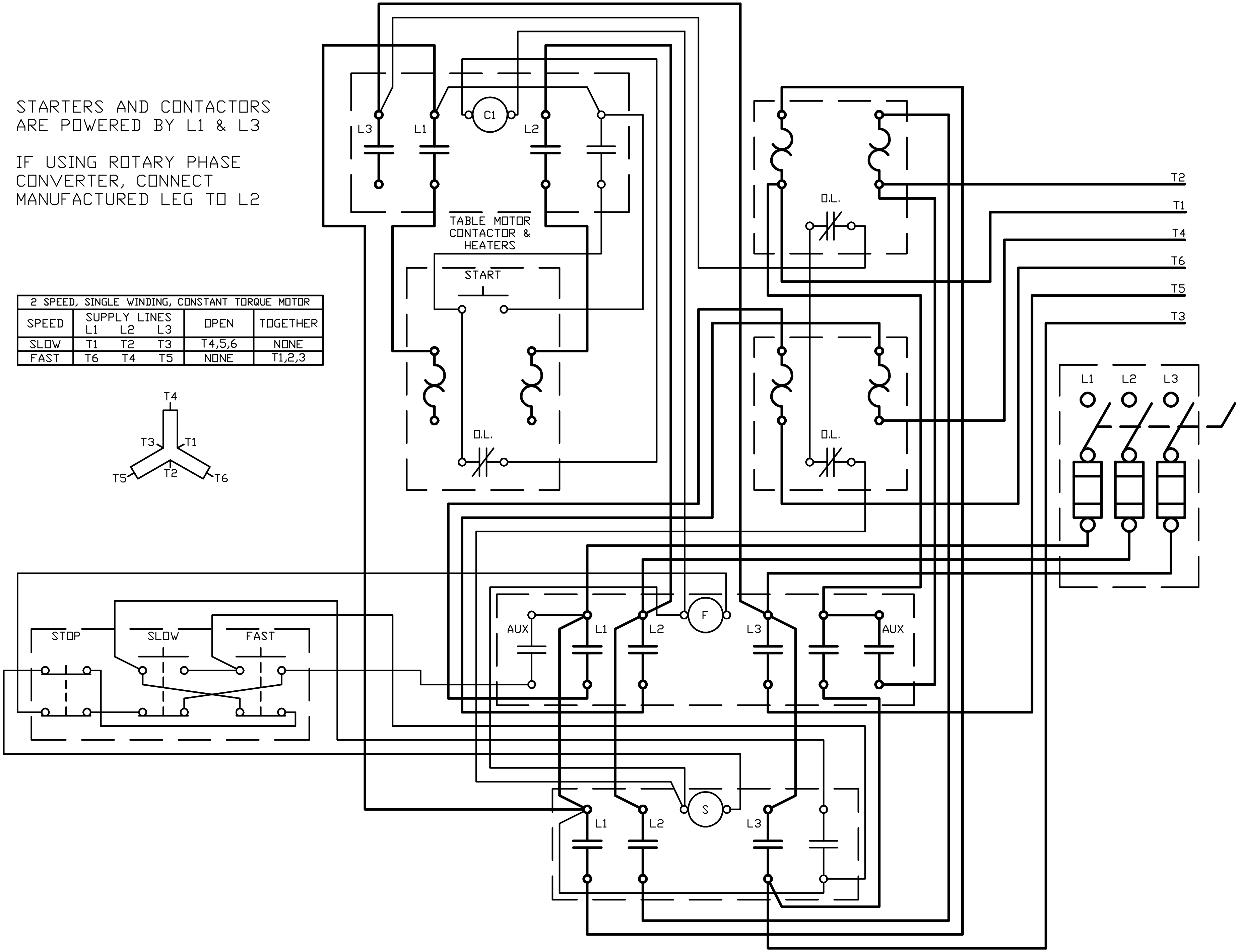
# GORTON 9-J WIRING SCHEMATIC

STARTERS AND CONTACTORS
ARE POWERED BY L1 & L3

IF USING ROTARY PHASE
CONVERTER, CONNECT
MANUFACTURED LEG TO L2

| 2 SPEED, SINGLE WINDING, CONSTANT TORQUE MOTOR | | | | | |
|---|---|---|---|---|---|
| SPEED | SUPPLY LINES L1 | L2 | L3 | OPEN | TOGETHER |
| SLOW | T1 | T2 | T3 | T4,5,6 | NONE |
| FAST | T6 | T4 | T5 | NONE | T1,2,3 |



I have had to go through a lot of trouble to hook up my Gorton 9-J to a VFD and latter to a rotary phase converter. I would like to thank peterh5322 on the Practical Machinist forums website for helping me get this mill running. The How To Identify The Six Motor Leads section is a direct cut and paste of his advice from the original thread on Practical Machinist. I am hoping this information makes it easier and quicker for someone the get their mill up and running.

When I first got my mill, I purchased a Hitachi SJ200 vfd. I opened up the motor electrical box, and found the six motor leads were labeled in an unconventional way. The marking where no help in hooking up the vfd. All you need to do is measure the resistance of the windings to figure out how to connect the wires. Before disconnecting any wires make sure you PERMANENTLY label the existing pairs. I labeled my wires, but one year later all but one were unreadable. That is why I had to create the schematic on the first page. Many older Gorton mills use a two speed, single winding, constant torque motor with six leads coming out of the motor. This connection diagram comes from the book “Electric Motor Repair” by Robert Rosenberg.

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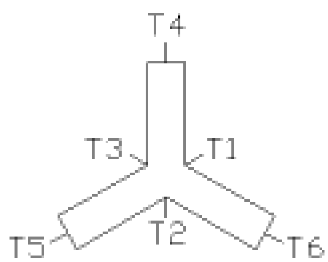


How To Identify The Six Motor Leads (cut and paste of peterh5322 advise)

“Assume that each segment of the winding has a dc resistance of 1 ohm. Further assume the terminals are temporarily labeled A, B, C, D, E and F, in no particular order. Measure the resistance from any terminal to each other terminal.

One would expect to find:

A-B: 1 || 5 = 1/((1/1) + (1/5)) = 0.83
A-C: 2 || 4 = 1/((1/2) + (1/4)) = 1.33
A-D: 3 || 3 = 1/((1/3) + (1/3)) = 1.5
A-E: 2 || 4 = 1/((1/2) + (1/4)) = 1.33
A-F: 1 || 5 = 1/((1/1) + (1/5)) = 0.83

Each of the above numbers may be multiplied by another factor selected to give numbers which more closely match your motor.

It should be clear that the two pairs of wires which have the highest resistance are those which are directly across from each other.

This allows us to temporarily label these T1 and T5.

It should be clear that the two wires which are lowest in resistance to that which was labeled T1 are T4 and T6. And so on, around the motor.

With the "star point" connected, as it would be when using a drum switch, or a two-speed magnetic starter set for high-speed, the resistance from any remaining wire to the star point is 0.5, while the resistance from any remaining wire to any other remaining wire is 1.

This is the high-speed connection."

The resistance readings from my motor are as follows (all in ohms)
A-B = 1.5
A-C = 2.4
A-D = 2.4
A-E = 1.5
A-F = 2.7

To find the factor to multiply the results by use the formula 0.83(x)=1.5, solve for x. X=1.8 for my particular motor. Divide all the results by 1.8. The adjusted numbers are
A-B = 0.83
A-C = 1.33
A-D = 1.33
A-E = 0.83
A-F = 1.5

A-F has the highest resistance so we label them A = T4 and F = T2 (I used A = T4 because is was the only label left on the motor leads, I later found out it was labeled wrong). B and E have the lowest resistance so B = T3 and E = T1. Next measure E to the remaining unmarked leads. The lead that measures 1.5 ohms compared to E gets labeled T6. C = T6 on my motor. Measure C to remaining unmarked leads. The lead that measures 1.5 ohms compared to C gets labeled T2 ( F = T2). Measuring F to D (the last unmarked lead) and should read 1.5 and D to B should also read 1.5 ohms.

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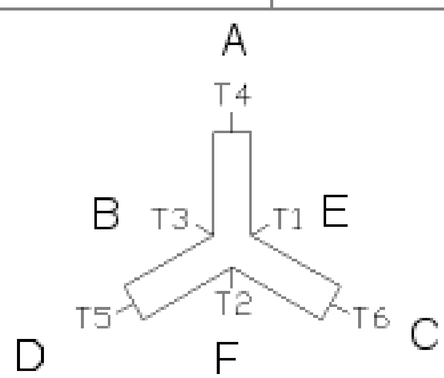


Hook B, E and F together and measure the resistance of B,E,F to A, then B,E,F to C and then B,E,F to D. I got a reading of 0.9 ohms. 0.9÷1.8 = 0.5, so that looks right. Measuring A to B, A to C and D to C gives a reading of 1.8 ohms, divide that by 1.8 gives you 1. That matches the numbers Peter gave us on the top of the previous page. To test the motor on high speed, connect B, E and F together and hook L1 to C, L2 to A and L3 to D.

You have a 50-50 chance that this is the right connection. If you hook A, C and D together and took measurements you would get the same readings as hooking together B, E and F. Set up the vfd with the right voltage, fla and cycles. I got a motor overload error after a minute or so. I then hooked up the motor for low speed and that worked fine. I left it set up that way for a while. Lucky for me these motors a tough, and it handled being connected wrong for far too long. After hooking the mill up to my RPC through the original controls, pressing the slow button only made the motor spin slowly. Pressing the fast button made it spin little faster, then pressing the slow button would bring it up to speed. I rewired the motor to this configuration

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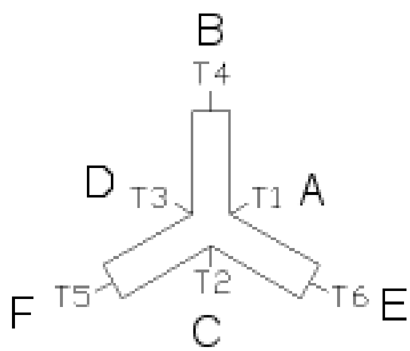


Now everything works like it should. I hope this helps out someone.

Sean