‘E’ Opto-Electrical Connector System
Subsea / Underwater / Marine

Introduction:
CRE’s range of metal shell Fibre Optic/Electrical Fully Sealed Connectors focus on delivering high reliability in tough environments. The design offers a high integrity sealing arrangement, metal keyways, along with our ability to design specific solutions for your application. They are designed for heavy duty use in the most rigorous underwater applications on the planet. Made of 316 stainless steel or custom built with any material specified, they come as standard with high open face pressure resistance. These robust and versatile connectors are rated to 4,000m and are designed for use with moulded or oil filled assemblies and tailored for the heaviest power, signal and electro-mechanical applications.

The most common applications:
- ROV
- Dive Bell Connectors
- Underwater Thruster

Key Features:
- Multi size shell body
- 12 contacts
- 1 & 2 Channel Configurations
- Multimode 50/125 and 62.5/125 versions
- Singlemode 9/125 Fibre
- Available as Patchcords and Pigtailed Bulkheads
- Right angled Plug End also available
- Pressure up to 6,000 Psi (Mated)
- Open face pressure up to 6000 Psi
- Oil filled available as standard (OF)
- Up to 1000Vdc
- Up to 18amp
Options:

- Field Installable
- Bespoke design/configuration to suit customer requirements at no extra cost
- Available in alternative materials: Aluminium, Titanium etc.

Testing:

- Pressure testing up to 6,000 Psi
- Durability testing with 100 mate and re-mate cycles
- Open face pressure testing up to 6000 Psi

Part Numbering System - Bulkhead Example

BR E 02  SM 1000  ST 01

- INTERFACE TYPE
- FIBRE CONNECTION TYPE
- FIBRE LENGTH IN MM
- SM-SINGLEMODE
- NUMBER OF CHANNELS
- CONNECTOR SIZE
- BR - BULKHEAD CONNECTOR RECEPTACLE

Part Numbering System - Connector Example

PL E 02  SM 1000  ST OF 01

- INTERFACE TYPE
- OF-OIL FILLED
- FIBRE CONNECTION TYPE
- FIBRE LENGTH IN MM
- SM-SINGLEMODE
- NUMBER OF CHANNELS
- CONNECTOR SIZE
- PL - PLUG IN LINE
Fibre Characteristics:

Singlemode - 9/125 (SM)
- Attenuation: 0.38dB/km @ 1,310nm
- Attenuation: 0.25dB/km @ 1,550nm
- Dispersion: 3.5ps/nm.km @ 1310nm
- Dispersion: 18.0ps/nm.km @ 1,550nm
- NA: 1.470

Multimode - 50/125 (MM)
- Attenuation: 2.8dB/km @ 850nm
- Attenuation: 0.8dB/km @ 1,300nm
- Bandwidth: 500MHz/km @ 850nm
- Bandwidth: 500MHz/km @ 1,300nm
- NA: 0.20

Multimode - 62.5/125 (MM)
- Attenuation: 3.0dB/km @ 850nm
- Attenuation: 1.0dB/km @ 1,300nm
- Bandwidth: 200MHz/km @ 850nm
- Bandwidth: 500MHz/km @ 1,300nm
- NA: 0.27

Contact CRE for special order materials.

Electrical and Environmental:
- Singlemode Insertion Loss: 9/125 Fibre @ 1,310nm/1,1550nm : Up To 2.0dB
- Multimode Insertion Loss: 50/125 & 62.5/125 @850nm/1300nm : Up To 1.0dB
- Operating Temperature: -40C to + 85C
- Storage Temperature: -55C to + 85C
- Durability: 2000 Matings minimum
- Depth Rating: 4000 Metres

Contact CRE for special order materials.

Fibre Characteristics:

Standard Mechanical Specification:

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell Body</td>
<td>Stainless Steel 316L</td>
</tr>
<tr>
<td>Retaining Nut</td>
<td>Stainless Steel/Aluminium Bronze</td>
</tr>
<tr>
<td>'O' Rings</td>
<td>Nitrile NI70</td>
</tr>
<tr>
<td>Contact Insert</td>
<td>Peek</td>
</tr>
<tr>
<td>Electrical Contacts</td>
<td>Ledged Nickel Copper C97 or K41</td>
</tr>
<tr>
<td>Plating Details</td>
<td>1um Acid Gold over 2.5um Nickel Copper Flash</td>
</tr>
<tr>
<td>Backing Washer</td>
<td>Black Acetal</td>
</tr>
</tbody>
</table>

Contact CRE for special order materials.

www.CRE-Marine.com
Tel: + 44 01224 872 445
Fax: + 44 01224 873 710
Email: sales@CRE-Marine.com

Revision 2019-02
Reference Dimensions 'E' Opto-Electrical Connector

Flanged Bulkhead Connector Receptacle-Composite (FR)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H-'O'Ring</th>
<th>J-'O'Ring</th>
<th>K-'O'Rings</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>64.7</td>
<td>12.7</td>
<td>38.1</td>
<td>25.5</td>
<td>37</td>
<td>7.1</td>
<td>BS020</td>
<td>BS026</td>
<td>31 x 2</td>
<td>01</td>
</tr>
</tbody>
</table>

All dimension in mm
Reference Dimensions 'E' Opto-Electrical Connector

Backshell Cable Connector Receptacle-Composite (PL)

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D-‘O’Ring</th>
<th>E-‘O’Ring</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>93.5</td>
<td>45</td>
<td>21</td>
<td>6 x 1.5</td>
<td>30 x 2</td>
<td>01</td>
</tr>
</tbody>
</table>

All dimension in mm

Revision 2019-02
Reference Dimensions 'E' Opto-Electrical Connector

Bulkhead Blanking Plug - PLEBC

Cable Connector Blanking Plug - BREBC

All dimensions in mm

Revision 2019-02
Assembled Dimensions 'E' Opto-Electrical Connector

<table>
<thead>
<tr>
<th></th>
<th>PLEBC</th>
<th>PLEOF01</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRE01</td>
<td>63.5</td>
<td>126</td>
</tr>
<tr>
<td>BRE01</td>
<td>67.5</td>
<td>130</td>
</tr>
</tbody>
</table>

Note: Step files for design purposes available from engineering @CRE-marine.com
Face View

1 CHANNEL

2 CHANNEL

FIBRE TYPE-----SM / MM
TAILS WITH CONNECTION TO SUIT-ST/SC ETC.

Pin Face View

Socket Face View

φ 1.56 Pin

For current carrying capacity and wire recommendations see page 9
Current Capacity and Wire Recommendations

- The current rating maybe impacted by cable selection and the ambient temperature.
- The amount of heat generated should not exceed the maximum temperature rating of the insulation material.
- Heat dissipation is lessened as the number of individually insulated conductors bundled together is increased.
- A derating factor must be applied for bundled conductors. See chart below.
- Current ratings shown below are for single conductors in free air at 30deg C ambient temp.
- Where applicable, alternative pin & current ratings are available. See chart below.
- Voltage up to 1000v
- For different pin configurations contact CRE

<table>
<thead>
<tr>
<th>Pin Diameter</th>
<th>1.56</th>
<th>1.56</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Size</td>
<td>16 awg</td>
<td>12 awg</td>
</tr>
<tr>
<td>Current</td>
<td>26 amps</td>
<td>50 amps</td>
</tr>
<tr>
<td>Current ratings based on PTFE type C cable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Derating Factors for Bundled Conductors**

<table>
<thead>
<tr>
<th>Bundle #</th>
<th>Derating Factor (x Amps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - 5</td>
<td>0.8</td>
</tr>
<tr>
<td>6 - 15</td>
<td>0.7</td>
</tr>
<tr>
<td>16 - 30</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Notes:

- Larger solder bucket options are not available on all contact configurations, please contact CRE Engineering to confirm your requirement is possible.
- Final wiring detail depends on through bore of interface chosen, please contact CRE Engineering to confirm your requirement is possible.