulting with** Avid CNC Support*.
- **Custom minimum spindle speed:** If you are using an 8.7 HP Avid spindle, you have the option to set a custom minimum spindle speed. The default minimum spindle speed for the 8.7 HP Avid spindle is 1000 RPM. It is only recommended to set a custom minimum speed if you have a specific need for it.
- **Home X and Y axes simultaneously:** This option is enabled by default and will home the X and Y axes at the same time, reducing the time required for a homing operation.

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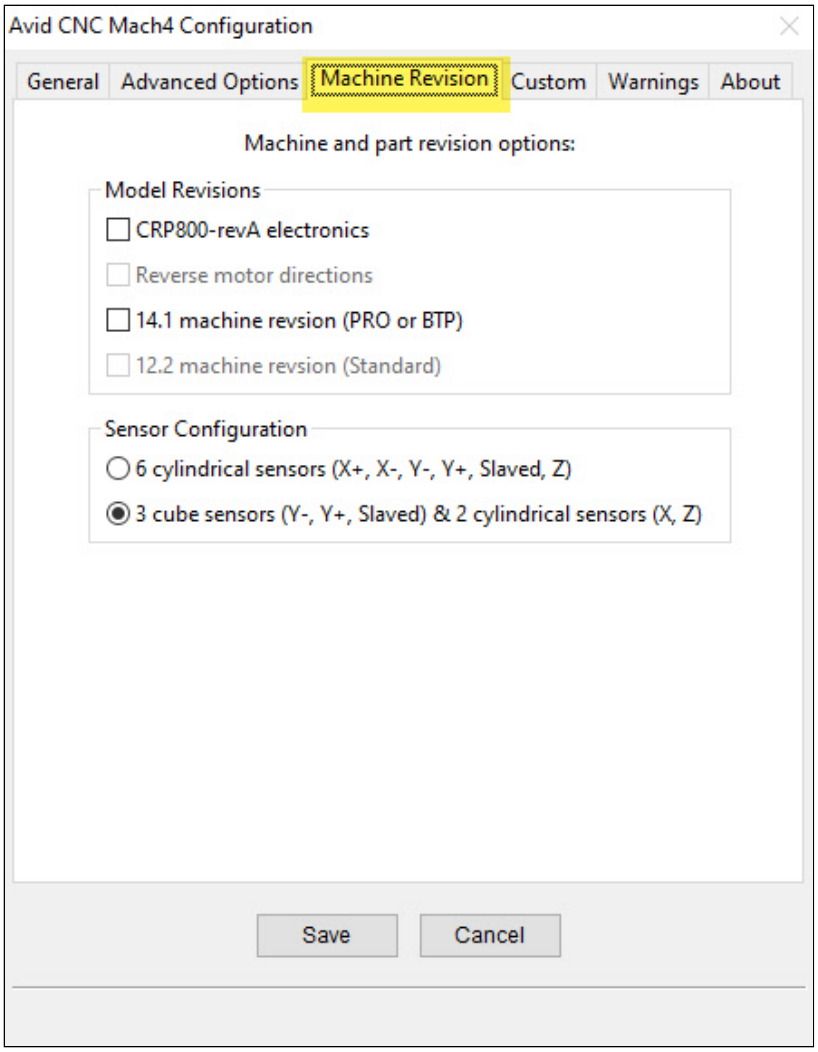
4. Machine Revisions



The **Machine Revisions** tab contains settings that apply for previous machine and electronics revisions.

- **CRP800-revA electronics:** CRP800 electronics purchased prior to July 2015.
- **Reverse motor directions:** Enabling this option will change the direction of all assigned motors. This will only be applicable for some machines with CRP800-revA electronics and NEMA 23 motors. Contact Avid CNC Support if you need assistance determining if this is a correct setting for your machine configuration.
- **14.1 machine revision:** This option is for PRO or Benchtop PRO machines utilizing a V-Con Z-Axis.
- **12.2 machine revision:** This option is for Standard machines utilizing a V-Con Z-Axis.
- **Sensor Configuration:**
  - **6 cylindrical:** This is the default sensor configuration for current Standard, Benchtop PRO, and Benchtop Standard machines. PRO machines purchased prior to February 2019 also use this configuration.
  - **3 cube and 2 cylindrical:** This is the default sensor configuration for current PRO machines.

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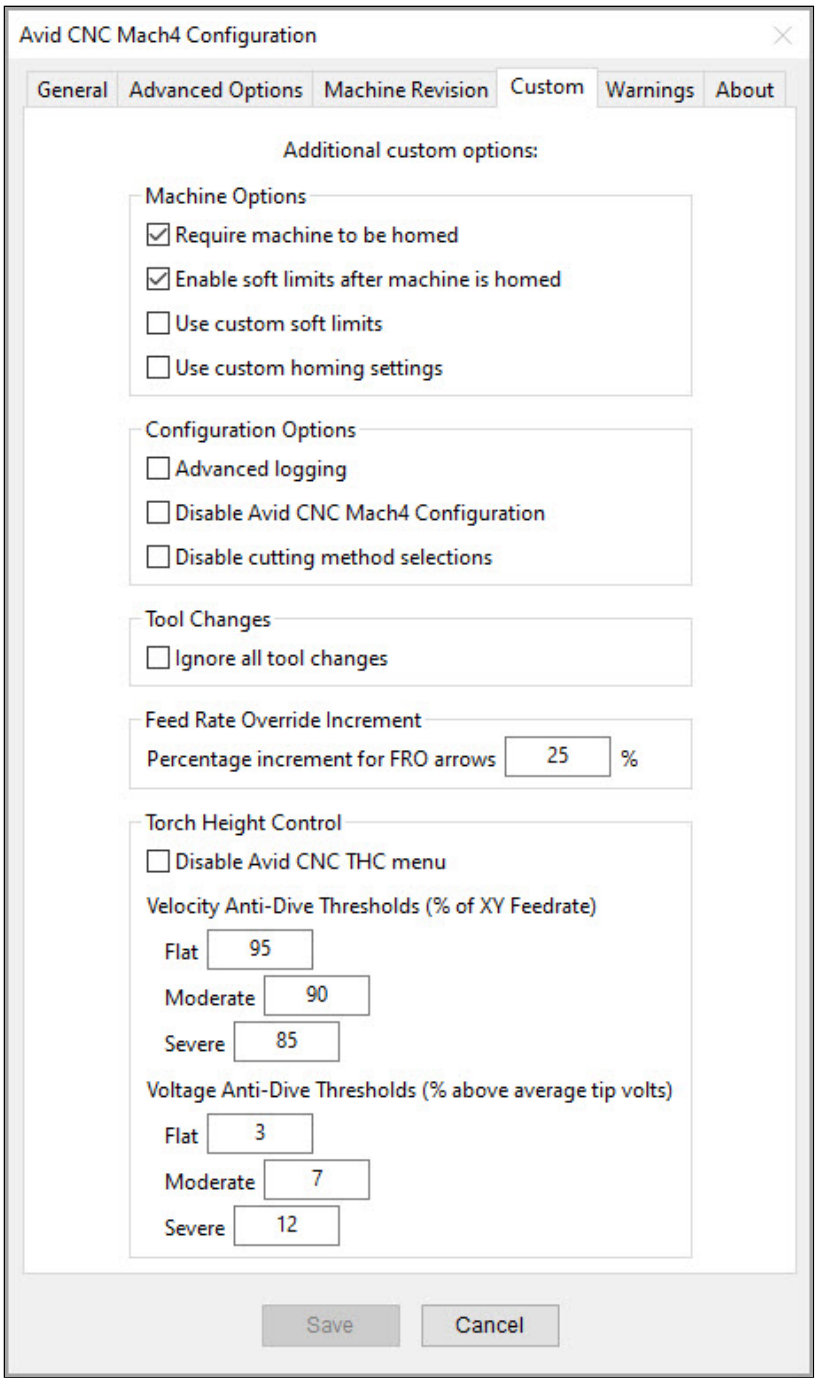
5. Custom



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The **Custom** tab contains additional options to customize your Mach4 configuration.

- **Require machine to be homed:** This option is enabled by default and will require the machine to be homed (using the Home X, Y, & Z Axes button) prior to running G-Code programs or using the Auto Z Touch Plate.
- **Enable soft limits after machine is homed:** This option is enabled by default and will enable soft limits after the machine has been homed. More information can be found about soft limits in the Mach4 Users Guide.
- **Use custom soft limits:** Enabling this option will allow you to specify your own maximum and minimum soft limits for all axes. Using this feature will be explained in more detail in the Mach4 Users Guide.
- **Use custom homing settings:** Enabling this option will allow you to specify your own settings for home order, home offset, and home direction. Using this feature will be explained in more detail in the Mach4 Users Guide.
- **Advanced logging:** Enabling this option will output additional configuration information that can be seen in Mach4's logging feature.
- **Disable Avid CNC Mach4 Configuration:** Enabling this option will prevent any configuration changes from being made when using the **Avid CNC Mach4 Configuration** window. When you check this box, you will see all options disabled on the *General, Advanced Settings,* and *Machine Revision* tabs. Click "Save" for this change to take effect.
- **Disable cutting method selections:** This option will disable the selection of cutting methods on the "Machine Setup" tab, detailed further in the Mach4 Users Guide.
- **Ignore all tool changes:** Enabling this option will ignore **ALL** tool changes in your G-Code program. If you have this option enabled and load a G-Code program with more than one tool change command, you will see a warning notification. However, it is still recommended to only use this option if you have a specific need for it.
- **Feed Rate Override Increment:** This percentage determines the percentage the feed rate is increased/decreased when the screenset arrows are clicked. Default setting is 25%.
- **Torch Height Control:** This section allows aditional control of the torch height control settings not shown on the screenset. More information can be found in the **Mach4 Plasma User Guide**

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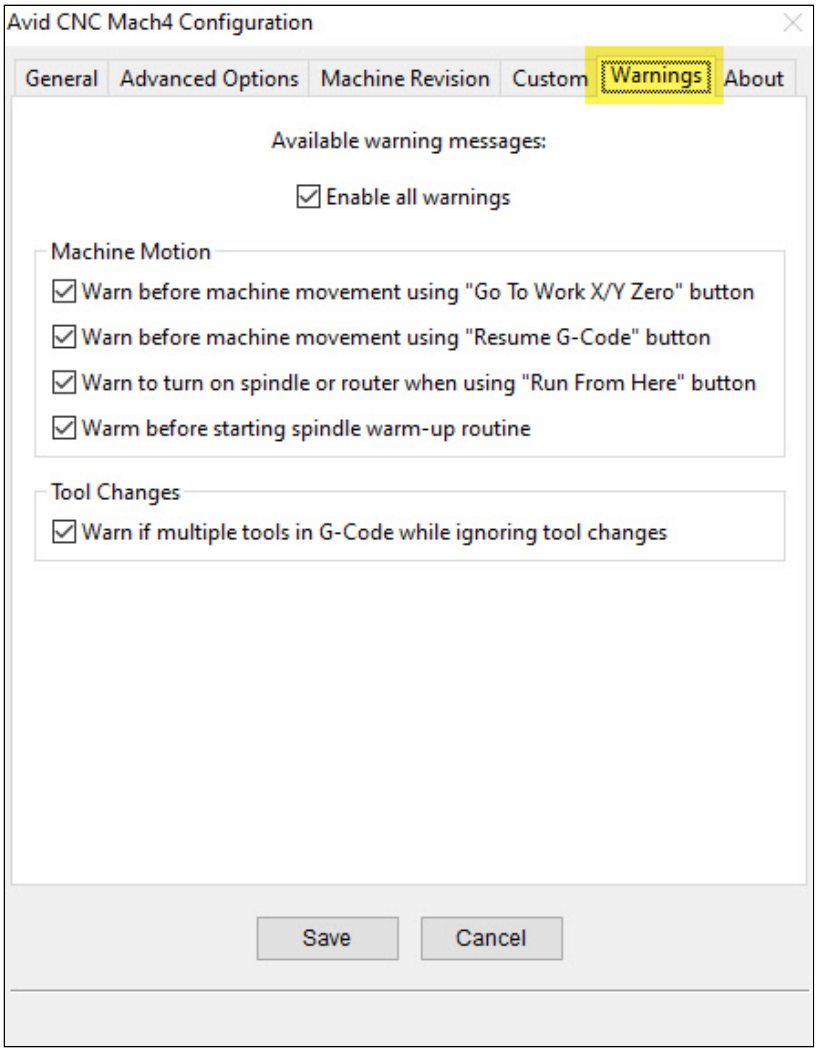
6. Warnings



The **Warnings** tab allows the enabling or disabling of some of the warning messages that can occur during use of Mach4.

- **Warn before machine movement using "Go To Work X/Y Zero" button:** The Go To Work X/Y Zero button will move the machine (at rapid pace) to the work coordinate X and Y zero position. This warning message will ask for confirmation before the machine makes any movement.
- **Warn before machine movement using "Resume G-Code" button:** During manual tool changes, the Resume G-Code button can be used to move the machine to a safe Z height before resuming the program. This warning message will ask for confirmation before the machine makes any movement.
- **Warn to turn on spindle or router when using "Run From Here" button:** The Run From Here button is used when starting a program from somewhere other than the start of the program. This warning messages is a reminder the spindle or router must be started manually.
- **Warn if multiple tools in G-Code while ignoring tool changes:** If the Ignore Tool Changes option is enabled, this warning message will appear when a G-Code file is loaded that contains multiple tool changes.

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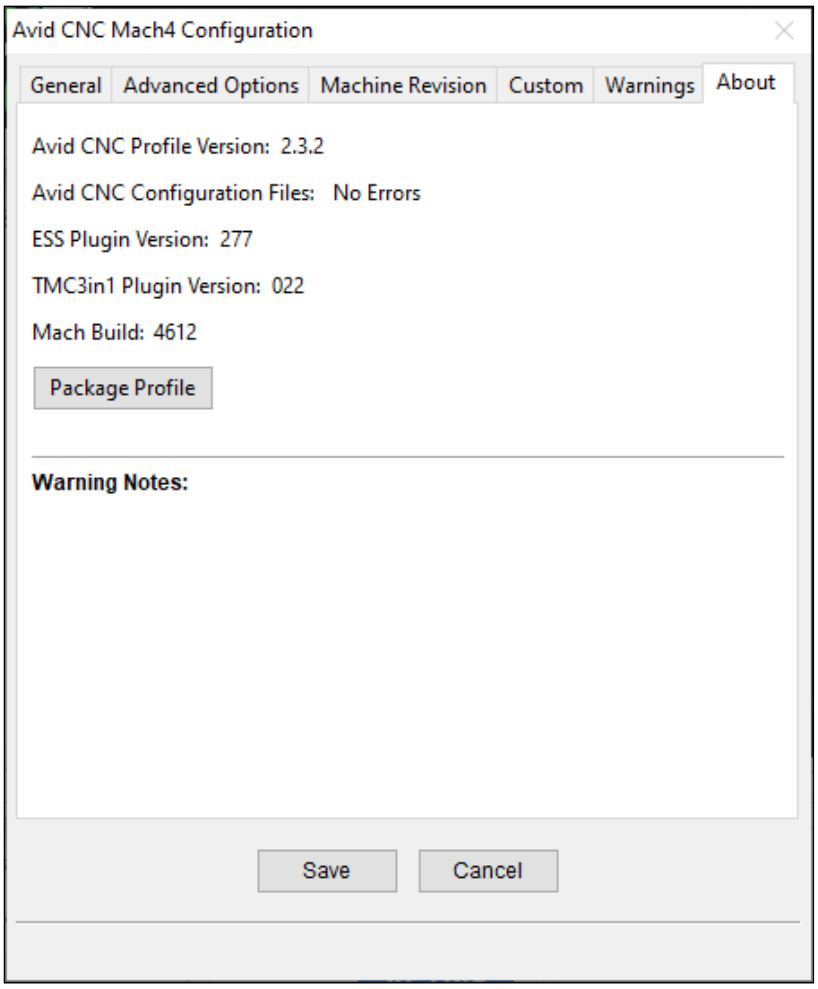
7. About



The **About** tab contains information that can be useful when talking with our support team.

- If there are any errors in your configuration file, or if your Mach4 install is using incorrect plugin versions, you will see additional messages displayed in the **Warning Notes** section.
- The **Package Profile** button is used to package the required files for our support team to assist in advanced troubleshooting. If this is necessary, follow the Package Mach4 Profile (https://www.avidcnc.com/support/instructions/software/mach4UsersGuide/#package-mach4-profile) instructions.

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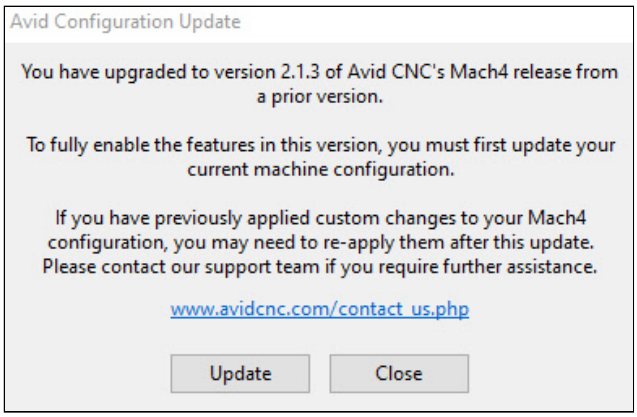
8. Additional Notifications



- If you are updating Mach4 from a version prior to Avid CNC v2.0.0, you are required to save your machine configuration to allow full use of Avid CNC's Mach4 features. If you have made custom changes, please Contact Us for assistance with your update.

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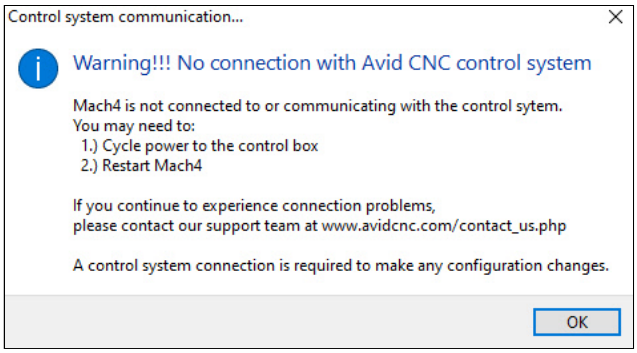

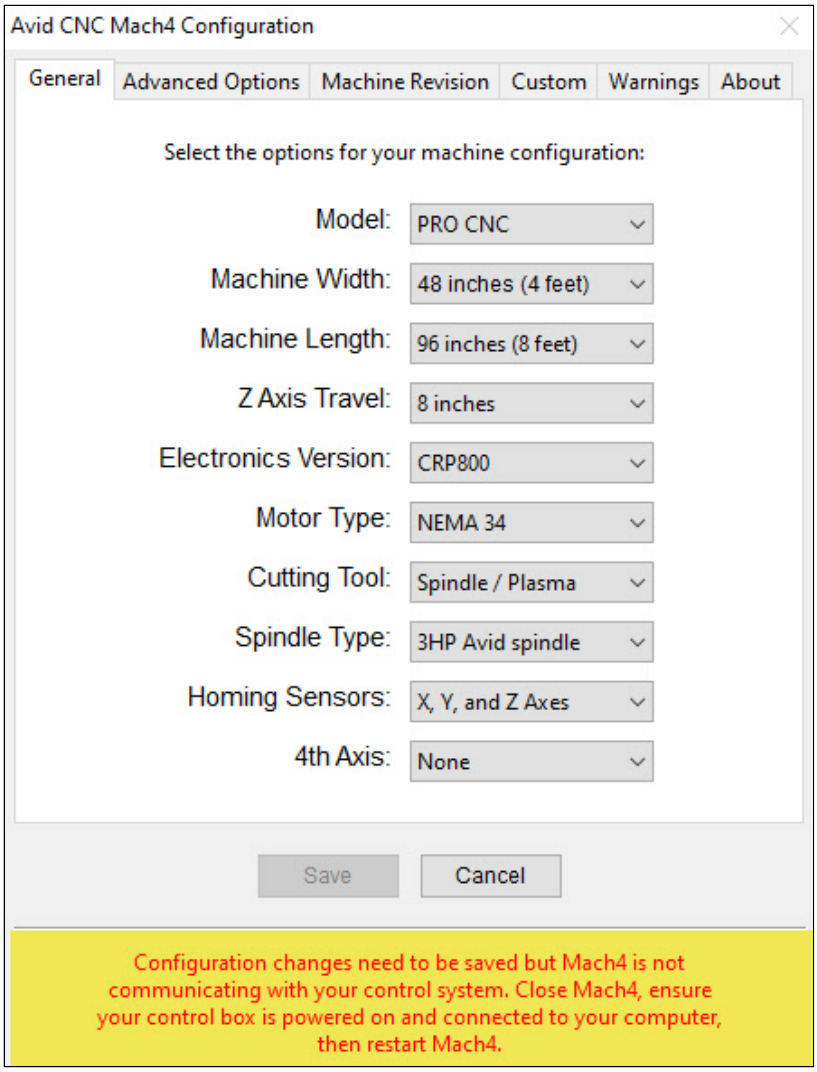

- Making changes to your Mach4 configuration requires active communications with your Avid CNC control system. If there is a communication error, you will be able to view configuration settings but are prevented from saving any changes. Follow the steps in the warning message to reestablish communication between Mach4 and your Avid CNC control system.

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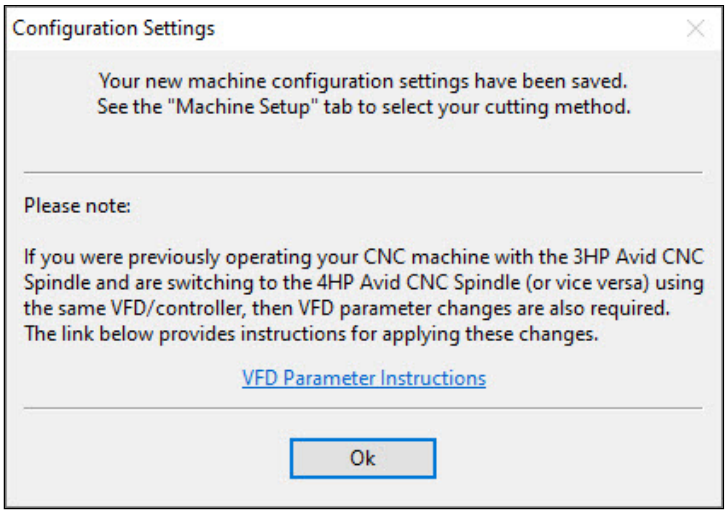

- If you had previously configured Mach4 with a 3 HP Avid CNC Spindle and are changing the **Spindle Type** selection to a 4 HP Avid CNC Spindle (or vice versa), you will see a notification letting you know that it is necessary to change VFD parameters. **This is only applicable if you are switching the spindle using the same VFD/controller.** Follow the link provided in the notification for instructions to make the necessary VFD parameter changes.

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