

PRT-E1500W VFD SETTINGS for CNC3020/CNC6040

"I finally figured out the VFD and [Mach3](#) software settings for my 1.5 kW, 110Vac, 400Hz Spindle with the PRT-E1500W VFD in order to run the spindle either in manual mode or with [PWM control](#) through the PC. Here's the procedure I used. (Note I didn't change the 220V setting to 110V in the VFD since there isn't a mechanism for generating higher voltage than the VFD supply and it doesn't appear to be necessary, but this should be vetted by another party (CHIMERA1960?) prior to long duration running).

1) Reset the VFD to factory settings

a) Set D001 to 1 (may be able to skip this step)

b) Set D176 to 1 and press Func (this resets VFD to factory settings)

2) Reset the VFD to 400Hz max operating frequency rather than the 50Hz default:

a) Set D002 to 400 (need to set this before D000)

b) Set D000 to 400

c) Set D003 to 400

d) Set D009 to 400

e) Set D021 to 400

f) Set D093 to 400

3) Set VFD to receive input frequency setting for spindle throttle control from the AVI terminal:

a) Set D031 to 1

4) OPTIONAL but I would recommend for additional debug/safety reasons: Set VFD to allow manual spindle "stop" from terminal even when running from PC

5) OPTIONAL: Set AVI terminal to readout spindle rpm instead of VFD frequency:

a) Set D039 to 1

6) To run the spindle manually with variable speed directly from the AVI terminal:

a) Set D032 to 0

b) Make sure [switch](#) next to AVI terminal is set to "Manually"

b) Use AVI "[Pot Dial](#)" to set spindle rpm

c) Use AVI "Run" to start spindle

d) Use AVI "Stop" to stop spindle or turn down [Pot Dial](#) to 0

7) To run the spindle from the PC (note the PWM signal from [Mach3](#) adjusts the setting of the AVI terminal as if it were the VFD [Pot](#). The PWM signal is NOT going directly to the spindle motor):

a) Make sure you have the right Port/Pin settings in Mach3 (see example settings below)

b) Set D032 to 1

c) Make sure [switch](#) next to PRT is set to "PC"

d) Very important: On [Mach3](#) User Panel, make sure you select and input the max spindle speed (i.e. 24000).

e) Select the actual spindle speed by adjusting up/down arrows or dragging the column up/down for relative speed setting changes.

f) Use "Spindle CW F5" button or "F5" to toggle turning the spindle on/of

Mach3 software settings that work for my spindle and wiring configuration (if you have an issue with the X,Y,Z position [controller](#) settings let me know, but I think most don't have this issue):

A) Ports/Pins

1) Port Setup and Axis Selection

- i) Port #1 Enabled
- ii) Kernel Speed Set to 35000 Hz (this worked for my 2.9 GHz [desktop controller](#), but you may need to use the lower 25000 Hz setting for slower machines)

2) Motor Outputs

- i) Spindle Enabled = Active
- ii) Spindle Step Pin# = 1
- iii) Spindle Dir Pin# = 0
- iv) Dir LowActive = Active
- v) Step Low Active = Active
- vi) Spindle Step Port = 1
- vii) Dir Port = 0

3) Input Signals

- i) EStop Enabled = Active
- ii) EStop Port = 1
- iii) EStop Pin Number = 10
- iv) EStop Active Low = Active
- v) EStop Emulated = Inactive

4) Output Signals

- i) Enable1 Enabled = Active
- ii) Enable1 Port# = 1
- iii) Enable1 Pin Number = 14
- iv) Enable1 Active Low = Active or Inactive
- iv) Output#1 Enabled = Active
- v) Output#1 Port# = 1
- vi) Output#1 Pin Number = 17 (this should NOT be the Motor Output Step Pin (e.g. Pin #1 in my configuration) as may be indicated in some of the user manuals)
- vii) Output#1 Active Low = Inactive (important to make sure Spindle is On when Mach3 [Toggle Switch](#) is on. May need to change this setting if [switch](#) appears to be operating backwards)

5) Spindle Setup

- i) Select "Use Spindle Motor Output"
- ii) Select "[PWM Control](#)"
- iii) Input "PWMBase Freq." (I used 421)
- iv) Input "Minimum PWM" (I used 0%)

B) Pulley Selection

- i) Pulley Number 4
- ii) Min Speed = 0
- iii) Max Speed = 24000
- iv) Ratio = 1

Good luck! Hope this helps!"