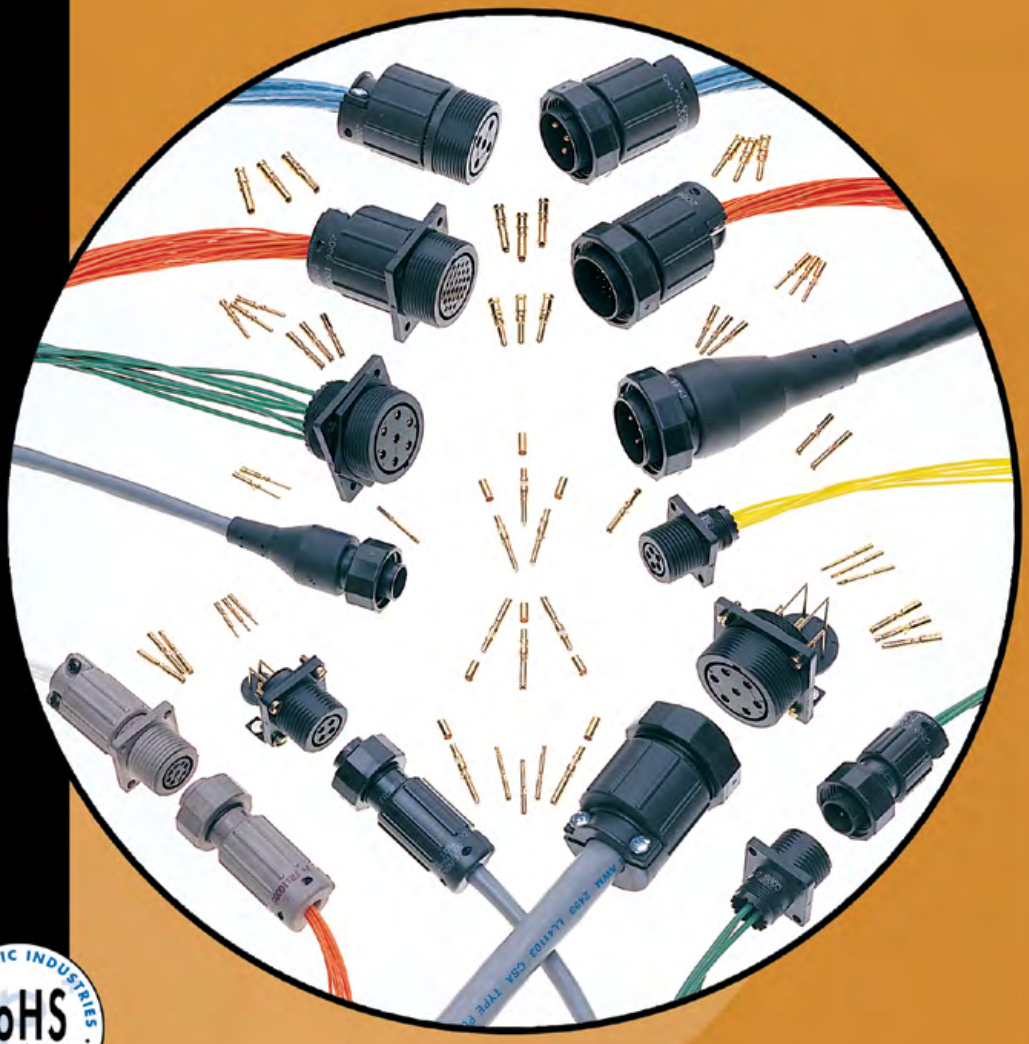
Positronic®

THE SCIENCE OF CERTAINTY

Front Runner

Circular Connectors



POSITRONIC INDUSTRIES RoHS Compliant EU Directive 2002/95/EC

FEATURING HIGH PERFORMANCE,
LIGHTWEIGHT,
COMPOSITE CONSTRUCTION

Catalog C-015 Rev. E1

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

POSITRONIC® IS AN ITAR REGISTERED COMPANY

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.**

Positronic
connectpositronic.com

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**DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.**

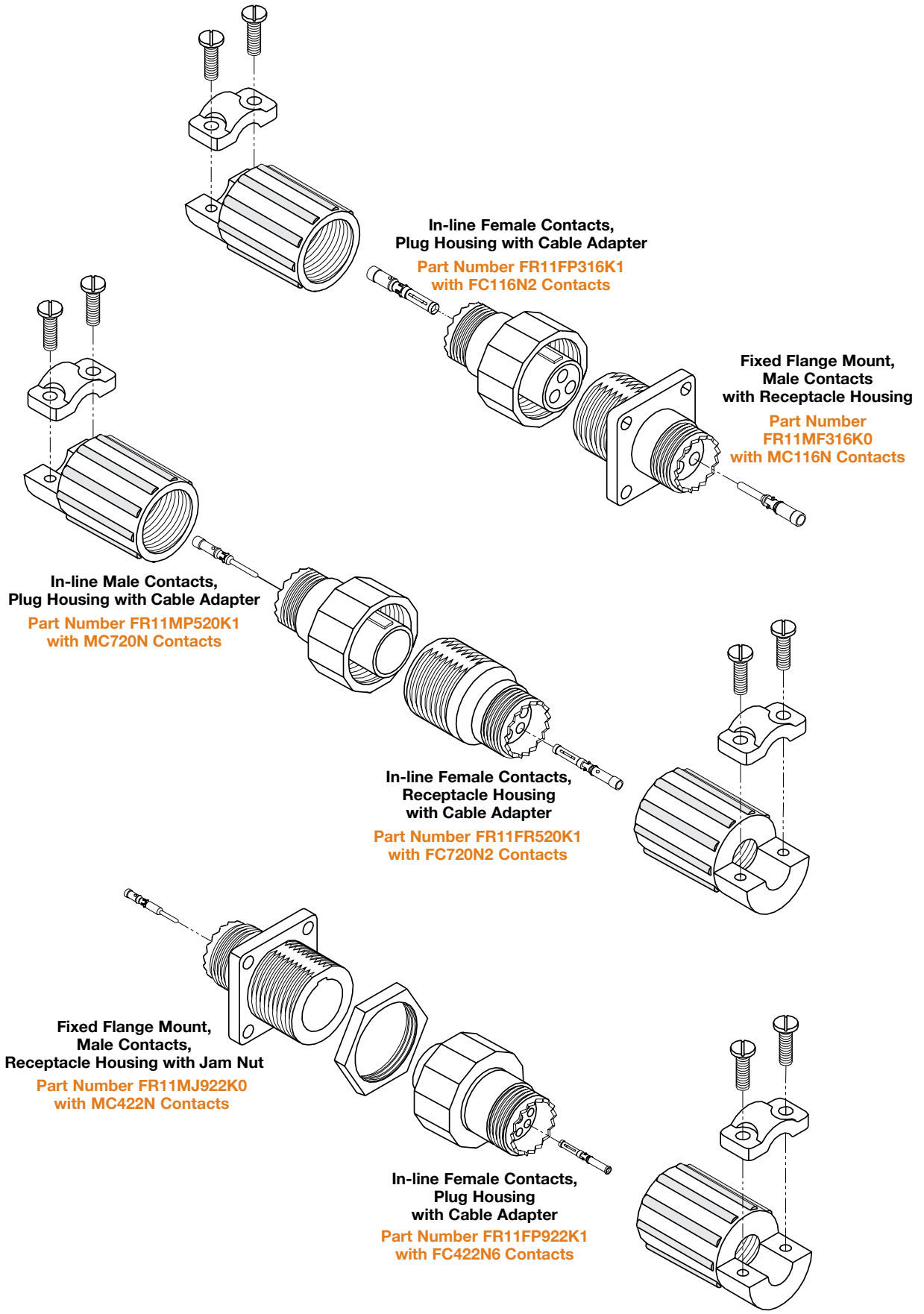
GENERAL PRODUCT INFORMATION

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. Hot pluggable capabilities to 25 amperes.
4. Two level sequential mating of contacts.
5. 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.
6. Mounting options include flange and jam nut or printed circuit board mount.
7. Environmental version provides dust and water ingress protection to I.E.C. IP67 (1 meter immersion for 30 minutes in mated condition).
8. EMI/RFI shielded version, electroless nickel plated plastic.
9. Easy contact servicing - rear insertion/front release contact retention system.
10. Threaded coupling nut system.

Contact Technical Sales for additional information.

TYPICAL CONNECTOR ASSEMBLIES



**In-line Female Contacts,
Plug Housing with Cable Adapter**
Part Number FR11FP316K1
with FC116N2 Contacts

**Fixed Flange Mount,
Male Contacts
with Receptacle Housing**
Part Number
FR11MF316K0
with MC116N Contacts

**In-line Male Contacts,
Plug Housing with Cable Adapter**
Part Number FR11MP520K1
with MC720N Contacts

**In-line Female Contacts,
Receptacle Housing
with Cable Adapter**
Part Number FR11FR520K1
with FC720N2 Contacts

**Fixed Flange Mount,
Male Contacts,
Receptacle Housing with Jam Nut**
Part Number FR11MJ922K0
with MC422N Contacts

**In-line Female Contacts,
Plug Housing
with Cable Adapter**
Part Number FR11FP922K1
with FC422N6 Contacts

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

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

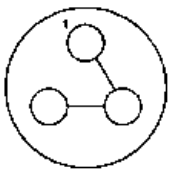
Nine (9) Size 22 Contacts
0.028 inch [0.7 mm] minimum creepage
for operation at 100V RMS

CONTACT ARRANGEMENTS FOR SIZE 19 HOUSING

VOLTAGE RATINGS PER EN60950 * INSULATION RESISTANCE OF 5 G OHMS

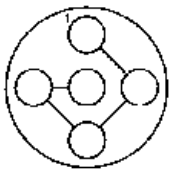
CONTACT ARRANGEMENTS ARE SHOWN APPROXIMATELY ACTUAL SIZE

MATING FACE OF MALE OR REAR VIEW OF FEMALE CONNECTOR SHOWN



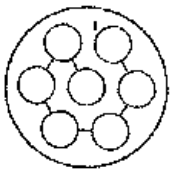
312

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



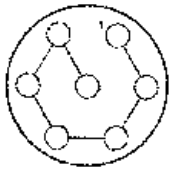
512

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



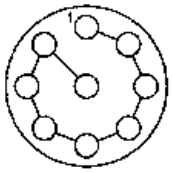
712

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



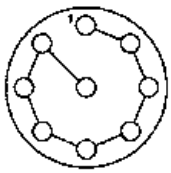
716

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



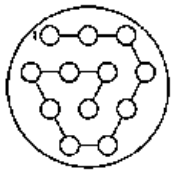
916

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



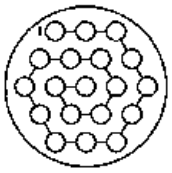
920

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



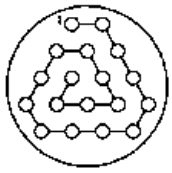
1220

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



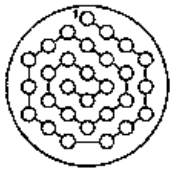
1920

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



1822

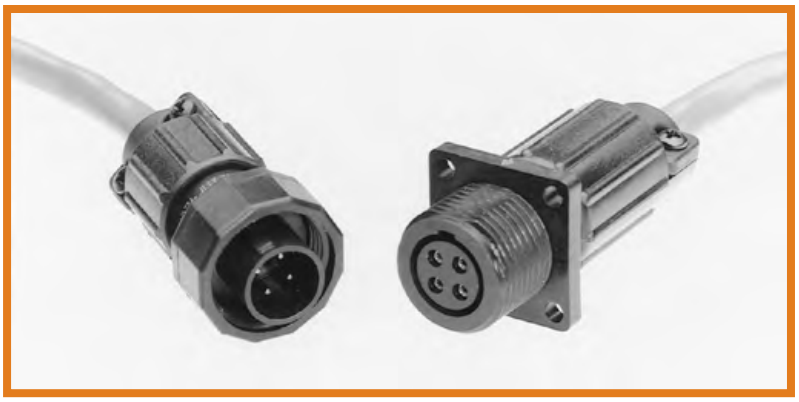
Eighteen (18) Size 22 Contacts
0.086 inch [2.2 mm]
minimum creepage for
operation at 400V RMS



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 polyester, 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.

Hot Pluggable (50 couplings per UL 1977, paragraph 15):
- **Size 12 Contacts:** 250 VAC at 25 amperes.
- **Size 16 Contacts:** 120 VAC at 4.5 amperes.

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.

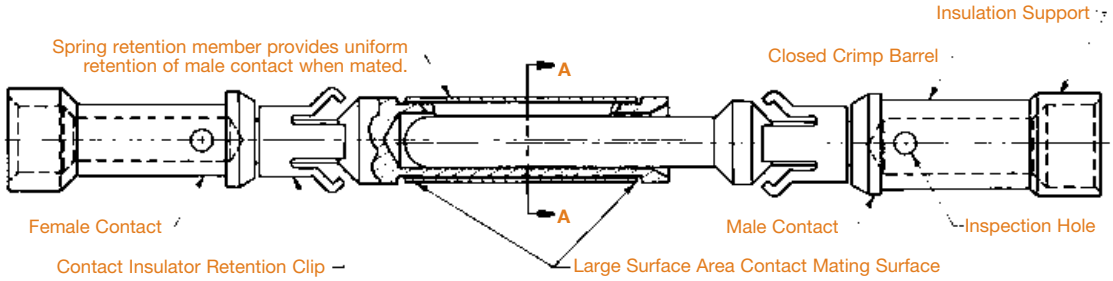
**DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.**

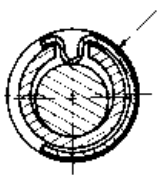
FRONT RUNNER HIGH PERFORMANCE CONTACTS

"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.

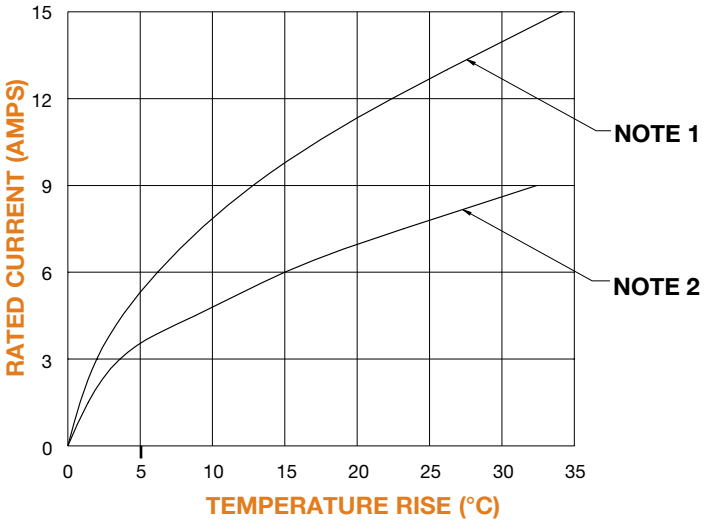
All Front Runner Series contacts are precision machined from solid copper alloy barstock. They are durable, smooth in construction, and have greater amperage capacities than hollow, sheet metal-style contacts.

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



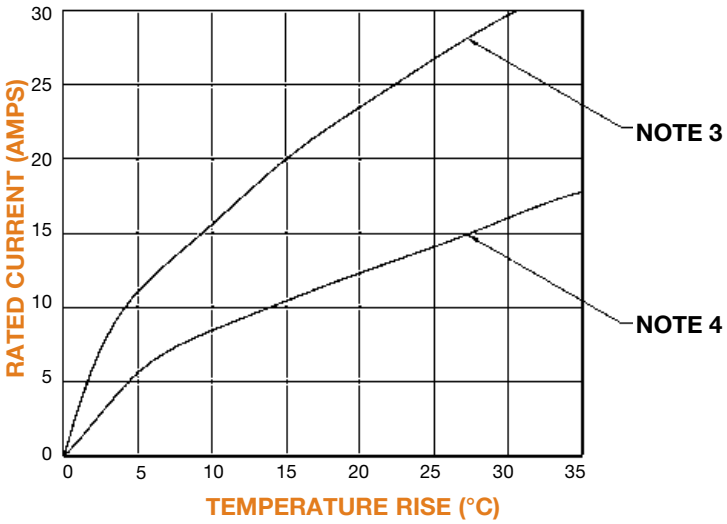
NOTE 1:

Curve developed using FR11MP316K0 and FR11FF316K0 connectors, MC116N and FC116N2 crimp contacts and 16 AWG [1.5 mm²] 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 mm²] 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 mm²] size wire. All contacts under load.

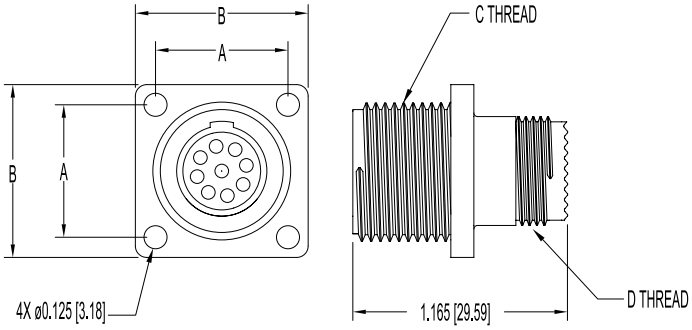
NOTE 4:

Curve developed using FR19MF716K0 and FR19FP716K0 connectors, MC116N and FC116N2 crimp contacts and 16 AWG [1.5 mm²] size wire. All contacts under load.

DIMENSIONS ARE IN INCHES [MILLIMETERS]. ALL DIMENSIONS ARE SUBJECT TO CHANGE.

FIXED FLANGE-MOUNT HOUSING

RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS

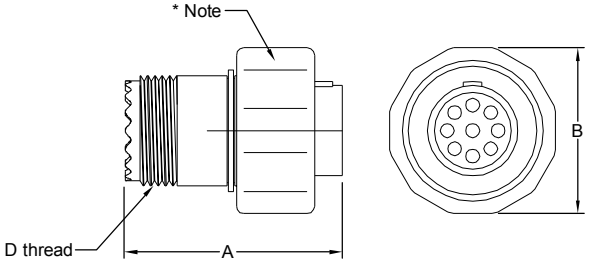


DIMENSION	SIZE 11 HOUSING	SIZE 19 HOUSING
A	0.719 [18.26]	1.062 [26.97]
B	0.938 [23.83]	1.438 [36.53]
C Thread	M19	M32
D Thread	M15	M28

MATERIALS:
Insert: Glass-filled DAP.
Housing: Glass-filled polyester.

FREE IN-LINE HOUSINGS

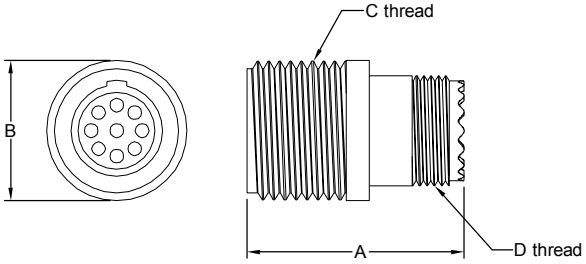
PLUG HOUSING,
MALE OR FEMALE CONTACTS



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



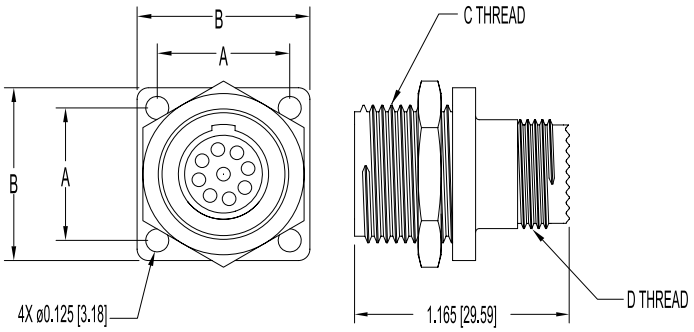
DIMENSION	SIZE 11 HOUSING	SIZE 19 HOUSING
A	1.165 [29.59]	1.165 [29.59]
B	ø 0.750 [19.05]	ø 1.181 [30.00]
C Thread	M19	M32
D Thread	M15	M28

MATERIALS:
Insert: Glass-filled DAP.
Housing & Coupling Nut: Glass-filled polyester.

**DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.**

FIXED JAM NUT MOUNTING

RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS



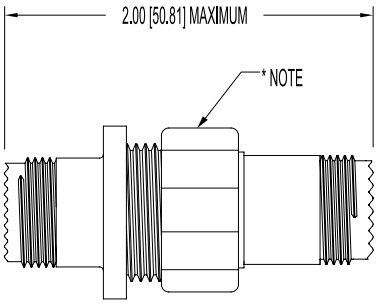
DIMENSION	SIZE 11 HOUSING	SIZE 19 HOUSING
A	0.719 [18.26]	1.062 [26.97]
B	0.938 [23.83]	1.438 [36.53]
C Thread	M19	M32
D Thread	M15	M28

MATERIALS AND FINISHES:

Insert: Glass-filled DAP.
Housing: Glass-filled polyester.
Jam Nut: Aluminum, black anodize.

IN-LINE TO IN-LINE MOUNTING

LENGTH OF MATED PAIR



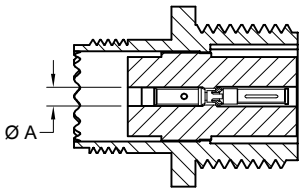
MATERIALS:

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



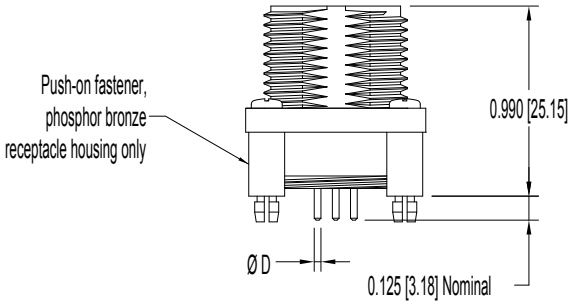
CONTACT SIZE	Ø D
12	0.195 [4.95]
16	0.125 [3.18]
20	0.097 [2.46]
22	0.079 [2.01]

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

STRAIGHT PRINTED BOARD MOUNT CONNECTOR

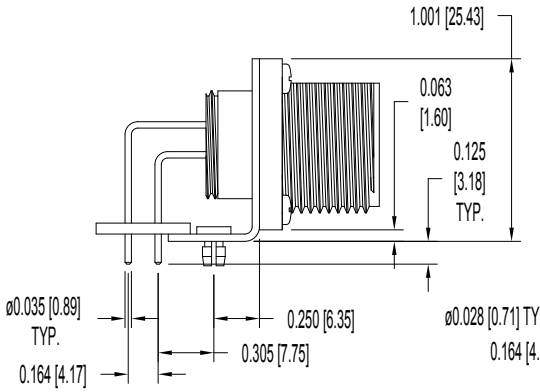
RECEPTACLE HOUSING, MALE OR FEMALE CONTACTS

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



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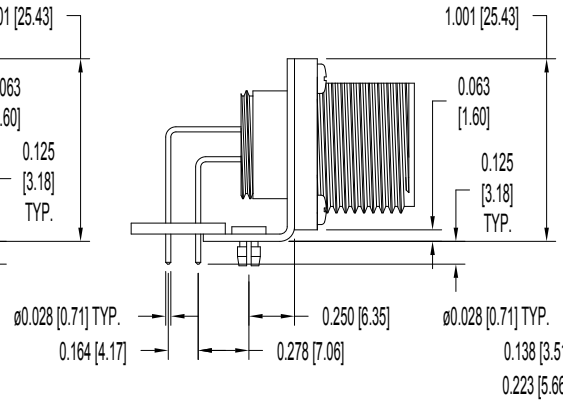

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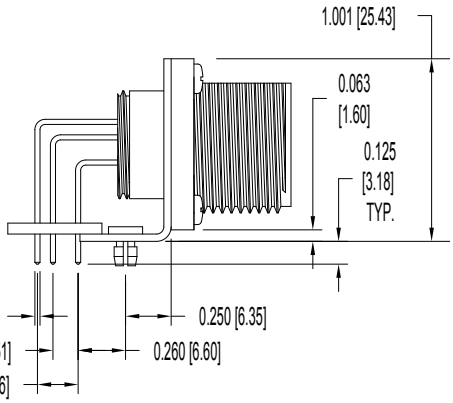

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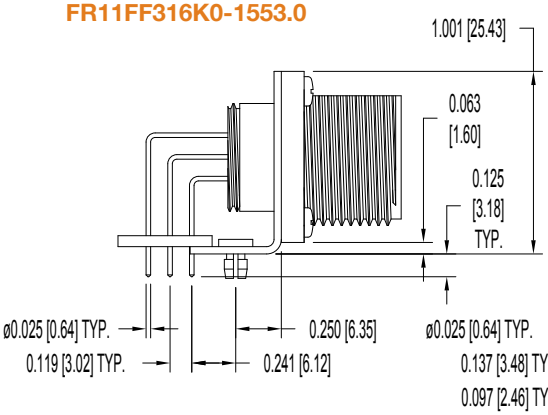

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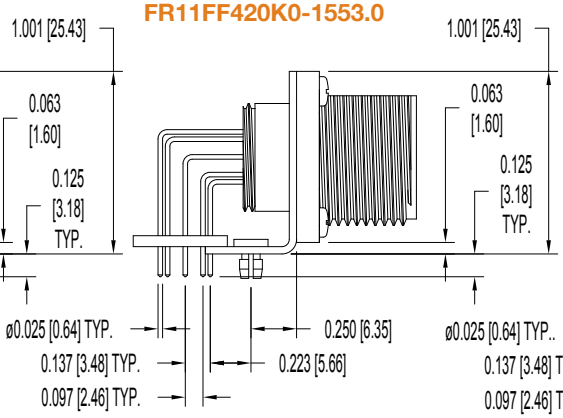

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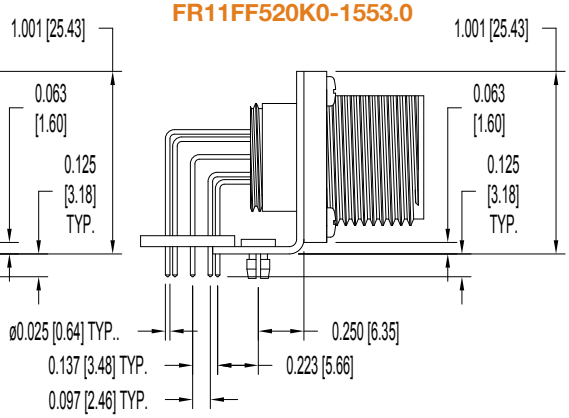

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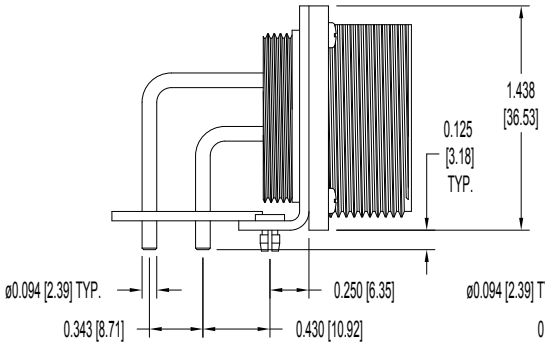
DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.



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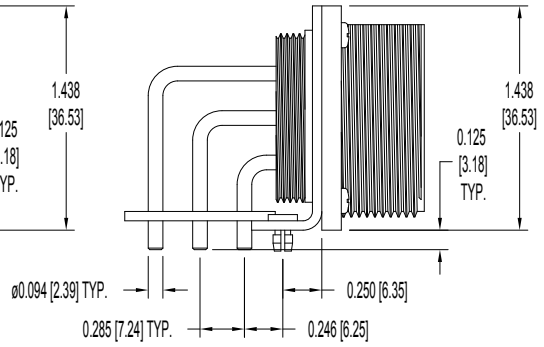

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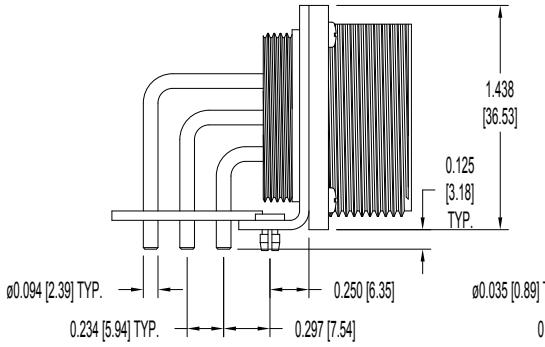

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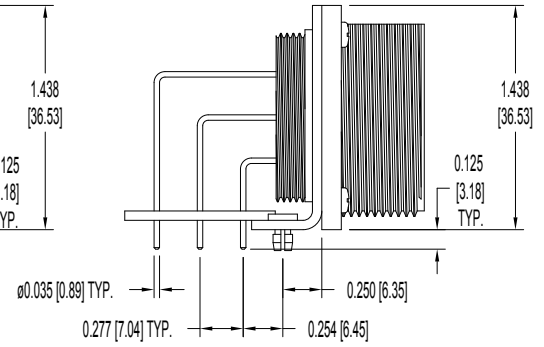

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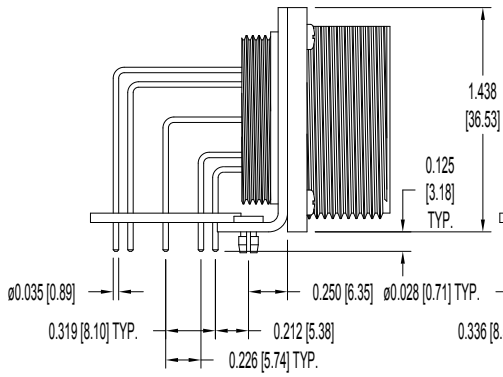

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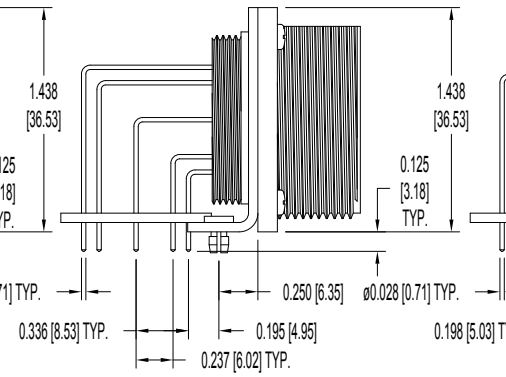

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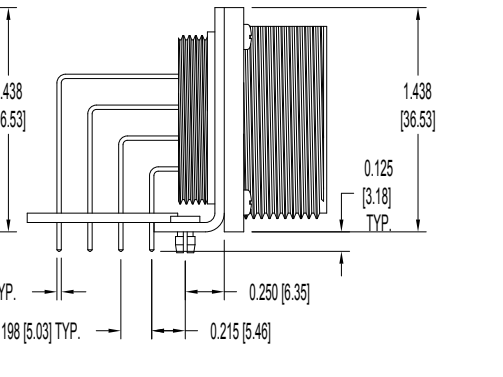

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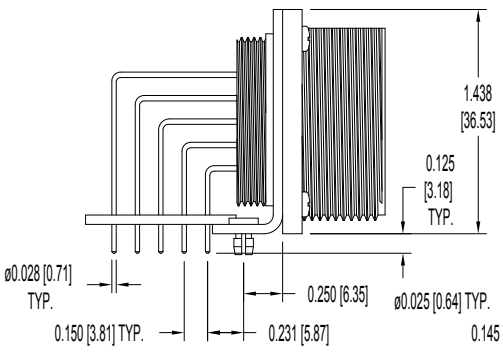

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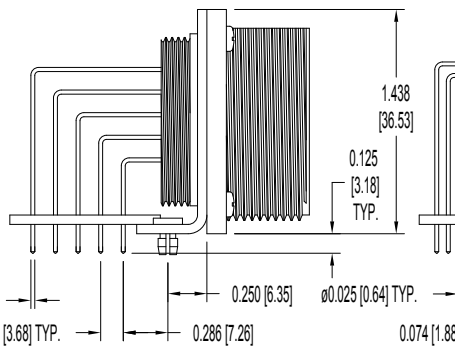

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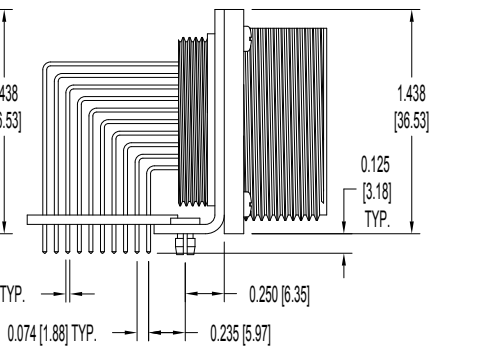


Typical Part Number:
FR19FF2922K0-1553.0

SUGGESTED PRINTED BOARD HOLE SIZES:

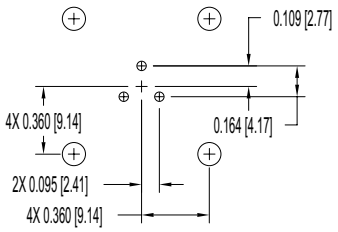
Suggest Ø 0.114 [2.90] plated through hole for size 12 contact termination positions.

Suggest Ø 0.052 [1.32] plated through hole for size 16 contact termination positions.

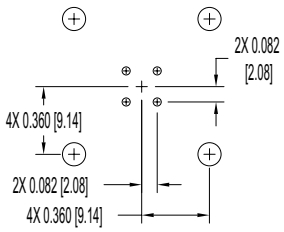
Suggest Ø 0.045 [1.14] plated through hole for size 20 contact termination positions.

Suggest Ø 0.040 [1.02] plated through hole for size 22 contact termination positions.

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



316



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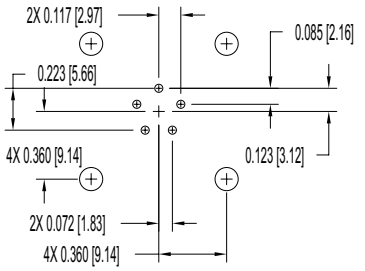

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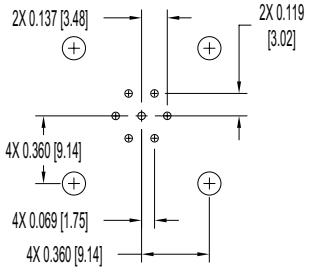

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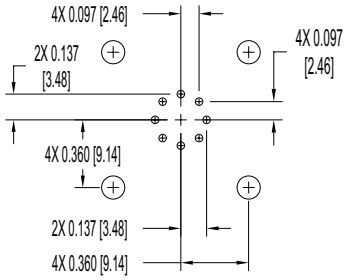

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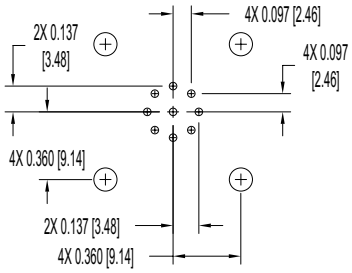

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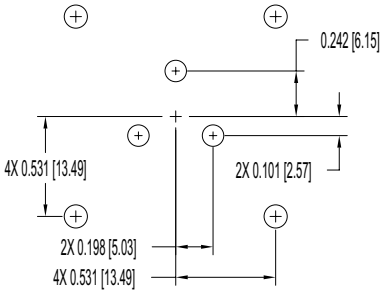

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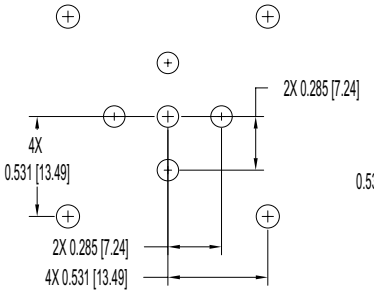

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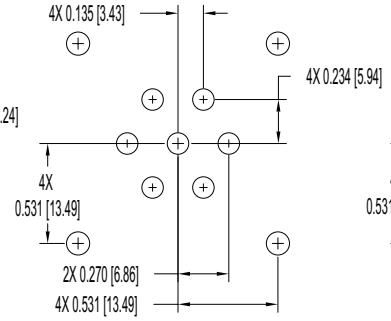

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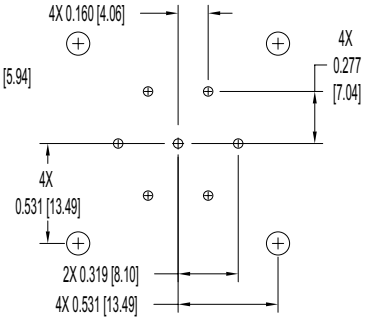

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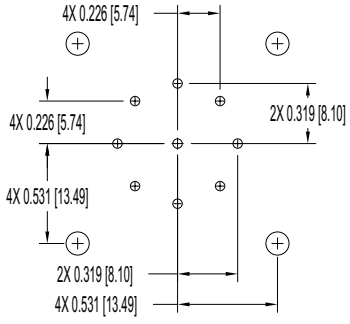

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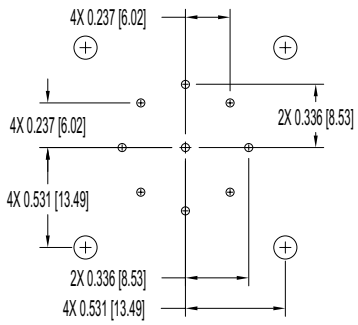

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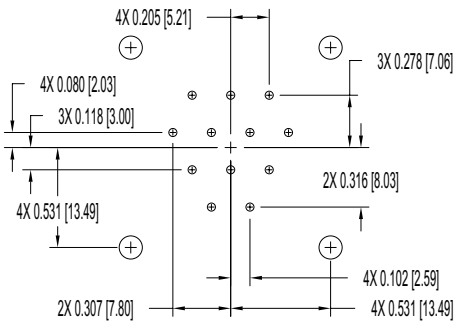

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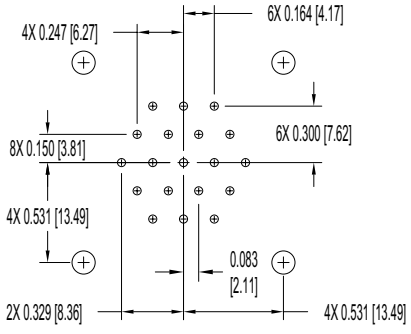

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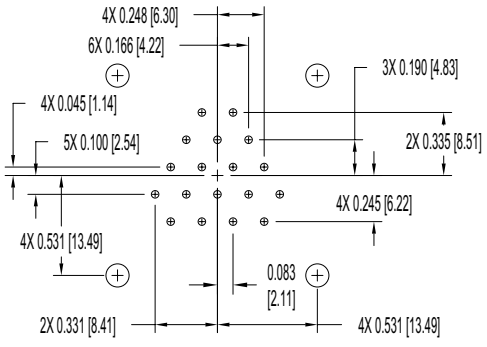

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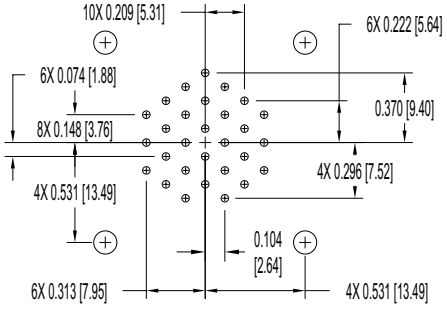


2922

**DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.**

90° PRINTED BOARD CONTACT HOLE PATTERN

SUGGESTED PRINTED BOARD HOLE SIZES:

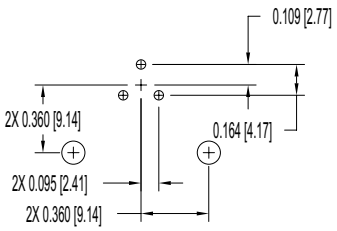
Suggest Ø 0.114 [2.90] plated through hole for size 12 contact termination positions.

Suggest Ø 0.052 [1.32] plated through hole for size 16 contact termination positions.

Suggest Ø 0.045 [1.14] plated through hole for size 20 contact termination positions.

Suggest Ø 0.040 [1.02] plated through hole for size 22 contact termination positions.

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



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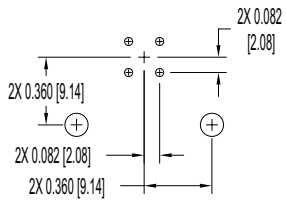

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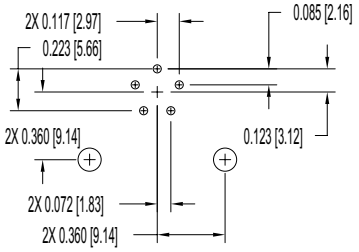

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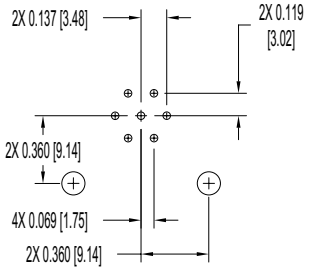

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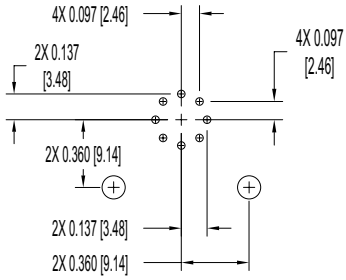

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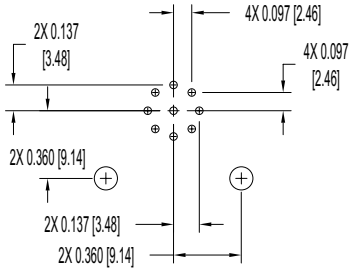

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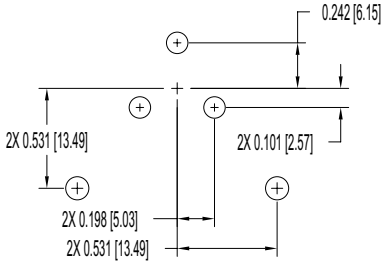

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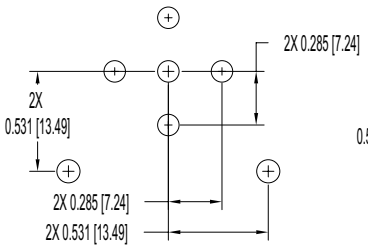

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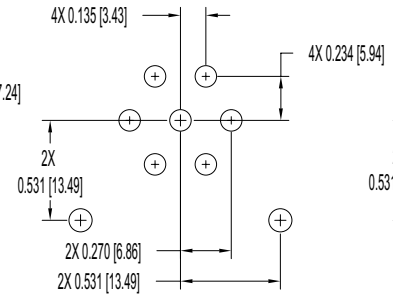

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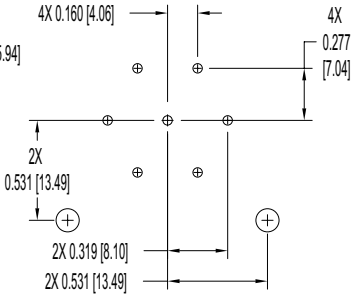

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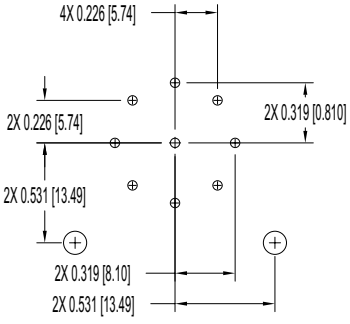

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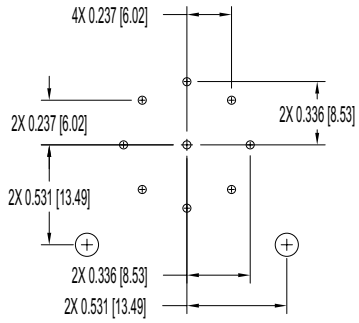

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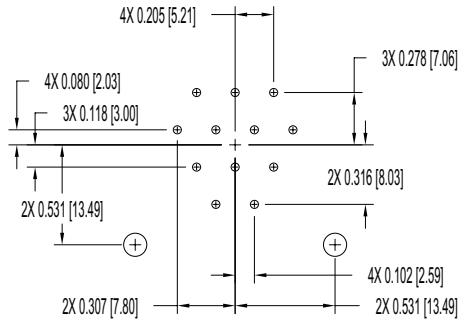

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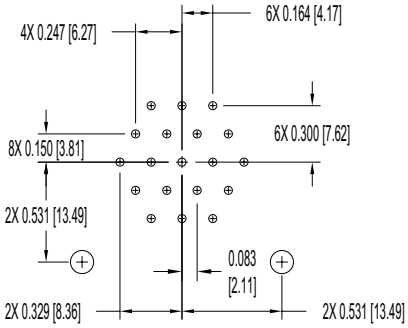

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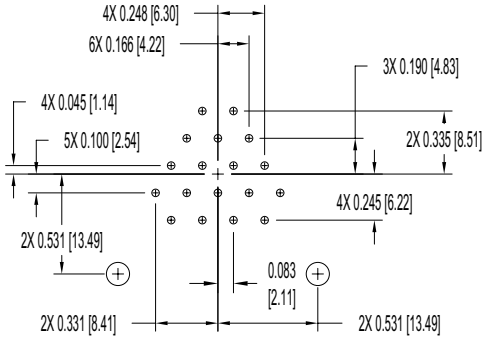

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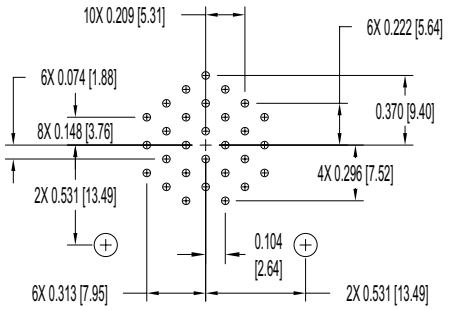


2922

DIMENSIONS

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

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

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.

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

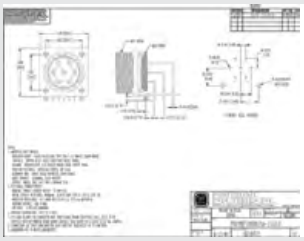
STEP 7 - ENVIRONMENTAL COMPLIANCE OPTIONS

/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

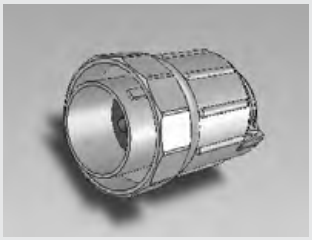
STEP 8 - SPECIAL OPTIONS

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

NOTE: Once you have made a connector selection, contact Technical Sales if you would like to receive a drawing in DXF, PDF format or a 3-dimensional IGES, STEP, or SOLIDWORKS file.



2-dimensional drawing



3-dimensional model

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

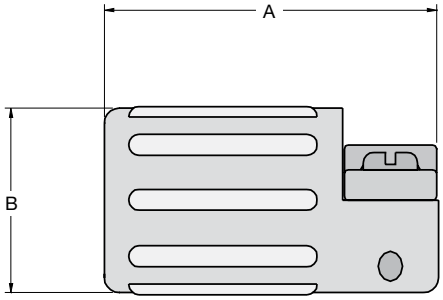
HOUSING SIZE	GENDER	HOUSING STYLE	MODIFICATION OF STANDARD (MOS) NUMBER	DESCRIPTION OF MODIFICATION
11 & 19	M / F	PLUG	**-1512.0**	Allows for connector to be supplied without the coupling nut and associated retainer ring.
11 & 19	M / F	FIXED FLANGE MOUNT RECEPTACLE	**-1553.0**	Allows for connector be to suppled 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	**-1554.0**	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	**-14**	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	**-15**	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.

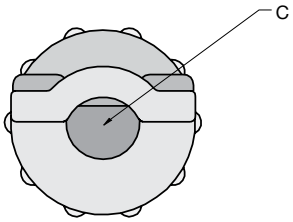
Find out more about Sequential Mating System,
Straight and Right Angle Thermocouple Printed Circuit Board mount contacts.

CONSULT TECHNICAL SALES OR VISIT OUR WEBSITE AS WWW.CONNECTPOSITRONIC.COM

CABLE ADAPTERS

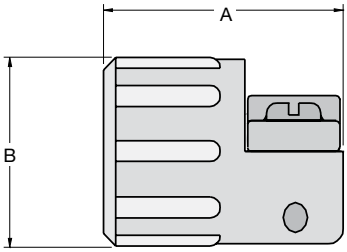


Long Cable Adapter

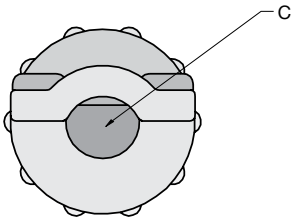


MATERIALS:

Cable Adapter & Cable Clamp: Glass-filled polyester.



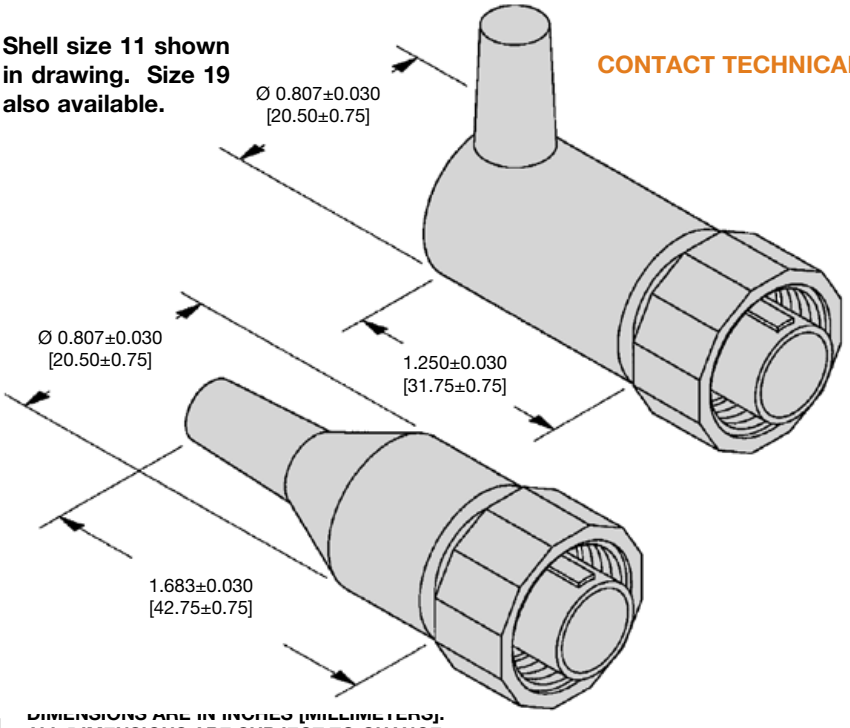
Short Cable Adapter



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

MOLDED CABLE ASSEMBLY

Shell size 11 shown in drawing. Size 19 also available.



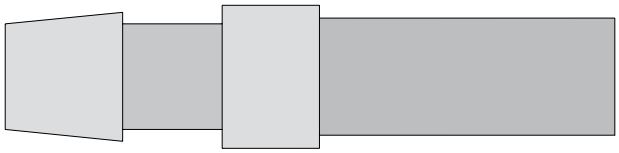
CONTACT TECHNICAL SALES FOR ORDERING INFORMATION.

ACCESSORIES

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

ACCESSORIES AND PANEL CUTOUTS

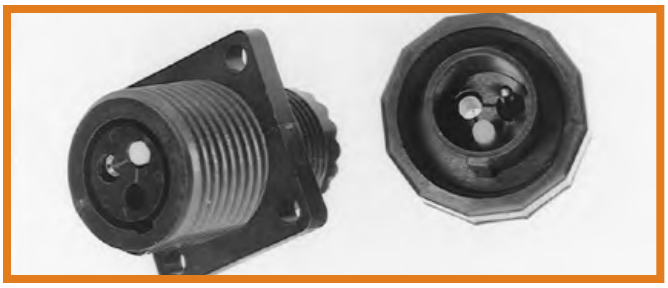
KEYING PLUGS



Keying Plug

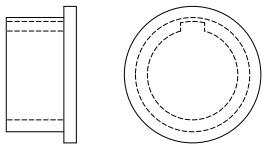
MATERIAL: Nylon.

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

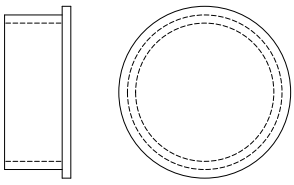
PART NUMBER
5125-11-2-0 for Size 11 Connector
5125-19-2-0 for Size 19 Connector



Use with Plug Shell

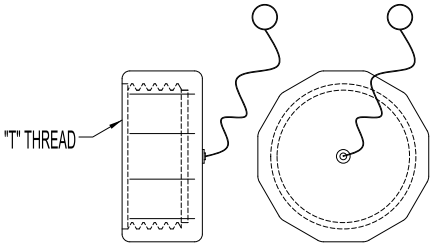
MATERIAL: Low density polyethylene.

PART NUMBER
5125-11-1-0 for Size 11 Connector
5125-19-1-0 for Size 19 Connector



Use with Receptacle Shell

THREADED DUST COVERS

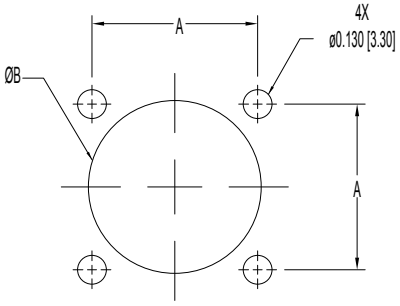


Use with Receptacle Shell

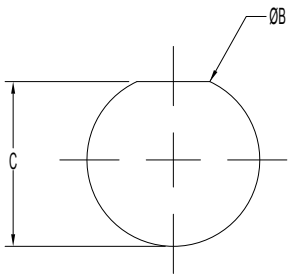
PART NUMBER	THREAD
5125-11-0-0 for Size 11 Connector	M19
5125-19-0-0 for Size 19 Connector	M32

MATERIAL: Glass-filled polyester.

PANEL MOUNTING CUTOUTS



Flange Mounting



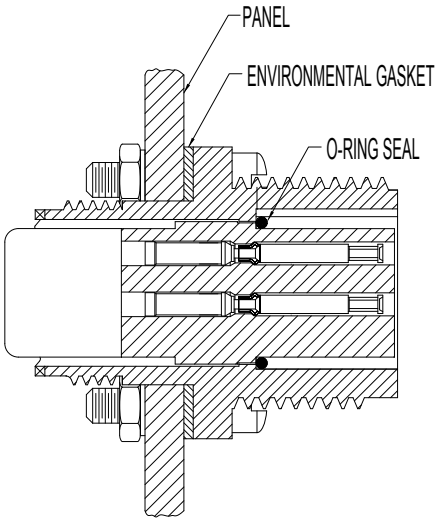
Jam Nut

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

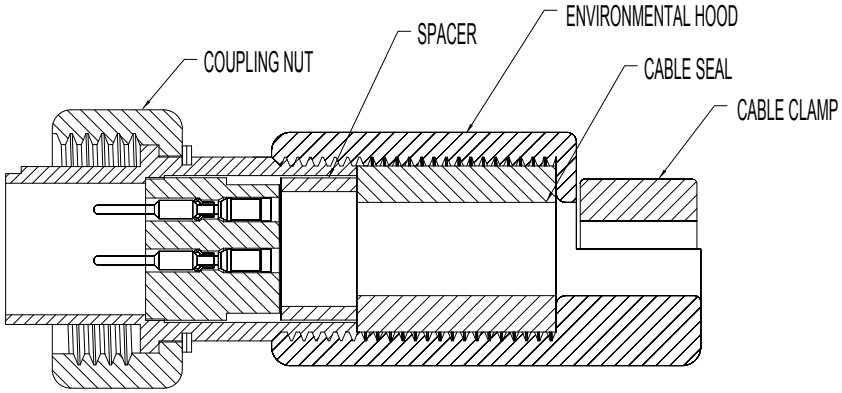
DIMENSION	SIZE 11 HOUSING	SIZE 19 HOUSING
A	0.719 [18.26]	1.062 [26.97]
Ø B	0.760 ±0.003 [19.30 ±0.08]	1.275 ±0.003 [32.39 ±0.08]
C	0.715 ±0.003 [18.16 ±0.08]	1.227 ±0.003 [31.17 ±0.08]

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

ENVIRONMENTAL DESIGN FEATURES



Fixed Female Flange Mounted Connector



Free Male In-line Connector

MATERIALS:

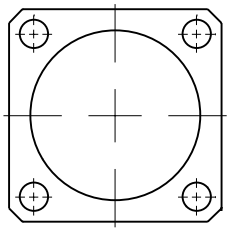
O-Ring: Thermoplastic elastomer.

ENVIRONMENTAL VERSION ACCESSORIES

ACCESSORIES

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

Environmental Flange Gasket

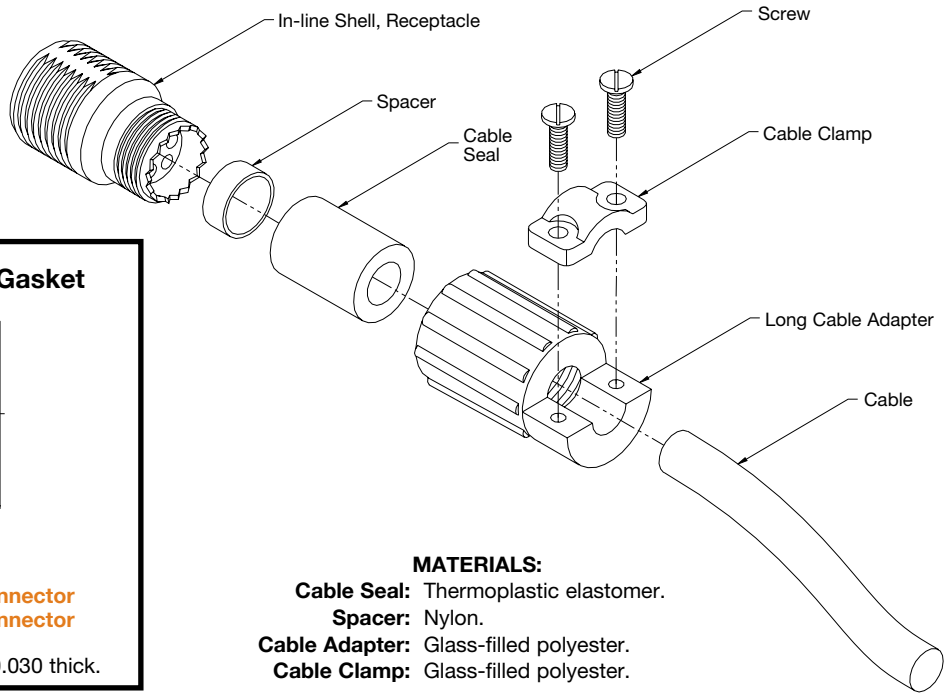


PART NUMBER:
5124-11-0-0 for Size 11 Connector
5124-19-0-0 for Size 19 Connector

MATERIAL: Neoprene sheet, 0.030 thick.

Environmental Cable Adapter Assembly

Male or Female, Free In-Line Connectors



MATERIALS:

Cable Seal: Thermoplastic elastomer.
Spacer: Nylon.
Cable Adapter: Glass-filled polyester.
Cable Clamp: Glass-filled polyester.

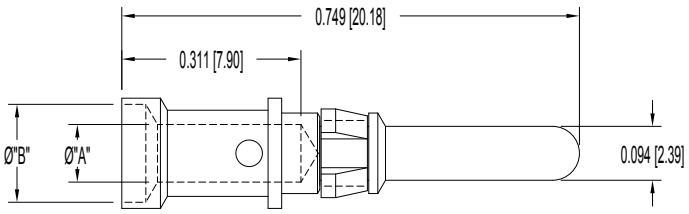
DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

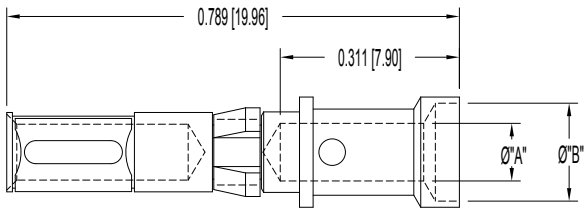
TECHNICAL DATA

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 [mm²]	Ø "A"	Ø "B"
MC612N	12 [4.0]	0.100 [2.54]	0.170 [4.32]

FEMALE

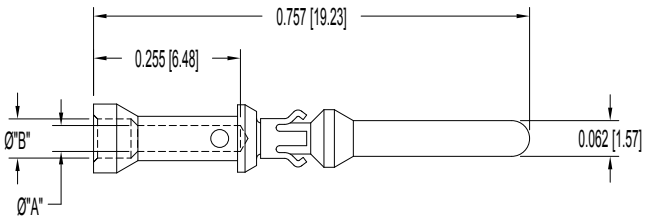
FEMALE CONTACT PART NUMBER	WIRE SIZE AWG [mm²]	Ø "A"	Ø "B"
FC612N2	12 [4.0]	0.100 [2.54]	0.170 [4.32]

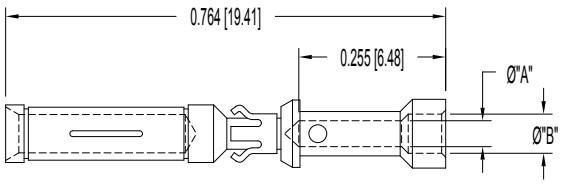
MATERIALS AND FINISHES:

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 [mm²]	Ø "A"	Ø "B"
MC114N	14 / 16 [2.5 / 1.5]	0.081 [2.06]	0.105 [2.67]
MC116N	16 / 18 [1.5 / 1.0]	0.067 [1.70]	0.093 [2.36]
MC120N	20 / 22 / 24 [0.5 / 0.3 / 0.25]	0.045 [1.14]	0.065 [1.65]

FEMALE

FEMALE CONTACT PART NUMBER	WIRE SIZE AWG [mm²]	Ø "A"	Ø "B"
FC114N2	14 / 16 [2.5 / 1.5]	0.081 [2.06]	0.105 [2.67]
FC116N2	16 / 18 [1.5 / 1.0]	0.067 [1.70]	0.093 [2.36]
FC120N2	20 / 22 / 24 [0.5 / 0.3 / 0.25]	0.045 [1.14]	0.065 [1.65]

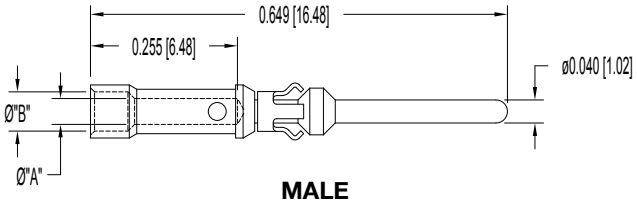
MATERIALS AND FINISHES:

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.

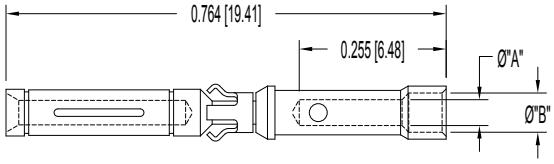
DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

SIZE 20 REMOVABLE CONTACTS



MALE

MALE CONTACT PART NUMBER	WIRE SIZE AWG [mm²]	Ø "A"	Ø "B"
MC720N3	20 / 22 / 24 [0.5 / 0.3 / 0.25]	0.045 [1.14]	0.068 [1.73]



FEMALE

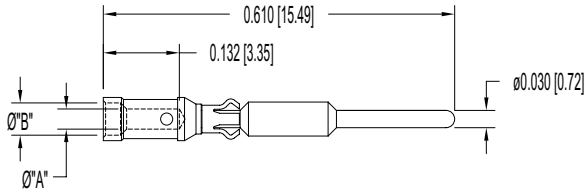
FEMALE CONTACT PART NUMBER	WIRE SIZE AWG [mm²]	Ø "A"	Ø "B"
FC720N2	20 / 22 / 24 [0.5 / 0.3 / 0.25]	0.045 [1.14]	0.068 [1.73]

MATERIALS AND FINISHES:

Material: Copper Alloy.
Finish: Gold flash over nickel.

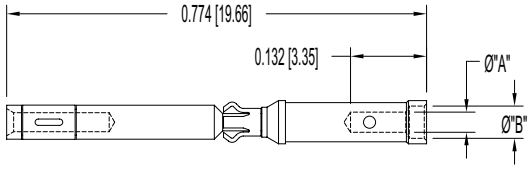
0.000030 inch [0.76 µ] gold over nickel available by adding "-14" suffix onto the part number. Example: FC720N2-14.

SIZE 22 REMOVABLE CONTACTS



MALE

MALE CONTACT PART NUMBER	WIRE SIZE AWG [mm²]	Ø "A"	Ø "B"
MC422N	22 / 24 / 26 [0.3 / 0.25 / 0.12]	0.035 [0.89]	0.056 [1.42]



FEMALE

FEMALE CONTACT PART NUMBER	WIRE SIZE AWG [mm²]	Ø "A"	Ø "B"
FC422N6	22 / 24 / 26 [0.3 / 0.25 / 0.12]	0.035 [0.89]	0.056 [1.42]

MATERIALS AND FINISHES:

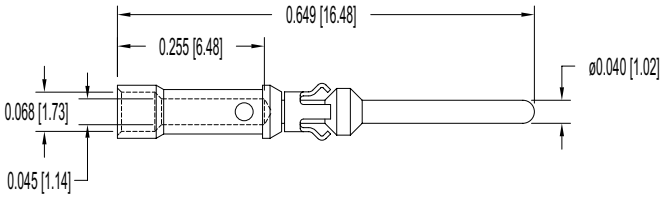
Material: Copper Alloy.
Finish: Gold flash over nickel.

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

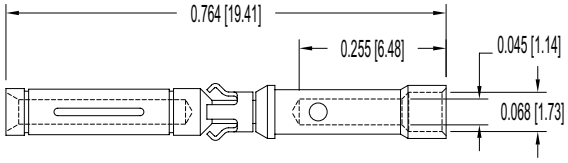
ADVANTAGES OF REAR INSERTION-FRONT RELEASE CONTACT RETENTION SYSTEM

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 [mm²]
K	CHROMEL (+)	MC720N3CH	FC720N2CH	WHITE	20 / 22 / 24 [0.5 / 0.3 / 0.25]
	ALUMEL (-)	MC720N3AL	FC720N2AL	GREEN	20 / 22 / 24 [0.5 / 0.3 / 0.25]
T	COPPER (+)	MC720N3CU	FC720N2CU	RED	20 / 22 / 24 [0.5 / 0.3 / 0.25]
	CONSTANTAN (-)	MC720N3CO	FC720N2CO	YELLOW	20 / 22 / 24 [0.5 / 0.3 / 0.25]
E	CHROMEL (+)	MC720N3CH	FC720N2CH	WHITE	20 / 22 / 24 [0.5 / 0.3 / 0.25]
	CONSTANTAN (-)	MC720N3CO	FC720N2CO	YELLOW	20 / 22 / 24 [0.5 / 0.3 / 0.25]

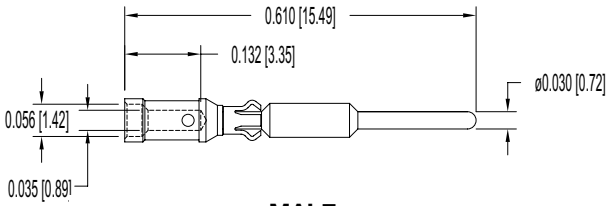
For more information on the availability of Type J thermocouple contacts, please contact Technical Sales.

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

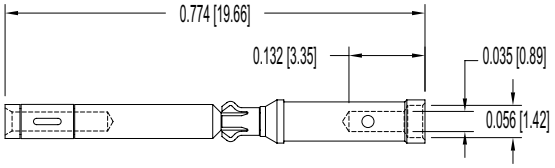
See page 24 for Crimp Tool information.

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 [mm²]
K	CHROMEL (+)	MC422NCH	FC422N6CH	WHITE	22 / 24 / 26 [0.3 / 0.25 / 0.12]
	ALUMEL (-)	MC422NAL	FC422N6AL	GREEN	22 / 24 / 26 [0.3 / 0.25 / 0.12]
T	COPPER (+)	MC422NCU	FC422N6CU	RED	22 / 24 / 26 [0.3 / 0.25 / 0.12]
	CONSTANTAN (-)	MC422NCO	FC422N6CO	YELLOW	22 / 24 / 26 [0.3 / 0.25 / 0.12]
E	CHROMEL (+)	MC422NCH	FC422N6CH	WHITE	22 / 24 / 26 [0.3 / 0.25 / 0.12]
	CONSTANTAN (-)	MC422NCO	FC422N6CO	YELLOW	22 / 24 / 26 [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 24 for Crimp Tool information.

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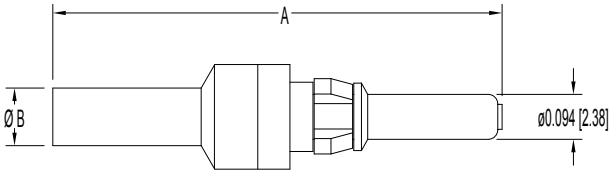
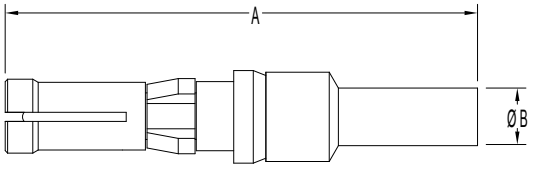
**DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.**

SIZE 12 CRIMP SHIELDED CONTACTS



MALE



FEMALE

CONTACT DESIGNATION	PART NUMBER	A	Ø B	CABLE SIZE
MALE	MC601D	0.936 [23.77]	0.041 [1.04]	RG 178 B/U RG 196 B/U
FEMALE	FC601D	0.984 [24.99]	0.041 [1.04]	RG 178 B/U RG 196 B/U
MALE	MC602D	0.936 [23.77]	0.070 [1.78]	RG 179 B/U RG 316 /U
FEMALE	FC602D	0.984 [24.99]	0.070 [1.78]	RG 179 B/U RG 316 /U

TECHNICAL CHARACTERISTICS

MATERIALS AND FINISHES:

Insulating Material: (Dielectric) PTFE, Teflon.

Inner Contacts: Brass & Phosphor bronze, 0.000030 inch [0.76 microns] gold over nickel and 0.000050 inch [1.27 microns] gold over nickel.

Contact Body: Brass and Phosphor bronze, gold flash over nickel.

MECHANICAL CHARACTERISTICS:

Removable Contacts: Rear insertion, front release.

Durability: 100 cycles minimum.

Vibration: 20g from 10 HZ to 500 HZ.

Shock: 30g - 11rms.

ELECTRICAL CHARACTERISTICS:

Initial Contact Resistance: 0.010 ohms maximum.

Nominal Impedance: 50 ohms.

Insertion Loss: 0.35 dB at 1 GHz
1.35 dB at 2 GHz
1.53 dB at 3 GHz

VSWR: 1.20 average at 1 GHz
1.45 average at 2 GHz
1.63 average at 3 GHz

Proof Voltage: 600 V r.m.s.

Above values measured using frequency domain techniques.

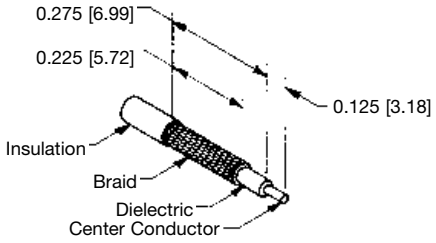
CLIMATIC CHARACTERISTICS:

Temperature Range: -55˚C to +125˚C.

CRIMP TOOL

Use 9504-0-0-0 Crimp Tool

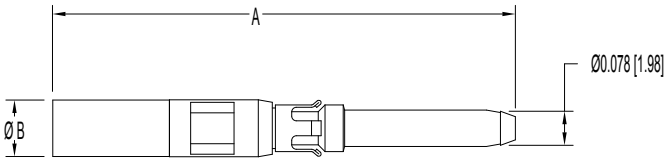
SHIELDED CABLE STRIP LENGTH



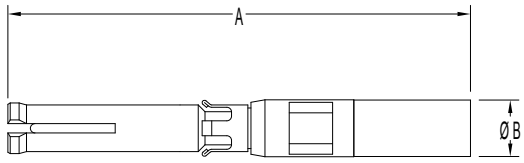
CONTACTS

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

SIZE 16 CRIMP SHIELDED CONTACTS



MALE



FEMALE

CONTACT DESIGNATION	PART NUMBER	A	Ø B	CABLE SIZE
MALE	MCS126N	0.993 [25.22]	0.045 [1.14]	RG 178 B/U RG 196 A/U
FEMALE	FCS126N2	0.967 [24.56]	0.045 [1.14]	RG 178 B/U RG 196 B/U
MALE	MCS226N	1.048 [26.62]	0.070 [1.78]	RG 179 B/U RG 316 /U
FEMALE	FCS226N2	1.022 [25.96]	0.070 [1.78]	RG 179 B/U 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 - 11rms.

9506-0-0-0 CRIMP TOOL

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			
VSWR				
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.

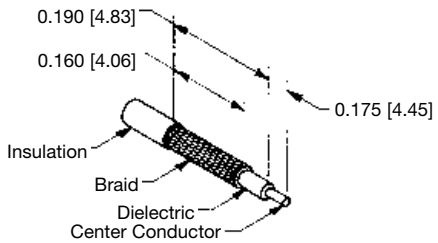
Initial Contact Resistance: 0.012 ohms maximum.

Insulator Resistance: 5 G ohms.

CLIMATIC CHARACTERISTICS:

Temperature Range: -55˚C to +125˚C

SHIELDED CABLE STRIP LENGTH



CONTACTS

DIMENSIONS ARE IN INCHES [MILLIMETERS].
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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

*1 All male and female crimp contacts can be ordered on reels in quantities of 2,000 by adding letter "R" after the contact part number.

Positronic Contact P/N	Contact Size	Handle & Positioner P/N	Hand Crimp Tool P/N	Mfg. Cross	Mil Equiv	Positioner	Mfg. Cross	Mil Equiv	Insertion Tool	Mfg. Cross	Mil Equiv	Removal Tool	Mfg. Cross	Mil Equiv	Automatic Crimp Tool *1 See Note
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	9550-0-0-0
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	9550-0-0-0
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	9550-0-0-0
FC422N6	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	---	9550-1-0-0
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	---	9550-1-0-0
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	---	9550-1-0-0
FC422N6CO		---	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	---	9550-1-0-0
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	---	9550-1-0-0
FC601D	12	9504-0-0-0	9504-1-0-0	HX4	M22520/5-01	9504-2-0-0	Y322	---	9099-3-0-0	ITP 1168	---	2711-0-0-0	P+	---	---
FC602D		9504-0-0-0	9504-1-0-0	HX4	M22520/5-01	9504-2-0-0	Y322	---	9099-3-0-0	ITP 1168	---	2711-0-0-0	P+	---	---
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	---	9550-1-0-0
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	---	9550-1-0-0
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	---	9550-1-0-0
FC720N2CO		---	9507-0-0-0	AFM8	M22520/2-01	9502-22-0-0	K1196	---	9099-4-0-0	ITP 1076	---	9081-2-0-0	RNG2103	---	9550-1-0-0
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	---	9550-1-0-0
FCS126N2	16	9506-0-0-0	9506-1-0-0	HX3	---	9506-2-0-0	X530	---	9099-0-0-0	ITH 1094	---	9081-4-0-0	RTG 2103	M81969/20-01	---
FCS226N2	20	9506-0-0-0	9506-1-0-0	HX3	---	9506-2-0-0	X530	---	9099-0-0-0	ITH 1094	---	9081-4-0-0	RTG 2103	M81969/20-01	---
MC114N	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	9550-0-0-0
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	9550-0-0-0
MC120N		---	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	9550-0-0-0
MC422N	22	---	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	---	9550-1-0-0
MC422NAL		---	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	---	9550-1-0-0
MC422NCH		---	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	---	9550-1-0-0
MC422NCO		---	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	---	9550-1-0-0
MC422NCU		---	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	---	9550-1-0-0
MC601D	12	9504-0-0-0	9504-1-0-0	HX4	M22520/5-01	9504-2-0-0	Y322	---	9099-3-0-0	ITP 1168	---	2711-0-0-0	P+	---	---
MC602D		9504-0-0-0	9504-1-0-0	HX4	M22520/5-01	9504-2-0-0	Y322	---	9099-3-0-0	ITP 1168	---	2711-0-0-0	P+	---	---
MC612N		---	9501-0-0-0	AF8	M22520/1-01	9502-19-0-0	TP1199	---	9099-3-0-0	ITP 1168	---	2711-0-0-0	P+	---	9550-0-0-0
MC720N3	20	---	9507-0-0-0	AFM8	M22520/2-01	9502-27-0-0	K1506	---	9099-4-0-0	ITP 1076	---	9081-2-0-0	RNG2103	---	9550-1-0-0
MC720N3AL		---	9507-0-0-0	AFM8	M22520/2-01	9502-21-0-0	K1195	---	9099-4-0-0	ITP 1076	---	9081-2-0-0	RNG2103	---	9550-1-0-0
MC720N3CH		---	9507-0-0-0	AFM8	M22520/2-01	9502-21-0-0	K1195	---	9099-4-0-0	ITP 1076	---	9081-2-0-0	RNG2103	---	9550-1-0-0
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	---	9550-1-0-0
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	---	9550-1-0-0
MCS126N	16	9506-0-0-0	9506-1-0-0	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	20	9506-0-0-0	9506-1-0-0	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 http://www.connectpositronic.com/pdf_view/178/

DIMENSIONS ARE IN INCHES [MILLIMETERS].
ALL DIMENSIONS ARE SUBJECT TO CHANGE.

SAVE TIME AND MONEY!

Let Positronic support you by cablizing your Front Runner connector selection.

Cable Assembly Design Support

We work closely with customers to:

1. Design assemblies in accordance with customer specifications.
2. Prepare cablized connector configuration and performance specifications.
3. Design each system in accordance with applicable customer, domestic, and international standards.
4. Define and conduct performance and verification testing.

Technical Sales Support

Engineering Support

Puerto Rico Cable Assembly

Quality Assurance

FOR MORE DETAILS CONTACT ***TECHNICAL SALES*** *OR VISIT OUR* ***WEB SITE*** *AT:*
HTTP://WWW.CONNECTPOSITRONIC.COM/PRODUCTS/47/CABLEASSEMBLIES

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**.

KING COBRA SERIES CONNECTORS

Offer the performance of high reliability machined contacts at a price you might expect from lower performance products.

- Lightweight, non-corrodible, composite material
- Right angle and straight PCB mount terminations
- Size 16, 20 and 22 machined contact options
- Power contact current ratings to 20 amperes each
- Environmental options to IP65
- Secured using unique one quarter turn locking system

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

DIMENSIONS ARE IN INCHES [MILLIMETERS].
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Connector Excellence®

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 "cablizing" 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 cablized 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 feed-through in high vacuum applications
- Leakage rate: 5 x 10-9 mbar.l/s @ vacuum 1.5 x 10-5 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** or call your nearest Positronic sales office listed on the back of this catalog.

LOCATIONS

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Sales Offices
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