

INSTALLER: PLEASE READ AND FOLLOW THESE INSTALLATION GUIDELINES

Ambient Temperature:

The maximum ambient temperature for a drive installation is either 40°C (104°F) or 50°C (122°F). Here are some recommendations to help keep your drive "cool":

- Derating for Temperature:** If the drive is installed in an environment where the ambient temperature will be near or exceed 40°C or 104°F and the drive is rated for 40°C or the drive is in an enclosure and the ambient temperature will be over 90° F you will need to derate the drive to meet the temperature requirements. For our P, S and H series drive you can derate the drive 20% to increase the temperature rating by 20%. For example a 50 Hp P Series Drive which is normally rated for 40°C, when derated by 20% to 40 Hp, can operate up to 50°C or 122°F.
- Reduce the heat load on the Drive:** Mount the drive away from direct sunlight.
- Exhaust and Intake Clearance:** Make sure the drive is mounted in a place where the intake and exhaust air is free from obstructions and the intake air is not near another heat source such as transformers or heating elements. Never install one drive such that the exhaust from one blows into the intake of another.
- Mount the drive in a Separate Enclosure:** A simple step that can save a lot of headaches is to mount the drive separately from other electrical equipment. Just a few extra devices in an enclosure can add significant heat that can push the internal ambient temperature of the cabinet beyond what is acceptable for the drive.

⚠ Terminal "N" is not a neutral, it is negative of the DC bus.

Bonding:

Nothing is more important for a drive than proper grounding. Improper grounding can cause everything from unexplained shutdowns to erratic operation. Where we see the most problems with grounding are in remote locations (like an irrigation pump) or isolated installations such as cranes or roof tops for HVAC. There are three critical things to remember about grounding your drive:

- Size of the ground cable.** The ground bonding cable must be the proper size to meet the impedance requirements as specified in our manual. A good practice is to use the size of your power input.
- Dedicated, direct cable.** The grounding cable should be dedicated and as short as possible from the bonding point. Longer cable runs will require larger cable to meet the impedance requirements. This is where following the recommendations above will serve you well. Under no circumstances should you use a mechanical connection such as conduit or electrical cabinets for your ground source.
- Bonding to the source input.** Ideally the grounding and source input are electrically connected such as when there is an isolation transformer with a neutral to ground bonding point. Refer to the drive manual on page 3-8 for minimum grounding conductor sizes and specifications.

**⚠ The following bonding methods are not acceptable:
Mechanical ground through conduit or through metal chassis.
Isolated or floating ground systems. Grounding through neutral wires. Corner grounded delta (call Cerus for recommendations).**

Clean Power, Correct Sizing & Clean Air:

Clean Power: The drive will need to be protected from input power problems and load related power issues (mainly due to long cable runs). There are unique issues regarding both input power and output power protection: See notes regarding input reactors, load reactors and surge suppressors below.

Correct Sizing: How your drive performs is dependent upon sizing the drive properly for the application. Your load is either constant torque or variable torque. Most Cerus drives are dual rated- the variable torque rating is always higher capacity than the constant torque rating. Here are some examples of variable and constant torque applications:

Constant	Variable	High Inertia
Conveyer Belt	Fan	Oil Pump Jack
Mixer	Pump	Centrifuge
Grinder		Any Flywheel
Lathe		Crane and Hoist

When sizing a drive you also must consider the inertia of the load. High inertia loads are hard to accelerate and decelerate. This resistance to speed change can cause the drive to trip out on DC overvoltage, as the inertia from the load reverses into the drive and causes the DC bus voltage to rise. When this happens the drive will trip on an overvoltage fault. Resetting the fault and putting the drive back in operation in this situation will void your warranty if done repetitively. In all such cases a DC braking unit should be used. DC braking units are standard on many of our small drives and are optional on all of our larger drives.

Clean Air: A drive that becomes coated with dust or debris cannot cool itself properly and will lead to premature failure of the drive. Make sure the drive has clean, dry air for cooling. If it is installed in an enclosure make sure to replace the air filters once a month to make sure the drive runs at peak performance.

Correct Settings: To protect your drive and to insure proper operation, follow our quick start guide which includes settings for most applications.

Please Read Carefully

Contactors

⚠ Except as noted below, do not use an output contactor for the purposes of starting and stopping a motor- this will damage the drive and void the warranty.

A contactor may be used to open the input power to the drive to provide drive isolation for service and repair. An output contactor may only be used to isolate the drive when interlocked utilizing the drive program for multi-motor control or bypass (exchange) operation. See manual I/O 20-27 for exchange, and APP 40-71 for multi-motor control.



Short Circuit Protection & Disconnect

Please refer to Appendix A and B of the drive manual for recommended fuse ratings, contactor and breaker ratings. When used with UL listed breakers the P Series drives have a UL listed input interrupting capacity rating of 65,000 Amps.

⚠ An input line reactor and lightning surge arrester must be used to provide protection when the drive is directly connected to a utility input source. They are recommended in all other cases.

Mounting & Installation

To reliably operate the inverter, install the inverter in the proper orientation and with recommended clearances.

⚠ Please refer to installation precautions on page 1 and the manual, chapter 3.

Incorrect terminal wiring could result in the equipment damage. Temperature in the cabinet or where the drive is installed should be between 14°F and 104°F non-condensing. Temperatures outside this range will damage drive. Temperatures up to 122°F are possible with 20% derating.

RECOMMENDED. (REQUIRED IF SOURCE IMPEDANCE IS < 2.5%)

Input Line Reactors

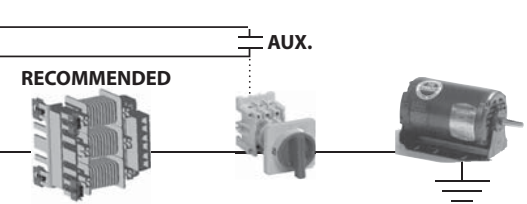
Please call Cerus Industrial for proper sizing and application of a line reactor on the drive input. When properly sized and applied, an input line reactor will reduce input power harmonics, improve power factor and increase drive protection.

⚠ An input reactor must be used when the drive is directly connected to utility power or when the input power source is more than 10 times the KVA rating of the inverter.

Motor Disconnect

If possible wire an auxiliary contact to the drive terminals BX to interlock the drive and prevent inadvertent damage.

⚠ The drive must be stopped before operating a motor disconnect.



Wiring Output to Motor

Please follow all wiring precautions as noted in the manual in section 3.2.2. Wiring length from the drive to the motor should be short enough to prevent insulation breakdown in the motor due to high voltage. Please call Cerus Industrial if the motor leads are longer than 100 feet for application recommendations. Long motor leads will require an output line reactor or output filter.

⚠ Do not connect power factor capacitors, surge arrestors or noise filters to the output of the inverter. This will void warranty.

WARNING: FAILURE TO FOLLOW INSTALLATION GUIDELINES MAY VOID WARRANTY

Hands-On Service

Legendary Reliability

Form CVFDW1 - Ver. 2 Cerus Industrial Warranty Registration Form for Variable Frequency Drives

NOTE: Failure to complete this form may delay warranty processing.

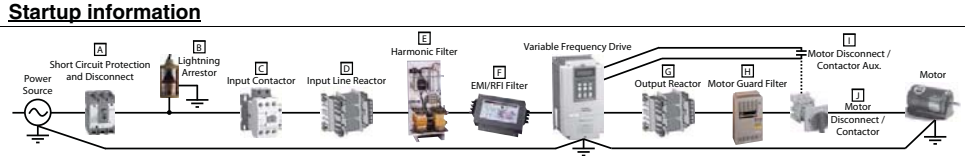
Cerus Industrial cannot provide technical support until the installer completes this form and files it with Cerus Technical Support. Only Cerus Certified personnel may use this form for Cerus (Titan) Variable Frequency Drives. Please fax this form to (503) 643-4925 or mail to 22995 NW Evergreen Parkway Suite 100 Hillsboro, Oregon 97124.



This form is also available to download (www.cerusind.com/library) and filed electronically by email to techsupport@cerusindustrial.com The Direct Source for Motor Control

	VFD 1	VFD 2	VFD 3
Part #			
Serial #			
INSTALLATION INFORMATION	Date of start-up _____	Date of start-up _____	Date of start-up _____

Motor Data									
Insulation Class/Rated Voltage	Ins.	/	V	Ins.	/	V	Ins.	/	V
Horsepower/Full Load Amperage		HP/	FLA		HP/	FLA		HP/	FLA
Service Factor/RPM		SF/	RPM		SF/	RPM		SF/	RPM
Application									
Torque	<input type="checkbox"/> constant	<input type="checkbox"/> variable		<input type="checkbox"/> constant	<input type="checkbox"/> variable		<input type="checkbox"/> constant	<input type="checkbox"/> variable	
Input phase	<input type="checkbox"/> three phase	<input type="checkbox"/> single phase		<input type="checkbox"/> three phase	<input type="checkbox"/> single phase		<input type="checkbox"/> three phase	<input type="checkbox"/> single phase	
Description <i>(i.e. pump jack, centrifuge, fan, blower, etc.)</i>									
Maximum & Minimum Environmental Temperature	Max: _____ °F	Min: _____ °F		Max: _____ °F	Min: _____ °F		Max: _____ °F	Min: _____ °F	
Distances in feet from VFD	_____ to motor	_____ to service transformer		_____ to motor	_____ to service transformer		_____ to motor	_____ to service transformer	



Startup information			
Installed Devices <i>(Indicate the letters of installed devices shown in diagram above, i.e., A, B, D, F)</i>			
Model Number of Dynamic Brake Unit / Resistor <i>(if applicable)</i>	DB Unit _____ / Resistor _____	DB Unit _____ / Resistor _____	DB Unit _____ / Resistor _____
Check proper wiring & grounding	<input type="checkbox"/> YES	<input type="checkbox"/> YES	<input type="checkbox"/> YES
Input Voltage on VFD terminals <i>R, S, & T</i>	_____ R-S _____ S-T _____ R-T	_____ R-S _____ S-T _____ R-T	_____ R-S _____ S-T _____ R-T
VFD Output Current Parameter Reading @ Max Speed	_____ Amps <i>(see manual for parameter)</i>	_____ Amps <i>(see manual for parameter)</i>	_____ Amps <i>(see manual for parameter)</i>
Speed control	<input type="checkbox"/> Keypad <input type="checkbox"/> 0-10V <input type="checkbox"/> Potentiometer <input type="checkbox"/> 4-20mA <input type="checkbox"/> Communication Card <input type="checkbox"/> PID	<input type="checkbox"/> Keypad <input type="checkbox"/> 0-10V <input type="checkbox"/> Potentiometer <input type="checkbox"/> 4-20mA <input type="checkbox"/> Communication Card <input type="checkbox"/> PID	<input type="checkbox"/> Keypad <input type="checkbox"/> 0-10V <input type="checkbox"/> Potentiometer <input type="checkbox"/> 4-20mA <input type="checkbox"/> Communication Card <input type="checkbox"/> PID
VFD parameters set according to quick start guide?	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Environmental Conditions <i>(Please select all applicable conditions)</i>	<input type="checkbox"/> Indoor <input type="checkbox"/> Dirt/Debris <input type="checkbox"/> Outdoor <input type="checkbox"/> Moisture <input type="checkbox"/> Direct Sunlight <input type="checkbox"/> Chemicals	<input type="checkbox"/> Indoor <input type="checkbox"/> Dirt/Debris <input type="checkbox"/> Outdoor <input type="checkbox"/> Moisture <input type="checkbox"/> Direct Sunlight <input type="checkbox"/> Chemicals	<input type="checkbox"/> Indoor <input type="checkbox"/> Dirt/Debris <input type="checkbox"/> Outdoor <input type="checkbox"/> Moisture <input type="checkbox"/> Direct Sunlight <input type="checkbox"/> Chemicals
VFD enclosed by?	<input type="checkbox"/> Cerus <input type="checkbox"/> Customer <input type="checkbox"/> Not Enclosed	<input type="checkbox"/> Cerus <input type="checkbox"/> Customer <input type="checkbox"/> Not Enclosed	<input type="checkbox"/> Cerus <input type="checkbox"/> Customer <input type="checkbox"/> Not Enclosed
Please complete the fields below if the VFD is installed in an enclosed package that was not built by Cerus Industrial.			
Enclosure NEMA rating	<input type="checkbox"/> 1 <input type="checkbox"/> 3R <input type="checkbox"/> 12 <input type="checkbox"/> 4 or 4X	<input type="checkbox"/> 1 <input type="checkbox"/> 3R <input type="checkbox"/> 12 <input type="checkbox"/> 4 or 4X	<input type="checkbox"/> 1 <input type="checkbox"/> 3R <input type="checkbox"/> 12 <input type="checkbox"/> 4 or 4X
Enclosure dimensions in inches	_____ H _____ W _____ D	_____ H _____ W _____ D	_____ H _____ W _____ D
Cooling Fan/AC Unit Size	Fan _____ (in.) / AC _____ (BTU)	Fan _____ (in.) / AC _____ (BTU)	Fan _____ (in.) / AC _____ (BTU)

INSTALLER INFORMATION	
Name	Phone
Email	Fax
Company/Address	
Installation date	Install Location

PURCHASER INFORMATION	
Name	Phone
Email	Fax
Company/Address	
Purchase date	PO#

Attention Installer



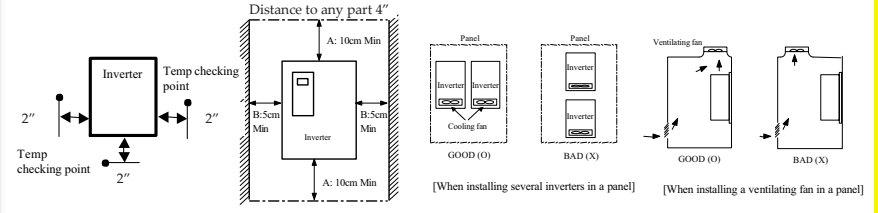
- The A,B,C's:**
- Ambient Temperature- of the installation
 - Bonding- make sure your grounding is correct
 - Clean Power and Air flow- for proper cooling
 - Correct Sizing- for the application

A drive is a sensitive piece of power electronics that when installed properly will provide you with years of trouble-free operation. While our drives have many built-in protective features, if the installation or application is incorrect, failures due to improper protection or installation will not be covered under warranty. To avoid this ugly situation we have developed the Drive Installation A, B, C's. Know these basic A,B,C's with every drive you purchase. An incorrectly applied or installed inverter can result in system malfunction or reduction in product life as well as component damage. You must read and understand the manual thoroughly before proceeding.

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Installation precautions

- 1) Handle the inverter with care to prevent damage to the plastic components. Do not hold the inverter by the front cover.
- 2) Do not mount the inverter in a location where excessive vibration (more than 5.9 m/sec²) is present such as installing the inverter on a press or other moving equipment.
- 3) Install in a location where temperature is within the permissible range (-10~40°C).
- 4) The inverter will be hot during operation. Install it on a non-combustible surface.
- 5) Mount the inverter on a flat, vertical and level surface. Inverter orientation must be vertical (top up) for proper heat dissipation. Also leave sufficient clearances around the inverter. However, A= Over 12 inches and B=8 inches should be obtained for inverters rated 30kW and above.
- 6) Do not mount the inverter in direct sunlight or near other heat sources.
- 7) The inverter shall be mounted in a Pollution Degree 2 environment. If the inverter is going to be installed in an environment with a high probability of dust, metallic particles, mists, corrosive gases, or other contaminants, the inverter must be located inside the appropriate electrical enclosure of the proper NEMA or IP rating.
- 8) When two or more inverters are installed or a ventilation fan is mounted in inverter panel, the inverters and ventilation fan must be installed in proper positions with extreme care taken to keep the ambient temperature of the inverters below the permissible value. If they are installed in improper positions, the ambient temperature of the inverters will rise.
- 9) Install the inverter using screws or bolts to insure the inverter is firmly fastened.



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