

## MIL-DTL-38999 Series IV connectors and cable assemblies



**EATON**

*Powering Business Worldwide*

# MIL-DTL-38999 Series IV general purpose connectors

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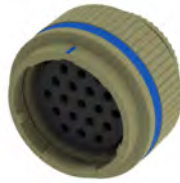
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# Specialized interconnect solutions

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## Power-Breech™ Customs - Up to 900 Amps

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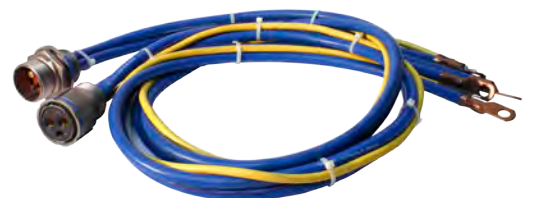
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## Cable Assemblies

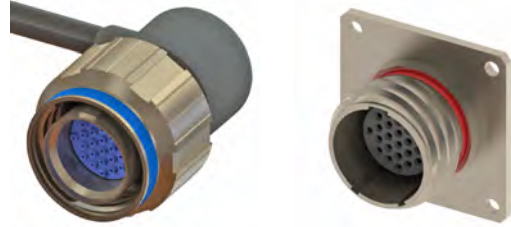
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## An extensive array of mil-circular connectors



NASA SSQ 21635 NATC connectors are available in 53 standard contact patterns including MIL-DTL-1553 high speed data and bussed configurations.



Micro-military circular connectors incorporate latest-generation designs to deliver significantly smaller sizes, lower weights and higher contact densities that MIL-DTL-38999 solutions.



Power-Breech™ connectors are rated up to 900 amps. These shell size 33 – 57 solutions utilize MIL-DTL-38999 Series IV derived coupling mechanisms.



MIL-DTL-38999 Series III and IV solutions include QPL, general purpose, hermetic, filtered, lanyard released and Wing-Lok™ plugs.

## Custom cables and wiring harnesses

Eaton can provide custom cables and wiring harnesses for turnkey design, collaborative co-development, or build-to-print programs.

End-to-end connectivity capabilities include:

- Application-specific solutions for high currents and voltages, Ethernet, and RF applications
- Single and multiple-layer foil and braided EMI/RFI shielding
- Extreme temperatures, shock, vibration, radiation, corrosive media and vacuum
- Integrated fluid and gas delivery and cable separation
- NASA NHB 5300 soldering and NASA-STD-8739.4 cable manufacturing compliances



In-house capabilities include overmolding and continuous fabric and metal braidings

## Custom Breech-Lok™ connector capabilities

**Breech-Lok™ custom lanyard solutions require significantly lower separation forces than D38999/31-compliant connectors**



- Straight pull releases with as low as 90 pounds of force.
- 15° off-angle separations with as low as 100 pounds of force.
- Designed to withstand 500 harsh-environment mating cycles and 100 snatch releases.
- Additional lanyard-plug modifications include redundant releases and custom and adjustable lanyard lengths.
- Breech-Lok™ lanyard release, flight heritage includes the Bell Helicopter V22 Osprey and the Eurocopter Tiger.

**Custom inserts, shells, and accessories deliver high contact densities and application-optimized performance**



- High-speed data including: fiber optic, MIL-DTL-1553, USB, and 10/100/1000/10GBASE-T Ethernet.
- Contact configurations include split-pair quadax, standard quadax, differential twinax, and controlled impedance.
- A readily-available library of custom inserts such as four #8 power and eight #16 contacts in a size 23 shell.
- Power-Breech™ custom solutions providing up to 900 amps.
- Additional customer-defined features: custom shell materials, platings, mounting flanges, backshells, strain reliefs, and extended coupling rings.

**Space rated, Breech-Lok™ technologies accelerate EVA and IVA custom-solution development**



- Custom solutions available with Class G finish, space-rated materials.
- Space-rated materials provide a total-mass loss of < 1% and contain < 0.1% volatile materials.
- Breech-Lok™ products have been space-flight approved by the NASA Goddard Space Flight Center.
- Flight heritage includes multiple space shuttle and satellite programs.
- Custom configurations available with the ergonomic Wing-Lok™ design are ideal for EVA and IVA applications.

# Power-Breech™ custom solutions up to 900 amps

## Meets MIL-DTL-38999 Series IV performance requirements



- ICBM program heritage; meets Boeing specifications 280-36501, 280-36503, 280-36505, and 280-36507.
- High-current capabilities include solutions configured with four, #4/0 contacts.
- Available with 2024 Al-alloy shells and CAD/OD (per QQ-P-416) finishes that withstand 500 hours salt spray.
- MIL-DTL-38999 Series IV derived, breech-mating designs survive 500 engagement cycles.
- Vibration and shock capabilities include MIL-STD-202, Method 204, Condition D and MIL-STD-38999H, Series IV.
- Positive-detent mechanism utilizes 270° of engagement rotation and provides visual, audible, and tactile mating indications.
- Shell designs are 100% scoop proof and are available in ten polarization configurations.
- Please contact Eaton at 800.840.0502 to discuss your high-current requirements.

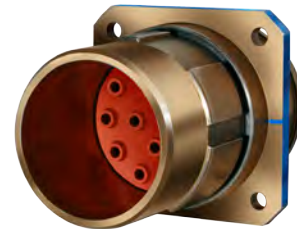
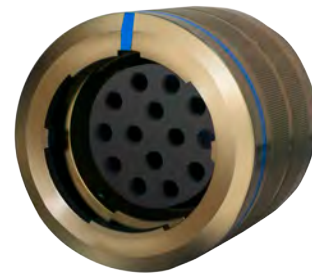
Custom Power-Breech™ solutions provide MIL-DTL-38999 Series IV performance in configurations with large contacts and shell sizes that are not available in QPL solutions. A Series IV derived, breech-lock-coupling mechanism provides quick, positive engagements.

These heritage-proven design platforms can be customized to meet a wide range of mission-specific requirements:

- Current ratings up to 900 amps.
- Extreme shock, vibration, temperature, humidity, and EMI/RFI environments.
- Harsh-environment cable assemblies.



This Power-Breech™ solution utilizes four #4/0 contacts in a size 57 shell to provide 900 amps.



These shell-size 41 connectors mate with 14 #8 contacts to provide a 640-amp current rating.

# Power-Breech™ technical specifications

## Heritage-proven designs in shell sizes 33 - 57

The specifications listed below have been confirmed through customer qualifications of Power-Breech™ connectors designed for their harsh-environment applications. These heritage-proven specifications are presented as capabilities references.

Please contact Eaton to discuss how quickly custom Power-Breech™ solutions can be developed to meet your specific requirements.

### Materials, Finish, and Mechanical

Shell and Coupling Ring Material	2024 Aluminum
Shell and Coupling Ring Plating	CAD/OD per QQ-P-416
Contact Material & Plating	Copper Alloy with Gold Plating, 50 Micro-Inches Minimum
Insulator	Hard Dielectric Wafer
Grommet and Seal	Fluorosilicone
Grounding Springs	Beryllium Copper
Mating Life	500 Cycles Minimum
Contact Retention	Up to 25 Pounds
Polarization	270° Engagement Rotation Available with Ten Different Polarizations

### Electrical and Environmental

Current Ratings	Up to 900 amps
Service Ratings	Up to 2800 VRMS at Sea Level
Emi Leakage Attenuation	> 85dB from 0.1 to 1,000MHz, 10dB Per Octave from 1,000 to 10,000MHz
Shell-to-Shell Conductivity	2.5 Millivolt Maximum Drop
Operating Temperature	-65°C to 200°C (-85°F to 392°F)
Sealing	Sand and Dust as per MIL-STD-202 and Ice Resistance
Corrosion Resistance	Withstands 500 Hours Salt Spray
Fluid Immersion	Various Fuels, Solvents, Coolants, and Oils as per EIA-364-10
Vibration	Per MIL-STD-202, Method 204, Condition B
Shock	EIA-364-27, Vibration: EIA-364-28

# General purpose QPL and modified connectors

## Field-proven performance in mission-critical applications



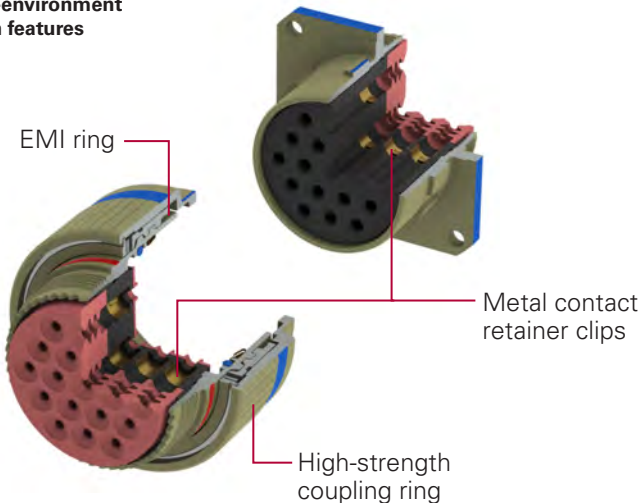
- Comprehensive range of QPL and modified solutions include Class G, space-rated connectors.
- High-speed-data configurations include MIL-STD-1553.
- Grounding occurs 0.050 inch (1.27mm) before electrical-contact engagement.
- 360° grounding fingers provide up to 65dB protection at 1GHz.
- -65°C to 200°C operating temperatures.
- Finish options include 500 hour salt-spray-rated platings.
- Please contact customer service at 805.484.0543 to order products or receive additional information.

Breech-Lok™ solutions comprise one of the industry's largest installed bases of MIL-DTL-38999 Series IV connectors. This track record of uncompromised reliability has been proven in harsh-environment applications ranging from weapons systems to spacecraft.

Breech-Lok™ products can be quickly customized to meet a broad array of mission-specific requirements:

- Special insert patterns and shell configurations.
- Customer-defined EMI/RFI compliances.
- Custom connector/cable assemblies.
- Please refer to page 5 for additional capabilities.

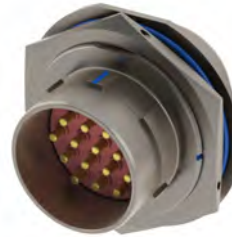
### Harsh-environment design features



**Straight plugs**



**Box-mount receptacles**



**Feed-thru receptacles**



**In-line receptacles**



**Jam-nut receptacles**



**Wall-mount receptacles**



# General-purpose connectors technical specifications

## Materials, Finish, and Mechanical

	Class C	Class F	Class G	Class K	Class S	Class T	Class W
Shell and Coupling Ring Material	2024 Al	2024 Al	2024 Al	Corrosion Resistant Steel		2024 Al	2024 Al
Shell and Coupling Ring Plating	Anodize	Nickel per ASTM B733*		Passivated	Electrodeposited Nickel	Nickel Fluorocarbon Polymer	CAD/OD per QQ-P-416
Contact Material & Plating	Copper Alloy with Gold Plating, 50 Micro-Inches Minimum						
Insulator	Hard Dielectric Wafer - All Finish Classes						
Grommet and Seal	Fluorosilicone - All Finish Classes						
Grounding Springs	Beryllium Copper - All Finish Classes						
Mating Life	500 Cycles Minimum - All Finish Classes						
Contact Retention	Up to 25 Pounds - All Finish Classes						
Polarization	Per MIL-STD-38999 Series IV; N, A, B, C, D, K, L, M, R, and U - All Finish Classes						

\*Class F coupling rings are anodized.

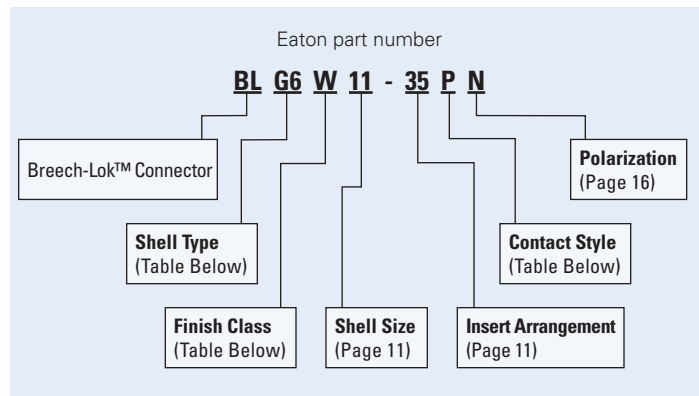
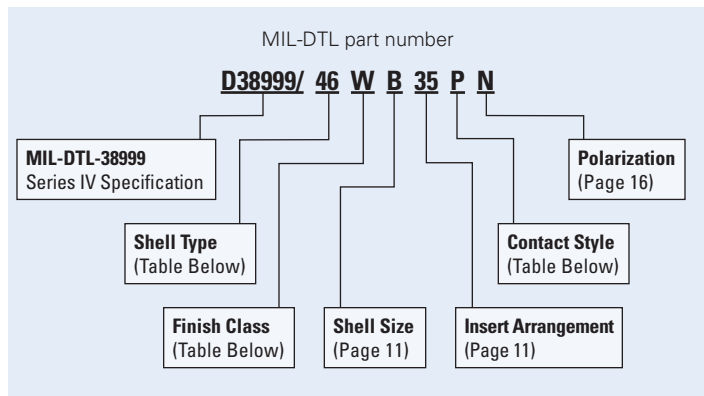
## Environmental, Shock, Vibration, and EMI/RFI

	Class C	Class F	Class G*	Class K**	Class S	Class T	Class W
Operating Temperature	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 175°C (-85°F to 347°F)	-65°C to 175°C (-85°F to 347°F)
Sealing	Sand and Dust as per MIL-STD-202 and Ice Resistance - All Finish Classes						
Corrosion Resistance	Withstands 500 Hours Salt Spray	Withstands 48 Hours Salt Spray		Withstands 500 Hours Salt Spray	Withstands 48 Hours Salt Spray	Withstands 500 Hours Salt Spray	
Fluid Immersion	Various Fuels, Solvents, Coolants, and Oils as per EIA-364-10 - All Finish Classes						
Sine Vibration	30g at Ambient Temperature - All Finish Classes						
Random Vibration	50g at Ambient Temperature - All Finish Classes						
Shock	300g +/- 15% Half-Sine-Wave Magnitude for 3 +/- 1mS - All Finish Classes						
EMI Attenuation @ 100 MHz	No EMI Shielding	> 90dB	> 90dB	> 80dB	> 90dB	> 90dB	> 90dB
EMI Attenuation @ 10 GHz	No EMI Shielding	> 65 dB	> 65 dB	> 45 dB	> 65 dB	> 50 dB	> 50 dB
Shell-to-Shell Conductivity	1.0 Millivolt Max. Drop	1.0 Millivolt Max. Drop	1.0 Millivolt Max. Drop	2.5 Millivolt Max. Drop	1.0 Millivolt Max. Drop	2.5 Millivolt Max. Drop	2.5 Millivolt Max. Drop

\*Class G thermal vacuum outgassing: total mass loss 1.0%, collected volatile condensable material 0.1% maximum.

\*\*Finish Class K configurations provide 2000°F firewall protection for 20 minutes minimum.

# General-purpose connectors ordering information



## Designator Descriptions

Designator Type	Military	Eaton	Description
Shell Type	MIL-DTL-38999/40	00	Wall-Mount Receptacle (Finish Class C, F, W, & K Configurations are QPL Certified)
	MIL-DTL-38999/42	02	Box-Mount Receptacle (Finish class C, F, & W Configurations are QPL Certified)
	MIL-DTL-38999/44	07	Jam-Nut Receptacle (Finish Class C, F, W, & K Configurations are QPL Certified)
	MIL-DTL-38999/46	G6	EMI Straight Plug (Finish Class F, W, & K Configurations are QPL Certified)
	MIL-DTL-38999/47	06	Non-EMI Straight Plug (Finish Class C, & W Configurations are QPL Ccertified)
	MIL-DTL-38999/49	03	In-Line Receptacle (Finish Class C, F, & W Configurations are QPL Certified)
	N/A	05	Bulkhead-Feed-Through Receptacle
Finish Class	C	C	Anodize, -65°C to 200°C (-85°F to 392°F)
	F	F	Nickel per ASTM B733*, -65°C to 200°C (-85°F to 392°F)
	G	G	Nickel per ASTM B733*, -65°C to 200°C (-85°F to 392°F)
	K	K	CRES (Passivated), -65°C to 200°C (-85°F to 392°F)
	S	S	Electrodeposited Nickel, -65°C to 200°C (-85°F to 392°F)
	T	T	Nickel Fluorocarbon Polymer, -65°C to 175°C (-85°F to 347°F)
	W	W	CAD/OD per QQ-P-416, -65°C to 175°C (-85°F to 347°F)
Contact Style	P	P	Pin
	S	S	Socket
	A	A	Pin, Non-Standard (Connector Shipped Without Contacts)
	B	B	Socket, Non-Standard (Connector Shipped Without Contacts)

\*Class F coupling rings are anodized

# General-purpose connectors standard shell & insert configurations

## Shell-Size Conversions

Military Designation	A	B	C	D	E	F	G	H	J	–
Shell Size & Eaton Designation	9	11	13	15	17	19	21	23	25	33

Please contact Eaton to discuss custom shells and inserts

Shell Size	Insert #	SR	TTL #	# 22D	# 20	# 16	# 12	#8 TWX
9	35	M	6	6				
9	98	I	3		3			
11	2	I	2			2		
11	3	II	3			3		
11	5	I	5		5			
11	35	M	13	13				
11	98	I	6		6			
11	99	I	7		7			
13	4	I	4			4		
13	35	M	22	22				
13	98	I	10		10			
15	5	II	5			5		
15	15	I	15		14	1		
15	18	I	18		18			
15	19	I	19		19			
15	35	M	37	37				
15	97	I	12		8	4		
17	2	M	2					2
17	6	I	6				6	
17	8	II	8			8		
17	26	I	26		26			
17	35	M	55	55				
17	98	M	26	24				2
17	99	I	23		21	2		
19	3	M	3					3
19	4	M	4					4
19	11	II	11			11		

Shell Size	Insert #	SR	TTL #	# 22D	# 20	# 16	# 12	# 10	#8 TWX	#8 PWR
19	18	M	18	14					4	
19	32	I	32		32					
19	35	M	66	66						
21	5	M	5						5	
21	11	I	11				11			
21	16	II	16			16				
21	26	M	25		23				2	
21	35	M	79	79						
21	39	I	39		37	2				
21	41	I	41		41					
23	21	II	21			21				
23	35	M	100	100						
23	53	I	53		53					
23	55	I	55		55					
23	97	I	16			16				
23	99	II	11			11				
25	4	I	56		48	8				
25	8	M	8						8	
25	11	N	11		2			9		
25	19	I	19				19			
25	20	N	30		10	13	4		3	
25	24	I	24			12	12			
25	29	I	29			29				
25	35	M	128	128						
25	43	I	43		23	20				
25	46	I	46		40	4			2	
25	61	I	61		61					
33	54	I	54		30	14	6			4
33	58	I	58		34	14	10			

SR = Service Rating.  
TTL # = the total number of contacts.

## Insert and contact ratings

### Insert Service Ratings

Service Rating	Suggested Operating Voltage (Sea Level)		Test Voltage (Sea level)	Test Voltage 50,000 Ft.	Test Voltage 70,000 Ft.	Test Voltage 100,000 Ft.
	AC (RMS)	DC				
I	600	850	1800 VRMS	600 VRMS	400 VRMS	200 VRMS
II	900	1250	2300 VRMS	800 VRMS	500 VRMS	200 VRMS
M	400	550	1300 VRMS	550 VRMS	350 VRMS	200 VRMS
N	230	270	1000 VRMS	400 VRMS	260 VRMS	200 VRMS

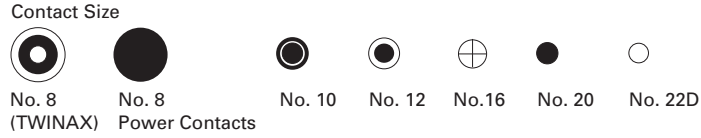
### Contact Part Number Cross Reference

	Contact Size	Eaton Part Number	Military Part Number
Pin	22D	5034-2400-0220	M39029/58-360
	20	5034-2400-0200	M39029/58-363
	16	5034-2400-0160	M39029/58-364
	12	5034-2400-0120	M39029/58-365
	10	Contact Eaton	M39029/58-528
	12 COAX	5034-2428-12P00	M39029/28-211
	12 COAX	Contact Eaton	M39029/102-558
	8 TWINAX	5034-2507-08P00	M39029/90-529
	8 POWER	5034-2488-0080	N / A
	Socket	22D	5034-2600-0220
20		5034-2600-0200	M39029/56-351
16		5034-2600-0160	M39029/56-352
12		5034-2600-0120	M39029/56-353
10		5034-2600-0100	M39029/56-527
12 COAX		5034-2711-12S00	M39029/75-416
12 COAX		Contact Eaton	M39029/103-559
8 TWINAX		5034-2703-08S00	M39029/91-530
8 POWER		5034-2651-0080	N / A

Contact Size	Crimp Well Data		Recommended Contact Rating (Amps)											
	Well Diameter	Minimum Well Depth	Wire Size (Awg)											
			28	26	24	22	20	18	16	14	12	10		
22D	.0345 ± .001	.141	1.5	2.0	3.0	5.0								
20	.047 ± .001	.209			3.0	5.0	7.5							
16	.067 ± .001	.209					7.5	10.0	13.0					
12	.100 ± .002	.209									20.0	23.0		
10	.137 ± .003	.355										23.0	33.0	

# Insert drawings 9-35 to 19-18

Legend:  
 † = Not MIL-Standard  
 ↓ = Main Key, Key Way Polarization



Insert Arrangement:	9-35	9-98	11-2	11-3 †	11-5	11-35
Quantity and Size:	6 No. 22D Contacts	3 No. 20 Contacts	2 No. 16 Contacts	3 No. 16 Contacts	5 No. 20 Contacts	13 No. 22D Contacts
Service Rating:	M	I	I	II	I	M
Insert Arrangement:	11-98	11-99	13-4	13-35	13-98	15-5
Quantity and Size:	6 No. 20 Contacts	7 No. 20 Contacts	4 No. 16 Contacts	22 No. 22D Contacts	10 No. 20 Contacts	5 No. 16 Contacts
Service Rating:	I	I	I	M	I	II
Insert Arrangement:	15-15	15-18	15-19	15-35	15-97	17-2 †
Quantity and Size:	1 No. 16 Contacts 14 No. 20 Contacts	18 No. 20 Contacts	19 No. 20 Contacts	37 No. 22D Contacts	4 No. 16 Contacts 8 No. 20 Contacts	2 No. 8 Contacts
Service Rating:	I	I	I	M	I	M
Insert Arrangement:	17-6	17-8	17-26	17-35	17-98 †	
Quantity and Size:	6 No. 12 Contacts	8 No. 16 Contacts	26 No. 20 Contacts	55 No. 22D Contacts	24 No. 22D Contacts 2 No. 8 Contacts	
Service Rating:	I	II	I	M	M	
Insert Arrangement:	17-99	19-3 †	19-4 †	19-11	19-18	
Quantity and Size:	21 No. 20 Contacts 2 No. 16 Contacts	3 No. 8 Contacts	4 No. 8 Contacts	11 No. 16 Contacts	14 No. 22D Contacts 4 No. 8 Contacts	
Service Rating:	I	M	M	II	M	

# Insert drawings 19-32 to 25-4

Legend:

† = Not MIL-Standard

↓ = Main Key, Key Way Polarization

Contact Size



No. 8  
(TWINAX)



No. 8  
Power Contacts

Front Face of Pin Insert Shown)



No. 10



No. 12



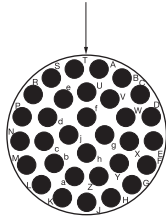
No. 16



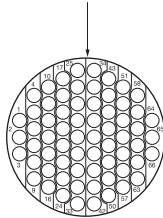
No. 20



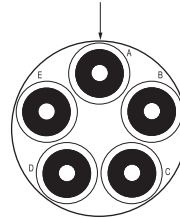
No. 22D



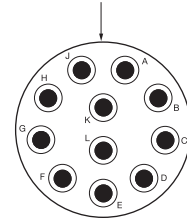
19-32  
32 No. 20 Contacts  
I



19-35  
66 No. 22D Contacts  
M

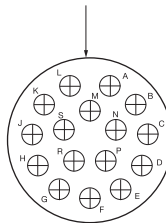


21-5 †  
5 No. 8 Contacts  
M



21-11  
11 No. 12 Contacts  
I

Insert Arrangement:  
Quantity and Size:  
Service Rating:

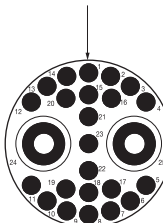


21-16  
16 No. 16 Contacts

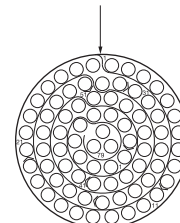
Insert Arrangement:  
Quantity and Size:

Service Rating::

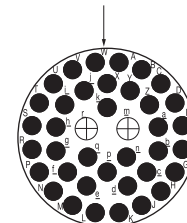
II



21-26 †  
23 No. 20 Contacts  
2 No. 8 Contacts  
M



21-35  
79 No. 22D Contacts  
2 No. 16 Contacts  
M

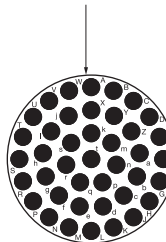


21-39  
37 No. 20 Contacts  
2 No. 16 Contacts  
I

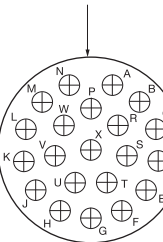
Insert Arrangement:  
Quantity and Size:

Service Rating::

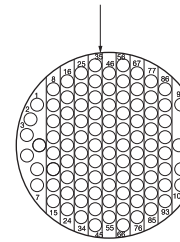
II



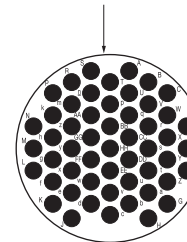
21-41  
41 No. 20 Contacts  
I



23-21  
21 No. 16 Contacts  
II



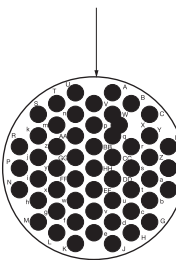
23-35  
100 No. 22D Contacts  
M



23-53  
53 No. 20 Contacts  
I

Insert Arrangement:  
Quantity and Size:  
Service Rating:

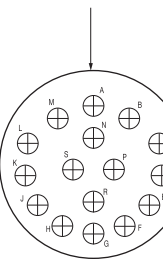
I



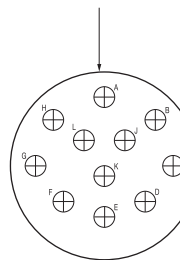
23-55  
55 No. 20 Contacts  
I

Insert Arrangement:  
Quantity and Size:  
Service Rating:

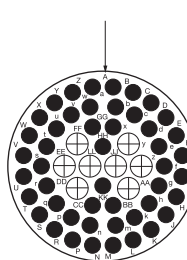
I



23-97  
16 No. 16 Contacts  
I



23-99  
11 No. 16 Contacts  
II



25-4  
48 No. 20 Contacts  
8 No. 16 Contacts  
I

Insert Arrangement:  
Quantity and Size:  
Service Rating:

I

# Insert drawings 25-8 to 33-58

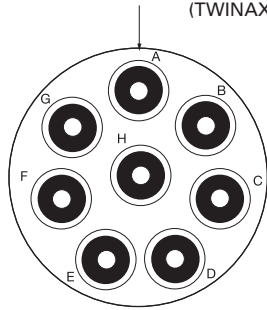
**Legend:**

† = Not MIL-Standard  
 ↓ = Main Key, Key Way Polarization

**Contact Size**

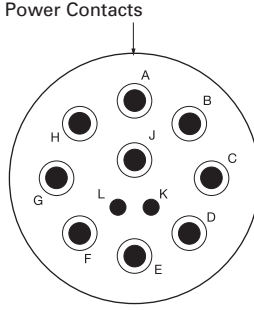


**Front Face of Pin Insert Shown**



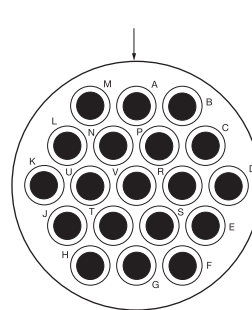
Insert Arrangement: 25-8  
 Quantity and Size: 8 No. 8 Contacts

Service Rating: M



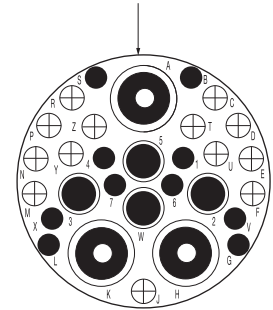
Insert Arrangement: 25-11  
 Quantity and Size: 2 No. 20 Contacts  
 9 No. 10 Contacts

Service Rating: N



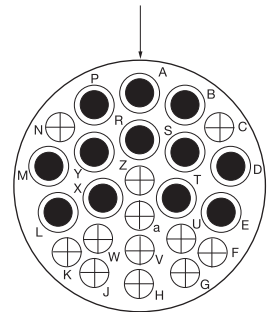
Insert Arrangement: 25-19  
 Quantity and Size: 19 No. 12 Contacts

Service Rating: I



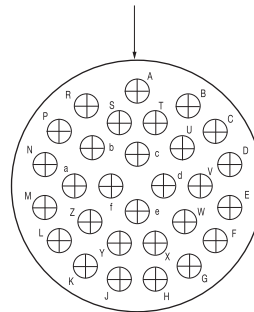
Insert Arrangement: 25-20  
 Quantity and Size: 10 No. 20 Contacts  
 13 No. 16 Contacts  
 4 No. 12 Contacts  
 3 No. 8 Contacts

Service Rating: N



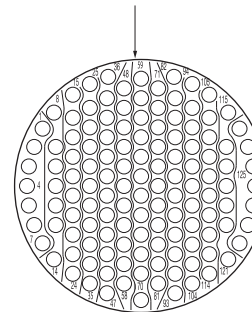
Insert Arrangement: 25-24  
 Quantity and Size: 12 No. 16 Contacts  
 12 No. 12 Contacts

Service Rating: I



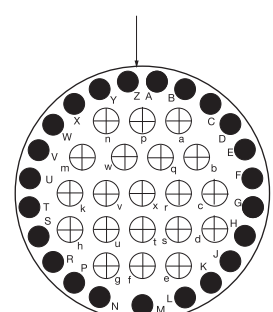
Insert Arrangement: 25-29  
 Quantity and Size: 29 No. 16 Contacts

Service Rating: I



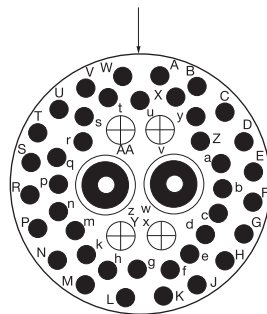
Insert Arrangement: 25-35  
 Quantity and Size: 128 No. 22D Contacts

Service Rating: M



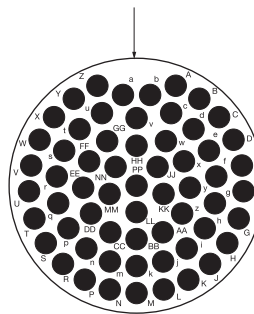
Insert Arrangement: 25-43  
 Quantity and Size: 23 No. 20 Contacts  
 13 No. 16 Contacts  
 20 No. 12 Contacts

Service Rating: I



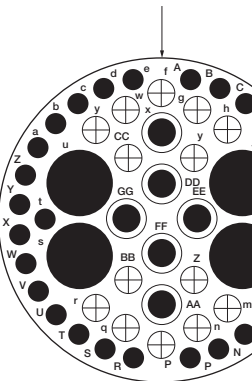
Insert Arrangement: 25-46  
 Quantity and Size: 40 No. 20 Contacts  
 4 No. 16 Contacts  
 2 No. 8 Contacts

Service Rating: I



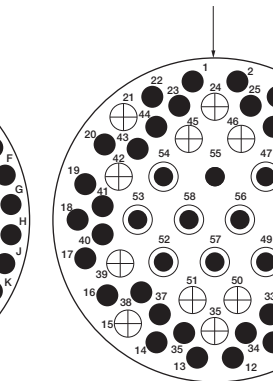
Insert Arrangement: 25-61  
 Quantity and Size: 61 No. 20 Contacts

Service Rating: I



Insert Arrangement: 33-54  
 Quantity and Size: 30 No. 20 Contacts  
 14 No. 16 Contacts  
 6 No. 12 Contacts  
 4 No. 8 Power Contacts

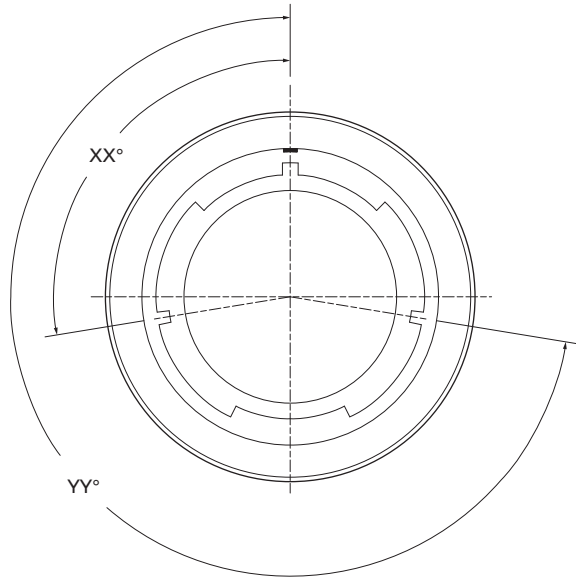
Service Rating: I



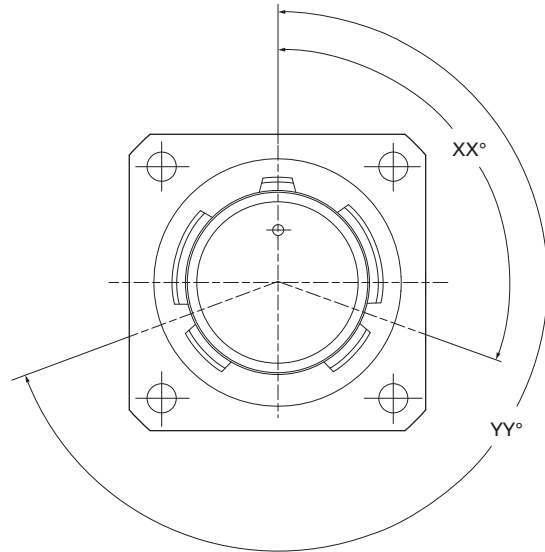
Insert Arrangement: 33-58  
 Quantity and Size: 34 No. 20 Contacts  
 14 No. 16 Contacts  
 10 No. 12 Contacts

Service Rating: I

## Polarization tables



Plugs

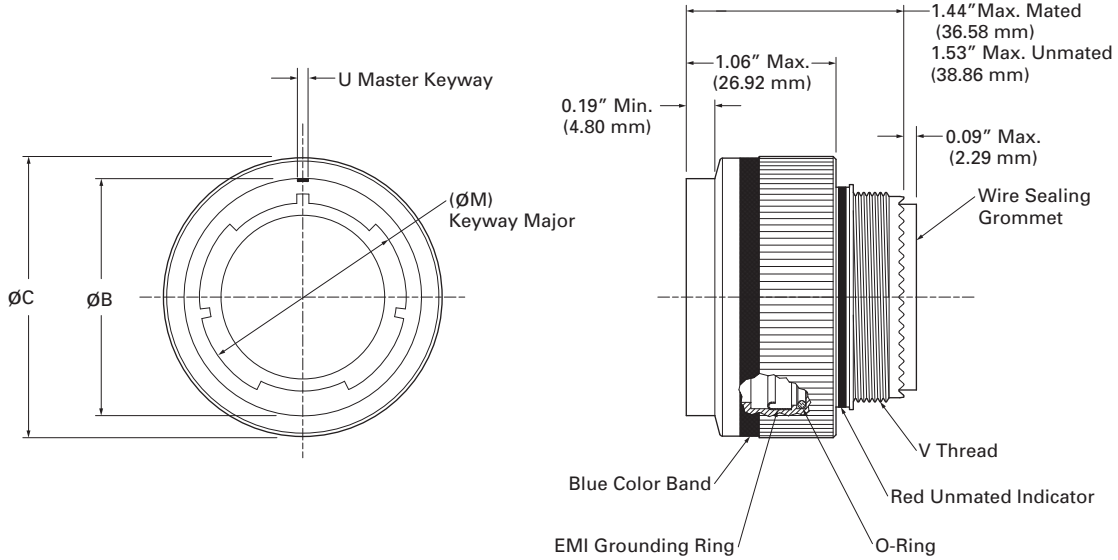


Receptacles

<b>Polarization</b>	<b>XX°</b>	<b>YY°</b>
N	110°	250°
A	100°	260°
B	90°	270°
C	80°	280°
D	70°	290°
K	120°	255°
L	120°	265°
M	120°	275°
R	120°	285°
U	0°	0°



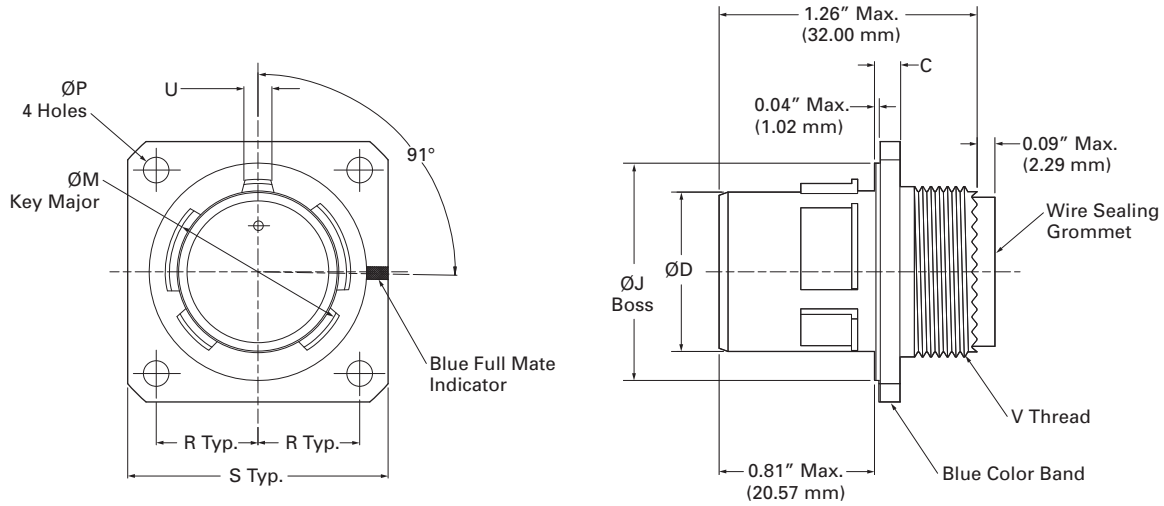
# D38999/46 & 47 straight plugs, Eaton types G6 & 06



Shell Size	U Reference Socket	Pin	$\varnothing B$ Max	$\varnothing C$ Max	$\varnothing M$ Max	V Thread
9	0.116 (2.95)	0.076 (1.93)	0.650 (16.51)	0.935 (23.75)	0.523 (13.28)	M12x1.0-6g-0.1R
11	0.116 (2.95)	0.076 (1.93)	0.775 (19.69)	1.047 (26.59)	0.644 (16.36)	M15x1.0-6g-0.1R
13	0.117 (2.97)	0.077 (1.96)	0.901 (22.89)	1.220 (30.99)	0.765 (19.43)	M18x1.0-6g-0.1R
15	0.137 (3.48)	0.097 (2.46)	1.039 (26.39)	1.346 (34.19)	0.889 (22.58)	M22x1.0-6g-0.1R
17	0.137 (3.48)	0.097 (2.46)	1.149 (29.18)	1.472 (37.39)	1.014 (25.76)	M25x1.0-6g-0.1R
19	0.157 (3.99)	0.117 (2.97)	1.275 (32.39)	1.582 (40.18)	1.094 (27.79)	M28x1.0-6g-0.1R
21	0.157 (3.99)	0.117 (2.97)	1.401 (35.59)	1.704 (43.28)	1.219 (30.96)	M31x1.0-6g-0.1R
23	0.177 (4.50)	0.137 (3.48)	1.527 (38.79)	1.831 (46.51)	1.348 (34.24)	M34x1.0-6g-0.1R
25	0.177 (4.50)	0.137 (3.48)	1.649 (41.88)	1.957 (49.71)	1.475 (37.47)	M37x1.0-6g-0.1R
33	0.229 (5.82)	0.181 (4.60)	2.200 (55.88)	2.515 (63.88)	1.908 (48.46)	M47x1.0-6g-0.1R

Dimensions are stated as inches (mm).

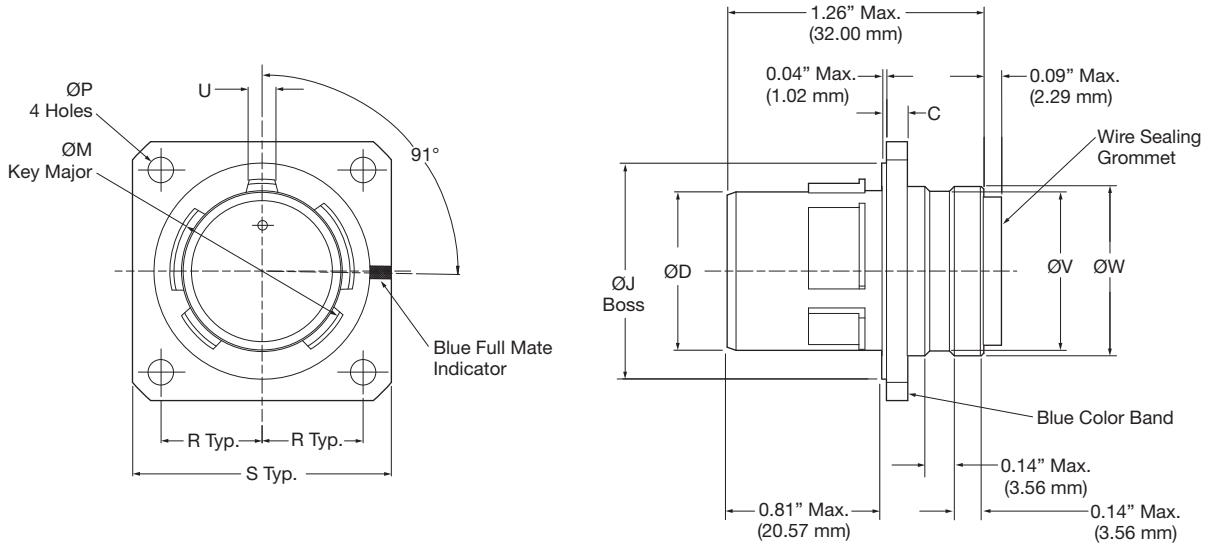
# D38999/40 wall-mount receptacles, Eaton type 00



Shell Size	ØC Max	ØD Max	ØJ Boss Max	ØM Ref	ØP Min	R BSC	S Max	U reference Socket	Pin	V Thread
9	0.102 (2.59)	0.384 (9.75)	0.668 (16.97)	0.464 (11.79)	0.122 (3.10)	0.328 (8.33)	0.948 (24.08)	0.065 (1.65)	0.105 (2.67)	M12x1.0-6g-0.1R
11	0.102 (2.59)	0.509 (12.93)	0.793 (20.14)	0.589 (14.96)	0.122 (3.10)	0.406 (10.31)	1.051 (26.70)	0.065 (1.65)	0.105 (2.67)	M15x1.0-6g-0.1R
13	0.102 (2.59)	0.634 (16.10)	0.919 (23.34)	0.720 (18.29)	0.122 (3.10)	0.453 (11.51)	1.146 (29.11)	0.065 (1.65)	0.105 (2.67)	M18x1.0-6g-0.1R
15	0.102 (2.59)	0.759 (19.28)	1.044 (26.52)	0.844 (21.44)	0.122 (3.10)	0.484 (12.31)	1.240 (31.50)	0.085 (2.16)	0.125 (3.18)	M22x1.0-6g-0.1R
17	0.102 (2.59)	0.885 (22.48)	1.170 (29.72)	0.969 (24.61)	0.122 (3.10)	0.531 (13.49)	1.335 (33.91)	0.085 (2.16)	0.125 (3.18)	M25x1.0-6g-0.1R
19	0.102 (2.59)	1.009 (25.63)	1.294 (32.87)	1.088 (27.64)	0.122 (3.10)	0.578 (14.68)	1.461 (37.11)	0.105 (2.67)	0.145 (3.68)	M28x1.0-6g-0.1R
21	0.133 (3.38)	1.134 (28.80)	1.419 (36.04)	1.213 (30.81)	0.122 (3.10)	0.625 (15.88)	1.583 (40.21)	0.105 (2.67)	0.145 (3.68)	M31x1.0-6g-0.1R
23	0.133 (3.38)	1.259 (31.98)	1.544 (39.22)	1.342 (34.09)	0.142 (3.61)	0.687 (17.46)	1.709 (43.41)	0.125 (3.18)	0.165 (4.19)	M34x1.0-6g-0.1R
25	0.133 (3.38)	1.384 (35.15)	1.669 (42.39)	1.469 (37.31)	0.142 (3.61)	0.750 (19.05)	1.835 (46.61)	0.125 (3.18)	0.165 (4.19)	M37x1.0-6g-0.1R
33	0.133 (3.38)	1.811 (46.00)	2.220 (56.39)	1.902 (48.31)	0.142 (3.61)	1.000 (25.40)	2.356 (59.84)	0.165 (4.19)	0.217 (5.51)	M47x1.0-6g-0.1R

Dimensions are stated as inches (mm).

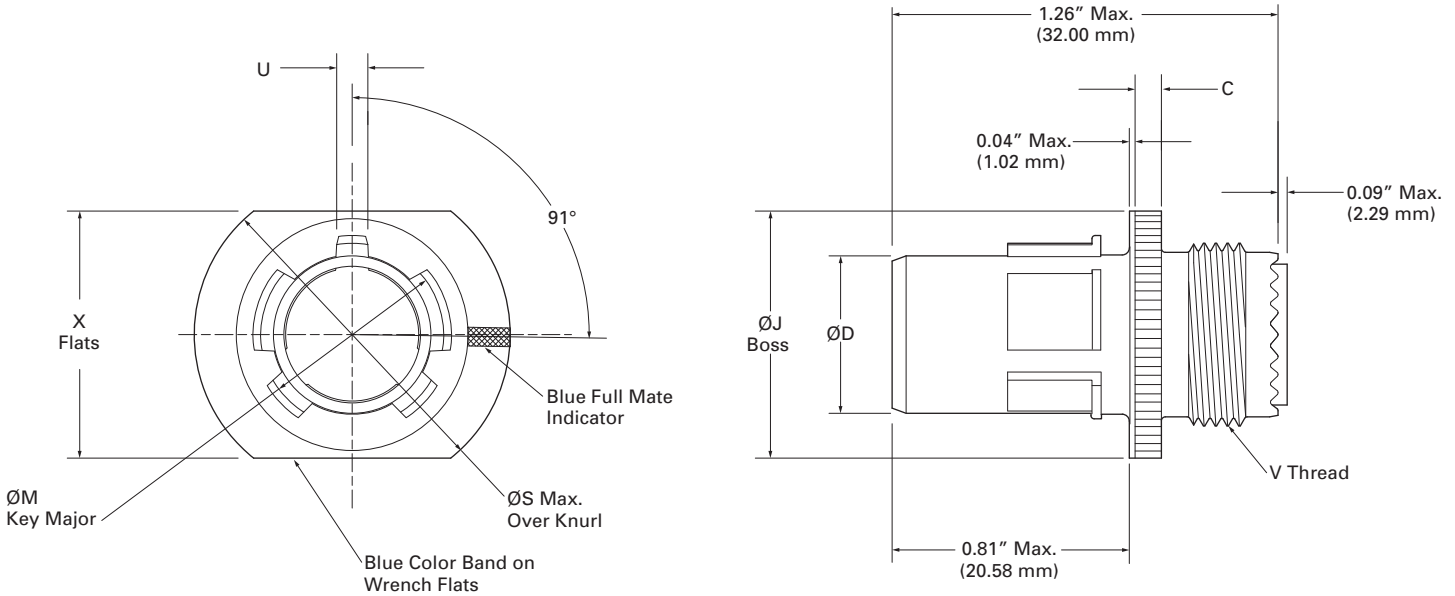
# D38999/42 box-mount receptacles, Eaton type 02



Shell Size	C Max	ØD Max	ØJ Boss Max	ØM Ref	ØP Min	R BSC	S Max	U reference Socket	Pin	ØV Max	ØW Max
9	0.102 (2.59)	0.384 (9.75)	0.668 (16.97)	0.464 (11.79)	0.122 (3.10)	0.328 (8.33)	0.948 (24.08)	0.065 (1.65)	0.105 (2.67)	0.412 (10.46)	0.453 (11.51)
11	0.102 (2.59)	0.509 (12.93)	0.793 (20.14)	0.589 (14.96)	0.122 (3.10)	0.406 (10.31)	1.051 (26.7)	0.065 (1.65)	0.105 (2.67)	0.535 (13.59)	0.578 (14.68)
13	0.102 (2.59)	0.634 (16.10)	0.919 (23.34)	0.720 (18.29)	0.122 (3.10)	0.453 (11.51)	1.146 (29.11)	0.065 (1.65)	0.105 (2.67)	0.649 (16.48)	0.692 (17.58)
15	0.102 (2.59)	0.759 (19.28)	1.044 (26.52)	0.844 (21.44)	0.122 (3.10)	0.484 (12.31)	1.240 (31.50)	0.085 (2.16)	0.125 (3.18)	0.771 (19.58)	0.818 (20.78)
17	0.102 (2.59)	0.885 (22.48)	1.170 (29.72)	0.969 (24.61)	0.122 (3.10)	0.531 (13.49)	1.335 (33.91)	0.085 (2.16)	0.125 (3.18)	0.897 (22.78)	0.944 (23.98)
19	0.102 (2.59)	1.009 (25.63)	1.294 (32.87)	1.088 (27.64)	0.122 (3.10)	0.578 (14.68)	1.461 (37.11)	0.105 (2.67)	0.145 (3.68)	1.003 (25.48)	1.051 (26.70)
21	0.133 (3.38)	1.134 (28.80)	1.419 (36.04)	1.213 (30.81)	0.122 (3.10)	0.625 (15.88)	1.583 (40.21)	0.105 (2.67)	0.145 (3.68)	1.129 (28.68)	1.173 (29.79)
23	0.133 (3.38)	1.259 (31.98)	1.544 (39.22)	1.342 (34.09)	0.142 (3.61)	0.687 (17.46)	1.709 (43.41)	0.125 (3.18)	0.165 (4.19)	1.255 (31.88)	1.299 (32.99)
25	0.133 (3.38)	1.384 (35.15)	1.669 (42.39)	1.469 (37.31)	0.142 (3.61)	0.750 (19.05)	1.835 (46.61)	0.125 (3.18)	0.165 (4.19)	1.377 (34.98)	1.425 (36.20)
33	0.133 (3.38)	1.811 (46.00)	2.220 (56.39)	1.902 (48.31)	0.142 (3.61)	1.000 (25.40)	2.356 (59.84)	0.165 (4.19)	0.217 (5.51)	1.839 (46.71)	1.925 (48.90)

Dimensions are stated as inches (mm).

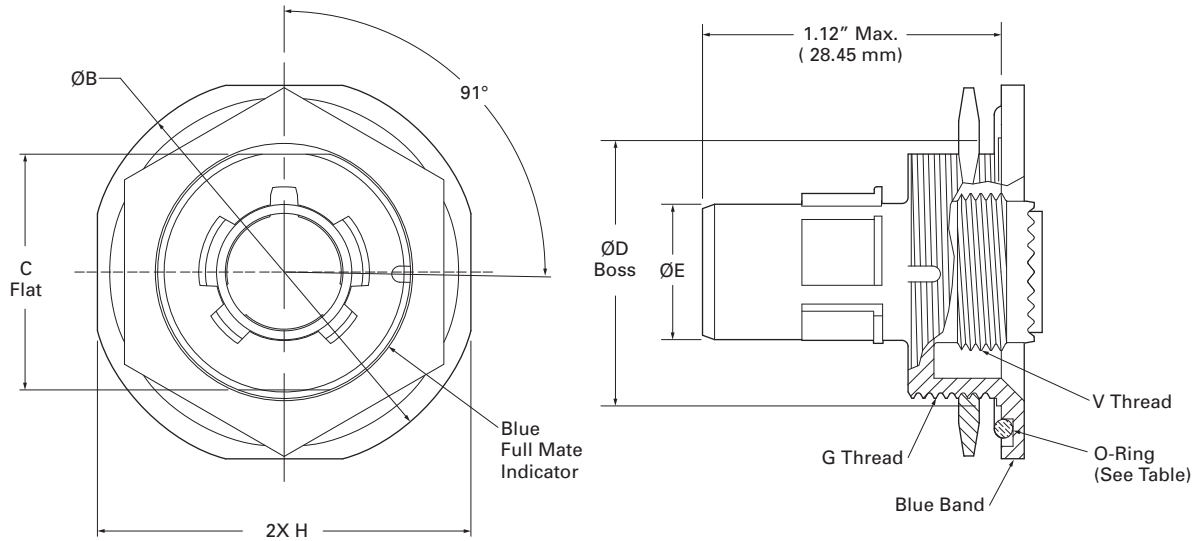
# D38999/49 in-line receptacles, Eaton type 03



Shell Size	C Max	ØD Max	ØJ Boss Max	ØM Ref	S Max	U reference Socket	Pin	V Thread	ØW Max
9	0.102 (2.59)	0.384 (9.75)	0.668 (16.97)	0.464 (11.79)	0.948 (24.08)	0.065 (1.65)	0.105 (2.67)	M12x1.0-6g-0.1R	.668 (16.97)
11	0.102 (2.59)	0.509 (12.93)	0.793 (20.14)	0.589 (14.96)	1.054 (26.77)	0.065 (1.65)	0.105 (2.67)	M15x1.0-6g-0.1R	.793 (20.14)
13	0.102 (2.59)	0.634 (16.10)	0.919 (23.34)	0.720 (18.29)	1.126 (28.60)	0.065 (1.65)	0.105 (2.67)	M18x1.0-6g-0.1R	.919 (23.34)
15	0.102 (2.59)	0.759 (19.28)	1.044 (26.52)	0.844 (21.44)	1.351 (34.32)	0.085 (2.16)	0.125 (3.18)	M22x1.0-6g-0.1R	1.044 (26.52)
17	0.102 (2.59)	0.885 (22.48)	1.170 (29.72)	0.969 (24.61)	1.476 (37.49)	0.085 (2.16)	0.125 (3.18)	M25x1.0-6g-0.1R	1.170 (29.72)
19	0.102 (2.59)	1.009 (25.63)	1.294 (32.87)	1.088 (27.64)	1.586 (40.28)	0.105 (2.67)	0.145 (3.68)	M28x1.0-6g-0.1R	1.294 (32.87)
21	0.133 (3.38)	1.134 (28.80)	1.419 (36.04)	1.213 (30.81)	1.711 (43.46)	0.105 (2.67)	0.145 (3.68)	M31x1.0-6g-0.1R	1.419 (36.04)
23	0.133 (3.38)	1.259 (31.98)	1.544 (39.22)	1.342 (34.09)	1.836 (46.63)	0.125 (3.18)	0.165 (4.19)	M34x1.0-6g-0.1R	1.544 (39.22)
25	0.133 (3.38)	1.384 (35.15)	1.669 (42.39)	1.469 (37.31)	1.964 (49.89)	0.125 (3.18)	0.165 (4.19)	M37x1.0-6g-0.1R	1.669 (42.39)
33	0.133 (3.38)	1.811 (46.00)	2.220 (56.39)	1.902 (48.31)	2.520 (64.01)	0.165 (4.19)	0.217 (5.51)	M47x1.0-6g-0.1R	2.220 (56.39)

Dimensions are stated as inches (mm).

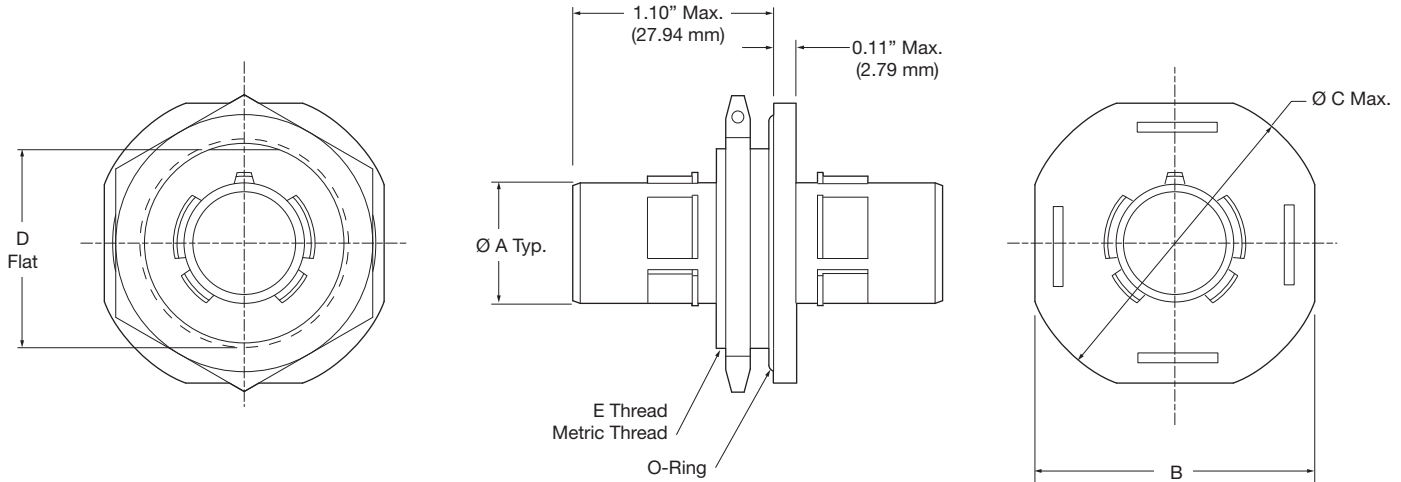
# D38999/44 jam-nut receptacles, Eaton type 07



Shell Size	ØB Max	C Max	ØD Max	ØE Max	G Thread	H Flat Max	V Thread	Jam nut D38999/28 Dash no.	O-ring MS9068 Dash no.
9	1.195 (30.35)	0.651 (16.54)	0.680 (17.27)	0.384 (9.75)	M17x1.0-6g-0.1R	1.073 (27.25)	M12x1.0-6g-0.1R	-2	-018
11	1.520 (38.61)	0.942 (23.93)	1.000 (25.40)	0.509 (12.93)	M25x1.0-6g-0.1R	1.394 (35.41)	M15x1.0-6g-0.1R	-3	-024
13	1.642 (41.71)	1.066 (27.08)	1.125 (28.58)	0.634 (16.10)	M28x1.0-6g-0.1R	1.520 (38.61)	M18x1.0-6g-0.1R	-4	-026
15	1.768 (44.91)	1.191 (30.25)	1.250 (31.75)	0.759 (19.28)	M31x1.0-6g-0.1R	1.642 (41.71)	M22x1.0-6g-0.1R	-5	-028
17	1.957 (49.71)	1.321 (33.55)	1.375 (34.93)	0.885 (22.48)	M34x1.0-6g-0.1R	1.799 (45.69)	M25x1.0-6g-0.1R	-7	-029
19	2.035 (51.69)	1.441 (36.60)	1.500 (38.10)	1.009 (25.63)	M38x1.0-6g-0.1R	1.909 (48.49)	M28x1.0-6g-0.1R	-9	-030
21	2.157 (54.79)	1.566 (39.78)	1.625 (41.28)	1.134 (28.80)	M41x1.0-6g-0.1R	2.035 (51.69)	M31x1.0-6g-0.1R	-10	-031
23	2.283 (57.99)	1.691 (42.95)	1.750 (44.45)	1.259 (31.98)	M44x1.0-6g-0.1R	2.157 (54.79)	M34x1.0-6g-0.1R	-11	-032
25	2.409 (61.19)	1.816 (46.13)	1.875 (47.63)	1.384 (35.15)	M47x1.0-6g-0.1R	2.283 (57.99)	M37x1.0-6g-0.1R	-12	-033
33	3.015 (76.58)	2.208 (56.08)	2.264 (57.51)	1.811 (46.00)	2.250-16 UN-2A	2.737 (69.52)	M47x1.0-6g-0.1R	N/A	-037

Dimensions are stated as inches (mm).

# Bulkhead-feed-through receptacles, Eaton type 05



Shell Size	ØA Max	B Max	ØC Max	D Max	E Thread
9	0.384 (9.75)	1.073 (27.25)	1.195 (30.35)	0.651 (16.54)	M22x1.0-6g-0.1R
11	0.509 (12.93)	1.394 (35.41)	1.520 (38.61)	0.942 (23.93)	M25x1.0-6g-0.1R
13	0.634 (16.10)	1.520 (38.61)	1.642 (41.71)	1.066 (27.08)	M28x1.0-6g-0.1R
15	0.759 (19.28)	1.642 (41.71)	1.768 (44.91)	1.191 (30.25)	M31x1.0-6g-0.1R
17	0.885 (22.48)	1.799 (45.69)	1.957 (49.71)	1.321 (33.55)	M34x1.0-6g-0.1R
19	1.009 (25.63)	1.909 (48.49)	2.035 (51.69)	1.441 (36.60)	M38x1.0-6g-0.1R
21	1.134 (28.80)	2.035 (51.69)	2.157 (54.79)	1.566 (39.78)	M41x1.0-6g-0.1R
23	1.259 (31.98)	2.157 (54.79)	2.283 (57.99)	1.691 (42.95)	M44x1.0-6g-0.1R
25	1.384 (35.15)	2.283 (57.99)	2.409 (61.19)	1.815 (46.10)	M47x1.0-6g-0.1R
33	1.811 (46.00)	2.737 (69.52)	3.015 (76.58)	2.208 (56.08)	2.250-16 UN-2A

Dimensions are stated as inches (mm).

# Connector accessories meet all Series IV requirements

## Protective covers, dummy-stowage receptacles, and connector savers



- QPL compliant and modified configurations are available with MIL-DTL-38999 defined materials and finish classes including 500 hour salt-sprayed platings.
- Rugged designs meet MIL-DTL-38999 Series IV shock and vibration requirements.
- Quick turn, custom capabilities include application-specific materials, mechanical configurations, and EMI/RFI compliances.

Breech-Lok™ accessories extend the service lives of connectors and cable assemblies by providing protection from contaminant intrusion, electrical and mechanical damage, and repeated engagement cycles.

### Receptacle and Plug Covers

Breech-Lok™ dust covers feature rugged chains constructed from passivated, stainless steel. A wide range of chain lengths and eyelet configurations are available.

### Dummy-Stowage Receptacles

Series IV dummy receptacles are available in QPL compliant and modified configurations to protect pins, sockets, and mating mechanisms when connectors are demated. These products can also be used as anchor points when cable assemblies are not mated to receptacles.

### Connector Savers

Breech-Lok™ connector savers significantly extend the service life of cables assemblies by isolating connectors from repeated engagement cycles.

- Available in gender-changer configurations.
- One-piece pin/socket assemblies minimize resistance and maximize reliability.
- Comprehensive range of protective accessories in shell sizes 9 to 33.



Receptacle covers



Plug covers

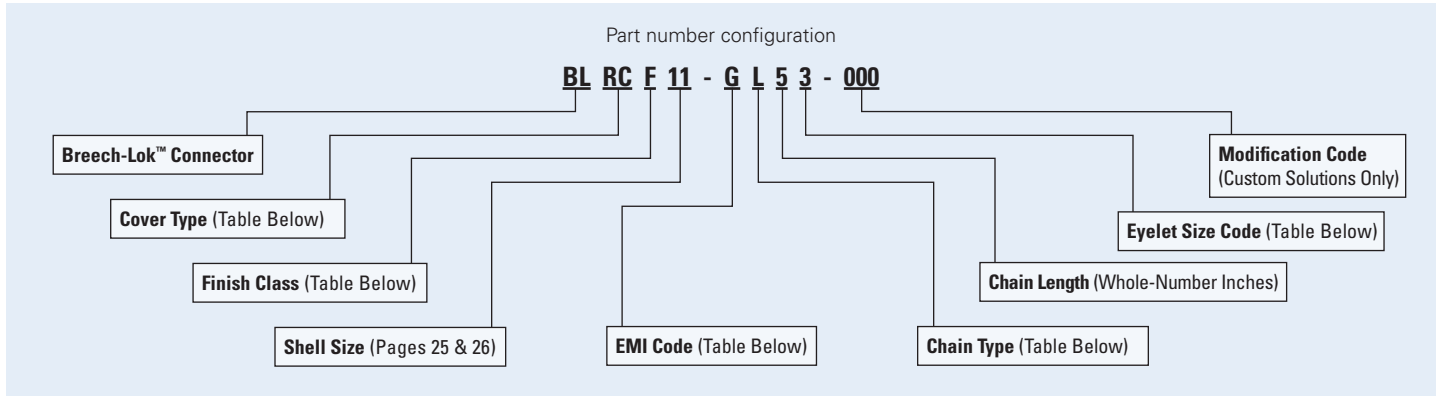


Dummy receptacles



Connector savers

# Receptacle and plug covers ordering information



## Eyelet-Size Codes

Code	Description	Code	Description
0	No Eyelet	5	0.219 Eyelet
1	0.125 dia. Eyelet	6	0.250 Eyelet
2	0.140 dia. Eyelet	R	Ring
3	0.167 dia. Eyelet	S	Split Ring
4	0.188 dia. Eyelet		

## Chain-Type Codes

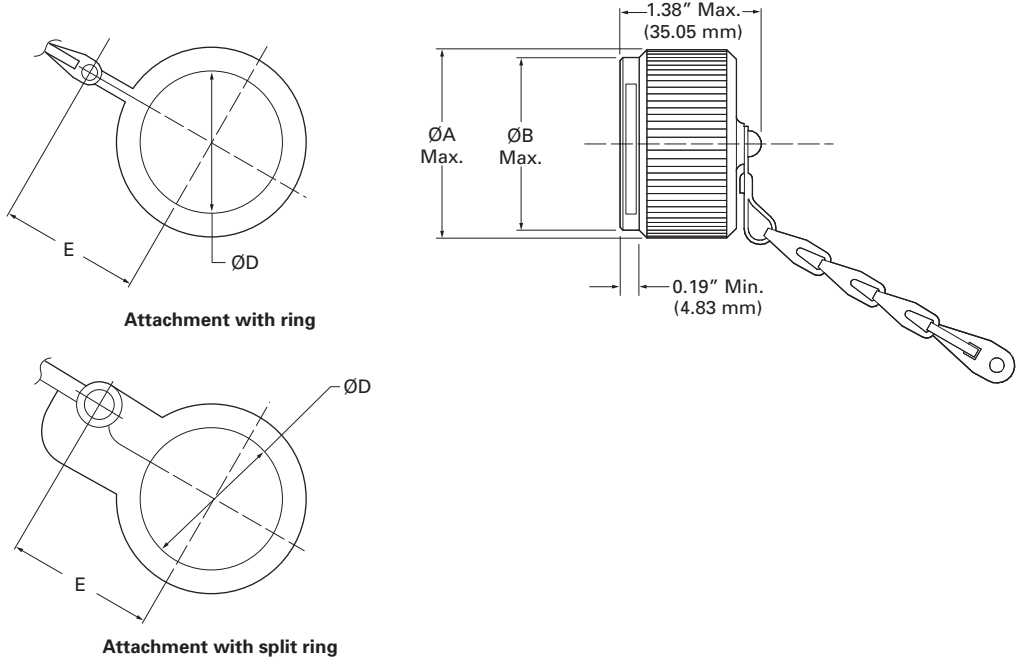
Code	Description	Code	Description
0	No Chain	P	CRES Cable, PVC Jacket
L	CRES Link Chain	T	CRES Cable, Teflon Jacket
B	CRES Bead Chain	U	CRES Cable, Nylon Jacket
C	CRES Cable, No Jacket	V	CRES Cable, Viton Jacket

## Designator Descriptions

Designator Type	Eaton	Description
Cover Type	RC	Receptacle Cover
	PC	Plug Cover
Finish Class	C	Anodize, -65°C to 200°C (-85°F to 392°F)
	F	Nickel per ASTM B733, -65°C to 200°C (-85°F to 392°F)
	G	Nickel per ASTM B733, -65°C to 200°C (-85°F to 392°F)
	K	CRES (Passivated), -65°C to 200°C (-85°F to 392°F)
	N	Nickel Plate per ASTM B733, -65°C to 200°C (-85°F to 392°F)
	S	Electrodeposited Nickel, -65°C to 200°C (-85°F to 392°F)
	T	Nickel Fluorocarbon Polymer, -65°C to 175°C (-85°F to 347°F)
EMI Codes	W	CAD/OD per QQ-P-416, -65°C to 175°C (-85°F to 347°F)
	Y	Passivated per SAE-AMS-QQ-P-35, -65°C to 200°C (-85°F to 392°F)
	G	EMI grounding, Receptacle Covers Only
	O	No EMI Grounding



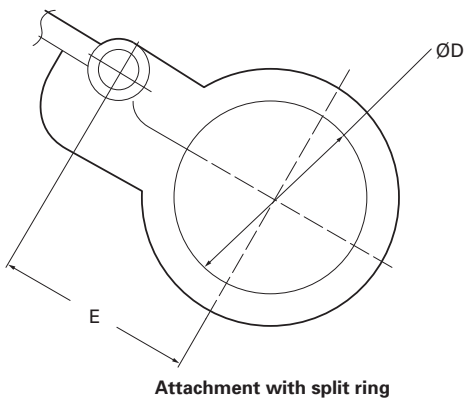
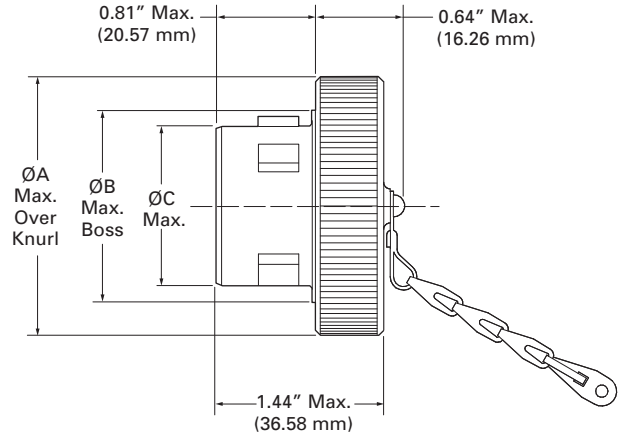
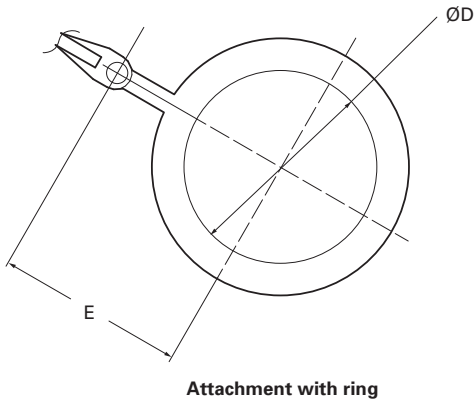
# Receptacle covers mechanical drawings



Finish Classes	All	All	All Except N & Y	All Except N & Y	N & Y	N & Y
Shell Size	ØA Max	ØB Max	ØD Min	ØE Min	ØD Min	ØE Min
9	0.880 (22.35)	0.650 (16.51)	0.685 (17.40)	0.722 (18.34)	0.685 (17.40)	0.722 (18.34)
11	0.922 (23.42)	0.775 (19.69)	1.006 (25.55)	0.880 (22.35)	0.809 (20.55)	0.781 (19.84)
13	1.047 (26.59)	0.900 (22.86)	1.124 (28.55)	0.959 (24.36)	1.006 (25.55)	0.880 (22.35)
15	1.219 (30.96)	1.040 (26.42)	1.248 (31.70)	1.057 (26.85)	1.124 (28.55)	0.959 (24.36)
17	1.344 (34.14)	1.150 (29.21)	1.367 (34.72)	1.057 (26.85)	1.288 (32.72)	0.978 (24.84)
19	1.469 (37.31)	1.275 (32.39)	1.524 (38.71)	1.156 (29.36)	1.406 (35.71)	1.057 (26.85)
21	1.579 (40.11)	1.400 (35.56)	1.642 (41.71)	1.234 (31.34)	1.524 (38.71)	1.156 (29.36)
23	1.704 (43.28)	1.525 (38.74)	1.760 (44.70)	1.258 (31.95)	1.642 (41.71)	1.234 (31.34)
25	1.829 (46.46)	1.650 (41.91)	1.878 (47.70)	1.333 (33.86)	1.760 (44.70)	1.258 (31.95)
33	2.329 (59.16)	2.200 (55.88)	2.282 (57.96)	1.565 (39.75)	N/A	N/A

Dimensions are stated as inches (mm).

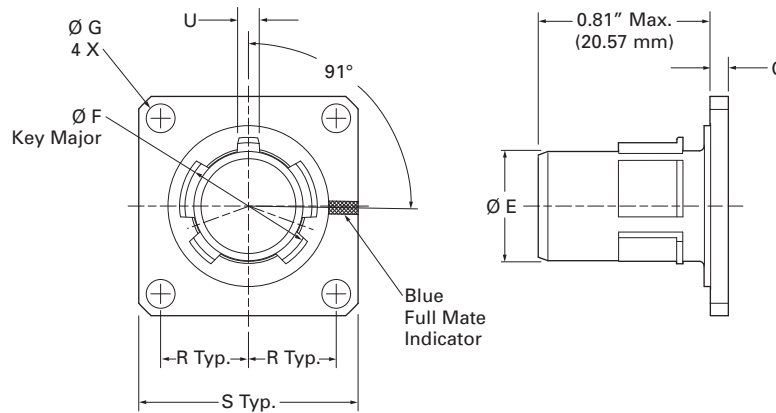
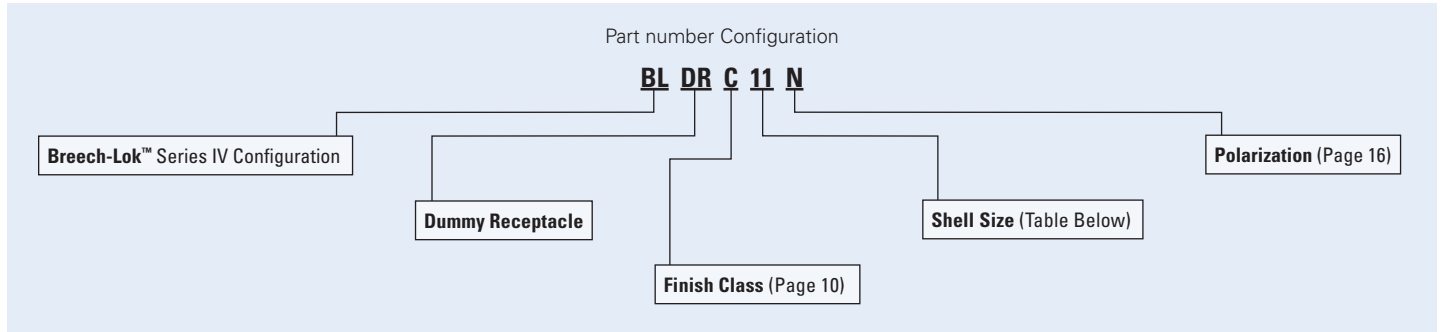
# Plug covers mechanical drawings



Shell Size	ØA Max	ØB Max	ØC Max	ØD Max	E Min
9	1.250 (31.75)	0.668 (16.97)	0.384 (9.75)	0.491 (12.47)	0.425 (10.80)
11	1.380 (35.05)	0.793 (20.14)	0.509 (12.93)	0.609 (15.47)	0.483 (12.27)
13	1.570 (39.88)	0.919 (23.34)	0.634 (16.10)	0.727 (18.47)	0.542 (13.77)
15	1.660 (42.16)	1.044 (26.52)	0.759 (19.28)	0.885 (22.48)	0.620 (15.75)
17	1.790 (45.47)	1.170 (29.72)	0.885 (22.48)	1.008 (25.60)	0.679 (17.25)
19	1.920 (48.77)	1.294 (32.87)	1.009 (25.63)	1.126 (28.60)	0.737 (18.72)
21	2.060 (52.32)	1.419 (36.04)	1.134 (28.80)	1.244 (31.60)	0.820 (20.83)
23	2.250 (57.15)	1.544 (39.22)	1.259 (31.98)	1.367 (34.72)	0.851 (21.62)
25	2.380 (60.45)	1.669 (42.39)	1.384 (35.15)	1.485 (37.72)	0.910 (23.11)
33	2.880 (73.15)	2.220 (56.39)	1.811 (46.00)	1.879 (47.73)	1.025 (26.04)

Dimensions are stated as inches (mm).

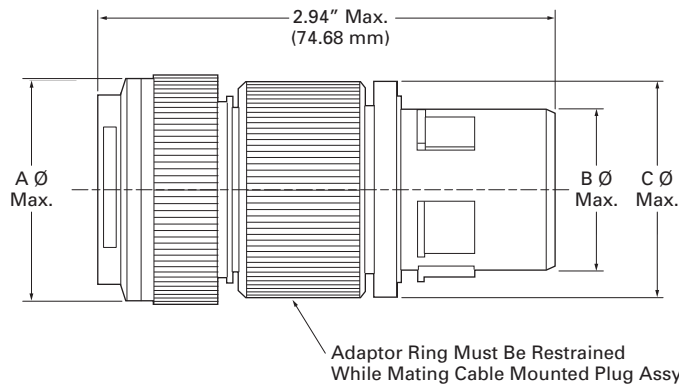
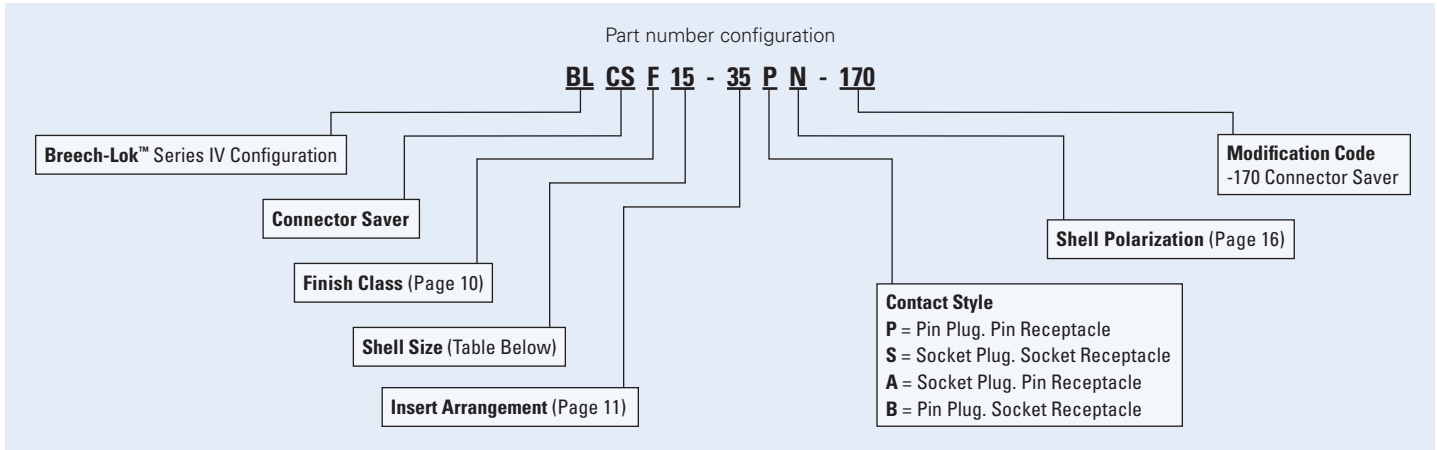
# Dummy-stowage receptacles mechanical drawings and ordering information



Shell Size	C Ref	ØE Max	ØF Ref	ØG Ref	R BSC	S Max	U Ref
9	0.102 (2.59)	0.384 (9.75)	0.461 (11.71)	0.137 (3.48)	0.328 (8.33)	0.950 (24.13)	0.065 (1.65)
11	0.102 (2.59)	0.509 (12.93)	0.589 (14.96)	0.137 (3.48)	0.406 (10.31)	1.051 (26.70)	0.065 (1.65)
13	0.102 (2.59)	0.634 (16.10)	0.720 (18.29)	0.137 (3.48)	0.453 (11.51)	1.145 (29.08)	0.065 (1.65)
15	0.102 (2.59)	0.759 (19.28)	0.844 (21.44)	0.137 (3.48)	0.485 (12.32)	1.240 (31.50)	0.085 (2.16)
17	0.102 (2.59)	0.885 (22.48)	0.969 (24.61)	0.137 (3.48)	0.531 (13.49)	1.334 (33.88)	0.085 (2.16)
19	0.133 (3.38)	1.009 (25.63)	1.088 (27.64)	0.137 (3.48)	0.578 (14.68)	1.460 (37.08)	0.105 (2.67)
21	0.133 (3.38)	1.134 (28.80)	1.213 (30.81)	0.137 (3.48)	0.625 (15.88)	1.582 (40.18)	0.105 (2.67)
23	0.133 (3.38)	1.259 (31.98)	1.342 (34.09)	0.157 (3.99)	0.688 (17.48)	1.708 (43.38)	0.125 (3.18)
25	0.133 (3.38)	1.384 (35.15)	1.469 (37.31)	0.157 (3.99)	0.750 (19.05)	1.834 (46.58)	0.125 (3.18)
33	0.133 (3.38)	1.811 (46.00)	1.905 (48.39)	0.157 (3.99)	1.00 (25.40)	2.345 (59.56)	0.165 (4.19)

Dimensions are stated as inches (mm).

# Connector savers mechanical drawings and ordering information



Shell Size	ØA Max	ØB Max	ØC Max
9	0.935 (23.75)	0.384 (9.75)	0.801 (20.35)
11	1.054 (26.77)	0.509 (12.93)	0.926 (23.52)
13	1.226 (31.14)	0.634 (16.10)	1.040 (26.42)
15	1.351 (34.32)	0.759 (19.28)	1.165 (29.59)
17	1.476 (37.49)	0.885 (22.48)	1.290 (32.77)
19	1.586 (40.28)	1.009 (25.63)	1.396 (35.46)
21	1.711 (43.46)	1.134 (28.80)	1.521 (38.63)
23	1.536 (39.01)	1.259 (31.98)	1.646 (41.81)
25	1.964 (49.89)	1.384 (35.15)	1.771 (44.98)
33	2.515 (63.88)	1.811 (46.00)	2.198 (55.83)

Dimensions are stated as inches (mm).

# Wing-Lok™ plugs meet all Series IV requirements

## Ergonomic designs facilitate rapid connector mating and demating



- Meets all MIL-DTL-38999 Series IV physical and electrical requirements.
- High-speed data configurations include MIL-STD-1553.
- Easily mated and demated, even when wearing bulky military or space-grade gloves.
- Rugged coupling design will not demate or loosen due to shock or vibration.
- Comprehensive range of solutions includes Class G, space-rated connectors.
- -65°C to 200°C operating temperatures.
- Please contact customer service at 800.840.0502 to order products or receive additional information.

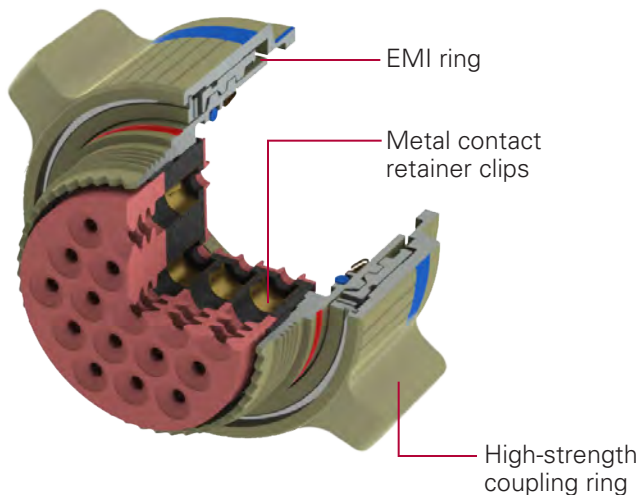
Wing-Lok™ plugs feature non-slip-grip designs that significantly reduce the amount of effort needed to perform rapid and repetitive connector engagements. Wing-Lok™ plugs can be quickly customized to meet a broad array of mission-specific requirements:

- Special insert and shell configurations.
- Customer-defined EMI/RFI compliances.
- Custom connector/cable assemblies.
- Please refer to page 5 for additional capabilities



Standard wing (W6 shell)

### Harsh-environment design features



Low-profile (WL6 shell)

# Wing-Lok™ plugs technical specifications

## Materials, Finish, and Mechanical

	Class C	Class F	Class G	Class K	Class S	Class T	Class W
Shell and Coupling Ring Material	2024 Al	2024 Al	2024 Al	Corrosion Resistant Steel	Corrosion Resistant Steel	2024 Al	2024 Al
Shell and Coupling Ring Plating	Anodize	Nickel per ASTM B733	Nickel per ASTM B733	Passivated	Electrodeposited Nickel	Nickel Fluorocarbon Polymer	CAD/OD per QQ-P-416
Contact Material & Plating	Copper Alloy with Gold Plating, 50 Micro-Inches Minimum - All Finish Classes						
Insulator	Hard Dielectric Wafer - All Finish Classes						
Grommet and Seal	Fluorosilicone - All Finish Classes						
Grounding Springs	Beryllium Copper - All Finish Classes						
Mating Life	500 Cycles Minimum - All Finish Classes						
Contact Retention	Up to 25 Pounds - All Finish Classes						
Polarization	Per MIL-STD-38999 Series IV; N, A, B, C, D, K, L, M, R, and U - All Finish Classes						

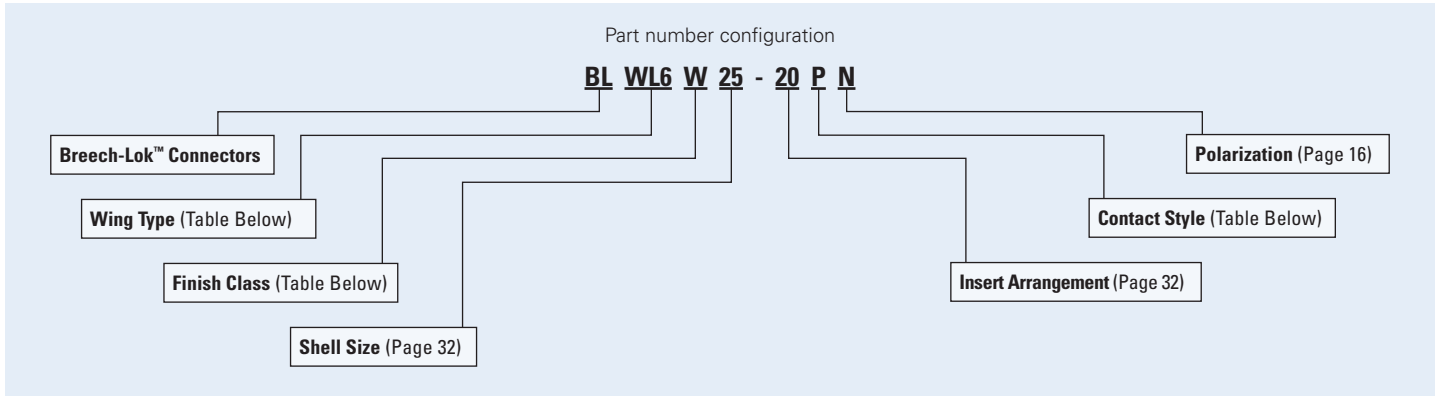
## Environmental, Shock, Vibration, and EMI/RFI

	Class C	Class F	Class G*	Class K**	Class S	Class T	Class W
Operating Temperature	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)	-65°C to 175°C (-85°F to 347°F)	-65°C to 175°C (-85°F to 347°F)
Sealing	Sand and Dust as per MIL-STD-202 and Ice Resistance - All Finish Classes						
Corrosion Resistance	Withstands 500 Hours Salt Spray	Withstands 48 Hours Salt Spray	Withstands 48 Hours Salt Spray	Withstands 500 Hours Salt Spray	Withstands 48 Hours Salt Spray	Withstands 500 Hours Salt Spray	Withstands 500 Hours Salt Spray
Fluid Immersion	Various Fuels, Solvents, Coolants, and Oils as per EIA-364-10 - All Finish Classes						
Sine Vibration	30g at Ambient Temperature - All Finish Classes						
Random Vibration	50g at Ambient Temperature - All Finish Classes						
Shock	300g +/- 15% Half-Sine-Wave Magnitude for 3 +/- 1mS - All Finish Classes						
EMI Attenuation @ 100 MHz	No EMI Shielding	> 90 dB	> 90 dB	> 80 dB	> 90 dB	> 90dB	> 90dB
EMI Attenuation @ 10 GHz	No EMI Shielding	> 65 dB	> 65 dB	> 45 dB	> 65 dB	> 50dB	> 50dB
Shell-to-Shell Conductivity	1.0 Millivolt Max. Drop	1.0 Millivolt Max. Drop	1.0 Millivolt Max. Drop	2.5 Millivolt Max. Drop	1.0 Millivolt Max. Drop	2.5 Millivolt Max. Drop	2.5 Millivolt Max. Drop

\*Class G thermal vacuum outgassing: total mass loss 1.0%, collected volatile condensable material 0.1% maximum.

\*\*Finish Class K configurations provide 2000°F firewall protection for 20 minutes minimum.

# Wing-Lok™ plugs ordering information



## Designator Descriptions

Designator Type	Eaton	Description
Wing Type	W6	Full Wing
	WL6	Low-Profile Wing
Finish Class	C	Anodize, -65°C to 200°C (-85°F to 392°F)
	F	Nickel per ASTM B733, -65°C to 200°C (-85°F to 392°F)
	G	Nickel per ASTM B733, -65°C to 200°C (-85°F to 392°F)
	K	CRES (Passivated), -65°C to 200°C (-85°F to 392°F)
	S	Electrodeposited Nickel, -65°C to 200°C (-85°F to 392°F)
	T	Nickel Fluorocarbon Polymer, -65°C to 175°C (-85°F to 347°F)
	W	CAD/OD per QQ-P-416, -65°C to 175°C (-85°F to 347°F)
Contact Type	P	Pin
	S	Socket
	A	Pin, Non-Standard
	B	Socket, Non-Standard

# Wing-Lok™ plugs shell & insert configurations

Please contact Eaton to discuss custom shells and inserts

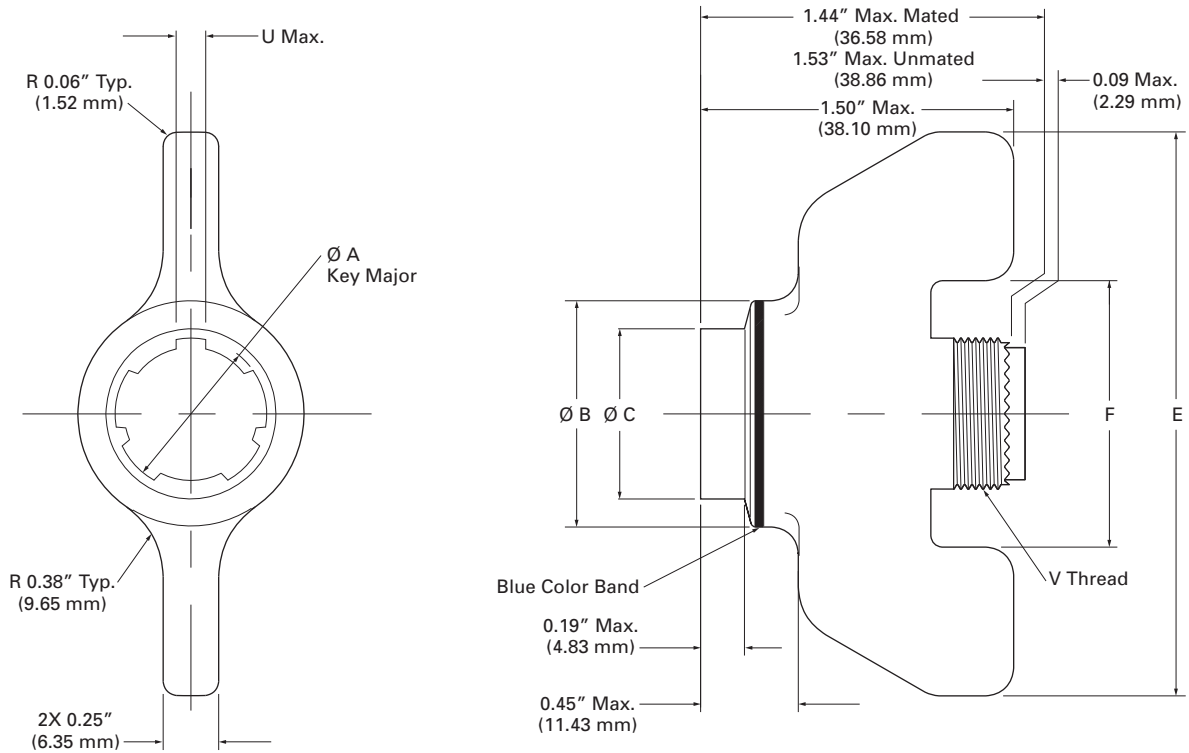
Shell Size	Insert #	SR	TTL #	# 22D	# 20	# 16	# 12	#8 TWX
9	35	M	6	6				
9	98	I	3		3			
11	2	I	2			2		
11	3	II	3			3		
11	5	I	5		5			
11	35	M	13	13				
11	98	I	6		6			
11	99	I	7		7			
13	4	I	4			4		
13	35	M	22	22				
13	98	I	10		10			
15	5	II	5			5		
15	15	I	15		14	1		
15	18	I	18		18			
15	19	I	19		19			
15	35	M	37	37				
15	97	I	12		8	4		
17	2	M	2					2
17	6	I	6				6	
17	8	II	8			8		
17	26	I	26		26			
17	35	M	55	55				
17	98	M	26	24				2
17	99	I	23		21	2		
19	3	M	3					3
19	4	M	4					4
19	11	II	11			11		

SR = Service Rating.  
TTL # = the total number of contacts.

Shell Size	Insert #	SR	TTL #	# 22D	# 20	# 16	# 12	# 10	#8 TWX	#8 PWR
19	18	M	18	14					4	
19	32	I	32		32					
19	35	M	66	66						
21	5	M	5						5	
21	11	I	11				11			
21	16	II	16			16				
21	26	M	25		23				2	
21	35	M	79	79						
21	39	I	39		37	2				
21	41	I	41		41					
23	21	II	21			21				
23	35	M	100	100						
23	53	I	53		53					
23	55	I	55		55					
23	97	I	16			16				
23	99	II	11			11				
25	4	I	56		48	8				
25	8	M	8						8	
25	11	N	11		2			9		
25	19	I	19				19			
25	20	N	30		10	13	4		3	
25	24	I	24			12	12			
25	29	I	29			29				
25	35	M	128	128						
25	43	I	43		23	20				
25	46	I	46		40	4			2	
25	61	I	61		61					
33	54	I	54		30	14	6			4
33	58	I	58		34	14	10			



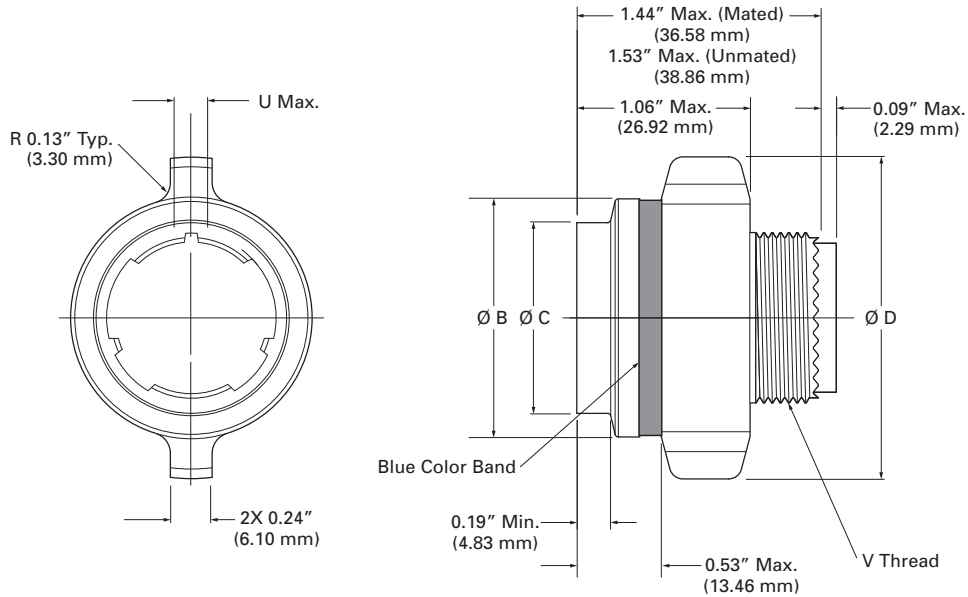
# Standard-wing plugs mechanical drawings



Shell Size	ØA Ref	ØB Max	ØC Max	E Ref	F Ref	U Max Socket	U Max Pin	V Thread
9	0.523 (13.28)	0.930 (23.62)	0.650 (16.51)	2.410 (61.21)	1.070 (27.18)	0.116 (2.95)	0.076 (1.93)	M12x1.0-6g-0.1R
11	0.644 (16.36)	1.049 (26.64)	0.775 (19.69)	2.540 (64.52)	1.200 (30.48)	0.116 (2.95)	0.076 (1.93)	M15x1.0-6g-0.1R
13	0.765 (19.43)	1.206 (30.63)	0.901 (22.89)	2.690 (68.33)	1.340 (34.04)	0.117 (2.97)	0.077 (1.96)	M18x1.0-6g-0.1R
15	0.889 (22.58)	1.346 (34.19)	1.039 (26.39)	2.840 (72.14)	1.500 (38.10)	0.137 (3.48)	0.097 (2.46)	M22x1.0-6g-0.1R
17	1.014 (25.76)	1.456 (36.98)	1.149 (29.18)	2.940 (74.68)	1.600 (40.64)	0.137 (3.48)	0.097 (2.46)	M25x1.0-6g-0.1R
19	1.094 (27.79)	1.581 (40.16)	1.275 (32.39)	3.060 (77.72)	1.720 (43.69)	0.158 (4.01)	0.118 (3.00)	M28x1.0-6g-0.1R
21	1.219 (30.96)	1.706 (43.33)	1.401 (35.59)	3.190 (81.03)	1.720 (43.69)	0.158 (4.01)	0.118 (3.00)	M31x1.0-6g-0.1R
23	1.348 (34.24)	1.831 (46.51)	1.527 (38.79)	3.310 (84.07)	1.980 (50.29)	0.178 (4.52)	0.137 (3.48)	M34x1.0-6g-0.1R
25	1.475 (37.47)	1.956 (49.68)	1.649 (41.88)	3.440 (87.38)	2.100 (53.34)	0.178 (4.52)	0.137 (3.48)	M37x1.0-6g-0.1R
33	1.908 (48.46)	2.510 (63.75)	2.200 (55.88)	3.990 (101.30)	2.650 (67.31)	0.229 (5.82)	0.181 (4.60)	M47x1.0-6g-0.1R

Dimensions are stated as inches (mm).

# Low-profile-wing plugs mechanical drawings



Shell Size	ØA	ØB Max	ØC Max	D Max	U Max Socket	U Max Pin	V Thread
9	0.523 (13.28)	0.923 (23.44)	0.650 (16.51)	1.423 (36.14)	0.116 (2.95)	0.076 (1.93)	M12x1.0-6g-0.1R
11	0.644 (16.36)	1.049 (26.64)	0.775 (19.69)	1.549 (39.34)	0.116 (2.95)	0.076 (1.93)	M15x1.0-6g-0.1R
13	0.765 (19.43)	1.206 (30.63)	0.901 (22.89)	1.706 (43.33)	0.117 (2.97)	0.077 (1.96)	M18x1.0-6g-0.1R
15	0.889 (22.58)	1.346 (34.19)	1.039 (26.39)	1.846 (46.89)	0.137 (3.48)	0.097 (2.46)	M22x1.0-6g-0.1R
17	1.014 (25.76)	1.456 (36.98)	1.149 (29.18)	1.956 (49.68)	0.137 (3.48)	0.097 (2.46)	M25x1.0-6g-0.1R
19	1.094 (27.79)	1.581 (40.16)	1.275 (32.39)	2.081 (52.86)	0.157 (3.99)	0.117 (2.97)	M28x1.0-6g-0.1R
21	1.219 (30.96)	1.706 (43.33)	1.401 (35.59)	2.206 (56.03)	0.157 (3.99)	0.117 (2.97)	M31x1.0-6g-0.1R
23	1.348 (34.24)	1.831 (46.51)	1.527 (38.79)	2.331 (59.21)	0.177 (4.50)	0.137 (3.48)	M34x1.0-6g-0.1R
25	1.475 (37.47)	1.956 (49.68)	1.649 (41.88)	2.456 (62.38)	0.177 (4.50)	0.137 (3.48)	M37x1.0-6g-0.1R
33	1.908 (48.46)	2.513 (63.83)	2.200 (55.88)	3.013 (76.53)	0.233 (5.92)	0.181 (4.60)	M47x1.0-6g-0.1R

Dimensions are stated as inches (mm).

# Filtered connectors for noise-sensitive applications

## High-density designs meet MIL-DTL-38999 shock and vibration with no deratings



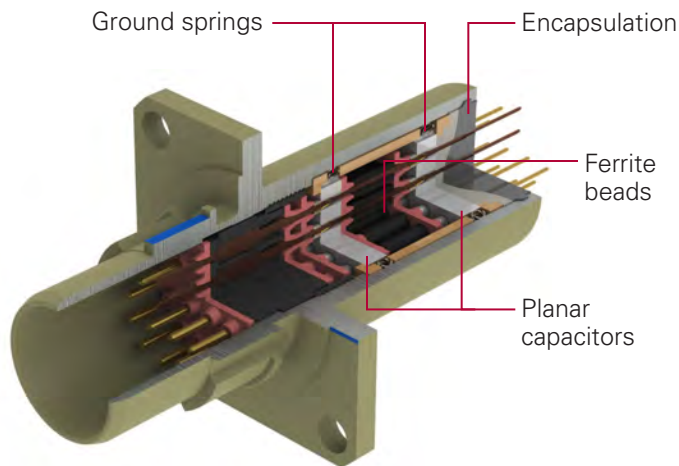
- Rugged design survives 500 cycles of mating and demating.
- -55°C to 125°C operating temperatures.
- Configurations include shell sizes 9 to 33 and most insert arrangements.
- Self-locking coupling nuts and end-bell accessory hardware.
- Finish options include platings rated for 500-hours salt-spray exposure.
- Class K configurations provide 2000°F firewall protection.

Breech-Lok™ filtered connectors utilize unique planar-capacitor designs that facilitate high-density solutions for noise-sensitive applications including: avionics, communications, SIGINT, and ISR.

These rugged connectors can be quickly modified to meet a broad array of mission-specific requirements:

- Filters optimized for any frequency, voltage, and impedance requirements.
- Special insert and shell configurations.
- Shielded connector/cable assemblies.
- Please refer to page 5 for additional capabilities.

### C, L, T and Pi-type filters are available



A rugged design enables meeting MIL-DTL-38999 shock and vibration requirements with no deratings.



## Filtered connectors technical specifications

### Materials, Finish, and Mechanical

	Class F	Class K	Class W
Shell and Coupling Ring Material	2024 Aluminum	Corrosion Resistant Stainless Steel	2024 Aluminum
Shell and Coupling Ring Plating	Nickel per ASTM B733	Passivated	CAD/OD per QQ-P-416
Contact Material & Plating	Copper Alloy With Gold Plating, 50 Micro-Inches Minimum - All Finish Classes		
Insulator	Hard Dielectric Wafer - All Finish Classes		
Grommet and Seal	Fluorosilicone - All Finish Classes		
Grounding Springs	Beryllium Copper - All Finish Classes		
Mating Life	500 Cycles Minimum - All Finish Classes		
Contact Retention	Up to 25 Pounds - All Finish Classes		
Polarization	Per MIL-STD-38999 Series IV; N, A, B, C, D, K, L, M, R, and U - All Finish Classes		

### Environmental, Shock, Vibration, and EMI/RFI

	Class F	Class K*	Class W
Operating Temperature	-55°C to 125°C (-67°F to 257°F)	-55°C to 125°C (-67°F to 257°F)	-55°C to 125°C (-67°F to 257°F)
Sealing	Dust (Fine Sand) per MIL-STD-202 and Ice Resistance - All Finish Classes		
Corrosion Resistance	Withstands 48 Hours Salt Spray	Withstands 500 Hours Salt Spray	Withstands 500 Hours Salt Spray
Fluid Immersion	Various Fuels, Solvents, Coolants, and Oils as per EIA-364-10 - All Finish Classes		
Sine Vibration	30g at Ambient Temperature	30g at Ambient Temperature	30g at Ambient Temperature
Random Vibration	50g at Ambient Temperature	50g at Ambient Temperature	50g at Ambient Temperature
Shock	300g +/- 15% Half-Sine-Wave Magnitude for 3 +/- 1mS - All Finish Classes		
Emi Leakage Attenuation	> 90 dB @ 100MHz > 65 dB @ 10GHz	> 80 dB @ 100MHz > 45 dB @ 10GHz	> 90 dB @ 100MHz > 50 dB @ 10GHz
Shell-to-Shell Conductivity	2.5 Millivolt Maximum Drop	2.5 Millivolt Maximum Drop	1.0 Millivolt Maximum Drop

\*Finish Class K configurations provide 2000°F firewall protection for 20 minutes minimum.

# Filter performance graphs

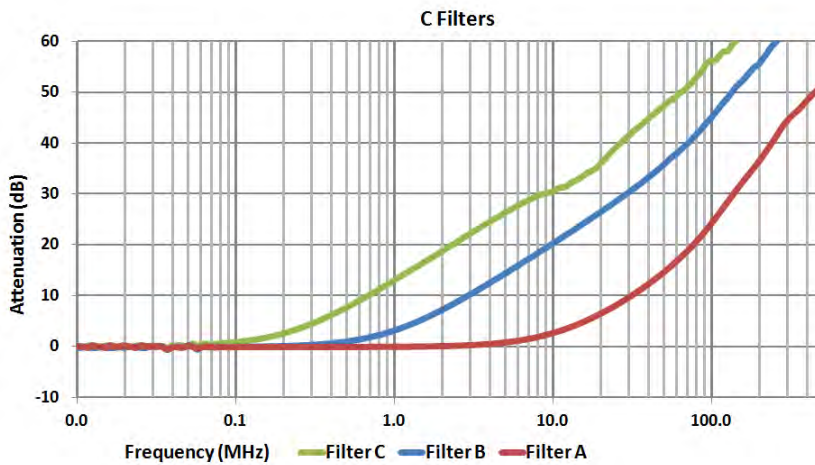
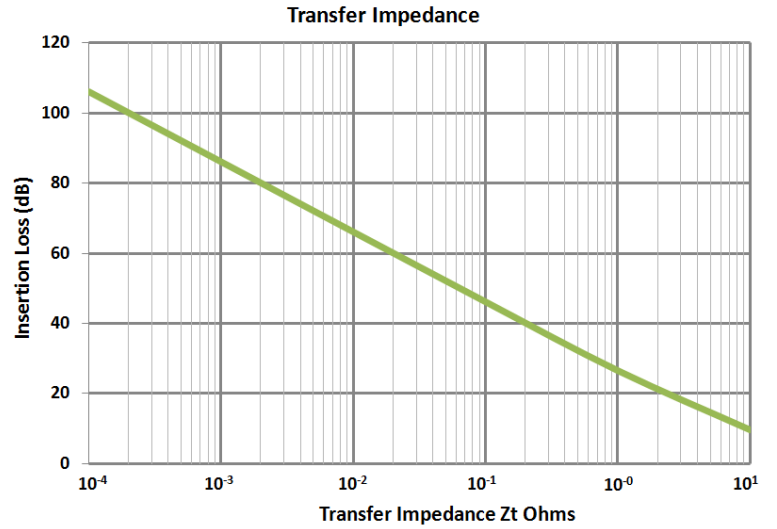
An estimate of insertion loss can be made using the following formula:

$$IL \text{ (dB)} = 20 \log \left[ 1 + \frac{Z_s Z_1}{Z_t (Z_s + Z_1)} \right]$$

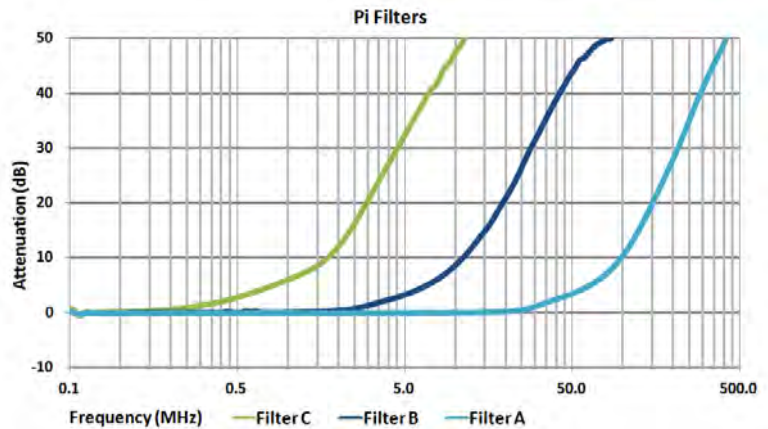
Zs = Source impedance in ohms

Z1 = Load impedance in ohms

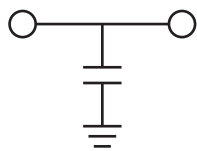
Zt = Transfer impedance in 50 ohm system



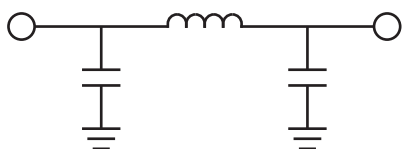
Please contact Eaton for L and T filter performance information.



## Filter types and attenuation ratings



The C filter is a low inductance, feed-thru capacitor. It is used to attenuate high-frequency signals.



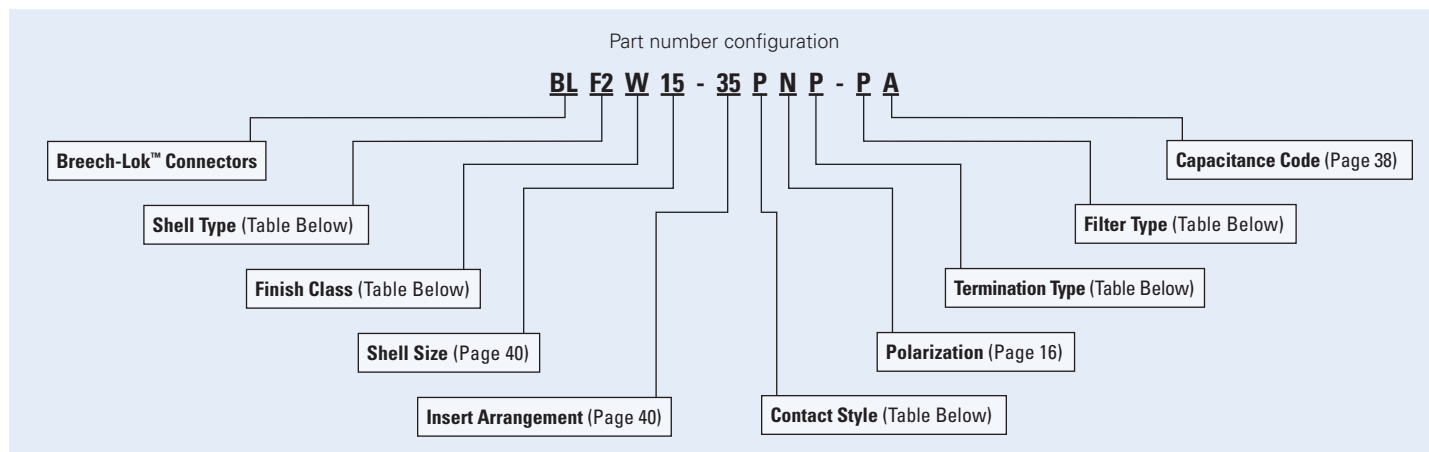
The Pi filter consists of two capacitive elements and one inductive element. The Pi filter provides better high-frequency performance than the C filter due to sharper roll-off and is designed for high source and load impedances.

### Electrical Ratings - Pi and C Filters

Maximum Operating Voltage	200VDC
Current Rating (RF)	3.0 Amps Minimum
IR/DWV	20 Giga Ohms Min @ 500 VDC
Dissipation Factor	2.5% Maximum

	Pi Filter			C Filter				
	Capacitance Code	C	B	A	Capacitance Code	C		B
	Capacitance (pF)	5300 8000	530 800	53 80	Capacitance (pF)	12000 18000	530 800	53 80
	Frequency (MHz)	dB Attenuation	dB Attenuation	dB Attenuation	Frequency (MHz)	dB Attenuation	dB Attenuation	dB Attenuation
Attenuation Minimums per MIL-STD-220 @25°C Without Bias Voltage or Current	0.1	0	0	0	0.1	-1	0	0
	0.5	-3	0	0	0.25	-3	0	0
	1	-6	0	0	1	-12	-3	0
	5	-32	-3	0	5	-26	-14	-1
	10	-47	-8	0	10	-30	-20	-3
	50	-81	-42	-3	50	-47	-36	-14
	100	-85	-54	-10	100	-56	-45	-24

## Filtered connectors ordering information



### Designator Descriptions

Designator Type	Eaton	Description
Shell Type	F2	Box Mount
	F7	Jam-Nut Mount
Finish Class	F	Nickel per ASTM B733
	K	CRES (Passivated)
	W	CAD/DD per QQ-P-416
Contact Style	P	Pin
	S	Socket
Filter Types	C	Capacitive
	L*	One Capacitive and One Inductive Element
	P	Pi Filter, One Capacitive and One Inductive Element
	T*	Two Inductive and One Capacitive Element
Termination Types	P	PC Tails
	S	Solder Cup

\*Contact Eaton for L and T-Type filter specifications.

## Filtered connectors insert and shell arrangements

Shell Size	Insert #	SR	TTL #	# 22D	# 20	# 16	# 12
9	35	M	6	6			
9	98	I	3		3		
11*	2	I	2			2	
11*	3	II	3			3	
11	5	I	5		5		
11	35	M	13	13			
11	98	I	6		6		
11	99	I	7		7		
13*	4	I	4			4	
13	35	M	22	22			
13	98	I	10		10		
15*	5	II	5			5	
15*	15	I	15		14	1	
15	18	I	18		18		
15	19	I	19		19		
15	35	M	37	37			
15*	97	I	12		8	4	
17	6	I	6				6
17	8	II	8			8	
17	26	I	26		26		
17	35	M	55	55			
17*	99	I	23		21	2	

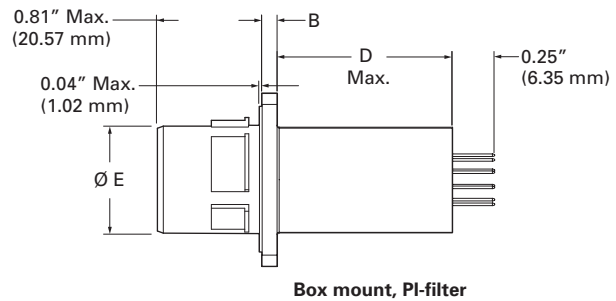
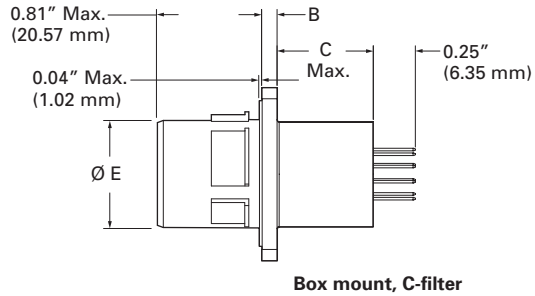
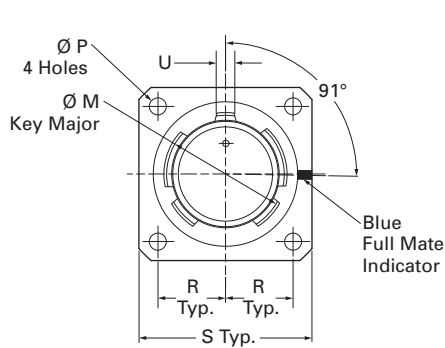
Shell Size	Insert #	SR	TTL #	# 22D	# 20	# 16	# 12	# 10	#8 PWR
19*	11	II	11			11			
19	32	I	32		32				
19	35	M	66	66					
21*	11	I	11				11		
21*	16	II	16			16			
21	35	M	79	79					
21*	39	I	39		37	2			
21	41	I	41		41				
23*	21	II	21			21			
23	35	M	100	100					
23	53	I	53		53				
23	55	I	55		55				
23*	97	I	16			16			
23*	99	II	11			11			
25	4	I	56		48	8			
25*	11	N	11		2			9	
25*	19	I	19				19		
25*	24	I	24			12	12		
25*	29	I	29			29			
25	35	M	128	128					
25*	43	I	43		23	20			
25	61	I	61		61				
33	54	I	54		30	14	6		4
33	58	I	58		34	14	10		

SR = Service Rating. Insert drawings are located in the General-Purpose Products section.

\*Please contact factory for lead times.



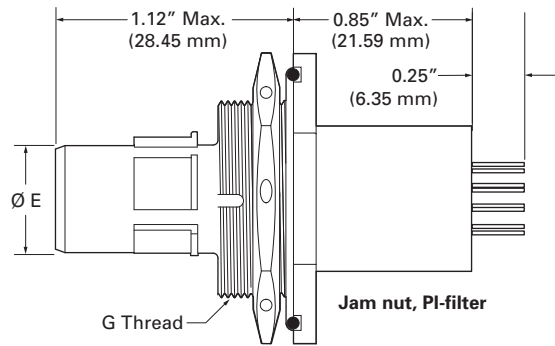
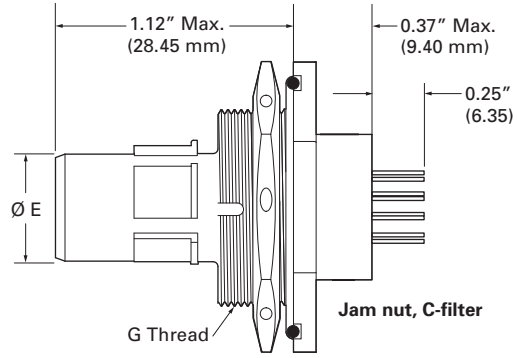
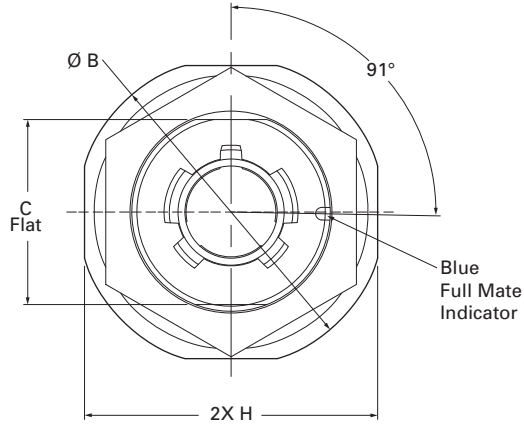
# Box-mount filtered receptacles mechanical drawings



Shell Size	B Max	C Max	D Max	ØE Max	ØM Ref	ØP Min	R BSC	S Type	U Reference Socket	Pin
9	0.102 (2.59)	0.670 (17.02)	1.140 (28.96)	0.384 (9.75)	0.464 (11.79)	0.122 (3.10)	0.328 (8.33)	0.948 (24.08)	0.065 (1.65)	0.105 (2.67)
11	0.102 (2.59)	0.670 (17.02)	1.140 (28.96)	0.509 (12.93)	0.589 (14.96)	0.122 (3.10)	0.406 (10.31)	1.051 (26.70)	0.065 (1.65)	0.105 (2.67)
13	0.102 (2.59)	0.670 (17.02)	1.140 (28.96)	0.634 (16.10)	0.720 (18.29)	0.122 (3.10)	0.453 (11.51)	1.146 (29.11)	0.065 (1.65)	0.105 (2.67)
15	0.102 (2.59)	0.670 (17.02)	1.140 (28.96)	0.759 (19.28)	0.844 (21.44)	0.122 (3.10)	0.484 (12.31)	1.240 (31.50)	0.085 (2.16)	0.125 (3.18)
17	0.102 (2.59)	0.670 (17.02)	1.140 (28.96)	0.885 (22.48)	0.969 (24.61)	0.122 (3.10)	0.531 (13.49)	1.335 (33.91)	0.085 (2.16)	0.125 (3.18)
19	0.102 (2.59)	0.670 (17.02)	1.140 (28.96)	1.009 (25.63)	1.088 (27.64)	0.122 (3.10)	0.578 (14.68)	1.461 (37.11)	0.105 (2.67)	0.145 (3.68)
21	0.133 (3.38)	0.710 (18.03)	1.180 (29.97)	1.134 (28.80)	1.213 (30.81)	0.122 (3.10)	0.625 (15.88)	1.583 (40.21)	0.105 (2.67)	0.145 (3.68)
23	0.133 (3.38)	0.710 (18.03)	1.180 (29.97)	1.259 (31.98)	1.342 (34.09)	0.142 (3.61)	0.687 (17.46)	1.709 (43.41)	0.125 (3.18)	0.165 (4.19)
25	0.133 (3.38)	0.710 (18.03)	1.180 (29.97)	1.384 (35.15)	1.469 (37.31)	0.142 (3.61)	0.750 (19.05)	1.835 (46.61)	0.125 (3.18)	0.165 (4.19)
33	0.133 (3.38)	0.710 (18.03)	1.180 (29.97)	1.811 (46.00)	1.902 (48.31)	0.142 (3.61)	1.000 (25.40)	2.356 (59.84)	0.165 (4.19)	0.217 (5.51)

Dimensions are stated as inches (mm).

# Jam-nut filtered receptacles mechanical drawings



Shell Size	ØB Max	C Max	ØE Max	G Thread	H Flat Max	Jam nut D389999/28 Dash no.	O-ring MS9068 Dash no.
9	1.195 (30.35)	0.651 (16.54)	0.384 (9.75)	M17x1.0-6g-0.1R	1.073 (27.25)	-2	-018
11	1.520 (38.61)	0.942 (23.93)	0.509 (12.93)	M25x1.0-6g-0.1R	1.394 (35.41)	-3	-024
13	1.642 (41.71)	1.066 (27.08)	0.634 (16.10)	M28x1.0-6g-0.1R	1.520 (38.61)	-4	-026
15	1.768 (44.91)	1.191 (30.25)	0.759 (19.28)	M31x1.0-6g-0.1R	1.642 (41.71)	-5	-028
17	1.957 (49.71)	1.321 (33.55)	0.885 (22.48)	M34x1.0-6g-0.1R	1.799 (45.69)	-7	-029
19	2.035 (51.69)	1.441 (36.60)	1.009 (25.63)	M38x1.0-6g-0.1R	1.909 (48.49)	-9	-030
21	2.157 (54.79)	1.566 (39.78)	1.134 (28.80)	M41x1.0-6g-0.1R	2.035 (51.69)	-10	-031
23	2.283 (57.99)	1.691 (42.95)	1.259 (31.98)	M44x1.0-6g-0.1R	2.157 (54.79)	-11	-032
25	2.409 (61.19)	1.816 (46.13)	1.384 (35.15)	M47x1.0-6g-0.1R	2.283 (57.99)	-12	-033
33	3.015 (76.58)	2.208 (56.08)	1.811 (46.00)	2.250-16 UN-2A	2.737 (69.52)	N/A	-037

Dimensions are stated as inches (mm).

# Breech-Lok™ hermetic connectors

Breech-Lok™ hermetic connectors meet all MIL-DTL-38999 Series IV requirements

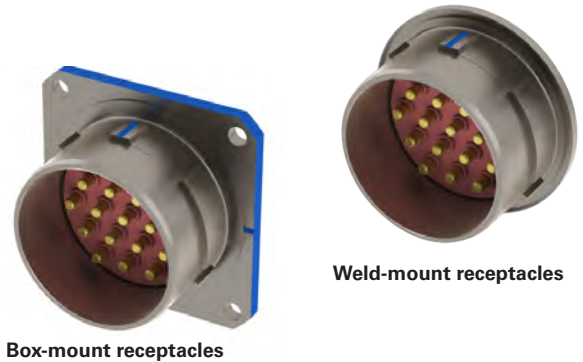


- No Helium leakage greater than 1 E-7 CC/S per EIA-364-02.
- Rugged design survives 500 cycles of mating and demating.
- Proven performance at -65°C to 200°C operating temperatures.
- Configurations include shell sizes 9 to 33 and most insert arrangements.
- Finish options include 500 hour, salt-spray-rated nickel plating as per ASTM B733.
- Please contact customer service at 800.840.0502 to order products or receive additional information.

Breech-Lok™ hermetic connectors are designed for use in pressurized applications and harsh environments. These rugged solutions provide the wide range of features offered by non-hermetic Breech-Lok™ products.

Breech-Lok™ hermetic connectors can be quickly customized to meet a broad array of mission-specific requirements:

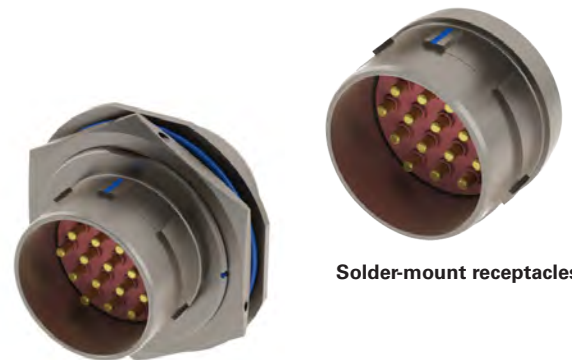
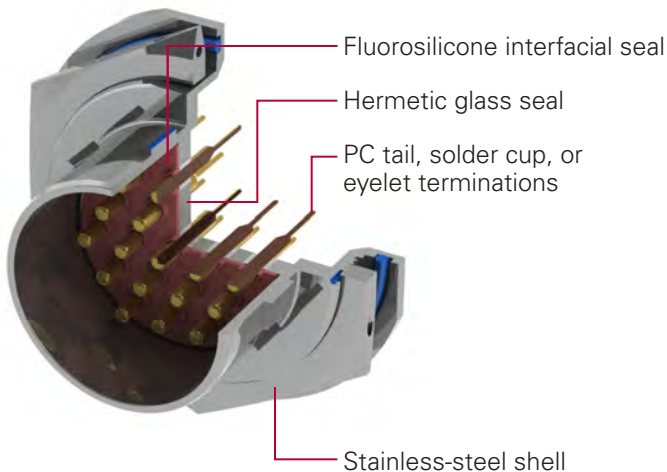
- Shell and seal materials optimized for specific environmental requirements.
- Special insert patterns.
- Custom connector/cable assemblies.
- Please refer to page 5 for additional capabilities.



Box-mount receptacles

Weld-mount receptacles

### Harsh-environment design features



Jam-nut receptacles

Solder-mount receptacles

## Hermetic connectors technical specifications

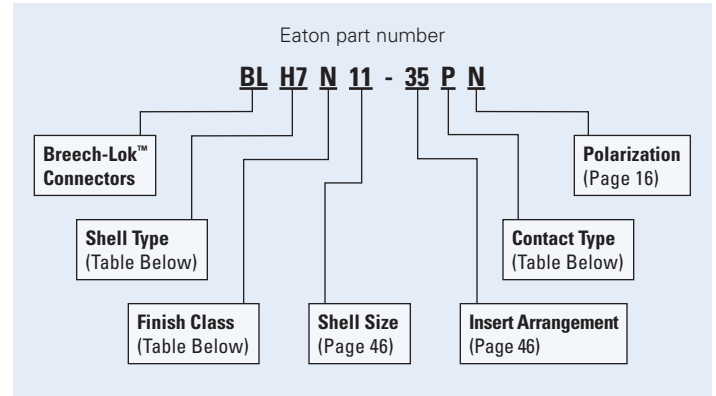
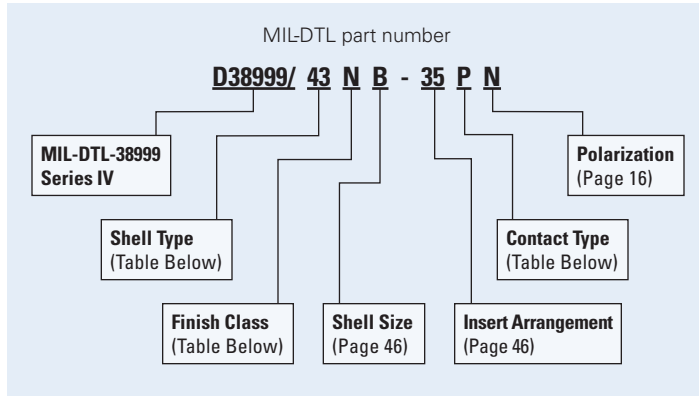
### Materials, Finish, and Mechanical

	Class N	Class Y
Shell	Stainless Steel	Stainless Steel
Shell and Coupling Ring Plating	Nickel Plate per ASTM B733	Passivated per SAE-AMS-QQ-P-35
Contact Type	Pin Only	Pin Only
Contact Material and Plating	Copper Alloy with Gold Plating, 50 Micro-Inches Minimum	Copper Alloy with Gold Plating, 50 Micro-Inches Minimum
Insulator	Hard Dielectric Wafer	Hard Dielectric Wafer
Grommet and Seal	Fluorosilicone and Hermetic Glass	Fluorosilicone and Hermetic Glass
Grounding Springs	Beryllium Copper	Beryllium Copper
Mating Life	500 Cycles Minimum	500 Cycles Minimum
Contact Retention	Up to 25 Pounds	Up to 25 Pounds
Polarization	Per MIL-STD-38999 Series IV; N, A, B, C, D, K, L, M, R, and U	Per MIL-STD-38999 Series IV; N, A, B, C, D, K, L, M, R, and U

### Environmental, Shock, Vibration, and EMI/RFI

	Class N	Class Y
Operating Temperature	-65°C to 200°C (-85°F to 392°F)	-65°C to 200°C (-85°F to 392°F)
Sealing	No Helium Leakage Greater than 1.0E-7 CC/S per EIA-364-02	No Helium Leakage Greater than 1.0E-7 CC/S per EIA-364-02
Corrosion Resistance	Withstands 48 Hours Salt Spray	Withstands 500 Hours Salt Spray
Fluid Immersion	Various Fuels, Solvents, Coolants, and Oils as per EIA-364-10	Various Fuels, Solvents, Coolants, and Oils as per EIA-364-10
Sine Vibration	30g at Ambient Temperature	30g at Ambient Temperature
Random Vibration	50g at Ambient Temperature	50g at Ambient Temperature
Shock	300g +/- 15% Half-Sine-Wave Magnitude for 3 +/- 1mS	300g +/- 15% Half-Sine-Wave Magnitude for 3 +/- 1mS
EMI Leakage Attenuation	> 90dB @100MHz > 65dB @ 10GHz	> 80dB @100MHz > 45dB @ 10GHz
Shell-to-Shell Conductivity	1.0 Millivolt Maximum Drop	2.5 Millivolt Maximum Drop

# Hermetic connectors ordering information



## Designator Cross References

Designator Type	Military	Eaton	Description
Shell Types	MIL-DTL-38999/45	H1	Solder-Mount Receptacle
	MIL-DTL-38999/41	H2	Box-Mount Receptacle
	MIL-DTL-38999/48	H4	Weld-Mount Receptacle
	MIL-DTL-38999/43	H7	Jam-Nut-Mount Receptacle
Finish Classes	N*	N*	Nickel Plate, -65°C to 200°C (-85°F to 392°F)
	Y*	Y*	Passivated, -65°C to 200°C (-85°F to 392°F)
Contact Types	C	C	PC Tails
	P	P	Pin with Solder Cup
	X	X	Pin with Eyelet

\*N and Y finish classes are QPL certified.

# Hermetic connectors shell and insert configurations

## Shell-Size Conversions

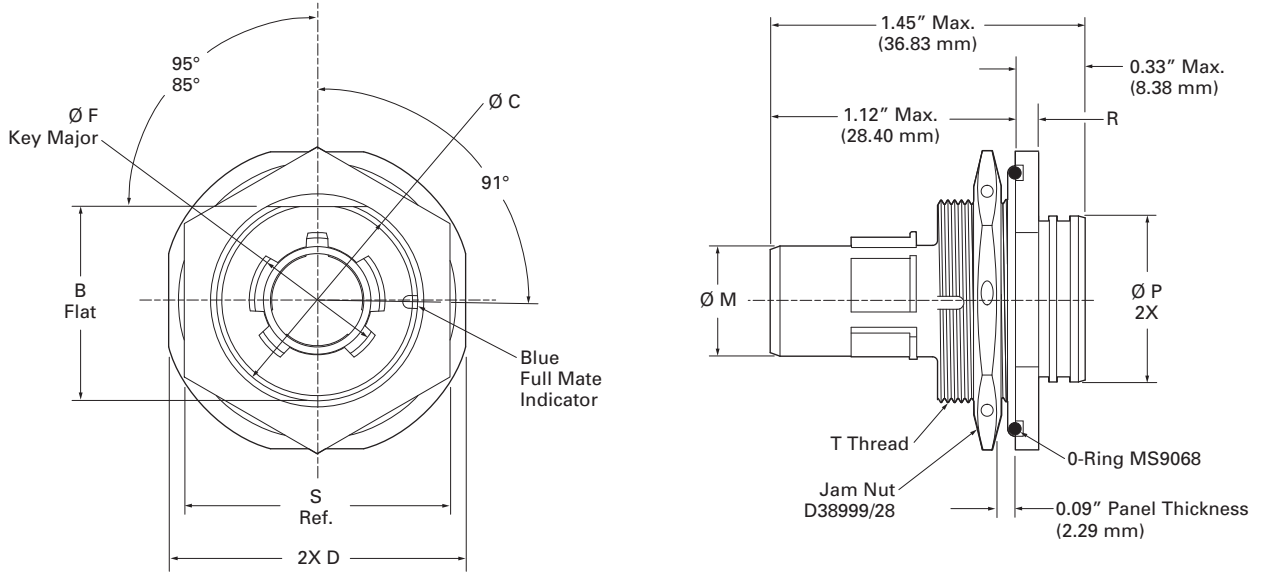
Military Designation	A	B	C	D	E	F	G	H	J	N/A
Shell Size & Eaton Designation	9	11	13	15	17	19	21	23	25	33

Please contact Eaton to discuss inserts for shell size 33 and custom requirements.

Shell Size	Insert #	SR	Total # Contacts	# 22D	# 20	# 16	# 12	Shell Size	Insert #	SR	Total # Contacts	# 22D	# 20	# 16	# 12	# 10
9	35	M	6	6				19	11	II	11			11		
9	98	I	3		3			19	32	I	32		32			
11	2	I	2			2		19	35	M	66	66				
11	3	II	3			3		21	11	I	11				11	
11	5	I	5		5			21	16	II	16			16		
11	35	M	13	13				21	35	M	79	79				
11	98	I	6		6			21	39	I	39		37	2		
11	99	I	7		7			21	41	I	41		41			
13	4	I	4			4		23	21	II	21			21		
13	35	M	22	22				23	35	M	100	100				
13	98	I	10		10			23	53	I	53		53			
15	5	II	5			5		23	55	I	55		55			
15	15	I	15		14	1		23	97	I	16			16		
15	18	I	18		18			23	99	II	11			11		
15	19	I	19		19			25	4	I	56		48	8		
15	35	M	37	37				25	11	N	11		2			9
15	97	I	12		8	4		25	19	I	19				19	
17	6	I	6				6	25	24	I	24			12	12	
17	8	II	8			8		25	29	I	29			29		
17	26	I	26		26			25	35	M	128	128				
17	35	M	55	55				25	43	I	43		23	20		
17	99	I	23		21	2		25	61	I	61		61			

SR = Service Rating. Insert drawings are located in the General Purpose Products section.

# D38999/43 jam-nut hermetic receptacles, Eaton type H7

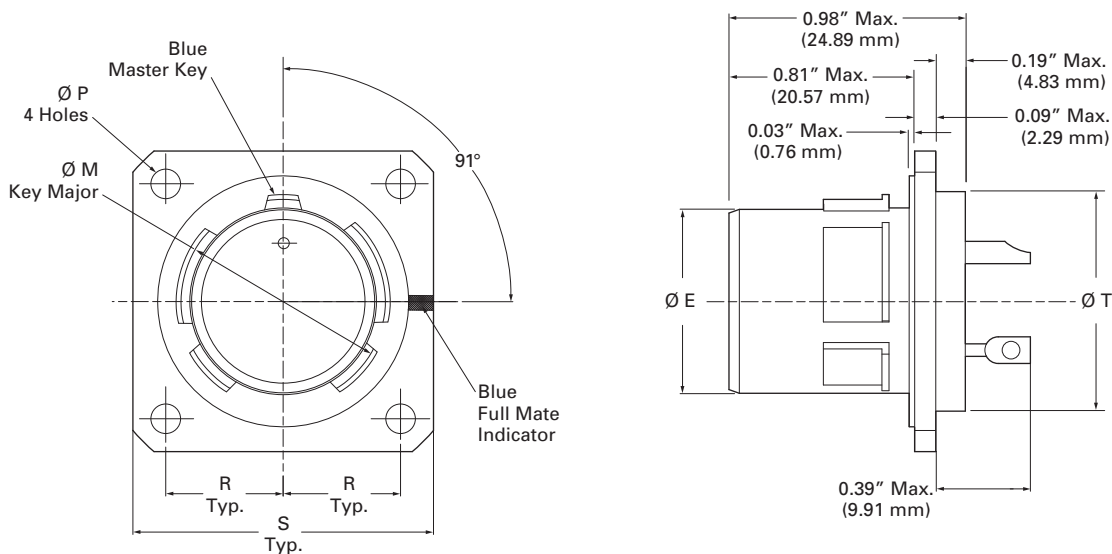


## Jam Nut Receptacles

Shell Size	ØB Max	ØC Max	ØD Max	F Ref	ØM Max	ØP Max	R Max	S Max	T Thread	O-Ring MS9068
9	0.655 (16.64)	0.689 (17.50)	1.079 (27.41)	0.464 (11.79)	0.384 (9.75)	0.660 (16.76)	0.118 (3.00)	0.945 (24.00)	M17x1.0-6g-0.1R	-019
11	0.755 (19.18)	0.815 (20.70)	1.268 (32.21)	0.589 (14.96)	0.509 (12.93)	0.779 (19.79)	0.118 (3.00)	1.036 (26.31)	M20x1.0-6g-0.1R	-022
13	0.942 (23.93)	1.004 (25.50)	1.394 (35.41)	0.720 (18.29)	0.634 (16.1)	0.909 (23.09)	0.118 (3.00)	1.230 (31.24)	M25x1.0-6g-0.1R	-024
15	1.066 (27.08)	1.126 (28.60)	1.520 (38.61)	0.844 (21.44)	0.759 (19.28)	1.035 (26.29)	0.118 (3.00)	1.387 (35.23)	M28x1.0-6g-0.1R	-026
17	1.191 (30.25)	1.259 (31.98)	1.642 (41.71)	0.969 (24.61)	0.885 (22.48)	1.157 (29.39)	0.118 (3.00)	1.429 (36.30)	M32x1.0-6g-0.1R	-028
19	1.316 (33.43)	1.384 (35.15)	1.831 (46.51)	1.088 (27.64)	1.009 (25.63)	1.283 (32.59)	0.150 (3.81)	1.586 (40.28)	M35x1.0-6g-0.1R	-128
21	1.442 (36.63)	1.507 (38.28)	1.957 (49.71)	1.213 (30.81)	1.134 (28.80)	1.409 (35.79)	0.150 (3.81)	1.783 (45.29)	M38x1.0-6g-0.1R	-130
23	1.565 (39.75)	1.626 (41.30)	2.079 (52.81)	1.342 (34.09)	1.259 (31.98)	1.535 (38.99)	0.150 (3.81)	1.941 (49.30)	M41x1.0-6g-0.1R	-132
25	1.692 (42.98)	1.752 (44.5)	2.205 (56.01)	1.469 (37.31)	1.384 (35.15)	1.657 (42.09)	0.150 (3.81)	2.017 (51.23)	M44x1.0-6g-0.1R	-134

Dimensions are stated as inches (mm).

## D38999/41 box-mount hermetic receptacles, Eaton type H2



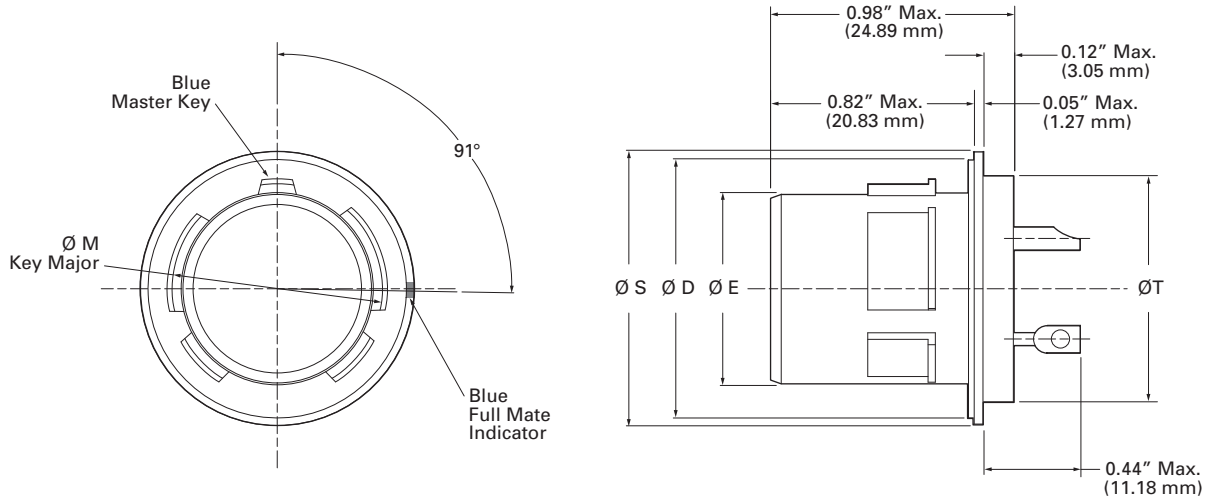
### Box Mount Receptacles

Shell Size	ØE Max	ØM Ref	ØP Min	R BSC	S Max	ØT Max
9	0.384 (9.75)	0.464 (11.79)	0.122 (3.10)	0.328 (8.33)	0.945 (24.00)	0.496 (12.60)
11	0.509 (12.93)	0.589 (14.96)	0.122 (3.10)	0.406 (10.31)	1.051 (26.70)	0.625 (15.88)
13	0.634 (16.10)	0.720 (18.29)	0.122 (3.10)	0.453 (11.51)	1.146 (29.11)	0.750 (19.05)
15	0.759 (19.28)	0.844 (21.44)	0.122 (3.10)	0.484 (12.31)	1.240 (31.50)	0.906 (23.01)
17	0.885 (22.48)	0.969 (24.61)	0.122 (3.10)	0.531 (13.49)	1.335 (33.91)	1.016 (25.81)
19	1.009 (25.63)	1.088 (27.64)	0.122 (3.10)	0.578 (14.68)	1.461 (37.11)	1.141 (28.98)
21	1.134 (28.80)	1.213 (30.81)	0.122 (3.10)	0.625 (15.88)	1.583 (40.21)	1.266 (32.16)
23	1.259 (31.98)	1.342 (34.09)	0.142 (3.61)	0.687 (17.46)	1.709 (43.41)	1.375 (34.93)
25	1.384 (35.15)	1.469 (37.31)	0.142 (3.61)	0.750 (19.05)	1.835 (46.61)	1.484 (37.69)

Dimensions are stated as inches (mm).



# D38999/45 solder-mount hermetic receptacles, Eaton type H1

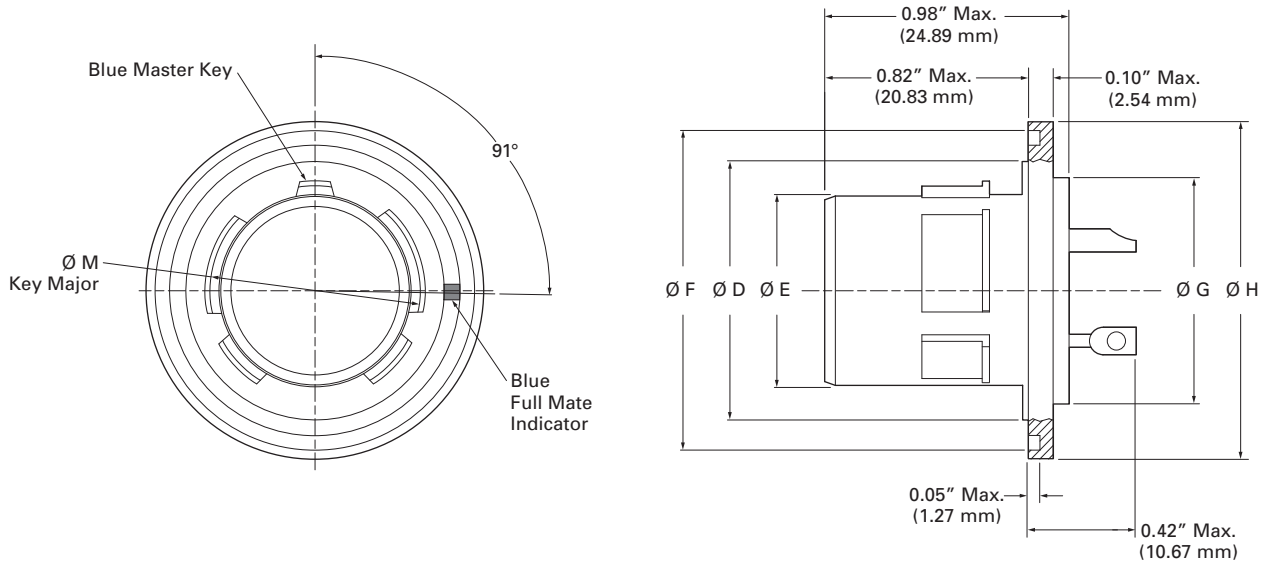


## Solder Mount Receptacles

Shell Size	ØD Max	ØE Max	ØM Max	ØS Max	ØT Max
9	0.668 (16.97)	0.384 (9.75)	0.464 (11.79)	0.734 (18.64)	0.655 (16.64)
11	0.793 (20.14)	0.509 (12.93)	0.589 (14.96)	0.862 (21.89)	0.783 (19.89)
13	0.919 (23.34)	0.634 (16.10)	0.720 (18.29)	0.988 (25.10)	0.909 (23.09)
15	1.044 (26.52)	0.759 (19.28)	0.844 (21.44)	1.110 (28.19)	1.035 (26.29)
17	1.170 (29.72)	0.885 (22.48)	0.969 (24.61)	1.236 (31.39)	1.157 (29.39)
19	1.294 (32.87)	1.009 (25.63)	1.088 (27.64)	1.330 (33.78)	1.251 (31.78)
21	1.419 (36.04)	1.134 (28.80)	1.213 (30.81)	1.456 (36.98)	1.377 (34.98)
23	1.544 (39.22)	1.259 (31.98)	1.342 (34.09)	1.582 (40.18)	1.503 (38.18)
25	1.669 (42.39)	1.384 (35.15)	1.469 (37.31)	1.704 (43.28)	1.629 (41.38)

Dimensions are stated as inches (mm).

# D38999/48 weld-mount hermetic receptacles, Eaton type H4



## Weld Mount Receptacles

Shell Size	ØD Max	ØE Max	ØF Ref	ØG Max	ØH Max	ØM
9	0.668 (16.97)	0.384 (9.75)	0.909 (23.09)	0.496 (12.60)	0.980 (24.89)	0.474 (12.04)
11	0.793 (20.14)	0.509 (12.93)	1.035 (26.29)	0.625 (15.88)	1.106 (28.09)	0.589 (14.96)
13	0.919 (23.34)	0.634 (16.10)	1.161 (29.49)	0.750 (19.05)	1.232 (31.29)	0.720 (18.29)
15	1.044 (26.52)	0.759 (19.28)	1.287 (32.69)	0.906 (23.01)	1.358 (34.49)	0.844 (21.44)
17	1.170 (29.72)	0.885 (22.48)	1.374 (34.90)	1.016 (25.81)	1.445 (36.70)	0.969 (24.61)
19	1.294 (32.87)	1.009 (25.63)	1.520 (38.61)	1.141 (28.98)	1.590 (40.39)	1.088 (27.64)
21	1.419 (36.04)	1.134 (28.80)	1.661 (42.19)	1.266 (32.16)	1.732 (43.99)	1.213 (30.81)
23	1.544 (39.22)	1.259 (31.98)	1.827 (46.41)	1.375 (34.93)	1.898 (48.21)	1.342 (34.09)
25	1.669 (42.39)	1.384 (35.15)	1.913 (48.59)	1.483 (37.67)	1.984 (50.39)	1.469 (37.31)

Dimensions are stated as inches (mm).

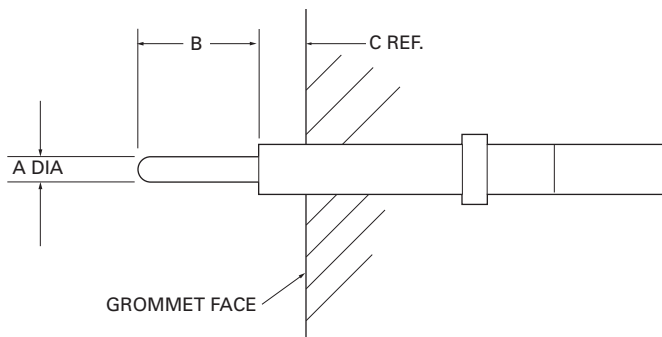
# Printed-circuit-board contact terminations

## PC tail contact terminations solder directly to printed circuit boards



- Available for general-purpose connectors in contact sizes 22D through 12. For hermetic and filtered connectors, please refer to the ordering-information table on the next page.
- Contact material: Copper alloy per QQ-C-530.
- Contact finish: Gold plate per MIL-G-45204, Type II, Grade C, Class 1 over nickel per QQ-N-290.
- Mating portions of pin per MIL-C-39029/58 and socket per MIL-C-39029/56 as applicable.
- Solders directly to printed-circuit boards using standard through-hole-soldering processes.

## Printed circuit board contacts - sockets

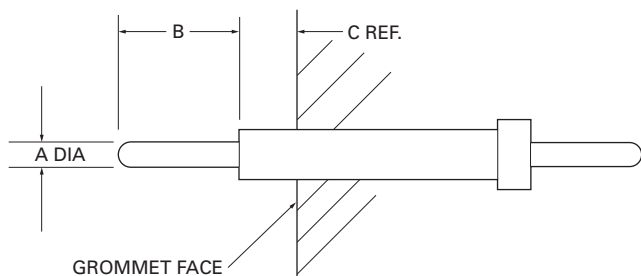


Contact Size	Socket Part Number	A	B	C
22d	5034-2601-0220	0.026 (0.67)	0.203 (5.16)	0.047 (1.19)
22d	5034-2602-0220	0.020 (0.51)	0.128 (3.25)	0.044 (1.12)
22d	5034-2608-2200	0.019 (0.48)	0.125 (3.18)	0.040 (1.02)
22d	5034-2609-0220	0.026 (0.67)	0.113 (2.87)	0.047 (1.19)
22d	5034-2612-0220	0.026 (0.67)	0.203 (5.16)	0.230 (5.84)
22d	5034-2613-0220	0.020 (0.51)	0.203 (5.16)	0.230 (5.84)
22d	5034-2620-0220	0.020 (0.51)	0.178 (4.52)	0.115 (2.92)
22d	5034-2628-0220	0.017 (0.44)	0.130 (3.30)	0.067 (1.70)
22d	5034-2629-0220	0.026 (0.67)	0.154 (3.91)	0.019 (0.48)
22d	5034-2635-0220	0.019 (0.48)	0.203 (5.16)	0.051 (1.30)
20	5034-2601-0200	0.026 (0.67)	0.203 (5.16)	0.047 (1.19)
20	5034-2602-0200	0.020 (0.51)	0.128 (3.25)	0.044 (1.12)
20	5034-2620-0200	0.020 (0.51)	0.178 (4.52)	0.115 (2.92)
20	5034-2632-0200	0.025 (0.64)	0.215 (5.46)	0.168 (4.27)
16	5034-2620-0160	0.029 (0.75)	0.178 (4.52)	0.115 (2.92)
12	5034-2620-1200	0.029 (0.75)	0.178 (4.52)	0.115 (2.92)

Dimensions are stated as inches (mm).

# Ordering information

## Printed circuit board contacts - pins



### How To Order

**Hermetic Connectors** Select the "C" Termination Option when Configuring the Part Number.

**Filtered Connectors** Select the "P" Termination Option when Configuring the Part Number.

**All Other Connectors** Order Pins and Sockets Using the Part Numbers in the Corresponding Tables.

Contact Size	Pin Part Number	A	B	C
22d	5034-2408-22P00	0.026 (0.67)	0.187 (4.75)	0.065 (1.65)
22d	5034-2418-0220	0.019 (0.48)	0.285 (7.24)	0.174 (4.42)
22d	5034-2421-0220	0.018 (0.46)	0.160 (4.06)	0.273 (6.93)
22d	5034-2422-0220	0.026 (0.67)	0.160 (4.06)	0.273 (6.93)
22d	5034-2430-22P00	0.026 (0.67)	0.203 (5.16)	0.047 (1.19)
22d	5034-2436-0220	0.020 (0.51)	0.250 (6.35)	0.328 (8.33)
22d	5034-2449-0220	0.027 (0.69)	0.154 (3.91)	0.019 (.48)
22d	5034-2503-22P00	0.027 (0.69)	0.145 (3.68)	0.065 (1.65)
22d	5034-2506-22P00	0.026 (0.67)	0.250 (6.35)	0.058 (1.47)
20	5034-2408-0200	0.026 (0.67)	0.187 (4.75)	0.065 (1.65)
20	5034-2418-0200	0.019 (0.48)	0.285 (7.24)	0.124 (3.15)
20	5034-2503-20P00	0.026 (0.67)	0.145 (3.68)	0.065 (1.65)
20	5034-2505-20P00	0.026 (0.67)	0.187 (4.75)	0.065 (1.65)
20	5034-2506-20P00	0.026 (0.67)	0.250 (6.35)	0.058 (1.47)
16	5034-2464-16P00	0.050 (1.27)	0.145 (3.68)	0.028 (0.71)
16	5034-2503-16P00	0.050 (1.27)	0.145 (3.68)	0.065 (1.65)
12	5034-2503-12P00	0.050 (1.27)	0.145 (3.68)	0.065 (1.65)

Dimensions are stated as inches (mm).

# Assembly instructions and tools

## Crimp Tools and Positioners

Contact Style	Contact Size	Crimp Tool Part Number	Positioner Part Number	Contact Style	Contact Size	Crimp Tool Part Number	Positioner Part Number
Pin	22D	M22520/2-01	M22520/2-09	Socket	22D	M22520/2-01	M22520/2-07
	20	M22520/1-01	M22520/1-04		20	M22520/1-01	M22520/1-04
	16	M22520/1-01	M22520/1-04		16	M22520/1-01	M22520/1-04
	12	M22520/1-01	M22520/1-04		12	M22520/1-01	M22520/1-04

Contact Eaton for Power-Breach™ contact-tool information.

### Wire stripping

Strip insulation from end of wire to be crimped. Do not cut or damage wire strands.

### Contact crimping

1. Insert stripped wire into contact crimp pot. Wire must be visible through inspection hole.

2. Using correct crimping tool and locator. Cycle the tool once to be sure the indenters are open. Insert contact and wire into locator. Squeeze tool handle firmly and completely to insure a proper crimp. The tool will not release unless the crimp indenters of tool is fully actuated.

3. Release crimped contact and wire from tool. Inspect the wire to be certain wire is visible through inspection hole in contact.

### Contact insertion



1. Insert wire into the insertion tool.



2. Slide insertion tool to the shoulder of the contact.



3. Stop insertion tool at the shoulder of the contact.



4. Use isopropyl alcohol to lubricate the grommet seal. Insert contact through grommet seal and wiggle until the contact locks in retainer clip.

### Contact extraction



1. Insert wire into insertion tool.



2. Use isopropyl alcohol to lubricate the grommet seal. Slide insertion tool along wire into grommet seal.



3. Press the insertion tool until seated firmly. Pull wire and insertion tool out to remove contact.

For additional information

- Visit [www.eaton.com/interconnect](http://www.eaton.com/interconnect)
- Call 805.484.0543
- Email [cicustomer.service@eaton.com](mailto:cicustomer.service@eaton.com)

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