MINING REELING CONTROL CABLE · MOBILE MACHINERY | 0.6/1 kV | 3 sizes | PUR low-temp

HIGH TENSILE · ARAMID BRAID

FC-MCR-A-HT 25G 0.6/1 kV

Mining Reeling Control Cable 0.6/1 kV – 25-core reeling control cable, with aramid tensile support braid, halogen-free low-temperature PUR sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, standards and installation guidance for 3 sizes.

Document no. FC-TDS-MC103-2026-9756-EN · Revision 0 · Issued 2 November 2026 · Language: English

01 Application and Product Overview

FC-MCR-A-HT 25G is a 25-core reeling control cable, with aramid tensile support braid 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 cross-linked polyethylene (XLPE) insulation, an inner sheath and an outer sheath of halogen-free polyurethane (PUR), flame-retardant, low-temperature grade. Core cross-sections: 0.75 – 1.5 mm². An aramid tensile support braid between the inner and outer sheath carries the axial load; the permissible pull of the largest size is 3,250 N.

Design

25 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. With 25 cores this cable replaces several smaller control cables on a single reel channel. A braid of aramid yarn is applied between the inner and outer sheath. The permissible pull in the tables includes the braid. To use the rating, the load must be introduced through the braid, with a cable grip or strain-relief clamp that holds the sheath and braid at both ends, and never through the conductors.

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
- Control cabinets, junction boxes and remote-control stations of mining machinery
- Operations where the ambient temperature falls to −40 °C while the cable is in motion, such as open-pit mines and decline portals in cold climates
- Steep declines, ramps, raises and shaft installations where the cable weight or the reel tension would otherwise load the conductors; the aramid braid carries the axial load

3 sizes	0.6/1 kV	+90 °C	Halogen-free
Cross-section 0.75 – 1.5 mm²	Rated voltage U_0/U	Maximum conductor temperature	Sheath: PUR low-temp

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)
- Aramid tensile support braid: permissible pull up to 3,250 N in the largest size
- Halogen-free insulation and sheaths; no halogen acid gases when burned (IEC 60754-1/-2)
- Flexible in motion down to −40 °C (fixed installation −50 °C)

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- Flame retardant to IEC 60332-1-2

Service notes for mining duty

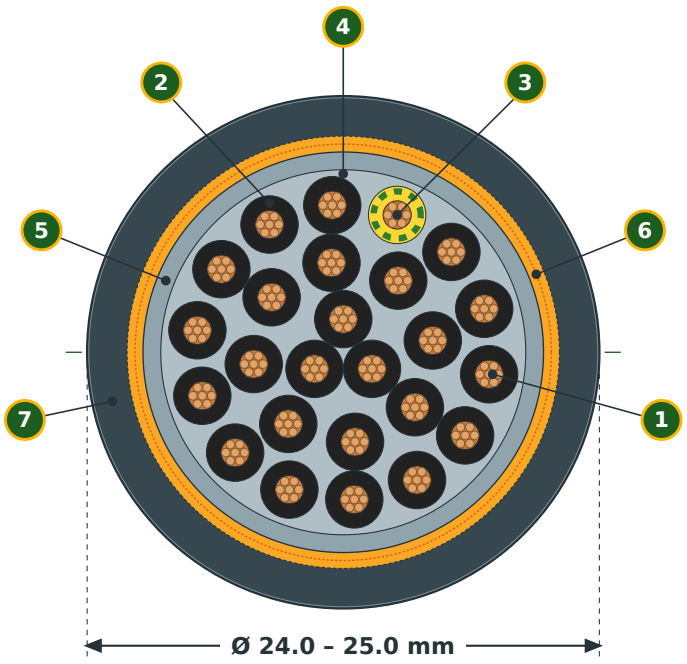
- Route control cables on the reel in a separate channel from MV or unscreened power cables, or use the screened version.
- Mark spare cores at both ends; a broken core in a reeling cable often appears first as an intermittent signal.

02 Construction

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

FC-MCR-A-HT

Sample size 25G1 · 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 cross-linked polyethylene (XLPE)
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	Tensile support braid	Aramid yarn braid between inner and outer sheath; carries the axial load
7	Outer sheath	Halogen-free polyurethane (PUR), flame-retardant, low-temperature grade

The drawing shows size 25G1. 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 cross-linked polyethylene (XLPE) 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
Tensile support braid	Aramid yarn braid, 0.76 mm thick, between the inner and the outer sheath; the braid carries the axial load
Outer sheath	Halogen-free polyurethane (PUR), flame-retardant, low-temperature grade

Sheath material

The low-temperature grade of halogen-free polyurethane (PUR) keeps the sheath flexible down to −40 °C in motion (−50 °C fixed), so the cable can be reeled and trailed at sub-zero surface temperatures without sheath cracking. It retains the abrasion, cut and tear resistance of standard PUR, resists mineral oil, UV radiation and ozone, and emits no halogen acid gases when burned. Typical use: open-pit and portal-to-decline operations in cold climates, and mines with cold intake air.

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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	−50 °C to +80 °C
Ambient temperature, in motion	−40 °C to +80 °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 on the copper cross-section plus the permissible load of the aramid support braid; the pull force of each size is in section 04 and in the tensile table
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	Yes (insulation, inner and outer sheath); IEC 60754-1/-2
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
25G0.75	FC-MC103-001	1.2	22.5	23.9	240	580	2,480	26.0	6	0.107
25G1	FC-MC103-002	1.4	24.0	25.0	250	680	2,750	19.5	7	0.143
25G1.5	FC-MC103-003	1.7	26.0	27.5	276	850	3,250	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 plus the permissible load of the aramid support braid (split out in the tensile table). 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).

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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
25G0.75	23.9	240	480	167	58.0
25G1	25.0	250	500	222	68.0
25G1.5	27.5	276	552	333	85.0

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.

06 Tensile Performance of the Aramid Support Braid

The aramid braid adds its own permissible working load to the copper-based rating. The table splits the permissible pull of every size into the copper part (15 N/mm² × copper cross-section) and the braid part, and shows how long a length of cable can hang vertically before its own weight reaches the rated pull. The braid part is a design value: aramid yarn strength 2,900 N/mm², braid efficiency 0.70 and a safety factor of 15 on the yarn strength. Introduce the load only through a cable grip or strain-relief clamp that holds the sheath and the braid.

Type designation cores × mm²	Pull, copper only N	Pull, aramid braid N	Total permissible pull N	Factor × standard	Free-hanging length m (vertical)
25G0.75	281	2,199	2,480	8.8	435
25G1	375	2,375	2,750	7.3	412
25G1.5	560	2,690	3,250	5.8	389

Free-hanging length = permissible pull ÷ (weight × 9.81). For hoisting, shaft suspension or lifting applications apply the safety factor required by the applicable regulations and confirm the arrangement with FeiChun.

07 Selection Guide and Sizing Aid

FC-MCR-A-HT 25G covers 3 sizes. The smallest, 25G0.75, has an outer diameter of up to 23.9 mm and weighs about 580 kg/km; the largest, 25G1.5, has an outer diameter of up to 27.5 mm and weighs about 850 kg/km, 1.5 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 240 mm to 276 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 25G1 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 25G1.5 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)
25G0.75	18.75	58.0	7,225	435
25G1	25	68.0	6,785	412
25G1.5	37.5	85.0	5,395	389

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.

08 Engineering Profile by Size

Each size of FC-MCR-A-HT 25G 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).

25G0.75: Ø 23.9 mm; bend radius 240 mm; weight 580 kg/km. Voltage drop at rated current (6 A) is 39.8 V per 100 m, loss 2.4 W/m, and the cable can support 435 m of its own length vertically at the rated pull of 2,480 N. Handling 25G0.75: 58.0 kg per 100 m, bending radius 240 mm; two people can lift a 20 m piece of about 11.6 kg.

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For 25G1 the design values are: Ø 25.0 mm, 680 kg/km, 2,750 N permissible pull (375 N copper, 2,375 N braid), 7 A rated current. The copper accounts for 33% of the weight, and 2.4 W/m is dissipated at full load, so heat-sensitive reel layers should be derated as shown in section 04. A 500 m length of 25G1 weighs about 340 kg; with a 500 mm minimum core the drum must be sized for that load.

Size 25G1.5 has a maximum conductor resistance of 13.30 Ω/km, a copper content of 333 kg/km and a minimum bending radius of 276 mm (reel core 552 mm). Short-circuit capability for 1 s is 0.21 kA. Expect 30.5 V of drop per 100 m at 9 A. Reel and handling: at 25G1.5 the minimum reel core is 552 mm and the cable weighs 85.0 kg per 100 m, so a 500 m length weighs about 425 kg before the drum.

09 Configuration Guidance and Variant Comparison

Typical case: a machine whose control cabinet needs 25 circuits through the reel. For this case FC-MCR-A-HT 25G is a fit in the 25G1 size (Ø 25.0 mm).

Choose this grade for cold intake air and surface sections while keeping the halogen-free benefit.

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

In the drawn size 25G1 the cores fill 62% of the circle inside the inner sheath, the inner sheath is 0.8 mm thick, the aramid braid 0.76 mm and the outer sheath 1.9 mm, giving a total wall of 3.5 mm around a core bundle of Ø 17.5 mm.

The aramid braid adds 2,375 N of permissible pull in the 25G1 size (2,750 N total instead of 375 N), at the cost of about 1.5 mm more diameter and 17 kg/km more weight than the standard design.

FC-MCR-A-HT 25G 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-A-HT 24G, has an outer Ø of 25.5 mm at 1 mm² against 25.0 mm here. The next larger core count, FC-MCR-A-HT 30G, measures 26.0 mm and weighs 750 kg/km (this model: 680 kg/km).

Element inventory and core layout

Element inventory of the drawn size 25G1: 25 elements with 25.0 mm² of copper in total. The 25 cores are stranded in 3 concentric layers (layer 1: 3 cores; layer 2: 8 cores; layer 3: 14 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 20 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	24	1 mm²	2.7	24.0
Protective (PE) conductor	1	1 mm²	2.7	1.0

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
25G0.75	23.9	M40	ferrule	12	127	120
25G1	25.0	M40	ferrule	12	127	125
25G1.5	27.5	M40	ferrule	12	127	138

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 25G1

Variant	Differs in	Outer Ø / H mm	Weight kg/km	Pull N	Current A
This datasheet FC-MCR-A-HT 25G	–	25.0	680	2,750	7
FC-MCR-U-HT 25G 0.6/1 kV	sheath	25.0 (+0%)	680 (+0%)	2,750 (+0%)	7 (+0%)
FC-MCR-S-HT 25G 0.6/1 kV	sheath	25.0 (+0%)	740 (+9%)	2,750 (+0%)	7 (+0%)
FC-MCR-A-HT 24G 0.6/1 kV	configuration	25.5 (+2%)	670 (-1%)	2,740 (-0%)	8 (+14%)
FC-MCR-A-HT 30G 0.6/1 kV	configuration	26.0 (+4%)	750 (+10%)	2,970 (+8%)	7 (+0%)
FC-MCR-A-C-HT 25G 0.6/1 kV	screen	26.0 (+4%)	770 (+13%)	2,860 (+4%)	7 (+0%)
FC-MCR-A 25G 0.6/1 kV	tensile braid	23.7 (-5%)	600 (-12%)	375 (-86%)	7 (+0%)

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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.

10 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 60754-1 / -2	Halogen acid gas emission when burned
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) and confirmation of halogen-free materials
- Tensile test of the finished cable including elongation at the rated pull, and inspection of the aramid braid coverage (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.

11 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.
- 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.
- Terminate the tensile braid: fix the cable with a cable grip or strain-relief clamp that holds the sheath and braid at both ends, so the braid, not the conductors, carries the load.

Sheath marking

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FEICHUN FC-MCR-A-HT [cross-section] 0.6/1 kV [year] [serial no.] [metre mark]
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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-A-HT 25G1 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.

12 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.

13 Related Datasheets

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

- FC-MCR-U-HT 25G 0.6/1 kV – 25-core reeling control cable, with aramid tensile support braid, PUR
- FC-MCR-S-HT 25G 0.6/1 kV – 25-core reeling control cable, with aramid tensile support braid, CSP rubber
- FC-MCR-A-HT 24G 0.6/1 kV – 24-core reeling control cable, with aramid tensile support braid, PUR low-temp

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- FC-MCR-A-HT 30G 0.6/1 kV – 30-core reeling control cable, with aramid tensile support braid, PUR low-temp
- FC-MCR-A-C-HT 25G 0.6/1 kV – 25-core reeling control cable with overall tinned-copper braid screen, with aramid tensile support braid, PUR low-temp
- FC-MCR-A 25G 0.6/1 kV – 25-core reeling control cable, PUR low-temp
- FC-MCR-A-HT 19G 0.6/1 kV – 19-core reeling control cable, with aramid tensile support braid, PUR low-temp
- FC-MCR-A-HT 36G 0.6/1 kV – 36-core reeling control cable, with aramid tensile support braid, PUR low-temp

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

Frequently asked questions

What is FC-MCR-A-HT 25G 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 25G1?
The outer diameter is 24.0 to 25.0 mm and the minimum bending radius in moving or reeling operation is 250 mm (6 to 10 × D depending on diameter).

What minimum reel core diameter is needed for 25G1?
At least 500 mm, which is twice the minimum bending radius of 250 mm. A larger core diameter extends cable life.

What current can each core of 25G1 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.

How much tensile load can 25G1 take, and how long can it hang freely?
The permissible pull force is 2,750 N (including the aramid braid; 375 N on the copper alone). With a weight of about 680 kg/km this corresponds to a free-hanging vertical length of about 412 m before the rated pull is reached; apply your own safety factor for hoisting or suspended installations.

What does the tensile support braid add compared with the standard design?
It raises the permissible pull of 25G1 from 375 N to 2,750 N, a factor of 7.3, and keeps the conductors from stretching and the cores from forming loops. The cable is somewhat larger and heavier than the standard version because of the braid layer.

What is the voltage drop and heat loss of 25G1 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?
Yes. The insulation and all sheaths are halogen-free; see section 03 for flame-retardancy and temperature data.

Which cross-sections are available?
FC-MCR-A-HT 25G: 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.

14 Trademark Notice and Intellectual Property

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Document control

Document no. FC-TDS-MC103-2026-9756-EN
Revision 0 — first issue
Date 2 November 2026
Product FC-MCR-A-HT 0.6/1 kV

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

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