Data sheet  
chainflex® CF210.UL

Servo cable (Class 4.2.2.1)  ●  For medium duty applications  ●  PVC outer jacket  ●  Shielded  ●  Oil-resistant  ●  Flame retardant

Example image
For detailed overview please see design table

Cable structure

Conductor
Stranded conductor in bending-resistant version consisting of bare copper wires (following DIN EN 60228).

Core insulation
Mechanically high-quality, especially low-capacitance TPE mixture.

Core structure
Power cores and control pair elements wound with a short pitch length around a high tensile strength centre element.

Core identification
Power cores: Black cores with white numbers, one green-yellow core.
1. Core: U / L1 / C / L+
2. Core: V / L2
3. Core: W / L3 / D / L-

1 Control pair: Black cores with white numbers.
1. Control core: 4 2. Control core: 5

2 Control pairs: Black cores with white numbers.
1. Control core: 5 2. Control core: 6
3. Control core: 7 4. Control core: 8

Element shield
Bending-resistant braiding made of tinned copper wires.

Intermediate layer
Foil taping over the outer layer.

Overall shield
Bending-resistant braiding made of tinned copper wires.
Coverage approx. 55 % linear, approx. 80 % optical

Outer jacket
Low-adhesion, oil-resistant PVC mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-4-1).
Colour: Pastel orange (similar to RAL 2003)
Printing: black

"00000 m"  igus chainflex CF210.UL.-.-.-.-.600/1000V E310776

cRUAs AWM Style 2570 VW-1 AWM I/II A/B 80°C 1000V FT1 EAC/CTP

CE RoHS-II conform  www.igus.de +++ chainflex cable works +++

* Length printing: Not calibrated. Only intended as an orientation aid.
Ø / Ø Cable identification according to Part No. (see technical table).
Example: ... chainflex CF210.UL.15.15.02.01 (4G1.5+(2x1.5)C)C 600/1000V ...
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Dynamic information

- **Bend radius**
  - e-chain® linear: minimum 10 x d
  - flexible: minimum 8 x d
  - fixed: minimum 5 x d

- **Temperature**
  - e-chain® linear:
    - flexible: +5 °C up to +70 °C
    - fixed: -5 °C up to +70 °C (following DIN EN 60811-504)
    - fixed: -15 °C up to +70 °C (following DIN EN 50305)

- **v max.**
  - unsupported: 10 m/s
  - gliding: 2 m/s

- **a max.**
  - 50 m/s²

- **Travel distance**
  - Unsupported travels and up to 10 m for gliding applications, Class 2

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

Guaranteed service life according to guarantee conditions

<table>
<thead>
<tr>
<th>Double strokes</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, from/to [°C]</td>
<td>R min. [factor x d]</td>
<td>R min. [factor x d]</td>
<td>R min. [factor x d]</td>
</tr>
<tr>
<td>+5/+15</td>
<td>12.5</td>
<td>13.5</td>
<td>14.5</td>
</tr>
<tr>
<td>+15/+60</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>+60/+170</td>
<td>12.5</td>
<td>13.5</td>
<td>14.5</td>
</tr>
</tbody>
</table>

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

Electrical information

- **Nominal voltage**
  - 600/1000 V (following DIN VDE 0298-3)

- **Testing voltage**
  - 4000 V (following DIN EN 50395)
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●  **Oil-resistant**  ●  **Flame retardant**

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**Properties and approvals**

- **UV resistance**  
  - Medium

- **Oil resistance**  
  - Oil-resistant (following DIN EN 50363-4-1), Class 2

- **Flame retardant**  
  - According to IEC 60332-1-2, CEI 20-35, FT1, VW-1

- **Silicone-free**  
  - Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

- **UL/CSA**  
  - Style 10989 and 2570, 1000 V, 80 °C

- **NFPA**  
  - Following NFPA 79-2012, chapter 12.9

- **EAC**  
  - Certificate No. RIU C-DE.ME77.B.02324 (TR ZU)

- **CTP**  
  - Certificate No. C-DE.PB49.B.00420 (Fire protection)

- **CEI**  
  - Following CEI 20-35

- **Lead-free**  
  - Following 2011/65/EC (RoHS-II)

- **Clean room**  
  - According to ISO Class 2. The outer jacket material of this series complies with CF5.10.07 - tested by IPA according to standard DIN EN ISO 14644-1

- **CE**  
  - Following 2014/35/EU
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Typical lab test setup for this cable series
- Test bend radius R: approx. 75 - 250 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 medium duty applications, Class 4
- Unsupported travel distances and up to 10 m for gliding applications, Class 2
- Light oil influence, Class 2
- No torsion, Class 1
- Preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- Wood/stone processing, Packaging industry, supply systems, Handling, adjusting equipment

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Technical tables:

Mechanical information

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Number of cores and conductor nominal cross section [mm²]</th>
<th>Outer diameter (d) max. [mm]</th>
<th>Copper index [kg/km]</th>
<th>Weight [kg/km]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Control pair shielded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF210.UL.15.15.02.01</td>
<td>(4G1.5+(2x1.5)C)C</td>
<td>12.0</td>
<td>154</td>
<td>253</td>
</tr>
<tr>
<td>CF210.UL.25.15.02.01</td>
<td>(4G2.5+(2x1.5)C)C</td>
<td>14.0</td>
<td>218</td>
<td>309</td>
</tr>
<tr>
<td>CF210.UL.40.15.02.01</td>
<td>(4G4.0+(2x1.5)C)C</td>
<td>15.0</td>
<td>281</td>
<td>429</td>
</tr>
<tr>
<td>CF210.UL.60.15.02.01</td>
<td>(4G6.0+(2x1.5)C)C</td>
<td>16.5</td>
<td>375</td>
<td>531</td>
</tr>
<tr>
<td>2 Control pairs shielded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF210.UL.15.07.02.02</td>
<td>(4G1.5+2x(2x0.75)C)C</td>
<td>13.5</td>
<td>174</td>
<td>298</td>
</tr>
<tr>
<td>CF210.UL.25.15.02.02</td>
<td>(4G2.5+2x(2x1.5)C)C</td>
<td>16.0</td>
<td>268</td>
<td>421</td>
</tr>
<tr>
<td>CF210.UL.40.15.02.02</td>
<td>(4G4.0+2x(2x1.5)C)C</td>
<td>17.0</td>
<td>340</td>
<td>520</td>
</tr>
<tr>
<td>CF210.UL.60.15.02.02</td>
<td>(4G6.0+2x(2x1.5)C)C</td>
<td>18.5</td>
<td>438</td>
<td>644</td>
</tr>
<tr>
<td>without control pair</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF210.UL.15.04</td>
<td>(4G1.5)C</td>
<td>9.5</td>
<td>85</td>
<td>151</td>
</tr>
<tr>
<td>CF210.UL.25.04</td>
<td>(4G2.5)C</td>
<td>11.5</td>
<td>145</td>
<td>231</td>
</tr>
<tr>
<td>CF210.UL.40.04</td>
<td>(4G4.0)C</td>
<td>12.5</td>
<td>217</td>
<td>323</td>
</tr>
</tbody>
</table>

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
G = with green-yellow earth core x = without earth core

Electrical information

<table>
<thead>
<tr>
<th>Conductor nominal cross section [mm²]</th>
<th>Maximum conductor resistance at 20 °C [Ω/km] (following DIN EN 50289-1-2)</th>
<th>Maximum current rating at 30 °C [A] (following DIN VDE 0298-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75</td>
<td>26.0</td>
<td>14</td>
</tr>
<tr>
<td>1.5</td>
<td>13.3</td>
<td>21</td>
</tr>
<tr>
<td>2.5</td>
<td>8.0</td>
<td>30</td>
</tr>
<tr>
<td>4.0</td>
<td>4.95</td>
<td>41</td>
</tr>
<tr>
<td>6.0</td>
<td>3.3</td>
<td>53</td>
</tr>
</tbody>
</table>

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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**Capacity**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Core/Core Capacity [approx. pF/m]</th>
<th>Core/Shield Capacity [approx. pF/m]</th>
<th>Core/Core Capacity [approx. pF/m]</th>
<th>Core/Shield Capacity [approx. pF/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Control pair shielded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF210.UL.15.15.02.01</td>
<td>80</td>
<td>140</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>CF210.UL.25.15.02.01</td>
<td>105</td>
<td>180</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>CF210.UL.40.15.02.01</td>
<td>115</td>
<td>200</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>CF210.UL.60.15.02.01</td>
<td>120</td>
<td>210</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>2 Control pairs shielded</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF210.UL.15.07.02.02</td>
<td>80</td>
<td>140</td>
<td>100</td>
<td>165</td>
</tr>
<tr>
<td>CF210.UL.25.07.02.02</td>
<td>105</td>
<td>180</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>CF210.UL.40.07.02.02</td>
<td>115</td>
<td>200</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>CF210.UL.60.07.02.02</td>
<td>120</td>
<td>210</td>
<td>120</td>
<td>215</td>
</tr>
<tr>
<td>without control pair</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF210.UL.15.04</td>
<td>80</td>
<td>140</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CF210.UL.25.04</td>
<td>105</td>
<td>180</td>
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</tr>
<tr>
<td>CF210.UL.40.04</td>
<td>115</td>
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<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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### Design table

<table>
<thead>
<tr>
<th>Art.-Nr.</th>
<th>Number of cores</th>
<th>Core design</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF210.UL.XX.XX.02.01</td>
<td>4+1x2</td>
<td></td>
</tr>
<tr>
<td>CF210.UL.XX.XX.02.02</td>
<td>4+2x2</td>
<td></td>
</tr>
<tr>
<td>CF210.UL.XX.04</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

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