

molex



AirBorn M Series

Microminiature Connectors — 0.050" (1.27mm)

TABLE OF CONTENTS

| | |
|---|-------------|
| Index | M-6 |
| Specifications..... | M-11 |
| Performance | M-12 |
| Part Number Description | M-13 |
| Mating Matrix | M-14 |
| Micro-Strip Connectors (Plastic) | |
| MA-1 One Row, Cable-to-Cable | M-15 |
| MA-1 One Row, Board-to-Cable | M-17 |
| MA-1 One Row Strip Connectors with Latches, MA Strip Guidelines | M-19 |
| MA-1 One Row, MA Strip Guidelines | M-20 – M-26 |
| MA-2 Two Row, Cable-to-Cable | M-27 |
| MA-2 Two Row, Board-to-Cable..... | M-29 |
| MA -2 Two Row Strip Connectors with Latches..... | M-31 |
| MA-2 Two Row, MA Strip Guidelines..... | M-32 – M-38 |
| Micro-D Cable-to-Cable Connectors (Metal and Plastic) | |
| MM - MM, MN - MN Rugged, Cable-to-Cable | M-39 |
| MM Rugged, Grounding Fingers..... | M-41 |
| MM Rugged, Integrated Shield Termination - Stranded Wire..... | M-43 |
| MM Rugged Metal Solder Cup (Integral Shield Termination) | M-45 |
| MM Rugged Metal, MN – Rugged Plastic Cable-to-Cable (Jumper Assembly) | M-47 |
| MQ - MQ, MP - MP Low-Profile | M-49 |
| MQ, MP Low-Profile, Jumper Assembly..... | M-51 |
| MK, ML Rugged Right-Angle, Narrow Footprint | M-53 |
| MK Rugged Right-Angle Through-Clearance..... | M-55 |
| MK Rugged Right-Angle Blind-Clearance | M-57 |
| MK, ML Rugged, Flex Cable Narrow Footprint..... | M-59 |
| MS, MR Low-Profile Right-Angle Narrow Footprint..... | M-61 |
| MS Low-Profile Right-Angle Blind-Clearance Cut | M-63 |
| MS, MR Low-Profile, Flex Cable Narrow Footprint..... | M-65 |
| MK, ML, MS, MR Board Layouts - Right-Angle Narrow Footprint..... | M-67 – M-70 |

TABLE OF CONTENTS

| | |
|--|-------------|
| MK Rugged Right-Angle, Board Mount Compressed Footprint | M-71 |
| MK Board Layouts - Right-Angle Compressed Footprint..... | M-73 – M-74 |
| MK - ML, MM - MN Board-to-Cable Rugged Board Mount Standard Footprint..... | M-75 |
| MK - ML, MM - MN Board-to-Cable Board Mount Standard Footprint..... | M-77 |
| MK, ML Board Layouts Right-Angle Standard Footprint..... | M-79 – M-80 |
| MK - ML Rugged Board Mount Cable-to-Board Narrow Footprint | M-81 |
| MK, ML Rugged Cable-to-Board Narrow Footprint | M-83 |
| MK, ML Board Layouts Straight Narrow Footprint | M-85 – M-86 |
| MK, ML Rugged Cable-to-Board Standard Footprint | M-87 |
| MK - ML Rugged Board Mount, MM - MN Rugged Cable-to-Board Standard Footprint | M-89 |
| MK - ML Board Layouts Straight, Standard Footprint..... | M-91 – M-94 |

Micro-D Surface Mount Board-to-Cable Connectors

| | |
|--|---------------|
| Specifications - Materials and Finishes - Surface Mount Connectors | M-95 |
| Performance - Surface Mount Connectors | M-96 |
| MM - MM, MN - MN Rugged Horizontal SMT Board SMT to Cable..... | M-97 |
| MM - MM, MN, MN Rugged Vertical SMT Cable-to-Board..... | M-99 |
| MM, MN Board Layouts - Rugged Horizontal SMT | M-101 – M-102 |
| MK - MM Rugged Cable-to-Board Vertical SMT..... | M-103 |
| MK - MM Rugged Cable-to-Board Vertical SMT..... | M-105 |
| MK, MM Board Layouts - Rugged Vertical SMT..... | M-107 – M-108 |
| MK - MM Rugged Card Edge Mount | M-109 |
| MK - MM Card Edge Mount to Cable..... | M-111 |
| MK, MM Board Layouts - Card Edge Mount | M-113 – M-116 |
| MF, MF Rugged Metal Filtered Cable Connectors | M-117 |
| Specifications - Materials and Finishes - Hybrid Connectors..... | M-119 |
| Performance Reference MIL-DTL-83513 - Hybrid Connectors | M-120 |
| MM, MM Rugged Metal Cable-to-Cable Hybrid | M-121 |
| MC, MC Circular Cable Connectors..... | M-123 |
| Specifications - Materials and Finishes - Rear Panel Mount Connectors..... | M-125 |
| Performance - Rear Panel Mount Connectors..... | M-126 |

TABLE OF CONTENTS

| | |
|---|---------------|
| MN - MN, MM - MM Rugged Metal and Plastic Cable-to-Cable (Rear Panel Mount)..... | M-127 |
| MN - MK, MM - MK Rugged Metal and Plastic Cable-to-Board (Rear Panel Mount) | M-129 |
| MK - MM, MK - MN Rugged Metal and Plastic Cable-to-Board (Rear Panel Mount)..... | M-131 |
| MK, MM, MK - MN Rugged Board Mount and MM, MN Rugged Cable (Rear Panel Mount) | M-133 |
| MK, MM, MN Board Layouts - Straight, Standard Footprint | M-135 – M-136 |
| MK - MK Right-Angle Board Mount (Rear Panel Mount)..... | M-137 |
| MK Board Layouts Right-Angle, Narrow Footprint, Rear Panel Mount | M-139 – M-140 |
| Specifications - Materials and Finishes - Sealed Connectors | M-141 |
| Performance Reference MIL-DTL-83513 | M-142 |
| MM, MM Rugged Metal I/O Sealed Connectors..... | M-143 |
| MM One Row Cable-to-Cable Rugged Metal Connectors | M-145 |
| MK One Row Right-Angle Rugged Metal PTH Connectors | M-147 |
| MK Board Layouts - Right-Angle Standard Polarization Positions | M-149 – M-150 |
| MK One Row Horizontal Surface Mount | M-151 |
| MK Board Layouts - One Row Horizontal SMT | M-153 – M-154 |

AirBorn M Series - Hardware, Contacts and Accessories

| | |
|--|---------------|
| Contacts, Contact Positions | M-157 |
| AirBorn M Series Wire Codes | M-158 – M-159 |
| Hardware - MM - MN - MQ - MP - MMHT - MQHT Jacking Hardware..... | M-160 |
| Polarized Keying Hardware | M-161 |
| MM - MQ I/O with EMI/RFI Backshell, MM - MK Rear Panel Mount Jackposts..... | M-162 |
| MK - Vertical SMT, MK - MS MKHT - MSHT, MTHT, MA, Mounting Brackets..... | M-163 |
| Twisted Pair Wire Connect Charts | M-164 |
| Hardware - Panel Mounting Dimensions, Panel Mounting Dimensions for Rear Panel Mount Connectors..... | M-165 |
| MM - MN Rugged Metal and Rugged Plastic Connector Savers..... | M-166 |
| MQ - MP Low-Profile Metal and Low-Profile Plastic Connector Savers..... | M-168 |
| MM - MM EMI/ RFI Straight Backshells..... | M-170 |
| MM - MM Rugged Metal 45° Backshells | M-172 |
| MM - MM Rugged Metal 90° Backshells | M-174 |

TABLE OF CONTENTS

| | |
|--|-------|
| MQ - MQ Low-Profile Metal EMI/RFI Straight Backshells | M-176 |
| MD - MD Rugged Metal Dust Covers | M-178 |
| MD - MD Rugged Metal Low-Profile Plastic ESD Dust Covers | M-180 |
| O-Rings and Gaskets | M-181 |
| MM, MN, MQ, MP - Rear Panel Mount Hardware for Standard I/O, Hardware for Non-Standard I/O | M-182 |
| Hardware - Panel Mounting Dimensions for Receptacles with Grounding Fingers | M-183 |
| C-Clip Hardware - MM - MN - MQ - MP - MMHT - MQHT Jacking Hardware | M-184 |

AirBorn MHT Series - 0.050" - High-Temperature Connectors

| | |
|--|-------|
| High-Temperature Connectors - Table of Contents..... | M-161 |
| Specifications..... | M-187 |
| Performance Reference MIL-DTL-83513 | M-188 |
| Part Number Description | M-189 |

Micro-D, High-Temperature, Cable-to-Cable Connectors

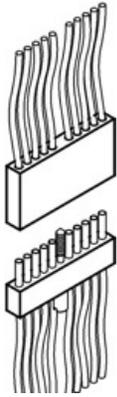
| | |
|--|-------|
| MMHT Rugged Metal, High Temperature Cable-to-Cable | M-190 |
| MQHT Rugged Metal, High Temperature Cable-to-Cable..... | M-192 |

Micro-D, High-Temperature, Board-to-Cable Connectors

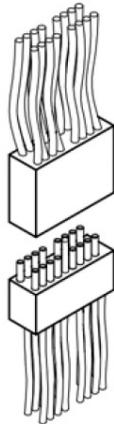
| | |
|--|---------------|
| MKHT - MMHT Rugged Metal, Right-Angle, Board-to-Cable Narrow Footprint..... | M-194 |
| MKHT Rugged Board Mount High-Temperature, MMHT Rugged Cable High-Temperature | M-196 |
| MKHT Board Layouts - Right-Angle, Narrow Footprint Standard Polarization | M-198 – M-199 |
| MSHT - MQHT Low-Profile Board Mount and Low-Profile Cable HT Narrow Footprint..... | M-200 |
| MSHT - MQHT Low-Profile Board Mount HT and Low-Profile Cable HT Narrow Footprint..... | M-202 |
| MSHT Board Layouts - Right-Angle, Narrow Footprint Standard Polarization..... | M-204 – M-205 |
| MTHT - MTHT Low-Profile Metal I/O Connector and Low-Profile Metal Board Mount with Mounting Holes..... | M-206 |
| MTHT Board Layouts Low-Profile Right-Angle, Standard Polarization | M-208 – M-209 |

AIRBORN M SERIES

MICRO-STRIP CONNECTORS CABLE-TO-CABLE

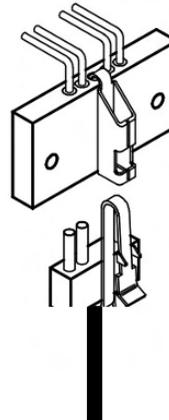


One Row
 Sizes: 2 through 60
 Page: M-15

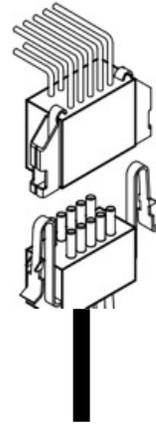


Two Row
 Sizes: 4 through 128
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MICRO-STRIP CONNECTORS BOARD-TO-CABLE



One Row
 Sizes: 3 through 60
 Page: M-17

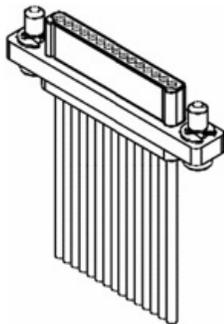
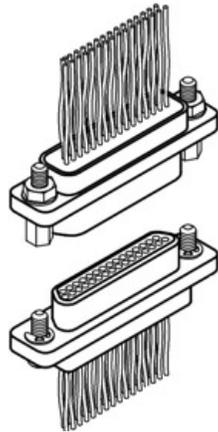


Two Row
 Sizes: 4 through 128
 Page: M-29

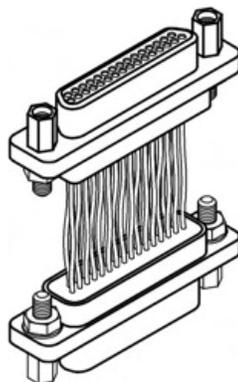
MICRO-D CONNECTORS CABLE-TO-CABLE

Rugged
 Sizes: 9 through 100
 Page: M-39

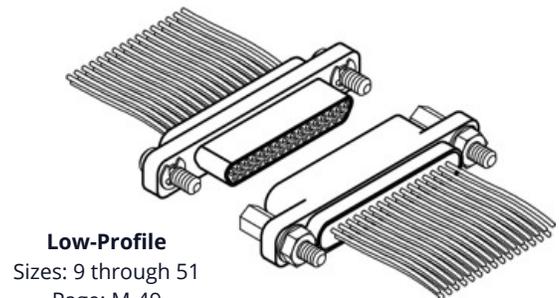
High-Temperature
 Sizes: 9 through 100
 Page: M-190



Single Row Micro
 Sizes: 4 through 25
 Page: M-143

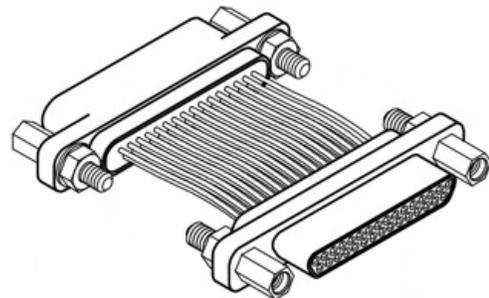


Rugged, Jumper Assembly
 Sizes: 9 through 100
 Page: M-47



Low-Profile
 Sizes: 9 through 51
 Page: M-49

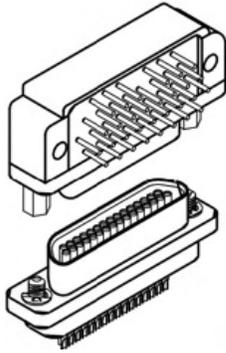
High-Temperature
 Sizes: 9 through 51
 Page: M-192



Low-Profile, Jumper Assembly
 Sizes: 9 through 51
 Page: M-51

AIRBORN M SERIES

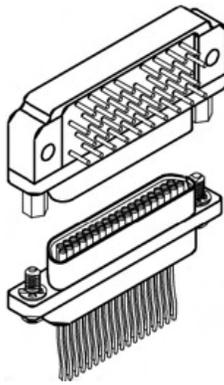
MICRO-D CONNECTORS BOARD-TO-CABLE



**Rugged Right-Angle,
Narrow Footprint**

Sizes: 9 through 100
Pages: M-53 and M-59

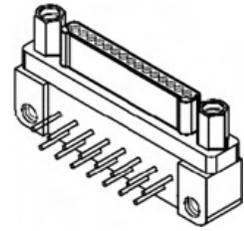
High-Temperature
Sizes: 9 through 100
Pages: M-194 and M-200



**Low-Profile Right-Angle,
Narrow Footprint**

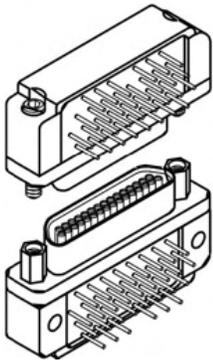
Sizes: 9 through 51
Pages: M-59 and M-63

High Temperature
Sizes: 9 through 51
Pages: M-200 and M-202



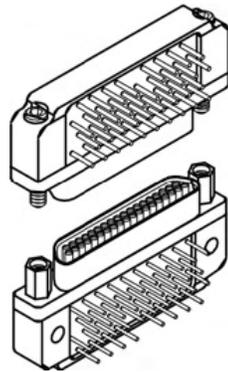
Single Row Micro

Sizes: 4 through 25
Page: M-145



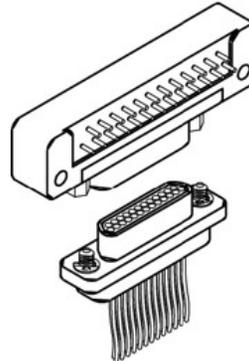
Rugged, Flex Cable

Sizes: 9 through 100
Page: M-57



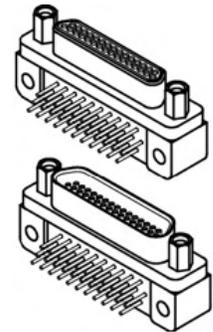
**Low-Profile, Flex Cable
Blind Clearance Cut**

Sizes: 9 through 5
Page: M-63



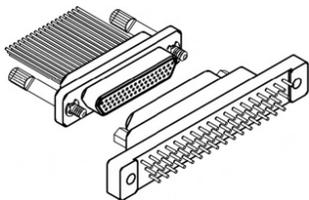
**Rugged Right-Angle,
Standard Footprint**

Sizes: 9 through 100
Pages: M-75 and M-77



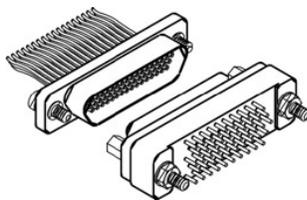
**Rear-Panel Mount
Compressed Footprint**

Sizes: 9 through 100
Pages: M-71



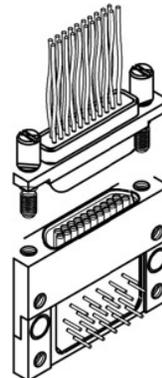
**Rugged Straight,
Narrow Footprint**

Sizes: 9 through 100
Pages: M-81 and M-83



**Rugged Straight,
Standard Footprint**

Sizes: 9 through 100
Pages: M-87 and M-89

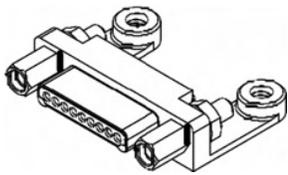


**Low-Profile,
Radius Shell
High Temperature**

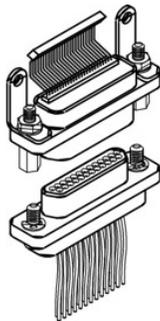
Sizes: 9 through 51
Page: M-206

AIRBORN M SERIES

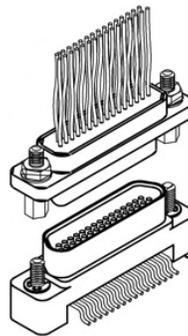
MICRO-D CONNECTORS SURFACE MOUNT BOARD-TO-CABLE



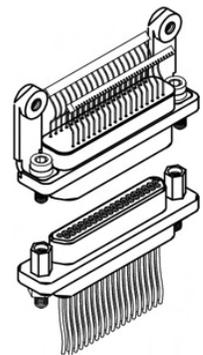
Single Row Micro
 Sizes 4 through 25
 Pages: M-151



Rugged Horizontal, Surface Mount
 Sizes: 9 through 51
 Pages: M-97 and M-99

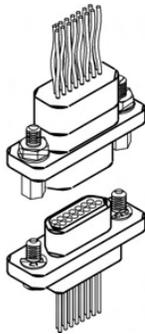


Rugged Vertical, Surface Mount
 Sizes: 9 through 51
 Pages: M-103 and M-105



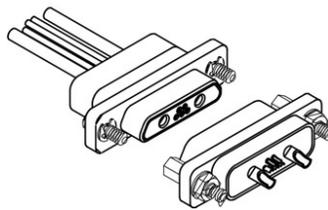
Rugged Card Edge Mount
 Sizes: 9 through 100
 Pages: M-109 and M-111

MICRO-D CONNECTORS FILTERED CABLE



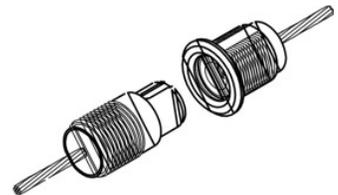
Rugged Filtered
 Sizes: 9 through 37
 Page: M-117

MICRO-D CONNECTORS HYBRID CABLE



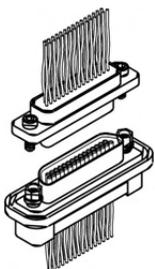
Rugged Hybrid
 Sizes: 7 and 24
 Page: M-121

CIRCULAR CABLE CONNECTORS

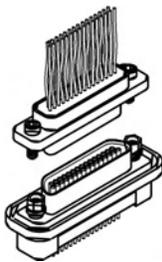


Circular
 Sizes: 7 and 19
 Page: M-123

MICRO-D CONNECTORS REAR PANEL MOUNT

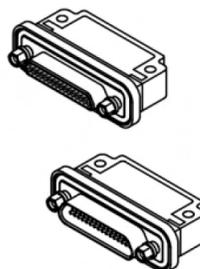


Rugged, Cable-to-Cable
 Sizes: 9 through 100
 Pages: M-127 and M-129



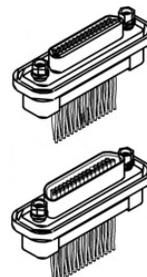
Rugged, Board-to-Cable
 Sizes: 9 through 100
 Page: M-131 and M-133

RIGHT-ANGLE BOARD MOUNT



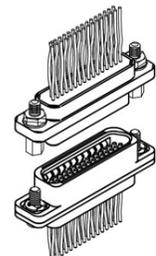
Rear Panel Mount
 Sizes: 9 through 100
 Page: 137

MICRO-D CONNECTORS SEALING



Rugged, I/O
 Sizes: 9 through 100
 Page: M-143

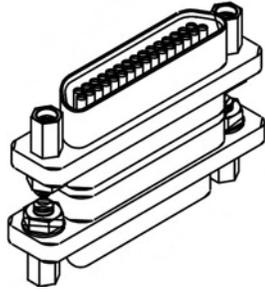
MICRO-D CONNECTORS GROUNDING FINGERS



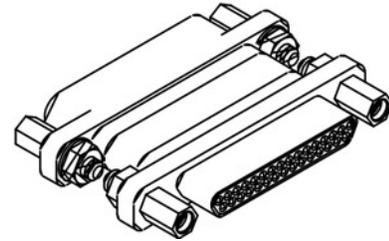
Rugged, I/O
 Sizes: 9 through 100
 Page: M-41

AIRBORN M SERIES

MICRO-D CONNECTORS CONNECTOR SAVERS

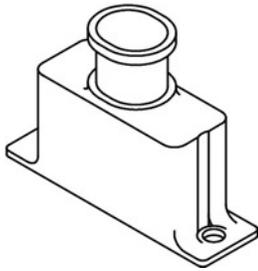


Rugged
Sizes: 9 through 100
Page: 166

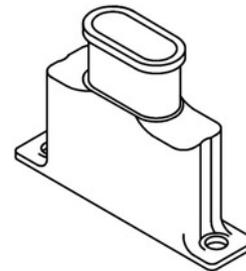
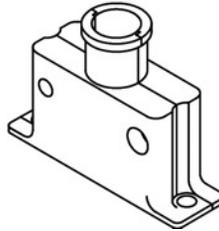


Low-Profile
Sizes: 9 through 51
Page: 168

ELECTROMAGNETIC INTERFERENCE (EMI)/RADIO FREQUENCY INTERFERENCE (RFI) STRAIGHT BACKSHELLS

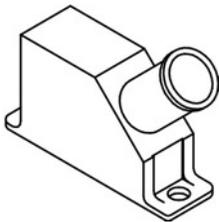


Rugged
Page: 170

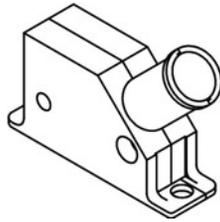


Low-Profile
Page: 176

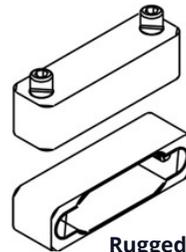
MICRO-D EMI/RFI 45° BACKSHELLS



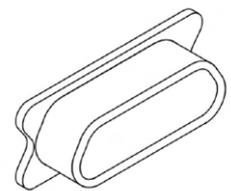
Rugged
Page: 172



DUST COVERS

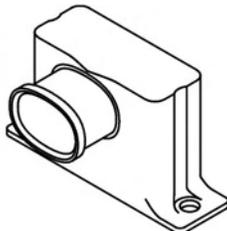


Rugged
Page: 178



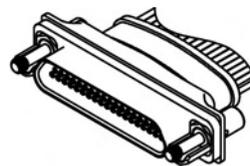
**Electrostatic Discharge (ESD)
Rugged and Low-Profile**
Page: 180

MICRO-D EMI/RFI 90° BACKSHELLS



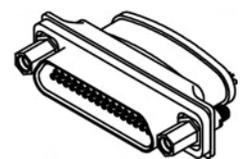
Rugged
Page: 174

INTEGRAL SHIELD TERMINATION



Rugged
Page: 43

INTEGRAL SHIELD TERMINATION WITH SOLDER CUPS



Rugged
Page: 47

AIRBORN M SERIES – 0.050"
MIL-DTL-83513

SPECIFICATIONS – MATERIALS AND FINISHES*

| | |
|----------------------------|---|
| CONTACTS: | Pins: BeCu alloy strip per ASTM B194 Sockets: brass per ASTM B121/B121M or ASTM B16/B16M or ASTM B453 |
| CONTACT FINISHES:** | Gold plate per ASTM B488 |
| SHELLS: | Aluminum alloy 6061-T6 per SAE AMS-QQ-A-250/11 or 6061-T6511 per SAE AMS-QQ-A-200/8 OR Stainless Steel 300 series per ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |

ALUMINUM

| | |
|--------------------------|--|
| SHELL FINISHES:** | Electroless nickel per SAE AMS2402, Class 3, 500 µm min Electrodeposited cadmium per SAE AMS-QQ-P-416, type II, class 3 Black anodized per MIL-A-8625, type III, class 2 Gold per MIL-DTL-45204, type II, grade C, class 0 Zinc nickel alloy per ASTM B841, over a suitable underplate Pure electrodeposited aluminum per MIL-DTL-83488, type 2 High phosphorous nickel with fluorocarbon polymer additive per SAE AMS2454, grade 2E, type V (9% MIN phosphorus content by weight) |
|--------------------------|--|

| | |
|---------------------------|---|
| MOLDED INSULATORS: | Glass filled polyphenylene sulfide per MIL-M-24519 Glass filled liquid crystal polymer per ASTM D5138 (One row only) |
|---------------------------|---|

| | |
|-------------------|---|
| EMBEDMENT: | Frey Engineering Co. insulated compound CF3003-80 and L-II-49 or equivalent |
|-------------------|---|

| | |
|--|--|
| JACKSCREWS, JACKPOSTS AND NUTS: | Corrosion resistant steel per ASTM A320 or ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
|--|--|

| | |
|---------------------------|--|
| CLIPS AND WASHERS: | Corrosion resistant steel per ASME 18.24 or NASM35333 or ASTM A484/A484M and ASTM A582/A582M (<i>For reference only: ASME 18.24 CRS per ASTM A693 and NASM35333 CRS per ASTM A240</i>) Passivated per ASME 18.24 or NASM35333 or SAE AMS2700 (<i>For reference only: ASME 18.24 and NASM35333 passivated per SAE AMS2700</i>) |
|---------------------------|--|

| | |
|--------------------|---|
| GUIDE PINS: | Corrosion resistant steel per ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
|--------------------|---|

| | |
|-----------------|---|
| LATCHES: | Beryllium copper in accordance with ASTM B194 Electroless nickel plate per SAE AMS2404 |
|-----------------|---|

INTERFACIAL

| | |
|----------------------|----------------------------------|
| SEAL GASKETS: | Fluorosilicone per MIL-DTL-25988 |
|----------------------|----------------------------------|

| | |
|--|--|
| TOLERANCES:** (Unless otherwise specified) | Angles: $\pm 5^\circ$ Decimals: $\pm 0.010''$; Fractions: $\pm 1/64''$ Wire lengths: insulated/stranded: $+1.0''/-0.0''$ uninsulated/solid: $+0.2''/-0.0''$ |
|--|--|

NOTES

Molex can manufacture special configurations for your exact specifications.

* Reference the above listed specifications or an equivalent industry standard when applicable

** When ordering to MIL Spec P/N, MIL Spec requirements apply

PERFORMANCE REFERENCE MIL-DTL-83513

AirBorn M Series meets or exceeds MIL-DTL-83513 Performance Specifications

| | |
|-------------------------------------|--|
| CONTACT RATING: | 3-amperes maximum |
| SOLDERABILITY: | Terminals (except crimp) tested in accordance with MIL-STD-202, method 208 |
| WIRE SIZE: | Stranded #26 AWG or solid #25 AWG standard <i>(consult factory for other sizes and types)</i> |
| TEST VOLTAGE: | 600V (RMS) 60 Hz |
| OPERATING TEMPERATURE: | -55° C to +125° C |
| INSULATION RESISTANCE: | 5,000 megohms minimum at 500 VDC |
| DURABILITY: | 500 connector mating cycles |
| VIBRATION: | Tested in accordance with MIL-STD-1344, method 2005, condition IV, according to MIL-83513 |
| SHOCK: | Tested in accordance with MIL-STD-1344, method 2004, condition E, according to MIL-83513 |
| SALT SPRAY: | Mated connectors tested in accordance with MIL-STD-1344, method 1001, test condition B |
| HUMIDITY: | Mated connectors tested in accordance with MIL-STD-1344, method 1002, type II <i>(except steps 7a and 7b)</i> |
| THERMAL SHOCK: | Tested to the temperature extremes of MIL-STD-1344, method 1003, test condition A <i>(except step 3, temperature shall be 125° C)</i> |
| CONTACT RESISTANCE: | 0.065 volt maximum drop at 2.5 amps (.026 ohms) |
| CONTACT ENGAGING FORCE: | 6.0 oz. maximum, with 0.0221 diameter test sleeve per contact |
| CONTACT SEPARATING: | 0.5 oz. minimum, with 0.0230 diameter test sleeve per contact |
| FORCE: | |
| CRIMP STRENGTH: | 5 pound minimum tensile strength |
| MATING & UNMATING FORCE: | 10 oz. maximum per contact |

PART NUMBER DESCRIPTION

Each part number consists of at least five elements: series, body description, size (number of contacts), type of contacts, and type of hardware. A sixth element is added whenever special modifications or options are available.

Each catalog page shows the choices available for each of these elements. By selecting one option from each category on the page, you can build a set of connectors to meet your requirements.

Each element is identified by a combination of letters and/or numbers in fixed field lengths, and separated by a hyphen (-). Each space must be filled in to complete the number. When the size is less than 100, use zeroes to backfill. For example: an order for size 9 will be 009; an order for size 51 will be 051 and so on.

SERIES:

This will always be a two letter designator, and will identify the connector series. All 0.050" connectors begin with the letter M. The second letter designates the various styles of 0.050" connectors.

BODY DESIGNATOR

Each digit of the Body Designator will normally identify (1) the number of rows, (2) the style of body, and (3) the body material. The three digit number to identify the body consists of one digit from each group.

SIZE:

The size is determined by the number of contacts in the connector, and is an integral part of the part number. If you are unable to locate the size you are looking for, contact Molex for further assistance.

CONTACTS:

Each page also identifies all contact and termination options for a given connector. The first two digits designate the type of contacts and terminations; the third digit designates the plating option.

HARDWARE:

Four digits comprise the Hardware Designator; two for style of hardware and two for polarization and/or wiring instruction. Follow the choices for each connector.

SPECIAL INSTRUCTIONS (OPTIONS):

Special instructions are designated by a three or four digit number added to the end of the Part Number. The Special Instructions Designator is included only where applicable.**

NOTES:

Each page is as comprehensive as possible. However, if you are unable to locate a particular connector size or option, please contact Molex for further assistance.

[x] Option is **NOT** RoHS compliant.

MATING MATRIX FOR AIRBORN M SERIES CONNECTORS

| PLUGS | RECEPTACLES | | | | | | | | | | |
|--------------------------|---------------|------------------|----------------|---------------------------|-----------------------------|----------------------|------------------------|------------------------|----------------------|-----------------------------|---------------------------|
| | MA (Strip) | MC (Circular) | MM (Hybrid) | MK (Metal) PC Board | ML (Plastic) PC Board | MM (Metal) I/O | MN (Plastic) I/O | MP (Plastic) I/O | MQ (Metal) I/O | MR (Plastic) PC Board | MS (Metal) PC Board |
| MA (Strip) | XX | | | | | | | | | | |
| MC (Circular) | | XX | | | | | | | | | |
| MM (Hybrid) | | | XX | | | | | | | | |
| MK (Metal) PC Board | | | | BB | BB | BI | BI | | | | |
| ML (Plastic) PC Board | | | | BB | BB | BI | BI | | | | |
| MM (Metal) I/O | | | | IB | IB | II | II | | | | |
| MN (Plastic) I/O | | | | IB | IB | II | II | | | | |
| MP (Plastic) I/O | | | | | | | | II | II | IB | IB |
| MQ (Metal) I/O | | | | | | | | II | II | IB | IB |
| MR (Plastic) PC Board | | | | | | | | BI | BI | BB | BB |
| MS (Metal) PC Board | | | | | | | | BI | BI | BB | BB |

I/O CONNECTORS

MM - MN - MP - MQ

PC BOARD MOUNTED CONNECTORS

MK - ML - MR - MS

INTER-MATEABLE CONNECTORS

MK - ML - MM - MN
MP - MQ - MR - MS

KEY

BB = PC Board Mounted Plug with PC Board Mounted Receptacle

BI = PC Board Mounted Plug with I/O Receptacle

IB = I/O Plug with PC Board Mounted Receptacle

II = I/O Plug with I/O Receptacle

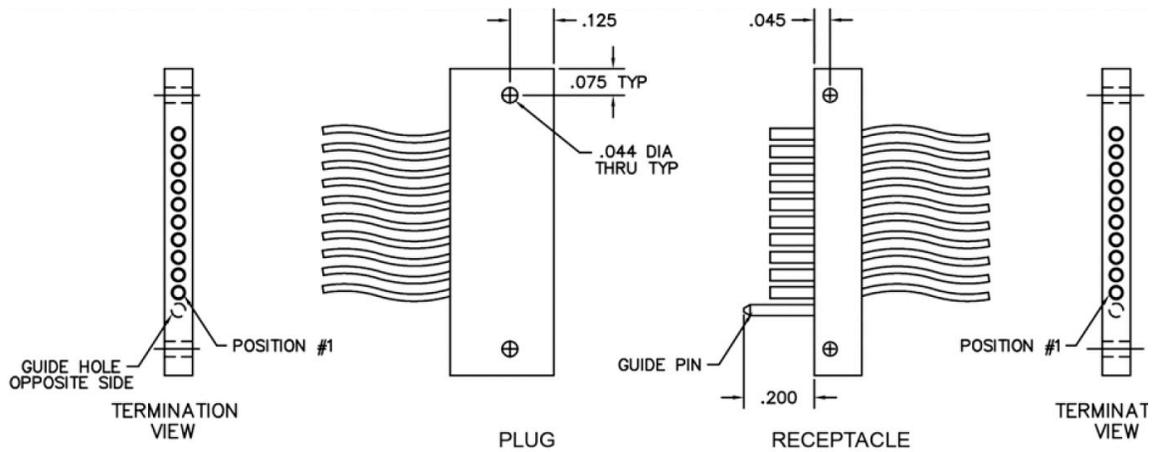
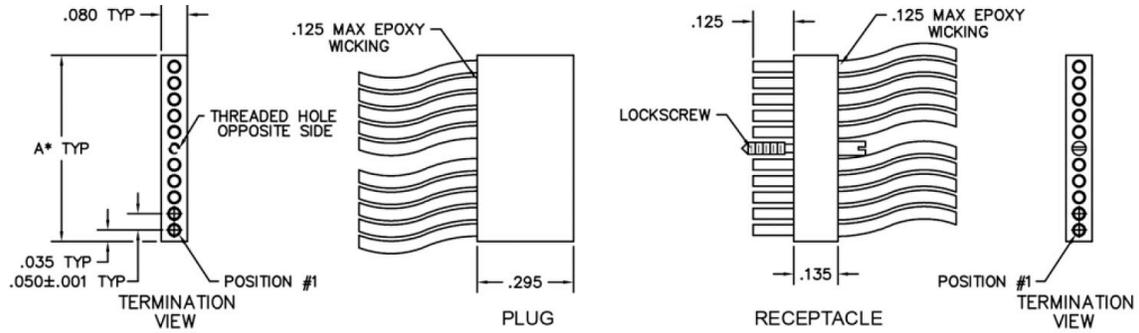
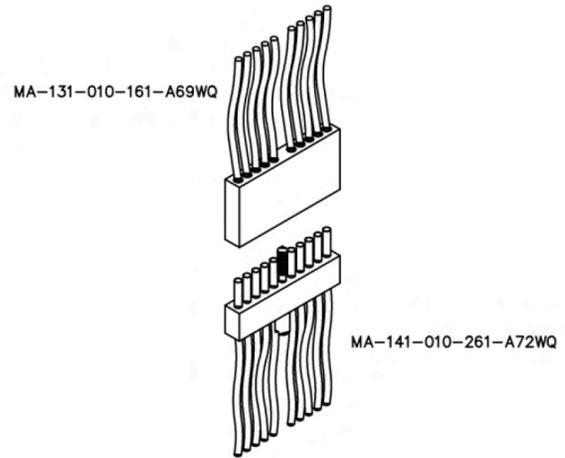
ONE ROW – STRIP CONNECTORS CABLE-TO-CABLE

MA-1

0.050" | 2 THROUGH 60 CONTACTS

| DIMENSIONS | |
|--|--------------------|
| To determine connector length (Dim "A"): | |
| Multiply the number by cavities in one row by 0.050" | _____ " |
| Add fixed end lengths (constant, 0.010" x 2) | _____ 0.02" |
| Add 0.150" for each mounting hole | _____ " |
| Total Length | _____ " |

Notes:
 Length over 2" may require support to insure alignment.
 When using on lock screw, use centermost available hole.
 * Maximum length is 3.020". Maximum number of contacts must be reduced to accommodate hardware and mounting holes.



OPTIONAL MOUNTING HOLES AND GUIDE PIN

ONE ROW – STRIP CONNECTORS BOARD-TO-CABLE

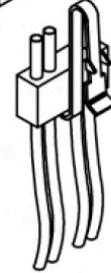
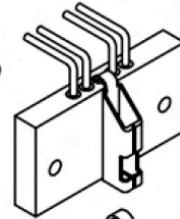
MA-1

0.050" | 2 THROUGH 60 CONTACTS

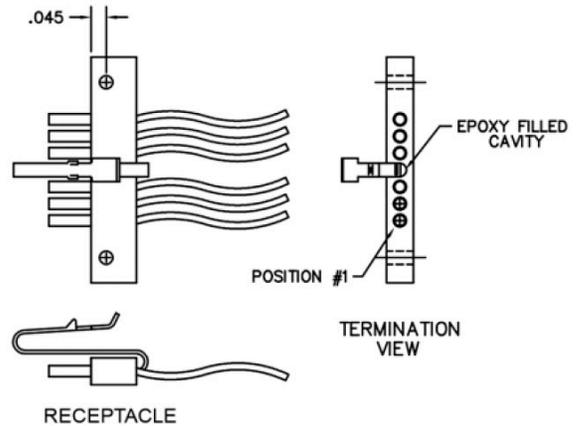
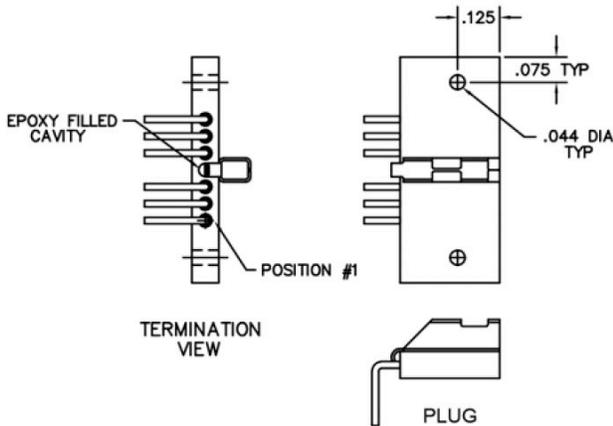
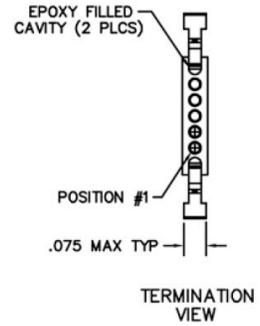
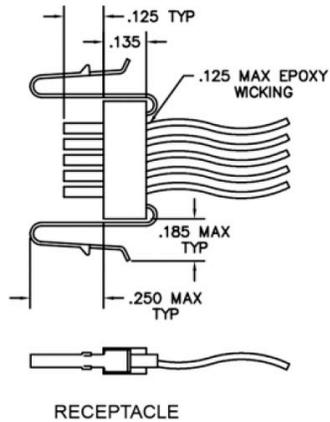
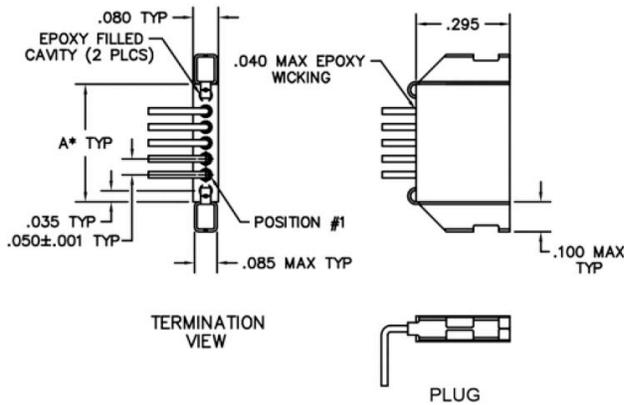
| DIMENSIONS | |
|--|--------------------|
| To determine connector length (Dim "A"): | |
| Multiply the number by cavities in one row by 0.050" | _____ " |
| Add fixed end lengths (constant, 0.010" x 2) | _____ 0.02" |
| Add 0.150" for each mounting hole | _____ " |
| Total Length | _____ " |

Notes:
 Length over 2" may require support to insure alignment.
 When using on lockscrew, use centermost available hole.
 * Maximum length is 3.020". Maximum number of contacts must be reduced to accommodate hardware and mounting holes.

MA-1D1-004-325-A0300

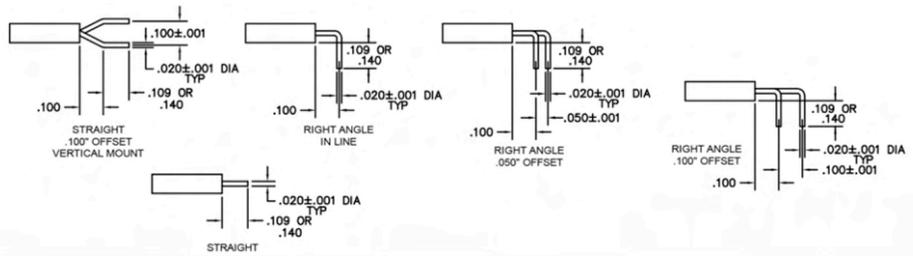


MA-141-004-261-A03WS



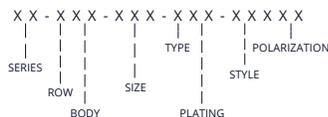
OPTIONAL MOUNTING HOLES

LEAD CONFIGURATION OPTIONS



| PLUGS | | RECEPTACLES | |
|---|---|--|---|
| SERIES | | | |
| MA | 0.050 Microminiature Strip Connector | MA | 0.050 Microminiature Strip Connector |
| BODY | | | |
| 1 | One-Row | 1 | One-Row |
| BODY STYLE: (Material: Polyphenylene sulfide) | | BODY STYLE: (Material: Polyphenylene sulfide) | |
| 11 | Plug, straight, with mounting holes | 21 | Receptacle, straight, with mounting holes |
| 31 | Plug, straight, without mounting holes | 41 | Receptacle, straight, without mounting holes |
| 51 | Plug, right-angle, .050" offset, with mounting holes | 61 | Receptacle, right-angle, .050" offset, with mounting holes |
| 71 | Plug, right-angle, 0.100" offset, with mounting holes | 81 | Receptacle, right-angle, 0.100.100" offset, with mounting holes |
| 91 | Plug, right-angle, .050" offset, without mounting holes | A1 | Receptacle, right-angle, .050" offset, without mounting holes |
| B1 | Plug, right-angle, 0.100" offset, without mounting holes | C1 | Receptacle, right-angle, 0.100.100" offset, without mounting holes |
| D1 | Plug, right-angle, in line, with mounting holes | E1 | Receptacle, right-angle, in line, with mounting holes |
| F1 | Plug, right-angle, in line, without mounting holes | G1 | Receptacle, right-angle, in line, without mounting holes |
| H1 | Plug, straight, 0.100" offset, without mounting holes | J1 | Receptacle, straight, 0.100.100" offset, without mounting holes |
| SIZE | | | |
| XXX | 002 - 60 | XXX | 002 - 60 |
| Note: Maximum number of contacts is reduced when using hardware or mounting holes. See dimensions chart on page 16. | | | |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 21 | Socket, straight, solder cup |
| 12 | Pin, straight, PCB leads, 0.109" | 22 | Socket, straight, PCB leads, 0.109" |
| 13 | Pin, straight, PCB leads, 0.140" | 23 | Socket, straight, PCB leads, 0.140" |
| 14 | Pin, straight, .500" pigtails (0.018 dia.) | 24 | Socket, straight, .500" pigtails (0.018 dia.) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 26 | Socket, straight, crimped wire |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail, PCB leads) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail, PCB leads) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (dip solder, pigtail, PCB leads) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (dip solder, pigtail, PCB leads) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail, PCB leads) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail, PCB leads) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| A00 | None | A00 | None |
| A01-A49 | Latch box, side mounted (cavity number location) | A01-A49 | Latch spring, side mounted (cavity number location) |
| A50 | Latch box (two end cavities)** | A51 | Latch box (two end cavities) |
| A64 | One guide hole (centered)* | A61 | One guide pin (centered)* |
| A65 | One guide hole (first cavity) | A62 | One guide pin (first cavity) |
| A66 | One guide hole (last cavity) | A63 | One guide pin (last cavity) |
| A68 | Two guide holes (two end cavities) | A67 | Two guide pins (two end cavities) |
| A69 | One threaded hole (centered)* | A72 | One lock screw (centered),* uninstalled |
| AHX | One guide hole (cavity #2 - #9) | APX | One guide pin (cavity #2 - #9) |
| ATX | One threaded hole (cavity #2 - #9) | ALX | One lock screw (cavity #2 - #9), uninstalled |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG MA-1D1-004-325-A0300
 RECEPTACLE MA-141-004-261-A03WS



NOTE: *To determine location, divide the total number of cavities by two and round to the next whole number, if result is a fraction. See page M-20.

****Not available with mounting holes.

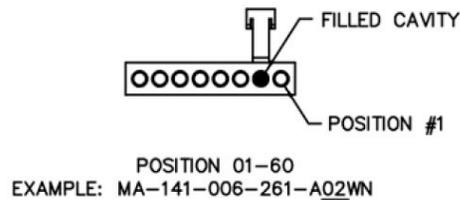
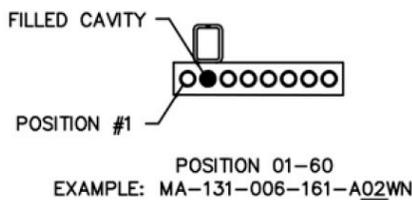
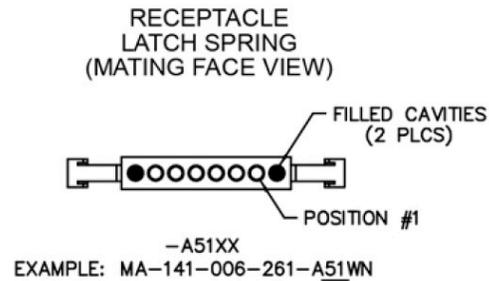
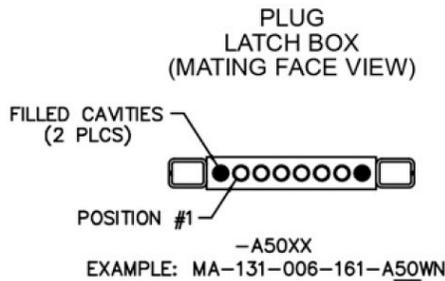
See MA strip guidelines, page 18, for location examples and visual clarification.

[x] Option is NOT RoHS-compliant

ONE ROW – STRIP CONNECTORS WITH LATCHES

MA-1

0.050" | 3 THROUGH 60 CONTACTS



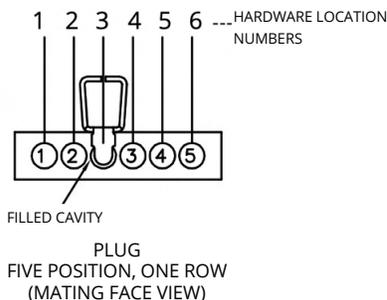
MA STRIP GUIDELINES

For "A" designator in hardware portion of part number

1. Any cavity that has a contact is considered an electrical position (including dummy contact).
2. All hardware locations, holes and/or epoxy filled cavities are considered mechanical positions.
3. Omit holes on board layout for mechanical positions and renumber board layout accordingly, except connectors with mechanical position(s) in end cavity(ies). See board layout examples, pages M-20 through M-26.
4. These guidelines apply for all hardware options, including guide holes (mechanical locations).
5. Do not skip wire colors on stranded wire assemblies.
6. Spacers underneath the connector are recommended when Rolled Annealed Printed Circuit Board (R/A PCB) mount connectors with mounting holes are used and the PCB had irregularities greater than 0.004" underneath the connector.

To determine hardware location number:

1. Divide the total number of cavities by two (including hardware cavity).
2. Round to the next whole number if result is a fraction.

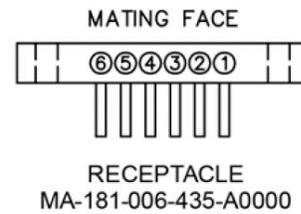
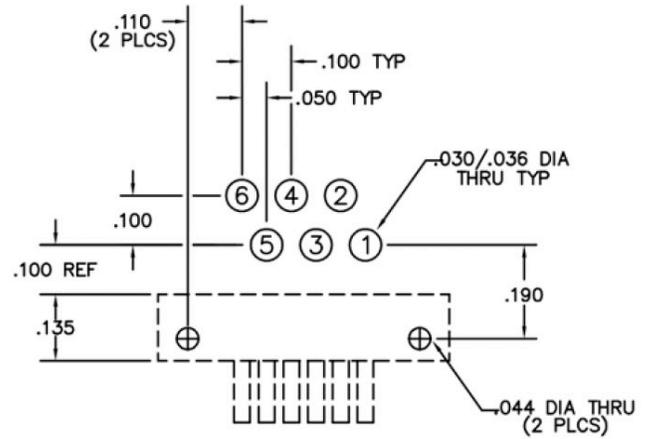
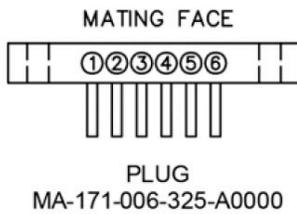
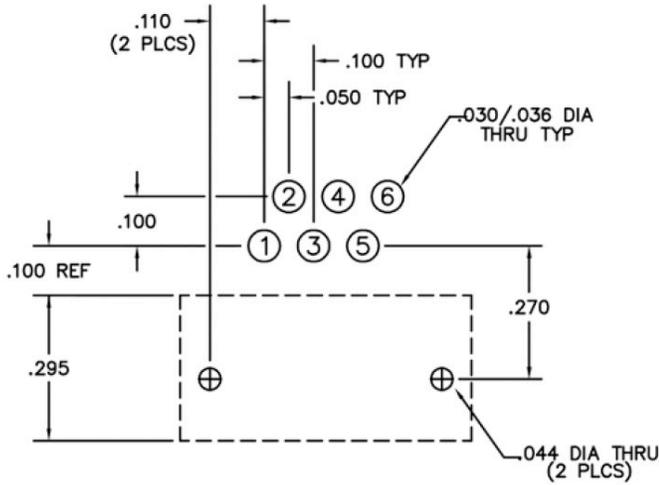


The connector to the left has six cavities with five live contacts. (five electrical positions and one mechanical position)

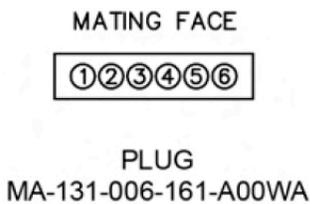
To determine the hardware location number:
 $6 \text{ cavities} \div 2 = 3$
 Hardware would be placed in location #3

MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.100") WITH MOUNTING HOLES (SIX ELECTRICAL POSITIONS)



CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES (SIX ELECTRICAL POSITIONS)



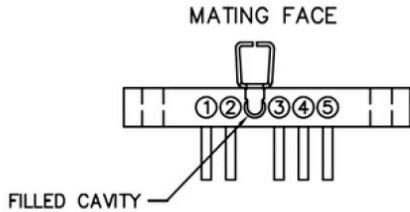
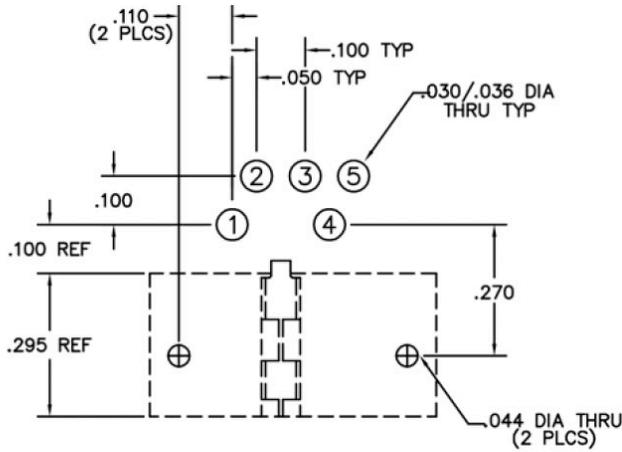
WIRE CONNECT CHART

- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN
- 5 — YEL
- 6 — GRN

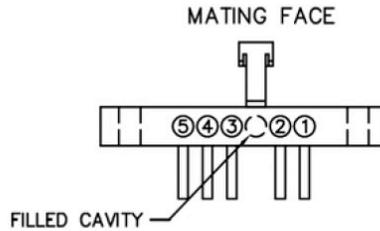
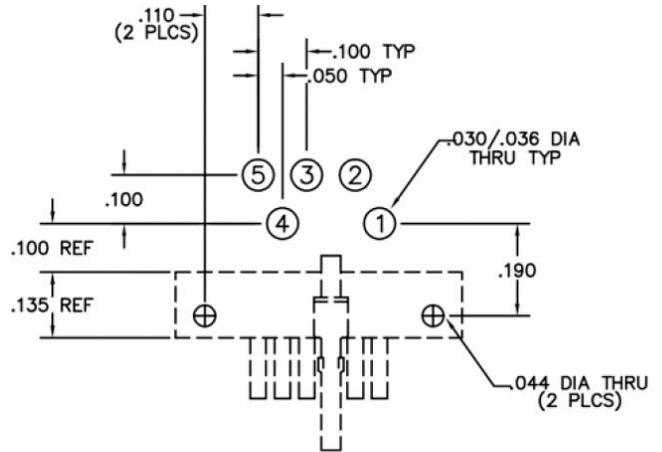
MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.100") WITH MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED.

(FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITION)



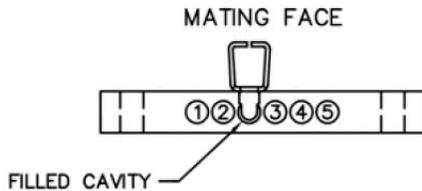
PLUG
MA-171-005-325-A0300



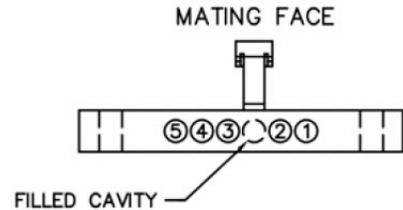
RECEPTACLE
MA-181-005-435-A0300

CRIMPED WIRE CONNECTORS, STRAIGHT WITH MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED.

(FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITION)



PLUG
MA-111-005-161-A03WA



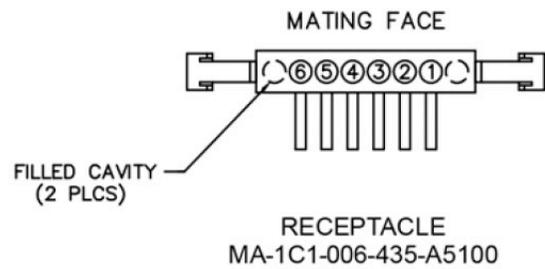
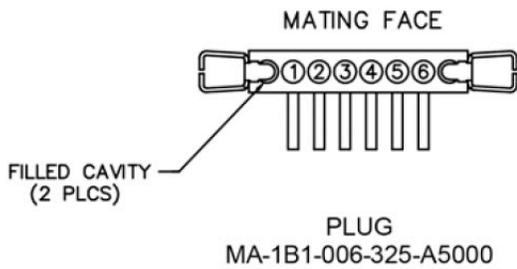
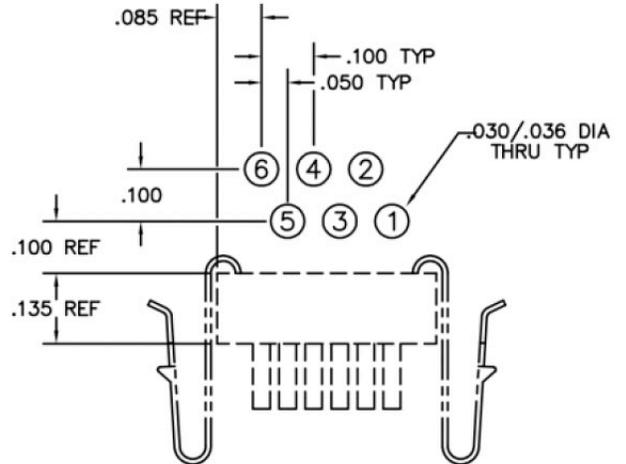
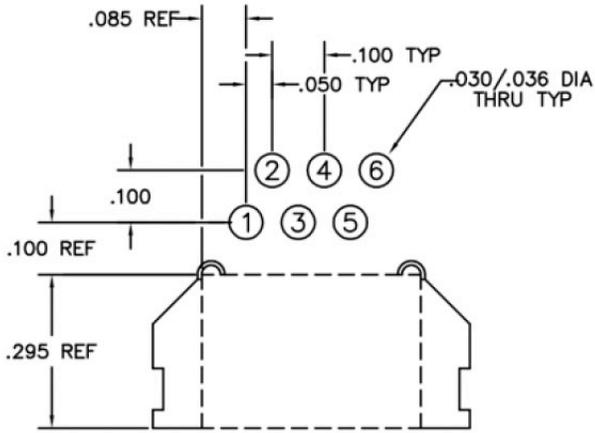
RECEPTACLE
MA-121-005-261-A03WA

WIRE CONNECT CHART

- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN
- 5 — YEL

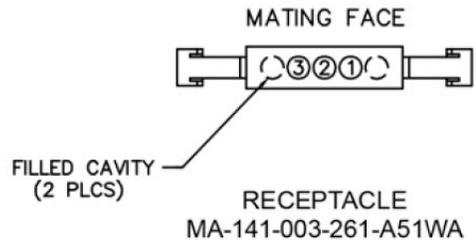
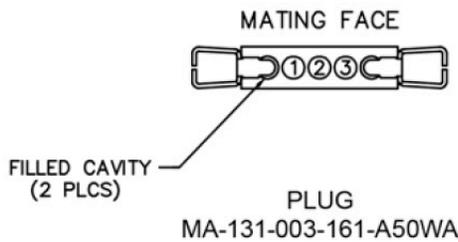
MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.100") WITHOUT MOUNTING HOLES, END MOUNT LATCHES, TWO END CAVITIES*
 (SIX ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)



* = This is the exception as noted in "MA Strip Guidelines", page 21, note 3.

CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES END MOUNT LATCHES, TWO END CAVITIES
 (THREE ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)



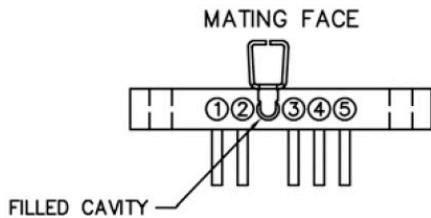
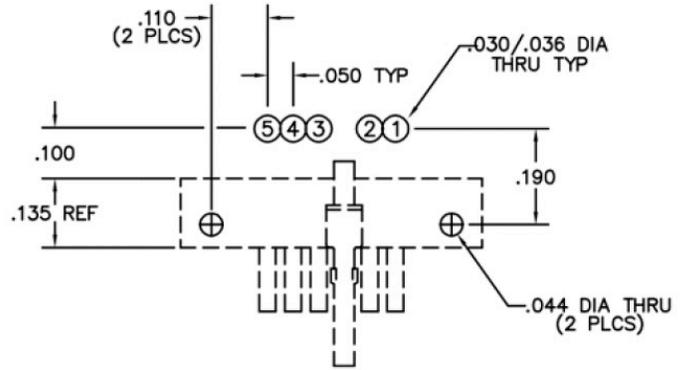
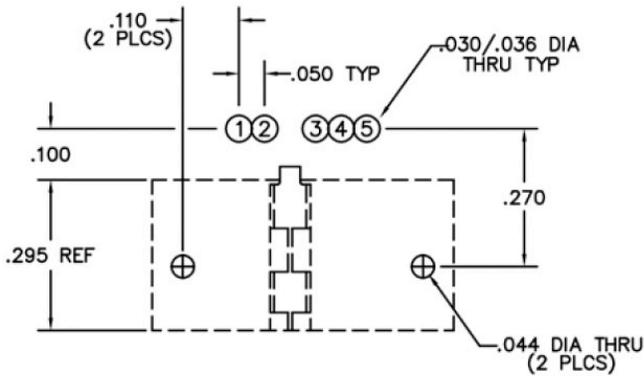
WIRE CONNECT CHART

- 1 — BLK
- 2 — BRN
- 3 — RED

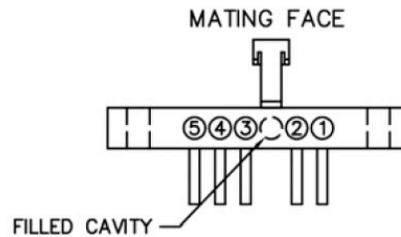
MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE INLINE (0.100") WITH MOUNTING HOLES SIDE MOUNT LATCH, CENTERED

(FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITIONS)



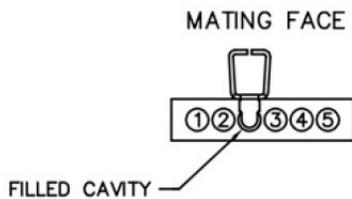
PLUG
MA-1D1-005-325-A0300



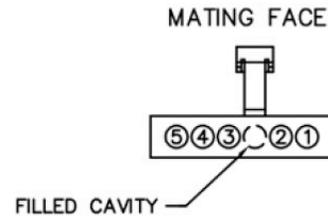
RECEPTACLE
MA-1E1-005-435-A0300

CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED

(FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITIONS)



PLUG
MA-131-005-161-A03WA



RECEPTACLE
MA-141-005-261-A03WA

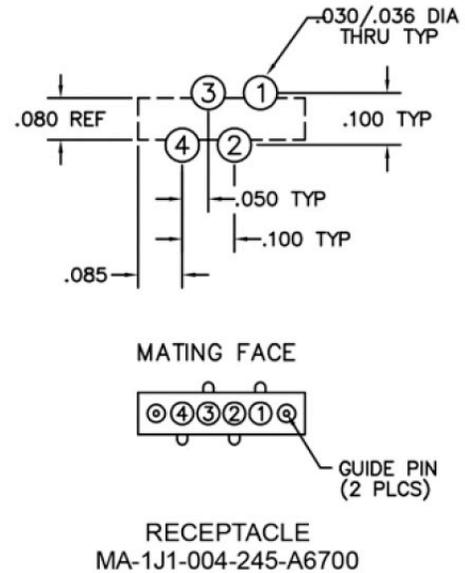
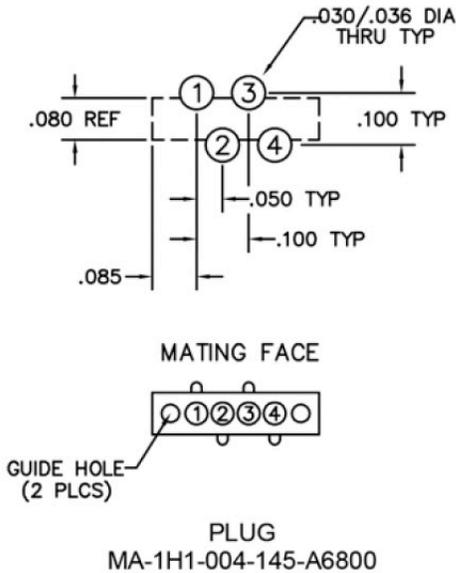
WIRE CONNECT CHART

- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN
- 5 — YEL

MA STRIP GUIDELINES

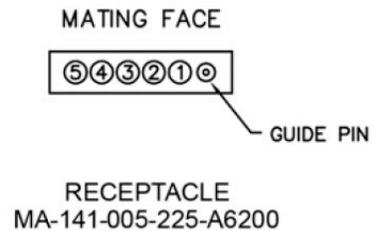
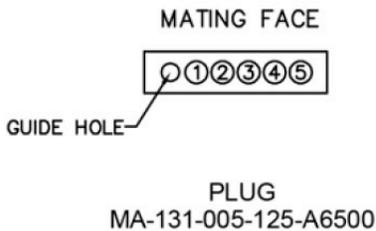
BOARD MOUNT CONNECTORS, STRAIGHT OFFSET (0.100") WITHOUT MOUNTING HOLES, TWO GUIDE HOLES/TWO END CAVITIES

(FOUR ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)



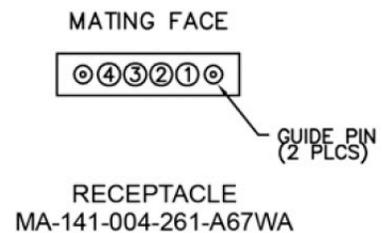
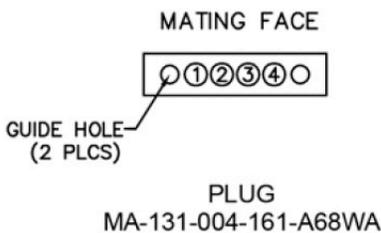
BOARD MOUNT CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, ONE GUIDE HOLE/PIN, FIRST CAVITY

(FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITION)



CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, TWO GUIDE HOLES/TWO END CAVITIES

(FOUR ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)

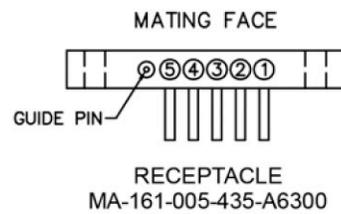
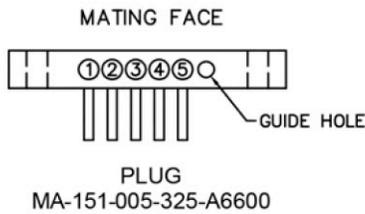
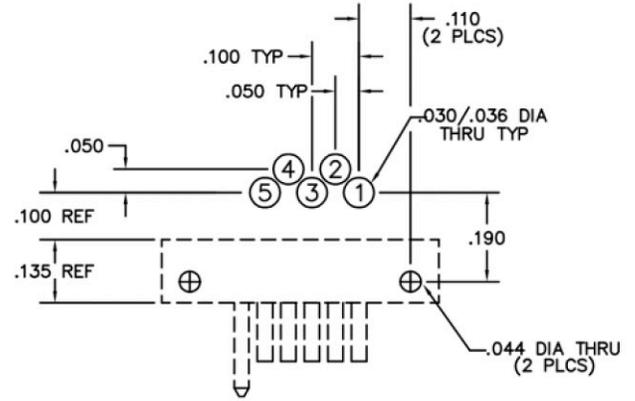
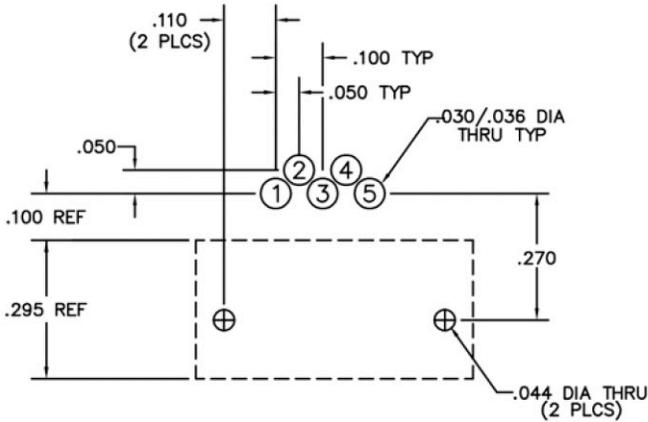


WIRE CONNECT CHART

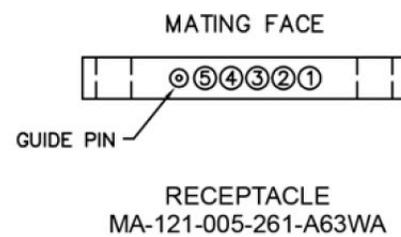
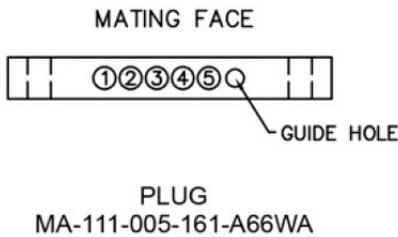
- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN

MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.050") WITH MOUNTING HOLES, GUIDE HOLE/PIN, LAST CAVITY (FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITIONS)



CRIMPED WIRE CONNECTORS, STRAIGHT WITH MOUNTING HOLES, GUIDE HOLE/PIN, LAST CAVITY (FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITIONS)

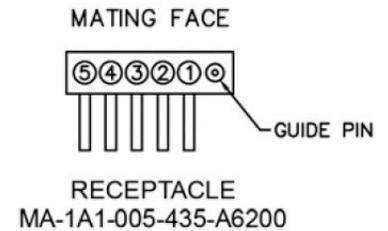
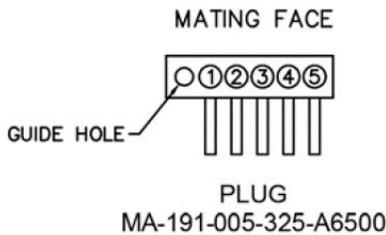
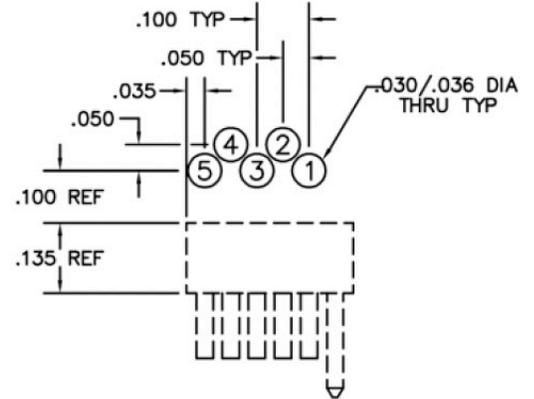
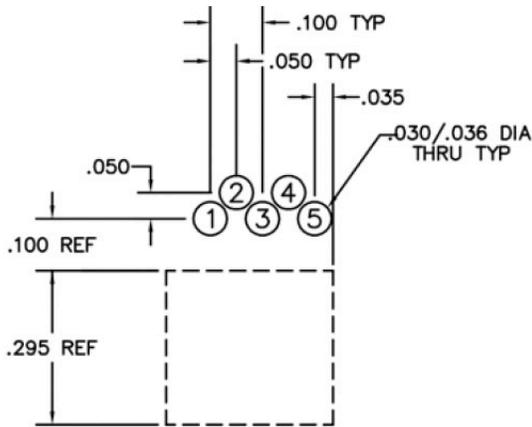


WIRE CONNECT CHART

- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN
- 5 — YEL

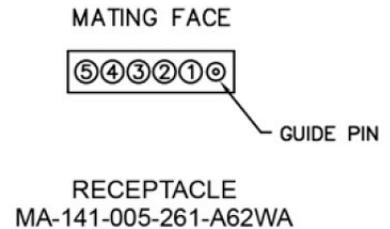
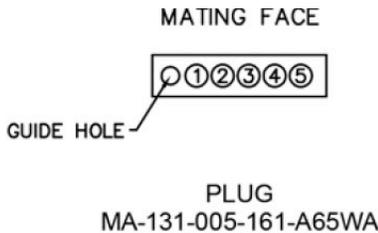
MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.050") WITHOUT MOUNTING HOLES, GUIDE HOLE/PIN, FIRST CAVITY*
 (FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITIONS)



* = This is the exception as noted in "MA Strip Guidelines", page 21, note 3.

CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, GUIDE HOLE/PIN, FIRST CAVITY
 (FIVE ELECTRICAL POSITIONS, ONE MECHANICAL POSITIONS)



WIRE CONNECT CHART

- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN
- 5 — YEL

TWO ROW - STRIP CONNECTORS CABLE-TO-CABLE

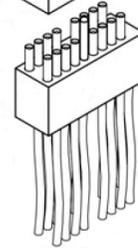
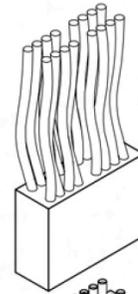
MA-2

0.050" | 4 THROUGH 128 CONTACTS

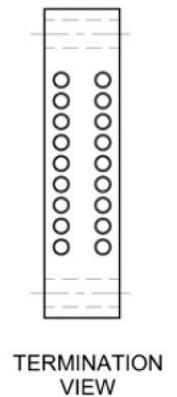
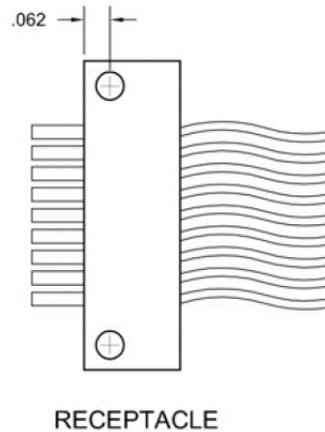
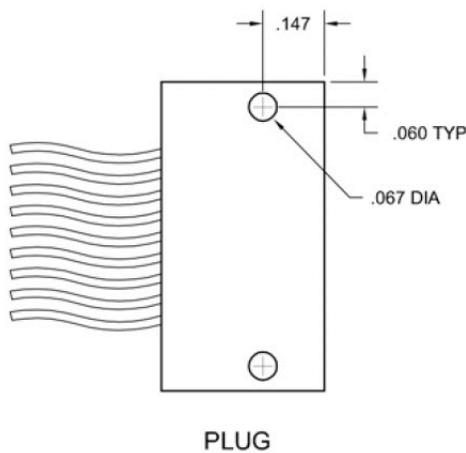
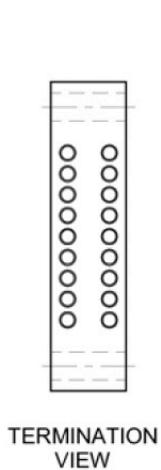
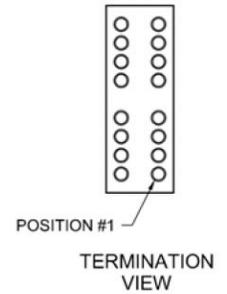
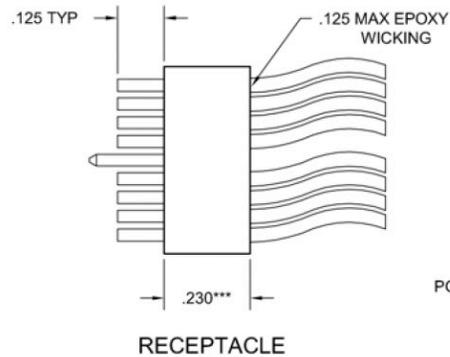
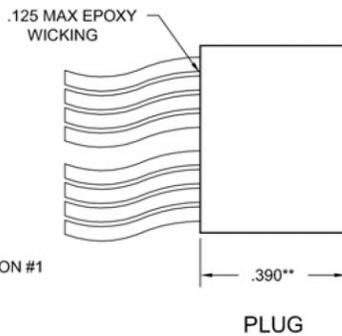
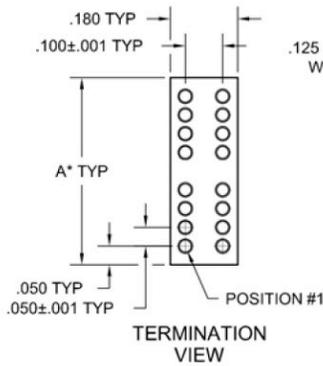
| DIMENSIONS | |
|--|--------------------|
| To determine connector length (Dim "A"): | |
| Multiply the number by cavities in one row by 0.050" | _____ " |
| Add fixed end lengths (constant, 0.025" x 2) | _____ 0.05" |
| Add 0.085" for each mounting hole | _____ " |
| Total Length | _____ " |

Notes:
 Length over 2" may require support to insure alignment.
 *Maximum length is 3.420". Maximum number of contacts must be reduced to accommodate hardware and mounting holes.
 **For solder cup or board mount applications, 0.295" becomes 0.390"
 ***For solder cup or board mount applications, 0.230" becomes 0.135"

MA-231-016-161-A64WS



MA-241-016-261-A61WS



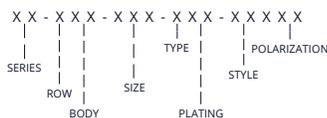
OPTIONAL MOUNTING HOLES

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|--|--|--|--|
| SERIES | | | |
| MA | 0.050 Microminiature Strip Connector | MA | 0.050 Microminiature Strip Connector |
| BODY | | | |
| 2 | Two-row | 2 | Two-row |
| BODY STYLE: (Material: Polyphenylene sulfide) | | BODY STYLE: (Material: Polyphenylene sulfide) | |
| 11 | Plug, straight, with mounting holes | 21 | Receptacle, straight, with mounting holes |
| 31 | Plug, straight, without mounting holes | 41 | Receptacle, straight, without mounting holes |
| SIZE | | | |
| XXX | 004 -128 | XXX | 004-128 |
| Note: Maximum number of contacts is reduced when using hardware or mounting holes. | | | |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 21 | Socket, straight, solder cup |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) | 24 | Socket, straight, 0.500" pigtails (0.018 dia.) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| 16 | Pin, straight, crimp wire | 26 | Socket, straight, crimp wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| AD0 | None | A00 | None |
| ABC | Latch box, side mounted (centered)* | ALC | Latch spring, side mounted (centered)* |
| A50 | Latch boxes (two end cavities).** | A51 | Latch springs, (two end cavities).** |
| A52 | Latch boxes (two end cavities).** | A53 | Latch springs, (two end cavities).** |
| A54 | Latch boxes (two end cavities).** | A55 | Latch springs, (two end cavities).** |
| A56 | Latch boxes (two end cavities).** | A57 | Latch springs, (two end cavities).** |
| A64 | One guide hole (centered)* | A61 | One guide pin (centered)* |
| A65 | One guide hole (first cavity) | A62 | One guide pin (first cavity) |
| A66 | One guide hole (last cavity) | A63 | One guide pin (last cavity) |
| A68 | Two guide holes (first and last cavity) | A67 | Two guide pins (first and last cavity) |
| AHX | One guide hole (cavity #2 - #9) | APX | One guide pin (cavity #2 - #9) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG
RECEPTACLE

MA-231-016-161-A64WS
MA-241-016-261-A61WS



NOTE: *To determine location, divide the total number of cavities (in one row) by two and round to the next whole number, if result is a fraction. See page M-20.

**Not available with mounting holes.

See MA strip guidelines, page M-20, for location examples and visual clarification. Connector part number must have even number of contacts. Consult factory for non-standard requirements.

[x] Option is not RoHS-compliant

molex

TWO ROW - STRIP CONNECTORS BOARD-TO-CABLE

MA-2

0.050" | 4 THROUGH 128 CONTACTS

DIMENSIONS

To determine connector length (Dim "A"):

Multiply the number by cavities in one row by 0.050" _____ "

Add fixed end lengths (constant, 0.025" x 2) _____ **0.05"**

Add 0.085" for each mounting hole _____ "

Total Length _____ "

Notes:

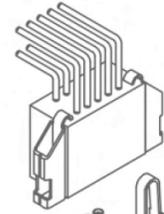
Length over 2" may require support to insure alignment.

*Maximum length is 3.420". Maximum number of contacts must be reduced to accommodate hardware and mounting holes.

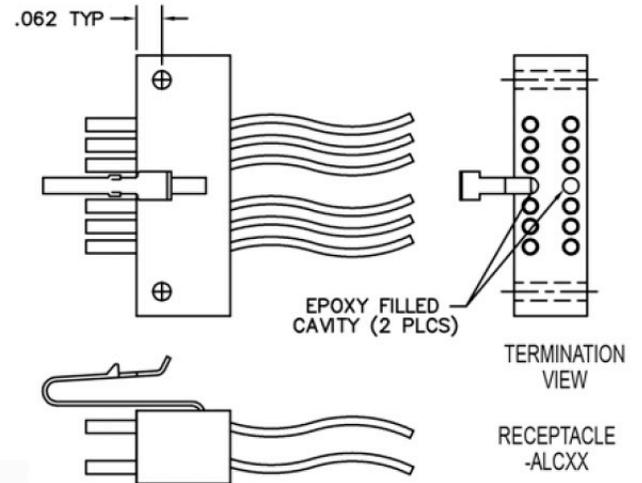
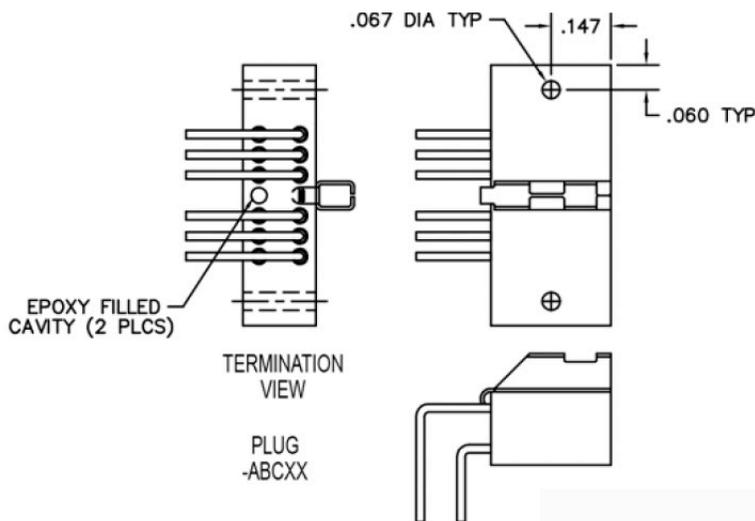
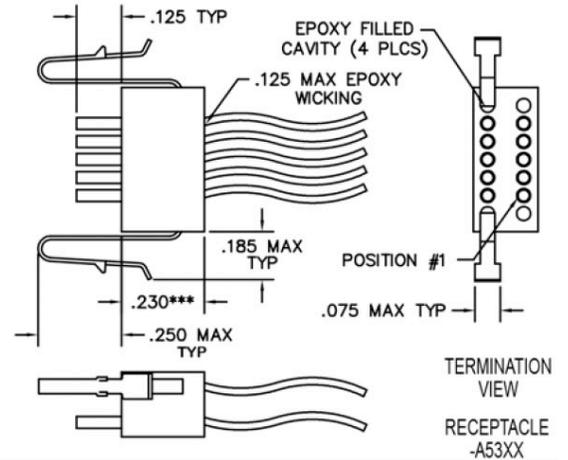
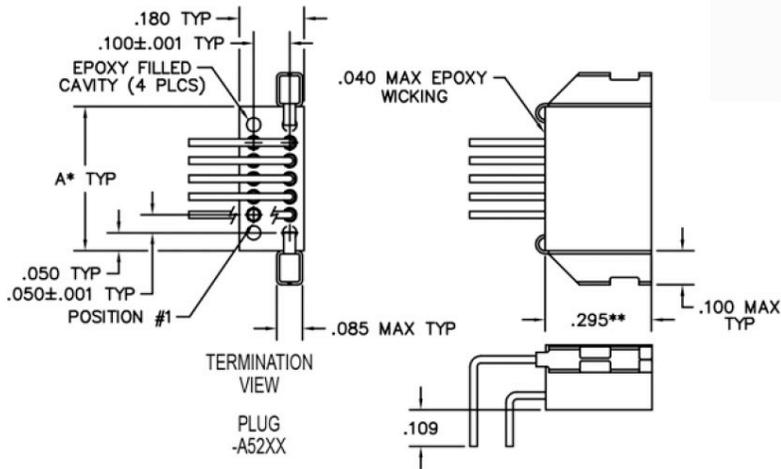
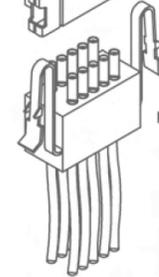
**For solder cup or board mount applications, 0.295" becomes 0.390"

***For solder cup or board mount applications, 0.230" becomes 0.135"

MA-2F1-010-325-A5200

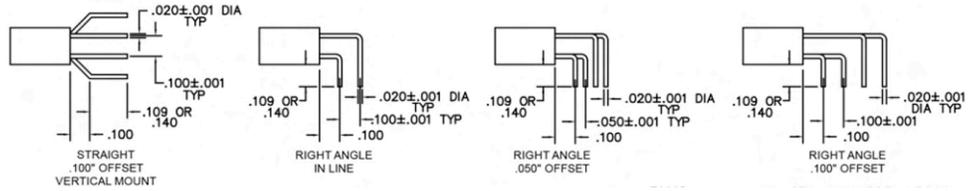


MA-241-010-261-A53WA



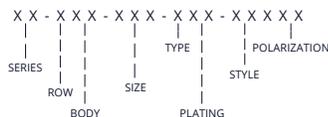
OPTIONAL MOUNTING HOLES

LEAD CONFIGURATION OPTIONS



| PLUGS | | RECEPTACLES | |
|--|---|--|---|
| SERIES | | | |
| MA | 0.050 Microminiature Strip Connector | MA | 0.050 Microminiature Strip Connector |
| BODY | | | |
| 2 | Two-row | 2 | Two-row |
| BODY STYLE: (Material: Polyphenylene sulfide) | | BODY STYLE: (Material: Polyphenylene sulfide) | |
| 11 | Plug, straight, with mounting holes | 21 | Receptacle, straight, with mounting holes |
| 31 | Plug, straight, without mounting holes | 41 | Receptacle, straight, without mounting holes |
| 51 | Plug, right-angle, 0.050" offset, with mounting holes | 61 | Receptacle, right-angle, 0.050" offset, with mounting holes |
| 71 | Plug, right-angle, 0.100.100" offset, with mounting holes | 81 | Receptacle, right-angle, 0.100.100" offset, with mounting holes |
| 91 | Plug, right-angle, 0.050" offset, without mounting holes | A1 | Receptacle, right-angle, 0.050" offset, without mounting holes |
| B1 | Plug, right-angle, 0.100.100" offset, without mounting holes | C1 | Receptacle, right-angle, 0.100.100" offset, without mounting holes |
| D1 | Plug, right-angle, in line, with mounting holes | E1 | Receptacle, right-angle, in line, with mounting holes |
| F1 | Plug, right-angle, in line, without mounting holes | G1 | Receptacle, right-angle, in line, without mounting hole |
| H1 | Plug, straight, 0.100.100" offset, without mounting holes | J1 | Receptacle, straight, 0.100.100" offset, without mounting holes |
| SIZE | | | |
| XXX | 004 -128 | XXX | 004-128 |
| Note: Maximum number of contacts is reduced when using hardware or mounting holes. | | | |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 21 | Socket, straight, solder cup |
| 12 | Pin, straight, PCB leads, 00.109" | 22 | Socket, straight, PCB leads, 00.109" |
| 13 | Pin, straight, PCB leads, 00.140" | 23 | Socket, straight, PCB leads, 00.140" |
| 14 | Pin, straight, .500" pigtails (00.018 dia.) | 24 | Socket, straight, .500" pigtails (00.018 dia.) |
| 15 | Pin, straight, 1.000" pigtails (00.018 dia.) | 25 | Socket, straight, 1.000" pigtails (00.018 dia.) |
| 16 | Pin, straight, crimped wire | 26 | Socket, straight, crimped wire |
| 32 | Pin, right-angle, PCB leads, 0.0.109" | 43 | Socket, right-angle, PCB leads, 0.0.109" |
| 33 | Pin, right-angle, PCB leads, 00.140" | 44 | Socket, right-angle, PCB leads, 00.140" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 μm Au contacts (crimp wire) | 1 | 50 μm Au contacts (crimp wire) |
| 3 | 50 μm Au contacts: 10 μm Au terminations (solder cup, pigtail, PCB leads) | 3 | 50 μm Au contacts: 10 μm Au terminations (solder cup, pigtail, PCB leads) |
| 5 | 50 μm Au contacts: Sn/Pb alloy terminations (pigtail, PCB leads) [X] | 5 | 50 μm Au contacts: Sn/Pb alloy terminations (pigtail, PCB leads) [X] |
| 7 | 50 μm Au contacts: SAC305 terminations (pigtail, PCB leads) | 7 | 50 μm Au contacts: SAC305 terminations (pigtail, PCB leads) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| AD0 | None | A00 | None |
| ABC | Latch box, side mounted (centered)* | ALC | Latch spring, side mounted (centered)* |
| A50 | Latch boxes (two end cavities).** | A51 | Latch springs, (two end cavities).* |
| A52 | Latch boxes (two end cavities).** | A53 | Latch springs, (two end cavities).** |
| A54 | Latch boxes (two end cavities).** | A55 | Latch springs, (two end cavities).** |
| A56 | Latch boxes (two end cavities).** | A57 | Latch springs, (two end cavities).** |
| A64 | One guide hole (centered)* | A61 | One guide pin (centered)* |
| A65 | One guide hole (first cavity) | A62 | One guide pin (first cavity) |
| A66 | One guide hole (last cavity) | A63 | One guide pin (last cavity) |
| A68 | Two guide holes (first and last cavity) | A67 | Two guide pins (first and last cavity) |
| AHX | One guide hole (cavity #2 - #9) | APX | One guide pin (cavity #2 - #9) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG MA-2F1-010-325-A5200
 RECEPTACLE MA-241-010-261-A53WA



NOTE: *To determine location, divide the total number of cavities (in one row) by two and round to the next whole number, if result is a fraction. See page M-20.

**Not available with mounting holes.

See MA strip guidelines, page 31, for location examples and visual clarification. Connector part number must have even number of contacts.

[X] Option is not RoHS-compliant

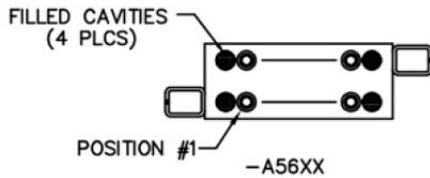
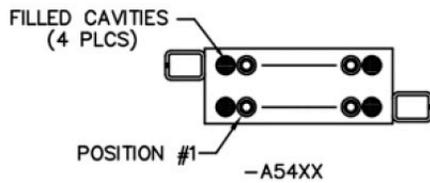
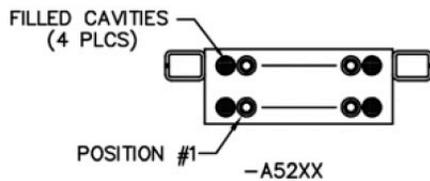
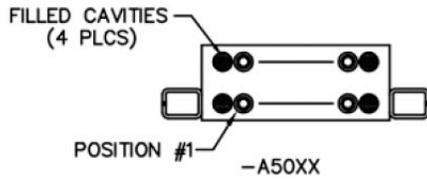
TWO ROW - STRIP CONNECTORS WITH LATCHES

MA-2

0.050" | 4 THROUGH 128 CONTACTS

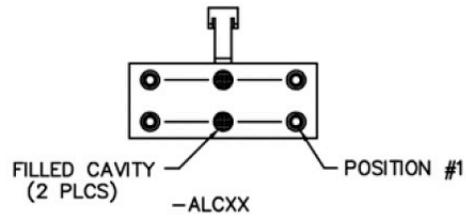
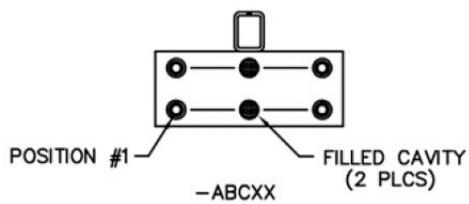
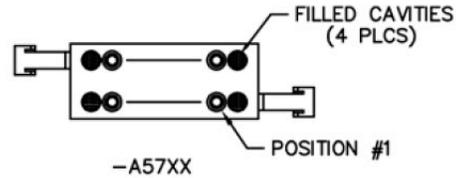
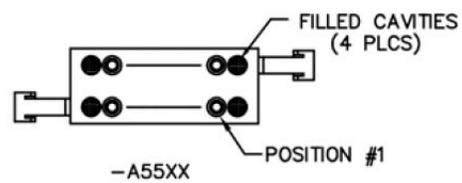
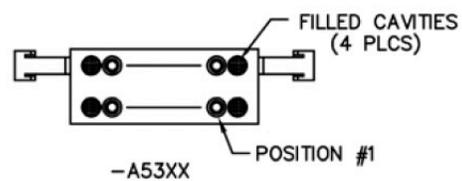
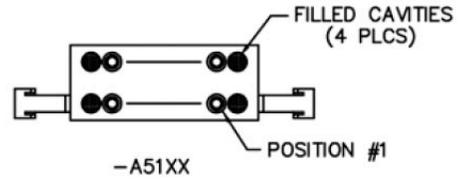
PLUG LATCH BOX

EXAMPLE: MA-231-012-161-A50WN



RECEPTACLE LATCH SPRING

EXAMPLE: MA-241-012-261-A51WN



NOTE: ALL DRAWINGS VIEWED FROM MATING FACE

MA STRIP GUIDELINES

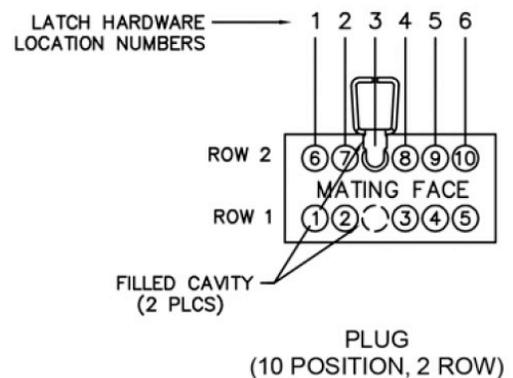
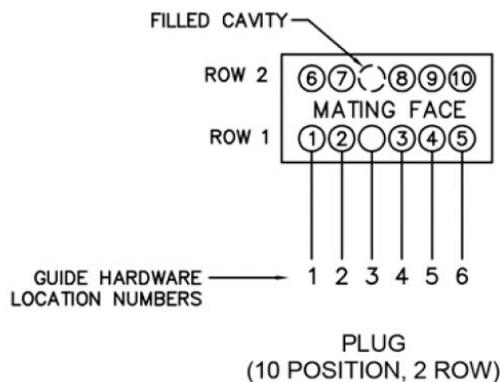
MA STRIP GUIDELINES

For "A" designator in hardware portion of part number

1. Any cavity that has a contact is considered an electrical position (including dummy contact).
2. All hardware locations, holes and/or epoxy filled cavities are considered mechanical positions.
3. The cavity adjacent to a mechanical hole, in the opposite row, will be an epoxy-filled cavity (two row only).
4. Side mount latch will always be in row two of connector (two row only).
5. Connector must always have an even number of contacts for standard part number (two row only). Consult factory for non-standard requirements.
6. Omit holes on board layout for mechanical positions and renumber board layout accordingly, except connectors with mechanical position(s) in end cavity(ies). See board layout examples, pages M-33 through M-38.
7. These guidelines apply for all hardware options, including guide holes (mechanical locations).
8. Do not skip wire colors on stranded wire assemblies.
9. Spacers underneath the connector are recommended when R/A PCB mount connectors with mounting holes are used and the PCB had irregularities greater than 0.004" underneath the connector.

To determine hardware location number:

1. Divide the total number of cavities in one row by two (including hardware cavity).
2. Round to the next whole number if result is a fraction.
3. Guide hardware will be located in Row 1 and Latch hardware will be in Row 2.

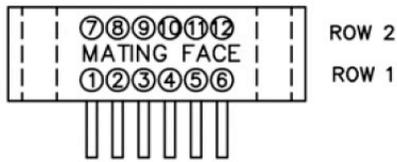
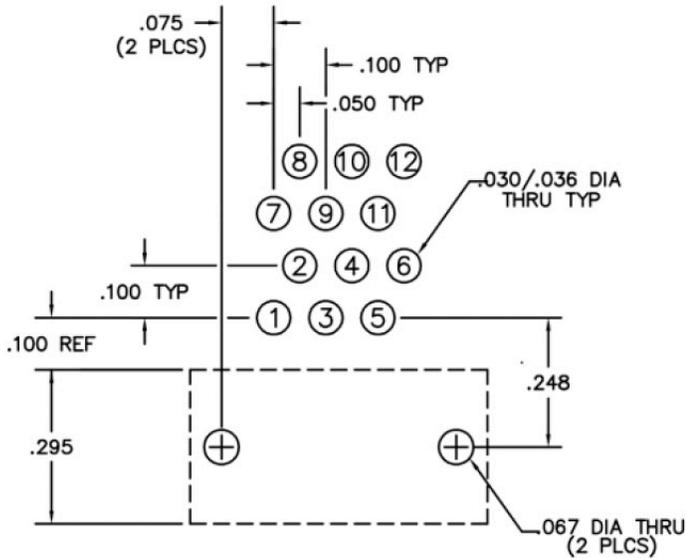


The example above shows 12 cavities with 10 live contacts. (10 electrical positions and 2 mechanical positions)

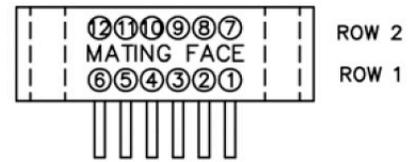
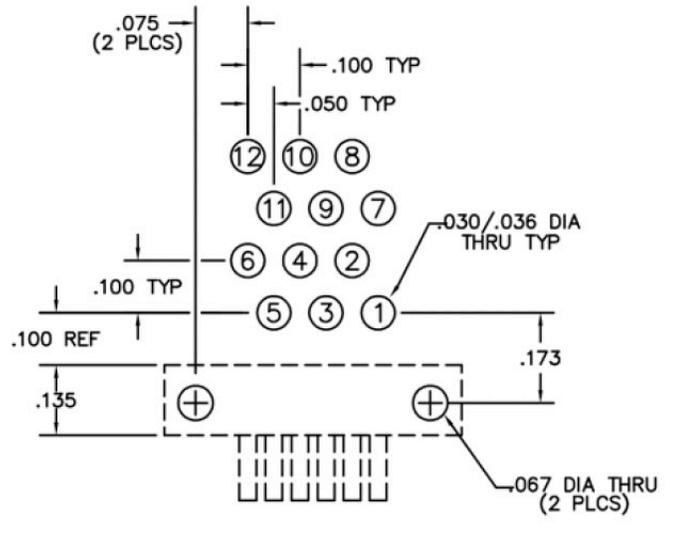
To determine the hardware location number:
6 cavities (in one row) $\div 2 = 3$
Hardware would be placed in location #3.

MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.1 0.100") WITH MOUNTING HOLES (12 ELECTRICAL POSITIONS)



PLUG
MA-271-012-325-A0000



RECEPTACLE
MA-281-012-435-A0000

CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES (12 ELECTRICAL POSITIONS)



PLUG
MA-231-012-161-A00WA



RECEPTACLE
MA-241-012-261-A00WA

WIRE CONNECT CHART

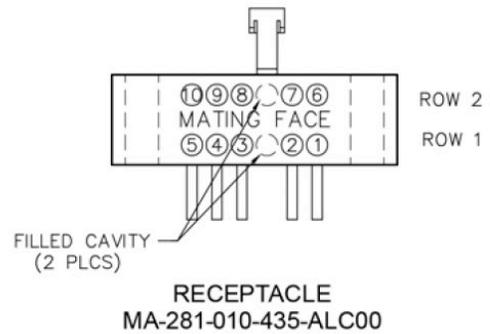
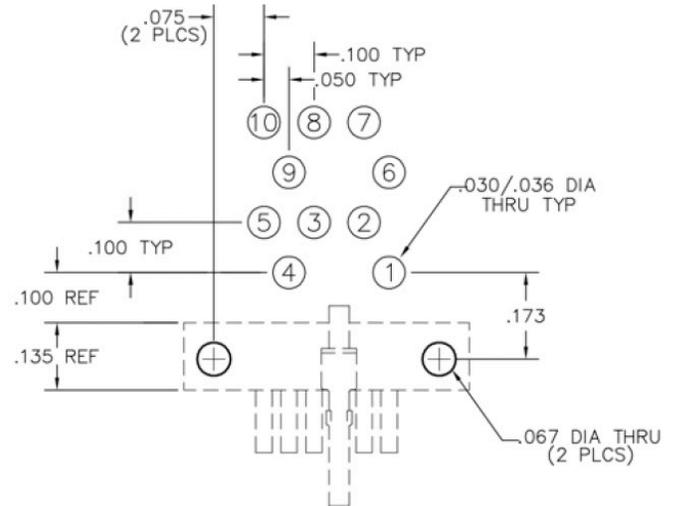
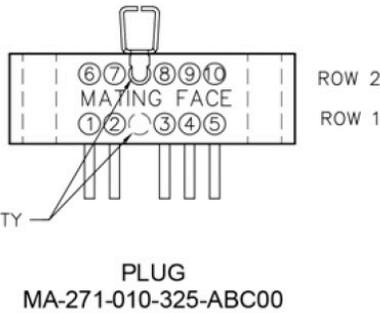
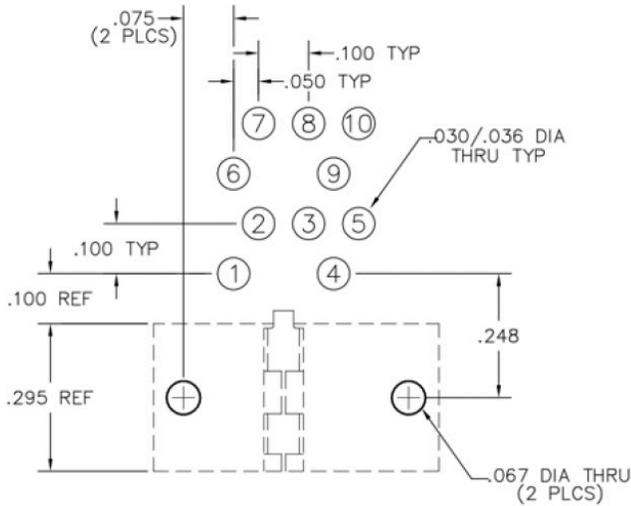
| | |
|---------|--------------|
| 1 — BLK | 7 — BLU |
| 2 — BRN | 8 — VIO |
| 3 — RED | 9 — GRY |
| 4 — ORN | 10 — WHT |
| 5 — YEL | 11 — WHT/BLK |
| 6 — GRN | 12 — WHT/BRN |

MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.100") WITH MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED.

(10 ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)

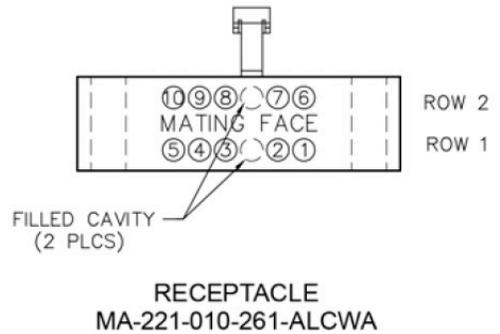
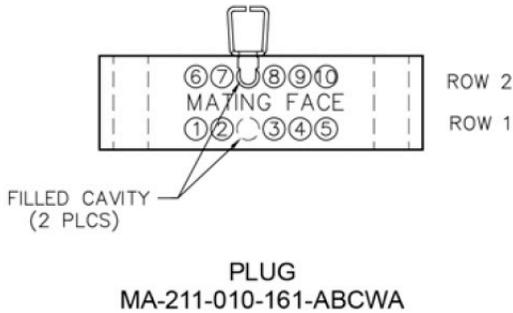
Note: Side mount latch will always be in row #2 of connector. Not recommended on row #1 for board mount applications.



CRIMPED WIRE CONNECTORS, STRAIGHT WITH MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED

(10 ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)

Note: Side mount latch will always be in row #2 of connector.

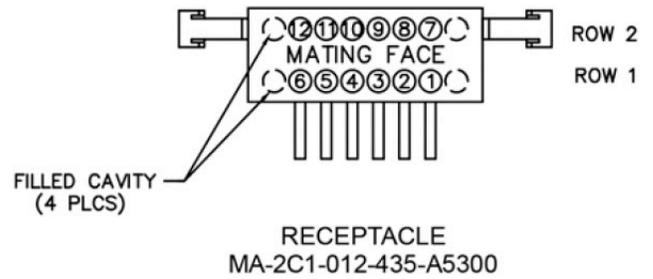
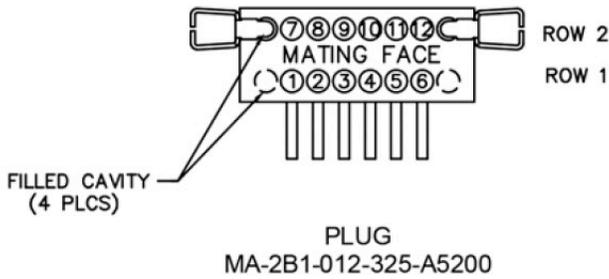
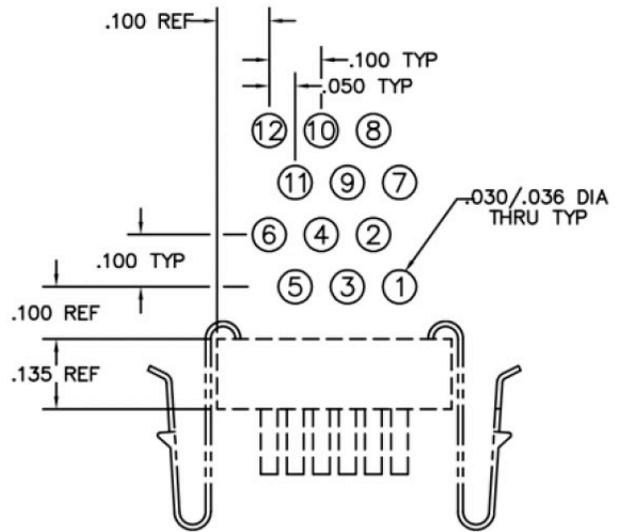
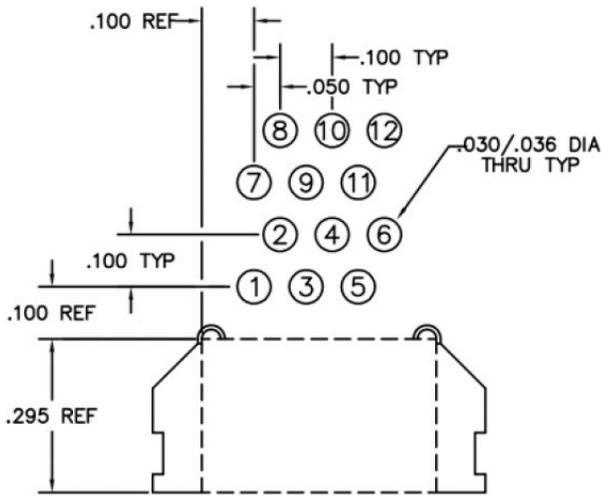


WIRE CONNECT CHART

| | | | | | |
|---|---|-----|----|---|-----|
| 1 | — | BLK | 6 | — | GRN |
| 2 | — | BRN | 7 | — | BLU |
| 3 | — | RED | 8 | — | VIO |
| 4 | — | ORN | 9 | — | GRY |
| 5 | — | YEL | 10 | — | WHT |

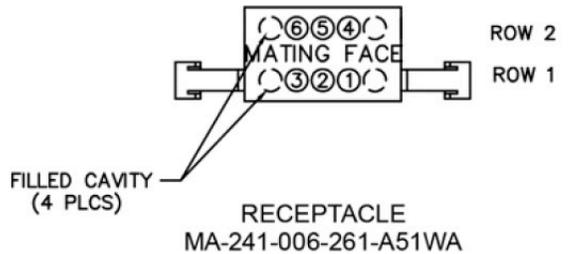
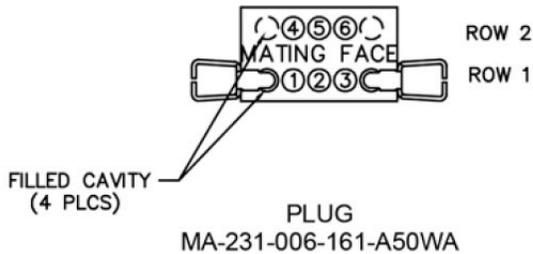
MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.100") WITHOUT MOUNTING HOLES, END MOUNT LATCHES, TWO END CAVITIES*
 (12 ELECTRICAL POSITIONS, FOUR MECHANICAL POSITIONS)



* = This is the exception as noted in "MA Strip Guidelines", page 31, note 3.

CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, END MOUNT LATCHES, 2 END CAVITIES
 (SIX ELECTRICAL POSITIONS, FOUR MECHANICAL POSITIONS)



WIRE CONNECT CHART

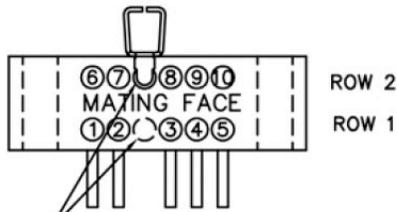
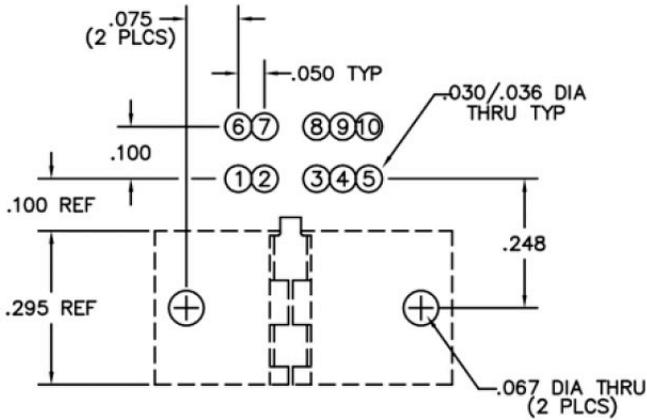
- 1 — BLK
- 2 — BRN
- 3 — RED
- 4 — ORN
- 5 — YEL
- 6 — GRN

MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE INLINE (0.100") WITH MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED

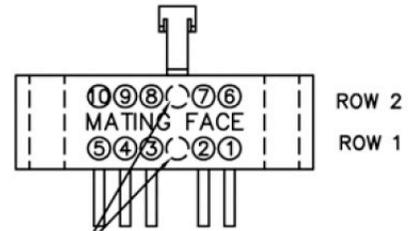
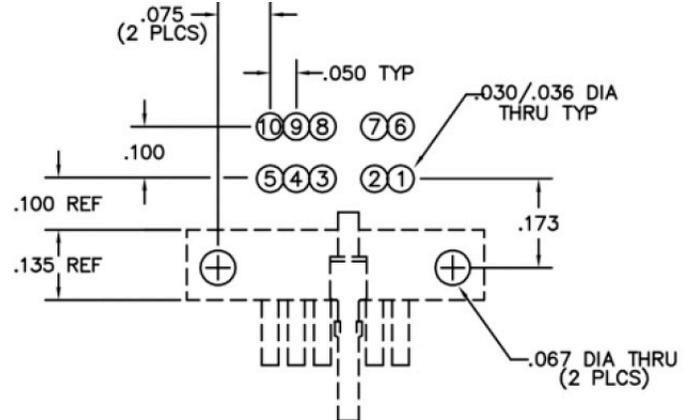
(10 ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)

Note: Side mount latch will always be in row #2 of connector. Not recommended on row #1 for board mount applications



FILLED CAVITY (2 PLCS)

PLUG
MA-2D1-010-325-ABC00

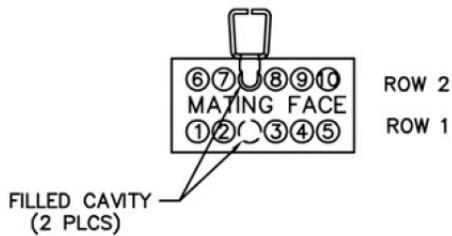


FILLED CAVITY (2 PLCS)

RECEPTACLE
MA-2E1-010-435-ALC00

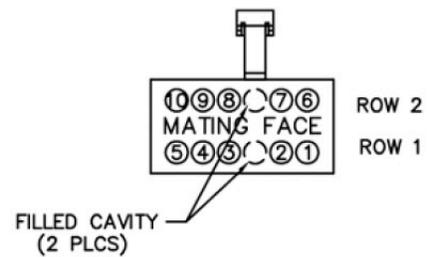
CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, SIDE MOUNT LATCH, CENTERED

(10 ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)



FILLED CAVITY (2 PLCS)

PLUG
MA-231-010-161-ABCWA



FILLED CAVITY (2 PLCS)

RECEPTACLE
MA-241-010-261-ALCWA

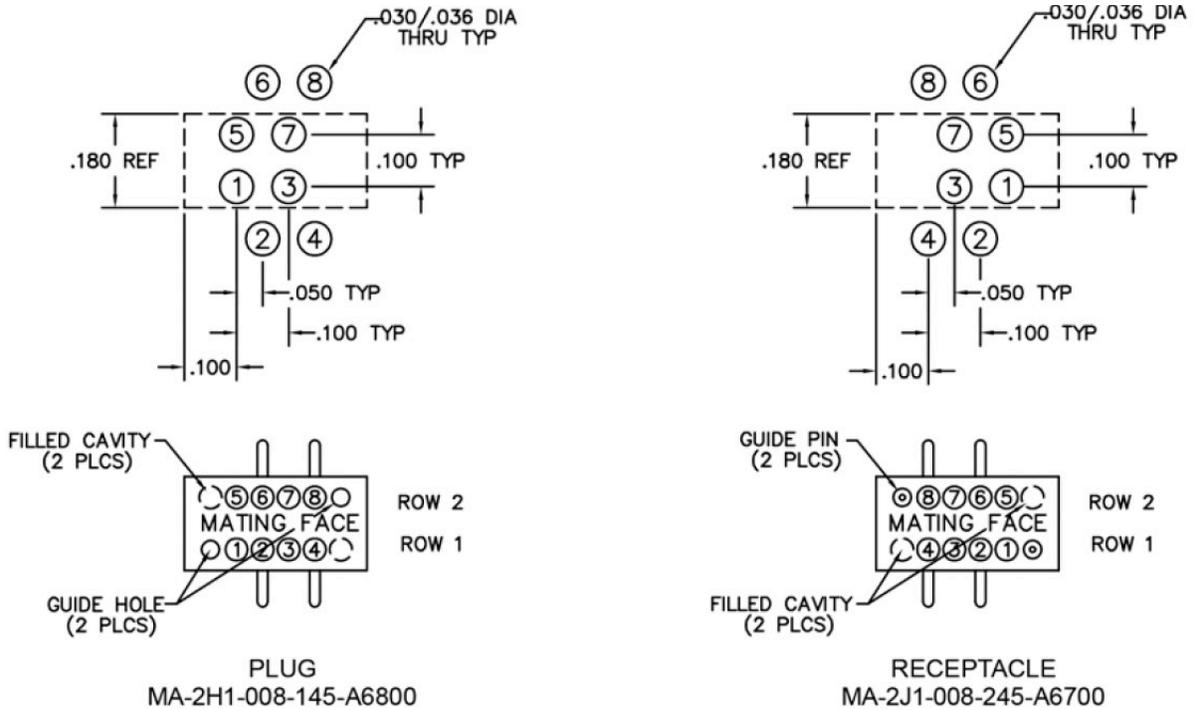
WIRE CONNECT CHART

| | |
|---------|----------|
| 1 — BLK | 6 — GRN |
| 2 — BRN | 7 — BLU |
| 3 — RED | 8 — VIO |
| 4 — ORN | 9 — GRY |
| 5 — YEL | 10 — WHT |

MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, STRAIGHT OFFSET (0.100") WITHOUT MOUNTING HOLES, TWO GUIDE HOLES/PINS, FIRST AND LAST CAVITIES

(EIGHT ELECTRICAL POSITIONS, FOUR MECHANICAL POSITIONS)



CRIMPED WIRE CONNECTORS, STRAIGHT WITHOUT MOUNTING HOLES, TWO GUIDE HOLES/PINS, FIRST AND LAST CAVITIES

(EIGHT ELECTRICAL POSITIONS, FOUR MECHANICAL POSITIONS)



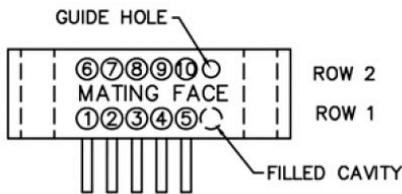
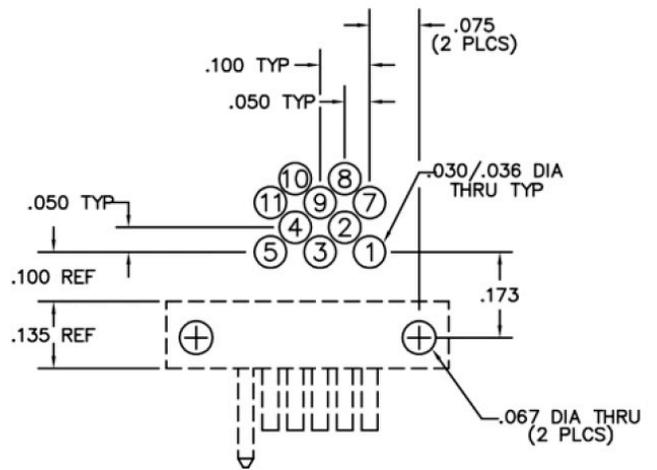
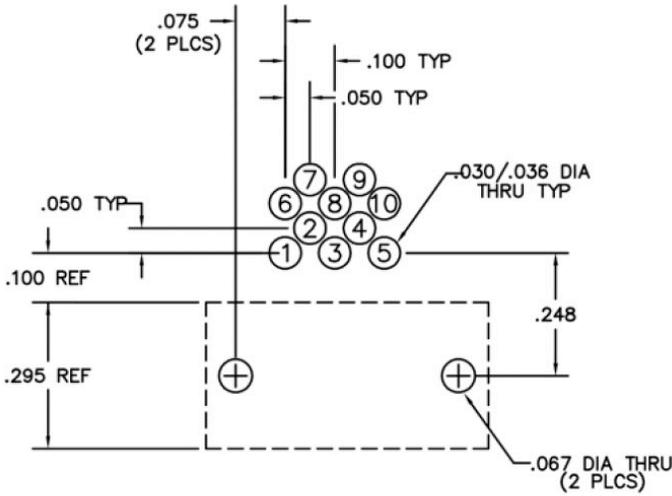
WIRE CONNECT CHART

| | |
|---------|---------|
| 1 — BLK | 5 — YEL |
| 2 — BRN | 6 — GRN |
| 3 — RED | 7 — BLU |
| 4 — ORN | 8 — VIO |

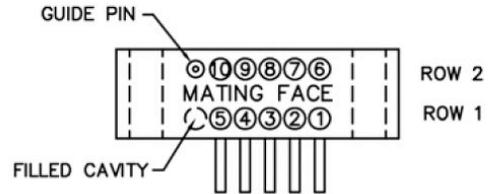
MA STRIP GUIDELINES

BOARD MOUNT CONNECTORS, RIGHT-ANGLE OFFSET (0.050") WITH MOUNTING HOLES, GUIDE HOLE/PIN, LAST CAVITY

(10 ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)



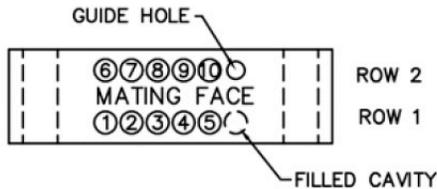
PLUG
MA-251-010-325-A6600



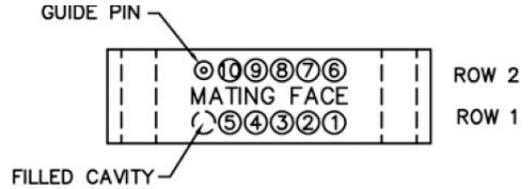
RECEPTACLE
MA-261-010-435-A6300

CRIMPED WIRE CONNECTORS, STRAIGHT WITH MOUNTING HOLES GUIDE HOLE/PIN, LAST CAVITY

(10 ELECTRICAL POSITIONS, TWO MECHANICAL POSITIONS)



PLUG
MA-211-010-161-A66WA



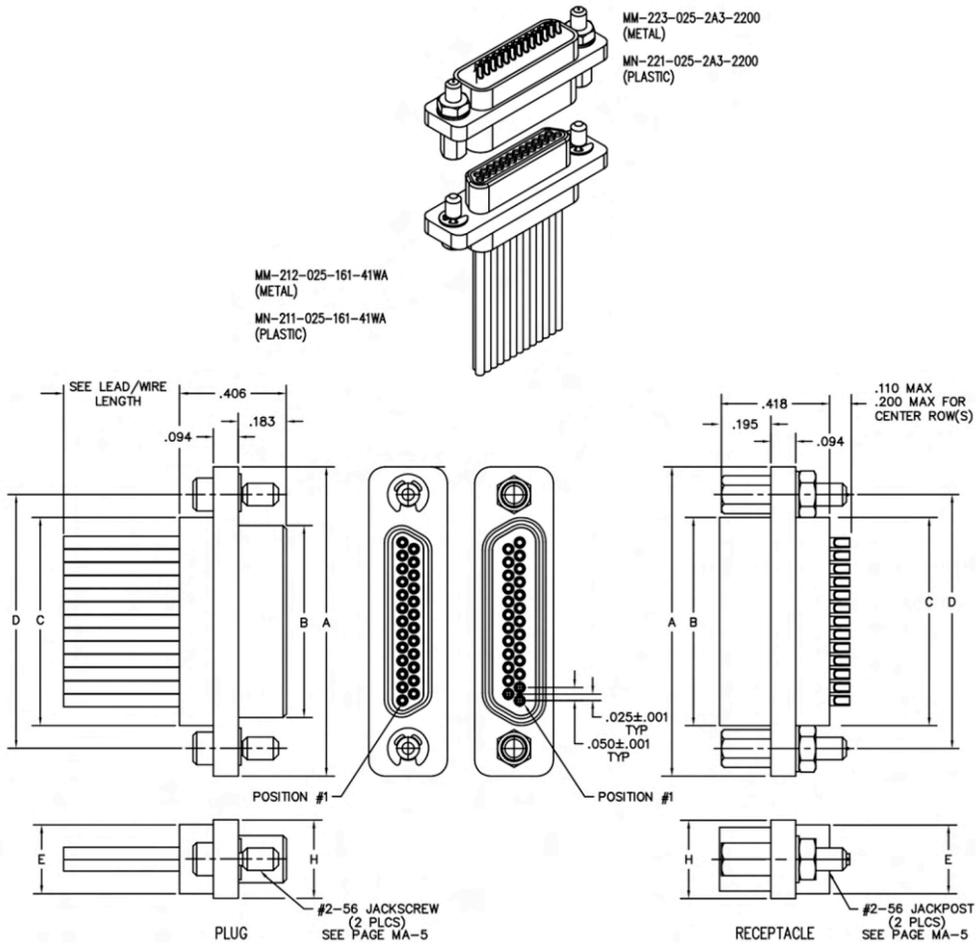
RECEPTACLE
MA-221-010-261-A63WA

WIRE CONNECT CHART

| | |
|---------|----------|
| 1 — BLK | 6 — GRN |
| 2 — BRN | 7 — BLU |
| 3 — RED | 8 — VIO |
| 4 — ORN | 9 — GRY |
| 5 — YEL | 10 — WHT |

CABLE-TO-CABLE

MM – RUGGED METAL & MN – RUGGED PLASTIC
0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|--------------------------|-------|--------------------------------------|
| Size | Contact Row | A | B | | C | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | | | |
| 51** | | 1.825 | 1.384 | 1.450 | 1.440 | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 0.310 | 0.341 | #4-40 UNC THD (0.147 DIA THROUGH) |
| 69 | | 1.725 | 1.284 | 1.350 | 1.340 | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 0.360 | 0.384 | #4-40 UNC THD (0.147 DIA THROUGH) |

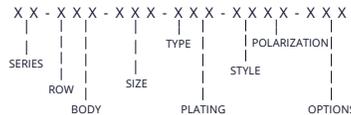
* 69 Position connectors are available in metal only.

** Two row, 51 position connectors are available in metal only, (non MIL-SPEC interface).

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN receptacles) | MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 51****) | 2 | Two-row (Sizes 9 through 51****) |
| 3 | Three-row (Size 51 and 69****) | 3 | Three-row (Size 51 and 69****) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 12 | Receptacle, straight, with ears |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | 1 | Polyphenylene sulfide (MN only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell | 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051****, 069****, 100 | XXX | 009, 015, 021, 025, 031, 037, 051****, 069****, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, 26 AWG solder cup | 21 | Socket, straight, 26 AWGAWG solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWGAWG solder cup |
| 1D | Pin, straight, 0.109" lead length (0.018 dia.) | 2D | Socket, straight, 0.109" lead length (0.018 dia.) |
| 1E | Pin, straight, 0.125" lead length (0.018 dia.) | 2E | Socket, straight, 0.125" lead length (0.018 dia.) |
| 1F | Pin, straight, 0.140" lead length (0.018 dia.) | 2F | Socket, straight, 0.140" lead length (0.018 dia.) |
| 1G | Pin, straight, 0.156" lead length (0.018 dia.) | 2G | Socket, straight, 0.156" lead length (0.018 dia.) |
| 1H | Pin, straight, 0.172" lead length (0.018 dia.) | 2H | Socket, straight, 0.172" lead length (0.018 dia.) |
| 1J | Pin, straight, 0.187" lead length (0.018 dia.) | 2J | Socket, straight, 0.187" lead length (0.018 dia.) |
| 13 | Pin, straight, .250" Lead Length (0.018 dia.) | 23 | Socket, straight, .250" lead length (0.018 dia.) |
| 1K | Pin, straight, .375" lead length (0.018 dia.) | 2K | Socket, straight, .375" lead length (0.018 dia.) |
| 14 | Pin, straight, .500" lead length (0.018 dia.) | 2L | Socket, straight, .500" lead length (0.018 dia.) |
| 15 | Pin, straight, 1.000" lead length (0.018 dia.) | 2M | Socket, straight, 1.000" lead length (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) ***** | 45 | Two turning jackscrews, Allen head, captivated** (85*) ***** |
| 99 | Keying hardware, see options below. (Body material 2, 3 and 4 only) | 99 | Keying hardware, see options below. (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | | | |
| KSXX | Two turning jackscrews. See page M-161 for keying options (Kj*) | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options (Kj*) |
| KPXX | Two fixed jacknuts. See page M-161 for keying options (KW) | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KW) |
| | | 900 | Interfacial sealing gasket |

PLUG: MM-212-031-161-41WA
 RECEPTACLE: MM-222-031-2G3-4500
 PLUG: MN-211-031-161-41WA
 RECEPTACLE: MN-221-031-2G3-4500

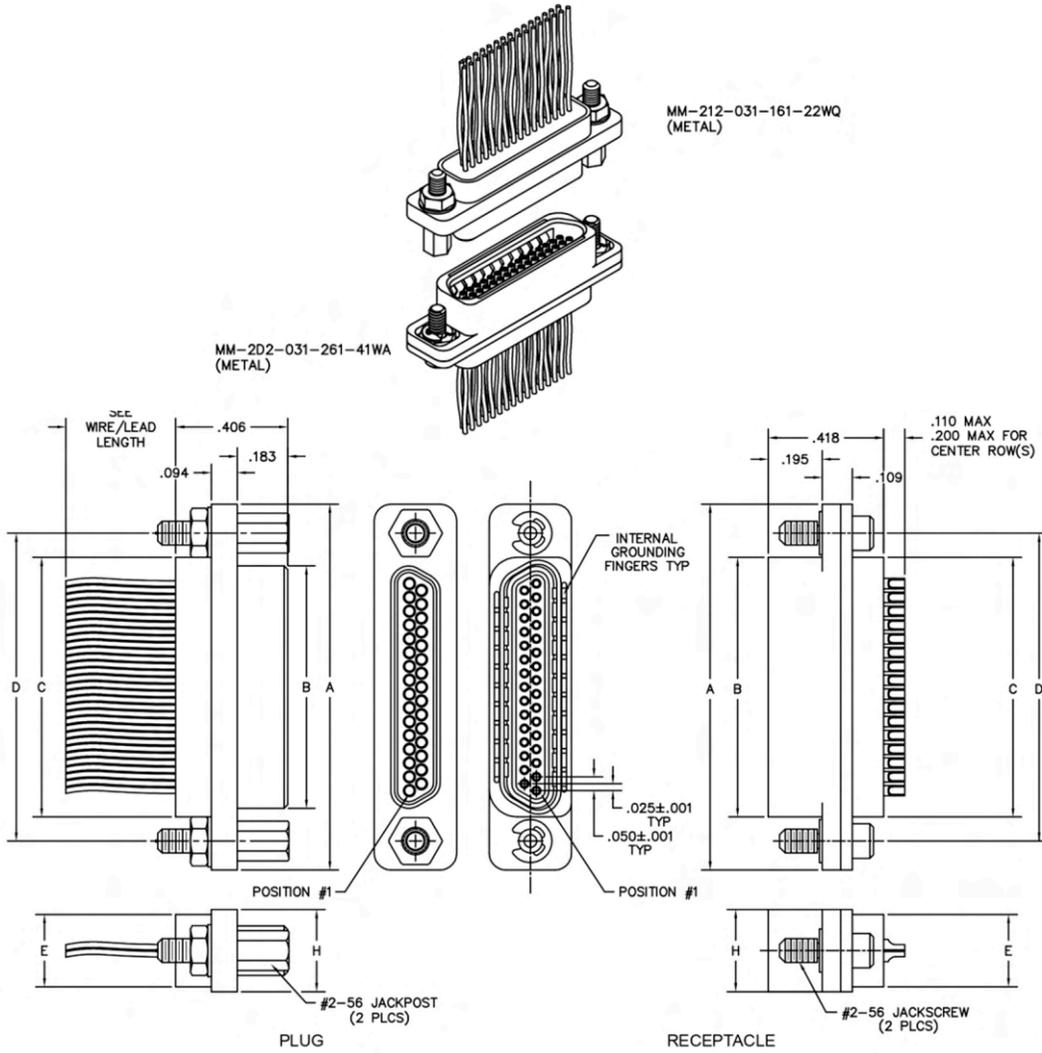


NOTE: * Use numbers or letters in parenthesis when ordering size 100.
 **Captive hardware is factory installed and non-removable.
 *****69 position connectors are available in metal only.
 **** 2 row, 51 position connectors are available in metal only (non Mil-Spec interface).
 *****Not a valid combination for MN series.
 [x] Option is not RoHS-compliant

CABLE-TO-CABLE GROUNDING FINGERS

MM - RUGGED METAL

0.050" | 9 THROUGH 100 CONTACTS

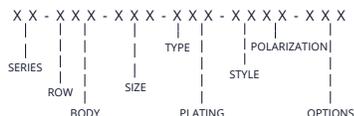


| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|---|
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | #4-40 UNC THD (0.147 DIA THROUGH) |
| 69 | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD (0.147 DIA THROUGH) |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MM | 0.050" Rugged Plastic I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Plastic I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69) | 3 | Three-row (Size 51 and 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 1 | Receptacle, straight, with grounding fingers |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 6 | Polyphenylene sulfide with with gold plated shell | 6 | Polyphenylene sulfide with with gold plated shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 21 | Socket, straight, solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWGAWG solder cup |
| 1D | Pin, straight, 0.109" lead length (0.018 dia.) SEE NOTE 1 | 2D | Socket, straight, 0.109" lead length (0.018 dia.) |
| 1E | Pin, straight, 0.125" lead length (0.018 dia.) SEE NOTE 1 | 2E | Socket, straight, 0.125" lead length (0.018 dia.) |
| 1F | Pin, straight, 0.140" lead length (0.018 dia.) SEE NOTE 1 | 2F | Socket, straight, 0.140" lead length (0.018 dia.) |
| 12 | Pin, straight, 0.150" lead length (0.018 dia.) SEE NOTE 1 | 22 | Socket, straight, 0.150" lead length (0.018 dia.) |
| 1G | Pin, straight, 0.156" lead length (0.018 dia.) SEE NOTE 1 | 2G | Socket, straight, 0.156" lead length (0.018 dia.) |
| 1H | Pin, straight, 0.172" lead length (0.018 dia.) SEE NOTE 1 | 2H | Socket, straight, 0.172" lead length (0.018 dia.) |
| 1J | Pin, straight, 0.187" lead length (0.018 dia.) SEE NOTE 1 | 2J | Socket, straight, 0.187" lead length (0.018 dia.) |
| 13 | Pin, straight, 0.250" Lead Lenth (0.018 dia.) SEE NOTE 1 | 23 | Socket, straight, 0.250" lead length (0.018 dia.) |
| 1K | Pin, straight, 0.375" lead length (0.018 dia.) SEE NOTE 1 | 2K | Socket, straight, 0.375" lead length (0.018 dia.) |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) SEE NOTE 1 | 2L | Socket, straight, 0.500" lead length (0.018 dia.) |
| 15 | Pin, straight, 1.000" lpigtails (0.018 dia.) SEE NOTE 1 | 2M | Socket, straight, 1.000" lead length (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 24 | Socket, straight, 0.500" pigtails (0.018 dia.) SEE NOTE 1 |
| | | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) SEE NOTE 1 |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts (solder cup, pigtail) | 3 | 50 µm Au contacts (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail)[x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies** (62*) | 22 | Two fixed jacknut assemblies** (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| 99 | Keying hardware, see options below. (Body material 2 and 3 only) | 99 | Keying hardware, see options below. (Body material 2 and 3 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, seepages M-158 and M-159. | XX | For wiring codes, seepages M-158 and M-1596 |
| OPTIONS | | | |
| KSXX | Two turning jackscrews. See page M-161 for keying options (KJ*) | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options (KJ*) |
| KPXX | Two fixed jacknuts. See page M-161 for keying options (KN*) | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KN*) |
| | | 900 | Interfacial sealing gasket |

PLUG: MM-212-031-161-22WQ
 RECEPTACLE: MM-2D2-031-261-41WA



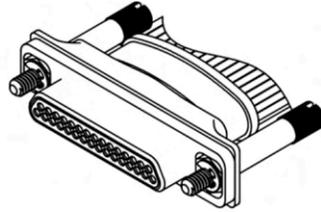
NOTES: The leads on these contacts are soft copper suitable for forming.
 * Use numbers or letters in parenthesis when ordering size 100.
 **Captive hardware is factory installed and non-removable.
 [x] Option is not RoHS-compliant



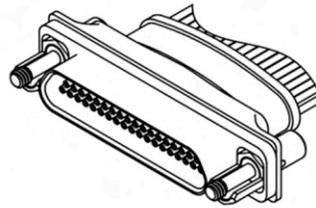
RUGGED METAL I/O (INTEGRAL SHIELD TERMINATION)

MM

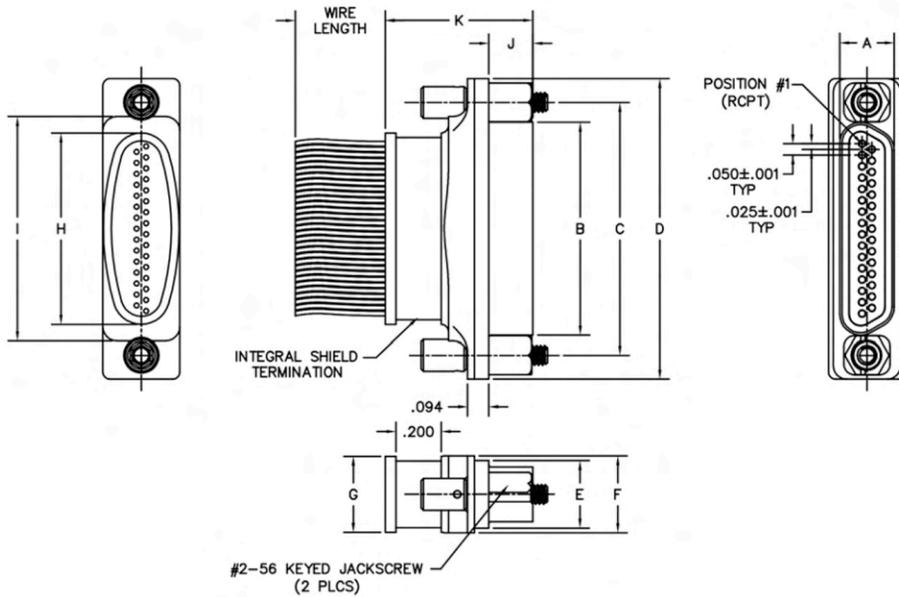
0.050" | 9 THROUGH 100 CONTACTS



MM-2P2-031-161-44WA
(PLUG)



MM-2Q2-031-261-99WA-KS11
(RECEPTACLE)



| DIMENSIONS | | | | | | | | | | | | | | | | | | |
|------------|-------------|----------|----------|----------|----------|-------|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Size | Contact Row | A | | B | | C | Hardware | D | E | F | G | H | I | J | | K | | |
| | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | | | | | | Plug | RCPT | Plug | RCPT | |
| 9 | 2 | 0.185 | 0.251 | 0.334 | 0.400 | 0.565 | #2-56 UNC THD (0.092 DIA THROUGH) | 0.775 | 0.298 | 0.340 | 0.335 | 0.290 | 0.290 | 0.440 | 0.183 | 0.195 | 0.640 | 0.652 |
| 15 | | | | 0.484 | 0.550 | 0.715 | | 0.925 | | | | 0.445 | 0.590 | | | | | |
| 21 | | | | 0.634 | 0.700 | 0.865 | | 1.075 | | | | 0.595 | 0.740 | | | | | |
| 25 | | | | 0.734 | 0.800 | 0.965 | | 1.175 | | | | 0.695 | 0.840 | | | | | |
| 31 | | | | 0.884 | 0.950 | 1.115 | | 1.325 | | | | 0.845 | 0.990 | | | | | |
| 37 | | | | 1.034 | 1.100 | 1.265 | | 1.475 | | | | 0.995 | 1.140 | | | | | |
| 51 | 3 | 0.228 | 0.294 | 1.384 | 1.450 | 1.615 | #2-56 UNC THD (0.092 DIA THROUGH) | 1.825 | 0.341 | 0.380 | 0.367 | 1.345 | 1.490 | 0.183 | 0.195 | 0.640 | 0.652 | |
| 51 | | | | 0.984 | 1.050 | 1.215 | | 1.425 | | | | 0.945 | 1.090 | | | | | |
| 69 | | | | 1.284 | 1.350 | 1.515 | | 1.725 | | | | 1.245 | 1.390 | | | | | |
| 100 | 4 | 0.271 | 0.394 | 1.384 | 1.508 | 1.800 | #4-40 UNC THD (0.147 DIA THROUGH) | 2.160 | 0.381 | 0.430 | 0.417 | 1.457 | 1.522 | | | | | |

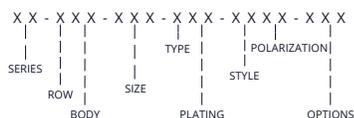
LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|--|--|--|---|
| SERIES | | | |
| MM | 0.050" Rugged Plastic I/O Connector | MM | 0.050" Rugged Plastic I/O Connector |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37, 51)*** | 2 | Two-row (Sizes 9 through 37, 51)*** |
| 3 | Three-row (Size 51 and 69) | 3 | Three-row (Size 51 and 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| P | Plug, straight, with ears and integral shield termination | Q | Receptacle, straight, with ears and integral shield termination |
| BODY STYLE: (Material: Polyphenylene sulfide) | | BODY STYLE: (Material: Polyphenylene sulfide) | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 161 | Pin, straight, 50 µm Au contacts (crimped stranded wire) | 261 | Socket, straight, 50 µm Au contacts (crimped stranded wire) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62)** | 22 | Two fixed jacknut assemblies (62)** |
| 41 | Two turning jackscrews, Allen head, retaining ring (81)** | 41 | Two turning jackscrews, Allen head, retaining ring (81)** |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82)** | 42 | Two long turning jackscrews, Allen head, retaining ring (82)** |
| 43 | Two turning jackscrews, slot head, retaining ring (83)** | 43 | Two turning jackscrews, slot head, retaining ring (83)** |
| 44 | Two long turning jackscrews, slot head, retaining ring (84)** | 44 | Two long turning jackscrews, slot head, retaining ring (84)** |
| 45 | Two turning jackscrews, Allen head, captivated* (85)** | 45 | Two turning jackscrews, Allen head, captivated* (85)** |
| 99 | Keying hardware, see options below | 99 | Keying hardware, see options below |
| WIRING | | WIRING | |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | | | |
| KSXX | Two turning jackscrews. See page M-161 for keying options (KJ)** | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options (KJ)** |
| KPXX | Two fixed jacknuts. See page M-161 for keying options (KN)** | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KN)** |
| | | 900 | Interfacial sealing |

NOTES

See page M-160 and M-162 for hardware dimensions. Reference PTB44 for band-it termination installation

PLUG: MM-2P2-031-161-44WA
RECEPTACLE: MM-2Q2-031-261-99WA-KS11



NOTE: Stainless steel micro band for shield termination, shipped with each connector

Molex Part Number CDG10026 1/8" short, CDG17492 1/8" long Band-it application tool -Molex Part Number CDG10027

*Captive hardware is factory installed and non-removable.

**Use numbers or letters in parenthesis when ordering size 100.

*** 2 Row, 51 position connectors are NON MIL-SPEC interface

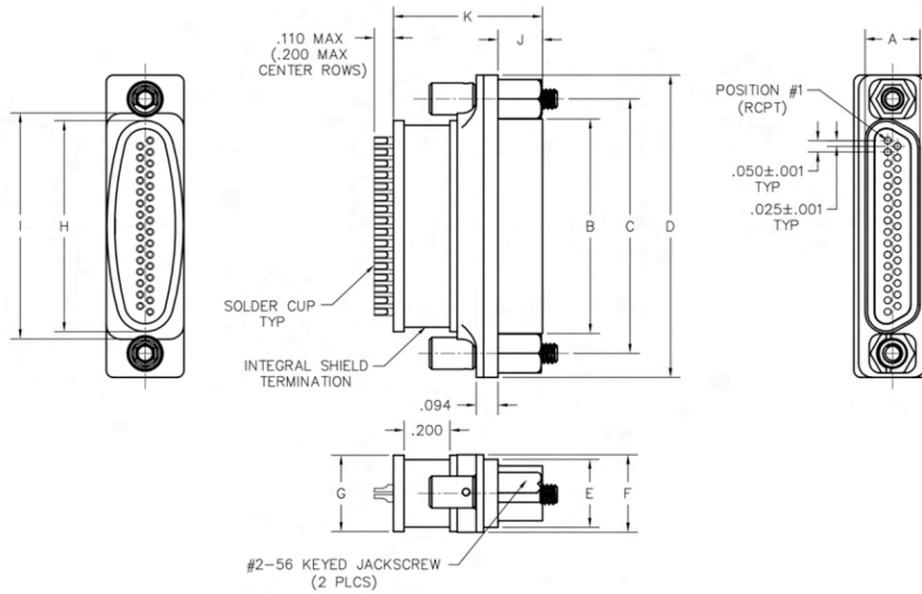
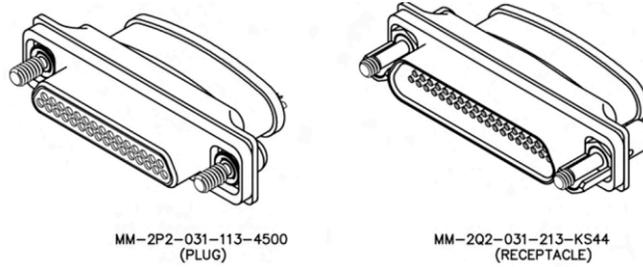
[x] Option is not RoHS-compliant

molex

RUGGED METAL SOLDER CUP (INTEGRAL SHIELD TERMINATION)

MM

0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | | | | | | | | | | |
|------------|-------------|----------|----------|----------|----------|-------|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Size | Contact Row | A | | B | | C | Hardware | D | E | F | G | H | I | J | | K | |
| | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | | | | | | Plug | RCPT | Plug | RCPT |
| 9 | 2 | 0.185 | 0.251 | 0.334 | 0.400 | 0.565 | #2-56 UNC THD (0.092 DIA THROUGH) | 0.775 | 0.298 | 0.340 | 0.335 | 0.375 | 0.440 | 0.183 | 0.195 | 0.640 | 0.652 |
| 15 | | | | 0.484 | 0.550 | 0.715 | | 0.925 | | | | 0.525 | 0.590 | | | | |
| 21 | | | | 0.634 | 0.700 | 0.865 | | 1.075 | | | | 0.675 | 0.740 | | | | |
| 25 | | | | 0.734 | 0.800 | 0.965 | | 1.175 | | | | 0.775 | 0.840 | | | | |
| 31 | | | | 0.884 | 0.950 | 1.115 | | 1.325 | | | | 0.925 | 0.990 | | | | |
| 37 | | | | 1.034 | 1.100 | 1.265 | | 1.475 | | | | 1.075 | 1.140 | | | | |
| 51 | 3 | 0.228 | 0.294 | 1.384 | 1.450 | 1.615 | #4-40 UNC THD (0.147 DIA THROUGH) | 1.825 | 0.341 | 0.380 | 0.367 | 1.425 | 1.490 | 0.183 | 0.195 | 0.640 | 0.652 |
| 51 | | | | 0.984 | 1.050 | 1.215 | | 1.425 | | | | 1.025 | 1.090 | | | | |
| 69 | | | | 1.284 | 1.350 | 1.515 | | 1.725 | | | | 1.325 | 1.390 | | | | |
| 100 | 4 | 0.271 | 0.394 | 1.384 | 1.508 | 1.800 | #4-40 UNC THD (0.147 DIA THROUGH) | 2.160 | 0.381 | 0.430 | 0.417 | 1.457 | 1.522 | | | | |



LEAD CONFIGURATION OPTIONS

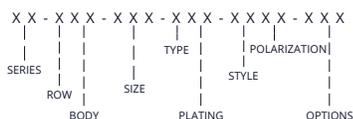
| PLUGS | | RECEPTACLES | |
|--------------------------------------|---|--------------------------------------|--|
| SERIES | | | |
| MM | 0.050 Rugged Metal Solder Cup Connector | MM | 0.050 Microminiature Strip Connector |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37, 51)*** | 2 | Two-row (Sizes 9 through 37, 51)*** |
| 3 | Three-row (Sizes 51 through 69) | 3 | Three-row (Sizes 51 through 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| P | Plug, straight, with ears and integral shield termination | Q | Receptacle, straight, with ears and integral shield termination |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| CONTACTS/PLATING/TERMINATIONS | | CONTACTS/PLATING/TERMINATIONS | |
| 113 | Pin, straight, 50 µm Au contacts, 10 µm Au termination 26 AWG solder cup | 213 | Socket, straight, 50 µm Au contacts, 10 µm Au termination 26 AWG solder cup |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62)** | 22 | Two fixed jacknut assemblies (62)** |
| 41 | Two turning jackscrews, Allen head, retaining ring (81)** | 41 | Two turning jackscrews, Allen head, retaining ring (81)** |
| 43 | Two turning jackscrews, slot head, retaining ring (83)** | 43 | Two turning jackscrews, slot head, retaining ring (83)** |
| 45 | Two turning jackscrews, Allen head, captivated* (85)** | 45 | Two turning jackscrews, Allen head, captivated* (85)** |
| 99 | Keying hardware, see options below | 99 | Keying hardware, see options below |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts. See page M-161 for keying options (KN)** | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KN)** |
| KSXX | Two turning jackcrews. See page M-161 for keying options (KP)** | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options (KJ)** |
| | | 99 | Interfacial seal |

NOTES

See page M-160 and M-162 for hardware dimensions.
Reference PTB43 for solder cup termination.
Reference PTB44 for band-it termination installation.

PLUG
RECEPTACLE

MM-2P2-031-113-4500
MM-2Q2-031-213-2200



NOTE: Stainless steel micro band for shield termination, shipped with each connector

Molex Part Number CDG10026 1/8" short, CDG17492 1/8" long
Band-it application tool - Molex Part Number COG10027

*Captive hardware is factory installed and non-removable.

**Use numbers or letters in parenthesis when ordering size 100.

***2 Row, 51 position connectors are NON MIL-SPEC interface

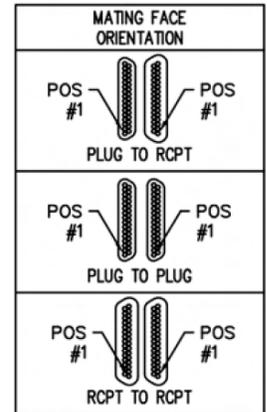
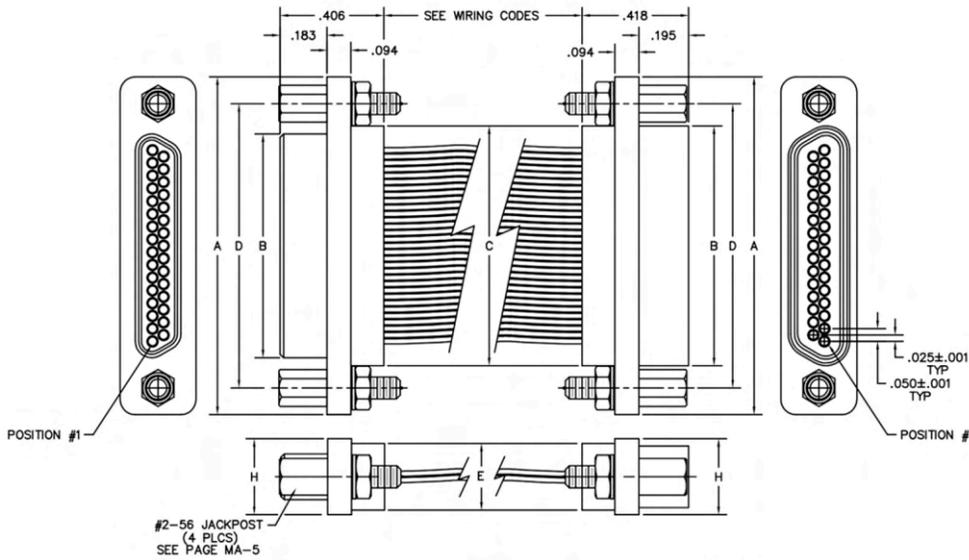
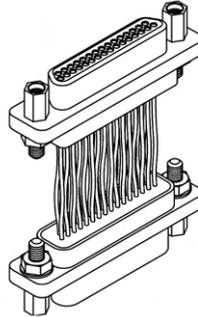
[x] Option is not RoHS-compliant

molex

CABLE-TO-CABLE (JUMPER ASSEMBLY)

MM – RUGGED METAL & MN – RUGGED PLASTIC
0.050" | 9 THROUGH 100 CONTACTS

MM-2J2-031-P51-22WA
(METAL)
MN-2J1-031-P51-22WA
(PLASTIC)



| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|---|
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | |
| 51** | 3 | 1.825 | 1.384 | 1.450 | 1.440 | 1.615 | 0.310 | 0.341 | #4-40 UNC THD (0.147 DIA THROUGH) |
| 51 | | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | | | |
| 69* | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD (0.147 DIA THROUGH) |

* 69 Position connectors are available in metal only.

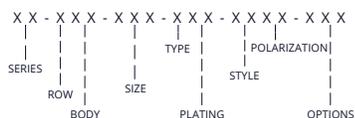
** Two row, 51 position connectors are available in metal only, (non MIL-SPEC interface).

LEAD CONFIGURATION OPTIONS

| PLUGS | |
|----------------------------|--|
| SERIES | |
| MM | 0.050 Rugged Metal 1/O Connector (MM mates with MK, ML, MM, MN receptacles) |
| MN | 0.050 Rugged Plastic 1/O Connector (MM mates with MK, ML, MM, MN receptacles) |
| BODY | |
| 2 | Two-row (Sizes 9 through 51****) |
| 3 | Three-row (Sizes 51 through 69***) |
| 4 | Four-row (Size 100) |
| BODY STYLE | |
| J | Jumper assembly, straight, with ears |
| BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) |
| 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum |
| K | Zinc nickel plating |
| T | Nickel polymer plating |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051****, 069***, 100 |
| CONTACTS | |
| TYPE CONTACTS/TERMINATIONS | |
| PP | Plug to plug |
| PS | Plug to receptacle |
| SS | Receptacle to receptacle |
| PLATING OPTION | |
| | 50 µm Au contacts (crimp wire) |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Four fixed jacknut assemblies (62*) |
| 41 | Four turning jackscrews, Allen head, retaining ring (81*) |
| 43 | Four turning jackscrews, slot head, retaining ring (83)** |
| 45 | Four turning jackscrews, Allen head, captivated** (85*)***** |
| 46 | Two fixed jacknuts and two turning jackscrews, Allen head, uninstalled (86*) |
| 47 | Two fixed jacknuts and two turning jackscrews, slot head, uninstalled (87*) |
| 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | |
| XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | |
| KPXX | Four fixed jacknuts. Receptacles supplied with interfacial sealing gasket. See page M-161 for keying options (KN*) |
| KSXX | Four turning jackscrews. Receptacles supplied with interfacial sealing gasket. See page M-161 for keying options (KJ*) |
| 99 | Interfacial sealing gasket |

PLUG

MM-2J2-031 - PS1-22WA
MN-2J1 -031-PS1-22WA

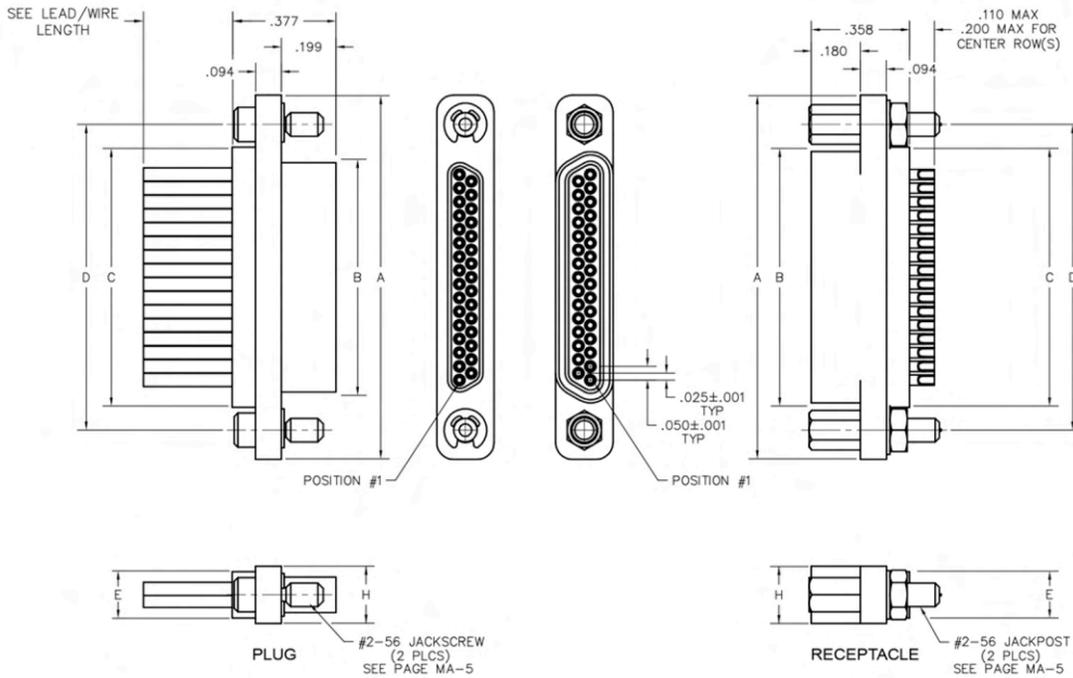
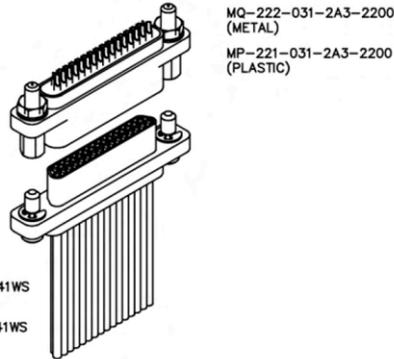


NOTE: *Use numbers or letters in parenthesis when ordering size 100.
 **Captive hardware is factory installed and non-removable.
 ***69 position connectors are available in metal only.
 ****2 row, 51 position connectors are available in metal only (non Mil-Spec interface).
 *****Not a valid combination for MN series.
 [x] Option is not RoHS-compliant

molex

CABLE-TO-CABLE

MQ - LOW-PROFILE METAL & MP - LOW-PROFILE PLASTIC
 0.050" | 9 THROUGH 51 CONTACTS



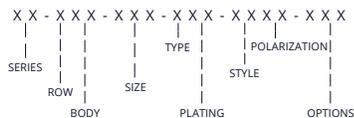
| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|-------|-------|--------------------------------------|
| Size | Contact Row | A | B | | C | D | E | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.398 | 0.565 | 0.173 | 0.208 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.928 | 0.442 | 0.528 | 0.548 | 0.715 | | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.698 | 0.865 | | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.798 | 0.965 | | | |
| 31 | | 1.328 | 0.842 | 0.928 | 0.948 | 1.115 | | | |
| 37 | | 1.478 | 0.992 | 1.078 | 1.098 | 1.265 | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.048 | 1.215 | 0.220 | 0.250 | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|--|
| SERIES | | | |
| MO | 0.050" Low-Profile Metal I/O Connector (MO mates with MP, MO, MR, MS receptacles) | MO | 0.050" Low-Profile Metal I/O Connector (MO mates with MP, MO, MR, MS plugs) |
| MP | 0.050" Low-Profile Plastic I/O Connector (MP mates with MP, MO, MR, MS receptacles) | MP | 0.050" Low-Profile Plastic I/O Connector (MP mates with MP, MO, MR, MS plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 1 | Receptacle, straight, with ears |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MP only) | 1 | Polyphenylene sulfide (MP only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 21 | Socket, straight, 26 AWG solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWGAWG solder cup |
| 1D | Pin, straight, 0.109" lead length (0.018 dia.) SEE NOTE 1 | 2D | Socket, straight, 0.109" lead length (0.018 dia.) |
| 1E | Pin, straight, 0.125" lead length (0.018 dia.) SEE NOTE 1 | 2E | Socket, straight, 0.125" lead length (0.018 dia.) |
| 1F | Pin, straight, 0.140" lead length (0.018 dia.) SEE NOTE 1 | 2F | Socket, straight, 0.140" lead length (0.018 dia.) |
| 12 | Pin, straight, 0.150" lead length (0.018 dia.) SEE NOTE 1 | 22 | Socket, straight, 0.150" lead length (0.018 dia.) |
| 1G | Pin, straight, 0.156" lead length (0.018 dia.) SEE NOTE 1 | 2G | Socket, straight, 0.156" lead length (0.018 dia.) |
| 1H | Pin, straight, 0.172" lead length (0.018 dia.) SEE NOTE 1 | 2H | Socket, straight, 0.172" lead length (0.018 dia.) |
| 1J | Pin, straight, 0.187" lead length (0.018 dia.) SEE NOTE 1 | 2J | Socket, straight, 0.187" lead length (0.018 dia.) |
| 13 | Pin, straight, 0.250" Lead Lenth (0.018 dia.) SEE NOTE 1 | 23 | Socket, straight, 0.250" lead length (0.018 dia.) |
| 1K | Pin, straight, 0.375" lead length (0.018 dia.) SEE NOTE 1 | 2K | Socket, straight, 0.375" lead length (0.018 dia.) |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) SEE NOTE 1 | 2L | Socket, straight, 0.500" lead length (0.018 dia.) |
| 15 | Pin, straight, 1.000" lpigtails (0.018 dia.) SEE NOTE 1 | 2M | Socket, straight, 1.000" lead length (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 24 | Socket, straight, 0.500" lead length (0.018 dia.) SEE NOTE 1 |
| | | 25 | Socket, straight, 1.000" lead length (0.018 dia.) SEE NOTE 1 |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts (solder cup, pigtail) | 3 | 50 µm Au contacts (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| 99 | Keying hardware, see options below. (Body material 2 and 3 only) | 99 | Keying hardware, see options below. (Body material 2 and 3 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | | | |
| KSXX | Two turning jackscrews. See page M-161 for keying options | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options |
| KPXX | Two fixed jacknuts. See page M-161 for keying options | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options |

PLUG: MQ-212-031-161-41WS
RECEPTACLE: MQ-222-031-2G3-4500

PLUG: MP-211-031-161-41WS
RECEPTACLE: MP-221-031-2G3-4500



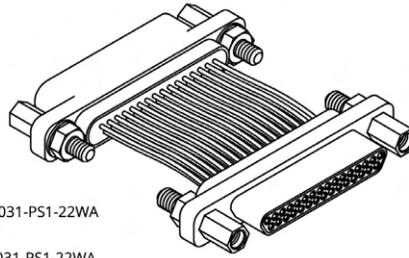
NOTE: The leads on these contacts are soft copper suitable for forming.
**Captive hardware is factory installed and non-removable.

[x] Option is not RoHS-compliant

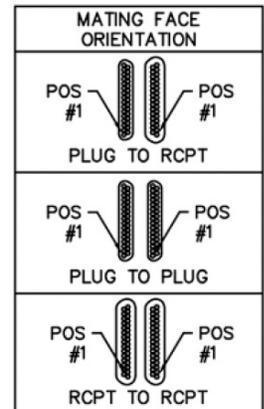
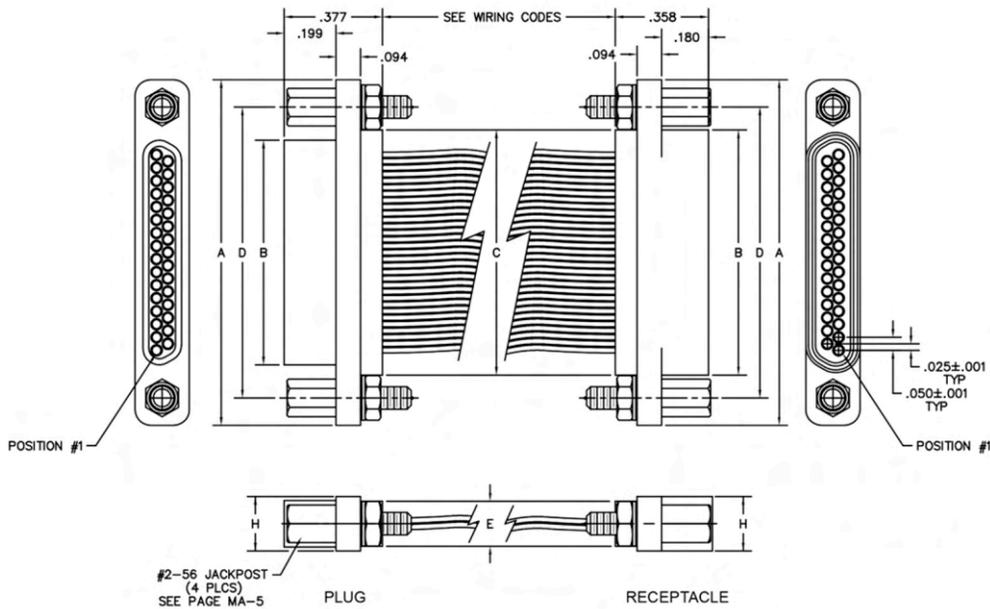


CABLE-TO-CABLE (JUMPER ASSEMBLY)

MQ - LOW-PROFILE METAL & MP - LOW-PROFILE PLASTIC
 0.050" | 9 THROUGH 51 CONTACTS



MQ-2J2-031-PS1-22WA
 (METAL)
 MP-2J1-031-PS1-22WA
 (PLASTIC)



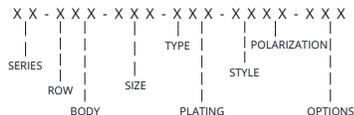
| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|------------------|-------|-----------------------------------|
| Size | Contact Row | A | B | | C | D | E | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | Potting Well MAX | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.398 | 0.565 | 0.173 | 0.208 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.928 | 0.442 | 0.528 | 0.548 | 0.715 | | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.698 | 0.865 | | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.798 | 0.965 | | | |
| 31 | | 1.328 | 0.842 | 0.928 | 0.948 | 1.115 | | | |
| 37 | 1.478 | 0.992 | 1.078 | 1.098 | 1.265 | 0.220 | 0.250 | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.048 | | | | 1.215 |

LEAD CONFIGURATION OPTIONS

| PLUGS | |
|----------------------------|---|
| SERIES | |
| MQ | 0.050" Low-Profile Metal I/O Connector (MQ mates with MP, MQ, MR, MS receptacles) |
| MP | 0.050" Low-Profile Plastic I/O Connector (MP mates with MP, MQ, MR, MS receptacles) |
| BODY | |
| 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Sizes 51) |
| BODY STYLE | |
| J | Jumper assembly, straight, with ears |
| BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MP only) |
| 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell |
| A | Pure electro-deposited aluminum |
| K | Zinc nickel plating |
| T | Nickel polymer plating |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051 |
| CONTACTS | |
| TYPE CONTACTS/TERMINATIONS | |
| PP | Plug to plug |
| PS | Plug to receptacle |
| SS | Receptacle to receptacle |
| PLATING OPTION | |
| | 50 µm Au contacts (crimp wire) |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Four fixed jacknut assemblies |
| 41 | Four turning jackscrews, Allen head, retaining ring |
| 43 | Four turning jackscrews, slot head, retaining ring |
| 45 | Four turning jackscrews, Allen head, captivated** |
| 46 | Two fixed jacknuts and two turning jackscrews, Allen head, uninstalled |
| 47 | Two fixed jacknuts and two turning jackscrews, slot head, uninstalled |
| 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | |
| XX | For wiring codes, see page M-158 and M-159. |
| OPTIONS | |
| KPXX | Four fixed jacknuts. See page M-161 for keying options |
| KSXX | Four turning jackscrews. See page M-161 for keying options |

PLUG
RECEPTACLE

MQ-2J2-031-PS1-22WA
MP-2J2-031-PS1-22WA



NOTE:

**Captive hardware is factory installed and non-removable.

[x] Option is not RoHS-compliant

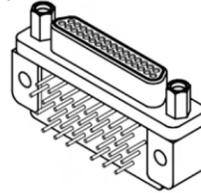
RIGHT-ANGLE BOARD MOUNT (NARROW FOOTPRINT)

MK & ML

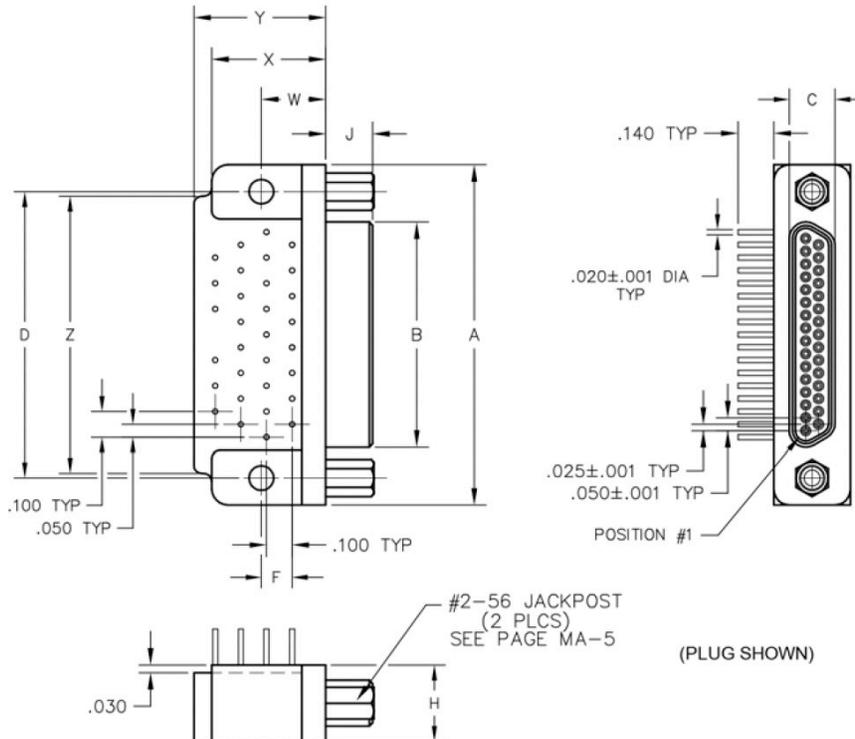
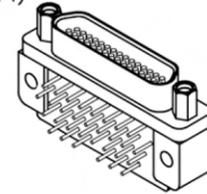
0.050" | 9 THROUGH 100 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MK-25... | MK, ML, MM, MN receptacles |
| ML-25... | MK, ML, MM, MN receptacles |
| ML-26.. | MK, ML, MM, MN plugs |
| ML-26.. | MK, ML, MM, MN plugs |

MK-252-031-335-220S
(PLUG)



MK-262-031-445-220S
(RCPT)



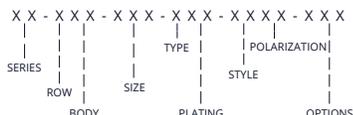
DIMENSIONS

| Size | Contact Row | A | B | | C | | D | F | H | J | | W | X MAX | Y MAX | Z | Hardware | Mounting Holes | |
|------|-------------|-------|----------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|---------------|---|---|--|-------|
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | Plug | RCPT | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.185 | 0.251 | 0.565 | 0.565 | 0.298 | 0.183 | 0.195 | 0.250 | 0.420 | 0.420 | 1.075 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | |
| 15 | | 0.925 | 0.484 | 0.550 | | | 0.715 | 0.120 | | | | | | | | | | 0.925 |
| 21 | | 1.075 | 0.634 | 0.700 | | | 0.865 | 1.075 | | | | | | | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | | | 0.965 | 1.175 | | | | | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | | | 1.115 | 1.080 | | | | | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | | | 1.265 | 1.180 | | | | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 0.228 | 0.341 | 1.215 | 0.150 | 0.341 | 0.300 | 0.430 | 0.650 | 1.220 | 1.450 | #4-40 UNC THD | 0.125 DIA #2-56 UNC Insert #4-40 UNC Insert | | |
| 69 | | 1.725 | 1.284 | 1.350 | | | 1.515 | 1.450 | | | | | | | | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 0.271 | 0.384 | 1.800 | 0.384 | 1.800 | 0.400 | 0.590 | 1.000 | 1.810 | #4-40 UNC THD | 0.125 DIA #2-56 UNC Insert #4-40 UNC Insert | | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN receptacles) | ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69***) | 3 | Three-row (Size 51 and 69***) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 5 | Plug, right-angle, narrow footprint, with mounting holes | 6 | Receptacle, right-angle, narrow footprint, with mounting holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (ML only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Electroless Ni shell with PPS insulator | 2 | Electroless Ni shell with PPS insulator |
| 3 | Electrodeposited cadmium shell with PPS insulator [x] | 3 | Electrodeposited cadmium shell with PPS insulator [x] |
| 4 | Hard anodized black shell with PPS insulator | 4 | Hard anodized black shell with PPS insulator |
| 5 | Stainless steel shell with PPS insulator | 5 | Stainless steel shell with PPS insulator |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069***, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069***, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| 34 | Pin, right-angle, PCB leads, 0.172" | 45 | Socket, right-angle, PCB leads, 0.172" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut (62*) | 22 | Two fixed jacknut (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring**** (81*) | 41 | Two turning jackscrews, Allen head, retaining ring**** (81*) |
| 99 | Keying hardware, see options below. (Body material 2 and 3 only) | 99 | Keying hardware, see options below. (Body material 2 and 3 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reversed body polarization | OR | Reversed body polarization |
| OS | Standard body polarization | OS | Standard body polarization |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts. (KN*) | KPXX | Two fixed jacknuts (KN*) and interfacial sealing gasket. |
| 94P | Mil-Spec footprint (size 100 only), standard body polarization | 900 | Interfacial sealing gasket |
| OB7 | #2-56 threaded inserts, standard body polarization | OB7 | #2-56 Threaded inserts and interfacial sealing gasket standard body polarization |
| OBJ | Mil-Spec footprint (size 100 only) with #2-56 threaded inserts, standard body polarization | OH7 | #4-40 threaded inserts (size 100 only), and interfacial sealing gasket, standard body polarization |
| OH7 | #4-40 threaded inserts (size 100 only), standard polarization | | |
| OH6 | Mil-Spec footprint (size 100 only) with #4-40 threaded inserts, standard body polarization | | |

PLUG: MK-252-031-335-220S
 RECEPTACLE: MK-262-031-445-220S



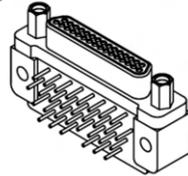
NOTE: See page M-161 for keying options
 *Use numbers in parenthesis when ordering size 100.
 ***69 position connectors are available in metal only.
 ****Connector body has no mounting holes.
 [x] Option is not RoHS-compliant

RIGHT-ANGLE BOARD MOUNT (THROUGH- CLEARANCE CUT)

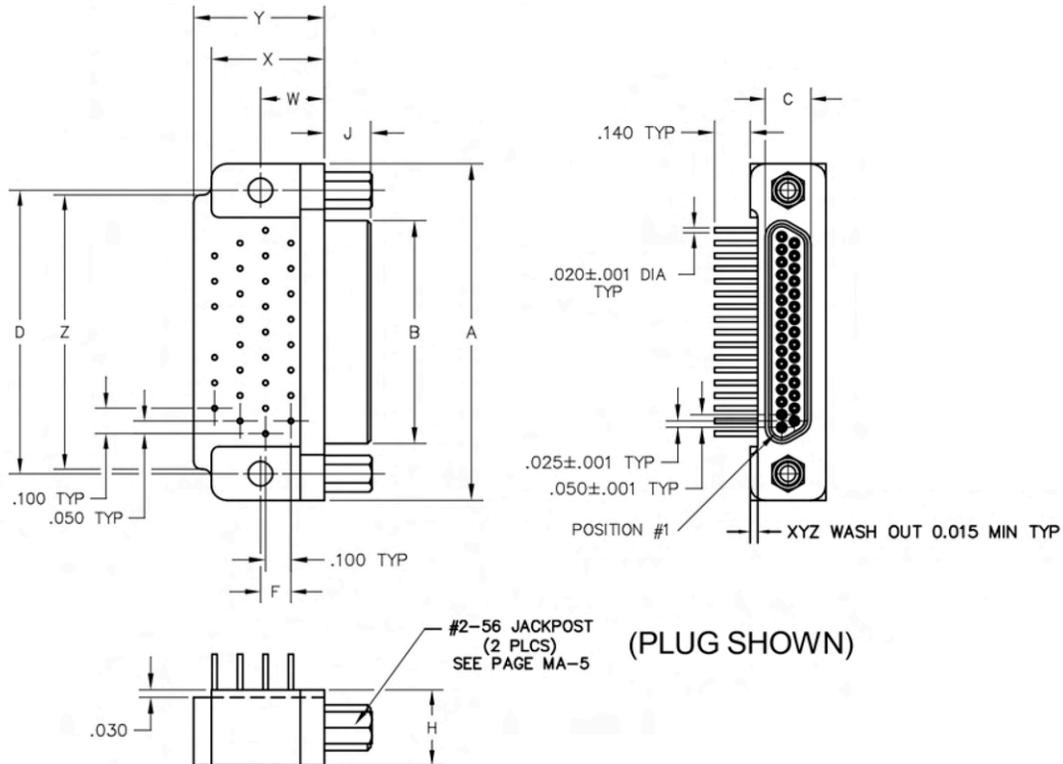
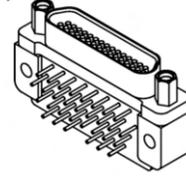
MK
0.050" | 9 THROUGH 100 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MK-2R... | MK, ML, MM, MN receptacles |
| MK-2S.. | MK, ML, MM, MN plugs |

MK-2R2-031-335-220S
(PLUG)



MK-2S2-031-445-220S
(RCPT)

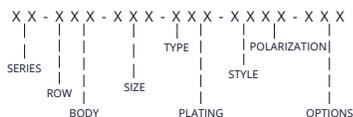


| DIMENSIONS | | | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|---|--|-------|-------|
| Size | Contact Row | A | B | | C | | D | F | H | J | | W | X MAX | Y MAX | Z | Hardware | Mounting Hole | | |
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | Plug | RCPT | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.185 | 0.251 | 0.565 | 0.020 | 0.298 | 0.183 | 0.195 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | | |
| 15 | | 0.925 | 0.484 | 0.550 | | | 0.715 | 0.120 | | | | | | | | | | 1.080 | |
| 21 | | 1.075 | 0.634 | 0.700 | | | 0.865 | | | | | | | | | | | | 1.180 |
| 25 | | 1.175 | 0.734 | 0.800 | | | 0.965 | | | | | | | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | | | 1.115 | | | | | | | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | | | 1.265 | | | | | | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 0.228 | 0.294 | 1.215 | 0.150 | 0.341 | 0.300 | 0.430 | 0.650 | 1.220 | 1.450 | #4-40 UNC THD | 0.125 DIA #2-56 UNC Insert #4-40 UNC Insert | | | |
| 69 | | 1.725 | 1.284 | 1.350 | | | 1.515 | | | | | | | | | | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 0.271 | 0.394 | 1.800 | 0.200 | 0.384 | 0.400 | 0.590 | 1.000 | 1.810 | #4-40 UNC THD | | | | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69) | 3 | Three-row (Size 51 and 69) |
| 4 | Four-row (Size 100 only) | 4 | Four-row (Size 100 only) |
| BODY STYLE | | BODY STYLE | |
| R | Plug, right-angle (through clearance cut), narrow footprint, with mounting holes | S | Receptacle, right-angle (through clearance cut), narrow footprint, with mounting holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Electroless Ni shell with PPS insulator | 2 | Electroless Ni shell with PPS insulator |
| 3 | Electrodeposited cadmium shell with PPS insulator [x] | 3 | Electrodeposited cadmium shell with PPS insulator [x] |
| 4 | Hard anodized black shell with PPS insulator | 4 | Hard anodized black shell with PPS insulator |
| 5 | Stainless steel shell with PPS insulator | 5 | Stainless steel shell with PPS insulator |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| 34 | Pin, right-angle, PCB leads, 0.172" | 45 | Socket, right-angle, PCB leads, 0.172" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut (62) | 22 | Two fixed jacknut (62) |
| 41 | Two turning jackscrews, Allen head, retaining ring**** (81) | 41 | Two turning jackscrews, Allen head, retaining ring**** (81) |
| 99 | Keying hardware, see options below. (Body material 2, 3 and 4 only) | 99 | Keying hardware, see options below. (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reversed body polarization** | OR | Reversed body polarization** |
| OS | Standard body polarization | OS | Standard body polarization |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts. (KN*) | KPXX | Two fixed jacknuts (KN*) and interfacial sealing gasket. |
| 94P | Mil-Spec footprint (size 100 only), standard body polarization | 900 | Interfacial sealing gasket |
| OB7 | #2-56 threaded inserts, standard body polarization | OB7 | #2-56 Threaded inserts and interfacial sealing gasket standard body polarization |
| OBJ | Mil-Spec footprint (size 100 only) with #2-56 threaded inserts, standard body polarization | OH7 | #4-40 threaded inserts (size 100 only), and interfacial sealing gasket, standard body polarization |
| OH7 | #4-40 threaded inserts (size 100 only), standard body polarization | | |
| OH6 | Mil-Spec footprint (size 100 only) with #4-40 threaded inserts, standard body polarization | | |

PLUG: MK-2R2-031-335-220S
 RECEPTACLE: MK-2S2-031-445-220S



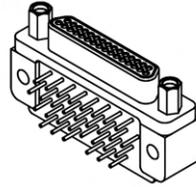
NOTE: See page M-161 for keying options
 *Use numbers in parenthesis when ordering size 100.
 **100 position connector standard body polarization only.
 ****Connector body has no mounting holes.
 [x] Option is not RoHS-compliant

RIGHT-ANGLE BOARD MOUNT (BLIND-CLEARANCE CUT)

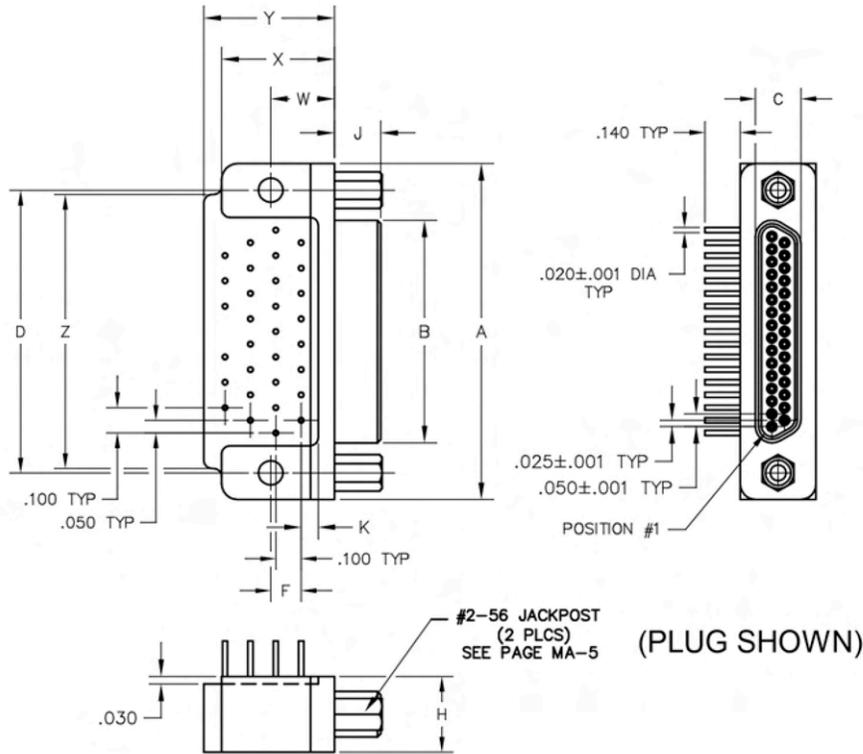
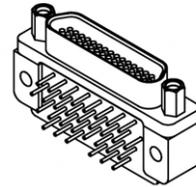
MK
0.050" | 9 THROUGH 100 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MK-2T... | MK, ML, MM, MN receptacles |
| MK-2V.. | MK, ML, MM, MN plugs |

MK-2T2-031-335-2205
(PLUG)



MK-2V2-031-445-2205
(RCPT)

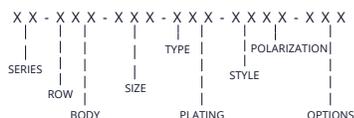


| DIMENSIONS | | | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---|---|--|-------|
| Size | Contact Row | A | B | | C | | D | F | H | J | | K | W | X MAX | Y MAX | Z | Hardware | Mounting Hole | |
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | Plug | RCPT | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.185 | 0.251 | 0.565 | 0.020 | 0.183 | 0.195 | 0.067 | 0.250 | 0.420 | 0.420 | 1.080 | 1.180 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | |
| 15 | | 0.925 | 0.484 | 0.550 | | | 0.715 | 0.120 | | | | | | | | | | | 0.298 |
| 21 | | 1.075 | 0.634 | 0.700 | | | 0.865 | | | | | | | | | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | | | 0.965 | | | | | | | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | | | 1.115 | | | | | | | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | | | 1.265 | | | | | | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 0.228 | 0.294 | 1.215 | 0.150 | 0.341 | 0.087 | 0.300 | 0.430 | 0.650 | 1.220 | 1.450 | #4-40 UNC THD | 0.125 DIA #2-56 UNC Insert #4-40 UNC Insert | | |
| 69 | | 1.725 | 1.284 | 1.350 | | | 1.515 | | | | | | | | | | | 0.755 | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 0.271 | 0.394 | 1.800 | 0.200 | 0.384 | 0.137 | 0.400 | 0.590 | 1.000 | 1.810 | #4-40 UNC THD | 0.125 DIA #2-56 UNC Insert #4-40 UNC Insert | | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69) | 3 | Three-row (Size 51 and 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE – BLIND CUT | | BODY STYLE – BLIND CUT | |
| R | Plug, right-angle (blind-clearance cut), narrow footprint, with mounting holes | V | Receptacle, right-angle (blind-clearance cut), narrow footprint, with mounting holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Electroless Ni shell with PPS insulator | 2 | Electroless Ni shell with PPS insulator |
| 3 | Electrodeposited cadmium shell with PPS insulator [x] | 3 | Electrodeposited cadmium shell with PPS insulator [x] |
| 4 | Hard anodized black shell with PPS insulator | 4 | Hard anodized black shell with PPS insulator |
| 5 | Stainless steel shell with PPS insulator | 5 | Stainless steel shell with PPS insulator |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| 34 | Pin, right-angle, PCB leads, 0.172" | 45 | Socket, right-angle, PCB leads, 0.172" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut (62*) | 22 | Two fixed jacknut (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring**** (81*) | 41 | Two turning jackscrews, Allen head, retaining ring**** (81*) |
| 99 | Keying hardware, see options below. (Body material 2, 3 and 4 only) | 99 | Keying hardware, see options below. (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reversed body polarization | OR | Reversed body polarization |
| OS | Standard body polarization | OS | Standard body polarization |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts. (KN*) | KPXX | Two fixed jacknuts (KN*) and interfacial sealing gasket. |
| 94P | Mil-Spec footprint (size 100 only), standard body polarization | 900 | Interfacial sealing gasket |
| OB7 | #2-56 threaded inserts, standard body polarization | OB7 | #2-56 Threaded inserts and interfacial sealing gasket standard body polarization |
| OBJ | Mil-Spec footprint (size 100 only) with #2-56 threaded inserts, standard body polarization | OH7 | #4-40 threaded inserts (size 100 only), and interfacial sealing gasket, standard body polarization |
| OH7 | #4-40 threaded inserts (size 100 only), standard body polarization | | |
| OH6 | Mil-Spec footprint (size 100 only) with #4-40 threaded inserts, standard body polarization | | |

PLUG: MK-2T2-031-335-220S
 RECEPTACLE: MK-2V2-031-445-220S



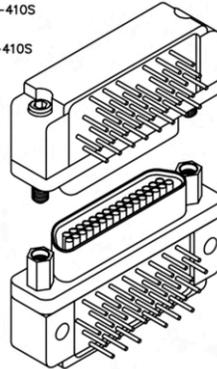
NOTE: See page M-161 for keying options
 *Use numbers in parenthesis when ordering size 100.
 ****Connector body has no mounting holes.
 [x] Option is not RoHS-compliant

BOARD-TO-FLEX CABLE (NARROW FOOTPRINT)

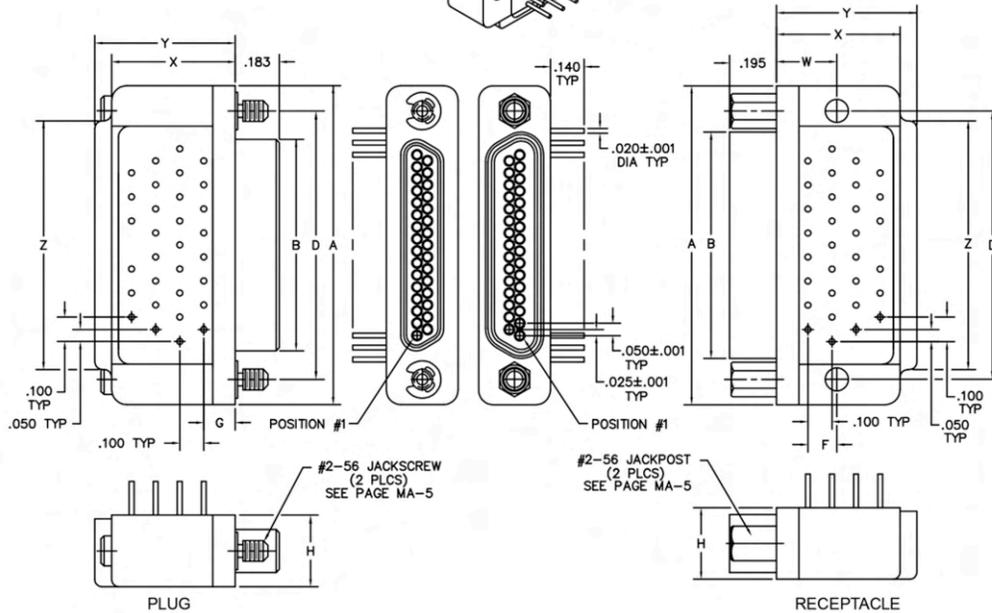
MK & ML – RUGGED BOARD MOUNT AND MK & ML – FLEX CABLE
0.050" | 9 THROUGH 100 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MK-2T... | MK, ML, MM, MN receptacles |
| MK-2V.. | MK, ML, MM, MN plugs |

MK-253-031-335-410S
(METAL)
ML-251-031-335-410S
(PLASTIC)



MK-263-031-445-220S
(METAL)
ML-261-031-445-220S
(PLASTIC)



| DIMENSIONS | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|-------|-------|-------|-------|-------|--------|---------------|---|--------|-------|
| Size | Contact Row | A | B | | D | F | G | H | W | X MAX | Y MAX | Z | Hardware | Mounting Hole | | |
| | | | Plug MAX | RCPT MAX | | | | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.565 | 0.020 | 0.230 | 0.298 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.715 | 0.120 | 0.130 | | | | | 0.925 | | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.865 | | | | | | | 0.1080 | | | 0.1180 | 1.075 |
| 25 | | 1.175 | 0.734 | 0.800 | 0.965 | | | | | | | | | | | 1.175 |
| 31 | | 1.325 | 0.884 | 0.950 | 1.115 | | | | | 1.080 | 1.180 | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.265 | 1.180 | 1.220 | | | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.215 | 0.150 | 0.150 | 0.341 | 0.300 | 0.430 | 0.650 | 1.220 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | | |
| 69* | | 1.725 | 1.284 | 1.350 | 1.515 | | | | | | | | | | 1.220 | 1.450 |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.800 | 0.200 | 0.200 | 0.384 | 0.400 | 0.590 | 1.000 | 1.810 | #4-40 UNC THD | 0.125 DIA #2-56 UNC Insert #4-40 UNC Insert | | |

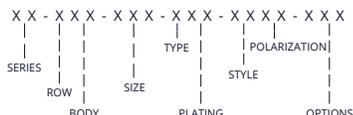
* 69 Position connectors are available in metal only.

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN receptacles) | ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN receptacles) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69***) | 3 | Three-row (Size 51 and 69***) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE - BLIND CUT | | BODY STYLE - BLIND CUT | |
| 5 | Plug, right-angle, narrow footprint, with mounting holes | 6 | Receptacle, right-angle, narrow footprint, with mounting holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (ML only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Electroless Ni shell with PPS insulator | 2 | Electroless Ni shell with PPS insulator |
| 3 | Electrodeposited cadmium shell with PPS insulator [x] | 3 | Electrodeposited cadmium shell with PPS insulator [x] |
| 4 | Hard anodized black shell with PPS insulator | 4 | Hard anodized black shell with PPS insulator |
| 5 | Stainless steel shell with PPS insulator | 5 | Stainless steel shell with PPS insulator |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069***, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069***, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| 34 | Pin, right-angle, PCB leads, 0.172" | 45 | Socket, right-angle, PCB leads, 0.172" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut (62*) | 22 | Two fixed jacknut (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring**** (81*) | 41 | Two turning jackscrews, Allen head, retaining ring**** (81*) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reversed body polarization | OR | Reversed body polarization |
| OS | Standard body polarization | OS | Standard body polarization |
| OPTIONS | | | |
| 94P | Mil-Spec footprint (size 100 only), standard body polarization | 900 | Interfacial sealing gasket |
| OB7 | Threaded inserts, standard body polarization | OB7 | Threaded inserts and interfacial sealing gasket standard body polarization |
| OBJ | Mil-Spec footprint (size 100 only) with threaded inserts, standard body polarization | | |

PLUG: MK-253-031-335-410S
RECEPTACLE: MK-263-031-445-220S

PLUG: ML- 251-031-335-410S
RECEPTACLE: ML- 261-031-445-220S



NOTE:

*Use numbers in parenthesis when ordering size 100.

***69 position connectors are available in metal only.

****Connector body has no mounting holes.

[x] Option is not RoHS-compliant

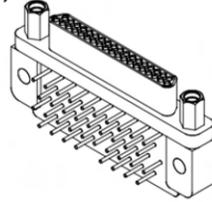
RIGHT-ANGLE BOARD MOUNT LOW-PROFILE (NARROW FOOTPRINT)

MS & MR

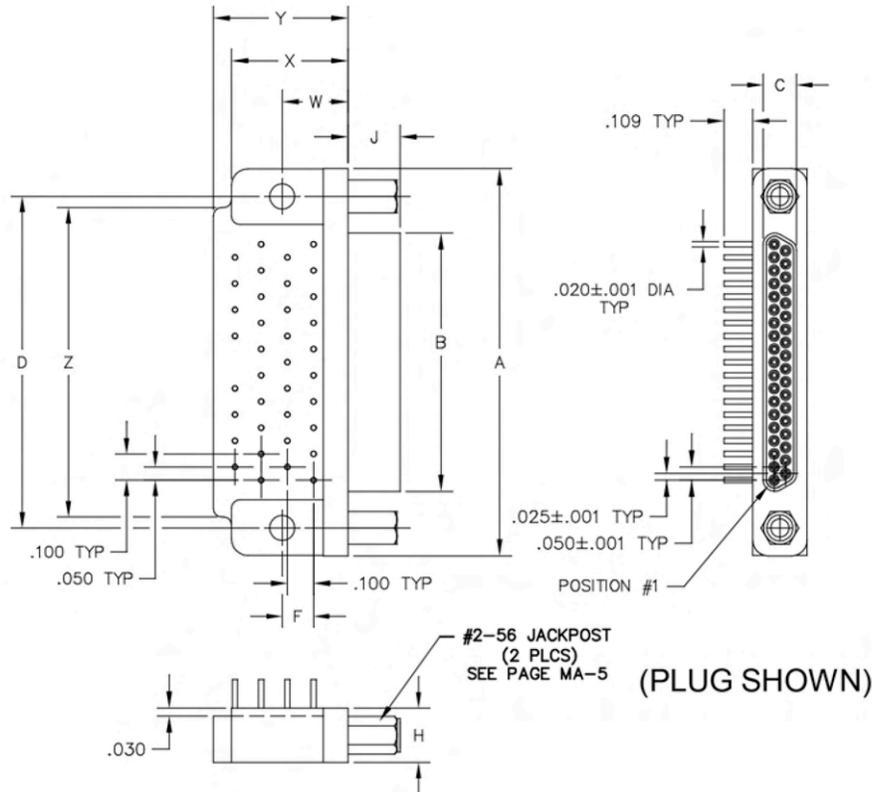
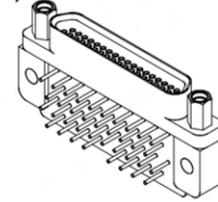
0.050" | 9 THROUGH 51 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MS-25... | MP, MO, MR, MS receptacles |
| MR-25... | MP, MO, MR, MS receptacles |
| MS-26.. | MP, MO, MR, MS plugs |
| MR-26... | MP, MO, MR, MS plugs |

MS-253-037-325-220S
(PLUG)



MS-263-037-435-220S
(RCPT)



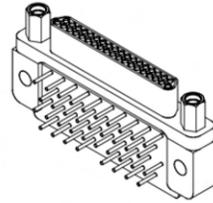
| DIMENSIONS | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|--|
| Size | Contact Row | A | B | | C | | D | F | H | J | | W | X MAX | Y MAX | Z | Hardware | Mounting Hole |
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | Plug | RCPT | | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.134 | 0.218 | 0.565 | 0.020 | 0.208 | 0.199 | 0.180 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert |
| 15 | | 0.928 | 0.442 | 0.528 | | | 0.715 | | | | | | | | | | |
| 21 | | 1.078 | 0.592 | 0.678 | | | 0.865 | | | | | | | | | | |
| 25 | | 1.178 | 0.692 | 0.778 | | | 0.965 | 0.120 | | | | | | | | | |
| 31 | | 1.328 | 0.842 | 0.928 | | | 1.115 | | | | | | | | | | |
| 37 | | 1.478 | 0.992 | 1.078 | | | 1.265 | | | | | | | | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 0.177 | 0.260 | 1.215 | 0.150 | 0.250 | 0.300 | 0.425 | 0.650 | 1.220 | | | | |

RIGHT-ANGLE BOARD MOUNT LOW-PROFILE (BLIND-CLEARANCE CUT)

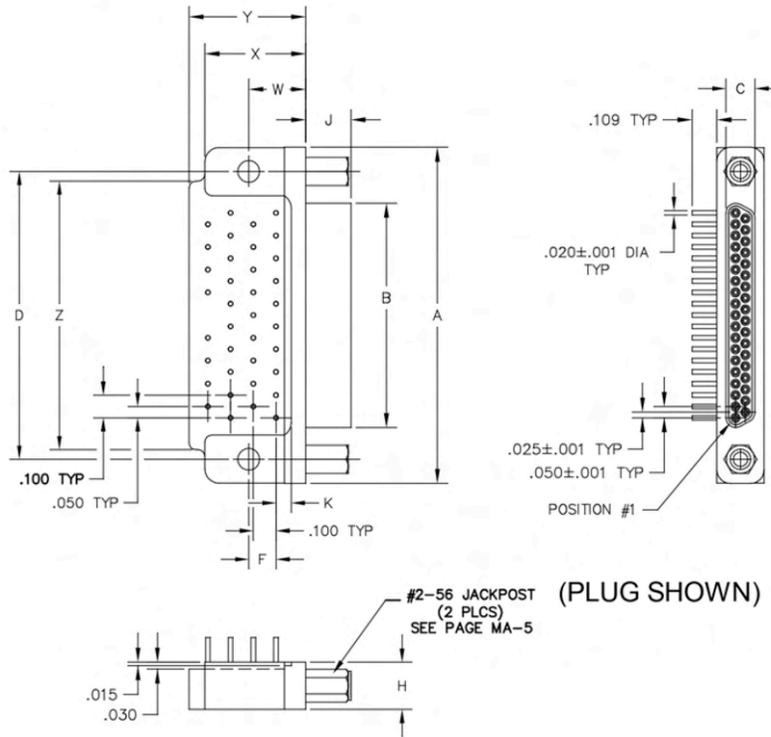
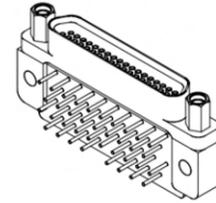
MS
0.050" | 9 THROUGH 51 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MS-2L | MP, MO, MR, MS receptacles |
| MS-2V. | MP, MO, MR, MS plugs |

MS-2T3-037-325-220S
(PLUG)



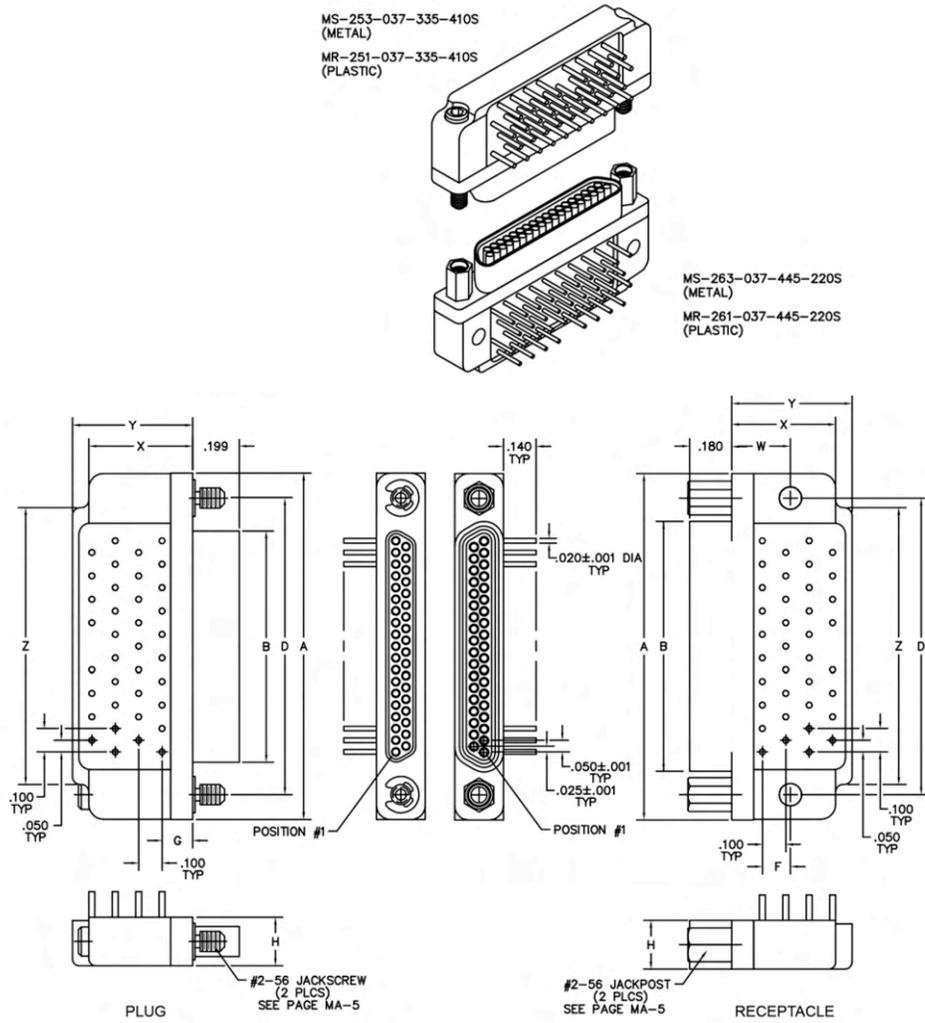
MS-2V3-037-435-220S
(RCPT)



| DIMENSIONS | | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|--|
| Size | Contact Row | A | B | | C | | D | F | H | J | | K | W | X MAX | Y MAX | Z | Hardware | Mounting Hole |
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | Plug | RCPT | | | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.134 | 0.218 | 0.565 | 0.020 | 0.208 | 0.199 | 0.180 | 0.067 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert |
| 15 | | 0.928 | 0.442 | 0.528 | | | 0.715 | 0.925 | | | | | | | | | | |
| 21 | | 1.078 | 0.592 | 0.678 | | | 0.865 | 1.075 | | | | | | | | | | |
| 25 | | 1.178 | 0.692 | 0.778 | | | 0.965 | 1.175 | | | | | | | | | | |
| 31 | | 1.328 | 0.842 | 0.928 | | | 1.115 | 1.080 | | | | | | | | | | |
| 37 | | 1.478 | 0.992 | 1.078 | | | 1.265 | 1.180 | | | | | | | | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 0.177 | 0.260 | 1.215 | 0.150 | 0.250 | 0.087 | 0.300 | 0.425 | 0.650 | 1.220 | | | | |

BOARD-TO-FLEX CABLE (NARROW FOOTPRINT)

MS & MR - LOW-PROFILE BOARD MOUNT AND MS & MR - FLEX CABLE
0.050" | 9 THROUGH 51 CONTACTS



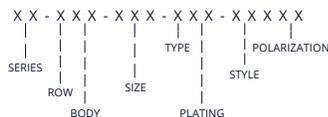
| DIMENSIONS | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|-------|-------|-------|-------|-------|---------------|-------------------|
| Size | Contact Row | A | B | | D | F | H | W | X MAX | Y MAX | Z | Hardware | Mounting Hole |
| | | | Plug MAX | RCPT MAX | | | | | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.565 | 0.020 | 0.208 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD | 0.096 DIA Through |
| 15 | | 0.928 | 0.442 | 0.528 | 0.715 | 0.925 | | | | | | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.865 | 1.075 | | | | | | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.965 | 1.175 | | | | | | | |
| 31 | | 1.328 | 0.842 | 0.928 | 1.115 | 1.080 | | | | | | | |
| 37 | | 1.478 | 0.992 | 1.078 | 1.265 | 1.180 | | | | | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.215 | 0.150 | 0.250 | 0.300 | 0.425 | 0.650 | 1.220 | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MS | 0.050" Low-Profile Metal PC Board Mount Connector (MS mates with MP, MQ, MR, MS receptacles) | MS | 0.050" Low-Profile Metal PC Board Mount Connector (MS mates with MP, MQ, MR, MS plugs) |
| MR | 0.050" Low-Profile Metal PC Board Mount Connector (MR mates with MP, MQ, MR, MS receptacles) | MR | 0.050" Low-Profile Metal PC Board Mount Connector (MR mates with MP, MQ, MR, MS plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| BODY STYLE | | BODY STYLE | |
| 5 | Plug, right-angle, narrow footprint, with mounting holes | 6 | Receptacle, right-angle, narrow footprint, with mounting holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (ML only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Electroless Ni shell with PPS insulator | 2 | Electroless Ni shell with PPS insulator |
| 3 | Electrodeposited cadmium shell with PPS insulator [x] | 3 | Electrodeposited cadmium shell with PPS insulator [x] |
| 4 | Hard anodized black shell with PPS insulator | 4 | Hard anodized black shell with PPS insulator |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051 | XXX | 009, 015, 021, 025, 031, 037, 051 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| 34 | Pin, right-angle, PCB leads, 0.172" | 45 | Socket, right-angle, PCB leads, 0.172" |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring | 41 | Two turning jackscrews, Allen head, retaining ring |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reversed body polarization | OR | Reversed body polarization |
| OS | Standard body polarization | OS | Standard body polarization |

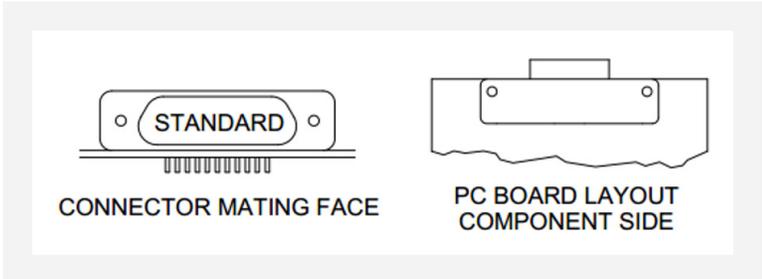
PLUG: MS-253-037-335-410S
 RECEPTACLE: MS-263-037-445-220S

PLUG: MR-251-037-335-410S
 RECEPTACLE: MR-261-037-445-220S

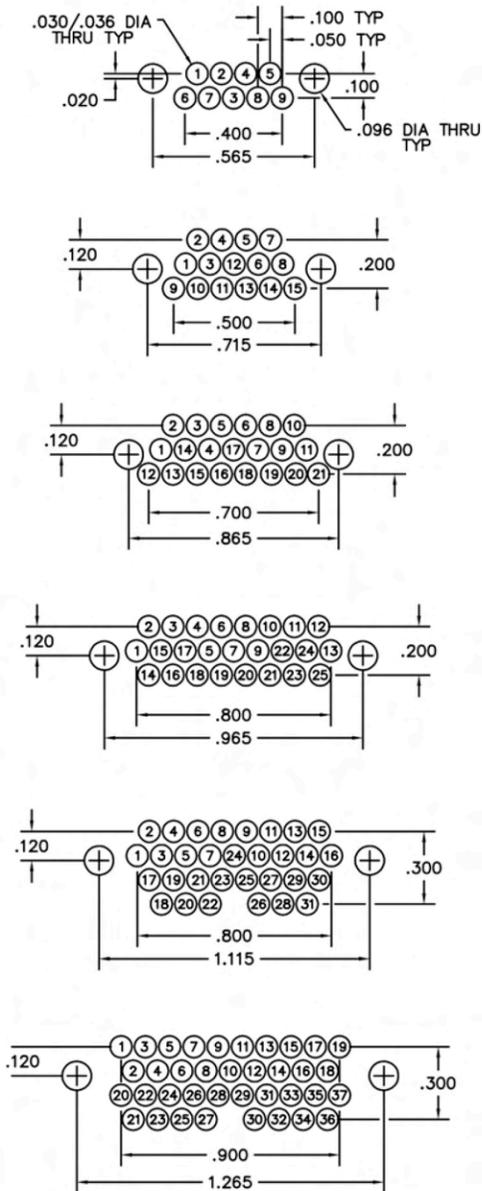


NOTE:
[x] Option is not RoHS-compliant

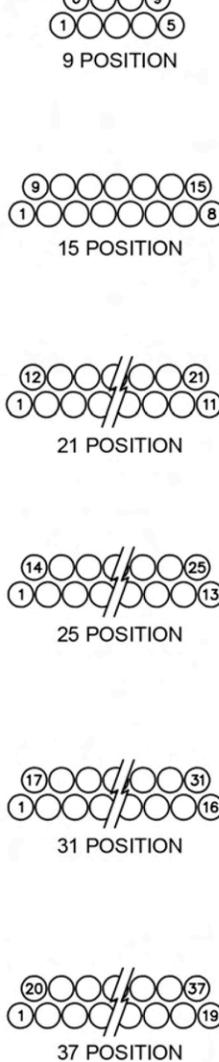
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 STANDARD POLARIZATION



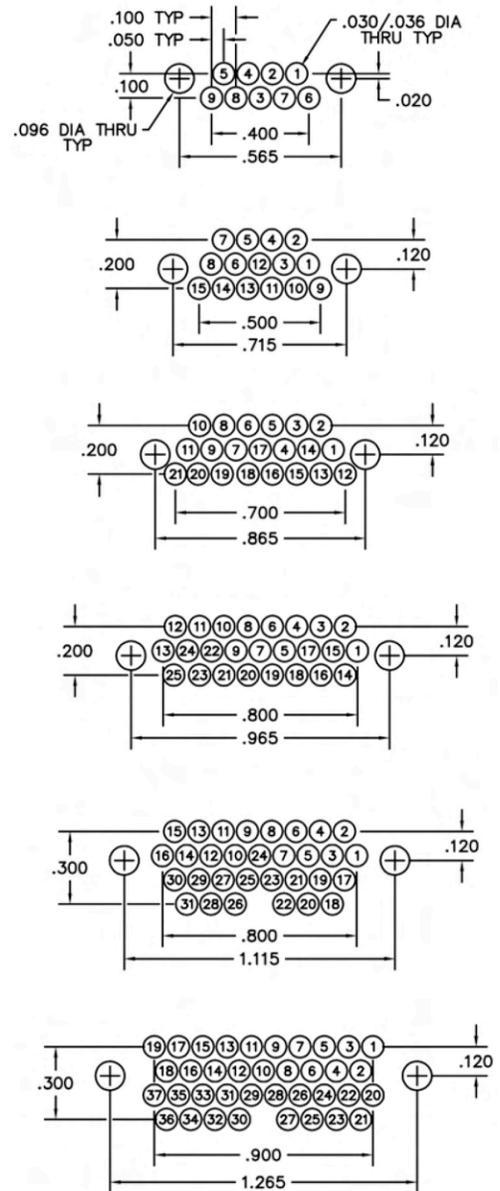
PLUG
 PC BOARD LAYOUT COMPONENT SIDE



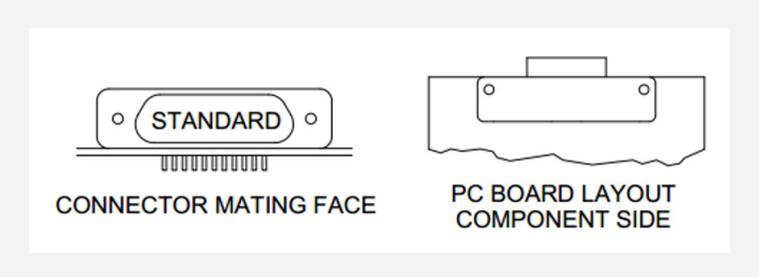
CONNECTOR MATING FACE* (RECEPTACLE)



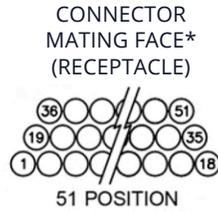
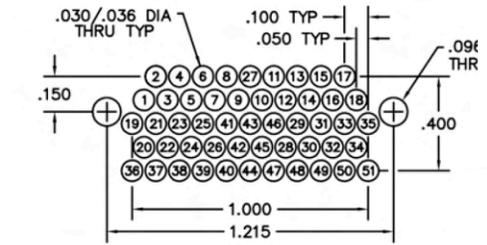
RECEPTACLE
 PC BOARD LAYOUT COMPONENT SIDE



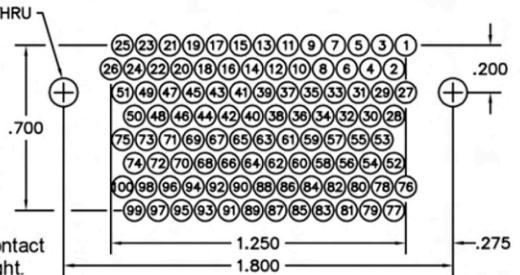
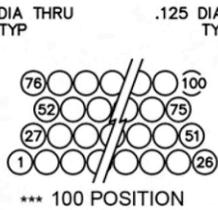
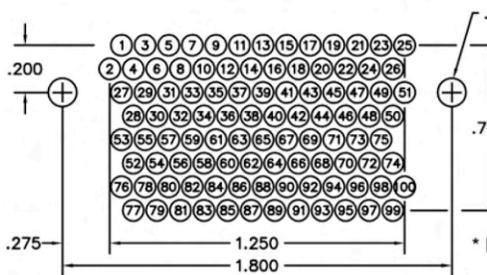
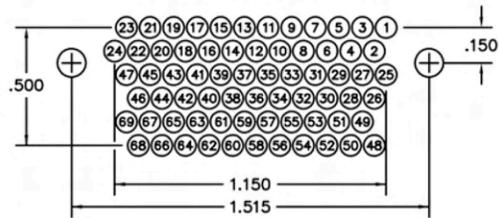
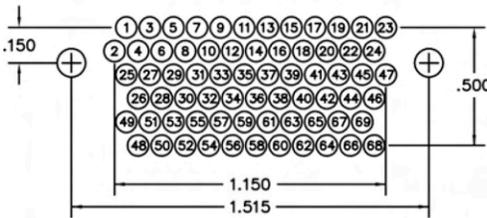
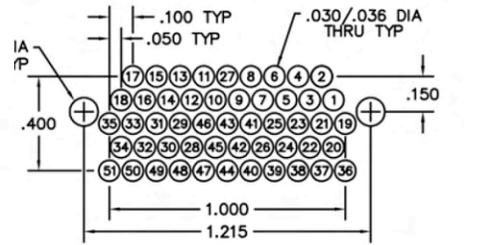
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 STANDARD POLARIZATION



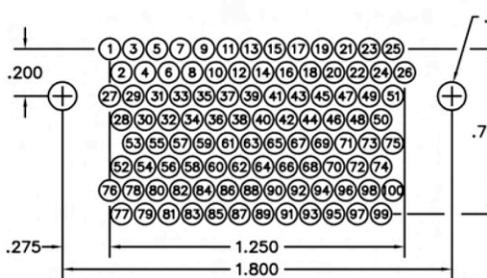
PLUG
 PC BOARD LAYOUT COMPONENT SIDE



RECEPTACLE
 PC BOARD LAYOUT COMPONENT SIDE



* For pin (plug) connectors, the contact numbers are reversed left to right.



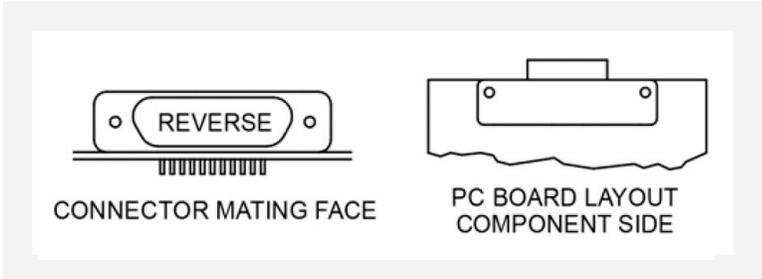
Mil-Spec Footprint

For Mil-Spec footprint, use "Option" -94P

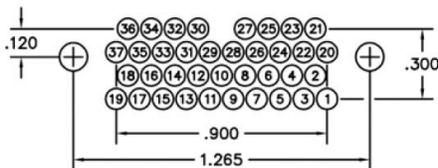
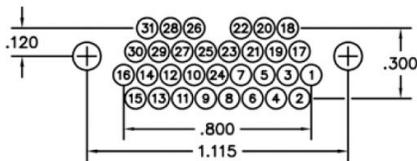
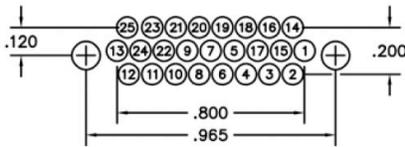
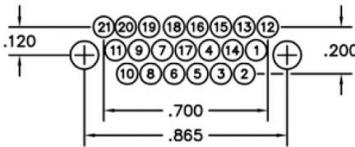
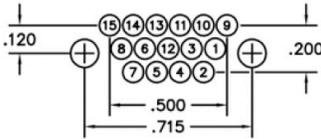
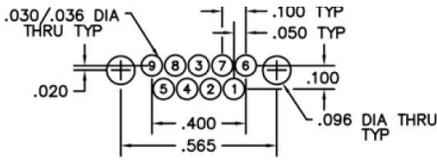
**69 and 100 positions not available in Low-Profile (MS, MR)

***100 position not available in through-cut body style (R, S)

RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 REVERSE POLARIZATION



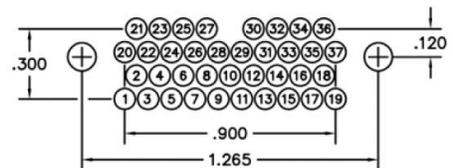
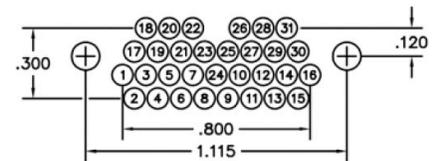
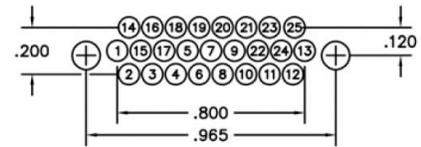
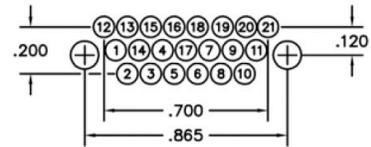
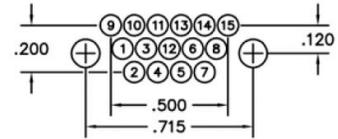
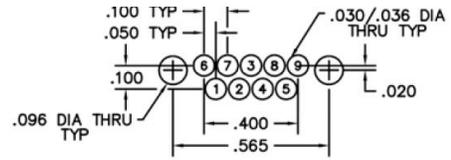
PLUG
 PC BOARD LAYOUT COMPONENT SIDE



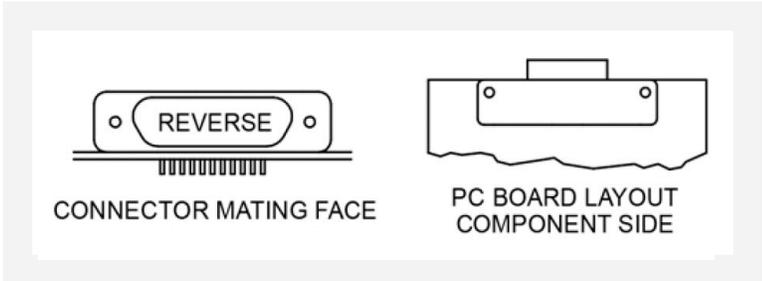
CONNECTOR MATING FACE*
 (RECEPTACLE)



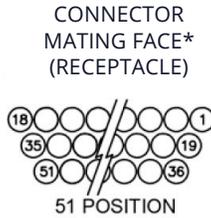
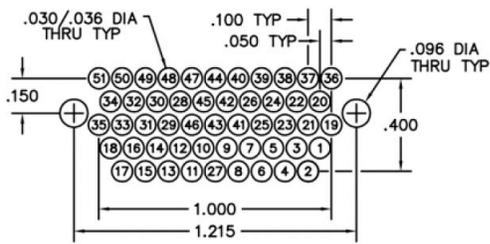
RECEPTACLE
 PC BOARD LAYOUT COMPONENT SIDE



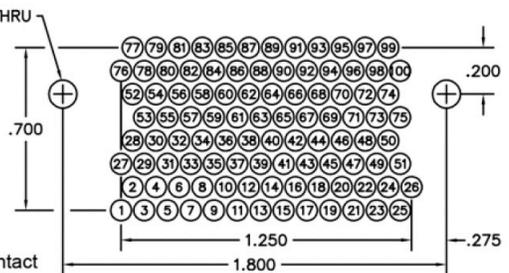
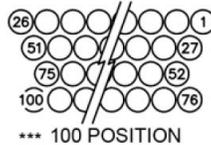
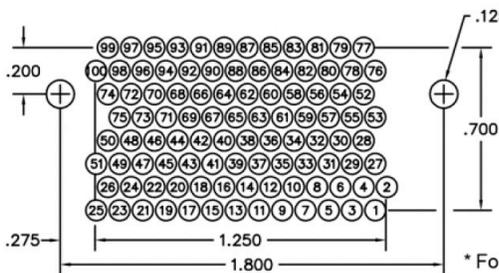
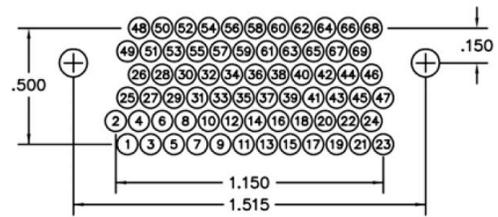
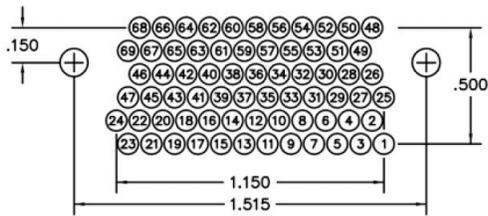
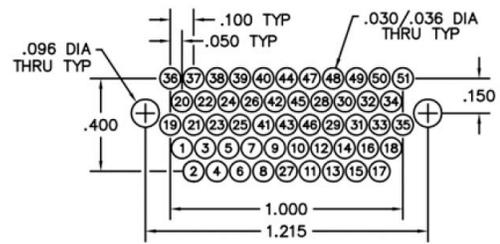
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 REVERSE POLARIZATION



PLUG
 PC BOARD LAYOUT COMPONENT SIDE



RECEPTACLE
 PC BOARD LAYOUT COMPONENT SIDE



* For pin (plug) connectors, the contact numbers are reversed left to right.

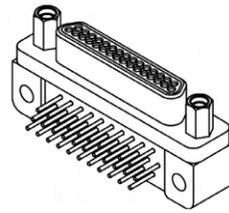
** 69 and 100 positions not available in Low-Profile (MS, MR)
 ***100 position not available in through-cut body style (R, S)

RIGHT-ANGLE BOARD MOUNT (COMPRESSED FOOTPRINT)

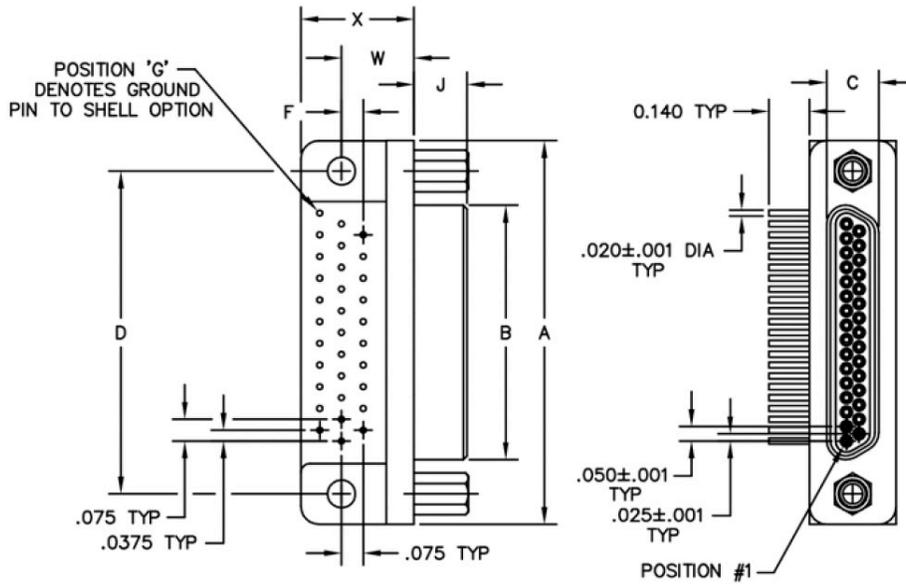
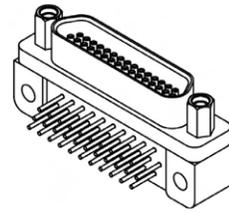
MK
0.050" | 9 THROUGH 100 CONTACTS

| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MK-2P... | MK, ML, MM, MN receptacles |
| MK-2Q.. | MK, ML, MM, MN plugs |

MK-2P2-031-A35-220S (PLUG)



MK-2Q2-031-845-220S (RECEPTACLE)

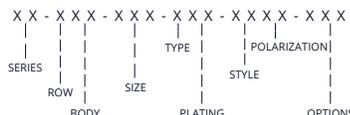


| DIMENSIONS | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|----------|----------|-------|--------|-------|-------|-------|-------|-------|---------------|--|
| Size | Contact Row | A | B | | C | | D | F | H | J | | W | X MAX | Hardware | Mounting Hole |
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | Plug | RCPT | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.185 | 0.251 | 0.565 | 0.0375 | 0.298 | 0.183 | 0.195 | 0.250 | 0.400 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert |
| 15 | | 0.925 | 0.484 | 0.550 | | | 0.715 | | | | | | | | |
| 21 | | 1.075 | 0.634 | 0.700 | | | 0.865 | | | | | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | | | 0.965 | | | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | | | 1.115 | | | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | | | 1.265 | | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 0.228 | 0.294 | 1.215 | 0.1125 | 0.341 | 0.300 | 0.490 | 0.300 | 0.490 | #4-40 UNC THD | 0.125 DIA or #4-40 UNC Threaded |
| 69 | | 1.725 | 1.284 | 1.350 | | | 1.515 | | | | | | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 0.271 | 0.394 | 1.800 | 0.1875 | 0.384 | 0.400 | 0.660 | 0.400 | 0.660 | #4-40 UNC THD | 0.125 DIA or #4-40 UNC Threaded |

LEAD CONFIGURATION OPTIONS

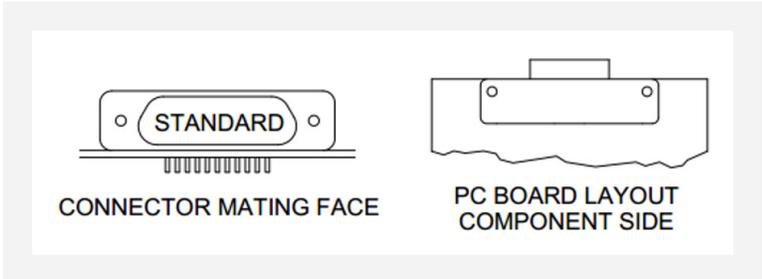
| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|---|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector | MK | 0.050" Rugged Metal PC Board Mount Connector |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69) | 3 | Three-row (Size 51) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE - BLIND CUT | | BODY STYLE - BLIND CUT | |
| P | Plug, right-angle, compressed footprint | Q | Receptacle, right-angle, compressed footprint |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Electroless Ni shell with PPS insulator | 2 | Electroless Ni shell with PPS insulator |
| 3 | Electrodeposited cadmium shell with PPS insulator [x] | 3 | Electrodeposited cadmium shell with PPS insulator [x] |
| 4 | Hard anodized black shell with PPS insulator | 4 | Hard anodized black shell with PPS insulator |
| 5 | Stainless steel shell with PPS insulator | 5 | Stainless steel shell with PPS insulator |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 43 | Socket, right-angle, PCB leads, 0.109" |
| 33 | Pin, right-angle, PCB leads, 0.140" | 44 | Socket, right-angle, PCB leads, 0.140" |
| 34 | Pin, right-angle, PCB leads, 0.172" | 45 | Socket, right-angle, PCB leads, 0.172" |
| A2 | Pin, right-angle, PCB leads, 0.109", with ground pin option | 83 | Socket, right-angle, PCB leads, 0.109", with ground pin option |
| A3 | Pin, right-angle, PCB leads, 0.140", with ground pin option | 84 | Socket, right-angle, PCB leads, 0.140", with ground pin option |
| A4 | Pin, right-angle, PCB leads, 0.172", with ground pin option | 85 | Socket, right-angle, PCB leads, 0.172", with ground pin option |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut (62*) | 22 | Two fixed jacknut (62*) |
| 99 | Keying hardware, see options below | 99 | Keying hardware, see options below |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OS | Standard body polarization | OS | Standard body polarization |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts (KN*) | KPXX | Two fixed jacknuts (KN*) and interfacial sealing gasket |
| 087 | Threaded inserts in mounting holes | 087 | Threaded inserts in mounting holes and interfacial sealing gasket |
| | | 900 | Interfacial sealing gasket |

PLUG: MK-2P2-031-335-220S
 RECEPTACLE: MK-2Q2-031-445-220S

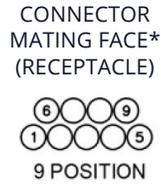
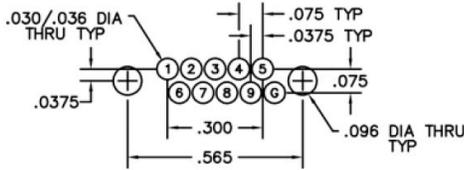


NOTE: See page M-161 for keying options
 *Use numbers in parenthesis when ordering size 100.
[x] Option is not RoHS-compliant

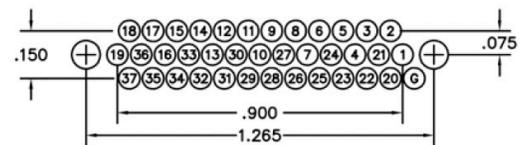
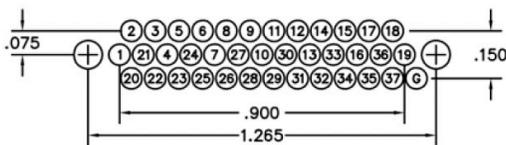
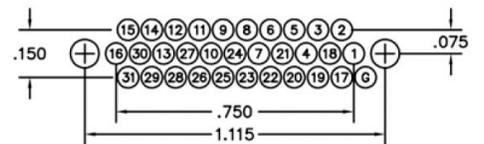
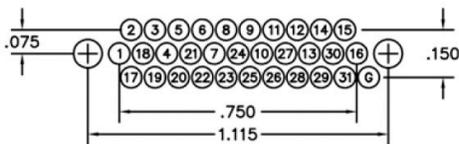
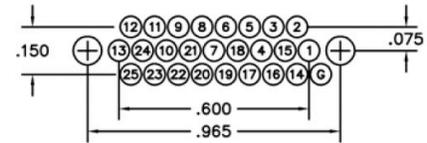
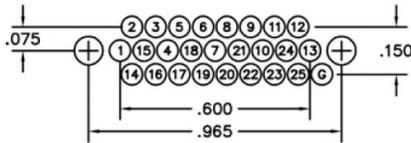
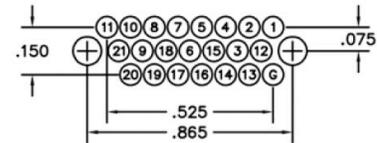
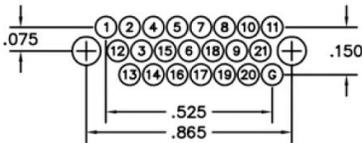
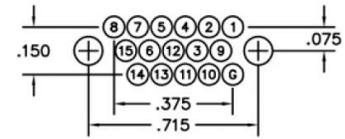
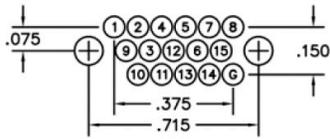
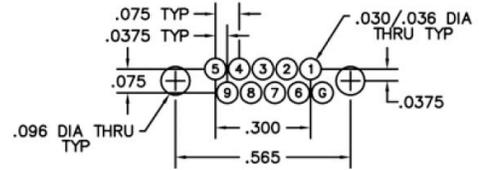
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, COMPRESSED FOOTPRINT
 STANDARD POLARIZATION



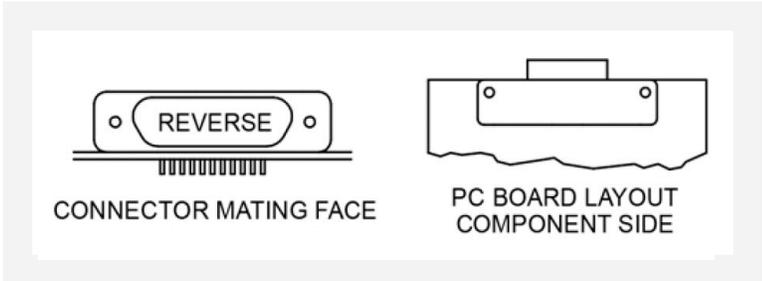
PLUG
 PC BOARD LAYOUT COMPONENT SIDE



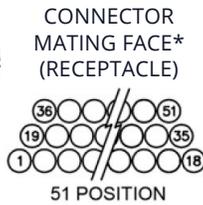
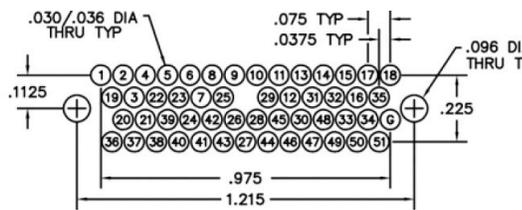
RECEPTACLE
 PC BOARD LAYOUT COMPONENT SIDE



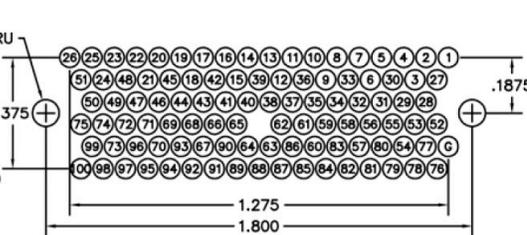
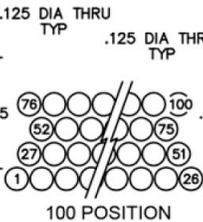
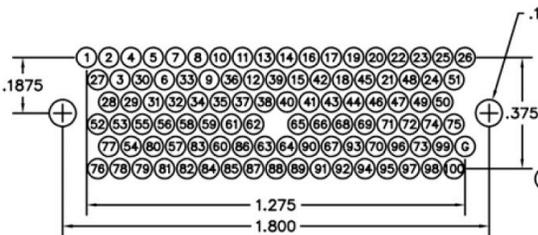
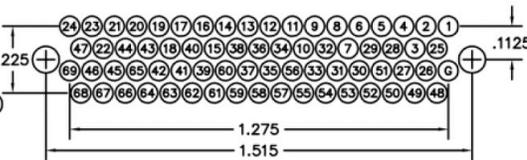
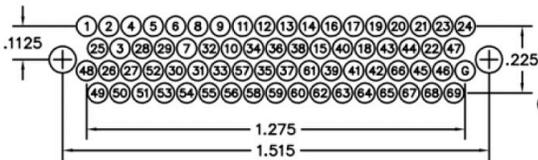
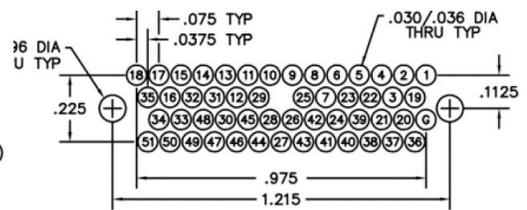
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, COMPRESSED FOOTPRINT
 STANDARD POLARIZATION



PLUG
 PC BOARD LAYOUT COMPONENT SIDE



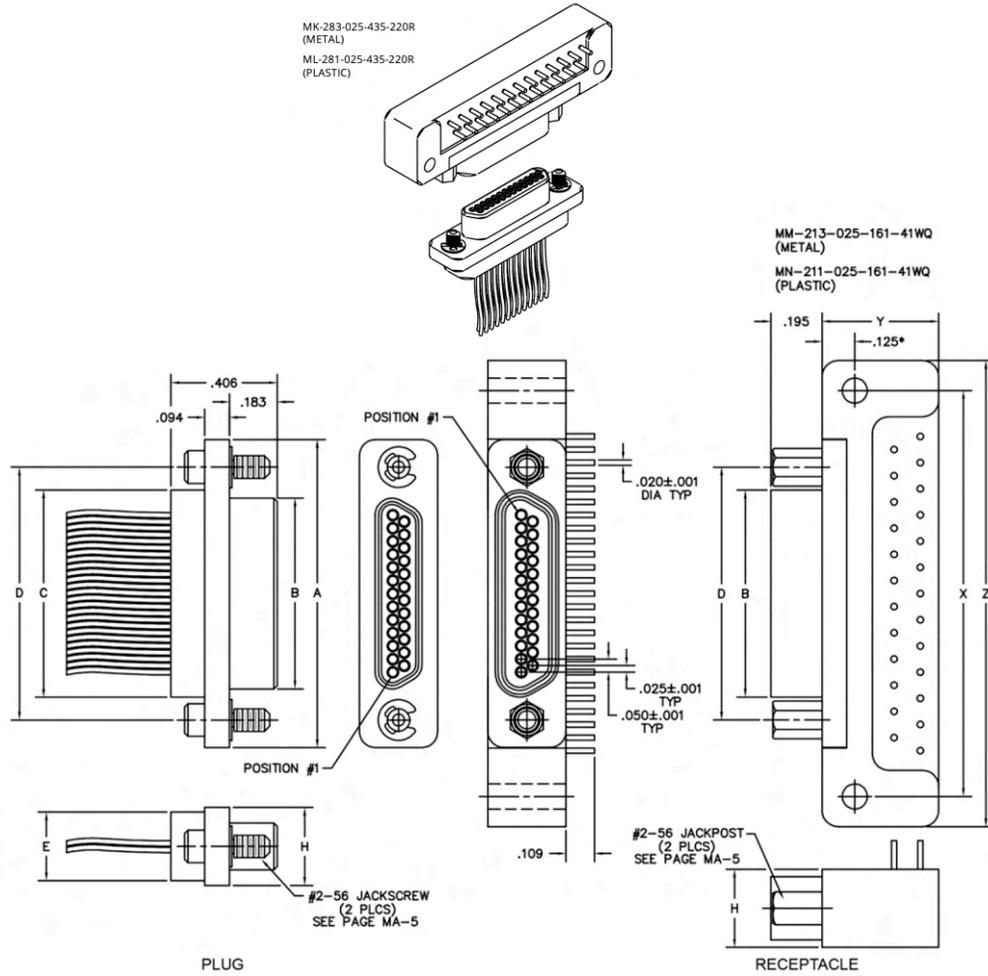
RECEPTACLE
 PC BOARD LAYOUT COMPONENT SIDE



* For pin (plug) connectors, the contact numbers are reversed left to right.

BOARD-TO-CABLE (STANDARD FOOTPRINT)

MK & ML – RUGGED BOARD MOUNT AND MM & MN – RUGGED CABLE
 0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|-----------------------|-------|-------|----------|------------------|---|---------------------------------------|-------|-------|
| Size | Contact Row | A | B | | C | D | E Potting Well Max | H | X | Y MAX | Z MAX | Hardware | Mounting Hole | | |
| | | | Plug MAX | RCPT MAX | | | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.270 | 0.298 | 1.150 | 0.455 | 1.390 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | | | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | | | | | | | | 0.715 | 1.300 | 1.540 |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | | | | | | | | 0.865 | 1.450 | 1.690 |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | | | | | | | | 0.965 | 1.550 | 1.790 |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | | | | | | | | 1.115 | 1.800 | 2.040 |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | | | | | | | | 1.265 | 2.100 | 2.340 |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 1.600 | 0.565 | 1.875 | #4-40 UNC THD | 0.125 DIA or #4-40 UNC Threaded | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | 2.500 | 0.665** | 2.780 | | | | |

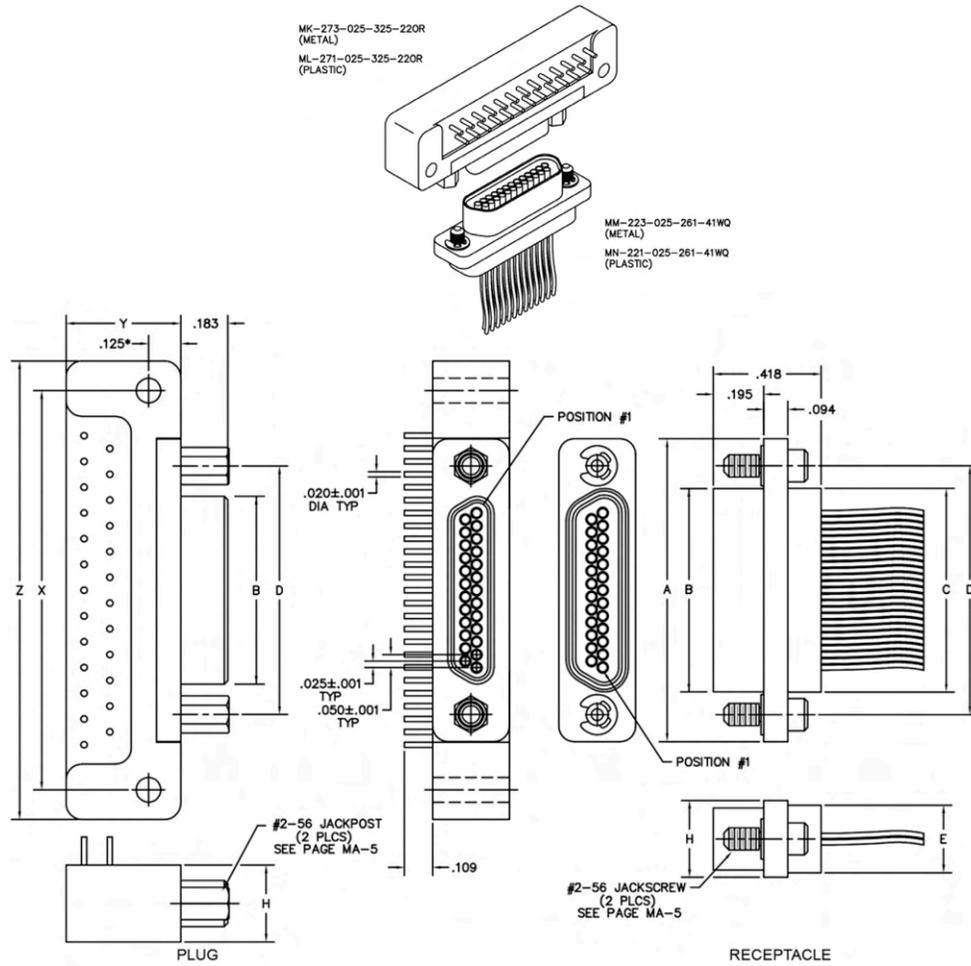
*0.225 For "-05k" and "OBJ" special codes (MIL-SPEC footprint for 100 position only)

** 0.765 Max for "-05k" and "OBJ" special codes (MIL-SPEC footprint for 100 position only)



BOARD-TO-CABLE (STANDARD FOOTPRINT)

MK & ML – RUGGED BOARD MOUNT AND MM & MN – RUGGED CABLE
0.050" | 9 THROUGH 100 CONTACTS



DIMENSIONS

| Size | Contact Row | A | B | | C | D | E Potting Well Max | H | X | Y MAX | Z MAX | Hardware | Mounting Hole |
|------|-------------|-------|-------------|-------------|-------|-------|-----------------------|-------|-------|----------|----------|------------------|---|
| | | | Plug MAX | RCPT MAX | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | 1.150 | 0.455 | 1.390 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | 1.300 | | 1.540 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | 1.450 | | 1.690 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | 1.550 | | 1.790 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | 1.800 | | 2.040 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | 2.100 | | 2.340 | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 1.600 | 0.565 | 1.875 | #4-40 UNC THD | 0.125 DIA or #4-40 UNC Threaded |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | 2.500 | 0.665** | 2.780 | | |

* 0.225 For "-05k" and "OBJ" special codes (MIL-SPEC footprint for 100 position only)

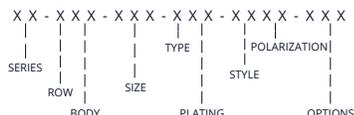
** 0.765 Max for "-05k" and "OBJ" special codes (MIL-SPEC footprint for 100 position only)

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|--|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN receptacles) | MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 8 | Receptacle, right-angle, standard footprint, with mtg holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell | 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, PCB leads, 0.109" | 21 | Socket, straight, solder cup |
| 33 | Pin, right-angle, PCB leads, 0.140" | 24 | Socket, straight, .500" pigtails (0.018 dia.) |
| 34 | Pin, right-angle, PCB leads, 0.172" | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| PLATING OPTIONS | | PLATING OPTIONS | |
| | | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut (62*) |
| 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| | | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| | | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| | | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| | | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| | | 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reversed body polarization | 00 | None |
| | | XX | For wiring codes, see page M-158 and M-159. |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts. See page M-161 for keying options (KN*) | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options (KJ*) |
| 05K | Mil-Spec footprint (size 100 only) | 900 | Interfacial sealing gasket |
| 0B7 | Threaded inserts | | |
| 0BJ | Mil-Spec footprint (size 100 only) with threaded inserts | | |

PLUG: MK-273-025-325-220R
RECEPTACLE: MM-223-025-261-41WQ

PLUG: ML-271-025-325-220R
RECEPTACLE: MN-221-025-261-41WQ



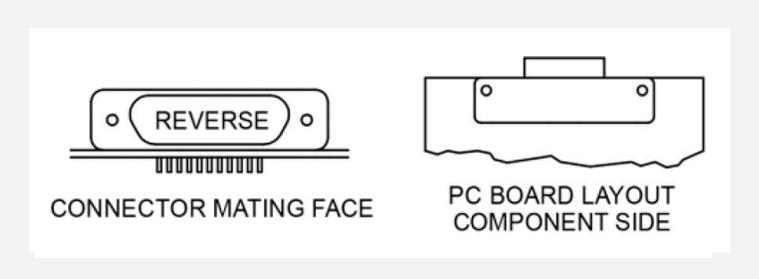
NOTE:

*Use numbers or letters in parenthesis when ordering size 100.

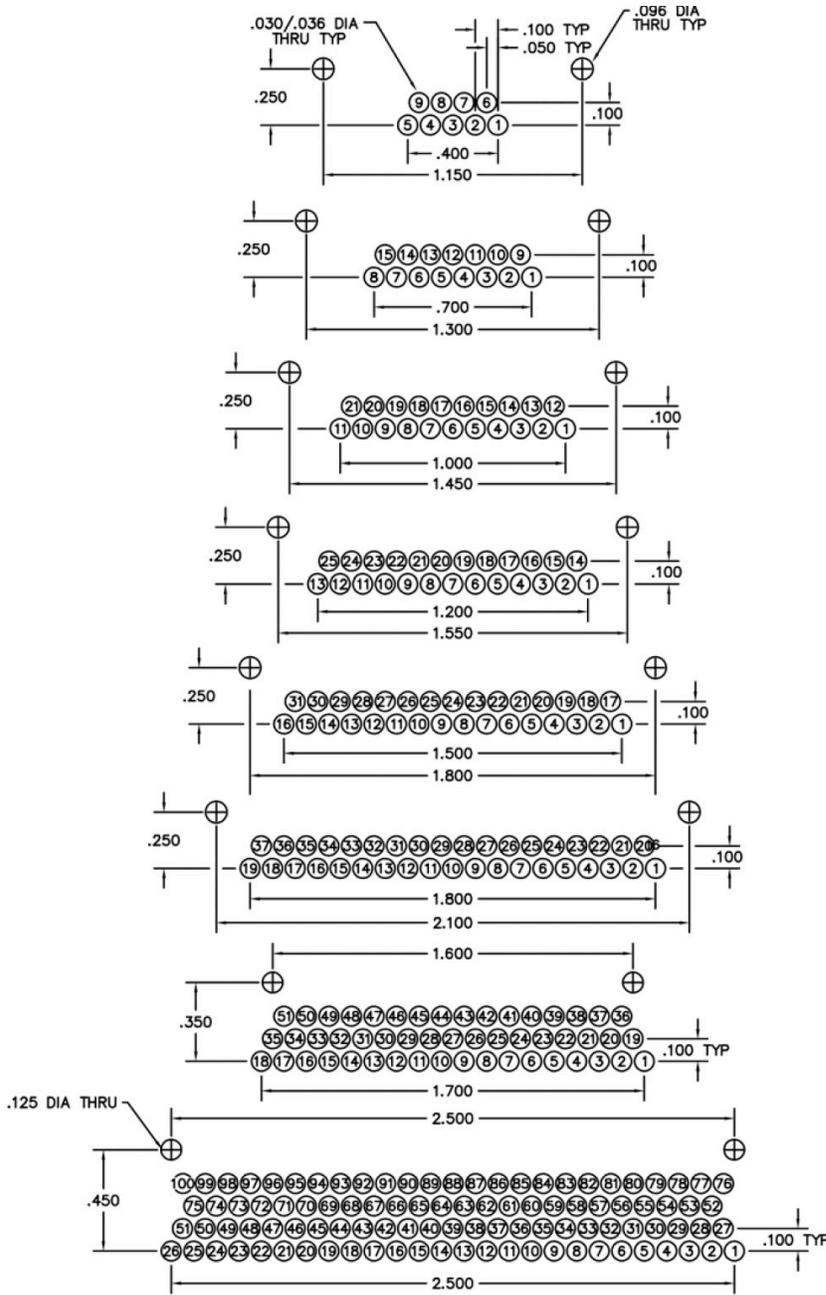
**Captive hardware is factory installed and non-removable.

[x] Option is NOT RoHS-compliant

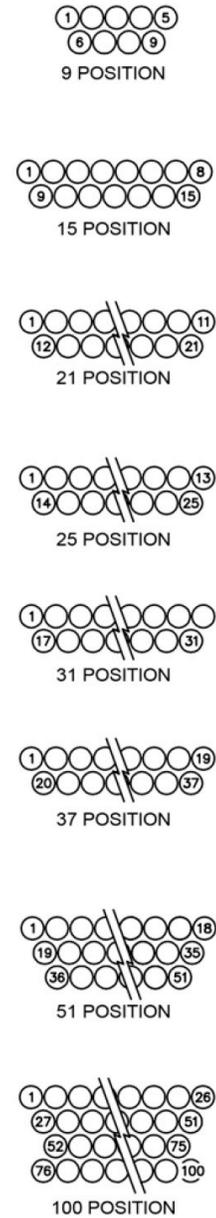
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, STANDARD FOOTPRINT
 REVERSE POLARIZATION



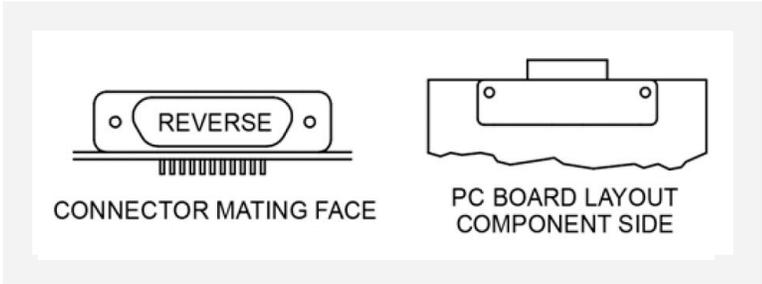
PLUG
 PC BOARD LAYOUT
 COMPONENT SIDE



CONNECTOR MATING FACE (PLUG)



RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, STANDARD FOOTPRINT
 REVERSE POLARIZATION



**RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE**

CONNECTOR
 MATING FACE
 (RECEPTACLE)



9 POSITION



15 POSITION



21 POSITION



25 POSITION



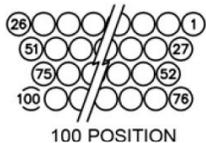
31 POSITION



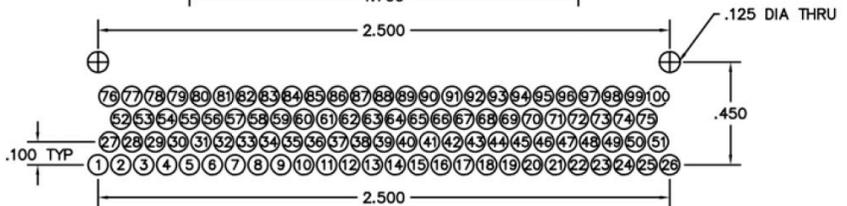
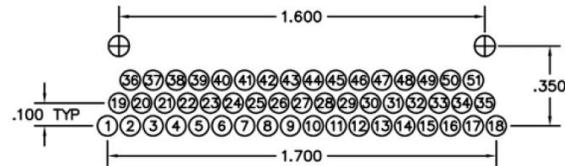
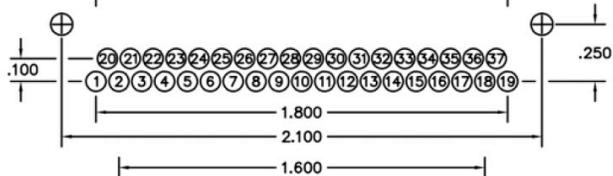
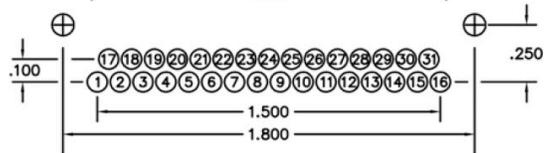
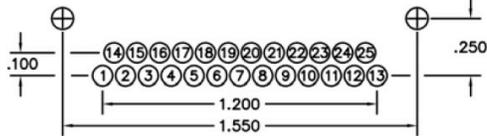
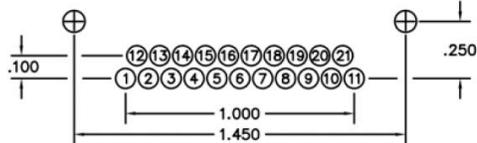
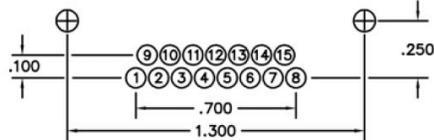
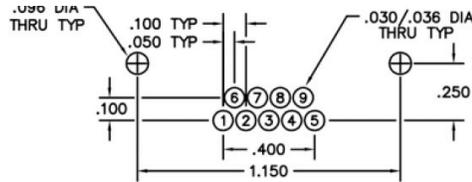
37 POSITION



51 POSITION

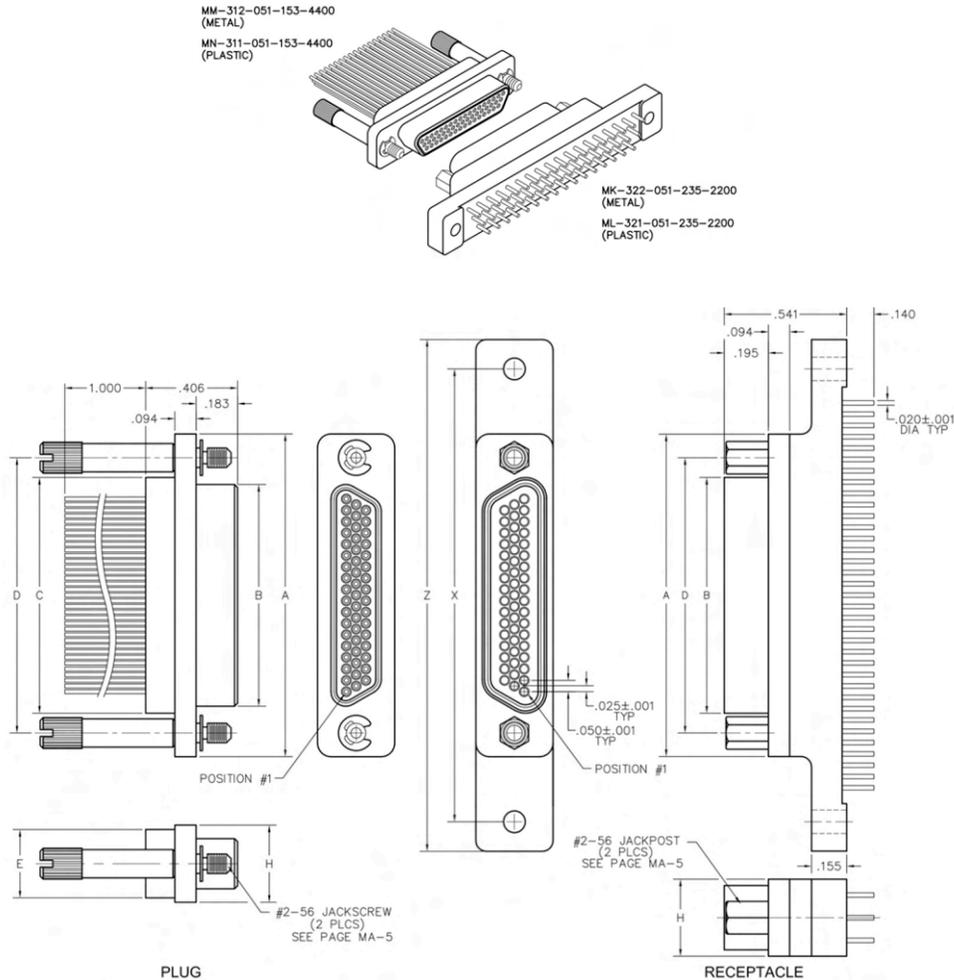


100 POSITION



CABLE-TO-BOARD (NARROW FOOTPRINT)

MK & ML – RUGGED BOARD MOUNT AND MM & MN – RUGGED CABLE
0.050" | 9 THROUGH 100 CONTACTS



DIMENSIONS

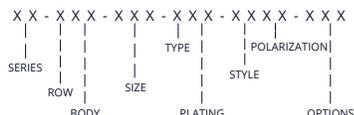
| Size | Contact Row | A | B | | C | D | E Potting Well Max | H | X | Z MAX | Hardware | Mounting Hole |
|------|-------------|-------|----------|----------|-------|-------|-----------------------|-------|-------|----------|--------------------------------------|---|
| | | | Plug MAX | RCPT MAX | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | 1.150 | 1.390 | #2-56 UNC THD (0.092 DIA Through) | 0.096 DIA or #2-56 UNC Threaded Insert |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | 2.100 | 2.340 | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 2.000 | 2.270 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | 2.800 | 3.240 | #4-40 UNC THD (0.147 DIA Through) | 0.125 DIA or #2-56 UNC Threaded Insert |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN receptacles) | ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 2 | Receptacle, straight, narrow footprint, with mtg holes |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell | 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 22 | Socket, straight, PCB leads, 0.109" |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) | 23 | Socket, straight, PCB leads, 0.140" |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | 24 | Socket, straight, PCB leads, 0.172" |
| 16 | Pin, straight, crimped wire | | |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | | |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | | |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | | |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | | |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | | |
| 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) | | |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see page M-158 and M-159. | | |
| OPTIONS | | | |
| KSXX | Two turning jackscrews. See page M-161 for keying options (KJ*) | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KN*) |
| | | 900 | Interfacial sealing gasket |
| | | 0B7 | Threaded inserts and interfacial sealing gasket. |

PLUG: MM-312-051-153-4400
RECEPTACLE: MK-322-051-235-2200

PLUG: MN-311-051-153-4400
RECEPTACLE: ML-321-051-235-2200



NOTE:

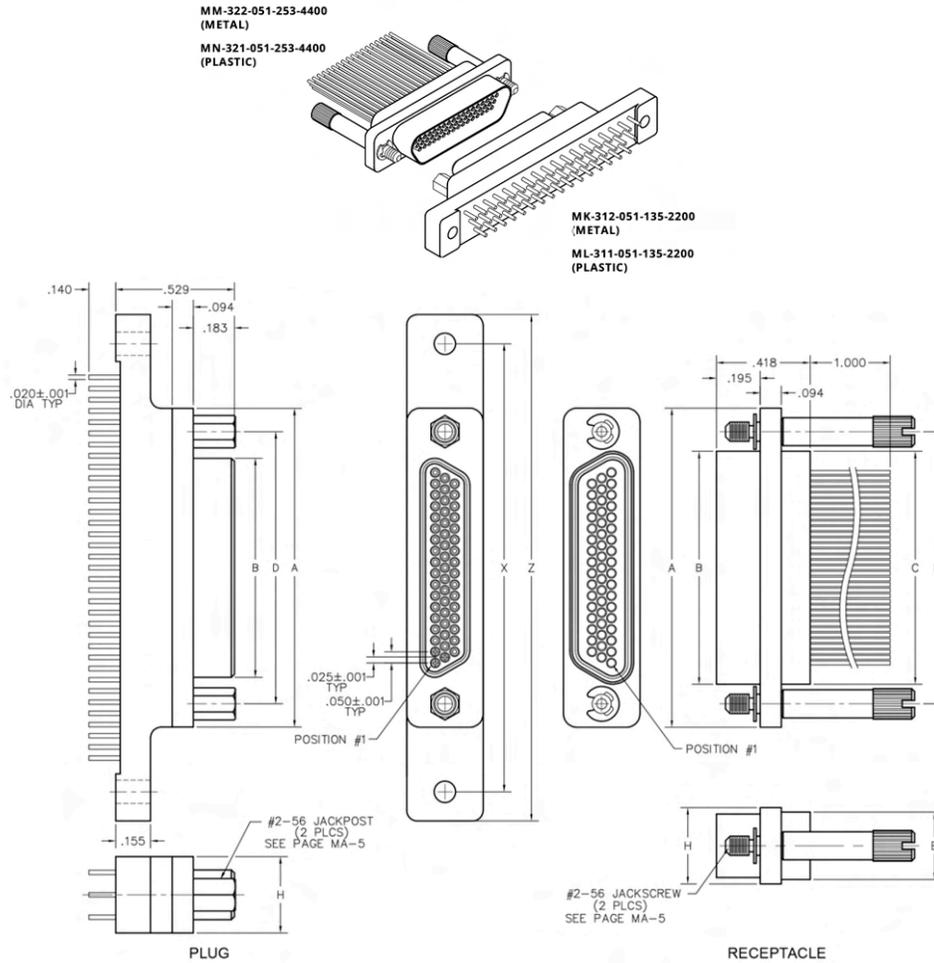
*Use numbers or letters in parenthesis when ordering size 100.

**Captive hardware is factory installed and non-removable.

[x] Option is NOT RoHS-compliant

CABLE-TO-BOARD (NARROW FOOTPRINT)

MK & ML – RUGGED BOARD MOUNT AND MM & MN – RUGGED CABLE
0.050" | 9 THROUGH 100 CONTACTS



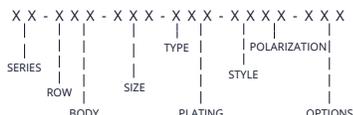
| DIMENSIONS | | | | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|-----------------------|-------|-------|----------|---------------|---|
| Size | Contact Row | A | B | | C | D | E Potting Well Max | H | X | Z MAX | Hardware | Mounting Hole |
| | | | Plug MAX | RCPT MAX | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | 1.150 | 1.390 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | 1.450 | 1.690 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | 1.500 | 1.740 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | 1.800 | 2.040 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | 2.100 | 2.340 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 2.000 | 2.270 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | 2.800 | 3.240 | #4-40 UNC THD | 0.125 DIA or #2-56 UNC Threaded Insert |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN receptacles) | MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, narrow footprint, with mtg holes | 2 | Receptacle, straight, with ears |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell | 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 12 | Pin, straight, PCB leads, 0.109" | 21 | Socket, straight, solder cup |
| 13 | Pin, straight, PCB leads, 0.140" | 24 | Socket, straight, 0.500" pigtails (0.018 dia.) |
| 14 | Pin, straight, PCB leads, 0.172" | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| | | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut assemblies (62*) |
| 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| | | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| | | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| | | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| | | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| | | 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| | | XX | For wiring codes, see page M-158 and M-159. |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KN*) | KSXX | Two turning jackscrews. See page M-161 for keying options (KJ*) |
| OB7 | Threaded inserts | 900 | Interfacial sealing gasket |

PLUG: MK-312-051-135-2200
RECEPTACLE: MM-322-051-253-4400

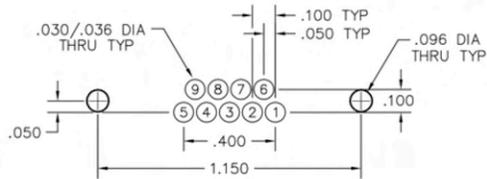
PLUG: ML-311-051-135-2200
RECEPTACLE: MN-321-051-253-4400



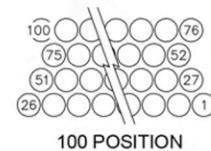
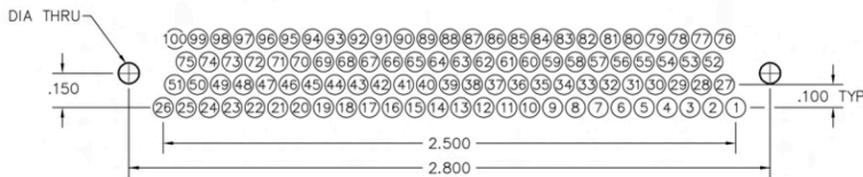
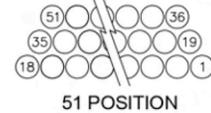
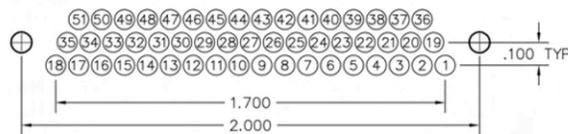
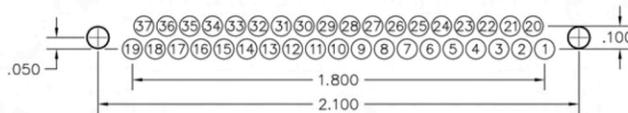
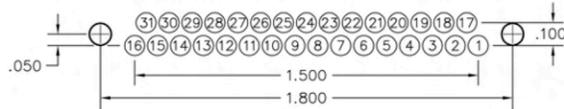
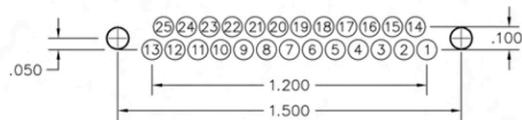
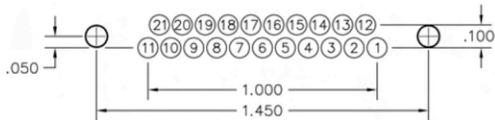
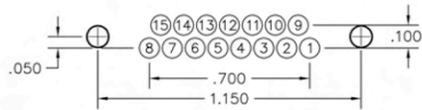
NOTE:
*Use numbers or letters in parenthesis when ordering size 100.
**Captive hardware is factory installed and non-removable.
[x] Option is not RoHS-compliant

RECOMMENDED PC BOARD LAYOUTS
STRAIGHT NARROW FOOTPRINT

PLUG
PC BOARD LAYOUT
COMPONENT SIDE



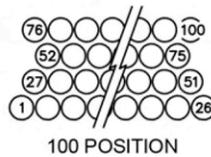
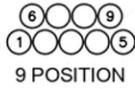
CONNECTOR
MATING FACE
(PLUG)



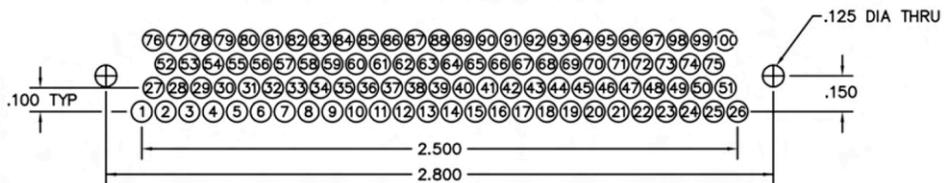
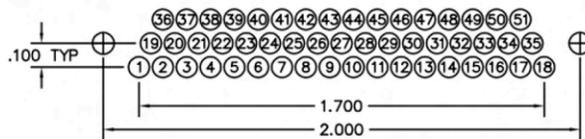
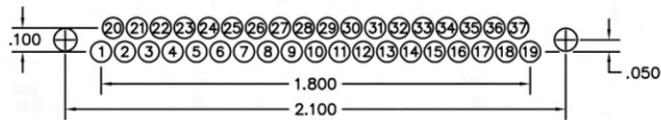
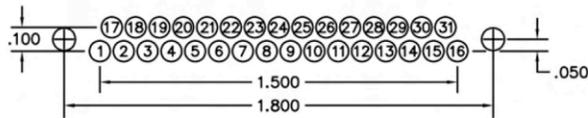
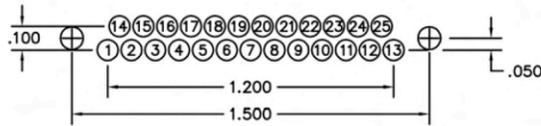
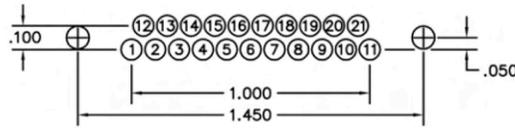
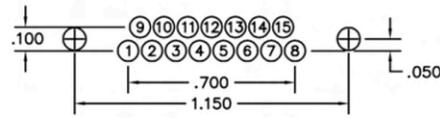
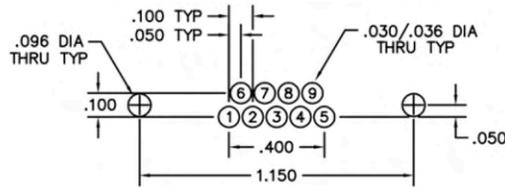
RECOMMENDED PC BOARD LAYOUTS

STRAIGHT NARROW FOOTPRINT

CONNECTOR
MATING FACE
(RECEPTACLE)

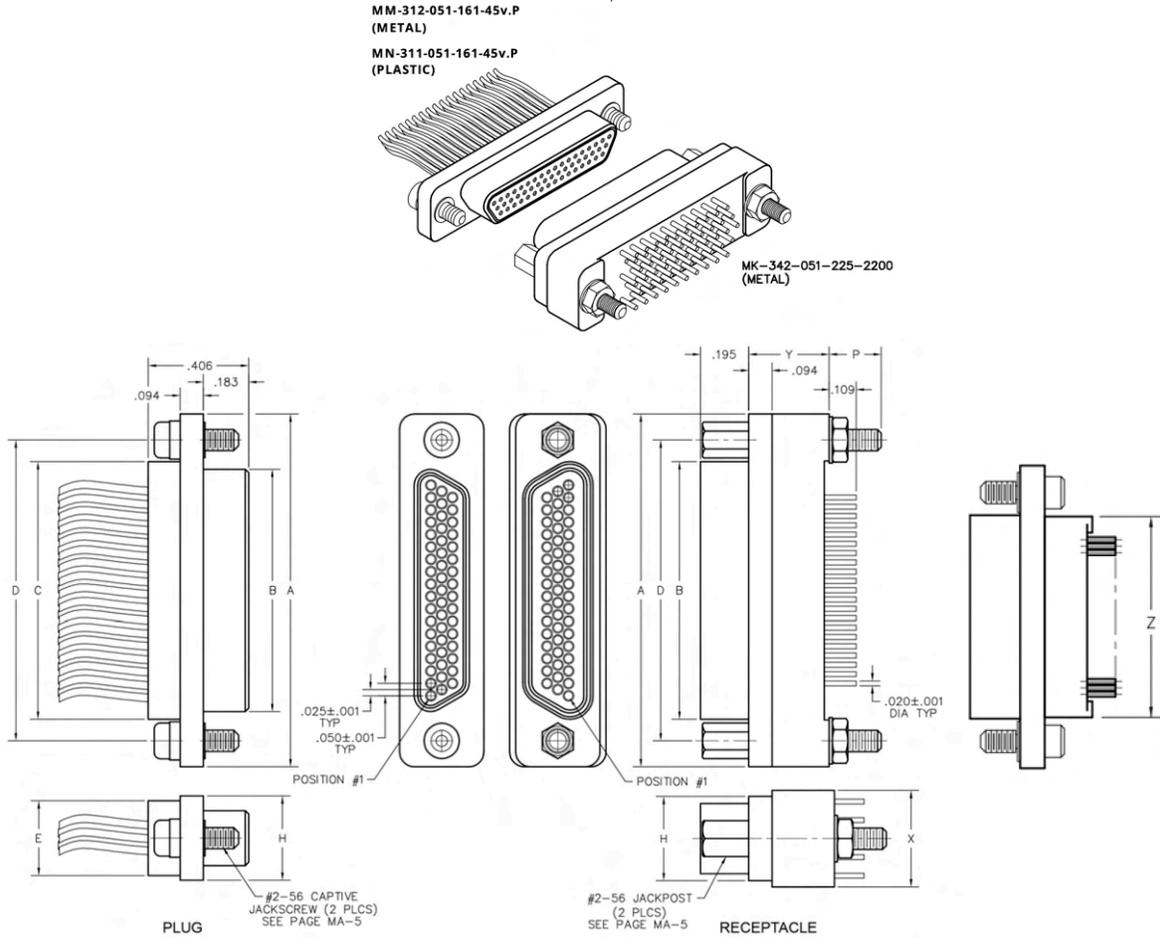


RECEPTACLE PC BOARD LAYOUT COMPONENT SIDE



CABLE-TO-BOARD (STANDARD FOOTPRINT)

MK & ML – RUGGED BOARD MOUNT AND MM & MN – RUGGED CABLE
 0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|-----------------------|-------|-------|-------|-------|---|---|
| Size | Contact Row | A | B | | C | D | E Potting Well Max | H | P | X | Z** | Hardware | |
| | | | Plug MAX | RCPT MAX | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | 0.210 | 0.298 | 0.390 | #2-56 UNC THD (#2-56 Clearance or #2-56 UNC Threaded Insert) | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | 0.540 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | 0.690 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | 0.780 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | 0.930 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | 1.080 | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 0.219 | 0.390 | 1.046 | | |
| 69 | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | | | 1.346 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | 0.216 | 0.490 | 1.530 | | #4-40 UNC THD (#4-40 Clearance or #4-40 UNC Threaded Insert) |

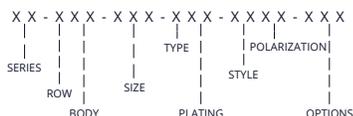
* 69 Position connectors are available in metal only.
 ** "Z" Dimension for turning jackscrew only.

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN receptacles) | ML | 0.050" Rugged Plastic PC Board Mount Connector (ML mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 and 69***) | 3 | Three-row (Size 51 and 69***) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 4 | Receptacle, straight, standard footprint |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | 1 | Polyphenylene sulfide (ML only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell | 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069*** 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069*** 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 22 | Socket, straight, PCB leads, 0.109" |
| 14 | Pin, straight, .500" pigtails (0.018 dia.) | 23 | Socket, straight, PCB leads, 0.140" |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | 24 | Socket, straight, PCB leads, 0.172" |
| 16 | Pin, straight, crimped wire | | |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | | |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 41 | Two turning jackscrews, Allen head, retaining ring****(81*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | | |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | | |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | | |
| 99 | Keying hardware, see options below (Body material 2, 3 and 4 only) | | |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see page M-158 and M-159. | | |
| OPTIONS | | | |
| KSXX | Two turning jackscrews. See page M-161 for keying options (KJ*) | KPXX | Two fixed jacknuts and interfacial sealing gasket. See page M-161 for keying options (KN*) |
| | | 900 | Interfacial sealing gasket |
| | | 0B7 | Threaded inserts and interfacial sealing gasket |

PLUG: MM-312 - 051-161-45WP
RECEPTACLE: MK-342-051-225-2200

PLUG: MN-311-051-161-45WP
RECEPTACLE: ML-341-051-225-2200

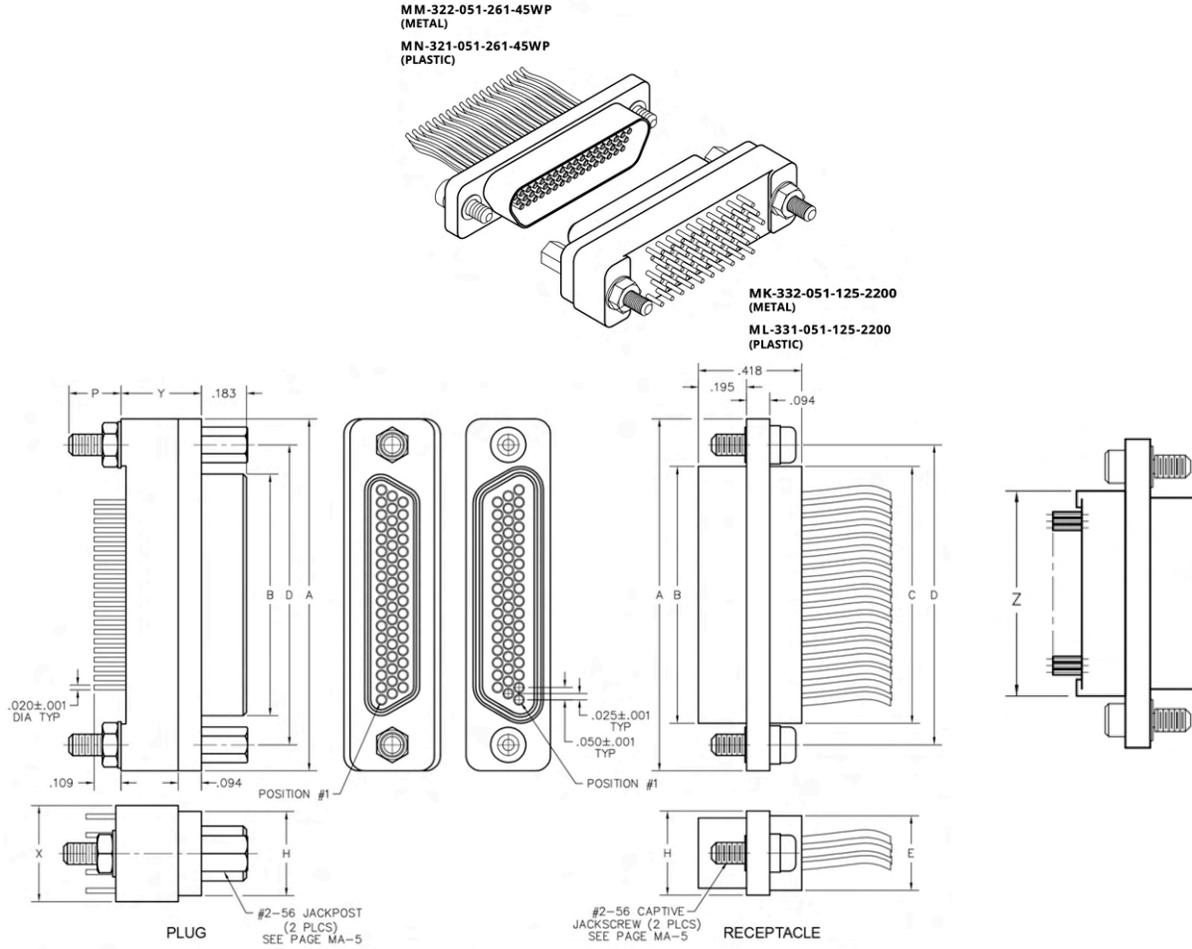


NOTE:
*Use numbers or letters in parenthesis when ordering size 100.
**Captive hardware is factory installed and non-removable.
*** 69 position connectors are available in metal only.
**** Connector body has no mounting holes.

[x] Option is NOT RoHS-compliant

CABLE-TO-BOARD (STANDARD FOOTPRINT)

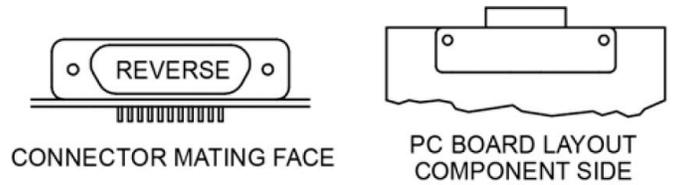
MK & ML – RUGGED BOARD MOUNT AND MM & MN – RUGGED CABLE
0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|--------------------|-------|-------|-------|-------|-------|--|-------|-------|-------|-------|-------|-------|
| Size | Contact Row | A | B | | C | D | E Potting Well Max | H | P | X | Y | Z** | Hardware | | | | | | |
| | | | Plug MAX | RCPT MAX | | | | | | | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | 0.210 | 0.298 | 0.280 | 0.690 | #2-56 UNC THD (#2-56 Clearance or #2-56 UNC Threaded Insert) | | | | | | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | | | | 0.310 | 0.341 | 0.219 | 0.390 | 0.325 | 1.046 |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | | | | | | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | | | | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | | | | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | | | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 0.219 | 0.390 | 0.325 | 1.046 | #4-40 UNC THD (#4-40 Clearance or #4-40 UNC Threaded Insert) | | | | | | |
| 69 | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | | | | | | 1.346 | | | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | 0.216 | 0.490 | 0.379 | 1.530 | #4-40 UNC THD (#4-40 Clearance or #4-40 UNC Threaded Insert) | | | | | | |

* 69 Position connectors are available in metal only.
** "Z" Dimension for turning jackscrew only.

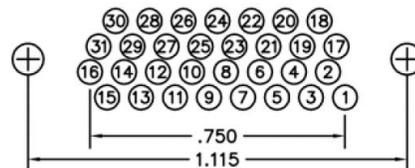
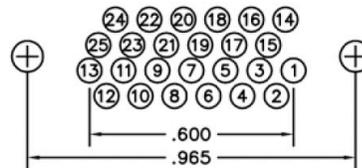
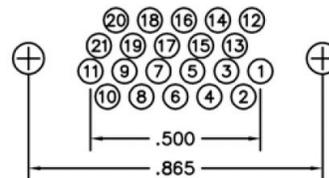
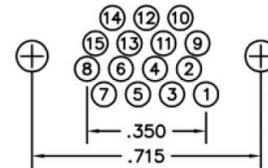
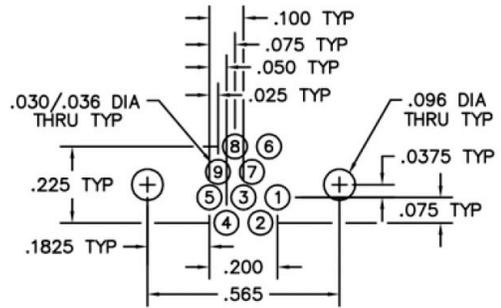
RECOMMENDED PC BOARD LAYOUTS
 STRAIGHT, STANDARD FOOTPRINT



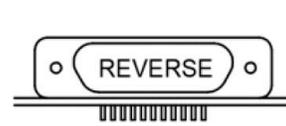
CONNECTOR MATING FACE (PLUG)



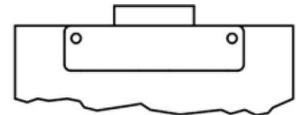
PLUG
 PC BOARD LAYOUT
 COMPONENT SIDE



RECOMMENDED PC BOARD LAYOUTS
STRAIGHT, STANDARD FOOTPRINT



CONNECTOR MATING FACE



PC BOARD LAYOUT COMPONENT SIDE

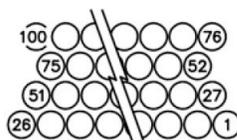
CONNECTOR MATING FACE (PLUG)



51 POSITION

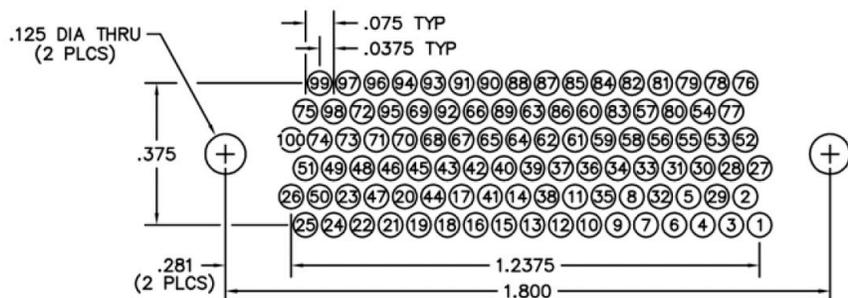
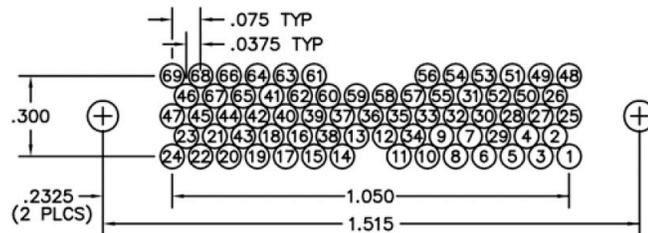
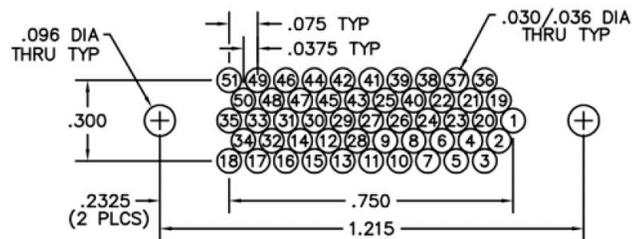


69 POSITION



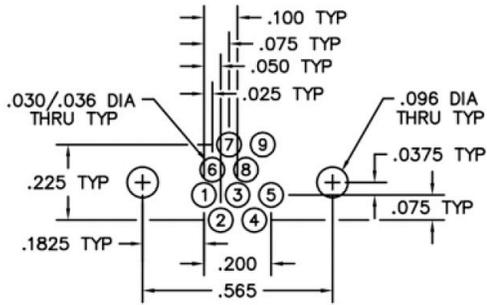
100 POSITION

PLUG
PC BOARD LAYOUT
COMPONENT SIDE



RECOMMENDED PC BOARD LAYOUTS
STRAIGHT, STANDARD FOOTPRINT

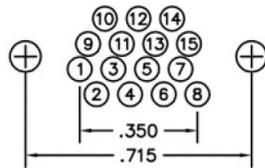
RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



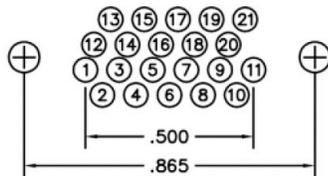
CONNECTOR
MATING FACE
(RECEPTACLE)



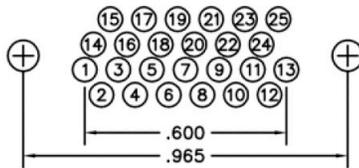
9 POSITION



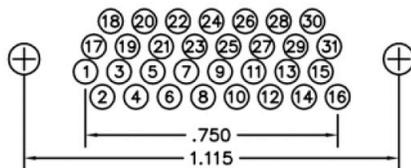
15 POSITION



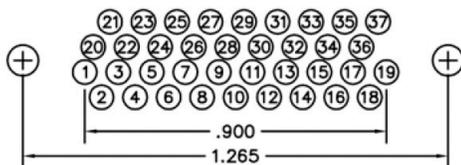
21 POSITION



25 POSITION



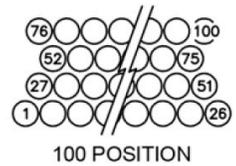
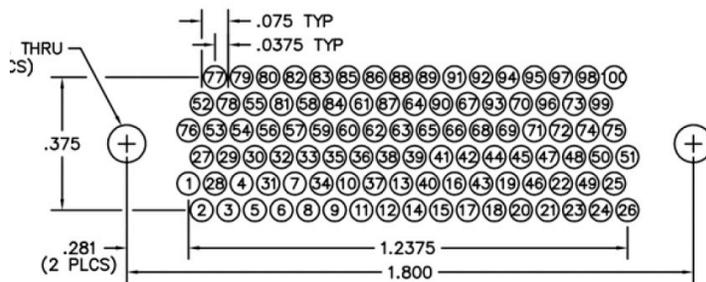
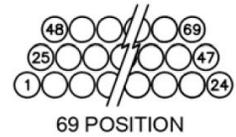
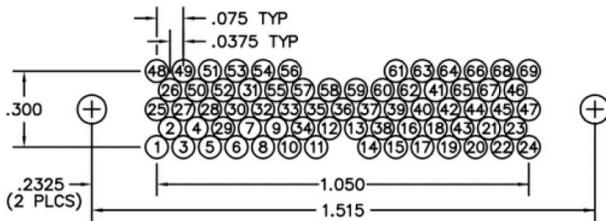
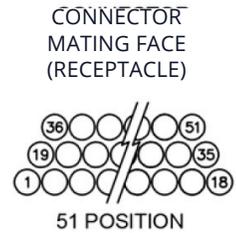
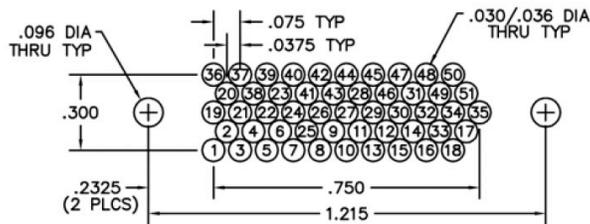
31 POSITION



37 POSITION

RECOMMENDED PC BOARD LAYOUTS
 STRAIGHT, STANDARD FOOTPRINT

RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE



SPECIFICATIONS – SURFACE MOUNT CONNECTORS MATERIALS AND FINISHES*

| | |
|--|--|
| CONTACTS: | Pins: BeCu alloy strip per ASTM B194 Sockets: Brass per ASTM B121/B121M or ASTM B16/B16M or ASTM B453 |
| CONTACT FINISHES: | Gold plate per ASTM B488 |
| SHELLS: | Aluminum Alloy 6061-T6 per SAE AMS-QQ-worxA-250/11 or 6061-T6511 per SAE AMS-QQ-A-200/8 OR Stainless steel 300 series per ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
| ALUMINUM SHELL FINISHES:** | Electroless nickel per SAE AMS2404, Class 3, 500 µm minimum Electrodeposited Cadmium per SAE AMS-QQ-P-416, type II, class 3 Black anodized per MIL-A-8625, type III, class 2 |
| MOLDED INSULATORS: | Glass-filled polyphenylene sulfide per MIL-M-24519 |
| EMBEDMENT: | Frey Engineering Co. insulating compound CF3003-80 and L-II-49 or equivalent |
| JACKSCREWS, JACKPOSTS AND NUTS: | Corrosion resistant steel per ASTM A320 or ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
| CLIPS AND WASHERS: | Corrosion resistant steel per ASME 18.24 or NASM35333 or ASTM A484/A484M and ASTM A582/A582M (For reference only: ASME 18.24 CRS per ASTM A693 and NASM35333 CRS per ASTM A240) Passivated per ASME 18.24 or NASM35333 or SAE AMS2700 (For reference only: ASME 18.24 and NASM35333 passivated per SAE AMS2700) |
| BRACKETS: | Card Edge Mount: Aluminum Alloy 7075-T6 per SAE AMS-QQ-A-250/12 or SAE AMS-QQ-A-200/11 plating consistent with aluminum shell Horizontal Surface Mount: Corrosion resistant steel per ASTM A240 Passivated per SAE AMS2700 |
| INTERFACIAL SEAL GASKETS: | Fluorosilicone per SAE AMS-R-25988 |
| TOLERANCES: (Unless otherwise specified) | Angles: ±5° Decimals: ±0.010"; Fractions: ±1/64" Wire lengths: uninsulated/solid: +0.2"/-0.0" |

NOTES

Molex can manufacture special configurations for your exact specifications.

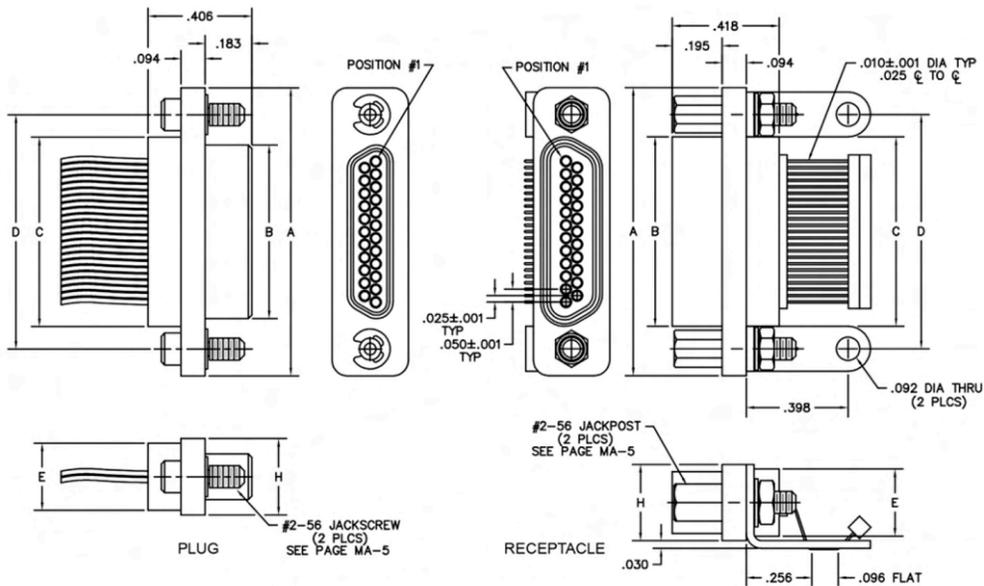
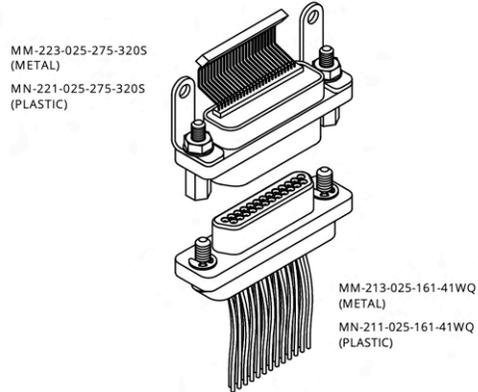
* Reference the above listed specifications or an equivalent industry standard when applicable

PERFORMANCE - SURFACE MOUNT CONNECTORS

| | |
|----------------------------------|--|
| CONTACT RATING: | 3-amperes maximum |
| SOLDERABILITY: | Terminals (except crimp) tested in accordance with MIL-STD-202, method 208 |
| WIRE SIZE: | Solid #30 AWG standard <i>(consult factory for other sizes and types)</i> |
| TEST VOLTAGE: | 600V (RMS) 60 Hz |
| OPERATING TEMPERATURE: | -55° C to +125° C |
| INSULATION RESISTANCE: | 5,000 megohms minimum at 500 VDC |
| DURABILITY: | 500 connector mating cycles |
| VIBRATION: | Tested in accordance with MIL-STD-1344, method 2005, condition IV, according to MIL-83513 |
| SHOCK: | Tested in accordance with MIL-STD-1344, method 2004, condition E, according to MIL-83513 |
| SALT SPRAY: | Mated connectors tested in accordance with MIL-STD-1344, method 1001, test condition B |
| HUMIDITY: | Mated connectors tested in accordance with MIL-STD-1344, method 1002, type II <i>(except steps 7a and 7b)</i> |
| THERMAL SHOCK: | Tested to the temperature extremes of MIL-STD-1344, method 1003, test condition A <i>(except step 3, temperature shall be 125° C)</i> |
| CONTACT RESISTANCE: | 0.065 volt maximum drop at 2.5 amps (.026 ohms) |
| CONTACT ENGAGING FORCE: | 6.0 oz. maximum, with 0.0221 diameter test sleeve per contact |
| CONTACT SEPARATING FORCE: | 0.5 oz. minimum, with 0.0230 diameter test sleeve per contact |
| CRIMP STRENGTH: | 5 pound minimum tensile strength |

BOARD SMT-TO-CABLE

MM – RUGGED METAL & MN – RUGGED PLASTIC
0.050" | 9 THROUGH 51 CONTACTS



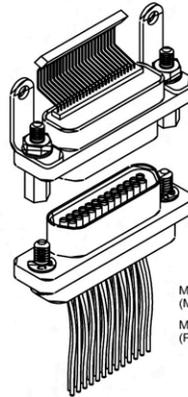
| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|--------------------------------------|
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | |
| 51* | | 1.825 | 1.384 | 1.450 | 1.440 | 1.615 | | | |

* 51 Position connectors are available in metal only.

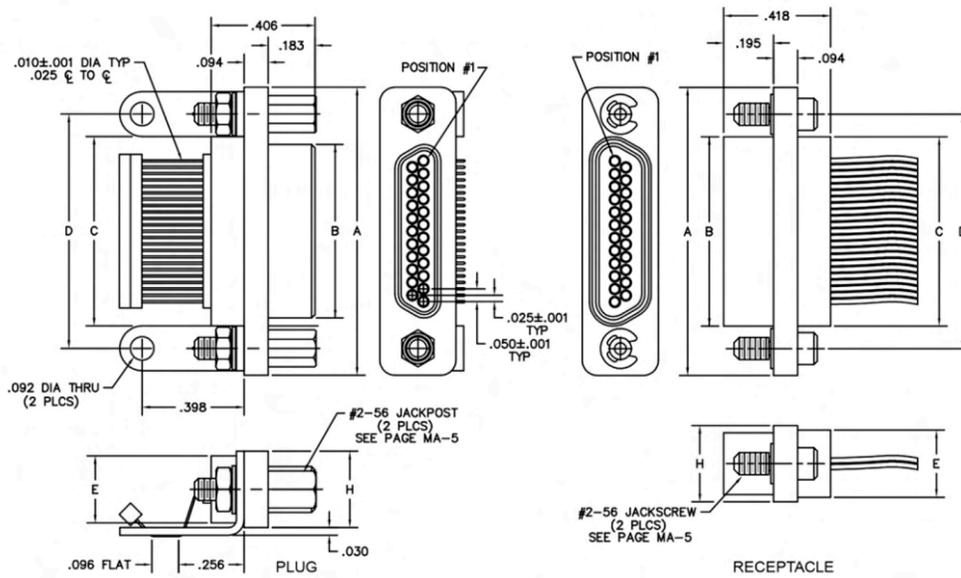
BOARD SMT-TO-CABLE

MM – RUGGED METAL & MN – RUGGED PLASTIC
0.050" | 9 THROUGH 51 CONTACTS

MM-212-025-175-3205
(METAL)
MN-211-025-175-3205
(PLASTIC)



MM-222-025-261-41WQ
(METAL)
MN-221-025-261-41WQ
(PLASTIC)



| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|--------------------------------------|
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | |
| 51* | | 1.825 | 1.384 | 1.450 | 1.440 | 1.615 | | | |

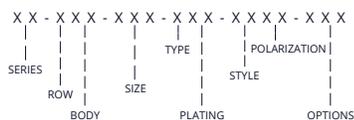
* = 51 Position connectors are available in metal only.

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MM | 0.050" Rugged Metal PC Board Mount, SMT Connector (MM mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| MN | 0.050" Rugged Plastic PC Board Mount, SMT Connector (MN mates with MK, ML, MM, MN receptacles) | MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 51***) | 2 | Two-row (Sizes 9 through 51***) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 2 | Receptacle, straight, with ears |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | 1 | Polyphenylene sulfide (MN only) |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| 5 | Polyphenylene sulfide with stainless steel shell | 5 | Polyphenylene sulfide with stainless steel shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051*** | XXX | 09, 015, 021, 025, 031, 037, 051*** |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 17 | Pin, Surface Mount | 21 | Socket, straight, solder cup |
| | | 24 | Socket, straight, .500" pigtails (0.018 dia.) |
| | | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| | | 1 | 50 µm Au contacts (crimp wire) |
| | | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 8 | 50 µm Au contacts: Sn plated terminations | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 32 | Two fixed jacknut assemblies with mounting bracket | 22 | Two fixed jacknut assemblies |
| 46 | Two turning jackscrews, Allen head, captivated** with mounting bracket | 41 | Two turning jackscrews, Allen head, retaining ring |
| | | 42 | Two long turning jackscrews, Allen head, retaining ring |
| | | 43 | Two turning jackscrews, slot head, retaining ring |
| | | 44 | Two long turning jackscrews, slot head, retaining ring |
| | | 45 | Two turning jackscrews, Allen head, captivated** |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OR | Reverse Body Polarization | 00 | None |
| OS | Standard Body Polarization | XX | For wiring codes, see page M-158 and M-159. |
| OPTIONS | | | |
| | | 900 | Interfacial sealing gasket |

PLUG: MM-213-025-161-41WQ
RECEPTACLE: MM-223-025-275-320S

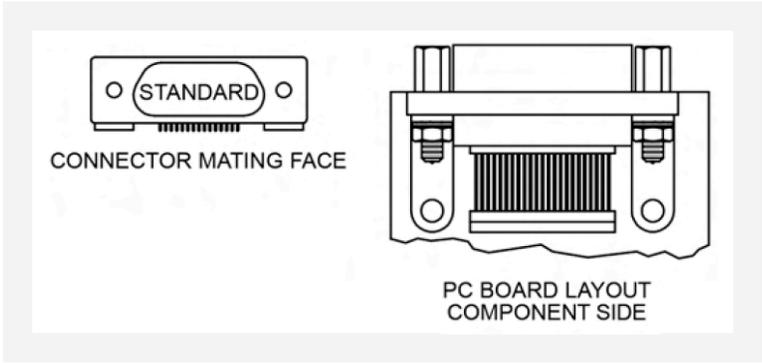
PLUG: MN-211-025-161-41WQ
RECEPTACLE: MN-221-025-275-320S



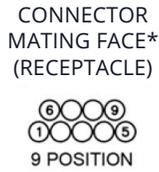
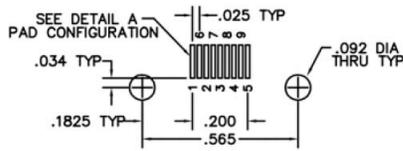
NOTE:
**Captive hardware is factory installed and non-removable.
***51 position connectors are available in metal only (non Mil-Spec interface).

[x] Option is not RoHS-compliant

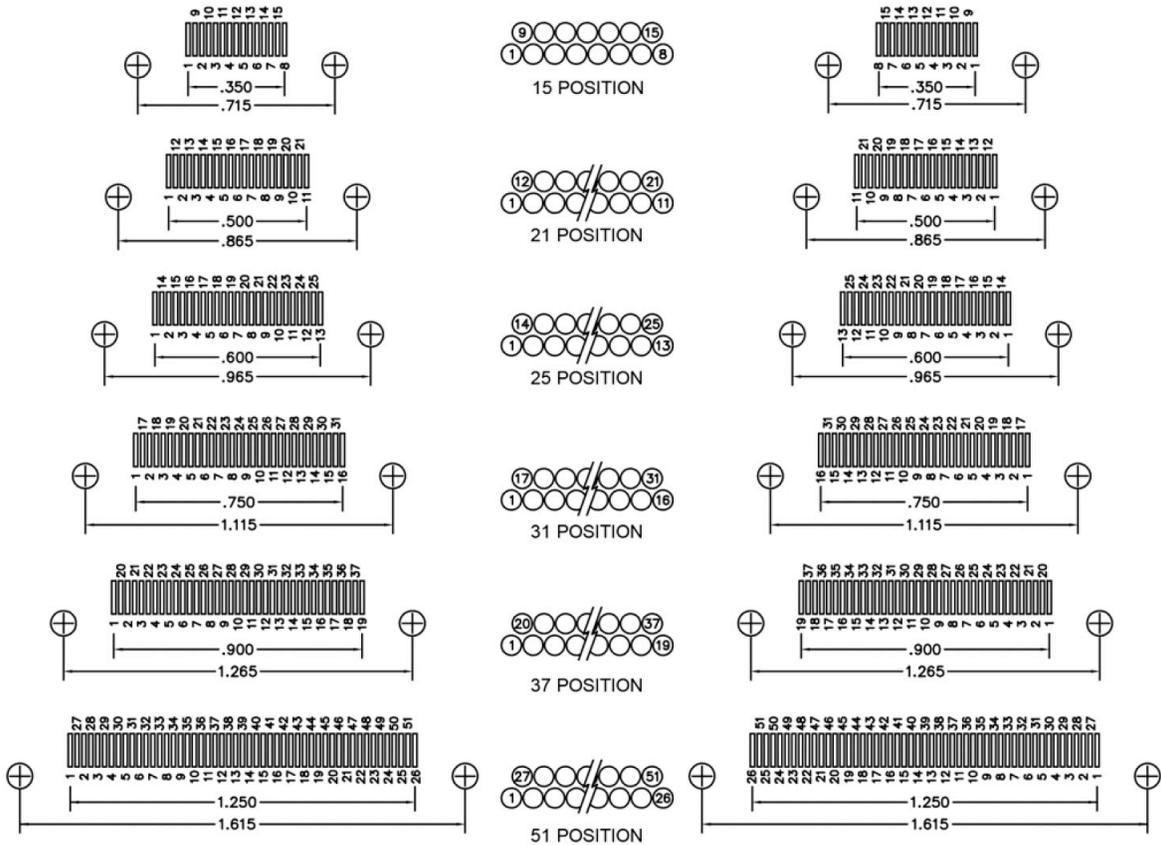
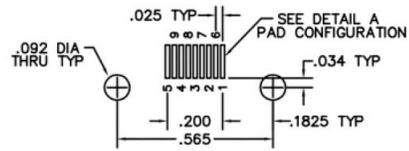
RECOMMENDED PC BOARD LAYOUTS
 SURFACE MOUNT
 STANDARD POLARIZATION



**PLUG
 PC BOARD LAYOUT
 COMPONENT SIDE**



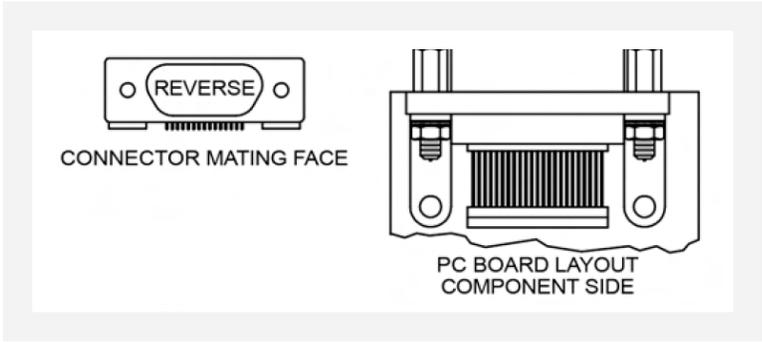
**RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE**



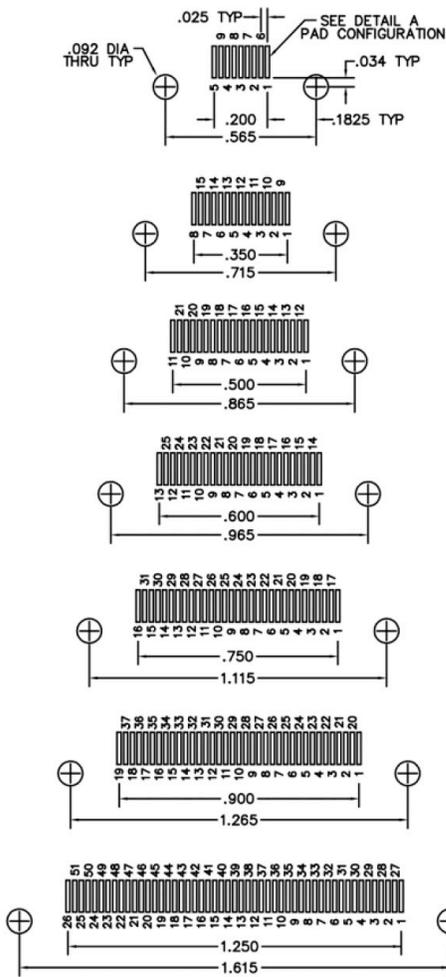
* For pin (plug) connectors, the contact numbers are reversed left to right.



RECOMMENDED PC BOARD LAYOUTS
SURFACE MOUNT
REVERSE POLARIZATION

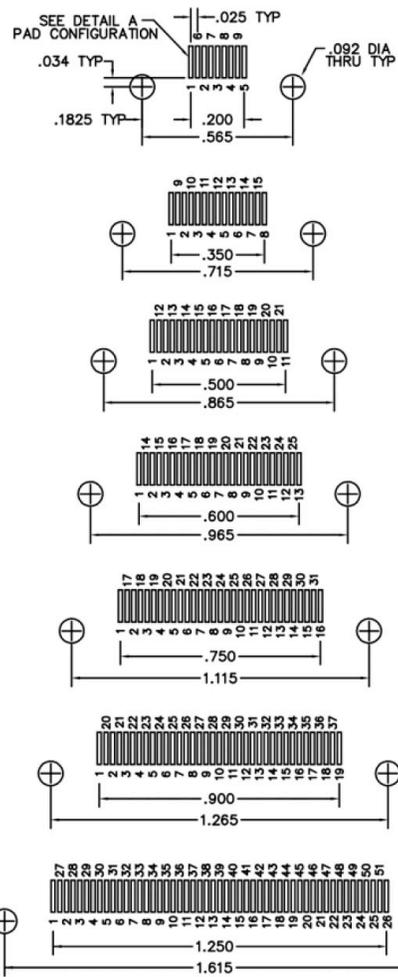


PLUG
PC BOARD LAYOUT
COMPONENT SIDE



RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE

CONNECTOR
MATING FACE*
(RECEPTACLE)



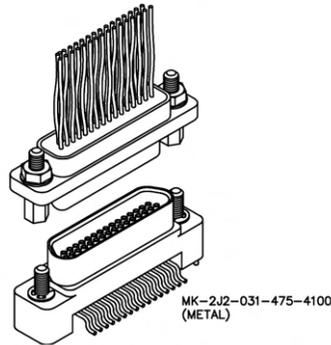
* For pin (plug) connectors, the contact numbers are reversed left to right.



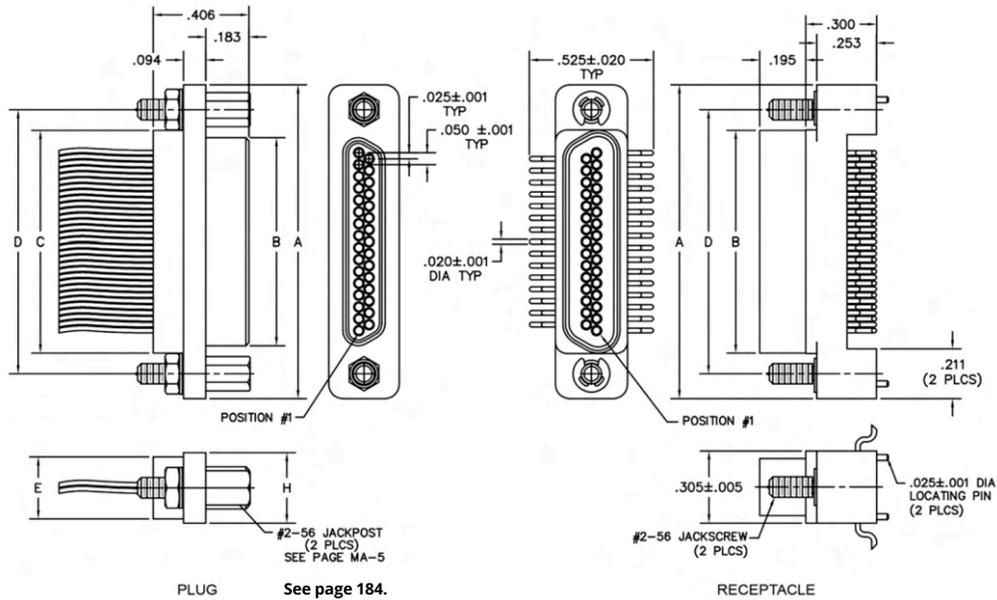
CABLE-TO-BOARD (VERTICAL SURFACE MOUNT)

MK - RUGGED SURFACE MOUNT & MM - RUGGED CABLE
 0.050" | 9 THROUGH 51 CONTACTS

MM-212-031-161-22WQ
 (METAL)



MK-2J2-031-475-4100
 (METAL)



PLUG See page 184.

RECEPTACLE

DIMENSIONS

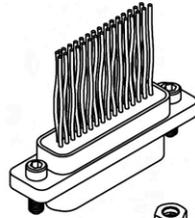
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
|------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|--------------------------------------|
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | |
| 51* | | 1.825 | 1.384 | 1.450 | 1.440 | 1.615 | | | |

* = 51 Position connectors are available in metal only.

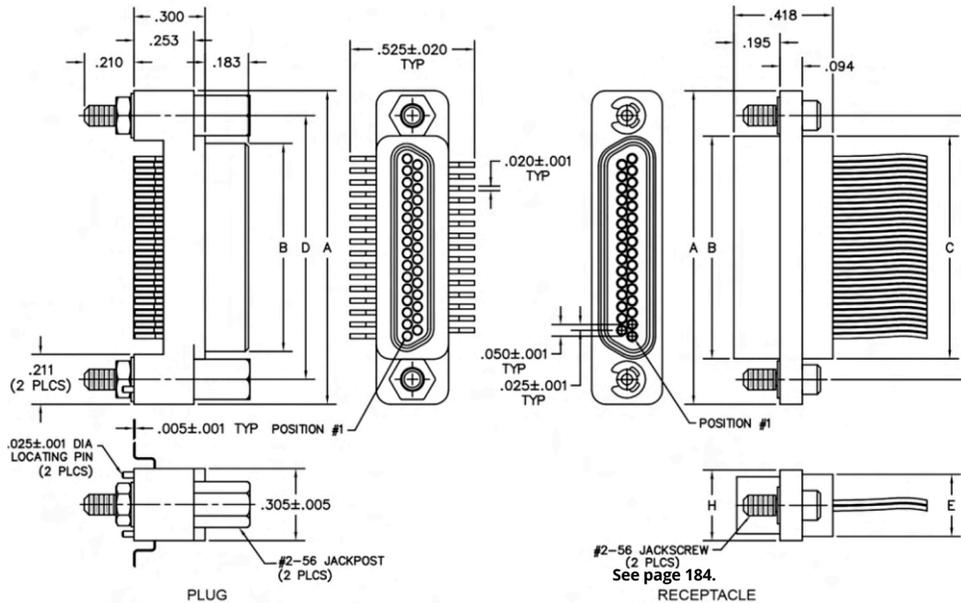
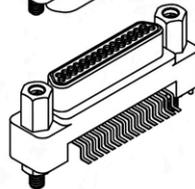
CABLE-TO-BOARD (VERTICAL SURFACE MOUNT)

MK - RUGGED SURFACE MOUNT & MM - RUGGED CABLE
 0.050" | 9 THROUGH 51 CONTACTS

MM-222-031-261-41WQ
 (METAL)



MK-2H2-031-375-2200
 (METAL)



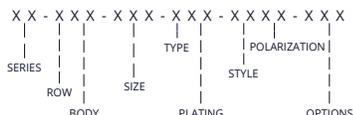
| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|---|
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | |
| 51* | | 1.825 | 1.384 | 1.450 | 1.440 | 1.615 | | | |

* = 51 Position connectors are available in metal only.

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MK | 0.050" Rugged Metal Surface Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 51*) | 2 | Two-row (Sizes 9 through 51*) |
| BODY STYLE | | BODY STYLE | |
| H | Plug, vertical surface mount | 2 | Receptacle, straight with ears |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051* | XXX | 09, 015, 021, 025, 031, 037, 051* |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 37 | Pin, vertical SMT | 21 | Socket, straight, solder cup |
| | | 24 | Socket, straight, .500" pigtails (0.018 dia.) |
| | | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 1 | 50 µm Au contacts (crimp wire) |
| 7 | 50 µm Au contacts: SAC305 terminations | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| | | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| | | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring | 41 | Two turning jackscrews, Allen head, retaining ring |
| 99 | Keying hardware, see options below | 42 | Two long turning jackscrews, Allen head, retaining ring |
| | | 43 | Two turning jackscrews, slot head, retaining ring |
| | | 44 | Two long turning jackscrews, slot head, retaining ring |
| | | 45 | Two turning jackscrews, Allen head, captivated** |
| | | 99 | Keying hardware, see options below |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| | | XX | For wiring codes, see page M-158 and M-159. |
| OPTIONS | | | |
| KPXX | Two fixed jacknuts. See page M-161 for keying options | KSXX | Two turning jackscrews and interfacial sealing gasket. See page M-161 for keying options |
| | | 900 | Interfacial sealing gasket |

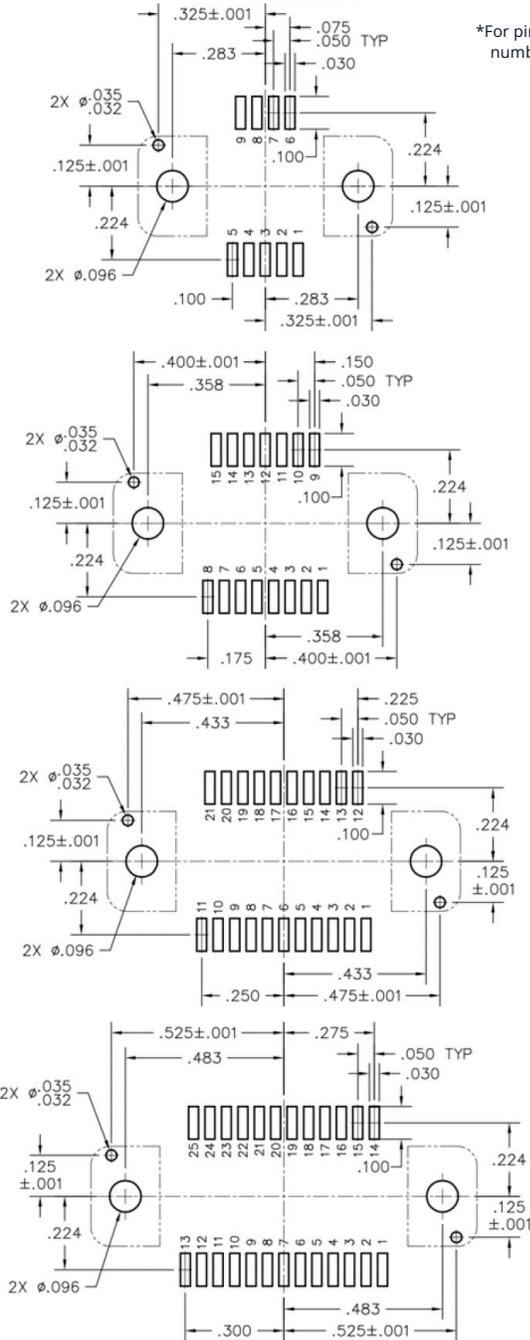
PLUG: MK-2H3-031-375-2200
RECEPTACLE: MM-223-031-213-4100



NOTE:
* = 2 row, 51 position connectors are non-Mil Spec interface.
** = Captive hardware is factory installed and non-removable.
[x] Option is not RoHS-compliant

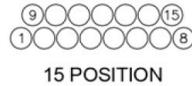
RECOMMENDED PC BOARD LAYOUTS
VERTICAL SURFACE MOUNT

**PLUG
PC BOARD LAYOUT
COMPONENT SIDE**

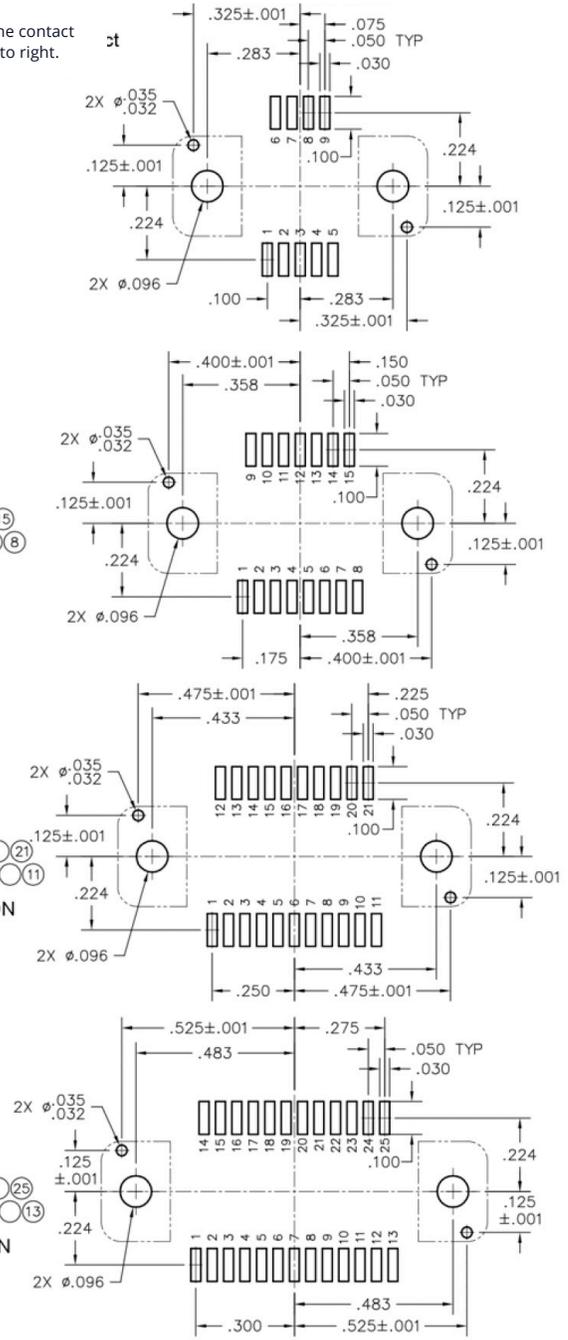


**CONNECTOR
MATING FACE*
(RECEPTACLE)**

*For pin (plug) connectors, the contact numbers are reversed left to right.



**RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE**



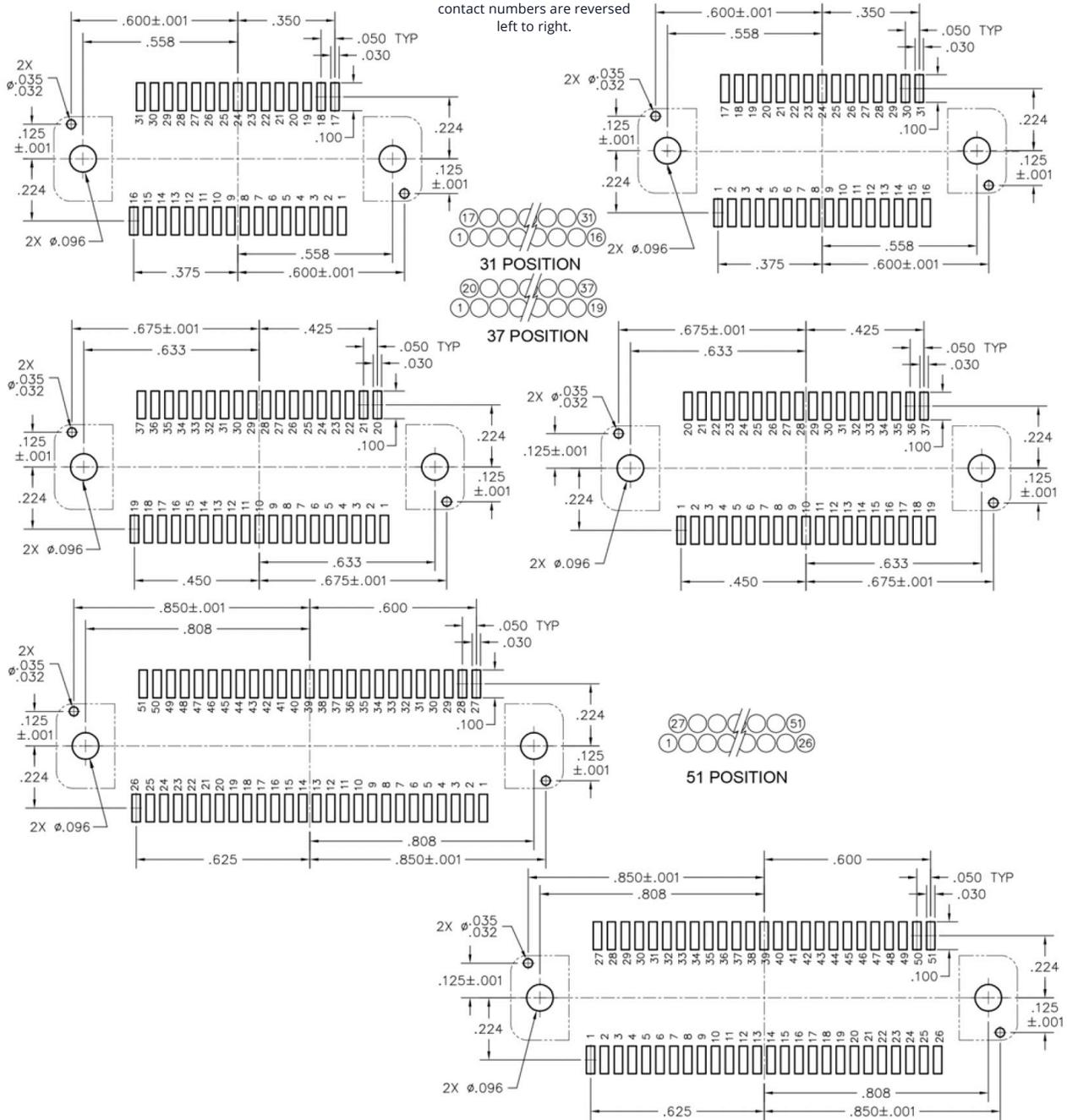
RECOMMENDED PC BOARD LAYOUTS
VERTICAL SURFACE MOUNT

**PLUG
PC BOARD LAYOUT
COMPONENT SIDE**

**CONNECTOR
MATING FACE*
(RECEPTACLE)**

**RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE**

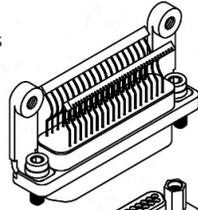
*For pin (plug) connectors, the contact numbers are reversed left to right.



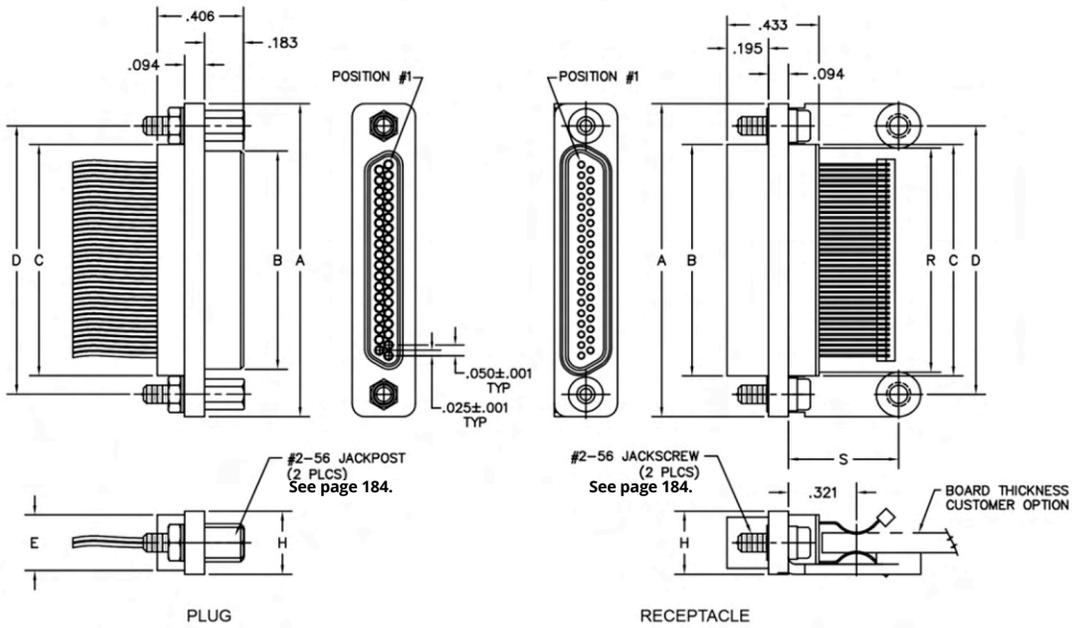
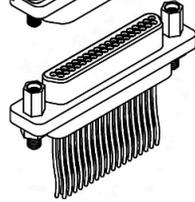
CARD EDGE MOUNT-TO-CABLE

MK - RUGGED CARD EDGE MOUNT & MM - RUGGED METAL
 0.050" | 9 THROUGH 100 CONTACTS

MK-2G2-037-275-460S
 (METAL)



MM-212-037-161-22WQ
 (METAL)

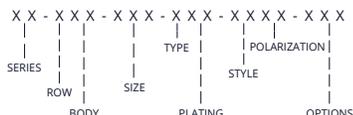


| DIMENSIONS | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|------------------|-------|---------------|---------------|----------------|-------|---|
| Size | Contact Row | A | B | | C | D | E | | H | Hardware | Mounting Holes | R | S |
| | | | Plug MAX | RCPT MAX | | | Potting Well MAX | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD | #4-40 UNC THD | 0.355 | 0.519 | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | 0.505 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | 0.655 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | 0.755 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | 0.905 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | 1.055 | | |
| 51 | | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | | | | | 1.005 | | |
| 69 | 3 | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | 0.310 | 0.341 | #4-40 UNC THD | 1.309 | 0.540 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD | 1.514 | | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal Card Edge Mount (MK mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 & 69) | 3 | Three-row (Size 51 & 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | G | Receptacle, straight, card edge with mounting brackets |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 27 | Socket, surface mount, 0.062-0.094" PCB thickness (.010 dia) |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) | 28 | Socket, surface mount, 0.109-0.140" PCB thickness (.010 dia) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | | |
| 16 | Pin, straight, crimped wire | | |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 8 | 50 µm Au contacts: Sn plated terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | | |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | | |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 32 | Two fixed jacknut assemblies (72*) |
| 22 | Two fixed jacknut assemblies (62*) | 46 | Two turning jackscrews, Allen head, captivated** (86*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | | |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | | |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | | |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | | |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | | |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | OS | Standard Body Polarization |
| XX | For wiring codes, see page M-158 and M-159. | | |
| OPTIONS | | | |
| | | 900 | Interfacial sealing gasket |

PLUG: MM-212-031-161-22WQ
RECEPTACLE: MK-2G2-031-275-460S-900

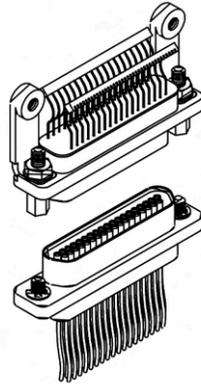


NOTE:
* = Use number in parenthesis when ordering size 100.
** = Captive hardware is factory installed and non-removable.
[x] Option is not RoHS-compliant

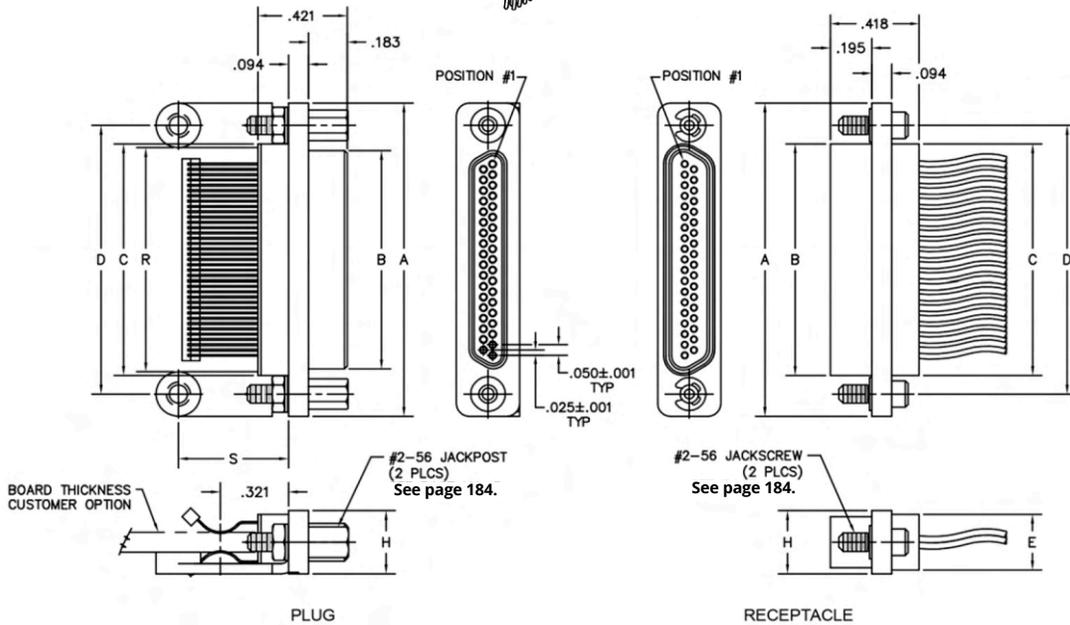
CARD EDGE MOUNT-TO-CABLE

MK - RUGGED CARD EDGE MOUNT & MM - RUGGED METAL
 0.050" | 9 THROUGH 100 CONTACTS

MK-2F2-037-175-3205
 (METAL)



MM-222-037-261-41WQ
 (METAL)



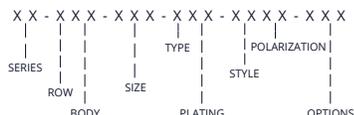
DIMENSIONS

| Size | Contact Row | A | B | | C | D | E | | H | Hardware | Mounting Holes | R | S |
|------|-------------|-------|----------|----------|-------|-------|------------------|-------|---------------|---------------|----------------|-------|---|
| | | | Plug MAX | RCPT MAX | | | Potting Well MAX | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD | #4-40 UNC THD | 0.355 | 0.519 | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | 0.505 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | 0.655 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | 0.755 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | 0.905 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | 1.055 | | |
| 51 | | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | | | | | 1.005 | | |
| 69 | 3 | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | 0.310 | 0.341 | #4-40 UNC THD | 1.309 | 0.540 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD | 1.514 | | | |

LEAD CONFIGURATION OPTIONS

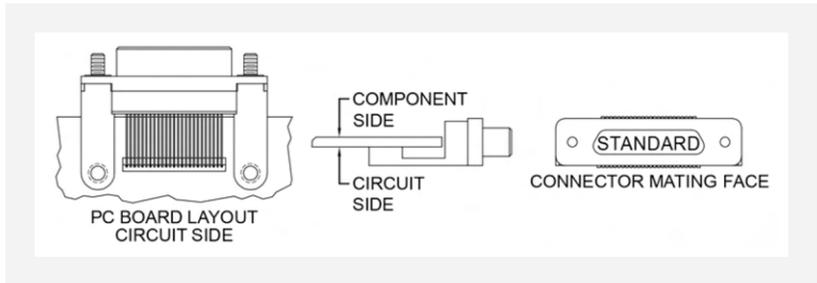
| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MK | 0.050" Rugged Metal Card Edge Mount Connector (MK mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 & 69) | 3 | Three-row (Size 51 & 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | G | Receptacle, straight, card edge with mounting brackets |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 27 | Socket, surface mount, 0.062-0.094" PCB thickness (.010 dia) |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) | 28 | Socket, surface mount, 0.109-0.140" PCB thickness (.010 dia) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | | |
| 16 | Pin, straight, crimped wire | | |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 8 | 50 µm Au contacts: Sn plated terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | | |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | | |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 32 | Two fixed jacknut assemblies (72*) |
| 22 | Two fixed jacknut assemblies (62*) | 46 | Two turning jackscrews, Allen head, captivated** (86*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | | |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | | |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | | |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | | |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | | |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | OS | Standard Body Polarization |
| XX | For wiring codes, see page M-158 and M-159. | | |
| OPTIONS | | | |
| | | 900 | Interfacial sealing gasket |

PLUG: MK-2F2-031-175-320S
RECEPTACLE: MM-222-031-261-41WQ-900

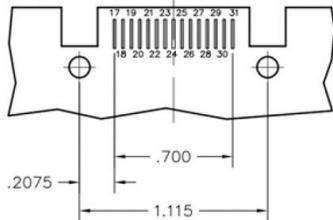
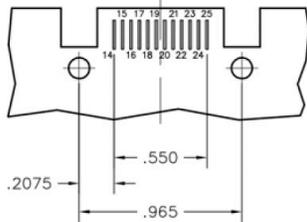
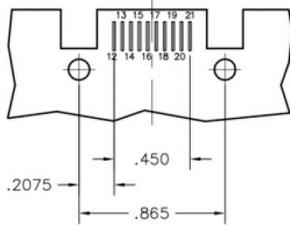
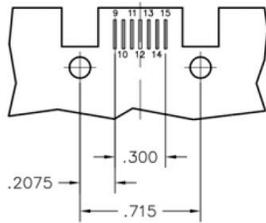
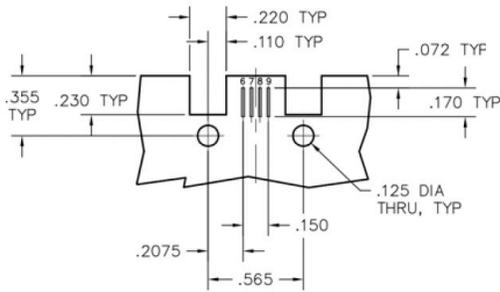


NOTE:
* = Use number in parenthesis when ordering size 100.
** = Captive hardware is factory installed and non-removable.
[x] Option is not RoHS-compliant

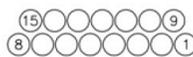
RECOMMENDED PC BOARD LAYOUTS
CARD EDGE MOUNT
STANDARD POLARIZATION



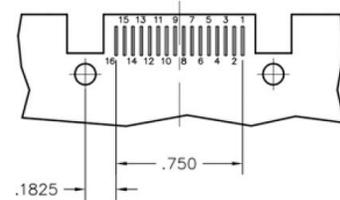
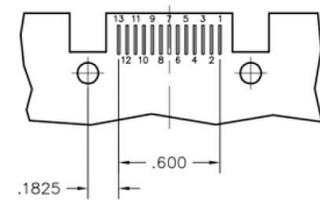
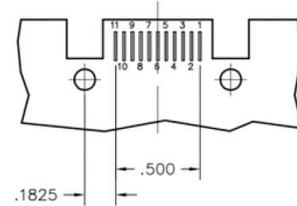
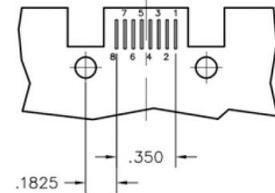
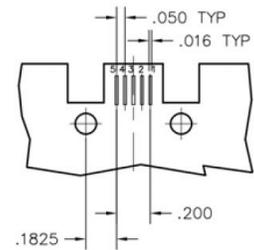
PLUG
PC BOARD LAYOUT
COMPONENT SIDE



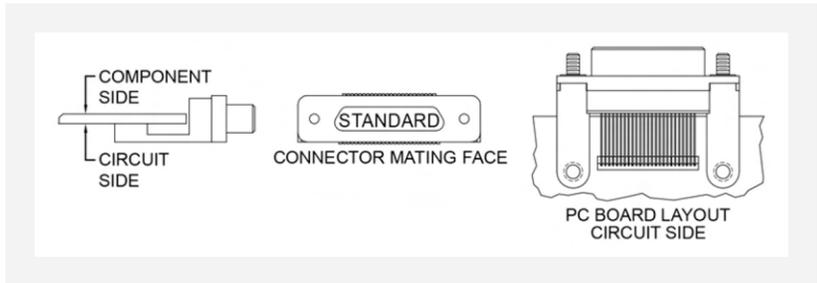
CONNECTOR
MATING FACE



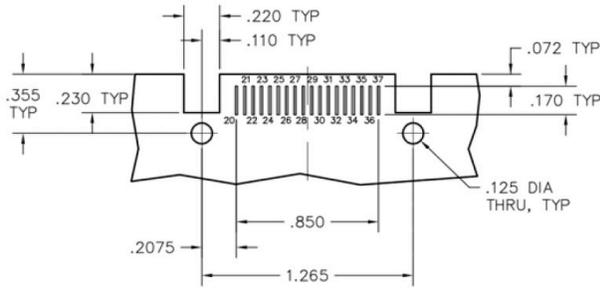
PLUG
PC BOARD LAYOUT
CIRCUIT SIDE



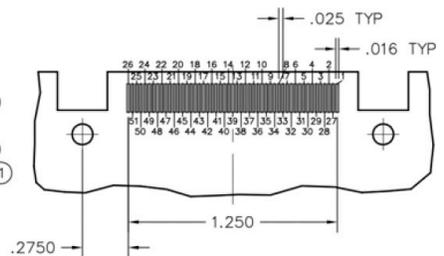
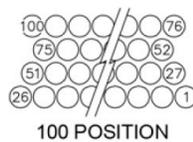
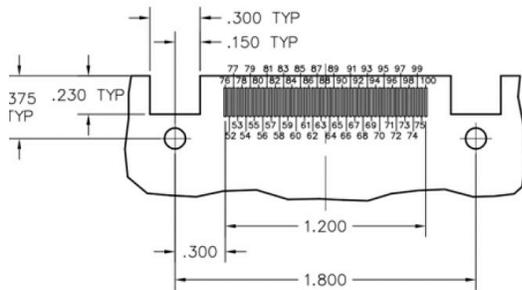
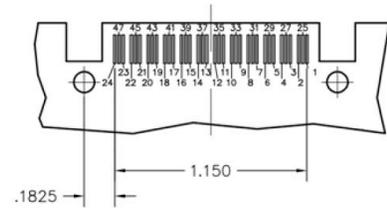
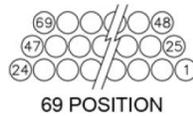
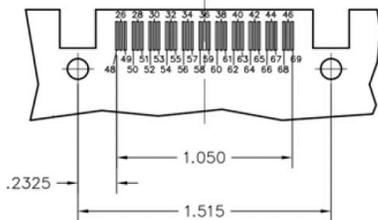
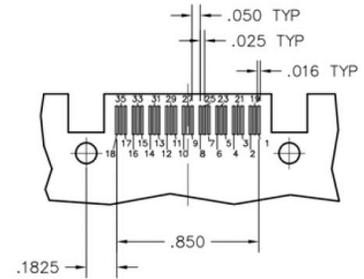
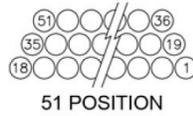
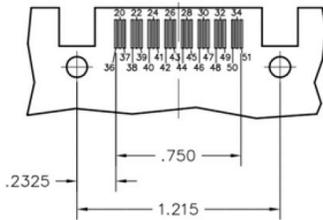
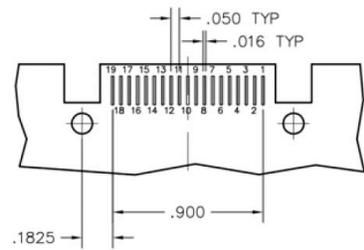
RECOMMENDED PC BOARD LAYOUTS
CARD EDGE MOUNT
STANDARD POLARIZATION



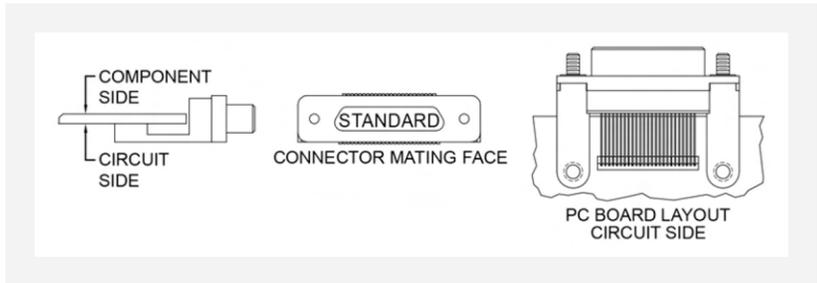
PLUG
PC BOARD LAYOUT
COMPONENT SIDE



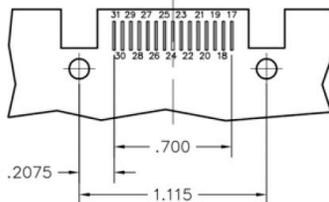
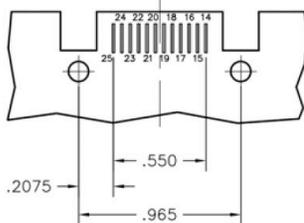
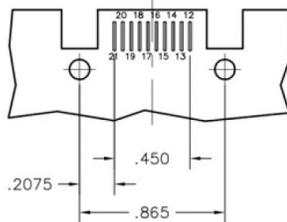
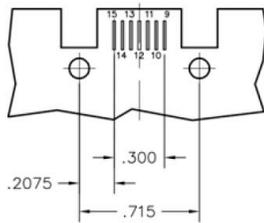
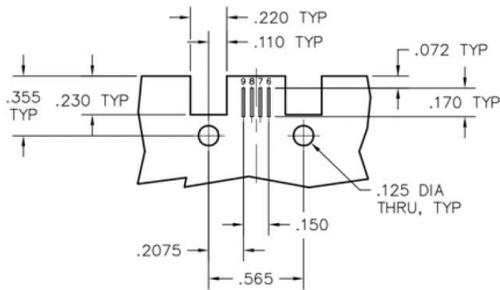
PLUG
PC BOARD LAYOUT
CIRCUIT SIDE



RECOMMENDED PC BOARD LAYOUTS
CARD EDGE MOUNT
STANDARD POLARIZATION



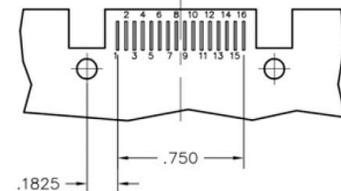
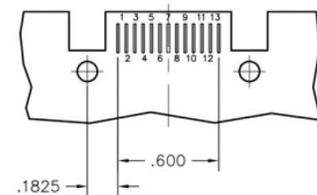
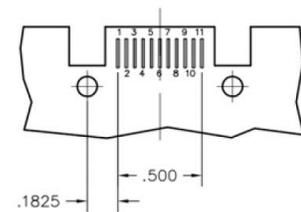
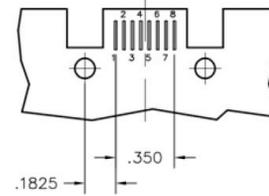
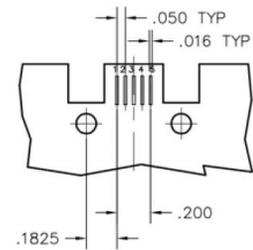
**RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE**



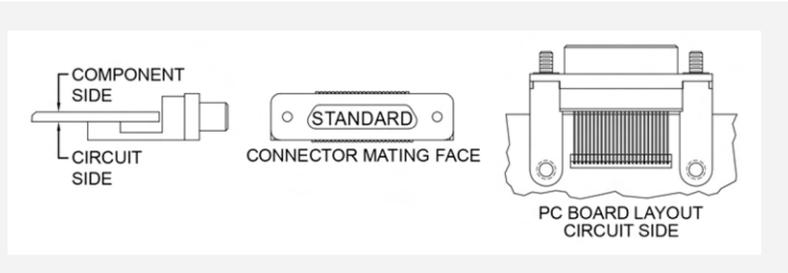
**CONNECTOR
 MATING FACE**



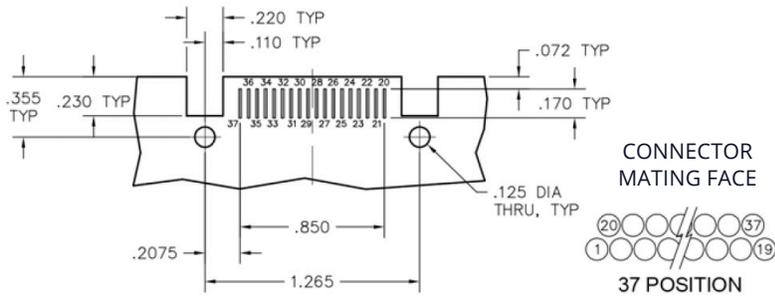
**RECEPTACLE
 PC BOARD LAYOUT
 CIRCUIT SIDE**



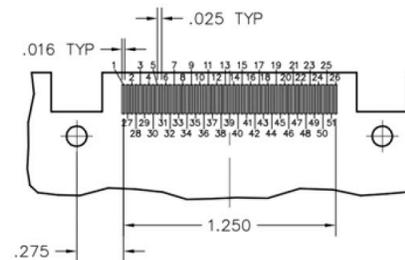
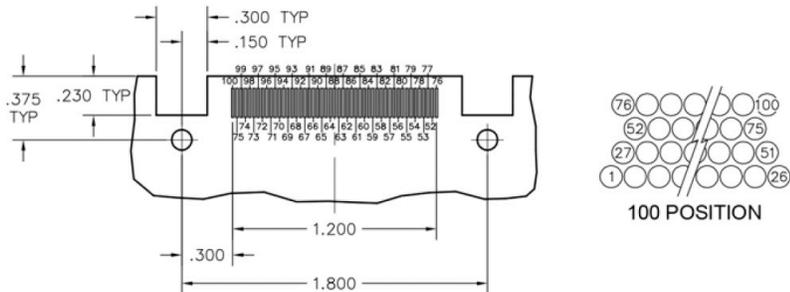
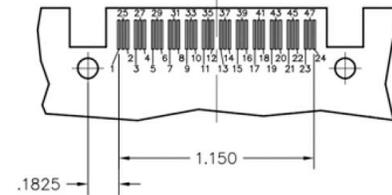
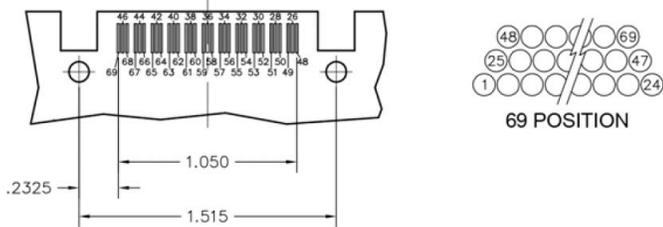
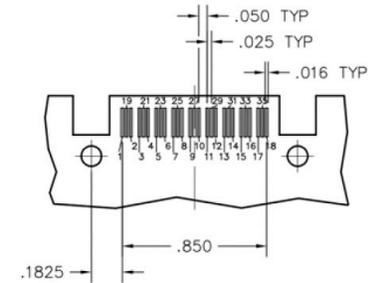
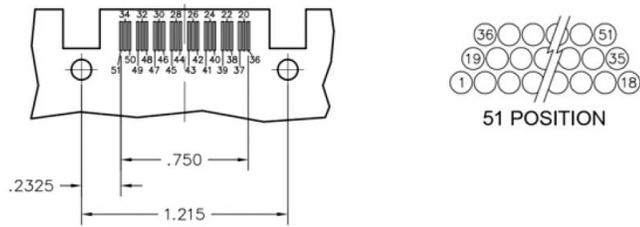
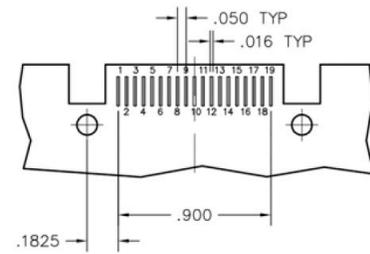
RECOMMENDED PC BOARD LAYOUTS
CARD EDGE MOUNT
STANDARD POLARIZATION



**RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE**



**RECEPTACLE
 PC BOARD LAYOUT
 CIRCUIT SIDE**



FILTERED CABLE CONNECTORS

MF - RUGGED METAL

0.050" | 9 THROUGH 37 CONTACTS

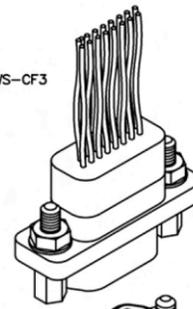
Electrical Data

Dielectric Withstanding Voltage (DWV): 300 VDC
 Insulation Resistance: 5000 Megohms at 100 VDC
 Working Voltage (WV): 100 VDC
 Current Rating: 3 Amps

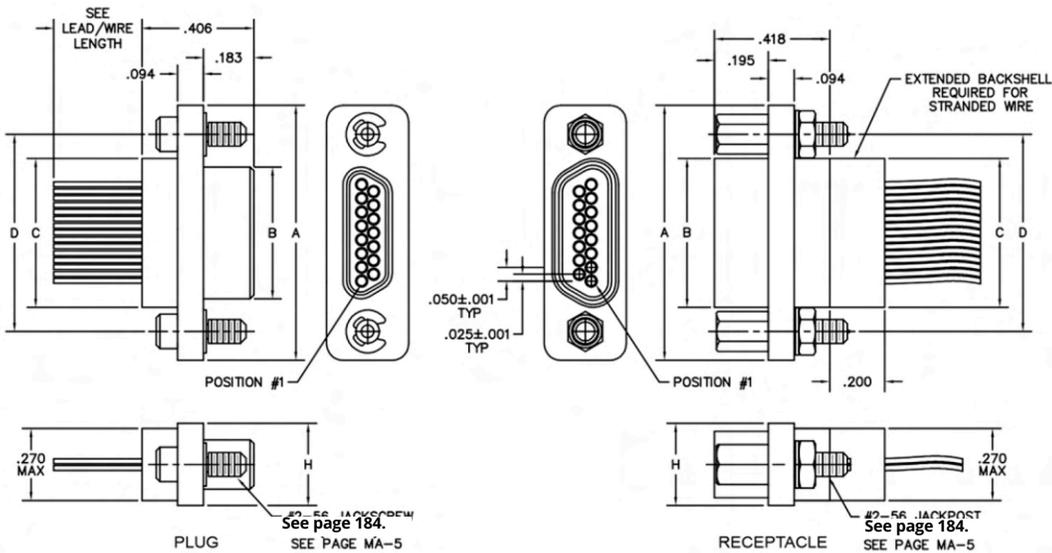
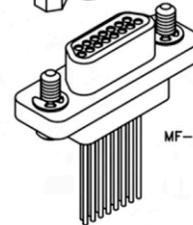
Application Notes

1. Hipot voltage must not exceed working voltage.
2. Maximum solder tinning temperature is 275° C while maintaining a tinning dwell of 5 seconds max.
3. Maximum solder station temperature is 360° C while maintaining a soldering dwell of less than 5 seconds.
4. Temperature exceeding 150° C should never be applied to the entire connector. Failure to adhere to these guidelines may result in damage to connector or significantly reduced operating characteristics.

MF-222-015-261-22WS-CF3



MF-212-015-145-4100-CF6



DIMENSIONS

| Size | Contact Row | A | B | | C | D | E | H | Hardware | Mounting Holes | R | S |
|------|-------------|-------|----------|----------|-------|-------|-------|-------|--------------------------------------|----------------|-------|-------|
| | | | Plug MAX | RCPT MAX | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) | #4-40 UNC THD | 0.355 | 0.519 |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | 0.505 | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | 0.655 | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | 0.755 | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | 0.905 | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | 1.055 | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | #4-40 UNC THD (0.147 DIA THROUGH) | #4-40 UNC THD | 1.005 | 0.540 |
| 69 | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | | | 1.309 | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD (0.147 DIA THROUGH) | #4-40 UNC THD | 1.514 | 0.540 |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MF | 0.050" Rugged Metal I/O Connector (MF mates with MK, ML, MM, MN receptacles) | MF | 0.050" Rugged Metal I/O Connector (MF mates with MK, ML, MM, MN receptacles) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 2 | Receptacle, straight, with ears and interfacial seal |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037 | XXX | 009, 015, 021, 025, 031, 037 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 1D | Pin, straight, 0.109" Lead Length (0.018 dia) See Note 1 | 2D | Socket, straight, 0.109" Lead Length (0.018 dia) |
| 1E | Pin, straight, 0.125" Lead Length (0.018 dia) See Note 1 | 2E | Socket, straight, 0.125" Lead Length (0.018 dia) |
| 1F | Pin, straight, 0.140" Lead Length (0.018 dia) See Note 1 | 2F | Socket, straight, 0.140" Lead Length (0.018 dia) |
| 12 | Pin, straight, 0.150" Lead Length (0.018 dia) See Note 1 | 22 | Socket, straight, 0.150" Lead Length (0.018 dia) |
| 1G | Pin, straight, 0.156" Lead Length (0.018 dia) See Note 1 | 2G | Socket, straight, 0.156" Lead Length (0.018 dia) |
| 1H | Pin, straight, 0.172" Lead Length (0.018 dia) See Note 1 | 2H | Socket, straight, 0.172" Lead Length (0.018 dia) |
| 1J | Pin, straight, 0.187" Lead Length (0.018 dia) See Note 1 | 2J | Socket, straight, 0.187" Lead Length (0.018 dia) |
| 13 | Pin, straight, 0.250" Lead Length (0.018 dia) See Note 1 | 23 | Socket, straight, 0.250" Lead Length (0.018 dia) |
| 1K | Pin, straight, 0.375" Lead Length (0.018 dia) See Note 1 | 2K | Socket, straight, 0.375" Lead Length (0.018 dia) |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia) See Note 1 | 2L | Socket, straight, 0.500" Lead Length (0.018 dia) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia) See Note 1 | 2M | Socket, straight, 1.000" Lead Length (0.018 dia) |
| 16 | Pin, straight, stranded wire | 24 | Socket, straight, 0.500" pigtails (0.018 dia) See Note 1 |
| | | 25 | Socket, straight, 1.000" pigtails (0.018 dia) See Note 1 |
| | | 26 | Socket, straight, stranded wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (stranded wire) [x] | 1 | 50 µm Au contacts (stranded wire) [x] |
| 3 | 50 µm Au contacts: 10 µm Au terminations (pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring | 41 | Two turning jackscrews, Allen head, retaining ring |
| 42 | Two long turning jackscrews, Allen head, retaining ring | 42 | Two long turning jackscrews, Allen head, retaining ring |
| 43 | Two turning jackscrews, slot head, retaining ring | 43 | Two turning jackscrews, slot head, retaining ring |
| 44 | Two long turning jackscrews, slot head, retaining ring | 44 | Two long turning jackscrews, slot head, retaining ring |
| 45 | Two turning jackscrews, Allen head, captivated** | 45 | Two turning jackscrews, Allen head, captivated** |
| WIRING | | WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see page M-158 and M-159. | XX | For wiring codes, see page M-158 and M-159. |
| CAPACITOR DESIGNATOR | | | |
| XXX | See tables below | XXX | See tables below |

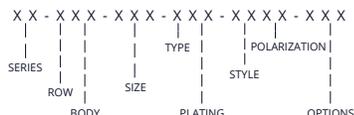
| CERAMIC CHIP CAPACITOR FILTERS | | | | | |
|--------------------------------|----------------|-----------------------------------|--------|--------|--------|
| Capacitor Designator | Cap Range (Pf) | Minimum Insertion Loss (Decibels) | | | |
| | | 10 MHz | 15 MHz | 30 MHz | 50 MHz |
| CF1 [x] | 150-250 | - | - | 1 | 4 |
| CF2 [x] | 300-500 | 1 | 2 | 5 | 8 |
| CF3 [x] | 700-1000 | 3 | 5 | 10 | 10 |
| CF4 [x] | 1300-2000 | 6 | 10 | 15 | 20 |
| CF5 [x] | 4000-5400 | 13 | 15 | 20 | 27 |
| CF6 [x] | 8500-11500 | 18 | 20 | 25 | 30 |

| PLANAR CAPACITOR FILTERS | | | | | |
|--------------------------|----------------|-----------------------------------|---------|---------|-------|
| Capacitor Designator | Cap Range (Pf) | Minimum Insertion Loss (Decibels) | | | |
| | | 10 MHz | 100 MHz | 500 MHz | 1 GHz |
| PF1 [x] | 150-250 | - | 8 | 33 | 36 |
| PF2 [x] | 300-500 | - | 13 | 37 | 44 |
| PF3 [x] | 700-1000 | 2 | 19 | 42 | 42 |
| PF4 [x] | 1300-2000 | 6 | 25 | 45 | 45 |
| PF5 [x] | 4000-5400 | 14 | 34 | 41 | 41 |
| PF6 [x] | 8500-11500 | 20 | 36 | 43 | 43 |

Minimum no load attenuation (in 50 Ohm system, 25° C)

PLUG: MF-212-015-145-4100-CF6
 RECEPTACLE: MM-222-031-2G3-4500

PLUG: MF-212-031-1G3-4500
 RECEPTACLE: MF-222-015-261-22WS-C



NOTE: The leads on these contacts are soft copper suitable for forming.
 ** = Captive hardware is factory installed and non-removable.
[x] Option is not RoHS-compliant

SPECIFICATIONS – HYBRID CONNECTORS

MATERIALS AND FINISHES*

| | |
|---|--|
| CONTACTS: | Pins: BeCu alloy strip per ASTM B194 Sockets: Brass per ASTM B121/B121M or ASTM B16/B16M or ASTM B453 |
| CONTACT FINISHES: | Gold plate per ASTM B488 |
| SHELLS: | Aluminum alloy 6061-T6 per SAE AMS-QQ-A-250/11 or 6061-T6511 per SAE AMS-QQ-A-200/8 |
| ALUMINUM SHELL FINISHES: | Electroless nickel per SAE AMS2404, Class 3, 500 µm minimum Electrodeposited Cadmium per SAE AMS-QQ-P-416, type II, class 3 |
| MOLDED INSULATORS: | Glass-filled polyphenylene sulfide per MIL-M-24519 |
| EMBEDMENT: | Frey Engineering Co. insulating compound CF3003-80 and L-II-49 or equivalent |
| JACKSCREWS, JACKPOSTS AND NUTS: | Corrosion resistant steel per ASTM A320 or ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
| CLIPS AND WASHERS: | Corrosion resistant steel per ASME 18.24 or NASM35333 <i>(For reference only: ASME 18.24 CRS per ASTM A693 and NASM35333 CRS per ASTM A240)</i> Passivated per ASME 18.24 or NASM35333 <i>(For reference only: ASME 18.24 and NASM35333 passivated per SAE AMS2700)</i> |
| INTERFACIAL SEAL GASKETS: | Fluorosilicone per SAE AMS-R-25988 |
| TOLERANCES: <i>(Unless otherwise specified)</i> | Angles: $\pm 5^\circ$ Decimals: $\pm 0.010''$; Fractions: $\pm 1/64''$ Wire lengths: insulated/stranded = $+1.0''/-0$ |

NOTES

Molex can manufacture special configurations for your exact specifications.

* = Reference the above listed specifications or an equivalent industry standard when applicable

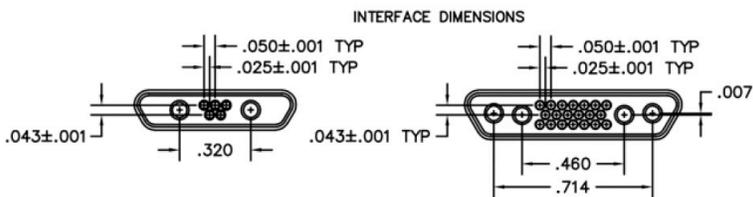
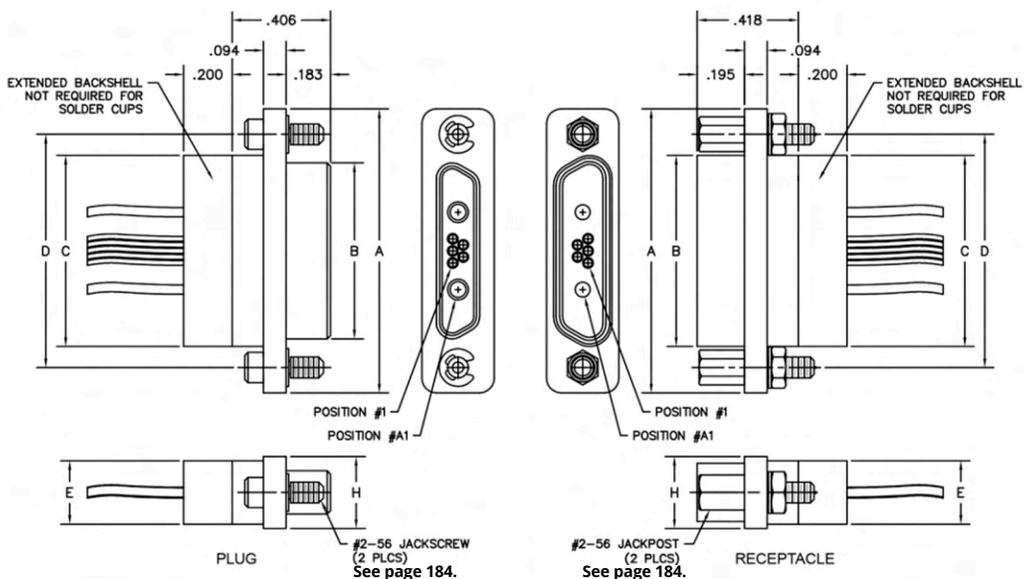
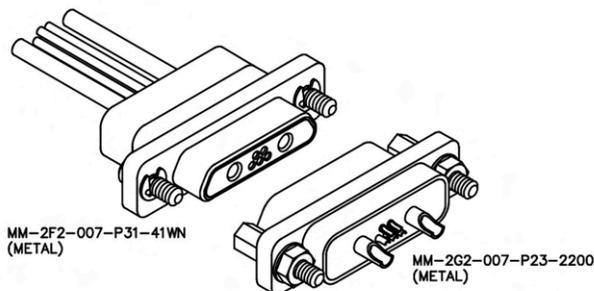
PERFORMANCE HYBRID CONNECTORS - REFERENCE MIL-DTL-83513

| | |
|-------------------------------|--|
| CONTACT RATING: | 3 amperes maximum for signal and coax contacts 13 amperes maximum for power contacts |
| SOLDERABILITY: | Terminals (except crimp) tested in accordance with MIL-STD-202, method 208 |
| WIRE SIZE: | Stranded #16 AWG standard for power contacts RG316 or RG178 standard for coax contacts Stranded #24-#28 AWG standard <i>(consult factory for other sizes and types)</i> |
| TEST VOLTAGE: | 600V (RMS) 60 Hz |
| OPERATING TEMPERATURE: | -55° C to +125° C |
| INSULATION RESISTANCE: | 5,000 megohms minimum at 500 VDC |
| DURABILITY: | 500 connector mating cycles |
| VIBRATION: | Tested in accordance with MIL-STD-1344, method 2005, condition IV, according to MIL-83513 |
| SHOCK: | Tested in accordance with MIL-STD-1344, method 2004, condition E, according to MIL-83513 |
| SALT SPRAY: | Mated connectors tested in accordance with MIL-STD-1344, method 1001, test condition B |
| HUMIDITY: | Mated connectors tested in accordance with MIL-STD-1344, method 1002, type II <i>(except steps 7a and 7b)</i> |
| THERMAL SHOCK: | Tested to the temperature extremes of MIL-STD-1344, method 1003, test condition A <i>(except step 3, temperature shall be 125° C)</i> |

CABLE-TO-CABLE HYBRID

MM - RUGGED METAL

0.050" | 7 THROUGH 24 CONTACTS



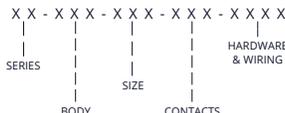
| DIMENSIONS | | | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|---|
| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | | | |
| 7 | 2 | 1.175 | 0.7344 | 0.800 | 0.790 | 0.965 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 24 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|--|--|--|--|
| SERIES | | | |
| MM | 0.050" Rugged Metal Connector | MM | 0.050" Rugged Metal Connector |
| BODY | | | |
| 2 | Two-row (Size 7) | 2 | Two-row (Size 7) |
| 3 | Three-row (Size 24) | 3 | Three-row (Size 24) |
| BODY STYLE | | BODY STYLE | |
| F | Plug, straight, with ears | G | Receptacle, straight, with ears and interfacial seal |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| SIZE | | | |
| 007 | Two power or coax and five signal | 007 | Two power or coax and five signal |
| 024 | Four power or coax and 20 signal | 024 | Four power or coax and 20 signal |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| P1 | Solder cup, power connector | P2 | Solder cup, power connector |
| P3 | Crimped wire, Power contacts M16878/4-16-9, length per wire code. | P4 | Crimped wire, Power contacts M16878/4-16-9, length per wire code. |
| C3 | Crimped wire, Coax RG316, length per wire code | C4 | Crimped wire, Coax RG316, length per wire code |
| C5 | Crimped wire, Coax RG178, length per wire code | C6 | Crimped wire, Coax RG178, length per wire code |
| Note: Plug connector has pin signal contacts and socket power/coax contacts. | | Note: Receptacle connector has socket signal contacts and pin power/coax contacts. | |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, power connectors only) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, power connectors only) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring | 41 | Two turning jackscrews, Allen head, retaining ring |
| 42 | Two long turning jackscrews, Allen head, retaining ring | 42 | Two long turning jackscrews, Allen head, retaining ring |
| 43 | Two turning jackscrews, slot head, retaining ring | 43 | Two turning jackscrews, slot head, retaining ring |
| 44 | Two long turning jackscrews, slot head, retaining ring | 44 | Two long turning jackscrews, slot head, retaining ring |
| 45 | Two turning jackscrews, Allen head, captivated** | 45 | Two turning jackscrews, Allen head, captivated** |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG
RECEPTACLE

MM-2F2-007-P31-41WN
MM-2G2-007-P41-22WS



NOTE:

**Captive hardware is factory installed and non-removable.

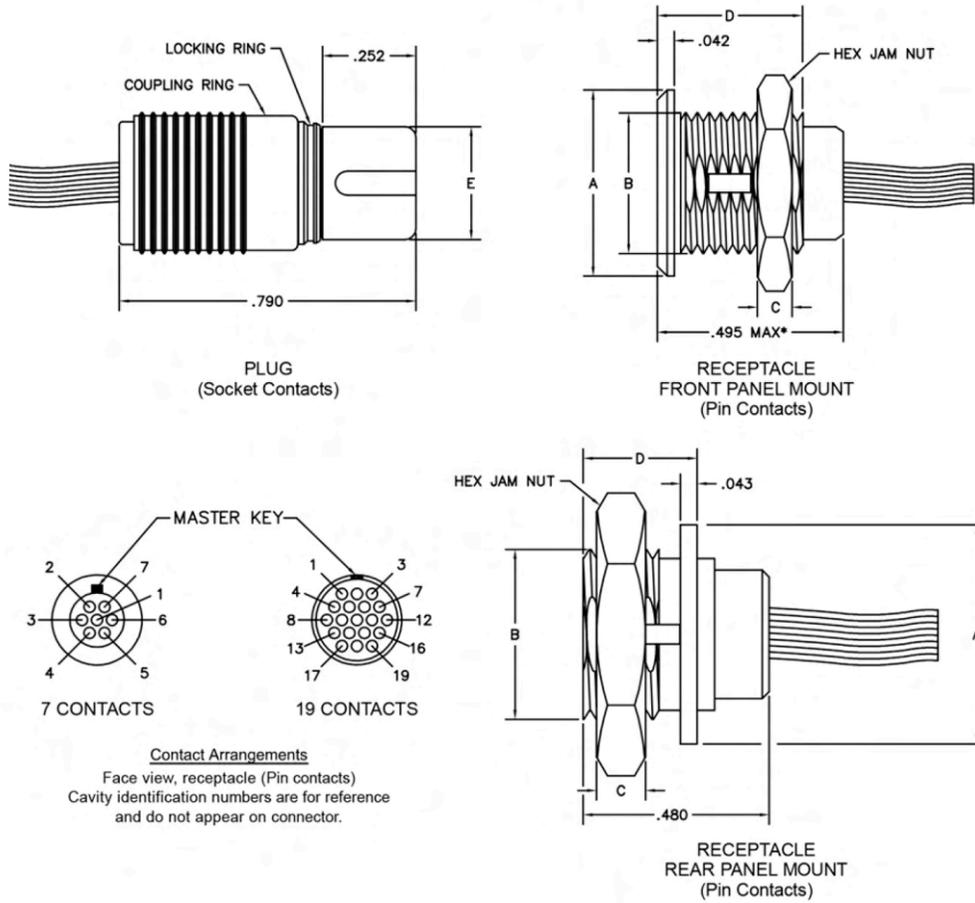
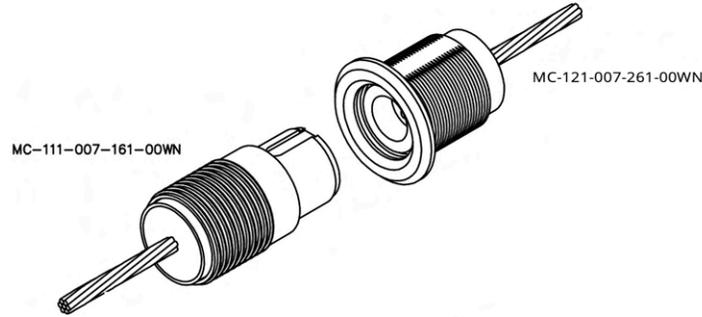
[x] Option is not RoHS-compliant

molex

CIRCULAR CABLE CONNECTORS

MC - RUGGED METAL

0.050" | 7 THROUGH 19 CONTACTS



| DIMENSIONS (RECEPTACLE) | | | | | |
|-------------------------|------------|--------------|-----------------|----------|-------|
| Mount | Body | A MAX DIA | B Thread | C Nut | D |
| FRONT PANEL | 1 (7 POS) | 0.510 | 3/8-32 UNEF-2A | 0.093 | 0.388 |
| FRONT PANEL | 2 (19 POS) | 0.575 | 1/2-28 UNEF-2A | 0.125 | 0.340 |
| REAR PANEL | 1 (7 POS) | 0.575 | 7/16-28 UNEF-2A | 0.093 | 0.293 |
| REAR PANEL | 2 (19 POS) | 0.575 | 1/2-28 UNEF-2A | 0.125 | 0.305 |

| DIMENSIONS (PLUG) ^{di} | |
|---------------------------------|--------------|
| Body | E MAX DIA |
| 1 (7 POS) | 0.305 |
| 2 (19 POS) | 0.405 |

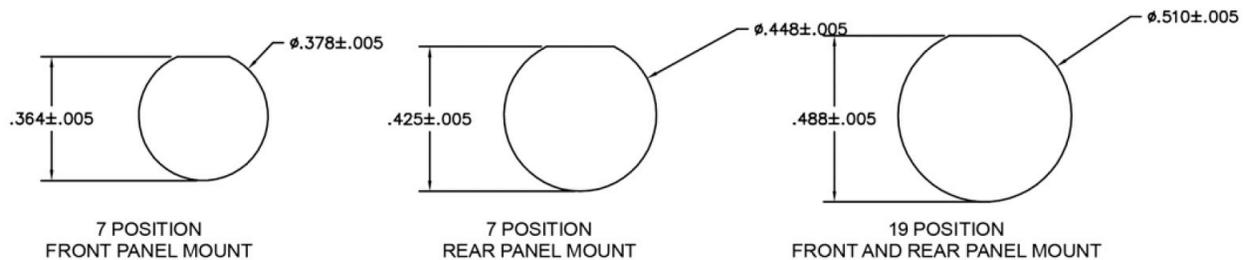
*0.530 Max for solder cup connectors



LEAD CONFIGURATION OPTIONS

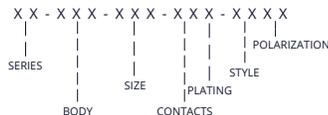
| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MC | 0.050" Circular Connector | MC | 0.050" Circular Connector |
| BODY | | | |
| 1 | Seven position shell | 1 | Seven position shell |
| 2 | 19 position shell | 2 | 19 position shell |
| BODY STYLE | | BODY STYLE | |
| 1 | Quick disconnect | 2 | Front mount, quick disconnect |
| | | 4 | Rear mount, quick disconnect |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide insulator, brass shell with electroless Ni plating | 1 | Polyphenylene sulfide insulator, brass shell with electroless Ni plating |
| SIZE | | | |
| XXX | 007, 019 | XXX | 007, 019 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 14 | Socket, straight, 0.500" pigtails (0.018 dia.) | 21 | Pin, straight, solder cup |
| 15 | Socket, straight, 1.000" pigtails (0.018 dia.) | 24 | Pin, straight, 0.500" pigtails (0.018 dia.) |
| 16 | Socket, straight, crimped wire | 25 | Pin, straight, 1.000" pigtails (0.018 dia.) |
| C5 | Crimped wire, Coax RG178, length per wire code | 26 | Pin, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PANEL MOUNTING DIMENSIONS



PLUG
RECEPTACLE

MC-111-007-161-00WN
MC-121-007-261-00WN



NOTE:
[x] Option is not RoHS-compliant

molex

SPECIFICATIONS – REAR PANEL MOUNT CONNECTORS MATERIALS AND FINISHES*

| | |
|---|--|
| CONTACTS: | Pins: BeCu alloy strip per ASTM B194 Sockets: Brass per ASTM B121/B121M or ASTM B453 |
| CONTACT FINISHES: | Gold plate per ASTM B488 |
| SHELLS: | Aluminum alloy 6061-T6 per SAE AMS-QQ-A-250/11 or 6061-T6511 per SAE AMS-QQ-A-200/8 |
| ALUMINUM SHELL FINISHES: | Electroless nickel per SAE AMS2404, Class 3, 500 µm minimum Electrodeposited cadmium per SAE AMS-QQ-P-416, type II, class 3 Black anodized per MIL-A-8625, type III, class 2 |
| MOLDED INSULATORS: | Glass-filled polyphenylene sulfide per MIL-M-24519 |
| EMBEDMENT: | Frey Engineering Co. insulating compound CF3003-80 and L-II-49 or equivalent |
| JACKSCREWS, JACKPOSTS AND NUTS: | Corrosion resistant steel per ASTM A320 or ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
| CLIPS AND WASHERS: | Corrosion resistant steel per ASME 18.24 <i>(For reference only: ASME 18.24 CRS per ASTM A693)</i> Passivated per ASME 18.24 |
| GASKETS: | Interfacial: fluorosilicone per SAE AMS-R-25988 Flange: fluorosilicone per SAE AMS-R-25988 Flange EMI: conductive elastomer per MIL-DTL-83528, type D |
| TOLERANCES: <i>(Unless otherwise specified)</i> | Angles: $\pm 5^\circ$ Decimals: $\pm 0.010''$; Fractions: $\pm 1/64''$ Wire lengths: insulated/stranded = $+1.0''/-0.0''$ uninsulated/solid = $+0.2''/-0.0''$ |

NOTES

Molex can manufacture special configurations for your exact specifications.

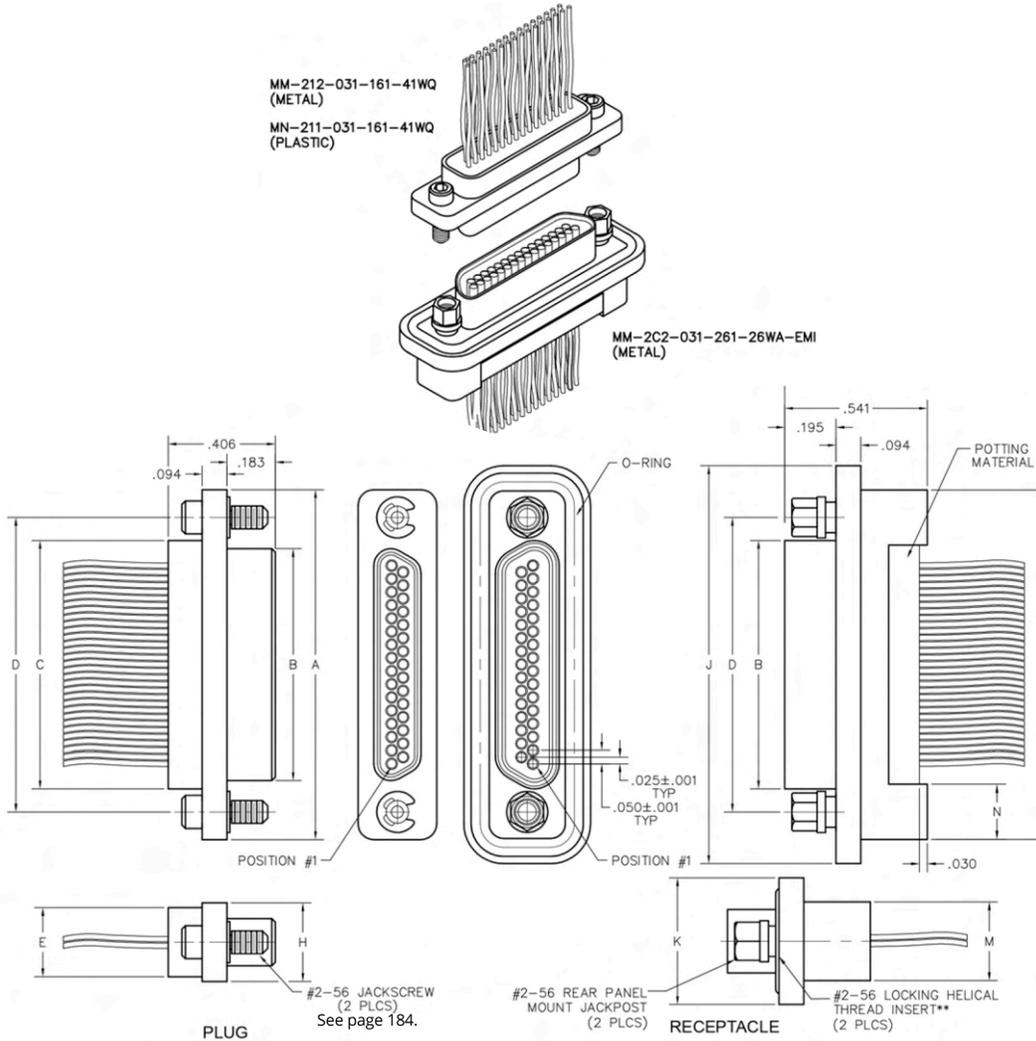
* Reference the above listed specifications or an equivalent industry standard when applicable

PERFORMANCE - REAR PANEL MOUNT CONNECTORS

| | |
|----------------------------------|--|
| CONTACT RATING: | 3-amperes maximum |
| SOLDERABILITY: | Terminals (except crimp) tested in accordance with MIL-STD-202, method 208 |
| WIRE SIZE: | Stranded #26 AWG or solid #25 AWG standard <i>(consult factory for other sizes and types)</i> |
| TEST VOLTAGE: | 600V (RMS) 60 Hz |
| OPERATING TEMPERATURE: | -55° C to +125° C |
| INSULATION RESISTANCE: | 5,000 megohms minimum at 500 VDC |
| DURABILITY: | 500 connector mating cycles |
| VIBRATION: | Tested in accordance with MIL-STD-1344, method 2005, condition IV, according to MIL-83513 |
| SHOCK: | Tested in accordance with MIL-STD-1344, method 2004, condition E, according to MIL-83513 |
| SALT SPRAY: | Mated connectors tested in accordance with MIL-STD-1344, method 1001, test condition B |
| HUMIDITY: | Mated connectors tested in accordance with MIL-STD-1344, method 1002, type II <i>(except steps 7a and 7b)</i> |
| THERMAL SHOCK: | Tested to the temperature extremes of MIL-STD-1344, method 1003, test condition A <i>(except step 3, temperature shall be 125° C)</i> |
| CONTACT RESISTANCE: | 0.065 volt maximum drop at 2.5 Amps (.026 Ohms) |
| CONTACT ENGAGING FORCE: | 6.0 oz. maximum, with 0.0221 diameter test sleeve |
| CONTACT SEPARATING FORCE: | 0.5 oz. minimum, with 0.0230 diameter test sleeve |
| CRIMP STRENGTH: | 5 pound minimum tensile strength |
| SEALING: | When mated, Molex rear panel mount connectors provide an environmental seal to water, moisture and certain chemicals as well as a dust and dirt barrier. |

CABLE-TO-CABLE (REAR PANEL MOUNT)

MM - RUGGED METAL AND MN - RUGGED PLASTIC
0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|-------|-------|---------------|-------|-------|-------|-------|-------|
| Size | Contact Row | A | B | | C | D | E | H | Hardware | J | K | L | M | N |
| | | | Plug MAX | RCPT MAX | | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD | 0.957 | 0.480 | 0.773 | 0.298 | 0.210 |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | 1.107 | | 0.923 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | 1.257 | | 1.073 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | 1.357 | | 1.173 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | 1.507 | | 1.323 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | 1.657 | | 1.473 | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | #2-56 UNC THD | 1.657 | 0.523 | 1.477 | 0.440 | 0.239 |
| 69* | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | | 1.957 | | 1.777 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD | 2.383 | 0.600 | 2.219 | 0.515 | 0.301 |

* 69 Position connectors are available in metal only.

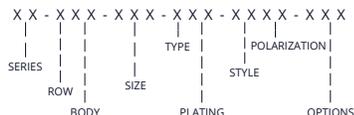
** Shell accepts 0.200 Max #2-56 screw length (0.295 Max #4-40 screw length).

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN receptacles) | | |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 & 69) | 3 | Three-row (Size 51 & 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | C | Receptacle, straight, rear panel mount, with fluorosilicone o-ring and interfacial seal |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, 26 AWG solder cup | 21 | Socket, straight, 26 AWG solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWG solder cup |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) | 24 | Socket, straight, 0.500" pigtails (0.018 dia.) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 24 | Two fixed jacknuts, rear panel mount, 0.040" panel thickness (64*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 26 | Two fixed jacknuts, rear panel mount, 0.060" panel thickness (66*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | 28 | Two fixed jacknuts, rear panel mount, 0.070" panel thickness (68*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | 29 | Two fixed jacknuts, rear panel mount, 0.080" panel thickness (69*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | | |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | | | |
| | | EMI | EMI o-ring (in lieu of fluorosilicone o-ring) |

PLUG: MM-212-031-161-41WQ
RECEPTACLE: MM-2C2-031-261-26WA-EMI

PLUG: MN-211-031-161-41WQ
RECEPTACLE: MM-2C2-031-261-26WA-EMI



NOTE:

* = Use number in parenthesis when ordering size 100.

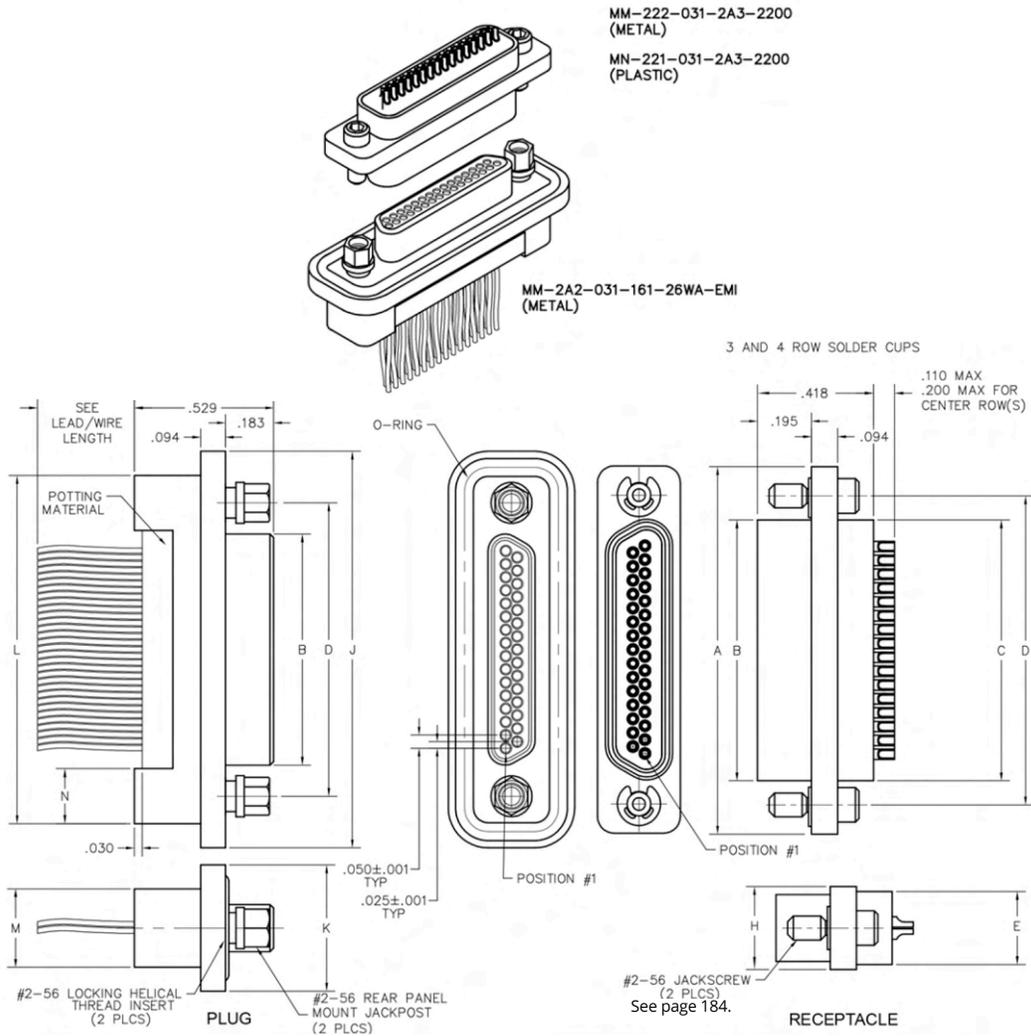
** = Captive hardware is factory installed and non-removable.

[x] Option is not RoHS-compliant

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CABLE-TO-CABLE (REAR PANEL MOUNT)

MM - RUGGED METAL AND MN - RUGGED PLASTIC
0.050" | 9 THROUGH 100 CONTACTS



DIMENSIONS

| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware | J | K | L | M | N |
|------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|-----------------------------------|-------|-------|-------|-------|-------|
| | | | Plug MAX | RCPT MAX | | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA Through) | 0.957 | 0.480 | 0.773 | 0.298 | 0.210 |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | 1.107 | | 0.923 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | 1.257 | | 1.073 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | 1.357 | | 1.173 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | 1.507 | | 1.323 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | 1.657 | | 1.473 | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | 1.657 | 0.523 | 1.477 | 0.440 | 0.239 | |
| 69* | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | | | 1.777 | | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD (0.147 DIA Through) | 2.383 | 0.600 | 2.219 | 0.515 | 0.301 |

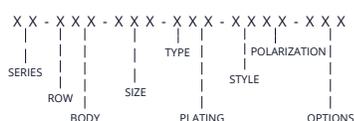
*69 Positon connectors are available in metal only.

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs) |
| | | MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 & 69) | 3 | Three-row (Size 51 & 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| A | Plug, straight, rear panel mount, with fluorosilicone o-ring | 2 | Receptacle, straight, with ears |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 1 | Polyphenylene sulfide (MN only) |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 2 | Polyphenylene sulfide with electroless Ni shell |
| 4 | Polyphenylene sulfide with hard anodized black shell | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| A | Pure electro-deposited aluminum | 4 | Polyphenylene sulfide with hard anodized black shell |
| K | Zinc nickel plating | A | Pure electro-deposited aluminum |
| T | Nickel polymer plating | K | Zinc nickel plating |
| | | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, 26 AWG solder cup | 21 | Socket, straight, 26 AWG solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWG solder cup |
| 1D | Pin, straight, 0.109" Lead Length (0.018 dia) See Note 1 | 2D | Socket, straight, 0.109" Lead Length (0.018 dia) |
| 1E | Pin, straight, 0.125" Lead Length (0.018 dia) See Note 1 | 2E | Socket, straight, 0.125" Lead Length (0.018 dia) |
| 1F | Pin, straight, 0.140" Lead Length (0.018 dia) See Note 1 | 2F | Socket, straight, 0.140" Lead Length (0.018 dia) |
| 12 | Pin, straight, 0.150" Lead Length (0.018 dia) See Note 1 | 22 | Socket, straight, 0.150" Lead Length (0.018 dia) |
| 1G | Pin, straight, 0.156" Lead Length (0.018 dia) See Note 1 | 2G | Socket, straight, 0.156" Lead Length (0.018 dia) |
| 1H | Pin, straight, 0.172" Lead Length (0.018 dia) See Note 1 | 2H | Socket, straight, 0.172" Lead Length (0.018 dia) |
| 1J | Pin, straight, 0.187" Lead Length (0.018 dia) See Note 1 | 2J | Socket, straight, 0.187" Lead Length (0.018 dia) |
| 13 | Pin, straight, 0.250" Lead Length (0.018 dia) See Note 1 | 23 | Socket, straight, 0.250" Lead Length (0.018 dia) |
| 1K | Pin, straight, 0.375" Lead Length (0.018 dia) See Note 1 | 2K | Socket, straight, 0.375" Lead Length (0.018 dia) |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia) See Note 1 | 2L | Socket, straight, 0.500" Lead Length (0.018 dia) |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia) See Note 1 | 2M | Socket, straight, 1.000" Lead Length (0.018 dia) |
| 16 | Pin, straight, stranded wire | 24 | Socket, straight, 0.500" pigtails (0.018 dia) See Note 1 |
| | | 25 | Socket, straight, 1.000" pigtails (0.018 dia) See Note 1 |
| | | 26 | Socket, straight, stranded wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 24 | Two fixed jacknuts, rear panel mount, 0.040" panel thickness (64*) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 26 | Two fixed jacknuts, rear panel mount, 0.060" panel thickness (66*) | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| 28 | Two fixed jacknuts, rear panel mount, 0.070" panel thickness (68*) | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 29 | Two fixed jacknuts, rear panel mount, 0.080" panel thickness (69*) | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| | | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | | | |
| EMI | EMI o-ring (in lieu of fluorosilicone o-ring) | 900 | Interfacial sealing gasket |

PLUG: MM-2A2-031-161-26WA-EMI
RECEPTACLE: MM-222-031-2G3-4500

PLUG: MN-2A2-031-161-26WA-EMI
RECEPTACLE: MN-221-031-2G3-4500



NOTE: The leads on these contacts are soft copper suitable for forming.

* = Use number in parenthesis when ordering size 100.

** = Captive hardware is factory installed and non-removable..

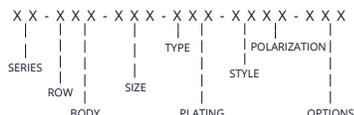
[x] Option is not RoHS-compliant

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|--|
| SERIES | | | |
| MM | 0.050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles) | MK | 0.050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs) |
| MN | 0.050" Rugged Plastic I/O Connector (MN mates with MK, ML, MM, MN receptacles) | | |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 & 69) | 3 | Three-row (Size 51 & 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | C | Receptacle, straight, standard footprint, rear panel mount with fluorosilicone a-ring and interfacial seal |
| BODY MATERIAL | | BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) | | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| A | Pure electro-deposited aluminum | A | Pure electro-deposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 22 | Socket, straight, PCB leads, 0.109" |
| 14 | Pin, straight, 0.500" pigtails (0.018 dia.) | 23 | Socket, straight, PCB leads, 0.140" |
| 15 | Pin, straight, 1.000" pigtails (0.018 dia.) | 24 | Socket, straight, PCB leads, 0.172" |
| 16 | Pin, straight, crimped wire | | |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | | |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 24 | Two fixed jacknuts, rear panel mount, 0.040" panel thickness (64*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 26 | Two fixed jacknuts, rear panel mount, 0.060" panel thickness (66*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | 28 | Two fixed jacknuts, rear panel mount, 0.070" panel thickness (68*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | 29 | Two fixed jacknuts, rear panel mount, 0.080" panel thickness (69*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | | |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | | |
| OPTIONS | | | |
| | | EMI | EMI o-ring (in lieu of fluorosilicone o-ring) |

PLUG: MM-212-031-161-41WQ
RECEPTACLE: MK-2C2-031-235-2600-EMI

PLUG: MN-211-031-161-41WQ
RECEPTACLE: MK-2C2-031-235-2600-EMI



NOTE:

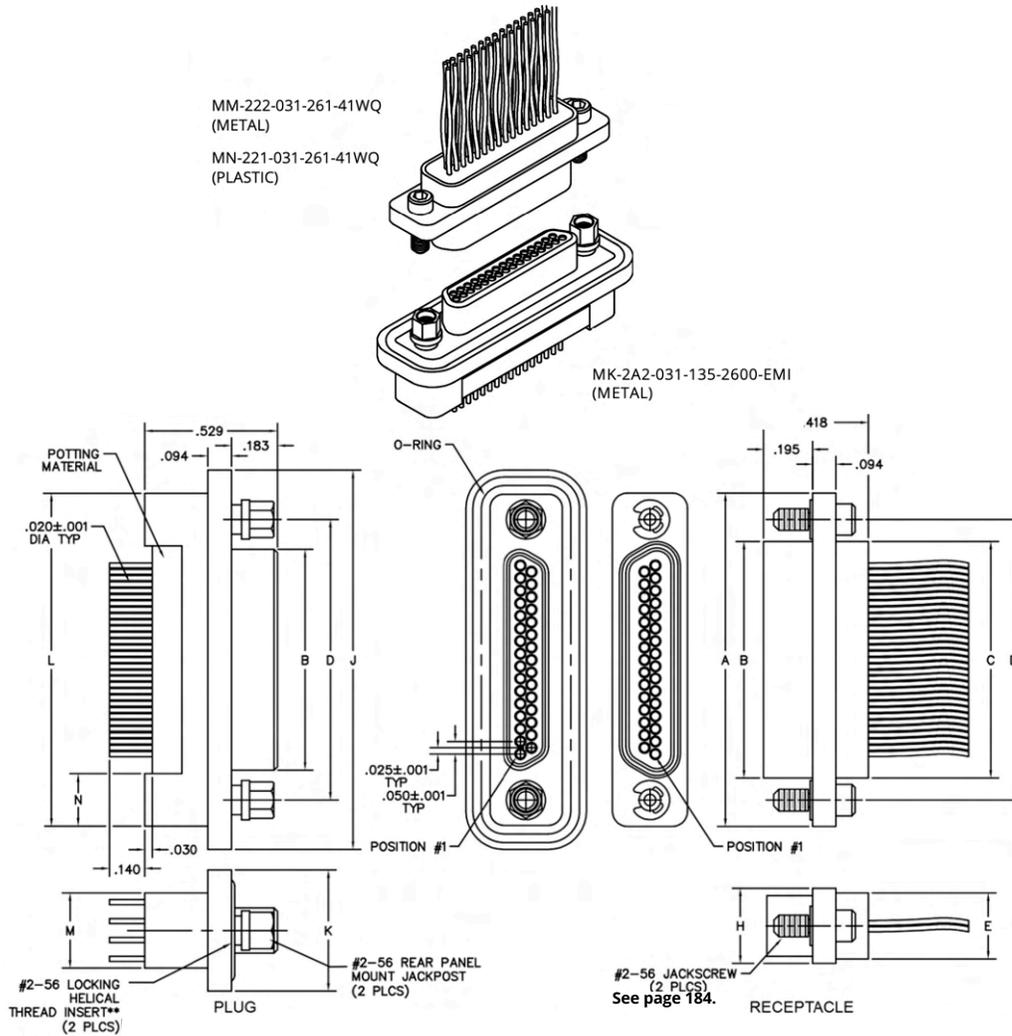
* = Use number in parenthesis when ordering size 100.

** = Captive hardware is factory installed and non-removable.

[x] Option is not RoHS-compliant

CABLE-TO-BOARD (REAR PANEL MOUNT)

MK - RUGGED BOARD MOUNT AND MM & MN - RUGGED CABLE
 0.050" | 9 THROUGH 100 CONTACTS



DIMENSIONS

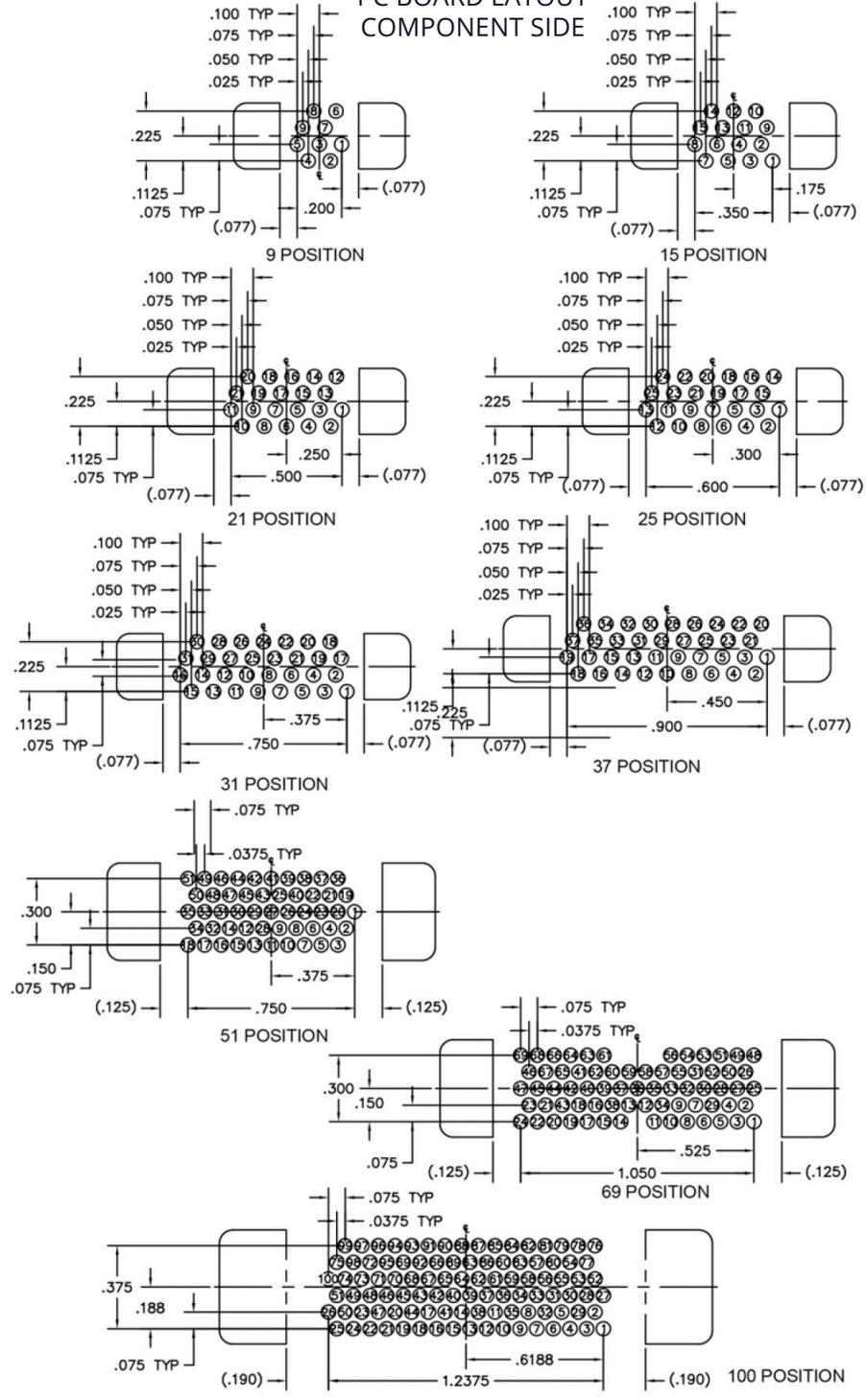
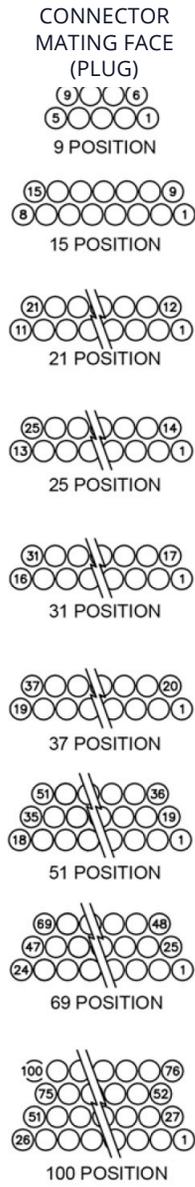
| Size | Contact Row | A | B | | C | D | E | H | Hardware | J | K | L | M | N |
|------|-------------|-------|----------|----------|-------|-------|-------|-------|---------------|-------|-------|-------|-------|-------|
| | | | Plug MAX | RCPT MAX | | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.298 | #2-56 UNC THD | 0.957 | 0.480 | 0.773 | 0.298 | 0.210 |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | 1.107 | | 0.923 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | 1.257 | | 1.073 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | 1.357 | | 1.173 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | 1.507 | | 1.323 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | 1.657 | | 1.473 | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | #2-56 UNC THD | 1.657 | 0.523 | 1.477 | 0.440 | 0.239 |
| 69* | | 1.725 | 1.284 | 1.350 | 1.340 | 1.515 | | | | 1.957 | | 1.777 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | #4-40 UNC THD | 2.383 | 0.600 | 2.219 | 0.515 | 0.301 |

*69 Position connectors are available in metal only.

**Shell accepts 0.200 Max #2-56 screw length (0.295 Max #4-40 screw length).

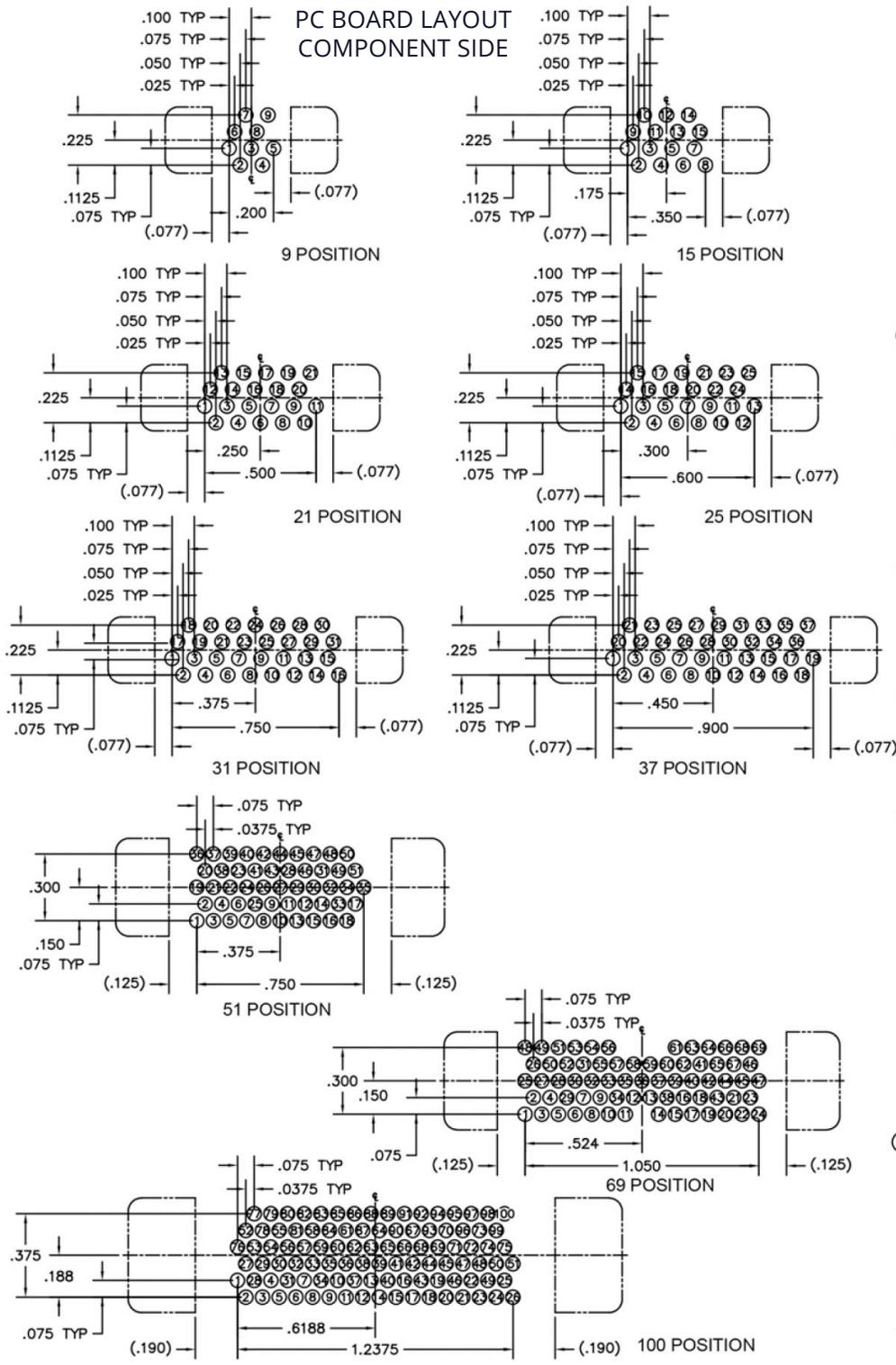
RECOMMENDED PC BOARD LAYOUTS
STRAIGHT, STANDARD FOOTPRINT

PLUG
PC BOARD LAYOUT
COMPONENT SIDE

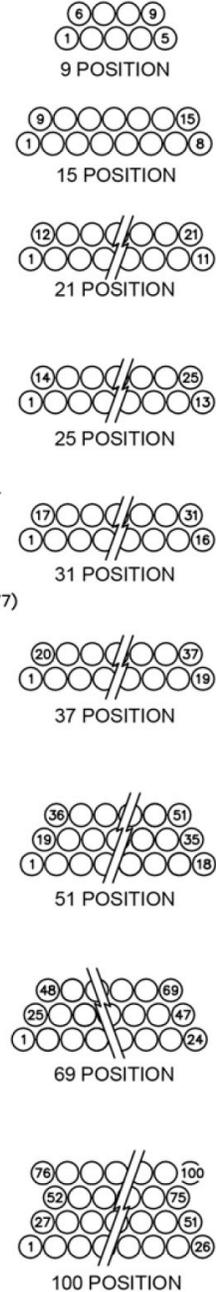


RECOMMENDED PC BOARD LAYOUTS
STRAIGHT, STANDARD FOOTPRINT

RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR
MATING FACE
(RECEPTACLE)

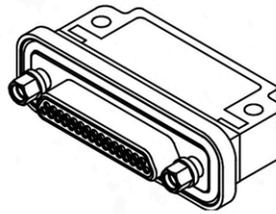


REAR PANEL MOUNT, RIGHT-ANGLE BOARD MOUNT

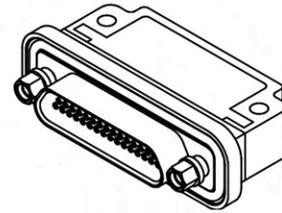
MK

0.050" | 9 THROUGH 100 CONTACTS

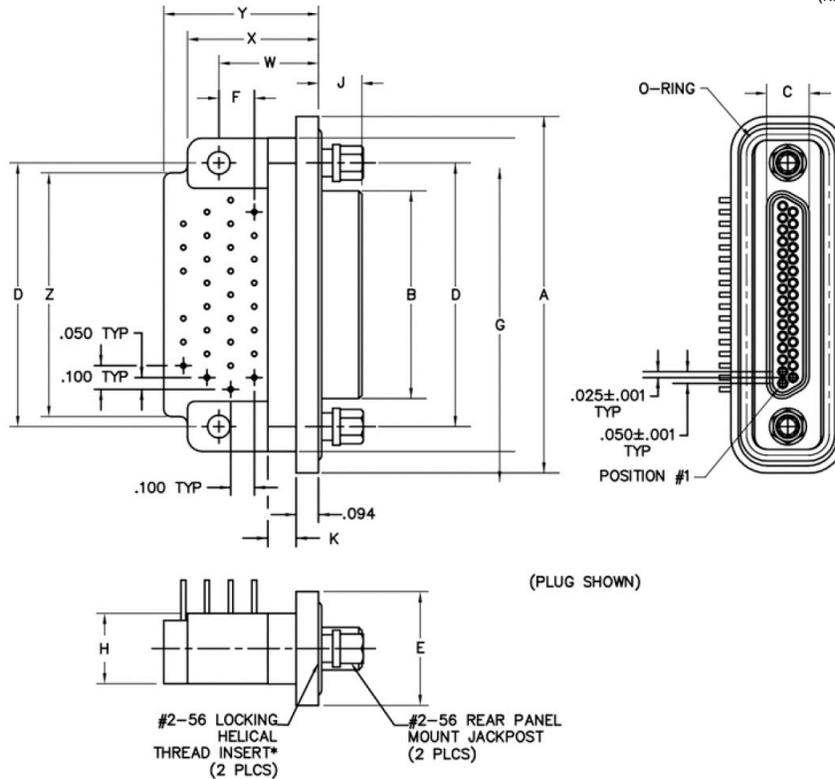
| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MK-2D... | MK, ML, MM, MN receptacles |
| MK-2E... | MK, ML, MM, MN plugs |



MK-2D2-031-335-260S
(PLUG)



MK-2E2-031-445-260S
(RECEPTACLE)

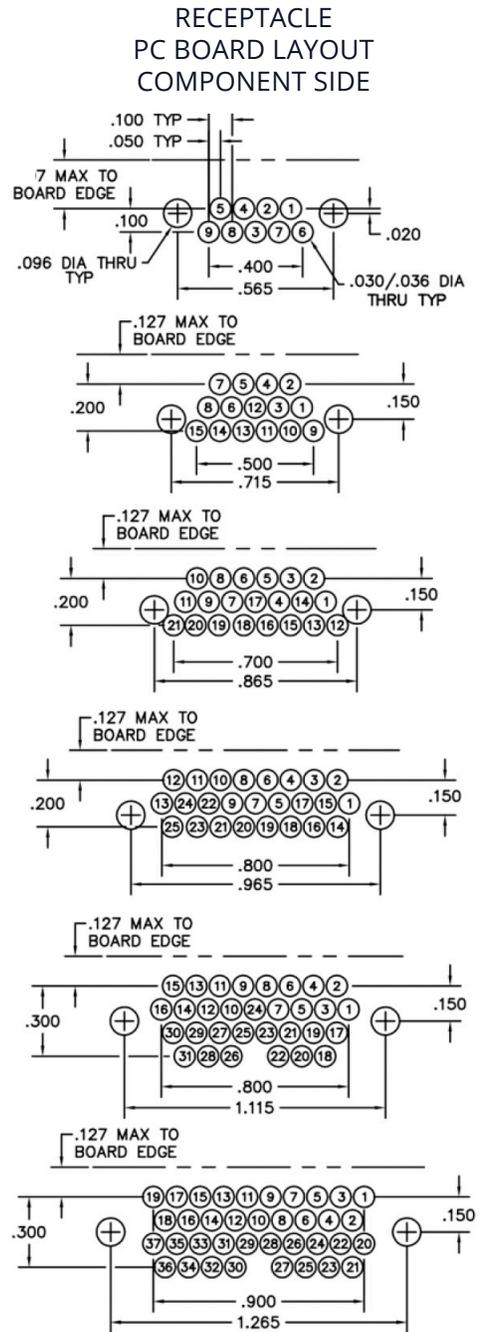
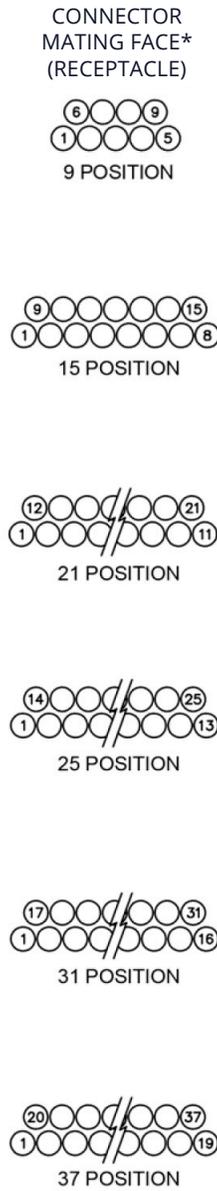
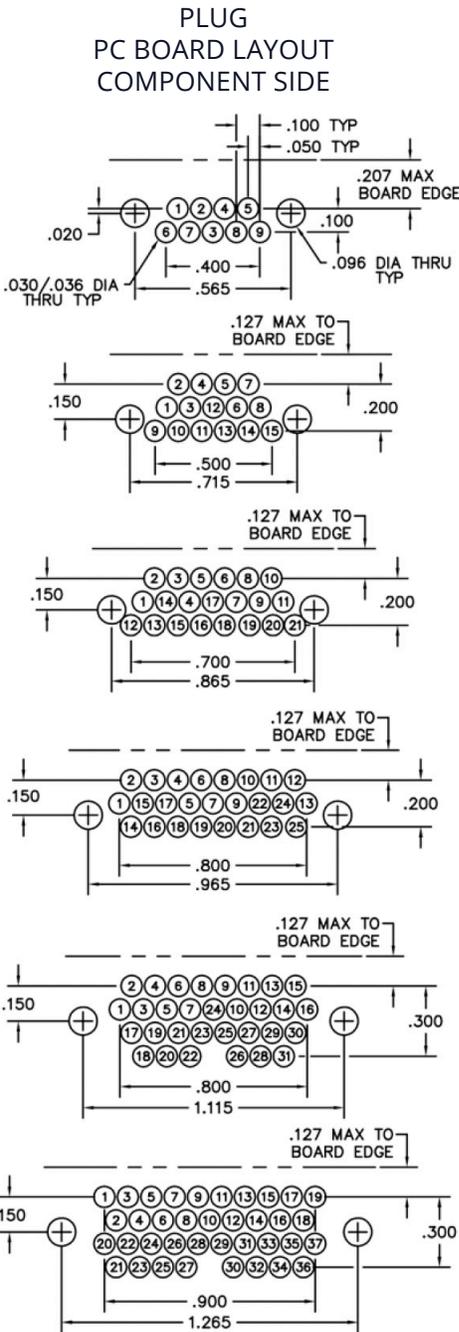
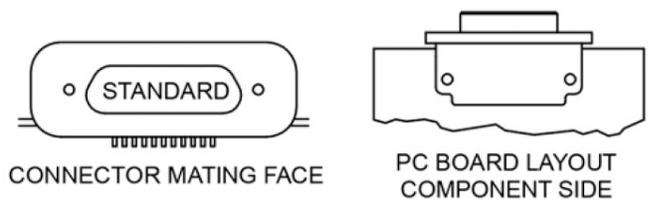


| DIMENSIONS | | | | | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|--|-------|
| Size | Contact Row | A | B | | C | | D | E | F | G | H | J | | K | W | X MAX | Y MAX | Z | Hardware | Mounting Hole | |
| | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | | | Plug | RCPT | | | | | | | | |
| 9 | 2 | 0.957 | 0.334 | 0.400 | 0.185 | 0.251 | 0.565 | 0.480 | 0.020 | 0.775 | 0.298 | 0.183 | 0.195 | 0.120 | 0.371 | 0.540 | 0.540 | 0.775 | #2-56 UNC THD | 0.096 DIA or #2-56 UNC Threaded Insert | |
| 15 | | 1.107 | 0.484 | 0.550 | | | 0.715 | | | | | | | | | | | | | | 0.925 |
| 21 | | 1.257 | 0.634 | 0.700 | | | 0.865 | | | | | | | | | | | | | | 1.075 |
| 25 | | 1.357 | 0.734 | 0.800 | | | 0.965 | | | | | | | | | | | | | | 1.175 |
| 31 | | 1.507 | 0.884 | 0.950 | | | 1.115 | | | | | | | | | | | | | | 1.325 |
| 37 | | 1.657 | 1.034 | 1.100 | | | 1.265 | | | | | | | | | | | | | | 1.475 |
| 51 | 3 | 1.657 | 0.984 | 1.050 | 0.228 | 0.294 | 1.215 | 0.523 | 0.150 | 1.425 | 0.341 | 0.176 | 0.577 | 0.775 | 1.180 | 1.180 | 0.770 | 1.220 | #4-40 UNC THD | 0.125 DIA or #4-40 UNC Threaded Insert | |
| 69 | | 1.957 | 1.284 | 1.350 | | | 1.515 | | | | | | | | | | | | | | 1.725 |
| 100 | 4 | 2.383 | 1.384 | 1.508 | 0.271 | 0.394 | 1.800 | 0.600 | 0.200 | 2.160 | 0.384 | 0.176 | 0.577 | 0.775 | 1.180 | 1.180 | | | #4-40 UNC THD | 0.125 DIA or #4-40 UNC Threaded Insert | |

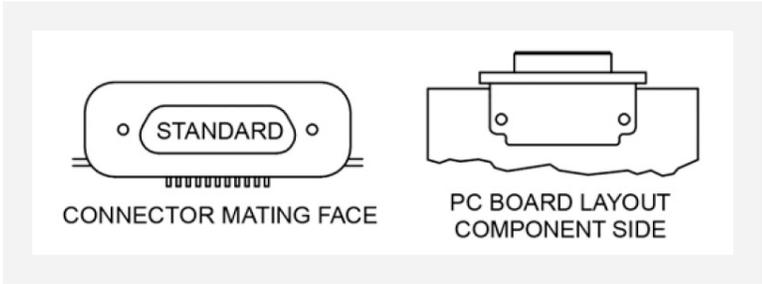
**Shell accepts 0.200 Max #2-56 screw length (0.295 Max #4-40 screw length).



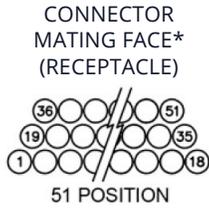
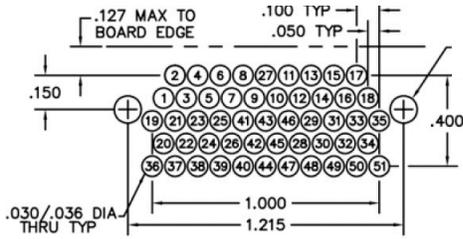
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 REAR PANEL MOUNT
 STANDARD POLARIZATION



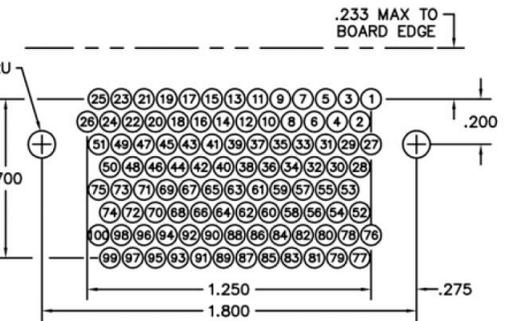
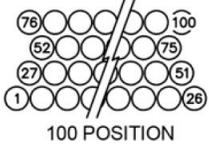
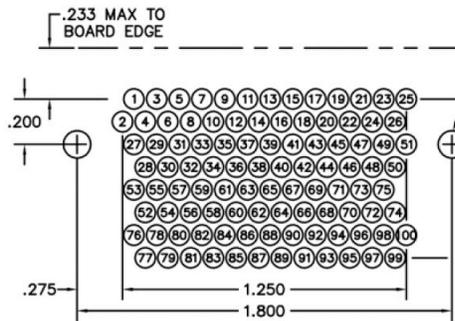
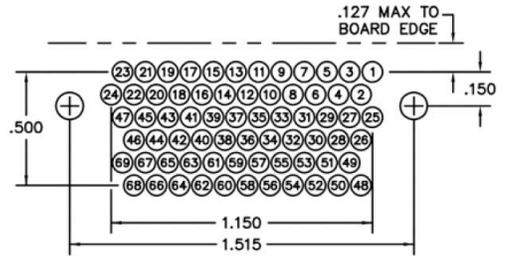
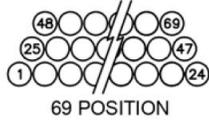
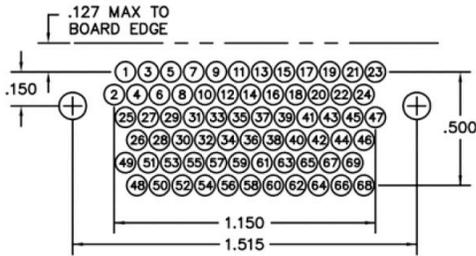
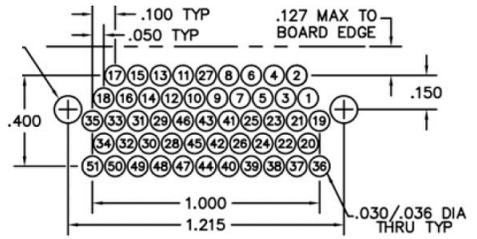
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 REAR PANEL MOUNT
 STANDARD POLARIZATION



PLUG
 PC BOARD LAYOUT
 COMPONENT SIDE



RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE



* For pin (plug) connectors, the contact numbers are reversed left to right.

SPECIFICATIONS – SEALED CONNECTORS MATERIALS AND FINISHES*

| | |
|---|--|
| CONTACTS: | Pins: BeCu alloy strip per ASTM B194 Sockets: Brass per ASTM B16 / B16M or ASTM B453 Uninsulated/solid wire tails: Brass per ASTM B16 / B16M or ASTM B453 |
| CONTACT FINISHES: | Gold plate per ASTM B488 |
| SHELLS: | Aluminum alloy 6061-T6 per SAE AMS-QQ-A-250/11 or 6061-T6511 per SAE AMS-QQ-A-200/8 |
| ALUMINUM SHELL FINISHES: | Electroless nickel per SAE AMS2404, Class 3, 500 µm minimum Electrodeposited Cadmium per SAE AMS-QQ-P-416, type II, class 3 Black anodized per MIL-A-8625, type III, class 2 |
| MOLDED INSULATORS: | Glass-filled polyphenylene sulfide per MIL-M-24519 |
| EMBEDMENT: | Frey Engineering Co. insulating compound CF3003-80 and L-II-49 or equivalent |
| JACKSCREWS, JACKPOSTS AND NUTS: | Corrosion resistant steel per ASTM A320 or ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
| GASKETS: | Interfacial: fluorosilicone per SAE AMS-R-25988 Flange: butyl per SAE AMS3238** Internal: EPDM per ASTM D2000** |
| TOLERANCES: <i>(Unless otherwise specified)</i> | Angles: $\pm 5^\circ$ Decimals: $\pm 0.010''$; Fractions: $\pm 1/64''$ Wire lengths: insulated/stranded = $+1.0''/-0.0''$ uninsulated/solid = $+0.2''/-0.0''$ |

NOTES

Molex can manufacture special configurations for your exact specifications.

*Reference the above listed specifications or an equivalent industry standard when applicable.

**Chemical compatibility of gasket materials must be considered for each application.

Contact Molex for specific application questions.

PERFORMANCE REFERENCE MIL-DTL-83513

| | |
|----------------------------------|--|
| INTERFACE: | Per M83513 |
| CONTACT RATING: | 3-amperes maximum |
| SOLDERABILITY: | Terminals (except crimp) tested in accordance with MIL-STD-202, method 208 |
| WIRE SIZE: | Stranded #24, #26, #28 AWG or solid #25 AWG standard (consult factory for other sizes and types) |
| TEST VOLTAGE: | 600V (RMS) 60 Hz |
| OPERATING TEMPERATURE: | -55° C to +125° C |
| INSULATION RESISTANCE: | 5,000 megohms minimum at 500 VDC |
| DURABILITY: | 500 connector mating cycles |
| VIBRATION: | Tested in accordance with EIA-364-28, condition IV, according to MIL-83513 |
| SHOCK: | Tested in accordance with EIA-364-27, condition E, according to MIL-83513 |
| SALT SPRAY: | Mated connectors tested in accordance with EIA-364-26, test condition B, according to M83513 |
| HUMIDITY: | Mated connectors tested in accordance with EIA-364-31, method IV (except steps 7a and 7b) |
| THERMAL SHOCK: | Tested to the temperature extremes of EIA-364-32, method A, test condition I (except step 3, temperature shall be 100° C) |
| CONTACT RESISTANCE: | 0.065 volt maximum drop at 2.5 Amps (.026 Ohms), according to M83513 |
| CONTACT ENGAGING FORCE: | 6.0 oz. maximum, with 0.0221 diameter test sleeve |
| CONTACT SEPARATING FORCE: | 0.5 oz. minimum, with 0.0230 diameter test sleeve |
| CRIMP STRENGTH: | 5 pound minimum tensile strength |
| SEALING: | 15 PSI per EIA-364-02 at room temperature, 5 minutes with no visible air leaks, positive pressure from wire (back side) of connector. (Body Styles E and H) 30 PSI per EIA-364-02 at room temperature, 5 minutes with no visible air leaks, positive pressure from wire (back side) of connector. (Body Styles K and L) |

NOTES

Molex can manufacture special configurations for your exact specifications.

*Reference the above listed specifications or an equivalent industry standard when applicable.

**When ordering to MIL Spec Part Number, MIL Spec requirements apply.

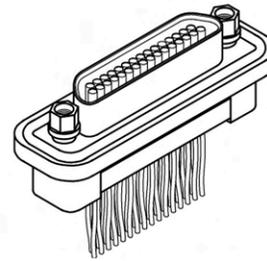
RUGGED METAL I/O (SEALED CONNECTOR)

MM
0.050" | 9 THROUGH 100 CONTACTS

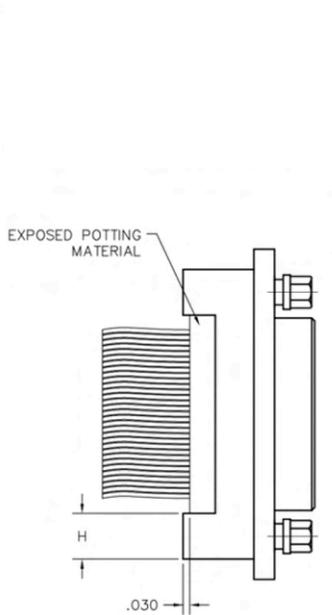
| MATING MATRIX | |
|---------------|----------------------------|
| Connector | Mates With |
| MM-2E... | MK, ML, MM, MN receptacles |
| MM-2H... | MK, ML, MM, MN plugs |
| MM-2K... | MK, ML, MM, MN receptacles |
| MM-2L... | MK, ML, MM, MN plugs |



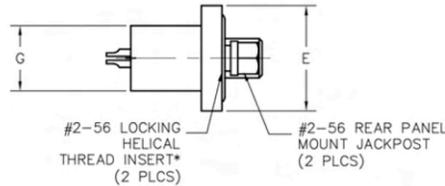
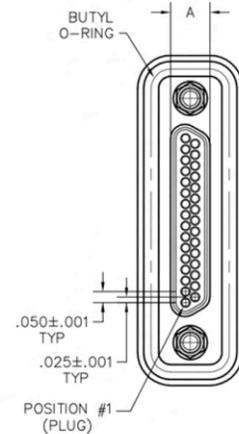
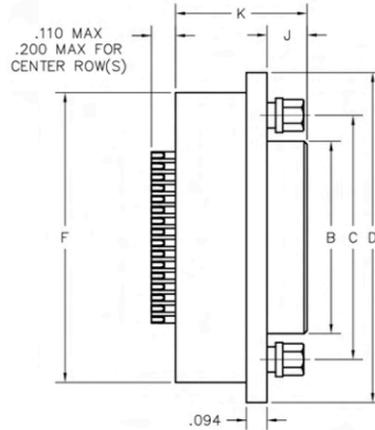
MM-2E-031-161-26WA (PLUG)



MM-2H2-031-261-26WA (RECEPTACLE)



STRANDED WIRE TERMINATION (PLUG SHOWN)



SOLDER CUP OR PIGTAIL TERMINATION (PLUG WITH SOLDER CUP TERMINATION SHOWN)

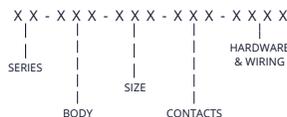
| DIMENSIONS | | | | | | | | | | | | | | | | |
|------------|-------------|----------|----------|----------|----------|-------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Size | Contact Row | A | | B | | C | Hardware | D | E | F | G | H | J | | K | |
| | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | | | | | | | | Plug | RCPT | Plug | RCPT |
| 9 | 2 | 0.180 | 0.251 | 0.334 | 0.400 | 0.565 | 2-56 UNC THD | 0.957 | 0.480 | 0.773 | 0.298 | 0.210 | 0.183 | 0.195 | 0.598 | 0.610 |
| 15 | | | | 0.484 | 0.550 | 0.715 | | 1.107 | | 0.923 | | | | | | |
| 21 | | | | 0.634 | 0.700 | 0.865 | | 1.257 | | 1.073 | | | | | | |
| 25 | | | | 0.734 | 0.800 | 0.965 | | 1.357 | | 1.173 | | | | | | |
| 31 | | | | 0.884 | 0.950 | 1.115 | | 1.507 | | 1.323 | | | | | | |
| 37 | | | | 1.034 | 1.100 | 1.265 | | 1.657 | | 1.473 | | | | | | |
| 51 | 3 | 0.228 | 0.294 | 0.984 | 1.050 | 1.215 | #4-40 UNC THD | 1.657 | 0.523 | 1.477 | 0.440 | 0.239 | 0.183 | 0.195 | 0.598 | 0.610 |
| 69 | | | | 1.284 | 1.350 | 1.515 | | 1.957 | | 1.777 | | | | | | |
| 100 | 4 | 0.271 | 0.394 | 1.384 | 1.508 | 1.800 | #4-40 UNC THD | 2.383 | 0.600 | 2.219 | 0.515 | 0.301 | 0.183 | 0.195 | 0.598 | 0.610 |

** Shell accepts 0.200 Max #2-56 screw length (0.295 Max #4-40 screw length).

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|--|---|-----------------------------------|---|
| SERIES | | | |
| MM | 0.050" " Rugged Metal I/O Connector | MM | 0.050" Rugged Metal I/O Connector |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51 & 69) | 3 | Three-row (Size 51 & 69) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| E | Plug, straight, rear panel mount. Sealed to 15 PSI pressure differential. | H | Receptacle, straight, rear panel mount, with fluorosilicone interfacial seal. Sealed to 15 PSI pressure differential. |
| K | Plug, straight, rear panel mount. Sealed to 30 PSI pressure differential. | L | Receptacle, straight, rear panel mount, with fluorosilicone interfacial seal. Sealed to 30 PSI pressure differential. |
| <i>All seal ratings are in the unmated condition</i> | | | |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Polyphenylene sulfide with electroless Ni shell | 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] | 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell | 4 | Polyphenylene sulfide with hard anodized black shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, solder cup | 21 | Socket, straight, solder cup |
| 14 | Pin, straight, .500" pigtails (0.018 dia.) | 24 | Socket, straight, .500" pigtails (0.018 dia.) |
| 16 | Pin, straight, stranded wire | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (stranded wire) [x] | 1 | 50 µm Au contacts (stranded wire) [x] |
| 3 | 50 µm Au contacts: Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: Au terminations (solder cup, pigtail) |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations (pigtail) [x] |
| 7 | 50 µm Au contacts: SAC305 terminations (pigtail) | 7 | 50 µm Au contacts: SAC305 terminations (pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 24 | Two fixed jacknuts, rear panel mount, 0.040" panel thickness (64*) | 24 | Two fixed jacknuts, rear panel mount, 0.040" panel thickness (64*) |
| 26 | Two fixed jacknuts, rear panel mount, 0.060" panel thickness (66*) | 26 | Two fixed jacknuts, rear panel mount, 0.060" panel thickness (66*) |
| 28 | Two fixed jacknuts, rear panel mount, 0.070" panel thickness (68*) | 28 | Two fixed jacknuts, rear panel mount, 0.070" panel thickness (68*) |
| 29 | Two fixed jacknuts, rear panel mount, 0.080" panel thickness (69*) | 29 | Two fixed jacknuts, rear panel mount, 0.080" panel thickness (69*) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None (solder cup and pigtail only) | 00 | None (solder cup and pigtail only) |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG: MM-2E2-031-161-26WA
 RECEPTACLE: MM-2H2-031-261-26WA



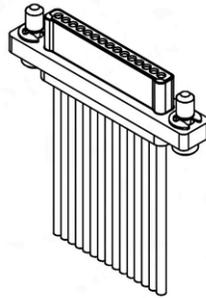
NOTE:
 * = Use number in parenthesis when ordering size 100.
[x] Option is not RoHS-compliant

ONE ROW CABLE-TO-CABLE RUGGED METAL I/O CONNECTORS

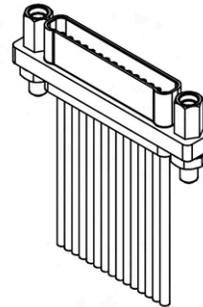
MM

0.050" | 4 THROUGH 25 CONTACTS

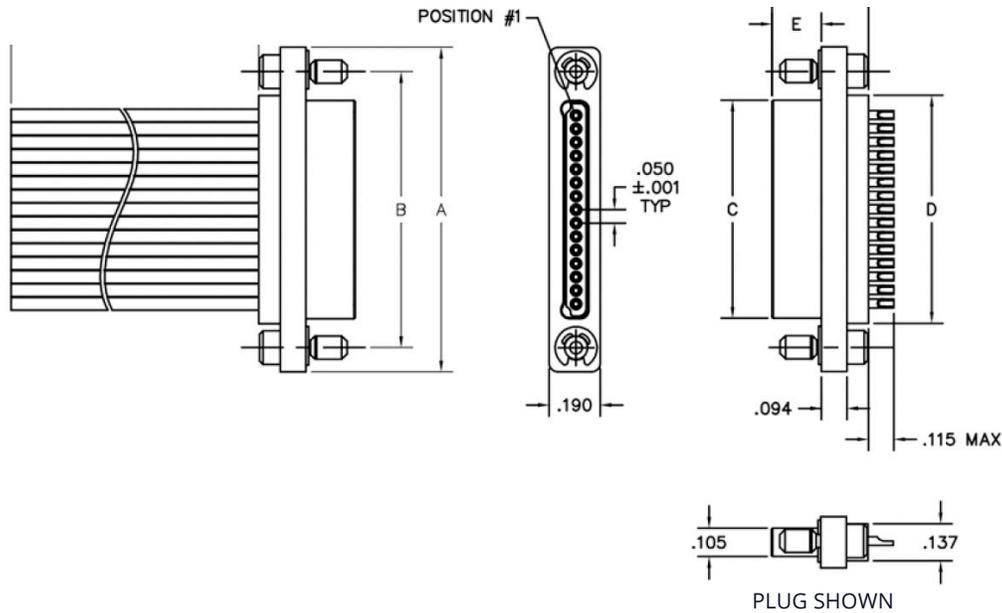
| MATING MATRIX | |
|---------------|---------------------------------|
| Connector | Mates With |
| MM-11.. | MM-12, MK-16, MK-18 receptacles |
| MM-12... | MM-11, MK-15, MK-17 plugs |



MM-112-015-161-41WO
(PLUG)



MM-122-015-261-22WO
(RECEPTACLE)



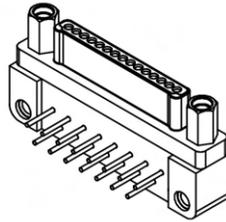
| DIMENSIONS | | | | | | | | | | |
|------------|-------|-------|----------|----------|-------|----------|----------|----------|----------|--------------------------------------|
| Size | A | B | C | | D | E | | F | | Hardware |
| | | | Plug MAX | RCPT MAX | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | |
| 4 | 0.655 | 0.475 | 0.260 | 0.297 | 0.297 | 0.M-161 | 0.198 | 0.358 | 0.370 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 5 | 0.705 | 0.525 | 0.310 | 0.347 | 0.347 | | | | | |
| 6 | 0.755 | 0.575 | 0.360 | 0.397 | 0.397 | | | | | |
| 9 | 0.905 | 0.725 | 0.510 | 0.547 | 0.547 | | | | | |
| 12 | 1.055 | 0.875 | 0.660 | 0.697 | 0.697 | | | | | |
| 15 | 1.205 | 1.025 | 0.810 | 0.847 | 0.847 | | | | | |
| 21 | 1.505 | 1.325 | 1.110 | 1.147 | 1.147 | | | | | |
| 25 | 1.705 | 1.525 | 1.310 | 1.347 | 1.347 | | | | | |

ONE ROW RIGHT-ANGLE PTH CONNECTORS

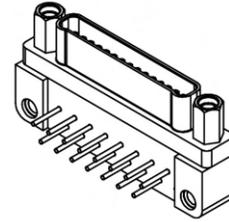
MK

0.050" | 4 THROUGH 25 CONTACTS

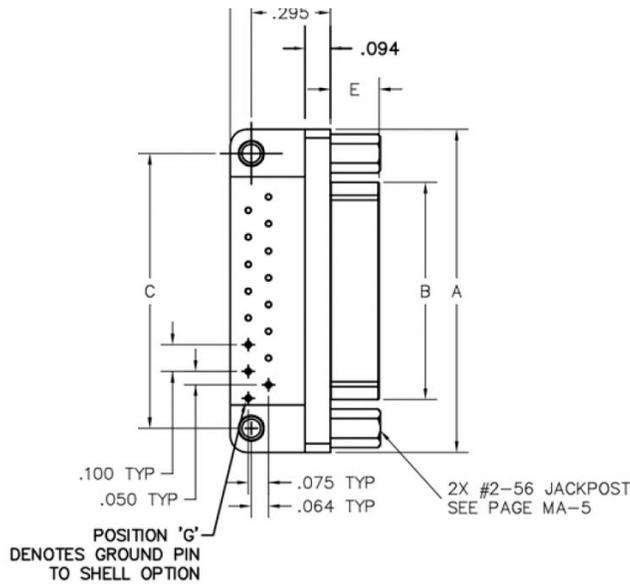
| MATING MATRIX | |
|---------------|--------------------------|
| Connector | Mates With |
| MK-15... | MM-12, MK-18 receptacles |
| MK-16... | MM-11, MK-17 plugs |



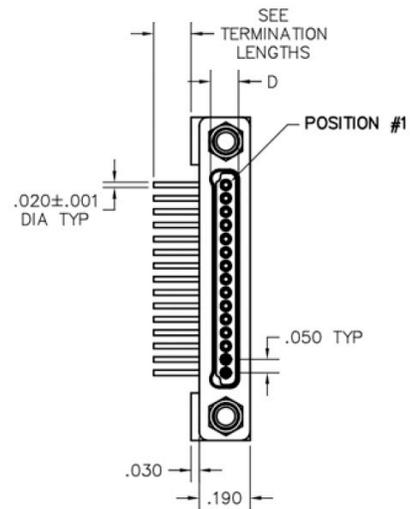
MK-152-015-325-2205
(PLUG)



MK-162-015-435-2205
(RECEPTACLE)

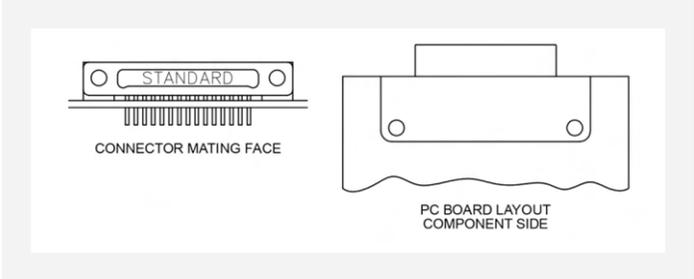


PLUG SHOWN

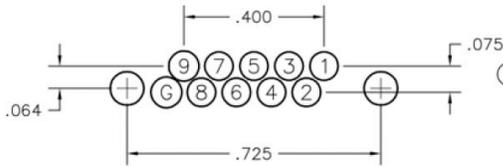
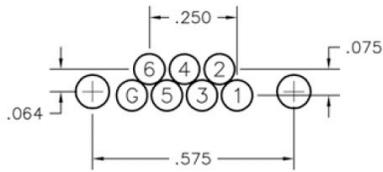
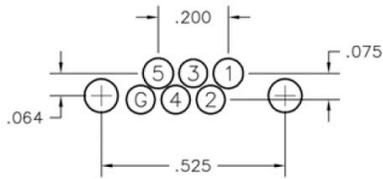
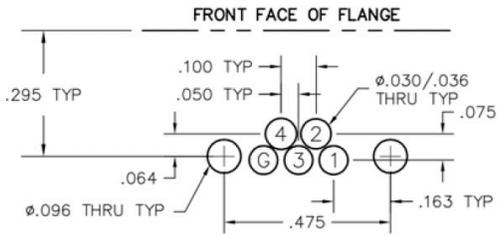


| DIMENSIONS | | | | | | | | | |
|------------|-------|----------|----------|-------|----------|----------|----------|----------|--|
| Size | A | B | | C | D | | E | | Mounting Hole |
| | | Plug MAX | RCPT MAX | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | |
| 4 | 0.655 | 0.260 | 0.297 | 0.475 | 0.110 | 0.142 | 0.M-161 | 0.198 | #2-56 Clearance Through or #2-56 UNC THD Threaded Insert |
| 5 | 0.705 | 0.310 | 0.347 | 0.525 | | | | | |
| 6 | 0.755 | 0.360 | 0.397 | 0.575 | | | | | |
| 9 | 0.905 | 0.510 | 0.547 | 0.725 | | | | | |
| 12 | 1.055 | 0.660 | 0.697 | 0.875 | | | | | |
| 15 | 1.205 | 0.810 | 0.847 | 1.025 | | | | | |
| 21 | 1.505 | 1.110 | 1.147 | 1.325 | | | | | |
| 25 | 1.705 | 1.310 | 1.347 | 1.525 | | | | | |

RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE
 STANDARD POLARIZATION
 POSITIONS FOUR THROUGH 9



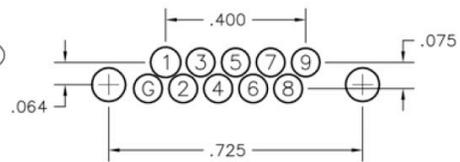
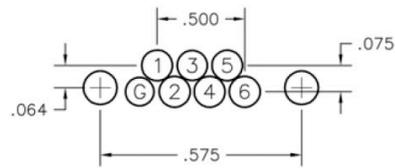
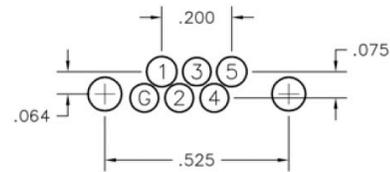
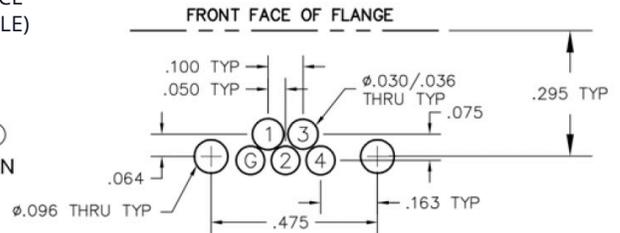
**PLUG
 PC BOARD LAYOUT
 COMPONENT SIDE**



**CONNECTOR
 MATING FACE*
 (RECEPTACLE)**

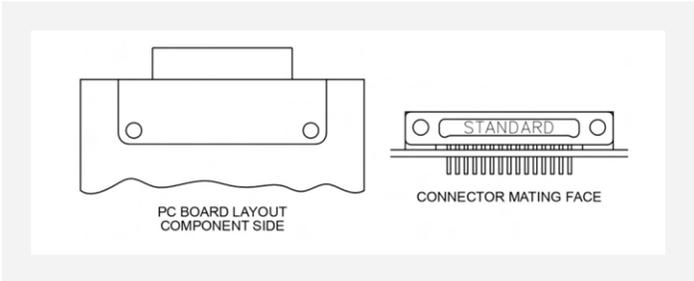


**RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE**

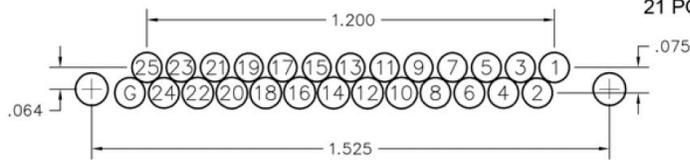
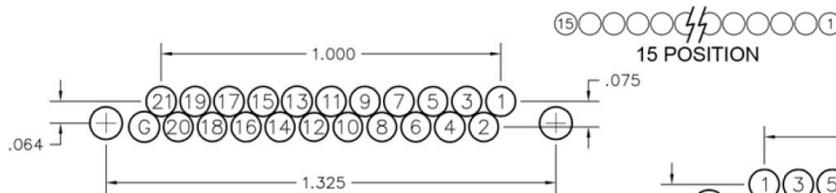
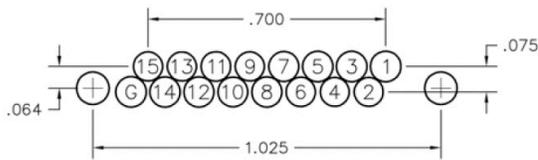
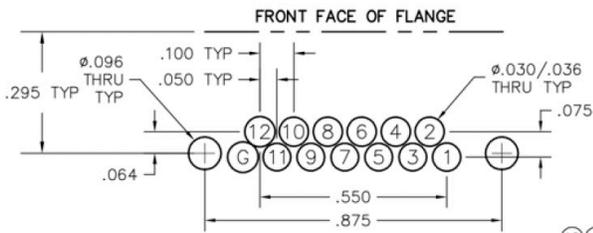


RECOMMENDED PC BOARD LAYOUTS

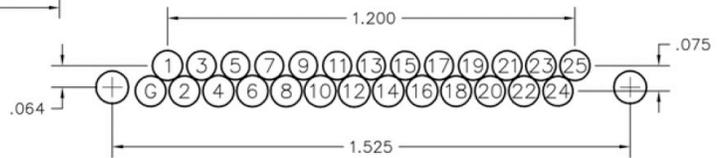
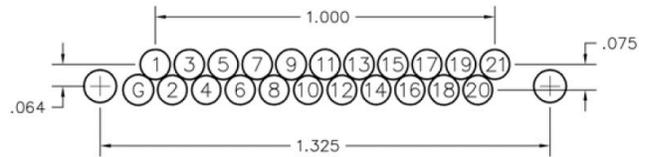
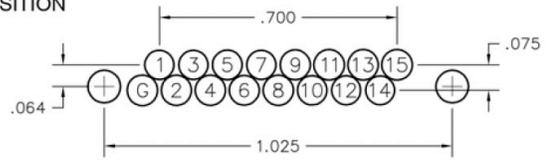
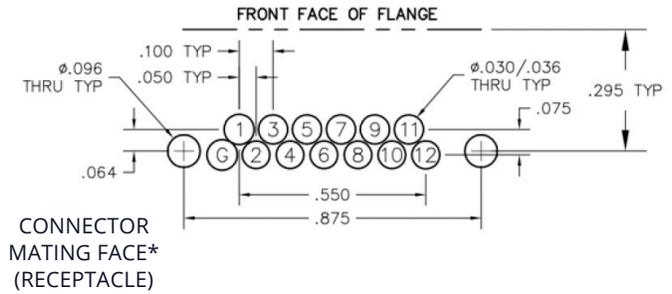
RIGHT-ANGLE
STANDARD POLARIZATION
POSITIONS 12 THROUGH 25



PLUG PC BOARD LAYOUT COMPONENT SIDE



RECEPTACLE PC BOARD LAYOUT COMPONENT SIDE

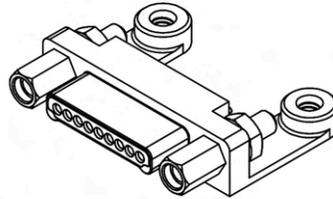


HORIZONTAL SURFACE MOUNT (ONE-ROW)

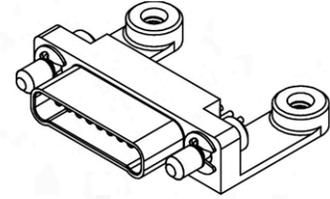
MK

0.050" | 4 THROUGH 25 CONTACTS

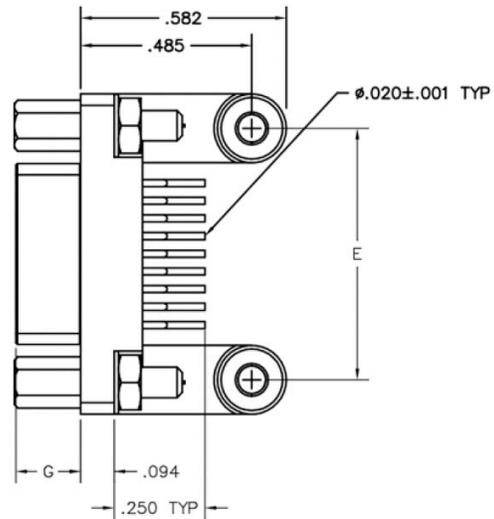
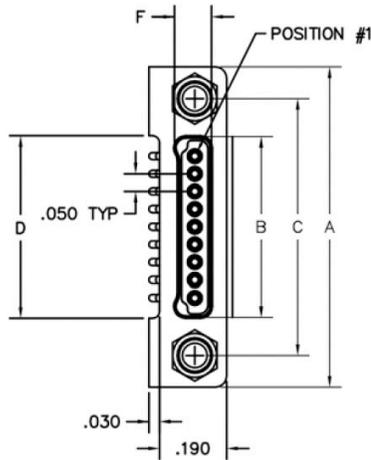
| MATING MATRIX | |
|---------------|--------------------------|
| Connector | Mates With |
| MK-17... | MM-12, MK-18 receptacles |
| MK-18... | MM-11, MK-17 plugs |



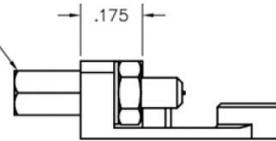
MK-172-009-175-220S
(PLUG)



MK-182-009-275-410S
(RECEPTACLE)



2X #2-56 JACKPOST
SEE PAGE MA-5



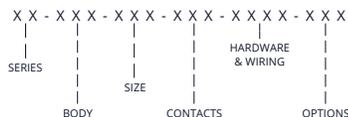
PLUG SHOWN

| DIMENSIONS | | | | | | | | | | | |
|------------|-------|----------|----------|-------|--------|-------|----------|----------|----------|----------|------------------------------|
| Size | A | B | | C | D | E | F | | G | | Mounting Hole |
| | | Plug MAX | RCPT MAX | | | | Plug MAX | RCPT MAX | Plug MAX | RCPT MAX | |
| 4 | 0.655 | 0.260 | 0.297 | 0.475 | 0.265 | 0.460 | 0.110 | 0.142 | 0.M-161 | 0.198 | #2-56 Threaded Through |
| 5 | 0.705 | 0.310 | 0.347 | 0.525 | 0.315 | 0.510 | | | | | |
| 6 | 0.755 | 0.360 | 0.397 | 0.575 | 0.365 | 0.560 | | | | | |
| 9 | 0.905 | 0.510 | 0.547 | 0.725 | 0.515 | 0.710 | | | | | |
| 12 | 1.055 | 0.660 | 0.697 | 0.875 | 0.665 | 0.860 | | | | | |
| 15 | 1.205 | 0.810 | 0.847 | 1.025 | 0.815 | 1.010 | | | | | |
| 21 | 1.505 | 1.110 | 1.147 | 1.325 | 1.115 | 1.310 | | | | | |
| 25 | 1.705 | 1.310 | 1.347 | 1.525 | 1.5315 | 1.510 | | | | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MK | 0.050" Rugged Metal Horizontal SMT Connector (MK mates to MK and MM) | MK | 0.050" Rugged Metal Horizontal SMT Connector (MK mates to MK and MM) |
| BODY | | | |
| 1 | 1-Row (Sizes 4 through 25) | 1 | 1-Row (Sizes 4 through 25) |
| BODY STYLE | | BODY STYLE | |
| 7 | Plug, horizontal SMT | 8 | Receptacle, horizontal SMT |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | Electroless Ni shell with PPS insert | 2 | Electroless Ni shell with PPS insert |
| 3 | Electrodeposited cadmium shell with PPS insert [x] | 3 | Electrodeposited cadmium shell with PPS insert [x] |
| 5 | Stainless steel shell with PPS insert | 5 | Stainless steel shell with PPS insert |
| A | Pure electrodeposited aluminum | A | Pure electrodeposited aluminum |
| K | Zinc nickel plating | K | Zinc nickel plating |
| T | Nickel polymer plating | T | Nickel polymer plating |
| SIZE | | | |
| XXX | 004, 005, 006, 009, 012, 015, 021, 025 | XXX | 004, 005, 006, 009, 012, 015, 021, 025 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 17 | Pin, surface mount | 27 | Socket, surface mount |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: Au terminations | 3 | 50 µm Au contacts: Au terminations |
| 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] | 5 | 50 µm Au contacts: Sn/Pb alloy terminations [x] |
| 7 | 50 µm Au contacts: SAC305 terminations | 7 | 50 µm Au contacts: SAC305 terminations |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring | 41 | Two turning jackscrews, Allen head, retaining ring |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OS | Standard body polarization | OS | Standard body polarization |
| OPTIONS | | | |
| | | 900 | Interfacial Seal |

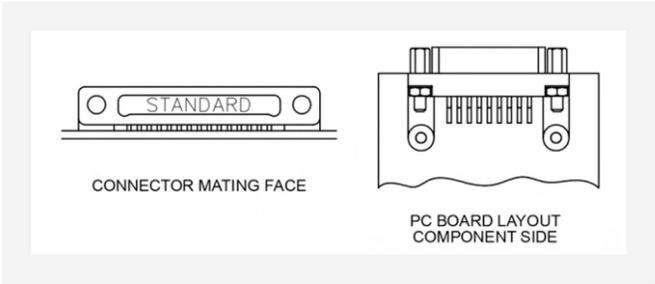
PLUG: MK-172-006-175-220S
 RECEPTACLE: MK-182-006-275-410S



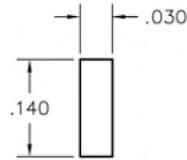
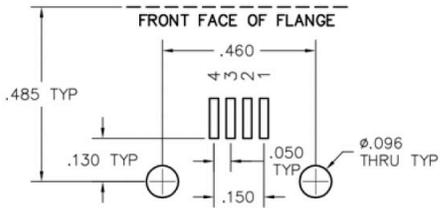
NOTE:
[x] Option is not RoHS-compliant

RECOMMENDED PC BOARD LAYOUTS

HORIZONTAL SMT
ONE ROW
POSITIONS FOUR THROUGH 9

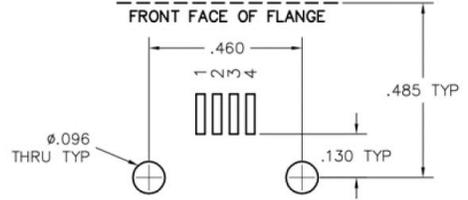


PLUG
PC BOARD LAYOUT
COMPONENT SIDE

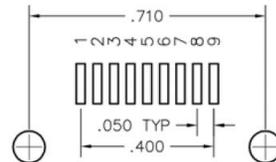
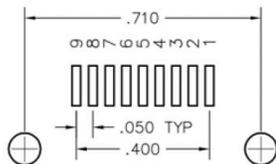
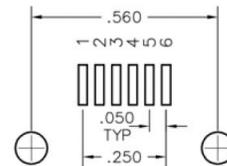
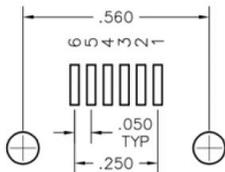
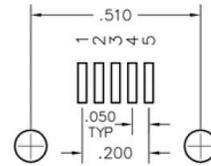
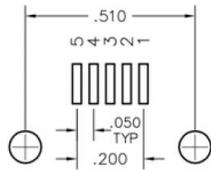


FOOTPRINT/PAD
CONFIGURATION

RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE

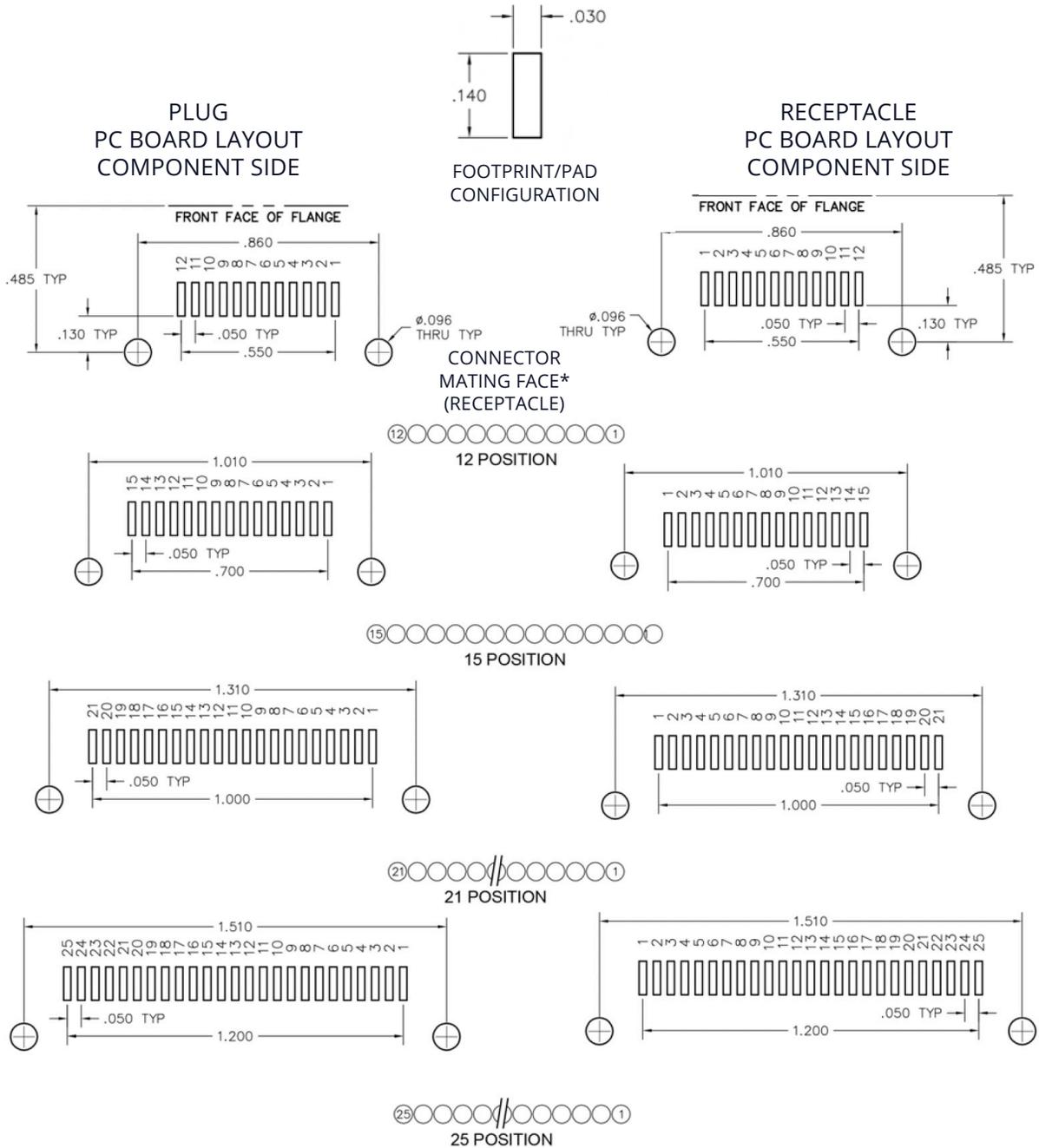
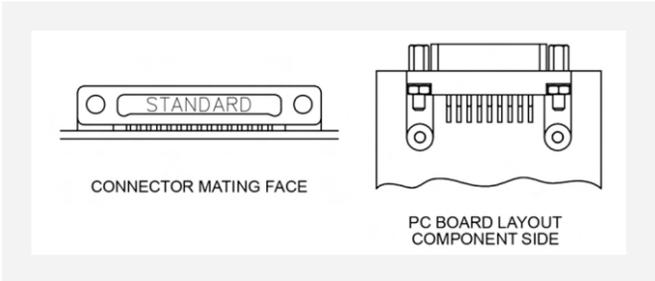


CONNECTOR
MATING FACE*
(RECEPTACLE)



RECOMMENDED PC BOARD LAYOUTS

HORIZONTAL SMT
ONE ROW
POSITIONS FOUR THROUGH 9



AIRBORN M SERIES ACCESSORIES

TABLE OF CONTENTS

AirBorn M Series - Hardware, Contacts and Accessories

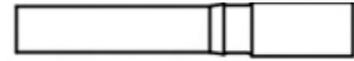
| | |
|--|---------------|
| Contacts, Contact Positions | M-157 |
| AirBorn M Series Wire Codes | M-158 – M-159 |
| Hardware - MM - MN - MQ - MP - MMHT - MQHT Jacking Hardware..... | M-160 |
| Polarized Keying Hardware | M-161 |
| MM - MQ I/O with EMI/RFI Backshell, MM - MK Rear Panel Mount Jackposts..... | M-162 |
| MK - Vertical SMT, MK - MS MKHT - MSHT, MTHT, MA, Mounting Brackets..... | M-163 |
| Twisted Pair Wire Connect Charts | M-164 |
| Hardware - Panel Mounting Dimensions, Panel Mounting Dimensions for Rear Panel Mount Connectors..... | M-165 |
| MM - MN Rugged Metal and Rugged Plastic Connector Savers..... | M-166 |
| MQ - MP Low-Profile Metal and Low-Profile Plastic Connector Savers..... | M-168 |
| MM - MM EMI/ RFI Straight Backshells..... | M-170 |
| MM - MM Rugged Metal 45° Backshells | M-172 |
| MM - MM Rugged Metal 90° Backshells | M-174 |
| MQ - MQ Low-Profile Metal EMI/RFI Straight Backshells | M-176 |
| MD - MD Rugged Metal Dust Covers | M-178 |
| MD - MD Rugged Metal Low-Profile Plastic ESD Dust Covers | M-180 |
| O-Rings and Gaskets | M-181 |
| MM, MN, MQ, MP - Rear Panel Mount Hardware for Standard I/O, Hardware for Non-Standard I/O | M-182 |
| Hardware - Panel Mounting Dimensions for Receptacles with Grounding Fingers | M-183 |
| C-Clip Hardware - MM - MN - MQ - MP - MMHT - MQHT Jacking Hardware..... | M-184 |

CONTACTS

CONTACT

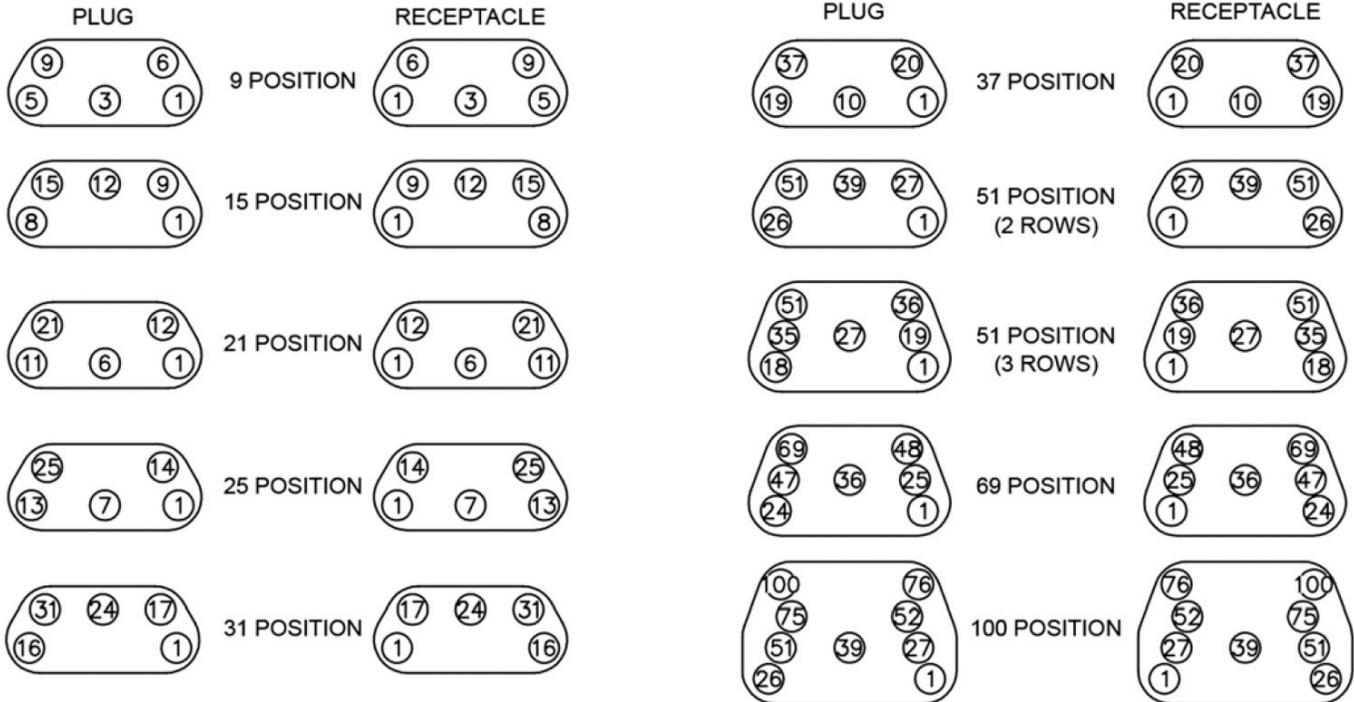


**PIN CONTACT
WITH CRIMP BARREL**

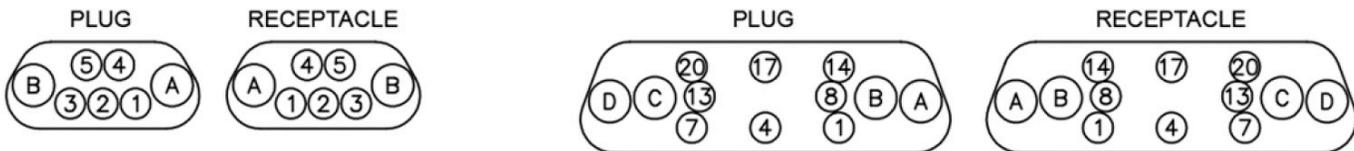


**SOCKET CONTACT
WITH CRIMP BARREL**

CONTACT POSITIONS



HYBRID CONNECTORS



Note: Numbers indicate corner and centermost contacts. Views shown are mating face.

CONNECTOR POLARIZATION



Note: Polarization option applies to PC board mounted, right-angle connectors. (Series MK, ML, MR and MS)
Only standard polarization option applies to PC board mounted, right-angle, high-temperature connectors. (Series MKHT, MSHT and MHT)

WIRE CODES – AIRBORN M SERIES

NEMA HP3-EXBEB (Formerly M16878/4-24 TFE 7 strand)

| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
|--------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| MIL-STD-681* | WA | WB | WC | UD | UE | WO | UG | UH | UJ | UK | UL | UM | UN | UP | UQ | UR |
| WHITE | WE | WF | WG | VD | VE | WH | VG | VH | VJ | VK | VL | VM | VN | VP | VQ | VR |
| YELLOW | WJ | WK | WL | | | WM | | | | | | | | | | |

NEMA HP3-EXBDB (Formerly M16878/4-26 TFE 7 strand)

| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
|--------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| MIL-STD-681* | WN | WP | WQ | YD | YE | WR | YG | YH | YJ | YK | YL | YM | YN | YP | YQ | YR |
| WHITE | WS | WT | WU | ZD | ZE | WV | ZG | ZH | ZJ | ZK | ZL | ZM | ZN | ZP | ZQ | ZR |
| YELLOW | WW | WX | WY | | | WZ | | | | | | | | | | |

NEMA HP3-EXBCB (Formerly M16878/4-28 TFE 7 strand)

| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
|--------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| MIL-STD-681* | XA | XB | XC | 10 | 1E | XO | 1G | 1H | 1J | 1K | 1L | 1M | 1N | 1P | 1Q | 1R |
| WHITE | XE | XF | XG | 20 | 2E | XH | 2G | 2H | 2J | 2K | 2L | 2M | 2N | 2P | 2Q | 2R |
| YELLOW | XJ | XK | XL | | | XM | | | | | | | | | | |

TWISTED PAIR PER NEMA WC27500-XXRC2U00 (SAE AS22759/11)

| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
|--------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 24 AWG | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | AN | AP | AQ | AR |
| 26 AWG | BA | BB | BC | BO | BE | BF | BG | BH | BJ | BK | BL | BM | BN | BP | BQ | BR |

TWISTED PAIR PER NEMA WC27500-XXSC2U00 (SAE AS22759/33)*** [x]

| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
|--------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| 24 AWG | JA | JB | JC | JD | JE | JF | JG | JH | JJ | JK | JL | JM | JN | JP | JQ | JR |
| 26 AWG | KA | KB | KC | KO | KE | KF | KG | KH | KJ | KK | KL | KM | KN | KP | KQ | KR |

NOTES

* Connectors with more than 100 contacts will repeat color coding after 100 colors

*** Per M83513, corrosion has been experienced on connectors that are pre-wired with 22759/33 and stored in sealed environments. Caution should be exercised when using this wire.

[x] Option is not RoHS-compliant

For twisted pair wire connect charts, see page M-164.

Twisted pair wire not available on MA, MC or Hybrid connectors

WIRE CODES – AIRBORN M SERIES

| SAE AS22759/11-24 | | | | | | | | | | | | | | | | |
|-------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
| M83513** | 5A | 5B | 5C | 5D | 5E | 5F | 5G | 5H | 5J | 5K | 5L | 5M | 5N | 5P | 5Q | 5R |
| MIL-STD-681* | CA | CB | CC | CD | CE | CF | CG | CH | CJ | CK | CL | CM | CN | CP | CQ | CR |
| WHITE | DA | DB | DC | DD | DE | DF | DG | DH | DJ | DK | DL | DM | DN | DP | DQ | DR |

| SAE AS22759/11-26 | | | | | | | | | | | | | | | | |
|-------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
| M83513** | 6A | 6B | V1 | 6D | 6E | V2 | 6G | 6H | 6J | 6K | 6L | Y6 | 6N | 6P | 6Q | 6R |
| MIL-STD-681* | X3 | X4 | W3 | ED | EE | W4 | EG | EH | EJ | EK | EL | EM | EN | EP | EQ | ER |
| WHITE | X1 | X2 | W1 | FD | FE | W2 | FG | FH | FJ | FK | FL | Y5 | FN | FP | FQ | FR |

| SAE AS22759/33-24*** [x] | | | | | | | | | | | | | | | | |
|--------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
| M83513** | LA | LB | LC | LO | LE | LF | LG | LH | LJ | LK | LL | LM | LN | LP | LQ | LR |
| WHITE | MA | MB | MC | MD | ME | MF | MG | MH | MJ | MK | ML | MM | MN | MP | MQ | MR |

| SAE AS22759/33-26*** [x] | | | | | | | | | | | | | | | | |
|--------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
| M83513** | NA | NB | Y3 | ND | NE | Y4 | NG | NH | NJ | NK | NL | Y8 | NN | NP | NQ | NR |
| WHITE | PA | PB | Y1 | PD | PE | Y2 | PG | PH | PJ | PK | PL | Y7 | PN | PP | PQ | PR |

NOTES

* Connectors with more than 100 contacts will repeat color code after 100 colors.

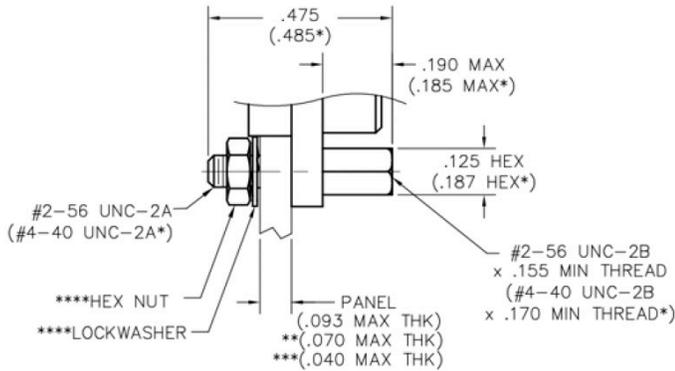
** Wire colors per M83513 are ten solid colors repeating.

*** Per M83513, corrosion has been experienced on connectors that are pre-wired with 22759/33 and stored in sealed environments. Caution should be exercised when using this wire.

[x] Option is not RoHS-compliant

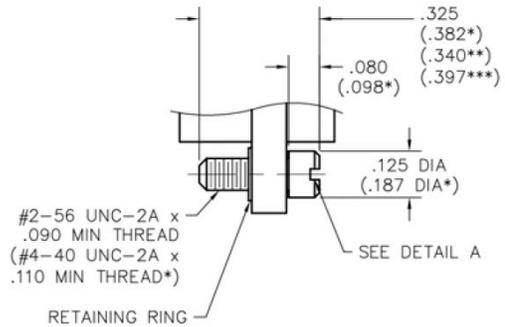
HARDWARE

MM - MN - MQ - MP - MMHT - MQHT JACKING HARDWARE



JACKPOST ASSEMBLY

| | |
|---|-------------------------|
| #2-56 JACKPOST | 00-000-000-000-2200 |
| #4-40 JACKPOST | 00-000-000-000-6200 |
| FOR RECEPTACLES WITH GROUNDING FINGERS | |
| #2-56 JACKPOST | 00-000-000-000-2200-0G7 |
| #4-40 JACKPOST | 00-000-000-000-6200-0G7 |



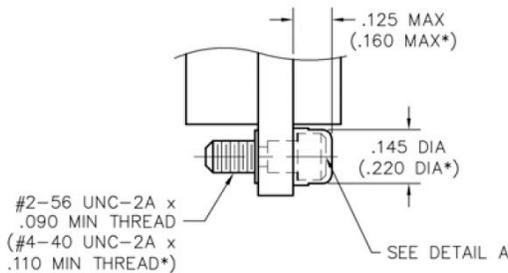
SHORT TURNING

JACKSCREW ASSEMBLY

| | |
|-----------------------------|---------------------|
| #2-56 JACKSCREW, ALLEN HEAD | 00-000-000-000-4100 |
| #2-56 JACKSCREW, SLOT HEAD | 00-000-000-000-4300 |
| #4-40 JACKSCREW, ALLEN HEAD | 00-000-000-000-8100 |
| #4-40 JACKSCREW, SLOT HEAD | 00-000-000-000-8300 |

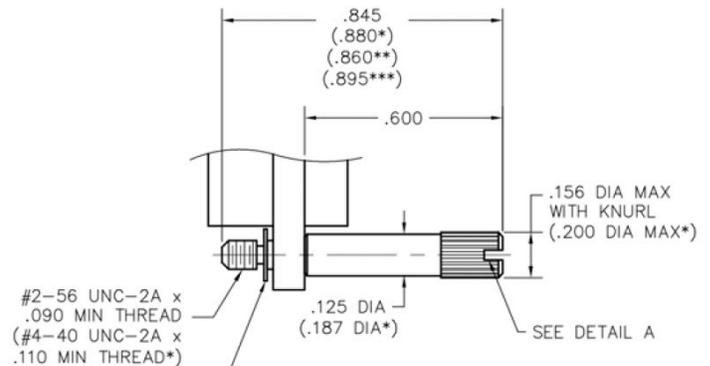
FOR RECEPTACLES WITH GROUNDING FINGERS

| | |
|-----------------------------|-------------------------|
| #2-56 JACKSCREW, ALLEN HEAD | 00-000-000-000-4100-0G7 |
| #2-56 JACKSCREW, SLOT HEAD | 00-000-000-000-4300-0G7 |
| #4-40 JACKSCREW, ALLEN HEAD | 00-000-000-000-8100-0G7 |
| #4-40 JACKSCREW, SLOT HEAD | 00-000-000-000-8300-0G7 |



SHORT CAPTIVE JACKSCREW ASSEMBLY

JACKSCREW, ALLEN HEAD
FACTORY INSTALLED ONLY



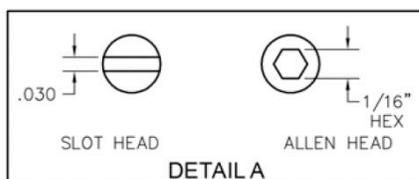
LONG TURNING

JACKSCREW ASSEMBLY

| | |
|-----------------------------|---------------------|
| #2-56 JACKSCREW, ALLEN HEAD | 00-000-000-000-4200 |
| #2-56 JACKSCREW, SLOT HEAD | 00-000-000-000-4400 |
| #4-40 JACKSCREW, ALLEN HEAD | 00-000-000-000-8200 |
| #4-40 JACKSCREW, SLOT HEAD | 00-000-000-000-8400 |

FOR RECEPTACLES WITH GROUNDING FINGERS

| | |
|-----------------------------|-------------------------|
| #2-56 JACKSCREW, ALLEN HEAD | 00-000-000-000-4200-0G7 |
| #2-56 JACKSCREW, SLOT HEAD | 00-000-000-000-4400-0G7 |
| #4-40 JACKSCREW, ALLEN HEAD | 00-000-000-000-8200-0G7 |
| #4-40 JACKSCREW, SLOT HEAD | 00-000-000-000-8400-0G7 |



NOTES

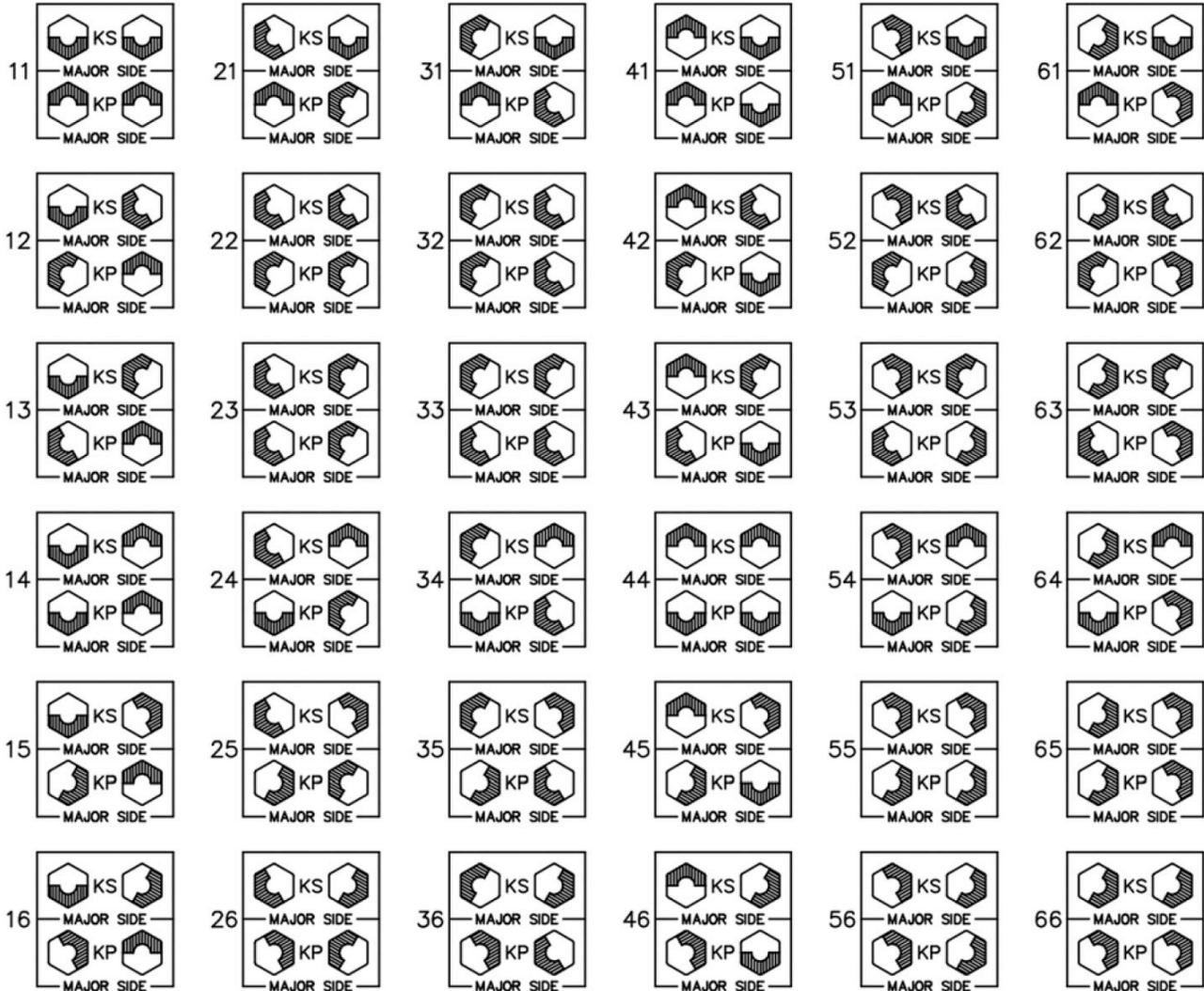
* Dimensions for 100 position connectors

** Applies to #2-56 hardware for receptacles with grounding fingers

*** Applies to #4-40 hardware for receptacles with grounding fingers

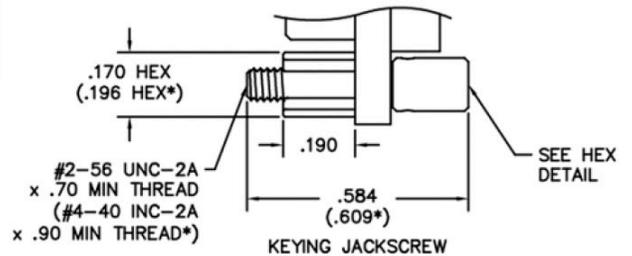
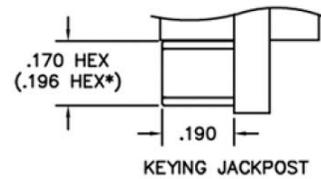
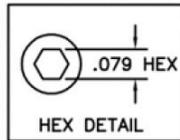
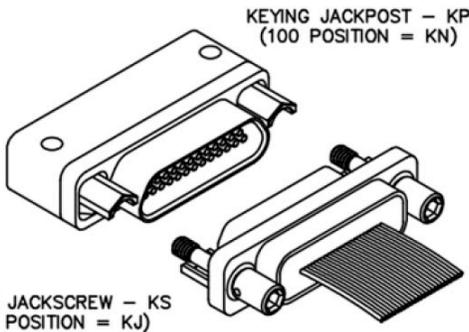
**** Hardware for receptacles with grounding fingers will come with flat washers, lockwashers, and spanner nuts

POLARIZED KEYING HARDWARE



Select the appropriate two digit number above and include as the last two digits of the hardware code in the part number. (Keying hardware is factory installed and non-removable).

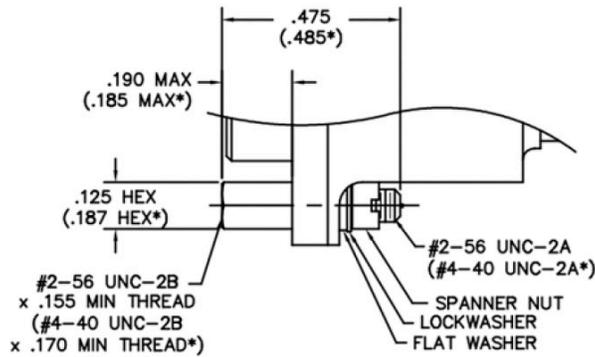
Example:
MM-213-025-161-99WA-KS11
MK-263-025-435-990S-KP11



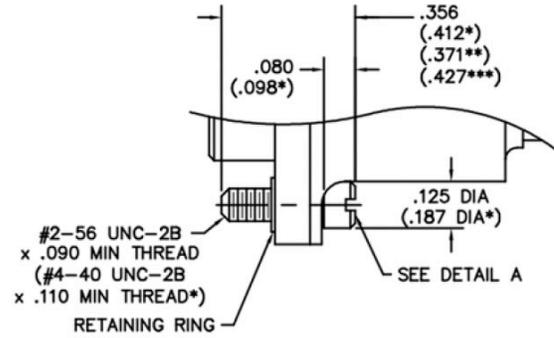
* = Dimensions for 100 position connectors

HARDWARE

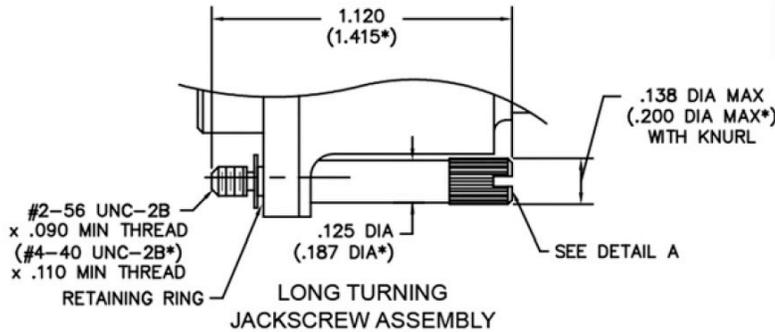
MM - MQ I/O WITH EMI/RFI BACKSHELL



- JACKPOST ASSEMBLY**
- #2-56 JACKPOST 00-000-000-000-2200-01G
 - #4-40 JACKPOST 00-000-000-000-6200-04A

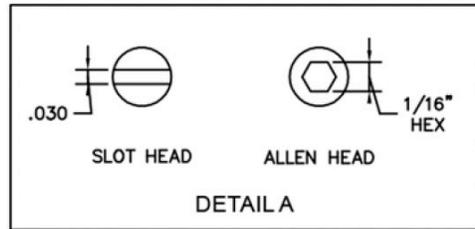


- SHORT TURNING JACKSCREW ASSEMBLY**
- #2-56 JACKSCREW, ALLEN HEAD 00-000-000-000-4100-01G
 - #2-56 JACKSCREW, SLOT HEAD 00-000-000-000-4300-01G
 - #4-40 JACKSCREW, ALLEN HEAD 00-000-000-000-8100-04A
 - #4-40 JACKSCREW, SLOT HEAD 00-000-000-000-8300-04A



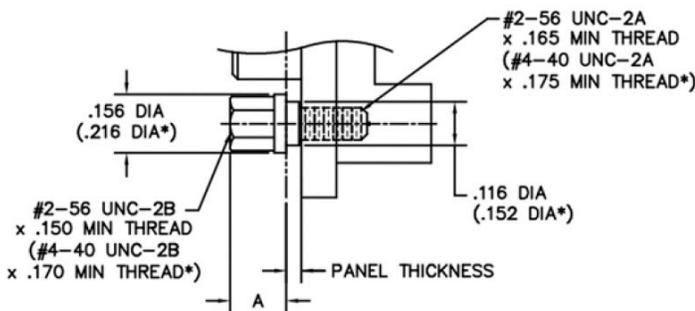
- LONG TURNING JACKSCREW ASSEMBLY**
- #2-56 JACKSCREW, SLOT HEAD 00-000-000-000-4400-01G
 - #4-40 JACKSCREW, SLOT HEAD 00-000-000-000-8400-04A
- FOR RECEPTACLES WITH GROUNDING FINGERS**
- #2-56 JACKSCREW, SLOT HEAD 00-000-000-000-4400-0FZ
 - #4-40 JACKSCREW, SLOT HEAD 00-000-000-000-8400-0FZ

- FOR RECEPTACLES WITH GROUNDING FINGERS**
- #2-56 JACKSCREW, ALLEN HEAD 00-000-000-000-4100-0FZ
 - #2-56 JACKSCREW, SLOT HEAD 00-000-000-000-4300-0FZ
 - #4-40 JACKSCREW, ALLEN HEAD 00-000-000-000-8100-0FZ
 - #4-40 JACKSCREW, SLOT HEAD 00-000-000-000-8300-0FZ



* = Dimensions for #4-40 hardware (100 position connectors)
 ** = Applies to #2-56 hardware for receptacles with grounding fingers
 *** = Applies to #4-40 hardware for receptacles with grounding fingers

MM - MK REAR PANEL MOUNT JACKPOSTS FOR BODY STYLES A, C, E, H, K AND L

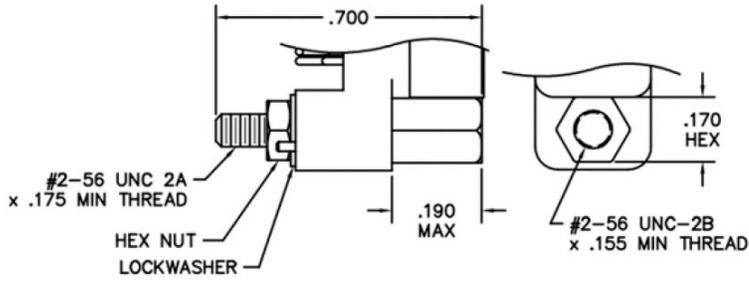


* = Dimensions for 100 position connectors

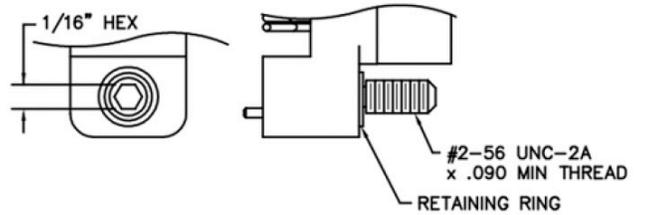
| Panel THK | Thread Size | Part Number | A MAX |
|-----------|-------------|-------------------------|-------|
| .040 | #2-56 | MM-000-000-000-2400-0D1 | 0.150 |
| .060 | | MM-000-000-000-2600-0D3 | 0.130 |
| .070 | | MM-000-000-000-2800-0D5 | 0.120 |
| .080 | | MM-000-000-000-2900-0D7 | 0.110 |
| .040 | #4-40 | MM-000-000-000-6400-0D2 | 0.150 |
| .060 | | MM-000-000-000-6600-0D4 | 0.130 |
| .070 | | MM-000-000-000-6800-0D6 | 0.120 |
| .080 | | MM-000-000-000-6900-0D8 | 0.110 |

HARDWARE

MK VERTICAL SMT

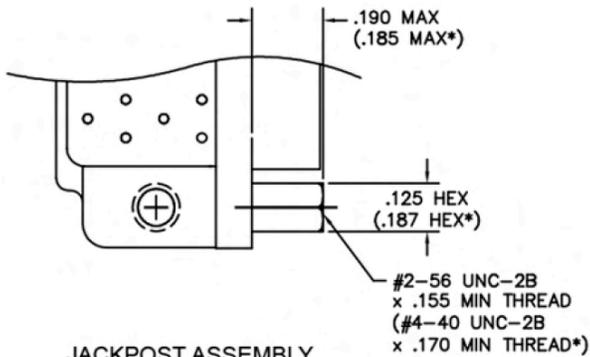


JACKPOST ASSEMBLY
FACTORY INSTALLED ONLY



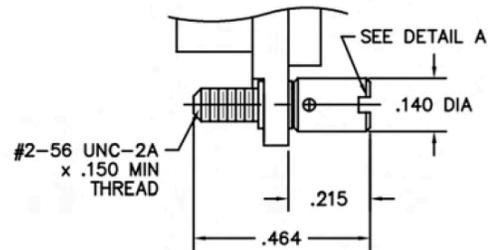
TURNING JACKSCREW ASSEMBLY
FACTORY INSTALLED ONLY

MK - MS, MKHT - MSHT



JACKPOST ASSEMBLY
CONSULT FACTORY

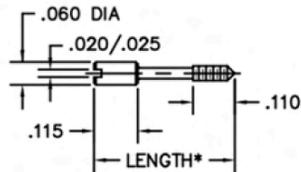
MTHT



JACKSCREW ASSEMBLY
FACTORY INSTALLED ONLY

* = Dimensions for 100 position connectors

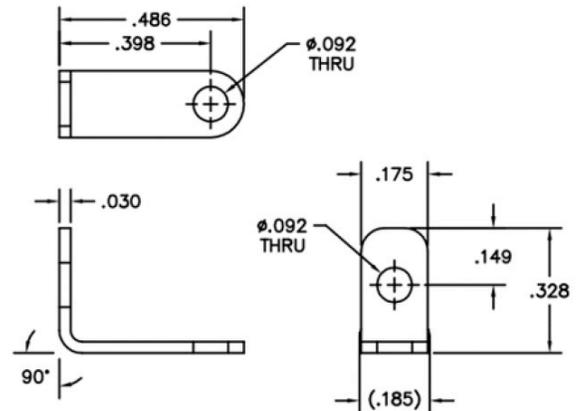
MA



1 MM LOCKSCREW
FOR MA STRIP CONNECTORS

- * .370 LONG CDG10492
- * .465 LONG CDG10493

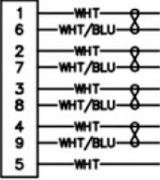
MOUNTING BRACKET



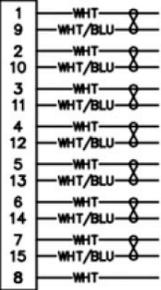
CDG12633 - 2 EACH

TWISTED PAIR WIRE CONNECT CHARTS

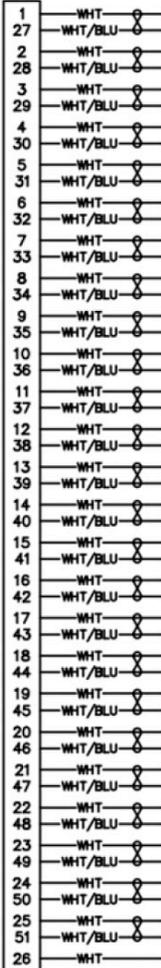
9 POSITION



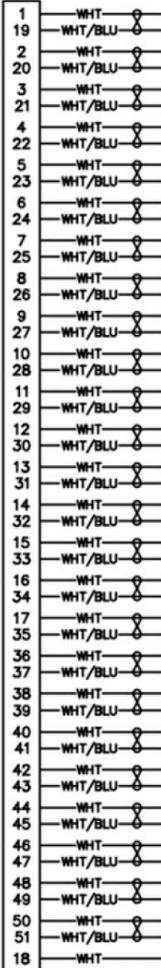
15 POSITION



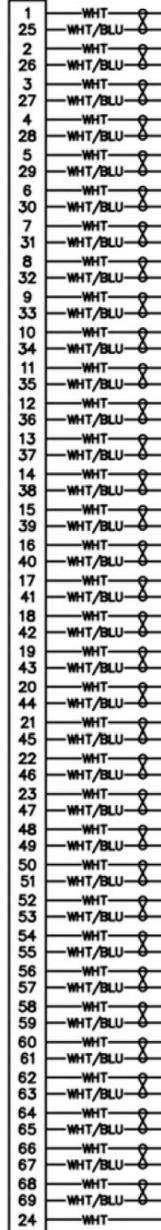
51 POSITION
2 rows



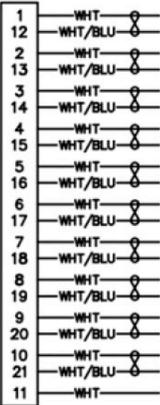
51 POSITION
3 rows



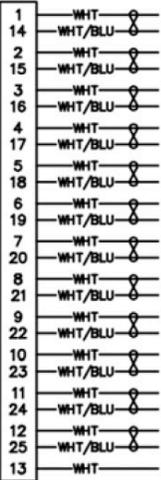
69 POSITION



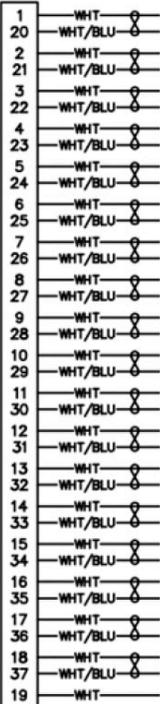
21 POSITION



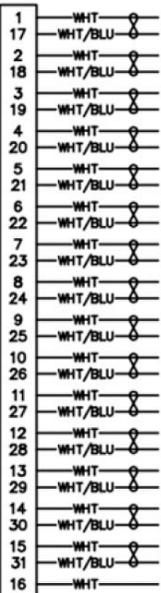
25 POSITION



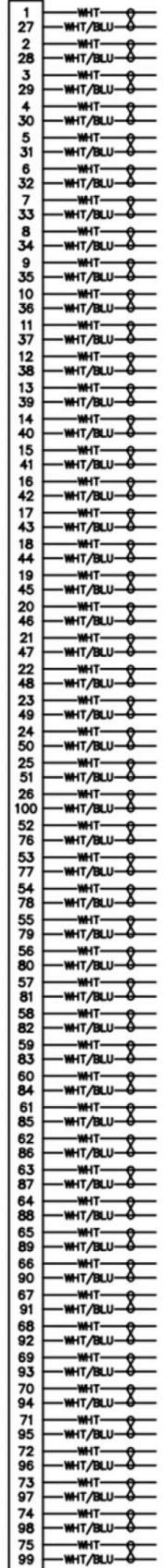
37 POSITION



31 POSITION

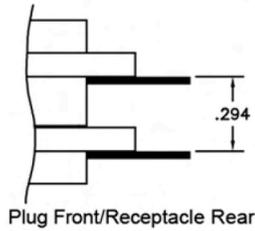
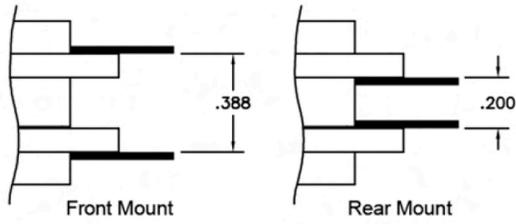


100 POSITION

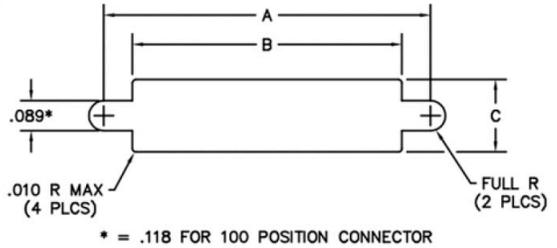


HARDWARE

PANEL MOUNTING DIMENSIONS



MOUNTING DIMENSIONS

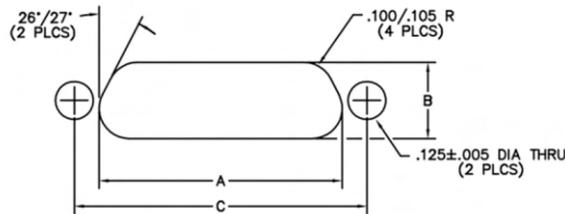


| DIMENSIONS | | | | | |
|-------------|------|-------------------------|-------------------------|------------------------------|------------------------------|
| Contact Row | Size | A + 0.004 - 0.000 | B + 0.005 - 0.000 | C + 0.004 - 0.000 | |
| | | | | MP, MQ, MR, MS MQHT, MSHT | MK, ML, MM, MN MKHT, MMHT |
| 2 | 9 | 0.570 | 0.400 | 0.215 | 0.273 |
| | 15 | 0.720 | 0.550 | | |
| | 21 | 0.870 | 0.700 | | |
| | 25 | 0.970 | 0.800 | | |
| | 31 | 1.120 | 0.950 | | |
| | 37 | 1.270 | 1.100 | | |
| 3 | 51 | 1.620 | 1.450 | 0.256 | 0.311 |
| | 69 | 1.520 | 1.350 | | |
| 4 | 100 | 1.805 | 1.442 | — | 0.383 |

PANEL MOUNTING DIMENSIONS FOR REAR PANEL MOUNT CONNECTORS

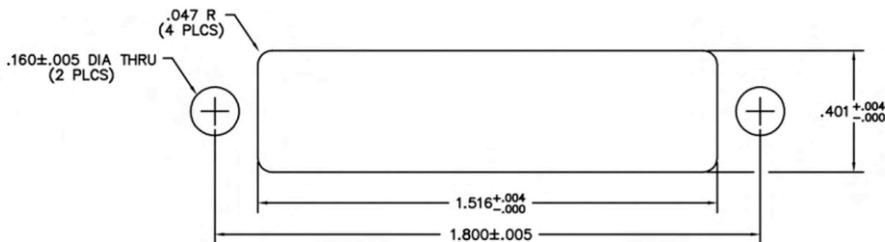
RUGGED METAL MM, MN, MK, ML SIZES: 9 - 69

| DIMENSIONS | | | |
|------------|-------------------------|-------------------------|--------------|
| Size | A + 0.004 - 0.000 | B + 0.005 - 0.000 | C + 0.005 |
| 9 | 0.401 | 0.252 | 0.565 |
| 15 | 0.551 | | 0.715 |
| 21 | 0.701 | | 0.865 |
| 25 | 0.801 | | 0.965 |
| 31 | 0.951 | | 1.115 |
| 37 | 1.101 | | 1.265 |
| 51 | 1.451 | 0.295 | 1.615 |
| 51 | 1.051 | | 1.215 |
| 69 | 1.351 | | 1.515 |



LOW-PROFILE MQ, MP, MS, MR SIZES: 9 - 51

| DIMENSIONS | | | |
|------------|-------------------------|-------------------------|--------------|
| Size | A + 0.004 - 0.000 | B + 0.005 - 0.000 | C + 0.005 |
| 9 | 0.379 | 0.219 | 0.565 |
| 15 | 0.529 | | 0.715 |
| 21 | 0.679 | | 0.865 |
| 25 | 0.779 | | 0.965 |
| 31 | 0.929 | | 1.115 |
| 37 | 1.079 | | 1.265 |
| 51 | 1.029 | 0.261 | 1.215 |

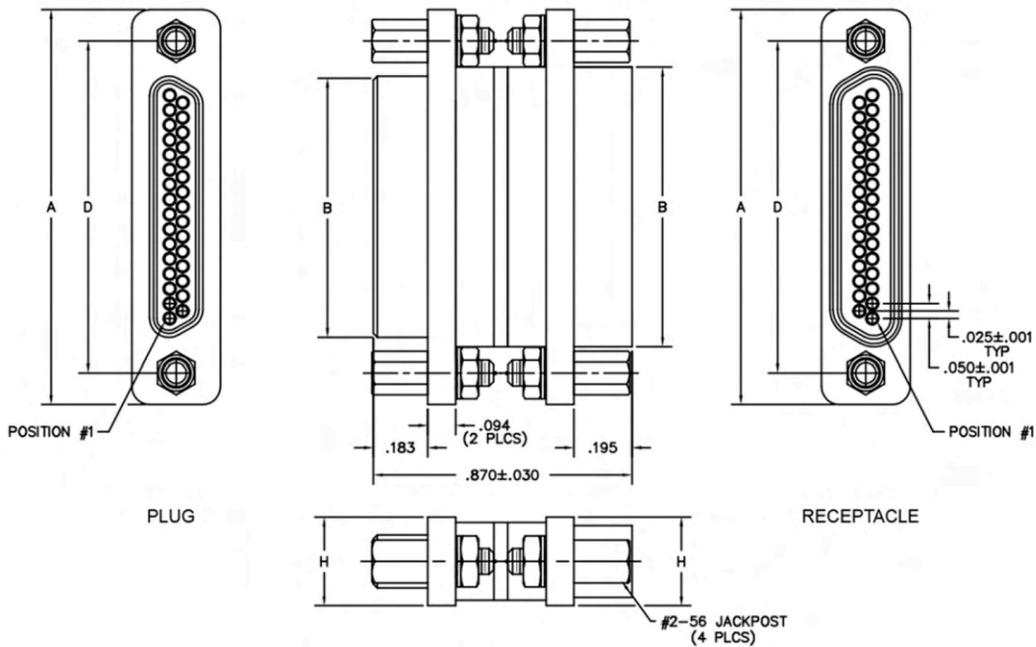
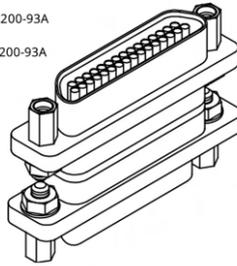


RUGGED METAL
MM, MN, MK, ML
SIZE 100

CONNECTOR SAVER

MM – RUGGED METAL & MN – RUGGED PLASTIC
0.050" | 9 THROUGH 100 CONTACTS

MM-212-031-143-2200-93A
(METAL)
MN-211-031-143-2200-93A
(PLASTIC)



| DIMENSIONS | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|--------------------------------------|
| Size | Contact Row | A | B | | D | H | Hardware |
| | | | Plug MAX | RCPT MAX | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.565 | 0.298 | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.925 | 0.484 | 0.550 | 0.715 | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.865 | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.965 | | |
| 31 | | 1.325 | 0.884 | 0.950 | 1.115 | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.265 | | |
| 51** | 3 | 1.825 | 1.384 | 1.450 | 1.615 | 0.341 | #4-40 UNC THD (0.147 DIA Through) |
| 51 | | 1.425 | 0.984 | 1.050 | 1.215 | | |
| 69*** | | 1.725 | 1.284 | 1.350 | 1.515 | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.800 | 0.384 | #4-40 UNC THD (0.147 DIA Through) |

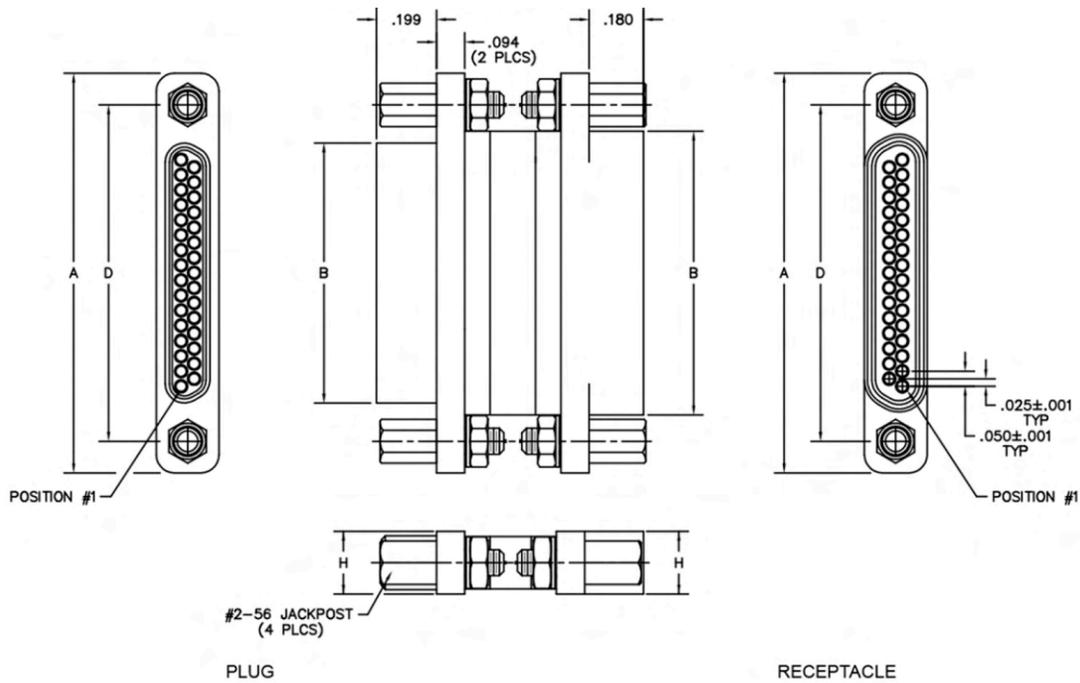
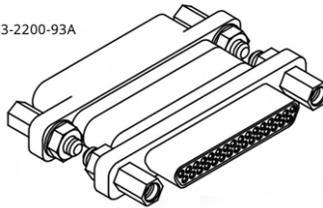
*** 69 Position connectors are available in metal only.

** Two row, 51 position connectors are available in metal only, (non MIL-SPEC interface).

CONNECTOR SAVER

MQ - LOW-PROFILE METAL & MP - LOW-PROFILE PLASTIC
 0.050" | 9 THROUGH 51 CONTACTS

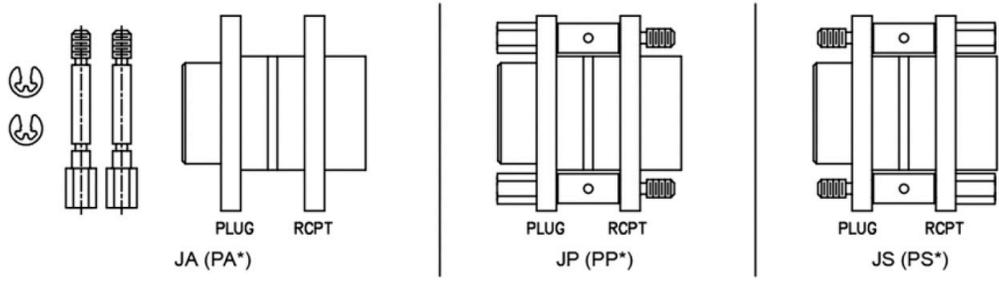
MQ-212-031-143-2200-93A
 (METAL)
 MP-211-031-143-2200-93A
 (PLASTIC)



| DIMENSIONS | | | | | | | |
|------------|-------------|-------|-------------|-------------|-------|--------------|---|
| Size | Contact Row | A | B | | D | H ± 0.005 | Hardware |
| | | | Plug MAX | RCPT MAX | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.565 | 0.298 | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.928 | 0.442 | 0.528 | 0.715 | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.865 | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.965 | | |
| 31 | | 1.328 | 0.842 | 0.928 | 1.115 | | |
| 37 | | 1.478 | 0.992 | 1.078 | 1.265 | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.215 | 0.341 | |

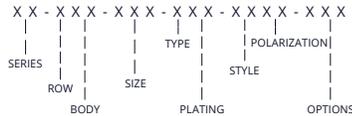
LEAD CONFIGURATION OPTIONS

| PLUGS | |
|----------------------------|---|
| SERIES | |
| MQ | 0.050" Low-Profile Metal MP |
| MP | 0.050" Low-Profile Plastic |
| BODY | |
| 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) |
| BODY STYLE | |
| 1 | Plug/Receptacle, straight with mounting ears |
| BODY MATERIAL | |
| 1 | Polyphenylene sulfide (MN only) |
| 2 | Polyphenylene sulfide with electroless Ni shell |
| 3 | Polyphenylene sulfide with electrodeposited cadmium shell [x] |
| 4 | Polyphenylene sulfide with hard anodized black shell |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051 |
| CONTACTS | |
| TYPE CONTACTS/TERMINATIONS | |
| 14 | Pin/Socket, straight |
| PLATING OPTION | |
| 3 | 50 µm Au contacts: 10 µm Au terminations |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Two fixed jacknut assemblies |
| JA | Turning jackpost with retaining ring, uninstalled |
| JP | Turning jackpost, internal thread on plug side |
| JS | Turning jackpost, internal thread on receptacle side |
| POLARIZATION/WIRING | |
| 00 | None |
| OPTIONS | |
| 93A | Connector saver designator |



PLUG
RECEPTACLE

MQ-212-031-143-2200-93A
MP-211-031-143-2200-93A

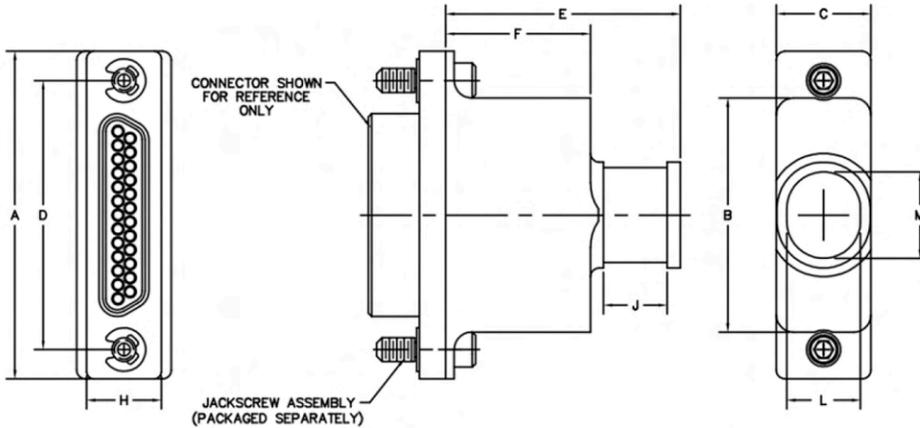
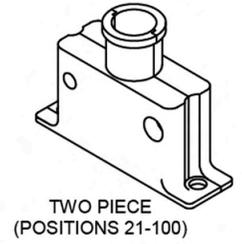
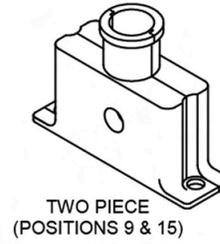
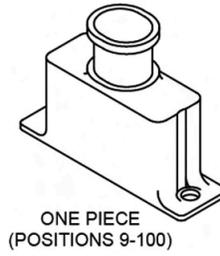


NOTE:
[x] Option is not RoHS-compliant

EMI/RFI STRAIGHT BACKSHELLS

MM - RUGGED METAL

0.050" | 9 THROUGH 100 CONTACTS



ONE PIECE

| DIMENSIONS | | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------|---|-----------------------------------|
| Size | Contact Row | A | B | C | D | E | F | H | J | L | M | Hardware |
| 9 | 2 | 0.775 | 0.440 | 0.340 | 0.565 | 0.843 | 0.520 | 0.298 | 0.229 | See table A on Part # SHT | | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.925 | 0.590 | | 0.715 | | | | | | | |
| 21 | | 1.075 | 0.740 | | 0.865 | | | | | | | |
| 25 | | 1.175 | 0.840 | | 0.965 | | | | | | | |
| 31 | | 1.325 | 0.990 | | 1.115 | | | | | | | |
| 37 | | 1.475 | 1.140 | | 1.265 | | | | | | | |
| 51 | | 1.825 | 1.490 | | 1.615 | | | | | | | |
| 51 | 3 | 1.425 | 1.090 | 0.380 | 1.215 | 0.933 | 0.610 | 0.341 | | | | |
| 69 | | 1.725 | 1.390 | | 1.515 | | | | | | | |
| 100 | 4 | 2.160 | 1.522 | 0.430 | 1.800 | 0.953 | 0.630 | 0.384 | | | | #4-40 UNC THD (0.147 DIA Through) |

TWO PIECE

| DIMENSIONS | | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------|---|-----------------------------------|
| Size | Contact Row | A | B | C | D | E | F | H | J | L | M | Hardware |
| 9 | 2 | 0.775 | 0.480 | 0.340 | 0.565 | 0.843 | 0.520 | 0.298 | 0.229 | See table 8 on Part # SHT | | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.925 | 0.630 | | 0.715 | | | | | | | |
| 21 | | 1.075 | 0.780 | | 0.865 | | | | | | | |
| 25 | | 1.175 | 0.880 | | 0.965 | | | | | | | |
| 31 | | 1.325 | 1.030 | | 1.115 | | | | | | | |
| 37 | | 1.475 | 1.180 | | 1.265 | | | | | | | |
| 51 | | 1.825 | 1.530 | | 1.615 | | | | | | | |
| 51 | 3 | 1.425 | 1.130 | 0.380 | 1.215 | 0.933 | 0.610 | 0.341 | | | | |
| 69 | | 1.725 | 1.430 | | 1.515 | | | | | | | |
| 100 | 4 | 2.160 | 1.528 | 0.430 | 1.800 | 0.953 | 0.630 | 0.384 | | | | #4-40 UNC THD (0.147 DIA Through) |

LEAD CONFIGURATION OPTIONS

| PLUGS | |
|---------------------|--|
| SERIES | |
| MM | 0.050" Rugged Metal Backshell |
| BODY | |
| 2 | Two-row (Sizes 9 through 51) |
| 3 | Three-row (Sizes 51 and 69) |
| 4 | Four-row (Size 100) |
| BODY STYLE | |
| 3 | Straight, one piece |
| 5 | Straight, two piece*** |
| BODY MATERIAL | |
| 2 | Aluminum, with electroless nickel plating |
| 3 | Aluminum, with electrodeposited cadmium [x] |
| 4 | Aluminum, with hard anodized black plating |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| EXIT | |
| 000 | Standard exit, see Table A |
| AA | Large exit, see Table A** |
| BB | Small exit, see Table A** |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| POLARIZATION/WIRING | |
| 00 | None |
| OPTIONS | |
| 0FZ | Required for receptacles with grounding fingers when ordering hardware styles 41, 43, 44, 81, 83, and 84 |

TABLE A (ONE PIECE)

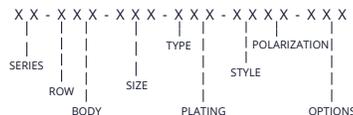
| EXIT DIMENSIONS | | | | | | |
|-----------------|-------|-------|-------|-------|-------|-------|
| Size | 000 | | AAA | | BBB | |
| | L | M | L | M | L | M |
| 9 | — | 0.188 | 0.265 | 0.310 | — | 0.129 |
| 15 | — | 0.230 | | 0.458 | — | 0.162 |
| 21 | 0.265 | 0.257 | | 0.608 | — | 0.188 |
| 25 | | 0.310 | | 0.708 | — | 0.206 |
| 31 | | 0.330 | | 0.858 | — | 0.225 |
| 37 | 0.297 | 0.375 | | 1.008 | — | 0.242 |
| 51 | | 0.515 | 1.034 | 0.265 | 0.300 | |
| 51 | | 0.470 | 0.921 | — | 0.290 | |
| 69 | 0.297 | 0.620 | 1.158 | 0.297 | 0.361 | |
| 100 | | 0.344 | 0.688 | 0.344 | 1.342 | 0.344 |

TABLE B (TWO PIECE)

| EXIT DIMENSIONS | | |
|-----------------|-------|-------|
| Size | 000 | |
| | L | M |
| 9 | — | 0.188 |
| 15 | — | 0.230 |
| 21 | 0.240 | 0.268 |
| 25 | | 0.325 |
| 31 | | 0.346 |
| 37 | 0.280 | 0.396 |
| 51 | | 0.554 |
| 51 | | 0.492 |
| 69 | 0.280 | 0.635 |
| 100 | | 0.711 |

RUGGED

MM-252-031-000-4100



NOTE: *Use number in parenthesis when ordering size 100.

**Available with body style 3 (one piece) only.

***Sizes 9 and 15 not recommended for solder cup applications or 24 AWG wire applications.

Stainless steel micro band for shield termination - Molex Part Number CDG10026, shipped with each backshell

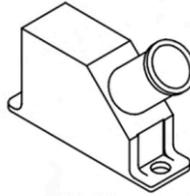
Band-it application tool - Molex Part Number CDG10027

[x] Option is not RoHS-compliant

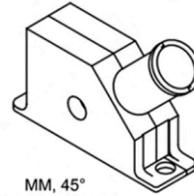
EMI/RFI 45° BACKSHELLS

MM - RUGGED METAL

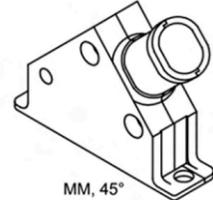
0.050" | 9 THROUGH 100 CONTACTS



MM, 45°
(ONE PIECE)

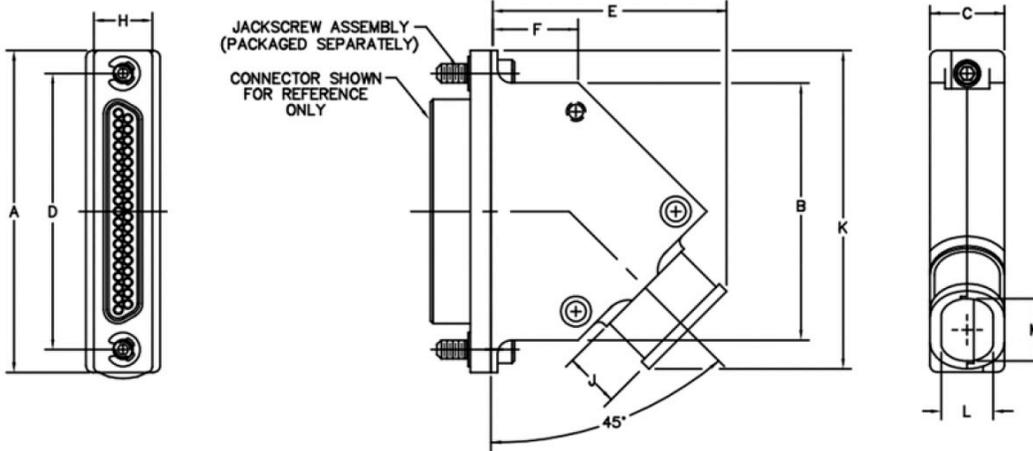


MM, 45°
(TWO PIECE)
(POSITIONS 9 & 15)



MM, 45°
(TWO PIECE)
(POSITIONS 21 - 100)

Note: 21 & 25 position, 2 piece backshells use two screw clamping configurations.



MM 45° (ONE PIECE)

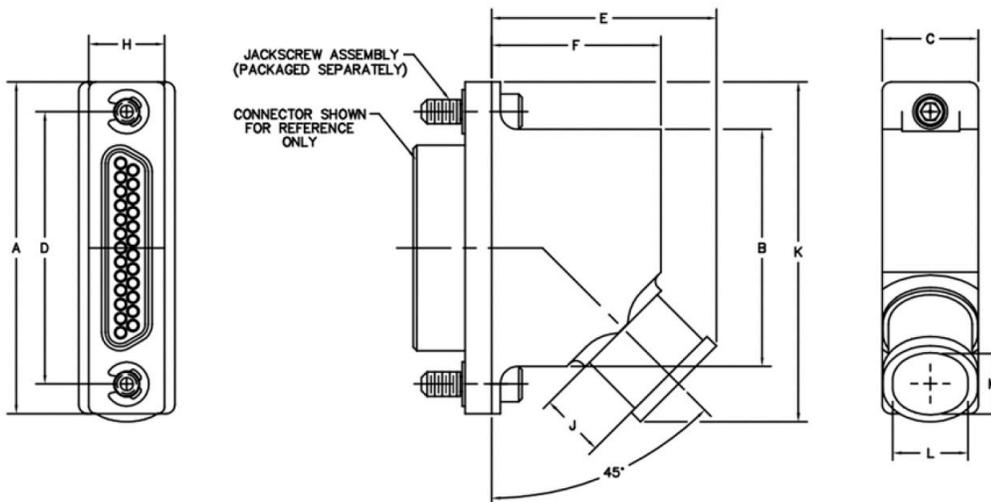
| DIMENSIONS | | | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------------------|
| Size | Contact Row | A | B | C | D | E | F | H | J | K | L | M | Hardware |
| 9 | 2 | 0.775 | 0.440 | 0.340 | 0.565 | 0.696 | 0.500 | 0.298 | 0.229 | 0.804 | — | 0.188 | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.925 | 0.590 | | 0.715 | 0.721 | 0.525 | | | 0.954 | — | 0.230 | |
| 21 | | 1.075 | 0.740 | | 0.865 | 0.746 | 0.550 | | | 1.103 | — | 0.257 | |
| 25 | | 1.175 | 0.840 | | 0.965 | 0.796 | 0.600 | | | 1.203 | 0.265 | 0.310 | |
| 31 | | 1.325 | 0.990 | | 1.115 | 0.846 | 0.650 | | | 1.353 | | 0.330 | |
| 37 | | 1.475 | 1.140 | | 1.265 | 0.921 | 0.725 | | | 1.503 | | 0.375 | |
| 51 | | 3 | 1.825 | | 1.490 | 0.380 | 1.615 | | | 1.144 | 0.950 | 0.341 | |
| 51 | 1.425 | | 1.090 | 1.215 | 0.946 | | 0.750 | 1.453 | 0.620 | | | | |
| 69 | 1.725 | | 1.390 | 1.515 | 0.750 | | 0.341 | 1.753 | 0.620 | | | | |
| 100 | 4 | 2.160 | 1.522 | 0.430 | 1.800 | 1.146 | 0.950 | 0.384 | — | 2.036 | 0.344 | 0.688 | #4-40 UNC THD (0.147 DIA Through) |

MM 45° (TWO PIECE)

| DIMENSIONS | | | | | | | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------------------|-------|-------|-------|--------------------------------------|
| Size | Contact Row | A | B | C | D | E | F | H | J | K | L | M | Hardware | | | | |
| 9 | 2 | 0.775 | 0.480 | 0.340 | 0.565 | 0.855 | 0.650 | 0.298 | 0.229 | 0.806 | — | 0.188 | #2-56 UNC THD (0.092 DIA Through) | | | | |
| 15 | | 0.925 | 0.630 | | 0.715 | 0.831 | 0.625 | | | 0.944 | — | 0.230 | | | | | |
| 21 | | 1.075 | 0.780 | | 0.865 | 0.985 | 0.421 | | | 1.059 | 0.240 | 0.268 | | | | | |
| 25 | | 1.175 | 0.880 | | 0.965 | 1.031 | 0.400 | | | 1.159 | | 0.333 | | | | | |
| 31 | | 1.325 | 1.030 | | 1.115 | 1.046 | | | | 1.309 | | 0.354 | | | | | |
| 37 | | 1.475 | 1.180 | | 1.265 | 1.081 | 0.380 | | | 1.615 | 1.193 | 0.341 | | 0.280 | 1.459 | 0.404 | #4-40 UNC THD (0.147 DIA Through) |
| 51 | | 1.825 | 1.530 | | 1.215 | 1.233 | | | | 0.625 | 1.809 | | | | 0.559 | | |
| 51 | 1.425 | 1.130 | 1.515 | 1.378 | 0.527 | 1.409 | | 0.492 | | | | | | | | | |
| 69 | 3 | 1.725 | 1.430 | 0.380 | 1.515 | 1.378 | 0.527 | 0.341 | — | 1.703 | 0.280 | 0.642 | #4-40 UNC THD (0.147 DIA Through) | | | | |
| 100 | 4 | 2.160 | 1.522 | 0.430 | 1.800 | 1.403 | 0.532 | 0.384 | — | 1.973 | 0.330 | 0.711 | | | | | |

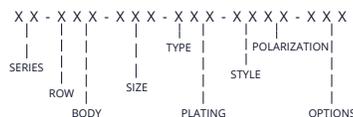
LEAD CONFIGURATION OPTIONS

| PLUGS | |
|---------------------|--|
| SERIES | |
| MM | 0.050" Rugged Metal Backshell |
| BODY | |
| 2 | Two-row (Sizes 9 through 51) |
| 3 | Three-row (Sizes 51 and 69) |
| 4 | Four-row (Size 100) |
| BODY STYLE | |
| 4 | 45°, one piece |
| 6 | 45°, two piece** |
| BODY MATERIAL | |
| 2 | Aluminum, with electroless nickel plating |
| 3 | Aluminum, with electrodeposited cadmium [x] |
| 4 | Aluminum, with hard anodized black plating |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| CONTACTS | |
| 000 | None |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| POLARIZATION/WIRING | |
| 00 | None |
| OPTIONS | |
| OFZ | Required for receptacles with grounding fingers when ordering hardware styles 41, 43, 81, and 83 |



RUGGED

MM-242-031-000-4100



NOTE:

*Use number in parenthesis when ordering size 100.

**Sizes 9 and 15 not recommended for solder cup applications.

Stainless steel micro band for shield termination - Molex Part Number CDG10026

Band-it application tool - Molex Part Number CDG10027

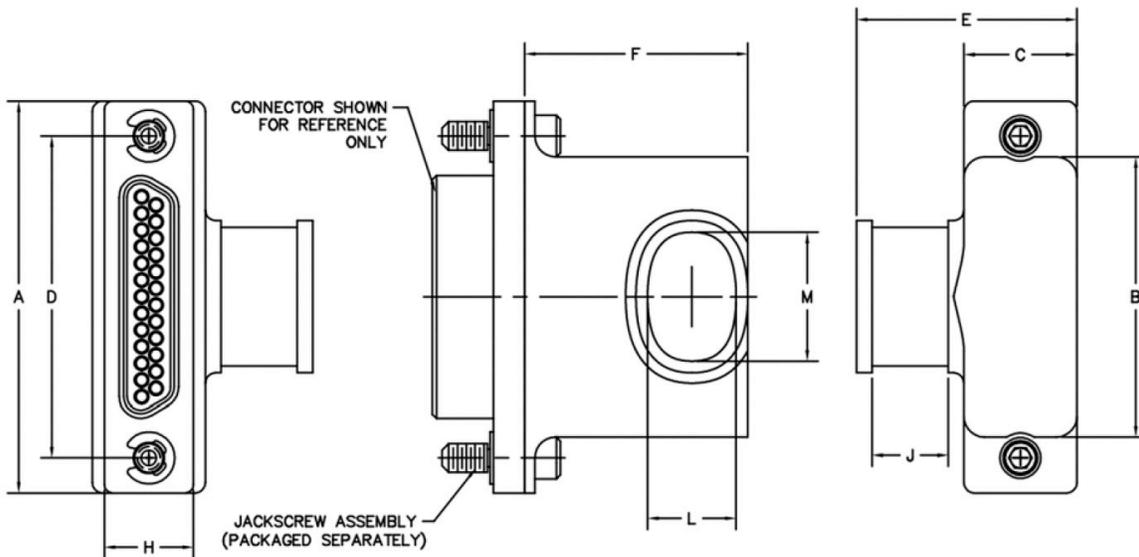
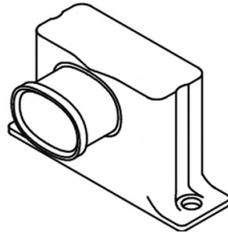
[x] Option is not RoHS-compliant

molex

EMI/RFI 90° BACKSHELLS

MM - RUGGED METAL

0.050" | 9 THROUGH 100 CONTACTS



ONE PIECE

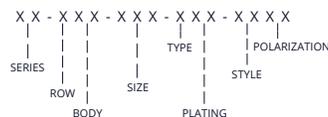
| DIMENSIONS | | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------------------|
| Size | Contact Row | A | B | C | D | E | F | H | J | L | M | Hardware |
| 9 | 2 | 0.775 | 0.440 | 0.340 | 0.565 | 0.663 | 0.671 | 0.295 | 0.229 | 0.266 | 0.268 | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.925 | 0.590 | | 0.715 | | | | | | 0.311 | |
| 21 | | 1.075 | 0.740 | | 0.865 | | | | | | 0.331 | |
| 25 | | 1.175 | 0.840 | | 0.965 | | | | | | 0.387 | |
| 31 | | 1.325 | 0.990 | | 1.115 | | | | | | 0.450 | |
| 37 | | 1.475 | 1.140 | | 1.265 | | | | | | 0.511 | |
| 51 | 3 | 1.825 | 1.490 | 0.380 | 1.615 | 0.703 | 0.703 | 0.341 | 0.298 | 0.678 | 0.619 | #4-40 UNC THD (0.147 DIA Through) |
| 51 | | 1.425 | 1.090 | | 1.215 | | | | | 0.823 | | |
| 69 | | 1.725 | 1.390 | | 1.515 | | | | | 0.823 | | |
| 100 | 4 | 2.106 | 1.522 | 0.430 | 1.800 | 0.753 | 0.749 | 0.384 | 0.344 | 1.063 | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | |
|---------------------|--|
| SERIES | |
| MM | 0.050" Rugged Metal Backshell |
| BODY | |
| 2 | Two-row (Sizes 9 through 51) |
| 3 | Three-row (Sizes 51 and 69) |
| 4 | Four-row (Size 100) |
| BODY STYLE | |
| 7 | 90°, one piece |
| BODY MATERIAL | |
| 2 | Aluminum, with electroless nickel plating |
| 3 | Aluminum, with electrodeposited cadmium [x] |
| 4 | Aluminum, with hard anodized black plating |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| EXIT | |
| 000 | Standard exit** |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| POLARIZATION/WIRING | |
| 00 | None |

RUGGED

MM-242-031-000-4100



NOTE:

*Use number in parenthesis when ordering size 100.

**Backshell exits are designed to accommodate 26 AWG wire or smaller
Stainless steel micro band for shield termination - Molex Part Number CDG10026,
shipped with each backshell

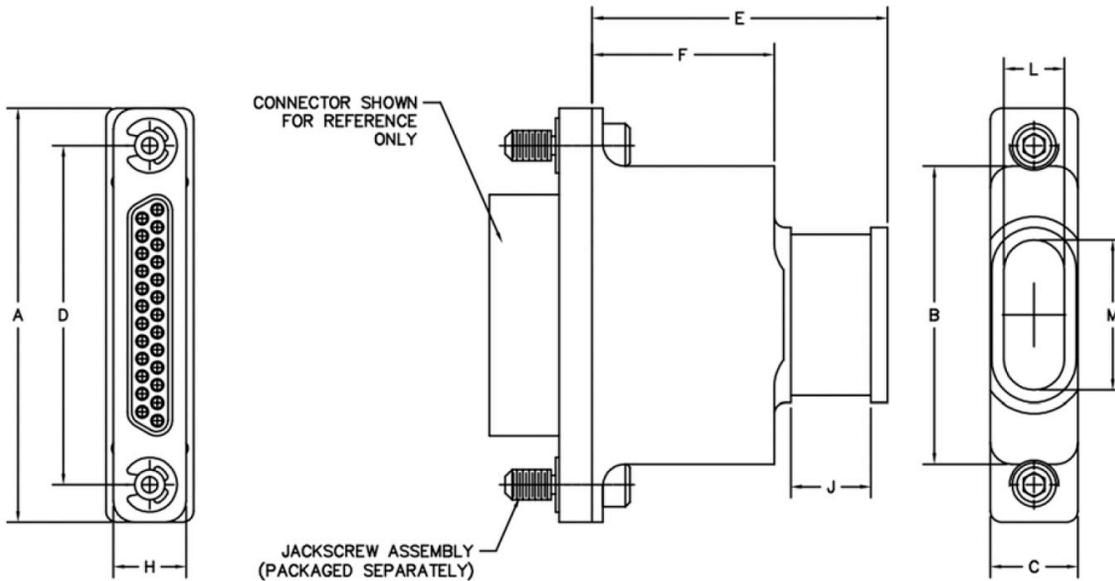
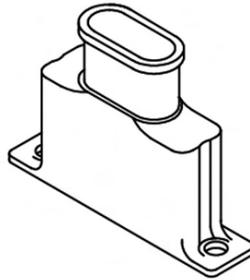
Band-it application tool - Molex Part Number CDG10027

[x] Option is not RoHS-compliant

EMI/RFI STRAIGHT BACKSHELLS

MQ - LOW-PROFILE METAL

0.050" | 9 THROUGH 51 CONTACTS



ONE PIECE

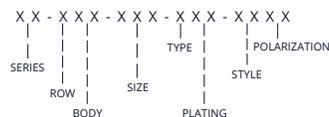
| DIMENSIONS | | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------------------|
| Size | Contact Row | A | B | C | D | E | F | H | J | L | M | Hardware |
| 9 | 2 | 0.778 | 0.448 | 0.250 | 0.565 | 0.843 | 0.520 | 0.208 | 0.229 | 0.172 | 0.197 | #2-56 UNC THD (0.092 DIA Through) |
| 15 | | 0.928 | 0.598 | | 0.715 | | | | | | 0.279 | |
| 21 | | 1.078 | 0.748 | | 0.865 | | | | | | 0.339 | |
| 25 | | 1.178 | 0.848 | | 0.965 | | | | | | 0.428 | |
| 31 | | 1.328 | 0.998 | | 1.115 | | | | | | 0.462 | |
| 37 | | 1.478 | 1.148 | | 1.265 | | | | | | 0.531 | |
| 51 | 3 | 1.428 | 1.098 | 0.292 | 1.215 | 0.933 | 0.610 | 0.250 | 0.220 | 0.596 | | |

LEAD CONFIGURATION OPTIONS

| PLUGS | |
|---------------------|--|
| SERIES | |
| MQ | 0.050" Low-Profile Metal Backshell |
| BODY | |
| 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Sizes 51) |
| BODY STYLE | |
| 3 | Straight, one piece |
| BODY MATERIAL | |
| 2 | Aluminum, with electroless nickel plating |
| 3 | Aluminum, with electrodeposited cadmium [x] |
| 4 | Aluminum, with hard anodized black plating |
| SIZE | |
| XXX | 009, 015, 021, 025, 031, 037, 051 |
| EXIT | |
| 000 | Standard exit |
| HARDWARE | |
| STYLE OF HARDWARE | |
| 00 | None |
| 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring |
| 43 | Two turning jackscrews, slot head, retaining ring |
| 44 | Two long turning jackscrews, slot head, retaining ring |
| POLARIZATION/WIRING | |
| 00 | None |

RUGGED

MQ-232-025-000-4100



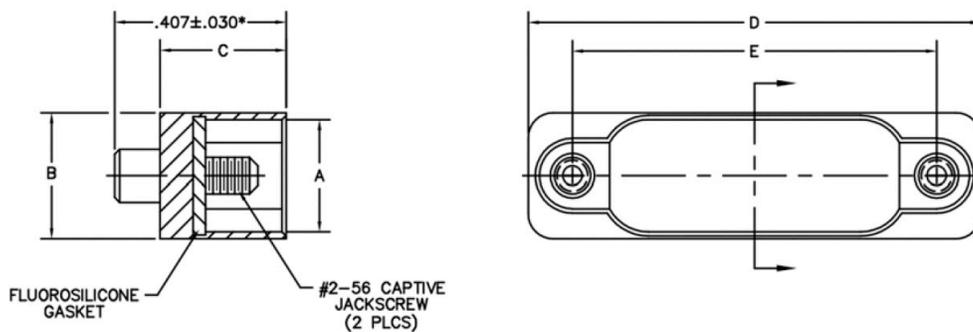
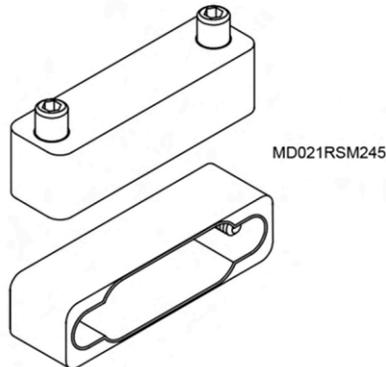
NOTE:

Stainless steel micro band for shield termination -
Molex Part Number CDG10026, shipped with each backshell
Band-it application tool -Molex Part Number CDG10027
[x] Option is not RoHS-compliant

DUST COVERS

MD - RUGGED METAL

0.050" | 9 THROUGH 100 CONTACTS



| DIMENSIONS | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|---------------|-------|
| Size | A | | B | | C | D | E | Hardware | |
| | Plug | RCPT | Plug | RCPT | | | | | |
| 9 | 0.203 | 0.265 | 0.298 | 0.298 | 0.299 | 0.775 | 0.565 | #2-56 UNC THD | |
| 15 | | | | | | 0.925 | 0.715 | | |
| 21 | | | | | | 1.075 | 0.865 | | |
| 25 | | | | | | 1.175 | 0.965 | | |
| 31 | | | | | | 1.325 | 1.115 | | |
| 37 | | | | | | 1.475 | 1.265 | | |
| 51 | 0.246 | 0.308 | 0.341 | 0.341 | | 1.425 | 1.215 | | |
| 69 | | | | | | 1.725 | 1.515 | | |
| 100 | 0.291 | 0.394 | 0.381 | 0.434 | | | 2.152 | | 1.800 |

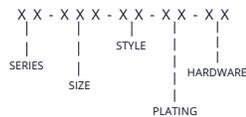
*100 Position dimensions .460±.030

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|--------------------------|--|--------------------------|--|
| SERIES | | | |
| MD | 0.050" Rugged Metal Dust Cover | MD | 0.050" Rugged Metal Dust Cover |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 069, 100 |
| STYLE | | | |
| RP | Plug, rugged metal | RP | Receptacle, rugged metal |
| PLATING | | | |
| M2 | Electroless nicke | M2 | Electroless nicke |
| M3 | Electrodeposited cadmium [x] | M3 | Electrodeposited cadmium [x] |
| M4 | Hard anodized black | M4 | Hard anodized black |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 22 | Two integrated jacknuts (62*) | 22 | Two integrated jacknuts (62*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | 45 | Two turning jackscrews, Allen head, captivated** (85*) |

RUGGED

MD-021-RS-M2-45



NOTE:

*Use number in parenthesis when ordering size 100.

**Captive hardware is factory installed and non-removable.

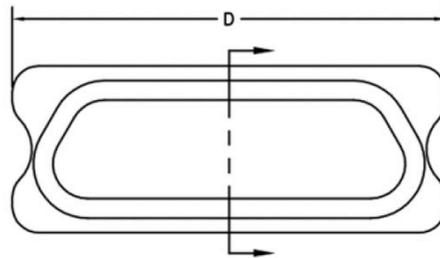
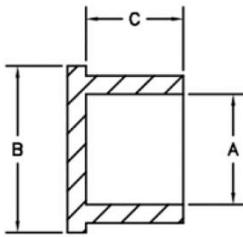
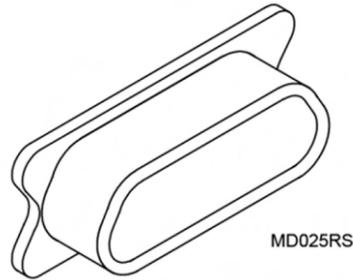
Not for use with rear panel mount connectors

Not for use on receptacles with grounding fingers

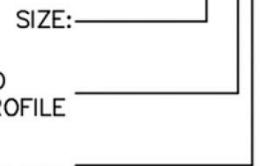
[x] Option is not RoHS-compliant

ESD DUST COVERS

MD - RUGGED METAL LOW-PROFILE PLASTIC 0.050" | 9 THROUGH 100 CONTACTS



EXAMPLE: MD025RS
MDXXXXX



- R - RUGGED
- L - LOW PROFILE
- P - PLUG
- S - RECEPTACLE

Material: Carbon filled polypropylene Static Decay meets MIL-PRF-81705D
Surface Resistivity per ASTM D 257-99(2005); <1.0 x 10¹² ohms/square

RUGGED PLASTIC

| DIMENSIONS | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|--------|-------|-----------|-----------|
| Size | Contact Row | A | | B | | C | | D | | D | |
| | | Plug | RCPT | Plug | RCPT | Plug | RCPT | Plug | RCPT | Plug | RCPT |
| 9 | 2 | 0.176 | 0.238 | 0.298 | 0.360 | 0.195 | 0.215 | 0.475 | 0.460 | MD009RP | MD009RS |
| 15 | | | | | | | | 0.625 | 0.610 | MD015RP | MD015RS |
| 21 | | | | | | | | 0.775 | 0.780 | MD021RP | MD021RS |
| 25 | | | | | | | | 0.875 | 0.860 | MD025RP | MD025RS |
| 31 | | | | | | | | 1.025 | 1.010 | MD031RP | MD031RS |
| 37 | | | | | | | | 1.175 | 1.160 | MD037RP | MD037RS |
| 51 | 3 | 0.219 | 0.218 | 0.340 | 0.400 | 0.195 | 0.215 | 1.525 | 1.510 | MD051RP-2 | MD051RS-2 |
| 51 | | | | | | | | 1.1255 | 1.110 | MD051RP | MD051RS |
| 69 | | | | | | | | 1.425 | 1.410 | MD069RP | MD069RS |
| 100 | | | | | | | | 1.500 | 1.615 | MD100RP | MD100RS |

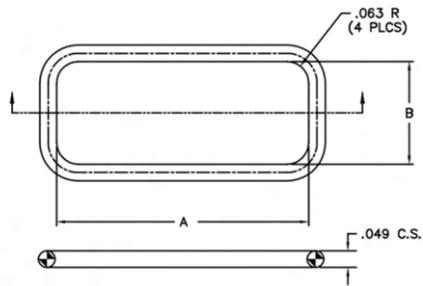
LOW-PROFILE PLASTIC

| DIMENSIONS | | | | | | | | | | | |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------|
| Size | Contact Row | A | | B | | C | | D | | D | |
| | | Plug | RCPT | Plug | RCPT | Plug | RCPT | Plug | RCPT | Plug | RCPT |
| 9 | 2 | 0.125 | 0.205 | 0.256 | 0.315 | 0.210 | 0.195 | 0.400 | 0.430 | MD009LP | MD009LS |
| 15 | | | | | | | | 0.550 | 0.580 | MD015LP | MD015LS |
| 21 | | | | | | | | 0.700 | 0.730 | MD021LP | MD021LS |
| 25 | | | | | | | | 0.800 | 0.830 | MD025LP | MD025LS |
| 31 | | | | | | | | 0.950 | 0.980 | MD031LP | MD031LS |
| 37 | | | | | | | | 1.100 | 1.130 | MD037LP | MD037LS |
| 51 | 3 | 0.168 | 0.247 | 0.298 | 0.360 | 0.195 | 0.195 | 1.050 | 1.080 | MD051LP | MD051LS |

Not for use on receptacles with grounding fingers

O-RINGS AND GASKETS

O-RINGS, FLUOROSILICONE AND BUTYL



| DIMENSIONS (REF ONLY) | | | |
|-----------------------|-------------|-------|-------|
| Size | Contact Row | A | B |
| 9 | 2 | 0.739 | 0.301 |
| 15 | | 0.889 | |
| 21 | | 1.039 | |
| 25 | | 1.139 | |
| 31 | | 1.297 | |
| 37 | 1.439 | | |
| 51 | 3 | 1.439 | 0.344 |
| 69 | | 1.731 | |
| 100 | 4 | 2.159 | 0.421 |

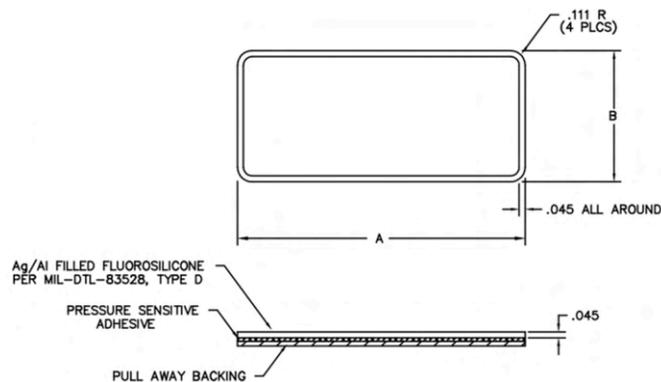
FLUOROSILICONE

| PART NUMBERS | |
|--------------|----------|
| Size | P/N |
| 9 | CDG17148 |
| 15 | CDG17149 |
| 21 | CDG17150 |
| 25 | CDG17151 |
| 31 | CDG17152 |
| 37 | CDG17153 |
| 51 | CDG17154 |
| 69 | CDG17155 |
| 100 | CDG17156 |

BUTYL

| PART NUMBERS | |
|--------------|----------|
| Size | P/N |
| 9 | CDG17478 |
| 15 | CDG17479 |
| 21 | CDG17480 |
| 25 | CDG17481 |
| 31 | CDG17482 |
| 37 | CDG17483 |
| 51 | CDG17484 |
| 69 | CDG17485 |
| 100 | CDG17486 |

EMI GASKET, FLUOROSILICONE

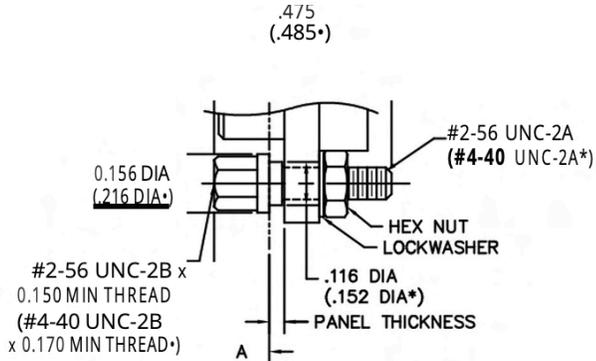


| DIMENSIONS (REF ONLY) | | | |
|-----------------------|-------------|-------|-------|
| Size | Contact Row | A | B |
| 9 | 2 | 0.872 | 0.395 |
| 15 | | 1.022 | |
| 21 | | 1.172 | |
| 25 | | 1.272 | |
| 31 | | 1.422 | |
| 37 | 1.572 | | |
| 51 | 3 | 1.572 | 0.438 |
| 69 | | 1.872 | |
| 100 | 4 | 2.298 | 0.515 |

| PART NUMBERS | |
|--------------|----------|
| Size | P/N |
| 9 | CDG15933 |
| 15 | CDG15934 |
| 21 | CDG15935 |
| 25 | CDG15936 |
| 31 | CDG15937 |
| 37 | CDG13044 |
| 51 | CDG15938 |
| 69 | CDG12978 |
| 100 | CDG15939 |

HARDWARE

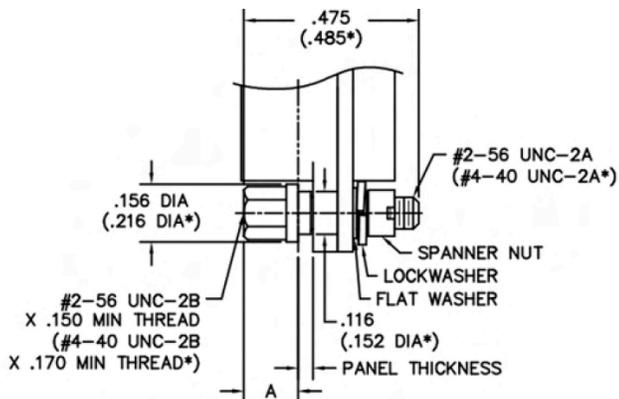
MM - MN - MQ - MP REAR PANEL MOUNT HARDWARE FOR STANDARD I/O CONNECTORS



*Dimensions for 100 position connectors

| Panel THK | Thread Size | Part Number | A MAX |
|-----------|-------------|-------------------------|-------|
| .040 | #2-56 | MM-000-000-000-2400-0F4 | 0.150 |
| .050 | | MM-000-000-000-2500-0F5 | 0.140 |
| .060 | | MM-000-000-000-2600-0F6 | 0.130 |
| .070 | | MM-000-000-000-2800-0F7 | 0.120 |
| .080 | | MM-000-000-000-2900-0F8 | 0.110 |
| .040 | #4-40 | MM-000-000-000-6400-0F9 | 0.150 |
| .050 | | MM-000-000-000-6500-0FA | 0.140 |
| .060 | | MM-000-000-000-6600-0FB | 0.130 |
| .070 | | MM-000-000-000-6800-0FC | 0.120 |
| .080 | | MM-000-000-000-6900-0FD | 0.110 |

MM - MN - MQ - MP REAR PANEL MOUNT HARDWARE FOR I/O CONNECTORS WITH GROUNDING FINGERS, INTEGRATED SHIELD TERMINATION, OR I/O WITH EMI/RFI BACKSHELL

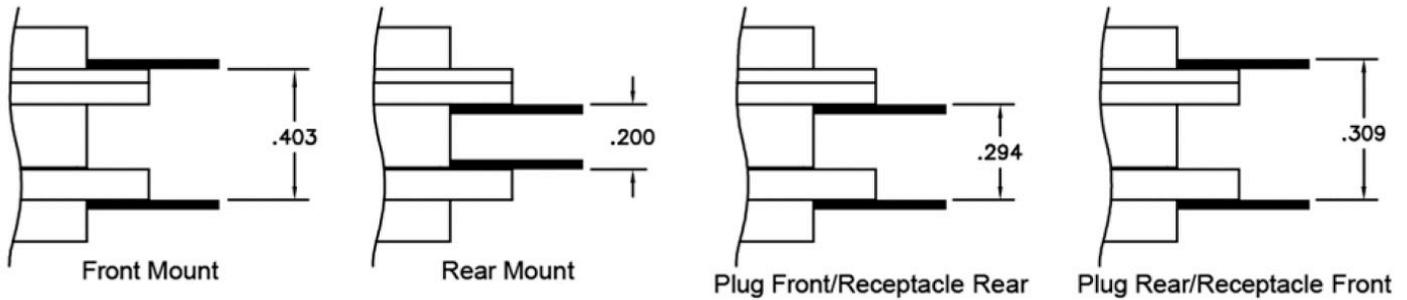


*Dimensions for 100 position connectors

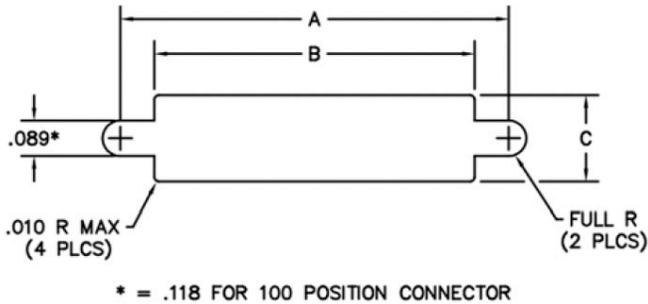
| Panel THK | Thread Size | Part Number | A MAX |
|-----------|-------------|-------------------------|-------|
| .040 | #2-56 | MM-000-000-000-2400-0G7 | 0.150 |
| .050 | | MM-000-000-000-2500-0G7 | 0.140 |
| .060 | | MM-000-000-000-2600-0G7 | 0.130 |
| .070 | | MM-000-000-000-2800-0G7 | 0.120 |
| .080 | | MM-000-000-000-2900-0G7 | 0.110 |
| .040 | #4-40 | MM-000-000-000-6400-0G7 | 0.150 |
| .050 | | MM-000-000-000-6500-0G7 | 0.140 |
| .060 | | MM-000-000-000-6600-0G7 | 0.130 |
| .070 | | MM-000-000-000-6800-0G7 | 0.120 |
| .080 | | MM-000-000-000-6900-0G7 | 0.110 |

HARDWARE

PANEL MOUNTING DIMENSIONS FOR RECEPTACLES WITH GROUNDING FINGERS

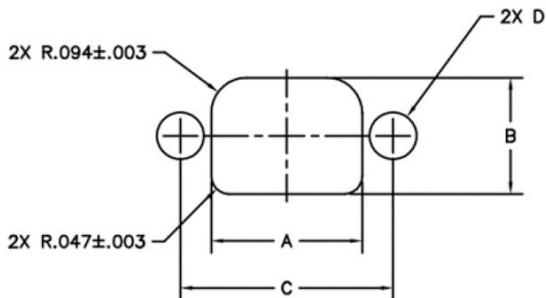


FRONT PANEL MOUNTING RECEPTACLES WITH GROUNDING FINGERS



| DIMENSIONS | | | | |
|------------|-------------------------|-------------------------|------------------------------|------------------------------|
| Size | A + 0.004 - 0.000 | B + 0.005 - 0.000 | C + 0.004 - 0.000 | |
| | | | MP, MQ, MR, MS MQHT, MSHT | MK, ML, MM, MN MKHT, MMHT |
| 9 | 0.570 | 0.400 | 0.215 | 0.273 |
| 15 | 0.720 | 0.550 | | |
| 21 | 0.870 | 0.700 | | |
| 25 | 0.970 | 0.800 | | |
| 31 | 1.120 | 0.950 | | |
| 37 | 1.270 | 1.100 | 0.256 | 0.311 |
| 51 | 1.220 | 1.050 | | |
| 69 | 1.520 | 1.350 | | |
| 100 | 1.805 | 1.442 | — | 0.383 |

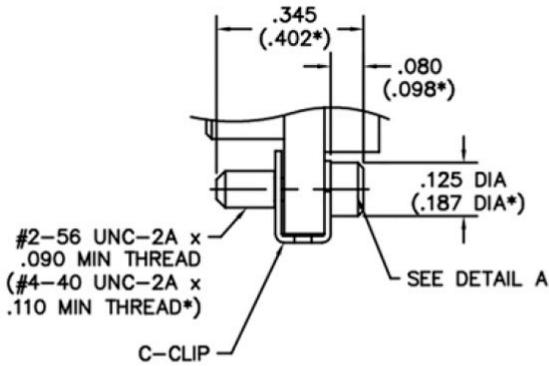
REAR PANEL MOUNTING RECEPTACLES WITH GROUNDING FINGERS



| DIMENSIONS | | | | |
|------------|-------------------------|-------------------------|--------------|-------------------------|
| Size | A + 0.004 - 0.000 | B + 0.004 - 0.000 | C ± 0.005 | C ± 0.005 Through |
| 9 | 0.401 | 0.308 | 0.565 | 0.125 |
| 15 | 0.551 | | 0.715 | |
| 21 | 0.701 | | 0.865 | |
| 25 | 0.801 | | 0.965 | |
| 31 | 0.951 | | 1.115 | |
| 37 | 1.101 | 0.351 | 1.265 | |
| 51 | 1.051 | | 1.215 | |
| 69 | 1.351 | | 1.515 | |
| 100 | 1.505 | 0.391 | 1.800 | 0.160 |

C-CLIP HARDWARE

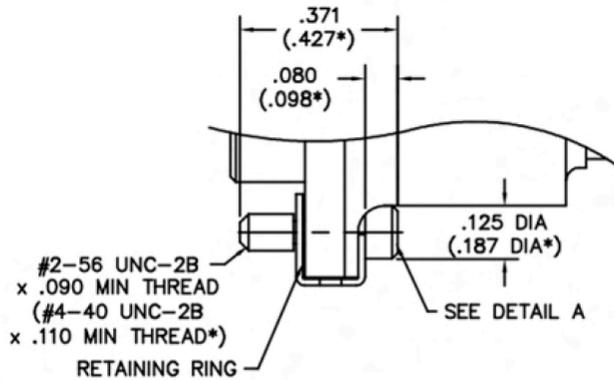
MM - MN - MQ - MP - MMHT - MQHT JACKING HARDWARE



SHORT TURNING
JACKSCREW ASSEMBLY
C-CLIP RETAINER

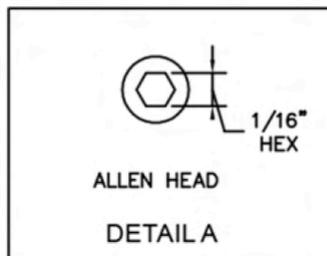
- #2-56 JACKSCREW, ALLEN HEAD 00-000-000-000-4A00
- #4-40 JACKSCREW, ALLEN HEAD 00-000-000-000-8A00

MM - MQ I/O WITH EMI/RFI BACKSHELL



SHORT TURNING
JACKSCREW ASSEMBLY
C-CLIP RETAINER

- #2-56 JACKSCREW, ALLEN HEAD 00-000-000-000-4A00-01G
- #4-40 JACKSCREW, ALLEN HEAD 00-000-000-000-8A00-04A



*Dimensions for #4-40 hardware (100 position connectors)

AIRBORN MHT SERIES – 0.050"
HIGH TEMPERATURE

TABLE OF CONTENTS

AirBorn MHT Series - 0.050" - High-Temperature Connectors

| | |
|--|-------|
| High-Temperature Connectors - Table of Contents..... | M-161 |
| Specifications..... | M-187 |
| Performance Reference MIL-DTL-83513 | M-188 |
| Part Number Description | M-189 |

Micro-D, High-Temperature, Cable-to-Cable Connectors

| | |
|--|-------|
| MMHT Rugged Metal, High-Temperature Cable-to-Cable | M-190 |
| MQHT Rugged Metal, High-Temperature Cable-to-Cable | M-192 |

Micro-D, High-Temperature, Board-to-Cable Connectors

| | |
|--|---------------|
| MKHT - MMHT Rugged Metal, Right-Angle, Board-to-Cable Narrow Footprint..... | M-194 |
| MKHT Rugged Board Mount High-Temperature, MMHT Rugged Cable High-Temperature | M-196 |
| MKHT Board Layouts - Right-Angle, Narrow Footprint Standard Polarization | M-198 – M-199 |
| MSHT - MQHT Low-Profile Board Mount and Low-Profile Cable HT Narrow Footprint..... | M-200 |
| MSHT - MQHT Low-Profile Board Mount HT and Low-Profile Cable HT Narrow Footprint..... | M-202 |
| MSHT Board Layouts - Right-Angle, Narrow Footprint Standard Polarization..... | M-204 – M-205 |
| MTHT - MTHT Low-Profile Metal I/O Connector and Low-Profile Metal Board Mount with Mounting Holes..... | M-206 |
| MTHT Board Layouts Low-Profile Right-Angle, Standard Polarization | M-208 – M-209 |

SPECIFICATIONS – MATERIALS AND FINISHES*

| | |
|---|--|
| CONTACTS: | Pins: Copper-based alloy selected for high temperature applications Sockets: Brass per ASTM 8121/8121Mor ASTM 816/816M or ASTM 8453 |
| CONTACT FINISHES:** | Gold plate per ASTM B488 |
| SHELLS: | Aluminum Alloy 6061-T6 per SAE AMS-QQ-A-250/11 or 6061-T6511 per SAE AMS-QQ-A-200/8 Electroless nickel per SAE AMS2404, class 3, 500 µm min |
| MOLDED INSULATORS: | High temperature thermoplastic |
| EMBEDMENT: | High temperature epoxy |
| JACKSCREWS, JACKPOSTS AND NUTS: | Corrosion resistant steel per ASTM A320 or ASTM A484/A484M and ASTM A582/A582M Passivated per SAE AMS2700 |
| CLIPS AND WASHERS: | Corrosion resistant steel per ASME 18.24 or NASM35333 <i>(For reference only: ASME 18.24 CRS per ASTM A693 and NASM35333 CRS per ASTM A240)</i> Passivated per ASME 18.24 or NASM35333 <i>(For reference only: ASME 18.24 and NASM35333 passivated per SAE AMS2700)</i> |
| INTERFACIAL SEAL GASKETS: | Fluorosilicone per SAE AMS-R-25988 |
| TOLERANCES:** <i>(Unless otherwise specified)</i> | Angles: $\pm 5^\circ$ Decimals: $\pm 0.010''$; Fractions: $\pm 1/64''$ Wire lengths: insulated/stranded: $+1.0''/-0.0''$ uninsulated/solid: $+0.2''/-0.0''$ |

NOTES

Molex can manufacture special configurations for your exact specifications.

*Reference the above listed specifications or an equivalent industry standard when applicable

PERFORMANCE REFERENCE MIL-DTL-83513

AirBorn M Series meets or exceeds MIL-DTL-83513 Performance Specifications

| | |
|----------------------------------|--|
| CONTACT RATING: | 3-amperes maximum |
| SOLDERABILITY: | Terminals (except crimp) tested in accordance with MIL-STD-202, method 208 |
| WIRE SIZE: | Stranded #24, #26, #28 AWG or solid #25 AWG standard <i>(consult factory for other sizes and types)</i> |
| TEST VOLTAGE: | 600V (RMS) 60 Hz |
| OPERATING TEMPERATURE: | -55° C to +125° C |
| INSULATION RESISTANCE: | 5,000 megohms minimum at 500 VDC |
| DURABILITY: | 500 connector mating cycles |
| SALT SPRAY: | Mated connectors tested in accordance with MIL-STD-1344, method 1001, test condition B |
| HUMIDITY: | Mated connectors tested in accordance with MIL-STD-1344, method 1002, type II <i>(except steps 7a and 7b)</i> |
| THERMAL SHOCK: | Tested to the temperature extremes of MIL-STD-1344, method 1003, test condition A <i>(except step 3, temperature shall be 205° C)</i> |
| CONTACT RESISTANCE: | 0.065 volt maximum drop at 2.5 Amps (0.026 Ohms) |
| CONTACT ENGAGING FORCE: | 6.0 oz. maximum, with 0.0221 diameter test sleeve |
| CONTACT SEPARATING FORCE: | 0.5 oz. minimum, with 0.0230 diameter test sleeve |
| CRIMP STRENGTH: | 5 pound minimum tensile strength |

NOTES

Molex can manufacture special configurations for your exact specifications.

* Reference the above listed specifications or an equivalent industry standard when applicable

** When ordering to MIL Spec P/N, MIL Spec requirements apply

PART NUMBER DESCRIPTION

Each part number consists of at least five elements: series, body description, size (number of contacts), type of contacts, and type of hardware. A sixth element is added whenever special modifications or options are available.

Each catalog page shows the choices available for each of these elements. By selecting one option from each category on the page, you can build a set of connectors to meet your requirements.

Each element is identified by a combination of letters and/or numbers in fixed field lengths, and separated by a hyphen (-). Each space must be filled in to complete the number. When the size is less than 100, use zeroes to backfill. For example: an order for size 9 is written as "009"; an order for size 51 is written as "051" and so on

SERIES:

This will always be a two letter designator, and will identify the connector series. All 0.050" connectors begin with the letter M. The second letter designates the various styles of 0.050" connectors. "HT" designates high-temperature.

BODY DESIGNATOR:

Each digit of the Body Designator will normally identify (1) the number of rows, (2) the style of body, and (3) the body material. The three digit number to identify the body consists of one digit from each group.

SIZE:

The size is determined by the number of contacts in the connector, and is an integral part of the part number. If you are unable to locate the size you are looking for, contact Molex for further assistance.

CONTACTS:

Each page also identifies all contact and termination options for a given connector. The first two digits designate the type of contacts and terminations; the third digit designates the plating option.

HARDWARE:

Four digits comprise the Hardware Designator; two for style of hardware and two for polarization and/or wiring instruction. Follow the choices for each connector.

SPECIAL INSTRUCTIONS (OPTIONS):

Special instructions are designated by a three or four digit number added to the end of the Part Number. The Special Instructions Designator is included only where applicable.**

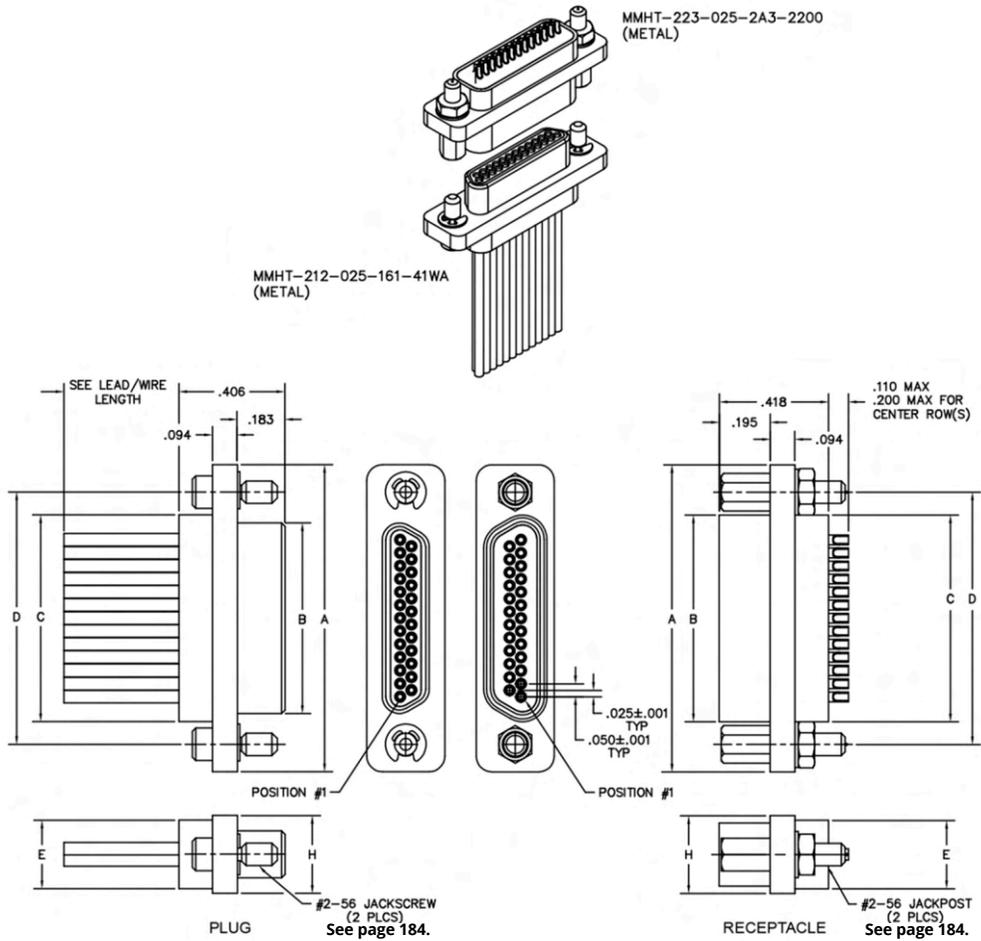
NOTES:

Each page is as comprehensive as possible. If you are unable to locate a particular connector size or option, please contact Molex for further assistance.

[x] Option is not RoHS compliant.

CABLE-TO-CABLE

MMHT - RUGGED METAL HIGH TEMPERATURE 0.050" | 9 THROUGH 100 CONTACTS



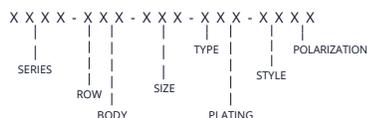
DIMENSIONS

| Size | Contact Row | A | B | | C | D | E Potting Well MAX | H | Hardware |
|------|-------------|-------|-------------|-------------|-------|-------|--------------------------|--------------------------------------|--------------------------------------|
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.270 | 0.298 | #2-56 UNC THD (0.092 DIA THROUGH) | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | | | | |
| 51 | 3 | 1.825 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.341 | #4-40 UNC THD (0.147 DIA THROUGH) |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.384 | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MMHT | 0.050" Rugged Metal I/O Connectors (MMHT mates with MMHT and MKHT receptacles) | MMHT | 0.050" Rugged Metal I/O Connectors (MMHT mates with MMHT and MKHT plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 51****) | 2 | Two-row (Sizes 9 through 51****) |
| 3 | Three-row (Size 51 and 69****) | 3 | Three-row (Size 51 and 69****) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears | 2 | Receptacle, straight, with ears and interfacial seal high temperature. |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | High temperature thermoplastic with electroless nickel shell | 2 | High temperature thermoplastic with electroless nickel shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, 26 AWG solder cup | 21 | Socket, straight, 26 AWG solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWG solder cup |
| 1D | Pin, straight, 0.109" lead length (0.018 dia.) SEE NOTE 1 | 2D | Socket, straight, 0.109" lead length (0.018 dia.) |
| 1E | Pin, straight, 0.125" lead length (0.018 dia.) SEE NOTE 1 | 2E | Socket, straight, 0.125" lead length (0.018 dia.) |
| 1F | Pin, straight, 0.140" lead length (0.018 dia.) SEE NOTE 1 | 2F | Socket, straight, 0.140" lead length (0.018 dia.) |
| 12 | Pin, straight, 0.150" lead length (0.018 dia.) SEE NOTE 1 | 22 | Socket, straight, 0.150" lead length (0.018 dia.) |
| 1G | Pin, straight, 0.156" lead length (0.018 dia.) SEE NOTE 1 | 2G | Socket, straight, 0.156" lead length (0.018 dia.) |
| 1H | Pin, straight, 0.172" lead length (0.018 dia.) SEE NOTE 1 | 2H | Socket, straight, 0.172" lead length (0.018 dia.) |
| 1J | Pin, straight, 0.187" lead length (0.018 dia.) SEE NOTE 1 | 2J | Socket, straight, 0.187" lead length (0.018 dia.) |
| 13 | Pin, straight, 0.250" Lead Lenth (0.018 dia.) SEE NOTE 1 | 23 | Socket, straight, 0.250" lead length (0.018 dia.) |
| 1K | Pin, straight, 0.375" lead length (0.018 dia.) SEE NOTE 1 | 2K | Socket, straight, 0.375" lead length (0.018 dia.) |
| 14 | Pin, straight, 0.500" lead length (0.018 dia.) SEE NOTE 1 | 2L | Socket, straight, 0.500" lead length (0.018 dia.) |
| 15 | Pin, straight, 1.000" lead length (0.018 dia.) SEE NOTE 1 | 2M | Socket, straight, 1.000" lead length (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 24 | Socket, straight, 0.500" lead length (0.018 dia.) SEE NOTE 1 |
| | | 25 | Socket, straight, 1.000" lead length (0.018 dia.) SEE NOTE 1 |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts (solder cup, pigtail) | 3 | 50 µm Au contacts (solder cup, pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 22 | Two fixed jacknut assemblies (62*) |
| 41 | Two turning jackscrews, Allen head, retaining ring (81*) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| 42 | Two long turning jackscrews, Allen head, retaining ring (82*) | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| 43 | Two turning jackscrews, slot head, retaining ring (83*) | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| 44 | Two long turning jackscrews, slot head, retaining ring (84*) | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| 45 | Two turning jackscrews, Allen head, captivated** (85*) | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG: MMHT-212-031-161-41WA
 RECEPTACLE: MMHT-222-031-2G3-4500



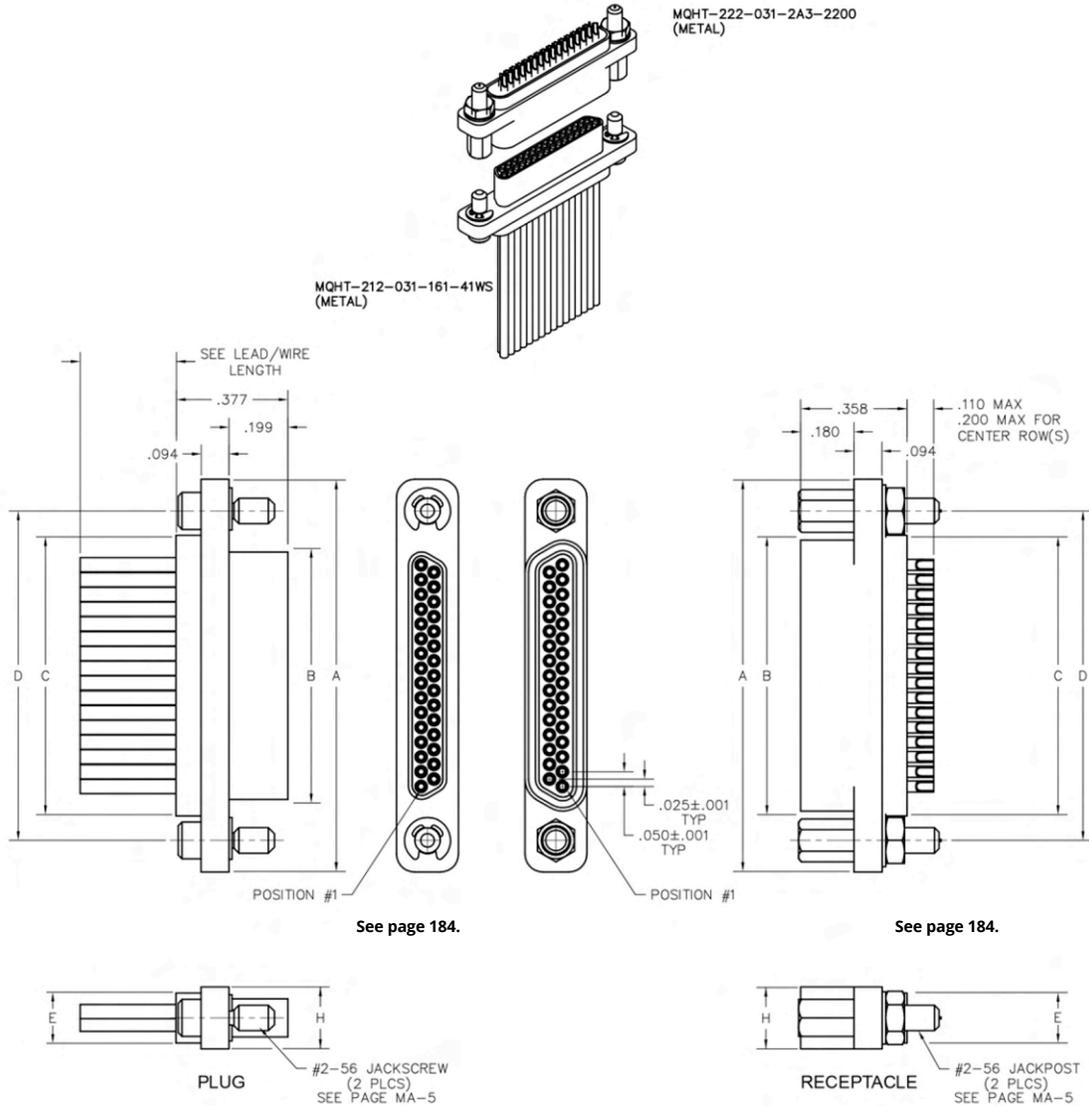
NOTE: The leads on these contacts are soft copper suitable for forming.
 * Use numbers or letters in parenthesis when ordering size 100.

** Captive hardware is factory installed and non-removable.

☒ Option is not RoHS-compliant

CABLE-TO-CABLE

MQHT - LOW-PROFILE METAL HIGH TEMPERATURE 0.050" | 9 THROUGH 100 CONTACTS



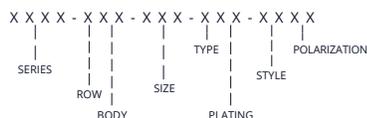
DIMENSIONS

| Size | Contact Row | A | B | | C | D | E | H | Hardware |
|------|-------------|-------|----------|----------|-------|-------|-------|-------|-----------------------------------|
| | | | Plug MAX | RCPT MAX | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.398 | 0.565 | 0.173 | 0.208 | #2-56 UNC THD (0.092 DIA THROUGH) |
| 15 | | 0.928 | 0.442 | 0.528 | 0.548 | 0.715 | | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.698 | 0.865 | | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.798 | 0.965 | | | |
| 31 | | 1.328 | 0.842 | 0.928 | 0.948 | 1.115 | | | |
| 37 | 1.478 | 0.992 | 1.078 | 1.098 | 1.265 | | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.048 | 1.215 | 0.220 | 0.250 | |

LEAD CONFIGURATION OPTIONS

| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|---|
| SERIES | | | |
| MQHT | 0.050" Rugged Metal I/O Connectors (MQHT mates with MQHT and MSHT receptacles) | MQHT | 0.050" Rugged Metal I/O Connectors (MQHT mates with MQHT and MSHT receptacles) Should this say plugs? |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| BODY STYLE | | BODY STYLE | |
| 1 | Plug, straight, with ears. High temperature. | 2 | Receptacle, straight, with ears. High temperature. |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | High temperature thermoplastic with electroless nickel shell | 2 | High temperature thermoplastic with electroless nickel shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051 | XXX | 009, 015, 021, 025, 031, 037, 051 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 11 | Pin, straight, 26 AWG solder cup | 21 | Socket, straight, 26 AWG solder cup |
| 1A | Pin, straight, 24 AWG solder cup | 2A | Socket, straight, 24 AWG solder cup |
| 1D | Pin, straight, 0.109" lead length (0.018 dia.) SEE NOTE 1 | 2D | Socket, straight, 0.109" lead length (0.018 dia.) |
| 1E | Pin, straight, 0.125" lead length (0.018 dia.) SEE NOTE 1 | 2E | Socket, straight, 0.125" lead length (0.018 dia.) |
| 1F | Pin, straight, 0.140" lead length (0.018 dia.) SEE NOTE 1 | 2F | Socket, straight, 0.140" lead length (0.018 dia.) |
| 12 | Pin, straight, 0.150" lead length (0.018 dia.) SEE NOTE 1 | 22 | Socket, straight, 0.150" lead length (0.018 dia.) |
| 1G | Pin, straight, 0.156" lead length (0.018 dia.) SEE NOTE 1 | 2G | Socket, straight, 0.156" lead length (0.018 dia.) |
| 1H | Pin, straight, 0.172" lead length (0.018 dia.) SEE NOTE 1 | 2H | Socket, straight, 0.172" lead length (0.018 dia.) |
| 1J | Pin, straight, 0.187" lead length (0.018 dia.) SEE NOTE 1 | 2J | Socket, straight, 0.187" lead length (0.018 dia.) |
| 13 | Pin, straight, 0.250" Lead Lenth (0.018 dia.) SEE NOTE 1 | 23 | Socket, straight, 0.250" lead length (0.018 dia.) |
| 1K | Pin, straight, 0.375" lead length (0.018 dia.) SEE NOTE 1 | 2K | Socket, straight, 0.375" lead length (0.018 dia.) |
| 14 | Pin, straight, 0.500" lead length (0.018 dia.) SEE NOTE 1 | 2L | Socket, straight, 0.500" lead length (0.018 dia.) |
| 15 | Pin, straight, 1.000" lead length (0.018 dia.) SEE NOTE 1 | 2M | Socket, straight, 1.000" lead length (0.018 dia.) |
| 16 | Pin, straight, crimped wire | 24 | Socket, straight, 0.500" lead length (0.018 dia.) SEE NOTE 1 |
| | | 25 | Socket, straight, 1.000" lead length (0.018 dia.) SEE NOTE 1 |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 1 | 50 µm Au contacts (crimp wire) | 1 | 50 µm Au contacts (crimp wire) |
| 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 22 | Two fixed jacknut assemblies |
| 41 | Two turning jackscrews, Allen head, retaining ring | 41 | Two turning jackscrews, Allen head, retaining ring |
| 42 | Two long turning jackscrews, Allen head, retaining ring | 42 | Two long turning jackscrews, Allen head, retaining ring |
| 43 | Two turning jackscrews, slot head, retaining ring | 43 | Two turning jackscrews, slot head, retaining ring |
| 44 | Two long turning jackscrews, slot head, retaining ring | 44 | Two long turning jackscrews, slot head, retaining ring |
| 45 | Two turning jackscrews, Allen head, captivated* | 45 | Two turning jackscrews, Allen head, captivated* |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| 00 | None | 00 | None |
| XX | For wiring codes, see pages M-158 and M-159. | XX | For wiring codes, see pages M-158 and M-159. |

PLUG: MQHT-212-031-161-41WS
 RECEPTACLE: MQHT-222-031-2G3-4500

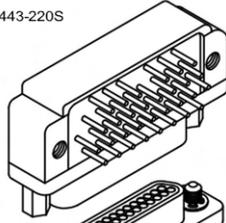


NOTE:
 The leads on these contacts are soft copper suitable for forming.
 **Captive hardware is factory installed and non-removable.

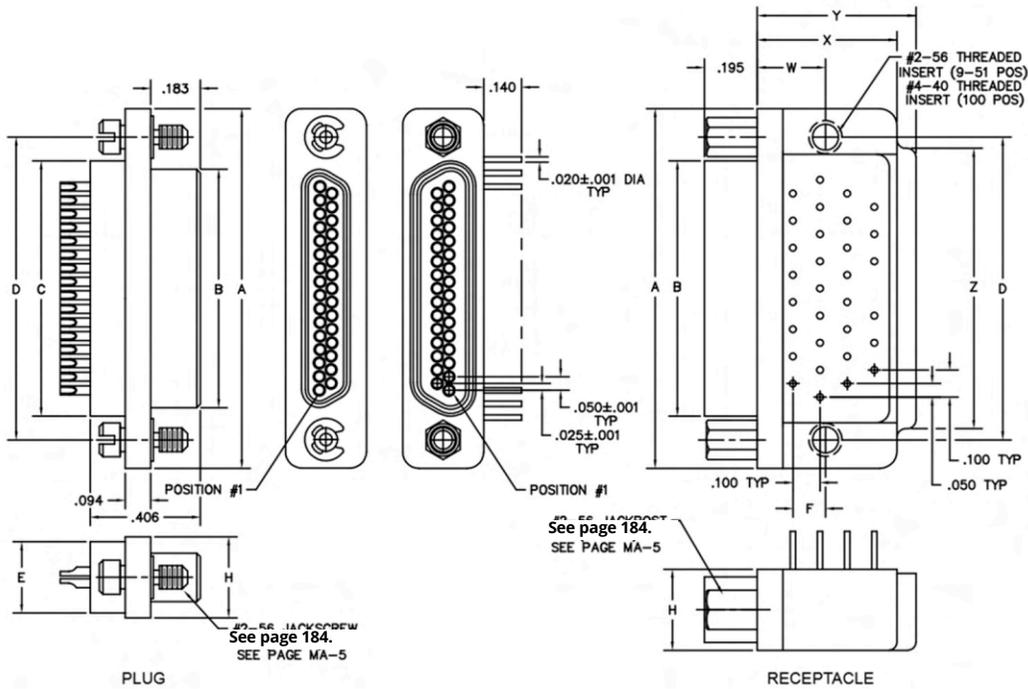
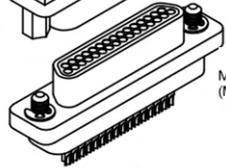
BOARD- (NARROW FOOTPRINT) TO-CABLE

MKHT - RUGGED BOARD MOUNT HIGH TEMPERATURE AND MMHT - RUGGED CABLE HIGH TEMPERATURE
 0.050" | 9 THROUGH 100 CONTACTS

MKHT-262-031-443-220S
 (METAL)



MMHT-212-031-113-4300
 (METAL)



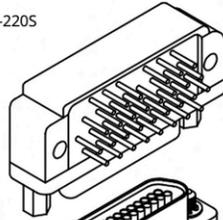
DIMENSIONS

| Size | Contact Row | A | B | | C | D | E | | F | H | W | X MAX | X MAX | Z | Hardware | |
|------|-------------|-------|----------|----------|-------|-------|------------------|-------|-------|-------|-------|-------|-------|---------------|---------------|-------|
| | | | Plug MAX | RCPT MAX | | | Potting Well MAX | | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.020 | 0.120 | 0.298 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD | |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | | | | | | | | | 0.925 |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | | | | | | | | | 1.075 |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | | | | | | | | | 1.175 |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | | | | | | | | | 1.080 |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | | | | | | | | | 1.180 |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.150 | 0.341 | 0.300 | 0.430 | 0.650 | 1.220 | #4-40 UNC THD | | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.200 | 0.384 | 0.400 | 0.590 | 1.000 | 1.810 | | | |

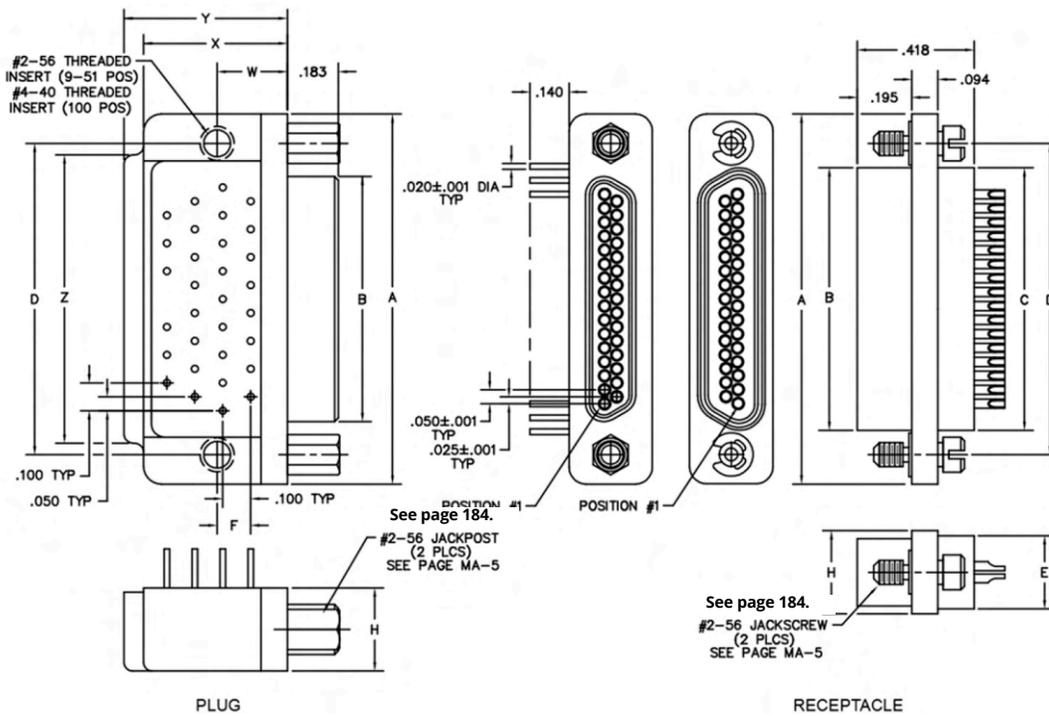
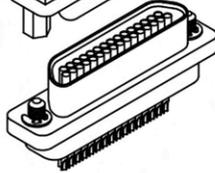
BOARD-TO-CABLE (NARROW FOOTPRINT)

MKHT - RUGGED BOARD MOUNT HIGH TEMPERATURE AND MMHT - RUGGED CABLE HIGH TEMPERATURE
 0.050" | 9 THROUGH 100 CONTACTS

MKHT-252-031-335-2205
 (METAL)



MMHT-222-031-213-4100
 (METAL)



PLUG

RECEPTACLE

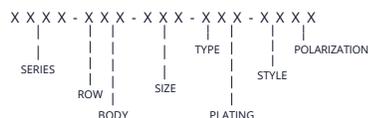
DIMENSIONS

| Size | Contact Row | A | B | | C | D | E | | F | H | W | X MAX | X MAX | Z | Hardware |
|------|-------------|-------|----------|----------|-------|-------|------------------|-------|-------|-------|-------|-------|-------|---------------|---------------|
| | | | Plug MAX | RCPT MAX | | | Potting Well MAX | | | | | | | | |
| 9 | 2 | 0.775 | 0.334 | 0.400 | 0.390 | 0.565 | 0.270 | 0.020 | 0.120 | 0.298 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD |
| 15 | | 0.925 | 0.484 | 0.550 | 0.540 | 0.715 | | 0.925 | | | | | | | |
| 21 | | 1.075 | 0.634 | 0.700 | 0.690 | 0.865 | | 1.075 | | | | | | | |
| 25 | | 1.175 | 0.734 | 0.800 | 0.790 | 0.965 | | 1.175 | | | | | | | |
| 31 | | 1.325 | 0.884 | 0.950 | 0.940 | 1.115 | | 1.080 | | | | | | | |
| 37 | | 1.475 | 1.034 | 1.100 | 1.090 | 1.265 | | 1.180 | | | | | | | |
| 51 | 3 | 1.425 | 0.984 | 1.050 | 1.040 | 1.215 | 0.310 | 0.150 | 0.341 | 0.300 | 0.430 | 0.650 | 1.220 | #4-40 UNC THD | |
| 100 | 4 | 2.160 | 1.384 | 1.508 | 1.432 | 1.800 | 0.360 | 0.200 | 0.384 | 0.400 | 0.590 | 1.000 | 1.810 | | |

LEAD CONFIGURATION OPTIONS

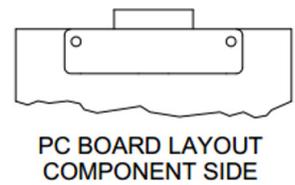
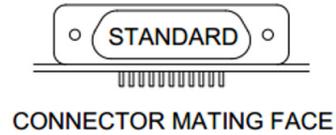
| PLUGS | | RECEPTACLES | |
|-----------------------------------|---|-----------------------------------|---|
| SERIES | | | |
| MKHT | 0.050" Rugged Metal PC Board Mount Connector (MKHT mates with MMHT receptacles) | MMHT | 0.050" Rugged Metal I/O Connector (MMHT mates with MKHT and MMHT plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| 4 | Four-row (Size 100) | 4 | Four-row (Size 100) |
| BODY STYLE | | BODY STYLE | |
| 5 | Plug, right-angle, narrow footprint, with threaded inserts. High temperature. | 2 | Receptacle, straight, with ears. High temperature. |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | High temperature thermoplastic with electroless nickel shell | 2 | High temperature thermoplastic with electroless nickel shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051, 100 | XXX | 009, 015, 021, 025, 031, 037, 051, 100 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, dip solder, 0.109" | 21 | Socket, straight, solder cup |
| 33 | Pin, right-angle, dip solder, 0.140" | 24 | Socket, straight, 0.500" pigtails (0.018 dia.) |
| 34 | Pin, right-angle, dip solder, 0.172" | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| 3 | 50 µm Au contacts: 10 µm Au terminations | 1 | 50 µm Au contacts (crimp wire) |
| | | 3 | 50 µm Au contacts: 10 µm Au terminations (solder cup, pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies (62*) | 41 | Two turning jackscrews, Allen head, retaining ring (81*) |
| | | 42 | Two long turning jackscrews, Allen head, retaining ring (82*) |
| | | 43 | Two turning jackscrews, slot head, retaining ring (83*) |
| | | 44 | Two long turning jackscrews, slot head, retaining ring (84*) |
| | | 45 | Two turning jackscrews, Allen head, captivated** (85*) |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OS | Standard body polarization | 00 | None |
| | | XX | For wiring codes, see pages M-158 and M-159. |
| OPTIONS | | | |
| | | 900 | Interfacial Seal |

PLUG: MKHT-252-031-335-220S
 RECEPTACLE: MMHT-222-031-213-4100

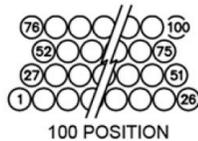
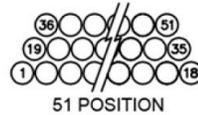


NOTE:
 *Use number in parenthesis when ordering size 100.
 **Captive hardware is factory installed and non-removable.

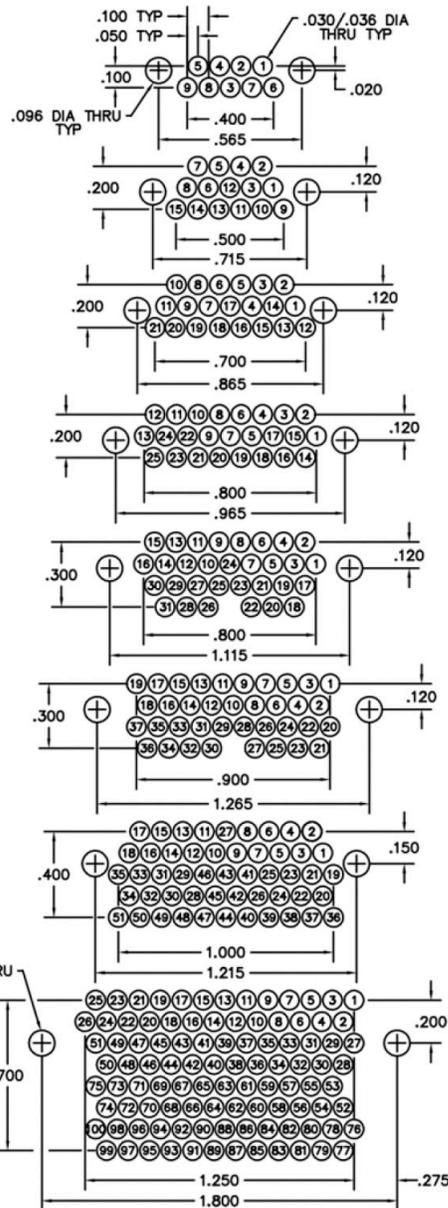
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 STANDARD POLARIZATION



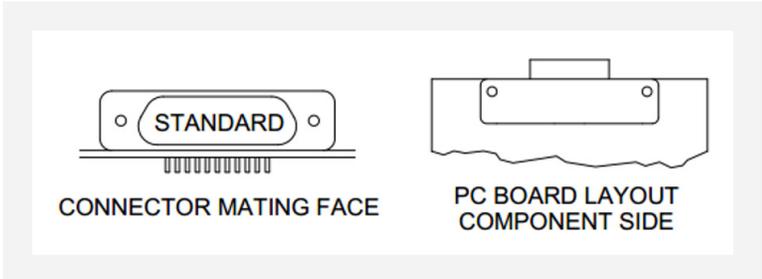
CONNECTOR MATING FACE (RECEPTACLE)



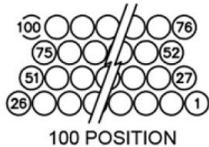
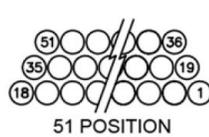
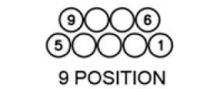
RECEPTACLE PC BOARD LAYOUT COMPONENT SIDE



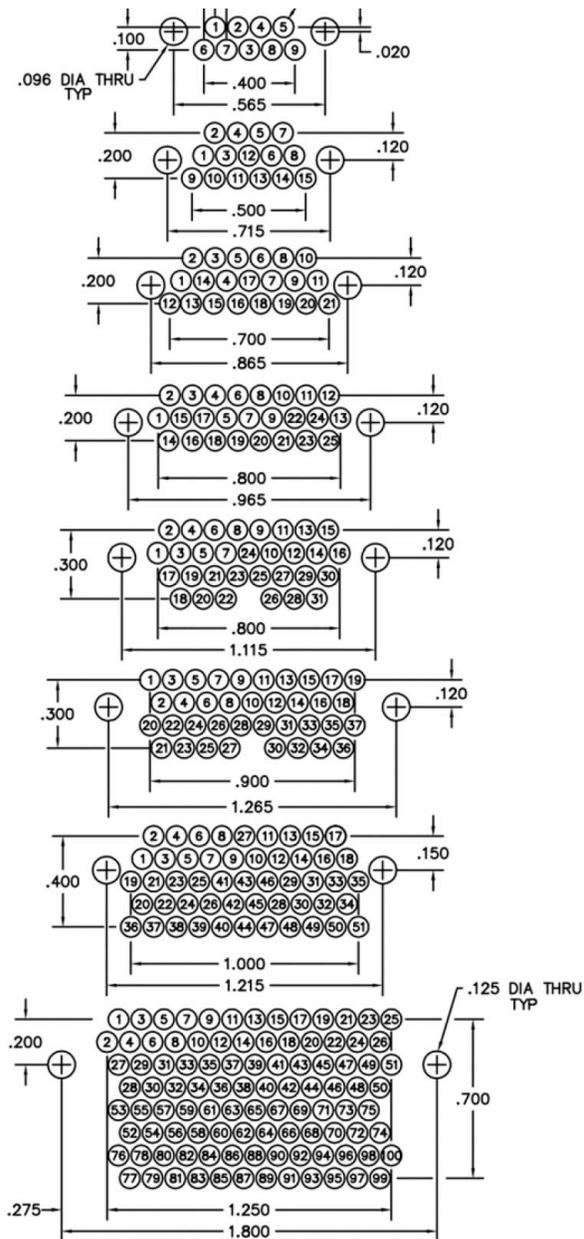
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 STANDARD POLARIZATION



CONNECTOR MATING FACE (PLUG)

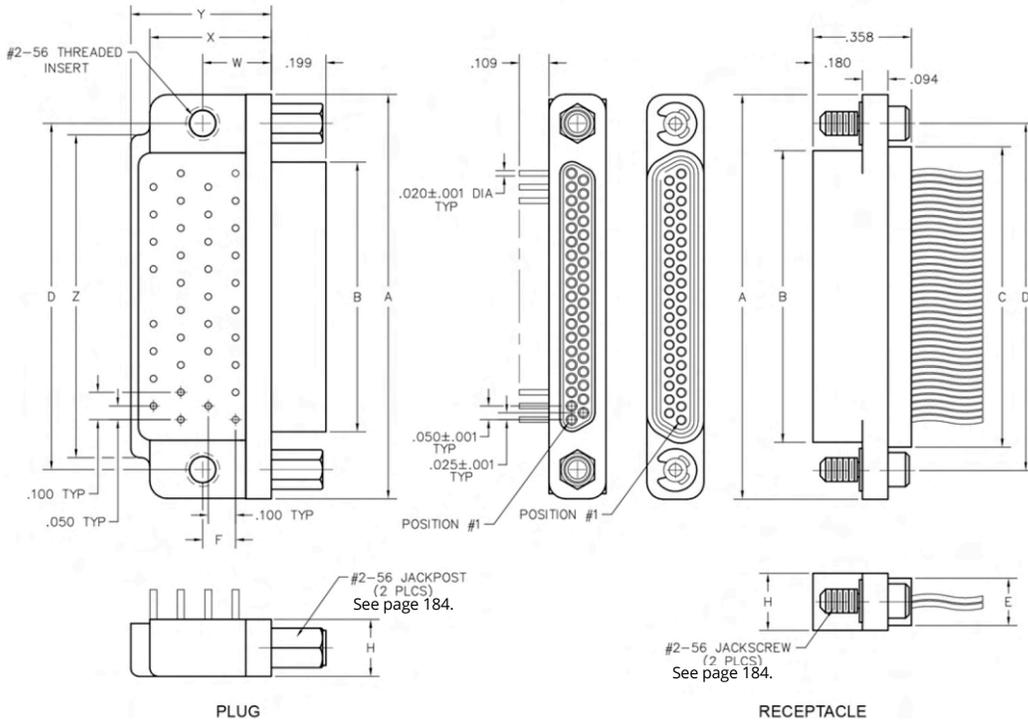
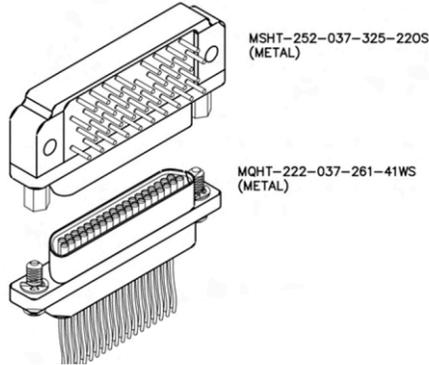


PLUG PC BOARD LAYOUT COMPONENT SIDE



BOARD-TO-CABLE (NARROW FOOTPRINT)

MSHT - LOW-PROFILE BOARD MOUNT HIGH TEMPERATURE AND
MQHT - LOW-PROFILE CABLE HIGH TEMPERATURE
 0.050" | 9 THROUGH 51 CONTACTS

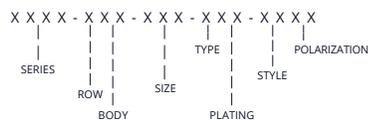


| DIMENSIONS | | | | | | | | | | | | | | | |
|------------|-------------|-------|----------|----------|-------|-------|------------------|-------|-------|-------|-------|-------|-------|-------|---------------|
| Size | Contact Row | A | B | | C | D | E | | F | H | W | X MAX | X MAX | Z | Hardware |
| | | | Plug MAX | RCPT MAX | | | Potting Well MAX | | | | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.398 | 0.565 | 0.173 | 0.020 | 0.120 | 0.208 | 0.250 | 0.420 | 0.420 | 0.775 | #2-56 UNC THD |
| 15 | | 0.928 | 0.442 | 0.528 | 0.548 | 0.715 | | 0.925 | | | | | | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.698 | 0.865 | | 1.075 | | | | | | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.798 | 0.965 | | 1.175 | | | | | | | |
| 31 | | 1.328 | 0.842 | 0.928 | 0.948 | 1.115 | | 1.080 | | | | | | | |
| 37 | | 1.478 | 0.992 | 1.078 | 1.098 | 1.265 | | 1.180 | | | | | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.048 | 1.215 | 0.220 | 0.150 | 0.250 | 0.300 | 0.425 | 0.650 | 1.220 | | |

LEAD CONFIGURATION OPTIONS

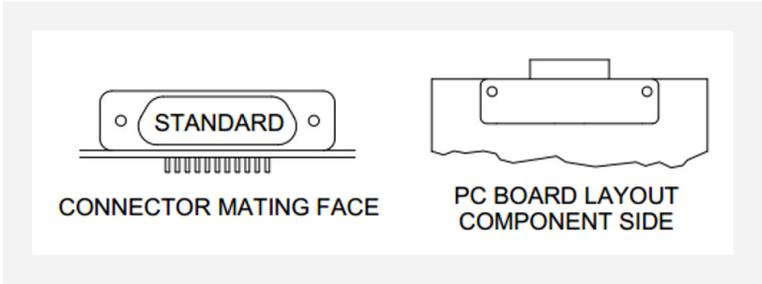
| PLUGS | | RECEPTACLES | |
|-----------------------------------|--|-----------------------------------|--|
| SERIES | | | |
| MSHT | 0.050" Low-Profile Metal PC Board Mount Connector (MSHT mates with MQHT receptacles) | MQHT | 0.050" Low-Profile Metal I/O Connector (MQHT mates with MQHT and MSHT plugs) |
| BODY | | | |
| 2 | Two-row (Sizes 9 through 37) | 2 | Two-row (Sizes 9 through 37) |
| 3 | Three-row (Size 51) | 3 | Three-row (Size 51) |
| BODY STYLE | | BODY STYLE | |
| 5 | Plug, right-angle, narrow footprint, with threaded inserts. High | 2 | Receptacle, straight, with ears. High temperature. |
| BODY MATERIAL | | BODY MATERIAL | |
| 2 | High temperature thermoplastic with electroless nickel shell | 2 | High temperature thermoplastic with electroless nickel shell |
| SIZE | | | |
| XXX | 009, 015, 021, 025, 031, 037, 051 | XXX | 009, 015, 021, 025, 031, 037, 051 |
| CONTACTS | | | |
| TYPE CONTACTS/TERMINATIONS | | TYPE CONTACTS/TERMINATIONS | |
| 32 | Pin, right-angle, dip solder, 0.109" | 21 | Socket, straight, solder cup |
| 33 | Pin, right-angle, dip solder, 0.140" | 24 | Socket, straight, 0.500" pigtails (0.018 dia.) |
| 34 | Pin, right-angle, dip solder, 0.172" | 25 | Socket, straight, 1.000" pigtails (0.018 dia.) |
| | | 26 | Socket, straight, crimped wire |
| PLATING OPTIONS | | PLATING OPTIONS | |
| | | 1 | 50 μm Au contacts (crimp wire) |
| 3 | 50 μm Au contacts: 10 μm Au terminations | 3 | 50 μm Au contacts: 10 μm Au terminations (solder cup, pigtail) |
| HARDWARE | | | |
| STYLE OF HARDWARE | | STYLE OF HARDWARE | |
| 00 | None | 00 | None |
| 22 | Two fixed jacknut assemblies | 41 | Two turning jackscrews, Allen head, retaining ring |
| | | 42 | Two long turning jackscrews, Allen head, retaining ring |
| | | 43 | Two turning jackscrews, slot head, retaining ring |
| | | 44 | Two long turning jackscrews, slot head, retaining ring |
| | | 45 | Two turning jackscrews, Allen head, captivated* |
| POLARIZATION/WIRING | | POLARIZATION/WIRING | |
| OS | Standard body polarization | 00 | None |
| | | XX | For wiring codes, see pages M-158 and M-159. |

PLUG: MSHT-252-037-323-220S
 RECEPTACLE: MQHT-222-037-261-41WS



NOTE:
 *Captive hardware is factory installed and non-removable.

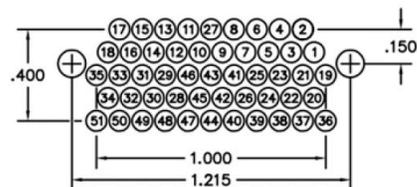
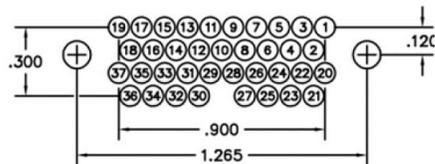
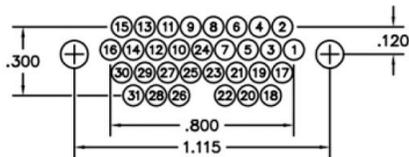
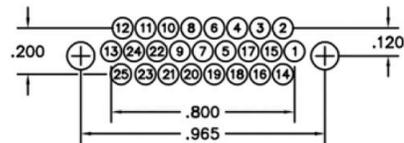
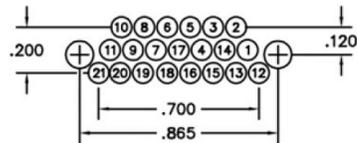
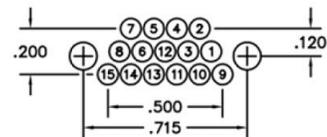
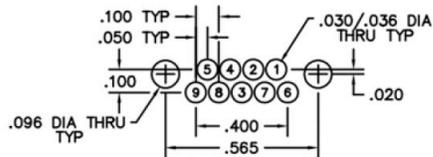
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 STANDARD POLARIZATION



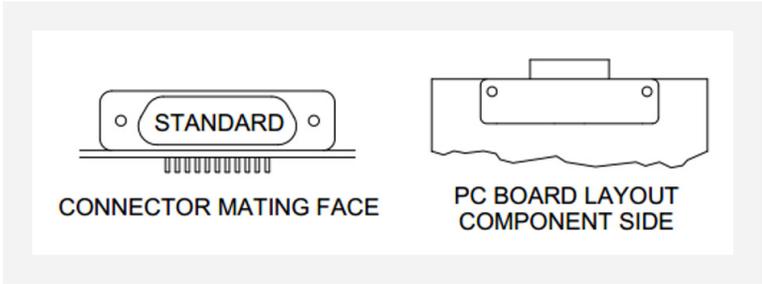
CONNECTOR
 MATING FACE
 (RECEPTACLE)



RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE



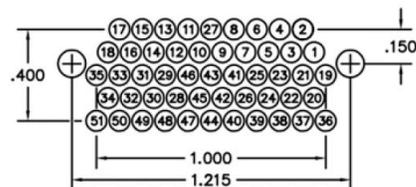
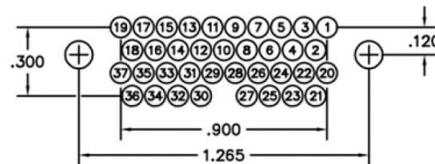
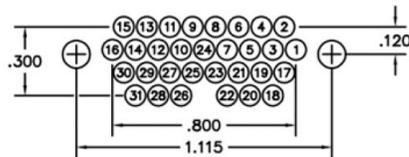
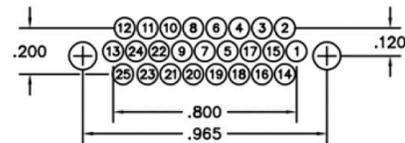
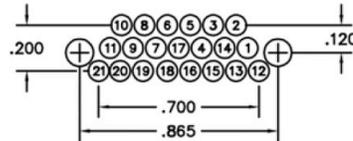
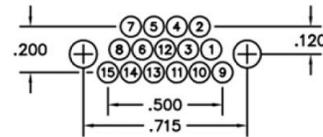
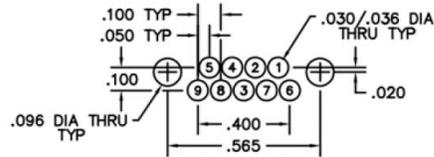
RECOMMENDED PC BOARD LAYOUTS
 RIGHT-ANGLE, NARROW FOOTPRINT
 STANDARD POLARIZATION



CONNECTOR
 MATING FACE
 (PLUG)



PLUG
 PC BOARD LAYOUT
 COMPONENT SIDE

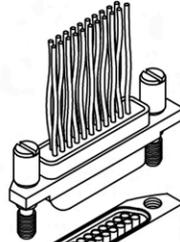


CABLE-TO-BOARD

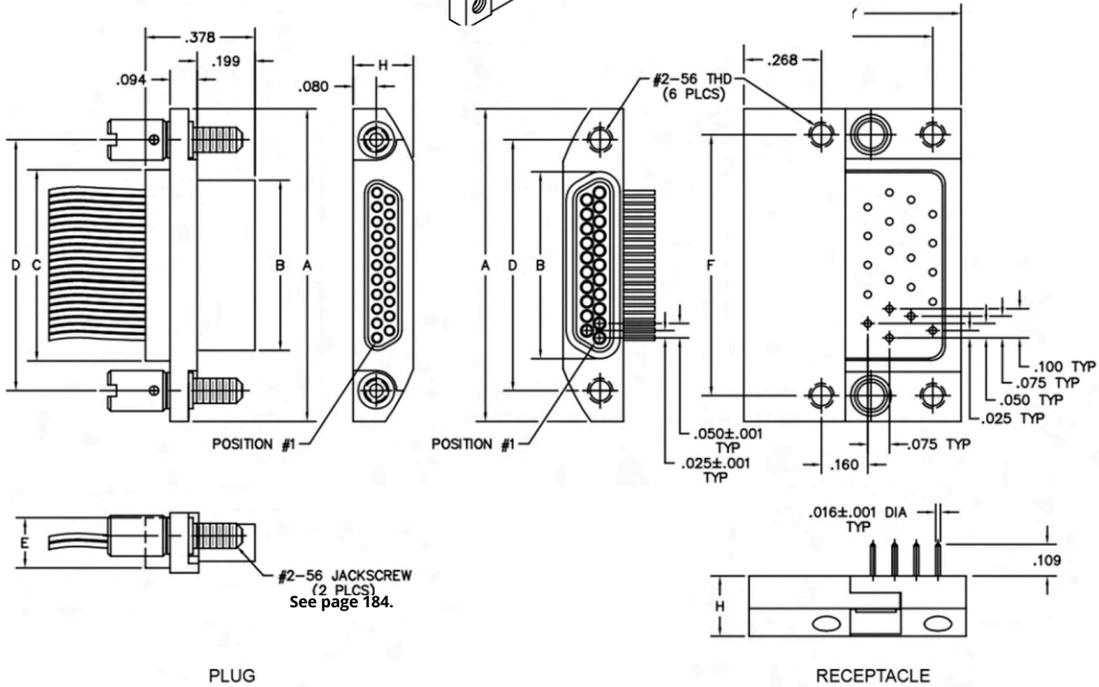
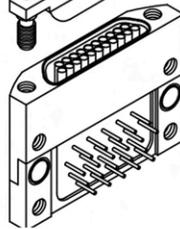
MTHT - LOW-PROFILE CABLE HIGH TEMPERATURE AND MTHT - LOW-PROFILE BOARD MOUNT HIGH TEMPERATURE

0.050" | 9 THROUGH 51 CONTACTS

MTHT-212-021-161-43WQ
(METAL)



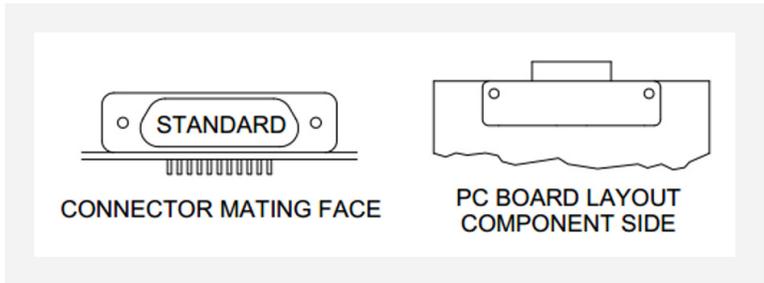
MTHT-2E2-021-433-0005
(METAL)



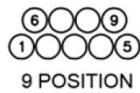
DIMENSIONS

| Size | Contact Row | A | B | | C | D | E Potting Well MAX | F | H | Hardware | W | Y |
|------|-------------|-------|-------------|-------------|-------|-------|--------------------------|-------|-------|---|-------|-------|
| | | | Plug MAX | RCPT MAX | | | | | | | | |
| 9 | 2 | 0.778 | 0.292 | 0.378 | 0.398 | 0.565 | 0.173 | 0.600 | 0.208 | #2-56 UNC THD (0.092 DIA Through) | 0.608 | 0.690 |
| 15 | | 0.928 | 0.442 | 0.528 | 0.548 | 0.715 | | 0.750 | | | | |
| 21 | | 1.078 | 0.592 | 0.678 | 0.698 | 0.865 | | 0.900 | | | | |
| 25 | | 1.178 | 0.692 | 0.778 | 0.798 | 0.965 | | 1.000 | | | | |
| 31 | | 1.328 | 0.842 | 0.928 | 0.948 | 1.115 | | 1.150 | | | | |
| 37 | | 1.478 | 0.992 | 1.078 | 1.098 | 1.265 | | 1.300 | | | | |
| 51 | 3 | 1.428 | 0.942 | 1.028 | 1.048 | 1.215 | 0.220 | 1.250 | 0.250 | | 0.728 | 0.825 |

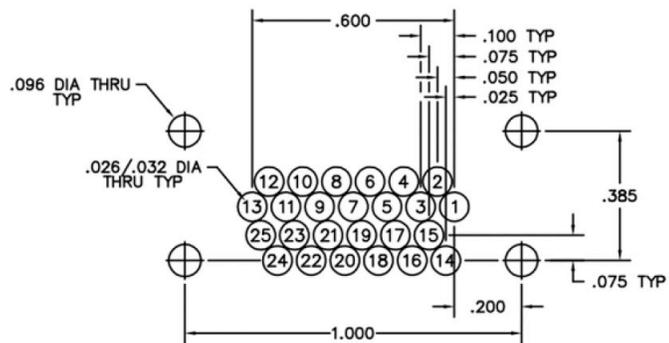
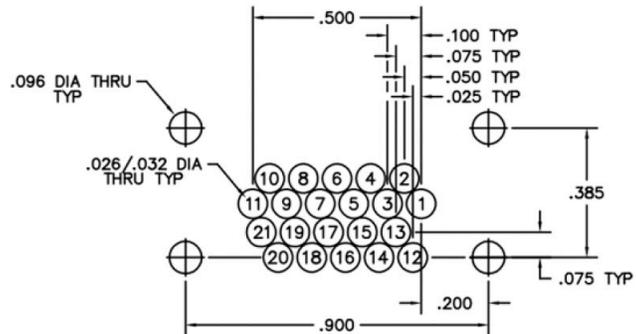
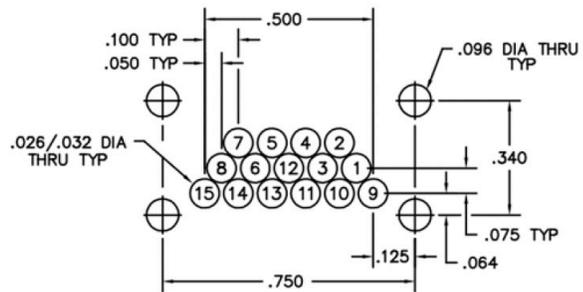
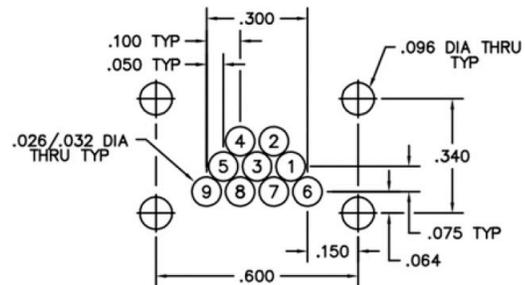
RECOMMENDED PC BOARD LAYOUTS
 LOW-PROFILE, RIGHT-ANGLE
 STANDARD POLARIZATION



CONNECTOR MATING FACE (RECEPTACLE)

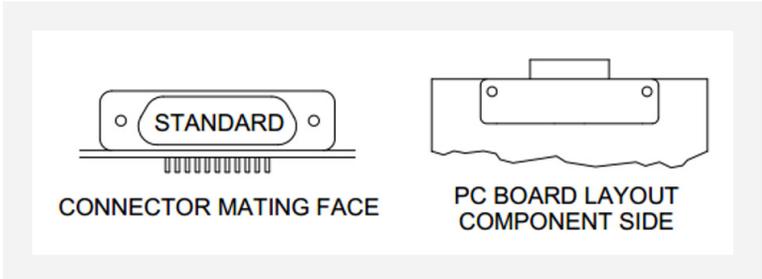


RECEPTACLE
 PC BOARD LAYOUT
 COMPONENT SIDE



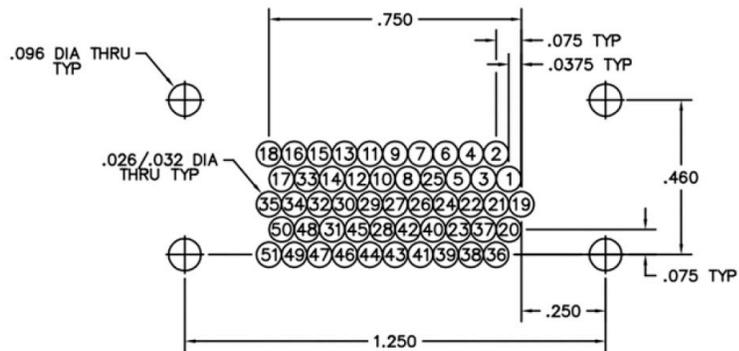
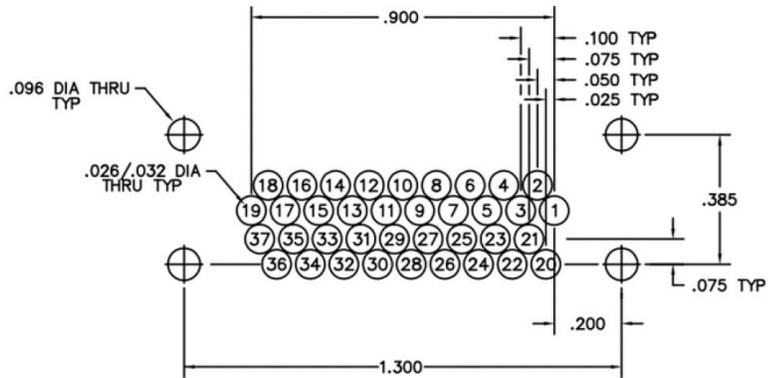
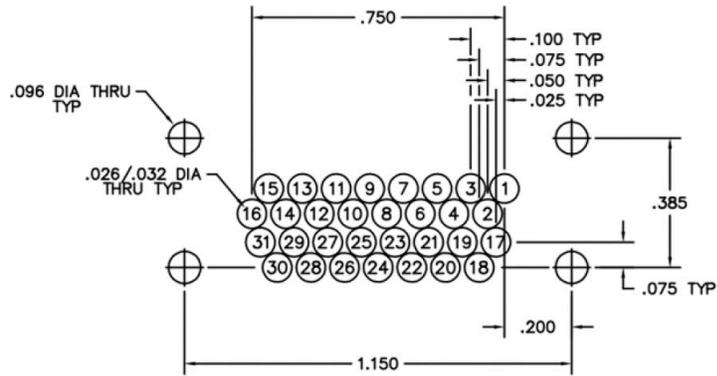
RECOMMENDED PC BOARD LAYOUTS

LOW-PROFILE, RIGHT-ANGLE
STANDARD POLARIZATION



RECEPTACLE PC BOARD LAYOUT COMPONENT SIDE

CONNECTOR
MATING FACE
(RECEPTACLE)



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