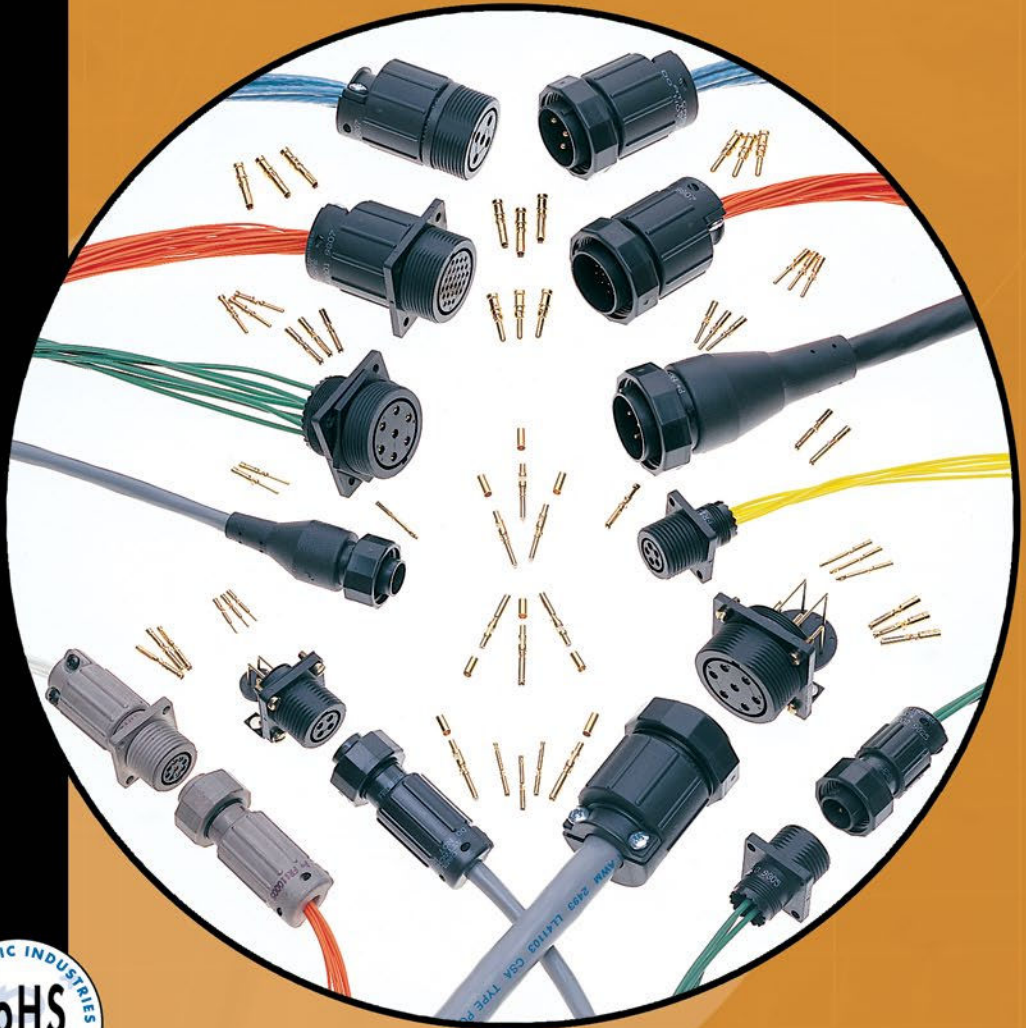




**Positronic**<sup>®</sup>  
an Amphenol company

# Front Runner

## Circular Connectors



FEATURING HIGH PERFORMANCE,  
LIGHTWEIGHT,  
COMPOSITE CONSTRUCTION

# 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

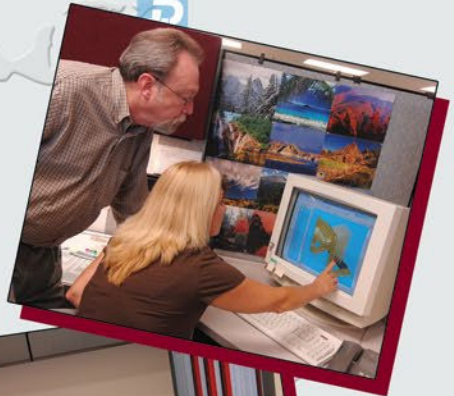
- Founded in **1966**
- **Involvement** in the development of international connector specifications through EIA®, IEC and ISO as well as PICMG®.
- Introduction of new and **unique connector products** to the electronics industry.
- Patent holder for many **unique connector features and manufacturing 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)  $\pm 0.001$  inches [0.03 mm] for male contact mating diameters.
- 2)  $\pm 0.003$  inches [0.08 mm] for contact termination diameters.
- 3)  $\pm 0.005$  inches [0.13 mm] for all other diameters.
- 4)  $\pm 0.015$  inches [0.38 mm] for all other dimensions.

POSITRONIC® IS AN ITAR REGISTERED COMPANY

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## HIGH PERFORMANCE, LIGHTWEIGHT, COMPOSITE CONSTRUCTION



- **SIZES 11 AND 19** connector diameters.
- **16 CONTACT ARRANGEMENTS** from 3 to 29 contacts.
- **EASY CONTACT SERVICING:** Rear insertion/front release of removable contacts.
- **TWO LEVEL SEQUENTIAL MATING OF CONTACTS.**
- **NON-CORRODIBLE/LIGHTWEIGHT COMPOSITE MATERIALS.**
- **ENVIRONMENTAL VERSION** features dust and water ingress protection to IEC IP67 (1 meter immersion for 30 minutes) in mated condition.
- **EMI/RFI SHIELDED VERSION**, electroless nickel plated plastic.
- **THERMOCOUPLE CONTACTS.**



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Front  
Runner

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GENERAL INFO

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APPL TOOLING



The **Front Runner Series** offers a multiplicity of connector features which makes it a first choice to meet the high performance and high reliability requirements of Medical, Transportation, Industrial Control, and Avionics applications. **Front Runner** features include:



- 1** Composite components: Lightweight and non-corrodible. Contacts machined from solid copper alloy.
- 2** Sixteen (16) contact arrangements from 3 to 29 contacts.
- 3** Two level sequential mating of contacts.
- 4** A mix of power and signal contacts in Sizes 12, 16, 20, and 22. Crimp removable contacts and printed board straight and right angle terminations.
- 5** Mounting options include flange and jam nut or printed circuit board mount.
- 6** Environmental version provides dust and water ingress protection to I.E.C. IP67 (1 meter immersion for 30 minutes in mated condition).
- 7** EMI/RFI shielded version, electroless nickel plated plastic.
- 8** Easy contact servicing - rear insertion/front release contact retention system.
- 9** Threaded coupling nut system.

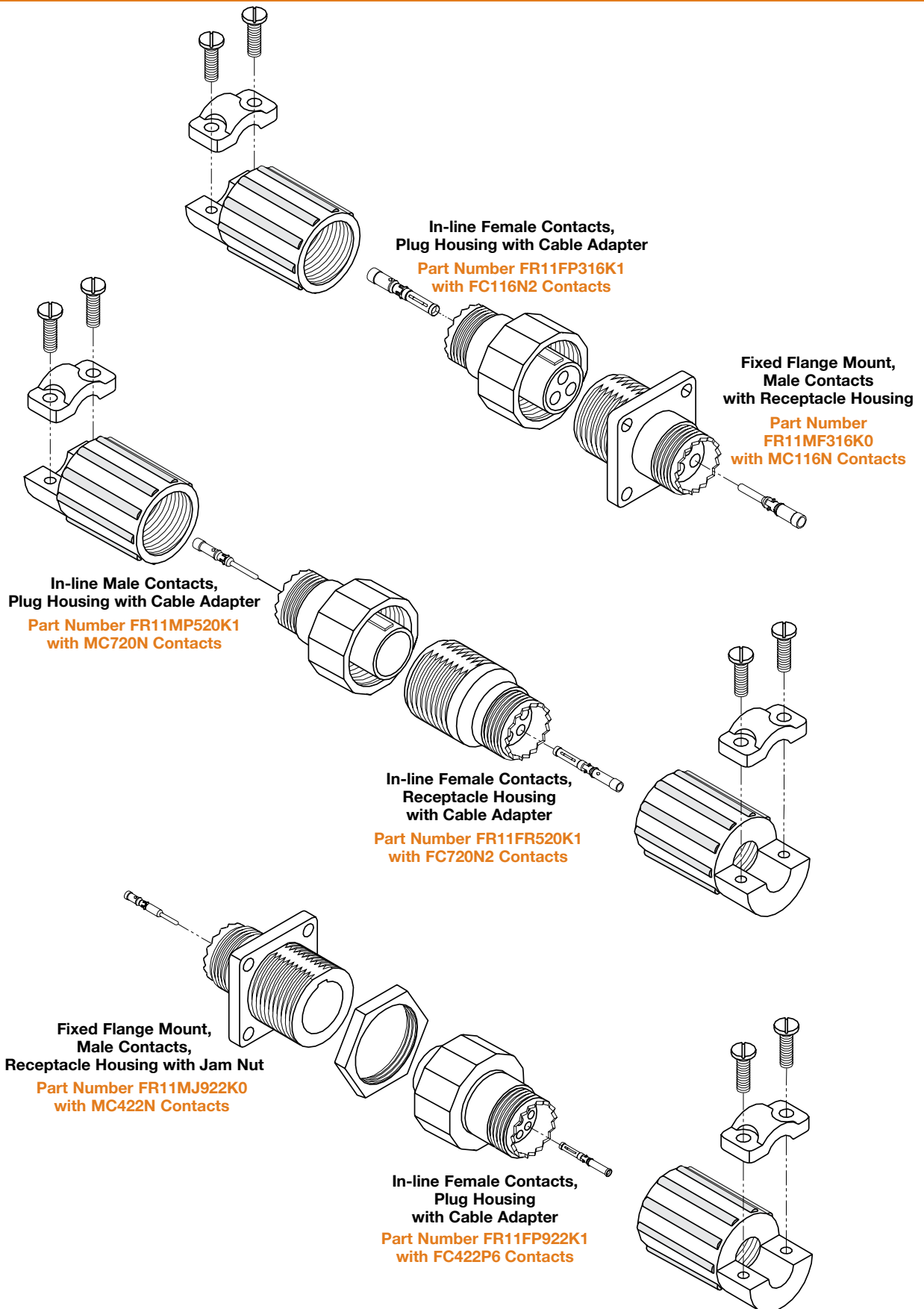
**Contact Technical Sales for additional information.**



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# TYPICAL CONNECTOR ASSEMBLIES

Front  
Runner





## CONTACT ARRANGEMENTS FOR SIZE 11 HOUSING

VOLTAGE RATINGS PER EN60950 \* INSULATION RESISTANCE OF 5 G OHMS

CONTACT ARRANGEMENTS ARE SHOWN APPROXIMATELY ACTUAL SIZE  
MATING FACE OF MALE OR REAR VIEW OF FEMALE CONNECTOR SHOWN



**316**

Three (3) Size 16 Contacts  
0.063 inch [1.6 mm] minimum creepage  
for operation at 300V RMS



**520**

Five (5) Size 20 Contacts  
0.039 inch [1.0 mm] minimum creepage  
for operation at 200V RMS



**822**

Eight (8) Size 22 Contacts  
0.028 inch [0.7 mm] minimum creepage  
for operation at 100V RMS



**420**

Four (4) Size 20 Contacts  
0.059 inch [1.5 mm] minimum creepage  
for operation at 250V RMS



**722**

Seven (7) Size 22 Contacts  
0.063 inch [1.6 mm] minimum creepage  
for operation at 300V RMS



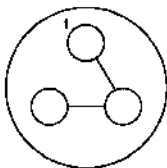
**922**

Nine (9) Size 22 Contacts  
0.028 inch [0.7 mm] minimum creepage  
for operation at 100V RMS

## CONTACT ARRANGEMENTS FOR SIZE 19 HOUSING

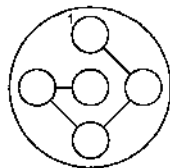
VOLTAGE RATINGS PER EN60950 \* INSULATION RESISTANCE OF 5 G OHMS

CONTACT ARRANGEMENTS ARE SHOWN APPROXIMATELY ACTUAL SIZE  
MATING FACE OF MALE OR REAR VIEW OF FEMALE CONNECTOR SHOWN



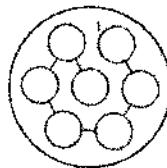
**312**

Three (3) Size 12 Contacts  
0.197 inch [5.0 mm]  
minimum creepage for  
operation at 600V RMS



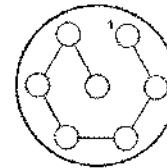
**512**

Five (5) Size 12 Contacts  
0.091 inch [2.3 mm]  
minimum creepage for  
operation at 400V RMS



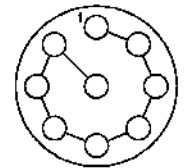
**712**

Seven (7) Size 12 Contacts  
0.071 inch [1.8 mm]  
minimum creepage for  
operation at 300V RMS



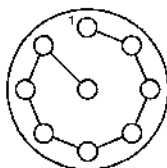
**716**

Seven (7) Size 16 Contacts  
0.189 inch [4.8 mm]  
minimum creepage for  
operation at 600V RMS



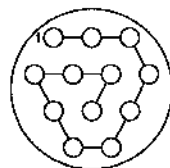
**916**

Nine (9) Size 16 Contacts  
0.118 inch [3.0 mm]  
minimum creepage for  
operation at 400V RMS



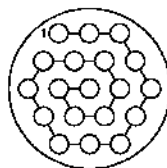
**920**

Nine (9) Size 20 Contacts  
0.154 inch [3.9 mm]  
Minimum Creepage for  
Operation at 600V RMS



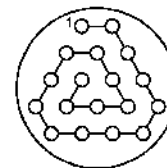
**1220**

Twelve (12) Size 20 Contacts  
0.102 inch [2.6 mm]  
minimum creepage for  
operation at 400V RMS



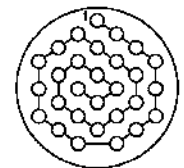
**1920**

Nineteen (19) Size 20 Contacts  
0.059 inch [1.5 mm]  
minimum creepage for  
operation at 250V RMS



**1822**

Eighteen (18) Size 22 Contacts  
0.086 inch [2.2 mm]  
minimum creepage for  
operation at 400V RMS



**2922**

Twenty-nine (29)  
Size 22 Contacts  
0.051 inch [1.3 mm]  
minimum creepage for  
operation at 250V RMS

• NOTE: Contact Technical Sales for availability of other contact arrangements.



## TECHNICAL CHARACTERISTICS

### MATERIALS AND FINISHES:

**Insulator Inserts:** Glass-filled DAP, Type SDG-F, black color, UL 94V-0.

### Non-Environmental Connectors:

**Housings:** Glass-filled polyester, black color, UL 94V-0.

**Coupling Nut:** Glass-filled polyester, black color, UL 94V-0.

**Cable Adapters:** Glass-filled polyester, black color, UL 94V-0.

### Environmental Connectors:

**Interfacial O-Rings:** T.P.E.

**Cable Adapters:** Glass-filled polyester with T.P.E. boot.

**Dust Cover:** Glass-filled polyethylene, black color, or low density polyethylene, black color, UL 94V-0.

### EMI/RFI Shielded Connectors:

**Housings:** Thermoplastic, electroless nickel over copper plated.

**Cable Adapters:** Thermoplastic, electroless nickel over copper plated.

**Contacts:** Copper alloy with gold flash over nickel or 0.000030 inch [0.76 microns] gold plate over nickel plate.

**Jam Nuts:** Aluminum, black anodized.

### MECHANICAL CHARACTERISTICS:

**Polarization:** Plug and receptacle housings are molded with integral polarization system.

**Removable Contacts:** Rear insertion/Front release removal. Female contact features "Closed Entry Design" for highest reliability.

### Contact Retention in Insulator:

- Size 22:** 6 lbs. [27 N] per IEC 60512-8, Test 15a.
- Size 20:** 10 lbs. [44 N] per IEC 60512-8, Test 15a.
- Size 16:** 20 lbs. [89 N] per IEC 60512-8, Test 15a.
- Size 12:** 20 lbs. [89 N] per IEC 60512-8, Test 15a.

### Sequential Contact

**Mating Systems:** One and two level systems. Contact Technical Sales for ordering information.

### Coupling System:

**Size 11 Housing:** M19 coupling nut.

**Size 19 Housing:** M32 coupling nut.

### Printed Board

**Contact Terminations:** Straight and 90° solder terminations.

**Mechanical Operations:** 500 operations.

### ELECTRICAL CHARACTERISTICS:

#### Nominal Contact Current Rating:

**Size 12:** 25 amperes.

**Size 16:** 13 amperes.

**Size 20:** 7.5 amperes.

**Size 22:** 5 amperes.

#### Initial Contact Resistance, Maximum:

**Size 12:** 0.001 ohms per IEC 60512-2, Test 2b.

**Size 16:** 0.0016 ohms per IEC 60512-2, Test 2b.

**Size 20:** 0.007 ohms per IEC 60512-2, Test 2b.

**Size 22:** 0.012 ohms per IEC 60512-2, Test 2b.

#### Size 16 Micro-Coaxial Contacts:

See page 22 for technical information.

#### Insulation Resistance:

5 G ohms per IEC 60512-2, Test 3a, Method A.

#### Creepage and

#### Clearance Distance:

See values given with the specific contact arrangements on page 3.

#### Working Voltage:

See values given with the specific contact arrangements on page 3.

### CLIMATIC CHARACTERISTICS:

**Working Temperature:** -55°C to +125°C.

#### Dust and Water Ingress:

Per IEC IP67 (1 meter immersion for 30 minutes) in mated condition.

### EMI/RFI SHIELDING CHARACTERISTICS:

**Surface Conductivity:** < 0.5 ohm per square.

#### Attenuation:

70-80 dB at most frequencies.

### THERMOCOUPLE CONTACTS:

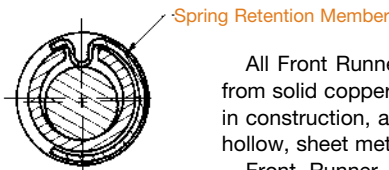
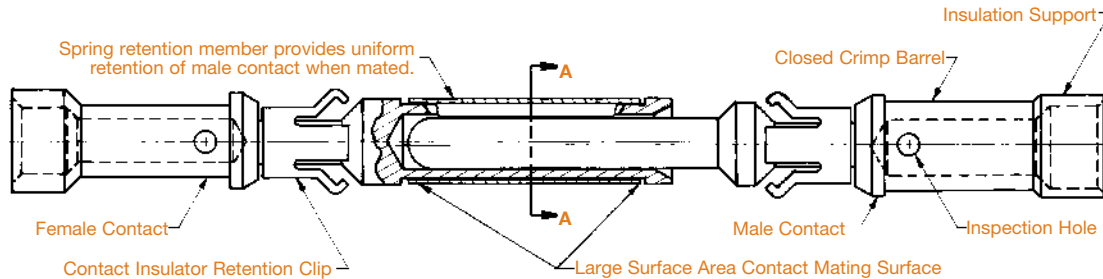
Size 20 and 22 crimp contacts are available. See page 20 for details.

PCB mount contacts are available please contact Technical Sales for details.





## FRONT RUNNER HIGH PERFORMANCE CONTACTS “LARGE SURFACE AREA CONTACT MATING SYSTEM” HIGH RELIABILITY “CLOSED ENTRY” DESIGN PRECISION MACHINED SOLID COPPER ALLOY



**SECTION A-A  
ENLARGED**

All contacts of Positronic’s Front Runner Series utilize the “Large Surface Area (L.S.A.) Contact Mating System.” The “L.S.A. Contact Mating System” insures the lowest level of contact resistance during mechanical endurance tests of 1000 coupling cycles or more. Contact insertion/withdrawal forces remain substantially the same during the life of the connector.

Front Runner Series use only “Closed Entry” design female contacts. The “Closed Entry” design prevents probe damage to the female contacts, and will not allow the female contact to accept misaligned or bent male contacts.

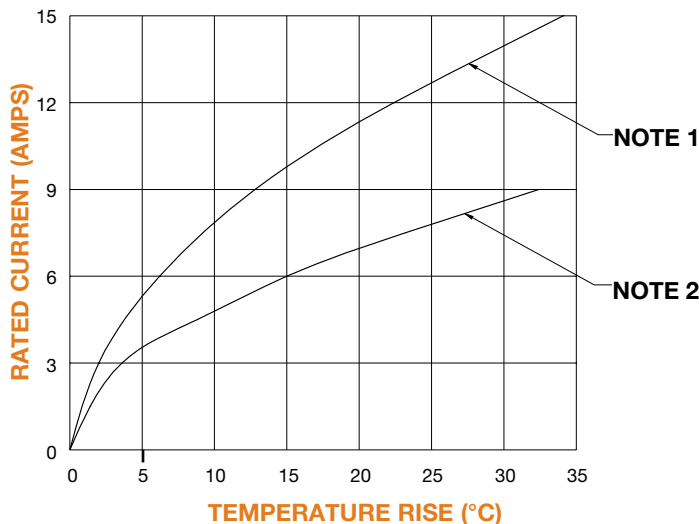
All Front Runner Series contacts are precision machined from solid copper alloy barstock. They are durable, smooth in construction, and have greater amperage capacities than hollow, sheet metal-style contacts.

Front Runner Series contacts, having a large contact surface area, produce less heat at the contact surface, thereby permitting the connector to operate at high amperage levels continuously and still maintain lower connector temperatures.

## CONNECTOR TEMPERATURE RISE CURVES

Tested per IEC Publication 60512-5-2, Test 5a

**Size 16 Contact / Size 20 Contacts / Size 11 Housing**



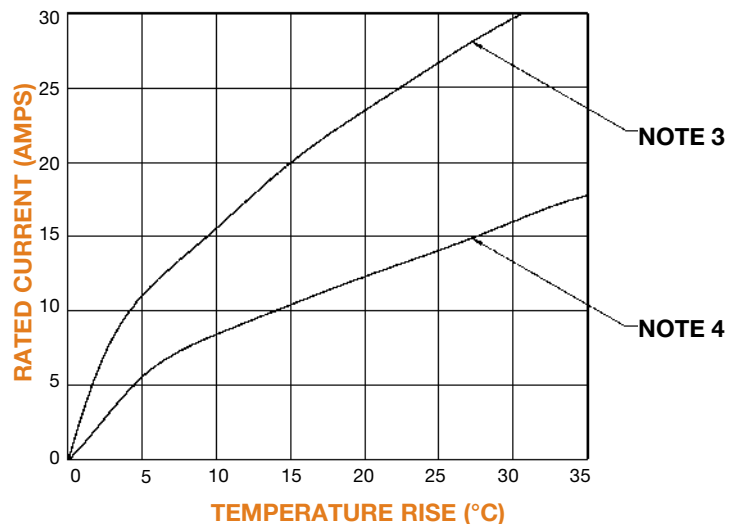
**NOTE 1:**

Curve developed using FR11MP316K0 and FR11FF316K0 connectors, MC116N and FC116N2 crimp contacts and 16 AWG [1.5 mm<sup>2</sup>] size wire. All contacts under load.

**NOTE 2:**

Curve developed using FR11MP520K0 and FR11FF520K0 connectors, MC720N and FC720N2 crimp contacts and 20 AWG [0.5 mm<sup>2</sup>] size wire. All contacts under load.

**Size 12 Contact / Size 16 Contacts / Size 19 Housing**



**NOTE 3:**

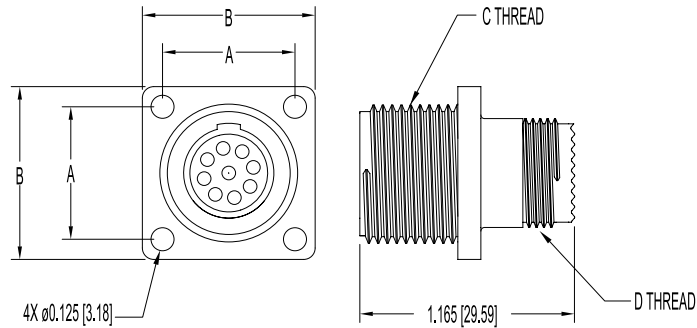
Curve developed using FR19MF312K0 and FR19FP312K0 connectors, MC612N and FC612N2 crimp contacts and 12 AWG [4.0 mm<sup>2</sup>] size wire. All contacts under load.

**NOTE 4:**

Curve developed using FR19MF716K0 and FR19FP716K0 connectors, MC116N and FC116N2 crimp contacts and 16 AWG [1.5 mm<sup>2</sup>] size wire. All contacts under load.



## FIXED FLANGE-MOUNT HOUSING RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS



| DIMENSION | SIZE 11 HOUSING | SIZE 19 HOUSING |
|-----------|-----------------|-----------------|
| A         | 0.719 [18.26]   | 1.062 [26.97]   |
| B         | 0.938 [23.83]   | 1.438 [36.53]   |
| C Thread  | M19             | M32             |
| D Thread  | M15             | M28             |

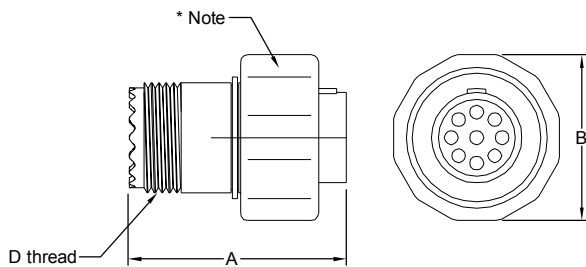
### MATERIALS:

**Insert:** Glass-filled DAP.

**Housing:** Glass-filled polyester.

## FREE IN-LINE HOUSINGS

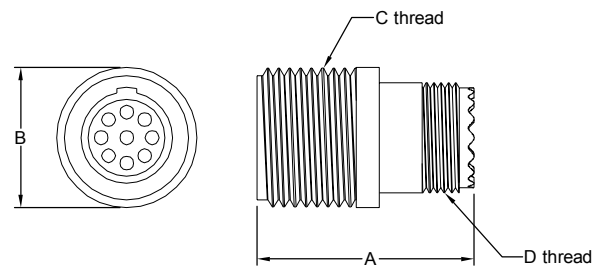
### PLUG HOUSING, MALE OR FEMALE CONTACTS



| DIMENSION | SIZE 11 HOUSING | SIZE 19 HOUSING |
|-----------|-----------------|-----------------|
| A         | 1.165 [29.59]   | 1.165 [29.59]   |
| B         | 0.890 [22.61]   | 1.435 [36.45]   |
| D Thread  | M15             | M28             |

**NOTE:**  
This connector may be ordered without the coupling nut.

### RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS



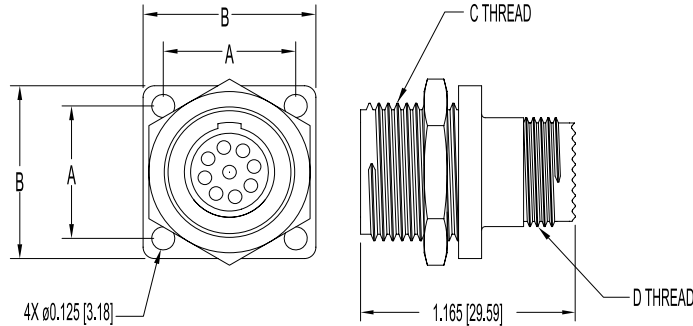
| DIMENSION | SIZE 11 HOUSING | SIZE 19 HOUSING |
|-----------|-----------------|-----------------|
| A         | 1.165 [29.59]   | 1.165 [29.59]   |
| B         | ø 0.750 [19.05] | ø 1.181 [30.00] |
| C Thread  | M19             | M32             |
| D Thread  | M15             | M28             |

### MATERIALS:

**Insert:** Glass-filled DAP.

**Housing & Coupling Nut:** Glass-filled polyester.

## FIXED JAM NUT MOUNTING RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS



| DIMENSION | SIZE 11 HOUSING | SIZE 19 HOUSING |
|-----------|-----------------|-----------------|
| A         | 0.719 [18.26]   | 1.062 [26.97]   |
| B         | 0.938 [23.83]   | 1.438 [36.53]   |
| C Thread  | M19             | M32             |
| D Thread  | M15             | M28             |

### MATERIALS AND FINISHES:

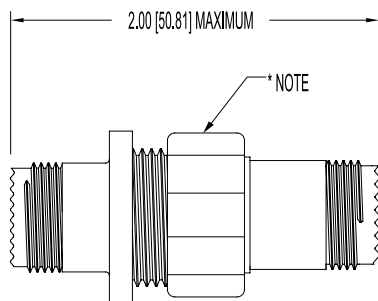
**Insert:** Glass-filled DAP.

**Housing:** Glass-filled polyester.

**Jam Nut:** Aluminum, black anodize.

DIMENSIONS

## IN-LINE TO IN-LINE MOUNTING LENGTH OF MATED PAIR



### MATERIALS:

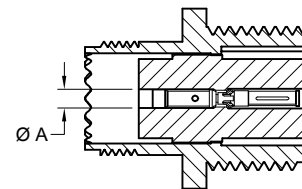
**Insert:** Glass-filled DAP.

**Housing & Coupling Nut:** Glass-filled polyester.

### NOTE:

This connector may be ordered without the coupling nut.

## CONTACT HOLE DIAMETER TERMINATION SIDE OF INSULATOR



| CONTACT SIZE | Ø D          |
|--------------|--------------|
| 12           | 0.195 [4.95] |
| 16           | 0.125 [3.18] |
| 20           | 0.097 [2.46] |
| 22           | 0.079 [2.01] |



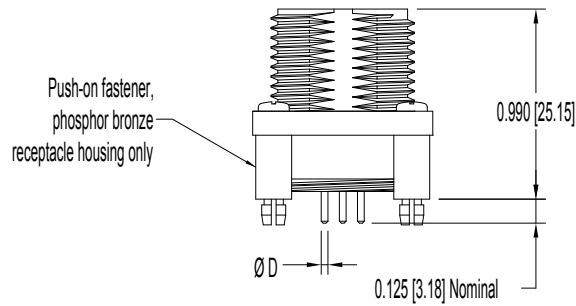
Positronic  
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# STRAIGHT AND 90° PRINTED BOARD CONNECTORS

Front  
Runner

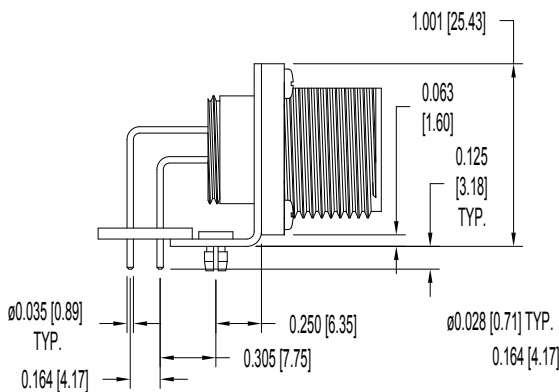
## STRAIGHT PRINTED BOARD MOUNT CONNECTOR RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS

| CONTACT SIZE | Ø D          |
|--------------|--------------|
| 12           | 0.094 [2.39] |
| 16           | 0.035 [0.89] |
| 20           | 0.028 [0.71] |
| 22           | 0.025 [0.64] |

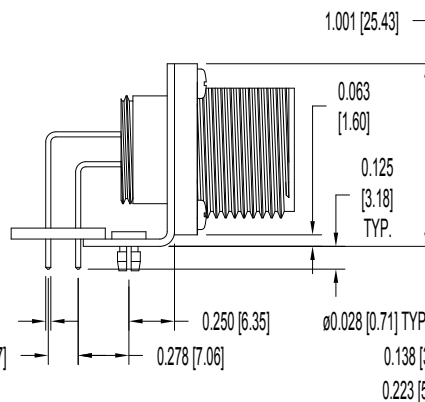


Typical Part Number:  
FR11FF316K0-1554.0

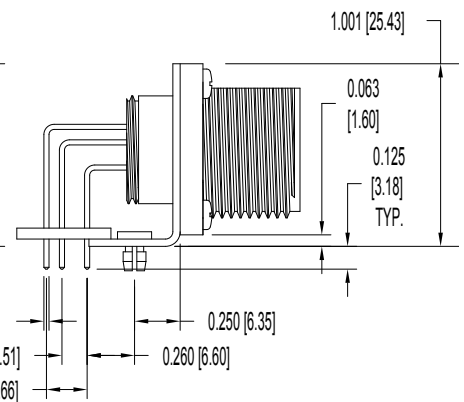
## 90° PRINTED BOARD MOUNT CONNECTOR



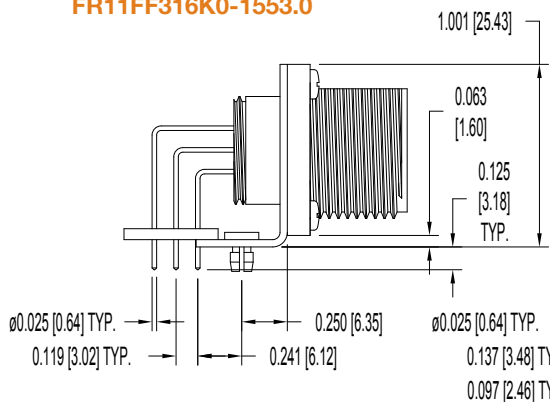
Typical Part Number:  
FR11FF316K0-1553.0



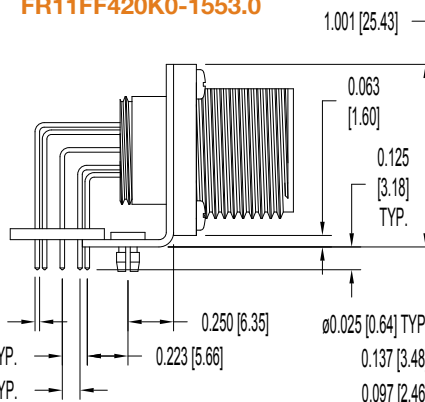
Typical Part Number:  
FR11FF420K0-1553.0



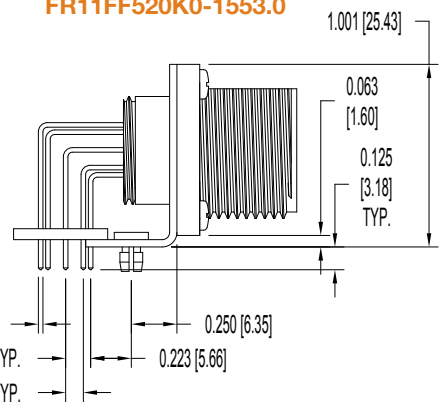
Typical Part Number:  
FR11FF520K0-1553.0



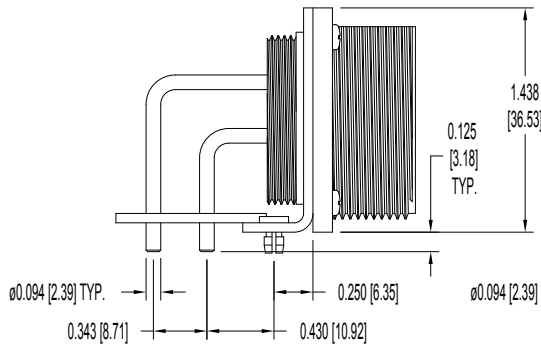
Typical Part Number:  
FR11FF722K0-1553.0



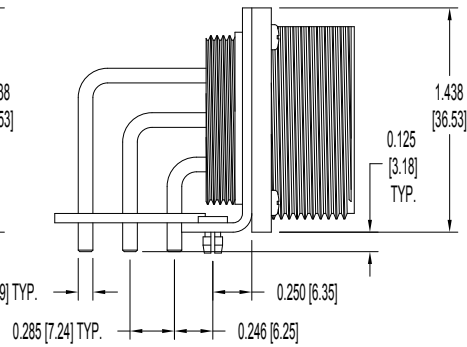
Typical Part Number:  
FR11FF822K0-1553.0



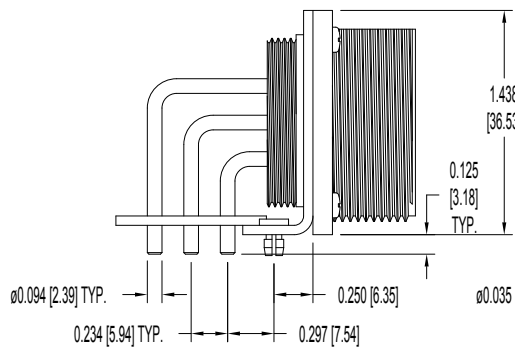
Typical Part Number:  
FR11FF922K0-1553.0



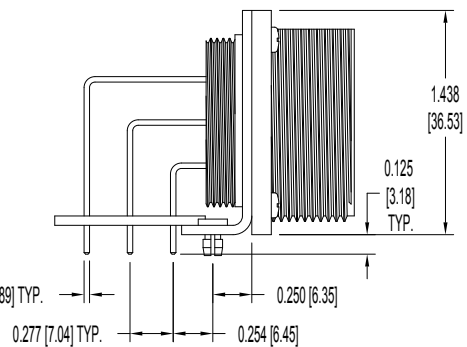
**Typical Part Number:**  
**FR19FF312K0-1553.0**



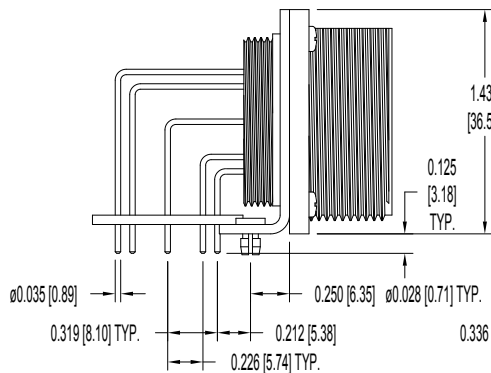
**Typical Part Number:**  
**FR19FF512K0-1553.0**



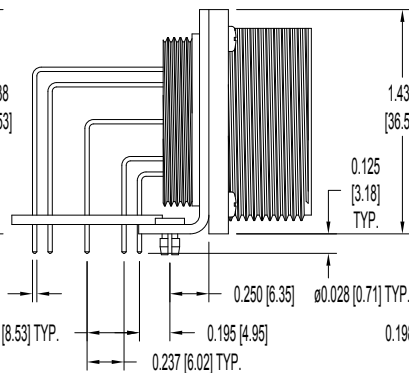
**Typical Part Number:**  
**FR19FF712K0-1553.0**



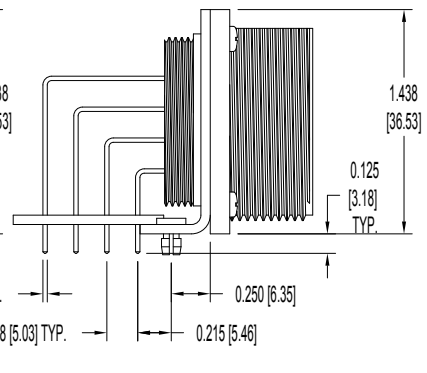
**Typical Part Number:**  
**FR19FF716K0-1553.0**



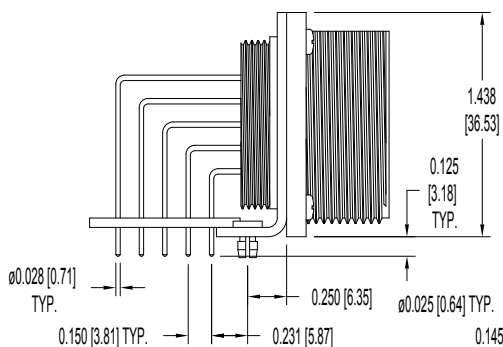
**Typical Part Number:**  
**FR19FF916K0-1553.0**



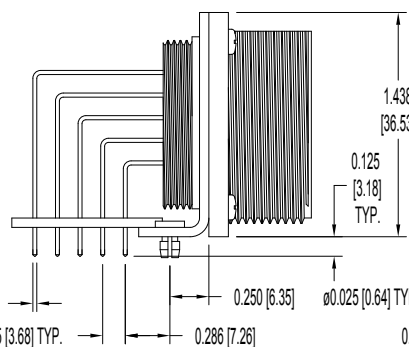
**Typical Part Number:**  
**FR19FF920K0-1553.0**



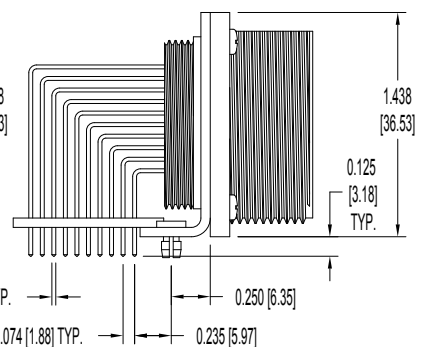
**Typical Part Number:**  
**FR19FF1220K0-1553.0**



**Typical Part Number:**  
**FR19FF1920K0-1553.0**



**Typical Part Number:**  
**FR19FF1822K0-1553.0**



**Typical Part Number:**  
**FR19FF2922K0-1553.0**



Positronic  
connectpositronic.com

# STRAIGHT PRINTED BOARD CONTACT HOLE PATTERN

Front  
Runner

## SUGGESTED PRINTED BOARD HOLE SIZES:

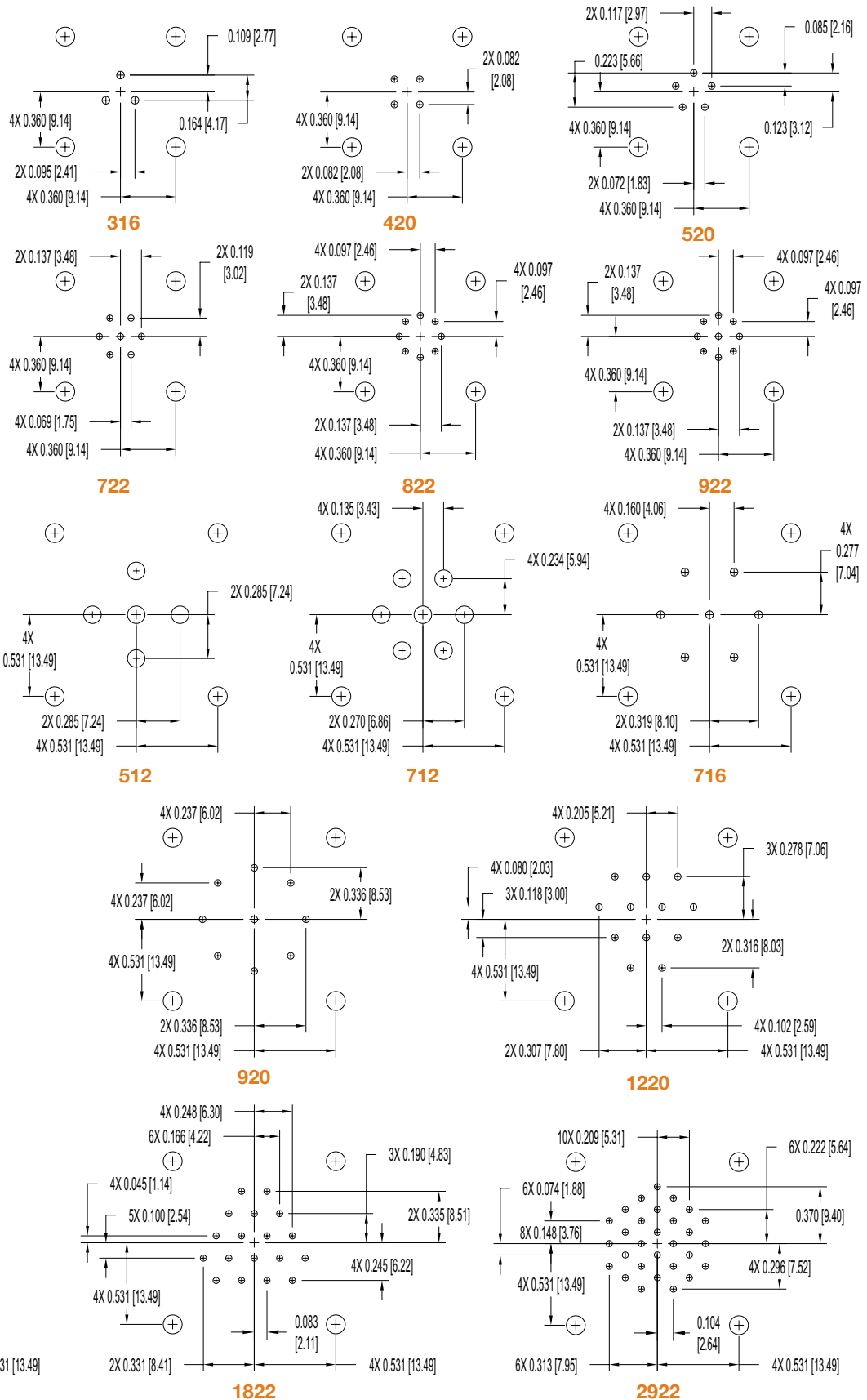
Suggest  $\varnothing$  0.114 [2.90] plated through hole for size 12 contact termination positions.

Suggest  $\varnothing$  0.052 [1.32] plated through hole for size 16 contact termination positions.

Suggest  $\varnothing$  0.045 [1.14] plated through hole for size 20 contact termination positions.

Suggest  $\varnothing$  0.040 [1.02] plated through hole for size 22 contact termination positions.

Suggest  $\varnothing$  0.123 $\pm$ 0.003 [3.12 $\pm$ 0.08] hole for mounting connector with push-on fasteners.



DIMENSIONS



### SUGGESTED PRINTED BOARD HOLE SIZES:

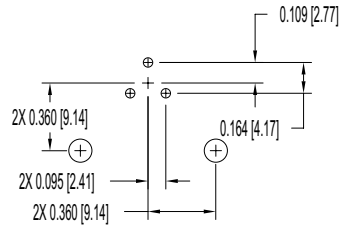
Suggest  $\varnothing$  0.114 [2.90] plated through hole for size 12 contact termination positions.

Suggest  $\varnothing$  0.052 [1.32] plated through hole for size 16 contact termination positions.

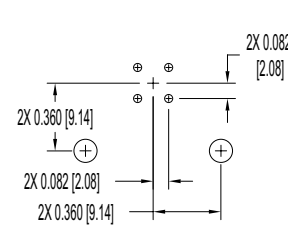
Suggest  $\varnothing$  0.045 [1.14] plated through hole for size 20 contact termination positions.

Suggest  $\varnothing$  0.040 [1.02] plated through hole for size 22 contact termination positions.

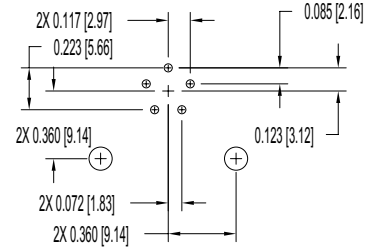
Suggest  $\varnothing$  0.123±0.003 [3.12±0.08] hole for mounting connector with push-on fasteners.



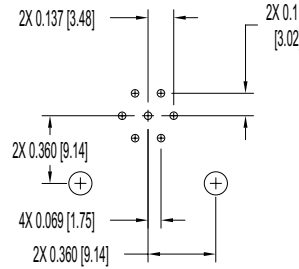
316



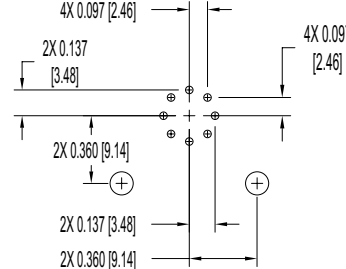
420



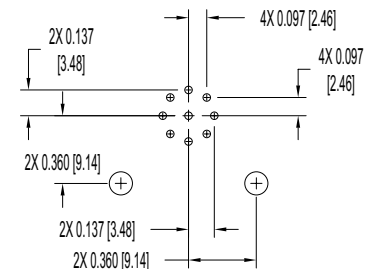
520



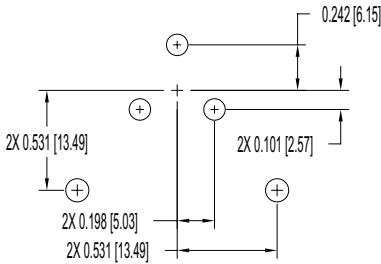
722



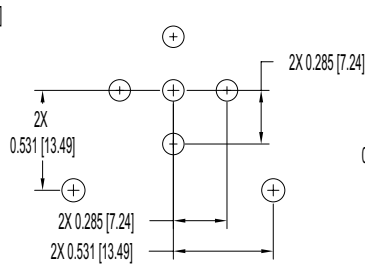
822



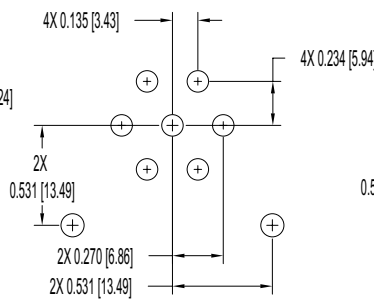
922



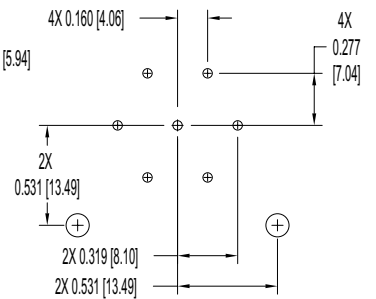
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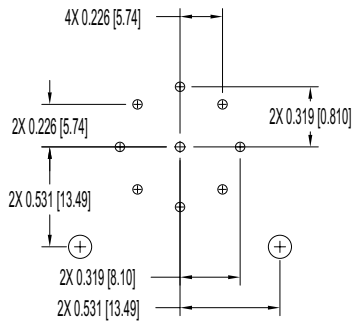
512



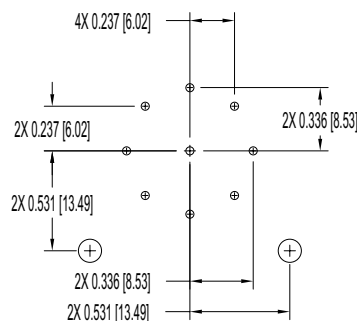
712



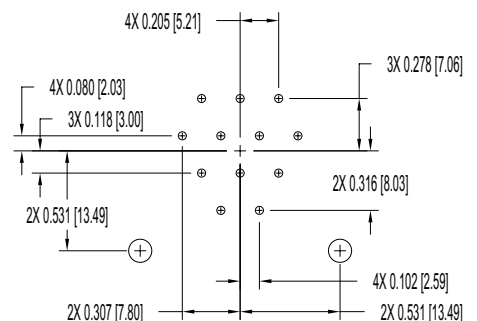
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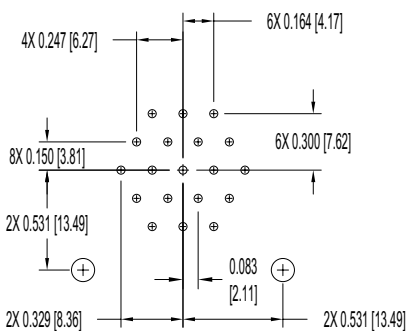
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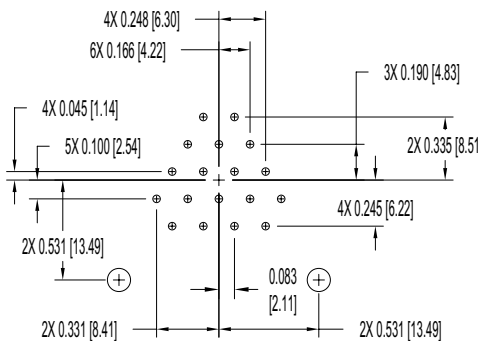
920



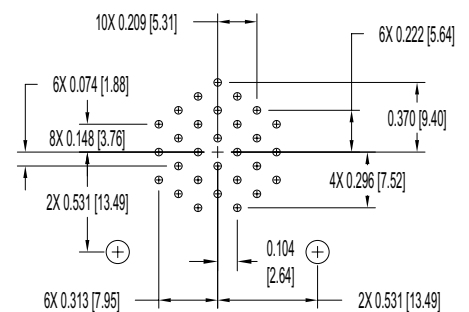
1220



1920



1822



2922

DIMENSIONS



## ORDERING INFORMATION - CODE NUMBERING SYSTEM

Specify Complete Connector By Selecting An Option From Step 1 Through 6

| STEP    | 1  | 2  | 3  | 4   | 5 | 6 | 7   | 8       |
|---------|----|----|----|-----|---|---|-----|---------|
| EXAMPLE | FR | 11 | MF | 922 | K | 0 | /AA | -1554.0 |

### STEP 1 - BASIC SERIES

FR - Front Runner Series

### STEP 2 - HOUSING SIZE

11 - Size 11 Housing  
19 - Size 19 Housing

### STEP 3 - HOUSING STYLE AND GENDER

MP - Free In-line, Male Contacts with Plug Housing  
FP - Free In-line, Female Contacts with Plug Housing  
MF - Fixed Flange Mount, Male Contacts with Receptacle Housing  
FF - Fixed Flange Mount, Female Contacts with Receptacle Housing  
MJ - Fixed Jam Nut, Male Contacts with Receptacle Housing  
FJ - Fixed Jam Nut, Female Contacts with Receptacle Housing  
MR - Free In-line, Male Contacts with Receptacle Housing  
FR - Free In-line, Female Contacts with Receptacle Housing

### STEP 4 - CONTACT ARRANGEMENTS AND SIZE

#### SIZE 11 HOUSING

316 - Three (3) Size 16 Contacts  
420 - Four (4) Size 20 Contacts  
520 - Five (5) Size 20 Contacts  
722 - Seven (7) Size 22 Contacts  
822 - Eight (8) Size 22 Contacts  
922 - Nine (9) Size 22 Contacts

#### SIZE 19 HOUSING

312 - Three (3) Size 12 Contacts  
512 - Five (5) Size 12 Contacts  
712 - Seven (7) Size 12 Contacts  
716 - Seven (7) Size 16 Contacts  
916 - Nine (9) Size 16 Contacts  
920 - Nine (9) Size 20 Contacts  
1220 - Twelve (12) Size 20 Contacts  
1822 - Eighteen (18) Size 22 Contacts  
1920 - Nineteen (19) Size 20 Contacts  
2922 - Twenty-nine (29) Size 22 Contacts

### STEP 5 - SERVICE CLASS

K - Non-Environmental  
L - Environmental  
M - EMI/RFI Shielded  
LM - Environmental and EMI/RFI Shielded

### STEP 8 - SPECIAL OPTIONS

FOR SPECIAL OPTIONS, SEE SPECIAL  
OPTIONS APPENDIX ON PAGE 13.

### STEP 7 - ENVIRONMENTAL COMPLIANCE OPTIONS

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

**Note:** If compliance to environmental  
legislation is not required, this step will  
not be used. Example: FR11MP922K1



### STEP 6 - CABLE ADAPTERS (HOOD)

- 0 - None
- 1 - Long, Straight, Non-Environmental
- 2 - Short, Straight, Non-Environmental
- 4 - Long, Straight, Environmental
- 41- Long, Straight, Environmental with single cable seal.  
(Size 11 - 0.150 [3.81] ID, size 19 - 0.345 [8.76] ID)
- 42- Long, Straight, Environmental with single cable seal.  
(Size 11 - 0.200 [5.08] ID, size 19 - 0.420 [10.67] ID)
- 43- Long, Straight, Environmental with single cable seal.  
(Size 11 - 0.250 [6.35] ID, size 19 - 0.495 [12.57] ID)
- 44- Long, Straight, Environmental with single cable seal.  
(Size 11 - 0.300 [7.62] ID, size 19 - 0.570 [14.48] ID)
- 5 - Long, Straight, EMI/RFI
- 6 - Short, Straight, EMI/RFI

**Note:** Crimp contacts must be ordered separately. Select desired  
contact size and wire gauge size from pages 18 - 19.

Order thermocouple contacts from page 20.  
Order size 16 micro-coaxial contacts from page 22.





**MODIFICATIONS (MOS)**

Specify complete connector by selecting a base part number from the **Ordering Information Page**.  
Once base part number is selected, add desired modification (MOS) number below to the end of the part number.

Example part number: FR19FR916K0-14-1553.0

| HOUSING SIZE | GENDER | HOUSING STYLE                 | MODIFICATION OF STANDARD (MOS) NUMBER | DESCRIPTION OF MODIFICATION   |
|--------------|--------|-------------------------------|---------------------------------------|---|
| 11 & 19      | M / F  | PLUG                          | <b>-1512.0</b>                        | Allows for connector to be supplied without the coupling nut and associated retainer ring.  |
| 11 & 19      | M / F  | FIXED FLANGE MOUNT RECEPTACLE | <b>-1553.0</b>                        | Allows for connector be to supplied with right angle (90°) printed board mount termination contacts that allow for a 0.125 [3.18] tail length.                    |
| 11 & 19      | M / F  | FIXED FLANGE MOUNT RECEPTACLE | <b>-1554.0</b>                        | Allows for connector to be supplied with straight printed board mount termination contacts that allow for a 0.125 [3.18] tail length. Push-on fasteners included. |
| 11 & 19      | M / F  | ALL                           | <b>-14</b>                            | Allows connector with signal contacts installed, for signal contacts only to be plated 0.000030 [0.76µ] gold over nickel.   |
| 11 & 19      | M / F  | ALL                           | <b>-15</b>                            | Allows connector with signal contacts installed, for signal contacts only to be plated 0.000050 [1.27µ] gold over nickel.   |

**MANY OTHER SPECIAL OPTIONS ARE AVAILABLE.**

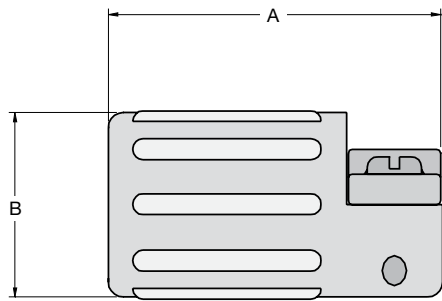
Find out more about Sequential Mating System,  
Straight and Right Angle Thermocouple Printed Circuit Board mount contacts.

**CONSULT TECHNICAL SALES OR VISIT OUR WEBSITE AS [WWW.CONNECTPOSITRONIC.COM](http://WWW.CONNECTPOSITRONIC.COM)**

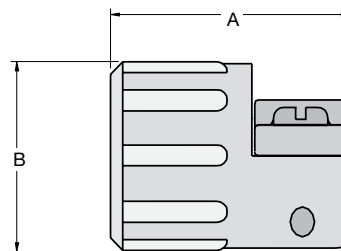
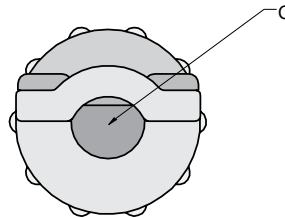
ORDERING INFO



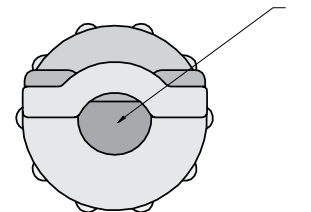
## CABLE ADAPTERS



Long Cable Adapter



Short Cable Adapter

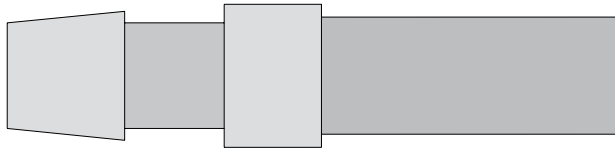


**MATERIALS:**

Cable Adapter & Cable Clamp: Glass-filled polyester.

| DIMENSIONS                 | LONG CABLE ADAPTER |                  |                             | SHORT CABLE ADAPTER |                  |                             |
|----------------------------|--------------------|------------------|-----------------------------|---------------------|------------------|-----------------------------|
|                            | A                  | B                | C<br>Cable Range            | A                   | B                | C<br>Cable Range            |
| <b>Size 11<br/>Housing</b> | 1.350<br>[34.29]   | 0.750<br>[19.05] | 0.300<br>[7.62]<br>Maximum  | 0.975<br>[24.77]    | 0.750<br>[19.05] | 0.300<br>[7.62]<br>Maximum  |
| <b>Size 19<br/>Housing</b> | 1.350<br>[34.29]   | 1.285<br>[32.64] | 0.570<br>[14.48]<br>Maximum | 0.975<br>[24.77]    | 1.285<br>[32.64] | 0.570<br>[14.48]<br>Maximum |

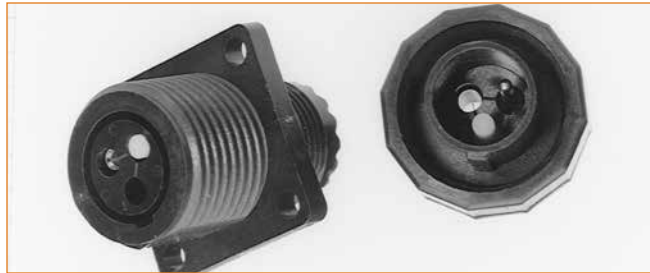
## KEYING PLUGS



Keying Plug

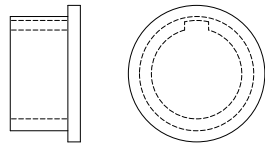
MATERIAL: Nylon.

| CONTACT SIZE | KEYING PLUG PART NUMBER |
|--------------|-------------------------|
| SIZE 12      | 5123-1-0-0              |
| SIZE 16      | 5123-2-0-0              |
| SIZE 20      | 5123-3-0-0              |
| SIZE 22      | 5123-4-0-0              |



## PRESS-ON DUST COVERS

| PART NUMBER                          |
|--------------------------------------|
| 5125-11-2-0<br>for Size 11 Connector |
| 5125-19-2-0<br>for Size 19 Connector |

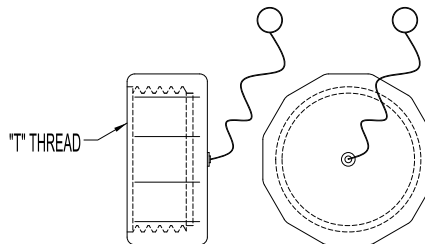


Use with Plug Shell

MATERIAL: Low density polyethylene.

## THREADED DUST COVERS

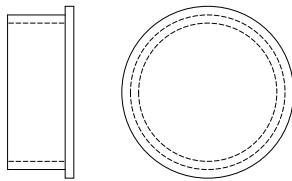
| PART NUMBER                          | THREAD |
|--------------------------------------|--------|
| 5125-11-0-0<br>for Size 11 Connector | M19    |
| 5125-19-0-0<br>for Size 19 Connector | M32    |



Use with Receptacle Shell

MATERIAL: Glass-filled polyester.

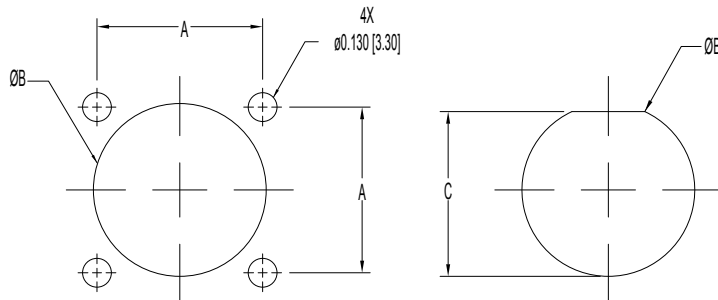
| PART NUMBER                          |
|--------------------------------------|
| 5125-11-1-0<br>for Size 11 Connector |
| 5125-19-1-0<br>for Size 19 Connector |



Use with Receptacle Shell



## PANEL MOUNTING CUTOUTS



Flange Mounting

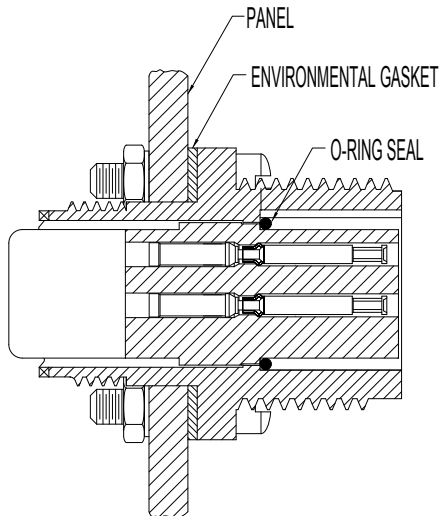
Jam Nut

Suggest 0.092 [2.34] maximum panel thickness if using environmental flange gasket or 0.122 [3.10] maximum panel thickness without gasket.

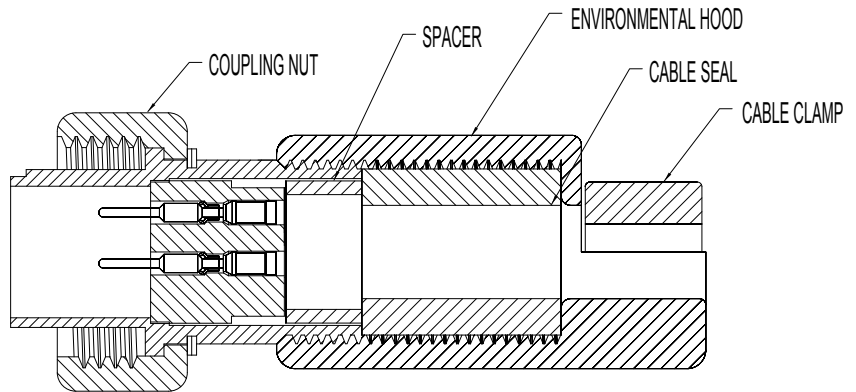
| DIMENSION | SIZE 11 HOUSING               | SIZE 19 HOUSING               |
|-----------|-------------------------------|-------------------------------|
| A         | 0.719 [18.26]                 | 1.062 [26.97]                 |
| Ø B       | 0.760 ±0.003<br>[19.30 ±0.08] | 1.275 ±0.003<br>[32.39 ±0.08] |
| C         | 0.715 ±0.003<br>[18.16 ±0.08] | 1.227 ±0.003<br>[31.17 ±0.08] |



## ENVIRONMENTAL DESIGN FEATURES



**Fixed Female Flange Mounted Connector**



**Free Male In-line Connector**

**MATERIALS:**

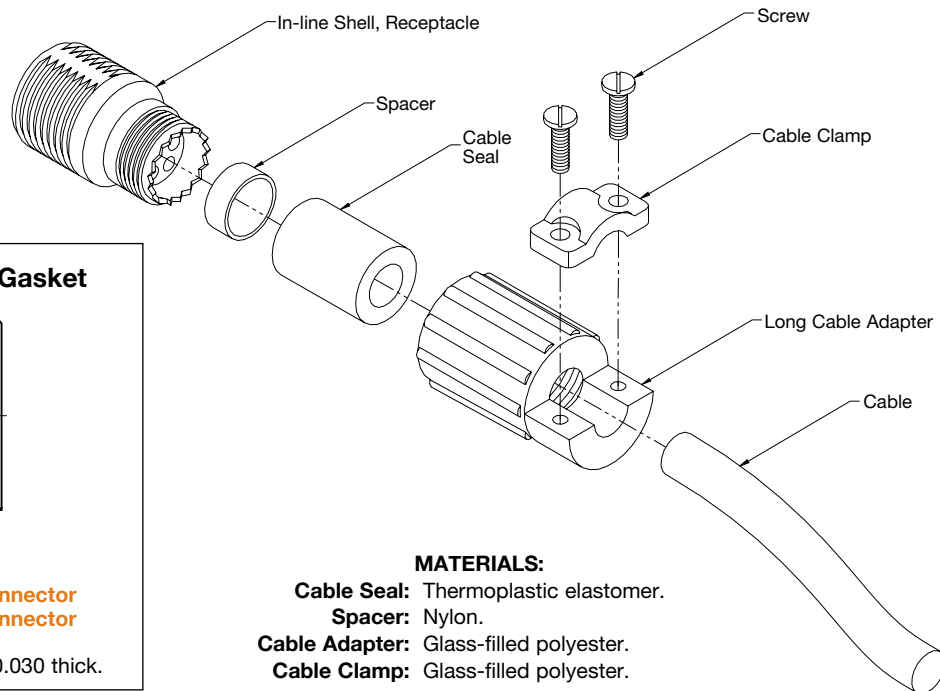
**O-Ring:** Thermoplastic elastomer.

## ENVIRONMENTAL VERSION ACCESSORIES

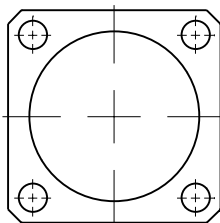
**NOTE:**

Environmental flange gaskets supplied with flange mount environmental connectors. Part numbers are shown for replacement parts only.

### Environmental Cable Adapter Assembly Male or Female, Free In-Line Connectors



#### Environmental Flange Gasket



**PART NUMBER:**

5124-11-0-0 for Size 11 Connector  
5124-19-0-0 for Size 19 Connector

**MATERIAL:** Neoprene sheet, 0.030 thick.

**MATERIALS:**

**Cable Seal:** Thermoplastic elastomer.

**Spacer:** Nylon.

**Cable Adapter:** Glass-filled polyester.

**Cable Clamp:** Glass-filled polyester.

## TECHNICAL DATA

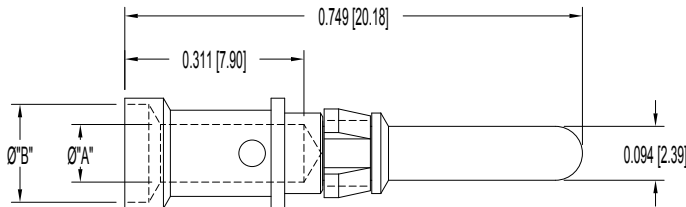


**MATERIAL:** Electroless nickel over copper. Electroless plating offers surface conductivity of  $< 0.5$  ohm per square and attenuation of 70-80 dB at most frequencies. Due to differences in cable construction and termination, results may vary and should be tested under actual operating conditions to determine exact values.

• **NOTE:** Dimensions are consistent with non-shielded versions.

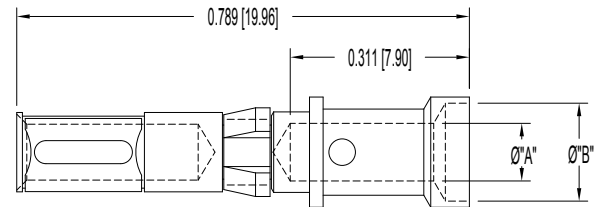


## SIZE 12 REMOVABLE CONTACTS



**MALE**

| MALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ] | Ø "A"           | Ø "B"           |
|--------------------------|----------------------------------|-----------------|-----------------|
| MC612N                   | 12<br>[4.0]                      | 0.100<br>[2.54] | 0.170<br>[4.32] |



**FEMALE**

| FEMALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ] | Ø "A"           | Ø "B"           |
|----------------------------|----------------------------------|-----------------|-----------------|
| FC612N2                    | 12<br>[4.0]                      | 0.100<br>[2.54] | 0.170<br>[4.32] |

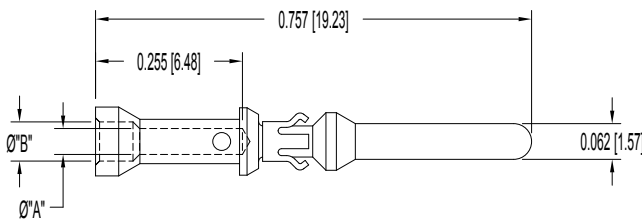
**MATERIALS AND FINISHES:**

**Material:** Copper Alloy.

**Finish:** Gold flash over nickel.

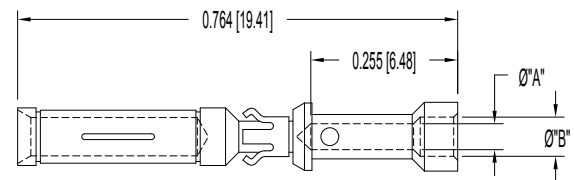
0.000030 inch [0.76 µ] gold over nickel available by adding "-14" suffix onto the part number. Example: MC612N-14.

## SIZE 16 REMOVABLE CONTACTS



**MALE**

| MALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ]   | Ø "A"           | Ø "B"           |
|--------------------------|------------------------------------|-----------------|-----------------|
| MC114N                   | 14 / 16<br>[2.5 / 1.5]             | 0.081<br>[2.06] | 0.105<br>[2.67] |
| MC116N                   | 16 / 18<br>[1.5 / 1.0]             | 0.067<br>[1.70] | 0.093<br>[2.36] |
| MC120N                   | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] | 0.045<br>[1.14] | 0.065<br>[1.65] |



**FEMALE**

| FEMALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ]   | Ø "A"           | Ø "B"           |
|----------------------------|------------------------------------|-----------------|-----------------|
| FC114N2                    | 14 / 16<br>[2.5 / 1.5]             | 0.081<br>[2.06] | 0.105<br>[2.67] |
| FC116N2                    | 16 / 18<br>[1.5 / 1.0]             | 0.067<br>[1.70] | 0.093<br>[2.36] |
| FC120N2                    | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] | 0.045<br>[1.14] | 0.065<br>[1.65] |

**MATERIALS AND FINISHES:**

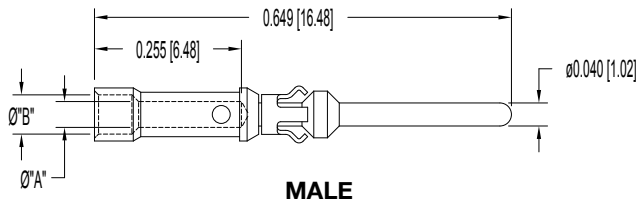
**Material:** Copper Alloy.

**Finish:** Gold flash over nickel.

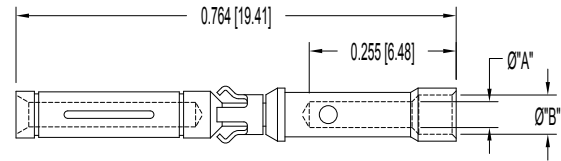
0.000030 inch [0.76 µ] gold over nickel available by adding "-14" suffix onto the part number. Example: FC612N-14.



## SIZE 20 REMOVABLE CONTACTS



MALE



FEMALE

| MALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ]   | Ø "A"           | Ø "B"           |
|--------------------------|------------------------------------|-----------------|-----------------|
| MC720N3                  | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] | 0.045<br>[1.14] | 0.068<br>[1.73] |

| FEMALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ]   | Ø "A"           | Ø "B"           |
|----------------------------|------------------------------------|-----------------|-----------------|
| FC720N2                    | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] | 0.045<br>[1.14] | 0.068<br>[1.73] |

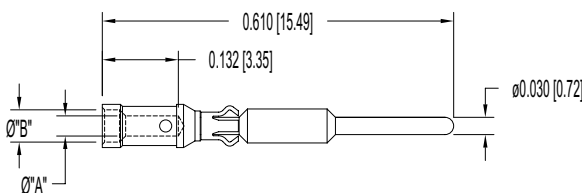
### MATERIALS AND FINISHES:

**Material:** Copper Alloy.

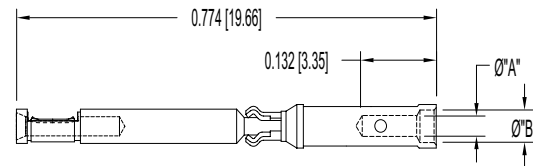
**Finish:** Gold flash over nickel.

0.000030 inch [0.76 µ] gold over nickel available by adding "-14" suffix onto the part number. Example: FC720N2-14.

## SIZE 22 REMOVABLE CONTACTS



MALE



FEMALE

| MALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ]    | Ø "A"           | Ø "B"           |
|--------------------------|-------------------------------------|-----------------|-----------------|
| MC422N                   | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] | 0.035<br>[0.89] | 0.056<br>[1.42] |

| FEMALE CONTACT PART NUMBER | WIRE SIZE AWG [mm <sup>2</sup> ]    | Ø "A"           | Ø "B"           |
|----------------------------|-------------------------------------|-----------------|-----------------|
| FC422P6                    | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] | 0.035<br>[0.89] | 0.056<br>[1.42] |

### MATERIALS AND FINISHES:

**Material:** Copper Alloy.

**Finish:** Gold flash over nickel.

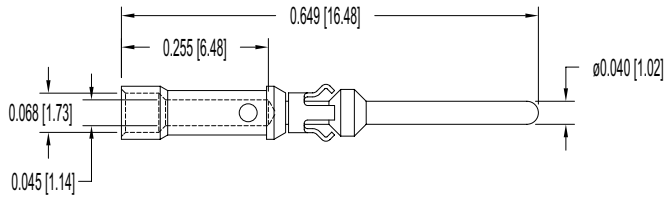
0.000030 inch [0.76 µ] gold over nickel available by adding "-14" suffix onto the part number. Example: MC422N-14.

## ADVANTAGES OF REAR INSERTION-FRONT RELEASE CONTACT RETENTION SYSTEM

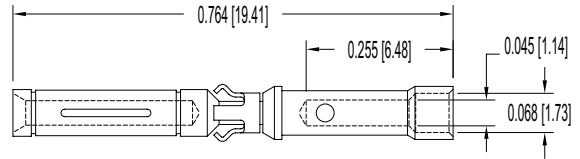
| CONSIDERATION        | FRONT RELEASE ADVANTAGE  |
|----------------------|--|
| 1. Size              | Will accept a wire with oversized insulation diameter.   |
| 2. Connector Wiring  | Less open wiring is required between the connector and the lacing or between the connector and the cable jacket. Minimum service time is required for repairs. |
| 3. Shielded Wires    | Provides the most effective RFI shielding as the shielding can be brought closer to the grommet surface for terminations to the connector shell.               |
| 4. Contact Servicing | Since the removal tool is inserted from the front, finding the correct position is relatively simple.  |
| 5. Wire Breakage     | The standard removal tool can be used to remove a contact which has a broken wire at the contact crimp joint.  |
| 6. Service Tools     | Metal tools are available for inserting and removing contacts.   |



## SIZE 20 CRIMP THERMOCOUPLE CONTACTS



MALE



FEMALE

| TYPE | MATERIAL       | MALE PART NUMBER | FEMALE PART NUMBER | COLOR CODE | WIRE SIZE AWG [mm <sup>2</sup> ]   |
|------|----------------|------------------|--------------------|------------|------------------------------------|
| K    | CHROMEL (+)    | MC720N3CH        | FC720N2CH          | WHITE      | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] |
|      | ALUMEL (-)     | MC720N3AL        | FC720N2AL          | GREEN      | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] |
| T    | COPPER (+)     | MC720N3CU        | FC720N2CU          | RED        | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] |
|      | CONSTANTAN (-) | MC720N3CO        | FC720N2CO          | YELLOW     | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] |
| E    | CHROMEL (+)    | MC720N3CH        | FC720N2CH          | WHITE      | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] |
|      | CONSTANTAN (-) | MC720N3CO        | FC720N2CO          | YELLOW     | 20 / 22 / 24<br>[0.5 / 0.3 / 0.25] |

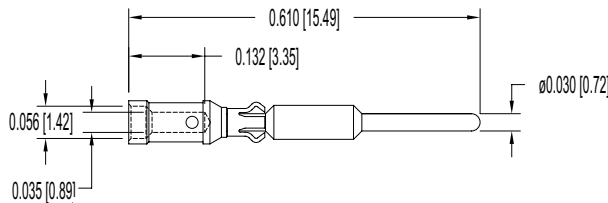
For more information on the availability of Type J thermocouple contacts, please contact Technical Sales.

For more information about thermocouple contacts with PCB solder termination, please contact Technical Sales.

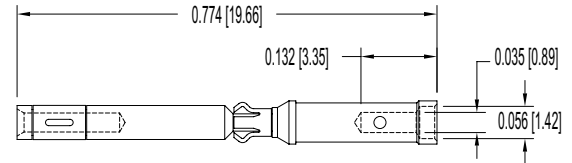
See page 23 for Crimp Tool information.

Chromel® and Alumel® are registered trademarks of Hoskins Manufacturing Company

## SIZE 22 CRIMP THERMOCOUPLE CONTACTS



MALE



FEMALE

| TYPE | MATERIAL       | MALE PART NUMBER | FEMALE PART NUMBER | COLOR CODE | WIRE SIZE AWG [mm <sup>2</sup> ]    |
|------|----------------|------------------|--------------------|------------|-------------------------------------|
| K    | CHROMEL (+)    | MC422NCH         | FC422N6CH          | WHITE      | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] |
|      | ALUMEL (-)     | MC422NAL         | FC422N6AL          | GREEN      | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] |
| T    | COPPER (+)     | MC422NCU         | FC422N6CU          | RED        | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] |
|      | CONSTANTAN (-) | MC422NCO         | FC422N6CO          | YELLOW     | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] |
| E    | CHROMEL (+)    | MC422NCH         | FC422N6CH          | WHITE      | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] |
|      | CONSTANTAN (-) | MC422NCO         | FC422N6CO          | YELLOW     | 22 / 24 / 26<br>[0.3 / 0.25 / 0.12] |

For more information on the availability of Type J thermocouple contacts, please contact Technical Sales.

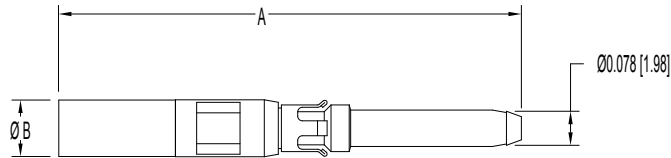
For more information about thermocouple contacts with PCB solder termination, please contact Technical Sales.

See page 23 for Crimp Tool information.

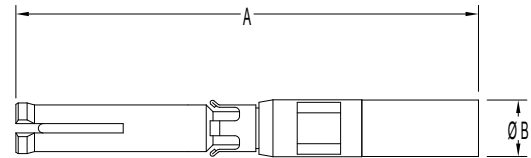
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## SIZE 16 CRIMP SHIELDED CONTACTS



**MALE**



**FEMALE**



| CONTACT DESIGNATION | PART NUMBER | A                | Ø B             | CABLE SIZE               |
|---------------------|-------------|------------------|-----------------|--------------------------|
| MALE                | MCS126N     | 0.993<br>[25.22] | 0.045<br>[1.14] | RG 178 B/U<br>RG 196 A/U |
| FEMALE              | FCS126N2    | 0.967<br>[24.56] | 0.045<br>[1.14] | RG 178 B/U<br>RG 196 B/U |
| MALE                | MCS226N     | 1.048<br>[26.62] | 0.070<br>[1.78] | RG 179 B/U<br>RG 316 /U  |
| FEMALE              | FCS226N2    | 1.022<br>[25.96] | 0.070<br>[1.78] | RG 179 B/U<br>RG 316 /U  |

## TECHNICAL CHARACTERISTICS

### MATERIALS AND FINISHES:

- Insulating Material:** (Dielectric) Teflon.
- Inner Contacts:** Phosphor bronze, 0.000030 inch [0.76 microns] gold over nickel.
- Outer Contacts:** Brass and beryllium copper, gold flash over nickel.

### MECHANICAL CHARACTERISTICS:

- Contact Retention in Insulator:** 20 lbs. [89N].
- Removable Contacts:** Rear insertion, front removable.
- Insertion Force per Contact:** 8 oz. [2.2 N] per contact maximum.
- Durability:** 100 cycles minimum.
- Vibration:** 20g from 10 HZ to 500 HZ.
- Shock:** 30g - 11ms.

### ELECTRICAL CHARACTERISTICS:

| MICRO-COAXIAL CONTACTS          | CONTACT/WIRE COMBINATIONS |       |        |       |
|---------------------------------|---------------------------|-------|--------|-------|
|                                 | 126N                      |       | 226N   |       |
|                                 | RG178                     | RG196 | RG179  | RG316 |
| Characteristic Impedance (ohms) | 50                        | 50    | 75     | 50    |
| Frequency Range                 | 0-500 MHz                 |       |        |       |
| <b>VSWR</b>                     |                           |       |        |       |
| 0 to 200 MHz                    | 1.25                      |       |        |       |
| 200 to 500 MHz                  | 1.70                      |       | 2.25   |       |
| Insertion Loss @ 500 MHz        | 0.2 dB                    |       | 1.0 dB |       |

- Dielectric Strength at Sea Level:** 600 V rms.
- Initial Contact Resistance:** 0.012 ohms maximum.
- Insulator Resistance:** 5 G ohms.

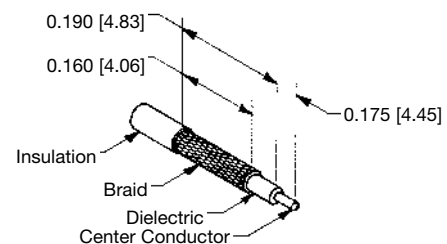
### CLIMATIC CHARACTERISTICS:

- Temperature Range:** -55°C to +125°C



**9506-0-0-0 CRIMP TOOL**

### SHIELDED CABLE STRIP LENGTH





## APPLICATION TOOLS SECTION

Front Runner connectors are offered with *removable crimp contacts*.

Positronic Industries recognizes the *importance of* supplying *application tooling* to support our customers' use of our products.

Information on application tooling is *available* on our web site at

<http://www.connectpositronic.com/products/157/ApplicationTooling>

There you will find *downloadable PDF* cross reference charts for removable contacts. These charts will *supply part numbers* for insertion, removal and crimping tools, along with *information regarding use* of tools and techniques.



# Connectors Designed To Customer Specifications

Positronic *Front Runner* connectors can be modified to customer specifications.

**Examples:** select loading of contacts for cost savings or to gain creepage and clearance distances; longer printed circuit board terminations; customer specified hardware.

*Contact Technical Sales with your particular requirements.*

**CONTACT APPLICATION TOOLS CROSS REFERENCE LIST**  
USE INDICATED POSITRONIC TOOLS FOR BEST RESULTS

| Positronic Contact P/N | Contact Size | Handle & Positioner P/N | Hand Crimp Tool P/N | Mfg. Cross  | Mill Equiv  | Positioner | Mfg. Cross  | Mill Equiv | Insertion Tool | Mfg. Cross   | Mill Equiv | Removal Tool | Mfg. Cross   | Mill Equiv |
|------------------------|--------------|-------------------------|---------------------|-------------|-------------|------------|-------------|------------|----------------|--------------|------------|--------------|--------------|------------|
| FC114N2                | 16           | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-1-0-0  | TH4        | M22520/1-03 | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| FC116N2                |              | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-1-0-0  | TH4        | M22520/1-03 | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| FC120N2                |              | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-1-0-0  | TH4        | M22520/1-03 | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| FC422P6                | 22           | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-20-0-0 | K1197      | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-3-0-0 | RNG2103      | ---          |            |
| FC422N6AL              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-20-0-0 | K1197      | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-3-0-0 | RNG2103      | ---          |            |
| FC422N6CH              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-20-0-0 | K1197      | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-3-0-0 | RNG2103      | ---          |            |
| FC422N6CO              | 12           | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-20-0-0 | K1197      | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-3-0-0 | RNG2103      | ---          |            |
| FC422N6CU              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-20-0-0 | K1197      | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-3-0-0 | RNG2103      | ---          |            |
| FC612N2                |              | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-19-0-0 | TP1199     | ---         | 9099-3-0-0 | ITP 1168       | ---          | 2711-0-0-0 | P+           | ---          |            |
| FC720N2                | 20           | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-22-0-0 | K1196      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| FC720N2AL              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-22-0-0 | K1196      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| FC720N2CH              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-22-0-0 | K1196      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| FC720N2CO              | 16           | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-22-0-0 | K1196      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| FC720N2CU              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-22-0-0 | K1196      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| FCS128N2               |              | 9506-0-0-0              | HX3                 | ---         | ---         | 9506-2-0-0 | X530        | ---        | 9099-0-0-0     | ITH 1094     | ---        | 9081-4-0-0   | RTG 2103     |            |
| FCS228N2               | 16           | 9506-0-0-0              | HX3                 | ---         | ---         | 9506-2-0-0 | X530        | ---        | 9099-0-0-0     | ITH 1094     | ---        | 9081-4-0-0   | RTG 2103     |            |
| MC114N                 |              | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-1-0-0  | TH4        | M22520/1-03 | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| MC116N                 |              | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-1-0-0  | TH4        | M22520/1-03 | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| MC120N                 | 22           | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-1-0-0  | TH4        | M22520/1-03 | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| MC422N                 |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-12-0-0 | K187       | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-1-0-0 | RTCO 2061    | ---          |            |
| MC422N3AL              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-12-0-0 | K187       | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-1-0-0 | RTCO 2061    | ---          |            |
| MC422N3CH              | 12           | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-12-0-0 | K187       | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-1-0-0 | RTCO 2061    | ---          |            |
| MC422N3CO              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-12-0-0 | K187       | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-1-0-0 | RTCO 2061    | ---          |            |
| MC422N3CU              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-12-0-0 | K187       | ---         | 9099-1-0-0 | ITH 1056       | M81969/18-02 | 9081-1-0-0 | RTCO 2061    | ---          |            |
| MC612N                 | 20           | 9501-0-0-0              | AF8                 | M22520/1-01 | 9502-19-0-0 | TP1199     | ---         | 9099-3-0-0 | ITP 1168       | ---          | 2711-0-0-0 | P+           | ---          |            |
| MC720N3                |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-27-0-0 | K1506      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| MC720N3AL              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-27-0-0 | K1195      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| MC720N3CH              | 16           | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-21-0-0 | K1195      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| MC720N3CO              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-21-0-0 | K1195      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| MC720N3CU              |              | 9507-0-0-0              | AFM8                | M22520/2-01 | 9502-21-0-0 | K1195      | ---         | 9099-4-0-0 | ITP 1076       | ---          | 9081-2-0-0 | RNG2103      | ---          |            |
| MCS126N                | 20           | 9506-0-0-0              | HX3                 | ---         | 9506-2-0-0  | X530       | ---         | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |
| MCS226N                |              | 9506-0-0-0              | HX3                 | ---         | 9506-2-0-0  | X530       | ---         | 9099-0-0-0 | ITH 1094       | M81969/18-01 | 9081-4-0-0 | RTG 2103     | M81969/20-01 |            |

For more listings see visit our web site to download a PDF file at <https://www.connectpositronic.com/tooling>

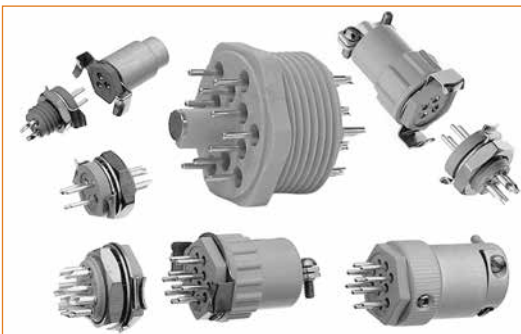
# OTHER CIRCULAR PRODUCTS

Positronic Industries offers a range of circular connectors in a variety of contact variants and package sizes with compliant press-in, solder and cable terminations. All Positronic connector products provide **high quality, reliability and flexibility.**

## BABY KING COBRA CONNECTORS

Miniature, rugged, economical

- Smaller package size than King Cobra
- Solder cup terminations
- Size 20 machined contacts
- Cable or panel mount options
- Environmental options to IP65
- Secured using unique one quarter turn locking system



## CIRCLE HEX SERIES CONNECTORS

Ideal for use in industrial and instrumentation applications where light weight, miniature, high reliability interconnections are necessary.

- “Twist Spring” locking device
- Large, miniature, and microminiature sizes available
- Solid machined contacts for high reliability
- Available in straight solder and solder cup terminations
- Variety of cable adapters and contact variants
- Contact current ratings to 7.5 amperes nominal

# Connector Excellence<sup>®</sup>

## Positronic HIGH RELIABILITY Products

### POWER

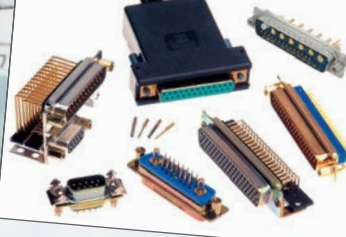


#### FEATURES:

- 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

- Contact Sizes:** 0, 8, 12, 16, 20, 22 and 24  
**Current Ratings:** To 200 amperes per contact  
**Terminations:** Crimp and panel mount, 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, DESC, 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°) solder, straight compliant press-in and right angle (90°) compliant press-in  
**Configurations:** Multiple variants in both standard and high densities, seven shell sizes  
**Qualifications:** MIL-DTL-24308, GSFC S-311-P-4, GSFC S-311-P-10, SAE AS39029, DESC

### RECTANGULAR



#### FEATURES:

- Two performance levels available: industrial quality and military quality
- A wide variety of accessories
- Broad selection of contact variants and package sizes
- Connector 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
- Leakage rate: 5 x 10<sup>-9</sup> mbar.l/s @ vacuum 1.5 x 10<sup>-5</sup> atm
- 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

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LOCATIONS