Fiber Optic Cables
Fiber Optic Cable Selection

Seamless communication between machines is becoming more and more complex every day. Finding the right cables for these types of applications is very important.

Many plant manufacturers and operators have EMC problem that occur sporadically or over time.

These problems are often based on conventional bus cables that either have insufficient or unreliable shielding.

Chainflex® bus cables are designed to prevent these problems and now Chainflex® Fiber Optic cables provide further advantages and safety benefits

Important fiber types:

- **Multi-mode fibers**
  - 50/125 µm
  - 62.5/125 µm
  The ideal fiber for large data volumes and longer transmission lengths in the field of automation. On account of the very low output attenuation (0.8-3 db/km per fiber and light wave length) of these fiber types, transmission lengths of several hundred meters can be realized quite easily.

- **POF (Plastic fibers)**
  - 980/1000 µm
  The ideal and low-cost fiber for short transmission paths. On account of the high output attenuation of the fiber type of 160-230 dB/km, lengths over 15 mm must be avoided in permanent-motion energy chains®.

- **PCF (Polymer Cladded fiber)**
  - 200/230 µm
  The ideal compromise for POF fiber. This plastic-coated quartz glass fiber is a viable alternative for many terminal devices that have been designed for POF. This means greater transmission lengths (100 m and more) are possible without the original POF terminal devices having to be replaced.

Chainflex® FOC cables offer the following advantages:

1. **Greater data security thanks to:**
   - FOC-typical better transmission characteristics
   - Greater possible transmission lengths of several 100 m
   - Greater possible data volumes thanks to lower attenuation values
   - Maximum EMC protection for the data transmitted
   - Future-proof installation (no cable replacement with new bus systems)

2. **Greater mechanical protection through:**
   - The FOC designed for permanent mechanical movement
   - The igus®-typical highly abrasion-proof and chemical resistant sheathing materials
   - The special Chainflex® design concept (tested at 30 million cycles without a significant increase in attenuation)

3. **Future-oriented cost reduction through:**
   - Bus-independent bus cable wiring
   - Longer service life in E-Chains®
   - Extendable without transmission limits

For further information see the test data on page 10.27
PUR Fiber Optic Cables

Chainflex® CFLG-2H
PUR Energy Chain® gradient glass fiber optic cable, UV-resistant, halogen-free, oil-resistant, metal-free

Construction
Fiber: 50/125 µm; 62.5/125 µm fibers in gel filled hollow cores
Core stranding: Tubes with one fiber in each are twisted with strain relief elements
Color code: Black fiber jackets with white printed numbers
Outer jacket: PUR-based blend, adapted to the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992  Color: Black

Technical Data
Minimum bending radius, moving: 12.5 outer cable diameter
Minimum bending radius, fixed: 7.5 x outer cable diameter
Permissible temperature, moving: -4°F to +140°F (-20°C to +60°C)
Permissible temperature, fixed: -13°F to +140°F (-25°C to +60°C)
UV Resistance: High
Oil Resistance: High

Typical Applications
• for high mechanical load requirements
• maximum EMI protection
• indoor and outdoor applications
• for unsupported and gliding travel up to 328 ft (100m) and more
• storage and retrieval units, machine tools, packaging machines, quick handling, cranes, refrigerating sector

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Fiber Count</th>
<th>Fiber Diameter</th>
<th>Outer Diameter µm (approx)</th>
<th>Weight (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>in. (mm)</td>
<td>lbs/mft (kg/km)</td>
</tr>
<tr>
<td>CFLG-2H-MF-50/125</td>
<td>2</td>
<td>50/125</td>
<td>.35 (9)</td>
<td>56 (85)</td>
</tr>
<tr>
<td>CFLG-2H-MF-62.5/125</td>
<td>2</td>
<td>62.5/125</td>
<td>.35 (9)</td>
<td>56 (85)</td>
</tr>
<tr>
<td>CFLG-2HS-MF-200/230</td>
<td>2</td>
<td>200/230</td>
<td>.35 (9)</td>
<td>56 (85)</td>
</tr>
</tbody>
</table>

NOTE: Other fiber counts available upon request
NOTE: The mentioned external diameters are maximum values.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Bandwidth with 850 nm (Mhz x km)</th>
<th>Attenuation with 850 nm (dB/km)</th>
<th>Bandwidth with 1300 nm (Mhz x km)</th>
<th>Attenuation with 1300 nm (dB/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFLG-2H-MF-50/125</td>
<td>200 - 600</td>
<td>2.5 - 3.5</td>
<td>600 - 1200</td>
<td>0.7 - 1.5</td>
</tr>
<tr>
<td>CFLG-2H-MF-62.5/125</td>
<td>160 - 200</td>
<td>3.2</td>
<td>200 - 500</td>
<td>0.9</td>
</tr>
<tr>
<td>CFLG-2HS-MF-200/230</td>
<td>20</td>
<td>6.0</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
**PUR Fiber Optic Cable**

**Chainflex® CFLK**

**PUR Energy Chain® polymer optic cable, oil-resistant**

**Construction**

**Polymer fiber:** Fiber diameter: 980/1000 µm; Numerical aperture, NA = 0.47

**Core:** PE insulation with stranded reinforcement

**Color:** Black

**Outer jacket:** PUR-based blend, adapted to the requirements of the Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992  
**Color:** violet

**Technical Data**

**Minimum bending radius, moving:** 12.5 outer cable diameter  
**Minimum bending radius, fixed:** 7.5 x outer cable diameter  
**Permissible temperature, moving:** -4°F to +158°F (-20°C to +70°C)  
**Permissible temperature, fixed:** -13°F to +158°F (-25°C to +70°C)  
**UV resistance:** Medium  
**Oil resistance:** High

**Typical Applications**

- for high mechanical load requirements  
- maximum EMI protection  
- preferably indoor applications  
- for unsupported and gliding travel up to 49 ft (15m) and more  
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Numbers of Fibers</th>
<th>Fiber Diameter (µm)</th>
<th>Outer Diameter (approx.)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFLK-L1-01</td>
<td>1</td>
<td>980/1000</td>
<td>.24 (6)</td>
<td>17.0 (25)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Bandwidth with 650 nm (Mhz x km)</th>
<th>Attenuation with 650 nm (dB/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFLK-L1-01</td>
<td>40</td>
<td>200</td>
</tr>
</tbody>
</table>

**No Minimum Order • No Cut Charges on up to 10 cuts of the same part number**
TPE Fiber Optic Cable (FOC)

Chainflex® CFLG-2LB

TPE Energy Chain® gradient glass fiber optic cable, UV-resistant, oil-resistant, metal-free, low temperature (-40°F)

Construction
- **Fiber**: 50/125 µm; 62.5/125 µm special fixed wire elements with aramid strain relief
- **Core stranding**: FOC wires stranded with high tensile aramide dampers with especially short pitch length
- **Color code**: Fibers blue with white numbers
- **Outer jacket**: TPE particularly abrasion-resistant, high-flex blend, oil-resistant, coolant resistant, adapted to suit the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992.
- **Color**: Black (RAL 9005)

Technical Data
- **Minimum bending radius, moving**: 5 x outer cable diameter
- **Minimum bending radius, fixed**: 5 x outer cable diameter
- **Permissible temperature, moving**: -40°F to +140°F (-40°C to +60°C)
- **Permissible temperature, fixed**: -40°F to +140°F (-40°C to +60°C)
- **UV Resistance**: High
- **Oil Resistance**: High

Typical Applications
- for maximum load requirements
- maximum EMC protection
- indoor and outdoor applications
- for unsupported and gliding travel up to 328 ft (100m) and more
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, semi-conductor insertion, refrigerating sector

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Fiber Count</th>
<th>Fiber Diameter</th>
<th>Outer Diameter µm (approx)</th>
<th>Weight (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in. (mm)</td>
<td>lbs/ft (kg/km)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CFLG-2LB-62.5/125</td>
<td>2</td>
<td>62.5/125</td>
<td>.33 (8.5)</td>
<td>31.5 (47)</td>
</tr>
<tr>
<td>CFLG-2LB-50/125</td>
<td>2</td>
<td>50/125</td>
<td>.33 (8.5)</td>
<td>31.5 (47)</td>
</tr>
</tbody>
</table>

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Bandwidth with 850 nm (Mhz x km)</th>
<th>Attenuation with 850 nm (dB/km)</th>
<th>Bandwidth with 1300 nm (Mhz x km)</th>
<th>Attenuation with 1300 nm (dB/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFLG-2LB-62.5/125-TC</td>
<td>160 - 200</td>
<td>3.2</td>
<td>200 - 500</td>
<td>0.9</td>
</tr>
<tr>
<td>CFLG-2LB-50/125</td>
<td>200-600</td>
<td>2.5 - 3.5</td>
<td>600 - 1200</td>
<td>0.7 - 1.5</td>
</tr>
</tbody>
</table>

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number
TPE Fiber Optic Cable

Chainflex® CFLG-G

TPE Energy Chain® gradient glass fiber optic cable, UV-resistant, halogen-free, oil-resistant, metal-free, low temperature (-40°C), hydrolysis resistant and microbe resistant

Construction
Fiber: 50/125 µm; 62.5/125 µm fibers in gel filled hollow cores
Core stranding: Strength rods with integrated torsion protection braid over gel-filled fiber sheath
Color code: 6 fiber — natural, yellow, green, red, violet, blue
  12 fiber — above colors and light blue, gray, brown, black, orange, pink
Outer jacket: TPE particularly abrasion-resistant, high-flex blend, oil-resistant, coolant resistant, adapted to suit the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992.
Color: Black (RAL 9005)

Technical Data
Minimum bending radius, moving: 15 x outer cable diameter
Minimum bending radius, fixed: 8.5 x outer cable diameter
Permissible temperature, moving: -40°F to +140°F (-40°C to +60°C)
Permissible temperature, fixed: -40°F to +140°F (-40°C to +60°C)
UV Resistance: High

Typical Applications
- for high mechanical load requirements
- maximum EMI protection
- indoor and outdoor applications
- for unsupported and gliding travel up to 1641 ft (500m) and more
- outdoor ship-to-shore, crane applications, conveyor technology

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Fiber Count</th>
<th>Fiber Diameter µm (approx) in.</th>
<th>Outer Diameter µm (approx) (nm)</th>
<th>Weight (approx.) lbs/m ft (kg/km)</th>
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<tbody>
<tr>
<td>CFLG-6G-62.5/125-TC</td>
<td>6</td>
<td>62.5/125</td>
<td>.45 (11.5)</td>
<td>75 (110)</td>
</tr>
<tr>
<td>CFLG-12G-62.5/125-TC</td>
<td>12</td>
<td>62.5/125</td>
<td>.45 (11.5)</td>
<td>75 (110)</td>
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<tr>
<td>CFLG-6G-50/125-TC</td>
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