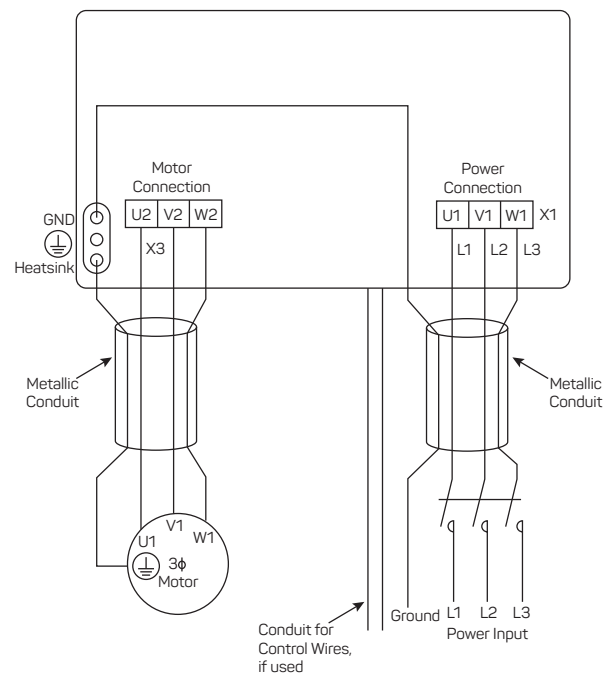
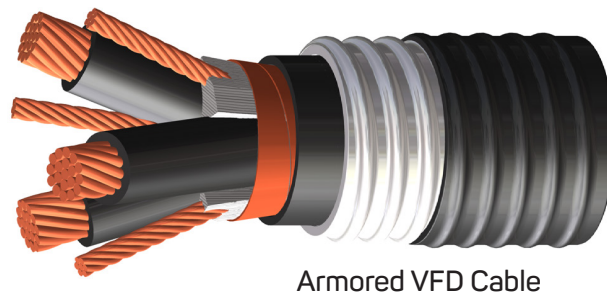
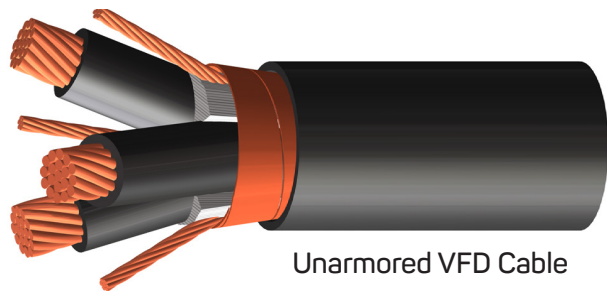


Recommended VFD Cable Installation Guide

INTRODUCTION:

Shawflex has developed 600 V, 1000 V, and 2000 V, VFD cable that provides clean power cable for Variable Frequency Drives. Shawflex's design provides the combination of a dual copper tape, shielded cable, with/without interlock armor, and a three balanced ground system. All these designs reduce electromagnetic interference (EMI), common mode or ground current, and reflected waves, making a safe, stable running motor and cable, reducing motor downtime and maintenance. However, without the proper installation of the VFD cable between drive and motor, all the benefits above might not be realized.

This VFD Cable Termination Guide illustrates the step-by-step procedure to terminate an unarmored/armored Shawflex copper-tape shield VFD cable into enclosures or panel boxes.



USING THIS TERMINATION GUIDE

All designs and specifications in the technical or commercial documentation of Shawflex is indicative only. This installation guide is intended for use by appropriately trained persons. Although the information provided in this installation guide is believed to be accurate, Shawflex makes no representations or warranties, expressed or implied, with respect to the accuracy or completeness of this installation guide. This installation guide is not a substitution of the National Electrical Code(NEC) or Canadian Electrical Code(CEC). Please follow the relevant rules in the NEC or CEC or any other international standards applicable to region of installation in conjunction with this recommended VFD cable installation guide.

Unarmored VFD Cable Installation Guide

UNARMORED (TRAY) VFD CABLE TERMINATION INSTRUCTIONS

The instructions below apply to both the drive and motor end of the cable as it pertains to Shawflex's copper tape shield VFD cables.

MATERIALS REQUIRED

- Proper Personal Protection Equipment (PPE)
- Suitable fittings or cable glands for the enclosure or panel box
- Heat shrink tubing (*DSG-Canusa CFW black heavy wall tubing, and green/yellow thin wall tubing CPX-201)
- Electrical tape (*DSG-Canusa CET electrical tape)



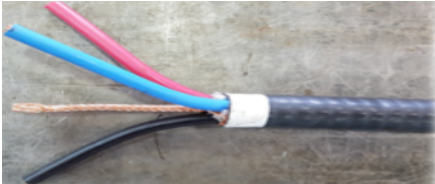


**For DSG-Canusa products including CFW, CPX-201, CET tape, please refer to www.dsgcanusa.com*

Note : Before proceeding with any electrical installation or work please ensure all power sources in the circuit have been turned off and verified with a voltage tester.

MAIN INSTALLATION PROCEDURES



1. Measure the length of the cable for jacket removal
2. Remove the outer cable jacket
3. Remove the exposed copper tape shield
4. Twist the exposed three ground wires together
5. Apply heat shrink tubing to the twisted grounds
6. Apply heat shrink tubing over the conductor/ground cable assembly, centered at the strip point of jacket
7. Insert cable into the enclosure through fitting
8. Tighten gland nut, and make sure the fitting is firmly in contact with the jacket
9. Route and trim the conductors, and terminate the ground conductors based on the motor drive manufacturer's recommendation.
10. Terminate the power conductors

Unarmored VFD Cable Installation Guide

| Steps | Diagram |
|---|---|
| <p>1. Measure the length of the cable for jacket removal</p> <ul style="list-style-type: none"> Insert the cable into the enclosure, and measure the length of cable to reach the termination points, keep the length for trimming once the cable is routed to the termination points. Utilize largest possible bending radius possible especially for 90-degree bends. Mark the entrance point on the cable in the enclosure with the CET electrical tape. | |
| <p>2. Remove the outer cable jacket</p> <ul style="list-style-type: none"> Strip off the jacket as short as possible based upon the installation parameters. Do not cut through the shield when removing the jacket. <p>* Optional Ripcord can be used for stripping off the jacket.</p> |  |
| <p>3. Remove the exposed copper tape shield</p> <ul style="list-style-type: none"> Untwist and straighten the exposed conductors and ground conductors. Cut off the shield and cable filler. Do not damage the insulated conductors and ground conductors. |  |
| <p>4. Twist the exposed ground conductors together</p> <ul style="list-style-type: none"> Any intermediate termination of the ground or shield should be avoided. |  |
| <p>5. Apply heat shrink tubing (*DSG-Canusa CPX - 201) to the twisted grounds</p> <ul style="list-style-type: none"> As required, using the HS tubing to keep the three ground wires together if necessary. |  |
| <p>6. Apply *DSG-Canusa CFW heat shrink tubing over the conductor/ground assembly, centered at the point where the jacket was removed</p> |  |

*For DSG-Canusa products including CFW, CPX-201, refer to www.dsgcanusa.com

Unarmored VFD Cable Installation Guide

| Steps | Diagram |
|---|---|
| <p>7. Insert cable into the enclosure through fitting</p> <ul style="list-style-type: none">• Insert the cable, and line up to the point where jacket was removed to the inner edge of the enclosure.• Terminate inside the enclosure for maximum shielding effectiveness.• Non-conductive glands should be used for drives that are in enclosures which contain any analog signals, I/O, PLC's etc. | |
| <p>8. Tighten the gland nut, and make sure the fitting is firmly in contact with the jacket</p> |  |
| <p>9. Route and trim the conductors, and terminate the ground conductors based on the motor drive manufacturer's recommendations</p> <ul style="list-style-type: none">• Ground wires must be terminated at both the drive and motor (at PE Ground) to provide a low impedance path to ground.• Grounding conductors must be large enough to carry the current required to trip the over current protection device (Fuse or Breaker). |  |
| <p>10. Terminate the power conductors</p> | |

OTHER RECOMMENDATIONS WHILE WIRING THE GROUND

- Locate drive as close as possible to the motor
- Run cable perpendicular to any communication/signaling cables
- Use Fiber Optic cable if possible for communication near VFD output
- Use of supplemental grounding conductors for noise reduction systems may be needed
- Use only listed devices, exothermic welding, or machine-type screws (2 thread minimum contact) for Equipment Ground Conductor connections
- Do not use equipment for continuity of ground conductor (do not series-connect chassis with jumpers, keep ground conductor with service conductors if possible)
- Use paint piercing hardware when bonding chassis
- Follow connector and fitting manufacturer's instructions
- Please use these recommendations along with/in conjunction with the VFD's manufacturer's installation specs, CEC and NEC

Armored VFD Cable Installation Guide

ARMORED (INTERLOCKED) VFD CABLE TERMINATION INSTRUCTIONS

The instructions below apply to both the drive and the motor end of the cable, and pertain to Shawflex copper tape shield interlocked armored VFD cables.

MATERIALS REQUIRED

- Proper Personal Protection Equipment (PPE)
- Suitable metallic fittings or cable glands for the enclosure or panel box
- Heat shrink tubing (*DSG-Canusa CFW black heavy wall tubing, and green/yellow thin wall tubing CPX-100)
- Electrical tape (*DSG-Canusa CET electrical tap)
- Hacksaw (24T), or proper armor stripper

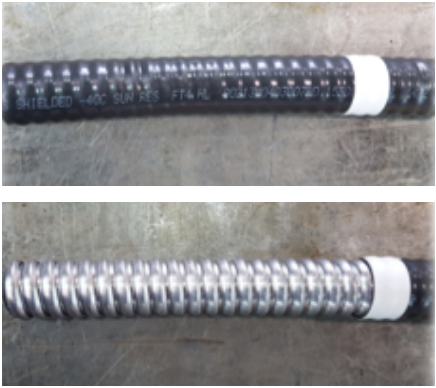
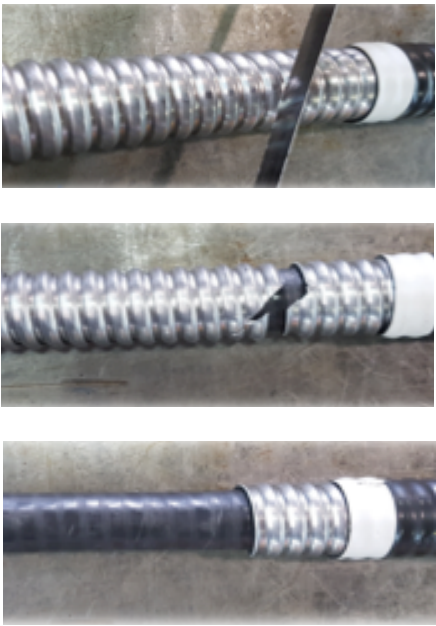
**For DSG-Canusa products including CFW, CPX-201, CET tape, please refer to www.dsgcanusa.com*

Note : Before proceeding with any electrical installation or work please ensure all power sources in the circuit have been turned off and verified with a voltage tester



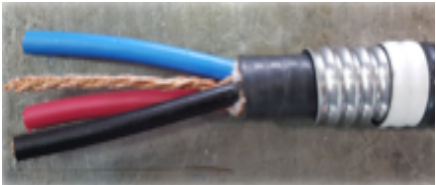
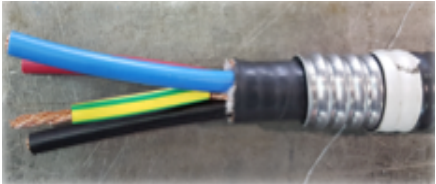

MAIN INSTALLATION PROCEDURES

1. Measure the length of the cable for jacket removal
2. Remove the outer cable jacket
3. Remove the interlocked armor
4. Remove the inner jacket
5. Remove the exposed copper tape shield
6. Twist the three exposed ground wires together
7. Apply heat shrink tubing to the twisted grounds
8. Apply heat shrink tubing over the conductor/ground assembly, centered at the strip point of jacket
9. Insert cable into the enclosure through fitting
10. Tighten the gland nut and make sure the fitting is firmly in contact with the armor
11. Route and trim the conductors, and terminate the ground conductors based on the motor drive manufacturer's recommendations
12. Terminate the power conductors

Armored VFD Cable Installation Guide


| Steps | Diagram |
|---|---|
| <p>1. Measure the length of the cable for jacket removal</p> <ul style="list-style-type: none">• Insert the cable into the enclosure, and measure the length of cable to reach the termination points, keep the length for trimming once the cable is routed to the termination points.• Utilize largest possible bending radius possible especially for 90-degree bends.• Mark out the point on the jacket at the entrance of fitting or cable gland. The cable jacket will be stripped off from that point. | |
| <p>2. Remove the outer cable jacket</p> <ul style="list-style-type: none">• Wrap electrical tape around the jacket, and mark the leading edge of the tape to the point previously marked. Remove the outer cable jacket from the point marked.• Ring cut the jacket along the leading edge of the tape.• Longitudinally cut from the top end of cable to the leading edge of the tape, down to the shield layer, and remove the jacket. |  |
| <p>3. Remove interlocked armor</p> <ul style="list-style-type: none">• Mark out the point on the armor at the entrance of enclosure, while lining up the jacket removal point to the entrance of fitting or cable gland.* Refer to the fitting manufacturers' recommendation.• Make a diagonal cut across the armor strip using a hacksaw (24T) at the point previously marked out. The cut should not damage the shield and insulated conductors in the cable core.• Alternately a CSA/UL approved armor cutting tool can be used• Gently bend and twist the cracked armor back and forth until the armor is broken• Slide off the armor.• Install an anti-short bushing between the armor and the cable core if necessary. |  |

Armored VFD Cable Installation Guide

| Steps | Diagram |
|--|---|
| <p>4. Remove the inner jacket</p> <ul style="list-style-type: none">Remove the PVC inner jacket, cut the jacket back to the length of the connector barrel.Keep the inner jacket intact as close to the point of the termination as possible. <p><i>Optional Ripcord can be used for stripping off the jacket</i></p> |  |
| <p>5. Remove the exposed copper tape shield</p> <ul style="list-style-type: none">Untwist and straighten conductors and ground conductors. Cut off the shield and cable filler at the point where jacket was removed.Do not damage the insulated conductors and ground conductors. |  |
| <p>6. Twist the exposed ground conductors together</p> <ul style="list-style-type: none">Any intermediate termination of the ground or shield should be avoided. |  |
| <p>7. Apply heat shrink tubing (*DSG-Canusa CPX-201) to the twisted grounds</p> <ul style="list-style-type: none">As required, use the heat shrink tubing to keep the three ground wires together. |  |
| <p>8. Apply heat shrink tubing (*DSG-Canusa CFW) over the conductor/grounds assembly, centered at the point where inner jacket removed</p> <ul style="list-style-type: none">Do not cover the exposed armor with the heat shrink tubing. |  |
| <p>9. Insert cable into the enclosure through fitting</p> <ul style="list-style-type: none">Insert the cable, and line up the point where outer jacket removed to the entrance of the enclosure.Use 360-degree termination glands for armor and copper tape shielded cablesFollow the fitting manufacturers' instruction. | |

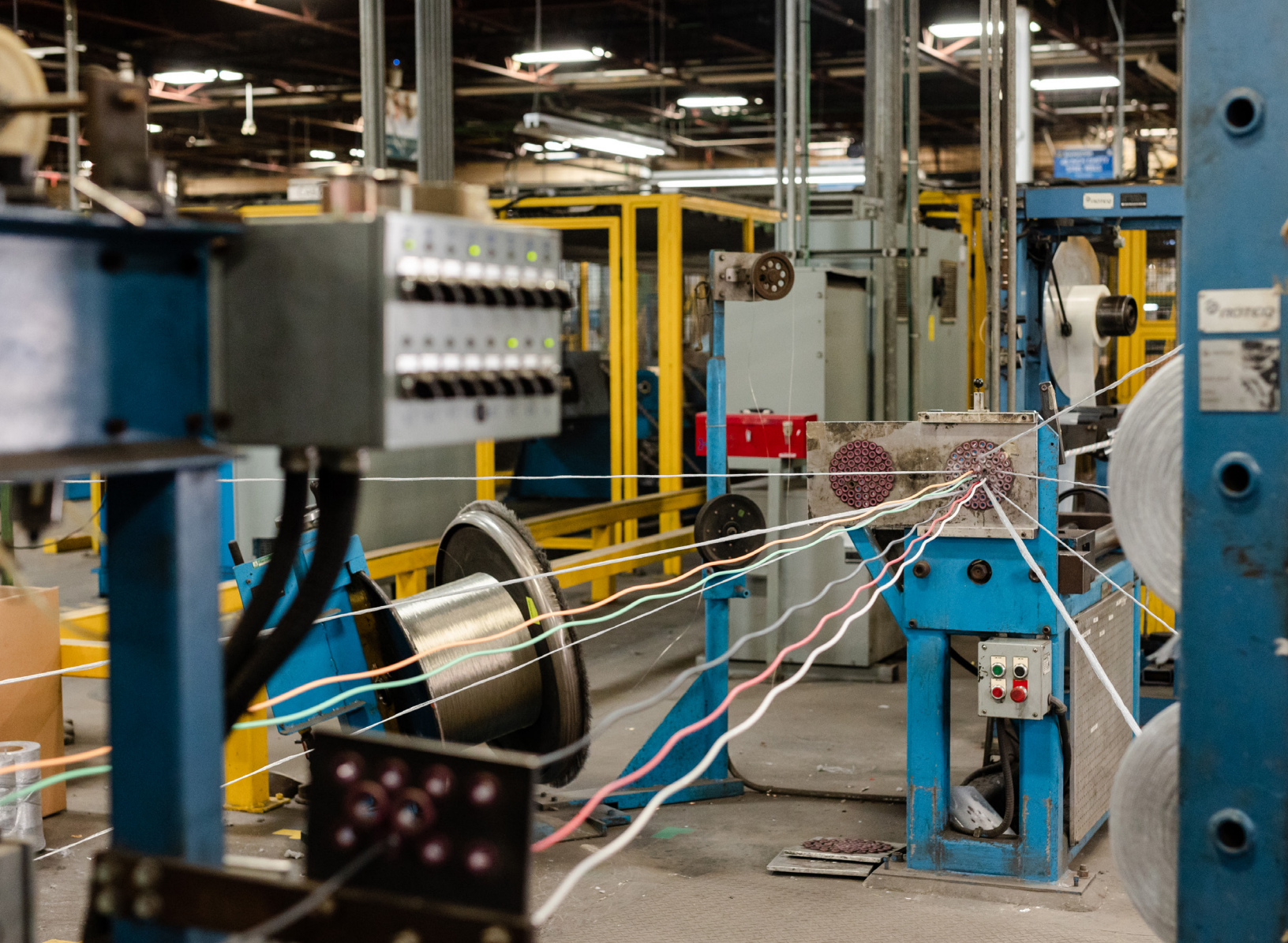
*For DSG-Canusa products including CFW, CPX-201, refer to www.dsgcanusa.com

Armored VFD Cable Installation Guide

| Steps | Diagram |
|--|---|
| 10. Tighten the gland nut, and make sure the fitting is firmly in contact with the Armor. | |
| 11. Route and trim the conductors, and terminate the ground conductors based on motor drive manufacturer's recommendations <ul style="list-style-type: none">• Ground wires must be terminated at both the drive and motor (at PE Ground) to provide a low impedance path to ground.• Grounding conductors must be large enough to carry the current required to trip the over current protective device (Fuse or Breaker) |  |
| 12. Terminate the power conductors | |

OTHER RECOMMENDATIONS WHILE WIRING THE GROUND

- Locate drive as close as possible to the motor
- Run cable perpendicular to any communication/signaling cables
- Use Fiber Optic cable if possible for communication near VFD output
- Use of supplemental grounding conductors for noise reduction systems may be needed
- Use only listed devices, exothermic welding, or machine-type screws (2 thread minimum contact) for Equipment Ground Conductor connections
- Do not use equipment for continuity of ground conductor (do not series-connect chassis with jumpers, keep ground conductor with service conductors if possible)
- Use paint piercing hardware when bonding chassis
- Follow connector and fitting manufacturer's instructions
- Please use these recommendations along with/in conjunction with the VFD's manufacturer's installation specs, CEC and NEC



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