

# MAKE BETTER CONNECTIONS

Tips for achieving a successful VFD installation.

By Alpa Shah, Director of Strategic Marketing and Sales, Service Wire Co.



Variable-frequency drive (VFD) cable users can use the new connectors designed by Service Wire Co., an Encompass™ Product Partner in the Rockwell Automation PartnerNetwork™, to minimize the effects of problems associated with VFD

The ServiceDrive ASD/VFD Cable System consists of cables specifically designed to build in all the optimum components along with matching connectors (see photo above). Optional hardware kits, such as termination kits and motor braid, are available for extra precaution against residual circulating currents.

When deciding on the appropriate motor lead power cable system for AC adjustable-speed drive systems with service, you can use the following cable system components for a successful installation.

## Conductor Insulation

Phase conductor insulation should be moisture-resistant, flame-retardant, cross-linked polyethylene (XHHW-2) suitable for 90°C conductor temperature operation in dry, damp and wet locations. This minimizes the effect of reflected wave. Thermoplastic and non-flame-retardant insulations are unacceptable.



Metal covering of galvanized steel interlocking metal armor acts as a backup low impedance path.

## Symmetrical Design for Ground Wires

Ground wires for three conductor cables could be bare or tinned copper wires based on the corrosiveness of the environment, but they should be located in each interstice and must be equidistant from the phase conductors. Three triangular and symmetrically placed phase and ground wires

in ServiceDrive lower magnetically induced ground current.

## Armor – The Metal Covering

Metal covering of galvanized steel interlocking metal armor acts as a backup low impedance path. The interlocked armor with electrical field containment and rejection properties reduces the effect of crosstalk.

In special cases, based on the project requirements, shielded tray cable without the armor may be more suitable if installed with appropriate VFD connectors.

### Shield

It's critical to use a copper tape shield over the binding tape and below the interlocked metal armor. If an overall EMI shield isn't used, electro-magnetic

emission problems are likely to occur.

Five-mils-thick bare copper tape shield that is helically applied with a minimum of 50% overlap assures full coverage at the cable bends, offers a high level of EMI screening, and acts as a low impedance path for common mode current when it's connected to the motor frame ground.

### Connectors

Any VFD installation needs a water-tight cable connectors that can provide a 360°-degree electrical bonding of the galvanized steel interlocking armor and the copper tape shield. The ServiceDrive connectors provide a 360° contact and keep the continuous low impedance path from the cable's shield or armor at both the motor and the drive or drive cabinet to avoid leakage of stray currents at the connection points.

Connection of the copper tape shield to the connector body in the Service-Drive connector is accomplished by an integral and self-retaining grounding collar that automatically provides a 360° connection as the connector is tightened after slipping it on the matching cable size. Connector assembly also is designed to ensure against loosening of threads due to vibration.

Using these essential features in your cables-connector system with voltage source PWM Drives will help ensure correct operation and longer service life from your drive-motor assembly. □

*Rockwell Automation Encompass Product Partner Service Wire is a wire and cable manufacturer with locations in West Virginia, Texas and Arizona.*

#### Service Wire

[www.rockwellautomation.com/go/p-servicewire](http://www.rockwellautomation.com/go/p-servicewire)

**Rockwell Automation Encompass Product Partner Program**

[www.rockwellautomation.com/go/tjencompass](http://www.rockwellautomation.com/go/tjencompass)