D-SUB FROM SPACE QUALITY PRODUCTS
TO INDUSTRIAL APPLICATIONS

HELMIUM LEAK RATE: < 5x10⁻⁹ mbar·l/s
STANDARD CONNECTION SYSTEMS
SHOCKS & VIBRATION RESISTANT
MIXED CONTACT CONNECTORS
- Normal Density
- High Density
- Thermocouple
- Power and Coaxial

THE FEEDTHROUGH SOLUTIONS
CUSTOM DESIGN

Catalog F-001
Rev. E

www.connectPOSITRONIC.com
Experience

- Founded in 1966
- Involvement in the development of international connector specifications through EIA®, IEC and ISO as well as PICMG®.
- Introduction of new and unique connector products to the electronics industry.
- Patent holder for many unique connector features and manufacturing techniques.
- Vertically integrated manufacturing – raw materials to finished connectors.

Technology

- Expertise with solid machined contacts provides a variety of high reliability connectors including high current density power connectors.
- Quality Assurance lab is capable of testing to IEC, EIA, UL, CUL, military and customer-specified requirements.
- In-house design and development of connectors based on market need or individual customer requirements.
- Internal manufacturing capabilities include automatic precision contact machining, injection molding, stamping, plating operations and connector assembly.
- Manufacturing locations in southwest Missouri, U.S.A. (headquarters); Puerto Rico, France, China, Singapore, and India. Total square footage: 407,441.

Support

- Compliance to a variety of international and customer specific environmental requirements.
- Large in-house inventory of finished connectors. Customer specific stocking programs.
- Factory direct technical sales support in major cities worldwide.
- One-on-one customer support from worldwide factory locations.
- World class web site.
- Value-added solutions and willingness to develop custom products with reasonable price and delivery.

Regional Headquarters

Springfield, MO  Auch, France  Singapore

Products described within this catalog may be protected by one or more of the following US patents:

#4,900,261  #5,255,580  #5,329,697
#6,260,268  #6,835,079  #7,115,002

Patented in Canada, 1992  Other Patents Pending

Positronic Provides Complete Capability

Mission Statement

“To utilize product flexibility and application assistance to present quality interconnect solutions which represent value to customers worldwide.”

Regional Headquarters

Springfield, MO  Auch, France  Singapore

Positronic Industries’ FEDERAL SUPPLY CODE (Cage Code) FOR MANUFACTURERS is 28198

Unless otherwise specified, dimensional tolerances are:

1) ±0.03 mm [0.001 inches] for male contact mating diameters.
2) ±0.08 mm [0.003 inches] for contact termination diameters.
3) ±0.13 mm [0.005 inches] for all other diameters.
4) ±0.38 mm [0.015 inches] for all other dimensions.

Information in this catalog is proprietary to Positronic and its subsidiaries. Positronic believes the data contained herein to be reliable. Since the technical information is given free of charge, the user employs such information at his own discretion and risk. Positronic Industries assumes no responsibility for results obtained or damages incurred from use of such information in whole or in part.

Positronic®, Positronic Industries, Inc.®, P+ logo, Positronic Global Connector Solutions®, Connector Excellence® and their logo designs are registered trademarks of Positronic Industries, Inc. Blue colored connectors shown in this catalog are a trademark of Positronic Industries, Inc.®, registered in the U.S. Patent and Trademark Office.
SPACE APPLICATIONS
D-SUBMINIATURE CONNECTORS

COMBO-D
D-SUBMINIATURE CONNECTORS WITH MIXED CONTACT COMBINATIONS

FRONT RUNNER SERIES
CIRCULAR CONNECTORS

CATALOG OF INDUSTRIAL AND MILITARY APPLICATION D-SUBMINIATURE CONNECTORS
# TABLE OF CONTENTS

- **Contact PosiBand** ............................................... 1-2  
The posiband contact system has many advantages over the legacy split tine design.

- **Xavac® Series Connectors** ................................. 3-6  
Xavac® series connectors are D-Subminiature feedthroughs for space or industrial vacuum applications.

- **Savac® Series Connectors** ............................... 7-10  
Savac® series connectors are D-Subminiature feedthroughs for space or industrial vacuum applications.

- **Thermocouple Connectors** .................................. 11  
The thermocouple connectors are available in D-Subminiature connectors version and also in hermetic version (D-subminiature feedthrough).

- **Xavac® / Savac® BNC** ..................................... 12-13  
Savac® and Xavac® series connectors are BNC feedthroughs for space or industrial vacuum applications.

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Xavac®, Savac®, Hivac® & Civac® are registered trademarks of Positronic Industries S.A.S
Hivac® Series Connectors .............................. 14-18
Hivac® series connectors are feedthroughs equipped with D-Subminiature adapter connectors for space or industrial vacuum applications.

Civac® Series Connectors .............................. 19-21
Civac® series connectors are circular feedthroughs for industrial vacuum applications.

Civac® BNC ...................................................... 22-23
Civac® is BNC feedthrough for industrial vacuum applications.

Custom Design ................................................ 24-28
Examples of custom design.

Technical Information ................................. 29

Xavac®, Savac®, Hivac® & Civac® are registered trademarks of Positronic Industries S.A.S
What Makes Positronic’s New “PosiBand®” Contact Interface a Significant Improvement?

High reliability connectors utilize female closed entry contacts that provide an unbroken ring of solid material at the face of the contact. The closed entry feature is crucial in preventing damage to female contacts used in harsh environments, repeated mating cycles, blind mate applications and applications requiring highest reliability.

The most common closed entry design utilized by connector manufacturers is a split tine and sleeve concept. See figure 1. With this design, both the mechanical forces and electrical interface are provided only at the tip of the female contact.

Positronic’s new PosiBand technology takes a unique approach for closed entry female contacts. PosiBand contacts utilize a two-piece contact design. See figure 2. Each piece serves a separate function, providing a more mechanically robust contact and more consistent electrical performance.

The main body of the PosiBand contact provides a true closed entry opening to enhance robustness. The PosiBand spring clip provides normal force on the male contact. Consistent electrical performance is supported through a larger area of contact interface between the male and female contact along the entire “floor” of the contact body. PosiBand contacts are QPL listed under SAE AS39029 and MIL-DLT-24308 specifications. PosiBand is also qualified under GSFC S-311-P4/08 Rev C and GSFC S-311-P4/10 Rev C to the higher 40 gram contact separation test.

continued on next page . . .
The PosiBand® contact system has many advantages over the legacy split tine design.

- **PosiBand** is more robust than split tine contact, which can be pried open in harsh environments, resulting in reduced normal force and degradation of electrical performance.
- **PosiBand** has greater surface area at the male and female contact interface, resulting in more consistent electrical performance.
- **PosiBand** has lower average insertion forces, resulting in greater ease in mating, especially in larger high density connectors. The average lower insertion force is accomplished while meeting or exceeding performance requirements.
- The **PosiBand**'s contact body does not require annealing of the crimp barrels, as does the split tine design. This eliminates concern of unintentionally heat-treating the mating end of the contact, which can cause electrical failure.
- **PosiBand** is qualified under SAE AS39029 and MIL-DTL-24308 specifications. **PosiBand** is also qualified under GSFC S-311-P4/08 Rev C and GSFC S-311-P4/10 Rev C to the higher 40 gram contact separation test requirement.

For more details about the advantages of the PosiBand® system, please view the detailed white paper at www.connectpositrionic.com/content/37/ or visit our website at www.connectpositrionic.com.

**TEMPERATURE RISE CURVES**

*Test conducted in accordance with UL1777.*

**Size 22 PosiBand Contacts**

- **Initial Contact Resistance:** 0.005 ohms, maximum.
- Curve developed using High Density D-subminiature connectors loaded with size 22 crimp contacts terminated to size 22 AWG wire.

**Size 20 PosiBand Contacts**

- **Initial Contact Resistance:** 0.004 ohms, maximum.
- Curve developed using Standard Density D-subminiature connectors loaded with size 20 crimp contacts terminated to size 20 AWG wire.
**XAVAC® Series Connectors**

XAVAC® Series Connectors are D-Subminiature feedthroughs for SPACE or INDUSTRIAL vacuum applications. Both sides contain four threaded mounting holes, an o-ring groove and fixed female jackscrews. These redundant features allow either side of the connector to be mounted toward the vacuum, giving the customer the ultimate in flexibility.

The type of contacts is according to the customer request: with normal density insulators 9, 15, 25, 37, and 50 contacts (AWG20): Male/Female, Male/Male, or Female/Female. With high density insulators: 15, 26, 44, 62, 78 and 104 contacts (AWG22): Male/Female. With mixed contact combinations (Power, Coaxial, and Signal contacts): Male/Female.

### MATERIALS AND FINISHES

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator</td>
<td>Glass-filled DAP per ASTM-D-5948 or polyester glass-filled per ASTM D 5927, UL94V0, ASTM E-595, NASA-RP-1124.</td>
</tr>
<tr>
<td>Contacts</td>
<td>Precision machined copper alloy.</td>
</tr>
<tr>
<td>Posiband Spring Clip</td>
<td>BeCu (Copper alloy).</td>
</tr>
<tr>
<td>Contact Plating</td>
<td>0.000050 inch (1.25 microns) gold over copper plate.</td>
</tr>
<tr>
<td>Shells</td>
<td>Brass with 0.000050 inch (1.25 microns) gold over copper plate or stainless steel.</td>
</tr>
<tr>
<td>Housing</td>
<td>Aluminium alloy, golden brown conversion coating.</td>
</tr>
<tr>
<td>O-ring</td>
<td>Viton (fluorocarbon). Other material per request. One mounting and one for spare part.</td>
</tr>
</tbody>
</table>

### MECHANICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Contacts</td>
<td>Size 8 Contact: 0.142 inch (3.61mm) mating diameter. Female contact: Features large surface area (L.S.A.) closed entry design utilizing BeCu mechanical retention member. Size 20 Contact: 0.040 inch (1.02mm) mating diameter. Female Posiband Contact: Closed entry design. Size 22 Contact: 0.030 inch (0.76mm) mating diameter. Female Posiband Contact: Closed entry design.</td>
</tr>
<tr>
<td>Contact Retention In Insert</td>
<td>9 lbs. (40 N).</td>
</tr>
<tr>
<td>Shells</td>
<td>Male shells may be dimpled for EMI/ESD ground paths.</td>
</tr>
<tr>
<td>Polarization</td>
<td>Trapezoidally shaped shells.</td>
</tr>
<tr>
<td>Mechanical Operations</td>
<td>500 operations, minimum, per IEC 60512-5.</td>
</tr>
</tbody>
</table>

### CLIMATIC CHARACTERISTICS

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range</td>
<td>-40 to +125°C. The temperature range can be expanded under certain conditions. Consult factory.</td>
</tr>
<tr>
<td>Helium Leak Rate</td>
<td>0.1x10⁻⁸mbar.l/s under a vacuum of 1.5x10⁻⁵ mbar.</td>
</tr>
<tr>
<td>Outgassing Non-Metallic Material</td>
<td>Total Mass Loss – TML &lt; 1 %. Collected Condensable Materials – CVCM &lt; 0.1 %.</td>
</tr>
</tbody>
</table>

### ELECTRICAL CHARACTERISTICS AT SEA LEVEL

**SIGNAL CONTACTS**

- Contact Current Rating: 14 A nominal, size 20. 10 A nominal, size 22.
- Initial Contact Resistance: 0.005 ohms maximum.
- Proof Voltage: 1000 V r.m.s.

**POWER CONTACTS**

- Contact Current Rating: 10, 15, 20, 30 and 40 amperes nominal.
- Initial Contact Resistance: 0.0005 ohms maximum.
- Proof Voltage: 1000 V r.m.s.

**SHIELDED CONTACTS**

- Initial Contact Resistance: 0.008 ohms maximum.
- Nominal Impedance: 50 ohms.
- Insertion Loss: -0.46 dB at 1 GHz, -1.5 dB at 2 GHz.
- VSWR: 1.15 average at 1 GHz, 1.56 average at 2 GHz.

Above values measured using frequency domain techniques.

**HIGH VOLTAGE CONTACTS**

- Flash over Voltage: 3600 V r.m.s.
- Proof Voltage: 2700 V r.m.s.
- Initial Contact Resistance: 0.008 ohms maximum.

**CONNECTOR**

- Insulator Resistance: 5 G ohms.
- Clearance and Creepage Distance: 0.039 inch (1.0mm) minimum.
- Working Voltage: 300 V r.m.s.
- Residual Magnetism For Space Flight Versions: Consult factory.
XAVAC® DIMENSIONS

All dimensions are in mm. 
All dimensions are subject to change.

* See ordering information: STEP 5 – Type of contacts
XAVAC® PANEL CUTOUT INFORMATION

The depths are identical for all XAVAC® sizes

<table>
<thead>
<tr>
<th>SHELL SIZE1</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHELL SIZE1</td>
<td>32,00</td>
<td>47,40</td>
<td>34,29</td>
<td>12,50</td>
<td>29,10</td>
<td>16,00</td>
</tr>
<tr>
<td>SHELL SIZE2</td>
<td>40,30</td>
<td>56,80</td>
<td>43,64</td>
<td>12,50</td>
<td>29,90</td>
<td>16,76</td>
</tr>
<tr>
<td>SHELL SIZE3</td>
<td>54,00</td>
<td>68,40</td>
<td>56,36</td>
<td>12,50</td>
<td>28,10</td>
<td>16,02</td>
</tr>
<tr>
<td>SHELL SIZE4</td>
<td>70,50</td>
<td>86,40</td>
<td>73,46</td>
<td>12,50</td>
<td>29,80</td>
<td>16,90</td>
</tr>
<tr>
<td>SHELL SIZE5</td>
<td>68,10</td>
<td>84,00</td>
<td>71,28</td>
<td>15,25</td>
<td>32,40</td>
<td>19,68</td>
</tr>
<tr>
<td>SHELL SIZE6</td>
<td>70,50</td>
<td>85,40</td>
<td>73,26</td>
<td>16,80</td>
<td>33,00</td>
<td>20,88</td>
</tr>
</tbody>
</table>

All dimensions are in mm.
All dimensions are subject to change.
### ORDERING INFORMATION – CODE NUMBERING SYSTEMS

<table>
<thead>
<tr>
<th>STEP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXAMPLE</td>
<td>XAVAC</td>
<td>15</td>
<td>M/S</td>
<td>G</td>
<td>.0</td>
<td>-</td>
</tr>
<tr>
<td>S****</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### STEP 1 – BASIC SERIES
XAVAC series

#### STEP 2 – CONNECTOR VARIANTS
- **Normal density**
  - 9-15-25-37-50
  - 15-26-44-62-78-104
- **High density**
  - 15-26-44-62-78-104
- **Mixed combinations**
  - (Consult Combo-D catalog)
  - 2WK2 up to 46W4

#### STEP 3 – CONNECTOR GENDER
- **M/S** : Male/Female Posiband
- **M/M** : Male/Male
  - Marking inverted on the two insulators front side
  - Not available for high density / mixed combinations
- **S/S** : Female Posiband/Female Posiband
  - Marking inverted on the two insulators front side
  - Not available for high density / mixed combinations

#### STEP 4 – TYPE OF APPLICATIONS
- **G** : Gold for Space version
- **D** : Gold and Dimpled for Space version
- **S** : Stainless-steel for Space version
  - Residual magnetism, consult factory
- **I** : Stainless-steel for Industrial version

#### STEP 5 – TYPE OF CONTACTS
- **0** : Normal density
- **1** : High density
- **2** : Power and/or mixed combinations
- **3** : Coax and/or mixed combinations
- **4** : High voltage
- **5** : Thermocouple contact (only normal density)

#### STEP 6 – SPECIAL OPTIONS
Consult Sales Department

### Position of thermocouple contacts:
- The first cavity is always loaded.
- Even cavities for negative contacts (-)
- Odd cavities for positive contacts (+)

### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Position of thermocouple contacts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 K</td>
<td>- The first cavity is always loaded.</td>
</tr>
<tr>
<td></td>
<td>- Even cavities for negative contacts (-)</td>
</tr>
<tr>
<td></td>
<td>- Odd cavities for positive contacts (+)</td>
</tr>
<tr>
<td>5 T</td>
<td>Chromel ® (+) Alumel ® (-)</td>
</tr>
<tr>
<td>5 J**</td>
<td>Copper (+) with gold flash Constantan (-)</td>
</tr>
<tr>
<td>5E**</td>
<td>Iron (+) Constantan (-)</td>
</tr>
</tbody>
</table>

Chromel® and Alumel® are registered trademarks of Hoskins Manufacturing Compan
SAVAC® Series Connectors are D-Subminiature feedthroughs for SPACE or INDUSTRIAL vacuum applications.

Both sides contain two threaded mounting holes (female jackscrews) and a o-ring groove. These redundant features allow either side of the connector to be mounted toward the vacuum, giving the customer the ultimate in flexibility.

The type of contacts is according to the customer request: with normal density insulators 9, 15, 25, 37, and 50 contacts (AWG20): Male/Female, Male/Male, or Female/Female. With high density insulators: 15, 26, 44, 62, 78 and 104 contacts (AWG22): Male/Female. With mixed contact combinations (Power, Coaxial, and Signal contacts): Male/Female.

### MATERIALS AND FINISHES

**Insulator:** Glass-filled DAP per ASTM-D-5948 or polyester glass-filled per ASTM D 5927, UL94V0, ASTM E-595, NASA-RP-1124.

**Contacts:** Precision machined copper alloy.

**Posiband Spring Clip:** BeCu (Copper alloy).

**Contact Plating:** 0,000050 inch (1,25 microns) gold over copper plate.

**Shells:** Brass with 0,000050 inch (1,25 microns) gold over copper plate or stainless steel.

**Housing:** Aluminium alloy, golden brown conversion coating.

**O-ring:** Viton (fluorocarbon). Other material per request. One mounting and one for spare part.

### MECHANICAL CHARACTERISTICS

**Fixed Contacts:**
- Size 8 Contact: 0.142 inch (3.61mm) mating diameter. Female contact: Features large surface area (L.S.A.) closed entry design utilizing BeCu mechanical retention member.
- Size 20 Contact: 0.040 inch (1.02mm) mating diameter. Female Posiband Contact: Closed entry design.
- Size 22 Contact: 0.030 inch (0.76mm) mating diameter. Female Posiband Contact: Closed entry design.

**Contact Retention In Insert:** 9 lbs. (40 N).

**Shells:** Male shells may be dimpled for EMI/ESD ground paths.

**Polarization:** Trapezoidally shaped shells.

**Mechanical Operations:** 500 operations, minimum, per IEC 60512-5.

### CLIMATIC CHARACTERISTICS

**Temperature Range:** 40 to +125°C. The temperature range can be expended under certain conditions. Consult factory.

**Helium Leak Rate At Ambient Temperature:** < 5x10^-8mbar.l/s under a vacuum of 1.5x10^-2 mbar.

**Outgassing Non-Metallic Material:** Total Mass Loss – TML < 1 %. Collected Volatile Condensable Materials – CVCM < 0,1 %.

### ELECTRICAL CHARACTERISTICS AT SEA LEVEL

**SIGNAL CONTACTS**
- Contact Current Rating: 14 A nominal, size 20.
- 10 A nominal, size 22.
- Initial Contact Resistance: 0.005 ohms maximum.
- Proof Voltage: 1000 V r.m.s.

**POWER CONTACTS**
- Contact Current Rating: 10, 15, 20, 30 and 40 amperes nominal.
- Initial Contact Resistance: 0.0005 ohms maximum.
- Proof Voltage: 1000 V r.m.s.

**SHIELDED CONTACTS**
- Initial Contact Resistance: 0.008 ohms maximum.
- Nominal Impedance: 50 ohms.
- Insertion Loss: -0.46 dB at 1 GHz
- -1.5 dB at 2 GHz.
- VSWR: 1.15 average at 1 GHz.
- 1.56 average at 2 GHz.

Above values measured using frequency domain techniques.

**HIGH VOLTAGE CONTACTS**
- Flash Over Voltage: 3600 V r.m.s.
- Proof Voltage: 2700 V r.m.s.
- Initial Contact Resistance: 0.008 ohms maximum.

**CONNECTOR**
- Insulator Resistance: 5 G ohms.
- Clearance And Creepage Distance: 0.039 inch (1.0mm) minimum.
- Working Voltage: 300 V r.m.s.
- Residual Magnetism For Space Flight Versions : Consult factory.

All SAVAC® Series connectors are 100 % leak tested after fabrication.

In addition to the standard options, Positronic can supply SAVAC® connectors as board mount varieties or with flying leads.

SAVAC® series connectors utilize precision machined contacts for strength and durability. The materials and finishes, as well as the technical characteristics of the SAVAC® series connectors conform to MIL-DTL-24308, Goddard, and the SPACE-D32 specifications.
### SAVAC® DIMENSIONS

<table>
<thead>
<tr>
<th>SHELL SIZE 1</th>
<th>SHELL SIZE 2</th>
<th>SHELL SIZE 3</th>
<th>SHELL SIZE 4</th>
<th>SHELL SIZE 5</th>
<th>SHELL SIZE 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>24.99</td>
<td>33.32</td>
<td>47.04</td>
<td>63.5</td>
<td>61.11</td>
</tr>
<tr>
<td>B</td>
<td>39.37</td>
<td>47.7</td>
<td>61.42</td>
<td>77.88</td>
<td>75.49</td>
</tr>
<tr>
<td>C</td>
<td>21.08</td>
<td>21.08</td>
<td>21.08</td>
<td>21.08</td>
<td>23.9</td>
</tr>
<tr>
<td>D</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

* See ordering information: STEP 5 – Type of contacts

### SAVAC® MOUNTING

All dimensions are in mm.
All dimensions are subject to change.
SAVAC® PANEL CUTOUT INFORMATION

The depths are identical for all SAVAC sizes

<table>
<thead>
<tr>
<th>SHELL SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19.70</td>
<td>24.99</td>
<td>40.40</td>
<td>11.70</td>
<td>22.10</td>
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<tr>
<td>2</td>
<td>28.10</td>
<td>33.32</td>
<td>48.70</td>
<td>11.70</td>
<td>22.10</td>
</tr>
<tr>
<td>3</td>
<td>41.90</td>
<td>47.04</td>
<td>62.50</td>
<td>11.70</td>
<td>22.10</td>
</tr>
<tr>
<td>4</td>
<td>58.40</td>
<td>63.50</td>
<td>78.90</td>
<td>11.70</td>
<td>22.10</td>
</tr>
<tr>
<td>5</td>
<td>55.20</td>
<td>61.11</td>
<td>76.50</td>
<td>14.70</td>
<td>24.90</td>
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<tr>
<td>6</td>
<td>58.40</td>
<td>63.50</td>
<td>78.90</td>
<td>16.00</td>
<td>26.50</td>
</tr>
</tbody>
</table>

All dimensions are in mm.
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# ORDERING INFORMATION – CODE NUMBERING SYSTEMS

<table>
<thead>
<tr>
<th>STEP</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXAMPLE</td>
<td>SAVAC</td>
<td>15</td>
<td>M/S</td>
<td>G</td>
<td>.0</td>
<td>S****</td>
</tr>
</tbody>
</table>

**STEP 1 – BASIC SERIES**
SAVAC series

**STEP 2 – CONNECTOR VARIANTS**
- High density: 15-26-44-62-78-104
- Mixed combinations (Consult Combo-D catalog): 2WK2 up to 46W4

**STEP 3 – CONNECTOR GENDER**
- M/S: Male/Female Posiband
- M/M: Male/Male
- Marking inverted on the two insulators front side
- Not available for high density / mixed combinations
- S/S: Female Posiband/Female Posiband
- Marking inverted on the two insulators front side
- Not available for high density / mixed combinations

5*: Thermocouple contact

**STEP 4 – TYPE OF APPLICATIONS**
- G: Gold for Space version
- D: Gold and Dimpled for Space version
- S: Stainless-steel for Space version
- I: Stainless-steel for Industrial version
- Residual magnetism, consult factory

**STEP 5 – TYPE OF CONTACTS**
- 0: Normal density
- 1: High density
- 2: Power and/or mixed combinations
- 3: Coax and/or mixed combinations
- 4: High voltage
- 5*: Thermocouple contact (only normal density)

### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Position of thermocouple contacts:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 K</td>
<td>- The first cavity is always loaded.</td>
</tr>
<tr>
<td>5 T</td>
<td>- Even cavities for negative contacts (-)</td>
</tr>
<tr>
<td>5 J**</td>
<td>- Odd cavities for positive contacts (+)</td>
</tr>
<tr>
<td>5E**</td>
<td></td>
</tr>
</tbody>
</table>

** Consult sales department

** Chromel® and Alumel® are registered trademarks of Hoskins Manufacturing Company.
D-subminiature connectors with thermocouple crimp contacts.

D-subminiature feed through equipped with thermocouple contacts and the counterparts with thermocouple crimp contacts.

The thermocouple connectors are available in D-subminiature connectors version and also in hermetic version (D-subminiature feed-through).

D-subminiature Connector
See Positronic D-subminiature connectors catalog (Standard and Space Versions).

Thermocouple crimp contacts:
- Dimensional conformity to SAE AS39029.
- Precision machined contacts.
- Size 20 contacts.
- Thermocouple alloy.

<table>
<thead>
<tr>
<th>Female and male crimp contacts Part-Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Type K</td>
</tr>
<tr>
<td>Chromel (+)</td>
</tr>
<tr>
<td>Alumel (-)</td>
</tr>
<tr>
<td>Copper (+) with gold flash</td>
</tr>
<tr>
<td>Constantan (-)</td>
</tr>
<tr>
<td>Type T</td>
</tr>
<tr>
<td>Copper (+) with gold flash</td>
</tr>
<tr>
<td>Constantan (-)</td>
</tr>
</tbody>
</table>

* Consult sales department

D-subminiature feed-through:
- Conform to MIL-DTL-24308
- Size 20 contacts
- Type of contacts: Male/Female
- Type of contacts: Type K "Chromel (+) / Alumel (-)
- Type T "Copper (+) with gold flash / Constantan (-)
- Type J* "Iron (+) / Constantan (-)
- Type E* "Chromel (+) / Constantan (-)

* Consult sales department

Position of thermocouple contacts:
- The first cavity is always loaded.
- Even cavities for negative contacts (-)
- Odd cavities for positive contacts (+)

Chromel® and Alumel® are registered trademarks of Hoskins Manufacturing Company.
MATERIALS AND FINISHES

Dielectric Material: PTFE and Epoxy Resin.
Outer Contacts: Brass. Silver finish 0.000016 inch (0.40 microns) min.
Center Contacts: Copper alloy with brass. Gold finish 0.000050 inch min. (1.25 microns), over copper.
Housing: Aluminium alloy, golden brown conversion coating.
O-Ring: Viton (fluorocarbon). Other material per request.
Fixation Screws: Stainless Steel (kitted).

MECHANICAL CHARACTERISTICS

Durability: 500 operations minimum.
Center Contact Retention: 27.2N min. (in molding).
Force To Engage And Disengage: 13.6 N max.

CLIMATIC CHARACTERISTICS

Temperature Range: -40°C to +125°C.
The temperature range can be extended under certain conditions. Consult factory.

Helium Leak Rate
At Ambient Temperature: < 5x10⁻⁹ mbar.L/s under a vacuum of 1.5x10⁻⁷ mbar.

ELECTRICAL CHARACTERISTICS AT SEA LEVEL

Frequency Range: 50 Ω:DC – 4 GHz
75 Ω:DC – 1 GHz
Working Voltage: 500 V RMS (Leakage current 2mA max).

Dielectric Withstanding Voltage: 1500 V RMS (Leakage current 2mA max).

Insulation Resistance: 5 GΩ min. at 500 V DC.
Between center contact & outer contact.
Only with special option S1400:
5 GΩ min. at 500 V DC.
Between outer contact & aluminium housing.

Contact Resistance:
Center contact: 4 mΩ.
Outer contact: 2.5 mΩ.

ROHS Compliant:
Connectors are ROHS compliant per ROHS directive 2002/95/EC of Jan 2003.

BNC SOCKET CONTACT INTERFACE IN ACCORDANCE TO MIL-STD-348 / MIL-C-39012/17H.
# ORDERING INFORMATION CODE NUMBERING SYSTEMS

## XAVAC

<table>
<thead>
<tr>
<th>STEP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tr>
<td>EXAMPLE</td>
<td>XAVAC</td>
<td>3</td>
<td>BNC</td>
<td>5</td>
<td>F/F</td>
<td>50</td>
<td>/AA</td>
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</tbody>
</table>

### STEP 1 - BASIC SERIES
- XAVAC Series

### STEP 2 - CONNECTOR VARIANTS
- **BNC Quantity**
  - 1 BNC, 2 BNC, 3 BNC, 4 BNC

### STEP 3 - HOUSING SIZE
- 5: Housing size 5
- 6: Housing size 6

### STEP 4 - CONNECTOR GENDER
- F/F only

(*) connector variants 4BNC5 and 4BNC6 are not possible with special option S1400.

### STEP 7 - SPECIAL OPTIONS

- **S1400**: Dielectric material between outer contact and aluminium housing

  Only with 1 BNC, 2 BNC and 3 BNC

### STEP 6 - ENVIRONMENTAL COMPLIANT OPTIONS

- /AA Only - Compliant per EU Directive 2002/95/EC (RoHS)

### STEP 5 - IMPEDANCE

- 50 - nominal impedance 50 Ω
- 75 - nominal impedance 75 Ω

## SAVAC

<table>
<thead>
<tr>
<th>STEP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
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<td>2</td>
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</tbody>
</table>

### STEP 1 - BASIC SERIES
- SAVAC Series

### STEP 2 - CONNECTOR VARIANTS
- **BNC Quantity**
  - 1 BNC, 2 BNC

### STEP 3 - HOUSING SIZE
- 5: Housing size 5
- 6: Housing size 6

### STEP 4 - CONNECTOR GENDER
- F/F only

### STEP 7 - SPECIAL OPTIONS

- **S1400**: Dielectric material between outer contact and aluminium housing

### STEP 6 - ENVIRONMENTAL COMPLIANT OPTIONS

- /AA Only - Compliant per EU Directive 2002/95/EC (RoHS)

### STEP 5 - IMPEDANCE

- 50 - nominal impedance 50 ohms
- 75 - nominal impedance 75 ohms
HIVAC®

HIVAC® Series Connectors are feedthroughs equipped with D-Subminiature Adapter Connectors for SPACE or INDUSTRIAL vacuum applications.

The HIVAC® Connector configuration requires three separate units to function properly. The center unit is the feedthrough. This feedthrough requires two adapter units, one for the atmospheric side and one for the vacuum side.

Both sides of the feedthrough contain four threaded mounting holes and an o-ring groove. These redundant features allow either side of the connector to be mounted toward the vacuum, giving the customer the ultimate in flexibility.

The feedthrough has always Female/Female contacts.

The contact type of Adapter Connector is always as male next to the feedthrough and the other sides are according to the Customer request, Male/Male or Male/Female for the normal density, and for the high density it is systematically Male/Female.

A feedthrough has 5 types of insulators: 37 or 50 contacts for normal D and 44, 62 and 104 contacts for high D.

**MATERIALS AND FINISHES**

- **Insulator:** Glass-filled DAP per ASTM-D-5948 or polyester glass-filled per ASTM D5927, UL94V0, ASTM E-595, NASA-RP-1124.
- **Contacts:** Precision machined copper alloy.
- **Posiband Spring Clip:** BeCu (Copper alloy).
- **Contact Plating:** 0.000050 inch (1,25 microns) gold over copper plate.
- **Shells:** Brass with 0.000050 inch (1,25 microns) gold over copper plate or stainless steel.
- **Housing:** Aluminium alloy, golden brown conversion coating.
- **O-ring:** Viton (fluorocarbon). Other material per request. One mounting and one for spare part.

**ELECTRICAL CHARACTERISTICS AT SEA LEVEL**

- **Contact Current Rating:** 7.5A nominal, size 20
- **Initial Contact Resistance:** 0.005 ohms maximum.
- **Proof Voltage:** 1000 V r.m.s.
- **Insulator Resistance:** 5 G ohms.
- **Clearance And Creepage Distance:** 0.039 inch (1.0 mm) minimum.
- **Working Voltage:** 300 V r.m.s.
- **Residual Magnetism for Space Flight Versions:** Consult factory.

**MECHANICAL CHARACTERISTICS**

- **Fixed Contacts:** Size 20 Contact: 0.040 inch (1.02mm) mating diameter.
- **Female Posiband contact:** Closed entry design
- **Size 22 Contact:** 0.030 inch (0.76mm) mating diameter.
- **Female Posiband Contact:** Closed entry design.
- **Contact Adapter:** Male to female.
- **Contact Retention In Insert:** 9 lbs. (40 N).
- **Shells:** Male shells may be dimpled for EMI/ESD ground paths.
- **Polarization:** Trapezoidally shaped shells.
- **Mechanical Operations:** 500 operations, minimum, per IEC 60512-5.

**CLIMATIC CHARACTERISTICS**

- **Temperature Range:** -40 to +125°C.
- **Helium Leak Rate At Ambient temperature:** < 5x10⁻¹⁹ mbar.L/s under a vacuum of 1.5x10⁻⁷ mbar.
- **Outgassing Non-Metallic Material:** Total Mass Loss – TML < 1 %.
  Collected Volatile Condensable Materials – CVCM < 0.1 %.
HIVAC® FEEDTHROUGH DIMENSIONS

All dimensions are in mm.
All dimensions are subject to change.

HIVAC® ADAPTER DIMENSIONS
HIVAC® FEEDTHROUGH PANEL CUTOUT INFORMATION

HIVAC® FEEDTHROUGH AND HIVAC ADAPTER MOUNTING

Mounting Marks Must Be Aligned

All dimensions are in mm.
All dimensions are subject to change.
## FEEDTHROUGH PART-NUMBERS

<table>
<thead>
<tr>
<th>STEP</th>
<th>1</th>
<th>2</th>
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<tr>
<td>EXAMPLE</td>
<td>HIVAC</td>
<td>37</td>
<td>.0</td>
<td>S****</td>
<td></td>
</tr>
</tbody>
</table>

### STEP 1 – BASIC SERIES
- **HIVAC FEEDTHROUGH**

### STEP 2 – CONNECTOR VARIANTS
- **Normal density**
  - 37-50
- **High density**
  - 44-62-104

### STEP 3 – TYPE OF CONTACTS LAYOUTS
- **0**: Normal density
- **1**: High density

## ADAPTER PART-NUMBERS

<table>
<thead>
<tr>
<th>STEP</th>
<th>1</th>
<th>2</th>
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<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>EXAMPLE</td>
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<td>37</td>
<td>.25</td>
<td>M</td>
<td>G</td>
<td>S****</td>
</tr>
</tbody>
</table>

### STEP 1 – BASIC SERIES
- **HIVAC ADAPTER**

### STEP 2 – HIVAC FEED-THROUGH
- **Normal density**
  - 37-50
- **High density**
  - 44-62-104

### STEP 3 – HIVAC ADAPTER CONTACT VARIANTS
- **Normal density with 37 variant**
  - 9-2X9-15-25-37
- **Normal density with 50 variant**
  - 9-2X9-15-25-50
- **High density with 44 variant**
  - 15-26-44
- **High density with 62 variant**
  - 62
- **High density with 104 variant**
  - 78-104

### STEP 4 – ADAPTER GENDER
- **M**: Male contact
- **S**: Female Posiband
- **MM-SS**: Use only with 37.2X9 and 50.2X9 HIVAC Adapter
- **MS**: Use only with 37.2X9 HIVAC Adapter
- For normal density: 2 Male HIVAC Adapters or 1 Male HIVAC Adapter with 1 Female HIVAC Adapter
- For high density: 1 Male HIVAC Adapter with 1 Female HIVAC Adapter

### STEP 5 – TYPE OF APPLICATIONS
- **G**: Gold for Space version
- **D**: Gold and Dimpled for Space Version
- **S**: Stainless-steel for Space version
- Residual magnetism, consult factory

### STEP 6 – SPECIAL OPTIONS
- Consult Sales Department
### RECAPITULATIVE PART-NUMBERS

**With All Adapter Variants**

<table>
<thead>
<tr>
<th>HIVAC Adapter</th>
<th>HIVAC Feedthrough</th>
<th>HIVAC Adapter</th>
<th>HIVAC Adapter</th>
<th>HIVAC Feedthrough</th>
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<td></td>
</tr>
</tbody>
</table>

* Type of application: G, D or S (See Code Numbering System).
** For high density: 1 Male HIVAC adapter with 1 Female HIVAC adapter.

**Example:** HIVAC37.2x9MS

**Example:** HIVAC50.2x9MMS
TECHNICAL CHARACTERISTICS

MATERIAL AND FINISHES

Insulator: Glass-filled DAP, type SDG-F, black color, UL 94V0.
Contacts: Precision machined copper alloy.
Contact Plating: 0.000030 inch (0.76 microns) gold plate over nickel plate.
Shells: Aluminium alloy, golden brown conversion coating.
Flange: Aluminium Alloy.
O-ring: Viton (fluorocarbon). Other material per request. One mounting and one for spare part.

CONTACT CURRENT RATING:

- Size 12: 25A nominal, size 12.
- Size 16: 13A nominal, size 16.
- Size 20: 7.5A nominal, size 20.
- Size 22: 5A nominal, size 22.

INITIAL CONTACT RESISTANCE:

- Size 12: 0.003 ohms max., size 12.
- Size 16: 0.003 ohms max., size 16.
- Size 20: 0.007 ohms max., size 20.
- Size 22: 0.012 ohms max., size 22.

INSULATOR RESISTANCE: 5 G ohms.

CLEARANCE AND CREEPAGE: See Front Runner Series Product catalog.

WORKING VOLTAGE: See Front Runner Series Product catalog.

EMI/RFI Shielding Characteristics: Consult factory.

MECHANICAL CHARACTERISTICS

Fixed Contacts: Size 12 contact: 0.094 inch (2.4mm) mating diameter.
- Size 16 contact: 0.0625 inch (1.688mm) mating diameter.
- Size 20 contact: 0.040 inch (1.02mm) mating diameter.
- Size 22 contact: 0.030 inch (0.76mm) mating diameter.

Contact Retention In Insulator: Size 12: 20 lbs (89 N).
- Size 16: 20 lbs (89 N).
- Size 20: 10 lbs (44 N).
- Size 22: 6 lbs (27 N).

Mechanical Operators: 500 coupling.

CLIMATIC CHARACTERISTICS

Temperature Range: -40 to +125°C. The temperature range can be expended under certain conditions. Consult factory.

Helium Leak Rate At Ambient Temperature: < 5x10^-9 mbar.l/s under a vacuum of 1.5x10^-2 mbar.

Outgassing:
- Total Mass Loss – TML < 1 %.
- Collected Volatile Condensable Materials – CVCM < 0.1 %.

PANEL MOUNTING CUTOUTS FOR CIVAC WITHOUT FLANGE

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Size 11 Housing</th>
<th>Size 19 Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø B</td>
<td>0.760 ± 0.003 (19.30 ± 0.08)</td>
<td>1.275 ± 0.003 (32.39 ± 0.08)</td>
</tr>
<tr>
<td>C</td>
<td>0.715 ± 0.003 (18.16 ± 0.08)</td>
<td>1.227 ± 0.003 (31.17 ± 0.08)</td>
</tr>
</tbody>
</table>
CIVAC® WITH FLANGE F63

CIVAC® WITHOUT FLANGE

Panel thickness 2mm Min. to 15mm Max.
## ORDERING INFORMATION – CODE NUMBERING SYSTEMS

### STEP 1

CIVAC – Circular Vacuum Connector

### STEP 2 – HOUSING SIZE

- **11** – Size 11 Housing
- **19** – Size 19 Housing

### STEP 3 – GENDER

First letter is mounted outside Vacuum equipment

- **M/M** Male/Male
- **F/F** Female/Female
- **M/F** Male/Female
- **F/M** Female/Male

### STEP 4 – SIZE CONTACT ARRANGEMENT*

<table>
<thead>
<tr>
<th>Size 11 Housing</th>
<th>Size 19 Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 – 3 size 16</td>
<td>312 – 3 size 12</td>
</tr>
<tr>
<td>420 – 4 size 20</td>
<td>512 – 5 size 12</td>
</tr>
<tr>
<td>520 – 5 size 20</td>
<td>712 – 7 size 12</td>
</tr>
<tr>
<td>722 – 7 size 22</td>
<td>716 – 7 size 16</td>
</tr>
<tr>
<td>822 – 8 size 22</td>
<td>916 – 9 size 16</td>
</tr>
<tr>
<td>922 – 9 size 22</td>
<td>920 – 9 size 20</td>
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<td>1220 – 12 size 20</td>
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<td></td>
<td>1822 – 18 size 22</td>
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<tr>
<td></td>
<td>1920 – 19 size 20</td>
</tr>
<tr>
<td></td>
<td>2922 – 29 size 22</td>
</tr>
</tbody>
</table>

### STEP 5 – SERVICE CLASS

- **O** – Standard
- **M** – EMI/RFI Shielded: consult factory.

### STEP 6 – FLANGE TYPE

- **0A(S)ₜ** – without flange
  - **A** = Shell in aluminium steel
  - **S** = Shell in Stainless steel
  - Consult factory for panel thickness

- **K63A(S)** – with flange
- **F63A(S)** – with flange

  - **K63** : Flange DN63 - ISO-K equipped with one size 11 or one size 19 connector.
  - **F63** : Flange DN63 - ISO-F equipped with one size 11 or one size 19 connector.
  - **A** : Flange in aluminium alloy
  - **S** : Flange in stainless steel
  - Consult factory for another flange dimensions

### STEP 7

Consult factory

---

* See Front Runner Series Product Catalog for detailed dimensional information.
CIVAC®
BNC

MATERIALS AND FINISHES

Dielectric Material: PTFE and Epoxy Resin.
Outer Contacts: Brass. Silver finish 0,000016 inch (0,40 microns) min.
Center Contacts: Copper alloy with brass. Gold finish 0,000050 inch min. (1,25 microns) over copper.
Housing: Aluminium alloy, golden brown conversion coating.
O-Ring: Viton (fluorocarbon). Other material per request. One mounting and one for spare part.
Fixation Screws: Stainless Steel (kitted).

MECHANICAL CHARACTERISTICS

Durability: 500 operations minimum.
Center Contact Retention: 27,2 N min. (in molding).
Force To Engage And Disengage: 13,6 N max.

CLIMATIC CHARACTERISTICS

Temperature Range: -40°C to +125°C.
The temperature range can be extended Under certain conditions. Consult factory.
Helium Leak Rate: < 5x10⁻⁹ mbar.l/s under a vacuum of 1.5x10⁻⁷ mbar.

ELECTRICAL CHARACTERISTICS AT SEA LEVEL

Frequency Range: 50 Ω : DC – 4 GHz
75 Ω : DC – 1 GHz
Working Voltage: 500 V RMS (Leakage current 2mA max).
Dielectric Withstanding Voltage: 1500 V RMS (Leakage current 2mA max).
Insulation Resistance: 5 GΩ min. at 500 V DC. Between center contact & outer contact.
Contact Resistance: Center contact: 4 mΩ.
Outer contact: 2.5 mΩ.
ROHS Compliant: Connectors are ROHS compliant per ROHS directive 2002/95/EC of Jan 2003.

BNC SOCKET CONTACT INTERFACE IN ACCORDANCE TO MIL-STD-348 / MIL-C-39012/17H.

Example

CIVAC 1 BNC F/F 50 /AA

STEP 1 – BASIC SERIES
CIVAC Series

STEP 2 – CONNECTOR VARIANTS
1 BNC (Other configurations On request)

STEP 3 – CONNECTOR GENDER
F/F only

STEP 4 – IMPEDANCE
50 – nominal impedance 50 ohms
75 – nominal impedance 75 ohms

STEP 5 – ENVIRONMENTAL COMPLIANCE OPTIONS
/AA Only – Compliant per EU Directive 2002/95/EC (RoHs)

STEP 6 – SPECIAL OPTIONS
S1400: Dielectric material between Outer contact and aluminium housing
(Other options on request)
HERMECTIC LOW PROFILE MOUNTING PLATE

124 FEMALE SIZE 22 CONTACTS
124 FEMALE SIZE 22 CONTACTS
WITH PCB EXTENSIONS
WITH PCB EXTENSIONS
HERMETIC ROUND FLANGES FOR INTERCONNECTION SYSTEM

10 D-SUBMINIATURE FEEDTHROUGHS

237 MALE / FEMALE SIZE 20 CONTACTS

HERMETIC ROUND FLANGES FOR VACUUM CHAMBERS

2 XAVAC® CONNECTORS

5 MALE/FEMALE SIZE 8 CONTACTS
20 MALE/FEMALE SIZE 20 CONTACTS

7 SAVAC® CONNECTORS

546 MALE/FEMALE SIZE 22 CONTACTS
HERMETIC FLANGE FOR VACUUM CHAMBERS

16 XAVAC® CONNECTORS

548 MALE/FEMALE SIZE 20 CONTACTS

HERMETIC ROUND FLANGE FOR VACUUM CHAMBERS

39 XAVAC® CONNECTORS

174 MALE / FEMALE SIZE 20 CONTACTS
1884 MALE / FEMALE SIZE 22 CONTACTS
Our Hermetic Connectors are widely recognized for their reliability, durability and performance capabilities. They are utilized worldwide in Scientific Laboratories and Space Industries.

For quality and service at a competitive price, Positronic Industries is unbeaten. Give us a try.
HERMETIC CONNECTORS / FEEDTHROUGH CUSTOM DESIGN

HERMETIC ROUND FLANGE FOR VACUUM CHAMBERS

THERMOCOUPLE SUBMINIATURE-D FEEDTHROUGH WITH SOCKET CONNECTORS AND THERMOCOUPLE WIRES

HERMETIC OBTURATOR

OPTIONS ON REQUEST CONSULT FACTORY
# CONVERSION TABLE

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<tr>
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<th>Pascal</th>
<th>Bar</th>
<th>Kg/cm²</th>
<th>Atmosph.</th>
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<td>0,9869.10(^{-5})</td>
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<th>Mbar</th>
<th>Inch.hg</th>
<th>Psi</th>
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</table>
### POWER

**Contact Sizes:**
0, 8, 12, 16, 20, 22 and 24

**Current Ratings:**
To 200 amperes per contact

**Terminations:**
Crimp and fixed cable connector, straight solder, right angle (90°) compliant press-in and right angle (90°) compliant press-in

**Configurations:**
Multiple variants in a variety of package sizes

**Compliance:**
PICMG 2.11, PICMG 3.0, VITA 41, DSCC, GSFC S-311-P-4, GSFC S-311-P-10

**Features:**
- High current density
- Energy saving - low contact resistance
- Hot swap capability
- AC/DC operation in a single connector
- Signal contacts for hardware management
- Blind mating
- Sequential mating
- Large surface area contact mating system
- Wide variety of accessories
- Customer-specified contact arrangements
- Modular tooling which produces a single piece connector insert

### D-SUBMINIATURE

**Contact Sizes:**
8, 16, 20 and 22

**Current Ratings:**
To 100 amperes

**Terminations:**
Crimp, wire solder, straight solder, right angle (90°) solder, straight compliant press-in and right angle (90°) compliant press-in

**Configurations:**
Multiple variants in both standard and high densities, thirty package sizes

**Compliance:**
MIL-DTL-28748, SAE AS39029, CCITT V.35

**Features:**
- Four performance levels available for best cost/performance ratio: professional, industrial, military and space-flight quality
- Options include high voltage, coax, thermocouple and air coupling contacts; environmentally sealed and dual port connector packages including mixed density contacts
- Broad selection of accessories
- Size 20 and 22 contacts suitable for use in carrying power
- IP65, IP67

### RECTANGULAR

**Contact Sizes:**
16, 20 and 22

**Current Ratings:**
To 13 amperes nominal

**Terminations:**
Crimp, wire solder, straight solder, right angle (90°) solder, and straight compliant press-in

**Configurations:**
Multiple variants in both standard and high densities, thirty package sizes

**Qualifications:**
MIL-DTL-28748, SAE AS39029, CCITT V.35

**Features:**
- Two performance levels available: industrial quality and military quality
- A wide variety of accessories
- Broad selection of contact arrangement and package sizes
- Connector coding device (keying) options

### CIRCULAR

**Contact Sizes:**
12, 16, 20 and 22

**Current Ratings:**
To 25 amperes nominal

**Terminations:**
Crimp, wire solder, straight solder, and right angle (90°) solder

**Configurations:**
Multiple variants in four package sizes

**Qualifications:**
Environmental protection to IP67

**Features:**
- Non-corrodible / lightweight composite construction
- EMI/RFI shielded versions
- Thermocouple contacts
- Environmentally sealed versions
- Rear insertion / front release of removable contacts
- Two level sequential mating
- Overmolding available on full assemblies

### CABLE

**Contact Sizes:**
8, 12, 16, 20 and 22

**Current Ratings:**
To 40 amperes nominal

**Terminations:**
Feedthrough is standard; flying leads and board mount available upon request

**Configurations:**
See D-subminiature and circular configurations above

**Compliance:**
Space-D32

**Features:**
- Intended for use as an electrical feedthrough in high vacuum applications
- Helium leakage rate at ambient temperature: ≤ 8x10⁻¹⁰ mbar.l/s under a vacuum 1.5x10⁻² mbar
- Signal, power, coax and high voltage versions available
- Connectors can be mounted on flange assembly per customer specification

### HERMETIC

**Contact Sizes:**
8, 12, 16, 20 and 22

**Current Ratings:**
To 40 amperes nominal

**Terminations:**
Feedthrough is standard; flying leads and board mount available upon request

**Configurations:**
See D-subminiature and circular configurations above

**Compliance:**
Space-D32

**Features:**
- Intended for use as an electrical feedthrough in high vacuum applications
- Helium leakage rate at ambient temperature: ≤ 8x10⁻¹⁰ mbar.l/s under a vacuum 1.5x10⁻² mbar
- Signal, power, coax and high voltage versions available
- Connectors can be mounted on flange assembly per customer specification

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