

Installation of 1.5kw 65mm Water Cooled Spindle on Long Mill

This is a write up that I have been promising you guys for a little while now. Since I have been able to get a few dozen hours of use I am comfortable enough with my installation method. There are a few reasons that I ended up going with the following spindle set up:

Huanyang Spindle Specs:

1.5kw (8A) (110V)

65mm

3.2kg

ER 11 collet with collets from 1mm - 7mm

Frequency range 0-400

Speed 0-24000 RPM

Water cooled

4pc bearing

Huanyang HY Series VFD

Seller: TALCNC

- 1- I wanted to stay as close as possible to the weight limitations for the Long Mill which seemed to lean towards a water-cooled spindle.
- 2- I didn't really want to have to mess around with figuring out a different mount.
- 3- I also did not care if it were 110v or 220v.
- 4- The ER 11 collet is as big as anyone with a Long Mill will need.
- 5- Additionally, it is very quiet and stays cool to the touch though out hours of operation



Figure 1-Direction Switch

I purchased this unit from a seller off of AliExpress because I could not find this configuration at a reasonable price in the United States. In addition to this you will need:

- 10 feet of heavy-duty extension cord three wire
- 5 feet of at least 4 wire coaxial cable
- 1 x IOT relay
- 1 x 30A 12V with power/load/ground inputs
- 1 x gallon cereal container that the water pump fits in
- Optional
- 2 x M8x1 Male barb hose ID 10mm fittings for the spindle
- 1 x 1/2" Male barb hose ID 10mm fitting for the pump
- 20 feet of 10mm hose

Installation

There are a few lessons learned that I have before we start the installation.

A. The spindle will only slide in the 65mm mount by inserting it from the bottom of the mount. IE the top of the spindle, the water fittings side, slides in from the bottom of the mount meaning the carriage cannot be mounted to the Long Mill.

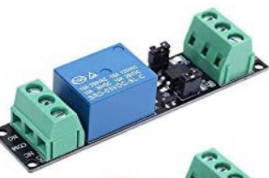


Figure 2-3V Relay

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- B. I tried a plethora of different relay types to control direction and I could get the Long Mill Control board to acuate a 3V relay however none of them would complete the circuit to control direction with CNCJs. So I ended up hard wiring the fwd/rev control with a switch.
- C. I ended up snapping one of the hose fittings that came with the spindle, so I replaced them with M8x1 Male barb hose ID 10mm fittings and using more flexible hose. Besides the hose that came with my spindle was not going to be long enough.
- D. I chose the cereal container from amazon because the pump would fit in it perfectly and you do not need that much water to cool the spindle. I added a little green food dye to some distilled water to make it easier to see if the eater was pumping although you can hear the IOT relay click on. I also got the 1/2" Male barb hose ID 10mm fitting and 10mm hose from Lowes.
- E. The VFD and the Spidle let off a lot of electromagnetic interference, do not mount it close to your control board it will cause issues. I am already flirting with danger having it so close to my Raspberry Pi.
- F. I would not run this set up in 110v configuration without a power conditioner of an UPS.
- G. Most of the instruction I found were for a different VFD and were for 220V so I had to figure out some of these things on my own.

Figure 3-Male barb fittings

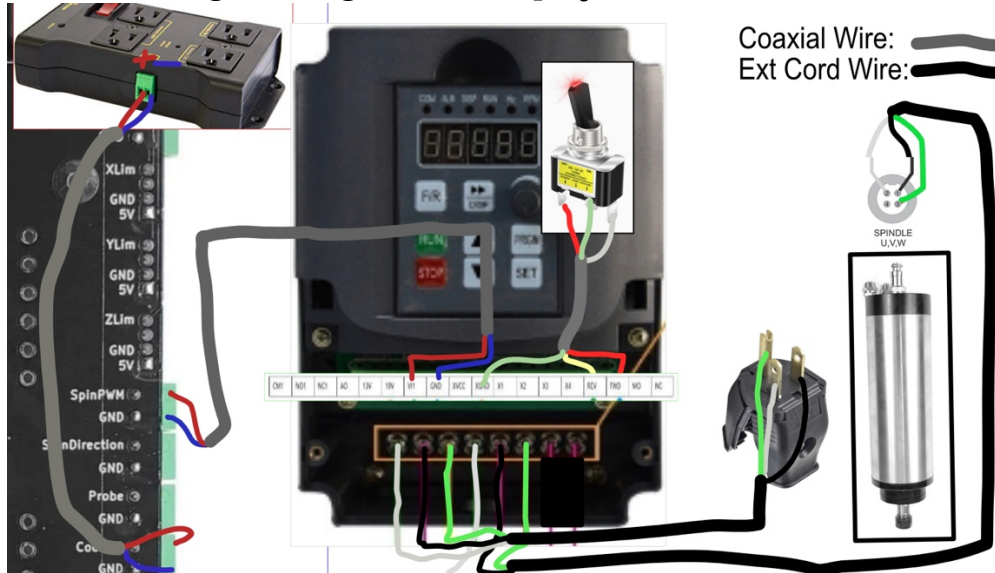


Ok so let's start putting it together.

1. So hopefully you already have your Long Mill apart and you can slide your spindle in from the bottom. Go ahead and do that and just get it mounted you will set the height later.
2. Follow the instructions form Sienci Labs for building the Long Mill there is nothing that is different other than mounting the spindle. However, you will need to run the heavy duty 3 wire extension cable through the drag chains with the other wiring.
3. Once you get everything mounted and wires up you will need to find a good location to mount the VFD. You will want to be able to see the display on the front, however you will not ever use the buttons on it. It needs to be located away from the Long Mill control board.

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4. Now that you have everything mounted up it is time to wire it all up see the wiring diagram displayed below for that.



5. From this point you will want to connect the hoses for your water pump and figure out where you will store the pump with the container. You will need to access this about every six months to put fresh distilled water in it probably. As stated in the lesson learned I replaced the fitting going into the VFD and used more flexible line and routed along with my dust collection. Once that is all done you can plug it into your normally off plug in your IOT relay. (note you could also save some money and space by hard wiring the pump to a 5v relay much like the 3v shown above)



1. (1, 2) 向上 [upward]
(3, 4) 向下 [down] 为0-10V
2. (1, 2, 3, 4) 全部向下 [All down] 为0-5V

6. Now that you have everything wired up there are a few settings that need to be changed in the VFD: P00.01 needs to be changed to 1, P07.08 needs to be set to 3, and all the switches on the dip switch with 4 switches needs to be in the down position. The dip switch is how you adjust the input power range for PWM coming from the control board.

-Switches down 1,2,3,4 =0-5v PWN (Long Mill)

-Switches down 3,4 + Switches up 1,2= 0-10v PWM

7. Depending on the sender software you are using you will need to set the max spindle speed on your Long Mill control board to 24000. gSender has it is the wizard and CNCJs can change it through the control panel. (see the CNCJs website for \$30=24000)
8. Now you can loosen the mounting bolts in the 65mm holder for the spindle and set it to a height that make sense. I lowered the Z all the way and put one of my smallest bits in. I lowered the spindle until the bit would reach the spoil board and tightened the 65mm holder bolts back down. You may need to check for tram issues, but I did not have any after surfacing my spoil board.

**Note: Your VFD and Spindle may be different from the one I have dole check with the manufacture if these instructions will work for you.

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