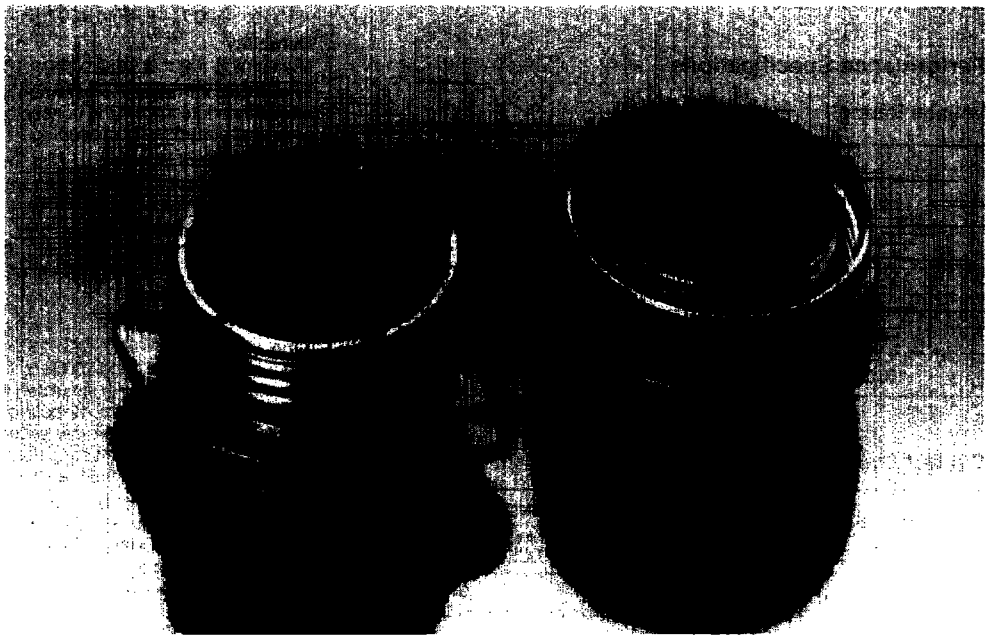
MIL-C-38999 Series III

METRIC



Severe environments encountered in modern commercial and military aircraft require connectors whose performance is improved over that provided by general purpose bayonet coupling connectors. Threaded coupling connectors have been available but lack the quick disconnect feature of the bayonet connector. An improved threaded connector has been developed by Matrix Science Corporation and qualified to MIL-C-38999 Series III. It provides "one turn" coupling and disconnect through the use of a self-locking acme thread, while still meeting the new environmental stress requirements.

The acronym SWAMP is defined by SAE as Severe Wind and Moisture Problems. Increasingly, modern aircraft are encountering these conditions in wheel wells, engine nacelles and wing tips. SWAMP includes exposure to extreme vibration, shock, fluids, sand dust, and both atmospheric and runway salts. The Series III connector was designed to perform under these conditions.

These connectors feature positive metal-to-metal bottoming, precluding relative shell-to-shell motion which may result in ordinary connector wear or moisture entrapment.

Matrix Science has pioneered the development of self-locking connectors in both MIL-C-5015 and MIL-C-83723 which do away with the need for safety wiring. The unique, patented, ratcheting device is the next generation of self-lockers. Being a simple, integral design, it is inherently superior to ball-and-spring, and tang-lock designs.

These connectors are offered in square flange (front and rear mount) and jam nut mount receptacles. All plugs provide EMI/RFI shielding up to 10 GHz through use of positive shell-to-shell annular spring fingers.

MIL-C-38999 Series III connectors have insert pattens and contacts common to MIL-C-38999 Series I, making for an easy transition from bayonet to the triple-lead, acme-thread, self-locking coupling.

The rear accessory threads are **metric,** as specified in MIL-C-38999. This results in additional wall thickness, giving greater strength and shock resistance. This is particularly important when heavier or shielded backshells are required for particular applications.

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MIL-C-38999
Series III (Continued)

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Performance Specifications

Voltage Rating

Altitude		Service Rating		
ft.	m	M	I	II
Sea Level	-	1300	1800	2300
50,000	15 240	800	1000	1000
70,000	21 336	800	1000	1000
100,000	30 480	800	1000	1000

Contact Current Rating and Retention

Contact Size*	Current Rating	Contact Retention	
	DC Test Amperage	Axial Load	
		lb	N
22D	5.0	10	44.5
20	7.5	15	66.7
16	13 0	25	111.2
12	23.0	25	111.2

*Organize individual circuits to maintain heat rise within operating temperature requirements.

Operating Temperature Range
-65°C to +200°C [-85°F to +392°F]

Durability
Minimum of 500 mating cycles.

Shock and Vibration Requirements
When tested as follows the connector shall sustain no physical damage or electrical discontinuity exceeding 1 microsecond.

MT93 Standard Shock
Pulse of an approximate half sine wave of 300 G magnitude with duration of 3 milliseconds applied in three axes.

MT93 High Impact Shock
When mounted as specified in MIL-S-901, Grade A, a drop of a 400 lb. hammer from 1 foot, 3 feet and 5 feet applied to connector in three axes, totaling nine impacts.

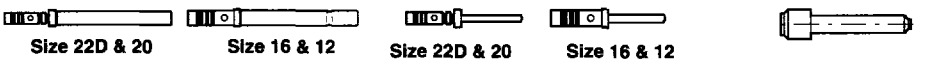
Vibration

Sine
Frequency range of 10 to 2000 Hz, in 20 minute sweeps, in 3 axes, with the following variations: (with simulated accessory load)
- Duration: 36 hours total, 12-hour cycles.
- Levels: Velocity of 10 in. per second (10-50 Hz); displacement of 0.06 [1.5] (50-140 Hz) and acceleration of 60 Gs peak (140-2000 Hz)
4 hours of each axis at room ambient -55°C and +200°C

Random
-(without simulated accessory load): 41.7 Gs RMS for 8 hours in two axes, totaling 16 hours at ambient temperature.
-(with simulated accessory load): 49.5 Gs RMS for 8 hours in two axes, totaling 16 hours at 200°C.

RFI & EMI
RFI & EMI attenuation at the specified frequency meet the requirements of MIL-C-38999.
RFI shielding effectiveness of mated connectors with RFI backshells is measured in a triaxial radio frequency leakage fixture.
EMI shielding effectiveness is measured at the interface of mated connectors and tested by the MODE STIR procedure specified in method 3008 of MIL-STD-1344.

Contacts, Sealing Plugs and Assembly Tools



Socket Contact | Pin Contact | Sealing Plug

Contact Size	Wire Range		Socket Contacts		Pin Contacts		Sealing Plugs	
	AWG	mm²	Military Part No.	MATRIX Part No.	Military Part No.	MATRIX Part No.	Military Part No.	MATRIX Part No.
22D	28-22	0.08-0.4	M39029/56-348	5100-101-0122	M39029/58-360	5000-068-0022	MS27488-22	3400-043-0022
20	24-20	0.2-0 6	M39029/56-351	5100-101-0120	M39029/58-363	5000-068-0020	MS27488-20	3400-043-0020
16	20-16	0.5-1.4	M39029/56-352	5100-101-0116	M39029/58-364	5000-068-0016	MS27488-16	3400-043-0016
12	14-12	2-3	M39029/56-353	5100-101-0112	M39029/58-365	5000-068-0012	MS27488-12	3400-043-0012

Crimping Tools

Contact Size	Wire Range		Finished Wire Dia. Range		Contact Type	Military Part No.	
	AWG	mm²	inch	mm		Crimping Tool	Turret or Positioner
22D	28-22	0.08-0.4	.030-.054	0.76-1.37	P	M22520/2-01	M22520/2-09
					S	M22520/2-01	M22520/2-07
20	24-20	0.2-0.6	.040-.083	1.02-2.11	P&S	M22520/1-01	M22520/1-04
16	20-16	0.5-1.4	.065-.109	1.34-2.62	P&S	M22520/1-01	M22520/1-04
12	14-12	2-3	.097-.142	2.46-4.01	P&S	M22520/1-01	M22520/1-04

Note: Each connector is furnished with contacts. One spare for inserts requiring 1 to 26 of each contact and two spares for inserts with more than 26 contacts and a minimum of one sealing plug up to 10% of the number of contacts.

Insertion/Extraction Tools

Contact Size	Color Code	Military Part No.	MATRIX Part No.
22D	Gr./Wh.	M81969/14-01	6500-048-0022
20	Rd./Wh.	M81969/14-10	6500-055-0020
16	Bl./Wh.	M81969/14-03	6500-001-0016
12	Yel./Wh.	M81969/14-04	6500-001-0012

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Military Part Number System

D38999/ 20 F B 35 P *

- **Shell Keying Position** (Use N for normal)
- **Contact Style** P = Pin S = Socket
- **Insert Arrangement**
- **Shell Size Code**
  A = 9 C = 13 E = 17 G = 21 J = 25
  B = 11 D = 15 F = 19 H = 23
- **Class**
  F = Aluminum, electroless nickel plating, -65°C to +200°C
  *J = Composite, olive drab cadmium plate -65°C to +175°C
  K = Stainless steel, passivated
  *M = Composite, electroless nickel plating, -65°C to +200°C
  S = Stainless steel, electro-deposited nickel, -65°C to +200°C
  W = Aluminum, olive drab cadmium plate, -65°C to +175°C (Extended salt spray)
  Y = Hermetically sealed, stainless steel, passivated, -65°C to +200°C (Consult Matrix Science Corporation)
- **Shell Style**
  20 = Wall mount receptacle
  21 = Box Mount receptacle, hermetic
  23 = Jam nut receptacle, hermetic
  24 = Jam nut receptacle
  25 = Solder mount receptacle, hermetic
  26 = Plug, RFI
  27 = Weld mount receptacle, hermetic
- **MS Number**

MATRIX Part Number System

MT93 0 T 11 F 35 P * *

- **Modification Number** (Consult Matrix Science Corporation)
- **Shell Keying Position** (Not required for normal)
- **Contact Style** P = Pin S = Socket
- **Insert Arrangement**
- **Finishes**
  B = Aluminum, olive drab cadmium plating, -65°C to +175°C
  F = Aluminum electroless nickel, -65°C to +200°C
  *J = Composite, olive drab cadmium plate -65°C to +175°C
  K = Stainless steel, passivated
  *M = Composite, electroless nickel plating, -65°C to +200°C
  S = Stainless steel electro-deposited nickel, -65°C to +200°C
- **Shell Sizes** (odd numbers only, 9 thru 25)
- **Class**
  T = Environmental
  Y = Hermetically sealed (Consult Matrix Science Corporation)
- **Configurations**
  0 = Receptacle, wall mount
  4 = Receptacle, jam nut
  8 = Plug, RFI
- **Matrix Science Corporation, thread coupling, 38999 Series III**

*Consult AMP for availability and dimensional data

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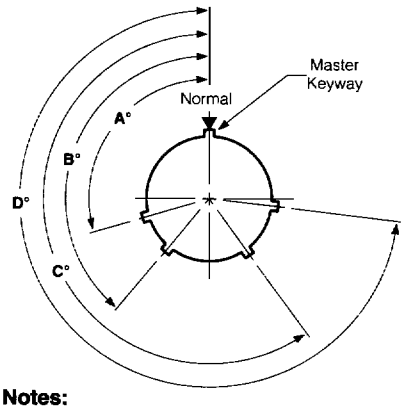
Series III (Continued)

METRIC

Polarization

Keying Positions



Notes:

1. All minor keys are rotated to provide shell polarization: the master key remains fixed as shown.
2. Mating face of receptacle is shown. Plug is opposite.

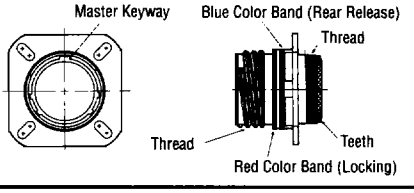
Shell Size	Polarizing Positions	Key Locations A°	B°	C°	D°	Service Rating
9	N	105	140	215	265	Refer to Insert Arrangement Captions Pages 2134-2136
	A	102	132	248	320	
	B	80	118	230	312	
	C	35	140	205	275	
	D	64	155	234	304	
	E	91	131	197	240	
11 thru 15	N	95	141	208	236	
	A	113	156	182	292	
	B	90	145	195	252	
	C	53	156	220	255	
	D	119	146	176	298	
	E	51	141	184	242	
17 thru 25	N	80	142	196	293	
	A	135	170	200	310	
	B	49	169	200	244	
	C	66	140	200	257	
	D	62	145	180	280	
	E	79	153	197	272	

Shell Size:

9
11
13
15
17
19
21
23
25

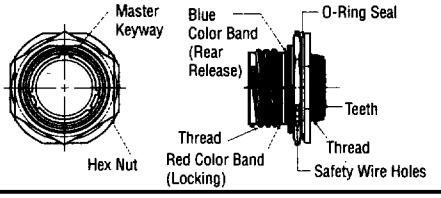
Receptacle Shell, Flange Wall Mount, Acme Thread Coupling

Military No. D38999/20
MATRIX No. MT930



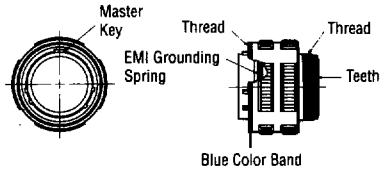
Receptacle Shell, Jam Nut Mount, Acme Thread Coupling

Military No. D38999/24
MATRIX No. MT934



Plug Shell, EMI Grounding, Acme Thread Coupling

Military No. D38999/26
MATRIX No. MT938



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