HARMONISED FLEXIBLE CABLE 300/500 V · DIN VDE 0282 / EN 50525 | 300/500 V | 4 sizes | halogen-free FRNC, low-temp | BARE COPPER | LOW-TEMPERATURE GRADE

# H05ZZ-F 3× 300/500 V

Halogen-Free Flexible Cable 300/500 V 300/500 V – 3 cores of equal cross-section in concentric layers with a short lay length. Low-temperature halogen-free FRNC sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, voltage drop and installation guidance for 4 sizes.

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## 01 Application and Product Overview

H05ZZ-F is the harmonised halogen-free flexible cable for 300/500 V. Cross-linked halogen-free insulation and a halogen-free flame-retardant sheath give a light, flexible connection for appliances and equipment in buildings where halogen acids must be avoided in a fire.

### Design

The conductors are class 5 fine-wire copper, bare or tinned. The cores are insulated with a cross-linked halogen-free compound for 90 °C at the conductor. The sheath is a halogen-free flame-retardant elastomer; multi-core cables from 7 cores and cables from 10 mm² carry an inner sheath. The type is covered by DIN EN 50525-3-21.

### Typical applications

- Exhibition halls, theatres and venues with high safety requirements
- Public transport, tunnels and underground installations
- Data centres, control rooms and clean production areas
- Ships and offshore installations where halogen-free cables are specified
- Mobile power distribution for events in enclosed buildings
- Machine connections in plants with halogen-free requirements
- Cable for hospitals, airports and schools
- Cold-climate duty: sites, cold stores and open-cast operations where the cable is moved at temperatures down to 40 °C

| 4 sizes | 300/500 V | +90 °C | Halogen-free |
|---|---|---|---|
| Cross-section 0.75 – 2.5 mm² | Rated voltage $U_0/U$ | Maximum conductor temperature | Sheath: halogen-free FRNC, low-temp |

### Key features

- Halogen-free insulation and sheath (IEC 60754-1/-2)
- Rated 90 °C at the conductor
- Rated voltage 300/500 V, test voltage 2 kV
- Class 5 conductors
- Flame-retardant to IEC 60332-1-2
- Harmonised type (HAR)
- 4 sizes from 0.75 to 2.5 mm²; weight from 102 to 213 kg/km; copper from 22 to 72 kg/km

### Core layout and conductor

3 cores of equal cross-section in concentric layers with a short lay length. Core colours: brown, black, grey (DIN VDE 0293-308); no protective core is included. The three-core layout feeds a three-phase motor without neutral; protective earth is provided separately. The conductors are bare annealed copper. Bare copper has the lowest conductor resistance of the class 5 range and is the usual choice for dry and damp indoor use. Where the cable is exposed to salt, sulphur or permanent moisture, the tinned version of the same cable is preferable.

### Standard background

H07ZZ-F and H05ZZ-F are harmonised halogen-free types covered by DIN EN 50525-3-21 (VDE 0285-525-3-21). ZZ identifies the thermoset halogen-free insulation and sheath.


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The low-temperature grade of the sheath compound remains flexible down to 40 °C in motion and 50 °C in fixed installation, so the cable can be reeled and trailed on cold sites, in cold stores and in northern open-cast operations. The mechanical and electrical ratings are those of the standard grade; only the cold-flexing limit is extended.

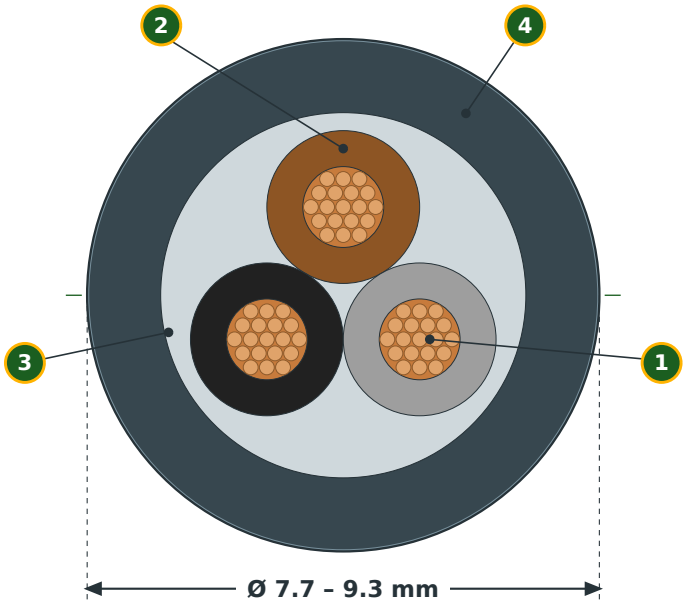
300/500 V suits domestic, office and light-industrial circuits up to 400 V three-phase. The test voltage is 2 kV.

## 02 Construction

**FEICHUN · CROSS-SECTION A-A · 300/500 V**

**H05ZZ-F**

Sample size 3×1 · Rev 0 · Illustrative, not to scale




| No. | Component | Material |
|---|---|---|
| 1 | Conductor | Bare annealed fine-wire copper, class 5 to IEC 60228 / DIN VDE 0295 |
| 2 | Insulation | Halogen-free cross-linked compound, type HX |
| 3 | Filler and binder tape | Halogen-free filler with polyester binder tape |
| 4 | Outer sheath | Halogen-free flame-retardant elastomer, low-temperature grade |

The drawing shows size 3×1. 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** | Bare annealed fine-wire copper, class 5 to DIN VDE 0295 / IEC 60228 |
| **Insulation** | Halogen-free cross-linked compound, type HX, maximum conductor temperature 90 °C |
| **Core identification** | Brown, black, grey to DIN VDE 0293-308 |
| **Stranding** | Cores in concentric layers with a short lay length |
| **Outer sheath** | Halogen-free flame-retardant elastomer, low-temperature grade; thickness about 1.2 mm at this size |

## 03 Electrical, Thermal and Mechanical Characteristics

### Electrical data

| | |
|---|---|
| **Rated voltage $U_0/U$** | 300/500 V AC |
| **Test voltage** | 2 kV AC, 5 min |
| **Maximum operating voltage, three-phase** | 550 V |
| **Maximum operating voltage, DC (core-earth / core-core)** | 0.3/0.5 kV (DC 0.45/0.9 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, bare |


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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** | −50 °C to +90 °C |
| **Ambient temperature, in motion** | −40 °C to +90 °C |
| **Minimum bending radius** | Fixed: 3 × D (D ≤ 12 mm), 4 × D (D > 12 mm); moving: 3 × D (D ≤ 8 mm), 4 × D (D ≤ 12 mm), 5 × D (D > 12 mm) (DIN VDE 0298-3) |
| **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** | Yes (insulation and sheath), IEC 60754-1/-2 |
| **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 – 300/500 V (4 sizes)

| Type designation cores × mm² | FeiChun article no. | Cond. Ø max mm | Outer Ø min mm | Outer Ø max 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3×0.75** | FC-H05Z-1022-01 | 1.2 | 7.4 | 8.9 | 27 | 36 | 102 | 22 | 34 | 26.0 | 15 | 0.107 |
| **3×1** | FC-H05Z-1022-02 | 1.4 | 7.7 | 9.3 | 28 | 37 | 116 | 29 | 45 | 19.5 | 17 | 0.143 |
| **3×1.5** | FC-H05Z-1022-03 | 1.7 | 8.8 | 10.6 | 32 | 42 | 154 | 43 | 68 | 13.3 | 23 | 0.214 |
| **3×2.5** | FC-H05Z-1022-04 | 2.2 | 10.4 | 12.5 | 50 | 62 | 213 | 72 | 112 | 7.98 | 31 | 0.357 |

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. 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 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 |
|---|---|---|---|---|---|---|---|---|---|
| **3×0.75** | 15 | 33.2 | 69.03 | 17.26 | 2.24 | 0.339 | 0.152 | 0.107 | 0.062 |
| **3×1** | 17 | 24.9 | 58.71 | 14.68 | 2.16 | 0.452 | 0.202 | 0.143 | 0.083 |
| **3×1.5** | 23 | 17.0 | 54.24 | 13.56 | 2.69 | 0.678 | 0.303 | 0.214 | 0.124 |
| **3×2.5** | 31 | 10.2 | 43.97 | 10.99 | 2.93 | 1.13 | 0.506 | 0.357 | 0.206 |

## 06 Selection Guide and Sizing Aid

H05ZZ-F 3× covers 4 sizes. The smallest, 3×0.75, has an outer diameter of up to 8.9 mm and weighs about 102 kg/km; the largest, 3×2.5, has an outer diameter of up to 12.5 mm and weighs about 213 kg/km, 2.1 times as much. Across the range the rated current rises from 15 A to 31 A at 30 °C and the fixed bending radius from 27 mm to 50 mm.

**Example 1.** A circuit draws 11 A continuously at 40 °C ambient temperature, in a group of two cables. Temperature factor 0.91, grouping factor 0.80: required table current = 11 / (0.91 × 0.80) = 16 A. The smallest suitable size is 3×1 with 17 A.


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**Example 2.** A circuit draws 20 A continuously at 35 °C ambient temperature, on its own. Temperature factor 0.96: required table current = 20 / (0.96) = 21 A. The smallest suitable size is 3×1.5 with 23 A.

## 07 Engineering Profile by Size

Every size of H05ZZ-F 3× with the dimensions that decide how it behaves in a circuit: layers, weight, copper share, heat, voltage drop, bending, termination and pull.

**3×0.75.** This size has with a conductor of Ø 1.2 mm under 0.60 mm of insulation (core Ø 2.4 mm) and an outer sheath of 1.2 mm; outer diameter 7.4–8.9 mm, weight about 102 kg/km of which copper 22 kg/km (22 %). Rated current 15 A at 30 °C; at that load the voltage drop is 69.03 V per 100 m (17.26 % of 400 V) and the loss 2.24 kW per 100 m. Bending radius 27 mm fixed, 36 mm moving; gland M16, lug bolt M5. Short-circuit rating 0.107 kA for 1 s; permitted pull 34 N, free-hanging length 33 m.

**3×1.** This size has with a conductor of Ø 1.3 mm under 0.60 mm of insulation (core Ø 2.5 mm) and an outer sheath of 1.2 mm; outer diameter 7.7–9.3 mm, weight about 116 kg/km of which copper 29 kg/km (25 %). Rated current 17 A at 30 °C; at that load the voltage drop is 58.71 V per 100 m (14.68 % of 400 V) and the loss 2.16 kW per 100 m. Bending radius 28 mm fixed, 37 mm moving; gland M16, lug bolt M5. Short-circuit rating 0.143 kA for 1 s; permitted pull 45 N, free-hanging length 39 m.

**3×1.5.** 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 1.3 mm; outer diameter 8.8–10.6 mm, weight about 154 kg/km of which copper 43 kg/km (28 %). Rated current 23 A at 30 °C; at that load the voltage drop is 54.24 V per 100 m (13.56 % of 400 V) and the loss 2.69 kW per 100 m. Bending radius 32 mm fixed, 42 mm moving; gland M20, lug bolt M5. Short-circuit rating 0.214 kA for 1 s; permitted pull 68 N, free-hanging length 45 m.

**3×2.5.** This size has with a conductor of Ø 2.1 mm under 0.80 mm of insulation (core Ø 3.7 mm) and an outer sheath of 1.4 mm; outer diameter 10.4–12.5 mm, weight about 213 kg/km of which copper 72 kg/km (34 %). Rated current 31 A at 30 °C; at that load the voltage drop is 43.97 V per 100 m (10.99 % of 400 V) and the loss 2.93 kW per 100 m. Bending radius 50 mm fixed, 62 mm moving; gland M25, lug bolt M5. Short-circuit rating 0.357 kA for 1 s; permitted pull 112 N, free-hanging length 53 m.

Averaged over all sizes copper makes up 28 % of the cable weight; the share rises from 22 % at 3×0.75 to 34 % at 3×2.5, which is why the larger sizes are costed mostly on the copper market price.

## 08 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 300/500 V.

| Type designation cores × mm² | Conductor Ø mm | Core Ø over insulation, mm | Insulation wall mm | Laid-up core Ø mm | Inner sheath mm | Outer sheath mm | Screen + braid mm | Sheath share of Ø, % |
|---|---|---|---|---|---|---|---|---|
| 3×0.75 | 1.17 | 2.37 | 0.60 | 5.7 | – | 1.21 | – | 30 |
| 3×1 | 1.35 | 2.55 | 0.60 | 6.1 | – | 1.23 | – | 29 |
| 3×1.5 | 1.65 | 3.05 | 0.70 | 7.2 | – | 1.28 | – | 26 |
| 3×2.5 | 2.13 | 3.73 | 0.80 | 8.6 | – | 1.42 | – | 25 |

## 09 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 |
|---|---|---|---|---|---|
| 3×0.75 | 8.9 | M16 | M5 | 10 | 15 |
| 3×1 | 9.3 | M16 | M5 | 10 | 15 |
| 3×1.5 | 10.6 | M20 | M5 | 10 | 15 |
| 3×2.5 | 12.5 | M25 | M5 | 10 | 25 |

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


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## 10 Comparison with Related Variants at Size 3×1

| Variant | Differs in | Outer Ø / H mm | Weight kg/km | Pull N | Current A |
|---|---|---|---|---|---|
| **This datasheet** H05ZZ-F 3× 300/500 V | – | 9.3 | 116 | 45 | 17 |
| H05ZZ-F 3G 300/500 V 3G1 | core configuration | 9.3 (+0%) | 116 (+0%) | 45 (+0%) | 17 (+0%) |
| H05ZZ-F 4G 300/500 V 4G1 | core configuration | 10.3 (+11%) | 148 (+28%) | 60 (+33%) | 17 (+0%) |
| H05ZZ-F 3× 300/500 V 3×1 | tinned vs bare copper | 9.3 (+0%) | 116 (+0%) | 45 (+0%) | 17 (+0%) |
| H05ZZ-F 3× 300/500 V 3×1 | low-temperature sheath | 9.3 (+0%) | 116 (+0%) | 45 (+0%) | 17 (+0%) |
| H05ZZ-F 2× 300/500 V 2×1 | core configuration | 8.8 (-5%) | 86 (-26%) | 30 (-33%) | 17 (+0%) |
| H05ZZ-F 4× 300/500 V 4×1 | core configuration | 10.3 (+11%) | 148 (+28%) | 60 (+33%) | 15 (-12%) |
| H05ZZ-F 5G 300/500 V 5G1 | core configuration | 11.1 (+19%) | 168 (+45%) | 75 (+67%) | 15 (-12%) |
| H05ZZ-F 5× 300/500 V 5×1 | core configuration | 11.1 (+19%) | 168 (+45%) | 75 (+67%) | 13 (-24%) |

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

## 11 Standards and Testing

| Standard | Scope |
|---|---|
| **DIN EN 50525-3-21 (VDE 0285-525-3-21)** | Halogen-free thermoset flexible cables |
| **IEC 60754-1 / -2** | Halogen content and acidity |
| **DIN VDE 0293-308** | Core identification |
| **DIN VDE 0295 / IEC 60228** | Conductors, class 5 |
| **DIN EN 60332-1-2 / IEC 60332-1-2** | Flame propagation |

### Routine and type tests

- AC voltage test on every drum length (routine test): 2 kV, 5 min
- Conductor resistance and checks of dimensions, insulation thickness and sheath thickness
- Continuity of conductors
- Flame propagation test (IEC 60332-1-2) on type-test samples
- Verification of the halogen-free compounds (IEC 60754-1/-2)

**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 EN 50525-3-21. 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.


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## 12 Installation, Marking and Delivery

### Installation guidance

- Observe the bending radii in section 04.
- Do not exceed the tensile load of 15 N/mm² of the copper cross-section.
- Select halogen-free glands and fittings to maintain the halogen-free concept of the installation.
- Do not use below the rated minimum temperature when moving the cable.
- Unwind from the drum completely before applying full load.
- Protect the sheath from permanent abrasion.

### Sheath marking

FEICHUN H05ZZ-F [cross-section] 300/500 V [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: H05ZZ-F 3×1 300/500 V** – 500 m on one drum. When requesting a quotation, state the cable type, configuration, cross-section, voltage, conductor (bare copper), length per piece, required standards and installation conditions.

## 13 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.

## 14 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.

- H05ZZ-F 3G 300/500 V – core configuration, halogen-free FRNC, low-temp
- H05ZZ-F 4G 300/500 V – core configuration, halogen-free FRNC, low-temp
- H05ZZ-F 3× 300/500 V – tinned vs bare copper, halogen-free FRNC, low-temp, tinned
- H05ZZ-F 3× 300/500 V – low-temperature sheath, halogen-free FRNC
- H05ZZ-F 2× 300/500 V – core configuration, halogen-free FRNC, low-temp
- H05ZZ-F 4× 300/500 V – core configuration, halogen-free FRNC, low-temp
- H05ZZ-F 5G 300/500 V – core configuration, halogen-free FRNC, low-temp
- H05ZZ-F 5× 300/500 V – core configuration, halogen-free FRNC, low-temp

Overview of all H05ZZ-F datasheets: H05 Series Flexible Cables 300/500 V

### Frequently asked questions

**What does ZZ mean in H07ZZ-F?**
Halogen-free thermoset insulation (Z) and halogen-free thermoset sheath (Z); F means flexible conductors.

**Is H07ZZ-F suitable for outdoor use?**
Yes, within the temperature range; for permanent outdoor exposure check the sheath for UV and weather suitability.

**What sizes are available for H05ZZ-F 3×?**
4 sizes from 0.75 to 2.5 mm². The outer dimension of the largest size, 3×2.5, is 12.5 mm and the weight is about 213 kg/km.

**What current can 3×1.5 carry?**
23 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.


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## 15 Trademark Notice and Intellectual Property

Cable type designations such as H05ZZ-F 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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