

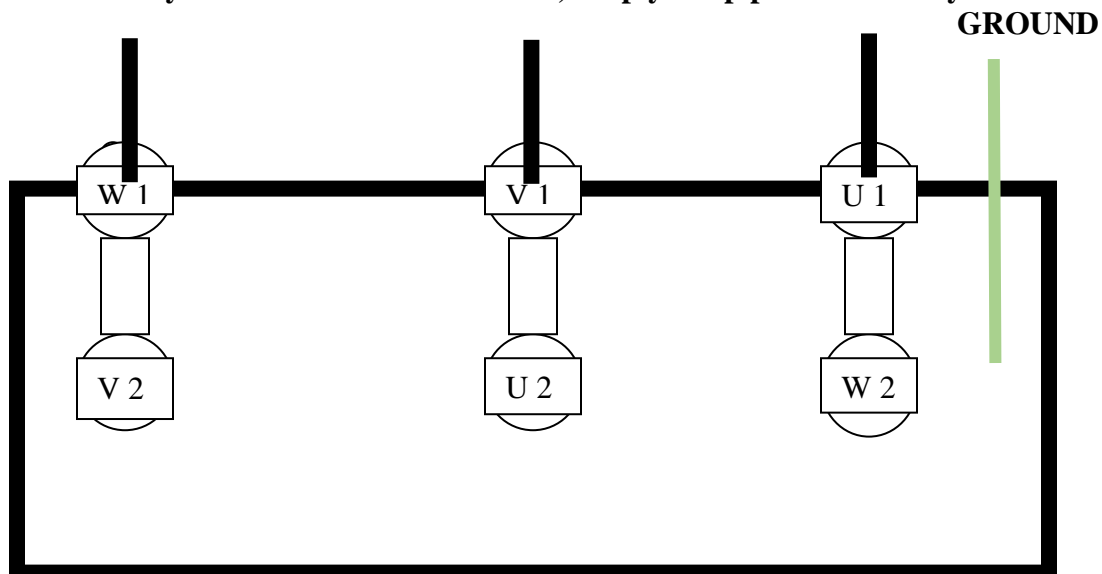
ST 111 VFD CONVERSION

INSTALLING 3 PHASE MOTORS.

The motors supplied may have a larger mounting frame than the original single phase units, therefore you may need to drill and tap some new holes in your mounts. Also, on some models, the lathe motor mount may require a slight modification due to the location of the terminal block. If necessary, remove the mounting plate, cut away the adjuster arm and mount the plate horizontally instead of vertically as before. The motor will now be sitting on top of the mounting plate and the weight of the motor will maintain the belt tension. On all models the motor pulleys will need to be bored out to 24 MM to fit the new motor shafts. We suggest you drill and tap the pulleys for set screws. This operation will require the use of your lathe, so bore the mill pulley first, using your original single phase motor on the lathe, then put the bored pulley on the new 3 phase lathe motor and mount it to the machine. Mount the 3 phase mill motor at this time and after you have completed your installation of the electrical components you can use the new lathe motor to bore the other pulley for the mill motor. If you choose, the new system can eliminate all the idler pulleys on all machines, as well as the Hi-Low spindle brake mechanism on Gold series and later machines, and run directly from the motor to the spindle pulley. The 3 phase motors can be run as high as 3200 RPM by changing the Hz settings in your VFD controller to 120 maximum. We suggest you choose a pulley combination for the lathe that is 1-2 ratio so your lathe will have a speed range of zero to 1600 rpm. For the mill, a 1-1 ratio will give you a speed range of zero to 3200 rpm.

WIRING THE 3 PHASE MOTORS

You will have 2 original cables that attached to your single phase motors. Use these same cables for your new 3 phase motors, the other ends of the cables will be disconnected from the switches and connected to the contactor supplied with your kit. On your motor terminal block, there are terminals marked U1, V1 and W1. The cables can be hooked to these in any order, but we suggest you do both motors the same. If any motor needs to be reversed, simply swap positions of any 2 wires.



KIT CONTENTS

- 2 2.0 HP 3 PHASE MOTORS**
- 1 INVERTER**
- 1 MAGNETIC CONTACTOR**
- 1 ON-OFF SWITCH FOR MAIN POWER**
- 1 ON-OFF SWITCH FOR LATHE TO MILL CHANGE**
- 1 E-STOP SWITCH**
- 1 RED INDICATOR LIGHT**
- 1 DECAL**
- 1 NEMA 6-15 220 VOLT PLUG**
- GENERIC WIRE**

- 1. Once you have made the pulley modification for the lathe motor as described above, you may now remove the original motors and mount the 3 phase motors to the machine.**
- 2. Because the 3 phase motor speed controls are all done by the inverter, you will not need any of the belt change mechanisms, idler pulleys and things like the hi-low spindle brake mechanisms. You may retain all these things if you like, but if you want a much simpler mechanical setup, you can remove them all and simply drive the spindle direct from the motor to the spindle pulley with a single belt.**
- 3. Once you have decided on your preferred mechanical drive method and the new lathe motor and drive pulley are mounted, you will need to decide on the location of your inverter, contactor and switches. The contactor should be mounted inside a housing, as it has exposed high voltage connections. The inverter can be mounted anywhere that is convenient to reach, as the connections are not exposed, but it also has a removable keypad and remote ribbon connector if you prefer to have a “smoother” control panel with the main body of the inverter hidden away and only the keypad and switches showing.**
- 4. Once you have decided on your control mounting, you can remove the original motor switches and the 110 volt plug from your main power cable. The original power cable will be used for your 220 volt single phase input to the inverter. You may choose to hard wire the cable to a box, or use a 220 volt plug and outlet. We suggest the NEMA 6-15 plug and outlet combination available at any home improvement store. Most cables came with Blue, Brown and Green/Yellow wires, or Black, White and Green wires. In either case, use the Green wire as your ground and the other 2 for your lines. On the cables running to the motors, you can**

use all three wires in any combination as explained in the prior diagram.

5. A simple way of keeping the front panel with a “clean’ appearance would be to mount the inverter over the holes where the original switches were mounted. If you prefer the inverter hidden and only the key pad showing, you can cut away the space between the switches and make a nice aluminum panel to cover the holes and mount the keypad in the panel. You can choose a location for the 2 switches anywhere on the front that is convenient. 1 switch will be for ON-OFF power and it will have the red indicator light wired to it. The other switch is the LATHE-MILL selector switch. You will see that the switches have a white spring loaded tab that, when depressed, allows the switch contact portion to be removed from the knob portion for easy installation.

6. Once you have finished your control installation follow the diagrams below for your wiring.

HOW DOES IT WORK?

Your 220 volt single phase power hot leads go to one side of the E-STOP switch (bottom 2 terminals) and the ground goes to the E terminal of the inverter. The other side of the E-STOP switch (top 2 terminals) sends power to 2 places-

1. To the SPINDLE POWER switch (bottom 2 terminals)
2. To the LATHE/MILL selector switch (bottom 2 terminals)

From the top 2 terminals of the SPINDLE POWER switch you will connect wires to the R and S terminals on the inverter. You will also connect a wire from one of the top terminal to one of the terminals on the red light, and the other terminal on the red light will go to a ground. From the top 2 terminals of the LATHE-MILL MODE switch you will connect 2 wires to the terminals on the magnetic contactor that are at opposite corners of the base.

The E-STOP switch is used in emergency situations only and will kill all power to the system by pushing in on the button. When you twist it, it will pop back out and reconnect power to the system. DO NOT use it as an ON-OFF switch for the machine.

When the ON-OFF switch is turned ON, power will flow to the inverter and it will be activated and it converts the single phase input to 3 phase output. Power will flow to the red indicator light and it will come on showing your system is ON. When your LATHE-MILL MODE switch is in the mill mode, power will be flowing through the contactor to the mill motor. When you turn the LATHE/MILL selector switch to LATHE, power flows to the 2 terminals located at opposite corners of

the contactor. This energizes the magnetic coils and pulls the contactor into place with a snap sound and switches the 3 phase lines to the lathe motor.

When the inverter powers up, it will go through a self-test, then settle down showing 000 on the screen. You will then press the green RUN button to activate it, and by turning the small knob, your motor will run. To reverse the motor direction use the MFK button. The default setting for max Hz is 50, but to increase motor speed you can go as high as 120. Instructions for changing the inverter codes will be sent in separate files.

MONEY SAVING TIP

If your old motors are still functioning, you can clean them up, and maybe spray a fresh coat of paint on them and put them back into the same boxes that you received the new motors. These original motors are no longer available, so you could probably sell them for 100.00 each on e-bay or craigslist.

INVERTER



L1



L2



P+



PB



U



V



W



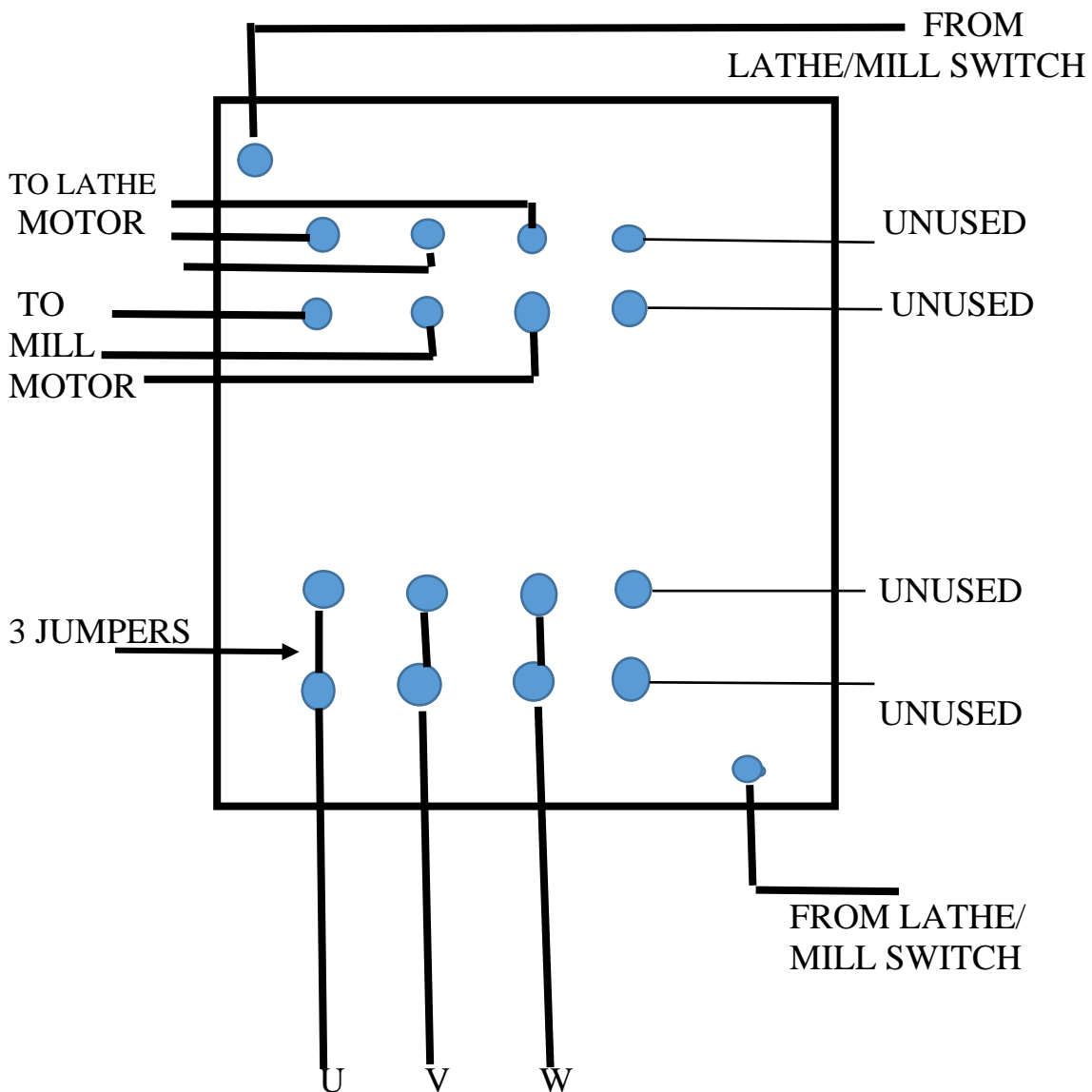
E



LINE 1 LINE 2 2 BLANKS LINES TO GROUND
 POWER FROM CONTACTOR
 ON-OFF SWITCH

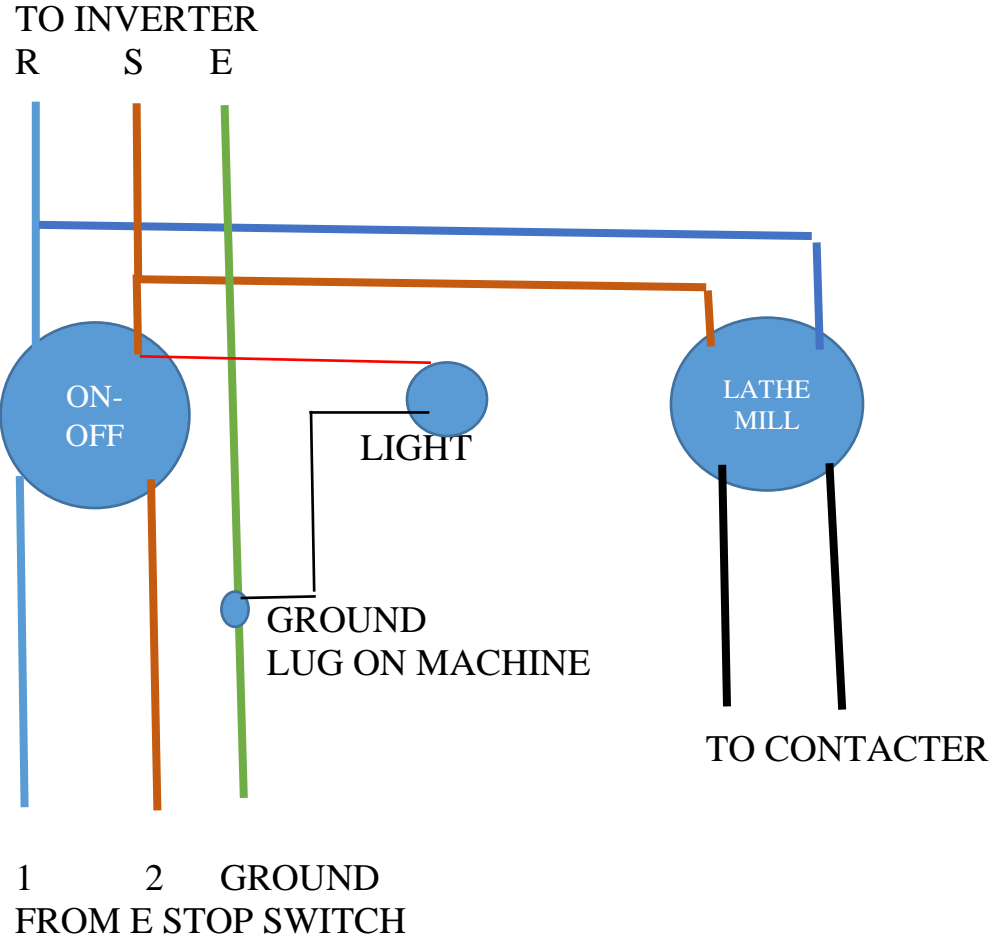
The row of low voltage terminals are only used if you are wiring to a CNC system for computer control of the spindle motor

MAGNETIC CONTACTOR
FRONT VIEW



FROM INVERTER

SWITCHES AND INDICATOR LIGHT



INVERTER



MOTORS ON 17-20 GOLD MACHINE



