




RoHS  
Ready 

# AMP Circular Connectors for Commercial Signal & Power Applications

 **Tyco Electronics**  
Our commitment. Your advantage.

## Introduction

### Product Facts

- Lightweight, all-plastic and metal-shell connectors
- CPC connectors are UL 94V-0 rated and made of stabilized, heat resistant, self-extinguishing thermoplastic material
- Metal-shell CPC connector housings made of UL 94V-0 rated thermoplastic
- Operating temperature range: -40°C to +105°C
- Available in panel or chassis mount and free-hanging configurations
- Quick connect/disconnect capability with thread assist, positive detent coupling
- Built-in pin and socket protection
- Polarized for proper mating of connector halves
- Special connector configurations offer special solder and posted contacts, special receptacles with or without threaded inserts
- Full complement of optional accessories
- Recognized under the Component Program of Underwriters Laboratories Inc.  for 250 VAC, rms or 250 VDC, Service‡; Series 1 and Series 3 (600 V); Series 4 (600 V) and Series 2, Series 6 (250 V) File No. E28476

‡Select connectors are recognized for 600 volts service.

### Restriction on the use of Hazardous Substances (RoHS)

At Tyco Electronics, we're ready to support your RoHS requirements. We've assessed more than 1.5 million end items/components for RoHS compliance, and issued new part numbers where any change was required to eliminate the restricted materials.

Part numbers in this catalog are RoHS Compliant, unless marked otherwise. These products comply with European Union Directive 2002/95/EC as amended 1 January 2006 that restricts the use of lead, mercury, cadmium, hexavalent chromium, PBB, and PBDE in

- Certified by Canadian Standards Association, File No. LR 7189 
- Produced under a Quality Management System certified to ISO 9001  A copy of the certificate is available upon request.
- Certain products meet VDE Standard 062 

### Six connector series for different interconnection requirements:



- Series 1—Standard density, signal and low-current applications using durable Multimatch contacts (.062 [1.57] pin diameter)
- Series 2—High density applications using Size 20 DM and 20 DF contacts (.040 [1.02] pin diameter)
- Series 3—Low density, power applications with Type XII contacts capable of carrying up to 35 amperes of current
- Series 4—Combination of standard and power density application with Type III+ and Type XII contacts
- Series 5—Power density application with Size 8 screw machined and precision formed contacts
- Series 6—Combination of standard and power density application with Type III+ and Size 8 contacts

certain electrical and electronic products sold into the EU as of 1 July 2006.

Note - For purposes of this Catalog, included within the definition of RoHS Compliant are products that are clearly "Out of Scope" of the RoHS Directive such as hand tools and other non-electrical accessories. Information regarding RoHS compliance is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information provided by our suppliers. This information is subject to change. For latest compliance status, refer to our website referenced at right.

### MIL-C-5015 Style Circular Plastic Connectors (CPC)

#### Product Facts

- Intermateable with Metal-Shell sizes 20-14 and 18-10, MIL-C-5015 Style connectors
- High impact resistant plastic housing made of UL 94V-0 rated material
- Lightweight
- Lower cost than standard MIL-C-5015 connectors
- Industry accepted Type III+ pin and socket contacts, available on reels in strip form for high volume, low cost, automatic machine terminations, or in loose piece form for low volume, prototype or maintenance and repair
- Improved alignment (U.S. Standard MIL-C-5015 Connectors) prevents mismatching with other housing insert arrangements
- Recognized under the Component Program of Underwriters Laboratories Inc.,  File No. E28476
- Certified by Canadian Standards Association, File No. LR 7189 

### Miniature CPC Connectors

#### Product Facts

- Compact, high contact density, environmentally sealed connectors
- Uses existing Mini-Universal MATE-N-LOK stamped and formed pin and socket contacts
- Two shell sizes—available in 1 to 4 and 5 to 9 position configurations

#### Need more information?

Call Technical Support.

They are staffed with specialists well versed in Tyco Electronics products. They can provide:

- Technical Support
- Catalogs
- Technical Documents
- Product Samples
- Authorized Tyco Electronics Distributor Locations

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### Getting the Information You Need

Our comprehensive on-line RoHS Customer Support Center provides a forum to answer your questions and support your RoHS needs. A RoHS FAQ (Frequently Asked Questions) is available with links to more detailed information. You can also submit RoHS questions and receive a response within 24 hours during a normal work week. The Support Center also provides:

- Cross-Reference from Non-compliant to Compliant Products
- Ability to browse RoHS Compliant Products in our on-line catalog

- Downloadable Technical Data
- Customer Information Presentation
- More detailed information regarding the definitions used above

So whatever your questions when it comes to RoHS, we've got the answers at

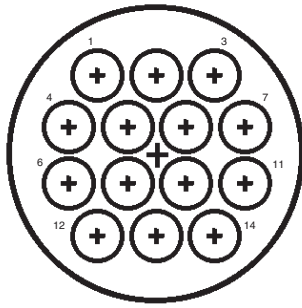
[www.tycoelectronics.com/leadfree](http://www.tycoelectronics.com/leadfree)

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## Connector Series and Types

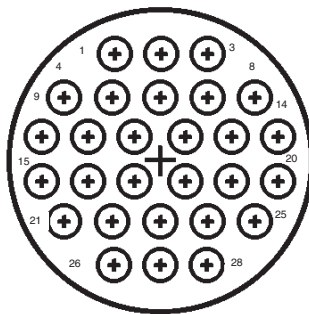


### Series 1—Size 16 Contacts

Series 1 connectors permit the use of multiple combinations of signal and coaxial circuits in the same housing by accepting durable Multimate contacts. These pin and socket contacts include Type III+ and

subminiature coaxial contacts, interchangeable in the same Multimate contact cavity. Type III+ contacts (.062 [1.57] pin diameter) are capable of carrying a maximum of 13 amperes when crimped in wire.

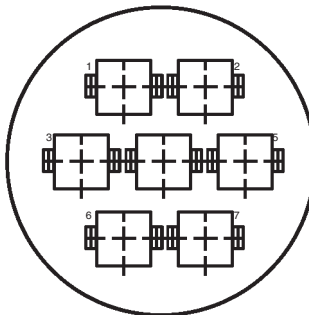
Type III solder contacts and posted contacts for pc board applications are also available. Many connector arrangements offer both standard and reverse sex contact loading—**from 4 thru 37 positions.**



### Series 2—Size 20 Contacts

Series 2 connectors accept Size 20 DF (precision formed) and Size 20 DM (screw-machined) pin and socket contacts with a .040 [1.02] pin diameter. Size 20 DF contacts are available in crimp and solder versions, as well as a posted version

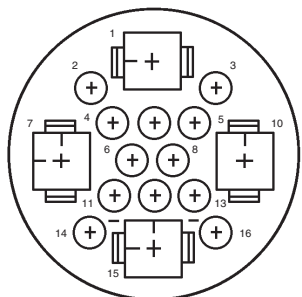
for wrap-type and pc board applications. Maximum current carrying capability is 7.5 amperes. Many connector arrangements offer both standard and reverse sex contact loading—**from 8 thru 63 positions.**



### Series 3—Power Contacts

Series 3 connectors accept Type XII power contacts which can carry up to 25 amps per contact. These contacts will accommodate a wire size range of 16 to

10 AWG [1.4 to 5 mm<sup>2</sup>]. Two connector sizes are available in both standard and reverse sex connector arrangements **3 and 7 positions.**

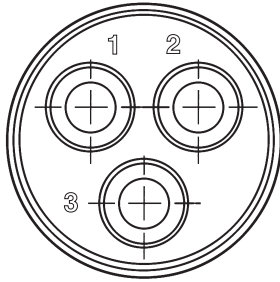


### Series 4—Combination Size 16 and Power Contacts

Series 4 connectors accept Size 16 Multimate and Type XII power contacts, combining the signal and coaxial circuit capabilities of Series 1 connectors with the

power circuit capabilities of Series 3 connectors. Available in two connector sizes offering power mixing combinations totaling **16 and 22 positions.**

**Connector Series and Types** (Continued)



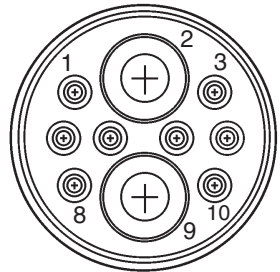
**Series 5—Power Contacts**  
**.125 POWERBAND**

Series 5 connectors combine the revolutionary performance of the new AMP POWERBAND Contact, high current contact in configurations similar to the Series 3 connectors. AMP POWERBAND contacts offer the electrical

performance of the best Mil Spec Size 8 screw-machined contacts with the economy and productivity of strip-fed, precision formed contacts.

Series 5 connectors are environmentally sealable to meet IEC IP 65 and IP 67 specifications.

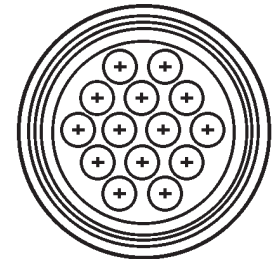
Rated at 600 VAC or VDC, 45 amperes maximum in a single contact, the connectors are available in free-hanging and panel-mount applications—**one connector configuration containing three .125 POWERBAND contacts.**



**Series 6—Combination, Size 16 and .125 POWERBAND Contacts**

Series 6 combines the high current and environmental sealing capability of Series 5, POWERBAND contacts, and the reliability of signal carrying, low current Type III+ contacts.

This combination of power and signal contacts is offered in **one connector configuration containing two .125 POWERBAND contacts and eight Type III+ signal pin and socket contacts.**

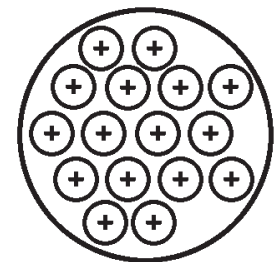


**MIL-C-5015 Style—Size 16 Contacts**

This new addition to the AMP Circular Plastic Connector Line is specifically designed to be **intermateable with Metal-Shell size 20-14 and 18-10, MIL-C-5015 Style connector systems.** The high impact resistant plastic housing offers the advantages of light weight

and lower cost than existing metal-shell connectors. In addition the connector design prevents mismatching when used with other insert arrangements. As part of the AMP Multimate family of connectors, the MIL-C-5015 style connector offers the

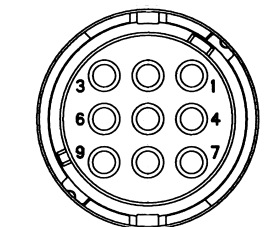
economies of crimp Type III+ pin and socket contacts in reel-mounted, strip-form for high volume automatic machine termination, as well as in loose piece-form for low volume, prototype or maintenance and repair.



**Metal-Shell, Circular Plastic Connectors**

Metal-Shell CPC connectors consist of a black thermoplastic insert in a nickel-plated, zinc alloy shell. These connectors are currently available in

**shell sizes 14, 22 and 28, and in two basic configurations consisting of plugs and square flange receptacles.**



**Miniature CPC Connectors**

These compact connectors accept existing Mini-Universal MATE-N-LOK pin and socket contacts, 30-18 AWG [.05-.8 mm<sup>2</sup>].

Two shell sizes (8 or 11) are available, accommodating **from 1 to 4 and 5 to 9 positions.**

Featuring high contact density and IP67 sealing, these durable connectors are well suited for many wire-to-wire, wire-to-board, and wire-to-panel applications.

## Performance Characteristics — CPC and Metal-Shell CPC Connectors

More information on the performance of AMP CPC and metal-shell CPC connectors is available by requesting the following AMP Product Specifications:

- 108-10024**—  
CPC Connectors
- 108-10037**—  
Type XII Contacts
- 108-10020**—  
Size 20 DM and 20 DF  
Contacts
- 108-10040**—  
Metal-Shell CPC  
Connectors
- 108-10042**—  
Type III+ Contacts
- 108-1579**—  
Sealed CPC Connectors  
with Removeable Contacts

Test Description	Procedure	Requirements
Maintenance Aging	Contacts removed and reinserted 10 times using applicable tools	No damage to contacts or housings. Contact retention maintained
Contact Retention	Axial load applied to contact to displace to the rear of the connector	Contacts remain in place when subjected to a minimum 10 lb. load*
Dielectric Withstanding Voltage (MIL-STD-1344, Method 3001)	Connectors subjected to 1500 volts rms at sea level	No breakdown or flashover
Thermal Shock	Connectors subjected to five cycles of temperature change (-55°C and +125°C)	No damage
Vibration (MIL-STD-202, Method 204, Test Condition B)	Connectors vibrated (wired and mated). Contacts wired in series with 100 milliamperes flowing during the test	No damage or loosening of parts. No interruption of electrical continuity longer than 10 microseconds
Physical Shock (MIL-STD-202, Method 213A, Test Condition A)	Connectors shocked 50 G (wired and mated). Contacts wired in series with 100 milliamperes flowing during the test	No damage or loosening of parts. No interruption of electrical continuity longer than 10 microseconds
Durability	Connectors mated and unmated 25 times with tin plated contacts and 500 times with gold plated contacts	No wear through damage to plating
Corrosion (Salt Spray) (MIL-STD-202, Method 101, Test Condition B)	Mated connectors subjected to 5% salt spray for 48 hours	No damage
Protection Against Solids	a. Test wire is pushed into mated connectors b. Mated connectors subjected to circulating talcum powder	a. Must not touch live parts b. No dust deposits observed on mating surfaces
Protection Against Water	Water is projected through jets against mated connector from any direction and then temporarily immersed in water	No water deposits shall be observed on mating surfaces of contacts or housings
Temperature Life	Mated connectors subjected to a temperature of +125°C for 200 hours	No damage
Insulation Resistance (MIL-STD-1344, Method 3003)	Measurement made between adjacent contacts with connector mated	5000 megohms minimum ambient temperature
Humidity (MIL-STD-202, Method 103, Test Condition B)	Mated connectors subjected to 10 days moisture test	Minimum insulation resistance of 100 megohms

\*For size 16 contacts. Size 8 contacts 25 lb. load, min.

## Levels of Protection for Electric Operating Material According to IEC 60529 and IEC 60947, Appendix C

**Environmentally Protected Circular Plastic Connectors, for Mated CPC Connectors Utilizing Peripheral Seals and either Wire Entry Seals (for Discrete Wire Applications) or Heat Shrink Boots (for Jacketed Cable Applications). Available are Various Sizes, Series 1, 5 and 6.**

**Internal Protection (IP)  
Definition:**

- **Per IEC 60947, Appendix C**—Pertains to low voltage switchgear and control gear.
- **Per IEC 60529**—Pertains to degrees of protection provided by enclosures (IP code).

**Sample Designation:**

(Where x is a numeral value), i.e. IP 65

### IP Codes

**IP**  
Index Letter

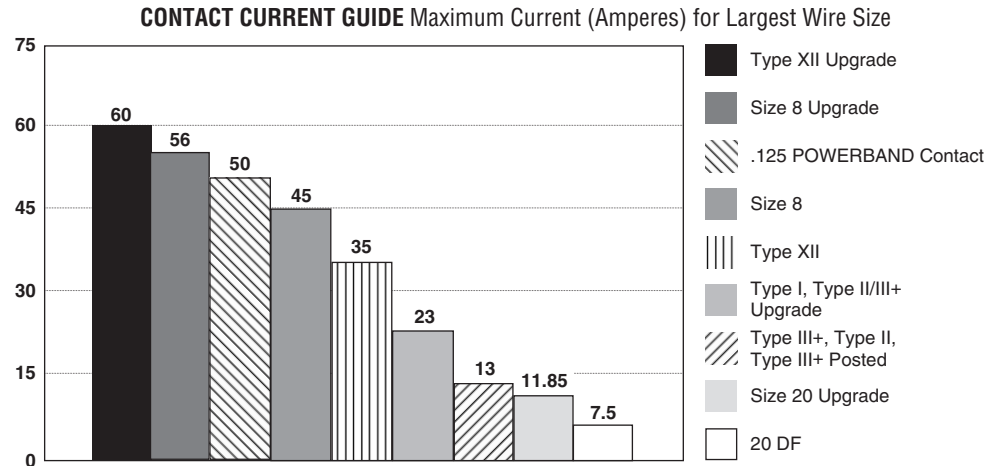
**X<sub>1</sub>**  
Degree of Protection  
against ingress of solid  
foreign objects

**X<sub>2</sub>**  
Degree of Protection  
against ingress of water

Degree of Protection, X <sub>1</sub>	Protection against ingress of solid foreign objects	Degree of Protection, X <sub>2</sub>	Protection against ingress of water
	No Protection	0	No Protection
1	Protection against objects >50mm diameter—including inadvertently touched by hands	1	Vertical Dripping—Protection against vertical drops of water
2	Protection against objects >12.5mm—including fingers	2	Dripping <15°—Protection against dripping water when the enclosure is tilted 15° from vertical
3	Protection against objects >2.5mm diameter including tools	3	Spraying at an angle up to 60° from vertical
4	Protection against objects >1.0mm diameter—including grains	4	Splashing—Protection against water splashed from any direction
5	Protection against ingress of solid foreign bodies	5	Jetting—Protection against water stream out of a nozzle, from any direction
6	Protection against ingress of dust	6	Powerful Jetting—Protection against temporary flooding due to powerful jet streams out of a nozzle from any direction
		7	Temporary immersion—Protection against temporary immersion

## Current Carrying Capabilities

The total current capacity of each contact in a given connector is dependent upon the heat rise resulting from the combination of electrical loads of the contacts in the connector arrangement and the maximum ambient temperature in which the connector will be operating. Caution must be taken so that this combination of conditions does not cause the internal temperature of the connector to exceed the maximum operating temperature of the housing material. Several variables which must be considered when determining this maximum current capability for your application are:



■ **Wire Size**—Larger wire will carry more current since it has less internal resistance to current flow and generates less heat. The wire also conducts heat away from the connector.

■ **Connector Size**—In general, with more circuits in a connector, less current per contact can be carried.

■ **Current Load Distribution**—Spreading those lines with greater current loads throughout the connector, particularly around the outer perimeter, will enhance heat dissipation.

■ **Ambient Temperature**—With higher ambient temperatures, less current can be carried.

### Current Rating Verification Can a contact rated at 10 amps carry 10 amps?

Maybe yes, but probably not. The reason lies in the test conditions used to rate the contact. If these conditions do not adequately reflect the application conditions, the actual allowable current levels may be lower than specified levels. For example, many manufacturers, including Tyco Electronics, test a single contact in air. This gives an accurate measure of the basic current-carrying capacity of the contact. Use the contact alone in air and it can certainly carry 10 amperes. Use it in a multi-position connector surrounded by other current-carrying contacts or in high ambient temperatures, and the contact should carry less current.

Similarly, as the contact ages and stress relaxation, environmental cycling, and other degradation factors take their toll, the contact's current-carrying capacity decreases. A prudent design must set current levels for such end-of-

design-life (EODL) conditions. Practical current-carrying capacity is not an absolute, but an application-dependent condition.

#### New Method Simplifies Ratings

To help the designer set the appropriate current level, Tyco Electronics has developed a method of specifying current-carrying capacity. This method takes into account the various application factors that influence current rating.

#### The method can be summarized as follows:

- The contact is aged to EODL conditions by durability cycling, thermal cycling, and environmental exposure.
- The contact's resistance stability is verified.
- The current necessary to produce the specified temperature rise is measured. This T-rise is usually 30°C.
- A rating factor is determined to allow derating of multiple contacts in the same housing and for different conductor sizes.

### Temperature

One other factor influencing current levels is the maximum operating temperature, for example, 105°C. If the application has a high ambient temperature (over 75°C) the contact's T-rise is limited by the maximum operating temperature. For example, an application temperature of 90°C limits the contact T-rise to 15°C. Since current produces heat (the I<sup>2</sup>R law), the current must be lowered to limit the T-rise.

A contact's T-rise depends not only on its I<sup>2</sup>R Joule heating, but also on its ability to dissipate the heat. Consider a contact in a multi-contact housing. Joule heating in multiple contacts will raise the local ambient temperature. Since the contact will not be able to dissipate its own heat as well by convection, the maximum T-rise will be realized at a lower current level. Consequently, the allowable current level must be lower to maintain an acceptable T-rise.

For a given connector, the current level will be set by the

loading density. A connector containing 50% current-carrying contacts will permit higher currents (per contact) than a connector will at 75% loading. The loading percentage assumes an even distribution of contacts within the housing. If all 10 contacts are grouped together in one section of a 20-position connector, the loading density may approach 100%.

#### The Importance of EODL

As stated, T-rise in a contact depends on both resistance and current. As it ages, a contact's resistance will increase. The contact designer will specify a maximum resistance for the contact, this level is the end-of-design-life resistance. Before the contact is tested for current, Tyco Electronics subjects it to a sequence of tests that exercises the major failure mechanisms and thereby simulates EODL conditions. Conditioning includes mating cycling, industrial mixed-flowing gases, humidity and temperature cycling, and vibration to sequentially introduce wear, corrosion, stress relaxation, and mechanical disturbance.



**Presentation — An Example\***

**Current Rating**

The presentation of current-carrying capacity in AMP product specifications includes two parts:

- First, a base curve showing current levels versus T-rise for a single circuit and the largest wire size (See figure 1). This represents the maximum current capacity of the contact. The curve is usually flat up to 75°C ambient and then drops off. Up to 75°C, the 30°C T-rise limits the amount of current, and above 75°C the current must be reduced to keep the combination of ambient temperature and T-rise from exceeding the maximum operating temperature of 105°C.
- Next are rating factors, a table of multipliers to account for connector loading and for smaller wire sizes (See figure 2). The designer first determines the base current for the ambient conditions of the application; then multiplies this base current by the rating factors to find the current level for the application's loading factor and wire size.

**Practical Values**

The current-rating method gives designers practical values applicable to their applications. While the specified current levels for a contact may be lower than for other testing methods, they are more practical and simplify the system design process.

"Spec-manship" is replaced by a realistic assessment of the current-carrying capacity of a contact under varying conditions of temperature, connector loading, and wire size.

Specific current-carrying data based on EOL and % loading is available from Tyco Electronics. Please contact your local Tyco Electronics Sales Engineer or call Tyco Electronics.

**Connector/Contact Acceptability**

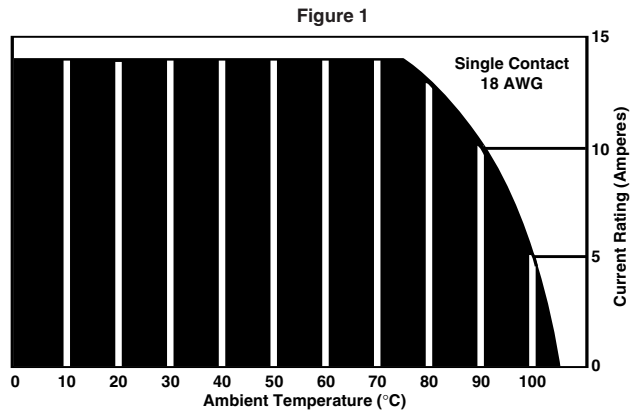
As previously stated, choosing the correct connector/contact combination is fundamental to the successful function of all connectors. The Selector Chart shown at right, is designed to simplify your choice

of connectors and their acceptable contacts. Once you have selected the wire size, current-carrying capacity need, number of positions required, and the type of contacts needed in your choice of connector, refer to this matrix for a quick look at exactly what is acceptable in a given connector type.

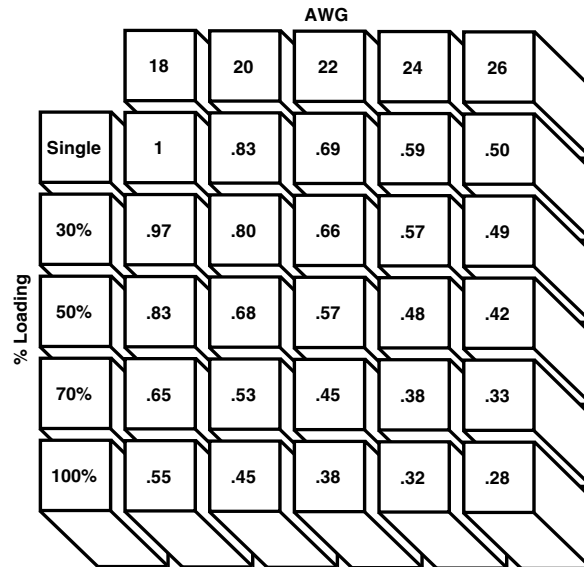
**\*Note:** Data is *not* typical of a specific CPC connector configuration. For specific current rating information based on % connector loading, contact Tyco Electronics.

To demonstrate the method of specifying current, consider the following application conditions; an ambient temperature of 65°C, a 50% loading of contacts in the housing, and 20 AWG [0.6mm<sup>2</sup>] wire.

- From Figure 1, the base current rating is 14 ampere with 18 AWG [0.8mm<sup>2</sup>] wire.
- Figure 2, the rating factor for 50% loading and 20 AWG [0.6mm<sup>2</sup>] wire is 0.68.
- The specific rating for this application is the product of the base rating and the rating factor:  
 $14 \times 0.68 = 9.5$  ampere
- Each of the contacts can carry 9.5 ampere.
- However, if the ambient temperature is 80°C the allowable T-rise becomes 25°C. The base current must be lowered to 12.8 ampere so that the 105°C maximum operating temperature is not exceeded. The current rating then becomes:  
 $12.8 \times 0.68 = 8.7$  ampere.



Graph shows the relationship between base current, ambient temperature, and contact T-rise.



Rating factors allow the base current to be adjusted for various connector loading and wire sizes.

**Contact Selector Chart**

Connector Type	20 DF	Type I	Type II	Type III+	Posted Type III+	Type XII	Sub-Mini Coax	POWERBAND Contacts
CPC Series 1			✓	✓	✓		✓	
CPC Series 2	✓							
CPC Series 3						✓		
CPC Series 4			✓	✓		✓	✓	
CPC Series 5								✓
CPC Series 6		✓	✓	✓				✓
CPC 5015				✓				
CMC Series 1			✓	✓	✓		✓	
CMC Series 2	✓							
CMC Series 3						✓		
CMC Series 4			✓	✓		✓	✓	

**Note:** All part numbers are RoHS Compliant.

CPC Series 1

**CPC Connectors, Series 1 for Cable or Panel Mount**  
(Accepts Type III+, High-Current Power, Type II and Subminiature Coax Contacts)



Listed part numbers are for connectors only; **contacts must be ordered separately.**

**Material**

**Housing**—Thermoplastic, 94V-0 rated, black

**Related Product Data**

- Contacts**—Pages 17-23
- Contact Arrangement**—Page 24
- Component Dimensions**—Page 25\*
- Accessories**—Pages 38-42, 52-54
- Performance Characteristics**—Page 6
- Application Tooling**—Pages 76-79
- Technical Documents**—Page 80

**Replacement Coupling Rings**

Shell Size	Part No.
11	213811-1
13	213813-1
17	213810-1
23	213812-1

**Keying**

Molded-in keying in two configurations:

**A**—Standard Configuration: 5 Keys

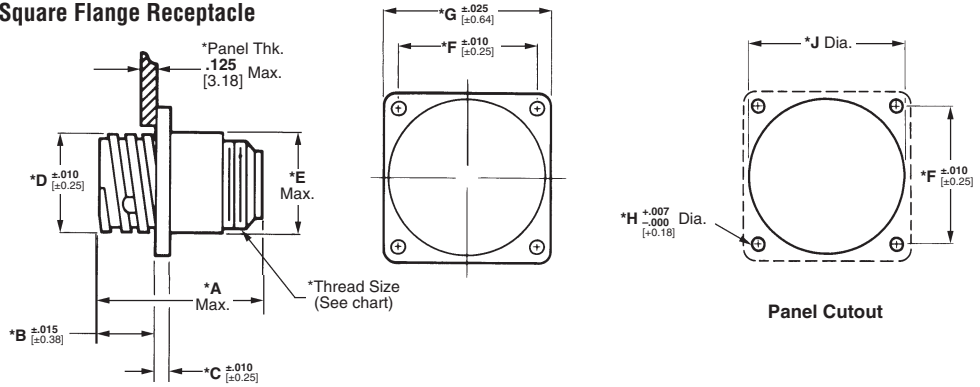


**B**—Optional Configuration: 4 Keys to prevent mismatching of standard and reverse sex.

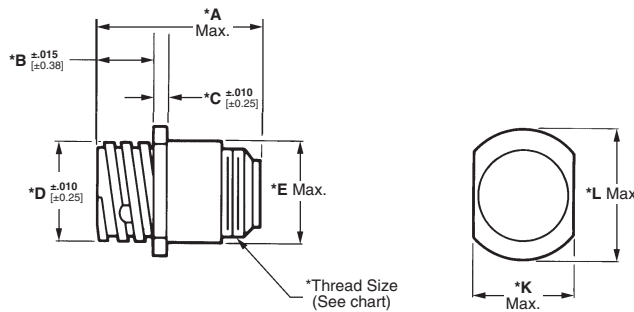


**Circular Plastic Connectors, Size 1**

**Square Flange Receptacle**

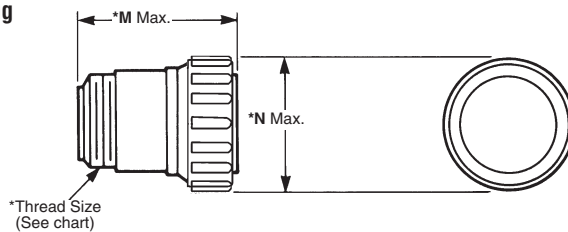


**Free-Hanging Receptacle**



**\*Note:** See page 25 for callout dimensions

**Plug**



**Standard Sex Connectors** (Receptacles accept pin contacts, Plugs accept socket contacts)

Arrangement	Keying	Square Flange Receptacle		Free-Hanging Receptacle	Plug
		With Threaded Inserts <sup>1</sup>	With Mounting Holes		
11-4	A	208130-1	206061-1	206153-1	206060-1
13-9	A	208131-1	206705-1	206705-2	206708-1
17-16	A	206036-8	206036-1	206036-3	206037-1
	B	—	213862-1	—	213849-1
23-24	A	211839-1	206838-1	206838-2	206837-1
	B	—	213866-1	—	213851-1
23-37	A	787610-1	206151-1	206151-2	206150-1
	B	—	213860-1	—	213848-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

**Reverse Sex Connectors** (Receptacles accept socket contacts, Plugs accept pin contacts)

Arrangement	Keying	Square Flange Receptacle		Free-Hanging Receptacle	Plug
		With Threaded Inserts <sup>1</sup>	With Mounting Holes		
11-4	A	211102-1	206430-1	206430-2	206429-1
17-14	A	211103-1	206043-1	206043-3	206044-1
	B	—	796437-2	—	796449-1
23-37	A	206306-5	206306-1	206306-2	206305-1
	B	—	213864-1	—	213850-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

Key Style "A" is the Standard 5 Locating Key arrangement. Key Style "B" is the 4 Locating Key arrangement.

**Note:** All part numbers  
are RoHS Compliant.

## Circular Plastic Connectors, Series 1, VDE Tested

**CPC Connectors, Series 1,  
for Cable or Panel Mount**  
(Accepts Type III+, High-  
Current Power, Type II and  
Subminiature Coax  
Contacts)



- Designed to meet requirements of VDE as shown in DIN Specification 57627
- Recognized under the Component Program of Underwriters Laboratories Inc. for 600 VAC and 600 VDC service, File No. E28476
- Certified by Canadian Standards Association, File No. LR 7189

Listed part numbers are for connectors only; **contacts must be ordered separately.**

### Material

**Housing**—Thermoplastic, 94V-0 rated, black

### Related Product Data

**Contacts**—Pages 17-23

**Contact Arrangement**—Page 24

**Component Dimensions**—Page 25\*

**Accessories**—Pages 38-42, 52-54

**Performance Characteristics**—Page 6

**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

### Replacement Coupling Rings

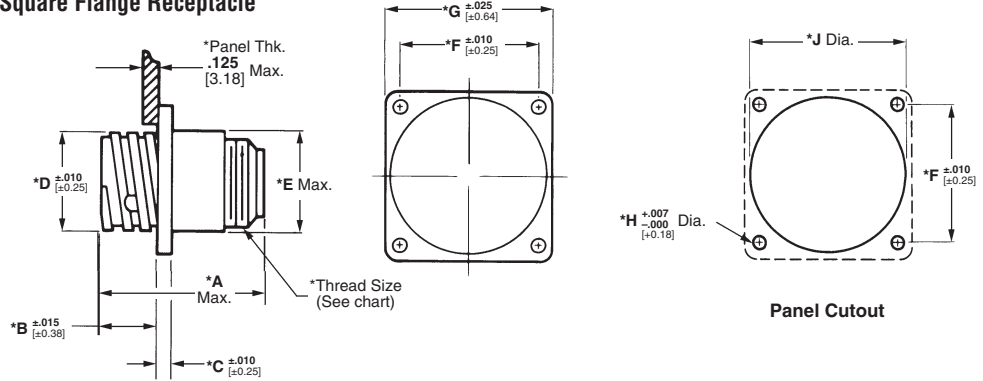
Shell Size	Part No.
13	213813-1
17	213810-1
23	213812-1

### Keying

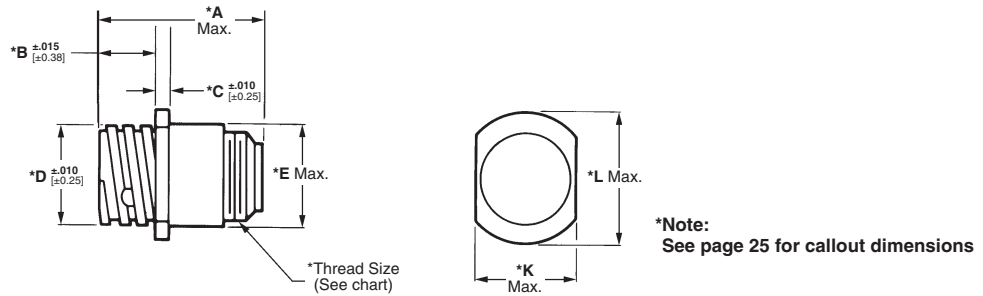
**A**—Standard Configuration: 5 Keys

**B**—Optional Configuration: 4 Keys

### Square Flange Receptacle

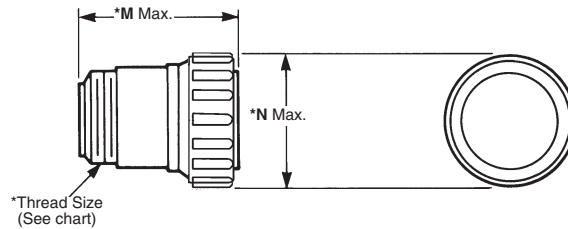


### Free-Hanging Receptacle



**\*Note:**  
See page 25 for callout dimensions

### Plug



### Standard Sex Connectors (Receptacles accept pin contacts, Plugs accept socket contacts)

Arrangement	Shell Size	No. of Positions	Keying	Square Flange Receptacle		Plug
				With Threaded Inserts <sup>1</sup>	With Mounting Holes	
13-7			A	211401-4	211401-1	211399-1
			A	211767-2	211767-1	211766-1
17-9			A	211771-2	211771-1	211770-2
			B	—	213870-1	213853-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

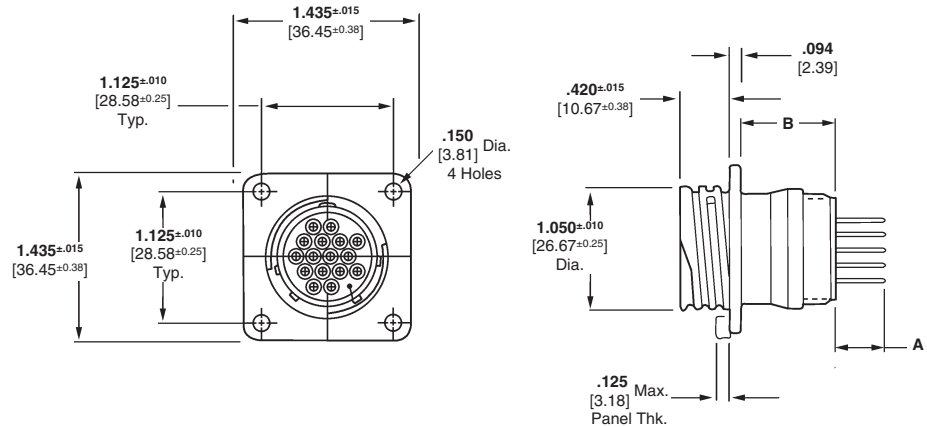
### Reverse Sex Connectors (Receptacles accept socket contacts, Plugs accept pin contacts)

Arrangement	Shell Size	No. of Positions	Keying	Square Flange Receptacle		Free-Hanging Receptacle	Plug
				With Threaded Inserts <sup>1</sup>	With Mounting Holes		
13-7			A	211398-4	211398-1	211398-2	211400-1
			A	—	211769-1	211769-3	211768-1
17-9			B	—	796439-2	—	796450-1
			A	—	211773-1	—	211772-1
23-19			B	—	213868-1	—	213852-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

Key Style "A" is the Standard 5 Locating Key arrangement. Key Style "B" is the 4 Locating Key arrangement.

**Square Flange Receptacles, Printed Circuit Board Mount**  
with .025 [0.64] sq. solder tails



**Material and Finish**

**Housing**—Thermoplastic, 94V-0 rated, black

**Contacts**—

**A**—Duplex plated gold flash on entire contact with .000030 [0.00076] min. gold on contact engagement area, tin on the termination area

**C**—Plated tin on the entire contact, tin on the termination area

**Related Product Data**

**Contact Arrangement**—Page 24

**Performance Characteristics**—Page 6

**Technical Documents**—Page 80

**Keying**

Molded-in keying in two configurations:

**A**—Standard Configuration: 5 Keys

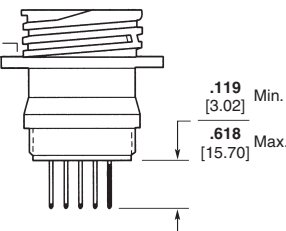


**B**—Optional Configuration: 4 Keys to prevent mismatching of standard and reverse sex.



**Other Available Posted Contacts**

Tyco Electronics can make available contacts with various solder tail lengths for loading into the standard or reverse sex, square flange receptacles for applications requiring custom solder tail lengths.



**Standard Sex (Posted Pin Contacts)**

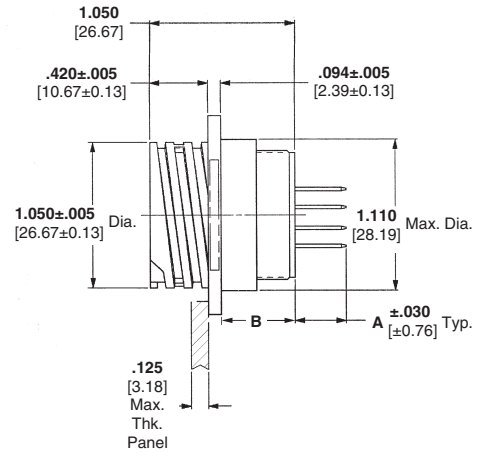
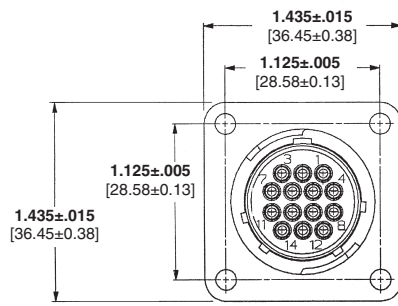
Arrangement No.	Receptacle Assemblies		Keying Style	Dimensions		Contact Finish Code	Peripheral Seal
	Mounting Holes	4-40 Threaded Inserts		A	B		
11-4	—	207825-9	A	.119 3.02	.816 20.73	A	N
13-7	—	1-796433-1	A	.220 5.59	.816 20.73	A	N
13-9	208223-9	—	A	.220 5.59	.816 20.73	A	N
	—	1-208223-0	A	.220 5.59	.816 20.73	A	N
17-16	—	1-207303-4	A	.220 5.59	.816 20.73	A C	N
	1-207303-3	—	A	.220 5.59	.816 20.73	A	N
	213855-4	213855-3	B	.220 5.59	.816 20.73	A	N
23-19	213782-4	—	A	.429 10.90	.679 17.24	A	N
	213859-2	—	B	.618 15.70	.674 17.12	A	N
23-24	—	213588-2	A	.220 5.59	.654 16.61	C	N
	213798-3	—	A	.618 15.70	.679 17.24	A	N
	213780-2	—	A	.220 5.59	.654 16.61	A	N
	213857-2	—	B	.429 10.90	.679 17.24	A	N
23-37	1-206934-1	—	A	.220 5.59	.654 16.61	A	N
	206934-5	—	—	.119 3.02	.654 16.61	A	N Y
	—	1-206934-7	A	.119 3.02	.654 16.61	A	Y
	208132-2	—	A	.429 10.90	.654 16.61	C	N
	1-206934-8	—	A	.429 10.90	.654 16.61	A	N
213854-3	—	B	.618 15.70	.654 16.61	A	N	
1-206934-9	—	A	.618 15.70	.654 16.61	A	N	

**Note:** Posts are .017 [0.43] offset from centerline of contacts. All posts must be oriented in the same plane for proper contact/post location.

**Note:** All part numbers are RoHS Compliant.

**Circular Plastic Connectors, Series 1 (Continued)**

**Square Flange Receptacles, Printed Circuit Board Mount**  
with .025 [0.64] sq. solder tails



**Material and Finish**

**Housing**—Thermoplastic, 94V-0 rated, black

**Contacts**—

**A**—Duplex plated gold flash on entire contact with .000030 [0.00076] min. gold on contact engagement area, tin on the termination area

**C**—Plated tin on the entire contact, tin on the termination area

**Related Product Data**

**Contact Arrangement**—Page 24

**Performance Characteristics**—Page 6

**Technical Documents**—Page 80

**Keying**—Page 12

**Special CPC Connectors, Square Flange Receptacles, Printed Circuit Board Mount With Round Posted Contacts (Size 16), Contact Arrangement 17-16**



**Material and Finish**

**Housing**—Thermoplastic, 94V-0 rated, heat-stabilized, fire-resistant, self-extinguishing, black

**Contacts**—Brass

**Plating**—

**Connector Part No. 207292-1**—Plated tin over .000050 [0.00127] min. nickel on entire contact

**Connector Part No. 207292-2**—Plated .000030 [0.00076] min. gold over .000050 [0.00127] min. nickel on entire contact

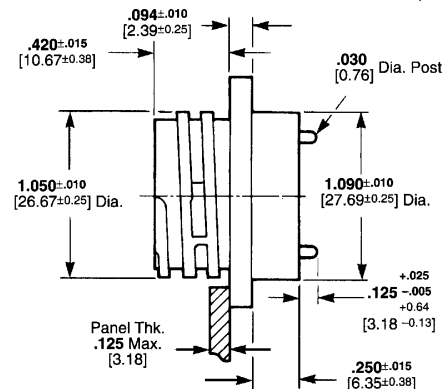
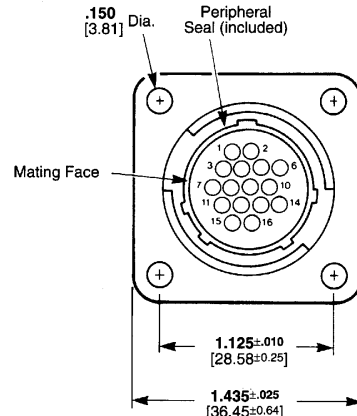
**Notes:** 1. Connector can be used for pressure bulkhead feed-thru (sealed) applications.

2. Receptacle is **Standard Sex**, supplied preloaded with 16 special round posted pin contacts, .030 [0.76] diameter.

**Reverse Sex (Posted Socket Contacts)**

Arrangement No.	Receptacle Assemblies		Keying Style	Dimensions		Contact Finish Code	Peripheral Seal
	Mounting Holes	4-40 Threaded Inserts		A	B		
11-4	208283-4	—	A	.159 4.04	.536 13.61	A	N
	1-788130-1	—	A	.704 17.88	.541 13.74	C	N
17-9	1-213826-1	—	A	.220 5.59	.536 13.61	C	Y
	213729-9	213729-6	A	.368 9.35	.536 13.61	A	N
17-14	1-213825-7	—	A	.220 5.59	.536 13.61	C	Y
	—	213729-8	A	.159 4.04	.536 13.61	C	N
	213858-3	—	B	.645 16.38	.394 10.00	A	N
23-19	213781-9	—	A	.557 14.15	.374 9.50	C	N
	213827-8	—	A	.368 9.35	.374 9.50	C	Y
	2-208224-1	—	A	.557 14.15	.374 9.50	A	N
23-37	213856-4	—	B	.159 4.04	.374 9.50	A	N
	1-208224-2	—	A	.368 9.35	.374 9.50	C	N
	1-213828-6	—	A	.368 9.35	.374 9.50	C	Y
	207890-2	—	A	.159 4.04	.374 9.50	A	N

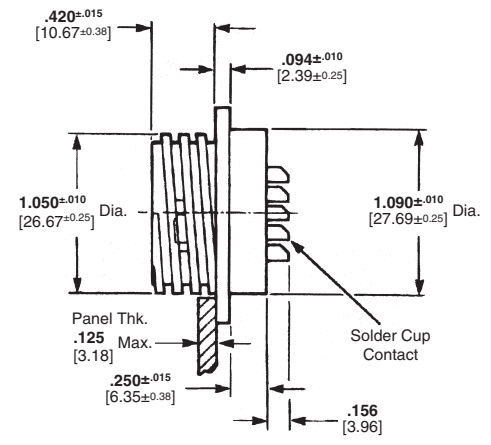
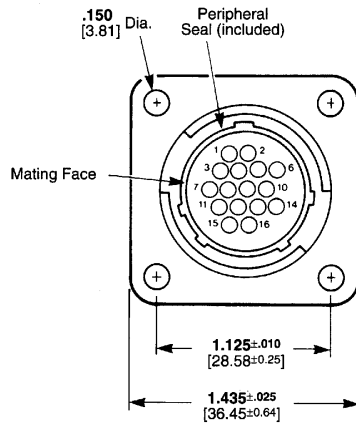
**Note:** Posts are .017 [0.43] offset from centerline of contacts. All posts must be oriented in the same plane for proper contact/post location.



**Note:** All part numbers are RoHS Compliant.

CPC Series 1

**Special CPC Connectors, Square Flange Receptacles, With Solder Type Contacts (Size 16), Contact Arrangement 17-16**



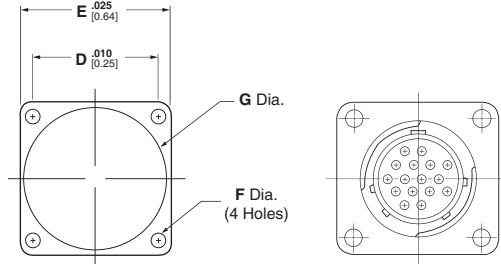
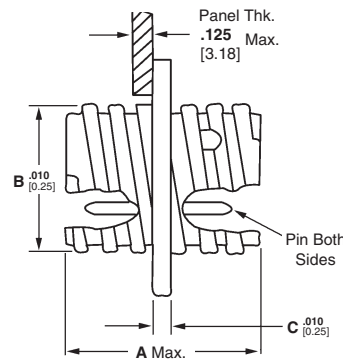
**Material and Finish**  
**Housing**—Thermoplastic, 94V-0 rated, heat-stabilized, fire-resistant, self-extinguishing, black  
**Contacts**—Brass  
**Plating**—  
**Connector Part No. 206404-1**—Plated .000030 [0.00076] min. gold over .000030 [0.00076] min. nickel on entire contact  
**Connector Part No. 206404-2**—Plated tin over .000100 [0.00254] min. copper on entire contact

- Notes:** 1. Connector can be used for pressure bulkhead feed-thru (sealed) applications.  
 2. Receptacle is standard sex, supplied preloaded with 16 special solder cup pin contacts.

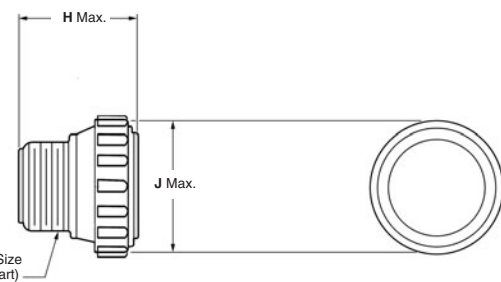
**Special CPC Connectors, Feed-Thru**  
 Pressure Rating up to 30 psi



**Receptacle, Feed-Thru**



**Panel Cutout**



**Plug**

**Material and Finish**  
**Housing**—Thermoplastic, 94V-0 rated, black  
**Contacts**—Copper alloy, gold over nickel plated

**Part Numbers**

Arrangement	Standard Numbering Plug	Reverse Numbering Plug	Feed-Thru Receptacle
11-4	206060-1	206516-1	206518-2
17-16	206037-1	206554-1	206552-1

**Dimensions**

Arrangement	Dimensions									Thread Size
	A	B	C	D	E	F	G	H	J	
11-4	1.209	.687	.094	.844	1.125	.125	.840	1.080	.975	5/8-24
	30.71	17.45	2.39	21.44	28.58	3.18	21.34	27.43	24.77	UNEF-2A
17-16	1.209	1.050	.094	1.125	1.435	.150	1.210	1.080	1.349	15/16-20
	30.71	26.67	2.39	28.58	36.45	3.81	30.73	27.43	34.26	UNEF-2A

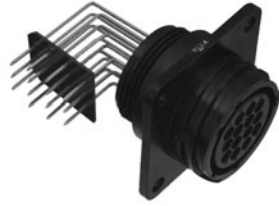
**Note:** Feed-Thru Receptacles are fully loaded with Size 16, feed-thru pin contacts. Order Size 16 crimp, snap-in socket contacts for plugs separately.

**Note:** All part numbers  
are RoHS Compliant.

**Circular Plastic Connectors, Series 1** (Continued)

**Square Flange Receptacles,  
Right-Angle, Posted**

with **.025 [0.64] sq.** solder tails



**Material and Finish**  
**Housing**—Thermoplastic, 94V-0 rated, black

**Location Wafer**—Phenolic, black

**Contact Posts**—.000100 [0.00254] min. tin over .000100 [0.00254] min. copper

**Contact Body**—

**A**—.000100 [0.00254] min. tin over .000050 [0.00127] min. nickel

**B**—.000030 [0.000762] min. gold for a length of .200 [5.08] min. from mating end, with remainder gold flash, both over .000050 [0.00127] min. nickel

**Related Product Data**

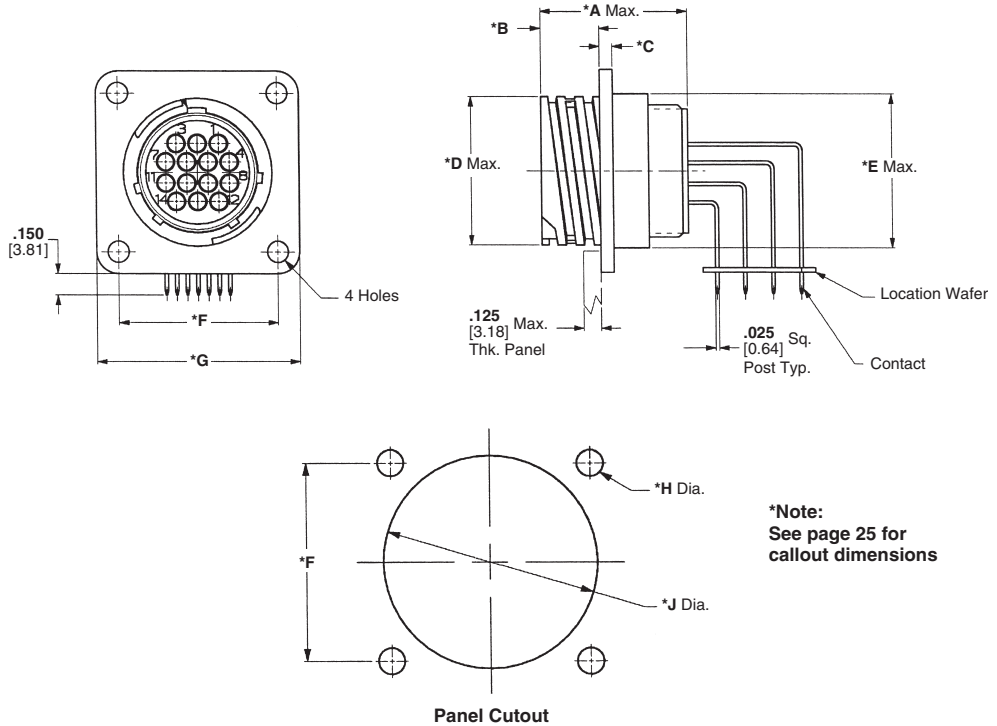
**Contact Arrangements**—Page 24

**Component Dimensions**—Page 25\*

**Performance Characteristics**—Page 6

**Keying**—Standard Configuration: 5 Keys

**Technical Documents**—Page 80



CPC  
Series 1

**Standard Sex (Posted Pin Contacts)**

Arrangement No.	Receptacle Assemblies		Contact Body Finish Code	Mating Plug Part No.
	Mounting Holes	4-40 Threaded Inserts		
11-4	1-796403-1	1-796403-2	B	206060-1
13-7	1-796435-1	1-796435-2	B	211399-1
13-9	1-796375-1	1-796375-2	B	206708-1
17-9	1-796497-1	—	B	211766-1
17-16	1-796404-1	—	B	206037-1
23-19	1-796405-1	—	B	211770-2
23-24	1-796387-1	—	A	206837-1
	1-796387-2	—	B	
23-37	1-796406-1	—	B	206150-1

**Reverse Sex (Posted Socket Contacts)**

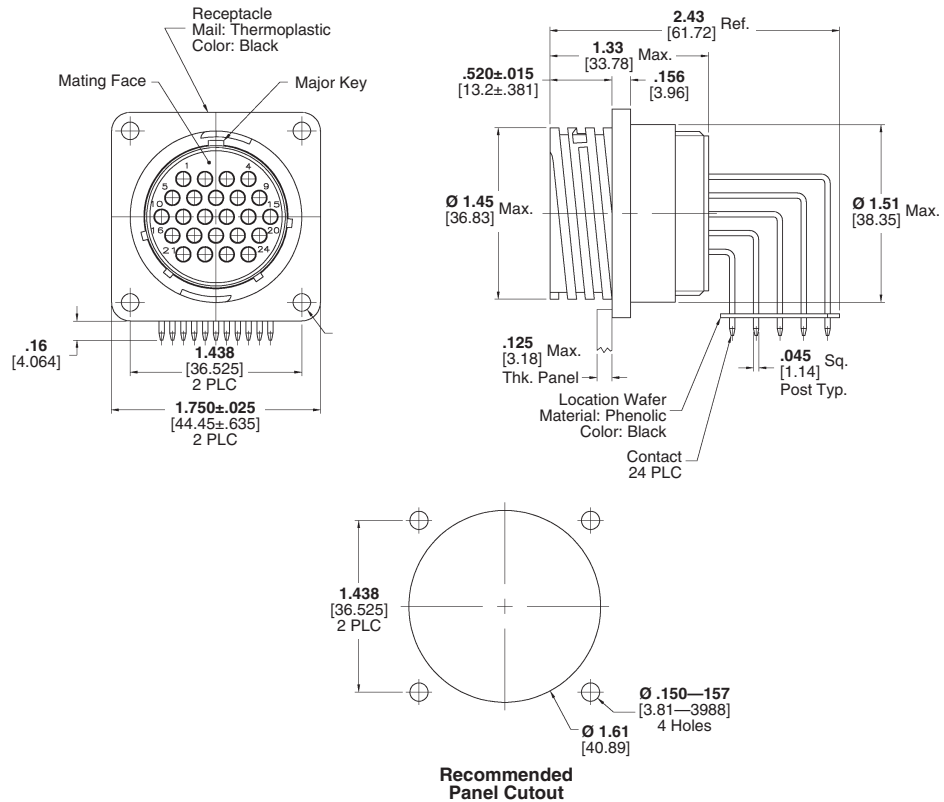
Arrangement No.	Receptacle Assemblies		Contact Body Finish Code	Mating Plug Part No.
	Mounting Holes	4-40 Threaded Inserts		
11-4	1-796407-1	—	B	206429-1
13-7	1-796500-1	—	B	211400-1
17-9	1-796501-1	—	B	211768-1
17-14 (shown)	796348-3	—	A	206044-1
	796348-2	—	B	
23-19	1-796502-1	—	B	211772-1
23-37	1-796409-1	—	B	206305-1

**Note:** All part numbers are RoHS Compliant.

**Circular Plastic Connectors, Series 1** (Continued)

**Square Flange Receptacles, Right-Angle, Posted**

with **.045 [1.14] sq.** solder tails.  
**For Higher Current Applications**



**Material and Finish**

**Housing**—Thermoplastic, 94V-0 rated, black

**Location Wafer**—Phenolic, black

**Contact Posts**—.000100 [0.00254] min. tin over .000100 [0.00254] min. copper

**Contact Body**—

**A**—.000100 [0.00254] min. tin over .000050 [0.00127] min. nickel

**B**—.000030 [0.000762] min. gold for a length of .200 [5.08] min. from mating end, with remainder gold flash, both over .000050 [0.00127] min. nickel

**Technical Documents**—Page 80

**Standard Sex (Posted Pin Contacts)**

Arrangement No.	Receptacle Assemblies Mounting Holes	Contact Body Finish Code	Mating Plug Part No.
13-7	1776903-1	B	211399-1
17-16	1776904-1	B	206037-1
23-24	1776905-1	B	206837-1
23-37	1776906-1	B	206150-1

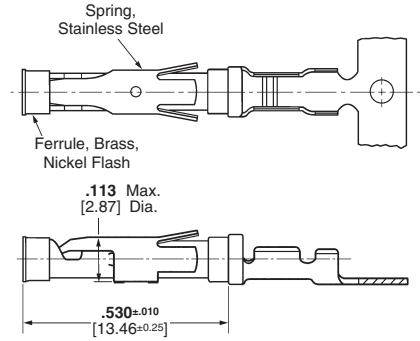
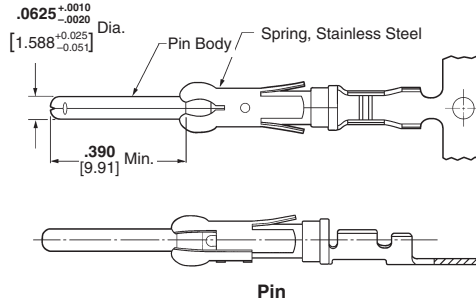
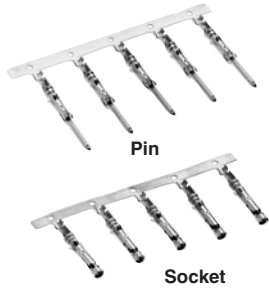
CPC Series 1



**Note:** All part numbers are RoHS Compliant.

**Signal Contacts**

**Type III+, Crimp, Snap-In**



**Material and Finish** — See chart.  
**Contact Body**—Brass or phosphor bronze  
**Retention Spring**—Stainless steel

**Application Tooling**—Pages 76-79  
**Technical Documents**  
 114-10004 Application Specification  
 108-10042 Product Specification

**Contact Size 16—Pin Diameter .062 [1.57] (Test Current, 13 Ampere)†**

†Single contact, free-air test current is not to be construed as contact rating current. Use only for testing. Refer to contact current carrying capability information on page 8.

AWG	Wire Size Range mm <sup>2</sup>	Ins. Dia. Range	Contact Finish	Strip Form Contact No.		Loose Piece Contact No.		Tooling Part No.	
				Pin	Socket	Pin	Socket	Loose Piece Hand Tool	Strip Form Applicators
30-28	0.05-0.09	.015-.030 0.38-0.76	Gold/Nickel <sup>2</sup>	788085-3	788088-2	—	—	90716-1	567867-1*** or 567947-1*** or 680602-□***
			Sel. Gold/Nickel <sup>3</sup>	788085-1	788088-1	788085-4	788088-3		
30-26	0.05-0.15	.040-.060 <sup>1</sup> 1.02-1.52	Bright Tin	1-66425-2	1-66424-1	—	—	91515-1 <sup>6</sup>	466598-□***
			Gold/Nickel <sup>2</sup>	66425-7	66424-7	66429-3	66428-3		
			Sel. Gold/Nickel <sup>3</sup>	66425-8	66424-8	66429-4	66428-4		
			Gold/Nickel <sup>2</sup>	66393-7	66394-7	—	—		
26-24	0.12-0.2	.035-.055 <sup>1</sup> 0.89-1.40	Sel. Gold/Nickel <sup>3</sup>	66393-8	66394-8	66406-4	66405-4	91515-1 <sup>6</sup> or 58495-1*	466321-□*** or 466908-2***
			Bright Tin	1-66106-5	1-66108-5	1-66107-1	1-66109-7		
			Gold/Nickel <sup>2</sup>	66106-7	66108-7	66107-3	66109-3		
			Sel. Gold/Nickel <sup>3</sup>	66106-8	66108-8	66107-4	66109-4		
24-20	0.2-0.6	.040-.080 <sup>1</sup> 1.02-2.03	Sel. Gold/Nickel <sup>4</sup>	—	66108-1	—	66109-1	91515-1 <sup>6</sup> or 58495-1*	466323-□*** or 466907-2***
			Bright Tin	2-66102-5	3-66104-0	1-66103-8	1-66105-9		
			Gold/Nickel <sup>2</sup>	66102-8	66104-8	66103-3	66105-3		
			Sel. Gold/Nickel <sup>3</sup>	66102-9	66104-9	66103-4	66105-4		
			Sel. Gold/Nickel <sup>3</sup>	2-66102-2	2-66104-3	1-66103-2	1-66105-3		
			Sel. Gold/Nickel <sup>4</sup>	—	66104-1	—	66105-1		
			Bright Tin	1-66564-2	1-66563-1	66566-7	66565-7		
			Sel. Gold/Nickel <sup>3</sup>	66564-8	66563-8	66566-4	66565-4		
18-16	0.8-1.4	.080-.100 <sup>1</sup> 2.03-2.54	Bright Tin	1-66332-4	1-66331-4	1-66400-0	1-66399-0	91523-1 <sup>6</sup> or 90225-2 <sup>6</sup>	466324-□*** or 466942-1***
			Gold/Nickel <sup>2</sup>	66332-7	66331-7	66400-3	66399-3		
			Sel. Gold/Nickel <sup>3</sup>	66332-8	66331-8	66400-4	66399-4		
			Sel. Gold/Nickel <sup>4</sup>	—	66331-2	—	66399-2		
18-14	0.8-2.0	.080-.100 <sup>1</sup> 2.03-2.54	Bright Tin	1-66098-9 <sup>5</sup>	1-66100-9	1-66099-5	1-66101-9	91505-1 <sup>6</sup> or 91523-1 <sup>6</sup> or 58495-1*	466325-□*** or 466906-1***
			Gold/Nickel <sup>2</sup>	66098-8	66100-8	66099-3	66101-3		
			Sel. Gold/Nickel <sup>3</sup>	66098-9	66100-9	66099-4	66101-4		
			Sel. Gold/Nickel <sup>4</sup>	66098-6	—	66099-1	—		
18-14	0.8-2.0	.110-.150 <sup>5</sup> 2.79-3.81	Bright Tin	1-66359-4	1-66358-6	1-66361-2	1-66360-2	91519-1 <sup>6</sup>	466326-□*** or 466923-2***
			Gold/Nickel <sup>2</sup>	66359-5	66358-8	66361-7	66360-7		
			Sel. Gold/Nickel <sup>3</sup>	66359-9	66358-0	66361-4	66360-4		
			Sel. Gold/Nickel <sup>4</sup>	—	66358-1	—	66360-1		
18-14	0.8-2.0	.110-.150 <sup>5</sup> 2.79-3.81	Bright Tin	66597-8	1-66598-0	66602-8	66601-9	91521-1 <sup>6</sup>	466958-1*** or 567364-□***
			Sel. Gold/Nickel <sup>3</sup>	66597-2	66598-2	66602-2	66601-2		

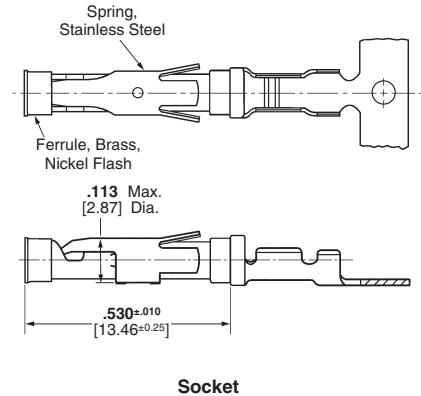
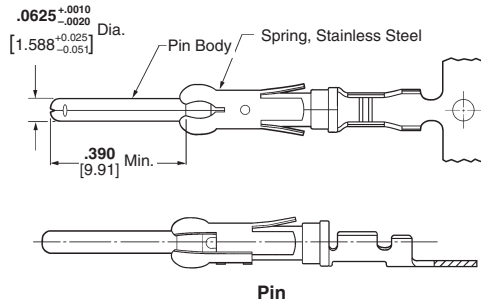
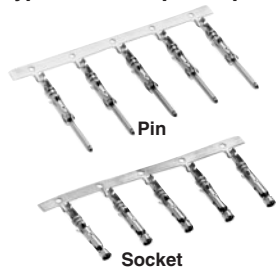
<sup>1</sup>Overall insulation crimp diameter, including crimp barrel, must not exceed .125 [3.18].  
<sup>2</sup>.000015 [0.00038] gold in the mating area over .000050 [0.00127] min. nickel.  
<sup>3</sup>.000030 [0.00076] gold in the mating area, with gold flash on remainder, over .000050 [0.00127] min. nickel.  
<sup>4</sup>.000030 [0.00076] gold in the mating area, with gold gradient on remainder, over .000050 [0.00127] min. nickel.

<sup>5</sup>Contacts can ONLY be used in: Metrimate; CPC Series 1 (Arr. 23-24), Series 4 (Arr. 23-13M, 23-16M, 23-22M), and VDE connectors.  
<sup>6</sup>To use with the 626 Pneumatic Tool: remove crimping head from Straight Action Hand Tool (SAHT), order SAHT Adapter Part No. 217201-1, Adapter Holder Part No. 356304-1 (with ratchet) or 189928-1 (without), and Power Unit Part No. 189721-1 (hand actuated) or 189722-1 (foot actuated).

<sup>6</sup>Standard reeling of strip form contacts.  
<sup>\*</sup>Commercial PRO-CRIMPER II hand tool for field repair only. Note: Die Set can be adapted for use with 626 Pneumatic Tool System. Insertion Tool Part No. 91002-1 (for insulation diameters .070 [1.78] or less), No. 200893-2 (for insulation diameters .090 [2.29] max.). Extraction Tool Part No. 305183. (Instruction Sheet 408-1216).  
<sup>\*\*\*</sup>Call Technical Support for Machine Applicator Part Numbers.

**Signal Contacts (Continued)**

**Enhanced High Current Type III+, Crimp, Snap-In**



**Material and Finish** — See chart.  
**Contact Body**—Copper Nickel Alloy  
**Retention Spring**—Stainless steel

**Related Product Data**  
**Application Tooling** — Pages 76-79  
**Technical Documents**  
 114-10004 Application Specification  
 108-10024-2 Product Specification

**Contact Size 16—Pin Diameter .062 [1.57]**

Wire Size Range		Ins. Dia. Range	Contact Finish	Strip Form Contact No.		Loose Piece Contact No.		Tooling Part No.	
AWG	mm <sup>2</sup>			Pin	Socket	Pin	Socket	Loose Piece Hand Tool	Strip Form Applicators
18-14	0.8-2.0	.080-.100 <sup>1</sup> 2.03-2.54	Gold	1-66359-6	1-66358-9	1-66361-4	1-66360-4	91519-1 <sup>3</sup>	466326-□*** or 466923-2***
			Tin	1-66359-9	2-66358-1	1-66361-6	1-66360-6		466958-1*** or 567364-□***
		.110-.150 <sup>2</sup> 2.79-3.81	Gold	1-66597-0	1-66598-1	66602-9	1-66601-0	91521-1 <sup>3</sup>	466958-1*** or 567364-□***
			Tin	1-66597-1	1-66598-2	1-66602-0	1-66601-2		

<sup>1</sup> Overall insulation crimp diameter, including crimp barrel, must not exceed .125 [3.18].  
<sup>2</sup> Contacts can ONLY be used in CPC, Series 1 (Arr. 23-24), Series 4 (Arr. 23-13M, 23-16M, 23-22M), and VDE connectors.  
<sup>3</sup> To use with the 626 Pneumatic Tool System: remove the crimping head from the Straight Action Hand Tool (SAHT) Assembly, order SAHT Adapter **Part No. 217201-1**, Adapter Holder **Part No. 356304-1** (with ratchet) or **189928-1** (without), and Power Unit **Part No. 189721-1** (hand actuated) or **189722-1** (foot actuated).  
 \*\*\* Call Technical Support for Automatic Machine Applicator Part Numbers.

**Ratings**

**Voltage:** 250 Volts AC/DC  
 600 Volts AC/DC, Series I, VDE tested and select loaded only

**Base Current:** Type III+ contacts: 17 amperes, 30°C temperature rise with single contact on 14 AWG wire  
**Enhanced High Current Type III+** contacts: 25 amperes, 30°C temperature rise with single contact on 14 AWG wire

**Temperature:** -55°C to +105°C

**VDE 0627:** XA/630/4KV/2 - Series I, VDE tested only

**Multiplication Rating Factor (F)**

**Type III+ Contacts (Note: 1 = 17 amperes)**

Shell Size	Percent Connector Loading					
	Single Circuit		≅ 50%		100%	
	Wire Size		Wire Size		Wire Size	
	30 AWG	14 AWG	30 AWG	14 AWG	30 AWG	14 AWG
11-4	.291	1	.212	.905	.140	.684
13-9	.278	.995	.175	.750	.134	.567
17-16	.270	.990	.146	.625	.127	.472
23-24	.281	.985	.138	.550	.120	.416
23-37	.275	.985	.131	.497	.114	.376

**Enhanced High Current Type III+ Contacts (14 AWG wire only - Note: 1 = 25 amperes)**

Shell Size	Percent Connector Loading		
	Single Circuit	≅ 50%	100%
	14 AWG	14 AWG	14 AWG
11-4	.880	.840	.640
13-9	.880	.640	.480
17-16	.880	.520	.400
23-24	.880	.520	.400
23-37	.880	.440	.320

**Note:** All part numbers are RoHS Compliant.

**Signal Contacts (Continued)**

**Type III+ (Precision Formed, Crimp)**

**Contact Size**—16  
**Pin Diameter**—.062 [1.57]

**Material and Finish**

**Contact Body**—Copper alloy, plated tin or gold

**Spring**—Stainless steel

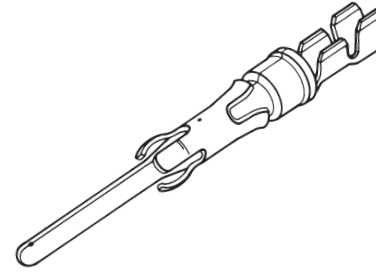
**Grounding Pin**  
(make first - break last)

**Related Product Data**

**Performance Characteristics**—Page 6

**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80



Wire Size Range		Ins. Dia. Range <sup>1</sup>	Contact Finish	Grounding Pin Part No.		Strip Form Applicator Part No.	Loose Piece Hand Tool Part No.
mm <sup>2</sup>	AWG			Strip Form	Loose Piece		
0.12-0.2	26-24	.035-.055 0.89-1.4	Tin	164159-3	164162-1	—	91515-1 <sup>5</sup> or 58495-1*
			Sel. Gold/Nickel <sup>4</sup>	164159-4	164162-2		
0.2-0.6	24-20	.045-.070 1.14-1.78	Bright Tin	164160-3	164163-1	466323-□*** or 466907-2***	91515-1 <sup>5</sup> or 91505-1 <sup>5</sup> or 58495-1*
			Sel. Gold/Nickel <sup>4</sup>	164160-4	164163-2		
0.8-1.4	18-16	.078-.098 1.98-2.49	Tin	164161-3	164164-1	466741-□*** or 680114-3***	91523-1 <sup>5</sup> or 91505-1 <sup>5</sup> or 58495-1*
			Sel. Gold/Nickel <sup>4</sup>	164161-4	164164-2		

<sup>1</sup>Overall insulation crimp diameter, including crimp barrel, must not exceed .125 [3.18].

<sup>4</sup>Gold flash over .000030 [0.00076] min. nickel on entire contact, with .000030 [0.00076] gold in contact area.

<sup>5</sup>To use with the 626 Pneumatic Tool System: remove the crimping head from the Straight Action Hand Tool (SAHT) Assembly, order SAHT Adapter **Part No. 217201-1**, Adapter Holder **Part No. 356304-1** (with ratchet) or **189928-1** (without), and Power Unit **Part No. 189721-1** (hand actuated) or **189722-1** (foot actuated).

\*Commercial PRO-CRIMPER II hand tool for field repair only. **Note:** Die Set can be adapted for use with the 626 Pneumatic Tool System.

\*\*\*Call Technical Support for Automatic Machine Applicator Part Numbers.

**Extraction Tool Part No. 539972-1.**

**High Current Power Contact—Size 16**

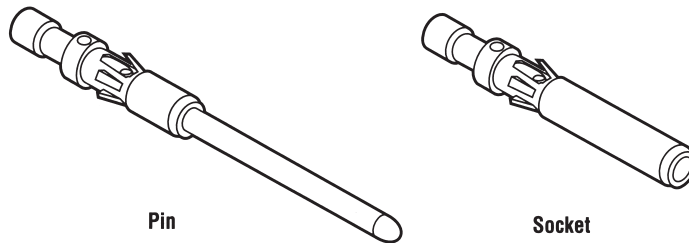
The features of the High Current Size 16 contact have been designed to retrofit into the existing AMP Connectors such as CPC (Circular Plastic Connector), CMC (Circular Metal Connector), G Series, M Series, Metrimate Square Grid and Drawer Connector housings. An initial T-Rise test in free air has shown a 23 amp capability with a 30° T-Rise. The contact may be crimped onto 14 AWG wire with an AMP hand tool **Part No. 601967-1**. Use turret TH502 **(1-601967-6)** for the pin and turret TH501 **(1-601967-5)** for the socket.

**Material**

**Body**—Copper alloy  
**Louvertac Band**—Beryllium copper  
**Retention Spring**—Stainless steel

**Finish**

**Body**—Silver  
**Louvertac Band**—Gold



Wire Range		Contact Part Nos.				Crimping Tool		
		Pin		Socket		Tool	Turret	
mm <sup>2</sup>	AWG	Loose Piece	Tape Mounted	Loose Piece	Tape Mounted		for Pins	for Sockets
0.8-1.4	18-16	796964-1	796964-2	796966-1	796966-2	601967-1	1-601967-5	1-601967-5
2	14	193844-1	193844-2	193846-1	193846-2	601967-1	1-601967-6	1-601967-5

**Extraction Tool Part No. 305183**

**Signal Contacts (Continued)**

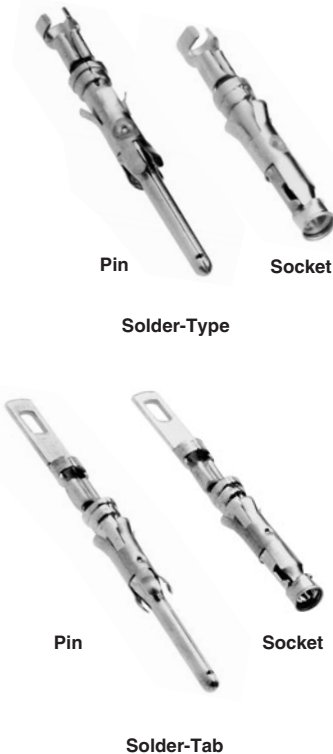
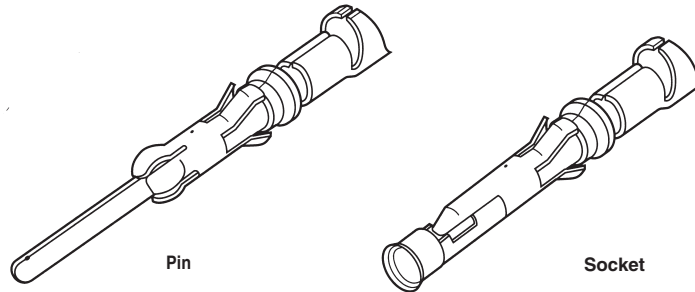
**Type III+ (Precision Formed, Solder)**

**Contact Size**—16  
**Pin Diameter**—.062 [1.57]

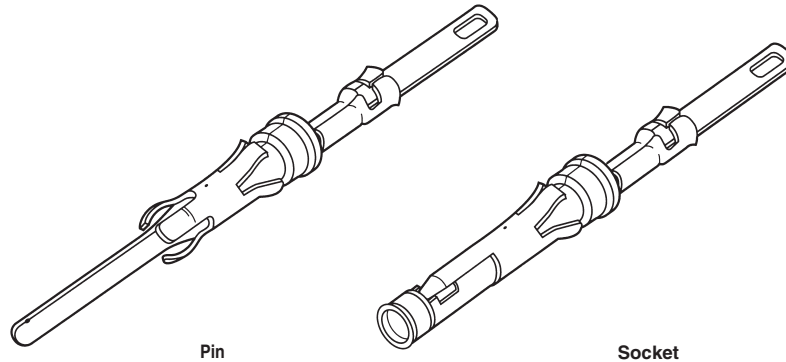
**Material and Finish**  
**Contact Body**—Copper alloy, plated tin or gold  
**Spring**—Stainless steel

**Related Product Data**  
**Performance Characteristics**—Page 6  
**Technical Documents**—Page 80

**Solder-Type**  
 (with Preformed Wire Barrel/Insulation Support)



**Solder-Tab**



**Contact Size 16—Pin Diameter .062 [1.57] (Test Current, 13 Ampere)‡**

Wire Size Range		Contact Finish	Loose Piece Contact No.	
AWG	mm <sup>2</sup>		Pin	Socket
26-20	0.12-0.6	Gold/Nickel <sup>1</sup>	66182-1	66183-1
18-16	0.8-1.4	Gold/Nickel <sup>1</sup>	66180-1	66181-1
Solder Tab <sup>4</sup>		Duplex <sup>2</sup>	202236-7	202237-7
		Bright Tin	202236-5	202237-5

<sup>1</sup>.000030 [0.00076] gold in mating area over .000030 [0.00076] min. nickel.  
<sup>2</sup>Duplex plated .000030 [0.00076] gold in mating area over .000030 [0.00076] min. nickel on contact body; bright tin on solder tab.  
<sup>3</sup>Bright tin on entire contact.  
<sup>4</sup>Designed for up to 14 AWG; but, not to exceed current limitation of contact.  
**Note:** These contacts can be used in Multimatch contact cavities of all connector housings.  
 ‡Single contact, free-air test current is not to be construed as contact rating current. Use only for testing.  
 Refer to contact current carrying capability information on page 8.  
**Extraction Tool Part No. 305183**

**Note:** All part numbers are RoHS Compliant.

**Signal Contacts (Continued)**

**Type II, Screw Machined, Crimp**

**Material**

**Contact Body**—Brass  
**Retention Spring**—Stainless steel

**Finish**

**Contact Body**—.000030 [0.00076] gold over .000050 [0.00127] nickel. Gold thickness controlled on socket O.D.

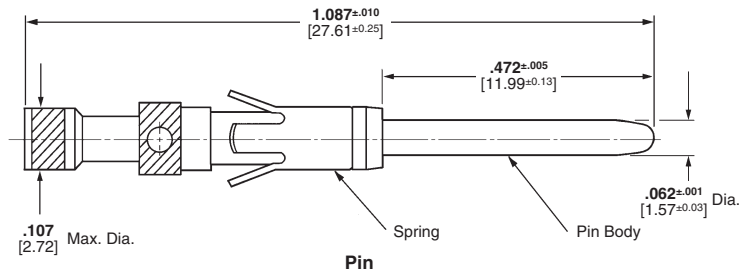
**Retention Spring**—Stainless steel

**Related Product Data**

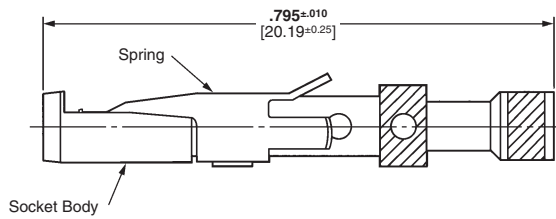
**Application Tooling**—Pages 76-79



Pin



Socket



Socket

**Contact Size 16—Pin Diameter .062 [1.57] (Test Current, 13 Ampere)†**

Wire Size Range		Ins. Dia. Range <sup>1</sup>	Tape Mounted Contact No. <sup>2</sup>		Loose Piece Contact No.		Contact Color Code	Tooling Part No.		
			Pin	Socket	Pin	Socket		Tape Mounted Dies for AMP-TAPETRONIC Machine 69875	Loose Piece Die Set for 626 Pneumatic Tool System	Hand Tool
28-24	0.08-0.20	.035-.055 0.89-1.40	201611-4	—	201611-1 <sup>4</sup>	201613-1 <sup>5</sup>	Red/Red	90249-2	90230-1 <sup>7</sup>	91538-1 or 601967-1
		.048-.065 1.22-1.65	—	—	201334-1 <sup>4</sup>	201332-1 <sup>5</sup>	Red/Red		—	601967-1
		.095-.110 2.41-2.79	—	—	202410-1 <sup>4</sup>	202411-1 <sup>5</sup>	Green	—	—	601967-1
24-20	0.2-0.6	.040-.062 1.02-1.57	201578-4	—	201578-1 <sup>4</sup>	201580-1 <sup>5</sup>	Yellow/Red	90249-2	90230-1 <sup>7</sup>	91538-1 or 58541-1* or 601967-1
		.055-.088 1.40-2.16	201330-6	201328-9	201330-1 <sup>4</sup>	201328-1 <sup>5</sup>	Yellow/Red		—	—
18 (Two)	0.9-0.9 (Two)	No. Ins. Support	—	—	202725-1 <sup>4</sup>	202726-1 <sup>4</sup>	Blue	—	90231-2 <sup>7</sup>	91539-1 or 601967-1
18-16	0.8-1.4	.080-.105 2.03-2.67	—	—	202507-1 <sup>4</sup>	202508-1 <sup>5</sup>	—	—	—	90136-1 or 601967-1
		No Ins. Support	200336-6	200333-8	200336-1 <sup>4</sup>	200333-1 <sup>4</sup>	Blue/Blue	90250-1	90231-2 <sup>7</sup>	91539-1 58541-1* or 601967-1
14	2	No Ins. Support	212618-2 <sup>3</sup>	201568-3	201570-1 <sup>4</sup>	201568-1 <sup>5</sup>	Violet/Blue	90250-1	90231-2 <sup>7</sup>	91539-1 58541-1* or 601967-1
			201570-2	—	212618-1 <sup>3,6,†</sup>	—	—	—	—	—

<sup>1</sup>Overall insulation crimp diameter, including crimp barrel, must not exceed .125 [3.18].

<sup>2</sup>For AMP-TAPETRONIC Machine No. 69875, order contacts by Tape Mounted Contact No., plus packaging code "IM REEL" (5000 parts per reel).

<sup>3</sup>Grounding pin is used to provide a make-first/break-last condition when mating and unmating connector halves.

<sup>4</sup>Use turret TH502 (1-601967-6) with hand tool 601967-1.

<sup>5</sup>Use turret TH501 (1-601967-5) with hand tool 601967-1.

<sup>6</sup>Pin length is .630±.005 [16.002±.127] on these two pins.

<sup>7</sup>Die Set requires "C" Head Adapter Part No. 318161-1; Adapter Holder Part No. 356304-1 (with ratchet) or 189928-1 (without); and Power Unit Part No. 189721-2 (hand actuated) or 189722-2 (foot actuated).

\*Commercial PRO-CRIMPER II Hand Tool for field repair use only. **Note:** Die Set can be adapted for use with the 626 Pneumatic Tool System.

†Does not use Hand Tool 91539-1 or 601967-1.

‡Single contact, free-air test current is not to be construed as contact rating current. Use only for testing. Refer to contact current carrying capability information on page 8.

**Insertion Tool Part No. 200893-2** (for insulation diameters .070 [1.78] or less).

**Extraction Tool Part No. 305183.**

**Note:** All part numbers are RoHS Compliant.

**Coaxial Contacts**

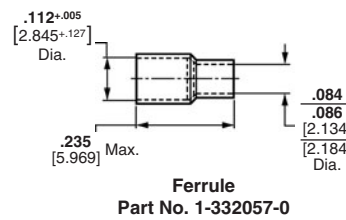
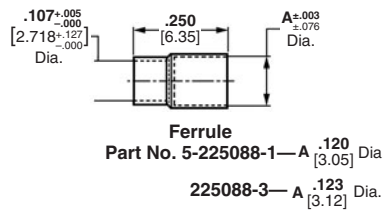
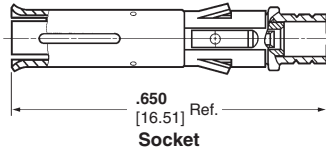
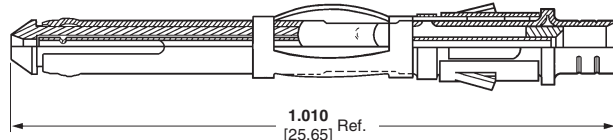
**Subminiature Coax, Size 16 Precision Formed, Crimp**



Pin



Socket



**Material**

- Outer Shell**—Brass per MIL-C-50
- Center Conductor**—Beryllium copper per QQ-C-533 (Pin); Brass per QQ-B-626 (Socket)
- Inner Dielectric**—Polypropylene
- Retention Spring**—Stainless steel per QQ-S-766
- Ferrule**—Copper per QQ-C-576

**Finish**

- Outer Shell, Center Conductor**—See charts
- Ferrule†**—Bright tin per MIL-T-10727

**Related Product Data**

**Application Tooling**—Pages 76-79

**Selection Chart for Coaxial Cable**

Cable Size (RG/U)	Contact Finish	Loose Piece Contact No.		Ferrule Part No.	Tooling Part No.	
		Pin	Socket		Die Sets for Hand Tool 69710-1 or 626 Pneumatic Tool System	Hand Tool or Die Set*
178, 196	Gold/Nickel Gold/Copper <sup>1</sup>	226537-2	51565-2	1-332057-0†	69690-2 <sup>7</sup>	69656-2
	Gold/Nickel Gold/Copper <sup>2</sup>	—	51565-5			
196 (Double Braid)	Gold/Nickel Gold/Copper <sup>1</sup>	226537-2	51565-2	5-225088-1†	—	69656-9
	Gold/Nickel Gold/Copper <sup>2</sup>	—	51565-5			
174, 188, 316	Gold/Nickel Gold/Copper <sup>1</sup>	226537-1	51565-1	1-332056-0	69690 <sup>7</sup>	91911-3*
	Gold/Nickel Gold/Copper <sup>2</sup>	226537-4	51565-4			
174 (Double Braid)	Gold/Nickel Gold/Copper <sup>1</sup>	226537-1	51565-1	5-225088-3	—	69656-7
	Gold/Nickel Gold/Copper <sup>2</sup>	226537-4	51565-4			
179, 187	Gold/Nickel Gold/Copper <sup>1</sup>	226537-1	51565-1	1-332056-0	69690-1 <sup>7</sup>	91911-4*
	Gold/Nickel Gold/Copper <sup>2</sup>	226537-4	51565-4			
187 (Double Braid)	Gold/Nickel Gold/Copper <sup>1</sup>	226537-1	51565-1	5-225088-1†	—	69656-8
	Gold/Nickel Gold/Copper <sup>2</sup>	226537-4	51565-4			
161	Gold/Nickel Gold/Copper <sup>1</sup>	226537-1	51565-1	1-332056-0	—	—
	Gold/Nickel Gold/Copper <sup>2</sup>	226537-4	51565-4			

<sup>1</sup>.000030 [0.00076] gold over .000050 [0.00127] nickel—outer shell and socket center conductor; .000030 [0.00076] gold over .000100 [0.00254] copper—pin center conductor.

<sup>2</sup>.000050 [0.00127] gold over .000050 [0.00127] nickel—outer shell and socket center conductor; .000050 [0.00127] gold over .000100 [0.00254] copper—pin center conductor.

<sup>7</sup>Die Set requires "C" Head Adapter **Part No. 318161-1**; Adapter Holder **Part No. 356304-1** (with ratchet) or **189928-1** (without); and Power Unit **Part No. 189721-2** (hand actuated) or **189722-2** (foot actuated).

†Does not use Hand Tool 91539-1 or 601967-1.

\*Used with PRO-CRIMPER II Hand Tool Frame **Part No. 354940-1**.

**Extraction Tool Part No. 305183**

## Coaxial Contacts (Continued)

### Subminiature Coax, Size 16 Precision Formed, Crimp

(Continued)

#### Finish

**Ferrule**<sup>†</sup>—Bright tin per  
MIL-T-10727

#### Related Product Data

**Application Tooling**—Pages 76-79

### Selection Chart for Twisted Pair and Shielded Wire

Wire Size		Contact Finish	Loose Piece Contact No.		Ferrule Part No.	Tooling Part No.	
AWG	mm <sup>2</sup>		Pin	Socket		Die Sets for Hand Tool 69710-1 or 626 Pneumatic Tool System	Hand Tool or Die Set*
30	0.05 (Twisted Pair, Solid)	Gold/Nickel	226537-3	51565-3	1-332057-0 <sup>†</sup>	69690-2 <sup>7</sup>	69656-2
		Gold/Copper <sup>1</sup>	226537-6	51565-6			
28	0.08-0.09 (Twisted Pair, Solid)	Gold/Nickel	226537-3	51565-3	1-332057-0 <sup>†</sup>	69690 <sup>7</sup>	91911-3*
		Gold/Copper <sup>1</sup>	226537-6	51565-6			
28	0.08-0.09 (Twisted Pair, Stranded 7 Str., .0050 [0.13] Dia.)	Gold/Nickel	226537-3	51565-3	1-332057-0 <sup>†</sup>	69690-1 <sup>7</sup> or 69690-2 <sup>7</sup>	91911-4* or 69656-2
		Gold/Copper <sup>1</sup>	226537-6	51565-6			
26	0.12-0.15 (Twisted Pair, Solid or Stranded 7 Str., .0063 [0.16] Dia.)	Gold/Nickel	226537-3	51565-3	1-332057-0 <sup>†</sup>	69690 <sup>7</sup>	91911-3*
		Gold/Copper <sup>1</sup>	226537-6	51565-6			
26	0.12-0.15 (Shielded, .075 [1.91] Max. O.D.)	Gold/Nickel	226537-1	51565-1	1-332057-0 <sup>†</sup>	69690-3 <sup>7</sup>	69656-3
		Gold/Copper <sup>1</sup>	226537-4	51565-4			

<sup>1</sup>.000030 [0.00076] gold over .000050 [0.00127] nickel—outer shell and socket center conductor; .000030 [0.00076] gold over .000100 [0.00254] copper—pin center conductor.

<sup>2</sup>.000050 [0.00127] gold over .000050 [0.00127] nickel—outer shell and socket center conductor; .000050 [0.00127] gold over .000100 [0.00254] copper—pin center conductor.

<sup>7</sup>Die Set requires "C" Head Adapter **Part No. 318161-1**; Adapter Holder **Part No. 356304-1** (with ratchet) or **189928-1** (without); and Power Unit **Part No. 189721-2** (hand actuated) or **189722-2** (foot actuated).

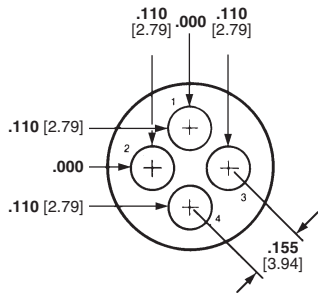
\*Used with PRO-CRIMPER II Hand Tool Frame **Part No. 354940-1**.

**Note:** A ferrule is required for each pin and socket.

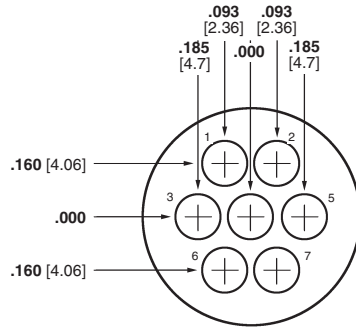
**Extraction Tool Part No. 305183.**

**Contact Arrangements, Series 1**

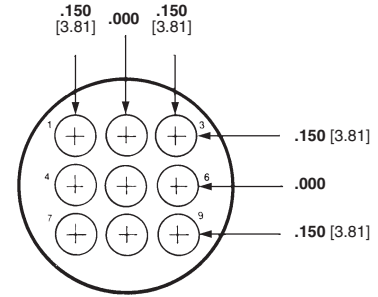
**Shell Sizes 11 and 13**



**Arrangement 11-4**  
Max. Wire Ins. Dia. = .100 [2.54]

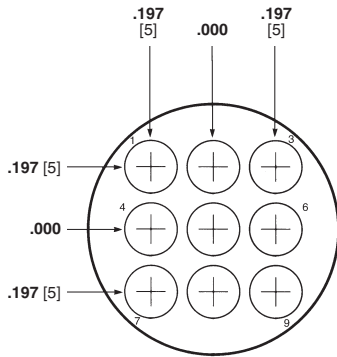


**Arrangement 13-7**  
Max. Wire Ins. Dia. = .100 [2.54]

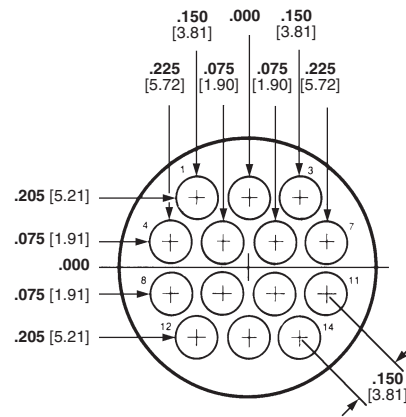


**Arrangement 13-9**  
Max. Wire Ins. Dia. = .100 [2.54]

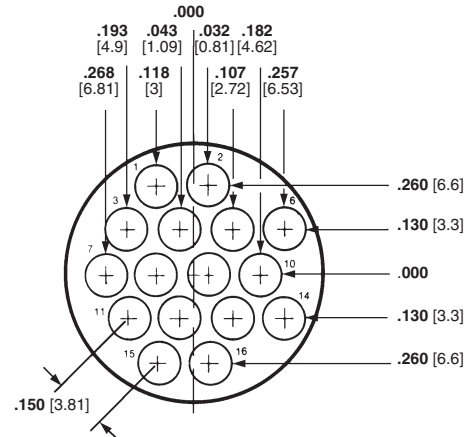
**Shell Size 17**



**Arrangement 17-9**  
Max. Wire Ins. Dia. = .150 [3.81]

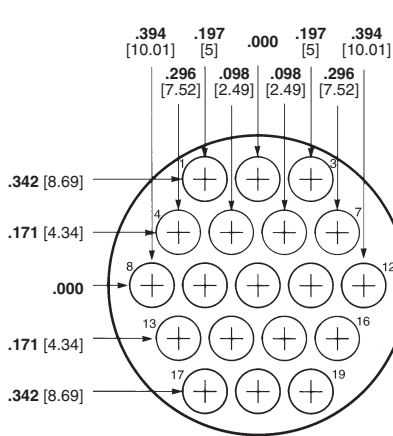


**Arrangement 17-14**  
Max. Wire Ins. Dia. = .100 [2.54]

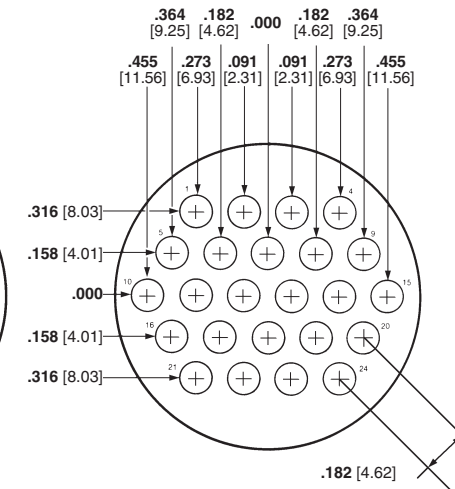


**Arrangement 17-16**  
Max. Wire Ins. Dia. = .100 [2.54]

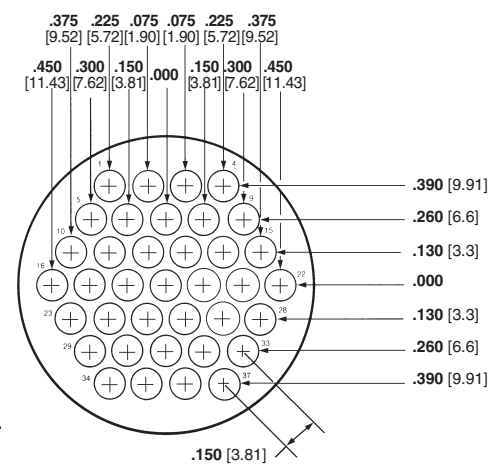
**Shell Size 23**



**Arrangement 23-19**  
Max. Wire Ins. Dia. = .150 [3.81]



**Arrangement 23-24**  
Max. Wire Ins. Dia. = .150 [3.81]



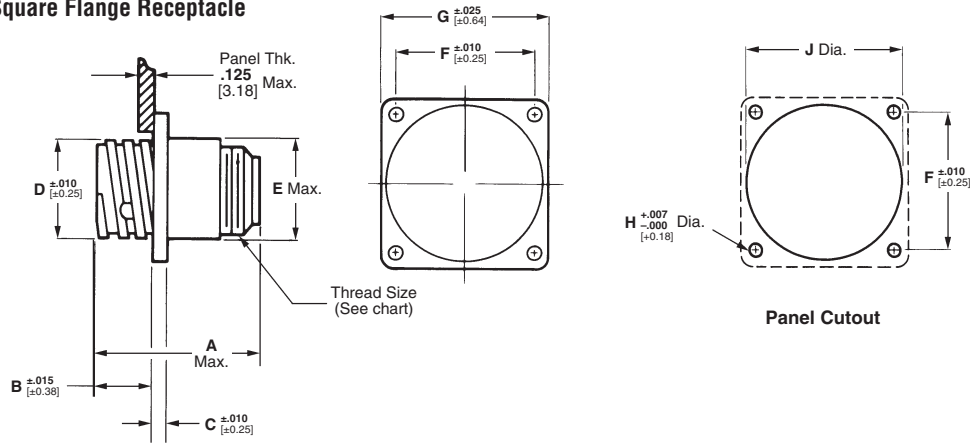
**Arrangement 23-37**  
Max. Wire Ins. Dia. = .100 [2.54]

**Note:** Contact arrangements shown are for pin mating face (plug or receptacle). Socket mating face is mirror image.

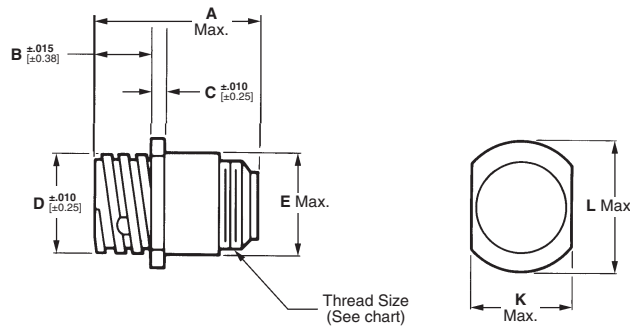


## Component Dimensions, Series 1

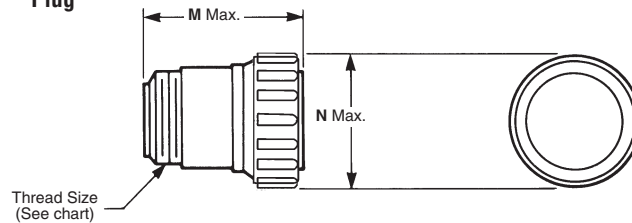
### Square Flange Receptacle



### Free-Hanging Receptacle



### Plug



CPC  
Series 1

Shell Size	Sex	Dimensions													Thread Size
		A	B	C	D	E	F	G	H	J	K	L	M	N	
11	Rev.	1.070 27.18	.420	.094	.687	.740	.844	1.125	.125	.840	.817	.935	1.365 34.67	.975	5/8-24 UNEF-2A
	Std.	1.350 34.29	10.67	2.39	17.45	18.8	21.44	28.58	3.18	21.34	20.75	23.75	1.080 27.43	24.77	
13	Std.	1.350 34.29	.420	.094	.812	.879	.969	1.281	.125	.979	.874	1.072	1.080 27.43	1.105	3/4-20 UNEF-2A
17	Rev.	1.070 27.18	.420	.094	1.050	1.110	1.125	1.435	.150	1.210	1.161	1.310	1.365 34.67	1.349	15/16-20 UNEF-2A
	Std.	1.350 34.29	10.67	2.39	26.67	28.19	28.58	36.45	3.81	30.73	29.49	33.27	1.080 27.43	34.26	
23	Rev.	1.070 27.18	.520	.156	1.438	1.510	1.438	1.750	.150	1.610	1.505	1.733	1.365 34.67	1.788	1-3/8-18 UNEF-2A
	Std.	1.350 34.29	13.21	3.96	36.53	38.35	36.53	44.45	3.81	40.89	38.23	44.02	1.080 27.43	45.42	

**Note:** All part numbers are RoHS Compliant.

**Circular Plastic Connectors, Series 2**

**CPC Connectors, Series 2 for Cable or Panel Mount**  
(Accepts Size 20 DM or DF Crimp, Snap-In Contacts)



Listed part numbers are for connectors only; **contacts must be ordered separately.**

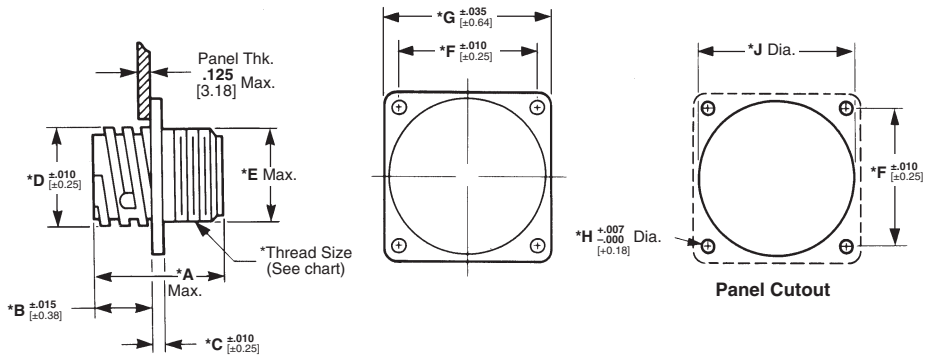
**Material**

**Housing**—Thermoplastic, 94V-0 rated, black

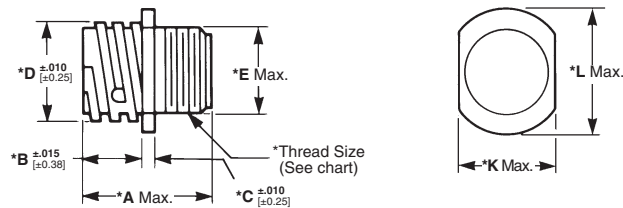
**Related Product Data**

- Contacts**—Pages 29-30
- Contact Arrangement**—Page 31
- Component Dimensions**—Page 32\*
- Accessories**—Pages 38-42
- Performance Characteristics**—Page 6
- Application Tooling**—Pages 76-79
- Technical Documents**—Page 80

**Square Flange Receptacle**

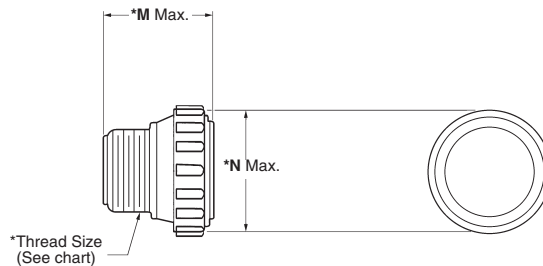


**Free-Hanging Receptacle**



**\*Note:** See page 32 for callout dimensions

**Plug**



**Standard Sex Connectors**

(Receptacles accept Size 20 DM or DF pin contacts, Plugs accept Size 20 DM or DF socket contacts)

Arrangement	Square Flange Receptacle		Free-Hanging Receptacle	Plug
	With Mounting Holes	With Threaded Inserts <sup>1</sup>		
11-8	205841-1	205841-3	205841-2	205838-1
11-9	206486-1	206852-8	206486-2	206485-1
17-28	205840-3	205840-4	206152-1	205839-3
23-63	205843-1	—	205843-2	205842-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

**Reverse Sex Connectors**

(Receptacles accept Size 20 DM or DF socket contacts, Plugs accept Size 20 DM or DF pin contacts)

Arrangement	Square Flange Receptacle		Free-Hanging Receptacle	Plug
	With Mounting Holes	With Threaded Inserts <sup>1</sup>		
11-8	206433-1	206433-3	206433-2	206434-1
17-28	206038-1	206038-4	206038-2	206039-1
23-57	206438-1	—	206438-2	206437-1

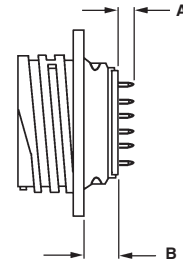
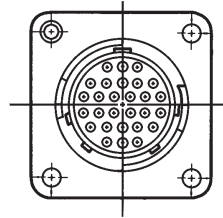
<sup>1</sup>Four 4-40 threaded inserts per receptacle.

**Note:** For Standard and Reverse Sex Connectors the maximum wire insulation diameter is .068 [1.73].

CPC Series 2

**Circular Plastic Connectors, Series 2** (Continued)

**Receptacles, Printed  
Circuit Board Mount**  
with .025 [0.64] sq. solder tails



**Material and Finish**

**Housing**—Thermoplastic, 94V-0 rated, black

**Contacts**—

**A**—Duplex plated gold flash on entire contact with .000030 [0.00076] min. gold on contact engagement area, tin on the termination area, all over .000050 [0.00127] min. nickel under-plating

**B**—Plated gold flash on the entire contact, tin on the termination area

**Related Product Data**

**Contact Arrangement**—Page 31

**Performance Characteristics**—Page 6

**Technical Documents**—Page 80

**Accessories**—Pages 38-42

**Standard Sex (Posted Pin Contacts)**

Arrangement		Receptacle Assemblies		Dimensions		Contact Finish Code
Shell Size	No. of Positions	Mounting Holes	4-40 Threaded Inserts <sup>1</sup>	A	B	
11-9		1-206852-2	—	.125 3.18	.230 5.84	A
		1-206852-1	—	.352 8.94	.230 5.84	A
17-28		1-207369-1	—	.125 3.18	.230 5.84	A
		1-207369-3	—	.352 8.94	.230 5.84	A
23-63		1-206455-2	—	.227 5.77	.338 8.59	A
		1-206455-1	—	.449 11.40	.338 8.59	A

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

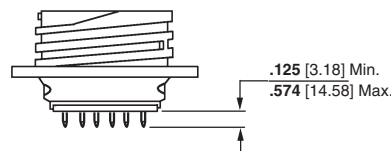
**Reverse Sex (Posted Socket Contacts)**

Arrangement		Receptacle Assemblies		Dimensions		Contact Finish Code
Shell Size	No. of Positions	Mounting Holes	4-40 Threaded Inserts <sup>1</sup>	A	B	
11-8		1-208657-1	—	.352 8.94	.285 7.24	A
		—	1-208657-0	.574 14.58	.230 7.24	A
17-28		1-207216-6	—	.125 3.18	.230 5.84	B
		1-207216-7	—	.352 8.94	.230 5.84	A
23-57		1-796329-1	—	.232 5.89	.333 8.46	A

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

**Other Available  
Posted Contacts**

Tyco Electronics can make available contacts with various solder tail lengths for loading into the standard or reverse sex, square flange receptacles for applications requiring custom solder tail lengths.



**Note:** All part numbers are RoHS Compliant.

**Circular Plastic Connectors, Series 2** (Continued)

**Special CPC Connectors, Series 2**

(Pressure rated up to 30 psi)



Listed plug connector part numbers are for connectors only; **contacts must be ordered separately.**

**Material**

**Housing**—Thermoplastic, 94V-0 rated, black

**Feed-Thru Contacts**—Copper alloy, plated gold over nickel

**Related Product Data**

**Socket Contacts (for Plugs)**—Pages 29-30

**Contact Arrangement**—Page 31

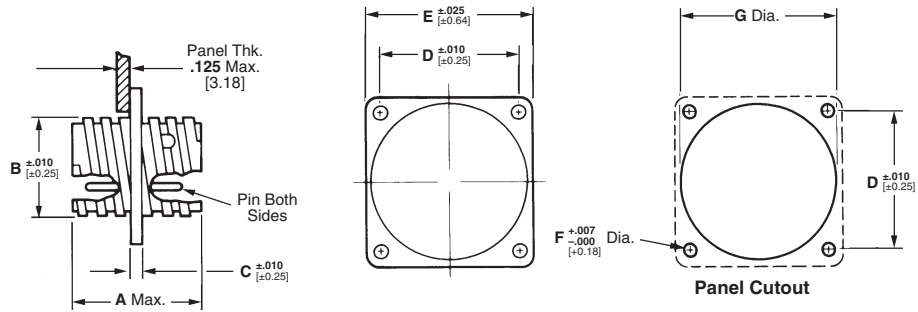
**Performance Characteristics**—Page 6

**Accessories**—Pages 38-42

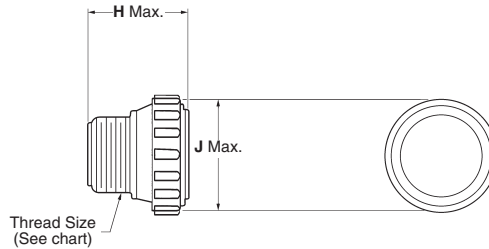
**Technical Documents**—Page 80

**Square Flange Feed-Thru Receptacles**

(with Permanently Sealed .040 [1.02] Dia. Solid Pins)



**Plug**



Arrangement No.	Dimensions									Thread Size
	A	B	C	D	E	F	G	H	J	
11-8	1.035 26.29	.688 17.48	.188 4.78	.844 21.44	1.125 28.58	.125 3.18	.840 21.34	.800 20.32	.975 24.77	5/8-24 UNEF-2A
17-28	1.040 26.42	1.050 26.67	.188 4.78	1.125 28.58	1.435 36.45	.150 3.81	1.210 30.73	.800 20.32	1.349 34.26	15/16-20 UNEF-2A

**Part Numbers**

Arrangement No.	Standard Numbering Plug	Reverse Numbering Plug	Square Flange Feed-Thru Receptacle
11-8	205838-1	206460-1	206458-1
17-28	206125-1	206126-1	206127-1

**Note:** One plug must have standard numbering of cavities, and the other plug must have reverse numbering of cavities.

CPC Series 2

**Note:** All part numbers are RoHS Compliant.

## Signal Contacts

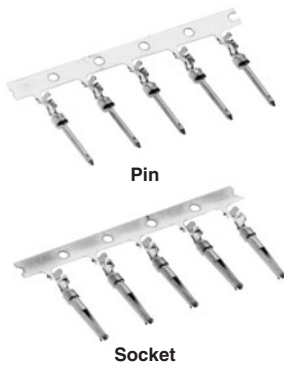
### Size 20 DF, Precision Formed, Crimp Contacts

**Contact Size**—20

**Pin Diameter**—.040 [1.02]

**\*Test Current**—7.5 ampere  
(Single contact, free-air test current; not to be construed as contact rating current. Use only for testing.)

**\*Note:** Total current capacity of each contact in any given connector is dependent on the heat rise resulting from the combination of electrical loads of all contacts in the connector arrangement and the maximum ambient temperature in which the connector will be operating. See page 8.



### Material

**Pin Body**—Brass

**Socket**—Phosphor bronze

### Contact Finish

**A**—Select gold flash over nickel on entire contact, with additional .000030 [0.00076] gold on mating end

**B**—Duplex plated .000030 [0.00076] gold on mating end, tin on termination end, with entire contact nickel underplated

**C**—Gold flash over nickel on entire contact

**D**—Duplex plated gold flash on mating end, tin on termination end, with entire contact nickel underplated

### Related Product Data

**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

**Product Specification**—108-40005

Insertion/Extraction Tool

**Part No. 91285-1**

Instruction Sheet—408-9404

This tool includes interchangeable tips to Insert/Extract:

Size 22, 28-22 AWG

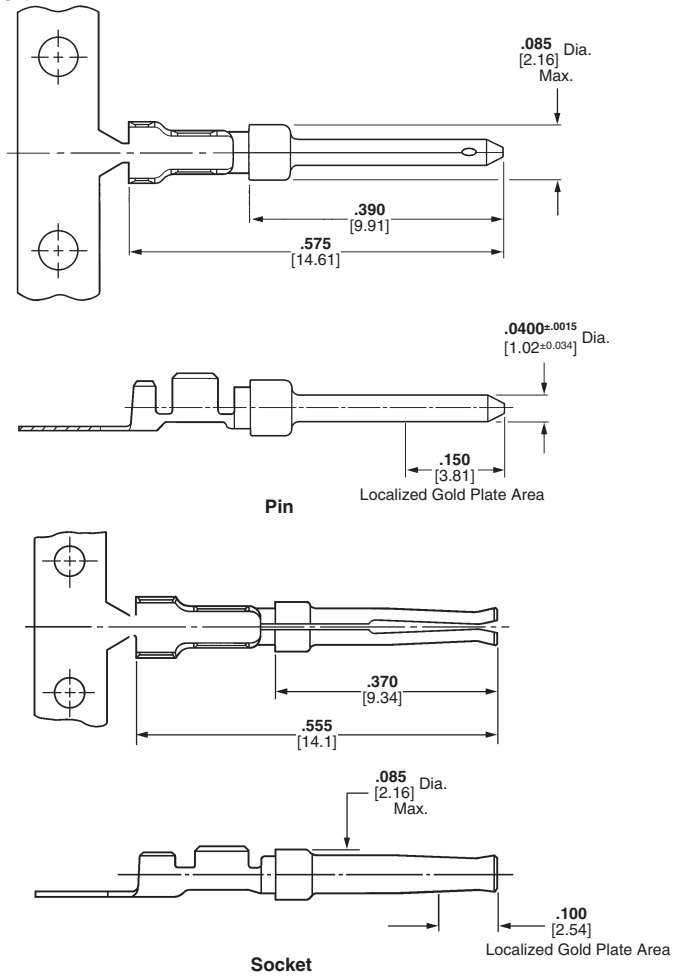
[0.08-0.03 mm<sup>2</sup>] Crimp Contacts

Size 20, 28-20 AWG [0.08-0.6 mm<sup>2</sup>]

Crimp and Solder Cup Contacts

Size 20, Posted Contacts

### With Insulation Support



Wire Size Range	Ins. Dia. Max.	Contact Code Finish	Contact Part Nos.				Tooling		Color Code (Loose Piece)
			Pin		Socket		Strip Form Applicator <sup>††</sup>	Hand Tool	
			Strip Form	Loose Piece	Strip Form	Loose Piece			
28-24 AWG [0.08-0.2 mm <sup>2</sup> ]	.040 1.02	A	66507-3	66507-9	66505-3	66505-9	466423-□†† or 466901-1†† or 1016015-1††	91503-1 <sup>5</sup>	Blue Dot
		B	1658540-4	1658540-5	1658538-2	—			
		C	66507-4	1-66507-0	66505-4	1-66505-0			
		D	1658540-1	1658540-2	1658538-3	5-66505-9			
26-22 AWG [0.12-0.4 mm <sup>2</sup> ]	.060 1.52	A	66682-2	66682-4	66683-2	66683-4	466758-2†† or 466963-1†† or 567804-1††	91549-1 <sup>5</sup>	Black Dot
		B	5066682-9	—	1-5066683-0	—			
		D	5066682-6	—	5066683-7	—			
		A	745254-2	745254-6	745253-2	745253-6			
24-20 AWG [0.2-0.6 mm <sup>2</sup> ]	.050 1.27	B	1658544-2	1658544-1	1658543-2	1658543-1	466968-1†† or 567036-□†† or 567849-1††	91525-1 <sup>5</sup>	Yellow Dot
		C	745254-3	745254-7	745253-3	745253-7			
		D	1658544-3	1-745254-6	1658543-3	1-745253-6			
		A	66506-3	66506-9	66504-3	66504-9			
24-20 AWG [0.2-0.6 mm <sup>2</sup> ]	.060 1.52	B	1658539-1	1658539-3	1658537-3	1658537-4	466422-□†† or 466900-1†† or 567801-1†† or 1016002-1††	91503-1 <sup>5</sup>	Red Dot
		C	66506-4	1-66506-0	66504-4	1-66504-0			
		D	1658539-2	1658539-4	1658537-1	1658537-2			

<sup>5</sup>To use with the 626 Pneumatic Tool System: remove the crimping head from the Straight Action Hand Tool (SAHT) Assembly, order SAHT Adapter **Part No. 217201-1**, Adapter Holder **Part No. 356304-1** (with ratchet) or **189928-1** (without), and Power Unit **Part No. 189721-1** (hand actuated) or **189722-1** (foot actuated).

<sup>††</sup>For complete information on AMP Strip Form Applicators for fully automatic and semiautomatic machines, contact Technical Support.

**Note:** Commercial PRO-CRIMPER III Maintenance and Repair Hand Tool for Wire Size 28-24 AWG [0.08-0.2 mm<sup>2</sup>] (Ins. Dia. Max. .040 [1.02]), and Wire Size 24-20 AWG [0.2-0.6 mm<sup>2</sup>] (Ins. Dia. Max. .060 [1.52])—**Part No. 58448-2**.

**Note:** Die Set **Part No. 58448-3** can be adapted for use with the 626 Pneumatic Tool System.

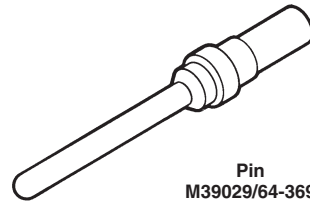
**Note:** All part numbers are RoHS Compliant.

**Signal Contacts** (Continued)

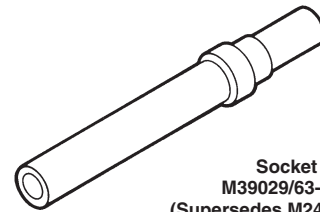
**Size 20 DM, Screw-Machined, Crimp Contacts**

Pin Diameter—.040 [1.02]

**Test Current\***—7.5 amperes (Single contact, free-air test current; not to be construed as contact rating current. Use only for testing.)



**Pin**  
M39029/64-369  
(Supersedes M24308/11-1)



**Socket**  
M39029/63-368  
(Supersedes M24308/10-1)

**Material and Finish**

**Pin Body**—Copper alloy per QQ-B-626

**Socket Body**—Beryllium copper per QQ-C-530

**Socket Sleeve**—Passivated stainless steel per QQ-S-766

**Plating pin and socket body**—.000050-.000100 [0.00127-0.00254] min. gold over .000100-.000150 [0.00254-0.00381] min. copper

Gold plating per MIL-G-45204  
Copper plating per MIL-C-14550

**Type 20 DF, Solder Contacts**

Pin Diameter—.040 [1.02]

**Test Current\***—7.5 amperes (Single contact, free-air test current; not to be construed as contact rating current. Use only for testing.)

**Material and Finish**

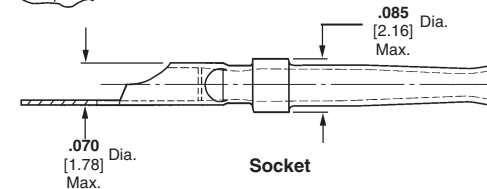
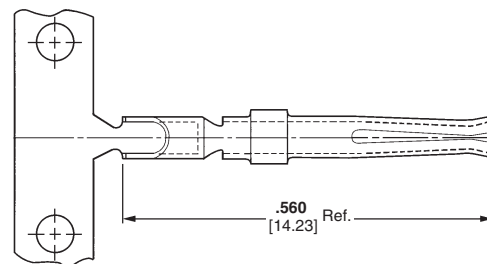
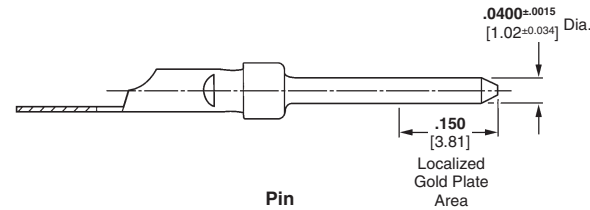
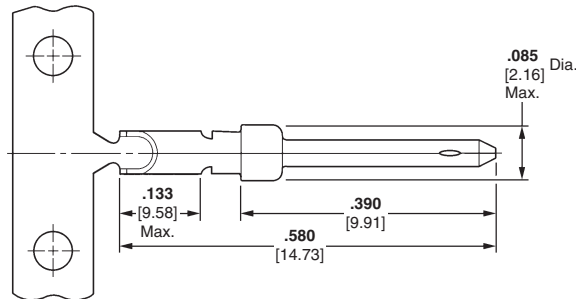
**Pin**—Brass, plated gold flash over nickel on entire contact with additional .000030 [0.00076] min. gold on mating end

**Socket**—Phosphor bronze, plated gold flash over nickel on entire contact with additional .000030 [0.00076] min. gold on mating end

**\*Note:** Total current capacity of each contact in a given connector is dependent on the heat rise resulting from the combination of electrical loads of all contacts in the connector arrangement and the maximum ambient temperature in which the connector will be operating. See page 8.

Wire Size Range <sup>1</sup> AWG mm <sup>2</sup>	Ins. Dia. (Max.)	Contact Configuration	Tape Mounted Contacts <sup>2</sup> Part No.	Loose Piece Contacts		Hand Tool Nos.		Positioner Nos.	
				Military No. (M39029)	Part No.	Military (M22520)	Part No.	Military (M22520)	Part No.
24-20	0.2-0.6	.068 1.73	Pin 205089-2	64-369	205089-1	02-01	601966-1	2-08	601966-5
			Socket 205090-2	63-368	205090-1				

<sup>1</sup>Overall insulation crimp diameter, including crimp barrel, must not exceed .125 [3.18].  
<sup>2</sup>.000015 [0.00038] gold in the mating area over .000050 [0.00127] nickel.



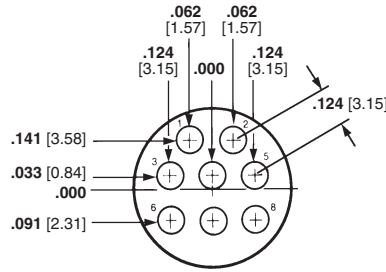
Strip Form Contact No.		Loose Piece Contact No.	
Pin	Socket	Pin	Socket
66570-2	66569-2	66570-3	66569-3

**Note:** Contacts to be soldered to wire before being inserted into housing, 18 AWG [0.8 - 0.9 mm<sup>2</sup>] max. wire size.

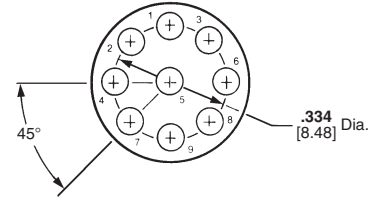
**Contact Arrangements, Series 2**

**Note:** Contact arrangements shown are of pin mating face (plug or receptacle). Socket mating face is mirror image.

**Shell Size 11**

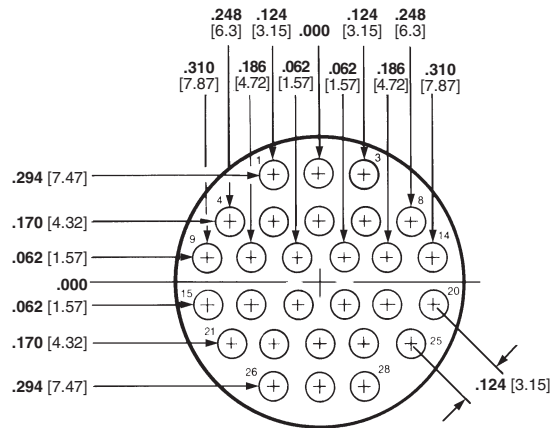


**Arrangement 11-8**  
Max. Wire Ins. Dia. = .068 [1.73]



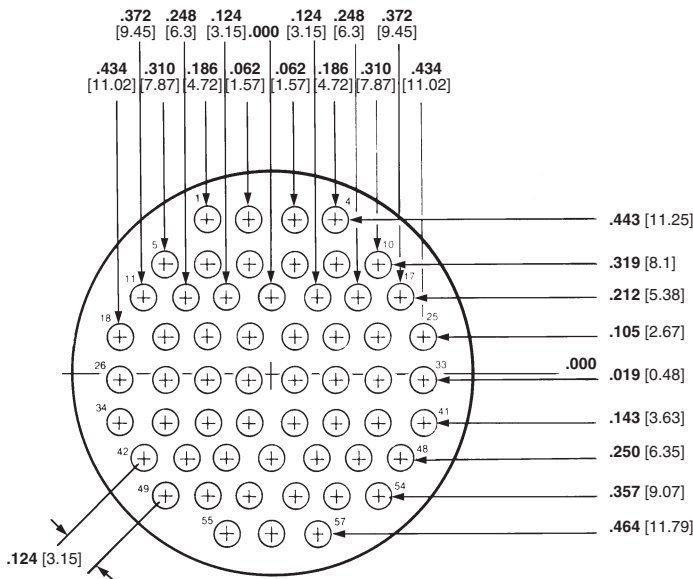
**Arrangement 11-9**  
Max. Wire Ins. Dia. = .068 [1.73]

**Shell Size 17**

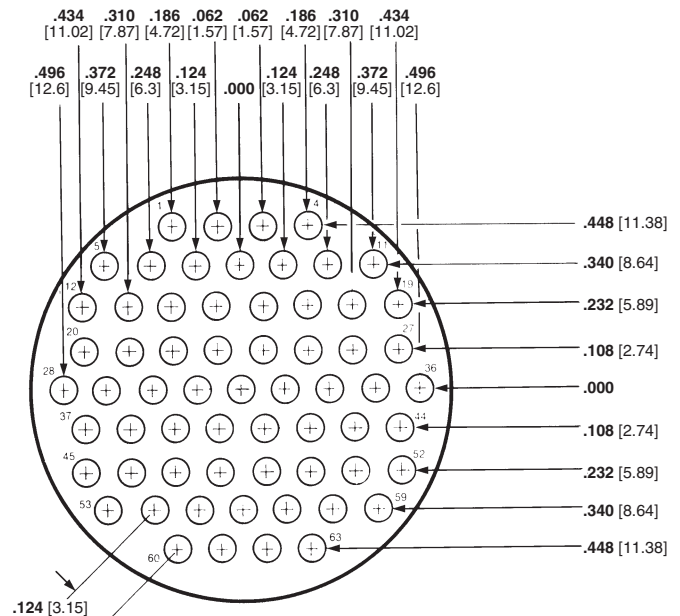


**Arrangement 17-28**  
Max. Wire Ins. Dia. = .068 [1.73]

**Shell Size 23**



**Arrangement 23-57**  
Max. Wire Ins. Dia. = .068 [1.73]

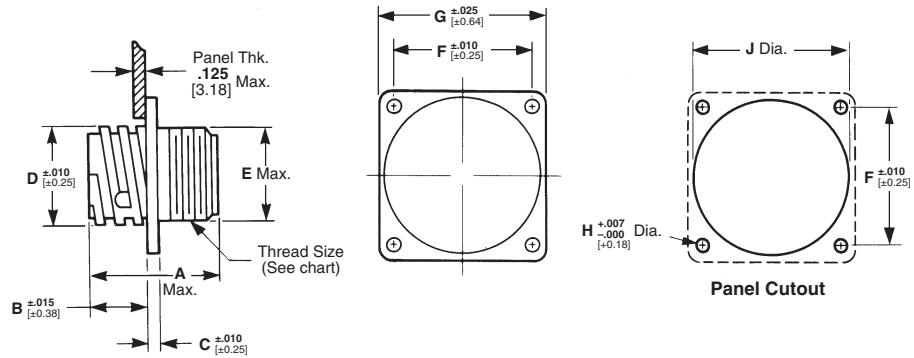


**Arrangement 23-63**  
Max. Wire Ins. Dia. = .068 [1.73]

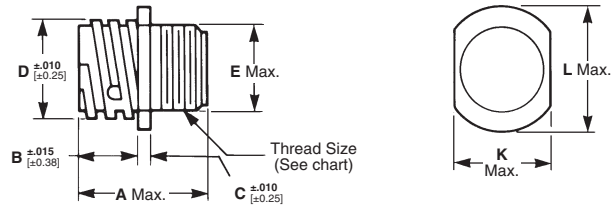
**Note:** All part numbers  
are RoHS Compliant.

## Component Dimensions, Series 2

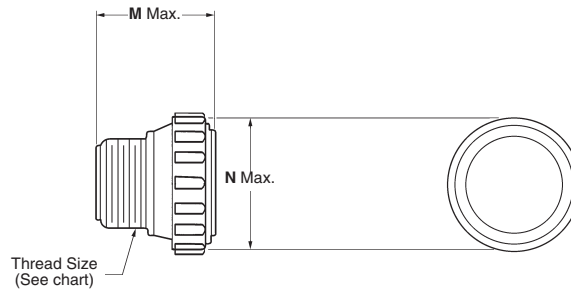
### Square Flange Receptacle



### Free-Hanging Receptacle



### Plug



Arrangement No.	Dimensions													Thread Size
	A	B	C	D	E	F	G	H	J	K	L	M	N	
11-8	.809	.420	.094	.688	.630	.844	1.125	.125	.840	.817	.935	.800	.975	5/8-24
11-9	20.55	10.67	2.39	17.48	16	21.44	28.58	3.18	21.34	20.75	23.75	20.32	24.77	UNEF-2A
17-28	.809	.420	.094	1.050	.943	1.125	1.435	.150	1.210	1.161	1.310	.800	1.349	15/16-20
	20.55	10.67	2.39	26.67	23.95	28.58	36.45	3.81	30.73	29.49	33.27	20.32	34.26	UNEF-2A
23-57	.924	.420	.156	1.438	1.515	1.438	1.750	.150	1.610	1.500	1.733	.915	1.788	1-3/8-18
23-63	23.47	10.67	3.96	36.53	38.48	36.53	44.45	3.81	40.89	38.1	44.02	23.24	45.42	UNEF-2A

**Note:** All dimensions apply to both standard and reverse sex connectors.



## Circular Plastic Connectors, Series 3

### CPC Connectors, Series 3



Listed part numbers are for connectors only; **contacts must be ordered separately.**

#### Material

**Housing**—Thermoplastic, 94V-0 rated, black

#### Related Product Data

**Contacts**—Page 34–35

**Contact Arrangement**—Page 35

**Component Dimensions**—Page 36\*

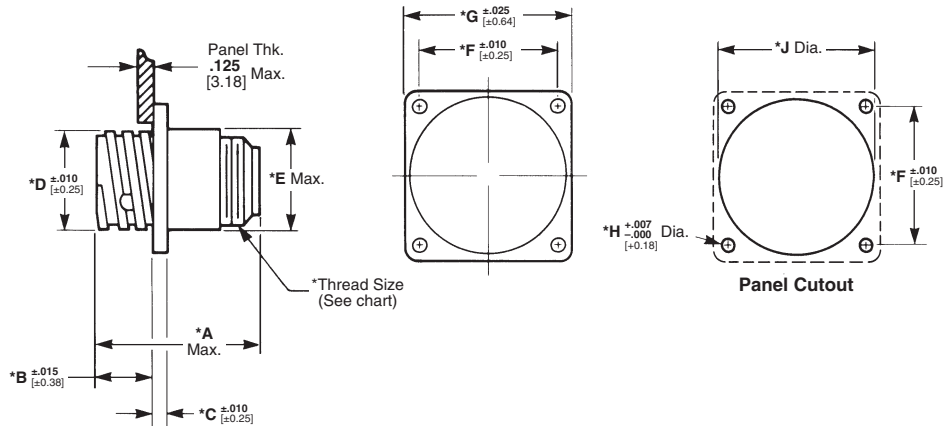
**Accessories**—Pages 38–42

**Performance Characteristics**—Page 6

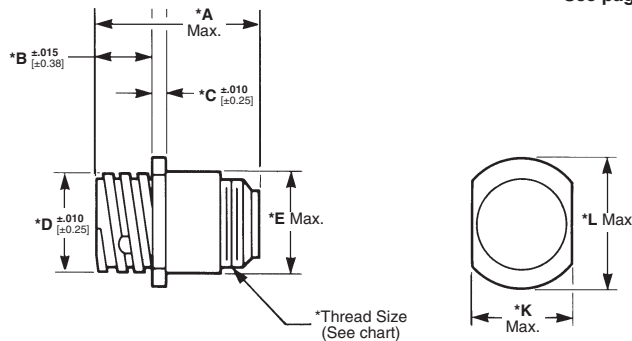
**Application Tooling**—Pages 76–79

**Technical Documents**—Page 80

### Square Flange Receptacle

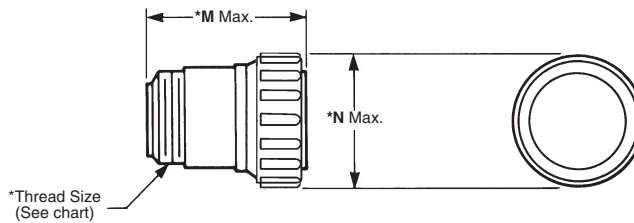


### Free-Hanging Receptacle



**\*Note:**  
See page 36 for Callout Dimensions

### Plug



### Standard Sex Connectors

(Receptacles accept Type XII Male/pin contacts, Plugs accept Type XII Female/socket contacts)

Arrangement	Square Flange Receptacle		Free-Hanging Receptacle	Plug
	With Mounting Holes	With Threaded Inserts <sup>1</sup>		
17-3	206036-2	213581-1	206207-1	206037-2
23-7	206137-1	206137-5	206137-2	206136-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

### Reverse Sex Connectors

(Receptacles accept Type XII Female/socket contacts, Plugs accepts Type XII Male/pin contacts)

Arrangement	Square Flange Receptacle		Free-Hanging Receptacle	Plug
	With Mounting Holes	With Threaded Inserts <sup>1</sup>		
17-3	206425-1	206425-5	206425-2	206426-1
23-7	206227-1	206227-6	206227-2	206226-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

**Note:** Maximum wire insulation diameter is .220 [5.59].

### Replacement Coupling Rings

Shell Size	Part No.
17	213810-1
23	213812-1

**Note:** All part numbers are RoHS Compliant.

**Power Contacts, Series 3**

**Type XII, Precision Formed, Crimp**

**Material**

Copper

**Finish**

- A—Tin
- B—.000030 [0.00076] selective gold over .000030 [0.00076] nickel
- C—.000100 [0.00254] silver plated contacts with lubricant added

**Test Current Rating**

- Silver or Gold—35 amperes ‡
- Tin—15 amperes ‡

‡Single contact, free-air test current; not to be construed as contact rating current. Use only for testing. Refer to contact current carrying capability information, page 8.

**Related Product Data**

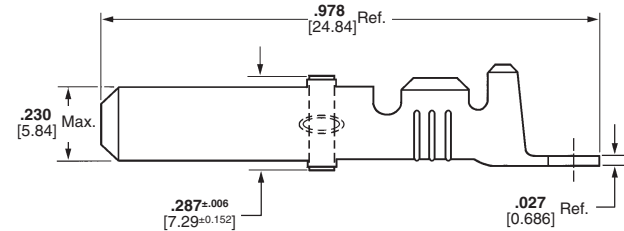
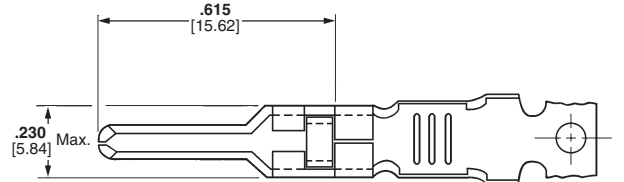
- Application Tooling—Pages 76-79
- Technical Documents—Page 80



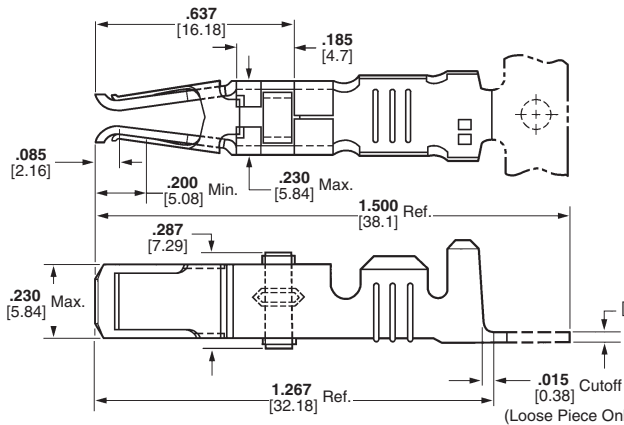
Male



Female



Male



Female

Extraction Tool Part No. 91019-3

Wire Size Range <sup>1</sup>	Ins. Dia. Range	Contact Finish	Strip Form Contact Part Nos.				Loose Piece		Tooling		
			Standard***		Heavy Duty Miniature***		Contact Part Nos.		Heavy Duty Miniature Applicator	Die Set for Hand Tool 69710-1 or 626 Pneumatic Tool System	
AWG	mm <sup>2</sup>		Male	Female	Male	Female	Male	Female			
16 and 14-12	1.25-1.4 and 2-3	.135-.160 3.43-4.06	A	66255-1	66740-7	66255-5	1-66740-2	66261-1	66740-8	567455-□***	90145-2 <sup>3,7</sup> and 90145-1 <sup>4,7</sup>
				66256-1 <sup>2</sup>	—	66256-5 <sup>2</sup>	—	66262-1 <sup>2</sup>	—		
			B	66255-2	66740-5	66255-6	1-66740-1	66261-2	66740-6		
				66256-2 <sup>2</sup>	—	66256-4 <sup>2</sup>	—	66262-2 <sup>2</sup>	—		
			C <sup>5</sup>	66255-7	66740-1	66255-8	66740-9	66261-4	66740-2		
				66256-6 <sup>2</sup>	—	66256-7 <sup>2</sup>	—	66262-4 <sup>2</sup>	—		
10	5-6	.190-.220 4.83-5.59	A	66253-1	66741-7	66253-5	1-66741-2	66259-1	66741-8	567021-□***	90140-17
				66254-1 <sup>2</sup>	—	—	—	66260-1 <sup>2</sup>	—		
			B	66253-2	66741-5	66253-6	1-66741-1	66259-2	66741-6		
				66254-2 <sup>2</sup>	—	—	—	66260-2 <sup>2</sup>	—		
			C <sup>5</sup>	66253-4	66741-1	66253-8	66741-9	66259-4	66741-2		
				66254-4 <sup>2</sup>	—	—	—	66260-4 <sup>2</sup>	—		

<sup>1</sup>Wire strip length—.281 [7.14].

<sup>2</sup>Ground contact.

<sup>3</sup>Die insert Part No. 90145-2 is for crimping 16 AWG [1.25-1.4 mm<sup>2</sup>] wire.

<sup>4</sup>Die insert Part No. 90145-1 is for crimping 14-12 AWG [2-3 mm<sup>2</sup>] wire.

<sup>5</sup>Recommended for high current/vibration applications where fretting corrosion is a problem.

<sup>7</sup>Die Set requires "C" Head Adapter Part No. 318161-1; Adapter Holder Part No. 356304-1 (with ratchet) or 189928-1 (without); and Power Unit Part No. 189721-2 (hand actuated) or 189722-2 (foot actuated).

Extraction Tool No. 91019-3.

\*\*\*Call Technical Support for Automatic Machine Applicator Part Numbers.

**Note:** All part numbers are RoHS Compliant.

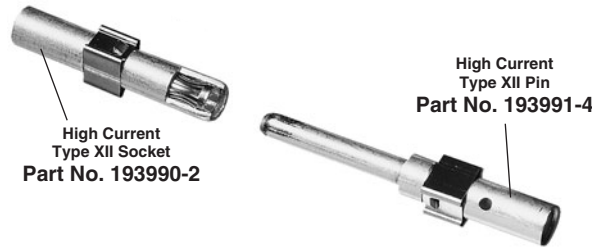
**Power Contacts, Series 3** (Continued)

**High Current Type XII Crimp Contacts**

The Multimate features of the High Current Type XII contact have been designed to fit into the existing AMP Connectors such as CPC (Circular Plastic Connector), CMC (Circular Plastic Metal-Shell Connector), G Series, M Series, and CMPC (Circular Multipin Connector) housings. An initial T-Rise test in free air has shown a 60 amp capability with a 30° T-Rise with 8 gage wires. The contact may be crimped onto 8 AWG wire with a Daniels Hand Tool M310 or AMP P/N 356114-1 and Positioner TP1068 or AMP P/N 356119-1.

**Current-Carrying Capacity**

The graph shows current-carrying capacity versus temperature rise for a fully energized 3 position CPC plug P/N 206037-2 and receptacle P/N 206036-2. These initial representative amperage ratings were conducted with 8 AWG wires that were 3 feet long.



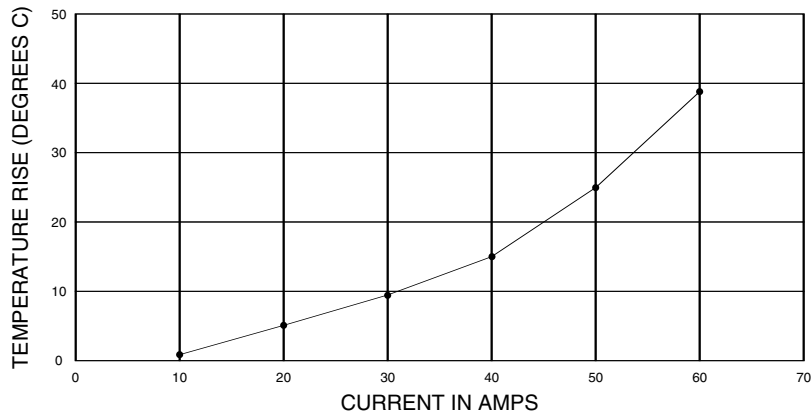
**Material**

- Body** — Copper Alloy
- Louvertac Band** — Beryllium Copper
- Retention Spring** — Stainless Steel
- Finish**
- Body** — Silver
- Louvertac Band** — Gold



Extraction Tool Part No. 224155-1

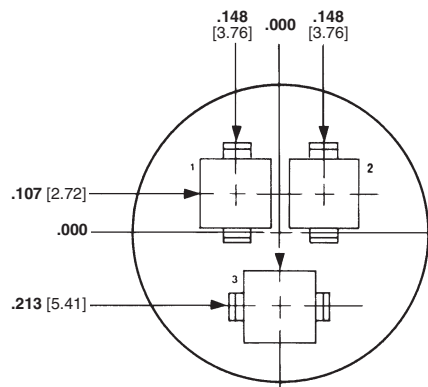
**Current Rating for 30°C Temperature Rise  
100% Energized  
3 Circuit Connector (Wire-to-Wire)**



**CPC Series 3**

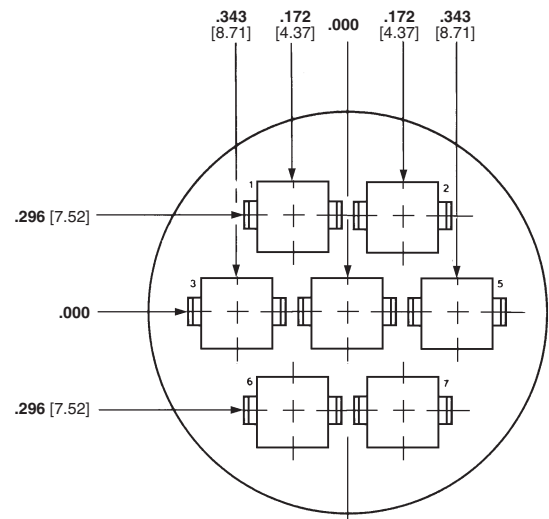
**Contact Arrangements, Series 3**

**Shell Size 17**



**Arrangement 17-3**  
Max. Wire Ins. Dia. = .220 [5.59]

**Shell Size 23**

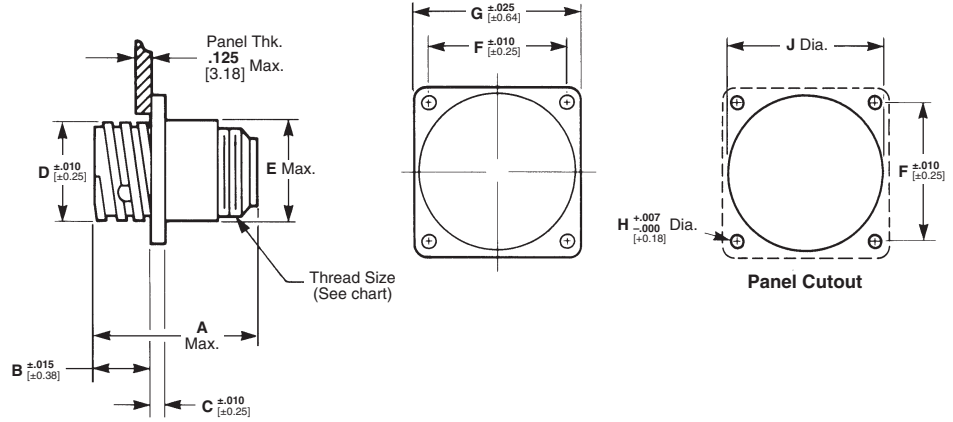


**Arrangement 23-7**  
Max. Wire Ins. Dia. = .220 [5.59]

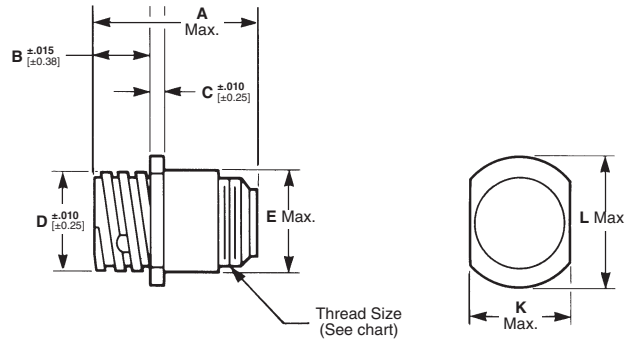
**Note:** Contact arrangements shown are of pin mating face (plug or receptacle). Socket mating face is mirror image.

**Component Dimensions, Series 3**

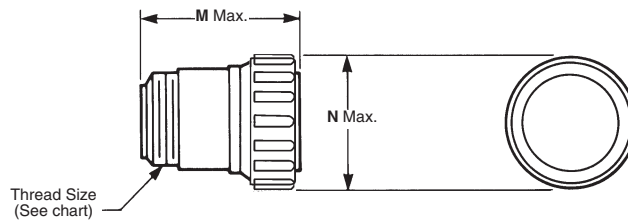
**Square Flange Receptacle**



**Free Hanging Receptacle**



**Plug**



Arrangement No.	Dimensions													Thread Size
	A	B	C	D	E	F	G	H	J	K	L	M	N	
17-3	1.635 41.53	.420 10.67	.094 2.39	1.050 26.67	1.110 28.19	1.125 28.58	1.435 36.45	.150 3.81	1.210 30.73	1.161 29.49	1.310 33.27	1.645 41.78	1.349 34.26	15/16-20 UNEF-2A
23-7	1.635 41.53	.520 13.21	.156 3.96	1.438 36.53	1.510 38.35	1.438 36.53	1.750 44.45	.150 3.81	1.610 40.89	1.505 38.23	1.733 44.02	1.645 41.78	1.788 45.42	1-3/8-18 UNEF-2A

**Note:** All dimensions apply to both standard and reverse sex.

CPC Series 3

**Note:** All part numbers  
are RoHS Compliant.

## Circular Plastic Connectors, Series 4

### CPC Connectors, Series 4, Standard Sex



Listed part numbers are for  
connectors only; **contacts must  
be ordered separately.**

#### Material

**Housing**—Thermoplastic, 94V-0 rated,  
black; 23-9M – Nylon 6/6, glass filled,  
black

#### Related Product Data

**Contacts**—Pages 17-21 and 34–35

**Contact Arrangements**—Below

**Accessories**—Pages 38-42

**Performance Characteristics**—  
Page 6

**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

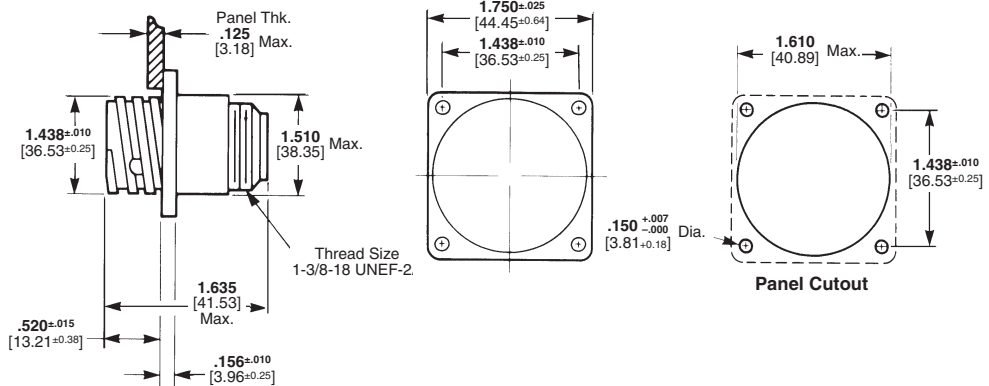
#### Replacement Coupling Ring

Shell Size	Part No.
23	213812-1

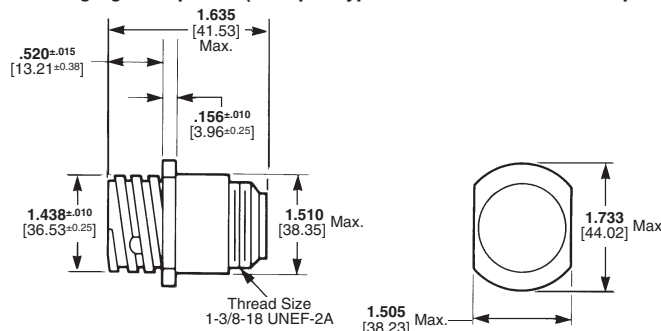
### Contact Arrangements, Series 4 Shell Size 23

**Note:** Contact arrangements  
shown are of pin mating face  
(plug or receptacle). Socket  
mating face is mirror image.

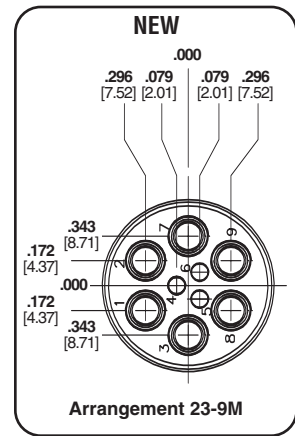
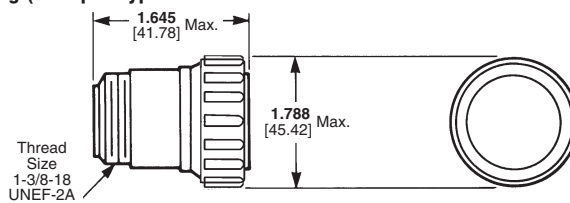
#### Square Flange Receptacle (Accepts Type XII Male and Multimate pin contacts)



#### Free-Hanging Receptacle (Accepts Type XII Male and Multimate pin contacts)



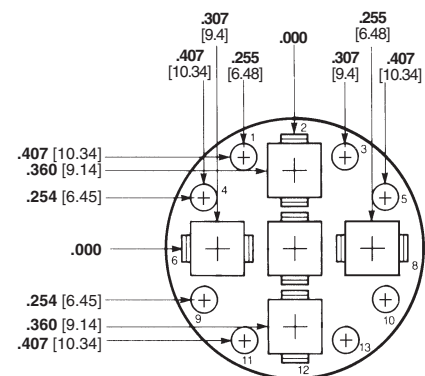
#### Plug (Accepts Type XII Female and Multimate socket contacts)



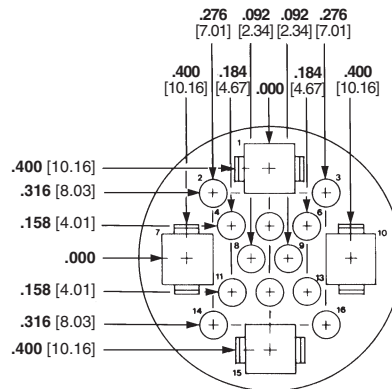
Arrangement	No. of Cavities		Square Flange Receptacle	Free-Hanging Receptacle	Plug
	Power	Multimate			
23-9M	6 (POWERBAND)	3	1776247-2 <sup>1</sup>	—	206136-4
23-13M	5 (Type XII)	8	211825-1	211825-2	211824-1
23-16M	4 (Type XII)	12	207486-1	207486-2	207485-1
23-22M	2 (Type XII)	20	206613-1	206613-3	206612-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

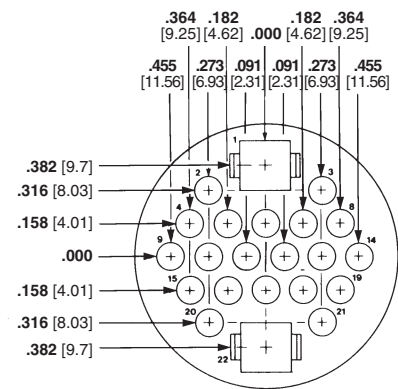
**Note:** Maximum wire insulation diameter is .150 [3.81] for Multimate contacts; .220 [5.59] for Power contacts.



**Arrangement 23-13M**  
 Max. Wire Ins. Dia. =  
 .150 [3.81] for Multimate Contacts,  
 .220 [5.59] for Power Contacts



**Arrangement 23-16M**  
 Max. Wire Ins. Dia. =  
 .150 [3.81] for Multimate Contacts,  
 .220 [5.59] for Power Contacts



**Arrangement 23-22M**  
 Max. Wire Ins. Dia. =  
 .150 [3.81] for Multimate Contacts,  
 .220 [5.59] for Power Contacts

**Note:** All part numbers are RoHS Compliant.

**CPC Connector Accessories**

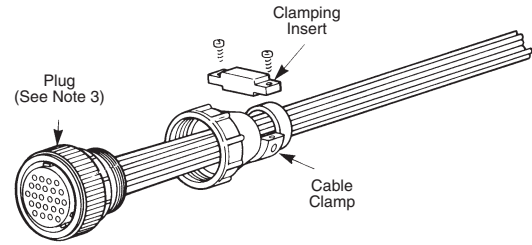
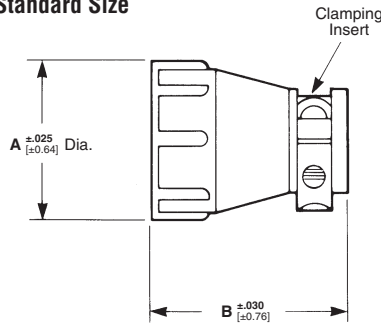
**Cable Clamps**

Cable clamps provide strain relief and can be used on all series receptacles and plugs.

**Material**

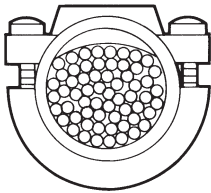
Black thermoplastic heat-stabilized, fire-resistant, self-extinguishing, UL 94V-0 rated

**Standard Size**

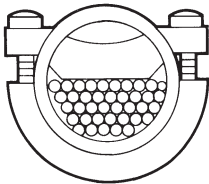


Shell Size	Dimensions		Cable O.D. (Max.)	Thread Size	Part No.	
	A	B			Individually Packaged	Bulk Packaged*
11	.825 20.96	1.250 31.75	.329 8.36	5/8-24 UNEF-2B	1-206062-4	1-206062-7** (400)
13	.950 24.13	1.400 35.56	.453 11.51	3/4-20 UNEF-2B	206966-7	206966-9** (200)
17	1.125 28.58	1.400 35.56	.453 11.51	15/16-20 UNEF-2B	206070-8	1-206070-0** (200)
23	1.600 40.64	1.555 39.5	.703 17.86	1-3/8-18 UNEF-2B	206138-8	1-206138-0** (100)

\*Numbers in parentheses specify, in multiples, the minimum quantity of parts that can be ordered.  
 \*\*Packaging includes two screws: shell sizes 11-17, screw length .500 [12.7]; shell size 23, screw length .625 [15.88].  
**Notes:** 1. Clamping areas adjustable by inverting or changing clamping inserts. The quantity of inserts supplied with each assembly is as follows: for size 11 cable clamps, one insert; for all other cable clamps, two inserts.  
 2. Components for all cable clamps are packaged unassembled. This includes the cable clamp, two screws and the clamping inserts.  
**Notes:** 3. Cable clamps can be threaded directly onto plugs or receptacles, or onto back-shell extenders (page 40).  
 4. Replacement screws are available in the following sizes: 3/8 in. [9.52]—**5019024-1**, 1/2 in. [12.7]—**5019024-2**, 5/8 in. [15.88]—**5019024-3**, 1 in. [25.4]—**5019024-4**, 3/4 in. [19.05]—**5019024-5**.  
 5. Cable clamp inserts not sold separately.

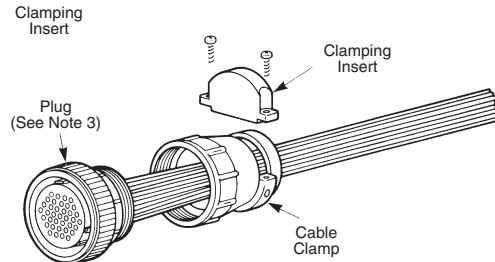
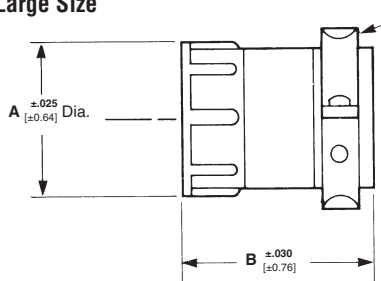


The clamping area can be adjusted by reversing the clamping insert as shown below.



For additional information concerning cable clamps, refer to Instruction Sheet 408-7582.

**Large Size**



Shell Size	Dimensions		Cable O.D. (Max.)	Thread Size	Part No.	
	A	B			Individually Packaged	Bulk Packaged*
11	.850 21.59	1.450 36.83	.453 11.51	5/8-24 UNEF-2B	206358-5	206358-6** (200)
13	1.131 28.73	1.655 42.04	.703 17.86	3/4-20 UNEF-2B	207008-5	207008-6** (100)
17	1.131 28.73	1.655 42.04	.703 17.86	15/16-20 UNEF-2B	206322-9	1-206322-0** (100)
23	1.600 40.64	1.655 42.04	1.125 28.58	1-3/8-18 UNEF-2B	206512-5	206512-6** (75)

\*Numbers in parentheses specify, in multiples, the minimum quantity of parts that can be ordered.  
 \*\*Packaging includes two screws: shell size 11, screw length .500 [12.7]; shell sizes 13-23, screw length .625 [15.88].  
**Notes:** 1. Clamping areas adjustable by inverting or changing clamping inserts. The quantity of inserts supplied with each assembly is as follows: for size 23 cable clamps, four inserts; for all other cable clamps, two inserts.  
 2. Components for all cable clamps are packaged unassembled. This includes the cable clamp, two screws and the clamping inserts.  
**Notes:** 3. Cable clamps can be threaded directly onto plugs or receptacles, or onto back-shell extenders (page 40).  
 4. Replacement screws are available in the following sizes: 3/8 in. [9.52]—**5019024-1**, 1/2 in. [12.7]—**5019024-2**, 5/8 in. [15.88]—**5019024-3**, 1 in. [25.4]—**5019024-4**, 3/4 in. [19.05]—**5019024-5**.  
 5. Cable clamp inserts not sold separately.

**Note:** All part numbers are RoHS Compliant.

**CPC Connector Accessories (Continued)**

**Self-Centering Cable Clamp (for Shell Size 23)**

The self-centering cable clamp is used in applications where strain relief protection is required and the cable or wire bundle is large and/or stiff.

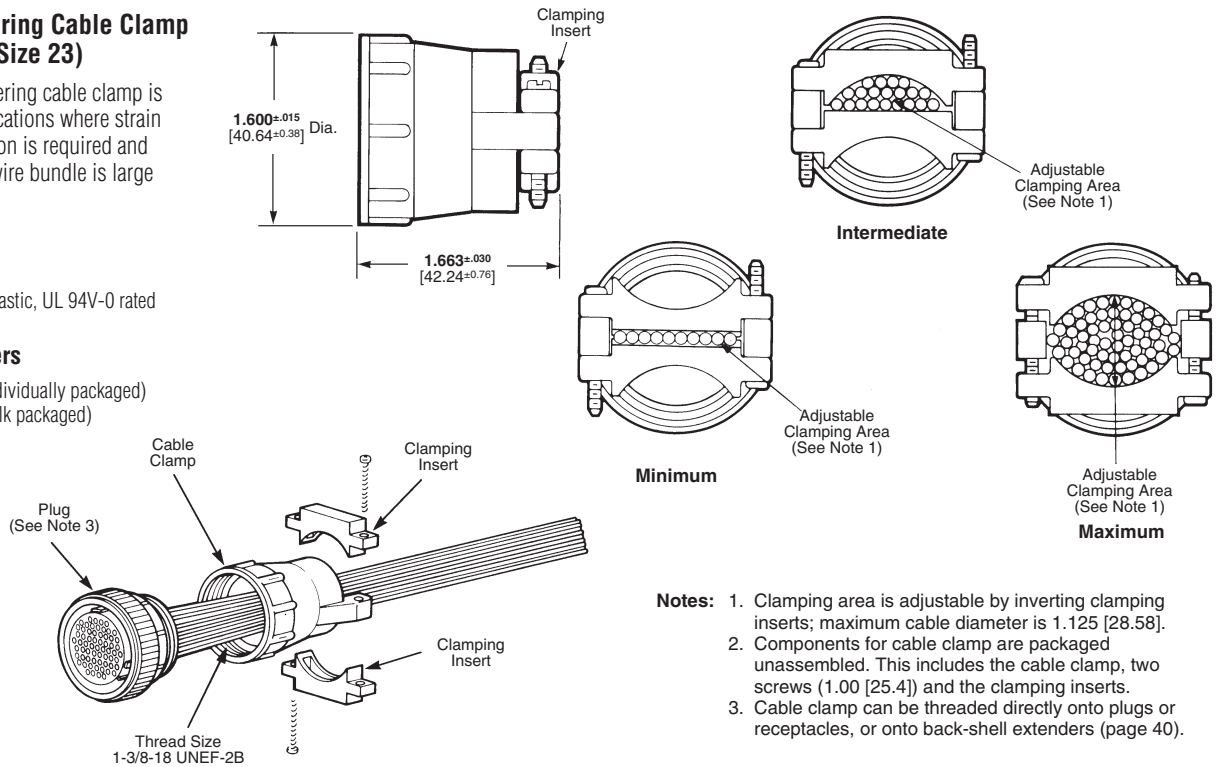
**Material**

Black thermoplastic, UL 94V-0 rated

**Part Numbers**

207774-3 (individually packaged)

207774-4 (bulk packaged)



- Notes:**
1. Clamping area is adjustable by inverting clamping inserts; maximum cable diameter is 1.125 [28.58].
  2. Components for cable clamp are packaged unassembled. This includes the cable clamp, two screws (1.00 [25.4]) and the clamping inserts.
  3. Cable clamp can be threaded directly onto plugs or receptacles, or onto back-shell extenders (page 40).

**Right-Angle Cable Clamps**

Right-angle cable clamps are used in tight areas where typical 180° cable clamp strain reliefs will not fit.

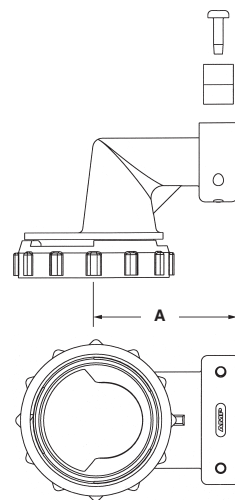
**Material**

Black thermoplastic, UL 94V-0 rated

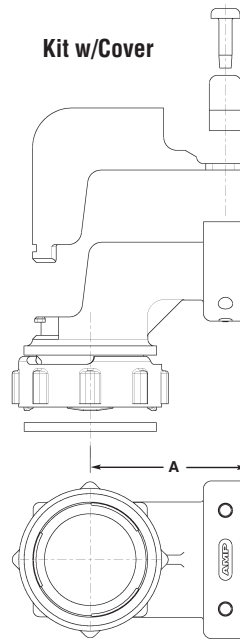
**Related Product Data**

Technical Documents — page 80

**Style A Kit**

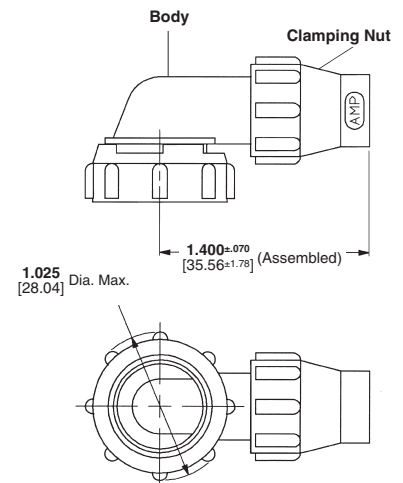


**Kit w/Cover**



**Style B**

**Part Number 213982-1 (for Shell Size 13)**



Shell Size	Dim. A	Cable O.D. Max.	Coupling Ring Thread Size	Part Number	
				Kit	Kit w/Cover
11	.900 [22.86]	.329 [8.36]	5/8-24 UNEF-2B	796379-2	1546347-2
13	1.100 [27.94]	.453 [11.51]	3/4-20 UNEF-2B	796380-2	1546348-2
17	1.200 [30.48]	.453 [11.51]	15/16-20 UNEF-2B	796381-2	1546349-2
23	1.500 [38.10]	.703 [17.86]	1-3/8-18 UNEF-2B	796382-2	1546350-2

**CPC Connector Accessories** (Continued)

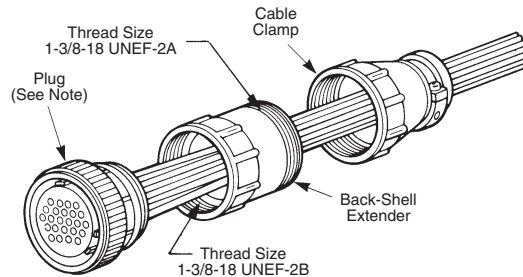
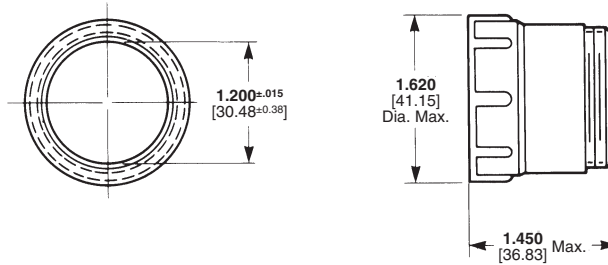
**Back-Shell Extender (for Shell Size 23)**

A back-shell extender is used with a cable clamp in applications where added length and/or additional wire breakout are required.

**Material**

Black glass-filled thermoplastic

**Part No. 207055-1**



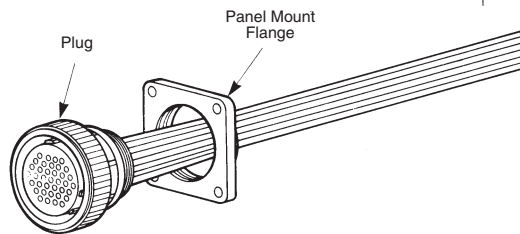
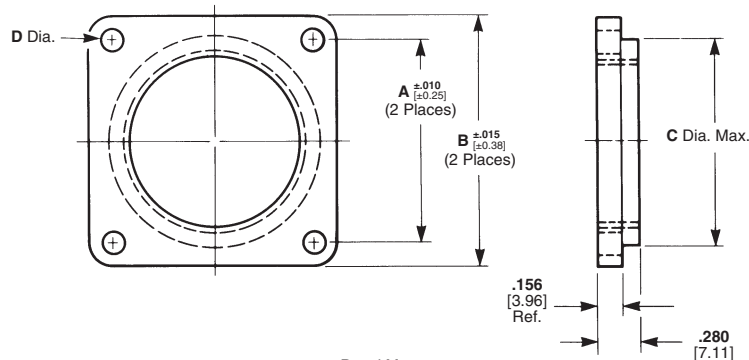
**Note:** Back-shell extenders can be threaded directly onto plugs or receptacles and will accept cable clamps of the appropriate size (pages 38 and 39).

**Panel Mount Flanges (for Plugs only)**

A panel mount flange is used in applications that require the plug half of a connector to be panel mounted.

**Material**

Black thermoplastic



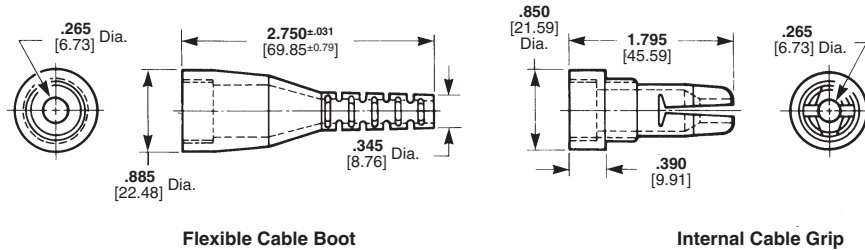
Shell Size	Dimensions				Part No.
	A	B	C	D	
11	.844 21.44	1.125 28.58	.750 19.05	.125 3.18	207299-1
13	.969 24.61	1.280 32.51	.875 22.22	.125 3.18	207299-2
17	1.125 28.58	1.435 36.45	1.110 28.19	.150 3.81	207299-3
23	1.438 36.53	1.750 44.45	1.510 38.35	.150 3.81	207299-4



**CPC Connector Accessories (Continued)**

**Flexible Cable Boot and Internal Cable Grip (for Shell Size 11)**

Flexible cable boots, with internal cable grip installed, provide strain relief capabilities for jacketed cable in applications where aesthetic appearance is essential. They can be threaded onto plugs or receptacles.



**Material**

Black thermoplastic

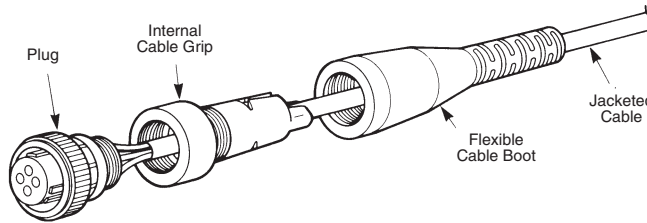
**Cable Range**

.150-.250 [3.81-6.35] Dia.

**Part Numbers**

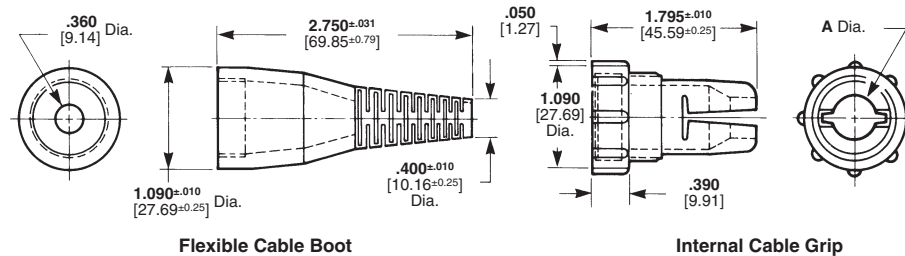
207489-1 (Cable Boot)

207490-1 (Cable Grip)



**Flexible Cable Boot and Internal Cable Grip (for Shell Size 17)**

Flexible cable boots, with internal cable grip installed, provide strain relief capabilities for jacketed cable in applications where aesthetic appearance is essential. They can be threaded onto plugs or receptacles.



**Material**

Black thermoplastic

**Part Numbers**

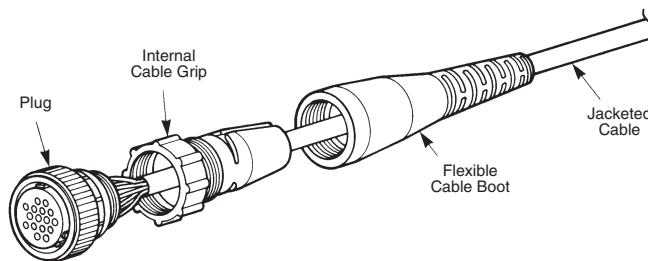
207241-1 (Cable Boot)

207387-1 (Cable Grip)

A Dia. = .325 [8.26] for cable range of .200-.250 [5.08-6.35]

207387-2 (Cable Grip)

A Dia. = .385 [9.78] for cable range of .250-.350 [6.35-8.89]



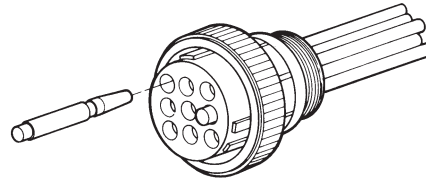
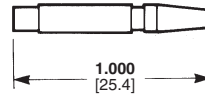
**CPC Connector Accessories** (Continued)

**Keying Plugs**

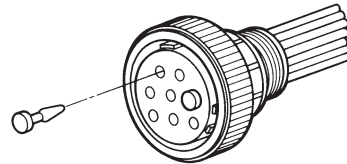
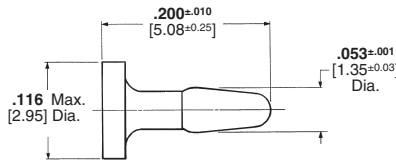
Keying plugs are used to provide keying capabilities for all connector series. Keying plugs are used in socket cavities of standard sex plugs and reverse sex receptacles, except when used with sealing caps.

**Material**

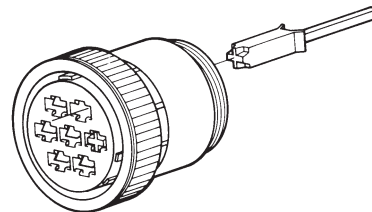
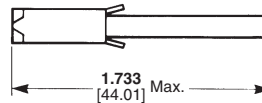
Nylon, natural, UL 94V-2 rated



**Series 1 and Series 4 Keying Plug**  
(for Types III+ and Subminiature COAXICON Contacts)  
**Part No. 200821-1**



**Series 2 Keying Plug**  
(for Size 20 DM and 20 DF Contacts)  
**Part No. 206509-1**



**Series 3 and Series 4 Keying Plugs**  
(for Type XII Contacts)  
**Part Nos. 206508-1** (Socket Cavities)—Shown Above  
**207597-1** (Pin Cavities)

**Material**

(206508-1) Nylon, natural, UL 94V-2 rated  
(207597-1) Thermoplastic, black, UL 94V-0 rated

## One-Piece Sealed Circular Plastic Connectors

### Product Facts

- Economical environmentally sealed connector designed for industrial applications
- Meets major Industrial Standards
- High strength, impact resistant thermoplastic housing, rated UL 94V-0
- Contains wire entry and peripheral seals
- AMP POWERBAND precision formed power contact (Series 5 and 6)
- Type III+ precision formed signal/low current contacts (Series 1 and Series 6)
- Other configurations in Series 1 can be made available, contact your local Tyco Electronics Sales Engineer or Tyco Electronics, Harrisburg, PA



The new Sealed One-Piece Circular Plastic Connectors are the latest product innovation to the sealed CPC product family. This design allows for easy assembly. The housing and the seal are attached. A newly designed wire entry seal protects the rear of the connector and a peripheral seal protects the connector interface. Simply crimp the contact onto a wire and insert the crimped wire contact through the seal and into the housing cavity. The connector loads the same as if the seal wasn't there. All connector cavities come in a sealed condition. No plugs are required if you do not use a position cavity. We have the

capability to provide this product sealing to you in all the shell sizes. If you don't see your particular size configuration, contact your local Tyco Electronics Sales Engineer or call Tyco Electronics for the latest information.

### Industry Standards One-Piece Sealed CPC products meet –

- IP 67 (Temporary immersion)

Fluid Protection Against – diesel fuel, gear and engine lubricants, gasoline, anti-freeze, hydraulic fluid, water, salt sprays, etc.

**Performance Characteristics** meets the same performance characteristics as shown on page 6.

**Operating Temperature Range**—  
-50°C to +125°C [-58°F to +257°F]

**UL Voltage Rating**—  
Series 1 600 V (AC or DC)  
Series 6 250 V (AC or DC)  
.125 POWERBAND Power Contact –  
45 amps, single contact  
rating at 30°C T-Rise  
Type III+ Contacts –  
13 amps, single contact  
rating at 30°C T-Rise

**Flammability Rating**—  
UL 94V-0 rated

**Sealing Capability**—  
Per IP 67

**Housing Material**—  
High strength, impact  
resistant thermoplastic

**Fluid Resistance**—  
Diesel fuel, gear and engine lubricants,  
gasoline, anti-freeze, hydraulic fluid,  
water

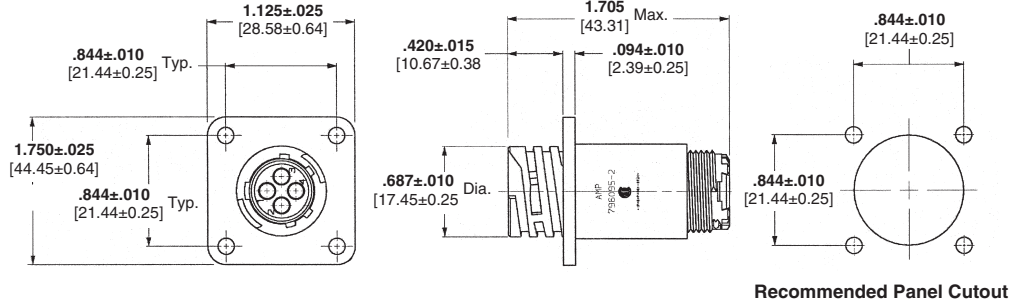
**Note:** All part numbers are RoHS Compliant.

## One-Piece Sealed Circular Plastic Connectors, Series 1

### Sealed CPC Receptacles, Special Series 1 with Pre-Installed, Bonded Peripheral Seal



### Square Flange Receptacle (Uses Flange Seal Part No. 81665-□ on page 51)

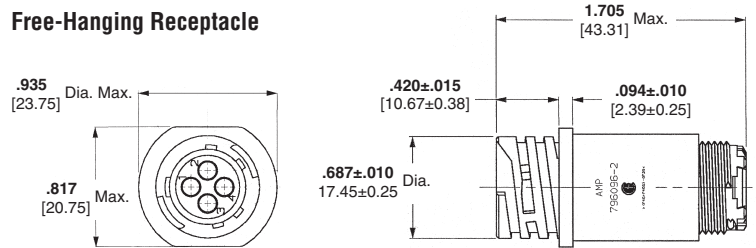


Listed part numbers are for connectors only; **contacts must be ordered separately.**

### Material and Finish

**Housing**—Thermoplastic, UL 94V-0 rated, black  
**Seal**—Elastomer, gray

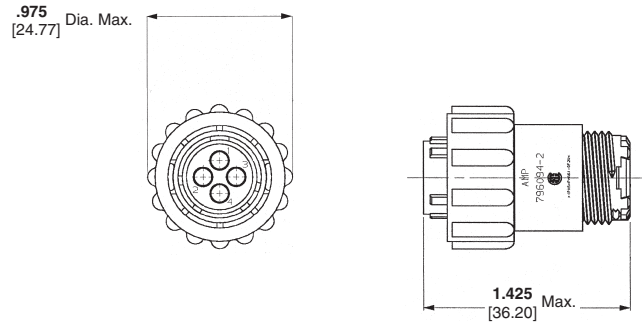
### Free-Hanging Receptacle



### Related Product Data

- Contacts**—Pages 17-22
- Contact Arrangement**—Page 24
- Component Dimensions**—Size 11-4 shown; request Customer Drawings for other sizes
- Accessories**—Pages 38-42 and 51-54
- Performance Characteristics**—Page 6
- Application Tooling**—Pages 76-79
- Technical Documents**—Page 80

### Plug



Arrangement	Shell No. of Size Positions	Sex	Square Flange Receptacle		Free-Hanging Receptacle	Plug	Insulation Diameter
			With Mounting Holes	With Threaded Inserts <sup>1</sup>			
11-4		Standard	796095-2	—	796096-2	796094-2	.065-.100 [1.65-2.54]
		Reverse	788154-2	—	788155-2	788153-2	.065-.100 [1.65-2.54]
13-9		Standard	788158-2	—	788159-2	788157-2	.065-.100 [1.65-2.54]
17-14		Reverse	796272-1	—	796273-1	796271-1	.065-.100 [1.65-2.54]
17-16		Standard	796275-1	796275-3	796276-1	796274-1	.065-.100 [1.65-2.54]
		Standard	796275-2	—	796276-2	796274-2	.040-.080 [1.01-2.03]
23-24		Standard	796190-1	—	796291-1	796188-1	.065-.120 [1.65-3.04]
23-37		Standard	796286-1	—	796287-1	796288-1	.065-.100 [1.65-2.54]

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

### Assembly Accessories

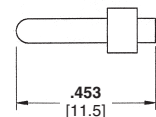
Seal Protectors are recommended to aid contact insertion through the wire entry seal. They are reusable.



**Part Number 208337-1** (Insert Pins)  
**Part Number 208338-1** (Insert Sockets)

### Wire Entry Seal Plug

**Part Number 796075-1** (6 per carrier strip)  
**Material**—Polypropylene, natural



**Note:** All part numbers  
are RoHS Compliant.

## One-Piece Sealed Circular Plastic Connectors, Series 5

### CPC Connectors, Series 5 Sealed – Reverse Sex



Listed part numbers are for connectors only; **contacts must be ordered separately.**

#### Material

**Housing**—Nylon, glass-filled UL rated 94V-0, black

#### Related Product Data

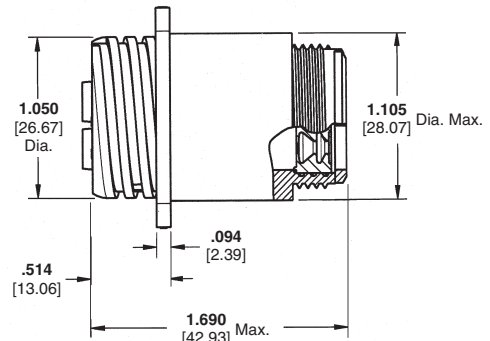
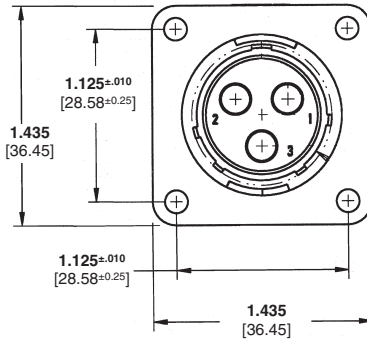
**Contacts**—Page 47

**Accessories**—Page 51

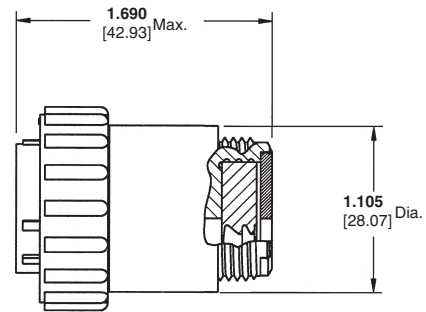
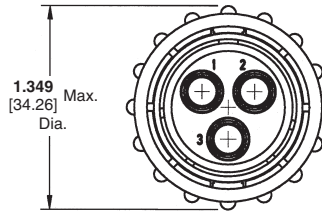
**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

### Square Flange Receptacle (Uses Flange Seal Part No. 81665-2 on page 51)



### Plug



Arrangement		Insulation Diameter	Square Flange Receptacle	Free-Hanging Receptacle	Plug
Shell Size	No. of Positions				
17-3		.095-.205 [2.41-5.21]	788189-1	796112-1	788188-1
		.150-.265 [3.81-6.73]	788189-2	796112-2	788188-2

### CPC Connectors, Series 6 Sealed



Listed part numbers are for connectors only; **contacts must be ordered separately.**

#### Material

**Housing**—Nylon, glass-filled UL rated 94V-0, black

#### Related Product Data

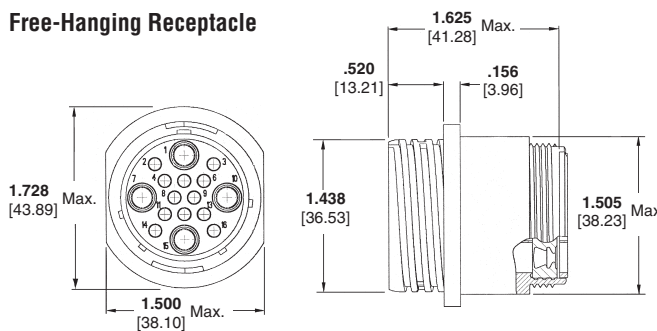
**Contacts**—Pages 17-23 and 47

**Application Tooling**—Pages 76-79

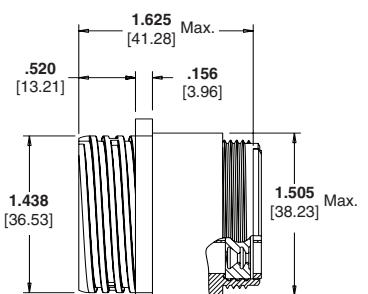
**Technical Documents**—Page 80

## One-Piece Sealed Circular Plastic Connectors, Series 6

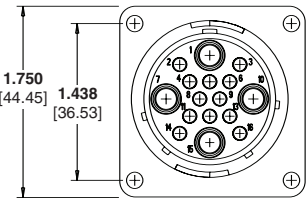
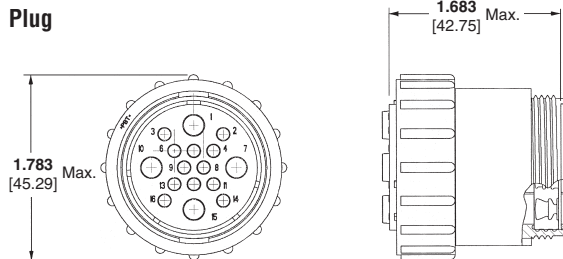
### Free-Hanging Receptacle



### Square Flange Receptacle



### Plug

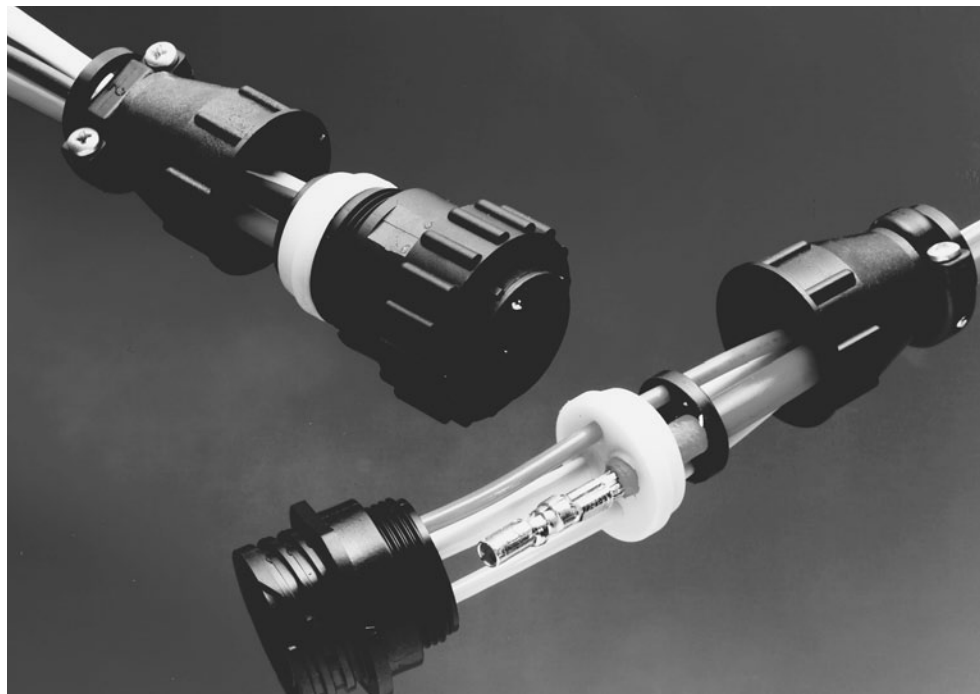


Arrangement		Insulation Diameter		Sex	Square Flange Receptacle w/Mounting Holes	Free-Hanging Receptacle	Plug
Shell Size	No. of Positions	Power	Signal				
23-16		.095-.205 [2.41-5.21]	.065-.100 [1.65-2.54]	Standard	796466-1	796207-1	796203-1
				Reverse	—	796330-1	796332-1

## Two-Piece Sealed Circular Plastic Connectors

### Product Facts

- Economical environmentally sealed connector designed for industrial applications
- Meets major Industrial Standards
- High strength, impact resistant thermoplastic housing, rated UL 94V-0
- Contains wire entry, peripheral, and full interfacial seals
- AMP POWERBAND precision formed power contact (Series 5 and 6)
- Type III+ precision formed signal/low current contacts (Series 6)
- Other configurations in Series 1 can be made available, contact your local Tyco Electronics Sales Engineer or Tyco Electronics, Harrisburg, PA



### Technical Documents

#### Instruction Sheet

408-4317 Two-Piece Sealed CPC Connectors

#### Product Specification

108-1579 Sealed CPC Connectors with Removable Contacts

Sealed CPC connectors are the latest additions to the growing family of AMP Circular Plastic Connectors. Sealed CPC connectors were developed as part of the Series 5 and 6 product line, specifically to meet the increasing demand for an economical environmentally sealed connector.

Sealed CPC connectors are designed to meet the requirements of UL, CSA, and VDE for environmentally sealed connectors used in industrial applications.

In addition, sealed CPC connectors are designed to meet the latest SAE and ASAE requirements as outlined in the standards listed here.

Sealed CPC connectors incorporated the latest technology in thermoplastic design and use the new AMP POWERBAND precision formed high current contact.

Illustrated above are the Series 5 (power) and Series 6

(power/signal mix) sealed connector configurations. Other sizes are available in a Series 1 (signal/low current) configuration. Contact your local Tyco Electronics Sales Engineer, or call Tyco Electronics for the latest design information.

### Industry Standards

#### Two-Piece Sealed CPC connectors meet—

- IP65

### Performance Characteristics

**Operating Temperature Range—**  
-50°C to +125°C [-58°F to +257°F]

#### UL Voltage Rating—

Series 5 600 V (AC or DC)  
Series 6 250 V (AC or DC)  
.125 POWERBAND Power Contact –  
45 amps, single contact  
rating at 30°C T-Rise  
Type III+ Contacts –  
13 amps, single contact  
rating at 30°C T-Rise

**Flammability Rating—**  
UL 94V-0 rated

**Sealing Capability—**  
Per IP 65

**Housing Material—**  
High strength, impact  
resistant thermoplastic

**Fluid Resistance—**  
Diesel fuel, gear and engine lubricants,  
gasoline, anti-freeze, hydraulic fluid,  
water

**Note:** All part numbers are RoHS Compliant.

**Sealed Circular Plastic Connectors**

**Multimate Size 16 Contacts**

Precision formed signal/low current

Pin Diameter—.062 [1.57]

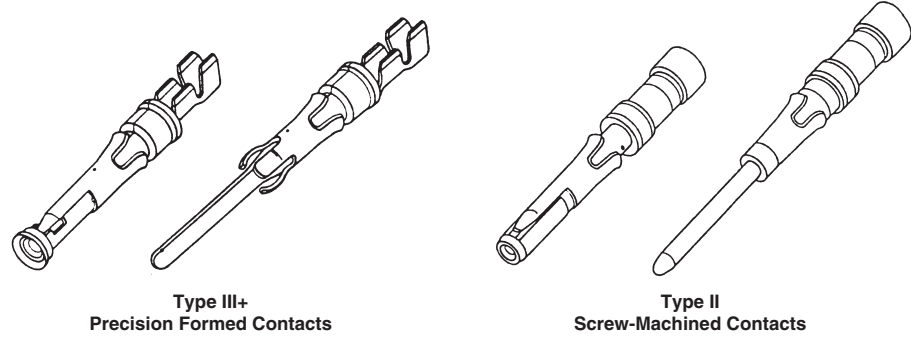
Test Current—13 amps max.

**.125 POWERBAND Contacts**

Precision formed high current

Pin Diameter—.125 [3.175]

Test Current—50 amps max.



**Type III+ Precision Formed Contacts**

**Type II Screw-Machined Contacts**

**Extraction Tool**  
**Part Number 318813-1**  
(Instruction Sheet 408-4374)

See pages 17-23 for complete product information and part numbers of Size 16 contacts applicable in Sealed CPC Connectors.

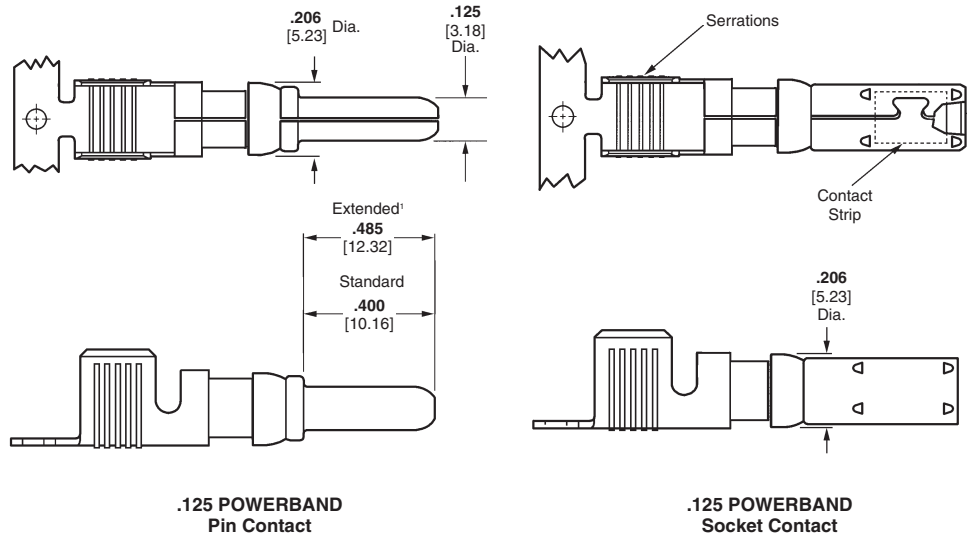
**Material and Finish**

**Contacts**—Copper with beryllium copper spring

**Plating Code**

**A** — Post plated .000200 [0.00508] min. silver in mating area with .000050 [0.00127] min. silver on remainder of contact, all over .000050 [0.00127] min. nickel

**B** — Post plated .000030 [0.00076] min. gold in mating area with gold flash on remainder of contact, all over .000050 [0.00127] min. nickel



**.125 POWERBAND Pin Contact**

**.125 POWERBAND Socket Contact**

**Related Product Data**

**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

Wire Size AWG/mm <sup>2</sup>	Contact Finish	Pin Length	Contact Part No.				Tooling Part No.	
			Strip		Loose Piece		Heavy Duty Miniature (HDM) Applicators (for AMP-O-LECTRIC Model G Machine, Base Part No. 354500)	Die Sets for Hand Tool 69710-1 or 626 Pneumatic Tool System*
			Pin	Socket	Pin	Socket		
14-12 2-3	A	Standard	213845-1	213847-1	213845-3	213847-3	680195-3	356612-1
	B	Standard	213845-2	213847-2	213845-4	213847-4		
	A	Extended <sup>†</sup>	213845-5	—	213845-7	—		
	B	Extended <sup>†</sup>	213845-6	—	213845-8	—		
10-8 5-8	A	Standard	213841-1	213843-1	213841-3	213843-3	680197-3	356611-1 (8 AWG)
	B	Standard	213841-2	213843-2	213841-4	213843-4		
	A	Extended <sup>†</sup>	213841-5	—	213841-7	—		356611-2 (10 AWG)
	B	Extended <sup>†</sup>	213841-6	—	213841-8	—		

<sup>†</sup>For use in One-Piece or Two-Piece Sealed Circular Plastic Connectors (CPC), Series 5 and 6.

‡Single contact, free-air test current; not to be construed as contact rating current. Use only for testing.

Refer to contact current carrying capability information, page 8.

**Note:** Standard Size 8, High Current Upgrade Size 8, and .125 POWERBAND contacts are **not** interchangeable.

\*A typical 626 Pneumatic Tool System requires: a power unit (**Part No. 189721-2**, hand actuated or **189722-2**, foot actuated), an adapter holder (**Part No. 356304-1**, with ratchet), and "C" Head adapter **Part No. 318161-1**.

Specifically designed for AMP CPC Connectors, Series 5 and 6, the new .125 POWERBAND contact offers the performance of a

MIL-Spec screw machined Size 8 contact with the economy of a stamped and formed, strip-feed contact. Strip-feed contacts

offer maximum production capabilities using standard AMP bench-mount, semi-automatic termination equipment. For low volume,

prototype or maintenance and repair requirements, the .125 POWERBAND contact is available in loose piece form.

**Note:** All part numbers are RoHS Compliant.

**Two-Piece Sealed Circular Plastic Connectors, Series 5**

**CPC Connectors, Series 5 Sealed – Reverse Sex**



Listed part numbers are for connectors only; **contacts must be ordered separately.**

**Material**

**Housing**—Nylon, glass-filled UL rated 94V-0, black

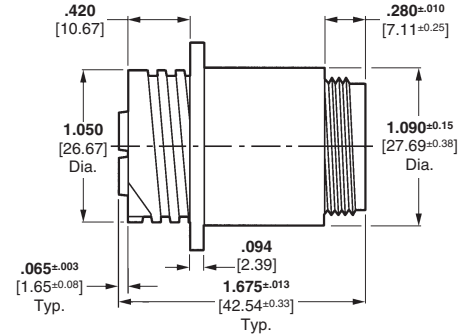
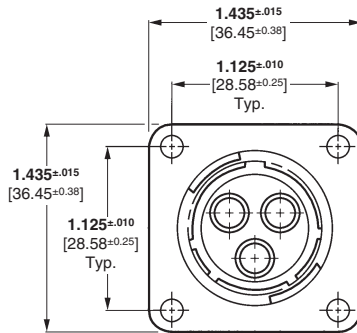
**Related Product Data**

- Contacts**—Pages 47
- Accessories**—Page 51
- Application Tooling**—Pages 76-79
- Technical Documents**—Page 80

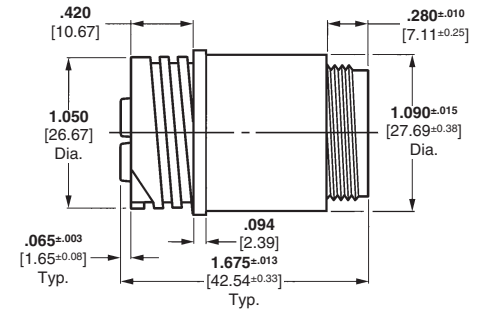
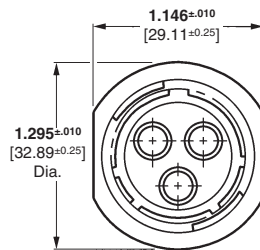
**Replacement Coupling Ring**

Shell Size	Part No.
17-3	213810-1

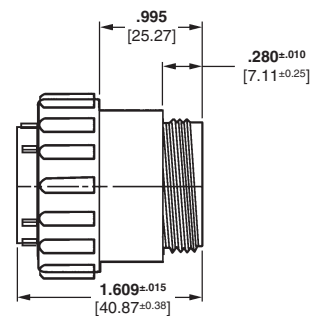
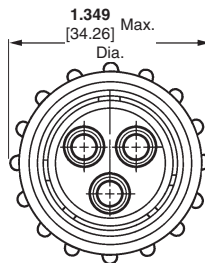
**Square Flange Receptacle** (Uses Flange Seal Part No. 81665-2 on page 51)



**Free-Hanging Receptacle**



**Plug** (With Full Interfacial Seal)



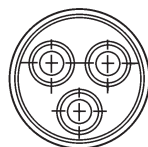
**Reverse Sex** (Receptacles accept socket contacts, Plugs accept pin contacts)

Arrangement	Square Flange Receptacle	Free-Hanging Receptacle	Plug
17-3 - Connector	213889-2	213890-2	213905-1
17-3 - Wire Entry Seal Kit	213899-1	213899-1	213899-1

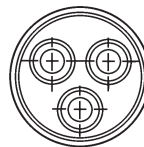
Kit includes (1) Silicon Wire Entry Seal and (1) Pressure Plate.  
\*Wire entry seals require cable clamp kits.

**Wire Entry Seals\***

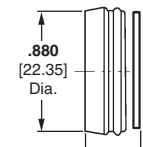
\*Cable clamp kit 213902-3 required. (Similar to 206322-9. See page 38 for dimensional detail of cable clamp) or cable clamp kit 213904-3. (Similar to 206070-8. See page 38 for dimensional detail of cable clamp).



**Rear View Receptacles**



**Rear View Plugs**



**Side View Plugs/Receptacles**

**Note:** Minimum insulation diameter is .156 [3.96]; Maximum insulation diameter is .260 [6.60].



## Two-Piece Sealed Circular Plastic Connectors, Series 6

### CPC Connectors, Series 6 Sealed – Reverse Sex



Listed part numbers are for connectors only; **contacts must be ordered separately.**

#### Material

**Housing**—Nylon, glass-filled UL rated 94V-0, black

#### Related Product Data

**Contacts**—Pages 17-21 and 47

**Accessories**—Page 51

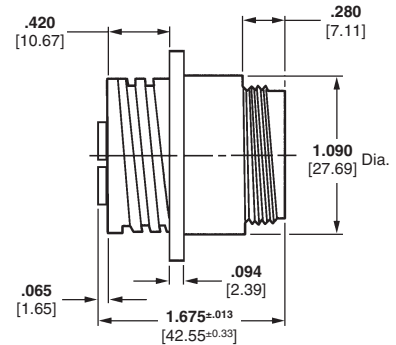
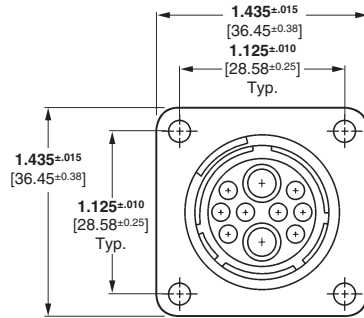
**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

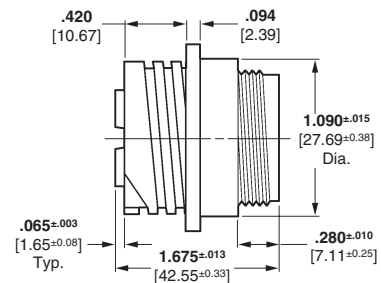
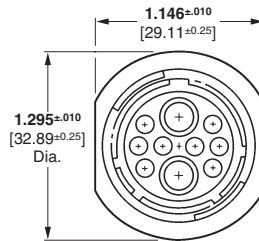
#### Replacement Coupling Ring

Shell Size	Part No.
17-10	213810-1

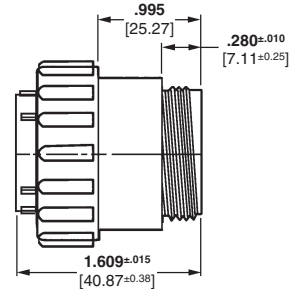
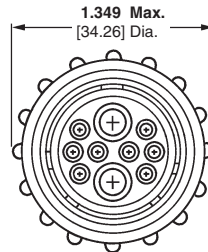
### Square Flange Receptacle (Uses Flange Seal Part No. 81665-2 on page 51)



### Free-Hanging Receptacle



### Plug



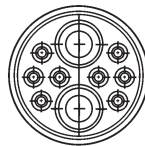
**Reverse Sex** (Receptacles accept socket contacts, Plugs accept pin contacts)

Arrangement	Square Flange Receptacle	Free-Hanging Receptacle	Plug
17-10 Connector	213893-2	213894-2	213906-1
17-10 Wire Entry Seal Kit	213900-1	213900-1	213900-1

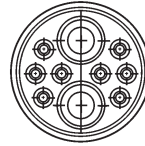
Kit includes (1) Silicon Wire Entry Seal and (1) Pressure Plate.  
\*Wire entry seals require cable clamp kits.

### Wire Entry Seal\*

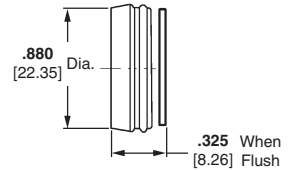
\*Cable clamp kit 213902-3 required. (Similar to 206322-9. See page 38 for dimensional detail of cable clamp) or cable clamp kit 213904-3. (Similar to 206070-8. See page 38 for dimensional detail of cable clamp).



Rear View Receptacles



Rear View Plugs



Side View Plugs/Receptacles

**Note:** Minimum insulation diameter is .156 [3.96]; maximum insulation diameter is .260 [6.60] for power contacts. Minimum insulation diameter is .060 [1.50]; maximum insulation diameter is .130 [3.30] for signal contacts.

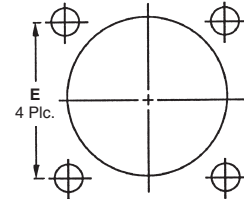
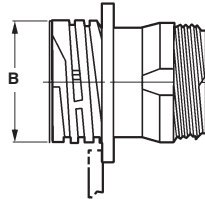
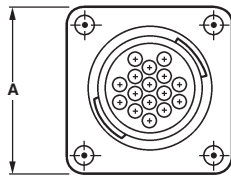
**Note:** All part numbers are RoHS Compliant.

## Two-Piece Sealed Circular Plastic Connectors, Special Series 1

### Sealed CPC Receptacles, Special Series 1 with Pre-Installed, Bonded Peripheral Seal

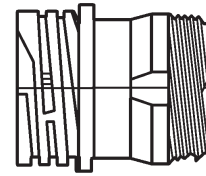
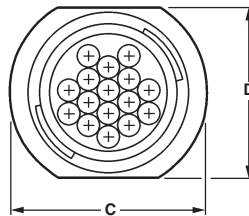


### Square Flange Receptacle (Uses Flange Seal Part No. 81665-□ on page 51)



Recommended Panel Cutout

### Free-Hanging Receptacle



Listed part numbers are for connectors only; **contacts must be ordered separately.**

#### Material and Finish

**Housing**—Thermoplastic, UL 94V-0 rated, black

**Seal**—Elastomer, gray

#### Related Product Data

**Contacts**—Pages 17-21

**Contact Arrangement**—Page 24

**Accessories**—Pages 38-42 and 51

**Performance Characteristics**—Page 6

**Application Tooling**—Pages 76-79

**Technical Documents**—Page 80

Shell Size	Dimension E
11	.844 21.44
13	.969 24.61
17	1.125 28.58
23	1.438 36.53

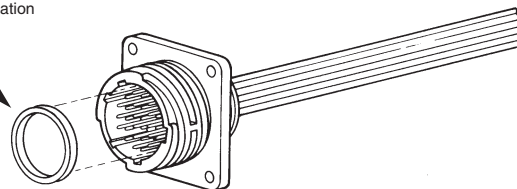
Two-Piece Sealed CPC Connectors

Arrangement	Series I Receptacles with Peripheral Seal								Mates with Plug Part No.	
	Dimensions		Sex	Square Flange Part No.		Dimensions		Free-Hanging Part No.		
Shell Size	No. of Positions	A		B	With Mounting Holes	With Threaded Inserts <sup>1</sup>	C		D	
11-4	28.58	1.125	.607	Std.	206061-2	—	.935	.817	206153-2	206060-1
		28.58	15.42	Rev.	206430-3	—	23.75	20.75	206430-4	206429-1
13-7	32.54	1.281	.812	Std.	211401-3	—	1.072	.874	—	211399-1
		32.54	20.62	Std.	206705-3	208131-2	27.23	22.20	206705-4	206708-1
17-16	36.45	1.435	1.050	Std.	206036-4	—	1.310	1.161	206036-5	206037-1
		36.45	26.67	Rev.	206043-4	—	33.27	29.49	206043-5	206044-1
23-24	44.45	1.750	1.438	Std.	206838-3	—	1.733	1.505	206838-4	206837-1
		44.45	36.53	Std.	206151-3	—	44.02	38.23	206151-4	206150-1
				Rev.	206306-3	—			206306-4	206305-1

<sup>1</sup>Four 4-40 threaded inserts per receptacle.

**Notes:** 1. For detailed performance data on peripheral seals, refer to Product Specification No. 108-10024.  
2. Receptacles mate with Series 1 plugs found on page 10.

Seal shown outside of connector for illustration purposes only.



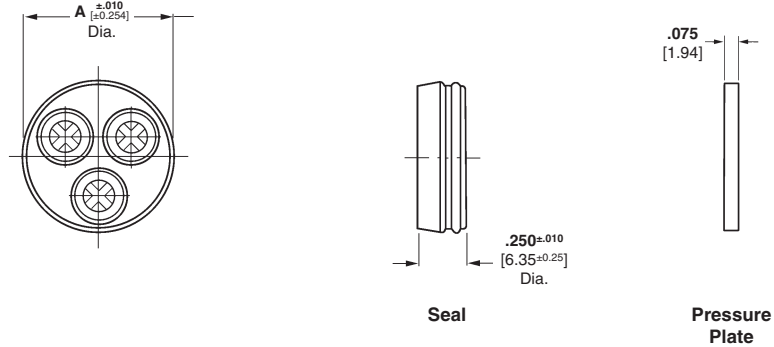
**Receptacles with pre-installed, bonded peripheral seals** are recommended for use in sealing/splash-proof applications, or where connectors will be subjected to vibration.

## Two-Piece Circular Plastic Connector Sealing Accessories

### Wire Entry Seal Kits for Plug and Receptacle Housings

#### Material and Finish

**Seal**—Silicon, black  
**Pressure Plate**—Nylon, black



Arrangement No.	Insulation Dia. Range	Dimension A	Kit for Pins	Kit for Sockets
13-9	.075-.125 1.91-3.18	.681 17.30	213926-1	213925-1
17-3	.178-.265 4.52-6.73	.790 20.07	213899-1	213899-1
17-10	.178-.265 4.52-6.73 .075-.125 1.91-3.18	.790 20.07	213900-1	213900-1
17-14	.075-.125 1.91-3.16	.790 20.07	213919-2	213919-1
17-16	.075-.125 1.91-3.16	.790 20.07	213920-2	213920-1

**Notes:** 1. Kits include one Gang Seal and one Pressure Plate marked for cavity identification.  
2. Arrangement No. 17-10 Insulation Dia. Range .178-.265 [4.52-6.73] for two holes, .075-.125 [1.95-3.18] for eight holes.

### Flange Seals

**Material** Neoprene, black

#### Related Product Data

**Dimensions**—Shell Size 17 shown; request Customer Drawings for other sizes

Shell Size	Part No.
11	81665-3
13	81665-4
17 (shown)	81665-2
23	81665-5

