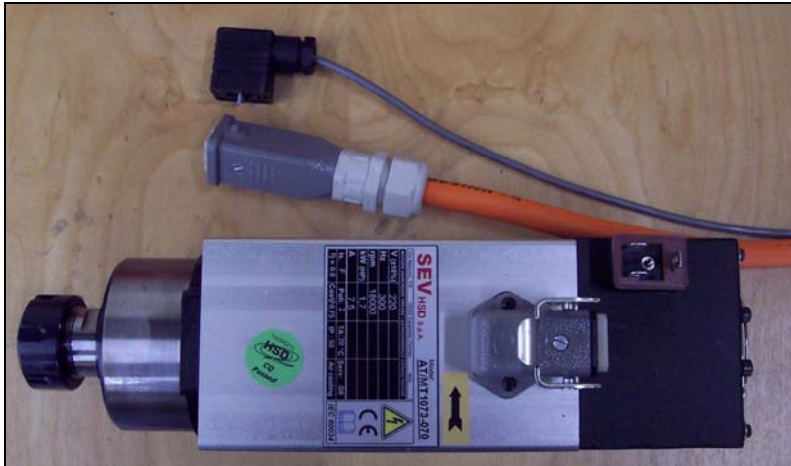


HSD Spindle with the PRSalpha and PRTalpha ShopBot



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 PRSalpha and PRTalpha control boxes. The PRTalpha model requires the addition of a 24v power supply. Instructions for installing the 24v power supply are included.



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.

ShopBot Tools, Inc
3333B Industrial Dr
Durham, NC 27704
919-680-4800 or 888-680-4466
www.shopbottools.com

HSD Spindle with the PRSalpha and PRTalpha ShopBot

Contents

Connecting the HSD Spindle with Variable Frequency Drive to the PRSalpha or PRTalpha ShopBot Control Box	3
1. Run power from the ShopBot Control Box to the VFD.	3
2. Connect the VFD to the Control Box.....	4
3. Attach the Fan Connection plug to HSD spindle	4
4. Attach the cable from the Fan Connection Plug to the 24V Power Supply inside the Control Box.	5
4.1 For the PRSalpha.....	5
4.2 For the PRTalpha.....	6
5. Connect the power cable from the VFD to the spindle.	9
Programming the VFD for ShopBot control.....	10
Navigating the VFD.....	11
Setting the RPM on the VFD.....	13
Spindle Warm up Procedure	13
Troubleshooting	14
If direction of spindle is incorrect.....	14
Check correct programming parameter	14
Check Spindle wiring.	14
If spindle is not turning on:	15
Check programming.....	15
Check switch wiring.....	15



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.

Connecting the HSD Spindle with Variable Frequency Drive to the PRSalpha or PRTalpha ShopBot Control Box



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.

1. Run power from the ShopBot Control Box to the VFD.

Power to the VFD must be connected to the proper contactor in the ShopBot Control Box. This is necessary for the safety systems to work correctly if the Emergency Stop button is pressed. For this installation the Yaskawa VFD supplied by ShopBot has a power cable pre-installed at the factory. Turn off control box and disconnect from incoming power before starting installation.

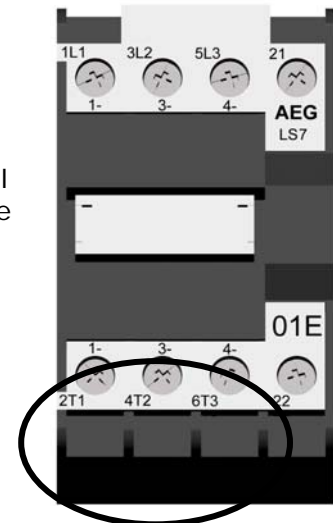
- After the ShopBot Control Box is in place as described in the ShopBot assembly instructions and the VFD is mounted, run the black cable from the VFD to the vacant cord grip in the right side of the Control Box. You will find this under the input power cables.
- Insert the cable from the VFD into the cord grip, pushing enough wire into the control box to reach the spindle contactor(s) and the ground bus bar.
- Connect to contactor #2 for a single spindle (#1) and contactor #6 for a second spindle (#2). Refer to the "Control Component Placement Diagram" (000943-00) included in the door of the ShopBot Control Box to locate the contactors.
- Connect the Green wire from the VFD power cable to the ground bus bar, located under the main disconnect in the Control Box.
- Connect the line conductors from the VFD to the proper contactor using the following terminals:

3 Phase Spindles

2T1 – Black wire
4T2 – White wire
6T3 – Red wire
Ground – Green wire

Single Phase Spindles

2T1 – Black wire
6T3 – Red wire
Not used – White wire (clip off)
Ground – Green wire

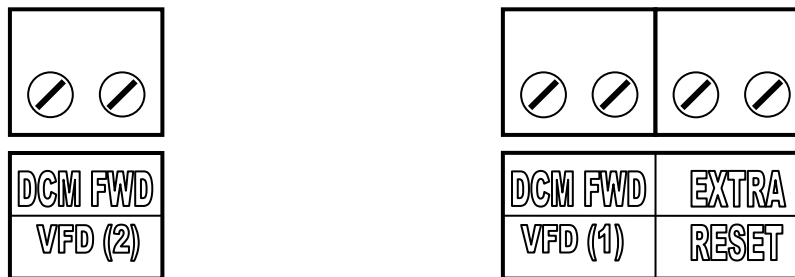


- Tighten cord grip.

2. Connect the VFD to the Control Box.

Note: The brown cable may have one of two possible wire combinations. One combination has three wires black, white, and red (red clipped back). The second combination has three wires black, green, and red (red clipped back). The white and green are interchangeable.

- Make sure the VFD is OFF before proceeding.
- The VFD has been pre-wired with the brown cable at the factory.
- Run the brown cable from the VFD to the Control Box.
- Pass the brown cable from the VFD through the cable access in the right side of the Control Box.
- Connect the black wire and the white (or green) wire from the brown cable into the VFD terminals on the Control Board labeled "VFD1" (For a second spindle, use the terminals labeled "VFD2"). Connect the black wire to the "FWD" terminal and the white (or green) wire to the "DCM" terminal. The red wire is not used and should be clipped back.



On ShopBot Control Board

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. Attach the cable from the Fan Connection Plug to the 24V Power Supply inside the Control Box.

The PRSalpha comes with a 24v power supply already installed in the Control Box. The PRTalpha requires an additional 24v power supply which is available from ShopBot as a separate 24v power supply kit. Follow the instructions for the model you have.

4.1 For the PRSalpha

- Locate the 24v power supply already installed 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 power supply.
-
- Continue with Step 5 "Connect the power cable from the VFD to the spindle".



24V power supply for PRS Alpha

-

4.2 For the PRTalpha

Install the 24v power supply in the control box

- Turn off the Control Box and disconnect from the incoming electric power.
- Attach the plate with the Din rail onto the back wall of the control box. Unscrew existing screws and attach mounting plate with the ¼-20 nylock nuts and washers provided in the 24v power supply install kit.
- The 24V power supply should be pre-wired but check that the **green** wire goes to ground, **white** to N, and **black** to L. Refer to pictures on next page if needed.
- Snap the 24V power supply to the Din rail mounting bracket



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

- See Figures A and B on following pages for illustration.
- Connect the **green** wire to the grounding terminal inside the Control Box. **(Figure A)**.
- Connect the **black** wire to the bottom of the 30 amp fuse holder **(Figures A&B)**.
- Connect the **white** wire with the 110v neutral, on the top of the farthest right contactor in position 5/L3 **(Figure B)**.

Connect cable from Fan Connection Plug

- 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 power supply.

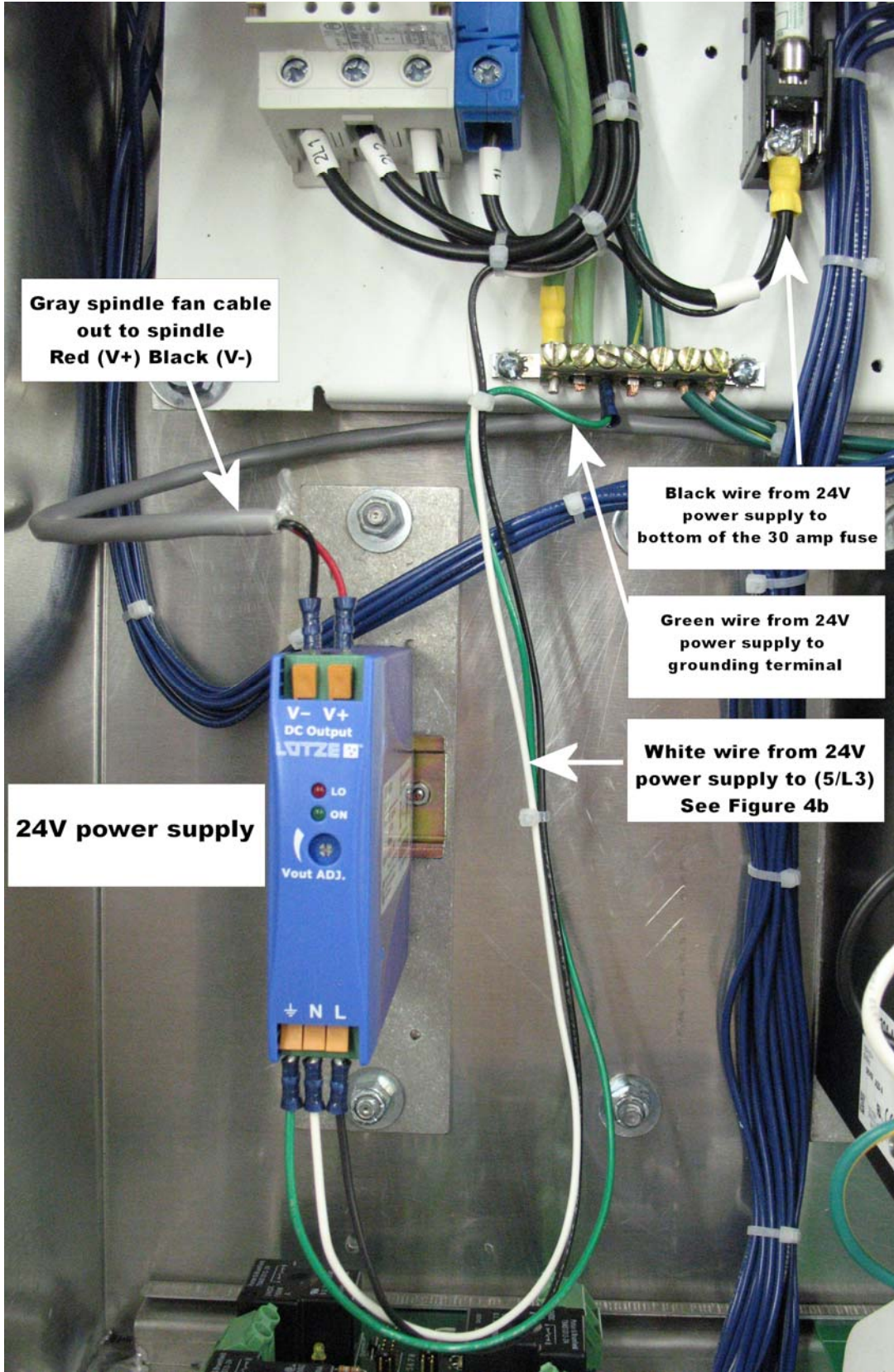


Figure A

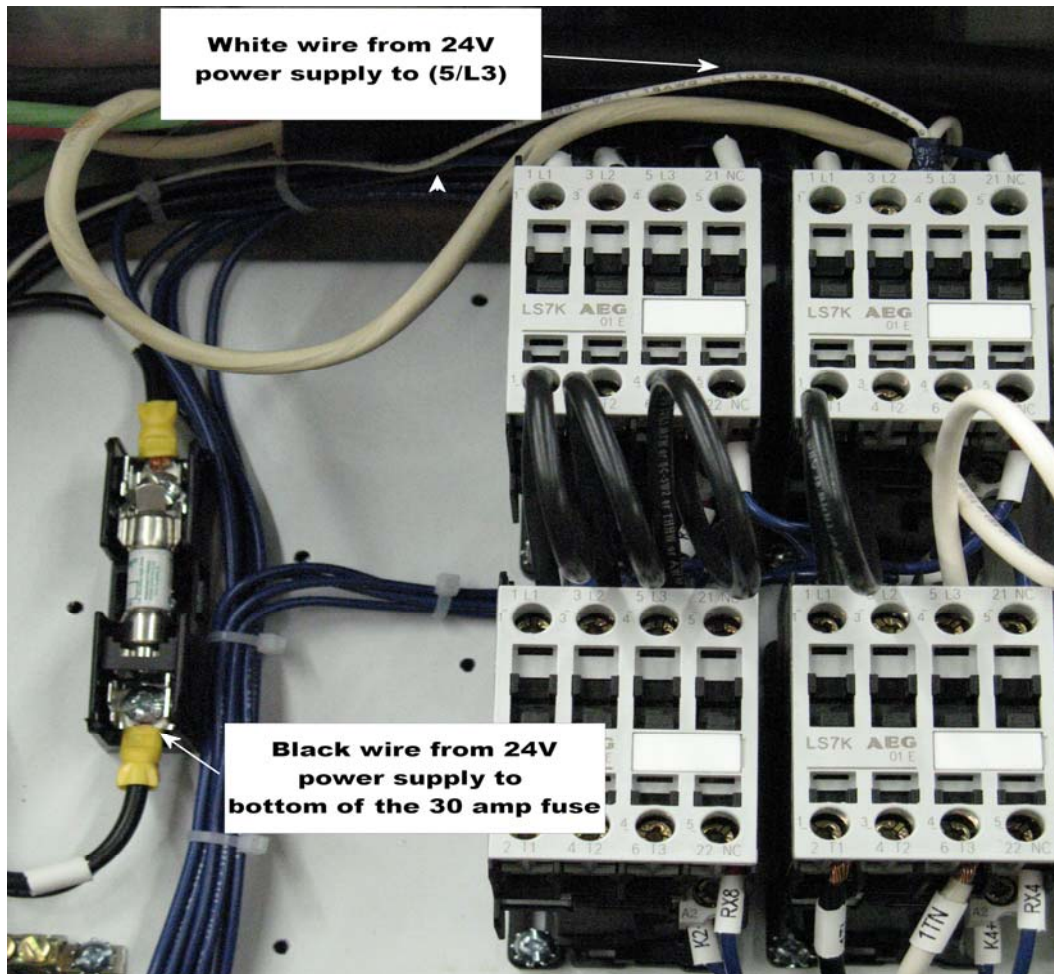


Figure B

- Continue with Step 5 "Connect the power cable from the VFD to the spindle".

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

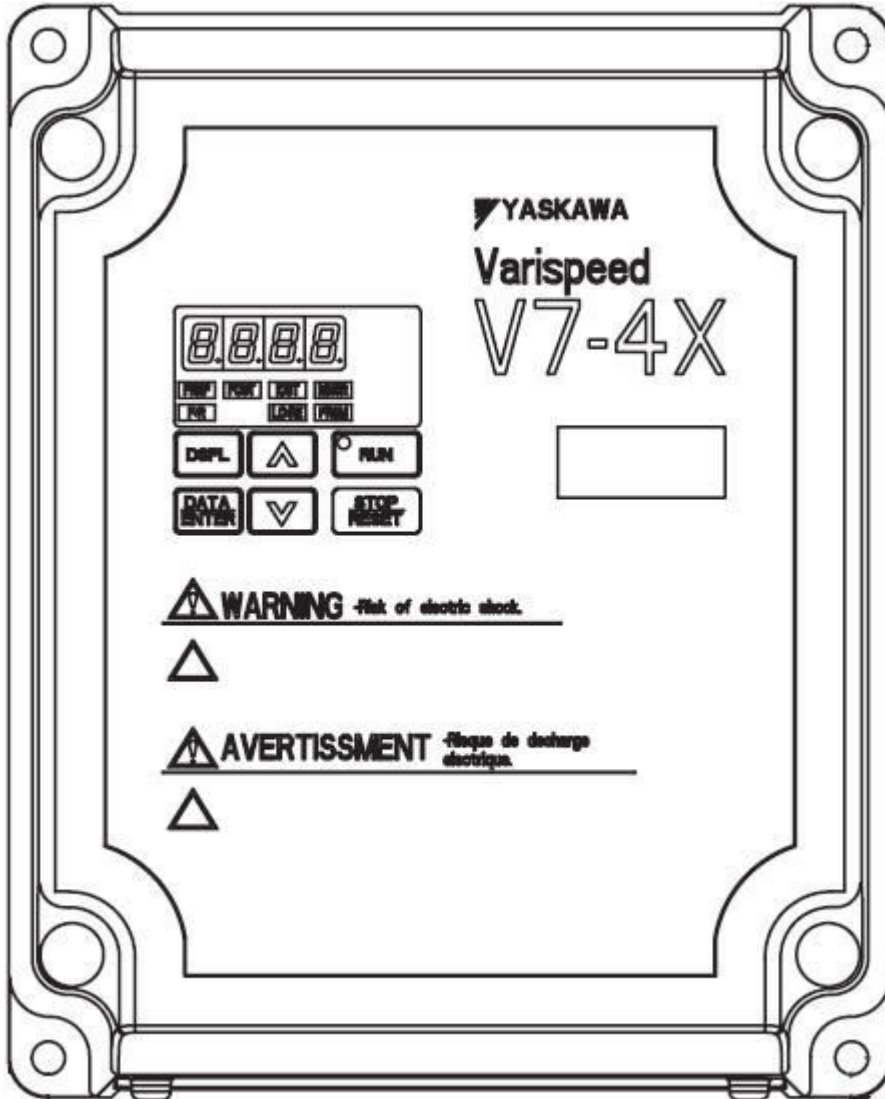
- Plug the electrical connector into the HSD spindle power plug.
- Depress the metal clip until it snaps in place.



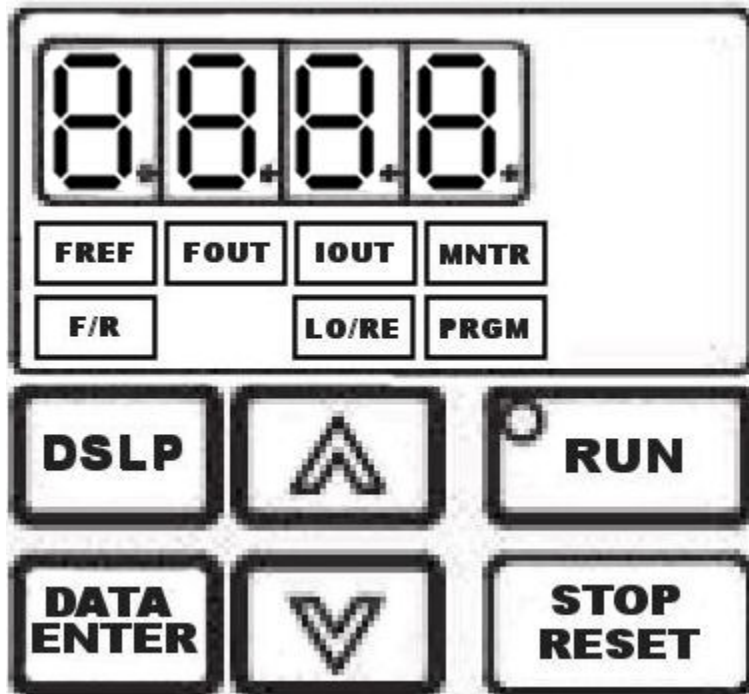
- Re-connect and turn on the Control Box. The fan should power up and start turning when the control box is turned on.

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 **DSL P** (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**P 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 using ShopBot commands in a ShopBot part (.sbp) file.

The ShopBot Control keypad can also be used to run a spindle(s) when you want to warm up the spindle or do diagnostics:

- Open the keypad from the ShopBot Control software using the **[K]** keyboard command.
-
- Click on **output #1** to run spindle #1 and/or **output #2** to run spindle #2 (light turns green)
- { #1 or #2 can also be activated with the ALT-1 or ALT-2 keystrokes }
-
- On the Control Box, push the green **START** button to run the spindle.
-
- Note: when the keypad is closed, the **FWD** signal from the ShopBot Control Box to the spindle will be cut off and the spindle will stop.

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 turning on output #1 (**Alt+1**) inside of the **Keypad** mode (**K**) within the ShopBot control software and then press the **Start button** on the 3 button pendant.

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 benched 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 **DSLP** (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:

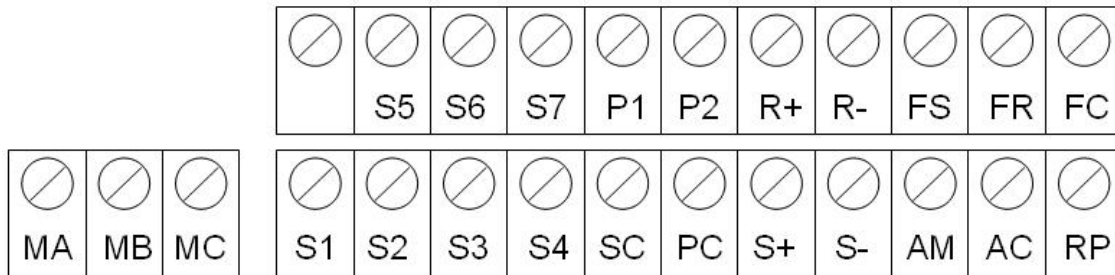
Check programming.

- 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.

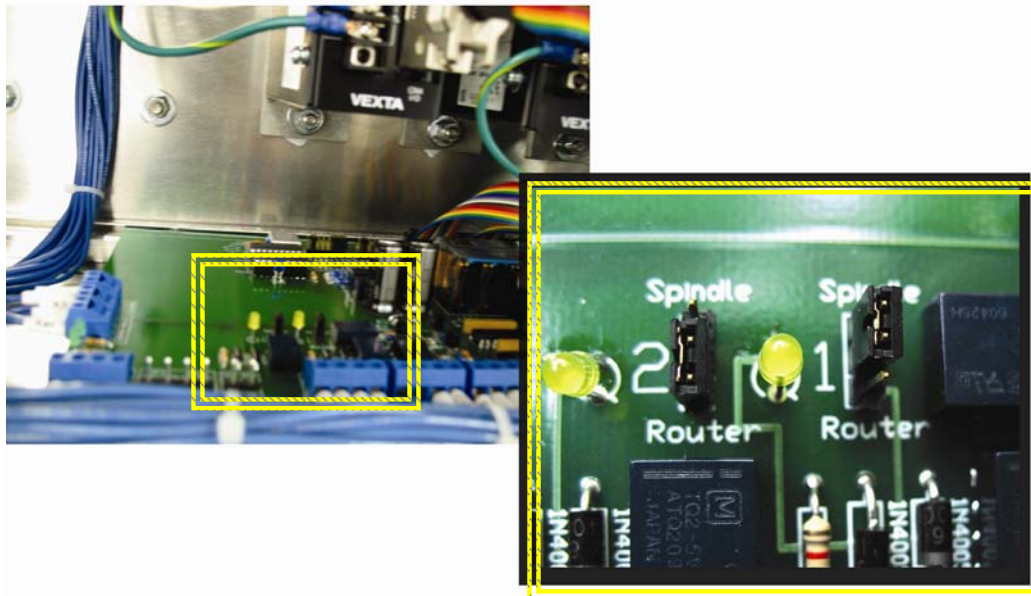
Check control box wiring as described in "Connecting the VFD to the Control Box" above.

- 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.