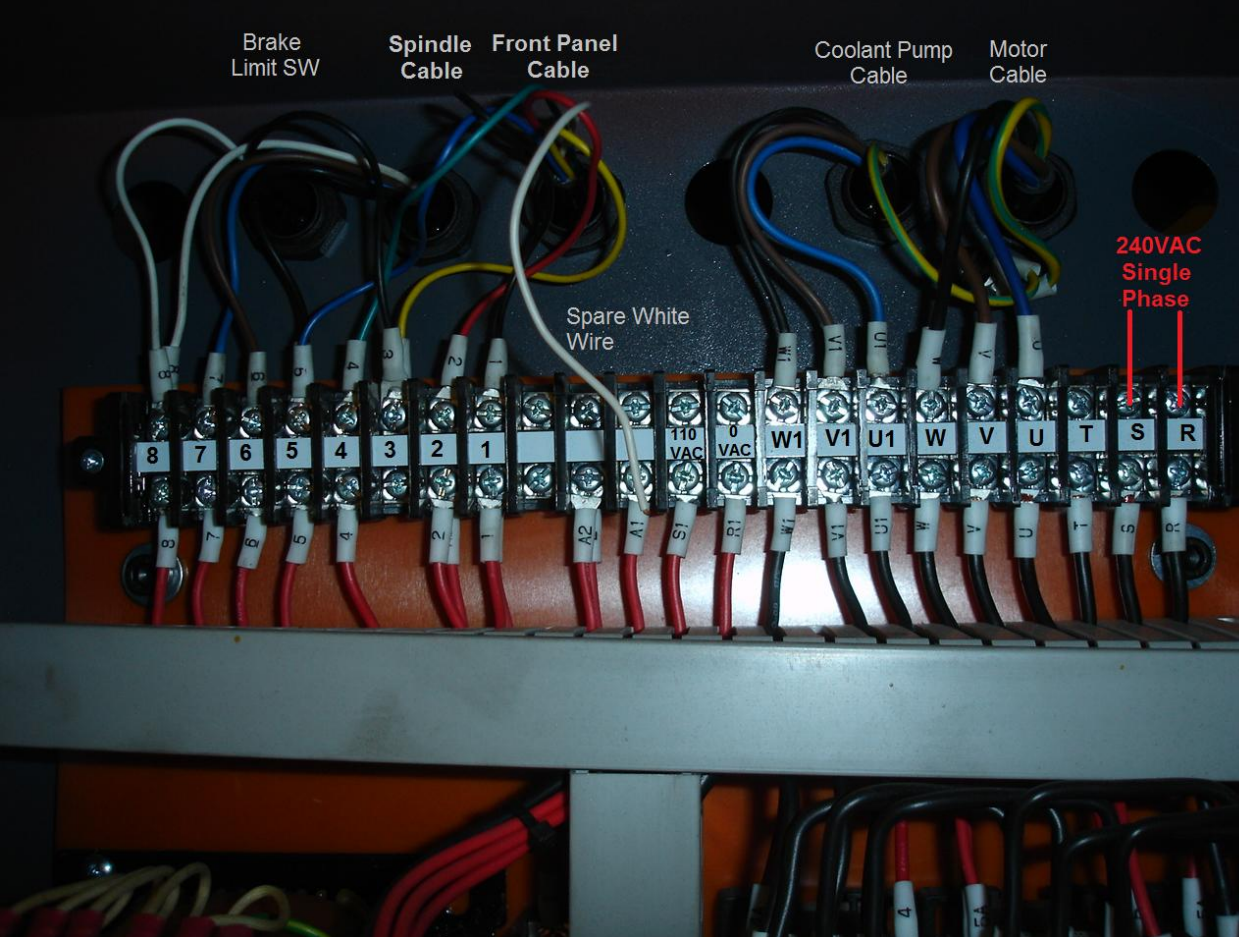


PM 1440GT Three Phase Lathe possible VFD connections/schematics to use the factory new lathe contactors to switch the VFD direction inputs. This is a possible way to reconfigure a lathe for VFD use without building a new control system board, but it is not recommended if possible vs. a dedicated VFD control system with low voltage relays and interlocks.

This basic conversion requires removing the high voltage wiring to the forward and reverse contactors. This is only for new machines as used contactors will most likely not work because of increased contact resistance from previous contact arching. Contactors are specifically designed for switching electrical power (120-480V) and not low voltage & low current signal level inputs, as such they may not work or be intermittent with switching low voltage/signal level inputs of a VFD. The Contactors can also be replaced with new DIN rail Mini-Contactors of the same configuration (WEG CWC07-01-30V04).
[https://www.automationdirect.com/adc/Shopping/Catalog/Motor_Controls/WEG_Electric_Miniature_Contactors_\(3-Pole\)/7_Amp_\(AC3\)/CWC07-01-30V04](https://www.automationdirect.com/adc/Shopping/Catalog/Motor_Controls/WEG_Electric_Miniature_Contactors_(3-Pole)/7_Amp_(AC3)/CWC07-01-30V04)

There are several different variants on the wiring of the PM1440GT. The suggested modifications/changes have not been tested, may differ by machine and are provided as is as a concept. You assume all responsibility for the use of any of these modifications or changes to the stock machine, compliance with all electrical codes and consequence of any/all use of the lathe. Consult Quality Machine Tools first as to any modifications to the lathe before they are made and how they effect the machine warranty.



It appears that the coolant pump may be single or 3 phase, if converted to single phase with a 3 phase pump then you will need a single phase coolant pump or consider a small VFD like the KBVF series.

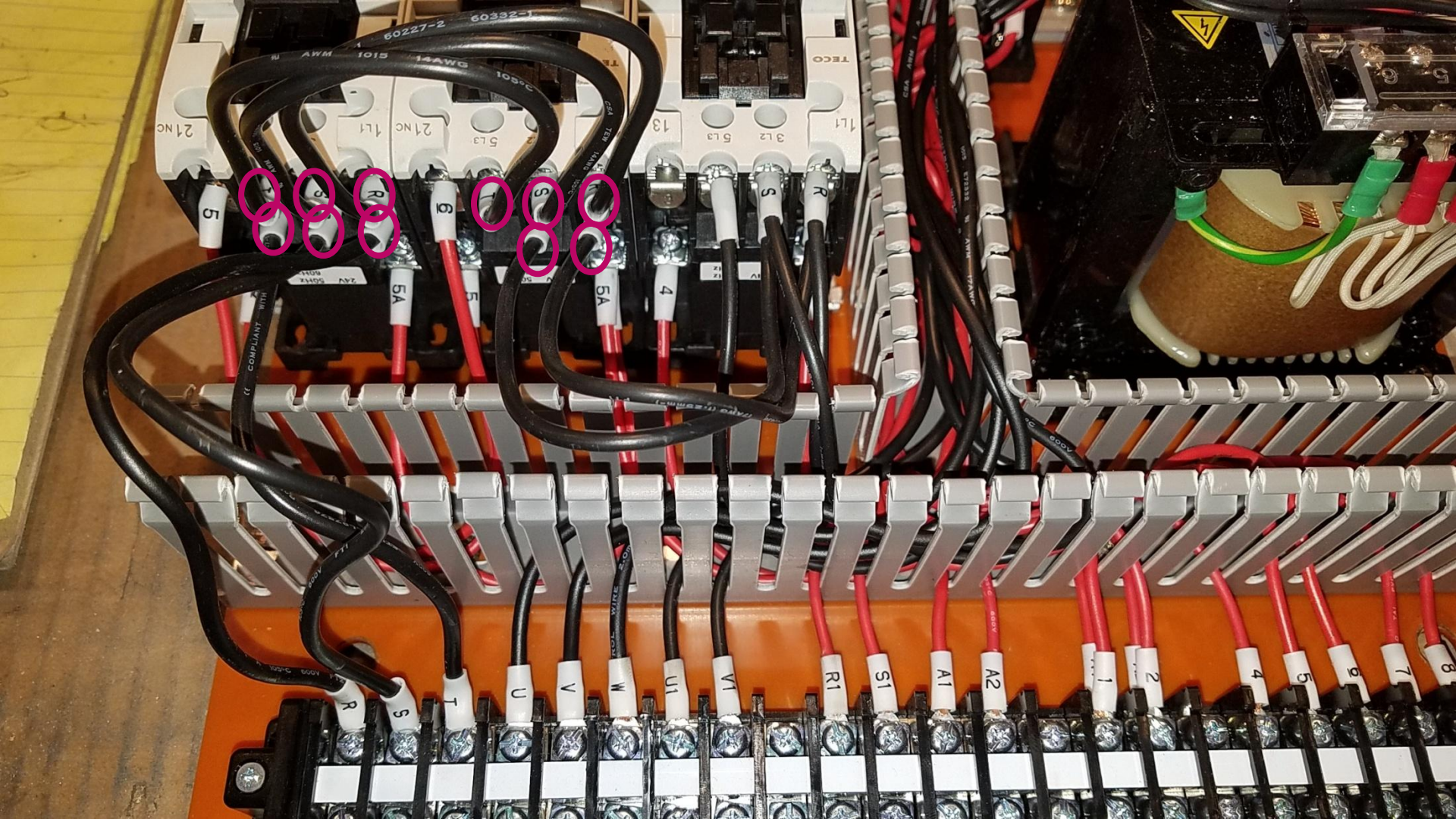
Some 1440GT versions have main power fusing, but this and wiring varies between different versions of this lathe. You must verify the high voltage connections for your version.

Only the R and S terminals are used when reconfigured to use to contactors to switch the VFD low voltage inputs. The R and S terminals must provide power to the transformer.

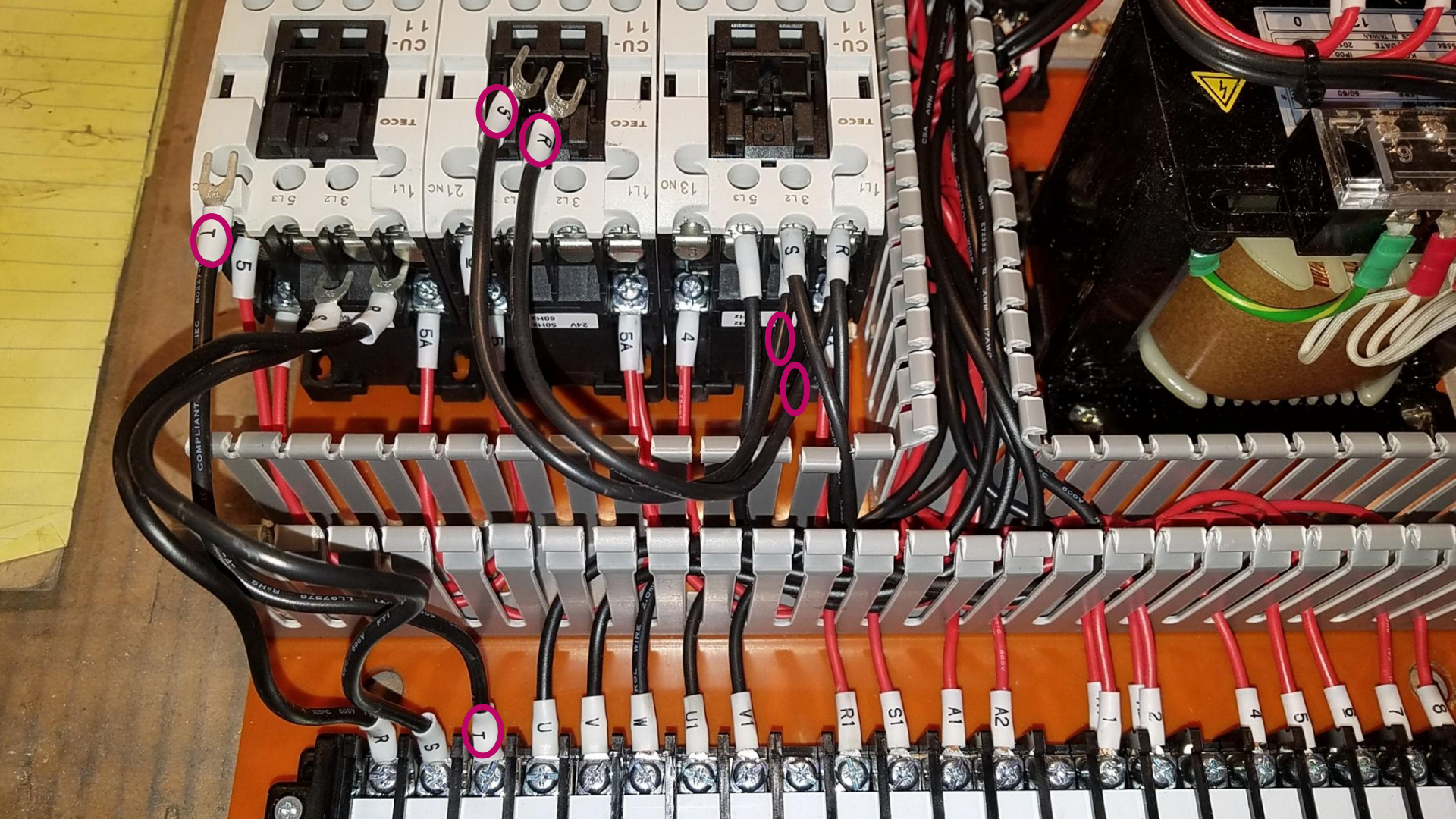
Terminals A1 and A2 provide 24 VAC for connection to a low voltage light.

Some lathe versions may also have a belt cover safety switch, as well as other control board configurations. So this is just a general guide as to one configuration.

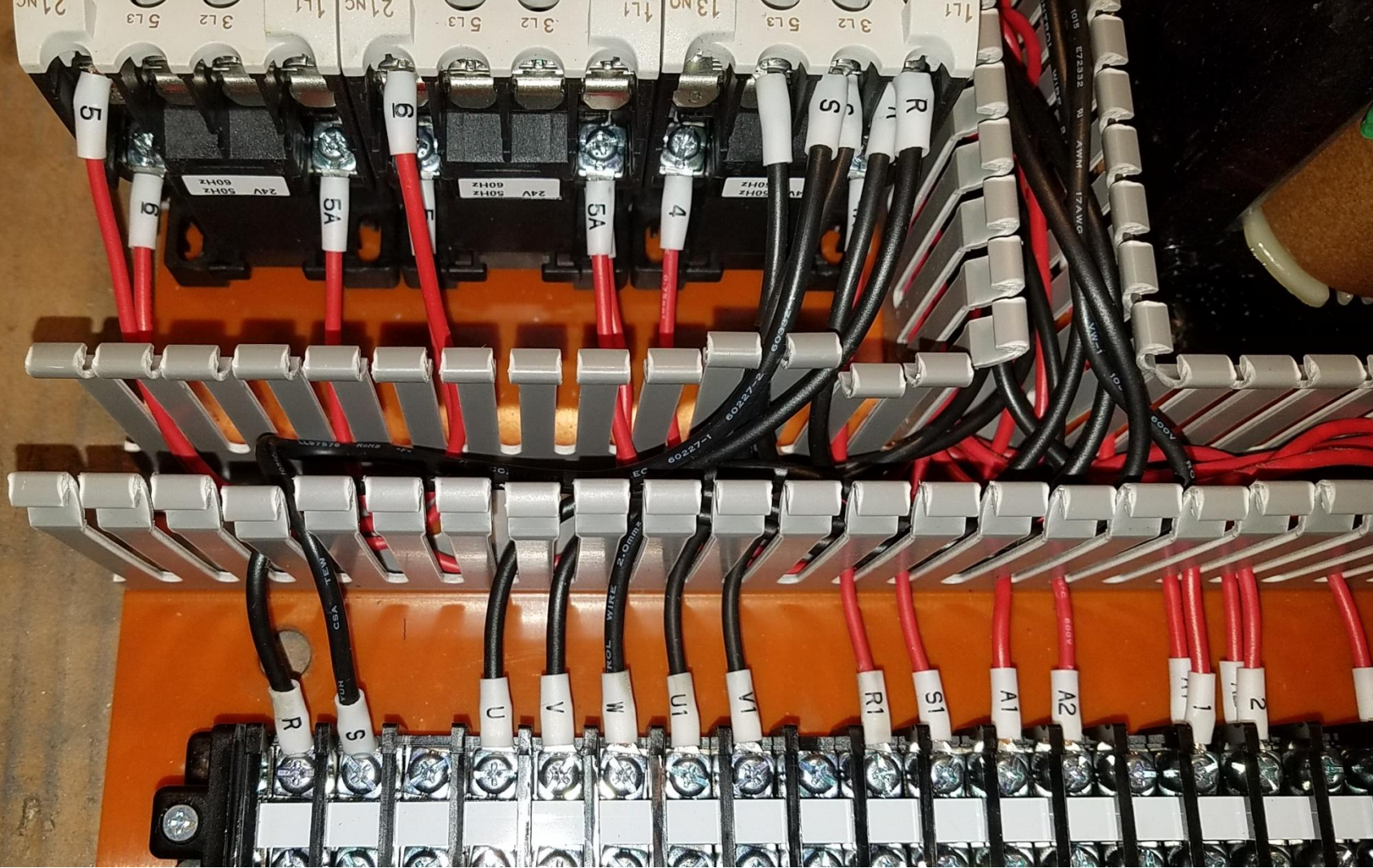
| <i>Description</i> | <i>Wire Color</i> | <i>Wire Label #</i> |
|---------------------------------------|-------------------|---------------------|
| Foot Brake - Return to Spindle Switch | White | 8 |
| Foot Brake - Power from E-Stop | Black | 3 |
| Spindle Switch - Power to switch | White | 8 |
| Spindle Switch - Stop | Blue | 7 |
| Spindle Switch - Reverse | Brown | 6 |
| Spindle Switch - Forward | Black | 5 |
| Front Panel - Jog Forward | Blue | 5 |
| Front Panel - Coolant | Green | 4 |
| Front Panel - Power E-Stop return | Yellow | 3 |
| Front Panel - Power Indicator return | Red | 2 |
| Front Panel - Power to E-Stop | Black | 1 |



Remove the purple circled HV black wires R(L1), S(L2), and T(L3) to the forward and reverse contactors. Disconnect and **remove each wire at both ends** the R, S, T jumpers between the forward and reverse contactors. Remove the R and S black wires that go from the Forward contactor to the Coolant contactor.



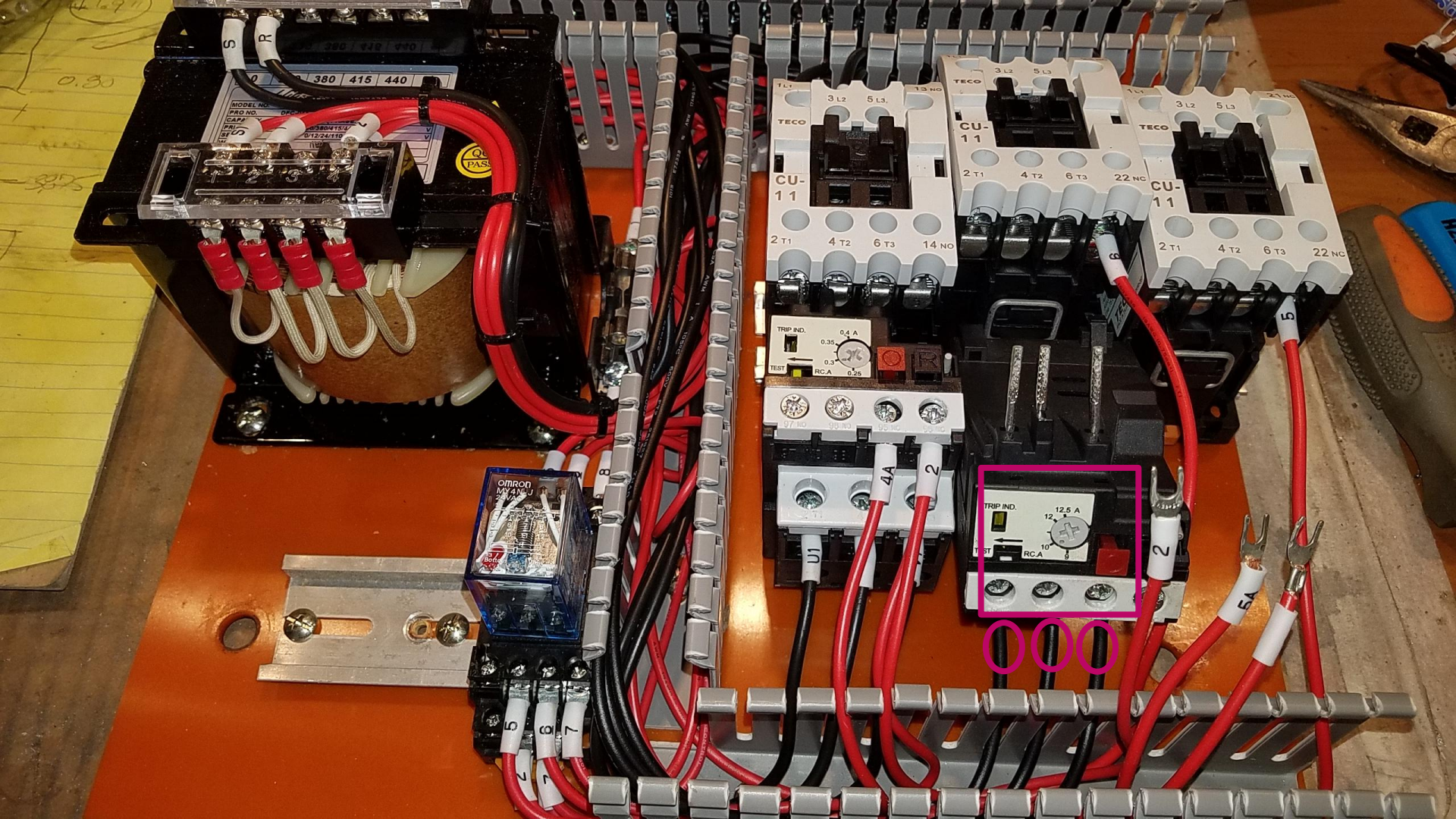
Disconnect and **remove each wire at both ends** for the T wire from the terminal strip to the reverse contactor. Completely remove the R and S black wires that was connected to the Forward contactor to the Coolant contactor. This may vary by lathe version.



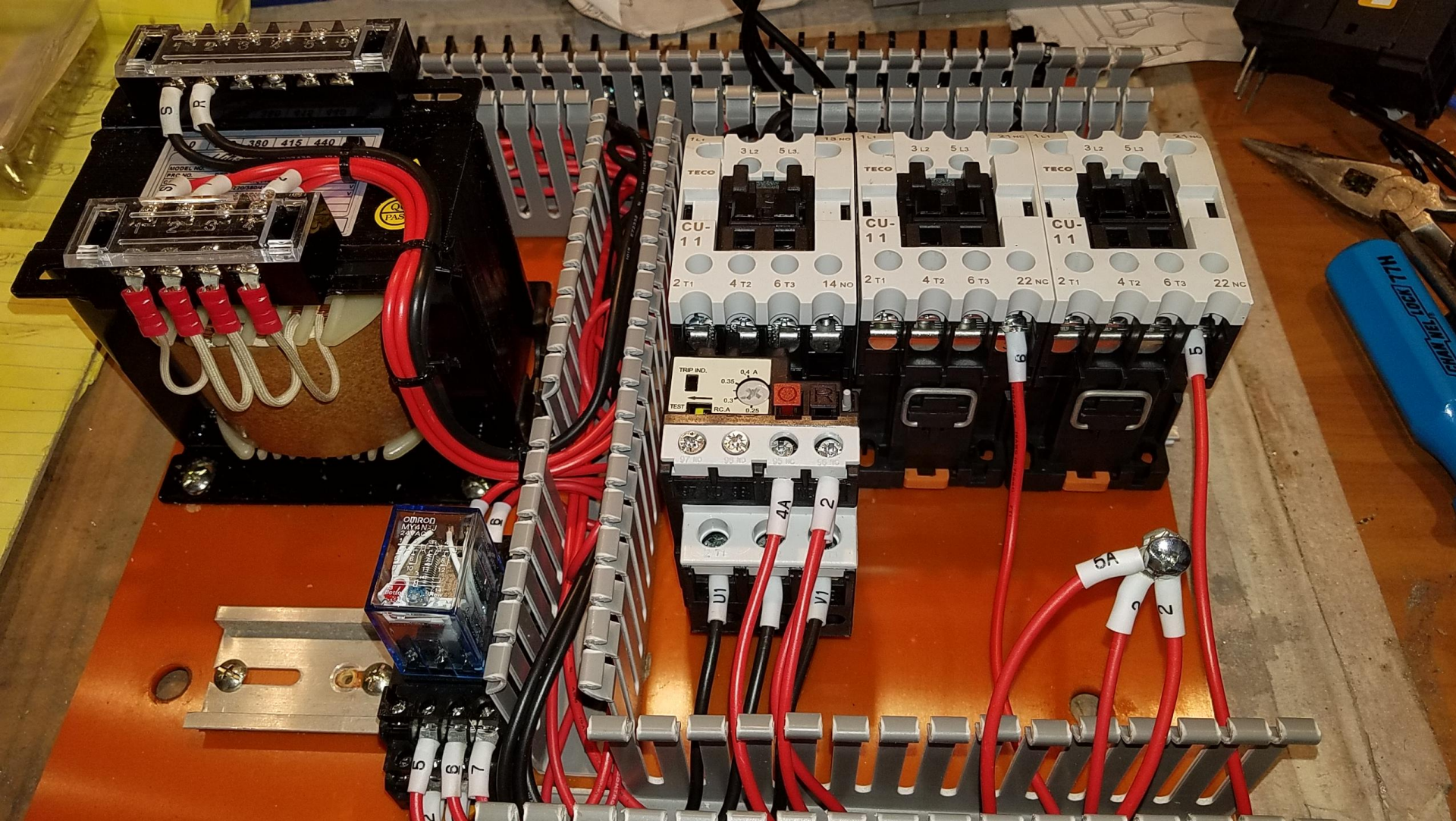
Connect the R and S Black wires connected to the terminal strip to the R and S terminals on the coolant contactor. Leave the other R and S black wire connected to the coolant contactor, these other two black wires must connect at the other end to the R and S terminals on the transformer. You have removed the input high voltage wires going to the forward and reverse contactors.



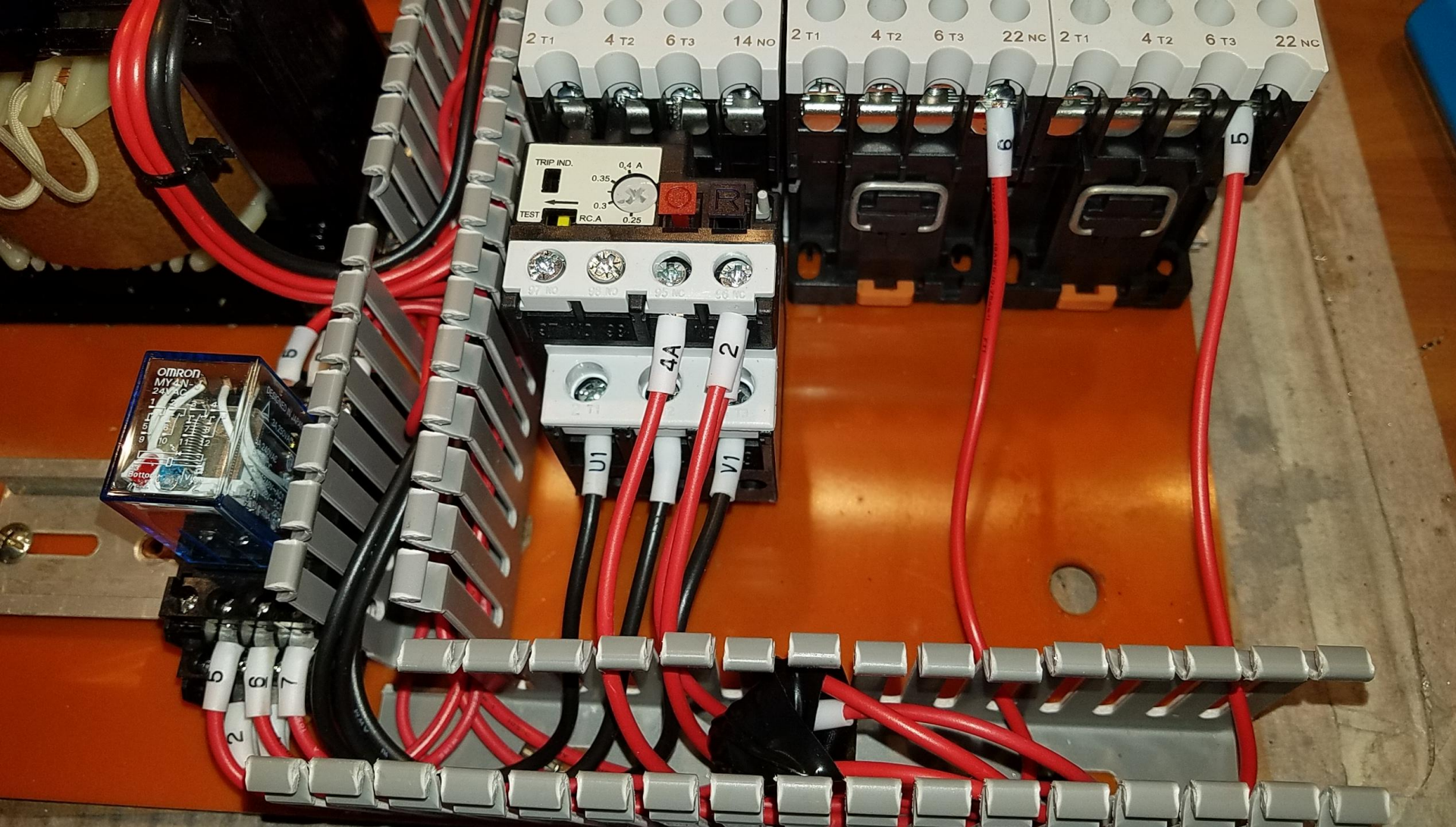
Remove the black jumper wires circled in purple between the forward and reverse contactors.



Disconnect the three red wires connected to the forward contactor overload relay, two are labeled 2 and one is labeled 5A. Swing the contactor forward and remove it along with the connected black wires all the way back to the motor connection terminals U, V and W.



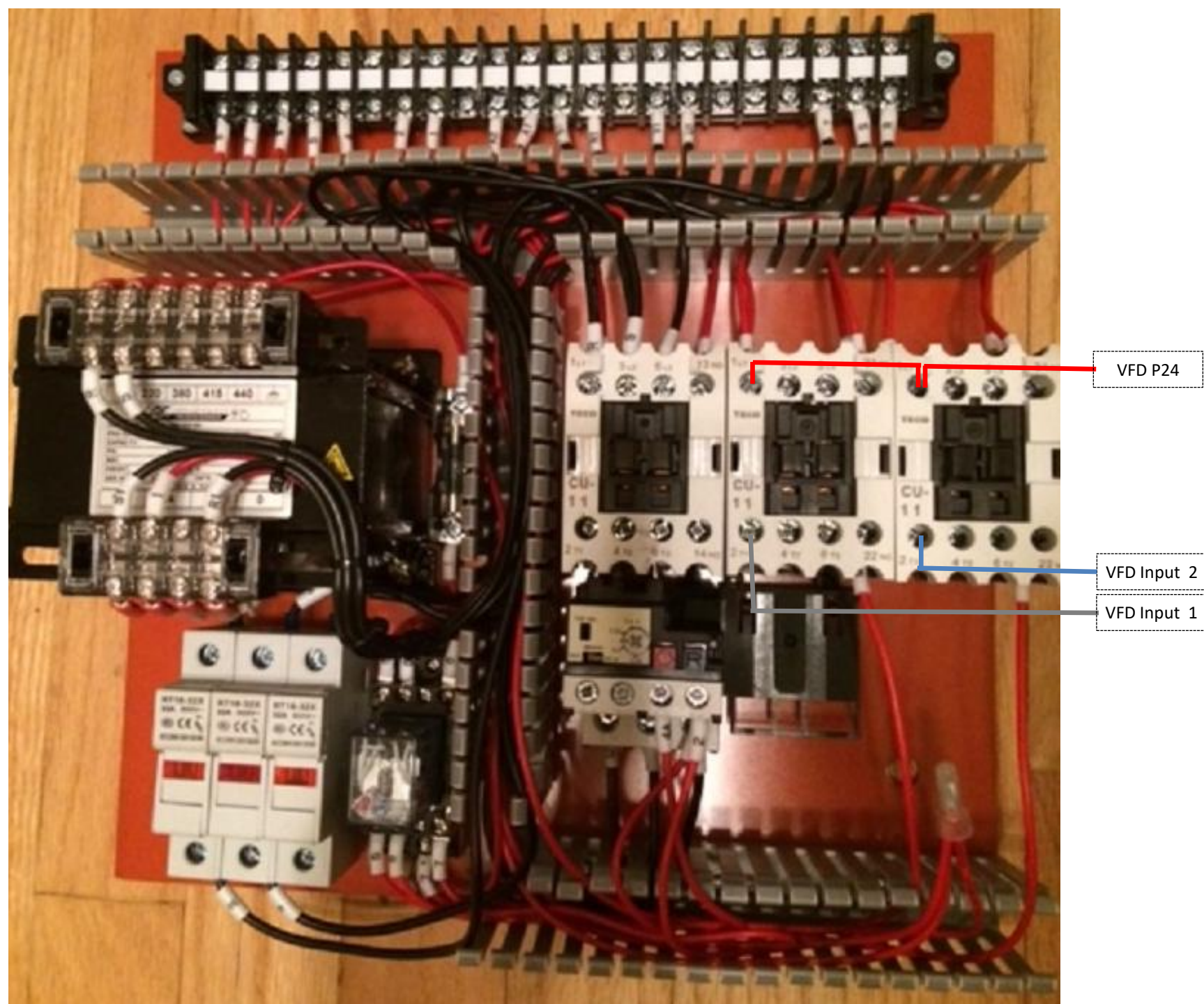
Connect the three red wires, two are labeled 2 and one is labeled 5A. You can either strip the wires and solder, use a crimp, or a small bolt as shown and then tape/insulate the connection.



Place the insulated red wires in the channel as shown. Black motor wires have been removed.

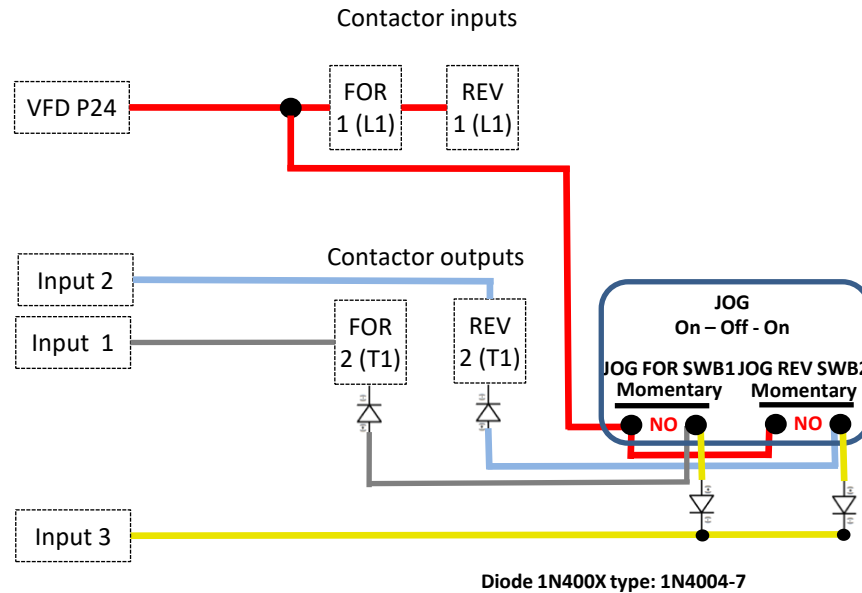
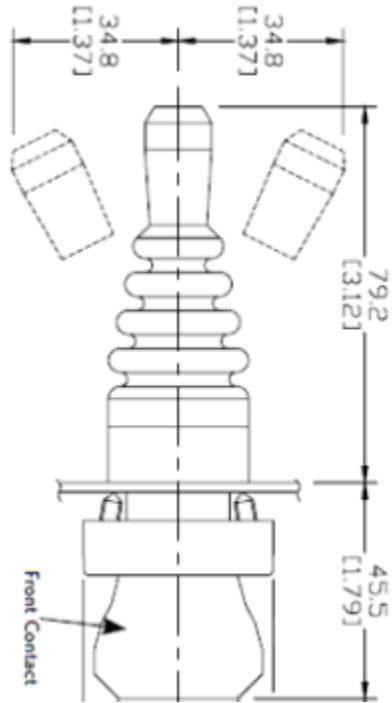


Use the contactor L1 and T1 terminals on the forward and reverse contactors to conduct the VFD low voltage inputs as shown. Com or P24 can be connected directly to the VFD terminal or through an addition NC closed switch block on the E-Stop.

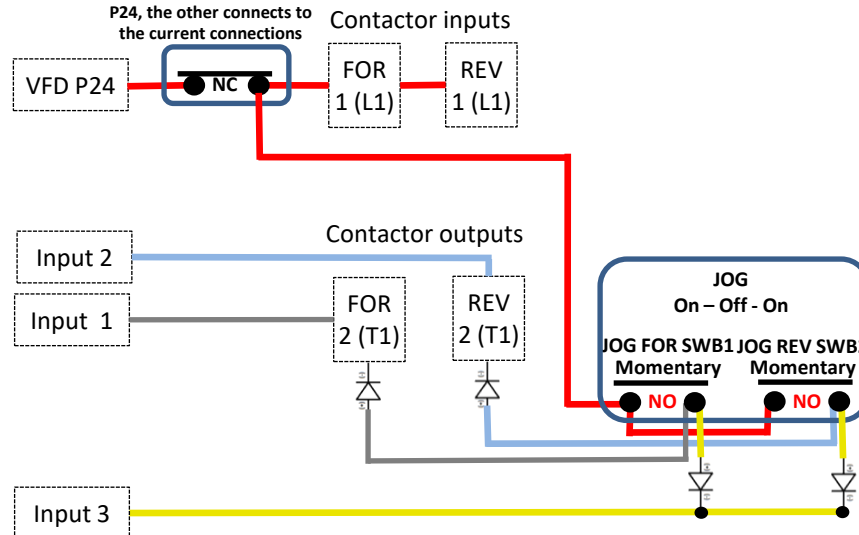


Two way Joystick Jog using For/Rev VFD inputs for Hitachi WJ200

ECX Series 22mm Plastic Joystick EXC3510



Optional is to have a Separate E-Stop Switch Block which disconnects P24 from VFD inputs when pressed. You need TWO NC switch blocks, one for P24, the other connects to the current connections



Note: The VFD inputs must be set to **SOURCE logic** to use the diodes as shown. Common must be P24 terminal on WJ200



NOTE: Input 3 must be programmed for Jog

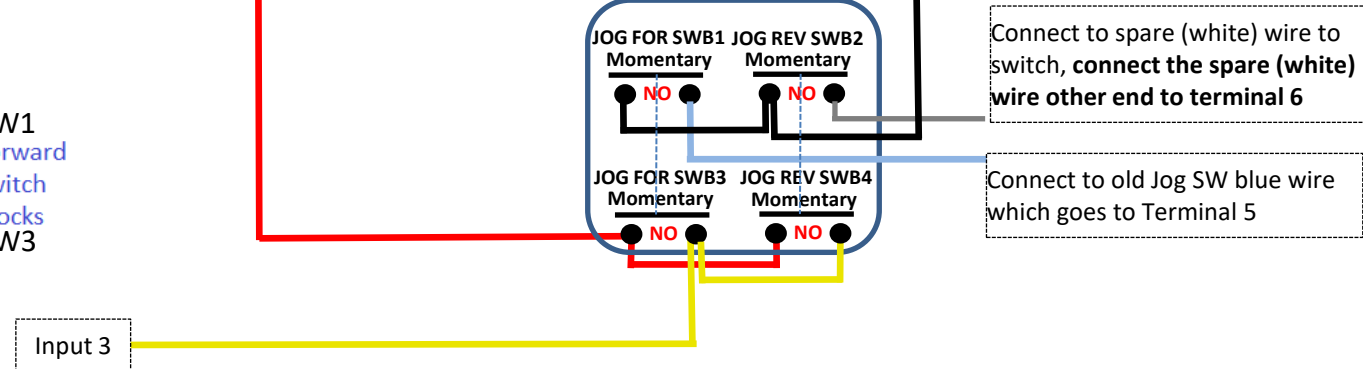
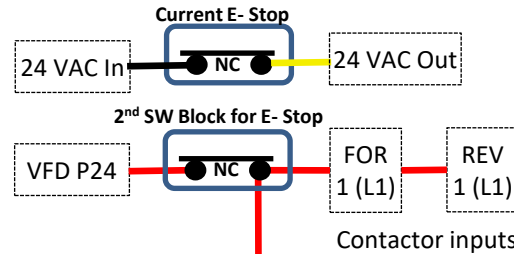
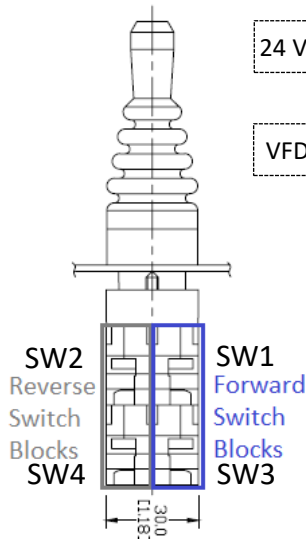
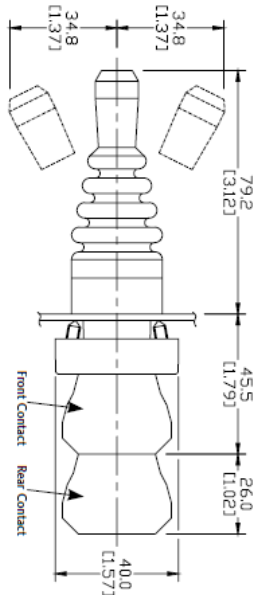
Diode 1N400X type: 1N4004-7

Two way Joystick Jog using For/Rev contactors for Hitachi WJ200

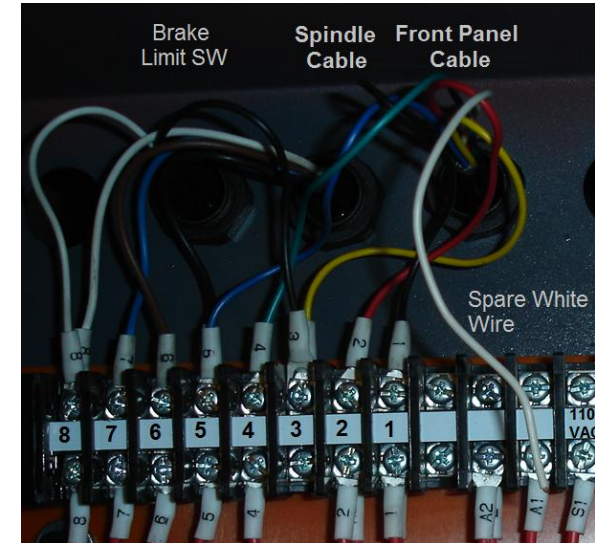
ECX Series 22mm Plastic Joystick ECX3510 and ECX1040-2 (two additional NO switch blocks)

Total of 4 NO switch blocks

Optional to have a Separate E-Stop Switch Block which disconnects P24 from VFD inputs when pressed. You need TWO NC switch blocks, one for P24, the other connects to the current 24 VAC connections

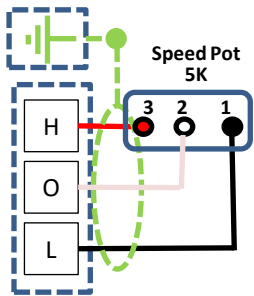


NOTE: Input 3 must be programmed for Jog



Use (24V) Lighted E-Stop Switch as Power Indicator

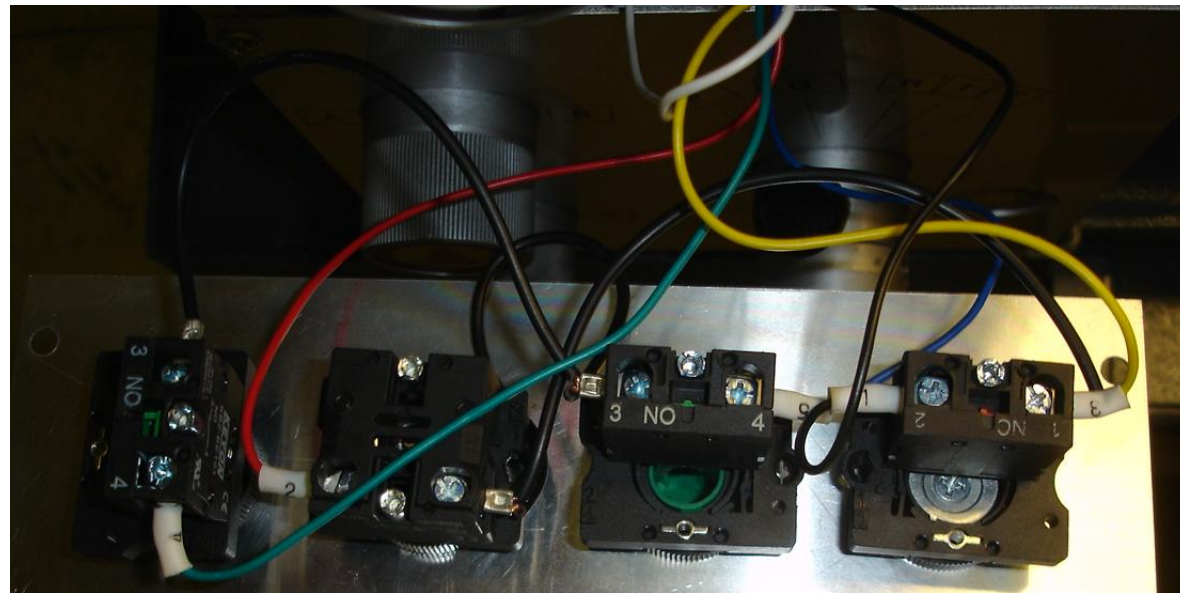
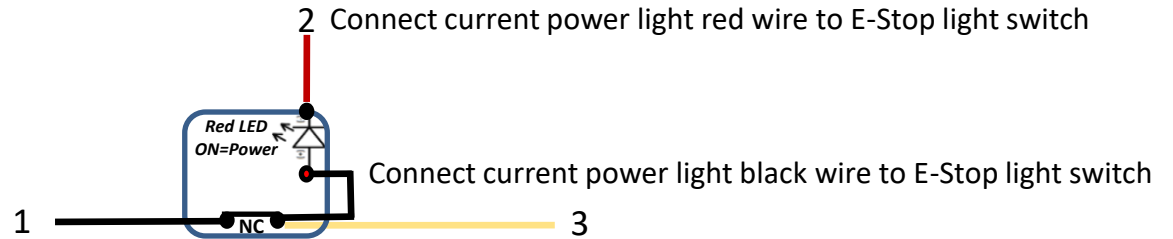
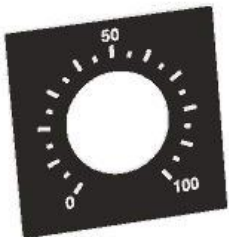
Replace factory power light with speed pot.



Speed Control
Use 4 conductor shielded cable (green wire is not used). ground cable shield at VFD end only



ECX2300-5K 22mm potentiometer 5K
ECX2640 22mm legend plate 0-100

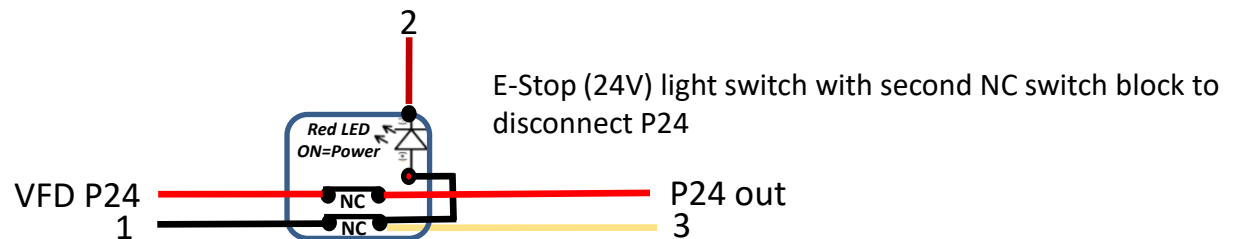


Coolant

Power Light

Jog

E-Stop



E-Stop (24V) light switch with second NC switch block to disconnect P24

VFD P24
1

P24 out
3

24V Lighted E-Stop, connect the current indicator lamp wires to the E-Stop light connections.

GCX1226-24

https://www.automationdirect.com/adc/Shopping/Catalog/Pushbuttons_-z-Switches_-z-Indicators/22mm_Metal/Emergency_Stop_Pushbuttons_Illuminated_-a-Non-Illuminated/GCX1226-24

https://www.automationdirect.com/adc/Shopping/Catalog/Pushbuttons_-z-Switches_-z-Indicators/22mm_Metal/22mm_Pushbutton_Accessories/Contact_Blocks/ECX1030-2

Fuji Electric AR22V0L-01E3R

[https://www.automationdirect.com/adc/Shopping/Catalog/Pushbuttons_-z-Switches_-z-Indicators/Fuji_Electric_22mm_\(AR22_Series\)/Emergency_Stop_Pushbuttons_Illuminated_-a-Non-Illuminated/AR22V0L-01E3R](https://www.automationdirect.com/adc/Shopping/Catalog/Pushbuttons_-z-Switches_-z-Indicators/Fuji_Electric_22mm_(AR22_Series)/Emergency_Stop_Pushbuttons_Illuminated_-a-Non-Illuminated/AR22V0L-01E3R)

[https://www.automationdirect.com/adc/Shopping/Catalog/Pushbuttons_-z-Switches_-z-Indicators/Fuji_Electric_22mm_\(AR22_Series\)/22mm_Pushbutton_Accessories/Contact_Blocks/AR9B291](https://www.automationdirect.com/adc/Shopping/Catalog/Pushbuttons_-z-Switches_-z-Indicators/Fuji_Electric_22mm_(AR22_Series)/22mm_Pushbutton_Accessories/Contact_Blocks/AR9B291)

Idec AVLW49902-R-24V

<http://www.lectrocomponents.com/products/idec-avlw49902-r-24v-switch.html>

<https://www.onlinecomponents.com/idec-avlw49902r24v.html>



Note: A second NC switch block is required if P24 is disconnected by the second switch block, the Idec model listed is configured with two NC contact blocks

Mechanical Foot Brake for Hitachi WJ200

Use of DPDT Limit Switch to Activate the VFD Free Run Command

Replace the current brake switch with a DPDT Limit Brake SW (snap action). Example is a Honeywell GLEA24C or similar limit switch

VFD P24 (logic source voltage for VFD inputs) is connected to NO switch block

Existing switch wires connected to separate NC switch block

<https://www.zoro.com/honeywell-micro-switch-global-limit-switch-glea24c/i/G4175893>

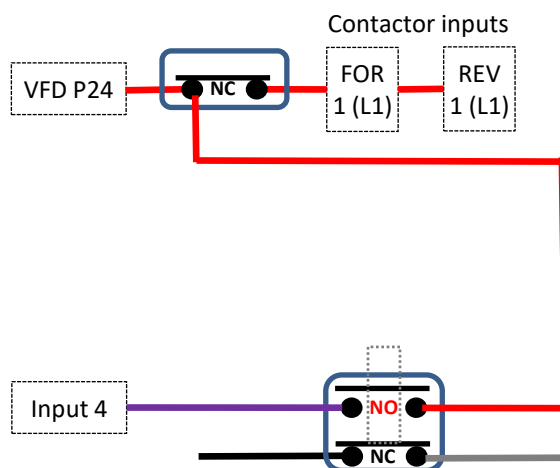
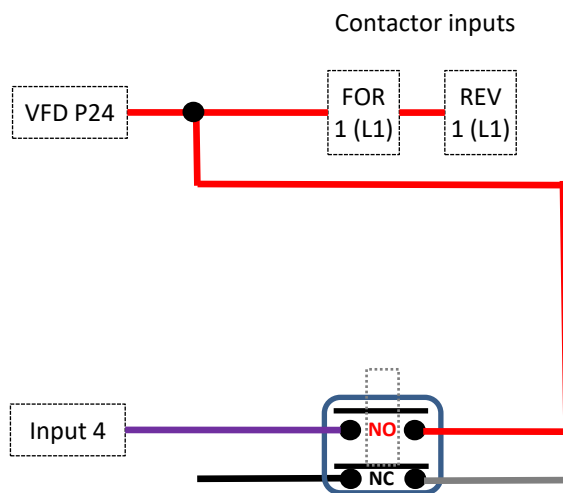
Current brake limit switch connections, black and white

GLEA24C



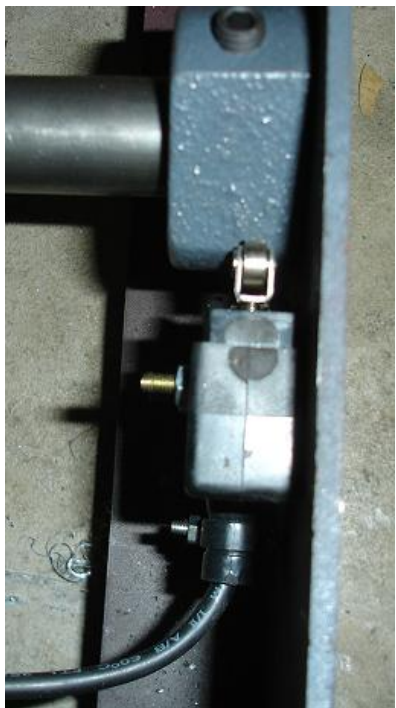
Global Limit Switches Series GLS: Top Roller Plunger, 2NC 2NO DPDT Snap Action, 0.5 in - 14NPT conduit

Note: The logic voltage for the free wheel command must always be active, so the voltage source for this input must not be interrupted by the E-Stop switch block.



NOTE: Input 4 must be programmed for Free Run Stop 11:(FRS: Free-Run Stop)

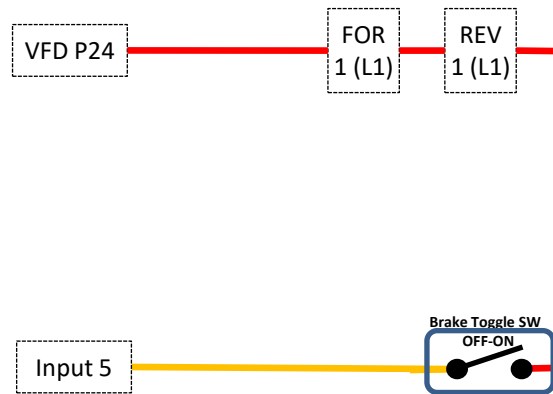
Stock single pole limit brake SW



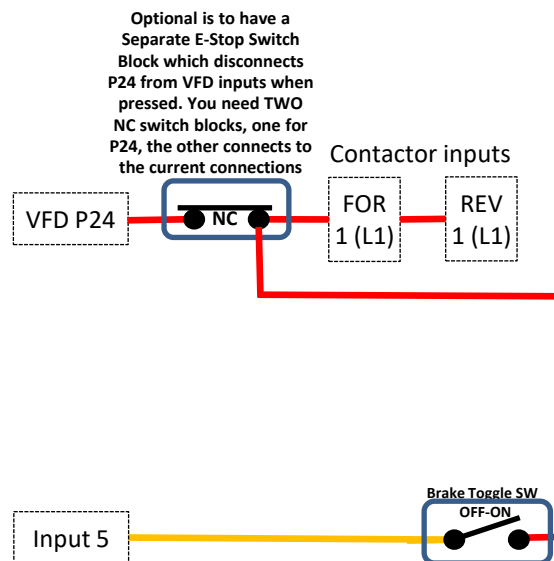
Two Stage Braking Switch for Hitachi WJ200

ON = longer braking time

2nd set of Contactor inputs



Use small mini/micro toggle switch at front panel to switch between single stage and two stage braking.



NOTE: Input 5 default is set for two stag braking when the input is active