# WetSeal™

✓Innovation

✓Experience

✓Reliability

✓Specialized

Innovative solutions. Experience. Reliability. Specialized.

When you need the connection to last, BIW Connector Systems can put these proven principles to work for you.

We are a leading global designer and manufacturer of harsh environment connectors and cable assemblies for industrial, military and commercial customers worldwide.

**INNOVATION**
Our proven ability to engineer solutions that work where others have failed has made us a world leader.


**EXPERIENCE**
Our engineering team with decades of experience are among the world's most talented engineers in the design and manufacturing of connectors, cables and contacts.

**RELIABILITY**
Today our manufacturing facility is among the most modern in the connector industry. We engineer connectors and hull penetrators for any marine application.

We are able to proof test connectors and cable assemblies in our on-site test facilities, which include pressure testing equipment suitable for 12,500 psi.

Our goal is to design and manufacture high performance products to meet the needs of our customers. Our Quality program is certified to conform to ISO 9001 standards.

**SPECIALIZED**
With decades of experience,we bring the latest technologies to market to meet customer needs.

From deep sea research to undersea mining, we meet the needs of the industry with both a standard line of products and a host of custom engineered systems.

# WetSeal Underwater Connectors

WetSeal Connectors are a versatile range of underwater connectors with 3 to 84 electrical contacts. All connectors have heavy duty metal shells. Elastomeric inserts provide redundant levels of sealing against water intrusion, and most connectors do not require O-rings.

Connectors are designed for real-life use, aboard ship, and can be safely mated under conditions of deck spray or rain.

## Design Features

**Metal Shells**
WetSeal Connectors are constructed using CRES316L shells. This material offers the best combination of strength and long-term corrosion resistance. For lighter weight, shells manufactured of 6061T6 Aluminum (hard anodized) are also available.

**Redundant Sealing**
All connectors are supplied with a peripheral main seal, and individual seals around each electrical contact. Either seal is sufficient to prevent the entrance of fluids. If rain or deck spray is encountered during connector mating, the sealing system maintains high insulation resistance even if small amounts of water are present.

**Low Mating Forces**
WetSeal Connectors have the lowest engagement forces of any underwater connectors in the industry. Misaligned contacts are the major cause of high engagement forces. Our unique manufacturing methods keep misalignment to less than 0.002. Our Silicon Aluminum Bronze coupling rings resist corrosion in sea water and never gall with threads on stainless steel shells. All connectors in our product line can be hand tightened and do not require the use of spanners or strap wrenches during engagement.

*On the Cover*
*HM 53-contact connector plug and receptacle. The versatile bulkhead adapter is also shown, as well as pressure-proof caps for both the plug and the recptacle. Bulkhead adapters are available in two convenient sizes.*

**Metal Keys**
All connectors are keyed with metal keys and keyways that are integral to the shell. Keys are never brazed. And metal keying provides positive protection against undesired connector rotation.

**High Conductivity Contacts**
BIW's manufacturing technique permits the use of high conductivity copper alloy for contacts in all of our connectors. Unlike glass sealed connectors, which always have ferrous contacts, WetSeal connectors have contacts with conductivity in excess of 80% IACS. WetSeal connectors never utilize Brass contacts.

**Medium Voltage**
Some WetSeal connectors have contacts suitable for up to 3.5KVDC. This makes the connectors suitable for use with the latest designs in using medium voltage umbilical cables for compact size and lower drag resistance.

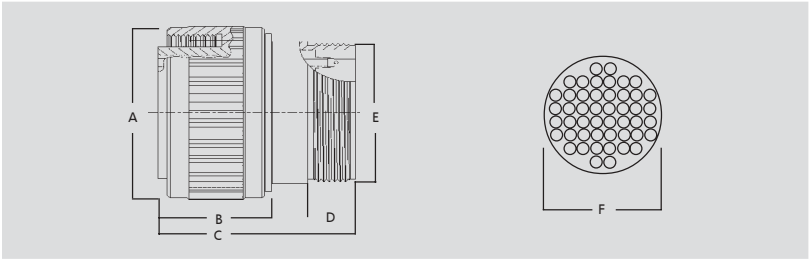
### WetSeal Underwater Connectors

HM high density rubber molded connectors have the ease of use of rubber molded connectors with the toughness and reliability of metal housings.

**Select HM Connectors for**

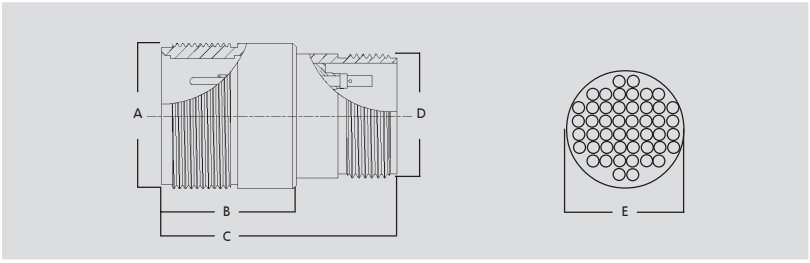
- Pressure Ratings of 10,000 psi
- Low Mating Forces
- Rough Handling
- Superior Electrical Performance

## In-Line Plugs - HM




| Part Number | Number of Contacts | Shell Size | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| HM1306-3S | 3 | 13 | 1.020 | 1.158 | 2.028 | 0.495 | 0.644 | .8125 |
| HM1606-7S | 7 | 16 | 1.210 | 1.158 | 2.028 | 0.495 | 0.832 | 1.000 |
| HM2006-12S | 12 | 20 | 1.488 | 1.158 | 2.028 | 0.495 | 1.065 | 1.250 |
| HM2406-19S | 19 | 24 | 1.740 | 1.158 | 2.028 | 0.495 | 1.318 | 1.500 |
| HM3406-48S | 48 | 34 | 2.500 | 1.158 | 2.028 | 0.495 | 2.059 | 2.250 |

## In-Line Receptacles - HM



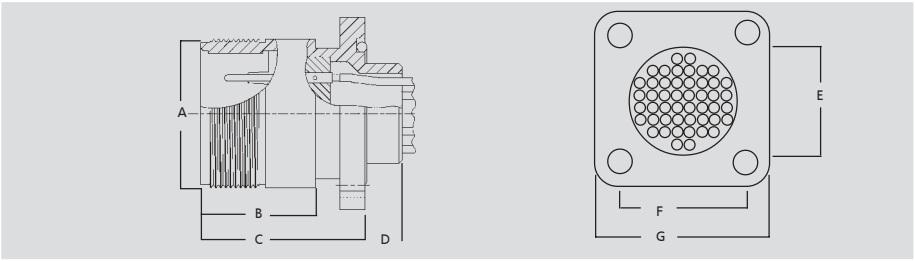

| Part Number | Number of Contacts | Shell Size | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| HM1301-3P | 3 | 13 | 0.813 | 1.157 | 2.027 | .644 | .8125 |
| HM1601-7P | 7 | 16 | 1.000 | 1.157 | 2.027 | .832 | 1.000 |
| HM2001-12P | 12 | 20 | 1.250 | 1.157 | 2.027 | 1.065 | 1.250 |
| HM2401-19P | 19 | 24 | 1.500 | 1.157 | 2.027 | 1.318 | 1.500 |
| HM3401-48P | 48 | 34 | 2.500 | 1.157 | 2.027 | 2.059 | 2.250 |

All dimensions are in inches and subject to change

### HM Connector Materials and Features

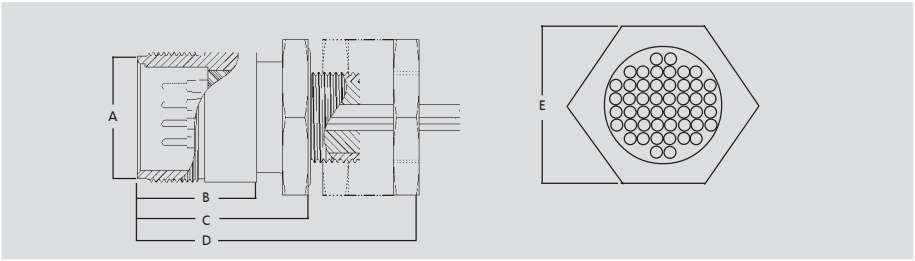
- Redundant Sealing System
- Service Rating - 13 Amp at 600 VAC
- Hydrostatic Rating - 10,000 psi
- Coupling Ring Material - Nickel-Aluminum-Bronze
- All Contacts are AWG 16
- Shell Material - Passivated CRES 316
- Insulator - Molded Synthetic Rubber
- Contact Material - Gold-Plated Copper Alloy

## Flange Mounted Bulkhead Receptacles - HM




| Part Number | Number of Contacts | Shell Size | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|---|---|
| HM1302-3P | 3 | 13 | 0.813 | 1.161 | 1.656 | 0.375 | .8125 | 0.937 | 1.312 |
| HM1602-7P | 7 | 16 | 1.161 | 1.161 | 1.650 | 0.375 | 1.000 | 1.062 | 1.437 |
| HM2002-12P | 12 | 20 | 1.250 | 1.161 | 1.656 | 0.375 | 1.250 | 1.250 | 1.750 |
| HM2402-19P | 19 | 24 | 1.500 | 1.161 | 1.656 | 0.375 | 1.500 | 1.437 | 1.937 |
| HM3402-48P | 48 | 34 | 2.500 | 1.161 | 1.656 | 0.375 | 2.250 | 2.125 | 2.750 |

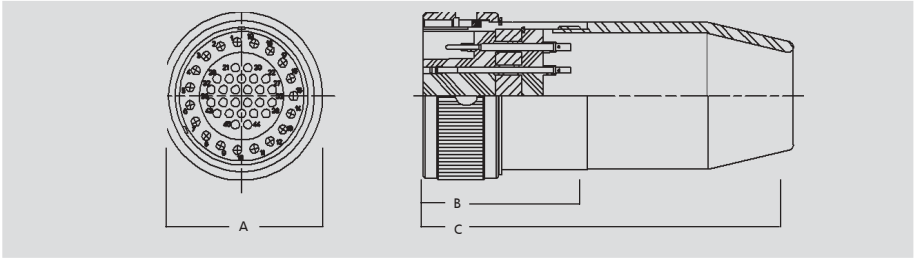
## Hex Mounted Jam Nut Receptacles - HM




| Part Number | Number of Contacts | Shell Size | A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| HM1307-3P | 3 | 13 | 0.813 | 1.410 | 1.656 | 2.160 | 1.187 |
| HM1607-7P | 7 | 16 | 1.161 | 1.410 | 1.656 | 2.160 | 1.312 |
| HM2007-12P | 12 | 20 | 1.250 | 1.410 | 1.656 | 2.160 | 1.500 |
| HM2407-19P | 19 | 24 | 1.500 | 1.410 | 1.656 | 2.160 | 1.250 |
| HM3407-48P | 48 | 34 | 2.500 | 1.410 | 1.656 | 2.160 | 2.250 |

All dimensions are in inches and subject to change

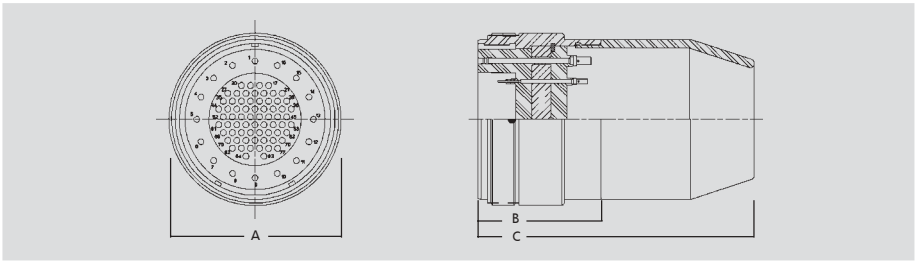
## High Voltage Plugs - HX




- 26 Pins at # 20 AWG, 300 VAC
- 19 Sockets at # 16 AWG, 3,000 VAC

| Part Number | Number of Contacts | Shell Size | A | B | C |
|---|---|---|---|---|---|
| HX1006-45P/S | 45 | 35 | 2.36 | 2.39 | 5.39 |
| HX1006-84P/S | 84 | 54 | 3.61 | 1.59 | 5.41 |

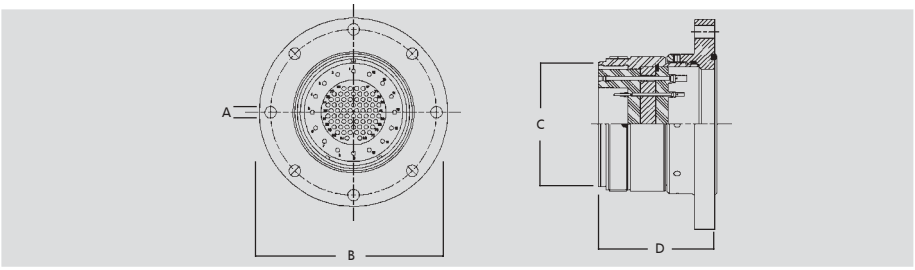
## High Voltage In-line Receptacle - HX




- 26 Pins at # 20 AWG, 300 VAC
- 19 Sockets at # 16 AWG, 3,000 VAC

| Part Number | Number of Contacts | Shell Size | A | B | C |
|---|---|---|---|---|---|
| HX1001-45P/S | 45 | 35 | 2.187 | 2.39 | 5.42 |
| HX1001-84P/S | 84 | 54 | 3.375 | 2.42 | 5.42 |

## High Voltage Bulkhead Receptacle - HX




- 68 Pins at # 20 AWG, 300 VAC
- 16 Sockets at # 16 AWG, 3,000 VAC

| Part Number | Number of Contacts | Shell Size | A | B | C | D |
|---|---|---|---|---|---|---|
| HX1002-45P/S | 45 | 35 | .332 | 3.60 | 2.187 | 2.62 |
| HX1002-84P/S | 84 | 54 | .332 | 5.25 | 3.375 | 2.91 |

All dimensions are in inches and subject to change

## Connector Technical Specifications

### Design Features

| | |
|---|---|
| Primary Seal | Integrally molded peripheral seal |
| Secondary Seal | Integrally molded cones and conical recess around each contact |
| Keying | Metal keys and keyways engage before contacts engage. |
| Mating | Connectors are easily mated and unmated by hand. Positive bottom ing prevents damage due to over tightening. |

### Environmental Features

Hydrostatic Pressure

HM Connectors

Mated Sets - 10,000 psig

Bulkhead Connectors - 10,000 psig open face

HX Connectors

Mated Sets - 5,000 psig

Bulkhead Connectors - 2,000 psig open face

| | |
|---|---|
| Thermal Shock | -30°C to +60°C |
| Salt Spray | Meets MIL-STD 1344, Method 1001, Condition B |
| Physical Shock | per MIL-S-901, Grade B, Class II |
| Durability | 200 cycles minimum |
| Coupling Force | 60 in. lbs. maximum |
| Vibration | Max. 10 ms discontinuity when tested per MIL-STD-167-1 for light equipment |

### Electrical Data

| | |
|---|---|
| Insulation Resistance | 5,000 Megohms at 500 VDC |
| Source Rating | |
| HM Connectors - 600 VAC | |
| HX Connectors - AWG 20 - 300 VAC | |
| AWG 16 - 3,000 VAC | |
| Contact Size | AWG 16 & 20 |
| Contact Resistance | Less than 12 MV at 5 Amps |
| Current Rating | 13 Amperes per circuit for # 16<br>7 Amperes per ciruit for # 20 |
| Contact Retention | Per MIL-STD-1344, method 2007 for AWG 16 contacts |

### Materials and Finishes

| | |
|---|---|
| Connector Shell | CRES 316 L |
| Plug Coupling Nut | Nickel Alum. Bronze per QQ-C-465 Alloy 630 |
| Interface Seals | Integrally molded Polychloroprene |
| Accessory Seals | Buna-N Class B per MIL-P-5516 |
| Insulation | Molded High Dielectric Polychloroprene |
| Contacts | Copper Alloy, Class A Type A of MIL-C-39029B. Contact area gold plated per MIL-G-45204 |



**BIW Connector Systems**
500 Tesconic Circle, Santa Rosa, CA 95401 USA
Telephone 707-523-2300 Fax 707-523-3567

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