DIN VDE 0250-809 · FLAT RUBBER-SHEATHED CABLE · FESTOON DUTY | 0.6/1 kV | 6 sizes | CR rubber | TINNED COPPER | REELING / FESTOON DUTY

NGFLGöu 4G 0.6/1 kV

Flat Rubber-Sheathed Flexible Cable 0.6/1 kV – 4 cores lie parallel in one plane, with the green-yellow core at the edge; a common flat sheath encloses them. Polychloroprene rubber sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, voltage drop and installation guidance for 6 sizes.

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01 Application and Product Overview

NGFLGöu is the flat, polychloroprene-sheathed flexible cable of DIN VDE 0250-809 for festoon and trolley systems. 4 cores of fine-wire copper lie parallel in one plane and are enclosed by a common flat sheath of oil-resistant rubber. The flat shape lets the cable hang in even loops on a festoon rail, which is why it is used on overhead cranes, conveyor tail ends and monorail systems.

Design

The cores are EPR-insulated (type 3GI3) and are laid side by side with the green-yellow core at the edge; the remaining cores carry numbers. A rubber compound fills the space between the cores and is covered by a polychloroprene sheath that gives the cable a stable flat profile with rounded edges. Because the cores lie in one plane, the cable bends easily around the flat axis and is guided on festoon trolleys without twisting.

Typical applications

- Festoon systems on overhead and gantry cranes
- Conveyor tail-end and belt-tripper cars that travel on a rail
- Monorail and overhead rail transport in mines and factories
- Machine-tool and press loaders with horizontally travelling carriages
- Hoists and lifting platforms that need a flat, light feeder
- Stage and studio equipment with travelling lighting bars
- Warehouse shuttles and storage and retrieval machines
- Retrofit of flat cables to DIN VDE 0250-809 in existing festoon runs

6 sizes	0.6/1 kV	+90 °C	CR rubber
Cross-section 1.5 – 16 mm²	Rated voltage U_0/U	Maximum conductor temperature	Sheath: CR rubber

Key features

- 4 cores in one plane, with a green-yellow core at the edge
- Flat profile 29.7 mm × 10.0 mm for the largest listed size: compact festoon loops
- EPR insulation rated 90 °C; short-circuit temperature 250 °C
- Oil-resistant, flame-retardant polychloroprene sheath
- Fine-wire class 5 conductors
- Bending radius 5 × H fixed, 8 × H in festoon operation (H = cable thickness)
- 6 sizes from 1.5 to 16 mm²; weight from 133 to 830 kg/km; copper from 58 to 610 kg/km

Core layout and conductor

4 cores lie parallel in one plane, with the green-yellow core at the edge; a common flat sheath encloses them. The conductors are tinned: each copper wire carries a thin tin coating. Tinning protects the copper against oxidation and corrosion in damp, salty or sulphurous atmospheres and keeps the conductor solderable, which is an advantage in outdoor, marine and mining installations. The resistance limits of tinned class 5 conductors are marginally higher than for bare copper; the R_{20} column shows the tinned values.

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Standard background

DIN VDE 0250-809 is the standard of the flat tough-rubber-sheathed flexible cable. It sets the number of cores, the conductor class, the insulation and sheath compounds and the flat dimensions that festoon rails and cable trolleys are designed around.

The standard sheath compound is flexible down to 25 °C in motion and 40 °C in fixed installation. For regular use below this limit select the low-temperature grade of the same cable.

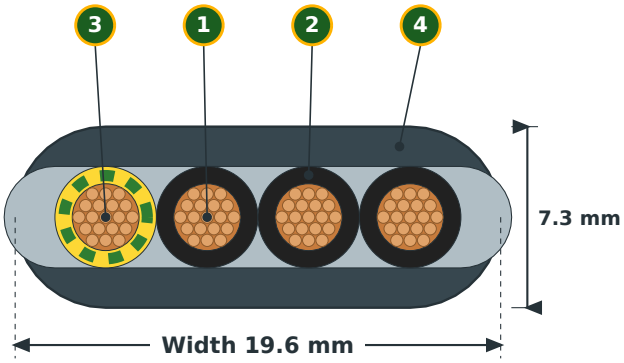
0.6/1 kV (rated phase-to-earth / phase-to-phase voltage) covers 400 V and 690 V three-phase systems; the test voltage is 3 kV.

02 Construction

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

NGFLGöu

Sample size 4G4 · Rev 0 · Illustrative, not to scale



No.	Component	Material
1	Conductor	Tinned annealed fine-wire copper, class 5 to IEC 60228 / DIN VDE 0295
2	Insulation	EPR rubber, type 3GI3 (90 °C)
3	Protective (PE) core	Green-yellow insulation, same cross-section as the power cores
4	Outer sheath	Polychloroprene (CR) rubber, type 5GM5

The drawing shows size 4G4. Other sizes have the same construction with scaled dimensions; the layout of every size is checked for non-overlap of all elements.

Construction details

Conductor	Tinned annealed fine-wire copper, class 5 to DIN VDE 0295 / IEC 60228
Insulation	EPR rubber, type 3GI3 (90 °C), maximum conductor temperature 90 °C
Core identification	Green-yellow core at the edge; remaining cores black with white numbers
Stranding	Cores laid parallel in one plane
Outer sheath	Polychloroprene (CR) rubber, type 5GM5; thickness about 1.6 mm at this size

03 Electrical, Thermal and Mechanical Characteristics

Electrical data

Rated voltage U_0/U	0.6/1 kV AC
Test voltage	3 kV AC, 5 min
Maximum operating voltage, three-phase	1.2 kV
Maximum operating voltage, DC (core-earth / core-core)	0.9/1.8 kV
Current-carrying capacity	Design values by the method of DIN VDE 0298-4, free air, 30 °C ambient
Conductor resistance	Maximum at 20 °C, class 5, tinned

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Thermal and mechanical data

Maximum conductor temperature	+90 °C
Maximum temperature at short circuit	+250 °C (5 s maximum)
Ambient temperature, fixed installation	−40 °C to +80 °C
Ambient temperature, in motion	−25 °C to +80 °C
Minimum bending radius	Fixed: 5 × H; festoon operation: 8 × H (H = cable thickness)
Maximum tensile load	15 N/mm² continuous on the total copper cross-section
Flame propagation	IEC 60332-1-2 / DIN EN 60332-1-2
Halogen-free	No (CR rubber)
Mineral oil resistance	Resistant, DIN EN 60811-404
UV and ozone resistance	Resistant
Water	Damp and wet areas, spray water

04 Dimensions, Weights and Rated Data – 0.6/1 kV (6 sizes)

Type designation cores × mm²	FeiChun article no.	Cond. Ø max mm	Width mm	Height mm	Bend radius fixed mm	Bend radius moving mm	Weight approx. kg/km	Copper kg/km	Max. pull N	R_{20} max Ω/km	Rated current A	I_k (1 s) kA
4G1.5	FC-NGFL-0602-01	1.7	14.5	5.4	27	43	133	58	90	13.7	21	0.214
4G2.5	FC-NGFL-0602-02	2.2	16.5	5.9	29	47	185	96	150	8.21	28	0.357
4G4	FC-NGFL-0602-03	2.7	19.6	7.3	37	58	285	154	240	5.09	38	0.572
4G6	FC-NGFL-0602-04	3.3	22.1	8.0	40	64	382	230	360	3.39	49	0.858
4G10	FC-NGFL-0602-05	4.1	25.3	8.8	44	71	560	384	600	1.95	67	1.43
4G16	FC-NGFL-0602-06	5.2	29.7	10.0	50	80	830	610	960	1.24	90	2.29

Current-carrying capacity: design values by the method of DIN VDE 0298-4, free air, 30 °C ambient; for other ambient temperatures use the factors below and the multi-core reduction factor already included in the table. Copper weight = 9.6 kg/(km·mm²) of copper cross-section (VDE copper index). Pull force = 15 N/mm² × total copper cross-section of the power cores. Diameters, dimensions and weights are nominal design values calibrated to published type tables; they vary within manufacturing tolerances. Confirm critical dimensions before dimensioning reels, glands 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	55	60
Factor	1.08	1.04	1.00	0.96	0.91	0.87	0.82	0.76	0.71

Short-circuit current rating

I_k = 0.143 kA/mm² × cross-section of the power core (conductor 90 °C → 250 °C). For another duration t: $I_{k,t} = I_{k,1s} / \sqrt{t}$ (0.1 s ≤ t ≤ 5 s).

05 Tensile Load, Reeling and Festoon Data

The values below support reel and festoon design: the permitted pull split into copper and braid parts, the free-hanging length (the length at which the cable's own weight reaches the rated pull, without a safety factor), the minimum reel core diameter and an indicative winding capacity for a reel with 2,500 mm flange diameter and 1,000 mm traverse width at 90 % fill. They are not a substitute for the reel manufacturer's calculation.

Type designation cores × mm²	Pull, copper N	Total permitted pull N	Free-hanging length m (vertical)	Min. festoon loop Ø mm
4G1.5	90	90	68	86
4G2.5	150	150	82	94
4G4	240	240	85	116
4G6	360	360	96	128
4G10	600	600	109	142
4G16	960	960	117	160

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06 Voltage Drop, Losses and Short-Circuit Data

Voltage drop per 100 m of cable at rated current with the conductor at 90 °C, cos φ = 0.8 and reactance 0.08 Ω/km (three-phase). The percentage refers to a system voltage of 400 V. Loss is the total I²R loss of the loaded cores per 100 m. The short-circuit columns give the permitted current for four durations.

Type designation cores × mm²	Rated current A	R at 90 °C Ω/km	Voltage drop V / 100 m	Voltage drop % of 400 V	Loss kW / 100 m	I_k 0.1 s kA	I_k 0.5 s kA	I_k 1 s kA	I_k 3 s kA
4G1.5	21	17.5	51.01	12.75	2.31	0.678	0.303	0.214	0.124
4G2.5	28	10.5	40.85	10.21	2.46	1.13	0.506	0.357	0.206
4G4	38	6.49	34.49	8.62	2.81	1.81	0.809	0.572	0.330
4G6	49	4.32	29.76	7.44	3.11	2.71	1.21	0.858	0.495
4G10	67	2.49	23.64	5.91	3.35	4.52	2.02	1.43	0.826
4G16	90	1.58	20.47	5.12	3.84	7.24	3.24	2.29	1.32

07 Selection Guide and Sizing Aid

NGFLGöu 4G covers 6 sizes. The smallest, 4G1.5, has 14.5 × 5.4 mm and weighs about 133 kg/km; the largest, 4G16, has 29.7 × 10.0 mm and weighs about 830 kg/km, 6.2 times as much. Across the range the rated current rises from 21 A to 90 A at 30 °C and the fixed bending radius from 27 mm to 50 mm.

Example 1. A circuit draws 26 A continuously at 40 °C ambient temperature, in a group of two cables. Temperature factor 0.91, grouping factor 0.80: required table current = 26 / (0.91 × 0.80) = 36 A. The smallest suitable size is 4G4 with 38 A.

Example 2. A circuit draws 59 A continuously at 35 °C ambient temperature, on its own. Temperature factor 0.96: required table current = 59 / (0.96) = 62 A. The smallest suitable size is 4G10 with 67 A.

08 Engineering Profile by Size

Every size of NGFLGöu 4G with the dimensions that decide how it behaves in a circuit: layers, weight, copper share, heat, voltage drop, bending, termination and pull.

4G1.5. This size has with a conductor of Ø 1.7 mm under 0.70 mm of insulation (core Ø 3.1 mm) and an outer sheath of 1.2 mm; 14.5 × 5.4 mm (W × H), weight about 133 kg/km of which copper 58 kg/km (44 %). Rated current 21 A at 30 °C; at that load the voltage drop is 51.01 V per 100 m (12.75 % of 400 V) and the loss 2.31 kW per 100 m. Bending radius 27 mm fixed, 43 mm moving; gland flat, lug bolt M5. Short-circuit rating 0.214 kA for 1 s; permitted pull 90 N, free-hanging length 68 m.

4G2.5. This size has with a conductor of Ø 2.1 mm under 0.70 mm of insulation (core Ø 3.5 mm) and an outer sheath of 1.2 mm; 16.5 × 5.9 mm (W × H), weight about 185 kg/km of which copper 96 kg/km (52 %). Rated current 28 A at 30 °C; at that load the voltage drop is 40.85 V per 100 m (10.21 % of 400 V) and the loss 2.46 kW per 100 m. Bending radius 29 mm fixed, 47 mm moving; gland flat, lug bolt M5. Short-circuit rating 0.357 kA for 1 s; permitted pull 150 N, free-hanging length 82 m.

4G4. This size has with a conductor of Ø 2.7 mm under 0.70 mm of insulation (core Ø 4.1 mm) and an outer sheath of 1.6 mm; 19.6 × 7.3 mm (W × H), weight about 285 kg/km of which copper 154 kg/km (54 %). Rated current 38 A at 30 °C; at that load the voltage drop is 34.49 V per 100 m (8.62 % of 400 V) and the loss 2.81 kW per 100 m. Bending radius 37 mm fixed, 58 mm moving; gland flat, lug bolt M5. Short-circuit rating 0.572 kA for 1 s; permitted pull 240 N, free-hanging length 85 m.

4G6. This size has with a conductor of Ø 3.3 mm under 0.70 mm of insulation (core Ø 4.7 mm) and an outer sheath of 1.6 mm; 22.1 × 8.0 mm (W × H), weight about 382 kg/km of which copper 230 kg/km (60 %). Rated current 49 A at 30 °C; at that load the voltage drop is 29.76 V per 100 m (7.44 % of 400 V) and the loss 3.11 kW per 100 m. Bending radius 40 mm fixed, 64 mm moving; gland flat, lug bolt M5. Short-circuit rating 0.858 kA for 1 s; permitted pull 360 N, free-hanging length 96 m.

4G10. This size has with a conductor of Ø 4.1 mm under 0.70 mm of insulation (core Ø 5.5 mm) and an outer sheath of 1.7 mm; 25.3 × 8.8 mm (W × H), weight about 560 kg/km of which copper 384 kg/km (69 %). Rated current 67 A at 30 °C; at that load the voltage drop is 23.64 V per 100 m (5.91 % of 400 V) and the loss 3.35 kW per 100 m. Bending radius 44 mm fixed, 71 mm moving; gland flat, lug bolt M6. Short-circuit rating 1.43 kA for 1 s; permitted pull 600 N, free-hanging length 109 m.

4G16. This size has with a conductor of Ø 5.2 mm under 0.70 mm of insulation (core Ø 6.6 mm) and an outer sheath of 1.7 mm; 29.7 × 10.0 mm (W × H), weight about 830 kg/km of which copper 610 kg/km (73 %). Rated current 90 A at 30 °C; at that load the voltage drop is 20.47 V per 100 m (5.12 % of 400 V) and the loss 3.84 kW per 100 m. Bending radius 50 mm fixed, 80 mm moving; gland flat, lug bolt M6. Short-circuit rating 2.29 kA for 1 s; permitted pull

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960 N, free-hanging length 117 m.

Averaged over all sizes copper makes up 65 % of the cable weight; the share rises from 44 % at 4G1.5 to 73 % at 4G16, which is why the larger sizes are costed mostly on the copper market price.

09 Construction Dimensions by Size

Wall thicknesses and diameters of the layers at each size, taken from the validated cross-section layout; the overall diameter in section 04 is the sum of these layers within tolerance. The insulation wall follows the voltage class 0.6/1 kV.

Type designation cores × mm²	Conductor Ø mm	Core Ø over insulation, mm	Insulation wall mm	Core row width mm	Inner sheath mm	Outer sheath mm	Screen + braid mm	Sheath share of Ø, %
4G1.5	1.65	3.05	0.70	12.2	–	1.15	–	43
4G2.5	2.13	3.53	0.70	14.1	–	1.18	–	40
4G4	2.70	4.10	0.70	16.4	–	1.60	–	44
4G6	3.30	4.70	0.70	18.8	–	1.64	–	41
4G10	4.08	5.48	0.70	22.0	–	1.67	–	38
4G16	5.16	6.56	0.70	26.2	–	1.73	–	35

10 Termination Planning (indicative)

Type designation cores × mm²	Outer Ø or W × H mm	Cable gland thread	Lug / ferrule bolt	Strip length mm	Straight length behind gland, mm
4G1.5	14.5 × 5.4	flat gland	M5	10	15
4G2.5	16.5 × 5.9	flat gland	M5	10	15
4G4	19.6 × 7.3	flat gland	M5	10	20
4G6	22.1 × 8.0	flat gland	M5	11	20
4G10	25.3 × 8.8	flat gland	M6	11	20
4G16	29.7 × 10.0	flat gland	M6	12	25

Gland threads, lug bolts and strip lengths are planning guides computed from the dimensions above; confirm them with the accessory manufacturer.

11 Comparison with Related Variants at Size 4G4

Variant	Differs in	Outer Ø / H mm	Weight kg/km	Pull N	Current A
This datasheet NGFLGöu 4G 0.6/1 kV	–	7.3	285	240	38
NGFLGöu 3G 0.6/1 kV 3G4	core configuration	7.3 (+0%)	216 (-24%)	180 (-25%)	38 (+0%)
NGFLGöu 5G 0.6/1 kV 5G4	core configuration	7.3 (+0%)	354 (+24%)	300 (+25%)	32 (-16%)
NGFLGöu 4G 0.6/1 kV 4G4	tinned vs bare copper	7.3 (+0%)	285 (+0%)	240 (+0%)	38 (+0%)
NGFLGöu 4G 0.6/1 kV 4G4	low-temperature sheath	7.3 (+0%)	285 (+0%)	240 (+0%)	38 (+0%)
NGFLGöu 4G 0.66/1.14 kV 4G4	voltage class	7.5 (+3%)	296 (+4%)	240 (+0%)	38 (+0%)
NGFLGöu 6G 0.6/1 kV 6G4	core configuration	7.3 (+0%)	420 (+47%)	360 (+50%)	28 (-26%)
NGFLGöu 7G 0.6/1 kV 7G4	core configuration	7.3 (+0%)	490 (+72%)	420 (+75%)	27 (-29%)
NGFLGöu 8G 0.6/1 kV 8G4	core configuration	7.3 (+0%)	560 (+96%)	480 (+100%)	25 (-34%)

Percentages show the change against this datasheet; where a variant does not offer the exact size, the nearest listed size is used.

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12 Standards and Testing

Standard	Scope
DIN VDE 0250-809	Flat tough-rubber-sheathed flexible cable
DIN VDE 0295 / IEC 60228	Conductors, class 5
DIN VDE 0207-20 / -21	Rubber insulation and sheath compounds
DIN VDE 0298-3 / -4	Application and current-carrying capacity
DIN EN 60332-1-2 / IEC 60332-1-2	Flame propagation

Routine and type tests

- AC voltage test on every drum length (routine test): 3 kV, 5 min
- Conductor resistance and checks of dimensions, insulation thickness and sheath thickness
- Continuity of conductors and protective earth
- Flame propagation test (IEC 60332-1-2) and mineral-oil resistance on type-test samples
- Bending and torsion tests for reeling duty (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.

The design follows DIN VDE 0250-809. This datasheet does not claim the VDE approval mark; mark or approval certificates, where required for a project, are arranged on request and apply only to the type tested.

13 Installation, Marking and Delivery

Installation guidance

- Hang the cable on its flat side only; never let it twist around its longitudinal axis in the festoon loop.
- Keep the loop diameter at or above twice the bending radius of the table.
- Use trolleys with a rounded cable clamp that spreads the clamping force across the flat width.
- Provide a free loop at both ends so that travel does not pull on the terminations.
- Separate the cable from sharp rail edges with protective profiles.
- Leave the green-yellow core slightly longer than the others at the terminal.

Sheath marking

FEICHUN NGFLGöu [cross-section] 0.6/1 kV [year] [serial no.] [metre mark]

Packing and delivery

Drum	Steel or fumigated wooden drums; 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
Drum label	Type, cross-section, length, gross/net weight, batch no., drum no.

Ordering information

Order example: NGFLGöu 4G4 0.6/1 kV – 500 m on one drum. When requesting a quotation, state the cable type, configuration, cross-section, voltage, conductor (tinned), length per piece, required standards and installation conditions.

14 Certification and Quality

All cable is subject to FeiChun's quality control, with routine testing over 100 % of the delivered length. Declarations of conformity, type-test reports and third-party tests (for example for a mine, a tunnel or a rail project) are provided per project requirement; copies of the records are available on request. FeiChun holds CE, EAC and UKCA documentation for certain product groups. Whether a certificate covers this specific construction must be confirmed with FeiChun before it is quoted in a tender.

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

15 Related Datasheets and Frequently Asked Questions

Variants of this cable with a different configuration, conductor, temperature grade, screen or voltage. All datasheets are PDF files.

- NGFLGöu 3G 0.6/1 kV – core configuration, CR rubber, tinned
- NGFLGöu 5G 0.6/1 kV – core configuration, CR rubber, tinned
- NGFLGöu 4G 0.6/1 kV – tinned vs bare copper, CR rubber

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- NGFLGöu 4G 0.6/1 kV – low-temperature sheath, CR rubber, low-temp, tinned
- NGFLGöu 4G 0.66/1.14 kV – voltage class, CR rubber, tinned
- NGFLGöu 6G 0.6/1 kV – core configuration, CR rubber, tinned
- NGFLGöu 7G 0.6/1 kV – core configuration, CR rubber, tinned
- NGFLGöu 8G 0.6/1 kV – core configuration, CR rubber, tinned

Overview of all NGFLGöu datasheets: NGFLGöu Flat Rubber-Sheathed Cables

Frequently asked questions

Why use a flat cable?
A flat cable hangs in uniform loops and takes less festoon height than a round cable of the same core count.

How many cores does NGFLGöu 4G have?
4 cores, including one green-yellow protective core.

What sizes are available for NGFLGöu 4G?
6 sizes from 1.5 to 16 mm². The outer dimension of the largest size, 4G16, is 10.0 mm and the weight is about 830 kg/km.

What current can 4G6 carry?
49 A in free air at 30 °C ambient, with the conductor at 90 °C. Other temperatures and grouping change the value; use the factors in section 04.

16 Trademark Notice and Intellectual Property

Cable type designations such as NGFLGöu are standardised, descriptive designations defined in DIN VDE and EN standards; they are used to state which standard this product is designed to. References to other manufacturers' trade names, where made, serve only for technical comparison; FeiChun Cables is not affiliated with them.

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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
Zihao Yang, Global Sales Manager: zihao.yang@feichuncables.com
WhatsApp: +86 138 5512 3218
Web: www.feichuncables.com

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