ANHUI FEICHUN SPECIAL CABLE CO., LTD.

安徽飞纯特种电缆有限公司

TECHNICAL SPECIFICATION: 2000V VFD POWER CABLES

3/C 2/0 AWG + 3 Grounds - Three Armor Configurations

PRODUCT OVERVIEW

This specification covers three variants of 2000 Volt Variable Frequency Drive (VFD) power cables featuring three conductors of 2/0 AWG copper with three symmetrical ground conductors. Each variant offers different levels of mechanical protection through varying armor configurations, designed to meet specific installation requirements and environmental conditions. All cables feature Cross Linked Polyethylene (XLPE) insulation with copper tape shielding for superior electrical performance and electromagnetic interference (EMI) protection.

> ***Note:*** *All three cable variants share identical electrical characteristics (67.43 mm² conductor area, 1 kV rated voltage class with 2000V VFD capability) and differ only in their mechanical protection layers.*

CABLE VARIANTS

VARIANT 1: TYPE TC-ER (COPPER TAPE SHIELD)

`CABLE ELEC 67.43mm² 1X3C+3T+SH 1kV XLPE`

Description: Standard Type TC-ER cable with copper tape shield and PVC outer jacket. Suitable for tray applications and general industrial installations where moderate mechanical protection is required.

Primary Applications: Cable trays, conduits, ducts, troughs, and protected indoor/outdoor installations.

Key Feature: Lightweight construction with excellent flexibility and EMI shielding performance.

VARIANT 2: TYPE MC (STEEL TAPE ARMOR)

`CABLE ELEC 67.43mm² 1X3C+3T+SH 1kV STA`

Description: Type MC cable featuring steel tape armor (STA) over copper tape shield. Provides enhanced mechanical protection against crushing and impact while maintaining reasonable flexibility for installation.

Primary Applications: Industrial facilities requiring moderate mechanical protection, aerial installations with messenger support, and environments with potential impact hazards.

Key Feature: Steel tape interlocked armor provides robust mechanical protection with improved crush resistance.

VARIANT 3: DOUBLE ARMORED HEAVY DUTY

`CABLE ELEC 67.43mm² 1X3C+3T+SH 1kV SWA`

Description: Heavy-duty cable with dual armor layers consisting of steel tape armor (STA) plus steel wire armor (SWA). Designed for the most demanding applications requiring maximum mechanical protection and durability.

Primary Applications: Direct burial, harsh industrial environments, mining operations, heavy machinery installations, and areas subject to severe mechanical stress.

Key Feature: Double armor construction provides superior protection against mechanical damage, rodent attack, and ground movement.

CABLE CONSTRUCTION (ALL VARIANTS)

- **1. CONDUCTORS:** Three Class B compressed stranded bare copper conductors per ASTM B3 and ASTM B8, each 2/0 AWG (67.43 mm^2 cross-sectional area, 0.405 inches diameter over conductor with 19 strands)
- **2. INSULATION:** Cross Linked Polyethylene (XLPE) insulation Type RHH/RHW-2, 90 mils thickness per conductor, rated for continuous operation at 90°C in wet and dry locations, emergency overload at 130°C, and short circuit conditions at 250°C
- **3. GROUND CONDUCTORS:** Three Class B compressed stranded bare copper ground conductors per ASTM B3 and ASTM B8, sized at minimum 50% of phase conductor area (1/0 AWG equivalent for 2/0 AWG phase conductors)
- **4. ASSEMBLY:** Conductors and grounds assembled with fillers as needed to achieve round cable geometry for optimal installation and performance
- **5. SHIELD (ALL VARIANTS):** 5 mil copper tape shield applied with minimum 50% overlap for effective EMI/RFI protection and fault current path
- **6. ARMOR LAYER (VARIANT-SPECIFIC):**
- • **Variant 1:** None (shield serves as primary protection)
- • **Variant 2:** Interlocked steel tape armor (STA) applied over shield
- • **Variant 3:** Interlocked steel tape armor (STA) plus galvanized steel wire armor (SWA) for double protection
- **7. OUTER JACKET:** Polyvinyl Chloride (PVC) jacket, 80 mils thickness for 2/0 AWG size. Chlorinated Polyethylene (CPE) jacket available upon request for enhanced chemical and heat resistance. Silicone-

> free formulation.

Insulation Color Coding

Conductor insulation colors follow ICEA S-58-679 Control Cable Conductor Identification Method 3: Phase 1 (Black), Phase 2 (Red), Phase 3 (Blue). Ground conductors are bare copper (uninsulated).

ELECTRICAL & PHYSICAL SPECIFICATIONS

2/0 AWG Configuration (Highlighted)

PARAMETER	SPECIFICATION	UNIT	NOTES
Conductor Size	**2/0 AWG**	**-**	**67.43 mm² cross-sectional area**
Number of Conductors	3	-	Three phase conductors
Conductor Stranding	19 strands	-	Class B compressed stranded
Diameter Over Conductor	0.405	inches	Per individual conductor
Insulation Thickness	90	mils	XLPE Type RHH/RHW-2
Number of Grounds	3	-	Symmetrical bare copper
Ground Size	1/0 AWG (min)	-	50% minimum of phase conductor
Shield Type	Copper Tape	-	5 mil, 50% minimum overlap
Diameter Over Shield	1.311	inches	Before armor application
Jacket Thickness (Variant 1)	80	mils	PVC or CPE
Approx. OD (Variant 1: TC-ER)	**1.471**	**inches**	**37.36 mm - No armor**
Approx. OD (Variant 2: MC-STA)	**1.571**	**inches**	**39.90 mm - Steel tape armor (estimated)**
Approx. OD (Variant 3: Double Armor)	**1.771**	**inches**	**44.98 mm - STA + SWA (estimated)**
Copper Weight	1,640	lbs/1000 ft	Phase conductors only
Approx. Cable Weight (Variant 1)	2,164	lbs/1000 ft	Complete cable assembly
Approx. Cable Weight (Variant 2)	2,564	lbs/1000 ft	With steel tape armor (estimated)
Approx. Cable Weight (Variant 3)	3,164	lbs/1000 ft	With double armor (estimated)
Rated Voltage	2000V	-	VFD applications
Voltage Class	1 kV	-	Per ICEA/NEMA standards
Temperature Rating (Normal)	90°C	-	Wet and dry locations
Temperature Rating (Emergency)	130°C	-	Overload conditions
Temperature Rating (Short Circuit)	250°C	-	Short duration fault conditions

Complete Size Range Reference

While this specification focuses on 2/0 AWG configuration, the cable series is available in a comprehensive range from 14 AWG through 500 KCMIL to accommodate various power distribution requirements. All sizes maintain the same construction principles and quality standards outlined in this document.

APPLICABLE STANDARDS & COMPLIANCE

Material Standards

ASTM B3
Soft or Annealed Copper Wire

ASTM B8
Concentric-Lay-Stranded Copper Conductors

Product Standards

UL 44
Thermoset-Insulated Wires and Cables

UL 1277
Electrical Power and Control Tray Cables

ICEA S-95-658
Power Cables Rated 2000V or Less (NEMA WC70)

ICEA S-58-679
Control Cable Conductor Identification Method 3

Fire Performance Standards

UL 1685 FT4
Vertical-Tray Fire Propagation and Smoke Release Test

IEEE 1202 FT4
Flame Test - 70,000 BTU/hr Vertical Tray Test

Regulatory Compliance

NEC Article 336.10
Type TC-ER Cable Requirements

NEC Articles 501 & 502
Hazardous Locations (Class I, II, III, Division 2)

Buy American Act
Compliant per 49 U.S.C. § 5323(j)

Buy America (BAA)
FTA Requirements per 49 C.F.R. Part 661

APPLICATIONS & FEATURES

Primary Applications

These 2000 Volt Type TC-ER and Type MC VFD power cables are specifically engineered for demanding industrial power distribution applications. The cables are designed to handle the unique challenges presented by variable frequency drives, including high-frequency switching transients, harmonic distortion, and electromagnetic interference. They are particularly well-suited for motor control applications in industrial facilities, HVAC systems, conveyor systems, pumping stations, and manufacturing automation equipment.

Installation Environments

The cables are approved for use in both wet and dry areas, providing versatility across diverse installation scenarios. Suitable installation methods include cable trays (Type TC-ER designation),

conduits, ducts, troughs, direct burial (Variants 2 and 3), and aerial installations supported by messenger wire. The robust construction allows for exposed runs in industrial environments where mechanical protection is essential. For Variant 3 with double armor, direct burial applications without additional protection are fully supported.

Hazardous Location Capability

All three cable variants are rated for use in Class I, Class II, and Class III, Division 2 hazardous locations as specified in NEC Articles 501 and 502. This makes them appropriate for installations in areas where flammable gases, combustible dusts, or easily ignitable fibers may be present under abnormal operating conditions. The comprehensive shielding and armor options provide additional safety margins in these critical applications.

Key Performance Features

The Cross Linked Polyethylene (XLPE) insulation system delivers superior electrical properties including excellent dielectric strength, high insulation resistance, and outstanding resistance to moisture and chemicals. The copper tape shield with minimum 50% overlap provides effective electromagnetic interference (EMI) and radio frequency interference (RFI) suppression, critical for VFD applications where high-frequency noise must be controlled to prevent interference with sensitive electronic equipment and control systems.

The three symmetrical ground conductors ensure low-impedance fault current paths and contribute to the overall shield effectiveness. This ground configuration meets the stringent grounding requirements for VFD installations and helps maintain safe operations during fault conditions. The silicone-free formulation eliminates potential contamination issues in sensitive manufacturing environments.

Temperature Performance

The cables support continuous operation at conductor temperatures up to 90°C in both wet and dry locations, providing substantial ampacity for demanding power distribution needs. During emergency overload conditions, the cables can operate at 130°C, allowing temporary overload capacity without cable damage. For short-circuit conditions, the cables withstand temperatures up to 250°C, ensuring reliability and safety during fault events until protective devices operate.

ARMOR CONFIGURATION COMPARISON

FEATURE	VARIANT 1: TC-ER	VARIANT 2: MC (STA)	VARIANT 3: DOUBLE ARMOR
Armor Type	None (Shield only)	Steel Tape Armor	Steel Tape + Steel Wire
Mechanical Protection	Basic	Enhanced	Maximum
Flexibility	Excellent	Good	Moderate
Weight	Lightest	Medium	Heaviest
Direct Burial	Not Recommended	Suitable	Highly Suitable
Crush Resistance	Limited	Good	Excellent
Impact Resistance	Basic	Enhanced	Superior

FEATURE	VARIANT 1: TC-ER	VARIANT 2: MC (STA)	VARIANT 3: DOUBLE ARMOR
Rodent Protection	Minimal	Good	Excellent
Installation Cost	Lowest	Medium	Higher
Best Applications	Trays, Protected Areas	Industrial Facilities	Harsh Environments, Burial

INSTALLATION GUIDELINES

General Requirements

Installation must be performed in accordance with applicable national and local electrical codes, particularly NEC Article 336 for Type TC-ER cables and relevant articles for armored cable installations. Installers should verify that minimum bending radius requirements are maintained throughout the installation process to prevent damage to conductors, insulation, or armor layers. For 2/0 AWG cables, the minimum bending radius during installation is typically eight times the cable outside diameter, while the minimum permanent bending radius after installation is six times the outside diameter.

Cable Handling

Proper cable handling procedures are essential to maintain cable integrity. Cables should be stored in a dry location and protected from direct sunlight when stored outdoors for extended periods. During installation, avoid dragging cables over sharp edges or rough surfaces that could damage the jacket or armor. Use appropriate cable pulling equipment and lubricants approved for the cable jacket material. Maximum pulling tensions should not exceed the manufacturer's recommendations to prevent conductor or insulation damage.

Termination Practices

The copper tape shield must be properly terminated at both ends of the cable run to ensure effective grounding and shield continuity. Ground conductors should be connected to the equipment grounding system in accordance with NEC requirements. For VFD applications, shield grounding practices are critical to minimize electrical noise and ensure proper operation of drive electronics. Consult VFD manufacturer recommendations regarding preferred shield grounding methods (single-point vs. multi-point grounding) for optimal performance.

Armor Termination (Variants 2 and 3)

When terminating armored cable variants, appropriate armor termination fittings must be used to provide mechanical support and maintain the integrity of the armor system. For Variant 2 with steel tape armor, use termination connectors rated for interlocked armor construction. For Variant 3 with double armor, both the steel tape and wire armor layers must be properly terminated using suitable glands or connectors designed for this construction type. Ensure that the armor termination provides a continuous ground path back to the source.

QUALITY ASSURANCE & TESTING

All cables manufactured by Anhui Feichun Special Cable Co., Ltd. undergo rigorous quality control testing to ensure compliance with applicable standards and specifications. Testing protocols include conductor

resistance measurements, insulation resistance testing at rated voltage, high-potential (hi-pot) testing for dielectric strength verification, and dimensional verification of all cable components.

Each production lot is subjected to flame test verification per UL 1685 FT4 and IEEE 1202 standards to confirm fire performance characteristics. Shield continuity and effectiveness testing ensures that electromagnetic shielding meets design requirements. For armored variants, armor integrity tests verify proper construction and mechanical properties. Complete test records are maintained for traceability and quality documentation purposes.

The manufacturing facility operates under a comprehensive quality management system that incorporates process controls, incoming material inspection, in-process monitoring, and final product verification. This systematic approach ensures consistent product quality and reliability across all cable variants and production runs.

ORDERING INFORMATION

When ordering, please specify the following information to ensure accurate product selection:

- **Cable Variant:** Specify Variant 1 (Type TC-ER), Variant 2 (Type MC with STA), or Variant 3 (Double Armor with STA + SWA)
- **Quantity:** Required cable length in feet or meters
- **Conductor Size:** 3/C 2/0 AWG + 3 Grounds (standard configuration per this specification)
- **Voltage Rating:** 2000V VFD (standard for this series)
- **Jacket Material:** Standard PVC or optional CPE (Chlorinated Polyethylene)
- **Packaging Requirements:** Reel size, cable length per reel, and any special shipping instructions
- **Special Requirements:** Any project-specific certifications, testing, or documentation requirements

For technical support, custom configurations, or additional information, please contact Anhui Feichun Special Cable Co., Ltd. technical sales team. Our engineering staff can provide assistance with cable selection, application engineering, and installation guidance to ensure optimal cable performance for your specific application requirements.

飞纯电缆

FEICHUN SPECIAL CABLES

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