

MIL-DTL-38999 Series III



MIL-DTL-38999 series III circular connector is designed for triple start thread coupling with anti-decoupling mechanism, solder contact and removable crimp contact, excellent environmental resistance performance, EMI/RFI shielding, high contact density, small size, light weight, withstand greater vibration, scoop-proof and mating hermetic.

This family of circular connectors is offered 4 kinds shell of different material, 9 kinds of size of shell, 2 kinds of finishes, 2 receptacle-mounting styles, 5 kinds of contact and more than 60 kinds of contact layout.

Part number

	D38999/	20	W	B	35	P	N
Basic series							
Type of connector							
20 = Square flange receptacle							
24 = Jam nut receptacle							
26 = Shielding plug							
Finish							
W = Olive green cadmium plating							
F = Electroless nickel plating							
K = Stainless steel passivated							
Shell size							
09 (A), 11 (B), 13 (C), 15 (D), 17 (E), 19 (F), 21 (G), 23 (H), 25 (J)							
Contact layout (See below)							
Type of contact							
P = Crimp pin							
S = Crimp socket							
PH = Solder pin							
SH = Solder socket							
PL = Long PCB pin							
PC = Short PCB pin							
SL = Long PCB socket							
SC = Short PCB socket							
Orientation							
N = Normal							
A, B, C, D = Alternative							

Electrical

Contact resistance and current rating:

Contact ID	Diameter (mm)	Resistance (mΩ)	Current (A)
22D [#]	Φ 0.76	≤ 12.0	5.0
20 [#]	Φ 1.00	≤ 5.0	7.5
16 [#]	Φ 1.60	≤ 2.5	13.0
12 [#]	Φ 2.40	≤ 1.5	23.0
10 [#]	Φ 3.15	≤ 1.0	40.0

EMI shielding:

At 1GHz: minimum attenuation 85dB (F and W)

At 10GHz: minimum attenuation 65dB (F)

At 10GHz: minimum attenuation 50dB (W)

Withstanding voltage (V):

Service rating	M	I	II	N
Sea level	1300	1800	2300	1000
21000m	800	1000	1000	600

Insulation resistance:

Normal $\geq 5000 \text{ M}\Omega$, damp heat $\geq 100 \text{ M}\Omega$

Electrical continuity between shells:

W class $\leq 2.5 \text{ m}\Omega$, F class $\leq 1.0 \text{ m}\Omega$, K class $\leq 5.0 \text{ m}\Omega$

Mechanical

Shell: Aluminum alloy, stainless steel or copper-alloy

Plating:

W class: Olive green cadmium plating

K class: Stainless steel passivated

F class: Electroless nickel plating

Insulator: Thermo-set plastic

Grommet and seal: Silicon rubber

Contact: Copper alloy with gold plated

Endurance: 500 cycles

Vibration:

Sine: 60g, with temperature cycling and simulated accessory (36 hours)

Random: 44.1 grms in high temperature

49.5 grms in ambient temperature

Shock: At 3 ms half sinusoid, peak value of acceleration: 300g

Contact retention:

22D[#], 45N 20[#], 67N 16[#], 111N 12[#], 111N 10[#], 111N 8[#], 111N

Environmental

Operating temperature:

W class: $-65^{\circ}\text{C} \sim +175^{\circ}\text{C}$

K, F class: $-65^{\circ}\text{C} \sim +200^{\circ}\text{C}$

Salt spray: according to method from MIL-DTL-38999

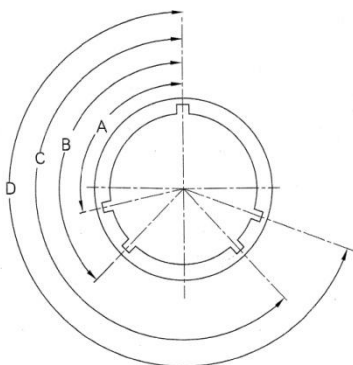
F class 48h

W class 500h

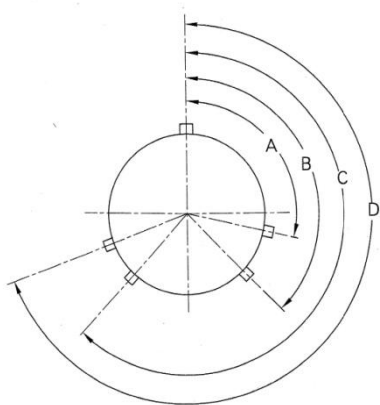
K class 1000h

Orientation

Receptacle



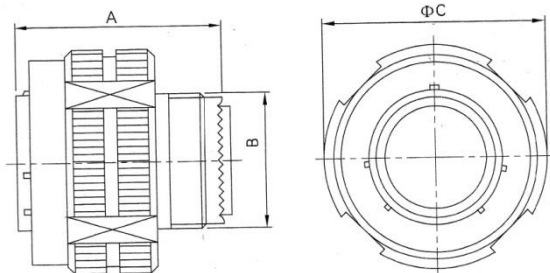
Plug



Shell No.	Angle	N	A	B	C	D	E
9	A°	105	102	80	35	64	91
	B°	140	132	118	140	155	131
	C°	215	248	230	205	234	197
	D°	265	320	312	275	304	240
11	A°	95	113	90	53	119	51
	B°	141	156	145	156	146	141
	C°	208	182	195	220	176	184
	D°	236	292	252	255	298	242
13	A°	95	113	90	53	119	51
	B°	141	156	145	156	146	141
	C°	208	182	195	220	176	184
	D°	236	292	252	255	298	242
15	A°	95	113	90	53	119	79
	B°	141	156	145	156	146	153
	C°	208	182	195	220	176	197
	D°	236	292	252	255	298	272
17	A°	80	135	49	66	62	79
	B°	142	170	169	140	145	153
	C°	196	200	200	200	180	197
	D°	293	310	244	257	280	272
19	A°	80	135	49	66	62	79
	B°	142	170	169	140	145	153
	C°	196	200	200	200	180	197
	D°	293	310	244	257	280	272
21	A°	80	135	49	66	62	79
	B°	142	170	169	140	145	153
	C°	196	200	200	200	180	197
	D°	293	310	244	257	280	272
23	A°	80	135	49	66	62	79
	B°	142	170	169	140	145	153
	C°	196	200	200	200	180	197
	D°	293	310	244	257	280	272
25	A°	80	135	49	66	62	79
	B°	142	170	169	140	145	153
	C°	196	200	200	200	180	197
	D°	293	310	244	257	280	272

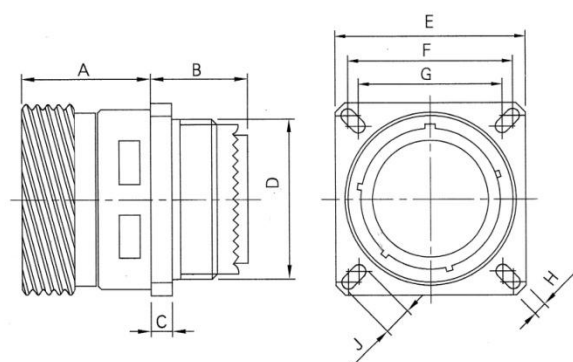
Shell size

Shielding plug (D38999/26)



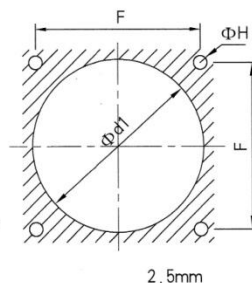
Shell No.	A (max)	B Thread	C (max)
09	31.00	M12*1-6g	21.80
11	31.00	M15*1-6g	25.00
13	31.00	M18*1-6g	29.40
15	31.00	M22*1-6g	32.40
17	31.00	M25*1-6g	35.60
19	31.00	M28*1-6g	38.50
21	31.00	M31*1-6g	41.70
23	31.00	M34*1-6g	44.90
25	31.00	M37*1-6g	48.00

Square receptacle (D38999/20)

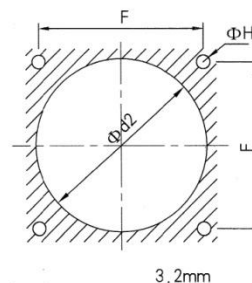


Front mounting

Rear mounting



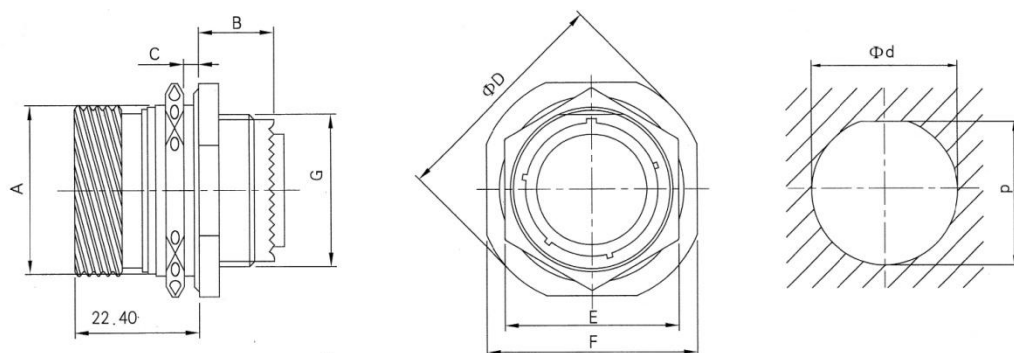
max 2.5mm



max 3.2mm

Shell No.	A (max)	B (max)	C (max)	D Thread	E	F	G	H	J	d1 (min)	d2 (min)
09	20.90	10.60	2.50	M12*1-6g	23.80	18.26	15.09	3.25	5.49	16.66	13.11
11	20.90	10.60	2.50	M15*1-6g	26.20	20.62	18.26	3.25	4.93	20.22	15.88
13	20.90	10.60	2.50	M18*1-6g	28.60	23.01	20.62	3.25	4.93	23.42	19.05
15	20.90	10.60	2.50	M22*1-6g	31.00	24.61	23.01	3.25	4.39	26.59	23.01
17	20.90	10.60	2.50	M25*1-6g	33.30	26.97	24.61	3.25	4.93	30.96	25.81
19	20.90	10.60	2.50	M28*1-6g	36.50	29.36	26.97	3.25	4.93	32.94	28.98
21	20.10	11.40	3.20	M31*1-6g	39.70	31.75	29.36	3.25	4.93	36.12	32.16
23	20.10	11.40	3.20	M34*1-6g	42.90	34.93	31.75	3.91	6.15	39.29	34.93
25	20.10	11.40	3.20	M37*1-6g	46.00	38.10	34.93	3.91	6.15	42.47	37.69

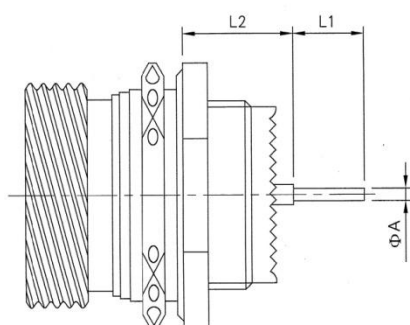
Jam nut receptacle (D38999/24)



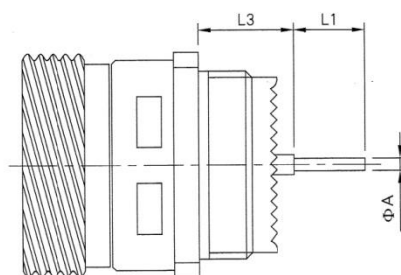
Shell No.	A	B (max)	C (max)	D (max)	E (max)	F	G Thread	d	p
09	16.50	9.90	3.20	30.50	24.00	27.00	M12*1-6g	17.70	16.99
11	19.30	9.90	3.20	35.20	27.00	31.80	M15*1-6g	20.88	19.53
13	24.00	9.90	3.20	38.40	32.00	34.90	M18*1-6g	25.58	24.26
15	27.20	9.90	3.20	41.60	36.00	38.10	M22*1-6g	28.80	27.53
17	30.40	9.90	3.20	44.80	37.00	41.30	M25*1-6g	31.98	30.68
19	33.40	9.90	3.20	49.30	41.00	46.00	M28*1-6g	35.15	33.86
21	36.50	9.90	3.20	52.70	46.00	49.20	M31*1-6g	38.28	37.06
23	39.70	9.90	3.20	55.90	50.00	52.40	M34*1-6g	41.50	40.24
25	42.80	9.90	3.20	59.00	51.23	55.60	M37*1-6g	44.68	43.41

Receptacle with PCB contact

Jam nut receptacle (D38999/24)



Square receptacle (D38999/20)



Type for PCB contact		L1	A
22D [#]	Long PCB contact	8.5	0.7
	Short PCB contact	4.0	
20 [#]	Long PCB contact	8.5	0.7
	Short PCB contact	5.1	
16 [#]	Long PCB contact	8.5	1.15
	Short PCB contact	5.1	

Size			Shell No.	Shell No.
			09, 11	13, 15, 17, 19, 21, 23, 25
L2	Male pin of 22D [#]	min	10.52	10.34
		max	11.46	11.28
	Female pin of 22D [#]	min	10.19	10.01
		max	11.46	11.28
	16 [#] or 20 [#]	min	10.69	10.51
		max	11.63	11.45
L3	Male pin of 22D [#]	min	9.48	9.48
		max	10.58	10.58
	Female pin of 22D [#]	min	9.15	9.15
		max	10.58	10.58
	16 [#] or 20 [#]	min	9.65	9.65
		max	10.75	10.75

MIL-DTL-38999 Series III of composite material shell



Production ID

D38999/	20	W	B	35	P	N
Basic series						
Type of connector						
20 = Square flange receptacle						
24 = Jam nut receptacle						
26 = Shielding plug						
Finish						
J = Olive green cadmium plating						
M = Electroless nickel plating						
Shell size						
09 (A), 11 (B), 13 (C), 15 (D), 17 (E), 19 (F), 21 (G), 23 (H), 25 (J)						
Contact layout (See below)						
Type of contact						
P = Crimp pin						
S = Crimp socket						
PH = Solder pin						
SH = Solder socket						
PL = Long PCB pin						
PC = Short PCB pin						
SL = Long PCB socket						
SC = Short PCB socket						
Orientation						
N = Normal						
A, B, C, D = Alternative						

Environmental

Operating temperature:

J class: -65 °C ~ +175 °C

M class: -65 °C ~ +200 °C

Salt spray: According to method from MIL-DTL-38999

2000h

Seal: Comply with the request of MIL-DTL-38999K low-pressure immersion.

Damp heat: 10 cycles in 24 hours according to MIL-DTL-38999K

Fluid resistant: Various fuels, coolant and solvent

Electrical

Contact resistance and current rating:

Contact ID	Diameter (mm)	Resistance (mΩ)	Current (A)
22D [#]	Φ 0.76	≤ 12	5.0
20 [#]	Φ 1.00	≤ 5.0	7.5
16 [#]	Φ 1.60	≤ 2.5	13.0
12 [#]	Φ 2.40	≤ 1.5	23.0
10 [#]	Φ 3.15	≤ 1.0	40.0

EMI shielding:

1GHz ~ 100GHz: minimum attenuation 90 dB

100MHz ~ 1GHz: minimum attenuation 85 dB

Withstanding voltage (V):

Service rating	Sea level	21000m
M	1300	800
N	1000	600
I	1800	1000
II	2300	1000

Insulation resistance:

At 500Vdc, ≥ 5000MΩ

Electrical continuity between shells:

≤ 3.0mΩ

Mechanical

Shell: Composite material

Finish:

J class: Olive green cadmium plating

M class: Electroless nickel plating

Insulator: Thermo-set plastic

Grommet and seal: Silicon rubber

Contact: Copper alloy gold plating

Endurance: ≥ 1500 cycles

Shock: At 3 ms half sinusoid, peak value of acceleration: 300 g

Contact layout



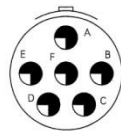
09-35 M



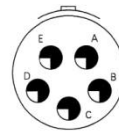
09-98 I



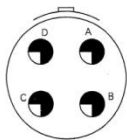
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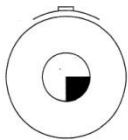
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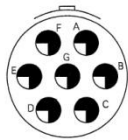
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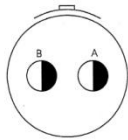
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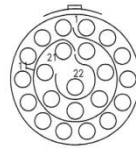
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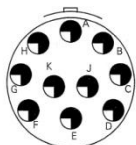
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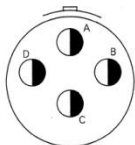
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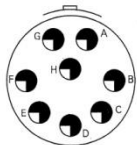
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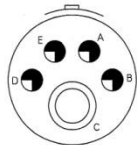
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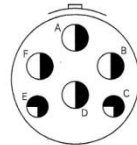
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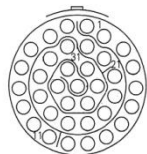
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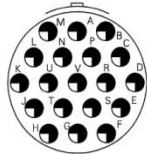
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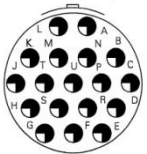
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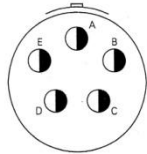
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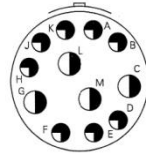
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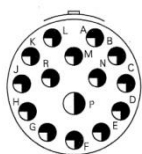
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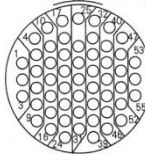
15-05 II



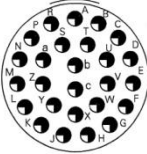
15-97 I



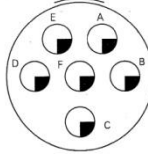
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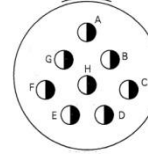
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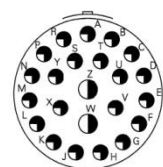
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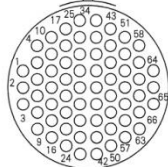
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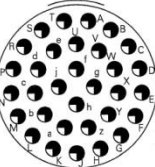
17-08 II



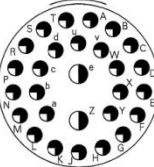
17-99 I



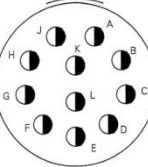
19-35 M



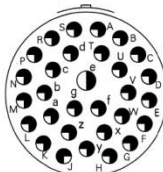
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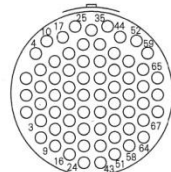
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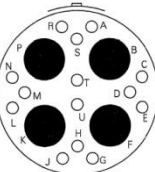
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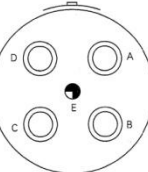
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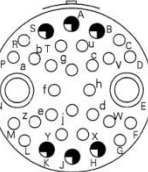
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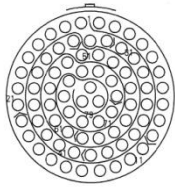
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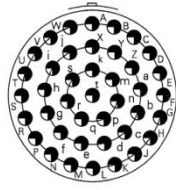
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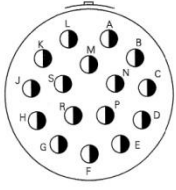
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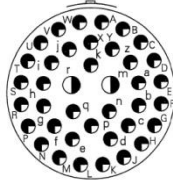
21-35 M



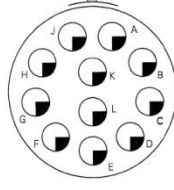
21-41 I



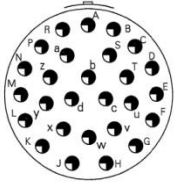
21-16 II



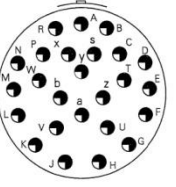
21-39 I



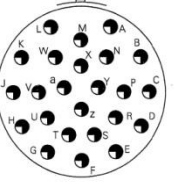
21-11 II



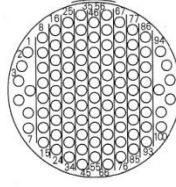
21-27 I



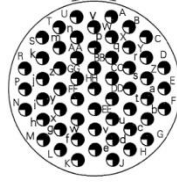
21-25 I



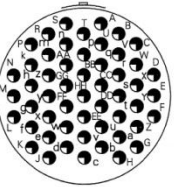
21-24 I



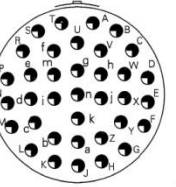
23-35 M



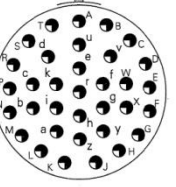
23-55 I



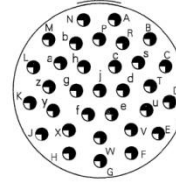
23-53 I



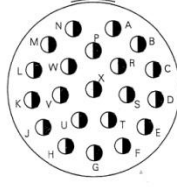
23-36 I



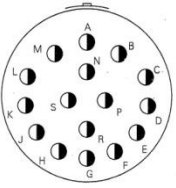
23-34 I



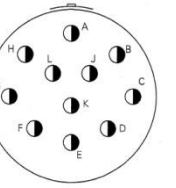
23-32 I



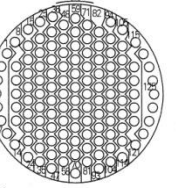
23-21 II



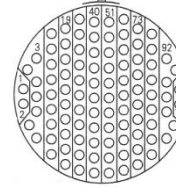
23-97 I



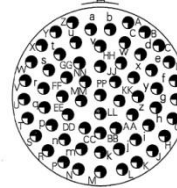
23-99 II



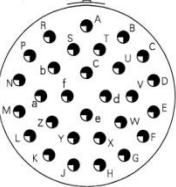
25-35 M



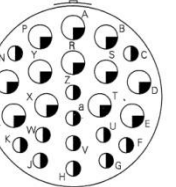
25-02 I



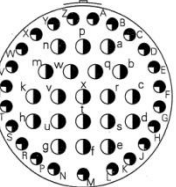
25-61 I



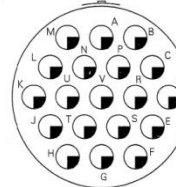
25-29 I



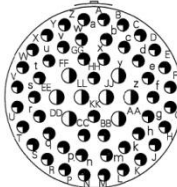
25-24 I



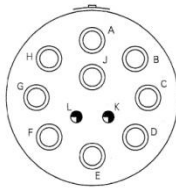
25-43 I



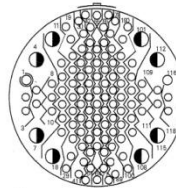
25-19 I



25-04 I



25-11

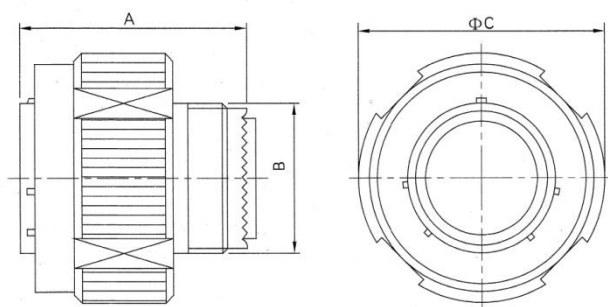


25-93 M

○ 22D # ● 20 # ◐ 16 # ◑ 12 # ◒ 10 # ◓ 8 #

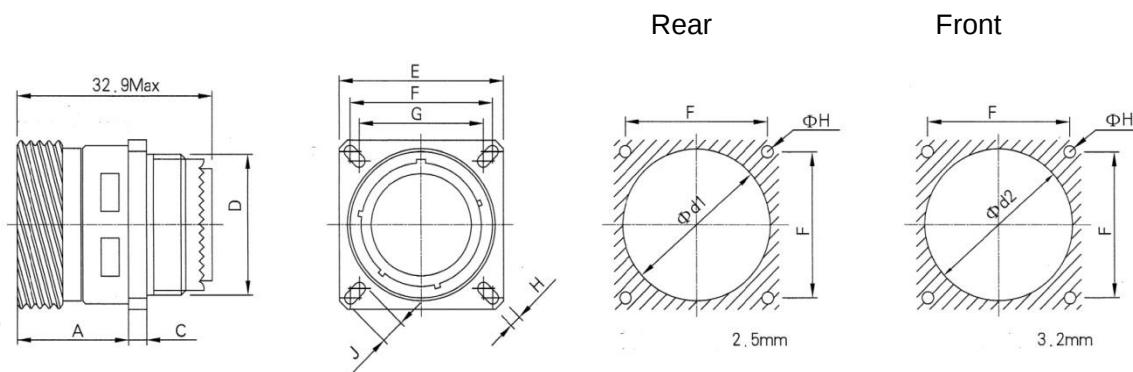
Shell size

Shielding plug (D38999/26)



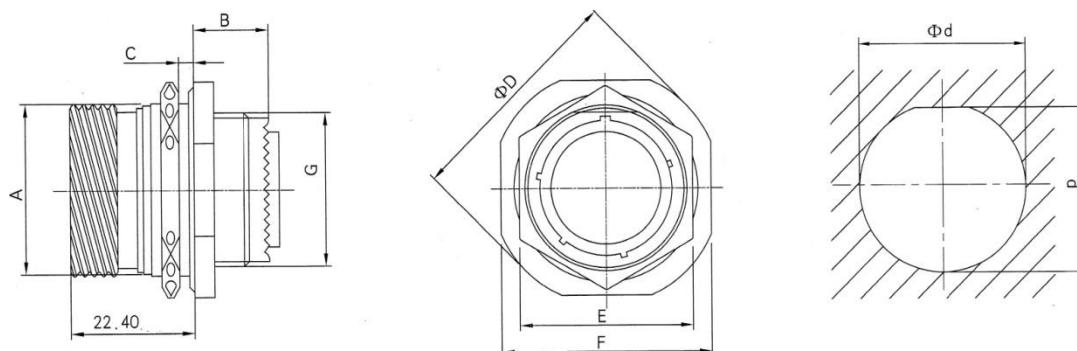
Shell No.	A (max)	Thread B	C (max)
09	31.00	M12×1-6g	21.80
11	31.00	M15×1-6g	25.00
13	31.00	M18×1-6g	29.40
15	31.00	M22×1-6g	32.40
17	31.00	M25×1-6g	35.60
19	31.00	M28×1-6g	38.50
21	31.00	M31×1-6g	41.70
23	31.00	M34×1-6g	44.90
25	31.00	M37×1-6g	48.00

Square receptacle (D38999/20)



Shell No.	A (max)	C (max)	Thread D	E	F	G	H	J	d1 (min)	d2 (min)
09	19.8	3.65	M12×1-6g	23.80	18.26	15.09	3.25	5.49	16.66	13.11
11	19.8	3.65	M15×1-6g	26.20	20.62	18.26	3.25	4.93	20.22	15.88
13	19.8	3.65	M18×1-6g	28.60	23.01	20.62	3.25	4.93	23.42	19.05
15	19.8	3.65	M22×1-6g	31.00	24.61	23.01	3.25	4.93	26.59	23.01
17	19.8	3.65	M25×1-6g	33.30	26.97	24.61	3.25	4.93	30.96	25.81
19	19.8	3.65	M28×1-6g	36.50	29.36	26.97	3.25	4.93	32.94	28.98
21	19.0	4.35	M31×1-6g	39.70	31.75	29.36	3.25	4.93	36.12	32.16
23	19.0	4.35	M34×1-6g	42.90	34.93	31.75	3.91	6.15	39.29	34.93
25	19.0	4.35	M37×1-6g	46.00	38.10	34.93	3.91	6.15	42.47	37.69

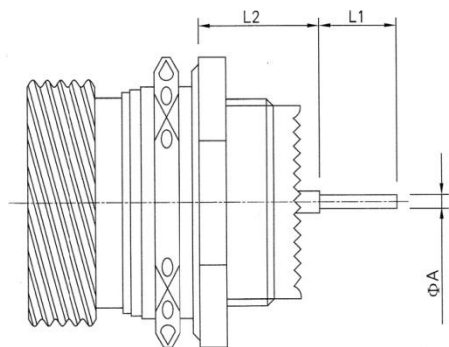
Jam nut receptacle (D38999/24)



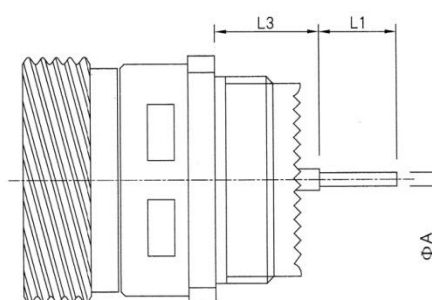
Shell No.	A	B (max)	C (max)	D (max)	E (max)	F	Thread G	d	p
09	16.50	9.90	3.20	30.50	24.00	27.00	M12×1-6g	17.70	16.99
11	19.30	9.90	3.20	35.20	27.00	31.80	M15×1-6g	20.88	19.53
13	24.00	9.90	3.20	38.40	32.00	34.90	M18×1-6g	25.58	24.26
15	27.20	9.90	3.20	41.60	36.00	38.10	M22×1-6g	28.80	27.53
17	30.40	9.90	3.20	44.80	37.00	41.30	M25×1-6g	31.98	30.68
19	33.40	9.90	3.20	49.30	41.00	46.00	M28×1-6g	35.15	33.86
21	36.50	9.90	3.20	52.70	46.00	49.20	M31×1-6g	38.28	37.06
23	39.70	9.90	3.20	55.90	50.00	52.40	M34×1-6g	41.50	40.24
25	42.80	9.90	3.20	59.00	51.23	55.60	M37×1-6g	44.68	43.41

Receptacle with PCB contact

Jam nut receptacle (D38999/24)



Square receptacle (D38999/20)



Type for PCB contact		L1	A
22D [#]	Long PCB contact	8.5	0.7
	Short PCB contact	4.0	
20 [#]	Long PCB contact	8.5	0.7
	Short PCB contact	5.1	
16 [#]	Long PCB contact	8.5	1.15
	Short PCB contact	5.1	

Size			Shell No.	Shell No.
			09, 11	13, 15, 17, 19, 21, 23, 25
L2	Male pin of 22D [#]	min	10.52	10.34
		max	11.46	11.28
	Female pin of 22D [#]	min	10.19	10.01
		max	11.46	11.28
	16 [#] or 20 [#]	min	10.69	10.51
		max	11.63	11.45
L3	Male pin of 22D [#]	min	9.48	9.48
		max	10.58	10.58
	Female pin of 22D [#]	min	9.15	9.15
		max	10.58	10.58
	16 [#] or 20 [#]	min	9.65	9.65
		max	10.75	10.75

MIL-DTL-38999 Series III for power

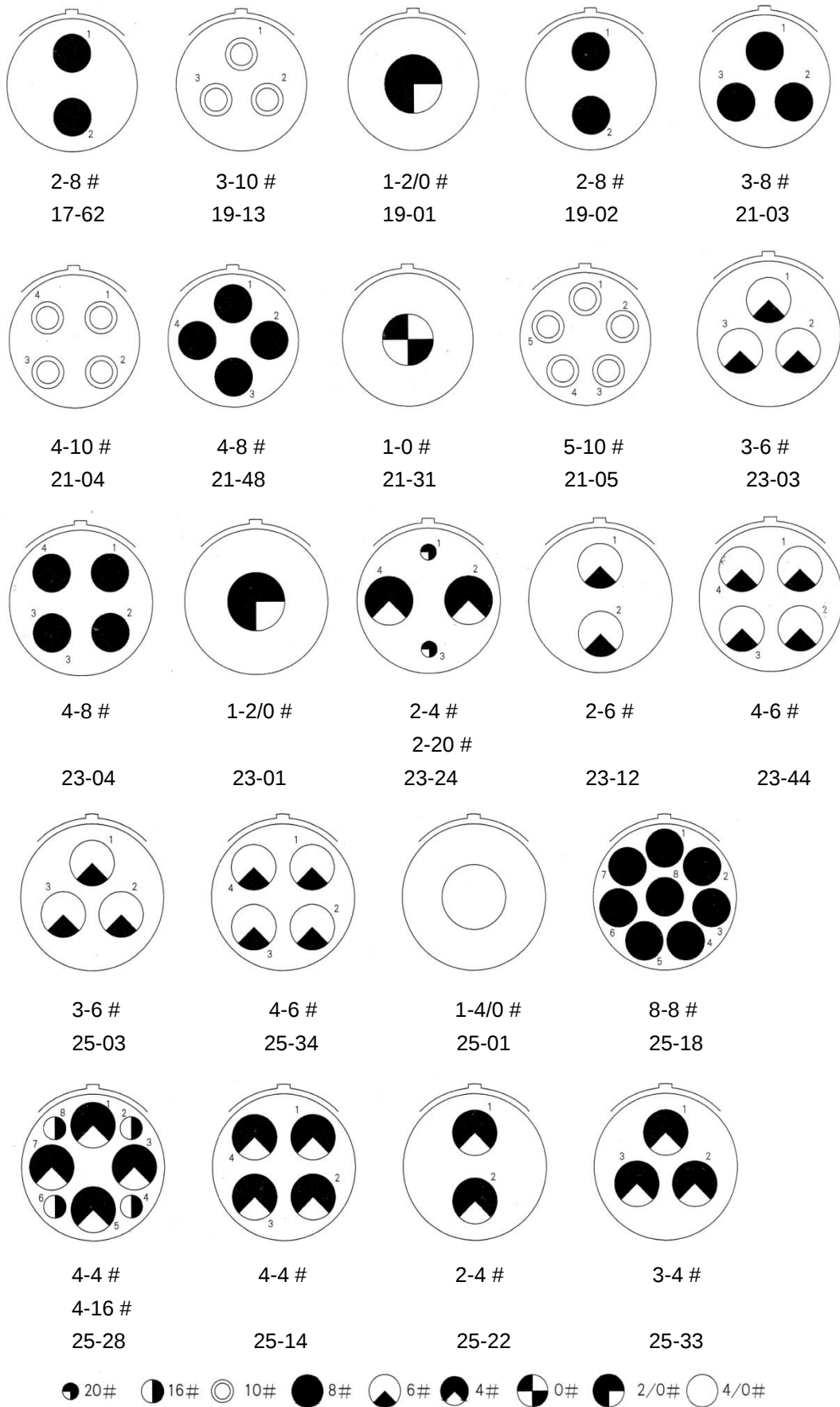
Part number

D38999P/	20	W	B	35	P	N
Basic series						
Type of connector						
20 = Square flange receptacle						
24 = Jam nut receptacle						
26 = Shielding plug						
Finish						
W = Olive green cadmium plating						
F = Electroless nickel plating						
K = Stainless steel passivated						
Shell size						
09 (A), 11 (B), 13 (C), 15 (D), 17 (E), 19 (F), 21 (G), 23 (H), 25 (J)						
Contact layout (See below)						
Type of contact						
P = Crimp pin						
S = Crimp socket						
PH = Solder pin						
SH = Solder socket						
Orientation						
N = Normal						
A, B, C, D = Alternative						

Contact resistance and current rating

Contact ID	Resistance (mΩ)	Current (A)
20 [#]	≤ 8.500	7.5
16 [#]	≤ 4.500	13
12 [#]	≤ 2.200	23
10 [#]	≤ 1.200	33
8 [#]	≤ 0.700	46
6 [#]	≤ 0.500	50
4 [#]	≤ 0.350	80
0 [#]	≤ 0.170	150
2/0 [#]	≤ 0.124	185
4/0 [#]	≤ 0.116	225

Contact layout



Shell size

Same as MIL-DTL-38999 series III.