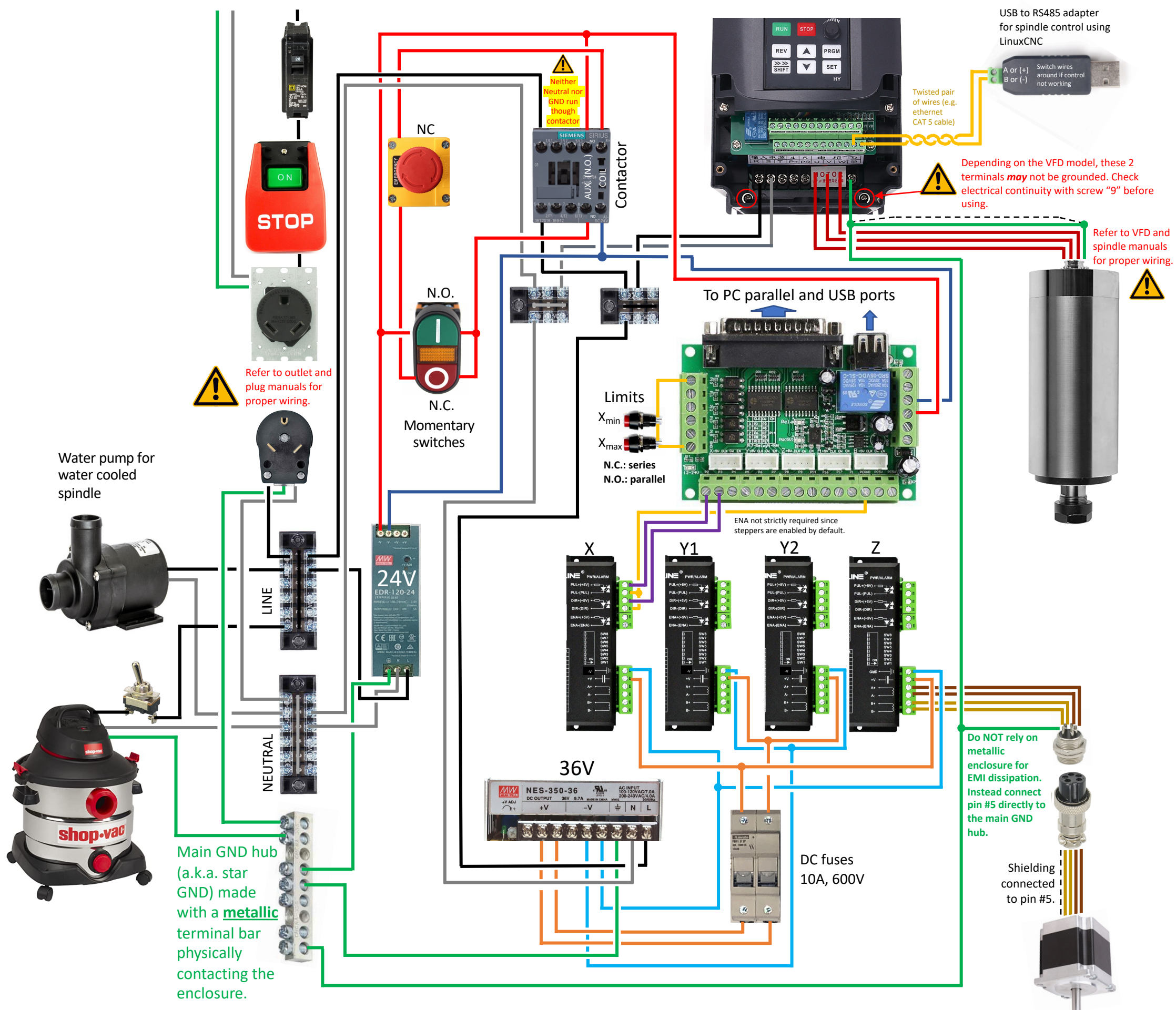


Example of CNC wiring – Drawing by Mokuleia – 11/22/2020

WARNINGS:

- Poor wiring can increase chance of fire, power surges, arc faults, and other serious consequences. You are doing this at your own risks. When in doubt, have an electrician review your work before powering up.
- Switches, contactors and PSUs represented in this diagram are used for illustration purposes only. Please select appropriate components based on your build and power source (110V or 220V, 15A or 20A or 30A).



Legend

- AC Line
- Neutral
- Ground
- DC +36V
- DC -36V
- DC +24V
- DC -24V
- DC +5V
- DC -5V
- Shielding

Recommended wire gauge:

- **Main AC power (110V or 220V):**
30A: 10AWG, 20A: 12AWG, 15A: 14AWG. Solid wires from circuit breaker to outlet, stranded wires for everything else.
- **PSUs to components (DC):** stranded 16AWG or 18 AWG,
- **For Stepper motors, spindle end-stops and sensors:** [refer to the wiki on GitHub](#)

Notes:

- When e-stop is engaged, the 24V signal powering the contactor coil will be interrupted, cutting power to the VFD/Spindle and the stepper drivers. The BOB will remain powered by the 24V PSU and PC. An additional wire can be connected between the e-stop and the BOB via one of the unused poles of the contactor. This way, engaging the physical e-stop can also trigger LinuxCNC's soft-stop (F1) to stop the milling job at the same time.
- To avoid ground loops, cables shielding should be grounded only at the controller end (to the GND hub inside the enclosure), except for the spindle where shielding should be grounded at both the controller end and the spindle body (more info [here](#)).
- Powering the BOB with PC via USB ensures that a common GND is shared with the parallel port.
- The fuses are connected to the stepper drivers in such a way (X-Z, Y1-Y2) that a blown fuse would not cause the machine to "pull itself apart".
- For 2 phase 220V build (two out-of-phase 110V - USA), both Line 1 and Line 2 must run through the main switch (placed between the breaker and outlet) and the contactor.