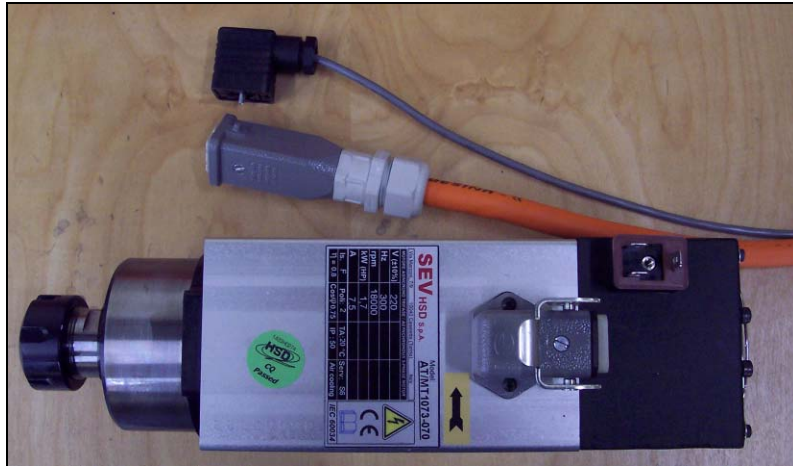


HSD Spindle with the PRSstandard and PRTstandard ShopBot



Instructions for installing and running your HSD Spindle with your ShopBot. Applies to HSD Spindles with Yaskawa model series V74X 3HP, 5HP, 7.5 and 10HP variable frequency drives with the PRSstandard and PRTstandard control boxes. Some models may require the addition of a 24v power supply. Instructions for installing the 24v power supply are included in this document. If you purchased the spindle with the tool, the 24v power supply has already been installed. ShopBot PRSstandards released after 9/5/07 have a 63/24v power supply.



WARNING! ELECTRIC SHOCK CAN KILL

Use extreme caution when working near live electrical circuits. Dangerous voltages exist inside the power supply that can cause serious injury or death. These instructions are intended for use by a licensed electrician.

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Connecting the HSD Spindle with Variable Frequency Drive to the PRSstandard or PRTstandard ShopBot Control Box



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1. Have a licensed electrician hardwire power to the VFD. We recommend using a commercial electrician rather than one who does mostly residential work.

3 Phase Spindles

Line1 – Black wire

Line2 – White wire

Line3 – Red wire

Ground – Green wire

Single Phase Spindles

Line1 – Black wire

Line3 – Red wire

Not used – White wire (clip off)

Ground – Green wire

2. Connect the VFD to the Control Box.

This step applies only to alpha models and is not included in these instructions.

3. Attach the Fan Connection plug to HSD spindle

- Make sure that power to the control box is disconnected.
- Locate the Fan Connection plug with attached 36ft cable.
- Attach the Fan Connection plug to the front face of the HSD spindle.
- Tighten the screw inside the Fan Connection plug.



4. Attaching the cable from the Fan Connection Plug if there is a 63/24V Power Supply inside the Control Box

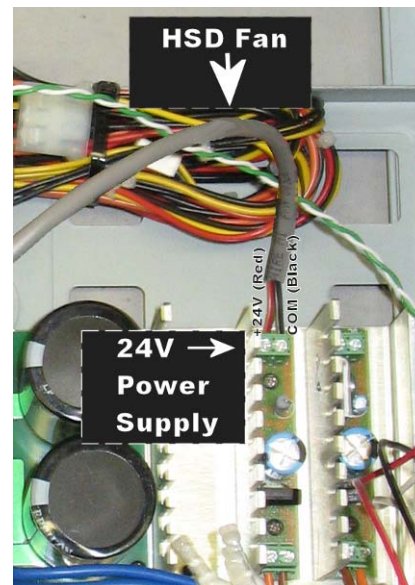
PRS standard ShopBots released after 9/5/07 have a 63/24v power supply. The 63V side powers the drivers and the 24V side powers an HSD spindle fan and relay boards. If you are installing a separate 24v power supply, go to Step 5.

- On the loose end of the 2 conductor cable (pre-wired into the fan connection plug), strip back ~ ¼" of insulation from both the Red and Black wires
- Remove the side of the control box case and route the cable inside the control box. The Red wire connects to the **(+24V)** side and the Black wire connects to the **(COM)** on the top of 24v power supply.
- See wiring diagram on next page if needed.

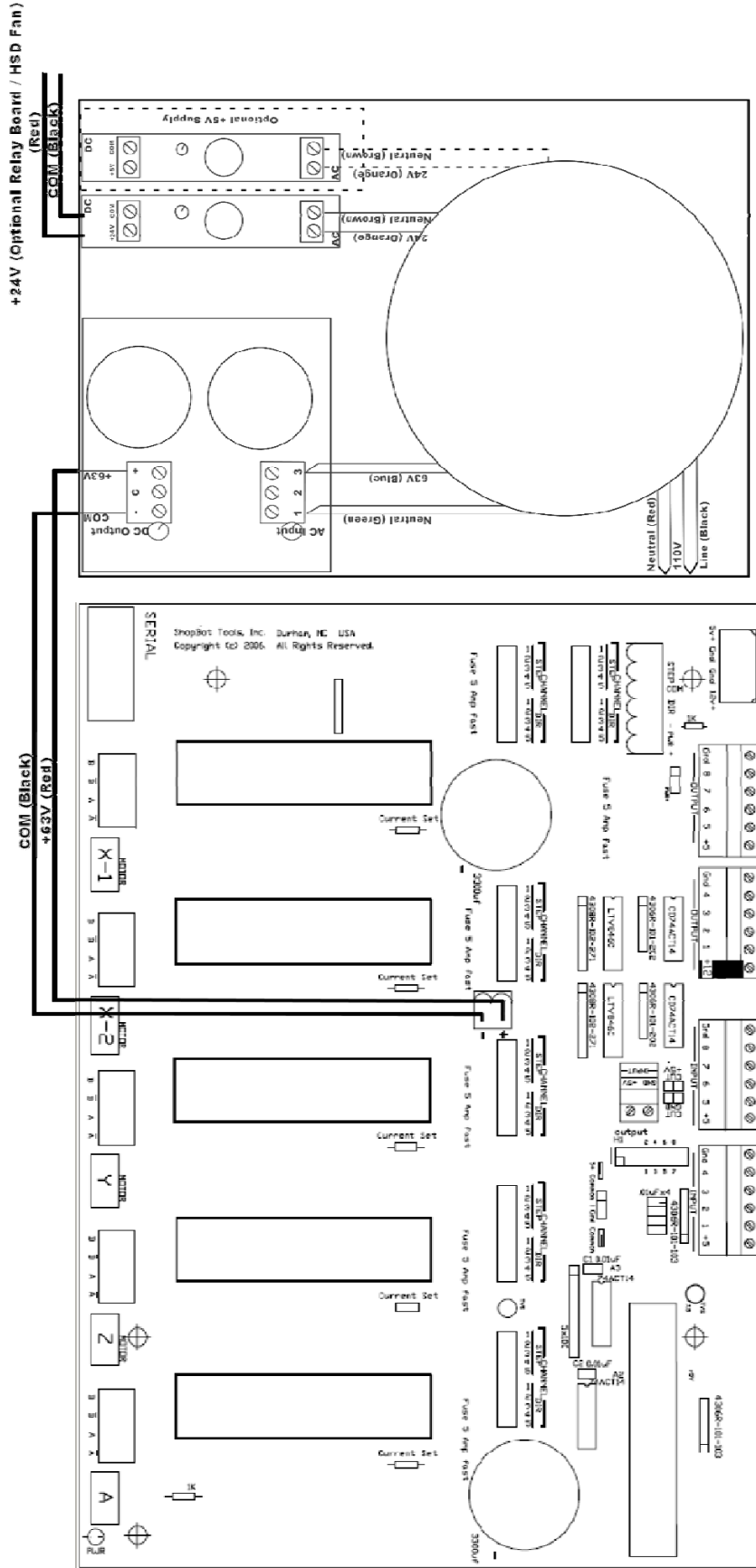
Control box with 63/24V power supply



Detail view from left

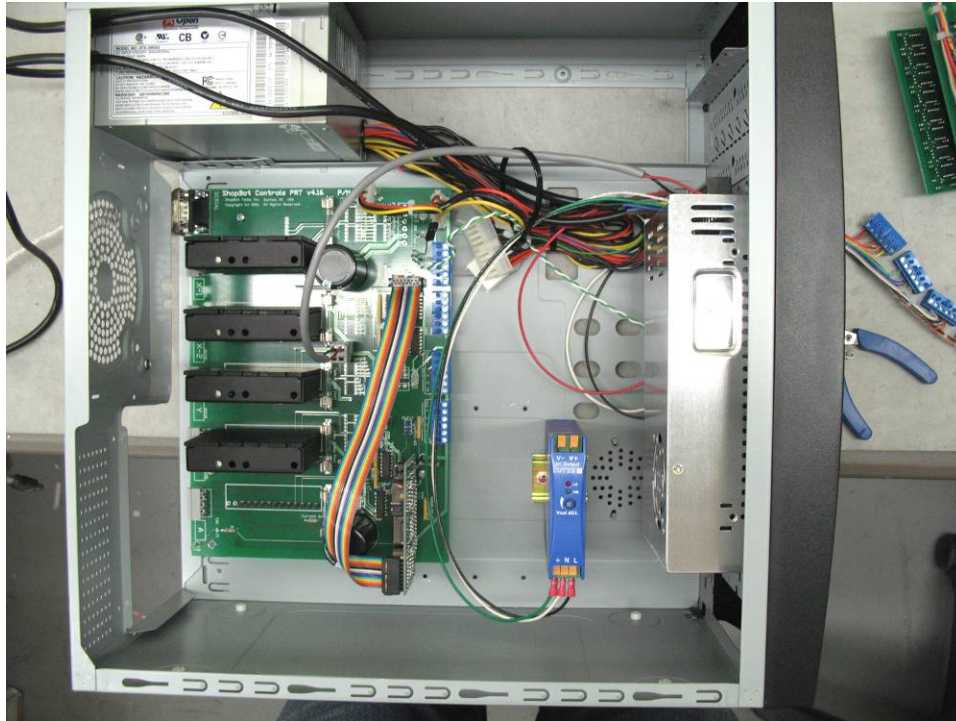


- Go to Step 6 to connect the power cable from the VFD to the spindle



5. Attaching the cable from the Fan Connection Plug if there is a separate 24V Power Supply inside the Control Box

If you purchased a spindle separately, you should also have purchased a 24v power supply and will need to follow Step 5.1 to install the 24v power supply.



5.1 Installing the 24v power supply in the control box

You'll need

- 24v power supply kit
- 5/32 drill bit
- Drill
- #2 Phillips head screw driver
- Small flat head screw driver

5.1.1 Mount the 24v power supply inside the control box.

- Turn off the Control Box and disconnect from the incoming electric power.
- Remove both sides of the control box.
- Mark the Din rail hole locations.
- Drill 5/32" holes for the Din rail mounting hardware.
- Mount Din rail with up arrow pointed up with hardware provided.
- The 24V power supply should be pre-wired but check that the **green** wire goes to ground, **white** to N, and **black** to L. Snap the 24V power supply to the Din rail mounting bracket.

5.1.2 Connect 24v power supply to existing power supply inside control box.

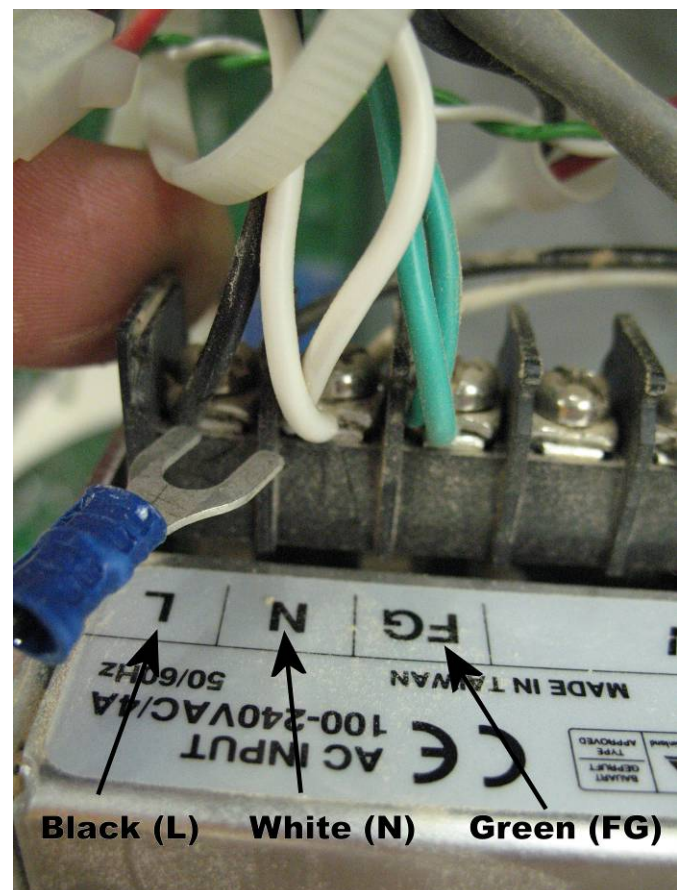
The 24v power supply for the HSD spindle must now be connected to the 48v power supply that is in the control box. This 48v power supply must be removed in order to access the terminal posts. The following will show how to access these terminals.

- With both of the sides of the control box removed, the tabs that hold the front face on should be accessible. Use a flat screwdriver to help release the tabs if necessary.
- With the tabs released from the main housing of the control box, slide the front face out of the way without disconnecting any of the wires that are still connected.
- Remove the mounting screws that hold the power supply
- Carefully remove the 48v power supply out the open side of the control box and remove the plastic cover (if present).



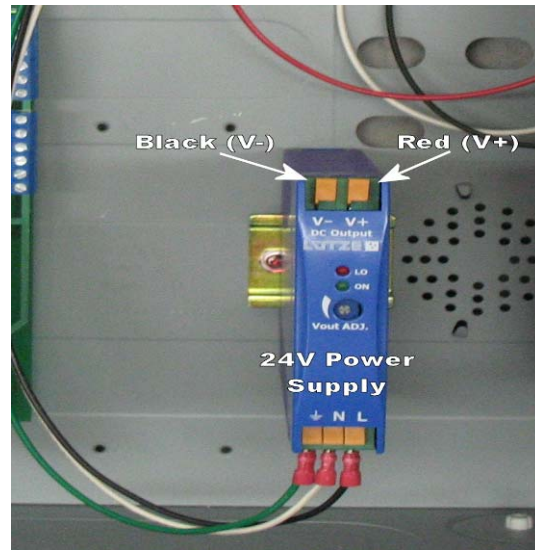
- Wire the loose ends from the new 24v power supply into the 48v power supply. Be aware that there are pre-existing wires already in place. Black goes to **L**, White goes to **N**, and Green goes to **FG**. Tighten the terminals so that wires are securely fastened.

- After the wiring is finished, replace plastic cover and reinstall the 48v power supply in the control box. Replace front face now if desired.



5.2 Connect the cable from the Fan Connection Plug to the 24v power supply in the control box.

- Strip back ~ ¼" of insulation from both the red and black wires at the loose end of the cable from the fan connection plug.
- Route the cable inside the control box.
- Connect the red wire to the (+) side and the black wire to the (-) on the top of 24v power supply. Replace the sides of the control box.



24V power supply for PRS Standard

6. Connect the power cable from the VFD to the spindle.

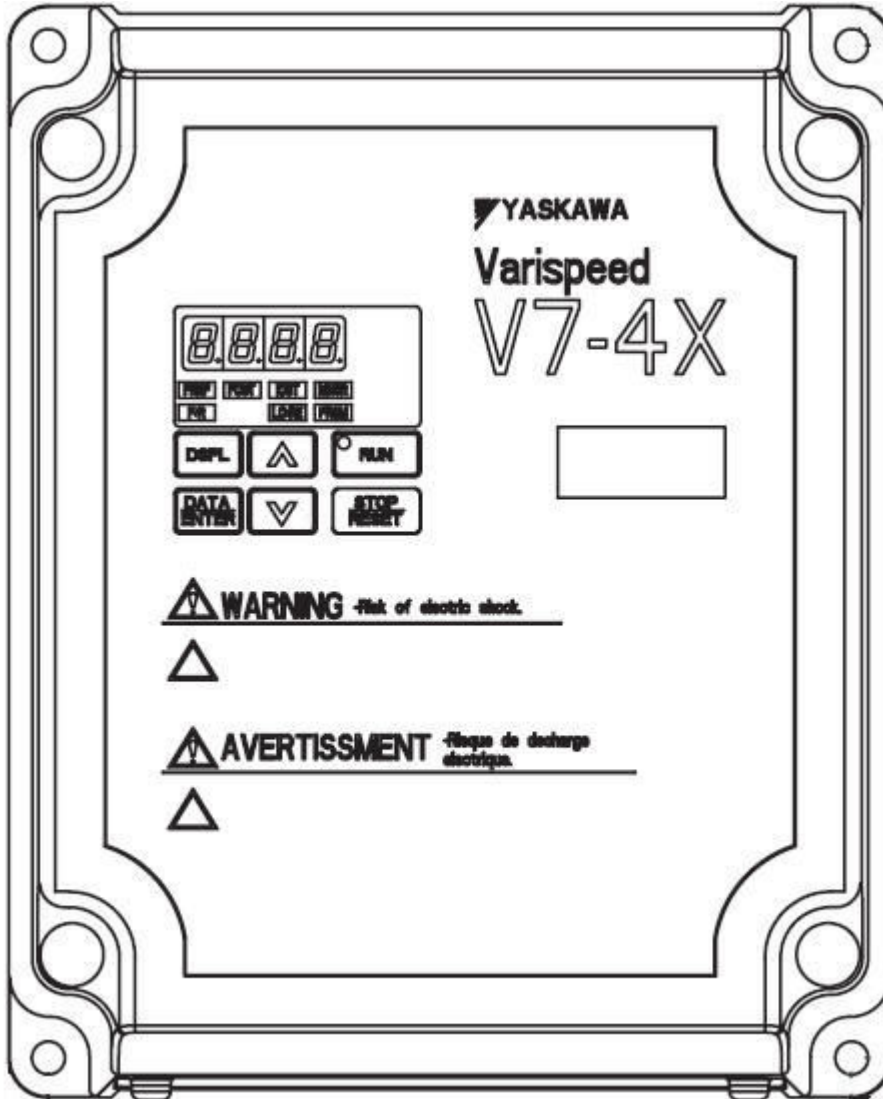
- Plug the electrical connector into the HSD spindle power plug.
- Depress the metal clip until it snaps in place.



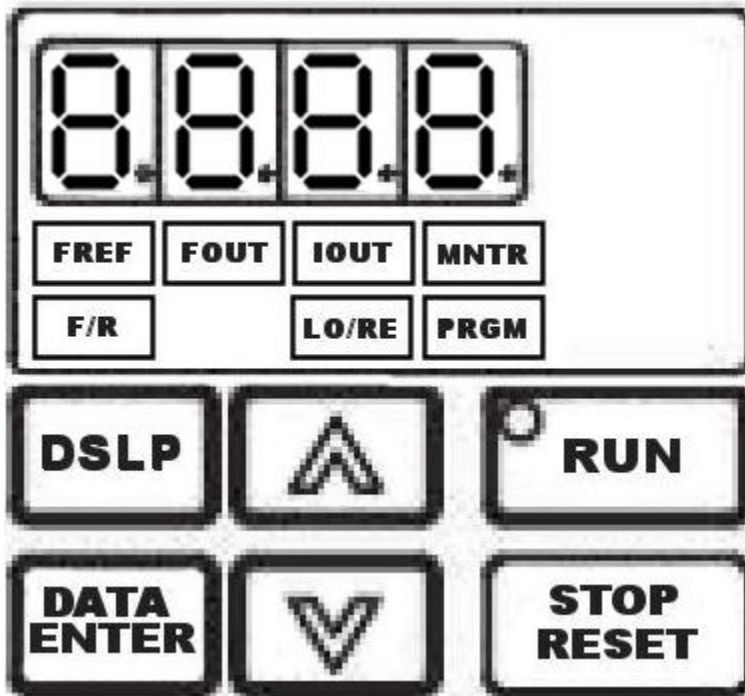
- Re-connect and turn on the Control Box. The fan should power up and start turning when the control box is turned on.

Programming the VFD for ShopBot control

This section is included for your information. The VFD has been pre-programmed at the factory in order for the ShopBot Control Box to control the operation of the spindle. Consult the parameters included with your specific spindle configuration.



Navigating the VFD



- Turn the ShopBot Control Box and spindle power **ON**.
- Press the **RESET** button on the left side of the Control Box. This action will turn the **VFD ON**.
- Press the **DSLP** (display) button on the VFD keypad to scroll through the modes until **PRGM** (program mode) is illuminated. This will display a parameter number.

N001

- Use the **Up or Down Arrow** keys to change to the appropriate parameter number.
- Press **Data Enter** again to show the Setting Increment.
- Using the **Up or Down Arrow** keys to change the Setting Increment.

4

- Press **Data Enter** again to accept the Setting Increment.
-
- Repeat until all parameters have been programmed

- Press the **DSL** button on the VFD keypad to scroll through the illuminated modes until **FREF** (frequency reference) is selected.

The ShopBot is now set up to control the operation of the connected spindle(s). Read the Ready Reference Guide, included in the ShopBot Manual, for information on how to operate a spindle.

- Set the frequency on the VFD for the desired RPM.
- Push STOP on the VFD to stop the spindle.

Setting the RPM on the VFD

The VFD as of July 2008 have been preprogrammed to display the frequency of the spindles RPM. The RPM of the spindle will display as multiple of 1000. For example: 11.5 x1000 = 11,500 RPM.

- Turn the ShopBot Control Box and spindle power **ON**.
- Press the **DSL P** (display) button on the VFD keypad to scroll through the modes until **FREF** (frequency mode) is illuminated. This will display the RPM value.
- Use the **up or down arrows** on the VFD display to set the RPM value desired.
- Start the spindle by pressing the **Start button** on the VFD

Spindle Warm up Procedure

To ensure proper care and achieve maximum performance and life of your spindle always properly warm up the spindles bearings. Failure to follow these procedures can cause premature failure or void the spindle warranty.

- Turn the ShopBot Control Box and spindle power **ON**.
- Press the **DSL P** (display) button on the VFD keypad to scroll through the modes until **FREF** (frequency mode) is illuminated. This will display current RPM value.
- On the VFD keypad move the **Arrows up or down to 9.0** (9000 RPM)* and hit the **Start button** on the VFD.
- Let the spindle run for 2 minutes at this speed.
- On the VFD keypad move the **Arrows up or down to 13.50** (13,500 RPM)* and hit the **Start button** on the VFD.
- Let the spindle run for 2 minutes at this speed.
- On the VFD keypad move the **Arrows up or down to 18.0** (18,000 RPM)* and hit the **Start button** on the VFD.
- Let the spindle run for 2 minutes at this speed.

The spindles bearings have now been brought up to normal operating temperature.

Troubleshooting

Although the HSD spindles are pre-wired and bench tested for operation and direction at the factory, there may be rare instances where opening the VFD is necessary.

If direction of spindle is incorrect



WARNING! Spinning the spindle in reverse can cause serious damage to tooling, spindles, and machine which can result in the collet nut loosening and causing tooling failure and personal injury. Do not operate spindle in reverse.

Check correct programming parameter

- Press the **DSL**P (display) button on the VFD keypad to scroll through the illuminated modes until **PRGM** (program mode) is selected. This will display the parameter number.
- Use the **Up or Down Arrow** keys to select parameter **n040**.
- Press **Data Enter** again to show the Setting Increment.
- The increment setting should be **1** for clockwise rotation.

Check Spindle wiring.

- Disconnect power to control box and VFD.
- Remove the 4 screws in the corners of the VFD (under plastic covers).
- Carefully remove face and disconnect data cable connecting the face to the body.
- Flip wiring (on two legs) going to the spindle. T1 (U), T2 (V), or T3 (W).
- Reconnect data cable and replace the VFD face.

If spindle is not turning on:

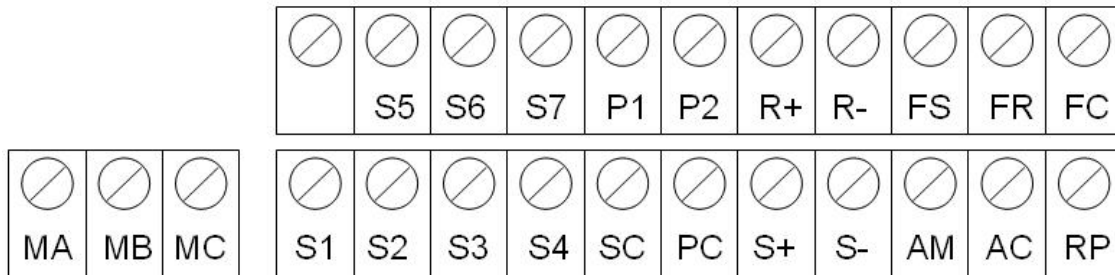
Check programming.

- Check the VFD parameters sheet that is specific to spindle and voltage purchased.
- Consult "**Navigating the VFD**" and the parameter sheet for the spindle configuration purchased.

Check switch wiring.

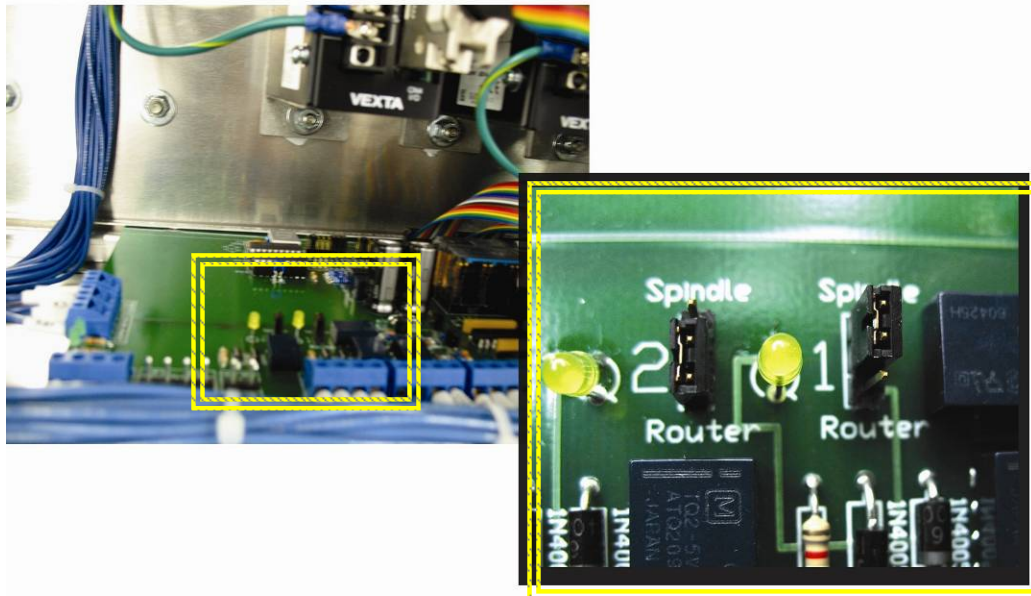
Check control box wiring as described in "Connecting the VFD to the Control Box" above.

- Trace the brown cable into the VFD.
- Disconnect power to control box and VFD.
- Remove the 4 screws in the corners of the VFD.
- Carefully remove face and disconnect data cable connecting the face to the body.
- Trace the black and white wire from the brown cable and check the connections, black wire to **S1** and white (or green) to **SC** (**SC** will be shared) (VFD Terminal block).
- Reconnect data cable and replace the VFD face.



VFD Terminal block

Check jumper settings switch in control box. It should be set in spindle position.



Closeup shows jumper#2 set to router side and jumper#1 set to spindle side.