ELIO® Fiber Optic Technology
EN4531, ABS1213, ABS1379, ARINC 801
Today's technology for Airborne & Military equipment is more and more complex, requiring the management of an increasing flow of information at greater speeds combined with the necessity to save weight.

In response to this need, SOURIAU offers a wide range of copper and fiber optic solutions for high speed networks in harsh environments.

Fiber optic is the best solution when high data-rate, EMI immunity and weight savings are required.

The ELIO® terminus can handle data speeds from several Mbit/s up to several Gbit/s thanks to its excellent optical performance in the most severe environments. Its unique user-friendly design and its versatility accounts for the selection of ELIO® by major customers in various markets for their fiber optic applications.
Typical applications

Civil Aeronautics

Ground Army

Military Aircraft

Rotary Wing

Railway and Industrial

Marine
Features & Benefits

Sealed Technology
IP67 without backshell.

Ruggedized Physical Contact
Flight proven A380.
Standardized worldwide (EN4531, Airbus qualified).
Withstanding the most severe vibration levels (A400M qualified).

Easy to Clean
Easy access to the end face of both male and female contacts:
- No risk to damage the sleeve when cleaning.
- No risk to capture dust inside the sleeve cavity.

Tool Free
Easy contact insertion with 1/4 turn bayonet.

Easy to Terminate
- Hermaphroditic terminus (same in receptacle and plug).
- ST®-like assembly process.
ELIO® Fiber Optic | Overview

Souriau ELIO® fiber optic

Aerospace standards
MIL-DTL-38999 / EN3645 / EN3646

Rectangular connectors
ARINC 600 / 809 / 404 & DOD

Railway
VGE1

Industrial
8XE

ELIO® contact can fit in many connector types

Standard #8 Quadrax cavity adaptor
- ELIO® contact can fit in any #8 Quadrax cavity
- Many optical/electrical hybrid layouts available
A complete optical solution

► Backshells: Souriau has developed a dedicated backshell range to ensure the best optical performance
► Harnesses and Patchcords: Souriau offers support from design through manufacturing
## ELIO® Fiber Optic Technology

### Product Series

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<td></td>
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<tr>
<td>Contact ordering information &amp; dimensions</td>
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</tr>
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</tr>
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<td>28</td>
</tr>
</tbody>
</table>
ELIO® Fiber Optic | Contacts

ELIO® contacts multimode & singlemode

- Robust spring-loaded butt-joint optical contact using ST style ferrule (diameter 2.5mm)
- Contact size equivalent to a #16 contact
- Anti-rotation of the contact for better vibration withstanding and optical performance
- Boot-grommet for rear sealing and protection of the cable against excessive bending
- Compatibility with loose and tight structure cables
- High level optical performance even after aging
- Bayonet locking system: no tool needed for mounting/dismounting
- Compatible with singlemode, multimode and POF cable

Technical features

Mechanical

- **Endurance:** Minimum 500 mating/unmating operations
- **Shock:** 300 g, 3 ms as per EN 2591-6402 method A
- **Vibration:** In MIL-DTL-38999 Series III/EN3645 connectors:
  - Sine 5Hz to 3000Hz as per EN2591-6403 method A
  - Random as per EN2591-6403 method B
- **Cable cyclic flexing:** 100 cycles, load 40N as per EN2591-609
- **Cable pulling:** 111N
- **Cable torsion:** 100 cycles, load 40N as per EN2591-611

Environmental

- **Salt spray:** See the connector standard
- **Temperature range:** -65°C to +125°C (1000 hours)

Optical

- **Multimode contact - Insertion Loss (IL):**
  - 0.1dB typical
  - < 0.3dB over 95% of the samples as per EN2591-601,
  - < 0.7dB maximum on 100% of the samples after tests
- **Multimode contact - Return Loss (RL):**
  - > 21dB before and after tests as per EN2591-605
- **Singlmode contact - Insertion Loss (IL):**
  - 0.3dB typical
  - < 0.5dB over 95% of the samples as per EN2591-601,
  - < 0.9dB maximum on 100% of the samples after tests
- **Singlmode contact - Return Loss (RL):**
  - > 55dB typical and > 50dB minimum

Resistance to fluids as per MIL-DTL-38999/EN3645 standard

- **Fuel:** JP5
- **Mineral Hydraulic fluid:** MIL-PRF-5606 (NATO H-515)
- **Synthetic hydraulic fluid:** AS1241 (Skydrol 500B4, LD4)
- **Mineral lubricant:** MIL-PRF-7870 (NATO O-142)
- **Synthetic lubricant:** MIL-PRF-23699 (NATO O-156),
  MIL-PRF-7808 (NATO O-148)
- **Cleaning fluid:** MIL-PRF-87937 diluted, Propanol,
  white spirit, Azeotrope R113 + Methanol
- **De-icing fluid:** AMS 1424 (NATO S-742)
- **Extinguishing fluid:** Chlorobromomethane
- **Cooling fluid:** Coolanol

* With multimode EN4641-100 cable and following the cabling process described in the “Technical Bulletin N°204 - ELIO® assembly wiring instructions” and the maintenance procedure in the document “Technical Bulletin N°170 - Fiber optics installation and maintenance procedure”.

EN4531
ABS1379
ARINC 801

Multimode contact
Singlemode contact
**ELIO® multimode contact**

**Ordering information**

<table>
<thead>
<tr>
<th></th>
<th>ELIO</th>
<th>09N</th>
<th>G</th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable external diameter &amp; Contact sealing:</strong></td>
<td>09N: 0.9±0.1mm. Non waterproof</td>
<td>18N: from 1.5mm to 1.9mm. Non waterproof</td>
<td>18W: 1.8±2.1mm. Waterproof</td>
<td>20N: from 1.7mm to 2.1mm. Non waterproof</td>
<td>20W: 2.0±2.1mm. Waterproof</td>
</tr>
<tr>
<td><strong>Fibre type:</strong></td>
<td>G: ELIO® Multimode fibre, 125 micrometers cladding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Boot type:</strong></td>
<td>L: Long boot</td>
<td>S: Short boot</td>
<td>N: No boot (non waterproof version only)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** For ABS1379/EN4531 cross reference, please consult us.

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**ELIO® contact dimensions**

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**Recommended cables**

SOURIAU can offer a wide range of cables in its assemblies, from low cost to high performance aeronautical cables. ELIO® contact is compatible with singlemode and multimode cable, with tactical and breakout cable. ELIO® contact is suitable with loose and tight structure cable.


**Note:** All dimensions are in millimeters (mm)
ELIO® Fiber Optic  Multimode Contact

MIL-DTL-38999
Series III/EN3645
ELIO® high density insert with multimode contact

- Standard MIL-DTL-38999/EN3645 shells without shielding ring (aluminum, composite, stainless steel, bronze)
- Environmental performance as per EN4531 based on MIL-DTL-38999/EN3645
- Temperature range: -65°C to +125°C (cable limitation)

Applications
- Fiber optic connector for all military and aeronautical applications wherever severe vibration or mechanical resistance are required:
  - Ground army,
  - Civil aircraft,
  - Marine,
  - Military aircraft,
  - Rotary wing

Layouts

Note: Layout 15-06 limited availability, please consult us.
## ELIO® high density insert with multimode contact

### Ordering information - Connectors delivered without contact

Composite, Aluminum & Stainless Steel

<table>
<thead>
<tr>
<th>Shell type:</th>
<th>8D</th>
<th>5</th>
<th>E</th>
<th>11</th>
<th>W</th>
<th>02</th>
<th>A</th>
<th>B</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>5: Plug</td>
<td>5</td>
<td>E</td>
<td>11</td>
<td>W</td>
<td>02</td>
<td>A</td>
<td>B</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Designation:

- E: ELIO® optical connector

### Shell size:

- 09 - 11 - 15 - 13 - 19 - 21 - 25

### Plating:

- **Aluminum:**
  - Z: Zinc nickel
  - ZC: Zinc cobalt
  - W: Olive green cadmium
  - F: Nickel

- **Composite:**
  - J: Olive green cadmium
  - M: Nickel
  - X: Without plating

- **Stainless steel:**
  - K: Passivated
  - S: Nickel

### Layouts: See previous page

### Insert type:

- A: Male insert
- B: Female insert with ceramic alignment sleeves

### Polarization:

- N, A, B, C, D, E

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### JVS Bronze

<table>
<thead>
<tr>
<th>Shell type:</th>
<th>JVS</th>
<th>E</th>
<th>6</th>
<th>A</th>
<th>11</th>
<th>02</th>
<th>A</th>
<th>B</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>6: Plug</td>
<td>6</td>
<td>E</td>
<td>A</td>
<td>11</td>
<td>02</td>
<td>A</td>
<td>B</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7: Receptacle with single hole jam nut fixing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Material:

- A: Bronze

### Shell size: 09 - 11 - 15 - 13 - 19 - 21 - 25

### Layouts: See previous page

### Insert type:

- A: Male insert
- B: Female insert with ceramic alignment sleeves

### Polarization: N, A, B, C, D, E

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### Dimensions

See pages 17 & 18.
Applications

- Fiber optic connector for all military and aeronautical applications wherever severe vibration or mechanical resistance are required.

**ELIO® AQ**
Adaptor for Quadrax #8 cavities

<table>
<thead>
<tr>
<th>Insert type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Insert</td>
<td>ELIOAQ6PB</td>
</tr>
<tr>
<td>Female Insert</td>
<td>ELIOAQ6SB</td>
</tr>
</tbody>
</table>

Delivered with alignment boot.

Ordering information

See SOURIAU «8D Series - MIL-DTL-38999 Series III» catalog.

Dimensions

See pages 17 & 18.

**MIL-DTL-38999**
Series III/EN3645
with ELIO® multimode contact and ELIO® AQ Adaptor for Quadrax #8 cavities

- ELIO® AQ is an adaptor to enable the ELIO® contact to fit in any #8 cavities
- Multiple possibilities to mix optical and electrical signals in the same insert
- Compatible with standard MIL-DTL-38999 Series III/EN3645 connectors (aluminum, composite, stainless steel, bronze)
- Design ensures ELIO® optical performance
- Environmental performance as per MIL-DTL-38999 and EN3645 standard
- Temperature range: -65°C to +150°C (cable limitation)
## Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>Receptacle</th>
<th>Shell size 09 to 19</th>
<th>Shell size 25</th>
<th>B</th>
<th>Shell size 09 to 19</th>
<th>Shell size 25</th>
<th>C</th>
<th>Shell size 09 to 19</th>
<th>Shell size 25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 0 &amp; 7</td>
<td></td>
<td></td>
<td></td>
<td>Type 0 &amp; 7</td>
<td></td>
<td></td>
<td>Type 0 &amp; 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metal</td>
<td>20.90 Max</td>
<td>20.10 Max</td>
<td></td>
<td>Metal</td>
<td>12.50 Max</td>
<td></td>
<td>Metal</td>
<td>13.00 Max</td>
</tr>
<tr>
<td></td>
<td>Composite</td>
<td>20.90 Max</td>
<td>20.10 Max</td>
<td></td>
<td>Composite</td>
<td>12.50 Max</td>
<td></td>
<td>Composite</td>
<td>13.00 Max</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Male insulator</td>
<td>4 Max</td>
<td></td>
<td></td>
<td>Female insulator</td>
<td>6.60 Max</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All dimensions are in millimeters (mm)
### Dimensions

**38999 Series III/EN3645 with ELIO® contacts in ELIO® high-density insert**

![Diagram of high-density insert with dimensions](image)

<table>
<thead>
<tr>
<th>ELIO® high density insert</th>
<th>ELIO® AQ adaptors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L</strong></td>
<td><strong>Contact length</strong></td>
</tr>
<tr>
<td></td>
<td>Male insulator</td>
</tr>
<tr>
<td>Plug</td>
<td></td>
</tr>
<tr>
<td>Square flange receptacle</td>
<td>4 Max</td>
</tr>
<tr>
<td>Jam nut receptacle</td>
<td>12 Max</td>
</tr>
</tbody>
</table>

**Total length example**

Square flange receptacle + plug + ELIO® contacts in ELIO® high-density insert

![Diagram of total length example](image)

*Unmated = C* + E* + L + 12 + R

*Mated = C* + D* + L + 12 + R + 5mm

* See previous page.

**Note:** All dimensions are in millimeters (mm)
Applications

• Fiber optic connector for all military and aeronautical applications wherever severe vibration or mechanical resistance are required.

ELIO® AQ
Adaptor for Quadrax #8 cavities

<table>
<thead>
<tr>
<th>Insert type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>ELIOAQQP (rear release - delivered with alignment boot)</td>
</tr>
<tr>
<td></td>
<td>ELIOAQ1P (front release)</td>
</tr>
<tr>
<td>Female</td>
<td>ELIOAQQS (rear release)</td>
</tr>
</tbody>
</table>

Ordering information

See Souriau «ARINC 600 Series» catalog.

Layouts
ARINC 600 shell size 2 & 3

<table>
<thead>
<tr>
<th>Cavity</th>
<th>Male Insert</th>
<th>Female Insert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q11*</td>
<td>11 #8</td>
<td>ELIOAQ0P (rear release)</td>
</tr>
<tr>
<td>118Q2</td>
<td>11 #8 #22</td>
<td>ELIOAQ0S (rear release)</td>
</tr>
<tr>
<td>C12Q6*</td>
<td>12 #12</td>
<td>ELIOAQ1P (front release)</td>
</tr>
</tbody>
</table>

* Grounded metal insert

Dimensions
See page 20.

ARINC 600 Series
with ELIO® multimode contact and ELIO® AQ Adaptor for Quadrax #8 cavities

• Compatible with standard ARINC 600 Souriau connector
• Designed to ensure ELIO® contact optical performances
• Many possibilities to mix optical and electrical contact
• Temperature range: -65°C to +125°C (cable limitation)
ARINC 600 with ELIO® contacts in ELIO® AQ adaptors

Note: All dimensions are in millimeters (mm)
ELIO® singlemode contact
Ordering information

<table>
<thead>
<tr>
<th>ELIO</th>
<th>09N</th>
<th>E</th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable external diameter &amp; Contact sealing:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09N: 0.9±0.1mm. Non waterproof</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18N: from 1.5mm to 1.9mm. Non waterproof</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18W: 1.8±0.1mm. Waterproof</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20N: from 1.7mm to 2.1mm. Non waterproof</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20W: 2.0±0.1mm. Waterproof</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibre type:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E: ELIO® Singlemode 9/125, PC polish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boot type:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L: Long boot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S: Short boot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N: No boot (non waterproof version only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All dimensions are in millimeters (mm)

Recommended cables

SOURIAU can offer a wide range of cables in its assemblies, from low cost to high performance aeronautical cables. ELIO® contact is compatible with singlemode and multimode cable, with tactical and breakout cable. ELIO® contact is suitable with loose and tight structure cable.

Applications

- Fiber optic connector for all military and aeronautical applications wherever severe vibration or mechanical resistance are required:
  - Ground army,
  - Civil aircraft,
  - Marine,
  - Military aircraft,
  - Rotary wing

Note: Layout 15-06 limited availability, please consult us.

Layouts

- Standard MIL-DTL-38999/EN3645 shells without shielding ring (aluminum, composite, stainless steel, bronze)
- Environmental performance as per EN4531 based on MIL-DTL-38999/EN3645
- Temperature range: -65°C to +125°C (cable limitation)
## ELIO® high density insert with singlemode contact

**Ordering information** - Connectors delivered without contact

### Composite, Aluminum & Stainless Steel

<table>
<thead>
<tr>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
<th>Shell type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5: Plug</td>
<td>0: Plug</td>
<td>7: Plug</td>
<td>0: Plug</td>
<td>7: Plug</td>
<td>0: Plug</td>
<td>7: Plug</td>
<td>0: Plug</td>
<td>7: Plug</td>
<td>0: Plug</td>
</tr>
<tr>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
<td>0: Receptacle with 4-hole square flange fixing</td>
</tr>
<tr>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
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<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
<td>7: Receptacle with single hole jam nut fixing (aluminum &amp; stainless steel)</td>
</tr>
</tbody>
</table>

**Designation:**

- E: ELIO® optical connector

**Shell size:**

- 09 - 11 - 15 - 13 - 19 - 21 - 25

**Plating:**

- **Aluminum:**
  - Z: Zinc nickel
  - ZC: Zinc cobalt
  - W: Olive green cadmium
  - F: Nickel

- **Composite:**
  - J: Olive green cadmium

- **Stainless steel:**
  - K: Passivated
  - S: Nickel

**Insert type:**

- A: Male insert
- B: Female insert with ceramic alignment sleeves - Specification 674 mandatory

**Polarization:**

- N, A, B, C, D, E

**Specification:**

- empty: Male insert type A
- 674: Female insert type B - mandatory

### JVS Bronze

<table>
<thead>
<tr>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
<th>Designation</th>
</tr>
</thead>
</table>

**Shell type:**

- 6: Plug

**Material:**

- A: Bronze

**Shell size:**

- 09 - 11 - 15 - 13 - 19 - 21 - 25

**Layouts:** See previous page

**Insert type:**

- A: Male insert
- B: Female insert with ceramic alignment sleeves - Specification 674 mandatory

**Polarization:**

- N, A, B, C, D, E

**Specification:**

- empty: Male insert type A
- 674: Female insert type B - mandatory

### Dimensions

See pages 17 & 18.
**Applications**

- Fiber optic connector for all military and aeronautical applications wherever severe vibration or mechanical resistance are required.

**ELIO® AQ**
Adaptor for Quadrax #8 cavities

<table>
<thead>
<tr>
<th>Insert type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Insert</td>
<td>ELIOAQ6PB</td>
</tr>
<tr>
<td>Female Insert</td>
<td>ELIOAQ6SB674</td>
</tr>
</tbody>
</table>

Delivered with alignment boot.

**Ordering information**

**Dimensions**
See pages 17 & 18.

**MIL-DTL-38999 Series III/EN3645**
with ELIO® singlemode contact and ELIO® AQ Adaptor for Quadrax #8 cavities

- ELIO® AQ is an adaptor to enable the ELIO® contact to fit in any #8 cavities
- Multiple possibilities to mix optical and electrical signals in the same insert
- Compatible with standard MIL-DTL-38999 Series III/EN3645 connectors (aluminum, composite, stainless steel, bronze)
- Design ensures ELIO® optical performance
- Environmental performance as per MIL-DTL-38999 and EN3645 standard
- Temperature range: -65°C to +150°C (cable limitation)

**Layouts**

### Layout 11

- 1 #8

### Layout 17

- 2 #12
- 38 #22D
- 1 #8
- 2 #8

### Layout 19

- 14 #22D
- 4 #8

### Layout 21

- 17 #22D
- 4 #8

### Layout 25

- 2 #8
- 40 #16
- 97 #22D
- 4 #8
Description

- The ELIO® contact has a specific mating sequence: the cable moves back during the mating. To avoid the ELIO® mating sequence to be disturbed and to ensure the best optical performances, Souriau has developed a dedicated backshell range for MIL-DTL-38999 Series III/EN3645 ELIO® connectors.

- There are 4 types of backshell available. They are compatible with standard electrical MIL-DTL-38999 Series III/EN3645 rear interface.

Type 1: Adaptor for use with a standard 38999 Series III/EN3645 backshell. Caution is necessary in the choice of the standard backshell: it must allow enough room to accommodate the push back of the cable during the connector mating.

Type 2: Backshell for straight or right angled heat shrink boot (not supplied), suitable for tactical cables or protection tubes for example. Adapted to sealed and low mechanical retention applications.

Type 3: Backshell with cable gland suitable for tactical cables only. Adapted to sealed and high mechanical retention applications. See table p.26 for dimension code depending on the shell size and the cable diameter.

Type 4: Backshell derived from Type 3 without the cable gland. Suitable to adapt specific male threaded adaptors (not supplied) for ANAMET or PMA tubes for example. See table p.27 for the size of the female thread depending on the shell size.

Ordering information

<table>
<thead>
<tr>
<th>Type</th>
<th>8DABE</th>
<th>A</th>
<th>F</th>
<th>13</th>
<th>F</th>
<th>01</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Adaptor for standard 38999 Series III/EN3645 backshell (standard backshell not supplied)</td>
<td>3</td>
<td>A</td>
<td>F</td>
<td>13</td>
<td>F</td>
<td>01</td>
</tr>
<tr>
<td>2: Backshell for straight or right angled heat shrink boot (heat shrink boot not supplied)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4: Backshell for specific male threaded adaptor for PMA or ANAMET tubes for example (not supplied). See table p.27 for thread dimensions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Angle:
A: Straight
For other angle, please consult us.

Coupling ring:
F: Non self locking type
For other system, please consult us.

Shell size: 09, 11, 13, 19, 25

Material & Plating:
W: Aluminum plated with Olive drab cadmium over electroless nickel - Salt spray 500 hours
F: Aluminum plated with Electroless nickel
A: Aluminum black anodized - Salt spray 500 hours
B: Bronze

Dimension code:
01: Only for Type 3, see table p.26
No digit for other types.
# Backshells - Dimensions

## Backshell Type 1

![Backshell Type 1 Diagram]

<table>
<thead>
<tr>
<th>Size</th>
<th>Thread A</th>
<th>ØB ±0.25</th>
<th>Thread C</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>M12x1</td>
<td>8.7</td>
<td>M12x1</td>
</tr>
<tr>
<td>11</td>
<td>M15x1</td>
<td>11.7</td>
<td>M15x1</td>
</tr>
<tr>
<td>13</td>
<td>M18x1</td>
<td>14.7</td>
<td>M18x1</td>
</tr>
<tr>
<td>19</td>
<td>M28x1</td>
<td>24.0</td>
<td>M28x1</td>
</tr>
<tr>
<td>25</td>
<td>M37x1</td>
<td>33.2</td>
<td>M37x1</td>
</tr>
</tbody>
</table>

## Backshell Type 2

![Backshell Type 2 Diagram]

<table>
<thead>
<tr>
<th>Size</th>
<th>Thread A</th>
<th>ØB ±0.25</th>
<th>ØC ±0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>M12x1</td>
<td>8.7</td>
<td>16.7</td>
</tr>
<tr>
<td>11</td>
<td>M15x1</td>
<td>11.7</td>
<td>19.7</td>
</tr>
<tr>
<td>13</td>
<td>M18x1</td>
<td>14.7</td>
<td>22.7</td>
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<tr>
<td>19</td>
<td>M28x1</td>
<td>22.0</td>
<td>26.6</td>
</tr>
<tr>
<td>25</td>
<td>M37x1</td>
<td>32.2</td>
<td>36.8</td>
</tr>
</tbody>
</table>

## Backshell Type 3

![Backshell Type 3 Diagram]

<table>
<thead>
<tr>
<th>Shell size</th>
<th>ØA</th>
<th>09 DC</th>
<th>09 Max</th>
<th>11 DC</th>
<th>11 Max</th>
<th>13 DC</th>
<th>13 Max</th>
<th>19 DC</th>
<th>19 Max</th>
<th>25 DC</th>
<th>25 Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 to 6 mm</td>
<td>00</td>
<td>101</td>
<td>3.5</td>
<td>00</td>
<td>101</td>
<td>5</td>
<td>00</td>
<td>101</td>
<td>5</td>
<td>00</td>
<td>104</td>
</tr>
<tr>
<td>5 to 7.8 mm</td>
<td>01</td>
<td>103</td>
<td>3.5</td>
<td>01</td>
<td>101</td>
<td>5</td>
<td>01</td>
<td>101</td>
<td>7</td>
<td>01</td>
<td>104</td>
</tr>
<tr>
<td>6 to 10 mm</td>
<td>02</td>
<td>114</td>
<td>5</td>
<td>02</td>
<td>114</td>
<td>7</td>
<td>02</td>
<td>114</td>
<td>7</td>
<td>02</td>
<td>105</td>
</tr>
<tr>
<td>8 to 11.8 mm</td>
<td>03</td>
<td>114</td>
<td>5</td>
<td>03</td>
<td>115</td>
<td>7</td>
<td>03</td>
<td>115</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 to 12 mm</td>
<td>04</td>
<td>116</td>
<td>11</td>
<td>04</td>
<td>116</td>
<td>11</td>
<td>04</td>
<td>116</td>
<td>11</td>
<td>05</td>
<td>122</td>
</tr>
<tr>
<td>9.5 to 14 mm</td>
<td>05</td>
<td>122</td>
<td>11</td>
<td>05</td>
<td>122</td>
<td>11</td>
<td>05</td>
<td>122</td>
<td>11</td>
<td>05</td>
<td>130</td>
</tr>
</tbody>
</table>

DC = Dimension Code

Note: All dimensions are in millimeters (mm)

Note: Same marquing as Type 4.
**Backshell Type 4**

![Backshell Type 4 Diagram]

<table>
<thead>
<tr>
<th>Size</th>
<th>Thread A</th>
<th>ØB ±0.25</th>
<th>Thread D</th>
<th>ØE ±0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>M12x1</td>
<td>8.7</td>
<td>M12x1.5</td>
<td>16.7</td>
</tr>
<tr>
<td>11</td>
<td>M15x1</td>
<td>11.7</td>
<td>M16x1.5</td>
<td>19.7</td>
</tr>
<tr>
<td>13</td>
<td>M18x1</td>
<td>14.7</td>
<td>M16x1.5</td>
<td>22.7</td>
</tr>
<tr>
<td>19</td>
<td>M28x1</td>
<td>22.0</td>
<td>M20x1.5</td>
<td>26.6</td>
</tr>
<tr>
<td>25</td>
<td>M37x1</td>
<td>32.2</td>
<td>M25x1.5</td>
<td>36.8</td>
</tr>
</tbody>
</table>

**Total length with backshell**

Length unmated = C* + E* + 43mm + T + Rt + Dt

Length mated = C* + D* + 43mm + T + Rt + Dt  * See page 17

**Backshell use examples**

**Type 2** - heat shrink boot not supplied
- 8DABE2AF13W with a straight boot on PMA tube
- 8DABE2AF13F with a right angled boot on tactical cable

**Type 3** - supplied with cable gland
- 8DABE3AF13W01

**Type 4** - supplied without the specific adaptor
- 8DABE4AF13W with PMA tube adaptor

Note: All dimensions are in millimeters (mm)
Harnessing

• Military or aerospace jumpers, highly exposed to extreme acceleration, deceleration with shock, vibration and environmental constraints like dust and contaminant, are a perfect example where know-how and experience are key to providing a cost-efficient and sustainable solution.

Interferometry

• Technical measurement that calculates the topography of a surface.

• The system gives in 3 dimensions the observed surface with curves similar to levels of a geographic map. As a result it is possible to get the geometric parameters of the optical contact with an extreme accuracy.

Ordering information

<table>
<thead>
<tr>
<th>HA02</th>
<th>XXXX</th>
<th>XXX</th>
<th>M</th>
<th>A</th>
</tr>
</thead>
</table>

Patchcord combination code:

XXXX: See tables p.29 to 31

Patchcord length:

In meter when possible. Examples:
- for a 3 meter assembly, use 003(M) and not 300(CM)
- for a 3.5 meter assembly, use 350(CM)

Length unit:

M: Meter
CM: Centimeter

Patchcord version index

Note: To create your patchcord part number, select your patchcord combination code in tables p.29 to 31 (1st contact - 2nd contact - Fiber Optic cable) and the length of your assembly on 3 digits in meter (M) or centimetre (CM). You must use meter when possible (see examples above).
**Harnesses - Recommended cables**

SOURIAU offers a wide range of cables, from cost efficient to high performance aeronautical cables. Fast delivery!

<table>
<thead>
<tr>
<th>Application</th>
<th>Standard</th>
<th>Cable code</th>
<th>Fiber type</th>
<th>Temperature range</th>
<th>Tensile strength (N)</th>
<th>Number of ways</th>
<th>Bandwidth Limit (MHz.km)*</th>
<th>Attenuation (dB.km)*</th>
<th>Min. bend radius (mm)</th>
<th>Weight (kg.km)</th>
<th>Structure outer jacket</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIGH PERFORMANCE CABLES</strong></td>
<td>ABS0963-003LF, EN4641-102</td>
<td>FCABLE11</td>
<td>62.5/125</td>
<td>1.8</td>
<td>-55°C to +125°C</td>
<td>250</td>
<td>1</td>
<td>400/1000</td>
<td>4.0/2.0</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ARINC802</td>
<td>FCABLE21</td>
<td>62.5/125</td>
<td>1.8</td>
<td>-55°C to +100°C</td>
<td>300</td>
<td>1</td>
<td>200/500</td>
<td>3.0/0.8</td>
<td>9</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>EN4641-101</td>
<td>FCABLE41</td>
<td>62.5/125</td>
<td>0.9</td>
<td>-55°C to +125°C</td>
<td>20</td>
<td>1</td>
<td>400/1000</td>
<td>4.0/2.0</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE33</td>
<td>9/125</td>
<td>1.8</td>
<td>-55°C to +125°C</td>
<td>250</td>
<td>1</td>
<td>No limit</td>
<td>0.5/0.5</td>
<td>20</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>EN4641-301, ABS2293 LG (50μm)</td>
<td>FCABLE22</td>
<td>50/125</td>
<td>1.8</td>
<td>-65°C to +135°C</td>
<td>200</td>
<td>1</td>
<td>400/1000</td>
<td>2.5/1.0</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td><strong>COST EFFICIENT CABLES</strong></td>
<td></td>
<td>FCABLE61</td>
<td>62.5/125</td>
<td>1.8</td>
<td>-40°C to +85°C</td>
<td>130</td>
<td>1</td>
<td>200/500</td>
<td>3.5/1.5</td>
<td>25</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE42</td>
<td>50/125</td>
<td>1.8</td>
<td>-40°C to +85°C</td>
<td>130</td>
<td>1</td>
<td>1500/500</td>
<td>3.0/1.0</td>
<td>25</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE43</td>
<td>9/125</td>
<td>1.8</td>
<td>-40°C to +85°C</td>
<td>130</td>
<td>1</td>
<td>No limit</td>
<td>0.5/0.5</td>
<td>25</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE13</td>
<td>9/125</td>
<td>0.9</td>
<td>-40°C to +85°C</td>
<td>10</td>
<td>1</td>
<td>No limit</td>
<td>0.6/0.6</td>
<td>15</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE31</td>
<td>62.5/125</td>
<td>1.6</td>
<td>-20°C to +70°C</td>
<td>200</td>
<td>1</td>
<td>200/500</td>
<td>3.5/1.0</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE12</td>
<td>50/125</td>
<td>1.8</td>
<td>-10°C to +70°C</td>
<td>200</td>
<td>1</td>
<td>1500/500</td>
<td>2.8/0.8</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCABLE32</td>
<td>50/125</td>
<td>5.5</td>
<td>-40°C to +85°C</td>
<td>1800</td>
<td>4</td>
<td>500/500</td>
<td>2.8/0.8</td>
<td>55</td>
<td>21</td>
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<td></td>
<td>FCABLE23</td>
<td>9/125</td>
<td>5</td>
<td>-40°C to +85°C</td>
<td>2000</td>
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<td>No limit</td>
<td>0.6/0.6</td>
<td>50</td>
<td>28</td>
</tr>
</tbody>
</table>

*1st value @850nm for multimode cable, 2nd value @1300nm for multimode (respectively 1300nm and 1550nm for singlemode)*

ELIO® is compatible with loose and tight structured cables. Tactical breakout cables are compatible with ELIO® with use of backshells.

Consult us for other harsh environment cables.

### Standard length tolerances

| Patchcord from 30 cm to 1 m | 0 / + 5 cm |
| Patchcord from 1 m to 4 m   | 0 / + 10 cm |
| Patchcord from 4 m to 15 m  | 0 / + 20 cm |
| Patchcord > 15 m            | 0 / + 30 cm |
## Patchcord combination code

Most common cables with most common contacts - For other combinations please consult us. All contact are UPC polished otherwise specified.

### With cable FCABLE11

<table>
<thead>
<tr>
<th>Contact 2</th>
<th>ST</th>
<th>SC</th>
<th>ARINC801 1.25mm</th>
<th>LC Simplex</th>
<th>FC</th>
<th>ELIO18NGLA</th>
<th>ELIO18NGSA</th>
<th>ELIO18WGSA</th>
<th>ELIO18WGSA</th>
<th>ELIO18NGLA</th>
<th>ELIO18NGSA</th>
<th>ELIO18WGSA</th>
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<tbody>
<tr>
<td>ELIO18NGLA</td>
<td>0350</td>
<td>0349</td>
<td>0533</td>
<td>0348</td>
<td>0183</td>
<td>0114</td>
<td>0347</td>
<td>0186</td>
<td>0346</td>
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<tr>
<td>ELIO18NGNA</td>
<td>0206</td>
<td>0215</td>
<td>0534</td>
<td>0211</td>
<td>0195</td>
<td>0190</td>
<td>0221</td>
<td>0220</td>
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<td>ELIO18NGSA</td>
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<td>0535</td>
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<td>0110</td>
<td>0251</td>
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<td>0188</td>
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### With cable FCABLE31

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<th>ARINC801 1.25mm</th>
<th>LC Simplex</th>
<th>FC</th>
<th>ELIO18NGLA</th>
<th>ELIO18NGSA</th>
<th>ELIO18WGSA</th>
<th>ELIO18WGSA</th>
<th>ELIO18NGLA</th>
<th>ELIO18NGSA</th>
<th>ELIO18WGSA</th>
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<tbody>
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<td>0345</td>
<td>0344</td>
<td>0641</td>
<td>0343</td>
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<td>ELIO18NGNA</td>
<td>0166</td>
<td>0175</td>
<td>0640</td>
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<td>ELIO18NGSA</td>
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</tbody>
</table>

### With cable FCABLE13

<table>
<thead>
<tr>
<th>Contact 2</th>
<th>ST</th>
<th>SC</th>
<th>ARINC801 1.25mm</th>
<th>LC Simplex</th>
<th>FC</th>
<th>ELIO09NELA</th>
<th>ELIO09NENA</th>
<th>ELIO09NESA</th>
<th>ARINC801 1.25mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELIO09NELA</td>
<td>0561</td>
<td>0560</td>
<td>0633</td>
<td>0559</td>
<td>0558</td>
<td>0675</td>
<td>0674</td>
<td>0551</td>
<td></td>
</tr>
<tr>
<td>ELIO09NENA</td>
<td>0564</td>
<td>0563</td>
<td>0632</td>
<td>0530</td>
<td>0562</td>
<td>0676</td>
<td>0552</td>
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<td></td>
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Note: For other combination cable/contacts please send a request to contactmilaero@souriau.com
### With cable FCABLE21

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</table>

Note: For other combination cable/contacts please send a request to contactmilaero@souriau.com
ELIO® Fiber Optic Technology

Tooling & Accessories

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- Universal test connector ................................................................. 35
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- ELIO® cleaning tool ...................................................................... 37
**Insertion & extraction tool**

<table>
<thead>
<tr>
<th>With boot</th>
<th>Without boot</th>
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<tbody>
<tr>
<td>The insertion &amp; extraction tool for ELIO® contact <strong>with</strong> boot is compatible with previous and new ELIO® contact versions.</td>
<td>The insertion &amp; extraction tool for ELIO® contact <strong>without</strong> boot is compatible with previous and new ELIO® contact versions.</td>
</tr>
</tbody>
</table>

80WV0059A  
80WV0060A

---

**Filler plug & Dummy contact**

**MIL-DTL-38999 Series III/EN3645 - for high density cavities**

- Male filler plug
  - ELIOAFPP

- Female filler plug
  - ELIOAFPS

**ARINC 600 Series - for Quadrax #8 cavities**

- Male dummy contact
  - ELIOA001

- Female dummy contact
  - ELIOA002

---

**ELIO® adaptor for ST polishing fixture**

With this adaptor, turn your ELIO® contact into an ST contact and save costs using standard ST polishing fixture.

Part Number: **ELIOAST**
**ELIO® coupler**

The ELIO® coupler is a tool used to measure optical losses of multimode and singlemode ELIO® jumpers without introducing a bias in the measurement due to the connector’s influence and without having to pull on the cable to remove the contact from the tool.

Delivered with dust caps. NOT FOR USE IN FLIGHT.

Part number: ELIOTELIOA

The operating instructions and the cleaning instructions are described in BT255A Instruction sheet.

Note: All dimensions are in millimeters (mm)

**ELIO® mechanical splice**

ELIO® sealed contacts terminated with the ELIO® cabling kit and connected through the ELIO® mechanical sleeve is a reliable and sealed solution to repair damaged optical links.

Part number: ELIOELIO

Note: Heatshrink boot and ELIO® contacts to be ordered separately.

**Universal test connector**

This connector can be connected to any other polarization. Ideal to limit the number of test leads.

The connector is customized with a green band and with a red band on the main polarization key to facilitate the mating.

Build your part number using the polarization letter «U»

NOT FOR USE IN FLIGHT.
SOURIAU and JDSU teamed to develop a contact end face inspection tool suitable for use with ELIO® / EN4531 / ARINC801 technology. Inspect before you connect.

Proactive inspection and cleaning can prevent poor signal performance and permanent damage to the contact end face.

The inspection tools can be bought through SOURIAU using the SOURIAU part numbers and directly through JDSU using the JDSU part numbers.

ELIO® male tip
SOURIAU PN: 80WL0047A, JDSU PN: FBPTU25MN
To inspect male singlemode & multimode ELIO® contacts in all connector styles, ELIO® male contact in AQ adaptor & ELIO® patchcords (adaptors to be used with barrel assembly)

ELIO® female tip
SOURIAU PN: 80WL0045A, JDSU PN: FBPTELIO
To inspect female multimode ELIO® contacts in AQ adaptor & ELIO® patchcords (adaptors to be used with barrel assembly)

ELIO® female tip for AQ adaptor
SOURIAU PN: 80WL0042A
To inspect female singlemode ELIO® contact in all AQ adaptor cavities (adaptors to be used with barrel assembly)
**ELIO® blind inspection tool**

The **blind inspection tool** is developed for faster and safer termini inspection in mass production environment and field use.

- **Fast**: It enables blind inspection thanks to a long guiding. Same inspection tip for the female and male insert.
- **Safe**: There is no risk of damaging with the probe tip the close-by termini or a ferrule.
- **User friendly**: Control with one hand. The tool remains fixed on the connector during inspection.

The blind inspection tool is delivered by Kit for each layout, consisting of male and female puck. The Blind inspection tool is dedicated to MIL-DTL-38999 Series III/EN3645 with ELIO® high insert density.

- **Layout 11-02**
  Kit Part Number: **80WL0036**

- **Layout 13-04**
  Kit Part Number: **80WL0037**

- **Layout 19-08**
  Kit Part Number: **80WL0038**

- **Layout 21-12**
  Kit Part Number: **80WL0043**
  Limited availability, please consult us.

- **Layout 25-24**
  Kit Part Number: **80WL0039**

**ELIO® cleaning pen**

**Standard cleaning pen for 2.5mm ceramic termini**

- Simple pushing motion to engage tool
- Audible CLICK to alert operator when tool is fully engage
- Dry & large cleaning strand eliminates the need for solvents to be effective
- Contaminates such as alcohol, water, skin oil, vegetable and hand lotion residue as well as graphite and t-shirt lint are lifted from the connector end face

Souriau recommends IBC™ Brand Cleaner M250 from USConec for cleaning the ELIO® termini.
ELIO® Fiber Optic Technology

Range Extension

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Product Range Extension

8XE Series with ELIO® Contacts

The ELIO® optical technology fits now the 8XE range to offer a ruggedized fiber optics for geophysics, oil & gas, offshore applications.

8XE Series = Overmolded 851 Series:
- High impact glass filled plastic offering a great impact & shock resistance as well as an ergonomic shape of the coupling ring.
- Suitable backshell in same plastic material allows IP68 sealing level.

High performance:
- High impact & shock resistance: drop & crush resistance.
- Easy, reliable & secure mating.
- Excellent sealing performance:
  IP68 (120 hours under 15m water) / IP69K.
- High salt spray resistance.

VGE1 Series with ELIO® Contacts

Rugged Fibre Optic Solutions for Railways. The solution for very high speed data transmission in parasitized environment.

Reliable to railway standards. Tested according to:
- Fire & smoke standards (NFF61030).
- ELIO® optical contact, field proven over 10 years.

Easy to install:
- No tool needed.

Standard connector:
- Same shell as electrical version according to VG95234.

Fibre versatility:
- Contacts designed for singlemode and multimode fibre.

See «VGE1 ELIO® Rugged Fiber Optic Solutions» product news on www.railway-connectors.com
Product Range Extension

**ELIO® Fiber Optic Hermetic**

Hermetic receptacles or feedthrough based on 38999 shells, intermateable with 38999 Series III plug populated ELIO® contacts.

**Truly hermetic:**
- Leak rate: < 10⁻⁹ atm.cm³/s.
- Temperature range: -55°C to 200°C.

**Wide range of layouts:**
- From 1 to 24 fiber optic channels.

**Customs:**
- Versatile technology that can be adapted to your needs.
ELIO® Fiber Optic

Optical connectors website

Visit our dedicated website:

www.optical-connectors.com

- Fiber optics basics
- ELIO® system
- Markets presentation
- Products overview
- Catalogs
- Datasheets

ELIO® training

Need to strengthen your global knowledge in optical fiber?

Need support for ELIO®’s use in the field?

Target your ELIO® training!

Souriau, in partnership with various training companies, offers training which can be adapted to your needs:

Installation module

Fundamentals of fiber optics

Theoretical and technological aspects on the installation of ELIO® in an aeronautical environment, notably:
- Handling precautions
- Optical faces inspections
- On-board optical measurement processes

Practical applications

Cabling module

Fundamentals of fiber optic

Theoretical and technological aspects on ELIO® contacts terminating, notably:
- Handling precautions
- ELIO® cabling process
- Control process by optical measurements

Terminating practical applications during two and a half days

For further information and a list of approved training companies, contact us at fiberoptics@souriau.com