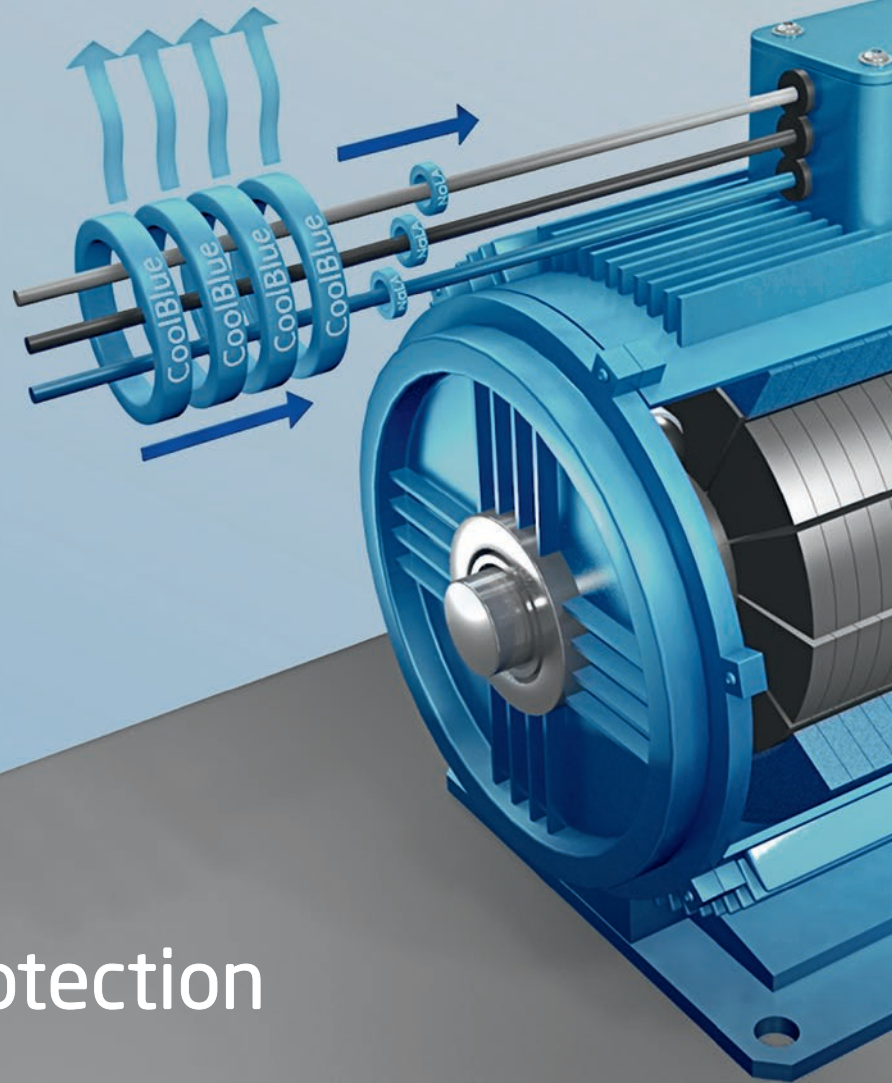




Motor Bearing Protection

The high costs of EMC-related failures

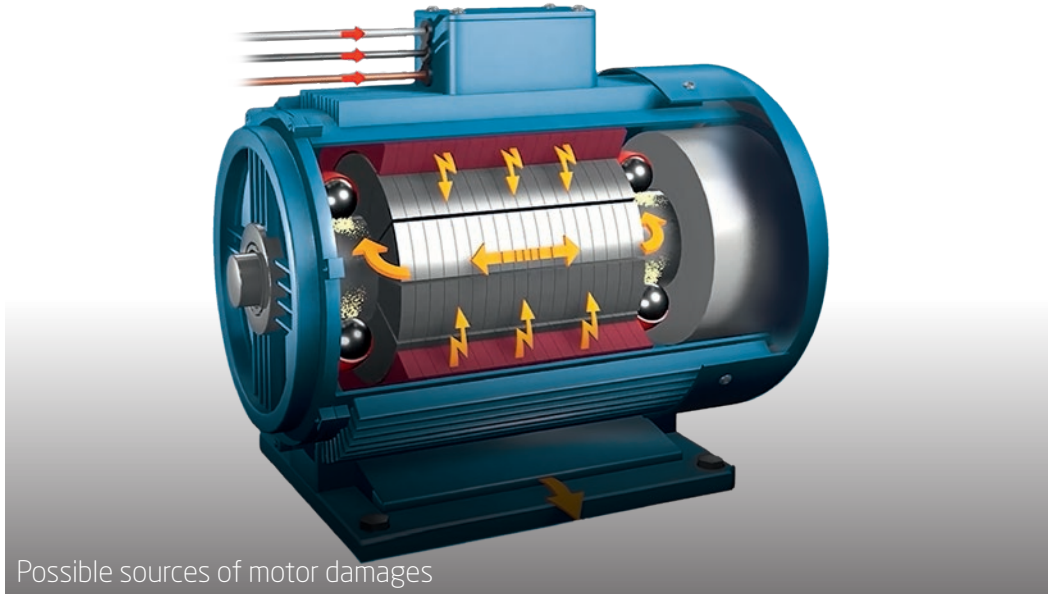
Variable frequency drive (VFD) driven electric motors have become a common asset as we continue to electrify all elements of our lives. Furthermore, VFDs are constantly increasing their switching frequency to improve control of connected equipment and energy efficiency.

However, practically every product enhancement has a drawback, as high switching frequencies produce EMC issues such as common-mode and differential-mode currents. While common-mode currents generated by the VFD are the most common cause of premature bearing failures because they damage the bearings (bearing fluting and ball

pitting) and change the properties of the lubricant in the bearing by heating up the system, differential currents attack the motor isolation and cause radiated EMC.

Aside from bearing damage – as is well known – conducted EMC may cause interference with the control system, causing it to trip due to interfering with sensor or communication signals, or false triggering of Residual Current Devices (RCD) devices.

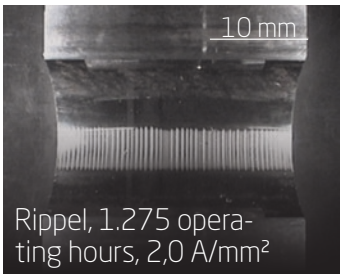
These harmful EMC topics result in shorter equipment life-time, fewer operating hours, and higher maintenance costs.



Possible sources of motor damages



Example of bearing failure



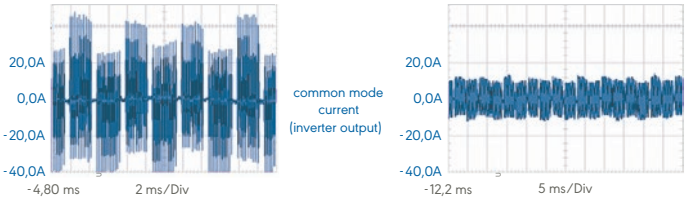
Rippel, 1.275 operating hours, 2,0 A/mm²

It is not Magic – It is Physics

An efficient method for reducing common-mode and differential-mode currents is to use nanocrystalline CoolBlue® and NaLa® toroidal cores, which allow the problem to be absorbed directly at the source.

CoolBlue® and NaLa® cores reduces high-frequency interference by increasing the system impedance only for high-frequency currents, with no effect on the equipment's operation.

These cores not only absorb significant amounts of current spikes at the motor terminals, but they also suppress

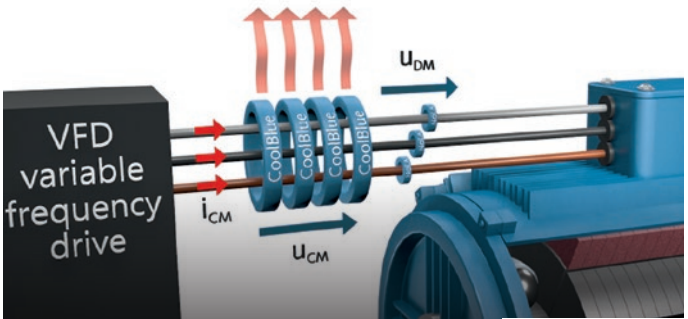


CoolBlue® and NaLa® in action

the asymmetric EMI currents generated by the parasitic currents of the motor and the motor cable.

The energy of the interference is converted into heat by the absorption of the current spike through the nanocrystalline core.

The common-mode and differential-mode currents can be significantly reduced to meet the respective EMC-guidelines while also significantly extending the standard bearing maintenance intervals.



For a more in-depth explanation, see our animation:

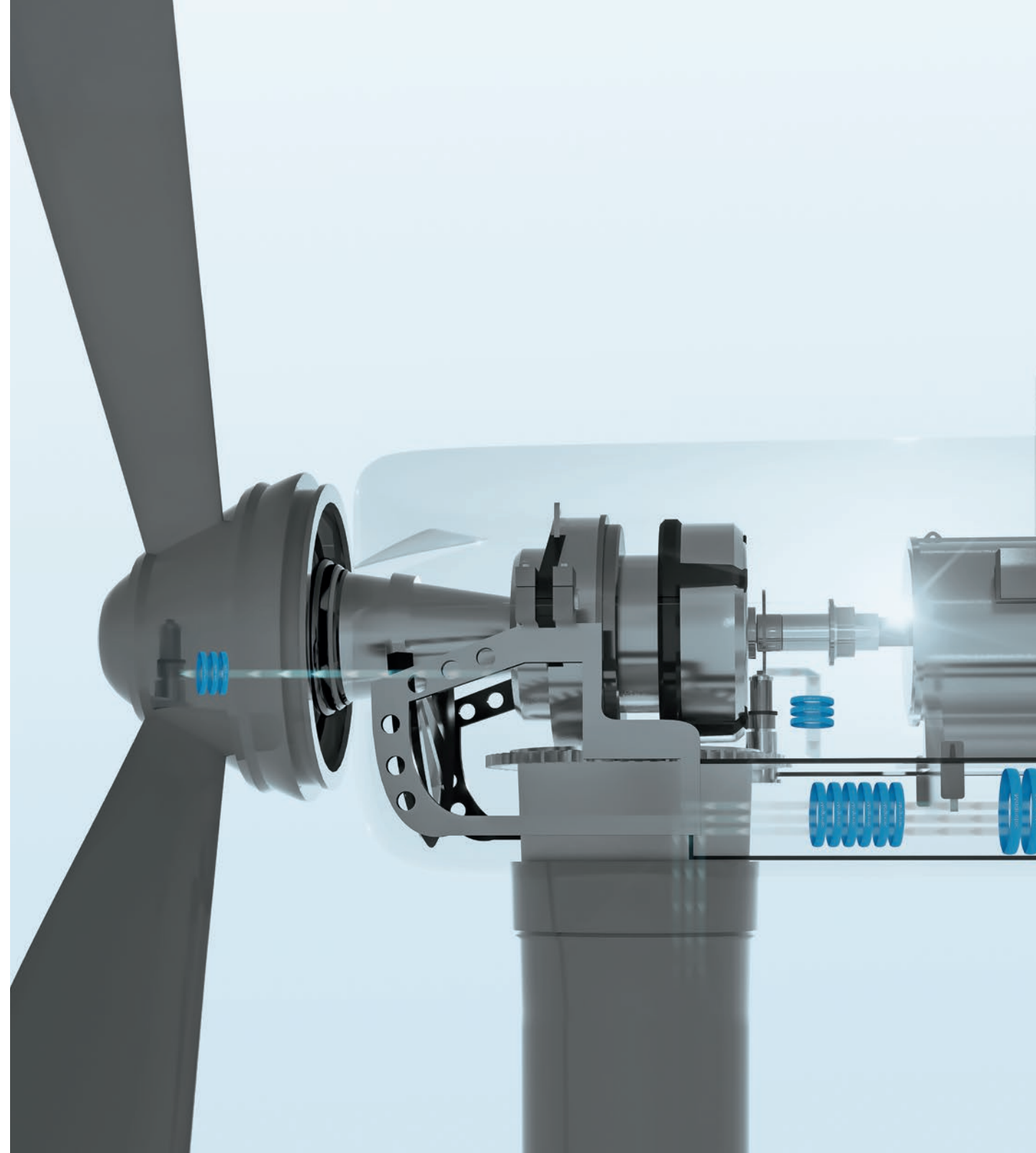


The Simple Solution for Motor Bearing Protection

AMC's CoolBlue® and NaLa® solutions offer a simple, maintenance-free, and simple-to-install solution for reducing the effect of damaging currents on your motor or generator bearings and addressing the issue of radiated emission, lowering your total cost of ownership (TCO) and increasing the overall equipment effectiveness of your equipment (OEE).

CoolBlue® solutions have been successfully installed in thousands of applications, including machine building, plant construction, off-road vehicles, elevators, harbor and port equipment, HVAC, mining, e-bike, marine, wind turbines, renewable energy and many others.

All CoolBlue® and NaLa® products are built on AMC's Nanoperm® nanocrystalline material, which has exceptional soft magnetic properties. This enables AMC to provide ideal suitable products by programming specific characteristics into the Nanoperm® material to adjust it to specific requirements, allowing us to always offer our customers the best possible solution.



Your Benefits

Looking for a proven and reliable technology for your VFD-operated equipment to solve problems caused by EMC-related topics? AMC has the solution for you.

AMC has the right product for you, whether you want to protect your motor or generator bearing from damaging common-mode currents with CoolBlue® or reduce the level of radiated noise with our CoolTube® solution to meet EMC standards like IEC 61400-40.

Our product portfolio provides you with the following advantages:

- > Easy to install also retrofit in existing systems
- > No maintenance required; simply install and forget
- > Significantly extend the life of your asset
- > Enhances interference suppression, for example, in pitch and azimuth drives in wind turbines
- > Increase the overall equipment effectiveness (OEE) of equipment by allowing extended maintenance intervals

CoolBlue® Selection Guide

Kilowatt	≤ 0,7	≤ 7,5	≤ 30	≤ 75	≤ 315	≤ 1.200	> 1.200
Part No oval	n/a	M-049	M-049	M-283	M-302	M-111	M-248
Part No round	M-923	M-967	M-967	M-113	M-116	M-117	M-205
Isat*/Apk N=1	2	4	4	6	12	16	22
Turns [N]	2	2	1	1	1	1	1
Number of required cores at cable length up to	50 m	2	2	4	4	4	4
	100 m	4	4	4	4	4	4
	200 m	4	4	6	6	6	6
	300 m	4	4	6	6	6	6

Download our selection guide for more information, and if you require CoolBlue® solutions with specific characteristics, shapes, and sizes, please contact us directly:



We look forward to your inquiry!

We will be happy to answer any questions you have about AMC's comprehensive product and service offering.

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