PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

Overview

<table>
<thead>
<tr>
<th>Bus system</th>
<th>Profibus</th>
<th>CAN-Bus / Fieldbus</th>
<th>Ethernet (CAT 5e / GigE / PoE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part. No.</td>
<td>CFROBOT8.001</td>
<td>CFROBOT8.022</td>
<td>CFROBOT8.045</td>
</tr>
</tbody>
</table>

Example drawing

(see the chapter belonging to the bus system for details)

Bus system

<table>
<thead>
<tr>
<th>Profinet (Type C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part. No.</td>
</tr>
<tr>
<td>CFROBOT8.060</td>
</tr>
</tbody>
</table>

Example drawing

(see the chapter belonging to the bus system for details)

Core design:
Conductor: Stranded conductor in especially bending-stable version consisting of bare or tinned copper wires (following DIN EN 60228).
Core insulation: According to bus specification.
Core identification: According to bus specification.

Shield design:
Material: Torsion-stable braid made of tinned copper wires.
Shield coverage: Linear: approx. 55%  Optical: approx. 80%

Jacket design:
Outer jacket: Low-adhesion mixture on the basis of PUR (following DIN VDE 0281-10), highly abrasion- and bending-stable, adapted to suit the requirements in 3D - e-chains®:
- oil-resistant (following DIN EN 50363-10-2)
- coolant-resistant
- flame-retardant (following IEC 60332-1-2, CEI 20-35 & VW-1)
- hydrolysis- and microbe-resistant
- MUD-resistant (following NEK 606 - status 2009)
- silicon-free (following PV 3.10.7 - status 1992)
- lead-free (following 2011/65/EU (RoHS-II))
- clean room ISO class 1 (following DIN ISO 14644-1 tested by IPA)
- UV-resistance: High

Colour outer jacket: Steel blue (similar to RAL 5011)
Cable marking (White):
- Style -----  VW-1 90°C 300 V  CE  --- conform  RoHS-II conform
- www.igus.de  +++ chainflex cable works +++

*Length printing: Not calibrated. Only intended as an orientation aid.
*: Cable identification according to part no. (see technical table for details).
Ex.: CFROBOT8.001: ⇒ ...chainflex CFROBOT8.001 (2x0,35)C E...
*: Printing of the UL-Style (see chapter belonging to the cable).
Ex.: CFROBOT8.001: ⇒ ...Style 20963 VW-1 AWM III A8 80°C 30V FT-1...
*: Printing according to bus specification.
Ex.: CFROBOT8.001: ⇒ ...CE Profibus conform...
PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

General mechanical values:
(for individual details see technical table)

<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) [°C]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-25 / -15</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
<tr>
<td>-15 / +70</td>
<td>±180</td>
<td>±120</td>
<td>±60</td>
</tr>
<tr>
<td>+70 / +80</td>
<td>±150</td>
<td>±90</td>
<td>±30</td>
</tr>
</tbody>
</table>

* Maximum torsion area [°] related to 1 m cable length.
(Ex.: At ±180°/m with a 3m long cable, the moving end can twist max. ±540°)

Guaranteed lifetime for this series according to the "chainflex® guarantee club" conditions (see chainflex® catalogue and www.igus.eu/chainflex-guarantee)

Guidelines:
CE, EAC & TR (CTP)

General electrical values:
(for individual details see technical table and chapter belonging to the cable)
PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3):
shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

Dynamic values:
Max. speed for
3D - e-chain® use:** Twisted: \( v = 180 \, ^\circ / \, s \)
Max. acceleration for
3D - e-chain® use:** Twisted: \( a = 60 \, ^\circ / \, s^2 \)
Max. speed in
e-chain® use:** Unsupported: \( v = 10 \, m / \, s \)
Gliding (up to 10 m): \( v = 2 \, m / \, s \)
Max. acceleration in
e-chain® use:** \( a = 10 \, m / \, s^2 \)

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

Typical test setup for this cable group:

Torsion:
Test range T: \( \pm 180^\circ / \, m \)
3D - e-chain® length S: \( 1 \, m \)
Test period: min. 3 - 5 million cycles
Test speed: approx. 80 - 120 \(^\circ / \, s\)
Test acceleration: approx. 40 \(^\circ / \, s^2\)

Linear:
Test bending radius R: approx. 63 - 75 mm
Test travel S2: approx. 1 - 12 m
Test period (linear): min. 1,5 - 3 million double strokes
Test speed: approx. 0,5 \( m / \, s \)
Test acceleration: approx. 1,5 \( m / \, s^2 \)

3D-e-chain® - servo cable for maximum torsion load:
- highly abrasion-stable
- almost unlimited resistance to oil
- especially for torsion applications, but also for unsupported travel distances and up to 10 m in gliding applications
- UV-resistant
- CE, RoHS-II, UR, EAC & TR (CTP)

Typical application areas:
Indoor and outdoor applications.
Robots, handling, spindles drives.
PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

Technical tables:

**Mechanical values:**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Number of cores &amp; nominal cross section [mm²]</th>
<th>External diameter (d)*** [max. mm]</th>
<th>Copper index [kg / km]</th>
<th>Weight [kg / km]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profibus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8.001</td>
<td>(2x0,35)C</td>
<td>8,0</td>
<td>29</td>
<td>62</td>
</tr>
<tr>
<td>CAN-Bus / Fieldbus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8.022</td>
<td>(4x0,5)C****</td>
<td>7,0</td>
<td>43</td>
<td>72</td>
</tr>
<tr>
<td>Ethernet (CAT5e / GigE / PoE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8.045</td>
<td>4x(2x0,14)C</td>
<td>8,5</td>
<td>39</td>
<td>69</td>
</tr>
<tr>
<td>Profinet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFROBOT8.060</td>
<td>(2x(2x0,34))C</td>
<td>8,5</td>
<td>36</td>
<td>70</td>
</tr>
</tbody>
</table>

*** External diameters are maximum values and may tend toward lower tolerance limits.

**** Star quad design (see the chapter belonging to the cable for details).

**Electrical values:**

<table>
<thead>
<tr>
<th>Nominal cross section [mm²]</th>
<th>Conductor resistance [approx. Ω / km] at 20 °C</th>
<th>Max. current rating [A] at 30 °C*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(following)</td>
<td>DIN EN 50289-1-2</td>
<td>DIN VDE 0298-4</td>
</tr>
<tr>
<td>0.14</td>
<td>135</td>
<td>2.5</td>
</tr>
<tr>
<td>0.34</td>
<td>62</td>
<td>7</td>
</tr>
<tr>
<td>0.35</td>
<td>64</td>
<td>7</td>
</tr>
<tr>
<td>0.5</td>
<td>44</td>
<td>10</td>
</tr>
</tbody>
</table>

* The max. current rating depends on factors such as the individual environmental conditions and the type of installation.
PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

CFROBOT8.001 (Profibus)

Electrical values:
Nominal voltage: 50 V
Test voltage: 500 V
Certifications: U: (E310776: Style 1589 & 20963, 30 V / 80 °C)
Operating capacity: approx. 30 pF / m (at 1 kHz) following DIN EN 50289-1-5
Characteristic wave resistance: 150 ± 15 Ω (at 3 MHz to 20 MHz) following DIN EN 50289-1-11

Construction table:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Colour code</th>
<th>Cable construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT8.001</td>
<td>2x0.35</td>
<td>red, green</td>
</tr>
</tbody>
</table>

(Back to overview or technical table)
CFROBOT8

PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

CFROBOT8.022 (CAN-Bus / Fieldbus)

Electrical values:
- Nominal voltage: 50 V
- Test voltage: 500 V
- Certifications: Я: (E310776: Style 1589 & 20963, 30 V / 80 °C)
- Operating capacity: approx. 40 pF / m (at 1 kHz) following DIN EN 50289-1-5
- Characteristic wave resistance: 120 ± 12 Ω (at 0,425 MHz to 1 MHz) following DIN EN 50289-1-11

Construction table:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Colour code</th>
<th>Cable construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT8.022</td>
<td>4x0.5, white, green, brown, yellow (star-quad stranding)</td>
<td></td>
</tr>
</tbody>
</table>

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CFROBOT8

PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

CFROBOT8.045 (Ethernet (CAT5e / GigE / PoE))

Electrical values:
- Nominal voltage: 50 V
- Test voltage: 500 V
- Certifications: U: (E310776: Style 1589 & 20236, 30 V / 80 °C)
- Operating capacity: approx. 40 pF / m (at 1 kHz) following DIN EN 50289-1-5
- Characteristic wave resistance: 100 ± 15 Ω (at 1 MHz to 100 MHz) following DIN EN 50289-1-11

Construction table:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Colour code</th>
<th>Cable construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT8.045</td>
<td>4x(2x0.14)C</td>
<td>whitegreen/green, whiteorange/orange, whiteblue/blue, whitebrown/brown (According to EIA/TIA 568)</td>
</tr>
</tbody>
</table>

(Back to overview or technical table)
CFROBOT8

PUR - 3D - e-chain® - Bus cable for maximum torsion load requirements (class 6.7.3): shielded, oil- and coolant-resistant, hydrolysis- and microbe-resistant, notch-resistant as well as flame-retardant.

CFROBOT8.060 (Profinet (Type C))

Electrical values:
- Nominal voltage: 50 V
- Test voltage: 500 V
- Certifications: У: (E310776: Style 1589 & 20963, 30 V / 80 °C)
- Operating capacity: approx. 48 pF / m (at 1 kHz) following DIN EN 50289-1-5
- Characteristic wave resistance: 100 ± 5 Ω (at 100 MHz) following DIN EN 50289-1-11

Construction table:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Colour code</th>
<th>Cable construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFROBOT8.060</td>
<td>2x(2x0.34)</td>
<td>white/blue, yellow/orange</td>
</tr>
</tbody>
</table>

(Back to overview or technical table)