



Do I Need a 100% Ground VFD Cable?

The Variable Frequency Drive (VFD) cable market has been marred by an assortment of products — described by the manufacturers as VFD cables — but lacking the essential properties required to perform effectively and reliably in many applications. Most VFD cables are designed with absolutely zero research or testing to ensure they effectively mitigate the issues associated with variable frequency drive systems. Belden's 100% Ground VFD cables are designed with application issues in mind and are proven for 25 years of reliable service.

What is a 100% Ground VFD Cable?

A 100% ground VFD cable is one that has the copper equivalent of 1 full phase conductor, distributed in 3 segments between the phase conductors.

100% ground means 0% filler. Belden uses copper to create a substantially round construction, while most manufacturers use reduced grounds and add fillers to round out the cable. Research has demonstrated that the design and copper content of the grounds system is the most important factor in determining the cables ability to mitigate common mode currents known to damage bearings and disrupt sensitive signals regardless of the length of run.

Why Specify a 100% Ground VFD Cable?

When developing what is now called VFD cable, Belden and the development partner, a major manufacturer of IGBT-based variable frequency drives, set specific parameters for performance and goals to mitigate the issues associated with variable frequency drives.

For many drives, NEC-compliant grounds lack the conductivity necessary to effectively bond the motor and drive at all frequencies and larger drives don't always need the extra copper bond provided by a 300% ground cable. The bond between the motor and drive was still determined to be the most significant factor in mitigating the release of common mode current—and the associated impact on adjacent circuits, sensitive instruments, networks and motor bearings—the equivalent of 3 phase conductors in the ground system.

Belden 100% ground VFD cables include fine stranded tinned conductors dual copper tapes and a full-size fine stranded uninsulated ground in 3 segments; located as close as possible to the phase conductors to reduce the ground inductance and offer the most optimum path for high frequency noise mitigation.

Belden Offers a Broad VFD Cable Portfolio

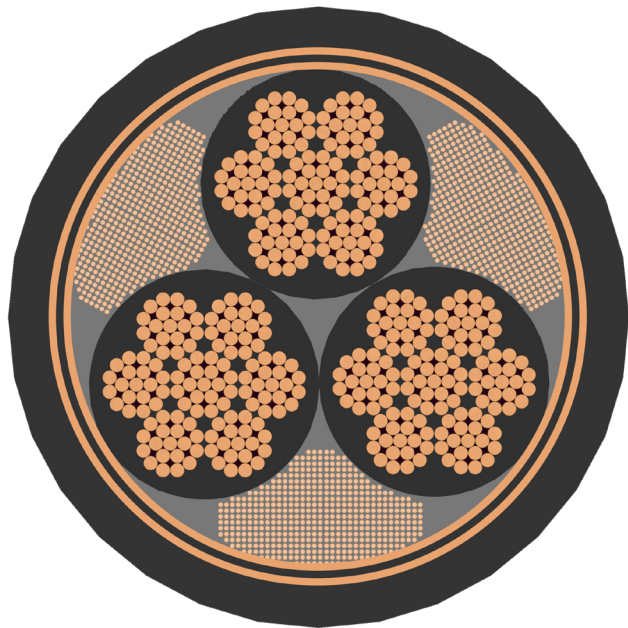
- 300% and 100% Ground High Performance Industrial-Grade
- Premium + Signal Pair
- Continuous-Flex and High-Flex
- Contractor-Grade
- Low Smoke Zero Halogen Options



For more information, visit
[belden.com/products/industrial/cable/vfd](https://www.belden.com/products/industrial/cable/vfd)

Design Matters

Often copied, never duplicated, Belden's competitors have offered what they call "equivalent" designs. One look at the cable cross sections show that these products are anything but equal.



Belden 100% Ground VFD Cable

- **Equal Distributions/Ground Symmetry**

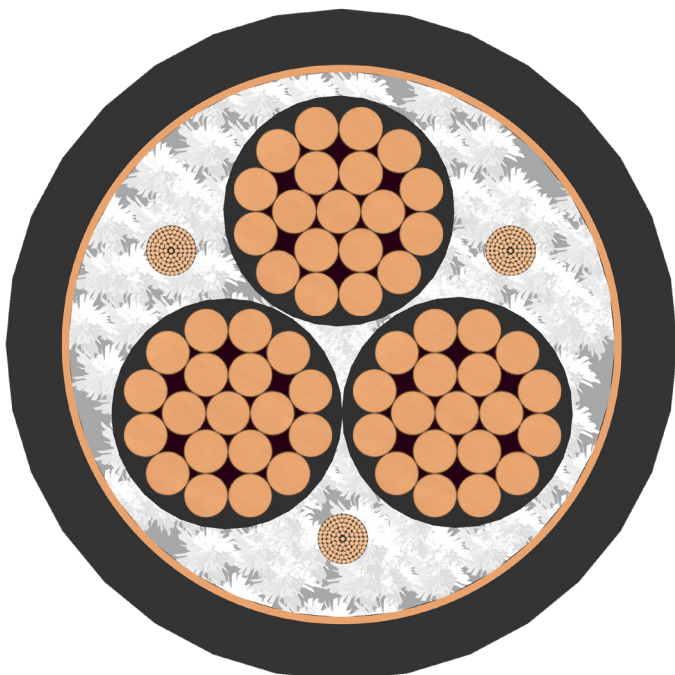
The Belden product on the left has virtually no fillers and the full-size uninsulated ground cable is distributed in 3 equal segments to reduce self-induction and the resulting bearing destroying currents.

- **Quality**

The quality of fabrication and the symmetry is evident in the Belden cable. The balanced geometry ensures that induced bearing currents and common mode noise currents are minimized. The close proximity of the grounds to phase conductors provides the lowest inductance while superior materials provide the lowest capacitance possible for maximum motor protection.

- **Added Protection**

The cross section of the Belden cable is virtually all fine stranded copper, designed to carry the high frequency current and noise associated with variable frequency drives. Also included are two layers of copper tape to optimize the high frequency noise conductance and resist the cracking that plagues single-layer 5 mil products. Finally, Belden uses tin-coated stranding to ensure connection reliability and protection against corrosion and thermal degradation.



Competitors "Equal" VFD Cable

- Reduced ground sizes
- Fillers vs copper
- Class B construction-grade stranding
- Single copper tape