

# HERMETIC CONNECTORS



## Positronic®

THE SCIENCE OF CERTAINTY  
an Amphenol company

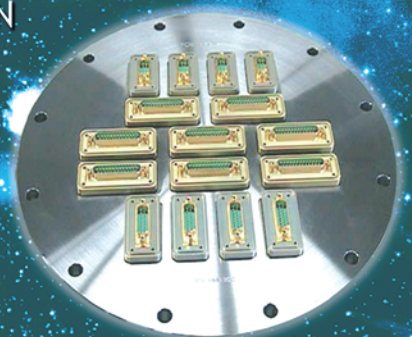
### D-SUB FROM SPACE QUALITY PRODUCTS TO INDUSTRIAL APPLICATIONS



- HELIUM LEAK RATE:  $< 5 \times 10^{-9}$  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. F

[www.connectpositronic.com](http://www.connectpositronic.com)

# Connector Excellence®

## Positronic Provides Complete Capability

**Mission Statement**  
*"To utilize product flexibility and application assistance to present quality interconnect solutions which represent value to customers worldwide."*

### 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

- **Quality Systems:** Select locations qualified to ISO 9001, ISO 14001, AS9100, MIL-STD-790 and customer "dock to stock" programs. Applicable products qualified to MIL-DTL-24308, SAE AS39029, DSCC 85039, MIL-DTL-28748, Space D32, GSFC S-311-P-4 and GSFC S-311-P-10.
- 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 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.

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THIS CATALOG SHOULD BE ACCOMPANIED BY COPIES  
OF POSITRONIC INDUSTRIES CONNECTOR  
CATALOGS AS PICTURED BELOW.

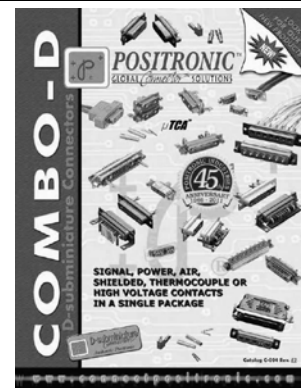


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## SPACE APPLICATIONS D-SUBMINIATURE CONNECTORS

## COMBO-D D-SUBMINIATURE CONNECTORS WITH MIXED CONTACT COMBINATIONS



## FRONT RUNNER SERIES CIRCULAR CONNECTORS

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





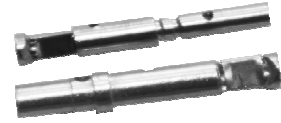
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# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

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



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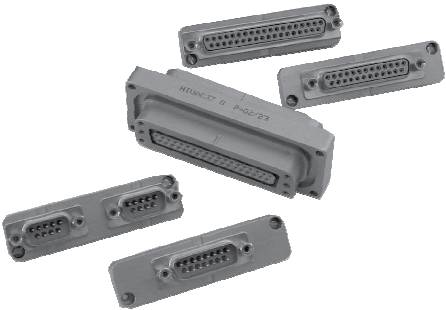


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Hivac® series connectors are feedthroughs equipped with D-Subminiature adapter connectors for space or industrial vacuum applications.



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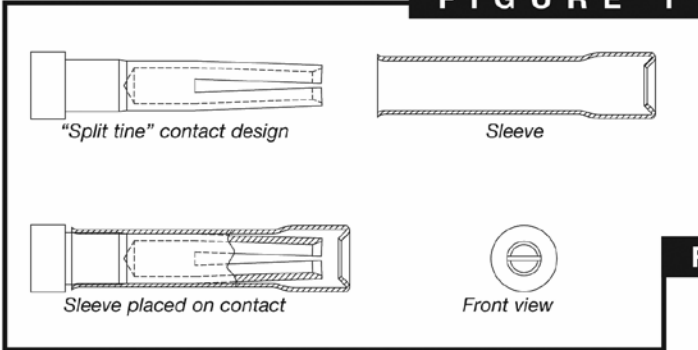
# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## 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.

**FIGURE 1**



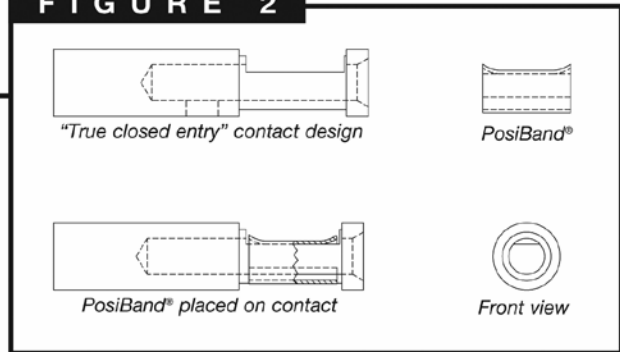
The most common **closed entry design** utilized by connector manufacturers is a split tine and sleeve concept. **See figure 1.** With this design, both the mechanical forces and

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.

**FIGURE 2**



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 . . .*

# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS



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continued from previous page . . .

## The PosiBand® contact system has many advantages over the legacy split tine design.

- X** 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.
- X** PosiBand has greater surface area at the male and female contact interface, resulting in more consistent electrical performance.
- X** 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.
- X** 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.
- X** 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.



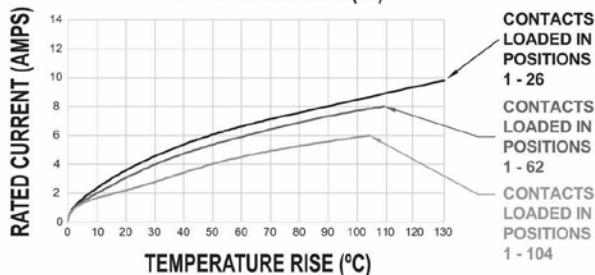
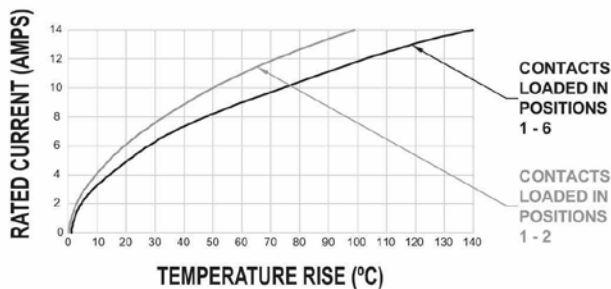
For more details about the **advantages of the PosiBand®** system, please view the detailed white paper at [www.connectpositronic.com/content/37/](http://www.connectpositronic.com/content/37/) or visit our web site at [www.connectpositronic.com](http://www.connectpositronic.com).



### TEMPERATURE RISE CURVES Test conducted in accordance with UL1977.

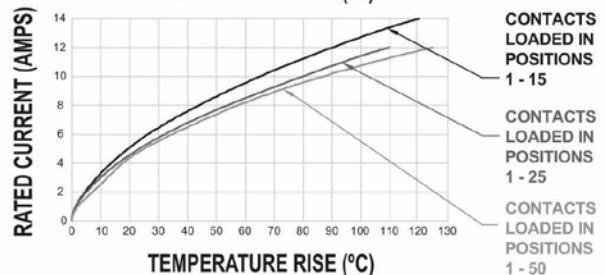
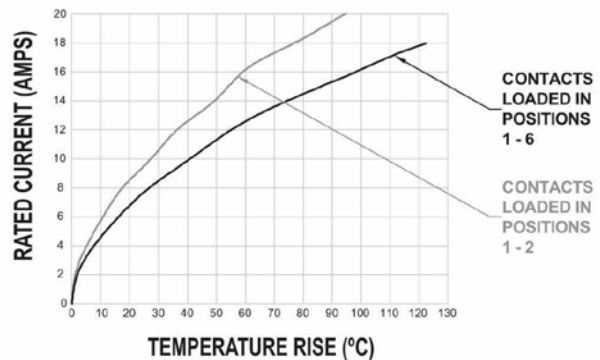
#### Size 22 PosiBand Contacts

**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.

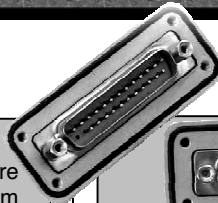




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# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## XAVAC®



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.

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

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

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

### MATERIALS AND FINISHES

<b>Insulator:</b>	Glass-filled DAP per ASTM-D-5948 or polyester glass-filled per ASTM D 5927, UL94V0, ASTM E-595, NASA-RP-1124.
<b>Contacts:</b>	Precision machined copper alloy.
<b>Posiband Spring Clip:</b>	BeCu (Copper alloy).
<b>Contact Plating:</b>	0,000050 inch (1,25 microns) gold over copper plate.
<b>Shells:</b>	Brass with 0,000050 inch (1,25 microns) gold over copper plate or stainless steel.
<b>Housing:</b>	Aluminium alloy, golden brown conversion coating.
<b>O-ring:</b>	Viton (fluorocarbon). Other material per request. One mounting and one for spare part.

### MECHANICAL CHARACTERISTICS

<b>Fixed Contacts:</b>	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.
<b>Contact Retention In Insert:</b>	9 lbs. (40 N).
<b>Shells:</b>	Male shells may be dimpled for EMI/ESD ground paths. Trapezoidally shaped shells.
<b>Polarization:</b>	
<b>Mechanical Operations:</b>	500 operations, minimum, per IEC 60512-5.

### CLIMATIC CHARACTERISTICS

<b>Temperature Range:</b>	-40 to +85°C. The temperature range can be expended under certain conditions. Consult factory.
<b>Helium Leak Rate At Ambient Temperature:</b>	< 5x10 <sup>-9</sup> mbar.l/s under a vacuum of 1.5x10 <sup>-2</sup> mbar.
<b>Outgassing Non-Metallic Material:</b>	Total Mass Loss – TML < 1 %. Collected Volatile Condensable Materials – CVCM < 0,1 %.

### ELECTRICAL CHARACTERISTICS AT SEA LEVEL

#### SIGNAL CONTACTS

<b>Contact Current Rating:</b>	14 A nominal, size 20. 10 A nominal, size 22.
<b>Initial Contact Resistance:</b>	0,005 ohms maximum.
<b>Proof Voltage:</b>	1000 V r.m.s.

#### POWER CONTACTS

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

#### SHIELDED CONTACTS

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

Above values measured using frequency domain techniques.

#### HIGH VOLTAGE CONTACTS

<b>Flash over Voltage:</b>	3600 V r.m.s.
<b>Proof Voltage:</b>	2700 V r.m.s.
<b>Initial Contact Resistance:</b>	0.008 ohms maximum.

#### CONNECTOR

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

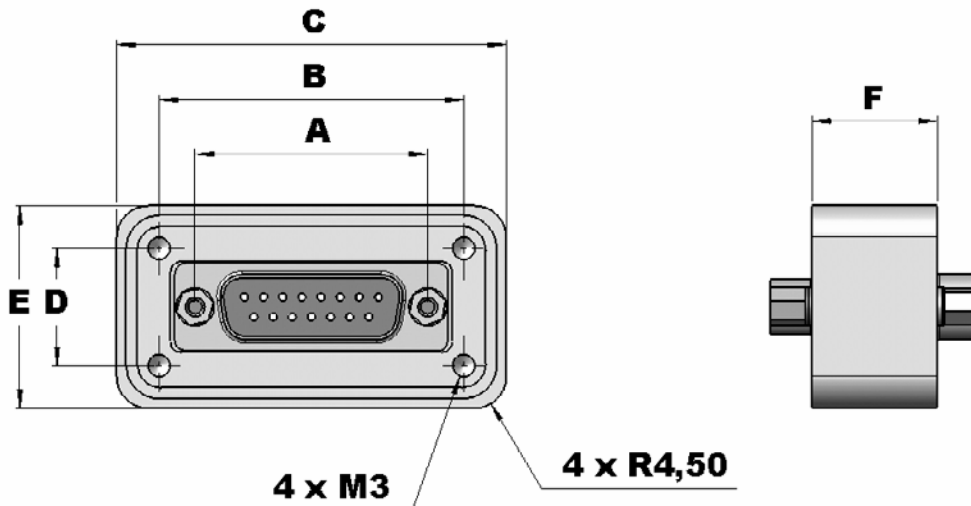


# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS



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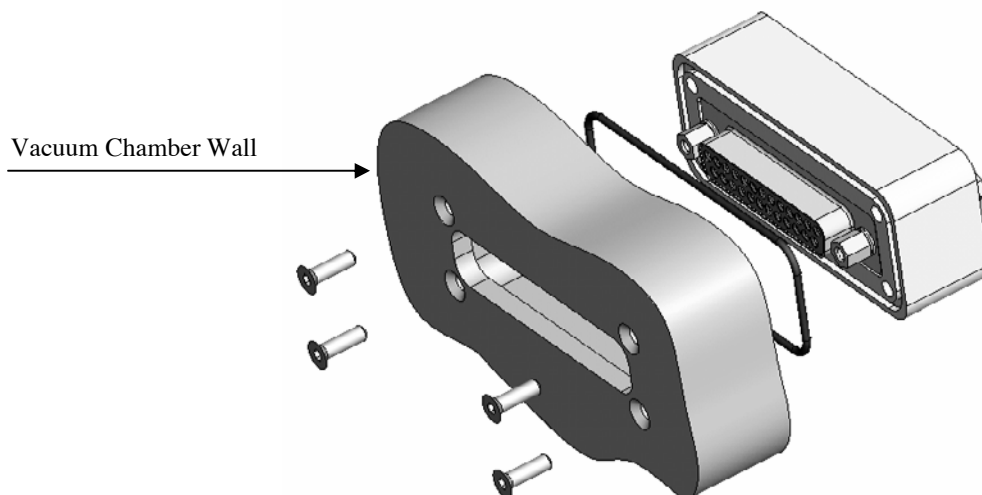
## XAVAC® DIMENSIONS



	A	B	C	D	E	F	
						Type 0-1-5*	Type 2-3-4*
SHELL SIZE 1	24,99	34,29	46,37	16,00	28,08	18	24
SHELL SIZE 2	33,32	43,64	55,79	16,76	28,92	18	24
SHELL SIZE 3	47,04	56,36	67,42	16,02	27,08	18	24
SHELL SIZE 4	63,50	73,46	85,38	16,90	28,82	18	24
SHELL SIZE 5	61,11	71,28	82,99	19,68	31,40	18	24
SHELL SIZE 6	63,50	73,26	84,38	20,88	32,00	18	24

\* See ordering information: STEP 5 – Type of contacts

## XAVAC® MOUNTING



All dimensions are in mm.

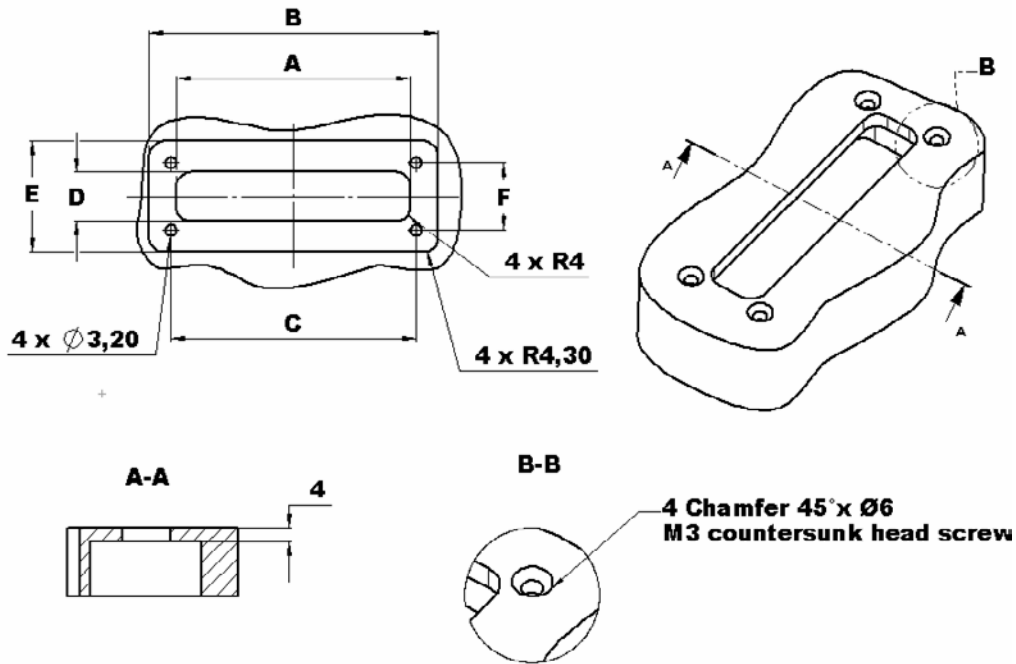
All dimensions are subject to change.



# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## XAVAC® PANEL CUTOUT INFORMATION

The depths are identical for all XAVAC® sizes



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

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

# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS



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## ORDERING INFORMATION – CODE NUMBERING SYSTEMS

STEP	1	2	3	4	5	6
EXAMPLE	XAVAC	15	M/S	G	.0	S****
<b>STEP 1 – BASIC SERIES</b> XAVAC series						<b>STEP 6 – SPECIAL OPTIONS</b> Consult Sales Department
<b>STEP 2 – CONNECTOR VARIANTS</b> Normal density 9-15-25-37-50 High density 15-26-44-62-78-104 Mixed combinations (Consult Combo-D catalog) 2WK2 up to 46W4						<b>STEP 5 – TYPE OF CONTACTS</b> 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)
<b>STEP 3 – CONNECTOR GENDER</b> 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						<b>STEP 4 – TYPE OF APPLICATIONS</b> 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

5\* : Thermocouple contact

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

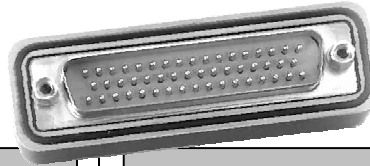
\*\* Consult sales department



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# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## SAVAC®



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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.

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.

### MATERIALS AND FINISHES

<b>Insulator:</b>	Glass-filled DAP per ASTM-D-5948 or polyester glass-filled per ASTM D 5927, UL94V0, ASTM E-595, NASA-RP-1124.
<b>Contacts:</b>	Precision machined copper alloy.
<b>Posiband Spring Clip:</b>	BeCu (Copper alloy).
<b>Contact Plating:</b>	0,000050 inch (1,25 microns) gold over copper plate.
<b>Shells:</b>	Brass with 0,000050 inch (1,25 microns) gold over copper plate or stainless steel.
<b>Housing:</b>	Aluminium alloy, golden brown conversion coating.
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<b>Contact Retention In Insert:</b>	9 lbs. (40 N).
<b>Shells:</b>	Male shells may be dimpled for EMI/ESD ground paths.
<b>Polarization:</b>	Trapezoidally shaped shells.
<b>Mechanical Operations:</b>	500 operations, minimum, per IEC 60512-5.

### CLIMATIC CHARACTERISTICS

<b>Temperature Range:</b>	40 to +85°C. The temperature range can be expended under certain conditions. Consult factory.
<b>Helium Leak Rate At Ambient Temperature:</b>	< 5x10 <sup>-9</sup> mbar.l/s under a vacuum of 1.5x10 <sup>-2</sup> mbar.
<b>Outgassing Non-Metallic Material:</b>	Total Mass Loss – TML < 1 %. Collected Volatile Condensable Materials – CVCM < 0,1 %.

### ELECTRICAL CHARACTERISTICS AT SEA LEVEL

#### SIGNAL CONTACTS

<b>Contact Current Rating:</b>	14 A nominal, size 20. 10 A nominal, size 22.
<b>Initial Contact Resistance:</b>	0,005 ohms maximum.
<b>Proof Voltage:</b>	1000 V r.m.s.

#### POWER CONTACTS

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

#### SHIELDED CONTACTS

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

Above values measured using frequency domain techniques.

#### HIGH VOLTAGE CONTACTS

<b>Flash Over Voltage:</b>	3600 V r.m.s.
<b>Proof Voltage:</b>	2700 V r.m.s.
<b>Initial Contact Resistance:</b>	0.008 ohms maximum.

#### CONNECTOR

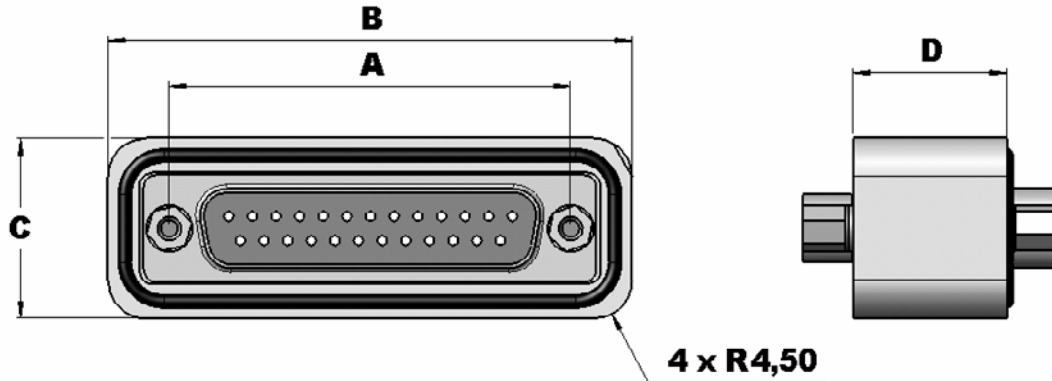
<b>Insulator Resistance:</b>	5 G ohms.
<b>Clearance And Creepage Distance:</b>	0.039 inch (1.0mm) minimum.
<b>Working Voltage:</b>	300 V r.m.s.
<b>Residual Magnetism For Space Flight Versions :</b>	Consult factory.

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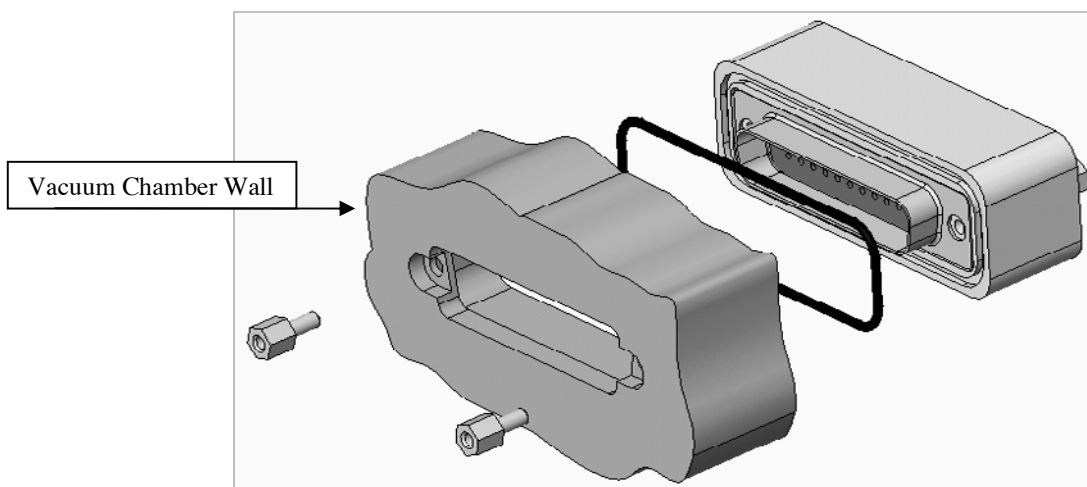
## SAVAC® DIMENSIONS



	A	B	C	D	
				Type 0-1-5*	Type 2-3-4*
<b>SHELL SIZE 1</b>	24.99	39.37	21.08	18	24
<b>SHELL SIZE 2</b>	33.32	47.7	21.08	18	24
<b>SHELL SIZE 3</b>	47.04	61.42	21.08	18	24
<b>SHELL SIZE 4</b>	63.5	77.88	21.08	18	24
<b>SHELL SIZE 5</b>	61.11	75.49	23.9	18	24
<b>SHELL SIZE 6</b>	63.5	77.88	25.5	18	24

\*See ordering information: STEP 5 – Type of contacts

## SAVAC® MOUNTING



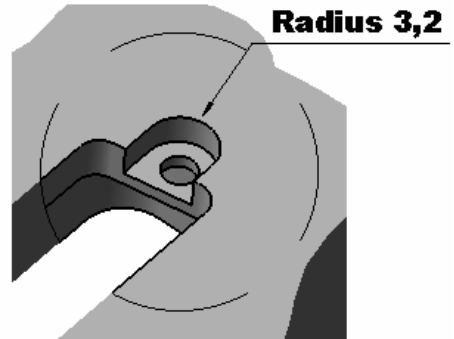
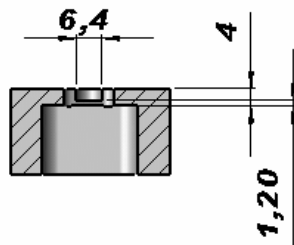
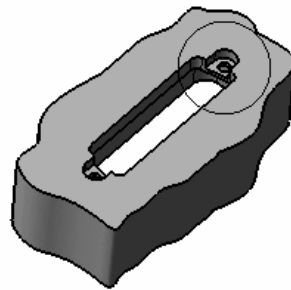
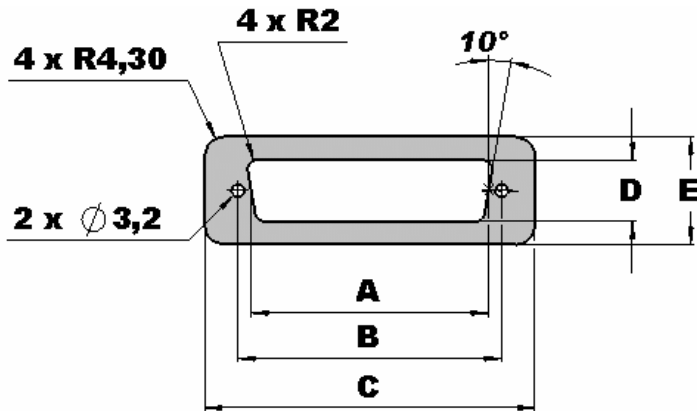
All dimensions are in mm.  
All dimensions are subject to change.



# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## SAVAC® PANEL CUTOUT INFORMATION

The depths are identical for all SAVAC sizes



	A	B	C	D	E
SHELL SIZE 1	19.70	24.99	40.40	11.70	22.10
SHELL SIZE 2	28.10	33.32	48.70	11.70	22.10
SHELL SIZE 3	41.90	47.04	62.50	11.70	22.10
SHELL SIZE 4	58.40	63.50	78.90	11.70	22.10
SHELL SIZE 5	55.20	61.11	76.50	14.70	24.90
SHELL SIZE 6	58.40	63.50	78.90	16.00	26.50

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

# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS



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## ORDERING INFORMATION – CODE NUMBERING SYSTEMS

STEP	1	2	3	4	5	6
EXAMPLE	SAVAC	15	M/S	G	.0	S****
<b>STEP 1 – BASIC SERIES</b> SAVAC series						<b>STEP 6 – SPECIAL OPTIONS</b> Consult Sales Department
<b>STEP 2 – CONNECTOR VARIANTS</b> Normal density 9-15-25-37-50 High density 15-26-44-62-78-104 Mixed combinations (Consult Combo-D catalog) 2WK2 up to 46W4						<b>STEP 5 – TYPE OF CONTACTS</b> 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)
<b>STEP 3 – CONNECTOR GENDER</b> 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						<b>STEP 4 – TYPE OF APPLICATIONS</b> 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

5\*: Thermocouple contact

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

\*\* Consult sales department



## THERMOCOUPLE CONNECTORS



**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.

Female and male crimp contacts Part-Number				
	Material	Male	Female	Color code
Type K	Chromel® (+)	MC6020DCH	FC6020D2CH	White
	Alumel® (-)	MC6020DAL	FC6020D2AL	Green
Type T	Copper (+) with gold flash	MC6020DCU	FC6020D2CU	Red
	Constantan (-)	MC6020DCO	FC6020D2CO	Yellow
Type J*	Iron (+)	MC6020DIR	FC6020D2IR	Black
	Constantan (-)	MC6020DCO	FC6020D2CO	Yellow
Type E*	Chromel® (+)	MC6020DCH	FC6020D2CH	White
	Constantan (-)	MC6020DCO	FC6020D2CO	Yellow

\* 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 of contacts : Type T "Copper (+) with gold flash / Constantan (-)
- Type of contacts : Type J "Iron (+) / Constantan (-)
- Type of contacts : 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 (+)



# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS



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## 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.

An Adapter Connector allows several combinations with a feedthrough.

The advantage of this system is that it allows the user the flexibility to purchase a single feedthrough and use it with a variety of adapters.

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

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

### MATERIALS AND FINISHES

<b>Insulator:</b>	Glass-filled DAP per ASTM-D-5948 or polyester glass-filled per ASTM D 5927, UL94V0, ASTM E-595, NASA-RP-1124.
<b>Contacts:</b>	Precision machined copper alloy.
<b>Posiband Spring Clip:</b>	BeCu (Copper alloy).
<b>Contact Plating:</b>	0,000050 inch (1,25 microns) gold over copper plate.
<b>Shells:</b>	Brass with 0,000050 inch (1,25 microns) gold over copper plate or stainless steel.
<b>Housing:</b>	Aluminium alloy, golden brown conversion coating.
<b>O-ring:</b>	Viton (fluorocarbon). Other material per request. One mounting and one for spare part.

### ELECTRICAL CHARACTERISTICS AT SEA LEVEL

<b>Contact Current Rating:</b>	7,5A nominal, size 20 5A nominal, size 22
<b>Initial Contact Resistance:</b>	0.005 ohms maximum.
<b>Proof Voltage:</b>	1000 V r.m.s.
<b>Insulator Resistance:</b>	5 G ohms.
<b>Clearance And Creepage Distance:</b>	0.039 inch (1,0 mm) minimum.
<b>Working Voltage:</b>	300 V r.m.s.
<b>Residual Magnetism for Space Flight Versions :</b>	Consult factory.

### MECHANICAL CHARACTERISTICS

<b>Fixed Contacts:</b>	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.
<b>Contact Adapter:</b>	Male to female.
<b>Contact Retention In Insert:</b>	9 lbs. (40 N).
<b>Shells:</b>	Male shells may be dimpled for EMI/ESD ground paths.
<b>Polarization:</b>	Trapezoidally shaped shells.
<b>Mechanical Operations:</b>	500 operations, minimum, per IEC 60512-5.

### CLIMATIC CHARACTERISTICS

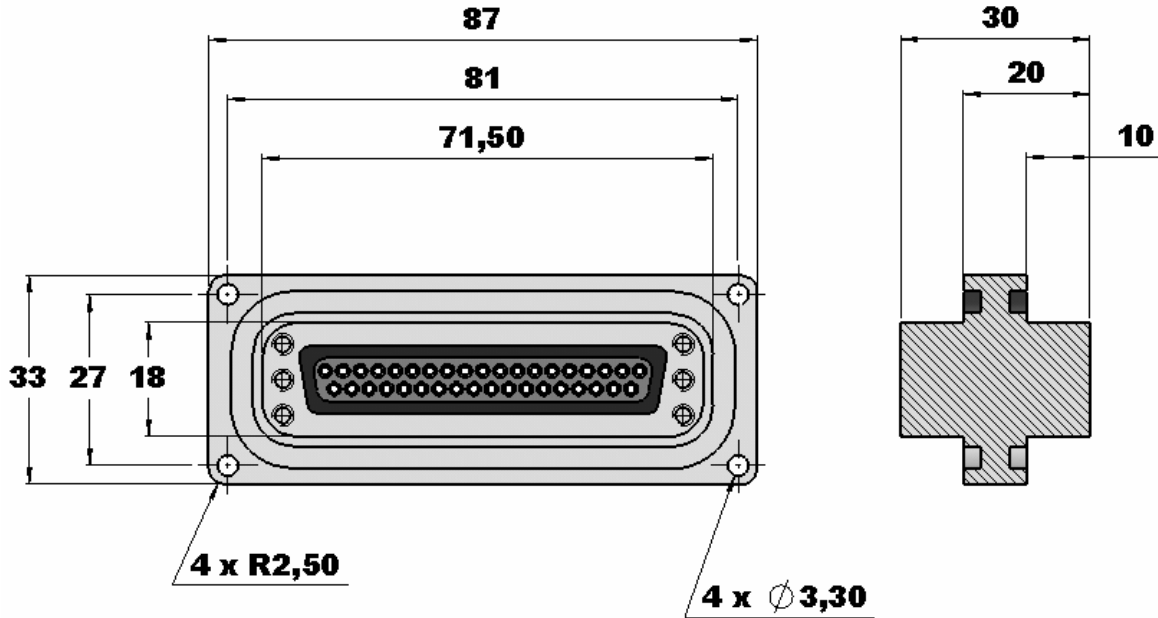
<b>Temperature Range:</b>	-40 to +85°C. The temperature range can be expended under certain conditions. Consult factory.
<b>Helium Leak Rate At Ambient temperature:</b>	< 5x10 <sup>-9</sup> mbar.l/s under a vacuum of 1.5x10 <sup>-2</sup> mbar.
<b>Outgassing Non-Metallic Material:</b>	Total Mass Loss – TML < 1 %. Collected Volatile Condensable Materials – CVCM < 0,1 %.



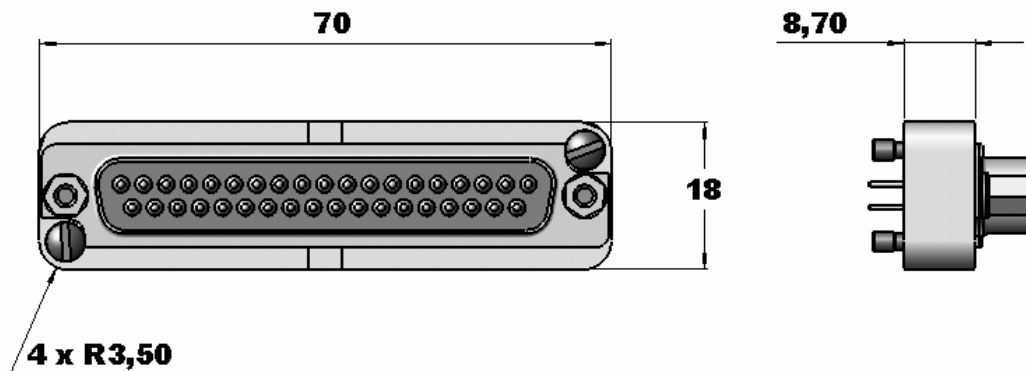
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# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## HIVAC® FEEDTHROUGH DIMENSIONS



## HIVAC® ADAPTER DIMENSIONS



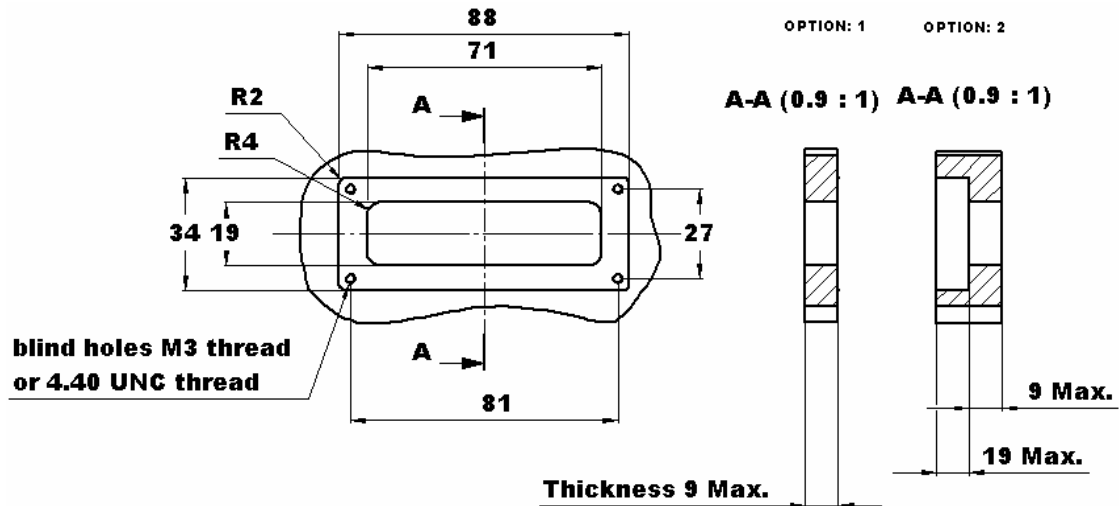
*All dimensions are in mm.  
All dimensions are subject to change.*

# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

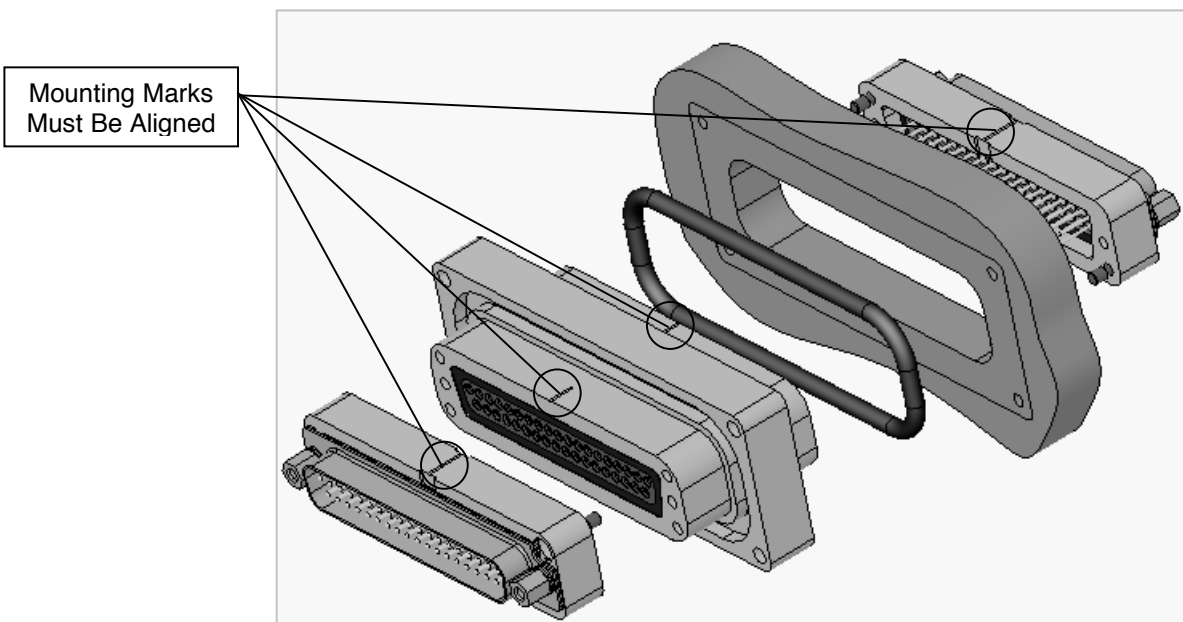


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## HIVAC® FEEDTHROUGH PANEL CUTOUT INFORMATION



## HIVAC® FEEDTHROUGH AND HIVAC ADAPTER MOUNTING



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



# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS

## ORDERING INFORMATION – CODE NUMBERING SYSTEMS

### FEEDTHROUGH PART-NUMBERS

STEP	1	2	3	4
EXAMPLE	HIVAC	37	.0	S****
<b>STEP 1 – BASIC SERIES</b> HIVAC FEEDTHROUGH			<b>STEP 4 – SPECIAL OPTIONS</b> Consult Sales Department	
<b>STEP 2 – CONNECTOR VARIANTS</b> Normal density 37-50 High density 44-62-104			<b>STEP 3 – TYPE OF CONTACTS LAYOUTS</b> 0 : Normal density 1 : High density	

### ADAPTER PART-NUMBERS

STEP	1	2	3	4	5	6
EXAMPLE	HIVAC	37	.25	M	G	S****
<b>STEP 1 – BASIC SERIES</b> HIVAC ADAPTER			<b>STEP 6 – SPECIAL OPTIONS</b> Consult Sales Department			
<b>STEP 2 – HIVAC FEED-THROUGH</b> Normal density 37-50 High density 44-62-104			<b>STEP 5 – TYPE OF APPLICATIONS</b> G : Gold for Space version D : Gold and Dimpled for Space Version S : Stainless-steel for Space version Residual magnetism, consult factory			
<b>STEP 3 – HIVAC ADAPTER CONTACT VARIANTS</b> 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			<b>STEP 4 – ADAPTER GENDER</b> 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			

# HERMETIC FEEDTHROUGH FOR SPACE OR INDUSTRIAL VACUUM APPLICATIONS



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## RECAPITULATIVE PART-NUMBERS

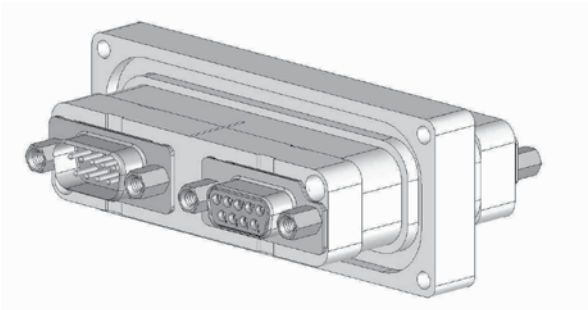
With All Adapter Variants

HIVAC Adapter	HIVAC Feedthrough	HIVAC Adapter	HIVAC Adapter	HIVAC Feedthrough	HIVAC Adapter
HIVAC37.9M*	<b>HIVAC37.0</b>	HIVAC37.9S*	<b>HIVAC50.0</b>	HIVAC50.9M*	HIVAC50.9S*
HIVAC37.9M*		HIVAC37.9M*		HIVAC50.9M*	HIVAC50.9M*
HIVAC37.9S*		HIVAC37.9S*		HIVAC50.9S*	HIVAC50.9S*
HIVAC37.2X9MS*		HIVAC37.2X9SM*	HIVAC50.2X9MM*		HIVAC50.2X9SS*
HIVAC37.2X9MS*		HIVAC37.2X9MS*	HIVAC50.15M*		HIVAC50.15S*
HIVAC37.2X9MM*		HIVAC37.2X9SS*	HIVAC50.15M*		HIVAC50.15M*
HIVAC37.2X9MM*		HIVAC37.2X9SS*	HIVAC50.15S*		HIVAC50.15S*
HIVAC37.2X9MM*		HIVAC37.2X9MM*	HIVAC50.25M*		HIVAC50.25S*
HIVAC37.2X9MM*		HIVAC37.2X9MS*	HIVAC50.25M*		HIVAC50.25M*
HIVAC37.2X9MM*		HIVAC37.2X9SM*	HIVAC50.25S*		HIVAC50.25S*
HIVAC37.2X9SS*		HIVAC37.2X9SS*	HIVAC50.50M*		HIVAC50.50S*
HIVAC37.2X9SS*		HIVAC37.2X9MS*	HIVAC50.50M*		HIVAC50.50M*
HIVAC37.2X9SS*		HIVAC37.2X9SM*	HIVAC50.50S*		HIVAC50.50S*
HIVAC37.15M*		HIVAC37.15S*	<b>HIVAC44.1</b>		HIVAC44.15S*
HIVAC37.15M*		HIVAC37.15M*	HIVAC44.15M*		HIVAC44.15M*
HIVAC37.15S*		HIVAC37.15S*	HIVAC44.26M*		HIVAC44.26S*
			HIVAC44.44M*		HIVAC44.44MS*
HIVAC37.25M*		HIVAC37.25S*	<b>HIVAC62.1</b>		HIVAC62.62S*
HIVAC37.25M*		HIVAC37.25M*	HIVAC62.62M*		HIVAC62.62M*
HIVAC37.25S*		HIVAC37.25S*			
HIVAC37.37M*		HIVAC37.37S*	<b>HIVAC104.1</b>		HIVAC104.78S*
HIVAC37.37M*		HIVAC37.37M*	HIVAC104.78M*		HIVAC104.15S*
HIVAC37.37S*		HIVAC37.37S*	HIVAC104.15M*		HIVAC104.15M*
			HIVAC104.104M*		HIVAC104.104S*

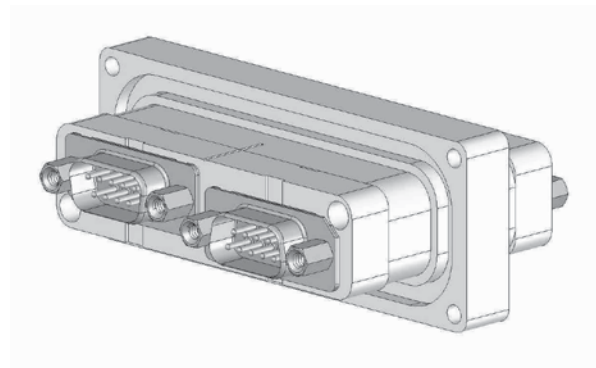
\* Type of application: G, D or S (See Code Numbering System).

\*\* For high density: 1 Male HIVAC adapter with 1 Female HIVAC adapter.

Example: HIVAC37.2x9MS



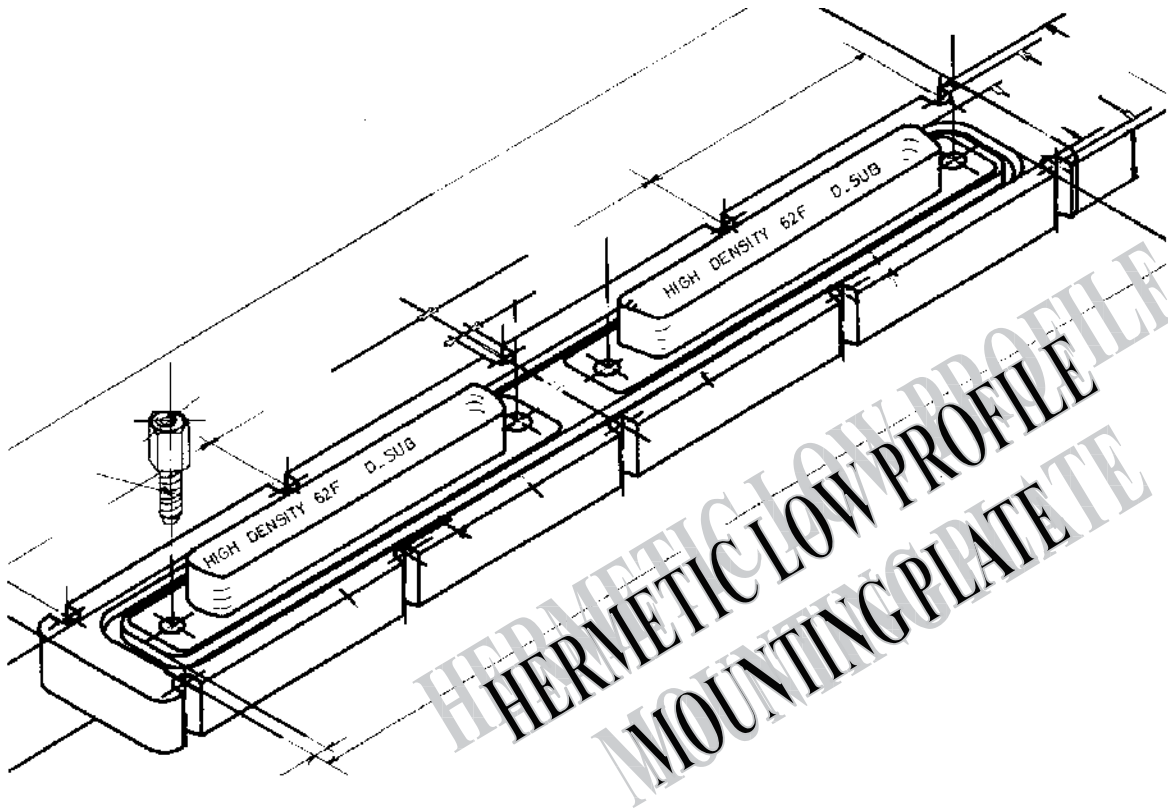
Example: HIVAC50.2x9MMS



HERMETIC CONNECTORS / FEEDTHROUGH  
CUSTOM DESIGN

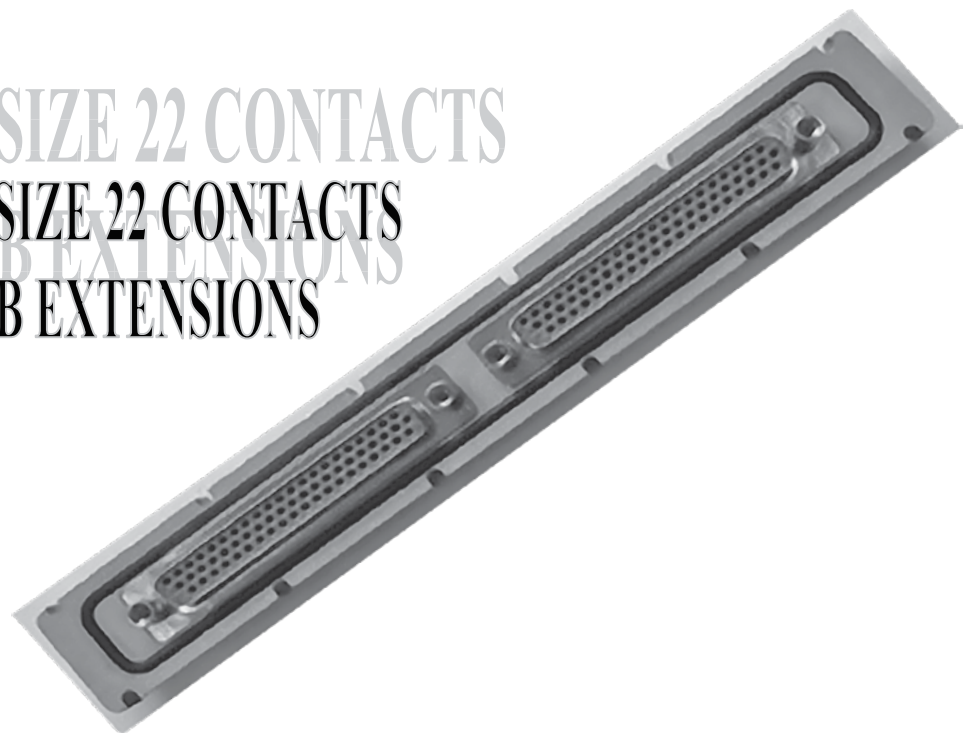


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HERMETIC LOW PROFILE  
MOUNTING PLATE

124 FEMALE SIZE 22 CONTACTS  
124 FEMALE SIZE 22 CONTACTS  
WITH PCB EXTENSIONS



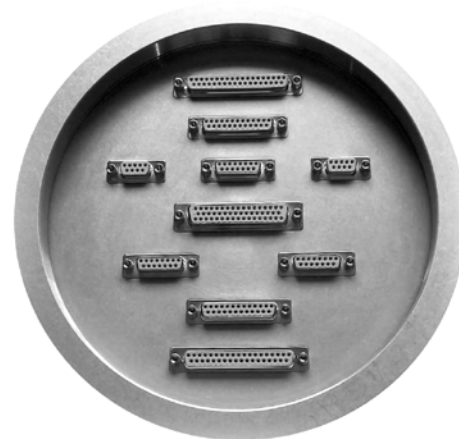


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# HERMETIC CONNECTORS / FEEDTHROUGH CUSTOM DESIGN

## 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





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# HERMETIC CONNECTORS / FEEDTHROUGH CUSTOM DESIGN

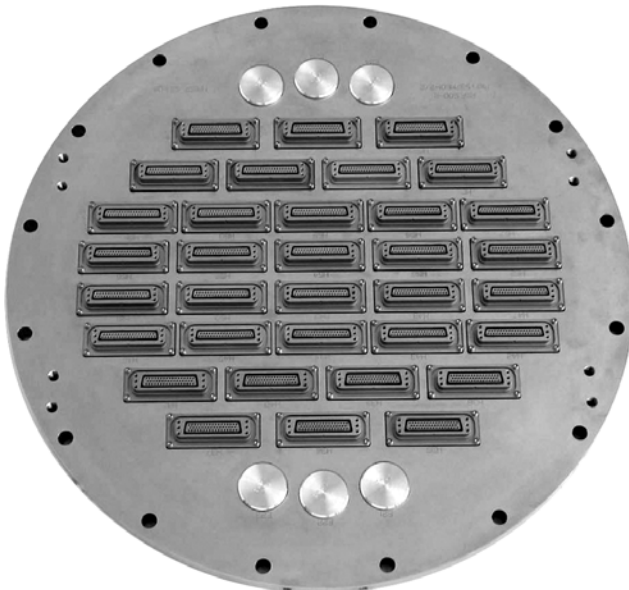
Our Hermetic Connectors are widely recognized for their reliability, durability and performance capabilities. They are utilized worldwide in Scientific Laboratories and Space Industries.

For quality and service at a competitive price, Positronic Industries is unbeaten. Give us a try.



## HERMETIC ROUND FLANGE FOR VACUUM CHAMBERS

### 34 HIVAC® CONNECTORS

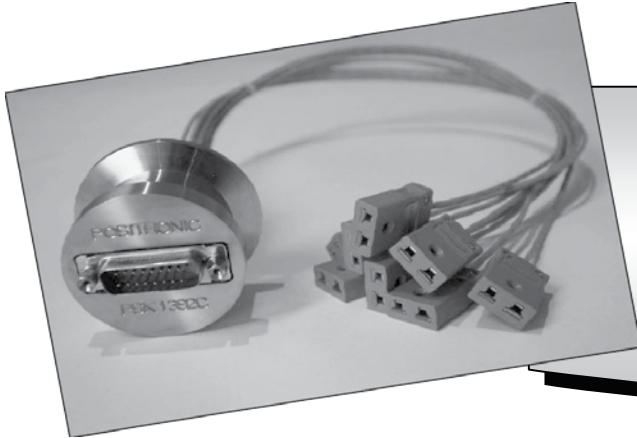


HERMETIC FLANGE REALIZED FOR  
INTESPACE TOULOUSE - FRANCE

1531 FEMALE/FEMALE SIZE 20 CONTACTS



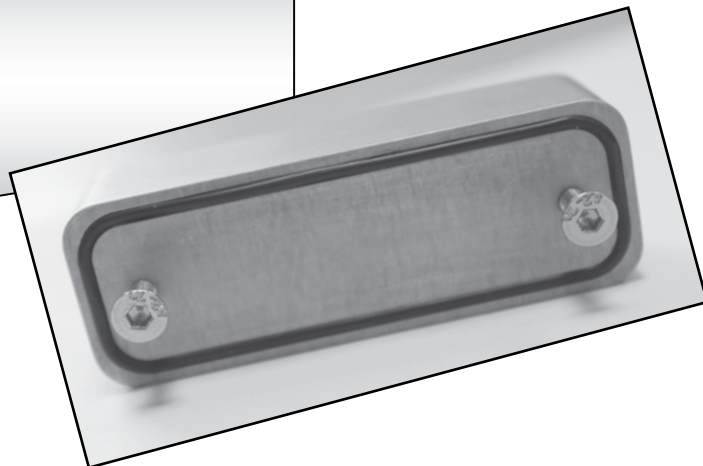
## HERMETIC ROUND FLANGE FOR VACUUM CHAMBERS



THERMOCOUPLE SUBMINIATURE-D  
FEEDTHROUGH  
WITH SOCKET CONNECTORS  
AND THERMOCOUPLE WIRES

## HERMETIC OBTURATOR

OPTIONS ON REQUEST  
CONSULT FACTORY





## CONVERSION TABLE

	Pascal	Bar	Kg/cm <sup>2</sup>	Atmosph.
Pascal	1	10 <sup>-5</sup>	1,02.10 <sup>-5</sup>	0,9869.10 <sup>-5</sup>
Bar	105	1	1,02	0,9869
Kg/cm <sup>2</sup>	0,980.10 <sup>-5</sup>	0,980	1	0,968
Atmosph.	1013.10 <sup>-5</sup>	1,013	1,033	1
Torr	133,3	0,1333.10 <sup>-2</sup>	1,36.10 <sup>-3</sup>	1315.10 <sup>-3</sup>
Mbar	100	01.10 <sup>-2</sup>	1,02.10 <sup>-3</sup>	0,9869.10 <sup>-3</sup>
Inch.Hg	3386	3,386.10 <sup>-2</sup>	0,03453	0,03345
Psi	6990	6,89.10 <sup>-2</sup>	0,0703	0,008

	Torr	Mbar	Inch.hg	Psi
Pascal	0,75.10 <sup>-2</sup>	10 <sup>-2</sup>	0,2953.10 <sup>-3</sup>	0,1451.10 <sup>-3</sup>
Bar	750	1000	29,53	14,51
Kg/cm <sup>2</sup>	735	980	28,96	14,22
Atmosph.	760	1013	29,95	14,70
Torr	1	1,333	0,03937	0,01934
Mbar	0,750	1	0,02953	0,01451
Inch.Hg	25,4	33,86	1	0,4910
Psi	51,75	69,947	2,041	1



# Connector Excellence<sup>®</sup>

## Positronic HIGH RELIABILITY Products

### POWER



#### FEATURES:

- High current density
- Energy saving - low contact resistance
- 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

**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°) solder, straight 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

### D-SUBMINIATURE



#### 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
- Broad selection of accessories
- Size 20 and 22 contacts suitable for use in carrying power
- IP65, IP67

**Contact Sizes:** 8, 16, 20 and 22  
**Current Ratings:** To 100 amperes  
**Terminations:** Crimp, wire solder, straight solder, right angle (90°) compliant press-in and right angle (90°) compliant press-in

**Configurations:** Multiple variants in both standard and high densities, seven connector housing sizes  
**Qualifications:** MIL-DTL-24308, GSFC S-311-P-4, GSFC S-311-P-10, SAE AS39029, DSCC

### RECTANGULAR



#### 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

**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

### CIRCULAR



#### 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

**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

### CABLE



#### FEATURES:

- Shorten the supply chain and reduce additional costs and delays by "cabling" your Positronic connector selection
- Overmolding available
- Shielded and environmentally sealed versions available
- Power cables and access boxes which meet the SAE J2496 specification

- ✓ Design assemblies in accordance with customer specifications.
- ✓ Prepare cabled connector configuration and performance specifications.
- ✓ Design each system in accordance with applicable customer, domestic, and international standards.
- ✓ Define and conduct performance and verification testing.

### HERMETIC



#### FEATURES:

- Intended for use as an electrical feedthrough in high vacuum applications
- Helium leakage rate at ambient temperature:  $< 5 \times 10^{-9}$  mbar.l/s under a vacuum  $1.5 \times 10^{-2}$  mbar
- Signal, power, coax and high voltage versions available
- Connectors can be mounted on flange assembly per customer specification

**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

For more information, visit [www.connectpositronic.com](http://www.connectpositronic.com) or call your nearest Positronic sales office listed on the back of this catalog.



**Positronic**<sup>®</sup>

an Amphenol company

**Regional Headquarters**

**Positronic | Americas**

423 N Campbell Ave  
Springfield MO 65806 USA

+1 800 641 4054  
info@connectpositronic.com

**Positronic | Europe**

Z.I. d'Engachies  
46, route d'Engachies  
F-32020 Auch Cedex 9 France

+33 5 6263 4491  
contact@connectpositronic.com

**Positronic | Asia**

3014A Ubi RD 1 #07-01  
Singapore 408703

+65 6842 1419  
singapore@connectpositronic.com

**Sales Offices**

Positronic has local sales representation all over the world. To find the nearest sales office, please visit [www.connectpositronic.com/locations](http://www.connectpositronic.com/locations)

LOCATIONS

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