












# Cannon Microminiature Product Overview Guide

|                           | MDM   | MDM PCB   | MDM C/P   | MDMH Hermetics  | TMDM Filter   | MD**   | MDB Coaxial   | MJS   | MIK   | MIKM  |
|---------------------------|---|---|---|---|---|--|---|---|---|---|
|                           |  |  |  |  |  |  |  |                |  |  |
| <b>Type</b>               | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket  | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket   |
| <b>Current Rating</b>     | 3A max.   | 3A max.   | 3A max.   | 3A max.   | 3A max.   | 3A max.  | 3A max.   | 3A max.   | 3A max.   | 3A max.   |
| <b>Contact Resistance</b> | 8 milliohms max.  | 8 milliohms max.  | 8 milliohms max.  | 24 milliohms max.   | 15 milliohms max.   | 8 milliohms max.   | 8 milliohms max. (signal)   | 8 milliohms max.  | 8 milliohms max.  | 8 milliohms max.  |
| <b>Contact Material</b>   | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy  | gold plated copper and steel  | gold plated copper alloy  | gold plated copper alloy   | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy  |
| <b>Shell</b>              | Metal   | Metal   | Metal   | Metal   | Metal   | Plastic  | Plastic   | Plastic   | Plastic   | Metal   |
| <b>Shell Material</b>     | Aluminum  | Aluminum  | Aluminum  | Steel   | Aluminum  | Thermoplastic & Thermoset  | Thermoset   | Thermoplastic & Thermoset   | Thermoplastic   | Steel   |
| <b>Available Layouts</b>  | 9, 15, 21, 25, 31, 37, 51 & 100   | 9, 15, 21, 25, 31, 37, 51 & 100   | 7C/P2, 24C/P4, 27C/P5 & 10C/P10   | 9, 15, 21, 25, 31, 37 & 51  | 9, 15, 21, 25, 31, 37 & 51  | 9, 15, 21, 25, 31, 37 & 51   | 7C/P2   | 10, 26, 51 & 66 - Rect/unshrouded<br>16, 28 & 35 - Rect/shrouded<br>26, 38, 42 & 76 - Polarized D | 7 & 55  | 7, 55 & 85  |
| <b>Configuration</b>      | Polarized D   | Polarized D   | Polarized D   | Polarized D   | Polarized D   | Polarized D  | Polarized D   | Rectangular & Polarized D   | Circular  | Circular  |
| <b>RoHS</b>               | Available   | Available   | Available   | Available   | No  | Available  | Available   | Available   | Available   | Available   |
| <b>Factory Terminated</b> | Yes*  | Yes   | Yes   | Yes*  | Yes   | Yes*   | Yes   | Yes*  | Yes   | Yes   |
| <b>Space Applications</b> | Available   | Available   | Available   | Yes   | Yes   | Available  | Available   | Available   | Yes   | Yes   |
| <b>Page Number</b>        | 7   | 18  | 22  | 23  | 25  | 28   | 32  | 39  | 44  | 44  |

|                           | MIKQ  | MT*   | MEB   | 2D  | CDL   | CTA*   | NDM   | NTP   | NJS   |
|---------------------------|---|---|---|---|---|--|---|---|---|
|                           |  |  |  |  |  |  |  |  |  |
| <b>Type</b>               | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket   | Plug and Socket  | Plug and Socket   | Plug and Socket   | Plug and Socket   |
| <b>Current Rating</b>     | 3A max.   | 3A max.   | 3A max.   | 5A max.   | 5A max.   | 5A max.  | 1A max.   | 1A max.   | 1A max.   |
| <b>Contact Resistance</b> | 8 milliohms max.  | 8 milliohms max.  | 8 milliohms max.  | 9 milliohms max.  | 9 milliohms max.  | 9 milliohms max.   | 60 milliohms max.   | 60 milliohms max.   | 60 milliohms max.   |
| <b>Contact Material</b>   | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy  | gold plated copper alloy   | precious metal alloy & gold plated copper alloy                                       | precious metal alloy & gold plated copper alloy                                       | precious metal alloy & gold plated copper alloy                                       |
| <b>Shell</b>              | Metal   | Plastic   | Plastic   | Plastic   | Plastic   | Plastic  | Metal   | Plastic   | Plastic   |
| <b>Shell Material</b>     | Steel   | Thermoplastic   | Thermoset   | Thermoplastic   | Thermoplastic   | Thermoplastic  | Thermoset   | Thermoset   | Thermoplastic   |
| <b>Available Layouts</b>  | 7, 19 & 37  | MTV - 1 thru 120<br>MTB - 1 thru 80   | 64, 128, 92 & 184   | 19, 31, 52, 79 & 100  | 139   | CTA3 - 1 thru 53<br>CTA4 - 1 thru 60   | 9, 15, 21, 25, 31 & 37  | 1 thru 40   | Rectangular - 9, 24 & 44<br>Circular - 27, 72 & 246                                   |
| <b>Configuration</b>      | Circular  | Strip   | Polarized D   | Polarized D   | Polarized D   | Strip  | Polarized D   | Strip   | Rectangular & Circular  |
| <b>RoHS</b>               | Available   | Available   | Available   | Available   | Yes   | Yes  | Yes   | Yes   | Yes   |
| <b>Factory Terminated</b> | Yes   | Yes*  | Yes*  | No  | No  | No   | Yes   | Yes   | Yes   |
| <b>Space Applications</b> | Yes   | Yes   | Yes   | No  | No  | No   | Yes   | Yes   | Yes   |
| <b>Page Number</b>        | 44  | 48  | 54  | 59  | 65  | 66   | 72  | 71  | 73  |

\* Solderpot versions available for end user termination

Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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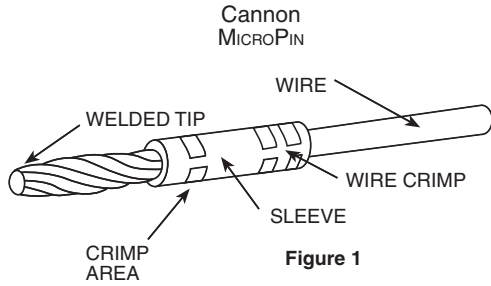


Figure 1

### Pos-A-Line Contact Alignment

The flexible twist-pin is recessed into the insulator and the rigid socket is exposed, reversing the traditional positions of pin and socket. During mating, the socket is guided into the pin insulator by the lead-in chamfer. The pin is kept from flexing beyond the socket capture radius by the walls of the cavity. The hemispherical weld of controlled radius at the tip of the pin combines with the lead-in chamfers of the socket contact and the pin insulator to cam the pin into alignment. By controlling the welding process and the dimensions of the socket contact and the insulators, it is impossible for the recessed pin to escape the socket capture radius.

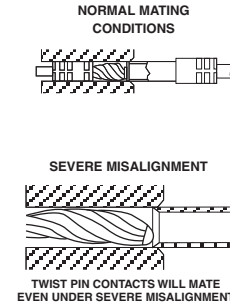


Figure 2

### Twist Pin Contact Technology

The foundation of ITT's Cannon Micro Connector portfolio starts with ITT's innovative twist pin contact system. This system was originally developed in the early 1960's and ITT was one of the original interconnect companies to license this technology and improve it. Our forty five years of experience in manufacturing and establishing a fully automated manufacturing system for this contact has truly given ITT the foremost knowledge in twist pin contact technology.

As the core of our micro products, the twist pin contact offers a superior electrical and mechanical system that outperforms traditional machined or stamped electrical contract systems. ITT's twist pin system consists of the Micro Socket and the Micro pin or Twist pin. Figure 1 show the basic contacts.

### Figure 1

The twist pin contact system consists of several stranded cores making up the wire bundle. The strands are subsequently heat treated and a weld is performed on the tip of each contact. Crimp sleeves are then inserted over the contact and crimp areas are defined to produce a seamless crimp system. The entire twist pin system is referred by ITT as a Pos-A-Line contact alignment system. Our reference to this system identifies that the flexible twist pin is recessed into the insulator and the rigid socket is exposed thus reversing the traditional positions of the pin and socket. During the mating sequence, the socket is guided into the pin insulator by the lead-in chamfer. The pin is kept from flexing beyond the socket capture radius by the walls of the cavity. The hemispherical weld of controlled radius at the tip of the pin combines with the lead-in chamfer of the socket contact and the pin insulator to cam the pin in alignment. ITT has developed a very robust Six Sigma manufacturing process that controls the welding process as well as the dimensions of the socket con-

tact and insulator material. The net result is a contact system that makes it impossible for the recessed pin to escape the socket capture radius. Figure 2 shows the twist pin features as well as mating and severe misalignment conditions.

The advantages of ITT's twist pin contact system are many and have been field proven in the most demanding applications and environments for over forty five years. Some of these advantages include:

- Seven points of electrical contact (Micro 0.050-inch & Centi Line 0.075-inch Interconnect Products)
- Five points of electrical contact (Nano 0.025-inch Interconnect Products)
- Contact and crimp sleeve materials carefully optimized for extremely reliable crimps- No design tradeoffs
- Seamless crimp sleeves
- Multiple 4-indent wire crimps standard and smaller bore micro socket contacts
- Standard integral tail & thru bundle micro pin contacts (high density packaging)
- High mating cycles
- High current handling capabilities
- System qualification in numerous Aerospace, Defense Electronic, and high temperature Geophysical applications.
- Wide array of wire terminations

The advantages listed above are by no means inclusive of ITT's innovative product improvement processes. Moving forward, ITT plans to introduce additional new product features supporting enhanced twist pin contact performance.





MDM connectors are used in applications requiring highly reliable, extremely small, lightweight connectors with higher density contact configurations than available in traditional rectangular connectors. They are available in 8 shell sizes accommodating from 9 to 100 contacts, and special arrangements of power and coaxial contacts.

These connectors are designed to meet the rapidly increasing demands for an environmental, high performance, rugged, moisture-sealed microminiature connector. This connector

employs size 24 MICROPIN™/MICROSOCKET™ contacts on .050 (1.27) centers in a contact density identical to the standard MICRO-D connector series, but with these additional features:

- Aluminum shells to provide greater strength, prevent chipping, cracking or breaking, offer electromagnetic (EMI) and RFI shielding.
- Silicone elastomer compression interfacial seal to provide a moisture and humidity seal between each contact and between contacts and shell.

## Specifications

### STANDARD MATERIALS AND FINISHES

|                         |   |
|-------------------------|---|
| Shell                   | - 6061-T6 Aluminum alloy per QQ-A-200/8, yellow chromate/cadmium, Type II, Class 3 over electroless nickel per SAE AMS-C-26074, Class 4.  |
| Insulator               | - Liquid Crystal Polymer per MIL-M-24519, Type GLCP-30F (9-100)<br>- Glass filled diallyl phthalate per MIL-M-14, Type SDGF (7*2 and 24*4)<br>- Polyphenylene sulfide per MIL-M-24519, Type GST-40F (16*5)<br>- Polyester per MIL-M-24519, Type GPT-30F (10*10) |
| Contacts                | - Copper alloy, gold plate  |
| Mounting Hardware       | - 300 Series stainless steel, passivate   |
| Kit, Jackpost (3) items | - 300 Series stainless steel, passivate   |
| Washer                  | - 400 Series stainless steel, passivate   |
| Standard Epoxy          | - Hysol EE4215/HD3561, color black or Hysol EE4198/HD3561, color green  |

### MECHANICAL FEATURES

|                         |   |
|-------------------------|---|
| Coupling                | - Friction/jackscrews   |
| Polarization            | - Keystone-shaped shells  |
| Contact Spacing Centers | - .050 (1.27)   |
| Shell Styles            | - Plug and receptacle   |
| No. of Contacts         | - 9 thru 100 signal;<br>5 signal/2 coaxial;<br>5 signal/2 power;<br>11 signal/5 coaxial;<br>11 signal/5 power;<br>0 signal/10 coaxial;<br>0 signal/10 power;<br>20 signal/4 coaxial;<br>20 signal/4 power |
| Coaxial Cable           | - RG - 178/U  |
| Wire Size               | - #24 thru #32 AWG  |
| Contact Termination     | - Multiple indent crimp   |

## Performance Data

The table below summarizes the results of key tests performed in accordance with MIL-STD-1344, where applicable. Data is applicable to standard connectors with standard termination. Variations may affect this data, so please consult customer service for further information on your requirements.

| Test                             | Method   | Criteria of Acceptance  |
|----------------------------------|--|---|
| Dielectric Withstanding Voltage  | Method 3001:<br>600 VAC at sea level<br>150 VAC at 70,00' altitude                 | No breakdown<br>No breakdown  |
| Insulation Resistance            | Method 3003  | 5,000 megohms minimum   |
| Thermal Shock                    | Method 1003, Condition A:<br>- 55°C to +125°C                                      | No physical damage  |
| Physical Shock                   | Method 2004, Condition E:<br>50 G's, 3 axes, 6 millisecond duration sawtooth pulse | No physical damage<br>No loss of continuity > 1 µsec                              |
| Vibration                        | Method 2005, Condition IV:<br>20 G's, 10-2,000 Hz. 12 hrs                          | No physical damage<br>No loss of continuity > 1 µsec                              |
| Durability                       | 500 cycles of mating and unmating, 500 CPH max.                                    | No mechanical or electrical defects   |
| Moisture Resistance              | Method 1002, Type II, omit steps 7a & 7b   | Insulation resistance > 100 megohms   |
| Salt Spray                       | Method 1001, Condition B:<br>48 hours  | Shall be capable of mating and unmating, and meet contact resistance requirements |
| Contact Resistance (MIL-STD-202) | Method 1001, Condition B:<br>At 3 amps<br>At 1 milliamp                            | 8 milliohms maximum<br>10 milliohms maximum                                       |
| Contact Retention                | Per MIL-DTL-83513  | 5 lb. minimum axial load  |

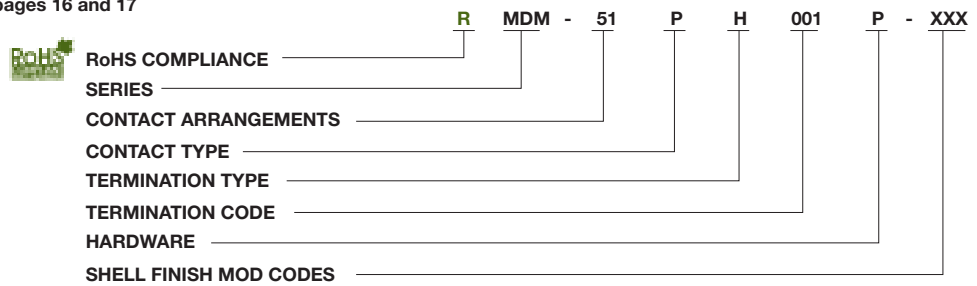
Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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## How to Order

For MIL-DTL-83513 ordering information see pages 16 and 17



### SERIES

MDM: (Size 9-100) Liquid Crystal Polymer (LCP)  
MDM: (Combo Layout) Diallyl Phthalate (DAP)

### CONTACT ARRANGEMENTS

9-15-21-25-31-37-51-100 (standard)  
16C5, 10C10, 7C2, 24C4 (coaxial) } or combination of  
16P5, 10P10, 7P2, 24P4 (power) } coax and power

### CONTACT TYPE

P - Pin S - Socket

### TERMINATION TYPE

H - Harness-insulated wire.  
L - Solid-uninsulated wire.  
S - Solder pot to accept #26 AWG MAX.  
harness wire. (Not available with power  
contact arrangements.)

### HARDWARE

M - Military specification hardware, see  
page 11 for military hardware codes.  
P - Jackpost  
K - Jackscrew-standard profile  
L - Jackscrew-low profile  
F - Float mount  
B - No hardware standard  
.091 (2.31) dia. hole for sizes 9-51;  
.120 (3.05) dia. hole for size 100.  
A - .125 (3.18) dia. mounting holes for sizes 9-51;  
.166 (4.22) dia. hole for size 100.  
B1 - .1475 (3.75) dia. hole for size 100  
(Per MIL-DTL-83513)

### TERMINATION CODE\*

(H) 001 - 18", 7/34 strand, #26 AWG,  
MIL-W-16878/4, Type E Teflon, yellow.  
(H) 003 - 18", 7/34 strand, #26 AWG,  
MIL-W-16878/4, Type E Teflon,  
color coded to MIL-STD-681 System I.  
(L) 1 - 1/2" uninsulated solid #25  
AWG gold plated copper.  
(L) 2 - 1" uninsulated solid #25 AWG  
gold plated copper.

### SHELL FINISH MOD CODES

No Number - (Standard cadmium/yellow  
chromate over nickel  
A174 - Electroless nickel  
A172 - Gold over nickel  
A141 - Irridite/alodine  
A30 - Black anodize

\*See page 79 and 81 for additional Termination codes.



COTS or Non Mil-Spec or Commercial or Industrial Standard Wire Termination Codes

Cannon Modification Code (Not MS)

The following termination codes are listed for your information. For additional codes please refer to Appendix on page 79 and 81. **All wire lengths are minimum.**

### Harness Type (H)

#26 AWG per MIL-W-16878/4, 7/34 strand, type E Teflon, stranded.

| Length       | All Yellow | Color Coded* |
|--------------|------------|--------------|
| 3 (76.2)     | H020       | H027         |
| 6 (152.4)    | H019       | H016         |
| 8 (203.2)    | H026       | H034         |
| 10 (254.0)   | H029       | H025         |
| 12 (304.8)   | H028       | H002         |
| 18 (457.2)   | H001       | H003         |
| 20 (508.0)   | H038       | H023         |
| 24 (609.6)   | H009       | H004         |
| 30 (762.0)   | H010       | H005         |
| 36 (914.4)   | H011       | H006         |
| 48 (1219.2)  | H013       | H048         |
| 72 (1828.8)  | H017       | H046         |
| 120 (3048.0) | H042       | H041         |

\* Cavity #1 black

### Solid Uninsulated Type (L)

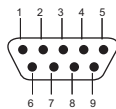
#25 AWG gold plated copper

| Termination Code | Length        |
|------------------|---------------|
| L61              | .125 (3.18)   |
| L56              | .150 (3.81)   |
| L57              | .190 (4.83)   |
| L39              | .250 (6.35)   |
| L58              | .375 (9.52)   |
| L1               | .500 (12.70)  |
| L14              | .750 (19.05)  |
| L2               | 1.000 (25.40) |
| L7               | 1.500 (38.10) |
| L6               | 2.000 (50.80) |
| L16              | 2.500 (63.50) |
| L10              | 3.000 (76.20) |

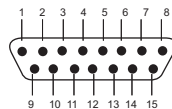
## Contact Arrangements

(Face View of Pin insert - Use Reverse Order for Socket Side)

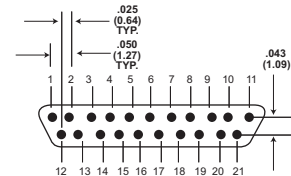
### Standard



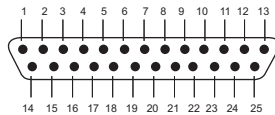
9 Contacts



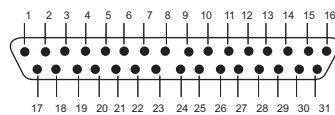
15 Contacts



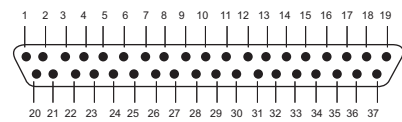
21 Contacts



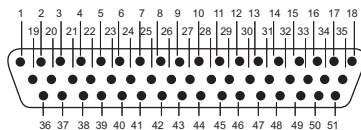
25 Contacts



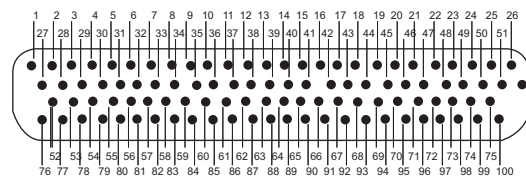
31 Contacts



37 Contacts

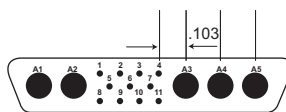


51 Contacts

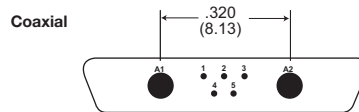


100 Contacts

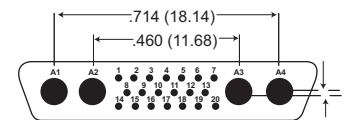
Contact identification numbers are for reference only and do not appear on insulator or connector body.



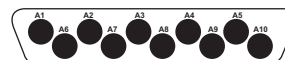
Size 51 Shell  
11 Micro contact  
5 Coax or 5 Power



Size 25 Shell  
5 Micro contact  
2 Coax or 2 Power



Size 51 Shell  
20 Micro contacts  
4 Coax or 4 Power  
(Not MS)



Size 100 Shell  
10 Micro contact  
10 Coax or 10 Power

Dimensions shown in inch (mm)

Specifications and dimensions subject to change

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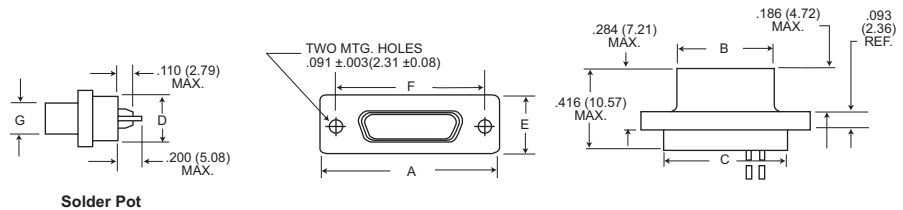


# Micro-D Metal Shell - .050" Contact Spacing

MDM

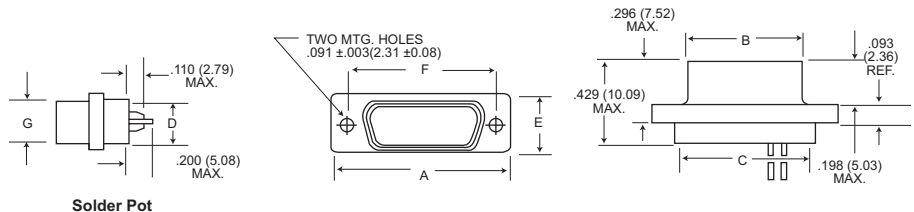
COTS or Non Mil-Spec or Commercial or Industrial Shell Dimensions (Conforms to MIL-DTL-83513)

## Plug



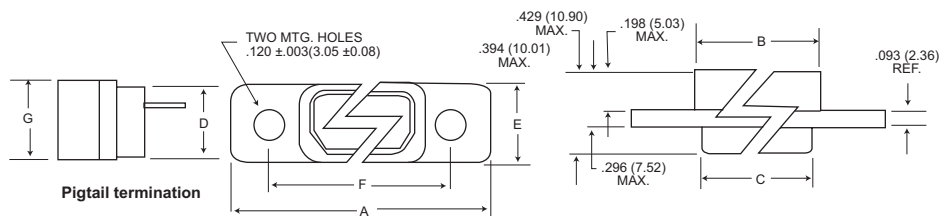
Solder Pot

## Receptacle



Solder Pot

## Receptacle (MDM-100 only)



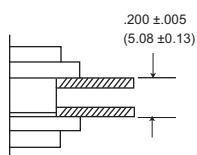
Pigtail termination

| Part Number<br>By Shell Size | A<br>Max.     | B<br>Max.     | C<br>Max.     | D<br>Max.   | E<br>Max.    | F<br>+ .005<br>(0.13) | G<br>Max.    | Average Weights**<br>oz. (gm.) ±5% |
|------------------------------|---------------|---------------|---------------|-------------|--------------|-----------------------|--------------|------------------------------------|
| MDM-9P*                      | .785 (19.94)  | .334 (8.48)   | .400 (10.16)  | .270 (6.86) | .308 (7.82)  | .565 (14.35)          | .185 (4.70)  | .063 (1.79)                        |
| MDM-9S*                      | .785 (19.94)  | .402 (10.21)  | .400 (10.16)  | .270 (6.86) | .308 (7.82)  | .565 (14.35)          | .253 (6.43)  | .063 (1.79)                        |
| MDM-15P*                     | .935 (23.75)  | .484 (12.29)  | .550 (13.97)  | .270 (6.86) | .308 (7.82)  | .715 (18.16)          | .185 (4.70)  | .084 (2.39)                        |
| MDM-15S*                     | .935 (23.75)  | .552 (13.97)  | .550 (13.97)  | .270 (6.86) | .308 (7.82)  | .715 (18.16)          | .253 (6.43)  | .083 (2.37)                        |
| MDM-21P*                     | 1.085 (27.56) | .634 (16.10)  | .700 (17.78)  | .270 (6.86) | .308 (7.82)  | .865 (21.97)          | .185 (4.70)  | .105 (2.99)                        |
| MDM-21P*                     | 1.085 (27.56) | .702 (17.83)  | .700 (17.78)  | .270 (6.86) | .308 (7.82)  | .865 (21.97)          | .253 (6.43)  | .104 (2.97)                        |
| MDM-25P*                     | 1.185 (30.10) | .734 (18.64)  | .800 (20.32)  | .270 (6.86) | .308 (7.82)  | .965 (24.51)          | .185 (4.70)  | .119 (3.39)                        |
| MDM-25S*                     | 1.185 (30.10) | .802 (20.37)  | .800 (20.32)  | .270 (6.86) | .308 (7.82)  | .965 (24.51)          | .253 (6.43)  | .118 (3.36)                        |
| MDM-31P*                     | 1.335 (33.91) | .884 (22.45)  | .950 (24.13)  | .270 (6.86) | .308 (7.82)  | 1.115 (28.32)         | .185 (4.70)  | .140 (3.99)                        |
| MDM-31S*                     | 1.335 (33.91) | .952 (24.18)  | .950 (24.13)  | .270 (6.86) | .308 (7.82)  | 1.115 (28.32)         | .253 (6.43)  | .139 (3.96)                        |
| MDM-37P*                     | 1.485 (37.72) | 1.034 (26.26) | 1.100 (27.94) | .270 (6.86) | .308 (7.82)  | 1.265 (32.13)         | .185 (4.70)  | .161 (4.59)                        |
| MDM-37S*                     | 1.485 (37.72) | 1.102 (27.99) | 1.100 (27.94) | .270 (6.86) | .308 (7.82)  | 1.265 (32.13)         | .253 (6.43)  | .160 (4.56)                        |
| MDM-51P*                     | 1.435 (36.45) | .984 (24.99)  | 1.050 (26.67) | .310 (7.87) | .351 (8.92)  | 1.215 (30.86)         | .228 (5.79)  | .193 (5.50)                        |
| MDM-51S*                     | 1.435 (36.45) | 1.052 (26.72) | 1.050 (26.67) | .310 (7.87) | .351 (8.92)  | 1.215 (30.86)         | .296 (7.52)  | .188 (5.35)                        |
| MDM-100P*                    | 2.170 (55.12) | 1.384 (35.15) | 1.442 (36.63) | .360 (9.14) | .394 (10.01) | 1.800 (45.72)         | .271 (6.88)  | .500 (14.3)                        |
| MDM-100S*                    | 2.170 (55.12) | 1.508 (38.10) | 1.442 (36.63) | .360 (9.14) | .394 (10.01) | 1.800 (45.72)         | .394 (10.01) | 1.040 (29.5)                       |

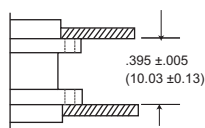
\*Add lead type and length; see How To Order.

\*\*\*Weight given is 1/2", insulated, solid, #25 AWG gold plated copper pigtails.

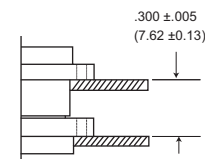
## Panel Mounting Dimensions (Sizes 9 - 100)



Plug and Receptacle  
Rear Mounted



Plug and Receptacle  
Front Mounted



Plug Front Mounted  
Receptacle Rear Mounted



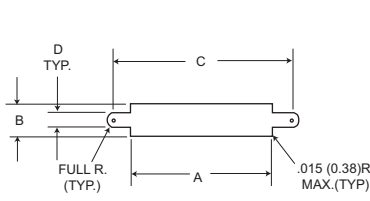
Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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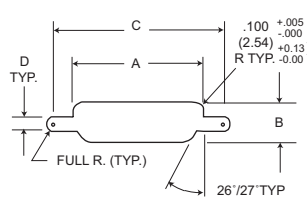
## Panel Cutouts

NOTE: See page 13 for rear panel mounting configuration.

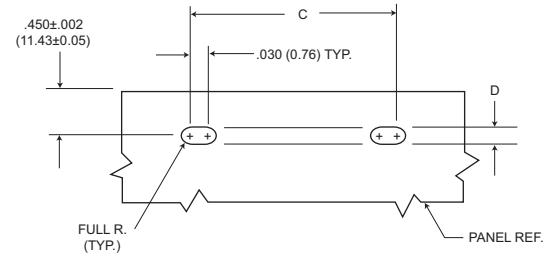
### Shell Sizes 9 thru 51



**Figure 1**  
Front Mounting

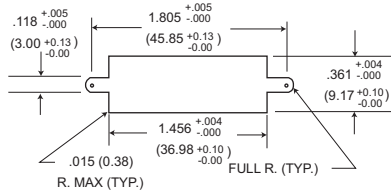


**Figure 2**  
Rear Mounting

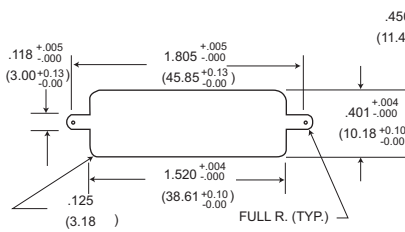


**Figure 3**  
Edgeboard Mounting

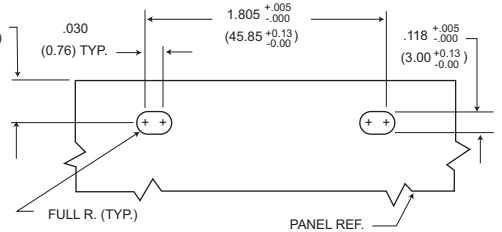
### Shell Size 100



**Figure 1**  
Front Mounting



**Figure 2**  
Rear Mounting



**Figure 3**  
Edgeboard Mounting

### For 9-51 Shell Sizes

#### NOTES:

1. Front panel mounting is the preferred mounting method. Front panel mounting dimensions (figure 1) will accommodate either #2-56 screws or jackpost hardware.
2. Rear panel mount dimensions (figure 2) will accommodate #2-56 screw hardware only. When mounting the connector with rear panel mount jackpost see the panel cut-out dimensions.
3. Edgeboard mounting bracket (figure 3) uses #2-56 screws. Dimension .450+/-0.002 (11.43+/-0.05) locates the MDM receptacle flush with the end of the board.

### For 100 Shell Size

#### NOTES:

1. Front mounting is the preferred mounting method. Front panel mounting dimensions (figure 1) will accommodate either #4-40 screws or jackpost hardware.
2. Rear panel mount dimensions (figure 2) will accommodate #4-40 screw hardware only see the panel cut-out dimensions.
3. Edgeboard mounting bracket (figure 3) uses #4-40 screws. Dimension .450+/-0.002 (11.43+/-0.05) locates the MDM receptacle flush with the end of the board.

| Shell Size | Cutout Figure | A<br>+.004<br>-.000 | B<br>+.004<br>-.000 | C<br>+.005<br>-.000 | D<br>+.005<br>-.000 |
|------------|---------------|---------------------|---------------------|---------------------|---------------------|
| 9          | 1             | .408                | .271                | .570                | .089                |
|            | 2             | .401                | .252                | .570                | .089                |
|            | 3             | -                   | -                   | .570                | .089                |
| 15         | 1             | .558                | .271                | .720                | .089                |
|            | 2             | .551                | .252                | .720                | .089                |
|            | 3             | -                   | -                   | .720                | .089                |
| 21         | 1             | .708                | .271                | .870                | .089                |
|            | 2             | .701                | .252                | .870                | .089                |
|            | 3             | -                   | -                   | .870                | .089                |
| 25         | 1             | .808                | .271                | .970                | .089                |
|            | 2             | .801                | .252                | .970                | .089                |
|            | 3             | -                   | -                   | .970                | .089                |
| 31         | 1             | .958                | .271                | 1.120               | .089                |
|            | 2             | .951                | .252                | 1.120               | .089                |
|            | 3             | -                   | -                   | 1.120               | .089                |
| 37         | 1             | 1.108               | .271                | 1.270               | .089                |
|            | 2             | 1.101               | .252                | 1.270               | .089                |
|            | 3             | -                   | -                   | 1.270               | .089                |
| 51         | 1             | 1.058               | .315                | 1.220               | .089                |
|            | 2             | 1.051               | .295                | 1.220               | .089                |
|            | 3             | -                   | -                   | 1.220               | .089                |

Dimensions shown in inch (mm)

Specifications and dimensions subject to change

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## Mounting Hardware Views (for sizes 9-51)

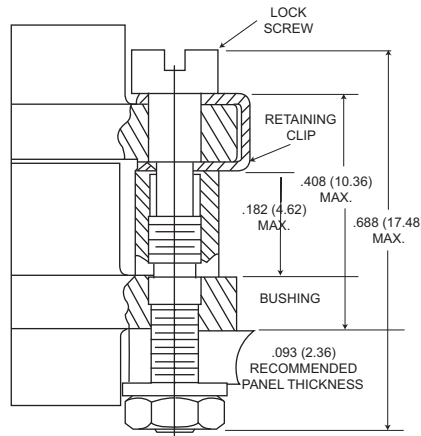
This hardware supplied unassembled.



**Screw Lock Assembly**

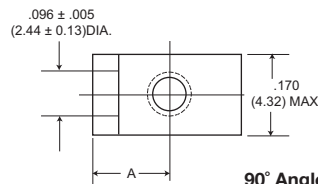


**90° Angle Mounting Bracket**

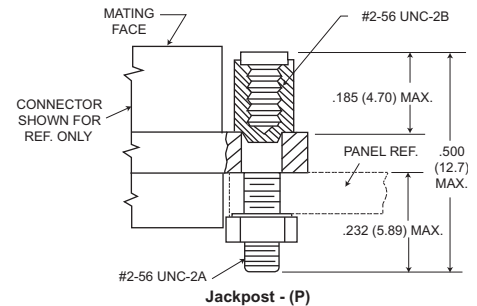


**Screw Lock Assembly\***

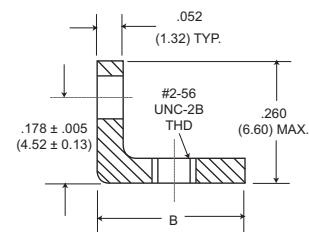
\*NOTE Torque value is 2.5 in/lbs max.



**90° Angle Mounting Bracket**



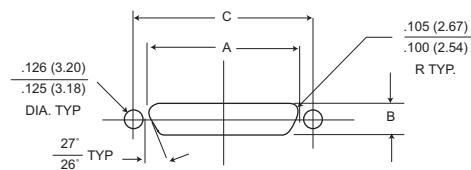
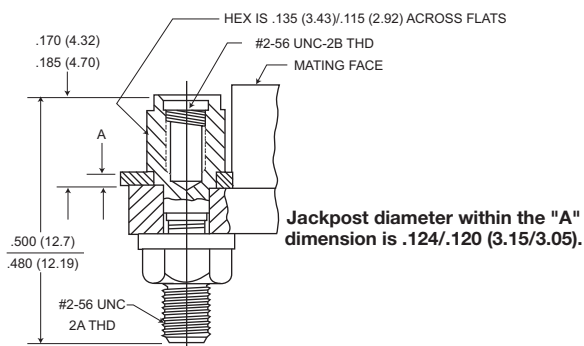
**Jackpost - (P)**



| Description   | Part Number  | A                |             |
|---|--------------|------------------|-------------|
|   |              | +/- .005 (±0.13) | B Max.      |
| Screw Lock Assembly                                   | 322-9500-000 |                  | N/A         |
| Jackpost kit  | 320-9505-000 |                  | N/A         |
| Mounting Bracket 90° MDM<br>for 9 thru 37 Shell Sizes | 015-9516-002 | .147 (3.73)      | .308 (7.82) |
| Mounting Bracket 90° MDM<br>for 51 Shell Size         | 015-9516-003 | .169 (4.29)      | .350 (8.89) |

NOTES: Screw lock assembly (322-9500-000) can be used for front mounting only. Jackpost kit (320-9505-000) consists of two assemblies, shipped unassembled.

## Jackpost Bushing (for rear panel mounting-for sizes 9-51)



### Plug and Receptacle Dimensions

| Shell Size | A             |               | B             |               | C             |
|------------|---------------|---------------|---------------|---------------|---------------|
|            | + .004 (0.10) | - .000 (0.00) | + .004 (0.10) | - .000 (0.00) |               |
| 9          | .401 (10.19)  |               | .252 (6.40)   |               | .565 (14.35)  |
| 15         | .551 (14.00)  |               | .252 (6.40)   |               | .715 (18.16)  |
| 21         | .701 (17.81)  |               | .252 (6.40)   |               | .865 (21.97)  |
| 25         | .801 (20.34)  |               | .252 (6.40)   |               | .965 (24.51)  |
| 31         | .951 (24.16)  |               | .252 (6.40)   |               | 1.115 (28.34) |
| 37         | 1.101 (27.97) |               | .252 (6.40)   |               | 1.265 (32.13) |
| 51         | 1.051 (26.70) |               | .295 (7.49)   |               | 1.215 (30.86) |

| Panel A Thickness | A             |               | Jackpost Kit Number* |
|-------------------|---------------|---------------|----------------------|
|                   | + .005 (0.13) | - .000 (0.00) |                      |
| 3/32 (2.4)        | .087 (2.21)   |               | 320-9505-007         |
| 1/16 (1.6)        | .056 (1.42)   |               | 320-9505-006         |
| 3/64 (1.2)        | .042 (1.07)   |               | 320-9505-005         |
| 1/32 (0.8)        | .025 (0.64)   |               | 320-9505-004         |

\*A kit consists of 2 jackpost, 2 nuts, 2 washers.



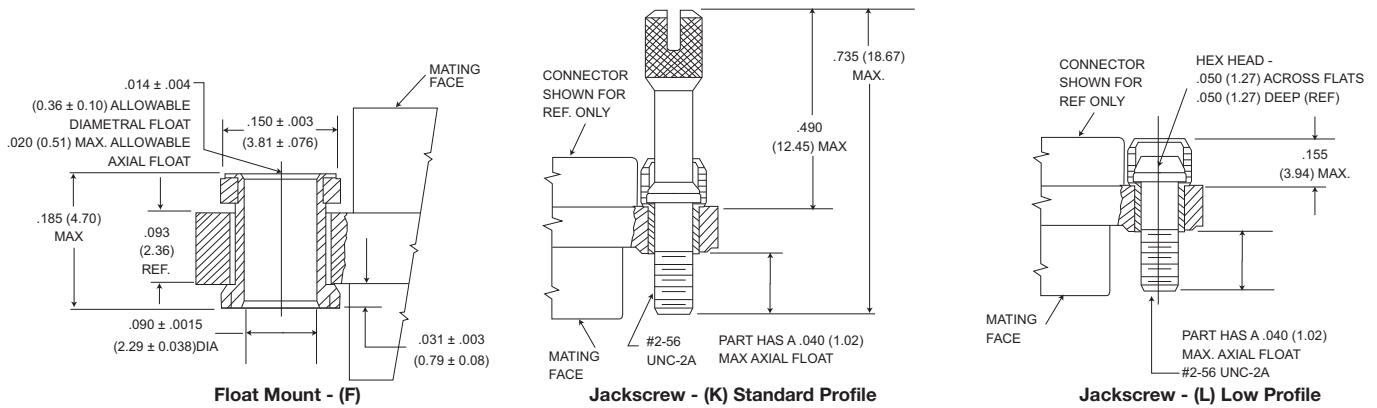
Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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## Mounting Hardware Views (sizes 9-51)

This hardware is factory installed.

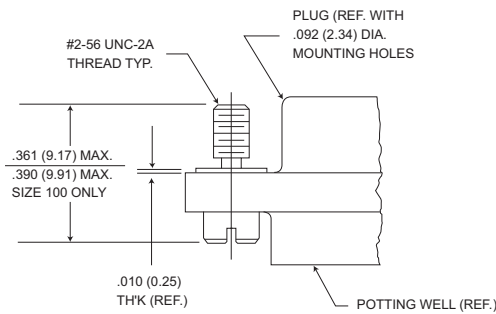


Shown here is a cutaway view of the float mount for the MDM connector. The basic shell dimensions are the same for the float mount and the screw mounting hole configurations. View shown is for standard float mount front panel mounting. Reverse mounting is available on request.

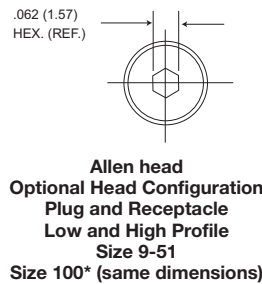
\* NOTE: Torque values are as follows:  
 Low Profile Jackscrew (L)-2.5 in-lbs  
 Standard Jackscrew (K)-2.5 in-lbs

## Mounting Hardware to Military Specification (for sizes 9 - 100) per MIL-DTL-83513/5

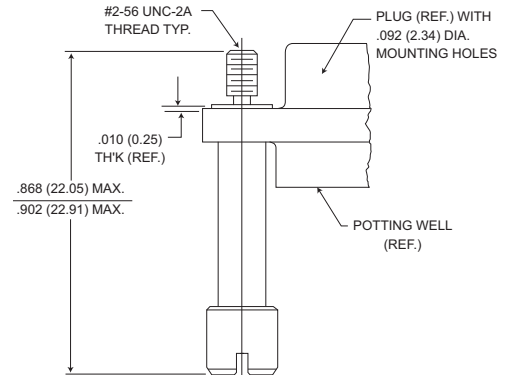
This hardware supplied in kits unassembled (2 pieces of each item).



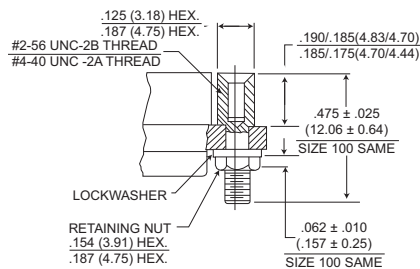
**Figure 1. Jackscrew - Low profile Slotted Head Size 9-51 Size 100\***



**Allen head Optional Head Configuration Plug and Receptacle Low and High Profile Size 9-51 Size 100\* (same dimensions)**



**Figure 2. Jackscrew - High Profile Slotted Head Size 9-51 Size 100\***



**Figure 3. Jackpost Assembly Size 9-51 Size 100\***

To order hardware kits separately, order either by M83513/5-\*\* or by 320-950X-XXX.

| Description  | Size 9-51 |              | Size 100* |                  |
|--|-----------|--------------|-----------|------------------|
|  | Mod Code  | Part Number  | Mod Code  | Part Number      |
| Slotted Head Jackscrew Assy Low Profile (Figure 1) | M5        | 320-9508-025 | 05        | M15 320-9508-021 |
| Slotted Head Jackscrew Assy Low Profile (Figure 2) | M6        | 320-9508-027 | 06        | M16 320-9508-023 |
| Allen Head Jackscrew Assy Low Profile (Figure 1)   | M2        | 320-9508-026 | 02        | M12 320-9508-022 |
| Allen Head Jackscrew Assy High Profile (Figure 2)  | M3        | 320-9508-028 | 03        | M13 320-9508-024 |
| Jackpost Assy (Figure 3)                           | M7        | 320-9505-033 | 07        | M17 320-9505-030 |

\*Size 100 requires B1 size mounting holes for Mil-Spec hardware

Note: Torque values as follows:

- Size 9-51 4.0 in-lbs
- Size 100 6.0 in-lbs

Dimensions shown in inch (mm)

Specifications and dimensions subject to change

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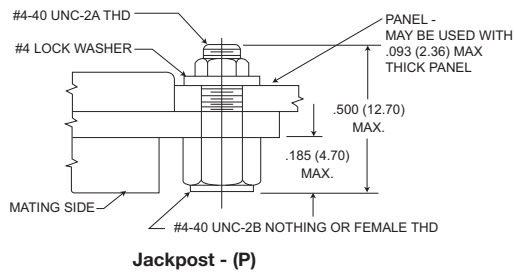
## Mounting Hardware Views (for size 100)

This hardware supplied unassembled.

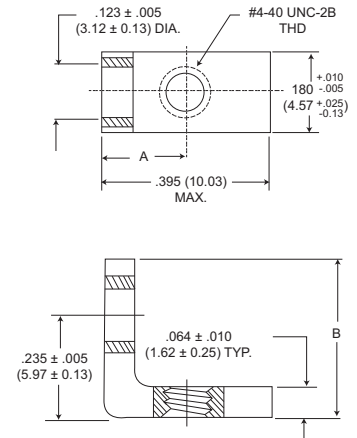


**90° Angle Mounting Bracket**

Note: Size 100 requires .120 dia (B) mounting hole when using Commercial (P) jackpost kits.



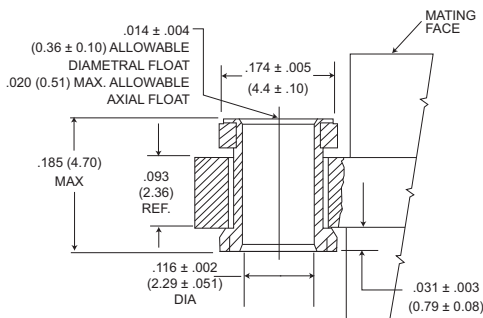
**Jackpost - (P)**



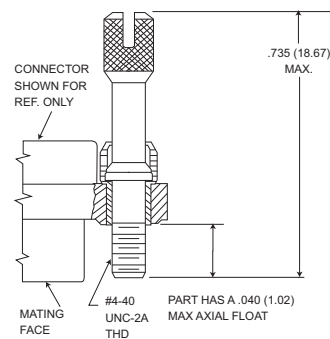
**90° Angle Mounting Bracket**

| Description              | Part Number  | A<br>± .005 (0.13) | B<br>Max.   |
|--------------------------|--------------|--------------------|-------------|
| Jackpost kit             | 320-9505-015 | N/A                |             |
| Mounting Bracket 90° MDM | 015-9528-000 | .191 (4.85)        | .370 (9.40) |

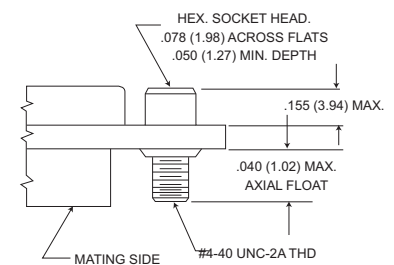
This hardware is factory installed.



**Float Mount - (F) Std.**



**Jackscrew - (K) Standard**



**Jackscrew - (L) (Low Profile)**

\*NOTE: Torque values are as follows:  
Low Profile Jackscrew (L)-4.0 in-lbs  
Standard Profile Jackscrew (K)-4.0 in-lbs

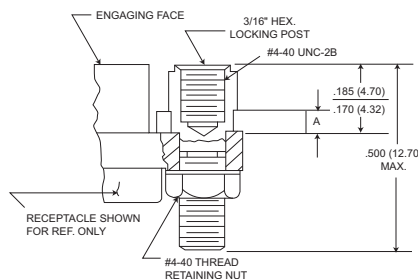
## Jackpost Bushing (for Rear Panel Mounting)

| Panel Thickness | A<br>+ .005 (0.13)<br>- .000 (0.00) | Jackpost Kit Number* |
|-----------------|-------------------------------------|----------------------|
| 3/32 (2.4)      | .087 (2.21)                         | 320-9505-013         |
| 1/16 (1.6)      | .058 (1.42)                         | 320-9505-012         |
| 1/32 (0.8)      | .025 (0.64)                         | 320-9505-010         |
| 3/64 (1.2)      | .042 (1.07)                         | 320-9505-011         |

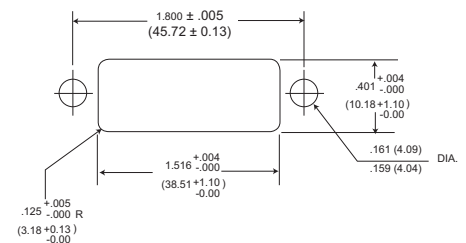
\*2 jackposts, 2 nuts, 2 washers

Torque value for size 100

Note: Size 100 requires B mounting hole shell size when using rear panel mount jackposts



### Dimensions for Rear Panel Mounting



Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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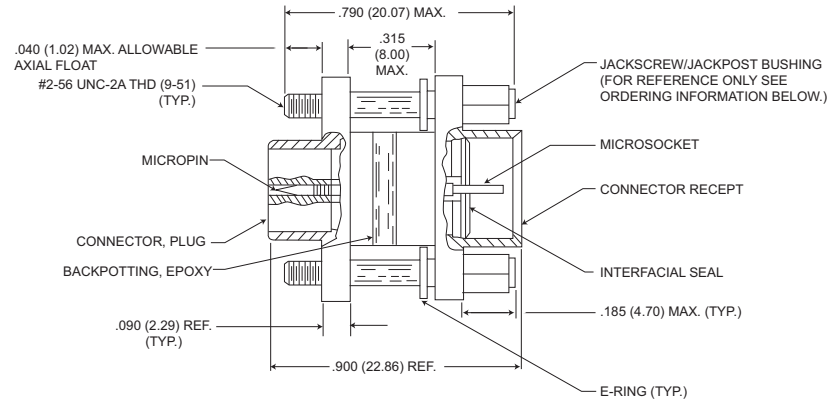
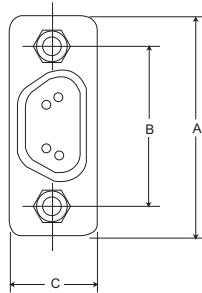
## Connector Saver



Save wear and tear on your equipment and systems connectors by using the "Connector Saver".

The multi-matings and unmatings experienced by most connectors during testing and final check out can be eliminated.

Simply mate the "Connectors Saver" to your unit and use the opposite side for your testing interface...less wear, less tear, less chance of damage. It is available in all eight standard MDM layouts. Mating hardware is available and can be ordered either separately or included with the connector saver.



MDM Size 9 Shown

| Size | Electroless Nickel (A174) Plated |              | Cadmium over Nickel (A101) Plated |               | *Hardware Kits  | A<br>Max.     | B<br>± .005 (0.13) | C<br>Max.    |
|------|----------------------------------|--------------|-----------------------------------|---------------|-----------------|---------------|--------------------|--------------|
|      | With Hardware                    | W/O Hardware | With Hardware                     | W/O Hardware  |                 |               |                    |              |
| 9    | MDM98479-86                      | MDM98479-18  | MDM98479-78                       | MDM-97294-371 | 320-9505-014**  | .785 (19.94)  | .565 (14.35)       | .308 (7.82)  |
| 15   | MDM98479-87                      | MDM98479-19  | MDM98479-79                       | MDM-97294-372 | 320-9505-014**  | .935 (23.75)  | .715 (18.16)       | .308 (7.82)  |
| 21   | MDM98479-88                      | MDM98479-20  | MDM98479-80                       | MDM-97294-373 | 320-9505-014**  | 1.085 (27.56) | .865 (21.97)       | .308 (7.82)  |
| 25   | MDM98479-89                      | MDM98479-21  | MDM98479-81                       | MDM-97294-374 | 320-9505-014**  | 1.185 (30.10) | .965 (24.51)       | .308 (7.82)  |
| 31   | MDM98479-90                      | MDM98479-14  | MDM98479-82                       | MDM-97294-375 | 320-9505-014**  | 1.335 (33.91) | 1.115 (28.32)      | .308 (7.82)  |
| 37   | MDM98479-91                      | MDM98479-15  | MDM98479-83                       | MDM-97294-376 | 320-9505-014**  | 1.485 (37.72) | 1.265 (32.13)      | .308 (7.82)  |
| 51   | MDM98479-92                      | MDM98479-16  | MDM98479-84                       | MDM-97294-377 | 320-9505-014**  | 1.435 (36.45) | 1.215 (30.86)      | .351 (8.91)  |
| 100  | MDM98479-93                      | MDM98479-17  | MDM98479-85                       | MDM-97294-717 | 320-9508-014*** | 2.170 (55.12) | 1.800 (45.72)      | .394 (10.01) |

\* Kit contains 2 jackpost/jackscrew bushings and 2 E-Rings.

\*\* Size 9-51-#2-56 UNC-2B Thread

\*\*\* Size 100-#4-40 UNC-2B Thread

Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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M83513/ 01 - H100 - \*\* \*\*\*\*

**SERIES**

- MDM - Metal Shell, Liquid Crystal Polymer (LCP)
- MDB - Diallyl Phthalate Insulator
- MDVB - Polyester Insulator
- 

**MIL-C-83513 SLASH SHEET**

- 01 - Plug, Connector, Solderpot
  - 02 - Receptacle, Connector, Solderpot
  - 03 - Plug, Connector, Crimp Type
  - 04 - Receptacle, Connector, Crimp Type
  - 05 - Hardware Only  $\triangle$
  - 06 - Plug, Connector, Solderpot
  - 07 - Receptacle, Connector, Solderpot
  - 08 - Plug, Connector, Crimp Type
  - 09 - Receptacle, Connector, Crimp Type
- } Metal Shell
- } Plastic  $\triangle$

**INSERT ARRANGEMENT**

|     | <u>METAL SHELL</u> | <u>PLASTIC</u> |
|-----|--------------------|----------------|
| A - | 9 Contact          | 9 Contact      |
| B - | 15 Contact         | 15 Contact     |
| C - | 21 Contact         | 21 Contact     |
| D - | 25 Contact         | 25 Contact     |
| E - | 31 Contact         | 31 Contact     |
| F - | 37 Contact         | 37 Contact     |
| G - | 51 Contact         | 51 Contact     |
| H - | 100 Contact        | $\triangle$    |

**WIRE TYPE**

- No Number - For Solderpot
- 01 - 18" long, #26 AWG per MIL-W-22759/11-26-9 (all white)
  - 02 - 36" long, #26 AWG per MIL-W-22759/11-26-9 (all white)
  - 03 - 18" long, #26 AWG per MIL-W-22759/11-26-9  
Color Coded per MIL-STD-681, System 1, 10 colors repeating  $\triangle$
  - 04 - 36" long, #26 AWG per MIL-W-22759/11-26-9  
Color Coded per MIL-STD-681, System 1, 10 colors repeating  $\triangle$
  - 05 - .5" long, #25 AWG, type S per QQ-W-343, Gold Plated
  - 06 - 1.0" long, #25 AWG, type S per QQ-W-343, Gold Plated
  - 07 - .5" long, #25 AWG, type S per QQ-W-343, Tin Plated
  - 08 - 1.0" long, #25 AWG, type S per QQ-W-343, Tin Plated
  - 09 - 18" long, #26 AWG per MIL-W-22759/33-26-9 (all white)  $\triangle$
  - 10 - 36" long, #26 AWG per MIL-W-22759/33-26-9 (all white)  $\triangle$
  - 11 - 18" long, #26 AWG per MIL-W-22759/33-26-9  
Color Coded per MIL-STD-681, System 1, 10 colors repeating  $\triangle$   $\triangle$
  - 12 - 36" long, #26 AWG per MIL-W-22759/33-26-9  
Color Coded per MIL-STD-681, System 1, 10 colors repeating  $\triangle$   $\triangle$
  - 13 - 72" long, #26 AWG per MIL-W-22759/11-26-9 (all white)
  - 14 - 72" long, #26 AWG per MIL-W-22759/11-26-9  
Color Coded per MIL-STD-681, System 1, 10 colors repeating  $\triangle$
  - 15 - 72" long, #26 AWG per MIL-W-22759/33-26-9 (all white)  $\triangle$
  - 16 - 72" long, #26 AWG per MIL-W-22759/33-26-9  
Color Coded per MIL-STD-681, System 1, 10 colors repeating  $\triangle$   $\triangle$

**NOTES:**

- <sup>1</sup> - For every Mil Spec Part Number, ITT has one corresponding part number shown an example
- $\triangle$  - Tolerance on wire lengths: 18", 36" and 72" long – +1.00"/-0.00" .5" and 1.00" – +.200"/-.000"
- $\triangle$  - For space application, connector shell finish must be "A174" and wire must be per MIL-W-22759/33-26.
- 4 - Any deviations to these P/N's will result in assignment of a special P/N, consult factory.
- $\triangle$  - Size 100 not available in / 06 through / 09. (Plastic shell)
- $\triangle$  - Color coding in accordance with MIL-STD-681, System 1, no parenthesis. See page 83 for color code chart.
- $\triangle$  - For mounting hardware to Military Specification (sizes 9 to 100) see page 13.

**SHELL FINISH**

- No number - for plastic type connector
- C – for Cadmium/Yellow chromate over nickel
- N – A174 - Electroless Nickel A174  $\triangle$



M83513/ 10 - A \*\* C \*

**SERIES**

Connector, Electrical, Rectangular  
 Microminiature, Polarized Shell  
 PC Board Mounting

**MIL-C-83513 SLASH SHEET**

- 10 - Connector, Plug, Condensed Board Right Angle (CBR), Sizes 9 – 37
- 11 - Connector, Plug, CBR, Size 51
- 12 - Connector, Plug, CBR, Size 100
- 13 - Connector, Receptacle, CBR, Sizes 9 – 37
- 14 - Connector, Receptacle, CBR Size 51
- 15 - Connector, Receptacle, CBR, Size 100
- 16 - Connector, Plug, Board Right Angle (BR), Sizes 9 – 37
- 17 - Connector, Plug, BR, Size 51
- 18 - Connector, Plug, BR, Size 100
- 19 - Connector, Receptacle, BR, Sizes 9 – 37
- 20 - Connector, Receptacle, BR Size 51
- 21 - Connector, Receptacle, BR Size 100
- 22 - Connector, Plug, Board Straight (BS), Sizes 9 – 37
- 23 - Connector, Plug, BS, Size 51
- 24 - Connector, Plug, BS, Size 100
- 25 - Connector, Receptacle, BS, Sizes 9 – 37
- 26 - Connector, Receptacle, BS, Size 51
- 27 - Connector, Receptacle, BS Size 100

**INSERT ARRANGEMENT**

METAL SHELL

- A - 9 Contact
- B - 15 Contact
- C - 21 Contact
- D - 25 Contact
- E - 31 Contact
- F - 37 Contact
- G - 51 Contact
- H - 100 Contact

**WIRE TYPE**

- No Number - For Solderpot
- 01 - .109" long, #24 AWG solid copper wire per QQ-W-343, Type "S", solder dipped
- 02 - .140" long, #24 AWG solid copper wire per QQ-W-343, Type "S", solder dipped  $\triangle$
- 03 - .172" long, #24 AWG solid copper wire per QQ-W-343, Type "S", solder dipped

**NOTES:**

- 1 - For every Mil Spec Part Number, ITT has one corresponding part number
- $\triangle$  - Tolerance on wire lengths  $\pm$ .015
- $\triangle$  - For space application, connector shell finish must be "N".
- 4 - Any deviations to these P/N's will result in assignment of a special P/N, consult customer service.

**SHELL FINISH**

- No letter - for plastic type connector
- C - Cadmium / Yellow chromate over nickel
- N - Electroless Nickel  $\triangle$   $\triangle$

**HARDWARE**

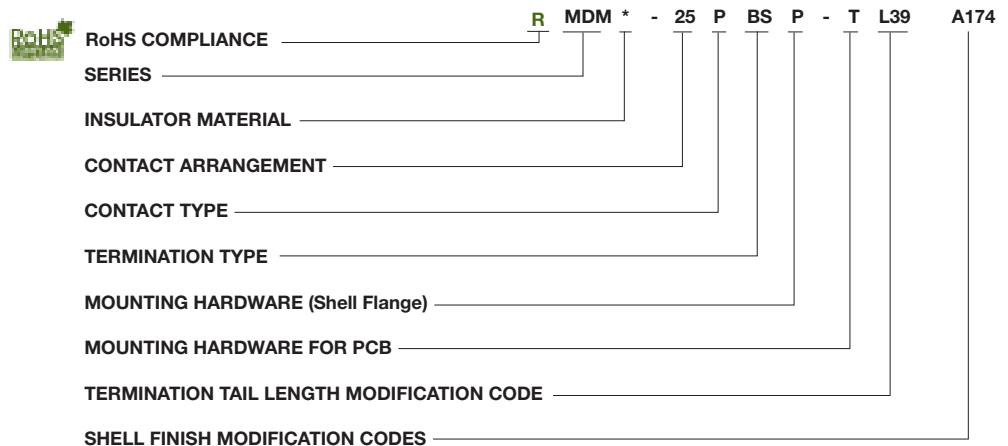
- N - No jackpost
- P - Jackpost (permanently attached)
- T - Threaded insert



MDM-PCB connectors are designed for use with flex circuitry, flat cable and printed circuit boards or multi-layer boards. They use the standard MDM metal shell and provide high density and high reliability in board-to-board, board-to-cable and cable-to-cable applications.

MDM-PCB connectors are available in 8 shell sizes with 9 to 100 contacts. Terminations may be straight (BS) or at 90° right angle (BR, CBR) board thickness. Jackpost mounting for use with locking hardware is also available.

## How to Order - MDM-PCB Series



- SERIES**  
MDM - Micro "D" Metal Shell
- INSULATOR MATERIAL**  
Liquid Crystal Polymer (LCP)
- CONTACT ARRANGEMENT**  
9, 15, 21, 25, 31, 37, 51, and 100
- CONTACT TYPE**  
P - Pin (Plug)  
S - Socket (Receptacle)

- TERMINATION TYPE**  
BS - Straight PCB Termination  
BR - Right Angle PCB Termination  
CBR - Right Angle Narrow Profile PCB Terminations
- MOUNTING HARDWARE (Shell Flange)**  
P - Jackposts  
M7 - Jackposts  
M83513/5-07 (Sizes 9-51)  
M17 - Jackposts  
M83513/5-17 (Size 100)  
No letter - none

- MOUNTING HARDWARE FOR PCB**  
T - Threaded Insert  
#2-56 Thd for Shell Sizes 9 thru 51  
#4-40 Thd for Shell Size 100  
No letter - none

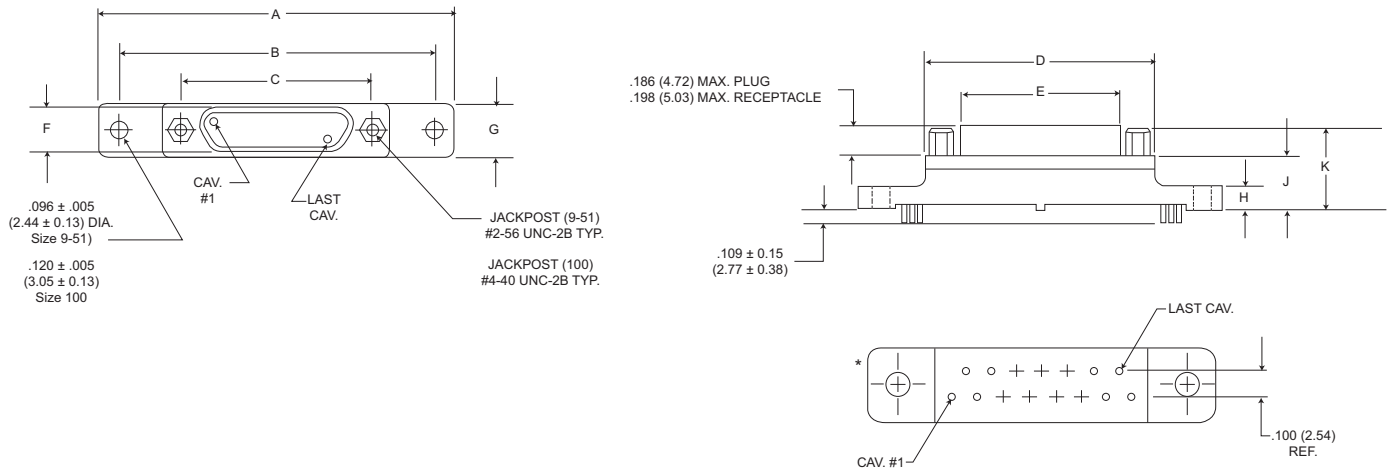
- TERMINATION TAIL LENGTH MODIFICATION CODE**  
None - .109 (2.77) ±.015 (0.38) Standard  
L61 - .125 (3.18)  
L56 - .150 (3.81)  
L57 - .190 (4.83)  
L39 - .250 (6.35)  
L58 - .375 (9.52)

- SHELL FINISH MODIFICATION CODES**  
None - Yellow Chromate/Cadmium over Nickel  
A174 - Electroless Nickel  
A172 - Gold over Nickel  
A141 - Iridite/Alodine  
A30 - Black Anodize  
(For special modification codes, consult customer service.)

NOTE: Back molding material - Epoxy Hysol #MG40FS



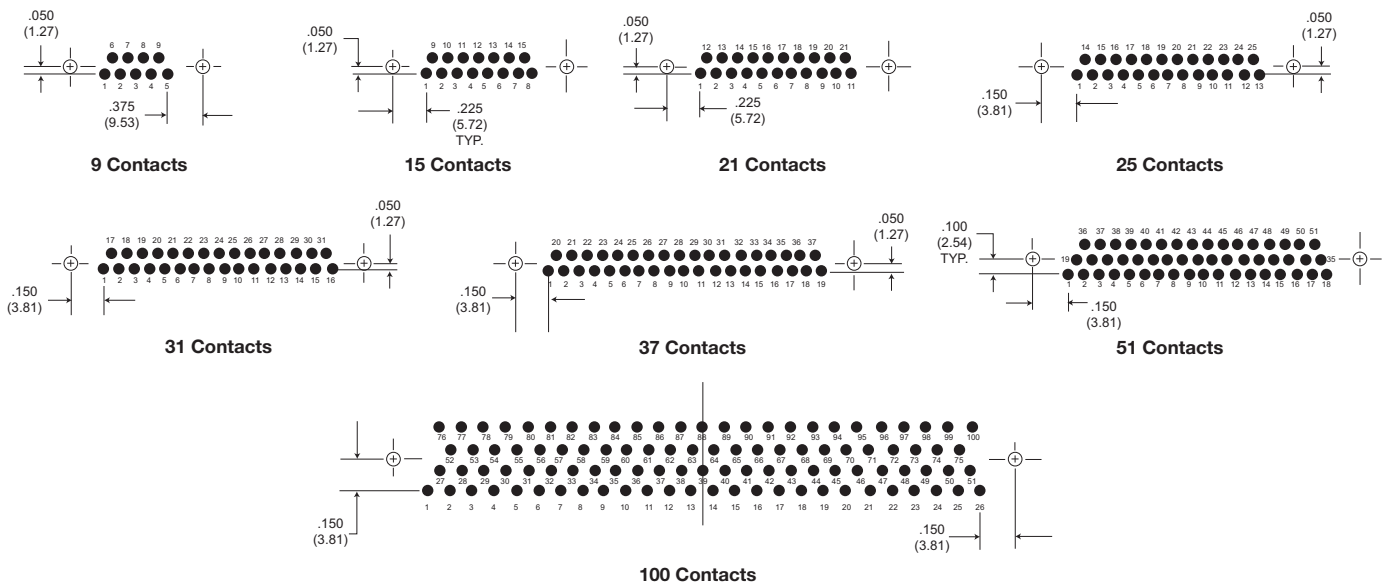
## BS (Board Straight) Series



### PCB Termination Arrangements\* (Viewed from PCB solder side)

Identification number shown for plug connector, use reverse order for socket connector.

NOTE: Dimensions shown are for reference only-consult factory for final design dimensions.



NOTE: Standard lead termination is #24 AWG, solid copper, solder or tin dipped

All Termination Configurations .100 (2.54) x .100 (2.54) Grid Pattern, Offset .050 (1.27)

| Part Number<br>By Shell Size | A             | B             | C             | D             | E             | F            | G            | H           | J            | K            |
|------------------------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|-------------|--------------|--------------|
|                              | Max.          | ±.007 (.18)   | ±.005 (.13)   | Max.          | Max.          | Max.         | Max.         | Max.        | Max.         | Max.         |
| MDM-9PBS*                    | 1.390 (35.31) | 1.150 (29.21) | .565 (14.35)  | .785 (19.94)  | .334 (8.48)   | .185 (4.70)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-9SBS*                    | 1.390 (35.31) | 1.150 (29.21) | .565 (14.35)  | .785 (19.94)  | .402 (10.21)  | .253 (6.43)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-15PBS*                   | 1.390 (35.31) | 1.150 (29.21) | .715 (18.16)  | .935 (23.75)  | .484 (12.29)  | .185 (4.70)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-15SBS*                   | 1.390 (35.31) | 1.150 (29.21) | .715 (18.16)  | .935 (23.75)  | .552 (13.97)  | .253 (6.43)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-21PBS*                   | 1.690 (43.93) | 1.450 (36.83) | .865 (21.97)  | 1.085 (27.56) | .634 (16.10)  | .185 (4.70)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-21SBS*                   | 1.690 (43.93) | 1.450 (36.83) | .865 (21.97)  | 1.085 (27.56) | .702 (17.83)  | .253 (6.43)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-25PBS                    | 1.740 (44.20) | 1.500 (38.10) | .965 (24.51)  | 1.185 (30.10) | .734 (18.64)  | .185 (4.70)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-25SBS*                   | 1.740 (44.20) | 1.500 (38.10) | .965 (24.51)  | 1.185 (30.10) | .802 (20.37)  | .253 (6.43)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-31PBS*                   | 2.040 (51.82) | 1.800 (45.72) | 1.115 (28.32) | 1.335 (33.91) | .884 (22.45)  | .185 (4.70)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-31SBS*                   | 2.040 (51.82) | 1.800 (45.72) | 1.115 (28.32) | 1.335 (33.91) | .952 (24.18)  | .253 (6.43)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-37PBS*                   | 2.340 (59.44) | 2.100 (53.34) | 1.265 (32.13) | 1.485 (37.72) | 1.034 (26.26) | .185 (4.70)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-37SBS*                   | 2.340 (59.44) | 2.100 (53.34) | 1.265 (32.13) | 1.485 (37.72) | 1.102 (27.99) | .253 (6.43)  | .308 (7.82)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-51PBS*                   | 2.270 (67.66) | 2.000 (50.80) | 1.215 (30.86) | 1.435 (36.45) | .984 (24.99)  | .228 (5.79)  | .351 (8.92)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-51SBS*                   | 2.270 (67.66) | 2.000 (50.80) | 1.215 (30.86) | 1.435 (36.45) | 1.052 (26.72) | .296 (7.52)  | .351 (8.92)  | .165 (4.19) | .355 (9.02)  | .555 (14.10) |
| MDM-100PBS*                  | 3.070 (77.98) | 2.800 (71.12) | 1.800 (45.72) | 2.175 (55.24) | 1.384 (35.15) | .271 (6.88)  | .460 (11.68) | .303 (7.70) | .550 (12.70) | .686 (17.42) |
| MDM-100SBS*                  | 3.070 (77.98) | 2.800 (71.12) | 1.800 (45.72) | 2.175 (55.24) | 1.508 (38.30) | .394 (10.01) | .460 (11.68) | .303 (7.70) | .550 (12.70) | .686 (17.75) |

\*For jackpost, add letter "P" or "M7" for sizes 9-51, "M17" for size 100.

Dimensions shown in inch (mm)

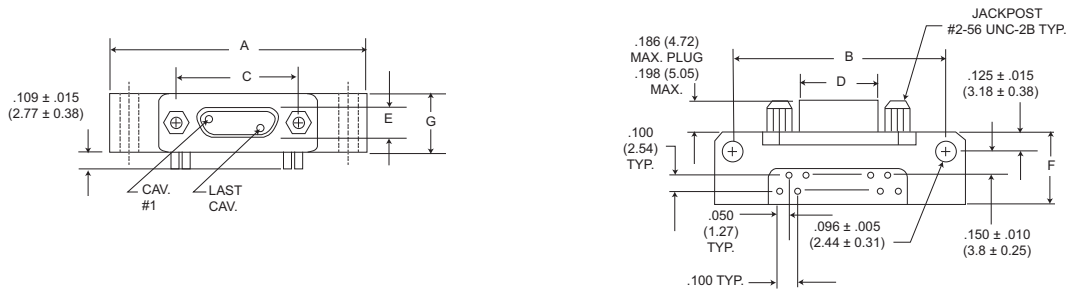
Specifications and dimensions subject to change

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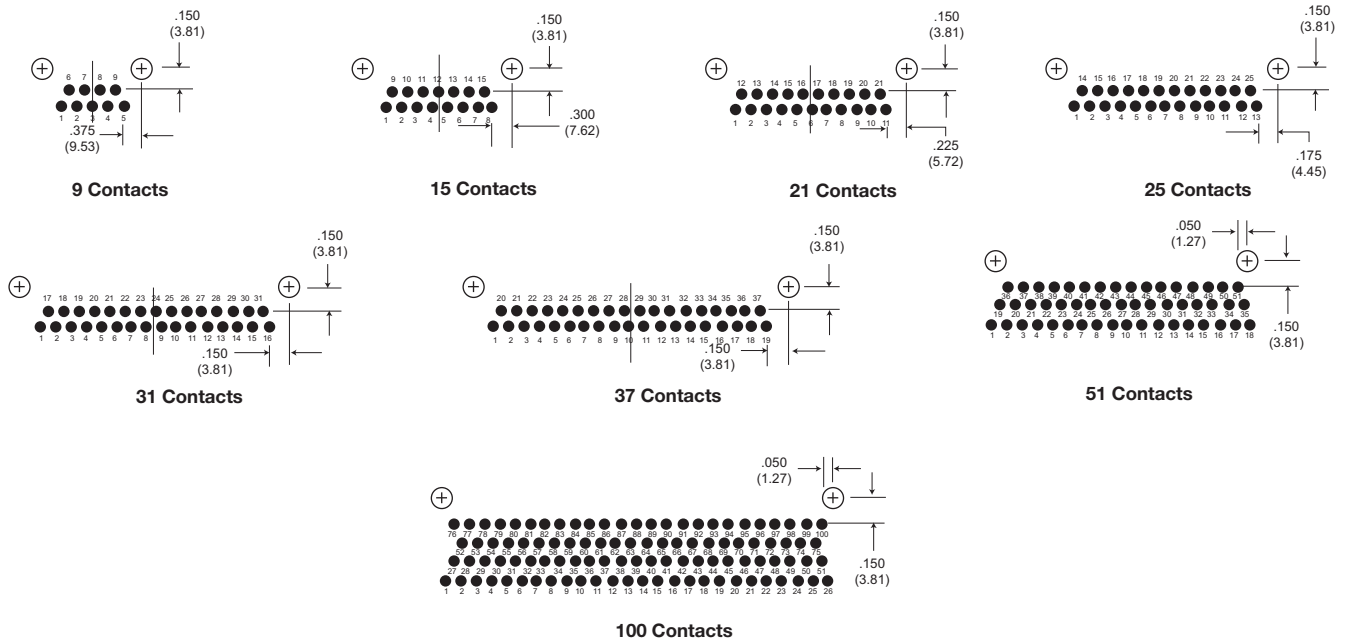


## BR (Board Right Angle) Series



### PCB Termination Arrangements (Viewed from bottom of connector, PCB solder side.)

Identification number shown for plug connector, use reverse order for socket connector.



NOTE: Standard lead termination is #24 AWG, gold plated, solid copper, solder or tin dripped.

All Termination Configurations .100 (2.54) x .100 (2.54) Grid Pattern, Offset .050 (1.27).

| Part Number<br>By Shell Size | A<br>Max.     | B<br>± .007 (.18) | C<br>± .005 (.13) | D<br>Max.     | E<br>Max.    | F<br>Max.    | G<br>Max.    |
|------------------------------|---------------|-------------------|-------------------|---------------|--------------|--------------|--------------|
| MDM-9PBR*                    | 1.390 (35.31) | 1.150 (29.21)     | .565 (14.35)      | .334 (8.48)   | .185 (4.70)  | .455 (11.56) | .308 (7.82)  |
| MDM-9SBR*                    | 1.390 (35.31) | 1.150 (29.21)     | .565 (14.35)      | .402 (10.21)  | .253 (6.43)  | .455 (11.56) | .308 (7.82)  |
| MDM-15PBR*                   | 1.540 (39.12) | 1.300 (33.02)     | .715 (18.16)      | .484 (12.29)  | .185 (4.70)  | .455 (11.56) | .308 (7.82)  |
| MDM-15SBR*                   | 1.540 (39.12) | 1.300 (33.02)     | .715 (18.16)      | .552 (13.97)  | .253 (6.43)  | .455 (11.56) | .308 (7.82)  |
| MDM-21PBR*                   | 1.690 (42.93) | 1.450 (36.83)     | .865 (21.97)      | .634 (16.10)  | .185 (4.70)  | .455 (11.56) | .308 (7.82)  |
| MDM-21SBR*                   | 1.690 (42.93) | 1.450 (36.83)     | .865 (21.97)      | .702 (17.83)  | .253 (6.43)  | .455 (11.56) | .308 (7.82)  |
| MDM-25PBR*                   | 1.790 (45.47) | 1.550 (39.37)     | .965 (24.51)      | .734 (18.64)  | .185 (4.70)  | .455 (11.56) | .308 (7.82)  |
| MDM-25SBR*                   | 1.790 (45.47) | 1.550 (39.37)     | .965 (24.51)      | .802 (20.37)  | .253 (6.43)  | .455 (11.56) | .308 (7.82)  |
| MDM-31PBR*                   | 2.040 (51.82) | 1.800 (45.72)     | 1.115 (28.32)     | .884 (22.45)  | .185 (4.70)  | .455 (11.56) | .308 (7.82)  |
| MDM-31SBR*                   | 2.040 (51.82) | 1.800 (45.72)     | 1.115 (28.32)     | .952 (24.18)  | .253 (6.43)  | .455 (11.56) | .308 (7.82)  |
| MDM-37PBR*                   | 2.340 (59.44) | 2.100 (53.34)     | 1.265 (32.13)     | 1.034 (26.26) | .185 (4.70)  | .455 (11.56) | .308 (7.82)  |
| MDM-37SBR*                   | 2.340 (59.44) | 2.100 (53.34)     | 1.265 (32.13)     | 1.102 (27.99) | .253 (6.43)  | .455 (11.56) | .308 (7.82)  |
| MDM-51PBR*                   | 1.875 (47.63) | 1.600 (40.64)     | 1.215 (30.86)     | .984 (24.99)  | .228 (5.79)  | .565 (14.35) | .351 (8.92)  |
| MDM-51SBR*                   | 1.875 (47.63) | 1.600 (40.64)     | 1.215 (30.86)     | 1.052 (26.72) | .296 (7.52)  | .565 (14.35) | .351 (8.92)  |
| MDM-100PBR*                  | 2.74 (69.72)  | 2.500 (63.50)     | 1.800 (45.72)     | 1.384 (35.15) | .271 (6.88)  | .755 (19.18) | .394 (10.01) |
| MDM-100SBR*                  | 2.74 (69.72)  | 2.500 (63.50)     | 1.800 (45.72)     | 1.508 (38.10) | .394 (10.01) | .755 (19.18) | .394 (10.01) |

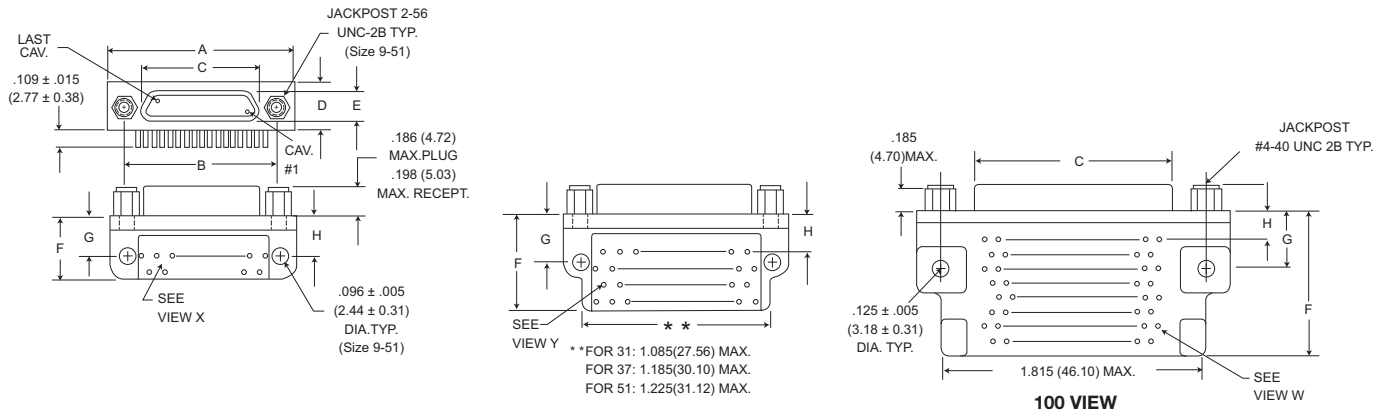
\*For jackpost, add letter "P" or "M7" for sizes 9-51, "M17" for size 100.



Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

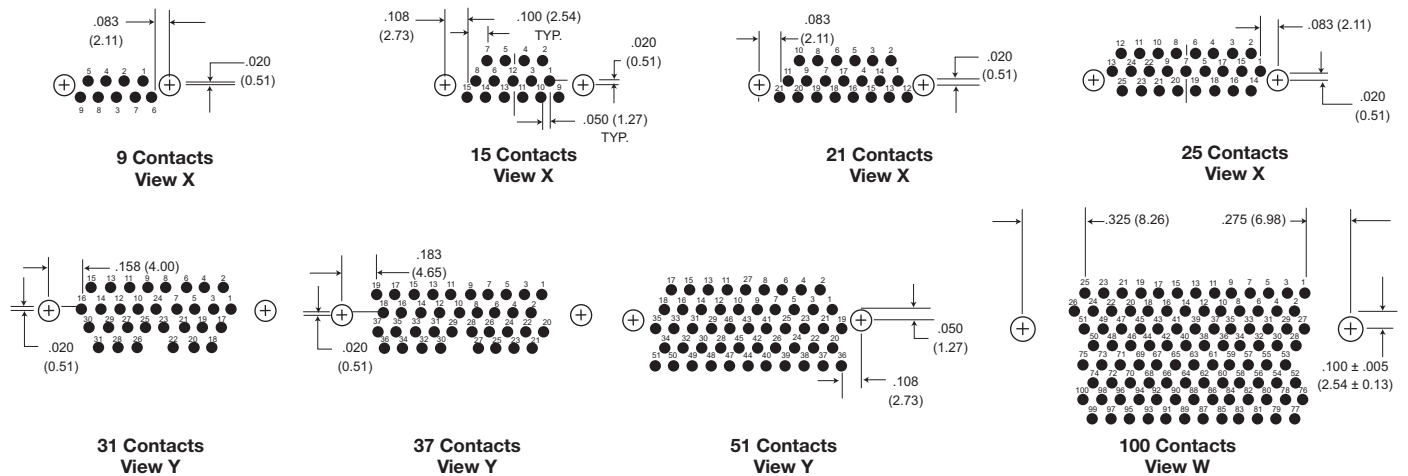
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## CBR (Condensed Board Right Angle) Series



### PCB Termination Arrangements (Viewed from bottom of connector, PCB solder side.)

Identification number shown for plug connector, use reverse order for socket connector.



All Termination Configurations .100 (2.54) x .100 (2.54) Grid Pattern, Offset .050 (1.27).

NOTE: Standard lead termination is #24 AWG, solid copper, solder or tin dripped.

| Part Number<br>By Shell Size | A<br>Max.     | B<br>± .005 (.13) | C<br>Max.     | D<br>Max.    | E<br>Max.    | F<br>Max.     | G<br>± .010 (.25) | H<br>± .010 (.25) |
|------------------------------|---------------|-------------------|---------------|--------------|--------------|---------------|-------------------|-------------------|
| MDM-9PCBR*                   | .785 (19.94)  | .565 (14.35)      | .334 (8.48)   | .308 (7.82)  | .185 (4.70)  | .420 (10.67)  | .250 (6.35)       | .230 (5.81)       |
| MDM-9SCBR*                   | .785 (19.94)  | .565 (14.35)      | .402 (10.21)  | .308 (7.82)  | .253 (6.43)  | .420 (10.67)  | .250 (6.35)       | .230 (5.81)       |
| MDM-15PCBR*                  | .935 (23.75)  | .715 (18.16)      | .484 (12.29)  | .308 (7.82)  | .185 (4.70)  | .420 (10.67)  | .250 (6.35)       | .130 (3.30)       |
| MDM-15SCBR*                  | .935 (23.75)  | .715 (18.16)      | .552 (13.97)  | .308 (7.82)  | .253 (6.43)  | .420 (10.67)  | .250 (6.35)       | .130 (3.30)       |
| MDM-21PCBR*                  | 1.085 (27.56) | .865 (21.97)      | .634 (16.10)  | .308 (7.82)  | .185 (4.70)  | .420 (10.67)  | .250 (6.35)       | .130 (3.30)       |
| MDM-21SCBR*                  | 1.085 (27.56) | .865 (21.97)      | .702 (17.83)  | .308 (7.82)  | .253 (6.43)  | .420 (10.67)  | .250 (6.35)       | .130 (3.30)       |
| MDM-25PCBR*                  | 1.185 (30.10) | .965 (24.51)      | .734 (18.64)  | .308 (7.82)  | .184 (4.70)  | .420 (10.67)  | .250 (6.35)       | .130 (3.30)       |
| MDM-25SCBR*                  | 1.185 (30.10) | .965 (24.51)      | .802 (20.37)  | .308 (7.82)  | .253 (6.43)  | .420 (10.67)  | .250 (6.35)       | .130 (3.30)       |
| MDM-31PCBR*                  | 1.335 (33.91) | 1.115 (28.32)     | .884 (22.45)  | .308 (7.82)  | .185 (4.70)  | .520 (13.21)  | .250 (6.35)       | .130 (3.30)       |
| MDM-31SCBR*                  | 1.335 (33.91) | 1.115 (28.32)     | .952 (24.18)  | .308 (7.82)  | .253 (6.43)  | .520 (13.21)  | .250 (6.35)       | .130 (3.30)       |
| MDM-37PCBR*                  | 1.485 (37.72) | 1.265 (32.13)     | 1.034 (26.26) | .308 (7.82)  | .185 (4.70)  | .520 (13.21)  | .250 (6.35)       | .130 (3.30)       |
| MDM-37SCBR*                  | 1.485 (37.72) | 1.265 (32.13)     | 1.102 (27.99) | .308 (7.82)  | .253 (6.43)  | .520 (13.21)  | .250 (6.35)       | .130 (3.30)       |
| MDM-51PCBR*                  | 1.435 (36.45) | 1.215 (30.86)     | .984 (24.99)  | .351 (8.92)  | .228 (5.79)  | .650 (16.15)  | .300 (7.62)       | .150 (3.81)       |
| MDM-51SCBR*                  | 1.435 (36.45) | 1.215 (30.86)     | 1.052 (26.72) | .351 (8.92)  | .296 (7.52)  | .650 (16.15)  | .300 (7.62)       | .150 (3.81)       |
| MDM-100PCBR*                 | 2.170 (55.12) | 1.800 (45.72)     | 1.384 (35.15) | .394 (10.01) | .271 (6.88)  | 1.000 (25.40) | .400 (10.16)      | .200 (5.08)       |
| MDM-100SCBR*                 | 2.170 (55.12) | 1.800 (45.72)     | 1.508 (38.10) | .394 (10.01) | .394 (10.01) | 1.000 (25.40) | .400 (10.16)      | .200 (5.08)       |

\*For jackpost, add letter "P" or "M7" for sizes 9-51, "M17" for size 100.

Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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# Flex Circuit Cable Assembly

## Terminating to Flexible Circuits



Ideally, for a low profile and a neat finish, it is best to terminate flexible circuits in line with the contacts. Since most Microminiature connectors have contacts set into two or three rows, termination is a simple process.

The diagrams opposite are basically a design guide for pad arrangements, to suit MDM connectors in particular and to ensure the circuits enter the potting well. The length of the pad is optional but of course it is important to provide enough coverlay, especially at the edges of the circuit, to avoid de-lamination. We suggest at least 0,51 mm (.020 inches). Our standard potting shrouds provide support to the circuit with a dimension of 7,00 mm (.275 inches) from the rear of the flange.

Please consult Customer Service for specific flex circuit assembly design considerations and requirements.

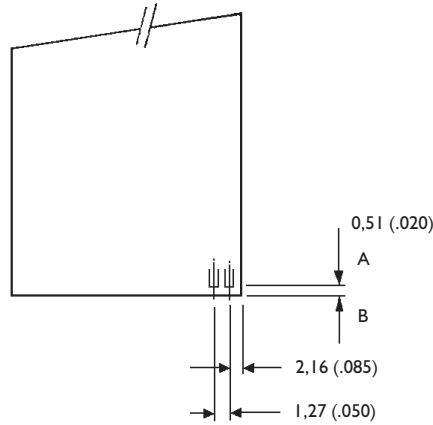
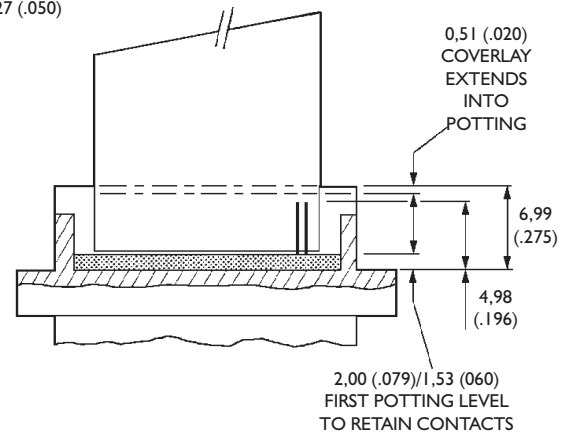


Diagram 1 shows details of the pad spacing and the suggested amount of material to be left between the end of the pad A and the edge of the flex B.

Diagram 2 illustrates how the connector is prepared with short pigtailed and a special first pot which just captures the contacts. The final back potting for strength is controlled by our standard 7,00 (.275) potting fixtures.



## Custom Back Shell Systems

ITT has designed numerous back shell solutions for micro miniature interconnects for many harsh environment applications. Although ITT does not offer a standard back shell portfolio today, we can design and manufacture a range of back fittings for our MDM connector products depending on the customer requirements. Utilizing one of our partnership relationships, one of our UK based micro product groups of ITT can provide can provide custom designs utilizing proven banded systems in which the braid is captivated over a chimney style outlet. These types of back shell systems are available in

different material finishes and sizes and can be provided with special process termination methods. In addition, ITT has developed a method of riveting the back fitting to the shell within the jacking area. This option guarantees 360 degree shielding effectiveness even when jackscrews or jacking posts are not being used.

Where a conduit system is preferred such as for test box environments in field locations, back fittings and a fully screened weatherproof convoluted trunking can be provided

In addition to the above ITT can provide special back potting style termination systems for environmental protection and strain relief. These types of a back shell style system are typically filled with epoxy or other encapsulating materials to provide a robust and effective back shell system.

## Sealing Gaskets

We have received requests for gasket materials to seal the MDM connectors into various enclosures. We recommend that you consider wider flanged connectors together with a low cost conductive gasket to provide an adequate surface area. This combination will give you IP-66 sealing with good EMC compliance. The following dimensions for gaskets and flange dimensions are regarded as the minimum that you should consider.

Conductive elastomers generally offer a superior shielding performance when compared with alternatives as in table below.

| Gasket Type           | Neoprene (wire impregnated) | Silicone (wire impregnated) | Silicone (oriented wire) | Neoprene (fabric wrap) | Metallic finger stock | Metallic fibres | Conductive silicone rubber |
|-----------------------|-----------------------------|-----------------------------|--------------------------|------------------------|-----------------------|-----------------|----------------------------|
| Shielding performance | S                           | S                           | G                        | G                      | G                     | G               | G                          |
| Temperature range     | S                           | G                           | G                        | S                      | G                     | G               | G                          |
| IP sealing            | P                           | P                           | S                        | S                      | P                     | P               | G                          |
| Compression force     | G                           | G                           | G                        | G                      | G                     | S               | S                          |
| Compression range     | S                           | S                           | S                        | G                      | G                     | P               | S                          |
| Surface texture       | P                           | P                           | G                        | P                      | G                     | P               | S                          |
| Compression set       | S                           | S                           | S                        | S                      | G                     | P               | G                          |
| Re-usability          | S                           | S                           | S                        | S                      | G                     | P               | G                          |

\* Neoprene is a trademark of Dupont P = Poor S = Satisfactory G = Good

Conductive rubber gaskets can be loaded with many different metallic fillers but the choice of material is dependent upon a number of factors such as level of conductivity, shielding effectiveness, galvanic compatibility and cost.

Galvanic Corrosion can occur when two dissimilar metals are in contact with one another in the presence of an electrolyte. The type of gasket material has to be assessed because of the use of metallic fillers. Many applications are dry indoor environments where corrosion is not a major concern. However, for external use, particularly marine, it is recommended that consideration be given to compatibility. The table on the next page is a summary.

| Enclosure Material       | Silver/Nickel | Silver/Copper | Silver/aluminum | Inert aluminum | Silver/Glass | Silver | Nickel/Graphite | Nickel |
|--------------------------|---------------|---------------|-----------------|----------------|--------------|--------|-----------------|--------|
| aluminum alloys          | X             | X             | □               | ▲              | X            | X      | □               | □      |
| Magnesium alloys         | X             | X             | □               | □              | X            | X      | □               | □      |
| Stainless steel          | ▲             | ▲             | ▲               | ▲              | ▲            | ▲      | ▲               | ▲      |
| Copper alloys            | ▲             | ▲             | ▲               | ▲              | ▲            | ▲      | ▲               | ▲      |
| Cadmium plating          | X             | X             | □               | □              | X            | X      | □               | □      |
| Tin plating              | □             | X             | □               | ▲              | □            | □      | ▲               | ▲      |
| Nickel plating           | ▲             | □             | □               | ▲              | ▲            | ▲      | ▲               | ▲      |
| Chromium plating         | ▲             | ▲             | ▲               | ▲              | ▲            | ▲      | ▲               | ▲      |
| Silver plating           | ▲             | ▲             | ▲               | ▲              | ▲            | ▲      | ▲               | ▲      |
| Zinc & galvanise plating | X             | X             | □               | □              | X            | X      | □               | □      |
| Titanium                 | ▲             | ▲             | ▲               | ▲              | ▲            | ▲      | ▲               | ▲      |

▲ = good □ = Satisfactory X = Not recommended



Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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# Appendix

## "L" Code Chart

| SORTED BY LENGTH |          |      | SORTED BY CODE   |         |          |
|------------------|----------|------|------------------|---------|----------|
| Wire Length, IN. |          |      | Wire Length, IN. |         |          |
| Decimal          | Fraction | Code | Code             | Decimal | Fraction |
| 0.080            |          | L63  | L1               | 0.500   | 1/2      |
| 0.094            | 3/32     | L62  | L2               | 1.000   |          |
| 0.110            |          | L65  | L3               | 6.000   |          |
| 0.125            | 1/8      | L61  | L4               | 12.000  |          |
| 0.140            |          | L67  | L5               | 20.000  |          |
| 0.150            |          | L56  | L6               | 2.000   |          |
| 0.171            |          | L66  | L7               | 1.500   |          |
| 0.187            | 3/16     | L17  | L8               | 7.000   |          |
| 0.190            |          | L57  | L9               | 5.000   |          |
| 0.210            |          | L59  | L10              | 3.000   |          |
| 0.250            | 1/4      | L39  | L11              | 4.000   |          |
| 0.312            | 3/8      | L60  | L12              | 0.625   | 5/8      |
| 0.375            | 3/8      | L58  | L13              | 10.000  |          |
| 0.380            |          | L64  | L14              | 0.750   | 3/4      |
| 0.500            | 1/2      | L1   | L15              | 3.500   |          |
| 0.625            | 5/8      | L12  | L16              | 2.500   |          |
| 0.750            | 3/4      | L4   | L17              | 0.187   | 3/16     |
| 1.000            |          | L2   | L18              | 8.000   |          |
| 1.500            |          | L7   | L25              | 2.250   |          |
| 2.000            |          | L6   | L28              | 4.500   |          |
| 2.250            |          | L25  | L39              | 0.250   | 1/4      |
| 2.500            |          | L16  | L45              | 9.000   |          |
| 3.000            |          | L10  | L46              | 15.000  |          |
| 3.500            |          | L15  | L52              | 11.500  |          |
| 4.000            |          | L11  | L55              | 18.000  |          |
| 4.500            |          | L28  | L56              | 0.150   |          |
| 5.000            |          | L9   | L57              | 0.190   |          |
| 6.000            |          | L3   | L58              | 0.375   | 3/8      |
| 7.000            |          | L8   | L59              | 0.210   |          |
| 8.000            |          | L18  | L60              | 0.312   | 5/16     |
| 9.000            |          | L45  | L61              | .0125   | 1/8      |
| 10.000           |          | L13  | L62              | 0.094   | 3/32     |
| 11.500           |          | L52  | L63              | 0.080   |          |
| 12.000           |          | L4   | L64              | 0.380   |          |
| 15.000           |          | L46  | L65              | 0.110   |          |
| 18.000           |          | L55  | L66              | 0.171   |          |
| 20.000           |          | L5   | L67              | 0.140   |          |

#25AWG, SOLID COPPER WIRE PER QQ-W-343, TYPE "S", GOLD PLATED PER MIL-G-45204, TYPE II GRADE C OR D, CLASS 1 (50 MICROINCHES MINIMUM)

Nano "L" Code Charts on page 80.

# Appendix

## "L" Code Chart (for Nano products only)

| SORTED BY LENGTH |          |      | SORTED BY CODE   |         |          |
|------------------|----------|------|------------------|---------|----------|
| Wire Length, IN. |          |      | Wire Length, IN. |         |          |
| Decimal          | Fraction | Code | Code             | Decimal | Fraction |
| 0.080            |          | L63  | L1               | 0.500   | 1/2      |
| 0.094            | 3/32     | L62  | L2               | 1.000   |          |
| 0.110            |          | L65  | L3               | 6.000   |          |
| 0.125            | 1/8      | L61  | L4               | 12.000  |          |
| 0.140            |          | L67  | L5               | 20.000  |          |
| 0.150            |          | L56  | L6               | 2.000   |          |
| 0.171            |          | L66  | L7               | 1.500   |          |
| 0.187            | 3/16     | L17  | L8               | 7.000   |          |
| 0.190            |          | L57  | L9               | 5.000   |          |
| 0.210            |          | L59  | L10              | 3.000   |          |
| 0.250            | 1/4      | L39  | L11              | 4.000   |          |
| 0.312            | 3/8      | L60  | L12              | 0.625   | 5/8      |
| 0.375            | 3/8      | L58  | L13              | 10.000  |          |
| 0.380            |          | L64  | L14              | 0.750   | 3/4      |
| 0.500            | 1/2      | L1   | L15              | 3.500   |          |
| 0.625            | 5/8      | L12  | L16              | 2.500   |          |
| 0.750            | 3/4      | L4   | L17              | 0.187   | 3/16     |
| 1.000            |          | L2   | L18              | 8.000   |          |
| 1.500            |          | L7   | L25              | 2.250   |          |
| 2.000            |          | L6   | L28              | 4.500   |          |
| 2.250            |          | L25  | L39              | 0.250   | 1/4      |
| 2.500            |          | L16  | L45              | 9.000   |          |
| 3.000            |          | L10  | L46              | 15.000  |          |
| 3.500            |          | L15  | L52              | 11.500  |          |
| 4.000            |          | L11  | L55              | 18.000  |          |
| 4.500            |          | L28  | L56              | 0.150   |          |
| 5.000            |          | L9   | L57              | 0.190   |          |
| 6.000            |          | L3   | L58              | 0.375   | 3/8      |
| 7.000            |          | L8   | L59              | 0.210   |          |
| 8.000            |          | L18  | L60              | 0.312   | 5/16     |
| 9.000            |          | L45  | L61              | .0125   | 1/8      |
| 10.000           |          | L13  | L62              | 0.094   | 3/32     |
| 11.500           |          | L52  | L63              | 0.080   |          |
| 12.000           |          | L4   | L64              | 0.380   |          |
| 15.000           |          | L46  | L65              | 0.110   |          |
| 18.000           |          | L55  | L66              | 0.171   |          |
| 20.000           |          | L5   | L67              | 0.140   |          |

#30AWG, SOLID COPPER WIRE PER QQ-W-343, TYPE "S", GOLD PLATED PER MIL-G-45204, TYPE II GRADE C OR D, CLASS 1 (50 MICROINCHES MINIMUM)



Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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# Appendix

## "H" Code Charts

16878/4

Wire, Electrical, Polytetrafluorethylene (PTFE) Insulated, 200 Degrees C, 600 Volts, Extruded Insulation

| Length | Yellow | White | System 1 |
|--------|--------|-------|----------|
| 1      | 030    | C30   | A30      |
| 2      | 024    | C24   | A24      |
| 3      | 020    | C20   | 027      |
| 4      | -      | C33   | 033      |
| 5      | 031    | C31   | A31      |
| 6      | 019    | 047   | 016      |
| 8      | 026    | C26   | 034      |
| 9      | 015    | C15   | A15      |
| 10     | 029    | C29   | 025      |
| 12     | 028    | 008   | 002      |
| 16     | 039    | C39   | A39      |
| 17     | 036    | C36   | A36      |
| 18     | 001    | 044   | 003      |
| 20     | 038    | C38   | 023      |
| 21     | 055    | C55   | A55      |
| 24     | 009    | 045   | 004      |
| 30     | 010    | C10   | 005      |
| 35     | 018    | C18   | A18      |
| 36     | 011    | 058   | 006      |
| 40     | 037    | C37   | A37      |
| 42     | 012    | 021   | A12      |
| 48     | 013    | C13   | 048      |
| 50     | 040    | C40   | A40      |
| 60     | 014    | C14   | 056      |
| 72     | 017    | 059   | 046      |
| 80     | 032    | C32   | A32      |
| 92     | 022    | C22   | A22      |
| 96     | 035    | C35   | A35      |
| 120    | 042    | C42   | 041      |
| 180    | 043    | C43   | A43      |

22759/11-26

Wire, Electrical, Fluoropolymer-Insulated, Extruded TFE, Silver-Coated Copper Conductor, 600 Volt

| Length | White | 10 Color Repeat | System 1 |
|--------|-------|-----------------|----------|
| 1      | G30   | Y30             | H30      |
| 2      | G24   | Y24             | H24      |
| 3      | G20   | Y20             | H20      |
| 4      | G33   | Y33             | H33      |
| 5      | G31   | Y31             | H31      |
| 6      | 065   | Y19             | 072      |
| 8      | G26   | Y26             | H26      |
| 9      | G15   | Y15             | H15      |
| 10     | G29   | Y29             | H29      |
| 12     | 066   | Y28             | 073      |
| 16     | G39   | Y39             | H39      |
| 17     | G36   | Y36             | H36      |
| 18     | 067   | Y01             | 074      |
| 20     | G38   | Y38             | H38      |
| 21     | G55   | Y55             | H55      |
| 24     | 068   | Y09             | 075      |
| 30     | G10   | Y10             | H10      |
| 35     | G18   | Y18             | H18      |
| 36     | 069   | Y11             | 076      |
| 40     | G37   | Y37             | H37      |
| 42     | G12   | Y12             | H12      |
| 48     | 070   | Y13             | 077      |
| 50     | G40   | Y40             | H40      |
| 60     | G14   | Y14             | H14      |
| 72     | 071   | Y17             | 078      |
| 80     | G32   | Y32             | H32      |
| 92     | G22   | Y22             | H22      |
| 96     | G35   | Y35             | H35      |
| 120    | G42   | Y42             | H42      |
| 180    | G43   | Y43             | H43      |

22759/33-26

Wire, Electrical, Fluoropolymer-Insulated, Crosslinked Modified, ETFE, Lightweight, Silver-Coated, High-Strength Copper Alloy 200 Degrees C, 600 Volt

| Length | White | 10 Color Repeat | System 1 |
|--------|-------|-----------------|----------|
| 1      | V30   | W30             | X30      |
| 2      | V24   | W24             | X24      |
| 3      | V20   | W20             | X20      |
| 4      | V33   | W33             | X33      |
| 5      | V31   | W31             | X31      |
| 6      | V19   | W19             | X19      |
| 8      | V26   | W26             | X26      |
| 9      | V15   | W15             | X15      |
| 10     | V29   | W29             | X29      |
| 12     | V28   | W28             | X28      |
| 16     | V39   | W39             | X39      |
| 17     | V36   | W36             | X36      |
| 18     | V01   | W01             | X01      |
| 20     | V38   | W38             | X38      |
| 21     | V55   | W55             | X55      |
| 24     | V09   | W09             | X09      |
| 30     | V10   | W10             | X10      |
| 35     | V18   | W18             | X18      |
| 36     | V11   | W11             | X11      |
| 40     | V37   | W37             | X37      |
| 42     | V12   | W12             | X12      |
| 48     | V13   | W13             | X13      |
| 50     | V40   | W40             | X40      |
| 60     | V14   | W14             | X14      |
| 72     | V17   | W17             | X17      |
| 80     | V32   | W32             | X32      |
| 92     | V22   | W22             | X22      |
| 96     | V35   | W35             | X35      |
| 120    | V42   | W42             | X42      |
| 180    | V43   | W43             | X43      |

Nano "H" Code Charts on page 82.

Dimensions shown in inch (mm)  
Specifications and dimensions subject to change

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# Appendix

## "H" Code Charts (for Nano products only)

MIL-W-16878/6

Wire, Electrical, Polytetrafluorethylene (PTFE)  
Insulated, 200 Degrees C, 250 Volts, Extruded  
Insulation

| Length | Yellow | White | System 1 |
|--------|--------|-------|----------|
| 1      | 030    | C30   | A30      |
| 2      | 024    | C24   | A24      |
| 3      | 020    | C20   | 027      |
| 4      | -      | C33   | 033      |
| 5      | 031    | C31   | A31      |
| 6      | 019    | 047   | 016      |
| 8      | 026    | C26   | 034      |
| 9      | 015    | C15   | A15      |
| 10     | 029    | C29   | 025      |
| 12     | 028    | 008   | 002      |
| 16     | 039    | C39   | A39      |
| 17     | 036    | C36   | A36      |
| 18     | 001    | 044   | 003      |
| 20     | 038    | C38   | 023      |
| 21     | 055    | C55   | A55      |
| 24     | 009    | 045   | 004      |
| 30     | 010    | C10   | 005      |
| 35     | 018    | C18   | A18      |
| 36     | 011    | 058   | 006      |
| 40     | 037    | C37   | A37      |
| 42     | 012    | 021   | A12      |
| 48     | 013    | C13   | 048      |
| 50     | 040    | C40   | A40      |
| 60     | 014    | C14   | 056      |
| 72     | 017    | 059   | 046      |
| 80     | 032    | C32   | A32      |
| 92     | 022    | C22   | A22      |
| 96     | 035    | C35   | A35      |
| 120    | 042    | C42   | 041      |
| 180    | 043    | C43   | A43      |

# Appendix

## MIL-STD-681 Wire Color Code

### Reference Data

| PIN No. | MIL-STD-681 No. | Base Color | First Stripe | Second Stripe | Third Stripe | PIN No. | MIL-STD-681 No. | Base Color | First Stripe | Second Stripe | Third Stripe |
|---------|-----------------|------------|--------------|---------------|--------------|---------|-----------------|------------|--------------|---------------|--------------|
| 1*      | 0               | BLK        |              |               |              | 51      | 957             | WHT        | GRN          | VIO           |              |
| 2*      | 1               | BRN        |              |               |              | 52      | 958             | WHT        | GRN          | GRY           |              |
| 3*      | 2               | RED        |              |               |              | 53      | 967             | WHT        | BLU          | VIO           |              |
| 4*      | 3               | ORN        |              |               |              | 54      | 968             | WHT        | BLU          | GRY           |              |
| 5*      | 4               | YEL        |              |               |              | 55      | 978             | WHT        | VIO          | GRY           |              |
| 6*      | 5               | GRN        |              |               |              | 56      | 9012            | WHT        | BLK          | BRN           | RED          |
| 7*      | 6               | BLU        |              |               |              | 57      | 9013            | WHT        | BLK          | BRN           | ORN          |
| 8*      | 7               | VIO        |              |               |              | 58      | 9014            | WHT        | BLK          | BRN           | YEL          |
| 9*      | 8               | GRY        |              |               |              | 59      | 9015            | WHT        | BLK          | BRN           | GRN          |
| 10*     | 9               | WHT        |              |               |              | 60      | 9016            | WHT        | BLK          | BRN           | BLU          |
| 11      | 90              | WHT        | BLK          |               |              | 61      | 9017            | WHT        | BLK          | BRN           | VIO          |
| 12      | 91              | WHT        | BRN          |               |              | 62      | 9018            | WHT        | BLK          | BRN           | GRY          |
| 13      | 92              | WHT        | RED          |               |              | 63      | 9023            | WHT        | BLK          | RED           | ORN          |
| 14      | 93              | WHT        | ORN          |               |              | 64      | 9024            | WHT        | BLK          | RED           | YEL          |
| 15      | 94              | WHT        | YEL          |               |              | 65      | 9025            | WHT        | BLK          | RED           | GRN          |
| 16      | 95              | WHT        | GRN          |               |              | 66      | 9026            | WHT        | BLK          | RED           | BLU          |
| 17      | 96              | WHT        | BLU          |               |              | 67      | 9027            | WHT        | BLK          | RED           | VIO          |
| 18      | 97              | WHT        | VIO          |               |              | 68      | 9028            | WHT        | BLK          | RED           | GRY          |
| 19      | 98              | WHT        | GRY          |               |              | 69      | 9034            | WHT        | BLK          | ORN           | YEL          |
| 20      | 901             | WHT        | BLK          | BRN           |              | 70      | 9035            | WHT        | BLK          | ORN           | GRN          |
| 21      | 902             | WHT        | BLK          | RED           |              | 71      | 9036            | WHT        | BLK          | ORN           | BLU          |
| 22      | 903             | WHT        | BLK          | ORN           |              | 72      | 9037            | WHT        | BLK          | ORN           | VIO          |
| 23      | 904             | WHT        | BLK          | YEL           |              | 73      | 9038            | WHT        | BLK          | ORN           | GRY          |
| 24      | 905             | WHT        | BLK          | GRN           |              | 74      | 9045            | WHT        | BLK          | YEL           | GRN          |
| 25      | 906             | WHT        | BLK          | BLU           |              | 75      | 9046            | WHT        | BLK          | YEL           | BLU          |
| 26      | 907             | WHT        | BLK          | VIO           |              | 76      | 9047            | WHT        | BLK          | YEL           | VIO          |
| 27      | 908             | WHT        | BLK          | GRY           |              | 77      | 9048            | WHT        | BLK          | YEL           | GRY          |
| 28      | 912             | WHT        | BRN          | RED           |              | 78      | 9056            | WHT        | BLK          | GRN           | BLU          |
| 29      | 913             | WHT        | BRN          | ORN           |              | 79      | 9057            | WHT        | BLK          | GRN           | VIO          |
| 30      | 914             | WHT        | BRN          | YEL           |              | 80      | 9058            | WHT        | BLK          | GRN           | GRY          |
| 31      | 915             | WHT        | BRN          | GRN           |              | 81      | 9067            | WHT        | BLK          | BLU           | VIO          |
| 32      | 916             | WHT        | BRN          | BLU           |              | 82      | 9068            | WHT        | BLK          | BLU           | GRY          |
| 33      | 917             | WHT        | BRN          | VIO           |              | 83      | 9078            | WHT        | BLK          | VIO           | GRY          |
| 34      | 918             | WHT        | BRN          | GRY           |              | 84      | 9123            | WHT        | BRN          | RED           | ORN          |
| 35      | 923             | WHT        | RED          | ORN           |              | 85      | 9124            | WHT        | BRN          | RED           | YEL          |
| 36      | 924             | WHT        | RED          | YEL           |              | 86      | 9125            | WHT        | BRN          | RED           | GRN          |
| 37      | 925             | WHT        | RED          | GRN           |              | 87      | 9126            | WHT        | BRN          | RED           | BLU          |
| 38      | 926             | WHT        | RED          | BLU           |              | 88      | 9127            | WHT        | BRN          | RED           | VIO          |
| 39      | 927             | WHT        | RED          | VIO           |              | 89      | 9128            | WHT        | BRN          | RED           | GRY          |
| 40      | 928             | WHT        | RED          | GRY           |              | 90      | 9134            | WHT        | BRN          | ORN           | YEL          |
| 41      | 934             | WHT        | ORN          | YEL           |              | 91      | 9135            | WHT        | BRN          | ORN           | GRN          |
| 42      | 935             | WHT        | ORN          | GRN           |              | 92      | 9136            | WHT        | BRN          | ORN           | BLU          |
| 43      | 936             | WHT        | ORN          | BLU           |              | 93      | 9137            | WHT        | BRN          | ORN           | VIO          |
| 44      | 937             | WHT        | ORN          | VIO           |              | 94      | 9138            | WHT        | BRN          | ORN           | GRY          |
| 45      | 938             | WHT        | ORN          | GRY           |              | 95      | 9145            | WHT        | BRN          | YEL           | GRN          |
| 46      | 945             | WHT        | YEL          | GRN           |              | 96      | 9146            | WHT        | BRN          | YEL           | BLU          |
| 47      | 946             | WHT        | YEL          | BLU           |              | 97      | 9147            | WHT        | BRN          | YEL           | VIO          |
| 48      | 947             | WHT        | YEL          | VIO           |              | 98      | 9148            | WHT        | BRN          | YEL           | GRY          |
| 49      | 948             | WHT        | YEL          | GRY           |              | 99      | 9156            | WHT        | BRN          | GRN           | BLU          |
| 50      | 956             | WHT        | GRN          | BLU           |              | 100     | 9157            | WHT        | BRN          | GRN           | VIO          |

\* 10 colors repeat is the standard wire color code for MIL-DTL-83513 connectors.



# Terminology

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**Adhesive dispensing:** a computer-controlled machine automatically dispenses epoxy adhesive.

**Backmolding:** this term refers to the process of transfer-molding epoxy performs into a mold. The epoxy is heated and pressurized, much like conventional plastic molding.

**Backpotting:** the application of epoxy to connector wire terminations for strain relief and sealing. Epoxy is dispensed with pneumatic syringes. Standard Micro products have built-in potting wells to contain the epoxy, but optional potting in custom configurations is accomplished with inexpensive molds.

**Brady labels:** wraparound adhesive labels for multi-conductor cable.

**Breakout:** the area where one or more cables are joined together. A breakout frequently requires splices and extra strain relief such as cable ties or tubing.

**Electrical testing:** Hi-pot, insulation resistance, and continuity testing are standard tests for cable assemblies.

**Etching:** etching is a chemical process to prepare certain types of Teflon insulated wire for potting. Without etching, the epoxy will not bond properly.

**Expando:** braided sleeving used to protect a wire bundle. The simplest and least expensive method of jacketing a cable, expando tubing is made of abrasion-resistant nylon or other materials. The ends of the tubing are usually encapsulated in epoxy.

**Header:** a general term for any printed circuit board mounted connector used as an I/O port.

**Hot stamping:** insulated wire is imprinted with identification numbers or text.

**Hot-stamped heat shrink tubing:** used for multi-conductor cables, heat shrink tubing is impression stamped, then installed on the cable and shrunk.

**Ink-jet marking:** dots of ink are sprayed through a stationary nozzle onto a part moving on a conveyor. Ink jet marking is now standard.

**Ink-stamping:** the traditional method of placing metal type in a marking machine which is inked with a roller. The metal type transfers the ink to a rubber pad, and the part is pressed onto the pad. Oven curing is required.

**Jumper Cable:** this term usually applies to a short cable assembly that plugs into a printed circuit board one end, with the other end mounted in an I/O panel.

**Lacing:** the process of tying individual wires together into bundles. Special lacing tape is used.

**Laser stripping:** insulation is removed from the wire by using a special laser stripping machine. Typically used on flat cable.

**Mass-termination:** simultaneous termination of multiple contacts. Normally associated with IDC termination, mass termination is also used on micropins in a special multi-contact crimp tool.

**Pigtail:** a single-ended cable assembly having one connector on one end and unterminated wire on the other end.

**Potting:** the application of various adhesives to a connector. Potting encapsulates the wires or terminals, providing environmental sealing and strain relief.

**Silkscreening:** Ink is transferred through a screen.

**Stripping:** insulation is removed from wire ends on automatic cut and strip equipment.

**Thermal Shock:** a conditioning environmental test that cycles a part repeatedly through a specified temperature range. Thermal shock is frequently performed prior to pressure testing.

**Tinning:** the application of molten solder to connector terminals. Micro products are tinned on a fully automatic machine with cleaning, pre-heating and inert gas tinning. Pre-tinned leads ensure excellent solderability.

**Wire marking:** individual numbered adhesive tags are attached to each wire.

**Wire striping:** insulated wire from #24 thru #28 AWG is striped with colors for circuit identification.

**Wiring fixtures:** flat wiring boards or more complicated three-dimensional fixtures are required for many multi-branched cable harnesses. Mating connectors are fixtured in the exact position of the end use equipment, and the cable assembly is built on the fixture.

# Product Safety Information

**THIS NOTE MUST BE READ IN CONJUNCTION WITH THE PRODUCT DATA SHEET/CATALOG. FAILURE TO OBSERVE THE ADVICE IN THIS INFORMATION SHEET AND THE OPERATING CONDITIONS SPECIFIED IN THE PRODUCT DATA SHEET/ CATALOG COULD RESULT IN HAZARDOUS SITUATIONS.**

## 1. MATERIAL CONTENT AND PHYSICAL FORM

Electrical connectors do not usually contain hazardous materials. They contain conducting and non-conducting materials and can be divided into two groups.

a) Printed circuit types and low cost audio types which employ all plastic insulators and casings.

b) Rugged, Fire Barrier and High Reliability types with metal casings and either natural rubber, synthetic rubber, plastic or glass insulating materials. Contact materials vary with type of connector and also application and are usually manufactured from either: Copper, copper alloys, nickel, alumel, chromel or steel. In special applications, other alloys may be specified.

## 2. FIRE CHARACTERISTICS AND ELECTRIC SHOCK HAZARD

**There is no fire hazard when the connector is correctly wired and used within the specified parameters. Incorrect wiring or assembly of the connector or careless use of metal tools or conductive fluids, or transit damage to any of the component parts may cause electric shock or burns. Live circuits must not be broken by separating mated connectors as this may cause arcing, ionization and burning.** Heat dissipation is greater at maximum resistance in a circuit. Hot spots may occur when resistance is raised locally by damage, e.g. cracked or deformed contacts, broken strands of wire. Local overheating may also result from the use of the incorrect application tools or from poor quality soldering or slack screw terminals. Overheating may occur if the ratings in the product Data Sheet/Catalog are exceeded and can cause breakdown of insulation and hence electric shock. If heating is allowed to continue it intensifies by further increasing the local resistance through loss of temper of spring contacts, formation of oxide film on contacts and wires and leakage currents through carbonization of insulation and tracking paths. Fire can then result in the presence of combustible materials and this may release noxious fumes. Overheating may not be visually apparent. Burns may result from touching overheated components.

## 3. HANDLING

Care must be taken to avoid damage to any component parts of electrical connectors during installation and use. Although there are normally no sharp edges, care must be taken when handling certain components to avoid injury to fingers. Electrical connectors may be damaged in transit to the customers, and damage may result in creation of hazards. Products should therefore be examined prior to installation/use and rejected if found to be damaged.

## 4. DISPOSAL

Incineration of certain materials may release noxious or even toxic fumes.

## 5. APPLICATION

Connectors with exposed contacts should not be selected for use on the current supply side of an electrical circuit, because an electric shock could result from touching exposed contacts on an unmated connector. Voltages in excess of 30 V ac or 42.5 V dc are potentially hazardous and care should be taken to ensure that such voltages cannot be transmitted in any way to exposed metal parts of the connector body. The connector and wiring should be checked, before making live, to have no damage to metal parts or insulators, no solder blobs, loose strands, conducting lubricants, swarf, or any other undesired conducting particles. Circuit resistance and continuity check should be made to make certain that there are no high resistance joints or spurious conducting paths. Always use the correct application tools as specified in the Data Sheet/Catalog. Do not permit untrained personnel to wire, assemble or tamper with connectors. For operation voltage please see appropriate national regulations.

## IMPORTANT GENERAL INFORMATION

**(i) Air and creepage paths/Operating voltage.** The admissible operating voltages depend on the individual applications and the valid national and other applicable safety regulations.

For this reason the air and creepage path data are only reference values. Observe reduction of air and creepage paths due to PC board and/or harnessing.

### (ii) Temperature

All information given are temperature limits. The operation temperature depends on the individual application.

### (iii) Other important information

Cannon continuously endeavors to improve their products. Therefore, Cannon products may deviate from the description, technical data and shape as shown in this catalog and data sheets.

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## Product Warranty

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Dimensions shown in inch (mm)

Specifications and dimensions subject to change

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