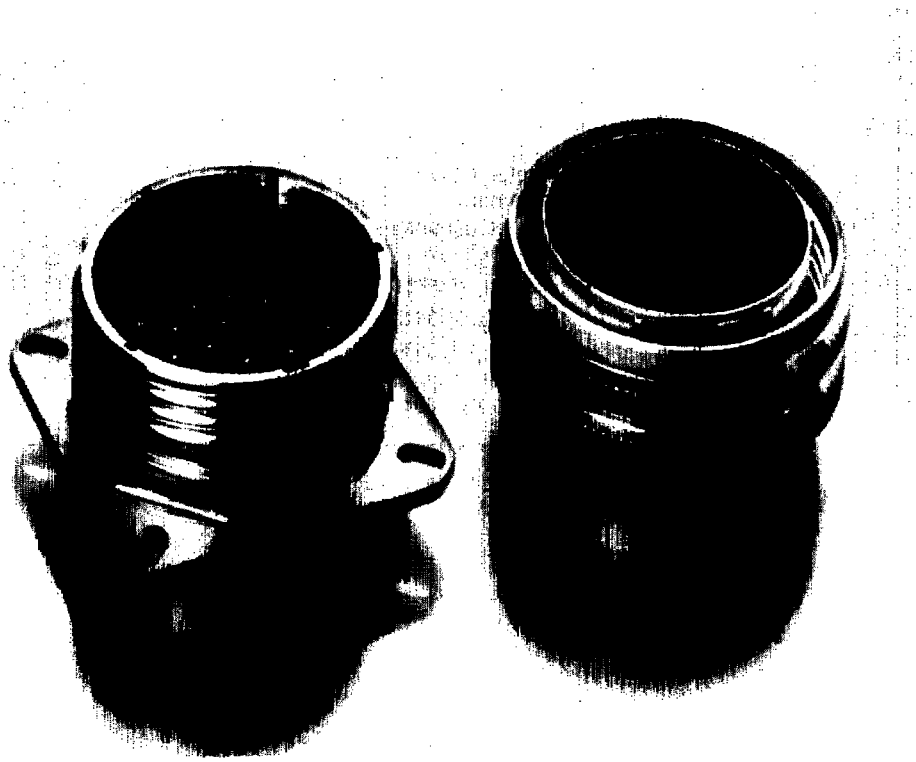
MIL-C-38999 Series III

Product Facts

- **Self-locking plugs with 2:1 differential uncoupling/coupling torque for high vibration environments**
- **Triple lead acme thread for quick disconnect**
- **Positive metal-to-metal bottoming for improved shell-to-shell conductivity**
- **Patented "frustum" insert retention system to withstand high G-loads during shock and vibration**
- **360° accessory teeth for improved vibration performance**
- **Sealing grommets accept a wide range of wire diameters**
- **"Cork and bottle" interfacial seals around each contact**
- **Closed entry socket contacts to prevent probe damage**
- **Thermocouple pin and socket contacts are available, consult AMP for specifications**



Severe environments encountered in modern commercial and military aircraft require connectors whose performance is improved over that provided by general purpose connectors. An improved threaded connector that will withstand a 2000°F [1093°C] flame test for 20 minutes 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 environment stress requirements.

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

The development of these self-locking connectors does 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. A wide range of shell sizes, contact arrangements and polarization options are also available.

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.

MIL-C-38999
Series III (Continued)

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.

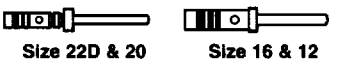
Vibration
Sine
Frequency range of 10 to 2000 Hz, in 20 minute sweeps, in 3 axes, with the following variations: (with simulated accessory load)
- Duration: 36 hours total, 12-hour cycles.
- Levels: Velocity of 10 in. per second (10-50 Hz); displacement of 0.06 [1.5] (50-140 Hz) and acceleration of 60 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 G RMS for 8 hours in two axes, totaling 16 hours at ambient temperature.
-(with simulated accessory load): 49.5 G RMS for 8 hours in two axes, totaling 16 hours at 200°C.

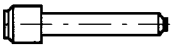
RFI & EMI
RFI & EMI attenuation at the specified frequency meet the requirements of MIL-C-38999.
RFI shielding effectiveness of mated connectors with RFI backshells is measured in a triaxial radio frequency leakage fixture.
EMI shielding effectiveness is measured at the interface of mated connectors 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			.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.

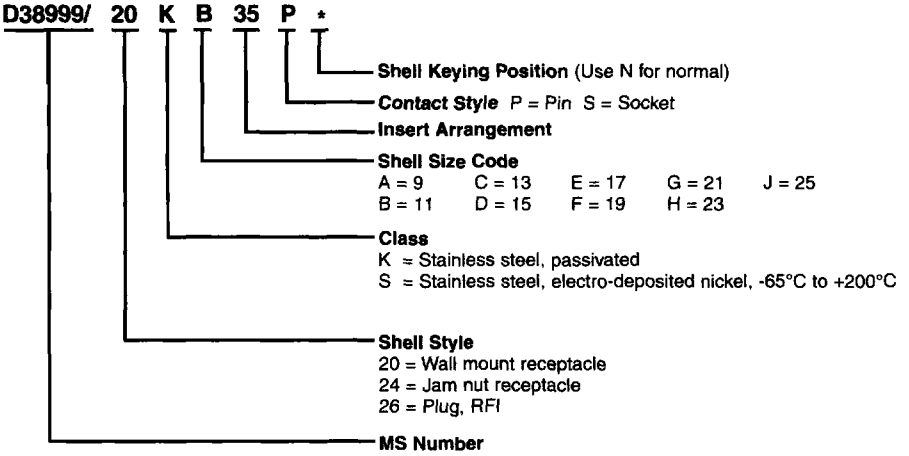
Insertion/Extraction Tools

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

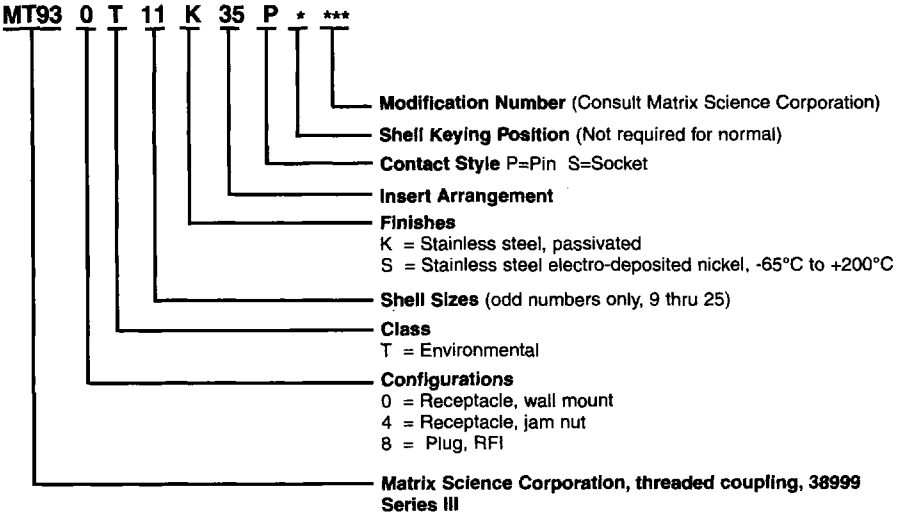
SOURCE: Catalog 82785

MIL-C-38999 Series III (Continued)

Military Part Number System



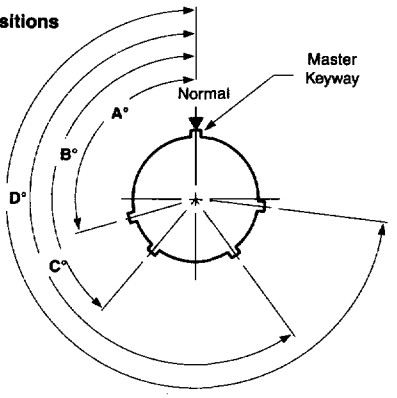
MATRIX Part Number System



MIL-C-38999 Series III (Continued)

Polarization

Keying Positions

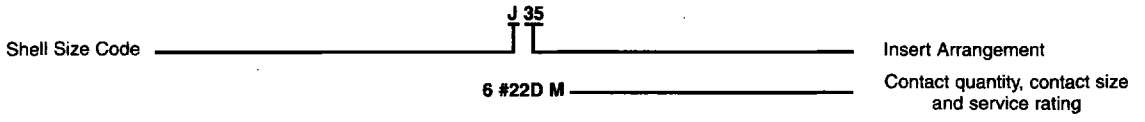


Notes:
1. All minor keys are rotated to provide shell polarization: the master key remains fixed as shown.
2. Mating face of receptacle is shown. Plug is opposite.

Shell Size	Polarizing Positions	Key Locations A°	B°	C°	D°	Service Rating
9	N	105	140	215	265	Refer to Insert Arrangement Captions on next three pages.
	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	

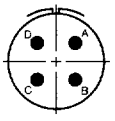
Insert Arrangements (Per MIL-STD-1560)

Numbering identification:

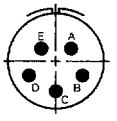


A35, 6 #22D M

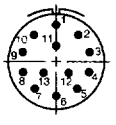
A98, 3 #20 I



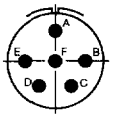
B04, 4 #20 I



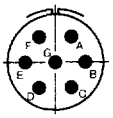
B05, 5 #20 I



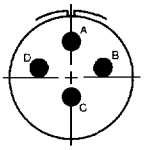
B35, 13 #22D M



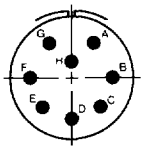
B98, 6 #20 I



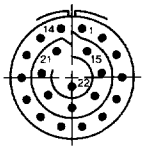
B99, 7 #20 I



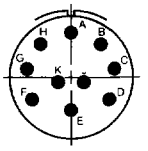
C04, 4 #16 I



C08, 8 #20 I



C35, 22 #22D M



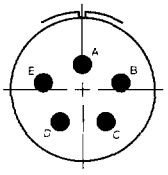
C98, 10 #20 I

Note: Mating face of pin insert is shown, Socket insert is opposite.

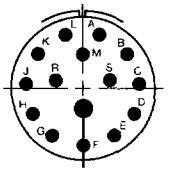
SOURCE: Catalog 82785

MIL-C-38999
Series III (Continued)

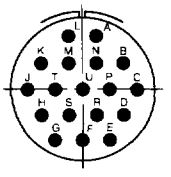
Insert Arrangements
(Continued)



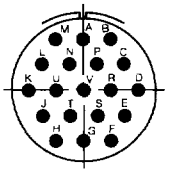
D05,
5 #16 II



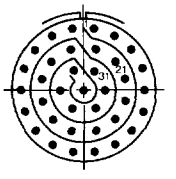
D15,
1 #16, 14 #201



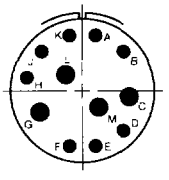
D18,
18 #20 I



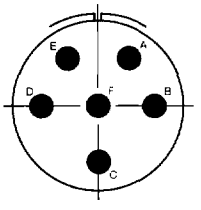
D19,
19 #20 I



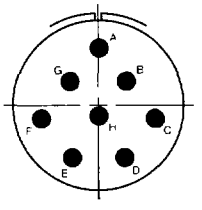
D35,
37 #22D M



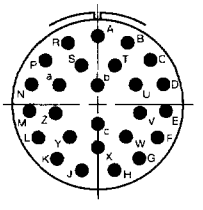
D97,
4 #16, 8 #20 I



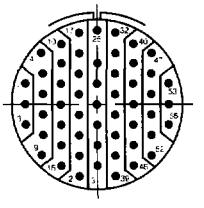
E06,
6 #12 I



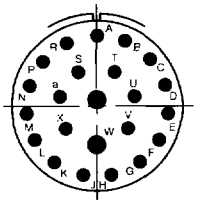
E08,
8 #16 II



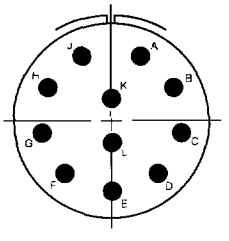
E26,
26 #20 I



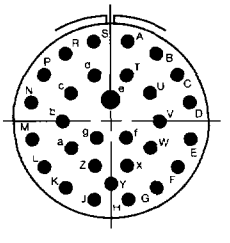
E35,
55 #22D M



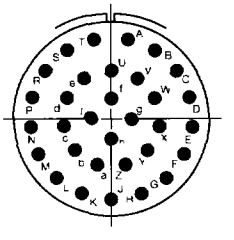
E99,
2 #16, 21 #20 I



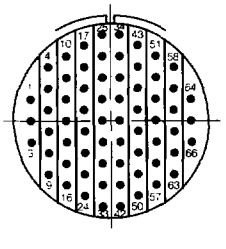
F11,
11 #16 II



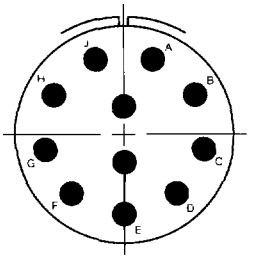
F 30,
1 #16, 29 #20 I



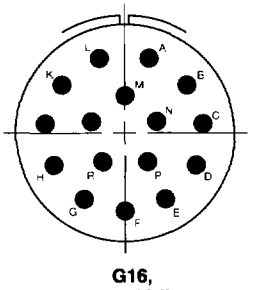
F32,
32 #20 I



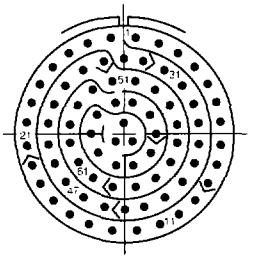
F35,
66 #22D M



G11,
11 #12 I



G16,
16 #16 II

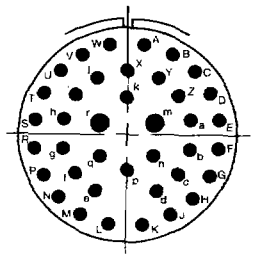


G35,
79 #22D M

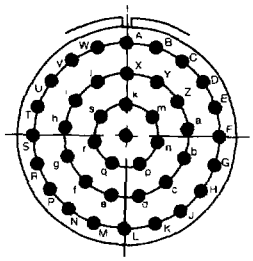
Note: Mating face of pin insert is shown. Socket insert is opposite.

MIL-C-38999
Series III (Continued)

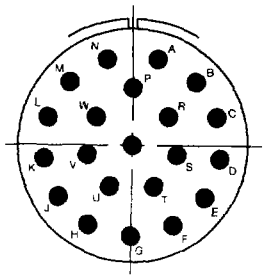
Insert Arrangements
(Continued)



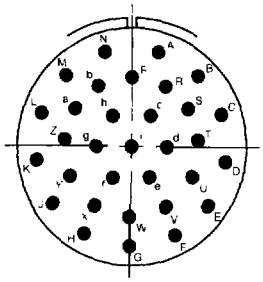
G39,
2 #16, 37 #20 I



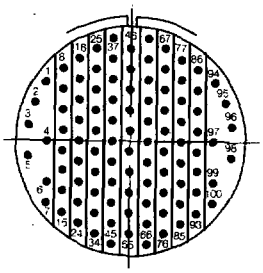
G41,
41 #20 I



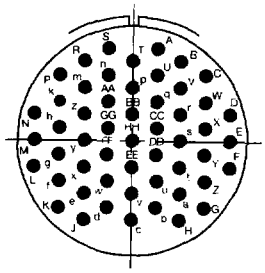
H21,
21 #16 II



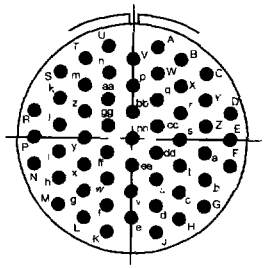
H32,
32 #20



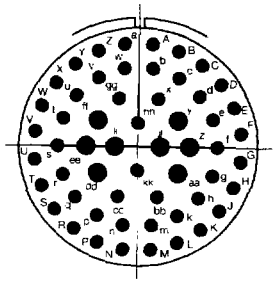
H35,
100 #22 D M



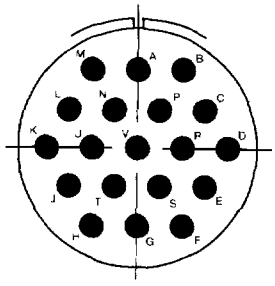
H53,
53 #20 I



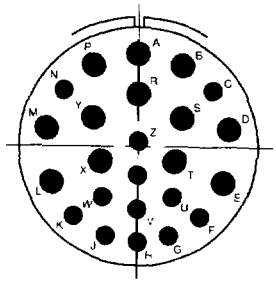
H55,
55 #20 I



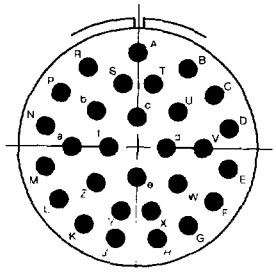
J04,
8 #16, 48 #20 I



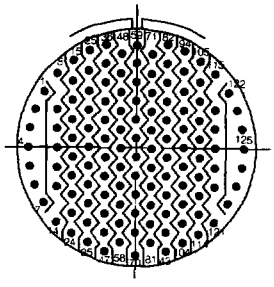
J19,
19 #12 I



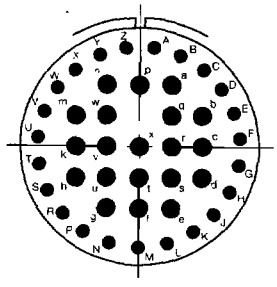
J24,
12 #12, 12 #16 I



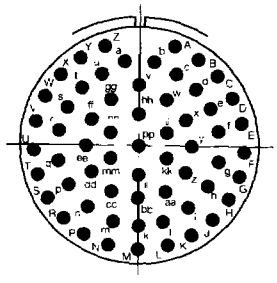
J29,
29 #16 I



J35,
128 #22D M



J43,
20 #16, 23 #20 I



J61,
61 #20 I

Note: Mating face of pin insert is shown. Socket insert is opposite.

SOURCE: Catalog 82785

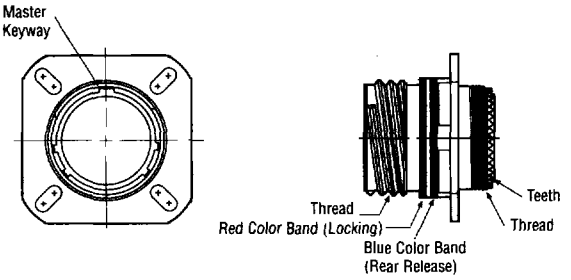
MIL-C-38999
Series III (Continued)

Shell Size:

9
11
13
15
17
19
21
23
25

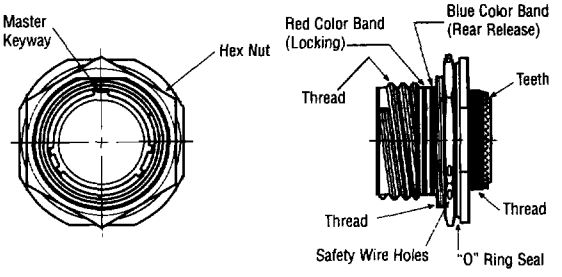
Receptacle Shell, Flange Wall Mount, Acme Threaded Coupling

Military No. D38999/20
MATRIX No. MT930



Receptacle Shell, Jam Nut Mount, Modified Acme Thread Coupling

Military No. D38999/24
MATRIX No. MT934



Plug Shell, EMI Grounding, Modified Acme Thread Coupling

Military No. D38999/26
MATRIX No. MT938