

**MIL-C-38999  
Series I**

Qualified to MIL-C-38999 Series I, these connectors are for general purpose, high density applications. They are available in shell sizes 9 through 25 with MIL-STD-1560 insert arrangements having up to 128 size 22D Contacts and a number of mixed contact arrangements.

This family of connectors is offered in a variety of receptacle mounting configurations. They include square flange receptacles, designed for front and rear wall mounting; square flange receptacles, designed for front and rear box mounting; and jam nut mounting receptacles which incorporate O-ring seals, designed for rear panel mounting in a "D" hole.

Plug connectors provide RFI protection for sensitive circuits by incorporating a continuous strip of positively attached grounding fingers attenuating interference up to 10 GHz.

These bayonet coupling connectors are inherently scoop-proof. Pins are recessed in elongated shells to prevent the possibility of bending contacts when a mating shell is scooped into the shell. Pin contact damage in non-scoop-proof connectors is commonly found in connectors installed in congested areas or in connector applications to semi-rigid harnesses.

Facilitating standardization, this connector family is offered with a range of contact sizes fully qualified to MIL-C-39029. Contact sizes 22D, 20, 16 and 12 permit the user to interconnect most circuits with wires ranging from 28 through 12 AWG [0.08 mm<sup>2</sup> through 3 mm<sup>2</sup>]. These crimp contacts are inserted and extracted from the rear of the connector, requiring a minimum of tools which simplifies both initial fabrication and field maintenance.

Shell polarization to prevent cross-mating of adjacent connectors having identical insert arrangements is available by selecting shells having different master key/keyway locations.

Series I connectors are available in a broad range of shell materials and finishes. Aluminum shells have surface finishes of bright cadmium, olive drab cadmium, and electroless nickel. The olive drab cadmium finish is applied over a nickel underplate and meets the severe 500-hour salt spray exposure test of MIL-STD-1344. Also available are steel passivated shells suitable for exposure to severe corrosive atmospheres and for rough handling applications.

### MIL-C-38999 Series I (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 | 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.

##### MB91 Standard Shock

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

##### MB91 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:

- Duration: 12 hours total, 4-hour cycles.

- Level: Displacement of .06 [1.5] (10-100 Hz) and acceleration of 30 Gs peak (100-2000 Hz) at ambient room temperature.

###### Random

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

##### RFI & EMI

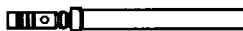
RFI & EMI attenuation at the specified frequency meet the requirements of MIL-C-38999.

RFI shielding effectiveness of mated connectors with RFI backshells is measured in a triaxial radio frequency leakage fixture.

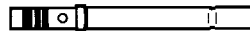
EMI shielding effectiveness is measured at the interface of mated connectors and tested by the MODE STIR procedure specified in method 3008 of MIL-STD-1344.

2  
Pin and Socket Connectors  
Military Specified Circular Connectors

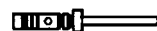
#### Contacts, Sealing Plugs and Assembly Tools



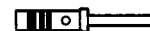
Size 22D & 20



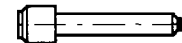
Size 16 & 12



Size 22D & 20



Size 16 & 12



Sealing Plug

Socket Contact

Pin Contact

| Contact Size | Wire Range |                 | Socket Contacts   |                 | Pin Contacts      |                 | Sealing Plugs     |                 |
|--------------|------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|
|              | AWG        | mm <sup>2</sup> | 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        | mm <sup>2</sup> | 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          |

#### Insertion/Extraction Tools

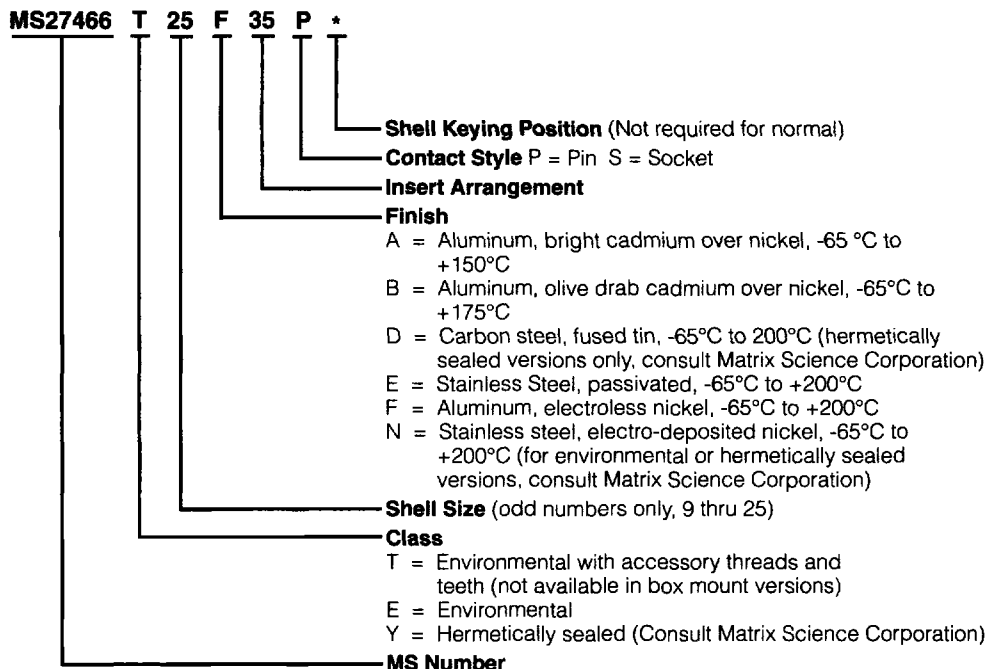
| Contact Size | Color Code | Military Part No. | MATRIX Part No. |
|--------------|------------|-------------------|-----------------|
| 22D          | Gr./Wh.    | M81969/14-01      | 6500-048-0022   |
| 20           | Rd./Wh.    | M81969/14-10      | 6500-055-0020   |
| 16           | Bl./Wh.    |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

**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.

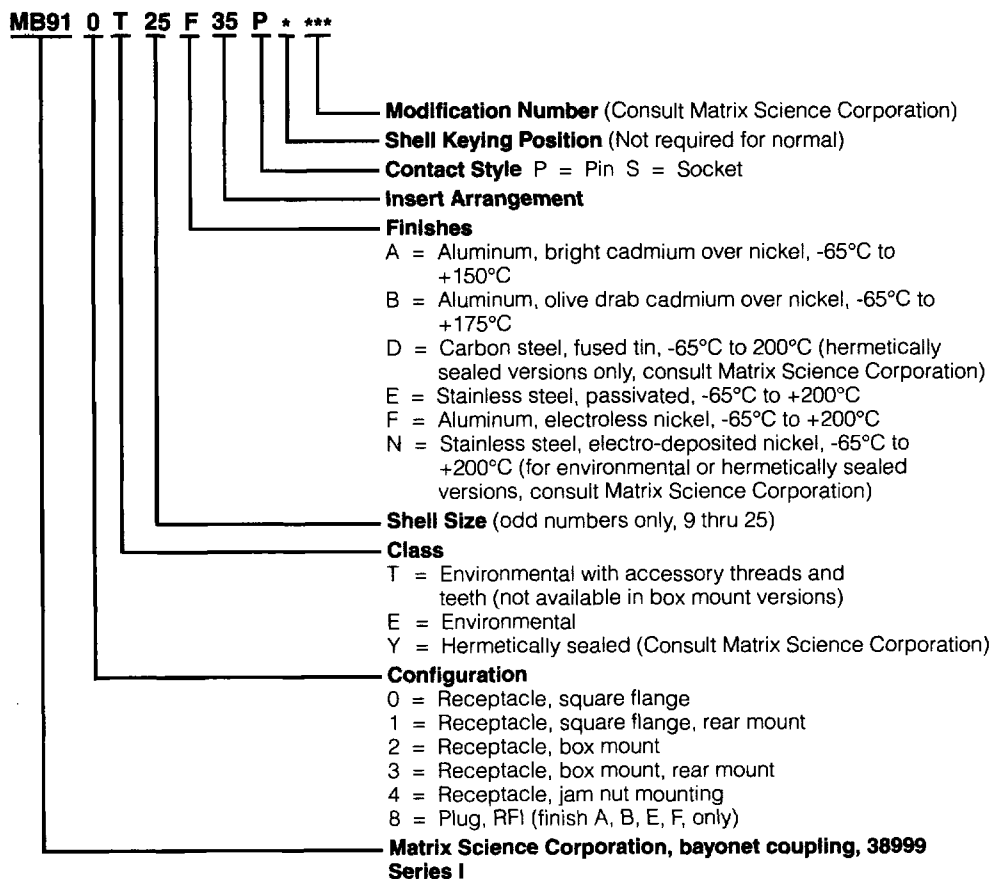
### MIL-C-38999

#### Series I (Continued)

#### Military Part Number System



#### MATRIX Part Number System

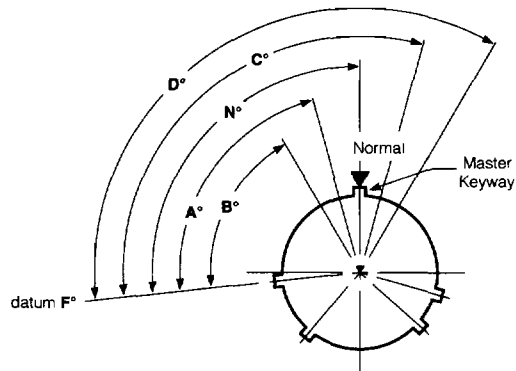


Pin and Socket Connectors  
Military Specified Circular Connectors

**MIL-C-38999**  
**Series I (Continued)**

**Polarization**

**Keying Positions**



**Notes:**

1. For shell polarization the master key has various positions relative to datum F; the minor keys remain fixed as shown. In the Normal position, the master key is 95° from F.
2. Mating face of receptacle is shown. Plug is opposite.

| Shell Size | Keying Positions |    |    |     |     | Service Rating  |
|------------|------------------|----|----|-----|-----|---|
|            | N°               | A° | B° | C°  | D°  |   |
| 9          | 95               | 77 | -  | -   | 113 | Refer to<br>Insert<br>Arrangement<br>captions<br>Pages<br>2134-2136 |
| 11         | 95               | 81 | 67 | 123 | 109 |   |
| 13         | 95               | 75 | 63 | 127 | 115 |   |
| 15         | 95               | 74 | 61 | 129 | 116 |   |
| 17         | 95               | 77 | 65 | 125 | 113 |   |
| 19         | 95               | 77 | 65 | 125 | 113 |   |
| 21         | 95               | 77 | 65 | 125 | 113 |   |
| 23         | 95               | 80 | 69 | 121 | 110 |   |
| 25         | 95               | 80 | 69 | 121 | 110 |   |

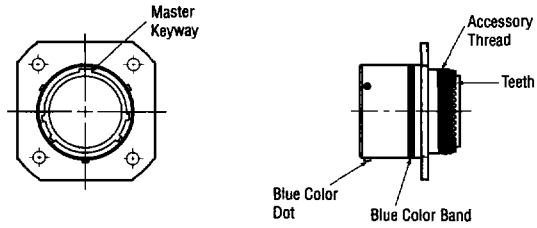
2  
 Pin and Socket Connectors  
 Military Specified Circular Connectors

**MIL-C-38999**  
**Series I (continued)**

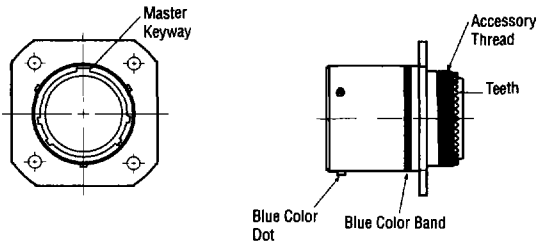
**Shell Size:**

|    |
|----|
| 9  |
| 11 |
| 13 |
| 15 |
| 17 |
| 19 |
| 21 |
| 23 |
| 25 |

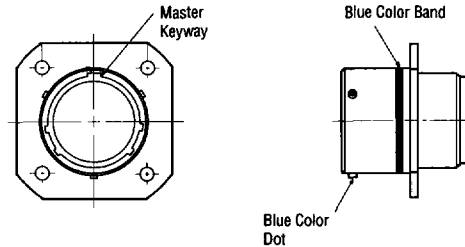
**Receptacle Shell,  
Flange Wall Mount,  
Bayonet Coupling**  
Military No. MS27466  
MATRIX No. MB910



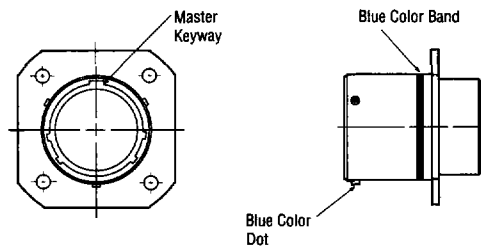
**Receptacle Shell,  
Flange Rear Wall Mount,  
Bayonet Coupling**  
Military No. MS27656  
MATRIX No. MB911



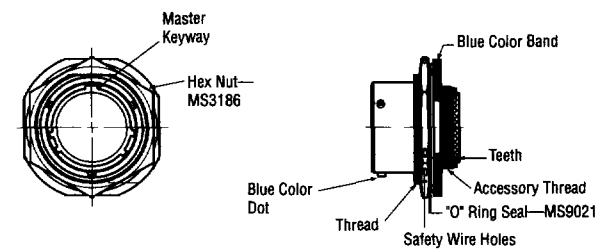
**Receptacle Shell,  
Flange Box Mount,  
Bayonet Coupling**  
Military No. MS27496  
MATRIX No. MB912



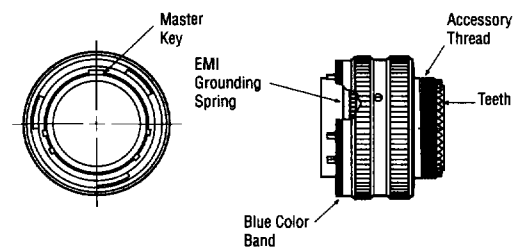
**Receptacle Shell,  
Flange Rear Box Mount,  
Bayonet Coupling**  
Military No. MS27505  
MATRIX No. MB913



**Receptacle Shell,  
Jam Nut Mount,  
Bayonet Coupling**  
Military No. MS27468  
MATRIX No. MB914



**Plug Shell,  
EMI Grounding,  
Bayonet Coupling**  
Military No. MS27467  
MATRIX No. MB918



Pin and Socket Connectors  
Military Specified Circular Connectors