

General Cable's broad line of VFD Industrial Cable solutions is tested and certified on both a regional and global level. In addition to the cable constructions below, we are designing, engineering and manufacturing custom cables to meet unique requirements every day.

SPECIFICATION	VOLTAGE	SHIELD	CONDUCTOR	INSULATION	GROUND	ARMOR	JACKET
4560/4565 CVTC®	1000 V/ 600 V	Overall Al/Polymer + Braid	Tinned Copper	XLPE	1 Full-Sized Insulated XLPE	N/A	PVC
4570 CVTC®	1000 V/ 600 V	Dual Copper Tape	Tinned Copper	XLPE	3 Symmetrical Bare Copper	N/A	PVC
4575 CVTC®	2000 V	Tinned Copper Braid + Al/Polymer	Tinned Copper	XLPE	3 Symmetrical Tinned Copper	N/A	PVC
4580 CVTC®	2000 V	Overall Copper Tape	Bare Copper	XLPE	3 Symmetrical Bare Copper	N/A	PVC
9600 CCW®	600 V	•	Bare Copper	XLPE	3 Symmetrical Bare Copper per NEC	•	PVC
9605 CCW®	600 V	•	Bare Copper	XLPE	3 Symmetrical Bare Copper per NEC	•	PVC
9615 CCW®	2000 V	•	Bare Copper	XLPE	3 Symmetrical Bare Copper per NEC	•	PVC
9675 CCW®	1000 V	•	Bare Copper	XLPE	3 Symmetrical Bare Copper per CEC	•	PVC
9700 CCW®	2.4 kV	•	Bare Copper	EPR	3 Symmetrical Bare Copper per NEC	•	PVC
9800 CCW®	5 kV	Bare Copper Tape	Bare Copper	EPR	3 Symmetrical Bare Copper per NEC	•	PVC
9805 CCW®	5 kV	Bare Copper Tape	Bare Copper	EPR	3 Symmetrical Bare Copper per NEC	•	PVC
9815 CCW®	8 kV	Bare Copper Tape	Bare Copper	EPR	3 Symmetrical Bare Copper per NEC	•	PVC

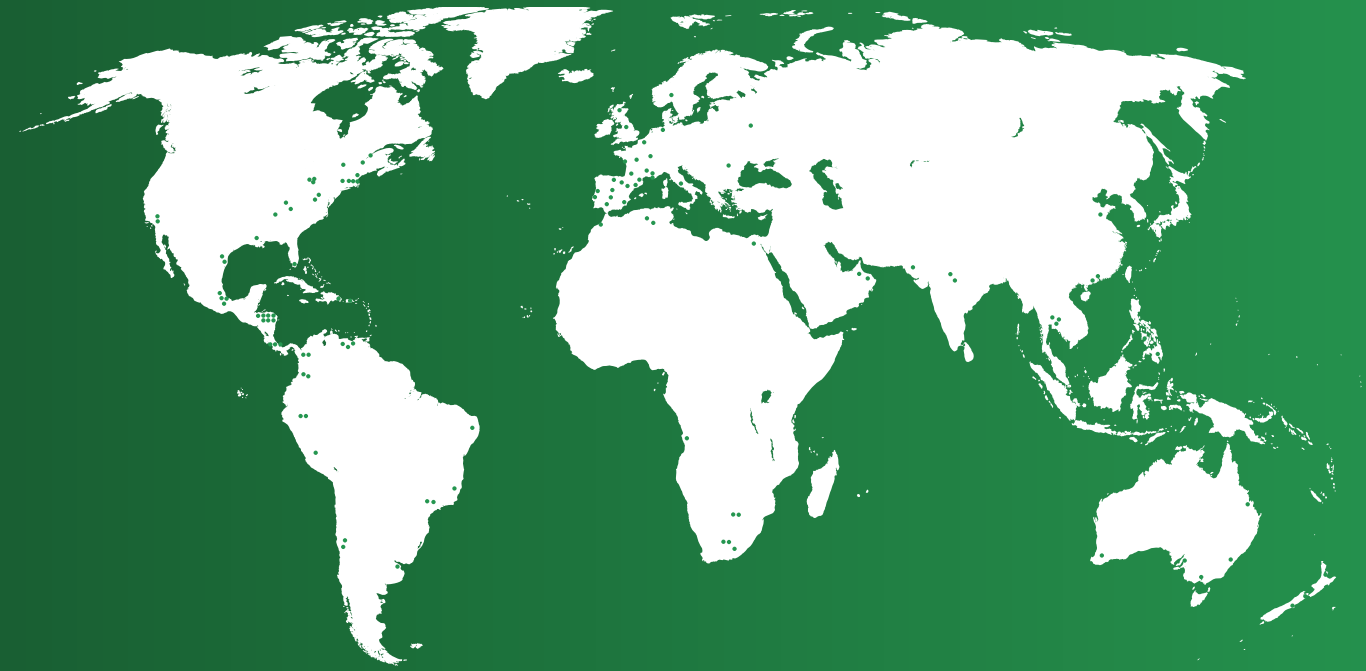
• Continuously corrugated welded armor not only protects the cable from mechanical damage but also functions as an excellent electrical shield when terminated properly.

Specifications and Compliances (may differ by construction)

UL 1277 600 V Type TC-ER	CSA C22.2 No.123 Metal Sheathed Cables
UL 1277 1000 V Flexible Motor Supply Cable	CSA C22.2 No.174 Cables and Cable Glands for Use in Hazardous Locations
UL 44 Type RHH or RHW-2 Conductors	CSA C22.2 No.38 Thermoset Insulated Wires and Cables
ICEA S-95-658/NEMA WC70	UL 1072 Medium-Voltage Power Cables
UL 1581 VW-1	UL 1309 Marine Shipboard Cables
IEEE 1202/CSA FT4	ICEA S-93-639/WC74, 5-46 kV Shielded Power Cables
UL 1569 Metal Clad Cables	AEIC CS8 Specification for Shielded Power Cable, 5-46 kV
UL 2225 Cables and Cable Fittings for Use in Hazardous Locations	



Global Reach



General Cable, a leading wire and cable innovator for over 165 years, serves customers through a global network of 57 manufacturing facilities in 26 countries and has worldwide sales representation and distribution. The Company is dedicated to the production of high-quality aluminum, copper and fiber optic wire and cable and systems solutions for the energy, construction, industrial, specialty and communications sectors. In addition to our strong brand recognition and strengths in technology and manufacturing, General Cable is also competitive in such areas as distribution and logistics, marketing, sales and customer service. This combination enables General Cable to better serve its customers as they expand into new geographic markets.



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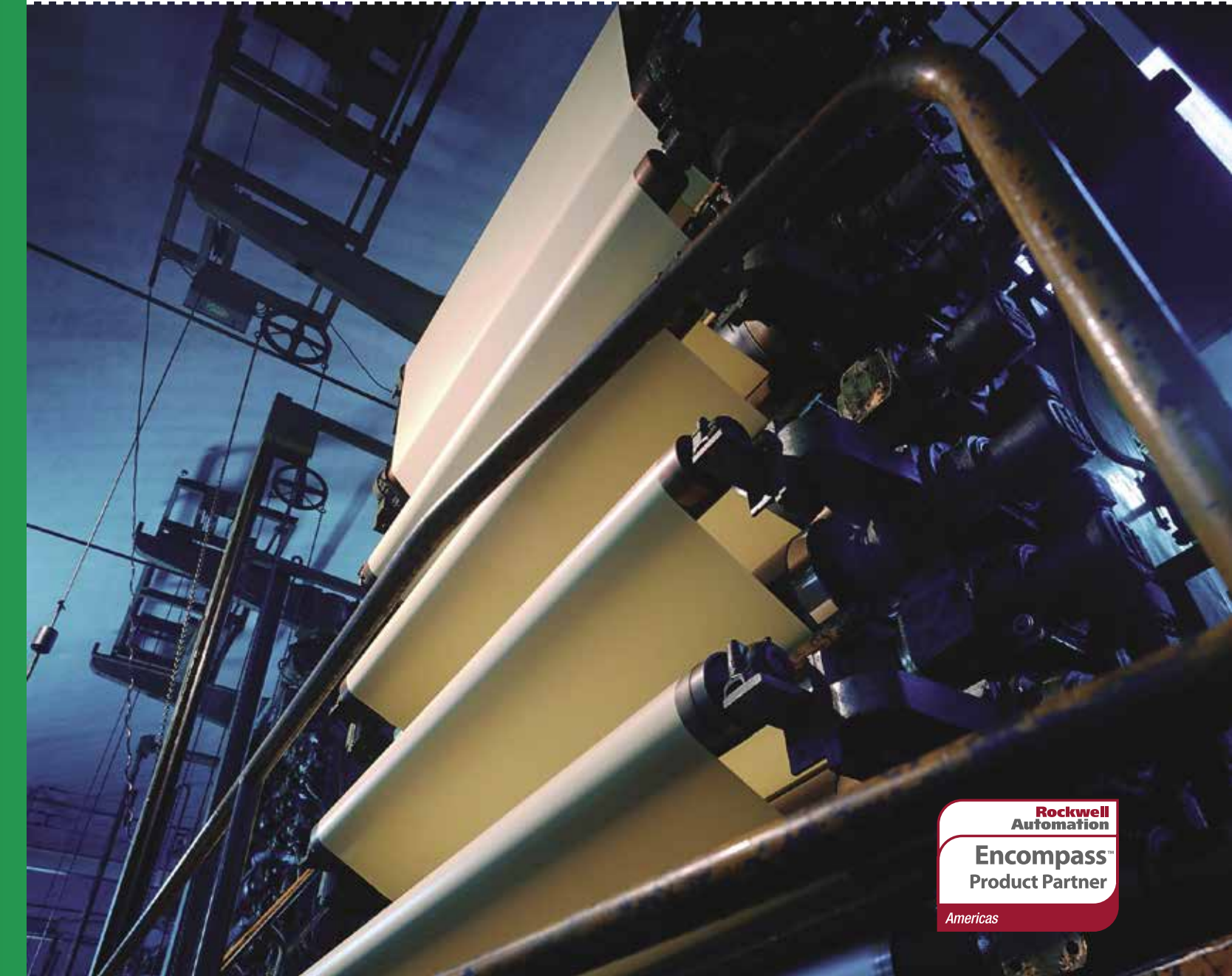
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Cable Solutions for Variable Frequency Drives

- CVTC® VFD Low-Voltage Power, Type TC-ER, Unarmored
- CCW® VFD Low- and Medium-Voltage Power, Type MC-HL, Armored



General Cable is part of the Rockwell Automation PartnerNetwork™ program, which offers global manufacturers access to a collaborative network of companies focused on developing, implementing and supporting best-in-breed automation solutions for customers. For more information on the Rockwell Automation PartnerNetwork, visit www.rockwellautomation.com/partners.



Tough challenges call for innovative solutions, and General Cable is your worldwide source for new products and a wide range of industry-leading industrial cables. As a selected partner in Rockwell Automation's Encompass™ Product Partner program, General Cable provides a line of cables for Variable Frequency Drives (VFD) in both unarmored and armored designs as well as in many power ratings.

----- SPECIALLY ENGINEERED CABLE DESIGNS FOR VFD APPLICATIONS -----

With 1 kV and 2 kV CVTC® VFD (XLPE/PVC) Type TC-ER unarmored and CCW® VFD (Continuously Corrugated Welded) 600 V – 8 kV Type MC-HL armored product lines, General Cable offers high-quality VFD cable solutions for factory automation, traditional power generation, refining and petrochemical, marine, specialty chemical and wastewater treatment applications. Many of General Cable's designs incorporate symmetrical grounding, minimizing ground voltages and induced ground currents, which can lead to motor-bearing fluting and premature motor failure. These cables undergo stringent testing to ensure reliable power from the AC drive systems to AC motors. With our processing capabilities and know-how as one of the industry's leading suppliers, our VFD industrial-grade designs efficiently handle voltage spikes, common with fast-switching PWM signals, and minimize both radiated and induced Electromagnetic Interference (EMI) through optimized ground and shielding system options.

CVTC® VFD cables may be customized to address the specific requirements of various Variable Frequency Drive applications and to ensure reliable performance and protection of VFD equipment. Designed for use with AC motors controlled by pulse-width modulated inverters in VFD applications, CVTC VFD cables reduce the risk of Electromagnetic Interference (EMI), which can lead to drive malfunction, and provide added protection in Class I, Division 2 hazardous industrial applications.

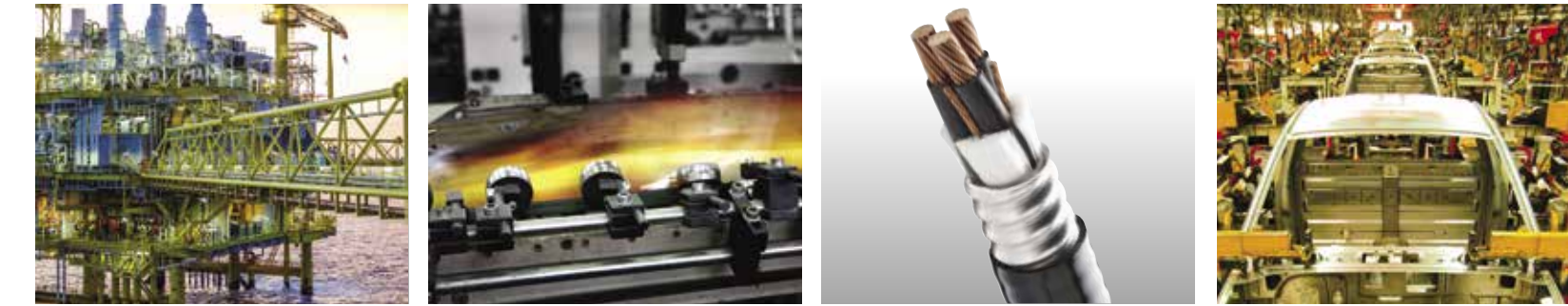
CCW® VFD cables are used in hazardous locations where cables are required to be impervious to gas, liquids and vapors, and terminated with explosion-proof glands to electrical equipment. CCW sets the standard in the refining industry with its design integrity for performance-demanding environments, and is a staple in offshore production platforms, refineries, LNG facilities and petrochemical processing mills. This product line is suitable for installation in Class I, II, and III, Divisions 1 and 2; and Class I, Zones 1 and 2 hazardous locations per NEC articles 501, 502, 503 and 505 and ideal for use in both hazardous and non-hazardous locations.

Primary Industry Applications for VFD Cables:

MARKETS	VFD OFFERING		
	Unarmored VFD (CVTC®)	Armored VFD (CCW®)	Applications
Marine		X	Fluid/Flow control - process pumps/drilling mud pumps (note: TYPE P VFD cable for flex applications)
Power & Energy Management	X	X	Process & flow control, cooling towers
Pulp & Paper	X	X	Conveyors, process equipment
Automotive & Tire	X	X	Material handling, process equipment, conveyors
Global Machine & Equipment	X	X	Packaging, material handling equipment, cranes, conveyors
Oil, Gas & Petrochemical	X	X	Fluid/Flow control - process pumps and cooling towers, terminals, & pipelines
Specialty Chemical	X	X	Fluid/Flow control, process pumps, rotary equipment
Water & Waste	X	X	Process/Flow control pumps, rotary equipment

The following highlights the features and benefits of specially engineered cable designs for use with AC motors controlled by pulse-width modulated inverters in VFD applications rated up to 1000 V, 2000 V, 5 kV and 8 kV:

CVTC® VFD Low-Voltage Power Type TC-ER	CCW® VFD Low- & Medium-Voltage Power Type MC-HL
<p>Compressed stranding to reduce overall cable diameter</p> <p>Dual copper tape shields provide maximum shield coverage required for Variable Frequency Drive applications</p> <p>Symmetrically placed annealed bare copper grounding conductors in direct contact with shield</p> <p>Designed to reduce the risk of Electromagnetic Interference (EMI), which can lead to malfunction</p> <p>Meets crush and impact requirements of Type MC cable</p> <p>Permitted for use in Class I, Division 2 industrial hazardous locations per NEC</p>	<p>Compact or compressed stranding to reduce conductor size</p> <p>XLPE insulation with high impulse voltage breakdown level resists degradation</p> <p>Symmetrically placed annealed bare copper grounding conductors in direct contact with shield</p>
	<p>Compact conductors provide reduced conductor size</p> <p>Pure EPR insulation system has outstanding corona resistance and high dielectric strength, providing electrical stability under stress</p> <p>Triple Extrusion applies strand shield, EPR insulation and insulation shield in one operation, eliminating exposure to contamination and providing maximum control and consistency</p>
	<p>Additional Benefits of CCW® VFD Low- & Medium-Voltage Power Cable</p> <p>Continuously Corrugated Welded Armor:</p> <ul style="list-style-type: none"> • Provides impervious barrier to moisture, gas and liquids • Provides EMI shielding performance • Factory assembled and tested for use as an economical, rugged and reliable alternative to cable in conduit wiring systems <p>Armored constructions suitable for use in Class I, II, & III, Divisions 1 and 2; and Class I, Zones 1 and 2 hazardous locations per NEC Articles 501, 502, 503 and 505</p>



When it comes to specifying cables that can handle the challenges presented in a VFD environment, General Cable, a selected partner with Rockwell Automation's Encompass Partner™ program, is your one-source cable provider. As seen with many technological breakthroughs, improvements in the AC drive technology over older DC drives are of exponential magnitude. Accelerating switching speeds, for instance, in the Insulated-Gate Bipolar Transistor (IGBT) can result in increased EMI and can have unfavorable effects

on cables and nearby electrical systems. As AC drives have been installed in most new construction and have become replacements in many existing applications, the need for specially engineered cable designs for VFD applications is all the more important. A properly designed, engineered and manufactured VFD cable, such as one of General Cable's solutions, is meant to be invisible to the infrastructure it resides in.

OUR COMMITMENT TO QUALITY & THE ENVIRONMENT

General Cable is always searching for new and better ways to put quality in your product. The right mix of R&D experience, manufacturing expertise and stringent testing by the most qualified team of engineers ensures that every cable meets industry standards and offers the highest quality possible. Our Lean Six Sigma philosophy eliminates waste, non-value-added processes and sources of variation while reducing cycle-time and improving capacity, space utilization and productivity. We have:

- ISO 9001 certified manufacturing facilities
- Ongoing process control and production management
- Quality assurance initiatives and rigorous performance standards
- R&D and innovative material development expertise
- Stringent in-house and third-party testing

We are also an environmentally conscious company committed to reducing and, where possible, eliminating hazardous substances. Through environmentally sound materials and production processes, General Cable facilities have fully implemented an ISO 14001-equivalent environmental management system with strict oversight. All applicable products meet RoHS standards, and we consistently work to comply with evolving REACH requirements pertaining to wire and cable products and materials. Our revolutionary 17 FREE® line of halogen-free industrial, datacom, fiber, cord and electronics cables features substantiated green properties and may qualify for credits under environmental incentive programs.