



# CoolBLUE<sup>®</sup> and NaLA<sup>®</sup>

A MORE Powerful Solution

## Common Mode Choke Application Guide for Motor Bearing and Stray Ground Currents

MH&W presents CoolBLUE<sup>®</sup> common mode chokes, and NaLA<sup>®</sup> differential line chokes, for the highest reliability and longevity of your VFD motor system!

VFD's create high frequency damaging motor bearing and high frequency circulating currents. If these currents aren't "choked" – bearing damage, lubrication breakdown, electrical discharge machining (EDM), and sensor interference will result. CoolBLUE<sup>®</sup> with NaLA<sup>®</sup> absorbs this high frequency damaging current before it gets to the motor.

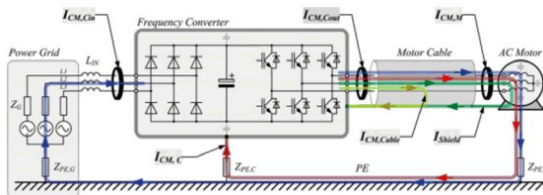


High Frequency Noise Fluting from Generated by  
VFD Common Mode Currents

### What is a common mode choke?

In electronics, a choke is a specially designed inductor used to block high frequency alternating current in an electrical circuit, while passing designed frequency currents. The name "choke" comes from "choking" higher, unwanted, frequencies.

In common mode noise situations, such as the noise generated from a VFD (IGBT switching), noise is going out simultaneously from all outputs, but also coupling back to earth ground. The only solution is to absorb the unwanted noise and keep it from being transmitted and coupling back to earth ground. To do this, high frequency currents should be captured through a magnetic core. CoolBLUE<sup>®</sup> is used in this application to provide high impedance at the unwanted high frequency.



Common mode currents will cause bearing damage in the motor, and electromagnetic interference which affects control signals, encoder feedback, communication links for programmable logic controllers, Remote I/O, metal detectors, pump monitors, and other types of sensors including, ultrasonic sensors, bar code/vision systems, weight and temperature sensors. Conducted ground current also leads to radiated emissions, with the drive cables acting as antennas.

CoolBLUE<sup>®</sup> cores act as a common mode choke by absorbing the damaging high frequency noise, so you can maximize equipment reliability, reduce maintenance costs and avoid unscheduled downtime.

CoolBLUE<sup>®</sup> and NaLA<sup>®</sup> solutions are used in:

- OEM manufacturers of HVAC equipment
- All International VFD manufacturers
- Paper/bottling/food/chemical manufacturing
- Hospital, office, and commercial buildings
- Automotive manufacturing
- Electric vehicle (EV) applications
- All types of pumps and fans
- Wind, solar, and other renewable energies

No Maintenance...unlike diverter rings which are subject to rust, dirt, grease, and worn grounding brushes. CoolBLUE<sup>®</sup> eliminates the need for ceramic bearings.

The CoolBLUE<sup>®</sup> cores have already saved millions of \$\$ in the world's industrial plants, hospitals, and office buildings by avoiding down time and equipment failures.

To achieve an effective reduction in destructive currents, the appropriate amount, and type, of CoolBLUE<sup>®</sup> and NaLA<sup>®</sup> cores must be placed in series over the line power cables at the VFD output. In this configuration, the cores operate as common mode and differential mode chokes.

This method significantly increases the service life of the motor bearings and reduces EMI, thereby reducing maintenance costs and standstill periods.

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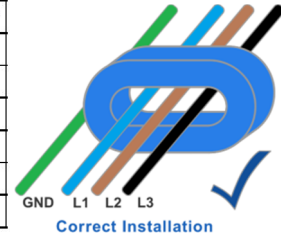
## VFD Application Guide - CoolBLUE® cores per horsepower/cable length

CoolBLUE® Part Number	Power Range Per Drive Rated Horsepower	Number of Cores Per Cable Length*			
		1-150ft	151-300ft	301-450ft	451-900ft**
CBO43HP1/4-50A4	1/4 to 10	2	4	6	8
CBO43HP1/4-50A4	11 to 50	4	4	6	8
CBO68HP51-100A06	51-100	4	4	6	8
CBO155HP101-428A12	101-428	4	4	6	8
CBR166HP429-1631A16	429-1631	4	4	6	8
CBO326HP1632+A23	1632 and over	4	4	6	8



## VFD Application Guide - NaLA® cores per horsepower/cable length

NaLA® Part Number	Power Range Per Drive Rated Horsepower	Number of Cores Per Cable Length*			
		1-150ft	151-300ft	301-450ft	451-900ft**
N18HP1/4-10	1/4 to 10	2	3	4	5
N18HP11-40	11 to 40	1	2	3	4
N29HP41-102	41-100	1	2	3	4
N57HP103-428	103-428	1	2	3	4
N75HP429-1631	429-1631	1	2	3	4
N123HP1632+	1632 and over	1	2	3	4



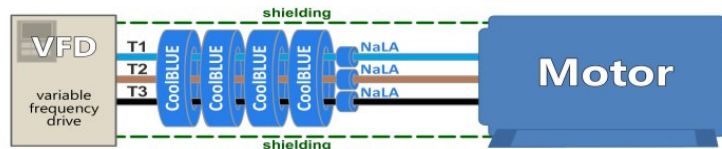
**Notes:**

- 1 - Data above is for information/guideline purposes.
- 2 - All cables/phases must travel through the CoolBLUE® cores. NaLA® cores are installed around each individual power cable, regardless of how many cables. Per application guide, NaLA® cores are per cable. No ground or shielding through cores!
- 3 - On motors up to 10hp, two turns are needed through the CoolBLUE® cores (pass cable through cores twice).
- 4 - It is important to use the correct number and type of cores.
- 5 - For servo and DC motors, please call CoolBLUE® Engineering.
- 6 - Install cores on load side of drive for typical motor applications. Cores may be installed on line side of VFD as well to reduce conductive and radiated emissions back to the power grid.
- 7 - CoolBLUE® offers brackets, and cable ties to hold cores in place. Please call CoolBLUE® Engineering for alternative methods.

\* Cable length between drive and motor must be multiplied by the number of cables per phase, to calculate the total cable length to be used in above guide for CoolBLUE®. The actual length of each cable, is used in the NaLA® guide.

\*\* For cable runs over 950ft, contact CoolBLUE® Engineering.  
Contact your local CoolBLUE® Engineer for detailed information.

Installation videos can be found at: [www.coolblue-mhw.com/installation/](http://www.coolblue-mhw.com/installation/)



Call Armature Electric Limited at (604) 879-6141, visit [www.armatureelectric.com](http://www.armatureelectric.com) or email [sales@armatureelectric.com](mailto:sales@armatureelectric.com)

