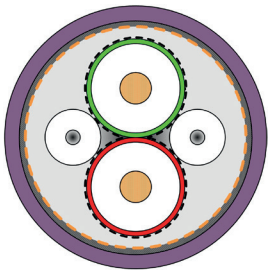
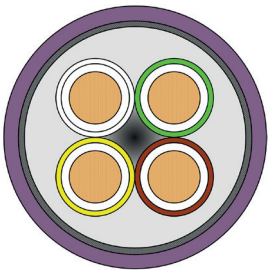
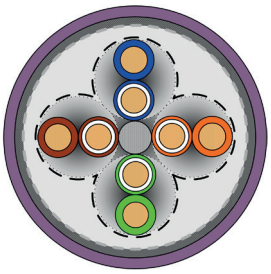
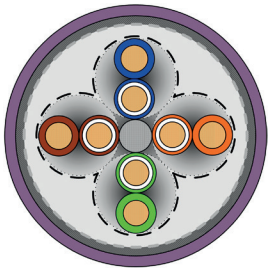
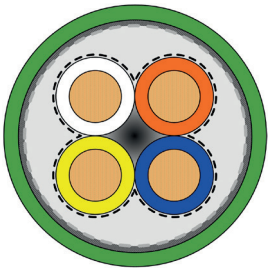
# Data sheet
# chainflex® CFBUS.LB

**Bus cable (Class 7.6.4.1) ● For heaviest duty applications ● TPE outer jacket ● Shielded ● Oil and bio-oil resistant ● Low-temperature-flexible ● PVC and halogen-free ● Hydrolysis and microbe-resistant**

Example image

| Profibus | CAN-Bus/Feldbus | Ethernet (CAT5/CAT5e/GigE/PoE) |
|---|---|---|
| CFBUS.LB.001-CFBUS.LB.004 | CFBUS.LB.020-CFBUS.LB.022 | CFBUS.LB.040-CFBUS.LB.045 |
|  |  |  |

| Ethernet (CAT6/GigE/PoE) | Profinet (Type C) |
|---|---|
| CFBUS.LB.049 | CFBUS.LB.060 |
|  |  |

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Example image

## Cable structure

| | |
|---|---|
| **Conductor** | Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| **Core insulation** | According to bus specification. |
| **Core structure** | According to bus specification. |
| **Core identification** | According to bus specification.<br>▶ Product range table |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage approx. 70 % linear, approx. 90 % optical |
| **Outer jacket** | Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.<br>Colour: Red lilac (similar to RAL 4001), Variants ▶ Product range table<br>Printing: black |

**„00000 m“* igus chainflex CFBUS.LB---① -----② E310776**

**ЯU AWM Style 22354 80°C 300V RoHS-II conform CE DESINA**

**---③ conform www.igus.de +++ chainflex cable works +++**

*** Length printing:** Not calibrated. Only intended as an orientation aid.
① / ② Cable identification according to Part No.(see technical table).
③ Printing according to bus specification (inclusive wave resistance).
Example: ... chainflex ... **CFBUS.LB.001** ... **(2x0.25)C** ... **EAC** ...

## Guaranteed service life according to guarantee conditions

| Double strokes | 5 million | | 7.5 million | | 12.5 million | |
|---|---|---|---|---|---|---|
| Temperature, from/to [°C] | CFBUS.LB .001-.022 | CFBUS.LB .040-.060 | CFBUS.LB .001-.022 | CFBUS.LB .040-.060 | CFBUS.LB .001-.022 | CFBUS.LB .040-.060 |
| | R min. [x d] | R min. [x d] | R min. [x d] | R min. [x d] | R min. [x d] | R min. [x d] |
| -35/-25 | 12.5 | 10 | 13.5 | 11 | 14.5 | 12 |
| -25/+60 | 10 | 7.5 | 11 | 8.5 | 12 | 9.5 |
| +60/+70 | 12.5 | 10 | 13.5 | 11 | 14.5 | 12 |

Minimum guaranteed service life of the cable under the specified conditions.
The installation of the cable is recommended within the middle temperature range.

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Example image

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **PFAS-free** | Use of PFAS-free materials according to the content of the REACH directive and its rules for the production and processing of chemical substances |
| **UL verified** | Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL AWM** | Details siehe Tabelle UL AWM |
| **CLPA** | **CFBUS.LB.045:** CC-Link IE Field, Reference no. 131<br>**CFBUS.LB.049:** CC-Link IE Field, Reference no. 138 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF9.15.07 - tested by IPA according to standard DIN EN ISO 14644-1 |
| **DESINA** | According to VDW, DESINA standardisation |
| **CE** | Following 2014/35/EU |

## Properties and approvals

### UL AWM details

| Part no. | UL style core insultation | UL style outer jacket | UL Voltage Rating [V] | UL Temperature Rating [°C] |
|---|---|---|---|---|
| CFBUS.LB.001 | 11807 | 22354 | 600 | 80 |
| CFBUS.LB.020 | 11807 | 22354 | 600 | 80 |
| CFBUS.LB.021 | 11807 | 22354 | 600 | 80 |
| CFBUS.LB.022 | 11807 | 22354 | 600 | 80 |
| CFBUS.LB.040 | 11632 | 22354 | 600 | 80 |
| CFBUS.LB.045 | 11632 | 22354 | 600 | 80 |
| CFBUS.LB.049 | 11632 | 22354 | 600 | 80 |
| CFBUS.LB.060 | 11632 | 22354 | 600 | 80 |

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Example image

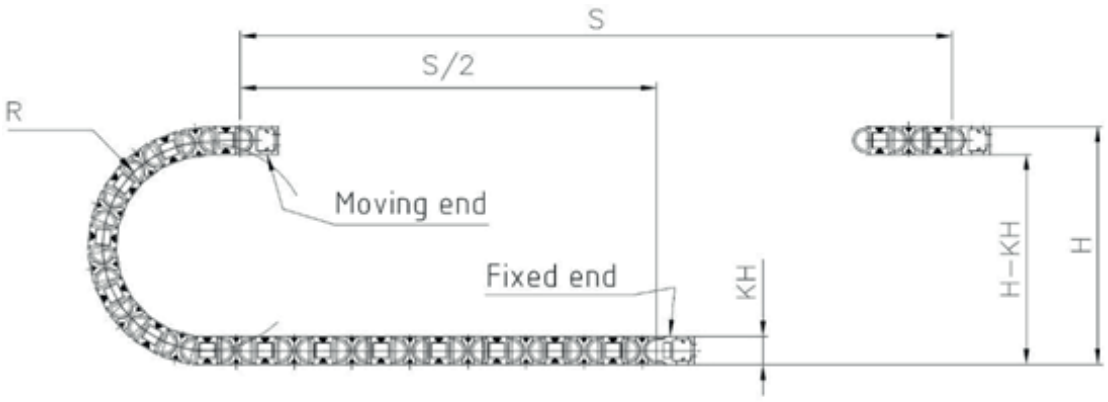
## Dynamic information

| | | | |
|---|---|---|---|
| Bend radius | e-chain® linear | minimum 7.5 x d |
| | flexible | minimum 6 x d |
| | fixed | minimum 4 x d |
| Temperature | e-chain® linear | -35 °C up to +70 °C |
| | flexible | -50 °C up to +70 °C (following DIN EN 60811-504) |
| | fixed | -55 °C up to +70 °C (following DIN EN 50305) |
| v max. | unsupported | 10 m/s |
| | gliding | 6 m/s |
| a max. | | 100 m/s² |
| Travel distance | | Unsupported travel distances and up to 400 m for gliding applications, Class 6 |

These values are based on specific applications or tests. They do not represent the limit of what is technically feasible.

## Typical lab test setup for this cable series

| | |
|---|---|
| **Test bend radius R** | approx. 75 - 100 mm |
| **Test travel S** | approx. 1 - 15 m |
| **Test duration** | minimum 2 - 4 million double strokes |
| **Test speed** | approx. 0,5 - 2 m / s |
| **Test acceleration** | approx. 0.5 - 1.5 m / s² |




## Typical application areas

- For heaviest duty applications, Class 7
- Unsupported travel distances and up to 400 m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications without direct solar radiation
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Clean room, semiconductor insertion, indoor cranes, low temperature applications

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Example image

## Technical tables:

Mechanical information

| Part No. | | Number of cores and conductor nominal cross section [mm²] | Outer diameter (d) max. [mm] | Copper index [kg/km] | Weight [kg/km] |
|---|---|---|---|---|---|
| **Profibus (1x2x0,64 mm)** | | | | | |
| CFBUS.LB.001 | | (2x0.25)C | 9.0 | 33 | 78 |
| **CAN-Bus** | | | | | |
| CFBUS.LB.020 [2] | | (4x0.25)C | 6.5 | 28 | 49 |
| CFBUS.LB.021 | | (2x0.5)C | 8.0 | 39 | 67 |
| CFBUS.LB.022 [2] | | (4x0.5)C | 8.0 | 43 | 78 |
| **Ethernet/CAT5** | | | | | |
| CFBUS.LB.040 [2] | EtherCAT | (4x0.25)C | 7.0 | 33 | 50 |
| **Ethernet/CAT5e** | | | | | |
| CFBUS.LB.045 | CC-Link IE Field | (4x(2x0.15))C | 8.5 | 42 | 71 |
| **Ethernet/CAT6** | | | | | |
| CFBUS.LB.049 | CC-Link IE Field | (4x(2x0.15))C | 8.5 | 42 | 71 |
| **Profinet** | | | | | |
| CFBUS.LB.060 [2] [13] | PROFINET EtherCAT | (4x0.38)C | 7.5 | 39 | 67 |

[2] The chainflex® types marked with 2) are cables designed as a star-quad.
[13] Colour outer jacket: Yellow-green (RAL 6018)
**G =** with green-yellow earth core
**x =** without earth core
**Note:** The given outer diameters are maximum values and may tend toward lower tolerance limits.

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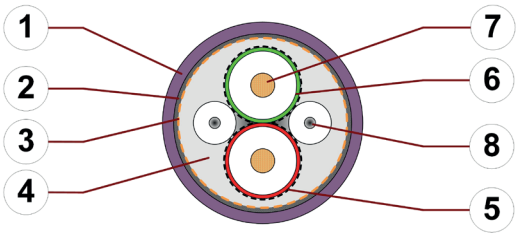
Example image

## Profibus

CFBUS.LB.001-CFBUS.LB.004

## Cable structure

(Electrical information please see next page)




1. Outer jacket: Pressure extruded, halogen-free TPE mixture
2. Shield: Extremely bending-resistant braiding made of tinned copper wires
3. Shield foil: Kupfer kaschierte Kunststofffolie
4. Inner jacket: Pressure extruded, gusset-filling TPE mixture
5. Banding: Plastic foil
6. Core insulation: Mechanically high quality TPE mixture (according to bus specification)
7. Conductor: Fine-wire strand in especially bending-stable version consisting of bare copper wires
8. Filling: Plastic dummy

**Example image**
For detailed overview please see design table

## Design table

| Part No. | Core group | Colour code | Core design |
|---|---|---|---|
| CFBUS.LB.001 | (2x0.25)C | red, green |  |
| CFBUS.LB.004 | (4x0.25)C | green, yellow, red, brown (Star-quad) |  |

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Example image

## Profibus

CFBUS.LB.001-CFBUS.LB.004

## Electrical information

(Cable structure please see previous page)

| Part No. | CFBUS.LB.001 | CFBUS.LB.004 |
|---|---|---|
| **Nominal voltage** | 50 V<br>600 V (following UL) | |
| **Testing voltage**<br>(following DIN EN 50289-1-3) | 500 V | |
| **Characteristic wave impedance**<br>(following DIN EN 50289-1-11) | 150 ± 15 Ω (at 20 MHz) | |

**Line attenuation approx. [dB/100m]**

| Part No. | 9.6 kHz | 38.4 kHz | 4 MHz | 16 MHz |
|---|---|---|---|---|
| CFBUS.LB.001 | 0.3 | 0.4 | 2.6 | 5.5 |
| CFBUS.LB.004 | 0.3 | 0.4 | 2.6 | 5.5 |

| Conductor nominal cross section | Part No. | Maximum conductor resistance at 20 °C (following DIN EN 50289-1-2) | Maximum current rating at 30 °C (following DIN VDE 0298-4) |
|---|---|---|---|
| [mm²] | | [Ω/km] | [A] |
| 0.25 | CFBUS.LB.001 | 68 | 5 |
| 0.25 | CFBUS.LB.004 | 82 | 5 |

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

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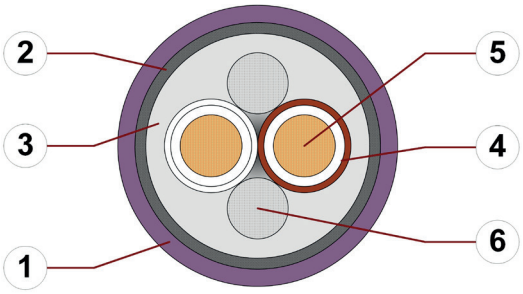
Example image

## CAN-Bus/Feldbus

CFBUS.LB.020-CFBUS.LB.022

## Cable structure

(Electrical information please see next page)




**Example image**
For detailed overview please see design table

1. Outer jacket: Pressure extruded, halogen-free TPE mixture
2. Overall shield: Extremely bending-resistant braiding made of tinned copper wires
3. Inner jacket: Pressure extruded, gusset-filling TPE mixture
4. Core insulation: Mechanically high quality TPE mixture (according to bus specification)
5. Conductor: Fine-wire strand in especially bending-stable version consisting of bare copper wires
6. Filling: Plastic yarn

## Design table

| Part No. | Core group | Colour code | Core design |
|---|---|---|---|
| CFBUS.LB.020 | (4x0.25)C | white, green, brown, yellow (Star-quad) |  |
| CFBUS.LB.021 | (2x0.5)C | white, brown |  |
| CFBUS.LB.022 | (4x0.5)C | white, green, brown, yellow (Star-quad) |  |

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Example image

## CAN-Bus/Feldbus

CFBUS.LB.020-CFBUS.LB.022

## Electrical information

(Cable structure please see previous page)

| Part No. | CFBUS.LB.020 | CFBUS.LB.021 | CFBUS.LB.022 |
|---|---|---|---|
| **Nominal voltage** | | 50 V<br>600 V (following UL) | |
| **Testing voltage**<br>(following DIN EN 50289-1-3) | | 500 V | |
| **Characteristic wave impedance**<br>(following DIN EN 50289-1-11) | | 120 ± 12 Ω (at 1 MHz) | |

| Conductor nominal cross section | Part No. | Maximum conductor resistance at 20 °C (following DIN EN 50289-1-2) | Maximum current rating at 30 °C (following DIN VDE 0298-4) |
|---|---|---|---|
| [mm²] | | [Ω/km] | [A] |
| 0.25 | CFBUS.LB.020 | 79 | 5 |
| 0.5 | CFBUS.LB.021 | 41 | 10 |
| 0.5 | CFBUS.LB.022 | 44.1 | 10 |

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

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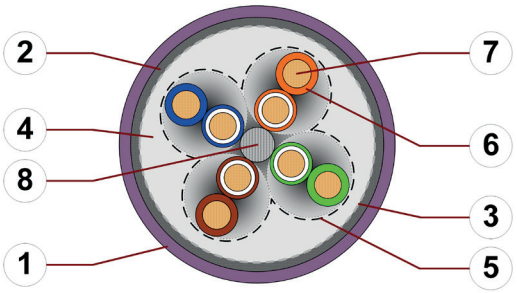
Example image

## Ethernet (CAT5/CAT5e/GigE/PoE)

CFBUS.LB.040-CFBUS.LB.045

## Cable structure

(Electrical information please see next page)




1. Outer jacket: Pressure extruded, halogen-free TPE mixture
2. Overall shield: Extremely bending-resistant braiding made of tinned copper wires
3. Shield foil: Aluminium clad plastic foil
4. Inner jacket: Pressure extruded, gusset-filling TPE mixture
5. Banding: Plastic fleece
6. Core insulation: Mechanically high quality TPE mixture (according to bus specification)
7. Conductor: Fine-wire strand in especially bending-stable version consisting of bare copper wires
8. Strain relief: Tensile stress-resistant centre element

**Example image**
For detailed overview please see design table

## Design table

| Part No. | Core group | Colour code | Core design |
|---|---|---|---|
| CFBUS.LB.040 | (4x0.25)C | white, green, brown, yellow (Star-quad) |  |
| CFBUS.LB.045 | (4x(2x0.15))C | white-blue/blue, white-orange/ orange, white-green/green, white-brown/brown |  |

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Example image

## Ethernet (CAT5/CAT5e/GigE/PoE)

CFBUS.LB.040-CFBUS.LB.045

## Electrical information

(Cable structure please see previous page)

| Part No. | CFBUS.LB.040 | CFBUS.LB.045 |
|---|---|---|
| **Nominal voltage** | 50 V<br>600 V (following UL) | |
| **Testing voltage**<br>(following DIN EN 50289-1-3) | 500 V | |
| **Operating capacity** | 50 pF/m | 60 pF/m |
| **Nominal Velocity of Propagation (NVP)** | 66 % | 67 % |
| **Characteristic wave impedance**<br>(following DIN EN 50289-1-11) | 100 ± 25 Ω | |

**Line attenuation approx. [dB/100m]**

| Part No. | 1 MHz | 4 MHz | 10 MHz | 16 MHz | 20 MHz | 31.25 MHz | 62.5 MHz | 100 MHz |
|---|---|---|---|---|---|---|---|---|
| CFBUS.LB.040 | 3.2 | 6.0 | 9.5 | 12.1 | 13.6 | 17.1 | 24.8 | 32.0 |
| CFBUS.LB.045 | 3.2 | 6.0 | 9.5 | 12.1 | 13.6 | 17.1 | 24.8 | 32.0 |

| **Conductor nominal cross section** | **Maximum conductor resistance at 20 °C** (following DIN EN 50289-1-2) | **Maximum current rating at 30 °C** (following DIN VDE 0298-4) |
|---|---|---|
| **[mm²]** | **[Ω/km]** | **[A]** |
| 0.15 | 111 | 2.5 |
| 0.25 | 70 | 5 |

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

| Part No. | Bus type | Link class | Maximum transmission length |
|---|---|---|---|
| CFBUS.LB.040 | Ethernet/CAT5 | Class D -<br>(Data applications up to 100 MHz) | 60 m |
| CFBUS.LB.045 | Ethernet/CAT5e | Class D -<br>(Data applications up to 100 MHz) | 60 m |

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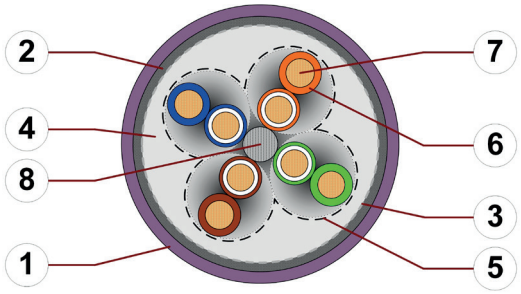
Example image

## Ethernet (CAT6/GigE/PoE)

CFBUS.LB.049

## Cable structure

(Electrical information please see next page)




1. Outer jacket: Pressure extruded, halogen-free TPE mixture
2. Overall shield: Extremely bending-resistant braiding made of tinned copper wires
3. Shield foil: Aluminium clad plastic foil
4. Inner jacket: Pressure extruded, gusset-filling TPE mixture
5. Banding: Plastic fleece
6. Core insulation: Mechanically high quality TPE mixture (according to bus specification)
7. Conductor: Fine-wire strand in especially bending-stable version consisting of bare copper wires
8. Strain relief: Tensile stress-resistant centre element

**Example image**
For detailed overview please see design table

## Design table

| Part No. | Core group | Colour code | Core design |
|---|---|---|---|
| CFBUS.LB.049 | (4x(2x0.15))C | white-blue/blue, white-orange/ orange, white-green/green, white-brown/brown |  |

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Example image

## Ethernet (CAT6/GigE/PoE)
CFBUS.LB.049

## Electrical information
(Cable structure please see previous page)

| Part No. | CFBUS.LB.049 |
|---|---|
| Nominal voltage | 50 V<br>600 V (following UL) |
| Testing voltage<br>(following DIN EN 50289-1-3) | 500 V |
| Operating capacity | 60 pF/m |
| Nominal Velocity of Propagation (NVP) | 67 % |
| Characteristic wave impedance<br>(following DIN EN 50289-1-11) | 100 ± 25 Ω |

**Line attenuation approx. [dB/100m]**

| Part No. | 1 MHz | 4 MHz | 10 MHz | 16 MHz | 20 MHz | 31.25 MHz | 62.5 MHz | 100 MHz | 150 MHz | 200 MHz | 250 MHz |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CFBUS.LB.049 | 3.2 | 6.0 | 9.5 | 12.1 | 13.6 | 17.1 | 24.8 | 32.0 | 40.0 | 47.5 | 55.0 |

| Conductor nominal cross section | Maximum conductor resistance at 20 °C (following DIN EN 50289-1-2) | Maximum current rating at 30 °C (following DIN VDE 0298-4) |
|---|---|---|
| [mm²] | [Ω/km] | [A] |
| 0.15 | 111 | 2.5 |

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

| Part No. | Bus type | Link class | Maximum transmission length |
|---|---|---|---|
| CFBUS.LB.049 | Ethernet/CAT6 | Class E -<br>(Data applications up to 250 MHz) | 60 m |

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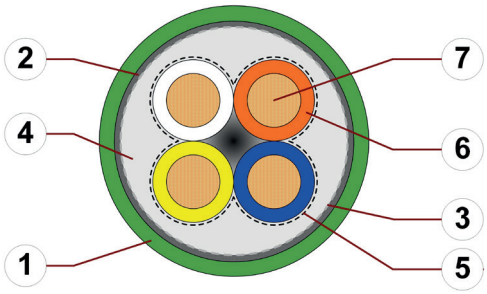
Example image

## Profinet (Type C)
CFBUS.LB.060

## Cable structure
(Electrical information please see next page)




**Example image**
For detailed overview please see design table

1. Outer jacket: Pressure extruded, halogen-free TPE mixture
2. Overall shield: Extremely bending-resistant braiding made of tinned copper wires
3. Shield foil: Aluminium clad plastic foil
4. Inner jacket: Pressure extruded, gusset-filling TPE mixture
5. Banding: Plastic foil
6. Core insulation: Mechanically high quality TPE mixture (according to bus specification)
7. Conductor: Fine-wire strand in especially bending-stable version consisting of bare copper wires

## Design table

| Part No. | Core group | Colour code | Core design |
|---|---|---|---|
| CFBUS.LB.060 | (4x0.38)C | white, orange, blue, yellow (Star-quad) |  |

# Data sheet
# chainflex® CFBUS.LB

**Bus cable (Class 7.6.4.1) ● For heaviest duty applications ● TPE outer jacket ● Shielded ● Oil and bio-oil resistant ● Low-temperature-flexible ● PVC and halogen-free ● Hydrolysis and microbe-resistant**

Example image

## Profinet (Type C)
CFBUS.LB.060

## Electrical information
(Cable structure please see previous page)

| Part No. | CFBUS.LB.060 |
|---|---|
| Nominal voltage | 50 V<br>600 V (following UL) |
| Testing voltage<br>(following DIN EN 50289-1-3) | 500 V |
| Operating capacity | 50 pF/m |
| Nominal Velocity of Propagation (NVP) | 66 % |
| Characteristic wave impedance<br>(following DIN EN 50289-1-11) | 100 ± 15 Ω |

**Line attenuation approx. [dB/100m]**

| Part No. | 1 MHz | 4 MHz | 10 MHz | 16 MHz | 20 MHz | 31.25 MHz | 62.5 MHz | 100 MHz |
|---|---|---|---|---|---|---|---|---|
| CFBUS.LB.060 | 2.4 | 4.8 | 7.6 | 9.6 | 10.7 | 13.4 | 19.0 | 24.0 |

| Conductor nominal cross section | Maximum conductor resistance at 20 °C<br>(following DIN EN 50289-1-2) | Maximum current rating at 30 °C<br>(following DIN VDE 0298-4) |
|---|---|---|
| [mm²] | [Ω/km] | [A] |
| 0.38 | 51 | 7 |

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

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