MINING REELING CONTROL CABLE · MOBILE MACHINERY | 0.6/1 kV | 3 sizes | CPE rubber

# FC-MCR-R-C 36G 0.6/1 kV

Mining Reeling Control Cable 0.6/1 kV – 36-core reeling control cable with overall tinned-copper braid screen, CPE rubber sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, standards and installation guidance for 3 sizes.

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## 01 Application and Product Overview

FC-MCR-R-C 36G is a 36-core reeling control cable with overall tinned-copper braid screen rated 0.6/1 kV for cable reels on drill rigs, LHD machines, shuttle cars and mobile mining plant. 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 – 1.5 mm².

### Design

36 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. A tinned-copper braid screen (≥ 85 % coverage) between the inner and outer sheath limits electromagnetic coupling between the control cores and nearby power cables. With 36 cores this cable replaces several smaller control cables on a single reel channel.

### Typical applications

- Control, signal and measuring circuits of drill rigs, LHD machines, shuttle cars and mobile crushers supplied through a cable reel
- Spring-driven and motor-driven cable reels on mining machines, cable handlers and conveyor take-up systems
- Operation with repeated winding, unwinding and bending within the permitted bending radius
- Wet, muddy, oily and abrasive environments typical of underground headings and open pits
- Circuits that need protection against electromagnetic interference: the overall tinned-copper braid screen limits coupling between control cores and nearby power cables
- Open-pit and surface duty that calls for a rubber sheath with proven weather, ozone and oil resistance

| 3 sizes | 0.6/1 kV | +90 °C | CPE rubber |
|---|---|---|---|
| Cross-section 0.75 – 1.5 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
- 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

### Service notes for mining duty

- Route control cables on the reel in a separate channel from MV or unscreened power cables, or use the screened version.
- Strip the outer sheath only as far as required for termination and seal the cable entry against water.

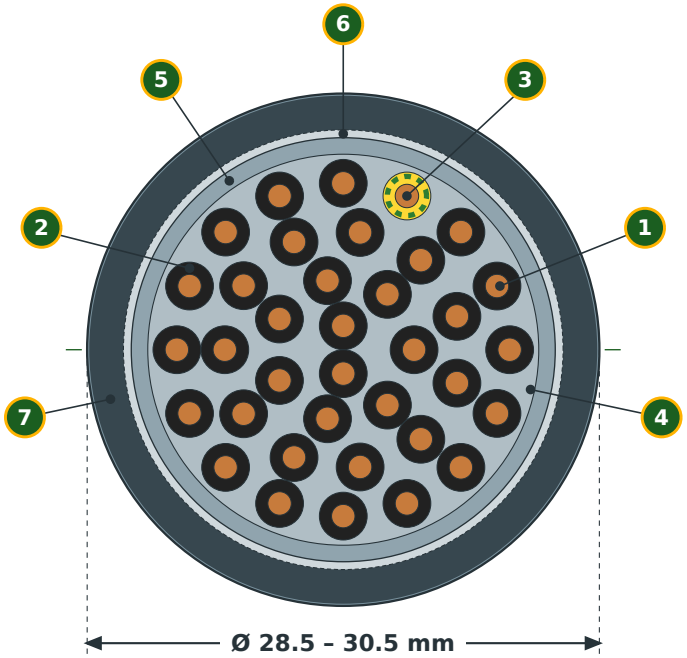

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## 02 Construction

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

**FC-MCR-R-C**

Sample size 36G1 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 | Filler and binder tape | Halogen-free compound, polyester tape |
| 5 | Inner sheath | Halogen-free polymer compound |
| 6 | Overall screen | Tinned-copper wire braid, coverage ≥ 85 % |
| 7 | Outer sheath | Chlorinated polyethylene (CPE) rubber, resistant to weather, ozone and oil |

The drawing shows size 36G1 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 |
| **Stranding** | Cores stranded in concentric layers 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 |

### 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 |


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### 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 |

## 04 Dimensions, Weights and Rated Data – 0.6/1 kV (3 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| **36G0.75 C** | FC-MC213-001 | 1.2 | 27.0 | 28.5 | 284 | 940 | 400 | 26.0 | 6 | 0.107 |
| **36G1 C** | FC-MC213-002 | 1.4 | 28.5 | 30.5 | 304 | 1,080 | 540 | 19.5 | 7 | 0.143 |
| **36G1.5 C** | FC-MC213-003 | 1.7 | 31.0 | 33.0 | 330 | 1,360 | 810 | 13.3 | 9 | 0.214 |

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 |
|---|---|---|---|---|---|
| **36G0.75 C** | 28.5 | 284 | 568 | 343 | 94.0 |
| **36G1 C** | 30.5 | 304 | 608 | 430 | 108.0 |
| **36G1.5 C** | 33.0 | 330 | 660 | 600 | 136.0 |

### Reel design guidance

- 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.


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## 06 Selection Guide and Sizing Aid

FC-MCR-R-C 36G covers 3 sizes. The smallest, 36G0.75 C, has an outer diameter of up to 28.5 mm and weighs about 940 kg/km; the largest, 36G1.5 C, has an outer diameter of up to 33.0 mm and weighs about 1,360 kg/km, 1.4 times as much. Across the range the rated current per core rises from 6 A to 9 A at 30 °C, and the minimum bending radius from 284 mm to 330 mm.

**Example 1.** A circuit carries 6 A per core at an ambient temperature of 40 °C. Required table current = 6 / 0.91 = 7 A per core. The smallest suitable size is 36G1 C with 7 A per core.

**Example 2.** A circuit carries 8 A per core at an ambient temperature of 35 °C. Required table current = 8 / 0.96 = 9 A per core. The smallest suitable size is 36G1.5 C with 9 A per core.

| Type designation cores × mm² | Total copper mm² | Cable weight kg/100 m | Winding capacity m | Free-hanging length m (vertical) |
|---|---|---|---|---|
| 36G0.75 C | 27 | 94.0 | 4,925 | 43 |
| 36G1 C | 36 | 108.0 | 4,355 | 50 |
| 36G1.5 C | 54 | 136.0 | 3,550 | 60 |

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. Free-hanging length = permissible pull ÷ (weight × 9.81); it is the length at which the cable’s own weight reaches the rated pull, without any safety factor for hoisting.

## 07 Engineering Profile by Size

Each size of FC-MCR-R-C 36G with the values that matter when sizing a circuit: dimensions, weight, copper share, heat and voltage drop at rated current, and the permissible pull. Voltage drop is for 100 m of cable at rated current with conductors at 90 °C (single-phase AC or DC round trip).

36G0.75 C: outer Ø 28.5 mm, about 940 kg/km of which 343 kg/km is copper (36%). Rated current is 6 A in free air at 30 °C; at that current the conductor loss is about 2.4 W per metre and the voltage drop over 100 m is 39.8 V (conductors at 90 °C). Per 100 m, 36G0.75 C contains 34.3 kg of copper and 59.7 kg of insulation, filler and sheath material, which sets the scrap value and the recycling split.

Choose 36G1 C when the load is near 7 A: the conductor resistance is 19.50 Ω/km, the overall size is Ø 30.5 mm and the weight 1,080 kg/km. The minimum reel core is 608 mm and the 1 s short-circuit rating 0.14 kA. Handling 36G1 C: 108.0 kg per 100 m, bending radius 304 mm; two people can lift a 20 m piece of about 21.6 kg.

36G1.5 C: Ø 33.0 mm; bend radius 330 mm; weight 1,360 kg/km. Voltage drop at rated current (9 A) is 30.5 V per 100 m, loss 2.7 W/m, and the cable can support 60 m of its own length vertically at the rated pull of 810 N. A 500 m length of 36G1.5 C weighs about 680 kg; with a 660 mm minimum core the drum must be sized for that load.

## 08 Configuration Guidance and Variant Comparison

Typical case: a machine whose control cabinet needs 36 circuits through the reel. For this case FC-MCR-R-C 36G is a fit in the 36G1 C size (Ø 30.5 mm).

Select CPE where weather and oil resistance are needed at a lower cost than CSP or PUR and where the cable is not dragged over sharp rock.

Rated 0.6/1 kV, the cable covers the common 400 V, 690 V and 1,000 V mining supplies.

In the drawn size 36G1 C the cores fill 54% of the circle inside the inner sheath, the inner sheath is 0.9 mm thick, the screen 0.45 mm and the outer sheath 2.1 mm, giving a total wall of 3.5 mm around a core bundle of Ø 22.5 mm.

FC-MCR-R-C 36G is one of 360 datasheets in the mining reeling control cable group and one of 953 in the library. The next smaller core count, FC-MCR-R-C 30G, has an outer Ø of 25.5 mm at 1 mm² against 30.5 mm here. The next larger core count, FC-MCR-R-C 37G, measures 30.5 mm and weighs 1,090 kg/km (this model: 1,080 kg/km).

### Element inventory and core layout

Element inventory of the drawn size 36G1 C: 36 elements with 36.0 mm² of copper in total. The 36 cores are stranded in 4 concentric layers (layer 1: 2 cores; layer 2: 7 cores; layer 3: 11 cores; layer 4: 16 cores), counted from the centre outwards, each layer with a short lay length and alternating lay direction. Keeping about 15 % of the cores as spare leaves 29 usable circuits plus the protective core; plan the core allocation before ordering because the number cannot be changed after manufacture.

| Element | Quantity | Cross-section | Ø over insulation mm | Copper mm² |
|---|---|---|---|---|
| Power / main core | 35 | 1 mm² | 2.7 | 35.0 |
| Protective (PE) conductor | 1 | 1 mm² | 2.7 | 1.0 |


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### Termination data (indicative)

| Type designation cores × mm² | Outer Ø or W × H mm | Cable gland thread | Lug / ferrule bolt | Strip length mm | Terminal row mm | Gland-to-bend straight mm |
|---|---|---|---|---|---|---|
| 36G0.75 C | 28.5 | M40 | ferrule | 12 | 183 | 142 |
| 36G1 C | 30.5 | M50 | ferrule | 12 | 183 | 152 |
| 36G1.5 C | 33.0 | M50 | ferrule | 12 | 183 | 165 |

Gland, lug and terminal-row values are planning guides computed from the dimensions above; confirm them with the accessory manufacturer.

### Comparison with related variants at size 36G1 C

| Variant | Differs in | Outer Ø / H mm | Weight kg/km | Pull N | Current A |
|---|---|---|---|---|---|
| **This datasheet** FC-MCR-R-C 36G | – | 30.5 | 1,080 | 540 | 7 |
| FC-MCR-S-C 36G 0.6/1 kV | sheath | 30.5 (+0%) | 1,100 (+2%) | 540 (+0%) | 7 (+0%) |
| FC-MCR-A-C 36G 0.6/1 kV | sheath | 30.5 (+0%) | 1,010 (-6%) | 540 (+0%) | 7 (+0%) |
| FC-MCR-R-C 30G 0.6/1 kV | configuration | 25.5 (-16%) | 830 (-23%) | 450 (-17%) | 7 (+0%) |
| FC-MCR-R-C 37G 0.6/1 kV | configuration | 30.5 (+0%) | 1,090 (+1%) | 560 (+4%) | 6 (-14%) |
| FC-MCR-R 36G 0.6/1 kV | screen | 29.5 (-3%) | 960 (-11%) | 540 (+0%) | 7 (+0%) |
| FC-MCR-R-C-HT 36G 0.6/1 kV | tensile braid | 32.0 (+5%) | 1,180 (+9%) | 3,910 (+624%) | 7 (+0%) |

Percentages show the change against this datasheet for the same cross-section; use them to judge what a change of sheath, voltage class, screen or tensile braid costs in size and weight.

## 09 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 0293-308** | Core identification |
| **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.


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## 10 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 machine.
- 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-MCR-R-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** | At least 3 years against manufacturing defects |
| **Reel label** | Type, cross-section, length, gross/net weight, batch no., reel no. |

### Ordering information

**Order example: FC-MCR-R-C 36G1 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.

## 11 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.

Mine-specific approvals (for example coal-mine safety marks, MSHA, or ATEX / IECEx for gassy atmospheres) are not implied by this datasheet; they depend on the project, the machine and the country and are arranged with the end user.

## 12 Related Datasheets

Variants of this cable with a different sheath, configuration or voltage. All datasheets are in PDF format.

- FC-MCR-S-C 36G 0.6/1 kV – 36-core reeling control cable with overall tinned-copper braid screen, CSP rubber
- FC-MCR-A-C 36G 0.6/1 kV – 36-core reeling control cable with overall tinned-copper braid screen, PUR low-temp
- FC-MCR-R-C 30G 0.6/1 kV – 30-core reeling control cable with overall tinned-copper braid screen, CPE rubber
- FC-MCR-R-C 37G 0.6/1 kV – 37-core reeling control cable with overall tinned-copper braid screen, CPE rubber
- FC-MCR-R 36G 0.6/1 kV – 36-core reeling control cable, CPE rubber
- FC-MCR-R-C-HT 36G 0.6/1 kV – 36-core reeling control cable with overall tinned-copper braid screen, with aramid tensile support braid, CPE rubber
- FC-MCR-R-C 25G 0.6/1 kV – 25-core reeling control cable with overall tinned-copper braid screen, CPE rubber
- FC-MCR-R-C 40G 0.6/1 kV – 40-core reeling control cable with overall tinned-copper braid screen, CPE rubber

Overview of all datasheets: Mining Reeling Control Cables 300/500 V and 0.6/1 kV

### Frequently asked questions

**What is FC-MCR-R-C 36G used for?**
Typical applications include control, signal and measuring circuits of drill rigs, LHD machines, shuttle cars and mobile crushers supplied through a cable reel.

**What are the outer diameter and minimum bending radius of 36G1 C?**
The outer diameter is 28.5 to 30.5 mm and the minimum bending radius in moving or reeling operation is 304 mm (6 to 10 × D depending on diameter).

**What minimum reel core diameter is needed for 36G1 C?**
At least 608 mm, which is twice the minimum bending radius of 304 mm. A larger core diameter extends cable life.

**What current can each core of 36G1 C carry?**
The table gives 7 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.


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**How much tensile load can 36G1 C take, and how long can it hang freely?**
The permissible pull force is 540 N. With a weight of about 1,080 kg/km this corresponds to a free-hanging vertical length of about 50 m before the rated pull is reached; apply your own safety factor for hoisting or suspended installations.

**What is the voltage drop and heat loss of 36G1 C at rated current?**
At 7 A and a conductor temperature of 90 °C the voltage drop is about 34.8 V per 100 m and the conductor loss about 2.4 W per metre (maximum resistance 19.500 Ω/km at 20 °C).

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

**Which cross-sections are available?**
FC-MCR-R-C 36G: 0.75, 1, 1.5 mm². Other sizes and special designs can be produced to order.

**Does this datasheet include mine-specific approvals?**
No. Mine-specific approvals, such as coal-mine safety marks, MSHA or ATEX/IECEx for gassy atmospheres, depend on the project and the country and are not implied by this document. Send the requirements to FeiChun technical support.

## 13 Trademark Notice and Intellectual Property

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