REELING CONTROL CABLE · PORT CRANES & SPREADERS | FIBRE-OPTIC HYBRID | 0.6/1 kV | 4 sizes | CPE rubber | 12G50

FC-CR-R-FM-C 24G 0.6/1 kV

Hybrid Control and Fibre-Optic Reeling Cable 0.6/1 kV – 24-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, CPE rubber sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, standards and installation guidance for 4 sizes.

Document no. FC-TDS-CR246-2026-F3950964-EN · Revision 0 · Issued 4 November 2026 · Language: English (AU)

01 Application and Product Overview

FC-CR-R-FM-C 24G is a 24-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen 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 chlorinated polyethylene (CPE) rubber, resistant to weather, ozone and oil. Core cross-sections: 0.75 – 2.5 mm².

Design

24 control cores are stranded in concentric layers around a central optical element, with the green-yellow protective core in the outer layer. The cable contains one optical element (12 multimode fibres OM2 50/125). OM2 multimode fibres work with low-cost 850 nm transceivers and are a good fit for the short links typical of a crane, such as reel-to-E-house or reel-to-PLC connections up to a few hundred metres. An overall tinned-copper braid screen (≥ 85 % coverage) protects the copper control circuits against interference from converter-fed drives.

Typical applications

- Control, signal and measuring circuits of crane trolleys, spreaders, headblocks and mobile machinery supplied through a cable reel
- Short crane data links (reel to E-house, PLC or camera converter) over OM2 multimode fibre in the same 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
- Circuits that need protection against electromagnetic interference: the overall tinned-copper braid screen limits coupling between control cores and nearby power cables

4 sizes	0.6/1 kV	+90 °C	CPE rubber
Cross-section 0.75 – 2.5 mm²	Rated voltage U_0/U	Maximum conductor temperature	Sheath: CPE rubber

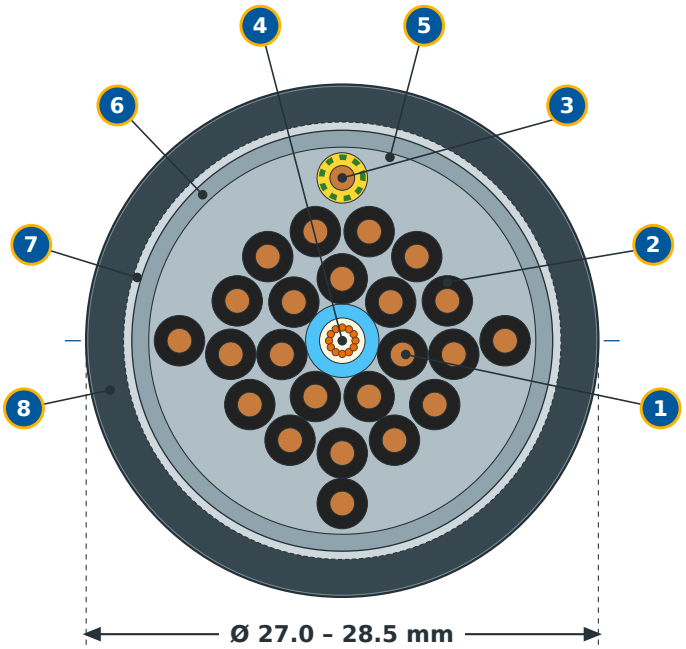
Key features

- Fine-wire class 5 copper cores with insulation thickness to 0.6/1 kV for reliable operation on a reel
- 12 multimode fibres OM2 50/125 in a crush-resistant loose-tube element on the cable axis
- 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)
- CPE rubber sheath with proven weather, ozone and oil resistance
- Overall tinned-copper braid screen (≥ 85 % coverage) for EMC
- Flame retardant to IEC 60332-1-2

02 Construction

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

FC-CR-R-FM-C
Sample size 24G1+12G50 C · 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	Optical element	12 multimode fibres OM2 50/125; gel-filled loose tube, aramid strength members
5	Filler and binder tape	Halogen-free compound, polyester tape
6	Inner sheath	Halogen-free polymer compound
7	Overall screen	Tinned-copper wire braid, coverage ≥ 85 %
8	Outer sheath	Chlorinated polyethylene (CPE) rubber, resistant to weather, ozone and oil

The drawing shows size 24G1+12G50 C. 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
Optical element	Central element: 12 multimode fibres OM2 50/125
Stranding	Control cores stranded in concentric layers around the optical element with a short lay length; polyester binder tape
Overall screen	Tinned-copper wire braid, coverage ≥ 85 %, between inner and outer sheath
Inner sheath	Halogen-free polymer compound, extruded tightly over the stranded cores
Outer sheath	Chlorinated polyethylene (CPE) rubber, resistant to weather, ozone and oil

Optical fibre data

Fibre type	Multimode G50/125 µm OM2, IEC 60793-2-10 A1a.1
Attenuation, cabled	≤ 3.0 dB/km at 850 nm; ≤ 1.0 dB/km at 1300 nm
Modal bandwidth (OFL)	≥ 500 MHz·km at 850 nm; ≥ 500 MHz·km at 1300 nm
Typical link reach	1 Gbit/s Ethernet up to 550 m (1000BASE-SX); 10 Gbit/s up to 82 m
Optical element	Gel-filled loose tube with aramid strength members and a crush-resistant TPU element sheath, placed on the cable axis where bending strain is lowest
Fibre colours	IEC 60304 / DIN VDE 0888 colour sequence; tube and element marked for identification
Fibre strain, reeling	≤ 0.25 % at the rated tensile load of the cable
Optical test	Attenuation of every fibre measured by OTDR after cabling; values recorded in the test certificate

Sheath material

The chlorinated polyethylene (CPE) rubber sheath offers good resistance to weather, ozone and mineral oil with good mechanical robustness and flexibility to −30 °C in motion, at a favourable cost level. CPE contains halogen; where halogen-free cables are specified, select the 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 (CPE rubber sheath)
UV and ozone resistance	Resistant
Mineral oil resistance	Resistant, IEC 60811-404
Optical element, temperature in operation	−40 °C to +70 °C

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 (4 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
24G0.75+12G50 C	FC-CR246-001	1.2	26.0	27.5	276	800	270	26.0	7	0.107
24G1+12G50 C	FC-CR246-002	1.4	27.0	28.5	284	910	360	19.5	8	0.143
24G1.5+12G50 C	FC-CR246-003	1.7	29.0	31.0	310	1,100	540	13.3	10	0.214
24G2.5+12G50 C	FC-CR246-004	2.2	32.0	34.0	340	1,450	900	7.98	14	0.357

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
24G0.75+12G50 C	27.5	276	552	258	80.0
24G1+12G50 C	28.5	284	568	316	91.0
24G1.5+12G50 C	31.0	310	620	430	110.0
24G2.5+12G50 C	34.0	340	680	660	145.0

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-R-FM-C 24G covers 4 sizes. The smallest, 24G0.75+12G50 C, has an outer diameter of up to 27.5 mm and weighs about 800 kg/km; the largest, 24G2.5+12G50 C, has an outer diameter of up to 34.0 mm and weighs about 1,450 kg/km, 1.8 times as much. Across the range the rated current per core rises from 7 A to 14 A at 30 °C, and the minimum bending radius from 276 mm to 340 mm.

Example 1. A circuit carries 7 A per core at an ambient temperature of 40 °C. Required table current = 7 / 0.91 = 8 A per core. The smallest suitable size is 24G1+12G50 C with 8 A per core.

Example 2. A circuit carries 9 A per core at an ambient temperature of 35 °C. Required table current = 9 / 0.96 = 10 A per core. The smallest suitable size is 24G1.5+12G50 C with 10 A per core.

Type designation cores × mm²	Total copper mm²	Cable weight kg/100 m	Winding capacity m
24G0.75+12G50 C	18	80.0	5,395
24G1+12G50 C	24	91.0	4,925
24G1.5+12G50 C	36	110.0	4,205
24G2.5+12G50 C	60	145.0	3,335

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 60793-2-10	Multimode optical fibres (A1a OM2 / A1b OM1)
IEC 60794-1-21	Optical cables – mechanical test methods
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)
- Optical attenuation of every fibre by OTDR after cabling (routine test); reeling and torsion tests with optical monitoring (type test)

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-R-FM-C [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-R-FM-C	FeiChun series and sheath system
Core configuration	24G1+12G50 C	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-R-FM-C 24G1+12G50 C 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-FM-C 24G 0.6/1 kV – 24-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, PUR
- FC-CR-R-F-C 24G 0.6/1 kV – 24-core reeling control cable with a central optical element (12 single-mode fibres G.652.D), overall tinned-copper braid screen, CPE rubber
- FC-CR-R-FM-C 6G 0.6/1 kV – 6-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, CPE rubber
- FC-CR-R-FM 24G 0.6/1 kV – 24-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), CPE rubber
- FC-CR-A-FM-C 24G 0.6/1 kV – 24-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, PUR low-temp
- FC-CR-R-FM-C 12G 0.6/1 kV – 12-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, CPE rubber
- FC-CR-S-FM-C 24G 0.6/1 kV – 24-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, CSP rubber
- FC-CR-R-FM-C 18G 0.6/1 kV – 18-core reeling control cable with a central optical element (12 multimode fibres OM2 50/125), overall tinned-copper braid screen, CPE rubber

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

Frequently asked questions

What is FC-CR-R-FM-C 24G 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 24G1+12G50 C?
The outer diameter is 27.0 to 28.5 mm and the minimum bending radius in moving or reeling operation is 284 mm (6 to 10 × D depending on diameter).

What minimum reel core diameter is needed for 24G1+12G50 C?
At least 568 mm, which is twice the minimum bending radius of 284 mm. A larger core diameter extends cable life.

What current can each core of 24G1+12G50 C carry?
The table gives 8 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.

Which optical fibres does FC-CR-R-FM-C 24G contain?
12 multimode fibres OM2 50/125. 1 Gbit/s Ethernet up to 550 m (1000BASE-SX); 10 Gbit/s up to 82 m.

How are the fibres connected on the reel?
Through a fibre-optic rotary joint (FORJ) on the reel axis, normally combined with the power slip-ring assembly. Match the number of FORJ channels to the number of fibres in use and keep spare fibres for later expansion.

Is this cable halogen-free?
No. The CPE 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-R-FM-C 24G: 0.75, 1, 1.5, 2.5 mm². Other sizes and special designs can be produced to order.

11 Trademark Notice and Intellectual Property

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Technical and commercial contacts

Anhui FeiChun Special Cable Co., Ltd.
International Business Department
Park No. 1, Private Science and Technology Park, Hefei National Economic and Technological Development Zone, Hefei, Anhui, China
Technical support: Tech@feichuncables.com
Mining and heavy industry: mining@feichuncables.com
Zihao Yang, Global Sales Manager: zihao.yang@feichuncables.com
WhatsApp: +86 138 5512 3218
Web: www.feichuncables.com

Document control

Document no. FC-TDS-CR246-2026-F3950964-EN
Revision 0 — first issue
Date 4 November 2026
Product FC-CR-R-FM-C 0.6/1 kV

Prepared — Engineering | Checked — QC | Approved — International Business