

CoolBLUE® Inductive Absorbers

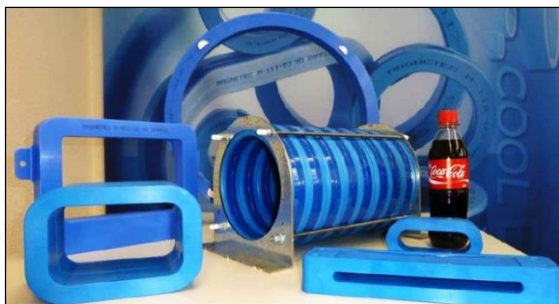
Common Mode Choke Design Guide for Reducing Motor Bearing Currents

MH&W presents CoolBLUE® toroids made from Magnetec's nanocrystalline material NANOPERM® which is used to reduce damaging motor bearing currents in modern high power inverter systems operating at high switching frequencies. Results of these unwanted currents - Bearings corrugate, leading to electrical breakdown in the lubrication, electrical discharge machining, and ultimately motor bearing failure.

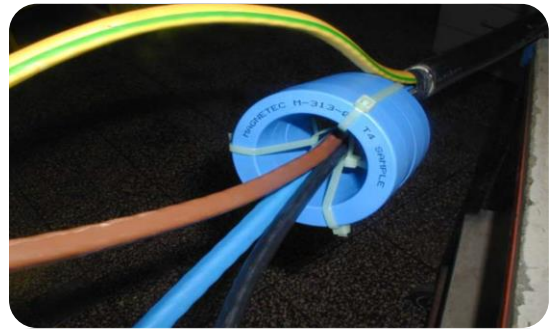
The use of CoolBLUE® cores not only significantly reduces the over voltage peaks at the motor terminals, but also suppresses the asymmetrical EMI currents which are generated by the parasitic currents of the motor itself together with the motor cable. In order to achieve an efficient reduction in these destructive effects, two or more CoolBLUE® of suitable geometry have to be placed together over the connector cables in the DC-link as well as at the inverter output. In this configuration, the cores operate as a common-mode choke.

This method significantly increases the service life of the motor bearings and thus reduces maintenance costs and standstill periods.

Easy, fast installation in all applications!



Examples of different core geometries



CoolBLUE®

- Used by major OEM manufacturers of HVAC equipment.
- Trusted by all International VFD manufacturers
- Used in paper mill manufacturing
- Used in all types of pumps
- No Maintenance...unlike motor shaft products subject to rust, dirt, grease, and worn grounding brushes.
- The CoolBLUE® Cores have already saved millions of dollars in the world's industrial plants, hospitals, and office buildings by avoiding down time, equipment failures

Why It Works

In the given configuration CoolBLUE® soft magnetic cores work as single turn common mode suppression choke. They do not affect the symmetrical power currents but efficiently dampen the asymmetrical radio frequency noise currents.

Product Features

- Single Turn Common Mode Suppression Choke
- Available for all power ranges
- Large variety of sizes
- Available in toroid and oval shapes

CoolBLUE® Inductive Absorbers

CoolBLUE® Selector Guide

How to choose the right core for your application.

Option 1 - Inverter Drive Application Guide

- Select a set of standard CoolBLUE® cores according to the necessary inner core diameter to fit over inverter cables.
- Use minimum of 2 cores per system
- Cores must be between inverter and generator.
- Install the cores as shown on examples.

Option 2

- Measure common mode shaft current.
- Select a set of suitable CoolBLUE® cores.
- Install the cores as shown on examples.

Option 3

- Call MH&W Engineering

CoolBLUE® Selector Tables

Round

Outer Dim. Inch/mm	Inner Dim. Inch/mm	Height Inch/mm	Core Part #	Max Asymmetric Current
2/50	1.6/40	0.8/20	M-367	3 Amps
3/80	2.5/63	1.25/30	M-113	6 Amps
4/100	3/80	1.25/30	M-114	8 Amps
5/130	4/100	1.25/30	M-115	9 Amps
6.25/160	5/130	1.25/30	M-116	12 Amps
7.75/200	6.75/175	1.25/30	M-117	16 Amps

Oval

Outer Dim. Inch/mm	Inner Dim. Inch/mm	Height Inch/mm	Core Part #	Max Asymmetric Current
2/50	1.6/40	0.8/20	M-049	3 Amps
3/80	2.5/63	1.25/30	M-283	6 Amps
4/100	3/80	1.25/30	M-284	8 Amps
5/130	4/100	1.25/30	M-142	9 Amps
6.25/160	5/130	1.25/30	M-302	12 Amps
7.75/200	6.75/175	1.25/30	M-111	16 Amps

Inverter Drive Application Guide

CoolBLUE® Cores per power range and cable length

CoolBLUE® Round	M-367	M-367	M-113	M-116	M-117	
CoolBLUE® Oval	M-049	M-049	M-283	M-302	M-111	M-248
Power Range (kW)	7.5	30	75	315	1200	Larger
Power Range (HP)	10	50	100	428	1632	Larger
Cable Length	# Cores	# Cores	# Cores	# Cores	# Cores	# Cores
150ft/50M	2	4	4	4	4	4
300ft/100M	4	4	4	4	4	4
450ft/150M	4	6	6	6	6	6
900ft/300M	4	6	6	6	6	6

Note 1 - Normal operation of CoolBLUE cores are below 158°F/70°C. However, if the cores are saturated they can get hot – reaching temperatures above 158°F/70°C. Saturation can occur if the motor cables are too long, motor cables are paralleled or high capacitance motor cables not suitable for frequency converter operation. It is important to use the correct number of cores to avoid saturation.

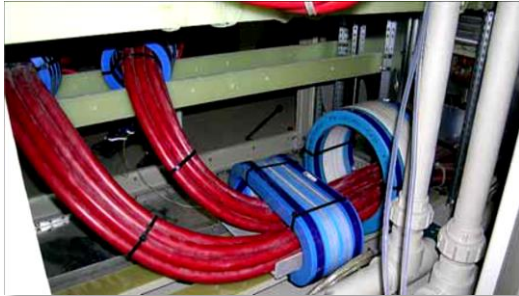
Note 2 – Data above is for information and guideline purposes. Please contact MH&W Engineering for detailed information.

Note 3 – Round and oval shape cores are for ease of installation and mechanical functionality. Round and oval cores listed above have same basic electrical absorption.

CoolBLUE[®] Inductive Absorbers

Installation Examples

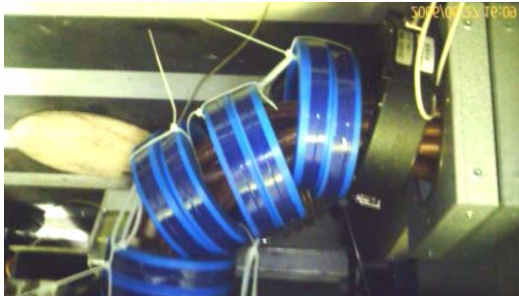
Installation Example #1 – DC Link



Installation Example #4



Installation Example #2



Installation Example #3 – Flat Wire



Order Magnetec Nanocrystalline Cores
direct online at . . .

MH&W DIRECT
B2B E-Commerce Site
buy samples and small quantities online
<http://direct.mhw-intl.com>

Current OEM customers of CoolBLUE[®]

GRUNDFOS

Electrolux

**Rockwell
Automation**

ABB

SIEMENS



BOSCH

Danfoss

**SEW
EURODRIVE**

VACON

For more information please call MH&W at 201-891-8800
or email CoolBlue@MHW-Intl.com

MH&W International Corp.
(201) 891-8800

<http://www.mhw-intl.com>
sales@mhw-intl.com

Rev.2

CoolBLUE[®] Inductive Absorbers

NEW! Rogowski Coil Tool

MH&W has acquired a flexible, clip-around, current probe to measure high frequency bearing currents in large motor drives . . . high frequencies produced by motor drive IGBT's in the kHz up to several MHz's.



This customized probe features:

- ✓ An electrostatically screened Rogowski coil. The screen decreases the effects of unwanted interference due to capacitive coupling from local voltages sources.
- ✓ A low frequency (-3dB) bandwidth to decrease any large fundamental power frequency currents. This significantly improves the SNR for measurement of high frequency bearing currents.
- ✓ A high frequency (-3dB) bandwidth of $\geq 10\text{MHz}$ for coil circumferences up to 1m.
- ✓ A wide range of Rogowski coil sizes suitable for even the largest drive cabling.
- ✓ Portable, battery operated for ease of field handling and testing.

Option of two outputs:

- Optional small 3 ½ digit LCD display showing the true RMS of the measured current. This enables a quick, simple diagnostic test for the presence of hf bearing currents.
- A BNC output enabling the engineer to look at the bearing current waveform and perform full diagnostics with an oscilloscope.