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Underwater Connectivity

# **‘C’ HV Electrical Connector Subsea / Underwater / Marine**



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## Introduction:

CRE has developed a wide range of metal shell connectors over the years focussed on delivering high reliability in tough environments. They are designed for heavy duty use in the most rigorous underwater applications on the planet. The design offers a high integrity sealing arrangement, metal key-ways, multiple options, size, pin quantity, voltage and current rating along with our ability to design specific solutions for your application.

Manufactured as standard from stainless steel or custom built with any material specified, they come with high open face pressure resistance. The standard connectors are rated to 6000m WD and are designed for use in moulded, oil filled and PBOF assemblies in power, signal and electro-mechanical applications.

## Common applications:

- ROV, Resident ROV & AUV
- Manned underwater vehicles
- Aquaculture
- Renewables
- Ocean science/research
- Dive / depressurisation systems

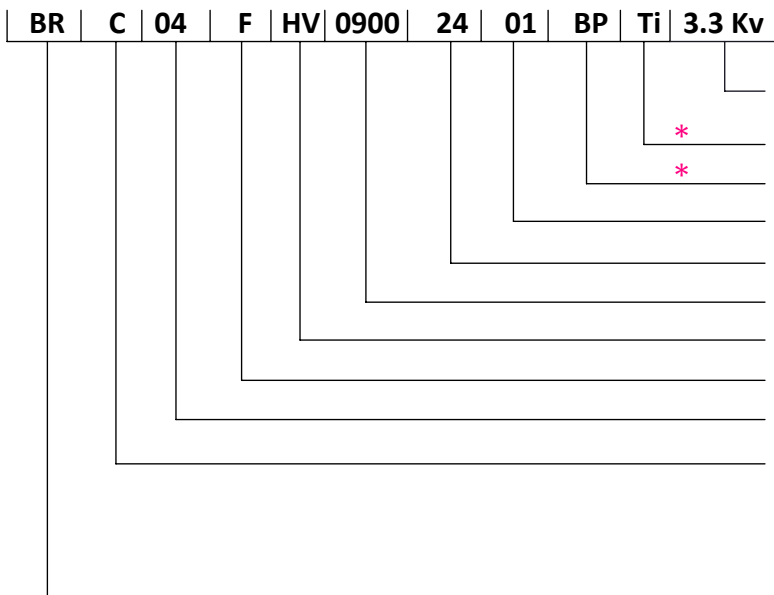
## Key features:

- Up to 4 contacts
- Mixed contact sizing options
- Custom solutions (contact qty/size/type, glass to metal)
- Rated for 6000m WD mated and open face as standard, higher pressure available on application
- Oil filled (OF) available as standard, pressure balanced oil filled (PBOF) available for certain pin configurations (connector & bulkhead assemblies)
- Working voltage and current dependent on contact density and diameter.

# 'C' HV Electrical Connector Subsea / Underwater / Marine

Part numbering:

Bulkhead example:



- Working Voltage
  - M.O.C., SS std, Ti, AL, Pk etc.
  - Back pressure (If required), PBOF
  - Interface number
  - Wire gauge
  - Wire length in mm.(i.e 900mm), standard cores
  - High Voltage
  - Male / Female
  - Number of contacts, BC ( Blanking Cap)
  - Connector family 'A', 'B', 'C' etc.
- BR - Bulkhead receptacle (Threaded)  
 FR - Flanged receptacle  
 RC - Moulded or oil filled receptacle  
 FC - Flanged moulded or oil filled receptacle.

**Notes:**

1. For standard assemblies, the part number structure indicated \* above is left blank.
2. Where custom wiring is required, Engineering will issue a BA\*\*\*\* (Bulkhead Assembly Part Number) to substitute for the wire length/gauge in the part number structure. For example, in the part number above 090024 would be replaced by BA followed by a four digit number to create a unique identifier.

| Component                                      | Material                                      |
|--|---|
| Bulkhead Body                                  | Stainless steel 316L standard                 |
| Contact Insert                                 | Isoval Glass Fabric                           |
| Electrical contacts                            | BS2874 CZ121                                  |
| Plating detail                                 | 1um Acid Gold over 2.5 um Nickel Copper Flash |
| Retaining nut/washer (optional, order if req.) | Stainless steel                               |
| Flange retainers (optional, order if req.)     | Stainless steel                               |
| 'O' Rings                                      | Nitrile NI70 or as specified by customer      |

**Notes:**

1. Contact CRE for any special-order materials required

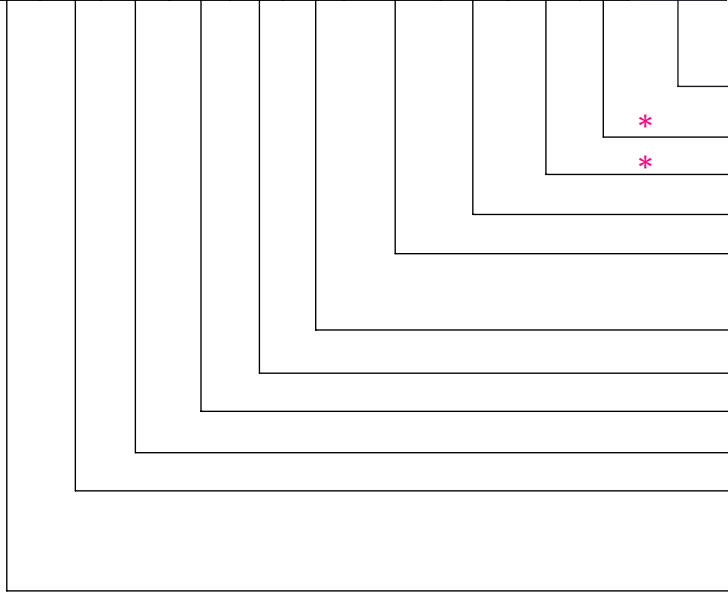


# 'C' HV Electrical Connector Subsea / Underwater / Marine

Part numbering:

Connector example:

|    |   |    |   |    |    |      |    |    |    |        |
|----|---|----|---|----|----|------|----|----|----|--------|
| PL | C | 04 | M | HV | OF | 4500 | 24 | 01 | Ti | 3.3 Kv |
|----|---|----|---|----|----|------|----|----|----|--------|



- Working Voltage
- M.O.C., SS std, Ti, AL, Pk etc.
- Oil filled interface
- Wire gauge
- Moulded cable tail length in mm (i.e 4500mm), standard cores.
- Oil filled, PBOF (Pressure Balanced Oil Filled)
- High Voltage
- Male / Female
- Number of contacts, BC ( Blanking Cap)
- Connector family 'A', 'B', 'C' etc.
  
- PL - Plug in Line
- PR - Plug Right Angle

**Notes:**

- For standard moulded assemblies, the part number structure indicated \* above is left blank.
- Where custom wired moulded tail is required, Engineering will issue a CA\*\*\*\* (Connector Assembly Part Number) to substitute for the wire length/gauge in the part number structure. For example, in the part number above 090024 would be replaced by CA followed by a four digit number to create a unique identifier.

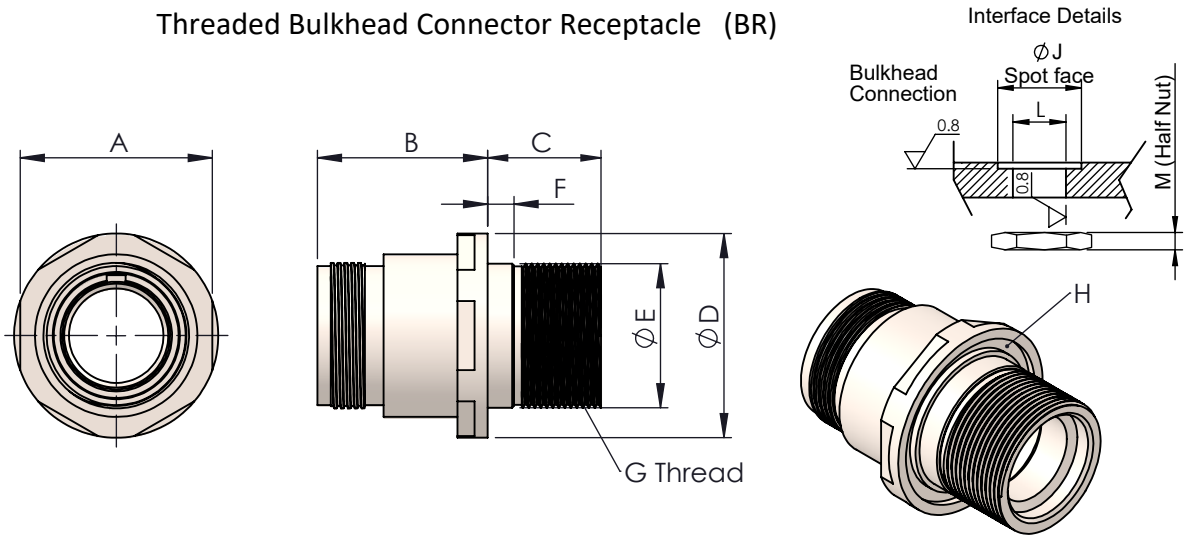
| Component           | Material                                      |
|---------------------|---|
| Connector Body      | Stainless steel 316L standard                 |
| Locking Collar      | Aluminium Nickel Bronze                       |
| Backing Washer      | Acetal  |
| Contact Insert      | Isoval Glass Fabric                           |
| Electrical Contacts | BS2874 CZ121                                  |
| Plating detail      | 1um Acid Gold over 2.5 um Nickel Copper Flash |
| 'O' Rings           | Nitrile NI70 or as specified by customer      |

**Notes:**

- Contact CRE for any special-order materials required
- Penetrator options are also available as required.

# Reference Dimensions 'C' Connector

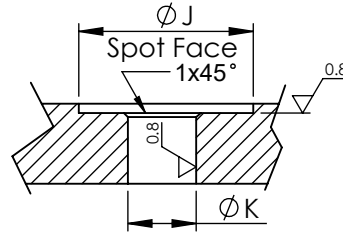
Threaded Bulkhead Connector Receptacle (BR)



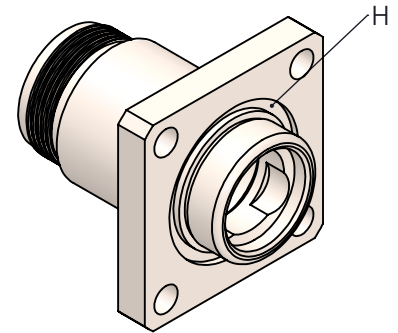
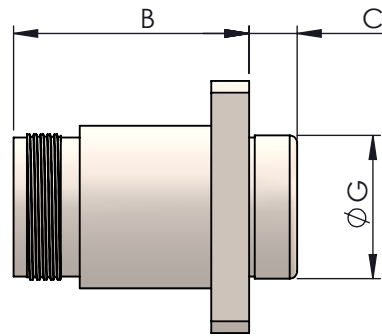
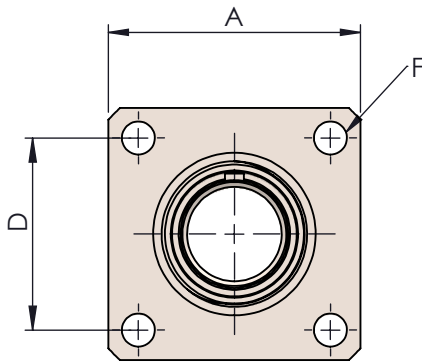
| A    | B  | C  | D  | E    | F | G            | H-'O'Ring | J  | L          | M | TYPE |
|------|----|----|----|------|---|--------------|-----------|----|------------|---|------|
| 50.8 | 45 | 30 | 54 | 38.1 | 7 | 1.1/2"-16 UN | BS130     | 56 | 38.15/38.2 | 6 | 01   |

# Reference Dimensions 'C' Connector

Flanged Bulkhead Connector Receptacle (FR)

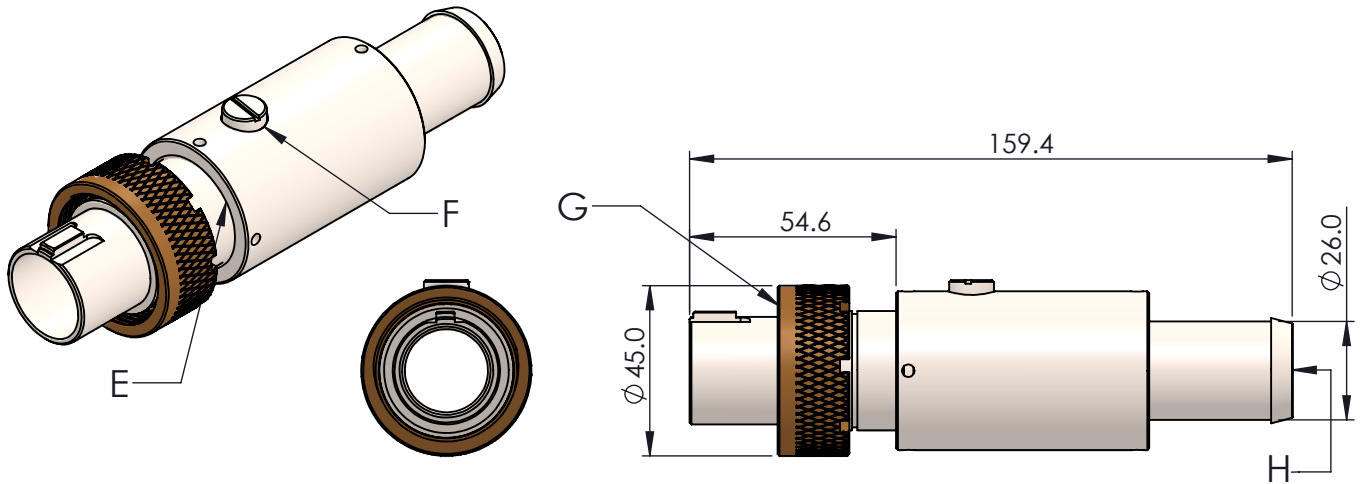


INTERFACE DETAILS



| A    | B    | C    | D    | E     | F    | G     | H-O'Ring | J  | M          | TYPE |
|------|------|------|------|-------|------|-------|----------|----|------------|------|
| 66.7 | 62.3 | 12.7 | 50.8 | 37.85 | 8.75 | 37.85 | BS130    | 96 | 37.95/38.0 | 01   |

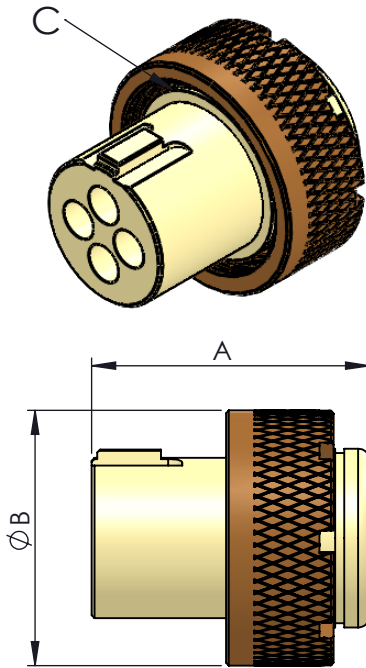
## Reference Dimensions 'C' Connector



| A     | B    | C  | D  | E-'O'Ring | F-'O'Ring | G-'O'Ring | BORE H | TYPE |
|-------|------|----|----|-----------|-----------|-----------|--------|------|
| 159.5 | 54.5 | 45 | 26 | BS025     | 6 x 1.5   | 30 x 2    | 12     | 02   |

# Reference Dimensions 'C' Connector

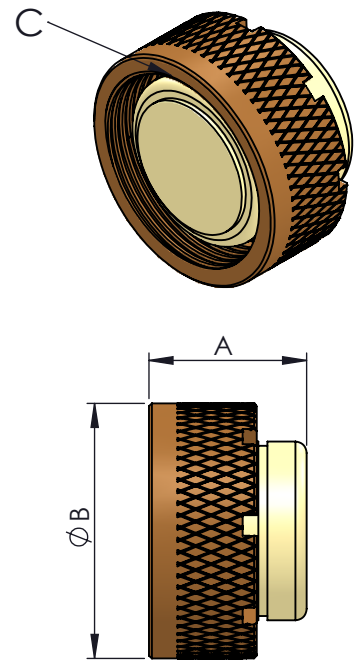
## Bulkhead Blanking Plug - PLCHVBC



MALE BULKHEAD

| FEMALE ASSEMBLY |    |           |
|-----------------|----|-----------|
| A               | B  | C-'O'Ring |
| 49              | 45 | BS025     |

PLC04FHVBC

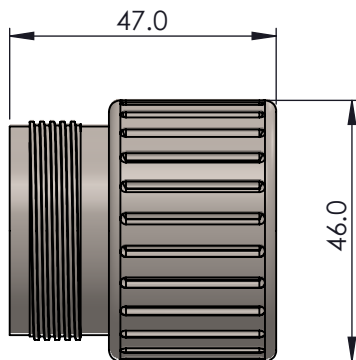


FEMALE BULKHEAD

| MALE ASSEMBLY |    |           |
|---------------|----|-----------|
| A             | B  | C-'O'Ring |
| 28            | 45 | BS025     |

PLCMHVBC

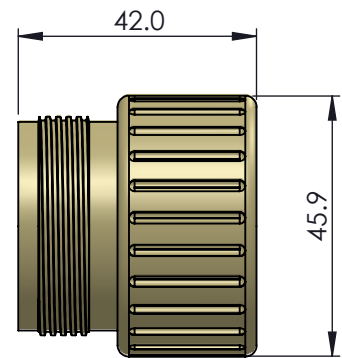
## Cable Connector Blanking Plug - BRCHVBC



MALE CCP

| FEMALE CAP |    |
|------------|----|
| A          | B  |
| 47         | 46 |

BRC04FHVBC



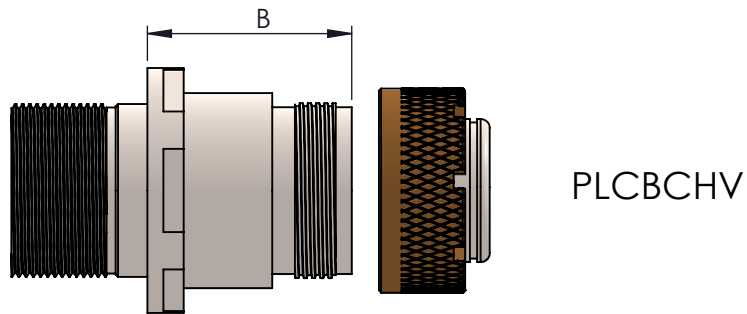
FEMALE CCP

| MALE CAP |    |
|----------|----|
| A        | B  |
| 42       | 46 |

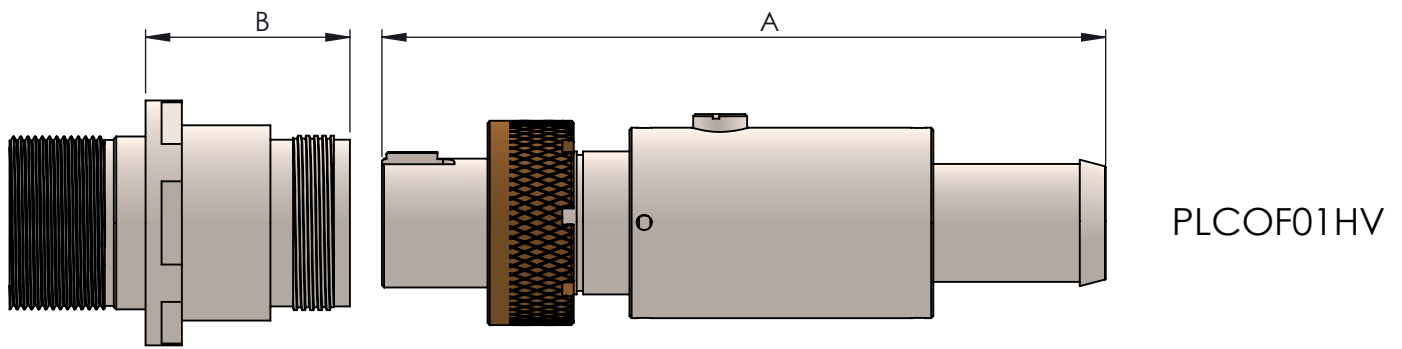
BRCMHVBC



## Assembled Dimensions 'C' Connector



Assembled Dimension = 'B' + 12mm



Assembled Dimension = 'B' + 'A' - 35mm

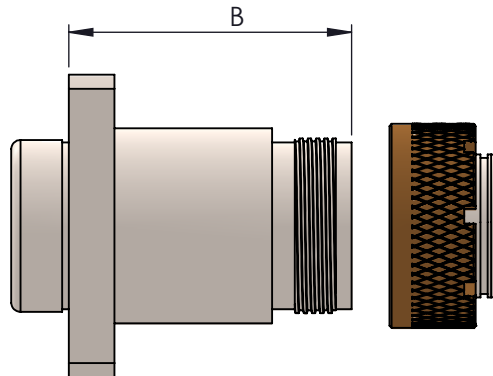
THREADED BULKHEADS  
BRC01

EXAMPLE: BRC01 'B' = 45.0, PLCOF01HV 'A' = 159.5  
THEREFORE ASSEMBLED DIMENSION IS  $45.0 + 159.5 - 35 = 169.5$

Mould Sizes Are Indicative

Note: Step files for design purposes available from [engineering@CRE-marine.com](mailto:engineering@CRE-marine.com)

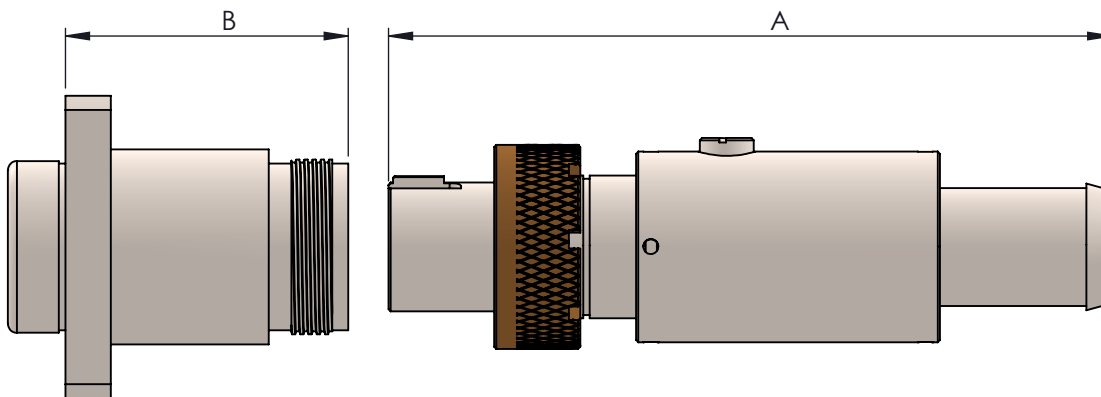
## Assembled Dimensions 'C' Connector



PLCBCHV

Assembled Dimension = 'B' + 12mm

### FLANGED BULKHEADS FRC01



PLCOF01HV

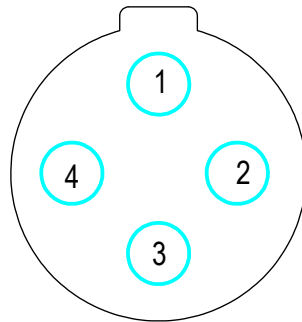
Assembled Dimension = 'B' + 'A' - 35mm

EXAMPLE: FRC01 'B' = 62.0, PLCOF01 'A' = 159.5  
THEREFORE ASSEMBLED DIMENSION IS  $62.0 + 159.5 - 35 = 186.5$

Mould Sizes Are Indicative

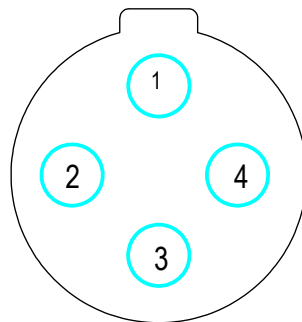
Note: Step files for design purposes available from [engineering@CRE-marine.com](mailto:engineering@CRE-marine.com)

## Pin Face View



4 WAY  
3300 VDC

## Socket Face View



4 WAY  
3300 VDC

  
Ø 3.3 Pin

For current carrying capacity and wire recommendations see page 12

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- The wire options for bulkheads are governed by the through bore of the bulkhead body and the dimensions of the solder bucket on the contact.
- Heat, caused by an electrical current flowing through a conductor will determine the amount of current that the wire will handle.
- The current rating follows industry standards for a single wire in free air at 30 deg. C with derating for bundled wires.
- The table below shows the current required to raise the temperature of a single insulated conductor to the limits of its insulation temperature.

#### Current Capacity and Wire Recommendations

|   |            |
|---|------------|
| <b>Contact dia.</b>                       | <b>3.3</b> |
| Wire size                                 | 8 awg      |
| Current                                   | 50 amps    |
| Contact rating based on PTFE type C cable |            |

| Derating Factors for Bundled Conductors |                          |
|---|--------------------------|
| Bundle #                                | Derating Factor (x Amps) |
| 2 - 5                                   | 0.8                      |

#### Recommended torque for threaded interfaces manufactured in 316L Stainless Steel assembled into metallic housings.

| Thread      | Torque N/m (Lubricated) | Torque Inch Pounds (Lubricated) |
|-------------|-------------------------|---------------------------------|
| 11/2-16 UNS | 15-17                   | 130-140                         |

The table above shows the recommended tightening torque values for threaded bulkhead interfaces into metallic housings.

We recommend the use of a small quantity of anti-seize lubricant such as Copaslip applied to the pin thread as a lubricant to aid the make-up process.

Should you require any further information or advice please contact CRE direct on sales@cre-marine.com