OKONITE C-L-X VFD CABLE SELECTION GUIDE BY MOTOR SIZE
General Guidelines for Typical Installations

OKO Cat #	AWG	Armor OD (in) without jacket	Overall OD (in)	230V 3ph	460V 3ph	575V 3ph	2300V 3ph
546-31-3403	14	0.53	0.64	1/2 to 3 HP	1/2 to 7 1/2 HP	1 TO 10 HP	
546-31-3453	12	0.58	0.69	5 HP	10 HP	--	
546-31-3503	10	0.62	0.73	7 1/2 HP	15 HP	15 to 20 HP	
571-31-3190	8	0.71	0.81	10 to 15 HP	20 HP to 30 HP	25 to 40 HP	
571-31-3191	6	0.80	0.90	20 HP	40 HP	50 HP	
571-31-3200	4	0.89	0.00	25 HP	50 HP	60 HP	
571-31-3204	2	1.02	1.13	30 to 40 HP	60 to 75 HP	75 to 100 HP	
571-31-3213	1/0	1.24	1.34	50 HP	100 HP	125 HP	
571-31-3216	2/0	1.34	1.44	60 HP	125 HP	150 HP	
571-31-3224	4/0	1.60	1.73	75 HP	150 HP	200 HP	
571-31-3228	250	1.74	1.87	75 HP	150 HP	200 HP	
571-31-3236	350	1.96	2.09	100 HP	200 HP	250 HP	
571-31-3244	500	2.28	2.44		250 HP	300 to 350 HP	
571-31-3248	750	2.75	2.92		300 to 350 HP	400 to 450 HP	
*571-31-3252	1000	3.11	3.30		400 HP	500 HP	
571-21-3200	4	1.19	1.30				60 to 350 HP
571-21-3204	2	1.34	1.45				400 to 450 HP
571-21-3217	2/0	1.60	1.73				500 HP

* non-stock

OKONITE NON-ARMORED (TC-ER) VFD CABLE SELECTION GUIDE BY MOTOR SIZE
General Guidelines for Typical Installations

OKO Cat #	AWG/ kcmil	Overall OD (in)	230V 3ph	460v 3ph	575V 3ph
202-31-6414	14	0.41	1/2 to 3 HP	1/2 to 7½ HP	1 to 10 HP
202-31-6412	12	0.45	5 HP	10 HP	-
202-31-6410	10	0.50	7½ HP	15 HP	15 to 20 HP
112-31-6408	8	0.65	10 to 15 HP	20 to 30 HP	25 to 40 HP
112-31-6406	6	0.73	20 HP	40 HP	50 HP
112-31-6404	4	0.82	25 HP	50 HP	60 HP
112-31-6402	2	0.98	30 to 40 HP	60 to 75 HP	75 to 100 HP
112-31-6410	1/0	1.19	50 HP	100 HP	125 HP
112-31-6412	2/0	1.27	60 HP	125 HP	150 HP
112-31-6414	4/0	1.49	75 HP	150 HP	200 HP
112-31-6420	250	1.64	75 HP	150 HP	200 HP
112-31-6425	350	1.90	100 HP	200 HP	250 HP
112-31-6430	500	2.15		250 HP	300 to 350 HP
112-31-6440	750	2.58		300 to 350 HP	400 to 450 HP
112-31-6450	1000	2.97		400 HP	500 HP

NOTES:

•Selection based on NEC 2017 Table 430.250 Full-Load Current, 3 ph AC motors and NEC 2017 Article 430.22 Conductors that supply a single motor used in a continuous duty application shall have an ampacity of not less than 125% of the motor's full-load current rating.
•Ampacity ratings of the 230V, 460V, and 575V cables are based on NEC 2017 Table 310.15(B)(16) for 90°C rated conductors and limited for small conductors by NEC 2017 Article 240.4(D).
•Ampacity ratings of the 2300V cables are based on NEC 2017 Table 310.60(C)(71) for 90°C rated conductors.
•Consult drive/motor manufacturer for exact FLA ratings as well as any temperature deratings that may apply.
•Consult drive manufacturer for recommended maximum cable lengths between drive and motor.
•Consult Okonite for cable recommendations on 4160V and higher.

Okonite Cables

Facilities Overview

District Offices, Manufacturing Plants & Service Centers

Manufacturing Plants


Orangeburg, SC - Compound Facility


Orangeburg, SC - Manufacturing Plant


Richmond, KY - Manufacturing Plant


Santa Maria, CA - Manufacturing Plant


Cumberland, RI - Manufacturing Plant


Paterson, NJ - Manufacturing Plant

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Portland, OR


Pittsburgh, PA

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OKONITE
VFD
CABLES

MADE IN THE USA
QUALITY CABLES SINCE 1878

THE OKONITE COMPANY

Setting the Standard in Quality Since 1878

OKONITE VFD CABLE

Okonite offers a full line of armored and non-armored cables for any VFD application. Okonite VFD cables are designed to minimize the detrimental effects of:

a) **Common Current and Motor Standing Voltage:**
By reducing the grounding circuit resistance with symmetrical ground and power conductors and with the continuous aluminum C-L-X sheath.

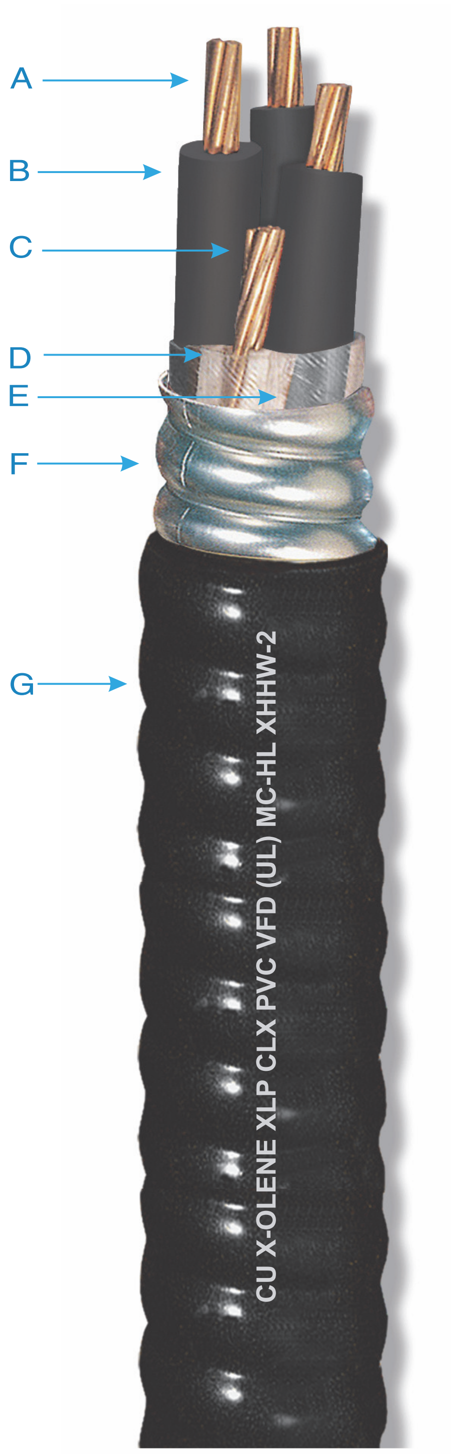
b) **Reflected Waves:**
X-Olene thermoset XLPE insulation can withstand continuous voltage spikes >1000V.

c) **Motor Circuit Cross Talk:**
C-L-X cables will contain any interference with the aluminum sheath. Type TC-ER cables will mitigate interference with the copper tape shield. In both cases the symmetrical cable design will keep any stray currents centered around the ground plane.

d) **Induced Ground Current in the Drive System Ground:**
Here again, the symmetrical cable design will keep any stray current centered around the ground plane.

Depending on your application, Okonite can provide either armored (C-L-X) or non-armored (Type TC-ER) constructions. Our staff of highly experienced Application Engineers can assist you in selecting the right VFD cable for your application. Contact your local representative for more information.

Okonite has been in business since 1878, making us the foremost manufacturer in the wire and cable industry. Employee owned since 1976, we are dedicated to manufacturing 100% in the USA.



A Bare Stranded Copper Conductors
B X-Olene Insulation-Color Coded for Identification
C 3 Bare, Stranded Copper Grounding Conductor(s)
D Non-Hygroscopic Fillers, as necessary
E Binder Tape
F Impervious, Continuous, Welded Corrugated, Aluminum C-L-X Sheath
G Black Okoseal Jacket

C-L-X® Type MC-HL (XHHW-2)

600V Power MC-HL Cable-Aluminum Sheath

600/1000V Marine Cable

3/C VFD & 4/C Copper Conductors/90°C Wet or Dry Rating

For Cable Tray Use - Sunlight Resistant - For Direct Burial

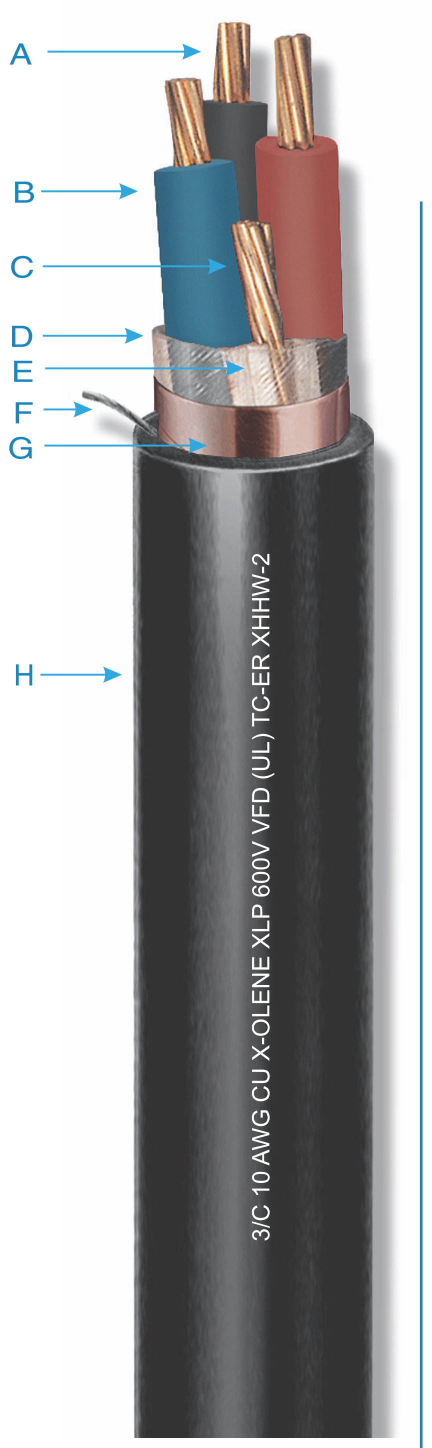
Insulation
X-Olene® is Okonite's trade name for its chemically cross-linked polyethylene, with high dielectric strength.

Assembly and Coverings
The individual conductors are cabled together with non-hygroscopic fillers and a binder tape overall. The C-L-X sheath exceeds the grounding conductor requirements of Table 250.122 of the NEC and UL 1569. A bare stranded copper grounding conductor(s), located in the outer interstices, is provided for grounding. The impervious, continuous, welded, corrugated aluminum C-L-X sheath provides complete protection against moisture, liquids and gases and has excellent mechanical strength. For direct burial in the ground, embedment in concrete, or for areas subjected to corrosive atmospheres, the C-L-X sheath is protected with a low temperature black Okoseal® (PVC) jacket.

Applications
C-L-X Type MC-HL cables with the impervious, continuous, corrugated aluminum sheath are recommended as an economical alternate to a wire in conduit system. In addition, the aluminum CLX sheath exceeds the equipment grounding requirements of NEC Section 250.118 and 250.122, and can be used as the equipment grounding conductor in non-HL areas.
These Okonite cables are authorized for use on services, feeders and branch circuits for power, lighting, control and signaling circuits in accordance with Article 330 and 725 of the NEC.
C-L-X Type MC-HL cables may be installed indoors or outdoors, in wet or dry locations, as open runs of cable secured to supports spaced not more than six feet apart, in cable tray, as aerial cable on a messenger, in any approved raceway, direct burial, or encased in concrete.
C-L-X type MC-HL cables are also approved for Classes I, II and III, Division 1 and 2 and Class I, Zones 1 and 2 hazardous locations per NEC Articles 501, 502, 503 and 505; in Zone 1, Zone 2, Class II Div 2, Class III Div 1 and Class III Div 2 per CEC.

Specifications
Conductors: Uncoated soft copper per ASTM B-3. Sizes smaller than #8 are compress stranded per ASTM B-8. Sizes #8 and larger are compact stranded per ASTM B-496.
Insulation: X-Olene per ICEA S-95-658/ NEMA WC70 and UL 44, Listed UL Type XHHW-2. Meets MIL-DTL-1377H, section 4.8.4.1.2 cold bend at -66°C and ASTM D746 brittle point at -76°C.
Conductor Identification: Control Sizes, #9 AWG and smaller, color coded insulation. Power Sizes, #8 AWG and larger, black with printed words of number and color.
Grounding Conductor(s): One or three bare soft copper per ASTM B-3. Stranded in accordance with UL 1581. Meets or exceeds requirements of NEC Table 250.122.
Sheath: Close fitting, impervious, continuous, welded, corrugated aluminum C-L-X per UL 1569. Exceeds grounding conductor requirements of NEC Table 250.122.
Jacket: Black Okoseal (PVC) per UL1569. Meets ASTM D746 brittle point at -40°C.

Product Features
- UL Listed as Type MC-HL cable per UL 2225 (E38916).
- UL Listed for cable tray use, direct burial and sunlight resistant.
- UL 1309 (CWCMC) listed & UL classified in accord with IEEE 1580 as Marine Shipboard Cable rated 600/1000 volts.
- Passes the IEEE 383-1974 and IEEE 1202 vertical tray flame tests.
- Passes the 210,000 BTU ICEA T-29-520 Vertical Tray Flame Test.
- Complete pre-packaged, factory-tested wiring system; color coded.
- C-L-X cables are quality control inspected to meet or exceed applicable UL standards.
- 90°C continuous operating temperature in all types of installations.
- 130°C emergency rating.
- 250°C short circuit rating.
- Good EMI shielding characteristics.
- Impervious, continuous metallic sheath excludes moisture, gases and liquids.
- Lower installed system cost than conduit or EMT systems.
- Provides excellent grounding safety.
- Excellent compression and impact resistance.
- Continuous long lengths.
- Installation temperature of -40°C or °F.
- Complies with NEC Articles 501, 502 and 503 for hazardous locations.
- American Bureau of Shipping Type approved as CWCMC Type MC-HL.
- Three symmetrical grounding conductors with the CLX sheath provide a superior low resistance return path for VFD and other modern ac drive/motor applications.
- CSA C22.2 No. 123 Type RA90.
- CSA C22.2 No. 174 Type HL.
- CSA listed as FT4 and LTGG (-40°C).
- CSA Type RA90 HL complies with CEC Zone 1, Zone 2, Class II Div 1 and Class III Div 1 and Class III Div 2 Hazardous Locations.



A Bare Stranded Copper Conductors
B X-Olene Insulation
C 3 Bare, Stranded Copper Grounding Conductors
D Binder Tape
E Fillers, as necessary
F Rip Cord
G Copper Tape Shield
H Black Okoseal Jacket

X-Olene®- Okoseal® Shielded VFD

UL Type TC-ER (XHHW-2) and cUL Type CIC

600V VFD Power and Control Tray Cable

Three Copper Conductors, 90°C Wet or Dry

With Three Symmetrical Grounding Conductors and One Copper Shield Tape

For Cable Tray Use - Sunlight Resistant - For Direct Burial

Insulation
X-Olene® is Okonite's trade name for its cross-linked polyethylene, with high dielectric strength insulation.

Assembly and Coverings
The three insulated conductors with three bare grounding conductors located in the outer interstices are cabled together per UL 1277 with fillers as needed and a binder tape overall. A 5 mil bare copper tape is helically wrapped over the cabled assembly with a 25% overlap. Extruded over the tape shield is a sunlight-resistant, flame retardant, black Okoseal® (PVC) jacket which has excellent resistance to acids and most chemicals and is rated for low temperature applications.

Applications
X-Olene shielded Type TC-ER cables are used to supply power to motors from variable frequency drives, where an economical design is desired. These cables can also be used for other power, lighting, control or signal circuits; indoors or outdoors; in cable trays, raceways, direct burial, or where supported by messenger wire; for Class 1 circuits as permitted in Article 725 of the NEC; and in cable trays in Class I, Division 2 hazardous locations in industrial establishments where the conditions of maintenance and supervision assure that only qualified persons will service the installation. Cables marked TC-ER may also be used between a cable tray and the utilization equipment or device, when installed in accordance with NEC 336.10 (7).

Specifications
Conductors: Uncoated soft copper per ASTM B-3. Sizes smaller than 8 AWG are compressed- stranded per ASTM B-8. Sizes 8 AWG and larger are compact stranded per ASTM B-496.
Insulation: X-Olene per ICEA S-95-658/ NEMA WC70 and UL 44, Listed UL Type XHHW-2.
Conductor Identification: Sizes 14, 12 and 10 AWG color-coded insulation per ICEA S-73-532/NEMA WC57 Method 1, Table E-2 color sequence. Sizes 8 AWG and larger black insulation with surface printing of numbers and colors per ICEA S-73-532/NEMA WC57 Method 3, Table E-2.
Grounding Conductor(s): Three bare soft copper per ASTM B-3. Sizes 10 AWG and smaller are compressed stranded per ASTM B-8, and sizes 8 AWG and larger are compact stranded per ASTM B-496. Meets or exceeds requirements of NEC Table 250.122.
Shield: A 5 mil bare copper tape is helically applied with 25% minimum overlap.
Jacket: The Okoseal (PVC) compound meets or exceeds the requirements of UL 1277 as tested in accordance with UL 1581.

Product Features
- Insulated conductors are UL Listed Type XHH/XHHW-2.
- 90°C continuous rating in wet or dry locations.
- 130°C emergency overload rating.
- 250°C short circuit rating.
- Three symmetrical grounding conductors and a helically applied copper tape provides a relatively low resistance return path, adequate for VFD and other modern AC drive/motor applications.
- Type TC-ER VFD cables are quality control inspected to meet or exceed applicable industry standards.
- Thermal stability at elevated temperatures.
- Mechanically rugged.
- High dielectric strength.
- Small diameter, lightweight.
- Minimum installation temperature of -40°C.

Applicable Standards
- UL Listed per Standard 1277 as Type TC-ER cable per E60422.
- UL Listed for cable tray use, direct burial and sunlight resistant.
- Vertical Tray Flame Tests: IEEE 383-1974, Sizes 2 AWG and larger also pass FT4/IEEE 1202.
- CSA C22.2 No. 239 Type CIC (Control and Instrumentation Cable) for sizes 4/0 AWG and smaller.