

Enclosure Components for VFD systems 2-3 Hp 1.5-2.2kW

Minimum recommended standard enclosure dimensions are 12" wide, 14" tall and 8" deep. Having a clear front window is optional, but also additional cost and not needed. You normally do not need to view the VFD, but I recommend a hinged latched cover that is easily accessible. You need to order a metal back panel to mount the VFD and components. You also need a DIN rail to mount components that might require this mounting system. General recommendations, you may find something cheaper on eBay. A steel cabinet may not need any venting, preferably 12-14" wide, 16" tall and 8" deep (BN4161408CHQT) should have enough volume. If active venting a fiber box is easier to cut holes in, either a hole saw or jig saw. Back plate material preference is galvanized steel > bare aluminum > painted steel/aluminum. You can search Automation Directs enclosures for size ranges. Some recommendations are below.

Metal Nema 1 Enclosure 16x12x8 N1C121608LP (no fan needed):

Hubbell-Wiegmann enclosure, NEMA 1, 16 x 12 x 8in (HxWxD), wall mount, carbon steel, ANSI 61 gray, light-textured polyester powder finish, single-door, 1/4-turn flush-mounted latch.

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosures/wall-mount enclosures/n1c121608lp>

Back Panel IN1P1216L:

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosure subpanels -a- internal mounting accessories/hubbell-wiegmann/standard painted carbon steel subpanels/n1p1216l>

Metal Nema 4/12 Enclosure 14x12x8 BN4141208CHQT (would use venting/fan):

Hubbell-Wiegmann Ultimate Mini-Max series enclosure, NEMA 4/12, 14 x 12 x 8in (HxWxD), wall mount, carbon steel, ANSI 61 gray, light-textured polyester powder finish, single-door, 1/4-turn semi-flush oil-tight latch. \$94

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosures/nema 12 enclosures/bn4141208chqt>

P1412G

Hubbell-Wiegmann subpanel, 12.88 x 10.88in, 14 gauge carbon steel, galvanized finish. For use with Bxxx and BN4xxx enclosures. \$10

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosure subpanels -a- internal mounting accessories/hubbell-wiegmann/galvanized subpanels/p1412g>

Metal Nema 4/12 Enclosure 16x14x8 BN4161408CHQT (no fan required)

Hubbell-Wiegmann Ultimate Mini-Max series enclosure, NEMA 4/12, 16 x 14 x 8in (HxWxD), wall mount, carbon steel, ANSI 61 gray, light-textured polyester powder finish, single-door, 1/4-turn semi-flush oil-tight latch.

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosures/nema 12 enclosures/bn4161408chqt>

P1614G

Hubbell-Wiegmann subpanel, 14.88 x 12.88in, 14 gauge carbon steel, galvanized finish. For use with Bxxx and BN4xxx enclosures. \$12

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosure subpanels -a- internal mounting accessories/hubbell-wiegmann/galvanized subpanels/p1614g>

Wall Mount, fiberglass reinforced polyester, requires a fan:

FR141208HPL

AttaBox Freedom series enclosure, NEMA 1/3/3S/4X/12/13, 14 x 12 x 8in (HxWxD), wall mount, fiberglass reinforced polyester, gray, crowned single-door, (2) quick-release latches, padlock hasp and staple.

https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosures/nema_3s_enclosures/fr141208hpl

FRCC141208HPL

AttaBox Freedom series enclosure, NEMA 1/3/3S/4X/12/13, 14 x 12 x 8in (HxWxD), wall mount, fiberglass reinforced polyester, gray, clear polycarbonate single-door, (2) quick-release latches, padlock hasp and staple.

https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosures/nema_3s_enclosures/frcc141208hpl

BP1412A

AttaBox subpanel, 12.88 x 10.88in, 12 gauge 3003H14 aluminum. For use with Freedom, MachoBox and Centurion series fiberglass enclosures.

<https://www.automationdirect.com/adc/shopping/catalog/enclosures -z- subpanels -z- thermal management -z- lighting/enclosure subpanels -a- internal mounting accessories/attabox/aluminum subpanels/bp1412a>

Fans and vents

Recommend eBay or any computer fan with screen. Most of my builds provide 24VDC back to the VFD cabinet to run a fan. It will turn on when the main system power is on. I recommend a vent directly under the VFD and a second vent to left or right side of the cabinet at the top. If a fan is installed it should be at the bottom of the cabinet blowing into the cabinet (positive pressure), and should have a filter screen. If you do not use an auxiliary fan in the enclosure than the VFD fan should be programmed to run whenever the VFD is running the motor, if the enclosure has a fan, the VFD fan only runs based on temperature. Chances are it will never turn on. I do not recommend using a temperature controller for the enclosure fan, the fans are very quiet, run for many years and are cheap to replace. I would get a double ball bearing 120mm case fan ~80-120 CFM, the voltage is dependent on your power source. You need Two fan vent covers in and out.

Example would be ADDA 120MM x 32MM Case Fan DC 24V 112 CFM AD1224HB-Y51

<https://www.ebay.com/itm/NEW-ADDA-120MM-x-32MM-Case-Fan-DC-24V-112-CFM-High-Air-Flow-AD1224HB-Y51/332353511580>

<http://www.ebay.com/itm/Dustproof-120mm-Case-Fan-Dust-Filter-Guard-Grill-Protector-Cover-PC-Computer-BLK-/281483943753>

<http://www.ebay.com/itm/SilverStone-120mm-Ultrafine-Magnetic-Fan-Filter-Model-FF123B-/261727060071>

<http://www.ebay.com/itm/Anodized-Aluminum-Computer-120MM-AC-DC-Fan-Dustproof-Filter-Strainer-Fan-Guard-/351183955687>

Main Power Disconnect switch 30-40A either 2 pole or 3 pole.

Most switches are 3P so just use two of the three poles. 30-32A is fine for 2 Hp, 3Hp would probably use 30-40A. Since the switch is not taking the turn on current of the motor directly, it does not need to be oversized. You can mount the switch directly to the back plate and use an extension shaft with a handle mounted to the cover, or use a cover mounted switch. You only need one switch it can either be mounted to the back of the enclosure with an extension rod to the handle OR a direct mount to the front or side of the enclosure. A breaker should not be used to routinely disconnect the power.

22003003-UL Socomec SIRCO M Series disconnect switch, non-fusible, 3-pole, 32A, 600 VAC rated, load break capable, UL 508 rated, panel or DIN rail mountable. \$21.50 . **Require SO handle and extension shaft, see switch listing for options.**

[https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection -z- Fuses -z- Disconnects/Disconnect Switches/Socomec UL 508 Rated Non-Fusible Disconnects/SIRCO-M Series, DIN Rail -a- Panel Mount \(16-80_Amps\)/22003003-UL](https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection -z- Fuses -z- Disconnects/Disconnect Switches/Socomec UL 508 Rated Non-Fusible Disconnects/SIRCO-M Series, DIN Rail -a- Panel Mount (16-80_Amps)/22003003-UL)

148E1111 SWITCH HANDLE

Socomec handle, round, S0 type, red/yellow, external front or right-side mount, defeatable, lockable. For use with NEMA 4/4X enclosures. \$26.50

https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-_Fuses_-z-_Disconnects/Disconnect_Switches/Socomec_UL_508_Rated_Non-Fusible_Disconnects/SIRCO-M_Series_Accessories/148E1111
14070520 SWITCH SHAFT for back panel mount and extension to front panel switch. Switch can also be side mounted. Socomec shaft, 200 mm (7.9 inch) length, 5 x 5 mm shaft size. For use with S0 and S00 type handles. \$4.00
https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-_Fuses_-z-_Disconnects/Disconnect_Switches/Socomec_UL_98_Rated_Non-Fusible_Disconnects/SIRCO-M_Compact_Series_Accessories/14070520



Door OR Side Mount 30A and 40A Examples:

OT40FT3 ABB 40A Disconnect Switch & OHBS2PJ HANDLE Type 1/3R/12 Combo NEW



MOELLER P1-32/EA/SVB Rotary Disconnect - DOOR Mount P132EASVB * NEW IN BOX* \$69.00



Also see WEG 40A rotary disconnect switch comes in Door mount and also back plate mount.

Fusing-Breakers

The recommend fusing/breaker for a WJ200 single phase 2 OR 3 HP single phase VFD is ~30A. Since single phase is "split" phase it is TWO 120VAC waves with a 180-degree phase difference. This requires TWO fuses OR a double pole breaker. A breaker can also be used at the electrical panel to a dedicated socket running the machine OR in the VFD enclosure. Technically, the WJ200-15SF will run just fine off of a 20A 240VAC breaker, the WJ200-22SF would require a minimum 30A

panel breaker. Fuses protect the equipment; breakers protect the wiring but are not fast enough to protect equipment. The standard for VFDs is to use high speed fuses if you want maximum protection, NOT time delay fuses. Either using high speed fuses or breaker works well. Optional is a single 15A breaker for 120VAC sockets or a dual pole 20A for two sets of sockets, both require a neutral wire (4 wire plug). With dual sockets one side is fed from one pole, the other socket set is fed by the other pole. Neutral and ground connects to both.

DIN rail double pole breaker **OR** fusing is mounted in the VFD enclosure, usually after the power disconnect switch. Main power Breaker/Fusing is optional if not on a dedicated 30A circuit. Use a separate 15A breaker for sub-systems like power supplies, if 4 wire power (i.e. L1, L2, Neutral and Ground) then one can also add two dual gang sockets for DRO and drives.

Gladiator miniature circuit breaker, 30A, 480Y / 277 VAC / 125 VDC, 2-pole 35mm DIN rail mount.

[https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z-_fuses_-z-_disconnects/ul_489_miniaure_circuit_breakers/gladiator_miniaure_circuit_breakers_\(gmcbu_series\)/2-pole_\(1a-63a\)/gmcbu-2c-30](https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z-_fuses_-z-_disconnects/ul_489_miniaure_circuit_breakers/gladiator_miniaure_circuit_breakers_(gmcbu_series)/2-pole_(1a-63a)/gmcbu-2c-30)

High Speed Fusing CC class which are smaller fuse, these are NOT midget fuses.

Bussmann KTK-R-30, 30A Fast Acting Class CC Fuse 600VAC, you need TWO, or FOUR if you want a spare set - Search eBay
CC Class Fuse Holder (You cannot use midget fuses)

Allen Bradley fuse holder 1492-FB2M30-L accepts Class CC fuses, 30A, 600V, 2-pole, 18-4 AWG copper only ,lighted indicator, 35mm DIN rail mount - Search eBay for this item, should be \$25-30.



EHCC2DU Edison modular fuse holder, accepts Class CC fuses, 30A, 600V, 2-pole, 18-4 AWG copper only, integral pressure plate with separate spade connection, 35mm DIN rail mount.

[https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-_Fuses_-z-_Disconnects/Fuses_-a-_Fuse_Holders/Fuse_Holders,_Fuse_Blocks_-a-_Accessories/Class_CC_-a-_Midget_Fuse_Holders_-a-_Accessories_\(30A\)/EHCC2DU](https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-_Fuses_-z-_Disconnects/Fuses_-a-_Fuse_Holders/Fuse_Holders,_Fuse_Blocks_-a-_Accessories/Class_CC_-a-_Midget_Fuse_Holders_-a-_Accessories_(30A)/EHCC2DU)

Bussman CHCC2DI Fuse Holder, 2-Pole 30A 600V, Class CC Fuses



LPSC002 Littelfuse, 30A 600vac 2-Pole, Fuseholder for Class CC Fuse



MERSEN USCC2 Fuse Holder, USCC, 2 Pole, 30A

<http://www.ebay.com/itm/MERSEN-USCC2-Fuse-Holder-USCC-2-Pole-30A/332101298496>

OR

High Speed Fusing J class which are quite a bit larger

JHL30-1 JHL high speed Class J drive fuse, current limiting, 30A, 600VAC, 13/16 inch x 2-1/4 inches, 1 fuse per pack. \$14.50, you need TWO

Bussmann JKS-30 30A Fast Acting Class J Fuse 600VAC,

Littelfuse JLS-30 (JLS30) 30 Amp (30A) 600V Class J Fast Acting Fuse

J Class Fuse Holder (these are much larger)

Allen Bradley 1492-FB2J30 Fuse Holder 30A 600V Class-J 2-pole, **Ferraz Shawmut US3J2I Ultrasafe** Indicator Fuse Holder, 30A, 600VAC



Optional additional breakers:

A 15A double (2) pole breaker that supplies 240VAC power to the 24 VDC power supply , and if used the coolant pump power. This protects the 240 VAC power wiring going to the lathe control box should there be a short. It can also be used to supply power to the 120/240VAC socket. **When purchasing one of my control systems, this breaker is included with the 24VDC power supply.**

Gladiator miniature circuit breaker, 15A, 480Y/277 VAC/125 VDC, 2-pole, C curve, thermal magnetic, 10kA SCCR, 35mm DIN rail mount.

[https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z-_fuses_-z-_disconnects/ul_489_miniature_circuit_breakers/gladiator_miniature_circuit_breakers_\(gmcbu_series\)/2-pole_\(1a-63a\)/gmcbu-2c-15](https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z-_fuses_-z-_disconnects/ul_489_miniature_circuit_breakers/gladiator_miniature_circuit_breakers_(gmcbu_series)/2-pole_(1a-63a)/gmcbu-2c-15)

DIN RAIL 35 mm Aluminum and Steel

https://www.automationdirect.com/adc/Shopping/Catalog/Enclosures_-z-_Subpanels_-z-_Thermal_Management_-z-_Lighting/Enclosure_Parts_-a-_Accessories/Internal_Component_Mounting_Accessories/DIN_Rails/DN-R35SAL1-2

https://www.automationdirect.com/adc/Shopping/Catalog/Enclosures_-z-_Subpanels_-z-_Thermal_Management_-z-_Lighting/Enclosure_Parts_-a-_Accessories/Internal_Component_Mounting_Accessories/DIN_Rails/DN-R35S1-2

Metal DIN rails for mounting fuse holder, power supply and breaker. Package of two 6.8" rails with mounting hardware

https://www.automationdirect.com/adc/shopping/catalog/enclosures_-z-_subpanels_-z-_thermal_management_-z-_lighting/enclosure_parts_-a-_accessories/din_rails/din8-p10

Braking Resistor - REQUIRED

400-500W 50-75 ohm braking resistor for 2 Hp **WJ200-015SF**: ARF500 68R J or rTJT50068RJ (68 Ohm)

<https://www.mouser.com/ProductDetail/ARCOL-Ohmite/ARF500-68R-J?qs=%2fha2pyFaduix4%252bTRwfZ2GIL95uPxfsALW05RcaUH4HiTFY%252bWBGLJQ%3d%3d>

<https://www.mouser.com/ProductDetail/TE-Connectivity/TJT50068RJ?qs=Rv6LVDxB0Zr88FZnqu%2Faww%3D%3D>

400-500W 35-50 ohm braking resistor for 3 Hp **WJ200-022SF**: ARF400 47R J TJT50047RJ (47 Ohm)

<https://www.mouser.com/ProductDetail/ARCOL-Ohmite/ARF400-47R-J?qs=sGAepiMZZMtbXrikmrvidAl35n5xACJL%2fOYuuWByqNwgVHbaSpMbng%3d%3d>

<https://www.mouser.com/ProductDetail/TE-Connectivity/TJT50047RJ?qs=%2fha2pyFaduIRFo1ohH%2fSon3H2k37z3j2NCJv%252b6QrOmCqO1CTGkvvs%3d%3d>

Internal wiring 10 or 12AWG 600V rated (THHN, THWN,..) power in, 14AWG to sockets/power supply. Black, Red, Green, White if neutral. Main power cable 12 AWG for 2 Hp, 10 AWG for 3 Hp (see VFD manual for specifics).

Motor cable is typically 14AWG shielded with 3 conductors plus a ground (20' minimum).

https://www.automationdirect.com/adc/shopping/catalog/cables/bulk_multi-conductor_cable/flexible_control_cable/14_awg_shielded/mctc-14-4s-1

Power Supply for Lights, Fan, etc. DIN Rail (12 or 24 VDC 50-100W)

MeanWell NDR-75-12, NDR-75-24 or similar. The Fan power needs to match the supply power. **A step down converter can be used to provide 12VDC from a 24VDC power supply.**

120W DC 24V to 12V 10A Buck Converter Light Voltage Regulator Power Vehicles Power Supply

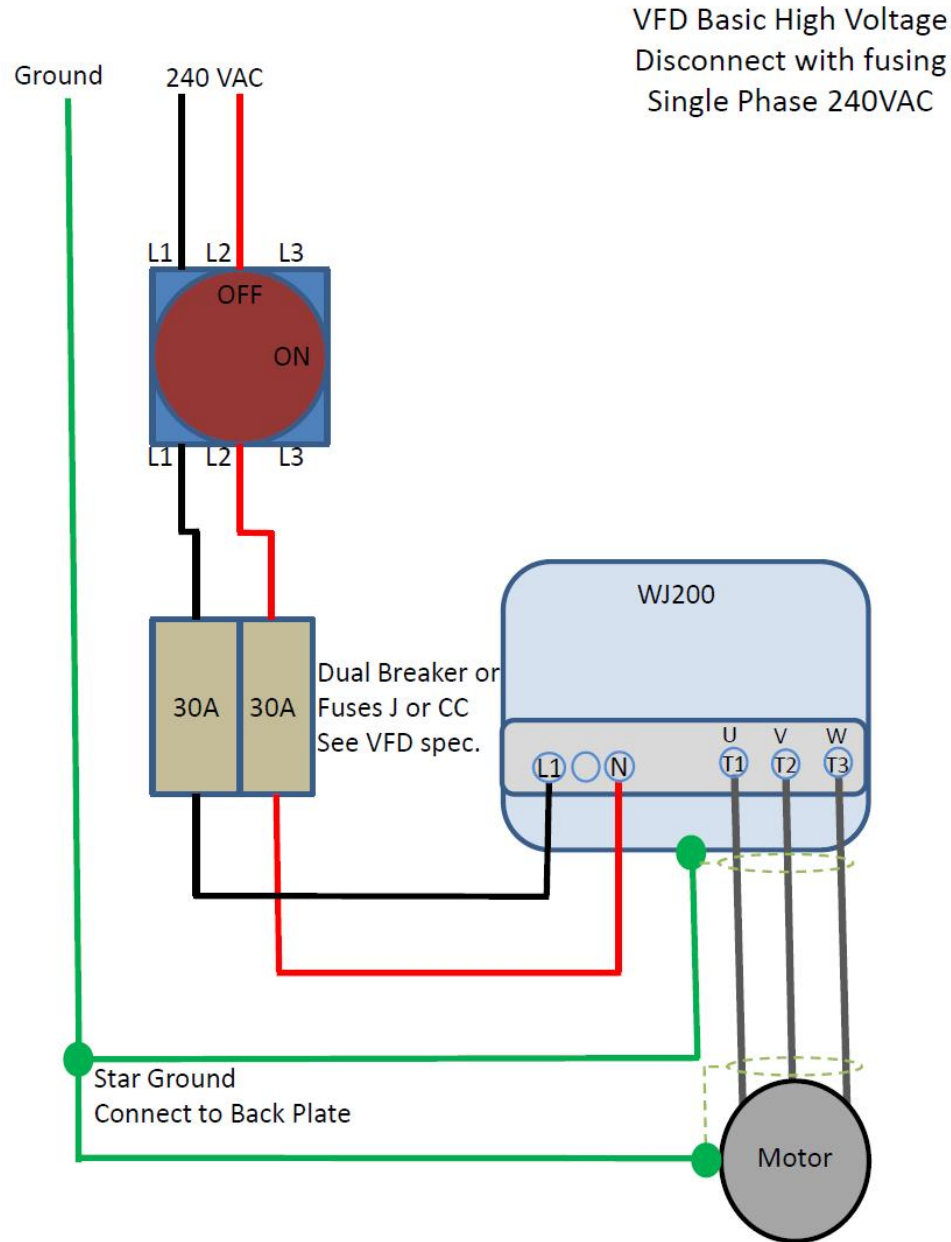
https://www.amazon.com/dp/B097SWGRRJ?psc=1&ref=ppx_yo2_dt_b_product_details

Tachometer kit and enclosure for it as needed for your build. These are available through eBay and a few vendors.

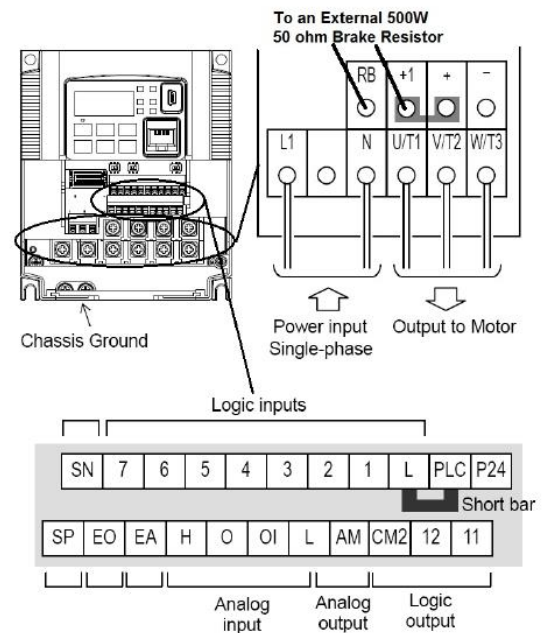
4 Digital LED Display Tachometer RPM Speed Meter Panel Inductive Hall Effect Sensor NPN Proximity Switch Red/Blue 10-9999RPM(Red)

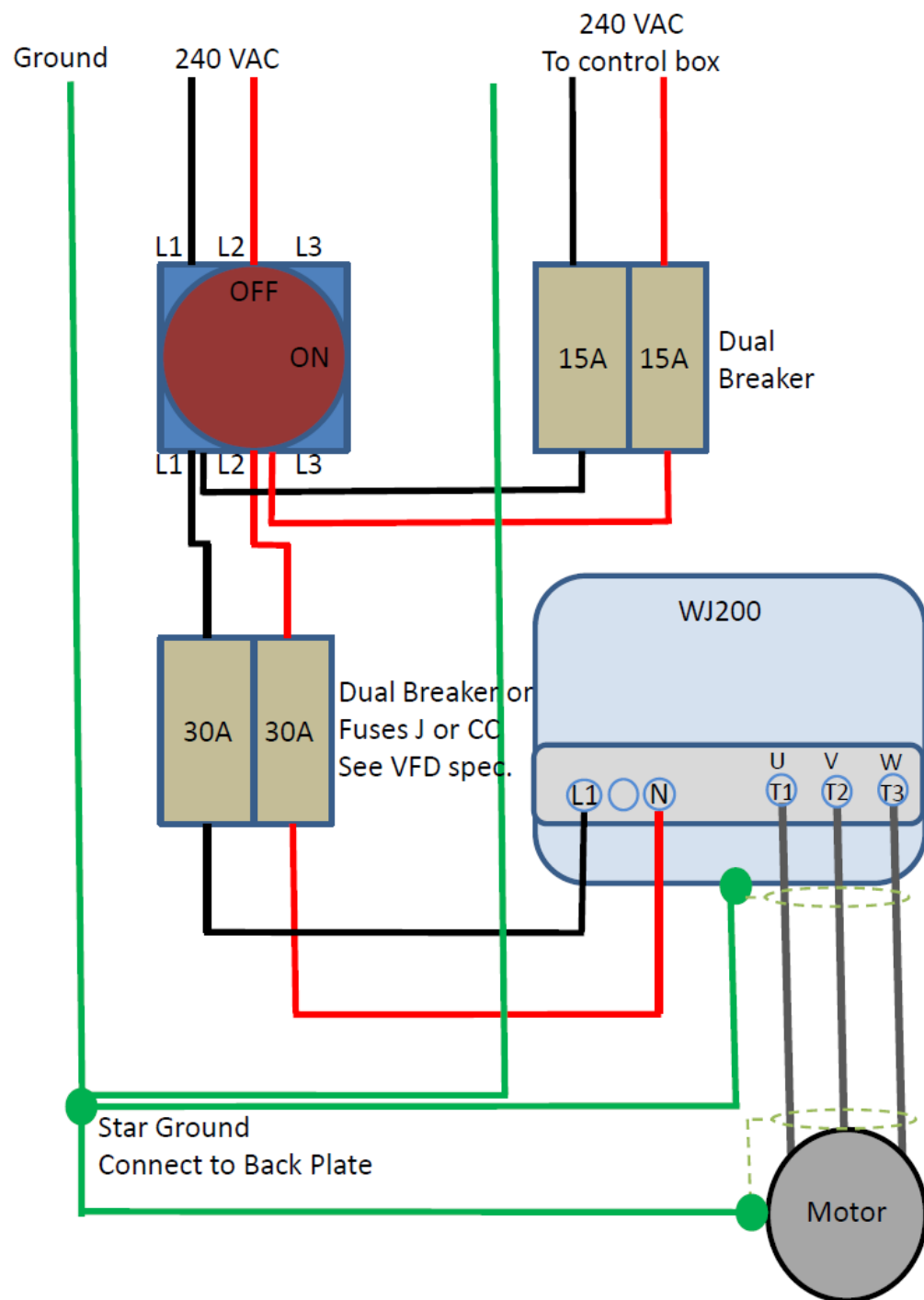
https://www.amazon.com/dp/B078N797TM?psc=1&ref=ppx_yo2_dt_b_product_details

Sample VFD Enclosure Schematic



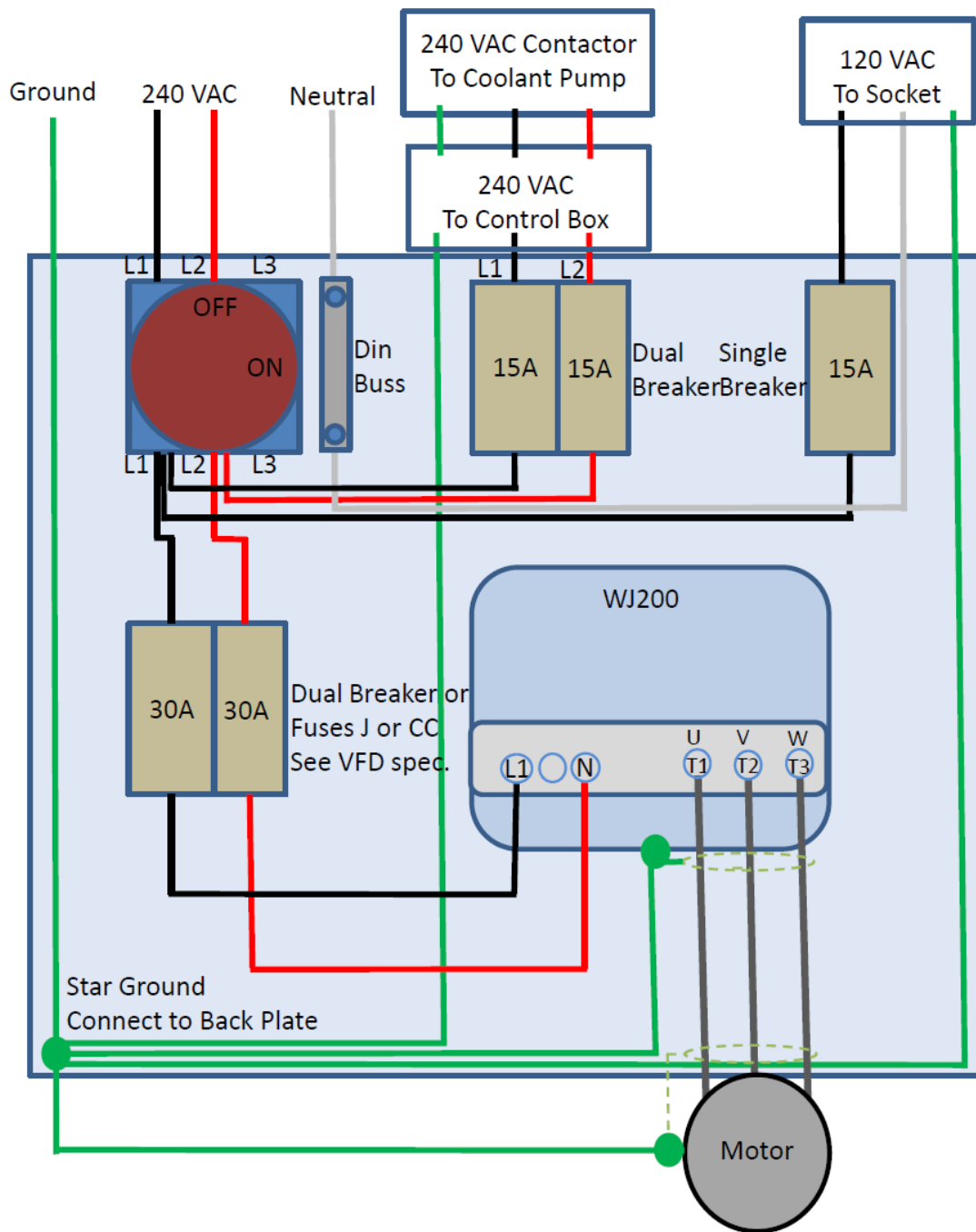
Single-phase 200V 0.75 to 2.2kW





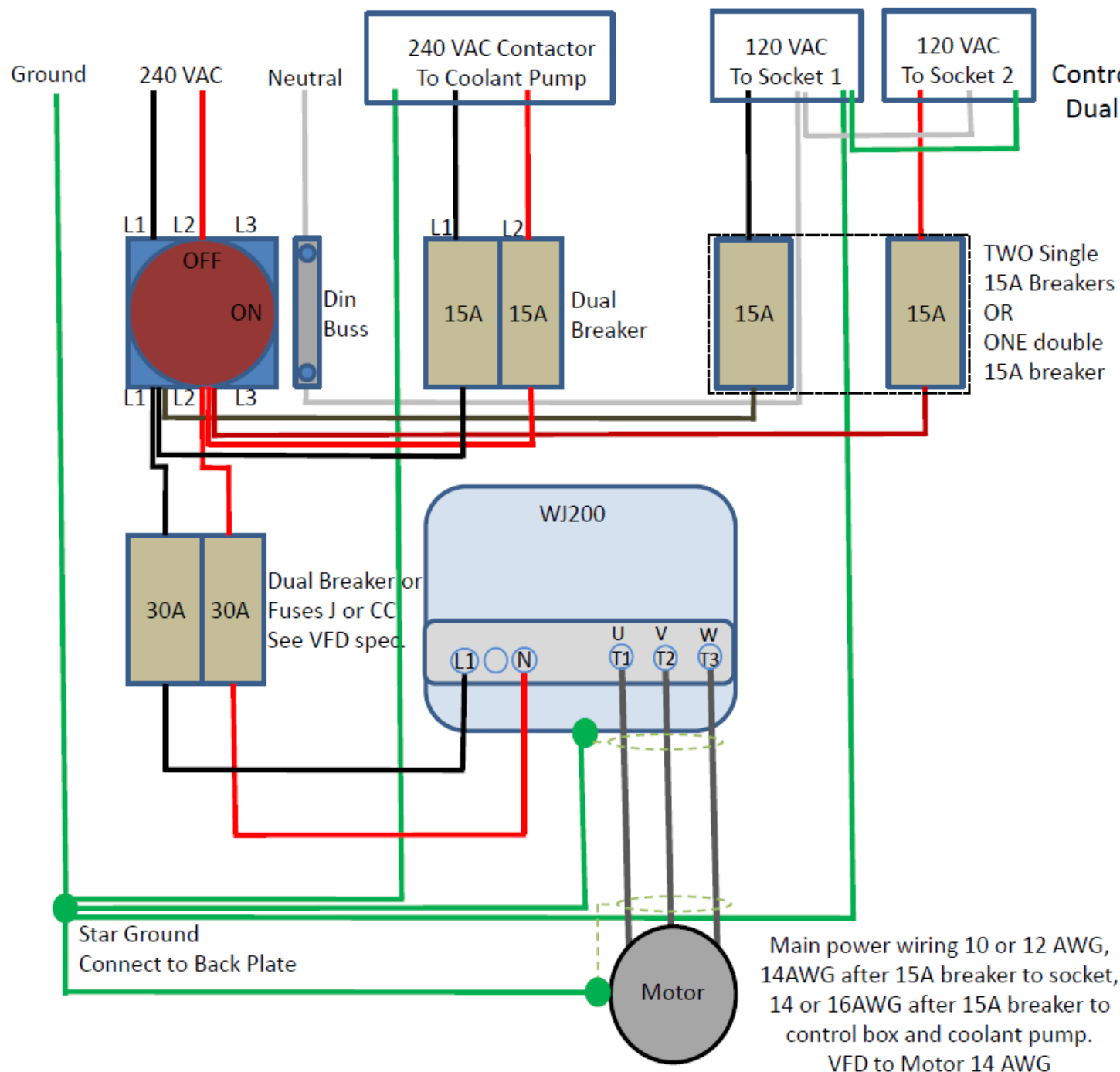
VFD Basic High Voltage
Disconnect with fusing
Control box/coolant 240VAC breaker
Single Phase 240VAC

Main power wiring 10 or 12 AWG,
14AWG after 15A breaker to socket,
14 or 16AWG after 15A breaker to
control box and coolant pump.
VFD to Motor 14AWG



VFD Basic High Voltage
Disconnect with fusing
Control box/coolant 240VAC breaker
Single 120VAC socket with breaker
Single Phase 240VAC

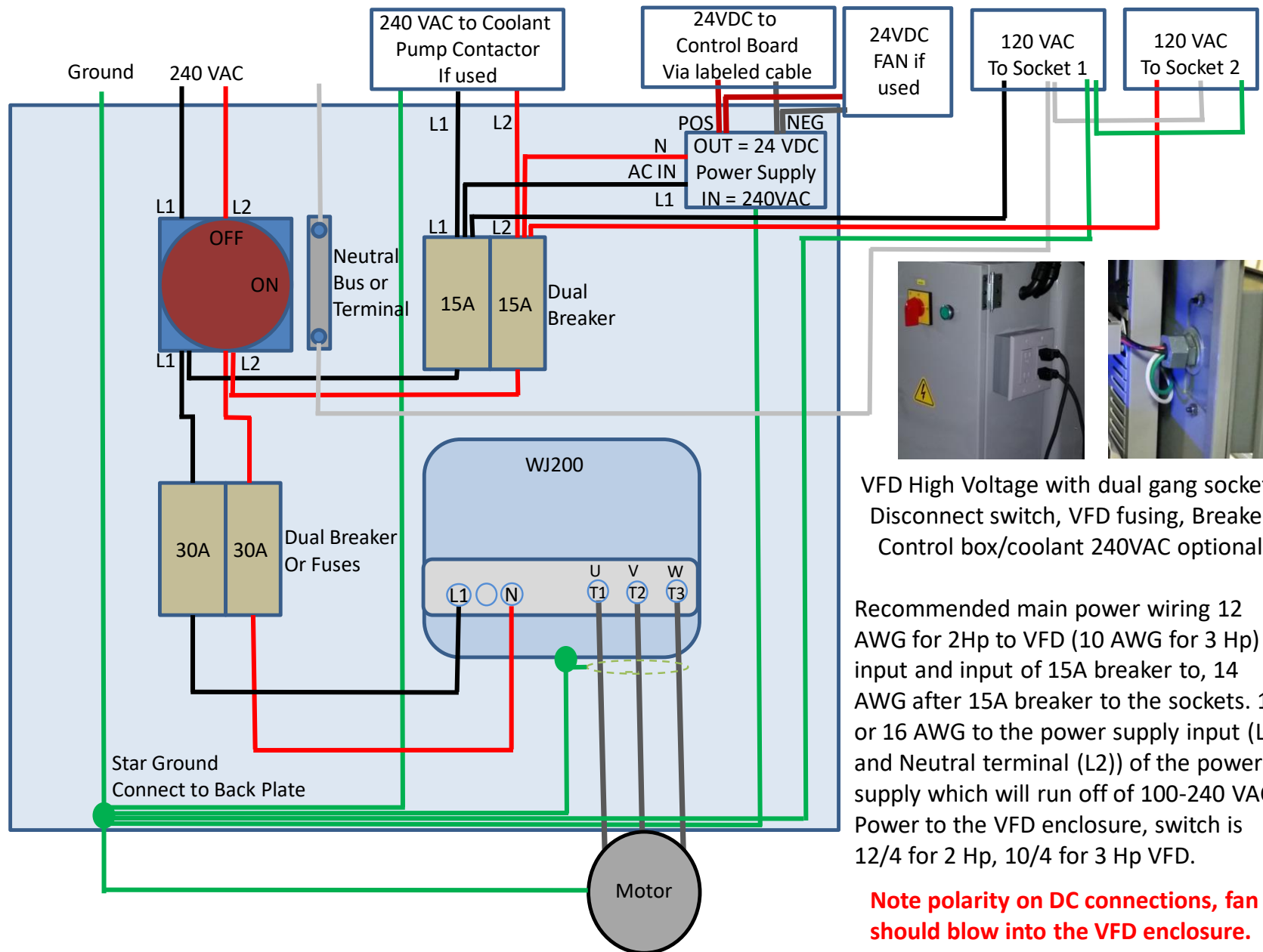
Main power wiring 10 or 12 AWG,
14AWG after 15A breaker to socket, 14
or 16AWG after 15A breaker to control
box and coolant pump.
VFD to Motor 14AWG



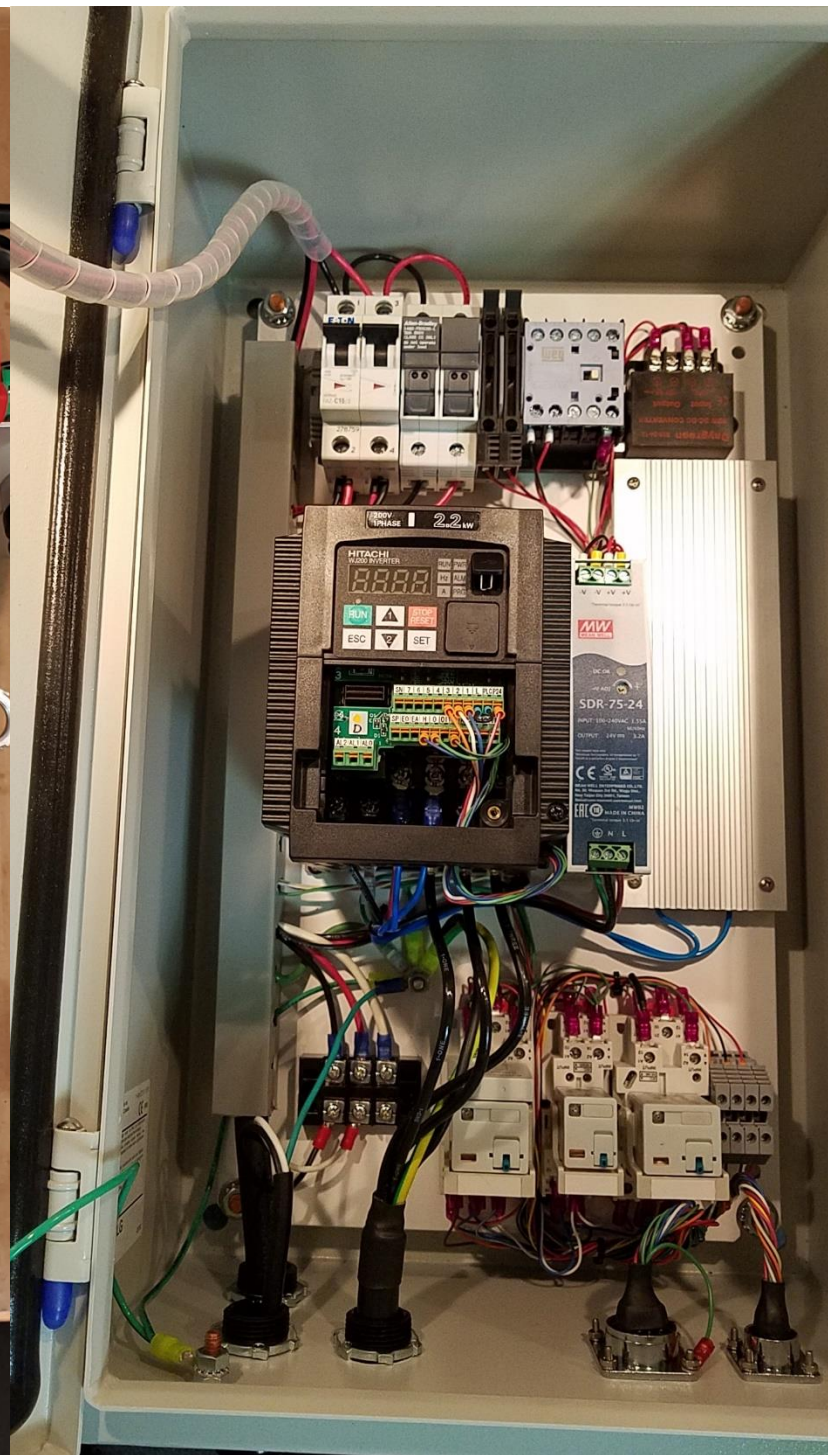
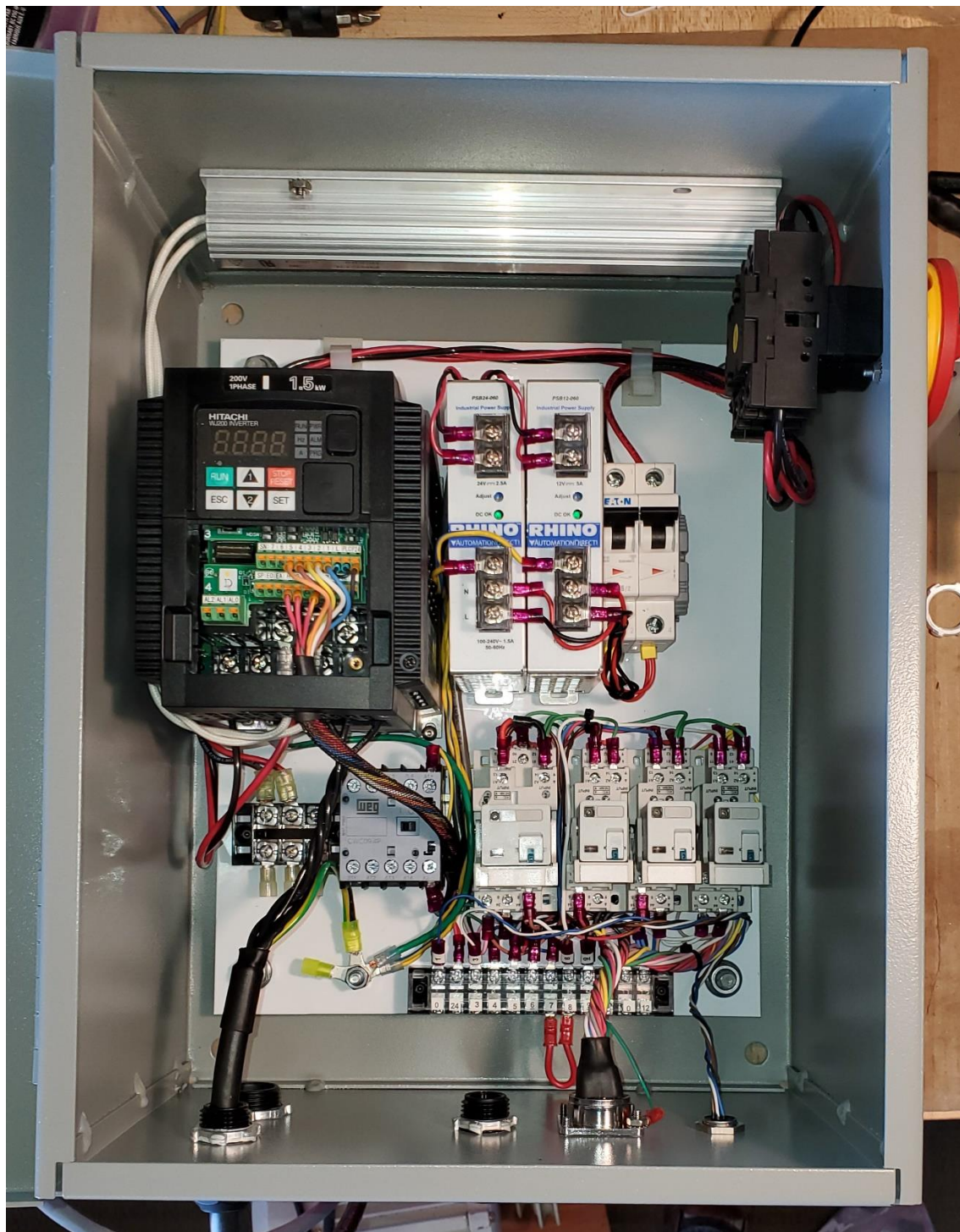
VFD Basic High Voltage
Disconnect with fusing
Control box/coolant 240VAC breaker
Dual 120VAC sockets with breaker
Single Phase 240VAC



Main power wiring 10 or 12 AWG,
14AWG after 15A breaker to socket,
14 or 16AWG after 15A breaker to
control box and coolant pump.
VFD to Motor 14 AWG







Example: Single Phase VFD Enclosure 1.5-2.2 kW

Hubbell-Wiegmann enclosure, 14 x 12 x 8 inch with HW-MP1412CS back plate
Socomec SIRCO M Series disconnect switch, with extension & handle
Allen Bradley 1492-FB2J30 Fuse Holder 30A 600V Class-J 2-pole
JHL30-1 JHL high speed Class J drive 30A fuses #2
FAZ-C15-2 Eaton supplementary protector, 2-pole 15A (240VAC to system/coolant)
FAZ-C15-1-SP Eaton supplementary protector, 1 pole 15A (120VAC outlet)
KTS011 0-60°C Compact Mechanical Thermostat NO Temperature Controller
120mm 24VDC Fan with filters screens
500W 50 ohm Aluminum shell braking resistor
Power Supply 100W 24VDC in lathe cabinet



Example: Three Phase VFD Enclosure 3.7 kW

Enclosure, 16 x 14 x 8 inch with fabricated back plate
ABB 40A disconnect switch, with extension & handle
Ferraz Shawmut US3J3I Ultrasafe Fuse Holder 30A 600V Class-J 3-pole
JHL30-1 JHL high speed Class J drive 30A fuses #3
FAZ-C3-12 Eaton supplementary protector, 3-pole 12A (240VAC to system/coolant)
120mm 24VDC Fan with filters screens
500W 47ohm Aluminum shell braking resistor
Rhino 24VDC 60W auxiliary power supply for control system and fan
500W 50 ohm Aluminum shell braking resistor



These are general recommendations as a starting point, each person does things slightly different. As mentioned, you might have a local electrician checkout everything to make sure it is all code compliant. I do not use GFI sockets with VFDs because they will trip frequently, this is sometimes an issue in the garage where current code requires them on sockets.

Enclosure with back panel, no venting/fan required (fewer holes to cut, but difficult to drill). Order one enclosure and one back plate. Make sure when attaching the start ground post that you clean the paint off in that area. I use a 10-32 screw for the ground post locked on with a threaded nut. You will want to use eye crimps for grounds, alternative is to use a grounding buss bar that takes bare wire, they are available from Home Depot. If you are going to use a fan, then go to the next size smaller enclosure and the plastic/fiberglass type which are much easier to cut holes in. I use a 24VDC computer fan with filter screens on the intake and exhaust, power is from the power supply. Fans are to blow into the box (pressurize the enclosure when the door is closed).

https://www.automationdirect.com/adc/shopping/catalog/enclosures_-z_subpanels_-z_thermal_management_-z_lighting/enclosures/nema_12_enclosures/bn4161408chqt

https://www.automationdirect.com/adc/shopping/catalog/enclosures_-z_subpanels_-z_thermal_management_-z_lighting/enclosure_subpanels_-a_internal_mounting_accessories/hubbell-wiegmann/galvanized_subpanels/p1614g

<https://www.homedepot.com/p/Square-D-7-Terminal-Ground-Bar-Kit-PK7GTACP/202353316>

Main power disconnect, order 1 of each below or select handle you want

[https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z_fuses_-z_disconnects/disconnect_switches/socomec_ul_508_rated_non-fusible_disconnects/sirco-m_series_din_rail_-a_panel_mount_\(16-100_amps\)/22003003-ul](https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z_fuses_-z_disconnects/disconnect_switches/socomec_ul_508_rated_non-fusible_disconnects/sirco-m_series_din_rail_-a_panel_mount_(16-100_amps)/22003003-ul)

https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z_fuses_-z_disconnects/disconnect_switches/socomec_ul_508_rated_non-fusible_disconnects/sirco-m_series_accessories/148e1111

https://www.automationdirect.com/adc/shopping/catalog/circuit_protection_-z_fuses_-z_disconnects/disconnect_switches/socomec_ul_98_rated_non-fusible_disconnects/sirco-m_compact_series_accessories/14070520

DIN rail 35mm with fasteners, order 1 cut to fit as needed.

https://www.automationdirect.com/adc/shopping/catalog/enclosures_-z_subpanels_-z_thermal_management_-z_lighting/enclosure_subpanels_-a_internal_mounting_accessories/integra/din_rails/din10-p10

Fuses, order 4 (2 spare).

<https://www.ebay.com/itm/Bussmann-30A-Fast-Acting-Class-CC-Fuse-600VAC-KTK-R-30/254134400733>

Fuse holder for CC fuse, order 1.

<https://www.ebay.com/itm/NEW-ALLEN-BRADLEY-1492-FB2M30-L-Fuse-Holder-with-2-poles-LED-Blown-Fuse-Ind/163514856559>

Main power cable from your socket to the VFD enclosure, this is 4 conductor with a neutral if you want to add 120V sockets, otherwise purchase 3 conductor if no sockets. If you have a 30A breaker technically you should use 10AWG wire, 20A breaker then 12 AWG. I used 12 AWG for my 1340GT. The VFD fuses above are 30A to handle surge current, not the rated wire current. A breaker protects the wire, a fuse protects the equipment. The VFD manuals give their recommended specifications.

[https://www.automationdirect.com/adc/shopping/catalog/cables/bulk_multi-conductor_cable/flexible_portable_cord_\(sjoow, soow, sjeoow, seoow, type w\)/insulation_type_-_seoow/seoow-12-4bk-1](https://www.automationdirect.com/adc/shopping/catalog/cables/bulk_multi-conductor_cable/flexible_portable_cord_(sjoow, soow, sjeoow, seoow, type w)/insulation_type_-_seoow/seoow-12-4bk-1)

You can get a metal or plastic duplex socket enclosure (single gang for one, dual gang for two duplex sockets), one or two duplex sockets (I usually get industrial grade) and cover plate (single or dual gang) at Home Depot. The box can be directly

mounted to the side of the VFD enclosure, if you want it remote like at the lathe I would use a metal box, you need cabl and strain reliefs at each end. Example below.

<https://www.homedepot.com/p/Greenfield-2-Gang-Weatherproof-Electrical-Outlet-Box-with-Three-1-2-in-Holes-Gray-B232PS/202188613>

OR if located at the lathe, connect with the 12 AWG or 14 AWG power wire, depends on the # outlets

<https://www.homedepot.com/p/Greenfield-2-Gang-Weatherproof-Electrical-Outlet-Box-with-Five-3-4-in-Holes-Gray-B352PS/202188617>

you will need these for the power cord into the VFD enclosure and power cord connection leaving the VFD enclosure and going to you sockets if used. so 1 for the main power into the enclosure, another 2 if a remote socket (power from the enclosure to the remote socket box, or one if the enclosure is directly mounted to the side of the VFD enclosure.

<https://www.homedepot.com/p/Halex-3-4-in-ACC-Non-Metallic-Strain-Relief-Cord-Connector-27697/202077092>

Other enclosure wires need to go through a strain relief so probably 2-3 of these. The motor cable has these already attached.

<https://www.homedepot.com/p/Halex-1-2-in-ACC-Non-Metallic-Strain-Relief-Cord-Connector-27693/202077093>

One or Two

<https://www.homedepot.com/p/Leviton-15-Amp-Industrial-Grade-Narrow-Body-Duplex-Outlet-Gray-R73-05252-0GS/100356982>

Cover plate, this is for two duplex, otherwise one duplex cover plate.

<https://www.homedepot.com/p/Leviton-2-Gang-Standard-Size-2-Duplex-Receptacles-Nylon-Wallplate-Gray-80716-GY/301701139>

Stranded wire 10-12AWG THNN or THWN for internal wiring in the cabinet, I would get something like 5-6' of black, red, white and green. This will be used to make connections in the VFD enclosure. It is sold by the foot at Home Depot, etc. There are various types, I get the 90C temperature rating, Nylon jacketed, stranded type.

<https://www.homedepot.com/s/12%20Stranded%20CU%20THHN%20Wire?NCNI-5>

Braking resistor, need 1. Mount to back plate or side of cabinet.

<https://www.mouser.com/ProductDetail/ARCOL-Ohmite/ARF500-68R-J?qs=/ha2pyFaduix4%2bTRwfZ2GIL95uPxfsALW05RcaUHp4HiTFY%2bWBGLJQ==>

You will need a metal cutting hole sole to drill the holes for the 1/2" and 3/4" strain reliefs, If I recall one takes a 7/8" hole saw for the 1/2" and 1 1/8" for the 3/4" strain reliefs.

You will need screws to mount the VFD, braking resistor, switch etc. Lots of little stuff. I tap directly into the metal back plate to mount everything, so you will need taps for all the screw sizes used.

Basic Tach with Hammond enclosure, need to carefully mill the cutout for the tach to fit, put a L bracket on the back of the box and attach under the DRO.

<https://www.ebay.com/itm/4-Digital-Red-LED-Tachometer-RPM-Speed-Meter-Hall-Proximity-Switch-Sensor-NPN/131742032244>

<https://www.ebay.com/itm/Hammond-1590B-Enclosure-Stompbox-Diy-Project-Box-Motley-Mods-Fast-Shipping/173367791100>

Tachulator, quite a bit more expensive, but has SFM. These can be used with a NPN NO Hall sensor for a magnetic pickup, the hall sensors are available on eBay for a few bucks. I can show you how to wire it, otherwise the optical is an option. I installed one of these on my lathe but with a custom enclosure and hall sensor.

<http://www.mkctools.com/tachoptions.htm>