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

FC-MVR-SR (N)TSCGEWÖU 12/20 kV

Round medium voltage reeling cable — EPR insulated, anti-torsion braid, double-layer red sheath — for RMG/RTG and gantry cranes, stacker-reclaimers, ship loaders and mobile equipment in standard-duty reeling service.

Document No. **FC-TDS-MVR-2026-E47B** Revision **0** Issue date **10 October 2026** Language **English (AU)**

01 Application & Product Overview

FC-MVR-SR is a round medium voltage reeling cable for standard-duty applications — medium travel speeds, dynamic tensile loads, changes of direction, running over rollers and moderate torsional stress — offering a cost-optimised alternative to the heavy-duty FC-MVR series.

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 reeling. Where data transmission is required, a fibre-optic version is available on request.

Typical applications

- RMG and RTG container cranes, gantry and overhead cranes on 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

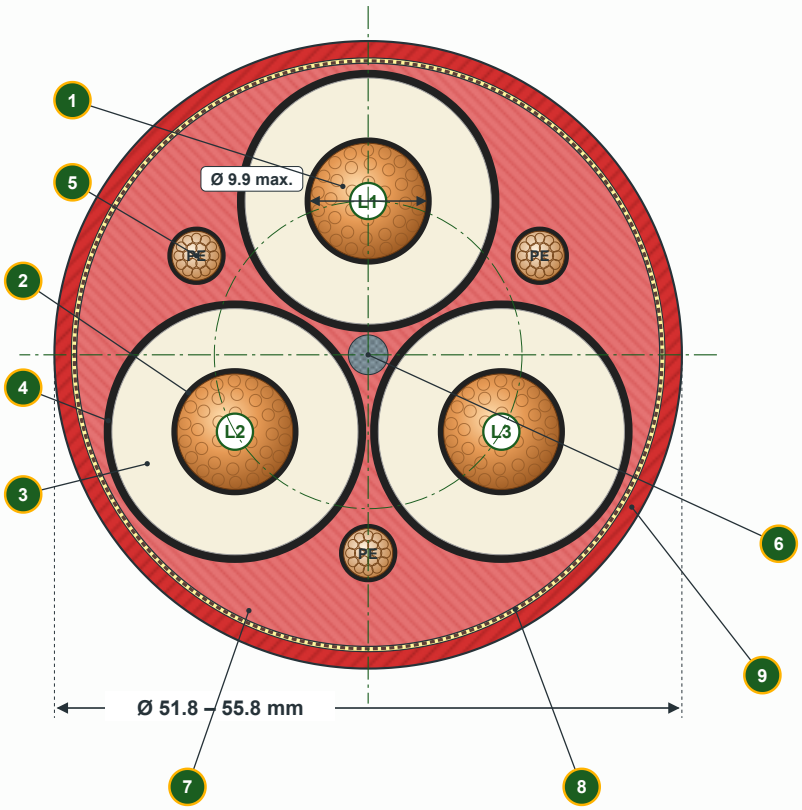
12/20 kV	200 m/min	20 / 30 N/mm²	± 25 °/m
Rated voltage U_0/U	Travel speed (reeling)	Static / dynamic tensile load on conductor	Permissible torsional stress

Cross-reference

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

Doc. No. FC-TDS-MVR-2026-E47B
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 200 m/min (reeling); for higher speeds use the heavy-duty FC-MVR series
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-MVRS20-02525	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-MVRS20-03525	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-MVRS20-05025	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-MVRS20-07035	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-MVRS20-09550	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-MVRS20-12070	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-MVRS20-15070	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-MVRS20-18595	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-MVRS20-24012	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-MVRS20-30015	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

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

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Document Control

Doc. No. FC-TDS-MVR-2026-E47B

Revision 0 — first issue

Date 10 October 2026

Product FC-MVR-SR (N)TSCGEWÖU 12/20 kV

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

FEICHUN CABLES