REELING CONTROL CABLE · PORT CRANES & SPREADERS | 0.6/1 kV | 5 sizes | CSP rubber

# FC-CR-S 3G 0.6/1 kV

Reeling Control Cable for Port Cranes 0.6/1 kV – 3-core reeling control cable, CSP rubber sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, standards and installation guidance for 5 sizes.

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## 01 Application and Product Overview

FC-CR-S 3G is a 3-core reeling control cable rated 0.6/1 kV for cable reels on port cranes, spreaders and yard equipment. It has fine-wire class 5 copper cores with halogen-free EPR/HEPR rubber insulation, an inner sheath and an outer sheath of chlorosulfonated polyethylene (CSP) rubber, resistant to weather, ozone and oil. Core cross-sections: 0.75 – 4 mm².

### Design

3 cores in concentric layers with a short lay length and polyester binder tape. Black cores carry white numbers; the green-yellow protective core lies in the outer layer. The cores are bound with halogen-free filler and covered by an inner sheath before the outer sheath is applied. Cables with few cores are used for dedicated circuits such as brake, limit-switch or sensor supply on the trolley.

### Typical applications

- Control, signal and measuring circuits of crane trolleys, spreaders, headblocks and mobile machinery supplied through a cable reel
- Spring-driven and motor-driven cable reels on RTG, RMG, STS and yard equipment
- Operation with repeated winding, unwinding and bending within the permitted bending radius
- Wet, oily and abrasive outdoor environments typical of container terminals and bulk ports
- Control cabinets, junction boxes and trolley equipment of crane and handling systems

| 5 sizes | 0.6/1 kV | +90 °C | CSP rubber |
|---|---|---|---|
| Cross-section 0.75 – 4 mm² | Rated voltage $U_0/U$ | Maximum conductor temperature | Sheath: CSP rubber |

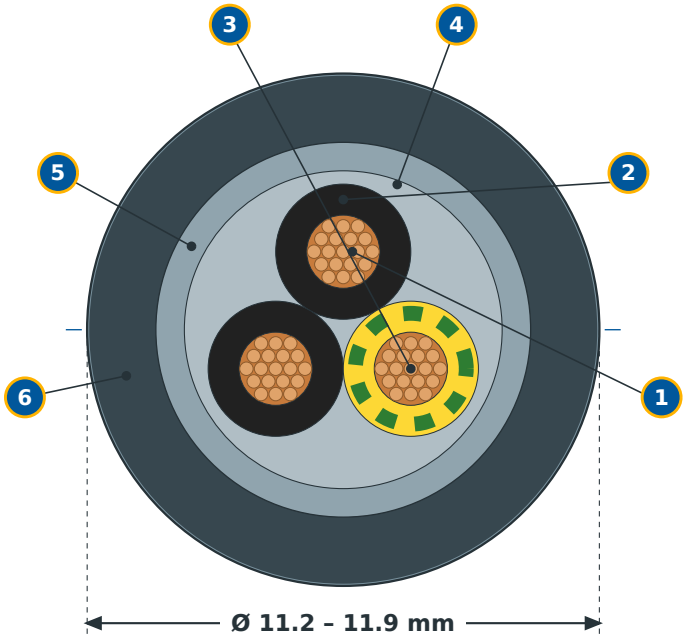
### Key features

- Fine-wire class 5 copper cores with insulation thickness to 0.6/1 kV for reliable operation on a reel
- Cores laid in concentric layers with a short lay length and polyester binder tape
- Number-printed black cores; green-yellow protective core in the outer layer (G types)
- CSP rubber sheath with proven weather, ozone and oil resistance
- Flame retardant to IEC 60332-1-2

## 02 Construction

**FEICHUN · CROSS-SECTION A-A · 0.6/1 kV**

**FC-CR-S**
Sample size 3G1.5 · Rev 0 · Illustrative, not to scale




| No. | Component | Material |
|---|---|---|
| 1 | Conductor | Bare annealed fine-wire copper, class 5 to IEC 60228 |
| 2 | Insulation | Halogen-free EPR/HEPR rubber |
| 3 | Protective (PE) core | Class 5 copper, green-yellow insulation |
| 4 | Filler and binder tape | Halogen-free compound, polyester tape |
| 5 | Inner sheath | Halogen-free polymer compound |
| 6 | Outer sheath | Chlorosulfonated polyethylene (CSP) rubber, resistant to weather, ozone and oil |

The drawing shows size 3G1.5. Other sizes have the same construction with scaled dimensions.

### Construction details

| | |
|---|---|
| **Conductor** | Bare annealed fine-wire copper, class 5 to DIN EN 60228 / IEC 60228 / VDE 0295 |
| **Insulation** | Halogen-free EPR/HEPR rubber to IEC 60502-1, maximum conductor temperature 90 °C |
| **Core identification** | Black cores with white numbers; green-yellow protective core in the outer layer |
| **Stranding** | Cores stranded in concentric layers with a short lay length; polyester binder tape |
| **Inner sheath** | Halogen-free polymer compound, extruded tightly over the stranded cores |
| **Outer sheath** | Chlorosulfonated polyethylene (CSP) rubber, resistant to weather, ozone and oil |

### Sheath material

The chlorosulfonated polyethylene (CSP) rubber sheath is a proven reeling-cable material for open-air cranes: excellent resistance to weather, ozone and mineral oil, good mechanical robustness and low-temperature flexibility to −30 °C in motion. CSP contains halogen; where halogen-free cables are specified, select the HFFR rubber or PUR version of the same construction.

## 03 Electrical, Thermal and Mechanical Characteristics

### Electrical data

| | |
|---|---|
| **Rated voltage $U_0/U$** | 0.6/1 kV AC |
| **Test voltage** | 3.5 kV AC, 5 min |
| **Maximum operating voltage, DC** | 0.9/1.8 kV |
| **Current-carrying capacity** | To DIN VDE 0298-4 at 30 °C ambient; the table gives rated design values |
| **Conductor resistance** | Maximum at 20 °C, class 5 to IEC 60228 |

## Thermal and mechanical data

| | |
|---|---|
| **Maximum conductor temperature** | +90 °C |
| **Maximum temperature at short circuit** | +250 °C |
| **Ambient temperature, fixed installation** | −40 °C to +90 °C |
| **Ambient temperature, in motion** | −30 °C to +90 °C |
| **Minimum bending radius** | Fixed: 4 × D (D ≥ 8 mm), 3 × D (D < 8 mm); moving or reeling: 6 × D (D ≤ 12 mm), 8 × D (D ≤ 20 mm), 10 × D (D > 20 mm) |
| **Maximum tensile load** | 15 N/mm² continuous, on the total copper cross-section of the power cores |
| **Maximum travelling speed** | 60 m/min on a cable reel; higher speeds on request |
| **Flame propagation** | IEC 60332-1-2 / DIN EN 60332-1-2 |
| **Halogen-free** | No (CSP rubber sheath) |
| **UV and ozone resistance** | Resistant |
| **Mineral oil resistance** | Resistant, IEC 60811-404 |

## Sheath material comparison

| Property | PUR | PUR low-temp | CSP rubber | CPE rubber | PCP rubber | HFFR rubber |
|---|---|---|---|---|---|---|
| **Abrasion resistance** | Excellent | Excellent | **Good** | Good | Very good | Good |
| **Cut and tear resistance** | Excellent | Excellent | **Good** | Good | Very good | Good |
| **Mineral oil resistance** | Very good | Very good | **Very good** | Very good | Very good | Good |
| **Weather, UV and ozone resistance** | Very good | Very good | **Excellent** | Very good | Excellent | Very good |
| **Cold flexibility (moving)** | −30 °C | −40 °C | **−30 °C** | −30 °C | −25 °C | −25 °C |
| **Halogen-free (IEC 60754-1/-2)** | Yes | Yes | **No** | No | No | Yes |

The column of the sheath used in this cable is highlighted. Ratings are qualitative; ask FeiChun for test data on a specific requirement.

## 04 Dimensions, Weights and Rated Data – 0.6/1 kV (5 sizes)

| Type designation cores × mm² | FeiChun article no. | Conductor Ø max mm | Outer Ø min mm | Outer Ø max mm | Min. bend radius mm | Weight approx. kg/km | Max. pull force N | $R_{20}$ max Ω/km | Current per core A | $I_k$ (1 s) kA |
|---|---|---|---|---|---|---|---|---|---|---|
| **3G0.75** | FC-CR052-001 | 1.2 | 10.1 | 10.7 | 64 | 122 | 34 | 26.0 | 15 | 0.107 |
| **3G1** | FC-CR052-002 | 1.4 | 10.5 | 11.2 | 68 | 135 | 45 | 19.5 | 17 | 0.143 |
| **3G1.5** | FC-CR052-003 | 1.7 | 11.2 | 11.9 | 72 | 161 | 68 | 13.3 | 23 | 0.214 |
| **3G2.5** | FC-CR052-004 | 2.2 | 12.3 | 13.1 | 104 | 208 | 112 | 7.98 | 31 | 0.357 |
| **3G4** | FC-CR052-005 | 2.7 | 13.6 | 14.5 | 116 | 273 | 180 | 4.95 | 42 | 0.572 |

Current-carrying capacity: rated design values to DIN VDE 0298-4 for flexible cables, free air, 30 °C ambient; values per core include the derating factor for the number of cores; for other ambient temperatures, grouping or layered winding on a reel, apply the factors below. Pull force = 15 N/mm² × total copper cross-section of the power cores. Diameters, dimensions and weights are nominal design values and vary within manufacturing tolerances; confirm critical dimensions before dimensioning reels, guides or festoon systems. Other sizes and configurations are produced to order.

### Ambient temperature factors (conductor 90 °C)

| °C | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
|---|---|---|---|---|---|---|---|
| Factor | 1.08 | 1.04 | 1.00 | 0.96 | 0.91 | 0.87 | 0.82 |

### Short-circuit current rating

$I_k$ = 0.143 kA/mm² × cross-section of the power core (conductor 90 °C → 250 °C). For another short-circuit duration t: $I_{k,t} = I_{k,1s} / \sqrt{t}$ (0.1 s ≤ t ≤ 5 s).

## 05 Reeling Performance and Reel Design Data

The values below support the dimensioning of the cable reel: minimum reel core diameter, copper weight for earthing and loop-resistance calculations, cable weight, and the rated current for the number of layers wound on the reel.

| Type designation cores × mm² | Outer Ø max mm | Min. bend radius on reel, mm | Min. reel core Ø mm | Copper weight kg/km | Cable weight kg/100 m |
|---|---|---|---|---|---|
| 3G0.75 | 10.7 | 64 | 128 | 20 | 12.2 |
| 3G1 | 11.2 | 68 | 136 | 27 | 13.5 |
| 3G1.5 | 11.9 | 72 | 144 | 40 | 16.1 |
| 3G2.5 | 13.1 | 104 | 208 | 67 | 20.8 |
| 3G4 | 14.5 | 116 | 232 | 107 | 27.3 |

### Reel design guidance

- Minimum reel core diameter = 2 × minimum bending radius = 2 × minimum bending radius (outer diameter D).
- Spring reels suit short travel and low tensile load; motor-driven reels with torque control keep the cable under constant, low tension.
- Fit a guide or level-wind that keeps the cable parallel to the reel axis to prevent crossing turns.
- Rated current falls with the number of layers on the reel because heat is not dissipated; see the layer factors below.

## 06 Selection Guide and Sizing Aid

FC-CR-S 3G covers 5 sizes. The smallest, 3G0.75, has an outer diameter of up to 10.7 mm and weighs about 122 kg/km; the largest, 3G4, has an outer diameter of up to 14.5 mm and weighs about 273 kg/km, 2.2 times as much. Across the range the rated current per core rises from 15 A to 42 A at 30 °C, and the minimum bending radius from 64 mm to 116 mm.

**Example 1.** A circuit carries 14 A per core at an ambient temperature of 40 °C. Required table current = 14 / 0.91 = 16 A per core. The smallest suitable size is 3G1 with 17 A per core.

**Example 2.** A circuit carries 27 A per core at an ambient temperature of 35 °C. Required table current = 27 / 0.96 = 29 A per core. The smallest suitable size is 3G2.5 with 31 A per core.

| Type designation cores × mm² | Total copper mm² | Cable weight kg/100 m | Winding capacity m |
|---|---|---|---|
| 3G0.75 | 2.25 | 12.2 | 37,745 |
| 3G1 | 3 | 13.5 | 34,665 |
| 3G1.5 | 4.5 | 16.1 | 30,495 |
| 3G2.5 | 7.5 | 20.8 | 25,195 |
| 3G4 | 12 | 27.3 | 20,440 |

Winding capacity is an indicative value for a reel with 2,500 mm flange diameter, 1,000 mm traverse width, core diameter equal to the minimum reel core diameter and 90 % fill; it is not a substitute for the reel manufacturer’s calculation.

## 07 Standards and Testing

| Standard | Scope |
|---|---|
| **DIN EN 60228 / IEC 60228 / VDE 0295** | Conductors, class 5 |
| **IEC 60502-1** | Insulation compound, power cables up to 1 kV |
| **DIN VDE 0298-3** | Application of cables – bending radii and tensile loads |
| **DIN VDE 0298-4** | Application of cables – current-carrying capacity |
| **DIN EN 60332-1-2 / IEC 60332-1-2** | Flame propagation, single cable |
| **DIN VDE 0298-300** | Core identification |
| **DIN VDE 0250-814** | Design reference for flexible reeling and trailing cables (NSHTÖU type) |
| **IEC 60811-404** | Mineral oil immersion test |

### Routine and type tests

- AC voltage test on every reel length (routine test): 3.5 kV AC, 5 min
- Conductor resistance and checks of dimensions, insulation thickness and sheath thickness
- Continuity of conductors and protective earth
- Bending, tensile tests (type test)
- Flame propagation (IEC 60332-1-2)

**Test documentation:** every delivery is accompanied by a test certificate from FeiChun's own laboratory. Third-party witnessed tests can be arranged at the buyer's cost.

## 08 Installation, Marking and Delivery

### Installation guidance

- Use a reel core diameter of at least twice the minimum bending radius; keep the cable free of loops and kinks while winding.
- Do not exceed the tensile load in the table; relieve the cable of tension at the reel hub and at the trolley.
- Connect the protective core (G types) at both ends; terminate the screen 360° where fitted.
- Keep control cables away from unscreened power cables running in parallel where possible.
- Inspect the sheath regularly for abrasion and mechanical damage.

### Sheath marking

```
FEICHUN FC-CR-S [cross-section] 0.6/1 kV [year] [serial no.] [metre mark]
```

### Packing and delivery

| | |
|---|---|
| **Reel** | Steel or fumigated wooden reels; cable ends sealed with heat-shrink caps |
| **Delivery length** | As ordered, in one continuous length without joints |
| **Lead time** | 2–3 weeks after technical approval |
| **Warranty** | 1 year, covering failures not caused by human factors |
| **Reel label** | Type, cross-section, length, gross/net weight, batch no., reel no. |

### Ordering information

| Field | Example | Meaning |
|---|---|---|
| **Series code** | FC-CR-S | FeiChun series and sheath system |
| **Core configuration** | 3G1.5 | Number of cores with G (protective core included) or × (no protective core), and core cross-section in mm² |
| **Rated voltage** | 0.6/1 kV | $U_0$/U, AC |
| **Length and packing** | 500 m, steel reel | Delivery length in one piece; reel type on request |

**Order example: FC-CR-S 3G1.5 0.6/1 kV** – 500 m on one steel reel. When requesting a quotation, state the cable type, configuration, cross-section, voltage, length per piece, required standards and installation conditions.

## 09 Certification and Quality

All cable is subject to FeiChun's quality control, with routine testing over 100 % of the delivered length. Certificates, type tests and third-party tests (for example partial discharge or compatibility with cable accessories) are provided per project requirement; copies of the records are available on request.

The CE, EAC and UKCA certificates listed in datasheet FC-TDS-TMP-2026-9238-EN apply to the FC-TPU-M D2X11Y product group. Confirm with FeiChun that the certificate scope covers this construction before quoting it in a tender.

## 10 Related Datasheets

Variants of this cable that differ in one attribute – sheath, configuration, optical fibres or voltage. All datasheets are in PDF format.

- FC-CR-U 3G 0.6/1 kV – 3-core reeling control cable, PUR
- FC-CR-S 2× 0.6/1 kV – 2-core reeling control cable, CSP rubber
- FC-CR-S-C 3G 0.6/1 kV – 3-core reeling control cable with overall tinned-copper braid screen, CSP rubber
- FC-CR-A 3G 0.6/1 kV – 3-core reeling control cable, PUR low-temp
- FC-CR-S 4G 0.6/1 kV – 4-core reeling control cable, CSP rubber
- FC-CR-R 3G 0.6/1 kV – 3-core reeling control cable, CPE rubber
- FC-CR-S 5G 0.6/1 kV – 5-core reeling control cable, CSP rubber
- FC-CR-P 3G 0.6/1 kV – 3-core reeling control cable, PCP rubber

Overview of all datasheets: Reeling Control Cables 0.6/1 kV

### Frequently asked questions

**What is FC-CR-S 3G used for?**
Typical applications include control, signal and measuring circuits of crane trolleys, spreaders, headblocks and mobile machinery supplied through a cable reel.

**What are the outer diameter and minimum bending radius of 3G1.5?**
The outer diameter is 11.2 to 11.9 mm and the minimum bending radius in moving or reeling operation is 72 mm (6 to 10 × D depending on diameter).

**What minimum reel core diameter is needed for 3G1.5?**
At least 144 mm, which is twice the minimum bending radius of 72 mm. A larger core diameter extends cable life.

**What current can each core of 3G1.5 carry?**
The table gives 23 A per core in free air at 30 °C ambient, already reduced for the number of cores; apply the ambient temperature factor and, on a reel, the layer factor.

**Is this cable halogen-free?**
No. The CSP rubber sheath contains halogen. If halogen-free cables are required, select the HFFR rubber or PUR version of the same construction.

**Which cross-sections are available?**
FC-CR-S 3G: 0.75, 1, 1.5, 2.5, 4 mm². Other sizes and special designs can be produced to order.

## 11 Trademark Notice and Intellectual Property

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