



# Small Circular Connectors

Space and Weight-Saving, High-Performance Connectivity for Data Rates to 10 Gb/s

# Small Circular Connectors

## Space and Weight-Saving, High-Performance Connectivity



TE Connectivity (TE) offers a variety of small circular connectors having higher contact densities in a familiar MIL-DTL-38999 form factor. All are designed for rugged durability and space and weight savings. The range of families allows you to find the best choice to not only meet an application's space constraints, but other needs as well.

### HIGH-SPEED NETWORKING

- Achieve data rates as high as 10 Gb/s
- Shielding for EMC and signal integrity

### DURABLE

- High mating cycle life

### RUGGED RELIABILITY

- Mechanical durability capable of withstanding vibration and shock
- Environmental sealing
- Resistance to fluids and other contaminants found in ground, aerospace, and marine applications

### VERSATILE

- Choice of coupling styles, contact counts, materials and plating to match application needs

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**TE Components . . . TE Technology . . . TE Know-how . . .**

AMP | AGASTAT | CII | HARTMAN | KILOVAC | MICRODOT | NANONICS | POLAMCO | Raychem  
SEACON | Rochester | DEUTSCH

Empower Engineers to Solve Problems, Moving the World Forward.



**Nanominiature**



**NANONICS  
Nanominiature Connectors**

- Versatile: 7, 19, and 44 positions
- Flexible: Push-pull or threaded coupling
- Environmentally sealed
- Factory terminated assemblies
- 4 to 16.5 mm diameter



**CeeLok FAS-T Nano  
Circular Connectors**

- Fast: 10G Ethernet capable 8-position connector
- Improved signal integrity: Innovative T-shaped contact pattern reduces crosstalk
- Extreme space and weight savings
- Factory terminated assemblies
- 5.5 to 13 mm diameter

**Microminiature**



**Circular HD Connectors**

- Cost-effective microcircular devices
- 5 shell sizes ranging from 14 to 27 mm in diameter
- Versatile: contact counts from 2 to 40
- Easy to mate: push-pull self-locking mating interface



**Metal-Shell Micro  
Circular Connectors**

- USB 2.0 signal compatible
- Flexible: bayonet, push-pull, or threaded coupling styles
- Pin and socket or spring probe contacts
- Signal only and hybrid signal/power versions
- 13 to 24 mm diameter



**Wildcat Micro Connectors**

- Compact: 2 shell sizes, 3, 5, or 9 contacts
- Lightweight materials for space and weight savings
- Rugged: extreme temperature, vibration, fluid, and corrosion resistance
- Bayonet coupling or optional anti-vibration triple-start threaded
- 12.5 to 15.2 mm diameter

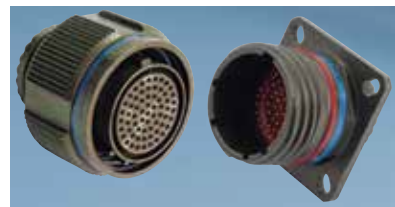
**Compact**



**CeeLok FAS-T Connectors**

- Fast: 10G Ethernet capable 8-position connector
- Space saving: Size 8 shell
- Convenient: field terminable, field repairable
- Improved signal integrity: innovative T-shaped contact pattern reduces crosstalk
- 16 mm diameter

**Standard**



**Wildcat 38999 Connectors**

- Use 38999 shells and accessories
- Space saving: nearly twice the contact density as standard MIL-DTL-38999 connectors
- Fully sealed cable and mating interface
- Rugged: threaded anti-vibration coupling
- 21.3 to 36.8 mm diameter



**CeeLok FAS-X Connectors**

- Fast: 1G and 10G Ethernet capable
- Compact: 2 shell sizes, 8 or 32 contacts
- 1 or 4 Ethernet channels
- Maintains a highly matched 100-ohm impedance, with superior signal integrity
- 0.984" (Size 11) and 1.889" (Size 25) dia.
- Lightweight aluminum or composite shells



	Nanominature		Microminature	
	NANONICS Nanominature Connectors	CeeLok FAS-T Nano Circular Connectors	Circular HD Connectors	Metal-Shell Micro Circular Connectors
Description	Extreme density for maximum space savings	10G speeds in a nanominature connector	Small, high density push-pull, self-locking, blind-mate circular I/O connectors	Wide range of options in a USB and Ethernet compatible connectors
Number of Contacts	7, 19, 44	8	3, 4, 7, 8, 9, 12, 19, 40	7, 14, 19, 30
Number of Shell Sizes	3	1	5	4
Plug Diameter	.25" to .475" (6.4 to 12.1 mm)	.30" (7.6 mm) Push Pull .355" (9.0 mm) Threaded	.551" to 1.063" (14 to 27 mm)	.551" to .984" (14 to 25 mm)
Temperature Rating (°C)	-55 to +200	-55 to +125	-65 to +125	-55 to +150
Sealing IP Rating	IP68	IP68	IP68	IP67
Sealing Altitude Immersion	—	—	—	—
Mating Cycles (Min.)	250	250	1000	2000
Salt Fog/Mist (Hours)	MIL-DTL-83513	MIL-DTL-83513	96	120
Vibration: Sine	10-2000 Hz, 20 g	10-2000 Hz, 20 g	50 g Half Sine	10-55-10 Hz, 20 g
Vibration: Random	50-2000 Hz, 46.3 g	50-2000 Hz, 46.3 g	10-2000 Hz, 15 g	—
Dielectric Withstanding Voltage (VAC)	500 @ Sea Level 150 @ 70,000'	500 @ Sea Level 150 @ 70,000'	725-1,000 @ Sea Level 175-250 @ 70,000'	500 @ Sea Level
Contact Current Rating (Amps/Contact)	1	1	0.5 up to 20	2
Coupling Style	Push-Pull, Threaded	Push-Pull, Threaded	Push-Pull	Push-Pull, Threaded, Bayonet
Contact Style	Pin & Socket	Pin & Socket	Pin & Socket	Pin & Socket Spring Probe
Scoop Proof	Yes	Yes	Yes	
Wire Size (AWG)	28 to 34	28 to 30	10 to 28	20 to 24
PCB Version	Yes	Yes	Yes	Yes
Shell Keying	No	No	Yes	Yes





Microminiature	Compact	Standard		
Wildcat Micro Connectors	CeeLok FAS-T Connectors	Wildcat 38999 Connectors	CeeLok FAS-X Connectors	
Extreme temperature, vibration, fluid, and corrosion resistance in a high-density, lightweight connector	10G speeds in a compact, field terminable, field repairable connector	38999 form factor with higher contact densities than MIL-DTL-38999 connectors	10G Ethernet data delivery in rugged, noisy environments	Description
3, 5, 9	8	11 to 118	8, 32	Number of Contacts
2	1	5	2	Number of Shell Sizes
.492" to .596" (12.5 to 15.15 mm)	.750" (19.05 mm)	.839" to 1.374" (21.33 to 34.90 mm)	0.984" and 1.889" (24.99 mm and 47.98 mm)	Plug Diameter
-55 to +175	-65 to +175	-65 to +200 (Nickel Plating) -65 to +175 (Cadmium Plating)	-65 to +200	Temperature Rating (°C)
IP67	IP67	—	IP67	Sealing IP Rating
—	70,000'	100,000'	50,000'	Sealing Altitude Immersion
500	500	500	500 (38941-22x and 38943-22x) 1500 (12331-22 and 12333-22)	Mating Cycles (Min.)
500 (Cadmium Plating)	500 (Black Nickel Zinc Plating)	500 (Cadmium Plating)		Salt Fog/Mist (Hours)
10–2000 Hz, 30 g Max	MIL-DTL-38999 Series III	MIL-DTL-38999 Series III		Vibration: Sine
50–2000 Hz, 1 g2/Hz	43.92 g	MIL-DTL-38999 Series III		Vibration: Random
1000	500 VAC @ Sea Level 100 VAC @ 70,000'	1000	1300	Dielectric Withstanding Voltage (VAC)
3 to 5	5	3	5	Contact Current Rating (Amps/Contact)
Bayonet, Threaded	Threaded	Threaded	Bayonet/Threaded	Coupling Style
Pin & Socket	Pin & Socket	Pin & Socket	Pin & Socket	Contact Style
Yes	Yes	Yes	Yes	Scoop Proof
22 to 28	22 to 28	24 to 28	22 to 36	Wire Size (AWG)
Yes	Yes	Yes	Yes	PCB Version
Yes	Yes	Yes	Yes	Shell Keying

# NANONICS Environmentally Sealed Circular Connectors



## RUGGED

- Metal shell
- Environmental O-ring seal

## FLEXIBLE CONFIGURATIONS

- 7, 19, and 44 positions
- Choice of coupling styles:
  - Push-pull quick disconnect
  - Threaded

## CUSTOMIZABLE

- Factory wired to your specifications
- Contact TE Connectivity for custom configurations

NANONICS environmentally sealed circular connectors represent one of the industry's smallest and most reliable connector designs. These connectors are ideally suited for applications where high density, reliability, and reduced size and weight are serious design parameters. Along with these attributes, they also meet the immersion requirements of IP68, more specifically, a mated pair immersed in 1 m of water for 2 hours.

Using the same contact system and materials as the DUALOBE rectangular series of connectors, the circular connectors are manufactured to the performance specifications of MIL-DTL-83513.

Plug connectors are offered in both quick-disconnect or threaded coupling configurations. Receptacle connectors are offered in front-panel-mount or rear-panel-mount configurations. The quick-disconnect plug will mate with both the front and rear-panel-mount receptacles, while the threaded coupling plug will only mate with the rear-mount receptacle.

The connectors are available in pin counts of 7, 19, and 44.

Optional backshells are also available for the plug connectors and the rear panel mount receptacle.

Ideal for cable-to-cable, cable-to-panel, or cable-to-board applications, TE Connectivity can also accommodate harness assemblies and custom configurations.

## Performance Characteristics

### ELECTRICAL

- **Contact Resistance:** .003-.008 ohms
- **Current Rating:** 1 amp max. per contact
- **Dielectric Withstanding Voltage:**  $V_{rms}$  60 Hz at room ambient conditions  
500 V @ sea level  
150 V @ 70,000 ft.
- **Insulation Resistance:**  
5000 M $\Omega$  min. (@ 500 VDC) at room ambient conditions
- **Magnetic Permeability:** 2 m $\mu$  max.

### MATERIALS

- **Contacts:** Beryllium copper alloy, plated gold over nickel
- **Plastic Insulators and Shells:** PPS
- **Metal Shells:** 6061-T6 aluminum with electroless nickel plating. Stainless steel shells available. Gold plated or matte black nickel also available (consult TE for details)

### ENVIRONMENTAL

- **Temperature Range:** -55°C to +200°C
- **Durability:** 250 mating cycles  
With mated pair of stainless steel shells: 1000 cycles (consult TE for part numbers)

### MECHANICAL

- **Jam Nut and Coupling Nut Torque:**  
7 Pos. — 6 in-lb max.  
19 Pos. — 8 in-lb max.  
44 Pos. — 10 in-lb max.



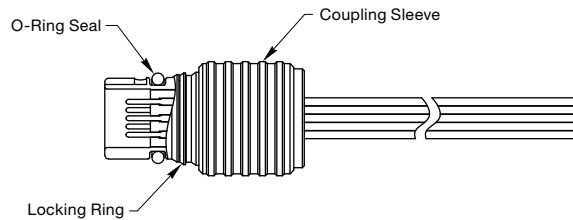
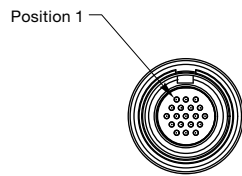
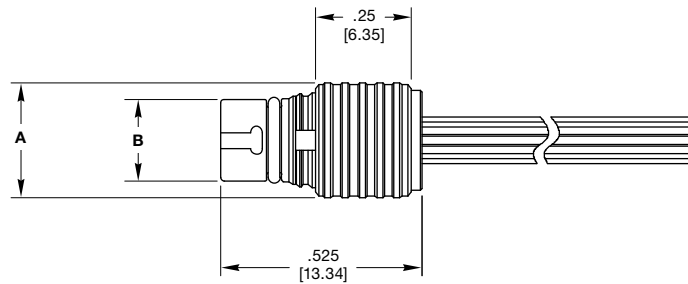
## NANONICS Environmentally Sealed Circular Connectors

### At a Glance: NANONICS Environmentally Sealed Circular Connectors

Type	Coupling/Mounting	Backshell	Drawing No.		
			7 Pos.	19 Pos.	44 Pos.
Plug	Quick Disconnect	None	1589055	1589057	1589059
		Straight	1589691	1589692	1589693
		Right Angle	1925026	1925027	1925028
	Threaded	None	1589063	1589064	1589065
		Straight	1589686	1589688	1589694
		Right Angle	1925029	1925030	1925031
Receptacle	Quick Disconnect, Flush Mount	None	1589056	1589058	1589690
	Quick Disconnect/Threaded, Panel Mount*	None	1589060	1589061	1589062
		Straight	1589685	1589687	1589695
	PCB Mount	—	1589953	1589954	1589955

\*Mates with both quick-disconnect and threaded plugs

### Quick-Disconnect Plug Assemblies

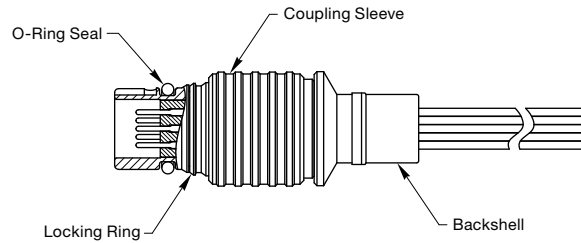
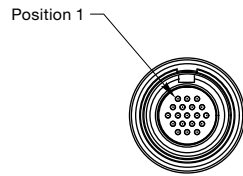
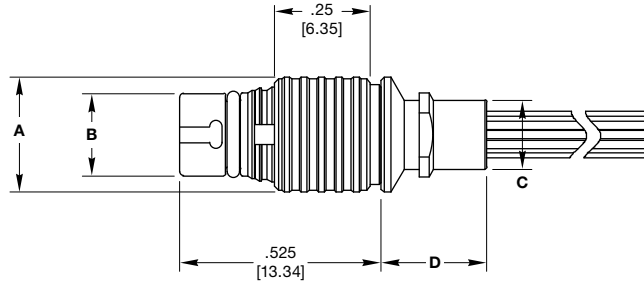


No. of Pos.	Dimensions		Drawing No.
	A (Dia.)	B (Dia.)	
7	.25 (6.35)	.165 (4.19)	1589055
19	.30 (7.62)	.215 (5.46)	1589057
44	.395 (10.03)	.315 (8.00)	1589059



## NANONICS Environmentally Sealed Circular Connectors

### Quick-Disconnect Plug Assemblies with Backshells

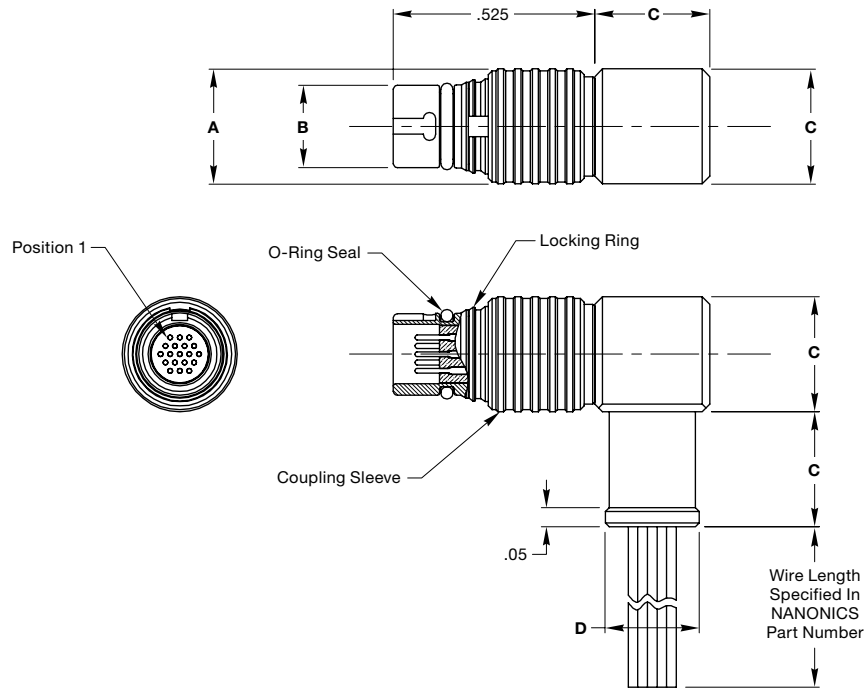


No. of Pos.	Dimensions				Drawing No.
	A (Dia.)	B (Dia.)	C (Dia.)	D	
7	.25 (6.35)	.165 (4.19)	.130 (3.30)	.275 (6.99)	1589691
19	.30 (7.62)	.215 (5.46)	.180 (4.57)	.275 (6.99)	1589692
44	.395 (10.03)	.315 (8.00)	.240 (6.10)	.325 (8.26)	1589693



## NANONICS Environmentally Sealed Circular Connectors

### Quick-Disconnect Plug Assemblies with Right-Angle Backshells

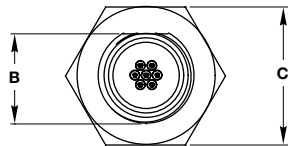
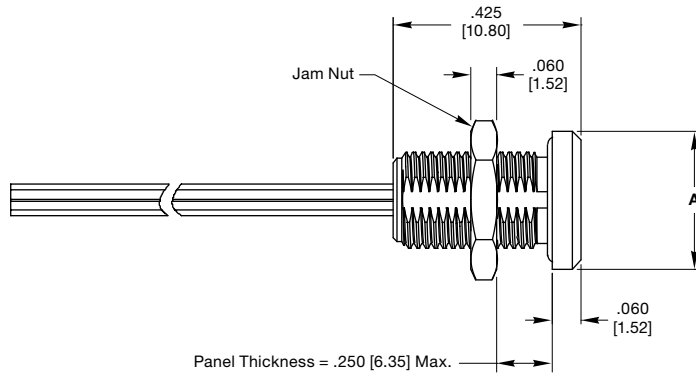


No. of Pos.	Dimensions				Drawing No.
	A (Dia.)	B (Dia.)	C	D (Dia.)	
7	.25 (6.35)	.165 (4.19)	.25	.195	1925026
19	.30 (7.62)	.215 (5.46)	.30	.245	1925027
44	.395 (10.03)	.315 (8.00)	.40	.310	1925028

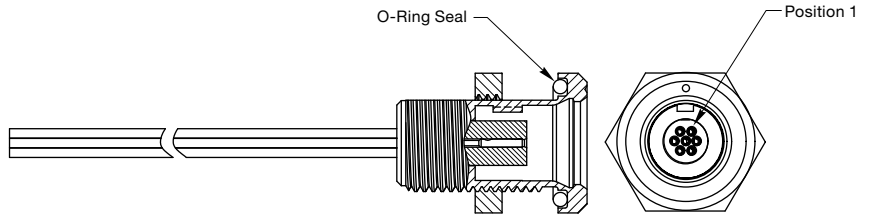


## NANONICS Environmentally Sealed Circular Connectors

### Quick-Disconnect Receptacle Assemblies, Flush Mount



Hex (Jam Nut)

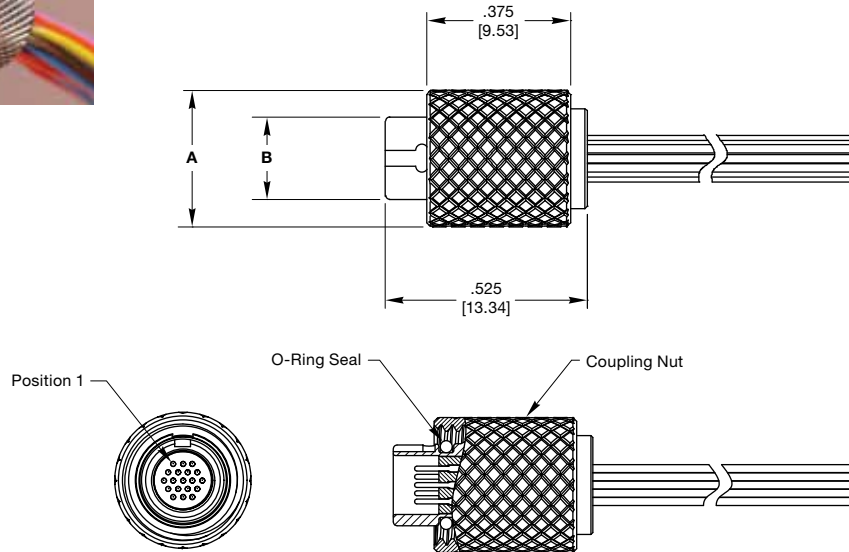


No. of Pos.	Dimensions			Drawing No.
	A (Dia.)	B	C	
7	.312 (7.92)	.204 (5.18)	.312 (7.92)	1589056
19	.375 (9.53)	.258 (6.55)	.375 (9.53)	1589058
44	.500 (12.7)	.375 (9.53)	.500 (12.7)	1589690



## NANONICS Environmentally Sealed Circular Connectors

### Threaded Plug Assemblies



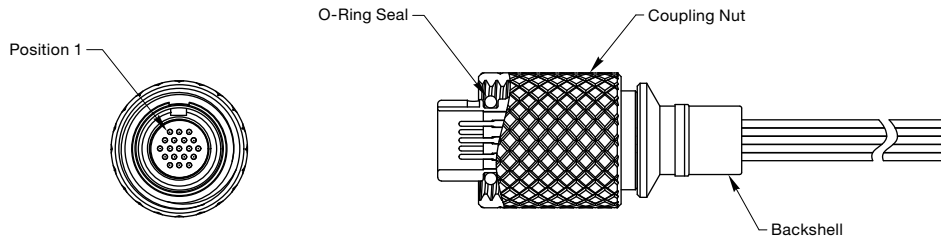
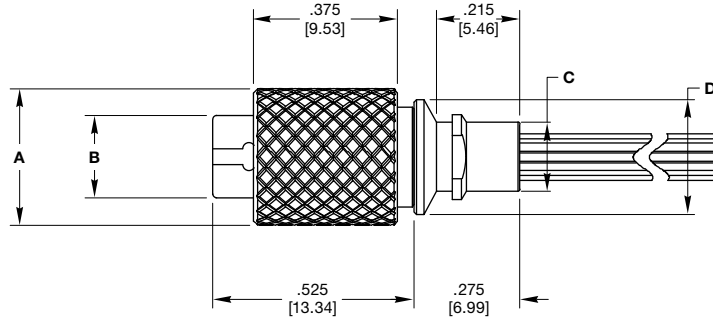
No. of Pos.	Dimensions		Drawing No.
	A (Dia.)	B (Dia.)	
7	.315 (8.00)	.165 (4.19)	1589063
19	.355 (9.02)	.215 (5.46)	1589064
44	.475 (12.07)	.315 (8.00)	1589065





## NANONICS Environmentally Sealed Circular Connectors

### Threaded Plug Assemblies with Backshell

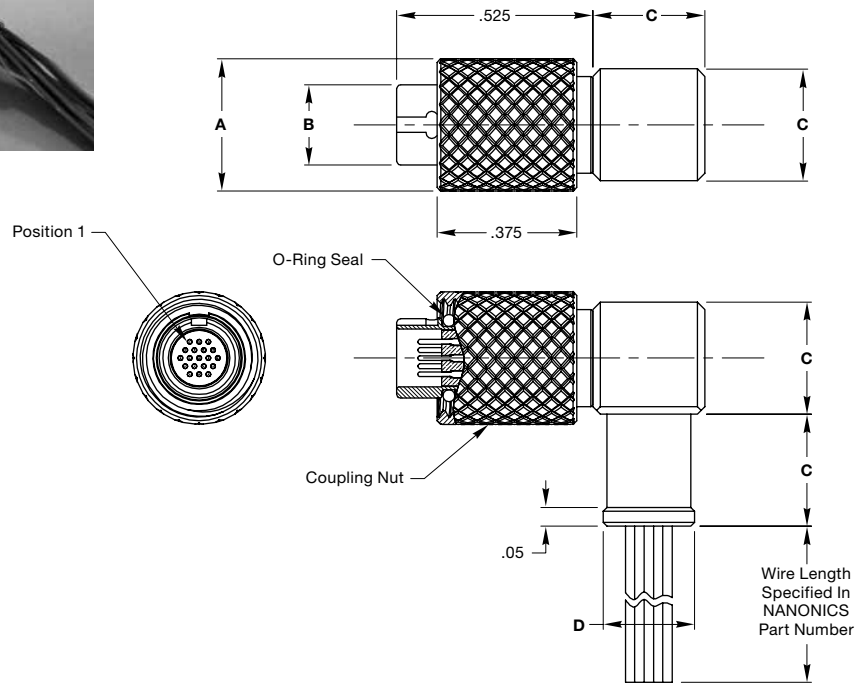


No. of Pos.	Dimensions				Drawing No.
	A (Dia.)	B (Dia.)	C	D (Dia.)	
7	.315 (8.00)	.165 (4.19)	.130 (3.30)	.250 (6.35)	1589686
19	.355 (9.02)	.215 (5.46)	.180 (4.57)	.300 (7.62)	1589688
44	.475 (12.07)	.315 (8.00)	.240 (8.10)	.395 (10.03)	1589694



## NANONICS Environmentally Sealed Circular Connectors

### Threaded Plug Assemblies with Right-Angle Backshell



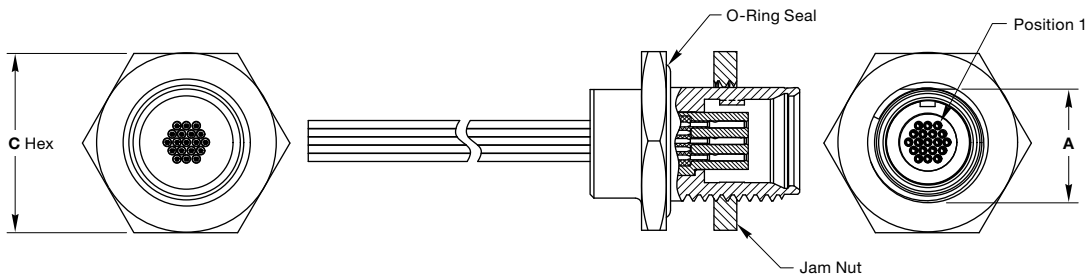
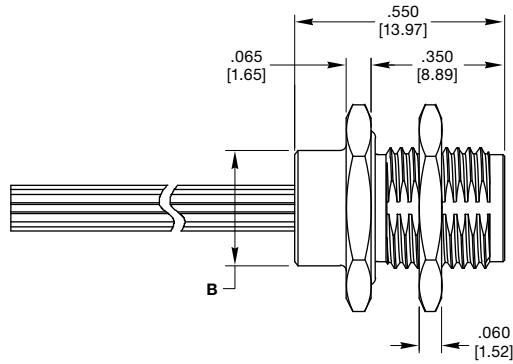
No. of Pos.	Dimensions				Drawing No.
	A (Dia.)	B (Dia.)	C	D (Dia.)	
7	.315 (8.00)	.165 (4.19)	.250	.195	1925029
19	.355 (9.02)	.215 (5.46)	.300	.245	1925030
44	.475 (12.07)	.315 (8.00)	.400	.310	1925031



## NANONICS Environmentally Sealed Circular Connectors

### Threaded/Quick-Disconnect Panel-Mount Receptacle Assemblies

Mates with both quick-disconnect and threaded plugs



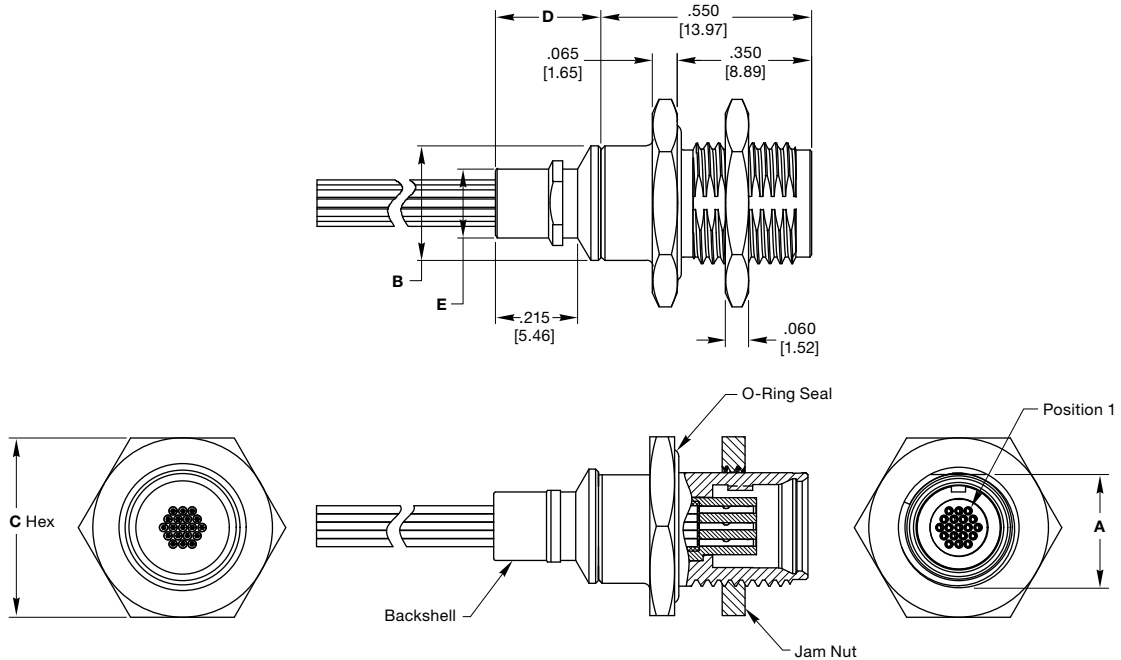
No. of Pos.	Dimensions			Drawing No.
	A (Dia.)	B (Dia.)	C	
7	.258 (6.55)	.250 (6.35)	.406 (10.31)	1589060
19	.298 (7.57)	.300 (7.62)	.469 (11.91)	1589061
44	.414 (10.51)	.395 (10.03)	.563 (14.30)	1589062



## NANONICS Environmentally Sealed Circular Connectors

### Threaded/Quick-Disconnect Panel-Mount Receptacle Assemblies with Backshell

Mates with both quick-disconnect and threaded plugs



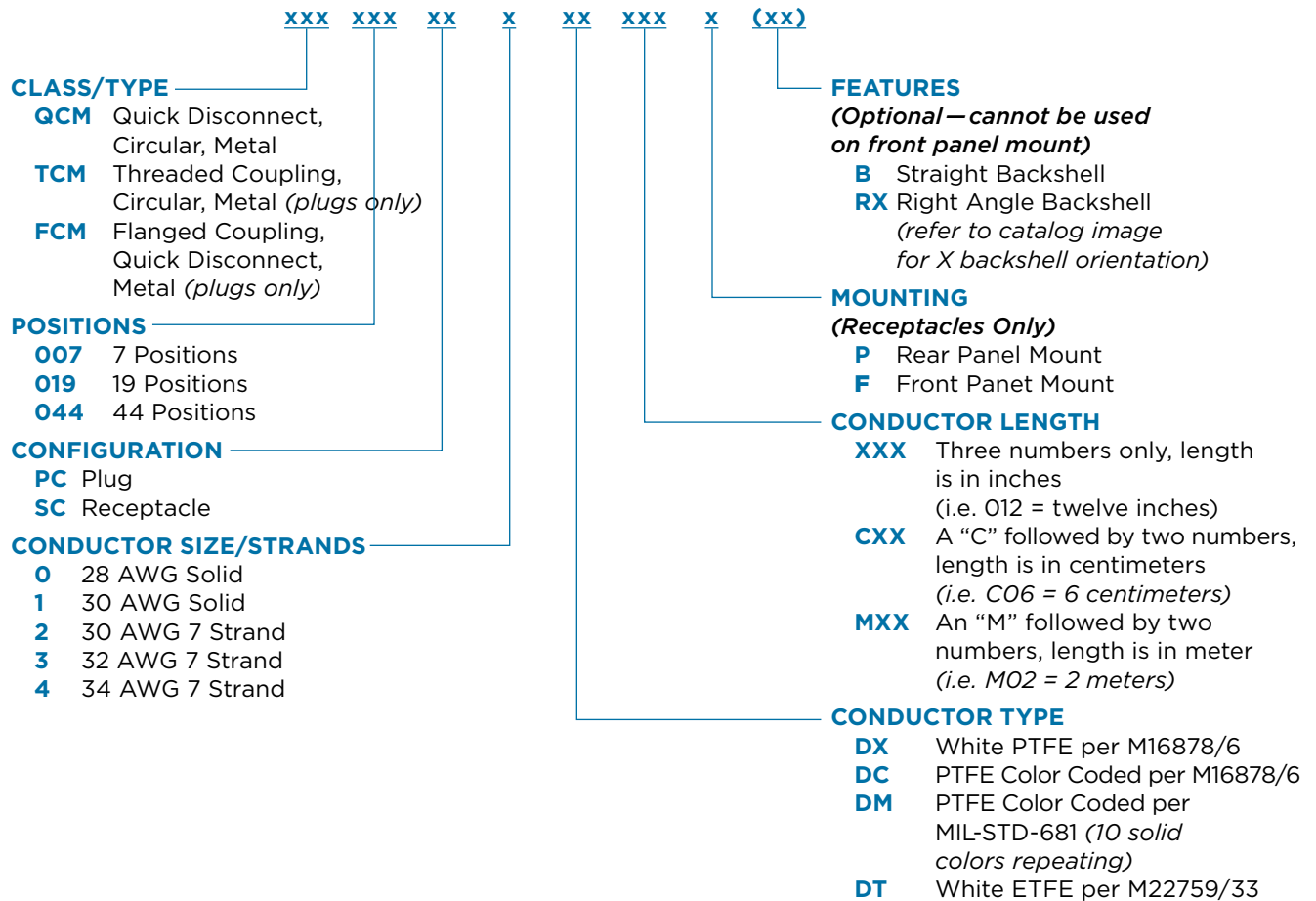
No. of Pos.	Dimensions					Drawing No.
	A (Dia.)	B (Dia.)	C	D	E (Dia.)	
7	.258 (6.55)	.250 (6.35)	.406 (10.31)	.275 (6.99)	.130 (3.30)	1589685
19	.298 (7.57)	.300 (7.62)	.469 (11.91)	.275 (6.99)	.180 (4.57)	1589687
44	.414 (10.51)	.395 (10.03)	.563 (14.30)	.325 (8.26)	.240 (6.10)	1589695



## NANONICS Environmentally Sealed Circular Connectors

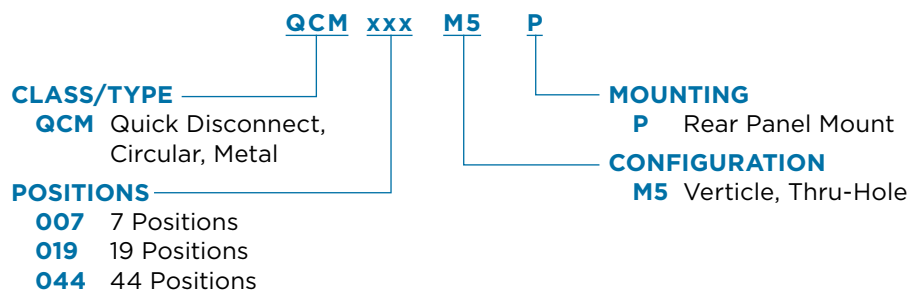
### Part Numbering Guide for NANONICS Environmentally Sealed Circular Connectors

#### Circular Connectors—Wire Terminations



### Part Numbering Guide for NANONICS Board-Mount Circular Connectors

#### Circular Connectors—Board Mounted Terminations

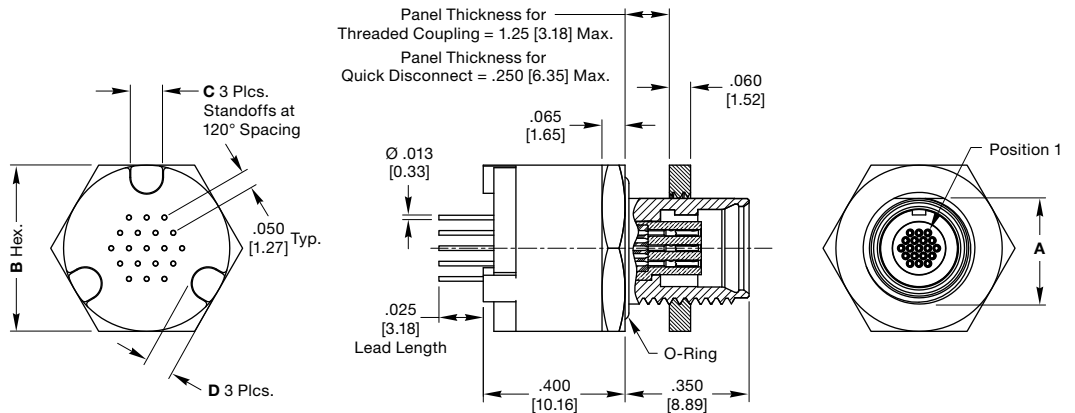




## NANONICS Environmentally Sealed Circular Connectors

### Thru-Hole Receptacle Assemblies, Vertical Mount

Mates with both quick-disconnect and threaded plugs



No. of Pos.	Dimensions				Drawing No.
	A (Dia.)	B	C	D	
7	.258 (6.55)	.406 (10.31)	.080 (2.03)	.070 (1.78)	1589953
19	.298 (7.57)	.469 (11.91)	.090 (2.29)	.080 (2.03)	1589954
44	.414 (10.52)	.563 (14.30)	.090 (2.29)	.080 (2.03)	1589955

### ACCESSORIES

#### Heat-Shrinkable Molded Boots



#### Hazard Matched

- Different materials to meet different temperature and environmental requirements
- Optional with pre-applied adhesives for quick installation and high-reliability IP67 sealing
- Epoxy sealing kits available

#### Versatile

- Sealing and strain relief to the wires and cables
- Straight or 90 degree cable exit

#### Bandstraps



#### Easy to Use

- Quick, easy, cost-effective and reliable termination of braided shielding

#### High Performance

- Low profile, one-piece design eliminates EMI leakage paths

#### Rugged

- Shock, vibration and environmental tested to meet aerospace and defense requirements

Description	Part No.
Bandstrap	BND-O812S

# CeeLok FAS-T Nano Circular Connectors

## 10 Gb/s Ethernet Connectivity



CeeLok FAS-T Nano circular connectors give you 10 Gb/s Ethernet connectivity in a nanominiature circular connector—pushing the limits of high-speed I/O to new levels of compact convenience, durability, and environmental sealing.

The connectors use the same shells as our well-established environmentally sealed circular connectors, but with an enhanced insert to support high-speed signals. The 8-position connector's T-shaped contact pattern provides noise cancellation and decoupling to minimize crosstalk and increase signal integrity.

### APPLICATIONS

#### HIGH SPEED

- Gigabit or 10 Gigabit rates for high-speed transmission of data, ideal for tight link budgets
- Factory terminated assemblies using 30 AWG TurboTwin cable
- T-shaped pin pattern improves signal integrity through uniform crosstalk cancellation

#### SPACE AND WEIGHT SAVINGS

- Nanominiature size enables high-speed connectivity in an extremely small space envelope
- Lightweight NANONICS housing available in push-pull or threaded coupling for a broad range of applications and uses

#### FLEXIBLE CONFIGURATIONS

- Choice of coupling styles:
  - Push-pull quick disconnect
  - Threaded
- Available in board-mount and cable-applied versions

#### RUGGED

- Withstands the harsh operating environment typical of aerospace, defense, and marine applications

- Military Weapons
- Ground Support Systems
- Soldier-Worn Applications
- Avionics
- Instrumentation
- Down-hole Telemetry Tools







### MECHANICAL/ENVIRONMENTAL

- **Vibration, Sine:** 10-2000 Hz, 20 g (EIA-364-28, Test Condition IV)
- **Vibration, Random:** 50-2000 Hz, 46.3 g (EIA-364-28, Test Condition V, Letter K)
- **Mating Cycles Min:** 250 Electroless nickel-plated aluminum shells
- **Mechanical Shock:** 300 g, 3 ms, Half-sine (EIA364-27, Test Condition D)
- **Weight:** Push-pull plug with a straight backshell and 1 meter of TurboTwin cable weighs less than 13 g. A PCB mount receptacle weighs less than 3 g
- **Temperature Range:** -55°C to +125°C
- **Environmental Sealing:**  
Immersion: IP68, mated  
Water Jet: IPX6, mated  
Dust: IP6X, mated
- **Durability:** 250 mating cycles
- **Salt Fog/Mist:** per Mil-DTL-83513

### ELECTRICAL DATA

- **Dielectric Withstanding Voltage:**  
500 VAC @ sea level  
100 VAC @ 70,000 ft.
- **Current Rating:** 1 A/contact

### MATERIALS

- **Body and Coupling Sleeve:**  
Electroless nickel-plated aluminum (standard)  
Passivated stainless steel (increased durability)
- **Contacts:** Beryllium copper alloy, gold over nickel
- **Locking Ring:** Electroless nickel-plated beryllium copper
- **Lead Organizer (PCB Mount):** Thermoplastic
- **Insulator:** Liquid crystal polymer
- **O-Ring:** Fluorosilicone

### STANDARDS AND TEST REPORT

- **TE Product Specification:** 108-32048
- **TE Qualification Test Report:** 501-134021

Type	Coupling/Mounting	Base Part No.		
		No Backshell	Straight Backshell	Right-Angle Backshell
Plug	Quick Disconnect	1925248-1	1925249-1	1925250-1
	Threaded Coupling	1925251-1	1925252-1	1925253-1
	Flanged Quick Disconnect	1925254-1	1925255-1	1925256-1
Receptacle	Front Flush Mount	1925257-1	—	—
	Rear Panel Mount*	1925258-1	1925259-1	1925260-1
	PCB Mount	1925261-1	—	—

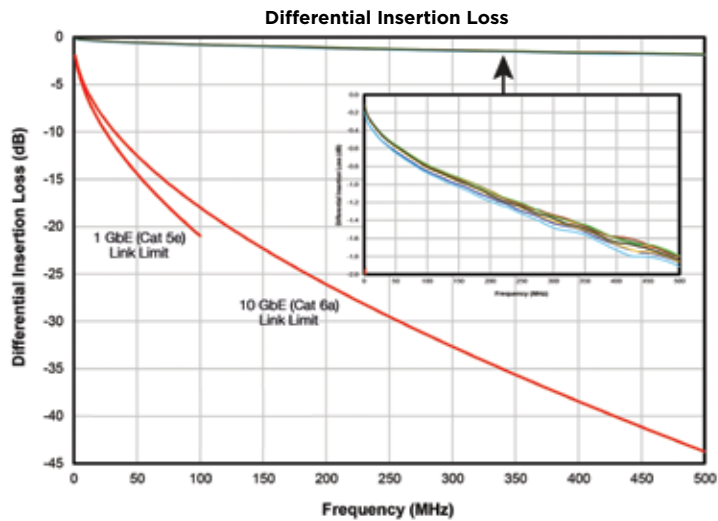
\*Mates with both quick-disconnect and threaded plugs.

Cable assemblies use Madison TurboTwin cable, a four-pair 30 AWG cable with a 100-ohm differential impedance. Standard length is 36". Consult TE for other lengths.

Board-mount connectors are terminated with 28 AWG solid copper wire, pre-soldered for ease of termination to the printed circuit board.



## Superior Signal Integrity at Gigabit Rates

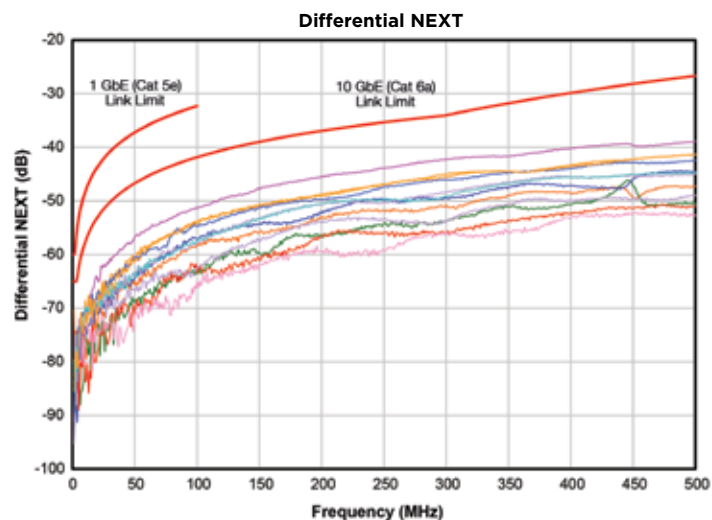
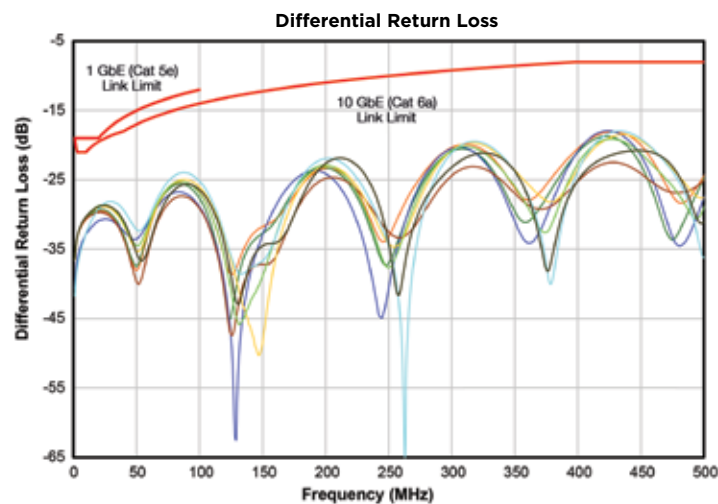


### Superior Impedance Matching

CeeLok FAS-T Nano connectors are designed to maintain a highly matched 100-ohm impedance, with superior signal integrity.

### More High-Frequency Headroom

The design and close impedance matching of the CeeLok FAS-T Nano connector gives you more performance margin to tolerate noisy environments that are sensitive to harmful interference.

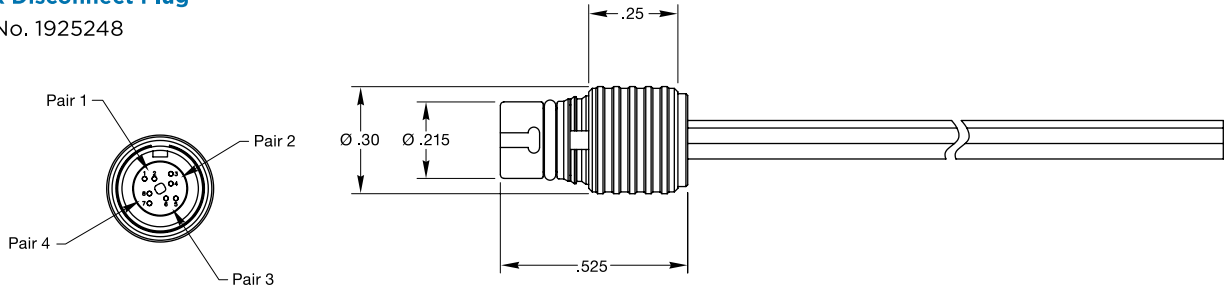




## CeeLok FAS-T Nano Circular Connectors

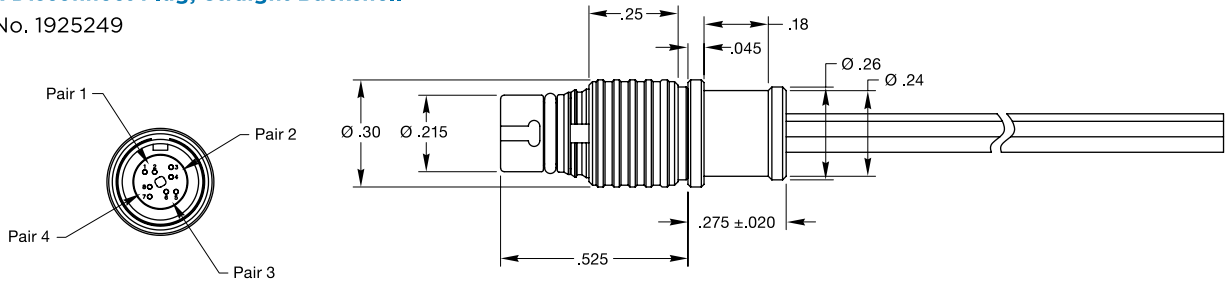
### Quick Disconnect Plug

Part No. 1925248



### Quick Disconnect Plug, Straight Backshell

Part No. 1925249

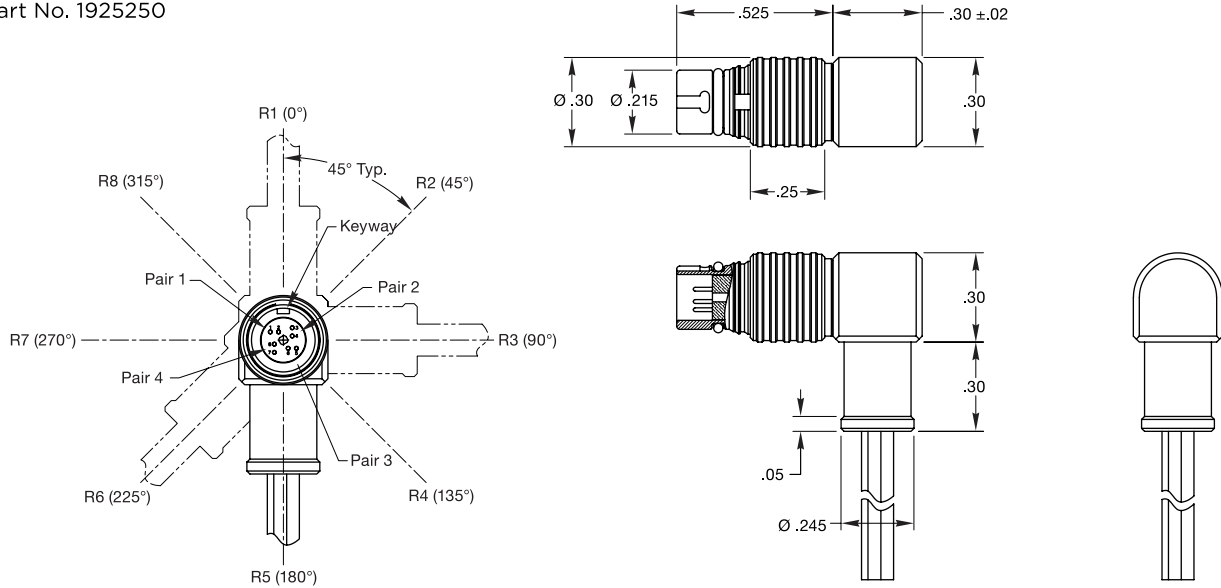




## CeeLok FAS-T Nano Circular Connectors

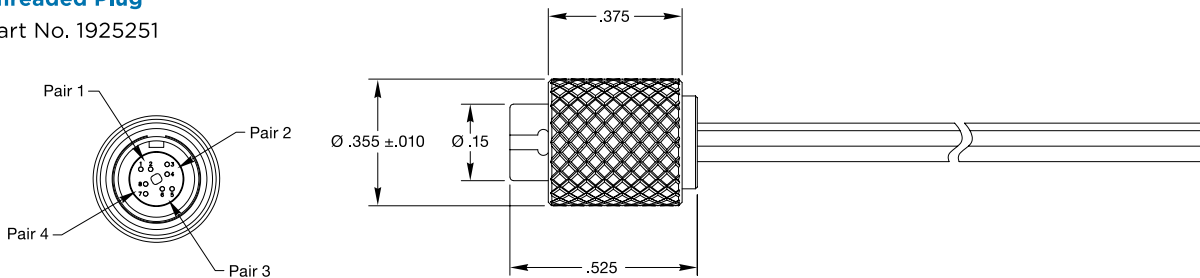
### Quick Disconnect Plug, Right-Angle Backshell

Part No. 1925250



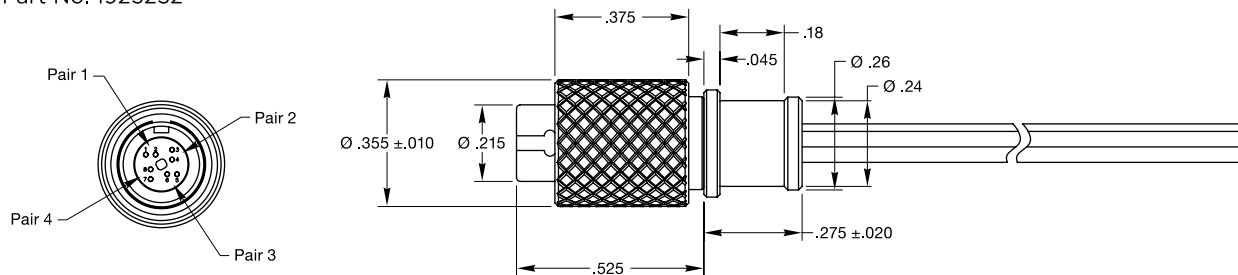
### Threaded Plug

Part No. 1925251



### Threaded Plug, Straight Backshell

Part No. 1925252

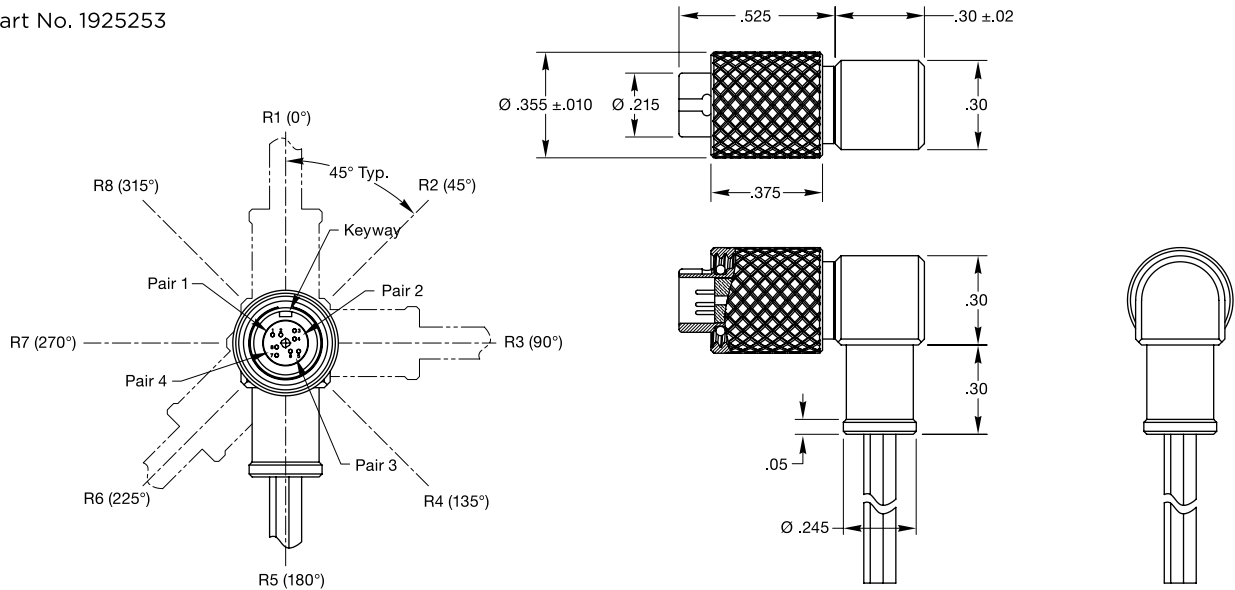




## CeeLok FAS-T Nano Circular Connectors

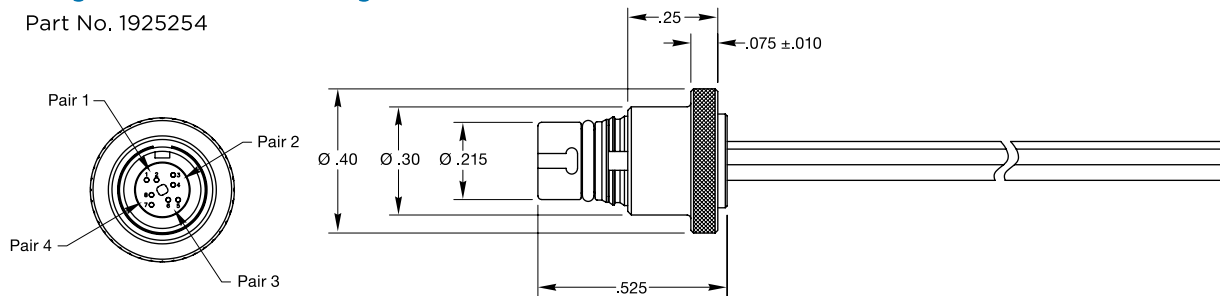
### Threaded Plug, Right-Angle Backshell

Part No. 1925253



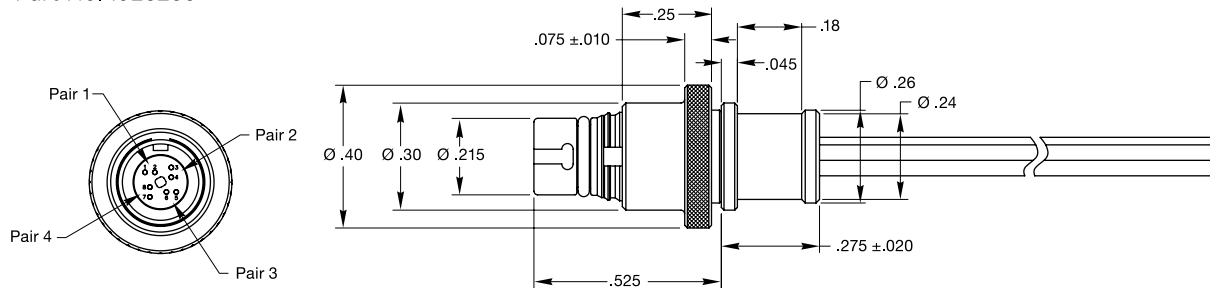
### Flanged Quick-Disconnect Plug

Part No. 1925254



### Flanged Quick-Disconnect Plug, Straight Backshell

Part No. 1925255

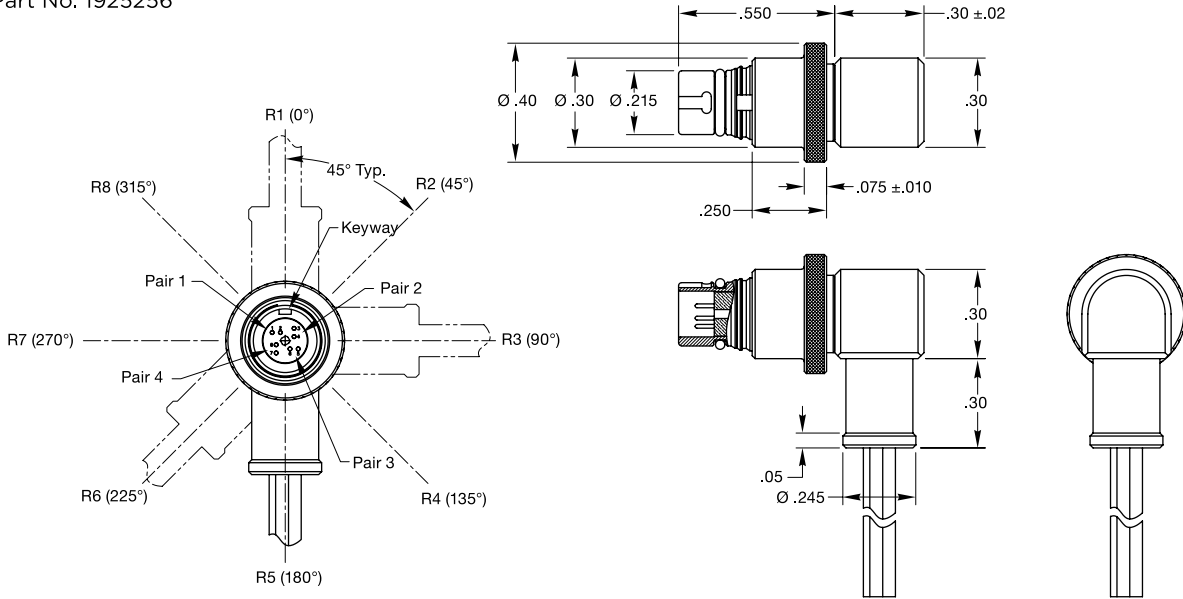




## CeeLok FAS-T Nano Circular Connectors

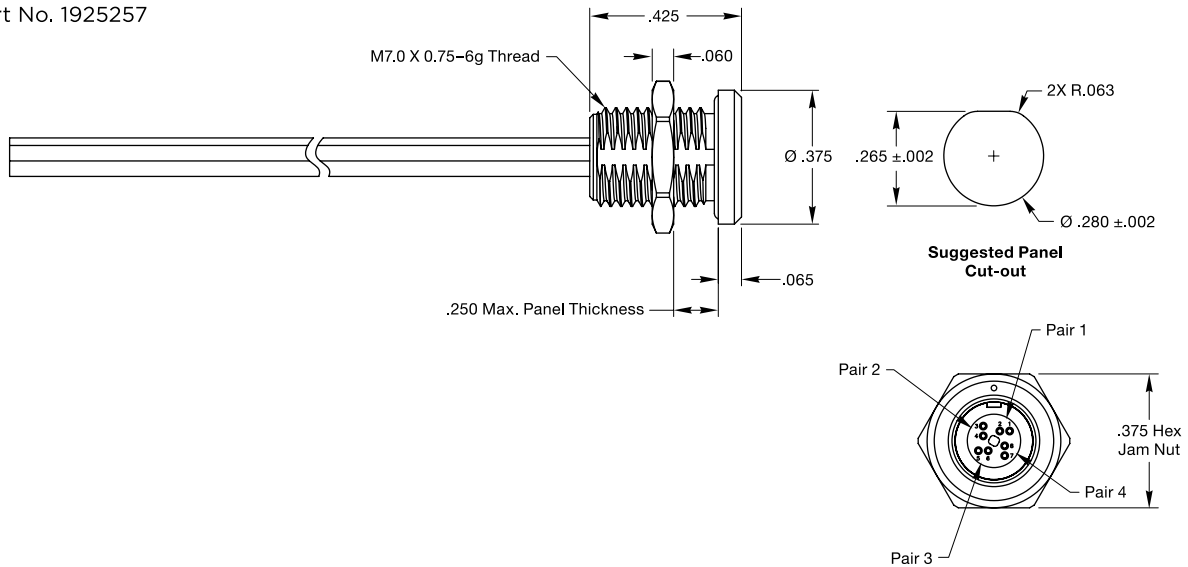
### Flanged Quick-Disconnect Plug, Right-Angle Backshell

Part No. 1925256



### Front Flush-Mount Receptacle

Part No. 1925257



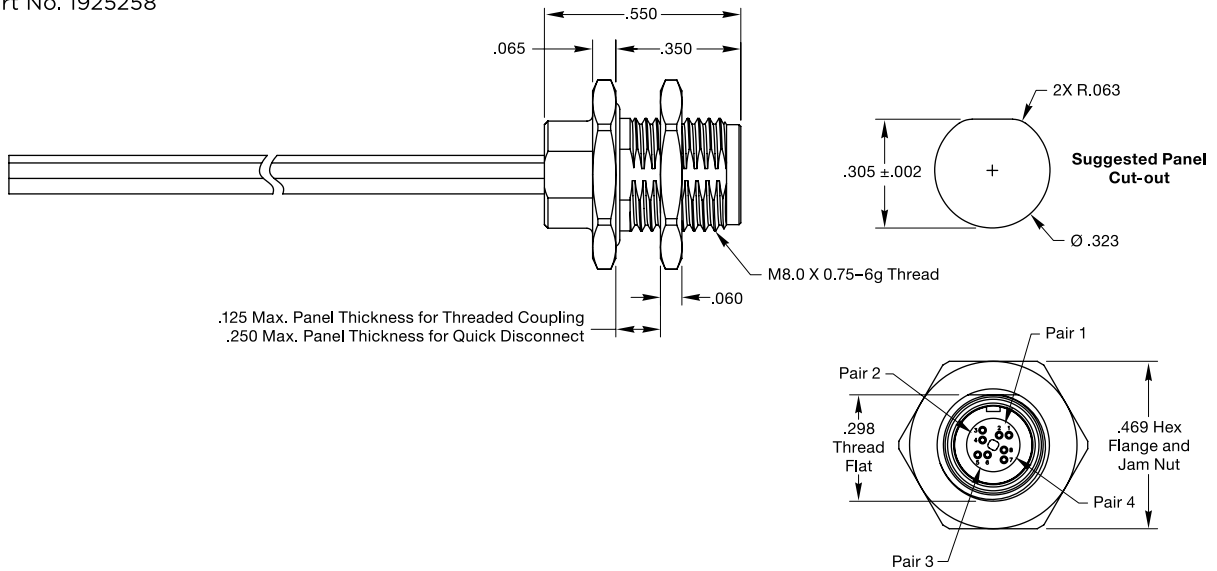


## CeeLok FAS-T Nano Circular Connectors

### Rear Panel-Mount Receptacle

Mates with both quick-disconnect and threaded plugs

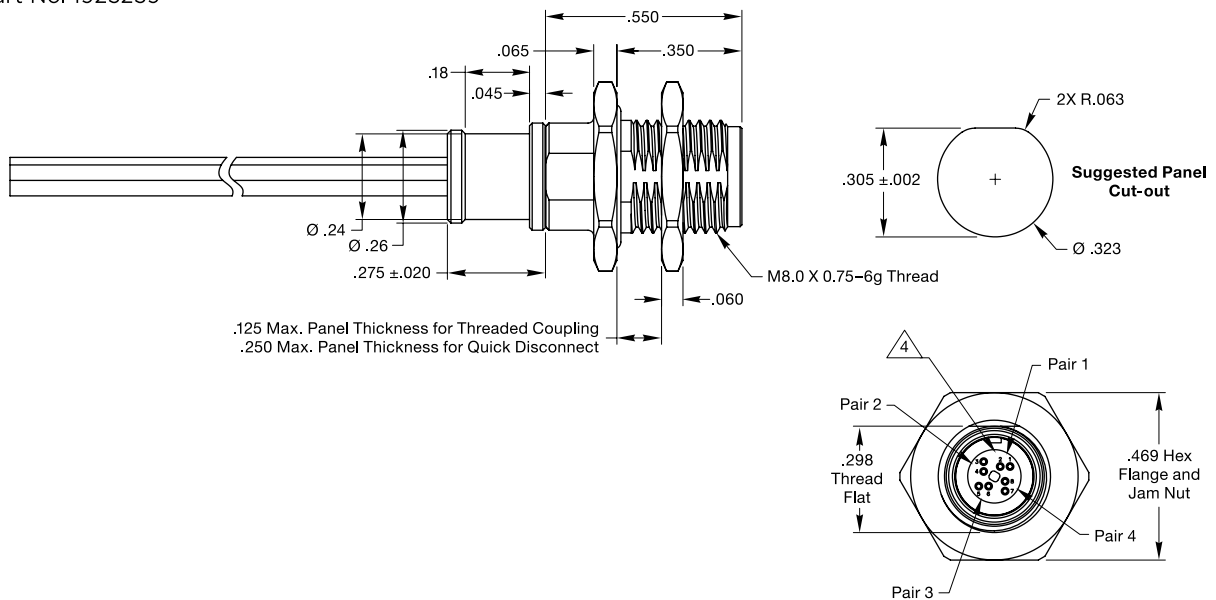
Part No. 1925258



### Rear Panel-Mount Receptacle, Straight Backshell

Mates with both quick-disconnect and threaded plugs

Part No. 1925259





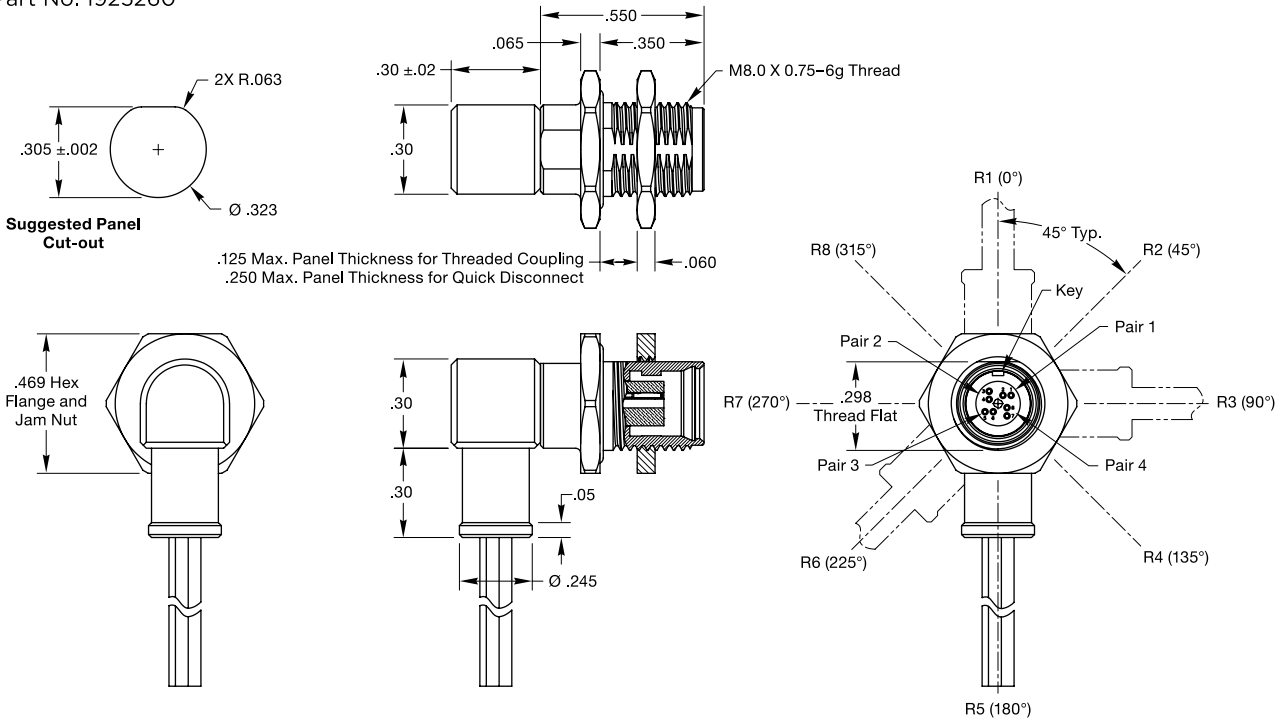


## CeeLok FAS-T Nano Circular Connectors

### Rear Panel-Mount Receptacle, Right-Angle Backshell

Mates with both quick-disconnect and threaded plugs

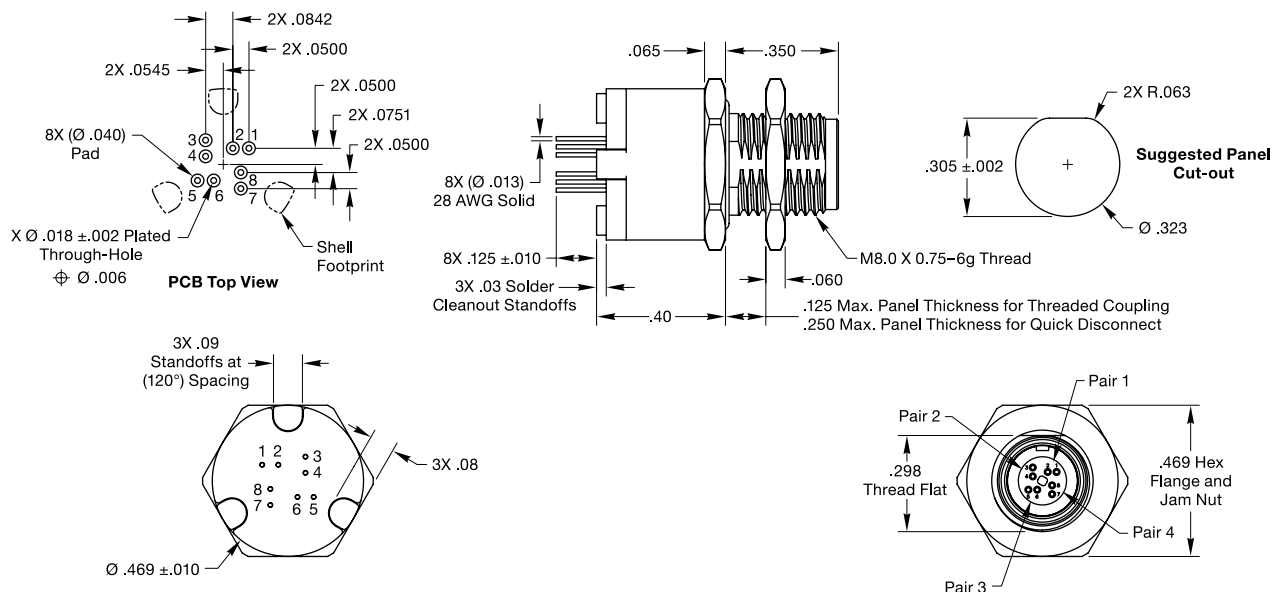
Part No. 1925260



### Thru-Hole Board-Mount Receptacle

Mates with both quick-disconnect and threaded plugs

Part No. 1925261





## Accessories

### Heat-Shrinkable Molded Boots



#### Hazard Matched

- Different materials to meet different temperature and environmental requirements
- Optional with pre-applied adhesives for quick installation and high-reliability IP67 sealing
- Epoxy sealing kits available

#### Versatile

- Sealing and strain relief to the wires and cables
- Straight or 90 degree cable exit

#### Application Tooling

- HL1910E or the HG-501A ThermoGun heat gun and appropriate hot air reflectors

### Bandstraps



#### Easy to Use

- Quick, easy, cost-effective and reliable termination of braided shielding

#### High Performance

- Low profile, one-piece design eliminates EMI leakage paths

#### Rugged

- Shock, vibration and environmental tested to meet aerospace and defense requirements

#### Material

- Passivated 304 stainless steel, 8" long x .125" wide

#### Electrical

- Operating Temperature: -65°C to +200°C
- Electrical Resistance: Meets  $\leq 1.0$  milliohm requirement of AS85049/128
- Corrosion Resistance: 500 hr. salt spray

#### Mechanical

- Tensile Strength: 200 lb.
- Braid Retention: Meets 100 lb. requirement of AS85049/128

#### Application Tooling

- Micro Tie-Dex II, A30199

Description	Part No.
Bandstrap	BND-0812S

# Circular HD Connectors

## Small-Space, High-Density Connectors for I/O Applications



### WIDE RANGE OF CHOICE

- Five shell body sizes ranging from 14 mm to 27 mm diameter
- Up to 40 signal contacts
- Up to 20 amps current rating

### APPLICATION FLEXIBILITY

- Panel-mount receptacles: IP68 rated with potted, solder cup or pcb termination
- Cable-attach plugs and receptacles: solder cup termination
- Chromate or black chromate finish

### EASY TO USE

- Push/pull self-locking mating and unmating
- Scoop proof, blindmating

### FULL RANGE OF INSERT CONFIGURATIONS

- Power, signal, or power and signal
- Multiple keying options

TE Connectivity Circular HD connectors offer the ease of push/pull, self-locking mating for I/O applications. The small, high-density connectors have the advantage of blind mating into small spaces that may normally require clearance for hand tightening to mate. The connectors are widely used in military and civilian use, including radio equipment, medical equipment, test equipment, audio and video equipment, data acquisition and industrial control.

## Performance Characteristics

### ELECTRICAL

- **Low-Level Contact Resistance:**  
See Table 1
- **Dielectric Withstanding Voltage:**  
See Table 2
- **Insulation Resistance:**  
5000 M $\Omega$  min.  
100 M $\Omega$  min. at elevated temperature (125°C)

### MATERIALS

- **Shells:** Chromate or black chromate-plated brass
- **Contacts:** Gold-plated copper alloy
- **Dielectric:** Thermoplastic, PEEK

### ENVIRONMENTAL

- **Temperature Range:** -65°C to +125°C
- **Salt Spray:** 96 hr
- **Temperature Life:** 1000 hr at 125°C (wired, mated connectors)
- **Hydrostatic Pressure:** Panel-mount receptacle, IP68, 1 m submersion for 2 hr

### MECHANICAL

- **Random Vibration:** 15 grms between 10-2000 Hz
- **Mechanical Shock:** 50 g half-sine pulse of 3 ms duration
- **Durability:** 1000 mating cycles

### TECHNICAL DOCUMENTS

- **Product Specification:** 108-127005
- **Qualification Test Report:** 501-127002



## Circular HD Connectors

**Table 1: Contact and Wire Information**

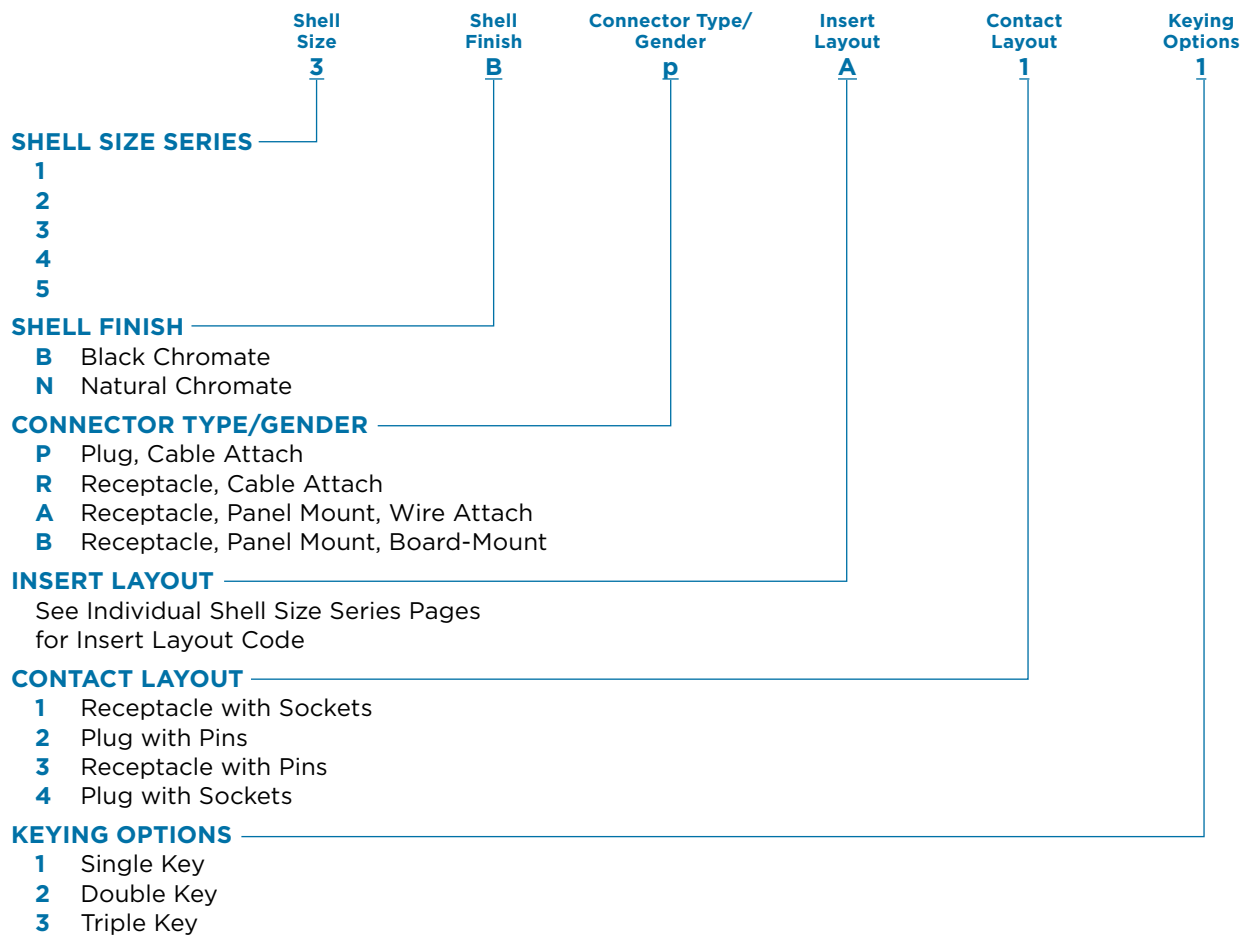
Contact Dia. (mm)	Solder Cup Dia. (mm)	Wire Size (Max.)		Contact Resistance (mΩ)	Separation Force (N), AWG mm <sup>2</sup> Contact Pair
		AWG	mm <sup>2</sup>		
0.5	0.4	28	0.06	21	0.15~0.6
0.7	0.6	24	0.15	21	0.2~0.6
0.9	0.8	22	0.38	5	0.5~1
1.3	1.2	18	0.62	3	0.8~2
1.6	1.8	16	2.0	2.5	0.5~2
2.0	2.0	14	2.0	2	1~3
2.3	2.1	12	3.0	1.5	2~3
3.0	3.1	10	5.0	1	4~7

**Table 2: Insert Dielectric withstanding Voltage**

Insert Configuration	VAC @ Height	
	Sea Level	70,000 ft (21,336 m)
I	1000	250
II	875	225
III	725	175

### DESCRIPTIVE INFORMATION

Descriptive Part Number Example:

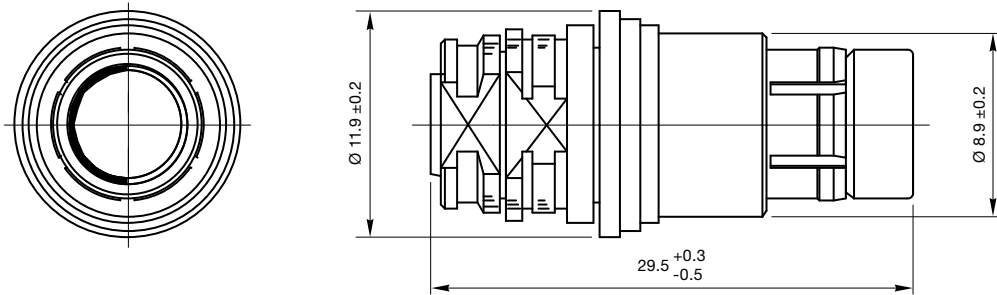




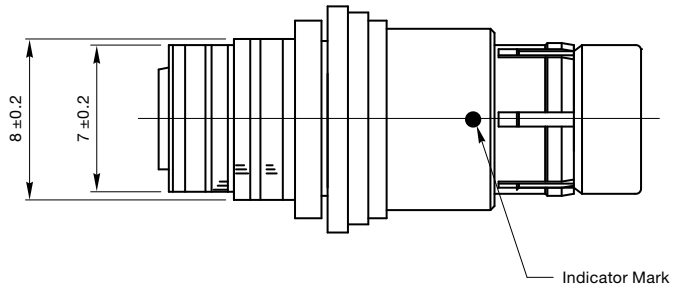
## Circular HD Connectors

### SHELL SERIES 1

#### Free-Hanging Cable-Attach Plug

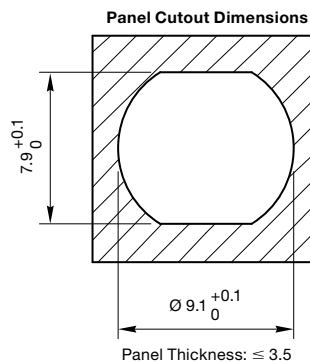
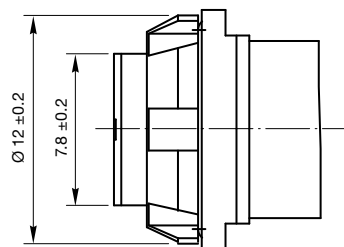
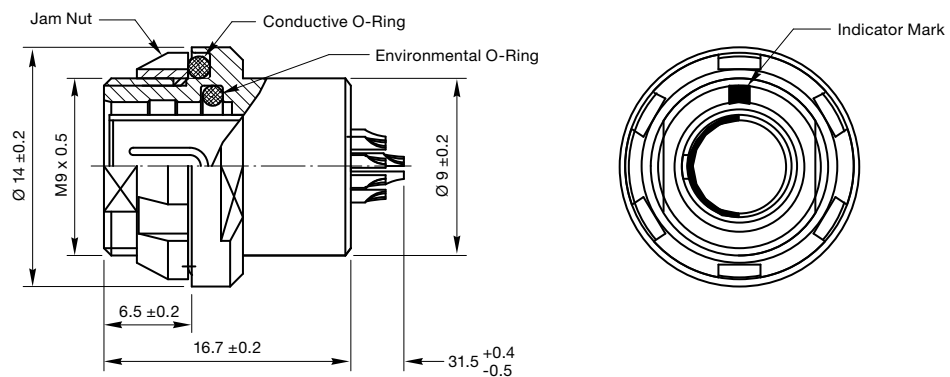


Maximum cable diameter = 3.8 mm



#### Panel-Mount Wire Termination Receptacle

Installation torque for mounting to panel: 1.5 ft-lb min.



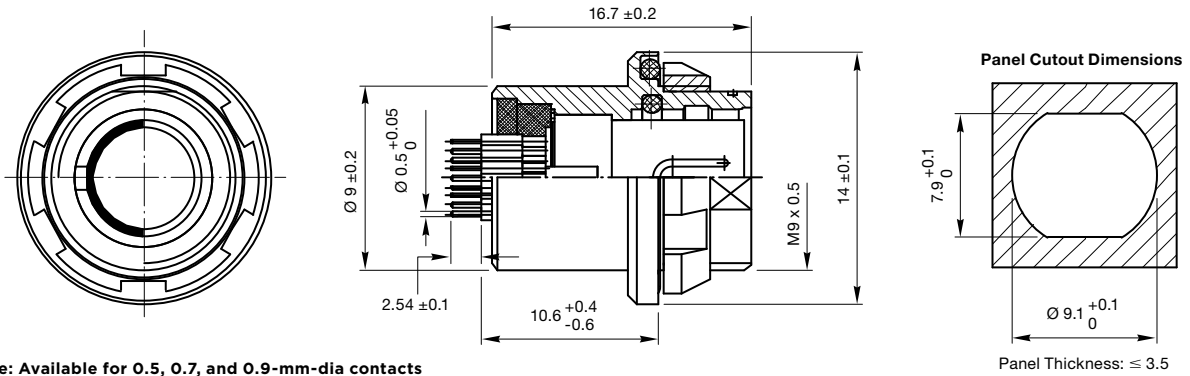


## Circular HD Connectors

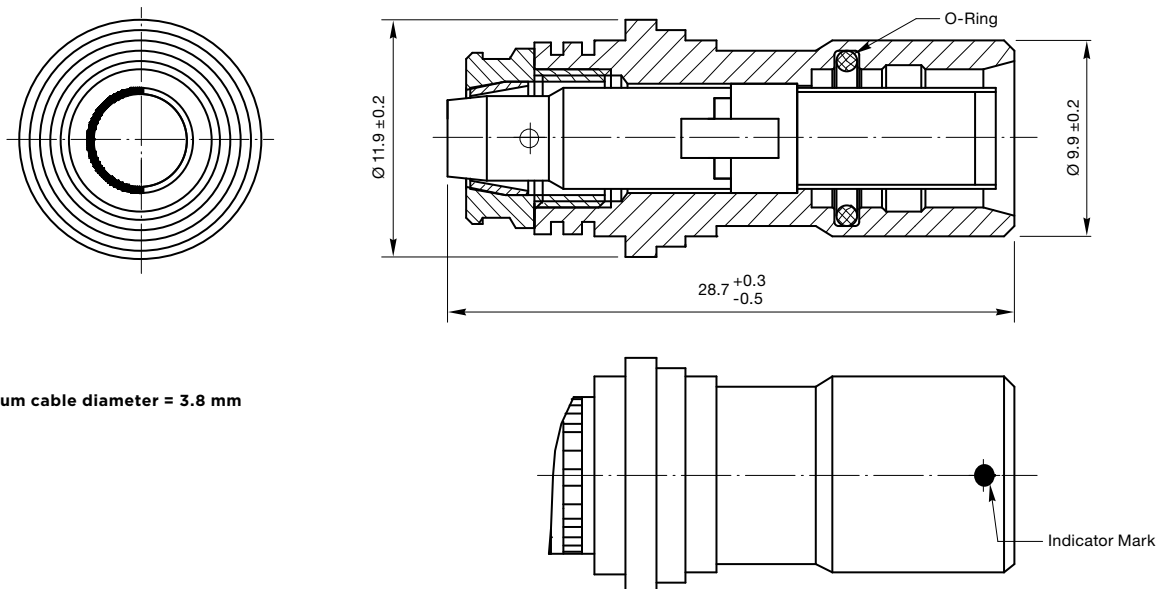
### SHELL SERIES 1

#### Panel-Mount, Board-Mount Receptacle

Installation torque for mounting to panel: 1.5 ft-lb min.



#### Free-Hanging Cable-Attach Receptacle





## Circular HD Connectors

### SHELL SERIES 1

#### Contact Arrangement

Receptacle (A) Socket Contacts	Plug (B) Pin Contacts	Receptacle (A) Pin Contacts	Plug (B) Socket Contacts	Layout Code	No. of Contacts (Contact Dia.)	Current Rating (A)	DWV*
				A	2 (0.9 mm)	6.3	II
				B	3 (0.9 mm)	5.5	II
				C	4 (0.7 mm)	3.8	III
				D	5 (0.7 mm)	3.8	III
				E	7 (0.5 mm)	1.5	III
				F	9 (0.5 mm)	1.0	III

\*Dielectric Withstanding Voltage: see Table 2, page 29.



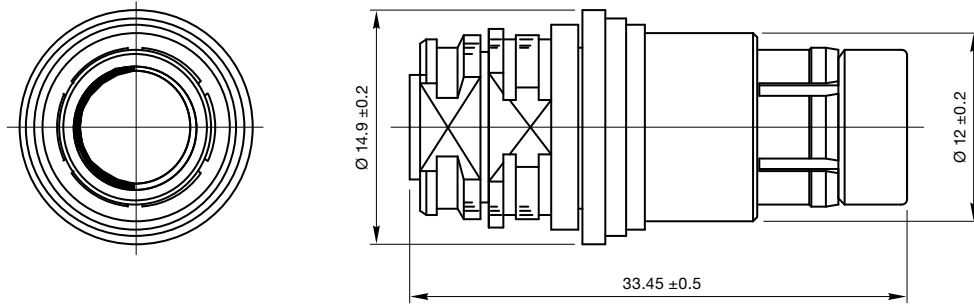




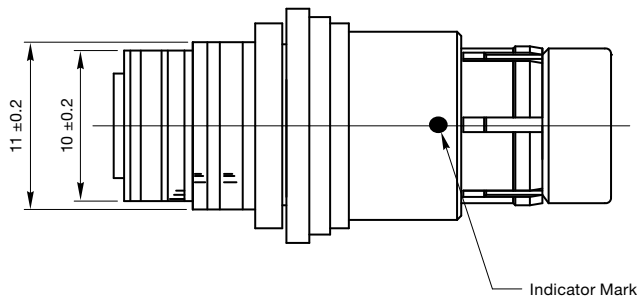
## Circular HD Connectors

### SHELL SERIES 2

#### Free-Hanging Cable-Attach Plug

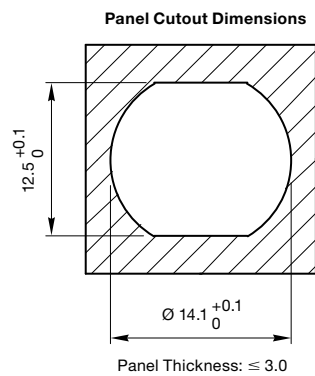
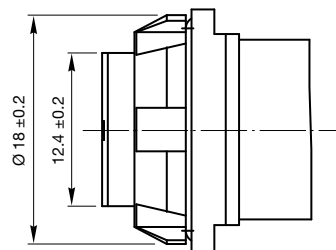
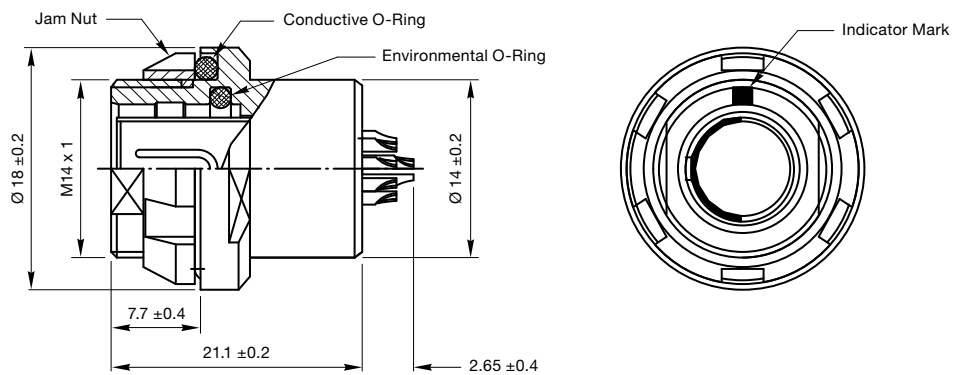


Maximum cable diameter = 6.0 mm



#### Panel-Mount Wire Termination Receptacle

Installation torque for mounting to panel: 2.5 ft-lb min.



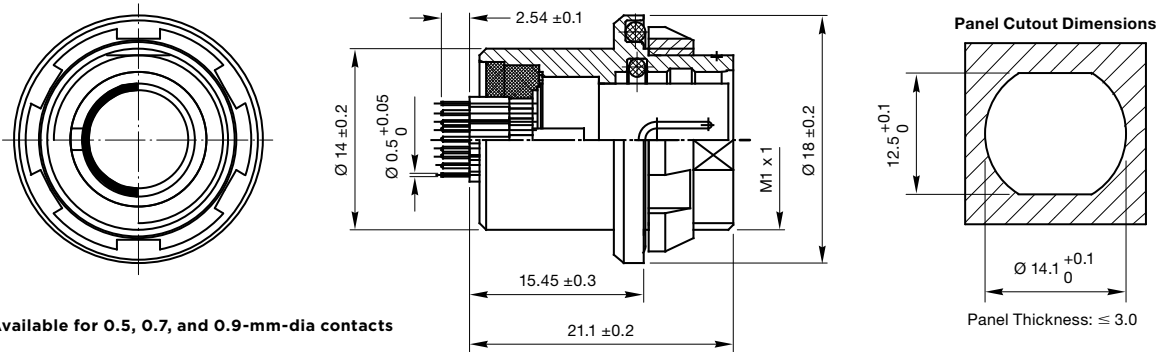


## Circular HD Connectors

### SHELL SERIES 1

#### Panel-Mount, Board-Mount Receptacle

Installation torque for mounting to panel: 2.5 ft-lb min.



### Contact Arrangement

Receptacle (A) Socket Contacts	Plug (B) Pin Contacts	Receptacle (A) Pin Contacts	Plug (B) Socket Contacts	Layout Code	No. of Contacts (Contact Dia.)	Current Rating (A)	DWV*
				A	2 (1.3 mm)	9	I
				B	3 (1.3 mm)	8.5	I
				C	4 (0.9 mm)	5.0	II
				D	5 (0.9 mm)	4.8	II
				E	6 (0.7 mm)	3.5	II
				F	7 (0.7 mm)	3.2	II
				G	8 (0.7 mm)	2.5	III
				H	12 (0.5 mm)	1.5	III

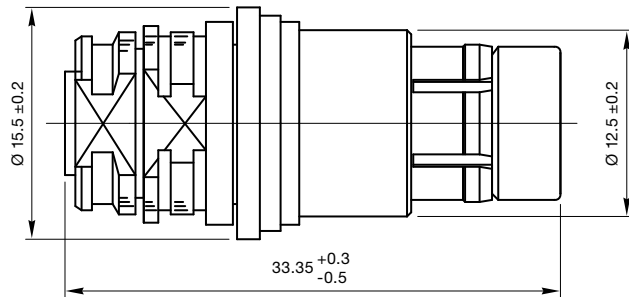
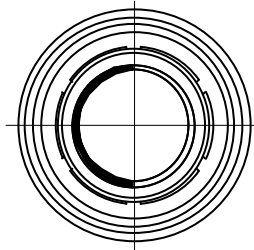
\*Dielectric Withstanding Voltage: see Table 2, page 29.



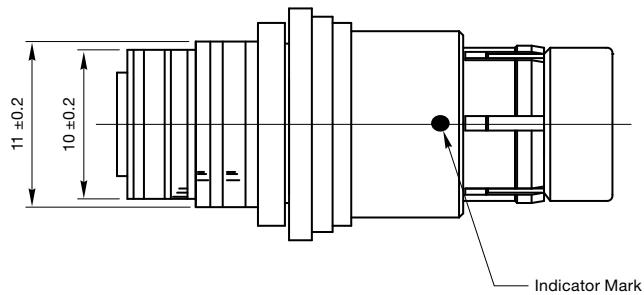
## Circular HD Connectors

### SHELL SERIES 3

#### Free-Hanging Cable-Attach Plug

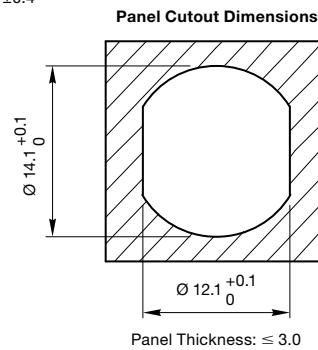
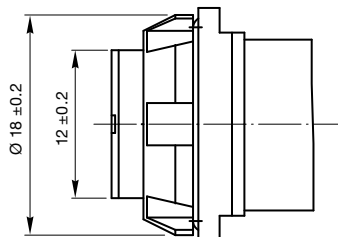
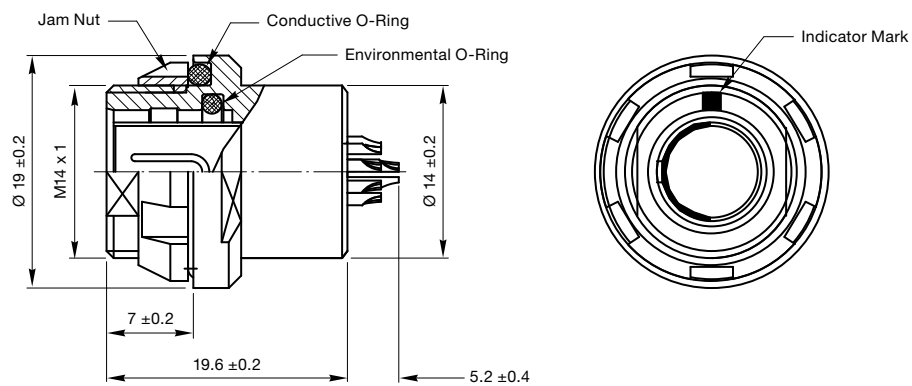


Maximum cable diameter = 6.2 mm



#### Panel-Mount Wire Termination Receptacle

Installation torque for mounting to panel: 2.5 ft-lb min.



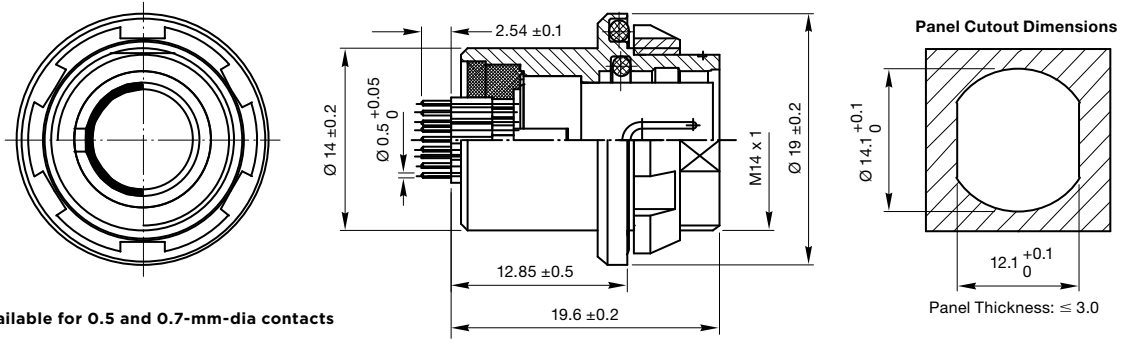


## Circular HD Connectors

### SHELL SERIES 3

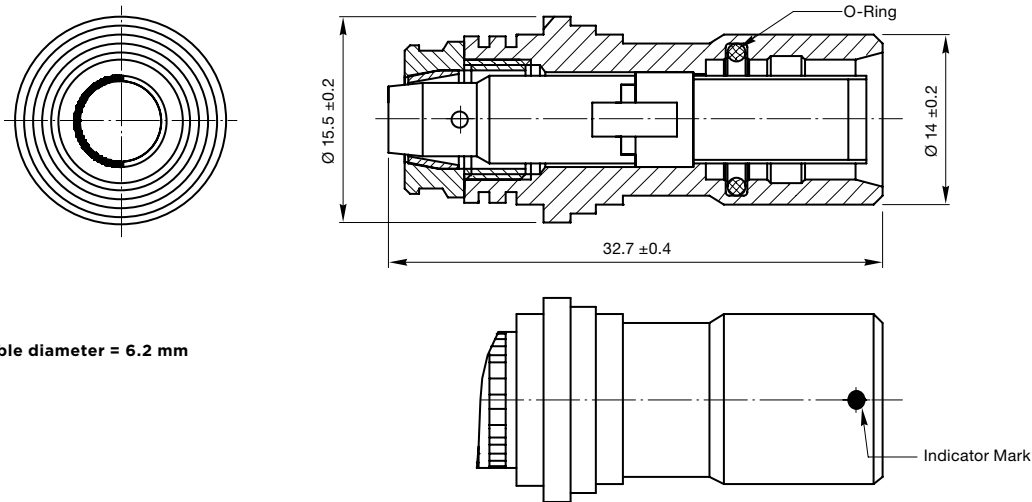
#### Panel-Mount, Board-Mount Receptacle

Installation torque for mounting to panel: 2.5 ft-lb min.



Note: Available for 0.5 and 0.7-mm-dia contacts

#### Free-Hanging Cable-Attach Receptacle



Maximum cable diameter = 6.2 mm

#### Contact Arrangement

Receptacle (A) Socket Contacts	Plug (B) Pin Contacts	Receptacle (A) Pin Contacts	Plug (B) Socket Contacts	Layout Code	No. of Contacts (Contact Dia.)	Current Rating (A)	DWV*
				A	10 (0.7 mm)	3.2	II
				B	12 (0.7 mm)	3.0	II
				C	19 (0.5 mm)	1.8	III

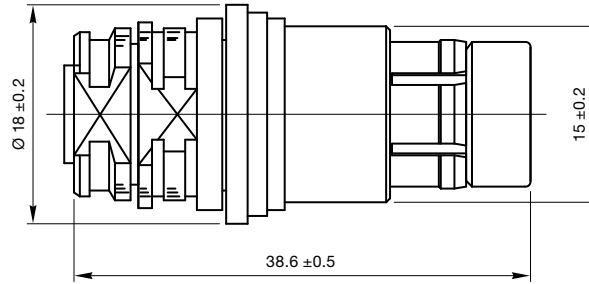
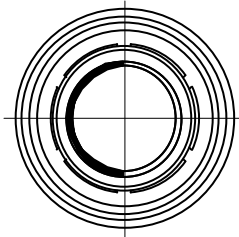
\*Dielectric Withstanding Voltage: see Table 2, page 29.



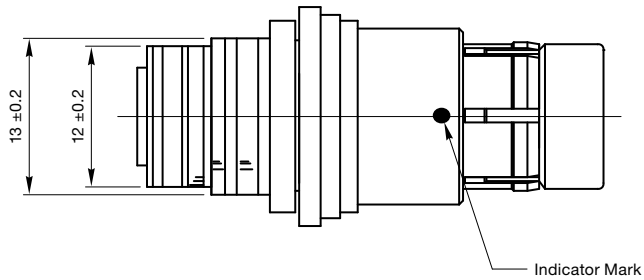
## Circular HD Connectors

### SHELL SERIES 4

#### Free-Hanging Cable-Attach Plug

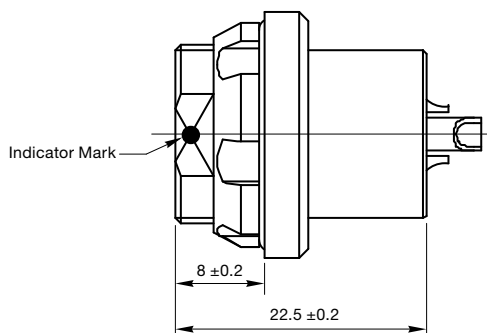
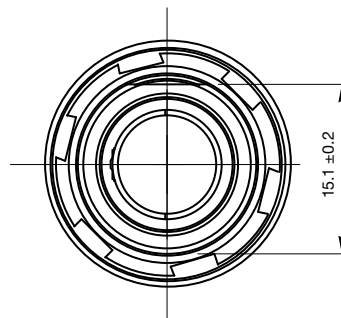
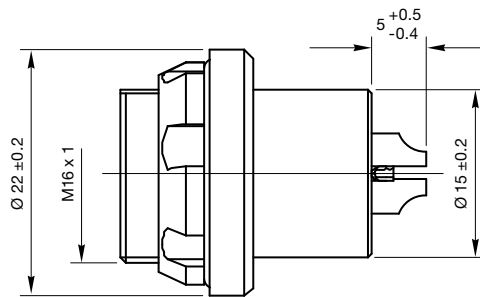


Maximum cable diameter = 8.0 mm

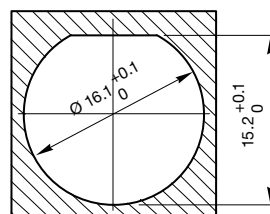


#### Panel-Mount Wire Termination Receptacle

Installation torque for mounting to panel: 3.5 ft-lb min.



#### Panel Cutout Dimensions



Panel Thickness:  $\leq 4.0$

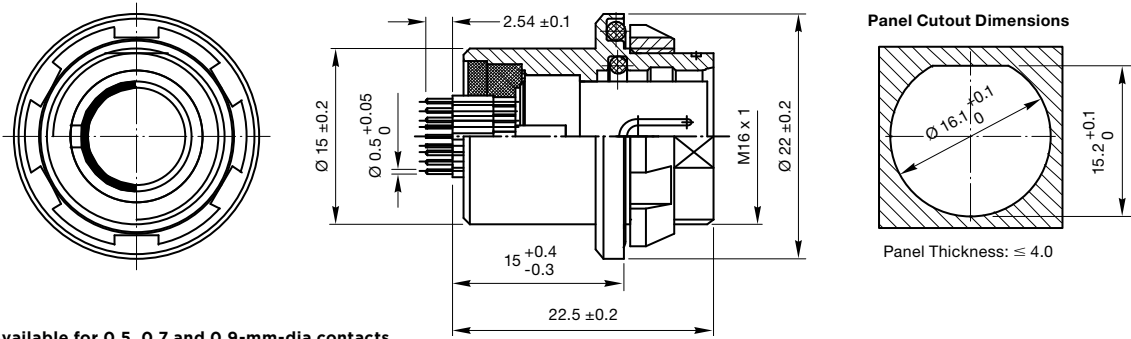


## Circular HD Connectors

### SHELL SERIES 4

#### Panel-Mount, Board-Mount Receptacle

Installation torque for mounting to panel: 3.5 ft-lb min.



**Note:** Available for 0.5, 0.7 and 0.9-mm-dia contacts





## Circular HD Connectors

### SHELL SERIES 4

#### Contact Arrangement

Receptacle (A) Socket Contacts	Plug (B) Pin Contacts	Receptacle (A) Pin Contacts	Plug (B) Socket Contacts	Layout Code	No. of Contacts (Contact Dia.)	Current Rating (A)	DWV*
				A	2 (1.6 mm)	15	I
				B	3 (1.6 mm)	13	I
				C	4 (1.3 mm)	8	II
				D	2 (2.3 mm) 2 (0.9 mm)	2.0 2.0	II
				E	5 (1.3 mm)	7.5	II
				F	6 (0.9 mm)	4.5	II
				G	7 (0.9 mm)	4.5	II
				H	8 (0.9 mm)	4.5	II
				I	1 (1.3 mm) 8 (0.9 mm)	8.0 4.0	II
				J	11 (0.9 mm)	4.0	II
				K	16 (0.7 mm)	2.8	III
				L	19 (0.7 mm)	2.5	III

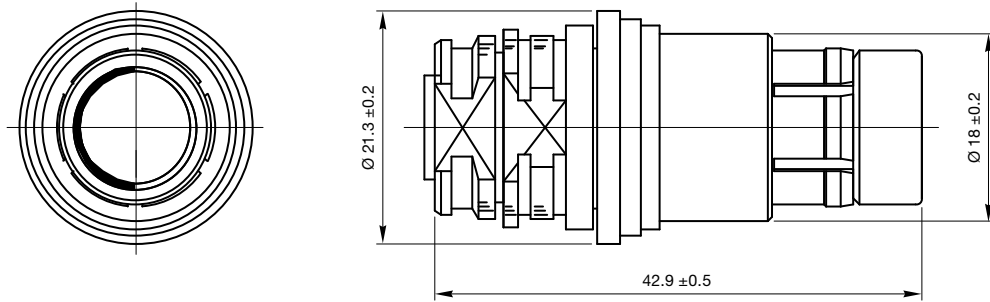
\*Dielectric Withstanding Voltage: see Table 2, page 29.



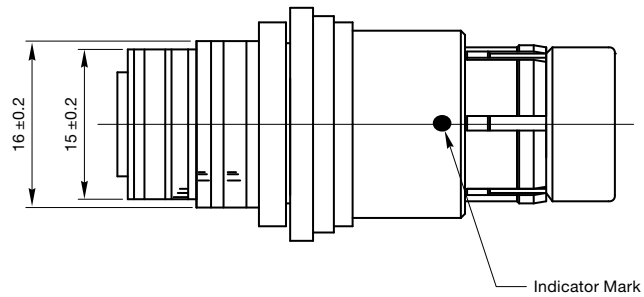
## Circular HD Connectors

### SHELL SERIES 5

#### Free-Hanging Cable-Attach Plug

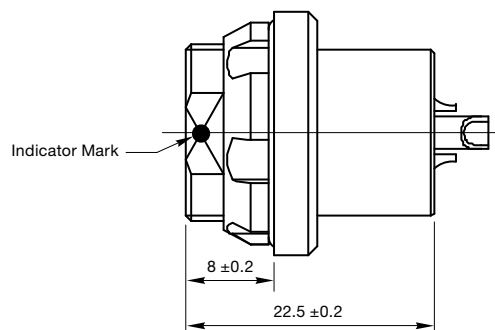
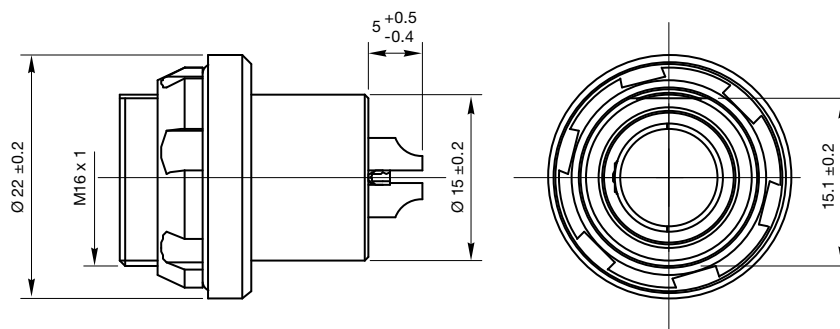


Maximum cable diameter = 10.0 mm

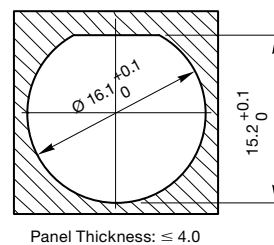


#### Panel-Mount Wire Termination Receptacle

Installation torque for mounting to panel: 4.0 ft-lb min.



#### Panel Cutout Dimensions





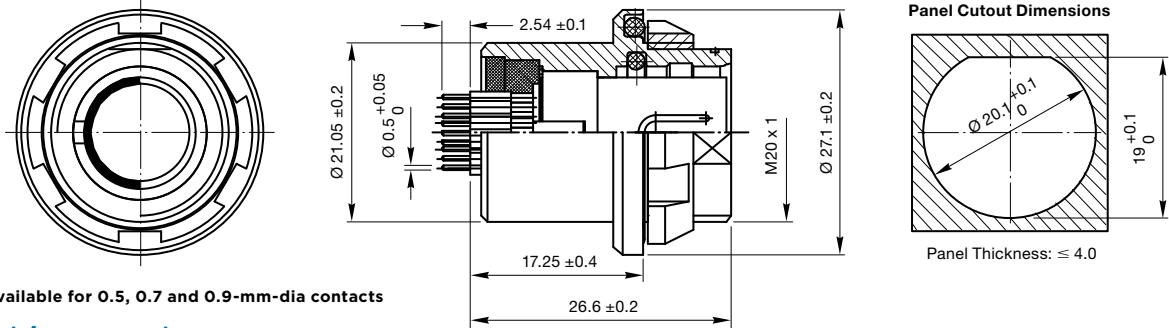


## Circular HD Connectors

### SHELL SERIES 5

#### Panel-Mount, Board-Mount Receptacle

Installation torque for mounting to panel: 4.0 ft-lb min.



Note: Available for 0.5, 0.7 and 0.9-mm-dia contacts

#### Contact Arrangement

Receptacle (A) Socket Contacts	Plug (B) Pin Contacts	Receptacle (A) Pin Contacts	Plug (B) Socket Contacts	Layout Code	No. of Contacts (Contact Dia.)	Current Rating (A)	DWV*
				A	2 (2.0 mm)	18.0	I
				B	2 (3.0 mm)	20.0	I
				C	3 (2.0 mm)	16.0	I
				D	4 (2.0 mm)	14.0	II
				E	1 (2.0 mm) 6 (1.3 mm)	19.0 5.0	II
				F	8 (1.3 mm)	7.2	II
				G	1 (2.0 mm) 8 (1.3 mm)	19.0 4.0	II
				H	10 (1.3 mm)	6.3	II
				I	12 (1.3 mm)	5.5	II

\*Dielectric Withstanding Voltage: see Table 2, page 29.



## Circular HD Connectors

### SHELL SERIES 5

#### Contact Arrangement

Receptacle (A) Socket Contacts	Plug (B) Pin Contacts	Receptacle (A) Pin Contacts	Plug (B) Socket Contacts	Layout Code	No. of Contacts (Contact Dia.)	Current Rating (A)	DWV*
				J	3 (1.3 mm) 10 (0.7 mm)	10.0 1.0	II
				K	15 (0.9 mm)	2.7	II
				L	4 (1.6 mm) 12 (0.7 mm)	10.0 0.5	II
				M	18 (0.9 mm)	3.2	III
				N	27 (0.7 mm)	2.2	III
				O	24 (0.7 mm)	2.5	III
				P	40 (0.5 mm)	1.0	III
				Q	10 (0.7 mm) 27 (0.5 mm)	2.2 1.0	III

\*Dielectric Withstanding Voltage: see Table 2, page 29.





## Circular HD Connectors

### ACCESSORIES

#### Sealing Boots



Series, Free-Hanging Connector	Cable Diameter Range (in)	Part No.	
		Boot Description (Straight)	Boot Description (90°)
Series 1	> 0.15	202A111-3/42-0	222A111-3/42-0
Series 2	0.15-0.24	202A111-3/42-0	222A111-3/42-0
	0.21-0.24	202A121-3/42-0	222A121-3/42-0
Series 3	0.15-0.24	202A111-3/42-0	222A111-3/42-0
	0.21-0.24	202A121-3/42-0	222A121-3/42-0
Series 4	0.21-0.31	202A121-3/42-0	222A121-3/42-0
Series 5	0.26-0.39	202A132-3/42-0	222A132-3/42-0

Notes: If the cable diameter falls below the minimum diameter heat shrink tubing may be used to shim the boot. All boots are precoated with Raychem /42 hot-melt adhesive.

#### Dust Caps



Series	Part No.	
	Plug	Receptacle
Series 1	2157953-1	2157954-1
Series 2	2101580-1	2101579-1
Series 3	2157927-1	2157928-1
Series 4	2157929-1	2157930-1
Series 5	2101580-2	2101579-2



## Circular HD Connectors

## Cross Reference: Descriptive Part Number to TE Part Number

Shell Series	Type	Configuration	Descriptive Part No.	TE Part No.		
1	Panel-Mount Receptacle	3 Pos Sockets, PCB Tails, Single Key	1-B-B-B-1-1	2157738-1		
		7 Pos Sockets, PCB Tails, Double Key	1-B-B-E-1-2	2157951-1		
		7 Pos Sockets, PCB Tails, Single Key	1-B-B-E-1-1	2157949-1		
		9 Pos Sockets, PCB Tails, Double Key	1-B-B-F-1-2	2157952-1		
	Plug	9 Pos Sockets, PCB Tails, Single Key	1-B-B-F-1-1	2157950-1		
		3 Pos Pins, Solder Cup Tails, Single Key	1-B-P-B-2-1	2157739-1		
		7 Pos Pins, Solder Cup Tails, Double Key	1-B-P-E-2-2	2157947-1		
		7 Pos Pins, Solder Cup Tails, Single Key	1-B-P-E-2-1	2157945-1		
		9 Pos Pins, Solder Cup Tails, Double Key	1-B-P-F-2-2	2157948-1		
		9 Pos Pins, Solder Cup Tails, Single Key	1-B-P-F-2-1	2157946-1		
		2	Panel-Mount Receptacle	7 Pos Sockets, PCB Tails, Single Key	2-B-B-F-1-1	2101553-1
				7 Pos Sockets, PCB Tails, Double Key	2-B-B-F-1-2	2101553-2
				7 Pos Sockets, Solder Cup Tails, Single Key	2-B-A-F-1-1	2101676-1
				7 Pos Sockets, Solder Cup Tails, Double Key	2-B-A-F-1-2	2101676-2
8 Pos Sockets, PCB Tails, Single Key	2-B-B-G-1-1			2157375-1		
8 Pos Sockets, PCB Tails, Double Key	2-B-B-G-1-2			2157375-2		
Plug	8 Pos Sockets, PCB Tails, Third Key		2-B-B-G-1-3	2157375-3		
	12 Pos Sockets, PCB Tails, Double Key		2-B-B-H-1-2	2157538-2		
	12 Pos Sockets, PCB Tails, Single Key		2-B-B-H-1-1	2157538-1		
	7 Pos Pins, Solder Cup Tails, Single Key		2-B-P-F-2-1	2101550-1		
4	Panel-Mount Receptacle	7 Pos Pins, Solder Cup Tails, Double Key	2-B-P-F-2-2	2101550-2		
		8 Pos Pins, Solder Cup Tails, Single Key	2-B-P-G-2-1	2157376-1		
		8 Pos Pins, Solder Cup Tails, Double Key	2-B-P-G-2-2	2157376-2		
		8 Pos Pins, Solder Cup Tails, Third Key	2-B-P-G-2-3	2157376-3		
	Plug	12 Pos Pins, Solder Cup Tails, Double Key	2-B-P-H-2-2	2157539-2		
		12 Pos Pins, Solder Cup Tails, Single Key	2-B-P-H-2-1	2157539-1		
		4 Pos Pins, Solder Cup Tails, Single Key	4-B-A-D-3-1	2157468-1		
		4 Pos Pins, Solder Cup Tails, Double Key	4-B-A-D-3-2	2157468-2		
5	Panel-Mount Receptacle	19 Pos Sockets, PCB Tails, Single Key	4-B-B-L-1-1	2157342-1		
		19 Pos Sockets, Solder Cup Tails, Single Key	4-B-A-L-1-1	2157343-1		
		4 Pos Sockets, Solder Cup Tails, Single Key	4-B-P-D-4-1	2157469-1		
		4 Pos Sockets, Solder Cup Tails, Double Key	4-B-P-D-4-2	2157469-2		
	Plug	19 Pos Pins, Solder Cup Tails, Single Key	4-B-P-L-2-1	2157344-1		
		40 Pos Sockets, PCB Tails, Single Key	5-B-B-P-1-1	2101549-1		
		40 Pos Sockets, Solder Cup Tails, Single Key	5-B-A-P-1-1	2101677-1		
		40 Pos, Sockets, PCB Tails, Double Key	5-B-B-P-1-2	2101549-2		
5	Plug	40 Pos, Sockets, Solder Cup Tails, Double Key	5-B-A-P-1-2	2101677-2		
		40 Pos Pins, Solder Cup Tails, Double Key	5-B-P-P-2-2	2101551-2		
5		40 Pos Pins, Solder Cup Tails, Single Key	5-B-P-P-2-1	2101551-1		

# Metal-Shell Micro Circular Connectors

## Rugged Connectors with Flexible Configurations

### HIGH-SPEED CONNECTIVITY

- Gigabit Ethernet, USB 2.0, and IEEE 1394 compatible

### DURABLE

- High-performance materials
- Individual fluorosilicone O-rings on all contacts
- IP67 sealing
- 2000 mating cycles

### FLEXIBLE CONFIGURATIONS

- Three coupling styles: push-pull, bayonet, threaded
- Common internal design
- Signal only and hybrid signal/power versions available
- Lightweight materials save space and weight
- Pin and socket or spring probe contacts
- Band strap for termination of braided shielding

### RELIABLE PERFORMANCE

- Shock and vibration resistant
- Excellent electrical performance

TE Connectivity (TE) offers a broad range of Metal-Shell Micro Circular connectors, all designed for rugged durability and space and weight savings in commercial aerospace applications and military vehicles, radios, and soldier-worn equipment.



## Performance Characteristics

### ELECTRICAL

- **Compatibility:** 1 Gb/s Ethernet, USB 2.0, IEEE 1394, Cat 5e
- **Contact Current-Carrying Capacity (1 pin):**  
Signal: 2 amps max.  
Power Pin:  
14 Positions: 5 amps max.  
30 Positions: 3 amps max.  
Power:  
14 Positions: 20 AWG (19 strands max.)  
30 Positions: 22 AWG (19 strands max.)
- **Operating Voltage:** 200 VAC max.
- **Termination Resistance:** 30 mΩ max.

### MECHANICAL AND ENVIRONMENTAL

- **Durability:** 2000 mating cycles
- **Operating Temperature:** -55°C to +150°C
- **Sealing:** IP67
- **Coupling Options:** Push-pull, bayonet, threaded
- **Shell Sizes/Positions:**  
M11 shell, 7 positions  
M15 shell, 14 positions  
M14 shell, 19 positions  
M22 shell, 30 positions

### • Wire Size:

- Signal Contact:  
All Positions: 24 AWG (7 strands)
- Power Contact:  
14 Positions: 20 AWG (19 strands)  
30 Positions: 22 AWG (19 strands)

- **Salt Spray Resistance:** 120 hours

### MATERIALS

- **Shell:** Brass, black tin-nickel plated
- **Insert:** LCP
- **Contacts:** Brass, plated gold over nickel
- **O-Ring:** Fluorosilicone

### TECHNICAL DOCUMENTS

- **Product Specification:**  
108-78938 (for 7 and 19 positions)  
108-78967 (for 14 and 30 positions)
- **Qualification Test Report:**  
501-78493 (for 7 and 19 positions)  
501-78526 (for 14 and 30 positions)



## Metal-Shell Micro Circular Connectors

### Signal Connectors: Pin and Socket Contacts

Shell Size	No. of Pos.	Coupling	Keying	Part No.						
				Plug, Wire Solder Cups	Receptacle, Wire Solder Cup	Receptacle, PCB Solder Tail	Dust Cap Option*			
							Plugs	Receptacles		
M11	7	Push-Pull	N	2174219-1	2174222-1	2174225-1	2822605-x	2201013-x		
			A	2174219-2	2174222-2	2174225-2				
			B	2174219-3	2174222-3	2174225-3				
		Bayonet	N	2174220-1	2174223-1 2260439-1**	2174226-1	2229015-x	2201014-x		
			A	2174220-2	2174223-2	2174226-2				
			B	2174220-3	2174223-3	2174226-3				
		Threaded	N	2174221-1	2174224-1	2174227-1	—	2201015-x		
			A	2174221-2	2174224-2	2174227-2				
			B	2174221-3	2174224-3	2174227-3				
		M14	19	Push-Pull	N	2174210-1	2174213-1	2174216-1	—	2201010-x
					A	2174210-2	2174213-2	2174216-2		
					B	2174210-3	2174213-3	2174216-3		
Bayonet	N			2174211-1	2174214-1	2174217-1	2287626-x	2201011-x		
	A			2174211-2	2174214-2	2174217-2				
	B			2174211-3	2174214-3	2174217-3				
Threaded	N			2174212-1	2174215-1	2174218-1	—	2201012-x		
	A			2174212-2	2174215-2	2174218-2				
	B			2174212-3	2174215-3	2174218-3				

\* -x suffix is length of wire rope: -1 = 70 mm • -2 = 100 mm • -3 = 120 mm • -4 = 150 mm. Consult TE for availability of dust caps not listed here.

\*\*In-Line Receptacle

### Hybrid Signal + Power Connectors: Pin and Socket Contacts

Shell Size	No. of Pos.	Coupling	Keying	Part No.		
				Plug, Solder Cups	Receptacle, In-Line	Receptacle, PCB Solder Tail
M15	14 (12 Signal, 2 Power)	Bayonet	N	2201481-1	4-2287069-1	2201482-1
			A	2201481-2	—	2201482-2
M22	30 (28 Signal, 2 Power)	Threaded	N	2201712-1	2288255-1	2201713-1
			A	2201712-2	—	2201713-2

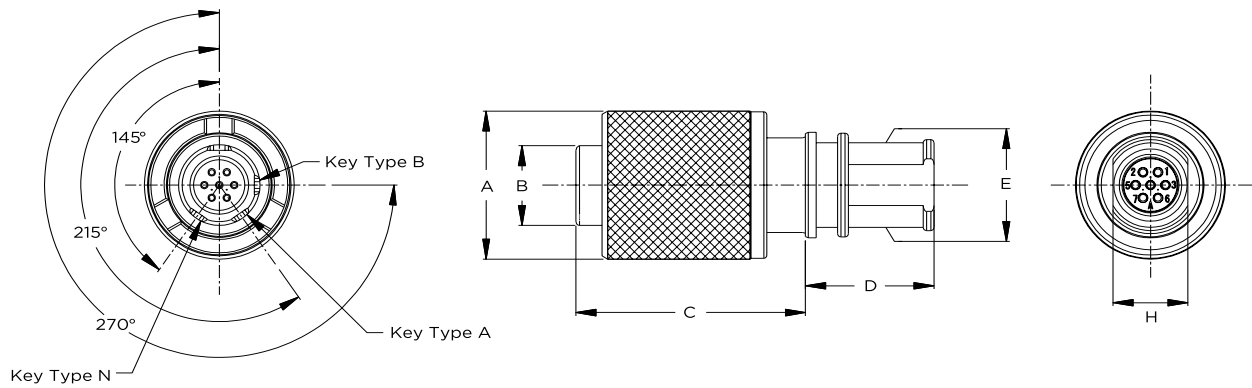


## Metal-Shell Micro Circular Connectors

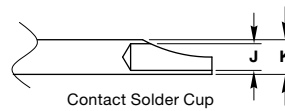
### PLUG CONNECTORS

#### Keying

#### Plug Connectors, Solder Cup



Coupling	No. of Pos.	Power Contacts	A (Dia.)	B (Dia.)	C	D	E (Dia.)	H	Key Type
Push-Pull	7	—	14	6.96	21.45	12	8	7	N, A, B
	19	—	17	9.36	21.85	11.45	8.65	8	N, A, B
Bayonet	7	—	14	7.62	21.45	12	8	7	N, A, B
	19	—	17	10.16	21.75	11.45	8.65	8	N, A, B
Threaded	14	2	19	12.16	21.95	16	11	10	N, A
	7	—	14	7.62	21.45	12	8	7	N, A, B
	19	—	16	10.16	21.45	11.45	8.65	8	N, A, B
	30	2	25	18.4	13.3	16	18.5	16	N, A



#### Contact Solder Cup Dimensions

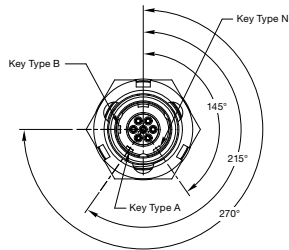
No. of Pos.	Power Contacts	Signal		Power	
		J	K	J	K
7, 19	—	0.65	0.85	—	—
14	2	0.9	1.15	1.2	1.5
30	2	0.76	1	1	1.3



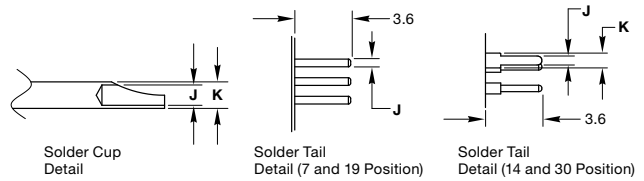
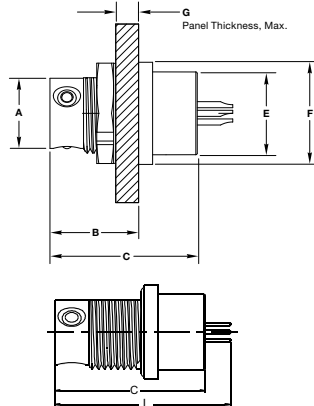
## Metal-Shell Micro Circular Connectors

### RECEPTACLE CONNECTORS

#### Keying



#### Panel-Mount Receptacle



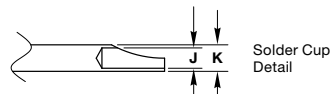
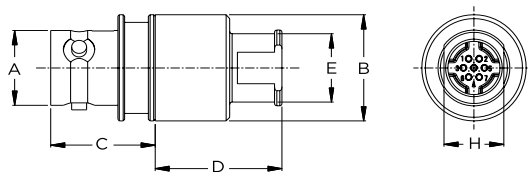
#### Panel-Mount Contacts

Contact Type	No. of Pos.	Power Contacts	Signal		Power	
			J	K	J	K
Solder Cup	7, 19	—	0.65	0.85	—	—
	7, 19	—	.5	—	—	—
Solder Tail	14	2	.5	.85	.7	1.15
	30	2	.5	.85	.7	1.16

#### Panel-Mount Receptacle

Coupling	No of Pos.	A	B	C	E (Dia.)	F (Dia.)	G	L
Push-Pull	7	9.82	12.40	20.90	11.60	14.30	3.20	24.40
	19	12.36	12.41	20.95	14.40	18.00	3.20	24.30
Bayonet	7	9.85	15.40	21.00	11.60	14.30	2.80	24.20
	19	12.05	15.41	20.35	14.40	18.00	3.20	23.60 or 25.30
	14	14.05	15.41	20.70	14.70	20.50	3.00	24.30
Threaded	7	10.54	13.44	18.60	11.60	14.30	3.20	22.20
	19	13.34	13.44	18.90	14.40	18.00	3.20	22.20
	30	22.20	13.15	19.70	19.30	27.00	3.60	23.50

#### In-Line Receptacle



#### Contacts

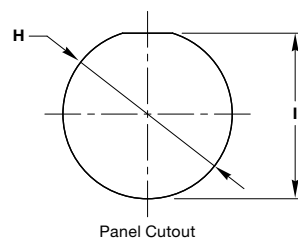
Coupling	No. of Pos.	Power Contacts	Signal Pin		Power Pin	
			J	K	J	K
Bayonet	7	—	0.65	0.85	—	—
	14	2	0.65	0.85	0.9	1.15
Threaded	30	2	0.65	0.85	0.9	1.15

#### In-Line Receptacle

Coupling	No of Pos.	Power Contacts	A (Dia.)	B (Dia.)	C	D	E (Dia.)	H
Bayonet	7	—	9.85	14	14	17	9	8
	14	2	14.05	18	14	14.7	15.9	15
Threaded	30	2	21.2	24	12	22	18.5	16

#### Panel Cutout Dimensions

Shell Size	H (Dia.)	I
M11	11.2	10.7
M14	14.4	13.5
M15	16	15.31
M22	22.34	21.4

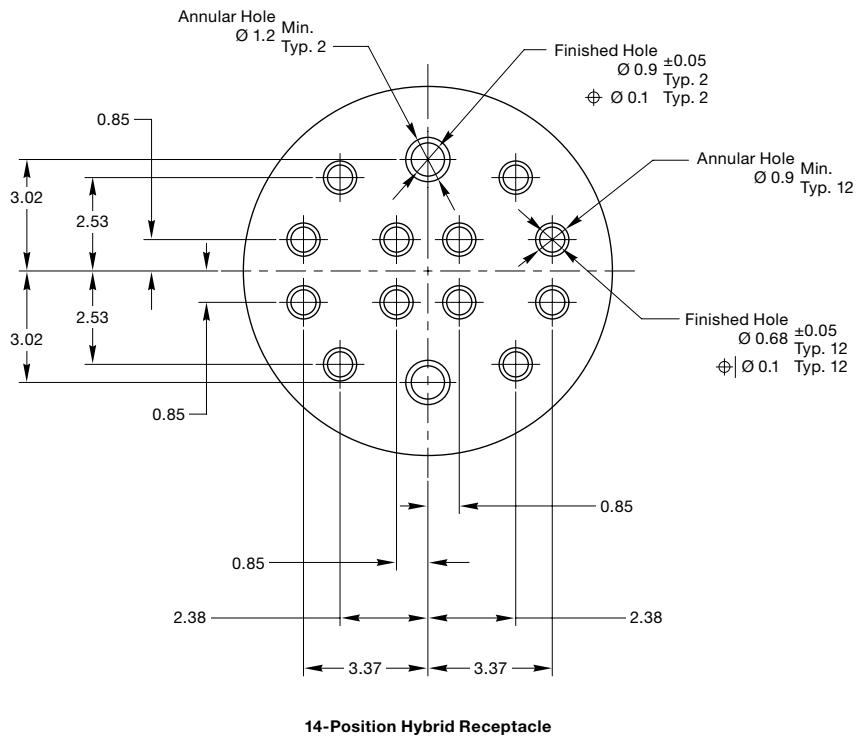
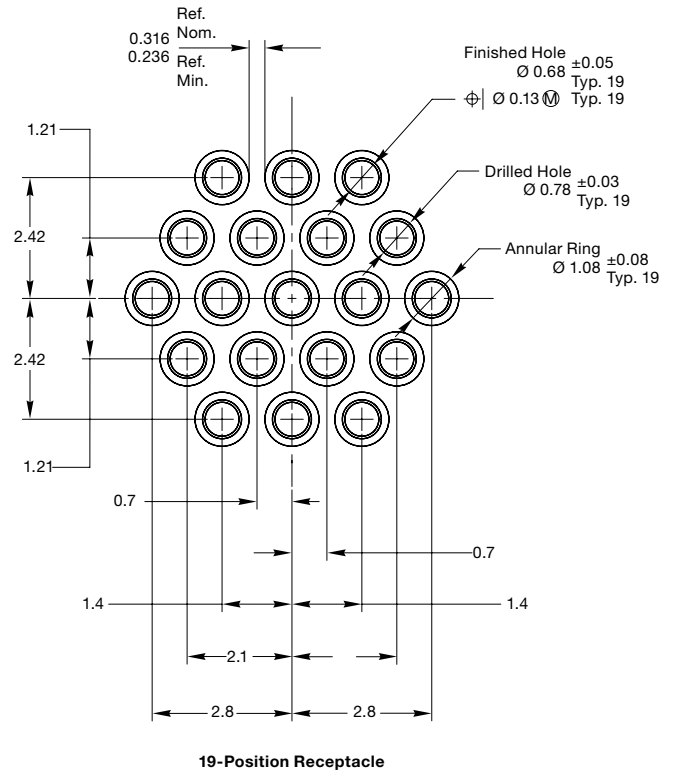
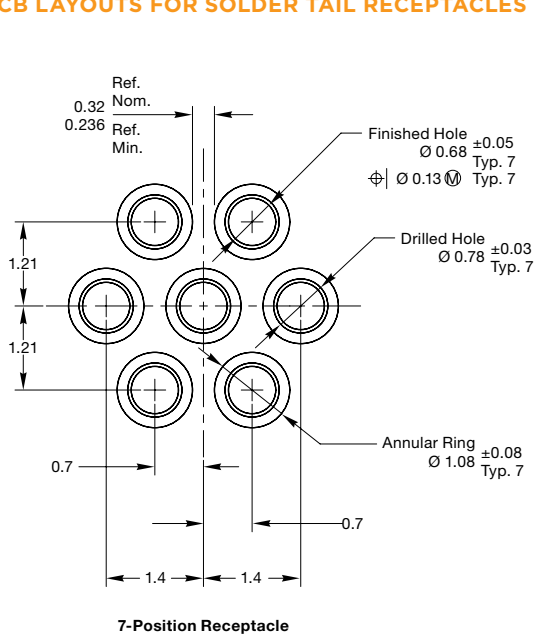






## Metal-Shell Micro Circular Connectors

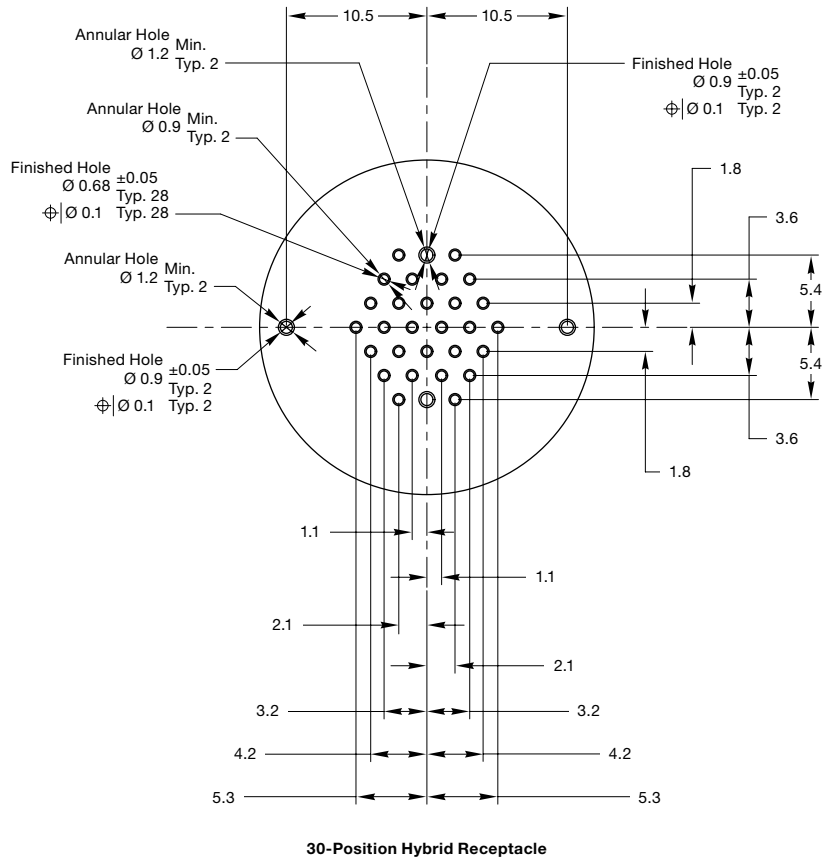
### PCB LAYOUTS FOR SOLDER TAIL RECEPTACLES



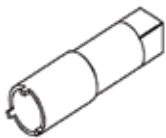


## Metal-Shell Micro Circular Connectors

### PCB LAYOUTS FOR SOLDER TAIL RECEPTACLES AND ACCESSORIES



### Nut Jig for 7P Receptacle Connectors Part No. 2288181-1



Use with connectors 2174206-\*,  
2174209-\*, 2174204-\*, 2174207-\*,  
2174205-\*, 2174208-\*

# Wildcat Micro Connectors

Compact, Reliable Interconnections for Demanding Applications



Offering a high-reliability interconnection for demanding applications including military and aerospace, Wildcat Micro connectors are extremely compact and available in two housing sizes with four contact layouts with 3, 5, or 9 contacts.

Coupling choices include a robust bayonet mechanism for quick and positive coupling or an anti-vibration triple-start threaded option.

Various mounting options are available, and the rear accessory feature provides for cable braid and boot termination.

A variety of material and plating options means versatile choices to match the demands of your application.

## SPACE AND WEIGHT SAVINGS

- High-density contact spacing and lightweight materials

## RUGGED RELIABILITY

- Robust bayonet coupling mechanism
- Extreme temperature, vibration and corrosion resistance
- Aggressive fluid resistance and dust ingress prevention
- Fully sealed cable and mating interface with IP67 rating

## DURABLE

- Over 500 mating cycles

## EASY TO USE

- Scalloped/knurled coupling ring for easy gripping
- Scoop-proof interface
- Rear removable crimp and PCB contacts
- Cable braid and boot rear feature for fast, effective shield termination and no need for separate backshell

## VERSATILE

- Multiple keying options
- Suitable for both signal and low power applications
- MIL-STD-1553 protocol compatible (3-way connectors)

## Performance Characteristics

### ELECTRICAL

- **Dielectric Withstand Voltage:** 1000 VAC
- **Current Rating:** 3 to 5 amps/contact, depending on layout

### ENVIRONMENTAL

- **Temperature:** -55°C to +175°C
- **Durability:** 500 mating cycles
- **Vibration:**
  - Sinusoidal: 10 to 2000 Hz, 30 g max.
  - Random: 50 to 2000 Hz, 1 g<sup>2</sup>/Hz
- **Fluid Resistance:** Withstands a wide range of military and aerospace fluids
- **Salt Spray Resistance:** 500 hours (cadmium finish)
- **Environmental Sealing:** IP67

### MATERIALS

- **Shell and Coupling Ring:** Aerospace-grade aluminum alloy as standard
- **Plating:** Olive drab cadmium, RoHS electroless nickel, black zinc nickel (other finishes available on request)
- **Insulators:** High-performance thermoplastic
- **Seals:** Fluorinated silicone
- **Contacts:** Gold-plated machined copper alloy
- **Wire Size:** 28 to 22 AWG, depending on layout

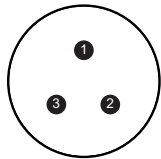


## Wildcat Micro Connectors

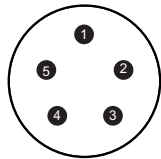
### Contact Arrangements

(Viewed from the mating face of a connector with male (pin) contacts)

#### Shell Size 03

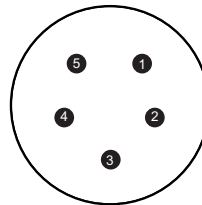


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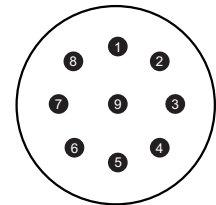


03-05

#### Shell Size 06

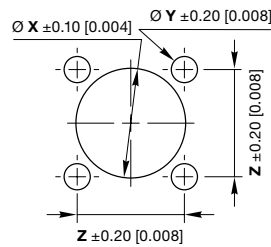


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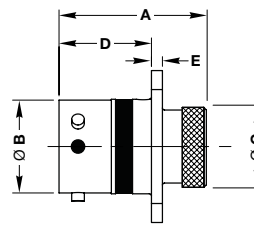
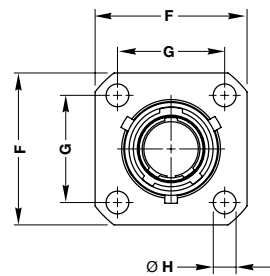


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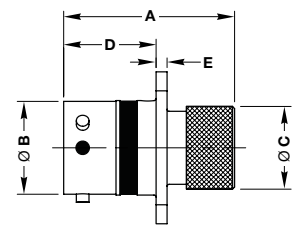
### Square Flange Receptacle: Shell Type 0



Shell Type 0 Panel Detail  
Panel Thickness = 2.25 Max. (0.089)



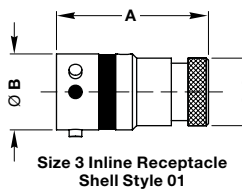
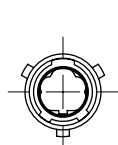
Square Flange Receptacle  
Shell Style 00



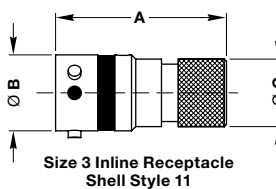
Square Flange Receptacle  
Shell Style 10

Shell Size	Shell Style	Knurl	A Max	ØB Max	ØC Max	D Max	E Max	F Max	G	ØH Min	ØX	ØY	Z
03	00	Short	18.20 (.717)	9.15 (.360)	8.20 (.323)	9.10 (.358)		16.40 (.646)	11.46 (.451)	2.50 (.098)	11.00 (.433)	3.10 (.122)	11.46 (.451)
	10	Long	21.50 (.846)				1.50 (.059)						
06	10	Long	20.45 (.805)	11.15 (.439)	10.05 (.396)	11.10 (.437)		18.20 (.717)	12.70 (.500)	2.50 (.098)	13.00 (.512)	3.10 (.122)	12.70 (.500)

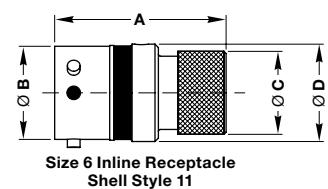
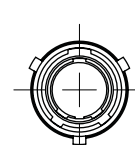
### In-Line Receptacle: Shell Style 1



Size 3 In-Line Receptacle  
Shell Style 01



Size 3 In-Line Receptacle  
Shell Style 11



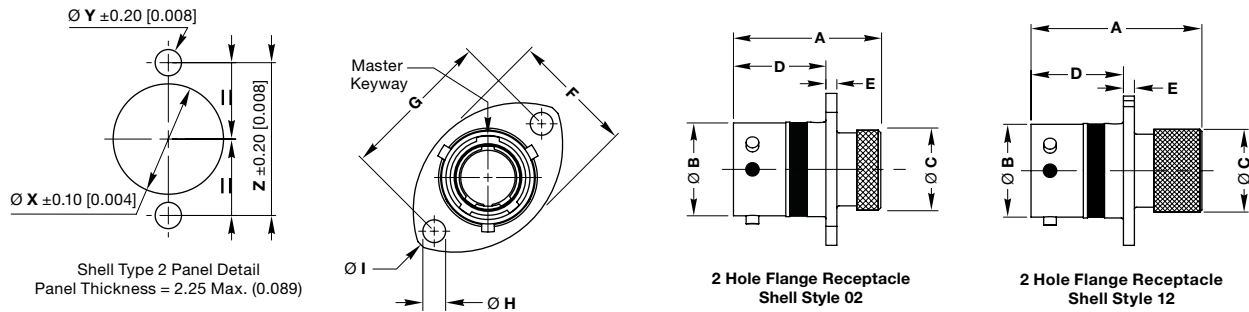
Size 6 In-Line Receptacle  
Shell Style 11

Shell Size	Shell Style	Knurl	A Max.	ØB Max.	ØC Max.	D Max.
03	01	Short	18.20 (.716)	9.15 (.360)	8.20 (.323)	N/A
	11	Long	20.45 (.805)			
06	11	Long	20.45 (.805)	11.15 (.439)	10.05 (.396)	11.75 (.462)



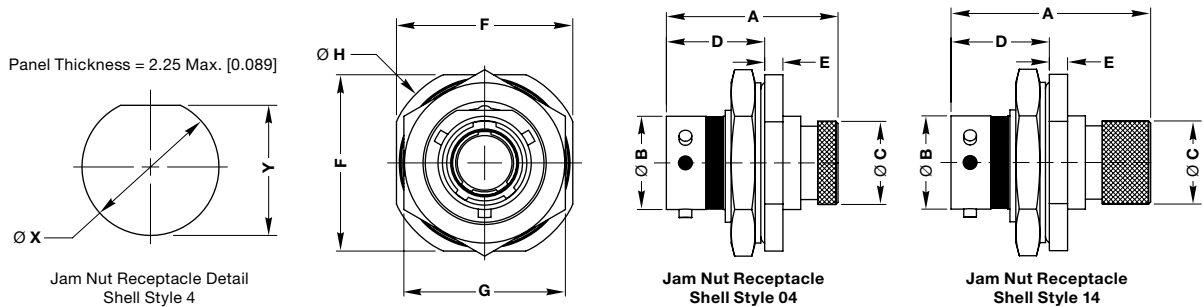
## Wildcat Micro Connectors

### 2-Hole Flanged Receptacle: Shell Type 2



Shell Size	Shell Style	Knurl	A Max.	ØB Max.	ØC Max.	D Max.	E Max.	F Max.	G	ØH Min.	ØI Max.	ØX	ØY	Z
03	02	Short	18.20 (.717)	9.15 (.360)	8.20 (.323)	9.10 (.358)	1.50 (.059)	13.40 (.528)	16.20 (.638)	2.50 (.098)	20.75 (.817)	11.00 (.433)	3.10 (.122)	16.20 (.638)
	12	Long	21.50 (.805)											
06	12	Long	20.45 (.805)	11.15 (.439)	10.05 (.396)	11.10 (.437)	1.50 (.059)	14.85 (.585)	18.00 (.709)	2.50 (.098)	22.70 (.894)	13.00 (.512)	3.10 (.122)	18.00 (.709)

### Jam Nut Receptacle: Shell Type 4

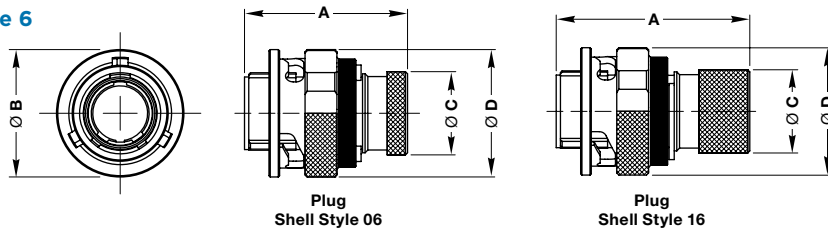


Shell Size	Shell Style	Knurl	A Max.	ØB Max.	ØC Max.	D Max.	E Max.	F Max.	G Max.	ØH Max.	ØX	Y
03	04	Short	18.20 (.717)	9.15 (.360)	8.20 (.323)	11.60 (.457)	2.35 (.093)	19.00 (.748)	17.10 (.673)	21.15 (.833)	12.20 (.480)	11.82 (.465)
	14	Long	21.50 (.846)									
06	04	Short	20.45 (.805)	11.15 (.439)	10.05 (.396)	11.70 (.461)	2.35 (.093)	21.00 (.827)	19.25 (.758)	23.15 (.911)	13.97 (0.55)	13.25 (0.52)
	14	Long	23.75 (.935)									



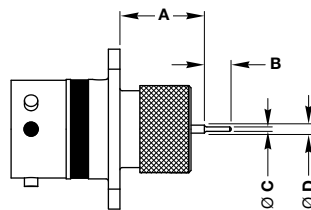
## Wildcat Micro Connectors

### Free Plug: Shell Type 6



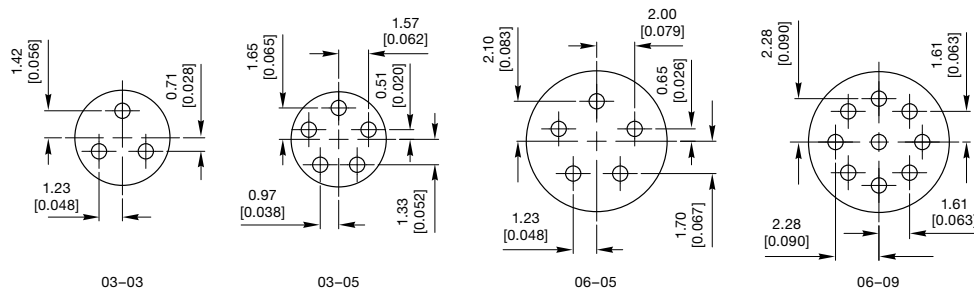
Shell Size	Shell Style	Knurl	A Max.	ØB Max.	ØC Max.	ØD Max.	
						Scalloped (Standard)	Knurled (Option Code 'KCR')
03	06	Short	18.50 (.728)	12.50 (0.492)	7.75 (0.305)	12.45 (0.490)	11.40 (0.449)
	16	Long	22.45 (.884)				
06	06	Short	19.40 (.764)	15.15 (0.596)	10.00 (0.394)	15.10 (0.594)	13.55 (0.533)
	16	Long	23.00 (.906)				

### PCB Tail Dimensions Square Flange Receptacle



Layout	Part No. Option Code	Contact Tail	Part No.		A		B Max.	ØC Max.	ØD Max.
			Pin	Socket	Max.	Min.			
03-03	-110	Long	605679-31	605681	15.03 (.592)	13.92 (.548)	3.05 (.120)	.70 (.028)	1.23 (.048)
	-111	Short	610292-31	610944	9.83 (.387)	8.72 (.343)	3.05 (.120)	.70 (.028)	1.23 (.048)
03-05	-120	Long	610006-31	610008	15.71 (.619)	14.58 (.574)	3.05 (.120)	.57 (.022)	.94 (.037)
	-121	Short	610294-31	610945	10.71 (.422)	9.58 (.377)	3.05 (.120)	.57 (.022)	.94 (.037)
06-05	-130	Long	604990-31	604992	14.91 (.587)	14.12 (.556)	3.05 (.120)	.57 (.022)	1.26 (.050)
	-131	Short	610293-31	610916	9.91 (.390)	8.12 (.320)	3.05 (.120)	.57 (.022)	1.26 (.050)
06-09	-140	Long	610006-31	610008	14.92 (.587)	14.14 (.557)	3.05 (.120)	.57 (.022)	.94 (.037)
	-141	Short	610294-31	610945	9.92 (.391)	9.14 (.360)	3.05 (.120)	.57 (.022)	.94 (.037)

### PCB Layout





## Wildcat Micro Connectors

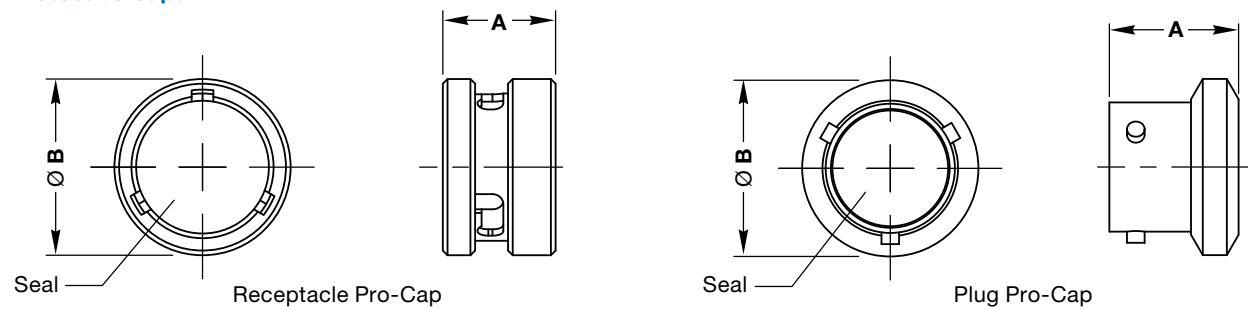
### CONTACTS AND TOOLING

Layout	Contact Part No.		Current Rating	Wire Size (AWG)	Conductor		Wire Sealing Range		Filler Plug	Ins/Ext Tool	Crimp Tool	Positioner	
	Pin	Socket			Ø Min.	Ø Max.	Ø Min.	Ø Max.				Pin	Socket
03-03	604946-31	604984	5 A	22-26	.32 (.013)	.79 (.031)	.60 (.030)	1.37 (.054)	600300-22	M81969/14-01	M22520/2-01	605463	605464
03-05	605705-31	605704	3 A	24-28	.25 (.010)	.51 (.020)	.60 (.024)	.96 (.038)	600300-24	605837		605839	605840
06-05	604927-31	604935	3 A	22-26	.32 (.013)	.79 (.031)	.60 (.024)	1.37 (.054)	600300-22	M81969/14-01		604972	604973
06-09	605705-31	605704	3 A	24-28	.25 (.010)	.51 (.020)	.60 (.024)	.96 (.038)	600300-24	605837		605839	605840
06-09*	610760-31	610539	3 A	22-26	.25 (.010)	.51 (.020)	.60 (.024)	.96 (.038)	600300-24	Non-Removable		610948	610947
06-05	610760-31	610539	3 A	22-26	.25 (.010)	.51 (.020)	.60 (.024)	.96 (.038)	600300-24	Non-Removable		610948	610947

\*Specifically for the '-220' option code: -220 option code should be used to order with these contacts for 22 AWG wire (see ordering information).

### ACCESSORIES

#### Protective Caps



Type	Shell Size	A Max.	ØB Max.	Part No.
Receptacle	03	8.80 (.346)	12.55 (.494)	605684-12
	06	9.80 (.386)	15.20 (.598)	604029-12
Plug	03	11.20 (.441)	12.55 (.494)	605687-12
	06	11.20 (.441)	15.20 (.598)	604027-12

-12 = Cadmium olive drab, -58 = Nickel

#### Raychem Heat-Shrink Boots

Shell Size	Straight Boot	90° Boot
03	204W221-25-G03	224W221-25-G03
06	204W221	224W221

#### CRES-Lock Bandstraps



##### Easy to Use

- Quick, easy, cost-effective and reliable termination of braided shielding

##### High Performance

- Low profile, one-piece design helps eliminate EMI leakage paths

##### Rugged

- Shock, vibration and environmental performance to meet aerospace and defense requirements



## Wildcat Micro Connectors

### ORDERING INFORMATION

#### Part Numbering System

**WM O 6 B W 06-05 S N - \*\*\***

#### SERIES

Wildcat Micro

#### SHELL REAR ACCESSORY

- 0** Short Knurl—Boot Mounting  
(Not Applicable for Shell Size 6, Types 0, 1, 2)
- 1** Long Knurl—Cable Screen Braid and  
Boot Mounting

#### SHELL TYPE

- 0** Square Flange Receptacle
- 1** In-line Receptacle
- 2** 2 Hole Flange Receptacle
- 4** Jam Nut Receptacle\*
- 6** Free Plug

#### COUPLING TYPE

- B** Bayonet
- T** Triple-start ACME Thread (Shell Size 06 only)

#### CLASS CODE

- W** Aluminum with Olive Drab Cadmium
- F** Aluminum with Electroless Nickel (RoHS Compliant)
- Z** Aluminum with Black Zinc Nickel (RoHS Compliant)

#### SHELL SIZE—INSERT ARRANGEMENT

- 03-03** Shell Size 3, 3 Positions
- 03-05** Shell Size 3, 5 Positions
- 06-05** Shell Size 6, 5 Positions
- 06-09** Shell Size 6, 9 Positions

#### CONTACT TYPE

- P** Pin
- S** Socket

#### KEYING

- N** Normal
- A, B, C, D, E**

#### OPTION CODE (3 DIGITS) OR MODIFICATION CODE

- 090** Supplied without Contacts
- 1xx** PCB Contact (see PCB option table for code)
- 220** Enlarged Crimp Barrel Contacts for 22 AWG Wire  
(non-removable, suitable for 03-05 and 06-09 layout only)
- KCR** Knurled Coupling Ring
- KC1** Supplied with Knurled Coupling Ring but without Contacts
- KC2** Supplied with Knurled Coupling Ring and with Enlarged Crimp Barrel Contacts for  
22 AWG Wire (non-removable, suitable for 03-05 and 06-09 layouts only)

\*Not available for the Triple-start ACME Thread Coupling Type.



# CeeLok FAS-T Connectors

Small Form Factor, Field Terminable Connectors



CeeLok FAS-T connectors offer a small form factor, field terminable I/O connector capable of 10 Gb/s Ethernet. Crimp-snap contacts enable easy termination and field repairability. The integral backshell offers easy 360-degree shield termination.

The compact size 8 shell helps designers meet the needs of reduced SWaP (size, weight, and power).

The connector's T-shaped contact pattern provides noise cancellation and decoupling to minimize crosstalk and increase signal integrity.

The CeeLok FAS-T connector is a true 100-ohm impedance connector that is compatible with Cat 5e and Cat 6a cables and protocols ranging from the USB and IEEE 1394 to gigabit and 10G Ethernet.

## HIGH SPEED

- Gigabit or 10 Gigabit rates
- Compatible with Cat 5e, Cat 6a or Cat 7 cables
- T-shaped pin pattern improves signal integrity through uniform crosstalk cancellation

## SPACE AND WEIGHT SAVINGS

- Compact size 8 shell

## EASY TERMINATION AND FIELD REPAIRABILITY

- Crimp-snap, 39029-style contacts

## FLEXIBLE BACKSHELL/SHIELDING OPTIONS

- Backshell integrated in plug body provides low profile, low cost, low weight strain relief and EMI protection
- Compatible with multiple braid termination techniques, adapter styles and seal boots

## RUGGED

- Scoop-proof design
- Insert assembly mechanically retained for  $\leq 25$  lb. retention force
- Robust coupling ring mechanism





## Performance Characteristics

### DATA RATES

- Gigabit and 10 Gigabit Ethernet when used with Cat 5e, Cat 6a or Cat 7 cables

### ELECTRICAL

- **Insulation Resistance:** 5000 MΩ ambient, 1000 MΩ @ 175°C
- **Dielectric Withstanding Voltage:** 500 VAC @ sea level, 100 VAC @ 70,000 ft.
- **Shielding Effectiveness:** per MIL-DTL-38999
- **Shell-to-Shell Conductivity:** 5 mV initial, 10 mV final

### MECHANICAL

- **Vibration, Sine:** MIL-DTL-38999 Series III (60 g), 4 hrs per axis, no elevated temperature
- **Vibration, Random:** EIA-364-28 Condition VI Letter J (43.92 g)
- **Durability:** 500 mating cycles
- **Contact Retention:** 10 lb. min.
- **Coupling Torque:** 8 in.-lb. max.

### ENVIRONMENTAL PROPERTIES

- **Operating Temperature:** -65°C to +175°C
- **Sealing:** Altitude immersion: 70,000 ft. (mated condition)
- **IP67:** Mated condition
- **IPX6 (water jet):** Receptacle, panel mounted (unmated condition)
- **Corrosion Resistance:** 500 hr. salt mist—black zinc nickel per AMS-2417

### MATERIALS

- **Shell:** Electroless nickel or black zinc for DOD-approved, RoHS-compliance, corrosion resistance (500 hr salt mist)
- **Insert:** High-temperature thermoplastic for excellent temperature endurance
- Low dielectric constant for superior signal integrity
- **Contacts:** Beryllium copper alloy

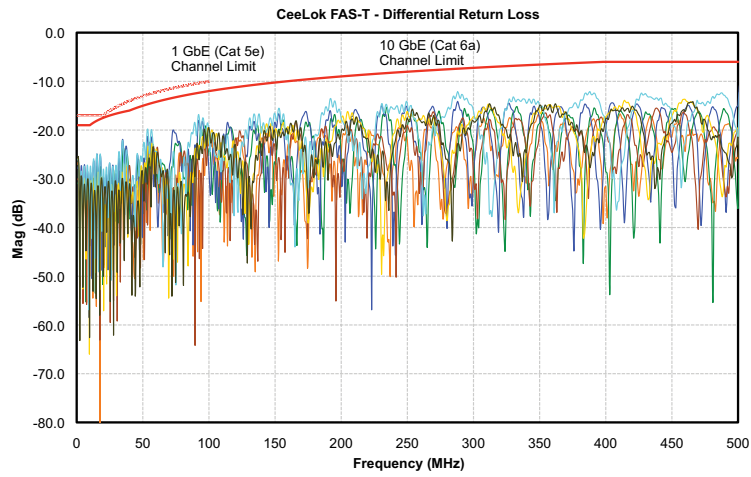
### STANDARDS AND SPECIFICATIONS

- **Product Specification:** 108-2482
- **Application Specification:** 114-32025
- **Instruction Sheet:** 408-32046
- **Test Report:** 501-134002
- **Electrical Performance Report:** 505-116000

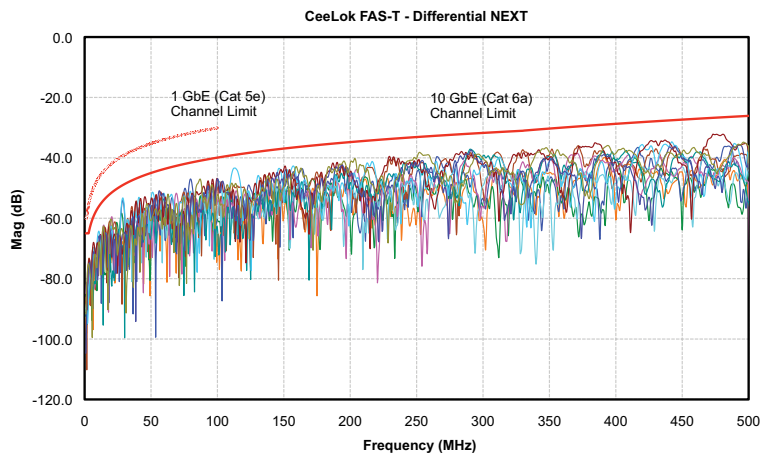
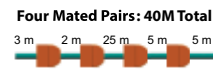




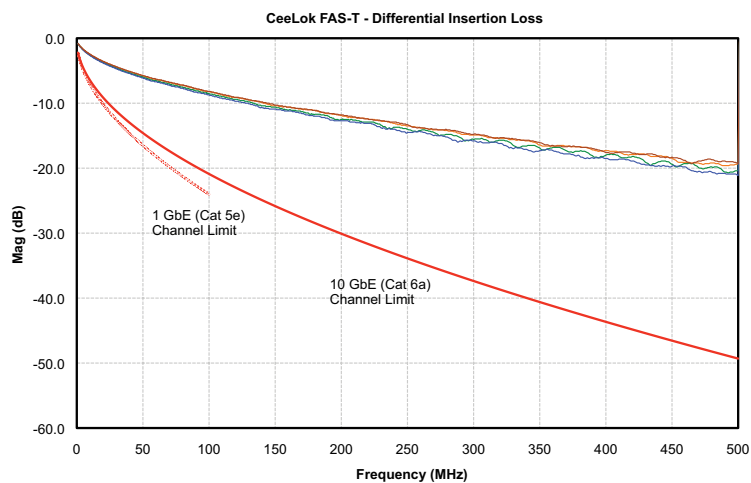
## CeeLok FAS-T Connectors



CeeLok FAS-T  
Differential Return Loss



CeeLok FAS-T  
Differential NEXT



CeeLok FAS-T  
Differential Insertion Loss



## CeeLok FAS-T Connectors

Type	Contacts Included	Key	Part No.	
			Electroless Nickel	Black Zinc Nickel
Plug	Socket	N	2102353-1	2102353-2
		A	2102353-3	2102353-4
		B	2102353-5	2102353-6
	None	N	2102353-7	2102353-8
		A	2102353-9	1-2102353-0
		B	1-2102353-1	1-2102354-2
Receptacle	Pin	N	2102352-1	2102352-2
		A	2102352-3	2102352-4
		B	2102352-5	2102352-6
	None	N	2102352-7	2102352-8
		A	2102352-9	1-2102352-0
		B	1-2102352-1	1-2102352-2
Box-Mount Receptacle	Pin	N	2102343-1	2102343-2
		A	2102343-3	2102343-4
		B	2102343-5	2102343-6
	None	N	2102343-7	2102343-8
		A	2102343-9	1-2102343-0
		B	1-2102343-1	1-2102343-2
Box-Mount Receptacle, PC Tail	Pin	N	2102453-1	2102453-2
	Pin	A	2102453-3	2102453-4
	Pin	B	2102453-5	2102453-6
Jam Nut Receptacle, PC Tail	Pin	N	2102351-1	2102351-2
	Pin	A	2102351-3	2102351-4
	Pin	B	2102351-5	2102351-6

### Contacts

Wire Size	Part No.	
	Pin	Socket, Hooded
24 – 26 AWG	2102349-3	2102350-5

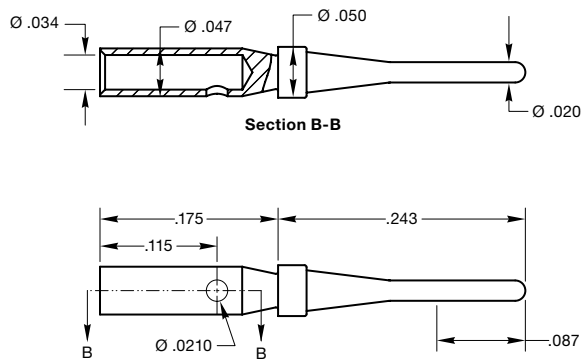
### Application Tooling

**Hand Crimp Tool:**  
M22520/2-01

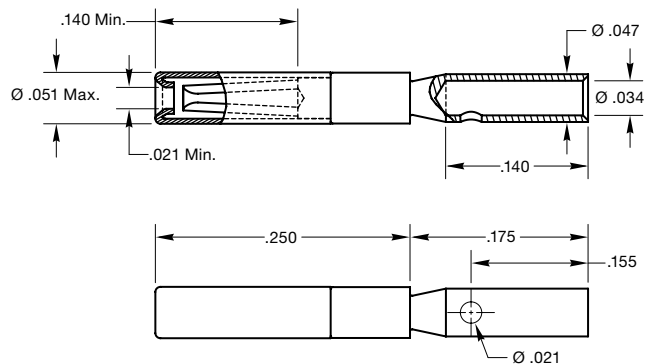
**Crimp Positioner:**  
TE Part No. 2217375-1

**Insertion/Extraction Tool:**  
TE Part No. 2217376-1

### Pin



### Socket



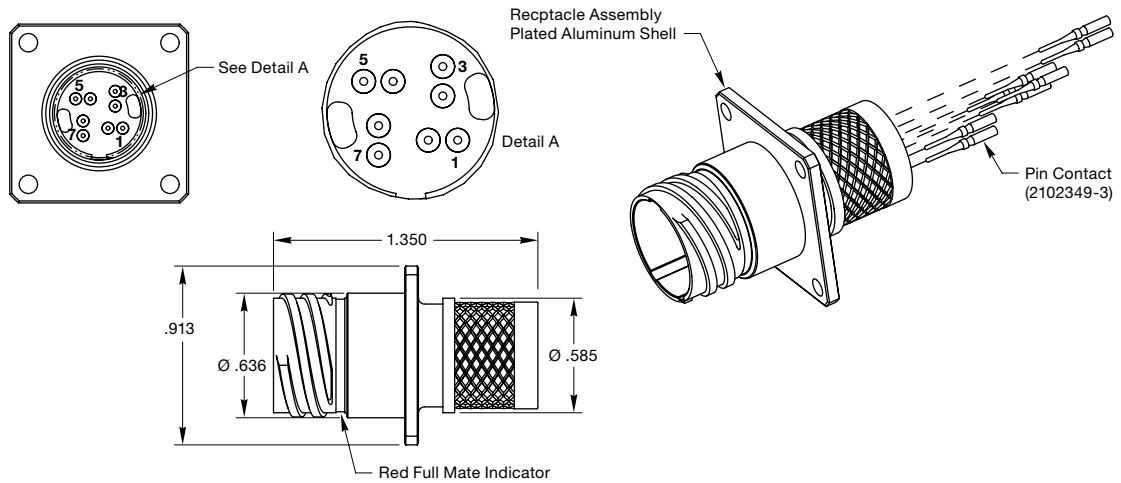


## CeeLok FAS-T Connectors

### PRODUCT DIMENSIONS

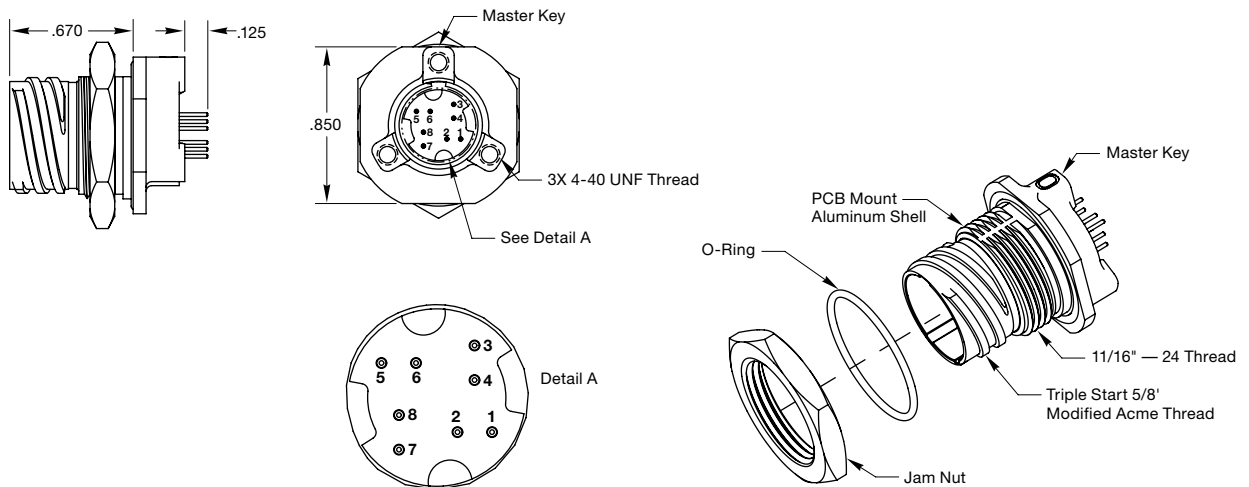
#### Boxmount Receptacle Kit Assembly

Part No. 2102343



#### Jam Nut Receptacle Assembly, PC Tail

Part No. 2102351



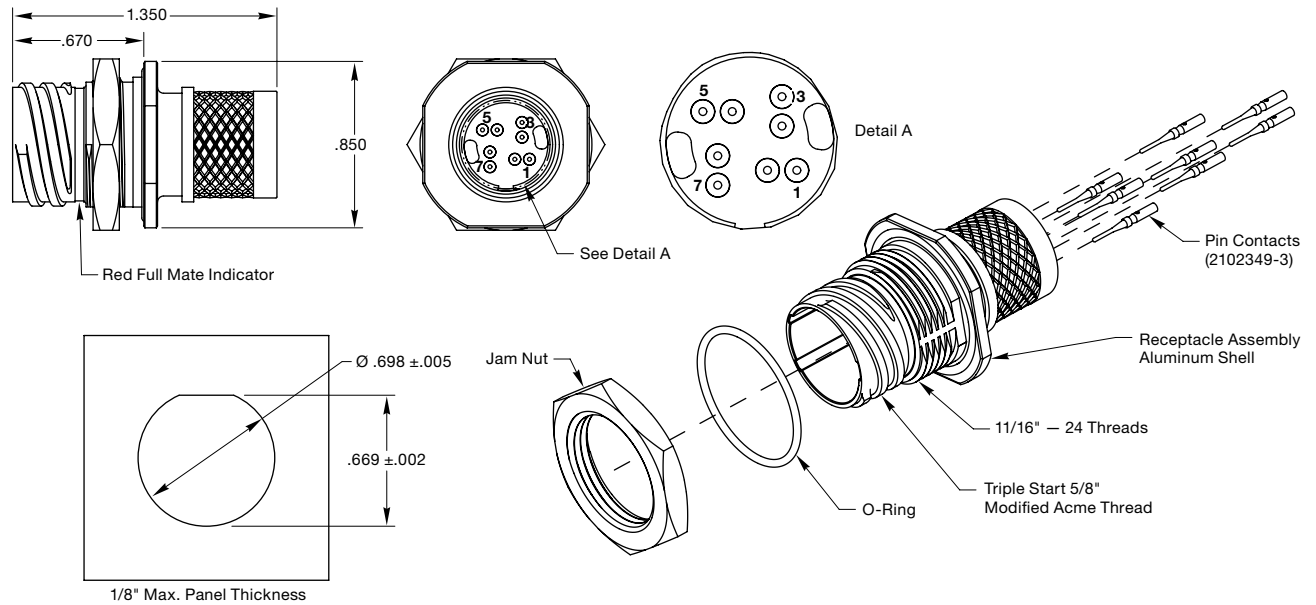


## CeeLok FAS-T Connectors

### PRODUCT DIMENSIONS

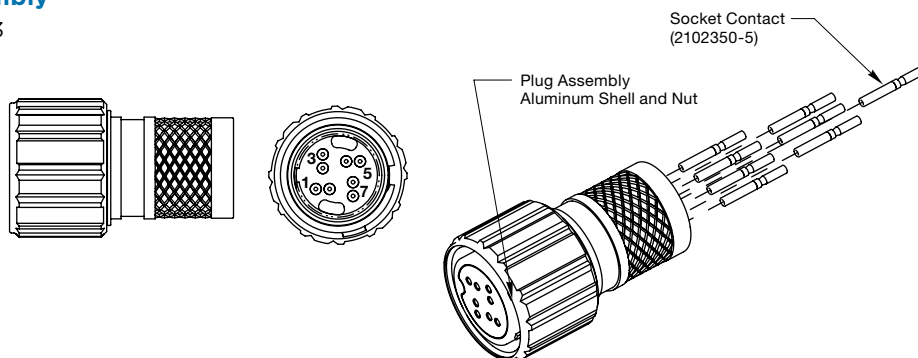
#### Receptacle Kit Assembly

Part No. 2102352



#### Plug Kit Assembly

Part No. 2102353



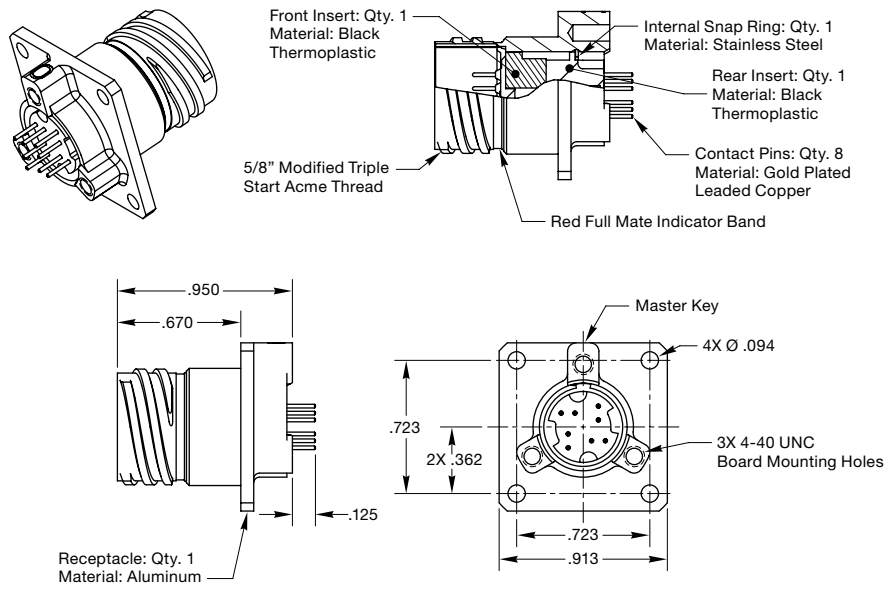


## CeeLok FAS-T Connectors

### PRODUCT DIMENSIONS

#### Boxmount Receptacle Assembly, PC Tail

Part No. 2102453



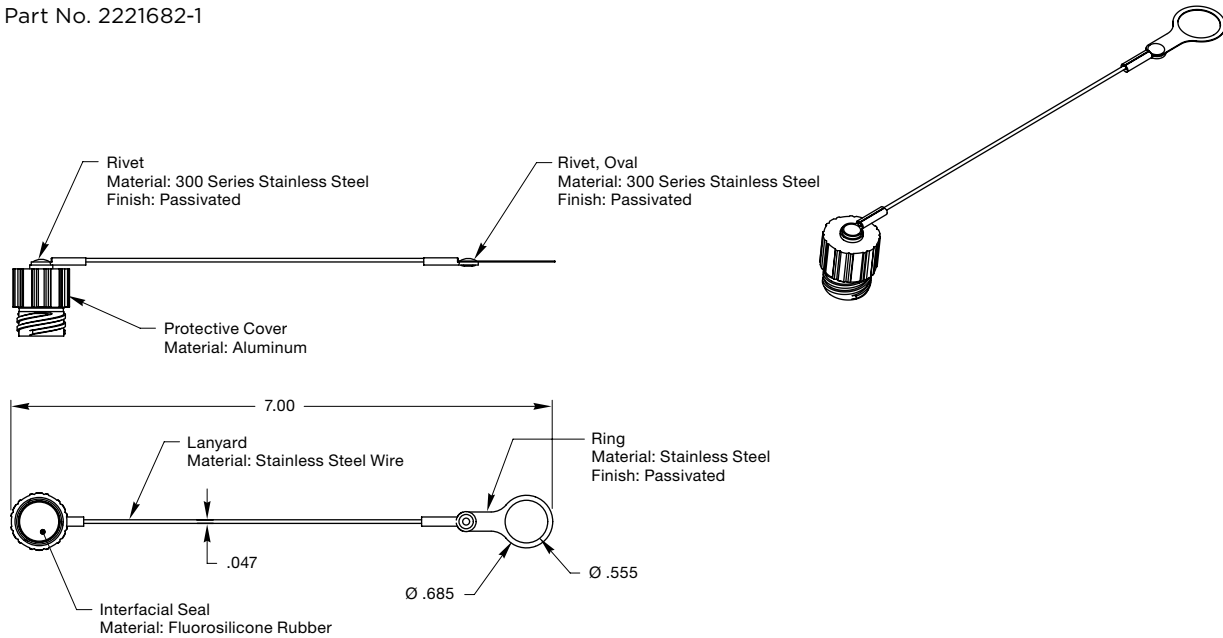


## CeeLok FAS-T Connectors

### PRODUCT DIMENSIONS

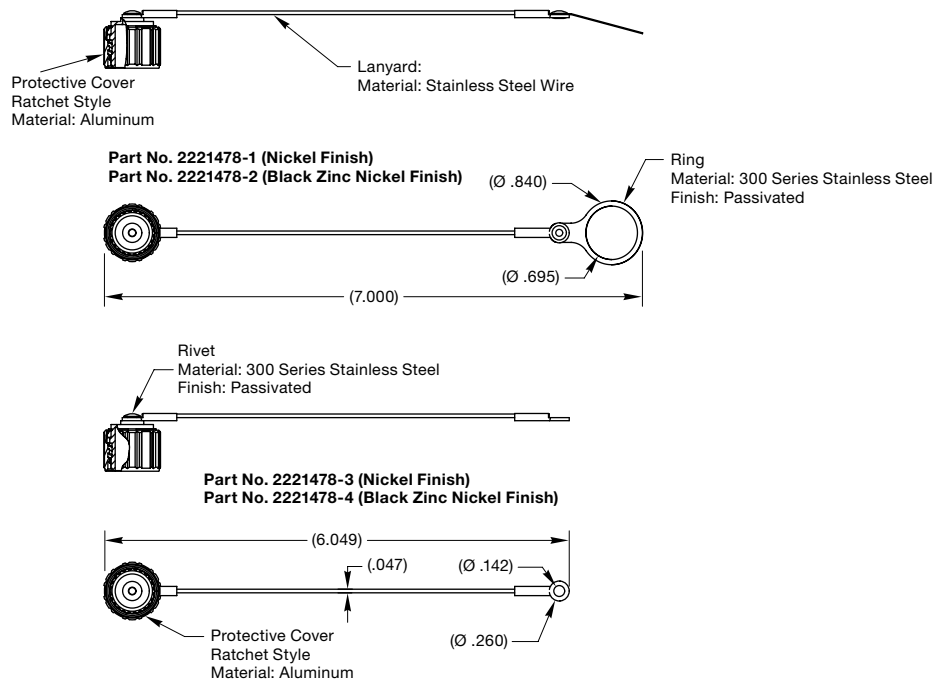
#### Protective Cover Cap, Plug

Part No. 2221682-1



#### Protective Cover Cap, Receptacle

Part No. 2221478-x







## CeeLok FAS-T Connectors

### ACCESSORIES

#### SolderSleeve Shield Terminators



##### Convenient and Effective

- Terminates a ground lead to cable shield in order to ground the shield
- Simple, quick termination
- Available with and without pigtails

##### Versatile

- Center or end strip for ease of termination
- Handles wide range of high data rate cables and diameters

##### Environmental

- Operating temperature: -55°C to +200°C
- Environmentally sealed
- Mechanically robust

##### Physical or Other Properties

- Terminates tin, silver and nickel flat or round braids
- Provides 360° of shielding

##### Product Offering

- Contact TE for a complete listing of SolderSleeve shield terminators

#### CRES-Lock Bandstraps



##### Easy to Use

- Quick, easy, cost-effective and reliable termination of braided shielding

##### High Performance

- Low profile, one-piece design eliminates EMI leakage paths

##### Rugged

- Shock, vibration and environmental tested to meet aerospace and defense requirements

##### Electrical

- Operating Temperature: -65°C to +200°C
- Electrical Resistance: Meets  $\leq 1.0$  m $\Omega$  requirement of AS85049/128
- Corrosion Resistance: 500 hr. salt spray

##### Mechanical

- Tensile Strength: 200 lb.
- Braid Retention: Meets 100 lb. requirement of AS85049/128

##### Application Tooling

- Micro Tie-Dex II, A30199

Description	Part No.
Bandstrap	BND-0812S



## CeeLok FAS-T Connectors

### ACCESSORIES

#### Heat-Shrinkable Molded Boots



#### Hazard Matched

- Different materials to meet different temperature and environmental requirements
- Optional with pre-applied adhesives for quick installation and high-reliability IP67 sealing
- Epoxy sealing kits available

#### Versatile

- Sealing and strain relief to the wires and cables
- Straight or 90 degree cable exit

#### Application Tooling

- HL1910E or the HG-501A ThermoGun heat gun and appropriate hot air reflectors

#### Product Offering

Temperature Range	Material	Adhesive Lined	Size* mm	Descriptive Part No.	
				Straight	90°
-20°C to 60°C	Flexible polyolefin	Yes	24/10.4/5.6	202K121-4/42-0	222K121-4/42-0
	Flexible polyolefin	Yes	30/14.2/5.9	202K132-4/42-0	222K132-4/42-0
-55°C to 120°C	Fluid-resistant elastomer	Yes	30/14.2/5.9	202K132-25/86-0	222K132-25/86-0
-55°C to 135°C	Flexible polyolefin	No	30/14.2/5.9	202K132-4-0	222K132-4-0
-55°C to 200°C	Modified fluoroelastomer	No	30/14.2/5.9	202K132-12-0	222K132-12-0
-75°C to 150°C	Fluid-resistant elastomer	Yes	30/14.2/5.9	202K132-25/225-0	222K132-25/225-0
	Fluid-resistant elastomer	No	30/14.2/5.9	202K132-25-0	222K132-25-0

\*Size = as-supplied diameter both ends/recovered diameter connector end/recovered diameter cable end.

#### High-Data-Rate Cables



#### Compact and Lightweight

- Thin-wall technology for smaller, lighter cables
- 28 AWG to 22 AWG conductors

#### Versions for Common Protocols

- Fast and Gigabit Ethernet in Cat 5e and Quadrx configurations
- IEEE 1394
- USB

#### Rugged

- Specialized TE developed polymer formulations designed to support better mechanical and thermal performance in harsh environments
- State-of-the-art FAA approved foam dielectrics for better signal transmission
- Ruggedized zero halogen jacket for marine applications that passes the rigorous military standards for flammability while meeting stringent smoke and toxicity requirements

#### Customizable

- Customizable to meet mission-critical needs such as EMI, fluid resistance, and flammability
- Hybrid designs
- Electrical testing capability, including skew and eye patterns

#### Robust

- Operating temperature range from -55°C to +200°C
- Full range of shielding options for signal integrity

# Wildcat 38999 Connectors

High Reliability and High Contact Density



Combine high reliability and high contact density in a familiar MIL-DTL-38999 format with Wildcat 38999 connectors. With higher contact density than mil-spec high-density inserts and nearly double the contact density of standard inserts, Wildcat 38999 connectors offer extreme temperature, vibration, and corrosion resistance, and durability of 500+ mating cycles in a space-saving design.

The easy-grip coupling ring and triple-start thread make mating and unmating fast and simple.

A variety of material and plating options means versatile choices to match the demands of your application.

## SPACE AND WEIGHT SAVINGS

- Almost double the contact density of MIL-DTL-38999 connectors
- Lightweight materials

## RUGGED

- Threaded anti-vibration coupling
- Scoop-proof interface
- Aggressive fluid resistance and dust ingress prevention

## RELIABLE

- Fully sealed cable and mating interface
- EMI screening as per MIL-DTL-38999 Series III
- RFI mating interface band

## VERSATILE

- Multiple keying options
- Various plating and material options
- Backshell or cable braid/boot rear feature that eliminates need for backshell
- Rear-removable crimp and PCB contacts (consult TE for PCB details)

## Performance Characteristics

### ELECTRICAL

- **Dielectric Withstand Voltage:** 1000 VAC
- **Current Rating:** 3 amps/contact

### ENVIRONMENTAL

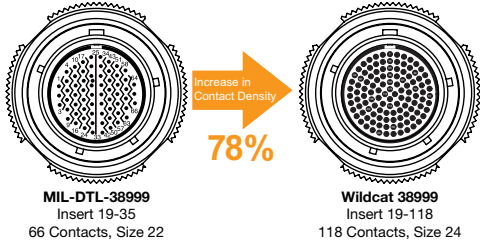
- **Temperature:**
  - 65°C to +175°C (cadmium)
  - 65°C to +200°C (nickel)
- **Durability:** 500 mating cycles min.
- **Vibration:** MIL-DTL-38999 Series III
- **Thermal Shock:** MIL-DTL-38999 Series III
- **Shock:** 300 g, 3 ms in 3 axes
- **Fluid resistance:** Withstands a wide range of military and aerospace fluids
- **Salt spray resistance:**
  - 500 hours (cadmium finish) per MIL-STD-1344 Method 100 B and NFC93422.
  - 48 hours (nickel finish)
- **Sealing:** Up to 30,000 m/100,000 ft. altitude

### MATERIALS

- **Shell and Coupling Ring:** Aerospace grade aluminum alloy as standard
- **Plating:** Olive drab cadmium, RoHS electroless nickel, black zinc nickel (other finishes available on request)
- **Seals:** Fluorinated silicone
- **Insulators:** High-performance thermoplastic
- **Contacts:** Gold-plated machined copper alloy
- **Wire Size:** 28 to 24 AWG

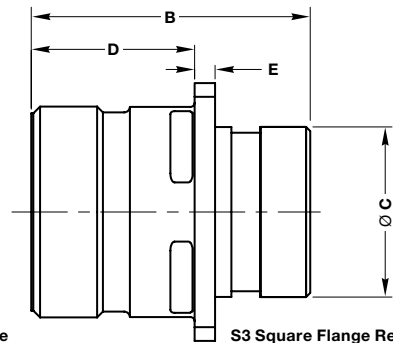
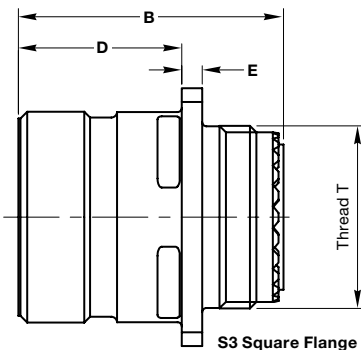
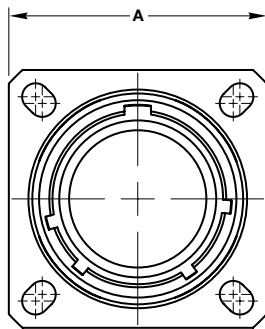


Wildcat 38999 Connectors



MIL-DTL-38999				DEUTSCH Wildcat 38999	
Standard Density Size 22D Contacts		High Density Size 23 Contacts		High Density Size 24 Contacts	
Insert	No. of Contacts	Insert	No. of Contacts	Insert	No. of Contacts
9-35	6	9-23	9	09-11	11
11-35	13	11-23	19	11-23	23
13-35	22	13-23	32	13-41	41
15-35	37	15-23	55	15-64	64
19-35	66	19-23	88	19-118	118

Square Flange Receptacle: Shell Type 0



Square Flange Receptacle with Accessory Thread

Shell Size	A Max.	B Max.	D Max.	E Max.	Thread 'T'
09	24.00 (.945)				M12 x 1.0-6g
11	26.40 (1.039)	31.55 (1.242)	19.90 (.783)	2.50 (.098)	M15 x 1.0-6g
13	28.90 (1.138)				M18 x 1.0-6g
15	31.30 (1.232)				M22 x 1.0-6g

Consult TE for further information on 19-118 connectors

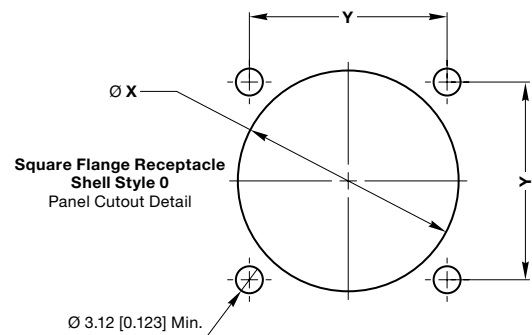
Square Flange Receptacle with Knurled Rear

Shell Size	A Max.	B Max.	C Max.	D Max.	E Max.
09	24.00 (.945)		11.30 (.445)		
11	26.40 (1.039)	33.80 (1.331)	14.35 (.565)	19.90 (.783)	2.50 (.098)
13	28.90 (1.138)		17.50 (.689)		
15	31.30 (1.232)		20.65 (.813)		

Consult TE for further information on 19-118 connectors

Square Flange Receptacle Panel Cutouts

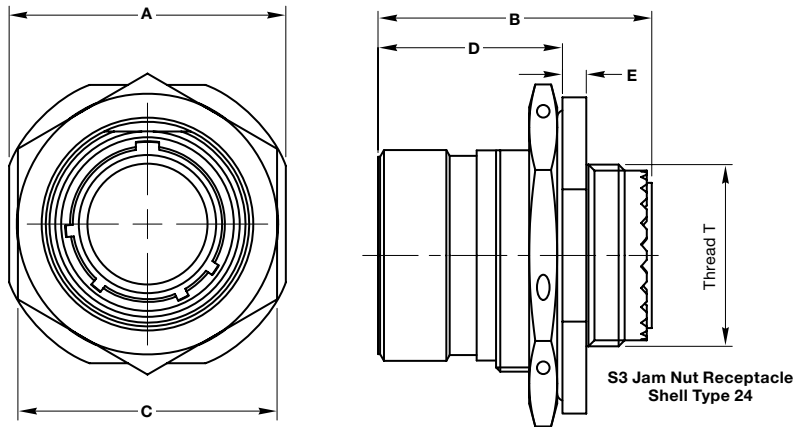
Shell Size	ØX		Y	
	Front Mount	Rear Mount	Max.	Min.
09	13.11 (.516)	16.66 (.656)	18.26 (.719)	15.09 (.594)
11	15.08 (.594)	22.22 (.875)	20.26 (.798)	18.26 (.719)
13	19.05 (.750)	23.42 (.922)	23.01 (.906)	20.62 (.812)
15	23.01 (.906)	26.59 (1.047)	24.61 (.969)	23.01 (.906)





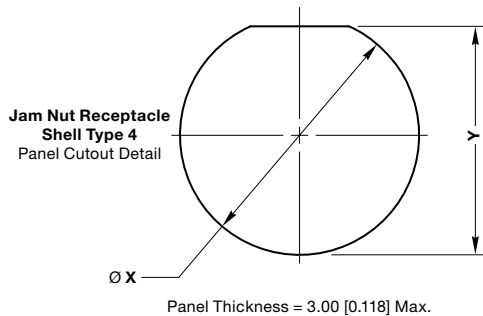
## Wildcat 38999 Connectors

### Jam Nut Receptacle: Shell Type 4



Shell Size	A Max.	B Max.	C Max.	D Max.	E Max.	Thread 'T'
09	27.20 (1.071)		23.25 (.915)			M12x1.0-6g
11	32.00 (1.260)	32.55 (1.281)	26.30 (1.035)	22.40 (.882)	2.95 (.116)	M15x1.0-6g
13	35.10 (1.382)		32.00 (1.260)			M18x1.0-6g
15	38.30 (1.508)		36.00 (1.417)			M22x1.0-6g

Consult TE for further information on 19-118 connectors



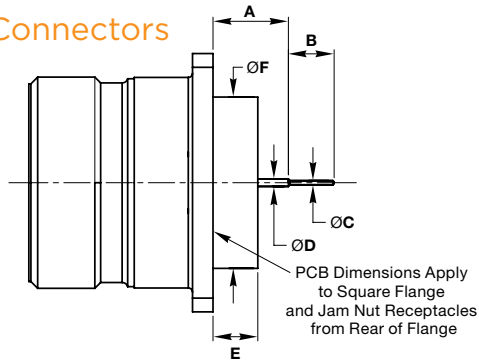
### Jam Nut Receptacle Panel Cutouts

Shell Size	ØX (±.01)	Y (±.01)
09	17.80 (.700)	16.89 (0.665)
11	20.98 (.826)	19.43 (.765)
13	25.68 (1.011)	24.16 (.951)
15	28.90 (1.138)	27.43 (1.080)



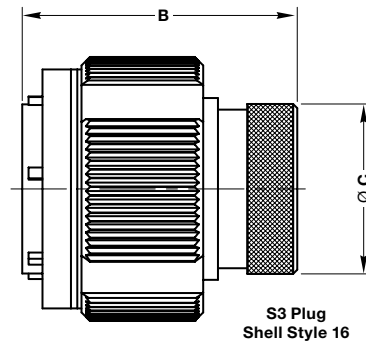
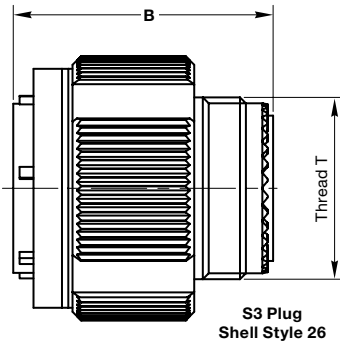
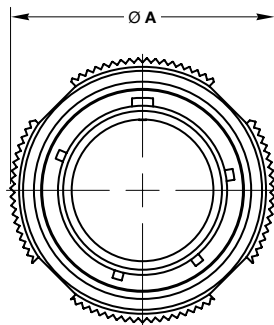
## Wildcat 38999 Connectors

### PCB Tail Dimensions



Layout	Part No. Option Code	Shell Accessory	Part No.		A		B Max.	ØC Max.	ØD Max.	E Max.	ØF Max.	
			Pins	Sockets	Max.	Min.					Shell Size	SØ Max.
09-11 11-23 13-41 15-64 19-118	-151	W320	611624-31	611625	11.73 (.462)	10.73 (.422)	5.55 (.219)	.60 (.024)	1.00 (.039)	5.74 (.226)	09	11.07 (.436)
	-151	W324	611556-31	611627	9.73 (.383)	8.73 (.344)	5.55 (.219)	.60 (.024)	1.00 (.039)	5.74 (.226)	11	14.33 (.564)
	-151	W330	Potted	Potted	9.73 (.383)	8.73 (.344)	5.55 (.219)	.60 (.024)	1.00 (.039)	5.74 (.226)	13	17.42 (.686)
	-151	W334	Potted	Potted	6.73 (.265)	5.73 (.226)	5.55 (.219)	.60 (.024)	1.00 (.039)	5.74 (.226)	15	20.57 (.810)

### Free Plug: Shell Type 6



### Plug with Accessory Thread

Shell Size	ØA Max.	B Max.	Thread 'T'
09	21.30 (.839)	31.10 (1.224)	M12x1.0-6g
11	23.75 (.935)		M15x1.0-6g
13	29.10 (1.146)		M18x1.0-6g
15	32.30 (1.272)		M22x1.0-6g

Consult TE for further information on 19-118 connectors

### Plug with Knurled Rear

Shell Size	ØA Max.	B Max.	ØC Max.
09	21.30 (.839)	33.30 (1.311)	11.30 (.445)
11	23.75 (.935)		14.35 (.565)
13	29.10 (1.146)		17.50 (.689)
15	32.30 (1.272)		27.00 (1.063)

Consult TE for further information on 19-118 connectors

### CONTACTS

Contact		Current Rating	Wire Size (AWG)	Conductor		Wire Sealing Range	
Pin	Socket			Min. Ø	Max. Ø	Min. Ø	Max. Ø
605719-31	605721	3 A	24-28	.254 (.010)	.511 (.020)	.600 (.024)	.96 (.038)

### TOOLING

Ins/Ext Tool	Crimp Tool	Positioner	
		Pin	Socket
605837	M22520/ 2-01	610286	610287

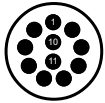


## Wildcat 38999 Connectors

### Contact Arrangement

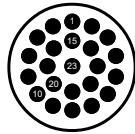
(Viewed from the mating face of a connector with male (pin) contacts)

Shell Size 09



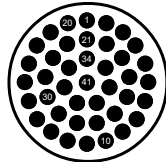
09-11

Shell Size 11



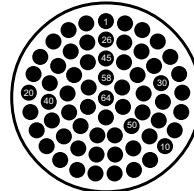
11-23

Shell Size 13



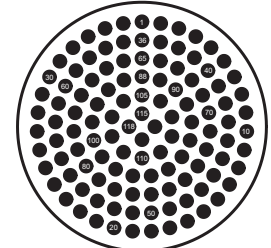
13-41

Shell Size 15



15-64

Shell Size 19



19-118

### ACCESSORIES

#### Protective Caps and Backshells

Wildcat 38999 connectors are compatible with MIL-DTL-38999 Series III type backshells and procaps or equivalent.

#### Raychem Heat-Shrink Boots

Shell Size	Straight Boot	90° Boot
09	202K121	222K121
11	202K132	222K121
13	202K142	222K132
15	202K142	222K142
19	202K153	222K152

#### CRES-Lock Bandstraps



##### Easy to Use

- Quick, easy, cost-effective and reliable termination of braided shielding

##### High Performance

- Low profile, one-piece design helps eliminate EMI leakage paths

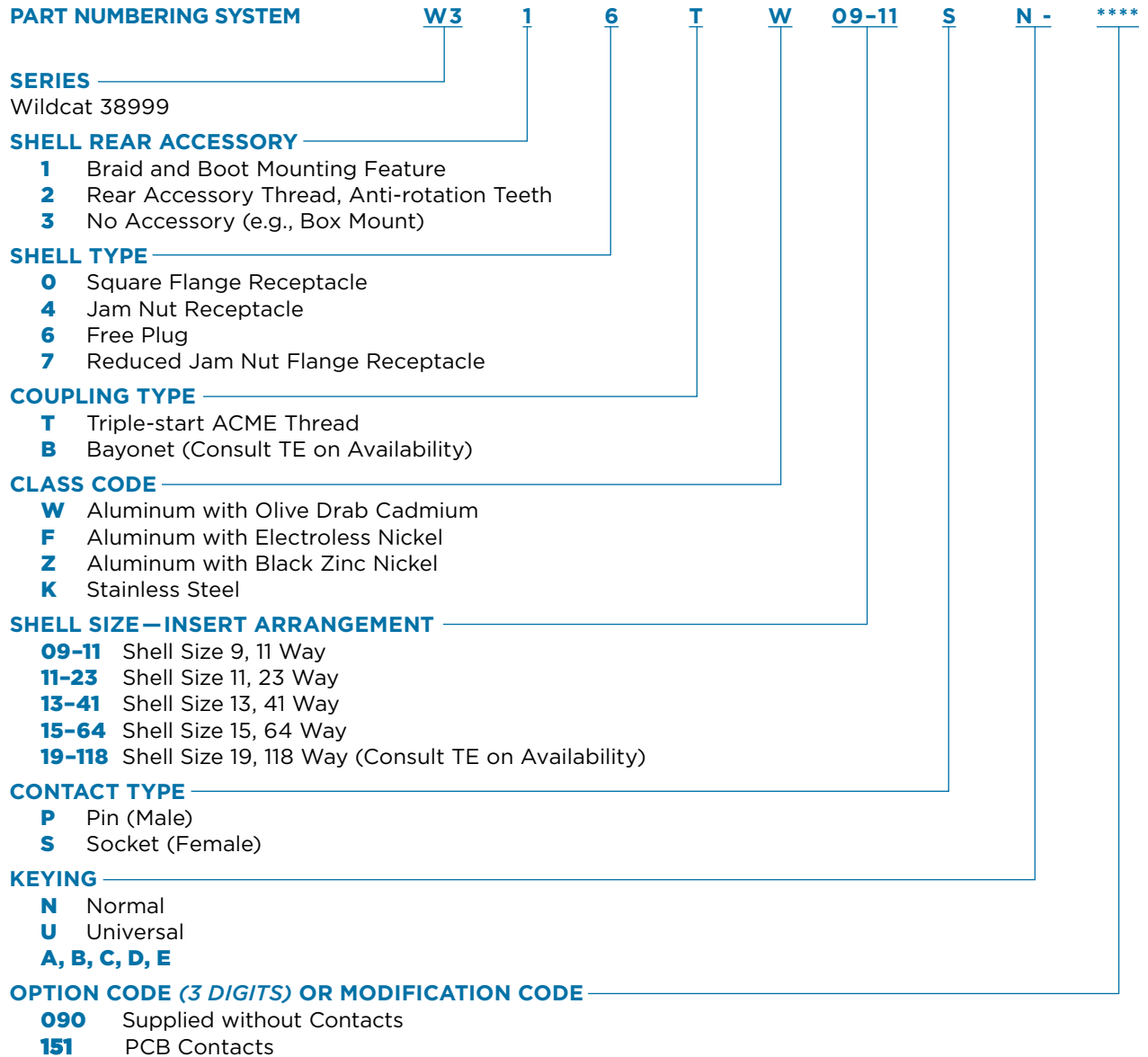
##### Rugged

- Shock, vibration and environmental performance to meet aerospace and defense requirements



## Wildcat 38999 Connectors

### ORDERING INFORMATION





# CeeLok FAS-X Connectors

The High-Performance, Rugged Solution for High-Speed



CeeLok FAS-X connectors with industry proven AS39029 contacts were designed for rugged environments and provide reliable, consistent high-speed performance.

RJ45 in M38999 connectors are much larger than the CeeLok FAS-X connector (shell size 19 versus shell size 11). Additionally, the insulation displacement crimp technology may be unsuitable for use in certain harsh environments for which the M39029 crimp contacts used in the CeeLok FAS-X connector were intentionally designed.

## RUGGED

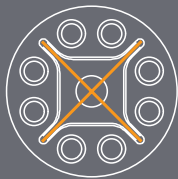
- MIL-DTL-32546.1 compliant
- Zero bit error rate
- Proven AS39029 crimp contacts
- Uses 38999-style shell

## FAST AND QUIET

- Gigabit or 10 Gigabit data delivery
- Excellent impedance matching and virtually no crosstalk
- Size 25 shell supports up to four Ethernet channels

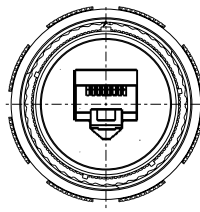
## HIGH PERFORMANCE

- Designed for use in rugged environments
- Ideal choice for 10G Ethernet, IEEE 1394, USB 2.0 and other high-speed protocols
- Optimized shielding arrangement for superior signal integrity

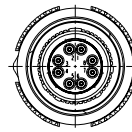


## CONVENIENT

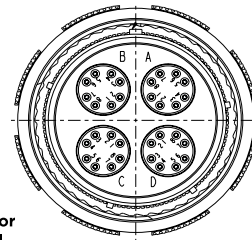
- Fast field assembly, termination and repair
- Available with aluminum or composite shells with a variety of finishes
- Install/repair using standard insertion/removal and crimping tools
- Range of inserts available for Size 25 shell for other connectivity needs



**RJ45**  
**One Ethernet Channel**  
Size 19 Shell  
**38.35 mm [1.51"] Dia.**



**CeeLok FAS-X Connector**  
**One Ethernet Channel**  
Size 11 Shell  
**24.89 mm [0.98"] Dia.**



**CeeLok FAS-X Connector**  
**Four Ethernet Channels**  
(Equivalent to four RJ45s)  
Size 25 Shell  
**47.75 mm [1.88"] Dia.**

## Performance Characteristics

### APPLICATIONS

- Military and Aerospace High-Speed Networking
- Gigabit Ethernet and 10G Ethernet Networks
- IEEE 1394b I/O
- Fibre Channel Networks
- Modular D38999

### MECHANICAL/ENVIRONMENTAL

- **Temperature Rating:** -65°C to +200°C
- **Mating Cycles (Min.):** 500
- **Plug Diameter:** 0.984" and 1.889" (24.99 mm and 47.98 mm)
- **Sealing IP Rating:** IP67
- **Sealing Altitude Immersion:** 50,000'

### ELECTRICAL DATA

- **Dielectric Withstanding Voltage:** 1300 VAC
- **Contact Current Rating (Amps/Contact):** 5

### MATERIALS

- **Shells:** Aluminum or composite, nickel plated
- **Contact Finish:** Gold

### STANDARDS AND TEST REPORTS

- **TE Qualification Test Reports:** 10065 and 20101203



## Superior Signal Integrity at Gigabit Rates

### Superior Impedance Matching

CeeLok FAS-X connectors are designed to maintain a highly matched 100-ohm impedance, with superior signal integrity.

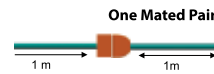
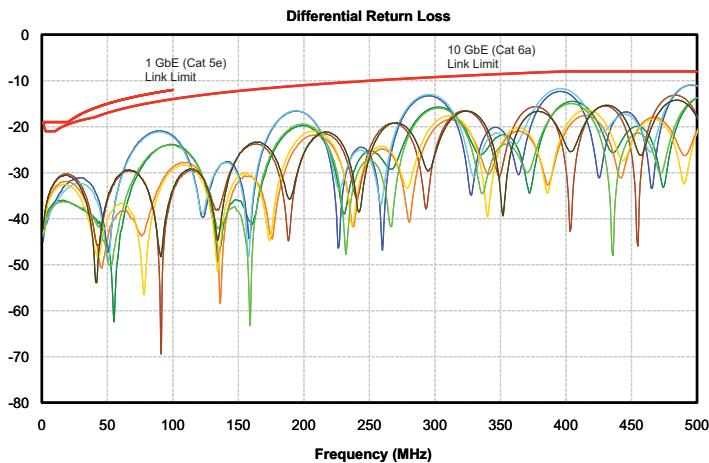
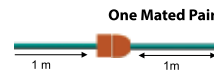
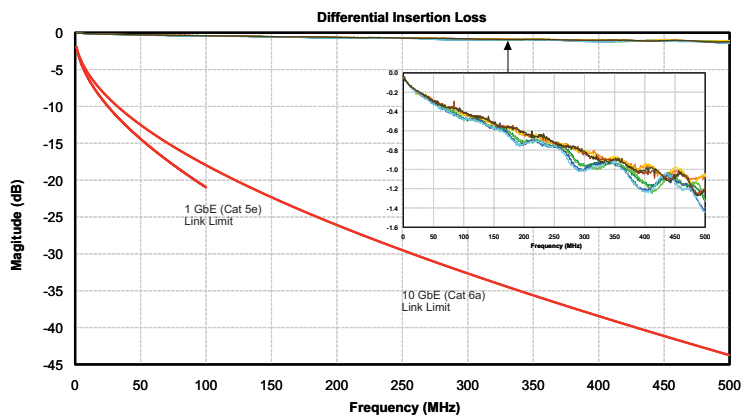
### More High-Frequency Headroom

The design and close impedance matching of the CeeLok FAS-X connector gives you more performance margin to tolerate noisy environments that are sensitive to harmful interference.

### Zero Bit Error Rate (BER) under Rugged Testing

The CeeLok FAS-X connector was tested by TE for bit errors for a high speed signal (1.0625 Gb/s) while simultaneously being subjected to random vibration and temperature cycling between -65°C and +200°C. No bit errors were detected.

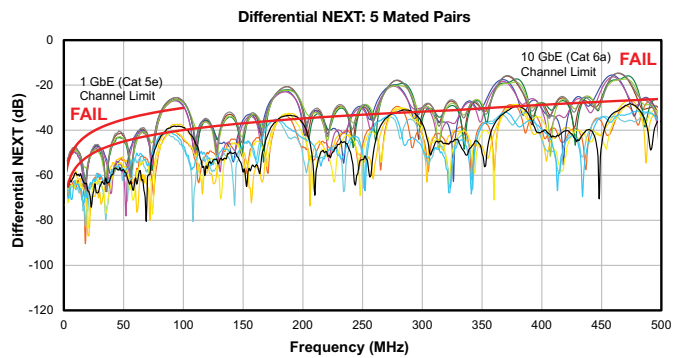
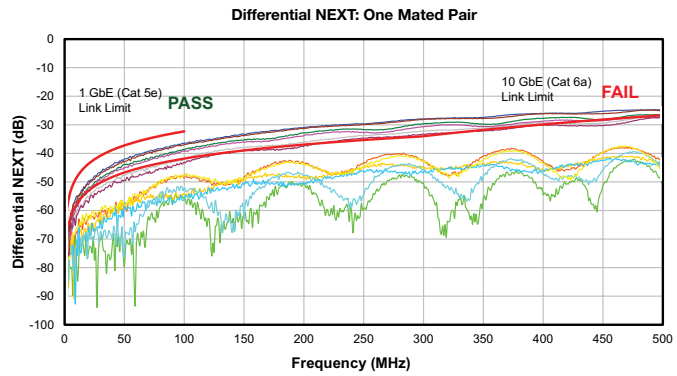
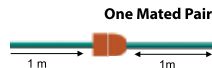
For more information, request Test Reports 10065 and 20101203.



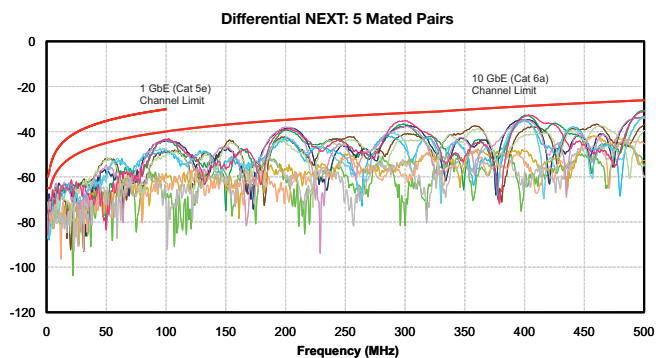
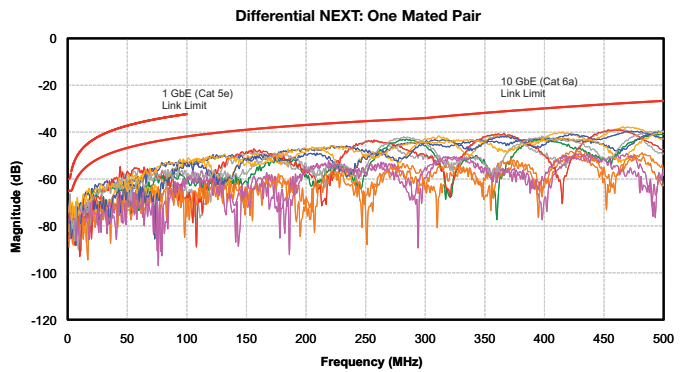
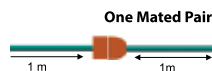


## Differential NEXT

D38999 Size 11 Connector  
MOD Def Standard 23-04 Pinout



## CeeLok FAS-X Connector





## Mil Connectors

### ORDERING INFORMATION

#### Part Numbering System

**CFX20** **J** **2532** **P** **Z** **N** **xxx**

#### GENERAL IDENTIFIER

- CFX20** Square Flange Receptacle (38999)
- CFX21** In-Line Receptacle (38999)
- CFX24** Jam Nut Receptacle (38999)
- CFX26** EMI/RFI Plug (38999)
- CFX30** Square Flange Receptacle (Braid Clamp Backshell)
- CFX34** Jam Nut Receptacle (Braid Clamp Backshell)
- CFX36** EMI/RFI Plug (Braid Clamp Backshell)
- CFX50** Square Flange Receptacle (Push-Pull Lanyard) (81703)
- CFX54** Jam Nut Receptacle (Push-Pull Lanyard) (81703)
- CFX58** Plug (Push-Pull Lanyard) (81703)
- CFX59** Rack-and-Panel Plug (Push-Pull Lanyard) (81703)

#### CLASS (MATERIAL AND FINISH)

- M** Nickel-Plated Composite
- J** O. D. Cadmium-Plated Composite
- F** Nickel-Plated Aluminum
- W** O. D. Cadmium-Plated Aluminum
- A** Passivated Stainless Steel
- T** PTFE Nickel-Plated Aluminum
- Z** Black Zinc Nickel-Plated Aluminum

#### SHELL SIZE AND CONTACT ARRANGEMENT

- 1108** Single-Channel, Shell Size 11, 8 Size 22 Contacts
- 2532** Quad-Channel, Shell Size 25, 32 Size 22 Contacts
- 1104** Single-Channel Fibre Channel, Shell Size 11
- 2516** Quad-Channel Fibre Channel, Shell Size 25
- 2500** Quad-Channel, Shell Size 25, No Inserts or Contacts

#### CONTACT TYPE AND PLATING

- P** Pin, Selective Gold Plating
- S** Socket, Selective Gold Plating
- F** Pin, Full Gold Plating
- G** Socket, Full Gold Plating
- H** Pin, High-Reliability Finish
- J** Socket, High-Reliability Finish
- A** No Pin Contacts Included
- B** No Socket Contacts Included

#### TERMINATION TYPE

- Z** Crimp
- A** .232" Long Solder Tail (Consult TE for part number availability)

#### KEYING POSITIONS

**N, A, B, C, D, E** (N is normal)

#### MODIFICATIONS

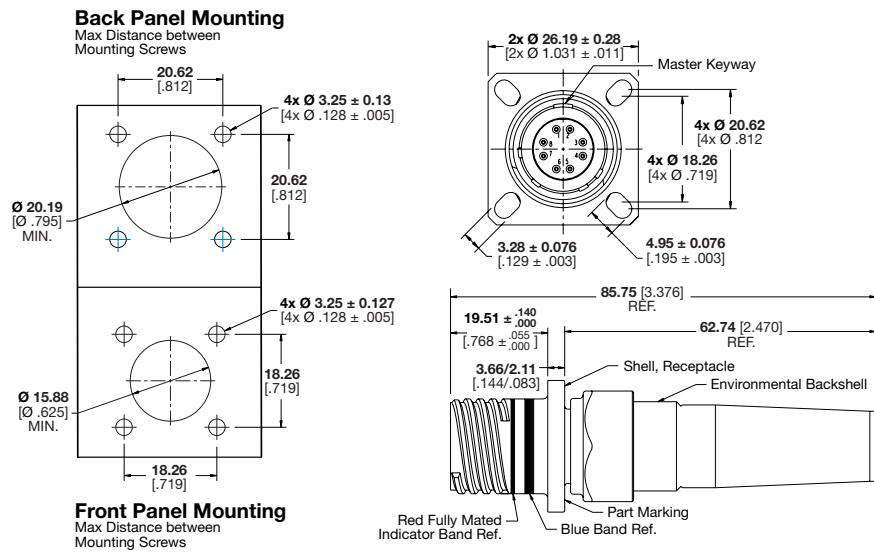
- 1A** Without Backshell
- 1077** Without Grommet (Shell Size 11 only)



## Single-Channel D38999 Circular, Shell Size 11

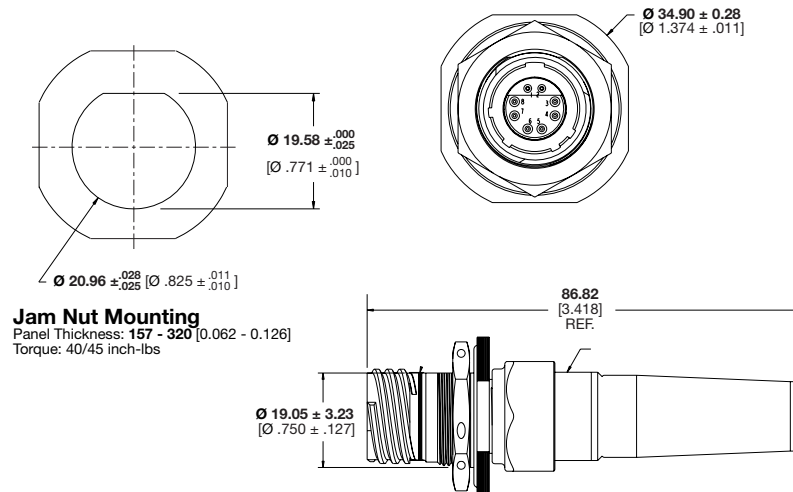
### Square Flange Receptacle

CFX20\*1108\*\*\*



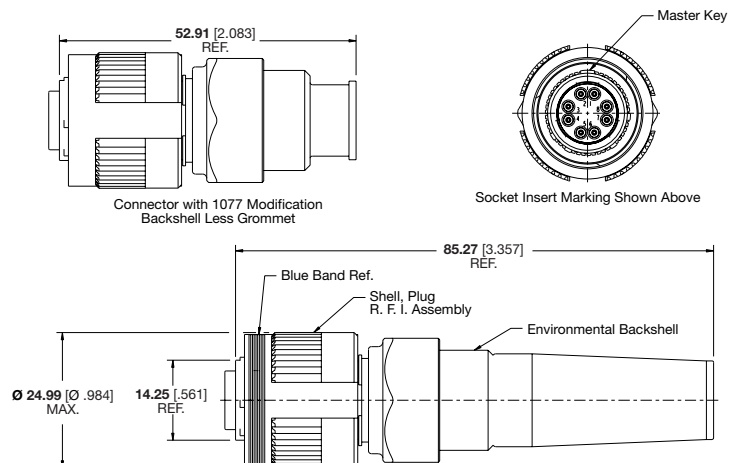
### Jam Nut Receptacle

CFX24\*1108\*\*\*



### Plug

CFX26\*1108\*\*\*

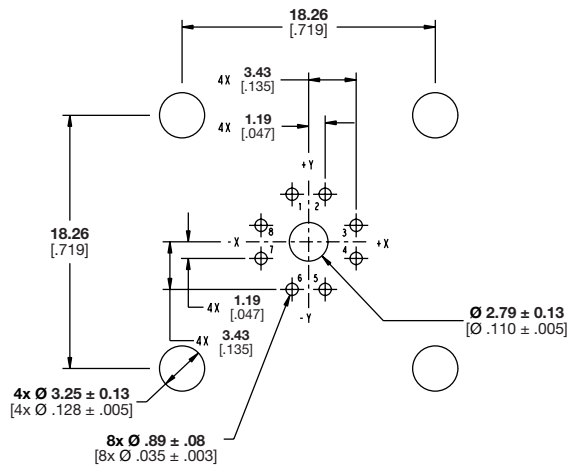
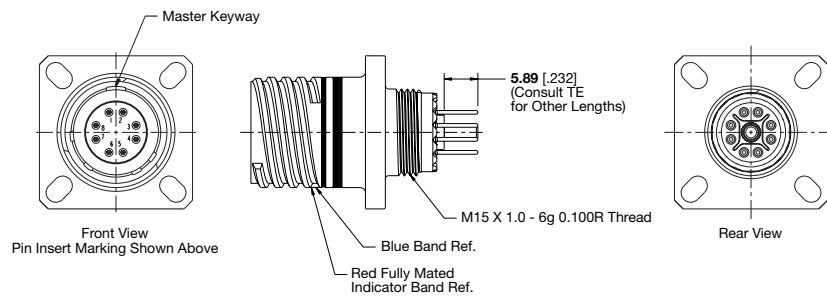




## Single-Channel D38999 Circular, Shell Size 11, PCB Mount

### Square Flange Receptacle

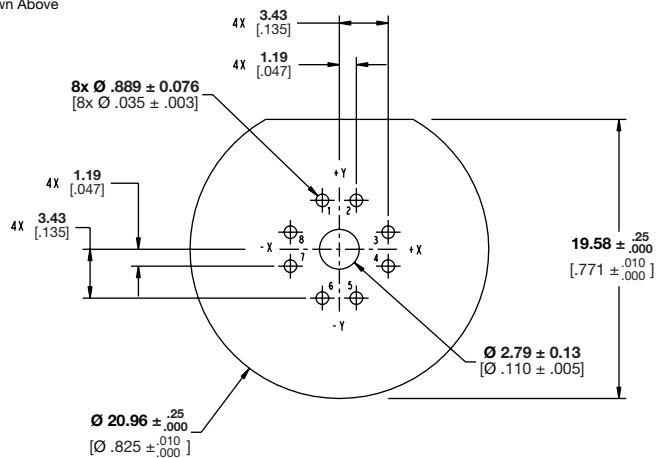
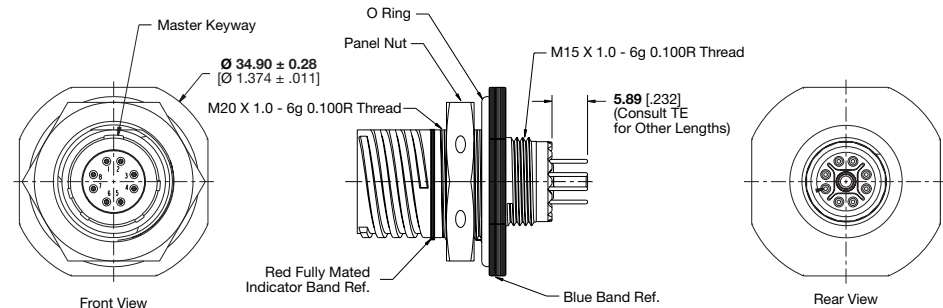
CFX20\*1108\*\*\*



## Single-Channel D38999 Circular, Shell Size 11, PCB Mount

### Jam Nut Receptacle

CFX24\*1108\*\*\*

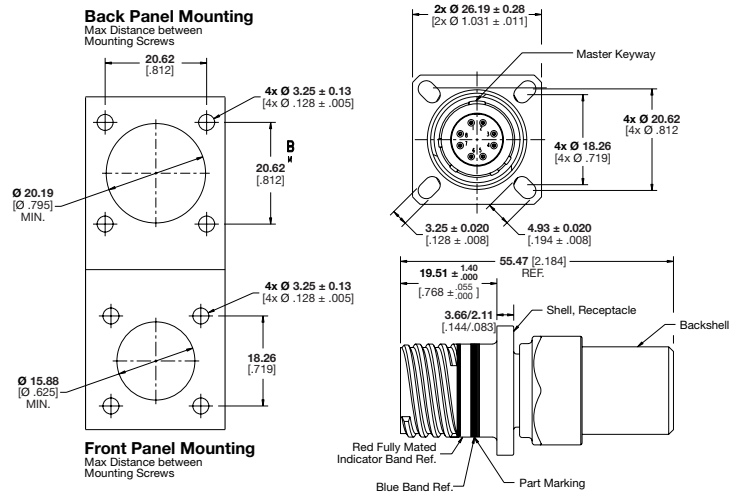




## Commercial Single-Channel Circular, Shell Size 11

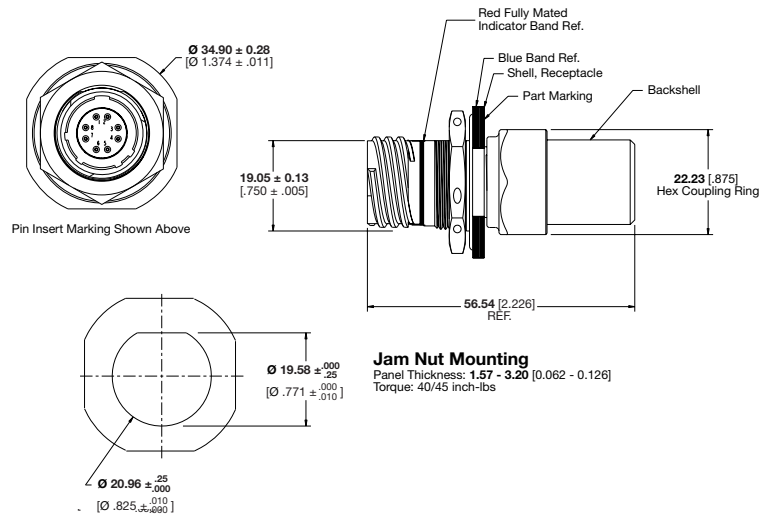
### Square Flange Receptacle with Braid Clamp Backshell

CFX30\*1108\*\*\*



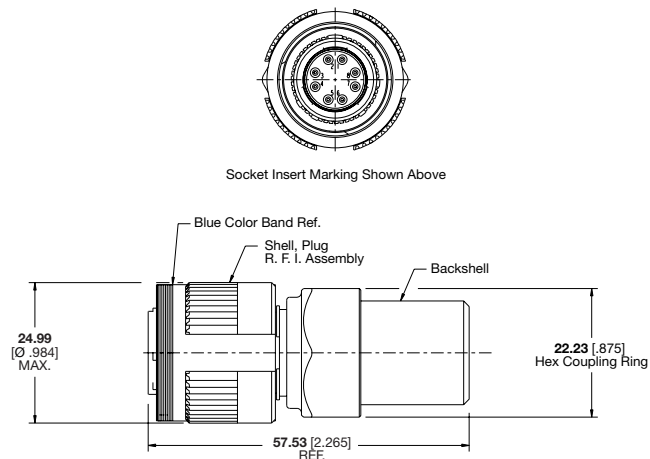
### Jam Nut Receptacle with Braid Clamp Backshell

CFX34\*1108\*\*\*



### EMI/RFI Plug with Braid Clamp Backshell

CFX36\*1108\*\*\*

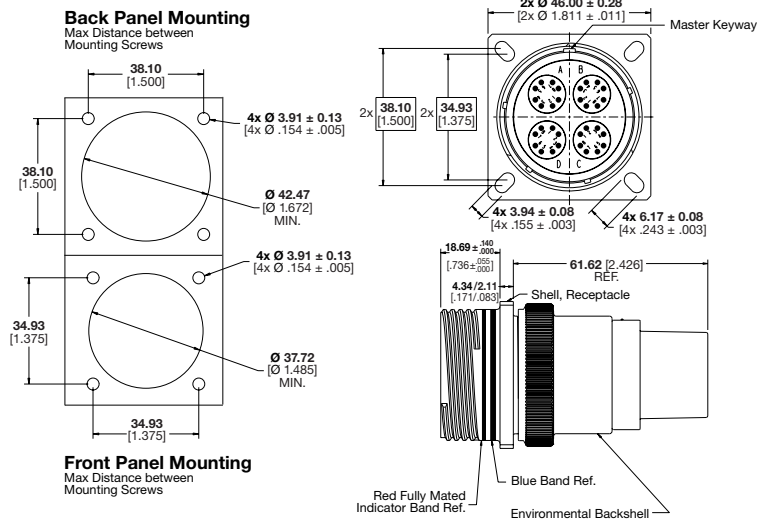




## Quad-Channel D38999 Circular, Shell Size 25

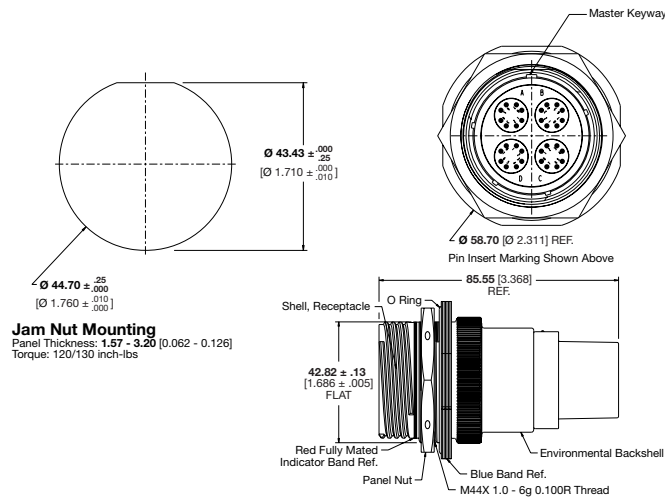
### Square Flange Receptacle

CFX20\*2532\*\*\*



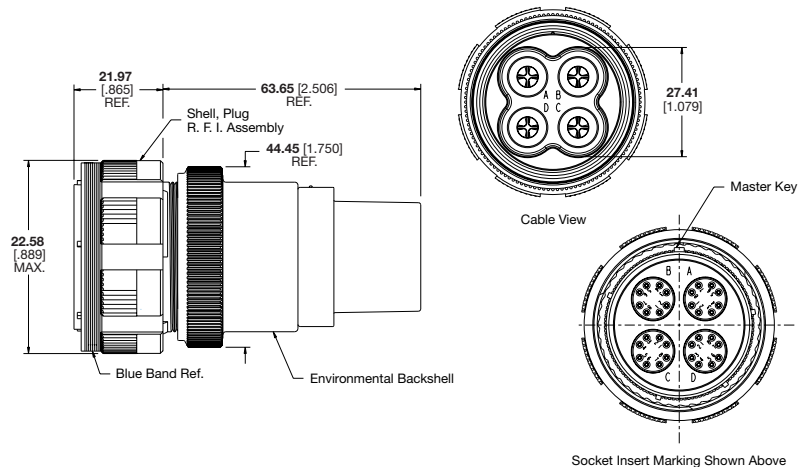
### Jam Nut Receptacle

CFX24\*2532\*\*\*



### Plug

CFX26\*2532\*\*\*

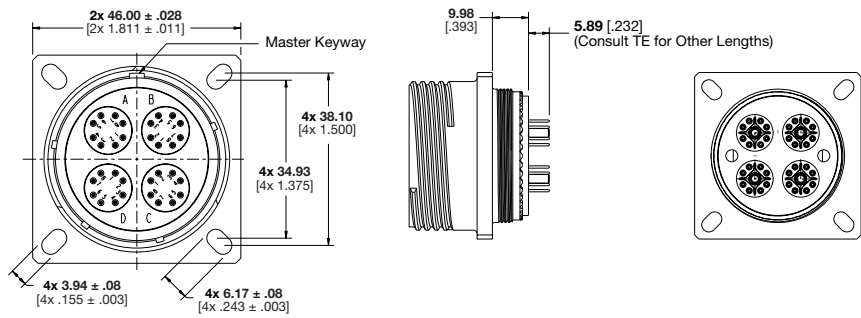




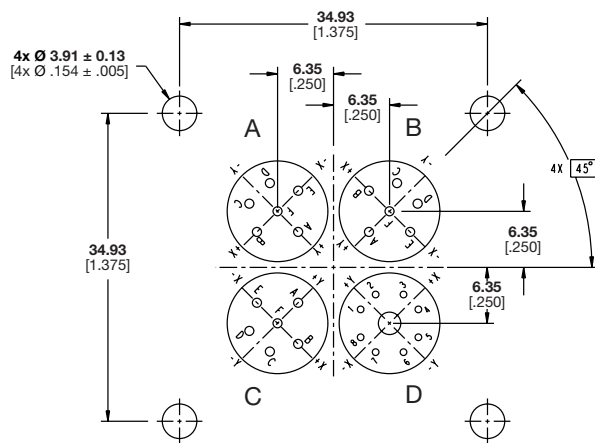


### Square Flange Receptacle

CFX20\*2532\*\*\*

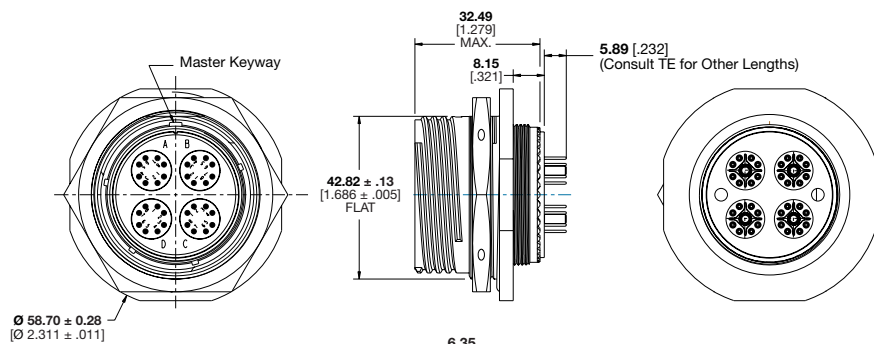


### PCB Layout

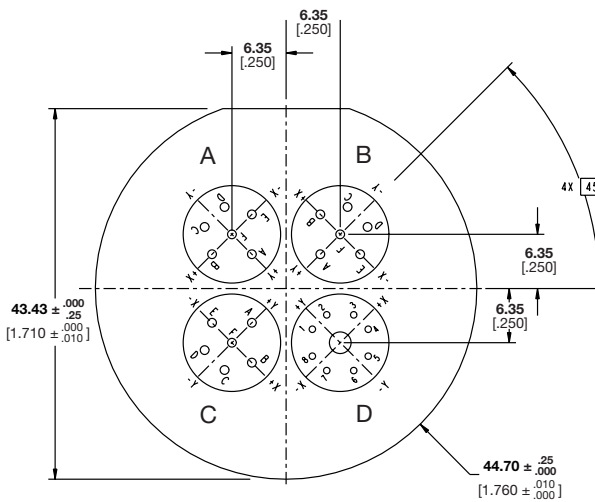


### Jam Nut Receptacle

CFX24\*2532\*\*\*



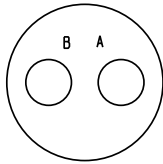
### PCB Layout



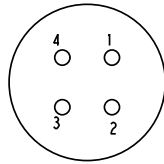


## CeeLok FAS-X Connector Modules

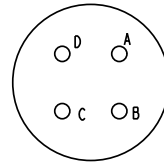
CeeLok FAS-X connectors are also available with a variety of modules to accommodate various counts of Size 22, 20, and 16 contacts in a Size 25 shell. Such capabilities allow convenient mixture of signal and power through the connectors.



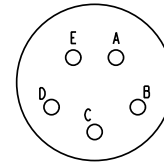
**1102**  
2 Size 16 Contacts



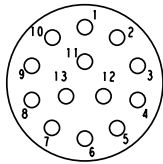
**11H4**  
4 Size 22 Contacts



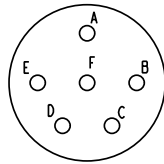
**1104**  
4 Size 20 Contacts



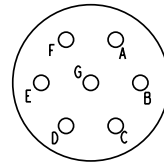
**1105**  
5 Size 20 Contacts



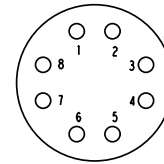
**1135**  
13 Size 22 Contacts



**1198**  
6 Size 20 Contacts



**1199**  
7 Size 20 Contacts



**11H8**  
8 Size 22 Contacts

### PRODUCT LINE

**MFX** CeeLok FAS-X Connector Modules

### MODULE SIZE (11)/CONTACT ARRANGEMENT

- 1102** 2 Size 16 Contacts
- 11H4** 4 Size 22 Contacts (High-Speed Insert Optimized for 150-Ohm Quad Cable)
- 1104** 4 Size 20 Contacts
- 1105** 5 Size 20 Contacts
- 11H8** 8 Size 22 Contacts (High-Speed Insert Optimized for 4-Pair 100-Ohm Differential Cables)
- 1135** 13 Size 22 Contacts
- 1198** 6 Size 20 Contacts
- 1199** 7 Size 20 Contacts

### CONTACT PLATING

- P** Pin, Localized Gold Finish
- S** Socket, Localized Gold Finish
- F** Pin, Full Gold Finish
- G** Socket, Full Gold Finish
- H** Pin, High-Reliability Finish
- J** Socket, High-Reliability Finish
- A** Less Pin
- B** Less Socket

### TERMINATION TYPE

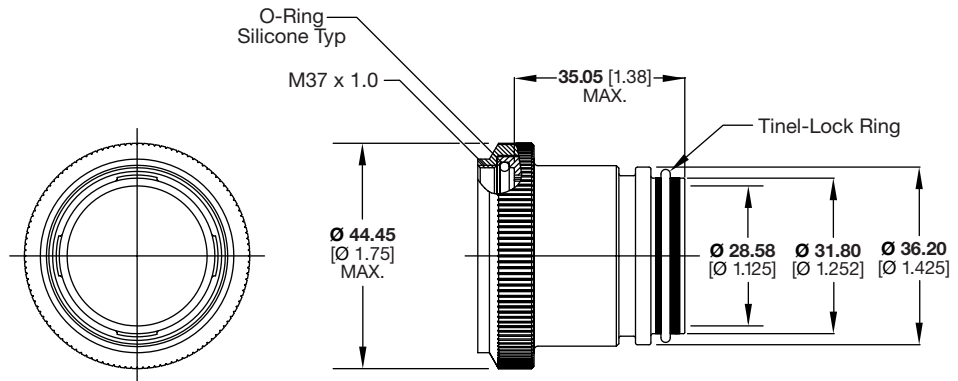
- Z** Crimp Contacts
- A - Y** Extended PCB Tail Contacts (Consult TE for Part Number Availability)

**MFX 1105 P Z**



### Adapters

Tinel-Lock backshell adapters are available to provide reliable braided shield termination using Tinel-Lock rings and accommodate a lipped heat-shrink boot.



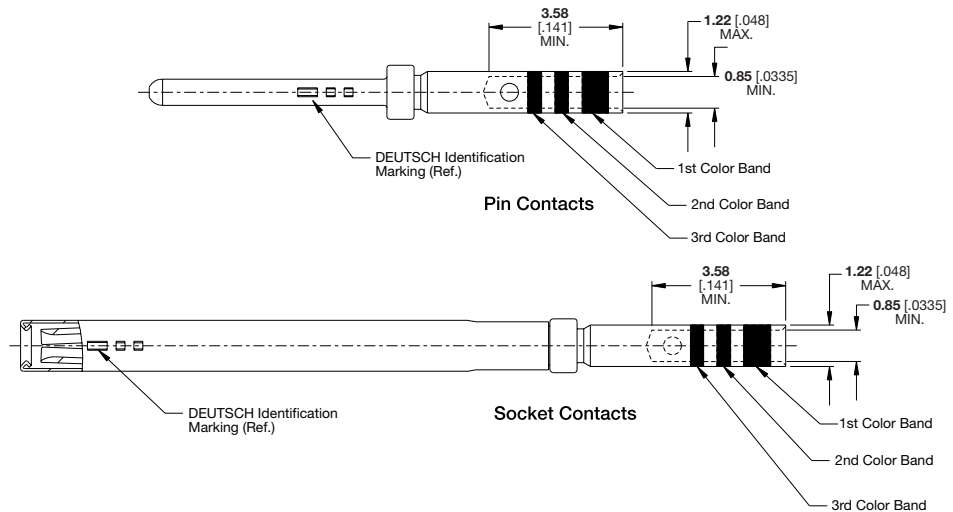
### Part No.

TXS201 A X 00-24 BI  
TXS201 A X 00-24 AI

Aluminum alloy body with nickel PTFE plating  
BI = Tinel-Lock ring for dual-layer 36 AWG or single layer 30 AWG braid shields  
AI = Tinel-Lock ring for single layer 26 AWG braid shields  
Consult your TE representative for other plating and shield termination options.

### Size 22D Contacts

28 - 22 AWG wire  
.160 to .190  
recommended  
strip length



Type	Military Part No.	TE DEUTSCH Part No.*	Color Bands			Crimp Tool	
			1st	2nd	3rd	Basic Tool	Positioner
Pin	AS39029/107-620	12331-22	Blue	Red	Black	M22520/2-01	M22520/2-09
	AS39029/58-360	38941-22, 38941-22L	Blue	Brown	Yellow	M22520/7-01	M22520/7-07
Socket	AS39029/106-614	12333-22	Orange	Blue	Black	M22520/2-01	M22520/2-07
	AS39029/56-348	38943-22, 38943-22L	Orange	Yellow	Gray	M22520/7-01	M22520/7-05

\*12331-22 and 12333-22 are high-durability contacts rated for 1500 mating cycles.  
38941-22x and 38943-22x are standard durability contacts rated for 500 mating cycles.  
The L suffix indicates localized plating; otherwise plating is standard.

## LET'S CONNECT

We make it easy to connect with our experts and are ready to provide all the support you need. Just call your local support number or visit [www.te.com/industrial](http://www.te.com/industrial) to chat with a Product Information Specialist.

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Consult TE for the latest dimensions and design specifications.

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