VFD (Variable-Frequency Drive) Cable

Variable-frequency drives (VFDs) control the speed and torque of AC motors by varying the frequency of the voltage to the motor; however, the VFD does not send a pure sine-wave frequency to the motor. They more accurately use a series of pulses which varies in frequency in a technique called pulse-width modulation (PWM).

While PWM is an excellent way to control a motor, it creates several issues that can affect the motor’s life and power quality, as well as create Electromagnetic Interference (EMI) and reduce the life of the cable.

By using a cable designed for use with VFDs, it is possible to limit the effect of high frequencies on the surrounding equipment and possibly prevent costly machine downtime.

AutomationDirect is pleased to introduce our new line of Variable-frequency drive (VFD) cable manufactured by Southwire Company.

Features
- Cross-linked Polyethylene (XLPE) conductor insulation
- Class K, flexible stranded tinned annealed copper conductors per ASTM B33, B172 and B174
- Green ground conductor with yellow stripe, cross linked Polyethylene (XLPE) insulation
- 100% coverage aluminum/mylar/aluminum foil shield
- 85% coverage tinned copper braid shield
- Tinned copper drain wire(s)
- Black Thermoplastic Elastomer (TPE) jacket
- Cut to length in 1 foot increments
- Minimum cut lengths as low as 10 feet
- Made in USA

Please Note: Our prices on VFD Cable are closely tied to the market price for copper. This allows us to offer the best savings possible if conditions are favorable; however, it also means that our prices may increase if market conditions warrant.

VFD 4-Conductor Cable Specifications

<table>
<thead>
<tr>
<th>Conductors Gauge &amp; Stranding</th>
<th>16AWG (26 Strands) to 2AWG (651 Strands), Class K flexible stranded tinned annealed copper per ASTM B33, B172 and B174</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Rating</td>
<td>600V UL 90°C TC-ER, 1000V WTTC, 1000V AWM, 1000V Flexible Motor Supply Cable</td>
</tr>
<tr>
<td>Outer Jacket Material</td>
<td>Thermoplastic Elastomer (TPE)</td>
</tr>
<tr>
<td>Outer Jacket Color</td>
<td>Black with white print</td>
</tr>
<tr>
<td>Cold Bend</td>
<td>-40°F (-40°C)</td>
</tr>
<tr>
<td>Min. Cut Length*</td>
<td>20 feet</td>
</tr>
<tr>
<td>Temperature Ratings</td>
<td>-40°F to +194°F (-40°C to +90°C)</td>
</tr>
<tr>
<td>Conductor Insulation</td>
<td>Black cross-linked Polyethylene (XLPE) with green/yellow ground</td>
</tr>
<tr>
<td>Conductor Markings</td>
<td>“1-ONE”, “2-TWO”, “3-THREE”, @ 4.5 inch intervals, ICEA Method 4</td>
</tr>
</tbody>
</table>

Approvals**
- ASTM B172 - Rope-Lay-Stranded Copper Conductors
- ASTM B174 - Bunch-Stranded Copper Conductors
- ASTM B33 - Tinned soft or annealed Copper
- UL 44 - Thermoceut Insulation
- UL 1063 - Machine Tool Wiring (MTW)
- UL 1277 - Type TC-ER Standard Power and Control Cables
- UL 2277 - Type WTTC Flexible Motor Supply
- UL 758 - AWM Style 20886 Standard for Appliance Wiring Material
- CSA C22.2 No. 230 Type TC
- CSA C22.2 No. 239 TYPE CIC
- CSA C22.2 No. 210 - CSA AWM I/II A/B
- CE RoHS 2

Sample Print Legend
- Southwire XXAWG (XXmm²) XX/C VFD XLPE CDRS TYPE TC-ER XXXXXX (UL) 600V 90°C DRY 90°C WET SUN RES OIL RES II DIR BUR -40°C OR WTTC 1000V OR AWM 20886 105°C 1000V OR Flexible Motor Supply Cable 1000V
- LLXXXXXXX CSA CIC/CTC FT4 OR AWM I/II A/B 1000V 105C, FT4 -40°C -- CE RoHS-2 Made in USA

* See web store for maximum cut lengths
** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com
### VFD 4-Conductor Cable Specifications Continued

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Nom. Capacitance Conductor to Shield (pF/ft.)</th>
<th>Nom. Capacitance Conductor to Conductor (pF/ft.)</th>
<th>Nom. Conductor DC Resistance @ 20ºC (Ohm/1000 ft.)</th>
<th>Nominal Outer Shield DC Resistance @ 20ºC (Ohm/1000 ft.)</th>
<th>Impedance</th>
<th>Velocity of Propagation</th>
<th>Max. Operating Voltage - UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFDC-16-4B-1</td>
<td>36.34</td>
<td>20.19</td>
<td>4.49</td>
<td>2.40</td>
<td>86.6</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-14-4B-1</td>
<td>44.10</td>
<td>24.50</td>
<td>2.82</td>
<td>2.31</td>
<td>71.4</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-12-4B-1</td>
<td>46.93</td>
<td>26.07</td>
<td>1.77</td>
<td>2.48</td>
<td>67.1</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-10-4B-1</td>
<td>52.52</td>
<td>29.18</td>
<td>1.12</td>
<td>2.63</td>
<td>60.0</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-8-4B-1</td>
<td>50.72</td>
<td>28.18</td>
<td>0.72</td>
<td>3.66</td>
<td>62.1</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-6-4B-1</td>
<td>56.81</td>
<td>31.56</td>
<td>0.45</td>
<td>3.48</td>
<td>55.4</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-4-4B-1</td>
<td>67.95</td>
<td>37.75</td>
<td>0.28</td>
<td>3.69</td>
<td>46.3</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
<tr>
<td>VFDC-2-4B-1</td>
<td>75.96</td>
<td>42.20</td>
<td>0.18</td>
<td>4.10</td>
<td>41.5</td>
<td>0.57</td>
<td>600V / 1000V</td>
</tr>
</tbody>
</table>

### VFD 4-Conductor Cable Selection

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Number of Conductors (includes ground)</th>
<th>AWG</th>
<th>Strand</th>
<th>Power Conductors</th>
<th>Ground (AWG)</th>
<th>Stranded Wire (AWG)</th>
<th>Insulation Thickness (mils)</th>
<th>Jacket Thickness (mils)</th>
<th>Nominal OD Inches</th>
<th>DC Resistance @ 20ºC (Ohm/1000 ft.)</th>
<th>Impedance</th>
<th>Velocity of Propagation</th>
<th>Max. Operating Voltage - UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFDC-16-4B-1</td>
<td>4</td>
<td>16AWG (1.31 mm²)</td>
<td>26</td>
<td>3</td>
<td>1 x (16)</td>
<td>1 x (16)</td>
<td>46</td>
<td>62</td>
<td>0.523</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-14-4B-1</td>
<td>4</td>
<td>14AWG (2.08 mm²)</td>
<td>41</td>
<td>3</td>
<td>1 x (14)</td>
<td>1 x (14)</td>
<td>46</td>
<td>62</td>
<td>0.565</td>
<td>15</td>
<td>15</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-12-4B-1</td>
<td>4</td>
<td>12AWG (3.31 mm²)</td>
<td>65</td>
<td>3</td>
<td>1 x (12)</td>
<td>1 x (12)</td>
<td>46</td>
<td>62</td>
<td>0.635</td>
<td>20</td>
<td>20</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-10-4B-1</td>
<td>4</td>
<td>10AWG (5.26 mm²)</td>
<td>105</td>
<td>3</td>
<td>1 x (10)</td>
<td>1 x (10)</td>
<td>46</td>
<td>62</td>
<td>0.698</td>
<td>30</td>
<td>30</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-8-4B-1</td>
<td>4</td>
<td>8AWG (8.36 mm²)</td>
<td>168</td>
<td>3</td>
<td>1 x (8)</td>
<td>4 x (14)</td>
<td>60</td>
<td>80</td>
<td>0.870</td>
<td>50</td>
<td>55</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-6-4B-1</td>
<td>4</td>
<td>6AWG (13.3 mm²)</td>
<td>266</td>
<td>3</td>
<td>1 x (6)</td>
<td>4 x (12)</td>
<td>60</td>
<td>80</td>
<td>0.942</td>
<td>65</td>
<td>75</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-4-4B-1</td>
<td>4</td>
<td>4AWG (21.2 mm²)</td>
<td>420</td>
<td>3</td>
<td>1 x (4)</td>
<td>4 x (10)</td>
<td>60</td>
<td>80</td>
<td>1.071</td>
<td>85</td>
<td>95</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFDC-2-4B-1</td>
<td>4</td>
<td>2AWG (33.6 mm²)</td>
<td>651</td>
<td>3</td>
<td>1 x (2)</td>
<td>4 x (8)</td>
<td>60</td>
<td>80</td>
<td>1.230</td>
<td>115</td>
<td>130</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

* Ampacity based on NEC 310.15 (B) (16) up to and including 2000 volts, not more than 3 current-carrying conductors, ambient 86ºF (30ºC)

All dimensions are nominal and subject to normal manufacturing tolerances.

Please Note: Our prices on VFD Cable are closely tied to the market price for copper. This allows us to offer the best savings possible if conditions are favorable; however, it also means that our prices may increase if market conditions warrant.

For the latest prices, please check AutomationDirect.com.