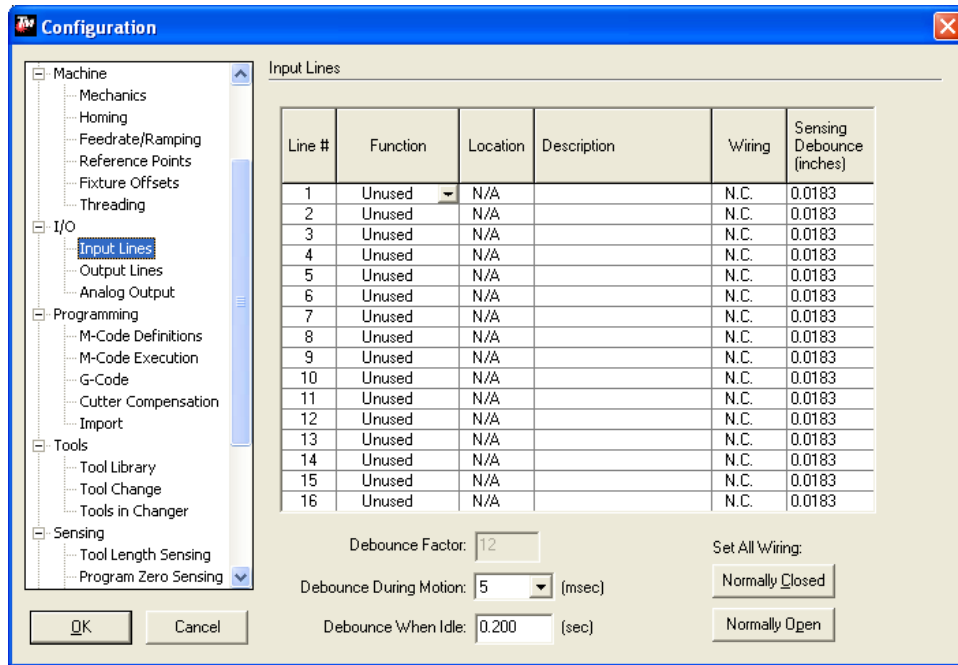


## Automatic Voltage Height Control Setup:

Using an Automatic Voltage Height Control (AVHC) allows the torch to compensate for warping or irregularities in metal sheets to ensure consistent cut quality. The AVHC should be installed and wired as indicated in the table assembly instructions. There are additional configuration changes that need to be made to utilize all of the AVHC's features.

The first step is to configure the input lines to use the 'Pierce' and 'Fault' signals from the AVHC.

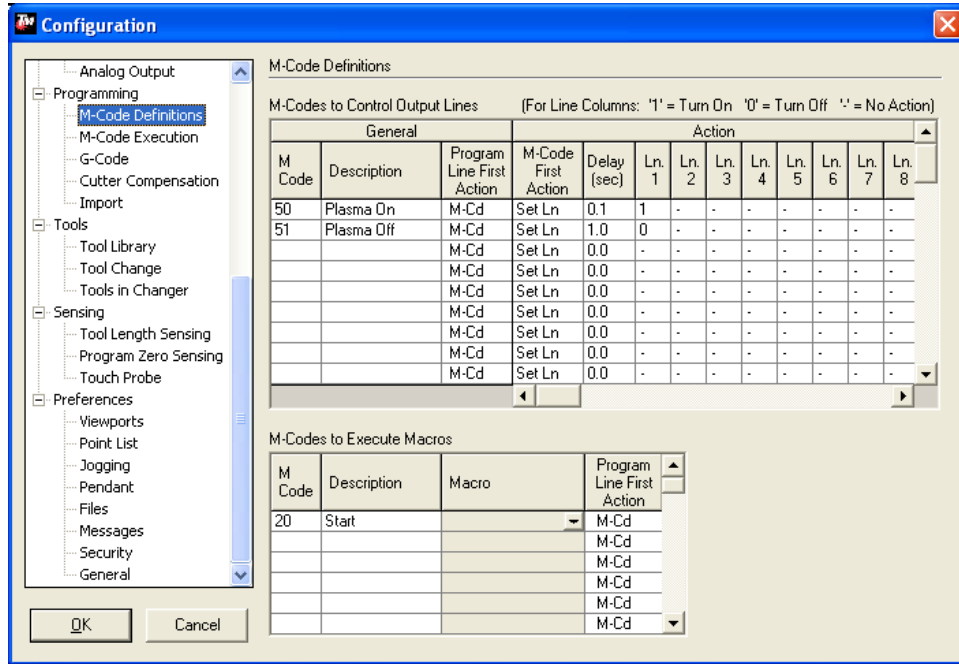


The input cable provided with the AVHC has five pairs of wires attached to it. From the assembly instructions pair one should be attached to the point labeled 'Pierce' and pair two should be in 'Fault'. For an AVHC make the following input line changes.

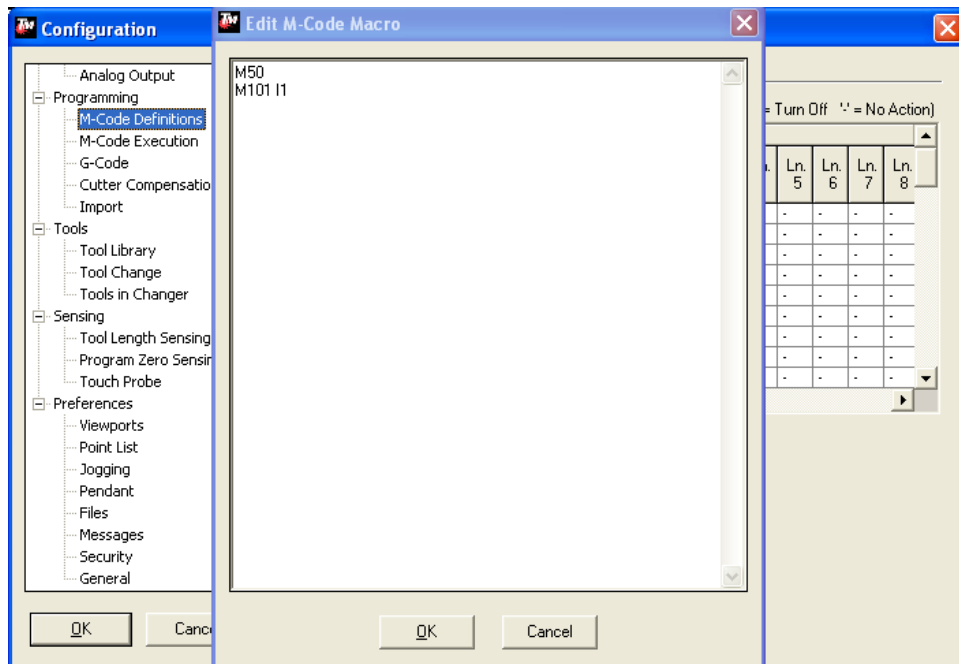
Line #	Function	Location	Description	Wiring	Sensing Debounce
1	Control	N/A	Pierce	N.O.	0.0183
2	Feed Hold	N/A	Feed Hold	N.O.	0.0183

The last change in the software in order to use an AVHC is in the M-code' execution and definitions, if a plasma cutter is the only tool being used on the CNC table then the following configuration changes will need to be made. If multiple tools are being used see the section entitled 'Multi Tool Setup' for changes.

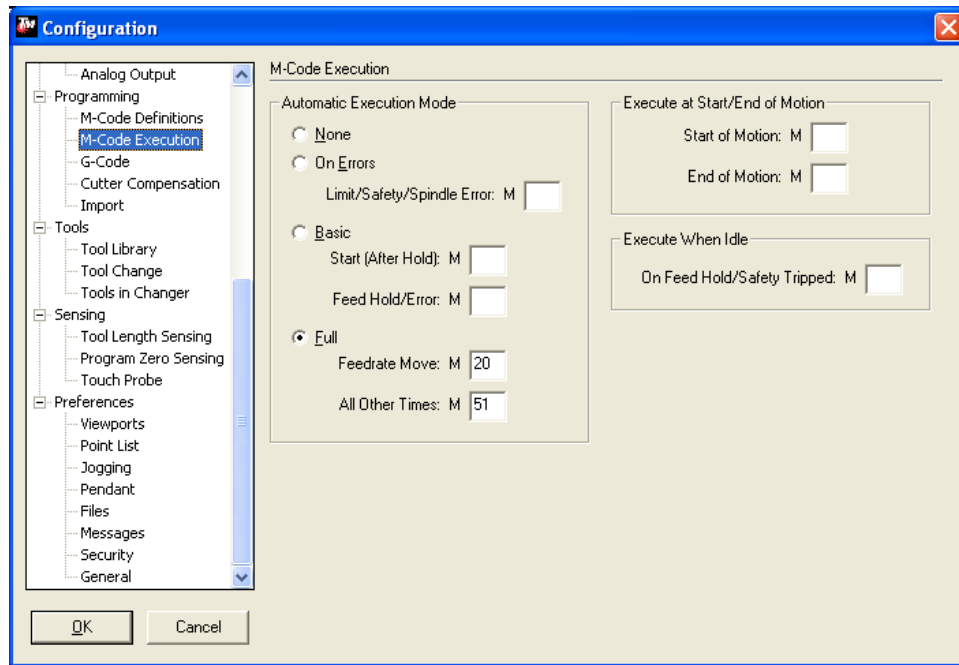
Begin by going to 'Configuration' → 'Programming' → 'M-code Definitions'. This menu lists the 'M-codes' that are used to control output lines. The 'M-code Definitions' menu also allows the creation of macros that enable multiple function M-codes. The Torchmate AVHC sends a signal to the software when the torch has established its cutting arc; this is send through input line 1. Using the AVHC requires a macro be made to interpret the input line.



To create the macro begin in the 'M-Codes to Execute Macros' tab, type in 20 for the 'M Code' with the 'Description' as 'Pierce Complete'. Select the 'Marco' tab and click on the ▼ to access the editor. The macro written is two lines the first line is 'M50' the second line is 'M101 I1'.

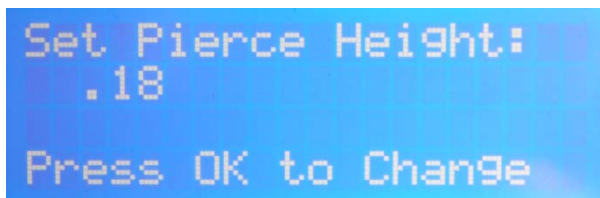


The macro is now made but will not be run until the 'M-code Execution' is also changed. Go to 'Configuration' → 'Programming' → 'M-code Execution'.



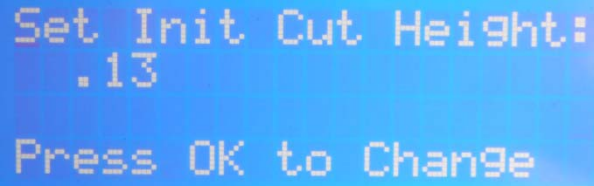
Where 'Feedrate Move' is listed under 'Full' execution change the value to the macro number which is '20' the macro will now be executed.

The AVHC electronics assembly also has a menu that needs to be configured as well. Turn on the AVHC, to navigate the menus press the up and down arrows, when the desired menu is reached it can be accessed by pressing 'OK'. Navigate to the 'Set Pierce Height'.



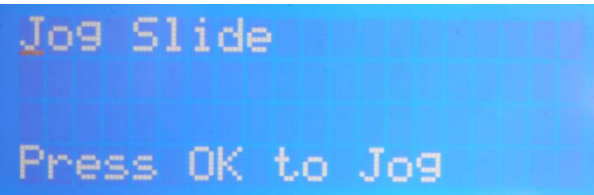
For gauge metal up through about 3/8" thick use a pierce height of 0.18 as the material gets thicker the number should be increased with thicker materials using 0.20 or even 0.22. The higher pierce height allows the increased splash back from piercing thicker materials to be avoided. To change the number press 'OK' then use the up and down arrows to change the value then press 'OK' again once the value is set.

Scroll down to the next menu 'Set Initial Cut Height'; this is the height that the torch transitions to after a pierce is complete. Generally this number will be slightly lower than the pierce height, about 1/8" from the material. When running in 'Manual' mode as discussed in the 'Test Cutting' section the 'Cut Height' will be the height the AVHC rides at while cutting.

A screenshot of a blue screen with white text. The text reads: "Set Init Cut Height:", ".13", and "Press OK to Change".

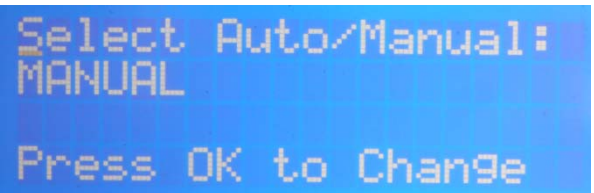
```
Set Init Cut Height:
.13
Press OK to Change
```

The next option on the AVHC is the 'Jog Slide' screen. Pressing 'OK' at this prompt will enable the torch to be manual toggled up and down the full range of travel. This is useful for positioning the torch but is not to be used when actually cutting. Once finished press 'OK' again to exit the menu, be sure to not be in this menu while cutting as the torch will not fire when 'Jog Slide' is enabled.

A screenshot of a blue screen with white text. The text reads: "Jog Slide" and "Press OK to Jog".

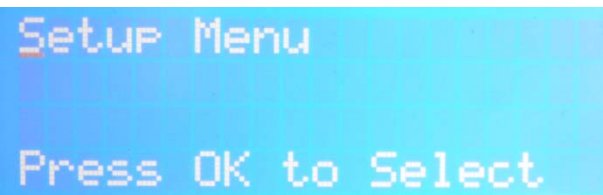
```
Jog Slide
Press OK to Jog
```

The 'Select Auto/Manual' screen is used to toggle the height control between its two modes of operation. For more information on modes of operation see 'AVHC Calibration' below.

A screenshot of a blue screen with white text. The text reads: "Select Auto/Manual:", "MANUAL", and "Press OK to Change".

```
Select Auto/Manual:
MANUAL
Press OK to Change
```

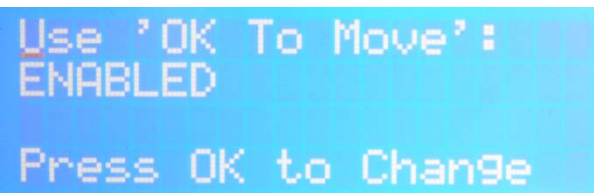
The next screen down is the 'Setup Menu' if 'OK' is pressed the AVHC will bring up the 'Setup Menu' this menu has additional settings that will be configured next.

A screenshot of a blue screen with white text. The text reads: "Setup Menu" and "Press OK to Select".

```
Setup Menu
Press OK to Select
```

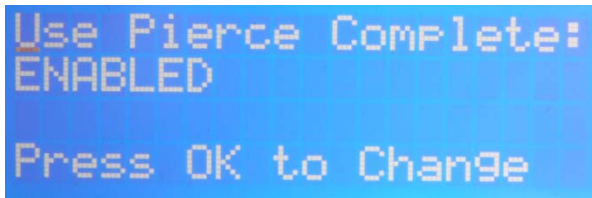
In the 'Setup Menu' there are additional settings and options, these options will be enabled or disabled based on the type of plasma cutter used.

The first option is 'OK to Move' this will only be enabled if the plasma cutter connected has an OK to move signal

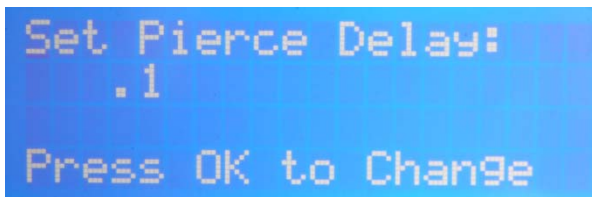
A screenshot of a blue screen with white text. The text reads: "Use 'OK To Move':", "ENABLED", and "Press OK to Change".

```
Use 'OK To Move':
ENABLED
Press OK to Change
```

The next option is 'Pierce Complete' this option enables the signal that is sent from the AVHC to the signal generator. This option should be enabled if there is a cable running from the AVHC to the signal generator's 'Input' port.



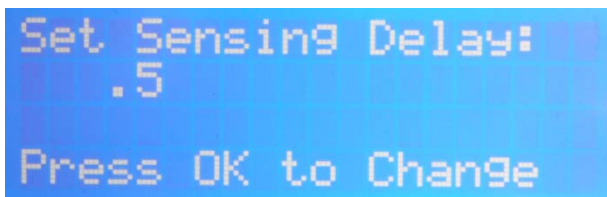
The 'Pierce Delay' is used for timing the transitions between various modes, refer the following table to determine what setting to use.



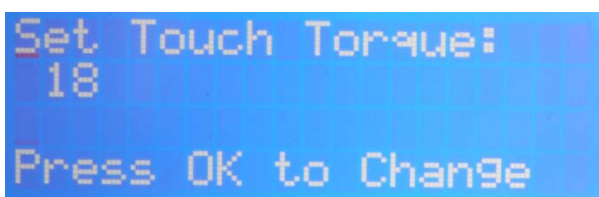
OK to Move	Pierce Complete	Pierce Delay
Disabled	Disabled	2.5 + sec.
Disabled	Enabled	0.8-1.5 sec.
Enabled	Enabled	0.1-0.3 sec.

The variations in the pierce delay are based on the thickness of material; a thicker material will need a slightly longer pierce delay.

The 'Sensing Delay' is the time after the pierce delay is expired before the AVHC begins to adjust for voltage. This setting only affects operation in 'Automatic' mode, and is generally left at 0.5 seconds. This setting allows for the torch to travel away from the pierce area to get a cleaner sample of cutting arc voltage before adjustments are made.



The last setting in the 'Setup Menu' is the 'Touch Torque' this setting determines how much resistance the motor will look for before determining that it has contacted the material. In normal operation the AVHC will lower the torch to sense where the material is, the AVHC will then retract back up to the 'Pierce Height'. The 'Touch Torque' is how much power the motor puts out when seeking the material.



The 'Touch Torque' is an amperage setting; this number should be set from 15-18. Under no circumstances should the 'Touch Torque' be set higher than 35, any setting higher over a long period of time will damage the AVHC's motor. If the 'Touch Torque' is set too low the AVHC will sense resistance before reaching the material and will attempt to fire the torch in the air. Refer to the 'Troubleshooting' section for more information.

The AVHC is now set to an initial state, some adjustments may be necessary to optimize cut quality. Cut quality settings are discussed in the 'Test Cutting' section of this manual.