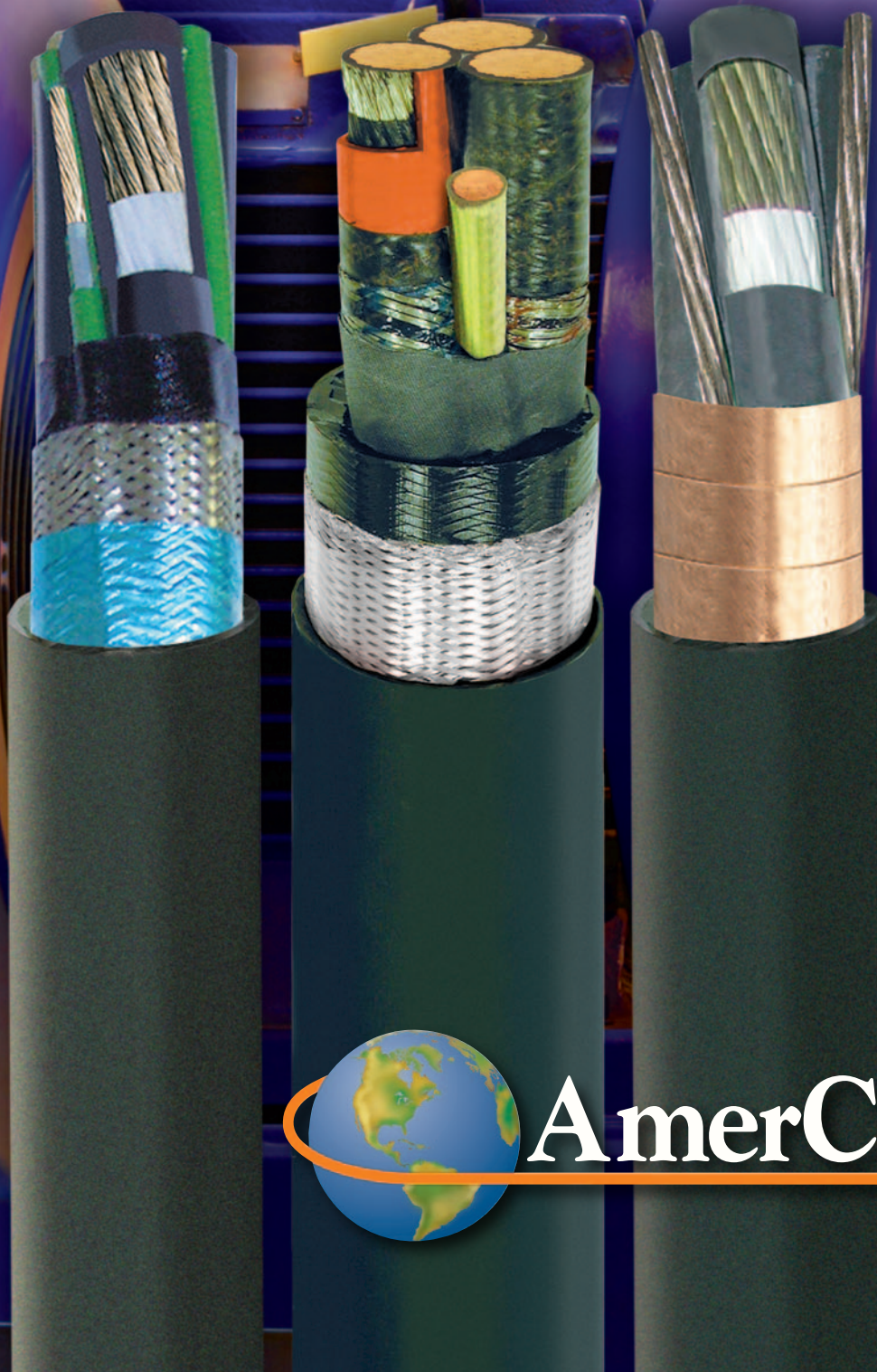


VFD CABLES

**100% EMI CONTAINMENT
FOR INDUSTRIAL APPLICATIONS**



AmerCable

INDUSTRIAL VFD CABLES

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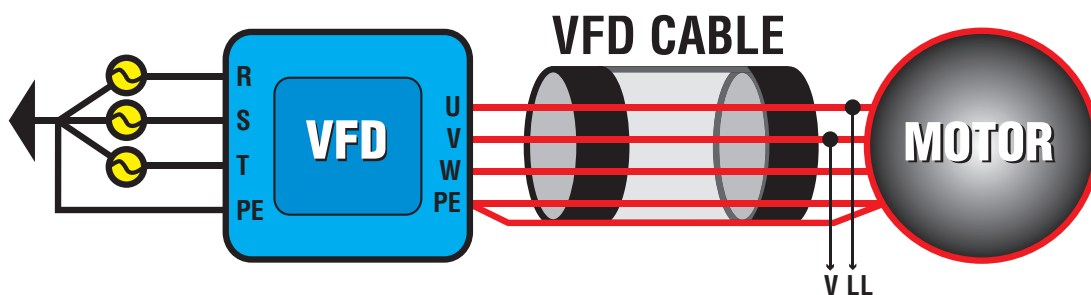
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Low-Smoke Halogen-Free and Fire Resistant
constructions available.
Contact your AmerCable rep.



AmerCable believes the information presented throughout this catalog to be reliable and current. All information is subject to change without notice. The information listed is approximate, and is presented only as a guide for product selection. We make no claims or warranties for the suitability of any product for any particular application.

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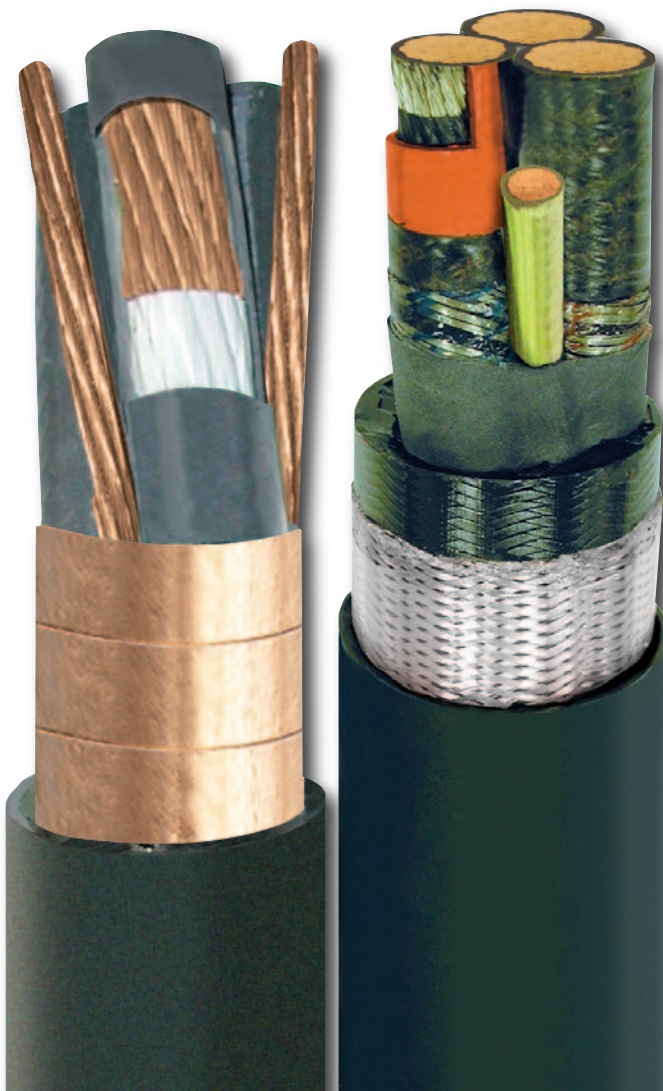
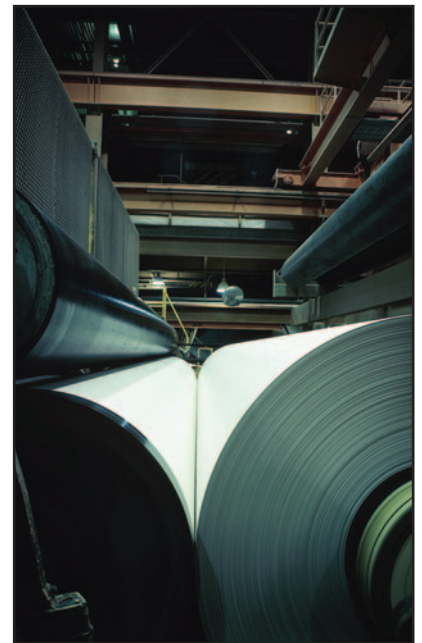
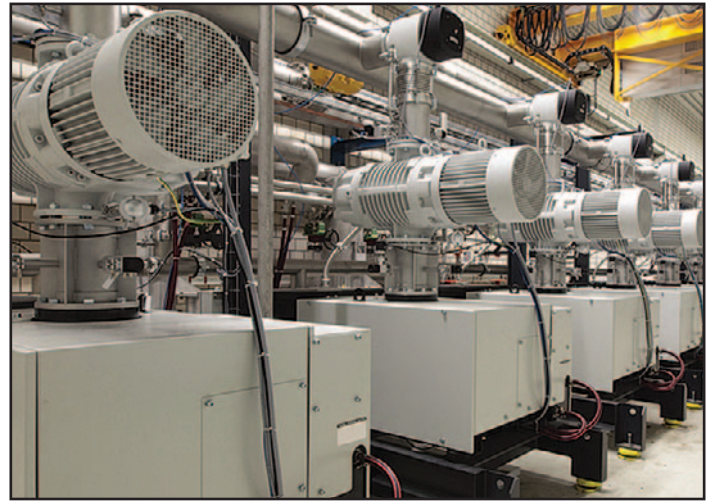
OUR COMMITMENT TO INDUSTRIAL PRODUCTIVITY



AmerCable's Industrial VFD Cables are specially engineered to provide 100% containment of EMI emissions and provide longer cable life in harsh operating conditions.

AmerCable VFD cables feature symmetrical ground conductors that reduce induced voltage imbalances and carry common mode noise back to the drive.

AmerCable's high strand count conductors and braid-shield design is much more flexible, easier to install and more resistant to vibration than Type MC cable.



www.AmerCable.com

FLEXIBLE TC-ER VFD POWER CABLE

Three Conductor • 90°C • 1000V*



Power Conductors (x3)

Soft annealed flexible stranded tinned copper per ASTM B-33

Insulation

Cross-linked, flexible, low dielectric constant compound rated 90°C.

Sizes larger than 4/0 AWG – individual conductors colored black with conductor number surface printed in contrasting ink.

Sizes 4/0 AWG and smaller – individually colored conductors – red, white, black.

Jacket

Flame retardant, moisture and sunlight resistant Polyvinyl Chloride (PVC). Colored black.

Symmetrical Ground Conductors (x3)

Three symmetrically placed flexible stranded tinned copper conductors in direct contact with the shield.

Metallic Shield

Sizes 8 AWG and Larger – Helically applied bare copper tape.

Sizes Smaller than 8 AWG – tin-coated copper braid plus aluminum/polyester tape.

Both shielding systems provide 100% coverage.



TC-ER Ratings & Approvals

- * ■ UL Listed as Type TC-ER 600V
- * ■ UL Listed as 1000V flexible motor supply cable (up to 4/0 AWG)
 - 90°C Temperature Rating
 - FT-4 and IEEE 1202 flame ratings
 - Sunlight resistant
 - Direct burial



APPLICATION

A flexible shielded power cable specifically engineered for use in variable frequency AC motor drive (VFD) applications.

FEATURES

- Specially engineered cable design produces a longer cable life in VFD applications.
- Overall shield provides 100% coverage containing VFD EMI emissions.
- Symmetrical ground conductors reduce induced voltage imbalances and carry common mode noise back to the drive.
- High strand count design is much more flexible, easier to install and more resistant to vibration than Type MC cable.
- Meets crush and impact requirements for Type MC cable.
- AmerCable's specially formulated insulation material has a lower dielectric constant (standard XLPE and EPR insulation materials have higher dielectric constants) which withstands reflected voltages. This allows for longer output cable distances and minimizes the effect of high frequency noise induced into the plant ground system.
- Permitted for Exposed Run ("ER") use in accordance with the NEC.
- Permitted for use in Class I, Division 2 and Zone 2 industrial hazardous locations per the NEC.
- Gas and vapor tight – impervious to water and air.
- Reduced tray fill (up to 35% less) than Type MC.
- Reduced installation time and cost compared to Type MC.
- Glands for this product cost up to 50% LESS than those for Type MC.
- Bend radius 12X O.D.

37-108 VFD • FLEXIBLE TC-ER VFD • 1000 VOLTS

| Size AWG/ kcmil | Size (mm ²) | Part No. 37-108 | Nominal Diameter (inches) | Weight (lbs/ 1000ft) | DC Resistance at 25°C (ohms/1000ft) | AC Resistance 90°C, 60Hz (ohms/1000ft) | Inductive Reactance (ohms/ 1000ft) | Voltage Drop 90°C, 60Hz (Volts/Amp/ 1000ft) | Grounding Conductor (x3) Size (AWG) | Ampacity | | |
|-----------------------|----------------------------|--------------------|---------------------------------|----------------------------|--|---|---|--|--|----------------|------------------|---------------|
| | | | | | | | | | | In Free Air | In Cable Tray | In Conduit |
| 14 | 2.08 | -508VFD | 0.466 | 158 | 2.907 | 3.635 | 0.036 | 5.069 | 18 | 15 | 15 | 15 |
| 12 | 3.29 | -516VFD | 0.509 | 199 | 1.826 | 2.283 | 0.034 | 3.195 | 16 | 20 | 20 | 20 |
| 10 | 5.23 | -308VFD | 0.522 | 258 | 1.153 | 1.441 | 0.032 | 2.028 | 14 | 30 | 30 | 30 |
| 8 | 8.30 | -309VFD | 0.653 | 368 | 0.708 | 0.885 | 0.036 | 1.262 | 14 | 65 | 55 | 48 |
| 6 | 13.21 | -310VFD | 0.737 | 517 | 0.445 | 0.556 | 0.034 | 0.804 | 12 | 87 | 75 | 65 |
| 4 | 21.17 | -312VFD | 0.956 | 814 | 0.300 | 0.376 | 0.031 | 0.552 | 12 | 114 | 95 | 89 |
| 2 | 35.00 | -314VFD | 1.103 | 1178 | 0.184 | 0.230 | 0.030 | 0.349 | 10 | 152 | 130 | 119 |
| 1 | 42.52 | -315VFD | 1.221 | 1462 | 0.147 | 0.184 | 0.031 | 0.287 | 10 | 177 | 145 | 137 |
| 1/0 | 50.00 | -316VFD | 1.447 | 1714 | 0.117 | 0.147 | 0.030 | 0.235 | 10 | 205 | 170 | 163 |
| 2/0 | 66.12 | -317VFD | 1.538 | 1951 | 0.093 | 0.117 | 0.029 | 0.193 | 10 | 237 | 195 | 186 |
| 4/0 | 95.00 | -319VFD | 1.883 | 3102 | 0.058 | 0.075 | 0.028 | 0.133 | 8 | 316 | 260 | 253 |
| 262 | 120 | -320VFD | 1.981 | 3642 | 0.048 | 0.063 | 0.026 | 0.114 | 6 | 362 | 297 | 284 |
| 313 | 150 | -321VFD | 2.082 | 4185 | 0.040 | 0.053 | 0.026 | 0.100 | 6 | 403 | 328 | 319 |
| 373 | 185 | -322VFD | 2.215 | 4834 | 0.034 | 0.045 | 0.025 | 0.088 | 6 | 449 | 362 | 358 |
| 444 | 240 | -323VFD | 2.371 | 5634 | 0.028 | 0.039 | 0.025 | 0.079 | 6 | 498 | 400 | 396 |
| 535 | 272.68 | -324VFD | 2.616 | 7592 | 0.024 | 0.033 | 0.025 | 0.071 | 6 | 555 | 445 | 441 |
| 646 | 300 | -326VFD | 2.878 | 9183 | 0.020 | 0.028 | 0.025 | 0.065 | 4 | 618 | 491 | 487 |
| 777 | 400 | -327VFD | 3.089 | 10834 | 0.016 | 0.025 | 0.025 | 0.060 | 4 | 687 | 546 | 537 |

- Cable diameters are subject to a +/- 5% manufacturing tolerance
- Ampacity in Free Air: Based on 30°C ambient temperature per 2023 NEC Table B.2(3)
- Ampacity in Cable Tray: Based on 30°C ambient temperature per 2023 NEC Table 310.16
- Ampacity in Conduit: Based on 30°C ambient temperature per 2023 NEC Table B.2(1)

STRANDING PROFILE

| Size AWG/kcmil | Size (mm ²) | Number of Strands | Uninsulated Conductor Diameter (inch) |
|-------------------|----------------------------|----------------------|--|
| 14 | 2.08 | 19 | 0.074 |
| 12 | 3.29 | 19 | 0.093 |
| 10 | 5.23 | 37 | 0.113 |
| 8 | 8.30 | 133 | 0.159 |
| 6 | 13.21 | 133 | 0.201 |
| 4 | 21.17 | 259 | 0.255 |
| 2 | 35 | 259 | 0.321 |
| 1 | 42.52 | 259 | 0.361 |
| 1/0 | 50 | 266 | 0.413 |
| 2/0 | 66.12 | 323 | 0.455 |
| 4/0 | 95 | 532 | 0.584 |
| 262 | 120 | 646 | 0.654 |
| 313 | 150 | 777 | 0.720 |
| 373 | 185 | 925 | 0.785 |
| 444 | 240 | 1110 | 0.860 |
| 535 | 272.68 | 1332 | 0.941 |
| 646 | 300 | 1591 | 1.029 |
| 777 | 400 | 1924 | 1.132 |



TC-ER VFD POWER CABLE

PVC Jacket • Three Conductor • 90°C • 600V



POWER CONDUCTORS (X3)

Soft annealed stranded bare copper per ASTM B3, B496

INSULATION

Low dielectric constant XLPE meeting XHHW-2 per UL 44

SYMMETRICAL GROUND CONDUCTORS (X3)

Three symmetrically placed stranded bare copper conductors in direct contact with the shield.

METALLIC SHIELD

Helically applied bare copper tape for provide 100% coverage.

JACKET

Flame retardant, moisture and sunlight resistant Polyvinyl Chloride (PVC) per UL 1277. Colored black.



RATINGS & APPROVALS

- UL Listed as Type TC-ER 600V
- 90°C Wet/Dry Temperature Rating
- FT-4/ IEEE 1202 Flame Rating
- Sunlight Resistant
- For Direct Burial



APPLICATION

TC-ER VFD cable is used to supply power to motors, or for connection to other power devices in industrial settings. Primary installations include cable trays, raceways, and outdoor locations supported by a messenger wire. Type TC-ER VFD is Listed for direct burial or in underground ducts and for use in Class 1, Division 2 hazardous locations and Class 1 control circuits. This cable may be used in wet or dry locations at temperatures not to exceed 90°C. The cable is specifically engineered for use in variable frequency AC motor drive (VFD) applications.

FEATURES

- Specially engineered cable design produces a longer cable life in VFD applications.
- Overall shield provides 100% coverage containing VFD EMI emissions.
- Symmetrical ground conductors reduce induced voltage imbalances and carry common mode noise back to the drive.
- Meets crush and impact requirements for Type MC
- AmerCable's specially formulated XLPE insulation material has a lower dielectric constant which withstands reflected voltages. This allows for longer output cable distances and minimizes the effect of high frequency noise induced into the plant ground system.
- Permitted for Exposed Run ("ER" use in accordance with the NEC 336.10(7).
- Permitted for use in Class I, Division 2 and Zone 2 industrial hazardous locations per the NEC.
- Gas and vapor tight – impervious to water and air.
- Bend radius 12X O.D.
- Color code per ICEA S-58-679 Method 4

37-600VFD • FLEXIBLE TC-ER VFD • 600 VOLTS

| Conductor Size | Wire Count | Part No. 37-600 | Conductor Diameter | Insulation Thickness | Insulation Diameter | Ground Size | Jacket Thickness | Jacket Diameter | Weight | NEC Ampacities | | | | | |
|----------------|------------|-----------------|--------------------|----------------------|---------------------|-------------|------------------|-----------------|--------|----------------|------|---------------|------|------------|------|
| | | | | | | | | | | In Free Air | | In Cable Tray | | In Conduit | |
| | | | | | | | | | | 90°C | 75°C | 90°C | 75°C | 90°C | 75°C |
| 14 | 7 | -508VFDCT | 0.073 | 0.030 | 0.145 | 18 | 0.060 | 0.460 | 162 | 15 | 15 | 15 | 15 | 15 | 15 |
| 12 | 7 | -516VFDCT | 0.092 | 0.030 | 0.165 | 16 | 0.060 | 0.495 | 208 | 20 | 20 | 20 | 20 | 20 | 20 |
| 10 | 7 | -308VFDCT | 0.112 | 0.030 | 0.180 | 14 | 0.060 | 0.530 | 269 | 30 | 30 | 30 | 30 | 30 | 30 |
| 8 | 7 | -309VFD | 0.141 | 0.045 | 0.242 | 14 | 0.060 | 0.665 | 384 | 65 | 57 | 55 | 50 | 48 | 43 |
| 6 | 7 | -310VFD | 0.169 | 0.045 | 0.269 | 12 | 0.060 | 0.725 | 522 | 87 | 77 | 75 | 65 | 65 | 58 |
| 4 | 7 | -312VFD | 0.213 | 0.045 | 0.312 | 12 | 0.060 | 0.820 | 719 | 114 | 101 | 95 | 85 | 89 | 79 |
| 2 | 7 | -314VFD | 0.268 | 0.045 | 0.369 | 10 | 0.080 | 0.980 | 1090 | 152 | 133 | 130 | 115 | 119 | 105 |
| 1 | 18 | -315VFD | 0.299 | 0.055 | 0.416 | 10 | 0.080 | 1.085 | 1321 | 177 | 156 | 145 | 130 | 137 | 121 |
| 1/0 | 18 | -316VFD | 0.336 | 0.055 | 0.451 | 10 | 0.080 | 1.160 | 1569 | 205 | 181 | 170 | 150 | 163 | 145 |
| 2/0 | 19 | -317VFD | 0.379 | 0.055 | 0.497 | 10 | 0.080 | 1.255 | 1904 | 237 | 208 | 195 | 175 | 186 | 166 |
| 3/0 | 18 | -318VFD | 0.423 | 0.055 | 0.540 | 8 | 0.080 | 1.355 | 2381 | 274 | 241 | 225 | 200 | 214 | 189 |
| 4/0 | 18 | -319VFD | 0.475 | 0.055 | 0.595 | 8 | 0.080 | 1.470 | 2847 | 316 | 277 | 260 | 230 | 253 | 223 |
| 250 | 36 | -330VFD | 0.520 | 0.065 | 0.667 | 6 | 0.080 | 1.630 | 3479 | 352 | 310 | 290 | 255 | 276 | 245 |
| 350 | 36 | -331VFD | 0.616 | 0.065 | 0.757 | 6 | 0.110 | 1.880 | 4662 | 433 | 381 | 350 | 310 | 345 | 305 |
| 500 | 36 | -333VFD | 0.736 | 0.065 | 0.880 | 6 | 0.110 | 2.145 | 6402 | 536 | 470 | 430 | 380 | 427 | 3798 |
| 750 | 61 | -334VFD | 0.908 | 0.080 | 1.090 | 4 | 0.110 | 2.600 | 9447 | 677 | 591 | 535 | 475 | 529 | 466 |

- Cable diameters are subject to a +/- 5% manufacturing tolerance
- Ampacity in Free Air: Based on 30°C ambient temperature per 2023 NEC Table B.2(3)
- Ampacity in Cable Tray: Based on 30°C ambient temperature per 2023 NEC Table 310.16
- Ampacity in Conduit: Based on 30°C ambient temperature per 2023 NEC Table B.2(1)



XLPE/PVC TC-ER VFD POWER CABLE

THREE CONDUCTOR • 90°C • 2000V



POWER CONDUCTORS (X3)

Soft annealed stranded bare copper per ASTM B3, B496

INSULATION

Low dielectric constant XLPE meeting RHH/RHW-2 per UL 44

SYMMETRICAL GROUND CONDUCTORS (X3)

Three symmetrically placed stranded bare copper conductors in direct contact with the shield.

METALLIC SHIELD

Helically applied bare copper tape for provide 100% coverage.

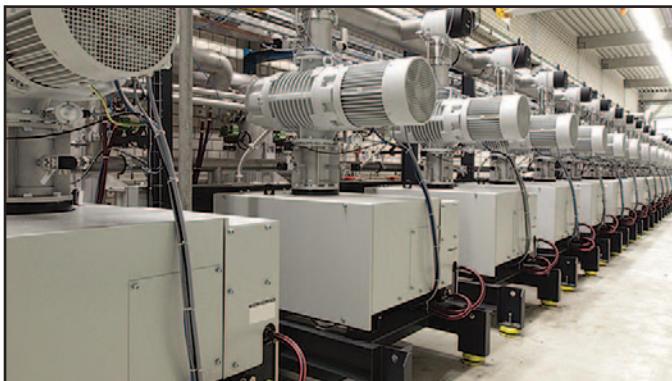
JACKET

Flame retardant, moisture and sunlight resistant Polyvinyl Chloride (PVC) per UL 1277. Colored black.



RATINGS & APPROVALS

- UL Listed as Type TC-ER 2000V
- 90°C Wet/Dry Temperature Rating
- FT-4/ IEEE 1202 Flame Rating
- Sunlight Resistant
- For Direct Burial



APPLICATION

TC-ER VFD cable is used to supply power to motors, or for connection to other power devices in industrial settings. Primary installations include cable trays, raceways, and outdoor locations supported by a messenger wire. Type TC-ER VFD is Listed for direct burial or in underground ducts and for use in Class 1, Division 2 hazardous locations and Class 1 control circuits. This cable may be used in wet or dry locations at temperatures not to exceed 90°C. The cable is specifically engineered for use in variable frequency AC motor drive (VFD) applications.

FEATURES

- Specially engineered cable design produces a longer cable life in VFD applications.
- Overall shield provides 100% coverage containing VFD EMI emissions.
- Symmetrical ground conductors reduce induced voltage imbalances and carry common mode noise back to the drive.
- Meets crush and impact requirements for Type MC
- AmerCable's specially formulated XLPE insulation material has a lower dielectric constant which withstands reflected voltages. This allows for longer output cable distances and minimizes the effect of high frequency noise induced into the plant ground system.
- Permitted for Exposed Run ("ER" use in accordance with the NEC 336.10(7).
- Permitted for use in Class I, Division 2 and Zone 2 industrial hazardous locations per the NEC.
- Gas and vapor tight – impervious to water and air.
- Bend radius 12X O.D.
- Color code per ICEA S-58-679 Method 4
- Cables are fully compliant with NFPA 79-2018

37-000VFD • TC-ER VFD • 2000 VOLTS

| Size AWG/ kcmil | Size mm ² | Part No. 37-000 | Nominal Diameter Inches* | Weight (Lbs./ 1000 Ft.) | DC Resist. @ 25°C (Ohms/ 1000 Ft.) | AC Resist. @ 90°C, 60 Hz (Ohms/ 1000 Ft.) | Inductive Reactance (Ohms/ 1000 Ft.) | Voltage Drop (Volts/Amp/ 1000 Ft.) | Grounding Conductor Size (3x) (AWG) | NEC Ampacities | | | | | |
|-----------------------|-------------------------|--------------------|--------------------------------|-------------------------------|---|--|---|--|--|----------------|------|------------------|------|---------------|------|
| | | | | | | | | | | In Free Air | | In Cable Tray | | In Conduit | |
| | | | | | | | | | | 90°C | 75°C | 90°C | 75°C | 90°C | 75°C |
| 14 | 2.1 | -508VFDCT | 0.570 | 158 | 2.680 | 3.350 | 0.046 | 4.684 | 18 | 15 | 15 | 15 | 15 | 15 | 15 |
| 12 | 3.3 | -516VFDCT | 0.610 | 199 | 1.680 | 2.100 | 0.043 | 2.951 | 16 | 20 | 20 | 20 | 20 | 20 | 20 |
| 10 | 5.2 | -308VFDCT | 0.655 | 258 | 1.060 | 1.325 | 0.040 | 1.876 | 14 | 30 | 30 | 30 | 30 | 30 | 30 |
| 8 | 8.3 | -309VFD | 0.770 | 368 | 0.6663 | 0.8329 | 0.040 | 1.194 | 14 | 65 | 57 | 55 | 50 | 48 | 43 |
| 6 | 13.2 | -310VFD | 0.885 | 517 | 0.4192 | 0.5240 | 0.038 | 0.765 | 12 | 87 | 77 | 75 | 65 | 65 | 58 |
| 4 | 21 | -312VFD | 0.975 | 814 | 0.2636 | 0.3295 | 0.036 | 0.493 | 12 | 114 | 101 | 95 | 85 | 89 | 79 |
| 2 | 35 | -314VFD | 1.090 | 1178 | 0.1659 | 0.2074 | 0.034 | 0.322 | 10 | 152 | 133 | 130 | 115 | 119 | 105 |
| 1 | 43 | -315VFD | 1.225 | 1462 | 0.1315 | 0.1644 | 0.034 | 0.263 | 10 | 177 | 156 | 145 | 130 | 137 | 121 |
| 1/0 | 50 | -316VFD | 1.330 | 1714 | 0.1042 | 0.1304 | 0.033 | 0.215 | 10 | 205 | 181 | 170 | 150 | 163 | 145 |
| 2/0 | 66 | -317VFD | 1.420 | 1951 | 0.0827 | 0.1034 | 0.032 | 0.176 | 10 | 237 | 208 | 195 | 175 | 186 | 166 |
| 3/0 | 86 | -318VFD | 1.520 | 2607 | 0.0655 | 0.0819 | 0.031 | 0.146 | 8 | 274 | 241 | 225 | 200 | 214 | 189 |
| 4/0 | 95 | -319VFD | 1.635 | 3102 | 0.0520 | 0.0653 | 0.030 | 0.122 | 8 | 316 | 277 | 260 | 230 | 253 | 223 |
| 250 | 126 | -330VFD | 1.855 | 3836 | 0.0440 | 0.0553 | 0.030 | 0.108 | 8 | 352 | 310 | 290 | 255 | 276 | 245 |
| 350 | 178 | -331VFD | 2.060 | 5141 | 0.0314 | 0.0396 | 0.029 | 0.085 | 6 | 433 | 381 | 350 | 310 | 345 | 305 |
| 500 | 250 | -333VFD | 2.325 | 6977 | 0.0220 | 0.0280 | 0.028 | 0.068 | 6 | 536 | 470 | 430 | 380 | 427 | 378 |
| 750 | 379 | -334VFD | 2.809 | 10051 | 0.0147 | 0.0191 | 0.028 | 0.055 | 4 | 677 | 591 | 535 | 475 | 529 | 467 |

- Cable diameters are subject to a +/- 5% manufacturing tolerance
- Ampacity in Free Air: Based on 30°C ambient temperature per 2023 NEC Table B.2(3)
- Ampacity in Cable Tray: Based on 30°C ambient temperature per 2023 NEC Table 310.16
- Ampacity in Conduit: Based on 30°C ambient temperature per 2023 NEC Table B.2(1)



EXTRA FLEXIBLE VFD POWER CABLE

GEXOL® INSULATED • TC-ER

Three Conductor • 2kV • Rated 110°C



Power Conductors (x3)

Soft annealed flexible stranded tinned copper per IEEE 1580 Table 11.

Insulation (2kV)

Gexol® cross-linked flame retardant polyolefin, meeting the requirements for Type P of IEEE 1580 and Type X110 of UL 1309/CSA 245. Color: Gray with printed phase I.D. (Black-White-Red)

Jacket

A black, arctic grade, flame retardant, oil, abrasion, chemical and sunlight resistant thermosetting compound meeting UL 1309/CSA 245 and IEEE 1580.

Armor (Optional)

Tinned copper basket weave wire armor per IEEE 1580 and UL 1309/CSA 245.

Ground Conductors (x3)

Soft annealed flexible stranded tinned copper per IEEE 1580 Table 11. Gexol® insulated and sized per UL 1277. Color: Green

Shield

Overall tinned copper braid plus aluminum/polyester tape providing 100% coverage.

Sheath (Optional)

A black, arctic grade, flame retardant, oil, abrasion, chemical and sunlight resistant thermosetting compound meeting UL 1309/CSA 245 and IEEE 1580.

Note: For armored versions the braid is placed between the inner jacket and outer sheath where it serves as both the EMI shield and armor.

Ratings & Approvals

- 110°C Temperature Rating
- UL Listed as Marine Shipboard Cable: (E111461)
- UL Listed as Type TC-ER (E123629)
- United States Coast Guard: November 2, 1987 / 9304
- CSA listed as Marine Shipboard Cable (82346)
- Flame resistance: IEEE 1202/FT-4
- Sunlight resistant

Halogen-Free and Fire Resistant constructions available by request.

APPLICATION

A flexible, braid and foil shielded, 2kV power cable specifically engineered for use in variable frequency AC motor drive (VFD) applications.

FEATURES

- Specially engineered cable design produces a longer cable life in VFD applications.
- Overall braid plus foil shield is engineered with 100% coverage and a surface transfer impedance <50 milliohms at 10MHz to contain EMI.
- Symmetrical insulated ground conductors reduce induced voltage imbalances and carry common mode noise back to the drive.
- High strand count conductors and braid shield design is much more flexible, easier to install and more resistant to vibration than Type MC cable.
- Gexol's lower dielectric constant (standard XLPEs, EPRs and other Type P insulation materials have higher dielectric constants) reduces reflected wave peak voltage magnitudes. This allows for longer output cable distances and minimizes the effect of high frequency noise induced into the plant ground system.
- 2kV insulation thickness is used to resist the potential 2-3x reflected voltages experienced in 600V VFD applications.
- Dual certified IEEE 1580 Type P and UL 1309/CSA 245 Type X110.
- Highest ampacity ratings: ABS 100°C, DNV 95°C, LRS 95°C, Transport Canada 95°C.
- Severe cold durability: exceeds CSA cold bend/cold impact (-40°C/-35°C).
- Flame retardant: IEC 332-3 Category A and IEEE 1202.
- Optional braid armor of bronze, aluminum or tinned copper.

Gexol® is a registered trademark of AmerCable Incorporated

37-102VFD • *EXTRA FLEXIBLE* VFD POWER CABLE GEXOL® INSULATED

| | | Unarmored | | | Armored & Sheathed (TS) | | | Grounding Conductor* Size (AWG) | NEC Ampacities | | |
|----------------|-----------------|-----------------|--------------------------|----------------------|-------------------------|--------------------------|----------------------|---------------------------------|----------------|---------------|------------|
| Size AWG/kcmil | mm ² | Part No. 37-102 | Nominal Diameter Inches* | Weight Lbs./1000 Ft. | Part No. 37-102 | Nominal Diameter Inches* | Weight Lbs./1000 Ft. | | In Free Air | In Cable Tray | In Conduit |
| 4 | 21 | -312VFD | 1.100 | 925 | -312TSVFD | 1.262 | 1138 | 12 | 114 | 95 | 89 |
| 2 | 34 | -314VFD | 1.235 | 1421 | -314TSVFD | 1.392 | 1512 | 10 | 152 | 130 | 119 |
| 1 | 43 | -315VFD | 1.340 | 1517 | -315TSVFD | 1.509 | 1851 | 10 | 177 | 145 | 137 |
| 1/0 | 54 | -316VFD | 1.450 | 1803 | -316TSVFD | 1.615 | 2136 | 10 | 205 | 170 | 163 |
| 2/0 | 70 | -317VFD | 1.580 | 2120 | -317TSVFD | 1.792 | 2660 | 10 | 237 | 195 | 186 |
| 3/0 | 86 | -318VFD | 1.750 | 2827 | -318TSVFD | 1.959 | 3269 | 8 | 274 | 225 | 214 |
| 4/0 | 109 | -319VFD | 1.900 | 3416 | -319TSVFD | 2.101 | 3864 | 8 | 316 | 260 | 253 |
| 262 | 132 | -320VFD | 2.050 | 4210 | -320TSVFD | 2.258 | 4661 | 6 | 362 | 297 | 286 |
| 313 | 159 | -321VFD | 2.130 | 5105 | -321TSVFD | 2.353 | 5325 | 6 | 403 | 328 | 319 |
| 373 | 189 | -322VFD | 2.275 | 5521 | -322TSVFD | 2.483 | 6674 | 6 | 449 | 362 | 358 |
| 444 | 227 | -323VFD | 2.425 | 6440 | -323TSVFD | 2.634 | 6994 | 6 | 498 | 400 | 396 |
| 535 | 273 | -324VFD | 2.643 | 7547 | -324TSVFD | 2.931 | 8477 | 6 | 556 | 445 | 441 |
| 646 | 326 | -326VFD | 2.920 | 8916 | -326TSVFD | 3.178 | 9888 | 4 | 618 | 491 | 487 |
| 777 | 394 | -327VFD | 3.102 | 10909 | -327TSVFD | 3.510 | 11803 | 4 | 687 | 546 | 537 |

- Cable diameters are subject to a +/- 5% manufacturing tolerance
- Ampacity in Free Air: Based on 30°C ambient temperature per 2023 NEC Table B.2(3)
- Ampacity in Cable Tray: Based on 30°C ambient temperature per 2023 NEC Table 310.16
- Ampacity in Conduit: Based on 30°C ambient temperature per 2023 NEC Table B.2(1)



CIR®-2 TYPE VFD POWER CABLE UL LISTED AS TYPE TC-ER

THREE CONDUCTOR • GEXOL® INSULATED • 600V • RATED 90°C

POWER CONDUCTORS (3)

Soft annealed flexible stranded tinned copper per IEEE 1580 Table 11.

INSULATION (2kV)

Gexol® cross-linked flame retardant polyolefin, meeting the requirements for Type P of IEEE 1580 and Type X110 of UL 1309/CSA 245.

Color: Gray with printed phase I.D. (Black-Red-Blue)

JACKET

A black, flame retardant, oil, abrasion, chemical and sunlight resistant thermoset CPE meeting UL 1309/CSA 245 and IEEE 1580.

GROUND CONDUCTORS (3)

Soft annealed flexible stranded tinned copper per IEEE 1580 Table 11. Gexol® insulation sized per UL 1277. Color: Green

Note: Sizes over 1" OD have uninsulated grounds

SHIELD

Overall tinned copper braid plus aluminum/polyester tape providing 100% coverage.



CIR-2 VFD POWER CABLE RATINGS & APPROVALS

- 90°C temperature rating
- UL Listed as Type TC-ER – Suitable for use in Class I, Div 2 and Zone 2 environments
- Flame Retardant – IEEE 1202
- Suitable for use in Class I, Div 2 and Zone 2 environments

APPLICATION

A flexible braid and foil shielded power cable specifically engineered for use in variable frequency AC motor drive (VFD) applications where user requires crush and impact protection.

FEATURES

- Specially engineered cable design produces longer service life in VFD applications.
- Overall braid and foil shield provides 100% coverage containing VFD EMI emissions.
- Symmetrical insulated ground conductors reduce induced voltage imbalances and carry common mode noise back to the drive.
- High strand count conductors and braid shield design is much more flexible, easier to install and more resistant to vibration than Type MC.
- GEXOL's lower dielectric constant (standard XLPEs, EPRs and other Type P insulation materials have higher dielectric constants) reduces reflected wave peak voltage magnitudes. This allows for longer output cable distances and minimizes the effect of high frequency noise induced into the plant ground system.
- 2kV insulation thickness resists the repetitive 2x voltage spikes from 600V VFDs and reduces drive over current trip problems due to cable charging current.
- Passes the same stringent crush and impact testing required by UL 2225 for Type MC-HL
- Gas & vapor tight – impervious to water and air

CIR-2 vs. TYPE MC

- Smaller bend radius (up to 40% smaller)
- Reduced tray fill (up to 35% less)
- Considerably more flexible
- Reduced installation time and cost
- Glands cost up to 50% LESS

37-102 CIRVA2 • FLEXIBLE TC-ER GEXOL® INSULATED

| Size AWG/ kcmil | Part No. 37-102- | Nominal Diameter Inches | Weight Per 1000 Ft. | DC Resistance @ 25°C (Ohms/1k ft) | AC Resistance @ 90°C, 60 Hz (Ohms/1k ft) | Inductive Reactance (Ohms/1k ft) | Voltage Drop @ 90°C (Volts/Amp/ 1k ft) | Green Insulated Grounding Size (AWG) | NEC Ampacities | | |
|-----------------------|---------------------|-------------------------------|---------------------------|--|---|--|---|---|-------------------|---------------------|---------------|
| | | | | | | | | | In Free Air | In Cable Tray | In Conduit |
| 14 | 508CIRVA2 | 0.742 | 283 | 2.907 | 3.635 | 0.040 | 5.073 | 18 | | 15 | 15 |
| 12 | 516CIRVA2 | 0.815 | 378 | 1.826 | 2.283 | 0.038 | 3.199 | 18 | 20 | 20 | 20 |
| 10 | 308CIRVA2 | 0.871 | 473 | 1.153 | 1.441 | 0.036 | 2.032 | 14 | 30 | 30 | 30 |
| 8 | 309CIRVA2 | 0.893 | 553 | 0.708 | 0.885 | 0.037 | 1.263 | 14 | 65 | 55 | 48 |
| 6 | 310CIRVA2 | 1.093 | 797 | 0.445 | 0.556 | 0.033 | 0.804 | 12 | 87 | 75 | 65 |
| 4 | 312CIRVA2 | 1.225 | 929 | 0.300 | 0.376 | 0.031 | 0.552 | 12 | 114 | 95 | 89 |
| 2 | 314CIRVA2 | 1.341 | 1276 | 0.184 | 0.230 | 0.029 | 0.348 | 10 | 152 | 130 | 119 |
| 1 | 315CIRVA2 | 1.447 | 1576 | 0.147 | 0.184 | 0.029 | 0.285 | 10 | 177 | 145 | 137 |
| 1/0 | 316CIRVA2 | 1.566 | 2144 | 0.117 | 0.147 | 0.029 | 0.234 | 10 | 205 | 170 | 163 |
| 2/0 | 317CIRVA2 | 1.733 | 2144 | 0.093 | 0.117 | 0.028 | 0.192 | 10 | 237 | 195 | 186 |
| 4/0 | 319CIRVA2 | 1.874 | 3131 | 0.058 | 0.075 | 0.027 | 0.132 | 8 | 316 | 260 | 253 |
| 262 | 320CIRVA2 | 2.031 | 3875 | 0.048 | 0.063 | 0.027 | 0.115 | 6 | 362 | 297 | 284 |
| 313 | 321CIRVA2 | 2.130 | 4709 | 0.040 | 0.053 | 0.026 | 0.100 | 6 | 403 | 328 | 319 |
| 373 | 322CIRVA2 | 2.257 | 5209 | 0.034 | 0.045 | 0.025 | 0.088 | 6 | 449 | 362 | 358 |
| 444 | 323CIRVA2 | 2.400 | 6310 | 0.028 | 0.039 | 0.025 | 0.080 | 6 | 498 | 400 | 396 |
| 535 | 324CIRVA2 | 2.705 | 7193 | 0.024 | 0.033 | 0.026 | 0.072 | 6 | 555 | 445 | 441 |
| 646 | 326CIRVA2 | 2.898 | 9217 | 0.020 | 0.028 | 0.026 | 0.065 | 4 | 618 | 491 | 487 |
| 777 | 327CIRVA2 | 3.102 | 10340 | 0.016 | 0.025 | 0.025 | 0.060 | 4 | 687 | 546 | 537 |



- Cable diameters are subject to a +/- 5% manufacturing tolerance
- Ampacity in Free Air: Based on 30°C ambient temperature per 2023 NEC Table B.2(3)
- Ampacity in Cable Tray: Based on 30°C ambient temperature per 2023 NEC Table 310.16
- Ampacity in Conduit: Based on 30°C ambient temperature per 2023 NEC Table B.2(1)

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MMV-VFD POWER CABLE

Three Conductor: 8kV – 15kV • 133% Insulation Level • Rated 90°C



Conductors (3)

Soft annealed flexible stranded tinned copper per IEEE 1580 Table 11.

Insulation

Extruded thermosetting 90°C Ethylene Propylene Rubber (EPR), meeting UL 1309 (Type E), IEEE 1580 (Type E) and UL 1072.

Insulation Shield

Composite shield consisting of 0.0126" tinned copper braided with nylon providing 60% copper shielded coverage meeting UL 1309, IEEE Std. 1580, and UL 1072. The nylon is colored for easy phase identification (three conductor = black, blue, red) without the need to remove the shield to find an underlying colored tape.

**Low smoke
halogen-free
jacket available.**

**Contact your
AmerCable rep.**

Conductor Shield

A combination of semi-conducting tape and extruded thermosetting semi-conducting material meeting UL 1309, IEEE 1580 and UL1072.

Insulation Shield

Semi-conducting layer meeting UL 1309, IEEE 1580 and UL 1072.

Symmetrical Insulated Grounding Conductors (3)

Soft annealed flexible stranded tinned copper conductor per IEEE 1580 Table 11. Gexol Insulation sized per Table 23.2 of UL1072. Color: Green

Jacket

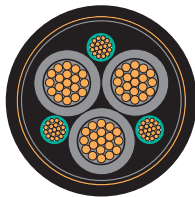
A black, arctic grade, flame retardant, oil, abrasion, chemical and sunlight resistant thermosetting compound meeting UL 1309/CSA 245, IEEE 1580, and UL 1072. This jacket allows for isolation between the insulation shields and overall shield. Shields can then be terminated on opposite ends to minimize circulating currents.

Armor/EMI Shield

Overall tinned copper braid plus aluminum/polyester tape provides 100% coverage. This braid serves as both an armor and EMI shield meeting both IEEE 1580 and UL 1307/CSA 245.

Sheath (optional)

A black, arctic grade, flame retardant, oil, abrasion, chemical and sunlight resistant thermosetting compound meeting UL 1309/CSA 245, IEEE 1580, and UL 1072. Colored jackets for signifying different voltage levels are also available on special request (orange = 8kV and red = 15kV).



APPLICATIONS

A flexible, braid and foil shielded, power cable specifically engineered for use in medium voltage variable frequency AC drive (VFD) applications.

FEATURES

- Flexible stranded conductors and braided shields. Suitable for applications involving repeated flexing and high vibration.
- Small minimum bending radius (8x OD) for easy installation.
- Insulation has a very low dielectric constant. This allows for longer output cable distances and minimizes common mode current.
- Overall braid plus foil shield is engineered with 100% coverage and a surface transfer impedance <50 milliohms at 10MHz to contain EMI.
- Symmetrical insulated ground conductors reduce induced voltage imbalances and carry common mode noise back to the drive.
- High strand count conductors and braid shield design is much more flexible, easier to install and more resistant to vibration than Type MC cable.
- Severe cold durability: exceeds CSA cold bend/cold impact (-40°C/-35°C).
- Flame retardant: IEC 332-3 Category A and IEEE 1202.
- Suitable for use in Class I, Division 1, and Zone 1 environments.

Ratings & Approvals

- UL Listed as Marine Shipboard Cable (E111461)
- American Bureau of Shipping (ABS)
- Det Norske Veritas (DNV) Pending
- Lloyd's Register of Shipping (LRS) Pending
- 90°C Temperature Rating
- Voltage Rating – 8kV to 15kV (25kV available on request)



THREE CONDUCTOR TYPE MMV-VFD MEDIUM VOLTAGE – 8KV • 133% INSULATION LEVEL

| | | Ampacity | | | | | | | | | |
|-----------------------|------|--------------------|---------------------------------|-------------------------------|--------------------------|--|---|---|---|--|--|
| Size AWG/ kcmil | mm2 | Part No. 37-105 | Nominal Diameter (inches) | Weight (Lbs./ 1000 Ft.) | In Free Air (amps) | Single Banked in Trays (amps) | DC Resistance at 25°C (ohms/1000 Ft.) | AC Resistance at 90°C, 60Hz (ohms/1000 Ft.) | Inductive Reactance (ohms/ 1000 Ft.) | Voltage Drop (Volts per amp per 1000 Ft.) | Green Insulated Grounding Conductor (3x) Size (AWG) |
| 6 | 12.5 | -332TSVFD | 1.687 | 1634 | 93 | 83 | 0.445 | 0.556 | 0.048 | 0.820 | 10 |
| 4 | 21 | -333TSVFD | 1.868 | 2074 | 120 | 105 | 0.300 | 0.376 | 0.043 | 0.564 | 10 |
| 2 | 34 | -334TSVFD | 2.071 | 2625 | 165 | 145 | 0.184 | 0.230 | 0.040 | 0.359 | 10 |
| 1 | 43 | -335TSVFD | 2.161 | 3022 | 185 | 165 | 0.147 | 0.184 | 0.038 | 0.294 | 8 |
| 1/0 | 54 | -336TSVFD | 2.262 | 3373 | 215 | 195 | 0.117 | 0.147 | 0.037 | 0.242 | 8 |
| 2/0 | 70 | -337TSVFD | 2.381 | 3826 | 245 | 220 | 0.093 | 0.117 | 0.036 | 0.199 | 8 |
| 3/0 | 86 | -338TSVFD | 2.489 | 4411 | 285 | 250 | 0.074 | 0.094 | 0.035 | 0.166 | 6 |
| 4/0 | 109 | -339TSVFD | 2.631 | 5093 | 325 | 290 | 0.058 | 0.075 | 0.033 | 0.139 | 6 |
| 262 | 132 | -340TSVFD | 3.857 | 5993 | 369 | 323 | 0.048 | 0.063 | 0.032 | 0.121 | 6 |
| 313 | 159 | -341TSVFD | 3.030 | 6867 | 407 | 359 | 0.040 | 0.053 | 0.032 | 0.106 | 6 |
| 373 | 189 | -342TSVFD | 3.164 | 7810 | 450 | 398 | 0.034 | 0.045 | 0.031 | 0.094 | 4 |
| 444 | 227 | -343TSVFD | 3.319 | 8855 | 497 | 438 | 0.028 | 0.039 | 0.030 | 0.085 | 4 |
| 535 | 273 | -344TSVFD | 3.492 | 9905 | 554 | 484 | 0.024 | 0.033 | 0.030 | 0.076 | 4 |

• Cable diameters are subject to a +/- 5% manufacturing tolerance

THREE CONDUCTOR TYPE MMV-VFD MEDIUM VOLTAGE 15KV • 133% INSULATION LEVEL

| | | Ampacity | | | | | | | | | |
|-----------------------|-----|--------------------|---------------------------------|-------------------------------|--------------------------|--|---|---|---|--|--|
| Size AWG/ kcmil | mm2 | Part No. 37-105 | Nominal Diameter (inches) | Weight (Lbs./ 1000 Ft.) | In Free Air (amps) | Single Banked in Trays (amps) | DC Resistance at 25°C (ohms/1000 Ft.) | AC Resistance at 90°C, 60Hz (ohms/1000 Ft.) | Inductive Reactance (ohms/ 1000 Ft.) | Voltage Drop (Volts per amp per 1000 Ft.) | Green Insulated Grounding Conductor (3x) Size (AWG) |
| 2 | 34 | -357TSVFD | 2.403 | 3231 | 165 | 145 | 0.184 | 0.230 | 0.0440 | 0.364 | 10 |
| 1 | 43 | -358TSVFD | 2.468 | 2959 | 185 | 165 | 0.147 | 0.184 | .0430 | 0.299 | 8 |
| 1/0 | 54 | -359TSVFD | 2.596 | 4090 | 215 | 195 | 0.117 | 0.147 | .041 | 0.246 | 8 |
| 2/0 | 70 | -360TSVFD | 2.714 | 4615 | 245 | 220 | 0.093 | 0.117 | 0.0390 | 0.203 | 8 |
| 3/0 | 86 | -361TSVFD | 2.875 | 5306 | 285 | 250 | 0.074 | 0.094 | .038 | 0.170 | 6 |
| 4/0 | 109 | -362TSVFD | 3.028 | 6131 | 325 | 290 | 0.058 | 0.075 | 0.037 | 0.142 | 6 |
| 262 | 132 | -363TSVFD | 3.260 | 7074 | 369 | 323 | 0.048 | 0.063 | 0.035 | 0.124 | 6 |
| 313 | 159 | -364TSVFD | 3.363 | 7787 | 407 | 359 | 0.040 | 0.053 | 0.034 | 0.109 | 6 |
| 373 | 189 | -365TSVFD | 3.500 | 8703 | 450 | 398 | 0.034 | 0.045 | 0.034 | 0.097 | 4 |
| 444 | 227 | -366TSVFD | 3.652 | 9912 | 497 | 438 | 0.028 | 0.039 | 0.033 | 0.080 | 4 |

- Cable diameters are subject to a +/- 5% manufacturing tolerance
- Ampacity in Free Air: Based on 90°C conductor temperature and 40C ambient temperature per 2023 NEC Table 315.60(C)(5)
- Ampacity in Tray: Based on 90°C conductor temperature and 40C ambient temperature per 2023 NEC Table 315.60(C)(9)

CABLE SELECTION GUIDE FOR VFD APPLICATIONS

The circuit of a typical voltage source PWM drive is shown in Figure 1. Each part of the equipment is bonded to the safety earth system to ensure personnel safety if faults occur.

All parts have capacitance to ground shown by:

- CM for the motor windings.
- CC1 and CC2 for the power converter circuits.
- CT for the transformer's secondary winding to the transformers' screen.

The IGBT switches are in constant operation at high frequency and this produces an inverter output voltage with a PWM wave shape as shown by the voltage V1 (Figure 1).

This IGBT switches also cause a motor line to ground voltage V2 (Figure 1), normally called a common mode voltage.

The common mode voltages cause short high-frequency pulses of common mode current to flow in the safety earth circuits, shown by currents I1 and I2 (Figure 1), unless the design includes cable features to stop this from happening.

It is essential that the common mode currents return to the inverter without causing EMC - EMI problems in other equipment, and this means that the common mode currents I1 and I2 must not flow in the safety earthing system.

For the motor, this is achieved by connecting a set of wires from the motor to the inverter that run with the main power cables. These are called symmetrical grounding conductors, see Figure 2. These conductors have a very low impedance compared with the other return path via the safety earthing system.

The three symmetrical grounding conductors and overall shields are connected as shown in Figure 3. This 360° connection is essential.

The common mode currents I1 and I2 now flow in the symmetrical grounding conductors. This happens because the symmetrical grounding conductors are close to the power conductors giving a low impedance route for the currents I1 and I2 compared with the safety earthing system. As I1 and I2 flow near the power conductors this avoids creating external EMC - EMI problems.

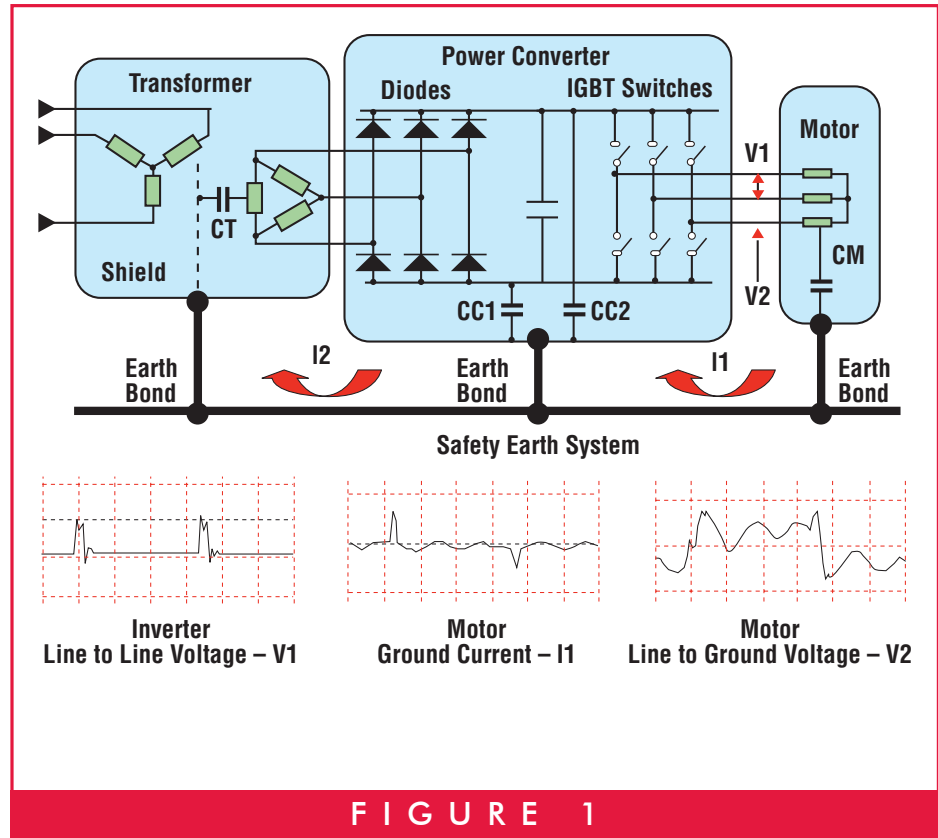
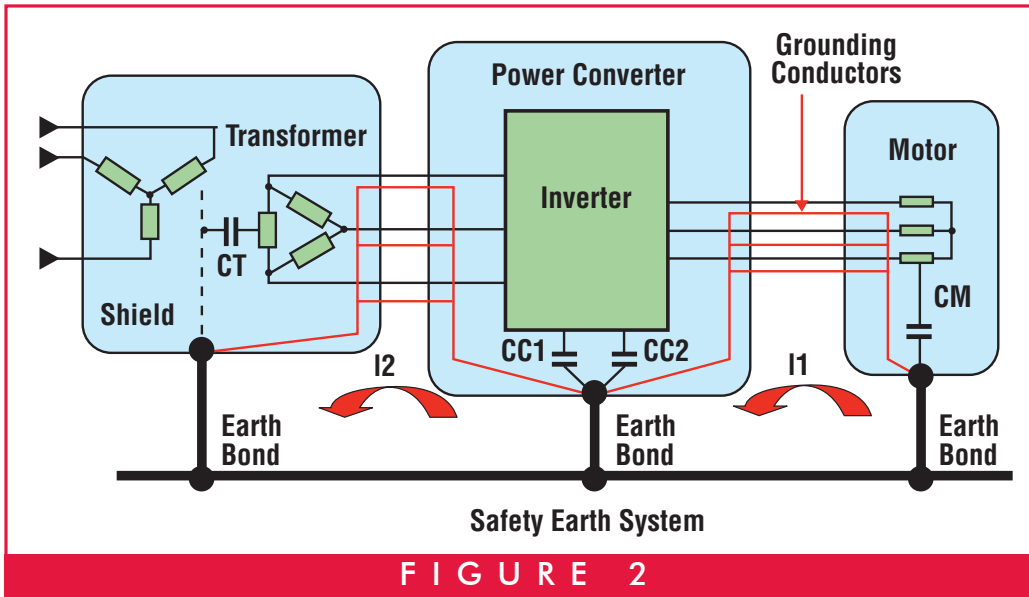


FIGURE 1

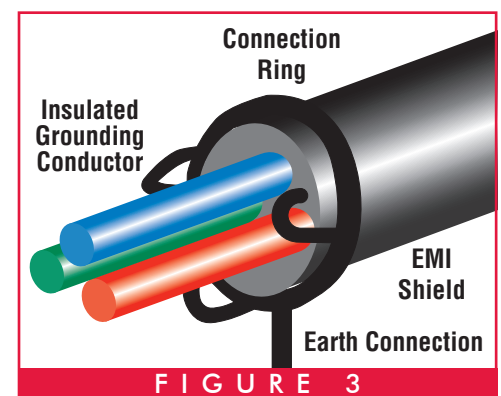


If symmetrical grounding conductors and an overall EMI shield are not used, EMC - EMI problems are very likely to occur.

For cables used with voltage source PWM drives, a number of features are required to ensure correct operation, avoid overheating and achieve longer service life.

The essential features of a medium voltage cable for PWM drives are :

- Insulation designed to withstand the transients produced by the PWM
- Insulation with a dielectric constant no greater than 3.0 to minimize capacitance
- Voltage rating of 3x the operating voltage to prevent corona
- Three symmetrical grounding conductors. Some cables only have one grounding conductor. This is not acceptable as it produces circulating currents in the earth system
- Extremely fine strands to carry the harmonic currents without overheating (i.e. the inductance of fine stranded conductors is less than 7, 19, 37 strand conductors)
- Overall shield to stop the radiation of voltage EMI fields
- Correct termination at both ends
- Semi-conducting shield around each insulation layer (MMV only)
- Metallic layer around each semi-conducting shield to earth the semi-conducting shield (MMV only).



Figures 1 - 3 courtesy of Convertteam



AmerCable manufactures high-quality flexible VFD cables for a wide variety of specialized industrial applications. As an ISO 9001:2015 certified cable manufacturer, AmerCable combines leading-edge technology, proven manufacturing techniques, and high-quality service to deliver the finest industrial and utility cable products available.



AmerCable serves a worldwide customer base from our manufacturing facility in El Dorado, Arkansas. Our professional field engineering and sales force work directly with customers, or in partnership with our network of independent distributors, to identify and fulfill your specific cable requirements.



Made in America

FOLLOW US!



| VFD Maximum Horsepower* | | | | |
|--------------------------|-----------|---------|---------|---------|
| Part Number [†] | AWG/kcmil | 230V 3Φ | 460V 3Φ | 575V 3Φ |
| -508VFD | 14 | 3 HP | 7.5 HP | 10 HP |
| -516VFD | 12 | 5 HP | 10 HP | 10 HP |
| -308VFD | 10 | 7.5 HP | 15 HP | 20 HP |
| -309VFD | 8 | 15 HP | 40 HP | 50 HP |
| -310VFD | 6 | 25 HP | 50 HP | 60 HP |
| -312VFD | 4 | 30 HP | 60 HP | 75 HP |
| -314VFD | 2 | 40 HP | 75 HP | 100 HP |
| -315VFD | 1 | 50 HP | 100 HP | 125 HP |
| -316VFD | 1/0 | 60 HP | 125 HP | 150 HP |
| -317VFD | 2/0 | 60HP | 150 HP | 200 HP |
| -319VFD | 4/0 | 100 HP | 200 HP | 250 HP |
| -320VFD | 262 | 100 HP | 200 HP | 300 HP |
| -321VFD | 313 | 125 HP | 250 HP | 300 HP |
| -322VFD | 373 | 125 HP | 250 HP | 350 HP |
| -323VFD | 444 | 150 HP | 300 HP | 400 HP |
| -324VFD | 535 | 150 HP | 350 HP | 450 HP |
| -326VFD | 646 | 200 HP | 400 HP | 500 HP |
| -327VFD | 777 | - | 450 HP | - |

*Recommended horsepowers are based on the Full-Load Current in Table 430.250 of the 2008 NEC and multiplied by 1.25 according to Article 430.22(A). The cable ampacities are based on 90°C conductor and cable installed in free based on Table B.310.3 in the NEC.

Actual horsepower will be subject to drive/motor manufacturer nameplate full-load current and local authority having jurisdiction.

[†] Complete part number can be determined by selecting the appropriate construction and adding the part number prefix (e.g. 37-102-319VFD for 4/0 Standard Gexol VFD)



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