REPLACES BITNER BITCRANE (N)SH(K)TÖU-J (FO) | 0.6/1 kV | (N)SHTÖU-J | 12E9 | PCP rubber

# FC-NSHTK-FO 3×150+3G25+12E9

## 0.6/1 kV

Replacement for BITNER BiTcrane (N)SH(K)TÖU-J (FO) 3×150+3G25+12E9. Low-Voltage Reeling Cable with Integrated Optical Fibres with 12 single-mode fibres E9/125 (G.652.D) – construction, dimensions, weight, current rating, fibre data, standards and installation guidance.

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## 01 Application and Product Overview

FC-NSHTK-FO 3×150+3G25+12E9 is a low-Voltage Reeling Cable with Integrated Optical Fibres rated 0.6/1 kV and the FeiChun replacement for BITNER BiTcrane (N)SH(K)TÖU-J (FO) 3×150+3G25+12E9. It has an outer diameter of 54.5 – 57.5 mm, weighs about 6,700 kg/km and carries 402 A in free air at 30 °C. The series covers 35 – 185 mm².

### Typical applications

- Low-voltage motor-driven and spring-driven reels of cranes and trolleys
- Single-mode fibres for long data links to the terminal or mine control system
- Mobile machines that need power and a fibre-optic data link in one reeling cable
- RTG, RMG and gantry cranes with remote monitoring
- Outdoor service with oil, UV radiation and ozone

### Design

Three power cores with three split protective earth conductors in the interstices and an optical element with 12 single-mode fibres E9/125 (G.652.D) at the centre, giving a round, balanced cross-section for monospiral and cylindrical reels.

| 3×150+3G25+12E9 | 0.6/1 kV | 402 A | Ø 57.5 mm |
|---|---|---|---|
| Cross-section | Rated voltage $U_0/U$ | Current at 30 °C | Outer dimension, max |

### Key features

- Plain fine-wire class 5 copper conductors to IEC 60228
- Optical element: 12 single-mode fibres E9/125 (G.652.D) in gel-filled loose tubes
- Travel speed up to 180 m/min, torsion ±25 °/m
- Anti-torsion braid between inner and outer sheath
- Flame-retardant to IEC 60332-1-2; oil-resistant to EN 60811-404; UV and ozone resistant

### Replacement reference

REFERENCE PRODUCT
**BITNER BiTcrane (N)SH(K)TÖU-J (FO) 3×150+3G25+12E9**
(N)SHTÖU-J

⇄

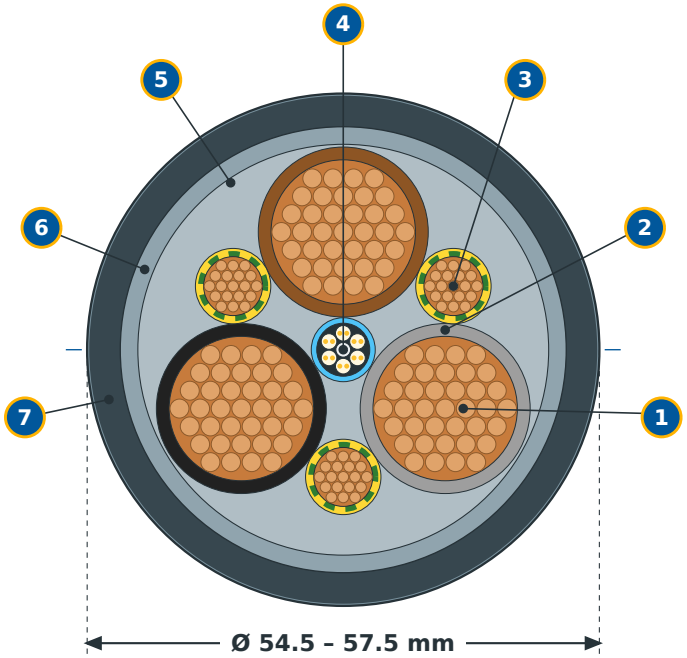
FEICHUN REPLACEMENT
**FC-NSHTK-FO 3×150+3G25+12E9 0.6/1 kV**
Low-Voltage Reeling Cable with Integrated Optical Fibres

The FeiChun cable has the same core configuration, voltage rating and field of application as the reference product. Dimensions and weights are FeiChun design values; compare them with reels, guides and glands before direct replacement.

## 02 Construction

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

**FC-NSHTK-FO**
Sample size 3×150+3G25+12E9 · Rev 0 · Illustrative, not to scale




| No. | Component | Material |
|---|---|---|
| 1 | Conductor | Plain fine-wire copper, class 5 to IEC 60228 |
| 2 | Insulation | EPR rubber compound 3GI3 to DIN VDE 0207-20 |
| 3 | Protective earth conductor | Green-yellow insulated copper |
| 4 | Optical element | 12 single-mode fibres E9/125 (G.652.D); ETFE tubes around GRP support |
| 5 | Filler and anti-torsion braid | Rubber filler; polyester braid |
| 6 | Inner sheath | Rubber compound 5GM3 |
| 7 | Outer sheath | Polychloroprene (PCP/CR) rubber compound 5GM5 to DIN VDE 0207-21, black |

The drawing shows 3×150+3G25+12E9. Other sizes have the same construction with scaled dimensions.

### Construction details

| | |
|---|---|
| **Construction basis** | FeiChun standard construction for (N)SHTÖU-J reeling cables with integrated optical fibres, designed to DIN VDE 0250-813. The core configuration, voltage rating and optical element match the reference type. |
| **Conductor** | Plain copper, very finely stranded, class 5 to IEC 60228 / DIN VDE 0295 |
| **Insulation** | EPR rubber compound 3GI3 to DIN VDE 0207-20 |
| **Core identification** | Colour code to HD 308; green-yellow protective core |
| **Protective earth** | Split into three green-yellow conductors in the interstices |
| **Optical element** | 12 single-mode fibres E9/125 (G.652.D); located at the centre of the cable |
| **Inner sheath** | Rubber compound 5GM3 to DIN VDE 0207-21 |
| **Anti-torsion braid** | Polyester (synthetic thread) braid, vulcanised between inner and outer sheath |
| **Outer sheath** | Polychloroprene (PCP/CR) rubber compound 5GM5 to DIN VDE 0207-21, black; resistant to oil (EN 60811-404), UV radiation and ozone |
| **Marking** | FEICHUN FC-NSHTK-FO 3×150+3G25+12E9 0.6/1 kV, metre marking |

### Optical fibre data

| | |
|---|---|
| **Fibre type** | Single-mode E9/125 µm, ITU-T G.652.D |
| **Attenuation, cabled** | ≤ 0.40 dB/km at 1310 nm; ≤ 0.30 dB/km at 1550 nm |
| **Typical link reach** | 1 and 10 Gbit/s Ethernet up to 10 km |
| **Optical element** | Six gel-filled ETFE buffer tubes (1–4 fibres each) stranded around a central GRP support element, with a rubber element sheath; 250 µm coated fibres |
| **Fibre identification** | Colour code to IEC 60304 / DIN VDE 0888; tubes colour-coded |
| **Fibre strain** | Fibres lie with excess length in the tubes so that reeling strain is not transferred to the fibres |
| **Optical test** | Attenuation of every fibre measured by OTDR after cabling; values in the test certificate |

### Sheath material

Polychloroprene (PCP/CR) rubber 5GM5 is the classic heavy-duty sheath of DIN VDE 0250 cables: flame-retardant, resistant to oil, weather, ozone and UV radiation, and elastic under repeated bending.

## 03 Electrical, Thermal and Mechanical Data

### Electrical data

| | |
|---|---|
| **Rated voltage $U_0/U$** | 0.6/1 kV AC |
| **Test voltage** | 3.5 kV AC, 5 min |
| **Current-carrying capacity** | DIN VDE 0298-4, 30 °C ambient; see table |
| **Conductor resistance** | Maximum at 20 °C, class 5 to IEC 60228 |

### Thermal and mechanical data

| | |
|---|---|
| **Maximum conductor temperature** | +90 °C |
| **Short-circuit temperature** | +250 °C |
| **Ambient temperature, fixed** | -40 … +80 °C |
| **Ambient temperature, moving** | -35 … +80 °C |
| **Minimum bending radius, moving** | See table (7.5 × D) |
| **Maximum tensile load** | 20 N/mm² of copper cross-section of the power cores |
| **Maximum travel speed** | 180 m/min |
| **Maximum torsion** | ±25 °/m |
| **Flame propagation** | IEC 60332-1-2 |
| **Halogen-free sheath** | No |
| **Oil, ozone and UV resistance** | Resistant |

## 04 Dimensions, Weights and Ratings

The highlighted row is 3×150+3G25+12E9; the adjacent sizes of the series are shown for comparison.

| Type designation | Article no. | Conductor Ø max mm | Outer Ø min mm | Outer Ø max mm | Min. bend radius mm | Weight approx. kg/km | Max. pull N | $R_{20}$ max Ω/km | Rated current A | $I_k$ (1 s) kA |
|---|---|---|---|---|---|---|---|---|---|---|
| 3×120+3G25+12E9 | FC-FO1986-31203G2512 | 14.2 | 49.5 | 52.5 | 394 | 5,540 | 7,200 | 0.161 | 350 | 17.16 |
| **3×150+3G25+12E9** | **FC-FO1986-31503G2512** | **15.8** | **54.5** | **57.5** | **432** | **6,700** | **9,000** | **0.129** | **402** | **21.45** |
| 3×185+3G35+12E9 | FC-FO1986-31853G3512 | 17.6 | 59.0 | 63.0 | 472 | 8,220 | 11,100 | 0.106 | 459 | 26.45 |

Current-carrying capacity: design values to DIN VDE 0298-4, free air, 30 °C ambient. Pull force = 20 N/mm² × copper cross-section of the power cores. Dimensions and weights are nominal design values within manufacturing tolerances.

### Ambient temperature factors

| °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 rating

$I_k$ = 0.143 kA/mm² × conductor cross-section for 1 s; for duration t: $I_{k,t} = I_{k,1s} / \sqrt{t}$.

## 05 Reel Design Data

Rated current for the number of layers on the reel (DIN VDE 0298-4 factors 0.80 / 0.61 / 0.49 / 0.41) and the minimum reel core diameter (2 × bending radius).

| Type designation | Outer Ø max, mm | Min. reel core Ø, mm | Copper, kg/km | 1 layer, A | 2 layers, A | 3 layers, A | 4 layers, A |
|---|---|---|---|---|---|---|---|
| 3×120+3G25+12E9 | 52.5 | 788 | 3,870 | 280 | 214 | 172 | 144 |
| **3×150+3G25+12E9** | **57.5** | **864** | **4,670** | **322** | **245** | **197** | **165** |
| 3×185+3G35+12E9 | 63.0 | 944 | 5,870 | 367 | 280 | 225 | 188 |

## 06 Selection Guide

**Typical use:** At 3×150+3G25+12E9 this size is used for main feeders of cranes and mobile machines and for high-power pumps up to about 218 kW; for higher loads, parallel runs are used.

At 400 V and cos φ 0.85, 3×150+3G25+12E9 supplies a three-phase load of about 218 kW at 30 °C in free air.

At 690 V and cos φ 0.85, 3×150+3G25+12E9 supplies a three-phase load of about 376 kW at 30 °C in free air.

For comparison: 3×120+3G25+12E9 has 52.5 mm, 5,540 kg/km and 350 A; 3×185+3G35+12E9 has 63.0 mm, 8,220 kg/km and 459 A. Choose the smallest size whose current, after the temperature and reel-layer factors, covers the load.

**Example.** A circuit carries 321 A at 40 °C ambient. Required table current = 321 / 0.91 = 353 A, so 3×150+3G25+12E9 (402 A) is suitable.

On a reel with 2,500 mm flange diameter, 1,000 mm traverse and 864 mm core, about 1,125 m of 3×150+3G25+12E9 can be wound (indicative).

## 07 Standards and Testing

| Standard | Scope |
|---|---|
| **DIN VDE 0250-814** | Design reference for the construction |
| **IEC 60228 / DIN VDE 0295** | Conductors, class 5 |
| **DIN VDE 0207-20 / -21** | Insulation and sheath compounds |
| **DIN VDE 0298-3 / -4** | Bending radii, tensile loads and current ratings |
| **IEC 60332-1-2** | Flame propagation, single cable |
| **EN 60811-404** | Mineral oil resistance |
| **ITU-T G.652.D** | Single-mode optical fibres |
| **IEC 60794-1-21** | Optical cables – mechanical test methods |

### Routine and type tests

- AC voltage test on every delivery length: 3.5 kV, 5 min
- Conductor resistance, dimensions and insulation thickness
- Continuity of all conductors and fibres
- Flame propagation, IEC 60332-1-2 (type test)

**Test documentation:** every delivery comes with a test certificate from FeiChun’s own laboratory; third-party witnessed tests can be arranged at the buyer’s cost.

## 08 Installation, Marking and Delivery

### Installation guidance

- Unwind the cable tangentially from the drum; avoid loops, kinks and pulling over the drum flange.
- Keep the bending radius and tensile load within the values in this datasheet.
- Protect trailing cables from being run over; use cable bridges or hangers where vehicles cross.
- Connect the protective conductor at both ends before the other cores.

### Sheath marking

FEICHUN FC-NSHTK-FO 3×150+3G25+12E9 0.6/1 kV [year] [metre mark]

### Packing and delivery

| | |
|---|---|
| **Packing** | Steel or fumigated wooden drums; cable ends sealed |
| **Delivery length** | As ordered, in one continuous length |
| **Lead time** | 2–3 weeks after technical approval |
| **Warranty** | 1 year, covering failures not caused by human factors |
| **Terms** | FCA buyer's nominated forwarder's warehouse in China (Incoterms 2020); prices subject to LME copper |

**Order example: FC-NSHTK-FO 3×150+3G25+12E9 0.6/1 kV** – replacement for BITNER BiTcrane (N)SH(K)TÖU-J (FO) 3×150+3G25+12E9, 500 m on one drum. State type, cross-section, voltage, length per piece and installation conditions when requesting a quotation.

## 09 Certification and Quality

FeiChun holds CE (Low Voltage Directive), EAC and UKCA certificates and an ATEX documentation verification for defined product groups. Whether a certificate scope covers this construction is confirmed per project. All cable is routine-tested over 100 % of the delivered length.

## 10 Related Datasheets

- FC-NSHTK-FO 3×150+3G25+12G62.5 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO)
- FC-NSHTK-FO 3×120+3G25+12G62.5 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO)
- FC-NSHTK-FO 3×185+3G35+12G62.5 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO)
- FC-NSHTK-FO 3×120+3G25+12E9 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO)
- FC-NSHTK-FO 4G16+12G62.5 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO)
- FC-NSHTK-FO 5G16+12G62.5 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO)
- FC-NSHTK-FOP 4G16+12G62.5 0.6/1 kV – replaces BITNER BiTcrane (N)SH(K)TÖU-J (FO) PLUS

Library overview: FeiChun replacements for BITNER fibre-optic reeling cables

### Frequently asked questions

**Can FC-NSHTK-FO 3×150+3G25+12E9 replace BITNER BiTcrane (N)SH(K)TÖU-J (FO) 3×150+3G25+12E9?**
Yes. It has the same core configuration, voltage rating, optical-fibre type and count, and field of application. Compare outer dimension, bending radius, weight and the fibre-optic rotary joint (FORJ) channels with your reel before ordering; FeiChun confirms suitability on request.

**What are the outer diameter and minimum bending radius of 3×150+3G25+12E9?**
Outer diameter 54.5 – 57.5 mm; minimum bending radius in moving operation 432 mm (7.5 × D).

**Which optical fibres are included?**
12 single-mode fibres E9/125 (G.652.D). Other fibre counts and types (E9/125, G50/125, G62.5/125 or combinations) are available on request.

**How are the fibres connected on the reel?**
Through a fibre-optic rotary joint (FORJ) on the reel axis, normally combined with the slip-ring assembly. Match the FORJ channels and fibre type (single-mode or multimode) to the fibres in use and keep spare fibres for later expansion.

**What current can 3×150+3G25+12E9 carry?**
402 A in free air at 30 °C. Apply the temperature factors and, on reels, the layer factors in this datasheet.

## 11 Trademark Notice and Intellectual Property

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### Document control

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