



**HERMETIC AND RUGGEDIZED INTERCONNECTS**

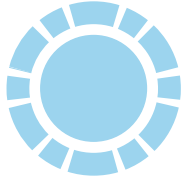


MADE IN USA



**CUSTOM IS OUR STANDARD**

[rampartproducts.com](http://rampartproducts.com)



# CONTENTS

## Applications

Rampart Products provides hermetic & ruggedized interconnect systems and components to many industries including Under Water, Mil/Aero, Oil & Gas, Space, Medical, Pipeline Inspection & Nuclear.

By leveraging an engineering-centric staff from multiple disciplines, Rampart Products is always thinking about better ways to design, manufacture, and perform. The culture of “change for the better” at Rampart translates to the best products with **competitive pricing and shorter lead times**. We are committed to providing the best solution to help lead our valued customer’s success.

Under Water

Oil & Gas

Mil/Aero

Medical

Space



## Products

Custom is our standard. More than 90% of our assemblies are custom engineered for only one user. The common element in our product line is extreme ruggedness.

**07 - RP5 Under Water Series:** Dry Mate - BCR - FCR - CCP - CCR - PBOF - Caps

**20 - Mated Hermetic Inserts**

**22 - Contacts**

**26 - Custom Interconnects**

**28 - HPHT Hermetic:** Booted Single Pin - Rotary Fit - Multi-Pin KTK - Multi-Pin Cup X Cup

# ABOUT RAMPART PRODUCTS

## Manufacturer - Made in USA

Rampart Products, founded in 2016, is a vertically integrated manufacturer that has experienced rapid growth due to our combination of cutting-edge technology and the highest level of customer satisfaction. In 2023, we acquired, fully refurbished, and relocated to a 42k square foot facility in the heart of Houston, Texas, USA to allow us to increase our output 5X! We still house all our corporate departments in the same facility to ensure strong collaboration between engineering, manufacturing and sales.

## Distributors

Rampart has many partners worldwide with varying areas of expertise to assist with the process of sourcing our specialty products:



Global



Canada



AR | LA | OK | TX



China



China



United Kingdom



Germany & Norway



Singapore

## Certifications

Rampart Products is fully certified to both AS9100 and ISO9001. We carry a US Cage Code as authorized suppliers to US defense agencies. Our QMS is a robust fully digital system.



Registrant Code: M49942

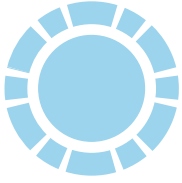


Certificate #AS0174



JCP Certification #0088796

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# COMPARISON OF HERMETICALLY SEALED CONNECTOR TECHNOLOGIES

Three primary methods exist to create a hermetically sealed electrical connector: Glass to Metal, Molded Epoxy, and Molded PEEK. Each method has distinct **advantages and disadvantages**.

## Glass-to-Metal (GTM)

There are two GTM methods with one superior at extreme temperatures and the other superior for higher pressures. Both seals are short, and the **glass is brittle, so the seal is prone to failure** from minor impacts on the end of the conductors such as during maintenance.

A matched thermal expansion method requires the housing, glass seal and conductor to have near equal coefficients of thermal expansion (CTE). A matched thermal expansion GTM is superior sealing at temperatures exceeding 400 °F but is limited to low conductivity materials for conductors.

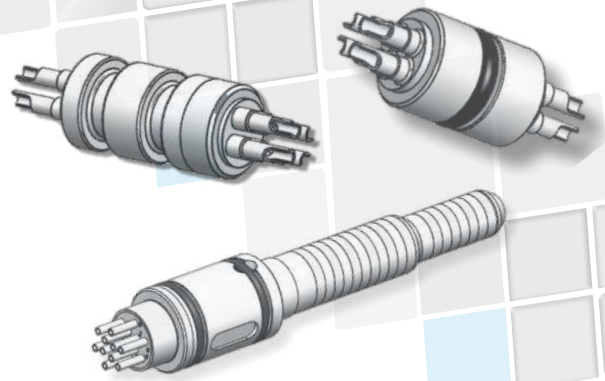
The compression seal method requires the housing to have a higher CTE thus compressing the glass onto the conductor after firing. The compression seal GTM is superior for sealing at pressures to 35,000 psi but is still **limited to low conductivity materials for the conductors**.

## Epoxy

For low pressure applications epoxy with low amounts of filler and open molds are used. For medium pressure applications epoxies filled with short glass fibers and closed molds are used. Both methods provide for a long seal and the epoxy is at least 2X more ductile than glass, so they are less prone to impact failures.

The open mold method allows for sealing odd shapes, requires low investment in manufacturing tooling but is costly due to the high amount of labor and slow cure time of the material. However, the main concern is the **seal is very unreliable** due to the absence of cavity pressure during molding.

The closed mold method is always combined with glass reinforced epoxy (GRE) and requires more manufacturing tooling investment but a lower labor level and faster cure time. The seal is quite reliable, but the **insulating body is still brittle and subject to damage** during maintenance.



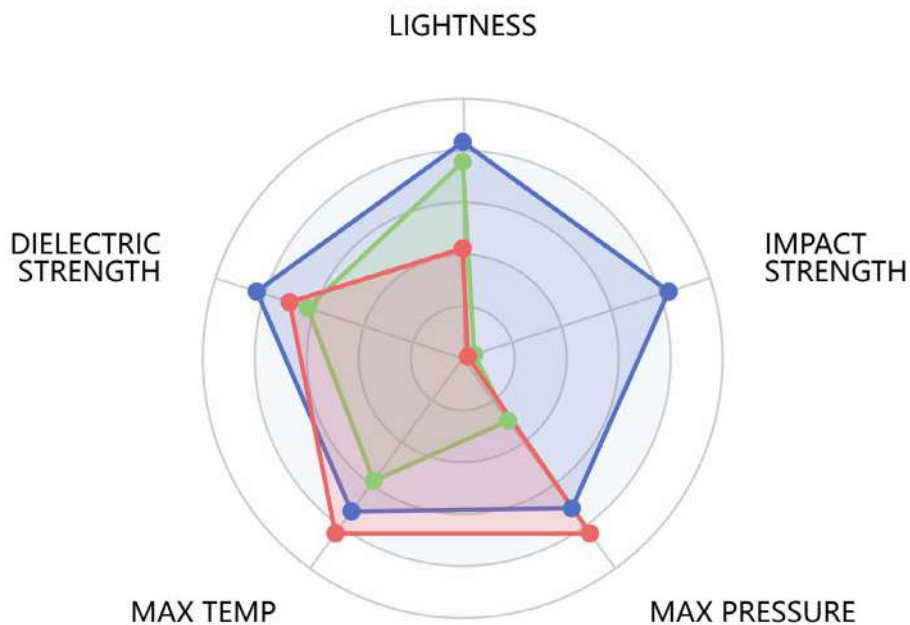
## PEEK

PEEK is the new kid on the block, first used for a hermetic connector in the 1990's. Always made in expensive molds with high pressure injection so they are not low cost. PEEK, and PEK, a higher temperature variant, are 20-40X more impact resistant than epoxies and glasses. This **impact resistance, and long seal length provides the most reliable and durable seal.**

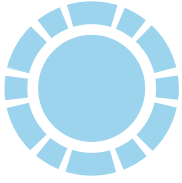
PEEK connectors are not limited to low conductivity conductors. A final trait of PEEK connectors, due to the material strength being near 300 series stainless steel or 6061-T6 aluminum, is **mounting features can often be integrated into the insulator body thus providing a featherweight but super rugged electrical interconnect.**

### PERFORMANCE COMPARISON

■ PEEK 
 ■ EPOXY 
 ■ GLASS







# CAPABILITY STATEMENT



Rampart Products manufactures Hermetic and Ruggedized Electrical Interconnects for commercial and government applications. An agile, certified small business with an engineering-centric staff, Rampart quickly responds to marketplace demands. We consistently outperform our competitors' lead times, which translates to customer success and lower costs.

When considering total life cycle cost or if failure is not an option, know that Rampart is singularly focused on delivering the highest quality products. Our streamlined processes and a fully digital QMS are the cornerstone of our success.

## **What Sets Rampart Products Apart From the Competition?**

- More than 99% of products made in the USA
- Competitive pricing
- Customer has unprecedented access to a responsive engineering staff
- Shorter lead times and 90%+ on-time delivery even though large amount of our sales are development projects

## **Hermetic & High-Pressure Sealing**

Rampart delivers a hermetic "airtight" seal that is helium leak rate tested and qualified to 10-8 cc/sec and liquid pressure tested up to 30,000 psi. This is accomplished by precise mold designs, PEEK material processing expertise and a staff with many years of experience and knowledge.

## **Harsh Environment Survivability**

Rampart Products' founders have over 100 years' experience designing and manufacturing products used in oil/gas drilling applications. The combination of high temperature, high pressure, high shock and vibration (up to **500°F, 30,000 psi, 2000 G's**) – makes it one of the toughest environments known.

This experience allows Rampart to cross over into other applications and use our knowledge to diversify our customer base and product lines.

One example is our entry into Subsea interconnect systems that compete directly yet outperform the industry standard product.

## **Core Capabilities**

Our staff are experts at mold design, molding processes, and precision machining, allowing us to deliver connectors which require:

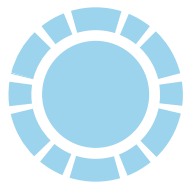
- Hermetic & High-Pressure Sealing
- Harsh Environment Survivability



# UNDER WATER - RP5 SERIES

Rampart Products' RP5 Series is the **most rugged high pressure under water connector** system available. Most variants are available from stock.



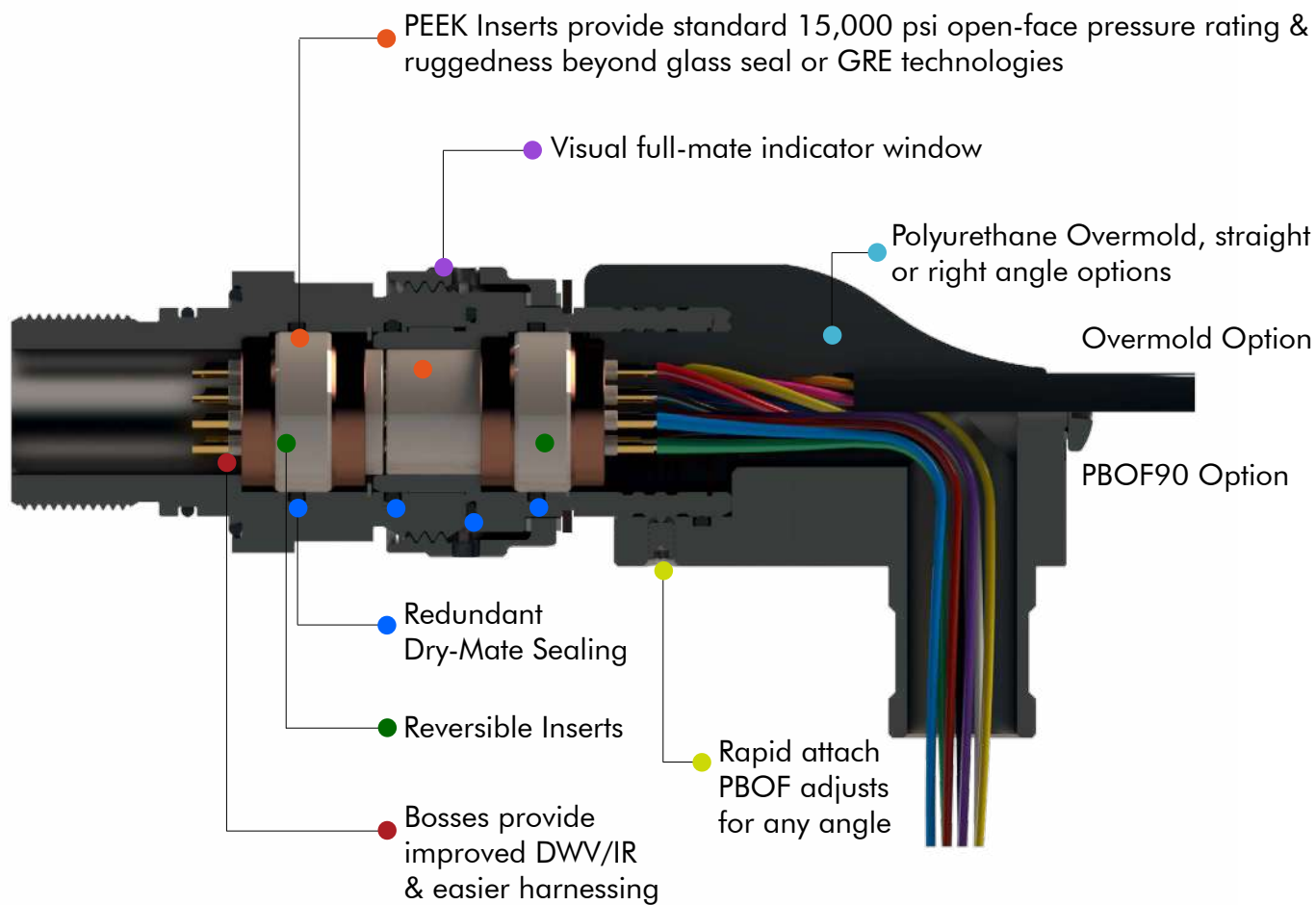


## UNDER WATER RP5 SERIES - DRY MATE

Under water connectors with standard 15,000 psi pressure rating (open faced, closed faced and PBOF), redundant sealing, super rugged PEEK insulators & **reliable delivery dates**.

Injection Molded PEEK is the most rugged electrical insulator technology available; easily outperforming glass to metal seals or glass reinforced epoxy (GRE). This prevents electrical shorts due to cracked glass seals or chipped glass reinforced epoxy insulators.

The connectors can be sold in kit form, or as factory terminated assemblies.





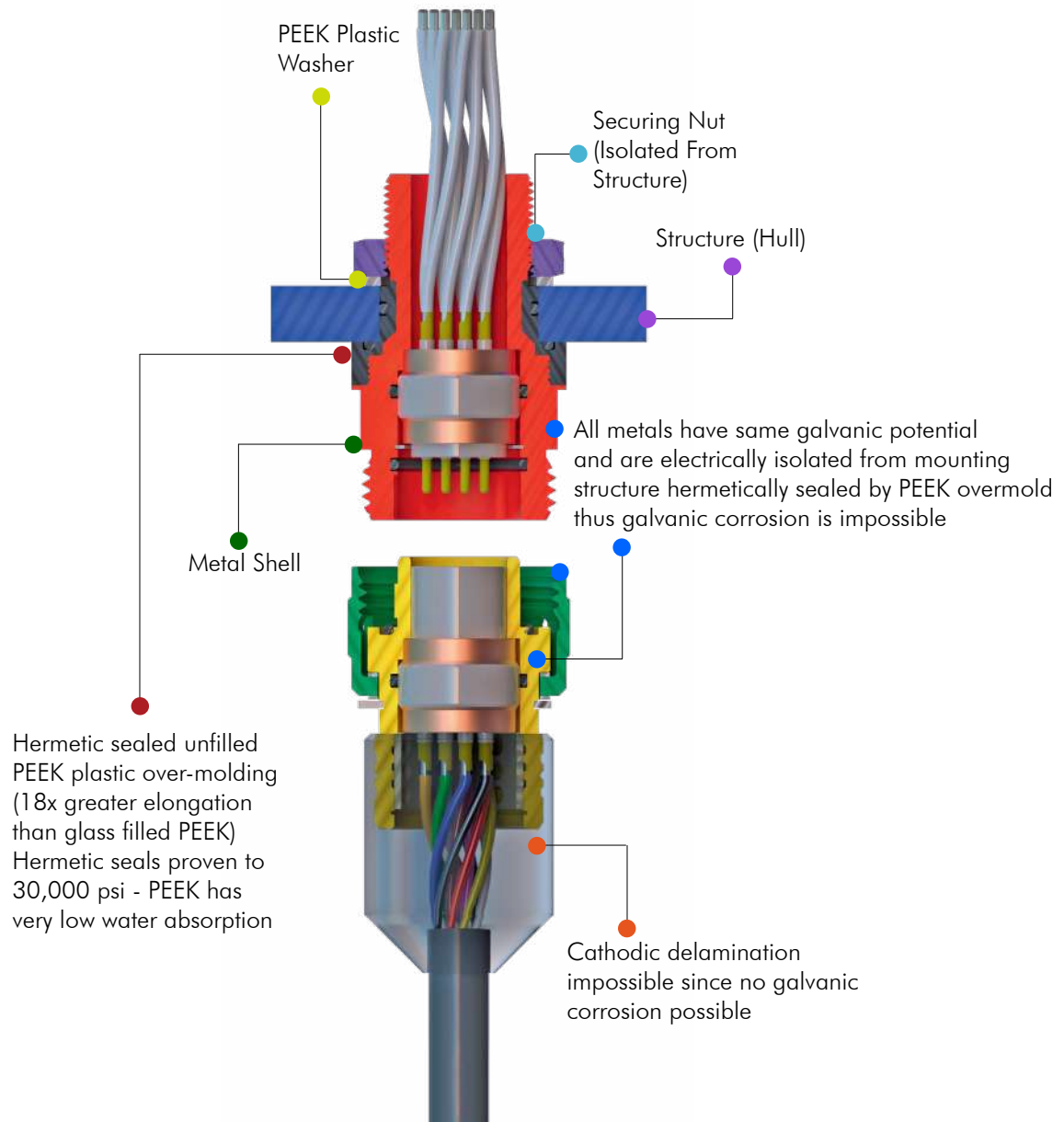


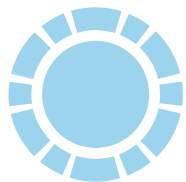
# KAHUNA

## CORROSION PROOF UNDERWATER CONNECTOR SYSTEM

**100% ELIMINATES CATHODIC DELAMINATION**

RP5 KAHUNA - DRY-MATE





## UNDER WATER RP5 SERIES - DRY MATE

Rampart Products Under Water connectors are **available in all common shell types as well as custom solutions.**

**BCR** - Bulkhead Connector, Receptacle



**BCR - Kahuna** - To eliminate cathodic delamination



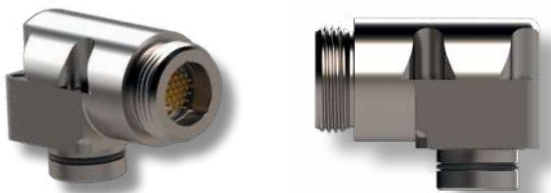
**FCR** - Flange Connector, Receptacle



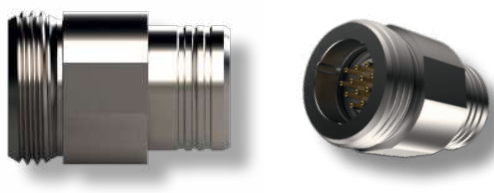
**FCR - Kahuna** - To eliminate cathodic delamination



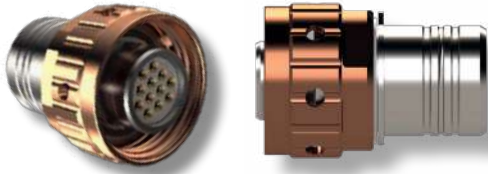
**FCR90** - Flange Connector, Receptacle  
Low Profile, 90 degrees



**CCR** - Cable Connector, Receptacle



**CCP** - Cable Connector, Plug



**CCP - Kahuna** - To eliminate cathodic delamination



**PBOF** - Pressure balanced oil filled, use with CCP and CCR.



**PBOF90** - Pressure balanced oil filled, use with CCP and CCR



**CAPS - SPLASH AND PRESSURE PROOF**

**Plug Protector** Splash Proof



**Receptacle Protector** Splash Proof

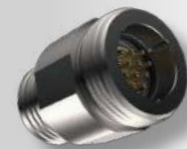
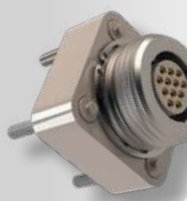
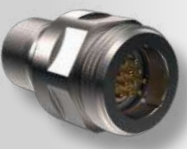


**Plug Protector** High Pressure



**Receptacle Protector** High Pressure





# UNDER WATER RP5 SERIES - DRY MATE



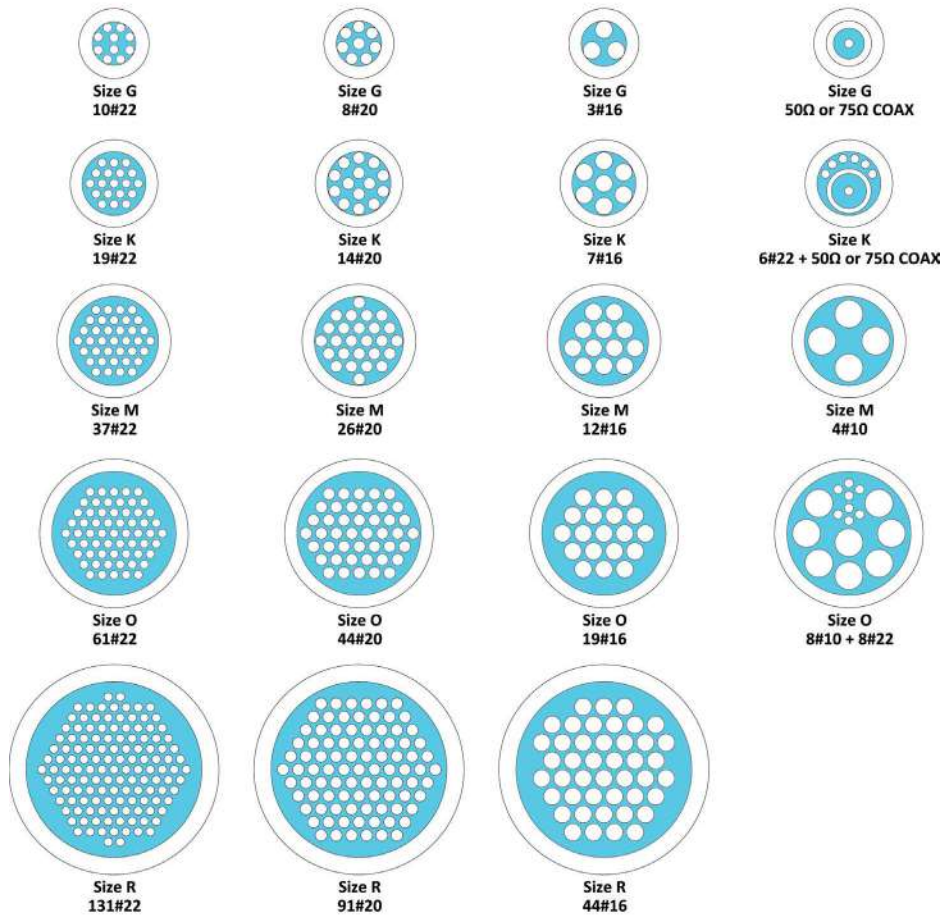
| RP5 MATERIALS                         |   |
|---------------------------------------|---|
| <b>Shells</b>                         | STD: 316 Stainless Steel - Passivated                     |
|                                       | OPT: Titanium<br>(other materials available upon request) |
| <b>CCP Nut</b>                        | STD: C630 Bronze  |
|                                       | Alternate Materials: Inquire                              |
| <b>Insert Body</b>                    | PEEK  |
| <b>Support Disk</b>                   | Copper Alloy  |
| <b>Electrical Contacts</b>            | Gold Plated Copper Alloy                                  |
| <b>Retaining Rings</b>                | 316 Stainless Steel<br>Alternate Materials: Inquire       |
| <b>PBOF Locking Screws &amp; Ring</b> |   |
| <b>CCP Nut Washers</b>                | Acetal  |
| <b>O-ring Seals</b>                   | NBR 90A Durometer   |

| RP5 PERFORMANCE SPECIFICATIONS |   |
|--------------------------------|---|
| <b>Pressure</b>                | 15,000 psi Open Faced, Closed Face and PBOF |
| <b>Temperature</b>             | STD: -30°F to 350°F*                        |
| <b>Voltage</b>                 | STD: 600 VDC *                              |
| <b>Amperage</b>                | #22: 7 Amps                                 |
|                                | #20: 11 Amps                                |
|                                | #16: 22 Amps                                |
|                                | #10: 42 Amps                                |
| <b>Insulation Resistance</b>   | 5 GΩ @ 1000 VDC @ ambient                   |

\* Higher temperature and higher voltage available upon request, above 180°F alternate FKM o-rings, CCP Nut Washers + Spacer must be used.

## STANDARD INSERT CONFIGURATIONS

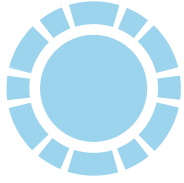
Standard insert configurations are **rapidly available and at low cost**. Custom configurations available. View shown is front of male.



| Rampart UWC - How to Order RP5BCR-K6#22-MSAX |  |     |     |    |      |    |   |   |   |
|--|--|-----|-----|----|------|----|---|---|---|
| Sample Part number                           |  | RP5 | BCR | -K | 6#22 | -M | S | A | X |
| Series                                       | RP5 (Metal Shell)                                    |     |     |    |      |    |   |   |   |
| Connector Style                              | FCR, FCR90, BCR, CCP, CCR                            |     |     |    |      |    |   |   |   |
| Shell Size                                   | G, K, M, O, R  |     |     |    |      |    |   |   |   |
| Contact Arrangement                          | See contact arrangement standard options in catalog. |     |     |    |      |    |   |   |   |
| Contact Style                                | M = Male (Pins), F = Female (Sockets)                |     |     |    |      |    |   |   |   |
| Shell Material                               | S = 316 Stainless Steel, T = Titanium                |     |     |    |      |    |   |   |   |
| Key Position                                 | A = Standard, B, C                                   |     |     |    |      |    |   |   |   |
| Standard:                                    | NO OPTION  |     |     |    |      |    |   |   |   |

**Items quoted separately:** BCR Nut and Washer; Cable and Overmold (CCP & CCR); Receptacle flying leads.

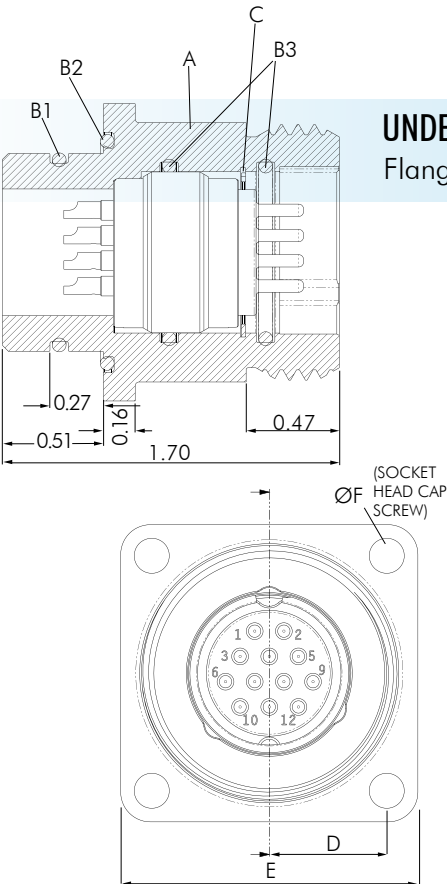
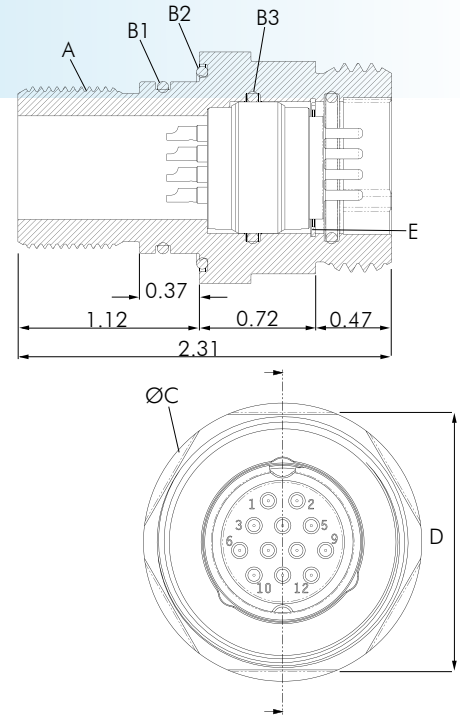




# COMPONENTS / DIMENSIONS (INCHES)

## UNDER WATER RP5 SERIES - BCR Bulkhead Connector, Receptacle

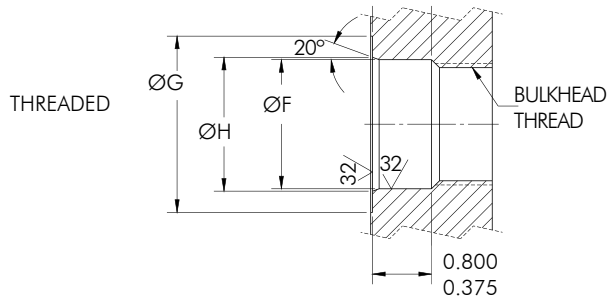
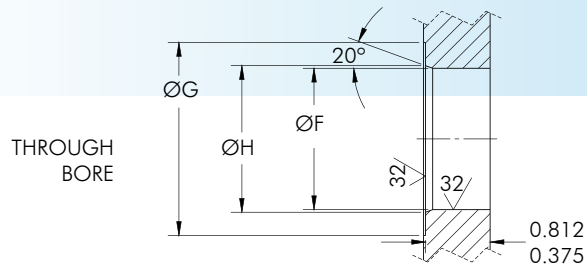
| BCR COMPONENTS / DIMENSIONS (INCHES) |                                   |  |  |                                 |          |                     |                        |
|--------------------------------------|-----------------------------------|--|--|---------------------------------|----------|---------------------|------------------------|
| SIZE                                 | A<br>BULKHEAD<br>THREAD<br>(CL 2) | B1<br>EXTERNAL<br>O-RING<br>(RADIAL<br>SEAL) | B2<br>EXTERNAL<br>O-RING<br>(FACE<br>SEAL) | 2X<br>B3<br>INTERNAL<br>O-RINGS | $\phi$ C | D<br>(HEX<br>FLATS) | E<br>RETAINING<br>RING |
| G                                    | 5/8 - 24 UNEF                     | 2-015  | 2-019                                      | 2-014                           | 1.06     | 0.938               | VH-50                  |
| K                                    | 3/4 - 20 UNEF                     | 2-017  | 2-020                                      | 2-016                           | 1.18     | 1.063               | VH-62                  |
| M                                    | 1 - 20 UNEF                       | 2-021  | 2-024                                      | 2-019                           | 1.43     | 1.313               | VH-81                  |
| O                                    | 1 1/8 - 16 UN                     | 2-023  | 2-027                                      | 2-023                           | 1.68     | 1.563               | VH-106                 |
| R                                    | 1 1/2 - 16 UN                     | 2-029  | 2-031                                      | 2-029                           | 2.06     | 1.938               | VH-150                 |



## UNDER WATER RP5 SERIES - FCR Flange Connector, Receptacle

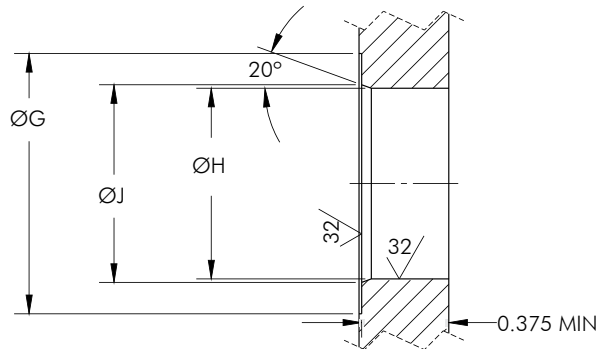
| FCR COMPONENTS / DIMENSIONS (INCHES) |          |  |  |                                 |                        |       |             |  |
|--------------------------------------|----------|--|--|---------------------------------|------------------------|-------|-------------|--|
| SIZE                                 | $\phi$ A | B1<br>EXTERNAL<br>O-RING<br>(RADIAL<br>SEAL) | B2<br>EXTERNAL<br>O-RING<br>(FACE<br>SEAL) | 2X<br>B3<br>INTERNAL<br>O-RINGS | C<br>RETAINING<br>RING | D     | E<br>SQUARE | 4X<br>$\phi$ F<br>FITS SOCKET<br>HEAD CAP<br>SCREW |
| G                                    | 0.933    | 2-015  | 2-019                                      | 2-014                           | VH-50                  | 0.453 | 1.12        | 4-40 UNC   |
| K                                    | 1.058    | 2-016  | 2-020                                      | 2-016                           | VH-62                  | 0.510 | 1.25        | 6-32 UNC   |
| M                                    | 1.308    | 2-020  | 2-023                                      | 2-019                           | VH-81                  | 0.593 | 1.50        | 8-32 UNC   |
| O                                    | 1.558    | 2-022  | 2-026                                      | 2-023                           | VH-106                 | 0.723 | 1.75        | 8-32 UNC   |
| R                                    | 1.933    | 2-028  | 2-030                                      | 2-029                           | VH-150                 | 0.884 | 2.12        | 10-24 UNC  |

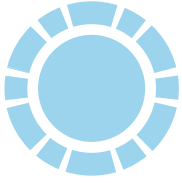
# MOUNTING DIMENSIONS (INCHES)



| <b>BCR MOUNTING DIMENSIONS</b>               |                    |                       |                   |  |
|--|--------------------|-----------------------|-------------------|--|
| Nut/washer available for through bore mount. |                    |                       |                   |  |
| SIZE   | ØF<br>+002<br>-000 | ØG<br>MIN<br>SPOTFACE | ØH<br>+/-<br>0.01 | MOUNTING<br>TORQUE<br>(UNLUBRICATED)<br>FT-LB<br>+/- 10% |
| <b>G</b>                                     | 0.687              | 1.08                  | 0.737             | 30   |
| <b>K</b>                                     | 0.812              | 1.20                  | 0.862             | 35   |
| <b>M</b>                                     | 1.062              | 1.45                  | 1.112             | 35   |
| <b>O</b>                                     | 1.187              | 1.70                  | 1.237             | 50   |
| <b>R</b>                                     | 1.625              | 2.08                  | 1.675             | 60   |

| <b>FCR MOUNTING DIMENSIONS</b> |              |                  |                    |                |
|--------------------------------|--------------|------------------|--------------------|----------------|
| SIZE                           | ØG           |                  | ØH<br>+002<br>-000 | ØJ<br>+/- 0.01 |
|                                | MIN SPOTFACE | DEPTH            |                    |                |
|                                |              | <b>&lt;0.001</b> | <b>&gt;0.001</b>   |                |
| <b>G</b>                       | 1.00         | 1.56             | 0.687              | 0.737          |
| <b>K</b>                       | 1.12         | 1.75             | 0.750              | 0.800          |
| <b>M</b>                       | 1.31         | 2.12             | 1.000              | 1.050          |
| <b>O</b>                       | 1.50         | 2.44             | 1.125              | 1.175          |
| <b>R</b>                       | 1.87         | 3.00             | 1.500              | 1.550          |

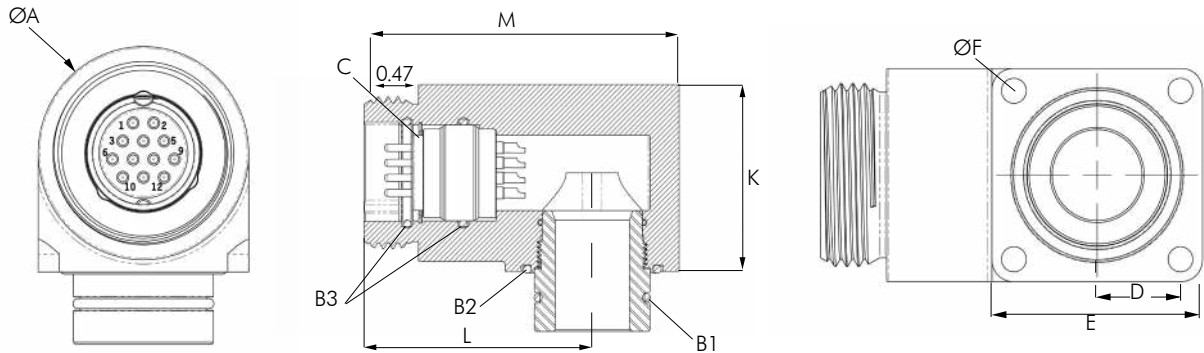




# COMPONENTS / DIMENSIONS (INCHES)

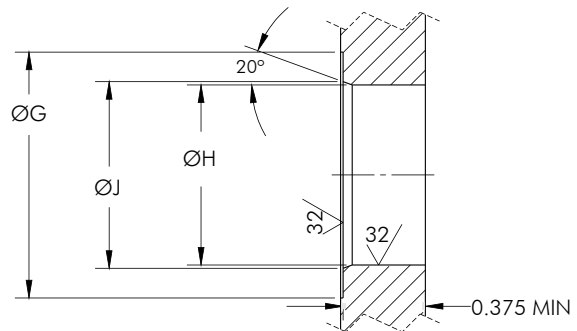
## UNDER WATER RP5 SERIES - FCR90

Flange Connector, Receptacle - Right Angle, Low Profile



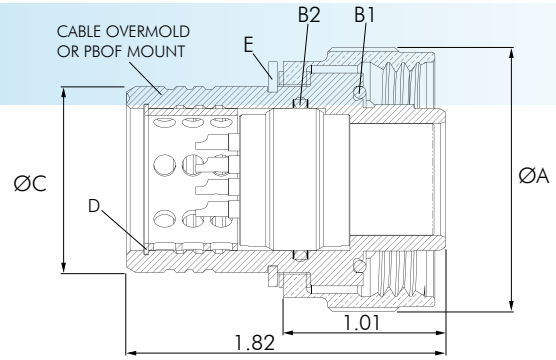
| FCR COMPONENTS / DIMENSIONS (INCHES) |                 |  |  |                                 |                        |       |             |  |       |       |       |
|--------------------------------------|-----------------|--|--|---------------------------------|------------------------|-------|-------------|--|-------|-------|-------|
| SIZE                                 | $\varnothing A$ | B1<br>EXTERNAL<br>O-RING<br>(RADIAL<br>SEAL) | B2<br>EXTERNAL<br>O-RING<br>(FACE<br>SEAL) | 2X<br>B3<br>INTERNAL<br>O-RINGS | C<br>RETAINING<br>RING | D     | E<br>SQUARE | 4X<br>$\varnothing F$<br>FITS<br>SOCKET<br>HEAD CAP<br>SCREW | K     | L     | M     |
| G                                    | 1.120           | 2-015  | 2-019                                      | 2-014                           | VH-50                  | 0.453 | 1.12        | 4-40 UNC   | 1.395 | 1.845 | 2.405 |
| K                                    | 1.250           | 2-016  | 2-020                                      | 2-016                           | VH-62                  | 0.510 | 1.25        | 6-32 UNC   | 1.460 | 1.845 | 2.47  |
| M                                    | 1.500           | 2-020  | 2-023                                      | 2-019                           | VH-81                  | 0.593 | 1.50        | 8-32 UNC   | 1.585 | 1.969 | 2.719 |
| O                                    | 1.750           | 2-022  | 2-026                                      | 2-023                           | VH-106                 | 0.723 | 1.75        | 8-32 UNC   | 1.710 | 2.032 | 2.907 |
| R                                    | 2.120           | 2-028  | 2-030                                      | 2-029                           | VH-150                 | 0.884 | 2.12        | 10-24 UNC  | 1.895 | 2.219 | 3.339 |

| MOUNTING DIMENSIONS |                                 |                 |                                  |                                |
|---------------------|---------------------------------|-----------------|----------------------------------|--------------------------------|
| SIZE                | $\varnothing G$                 |                 | $\varnothing H$<br>+002<br>- 000 | $\varnothing J$<br>+/-<br>0.01 |
|                     | MIN SPOTFACE<br>DEPTH<br><0.001 | DEPTH<br>>0.001 |                                  |                                |
| G                   | 1.00                            | 1.56            | 0.687                            | 0.737                          |
| K                   | 1.12                            | 1.75            | 0.750                            | 0.800                          |
| M                   | 1.31                            | 2.12            | 1.000                            | 1.050                          |
| O                   | 1.50                            | 2.44            | 1.125                            | 1.175                          |
| R                   | 1.87                            | 3.00            | 1.500                            | 1.550                          |



## UNDER WATER RP5 SERIES - CCP

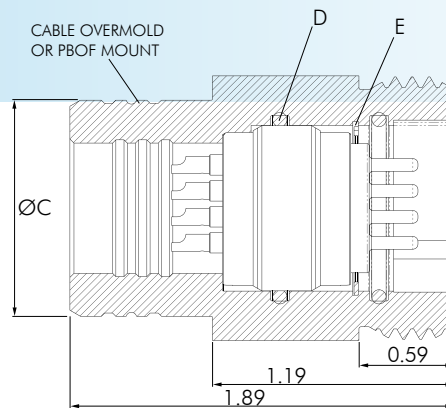
Cable Connector, Plug



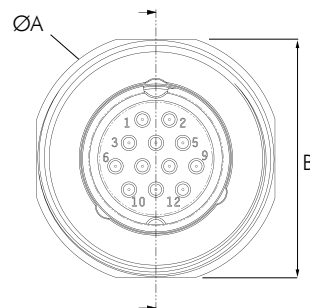
| CCP COMPONENTS / DIMENSIONS (INCHES) |      |   |   |       |                        |                        |
|--------------------------------------|------|---|---|-------|------------------------|------------------------|
| SIZE                                 | ØA   | B1<br>INTERNAL<br>O-RING<br>(FACE SEAL) | B2<br>INTERNAL<br>O-RING<br>(RADIAL SEAL) | ØC    | D<br>RETAINING<br>RING | E<br>RETAINING<br>RING |
| G                                    | 1.15 | 2-016                                   | 2-014                                     | 0.750 | VH-50                  | RSSE-075-CSOP          |
| K                                    | 1.27 | 2-018                                   | 2-016                                     | 0.875 | VH-62                  | RSSE-087-CSOP          |
| M                                    | 1.51 | 2-021                                   | 2-019                                     | 1.062 | VH-81                  | RSSE-106-CSOP          |
| O                                    | 1.74 | 2-025                                   | 2-023                                     | 1.250 | VH-106                 | RSSE-125-CSOP          |
| R                                    | 2.14 | 2-030                                   | 2-029                                     | 1.750 | VH-150                 | RSSE-175-CSOP          |

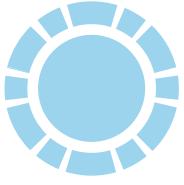
## UNDER WATER RP5 SERIES - CCR

Cable Connector, Receptacle



| CCR COMPONENTS / DIMENSIONS (INCHES) |      |              |       |                            |                        |
|--------------------------------------|------|--------------|-------|----------------------------|------------------------|
| SIZE                                 | ØA   | B<br>(FLATS) | ØC    | 2X<br>D<br>INTERNAL O-RING | E<br>RETAINING<br>RING |
| G                                    | 1.00 | 0.92         | 0.75  | 2-014                      | VH-50                  |
| K                                    | 1.12 | 1.05         | 0.875 | 2-016                      | VH-62                  |
| M                                    | 1.37 | 1.30         | 1.062 | 2-019                      | VH-81                  |
| O                                    | 1.62 | 1.55         | 1.250 | 2-023                      | VH-106                 |
| R                                    | 2.00 | 1.90         | 1.750 | 2-029                      | VH-150                 |

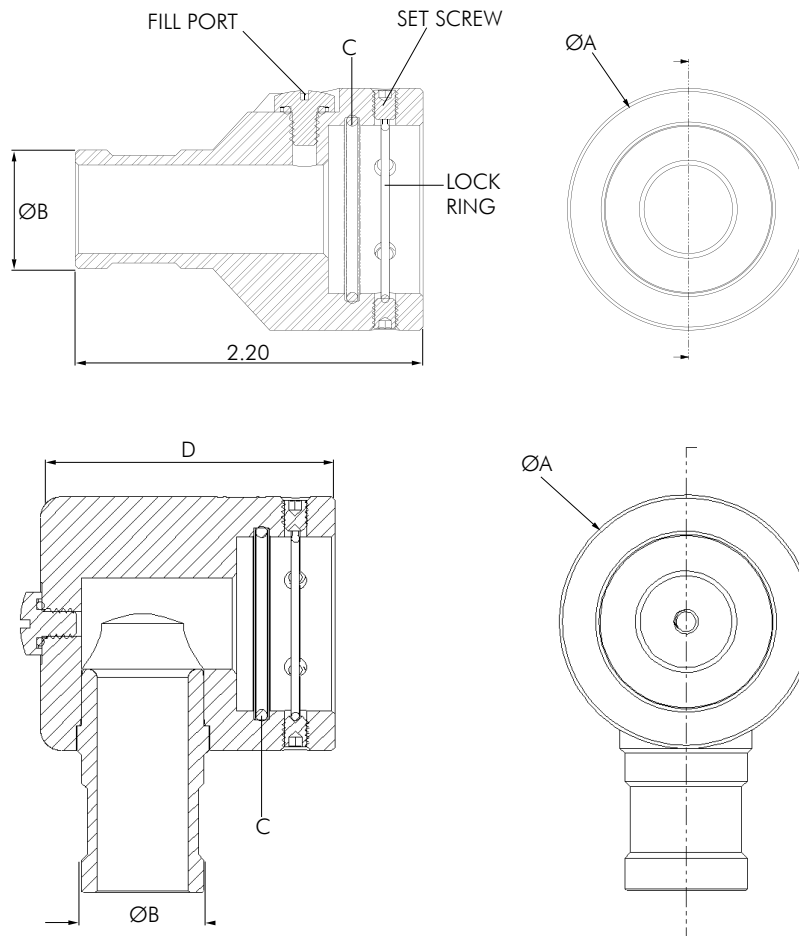




## COMPONENTS / DIMENSIONS (INCHES)

### UNDER WATER RP5 SERIES - PBOF ADAPTER

Pressure balanced oil filled, use with CCP and CCR.



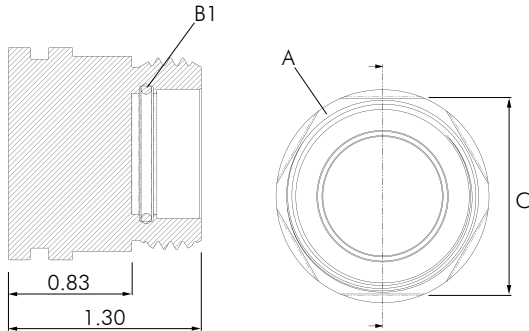
| PBOF COMPONENTS / DIMENSIONS (INCHES) |                 |                 |       |      | P/N'S     |              |
|---------------------------------------|-----------------|-----------------|-------|------|-----------|--------------|
| SIZE                                  | $\varnothing A$ | $\varnothing B$ | C     | D    | STRAIGHT  | RIGHT ANGLE  |
| G                                     | 1.24            | 0.62            | 2-018 | 1.67 | RP5PBOF-G | RP5PBOF-90-G |
| K                                     | 1.36            | 0.62            | 2-020 | 1.67 | RP5PBOF-K | RP5PBOF-90-K |
| M                                     | 1.55            | 0.75            | 2-023 | 1.80 | RP5PBOF-M | RP5PBOF-90-M |
| O                                     | 1.74            | 1.12            | 2-026 | 2.17 | RP5PBOF-O | RP5PBOF-90-O |
| R                                     | 2.24            | 1.25            | 2-031 | 2.30 | RP5PBOF-R | RP5PBOF-90-R |



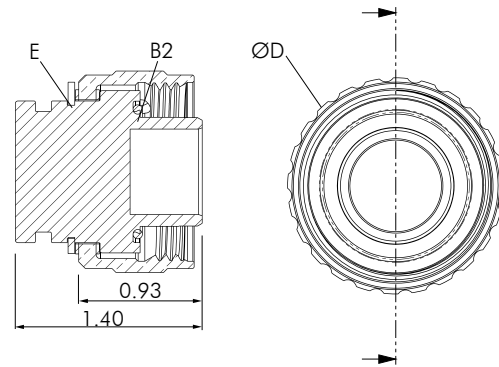


# SPLASH AND PRESSURE PROOF

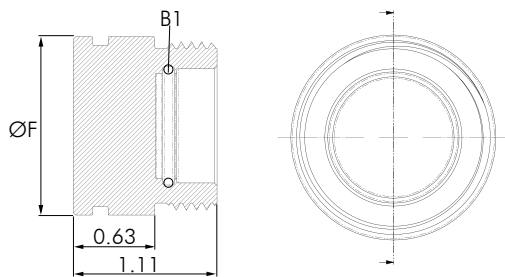
PLUG PROTECTOR HIGH PRESSURE



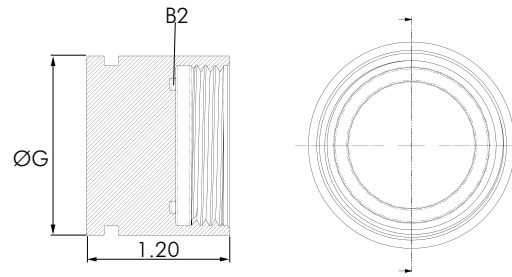
RECEPTACLE PROTECTOR HIGH PRESSURE



PLUG PROTECTOR SPLASH PROOF



RECEPTACLE PROTECTOR SPLASH PROOF

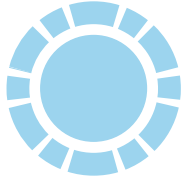


## CAP DIMENSIONS (INCHES)

| SIZE | A    | B1<br>O-RING | B2<br>O-RING | C<br>HEX | ØD   | E<br>RETAINING RING | ØF   | ØG   |
|------|------|--------------|--------------|----------|------|---------------------|------|------|
| G    | 1.06 | 2-014        | 2-016        | 0.938    | 1.15 | RSSE-075-CSOP       | 1.25 | 1.10 |
| K    | 1.18 | 2-016        | 2-018        | 1.063    | 1.27 | RSSE-087-CSOP       | 1.40 | 1.25 |
| M    | 1.43 | 2-019        | 2-021        | 1.313    | 1.51 | RSSE-106-CSOP       | 1.50 | 1.43 |
| O    | 1.68 | 2-023        | 2-025        | 1.563    | 1.74 | RSSE-125-CSOP       | 1.80 | 1.68 |
| R    | 2.06 | 2-029        | 2-030        | 1.938    | 2.14 | RSSE-175-CSOP       | 2.38 | 2.12 |

## PART NUMBERS

| SIZE | PLUG PROTECTOR<br>HIGH PRESSURE | RECEPTACLE<br>PROTECTOR HIGH<br>PRESSURE | PLUG<br>PROTECTOR<br>SPLASH PROOF | RECEPTACLE<br>PROTECTOR<br>SPLASH PROOF |
|------|---------------------------------|--|-----------------------------------|---|
| G    | RP5-PP-HP-G                     | RP5-RP-HP-G                              | RP5-PP-SP-G                       | RP5-RP-SP-G                             |
| K    | RP5-PP-HP-K                     | RP5-RP-HP-K                              | RP5-PP-SP-K                       | RP5-RP-SP-K                             |
| M    | RP5-PP-HP-M                     | RP5-RP-HP-M                              | RP5-PP-SP-M                       | RP5-RP-SP-M                             |
| O    | RP5-PP-HP-O                     | RP5-RP-HP-O                              | RP5-PP-SP-O                       | RP5-RP-SP-O                             |
| R    | RP5-PP-HP-R                     | RP5-RP-HP-R                              | RP5-PP-SP-R                       | RP5-RP-SP-R                             |

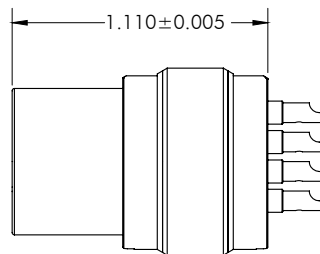
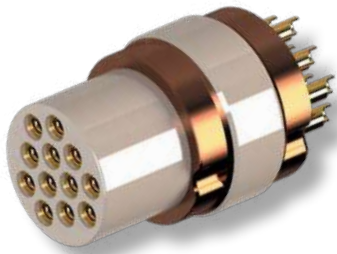
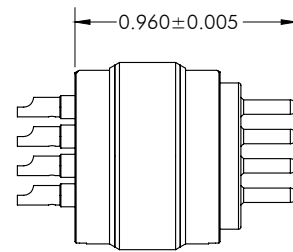
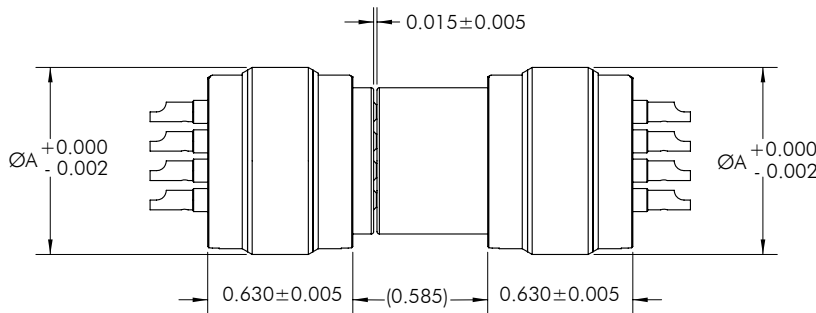


# INSERTS



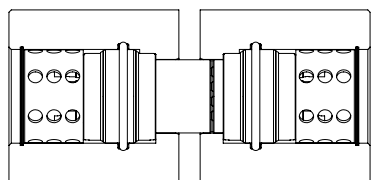
For the engineer that wants to control the design of their own interconnect, Rampart Products is **now offering our standard inserts from the RP5 Series** connector product line.

The inserts shown are all rated for high pressure (15,000 psi) and high temperature (200C), using an oring seal and integrated clocking features to fully realize your design's intent. Customer level drawings and STP files are available to aid the design process.



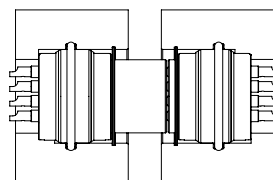
| DIMENSIONS (INCHES) |       |
|---------------------|-------|
| SIZE                | øA    |
| G                   | 0.500 |
| K                   | 0.625 |
| M                   | 0.812 |
| O                   | 1.062 |
| R                   | 1.500 |

## MOUNTING DETAIL MATE



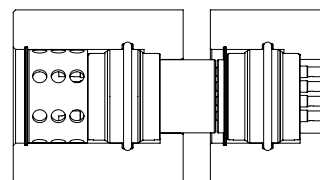
REAR LOAD

REAR LOAD



FRONT LOAD

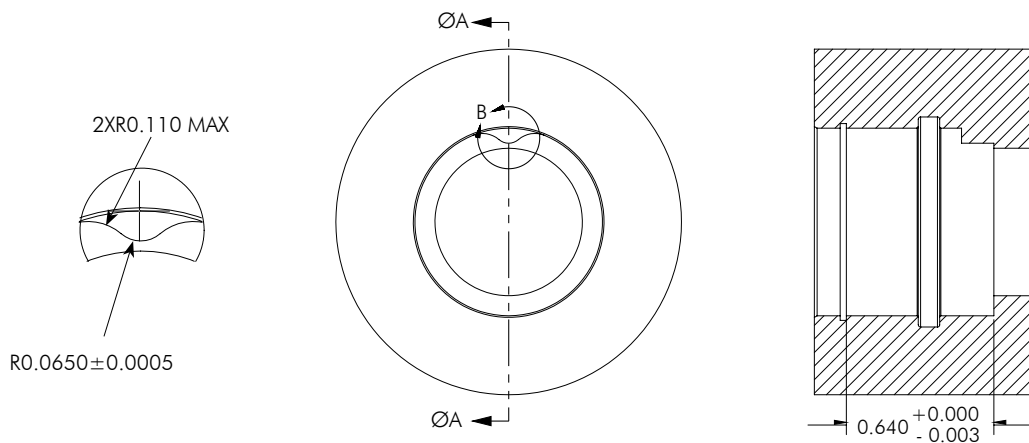
FRONT LOAD



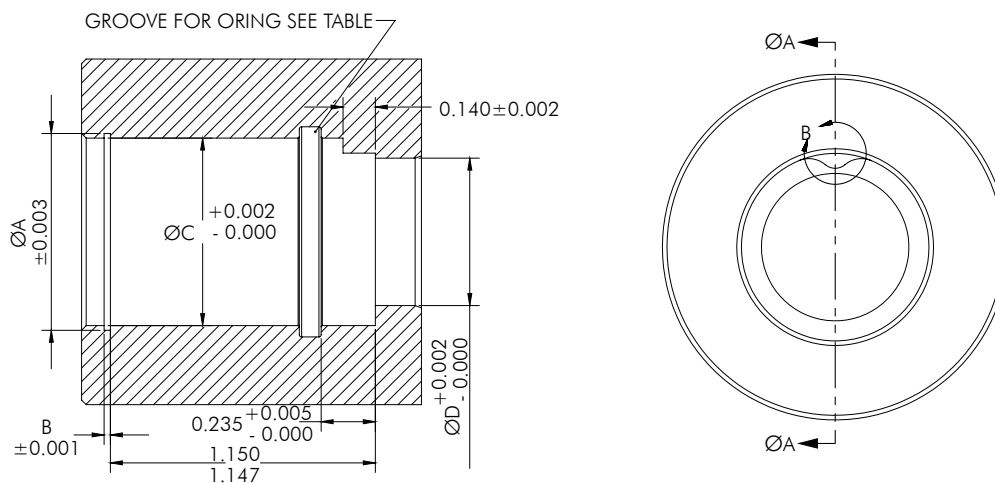
MIXED



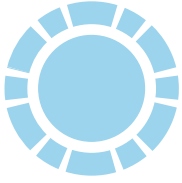
### MOUNTING DETAIL FRONT LOAD



### MOUNTING DETAIL REAR LOAD

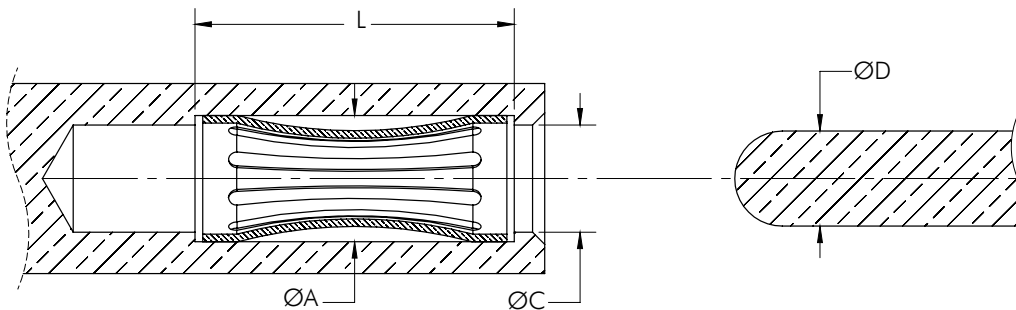


| SIZE | O-RING | øA    | B     | C     | D     |
|------|--------|-------|-------|-------|-------|
| G    | 2-014  | 0.528 | 0.023 | 0.502 | 0.357 |
| K    | 2-016  | 0.653 | 0.023 | 0.627 | 0.460 |
| M    | 2-019  | 0.854 | 0.027 | 0.814 | 0.640 |
| O    | 2-023  | 1.106 | 0.032 | 1.064 | 0.851 |
| R    | 2-029  | 1.544 | 0.032 | 1.502 | 1.155 |



## CONTACTS

For applications where reliability is paramount, space is limited, and high current is a requirement, the Rampart hourglass contact design offers an unparalleled solution.



| PERFORMANCE SPECIFICATIONS |                         |
|----------------------------|-------------------------|
| <b>Material</b>            | C17200 Copper Beryllium |
| <b>Finish</b>              | Gold Plate              |
| <b>Max. Temperature</b>    | 400°F                   |
| <b>Amperage</b>            | #22: 7 Amps             |
|                            | #20: 11 Amps            |
|                            | #16: 22 Amps            |

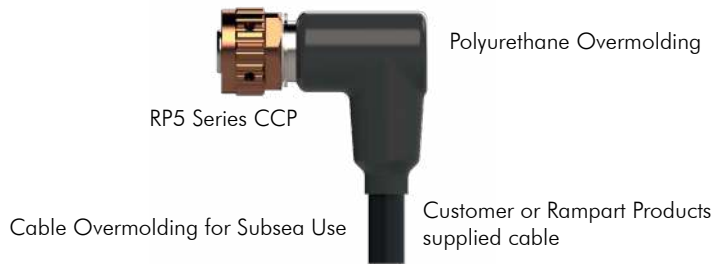


| PART NUMBERS |             |                          |               |              |       |
|--------------|-------------|--------------------------|---------------|--------------|-------|
| SIZE         | PART NUMBER | ØA<br>+0.0000<br>-0.0010 | ØC<br>±0.0010 | L<br>±0.0040 | ØD    |
| #22          | C100417-22  | 0.0515                   | 0.0380        | 0.2100       | 0.031 |
| #20          | C100417-20  | 0.0615                   | 0.0480        | 0.2100       | 0.040 |
| #16          | C100417-16  | 0.0840                   | 0.0705        | 0.2100       | 0.063 |

## VALUE ADDED SERVICES

Rampart Products offers **additional services to complement our ruggedized connectors**. This includes:

- Wire harnessing (tech certified to IPC-A-610)
- Cable assembly (polyurethane over-mold)
- Potting/Strain relieving



**Standard 4-way Rotatable Set with Wire**

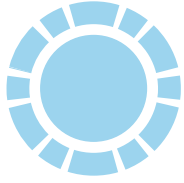


**Custom 7-way Bulkhead with MDM**

**Assembly for BabelFish Interface**







## INNOVATION: RAMTAC™

Since its inception, we have put thousands of connectors in service, being subjected to the most rugged conditions – logging millions of hours in **extreme environments with no failures**. When the industry needed a more robust contact design – Rampart showed its innovative process and responded with RamTac™.

The design has passed the most stringent industry standard qualification test by an independent test facility, recorded many hours performing as advertised – but, the real test and measure of achievement, are the satisfied customers that keep coming back.

Our company produces a variety of unique rotary connector designs, ranging from 3 to 10 contacts.



### Key Features

- Extreme shock and vibration resistance.
- High temperature capable to 500°F.
- Very durable with no risk of damage during cleaning.
- High electrical current capacity.
- No elastomer energizer subject to compression set.



RamTac™ was first introduced in 2019 at the Offshore Technology Conference in Houston, Texas. After being granted its third patent, at the 2023's Offshore Technology Conference, Rampart won the American Society of Mechanical Engineers' Woelfel Best Mechanical Engineering Award for the Rotary-Fit Connector System containing RamTac™.

Oil & Gas

Mil/Aero

Medical

Space

### Superior Contact Technology

- Our customer required an extreme pressure hermetic connector tolerant of angular misalignment, that could blind wet mate for an oil drilling application. Rampart developed a robust uni-body contact design versus competitors that use a less reliable multi-piece design. Qualified product delivered in only 12 weeks.



# CUSTOMER EXPERIENCE

**“Responsive to our needs and focused on the highest possible quality product”**

*What pains were you experiencing before working with Rampart Products?*

The subsea cable industry has historically been a subset of the aerospace industry when it comes to interconnecting cabling systems. Our subsea applications are primarily a custom or one-off solution. This placed our subsea connection needs in a back seat to the more prevalent aerospace cabling needs and as such the industry is slow and unresponsive to **immediate needs**.

*What made you choose Rampart Products?*

Rampart has expressed a desire to not only focus their attention to the subsea connectivity market, but they have also made an open commitment to be the best at it. The people at Rampart truly have walked this claim and became an integral part of our team. They are **responsive to our needs and focused on the highest possible quality product**.

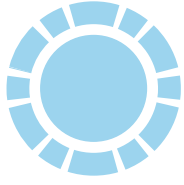
*How has this made a difference in your business?*

We have experienced a reduction in lead time for our subsea connectors and we have been **able to pursue more complex designs in our subsea applications**. We now have a new product ready for Failure Analysis Testing that we hope will meet our customers’ stringent requirements.

*What has surprised you most about the experience?*

Rampart’s **ability to rapidly move from concept design to finished product**, their willingness to develop new designs, and level of first-time quality.

**Jason Wooldridge,**  
Oceaneering



# CUSTOM INTERCONNECTS

Capacity and Service



## Variable Separation Force Connector

- Customer specifies positive, zero, or negative force.
- Reliable in-flight electrical disconnect.
- Tapered mating eliminates binding.
- Blind engagement possible as the system allows for linear and angular misalignment.

## Coaxial/RF - Custom

- Customer issued cable. Delivered in 12 weeks.
- Design per customer request: low profile envelope, 50  $\Omega$  impedance rating.
- Video transmit on Unmanned Under Water Vehicle (UUV).



## Coaxial/RF - Standard

- Common in drilling applications.
- 2 lines of communication on single axis, but not used for matched impedance as above.
- Hermetic 20,000 psi at 400°F.



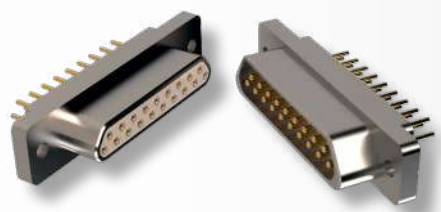
## Autoclavable Connector

Due to long lead times, the customer's supply chain was disrupted, and could not deliver the product to the end user. Rampart delivered the solution in 12 weeks, which included customer inputs for improvements.



### Circular Plastic Flange Mount Receptacle

Although this is an industry-standard solution, it was unavailable due to supply chain issues. Rampart delivered on time and offered a stocking program to guarantee a steady supply in the future.

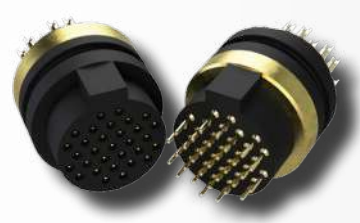


### Rectangular Micro miniature Plug and Receptacle

- Robust PEEK insulator.
- Lightweight.
- Rapid development and delivery.
- Hermetic available upon request.

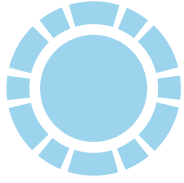
### Hermetic Electrical Impedance Sensor

- Used to determine the response of a liquid under high pressure and/or at high temperature.
- Common in environmental monitoring applications.
- Detects the presence and concentration of contaminants within a fluid.



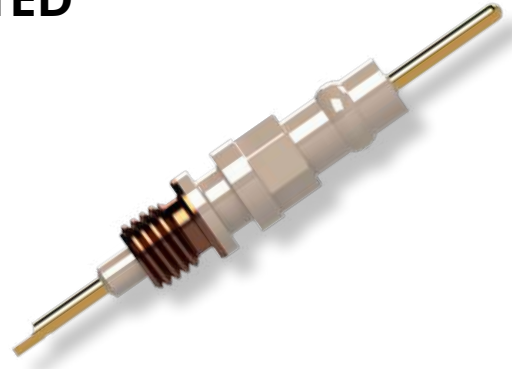
### Multi-conductor mated Hermetic set

Custom packaged mated multi-conductor hermetic connector set. Special requirement to be non-magnetic.

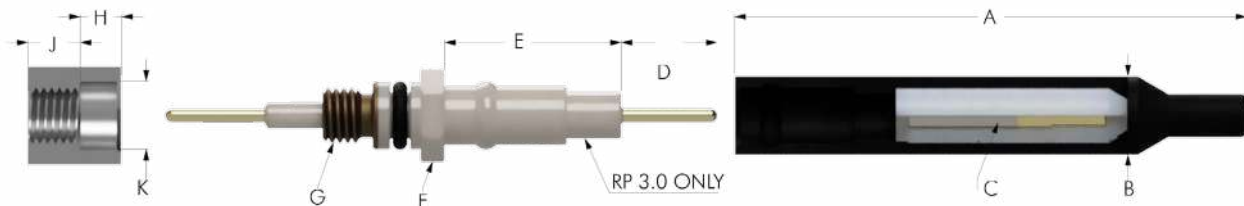


# HPHT HERMETIC BOOTED

Rampart Products' Single Pin Connectors & Booted Contacts, **available from stock**, interchange with industry standards. Optional solder cup on low pressure end.



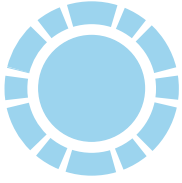
| SPECIFICATIONS        |                 |                 |                  |
|-----------------------|-----------------|-----------------|------------------|
| <b>Temperature</b>    | Up to 500 °F    | <b>Pressure</b> | Up to 30,000 psi |
| <b>Voltage</b>        | up to 8,000 VDC | <b>Current</b>  | 18 Amps          |
| MATERIALS             |                 |                 |                  |
| <b>Boot</b>           | FKM and HNBR    |                 |                  |
| <b>Boot Insulator</b> | PTFE            |                 |                  |
| <b>Contacts</b>       | Copper Alloy    |                 |                  |
| <b>Body</b>           | PEEK            |                 |                  |
| <b>Thread</b>         | Copper Alloy    |                 |                  |
| DIMENSIONS (INCHES)   |                 |                 |                  |
|                       | RP 1.X          | RP 2.X          | RP 3.X           |
| <b>A</b>              | 1.75            | 1.75            | 2.35             |
| <b>B</b>              | 0.26            | 0.31            | 0.36             |
| <b>C</b>              | 20-24 AWG       | 14-24 AWG       | 12-24 AWG        |
| <b>D</b>              | 0.44            | 0.44            | 0.44             |
| <b>E</b>              | 0.37            | 0.37            | 0.71             |
| <b>F</b>              | 1/4 Hex         | 1/4 Hex         | 3/8 Hex          |
| <b>G</b>              | 10-32 UNF       | 1/4-28 UNF      | 1/4-28 UNF       |
| <b>H</b>              | 0.17            | 0.20            | 0.19             |
| <b>J</b>              | 0.20            | 0.24            | 0.24             |
| <b>K</b>              | 0.250/0.251     | 0.312/0.313     | 0.312/0.313      |





## PART NUMBERS

|       |  |   |
|-------|--|---|
| RP1.0 |  | <b>Contact:</b> PIN-PIN                             |
|       |  | <b>Thread:</b> 10-32 UNF-2A                         |
|       |  | <b>O-Ring Size:</b> 2-006                           |
|       |  | <b>Max. Temperature at Max. Pressure (°F):</b> 400° |
|       |  | <b>Max. Pressure at 400°F (psi):</b> 30,000         |
| RP1.1 |  | <b>Contact:</b> CUP-PIN                             |
|       |  | <b>Thread:</b> 1/4-28 UNF-2A                        |
|       |  | <b>O-Ring Size:</b> 2-008                           |
|       |  | <b>Max. Temperature at Max. Pressure (°F):</b> 400° |
|       |  | <b>Max. Pressure at 400°F (psi):</b> 20,000         |
| RP2.0 |  | <b>Contact:</b> PIN-PIN                             |
|       |  | <b>Thread:</b> 1/4-28 UNF-2A                        |
|       |  | <b>O-Ring Size:</b> 2-008                           |
|       |  | <b>Max. Temperature at Max. Pressure (°F):</b> 400° |
|       |  | <b>Max. Pressure at 400°F (psi):</b> 30,000         |
| RP2.1 |  | <b>Contact:</b> PIN-PIN                             |
|       |  | <b>Thread:</b> 1/4-28 UNF-2A                        |
|       |  | <b>O-Ring Size:</b> 2-008                           |
|       |  | <b>Max. Temperature at Max. Pressure (°F):</b> 400° |
|       |  | <b>Max. Pressure at 400°F (psi):</b> 20,000         |
| RP2.3 |  | <b>Contact:</b> PIN-PIN                             |
|       |  | <b>Thread:</b> 1/4-28 UNF-2A                        |
|       |  | <b>O-Ring Size:</b> 2-008                           |
|       |  | <b>Max. Temperature at Max. Pressure (°F):</b> 400° |
|       |  | <b>Max. Pressure at 400°F (psi):</b> 30,000         |
| RP2.5 |  | <b>Contact:</b> THD-PIN                             |
|       |  | <b>Thread:</b> 1/4-28 UNF-2A                        |
|       |  | <b>O-Ring Size:</b> 2-008                           |
|       |  | <b>Max. Temperature at Max. Pressure (°F):</b> 400° |
|       |  | <b>Max. Pressure at 400°F (psi):</b> 25,000         |

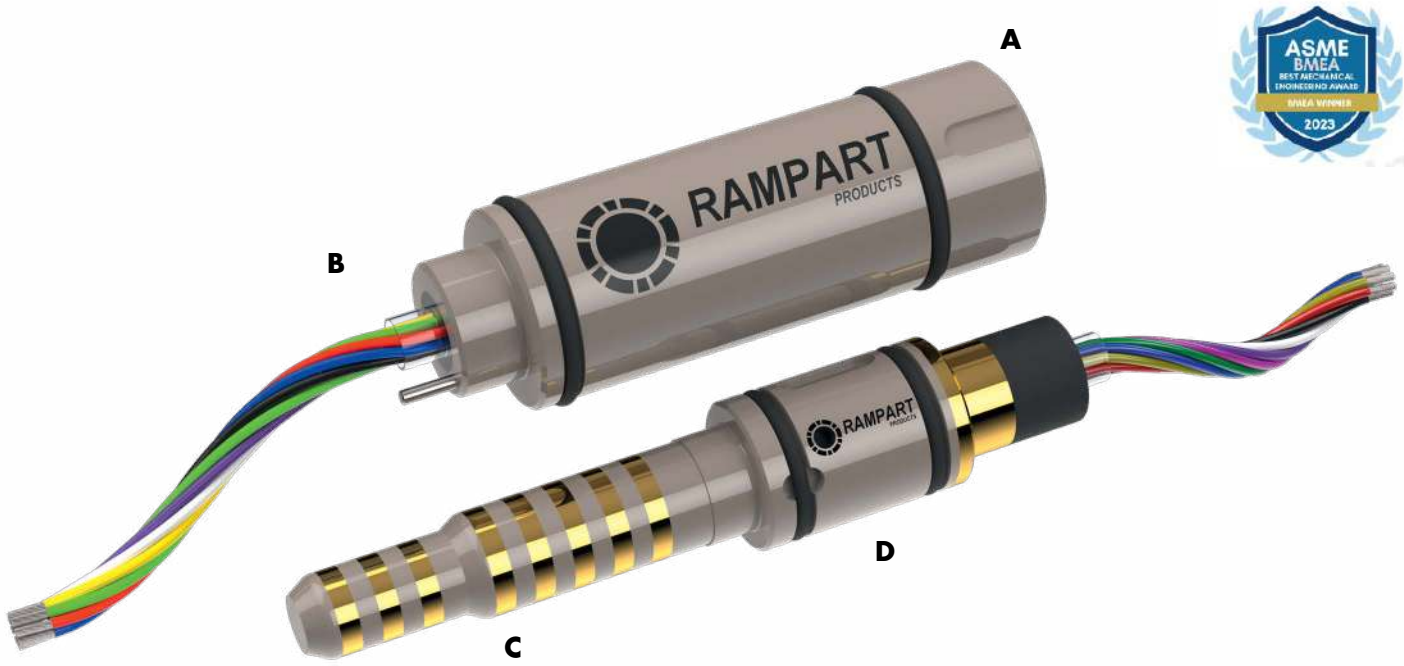


# HPHT HERMETIC BOOTED

|            |  |  |               |
|------------|--|--|---------------|
| RP2.11     |  | <b>Contact:</b>                                | CUP-PIN       |
|            |  | <b>Thread:</b>                                 | 1/4-28 UNF-2A |
|            |  | <b>O-Ring Size:</b>                            | 2-008         |
|            |  | <b>Max. Temperature at Max. Pressure (°F):</b> | 400°          |
|            |  | <b>Max. Pressure at 400°F (psi):</b>           | 20,000        |
| RP2.13     |  | <b>Contact:</b>                                | CUP-PIN       |
|            |  | <b>Thread:</b>                                 | 1/4-28 UNF-2A |
|            |  | <b>O-Ring Size:</b>                            | 2-008         |
|            |  | <b>Max. Temperature at Max. Pressure (°F):</b> | 400°          |
|            |  | <b>Max. Pressure at 400°F (psi):</b>           | 30,000        |
| RP3.0      |  | <b>Contact:</b>                                | PIN-PIN       |
|            |  | <b>Thread:</b>                                 | 1/4-28 UNF-2A |
|            |  | <b>O-Ring Size:</b>                            | 2-008         |
|            |  | <b>Max. Temperature at Max. Pressure (°F):</b> | 400°          |
|            |  | <b>Max. Pressure at 400°F (psi):</b>           | 25,000        |
| RP3.11     |  | <b>Contact:</b>                                | CUP-PIN       |
|            |  | <b>Thread:</b>                                 | 1/4-28 UNF-2A |
|            |  | <b>O-Ring Size:</b>                            | 2-008         |
|            |  | <b>Max. Temperature at Max. Pressure (°F):</b> | 400°          |
|            |  | <b>Max. Pressure at 400°F (psi):</b>           | 20,000        |
| 2A-6003-00 |  | <b>Contact:</b>                                | CUP-PIN       |
|            |  | <b>Thread:</b>                                 | 1/4-28 UNF-2A |
|            |  | <b>O-Ring Size:</b>                            | 2-008         |
|            |  | <b>Max. Temperature at Max. Pressure (°F):</b> | 400°          |
|            |  | <b>Max. Pressure at 400°F (psi):</b>           | 30,000        |
| 2A-6012-00 |  | <b>Contact:</b>                                | CUP-PIN       |
|            |  | <b>Thread:</b>                                 | 1/4-28 UNF-2A |
|            |  | <b>O-Ring Size:</b>                            | 2-006         |
|            |  | <b>Max. Temperature at Max. Pressure (°F):</b> | 400°          |
|            |  | <b>Max. Pressure at 400°F (psi):</b>           | 30,000        |

## HPHT HERMETIC ROTARY FIT

Head to head testing by customers has proven the innovation packed Rampart Products Rotary Fit connector system is unquestionably the highest performing and **most rugged available in the market.**



**A.** RamTac™\* is superior in shock and vibration resistance; proven by rigorous lab and field testing performed by two of our major customers and DynaQual Labs.

**B.** Termination options:  
- Flying leads  
- Solder cups with HPHT hermetic bulkheads.

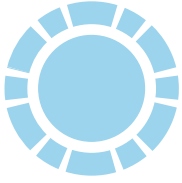
**C.** No solder joints that will fail under shock and vibration.

**D.** Molded PEEK bodies provide increased rigidity and insulation resistance versus others' assembled systems.

\*US & International Patents apply.

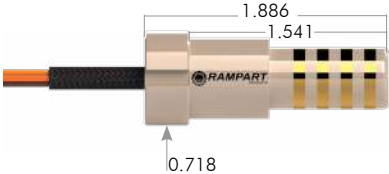

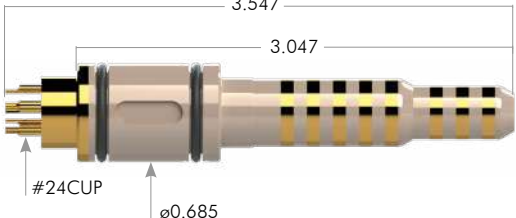


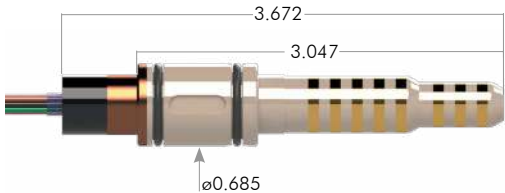
| GENERAL               |                                  | PERFORMANCE SPECIFICATIONS |                           |
|-----------------------|----------------------------------|----------------------------|---------------------------|
| # Contacts            | 10, 8, 4                         | Current                    | Up to 8 Amps              |
| Termination           | Solder Cup or Flying Leads       | Voltage                    | 1000 VDC                  |
| Body Material         | PEEK                             | Temperature                | Up to 500 °F              |
| Contact Material      | C172 Beryllium Copper or Inconel | Pressure                   | Up to 30,000 psi          |
| Support Disk Material | Copper alloy                     | Insulation Resistance      | 5 GΩ @ 1000 VDC @ ambient |


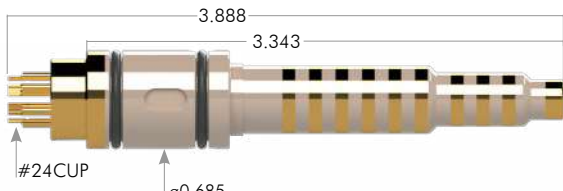



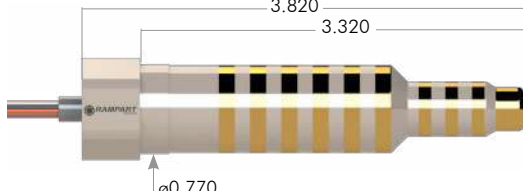

RamTac™ Contact Technology Patent No. 11,489,278 / 11,217,928 / 11,588,264

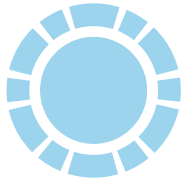


# HPHT HERMETIC ROTARY FIT



|         |   |  |
|---------|---|--|
| A100337 |    | <p><b>MALE FLYING LEADS 4-WAY</b></p> <p># Contacts: 4</p> <p>O-Ring Size: N/A</p> <p>Max. Pressure at 400°F (psi): N/A</p> <p>Max. Temperature at Max. Pressure (°F): 500°</p>                            |
| A100338 |    | <p><b>FEMALE FLYING LEADS 4-WAY</b></p> <p># Contacts: 4</p> <p>O-Ring Size: N/A</p> <p>Max. Pressure at 400°F (psi): N/A</p> <p>Max. Temperature at Max. Pressure (°F): 500° (SPECIAL)</p>                |
| A100461 |   | <p><b>MALE SOLDER CUPS 8-WAY</b></p> <p># Contacts: 8</p> <p>O-Ring Size: 2-015 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 20,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>           |
| A100367 |  | <p><b>FEMALE SOLDER CUPS 8-WAY</b></p> <p># Contacts: 8</p> <p>O-Ring Size: 2-018 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 20,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>         |
| A100506 |  | <p><b>FEMALE FLYING LEADS 8-WAY</b></p> <p># Contacts: 8</p> <p>O-Ring Size: 2-018 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): N/A</p> <p>Max. Temperature at Max. Pressure (°F): 500° (SPECIAL)</p> |
| A100510 |  | <p><b>MALE FLYING LEADS 8-WAY</b></p> <p># Contacts: 8</p> <p>O-Ring Size: 2-018 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 20,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>          |

|                |   |  |
|----------------|---|--|
| <p>A100616</p> |    | <p><b>FEMALE FLYING LEADS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: 2-018 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): N/A</p> <p>Max. Temperature at Max. Pressure (°F): 500° (SPECIAL)</p> |
| <p>A100500</p> |    | <p><b>MALE SOLDER CUPS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: 2-015 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 30,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>           |
| <p>A100577</p> |    | <p><b>FEMALE SOLDER CUPS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: 2-018 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 30,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>         |
| <p>A100923</p> |   | <p><b>MALE FLYING LEADS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: 2-015 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 30,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>          |
| <p>A100924</p> |  | <p><b>FEMALE FLYING LEADS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: 2-019 FKM 90A DURO</p> <p>Max. Pressure at 400°F (psi): 30,000</p> <p>Max. Temperature at Max. Pressure (°F): 400°</p>        |
| <p>A101010</p> |  | <p><b>MALE FLYING LEADS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: N/A</p> <p>Max. Pressure at 400°F (psi): N/A</p> <p>Max. Temperature at Max. Pressure (°F): 500°</p>                            |
| <p>A100172</p> |  | <p><b>FEMALE FLYING LEADS 10-WAY</b></p> <p># Contacts: 10</p> <p>O-Ring Size: N/A</p> <p>Max. Pressure at 400°F (psi): N/A</p> <p>Max. Temperature at Max. Pressure (°F): 500° (SPECIAL)</p>                |

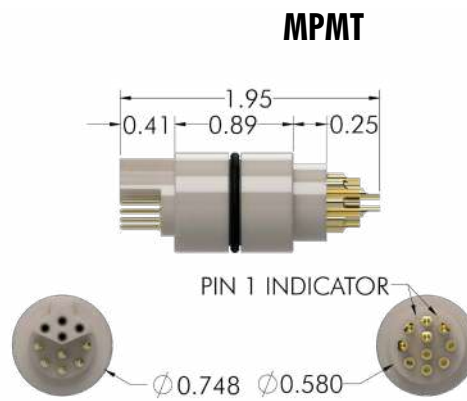
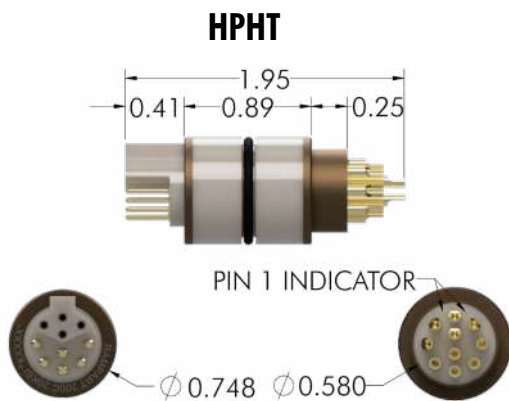


# HPHT HERMETIC MULTI-PIN KTK

Rampart Products' KTK interchange with industry standards, and are constructed of superior PEEK eliminating epoxy fragments that cause electrical discontinuities.

## Key Features

- Seamless integration with industry standard.
- Tiered solder cups for easy access.
- High contact force for reliable connection under shock & vibration.
- Permanent lot code marking.
- PEEK body is twice as durable vs glass reinforced epoxy.
- **Always in stock.**



| MATERIALS           |                  | PERFORMANCE SPECIFICATIONS   |                             |            |
|---------------------|------------------|------------------------------|-----------------------------|------------|
|                     |                  |                              | HPHT                        | MPMT       |
| <b>Body</b>         | PEEK             | <b>Temperature</b>           | 400 °F                      | 329 °F     |
| <b>Contacts</b>     | Beryllium Copper | <b>Pressure</b>              | 20,000 psi                  | 12,000 psi |
| <b>Support Disk</b> | Copper Alloy     | <b>Insulation Resistance</b> | 500 MΩ @ 1000 VDC @ ambient |            |
| <b>PART NUMBERS</b> |                  | <b>4 PIN / 6 SOCKET</b>      | 3A-6018-00                  | 3A-6020-00 |
|                     |                  | <b>6 PIN / 4 SOCKET</b>      | 3A-6019-00                  | 3A-6021-00 |

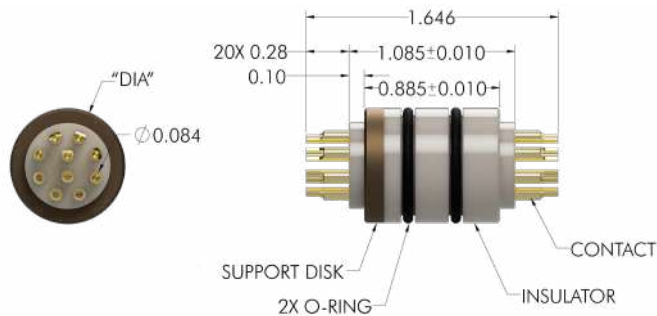
# HPHT HERMETIC MULTI-PIN CUP X CUP

Pre-tooled standard configurations available from stock or **readily available for manufacture.**



PEEK body insulator is 20X as impact resistant vs glass reinforced epoxy and 40X more so than glass seals.

| MATERIALS           |                  | PERFORMANCE SPECIFICATIONS |                     |
|---------------------|------------------|----------------------------|---------------------|
| <b>Body</b>         | PEEK             | <b>Temperature</b>         | Up to 500 °F        |
| <b>Contacts</b>     | Beryllium Copper | <b>Pressure</b>            | 30,000 psi @ 400 °F |
| <b>Support Disk</b> | Beryllium Copper | <b>Voltage</b>             | 600 VDC             |



| "DIA"    | CONDUCTORS | PART NUMBERS | UNI-DIRECTION | BI-DIRECTION |
|----------|------------|--------------|---------------|--------------|
| 0.750 in | 10X 20AWG  |              | A100003       | A100004      |
| 0.750 in | 8X 20AWG   |              | A100081       | A100080      |
| 0.687 in | 10X 20AWG  |              | A100085       | A100084      |
| 0.687 in | 8X 20AWG   |              | A100083       | A100082      |



+1 832.460.2892

info@rampartproducts.com

10615 Shadow Wood Drive, Houston, TX 77043

linkedin.com/company/rampart-products



MADE IN USA

