



# **CRP500 Spindle / VFD Retrofit Guide**

*v2022Q1.1*

## **i** Info

If you are using Mach3 CNC controller software, please refer to our **Mach3 CRP500 VFD Retrofit Guide**.

## Control Box Modification

The first step in setting up your Spindle will be to upgrade your current CNC Controller with VFD compatibility. You should have received a 14-pin SP/THC cable and strain relief fitting with your Retrofit Kit.



## **i** SP/THC Cable

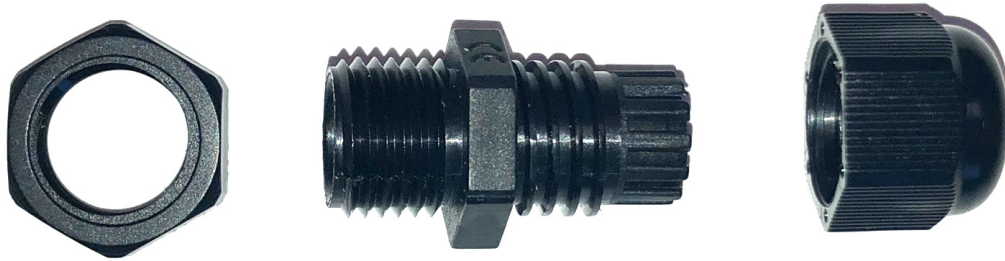
SP/THC cables included in Plug and Play Spindle / VFD Systems purchased after November 2020 are black in color, as opposed to the gray cable pictured. Where relevant, differences between these two cables will be noted in the instructions.

## **⚙️** 8.7 HP Plug and Play Spindle / VFD System

If you are upgrading to the 8.7 HP Plug and Play Spindle / VFD System, ensure you use the new 14-pin cable that came with your 8.7 HP system.

Systems produced after mid-February 2022 include a hardwired SP/THC cable.

The strain relief will be used to attach the provided SP/THC cable to your control unit. There should be an unused hole in your control unit's gland plate, this will be where the strain relief is installed.

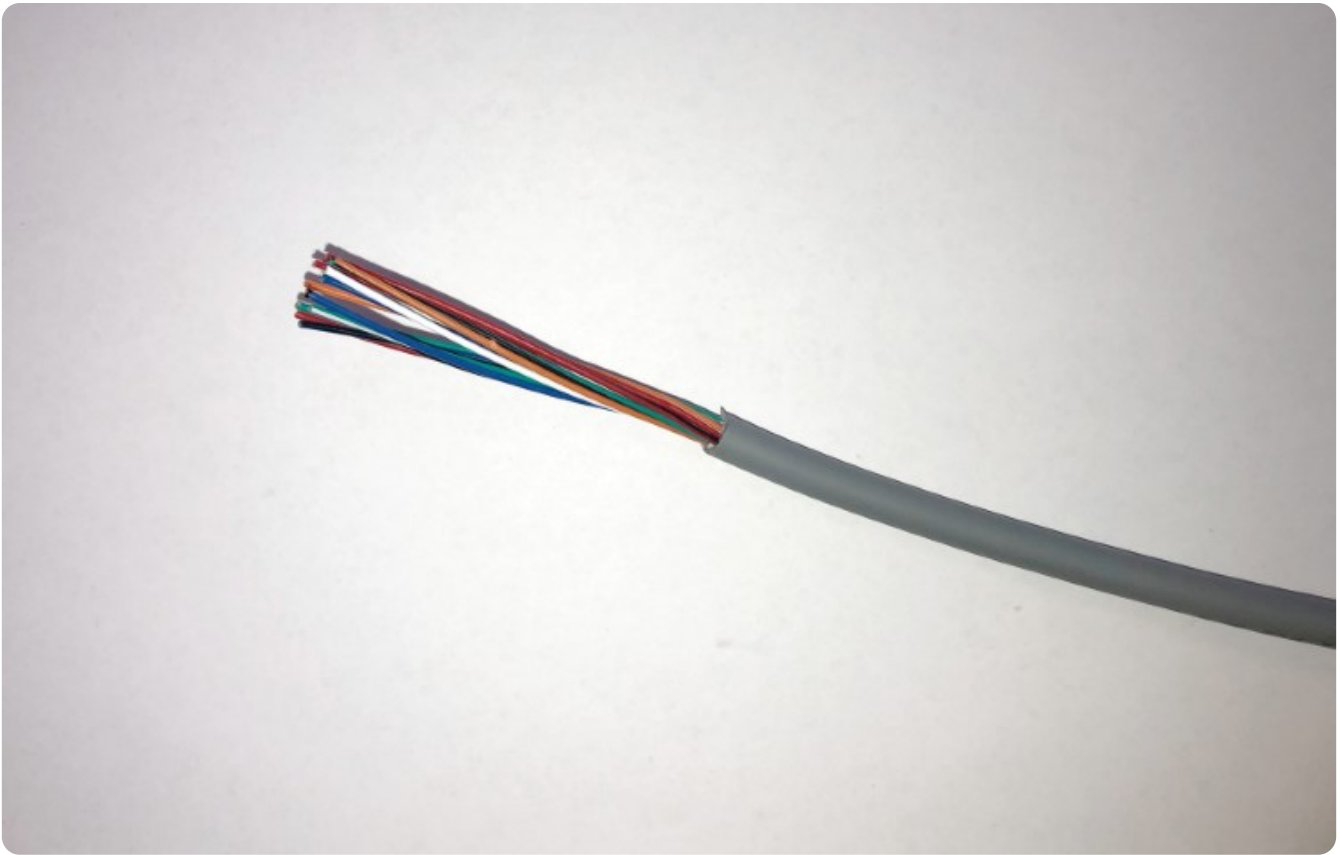


The left (as shown) threaded end of the strain relief should be installed into the gland plate of the control unit, from the exterior. The clamping collar (at left in photo) should then be threaded onto the strain relief, from the interior, to hold it in place on the gland plate.

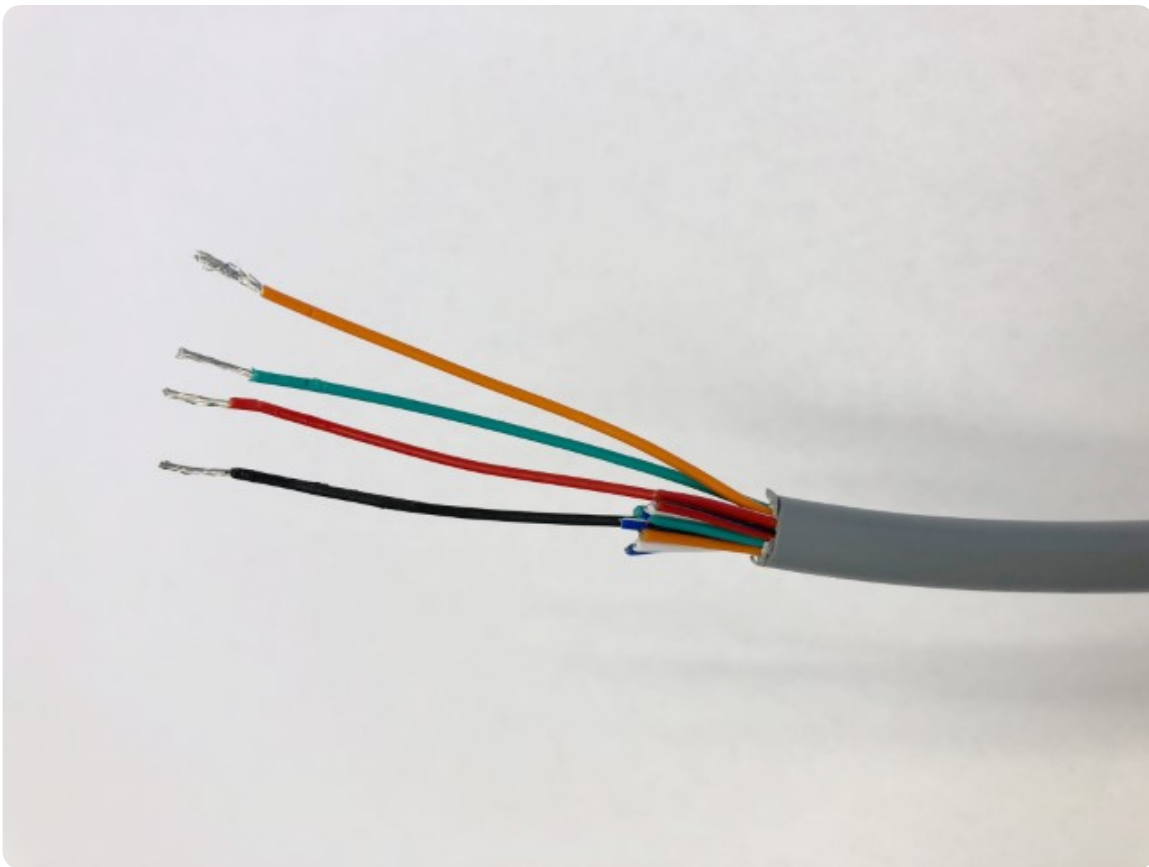
At this point, one end of the SP/THC cable should have the 14-pin connector removed with the wires stripped to bare leads as shown in the photo series below.



Clip one end of the SP/THC cable as shown above.



Strip the sheathing on the cable back at least 1.5" (it is easier to work with if you strip 1.5 - 3").



Separate out the wires listed below, depending on which SP/THC cable you have. They may now be ferruled or tinned if you desire, although they will function as bare wires. The remaining wires are not used and can be cut back.

**Gray SP/THC cable:**

- Black, Red, Orange, and Green wires.

**Black SP/THC cable:**

- Black, White/Black, Brown, and White/Brown wires.

**8.7 HP systems with hardwired SP/THC cable:**

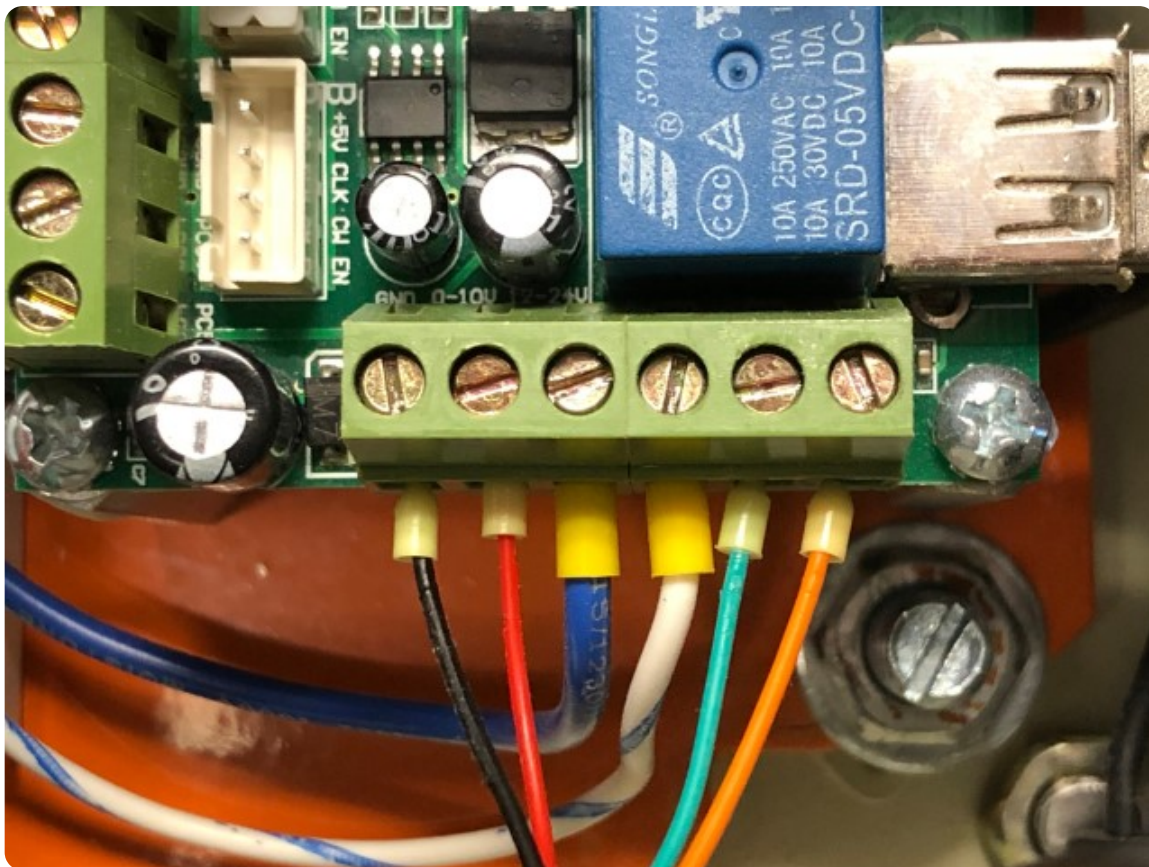
- Orange/White, White/Orange, Green/White, and White/Green wires.

The clipped and stripped end of the SP/THC cable can now pass through the strain relief installed in your gland plate.

Ensure the cable nut (shown at the right in the strain relief image) is partially threaded onto the strain relief prior to inserting the cable.

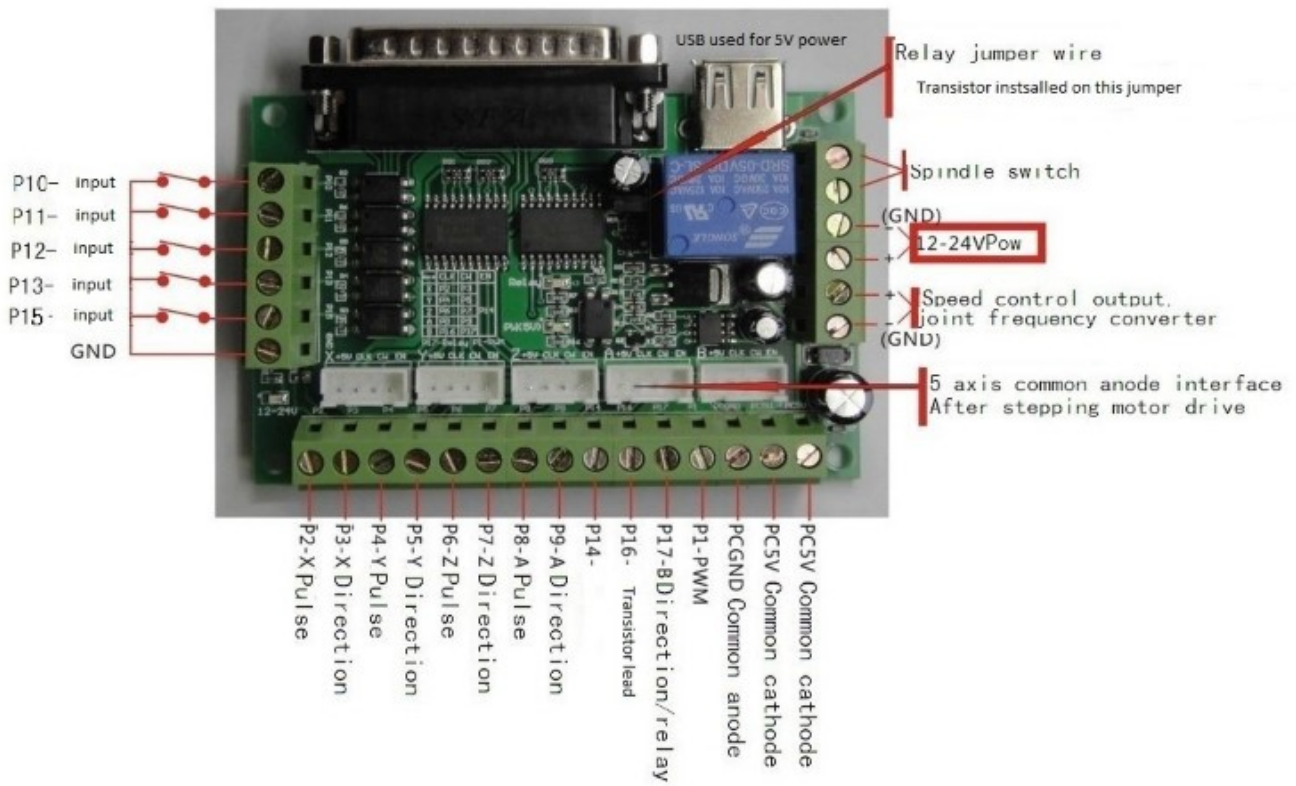
Once there is a sufficient length of cable inside your control box to reach your break out board, the cable nut can be tightened down onto the strain relief. This will secure the cable to the control unit.

The stripped and ferruled wires from the SP/THC cable can now be connected to your break out board (BOB). The image above shows which screw terminals correspond to which screw terminal on the BOB. When looking at the BOB in the depicted orientation, the connections should be as follows:



BOB Connection	Wire Color (gray cable)	Wire Color (black cable)	Wire Color (8.7 HP systems w/ hardwired cable)
PWM signal ground to VFD	Black	White/Black	White/Green
PWM signal 0-10V output to VFD	Red	Black	Green/White
10V from discrete power supply (required for PWM output)	Existing Connection	Existing Connection	Existing Connection
Ground to discrete power supply (required for PWM output)	Existing Connection	Existing Connection	Existing Connection
Spindle relay ground	Green	White/Brown	White/Orange
Spindle relay signal	Orange	Brown	Orange/White

*Note: The middle two screw terminals should already be connected to 12V power and should not be changed or modified.*



The above image should further clarify how to connect the SP/THC cable to the BOB.

If you have not tightened your strain relief, you can do that now.

Your control unit is now ready to communicate with your Spindle and VFD package.



## Spindle Controller Connections

### 14-Pin SP/THC Cable



Connect the 14-pin SP/THC cable to your Spindle Controller.

#### 8.7 HP Plug and Play Spindle / VFD System

This step is not required for systems that included a hardwired SP/THC cable.

## M23 Spindle Cable



Connect the male end of your M23 spindle cable to your Spindle Controller, aligning the arrow on the cable connector with the arrow on the panel mount connector.

## Power Cable

Plug the power cable from the Spindle Controller into an appropriate receptacle, based on your application below.

### 3 HP and 4 HP Plug and Play Spindle / VFD System

- L6-30 receptacle (200-240VAC single-phase)

### 8.7 HP Plug and Play Spindle / VFD System

- L21-30 receptacle (200-240VAC three-phase)
- If running on single-phase, refer to **power requirements** for this system.

## Spindle Connection

### 3 Avid HP Spindle



Connect the female end of the M23 spindle cable to the spindle, aligning the arrows as in the previous step.

## 4 Avid HP Spindle



*M23 Cable Seated*



*M23 Cable Fully Tightened*

Connect the female end of the M23 spindle cable to the spindle. Ensure the connector is seated before tightening.

### Assembly Note

It may be necessary to rotate the M23 cable to allow it to seat properly. During this process you will feel the connector drop into place when the pins and sockets of the connector align.

## 8.7 Avid HP Spindle



*M23 Cable Seated*



*M23 Cable Fully Tightened*

Connect the female end of the M23 spindle cable to the spindle. Ensure the connector is seated before tightening.

### Assembly Note

It may be necessary to rotate the M23 cable to allow it to seat properly. During this process you will feel the connector drop into place when the pins and sockets of the connector align.

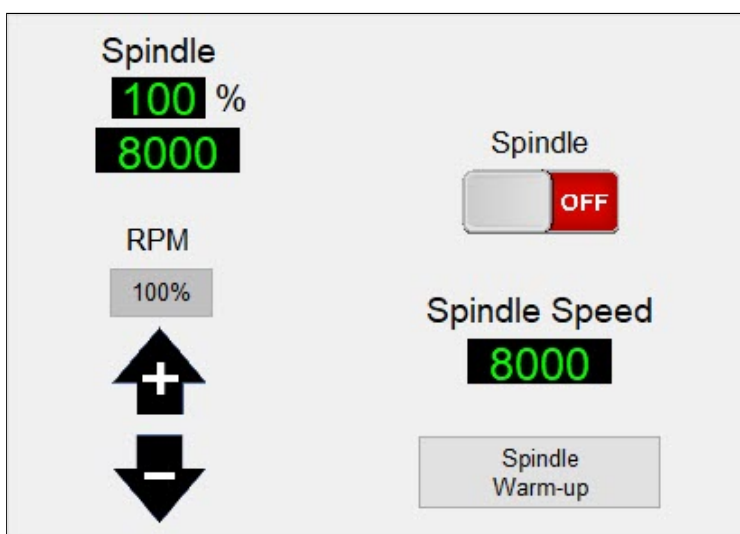
## Mach4 Setup

### Mach4 Version

Use of the 4 HP Avid CNC spindle requires version 2.2.2 or newer of Mach4 and use of the 8.7 HP Avid CNC spindle requires version 2.1.0 or newer of Mach4. If you need to update your installation of Mach4, please visit the [Mach4 downloads](#) page and Contact Us with any questions.

After the physical connections are complete, the next step is to configure Mach4 for your spindle. If you have not configured Mach4 for your machine, follow the steps in the [CNC Software Setup Guide](#).

If you are currently using Mach4, you will need to update your Mach4 configuration using the [Avid CNC Mach4 Configuration](#) menu. When selecting a Cutting Tool, choose "Spindle" (or "Spindle / Plasma" for dual-use machines) and the appropriate Spindle Type.



Once you have configured Mach4 with a Spindle cutting tool, you will see the spindle control functions shown above. For more detail about each of the buttons and DROs, refer to the [Mach4 Users Guide](#). Each spindle type has a pre-defined minimum and maximum speed, as shown in the table below.

Spindle Type	Min Speed (RPM)	Max Speed (RPM)
3 HP Avid CNC spindle	8000	24,000
4 HP Avid CNC spindle	6000	24,000
8.7 HP Avid CNC spindle	1000	24,000

To manually adjust the spindle speed, enter a speed within your spindle's range into the Spindle Speed DRO. If you enter a value too low, it will bump up to the minimum, too high and it will bump down to the maximum.

Once you have input a valid spindle speed, click the Spindle toggle button to turn the spindle on and run it at that speed (Mach4 will need to be enabled to turn the spindle on).

Check that you can adjust speed while the spindle is on by entering various speeds (between your spindle's min and max speeds) into Spindle Speed DRO and hit enter.

If the spindle responds to these speed commands, your VFD and Spindle package is ready for use!

If you experience any trouble while following this guide, please feel free to Contact Us.

