TYPE · ROUND MV REELING | 12/20 kV | Based on DIN VDE 0250-813 | PROTOLON XPRT Equivalent

FC-MVR (N)TSCGEWÖU 12/20 kV

Round medium voltage reeling cable — EPR insulated, anti-torsion braid, double-layer red sheath — for high-speed container cranes, ship-to-shore cranes, stacker-reclaimers and large mobile equipment.

Document No. **FC-TDS-MVR-2026-E36A** Revision **0** Issue date **10 October 2026** Language **English (AU)**

01 Application & Product Overview

FC-MVR is a heavy-duty round medium voltage reeling cable for high to extreme mechanical stress — high travel speeds, dynamic tensile loads, frequent changes of direction in different planes, running over rollers and torsional stress.

Three EPR-insulated power cores are stranded around a central cradle separator, with the earth conductor split into three equal parts in the outer interstices for a symmetrical design and balanced fault-current return. An anti-torsion braid vulcanised between the inner and outer sheaths keeps the cable stable during high-speed reeling. Where data transmission is required, the fibre-optic version FC-MVR-LWL is available.

Typical applications

- STS, RMG and RTG container cranes on motor-driven reeling drums
- Ship loaders, stacker-reclaimers and bulk-handling gantries
- Large mobile mining equipment and excavators
- Feeder cables for mobile substations and transfer cars
- Outdoor and indoor use — resistant to ozone, UV, moisture and oil

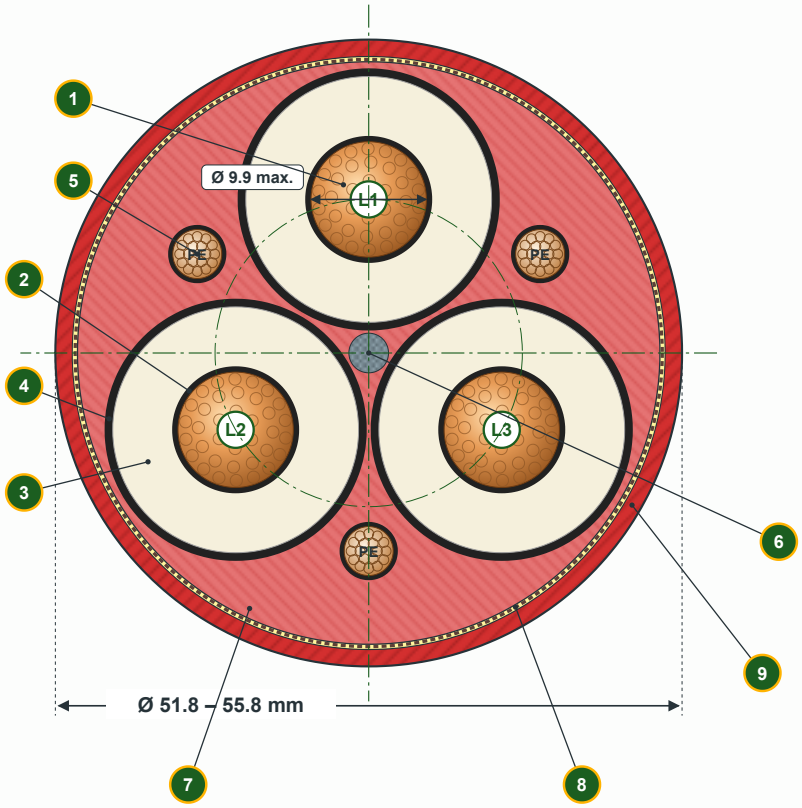
12/20 kV	240 m/min	20 / 30 N/mm²	± 25 °/m
Rated voltage U_0/U	Travel speed (reeling), higher on request	Static / dynamic tensile load on conductor	Permissible torsional stress

Cross-reference

REFERENCE TYPE	FEICHUN EQUIVALENT
PROTOLON XPRT (N)TSCGEWÖU 12/20 kV	FC-MVR (N)TSCGEWÖU 12/20 kV

Also suitable as a direct replacement for earlier PROTOLON (SMK) (N)TSCGEWÖU 12/20 kV installations — same designation, dimensions within the same envelope.

02 Construction



FEICHUN · SECTION A–A · 12/20 kV

FC-MVR (N)TSCGEWÖU

Doc. No. FC-TDS-MVR-2026-E36A
Ref. 3×50+3×25/3
Rev. 0 · 2026-10-10 · 1st-angle · NTS

Drawing representative of the 3×50 mm² size; other sizes scale proportionally.

Pos.	Element	Material
1	Phase conductor	Tinned annealed Cu, very finely stranded, class 5 (IEC 60228) / class FS (DIN VDE 0295)
2	Inner semiconductive layer	Extruded semiconductive EPR
3	Insulation	High-grade EPR, min. 3GI3 (DIN VDE 0207-20), natural colour
4	Outer semiconductive layer	Modified semiconductive compound, black, strippable cold
5	Earth conductor	Tinned Cu, split into 3 equal parts in the 3 outer interstices, semiconductive covering
6	Cradle separator	Central profiled rubber element
7	Inner sheath	EPR-based rubber compound, min. 5GM3, red, longitudinally water-blocking
8	Anti-torsion braid	Polyester yarn braid, vulcanised between inner and outer sheath
9	Outer sheath	Polychloroprene (CR/PCP), min. 5GM5, abrasion- and tear-resistant, red

Design features

Item	Description
Core arrangement	Three power cores stranded around a central cradle separator; earth conductor split into 3 parts in the outer interstices
Electrical field control	Triple-extruded inner semicon / EPR insulation / outer semicon, cured in one continuous process
Core identification	Natural insulation with black semiconductive layer; numbered tapes L1, L2, L3
Sheath system	Double-layer sandwich sheath with vulcanised anti-torsion braid — torsion-stable, high tear and abrasion resistance
Data transmission	Fibre-optic version available as FC-MVR-LWL (N)TSKCGEWÖU (6–24 fibres, G50 / G62.5 / E9)
Sheath colour	Red (standard); yellow or black on request

FEICHUN CABLE

03 Electrical, Thermal & Mechanical Data

Electrical parameters

Parameter	Value
Rated voltage U_0/U	12/20 kV
Max. operating voltage AC	13.9/24 kV
Max. operating voltage DC	20.8/36 kV
AC test voltage	29 kV, 5 min
Partial discharge	≤ 10 pC at 1.73 U_0
Current rating basis	DIN VDE 0298-4; laid in air, 30 °C ambient — apply reeling factors (§04)
Short-circuit duration basis	1 s, from 90 °C to 250 °C

Thermal & mechanical parameters

Parameter	Value
Max. conductor temperature	+90 °C
Short-circuit temperature	+250 °C (max. 5 s)
Ambient – fixed installation	−50 °C to +80 °C
Ambient – fully flexible	−35 °C to +80 °C
Max. tensile load	20 N/mm² static; 30 N/mm² dynamic (acceleration) — of total phase conductor cross-section
Torsional stress	± 25 °/m
Min. bending radius	Per DIN VDE 0298-3 — see table §04
S-type direction changes	Min. spacing 20 × D
Travel speed	Up to 240 m/min (reeling); higher speeds on request
Resistance	Oil (DIN EN 60811-404), ozone, UV, moisture; water resistance per HD 22.16

04 Dimensions, Weights & Ratings — 12/20 kV

Cores × cross-section mm²	FeiChun part no.	Conductor Ø max. mm	Earth cond. Ø max. mm	Outer diameter min. mm	Outer diameter max. mm	Min. bending radius mm	Weight approx. kg/km	Max. tensile force static N	Max. tensile force dynamic N	R_{20} max. Ω/km	Current rating A	Short-circuit current kA (1 s)
3×25+3×25/3	FC-MVR20-02525	7.1	4.2	44.1	47.1	471	2,950	1,500	2,250	0.795	139	3.58
3×35+3×25/3	FC-MVR20-03525	8.3	4.2	46.6	49.6	496	3,440	2,100	3,150	0.565	172	5.01
3×50+3×25/3	FC-MVR20-05025	9.9	4.2	51.8	55.8	558	4,300	3,000	4,500	0.393	215	7.15
3×70+3×35/3	FC-MVR20-07035	11.8	5.0	55.0	59.0	590	5,350	4,200	6,300	0.277	265	10.01
3×95+3×50/3	FC-MVR20-09550	13.8	5.9	61.6	65.6	656	6,660	5,700	8,550	0.210	319	13.59
3×120+3×70/3	FC-MVR20-12070	15.4	7.0	65.1	69.1	691	7,870	7,200	10,800	0.164	371	17.16
3×150+3×70/3	FC-MVR20-15070	17.2	7.0	69.0	73.0	730	9,060	9,000	13,500	0.132	428	21.45
3×185+3×95/3	FC-MVR20-18595	19.0	8.0	74.3	78.3	783	10,850	11,100	16,650	0.108	488	26.46
3×240+3×120/3	FC-MVR20-24012	21.8	9.0	80.3	84.3	843	13,340	14,400	21,600	0.0817	574	34.32
3×300+3×150/3	FC-MVR20-30015	24.4	10.0	87.2	92.2	922	16,250	18,000	27,000	0.0654	660	42.90

Current rating: nominal value for rubber cables laid in air at 30 °C ambient (DIN VDE 0298-4) — multiply by the factors below for reeled operation and other ambient temperatures. Alternative earth configurations, sheath colours and the fibre-optic version FC-MVR-LWL are manufactured to order.

Reeling factors — cylindrical drum

Layers on drum	1	2	3	4	5
Factor	0.80	0.61	0.49	0.42	0.38

Ambient temperature factors (90 °C conductor)

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

05 Standards, Tests & Resistance Properties

Standard	Scope
DIN VDE 0250-813	Basis of design (MV trailing / reeling cable)
DIN VDE 0295 / IEC 60228	Conductors, class 5 / FS
DIN VDE 0207-20 / -21	Insulation (3GI3) and sheath (5GM5) compounds
DIN VDE 0298-3 / -4	Bending radii, current ratings
DIN EN 60811-404	Oil resistance of sheath
HD 22.16 / EN 50525-1	Water resistance; general requirements
IEC 60502-2 (ref.)	Partial discharge and electrical test methods

Routine & type tests

- AC voltage test 29 kV on every drum, partial discharge measurement
- Conductor resistance and dimensional checks
- Insulation resistance and semiconductive layer strippability
- Reeling, reversed bending and torsion tests (type test)
- Ozone, UV and oil resistance — unrestricted outdoor use

Test documentation: each delivery is accompanied by a FeiChun in-house laboratory inspection certificate (electrical and dimensional). Third-party witnessed testing can be arranged at the buyer's cost.

06 Installation, Marking & Delivery

Installation notes

- Drum core diameter ≥ 2 × minimum bending radius; use guide rollers sized to the same radius.
- Unwind tangentially from the delivery drum — never pull off over the flange; avoid loops and kinks.
- Keep torsion within ± 25 °/m; maintain at least 20 × D between S-type direction changes.
- Keep tensile force within the static/dynamic limits tabulated, including acceleration and braking peaks.
- Lay out and relax the cable before the first reeling; check tension-control settings at commissioning.
- Use stress-control terminations rated for 12/20 kV EPR cables (24 kV equipment class) and connect all three earth conductor parts at each end.

Cold-strippable semicon: the outer semiconductive layer is designed to be removed cold with suitable stripping tools — do not score the insulation. Re-check the minimum bending radius at cable entries to drums and slip-ring housings.

Sheath marking

```
FEICHUN FC-MVR (N)TSCGEWÖU 3×50+3×25/3
12/20 kV 2026 [serial no.] [metre mark]
```

Packing & delivery

Item	Standard
Drum	Steel or fumigated wooden drums, ends sealed with heat-shrink caps; pulling eye on request
Lengths	To order, single continuous length (no joints)
Production lead time	2–3 weeks after technical confirmation
Warranty	Min. 3 years against manufacturing defects
Drum label	Type, size, length, gross/net weight, batch no., drum no.

07 Certifications & Quality

CE — LVD 2014/35/EU

Attestation No. M.2025.206.C116598 · EN 50525-1:2011+A1:2022 · UDEM International Certification · valid to 01.04.2030

EAC — TR CU 004/2011

Certificate No. ЕАЭС KG417/052.CN.02.15390 · GOST 31996-2012, GOST 31565-2012 · valid 24.10.2025–23.10.2030

UKCA — Verification

No. ICR/VC/HS2508110 · BS EN 50525-1:2011+A1:2022 · ICR Polska · valid to 17.08.2030

FeiChun also holds ATEX (Directive 2014/34/EU) documentation verification and IECEx / VDE related approvals for designated product families. Certificate copies are available on request.

08 Trademark Notice & Intellectual Property

PROTOLON®, PROTOLON XPRT and PROTOLON (SMK) are trademarks of their respective owner (Prysmian Group). They are cited solely to identify the reference type for technical cross-referencing; FeiChun Cables has no affiliation with, and is not endorsed by, the trademark owner. FC-MVR is a FeiChun product designed to equivalent functional performance.

© 2026 Anhui FeiChun Special Cable Co., Ltd. — All rights reserved. This document, including its drawings, tables and layout, is the intellectual property of FeiChun and is protected under the Copyright Law and the Anti-Unfair Competition Law of the People's Republic of China and the Copyright Act 1968 (Cth) of Australia. Reproduction, redistribution or modification in whole or in part without written consent is prohibited. Technical data are subject to change without notice as part of continuous product development.

Technical & Sales Contact

Anhui FeiChun Special Cable Co., Ltd.

International Business Department

No. 1 Park, Private Science & Technology Park, Hefei National ETDZ, Hefei, Anhui, China

Technical: Tech@feichuncables.com

Mining & 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

Doc. No. FC-TDS-MVR-2026-E36A

Revision 0 — first issue

Date 10 October 2026

Product FC-MVR (N)TSCGEWÖU 12/20 kV

Prepared — Technical Dept.	Checked — QA	Approved — Intl. Business

FEICHUN CABLES