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36 month Chainflex® guarantee
Guaranteed lifetime for predictable reliability
▶ Selection table page 362

With the help of the Chainflex® service life calculator, you can quickly and easily calculate the expected service life of Chainflex® cables specifically for your application:

www.igus.com/chainflexlife
In the industrial applications of today, robots have introduced ever more complex sequences of movements that demand torsional and/or three-dimensional flexible cables with a long service life similar to the Chainflex® cables for use in linear Energy Chain Systems®.

Wires, stranded, shields and sheathing materials must compensate both major changes in bending load and changes in diameter due to torsional movements. For this purpose, different "soft" structural elements, e.g. rayon fibres, PTFE elements or filling elements that absorb torsion forces are used in Chainflex® CFROBOT cables.

Special demands are made on the braided shielding in torsion cables. Optimized shield structures with PTFE gliding films are used to absorb the forces caused by torsion movements.

To use an example of torsional Bus cables, the transmission characteristics such as attenuation, cable capacity and signal quality must remain within very tight tolerance ranges over the whole service life. This is achieved through the use of special insulating materials and mechanical elements with matching capacity values.

The highly abrasion-resistant, halogen-free and flame-resistant PUR sheathing mixture in motor, hybrid/control cables and bus cables protects the core elements from possible damage.

The CFROBOT cable line utilizes two jacket materials PUR and TPE. These materials were carefully chosen to protect the core elements like power conductors, high-speed data pairs and fiber optic components from possible damage. PUR jacket is highly abrasion resistant, halogen free and flame resistant. TPE jacket is highly abrasion resistant and halogen-free.

The special design logic behind CFROBOT cables was developed in theory and needed to be validated through testing. igus® set out to develop a test that would simulate the torsion stress cables will endure in the field. We do this by utilizing the Triflex® R Energy Chain® which can be twisted to various degrees at very high frequencies. This test is referred to as the igus® Torsion Test Standard.

According to this standard, all Chainflex® ROBOT cables in a Triflex® R Energy Chain® are twisted with a fixed-point distance of one meter and a torsion of +/- 180° at least 3 million times. In addition, a test is carried out on a test bench with a Triflex® R length of approx. 2500 mm with 270° torsion. This test duplicated the forces and impacts that cables are exposed to in industrial robotic applications.
We have also found that all the non-shielded, gusset-filled extruded standard Chainflex® control cables of the series CF130, CF5, CF77-UL-D, CF9 and CF9-UL correspond to the above mentioned igus® standard and have been approved for use in torsion applications.

The following CFROBOT torsion cable types are currently available:

- Hybrid/Control Cables
- Motor/Servo Cables
- Bus/Data Cables
- Fiber Optic Cables

We can also offer you Chainflex® ROBOT cables terminated with the connectors of your choice as ReadyCable®, or as a ready-to-install ReadyChain® cable assembly.
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(1) Exclusive! Guaranteed lifetime for this series according to the guarantee conditions ► Page 22-23
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* Higher number of cycles? Online lifetime calculation ➤ www.igus.com/chainflexlife
Control cable | PUR | Chainflex® CF77-UL-D

- For torsion applications
- PUR outer jacket
- Oil resistant and coolant-resistant
- Flame retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic Information

| Bend radius | E-Chain® linear | min. 6.8 x d |
|            | flexible        | min. 5 x d  |
|            | fixed           | min. 4 x d  |
| Temperature| E-Chain® linear | -13 °F to +176 °F (-25 °C to +80 °C) |
|            | flexible        | -40 °F to +176 °F (-40 °C to +80 °C) |
|            | fixed           | -58 °F to +176 °F (-50 °C to +80 °C) |
| v max.     | twisted         | 180 °/s     |
| a max.     | twisted         | 60 °/s²     |
| Travel distance | Robots and multi-axis movements, Class 1 |
| Torsion    | ± 180°, with 3.281ft (1m) cable length, Class 3 |
|            | (except for 5-core types ≥ 4.0 mm² Product range table) |

Cable structure

- Conductors: Conductor consisting of bare copper wires (according to DIN EN 60228).
- Conductor insulation: Mechanically high-quality TPE mixture.
- Conductor construction:
  - Number of conductors < 12: Conductors cabled in a layer with short pitch length.
  - Number of conductors ≥ 12: Conductors combined in bundles and stranded together around a high-tensile strength core, using short pitch directions for a low-torsion cable structure.

- Color code:
  - 24-22 AWG: Color code in accordance with DIN 47100.
  - 20-10 AWG: Black with white numbers, one conductor green-yellow.
  - CF77-UL-03-04-IN1: brown, blue, black, white

- Outer jacket: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Gray (similar to RAL 7040).

Electrical Information

- Nominal voltage:
  - 24-22 AWG: 300 V
  - 20-6 AWG: 1000 V

- Test voltage: 2000 V (following DIN EN 50395)

Configurators: [www.igus.com/CF77-UL-D](http://www.igus.com/CF77-UL-D)
Properties and approvals

- **UV resistance**: Medium
- **Oil resistance**: Oil-resistant (following DIN EN 50363-10-2), Class 3
- **Offshore**: MUD-resistant following NEK 606 - status 2009
- **Flame resistance**: 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)
- **Halogen-free**: Following DIN EN 60754
- **UL/CSA**: 24-22 AWG: Style 10493 and 20233, 300 V, +80 °C
  20-10 AWG: Style 11323 and 21223, 1000 V, +80 °C
- **NFPA 79**: Complies to NFPA 79-2018 chapter 12.9.
- **DNV-GL**: Type approval certificate No. 61 935-14 HH
- **EAC**: Certificate No. RU C-DE.ME77.B.01254 (TR ZU)
- **CTP**: Certificate No. C-DE.PB49.B.00416 (Fire protection)
- **CEI**: Following CEI 20-35
- **Lead-free**: Following 2011/65/EC (RoHS-II)
- **Clean room**: According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
- **DESINA**: According to VDW, DESINA standardization.
- **CE**: Following 2014/35/EU

Guaranteed service life (details see page 22-23)

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<th>10 million</th>
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<td>+158/+176</td>
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* Higher number of cycles? Online lifetime calculation ▶ www.chainflex.com/chainflexlife

Typical application areas
- For high mechanical load requirements, Class 5
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications with average sun radiation
- Robots, Handling, spindle drives
### Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [mm] | Copper index | Weight [lbs/mi] | Weight [kg/km]
--- | --- | --- | --- | --- | --- | ---
**New** CF77-UL-02-03-INI | 24 | 3 x 0.25 | 0.20 | 5.0 | 5.4 | 8 | 19.5 | 29
CF77-UL-02-04-D | 24 | 4 x 0.25 | 0.22 | 5.5 | 7.4 | 11 | 23.5 | 35
**New** CF77-UL-02-12-D | 24 | 12 x 0.25 | 0.35 | 9.0 | 20.2 | 30 | 51.7 | 77
**New** CF77-UL-02-18-D | 24 | 18 x 0.25 | 0.41 | 10.5 | 30.2 | 45 | 76.6 | 114
**CF77-UL-03-04-INI** | 12 | 4 x 0.34 | 0.24 | 6.0 | 10.8 | 16 | 26.2 | 39
CF77-UL-05-04-D | 20 | 4 G 0.5 | 0.24 | 6.0 | 14.1 | 21 | 28.9 | 43
CF77-UL-05-05-D | 20 | 5 G 0.5 | 0.26 | 6.5 | 17.5 | 26 | 33.6 | 50
CF77-UL-05-07-D | 20 | 7 G 0.5 | 0.30 | 7.5 | 26.2 | 39 | 52.4 | 78
CF77-UL-05-12-D | 20 | 12 G 0.5 | 0.39 | 10.0 | 42.3 | 63 | 86.7 | 129
CF77-UL-05-18-D | 20 | 18 G 0.5 | 0.47 | 12.0 | 63.2 | 94 | 120.3 | 179
CF77-UL-05-25-D | 20 | 25 G 0.5 | 0.55 | 14.0 | 86.7 | 129 | 159.9 | 238
CF77-UL-05-30-D | 20 | 30 G 0.5 | 0.59 | 15.0 | 104.2 | 155 | 211.7 | 315
CF77-UL-07-03-D | 18 | 3 G 0.75 | 0.26 | 6.5 | 15.5 | 23 | 36.3 | 54
CF77-UL-07-04-D | 18 | 4 G 0.75 | 0.28 | 7.0 | 20.2 | 30 | 42.3 | 63
CF77-UL-07-05-D | 18 | 5 G 0.75 | 0.30 | 7.5 | 25.5 | 38 | 49.1 | 73
CF77-UL-07-07-D | 18 | 7 G 0.75 | 0.33 | 8.5 | 35.6 | 53 | 69.2 | 103
CF77-UL-07-12-D | 18 | 12 G 0.75 | 0.47 | 12.0 | 60.5 | 90 | 125.7 | 187
CF77-UL-07-18-D | 18 | 18 G 0.75 | 0.53 | 13.5 | 90.0 | 134 | 168.7 | 251
CF77-UL-07-20-D | 18 | 20 G 0.75 | 0.57 | 14.5 | 100.1 | 149 | 189.5 | 282
CF77-UL-07-25-D | 18 | 25 G 0.75 | 0.63 | 16.0 | 125.0 | 186 | 239.2 | 356
CF77-UL-07-36-D | 18 | 36 G 0.75 | 0.75 | 19.0 | 187.5 | 279 | 339.3 | 505
CF77-UL-07-42-D | 18 | 42 G 0.75 | 0.83 | 21.0 | 229.1 | 341 | 389.7 | 580
**CF77-UL-10-02-D** | 17 | 2 x 1.0 | 0.26 | 6.5 | 13.4 | 20 | 35.6 | 53
CF77-UL-10-03-D | 17 | 3 G 1.0 | 0.26 | 6.5 | 20.2 | 30 | 42.3 | 63
CF77-UL-10-04-D | 17 | 4 G 1.0 | 0.28 | 7.0 | 26.9 | 40 | 51.7 | 77
CF77-UL-10-05-D | 17 | 5 G 1.0 | 0.31 | 8.0 | 33.6 | 50 | 63.2 | 94
CF77-UL-10-07-D | 17 | 7 G 1.0 | 0.35 | 9.0 | 47.0 | 70 | 77.3 | 115
CF77-UL-10-12-D | 17 | 12 G 1.0 | 0.49 | 12.5 | 80.0 | 119 | 151.2 | 225
CF77-UL-10-18-D | 17 | 18 G 1.0 | 0.59 | 15.0 | 119.6 | 178 | 219.1 | 326
CF77-UL-10-25-D | 17 | 25 G 1.0 | 0.69 | 17.5 | 166.6 | 248 | 293.0 | 436
CF77-UL-10-42-D | 17 | 42 G 1.0 | 0.89 | 22.5 | 291.0 | 433 | 456.3 | 679

12) Color outer jacket: Yellow (RAL 1021)

**Note:** The given outer diameters are maximum values.

G = with green-yellow earth core  x = without earth core

---

**Control cable | PUR | Chainflex® CF77-UL-D**

---

### Example image

---

**Configurators** ▶ [www.igus.com/CF77-UL-D](http://www.igus.com/CF77-UL-D)
<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max.</th>
<th>Copper index</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[mm²] [in.]</td>
<td>[mm]</td>
<td>[lbs/mft]</td>
<td>[kg/km]</td>
</tr>
<tr>
<td>CF77-UL-15-03-D</td>
<td>16</td>
<td>3 G 1.5</td>
<td>0.30</td>
<td>7.5</td>
<td>30.2</td>
</tr>
<tr>
<td>CF77-UL-15-04-D</td>
<td>16</td>
<td>4 G 1.5</td>
<td>0.31</td>
<td>8.0</td>
<td>40.3</td>
</tr>
<tr>
<td>CF77-UL-15-05-D</td>
<td>16</td>
<td>5 G 1.5</td>
<td>0.33</td>
<td>8.5</td>
<td>50.4</td>
</tr>
<tr>
<td>CF77-UL-15-07-D¹⁷</td>
<td>16</td>
<td>7 G 1.5</td>
<td>0.41</td>
<td>10.5</td>
<td>69.9</td>
</tr>
<tr>
<td>CF77-UL-15-12-D</td>
<td>16</td>
<td>12 G 1.5</td>
<td>0.55</td>
<td>14.0</td>
<td>119.6</td>
</tr>
<tr>
<td>CF77-UL-15-18-D</td>
<td>16</td>
<td>18 G 1.5</td>
<td>0.67</td>
<td>17.0</td>
<td>179.4</td>
</tr>
<tr>
<td>CF77-UL-15-25-D</td>
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<td>25 G 1.5</td>
<td>0.77</td>
<td>19.5</td>
<td>249.3</td>
</tr>
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<td>CF77-UL-15-36-D</td>
<td>16</td>
<td>36 G 1.5</td>
<td>0.93</td>
<td>23.5</td>
<td>370.3</td>
</tr>
<tr>
<td>CF77-UL-15-42-D</td>
<td>16</td>
<td>42 G 1.5</td>
<td>1.04</td>
<td>26.5</td>
<td>454.3</td>
</tr>
<tr>
<td>CF77-UL-25-03-D</td>
<td>14</td>
<td>3 G 2.5</td>
<td>0.33</td>
<td>8.5</td>
<td>50.4</td>
</tr>
<tr>
<td>CF77-UL-25-04-D</td>
<td>14</td>
<td>4 G 2.5</td>
<td>0.37</td>
<td>9.5</td>
<td>67.2</td>
</tr>
<tr>
<td>CF77-UL-25-05-D</td>
<td>14</td>
<td>5 G 2.5</td>
<td>0.41</td>
<td>10.5</td>
<td>83.3</td>
</tr>
<tr>
<td>CF77-UL-25-07-D¹⁷</td>
<td>14</td>
<td>7 G 2.5</td>
<td>0.49</td>
<td>12.5</td>
<td>116.9</td>
</tr>
<tr>
<td>CF77-UL-25-12-D</td>
<td>14</td>
<td>12 G 2.5</td>
<td>0.67</td>
<td>17.0</td>
<td>199.6</td>
</tr>
<tr>
<td>CF77-UL-40-04-D</td>
<td>12</td>
<td>4 G 4.0</td>
<td>0.45</td>
<td>11.5</td>
<td>110.9</td>
</tr>
<tr>
<td>CF77-UL-40-05-D</td>
<td>12</td>
<td>5 G 4.0</td>
<td>0.47</td>
<td>12.0</td>
<td>133.0</td>
</tr>
<tr>
<td>CF77-UL-60-05-D</td>
<td>10</td>
<td>5 G 6.0</td>
<td>0.55</td>
<td>14.0</td>
<td>199.6</td>
</tr>
</tbody>
</table>

¹⁷ When using the cables with "7 G 1.5 mm²" and "7 G 2.5 mm²" minimum bend radius must be 17.5 x d with gliding travel distance ≥ 5 m.

Note: The given outer diameters are maximum values.
G = with green-yellow earth core  x = without earth core

Order example: CF77-UL-02-04-D – To your desired length
CF77-UL-D Chainflex® series -02 Code nominal cross section -04 Number of conductors
Online order ► www.chainflex.com/CF77-UL-D
Delivery time 24hrs or today.
Delivery time means time until goods are shipped.

36 month guarantee ... 1,354 types from stock ... no cutting charges
**Control cable | PUR | Chainflex® CFROBOT2**

**For torsion applications**  
- PUR outer jacket  
- Shielded  
- Oil resistant and coolant-resistant

**For torsion applications**  
- Flame retardant  
- PVC and halogen-free  
- Notch-resistant  
- Hydrolysis and microbe-resistant

---

**Dynamic Information**

<table>
<thead>
<tr>
<th>Bend radius</th>
<th>E-Chain® twisted</th>
<th>flexible</th>
<th>min. 10 x d</th>
</tr>
</thead>
<tbody>
<tr>
<td>fixed</td>
<td></td>
<td></td>
<td>min. 8 x d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th>E-Chain® twisted</th>
<th>flexible</th>
<th>-13 °F to +176 °F (-25 °C to +80 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>fixed</td>
<td></td>
<td></td>
<td>-40 °F to +176 °F (-40 °C to +80 °C)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>° max. twisted</th>
<th>twisted</th>
<th>180 °/s</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>a max. twisted</th>
<th>twisted</th>
<th>60 °/s²</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Travel distance</th>
<th>Robots and multi-axis movements, Class 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281 ft (1m) cable length, Class 3</td>
</tr>
</tbody>
</table>

**Cable structure**

- **Conductors**: Conductor consisting of bare copper wires (according to DIN EN 60228).
- **Conductor insulation**: Mechanically high-quality TPE mixture.
- **Color code**: Black with white numbers, one conductor green-yellow.
- **Element shield**: Extremely torsion-resistant tinned braided copper shield.
- **Outer jacket**: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Dark blue (similar to RAL 5011)

**Electrical Information**

- **Nominal voltage**: 300 V
- **Test voltage**: 2000 V (following DIN EN 50395)

**Properties and approvals**

- **UV resistance**: High
- **Oil resistance**: Oil-resistant (following DIN EN 50363-10-2), Class 3
- **Flame resistance**: According to IEC 60332-1-2, CEI 20-35, FT1, VW-1

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**Configurators**: [www.igus.com/CFROBOT2](http://www.igus.com/CFROBOT2)
Silicone-free
Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)

Halogen-free
Following DIN EN 60754

UL/CSA
Style 10493 and 20317, 300 V, +80 °C

NFPA 79
Complies to NFPA 79-2018 chapter 12.9.

EAC
Certificate No. RU C-DE.ME77.B.01254 (TR ZU)

CTP
Certificate No. C-DE.PB49.B.00416 (Fire protection)

CEI
Following CEI 20-35

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

Clean room
According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1

Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles</th>
<th>Temperature, from/to [°F]</th>
<th>Torsion max. [°/m]</th>
<th>Torsion max. [°/m]</th>
<th>Torsion max. [°/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-13/+5</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td></td>
<td>+5/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td></td>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation – www.chainflex.com/chainflexlife

Typical application areas
- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives

Part No. | AWG | Number of Conductors and rated cross section [mm²] | Outer diameter max. [mm] | Copper index | Weight [lbs/mft] [kg/km] |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT2-07-04-C</td>
<td>18</td>
<td>4 G 0.75</td>
<td>0.33</td>
<td>8.5</td>
<td>28.2</td>
</tr>
<tr>
<td>CFROBOT2-07-05-C</td>
<td>18</td>
<td>5 G 0.75</td>
<td>0.33</td>
<td>8.5</td>
<td>34.3</td>
</tr>
<tr>
<td>CFROBOT2-07-07-C</td>
<td>18</td>
<td>7 G 0.75</td>
<td>0.39</td>
<td>10.0</td>
<td>47.7</td>
</tr>
<tr>
<td>CFROBOT2-07-12-C</td>
<td>18</td>
<td>12 G 0.75</td>
<td>0.55</td>
<td>14.0</td>
<td>82.0</td>
</tr>
<tr>
<td>CFROBOT2-07-18-C</td>
<td>18</td>
<td>18 G 0.75</td>
<td>0.65</td>
<td>16.5</td>
<td>124.3</td>
</tr>
</tbody>
</table>

Note: The given outer diameters are maximum values.
G = with green-yellow earth core  x = without earth core
**Data cable | PUR | Chainflex® CFROBOT3**

- For torsion applications
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant

### Dynamic Information

<table>
<thead>
<tr>
<th>Bend radius</th>
<th>E-Chain® twisted</th>
<th>E-Chain® flexible</th>
<th>E-Chain® fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>min. 10 x d</td>
<td>min. 8 x d</td>
<td>min. 5 x d</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th>E-Chain® twisted</th>
<th>E-Chain® flexible</th>
<th>E-Chain® fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>-13 °F to +176 °F (-25 °C to +80 °C)</td>
<td>-40 °F to +176 °F (-40 °C to +80 °C)</td>
<td>-58 °F to +176 °F (-50 °C to +80 °C)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>v max.</th>
<th>twisted</th>
<th>180 °/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>a max.</td>
<td>twisted</td>
<td>60 °/s²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Travel distance</th>
<th>Robots and multi-axis movements, Class 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281ft (1m) cable length, Class 3</td>
</tr>
</tbody>
</table>

### Cable structure

- **Conductors**: Conductor consisting of bare copper wires (according to DIN EN 60228).
- **Conductor insulation**: Mechanically high-quality TPE mixture.
- **Color code**: Color code in accordance with DIN 47100.
- **Overall shield**: Extremely torsion-resistant tinned braided copper shield. 85 % optical coverage
- **Outer jacket**: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Dark blue (similar to RAL 5011)

### Electrical Information

- **Nominal voltage**: 300 V
- **Test voltage**: 2000 V (following DIN EN 50395)

### Properties and approvals

- **UV resistance**: High
- **Oil resistance**: Oil-resistant (following DIN EN 50363-10-2), Class 3
- **Flame resistance**: According to IEC 60332-1-2, CEI 20-35, FT1, VW-1

**Configurators**: [www.igus.com/CFROBOT3](http://www.igus.com/CFROBOT3)

**New**
Class 6.1.3.3

Silicone-free
Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
Style 10497 and 20911, 300 V, +80 °C

UL/CSA
Complies to NFPA 79-2018 chapter 12.9.

NFPA 79
Certificate No. RU C-DE.ME77.B.01254 (TR ZU)

EAC
Certificate No. C-DE.PB49.B.00416 (Fire protection)

CTP
Following CEI 20-35

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

Clean room
According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
Following 2014/35/EU

Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, from/to [°F]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
</tr>
<tr>
<td>-13/+5</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>+5/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ► www.chainflex.com/chainflexlife

Typical application areas
- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- robots, Handling, spindle drives

Part No. | AWG | Number of Conductors and rated cross section | Outer diameter max. [mm] | Copper index | Weight [lbs/mft] | [kg/km] |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT3-02-03-02</td>
<td>24</td>
<td>3 PR x 0.25</td>
<td>0.35</td>
<td>9.0</td>
<td>21.5</td>
<td>32</td>
</tr>
<tr>
<td>CFROBOT3-02-04-02</td>
<td>24</td>
<td>4 PR x 0.25</td>
<td>0.41</td>
<td>10.5</td>
<td>25.5</td>
<td>38</td>
</tr>
<tr>
<td>CFROBOT3-02-06-02</td>
<td>24</td>
<td>6 PR x 0.25</td>
<td>0.45</td>
<td>11.5</td>
<td>34.9</td>
<td>52</td>
</tr>
<tr>
<td>CFROBOT3-02-08-02</td>
<td>24</td>
<td>8 PR x 0.25</td>
<td>0.55</td>
<td>14.0</td>
<td>44.3</td>
<td>66</td>
</tr>
<tr>
<td>CFROBOT3-05-05-02</td>
<td>20</td>
<td>5 PR x 0.5</td>
<td>0.49</td>
<td>12.5</td>
<td>50.4</td>
<td>75</td>
</tr>
</tbody>
</table>

Note: The given outer diameters are maximum values.
G = with green-yellow earth core  x = without earth core
Measuring system cable | PUR | Chainflex® CFROBOT4

10,000,000 Cycles guaranteed
±180°/3.28 ft
3D movements

- For torsion applications
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

**Dynamic Information**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>E-Chain® twisted</th>
<th>E-Chain® flexible</th>
<th>E-Chain® fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bend radius</td>
<td>min. 10 x d</td>
<td>min. 8 x d</td>
<td>min. 5 x d</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible</td>
<td>-13 °F to +176 °F (-25 °C to +80 °C)</td>
<td>-40 °F to +176 °F (-40 °C to +80 °C)</td>
<td></td>
</tr>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v max.</td>
<td>180 °/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a max.</td>
<td>60 °/s²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel distance</td>
<td>Robots and multi-axis movements, Class 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281ft (1m) cable length, Class 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cable structure**

- **Conductors**: Conductor consisting of bare copper wires (according to DIN EN 60228).
- **Conductor insulation**: Mechanically high-quality TPE mixture.
- **Color code**: According to measuring system specification.
- **Element shield**: Extremely torsion-resistant tinned braided copper shield. 80 % optical coverage
- **Overall shield**: Extremely torsion-resistant tinned braided copper shield. 85 % optical coverage
- **Outer jacket**: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Dark blue (similar to RAL 5011)

**Electrical Information**

- **Nominal voltage**: 30 V
- **Test voltage**: 500 V

Configurators ► www.igus.com/CFROBOT4
## Properties and approvals

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV resistance</td>
<td>High</td>
</tr>
<tr>
<td>Oil resistance</td>
<td>Oil-resistant (following DIN EN 50363-10-2), Class 3</td>
</tr>
<tr>
<td>Flame resistance</td>
<td>According to IEC 60332-1-2, CEI 20-35, FT1, VW-1</td>
</tr>
<tr>
<td>Silicone-free</td>
<td>Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)</td>
</tr>
<tr>
<td>Halogen-free</td>
<td>Following DIN EN 60754</td>
</tr>
<tr>
<td>UL/CSA</td>
<td>Style 1589 and 20236, 30 V, +80 °C</td>
</tr>
<tr>
<td>EAC</td>
<td>Certificate No. RU C-DE.ME77.B.01218 (TR ZU)</td>
</tr>
<tr>
<td>CTP</td>
<td>Certificate No. C-DE.PB49.B.00416 (Fire protection)</td>
</tr>
<tr>
<td>CEI</td>
<td>Following CEI 20-35</td>
</tr>
<tr>
<td>Lead-free</td>
<td>Following 2011/65/EC (RoHS-II)</td>
</tr>
<tr>
<td>Clean room</td>
<td>According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1 Following 2014/35/EU</td>
</tr>
</tbody>
</table>

## Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>Temperature, from/to [°F]</th>
<th>Torsion max. [°/m]</th>
<th>Torsion max. [°/m]</th>
<th>Torsion max. [°/m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 million</td>
<td>-13/+5</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td></td>
<td>+5/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td></td>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ▶️ www.chainflex.com/chainflexlife

## Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- robots, Handling, spindle drives
# Measuring System Cable | PUR | Chainflex® CFROBOT4

## igus® chainflex® CFROBOT4

Example image

<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max.</th>
<th>Copper index</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[mm²]</td>
<td>[in.]</td>
<td>lbs/mft</td>
<td>[kg/km]</td>
</tr>
<tr>
<td>CFROBOT4-001</td>
<td>26</td>
<td>3 STP x 0.14</td>
<td>0.41</td>
<td>41.7</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>2 x 0.14</td>
<td>10.5</td>
<td>77.3</td>
<td>115</td>
</tr>
<tr>
<td>CFROBOT4-006</td>
<td>26</td>
<td>3 STP x 0.14</td>
<td>0.45</td>
<td>49.7</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>4 x 0.22</td>
<td>11.5</td>
<td>92.7</td>
<td>138</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>2 C x 0.5</td>
<td>4.5</td>
<td>92.7</td>
<td>138</td>
</tr>
<tr>
<td>CFROBOT4-009</td>
<td>24</td>
<td>4 PR x 0.25</td>
<td>0.37</td>
<td>32.3</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>2 x 0.5</td>
<td>9.5</td>
<td>60.5</td>
<td>90</td>
</tr>
<tr>
<td>CFROBOT4-015</td>
<td>26</td>
<td>4 PR x 0.14</td>
<td>0.35</td>
<td>32.9</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>4 x 0.5</td>
<td>9.0</td>
<td>62.5</td>
<td>93</td>
</tr>
<tr>
<td>CFROBOT4-028</td>
<td>24</td>
<td>4 PR x 0.20</td>
<td>0.30</td>
<td>29.6</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>2 x 0.38</td>
<td>7.5</td>
<td>48.4</td>
<td>72</td>
</tr>
</tbody>
</table>

13) Color outer jacket: Yellow-green (RAL 6018)

Note: The given outer diameters are maximum values.

G = with green-yellow earth core x = without earth core

<table>
<thead>
<tr>
<th>STP</th>
<th>Individually shielded Twisted Pair</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR</td>
<td>Twisted Pair</td>
</tr>
<tr>
<td>SC</td>
<td>Individually shielded Conductor</td>
</tr>
<tr>
<td>SHLD</td>
<td>Shielded Precable</td>
</tr>
</tbody>
</table>
# Class 6.1.3.3

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Core group</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT4-001</td>
<td>3x(2x0.14)C, 4x0.14, 2x0.5</td>
<td>green/yellow, black/brown, red/orange, gray/blue/white-yellow/white-black, brown-red/brown-blue</td>
</tr>
<tr>
<td>CFROBOT4-006</td>
<td>3x(2x0.14)C, (4x0.14), (4x0.22), (2x0.5)</td>
<td>green/yellow, black/brown, red/orange, gray/blue/white-yellow/white-black, brown-yellow/brown-gray/green-black/green-red, brown-red/brown-blue</td>
</tr>
<tr>
<td>CFROBOT4-009</td>
<td>4x(2x0.25), 2x0.5</td>
<td>brown/green, blue/violet, gray/pink, red/black, white, brown</td>
</tr>
<tr>
<td>CFROBOT4-015</td>
<td>4x(2x0.14), 4x0.5</td>
<td>brown/green, yellow/violet, gray/pink, red/black, blue, white, brown-green, white-green</td>
</tr>
<tr>
<td>CFROBOT4-028</td>
<td>2x(2x0.20), (2x0.38)</td>
<td>green/yellow, pink/blue, red/black</td>
</tr>
</tbody>
</table>

**Order example:** CFROBOT4-009 – To your desired length

CFROBOT4 Chainflex® series -009 Code measuring system type

Online order ▶ www.chainflex.com/CFROBOT4

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.
Fiber optic cable | TPE | Chainflex® CFROBOT5

- **For torsion applications**
- **TPE outer jacket**
- **Oil and bio-oil resistant**
- **UV-resistant**
- **Low-temperature-flexibility**
- **Hydrolysis and microbe-resistant**
- **PVC and halogen-free**

**Dynamic Information**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bend radius</td>
<td>E-Chain® twisted: min. 10 x d</td>
</tr>
<tr>
<td></td>
<td>flexible: min. 8 x d</td>
</tr>
<tr>
<td></td>
<td>fixed: min. 5 x d</td>
</tr>
<tr>
<td>Temperature</td>
<td>E-Chain® twisted: -31 °F to +176 °F (-35 °C to +80 °C)</td>
</tr>
<tr>
<td></td>
<td>flexible: -58 °F to +176 °F (-50 °C to +80 °C)</td>
</tr>
<tr>
<td></td>
<td>fixed: -67 °F to +176 °F (-55 °C to +80 °C)</td>
</tr>
<tr>
<td>v max.</td>
<td>twisted: 180 °/s</td>
</tr>
<tr>
<td>a max.</td>
<td>twisted: 60 °/s²</td>
</tr>
<tr>
<td>Travel distance</td>
<td>Robots and multi-axis movements, Class 1</td>
</tr>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281 ft (1m) cable length, Class 3</td>
</tr>
</tbody>
</table>

**Cable structure**

- **Fibers**: 50/125 μm, 62.5/125 μm special fixed fiber elements with aramid strain relief
- **Conductor construction**: Optical Fibers cabled with high-tensile aramid dampers around a central reinforced filler element.
- **Color code**: ▶ See P/N Table
- **Outer jacket**: Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in E-Chains®. Color: Jet black (similar to RAL 9005)

**Properties and approvals**

- **UV resistance**: High
- **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
- **Lead-free**: Following 2011/65/EC (RoHS-II)
- **Clean room**: 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. Following 2014/35/EU

**Configurators** ▶ www.igus.com/CFROBOT5
Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, from/to [°F]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
</tr>
<tr>
<td>-31/-13</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>-13/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ► www.chainflex.com/chainflexlife

Typical application areas
- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- robots, Handling

Part No. | Fiber Count | Number of fibers/Fiber diameter/Conductor nominal cross section | Outer diameter max. [in.] [mm] | Weight [lbs/mft] [kg/km]
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT5-500</td>
<td>2</td>
<td>2x62.5/125</td>
<td>0.33</td>
<td>8.5</td>
</tr>
<tr>
<td>CFROBOT5-501</td>
<td>2</td>
<td>2x50/125</td>
<td>0.33</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Part No. | Bandwidth [MHz x km] @ 850 nm | Bandwidth [MHz x km] @ 1300 nm | Attenuation [dB/km] @ 850 nm | Attenuation [dB/km] @ 1300 nm | Fiber identification |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT5-500</td>
<td>≥ 200</td>
<td>≥ 500</td>
<td>≤ 3.0</td>
<td>≤ 0.7</td>
<td>orange with white numbers</td>
</tr>
<tr>
<td>CFROBOT5-501</td>
<td>≥ 500</td>
<td>≥ 500</td>
<td>≤ 2.5</td>
<td>≤ 0.7</td>
<td>blue with white numbers</td>
</tr>
</tbody>
</table>

Note: The given outer diameters are maximum values. G = with green-yellow earth core x = without earth core

Order example: CFROBOT5.501 – To your desired length
CFROBOT5 Chainflex® series -501 Code Type of fibres

Online order ► www.chainflex.com/CFROBOT5

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.
Motor cable | PUR | Chainflex® CFROBOT6

- For torsion applications
- PUR outer jacket
- Oil resistant and coolant-resistant
- Flame retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic Information

<table>
<thead>
<tr>
<th>Bend radius</th>
<th>E-Chain® twisted</th>
<th>min. 10 x d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>flexible</td>
<td>min. 8 x d</td>
</tr>
<tr>
<td></td>
<td>fixed</td>
<td>min. 5 x d</td>
</tr>
<tr>
<td>Temperature</td>
<td>E-Chain® twisted</td>
<td>-13 °F to +176 °F (-25 °C to +80 °C)</td>
</tr>
<tr>
<td></td>
<td>flexible</td>
<td>-40 °F to +176 °F (-40 °C to +80 °C)</td>
</tr>
<tr>
<td></td>
<td>fixed</td>
<td>-58 °F to +176 °F (-50 °C to +80 °C)</td>
</tr>
<tr>
<td>v max.</td>
<td>twisted</td>
<td>180 °/s</td>
</tr>
<tr>
<td>a max.</td>
<td>twisted</td>
<td>60 °/s²</td>
</tr>
<tr>
<td>Travel distance</td>
<td>Robots and multi-axis movements, Class 1</td>
<td></td>
</tr>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281ft (1m) cable length, Class 3</td>
<td></td>
</tr>
</tbody>
</table>

Cable structure

- Conductors: Conductor consisting of bare copper wires (according to DIN EN 60228).
- Conductor insulation: Mechanically high-quality TPE mixture.
- Color code: Black with white numbers 1-2, one conductor green-yellow.
- Outer jacket: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Dark blue (similar to RAL 5011)

Electrical Information

- Nominal voltage: 1000 V
- Test voltage: 4000 V (following DIN EN 50395)

Properties and approvals

- UV resistance: High
- Oil resistance: Oil-resistant (following DIN EN 50363-10-2), Class 3
- Flame resistance: 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)

Configurators: www.igus.com/CFROBOT6
Halogen-free
Following DIN EN 60754

UL/CSA
Style 10492 and 21223, 1000 V, +80 °C

NFPA 79
Complies to NFPA 79-2018 chapter 12.9.

EAC
Certificate No. RU 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 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
Following 2014/35/EU

Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, from/to [°F]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
</tr>
<tr>
<td>-13/+5</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>+5/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ➤ www.chainflex.com/chainflexlife

Typical application areas
- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- robots, Handling, spindle drives

<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max. [mm]</th>
<th>Copper index</th>
<th>Weight [lbs/mft]</th>
<th>[kg/km]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT6-100-03</td>
<td>8</td>
<td>G 10.0</td>
<td>0.61</td>
<td>15.5</td>
<td>199.6</td>
<td>297</td>
</tr>
<tr>
<td>CFROBOT6-160-03</td>
<td>6</td>
<td>G 16.0</td>
<td>0.71</td>
<td>18.0</td>
<td>319.2</td>
<td>475</td>
</tr>
<tr>
<td>CFROBOT6-250-03</td>
<td>4</td>
<td>G 25.0</td>
<td>1.00</td>
<td>25.5</td>
<td>495.2</td>
<td>737</td>
</tr>
</tbody>
</table>

Note: The given outer diameters are maximum values.
G = with green-yellow earth core x = without earth core
Motor cable | PUR | Chainflex® CFROBOT7

10,000,000 Cycles guaranteed
±180°/3.28 ft Torsion E-Chain®
3D movements Travel distance E-Chain®

- For torsion applications
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant
- Flame retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant
- Variable Frequency Drives

Dynamic Information

- **Bend radius**
  - E-Chain® twisted: min. 10 x d
  - flexible: min. 8 x d
  - fixed: min. 5 x d

- **Temperature**
  - E-Chain® twisted: -13 °F to +176 °F (-25 °C to +80 °C)
  - flexible: -40 °F to +176 °F (-40 °C to +80 °C)
  - fixed: -58 °F to +176 °F (-50 °C to +80 °C)

- **v max.**
  - twisted: 180 °/s

- **a max.**
  - twisted: 60 °/s²

- **Travel distance**
  - Robots and multi-axis movements, Class 1

- **Torsion**
  - ± 180°, with 3.281ft (1m) cable length, Class 3

Cable structure

- **Conductors**
  - Conductor consisting of bare copper wires (according to DIN EN 60228).

- **Conductor insulation**
  - Mechanically high-quality TPE mixture.

- **Color code**
  - Power conductors: Black with white numbers, one conductor green-yellow.
  - 2 Control pairs: Black with white numbers. Control Pair 1: Printed 5 and 6
  - Control Pair 2: Printed 7 and 8
  - 4 Control pairs: Color code in accordance with DIN 47100

- **Overall shield**
  - Extremely torsion-resistant tinned braided copper shield.
  - 85 % optical coverage

- **Outer jacket**
  - Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2).
  - Color: Dark blue (similar to RAL 5011)

Electrical Information

- **Nominal voltage**
  - 1000 V

- **Test voltage**
  - 4000 V (following DIN EN 50395)

Configurators ▶️ www.igus.com/CFROBOT7
Properties and approvals

UV resistance
High

Oil resistance
Oil-resistant (following DIN EN 50363-10-2), Class 3

Flame resistance
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)

Halogen-free
Following DIN EN 60754

UL/CSA
Style 10492 and 21223, 1000 V, +80 °C

NFPA 79
Complies to NFPA 79-2018 chapter 12.9.

EAC
Certificate No. RU 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 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1

CE
Following 2014/35/EU

Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Torsion max. °/m</td>
<td>Torsion max. °/m</td>
<td>Torsion max. °/m</td>
</tr>
<tr>
<td>-13/+5</td>
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<td>±90</td>
<td>±30</td>
</tr>
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<td>+5/+158</td>
<td>±180</td>
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<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ► www.chainflex.com/chainflexlife

Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- robots, Handling, spindle drives
### igus® chainflex® CFROBOT7

**Motor cable | PUR | Chainflex® CFROBOT7**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max.</th>
<th>Copper index</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[mm²] [in.]</td>
<td>[mm]</td>
<td>[lbs/mft]</td>
<td>[kg/km]</td>
</tr>
<tr>
<td><strong>without control pair</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT7-15-03-C</td>
<td>16</td>
<td>3 G 1.5</td>
<td>0.33</td>
<td>8.5</td>
<td>40.3</td>
</tr>
<tr>
<td>CFROBOT7-15-04-C</td>
<td>16</td>
<td>4 G 1.5</td>
<td>0.35</td>
<td>9.0</td>
<td>51.7</td>
</tr>
<tr>
<td>CFROBOT7-25-03-C</td>
<td>14</td>
<td>3 G 2.5</td>
<td>0.39</td>
<td>10.0</td>
<td>62.5</td>
</tr>
<tr>
<td>CFROBOT7-25-04-C</td>
<td>14</td>
<td>4 G 2.5</td>
<td>0.41</td>
<td>10.5</td>
<td>80.0</td>
</tr>
<tr>
<td>CFROBOT7-60-04-C</td>
<td>10</td>
<td>4 G 6.0</td>
<td>0.59</td>
<td>15.0</td>
<td>186.8</td>
</tr>
<tr>
<td><strong>2 Control pairs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT7-15-02-02-C</td>
<td>16</td>
<td>4 G 1.5</td>
<td>0.65</td>
<td>16.5</td>
<td>132.4</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>2 PR x 1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT7-25-02-02-C</td>
<td>14</td>
<td>4 G 2.5</td>
<td>0.65</td>
<td>16.5</td>
<td>163.3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>2 PR x 1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4 Control pairs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT7-40-02-04-C</td>
<td>12</td>
<td>4 G 4.0</td>
<td>0.67</td>
<td>17.0</td>
<td>170.0</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>4 PR x 0.25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The given outer diameters are maximum values.

G = with green-yellow earth core  x = without earth core
Class 6.1.3.3

Order example: CFROBOT7-15-03-C – To your desired length
CFROBOT7 Chainflex® series -15 Code nominal cross section -03 Number of conductors

Online order ► www.chainflex.com/CFROBOT7

Delivery time 24hrs or today.
Delivery time means time until goods are shipped.
Chainflex® CFROBOT

- For torsion applications
- TPE outer jacket
- Shielded
- Oil and bio-oil resistant
- PVC-free

- UV-resistant
- Flame retardant
- Hydrolysis and microbe-resistant
- Variable Frequency Drives

**Dynamic Information**

<table>
<thead>
<tr>
<th>Bend radius</th>
<th>E-Chain® twisted</th>
<th>min. 10 x d</th>
</tr>
</thead>
<tbody>
<tr>
<td>flexible</td>
<td>min. 8 x d</td>
<td></td>
</tr>
<tr>
<td>fixed</td>
<td>min. 5 x d</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th>E-Chain® twisted</th>
<th>-31 °F to +194 °F (-35 °C to +90 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>flexible</td>
<td>-49 °F to +212 °F (-45 °C to +100 °C)</td>
<td></td>
</tr>
<tr>
<td>fixed</td>
<td>-58 °F to +212 °F (-50 °C to +100 °C)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>v max.</th>
<th>twisted</th>
<th>180 °/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>a max.</td>
<td>twisted</td>
<td>60 °/s²</td>
</tr>
</tbody>
</table>

**Travel distance**

- Robots and multi-axis movements, Class 1
- ± 180°, with 3.28ft (1m) cable length, Class 3

**Cable structure**

- Conductors: Conductor consisting of bare copper wires (according to EN 60228).
- Conductor insulation: Mechanically high-quality TPE mixture.
- Overall shield: Extremely torsion-resistant tinned braided copper shield. 90 % optical coverage
- Outer jacket: Low-adhesion mixture on the basis of TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in E-Chains®. Color: Jet black (similar to RAL 9005)

**Electrical Information**

- Nominal voltage: 1000 V
- Test voltage: 4000 V (following DIN EN 50395)

**Example image**

Configurators ➤ www.igus.com/CFROBOT
**Properties and approvals**

- **UV resistance**: High
- **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
- **Flame resistance**: 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 10258 and 21387, 1000 V, +90 °C
- **NFPA 79**: Complies to NFPA 79-2018 chapter 12.9.
- **EAC**: Certificate No. RU 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 1. The outer jacket material of this series complies with CF34.UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1. Following 2014/35/EU

**Guaranteed service life (details see page 22-23)**

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, from/to [°F]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
</tr>
<tr>
<td>-31/-13</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>-13/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ➤ www.chainflex.com/chainflexlife

**Typical application areas**

- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- robots, Handling, spindle drives

<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max. [mm]</th>
<th>Copper index</th>
<th>Weight [lbs/mft]</th>
<th>Weight [kg/km]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT-035</td>
<td>8</td>
<td>1 x 10.0</td>
<td>0.41</td>
<td>10.5</td>
<td>84.0</td>
<td>125</td>
</tr>
<tr>
<td>CFROBOT-036</td>
<td>6</td>
<td>1 x 16.0</td>
<td>0.47</td>
<td>12.0</td>
<td>127.0</td>
<td>189</td>
</tr>
<tr>
<td>CFROBOT-037</td>
<td>4</td>
<td>1 x 25.0</td>
<td>0.57</td>
<td>14.5</td>
<td>200.2</td>
<td>298</td>
</tr>
<tr>
<td>CFROBOT-038</td>
<td>2</td>
<td>1 x 35.0</td>
<td>0.61</td>
<td>15.5</td>
<td>270.8</td>
<td>403</td>
</tr>
</tbody>
</table>

Note: The given outer diameters are maximum values. G = with green-yellow earth core  x = without earth core

36 month guarantee ... 1,354 types from stock ... no cutting charges
Bus cable | PUR | Chainflex® CFROBOT8

- For torsion applications
- PUR outer jacket
- Shielded
- Oil resistant and coolant-resistant

- Flame retardant
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic Information

<table>
<thead>
<tr>
<th>Dynamic Information</th>
<th>E-Chain® twisted</th>
<th>E-Chain® flexible</th>
<th>E-Chain® fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bend radius</td>
<td>min. 10 x d</td>
<td>min. 8 x d</td>
<td>min. 5 x d</td>
</tr>
<tr>
<td>Temperature</td>
<td>-13 °F to +158 °F (-25 °C to +70 °C)</td>
<td>-40 °F to +158 °F (-40 °C to +70 °C)</td>
<td>-58 °F to +158 °F (-50 °C to +70 °C)</td>
</tr>
<tr>
<td>v max.</td>
<td>180 °/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a max.</td>
<td>twisted</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 °/s²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel distance</td>
<td>Robots and multi-axis movements, Class 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281ft (1m) cable length, Class 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cable structure

- Conductors: Conductor consisting of bare copper wires (according to DIN EN 60228).
- Conductor insulation: According to bus specification.
- Conductor construction: According to bus specification.
- Color code: According to bus specification. ► See P/N Table
- Intermediate layer: Foil taping over the outer layer.
- Overall shield: Torsion resistant tinned braided copper shield. 80 % optical coverage
- Outer jacket: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Dark blue (similar to RAL 5011)

Electrical Information

- Nominal voltage: 30 V
- Test voltage: 500 V

Configurators ► www.igus.com/CFROBOT8
Properties and approvals

- **UV resistance**: High
- **Oil resistance**: Oil-resistant (following DIN EN 50363-10-2), Class 3
- **Flame resistance**: According to IEC 60332-1-2, CEI 20-35, FT1
- **Silicone-free**: Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
- **UL/CSA**: Style 1589 and 20236, 30 V, +80 °C
- **EAC**: Certificate No. RU C-DE.ME77.B.01218 (TR ZU)
- **CTP**: Certificate No. C-DE.PB49.B.00416 (Fire protection)
- **CEI**: Following CEI 20-35
- **Lead-free**: Following 2011/65/EC (RoHS-II)
- **Clean room**: According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
  - **CE**: Following 2014/35/EU

**Guaranteed service life (details see page 22-23)**

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature, from/to [°F]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
<td>Torsion max. [°/m]</td>
</tr>
<tr>
<td>-13/+5</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>+5/+140</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+140/+158</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation [www.chainflex.com/chainflexlife](http://www.chainflex.com/chainflexlife)

**Typical application areas**

- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, also with bio-oils, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives
### Bus cable | PUR | Chainflex® CFROBOT8

<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max.</th>
<th>Copper index</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[mm²]</td>
<td>[in.²]</td>
<td>[mm]</td>
<td>lbs/mft</td>
</tr>
<tr>
<td>Profibus (1x2x0.64 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-001</td>
<td>22</td>
<td>1 PR x 0.35</td>
<td>0.31</td>
<td>8.0</td>
<td>18.1</td>
</tr>
<tr>
<td>CAN-Bus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-022</td>
<td>20</td>
<td>2 PR x 0.5</td>
<td>0.30</td>
<td>7.5</td>
<td>27.6</td>
</tr>
<tr>
<td>DeviceNet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-030</td>
<td>24</td>
<td>1 PR x 24AWG</td>
<td>0.37</td>
<td>9.5</td>
<td>19.5</td>
</tr>
<tr>
<td>Ethernet/CAT5e</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-045</td>
<td>26</td>
<td>4 STP x 0.14</td>
<td>0.37</td>
<td>9.5</td>
<td>32.3</td>
</tr>
<tr>
<td>Ethernet/CAT6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-049</td>
<td>26</td>
<td>4 STP x 0.14</td>
<td>0.37</td>
<td>9.5</td>
<td>32.9</td>
</tr>
<tr>
<td>Ethernet/CAT6A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-050</td>
<td>26</td>
<td>4 STP x 0.15</td>
<td>0.41</td>
<td>10.5</td>
<td>34.3</td>
</tr>
<tr>
<td>Ethernet/CAT7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-052</td>
<td>26</td>
<td>4 STP x 0.15</td>
<td>0.41</td>
<td>10.5</td>
<td>34.9</td>
</tr>
<tr>
<td>Profinet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8-060</td>
<td>22</td>
<td>2 PR x 0.34</td>
<td>0.33</td>
<td>8.5</td>
<td>22.8</td>
</tr>
</tbody>
</table>

**Note:** The given outer diameters are maximum values.

- **G** = with green-yellow earth core
- **x** = without earth core
- **STP** = Individually shielded Twisted Pair
- **PR** = Twisted Pair
- **SC** = Individually shielded Conductor
- **SHLD** = Shielded Precable

**Order example:** CFROBOT8-052 – To your desired length

**CFROBOT8** Chainflex® series -052 Code Bus type

**Online order** ➤ [www.chainflex.com/CFROBOT8](http://www.chainflex.com/CFROBOT8)

**Delivery time 24hrs or today.**

Delivery time means time until goods are shipped.
<table>
<thead>
<tr>
<th>Part No.</th>
<th>Characteristic Impedance [Ω]</th>
<th>Core group</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT8-001</td>
<td>150</td>
<td>(2x0.35)C</td>
<td>red, green</td>
</tr>
<tr>
<td>CFROBOT8-022</td>
<td>120</td>
<td>(4x0.5)C</td>
<td>white, green, brown, yellow (Star-quad)</td>
</tr>
<tr>
<td>CFROBOT8-030</td>
<td>120</td>
<td>(2xAWG24)C</td>
<td>white/blue, red, black</td>
</tr>
<tr>
<td>CFROBOT8-045</td>
<td>100</td>
<td>4x(2x0.14)C</td>
<td>white-green/green, white-orange/orange, white-blue/blue, white-brown/brown</td>
</tr>
<tr>
<td>CFROBOT8-049</td>
<td>100</td>
<td>4x(2x0.14)C</td>
<td>white-green/green, white-orange/orange, white-blue/blue, white-brown/brown</td>
</tr>
<tr>
<td>CFROBOT8-050</td>
<td>100</td>
<td>4x(2x0.15)C</td>
<td>white-green/green, white-orange/orange, white-blue/blue, white-brown/brown</td>
</tr>
<tr>
<td>CFROBOT8-052</td>
<td>100</td>
<td>4x(2x0.15)C</td>
<td>white-green/green, white-orange/orange, white-blue/blue, white-brown/brown</td>
</tr>
<tr>
<td>CFROBOT8-060</td>
<td>100</td>
<td>(2x0x.34)C</td>
<td>white/blue, yellow/orange</td>
</tr>
</tbody>
</table>

**Technical note on bus cables**

Chainflex® bus cables have been specially developed and tested for continuously moving use in e-chains®. Depending on the material used for the outer jacket and on the underlying construction principle, the bus cables are designed for different mechanical requirements and resistance to different media. The cables have been electrically designed in such a way that, on the one hand, the electrical requirements of the respective bus specification are reliably met and, on the other, there is a high degree of EMC reliability. It is also ensured that the electrical values remain stable over the long term in spite of constant movement. The overall quality of transmission in a complete bus communication system, however, is not solely dependent on the cable used. What is also essential is that all components (electronic parts, connecting system and cable) are precisely matched to each other and that the maximum transmission lengths, which are dependent on the respective system, are adhered to with regard to the data transmission rates needed. A cable is thus not solely responsible for the reliable transmission of signals. igus® advises you when you are designing your bus system to take all these factors into account and, with its extensive tests, helps you to ensure the process reliability of your system from the very beginning.
Hybrid cable | PUR | Chainflex® CFROBOT9

- For torsion applications
- PUR outer jacket
- Unshielded/shielded
- Oil resistant and coolant-resistant
- Flame retardant
- PVC and halogen-free
- Notch-resistant
- Hydrolysis and microbe-resistant

Dynamic Information

<table>
<thead>
<tr>
<th>Dynamic Parameter</th>
<th>E-Chain® twisted</th>
<th>E-Chain® flexible</th>
<th>E-Chain® fixed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bend radius</td>
<td>min. 10 x d</td>
<td>min. 8 x d</td>
<td>min. 5 x d</td>
</tr>
<tr>
<td>Temperature</td>
<td>-13 °F to +176 °F</td>
<td>-40 °F to +176 °F</td>
<td>-58 °F to +176 °F</td>
</tr>
<tr>
<td>v max.</td>
<td>twisted 180 °/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a max.</td>
<td>twisted 60 °/s²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel distance</td>
<td>Robots and multi-axis movements, Class 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torsion</td>
<td>± 180°, with 3.281ft (1m) cable length, Class 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cable structure

- Conductors: Conductor consisting of bare copper wires (according to DIN EN 60228).
- Conductor insulation: Mechanically high-quality TPE mixture.
- Color code: See P/N Table
- Element shield: Extremely torsion-resistant tinned braided copper shield.
- Outer jacket: Low-adhesion, highly abrasion-resistant mixture on the basis of PUR, adapted to suit the requirements in E-Chains® (following DIN EN 50363-10-2). Color: Dark blue (similar to RAL 5011)

Electrical Information

- Nominal voltage: 300 V
- Test voltage: 2000 V (following DIN EN 50395)

Configurators: www.igus.com/CFROBOT9
Properties and approvals

- **UV resistance**: High
- **Oil resistance**: Oil-resistant (following DIN EN 50363-10-2), Class 3
- **Flame resistance**: 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)
- **Halogen-free**: Following DIN EN 60754
- **UL/CSA**:
  - **17 AWG**: Style 10467 and 20317, 300 V, +80 °C
  - **24 AWG**: Style 10493 and 20317, 300 V, +80 °C
- **NFPA 79**: Complies to NFPA 79-2018 chapter 12.9.
- **EAC**: Certificate No. RU C-DE.ME77.B.01254 (TR ZU)
- **CTP**: Certificate No. C-DE.PB49.B.00416 (Fire protection)
- **CEI**: Following CEI 20-35
- **Lead-free**: Following 2011/65/EC (RoHS-II)
- **Clean room**: According to ISO Class 1. The outer jacket material of this series complies with CF27.07.05.02.01.D - tested by IPA according to standard DIN EN ISO 14644-1
- **CE**: Following 2014/35/EU

### Guaranteed service life (details see page 22-23)

<table>
<thead>
<tr>
<th>Cycles*</th>
<th>5 million</th>
<th>7.5 million</th>
<th>10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature, from/to [°F]</strong></td>
<td><strong>Torsion max. [°/m]</strong></td>
<td><strong>Torsion max. [°/m]</strong></td>
<td><strong>Torsion max. [°/m]</strong></td>
</tr>
<tr>
<td>-13/+5</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>+5/+158</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+158/+176</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Higher number of cycles? Online lifetime calculation ▶ www.chainflex.com/chainflexlife

### Typical application areas

- For maximum mechanical load requirements with torsional movements, Class 6
- Robots and multi-axis movements, Class 1
- Almost unlimited resistance to oil, Class 3
- Torsion ± 180°, with 1 m cable length, Class 3
- Indoor and outdoor applications, UV-resistant
- Robots, Handling, spindle drives
### Hybrid cable | PUR | Chainflex® CFROBOT9

**igus® chainflex® CFROBOT9**

Example image

<table>
<thead>
<tr>
<th>Part No.</th>
<th>AWG</th>
<th>Number of Conductors and rated cross section</th>
<th>Outer diameter max.</th>
<th>Copper index</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[mm²]</td>
<td>[in.]</td>
<td>[mm]</td>
<td>lbs/mft</td>
</tr>
<tr>
<td>CFROBOT9-001</td>
<td>17</td>
<td>5 G 1.0</td>
<td>0.41</td>
<td>10.5</td>
<td>54.4</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>2 x 1.0 SHLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT9-004</td>
<td>17</td>
<td>16 G 1.0</td>
<td>0.63</td>
<td>16.0</td>
<td>130.4</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>2 x 1.0 SHLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT9-005</td>
<td>17</td>
<td>23 G 1.0</td>
<td>0.77</td>
<td>19.5</td>
<td>180.1</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>2 x 1.0 SHLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT9-006</td>
<td>17</td>
<td>24 G 1.0</td>
<td>0.79</td>
<td>20.0</td>
<td>188.2</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>2 x 1.0 SHLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT9-007</td>
<td>24</td>
<td>15 STP x 0.25</td>
<td>0.73</td>
<td>18.5</td>
<td>153.9</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>2 PR x 0.25 SHLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT9-010</td>
<td>24</td>
<td>4 STP x 0.25</td>
<td>0.41</td>
<td>10.5</td>
<td>41.7</td>
</tr>
</tbody>
</table>

**Note:** The given outer diameters are maximum values.

G = with green-yellow earth core  x = without earth core
### Part No. - Core group - Color code

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Core group</th>
<th>Color code</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT9-001</td>
<td>5G1.0 (2x1.0)C</td>
<td>white with black numbers 1-4, one conductor green-yellow white with black numbers 5-6</td>
</tr>
<tr>
<td>CFROBOT9-004</td>
<td>16G1.0 (2x1.0)C</td>
<td>white with black numbers 1-4, 7-17, one conductor green-yellow white with black numbers 5-6</td>
</tr>
<tr>
<td>CFROBOT9-005</td>
<td>23G1.0 (2x1.0)C</td>
<td>white with black numbers 1-4, 7-24, one conductor green-yellow white with black numbers 5-6</td>
</tr>
<tr>
<td>CFROBOT9-006</td>
<td>24G1.0 (2x1.0)C</td>
<td>white with black numbers 1-4, 7-25, one conductor green-yellow white with black numbers 5-6</td>
</tr>
<tr>
<td>CFROBOT9-007</td>
<td>15x(2x0.25)C (4x0.25)C</td>
<td>Color code in accordance with DIN 47100. white/green/brown/yellow(CAN-Bus)</td>
</tr>
<tr>
<td>CFROBOT9-010</td>
<td>4x(2x0.25)C/C</td>
<td>white/brown, green/yellow, gray/pink, blue/red</td>
</tr>
</tbody>
</table>

igus® Chainflex® cables in triflex® R E-Chain® for 6-axis robots