

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

Minimum standard enclosure dimensions are 12" wide, 14" tall and 8" deep. Having a clear front window is optional, but also additional cost. 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 steel 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.

I recommend a compression-molded fiberglass reinforced polyester, gray, with a hinged cover and hasp closures

HW-141208CHQR

Hubbell-Wiegmann enclosure, NEMA 1/3/3S/4X/12/13, 14 x 12 x 8 inch (HxWxD), wall mount, hot compression-molded fiberglass reinforced polyester, gray, single-door, **quick-release latch(es)**, padlock hasp and staple. \$136

<https://www.automationdirect.com/ad/Shopping/Catalog/Enclosures -z- Subpanels -z- Thermal Management -z- Lighting/Enclosures/Fiberglass Enclosures/HW-141208CHQR>

HW-CC141208CHQR

Hubbell-Wiegmann enclosure, NEMA 1/3/3S/4X/12/13, 14 x 12 x 8 inch (HxWxD), wall mount, hot compression-molded fiberglass reinforced polyester, gray, **clear polycarbonate single-door, quick-release latch(es), padlock hasp** and staple. \$189

<https://www.automationdirect.com/ad/Shopping/Catalog/Enclosures -z- Subpanels -z- Thermal Management -z- Lighting/Enclosures/Fiberglass Enclosures/HW-CC141208CHQR>

Back Panel

HW-MP1412CS

Hubbell-Wiegmann subpanel, 12.8 x 10.8in, 14 gauge carbon steel, white polyester powder finish. For use with 14 x 12in (HxW) Premium and JIC series fiberglass enclosures and HW-N4X25PBW pushbutton enclosures. \$15.50

<https://www.automationdirect.com/ad/Shopping/Catalog/Enclosures -z- Subpanels -z- Thermal Management -z- Lighting/Enclosure Subpanels -a- Internal Mounting Accessories/Painted Carbon Steel Subpanels/HW-MP1412CS>

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, the voltage is dependent on your power source.

<http://www.ebay.com/itm/120mm-38mm-New-Case-Fan-24V-120CFM-Cooling-Ball-Brgs-2-Wire-4-Screws-338-/180808320960>

<http://www.ebay.com/itm/120mm-25mm-New-Case-Fan-24V-75CFM-Ball-Brg-Computer-Cooling-4-Screws-2-Wire-383-/180953206300>

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

<http://www.ebay.com/itm/Kingwin-KFT-12-120-mm-Fan-Filter-Cooling-/231955283561>

<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>

Disconnect switch 25-40A either 2 pole or 3 pole. Most switches are 3P so just use two of the three poles. 25-32A 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.

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 S0 handle and extension shaft.

[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

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

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



40 Amp Disconnect Switch Panel Builders Kit - Shaft Handle & Switch Ensto



<http://www.ebay.com/itm/40A-40-Amp-Disconnect-Switch-Panel-Builders-Kit-Shaft-Handle-Switch-Ensto-/132052326203>

Door Mount 25A and 32A Examples:

MOELLER P1-25/EA/SVB/N MAIN SWITCH, 3 POLE, 690VAC, 25A

<http://www.ebay.com/itm/MOELLER-P1-25-EA-SVB-N-MAIN-SWITCH-3-POLE-690VAC-25A-/112251247635>

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

<http://www.ebay.com/itm/P1-32-EA-SVB-Rotary-Disconnect-DOOR-Mount-P132EASVB-NEW-IN-BOX-/231993956349>



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 (which is what I use), 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 supplemental double pole breaker mounted in the VFD enclosure, usually after the power disconnect switch.

FAZ-C30-2 Eaton miniature supplementary protector, 30A, 480Y/277 VAC / 96 VDC, 2-pole, C curve, UL 1077 recognized, 10kA SCCR, 35mm DIN rail mount, thermal magnetic. \$18

[https://www.automationdirect.com/ad/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Double_Pole_Supplementary_Protectors_\(0.5A-63A,_FAZ_Series\)/C_Curve_\(0.5A-63A,_FAZ-CXX-2\)/FAZ-C30-2](https://www.automationdirect.com/ad/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Double_Pole_Supplementary_Protectors_(0.5A-63A,_FAZ_Series)/C_Curve_(0.5A-63A,_FAZ-CXX-2)/FAZ-C30-2)

FAZ-C32-2 Eaton miniature supplementary protector, 32A, 480Y/277 VAC / 96 VDC, 2-pole, C curve, UL 1077 recognized, 10kA SCCR, 35mm DIN rail mount, thermal magnetic. \$18

[https://www.automationdirect.com/ad/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Double_Pole_Supplementary_Protectors_\(0.5A-63A,_FAZ_Series\)/C_Curve_\(0.5A-63A,_FAZ-CXX-2\)/FAZ-C32-2](https://www.automationdirect.com/ad/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Double_Pole_Supplementary_Protectors_(0.5A-63A,_FAZ_Series)/C_Curve_(0.5A-63A,_FAZ-CXX-2)/FAZ-C32-2)

High Speed **Fusing J class** which are the standard but they are large

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,

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

J Class Fuse Holder

Allen Bradley 1492-FB2J30 Fuse Holder 30A 600V Class-J 2-pole



Ferraz Shawmut US3J2I Ultrasafe Indicator Fuse Holder, 30A, 600VAC



<http://www.ebay.com/itm/Ferraz-Shawmut-US3J2I-Ultrasafe-Indicator-Fuse-Holder-30A-600VAC-/201790269657>

<http://www.ebay.com/itm/Ferraz-Shawmut-Gould-ULTRASAFE-600V-30A-Fuse-Holder-US3J2I-W213942C-/132073118337>

OR High Speed **Fusing CC class** which are much smaller these are NOT midget fuses.

Bussmann KTK-R-30, 30A Fast Acting Class CC Fuse 600VAC, you need TWO

<http://www.ebay.com/itm/BUSSMANN-KTK-R-30-Fuse-30A-Class-CC-KTK-R-600VAC-ktk-r-30-free-shipping-fast-too-/222020222644>

CC Class Fuse Holder (You cannot use midget fuses)

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



Ferraz Shawmut Ultrasafe USCC2 CLASS CC 600V 30A 2 Pole Fuse Holder



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

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

Optional additional breakers:

A 3A 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.

FAZ-C3-2 Eaton miniature supplementary protector, 3A, 480Y/277 VAC / 96 VDC, 2-pole, C curve, UL 1077 recognized, 10kA SCCR, 35mm DIN rail mount, thermal magnetic. \$18

[https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Double_Pole_Supplementary_Protectors_\(0.5A-63A,_FAZ_Series\)/C_Curve_\(0.5A-63A,_FAZ-CXX-2\)/FAZ-C3-2](https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Double_Pole_Supplementary_Protectors_(0.5A-63A,_FAZ_Series)/C_Curve_(0.5A-63A,_FAZ-CXX-2)/FAZ-C3-2)

If you want to add a 120VAC socket, then you will need a neutral wire to the machine and a 15A breaker to protector the wiring and socket(s) from overload or a short. Wiring would be 14G from the breaker to the socket(s). Power would come off of 1 pole from the main disconnect switch. This is just an example.

FAZ-C15-1-SP Eaton miniature supplementary protector, 15A, 277 VAC / 48 VDC, 1-pole, C curve, UL 1077 recognized, 10kA SCCR, 35mm DIN rail mount, thermal magnetic. \$18

[https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Single_Pole_Supplementary_Protectors_\(0.5A-63A,_FAZ_Series\)/C_Curve_\(0.5A-63A,_FAZ-CXX-1-SP\)/FAZ-C15-1-SP](https://www.automationdirect.com/adc/Shopping/Catalog/Circuit_Protection_-z-Fuses_-z-Disconnects/UL_1077_Rated_Supplementary_Protectors/Single_Pole_Supplementary_Protectors_(0.5A-63A,_FAZ_Series)/C_Curve_(0.5A-63A,_FAZ-CXX-1-SP)/FAZ-C15-1-SP)

DIN RAIL 35 mm Aluminum and Steel

https://www.automationdirect.com/ad/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/ad/Shopping/Catalog/Enclosures_-z-Subpanels_-z-Thermal_Management_-z-Lighting/Enclosure_Parts_-a-Accessories/Internal_Component_Mounting_Accessories/DIN_Rails/DN-R35S1-2

500W 50ohm Aluminum shell braking resistor

<http://www.ebay.com/itm/500W-50ohm-aluminium-shell-braking-resistor-resistance-Dummy-Load-for-Audio-/231092889325>

<http://www.digikey.com/product-detail/en/te-connectivity-amp-connectors/TJT50068RJ/A123925-ND/5878246>