**G3 OPTICAL WET-MATE CONNECTOR**

**DESCRIPTION**

One of SEACON’s latest fiber optic developments is the G3 optical wet-mate connector. Manufactured by SEACON Advanced Products, LLC in Bellville, Texas, this new, third generation connector utilizes existing HYDRA LIGHT technology and is available in 6 channels with either single-mode or multi-mode optical fibers. The G3 offers low profile optical connectivity combined with simplicity of operation and is ideally suited for tight interfaces requiring low loss optical performance. This connector can incorporate flat or angle polished contacts making it ideal for either signal communication systems or optical measurement and sensing systems such as tubing hanger connections, tree connections, riser monitoring systems and life of field seismic systems (LoFS).

**KEY FEATURES**

- Very small form factor, with low loss optical performance
- Matched pairs not required
- Internal pressure compensated
- 15,000 psi, 150°C operating
- Footprint < 1.5 x 0.875"
- 6 channels, single-mode or multi-mode
- Few internal moving parts
- Simplicity of operation
- Elastomers suited for harsh chemical environments
- Patented "Joined Chamber" concept
- Suitable for ROV, Diver, or Stab Plate operation

**QUALITY**

DESCRIPTION

The CM2001 is a very small, single pin underwater mateable electrical connector which is a simple yet robust design with very few moving parts. It is designed for high pressure applications and is available in a high temperature version.

KEY FEATURES

- Very small single pin connector
  - Diameter: Less than 1" (25mm)
  - Receptacle length: Less than 3" (75mm)
  - Plug length: Less than 2.7" (69mm)
- CM2000 series of connectors have:
  - A field proven track record of over 20 million accumulated operating hours
  - Mean Time Between Failure (MTBF) of better than 4.4 million hours
- Oil-filled pressure balanced socket contacts
- Extensive qualification testing data available
- Successful completion of long-term testing (3 years) by an independent body
- Voltage rating to 1,000 VAC
- Current rating to 10 amps
- Rated to 23,000 feet (7,000m)
- Simple and robust with few moving parts
- Redundant sealing barriers for contacts
- No single point failures
- Wide operational temperature rating to +65ºC (+149ºF)
- Elastomers have over 20 years of use underwater
- Alternative range of terminations available

QUALITY

## CONFIGURATIONS

- Stab configuration as standard
- Diver or ROV configurations available
- Ø2mm electrical contact size
- Oil filled pressure balanced socket contacts
- Redundant sealing barriers for each contact
- Terminations:
  - Oil-filled
  - Molded cable
  - Customer specific
- Easily configured into many different configurations:
  - Flying lead
  - Bulkhead mounted, flange mounted
  - Straight terminations, 90º terminations
  - Omnitec MKII interface
  - Molded terminations
  - Parking places
  - Long-term protective caps
  - Short-term protective caps

## DESIGN RATINGS

- Ø2mm contacts: 1,000 VAC, 10 amps
- Depth Rating: Ø2mm contact is an ultra-deepwater configuration, rated to 690 bar (10,000psi), equates to over 7,000m (23,000 feet)
- Socket contacts never see the outside environment, always contained in dual nested oil-filled bladders
- Design life: 25 years
- Minimum Life-Cycle: 100 mate/de-mates
- Maintenance-free over design life (within number of mate/de-mate cycles)
- Operating Temperature: -5ºC to +65ºC (23ºF to +149ºF)
- Storage Temperature: -20ºC to +65ºC (-4ºF to +149ºF)

## OPERATION

- Typical mate force: 3 to 6 lbs (1.36 to 2.72kg)
- De-mate force: 25% of mating force
- Force to maintain: 0 lbs
- Typical mating stroke length: 1.7” (43mm)
- Maximum angular misalignment: 0.5º
- Maximum axial separation: 2.5mm (0.1 inches)

## MATERIALS

- Housing of choice: Titanium, 17-4 PH, Nitronic 50, Inconel, Ferralium, 316, Al Ni Bronze, Beryllium copper and PEEK)
- Insulator: PEEK
- Compensation bladders: Natural rubber (Alternative elastomers available for special fluid compatibility requirements)
- O-rings: Nitrile

## TRACK RECORD AND RELIABILITY DATA

- Deepest recorded actual operating depth to 15,420 feet (4,700m)
- The CH2000’s currently in service have now reached accumulated operating hours in excess of 26 million hours with a Mean Time Between Failure of better than 6.1 million hours
**PRINCIPLE OF OPERATION**

The critical electrical contact is made without exposure to external contamination in a harsh subsea environment. This is achieved as described by the following mating sequence:

**Step 1:** The contact pin enters the outer bladder entry of the receptacle contact.

![Step 1](image1)

**Step 2:** The contact pin is wiped and bathed in dielectric fluid as the entry throat maintains a force around the pin ensuring a secure seal.

![Step 2](image2)

**Step 3:** The contact pin continues and enters a second inner bladder entry and is wiped and bathed in dielectric fluid again.

![Step 3](image3)

**Step 4:** The pin engages with the mating socket within the dielectric filled inner bladder enclosure.

![Step 4](image4)

Mated Contact: During and after the mating activity, two seals are created and maintained around the pin contact within the oil-filled and pressure-compensated bladders.

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**QUALIFICATION TESTING**

In addition to the full range of testing highlighted in **SEACON** document SC-ENG-1011. The following was specifically completed for the **CM2001 / 2mm connector:**

- Deepwater Testing - Performed by **SEACON** - Mated connector to 10,000 psi (690 bar), open face to 10,000 psi (690 bar)
KEY INTERFACE DIMENSIONS

**CM2001 / 2mm Receptacle (with pin)**

(Dimensions are in inches)

```
(1.65) (3.63) (1.98) 

(0.55) MAX 

(0.75) FLATS 
```

**CM2001 / 2mm Plug (with socket)**

(Dimensions are in inches)

```
(1.00) (3.34) (1.72) (1.53) 

(0.75) FLATS 
```

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4 CHANNEL DRY-MATE FIBRE OPTIC CONNECTOR

DESCRIPTION
Small compact connector originally designed and developed for the demanding downhole environment. The materials and design chosen are specific for these arduous conditions. The compact nature of this connector lends itself to many applications where overall size needs to be kept to a minimum.

KEY FEATURES
- Based around proven optical connector designs
- Small in size (see following drawings)
- Wide temperature rating
- Single or multi-mode fibre accommodated
- Available in different materials and terminations to suit the requirement
- Dual "O" seals
- Field installable (in certain environments)
QUALITY

· SEACON (europe) Ltd operate a Quality Management System accredited to ISO 9001.

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Descripción

Este par de conectores de 8 vías fue diseñado para una herramienta de línea de cables que está montada en un brazo que conduce a un sensor. Esto significaba que cuando la herramienta era recuperada, el sensor se podía cambiar rápidamente y fácilmente sin herramientas o formación especializada. Como el conector vería directamente los fluidos de la boya de alta presión y temperatura, el conector está moldeado en Viton®. El cable tiene un revestimiento externo de ETFE para sellar a la caja del cable. Esto ofrece la ventaja de que las mitades libres del conector pueden instalarse en el campo, pero se requiere una soldadura.

La filosofía de conexión está basada en nuestro rango estándar de conector WET-CON. El contacto del clavo tiene un diámetro de sellado y cuando se conecta en el agujero de la clavija, dos anillos de sellado integrados se resbalan en este diámetro. Esto significa que hay dos sellos de anillo entre el contacto y el tierra y cuatro sellos de anillo entre diferentes contactos. Debido a que no hay diferencias de presión en el diseño, el par de conectores se pueden tolerar bajo presión.

<table>
<thead>
<tr>
<th>Características Clave</th>
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</thead>
<tbody>
<tr>
<td>Alta temperatura</td>
</tr>
<tr>
<td>Alta presión</td>
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<tr>
<td>Excelentes propiedades eléctricas</td>
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<tr>
<td>Ocho contactos</td>
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<tr>
<td>Ambiente áspero</td>
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<tr>
<td>Abrazadera positiva para desconexión</td>
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VS-8#22-IJMP-FI & VS-8#22-ILFS-FI

Fecha: Diciembre de 2017
**DESIGN SPECIFICATION**

- Max working pressure: 1380 bar (20,000 psi) mated or unmated
- Max continuous working temperature: +200°C (392°F)
- Min continuous working temperature: -17°C (1.4°F)
- Min storage temperature: -40°C (-40°F)
- Voltage: 600 VDC/440 VAC
- Current (max): 2.5 amps

**MATERIALS**

- Pin & socket contact: 22AWG Copper alloy, Gold plated. Socket incorporates a Multilam™ for positive electrical contact
- Connector body: Moulded in 100% VITON® fluroelastomer grade 'A'. It has a continuous temperature rating of -17°C to 250°C (1.4°F to 482°F)
- Cable: Raychem Spec 55. 22AWG with cross linked ETFE polymer jacket. It has a continuous temperature rating of -65°C to 200°C (149°F to 392°F) and short periods at 400°C (752°F) and combines the easy handling of a flexible wire with excellent scrape, abrasion and cut through characteristics
- Solder: High temperature solder is used to solder the wire to the contact

**CONFIGURATION**

- See Page 3

**QUALIFICATION**

- A pair of connectors has successfully been laboratory tested to 1725 bar (25,000 psi) and 200°C (392°F)
- A pair of connectors has successfully been installed in a wire line tool within a test well at a depth of 360m (1,200 ft)

**QUALITY**

- SEACON (europe) Ltd operate a Quality Management System accredited to ISO 9001.
Figure 2 - VS-8#22-ILFS-FI & VS-8#22-ILMP-FI

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