

AN003

Extending the Life of Your Motor.

Does the Type of Cable Really Matter in My VFD System?



The answer is yes.

ONE: Shielding to address high and low frequency noise issues

Shielding on cables is what prevents interaction between systems.

In short, the type of shield on a cable is the cable's defense against noise. THHN and most generic control/tray cable are aluminum shielded or unshielded. Belden's VFD cable is offered with two shielding options: a foil + tinned copper braid (100% coverage foil shield along with an 80% braid shield), or

a dual 2mil copper table shield. Belden's shielding system is designed to prevent noise from radiating from the VFD system and interfering with surrounding networking, instrumentation, wireless communication, and industrial devices.

TWO: Withstanding voltage spikes/reflected wave voltage

The wall thickness and material of insulation is how a cable combats voltage spikes.

Belden's VFD cable has XLP insulation which has much lower capacitance (has higher

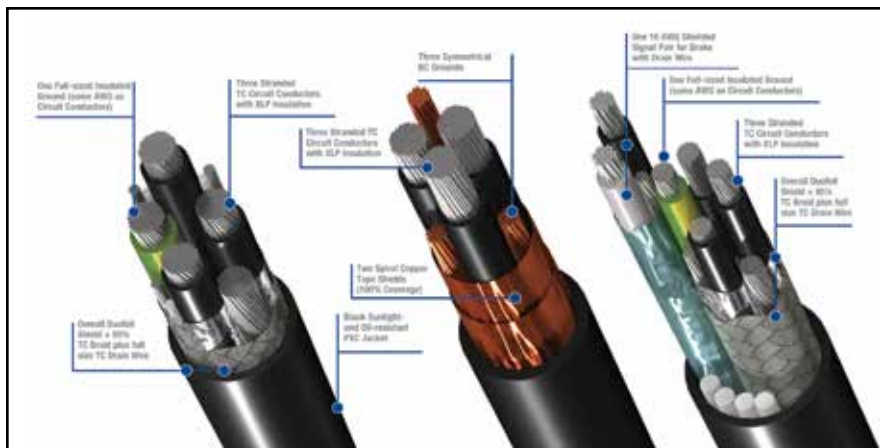
corona inception voltage) than THHN and generic control/tray cable which use PVC. This is particularly important in wet or damp environments as PVC is more susceptible to absorbing moisture -resulting in less than half the insulation capability of XLP. The wall thickness of VFD cable withstands voltage spikes significantly better.

THREE: Standing up against high temperatures

The type of insulation on your cable determines how it responds to thermal stress.

Belden's VFD cable has thermoset insulation which won't melt or drip like THHN and generic control/tray cable's insulation material (thermoplastic) will in higher temperatures. If your insulation is thermoplastic like THHN/ tray, you run the risk that it will melt, drip, or simply deform. This will not only reduce the insulation properties, it can cause damage to critical and expensive equipment/machinery. Belden's thermoset insulation is safer and better tolerant of high temperatures.

There are many more differences and reasons why the cable choice is critical in a VFD System. For additional information please reference white papers such as: **"Choosing the Right Cable for Your VFD System"**



Technical Illustration: Features of variable frequency drive cables from Belden.

Belden VFD Cable Guide

Style	Part Number	Description	
Foil/braid shield			
16 AWG	29500	(3) Stranded Tinned Copper Conductors + Full-size Insulated Ground, Overall Beldfoil® + 85% Tinned Cooper Braid Shield, Full-size Drain Wire, XLP Insulated Circuit Conductors, Black PVC Jacket; 1000V UL Flexible Motor Supply Cable	
14 AWG	29501		
12 AWG	29502		
10 AWG	29503		
8 AWG	29504		
6 AWG	29505		
4 AWG	29506		
2 AWG	29507		
Dual copper tape shield			
1 AWG	29528	Symmetrical Design with (3) Stranded Tinned Copper Circuit Conductors + (3) Symmetrical Bare Copper Grounds, 2 Spiral Copper Tape Shields (100% Coverage), XLP Insulation, Black PVC Jacket; 1000V UL Flexible Motor Supply Cable	
1/0 AWG	29529		
2/0 AWG	29530		
3/0 AWG	29531		
4/0 AWG	29532		
Signal Pair for Brake Applications	Foil/braid shield with a 16 AWG signal pair		
	16 AWG	29510	With Signal Pair for Brake, (3) Stranded Tinned Copper Conductors + Full-size PVC Ground, Overall Beldfoil + 85% Tinned Copper Braid Shield, (1) 16 AWG Shielded Signal Pair for Brake with Drain Wire, XLP Insulated Circuit Conductors, Black PVC Jacket; 1000V UL Flexible Motor Supply Cable
	14 AWG	29511	
	12 AWG	29512	
	10 AWG	29513	
2000 V	Foil / braid shield		
	14 AWG	29536	(3) Stranded Tinned Copper Conductors + Full-size Insulated Ground, Overall Beldfoil® + 85% Tinned Cooper Braid Shield, Full-size Drain Wire, XLP Insulated Circuit Conductors, Black PVC Jacket; 2000V UL Flexible Motor Supply Cable
	12 AWG	29537	
	10 AWG	29538	
	8 AWG	29539	
	6 AWG	29540	
	4 AWG	29541	
	2 AWG	29542	
	Dual copper tape shield		
	1 AWG	29543	Symmetrical Design with (3) Stranded Tinned Copper Circuit Conductors + (3) Symmetrical Bare Copper Grounds, 2 Spiral Copper Tape Shields (100% Coverage), XLP Insulation, Black PVC Jacket; 2000V UL Flexible Motor Supply Cable
1/0 AWG	29544		
2/0 AWG	29545		
3/0 AWG	29546		
4/0 AWG	29547		
Low Smoke Zero Halogen	Foil/braid shield		
	16 AWG	29500T	(3) Stranded Tinned Copper Conductors + Full-size Insulated Ground, Overall Beldfoil® + 85% Tinned Cooper Braid Shield, Full-size Drain Wire, XLP Insulated Circuit Conductors, Black LSZH Jacket; 1000V UL Flexible Motor Supply Cable
	14 AWG	29501T	
	12 AWG	29502T	
	10 AWG	29503T	
	8 AWG	29504T	
	6 AWG	29505T	
	4 AWG	29506T	
	2 AWG	29507T	
	With dual copper tape shield		
	1 AWG	29528T	Symmetrical Design with (3) Stranded Tinned Copper Circuit Conductors + (3) Symmetrical Bare Copper Grounds, 2 Spiral Copper Tape Shields (100% Coverage), XLP Insulation, Black LSZH Jacket; 1000V UL Flexible Motor Supply Cable
	1/0 AWG	29529T	
	2/0 AWG	29530T	
3/0 AWG	29531T		
4/0 AWG	29532T		