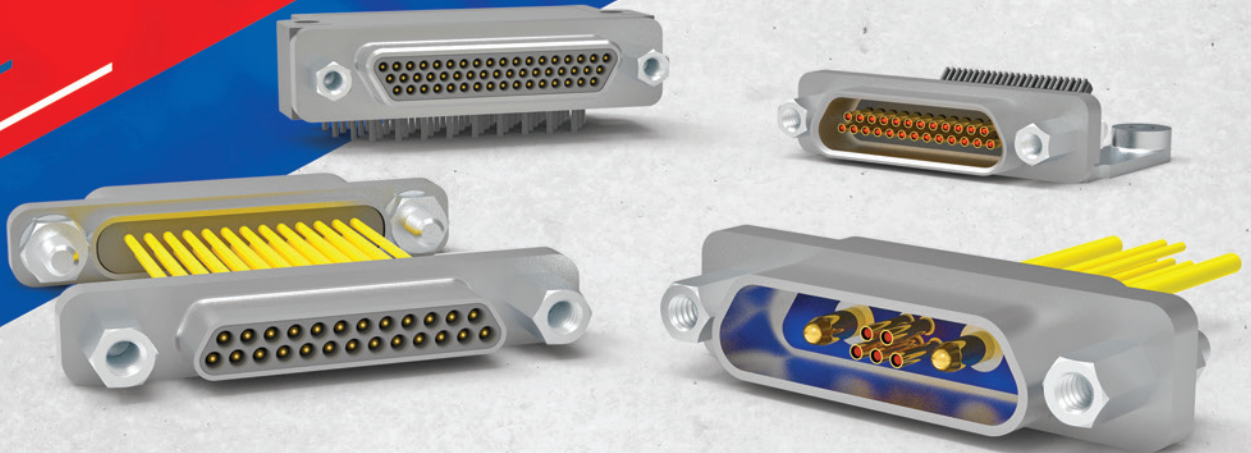


M Series

Microminatures — 0.050" (1.27mm)

 **AirBorn**
a **molex** company



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"M" Series

.050" Microminiature PCB and I/O Connectors

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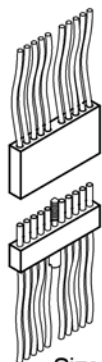
"M" SERIES - .050"
MIL-DTL-83513
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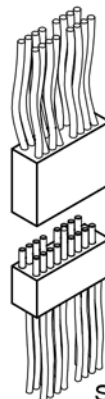
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**Micro-Strip
Connectors
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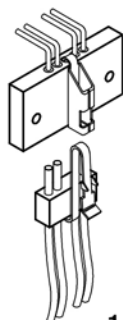


1 Row
Sizes: 3 thru 60
Page: M-11

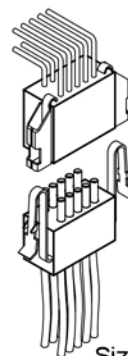


2 Row
Sizes: 4 thru 128
Page: M-23

**Micro-Strip
Connectors
Board to Cable**

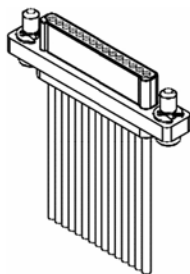


1 Row
Sizes: 3 thru 60
Page: M-13

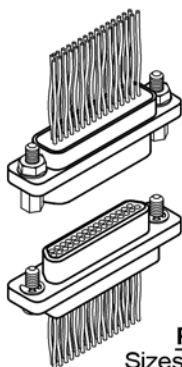


2 Row
Sizes: 4 thru 128
Page: M-25

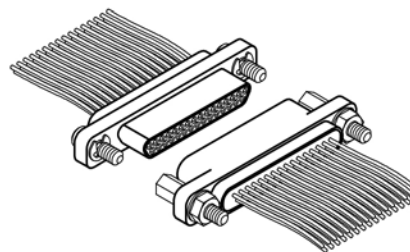
**Micro-D
Connectors
Cable to Cable**



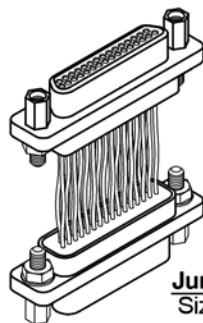
Single Row Micro
Sizes: 4 thru 25
Page: M-127



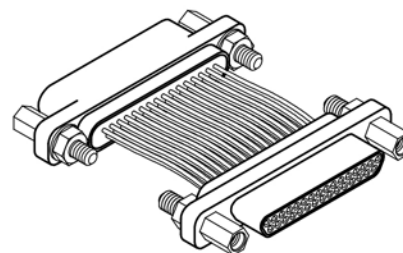
Rugged
Sizes: 9 thru 100
Page: M-35
High Temperature Sizes: 9 thru 100
Page: MHT-7



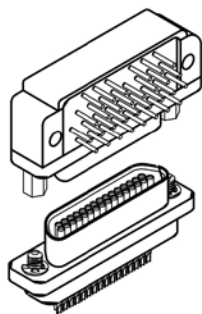
Low Profile
Sizes: 9 thru 51
Page: M-39
High Temperature Sizes: 9 thru 51
Page: MHT-9



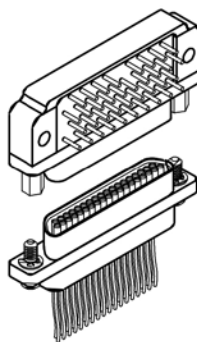
**Rugged,
Jumper Assembly**
Sizes: 9 thru 100
Page: M-37



Low Profile, Jumper Assembly
Sizes: 9 thru 51
Page: M-41

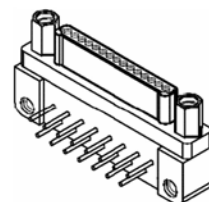


**Rugged Right Angle,
Narrow Footprint**
 Sizes: 9 thru 100
 Pages: M-43 & M-48
 High Temperature Sizes: 9 thru 100
 Pages: MHT-11 & MHT-13

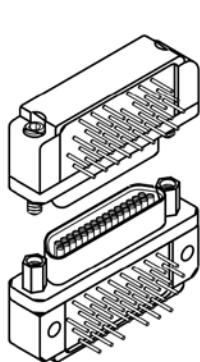


**Low Profile Right Angle,
Narrow Footprint**
 Sizes: 9 thru 51
 Pages: M-51 & M-54
 High Temperature Sizes: 9 thru 51
 Pages: MHT-17 & MHT-19

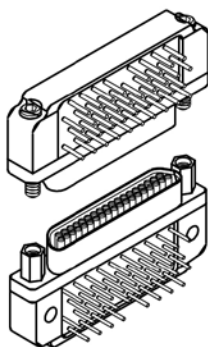
Micro-D Connectors Board to Cable



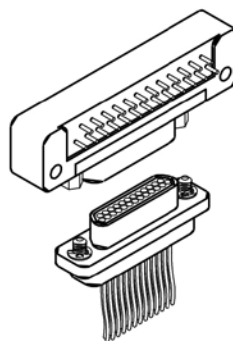
Single Row Micro
 Sizes: 4 thru 25
 Page: M-129



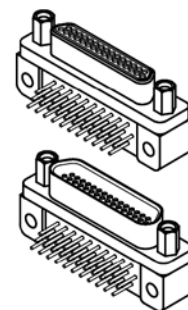
Rugged, Flex Cable
 Sizes: 9 thru 100
 Page: M-49



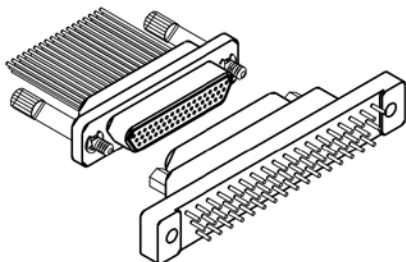
Low Profile, Flex Cable
 Sizes: 9 thru 51
 Page: M-55



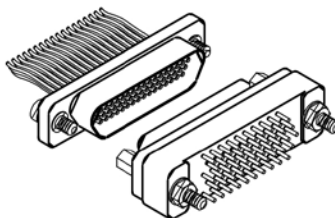
**Rugged Right Angle,
Standard Footprint**
 Sizes: 9 thru 100
 Pages: M-61 & M-63



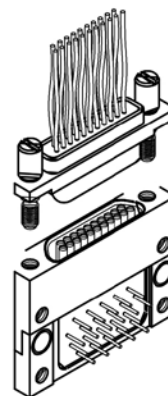
**Rear Panel Mount
Compressed Footprint**
 Sizes: 9 thru 100
 Pages: M-60.1 & M-60.4



**Rugged Straight,
Narrow Footprint**
 Sizes: 9 thru 100
 Pages: M-67 & M-69

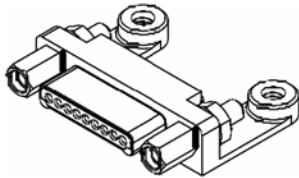


**Rugged Straight,
Standard Footprint**
 Sizes: 9 thru 100
 Pages: M-73 & M-75

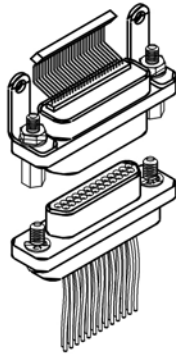


Low Profile, Radius Shell
 High Temperature Sizes: 9 thru 51
 Page: MHT-23

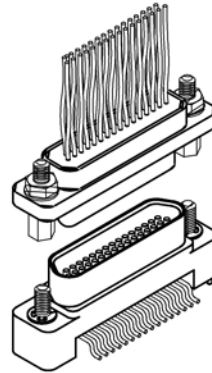
**Micro-D
Connectors
Surface Mount
Board to Cable**



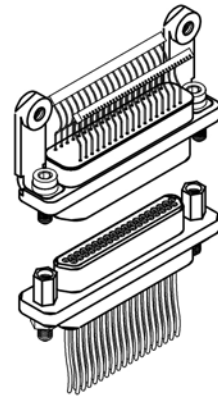
Sing Row Micro
Sizes 4 thru 25
Pages: M-133



**Rugged Horizontal,
Surface Mount**
Sizes: 9 thru 51
Pages: M-83 & M-85

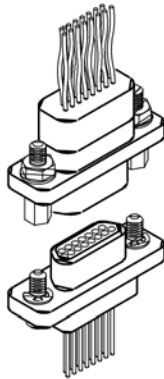


**Rugged Vertical,
Surface Mount**
Sizes: 9 thru 51
Pages: M-89 & M-91



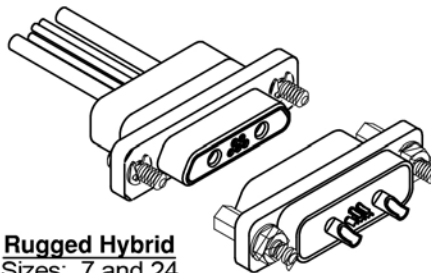
**Rugged
Card Edge Mount**
Sizes: 9 thru 100
Pages: M-95 & M-97

**Micro-D
Connectors
Filtered Cable**



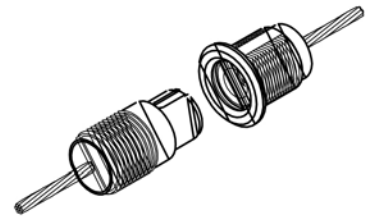
Rugged Filtered
Sizes: 9 thru 37
Page: M-103

**Micro-D
Connectors
Hybrid Cable**



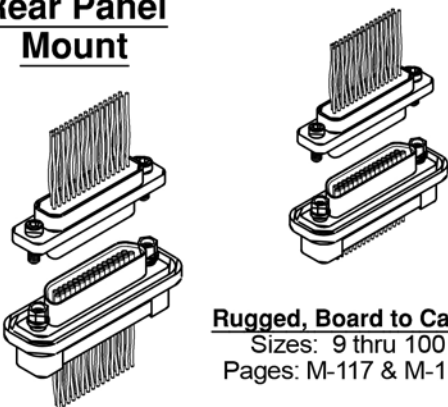
Rugged Hybrid
Sizes: 7 and 24
Page: M-107

**Circular Cable
Connectors**



Circular
Sizes: 7 & 19
Page: M-109

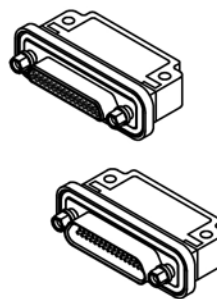
**Micro-D
Connectors
Rear Panel
Mount**



Rugged, Board to Cable
Sizes: 9 thru 100
Pages: M-117 & M-119

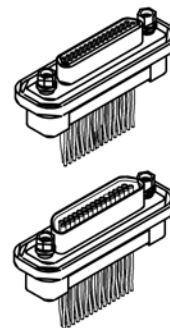
Rugged, Cable to Cable
Sizes: 9 thru 100
Pages: M-113 & M-115

**Right Angle
Boardmount**



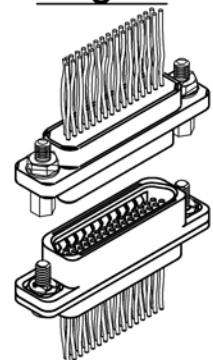
Rear Panel Mount
Sizes: 9 thru 100
Page: M-122.1 & M-122.4

**Micro-D
Connectors
Sealing**

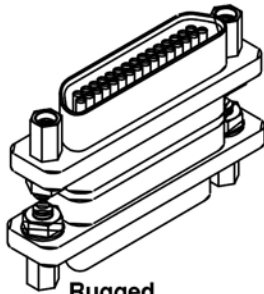


Rugged, I/O
Sizes: 9 thru 100
Page: M-125

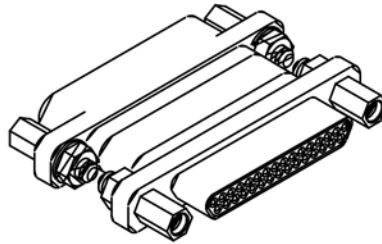
**Micro-D
Connectors
Grounding
Fingers**



Rugged, I/O
Sizes: 9 thru 100
Page: M-36.1

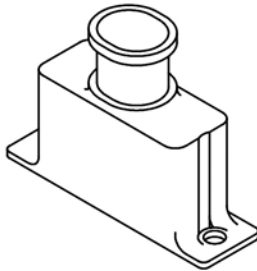


Rugged
 Sizes: 9 thru 100
 Page: MA-11

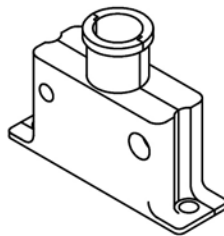


Low Profile
 Sizes: 9 thru 51
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**Micro-D
 Connectors
 Connector Savers**

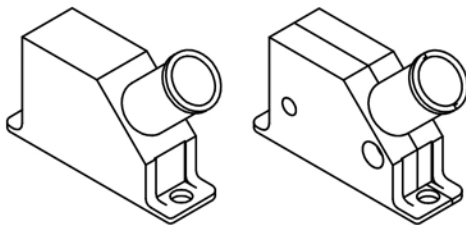


Rugged
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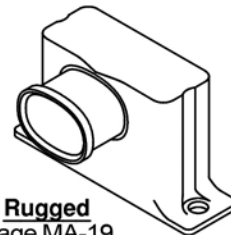
Low Profile
 Page MA-21

**EMI / RFI Straight
 Backshells**



Rugged
 Page MA-17

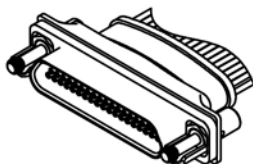
**Micro-D
 EMI / RFI 45°
 Backshells**



Rugged
 Page MA-19

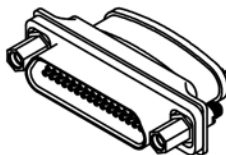
**Micro-D
 EMI / RFI 90°
 Backshells**

**Integral Shield
 Termination**



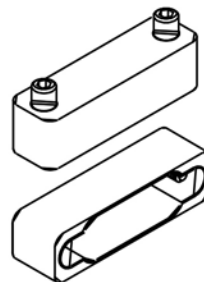
Rugged
 Page M-36.3

**Integral Shield
 Termination
 with Solder Cups**

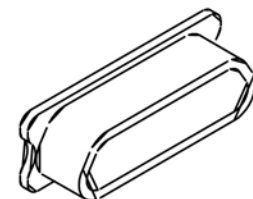


Rugged
 Page M-36.5

**Dust
 Covers**



Rugged
 Page MA-23



**ESD
 Rugged & Low Profile**
 Page MA-25

"M" SERIES - .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 Finish:**	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 AMS2404, Class 3, 500 μ " 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 Phosphorus 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. insulating compound CF3003-80 and L-II-49 or equivalent
Jack screws, 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)
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: Fractions = $\pm 1/64$ " Decimals = ± 0.010 " Angles = $\pm 5^\circ$ Wire lengths: insulated/stranded = $+1.0"/-0.0$ " uninsulated/solid = $+0.2"/-0.0$ "

Note: AirBorn 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 (consult factory for other sizes and types)
Test Voltage:	600 V, RMS, 60 Hz
Operating Temperature:	-55° C to +125° C
Insulation Resistance:	5,000 megohms minimum @ 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 (except steps 7a and 7b)
Thermal Shock:	Tested to the temperature extremes of MIL-STD-1344, Method 1003, Test Condition A (except step 3, temperature shall be 125° C)
Contact Resistance:	0.065 volt maximum drop @ 2.5 amps (.026 ohms)
Contact Engaging Force:	6.0 ounce maximum, with .0221 diameter test sleeve per contact
Contact Separating Force:	0.5 ounce minimum, with .0230 diameter test sleeve per contact
Crimp Strength:	5 pound minimum tensile strength
Mating & Unmating Force:	10 ounces 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, for example, is less than 100, indicate as 009, 051, etc.

Series:

This will always be a two letter designator, and will identify the connector series. All .050" connectors begin with the letter "M". The second letter designates the various styles of .050" connectors.

Body:

Each digit of the Body Designator will normally identify (1) the number of rows, (2) the style of body, and (3) the body materials. 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. Order only sizes shown on the catalog page unless otherwise noted.

Contacts:

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

Hardware:

The hardware designator is four digits; two for style of hardware and two for polarization or wiring instruction. Follow the choices for each connector.

Special Instructions (Options):

Special instructions are referenced by a three or four digit number added to the end of the part number. The last three or four digits are included only when applicable. AirBorn will provide individual code numbers as needed.

Note:

Each page is as comprehensive as possible. However, if you do not find a particular connector size or option, please contact the factory for further assistance.

☒ Symbolizes options that are not RoHS compliant.

Mating Matrix for AirBorn "M" Series Connectors

RECEPTACLES

P
L
U
G
S

	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

KEY:

I/O Connectors

MM-MN-MP-MQ

BB = PC Board Mounted Plug with PC Board Mounted Receptacle

PC Board Mounted Connectors

MK-ML-MR-MS

BI = PC Board Mounted Plug with I/O Receptacle

Inter-mateable Connectors

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

IB = I/O Plug with PC Board Mounted Receptacle

II = I/O Plug with I/O Receptacle

For Military Configurations, See pages MIL-1 thru MIL-22

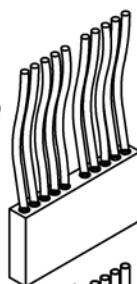
1 • ROW Strip Connectors Cable to Cable

.050"

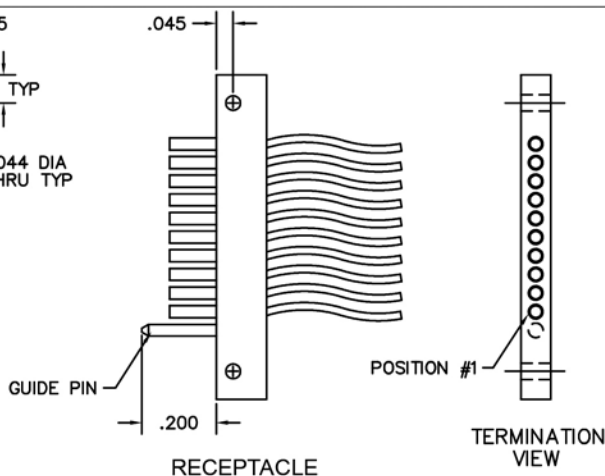
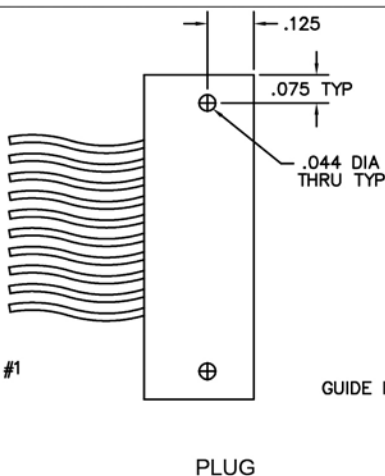
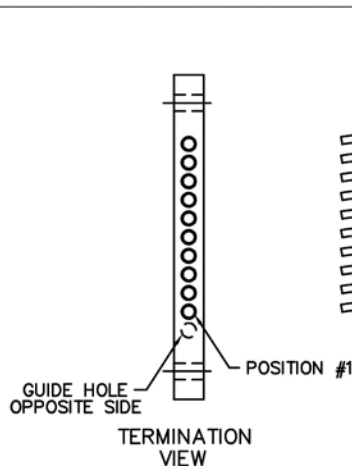
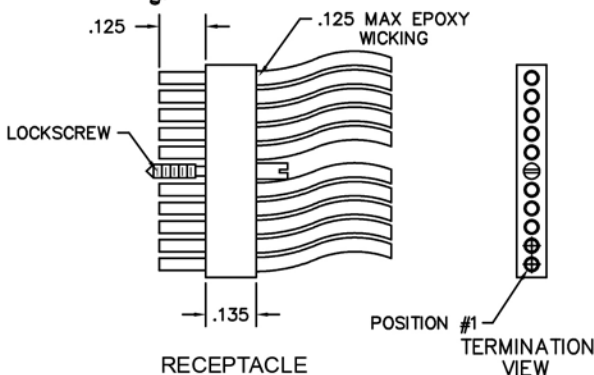
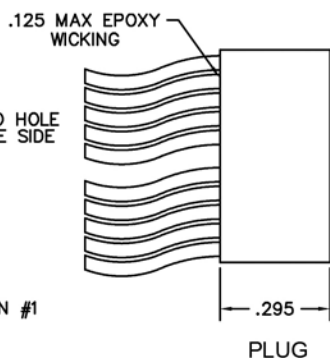
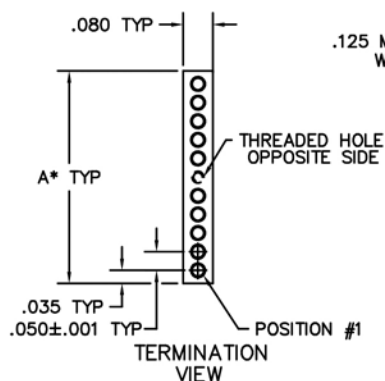
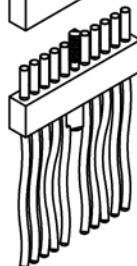
MA-1

2 thru 60 Contacts

MA-131-010-161-A69WQ



MA-141-010-261-A72WQ



OPTIONAL MOUNTING HOLES & GUIDE PIN

DIMENSIONS

To determine connector length (Dim "A"):	
Multiply the number of cavities in one row by .050"	
Add fixed end lengths (constant, .010" x 2)	0.02"
Add .150" for each mounting hole	
Total Length:	

Notes:

Length over 2" may require support to insure alignment.

When using one lock screw, use centermost available hole.

* = Maximum length is 3.020". Maximum number of contacts must be reduced to accommodate hardware and mounting holes.

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PLUG: MA-131-010-161-A69WQ
RECEPTACLE: MA-141-010-261-A72WQ
XX-XXX-XXX-XXX-XXXXX

PLUG

RECEPTACLE

SERIES	
MA .050" Microminiature Strip Connector	MA .050" Microminiature Strip Connector

BODY	
1 1-Row	1 1-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 002 - 060	XXX 002 - 060
Note: Maximum number of contacts is reduced when using hardware or mounting holes. See dimension chart on M-11.	

CONTACTS	
TYPE CONTACTS/TERMINATIONS:	TYPE CONTACTS/TERMINATIONS:
11 Pin, straight, solder cup	21 Socket, straight, solder cup
14 Pin, straight, .500" pigtails (.018 dia)	24 Socket, straight, .500" pigtails (.018 dia)
15 Pin, straight, 1.000" pigtails (.018 dia)	25 Socket, straight, 1.000" pigtails (.018 dia)
16 Pin, straight, crimped wire	26 Socket, straight, crimped wire
PLATING OPTIONS:	PLATING OPTIONS:
1 50 μ" Au contacts (crimp wire)	1 50 μ" Au contacts (crimp wire)
3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)	3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)
5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒	5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
7 50 μ" Au contacts; SAC305 terminations (pigtail)	7 50 μ" Au contacts; SAC305 terminations (pigtail)

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 boxes (two end cavities)	A51 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 (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 MA-3 & MA-4	XX For wiring codes, see pages MA-3 & MA-4

* = 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-15.
See MA strip guidelines, page M-15, for location examples & visual clarification.

☒ = Option not RoHS compliant

1 • ROW

Strip Connectors

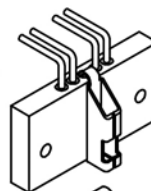
Board to Cable

.050"

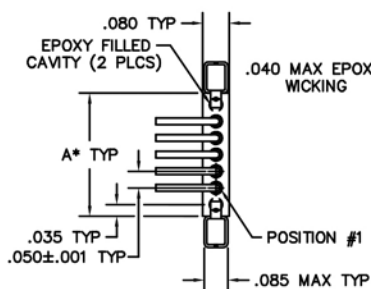
MA-1

2 thru 60 Contacts

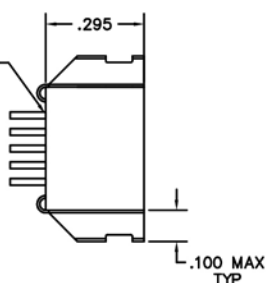
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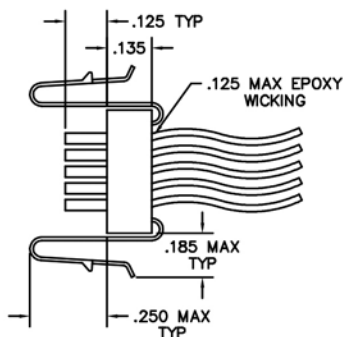
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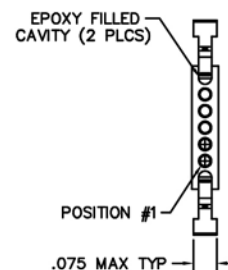
TERMINATION VIEW



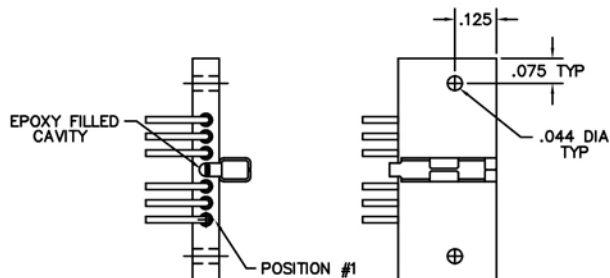
PLUG



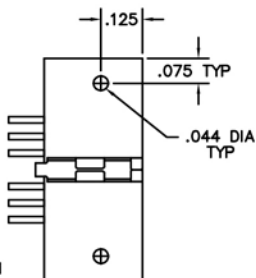
RECEPTACLE



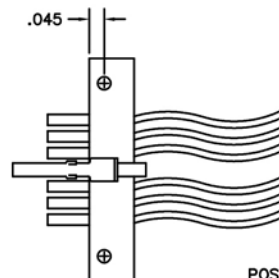
TERMINATION VIEW



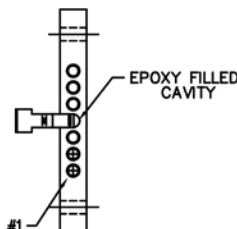
TERMINATION VIEW



PLUG



POSITION #1



TERMINATION VIEW

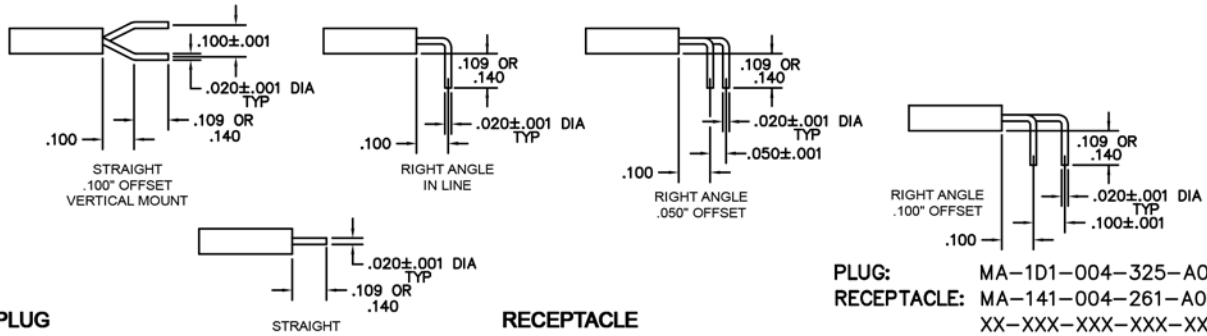
OPTIONAL MOUNTING HOLES

DIMENSIONS

To determine connector length (Dim "A"):	
Multiply the number of cavities in one row by .050"	 "
Add fixed end lengths (constant, .010" x 2)	 0.02"
Add .150" for each mounting hole	 "
Total Length:	 "

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

LEAD CONFIGURATION OPTIONS



PLUG		RECEPTACLE		XX-XXX-XXX-XXX-XXXX	
STRAIGHT		.140			
SERIES					
MA .050" Microminiature Strip Connector		MA .050" Microminiature Strip Connector			
BODY					
1 1-Row		1 1-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, .100" offset, with mounting holes		81 Receptacle, right angle, .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, .100" offset, without mounting holes		C1 Receptacle, right angle, .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, .100" offset, without mounting holes		J 1 Receptacle, straight, .100" offset, without mounting holes			
SIZE					
XXX 002 - 060		XXX 002 - 060			
Note: Maximum number of contacts is reduced when using hardware or mounting holes. See dimension chart on M-13.					
CONTACTS					
TYPE CONTACTS/TERMINATIONS:		TYPE CONTACTS/TERMINATIONS:			
11 Pin, straight, solder cup		21 Socket, straight, solder cup			
12 Pin, straight, PCB leads, .109"		22 Socket, straight, PCB leads, .109"			
13 Pin, straight, PCB leads, .140"		23 Socket, straight, PCB leads, .140"			
14 Pin, straight, .500" pigtails (.018 dia)		24 Socket, straight, .500" pigtails (.018 dia)			
15 Pin, straight, 1.000" pigtails (.018 dia)		25 Socket, straight, 1.000" pigtails (.018 dia)			
16 Pin, straight, crimped wire		26 Socket, straight, crimped wire			
32 Pin, right angle, PCB leads, .109"		43 Socket, right angle, PCB leads, .109"			
33 Pin, right angle, PCB leads, .140"		44 Socket, right angle, PCB leads, .140"			
PLATING OPTIONS:		PLATING OPTIONS:			
1 50 μ" Au contacts (crimp wire)		1 50 μ" Au contacts (crimp wire)			
3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail, PCB leads)		3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail, PCB leads)			
5 50 μ" Au contacts; Sn/Pb alloy terminations (dip solder, pigtail, PCB leads) ☒		5 50 μ" Au contacts; Sn/Pb alloy terminations (dip solder, pigtail, PCB leads) ☒			
7 50 μ" Au contacts; SAC305 terminations (pigtail, PCB leads)		7 50 μ" 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 boxes (two end cavities).**		A51 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 (two end cavities)		A67 Two guide pins (two end cavities)			
A69 One threaded hole (centered)*		A72 One lockscrew (centered)*			
APX One guide hole (cavity #2 - #9)		APX One guide pin (cavity #2 - #9)			
ATX One threaded hole (cavity #2 - #9)		ALX One lockscrew (cavity #2 - #9)			
POLARIZATION / WIRING:		POLARIZATION / WIRING			
00 None		00 None			
XX For wiring codes, see pages MA-3 & MA-4		XX For wiring codes, see pages MA-3 & MA-4			

* = 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-15.

** = Not available with mounting holes.

See MA strip guidelines, page M-15, for location examples & visual clarification.

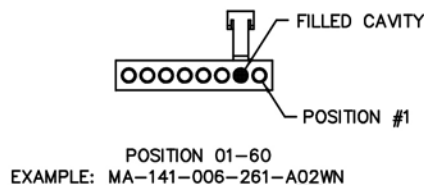
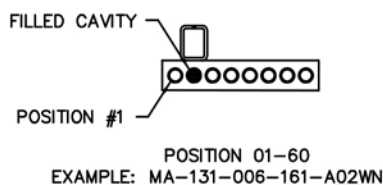
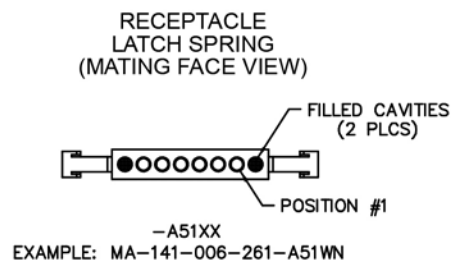
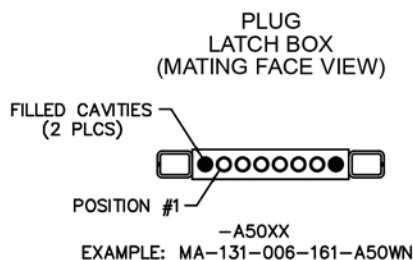
☒ = Option not RoHS compliant

1 • ROW Strip Connectors with Latches

.050"

MA-1

3 thru 60 Contacts



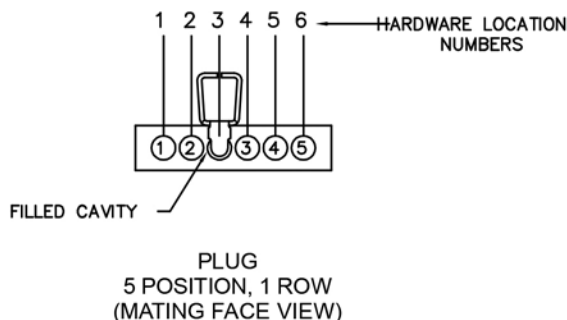
MA Strip Guidelines

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-16 thru M-22.
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 R/A PCB mount connectors with mounting holes are used and the PCB had irregularities greater than .004" underneath the connector.

To determine hardware location number:

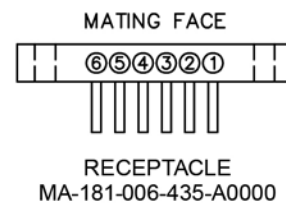
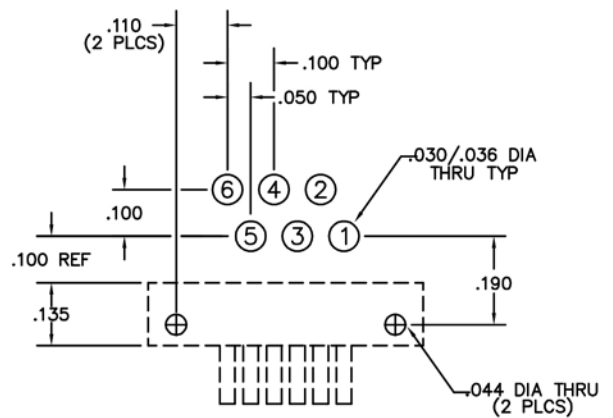
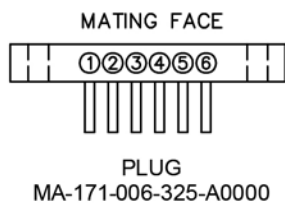
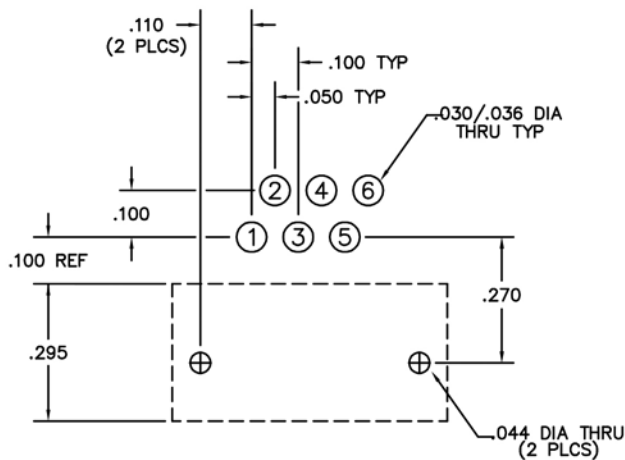
1. Divide the total number of cavities by two (including hardware cavity).
2. Round to the next whole number if result is a fraction.



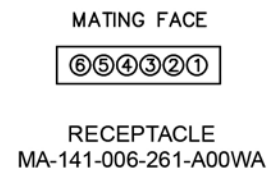
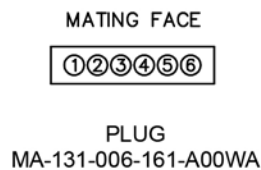
The connector above has 6 cavities with 5 live contacts.
(5 electrical positions & 1 mechanical position)

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

**Board mount connectors, right angle offset (.100") with mounting holes
(6 electrical positions)**



**Crimped wire connectors, straight without mounting holes
(6 electrical positions)**

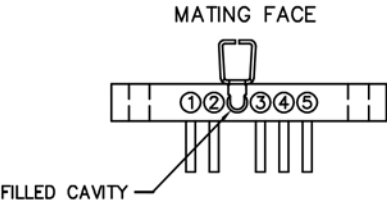
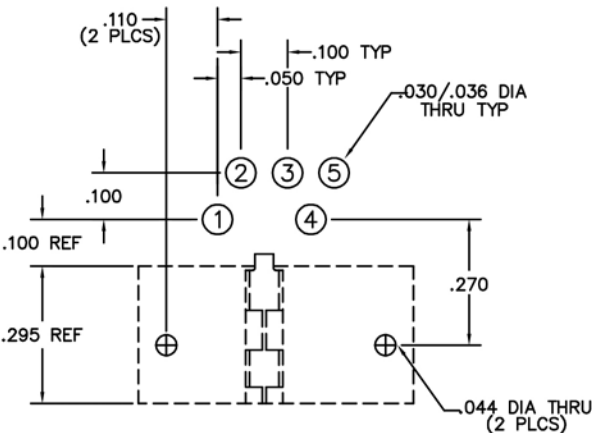


WIRE CONNECT CHART

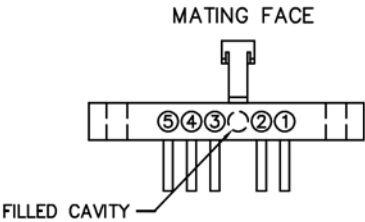
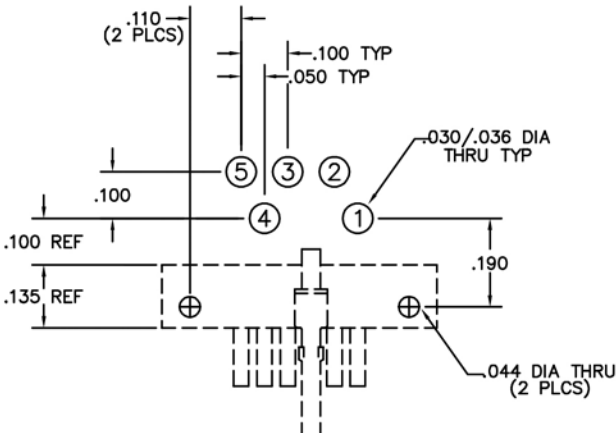
1	—	BLK
2	—	BRN
3	—	RED
4	—	ORN
5	—	YEL
6	—	GRN

**Board mount connectors, right angle offset (.100") with mounting holes.
Side mount latch, centered.**

(5 electrical positions, 1 mechanical positions)



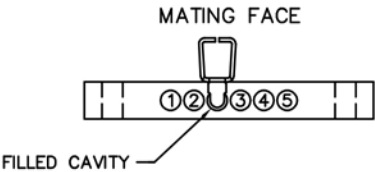
PLUG
MA-171-005-325-A0300



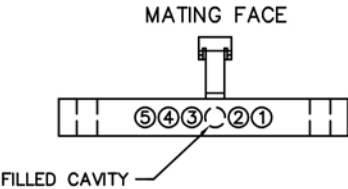
RECEPTACLE
MA-181-005-435-A0300

**Crimped wire connectors, straight with mounting holes.
Side mount latch, centered.**

(5 electrical positions, 1 mechanical positions)



PLUG
MA-111-005-161-A03WA

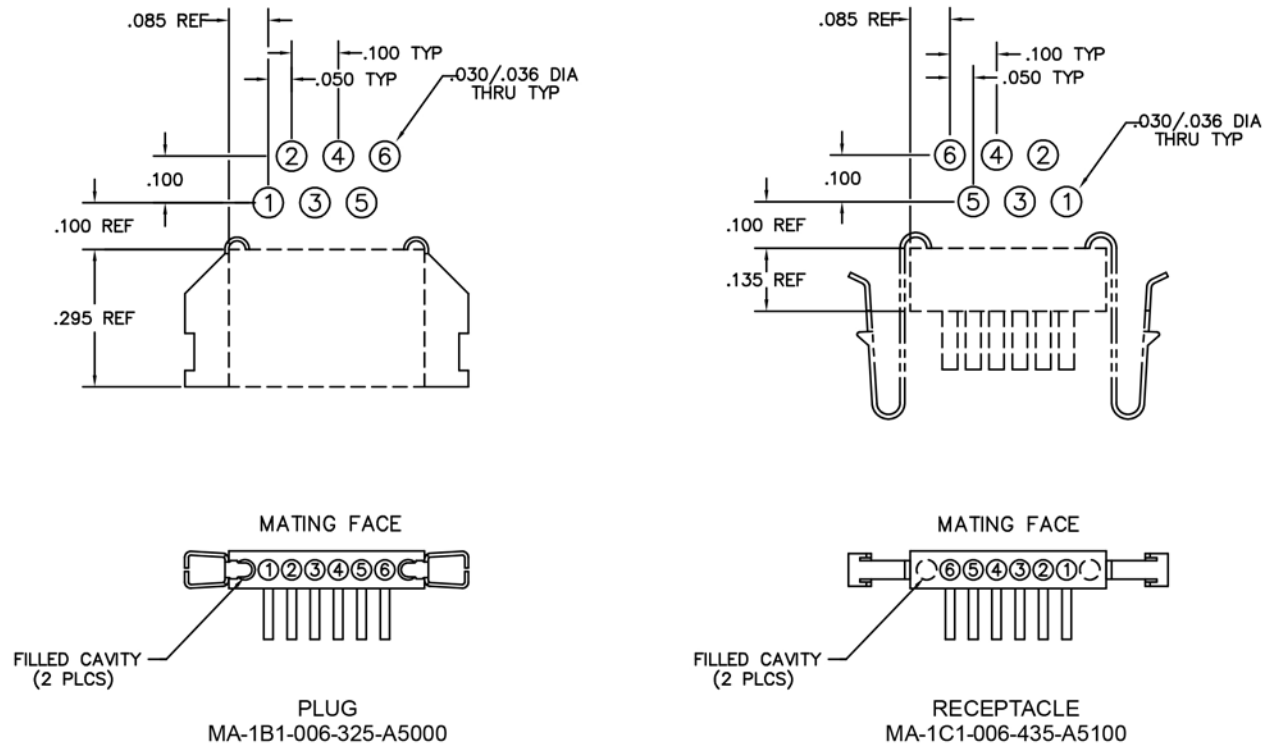


RECEPTACLE
MA-121-005-261-A03WA

WIRE CONNECT CHART

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

Board mount connectors, right angle offset (.100") without mounting holes
End mount latches, 2 end cavities*
(6 electrical positions, 2 mechanical positions)



* = THIS IS THE EXCEPTION AS NOTED IN "MA STRIP GUIDELINES", PAGE M-15, NOTE 3.

Crimped wire connectors, straight without mounting holes
End mount latches, 2 end cavities
(3 electrical positions, 2 mechanical positions)

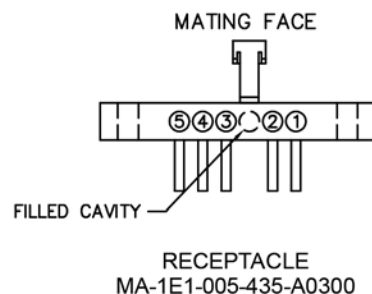
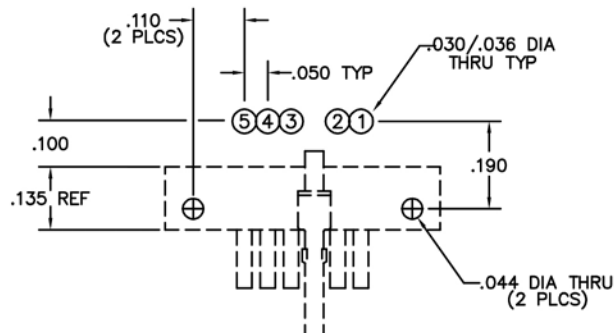
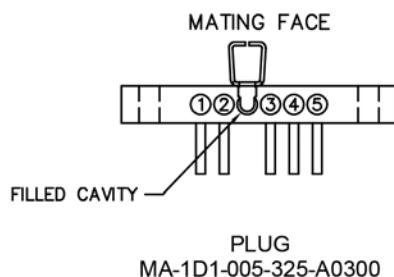
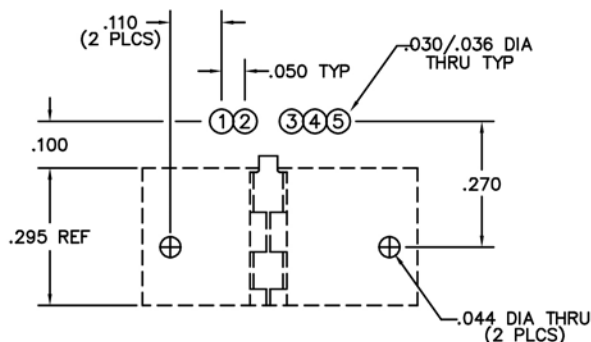


WIRE CONNECT CHART

1 — BLK
 2 — BRN
 3 — RED

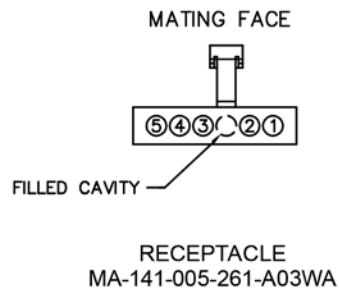
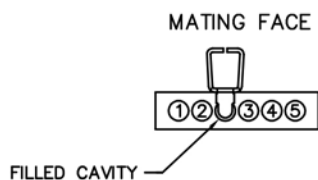
Board mount connectors, right angle inline (.100") with mounting holes Side mount latch, centered

(5 electrical positions, 1 mechanical positions)



Crimped wire connectors, straight without mounting holes Side mount latch, centered

(5 electrical positions, 1 mechanical positions)



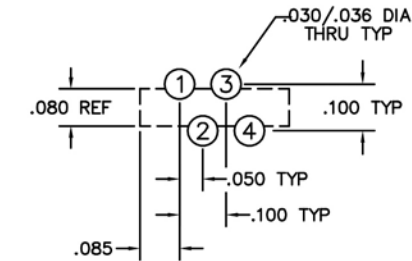
WIRE CONNECT CHART

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

Board mount connectors, straight offset (.100") without mounting holes

Two guide holes/two end cavities

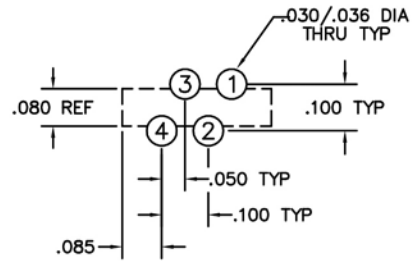
(4 electrical positions, 2 mechanical positions)



MATING FACE

GUIDE HOLE (2 PLCS)

PLUG
MA-1H1-004-145-A6800



MATING FACE

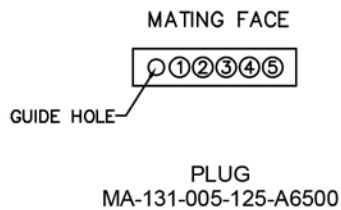
GUIDE PIN (2 PLCS)

RECEPTACLE
MA-1J1-004-245-A6700

Board mount connectors, straight without mounting holes

One guide hole/pin, first cavity

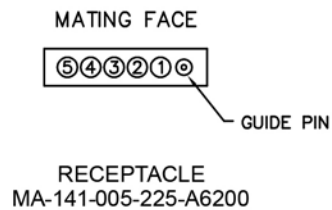
(5 electrical positions, 1 mechanical position)



MATING FACE

GUIDE HOLE

PLUG
MA-131-005-125-A6500



MATING FACE

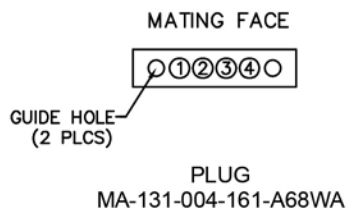
GUIDE PIN

RECEPTACLE
MA-141-005-225-A6200

Crimped wire connectors, straight without mounting holes

Two guide holes/two end cavities

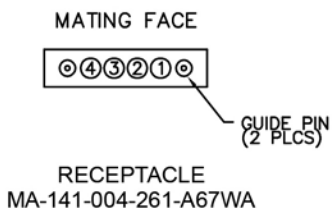
(4 electrical positions, 2 mechanical positions)



MATING FACE

GUIDE HOLE (2 PLCS)

PLUG
MA-131-004-161-A68WA



MATING FACE

GUIDE PIN (2 PLCS)

RECEPTACLE
MA-141-004-261-A67WA

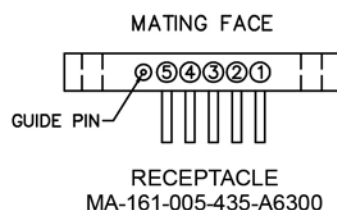
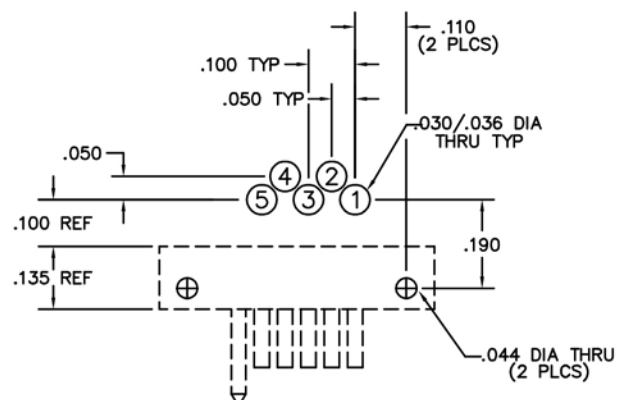
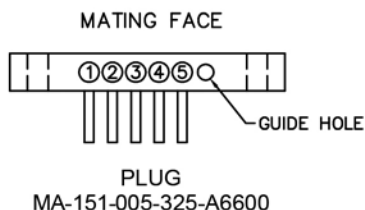
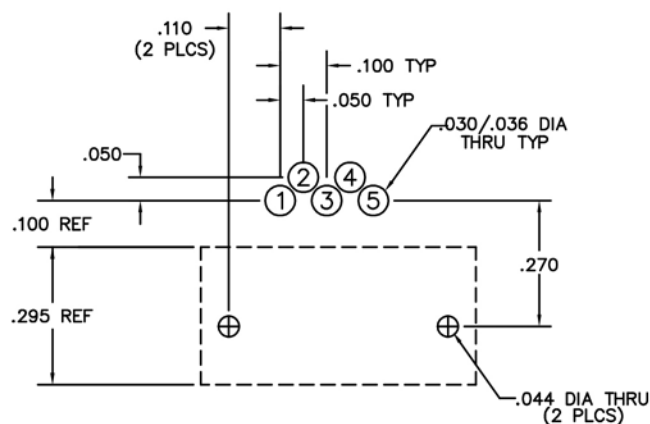
WIRE CONNECT CHART

1	—	BLK
2	—	BRN
3	—	RED
4	—	ORN

Board mount connectors, right angle offset (.050") with mounting holes

Guide hole/pin, last cavity

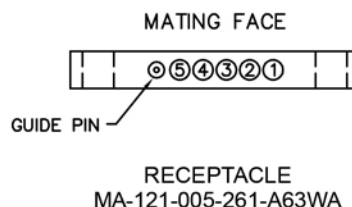
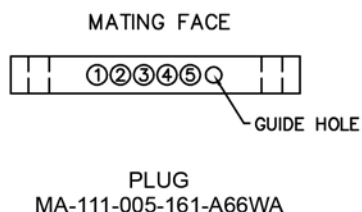
(5 electrical positions, 1 mechanical positions)



Crimped wire connectors, straight with mounting holes

Guide hole/pin, last cavity

(5 electrical positions, 1 mechanical positions)



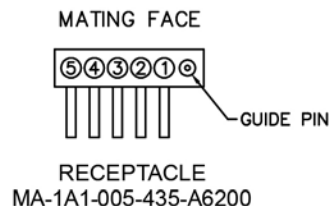
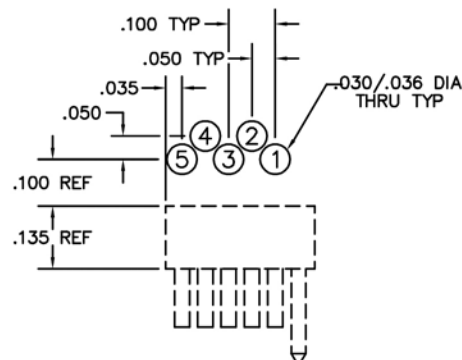
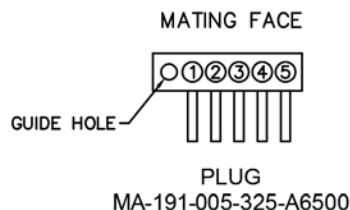
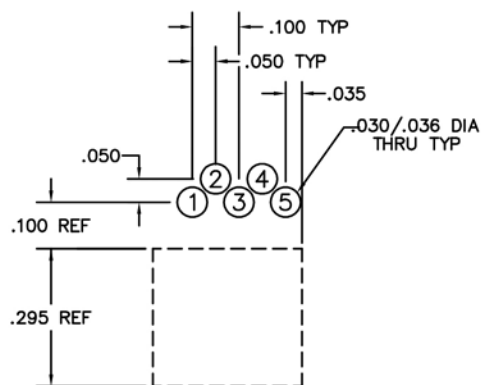
WIRE CONNECT CHART

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

Board mount connectors, right angle offset (.050") without mounting holes

Guide hole/pin, first cavity*

(5 electrical positions, 1 mechanical positions)

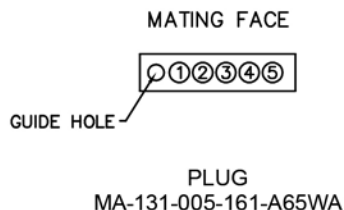


* = THIS IS THE EXCEPTION AS NOTED IN "MA STRIP GUIDELINES", PAGE M-15, NOTE 3.

Crimped wire connectors, straight without mounting holes

Guide hole/pin, first cavity

(5 electrical positions, 1 mechanical positions)



WIRE CONNECT CHART

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

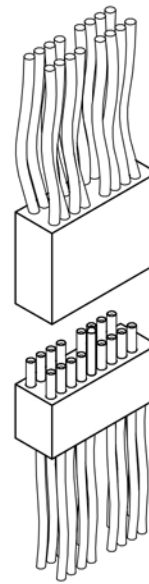
2 • ROW Strip Connectors Cable to Cable

.050"

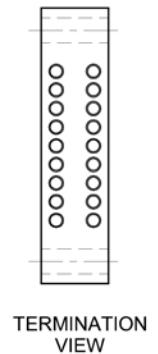
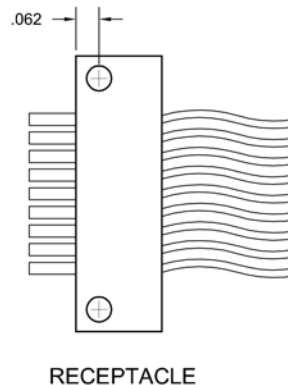
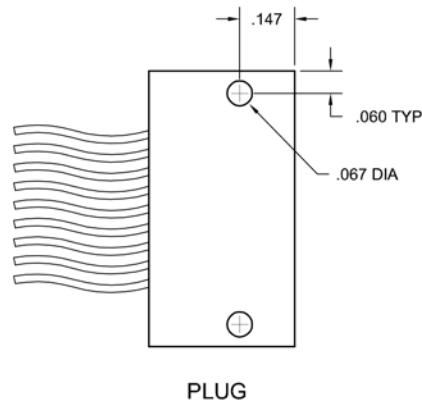
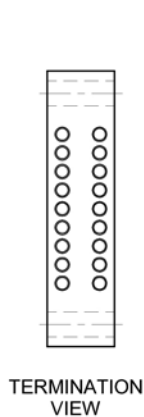
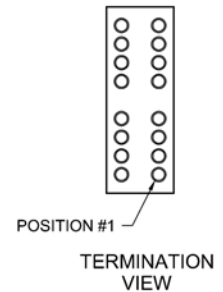
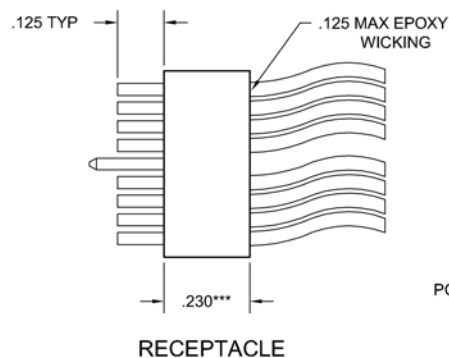
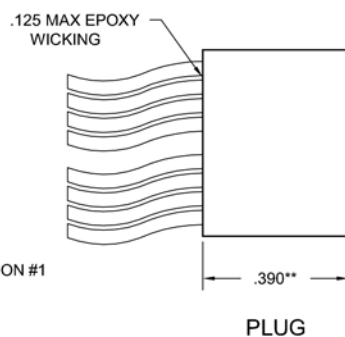
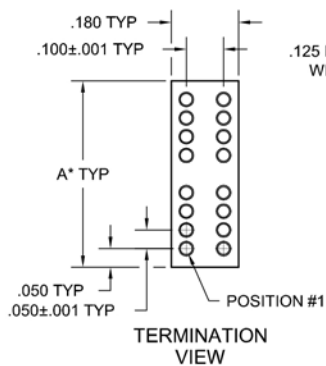
MA-2

4 thru 128 Contacts

MA-231-016-161-A64WS



MA-241-016-261-A61WS



OPTIONAL MOUNTING HOLES

DIMENSIONS

To determine connector length (Dim "A"):

Multiply the number of cavities in one row by .050"

Add fixed end lengths (constant, .025" x 2)

Add .085" for each mounting hole

Total Length:

	0.05"

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, .390" becomes .295"

*** = For solder cup or board mount applications, .230" becomes .135"

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PLUG: MA-231-016-161-A64WS
RECEPTACLE: MA-241-016-261-A61WS
XX-XXX-XXX-XXX-XXXXX

PLUG

RECEPTACLE

SERIES	
MA .050" Microminiature Strip Connector	MA .050" Microminiature Strip Connector
BODY	
2 2-Row	2 2-Row
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. See dimension chart on M-23.	
CONTACTS	
TYPE CONTACTS/TERMINATIONS:	
11 Pin, straight, solder cup	21 Socket, straight, solder cup
14 Pin, straight, .500" pigtails (.018 dia)	24 Socket, straight, .500" pigtails (.018 dia)
15 Pin, straight, 1.000" pigtails (.018 dia)	25 Socket, straight, 1.000" pigtails (.018 dia)
16 Pin, straight, crimped wire	26 Socket, straight, crimped wire
PLATING OPTIONS:	
1 50 μ" Au contacts (crimp wire)	1 50 μ" Au contacts (crimp wire)
3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)	3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)
5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒	5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
7 50 μ" Au contacts; SAC305 terminations (pigtail)	7 50 μ" Au contacts; SAC305 terminations (pigtail)
HARDWARE	
STYLE OF HARDWARE:	
A00 None	A00 None
ABC Latch box, side mounted (centered)* See page M-27	ALC Latch spring, side mounted (centered)* See page M-27
A50 Latch boxes (two end cavities). See page M-27**	A51 Latch springs, (two end cavities). See page M-27**
A52 Latch boxes (two end cavities). See page M-27**	A53 Latch springs, (two end cavities). See page M-27**
A54 Latch boxes (two end cavities). See page M-27**	A55 Latch springs, (two end cavities). See page M-27**
A56 Latch boxes (two end cavities). See page M-27**	A57 Latch springs, (two end cavities). See page M-27**
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 & last cavity)	A67 Two guide pins (first & last cavity)
AHX One guide hole (cavity #2 - #9)	APX One guide pin (cavity #2 - #9)
POLARIZATION / WIRING:	
00 None	00 None
XX For wiring codes, see page MA-3 & MA-4	XX For wiring codes, see page MA-3 & MA-4

* = 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-28.

** = Not available with mounting holes.

See MA strip guidelines, page M-28, for location examples & visual clarification.

Connector part number must have even number of contacts.

Consult factory for non-standard requirements.

☒ = Option not RoHS compliant

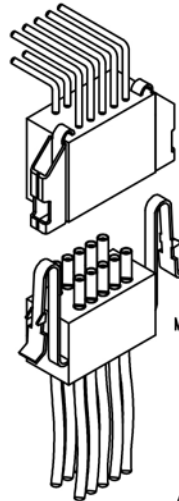
2 • ROW Strip Connectors Board to Cable

.050"

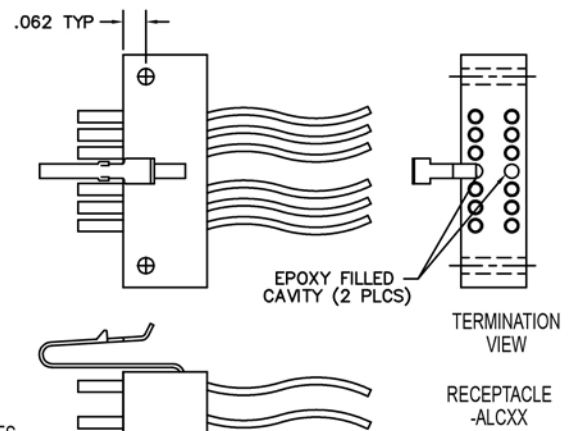
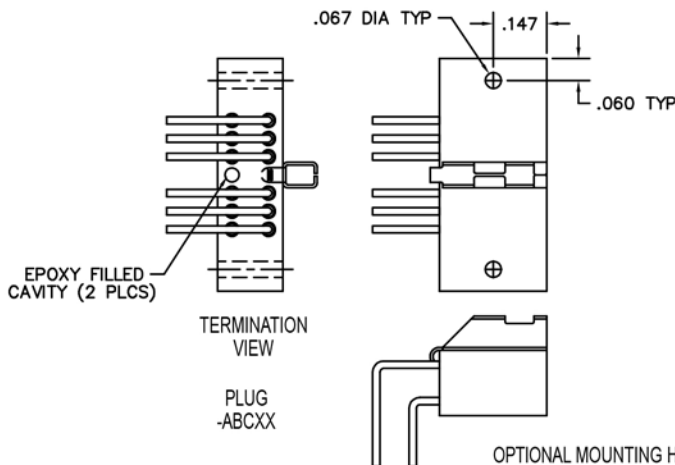
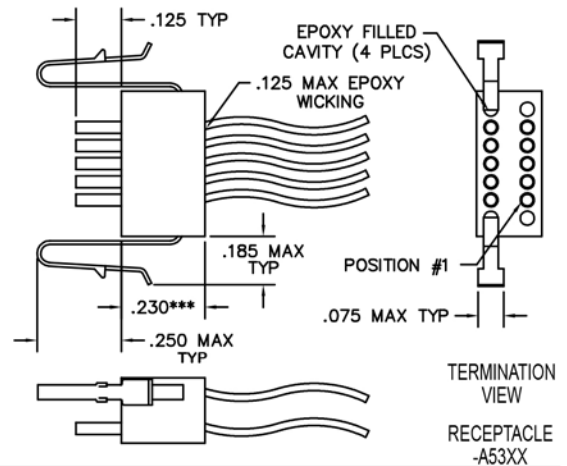
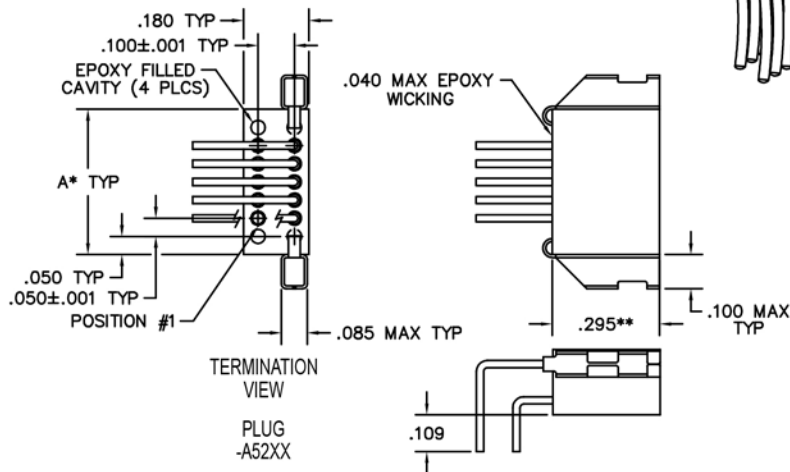
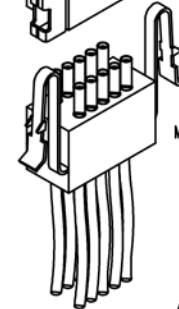
MA-2

4 thru 128 Contacts

MA-2F1-010-325-A5200



MA-241-010-261-A53WA



DIMENSIONS

To determine connector length (Dim "A"):

Multiply the number of cavities in one row by .050"

Add fixed end lengths (constant, .025" x 2)

Add .085" for each mounting hole

Total Length:

	.05"

Notes:

Length over 2" may require support to insure alignment

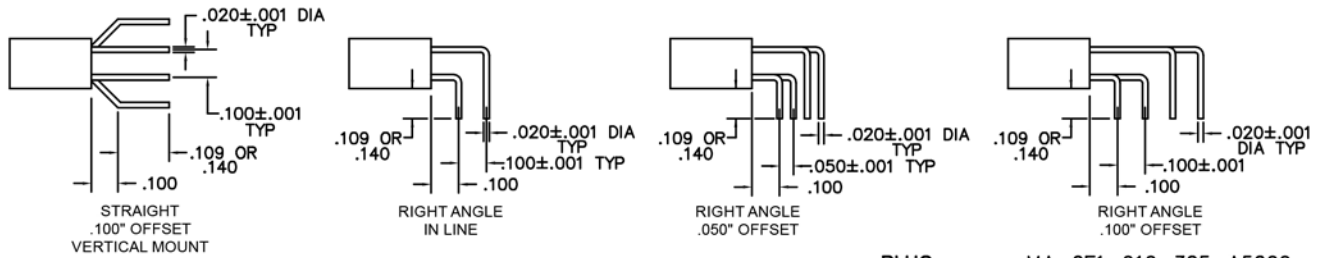
* = Maximum length is 3.420". Maximum number of contacts

must be reduced to accommodate hardware and mounting holes.

** = For cable applications, .295" becomes .390"

*** = For solder cup or board mount applications, .230" becomes .135"

LEAD CONFIGURATION OPTIONS



PLUG: MA-2F1-010-325-A5200
RECEPTACLE: MA-241-010-261-A53WA
XX-XXX-XXX-XXX-XXXXX

PLUG

RECEPTACLE

SERIES	
MA .050" Microminiature Strip Connector	MA .050" Microminiature Strip Connector
BODY	
2 2-Row	2 2-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, .100" offset, with mounting holes	81 Receptacle, right angle, .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, .100" offset, without mounting holes	C1 Receptacle, right angle, .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, .100" offset, without mounting holes	J1 Receptacle, straight, .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. See dimension chart on M-25.	
CONTACTS	
TYPE CONTACTS/TERMINATIONS:	TYPE CONTACTS/TERMINATIONS:
11 Pin, straight, solder cup	21 Socket, straight, solder cup
12 Pin, straight, PCB leads, .109"	22 Socket, straight, PCB leads, .109"
13 Pin, straight, PCB leads, .140"	23 Socket, straight, PCB leads, .140"
14 Pin, straight, .500" pigtails (.018 dia)	24 Socket, straight, .500" pigtails (.018 dia)
15 Pin, straight, 1.000" pigtails (.018 dia)	25 Socket, straight, 1.000" pigtails (.018 dia)
16 Pin, straight, crimped wire	26 Socket, straight, crimped wire
32 Pin, right angle, PCB leads, .109"	43 Socket, right angle, PCB leads, .109"
33 Pin, right angle, PCB leads, .140"	44 Socket, right angle, PCB leads, .140"
PLATING OPTIONS:	PLATING OPTIONS:
1 50 μ " Au contacts (crimp wire)	1 50 μ " Au contacts (crimp wire)
3 50 μ " Au contacts: 10 μ " Au terminations (solder cup, pigtail, PCB leads)	3 50 μ " Au contacts: 10 μ " Au terminations (solder cup, pigtail, PCB leads)
5 50 μ " Au contacts; Sn/Pb alloy terminations (pigtail, PCB leads) ☒	5 50 μ " Au contacts; Sn/Pb alloy terminations (pigtail, PCB leads) ☒
7 50 μ " Au contacts; SAC305 terminations (pigtail, PCB leads)	7 50 μ " Au contacts; SAC305 terminations (pigtail, PCB leads)
HARDWARE	
STYLE OF HARDWARE:	STYLE OF HARDWARE:
A00 None	A00 None
ABC Latch box, side mounted (centered)* See page M-27	ALC Latch spring, side mounted (centered)* See page M-27
A50 Latch boxes (two end cavities). See page M-27**	A51 Latch springs, (two end cavities). See page M-27**
A52 Latch boxes (two end cavities). See page M-27**	A53 Latch springs, (two end cavities). See page M-27**
A54 Latch boxes (two end cavities). See page M-27**	A55 Latch springs, (two end cavities). See page M-27**
A56 Latch boxes (two end cavities). See page M-27**	A57 Latch springs, (two end cavities). See page M-27**
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 & last cavity)	A67 Two guide pins (first & 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 page MA-3 & MA-4	XX For wiring codes, see page MA-3 & MA-4

* = 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-28.

** = Not available with mounting holes.

See MA strip guidelines, page M-28, for location examples & visual clarification.

Connector part number must have even number of contacts.

Consult factory for non-standard requirements.

☒ = Option not RoHS compliant

2 • ROW Strip Connectors with Latches

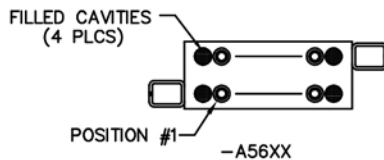
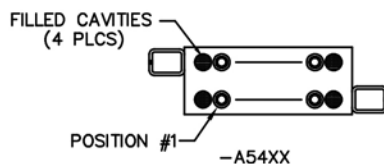
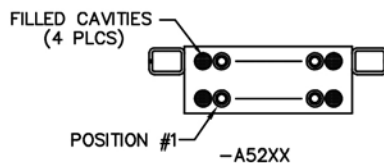
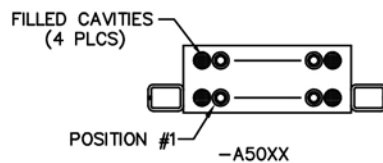
.050"

MA-2

4 thru 128 Contacts

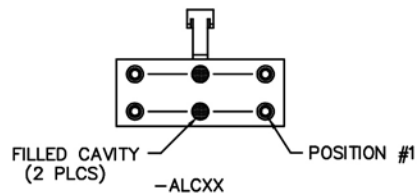
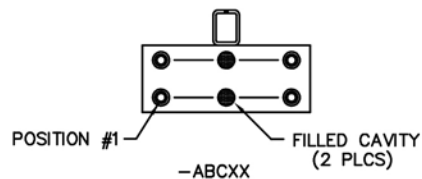
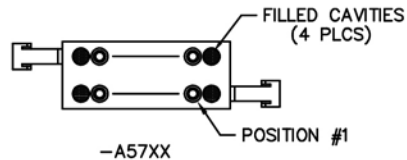
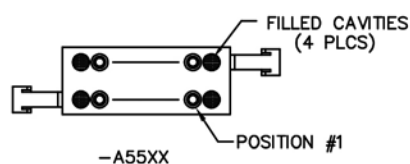
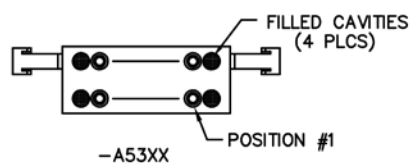
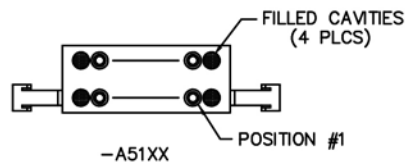
PLUG
LATCH BOX

EXAMPLE: MA-231-012-161-A50WN



RECEPTACLE
LATCH SPRING

EXAMPLE: MA-241-012-261-A51WN



NOTE: ALL DRAWINGS VIEWED FROM MATING FACE

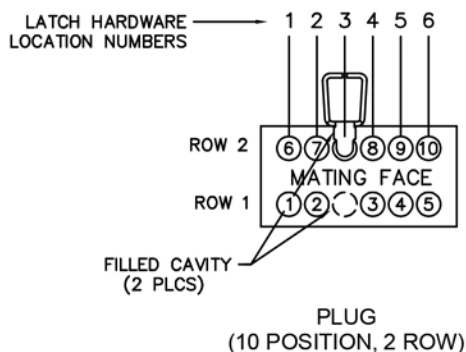
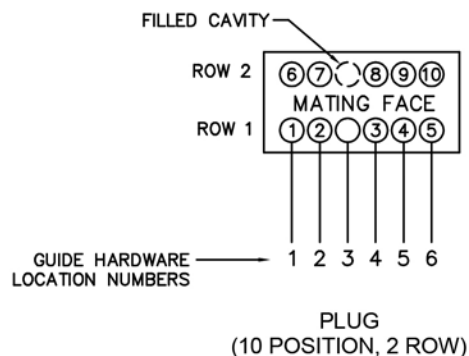
MA Strip Guidelines

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 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-29 thru M-34.
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 .004" underneath the connector.

To determine centered hardware location number:

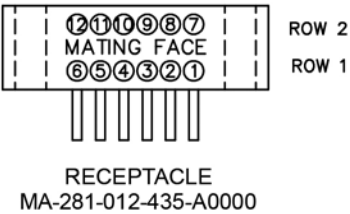
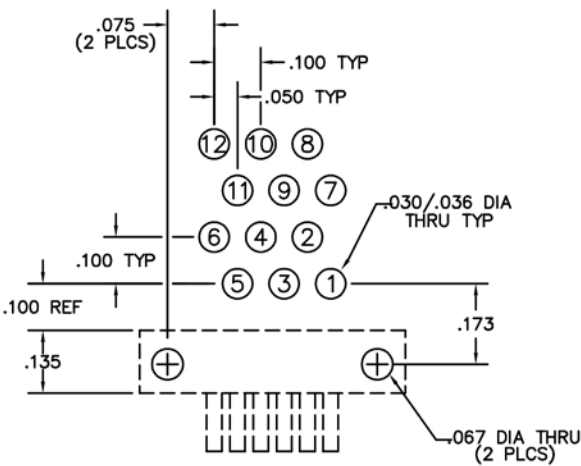
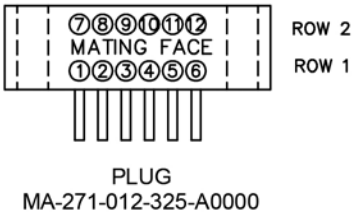
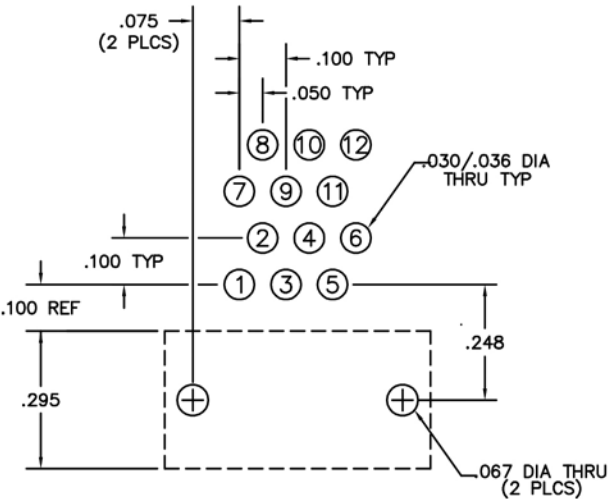
1. Divide the total number of cavities in one row by two (including hardware cavity).
2. Round to the next whole number if result is a fraction.
3. Guide hardware will be located in Row 1 and Latch hardware will be in Row 2.



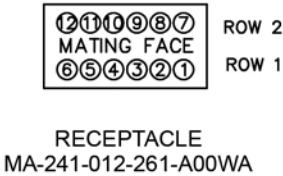
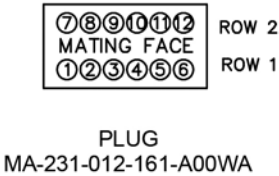
The example above shows 12 cavities with 10 live contacts.
(10 electrical positions & 2 mechanical positions)

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

Board mount connectors, right angle offset (.100") with mounting holes
(12 electrical positions)



Crimped wire connectors, straight without mounting holes
(12 electrical positions)



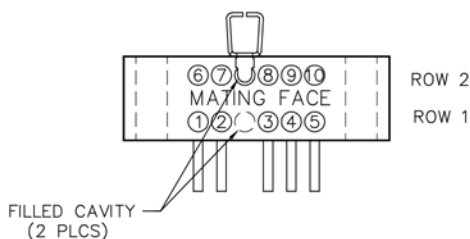
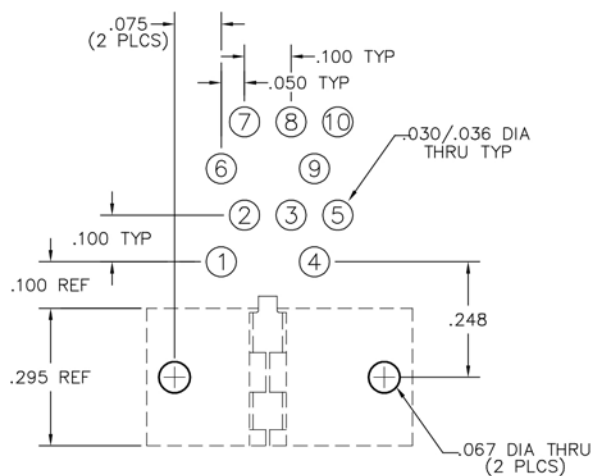
WIRE CONNECT CHART

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

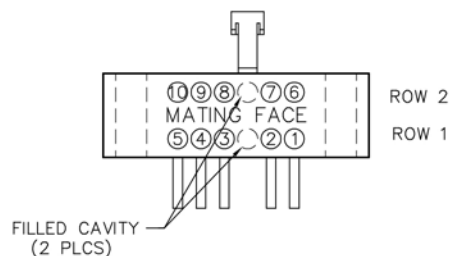
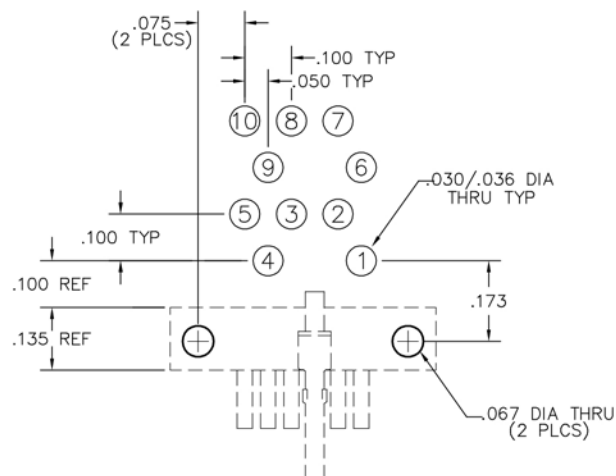
Board mount connectors, right angle offset (.100") with mounting holes. Side mount latch, centered.

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

(10 electrical positions, 2 mechanical positions)



PLUG
MA-271-010-325-ABC00

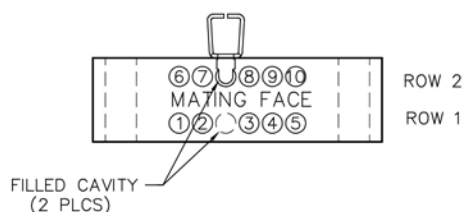


RECEPTACLE
MA-281-010-435-ALC00

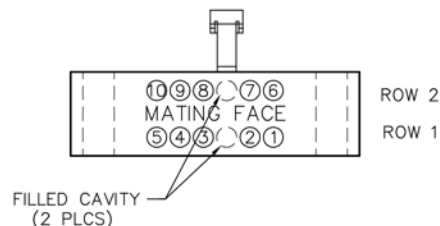
Crimped wire connectors, straight with mounting holes. Side mount latch, centered.

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

(10 electrical positions, 2 mechanical positions)



PLUG
MA-211-010-161-ABCWA



RECEPTACLE
MA-221-010-261-ALCWA

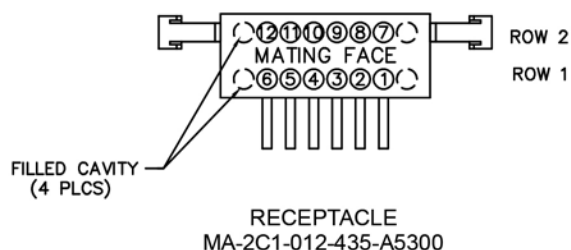
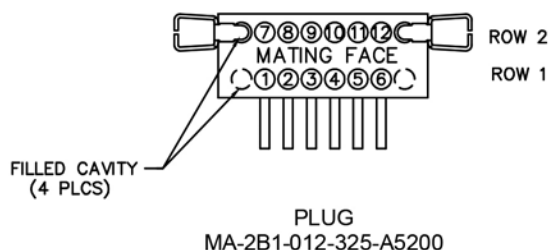
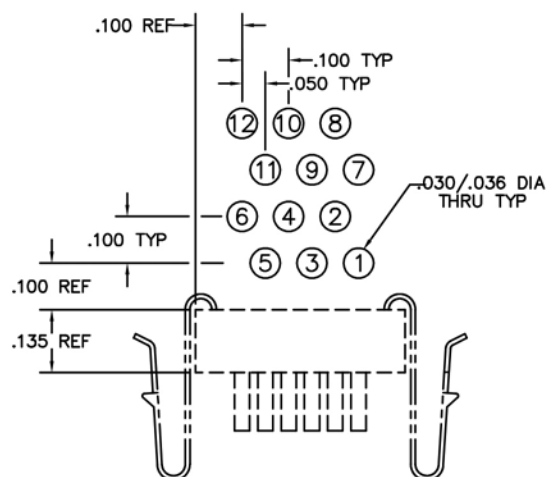
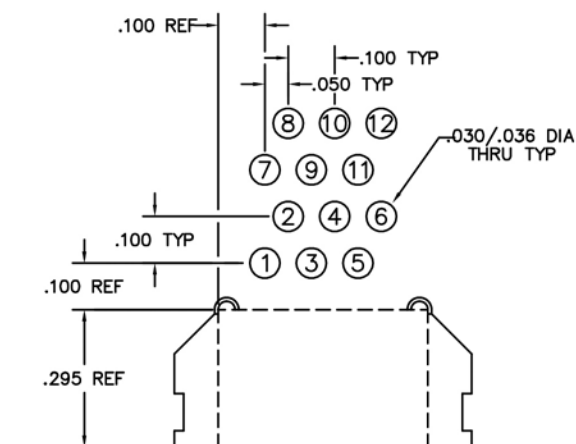
WIRE CONNECT CHART

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

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(512) 863-5585

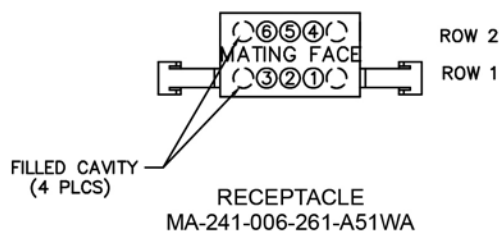
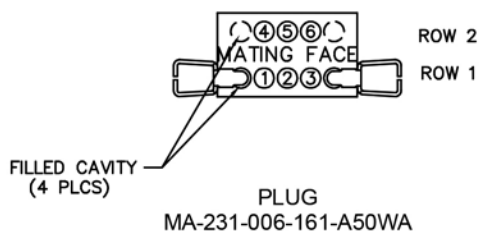
Board mount connectors, right angle offset (.100") without mounting holes End mount latches, 2 end cavities*

(12 electrical positions, 4 mechanical positions)



* = THIS IS THE EXCEPTION AS NOTED IN "MA STRIP GUIDELINES", PAGE M-28, NOTE 6.

Crimped wire connectors, straight without mounting holes End mount latches, 2 end cavities (6 electrical positions, 4 mechanical positions)



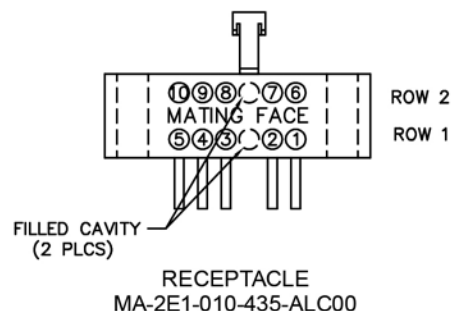
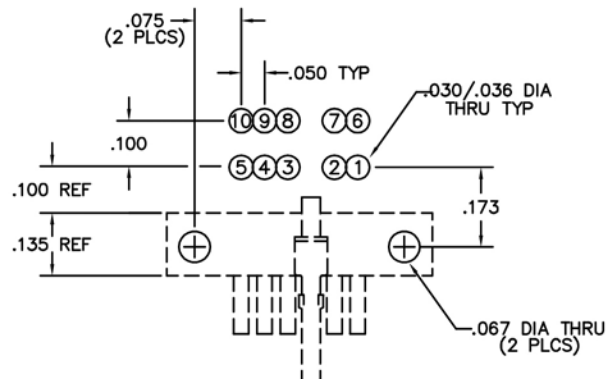
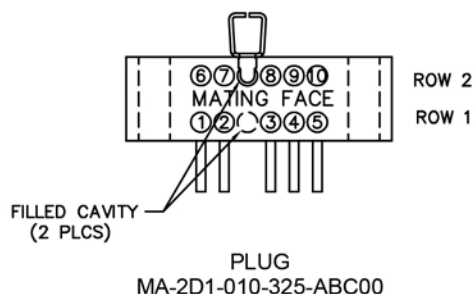
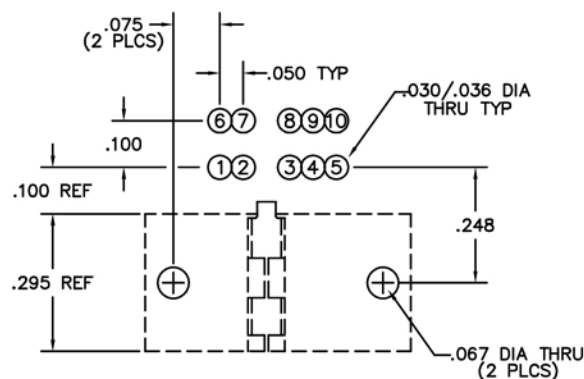
WIRE CONNECT CHART

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

Board mount connectors, right angle inline (.100") with mounting holes Side mount latch, centered

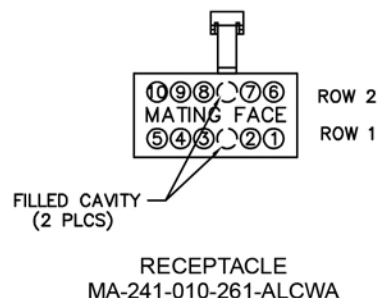
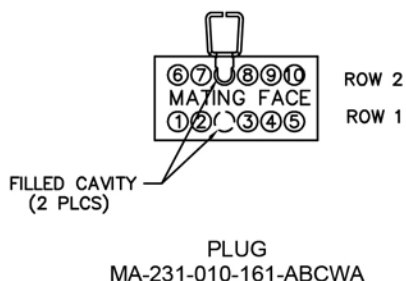
Note: Side mount latch will always be in row #2 of connector. Not recommended on row #1 for board mount applications.

(10 electrical positions, 2 mechanical positions)



Crimped wire connectors, straight without mounting holes Side mount latch, centered

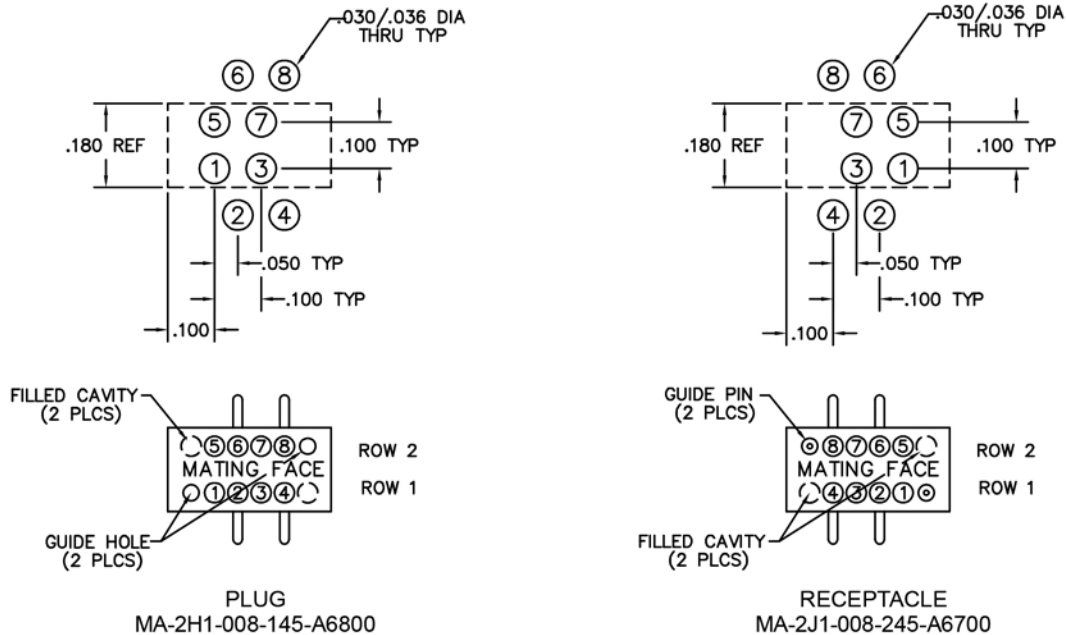
(10 electrical positions, 2 mechanical positions)



WIRE CONNECT CHART

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

Board mount connectors, straight offset (.100") without mounting holes
Two guide holes/pins, first & last cavities
(8 electrical positions, 4 mechanical positions)



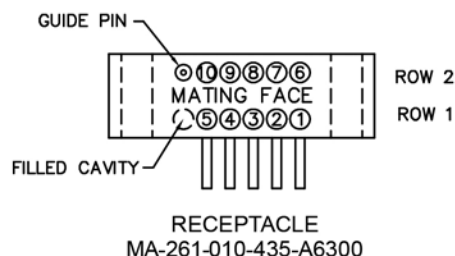
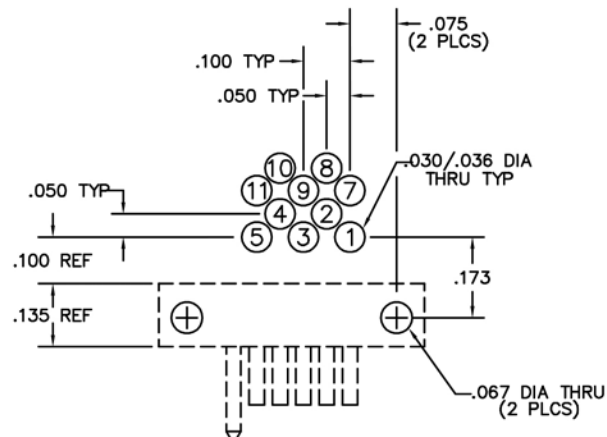
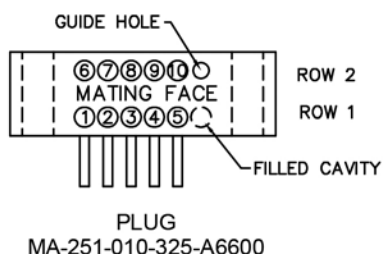
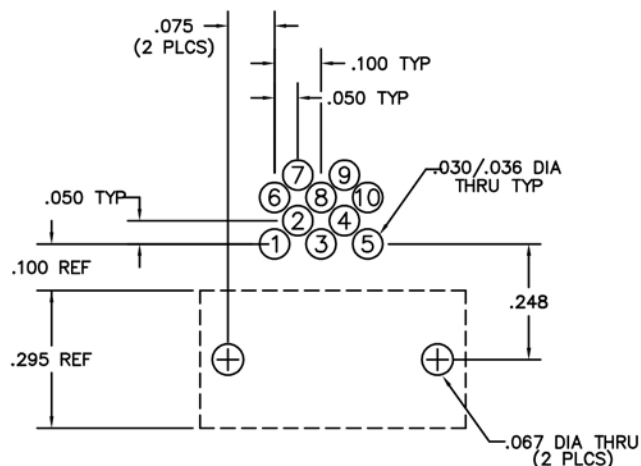
Crimped wire connectors, straight without mounting holes
Two guide holes/pins, first & last cavities
(8 electrical positions, 4 mechanical positions)



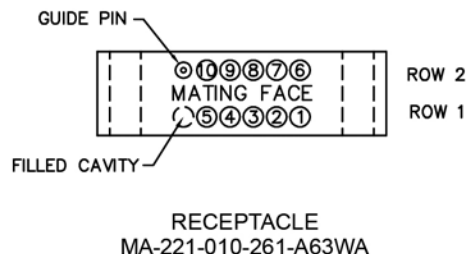
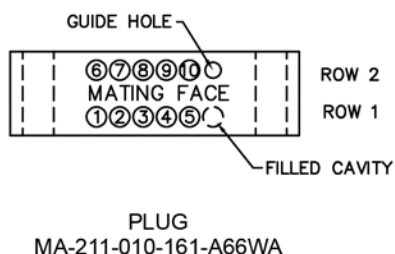
WIRE CONNECT CHART

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

Board mount connectors, right angle offset (.050") with mounting holes
Guide hole/pin, last cavity
 (10 electrical positions, 2 mechanical positions)



Crimped wire connectors, straight with mounting holes
Guide hole/pin, last cavity
 (10 electrical positions, 2 mechanical positions)



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

.050"

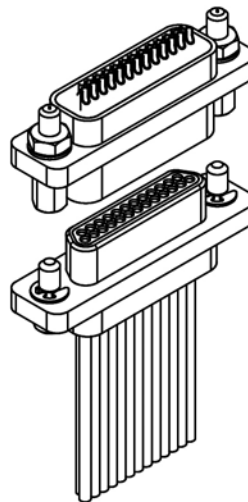
9 thru 100 Contacts

Rugged Metal

MM

Rugged Plastic

MN

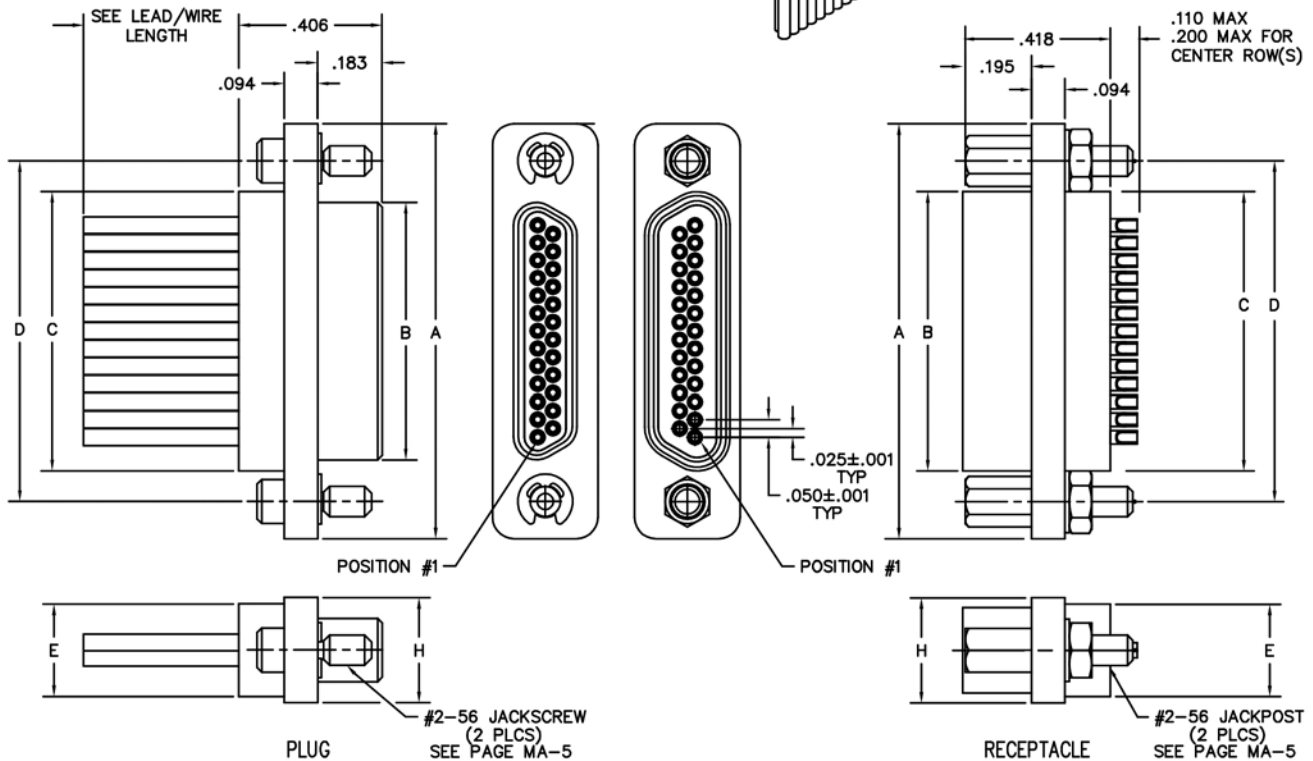


MM-223-025-2A3-2200
(METAL)

MN-221-025-2A3-2200
(PLASTIC)

MM-212-025-161-41WA
(METAL)

MN-211-025-161-41WA
(PLASTIC)



DIMENSIONS								
SIZE	CONTACT ROWS	A	B		C	D	E	H
			PLUG MAX	RCPT MAX			POTTING WELL MAX	
9	2	.775	.334	.400	.390	.565	.270	.298
15		.925	.484	.550	.540	.715		
21		1.075	.634	.700	.690	.865		
25		1.175	.734	.800	.790	.965		
31		1.325	.884	.950	.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	.310	.341
51		1.425	.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	.360	.384

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

** = 2 ROW, 51 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY,
(NON MIL-SPEC INTERFACE).

#2-56 UNC THD
(.092 DIA THRU)

#4-40 UNC THD
(.147 DIA THRU)

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

PLUG		RECEPTACLE	
SERIES		SERIES	
MM .050" Rugged Metal I/O Connector		MM .050" Rugged Metal I/O Connector	
MN .050" Rugged Plastic I/O Connector		MN .050" Rugged Plastic I/O Connector	
(MM & MN mate with MK, ML, MM, MN receptacles)		(MM & MN mate with MK, ML, MM, MN plugs)	
BODY		BODY	
2 2-Row (Sizes 9 thru 51****)		2 2-Row (Sizes 9 thru 51****)	
3 3-Row (Size 51 & 69****)		3 3-Row (Size 51 & 69****)	
4 4-Row (Size 100)		4 4-Row (Size 100)	
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 nickel shell		2 Polyphenylene Sulfide with electroless nickel shell	
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒		3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	
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		SIZE	
XXX 009, 015, 021, 025, 031, 037, 051****, 069***, 100		XXX 009, 015, 021, 025, 031, 037, 051****, 069***, 100	
CONTACTS		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, .109" Lead Length (.018 dia)		2D Socket, straight, .109" Lead Length (.018 dia)	
1E Pin, straight, .125" Lead Length (.018 dia)		2E Socket, straight, .125" Lead Length (.018 dia)	
1F Pin, straight, .140" Lead Length (.018 dia)		2F Socket, straight, .140" Lead Length (.018 dia)	
1G Pin, straight, .156" Lead Length (.018 dia)		2G Socket, straight, .156" Lead Length (.018 dia)	
1H Pin, straight, .172" Lead Length (.018 dia)		2H Socket, straight, .172" Lead Length (.018 dia)	
1J Pin, straight, .187" Lead Length (.018 dia)		2J Socket, straight, .187" Lead Length (.018 dia)	
13 Pin, straight, .250" Lead Length (.018 dia)		23 Socket, straight, .250" Lead Length (.018 dia)	
1K Pin, straight, .375" Lead Length (.018 dia)		2K Socket, straight, .375" Lead Length (.018 dia)	
14 Pin, straight, .500" Lead Length (.018 dia)		2L Socket, straight, .500" Lead Length (.018 dia)	
15 Pin, straight, 1.000" Lead Length (.018 dia)		2M Socket, straight, 1.000" Lead Length (.018 dia)	
16 Pin, straight, crimped wire		26 Socket, straight, crimped wire	
PLATING OPTIONS:		PLATING OPTIONS:	
1 50 µ" Au contacts (crimp wire)		1 50 µ" Au contacts (crimp wire)	
3 50 µ" Au contacts (solder cup, pigtail)		3 50 µ" Au contacts (solder cup, pigtail)	
5 50 µ" Au contacts; Sn/Pb alloy terminations ☒		5 50 µ" Au contacts; Sn/Pb alloy terminations ☒	
7 50 µ" Au contacts; SAC305 terminations		7 50 µ" Au contacts; SAC305 terminations	
HARDWARE		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 page MA-3 & MA-4		XX For wiring codes, see page MA-3 & MA-4	
OPTIONS		OPTIONS	
KSXX Two turning jackscrews. See page MA-6 for keying options (KJ*)		KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 for keying options (KJ*)	
KPXX Two fixed jacknuts. See page MA-6 for keying options (KN*)		KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options (KN*)	
		900 Interfacial sealing gasket	

* = 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.
☒ = Option not RoHS compliant

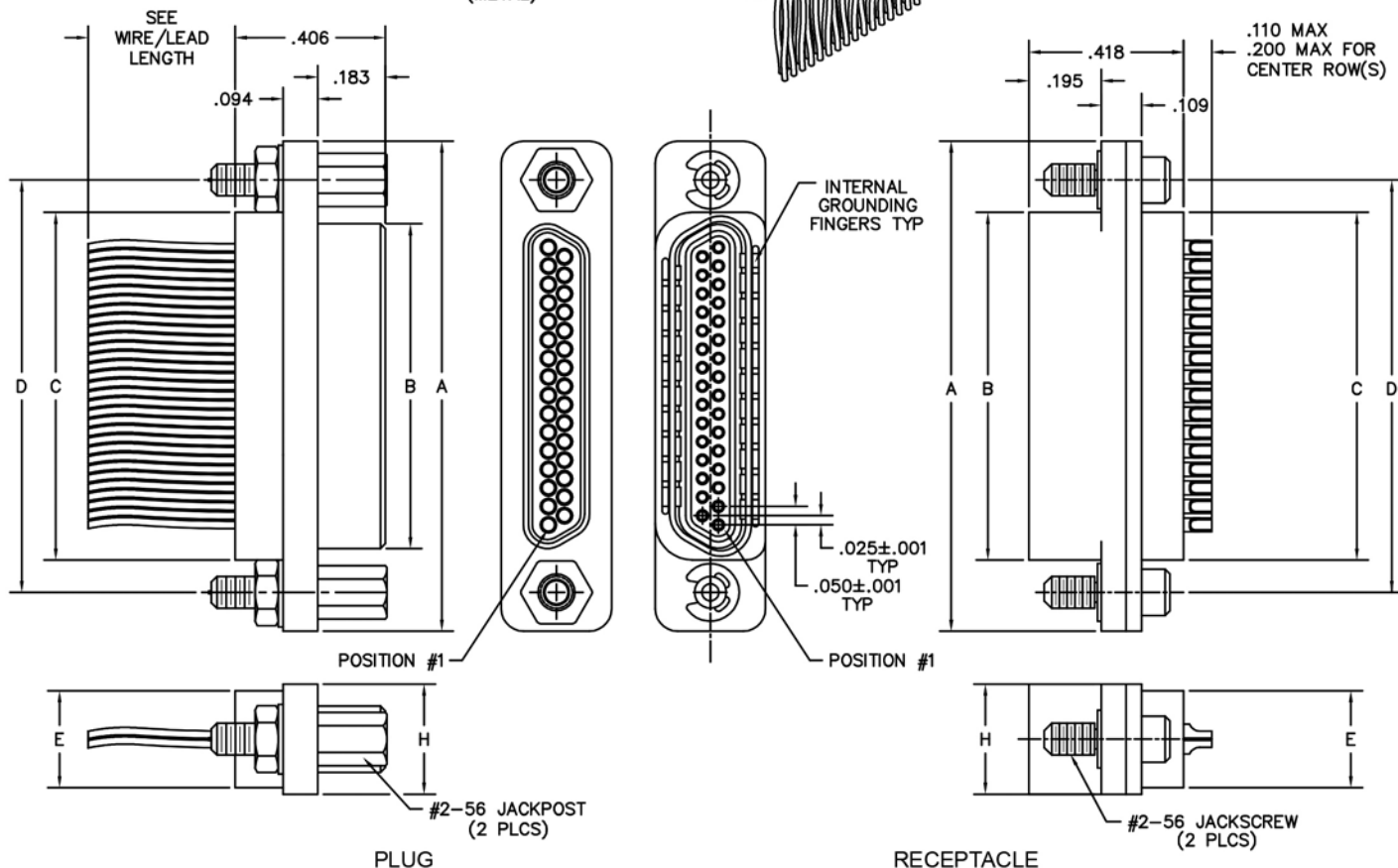
Cable to Cable Grounding Fingers

.050"
9 thru 100 Contacts
Rugged Metal

MM

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

MM-2D2-031-261-41WA
(METAL)



DIMENSIONS								
SIZE	CONTACT ROWS	A	B		C	D	E	H
			PLUG MAX	RCPT MAX			POTTING WELL MAX	
9	2	.775	.334	.400	.390	.565	.270	.298
15		.925	.484	.550	.540	.715		
21		1.075	.634	.700	.690	.865		
25		1.175	.734	.800	.790	.965		
31		1.325	.884	.950	.940	1.115		
37		1.475	1.034	1.100	1.090	1.265		
51	3	1.425	.984	1.050	1.040	1.215	.310	.341
69		1.725	1.284	1.350	1.340	1.515		
100	4	2.160	1.384	1.508	1.432	1.800	.360	.384

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

PLUG		RECEPTACLE	
SERIES			
MM .050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles)		MM .050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)	3 3-Row (Size 51 & 69)	3 3-Row (Size 51 & 69)
3 3-Row (Size 51 & 69)	4 4-Row (Size 100)	4 4-Row (Size 100)	
BODY STYLE: 1 Plug, straight, with ears		BODY STYLE: D Receptacle, straight, with grounding fingers	
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 6 Polyphenylene Sulfide with gold plated shell		BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 6 Polyphenylene Sulfide 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: 11 Pin, straight, solder cup 1A Pin, straight, 24 awg solder cup 1D Pin, straight, .109" Lead Length (.018 dia) SEE NOTE 1 1E Pin, straight, .125" Lead Length (.018 dia) SEE NOTE 1 1F Pin, straight, .140" Lead Length (.018 dia) SEE NOTE 1 12 Pin, straight, .150" Lead Length (.018 dia) SEE NOTE 1 1G Pin, straight, .156" Lead Length (.018 dia) SEE NOTE 1 1H Pin, straight, .172" Lead Length (.018 dia) SEE NOTE 1 1J Pin, straight, .187" Lead Length (.018 dia) SEE NOTE 1 13 Pin, straight, .250" Lead Length (.018 dia) SEE NOTE 1 1K Pin, straight, .375" Lead Length (.018 dia) SEE NOTE 1 14 Pin, straight, .500" pigtails (.018 dia) SEE NOTE 1 15 Pin, straight, 1.000" pigtails (.018 dia) SEE NOTE 1 16 Pin, straight, crimped wire		TYPE CONTACTS/TERMINATIONS: 21 Socket, straight, solder cup 2A Socket, straight, 24 awg solder cup 2D Socket, straight, .109" Lead Length (.018 dia) 2E Socket, straight, .125" Lead Length (.018 dia) 2F Socket, straight, .140" Lead Length (.018 dia) 22 Socket, straight, .150" Lead Length (.018 dia) 2G Socket, straight, .156" Lead Length (.018 dia) 2H Socket, straight, .172" Lead Length (.018 dia) 2J Socket, straight, .187" Lead Length (.018 dia) 23 Socket, straight, .250" Lead Length (.018 dia) 2K Socket, straight, .375" Lead Length (.018 dia) 2L Socket, straight, .500" Lead Length (.018 dia) 2M Socket, straight, 1.000" Lead Length (.018 dia) 24 Socket, straight, .500" pigtails (.018 dia) SEE NOTE 1 25 Socket, straight, 1.000" pigtails (.018 dia) SEE NOTE 1 26 Socket, straight, crimped wire	
PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)		PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)	
HARDWARE			
STYLE OF HARDWARE: 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*) 99 Keying hardware, see options below. (Body material 2 and 3 only)		STYLE OF HARDWARE: 00 None 22 Two fixed captive 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*) 99 Keying hardware, see options below. (Body material 2 and 3 only)	
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4		POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4	
OPTIONS			
KSXX Two turning jackscrews. See page MA-6 for keying options (KJ*) KPXX Two fixed jacknuts. See page MA-6 for keying options (KN*)		KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 for keying options (KJ*) KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options (KN*) 900 Interfacial sealing gasket	

* = Use numbers or letters in parenthesis when ordering size 100.
 ** = Captive hardware is factory installed and non-removable.

NOTE 1 = The leads on these contacts are soft copper suitable for forming.

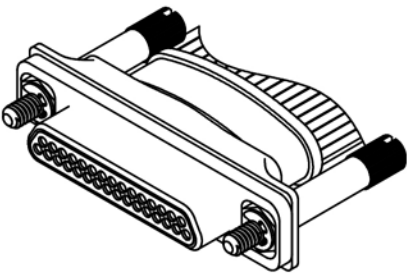
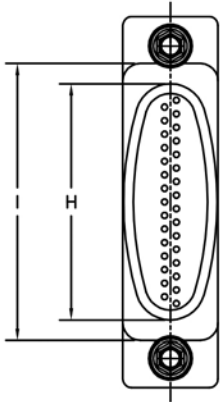
☒ = Option not RoHS compliant

Rugged Metal I/O
(Integral Shield Termination)

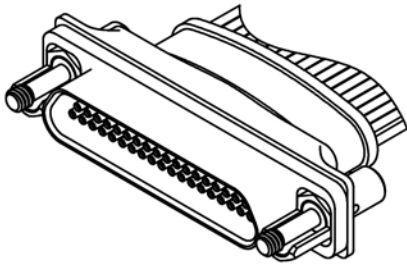
.050"
9 thru 100 Contacts

MM

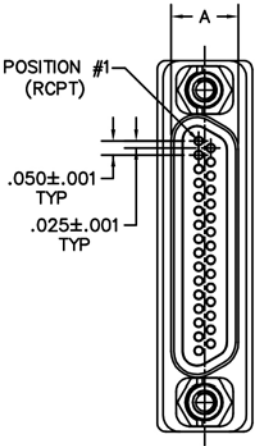
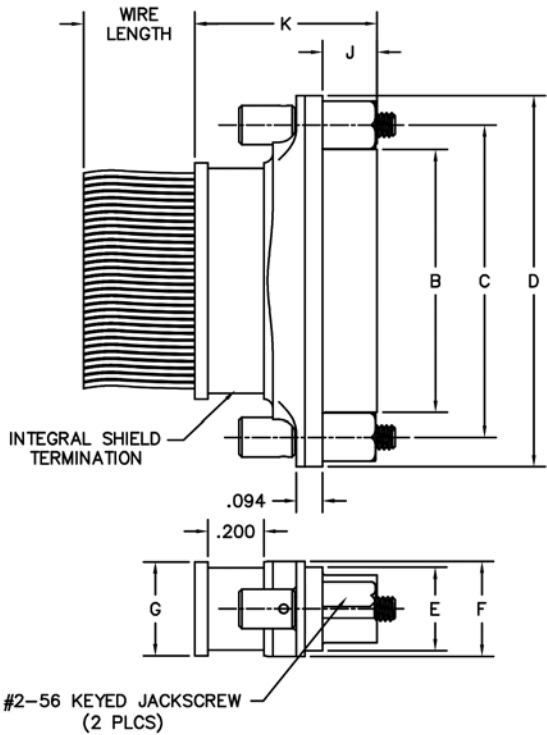
MATING MATRIX	
CONNECTOR	MATES WITH
MM-2P...	MK, ML, MM, MN receptacles
MM-2Q...	MK, ML, MM, MN plugs



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



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



DIMENSIONS																	
SIZE	CONTACT ROWS	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	.185	.251	.334	.400	.565	#2-56 UNC THD (.092 DIA THRU)	.775	.298	.340	.290	.290	.440	.183	.195	.640	.652
15				.484	.550	.715		.925			.445	.590					
21				.634	.700	.865		1.075			.595	.740					
25				.734	.800	.965		1.175			.695	.840					
31				.884	.950	1.115		1.325			.845	.990					
37				1.034	1.100	1.265		1.475			.995	1.140					
51	3	.228	.294	1.384	1.450	1.615		1.825	.341	.380	.367	1.345	1.490				
51				.984	1.050	1.215		1.425				.945	1.090				
69				1.284	1.350	1.515		1.725				1.245	1.390				
100	4	.271	.394	1.384	1.508	1.800	#4-40 UNC THD (.147 DIA THRU)	2.160	.381	.430	.417	1.457	1.522				

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

XX-XXX-XXX-XXX-XXXX
SERIES SIZE HARDWARE & WIRING
BODY CONTACTS

PLUG

SERIES

MM .050" Rugged Metal I/O Connector

BODY

- 2 2-Row (Sizes 9 thru 37, 51)***
- 3 3-Row (Sizes 51 thru 69)
- 4 4-Row (Size 100)

BODY STYLE:

- P Plug, straight, with ears and integral shield termination

BODY MATERIAL:

- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

CONTACTS/PLATING/TERMINATIONS:

- 161 Pin, straight, 50 µ" Au contacts (crimped stranded wire)

HARDWARE & WIRING

STYLE OF HARDWARE:

- 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, allenhead, captivated* (85)**
- 99 Keying hardware, see options below

WIRING:

- XX For wiring codes, see page MA-3 & MA-4

OPTIONS

- KSXX Two turning jackscrews
See page MA-6 for keying options (KJ)**
- KPXX Two fixed jacknuts
See page MA-6 for keying options (KN)**

NOTES

See page MA-5 & MA-7 for hardware dimensions.
Reference PTB44 for band-it termination installation

Stainless steel micro band for shield termination, shipped with each connector
AirBorn part number CDG10026 1/8" short, CDG17492 1/8" long
Band-it application tool - AirBorn 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
- ☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MM .050" Rugged Metal I/O Connector

BODY

- 2 2-Row (Sizes 9 thru 37, 51)***
- 3 3-Row (Sizes 51 thru 69)
- 4 4-Row (Size 100)

BODY STYLE:

- Q Receptacle, straight, with ears and integral shield termination

BODY MATERIAL:

- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

CONTACTS/PLATING/TERMINATIONS:

- 261 Socket, straight, 50 µ" Au contacts (crimped stranded wire)

HARDWARE & WIRING

STYLE OF HARDWARE:

- 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, allenhead, captivated* (85)**
- 99 Keying hardware, see options below

WIRING:

- XX For wiring codes, see page MA-3 & MA-4

OPTIONS

- 900 Interfacial seal
- KSXX Two turning jackscrews & interfacial sealing gasket
See page MA-6 for keying options (KJ)**
- KPXX Two fixed jacknuts & interfacial sealing gasket
See page MA-6 for keying options (KN)**

NOTES

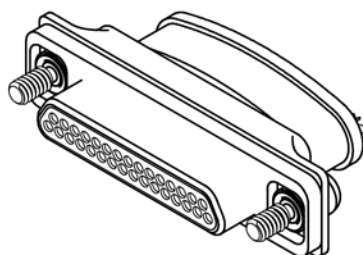
See page MA-5 & MA-7 for hardware dimensions.
Reference PTB44 for band-it termination installation

Rugged Metal Solder Cup (Integral Shield Termination)

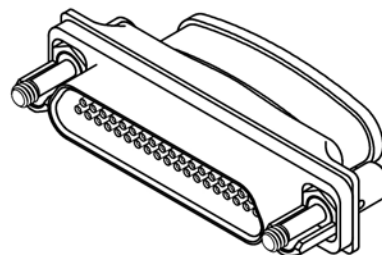
.050"

9 thru 100 Contacts

MM

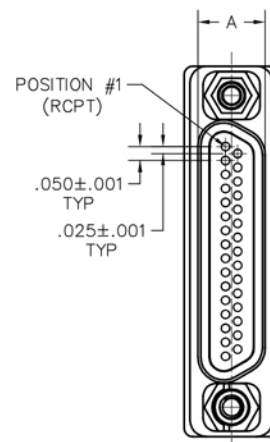
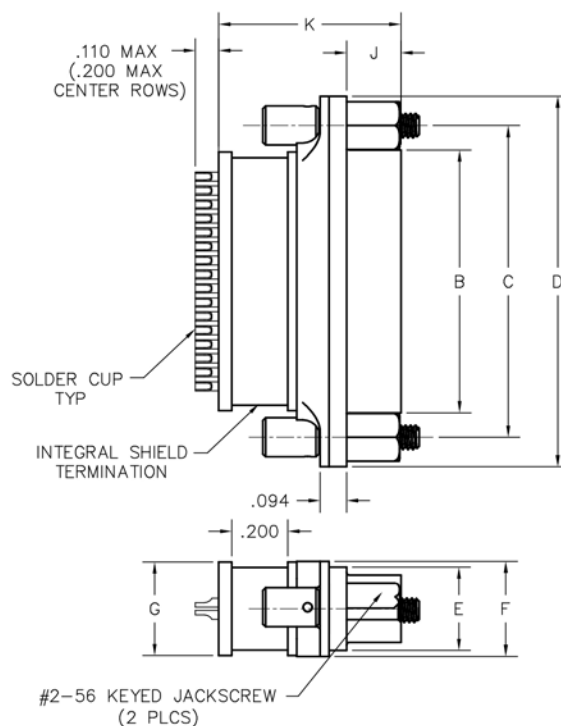
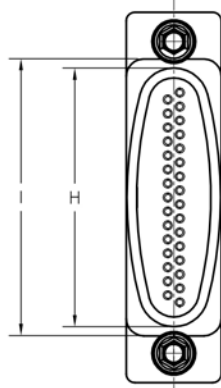


MM-2P2-031-113-4500
(PLUG)



MM-2Q2-031-213-KS44
(RECEPTACLE)

MATING MATRIX	
CONNECTOR	MATES WITH
MM-2P...	MK, ML, MM, MN receptacles
MM-2Q...	MK, ML, MM, MN plugs



DIMENSIONS																	
SIZE	CONTACT ROWS	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	.185	.251	.334	.400	.565	#2-56 UNC THD (.092 DIA THRU)	.775	.298	.340	.335	.375	.440	.183	.195	.640	.652
15				.484	.550	.715		.925				.525	.590				
21				.634	.700	.865		1.075				.675	.740				
25				.734	.800	.965		1.175				.775	.840				
31				.884	.950	1.115		1.325				.925	.990				
37				1.034	1.100	1.265		1.475				1.075	1.140				
51				1.384	1.450	1.615		1.825				1.425	1.490				
51	3	.228	.294	.984	1.050	1.215	1.425	.341	.380	.367	1.025	1.090					
69				1.284	1.350	1.515	1.725				1.325	1.390					
100	4	.271	.394	1.384	1.508	1.800	#4-40 UNC THD (.147 DIA THRU)	2.160	.381	.430	.417	1.457	1.522				

PLUG: MM-2P2-031-113-4500

RECEPTACLE: MM-2Q2-031-213-2200

XX-XXX-XXX-XXX-XXXX

SERIES SIZE HARDWARE & WIRING
BODY CONTACTS

PLUG

SERIES

MM .050" Rugged Metal Solder Cup Connector

BODY

- 2 2-Row (Sizes 9 thru 37, 51)***
- 3 3-Row (Sizes 51 thru 69)
- 4 4-Row (Size 100)

BODY STYLE:

- P Plug, straight, with ears and integral shield termination

BODY MATERIAL:

- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

CONTACTS/PLATING/TERMINATIONS:

- 113 Pin, straight, 50 μ " Au contacts, 10 μ " Au termination
26 AWG solder cup

HARDWARE & WIRING

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)**
- 45 Two turning jackscrews, allenhead,captivated* (85)**
- 99 Keying hardware, see options below

WIRING:

- 00 None

OPTIONS

- KPXX Two fixed jacknuts
See page MA-6 for keying options (KN)**
- KSXX Two turning jackscrews.
See page MA-6 for keying options (KP)**

NOTES

See page MA-5 & MA-7 for hardware dimensions.
Reference PTB43 for solder cup termination
Reference PTB44 for band-it termination installation

Stainless steel micro band for shield termination, shipped with each connector
AirBorn part number CDG10026 1/8" short, CDG17492 1/8" long
Band-it application tool - AirBorn 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
- ☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MM .050" Rugged Metal Solder Cup Connector

BODY

- 2 2-Row (Sizes 9 thru 37, 51)***
- 3 3-Row (Sizes 51 thru 69)
- 4 4-Row (Size 100)

BODY STYLE:

- Q Receptacle, straight, with ears and integral shield termination

BODY MATERIAL:

- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

CONTACTS/PLATING/TERMINATIONS:

- 213 Socket, straight, 50 μ " Au contacts, 10 μ " Au termination
26 AWG solder cup

HARDWARE & WIRING

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)**
- 45 Two turning jackscrews, allenhead,captivated* (85)**
- 99 Keying hardware, see options below

WIRING:

- 00 None

OPTIONS

- 900 Interfacial seal
- KPXX Two fixed jacknuts & interfacial sealing gasket
See page MA-6 for keying options (KN)**
- KSXX Two turning jackscrews & interfacial sealing gasket
See page MA-6 for keying options (KJ)**

NOTES

See page MA-5 & MA-7 for hardware dimensions.
Reference PTB43 for solder cup termination
Reference PTB44 for band-it termination installation

Cable to Cable (Jumper Assembly)

.050"

9 thru 100 Contacts

Rugged Metal

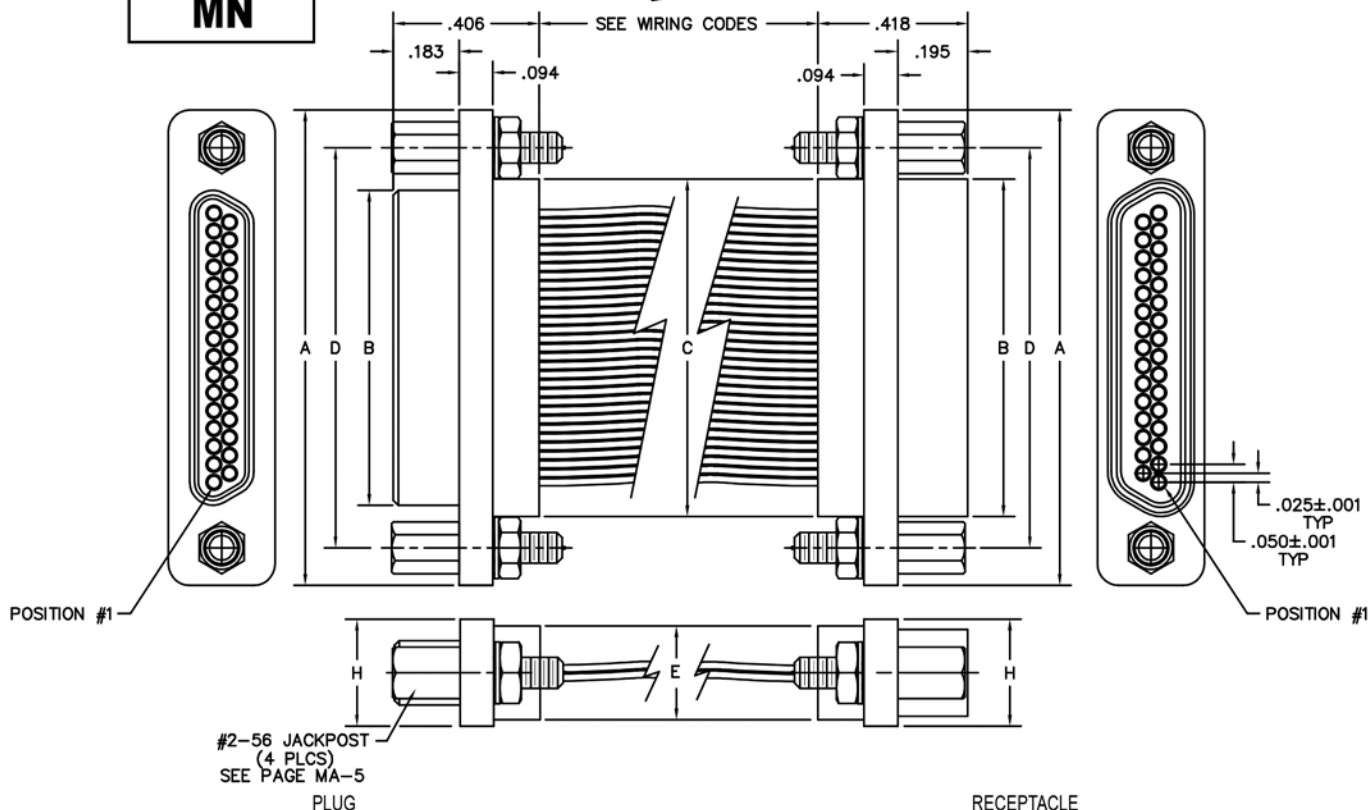
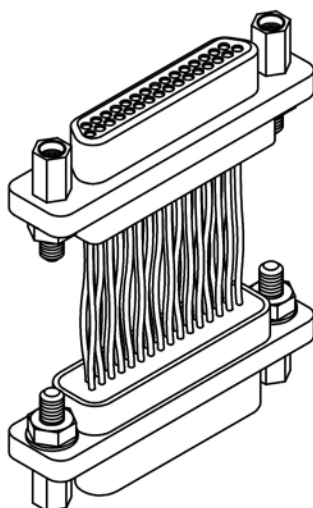
MM

Rugged Plastic

MN

MM-2J2-031-PS1-22WA
(METAL)

MN-2J1-031-PS1-22WA
(PLASTIC)

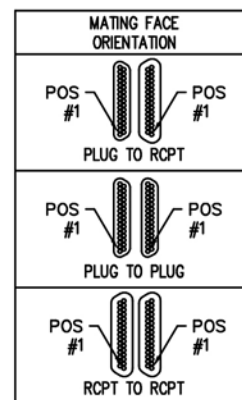


SIZE	CONTACT ROWS	A	B		C	D	E POTTING WELL MAX	H	HARDWARE
			PLUG MAX	RCPT MAX					
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD (.092 DIA THRU)
15		.925	.484	.550	.540	.715			
21		1.075	.634	.700	.690	.865			
25		1.175	.734	.800	.790	.965			
31		1.325	.884	.950	.940	1.115			
37		1.475	1.034	1.100	1.090	1.265			
51**	3	1.825	1.384	1.450	1.440	1.615	.310	.341	#4-40 UNC THD (.147 DIA THRU)
51		1.425	.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	.360	.384	

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

** = 2 ROW, 51 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY,
(NON MIL-SPEC INTERFACE).

RECEPTACLE



MM-2J2-031-PS1-22WA
 MN-2J1-031-PS1-22WA
 XX-XXX-XXX-XXX-XXXX-XXX

SERIES

MM .050" Rugged Metal I/O Connector
 MN .050" Rugged Plastic I/O Connector
 (MM & MN mate with MK, ML, MM, MN assemblies)

BODY

- 2 2-Row (Sizes 9 thru 51****)
- 3 3-Row (Size 51 & 69****)
- 4 4-Row (Size 100)

BODY STYLE:

- J Jumper assembly, straight, with ears

BODY MATERIAL:

- 1 Polyphenylene Sulfide (MN only)
- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
- 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 OPTIONS:

- 1 50 µ" 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 page MA-3 & MA-4

OPTIONS

- KSXX Four turning jackscrews. Receptacles supplied with interfacial sealing gasket. See page MA-6 for keying options (KJ*)
- KPXX Four fixed jacknuts. Receptacles supplied with interfacial sealing gasket. See page MA-6 for keying options (KN*)
- 900 Interfacial sealing gasket

* = 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.

☒ = Option not RoHS compliant

Cable to Cable

.050"

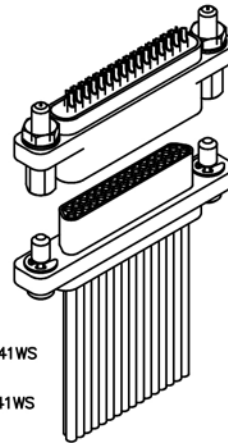
9 thru 51 Contacts

Low Profile Metal

MQ

Low Profile Plastic

MP

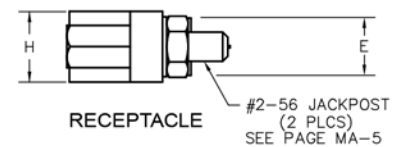
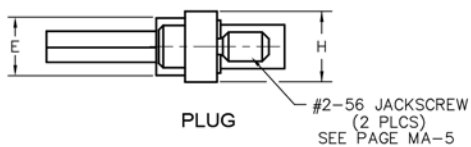
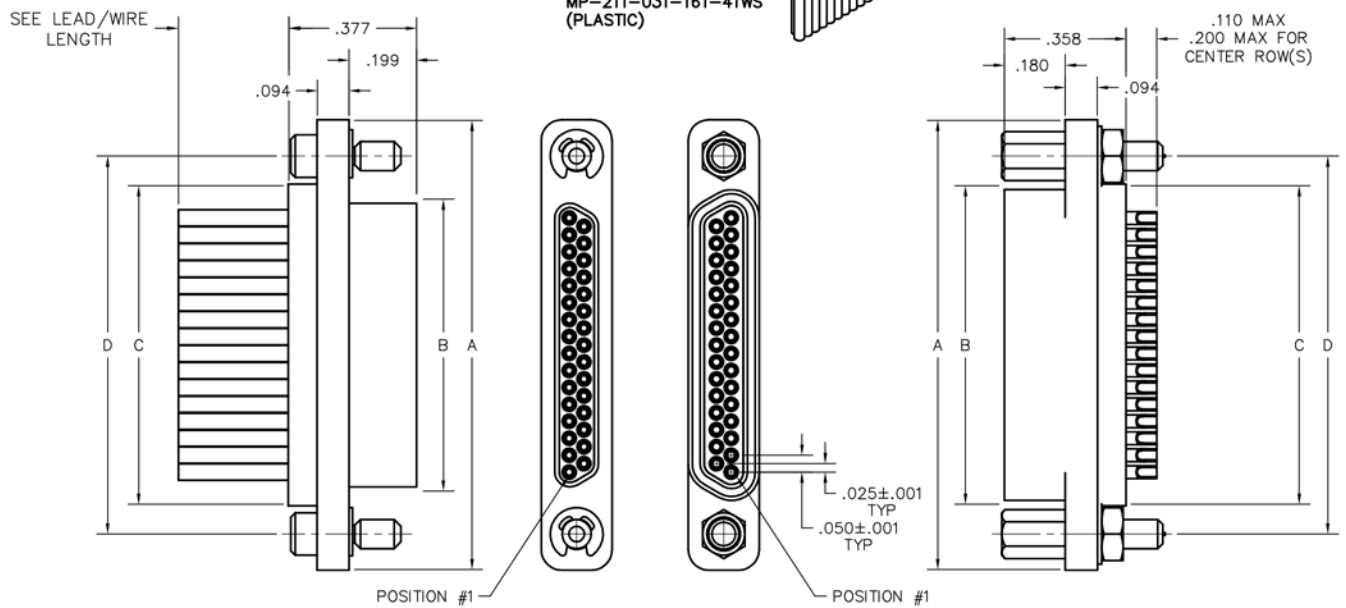


MQ-222-031-2A3-2200
(METAL)

MP-221-031-2A3-2200
(PLASTIC)

MQ-212-031-161-41WS
(METAL)

MP-211-031-161-41WS
(PLASTIC)



DIMENSIONS								
SIZE	CONTACT ROWS	A	B		C	D	E POTTING WELL MAX	H
			PLUG MAX	RCPT MAX				
9	2	.778	.292	.378	.398	.565	.173	.208
15		.928	.442	.528	.548	.715		
21		1.078	.592	.678	.698	.865		
25		1.178	.692	.778	.798	.965		
31		1.328	.842	.928	.948	1.115		
37		1.478	.992	1.078	1.098	1.265		
51	3	1.428	.942	1.028	1.048	1.215	.220	.250

PLUG		RECEPTACLE		PLUG: MQ-212-031-161-41WS		RECEPTACLE: MQ-222-031-2G3-4500		PLUG: MP-211-031-161-41WS		RECEPTACLE: MP-221-031-2G3-4500		XX-XXX-XXX-XXX-XXXX-XXX	
SERIES		SERIES											
MQ .050" Low Profile Metal I/O Connector		MQ .050" Low Profile Metal I/O Connector											
MP .050" Low Profile Plastic I/O Connector		MP .050" Low Profile Plastic I/O Connector											
(MQ & MP mate with MP, MQ, MR, MS receptacles)		(MQ & MP mate with MP, MQ, MR, MS plugs)											
BODY		BODY											
2 2-Row (Sizes 9 thru 37)		2 2-Row (Sizes 9 thru 37)											
3 3-Row (Size 51)		3 3-Row (Size 51)											
BODY STYLE:		BODY STYLE:											
1 Plug, straight, with ears		2 Receptacle, straight, with ears											
BODY MATERIAL:		BODY MATERIAL:											
1 Polyphenylene Sulfide (MP only)		1 Polyphenylene Sulfide (MP only)											
2 Polyphenylene Sulfide with electroless nickel shell		2 Polyphenylene Sulfide with electroless nickel shell											
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒		3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒											
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		SIZE											
XXX 009, 015, 021, 025, 031, 037, 051		XXX 009, 015, 021, 025, 031, 037, 051											
CONTACTS		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, .109" Lead Length (.018 dia) SEE NOTE 1		2D Socket, straight, .109" Lead Length (.018 dia)											
1E Pin, straight, .125" Lead Length (.018 dia) SEE NOTE 1		2E Socket, straight, .125" Lead Length (.018 dia)											
1F Pin, straight, .140" Lead Length (.018 dia) SEE NOTE 1		2F Socket, straight, .140" Lead Length (.018 dia)											
12 Pin, straight, .150" Lead Length (.018 dia) SEE NOTE 1		22 Socket, straight, .150" Lead Length (.018 dia)											
1G Pin, straight, .156" Lead Length (.018 dia) SEE NOTE 1		2G Socket, straight, .156" Lead Length (.018 dia)											
1H Pin, straight, .172" Lead Length (.018 dia) SEE NOTE 1		2H Socket, straight, .172" Lead Length (.018 dia)											
1J Pin, straight, .187" Lead Length (.018 dia) SEE NOTE 1		2J Socket, straight, .187" Lead Length (.018 dia)											
13 Pin, straight, .250" Lead Length (.018 dia) SEE NOTE 1		23 Socket, straight, .250" Lead Length (.018 dia)											
1K Pin, straight, .375" Lead Length (.018 dia) SEE NOTE 1		2K Socket, straight, .375" Lead Length (.018 dia)											
14 Pin, straight, .500" Lead Length (.018 dia) SEE NOTE 1		2L Socket, straight, .500" Lead Length (.018 dia)											
15 Pin, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1		2M Socket, straight, 1.000" Lead Length (.018 dia)											
16 Pin, straight, crimped wire		24 Socket, straight, .500" Lead Length (.018 dia) SEE NOTE 1											
		25 Socket, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1											
		26 Socket, straight, crimped wire											
PLATING OPTIONS:		PLATING OPTIONS:											
1 50 μ" Au contacts (crimp wire)		1 50 μ" Au contacts (crimp wire)											
3 50 μ" Au contacts (solder cup, pigtail)		3 50 μ" Au contacts (solder cup, pigtail)											
5 50 μ" Au contacts; Sn/Pb alloy terminations ☒		5 50 μ" Au contacts; Sn/Pb alloy terminations ☒											
7 50 μ" Au contacts; SAC305 terminations		7 50 μ" Au contacts; SAC305 terminations											
HARDWARE		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 page MA-3 & MA-4		XX For wiring codes, see page MA-3 & MA-4											
OPTIONS		OPTIONS											
KSXX Two turning jackscrews. See page MA-6 for keying options		KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 for keying options											
KPXX Two fixed jacknuts. See page MA-6 for keying options		KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options											

** = Captive hardware is factory installed and non-removable.
☒ = Option not RoHS compliant

NOTE 1 = The leads on these contacts are soft copper suitable for forming.

Cable to Cable (Jumper Assembly)

.050"

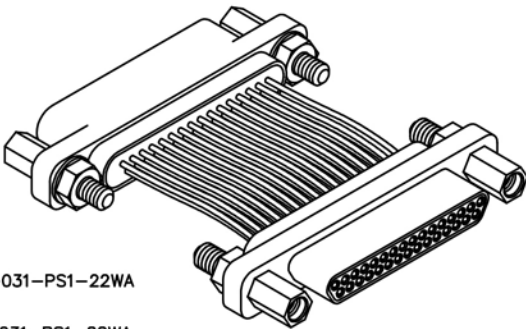
9 thru 51 Contacts

Low Profile Metal

MQ

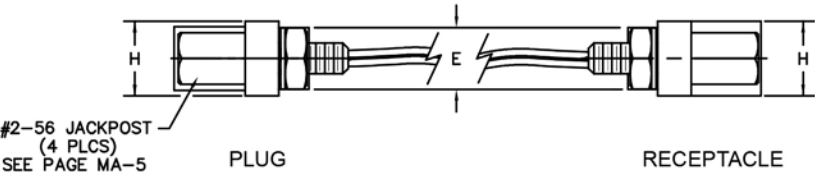
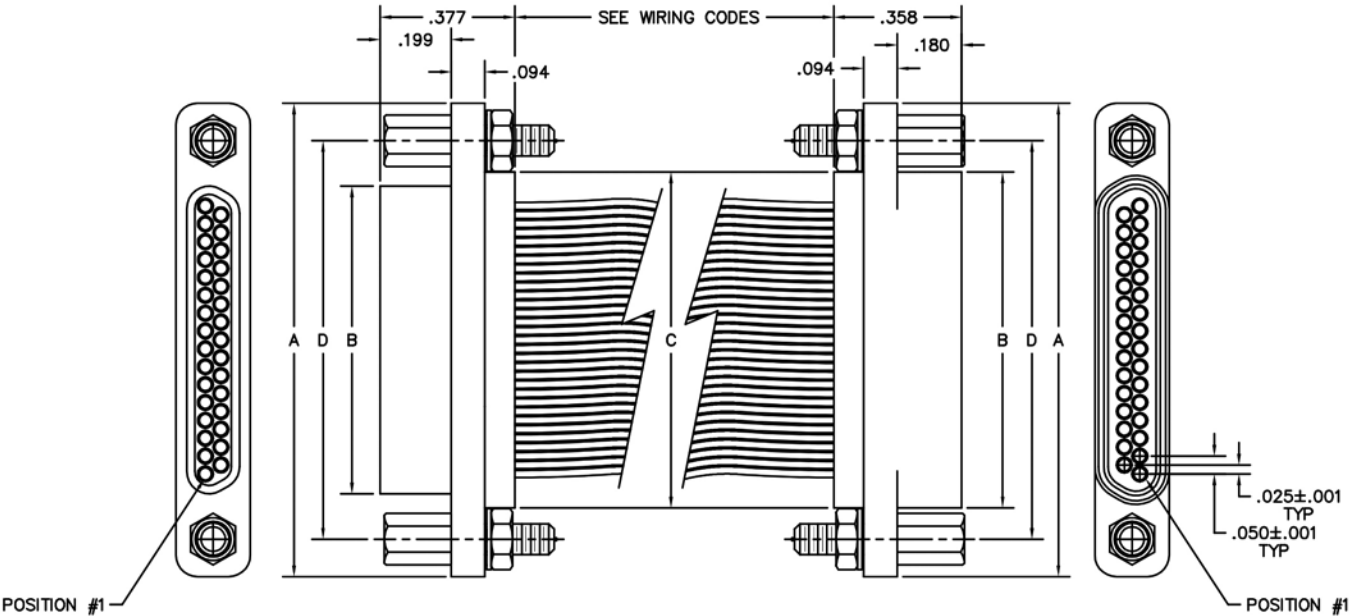
Low Profile Plastic

MP

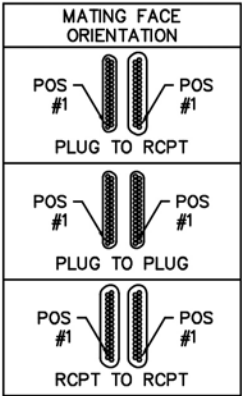


MQ-2J2-031-PS1-22WA
(METAL)

MP-2J1-031-PS1-22WA
(PLASTIC)



DIMENSIONS								
SIZE	CONTACT ROWS	A	B		C	D	E	HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL MAX	
9	2	.778	.292	.378	.398	.565	.173	#2-56 UNC THD (.092 DIA THRU)
15		.928	.442	.528	.548	.715		
21		1.078	.592	.678	.698	.865		
25		1.178	.692	.778	.798	.965		
31		1.328	.842	.928	.948	1.115		
37	3	1.478	.992	1.078	1.098	1.265	.220	
51		1.428	.942	1.028	1.048	1.215		
							.250	



MQ- 2J2-031 - PS1-22WA
MP- 2J1-031 - PS1-22WA
XX-XXX-XXX-XXX-XXXX-XXXX

SERIES

MQ .050" Low Profile Metal I/O Connector
MP .050" Low Profile Plastic I/O Connector
(MQ & MP mate with MP, MQ, MR, MS receptacles)

BODY

- 2 2-Row (Sizes 9 thru 37)
3 3-Row (Size 51)

BODY STYLE:

- J Jumper assembly, straight, with ears

BODY MATERIAL:

- 1 Polyphenylene Sulfide (MP only)
2 Polyphenylene Sulfide with electroless nickel shell
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
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 OPTIONS:

- 1 50 μ " 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 MA-3 & MA-4

OPTIONS

KSXX Four turning jackscrews. See page MA-6 for keying options
KPXX Four fixed jacknuts. See page MA-6 for keying options

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

☒ = Option not RoHS compliant

Right Angle Boardmount (Narrow Footprint)

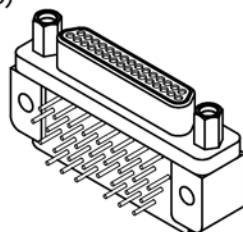
.050"

9 thru 100 Contacts

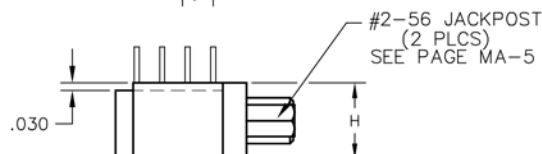
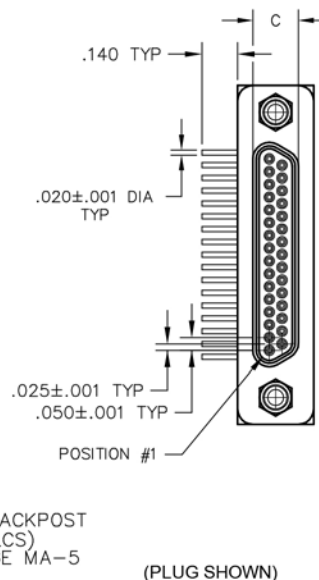
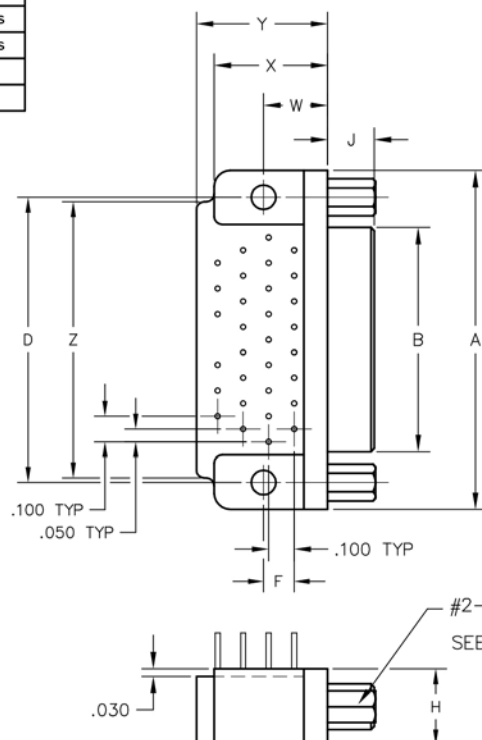
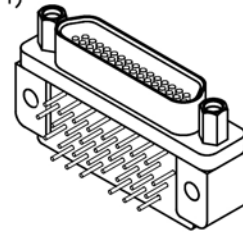
MK, ML

MATING MATRIX	
CONNECTOR	MATES WITH
MK-25...	MK, ML, MM, MN receptacles
ML-25...	MK, ML, MM, MN receptacles
MK-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 ROWS	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	.775	.334	.400	.185	.251	.565	.020	.183	.195	.250	.420	.420	.520	.775	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550			.715	.120							.925		
21		1.075	.634	.700			.865								1.075		
25		1.175	.734	.800			.965								1.175		
31		1.325	.884	.950			1.115								1.080		
37	3	1.475	1.034	1.100	.228	.294	1.265	.150	.341	.300	.430	.450	.520	.650	1.180	#4-40 UNC THD	.125 DIA #2-56 UNC INSR #4-40 UNC INSR
51		1.425	.984	1.050			1.215							1.220			
69		1.725	1.284	1.350			1.515							1.450			
100	4	2.160	1.384	1.508	.271	.394	1.800	.200	.384	.400	.590	1.000	1.810				

PLUG: MK-252-031-335-220S

RECEPTACLE: MK-262-031-445-220S



PLUG

SERIES

MK .050" Rugged Metal PC Board Mount Connector
ML .050" Rugged Plastic PC Board Mount Connector
(MK & ML mate with MK, ML, MM, MN, receptacles)

BODY

- 2 2-Row (Sizes 9 thru 37)
 - 3 3-Row (Size 51 & 69***)
 - 4 4-Row (Size 100)
- BODY STYLE:**
- 5 Plug, right angle, narrow footprint, w/ mounting holes
- BODY MATERIAL:**
- 1 Polyphenylene Sulfide (ML only)
 - 2 Electroless nickel shell w/ PPS insulator
 - 3 Electrodeposited cadmium shell w/ PPS insulator ☒
 - 4 Hard anodized black shell w/ PPS insulator
 - 5 Stainless steel shell w/ PPS insulator
 - 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:

- 32 Pin, right angle, PCB leads, .109"
- 33 Pin, right angle, PCB leads, .140"
- 34 Pin, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 µ" Au contacts: Au terminations
- 5 50 µ" Au contacts: Sn/Pb alloy terminations ☒
- 7 50 µ" Au contacts: SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts (62")
- 41 Two turning jackscrews, allen head, retaining ring****(81")
- 99 Keying hardware, see options below (Body material 2, 3 and 4 only)

POLARIZATION / WIRING:

- 0R Reversed body polarization
- 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts (KN*)
- 94P Mil-Spec footprint (size 100 only), standard body polarization
- 0B7 #2-56 threaded inserts, standard body polarization
- 0BJ Mil-Spec footprint (size 100 only) with #2-56 threaded inserts, standard body polarization
- 0H7 #4-40 threaded inserts (size 100 only), standard body polarization
- 0H6 Mil-Spec footprint (size 100 only) with #4-40 threaded inserts, standard body polarization

NOTES

See page MA-6 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.

☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MK .050" Rugged Metal PC Board Mount Connector
ML .050" Rugged Plastic PC Board Mount Connector
(MK & ML mate with MK, ML, MM, MN plugs)

BODY

- 2 2-Row (Sizes 9 thru 37)
 - 3 3-Row (Size 51 & 69***)
 - 4 4-Row (Size 100)
- BODY STYLE:**
- 6 Receptacle, right angle, narrow footprint, w/ mounting holes
- BODY MATERIAL:**
- 1 Polyphenylene Sulfide (ML only)
 - 2 Electroless nickel shell w/ PPS insulator
 - 3 Electrodeposited cadmium shell w/ PPS insulator ☒
 - 4 Hard anodized black shell w/ PPS insulator
 - 5 Stainless steel shell w/ PPS insulator
 - 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:

- 43 Socket, right angle, PCB leads, .109"
- 44 Socket, right angle, PCB leads, .140"
- 45 Socket, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 µ" Au contacts: Au terminations
- 5 50 µ" Au contacts: Sn/Pb alloy terminations ☒
- 7 50 µ" Au contacts: SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts (62")
- 41 Two turning jackscrews, allen head, retaining ring****(81")
- 99 Keying hardware, see options below (Body material 2, 3 and 4 only)

POLARIZATION / WIRING:

- 0R Reversed body polarization
- 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts (KN*) and interfacial sealing gasket.
- 900 Interfacial sealing gasket
- 0B7 #2-56 Threaded inserts and interfacial sealing gasket standard body polarization
- 0H7 #4-40 threaded inserts (size 100 only), and interfacial sealing gasket, standard body polarization

NOTES

See page MA-6 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.

✗ = Option not RoHS compliant

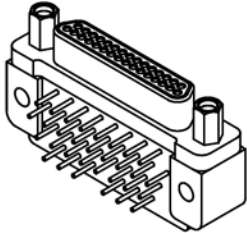
Right Angle
Boardmount
(Thru Clearance Cut)

.050"
9 thru 100 Contacts

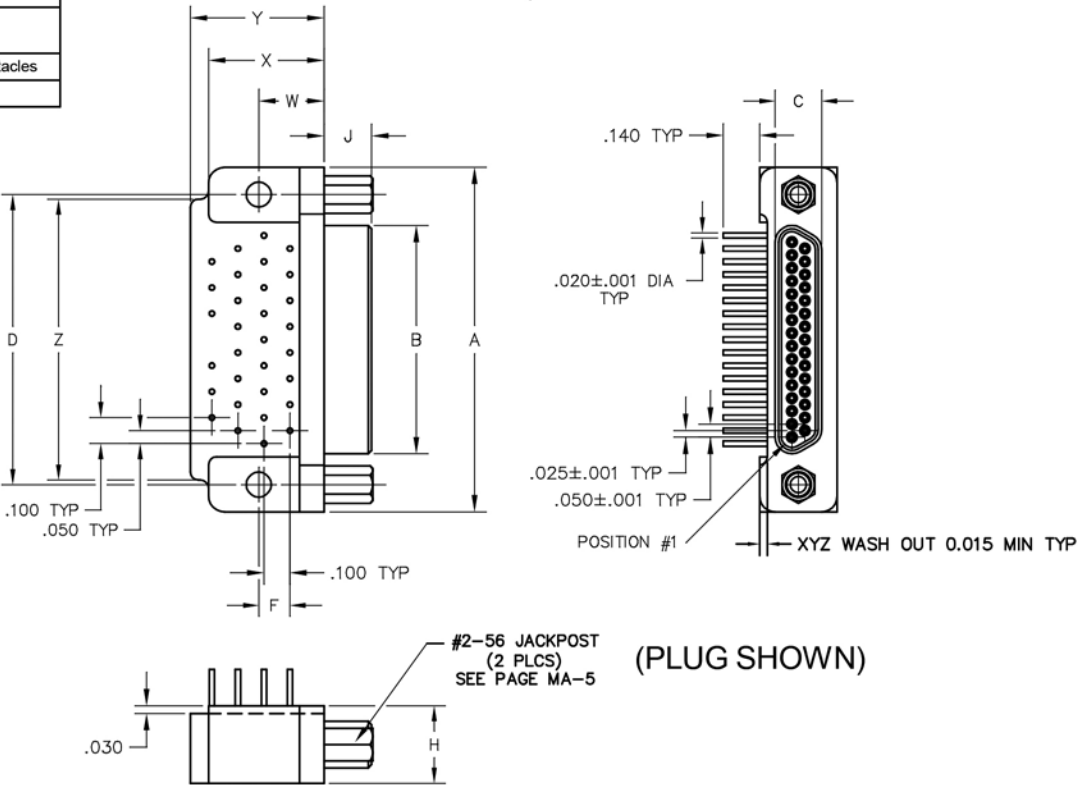
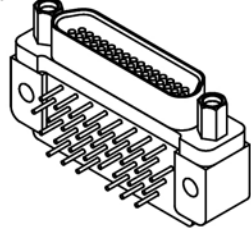


MATING MATRIX	
CONNECTOR	MATES WITH
MK-2R...	MK, ML, MM, MN receptacles
MK-2S...	MK, ML, MM, MN plugs

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



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



DIMENSIONS																	
SIZE	CONTACT ROWS	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	.775	.334	.400	.185	.251	.565	.020	.120	.183	.195	.250	.420	.420	.775	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550			.715	.925									
21		1.075	.634	.700			.865	1.075									
25		1.175	.734	.800			.965	1.175									
31		1.325	.884	.950			1.115	1.080									
37		1.475	1.034	1.100			1.265	.450					.520	1.180			
51	3	1.425	.984	1.050	.228	.294	1.215	.150	.341			.300	.430	.650	1.220		
69		1.725	1.284	1.350			1.515							.755	1.450		
100	4	2.160	1.384	1.508	.271	.394	1.800	.200	.384			.400	.590	1.000	1.810	#4-40 UNC THD	.125 DIA #2-56 UNC INSERT #4-40 UNC INSERT

PLUG: MK-2R2-031-335-220S
RECEPTACLE: MK-2S2-031-445-220S
 XX-XXX-XXX-XXX-XXXX-XXX
 | | | |
 BODY CONTACTS OPTIONS
 SERIES SIZE HARDWARE

PLUG

SERIES

MK .050" Rugged Metal PC Board Mount Connector
(MK mates with MK, ML, MM, MN, receptacles)

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (size 100 only)

BODY STYLE: Thru Cut

R Plug, right angle (thru clearance cut), narrow footprint, w/ mounting holes

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator
- 5 Stainless steel shell w/ PPS insulator
- 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:

- 32 Pin, right angle, PCB leads, .109"
- 33 Pin, right angle, PCB leads, .140"
- 34 Pin, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 µ" Au contacts: Au terminations
- 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒
- 7 50 µ" Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts (62)
- 41 Two turning jackscrews, allen head, retaining ring**** (81)
- 99 Keying hardware, see options below (Body material 2, 3 and 4 only)

POLARIZATION / WIRING:

- 0R Reversed body polarization**
- 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts (KN*)
- 94P Mil-Spec footprint (size 100 only), standard body polarization
- 0B7 #2-56 threaded inserts, standard body polarization
- 0BJ Mil-Spec footprint (size 100 only) with #2-56 threaded inserts, standard body polarization
- 0H7 #4-40 threaded inserts (size 100 only), standard body polarization
- 0H6 Mil-Spec footprint (size 100 only) with #4-40 threaded inserts, standard body polarization

NOTES

See page MA-6 for keying options

* = Use numbers in parenthesis when ordering size 100.

** = 100 position connector standard body polarization only.

**** = Connector body has no mounting holes.

☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MK .050" Rugged Metal PC Board Mount Connector
(MK mates with MK, ML, MM, MN plugs)

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100 only)

BODY STYLE: Thru Cut

S Receptacle, right angle (thru clearance cut), narrow footprint, w/ mounting holes

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator
- 5 Stainless steel shell w/ PPS insulator
- 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:

- 43 Socket, right angle, PCB leads, .109"
- 44 Socket, right angle, PCB leads, .140"
- 45 Socket, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 µ" Au contacts: Au terminations
- 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒
- 7 50, u" Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts (62)
- 41 Two turning jackscrews, allen head, retaining ring**** (81)
- 99 Keying hardware, see options below (Body material 2, 3 and 4 only)

POLARIZATION / WIRING:

- 0R Reversed body polarization**
- 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts (KN*) and interfacial sealing gasket.
- 900 Interfacial sealing gasket
- 0B7 #2-56 Threaded inserts and interfacial sealing gasket standard body polarization
- 0H7 #4-40 threaded inserts (size 100 only), and interfacial sealing gasket, standard body polarization

NOTES

See page MA-6 for keying options

* = Use numbers in parenthesis when ordering size 100.

** = 100 position connector standard body polarization only.

**** = Connector body has no mounting holes.

☒ = Option not RoHS compliant

Right Angle Boardmount (Blind Clearance Cut)

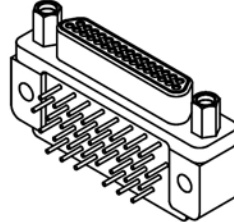
.050"

9 thru 100 Contacts

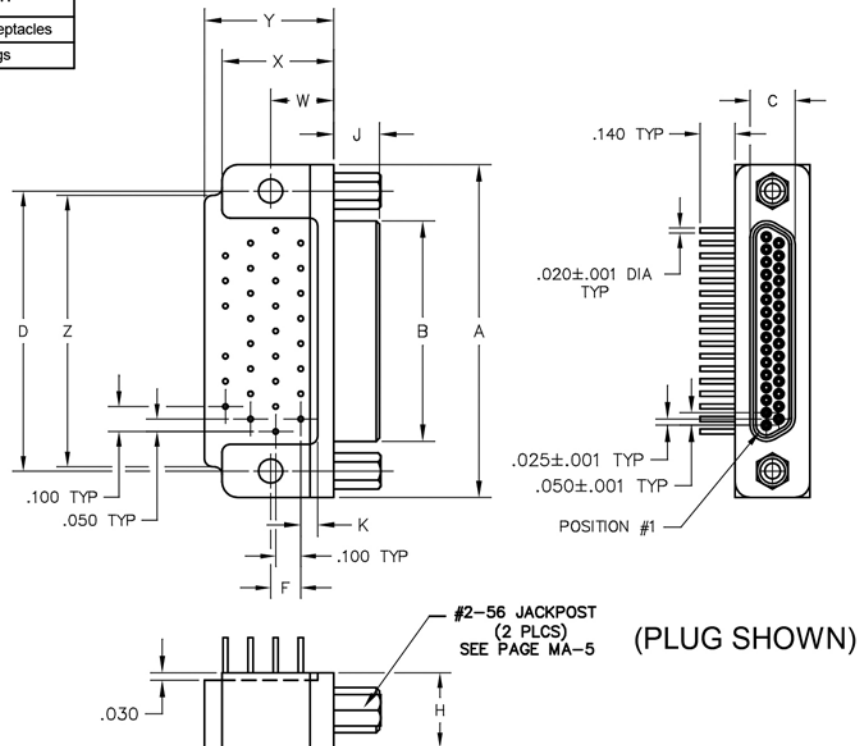
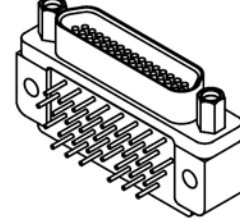
MK

MATING MATRIX	
CONNECTOR	MATES WITH
MK-2T...	MK, ML, MM, MN receptacles
MK-2V...	MK, ML, MM, MN plugs

MK-2T2-031-335-220S
(PLUG)



MK-2V2-031-445-220S
(RCPT)



DIMENSIONS																		
SIZE	CONTACT ROWS	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	.775	.334	.400	.185	.251	.565	.020	.298	.183	.195	.067	.250	.420	.420	.775	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550			.715									.925		
21		1.075	.634	.700			.865									1.075		
25		1.175	.734	.800			.965									1.175		
31		1.325	.884	.950			1.115									1.080		
37		1.475	1.034	1.100			1.265									1.180		
51	3	1.425	.984	1.050	.228	.294	1.215	.150	.341			.087	.300	.430	.650	1.220		
69		1.725	1.284	1.350			1.515								1.450			
100	4	2.160	1.384	1.508	.271	.394	1.800	.200	.384			.137	.400	.590	1.000	1.810	#4-40 UNC THD	.125 DIA #2-56 UNC INSERT #4-40 UNC INSERT

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

 XX-XXX-XXX-XXX-XXXX-XXX
 | | | | |
 BODY CONTACTS OPTIONS
 SERIES SIZE HARDWARE

PLUG

SERIES

MK .050" Rugged Metal PC Board Mount Connector
(MK mates with MK, ML, MM, MN, receptacles)

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100)
- BODY STYLE: Blind Cut
- T Plug, right angle (blind clearance cut), narrow footprint, w/ mounting holes
- BODY MATERIAL:
- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator
- 5 Stainless steel shell w/ PPS insulator
- 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:
- 32 Pin, right angle, PCB leads, .109"
 - 33 Pin, right angle, PCB leads, .140"
 - 34 Pin, right angle, PCB leads, .172"
- PLATING OPTIONS:
- 3 50 μ " Au contacts: Au terminations
 - 5 50 μ " Au contacts; Sn/Pb alloy terminations ☒
 - 7 50 μ " Au contacts; SAC305 terminations

HARDWARE

- STYLE OF HARDWARE:
- 00 None
 - 22 Two fixed jacknuts (62")
 - 41 Two turning jackscrews, allen head, retaining ring****(81")
 - 99 Keying hardware, see options below (Body material 2, 3 and 4 only)
- POLARIZATION / WIRING:
- 0R Reversed body polarization
 - 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts (KN*)
- 94P Mil-Spec footprint (size 100 only), standard body polarization
- 0B7 #2-56 threaded inserts, standard body polarization
- 0BJ Mil-Spec footprint (size 100 only) with #2-56 threaded inserts, standard body polarization
- 0H7 #4-40 threaded inserts (size 100 only), standard body polarization
- 0H6 Mil-Spec footprint (size 100 only) with #4-40 threaded inserts, standard body polarization

NOTES

- See page MA-6 for keying options
- * = Use numbers in parenthesis when ordering size 100.
 - **** = Connector body has no mounting holes.
 - ☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MK .050" Rugged Metal PC Board Mount Connector
(MK mates with MK, ML, MM, MN plugs)

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100)
- BODY STYLE: Blind Cut
- V Receptacle, right angle (blind clearance cut), narrow footprint, w/ mounting holes
- BODY MATERIAL:
- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator
- 5 Stainless steel shell w/ PPS insulator
- 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:
- 43 Socket, right angle, PCB leads, .109"
 - 44 Socket, right angle, PCB leads, .140"
 - 45 Socket, right angle, PCB leads, .172"
- PLATING OPTIONS:
- 3 50 μ " Au contacts: Au terminations
 - 5 50 μ " Au contacts; Sn/Pb alloy terminations ☒
 - 7 50 μ " Au contacts; SAC305 terminations

HARDWARE

- STYLE OF HARDWARE:
- 00 None
 - 22 Two fixed jacknuts (62")
 - 41 Two turning jackscrews, allen head, retaining ring****(81")
 - 99 Keying hardware, see options below (Body material 2, 3 and 4 only)
- POLARIZATION / WIRING:
- 0R Reversed body polarization
 - 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts (KN*) and interfacial sealing gasket.
- 900 Interfacial sealing gasket
- 0B7 #2-56 Threaded inserts and interfacial sealing gasket, standard body polarization
- 0H7 #4-40 threaded inserts (size 100 only), and interfacial sealing gasket, standard body polarization

NOTES

- See page MA-6 for keying options
- * = Use numbers in parenthesis when ordering size 100.
 - **** = Connector body has no mounting holes.
 - ☒ = Option not RoHS compliant

Board (Narrow Footprint) to Flex Cable

.050"

9 thru 100 Contacts

Rugged Board Mount

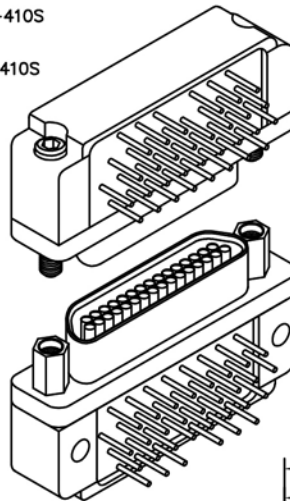
MK, ML

Flex Cable

MK, ML

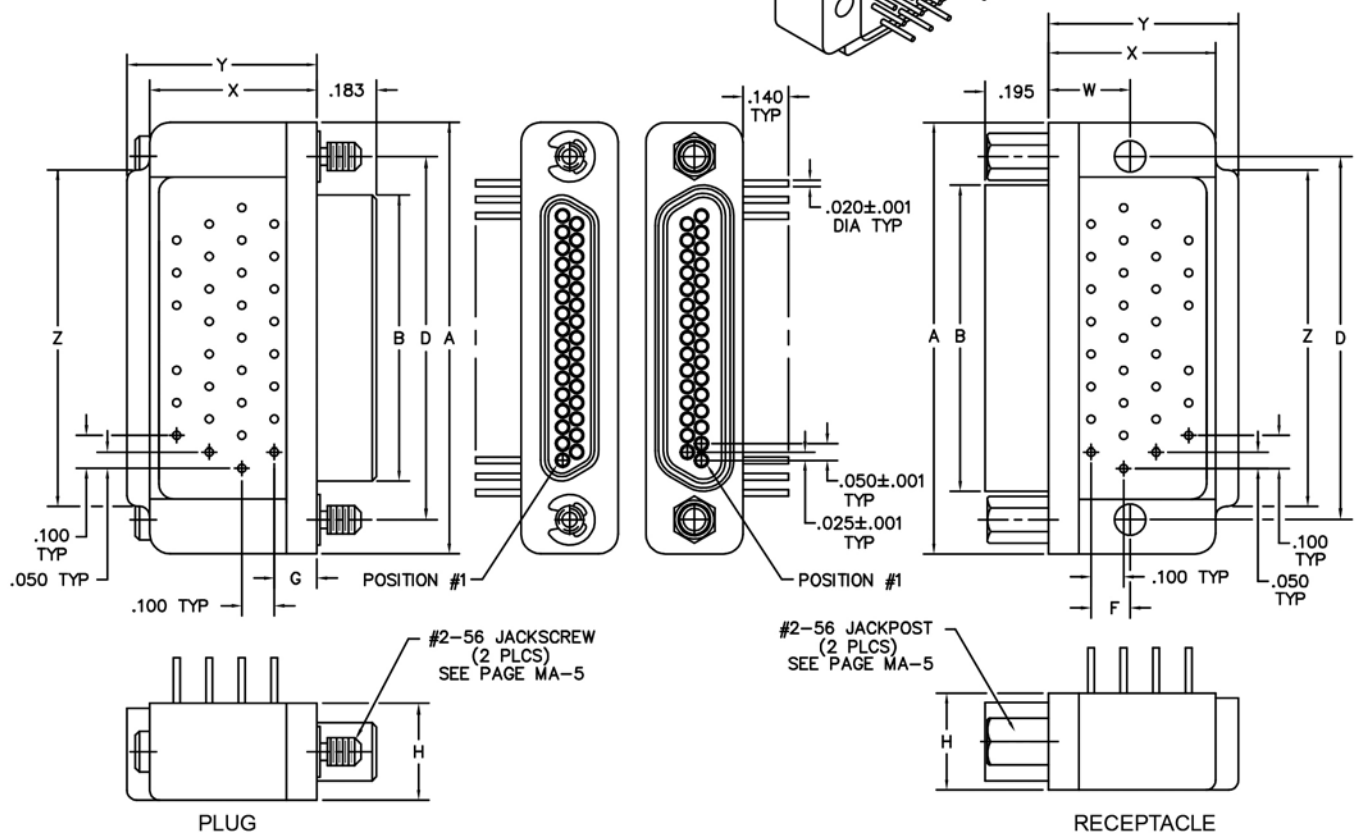
MK-253-031-335-410S
(METAL)

ML-251-031-335-410S
(PLASTIC)



MK-263-031-445-220S
(METAL)

ML-261-031-445-220S
(PLASTIC)



DIMENSIONS														
SIZE	CONTACT ROWS	A	B		D	F	G	H	W	X MAX	Y MAX	Z	HARDWARE	MOUNTING HOLE
			PLUG MAX	RCPT MAX										
9	2	.775	.334	.400	.565	.020	.230	.298	.250	.420	.420	.775	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550	.715	.120	.130					.925		
21		1.075	.634	.700	.865							1.075		
25		1.175	.734	.800	.965							1.175		
31		1.325	.884	.950	1.115							1.080		
37		1.475	1.034	1.100	1.265							1.180		
51	3	1.425	.984	1.050	1.215	.150	.150	.341	.300	.430	.650	1.220	#2-56 UNC THD	.125 DIA OR #2-56 UNC THREADED INSERT
69*		1.725	1.284	1.350	1.515						.755	1.450		
100	4	2.160	1.384	1.508	1.800	.200	.200	.384	.400	.590	1.000	1.810	#4-40 UNC THD	
* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.														

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

PLUG: MK-253-031-335-410S
RECEPTACLE: MK-263-031-445-220S
PLUG: ML-251-031-335-410S
RECEPTACLE: ML-261-031-445-220S
 XX-XXX-XXX-XXX-XXXX-XXX

PLUG

RECEPTACLE

SERIES	
MK .050" Rugged Metal PC Board Mount Connector	MK .050" Rugged Metal PC Board Mount Connector
ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN receptacles)	ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)
3 3-Row (Size 51 & 69***)	3 3-Row (Size 51 & 69***)
4 4-Row (Size 100)	4 4-Row (Size 100)
BODY STYLE:	BODY STYLE:
5 Plug, right angle, narrow footprint, w/ mtg holes	6 Receptacle, right angle, narrow footprint, w/ mtg holes
BODY MATERIAL:	BODY MATERIAL:
1 Polyphenylene Sulfide (ML only)	1 Polyphenylene Sulfide (ML only)
2 Electroless nickel shell w/ PPS insulator	2 Electroless nickel shell w/ PPS insulator
3 Electrodeposited cadmium shell w/ PPS insulator ☒	3 Electrodeposited cadmium shell w/ PPS insulator ☒
4 Hard anodized black shell w/ PPS insulator	4 Hard anodized black shell w/ PPS insulator
5 Stainless steel shell w/ PPS insulator	5 Stainless steel shell w/ 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, .109"	43 Socket, right angle, PCB leads, .109"
33 Pin, right angle, PCB leads, .140"	44 Socket, right angle, PCB leads, .140"
34 Pin, right angle, PCB leads, .172"	45 Socket, right angle, PCB leads, .172"
PLATING OPTIONS:	PLATING OPTIONS:
3 50 µ" Au contacts: Au terminations	3 50 µ" Au contacts: Au terminations
5 50 µ" Au contacts: Sn/Pb alloy terminations ☒	5 50 µ" Au contacts: Sn/Pb alloy terminations ☒
7 50 µ" Au contacts: SAC305 terminations	7 50 µ" 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*)
POLARIZATION / WIRING:	POLARIZATION / WIRING:
0R Reversed body polarization	0R Reversed body polarization
0S Standard body polarization	0S Standard body polarization

OPTIONS	
94P Mil-Spec footprint (size 100 only) Standard body polarization	900 Interfacial sealing gasket
0B7 Threaded inserts, standard body polarization	0B7 Threaded inserts and interfacial sealing gasket, standard body polarization
0BJ Mil-Spec footprint (size 100 only) with threaded inserts, standard body polarization	

* = Use numbers in parenthesis when ordering size 100.

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

**** = Connector body has no mounting holes.

☒ = Option not RoHS compliant

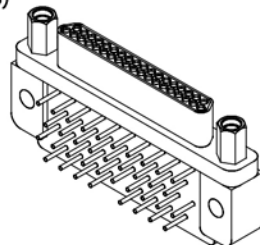
Right Angle Boardmount Low Profile (Narrow Footprint)

.050"
9 thru 51 Contacts

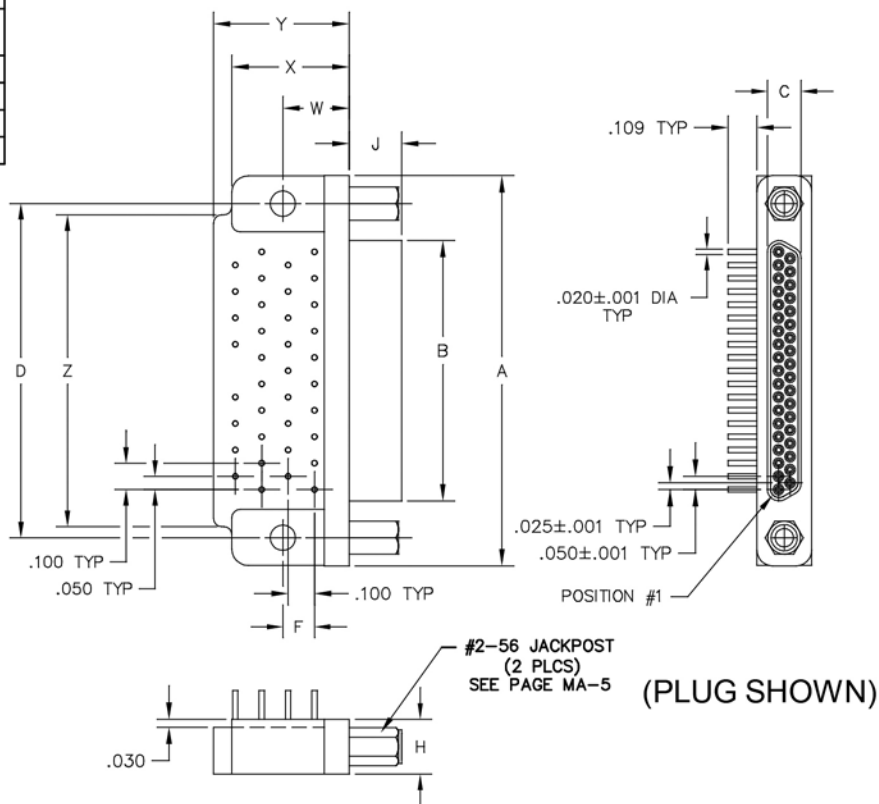
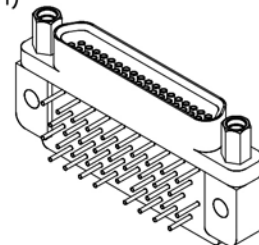
MS, MR

MATING MATRIX	
CONNECTOR	MATES WITH
MS-25...	MP, MQ, MR, MS receptacles
MR-25...	MP, MQ, MR, MS receptacles
MS-26...	MP, MQ, MR, MS plugs
MR-26...	MP, MQ, MR, MS plugs

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



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



DIMENSIONS																			
SIZE	CONTACT ROWS	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	.778	.292	.378	.134	.218	.565	.020	.120	.199	.180	.250	.420	.420	.775	#2-56 UNC THD	#2-56 UNC THREADED INSERT		
15		.928	.442	.528			.715	.925											
21		1.078	.592	.678			.865	1.075											
25		1.178	.692	.778			.965	1.175											
31		1.328	.842	.928			1.115	1.080											
37		1.478	.992	1.078			1.265	1.180											
51	3	1.428	.942	1.028	.177	.260	1.215	.150	.250			.300	.425	.650	1.220				

PLUG: MS-253-037-325-220S
RECEPTACLE: MS-263-037-435-220S
XX-XXX-XXX-XXX-XXXX-XXX
 | | | |
 SERIES SIZE CONTACTS OPTIONS
 |
 HARDWARE

PLUG

SERIES

MS .050" Low Profile Metal PC Board Mount Connector
 MR .050" Low Profile Plastic PC Board Mount Connector
 (MS & MR mate with MP, MQ, MR, MS, receptacles)

BODY

- 2 2-Row (Sizes 9 thru 37)
 3 3-Row (Size 51)

 BODY STYLE:
 5 Plug, right angle, narrow footprint, w/ mounting holes

- BODY MATERIAL:
 1 Polyphenylene Sulfide (MR only)
 2 Electroless nickel shell w/ PPS insulator
 3 Electrodeposited cadmium shell w/ PPS insulator ☒
 4 Hard anodized black shell w/ PPS insulator

SIZE

XXX 009, 015, 021, 025, 031, 037, 051

CONTACTS

- TYPE CONTACTS/TERMINATIONS:
 32 Pin, right angle, PCB leads, .109"
 33 Pin, right angle, PCB leads, .140"
 34 Pin, right angle, PCB leads, .172"

- PLATING OPTIONS:
 3 50 µ" Au contacts: Au terminations
 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒
 7 50 µ" Au contacts; SAC305 terminations

HARDWARE

- STYLE OF HARDWARE:
 00 None
 22 Two fixed jacknuts
 41 Two turning jackscrews, allen head, retaining ring*
 99 Keying hardware, see options below (Body material 2, 3 and 4 only)

- POLARIZATION / WIRING:
 0R Reversed body polarization
 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts
 905 Threaded inserts, standard body polarization

NOTES

See page MA-6 for keying options
 * = Connector body has no mounting holes.
☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MS .050" Low Profile Metal PC Board Mount Connector
 MR .050" Low Profile Plastic PC Board Mount Connector
 (MS & MR mate with MP, MQ, MR, MS plugs)

BODY

- 2 2-Row (Sizes 9 thru 37)
 3 3-Row (Size 51)

 BODY STYLE:
 6 Receptacle, right angle, narrow footprint, w/ mounting holes

- BODY MATERIAL:
 1 Polyphenylene Sulfide (MR only)
 2 Electroless nickel shell w/ PPS insulator
 3 Electrodeposited cadmium shell w/ PPS insulator ☒
 4 Hard anodized black shell w/ PPS insulator

SIZE

XXX 009, 015, 021, 025, 031, 037, 051

CONTACTS

- TYPE CONTACTS/TERMINATIONS:
 43 Socket, right angle, PCB leads, .109"
 44 Socket, right angle, PCB leads, .140"
 45 Socket, right angle, PCB leads, .172"

- PLATING OPTIONS:
 3 50 µ" Au contacts: Au terminations
 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒
 7 50 µ" Au contacts; SAC305 terminations

HARDWARE

- STYLE OF HARDWARE:
 00 None
 22 Two fixed jacknuts
 41 Two turning jackscrews, allen head, retaining ring*
 99 Keying hardware, see options below (Body material 2, 3 and 4 only)

- POLARIZATION / WIRING:
 0R Reversed body polarization
 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts
 905 Threaded inserts, standard body polarization

NOTES

See page MA-6 for keying options
 * = Connector body has no mounting holes.
☒ = Option not RoHS compliant

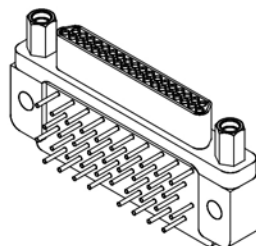
Right Angle Boardmount Low Profile (Blind Clearance Cut)

.050"
9 thru 51 Contacts

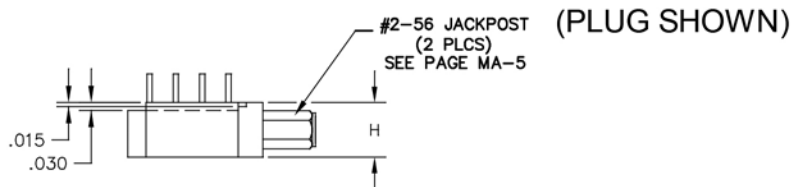
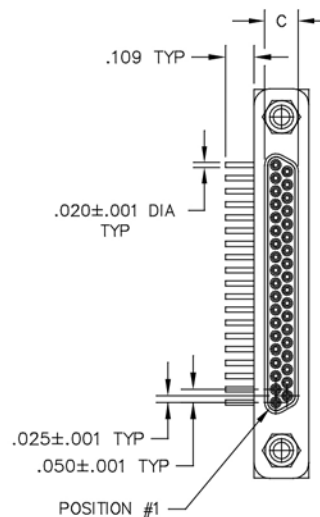
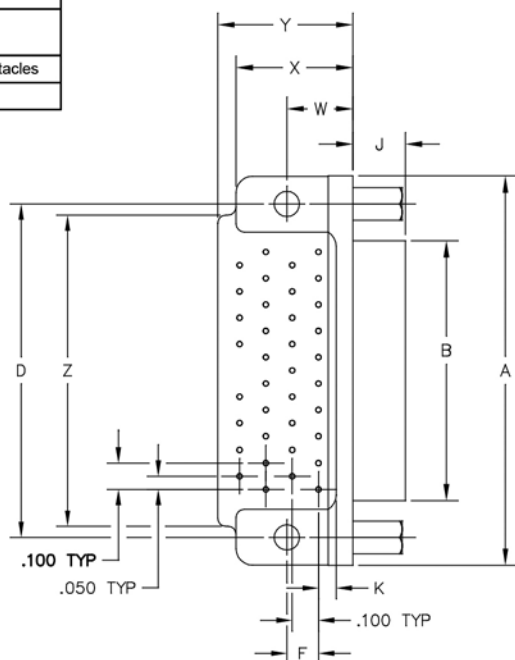
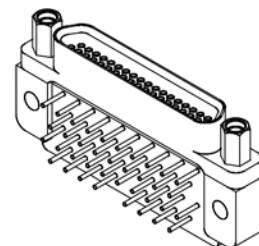
MS

MATING MATRIX	
CONNECTOR	MATES WITH
MS-2T...	MP, MQ, MR, MS receptacles
MS-2V..	MP, MQ, MR, MS plugs

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



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



DIMENSIONS																		
SIZE	CONTACT ROWS	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	.778	.292	.378	.134	.218	.565	.020	.208	.199	.180	.067	.250	.420	.420	.775	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.928	.442	.528			.715	.120								.925		
21		1.078	.592	.678			.865									1.075		
25		1.178	.692	.778			.965									1.175		
31		1.328	.842	.928			1.115							1.080				
37		1.478	.992	1.078			1.265	1.180										
51	3	1.428	.942	1.028	.177	.260	1.215	.150	.250	.087	.300	.425	.650	1.220				

PLUG: MS-2T3-037-325-220S
RECEPTACLE: MS-2V3-037-435-220S
 XX-XXX-XXX-XXX-XXXX-XXX
 | | | |
 BODY CONTACTS OPTIONS
 SERIES SIZE HARDWARE

PLUG

SERIES

MS .050" Low Profile Metal PC Board Mount Connector
(MS mates with MP, MQ, MR, MS, receptacles)

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51)

BODY STYLE:

- T Plug, right angle, narrow footprint, w/ mounting holes

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator

SIZE

XXX 009, 015, 021, 025, 031, 037, 051

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 32 Pin, right angle, PCB leads, .109"
- 33 Pin, right angle, PCB leads, .140"
- 34 Pin, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 μ " Au contacts: Au terminations
- 5 50 μ " Au contacts; Sn/Pb alloy terminations ☒
- 7 50 μ " Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts
- 41 Two turning jackscrews, allen head, retaining ring*
- 99 Keying hardware, see options below

POLARIZATION / WIRING:

- 0R Reversed body polarization
- 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts
- 905 Threaded inserts, standard body polarization

NOTES

See page MA-6 for keying options
 * = Connector body has no mounting holes.
☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MS .050" Low Profile Metal PC Board Mount Connector
(MS mates with MP, MQ, MR, MS plugs)

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51)

BODY STYLE:

- V Receptacle, right angle, narrow footprint, w/ mounting holes

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator

SIZE

XXX 009, 015, 021, 025, 031, 037, 051

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 43 Socket, right angle, PCB leads, .109"
- 44 Socket, right angle, PCB leads, .140"
- 45 Socket, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 μ " Au contacts: Au terminations
- 5 50 μ " Au contacts; Sn/Pb alloy terminations ☒
- 7 50 μ " Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts
- 41 Two turning jackscrews, allen head, retaining ring*
- 99 Keying hardware, see options below

POLARIZATION / WIRING:

- 0R Reversed body polarization
- 0S Standard body polarization

OPTIONS

- KPXX Two fixed jacknuts
- 905 Threaded inserts, standard body polarization

NOTES

See page MA-6 for keying options
 * = Connector body has no mounting holes.
☒ = Option not RoHS compliant

Board (Narrow Footprint) to Flex Cable

.050"

9 thru 51 Contacts

Low Profile Board Mount

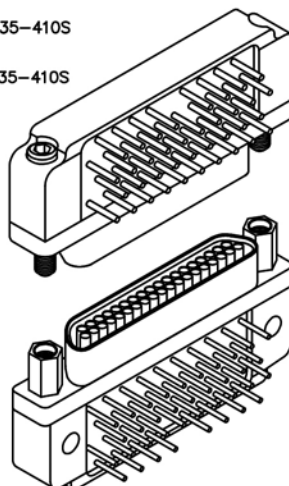
MS, MR

Flex Cable

MS, MR

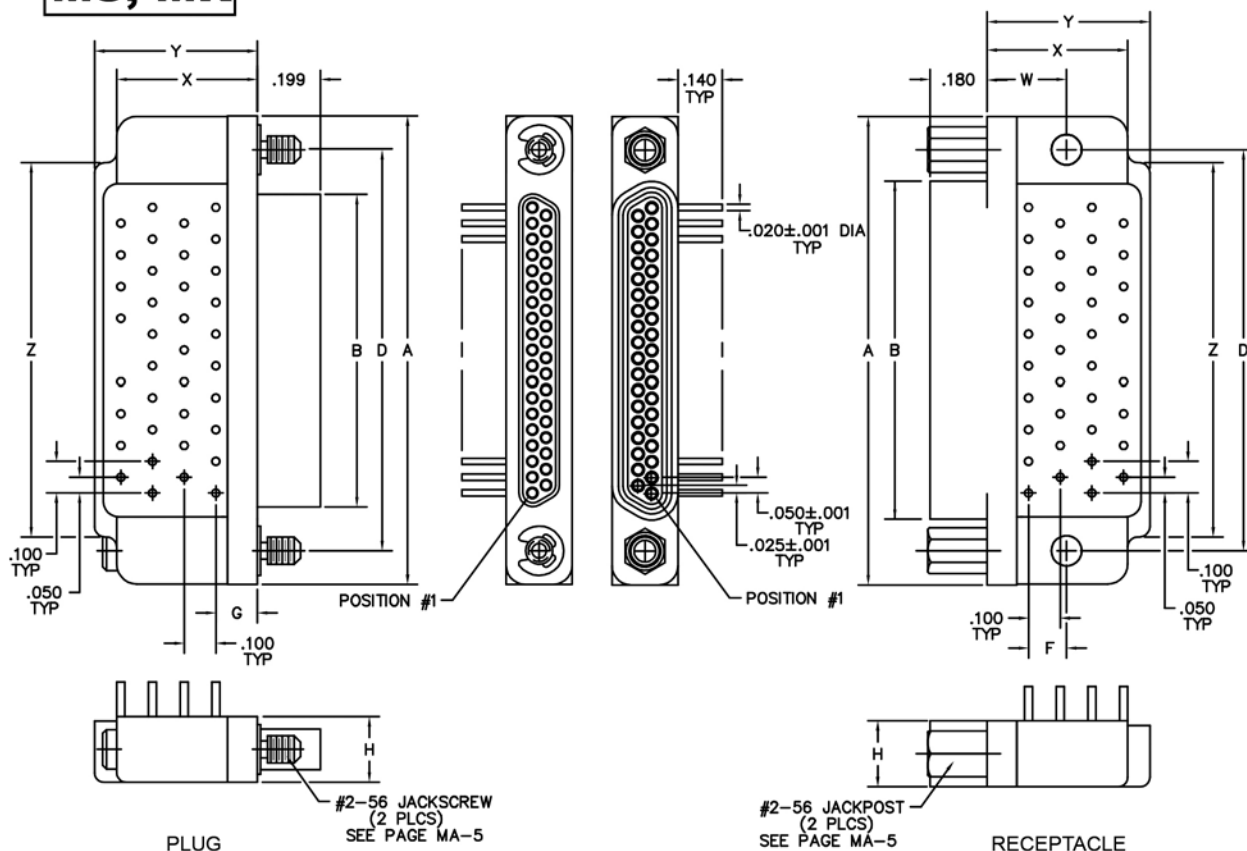
MS-253-037-335-410S
(METAL)

MR-251-037-335-410S
(PLASTIC)



MS-263-037-445-220S
(METAL)

MR-261-037-445-220S
(PLASTIC)



DIMENSIONS																	
SIZE	CONTACT ROWS	A	B		D	F	G	H	W	X MAX	Y MAX	Z	HARDWARE	MOUNTING HOLE			
			PLUG MAX	RCPT MAX													
9	2	.778	.292	.378	.565	.020	.230						#2-56 UNC THD	.096 DIA THRU			
15		.928	.442	.528	.715												
21		1.078	.592	.678	.865												
25		1.178	.692	.778	.965												
31		1.328	.842	.928	1.115												
37		1.478	.992	1.078	1.265												
51	3	1.428	.942	1.028	1.215	.150	.150	.250	.300	.425	.650	1.220					

PLUG: MS-253-037-335-410S

RECEPTACLE: MS-263-037-445-220S

PLUG: MR-251-037-335-410S

RECEPTACLE: MR-261-037-445-220S

XX-XXX-XXX-XXX-XXXX

PLUG

RECEPTACLE

SERIES	
MS .050" Low Profile Metal PC Board Mount Connector MR .050" Low Profile Plastic PC Board Mount Connector (MS & MR mate with MP, MQ, MR, MS receptacles)	MS .050" Low Profile Metal PC Board Mount Connector MR .050" Low Profile Plastic PC Board Mount Connector (MS & MR mate with MP, MQ, MR, MS plugs)

BODY	
2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51)	2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51)
BODY STYLE: 5 Plug, right angle, narrow footprint, w/ mtg holes	BODY STYLE: 6 Receptacle, right angle, narrow footprint, w/ mtg holes
BODY MATERIAL: 1 Polyphenylene Sulfide (ML only) 2 Electroless nickel shell w/ PPS insulator 3 Electrodeposited cadmium shell w/ PPS insulator ☒ 4 Hard anodized black shell w/ PPS insulator	BODY MATERIAL: 1 Polyphenylene Sulfide (ML only) 2 Electroless nickel shell w/ PPS insulator 3 Electrodeposited cadmium shell w/ PPS insulator ☒ 4 Hard anodized black shell w/ PPS insulator

SIZE	
XXX 009, 015, 021, 025, 031, 037, 051	XXX 009, 015, 021, 025, 031, 037, 051

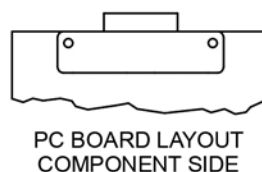
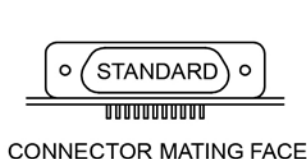
CONTACTS	
TYPE CONTACTS/TERMINATIONS: 32 Pin, right angle, PCB leads, .109" 33 Pin, right angle, PCB leads, .140" 34 Pin, right angle, PCB leads, .172"	TYPE CONTACTS/TERMINATIONS: 43 Socket, right angle, PCB leads, .109" 44 Socket, right angle, PCB leads, .140" 45 Socket, right angle, PCB leads, .172"
PLATING OPTIONS: 3 50 µ" Au contacts: Au terminations 5 50 µ" Au contacts: Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts: SAC305 terminations	PLATING OPTIONS: 3 50 µ" Au contacts: Au terminations 5 50 µ" Au contacts: Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts: SAC305 terminations

HARDWARE	
STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies 41 Two turning jackscrews, allen head, retaining ring	STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies 41 Two turning jackscrews, allen head, retaining ring
POLARIZATION / WIRING: 0R Reversed body polarization 0S Standard body polarization	POLARIZATION / WIRING: 0R Reversed body polarization 0S Standard body polarization

☒ = Option not RoHS compliant

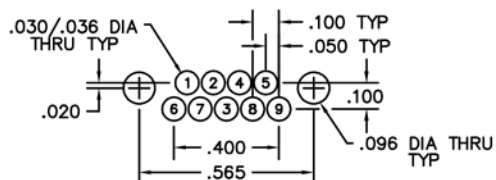
Recommended PC Board Layout

Right Angle, Narrow Footprint
Standard Polarization

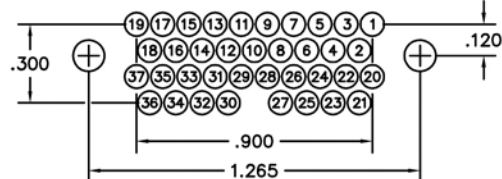
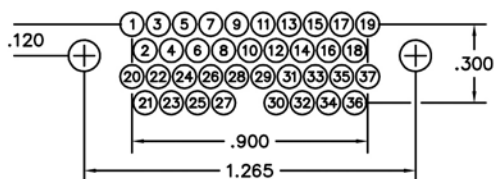
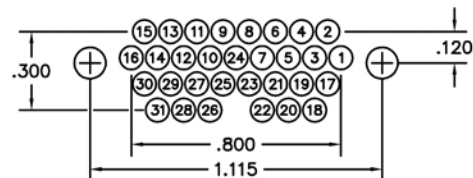
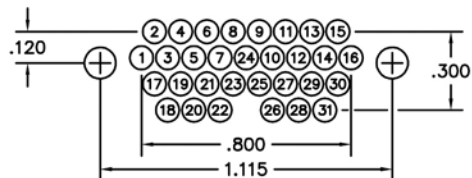
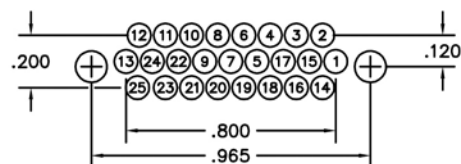
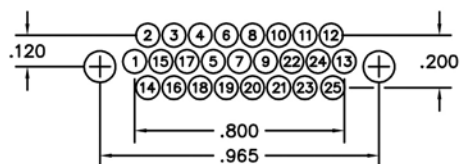
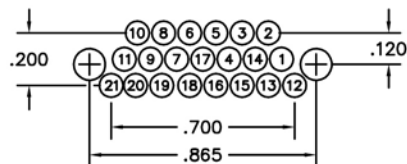
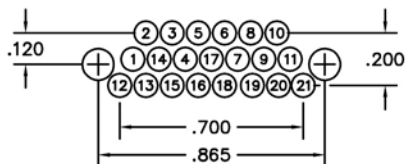
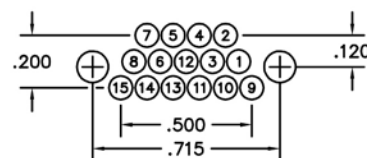
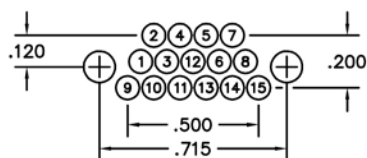
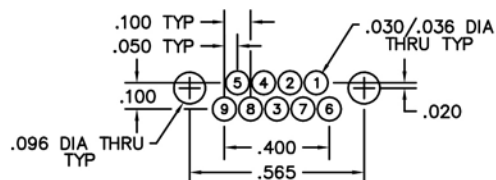


PLUG
PC BOARD LAYOUT
COMPONENT SIDE

RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE

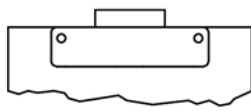


CONNECTOR
MATING FACE*
(RECEPTACLE)





CONNECTOR MATING FACE

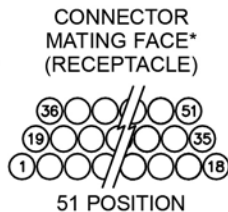
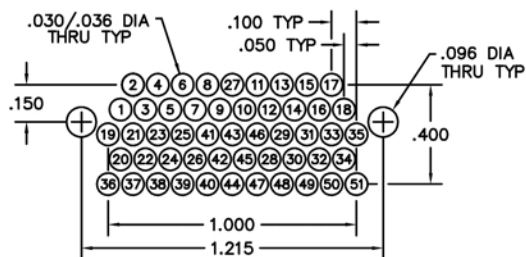


PC BOARD LAYOUT
COMPONENT SIDE

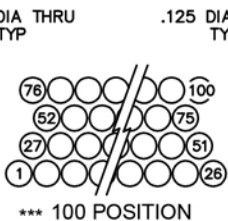
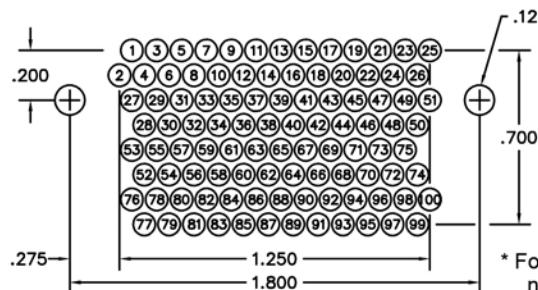
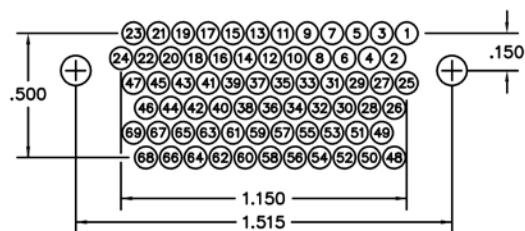
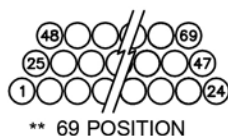
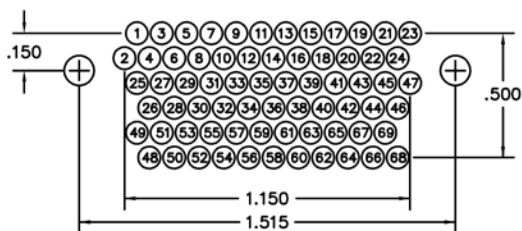
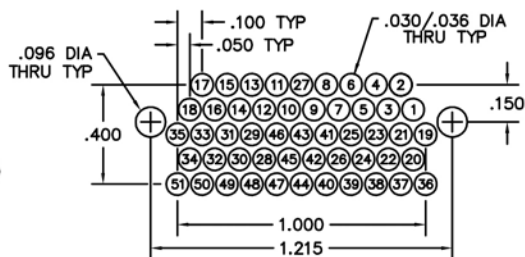
Recommended PC Board Layout

Right Angle, Narrow Footprint
Standard Polarization

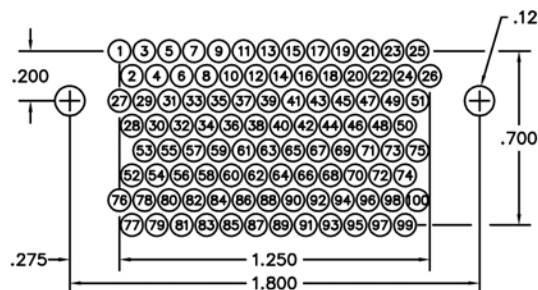
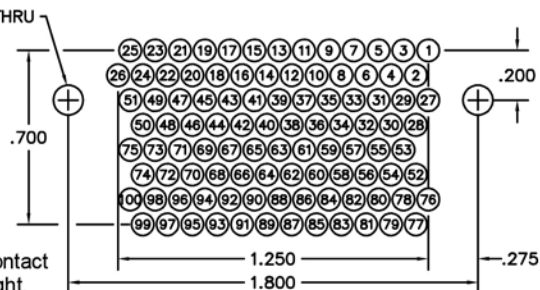
PLUG
PC BOARD LAYOUT
COMPONENT SIDE



RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



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



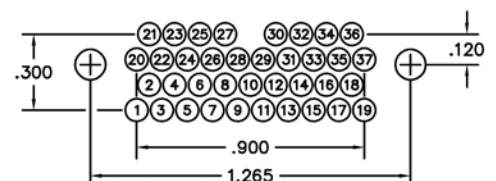
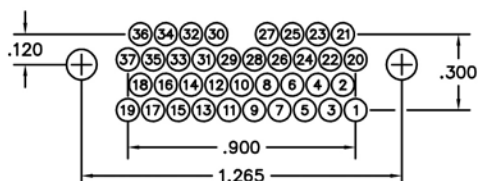
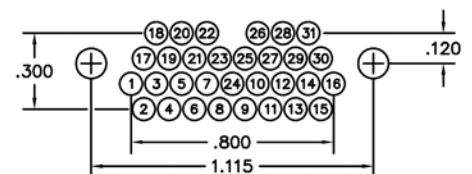
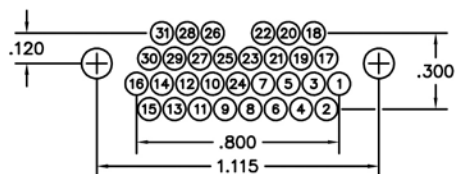
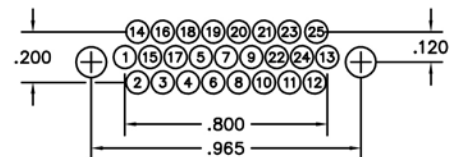
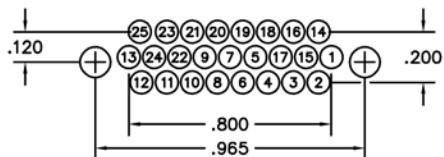
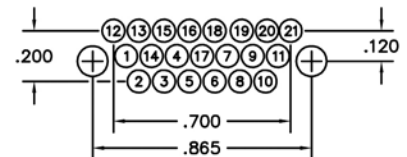
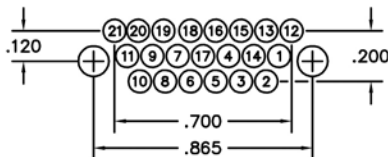
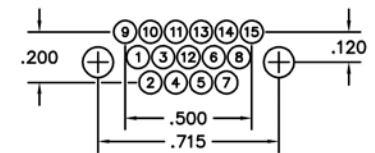
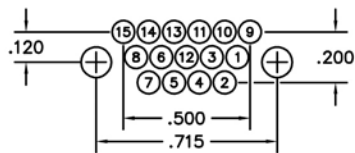
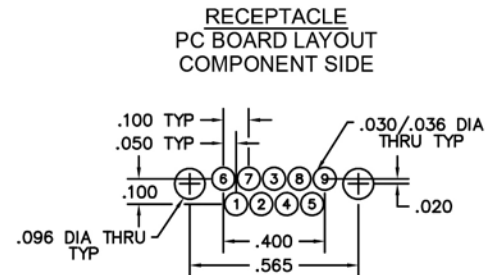
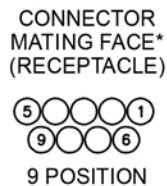
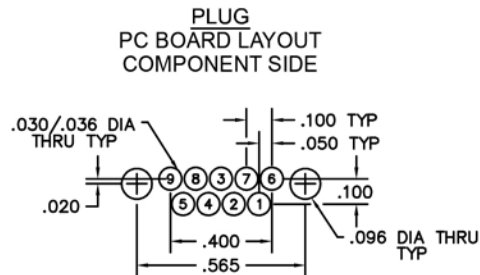
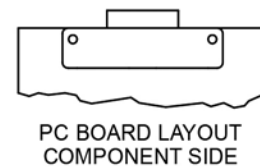
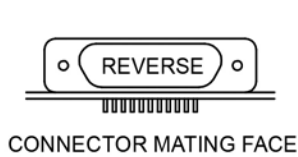
Mil-Spec Footprint

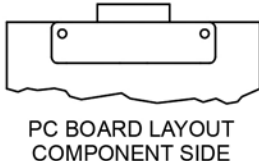
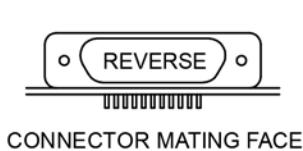
For Mil-Spec footprint, use "Option" -94P

** = 69 and 100 positions not available in low profile (MS, MR)
*** = 100 position not available in thru-cut body style (R, S)

Recommended PC Board Layout

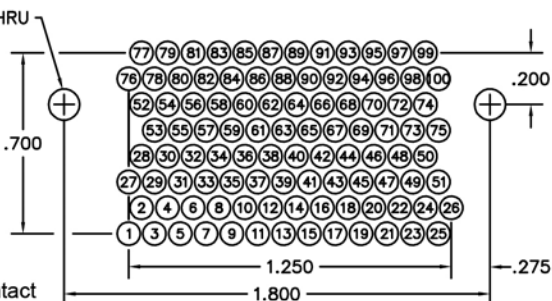
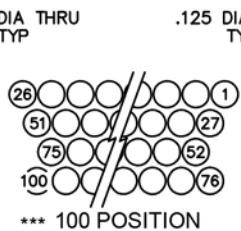
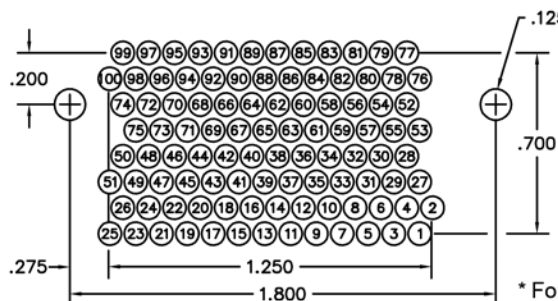
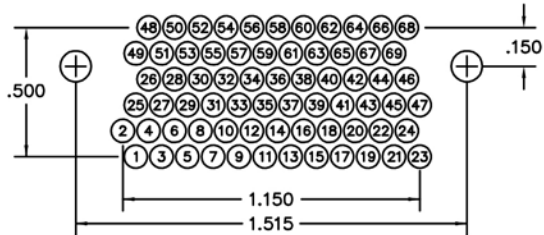
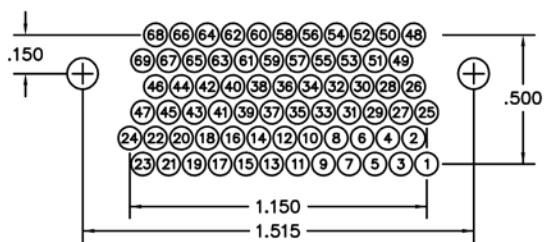
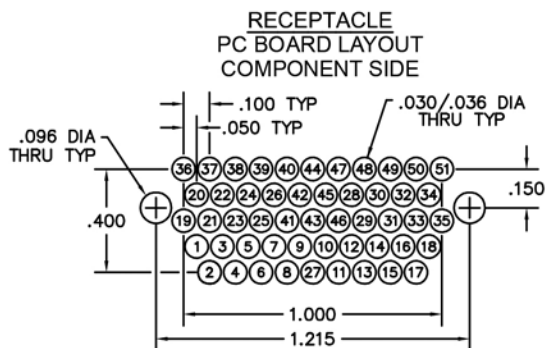
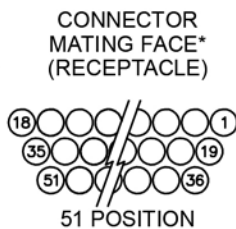
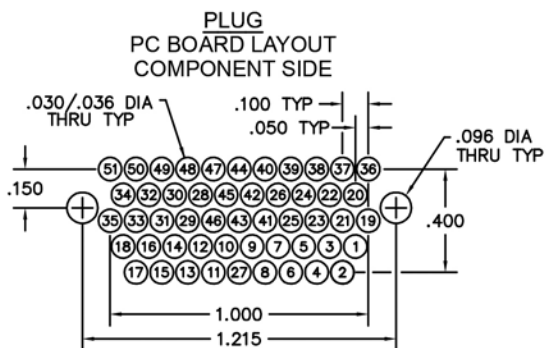
Right Angle, Narrow Footprint
Reverse Polarization





Recommended PC Board Layout

Right Angle, Narrow Footprint
Reverse Polarization



* 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 thru-cut body style (R, S)

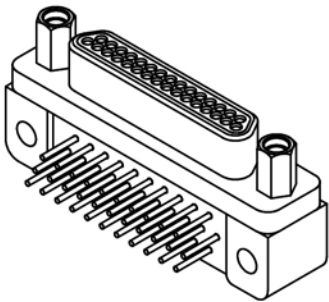
Right Angle Boardmount (Compressed Footprint)

.050"
9 thru 100 Contacts

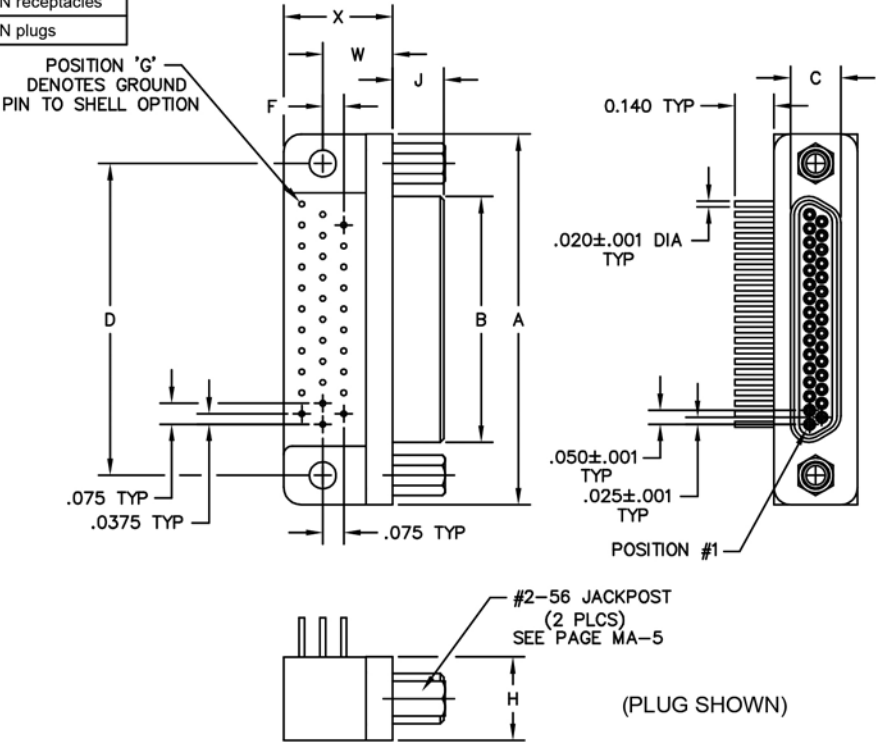
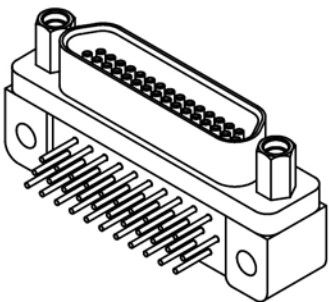
MK

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-B45-220S
(RECEPTACLE)



DIMENSIONS															
SIZE	CONTACT ROWS	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	.775	.334	.400	.185	.251	.565	.0375	.298	.183	.195	.250	.400	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550			.715	.075							
21		1.075	.634	.700			.865								
25		1.175	.734	.800			.965								
31		1.325	.884	.950			1.115								
37		1.475	1.034	1.100			1.265								
51	3	1.425	.984	1.050	.228	.294	1.215	.1125	.341	.300	.490	.400	.660	#4-40 UNC THD	.125 DIA OR #4-40 UNC THREADED INSERT
69		1.725	1.284	1.350			1.515								
100	4	2.160	1.384	1.508	.271	.394	1.800	.1875	.384						

PLUG: MK-2P2-031-335-220S
RECEPTACLE: MK-2Q2-031-445-220S
 XX-XXX-XXX-XXX-XXXX-XXX
 | | | | |
 BODY CONTACTS OPTIONS
 SERIES SIZE HARDWARE

PLUG

SERIES

MK .050" Rugged Metal PC Board Mount Connector

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100)

BODY STYLE:

P Plug, right angle, compressed footprint

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator
- 5 Stainless steel shell w/ PPS insulator
- 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:

- 32 Pin, right angle, PCB leads, .109"
- 33 Pin, right angle, PCB leads, .140"
- 34 Pin, right angle, PCB leads, .172"
- A2 Pin, right angle, PCB leads, .109", w/ ground pin option
- A3 Pin, right angle, PCB leads, .140", w/ ground pin option
- A4 Pin, right angle, PCB leads, .172", w/ ground pin option

PLATING OPTIONS:

- 3 50 μ " Au contacts: Au terminations
- 5 50 μ " Au contacts: Sn/Pb alloy terminations ☒
- 7 50 μ " Au contacts: SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts (62*)
- 99 Keying hardware, see options below

POLARIZATION:

0S Standard body polarization

OPTIONS

- 0B7 Threaded inserts in mounting holes
- KPXX Two fixed jacknuts (KN*)

NOTES

See page MA-6 for keying options

* = Use numbers in parenthesis when ordering size 100.
☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MK .050" Rugged Metal PC Board Mount Connector

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100)

BODY STYLE:

Q Receptacle, right angle, compressed footprint

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator
- 5 Stainless steel shell w/ PPS insulator
- 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:

- 43 Socket, right angle, PCB leads, .109"
- 44 Socket, right angle, PCB leads, .140"
- 45 Socket, right angle, PCB leads, .172"
- B3 Socket, right angle, PCB leads, .109", w/ ground pin option
- B4 Socket, right angle, PCB leads, .140", w/ ground pin option
- B5 Socket, right angle, PCB leads, .172", w/ ground pin option

PLATING OPTIONS:

- 3 50 μ " Au contacts: Au terminations
- 5 50 μ " Au contacts: Sn/Pb alloy terminations ☒
- 7 50 μ " Au contacts: SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknuts (62*)
- 99 Keying hardware, see options below

POLARIZATION:

0S Standard body polarization

OPTIONS

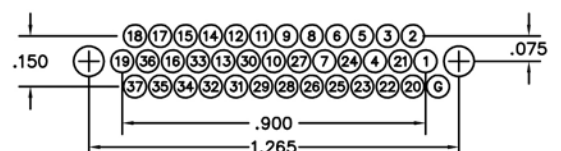
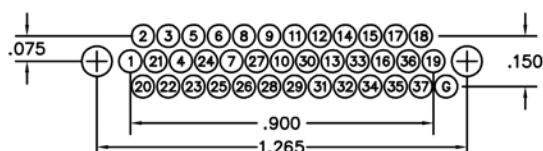
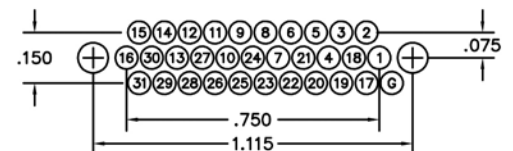
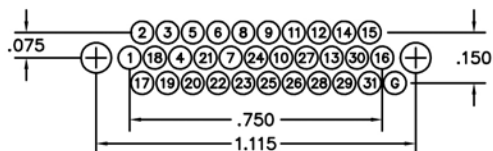
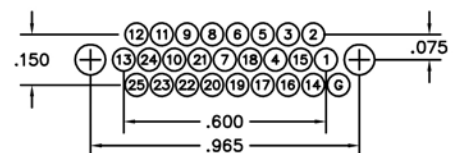
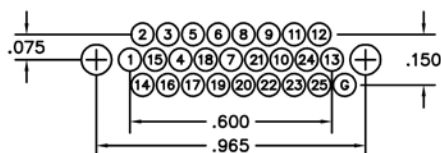
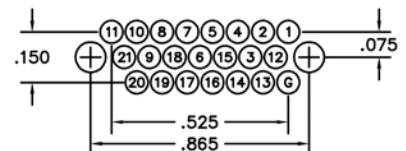
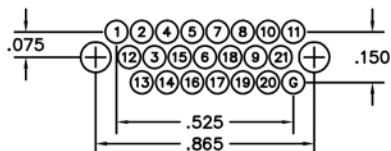
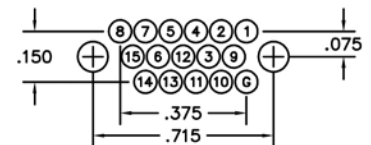
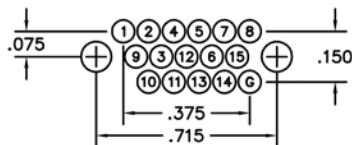
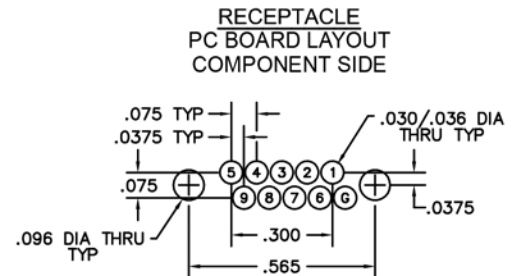
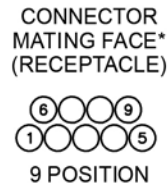
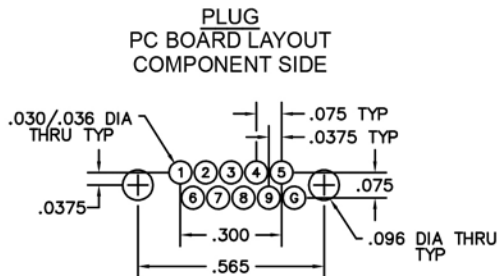
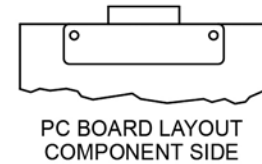
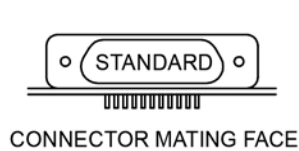
- 900 Interfacial sealing gasket
- 0B7 Threaded inserts in mounting holes and interfacial sealing gasket
- KPXX Two fixed jacknuts (KN*) and interfacial sealing gasket

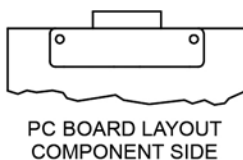
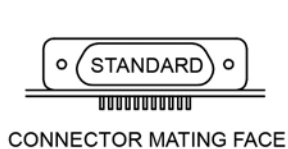
NOTES

See page MA-6 for keying options

Recommended PC Board Layout

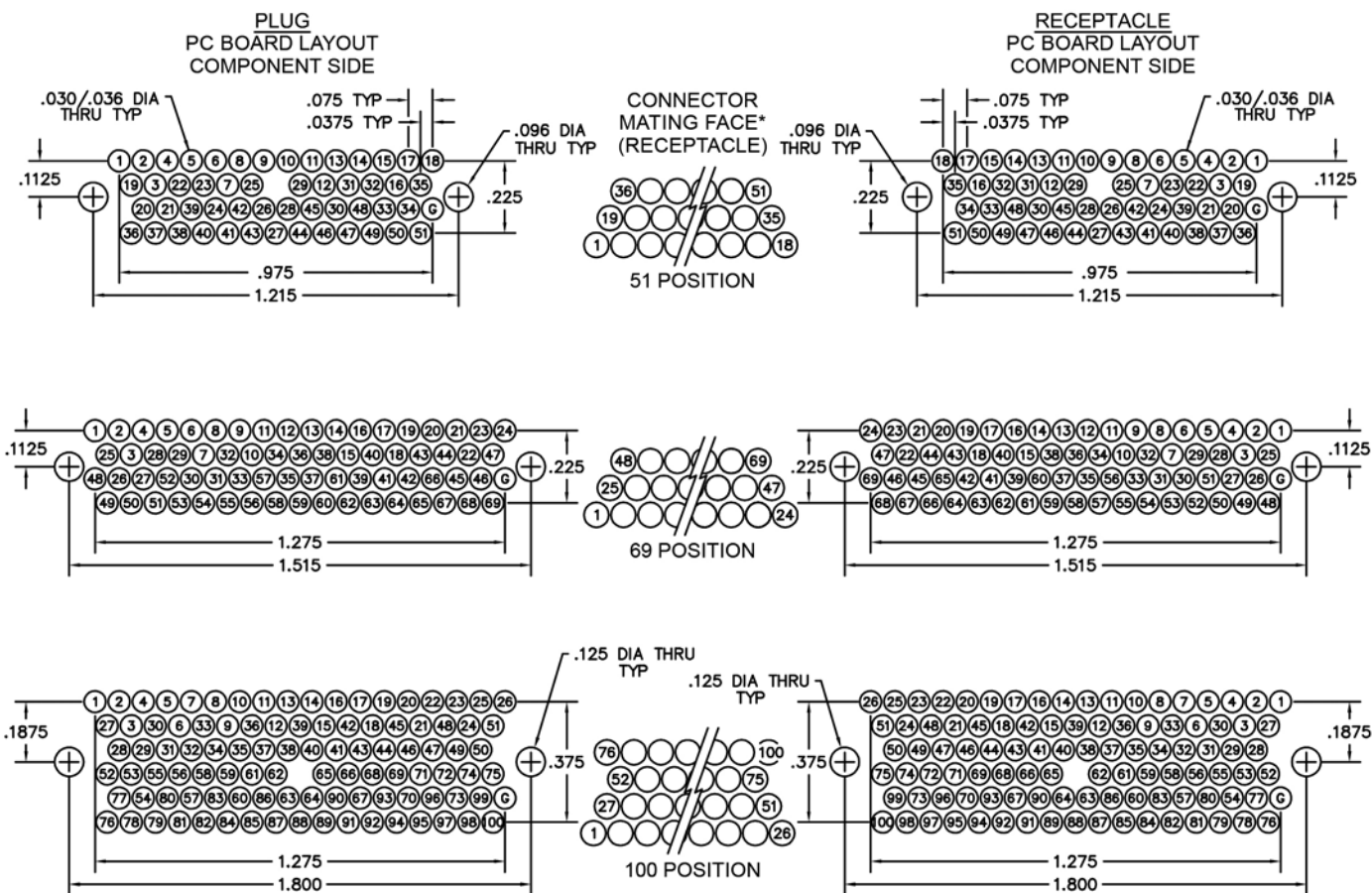
Right Angle, Compressed Footprint
Standard Polarization





Recommended PC Board Layout

Right Angle, Compressed Footprint
Standard Polarization



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

Board (Standard Footprint) to Cable .050"

9 thru 100 Contacts

Rugged Board Mount

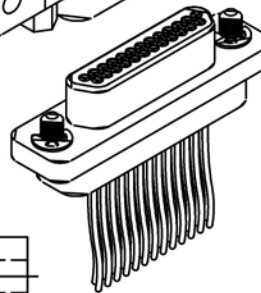
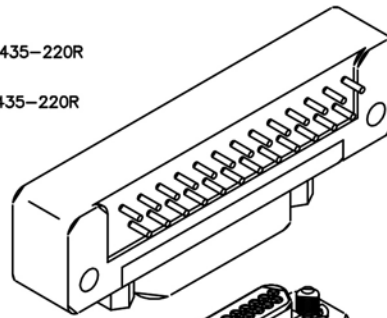
MK, ML

Rugged Cable

MM, MN

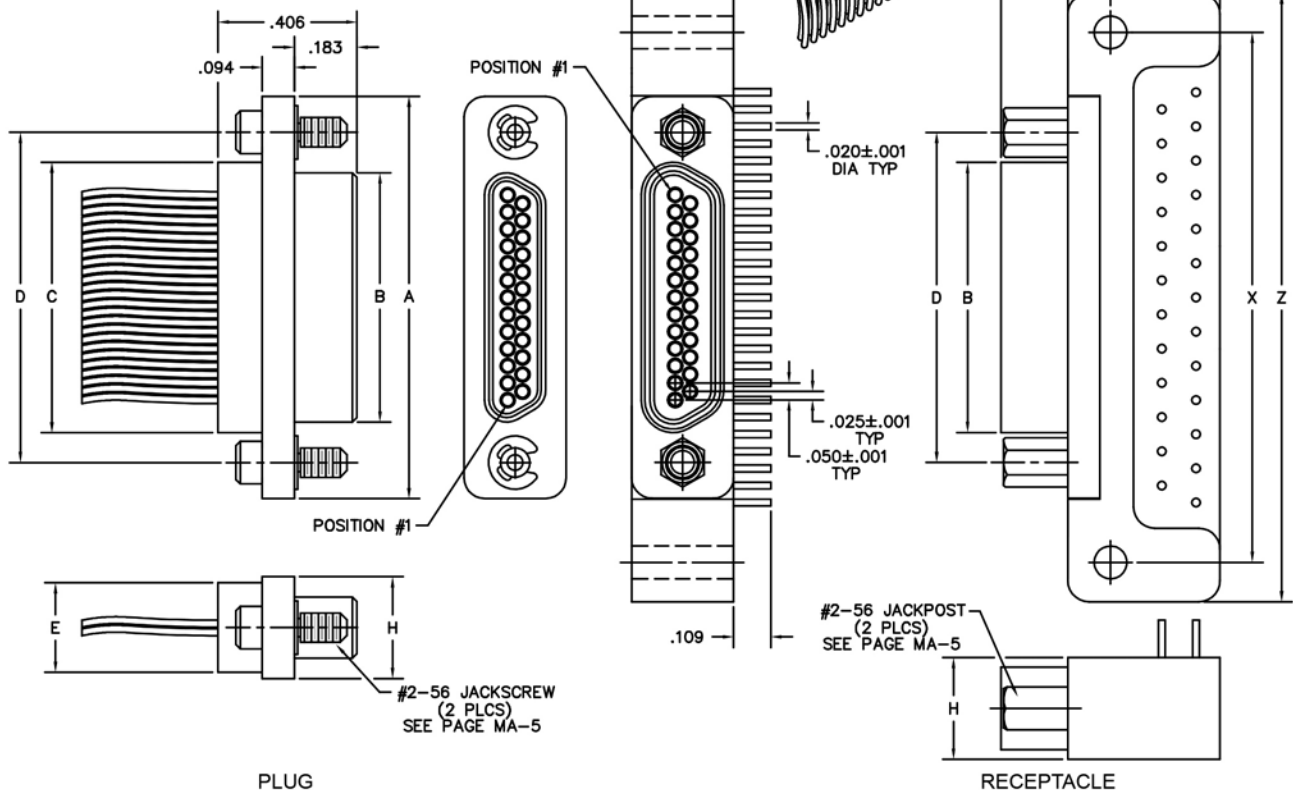
MK-283-025-435-220R
(METAL)

ML-281-025-435-220R
(PLASTIC)



MM-213-025-161-41WQ
(METAL)

MN-211-025-161-41WQ
(PLASTIC)



DIMENSIONS													
SIZE	CONTACT ROWS	A	B		C	D	E	H	X	Y	Z	HARDWARE	MOUNTING HOLE
			PLUG MAX	RCPT MAX			POTTING WELL MAX			MAX	MAX		
9	2	.775	.334	.400	.390	.565	.270	.298	1.150	.455	1.390	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550	.540	.715			1.300		1.540		
21		1.075	.634	.700	.690	.865			1.450		1.690		
25		1.175	.734	.800	.790	.965			1.550		1.790		
31		1.325	.884	.950	.940	1.115			1.800		2.040		
37	3	1.475	1.034	1.100	1.090	1.265	.310	.341	2.100	.565	2.340	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
51		1.425	.984	1.050	1.040	1.215			1.600		1.875		
100		2.160	1.384	1.508	1.432	1.800			2.500		2.780		
	4						.360	.384		.665**		#4-40 UNC THD	.125 DIA OR #4-40 UNC THREADED INSERT

* = .225 FOR ".05K" AND "0BJ" SPECIAL CODES (MIL-SPEC FOOTPRINT FOR 100 POSITION ONLY)

** = .765 MAX FOR ".05K" AND "0BJ" SPECIAL CODES (MIL-SPEC FOOTPRINT FOR 100 POSITION ONLY)

		PLUG:	MM-213-025-161-41WQ
		RECEPTACLE:	MK-283-025-435-220R
		PLUG:	MN-211-025-161-41WQ
		RECEPTACLE:	ML-281-025-435-220R
PLUG		RECEPTACLE	
SERIES			
MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN receptacles)		MK .050" Rugged Metal PC Board Mount Connector ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)		2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)	
BODY STYLE: 1 Plug, straight, with ears		BODY STYLE: 8 Receptacle, right angle, standard footprint, w/ mtg holes	
BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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		BODY MATERIAL: 1 Polyphenylene Sulfide (ML only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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, 100		XXX 009, 015, 021, 025, 031, 037, 051, 100	
CONTACTS			
TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, solder cup 14 Pin, straight, .500" pigtails (.018 dia) 15 Pin, straight, 1.000" pigtails (.018 dia) 16 Pin, straight, crimped wire		TYPE CONTACTS/TERMINATIONS: 43 Socket, right angle, PCB leads, .109" 44 Socket, right angle, PCB leads, .140" 45 Socket, right angle, PCB leads, .172"	
PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)		PLATING OPTIONS: 3 50 µ" Au contacts: 10 µ" Au terminations 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts; SAC305 terminations	
HARDWARE			
STYLE OF HARDWARE: 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") 99 Keying hardware, see options below (Body material 2, 3 and 4 only)		STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies (62") 99 Keying hardware, see options below (Body material 2, 3 and 4 only)	
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4		POLARIZATION / WIRING OR Reversed body polarization	
OPTIONS			
KSXX Two turning jackscrews. See page MA-6 for keying options (KJ*)		KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options (KN*) 900 Interfacial sealing gasket 05K Mil-Spec footprint (size 100 only) 0B7 Threaded inserts and interfacial sealing gasket 0BJ Mil-Spec footprint (size 100 only) with threaded inserts and interfacial sealing gasket ☒	

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

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

☒ = Option not RoHS compliant

Board (Standard Footprint) to Cable

.050"

9 thru 100 Contacts

Rugged Board Mount

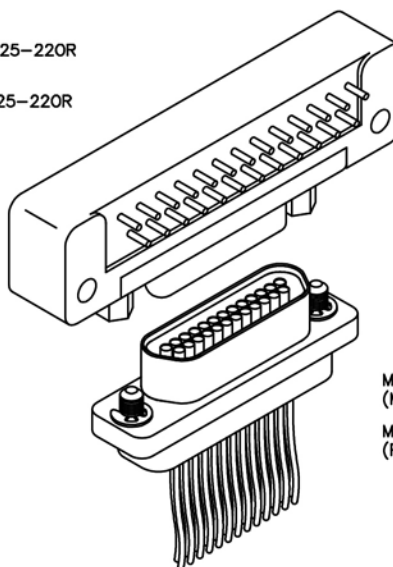
MK, ML

Rugged Cable

MM, MN

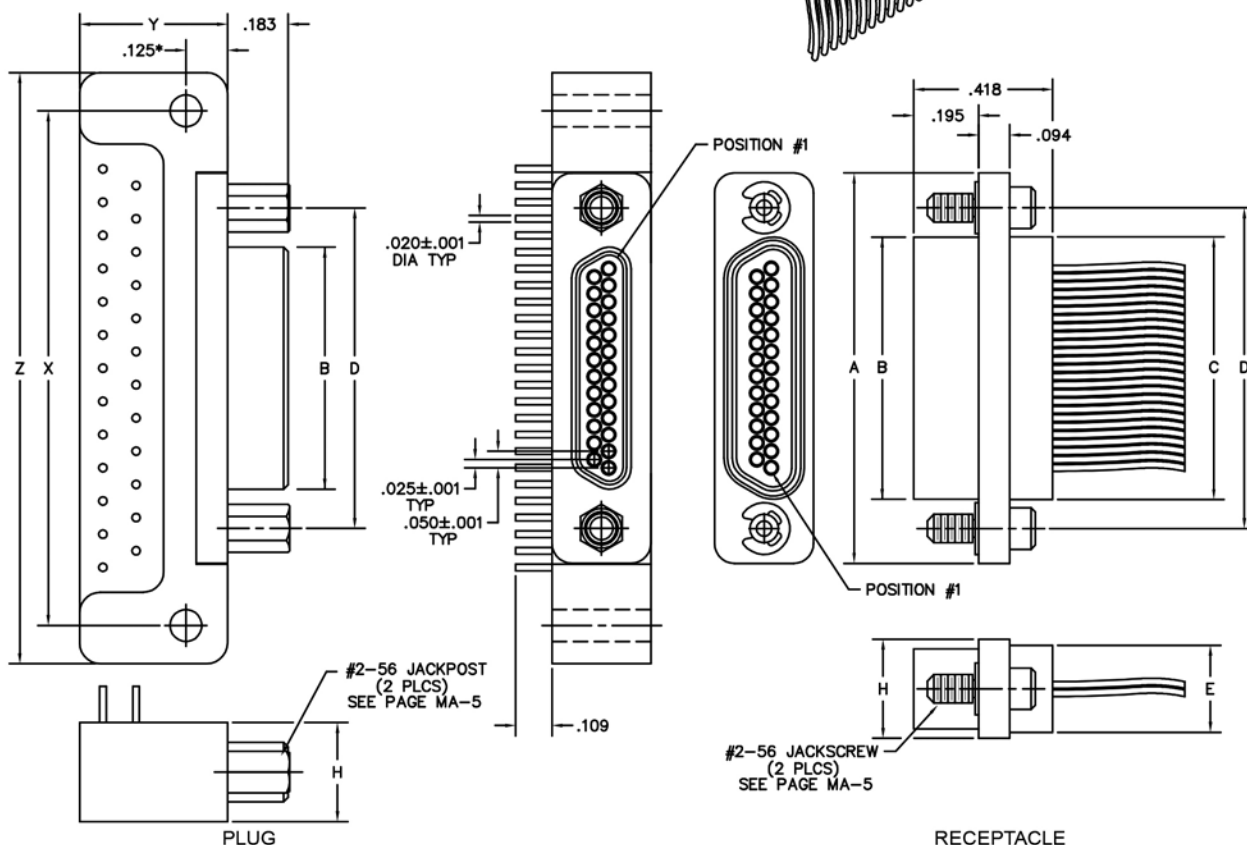
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(METAL)

ML-271-025-325-220R
(PLASTIC)



MM-223-025-261-41WQ
(METAL)

MN-221-025-261-41WQ
(PLASTIC)



DIMENSIONS												
SIZE	CONTACT ROWS	A	B		C	D	E	H	X	Y	Z	HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL MAX					
9	2	.775	.334	.400	.390	.565	.270	.298	1.150	.455	1.390	#2-56 UNC THD
15		.925	.484	.550	.540	.715			1.300		1.540	
21		1.075	.634	.700	.690	.865			1.450		1.690	
25		1.175	.734	.800	.790	.965			1.550		1.790	
31		1.325	.884	.950	.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	.984	1.050	1.040	1.215	.310	.341	1.600	.565	1.875	#4-40 UNC THD
100	4	2.160	1.384	1.508	1.432	1.800	.360	.384	2.500	.665**	2.780	

* = .225 FOR ".05K" AND ".0BJ" SPECIAL CODES (MIL-SPEC FOOTPRINT FOR 100 POSITION ONLY)

** = .765 MAX FOR ".05K" AND ".0BJ" SPECIAL CODES (MIL-SPEC FOOTPRINT FOR 100 POSITION ONLY)

PLUG		RECEPTACLE	
PLUG: MK-273-025-325-220R RECEPTACLE: MM-223-025-261-41WQ PLUG: ML-271-025-325-220R RECEPTACLE: MN-221-025-261-41WQ XX-XXX-XXX-XXX-XXXX-XXX			
SERIES			
MK .050" Rugged Metal PC Board Mount Connector ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN receptacles)		MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)		2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)	
BODY STYLE:		BODY STYLE:	
7 Plug, right angle, standard footprint, w/ mtg holes		2 Receptacle, straight, with ears	
BODY MATERIAL:		BODY MATERIAL:	
1 Polyphenylene Sulfide (ML only)		1 Polyphenylene Sulfide (MN only)	
2 Polyphenylene Sulfide with electroless nickel shell		2 Polyphenylene Sulfide with electroless nickel shell	
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒		3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	
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, .109"		21 Socket, straight, solder cup	
33 Pin, right angle, PCB leads, .140"		24 Socket, straight, .500" pigtails (.018 dia)	
34 Pin, right angle, PCB leads, .172"		25 Socket, straight, 1.000" pigtails (.018 dia)	
		26 Socket, straight, crimped wire	
PLATING OPTIONS:		PLATING OPTIONS:	
3 50 µ" Au contacts: 10 u" Au terminations		1 50 µ" Au contacts (crimp wire)	
5 50 µ" Au contacts; Sn/Pb alloy terminations ☒		3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail)	
7 50 µ" Au contacts; SAC305 terminations		5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒	
		7 50 µ" 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	
0R Reversed body polarization		00 None	
		XX For wiring codes, see page MA-3 & MA-4	
OPTIONS			
KPXX Two fixed jacknuts. See page MA-6 for keying options (KN*)		KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 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			

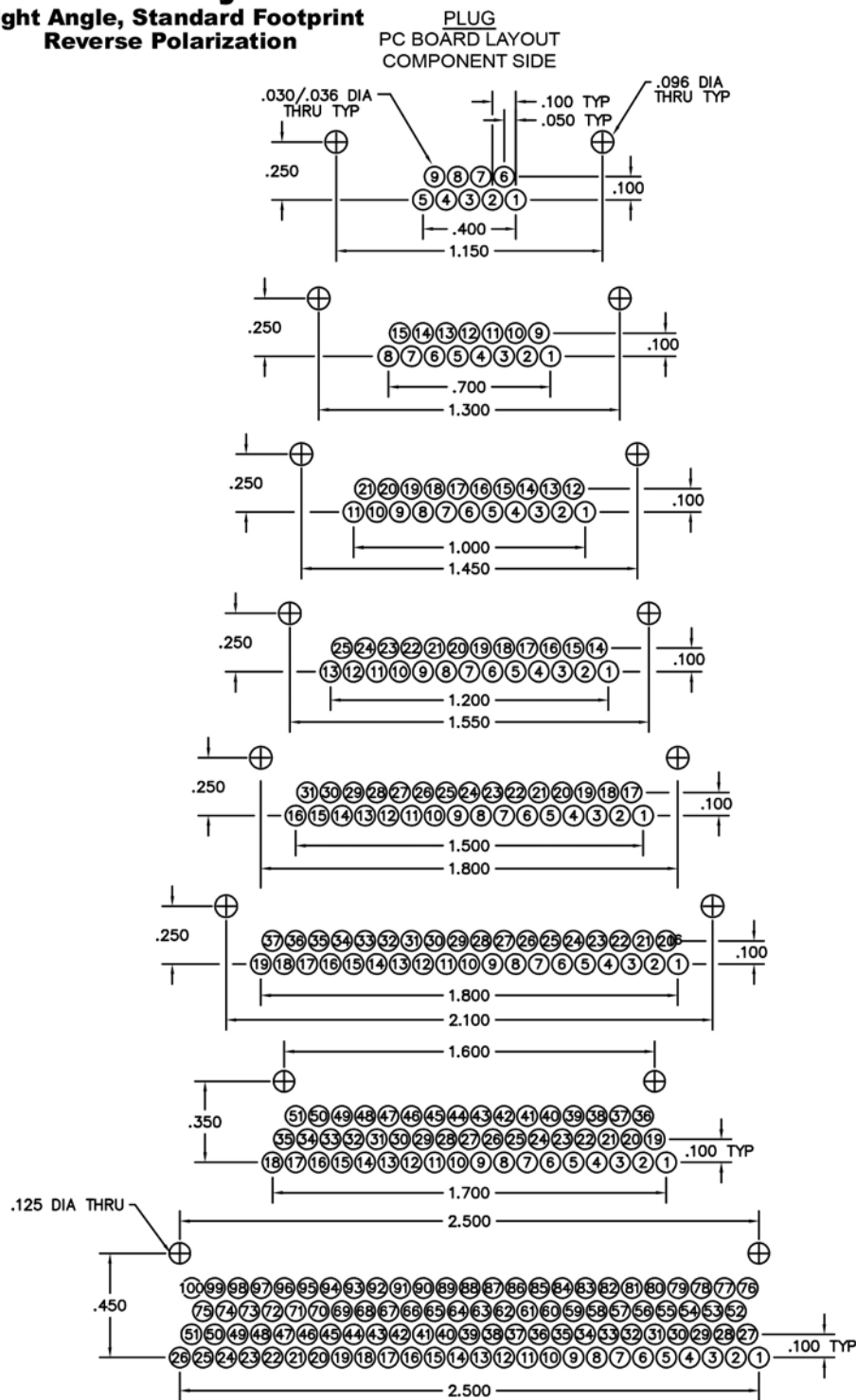
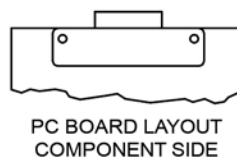
* = Use numbers or letters in parenthesis when ordering size 100.

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

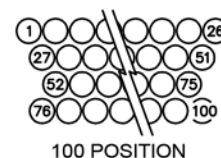
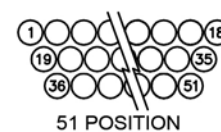
☒ = Option not RoHS compliant

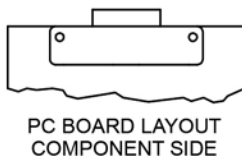
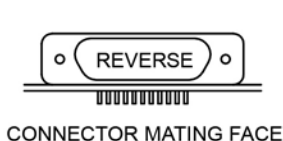
Recommended PC Board Layout

Right Angle, Standard Footprint
Reverse Polarization



CONNECTOR
MATING FACE
(PLUG)

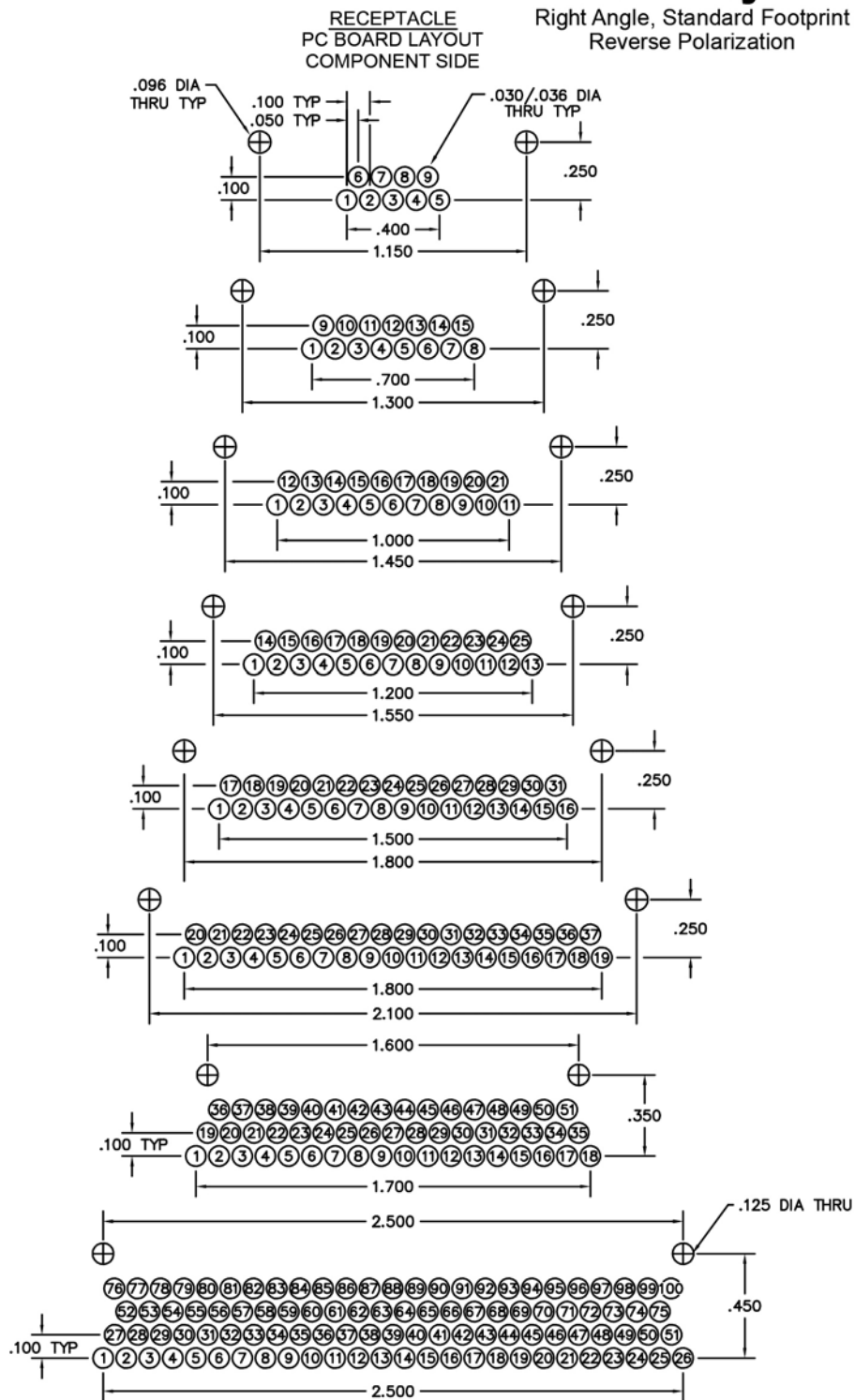
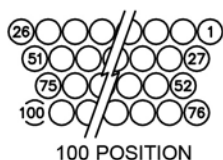




Recommended PC Board Layout

Right Angle, Standard Footprint
Reverse Polarization

CONNECTOR
MATING FACE
(RECEPTACLE)



Cable to Board (Narrow Footprint)

.050"

9 thru 100 Contacts

Rugged Cable

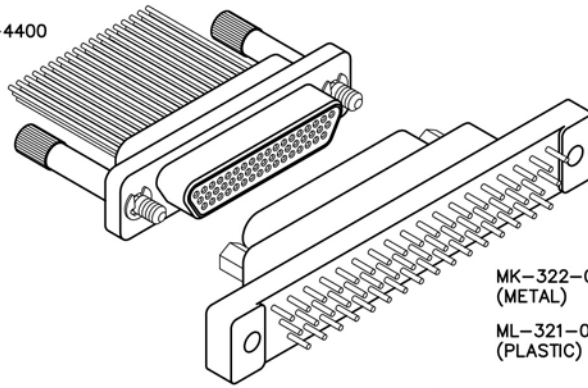
MM, MN

Rugged Board Mount

MK, ML

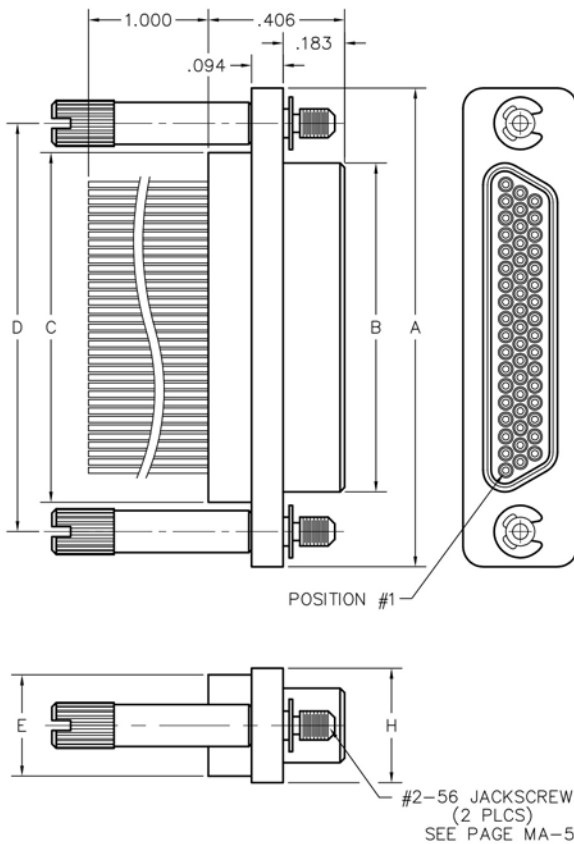
MM-312-051-153-4400
(METAL)

MN-311-051-153-4400
(PLASTIC)

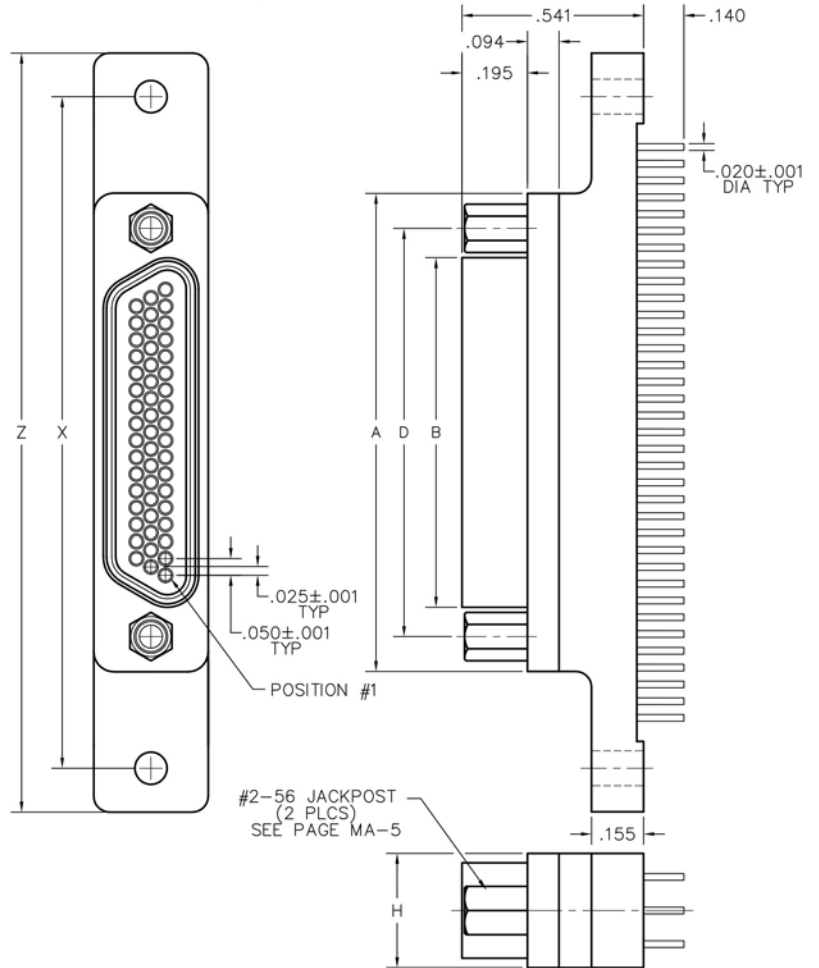


MK-322-051-235-2200
(METAL)

ML-321-051-235-2200
(PLASTIC)



PLUG



RECEPTACLE

DIMENSIONS													
SIZE	CONTACT ROWS	A	B		C	D	E		H	X	Z MAX	HARDWARE	MOUNTING HOLE
			PLUG MAX	RCPT MAX			POTTING WELL MAX	WELL MAX					
9	2	.775	.334	.400	.390	.565	.270	.298	1.150	1.390	#2-56 UNC THD (.092 DIA THRU)	.096 DIA OR #2-56 UNC THREADED INSERT	
15		.925	.484	.550	.540	.715							
21		1.075	.634	.700	.690	.865							
25		1.175	.734	.800	.790	.965							
31		1.325	.884	.950	.940	1.115							
37		1.475	1.034	1.100	1.090	1.265							
51	3	1.425	.984	1.050	1.040	1.215	.310	.341	2.000	2.270			
100	4	2.160	1.384	1.508	1.432	1.800	.360	.384	2.800	3.240	#4-40 UNC THD (.147 DIA THRU)	.125 DIA OR #2-56 UNC THREADED INSERT	

PLUG: MM-312-051-153-4400

RECEPTACLE: MK-322-051-235-2200

PLUG: MN-311-051-153-4400

RECEPTACLE: ML-321-051-235-2200

PLUG

RECEPTACLE

SERIES	
MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN receptacles)	MK .050" Rugged Metal PC Board Mount Connector ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)	2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)
BODY STYLE: 1 Plug, straight, with ears	BODY STYLE: 2 Receptacle, straight, narrow footprint, w/ mtg holes
BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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	BODY MATERIAL: 1 Polyphenylene Sulfide (ML only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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, 100	XXX 009, 015, 021, 025, 031, 037, 051, 100

CONTACTS	
TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, solder cup 14 Pin, straight, .500" pigtails (.018 dia) 15 Pin, straight, 1.000" pigtails (.018 dia) 16 Pin, straight, crimped wire	TYPE CONTACTS/TERMINATIONS: 22 Socket, straight, PCB leads, .109" 23 Socket, straight, PCB leads, .140" 24 Socket, straight, PCB leads, .172"
PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail) 5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 μ" Au contacts; SAC305 terminations (pigtail)	PLATING OPTIONS: 3 50 μ" Au contacts: 10 μ" Au terminations 5 50 μ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 μ" Au contacts; SAC305 terminations

HARDWARE	
STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies (62*) 41 Two turning jackscrews, allen head, retaining ring (81*) 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)	STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies (62*) 99 Keying hardware, see options below (Body material 2, 3 and 4 only)
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4	POLARIZATION / WIRING 00 None

OPTIONS	
KSXX Two turning jackscrews. See page MA-6 for keying options (KJ*)	KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options (KN*) 900 Interfacial sealing gasket 0B7 Threaded inserts and interfacial sealing gasket

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

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

☒ = Option not RoHS compliant

Cable to Board (Narrow Footprint)

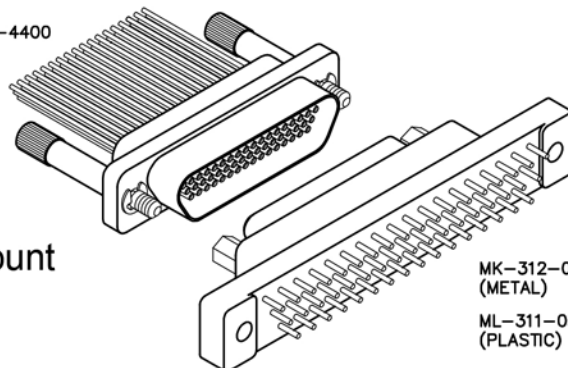
.050"
9 thru 100 Contacts
Rugged Cable Rugged Board Mount

MM, MN

MK, ML

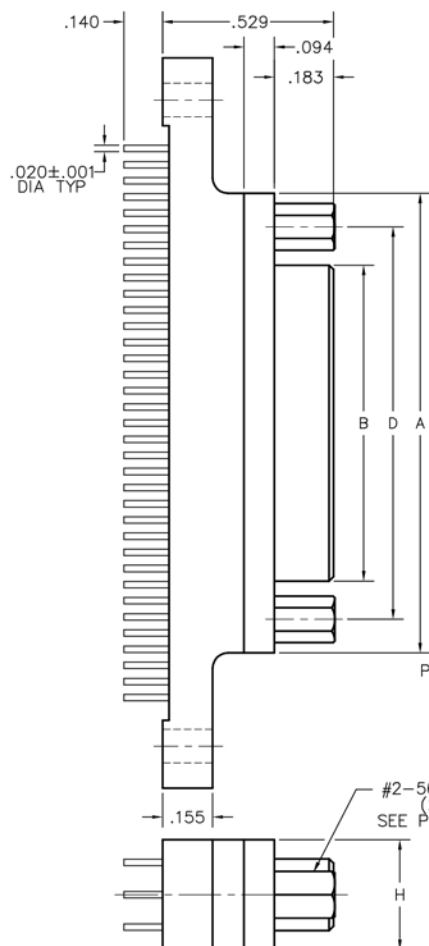
MM-322-051-253-4400
(METAL)

MN-321-051-253-4400
(PLASTIC)

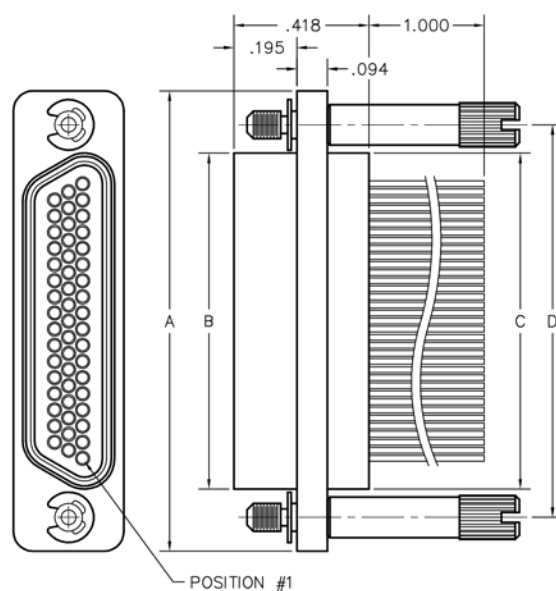
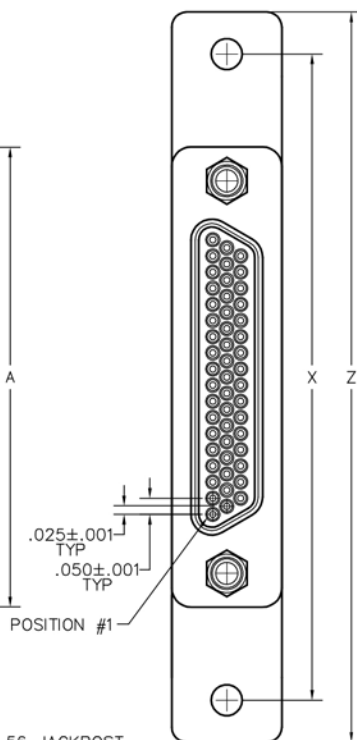


MK-312-051-135-2200
(METAL)

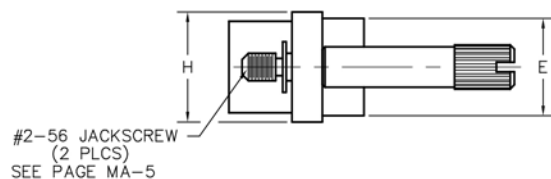
ML-311-051-135-2200
(PLASTIC)



PLUG



RECEPTACLE



DIMENSIONS												
SIZE	CONTACT ROWS	A	B		C	D	E	H	X	Z MAX	HARDWARE	MOUNTING HOLE
			PLUG MAX	RCPT MAX			POTTING WELL MAX					
9	2	.775	.334	.400	.390	.565	.270	.298	1.150	1.390	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		.925	.484	.550	.540	.715			1.450	1.690		
21		1.075	.634	.700	.690	.865			1.500	1.740		
25		1.175	.734	.800	.790	.965			1.800	2.040		
31		1.325	.884	.950	.940	1.115			2.100	2.340		
37		1.475	1.034	1.100	1.090	1.265						
51	3	1.425	.984	1.050	1.040	1.215	.310	.341	2.000	2.270	#4-40 UNC THD	.125 DIA OR #2-56 UNC THREADED INSERT
100	4	2.160	1.384	1.508	1.432	1.800	.360	.384	2.800	3.240		

PLUG:		MK-312-051-135-2200	
RECEPTACLE:		MM-322-051-253-4400	
PLUG:		ML-311-051-135-2200	
RECEPTACLE:		MN-321-051-253-4400	
PLUG		RECEPTACLE	
SERIES			
MK .050" Rugged Metal PC Board Mount Connector ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN receptacles)		MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)		2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51) 4 4-Row (Size 100)	
BODY STYLE: 1 Plug, straight, narrow footprint, w/ mtg holes		BODY STYLE: 2 Receptacle, straight, with ears	
BODY MATERIAL: 1 Polyphenylene Sulfide (ML only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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		BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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, 100		XXX 009, 015, 021, 025, 031, 037, 051, 100	
CONTACTS			
TYPE CONTACTS/TERMINATIONS: 12 Pin, straight, PCB leads, .109" 13 Pin, straight, PCB leads, .140" 14 Pin, straight, PCB leads, .172"		TYPE CONTACTS/TERMINATIONS: 21 Socket, straight, solder cup 24 Socket, straight, .500" pigtails (.018 dia) 25 Socket, straight, 1.000" pigtails (.018 dia) 26 Socket, straight, crimped wire	
PLATING OPTIONS: 3 50 µ" Au contacts: 10 µ" Au terminations 5 50 µ" Au contacts: Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts: SAC305 terminations		PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts: Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts: SAC305 terminations (pigtail)	
HARDWARE			
STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies (62*) 99 Keying hardware, see options below (Body material 2, 3 and 4 only)		STYLE OF HARDWARE: 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*) 99 Keying hardware, see options below (Body material 2, 3 and 4 only)	
POLARIZATION / WIRING: 00 None		POLARIZATION / WIRING 00 None XX For wiring codes, see page MA-3 & MA-4	
OPTIONS			
KPXX Two fixed jacknuts. See page MA-6 for keying options (KN*) OB7 Threaded inserts		KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 for keying options (KJ*) 900 Interfacial sealing gasket	

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

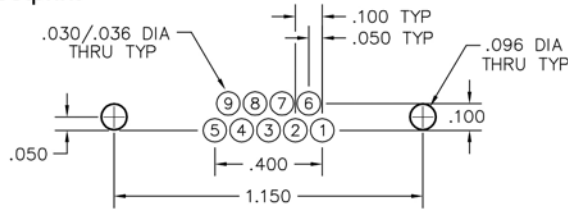
** = Captive hardware is factory installed and non-removable.

☒ = Option not RoHS compliant

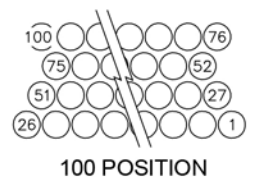
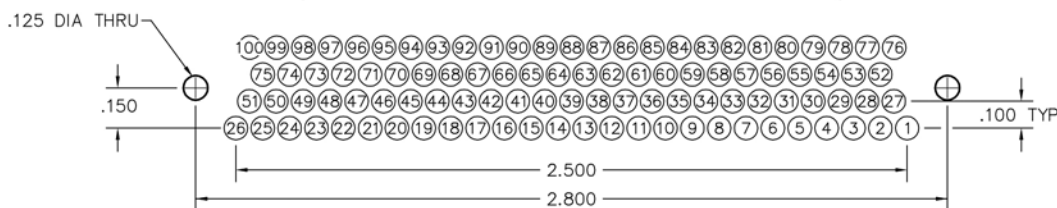
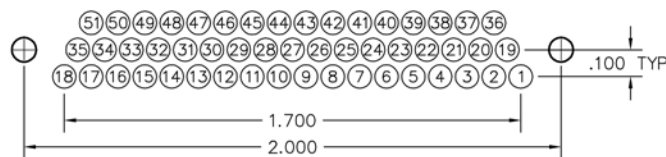
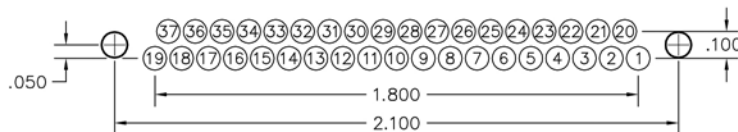
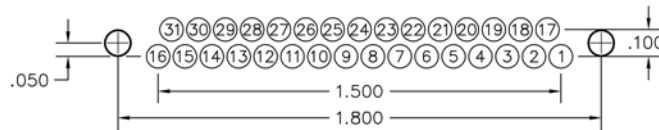
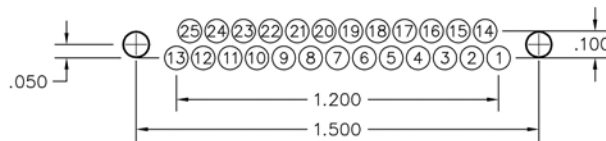
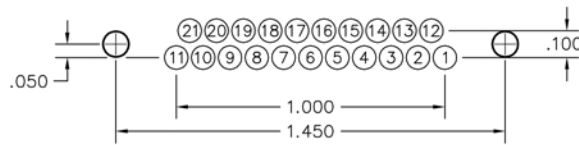
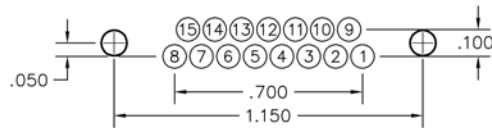
Recommended PC Board Layout

Straight, Narrow Footprint

PLUG PC BOARD LAYOUT COMPONENT SIDE



CONNECTOR MATING FACE (PLUG)

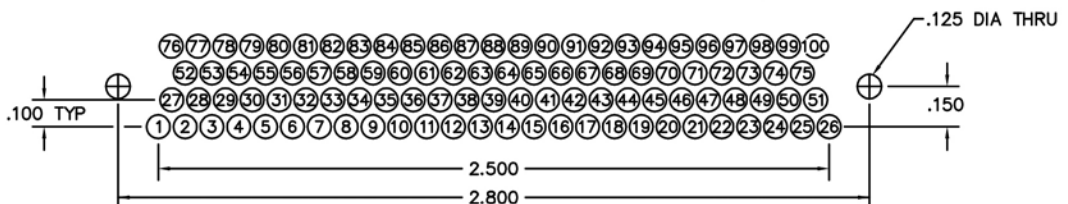
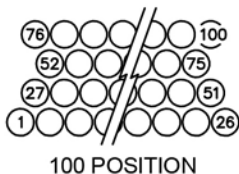
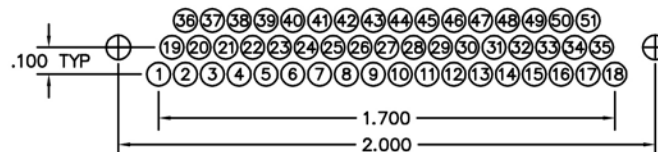
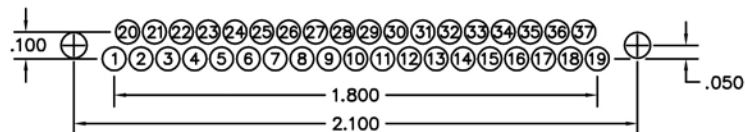
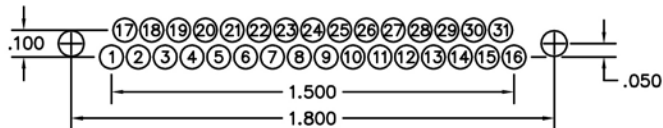
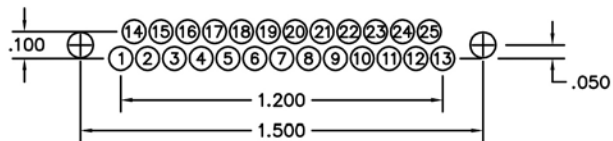
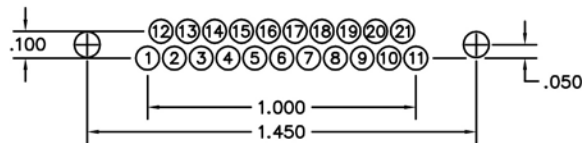
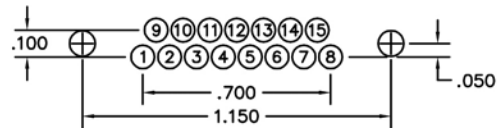
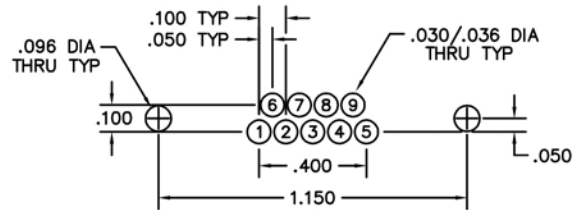


Recommended PC Board Layout Straight, Narrow Footprint

CONNECTOR
MATING FACE
(RECEPTACLE)



RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



Cable to Board (Standard Footprint)

.050"

9 thru 100 Contacts

Rugged Cable

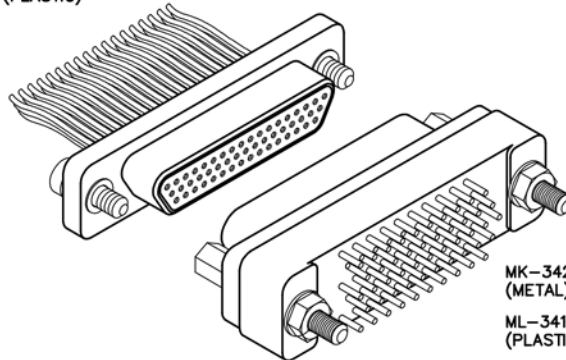
MM, MN

Rugged Board Mount

MK, ML

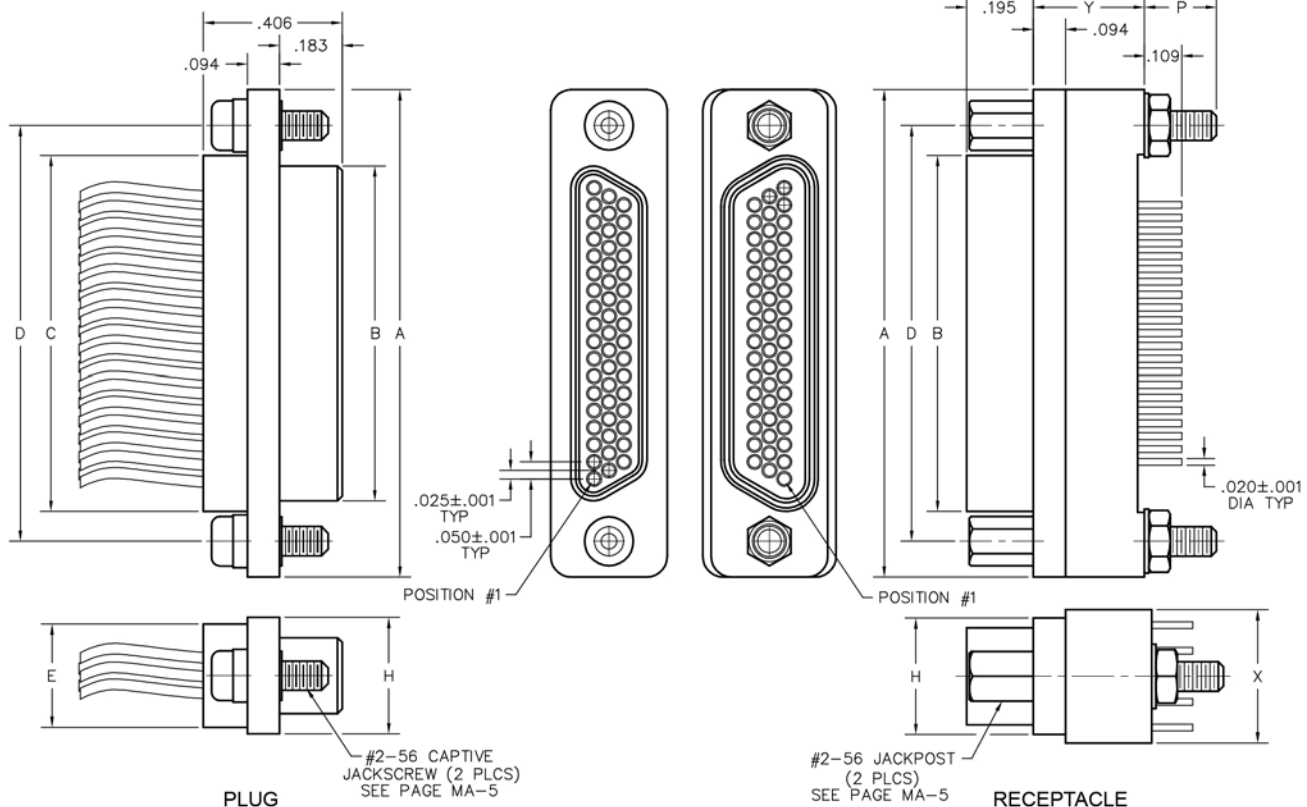
MM-312-051-161-45WP
(METAL)

MN-311-051-161-45WP
(PLASTIC)



MK-342-051-225-2200
(METAL)

ML-341-051-225-2200
(PLASTIC)



PLUG

#2-56 CAPTIVE
JACKSCREW (2 PLCS)
SEE PAGE MA-5

#2-56 JACKPOST
(2 PLCS)
SEE PAGE MA-5

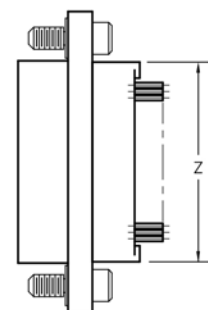
RECEPTACLE

DIMENSIONS													
SIZE	CONTACT ROWS	A	B		C	D	E	H	P	X	Y	Z**	HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL MAX						
9	2	.775	.334	.400	.390	.565	.270	.298	.210	.298	.280	.390	#2-56 UNC THD (#2-56 CLEARANCE OR #2-56 UNC THREADED INSERT)
15		.925	.484	.550	.540	.715						.540	
21		1.075	.634	.700	.690	.865						.690	
25		1.175	.734	.800	.790	.965						.780	
31		1.325	.884	.950	.940	1.115						.930	
37		1.475	1.034	1.100	1.090	1.265						1.080	
51	3	1.425	.984	1.050	1.040	1.215	.310	.341	.219	.390	.325	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	.360	.384	.216	.490	.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

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.
** = "Z" DIMENSION FOR TURNING JACKSCREW ONLY



PLUG: MM-312-051-161-45WP
RECEPTACLE: MK-342-051-225-2200
PLUG: MN-311-051-161-45WP
RECEPTACLE: ML-341-051-225-2200
 XX-XXX-XXX-XXX-XXXX-XXX

PLUG		RECEPTACLE	
SERIES			
MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN receptacles)		MK .050" Rugged Metal PC Board Mount Connector ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)	3 3-Row (Size 51 & 69***)	3 3-Row (Size 51 & 69***)
4 4-Row (Size 100)	4 4-Row (Size 100)		
BODY STYLE: 1 Plug, straight, with ears		BODY STYLE: 4 Receptacle, straight, standard footprint	
BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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		BODY MATERIAL: 1 Polyphenylene Sulfide (ML only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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		XXX 009, 015, 021, 025, 031, 037, 051, 069***, 100	
CONTACTS			
TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, solder cup 14 Pin, straight, .500" pigtails (.018 dia) 15 Pin, straight, 1.000" pigtails (.018 dia) 16 Pin, straight, crimped wire		TYPE CONTACTS/TERMINATIONS: 22 Socket, straight, PCB leads, .109" 23 Socket, straight, PCB leads, .140" 24 Socket, straight, PCB leads, .172"	
PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts; 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)		PLATING OPTIONS: 3 50 µ" Au contacts; 10 µ" Au terminations 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts; SAC305 terminations	
HARDWARE			
STYLE OF HARDWARE: 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*) 99 Keying hardware, see options below (Body material 2, 3 and 4 only)		STYLE OF HARDWARE: 00 None 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)	
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4		POLARIZATION / WIRING 00 None	
OPTIONS			
KSXX Two turning jackscrews. See page MA-6 for keying options (KJ*)		KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options (KN*) 900 Interfacial sealing gasket 0B7 Threaded inserts and interfacial sealing gasket	

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

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

☒ = Option not RoHS compliant

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

**** = Connector body has no mounting holes.

Cable to Board (Standard Footprint)

.050"

9 thru 100 Contacts

Rugged Cable

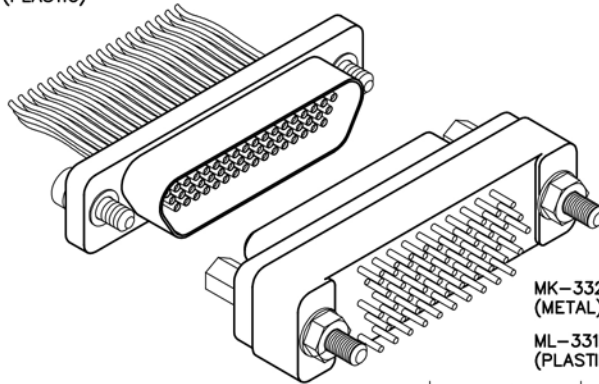
MM, MN

Rugged Board Mount

MK, ML

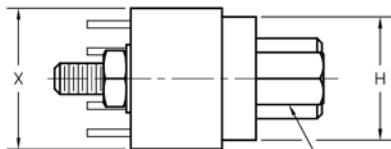
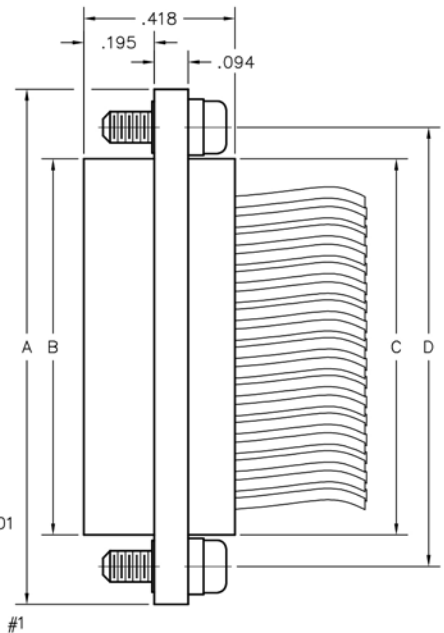
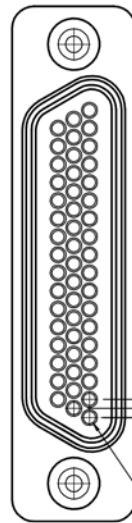
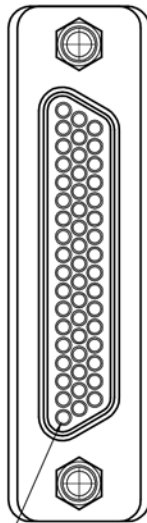
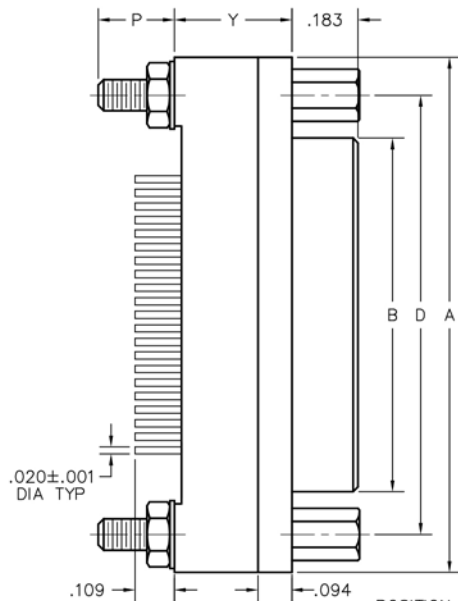
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(METAL)

MN-321-051-261-45WP
(PLASTIC)



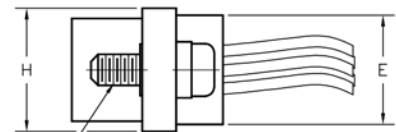
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(METAL)

ML-331-051-125-2200
(PLASTIC)



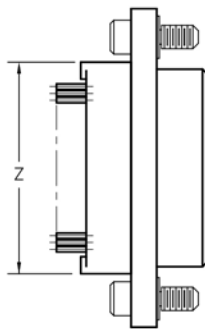
PLUG

#2-56 JACKPOST
(2 PLCS)
SEE PAGE MA-5



RECEPTACLE

#2-56 CAPTIVE
JACKSCREW (2 PLCS)
SEE PAGE MA-5



DIMENSIONS														
SIZE	CONTACT ROWS	A	B		C	D	E		H	P	X	Y	Z**	HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL	MAX						
9	2	.775	.334	.400	.390	.565	.270	.298	.210	.298	.280	.280	.390	#2-56 UNC THD (#2-56 CLEARANCE OR #2-56 UNC THREADED INSERT)
15		.925	.484	.550	.540	.715							.540	
21		1.075	.634	.700	.690	.865							.690	
25		1.175	.734	.800	.790	.965							.780	
31		1.325	.884	.950	.940	1.115							.930	
37	3	1.475	1.034	1.100	1.090	1.265	.310	.341	.214	.390	.325	.330	1.080	#4-40 UNC THD (#4-40 CLEARANCE OR #4-40 UNC THREADED INSERT)
51		1.425	.984	1.050	1.040	1.215							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	.360	.384	.216	.490	.379	1.530		

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

** = "Z" DIMENSION FOR TURNING JACKSCREW ONLY

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.
** = "Z" DIMENSION FOR TURNING JACKSCREW ONLY

PLUG**RECEPTACLE**

PLUG: MK-332-051-125-2200

RECEPTACLE: MM-322-051-261-45WP

PLUG: ML-331-051-125-2200

RECEPTACLE: MN-321-051-261-45WP

SERIES	
MK .050" Rugged Metal PC Board Mount Connector	MM .050" Rugged Metal I/O Connector
ML .050" Rugged Plastic PC Board Mount Connector (MK & ML mate with MK, ML, MM, MN receptacles)	MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)
3 3-Row (Size 51 & 69***)	3 3-Row (Size 51 & 69***)
4 4-Row (Size 100)	4 4-Row (Size 100)
BODY STYLE:	BODY STYLE:
3 Plug, straight, standard footprint	2 Receptacle, straight, with ears
BODY MATERIAL:	BODY MATERIAL:
1 Polyphenylene Sulfide (ML only)	1 Polyphenylene Sulfide (MN only)
2 Polyphenylene Sulfide with electroless nickel shell	2 Polyphenylene Sulfide with electroless nickel shell
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
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:
12 Pin, straight, PCB leads, .109"	21 Socket, straight, solder cup
13 Pin, straight, PCB leads, .140"	24 Socket, straight, .500" pigtails (.018 dia)
14 Pin, straight, PCB leads, .172"	25 Socket, straight, 1.000" pigtails (.018 dia)
	26 Socket, straight, crimped wire
PLATING OPTIONS:	PLATING OPTIONS:
3 50 µ" Au contacts; 10 µ" Au terminations	1 50 µ" Au contacts (crimp wire)
5 50 µ" Au contacts; Sn/Pb alloy terminations ☒	3 50 µ" Au contacts; 10 µ" Au terminations (solder cup, pigtail)
7 50 µ" Au contacts; SAC305 terminations	5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
	7 50 µ" 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°)
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 MA-3 & MA-4

OPTIONS	
KPXX Two fixed jacknuts. See page MA-6 for keying options (KN*)	KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 for keying options (KJ*)
0B7 Threaded inserts	900 Interfacial sealing gasket

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

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

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

**** = Connector body has no mounting holes.

☒ = Option not RoHS compliant

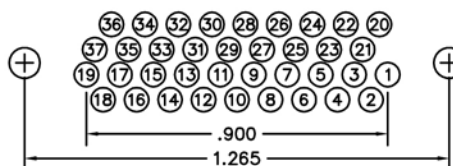
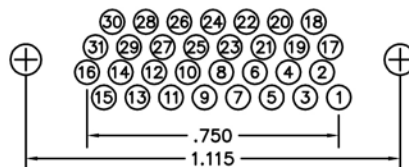
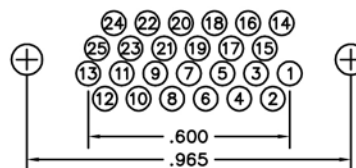
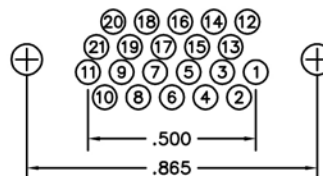
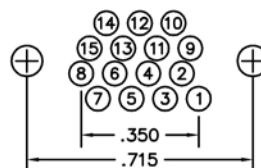
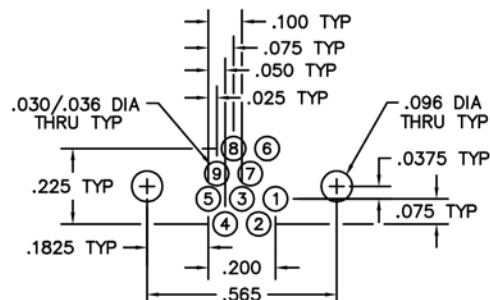
Recommended PC Board Layout

Straight, Standard Footprint

CONNECTOR
MATING FACE
(PLUG)

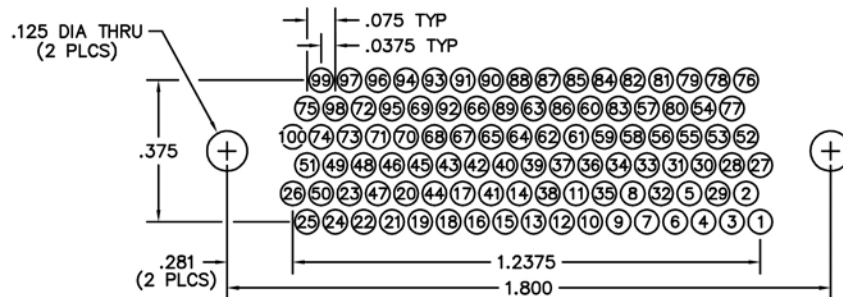
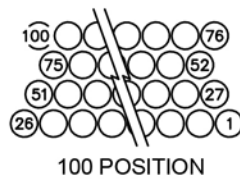
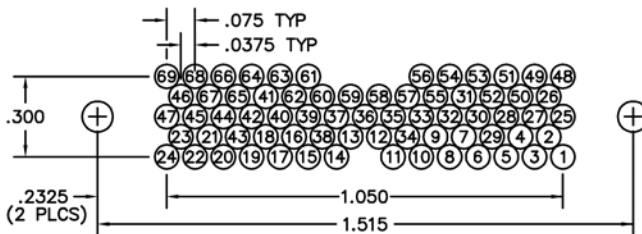
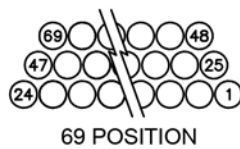
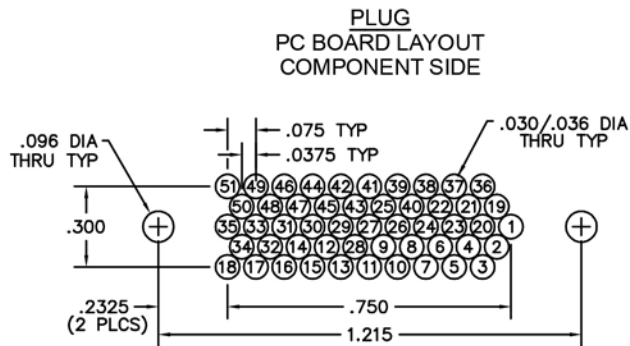
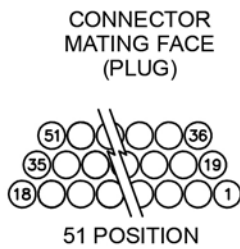


PLUG
PC BOARD LAYOUT
COMPONENT SIDE



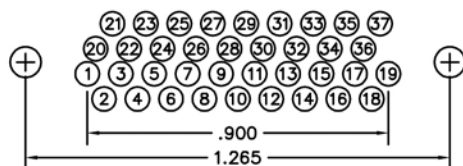
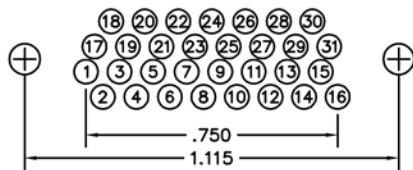
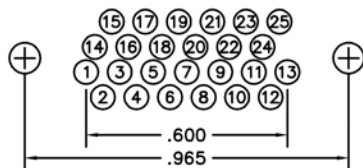
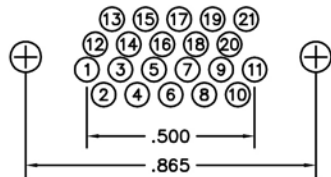
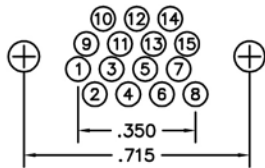
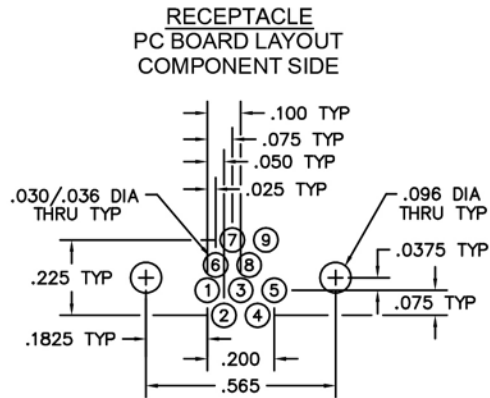
Recommended PC Board Layout

Straight, Standard Footprint



Recommended PC Board Layout

Straight, Standard Footprint



CONNECTOR
MATING FACE
(RECEPTACLE)



9 POSITION



15 POSITION



21 POSITION



25 POSITION



31 POSITION

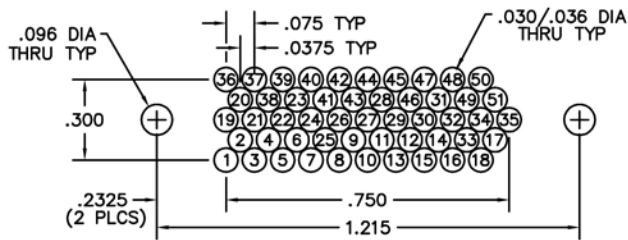


37 POSITION

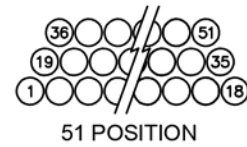
Recommended PC Board Layout

Straight, Standard Footprint

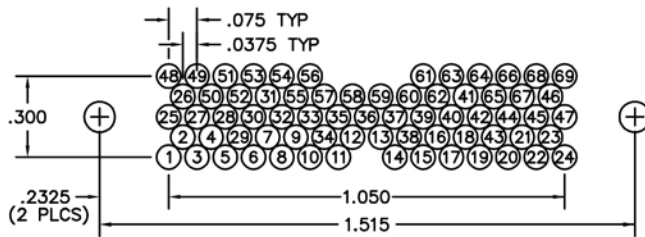
RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



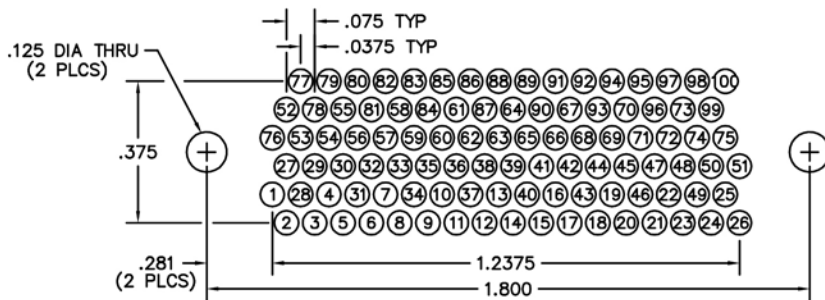
CONNECTOR
MATING FACE
(RECEPTACLE)



51 POSITION



69 POSITION



100 POSITION

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 Finish:	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 AMS2404, Class 3, 500 μ " min 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: Fractions = $\pm 1/64$ " Decimals = $\pm .010$ " Angles = $\pm 5^\circ$ Wire lengths: uninsulated/solid = $+0.2"/-0.0$ "

Note: AirBorn 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 (consult factory for other sizes and types)
Test Voltage:	600 V, RMS, 60 Hz
Operating Temperature:	-55° C to +125° C
Insulation Resistance:	5,000 megohms minimum @ 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 (except steps 7a and 7b)
Thermal Shock:	Tested to the temperature extremes of MIL-STD-1344, Method 1003, Test Condition A (except step 3, temperature shall be 125° C)
Contact Resistance:	0.065 volt maximum drop @ 2.5 amps (.026 ohms)
Contact Engaging Force:	6.0 ounce maximum, with .0221 diameter test sleeve
Contact Separating Force:	0.5 ounce minimum, with .0230 diameter test sleeve
Crimp Strength:	5 pound minimum tensile strength

Board SMT to Cable

.050"

9 thru 51 Contacts

Rugged Metal

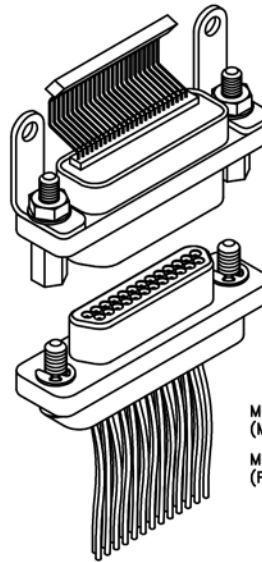
MM

Rugged Plastic

MN

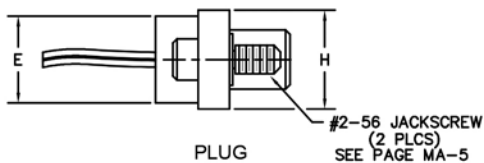
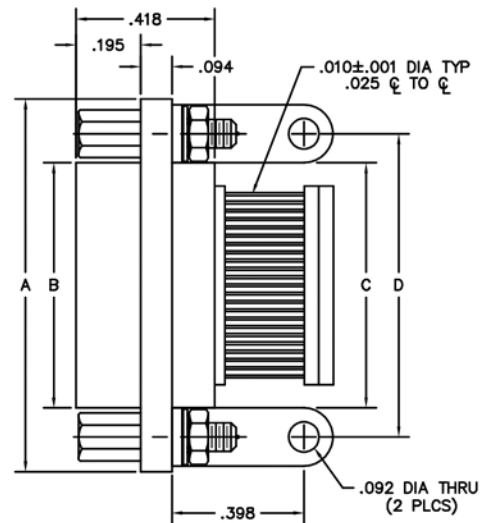
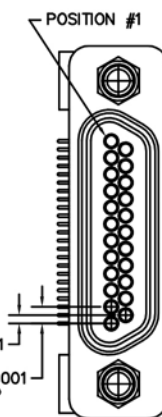
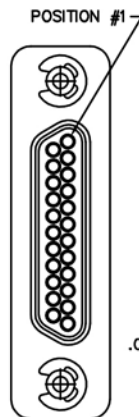
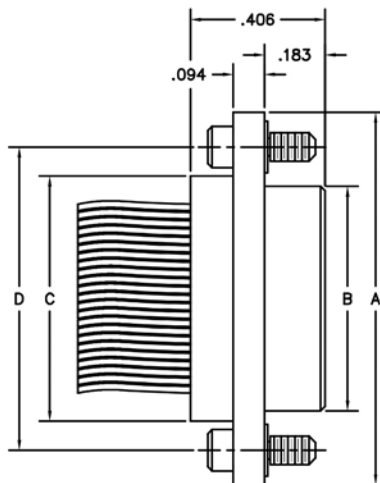
MM-223-025-275-320S
(METAL)

MN-221-025-275-320S
(PLASTIC)

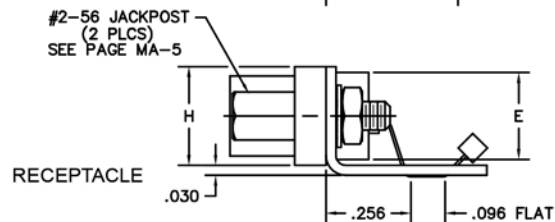


MM-213-025-161-41WQ
(METAL)

MN-211-025-161-41WQ
(PLASTIC)



PLUG



RECEPTACLE

DIMENSIONS									
SIZE	CONTACT ROWS	A	B		C	D	E	H	HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL MAX		
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD (.092 DIA THRU)
15		.925	.484	.550	.540	.715			
21		1.075	.634	.700	.690	.865			
25		1.175	.734	.800	.790	.965			
31		1.325	.884	.950	.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.

PLUG: MM-213-025-161-41WQ

RECEPTACLE: MM-223-025-275-320S

PLUG: MN-211-025-161-41WQ

RECEPTACLE: MN-221-025-275-320S

PLUG

RECEPTACLE

SERIES		XX-XXX-XXX-XXX-XXXX-XXX	
MM .050" Rugged Metal I/O Connector	MM .050" Rugged Metal PC Board Mount, SMT Connector		
MN .050" Rugged Plastic I/O Connector	MN .050" Rugged Plastic PC Board Mount, SMT Connector		
(MM & MN mate with MK, ML, MM, MN receptacles)		(MM & MN mate with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 51***)	2 2-Row (Sizes 9 thru 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 nickel shell	2 Polyphenylene Sulfide with electroless nickel shell		
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒		
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 009, 015, 021, 025, 031, 037, 051***		
CONTACTS			
TYPE CONTACTS/TERMINATIONS:	TYPE CONTACTS/TERMINATIONS:		
11 Pin, straight, solder cup	27 Socket, Surface Mount		
14 Pin, straight, .500" pigtails (.018 dia)			
15 Pin, straight, 1.000" pigtails (.018 dia)			
16 Pin, straight, crimped wire			
PLATING OPTIONS:	PLATING OPTIONS:		
1 50 μ" Au contacts (crimp wire)	5 50 μ" Au contacts; Sn/Pb alloy terminations ☒		
3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)	8 50 μ" Au contacts; Sn plated terminations		
5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒			
7 50 μ" Au contacts; SAC305 terminations (pigtail)			
HARDWARE			
STYLE OF HARDWARE:	STYLE OF HARDWARE:		
00 None	00 None		
22 Two fixed jacknut assemblies	32 Two fixed jacknut assemblies with mounting bracket		
41 Two turning jackscrews, allen head, retaining ring	46 Two turning jackscrews, allen head, captivated** with mounting bracket		
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		
00 None	OR Reverse Body Polarization		
XX For wiring codes, see page MA-3 & MA-4	OS Standard Body Polarization		
OPTIONS			
	900 Interfacial sealing gasket		

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

*** = 51 position connectors are available in metal only (non Mil-Spec interface).

☒ = Option not RoHS compliant

Board SMT to Cable

.050"

9 thru 51 Contacts

Rugged Metal

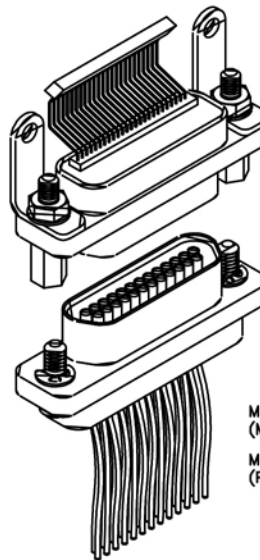
MM

Rugged Plastic

MN

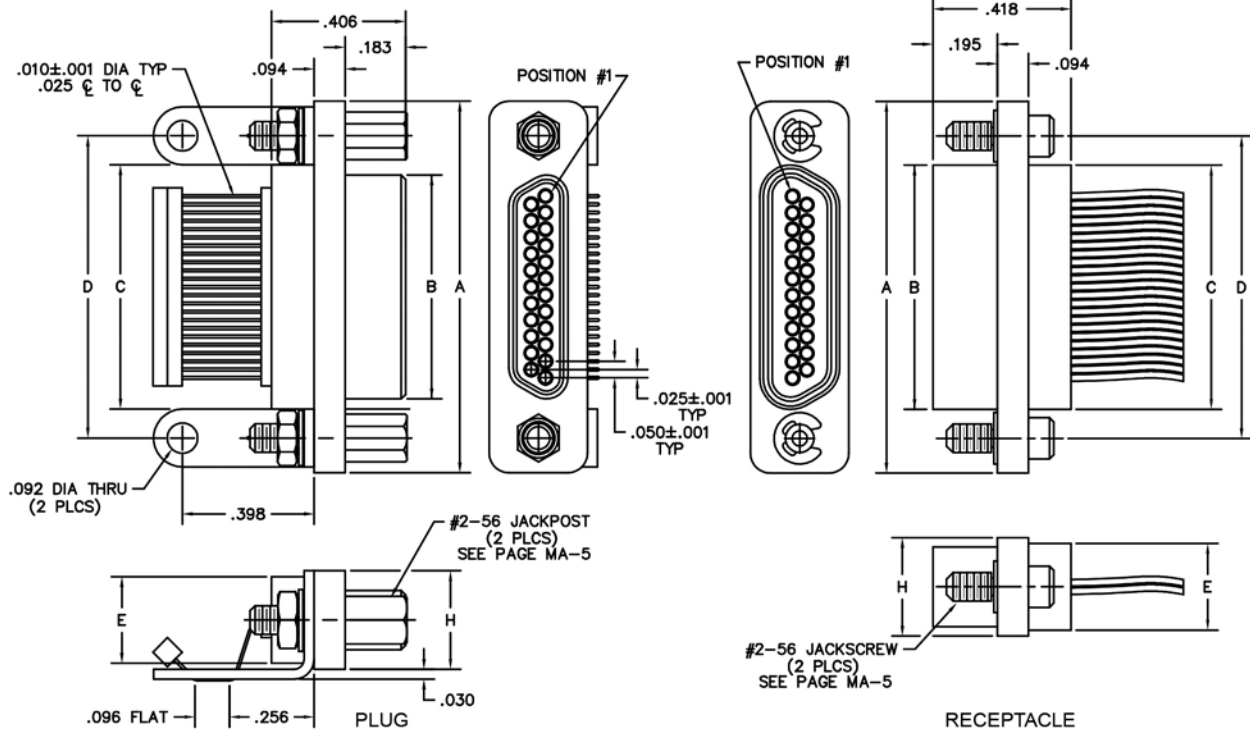
MM-212-025-175-320S
(METAL)

MN-211-025-175-320S
(PLASTIC)



MM-222-025-261-41WQ
(METAL)

MN-221-025-261-41WQ
(PLASTIC)



DIMENSIONS									
SIZE	CONTACT ROWS	A	B		C	D	E	H	HARDWARE
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD (.092 DIA THRU)
15		.925	.484	.550	.540	.715			
21		1.075	.634	.700	.690	.865			
25		1.175	.734	.800	.790	.965			
31		1.325	.884	.950	.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.

PLUG		RECEPTACLE	
SERIES MM .050" Rugged Metal PC Board Mount, SMT Connector MN .050" Rugged Plastic PC Board Mount, SMT Connector (MM & MN mate with MK, ML, MM, MN receptacles)		SERIES MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN plugs)	
BODY 2 2-Row (Sizes 9 thru 51***) BODY STYLE: 1 Plug, straight, with ears BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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		BODY 2 2-Row (Sizes 9 thru 51***) BODY STYLE: 2 Receptacle, straight, with ears BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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***		SIZE XXX 009, 015, 021, 025, 031, 037, 051***	
CONTACTS TYPE CONTACTS/TERMINATIONS: 17 Pin, Surface Mount PLATING OPTIONS: 5 50 μ" Au contacts; Sn/Pb alloy terminations ☒ 8 50 μ" Au contacts; Sn plated terminations		CONTACTS TYPE CONTACTS/TERMINATIONS: 21 Socket, straight, solder cup 24 Socket, straight, .500" pigtails (.018 dia) 25 Socket, straight, 1.000" pigtails (.018 dia) 26 Socket, straight, crimped wire PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail) 5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 μ" Au contacts; SAC305 terminations (pigtail)	
HARDWARE STYLE OF HARDWARE: 00 None 32 Two fixed jacknut assemblies with mounting bracket 46 Two turning jackscrews, allen head, captivated** with mounting bracket		HARDWARE STYLE OF HARDWARE: 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: 0R Reverse Body Polarization 0S Standard Body Polarization		POLARIZATION / WIRING 00 None XX For wiring codes, see page MA-3 & MA-4	
OPTIONS 900 Interfacial sealing gasket			

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

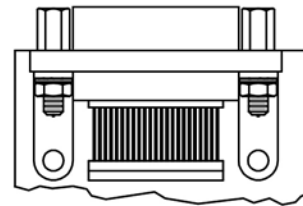
*** = 51 position connectors are available in metal only (non Mil-Spec interface).

☒ = Option not RoHS compliant

Recommended PC Board Layout

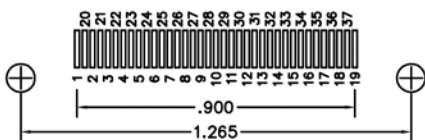
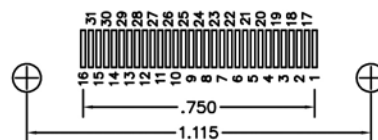
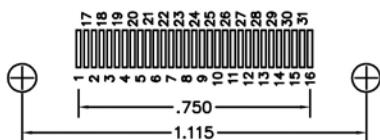
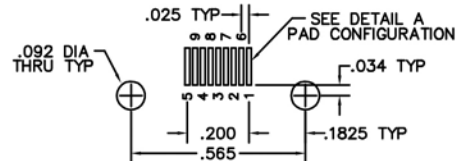
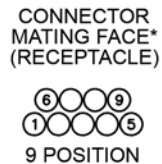
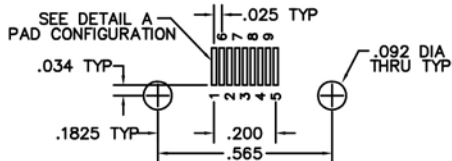
Surface Mount
Standard Polarization

PLUG
PC BOARD LAYOUT
COMPONENT SIDE



PC BOARD LAYOUT
COMPONENT SIDE

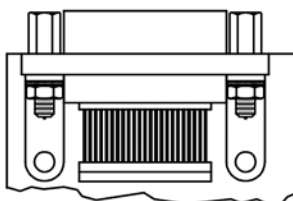
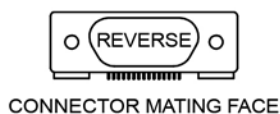
RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



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

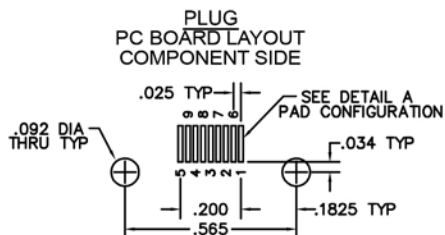
MATING FACE THIS SIDE



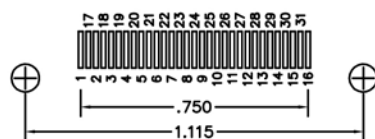
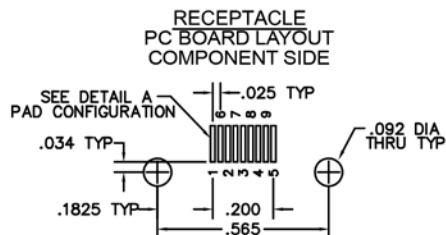


Recommended PC Board Layout

Surface Mount
Reverse Polarization



CONNECTOR
MATING FACE*
(RECEPTACLE)



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



Cable to Board (Vertical Surface Mount)

.050"

9 thru 51 Contacts

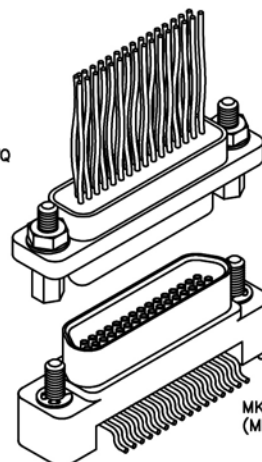
Rugged Surface Mount

MK

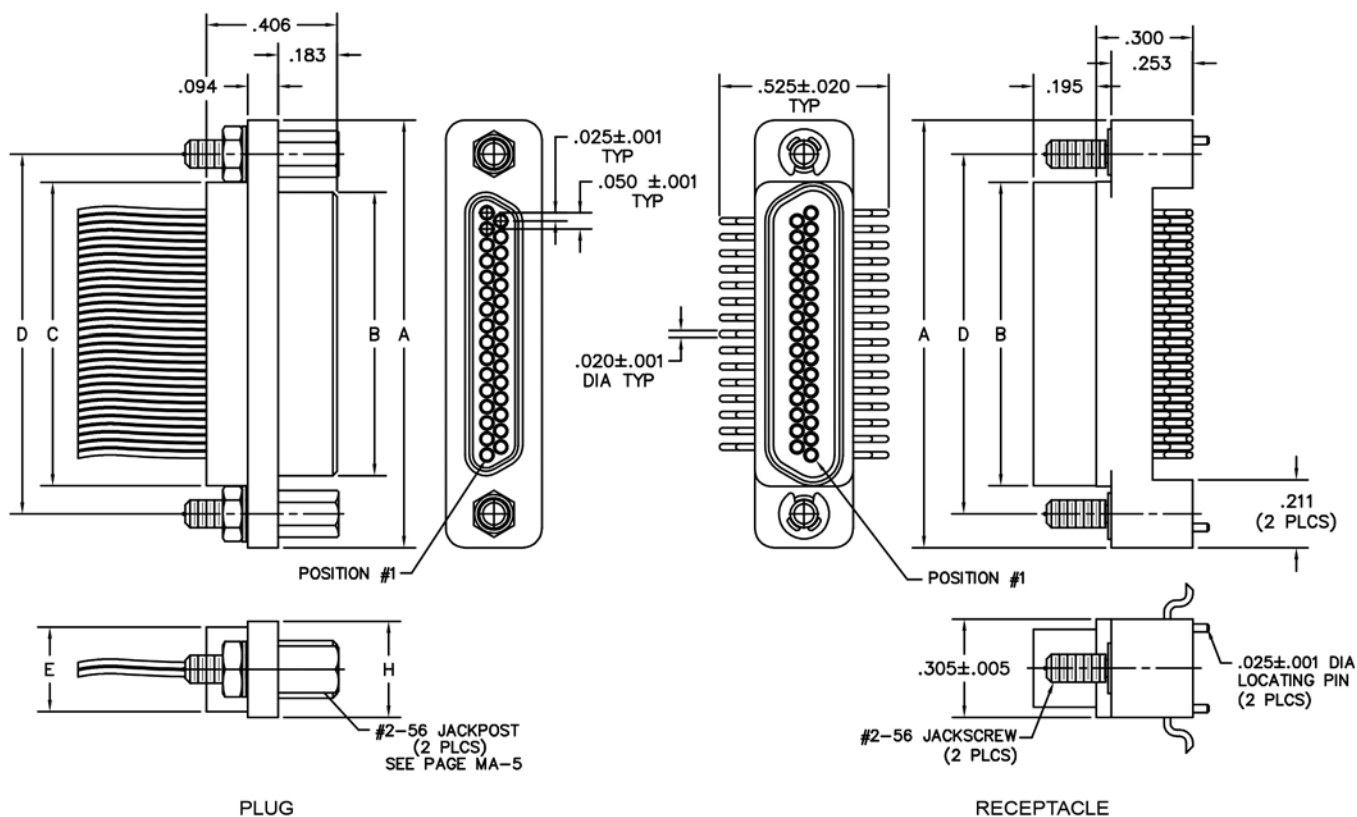
Rugged Cable

MM

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



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



PLUG

RECEPTACLE

SIZE	CONTACT ROWS	DIMENSIONS							
		A	B		C	D	E	H	HARDWARE
			PLUG MAX	RCPT MAX					
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD (.092 DIA THRU)
15		.925	.484	.550	.540	.715			
21		1.075	.634	.700	.690	.865			
25		1.175	.734	.800	.790	.965			
31		1.325	.884	.950	.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 NON-MIL SPEC INTERFACE

PLUG: MM-212-031-161-41WQ
RECEPTACLE: MK-2J2-031-475-2200
XX-XXX-XXX-XXX-XXXX-XXX

PLUG

RECEPTACLE

SERIES	
MM .050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles)	MK .050" Rugged Metal Surface Mount Connector (MK mates with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 51*)	2 2-Row (Sizes 9 thru 51*)
BODY STYLE: 1 Plug, straight, with ears	BODY STYLE: J Receptacle, vertical surface mount
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 4 Polyphenylene Sulfide with hard anodized black shell A Pure Electro-Deposited Aluminum K Zinc Nickel Plating T Nickel Polymer Plating	BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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*	XXX 009, 015, 021, 025, 031, 037, 051*

CONTACTS	
TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, solder cup 14 Pin, straight, .500" pigtails (.018 dia) 15 Pin, straight, 1.000" pigtails (.018 dia) 16 Pin, straight, crimped wire	TYPE CONTACTS/TERMINATIONS: 47 Socket, vertical smt
PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)	PLATING OPTIONS: 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts; SAC305 terminations

HARDWARE	
STYLE OF HARDWARE: 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** 99 Keying hardware, see options below	STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies 41 Two turning jackscrews, allen head, retaining ring 99 Keying hardware, see options below
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4	POLARIZATION / WIRING: 00 None

OPTIONS	
KSXX Two turning jackscrews. See page MA-6 for keying options	KPXX Two fixed jacknuts and interfacial sealing gasket. See page MA-6 for keying options 900 Interfacial sealing gasket

* = 2 row, 51 position connectors are non-Mil Spec interface.

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

☒ = Option not RoHS compliant

Cable to Board (Vertical Surface Mount)

.050"

9 thru 51 Contacts

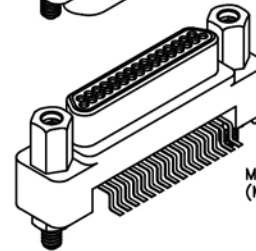
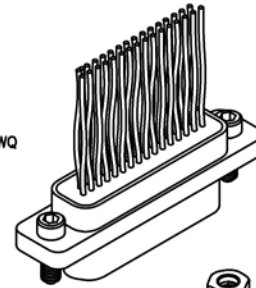
Rugged Surface Mount

MK

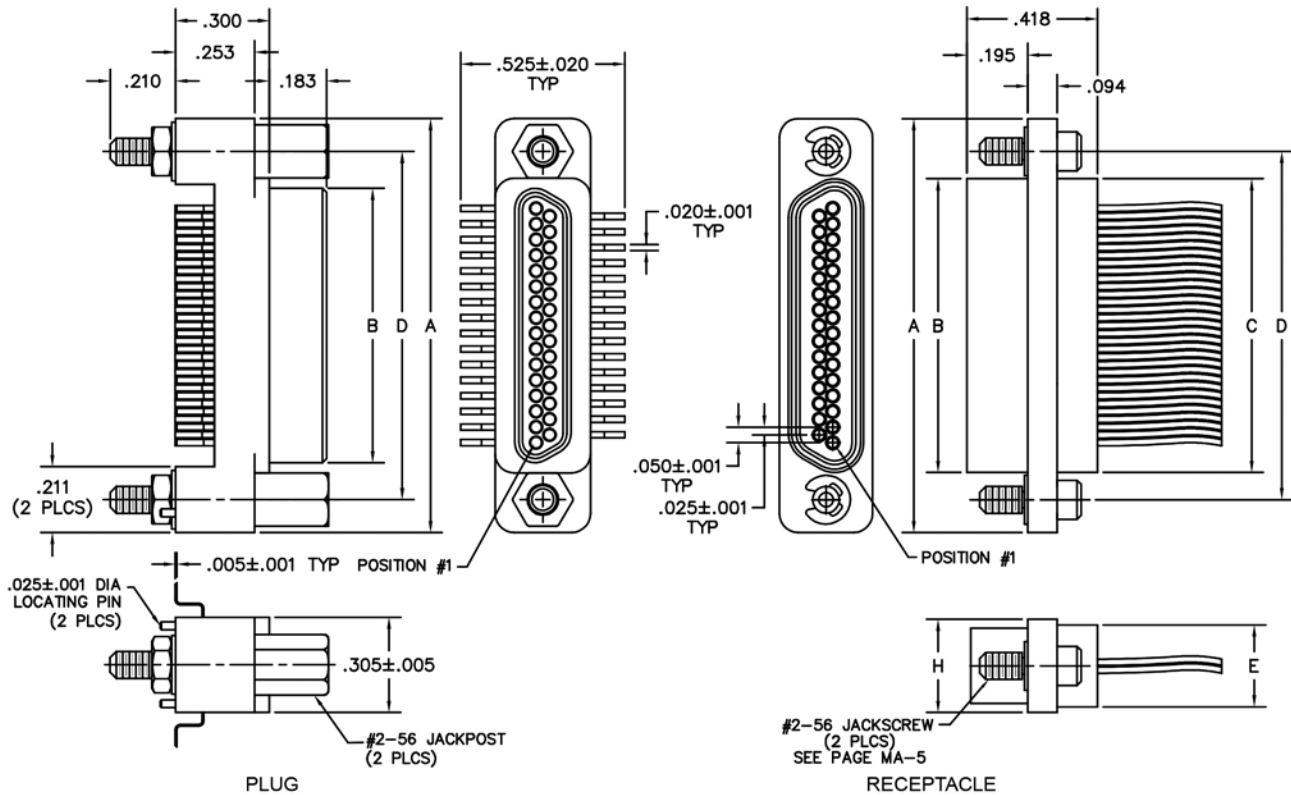
Rugged Cable

MM

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



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



DIMENSIONS								
SIZE	CONTACT ROWS	A	B		C	D	E	HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL MAX	
9	2	.775	.334	.400	.390	.565	.270	#2-56 UNC THD (.092 DIA THRU)
15		.925	.484	.550	.540	.715		
21		1.075	.634	.700	.690	.865		
25		1.175	.734	.800	.790	.965		
31		1.325	.884	.950	.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 NON-MIL SPEC INTERFACE

www.airborn.com
(512) 863-5585

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

PLUG

RECEPTACLE

SERIES	
MK .050" Rugged Metal Surface Mount Connector (MK mates with MK, ML, MM, MN receptacles)	MM .050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 51*)	2 2-Row (Sizes 9 thru 51*)
BODY STYLE: H Plug, vertical surface mount	BODY STYLE: 2 Receptacle, straight, with ears
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 4 Polyphenylene Sulfide with hard anodized black shell A Pure Electro-Deposited Aluminum K Zinc Nickel Plating T Nickel Polymer Plating	BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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*	XXX 009, 015, 021, 025, 031, 037, 051*

CONTACTS	
TYPE CONTACTS/TERMINATIONS: 37 Pin, vertical smt	TYPE CONTACTS/TERMINATIONS: 21 Socket, straight, solder cup 24 Socket, straight, .500" pigtails (.018 dia) 25 Socket, straight, 1.000" pigtails (.018 dia) 26 Socket, straight, crimped wire
PLATING OPTIONS: 5 50 μ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 μ" Au contacts; SAC305 terminations	PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail) 5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 μ" Au contacts; SAC305 terminations (pigtail)

HARDWARE	
STYLE OF HARDWARE: 00 None 22 Two fixed jacknut assemblies 41 Two turning jackscrews, allen head, retaining ring 99 Keying hardware, see options below	STYLE OF HARDWARE: 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** 99 Keying hardware, see options below
POLARIZATION / WIRING: 00 None	POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4

OPTIONS	
KPXX Two fixed jacknuts. See page MA-6 for keying options	KSXX Two turning jackscrews and interfacial sealing gasket. See page MA-6 for keying options 900 Interfacial sealing gasket

* = 2 row, 51 position connectors are non-Mil Spec interface.

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

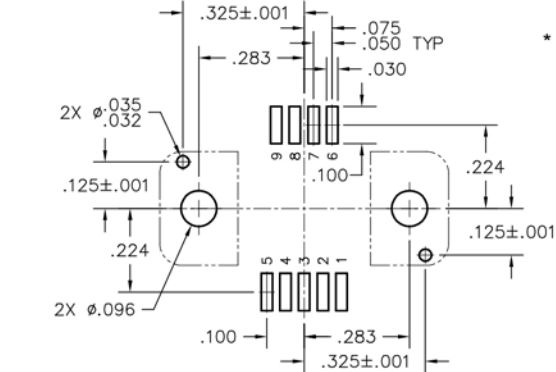
☒ = Option not RoHS compliant

Recommended PC Board Layout

Vertical Surface Mount

PLUG

PC BOARD LAYOUT COMPONENT SIDE



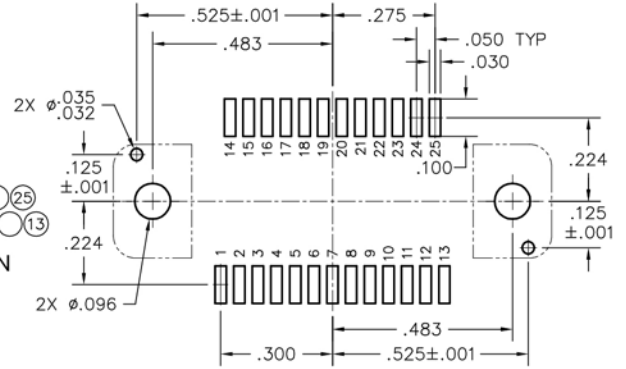
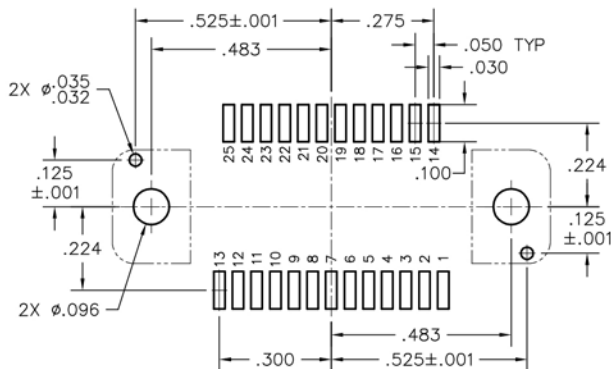
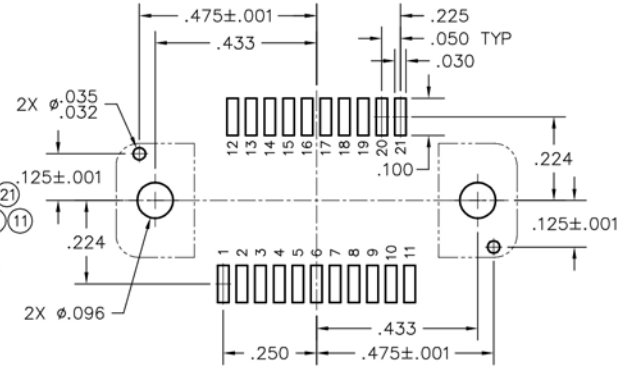
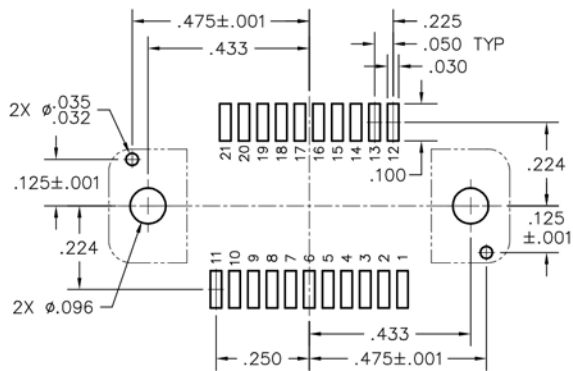
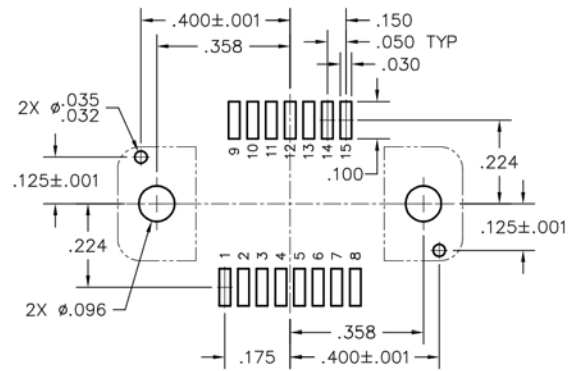
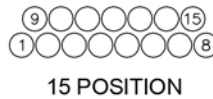
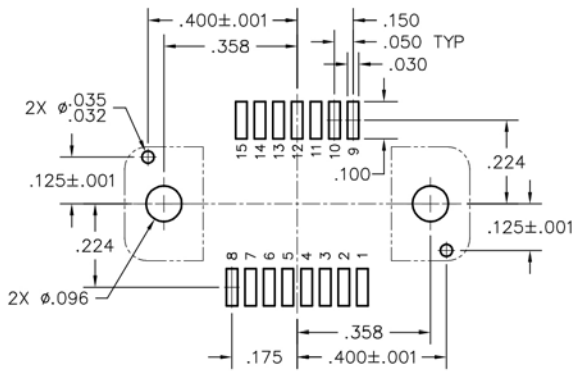
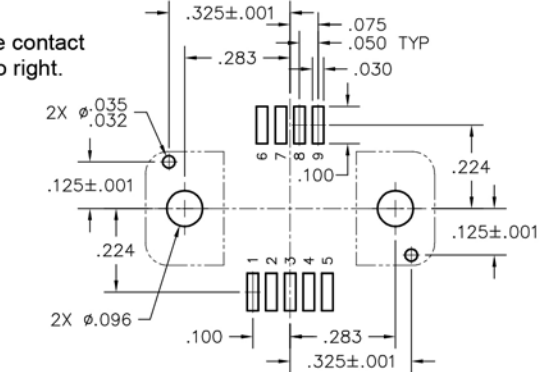
CONNECTOR MATING FACE* (RECEPTACLE)

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



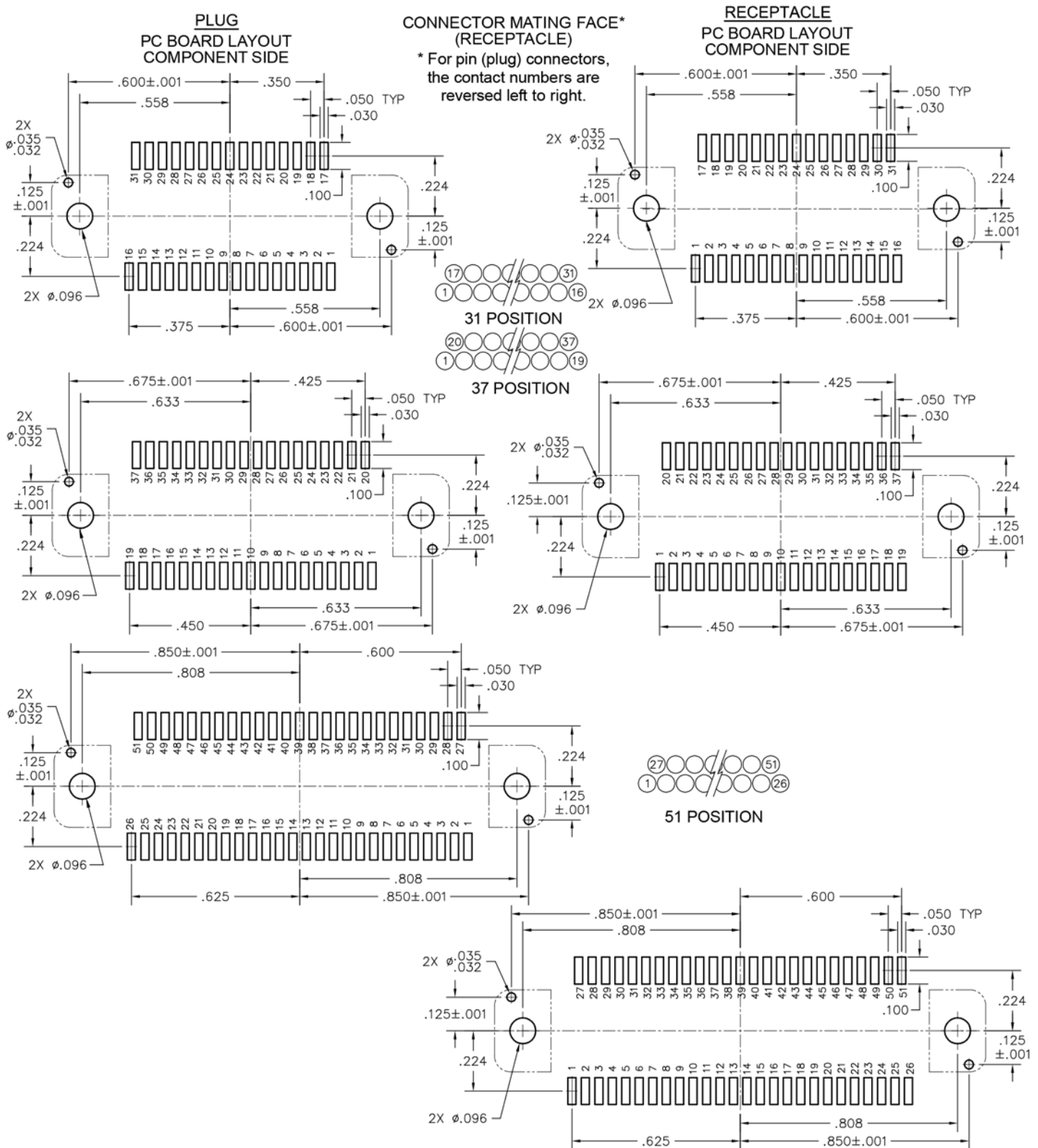
RECEPTACLE

PC BOARD LAYOUT COMPONENT SIDE



Recommended PC Board Layout

Vertical Surface Mount



Card Edge Mount to Cable .050"

9 thru 100 Contacts

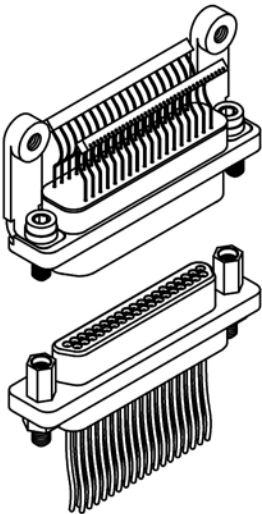
Rugged Card Edge Mount

MK

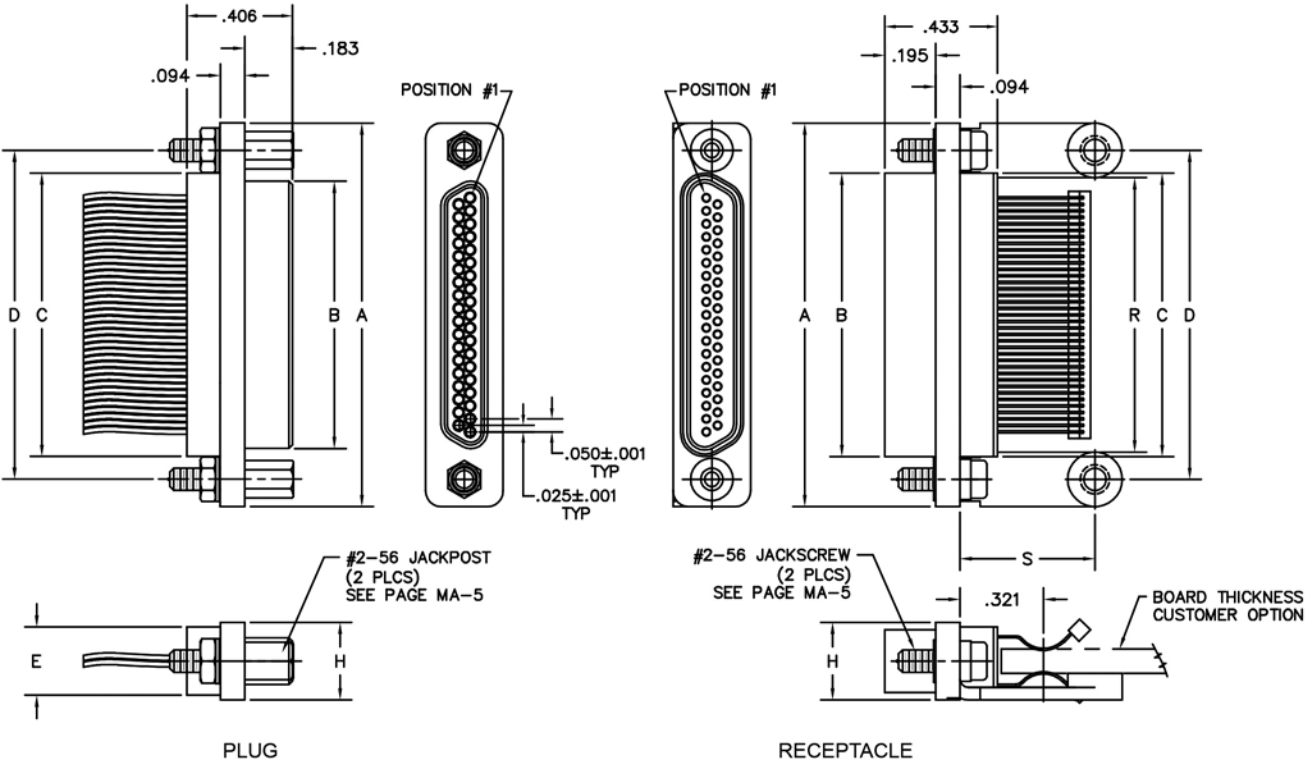
Rugged Metal

MM

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



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



DIMENSIONS											
SIZE	CONTACT ROWS	A	B		C	D	E		H	HARDWARE	MOUNTING HOLES
			PLUG MAX	RCPT MAX			POTTING WELL MAX				
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD	#4-40 UNC THD	.355
15		.925	.484	.550	.540	.715					.505
21		1.075	.634	.700	.690	.865					.655
25		1.175	.734	.800	.790	.965					.755
31		1.325	.884	.950	.940	1.115					.905
37		1.475	1.034	1.100	1.090	1.265					1.055
51	3	1.425	.984	1.050	1.040	1.215	.310	.341	#4-40 UNC THD		1.005
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	.360	.384	#4-40 UNC THD		1.514 .540

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

PLUG

RECEPTACLE

SERIES	
MM .050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN receptacles)	MK .050" Rugged Metal Card Edge Mount (MK mates with MK, ML, MM, MN plugs)
BODY	
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)
3 3-Row (Size 51 & 69)	3 3-Row (Size 51 & 69)
4 4-Row (Size 100)	4 4-Row (Size 100)
BODY STYLE: 1 Plug, straight, with ears	BODY STYLE: G Receptacle, straight, card edge with mounting brackets
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 4 Polyphenylene Sulfide with hard anodized black shell A Pure Electro-Deposited Aluminum K Zinc Nickel Plating T Nickel Polymer Plating	BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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, 069, 100	XXX 009, 015, 021, 025, 031, 037, 051, 069, 100
CONTACTS	
TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, solder cup 14 Pin, straight, .500" pigtails (.018 dia) 15 Pin, straight, 1.000" pigtails (.018 dia) 16 Pin, straight, crimped wire	TYPE CONTACTS/TERMINATIONS: 27 Socket, surface mount, .062-.094" pcb thickness (.010 dia) 28 Socket, surface mount, .109-.140" pcb thickness (.010 dia)
PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)	PLATING OPTIONS: 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒ 8 50 µ" Au contacts; Sn plated terminations
HARDWARE	
STYLE OF HARDWARE: 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*)	STYLE OF HARDWARE: 32 Two fixed jacknut assemblies (72*) 46 Two turning jackscrews, allen head, captivated** (86*)
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4	POLARIZATION / WIRING 0S Standard Body Polarization
OPTIONS	
900 Interfacial sealing gasket	

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

Card Edge Mount to Cable

.050"

9 thru 100 Contacts

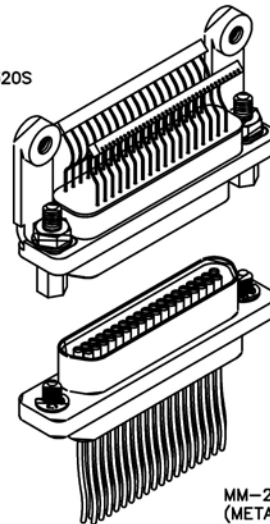
Rugged Card Edge Mount

MK

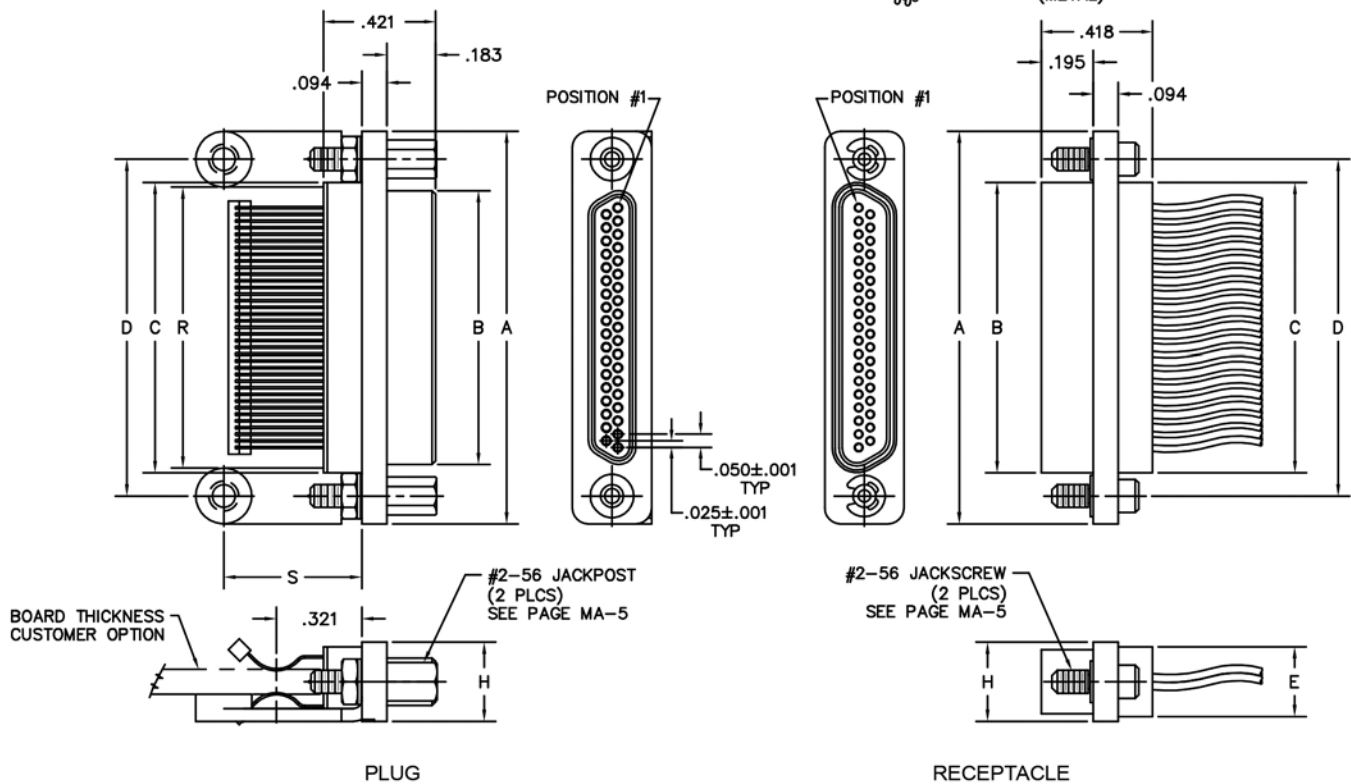
Rugged Metal

MM

MK-2F2-037-175-320S
(METAL)



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



DIMENSIONS												
SIZE	CONTACT ROWS	A	B		C	D	E POTTING WELL MAX	H	HARDWARE	MOUNTING HOLES	R	S
			PLUG MAX	RCPT MAX								
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD	#4-40 UNC THD	.355	.519
15		.925	.484	.550	.540	.715					.505	
21		1.075	.634	.700	.690	.865					.655	
25		1.175	.734	.800	.790	.965					.755	
31		1.325	.884	.950	.940	1.115					.905	
37	3	1.475	1.034	1.100	1.090	1.265	.310	.341	#4-40 UNC THD	#4-40 UNC THD	1.055	.540
51		1.425	.984	1.050	1.040	1.215					1.005	
69		1.725	1.284	1.350	1.340	1.515					1.309	
100		2.160	1.384	1.508	1.432	1.800	.360	.384	#4-40 UNC THD		1.514	

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

PLUG

RECEPTACLE

SERIES	
MK .050" Rugged Metal Card Edge Mount Connector (MK mates with MK, ML, MM, MN receptacles)	MM .050" Rugged Metal I/O Connector (MM mates with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)
3 3-Row (Size 51 & 69)	3 3-Row (Size 51 & 69)
4 4-Row (Size 100)	4 4-Row (Size 100)

BODY STYLE:	BODY STYLE:
F Plug, straight, card edge, with mounting brackets	2 Receptacle, straight, with ears

BODY MATERIAL:	BODY MATERIAL:
2 Polyphenylene Sulfide with electroless nickel shell	2 Polyphenylene Sulfide with electroless nickel shell
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
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:
17 Pin, surface mount, .062-.094 pcb thickness (.010 dia)	21 Socket, straight, solder cup
18 Pin, surface mount, .109-.140 pcb thickness (.010 dia)	24 Socket, straight, .500" pigtails (.018 dia)
	25 Socket, straight, 1.000" pigtails (.018 dia)
	26 Socket, straight, crimped wire

PLATING OPTIONS:	PLATING OPTIONS:
5 50 µ" Au contacts; Sn/Pb alloy terminations ☒	1 50 µ" Au contacts (crimp wire)
8 50 µ" Au contacts; Sn plated terminations	3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail)
	5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
	7 50 µ" Au contacts; SAC305 terminations (pigtail)

HARDWARE	
STYLE OF HARDWARE:	STYLE OF HARDWARE:
32 Two fixed jacknut assemblies (72*)	00 None
46 Two turning jackscrews, allen head, captivated** (86*)	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
0S Standard Body Polarization	00 None
	XX For wiring codes, see page MA-3 & MA-4

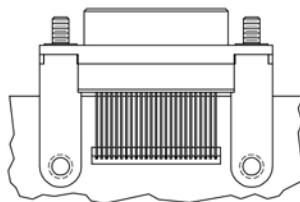
OPTIONS	
	900 Interfacial sealing gasket

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

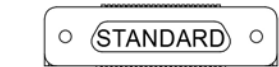
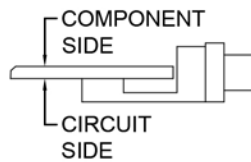
☒ = Option not RoHS compliant

Recommended PC Board Layout

Card Edge Mount
Standard Polarization

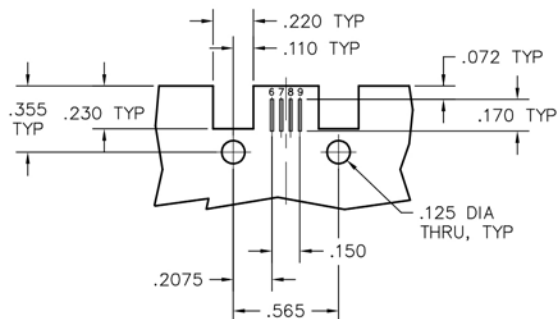


PC BOARD LAYOUT
CIRCUIT SIDE



CONNECTOR MATING FACE

PLUG
PC BOARD LAYOUT
COMPONENT SIDE

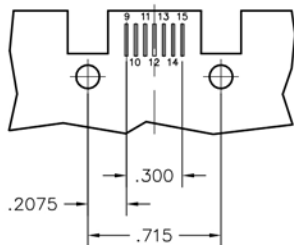
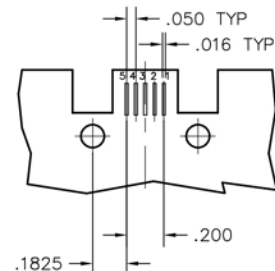


CONNECTOR
MATING FACE

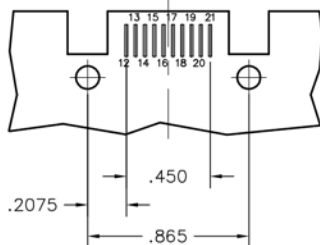
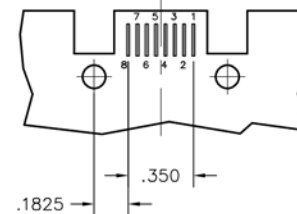


9 POSITION

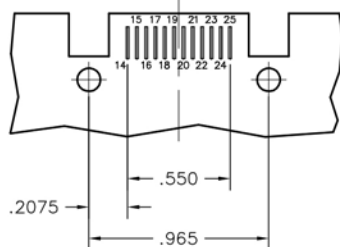
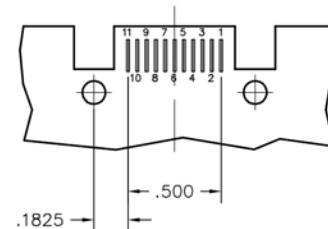
PLUG
PC BOARD LAYOUT
CIRCUIT SIDE



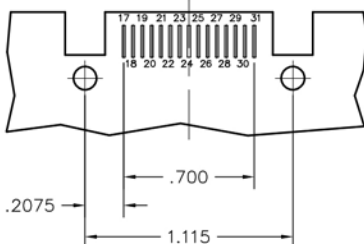
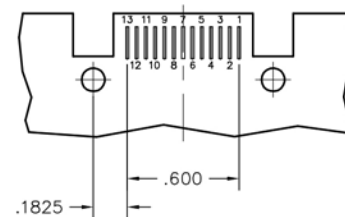
15 POSITION



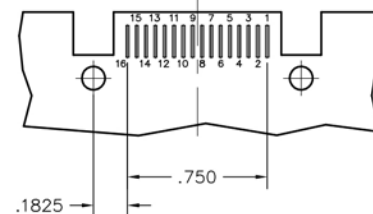
21 POSITION

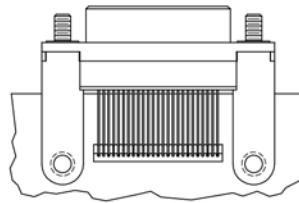
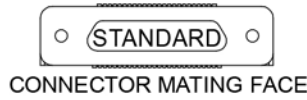
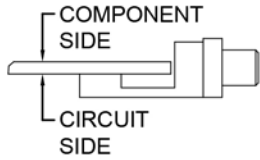


25 POSITION



31 POSITION



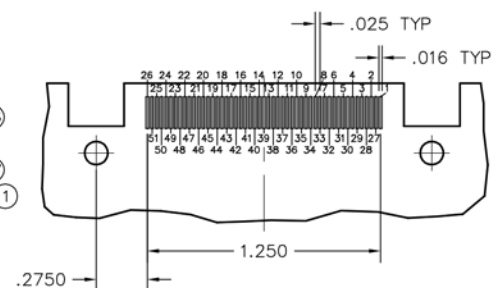
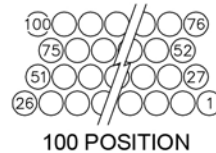
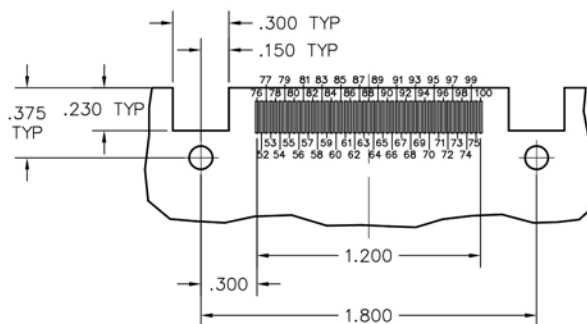
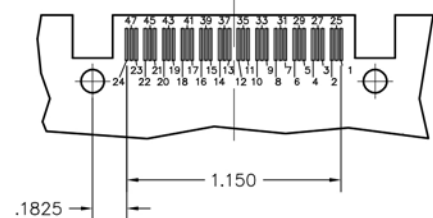
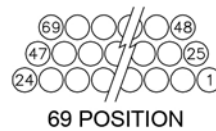
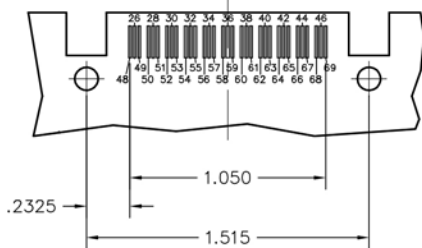
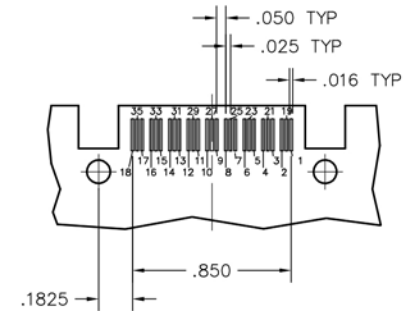
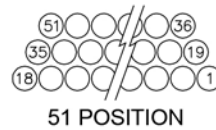
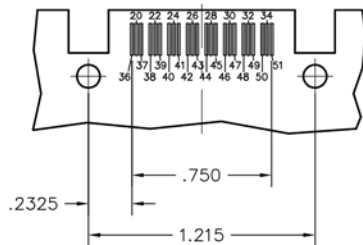
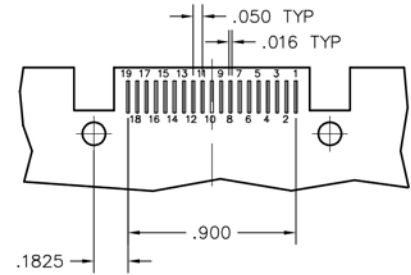
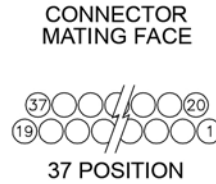
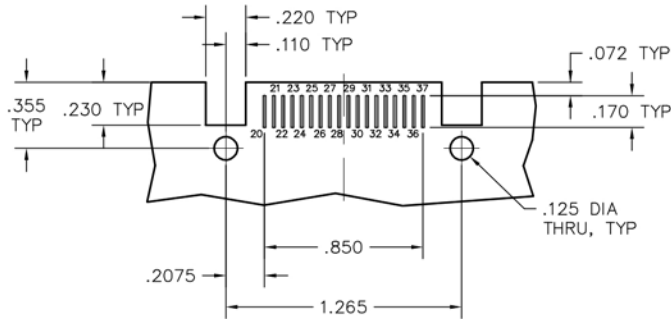


Recommended PC Board Layout

Card Edge Mount
Standard Polarization

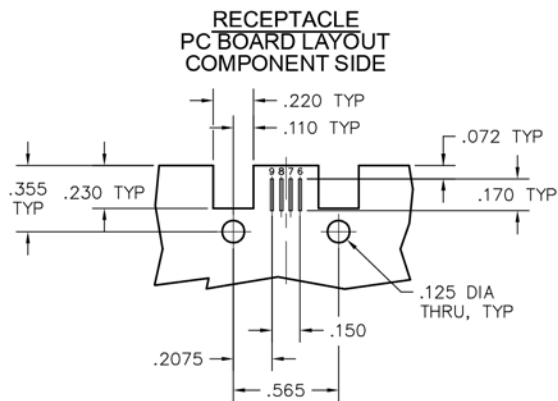
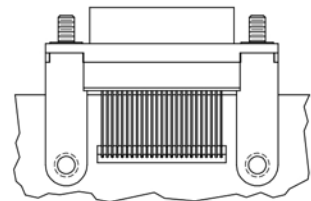
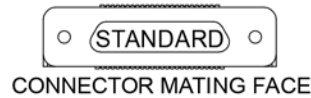
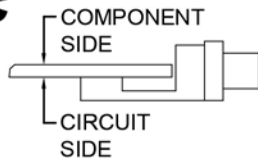
PLUG
PC BOARD LAYOUT
COMPONENT SIDE

PLUG
PC BOARD LAYOUT
CIRCUIT SIDE

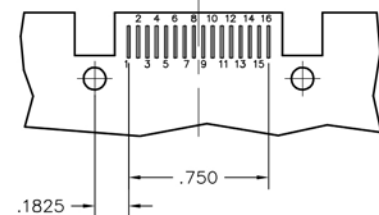
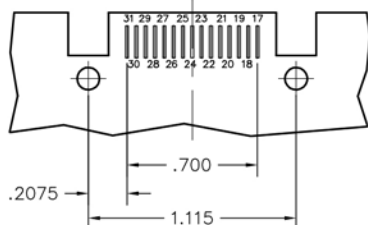
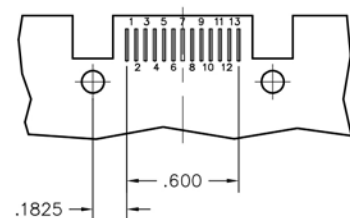
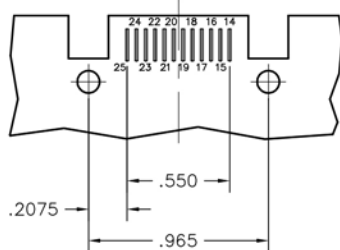
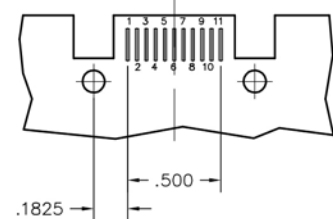
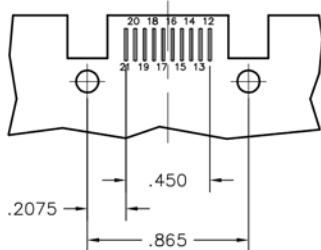
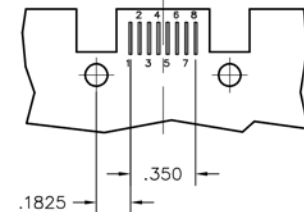
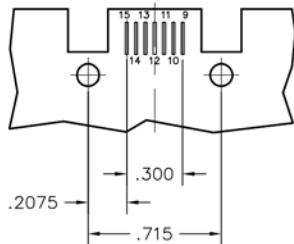
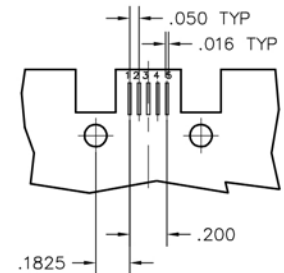


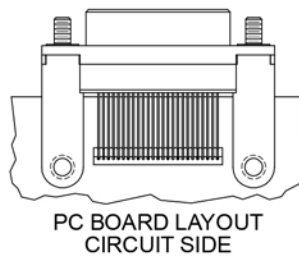
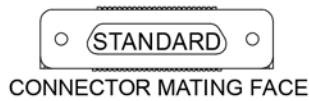
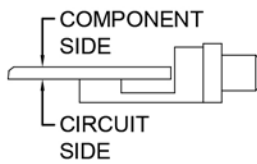
Recommended PC Board Layout

Card Edge Mount
Standard Polarization



CONNECTOR
MATING FACE

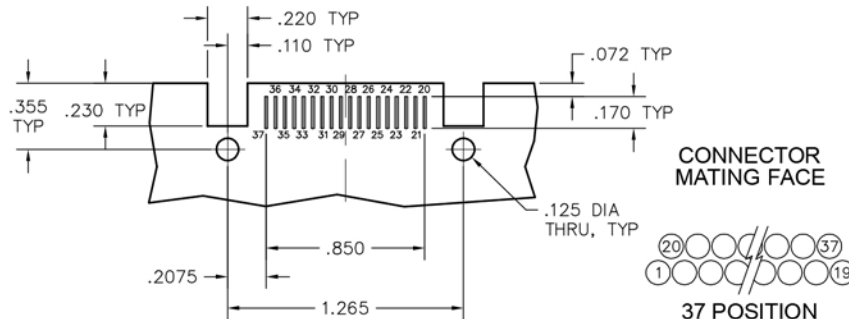




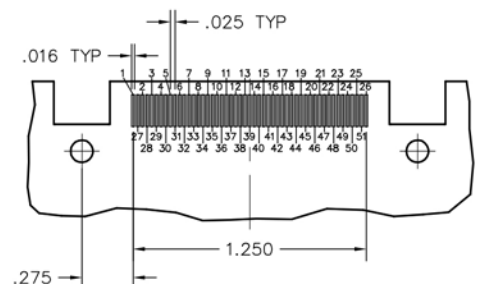
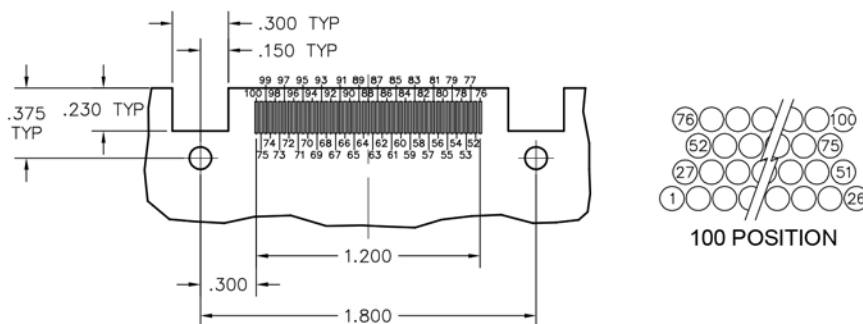
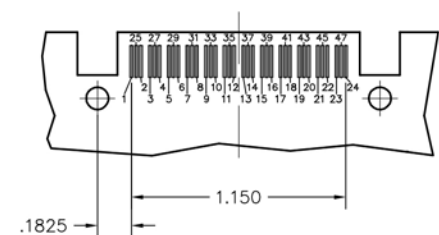
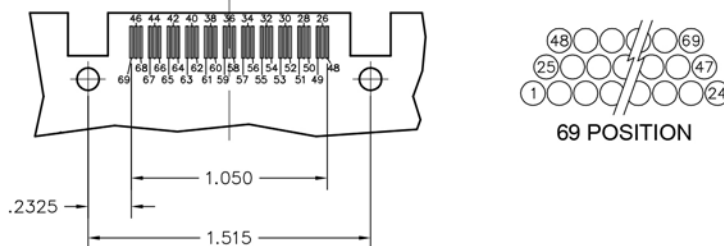
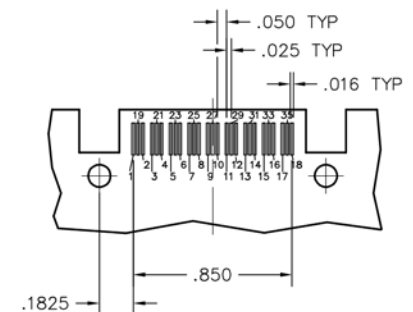
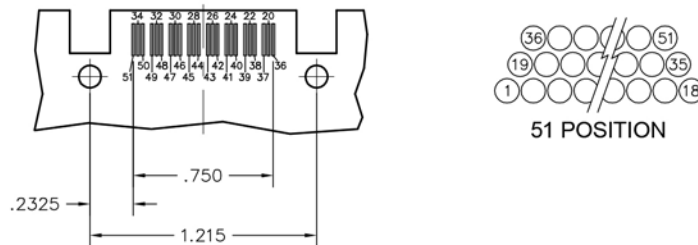
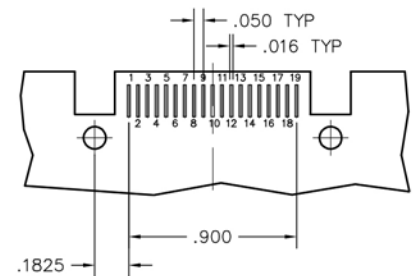
Recommended PC Board Layout

Card Edge Mount
Standard Polarization

RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE



RECEPTACLE
PC BOARD LAYOUT
CIRCUIT SIDE



Filtered Cable Connectors

.050"

9 thru 37 Contacts

Rugged Metal

MF

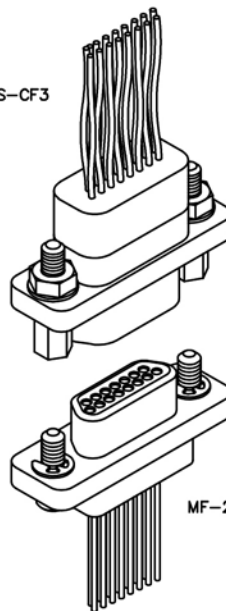
Electrical Data

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

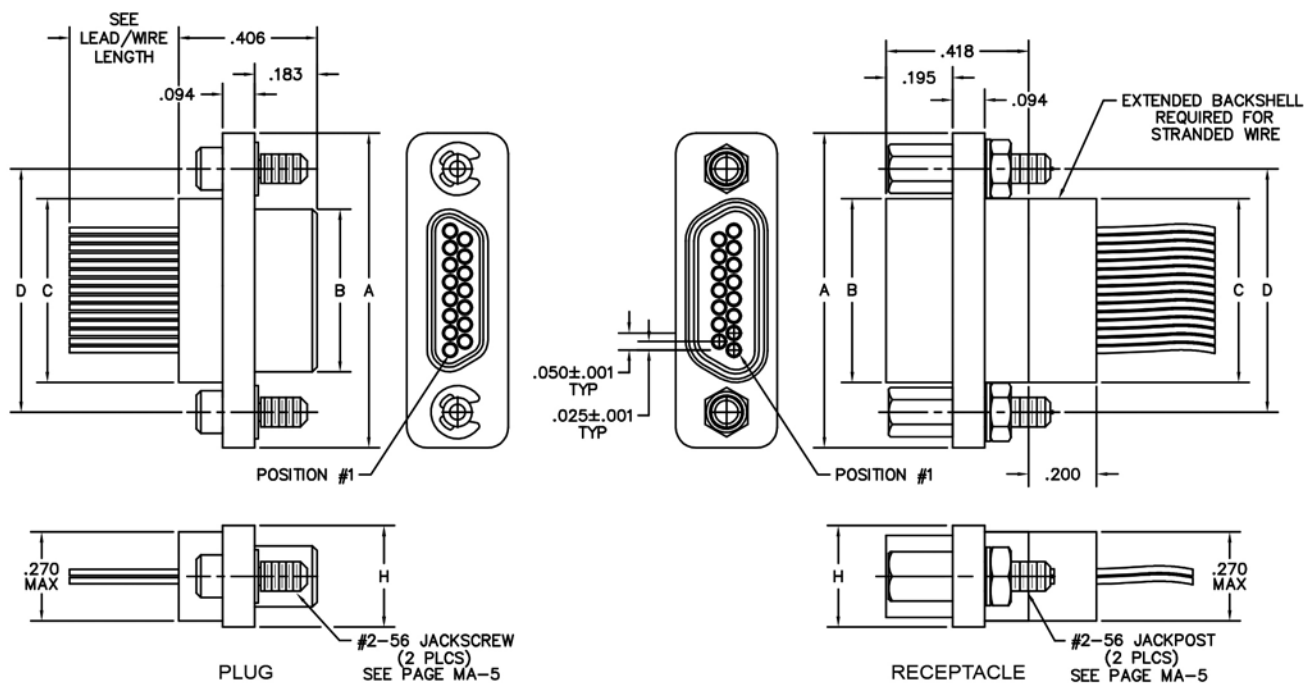
Application Notes

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 ROWS	A	B		C	D	H	HARDWARE
			PLUG MAX	RCPT MAX				
9	2	.775	.334	.400	.390	.565	.298	#2-56 UNC THD (.092 DIA THRU)
15		.925	.484	.550	.540	.715		
21		1.075	.634	.700	.690	.865		
25		1.175	.734	.800	.790	.965		
31		1.325	.884	.950	.940	1.115		
37		1.475	1.034	1.100	1.090	1.265		

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-CF3
 XX-XXX-XXX-XXX-XXXX-XXX

PLUG		RECEPTACLE	
SERIES			
MF .050" Rugged Metal I/O Connector (MF mates with MK, ML, MM, MN receptacles)		MF .050" Rugged Metal I/O Connector (MF mates with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37)		2 2-Row (Sizes 9 thru 37)	
BODY STYLE: 1 Plug, straight, with ears		BODY STYLE: 2 Receptacle, straight, with ears & interfacial seal	
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell		BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell	
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒		3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	
SIZE			
XXX 009, 015, 021, 025, 031, 037		XXX 009, 015, 021, 025, 031, 037	
CONTACTS			
TYPE CONTACTS/TERMINATIONS: 1D Pin, straight, .109" Lead Length (.018 dia) SEE NOTE 1 1E Pin, straight, .125" Lead Length (.018 dia) SEE NOTE 1 1F Pin, straight, .140" Lead Length (.018 dia) SEE NOTE 1 12 Pin, straight, .150" Lead Length (.018 dia) SEE NOTE 1 1G Pin, straight, .156" Lead Length (.018 dia) SEE NOTE 1 1H Pin, straight, .172" Lead Length (.018 dia) SEE NOTE 1 1J Pin, straight, .187" Lead Length (.018 dia) SEE NOTE 1 13 Pin, straight, .250" Lead Length (.018 dia) SEE NOTE 1 1K Pin, straight, .375" Lead Length (.018 dia) SEE NOTE 1 14 Pin, straight, .500" pigtails (.018 dia) SEE NOTE 1 15 Pin, straight, 1.000" pigtails (.018 dia) SEE NOTE 1 16 Pin, straight, stranded wire		TYPE CONTACTS/TERMINATIONS: 2D Socket, straight, .109" Lead Length (.018 dia) 2E Socket, straight, .125" Lead Length (.018 dia) 2F Socket, straight, .140" Lead Length (.018 dia) 22 Socket, straight, .150" Lead Length (.018 dia) 2G Socket, straight, .156" Lead Length (.018 dia) 2H Socket, straight, .172" Lead Length (.018 dia) 2J Socket, straight, .187" Lead Length (.018 dia) 23 Socket, straight, .250" Lead Length (.018 dia) 2K Socket, straight, .375" Lead Length (.018 dia) 2L Socket, straight, .500" Lead Length (.018 dia) 2M Socket, straight, 1.000" Lead Length (.018 dia) 24 Socket, straight, .500" pigtails (.018 dia) SEE NOTE 1 25 Socket, straight, 1.000" pigtails (.018 dia) SEE NOTE 1 26 Socket, straight, stranded wire	
PLATING OPTIONS: 1 50 µ" Au contacts (stranded wire) ☒ 3 50 µ" Au contacts: 10 µ" Au terminations (pigtails) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtails) ☒		PLATING OPTIONS: 1 50 µ" Au contacts (stranded wire) ☒ 3 50 µ" Au contacts: 10 µ" Au terminations (pigtails) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtails) ☒	
HARDWARE			
STYLE OF HARDWARE: 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**		STYLE OF HARDWARE: 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**	
WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4		WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4	
CAPACITOR DESIGNATOR			
XXX See tables below		XXX See tables below	

** = Captive hardware is factory installed and non-removable.
☒ = Option not RoHS compliant

NOTE 1 = The leads on these contacts are soft copper suitable for forming.

CERAMIC CHIP CAPACITOR FILTERS

CAPACITOR DESIGNATOR	CAP RANGE (pF)	MINIMUM INSERTION LOSS (DECIBELS)			
		10 MHz	15 MHz	30 MHz	50 MHz
CF1 ☒	150-250	—	—	1	4
CF2 ☒	300-500	1	2	5	8
CF3 ☒	700-1000	3	5	10	10
CF4 ☒	1300-2000	6	10	15	20
CF5 ☒	4000-5400	13	15	20	27
CF6 ☒	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 ☒	150-250	—	8	33	36
PF2 ☒	300-500	—	13	37	44
PF3 ☒	700-1000	2	19	42	42
PF4 ☒	1300-2000	6	25	45	45
PF5 ☒	4000-5400	14	34	41	41
PF6 ☒	8500-11500	20	36	43	43

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

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 Power: Copper based alloy selected for power applications
Contact Finish:	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 μ " min 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 / A582 Passivated per SAE AMS2700
Clips and Washers:	Corrosion resistant steel per ASME 18.24 or NASM35333 (For reference only: ASME 18.24 CRS per ASTM A693 and NASM35333 CRS per ASTM A240) Passivated per ASME 18.24 or NASM35333 (For reference only: ASME 18.24 and NASM35333 passivated per SAE AMS2700)
Interfacial Seal Gaskets:	Fluorosilicone per SAE AMS-R-25988
Tolerances:	Unless otherwise specified: Fractions = $\pm 1/64$ " Decimals = $\pm .010$ " Angles = $\pm 5^\circ$ Wire lengths: insulated/stranded = $+1.0"/-0.0$ "

Note: AirBorn can manufacture special configurations for your exact specifications.

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

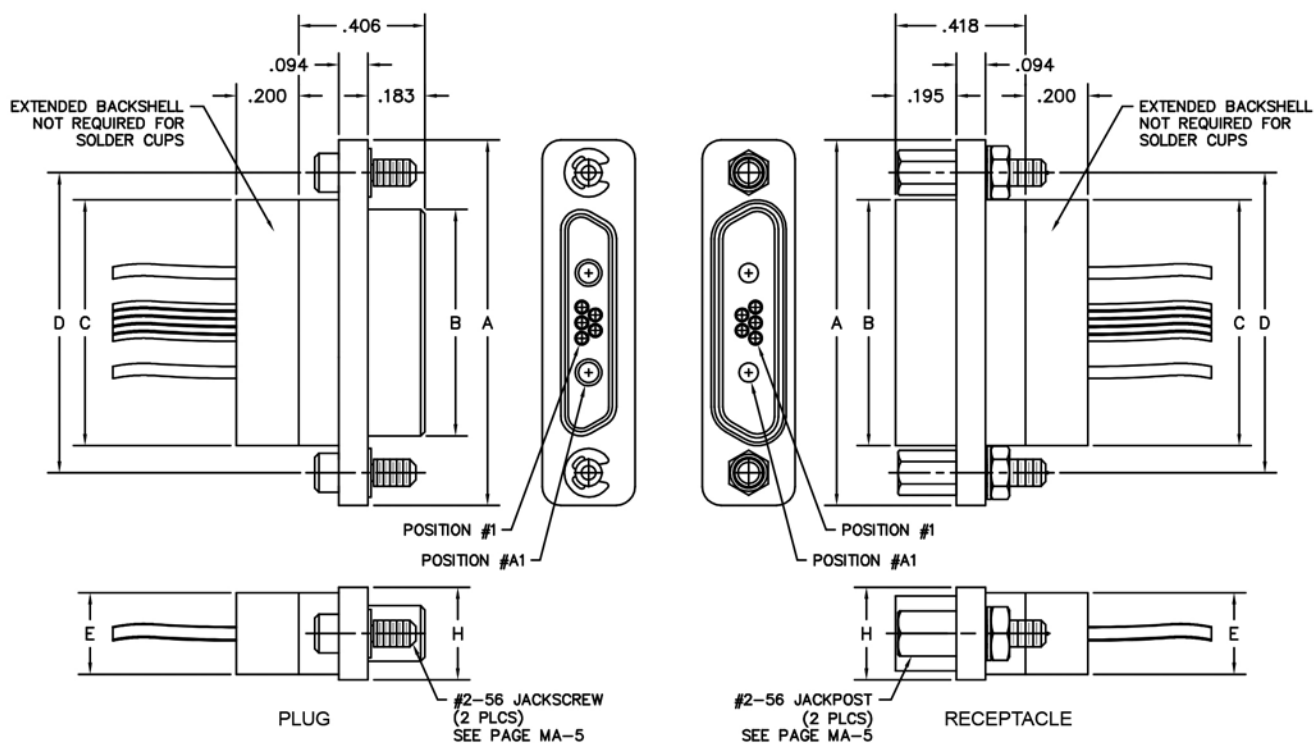
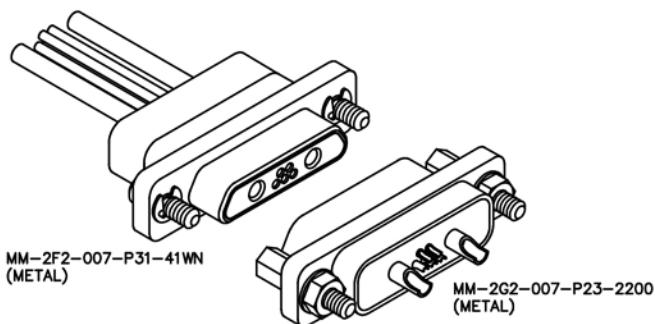
Performance - Hybrid Connectors

Reference MIL-DTL-83513

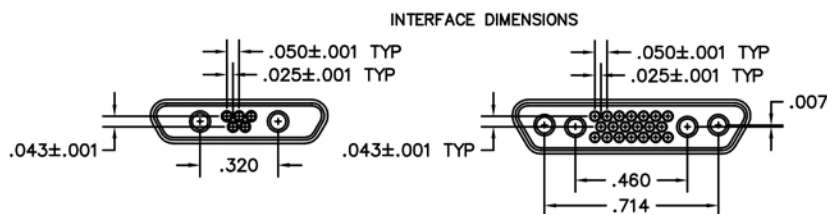
Contact Rating:	3-amperes maximum for signal and coax contacts 13-amperes maximum for power contacts
Solderability:	Terminals (except crimp) tested in accordance with MIL-STD-202, Method 208
Wire Size:	Stranded #16 AWG standard for power contacts RG316 or RG178 standard for coax contacts Stranded #24-#28 AWG standard (consult factory for other sizes and types)
Test Voltage:	600 V, RMS, 60 Hz
Operating Temperature:	-55° C to +125° C
Insulation Resistance:	5,000 megohms minimum @ 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 (except steps 7a and 7b)
Thermal Shock:	Tested to the temperature extremes of MIL-STD-1344, Method 1003, Test Condition A (except step 3, temperature shall be 125° C)

Cable to Cable Hybrid .050" 7 or 24 Contacts Rugged Metal

MM



DIMENSIONS									
SIZE	CONTACT ROWS	A	B		C	D	E		HARDWARE
			PLUG MAX	RCPT MAX			POTTING WELL MAX	H	
7	2	1.175	.734	.800	.790	.965	.270	.298	#2-56 UNC THD (.092 DIA THRU)
24	3	1.425	.984	1.050	1.040	1.215	.310	.341	



PLUG: MM-2F2-007-P31-41WN
 RECEPTACLE: MM-2G2-007-P41-22WS
 XX-XXX-XXX-XXX-XXXX

PLUG

RECEPTACLE

SERIES	
MM .050" Rugged Metal Connector	MM .050" Rugged Metal Connector

BODY	
2 2-Row (Size 7)	2 2-Row (Size 7)
3 3-Row (Size 24)	3 3-Row (Size 24)
BODY STYLE: F Plug, straight, with ears	BODY STYLE: G Receptacle, straight, with ears & interfacial seal
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell	BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒

SIZE	
007 2 Power or Coax and 5 Signal	007 2 Power or Coax and 5 Signal
024 4 Power or Coax and 20 Signal	024 4 Power or Coax and 20 Signal

CONTACTS	
TYPE CONTACTS/TERMINATIONS: P1 Solder cup, power connector P3 Crimped wire, Power contacts M16878/4-16-9, length per wire code. C3 Crimped wire, Coax RG316, length per wire code C5 Crimped wire, Coax RG178, length per wire code Note: Plug connector has pin signal contacts and socket power/coax contacts.	TYPE CONTACTS/TERMINATIONS: P2 Solder cup, power connector P4 Crimped wire, Power contacts M16878/4-16-9, length per wire code. C4 Crimped wire, Coax RG316, length per wire code C6 Crimped wire, Coax RG178, length per wire code Note: Receptacle connector has socket signal contacts and pin power/coax contacts.
PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, power connectors only)	PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, power connectors only)

HARDWARE	
STYLE OF HARDWARE: 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**	STYLE OF HARDWARE: 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**
WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4	WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4

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

☒ = Option not RoHS compliant

Circular Cable Connectors

.050"

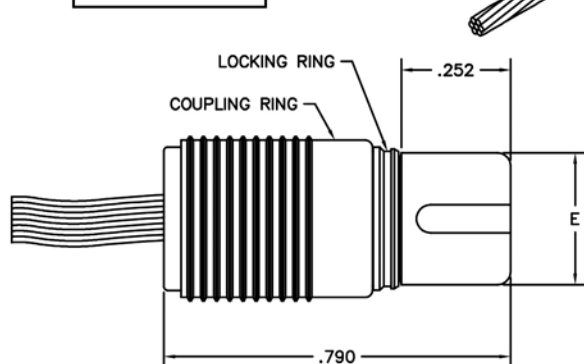
7 & 19 Contacts

Rugged Metal

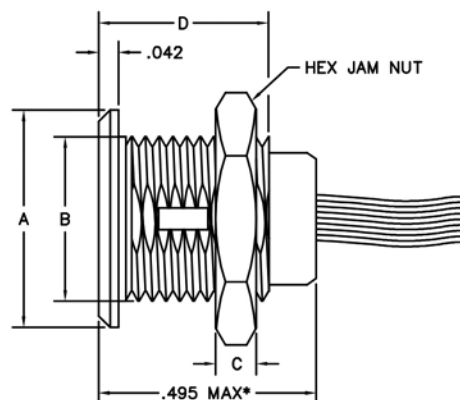
MC

MC-111-007-161-00WN

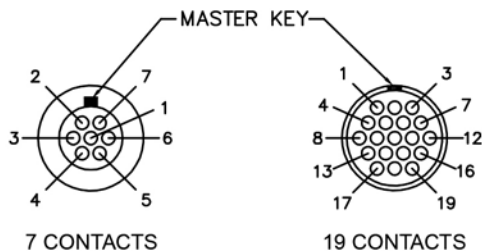
MC-121-007-261-00WN



PLUG
(Socket Contacts)

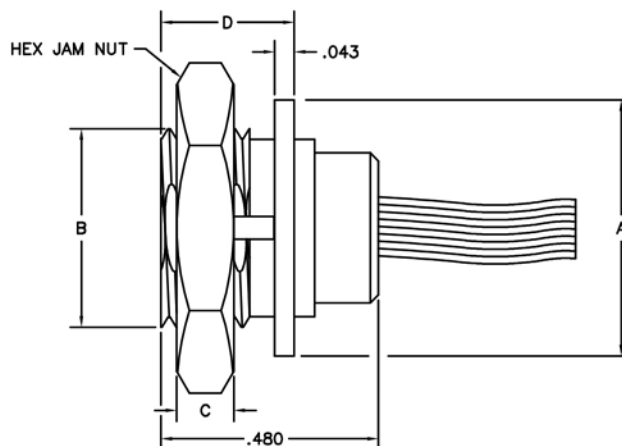


RECEPTACLE
FRONT PANEL MOUNT
(Pin Contacts)



Contact Arrangements

Face view, receptacle (Pin contacts)
Cavity identification numbers are for reference
and do not appear on connector.



RECEPTACLE
REAR PANEL MOUNT
(Pin Contacts)

DIMENSIONS (RECEPTACLE)					
MOUNT	BODY	A MAX DIA	B THREAD	C NUT	D
FRONT PANEL	1 (7 POS)	.510	3/8-32 UNEF-2A	.093	.388
FRONT PANEL	2 (19 POS)	.575	1/2-28 UNEF-2A	.125	.340
REAR PANEL	1 (7 POS)	.575	7/16-28 UNEF-2A	.093	.293
REAR PANEL	2 (19 POS)	.575	1/2-28 UNEF-2A	.125	.305

* = .530 MAX FOR SOLDER CUP CONNECTORS

DIMENSIONS (PLUG)	
BODY	E MAX DIA
1 (7 POS)	.305
2 (19 POS)	.405

PLUG: MC-111-007-161-00WN
 RECEPTACLE: MC-121-007-261-00WN
 XX-XXX-XXX-XXX-XXXX

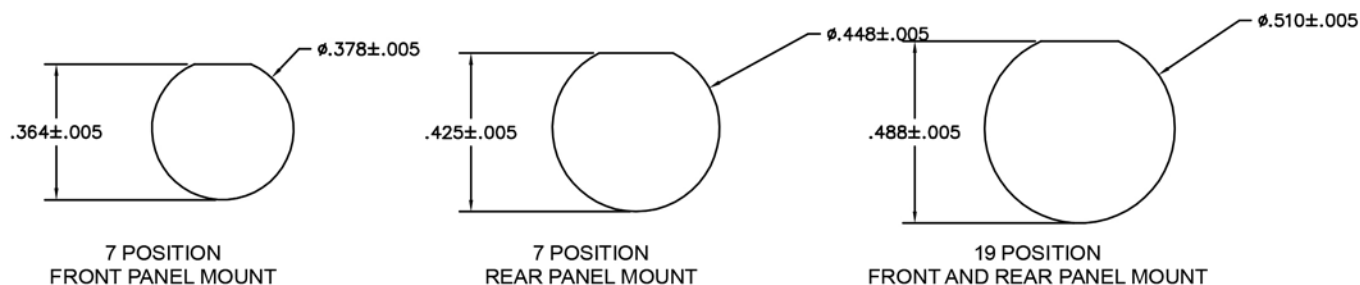
PLUG

RECEPTACLE

SERIES	
MC .050" Circular Connector	MC .050" Circular Connector
BODY	
1 7 position shell	1 7 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 nickel plating	1 Polyphenylene Sulfide insulator, brass shell with electroless nickel plating
SIZE	
XXX 007, 019	XXX 007, 019
CONTACTS	
TYPE CONTACTS/TERMINATIONS:	TYPE CONTACTS/TERMINATIONS:
14 Socket, straight, .500" pigtails (.018 dia)	21 Pin, straight, solder cup
15 Socket, straight, 1.000" pigtails (.018 dia)	24 Pin, straight, .500" pigtails (.018 dia)
16 Socket, straight, crimped wire	25 Pin, straight, 1.000" pigtails (.018 dia)
	26 Pin, straight, crimped wire
PLATING OPTIONS:	PLATING OPTIONS:
1 50 μ " Au contacts (crimp wire)	1 50 μ " Au contacts (crimp wire)
3 50 μ " Au contacts: 10 μ " Au terminations (pigtail)	3 50 μ " Au contacts: 10 μ " Au terminations (solder cup, pigtail)
5 50 μ " Au contacts; Sn/Pb alloy terminations (pigtail) ☒	5 50 μ " Au contacts; Sn/Pb alloy terminations (pigtail) X
7 50 μ " Au contacts; SAC305 terminations (pigtail)	7 50 μ " 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 page MA-3 & MA-4	XX For wiring codes, see page MA-3 & MA-4

☒ = Option not RoHS compliant

PANEL MOUNTING DIMENSIONS



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 Finish:	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 μ " min 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:	Corrosion resistant steel per ASME 18.24 (For reference only: ASME 18.24 CRS per ASTM A693) Passivated per ASME 18.24 (For reference only: ASME 18.24 passivated per SAE AMS2700)
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:	Unless otherwise specified: Fractions = $\pm 1/64$ " Decimals = ± 0.010 " Angles = $\pm 5^\circ$ Wire lengths: insulated/stranded = $+1.0"/-0.0$ " uninsulated/solid = $+0.2"/-0.0$ "

Note: AirBorn 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 (consult factory for other sizes and types)
Test Voltage:	600 V, RMS, 60 Hz
Operating Temperature:	-55° C to +125° C
Insulation Resistance:	5,000 megohms minimum @ 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 (except steps 7a and 7b)
Thermal Shock:	Tested to the temperature extremes of MIL-STD-1344, Method 1003, Test Condition A (except step 3, temperature shall be 125° C)
Contact Resistance:	0.065 volt maximum drop @ 2.5 amps (.026 ohms)
Contact Engaging Force:	6.0 ounce maximum, with .0221 diameter test sleeve
Contact Separating Force:	0.5 ounce minimum, with .0230 diameter test sleeve
Crimp Strength:	5 pound minimum tensile strength
Sealing:	When mated, AirBorn 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)

.050"
9 thru 100 Contacts

Rugged Metal Rugged Plastic

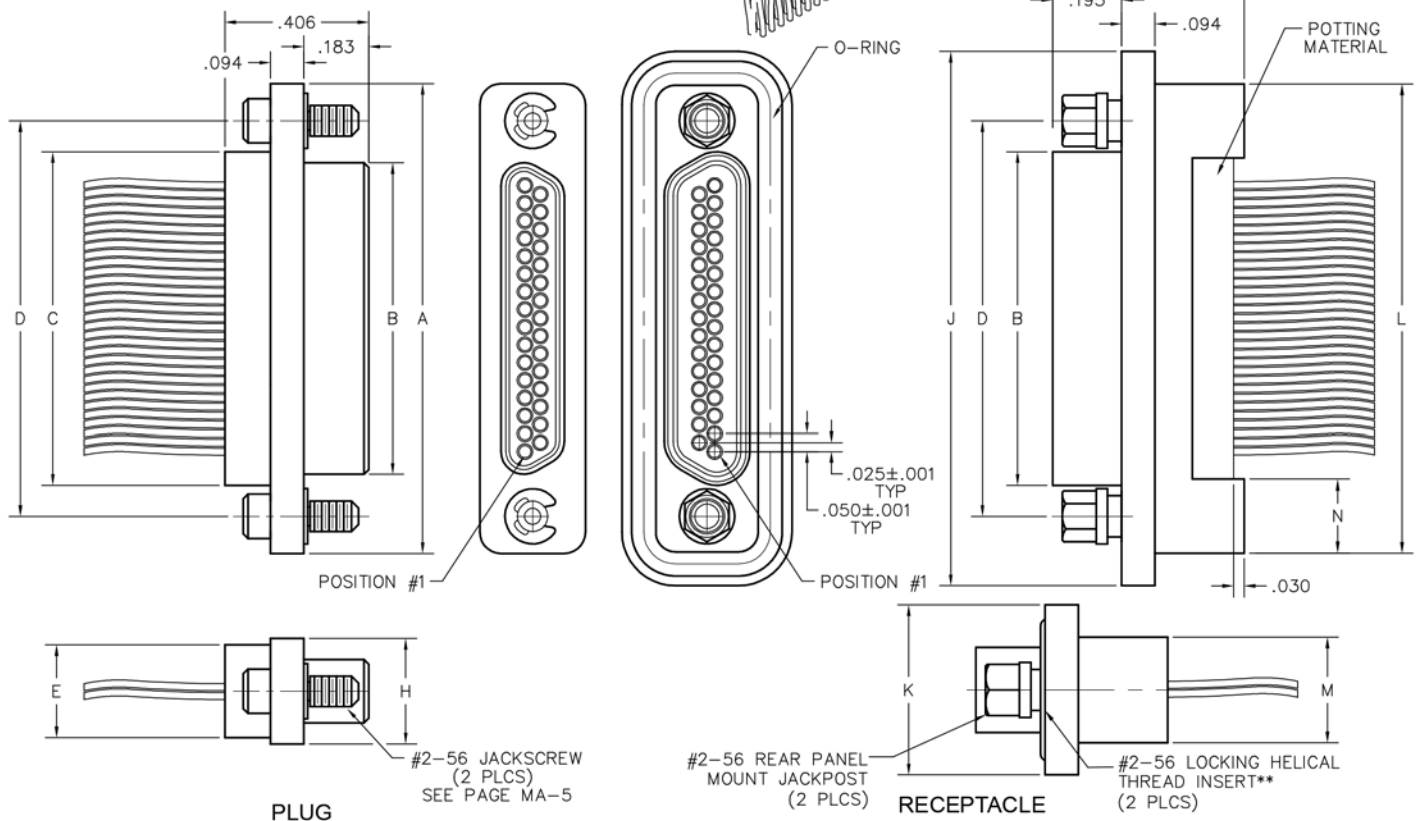
MM

MN

MM-212-031-161-41WQ
(METAL)

MN-211-031-161-41WQ
(PLASTIC)

MM-2C2-031-261-26WA-EMI
(METAL)



DIMENSIONS														
SIZE	CONTACT ROWS	A	B		C	D	E	H	HARDWARE	J	K	L	M	N
			PLUG MAX	RCPT MAX			POTTING WELL MAX							
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD	.957	.480	.773	.298	.210
15		.925	.484	.550	.540	.715				1.107		.923		
21		1.075	.634	.700	.690	.865				1.257		1.073		
25		1.175	.734	.800	.790	.965				1.357		1.173		
31		1.325	.884	.950	.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	.984	1.050	1.040	1.215	.310	.341		1.657	.523	1.477	.440	.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	.360	.384	#4-40 UNC THD	2.383	.600	2.219	.515	.301

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

** = SHELL ACCEPTS .200 MAX #2-56 SCREW LENGTH (.295 MAX #4-40 SCREW LENGTH).

www.airborn.com
(512) 863-5585

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
 XX-XXX-XXX-XXX-XXXX-XXX

PLUG

RECEPTACLE

SERIES	
MM .050" Rugged Metal I/O Connector	MM .050" Rugged Metal I/O Connector
MN .050" Rugged Plastic I/O Connector	
(MM & MN mate with MK, ML, MM, MN receptacles)	
(MM mates with MK, ML, MM, MN plugs)	

BODY	
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)
3 3-Row (Size 51 or 69)	3 3-Row (Size 51 or 69)
4 4-Row (Size 100)	4 4-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 nickel shell
2 Polyphenylene Sulfide with electroless nickel shell	3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒	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, .500" pigtails (.018 dia)	24 Socket, straight, .500" pigtails (.018 dia)
15 Pin, straight, 1.000" pigtails (.018 dia)	25 Socket, straight, 1.000" pigtails (.018 dia)
16 Pin, straight, crimped wire	26 Socket, straight, crimped wire

PLATING OPTIONS:	PLATING OPTIONS:
1 50 µ" Au contacts (crimp wire)	1 50 µ" Au contacts (crimp wire)
3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail)	3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail)
5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒	5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
7 50 µ" Au contacts; SAC305 terminations (pigtail)	7 50 µ" 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, .040" panel thickness (64°)
42 Two long turning jackscrews, allen head, retaining ring (82°)	26 Two fixed jacknuts, rear panel mount, .060" panel thickness (66°)
43 Two turning jackscrews, slot head, retaining ring (83°)	28 Two fixed jacknuts, rear panel mount, .070" panel thickness (68°)
44 Two long turning jackscrews, slot head, retaining ring (84°)	29 Two fixed jacknuts, rear panel mount, .080" panel thickness (69°)
45 Two turning jackscrews, allen head, captivated** (85°)	

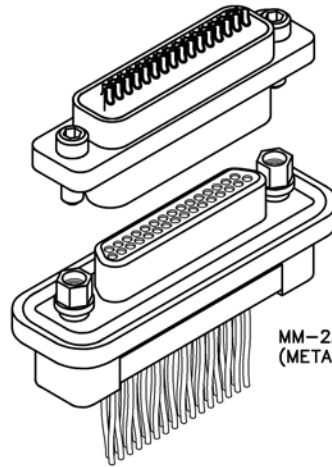
POLARIZATION / WIRING:	POLARIZATION / WIRING
00 None	00 None
XX For wiring codes, see page MA-3 & MA-4	XX For wiring codes, see page MA-3 & MA-4

OPTIONS	
	EMI EMI o-ring (in lieu of fluorosilicone o-ring)

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

9 thru 100 Contacts

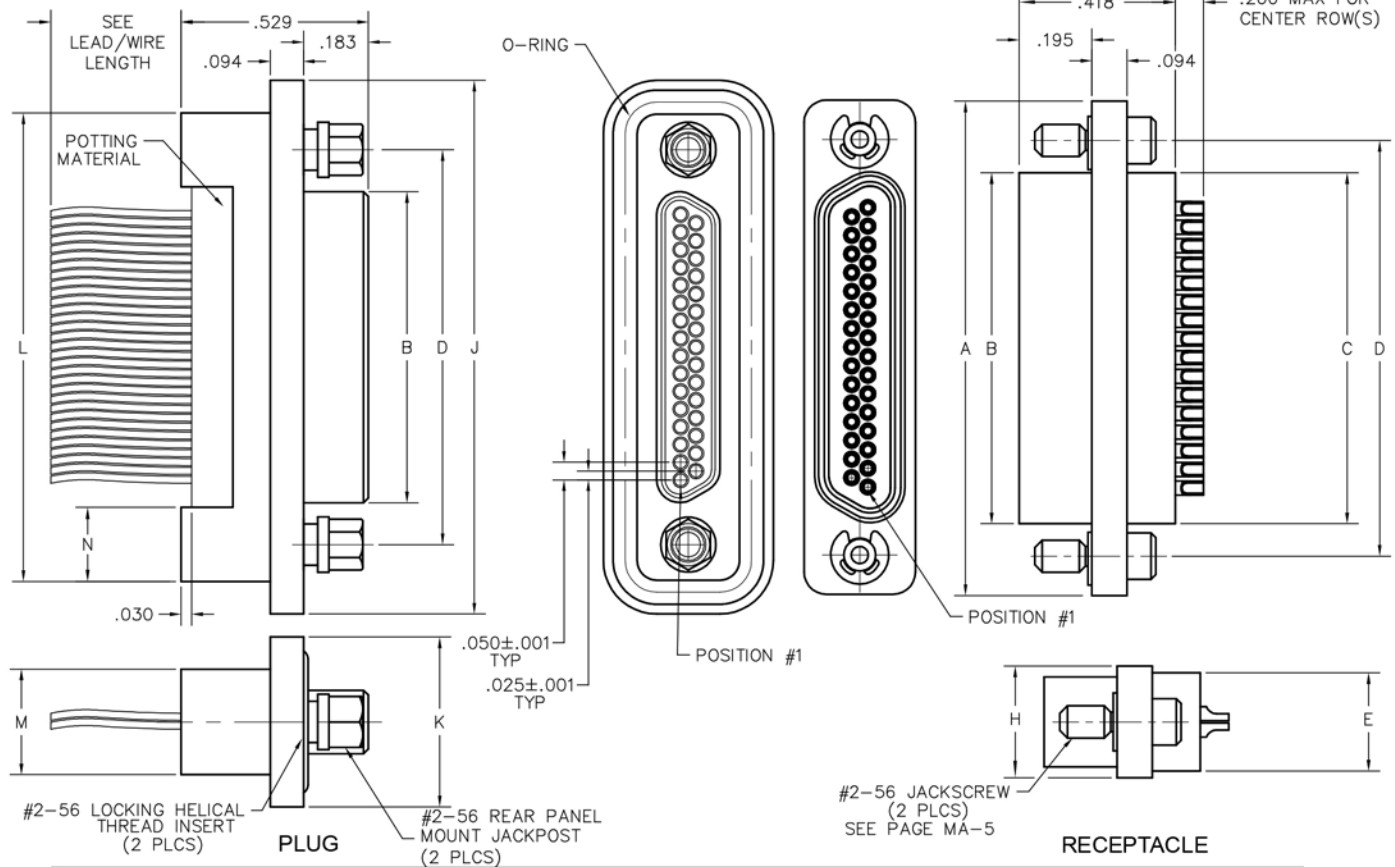
Rugged Plastic

MN

MN-221-031-2A3-2200
(PLASTIC)

MM-2A2-031-161-26WA-EMI
(METAL)

3 AND 4 ROW SOLDER CUPS



DIMENSIONS														
SIZE	CONTACT ROWS	A	B		C	D	E	H	HARDWARE	J	K	L	M	N
			PLUG MAX	RCPT MAX			POTTING WELL MAX							
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD (.092 DIA THRU)	.957	.480	.773	.298	.210
15		.925	.484	.550	.540	.715				1.107		.923		
21		1.075	.634	.700	.690	.865				1.257		1.073		
25		1.175	.734	.800	.790	.965				1.357		1.173		
31		1.325	.884	.950	.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	.984	1.050	1.040	1.215	.310	.341	#4-40 UNC THD (.147 DIA THRU)	1.657	.523	1.477	.440	.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		.360		

"M" Series Connectors
M-115

PLUG		RECEPTACLE	
SERIES MM .050" Rugged Metal I/O Connector (MM mateS with MK, ML, MM, MN receptacles)		SERIES MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN plugs)	
BODY 2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51 & 69) 4 4-Row (Size 100) BODY STYLE: A Plug, straight, rear panel mount, with fluorosilicone o-ring BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☐ 4 Polyphenylene Sulfide with hard anodized black shell A Pure Electro-Deposited Aluminum K Zinc Nickel Plating T Nickel Polymer Plating		BODY 2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51 & 69) 4 4-Row (Size 100) BODY STYLE: 2 Receptacle, straight, with ears BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☐ 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, 069, 100		SIZE XXX 009, 015, 021, 025, 031, 037, 051, 069, 100	
CONTACTS TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, 26 awg solder cup 1A Pin, straight, 24 awg solder cup 1D Pin, straight, .109" Lead Length (.018 dia) SEE NOTE 1 1E Pin, straight, .125" Lead Length (.018 dia) SEE NOTE 1 1F Pin, straight, .140" Lead Length (.018 dia) SEE NOTE 1 12 Pin, straight, .150" Lead Length (.018 dia) SEE NOTE 1 1G Pin, straight, .156" Lead Length (.018 dia) SEE NOTE 1 1H Pin, straight, .172" Lead Length (.018 dia) SEE NOTE 1 1J Pin, straight, .187" Lead Length (.018 dia) SEE NOTE 1 13 Pin, straight, .250" Lead Length (.018 dia) SEE NOTE 1 1K Pin, straight, .375" Lead Length (.018 dia) SEE NOTE 1 14 Pin, straight, .500" Lead Length (.018 dia) SEE NOTE 1 15 Pin, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1 16 Pin, straight, crimped wire PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au Terminations (solder cup, pigtail) 5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☐ 7 50 μ" Au contacts; SAC305 terminations (pigtail)		CONTACTS TYPE CONTACTS/TERMINATIONS: 21 Socket, straight, 26 awg solder cup 2A Socket, straight, 24 awg solder cup 2D Socket, straight, .109" Lead Length (.018 dia) 2E Socket, straight, .125" Lead Length (.018 dia) 2F Socket, straight, .140" Lead Length (.018 dia) 22 Socket, straight, .150" Lead Length (.018 dia) 2G Socket, straight, .156" Lead Length (.018 dia) 2H Socket, straight, .172" Lead Length (.018 dia) 2J Socket, straight, .187" Lead Length (.018 dia) 23 Socket, straight, .250" Lead Length (.018 dia) 2K Socket, straight, .375" Lead Length (.018 dia) 2L Socket, straight, .500" Lead Length (.018 dia) 2M Socket, straight, 1.000" Lead Length (.018 dia) 24 Socket, straight, .500" Lead Length (.018 dia) SEE NOTE 1 25 Socket, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1 26 Socket, straight, crimped wire PLATING OPTIONS: 1 50 μ" Au contacts (crimp wire) 3 50 μ" Au contacts: 10 μ" Au Terminations (solder cup, pigtail) 5 50 μ" Au contacts; Sn/Pb alloy terminations (pigtail) ☐ 7 50 μ" Au contacts; SAC305 terminations (pigtail)	
HARDWARE STYLE OF HARDWARE: 00 None 24 Two fixed jacknuts, rear panel mount, .040" panel thickness (64*) 26 Two fixed jacknuts, rear panel mount, .060" panel thickness (66*) 28 Two fixed jacknuts, rear panel mount, .070" panel thickness (68*) 29 Two fixed jacknuts, rear panel mount, .080" panel thickness (69*) POLARIZATION / WIRING 00 None XX For wiring codes, see page MA-3 & MA-4		HARDWARE STYLE OF HARDWARE: 00 None 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 00 None XX For wiring codes, see page MA-3 & MA-4	
OPTIONS EMI EMI o-ring (in lieu of fluorosilicone o-ring)		OPTIONS 900 Interfacial sealing gasket	

* = Use number in parenthesis when ordering size 100.

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

☒ = Option not RoHS compliant

NOTE 1 = The leads on these contacts are soft copper suitable for forming.

MM, MN

"M" Series Connectors
M-117

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
 XX-XXX-XXX-XXX-XXXX-XXX

PLUG		RECEPTACLE	
SERIES			
MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN receptacles)		MK .050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN plugs)	
BODY			
2 2-Row (Sizes 9 thru 37)	2 2-Row (Sizes 9 thru 37)	3 3-Row (Size 51 or 69)	3 3-Row (Size 51 or 69)
3 3-Row (Size 51 or 69)	4 4-Row (Size 100)	4 4-Row (Size 100)	
BODY STYLE: 1 Plug, straight, with ears		BODY STYLE: C Receptacle, straight, standard footprint, rear panel mount with fluorosilicone o-ring and interfacial seal	
BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 4 Polyphenylene Sulfide with hard anodized black shell A Pure Electro-Deposited Aluminum K Zinc Nickel Plating T Nickel Polymer Plating		BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 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, 069, 100		XXX 009, 015, 021, 025, 031, 037, 051, 069, 100	
CONTACTS			
TYPE CONTACTS/TERMINATIONS: 11 Pin, straight, solder cup 14 Pin, straight, .500" pigtails (.018 dia) 15 Pin, straight, 1.000" pigtails (.018 dia) 16 Pin, straight, crimped wire		TYPE CONTACTS/TERMINATIONS: 22 Socket, straight, PCB leads, .109" 23 Socket, straight, PCB leads, .140" 24 Socket, straight, PCB leads, .172"	
PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts; 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)		PLATING OPTIONS: 3 50 µ" Au contacts; 10 µ" Au terminations 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts; SAC305 terminations	
HARDWARE			
STYLE OF HARDWARE: 00 None 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")		STYLE OF HARDWARE: 00 None 24 Two fixed jacknuts, rear panel mount, .040" panel thickness (64") 26 Two fixed jacknuts, rear panel mount, .060" panel thickness (66") 28 Two fixed jacknuts, rear panel mount, .070" panel thickness (68") 29 Two fixed jacknuts, rear panel mount, .080" panel thickness (69")	
POLARIZATION / WIRING: 00 None XX For wiring codes, see page MA-3 & MA-4		POLARIZATION / WIRING 00 None	
OPTIONS			
EMI EMI o-ring (in lieu of fluorosilicone o-ring)			

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

☒ = Option not RoHS compliant

Cable to Board (Rear Panel Mount)

.050"

9 thru 100 Contacts

Rugged Board Mount

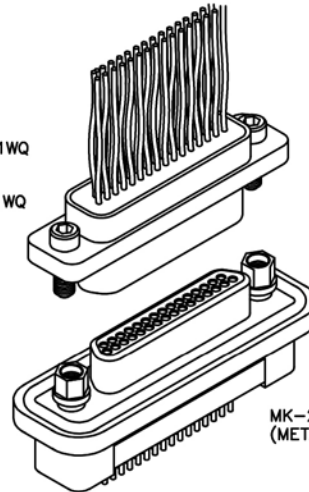
MK

Rugged Cable

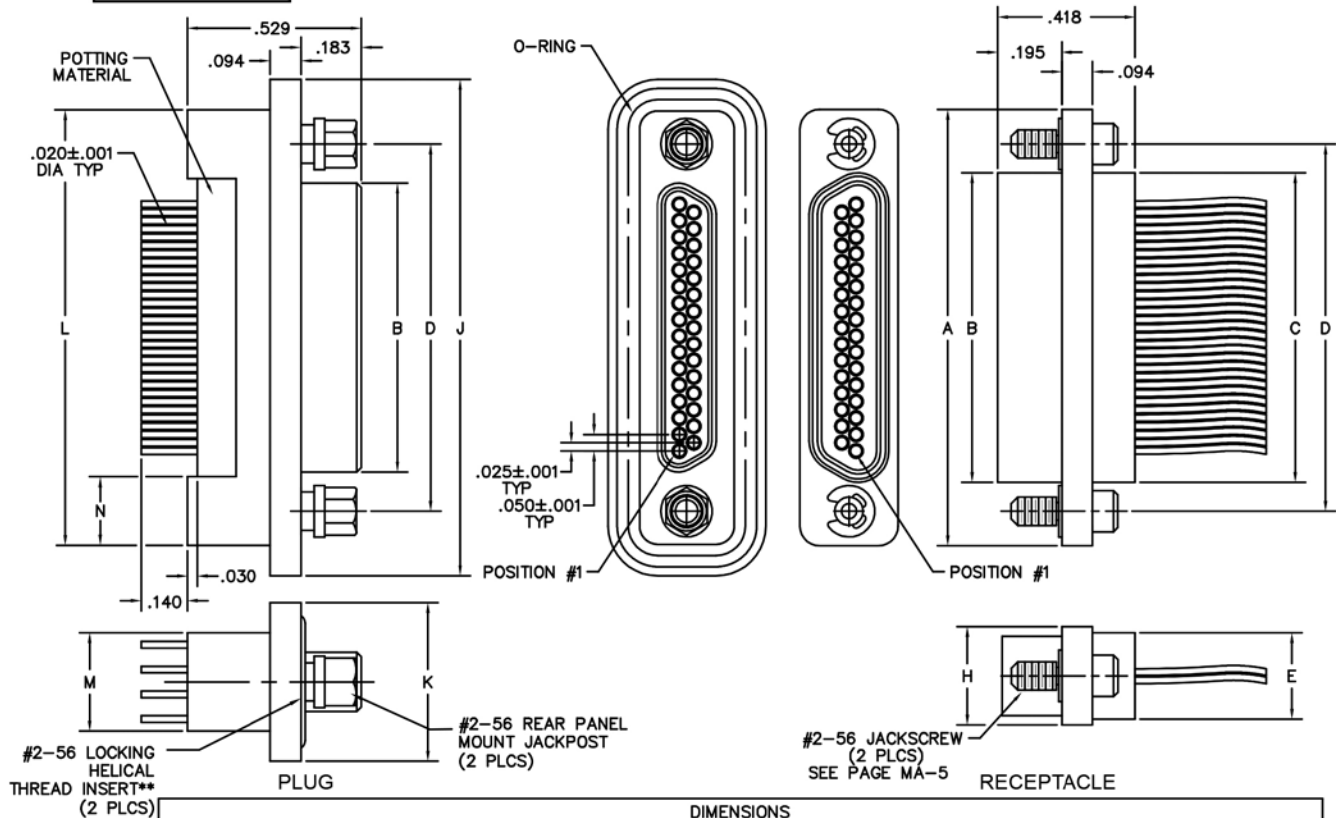
MM, MN

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

MN-221-031-261-41WQ
(PLASTIC)



MK-2A2-031-135-2600-EMI
(METAL)



SIZE	CONTACT ROWS	A	B		C	D	E		H	HARDWARE	J	K	L	M	N
			PLUG MAX	RCPT MAX			POTTING WELL MAX								
9	2	.775	.334	.400	.390	.565	.270	.298	#2-56 UNC THD		.957	.480	.773	.298	.210
15		.925	.484	.550	.540	.715					1.107		.923		
21		1.075	.634	.700	.690	.865					1.257		1.073		
25		1.175	.734	.800	.790	.965					1.357		1.173		
31		1.325	.884	.950	.940	1.115					1.507		1.323		
37	3	1.475	1.034	1.100	1.090	1.265	.310	.341			1.657	.523	1.473	.440	.239
51		1.425	.984	1.050	1.040	1.215					1.657		1.477		
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	.360	.384	#4-40 UNC THD		2.383	.600	2.219	.515	.301

* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

** = SHELL ACCEPTS .200 MAX #2-56 SCREW LENGTH (.295 MAX #4-40 SCREW LENGTH).

www.airborn.com
(512) 863-5585

PLUG: MK- 2A2-031 - 135-2600-EMI
 RECEPTACLE: MM- 222-031 - 261-41WQ
 PLUG: MK- 2A2-031 - 135-2600-EMI
 RECEPTACLE: MN- 221-031 - 261-41WQ
 XX-XXX-XXX-XXX-XXXX-XXX

PLUG

RECEPTACLE

SERIES	
MK .050" Rugged Metal PC Board Mount Connector (MK mates with MK, ML, MM, MN receptacles)	MM .050" Rugged Metal I/O Connector MN .050" Rugged Plastic I/O Connector (MM & MN mate with MK, ML, MM, MN plugs)

BODY	
2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51 or 69) 4 4-Row (Size 100)	2 2-Row (Sizes 9 thru 37) 3 3-Row (Size 51 or 69) 4 4-Row (Size 100)
BODY STYLE: A Plug, straight, standard footprint, rear panel mount with fluorosilicone o-ring	BODY STYLE: 2 Receptacle, straight, with ears
BODY MATERIAL: 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒ 4 Polyphenylene Sulfide with hard anodized black shell	BODY MATERIAL: 1 Polyphenylene Sulfide (MN only) 2 Polyphenylene Sulfide with electroless nickel shell 3 Polyphenylene Sulfide with electrodeposited cadmium 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: 12 Pin, straight, PCB leads, .109" 13 Pin, straight, PCB leads, .140" 14 Pin, straight, PCB leads, .172"	TYPE CONTACTS/TERMINATIONS: 21 Socket, straight, solder cup 24 Socket, straight, .500" pigtails (.018 dia) 25 Socket, straight, 1.000" pigtails (.018 dia) 26 Socket, straight, crimped wire
PLATING OPTIONS: 3 50 µ" Au contacts: 10 µ" Au terminations 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒ 7 50 µ" Au contacts; SAC305 terminations	PLATING OPTIONS: 1 50 µ" Au contacts (crimp wire) 3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail) 5 50 µ" Au contacts; Sn/Pb alloy terminations (pigtail) ☒ 7 50 µ" Au contacts; SAC305 terminations (pigtail)

HARDWARE	
STYLE OF HARDWARE: 00 None 24 Two fixed jacknuts, rear panel mount, .040" panel thickness (64*) 26 Two fixed jacknuts, rear panel mount, .060" panel thickness (66*) 28 Two fixed jacknuts, rear panel mount, .070" panel thickness (68*) 29 Two fixed jacknuts, rear panel mount, .080" panel thickness (69*)	STYLE OF HARDWARE: 00 None 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: 00 None	POLARIZATION / WIRING 00 None XX For wiring codes, see page MA-3 & MA-4

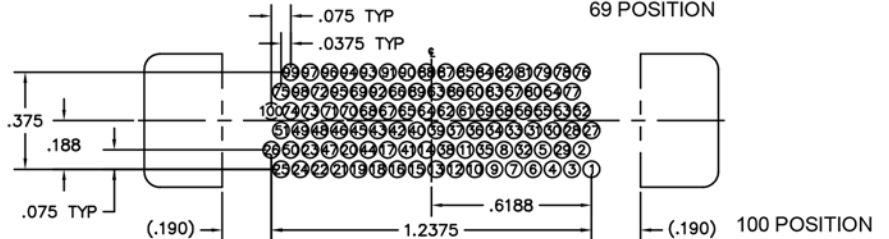
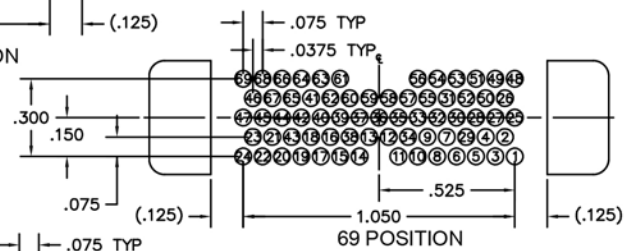
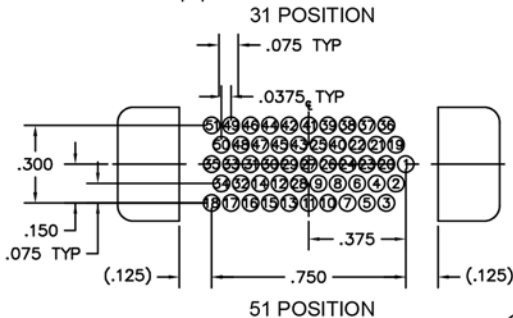
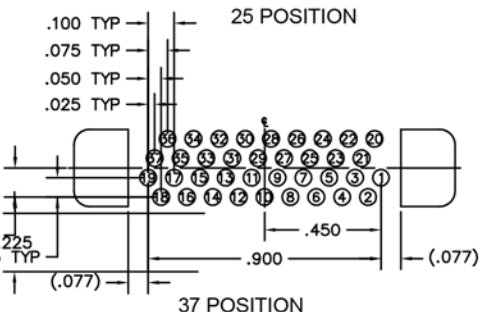
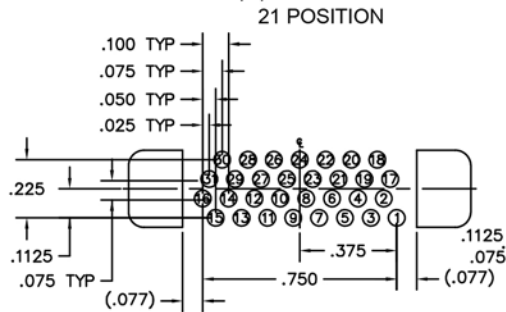
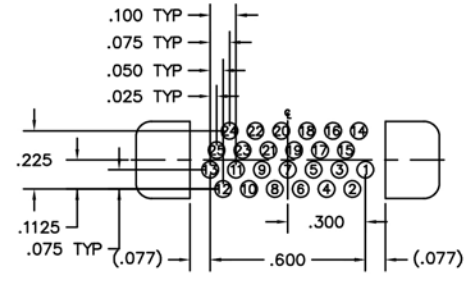
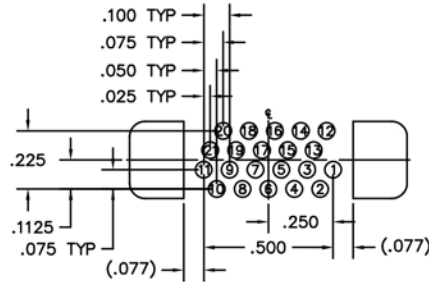
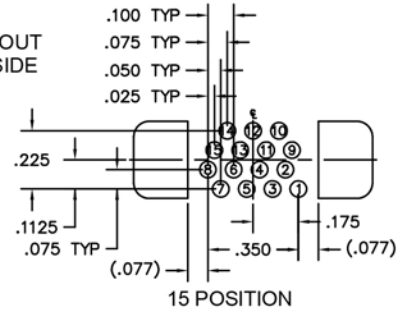
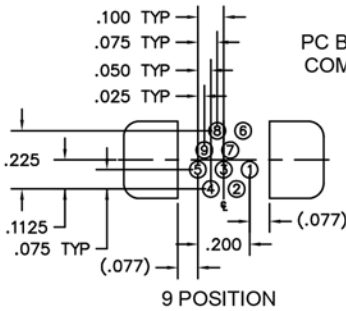
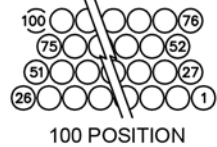
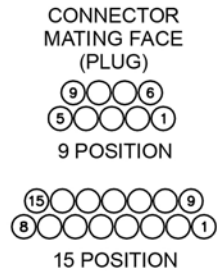
OPTIONS	
EMI EMI o-ring (in lieu of fluorosilicone o-ring)	900 Interfacial sealing gasket

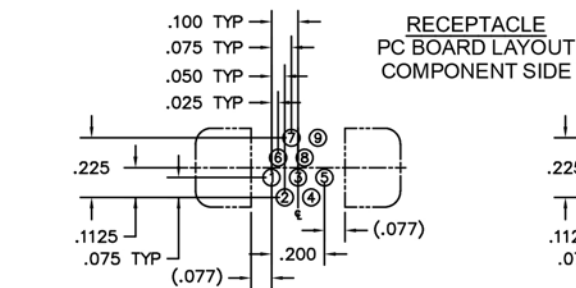
* = Use number in parenthesis when ordering size 100.
 ** = Captive hardware is factory installed and non-removable.

☒ = Option not RoHS compliant

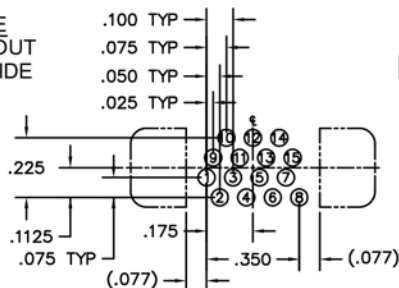
Recommended PC Board Layout

Straight, Standard Footprint

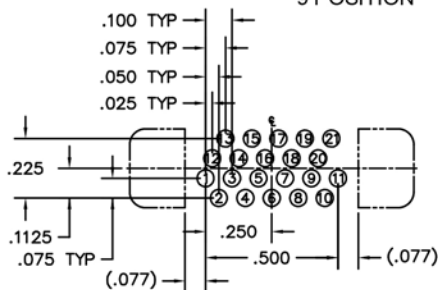




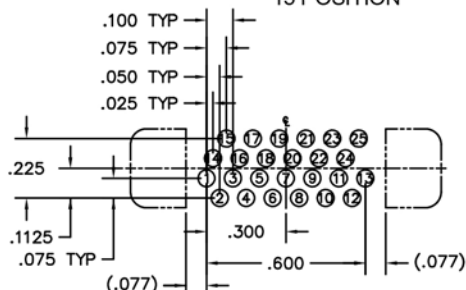
9 POSITION



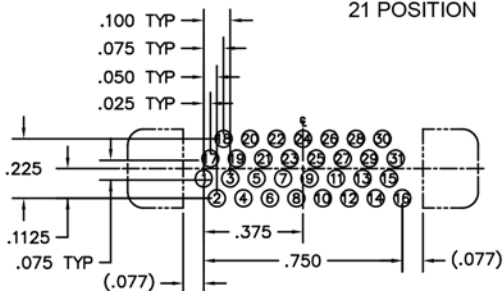
15 POSITION



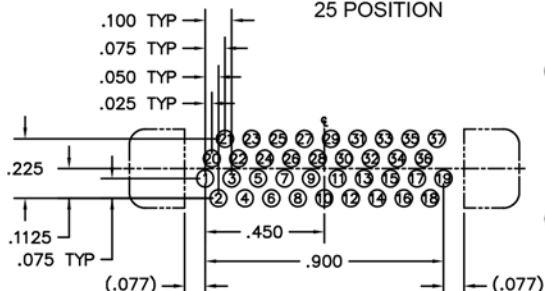
21 POSITION



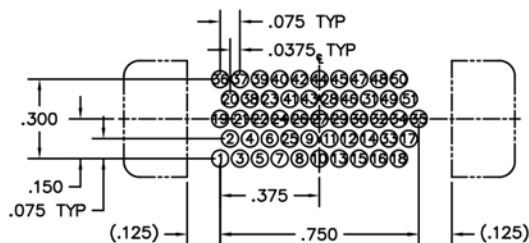
25 POSITION



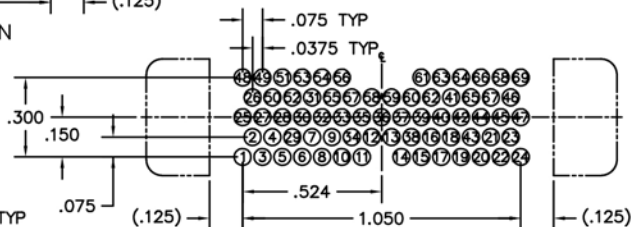
31 POSITION



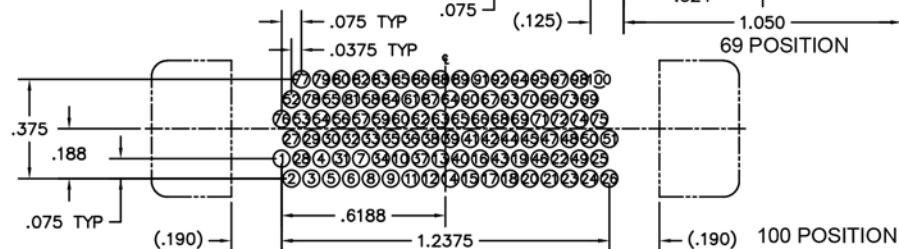
37 POSITION



51 POSITION



69 POSITION



100 POSITION

Recommended PC Board Layout

Straight, Standard Footprint

CONNECTOR
MATING FACE
(RECEPTACLE)



9 POSITION



15 POSITION



21 POSITION



25 POSITION



31 POSITION



37 POSITION



51 POSITION



69 POSITION



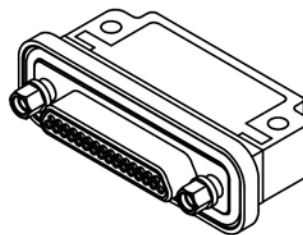
100 POSITION

Rear Panel Mount, Right Angle Boardmount

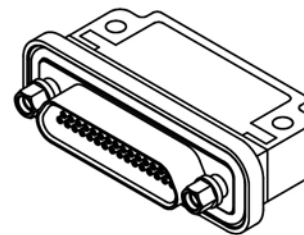
.050"

9 thru 100 Contacts

MK

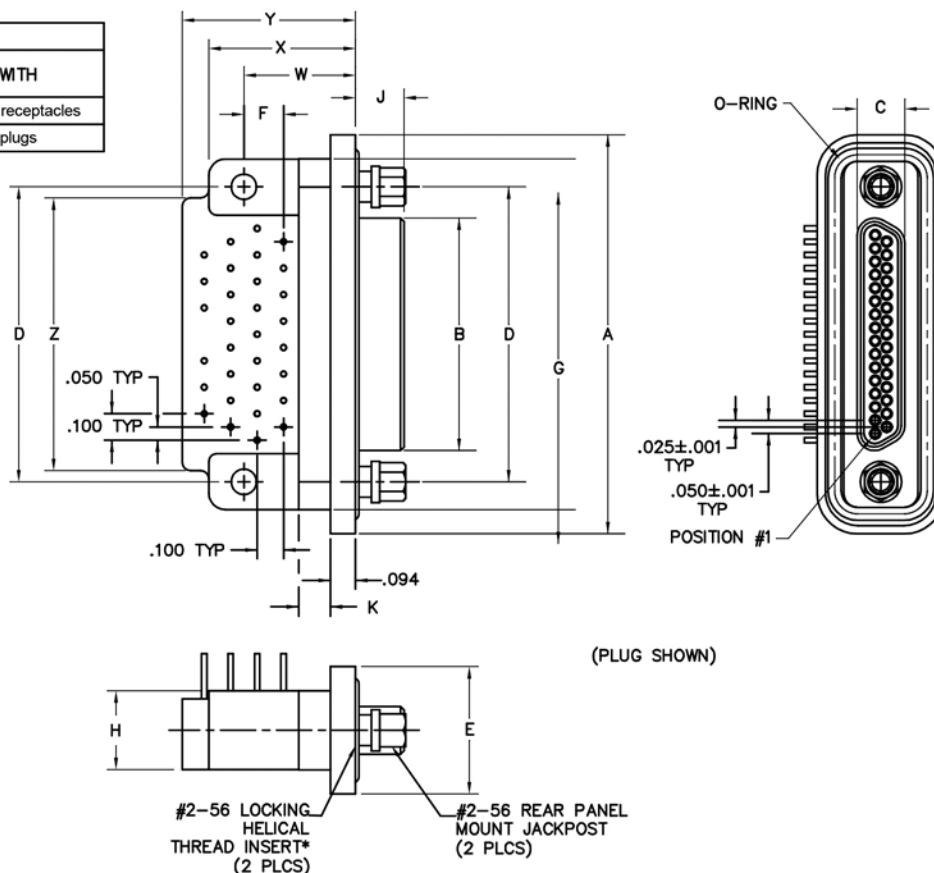


MK-2D2-031-335-260S
(PLUG)



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

MATING MATRIX	
CONNECTOR	MATES WITH
MK-2D...	MK, ML, MM, MN receptacles
MK-2E...	MK, ML, MM, MN plugs



DIMENSIONS																					
SIZE	CONTACT ROWS	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	.957	.334	.400	.185	.251	.565	.480	.020	.775	.298	.183	.195	.120	.421	.371	.540	.540	.775	#2-56 UNC THD	.096 DIA OR #2-56 UNC THREADED INSERT
15		1.107	.484	.550			.715			.925							.925				
21		1.257	.634	.700			.865			1.075						.560	1.075				
25		1.357	.734	.800			.965			1.175						.560	1.175				
31		1.507	.884	.950			1.115			1.325						.660	1.030				
37		1.657	1.034	1.100			1.265			1.475							1.180				
51	3	1.657	.984	1.050	.228	.294	1.215	.523	.150	1.425	.341	.183	.195	.120	.421	.550	.770	1.220	#4-40 UNC THD	.125 DIA OF #4-40 UNC THREADED INSERT	
69		1.957	1.284	1.350			1.515										1.725				.870
100	4	2.383	1.384	1.508	.271	.394	1.800	.600	.200	2.160	.381			.176	.577	.775	1.180	1.810	#4-40 UNC THD	.125 DIA OF #4-40 UNC THREADED INSERT	

** = SHELL ACCEPTS .190 MAX #2-56 SCREW LENGTH (.220 MAX #4-40 SCREW LENGTH).

PLUG: MK 2D2-031-335-260S
RECEPTACLE: MK 2E2-031-445-260S
XX-XXX-XXX-XXX-XXXX-XXX
 | | | | |
 BODY CONTACTS OPTIONS
 SERIES SIZE HARDWARE

PLUG

SERIES

MK .050" Rugged Metal PC Board Mount Connector

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100)

BODY STYLE:

- D Plug, right angle, rear panel mount
with fluorosilicone o-ring

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 32 Pin, right angle, PCB leads, .109"
- 33 Pin, right angle, PCB leads, .140"
- 34 Pin, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 µ" Au contacts
- 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒
- 7 50,µ" Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 24 Two fixed jacknuts, rear panel mount,
.040" panel thickness (64*)
- 26 Two fixed jacknuts, rear panel mount,
.060" panel thickness (66*)
- 28 Two fixed jacknuts, rear panel mount,
.070" panel thickness (68*)
- 29 Two fixed jacknuts, rear panel mount,
.080" panel thickness (69*)

POLARIZATION:

- 0S Standard body polarization

OPTIONS

- EMI EMI gasket (in lieu of fluorosilicone o-ring)
- OB7 Threaded inserts in mounting holes
- OFW Threaded inserts in mounting holes and
EMI gasket (in lieu of fluorosilicone o-ring)

NOTES

See page MA-10 for rear panel mounting dimensions.
See page MA-7 for rear panel hardware dimensions.

- * = Use numbers in parenthesis when ordering size 100.
- ☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MK .050" Rugged Metal PC Board Mount Connector

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51 & 69)
- 4 4-Row (Size 100)

BODY STYLE:

- E Receptacle, right angle, rear panel mount
with fluorosilicone o-ring and interfacial seal

BODY MATERIAL:

- 2 Electroless nickel shell w/ PPS insulator
- 3 Electrodeposited cadmium shell w/ PPS insulator ☒
- 4 Hard anodized black shell w/ PPS insulator

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 43 Socket, right angle, PCB leads, .109"
- 44 Socket, right angle, PCB leads, .140"
- 45 Socket, right angle, PCB leads, .172"

PLATING OPTIONS:

- 3 50 µ" Au contacts
- 5 50 µ" Au contacts; Sn/Pb alloy terminations ☒
- 7 50,µ" Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:

- 00 None
- 24 Two fixed jacknuts, rear panel mount,
.040" panel thickness (64*)
- 26 Two fixed jacknuts, rear panel mount,
.060" panel thickness (66*)
- 28 Two fixed jacknuts, rear panel mount,
.070" panel thickness (68*)
- 29 Two fixed jacknuts, rear panel mount,
.080" panel thickness (69*)

POLARIZATION:

- 0S Standard body polarization

OPTIONS

- EMI EMI gasket (in lieu of fluorosilicone o-ring)
- OB7 Threaded inserts in mounting holes
- OFW Threaded inserts in mounting holes and
EMI gasket (in lieu of fluorosilicone o-ring)

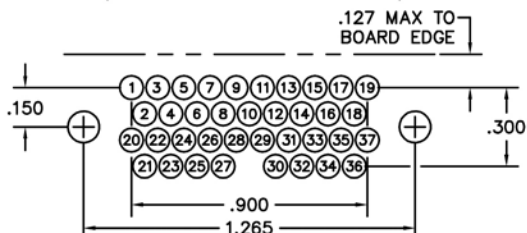
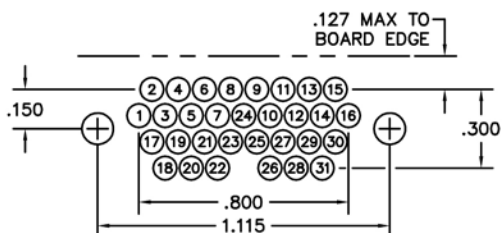
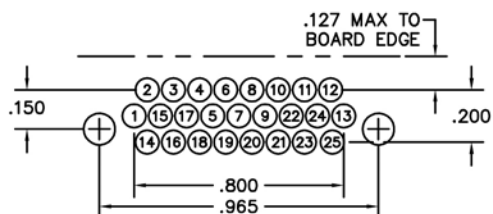
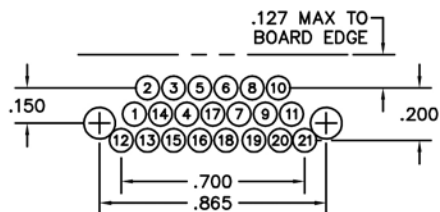
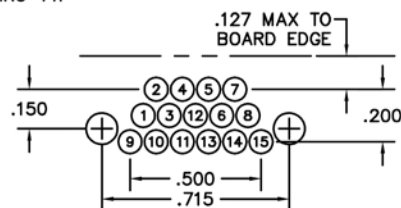
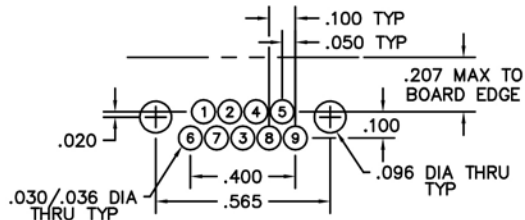
NOTES

See page MA-10 for rear panel mounting dimensions.
See page MA-7 for rear panel hardware dimensions.

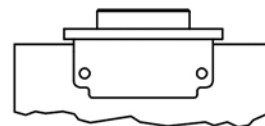
Recommended PC Board Layout

Right Angle, Narrow Footprint Rear Panel Mount Standard Polarization

PLUG
PC BOARD LAYOUT
COMPONENT SIDE



CONNECTOR MATING FACE



PC BOARD LAYOUT
COMPONENT SIDE

RECEPTACLE
PC BOARD LAYOUT
COMPONENT SIDE

CONNECTOR
MATING FACE*
(RECEPTACLE)



9 POSITION



15 POSITION



21 POSITION



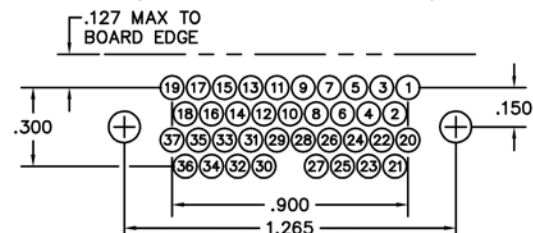
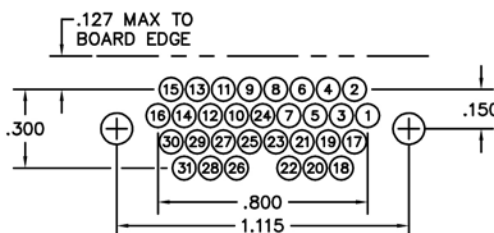
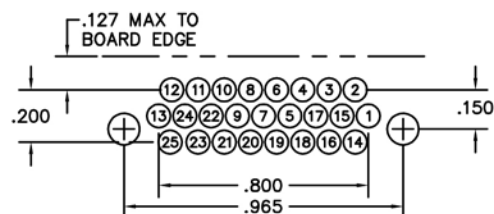
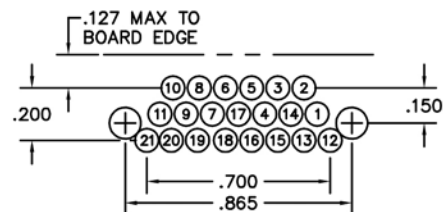
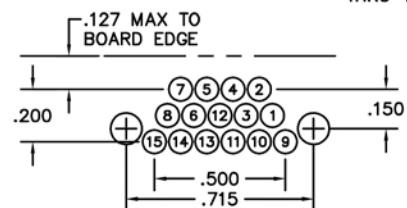
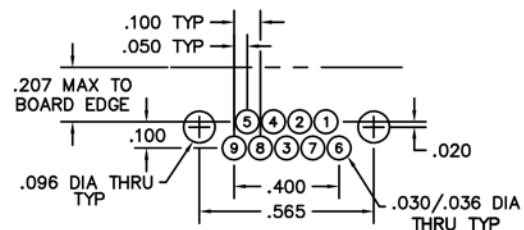
25 POSITION

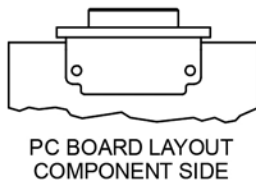
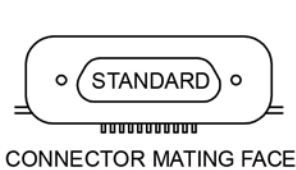


31 POSITION



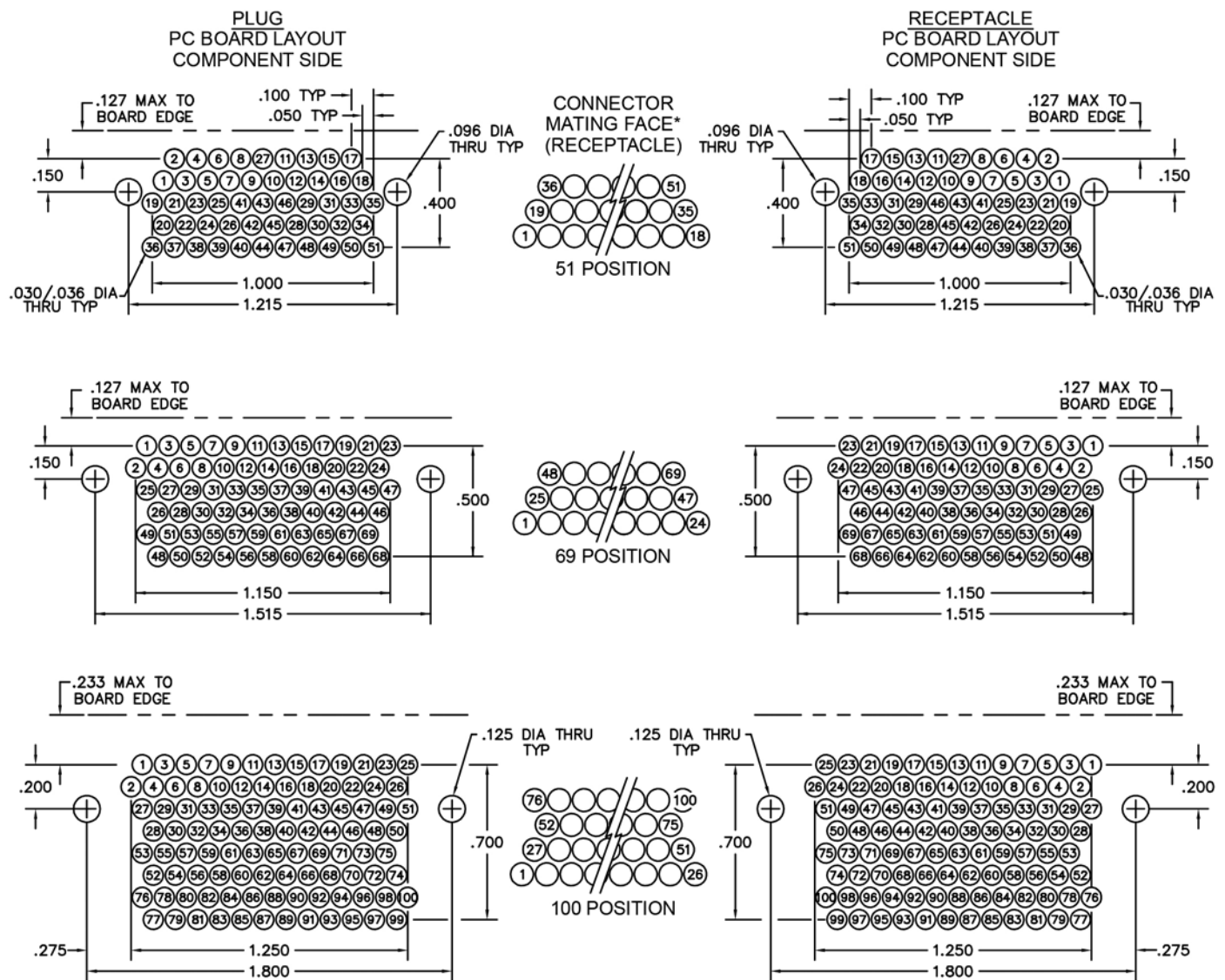
37 POSITION





Recommended PC Board Layout

Right Angle, Narrow Footprint
Rear Panel Mount
Standard Polarization



* 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 Finish:	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 μ " min 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
Jackposts:	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:	Unless otherwise specified: Fractions = $\pm 1/64$ " Decimals = $\pm .010$ " Angles = $\pm 5^\circ$ Wire lengths: insulated/stranded = $+1.0"/-0.0$ " uninsulated/solid = $+0.2"/-0.0$ "

Note: AirBorn 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 AirBorn for specific application questions.

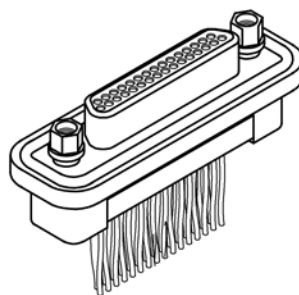
Performance

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:	600 V, RMS, 60 Hz
Operating Temperature:	-55° C to +100° C
Insulation Resistance:	5,000 megohms minimum @ 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 @ 2.5 amps (.026 ohms), according to M83513
Contact Engaging Force:	6.0 ounce maximum, with .0221 diameter test sleeve
Contact Separating Force:	0.5 ounce minimum, with .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 & 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 & L)

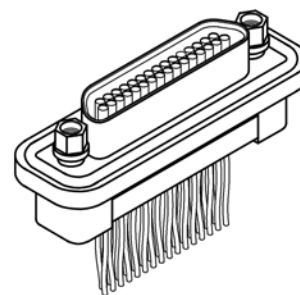
Rugged Metal I/O (Sealed Connector)

.050"
9 thru 100 Contacts

MM

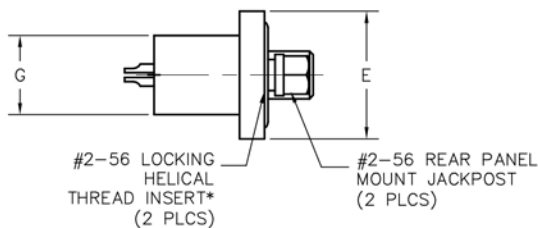
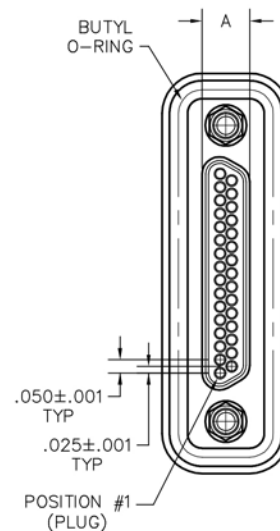
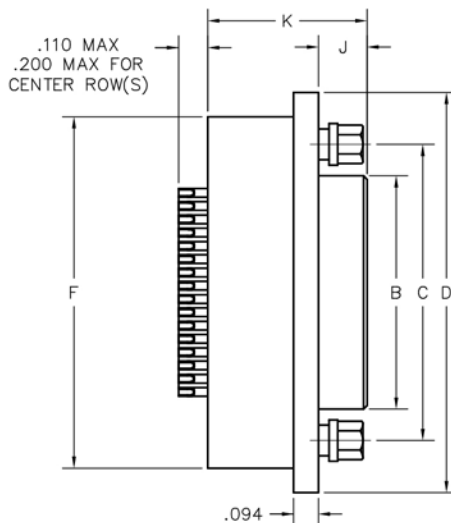
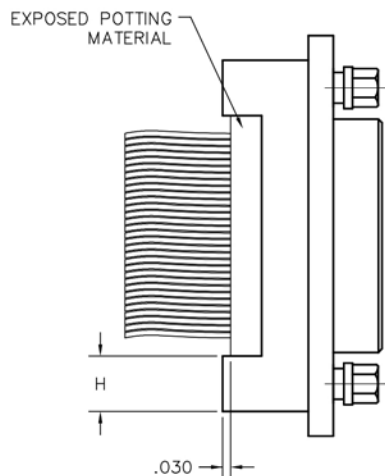


MM-2E2-031-161-26WA
(PLUG)



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

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



STRANDED WIRE TERMINATION
(PLUG SHOWN)

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

DIMENSIONS																
SIZE	CONTACT ROWS	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	.185	.251	.334	.400	.565	#2-56 UNC THD	.957	.480	.773	.298	.210	.183	.195	.598	.610
15				.484	.550	.715		1.107		.923						
21				.634	.700	.865		1.257		1.073						
25				.734	.800	.965		1.357		1.173						
31				.884	.950	1.115		1.507		1.323						
37				1.034	1.100	1.265		1.657		1.473						
51	3	.228	.294	.984	1.050	1.215		1.657	.523	1.477	.440	.239				
69				1.284	1.350	1.515		1.957		1.777						
100	4	.271	.394	1.384	1.508	1.800	#4-40 UNC THD	2.383	.600	2.219	.515	.301				

** = SHELL ACCEPTS .200 MAX #2-56 SCREW LENGTH (.295 MAX #4-40 SCREW LENGTH).

PLUG: MM-2E2-031-161-26WA

RECEPTACLE: MM-2H2-031-261-26WA

XX-XXX-XXX-XXX-XXXX
SERIES SIZE HARDWARE & WIRING
BODY CONTACTS

PLUG

SERIES

MM .050" Rugged Metal I/O Connector

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Sizes 51 thru 69)
- 4 4-Row (Size 100)

BODY STYLE:

- E Plug, straight, rear panel mount.
Sealed to 15 PSI pressure differential.
- K Plug, straight, rear panel mount.
Sealed to 30 PSI pressure differential.

All seal ratings are in the unmated condition

BODY MATERIAL:

- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
- 4 Polyphenylene Sulfide with hard anodized black shell

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 11 Pin, straight, solder cup
- 14 Pin, straight, .500" pigtails (.018 dia)
- 16 Pin, straight, stranded wire

PLATING OPTIONS:

- 1 50 μ " Au contacts (stranded wire) ☒
- 3 50 μ " Au contacts; Au terminations (solder cup, pigtail)
- 5 50 u" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
- 7 50 u" Au contacts; SAC305 terminations (pigtail)

HARDWARE & WIRING

STYLE OF HARDWARE:

- 00 None
- 24 Two fixed jacknuts, rear panel mount,
.040" panel thickness (64")
- 26 Two fixed jacknuts, rear panel mount,
.060" panel thickness (66")
- 28 Two fixed jacknuts, rear panel mount,
.070" panel thickness (68")
- 29 Two fixed jacknuts, rear panel mount,
.080" panel thickness (69")

WIRING:

- 00 None (solder cup and pigtail only)
- XX For wiring codes, see page MA-3 & MA-4

NOTES

See page MA-10 for rear panel mounting dimensions.
See page MA-7 for hardware dimensions.
See Product Technical Bulletin #43 for soldering to solder cups.

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

☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MM .050" Rugged Metal I/O Connector

BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Sizes 51 thru 69)
- 4 4-Row (Size 100)

BODY STYLE:

- H Receptacle, straight, rear panel mount,
with fluorosilicone interfacial seal.
Sealed to 15 PSI pressure differential.
- L Receptacle, straight, rear panel mount,
with fluorosilicone interfacial seal.
Sealed to 30 PSI pressure differential.

All seal ratings are in the unmated condition

BODY MATERIAL:

- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
- 4 Polyphenylene Sulfide with hard anodized black shell

SIZE

XXX 009, 015, 021, 025, 031, 037, 051, 069, 100

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 21 Socket, straight, solder cup
- 24 Socket, straight, .500" pigtails (.018 dia)
- 26 Socket, straight, crimped wire

PLATING OPTIONS:

- 1 50 μ " Au contacts (stranded wire) ☒
- 3 50 μ " Au contacts; Au terminations (solder cup, pigtail)
- 5 50 u" Au contacts; Sn/Pb alloy terminations (pigtail) ☒
- 7 50 u" Au contacts; SAC305 terminations (pigtail)

HARDWARE & WIRING

STYLE OF HARDWARE:

- 00 None
- 24 Two fixed jacknuts, rear panel mount,
.040" panel thickness (64")
- 26 Two fixed jacknuts, rear panel mount,
.060" panel thickness (66")
- 28 Two fixed jacknuts, rear panel mount,
.070" panel thickness (68")
- 29 Two fixed jacknuts, rear panel mount,
.080" panel thickness (69")

WIRING:

- 00 None (solder cup and pigtail only)
- XX For wiring codes, see page MA-3 & MA-4

NOTES

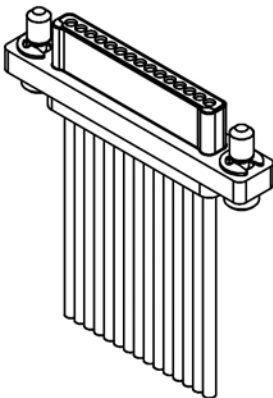
See page MA-10 for rear panel mounting dimensions.
See page MA-7 for hardware dimensions.
See Product Technical Bulletin #43 for soldering to solder cups.

Cable to Cable (1 Row)

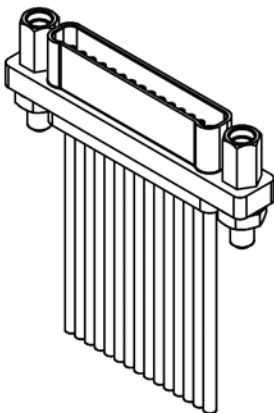
.050"
4 thru 25 Contacts

MM

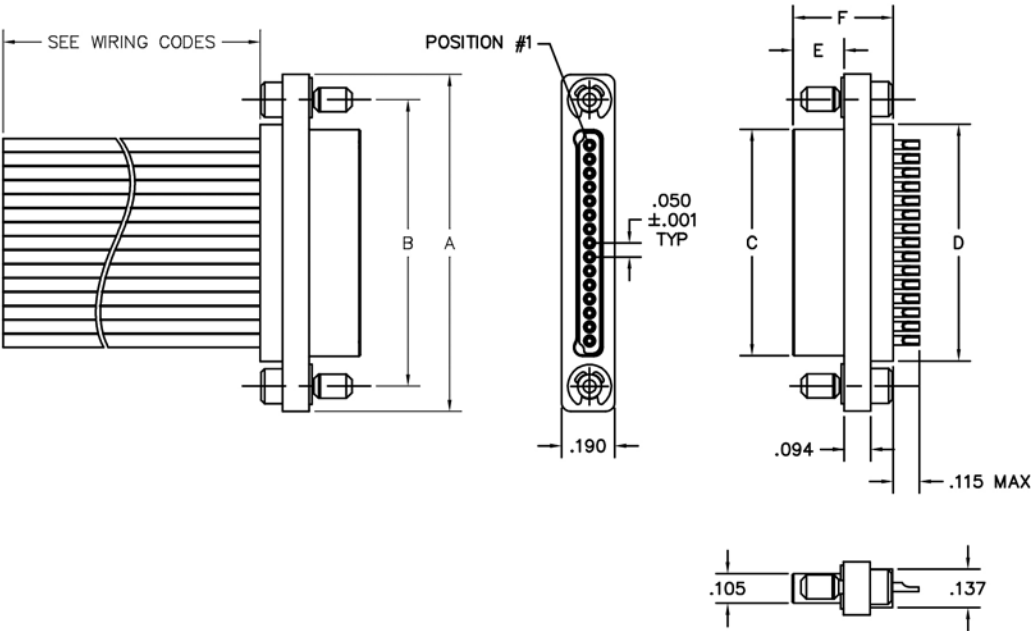
MATING MATRIX	
CONNECTOR	MATES WITH
MM-11...	MM-12, MK-16, MK-18 receptacles
MM-12...	MM-11, MK-15, MK-17 plugs



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



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



PLUG SHOWN

DIMENSIONS										
SIZE	A	B	C		D	E		F		HARDWARE
			PLUG MAX	RCPT MAX		PLUG MAX	RCPT MAX	PLUG MAX	RCPT MAX	
4	.655	.475	.260	.297	.297	.186	.198	.358	.370	#2-56 UNC THD (.092 THRU)
5	.705	.525	.310	.347	.347					
6	.755	.575	.360	.397	.397					
9	.905	.725	.510	.547	.547					
12	1.055	.875	.660	.697	.697					
15	1.205	1.025	.810	.847	.847					
21	1.505	1.325	1.110	1.147	1.147					
25	1.705	1.525	1.310	1.347	1.347					

PLUG: MM-112-006-113-2200
RECEPTACLE: MM-122-006-2A3-4100

XX XXX XXX XXX XXXX XXX

SERIES BODY CONTACTS OPTIONS

SIZE HARDWARE

PLUG

SERIES

MM .050" Rugged Metal I/O Connector
(MM mates to MK & MM)

BODY

- | | |
|---|--|
| 1 | 1-Row (Sizes 4 thru 25) |
| | BODY STYLE: |
| 1 | Plug, straight |
| | BODY MATERIAL: |
| 2 | Electroless nickel shell w/ PPS insert |
| 3 | Electrodeposited cadmium shell w/ PPS insert ☒ |
| 5 | Stainless Steel shell w/ PPS insert |
| A | Pure Electro-Deposited Aluminum |
| K | Zinc Nickel Plating |
| T | Nickel Polymer Plating |

SIZE

XXX 004, 005, 006, 009, 012, 015, 021, 025

CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 11 Pin, straight, 26 awg solder cup
1A Pin, straight, 24 awg solder cup
12 Pin, straight, 0.150" pigtails (.018 dia)
13 Pin, straight, 0.250" pigtails (.018 dia)
14 Pin, straight, 0.500" pigtails (.018 dia)
16 Pin, straight, crimped wire
- PLATING OPTIONS:
- 1 50 u" Au contacts (Crimped Wire)
3 50 u" Au contacts; Au terminations
(solder cup, pigtail)
5 50 u" Au contacts; Sn/Pb alloy terminations
(pigtail) ☒
7 50 u" Au contacts; SAC305 terminations (pigtail)

HARDWARE

STYLE OF HARDWARE:

- ```
00 None
22 Two fixed jacknut assemblies
41 Two turning jackscrews, allen head, retaining ring
45 Two turning jackscrews, allen head, captivated**
```

## WIRING

XX For wiring codes, see page MA-3 & MA-4

## RECEPTACLE

## SERIES

MM .050" Rugged Metal I/O Connector  
(MM mates to MK & MM)

## BODY

- |   |                                                                                  |
|---|----------------------------------------------------------------------------------|
| 1 | 1-Row (Sizes 4 thru 25)                                                          |
|   | BODY STYLE:                                                                      |
| 2 | Receptacle, straight                                                             |
|   | BODY MATERIAL:                                                                   |
| 2 | Electroless nickel shell w/ PPS insert                                           |
| 3 | Electrodeposited cadmium shell w/ PPS insert <input checked="" type="checkbox"/> |
| 5 | Stainless Steel shell w/ PPS insert                                              |
| A | Pure Electro-Deposited Aluminum                                                  |
| K | Zinc Nickel Plating                                                              |
| T | Nickel Polymer Plating                                                           |

## SIZE

XXX 004, 005, 006, 009, 012, 015, 021, 025

## CONTACTS

TYPE CONTACTS/TERMINATIONS:

- 21 Skt, straight, 26 awg solder cup  
2A Skt, straight, 24 awg solder cup  
22 Skt, straight, 0.150" pigtails (.018 dia)  
23 Skt, straight, 0.250" pigtails (.018 dia)  
24 Skt, straight, 0.500" pigtails (.018 dia)  
26 Skt, straight, crimped wire
- PLATING OPTIONS:
- 1 50 u" Au contacts (Crimped Wire)  
3 50 u" Au contacts; Au terminations  
(solder cup, pigtail)  
5 50 u" Au contacts; Sn/Pb alloy terminations  
(pigtail) ☒  
7 50 u" Au contacts; SAC305 terminations (pigtail)

## HARDWARE

STYLE OF HARDWARE:

- 00 None  
22 Two fixed jacknut assemblies  
41 Two turning jackscrews, allen head, retaining ring  
45 Two turning jackscrews, allen head, captivated\*\*

## WIRING

XX For wiring codes, see page MA-3 & MA-4

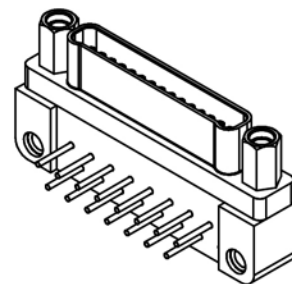
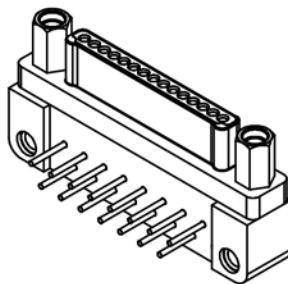
## OPTIONS

900 Interfacial Seal

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

☒ = Option not RoHS compliant

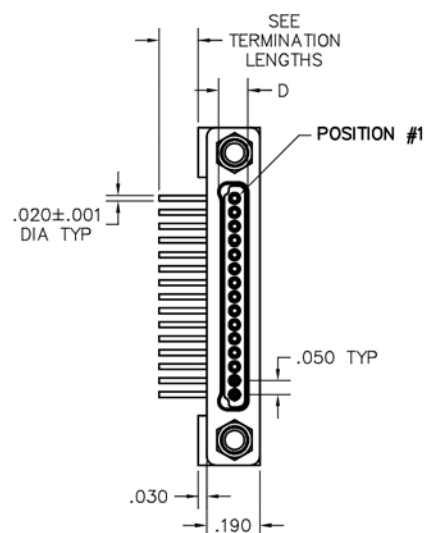
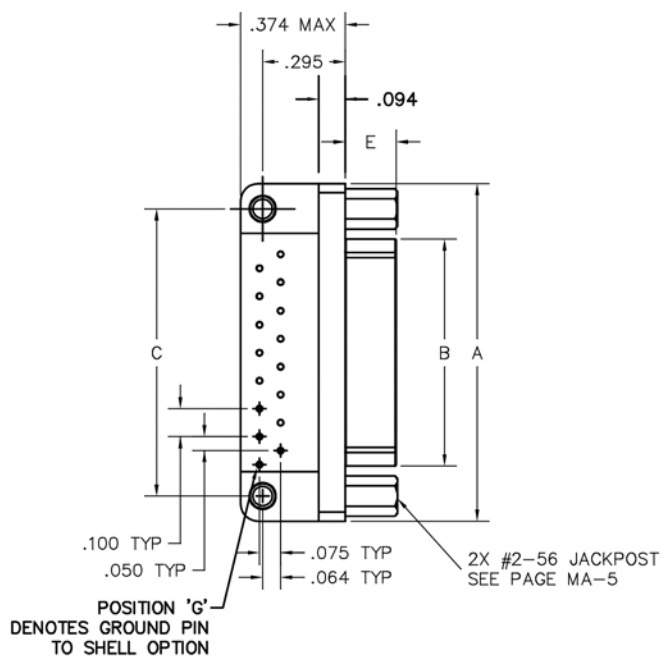
**.050"**  
**4 thru 25 Contacts**

**MK**

| MATING MATRIX |                          |
|---------------|--------------------------|
| CONNECTOR     | MATES WITH               |
| MK-15...      | MM-12, MK-18 receptacles |
| MK-16...      | MM-11, MK-17 plugs       |

MK-152-015-325-220S  
(PLUG)

MK-162-015-435-220S  
(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          | .655  | .260     | .297     | .475  | .110     | .142     | .186     | .198     | #2-56<br>CLEARANCE<br>THRU<br>OR<br>#2-56 UNC<br>THREADED<br>INSERT |
| 5          | .705  | .310     | .347     | .525  |          |          |          |          |                                                                     |
| 6          | .755  | .360     | .397     | .575  |          |          |          |          |                                                                     |
| 9          | .905  | .510     | .547     | .725  |          |          |          |          |                                                                     |
| 12         | 1.055 | .660     | .697     | .875  |          |          |          |          |                                                                     |
| 15         | 1.205 | .810     | .847     | 1.025 |          |          |          |          |                                                                     |
| 21         | 1.505 | 1.110    | 1.147    | 1.325 |          |          |          |          |                                                                     |
| 25         | 1.705 | 1.310    | 1.347    | 1.525 |          |          |          |          |                                                                     |



**PLUG:** MK-152-006-325-220S  
**RECEPTACLE:** MK-162-006-425-220S  
XX-XXX-XXX-XXX-XXXX-XXX  
|       |       |       |  
| BODY | CONTACTS | OPTIONS |  
|-----|-----|-----|  
| SERIES | SIZE | HARDWARE |

## PLUG

### SERIES

MK .050" Rugged Metal Right Angle PTH Connector  
(MK mates to MK & MM)

### BODY

- 1 1-Row (Sizes 4 thru 25)  
 BODY STYLE:  
 5 Plug, right angle, standard footprint, with mounting holes  
 BODY MATERIAL:  
 2 Electroless nickel shell w/ PPS insert  
 3 Electrodeposited cadmium shell w/ PPS insert ☒  
 5 Stainless Steel shell w/ PPS insert  
 A Pure Electro-Deposited Aluminum  
 K Zinc Nickel Plating  
 T Nickel Polymer Plating

### SIZE

XXX 004, 005, 006, 009, 012, 015, 021, 025

### CONTACTS

- TYPE CONTACTS/TERMINATIONS:  
 32 Pin, right angle, pcb leads, .109"  
 33 Pin, right angle, pcb leads, .140"  
 34 Pin, right angle, pcb leads, .172"  
 A2 Pin, right angle, pcb leads, .109" w/ ground pin option  
 A3 Pin, right angle, pcb leads, .140" w/ ground pin option  
 A4 Pin, right angle, pcb leads, .172" w/ ground pin option  
 PLATING OPTIONS:  
 3 50 u" Au contacts; Au terminations  
 5 50 u" Au contacts; Sn/Pb alloy terminations ☒  
 7 50 u" Au contacts; SAC305 terminations

### HARDWARE

- STYLE OF HARDWARE:  
 00 None  
 22 Two fixed jacknut assemblies  
 POLARIZATION:  
 0S Standard body polarization

### OPTIONS

- 0B7 Threaded inserts, standard body polarization

## RECEPTACLE

### SERIES

MK .050" Rugged Metal Right Angle PTH Connector  
(MM mates to MK & MM)

### BODY

- 1 1-Row (Sizes 4 thru 25)  
 BODY STYLE:  
 6 Receptacle, right angle, standard footprint, with mounting holes  
 BODY MATERIAL:  
 2 Electroless nickel shell w/ PPS insert  
 3 Electrodeposited cadmium shell w/ PPS insert ☒  
 5 Stainless Steel shell w/ PPS insert  
 A Pure Electro-Deposited Aluminum  
 K Zinc Nickel Plating  
 T Nickel Polymer Plating

### SIZE

XXX 004, 005, 006, 009, 012, 015, 021, 025

### CONTACTS

- TYPE CONTACTS/TERMINATIONS:  
 43 Socket, right angle, pcb leads, .109"  
 44 Socket, right angle, pcb leads, .140"  
 45 Socket, right angle, pcb leads, .172"  
 B3 Socket, right angle, pcb leads, .109" w/ ground pin option  
 B4 Socket, right angle, pcb leads, .140" w/ ground pin option  
 B5 Socket, right angle, pcb leads, .172" w/ ground pin option  
 PLATING OPTIONS:  
 3 50 u" Au contacts; Au terminations  
 5 50 u" Au contacts; Sn/Pb alloy terminations ☒  
 7 50 u" Au contacts; SAC305 terminations

### HARDWARE

- STYLE OF HARDWARE:  
 00 None  
 22 Two fixed jacknut assemblies  
 POLARIZATION:  
 0S Standard body polarization

- 900 Interfacial Seal  
 0B7 Threaded inserts and interfacial sealing gasket,  
 standard body polarization

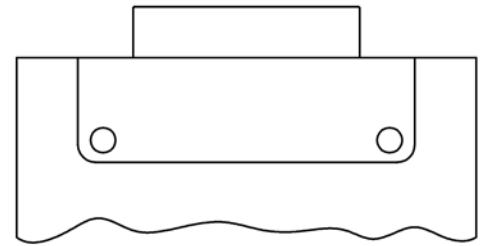
☒ = Option not RoHS compliant

# Recommended PC Board Layout

RIGHT ANGLE  
Standard Polarization  
Pos 4 thru 9

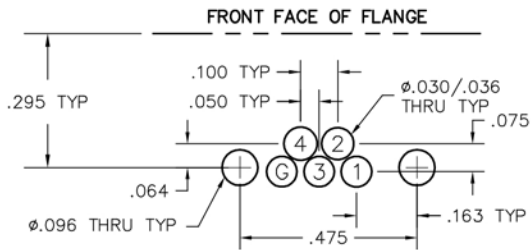


CONNECTOR MATING FACE



PC BOARD LAYOUT  
COMPONENT SIDE

PLUG  
PC BOARD LAYOUT  
COMPONENT SIDE

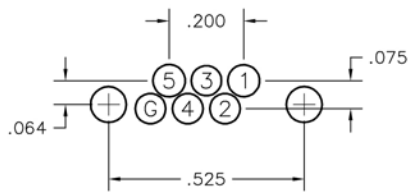
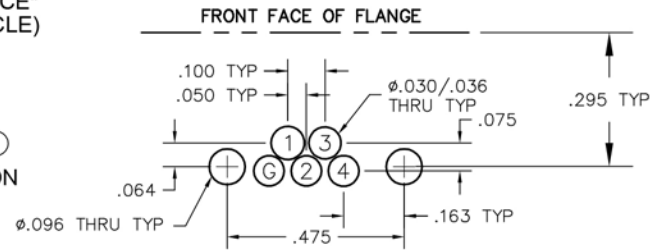


CONNECTOR  
MATING FACE\*  
(RECEPTACLE)

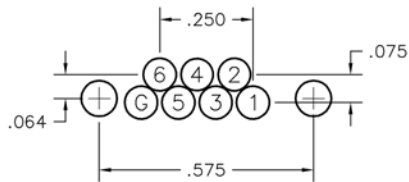
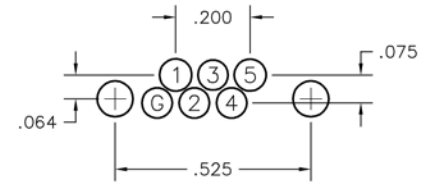


4 POSITION

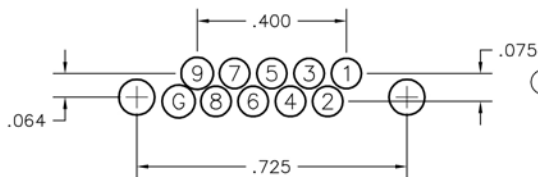
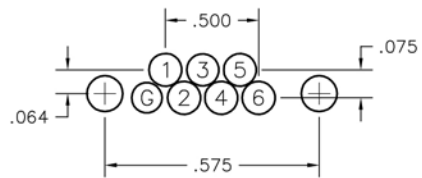
RECEPTACLE  
PC BOARD LAYOUT  
COMPONENT SIDE



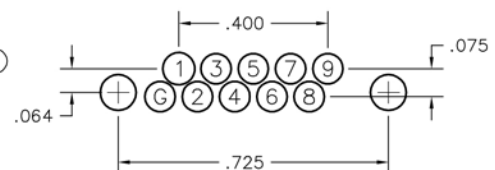
5 POSITION

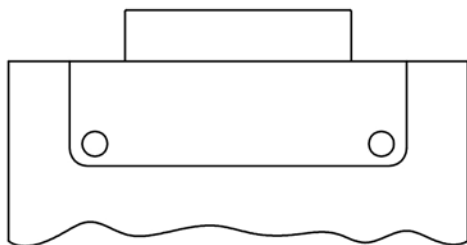


6 POSITION



9 POSITION





PC BOARD LAYOUT  
COMPONENT SIDE

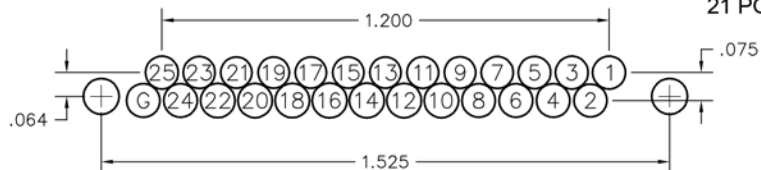
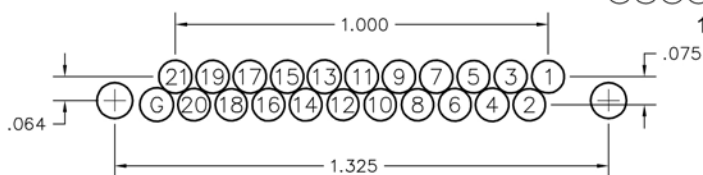
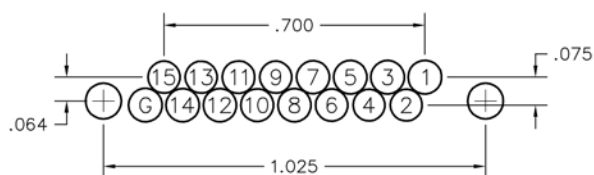
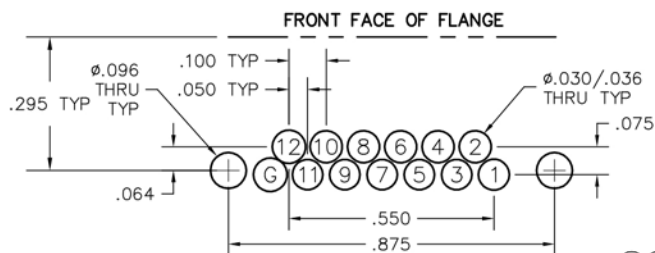


CONNECTOR MATING FACE

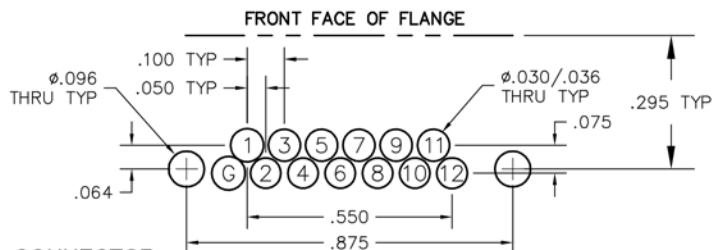
## Recommended PC Board Layout

RIGHT ANGLE  
Standard Polarization  
Pos 12 thru 25

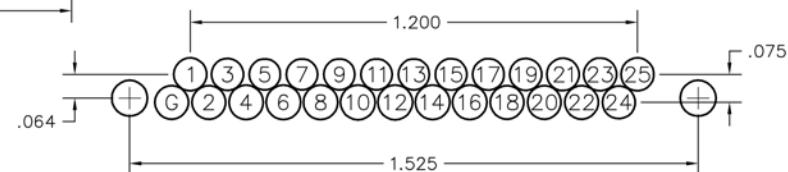
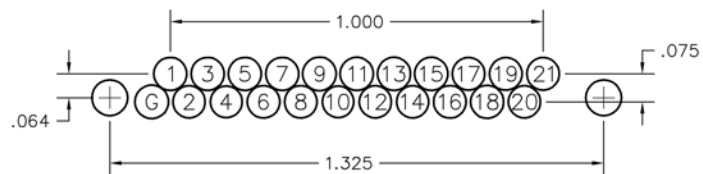
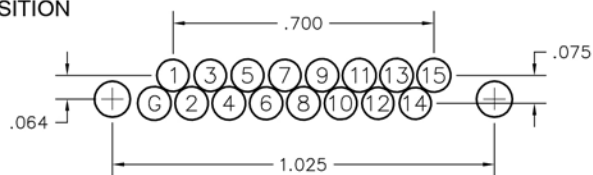
PLUG  
PC BOARD LAYOUT  
COMPONENT SIDE



RECEPTACLE  
PC BOARD LAYOUT  
COMPONENT SIDE



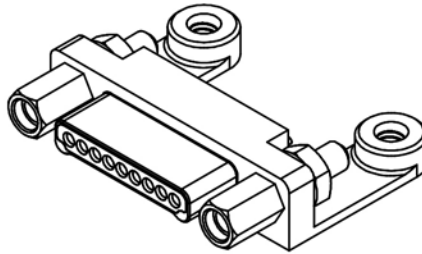
CONNECTOR  
MATING FACE\*  
(RECEPTACLE)



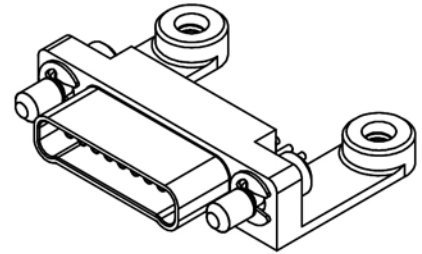
# Horizontal Surface Mount (1 Row)

**.050"**  
**4 thru 25 Contacts**

**MK**

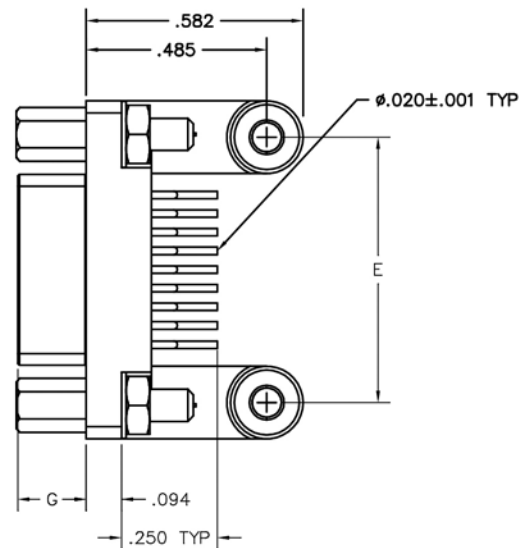
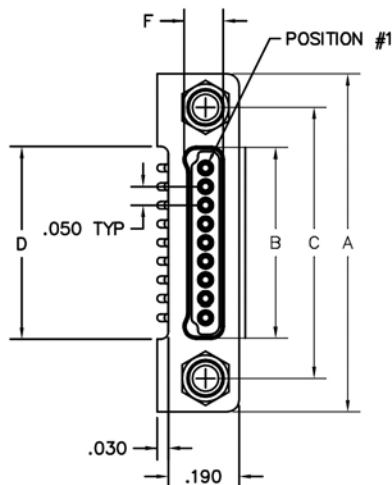


MK-172-009-175-220S  
(PLUG)



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

| MATING MATRIX |                          |
|---------------|--------------------------|
| CONNECTOR     | MATES WITH               |
| MK-17...      | MM-12, MK-18 receptacles |
| MK-18...      | MM-11, MK-17 plugs       |



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

PLUG SHOWN

| DIMENSIONS |       |             |             |       |       |       |             |             |             |             |
|------------|-------|-------------|-------------|-------|-------|-------|-------------|-------------|-------------|-------------|
| SIZE       | A     | B           |             | C     | D     | E     | F           |             | G           |             |
|            |       | PLUG<br>MAX | RCPT<br>MAX |       |       |       | PLUG<br>MAX | RCPT<br>MAX | PLUG<br>MAX | RCPT<br>MAX |
| 4          | .655  | .260        | .297        | .475  | .265  | .460  | .110        | .142        | .186        | .198        |
| 5          | .705  | .310        | .347        | .525  | .315  | .510  |             |             |             |             |
| 6          | .755  | .360        | .397        | .575  | .365  | .560  |             |             |             |             |
| 9          | .905  | .510        | .547        | .725  | .515  | .710  |             |             |             |             |
| 12         | 1.055 | .660        | .697        | .875  | .665  | .860  |             |             |             |             |
| 15         | 1.205 | .810        | .847        | 1.025 | .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 | 1.315 | 1.510 |             |             |             |             |

PLUG: MK-172-006-175-220S  
 RECEPTACLE: MK-182-006-275-410S  
 XX-XXX-XXX-XXX-XXXX-XXX  
 |        |        |        |  
 BODY    CONTACTS    OPTIONS  
 SERIES    SIZE        HARDWARE

PLUG

SERIES

MK .050" Rugged Metal Horizontal SMT Connector  
 (MK mates to MK & MM)

BODY

1 1-Row (Sizes 4 thru 25)  
 BODY STYLE:  
 7 Plug, Horizontal SMT  
 BODY MATERIAL:  
 2 Electroless nickel shell w/ PPS insert  
 3 Electrodeposited cadmium shell w/ PPS insert ☒  
 5 Stainless Steel shell w/ PPS insert  
 A Pure Electro-Deposited Aluminum  
 K Zinc Nickel Plating  
 T Nickel Polymer Plating

SIZE

XXX 004, 005, 006, 009, 012, 015, 021, 025

CONTACTS

TYPE CONTACTS/TERMINATIONS:  
 17 Pin, surface mount  
 PLATING OPTIONS:  
 3 50 u" Au contacts; Au terminations  
 5 50 u" Au contacts; Sn/Pb alloy terminations ☒  
 7 50 u" Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:  
 00 None  
 22 Two fixed jacknut assemblies  
 41 Two turning jackscrews, allen head, retaining ring  
 POLARIZATION:  
 0S Standard body polarization

OPTIONS

☒ = Option not RoHS compliant

RECEPTACLE

SERIES

MK .050" Rugged Metal Horizontal SMT Connector  
 (MK mates to MK & MM)

BODY

1 1-Row (Sizes 4 thru 25)  
 BODY STYLE:  
 8 Receptacle, Horizontal SMT  
 BODY MATERIAL:  
 2 Electroless nickel shell w/ PPS insert  
 3 Electrodeposited cadmium shell w/ PPS insert ☒  
 5 Stainless Steel shell w/ PPS insert  
 A Pure Electro-Deposited Aluminum  
 K Zinc Nickel Plating  
 T Nickel Polymer Plating

SIZE

XXX 004, 005, 006, 009, 012, 015, 021, 025

CONTACTS

TYPE CONTACTS/TERMINATIONS:  
 27 Socket, surface mount  
 PLATING OPTIONS:  
 3 50 u" Au contacts; Au terminations  
 5 50 u" Au contacts; Sn/Pb alloy terminations ☒  
 7 50 u" Au contacts; SAC305 terminations

HARDWARE

STYLE OF HARDWARE:  
 00 None  
 22 Two fixed jacknut assemblies  
 41 Two turning jackscrews, allen head, retaining ring  
 POLARIZATION:  
 0S Standard body polarization

OPTIONS

900 Interfacial Seal

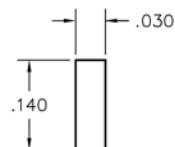


# Recommended PC Board Layout

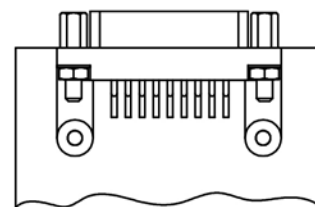
Horizontal SMT  
1 ROW  
Pos 4 thru 9



CONNECTOR MATING FACE

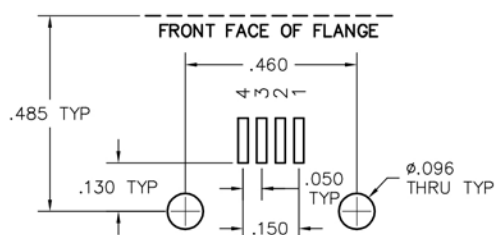


FOOTPRINT/PAD CONFIGURATION



PC BOARD LAYOUT  
COMPONENT SIDE

PLUG  
PC BOARD LAYOUT  
COMPONENT SIDE

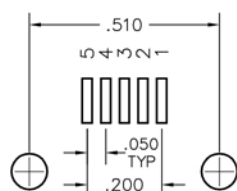
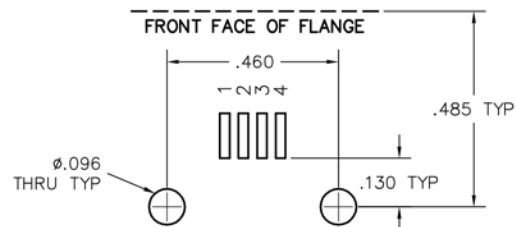


CONNECTOR  
MATING FACE\*  
(RECEPTACLE)

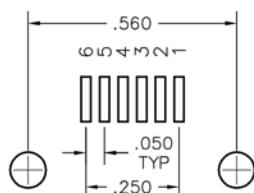
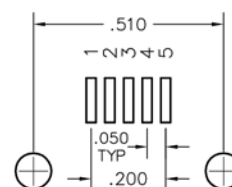


4 POSITION

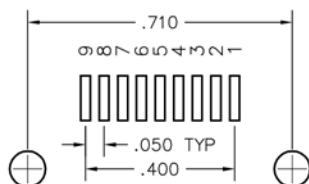
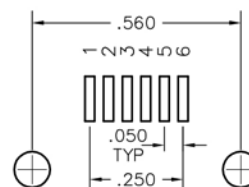
RECEPTACLE  
PC BOARD LAYOUT  
COMPONENT SIDE



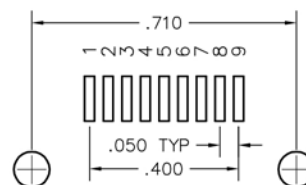
5 POSITION



6 POSITION

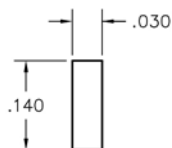


9 POSITION





CONNECTOR MATING FACE

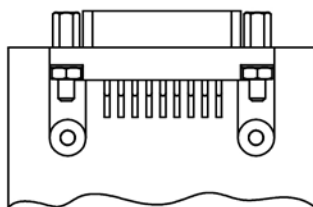


FOOTPRINT/PAD CONFIGURATION

## Recommended PC Board Layout

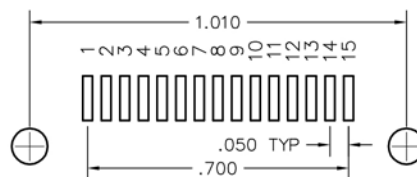
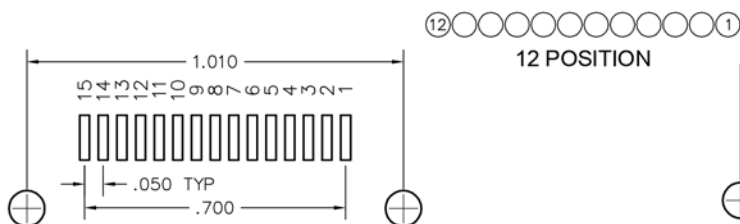
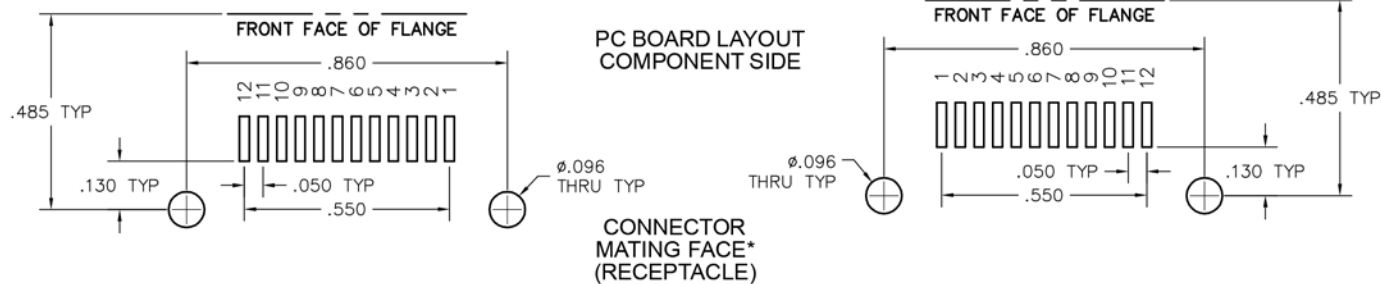
Horizontal SMT  
1 ROW  
Pos 12 thru 25

PLUG  
PC BOARD LAYOUT  
COMPONENT SIDE

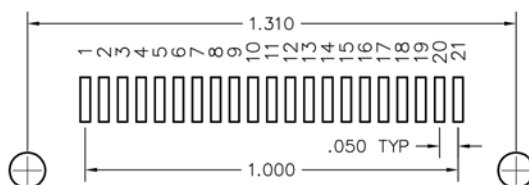
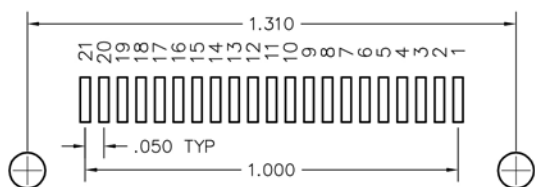


PC BOARD LAYOUT  
COMPONENT SIDE

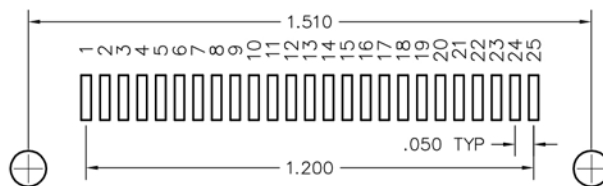
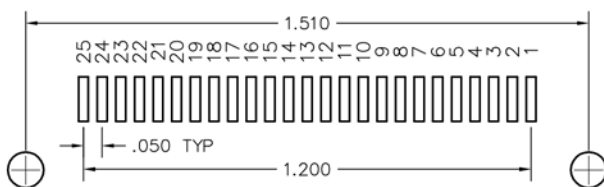
RECEPTACLE  
PC BOARD LAYOUT  
COMPONENT SIDE



15 POSITION



21 POSITION



25 POSITION

# **"MHT" SERIES - .050"**

## **High Temperature**

# Contents

## "MHT" Series

### .050" Microminiature PCB and I/O Connectors, High Temperature

|                                                                     |                                                                  |
|---------------------------------------------------------------------|------------------------------------------------------------------|
| MHT-1                                                               | Contents                                                         |
| MHT-2                                                               | Specifications                                                   |
| MHT-3                                                               | Performance                                                      |
| MHT-4                                                               | Part number description                                          |
| <b>Micro-D, High Temperature, Cable to Cable Connectors (Metal)</b> |                                                                  |
| MHT-5                                                               | MMHT - MMHT Rugged                                               |
| MHT-7                                                               | MQHT - MQHT Low profile                                          |
| <b>Micro-D, High Temperature, Board to Cable Connectors (Metal)</b> |                                                                  |
| MHT-9, 11                                                           | MKHT - MMHT Rugged right angle, narrow footprint                 |
| MHT-13                                                              | MKHT Board layouts - right angle, narrow footprint               |
| MHT-15, 17                                                          | MSHT - MQHT Low profile right angle, narrow footprint            |
| MHT-19                                                              | MSHT Board layouts - right angle, narrow footprint               |
| MHT-21                                                              | MTHT - MTHT Low Profile right angle, radius, four mounting holes |
| MHT-23                                                              | MTHT Board layouts - right angle, radius, four mounting holes    |

# Specifications

## Materials and Finishes \*

|                                            |                                                                                                                                                                                                                                                                       |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Contacts:</b>                           | Pins: Copper based alloy selected for high temperature applications<br>Sockets: Brass per ASTM B121 / B121M or ASTM B16 / B16M or<br>ASTM B453                                                                                                                        |
| <b>Contact Finish:</b>                     | Gold plate per ASTM B488                                                                                                                                                                                                                                              |
| <b>Shells:</b>                             | Aluminum Alloy 6061-T6 per SAE AMS-QQ-A-250/11 or 6061-T6511<br>per SAE AMS-QQ-A-200/8<br>Electroless Nickel per SAE AMS2404, Class 3, 500 $\mu$ " min                                                                                                                |
| <b>Molded Insulators:</b>                  | High temperature thermoplastic                                                                                                                                                                                                                                        |
| <b>Embedment:</b>                          | High temperature epoxy                                                                                                                                                                                                                                                |
| <b>Jackscrews,<br/>Jackposts and Nuts:</b> | Corrosion resistant steel per ASTM A320 or ASTM A484 / A484M and ASTM A582 / A582M<br>Passivated per SAE AMS2700                                                                                                                                                      |
| <b>Clips and Washers:</b>                  | Corrosion resistant steel per ASME 18.24 or NASM35333<br>(For reference only: ASME 18.24 CRS per ASTM A693 and NASM35333 CRS<br>per ASTM A240)<br>Passivated per ASME 18.24 or NASM35333<br>(For reference only: ASME 18.24 and NASM35333 passivated per SAE AMS2700) |
| <b>Interfacial<br/>Seal Gaskets:</b>       | Fluorosilicone per SAE AMS-R-25988                                                                                                                                                                                                                                    |
| <b>Tolerances:</b>                         | Unless otherwise specified: Fractions = $\pm 1/64$ "<br>Decimals = $\pm .010$ "<br>Angles = $\pm 5^\circ$<br>Wire lengths: insulated/stranded = $+1.0"/-0.0$ "<br>uninsulated/solid = $+0.2"/-0.0$ "                                                                  |

Note: AirBorn 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

|                                  |                                                                                                                                |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Contact Rating:</b>           | 3-amperes maximum                                                                                                              |
| <b>Solderability:</b>            | Terminals (except crimp) tested in accordance with MIL-STD-202, Method 208                                                     |
| <b>Wire Size:</b>                | Stranded #24, #26, #28 AWG or solid #25 AWG standard (consult factory for other sizes and types)                               |
| <b>Test Voltage:</b>             | 600 V, RMS, 60 Hz                                                                                                              |
| <b>Operating Temperature:</b>    | -55° C to +205° C                                                                                                              |
| <b>Insulation Resistance:</b>    | 5,000 megohms minimum @ 500 VDC                                                                                                |
| <b>Durability:</b>               | 500 connector mating cycles                                                                                                    |
| <b>Salt Spray:</b>               | Mated connectors tested in accordance with MIL-STD-1344, Method 1001, Test Condition B                                         |
| <b>Humidity:</b>                 | Mated connectors tested in accordance with MIL-STD-1344, Method 1002, Type II (except steps 7a and 7b)                         |
| <b>Thermal Shock:</b>            | Tested to the temperature extremes of MIL-STD-1344, Method 1003, Test Condition A (except step 3, temperature shall be 205° C) |
| <b>Contact Resistance:</b>       | 0.065 volt maximum drop @ 2.5 amps (.026 ohms)                                                                                 |
| <b>Contact Engaging Force:</b>   | 6.0 ounce maximum, with .0221 diameter test sleeve                                                                             |
| <b>Contact Separating Force:</b> | 0.5 ounce minimum, with .0230 diameter test sleeve                                                                             |
| <b>Crimp Strength:</b>           | 5 pound minimum tensile strength                                                                                               |

# 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, for example, is less than 100, indicate as 009, 051, etc.

## **Series:**

This will always be a four letter designator which will identify the connector series. All .050" connectors begin with the letter "M". The second letter designates the various styles of .050" connectors. "HT" designates high temperature.

## **Body:**

Each digit of the Body Designator will normally identify (1) the number of rows, (2) the style of body, and (3) the body materials. 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. Order only sizes shown on the catalog page unless otherwise noted.

## **Contacts:**

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

## **Hardware:**

The hardware designator is four digits; two for style of hardware and two for polarization or wiring instruction. Follow the choices for each connector.

## **Special Instructions (Options):**

Special instructions are referenced by a three digit number added to the end of the part number. The last three digits are included only when applicable. AirBorn will provide individual code numbers as needed.

## **Note:**

Each page is as comprehensive as possible. However, if you do not find a particular connector size or option, please contact the factory for further assistance.

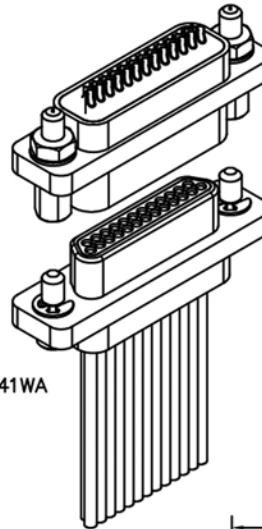
# Cable to Cable

**.050"**

**9 thru 100 Contacts**

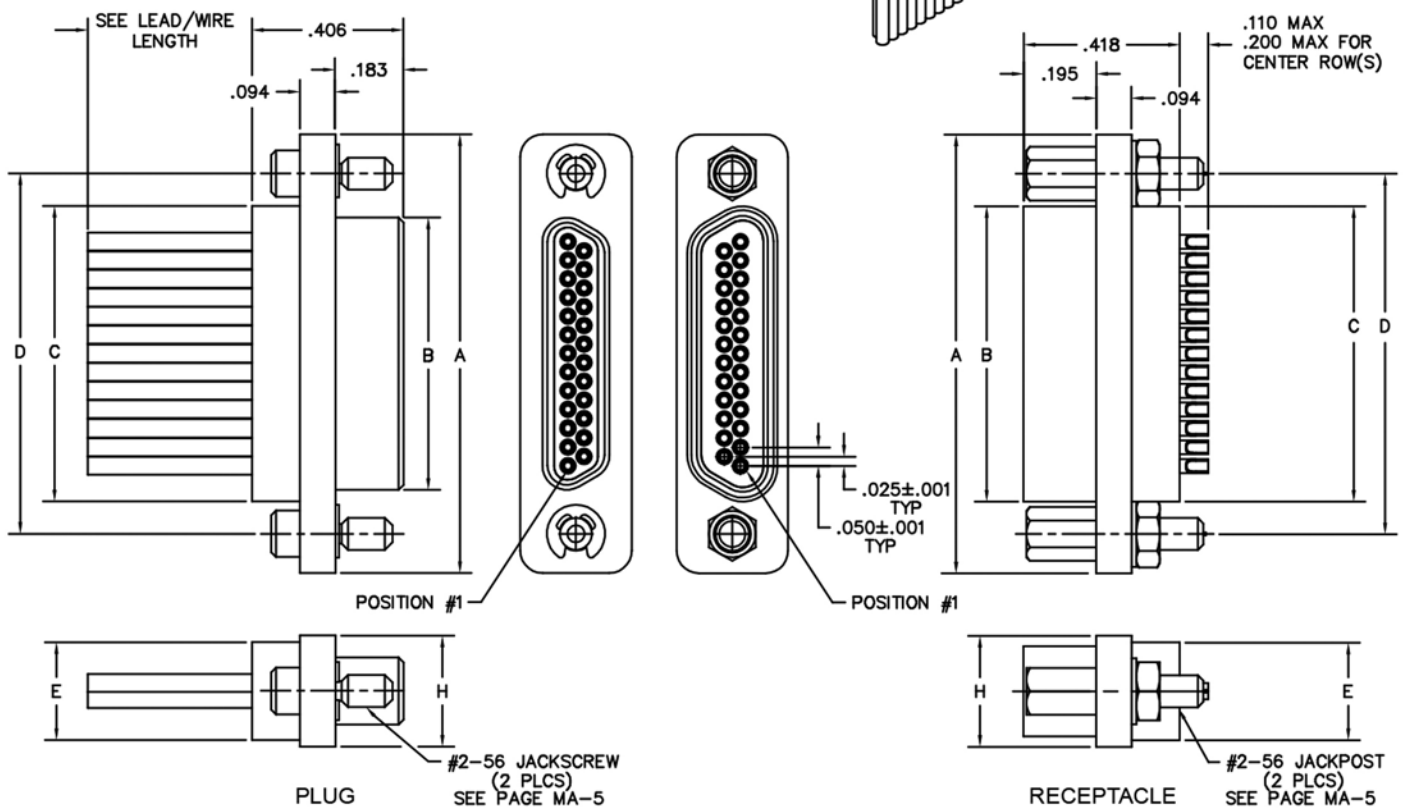
**Rugged Metal  
High Temperature**

**MMHT**



MMHT-223-025-2A3-2200  
(METAL)

MMHT-212-025-161-41WA  
(METAL)



| DIMENSIONS |              |       |          |          |       |       |                  |      |                                  |
|------------|--------------|-------|----------|----------|-------|-------|------------------|------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B        |          | C     | D     | E                | H    | HARDWARE                         |
|            |              |       | PLUG MAX | RCPT MAX |       |       | POTTING WELL MAX |      |                                  |
| 9          | 2            | .775  | .334     | .400     | .390  | .565  | .270             | .298 | #2-56 UNC THD<br>(.092 DIA THRU) |
| 15         |              | .925  | .484     | .550     | .540  | .715  |                  |      |                                  |
| 21         |              | 1.075 | .634     | .700     | .690  | .865  |                  |      |                                  |
| 25         |              | 1.175 | .734     | .800     | .790  | .965  |                  |      |                                  |
| 31         |              | 1.325 | .884     | .950     | .940  | 1.115 |                  |      |                                  |
| 37         | 3            | 1.475 | 1.034    | 1.100    | 1.090 | 1.265 | .310             | .341 | #4-40 UNC THD<br>(.147 DIA THRU) |
| 51         |              | 1.425 | .984     | 1.050    | 1.040 | 1.215 |                  |      |                                  |
| 100        | 4            | 2.160 | 1.384    | 1.508    | 1.432 | 1.800 | .360             | .384 |                                  |

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

PLUG

RECEPTACLE

| SERIES                                                                             |                                                                              |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| MMHT .050" Rugged Metal I/O Connector<br>(MMHT mates with MMHT & MKHT receptacles) | MMHT .050" Rugged Metal I/O Connector<br>(MMHT mates with MMHT & MKHT plugs) |

| BODY                                                                                |                                                                                            |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 2 2-Row (Sizes 9 thru 51****)                                                       | 2 2-Row (Sizes 9 thru 51****)                                                              |
| 3 3-Row (Size 51 & 69****)                                                          | 3 3-Row (Size 51 & 69****)                                                                 |
| 4 4-Row (Size 100)                                                                  | 4 4-Row (Size 100)                                                                         |
| BODY STYLE:<br>1 Plug, straight, with ears                                          | BODY STYLE:<br>2 Receptacle, straight, with ears and interfacial seal<br>High temperature. |
| BODY MATERIAL:<br>2 High temperature thermoplastic with electroless<br>nickel shell | BODY MATERIAL:<br>2 High temperature thermoplastic with electroless<br>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:<br>11 Pin, straight, 26 awg solder cup<br>1A Pin, straight, 24 awg solder cup<br>1D Pin, straight, .109" Lead Length (.018 dia) SEE NOTE 1<br>1E Pin, straight, .125" Lead Length (.018 dia) SEE NOTE 1<br>1F Pin, straight, .140" Lead Length (.018 dia) SEE NOTE 1<br>12 Pin, straight, .150" Lead Length (.018 dia) SEE NOTE 1<br>1G Pin, straight, .156" Lead Length (.018 dia) SEE NOTE 1<br>1H Pin, straight, .172" Lead Length (.018 dia) SEE NOTE 1<br>1J Pin, straight, .187" Lead Length (.018 dia) SEE NOTE 1<br>13 Pin, straight, .250" Lead Length (.018 dia) SEE NOTE 1<br>1K Pin, straight, .375" Lead Length (.018 dia) SEE NOTE 1<br>14 Pin, straight, .500" Lead Length (.018 dia) SEE NOTE 1<br>15 Pin, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1<br>16 Pin, straight, crimped wire | TYPE CONTACTS/TERMINATIONS:<br>21 Socket, straight, 26 awg solder cup<br>2A Socket, straight, 24 awg solder cup<br>2D Socket, straight, .109" Lead Length (.018 dia)<br>2E Socket, straight, .125" Lead Length (.018 dia)<br>2F Socket, straight, .140" Lead Length (.018 dia)<br>22 Socket, straight, .150" Lead Length (.018 dia)<br>2G Socket, straight, .156" Lead Length (.018 dia)<br>2H Socket, straight, .172" Lead Length (.018 dia)<br>2J Socket, straight, .187" Lead Length (.018 dia)<br>23 Socket, straight, .250" Lead Length (.018 dia)<br>2K Socket, straight, .375" Lead Length (.018 dia)<br>2L Socket, straight, .500" Lead Length (.018 dia)<br>2M Socket, straight, 1.000" Lead Length (.018 dia)<br>24 Socket, straight, .500" Lead Length (.018 dia) SEE NOTE 1<br>25 Socket, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1<br>26 Socket, straight, crimped wire |
| PLATING OPTIONS:<br>1 50 μ" Au contacts (crimp wire)<br>3 50 μ" Au contacts (solder cup, pigtail)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PLATING OPTIONS:<br>1 50 μ" Au contacts (crimp wire)<br>3 50 μ" Au contacts (solder cup, pigtail)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| HARDWARE                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies (62")<br>41 Two turning jackscrews, allen head,<br>retaining ring (81")<br>42 Two long turning jackscrews, allen head,<br>retaining ring (82")<br>43 Two turning jackscrews, slot head,<br>retaining ring (83")<br>44 Two long turning jackscrews, slot head,<br>retaining ring (84")<br>45 Two turning jackscrews, allen head,<br>captivated** (85") | STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies (62")<br>41 Two turning jackscrews, allen head,<br>retaining ring (81")<br>42 Two long turning jackscrews, allen head,<br>retaining ring (82")<br>43 Two turning jackscrews, slot head,<br>retaining ring (83")<br>44 Two long turning jackscrews, slot head,<br>retaining ring (84")<br>45 Two turning jackscrews, allen head,<br>captivated** (85") |
| POLARIZATION / WIRING<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                                                                                                          | POLARIZATION / WIRING<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                                                                                                          |

\* = Use numbers or letters in parenthesis when ordering size 100.  
 \*\* = Captive hardware is factory installed and non-removable.

NOTE 1 = The leads on these contacts are soft copper  
 suitable for forming.

# Cable to Cable

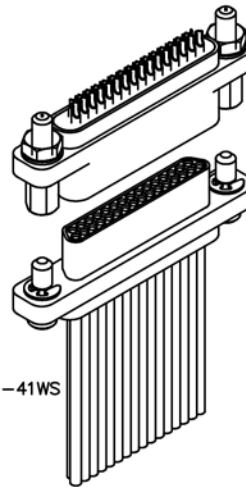
**.050"**

**9 thru 51 Contacts**

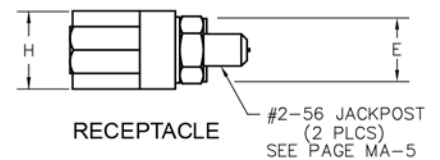
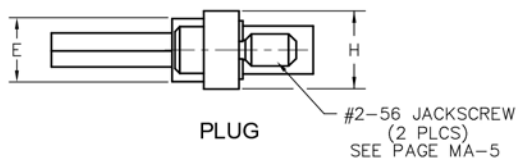
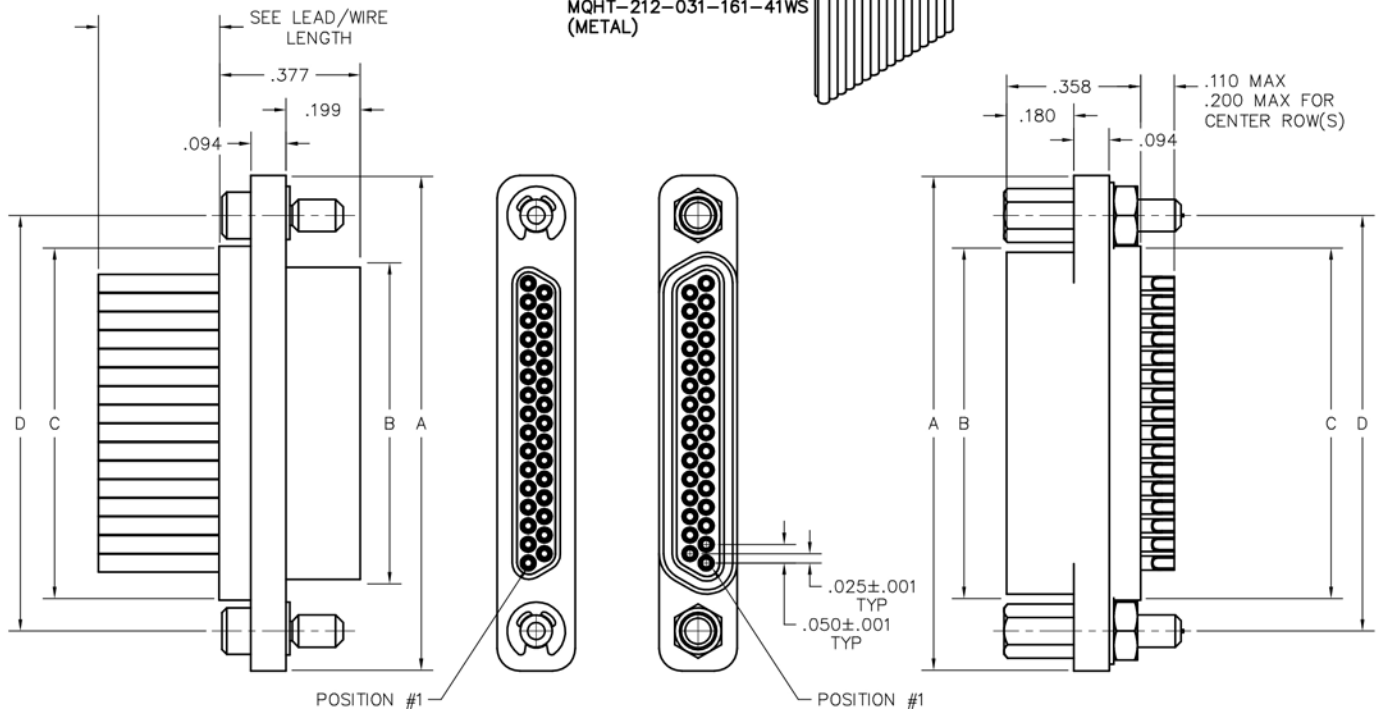
**Low Profile Metal  
High Temperature**

**MQHT**

MQHT-222-031-2A3-2200  
(METAL)



MQHT-212-031-161-41WS  
(METAL)



| DIMENSIONS |              |       |          |          |       |       |                  |      |                                  |
|------------|--------------|-------|----------|----------|-------|-------|------------------|------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B        |          | C     | D     | E                |      | H                                |
|            |              |       | PLUG MAX | RCPT MAX |       |       | POTTING WELL MAX |      |                                  |
| 9          | 2            | .778  | .292     | .378     | .398  | .565  | .173             | .208 | #2-56 UNC THD<br>(.092 DIA THRU) |
| 15         |              | .928  | .442     | .528     | .548  | .715  |                  |      |                                  |
| 21         |              | 1.078 | .592     | .678     | .698  | .865  |                  |      |                                  |
| 25         |              | 1.178 | .692     | .778     | .798  | .965  |                  |      |                                  |
| 31         |              | 1.328 | .842     | .928     | .948  | 1.115 |                  |      |                                  |
| 37         |              | 1.478 | .992     | 1.078    | 1.098 | 1.265 |                  |      |                                  |
| 51         | 3            | 1.428 | .942     | 1.028    | 1.048 | 1.215 | .220             | .250 |                                  |



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

PLUG

RECEPTACLE

| SERIES                                                                                  |                                                                                         |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| MQHT .050" Low Profile Metal I/O Connector<br>(MQHT mates with MQHT & MSHT receptacles) | MQHT .050" Low Profile Metal I/O Connector<br>(MQHT mates with MQHT & MSHT receptacles) |

| BODY                                                                             |                                                                                  |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 2 2-Row (Sizes 9 thru 37)                                                        | 2 2-Row (Sizes 9 thru 37)                                                        |
| 3 3-Row (Size 51)                                                                | 3 3-Row (Size 51)                                                                |
| BODY STYLE:<br>1 Plug, straight, with ears. High Temperature.                    | BODY STYLE:<br>2 Receptacle, straight, with ears. High temperature.              |
| BODY MATERIAL:<br>2 High temperature thermoplastic with electroless nickel shell | BODY MATERIAL:<br>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:<br>11 Pin, straight, 26 awg solder cup<br>1A Pin, straight, 24 awg solder cup<br>1D Pin, straight, .109" Lead Length (.018 dia) SEE NOTE 1<br>1E Pin, straight, .125" Lead Length (.018 dia) SEE NOTE 1<br>1F Pin, straight, .140" Lead Length (.018 dia) SEE NOTE 1<br>1G Pin, straight, .150" Lead Length (.018 dia) SEE NOTE 1<br>1H Pin, straight, .156" Lead Length (.018 dia) SEE NOTE 1<br>1J Pin, straight, .172" Lead Length (.018 dia) SEE NOTE 1<br>1K Pin, straight, .187" Lead Length (.018 dia) SEE NOTE 1<br>1L Pin, straight, .250" Lead Length (.018 dia) SEE NOTE 1<br>1M Pin, straight, .375" Lead Length (.018 dia) SEE NOTE 1<br>1N Pin, straight, .500" Lead Length (.018 dia) SEE NOTE 1<br>1P Pin, straight, 1.000" Lead Length (.018 dia) SEE NOTE 1<br>16 Pin, straight, crimped wire | TYPE CONTACTS/TERMINATIONS:<br>21 Socket, straight, 26 awg solder cup<br>2A Socket, straight, 24 awg solder cup<br>2D Socket, straight, .109" Lead Length (.018 dia)<br>2E Socket, straight, .125" Lead Length (.018 dia)<br>2F Socket, straight, .140" Lead Length (.018 dia)<br>2G Socket, straight, .150" Lead Length (.018 dia)<br>2H Socket, straight, .156" Lead Length (.018 dia)<br>2J Socket, straight, .172" Lead Length (.018 dia)<br>2K Socket, straight, .187" Lead Length (.018 dia)<br>2L Socket, straight, .250" Lead Length (.018 dia)<br>2M Socket, straight, .375" Lead Length (.018 dia)<br>2N Socket, straight, .500" Lead Length (.018 dia)<br>2P Socket, straight, 1.000" Lead Length (.018 dia)<br>26 Socket, straight, crimped wire |
| PLATING OPTIONS:<br>1 50 µ" Au contacts (crimp wire)<br>3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PLATING OPTIONS:<br>1 50 µ" Au contacts (crimp wire)<br>3 50 µ" Au contacts: 10 µ" Au terminations (solder cup, pigtail)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

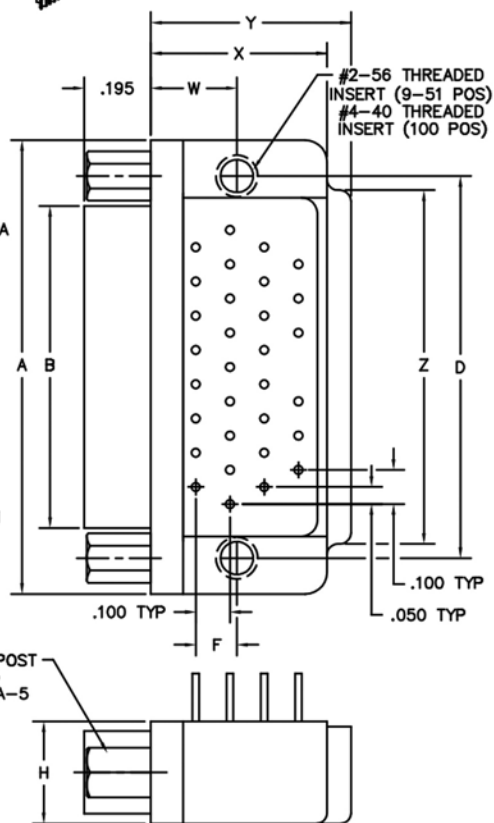
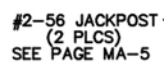
| HARDWARE                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies<br>41 Two turning jackscrews, allen head, retaining ring<br>42 Two long turning jackscrews, allen head, retaining ring<br>43 Two turning jackscrews, slot head, retaining ring<br>44 Two long turning jackscrews, slot head, retaining ring<br>45 Two turning jackscrews, allen head, captivated* | STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies<br>41 Two turning jackscrews, allen head, retaining ring<br>42 Two long turning jackscrews, allen head, retaining ring<br>43 Two turning jackscrews, slot head, retaining ring<br>44 Two long turning jackscrews, slot head, retaining ring<br>45 Two turning jackscrews, allen head, captivated* |
| POLARIZATION / WIRING<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                                                      | POLARIZATION / WIRING<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                                                      |

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

NOTE 1 = The leads on these contacts are soft copper suitable for forming.

**MMHT**

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



RECEPTACLE

**"MHT" Series Connectors**  
**MHT-9**

PLUG: MMHT- 212 - 031 - 113 - 4300  
 RECEPTACLE: MKHT- 262 - 031 - 443 - 220S  
 XXXX- XXX- XXX- XXX- XXXX

## PLUG

## RECEPTACLE

| SERIES                                                                             |                                                                                  |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| MMHT .050" Rugged Metal I/O Connector<br>(MMHT mates with MMHT & MKHT receptacles) | MKHT .050" Rugged Metal PC Board Mount Connector<br>(MKHT mates with MMHT plugs) |

| BODY                                                                             |                                                                                                                         |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 2 2-Row (Sizes 9 thru 37)                                                        | 2 2-Row (Sizes 9 thru 37)                                                                                               |
| 3 3-Row (Size 51)                                                                | 3 3-Row (Size 51)                                                                                                       |
| 4 4-Row (Size 100)                                                               | 4 4-Row (Size 100)                                                                                                      |
| BODY STYLE:<br>1 Plug, straight, with ears. High temperature.                    | BODY STYLE:<br>6 Receptacle, right angle, narrow footprint, w/ threaded inserts and interfacial seal. High temperature. |
| BODY MATERIAL:<br>2 High temperature thermoplastic with electroless nickel shell | BODY MATERIAL:<br>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:<br>11 Pin, straight, solder cup<br>14 Pin, straight, .500" pigtails (.018 dia)<br>15 Pin, straight, 1.000" pigtails (.018 dia)<br>16 Pin, straight, crimped wire | TYPE CONTACTS/TERMINATIONS:<br>43 Socket, right angle, dip solder, .109" x .020" dia<br>44 Socket, right angle, dip solder, .140" x .020" dia<br>45 Socket, right angle, dip solder, .172" x .020" dia |
| PLATING OPTIONS:<br>1 50 $\mu$ " Au contacts (crimp wire)<br>3 50 $\mu$ " Au contacts: 10 $\mu$ " Au terminations (solder cup, pigtail)                                                      | PLATING OPTIONS:<br>3 50 $\mu$ " Au contacts: 10 $\mu$ " Au terminations                                                                                                                               |

| HARDWARE                                                                                                                                                                                                                                                                                                                                                       |                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| STYLE OF HARDWARE:<br>00 None<br>41 Two turning jackscrews, allen head, retaining ring (81*)<br>42 Two long turning jackscrews, allen head, retaining ring (82*)<br>43 Two turning jackscrews, slot head, retaining ring (83*)<br>44 Two long turning jackscrews, slot head, retaining ring (84*)<br>45 Two turning jackscrews, allen head, captivated** (85*) | STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies (62*) |
| POLARIZATION / WIRING:<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                                                 | POLARIZATION / WIRING<br>0S Standard body polarization                 |

\* = Use number in parenthesis when ordering size 100.

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

MKHT-252-031-335-220S  
(METAL)

# Board (Narrow Footprint) to Cable .050"

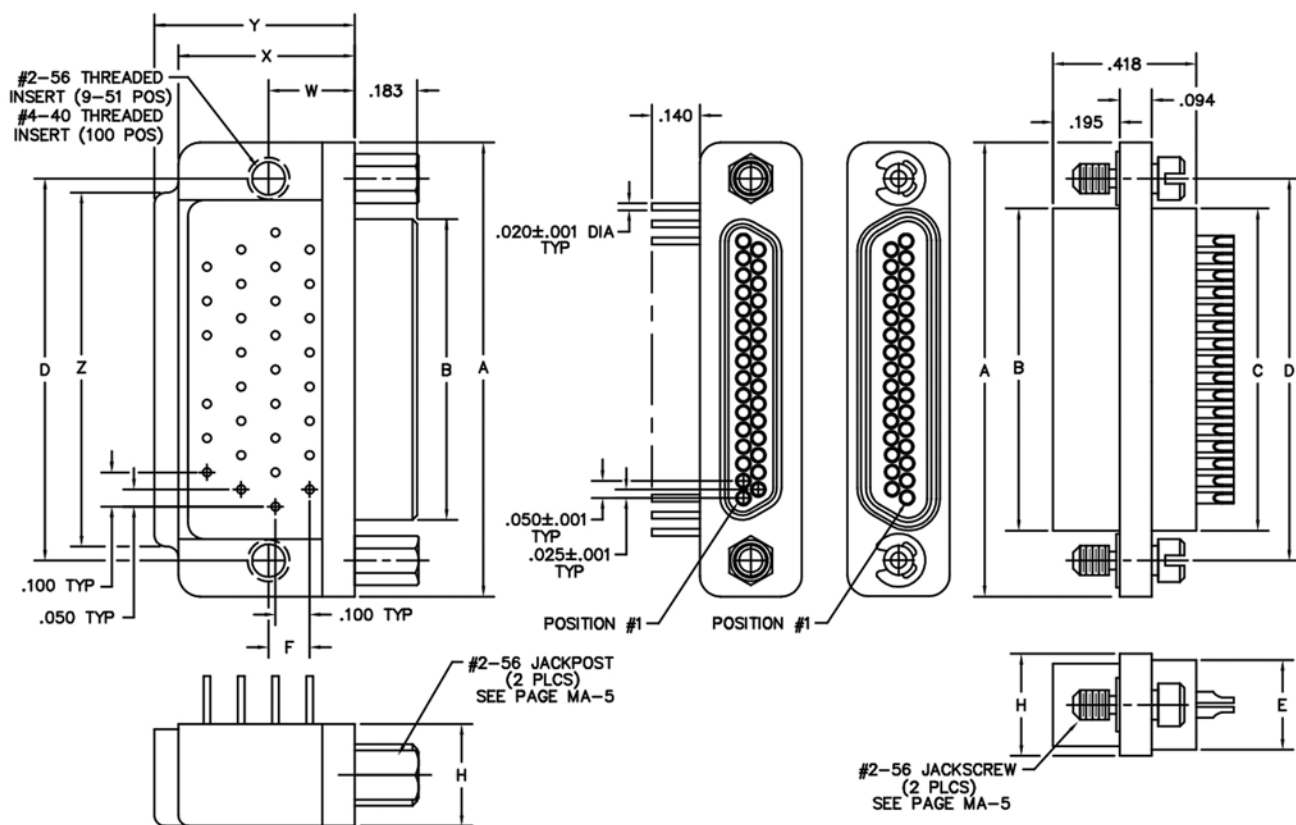
9 thru 100 Contacts

**Rugged Board Mount      Rugged Cable**  
**High Temperature      High Temperature**

**MKHT**

**MMHT**

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



PLUG

RECEPTACLE

| DIMENSIONS |              |       |          |          |       |       |                  |       |      |      |       |       |       |               |               |
|------------|--------------|-------|----------|----------|-------|-------|------------------|-------|------|------|-------|-------|-------|---------------|---------------|
| SIZE       | CONTACT ROWS | A     | B        |          | C     | D     | E                | F     | H    | W    | X MAX | Y MAX | Z     | HARDWARE      |               |
|            |              |       | PLUG MAX | RCPT MAX |       |       | POTTING WELL MAX |       |      |      |       |       |       |               |               |
| 9          | 2            | .775  | .334     | .400     | .390  | .565  | .270             | .020  | .298 | .250 | .420  | .420  | .775  | #2-56 UNC THD |               |
| 15         |              | .925  | .484     | .550     | .540  | .715  |                  | .925  |      |      |       |       |       |               |               |
| 21         |              | 1.075 | .634     | .700     | .690  | .865  |                  | 1.075 |      |      |       |       |       |               |               |
| 25         |              | 1.175 | .734     | .800     | .790  | .965  |                  | 1.175 |      |      |       |       |       |               |               |
| 31         |              | 1.325 | .884     | .950     | .940  | 1.115 |                  | 1.080 |      |      |       |       |       |               |               |
| 37         |              | 1.475 | 1.034    | 1.100    | 1.090 | 1.265 |                  | 1.180 |      |      |       |       |       |               |               |
| 51         | 3            | 1.425 | .984     | 1.050    | 1.040 | 1.215 | .310             | .150  | .341 | .300 | .430  | .650  | 1.220 |               |               |
| 100        | 4            | 2.160 | 1.384    | 1.508    | 1.432 | 1.800 | .360             | .200  | .384 | .400 | .590  | 1.000 | 1.810 |               | #4-40 UNC THD |

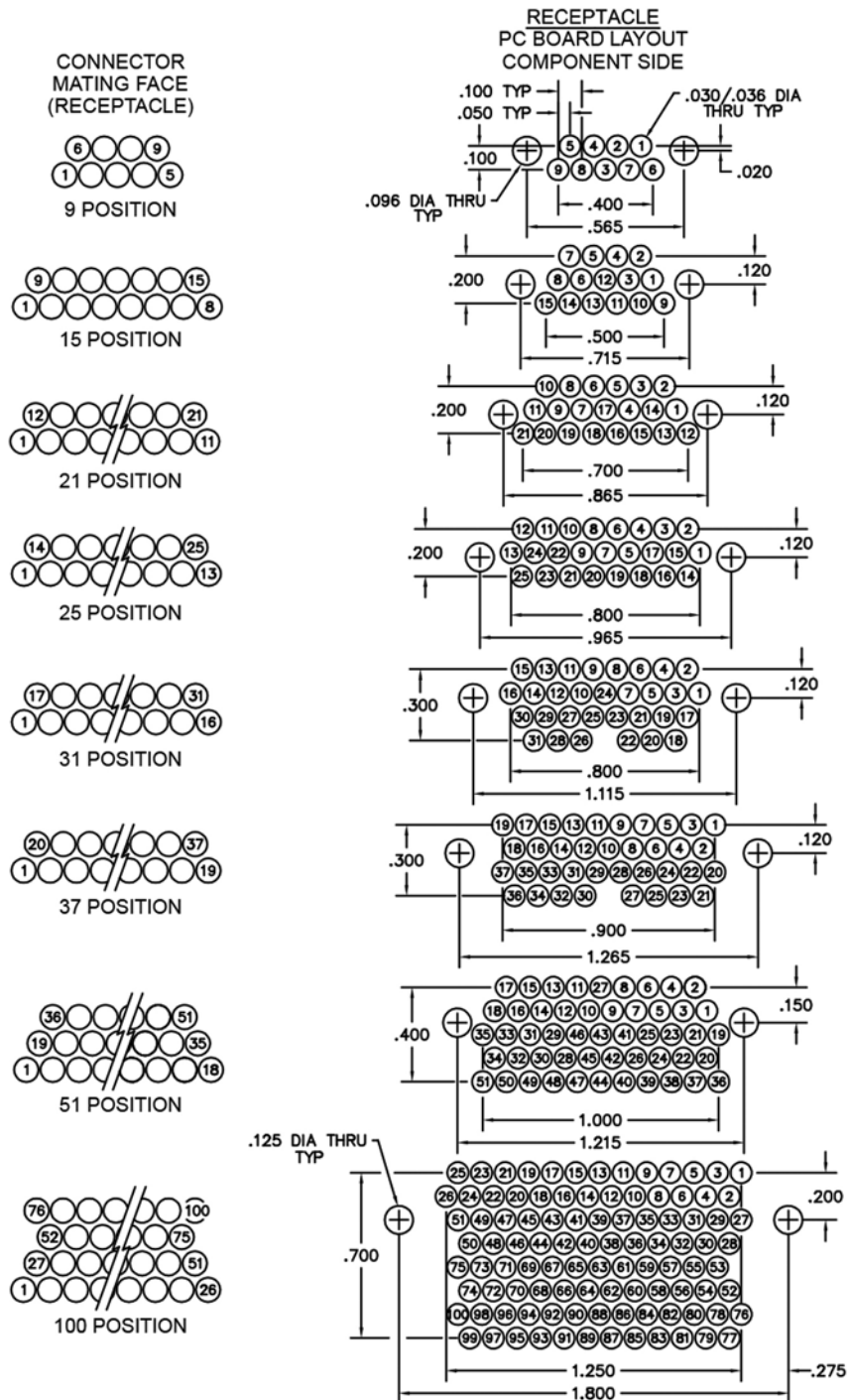
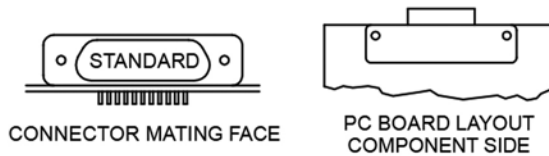
| PLUG                                                                                   |                                                                  | RECEPTACLE                                                                   |  |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------|--|
| <b>SERIES</b>                                                                          |                                                                  |                                                                              |  |
| MKHT .050" Rugged Metal PC Board Mount Connector<br>(MKHT mates with MMHT receptacles) |                                                                  | MMHT .050" Rugged Metal I/O Connector<br>(MMHT mates with MKHT & MMHT plugs) |  |
| <b>BODY</b>                                                                            |                                                                  |                                                                              |  |
| 2 2-Row (Sizes 9 thru 37)                                                              | 2 2-Row (Sizes 9 thru 37)                                        |                                                                              |  |
| 3 3-Row (Size 51)                                                                      | 3 3-Row (Size 51)                                                |                                                                              |  |
| 4 4-Row (Size 100)                                                                     | 4 4-Row (Size 100)                                               |                                                                              |  |
| <b>BODY STYLE:</b>                                                                     |                                                                  |                                                                              |  |
| 5 Plug, right angle, narrow footprint, w/ threaded inserts. High temperature.          | 2 Receptacle, straight, with ears. High temperature.             |                                                                              |  |
| <b>BODY MATERIAL:</b>                                                                  |                                                                  |                                                                              |  |
| 2 High temperature thermoplastic with electroless nickel shell                         | 2 High temperature thermoplastic with electroless nickel shell   |                                                                              |  |
| <b>SIZE</b>                                                                            |                                                                  |                                                                              |  |
| XXX 009, 015, 021, 025, 031, 037, 051, 100                                             |                                                                  | XXX 009, 015, 021, 025, 031, 037, 051, 100                                   |  |
| <b>CONTACTS</b>                                                                        |                                                                  |                                                                              |  |
| <b>TYPE CONTACTS/TERMINATIONS:</b>                                                     |                                                                  | <b>TYPE CONTACTS/TERMINATIONS:</b>                                           |  |
| 32 Pin, right angle, dip solder, .109"                                                 | 21 Socket, straight, solder cup                                  |                                                                              |  |
| 33 Pin, right angle, dip solder, .140"                                                 | 24 Socket, straight, .500" pigtails (.018 dia)                   |                                                                              |  |
| 34 Pin, right angle, dip solder, .172"                                                 | 25 Socket, straight, 1.000" pigtails (.018 dia)                  |                                                                              |  |
|                                                                                        | 26 Socket, straight, crimped wire                                |                                                                              |  |
| <b>PLATING OPTIONS:</b>                                                                |                                                                  | <b>PLATING OPTIONS:</b>                                                      |  |
| 3 50 μ" Au contacts: 10 μ" Au terminations                                             | 1 50 μ" Au contacts (crimp wire)                                 |                                                                              |  |
|                                                                                        | 3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail) |                                                                              |  |
| <b>HARDWARE</b>                                                                        |                                                                  |                                                                              |  |
| <b>STYLE OF HARDWARE:</b>                                                              |                                                                  | <b>STYLE OF HARDWARE:</b>                                                    |  |
| 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*)        |                                                                              |  |
| <b>POLARIZATION / WIRING:</b>                                                          |                                                                  | <b>POLARIZATION / WIRING</b>                                                 |  |
| 0S Standard body polarization                                                          | 00 None                                                          |                                                                              |  |
|                                                                                        | XX For wiring codes, see page MA-3 & MA-4                        |                                                                              |  |
| <b>OPTIONS</b>                                                                         |                                                                  |                                                                              |  |
|                                                                                        |                                                                  | 900 Interfacial sealing gasket                                               |  |

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



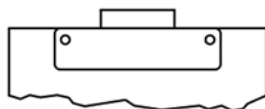
# Recommended PC Board Layout

Right Angle, Narrow Footprint  
Standard Polarization



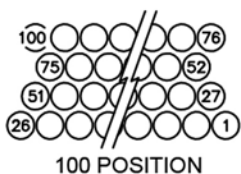


CONNECTOR MATING FACE



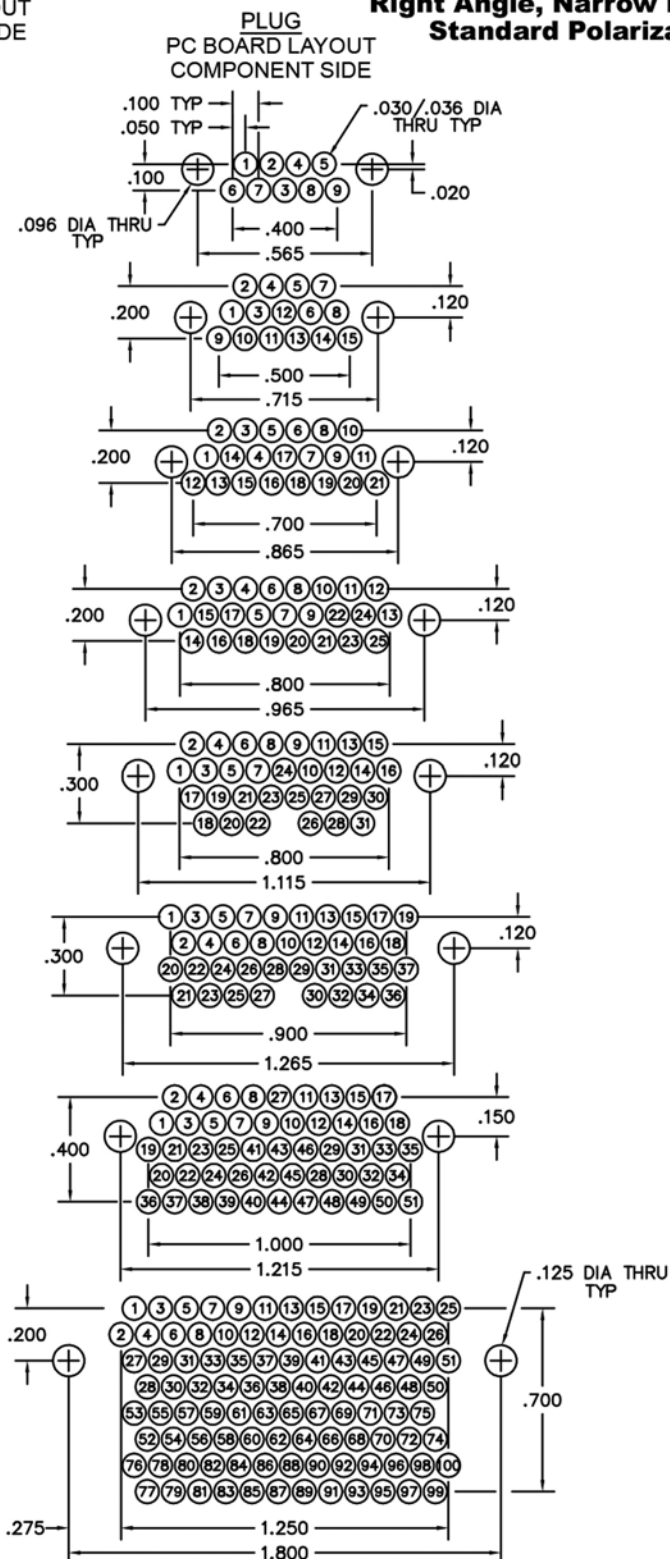
PC BOARD LAYOUT  
COMPONENT SIDE

CONNECTOR  
MATING FACE  
(PLUG)



## Recommended PC Board Layout

Right Angle, Narrow Footprint  
Standard Polarization



# Board (Narrow Footprint) to Cable .050"

9 thru 51 Contacts

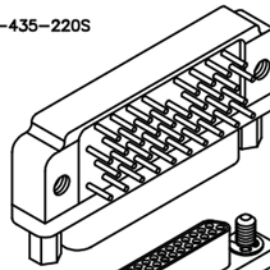
Low Profile Board Mount  
High Temperature

**MSHT**

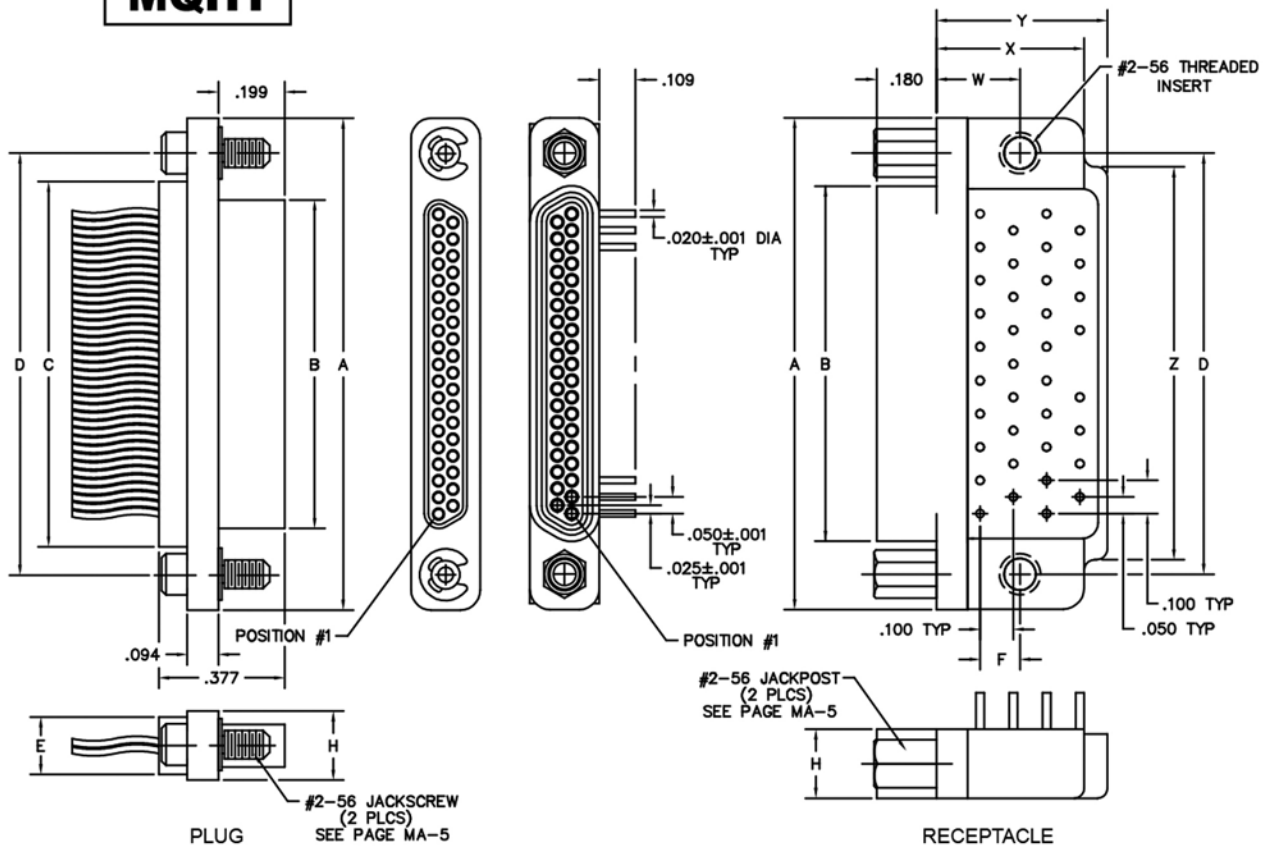
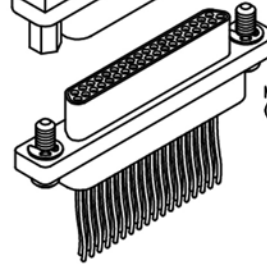
Low Profile Cable  
High Temperature

**MQHT**

MSHT-262-037-435-220S  
(METAL)



MQHT-212-037-161-41WS  
(METAL)



| DIMENSIONS |              |       |          |          |       |       |                  |       |      |      |       |       |       |               |
|------------|--------------|-------|----------|----------|-------|-------|------------------|-------|------|------|-------|-------|-------|---------------|
| SIZE       | CONTACT ROWS | A     | B        |          | C     | D     | E                | F     | H    | W    | X MAX | Y MAX | Z     | HARDWARE      |
|            |              |       | PLUG MAX | RCPT MAX |       |       | POTTING WELL MAX |       |      |      |       |       |       |               |
| 9          | 2            | .778  | .292     | .378     | .398  | .565  | .173             | .020  | .208 | .250 | .420  | .420  | .775  | #2-56 UNC THD |
| 15         |              | .928  | .442     | .528     | .548  | .715  |                  | .925  |      |      |       |       |       |               |
| 21         |              | 1.078 | .592     | .678     | .698  | .865  |                  | 1.075 |      |      |       |       |       |               |
| 25         |              | 1.178 | .692     | .778     | .798  | .965  |                  | 1.175 |      |      |       |       |       |               |
| 31         |              | 1.328 | .842     | .928     | .948  | 1.115 |                  | 1.080 |      |      |       |       |       |               |
| 37         |              | 1.478 | .992     | 1.078    | 1.098 | 1.265 |                  | 1.180 |      |      |       |       |       |               |
| 51         | 3            | 1.428 | .942     | 1.028    | 1.048 | 1.215 | .220             | .150  | .250 | .300 | .425  | .650  | 1.220 |               |

**PLUG:** MQHT-212-037-161-41WS  
**RECEPTACLE:** MSHT-262-037-433-220S  
 XXXX-XXX-XXX-XXX-XXXX

**PLUG**

**RECEPTACLE**

| SERIES                                                                                  |                                                                                       |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| MQHT .050" Low Profile Metal I/O Connector<br>(MQHT mates with MQHT & MSHT receptacles) | MSHT .050" Low Profile Metal PC Board Mount Connector<br>(MSHT mates with MQHT plugs) |

| BODY                                                                             |                                                                                                    |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 2 2-Row (Sizes 9 thru 37)<br>3 3-Row (Size 51)                                   | 2 2-Row (Sizes 9 thru 37)<br>3 3-Row (Size 51)                                                     |
| BODY STYLE:<br>1 Plug, straight, with ears. High temperature.                    | BODY STYLE:<br>6 Receptacle, right angle, narrow footprint, w/ threaded inserts. High temperature. |
| BODY MATERIAL:<br>2 High temperature thermoplastic with electroless nickel shell | BODY MATERIAL:<br>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:<br>11 Pin, straight, solder cup<br>14 Pin, straight, .500" pigtails (.018 dia)<br>15 Pin, straight, 1.000" pigtails (.018 dia)<br>16 Pin, straight, crimped wire | TYPE CONTACTS/TERMINATIONS:<br>43 Socket, right angle, dip solder, .109" x .020" dia<br>44 Socket, right angle, dip solder, .140" x .020" dia<br>45 Socket, right angle, dip solder, .172" x .020" dia |
| PLATING OPTIONS:<br>1 50 μ" Au contacts (crimp wire)<br>3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)                                                                     | PLATING OPTIONS:<br>3 50 μ" Au contacts: 10 μ" Au terminations                                                                                                                                         |

| HARDWARE                                                                                                                                                                                                                                                                                                                        |                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| STYLE OF HARDWARE:<br>00 None<br>41 Two turning jackscrews, allen head, retaining ring<br>42 Two long turning jackscrews, allen head, retaining ring<br>43 Two turning jackscrews, slot head, retaining ring<br>44 Two long turning jackscrews, slot head, retaining ring<br>45 Two turning jackscrews, allen head, captivated* | STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies |
| POLARIZATION / WIRING:<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                  | POLARIZATION / WIRING<br>0S Standard body polarization           |

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

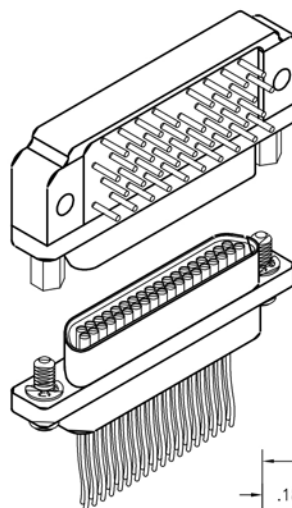
# Board (Narrow Footprint) to Cable

.050"  
9 thru 51 Contacts

Low Profile Board Mount    Low Profile Cable  
High Temperature            High Temperature

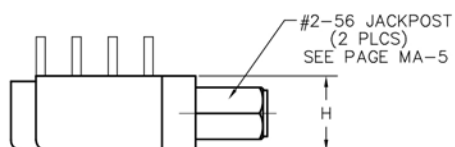
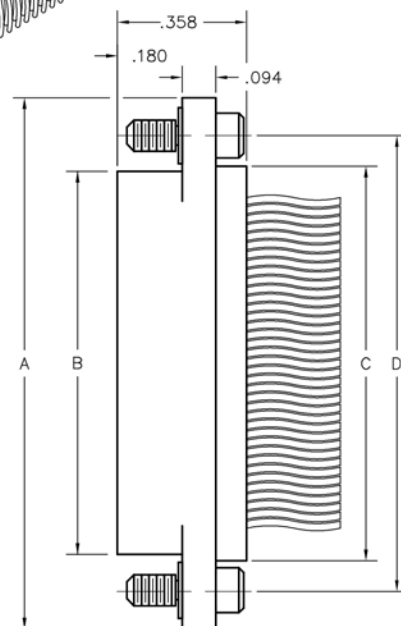
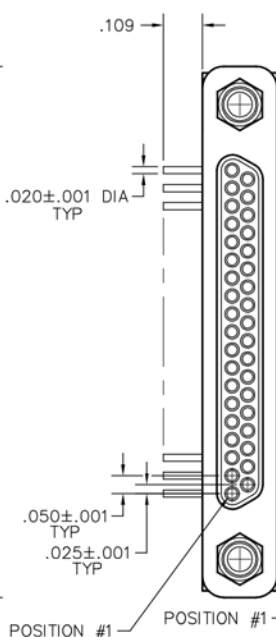
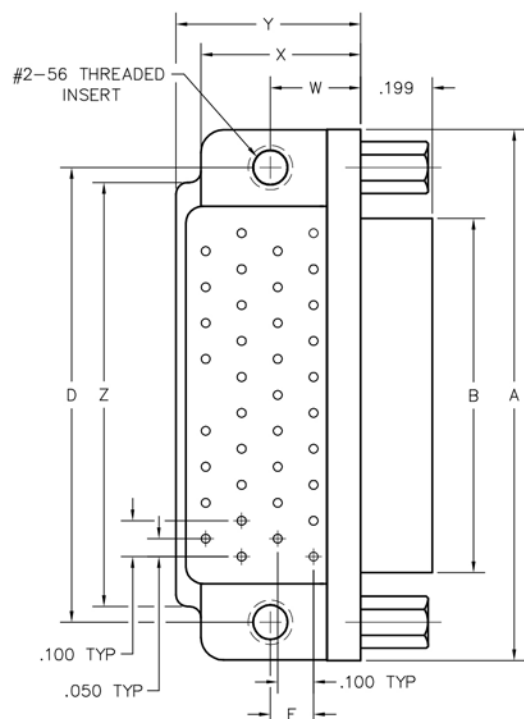
**MSHT**

**MQHT**

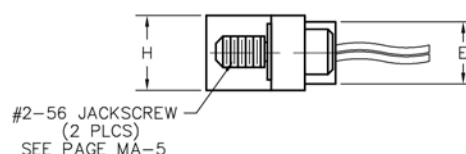


MSHT-252-037-325-220S  
(METAL)

MQHT-222-037-261-41WS  
(METAL)



PLUG



RECEPTACLE

| DIMENSIONS |              |       |          |          |       |       |                  |       |      |      |       |       |       |               |  |
|------------|--------------|-------|----------|----------|-------|-------|------------------|-------|------|------|-------|-------|-------|---------------|--|
| SIZE       | CONTACT ROWS | A     | B        |          | C     | D     | E                | F     | H    | W    | X MAX | Y MAX | Z     | HARDWARE      |  |
|            |              |       | PLUG MAX | RCPT MAX |       |       | POTTING WELL MAX |       |      |      |       |       |       |               |  |
| 9          | 2            | .778  | .292     | .378     | .398  | .565  | .173             | .020  | .208 | .250 | .420  | .420  | .775  | #2-56 UNC THD |  |
| 15         |              | .928  | .442     | .528     | .548  | .715  |                  | .120  |      |      |       |       | .925  |               |  |
| 21         |              | 1.078 | .592     | .678     | .698  | .865  |                  |       |      |      |       |       | 1.075 |               |  |
| 25         |              | 1.178 | .692     | .778     | .798  | .965  |                  | 1.175 |      |      |       |       |       |               |  |
| 31         |              | 1.328 | .842     | .928     | .948  | 1.115 |                  | .450  |      |      | .520  | 1.080 |       |               |  |
| 37         |              | 1.478 | .992     | 1.078    | 1.098 | 1.265 |                  | .450  |      |      |       | 1.180 |       |               |  |
| 51         | 3            | 1.428 | .942     | 1.028    | 1.048 | 1.215 | .220             | .150  | .250 | .300 | .425  | .650  | 1.220 |               |  |



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

**PLUG**

**RECEPTACLE**

| SERIES                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MSHT .050" Low Profile Metal PC Board Mount Connector<br>(MSHT mates with MQHT receptacles)                                                               | MQHT .050" Low Profile Metal I/O Connector<br>(MQHT mates with MQHT & MSHT plugs)                                                                                                                                                                                                                                               |
| BODY                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                 |
| 2 2-Row (Sizes 9 thru 37)                                                                                                                                 | 2 2-Row (Sizes 9 thru 37)                                                                                                                                                                                                                                                                                                       |
| 3 3-Row (Size 51)                                                                                                                                         | 3 3-Row (Size 51)                                                                                                                                                                                                                                                                                                               |
| BODY STYLE:<br>5 Plug, right angle, narrow footprint, w/ threaded inserts. High temperature.                                                              | BODY STYLE:<br>2 Receptacle, straight, with ears. High temperature.                                                                                                                                                                                                                                                             |
| BODY MATERIAL:<br>2 High temperature thermoplastic with electroless nickel shell                                                                          | BODY MATERIAL:<br>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:<br>32 Pin, right angle, dip solder, .109"<br>33 Pin, right angle, dip solder, .140"<br>34 Pin, right angle, dip solder, .172" | TYPE CONTACTS/TERMINATIONS:<br>21 Socket, straight, solder cup<br>24 Socket, straight, .500" pigtails (.018 dia)<br>25 Socket, straight, 1.000" pigtails (.018 dia)<br>26 Socket, straight, crimped wire                                                                                                                        |
| PLATING OPTIONS:<br>3 50 μ" Au contacts: 10 μ" Au terminations                                                                                            | PLATING OPTIONS:<br>1 50 μ" Au contacts (crimp wire)<br>3 50 μ" Au contacts: 10 μ" Au terminations (solder cup, pigtail)                                                                                                                                                                                                        |
| HARDWARE                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                 |
| STYLE OF HARDWARE:<br>00 None<br>22 Two fixed jacknut assemblies                                                                                          | STYLE OF HARDWARE:<br>00 None<br>41 Two turning jackscrews, allen head, retaining ring<br>42 Two long turning jackscrews, allen head, retaining ring<br>43 Two turning jackscrews, slot head, retaining ring<br>44 Two long turning jackscrews, slot head, retaining ring<br>45 Two turning jackscrews, allen head, captivated* |
| POLARIZATION / WIRING:<br>0S Standard body polarization                                                                                                   | POLARIZATION / WIRING<br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                                                                                                                                                                   |

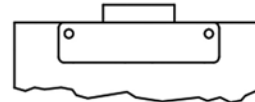
\* = Captive hardware is factory installed and non-removable.

# Recommended PC Board Layout

Right Angle, Narrow Footprint  
Standard Polarization



CONNECTOR MATING FACE

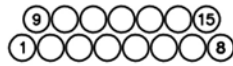


PC BOARD LAYOUT  
COMPONENT SIDE

CONNECTOR  
MATING FACE  
(RECEPTACLE)



9 POSITION



15 POSITION



21 POSITION



25 POSITION



31 POSITION

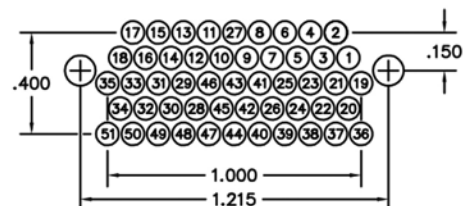
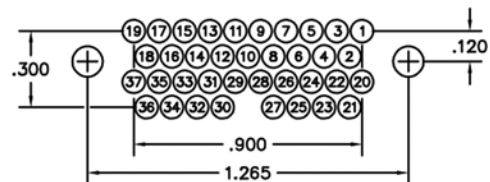
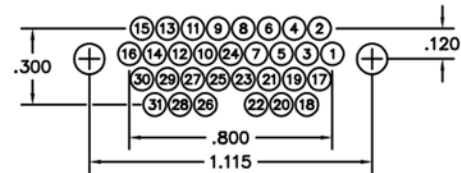
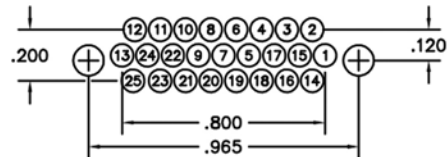
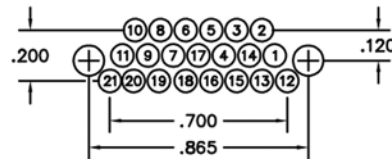
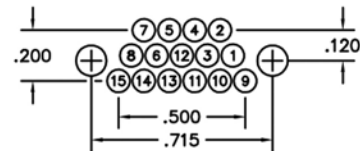
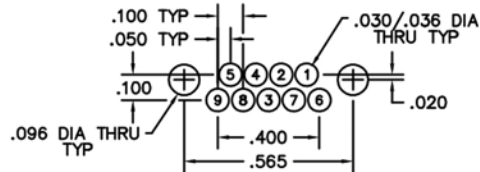


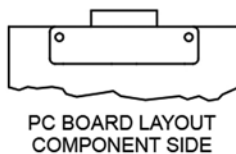
37 POSITION



51 POSITION

RECEPTACLE  
PC BOARD LAYOUT  
COMPONENT SIDE

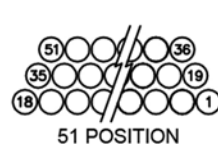




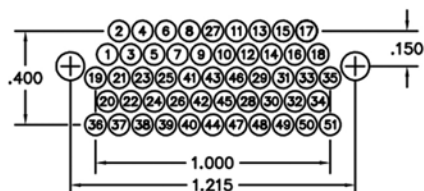
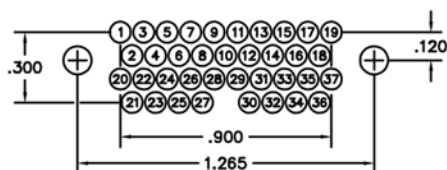
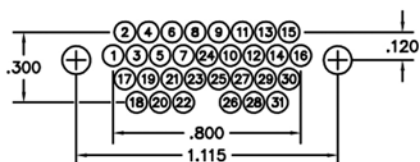
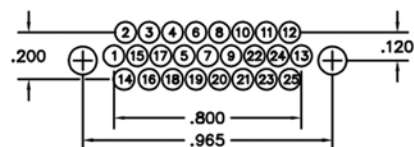
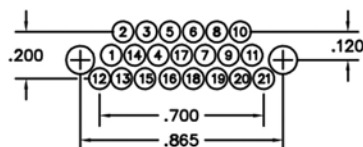
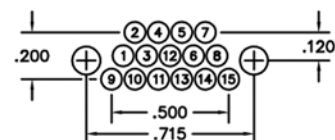
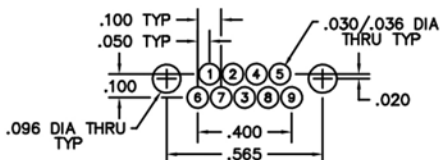
## Recommended PC Board Layout

Right Angle, Narrow Footprint  
Standard Polarization

CONNECTOR  
MATING FACE  
(PLUG)



PLUG  
PC BOARD LAYOUT  
COMPONENT SIDE



# Cable to Board

**.050"**

**9 thru 51 Contacts**

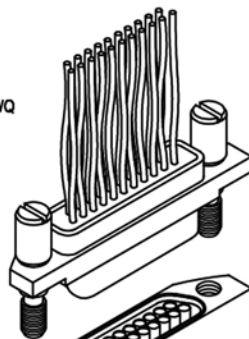
**Low Profile Cable  
High Temperature**

**MTHT**

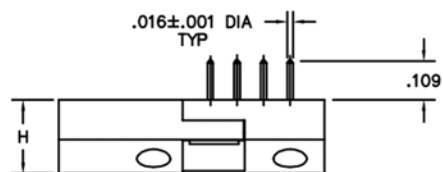
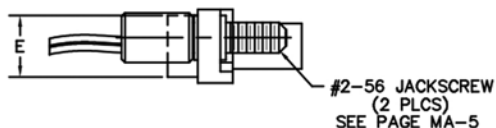
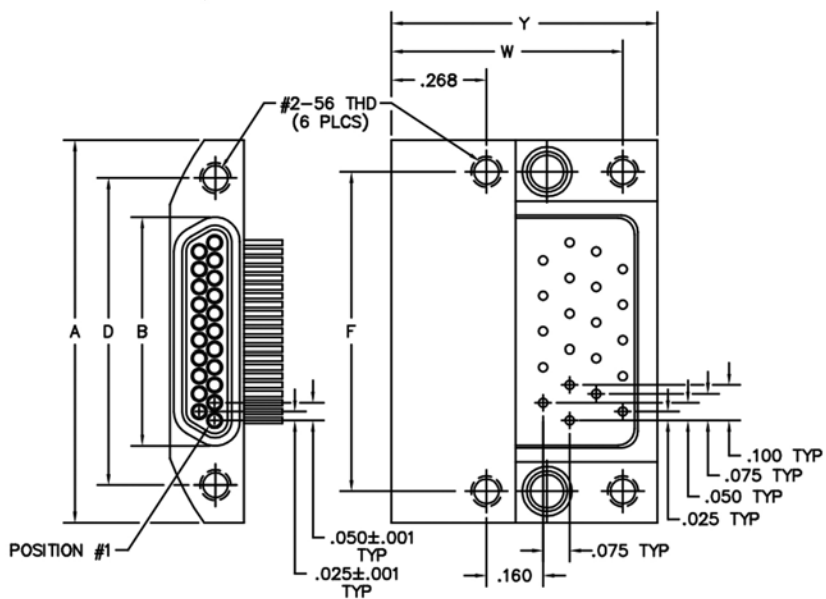
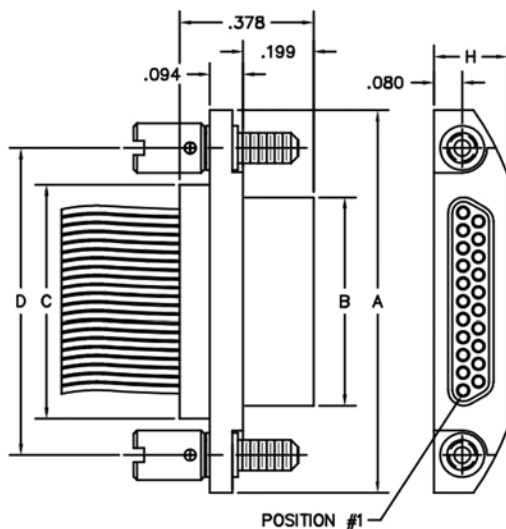
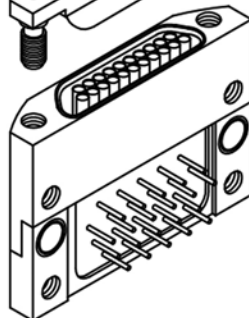
**Low Profile Board Mount  
High Temperature**

**MTHT**

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



MTHT-2E2-021-433-000S  
(METAL)



PLUG

RECEPTACLE

| DIMENSIONS |              |       |          |          |       |       |                  |       |      |                                  |      |      |
|------------|--------------|-------|----------|----------|-------|-------|------------------|-------|------|----------------------------------|------|------|
| SIZE       | CONTACT ROWS | A     | B        |          | C     | D     | E                | F     | H    | HARDWARE                         | W    | Y    |
|            |              |       | PLUG MAX | RCPT MAX |       |       | POTTING WELL MAX |       |      |                                  |      |      |
| 9          | 2            | .778  | .292     | .378     | .398  | .565  | .173             | .600  | .208 | #2-56 UNC THD<br>(.092 DIA THRU) | .608 | .690 |
| 15         |              | .928  | .442     | .528     | .548  | .715  |                  | .750  |      |                                  |      |      |
| 21         |              | 1.078 | .592     | .678     | .698  | .865  |                  | .900  |      |                                  |      |      |
| 25         |              | 1.178 | .692     | .778     | .798  | .965  |                  | 1.000 |      |                                  |      |      |
| 31         |              | 1.328 | .842     | .928     | .948  | 1.115 |                  | 1.150 |      |                                  |      |      |
| 37         | 3            | 1.478 | .992     | 1.078    | 1.098 | 1.265 | .220             | 1.300 | .250 |                                  | .728 | .825 |
| 51         |              | 1.428 | .942     | 1.028    | 1.048 | 1.215 |                  | 1.250 |      |                                  |      |      |

PLUG: MTHT- 212- 021- 161- 43WQ  
 RECEPTACLE: MTHT- 2E2- 021- 433- 000S  
 XXXX- XXX- XXX- XXX- XXXX

**PLUG**

**RECEPTACLE**

|                                                                                                                                                                                                     |                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SERIES</b>                                                                                                                                                                                       |                                                                                                                                                                                                                  |
| MTHT .050" Low Profile Metal I/O Connector<br>(MTHT mates with MTHT receptacles)                                                                                                                    | MTHT .050" Low Profile Metal PC Board Mount Connector<br>(MTHT mates with MTHT plugs)                                                                                                                            |
| <b>BODY</b>                                                                                                                                                                                         |                                                                                                                                                                                                                  |
| 2 2-Row (Sizes 9 thru 37)                                                                                                                                                                           | 2 2-Row (Sizes 9 thru 37)                                                                                                                                                                                        |
| 3 3-Row (Size 51)                                                                                                                                                                                   | 3 3-Row (Size 51)                                                                                                                                                                                                |
| <b>BODY STYLE:</b><br>1 Plug, straight, with ears. Low profile, radius.<br>High temperature.                                                                                                        | <b>BODY STYLE:</b><br>E Receptacle, right angle, with four mounting holes.<br>Low profile, radius. High temperature.                                                                                             |
| <b>BODY MATERIAL:</b><br>2 High temperature thermoplastic with electroless<br>nickel shell                                                                                                          | <b>BODY MATERIAL:</b><br>2 High temperature thermoplastic with electroless<br>nickel shell                                                                                                                       |
| <b>SIZE</b>                                                                                                                                                                                         |                                                                                                                                                                                                                  |
| XXX 009, 015, 021, 025, 031, 037, 051                                                                                                                                                               | XXX 009, 015, 021, 025, 031, 037, 051                                                                                                                                                                            |
| <b>CONTACTS</b>                                                                                                                                                                                     |                                                                                                                                                                                                                  |
| <b>TYPE CONTACTS/TERMINATIONS:</b><br>11 Pin, straight, solder cup<br>14 Pin, straight, .500" pigtails (.018 dia)<br>15 Pin, straight, 1.000" pigtails (.018 dia)<br>16 Pin, straight, crimped wire | <b>TYPE CONTACTS/TERMINATIONS:</b><br>43 Socket, right angle, gold plated, .109" x .016" dia<br>44 Socket, right angle, gold plated, .140" x .016" dia<br>45 Socket, right angle, gold plated, .172" x .016" dia |
| <b>PLATING OPTIONS:</b><br>1 50 µ" Au contacts (crimp wire)<br>3 50 µ" Au contacts: 10 µ" Au terminations<br>(solder cup, pigtail)                                                                  | <b>PLATING OPTIONS:</b><br>3 50 µ" Au contacts: 10 µ" Au terminations                                                                                                                                            |
| <b>HARDWARE</b>                                                                                                                                                                                     |                                                                                                                                                                                                                  |
| <b>STYLE OF HARDWARE:</b><br>00 None<br>41 Two turning jackscrews, allen head<br>43 Two turning jackscrews, slot head                                                                               | <b>STYLE OF HARDWARE:</b><br>00 Integrated jacknuts                                                                                                                                                              |
| <b>POLARIZATION / WIRING:</b><br>00 None<br>XX For wiring codes, see page MA-3 & MA-4                                                                                                               | <b>POLARIZATION / WIRING</b><br>0S Standard body polarization                                                                                                                                                    |





CONNECTOR MATING FACE

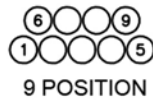


PC BOARD LAYOUT  
COMPONENT SIDE

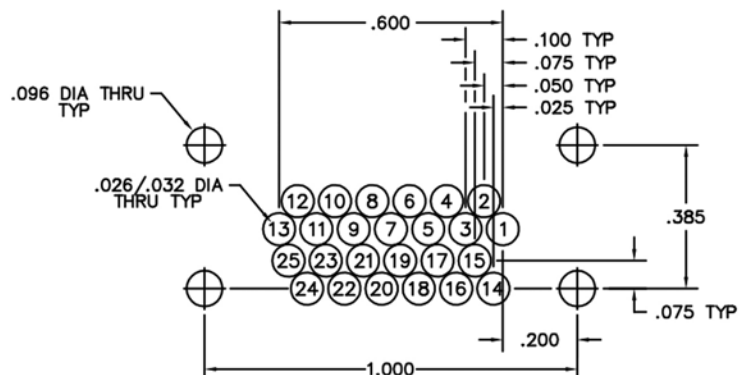
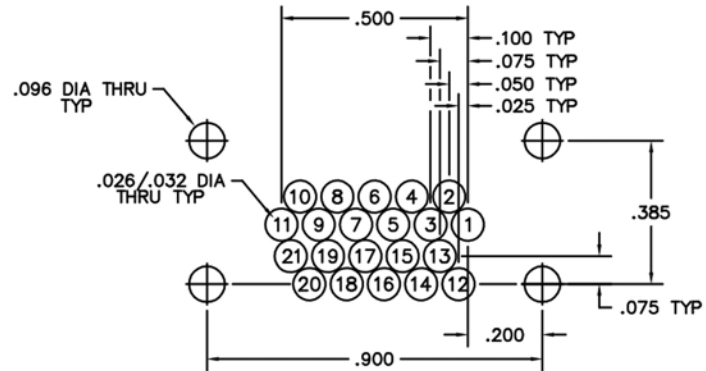
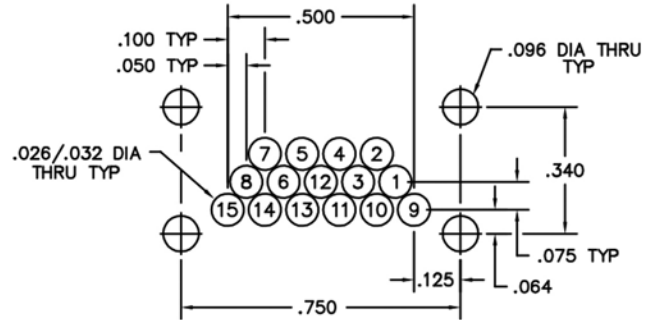
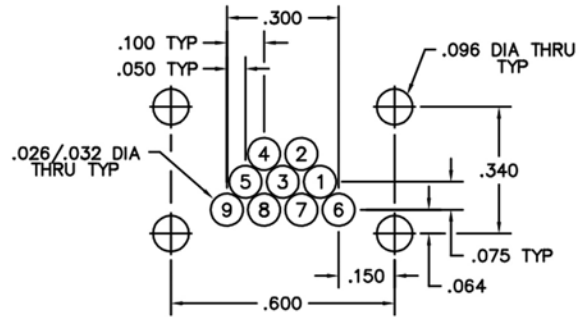
# Recommended PC Board Layout

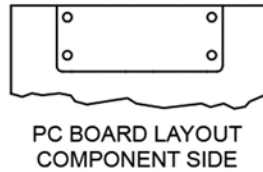
Low Profile, Right Angle  
Standard Polarization

CONNECTOR  
MATING FACE  
(RECEPTACLE)



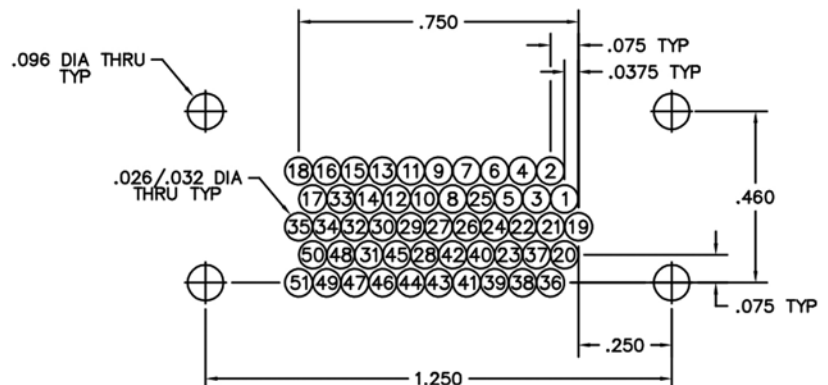
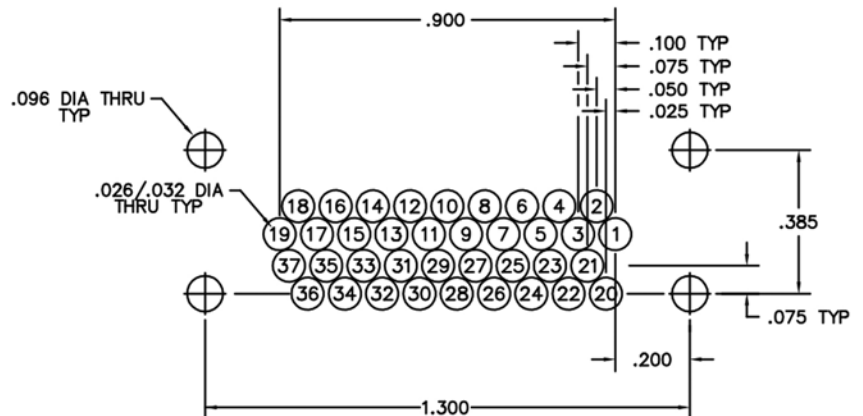
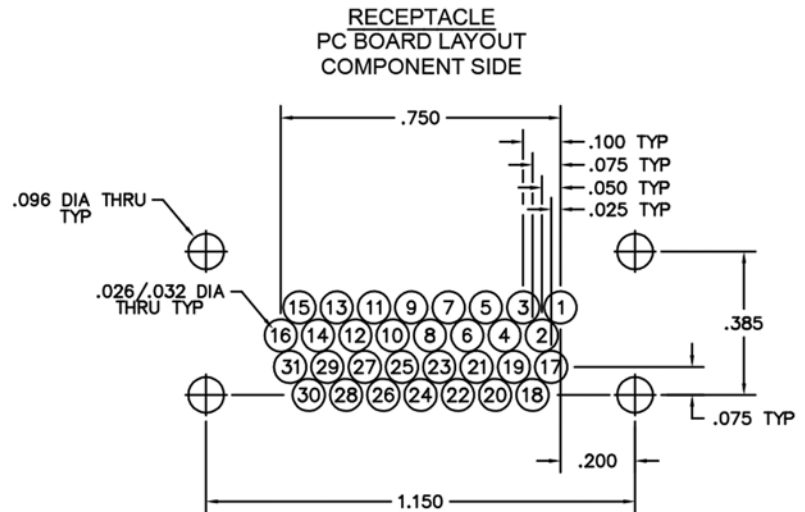
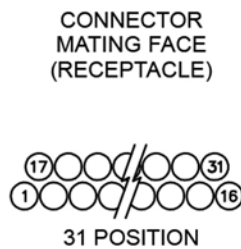
RECEPTACLE  
PC BOARD LAYOUT  
COMPONENT SIDE





## Recommended PC Board Layout

Low Profile, Right Angle  
Standard Polarization



## **"M" SERIES ACCESSORIES**

# Contents

## "M" Series

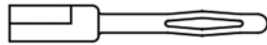
### Hardware, Contacts and Accessories

#### Wire Codes, Contacts and Hardware

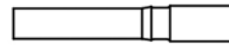
|            |                                                         |
|------------|---------------------------------------------------------|
| MA-2       | Contacts, contact positions and connector polarization  |
| MA-3, MA-4 | Wire codes (24 awg, 26 awg, 28 awg and twisted pairs)   |
| MA-5       | Hardware - MM, MN, MP, MQ, MMHT and MQHT                |
| MA-6       | Keying hardware                                         |
| MA-7       | Hardware - MM, MQ, EMI and Rear Panel Mount (MM and MK) |
| MA-8       | Hardware - Miscellaneous                                |

#### Accessories

|       |                                                             |
|-------|-------------------------------------------------------------|
| MA-11 | Connector savers, rugged (metal - MQ and plastic - MN)      |
| MA-13 | Connector savers, low profile (metal - MQ and plastic - MN) |
| MA-15 | EMI/RFI backshells, straight exit, rugged (metal - MM)      |
| MA-17 | EMI/RFI backshells, 45° exit, rugged (metal - MM)           |
| MA-19 | EMI/RFI backshells, 90° exit, rugged (metal - MM)           |
| MA-21 | EMI/RFI backshells, straight exit, low profile (metal - MQ) |
| MA-23 | Dust covers, rugged (metal - MD)                            |
| MA-25 | ESD dust covers, rugged and low profile (plastic - MD)      |
| MA-26 | O-rings and gaskets                                         |
| MA-27 | Rear Panel Mount Hardware                                   |
| MA-28 | Panel cut-outs, MM connectors with grounding fingers        |



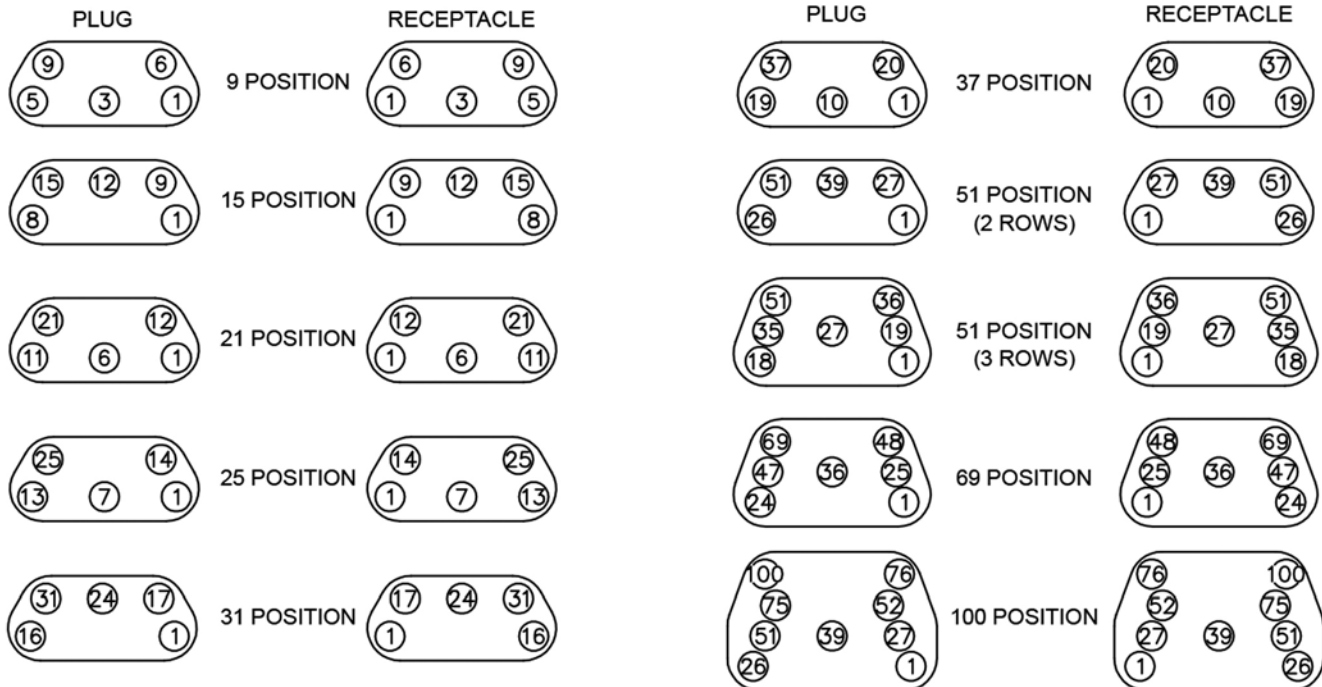
PIN CONTACT  
WITH CRIMP BARREL



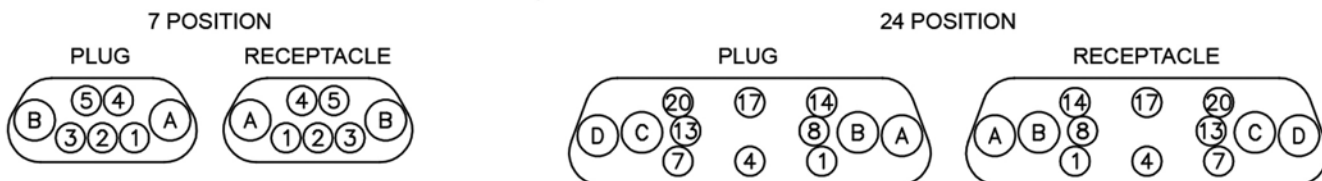
SOCKET CONTACT  
WITH CRIMP BARREL

## Contacts

## 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 & MS)

Only standard polarization option applies to PC board mounted, right angle,  
high temperature connectors. (Series MKHT, MSHT & MHT)



## Wire Codes

### 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  | WD  | 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  | 1D  | 1E  | XD  | 1G  | 1H  | 1J  | 1K  | 1L  | 1M  | 1N  | 1P  | 1Q   | 1R   |
| WHITE        | XE | XF  | XG  | 2D  | 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  | BD  | BE  | BF  | BG  | BH  | BJ  | BK  | BL  | BM  | BN  | BP  | BQ   | BR   |

### TWISTED PAIR per NEMA WC27500-XXSC2U00 (SAE AS22759/33)\*\*\* ☒

|        | 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  | KD  | KE  | KF  | KG  | KH  | KJ  | KK  | KL  | KM  | KN  | KP  | KQ   | KR   |

For twisted pair wire connect charts, see page MA-9

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

\* = Connectors with more than 100 contacts will repeat color code 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.

☒ = Option not RoHS compliant

# Wire Codes

## 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\*\*\* ☒

|          | 6" | 12" | 18" | 24" | 30" | 36" | 42" | 48" | 54" | 60" | 66" | 72" | 84" | 96" | 108" | 120" |
|----------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| M83513** | LA | LB  | LC  | LD  | 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\*\*\* ☒

|          | 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   |

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

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

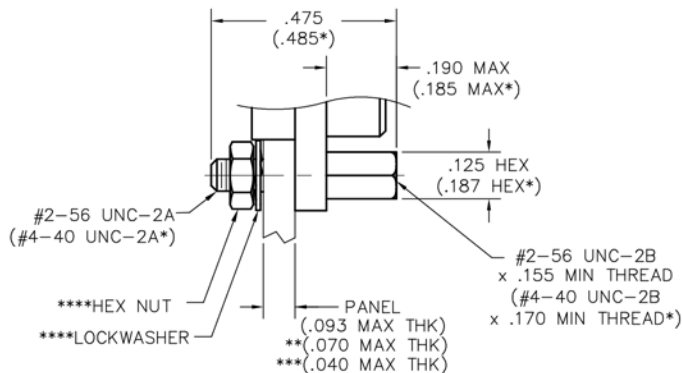
\*\*\* = Per M83513, corrosion has been experienced on connectors that are pre-wired with 22759/33 and stored in sealed environments.

Caution should be exercised when using this wire.

☒ = Option not RoHS compliant

# Hardware

## MM - MN - MQ - MP - MMHT - MQHT Jacking Hardware

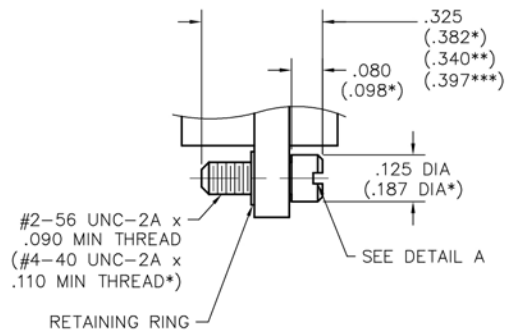


### JACKPOST ASSEMBLY

|                |                     |
|----------------|---------------------|
| #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 |

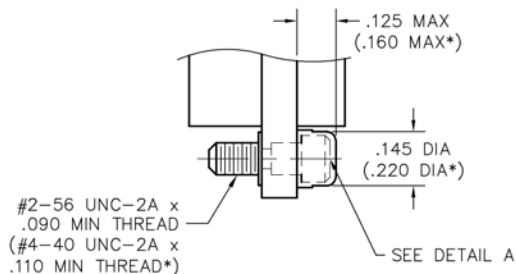


### SHORT TURNING JACKSCREW ASSEMBLY

|                             |                     |
|-----------------------------|---------------------|
| #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 |

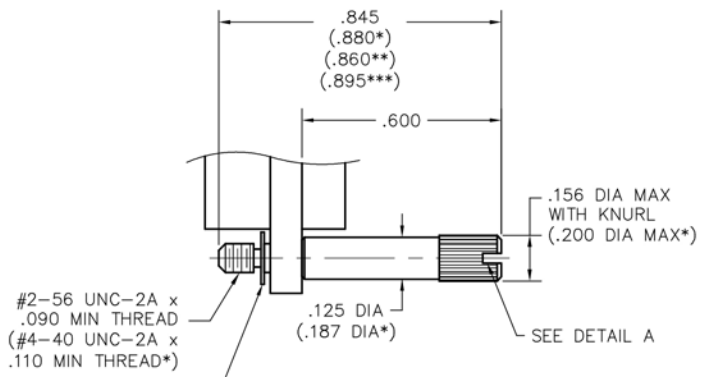
### FOR RECEPTACLES WITH GROUNDING FINGERS

|                             |                         |
|-----------------------------|-------------------------|
| #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

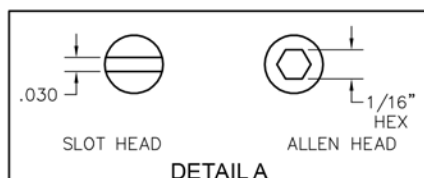


### LONG TURNING JACKSCREW ASSEMBLY

|                             |                     |
|-----------------------------|---------------------|
| #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 |

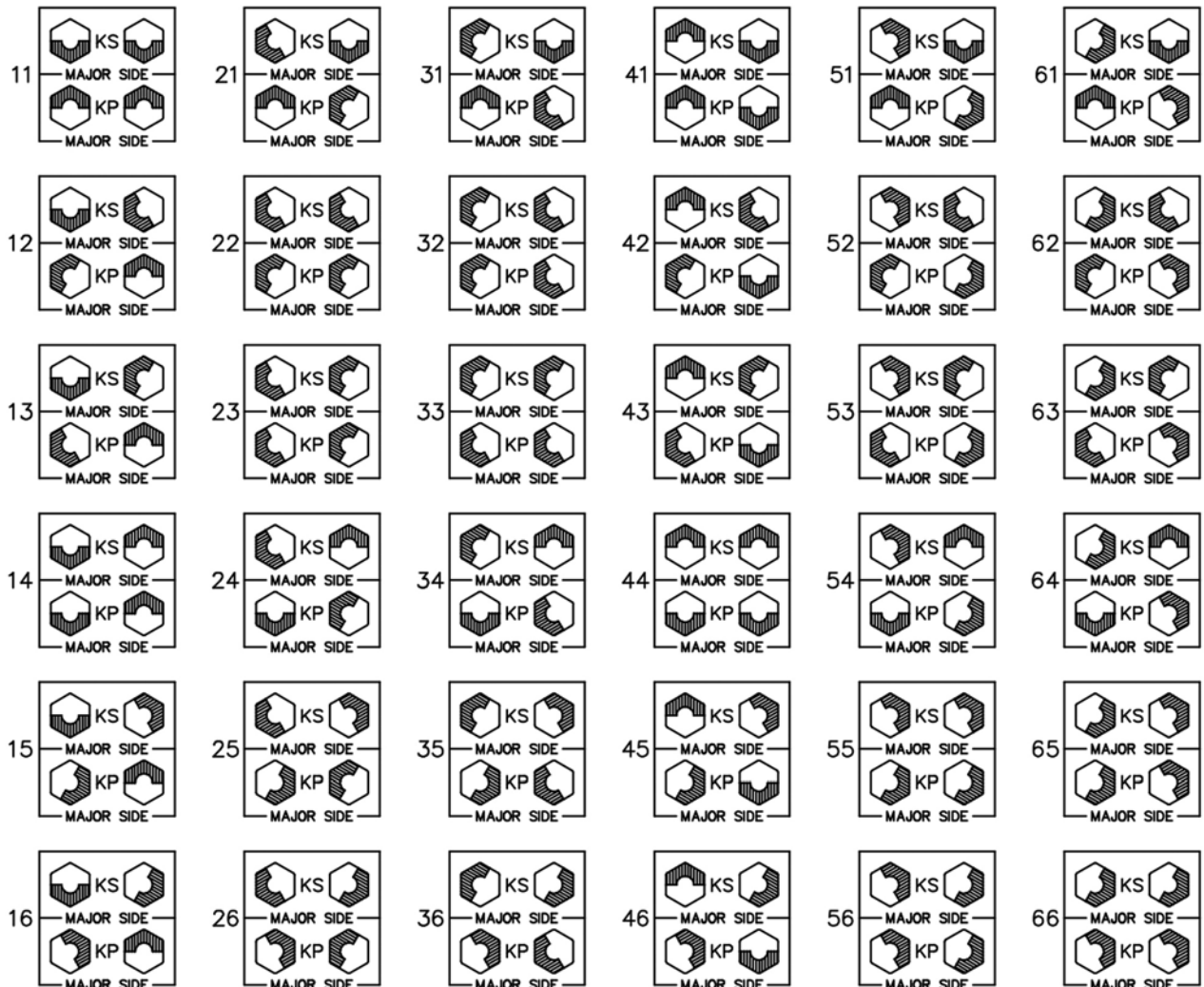
### FOR RECEPTACLES WITH GROUNDING FINGERS

|                             |                         |
|-----------------------------|-------------------------|
| #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 |



- \* = 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 a flat washers, lockwashers, and spanner nuts

# Polarized Keying Hardware

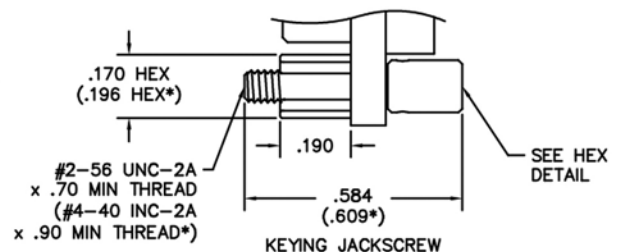
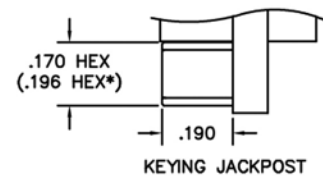
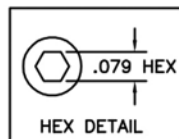
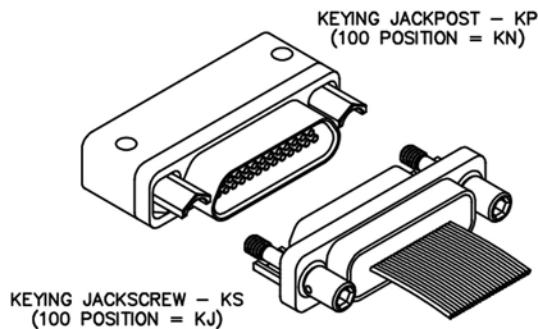


Select the appropriate two digit number above and include as the last two digits of the hardware code in the part number.  
(Keying hardware is factory installed and non-removable).

Example:

MM-213-025-161-99WA-KS11

MK-263-025-435-990S-KP11

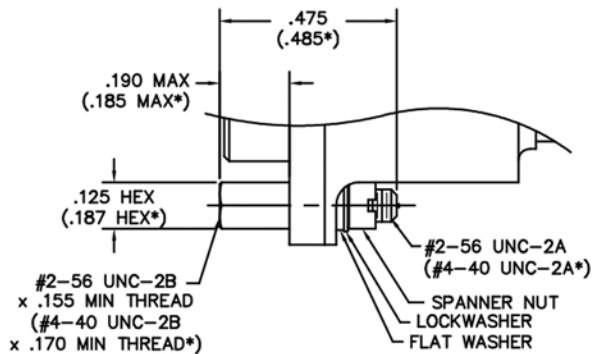


\* = Dimensions for 100 position connectors



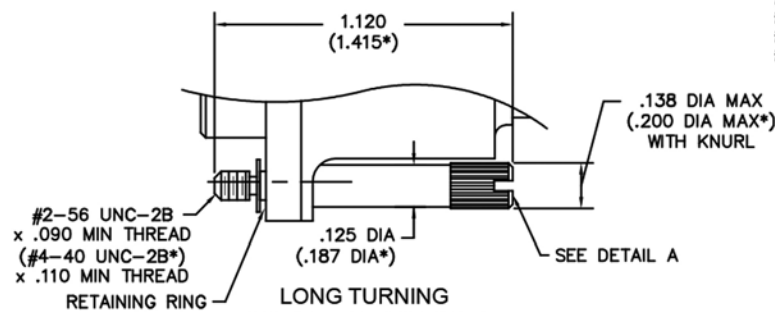
# Hardware

## 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

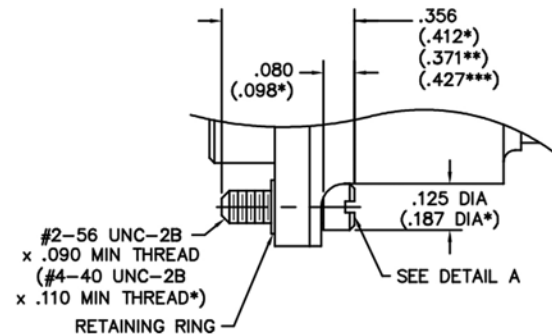


LONG TURNING  
JACKSCREW ASSEMBLY

#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

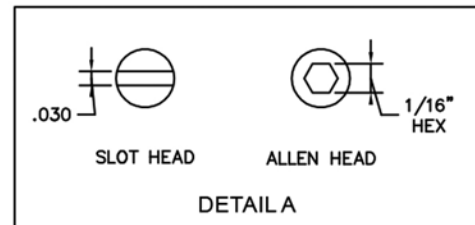


SHORT TURNING  
JACKSCREW ASSEMBLY

#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

### 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

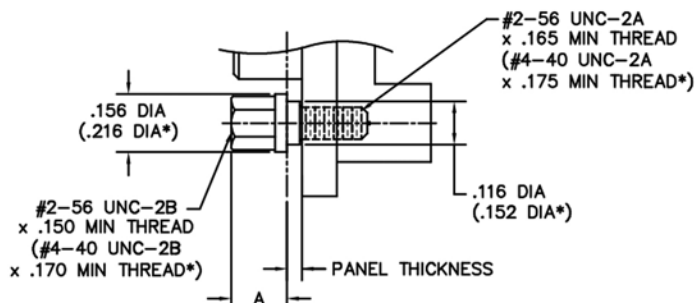


\* = Dimensions for #4-40 hardware (100 position connectors)

\*\* = 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"



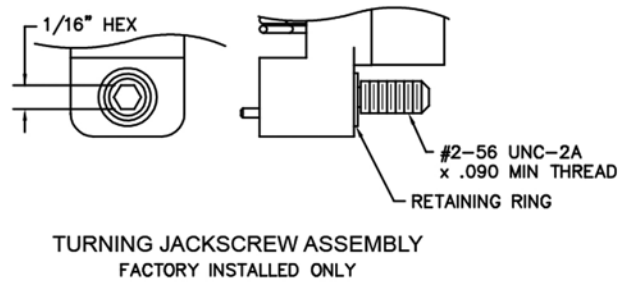
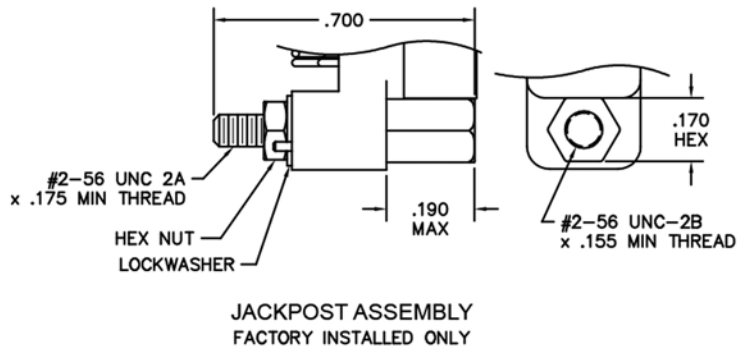
| PANEL THK | THREAD SIZE | PART NUMBER             | A MAX |
|-----------|-------------|-------------------------|-------|
| .040      | #2-56       | MM-000-000-000-2400-0D1 | .150  |
| .060      |             | MM-000-000-000-2600-0D3 | .130  |
| .070      |             | MM-000-000-000-2800-0D5 | .120  |
| .080      |             | MM-000-000-000-2900-0D7 | .110  |
| .040      |             | MM-000-000-000-6400-0D2 | .150  |
| .060      | #4-40       | MM-000-000-000-6600-0D4 | .130  |
| .070      |             | MM-000-000-000-6800-0D6 | .120  |
| .080      |             | MM-000-000-000-6900-0D8 | .110  |

\* = Dimensions for 100 position connectors

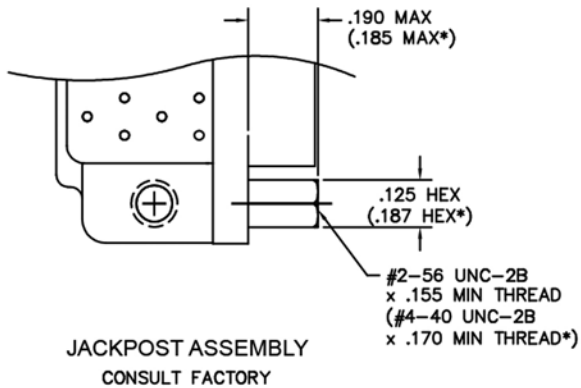


# Hardware

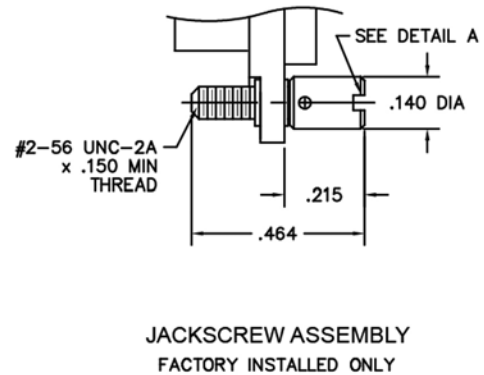
## MK Vertical SMT



## MK - MS MKHT - MSHT

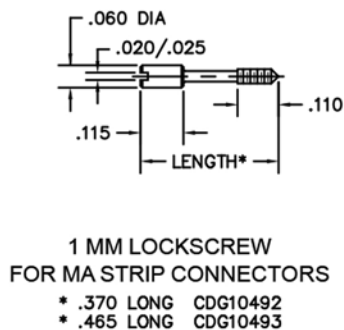


## MHT

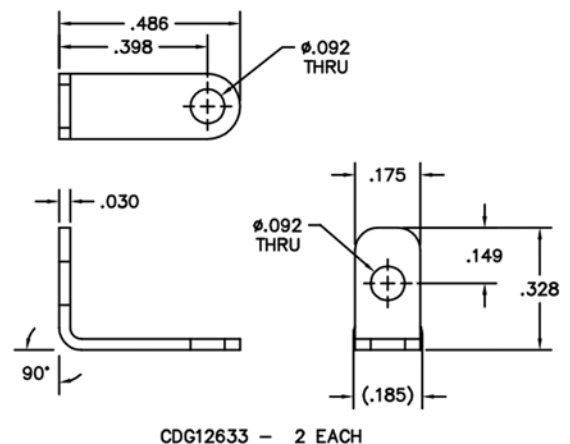


\* = Dimensions for 100 position connectors

## MA

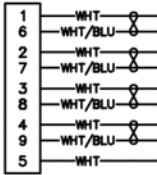


## Mounting Bracket

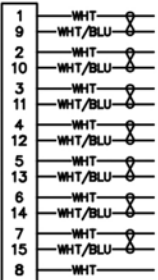


# Twisted Pair Wire Connect Charts

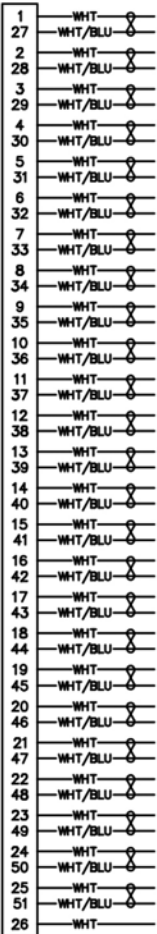
9 POSITION



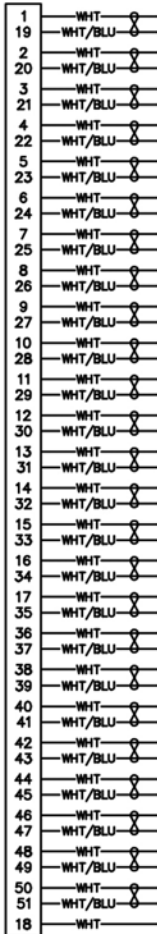
15 POSITION



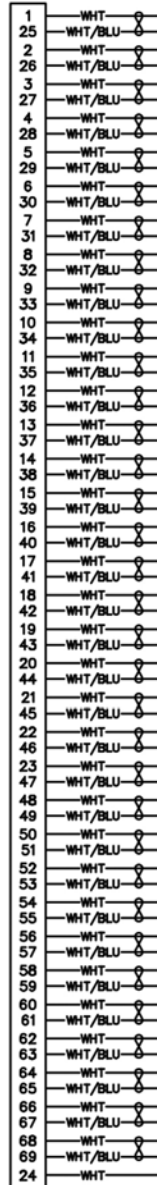
51 POSITION  
2 rows



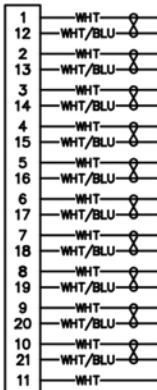
51 POSITION  
3 rows



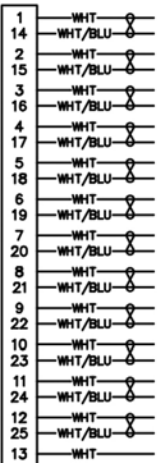
69 POSITION



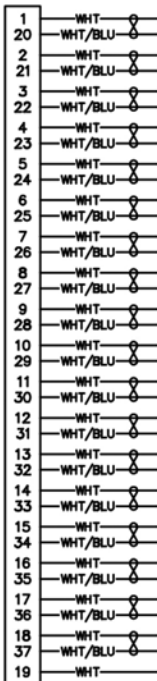
21 POSITION



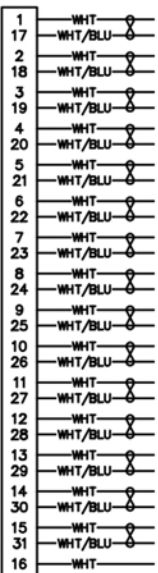
25 POSITION



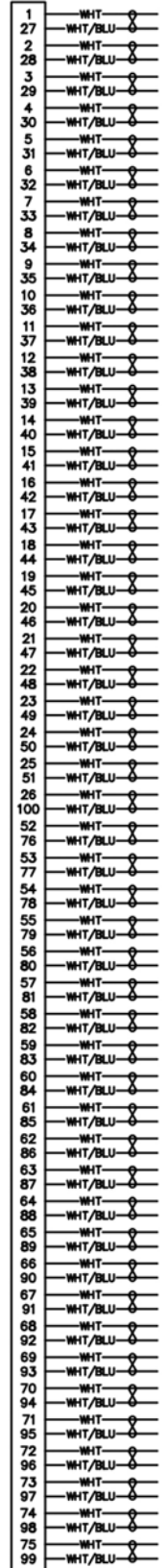
37 POSITION



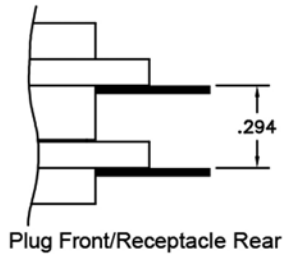
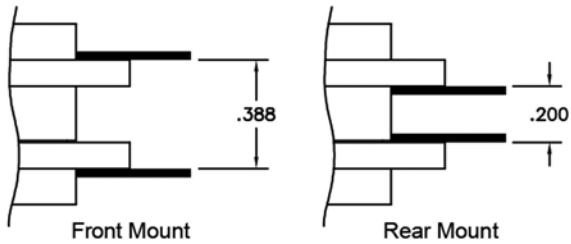
31 POSITION



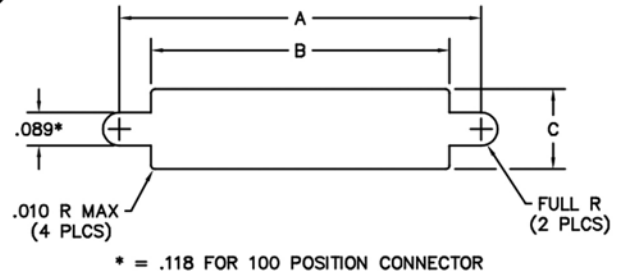
100 POSITION



## Panel Mounting Dimensions



MOUNTING DIMENSIONS

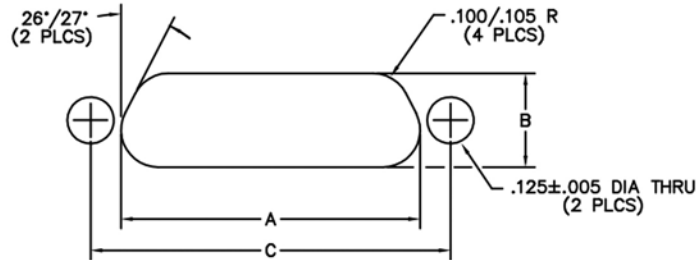


| DIMENSIONS   |      |                     |                     |                              |                              |
|--------------|------|---------------------|---------------------|------------------------------|------------------------------|
| CONTACT ROWS | SIZE | A<br>+.004<br>-.000 | B<br>+.005<br>-.000 | C<br>+.004<br>-.000          |                              |
|              |      |                     |                     | MP, MQ, MR, MS<br>MQHT, MSHT | MK, ML, MM, MN<br>MKHT, MMHT |
| 2            | 9    | .570                | .400                | .215                         | .273                         |
|              | 15   | .720                | .550                |                              |                              |
|              | 21   | .870                | .700                |                              |                              |
|              | 25   | .970                | .800                |                              |                              |
|              | 31   | 1.120               | .950                |                              |                              |
|              | 37   | 1.270               | 1.100               |                              |                              |
| 3            | 51   | 1.620               | 1.450               | .256                         | .311                         |
|              | 69   | 1.220               | 1.050               |                              |                              |
| 4            | 100  | 1.520               | 1.350               | .215                         | .273                         |
|              |      | 1.805               | 1.435               | —                            | .383                         |

## Panel Mounting Dimensions for Rear Panel Mount Connectors

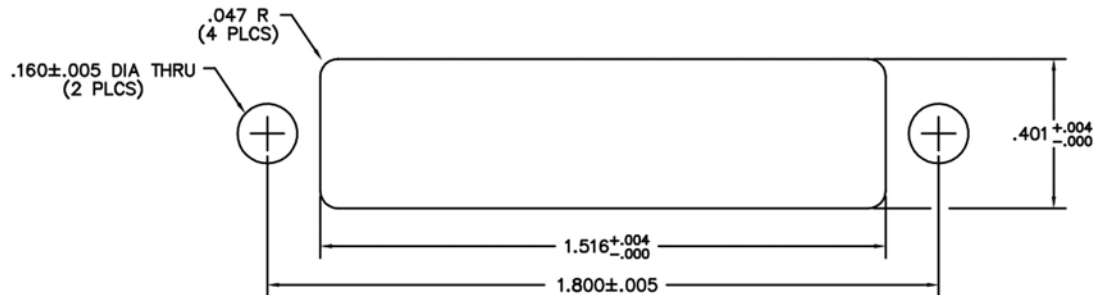
RUGGED METAL  
MM, MN, MK, ML  
SIZES: 9 - 69

| DIMENSIONS |                     |                     |            |
|------------|---------------------|---------------------|------------|
| SIZE       | A<br>+.004<br>-.000 | B<br>+.005<br>-.000 | C<br>±.005 |
| 9          | .401                | .252                | .565       |
| 15         | .551                |                     | .715       |
| 21         | .701                |                     | .865       |
| 25         | .801                |                     | .965       |
| 31         | .951                |                     | 1.115      |
| 37         | 1.101               |                     | 1.265      |
| 51         | 1.451               | .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<br>+.004<br>-.000 | B<br>+.005<br>-.000 | C<br>±.005 |
| 9          | .379                | .219                | .565       |
| 15         | .529                |                     | .715       |
| 21         | .679                |                     | .865       |
| 25         | .779                |                     | .965       |
| 31         | .929                |                     | 1.115      |
| 37         | 1.079               |                     | 1.265      |
| 51         | 1.029               | .261                | 1.215      |



RUGGED METAL  
MM, MN, MK, ML  
SIZE 100

# Connector Saver

.050"

9 thru 100 Contacts

Rugged Metal

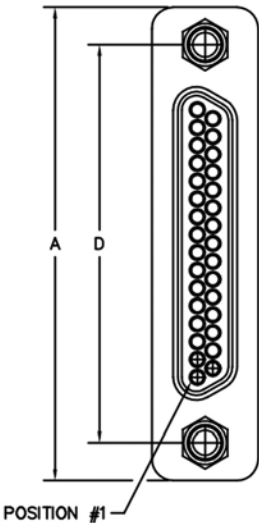
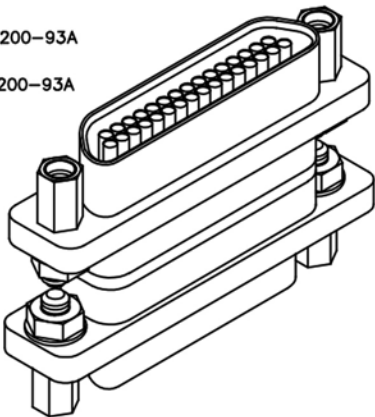
MM

Rugged Plastic

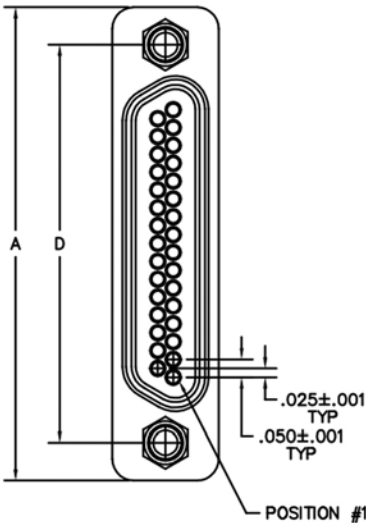
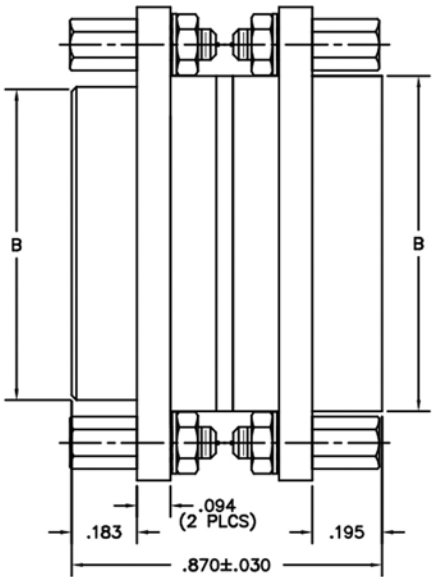
MN

MM-212-031-143-2200-93A  
(METAL)

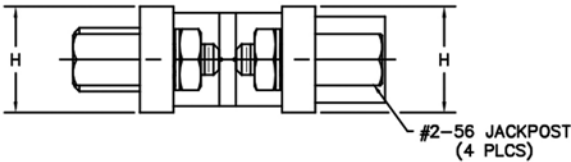
MN-211-031-143-2200-93A  
(PLASTIC)



PLUG



RECEPTACLE



| DIMENSIONS |              |       |          |          |       |      |                                  |
|------------|--------------|-------|----------|----------|-------|------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B        |          | D     | H    | HARDWARE                         |
|            |              |       | PLUG MAX | RCPT MAX |       |      |                                  |
| 9          | 2            | .775  | .334     | .400     | .565  | .298 | #2-56 UNC THD<br>(.092 DIA THRU) |
| 15         |              | .925  | .484     | .550     | .715  |      |                                  |
| 21         |              | 1.075 | .634     | .700     | .865  |      |                                  |
| 25         |              | 1.175 | .734     | .800     | .965  |      |                                  |
| 31         |              | 1.325 | .884     | .950     | 1.115 |      |                                  |
| 37         |              | 1.475 | 1.034    | 1.100    | 1.265 |      |                                  |
| 51**       | 3            | 1.825 | 1.384    | 1.450    | 1.615 | .341 | #4-40 UNC THD<br>(.147 DIA THRU) |
| 51         |              | 1.425 | .984     | 1.050    | 1.215 |      |                                  |
| 69***      |              | 1.725 | 1.284    | 1.350    | 1.515 |      |                                  |
| 100        | 4            | 2.160 | 1.384    | 1.508    | 1.800 | .384 |                                  |

\*\* = 2 ROW, 51 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY (NON MIL-SPEC INTERFACE)  
\*\*\* = 69 POSITION CONNECTORS ARE AVAILABLE IN METAL ONLY.

PLUG/RECEPTACLE: MM- 212 - 031 - 143 - 2200 - 93A  
 MN- 211 - 031 - 143 - 2200 - 93A  
 XX-XXX-XXX-XXX-XXXX-XXX

## SERIES

MM .050" Rugged Metal  
 MN .050" Rugged Plastic

## BODY

- 2 2-Row (Sizes 9 thru 51\*\*)
- 3 3-Row (Size 51 & 69\*\*\*)
- 4 4-Row (Size 100)

### BODY STYLE:

- 1 Plug/Receptacle, straight with mounting ears, receptacle includes interfacial sealing gasket

### BODY MATERIAL:

- 1 Polyphenylene Sulfide (MN only)
- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
- 4 Polyphenylene Sulfide with hard anodized black shell

## SIZE

XXX 009, 015, 021, 025, 031, 037, 051\*\*, 069\*\*\*, 100

## CONTACTS

### TYPE CONTACTS/TERMINATIONS:

- 14 Pin/Socket, straight

### PLATING OPTIONS:

- 3 50  $\mu$ " Au contacts: 10  $\mu$ " Au terminations

## HARDWARE

### STYLE OF HARDWARE:

- 00 None
- 22 Two fixed jacknut assemblies (62\*)
- JA Turning jackpost with retaining ring, uninstalled (PA\*)
- JP Turning jackpost, internal thread on plug side (PP\*)
- JS Turning jackpost, internal thread on receptacle side (PS\*)

### POLARIZATION / WIRING:

- 00 None

## SPECIAL DESIGNATORS

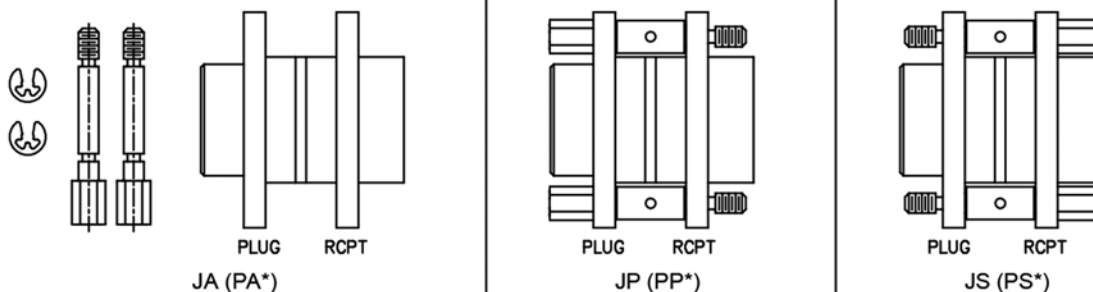
93A Connector saver designator

\* = Use number in parenthesis when ordering size 100.

\*\* = 2 row, 51 position connectors are available in metal only (non mil-spec interface)

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

☒ = Option not RoHS compliant





# Connector Saver

**.050"**

**9 thru 51 Contacts**

**Low Profile Metal**

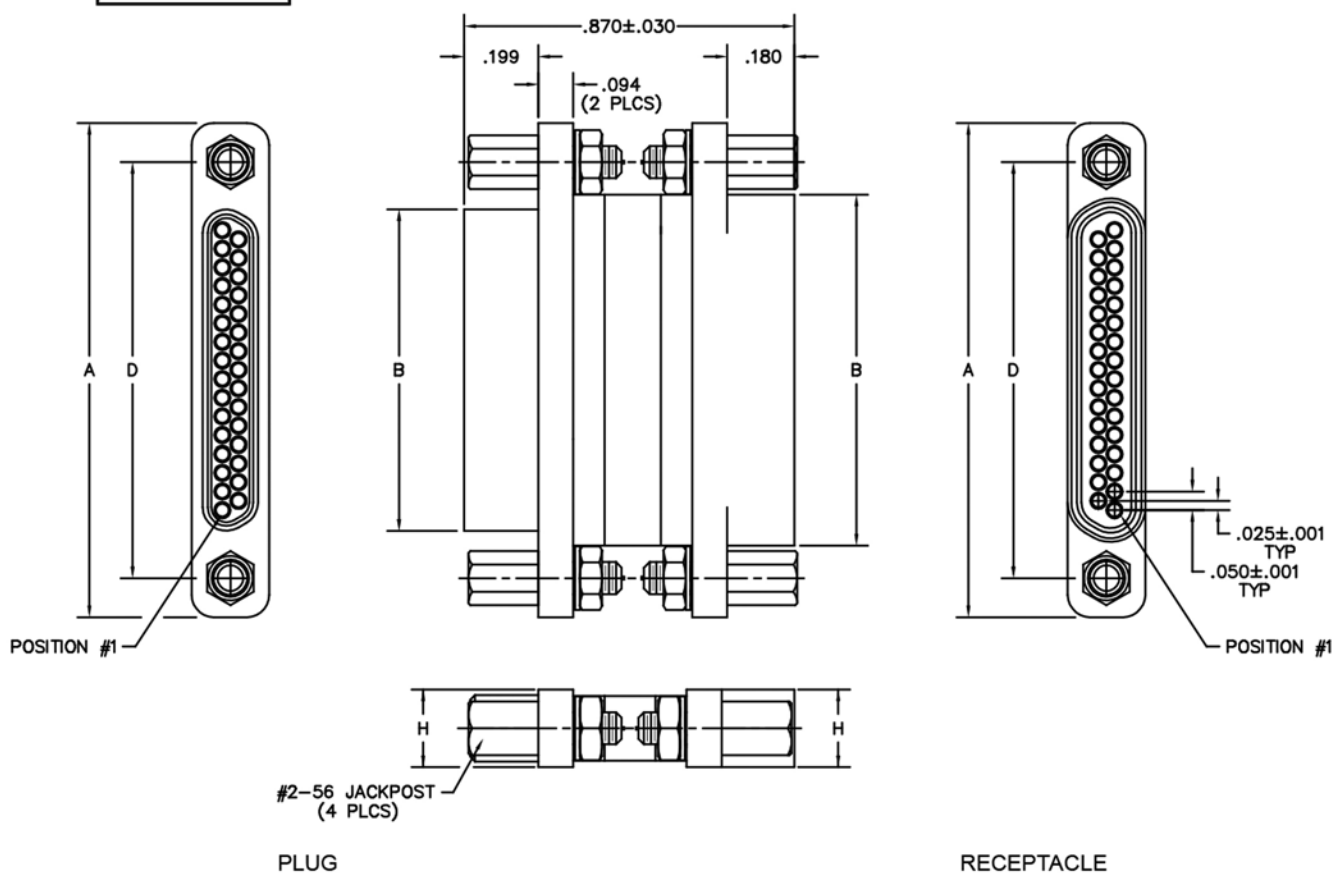
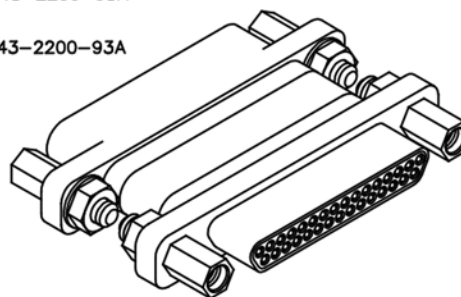
**MQ**

**Low Profile Plastic**

**MP**

MQ-212-031-143-2200-93A  
(METAL)

MP-211-031-143-2200-93A  
(PLASTIC)



| DIMENSIONS |              |       |             |             |       |            |
|------------|--------------|-------|-------------|-------------|-------|------------|
| SIZE       | CONTACT ROWS | A     | B           |             | D     | H<br>±.005 |
|            |              |       | PLUG<br>MAX | RCPT<br>MAX |       |            |
| 9          | 2            | .778  | .292        | .378        | .565  | .208       |
| 15         |              | .928  | .442        | .528        | .715  |            |
| 21         |              | 1.078 | .592        | .678        | .865  |            |
| 25         |              | 1.178 | .692        | .778        | .965  |            |
| 31         |              | 1.328 | .842        | .928        | 1.115 |            |
| 37         | 3            | 1.478 | .992        | 1.078       | 1.265 | .250       |
| 51         |              | 1.428 | .942        | 1.028       | 1.215 |            |

#2-56 UNC THD  
(.092 DIA THRU)

PLUG/RECEPTACLE: MQ- 212 - 031 - 143 - 2200 - 93A  
 MP- 211 - 031 - 143 - 2200 - 93A  
 XX-XXX-XXX-XXX-XXXX-XXX

## SERIES

MQ .050" Low Profile Metal  
 MP .050" Low Profile Plastic

## BODY

- 2 2-Row (Sizes 9 thru 37)
- 3 3-Row (Size 51)

### BODY STYLE:

- 1 Plug/Receptacle, straight with mounting ears

### BODY MATERIAL:

- 1 Polyphenylene Sulfide (MN only)
- 2 Polyphenylene Sulfide with electroless nickel shell
- 3 Polyphenylene Sulfide with electrodeposited cadmium shell ☒
- 4 Polyphenylene Sulfide with hard anodized back shell

## SIZE

XXX 009, 015, 021, 025, 031, 037, 051

## CONTACTS

### TYPE CONTACTS/TERMINATIONS:

- 14 Pin/Socket, straight

### PLATING OPTIONS:

- 3 50  $\mu$ " Au contacts: 10  $\mu$ " 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

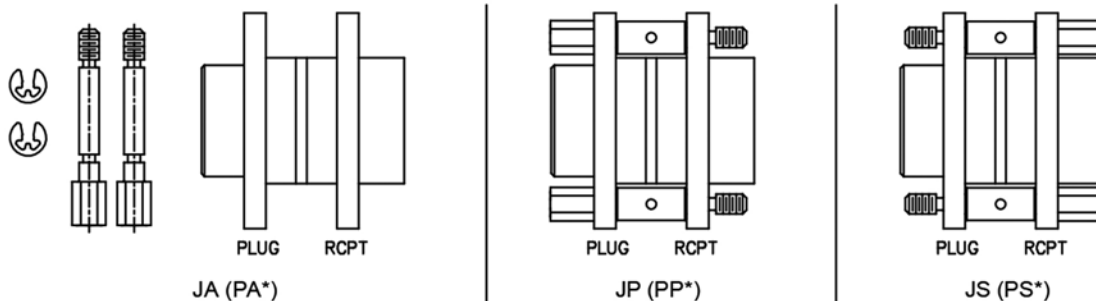
### POLARIZATION / WIRING:

- 00 None

## SPECIAL DESIGNATORS

93A Connector saver designator

☒ = Option not RoHS compliant



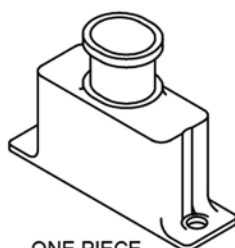
# EMI/RFI Straight Backshells

**.050"**

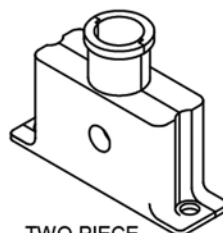
**9 thru 100 Contacts**

**Rugged Metal**

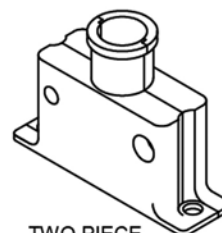
**MM**



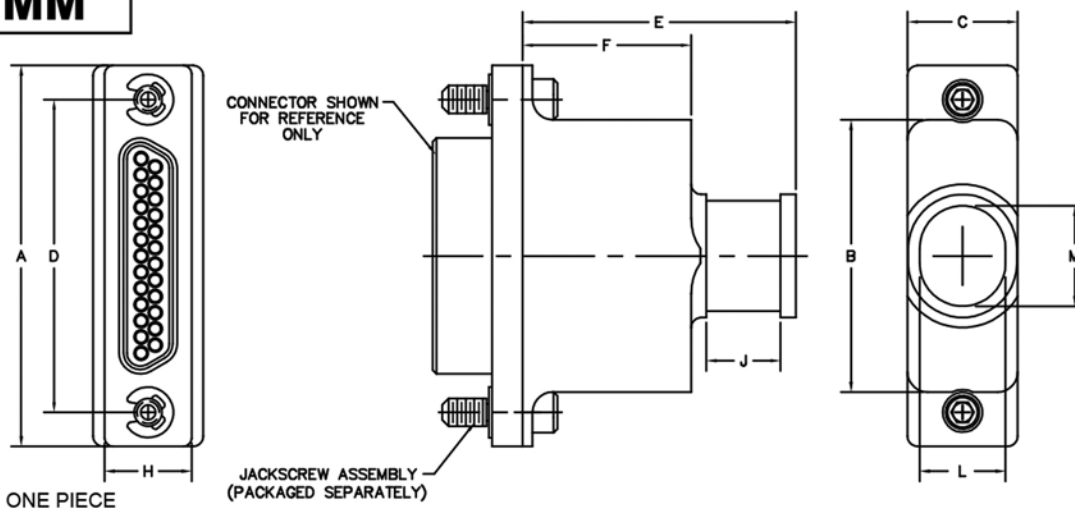
ONE PIECE  
(POSITIONS 9-100)



TWO PIECE  
(POSITIONS 9 & 15)



TWO PIECE  
(POSITIONS 21-100)



| DIMENSIONS |              |       |       |      |       |      |      |      |      |                          |   |                               |
|------------|--------------|-------|-------|------|-------|------|------|------|------|--------------------------|---|-------------------------------|
| SIZE       | CONTACT ROWS | A     | B     | C    | D     | E    | F    | H    | J    | L                        | M | HARDWARE                      |
| 9          | 2            | .775  | .440  | .340 | .565  | .843 | .520 | .298 | .229 | SEE TABLE A ON PART# SHT |   | #2-56 UNC THD (.092 DIA THRU) |
| 15         |              | .925  | .590  |      | .715  |      |      |      |      |                          |   |                               |
| 21         |              | 1.075 | .740  |      | .865  |      |      |      |      |                          |   |                               |
| 25         |              | 1.175 | .840  |      | .965  |      |      |      |      |                          |   |                               |
| 31         |              | 1.325 | .990  |      | 1.115 |      |      |      |      |                          |   |                               |
| 37         |              | 1.475 | 1.140 |      | 1.265 |      |      |      |      |                          |   |                               |
| 51         | 3            | 1.825 | 1.490 | .380 | 1.615 | .933 | .610 | .341 | .229 | SEE TABLE A ON PART# SHT |   | #2-56 UNC THD (.092 DIA THRU) |
| 51         |              | 1.425 | 1.090 |      | 1.215 |      |      |      |      |                          |   |                               |
| 69         |              | 1.725 | 1.390 |      | 1.515 |      |      |      |      |                          |   |                               |
| 100        | 4            | 2.160 | 1.522 | .430 | 1.800 | .953 | .630 | .384 |      |                          |   | #4-40 UNC THD (.147 DIA THRU) |

TWO PIECE

| DIMENSIONS |              |       |       |      |       |      |      |      |      |                          |   |                               |
|------------|--------------|-------|-------|------|-------|------|------|------|------|--------------------------|---|-------------------------------|
| SIZE       | CONTACT ROWS | A     | B     | C    | D     | E    | F    | H    | J    | L                        | M | HARDWARE                      |
| 9          | 2            | .775  | .480  | .340 | .565  | .843 | .520 | .298 | .229 | SEE TABLE B ON PART# SHT |   | #2-56 UNC THD (.092 DIA THRU) |
| 15         |              | .925  | .630  |      | .715  |      |      |      |      |                          |   |                               |
| 21         |              | 1.075 | .780  |      | .865  |      |      |      |      |                          |   |                               |
| 25         |              | 1.175 | .880  |      | .965  |      |      |      |      |                          |   |                               |
| 31         |              | 1.325 | 1.030 |      | 1.115 |      |      |      |      |                          |   |                               |
| 37         |              | 1.475 | 1.180 |      | 1.265 |      |      |      |      |                          |   |                               |
| 51         | 3            | 1.825 | 1.530 | .380 | 1.615 | .933 | .610 | .341 | .229 | SEE TABLE B ON PART# SHT |   | #2-56 UNC THD (.092 DIA THRU) |
| 51         |              | 1.425 | 1.130 |      | 1.215 |      |      |      |      |                          |   |                               |
| 69         |              | 1.725 | 1.430 |      | 1.515 |      |      |      |      |                          |   |                               |
| 100        | 4            | 2.160 | 1.528 | .430 | 1.800 | .953 | .630 | .384 |      |                          |   | #4-40 UNC THD (.147 DIA THRU) |

RUGGED: MM-252- 031-000- 4100  
XX-XXX-XXX-XXX-XXXX-XXX

### SERIES

MM .050" Rugged Metal Backshell

### BODY

- 2 2-Row (Sizes 9 thru 51)
- 3 3-Row (Sizes 51 & 69)
- 4 4-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 ☒
- 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
- AAA Large exit, see Table A\*\*
- BBB 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, & 84

\* = 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 - AirBorn part number CDG10026, shipped with each backshell

Band-it application tool - AirBorn part number CDG10027

☒ = Option not ROHS compliant

TABLE A (ONE PIECE)

| EXIT DIMENSIONS |      |      |      |       |      |      |
|-----------------|------|------|------|-------|------|------|
| SIZE            | 000  |      | AAA  |       | BBB  |      |
|                 | L    | M    | L    | M     | L    | M    |
| 9               | —    | .188 | .265 | .310  | —    | .129 |
| 15              | —    | .230 |      | .458  | —    | .162 |
| 21              | .265 | .257 |      | .608  | —    | .188 |
| 25              |      | .310 |      | .708  | —    | .206 |
| 31              |      | .330 |      | .858  | —    | .225 |
| 37              |      | .375 |      | 1.008 | —    | .242 |
| 51              |      | .515 | .297 | 1.034 | .265 | .300 |
| 51              | .297 | .470 |      | .921  | —    | .290 |
| 69              |      | .620 |      | 1.158 | .297 | .361 |
| 100             |      | .344 |      | 1.342 | .344 | .461 |

TABLE B (TWO PIECE)

| EXIT DIMENSIONS |      |      |
|-----------------|------|------|
| SIZE            | 000  |      |
|                 | L    | M    |
| 9               | —    | .188 |
| 15              | —    | .230 |
| 21              | .240 | .268 |
| 25              |      | .325 |
| 31              |      | .346 |
| 37              |      | .396 |
| 51              |      | .554 |
| 51              | .280 | .492 |
| 69              |      | .635 |
| 100             |      | .711 |

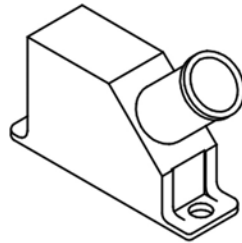
# EMI/RFI 45° Backshells

**.050"**

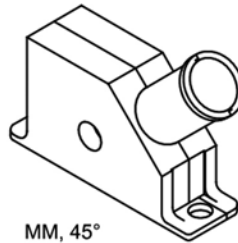
**9 thru 100 Contacts**

**Rugged Metal**

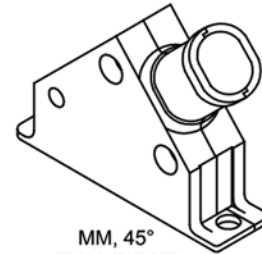
**MM**



MM, 45°  
(ONE PIECE)



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



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

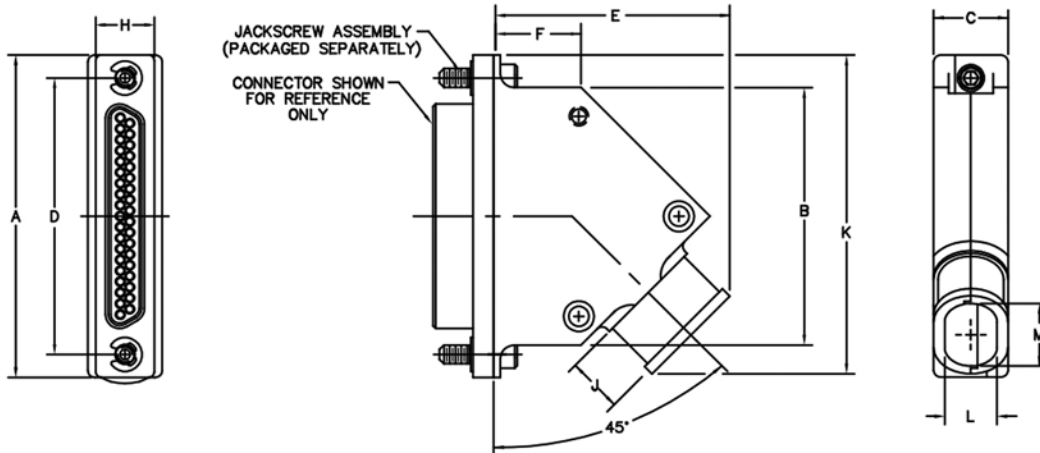
Note: 21 & 25 position, 2 piece backshells use two screw clamping configurations.

MM, 45° (ONE PIECE)

| DIMENSIONS |              |       |       |      |       |       |      |      |      |       |      |      |                                  |
|------------|--------------|-------|-------|------|-------|-------|------|------|------|-------|------|------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B     | C    | D     | E     | F    | H    | J    | K     | L    | M    | HARDWARE                         |
| 9          | 2            | .775  | .440  | .340 | .565  | .696  | .500 | .298 | .229 | .804  | —    | .188 | #2-56 UNC THD<br>(.092 DIA THRU) |
| 15         |              | .925  | .590  |      | .715  | .721  | .525 |      |      | .954  | —    | .230 |                                  |
| 21         |              | 1.075 | .740  |      | .865  | .746  | .550 |      |      | 1.103 | —    | .257 |                                  |
| 25         |              | 1.175 | .840  |      | .965  | .796  | .600 |      |      | 1.203 | .265 | .310 |                                  |
| 31         |              | 1.325 | .990  |      | 1.115 | .846  | .650 |      |      | 1.353 |      | .330 |                                  |
| 37         |              | 1.475 | 1.140 |      | 1.265 | .921  | .725 |      |      | 1.503 |      | .375 |                                  |
| 51         | 3            | 1.825 | 1.490 | .380 | 1.615 | 1.144 | .950 | .341 | .229 | 1.853 | .297 | .510 | #4-40 UNC THD<br>(.147 DIA THRU) |
| 51         |              | 1.425 | 1.090 |      | 1.215 | .946  | .750 |      |      | 1.453 |      | .470 |                                  |
| 69         |              | 1.725 | 1.390 |      | 1.515 |       |      |      |      | 1.753 |      | .620 |                                  |
| 100        | 4            | 2.160 | 1.522 | .430 | 1.800 | 1.146 | .950 | .384 |      | 2.036 | .344 | .688 |                                  |

MM, 45° (TWO PIECE)

| DIMENSIONS |              |       |       |      |       |       |      |      |      |       |      |      |                                  |
|------------|--------------|-------|-------|------|-------|-------|------|------|------|-------|------|------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B     | C    | D     | E     | F    | H    | J    | K     | L    | M    | HARDWARE                         |
| 9          | 2            | .775  | .480  | .340 | .565  | .855  | .650 | .298 | .229 | .806  | —    | .188 | #2-56 UNC THD<br>(.092 DIA THRU) |
| 15         |              | .925  | .630  |      | .715  | .831  | .625 |      |      | .944  | —    | .230 |                                  |
| 21         |              | 1.075 | .780  |      | .865  | .985  | .421 |      |      | 1.059 | .240 | .268 |                                  |
| 25         |              | 1.175 | .880  |      | .965  | 1.031 |      |      |      | 1.159 |      | .333 |                                  |
| 31         |              | 1.325 | 1.030 |      | 1.115 | 1.046 |      |      |      | 1.309 |      | .354 |                                  |
| 37         |              | 1.475 | 1.180 |      | 1.265 | 1.081 | .400 |      |      | 1.459 | .280 | .404 |                                  |
| 51         | 3            | 1.825 | 1.530 | .380 | 1.615 | 1.193 |      | .341 | .229 | 1.809 |      | .559 | #4-40 UNC THD<br>(.147 DIA THRU) |
| 51         |              | 1.425 | 1.130 |      | 1.215 | 1.233 | .625 |      |      | 1.409 |      | .492 |                                  |
| 69         |              | 1.725 | 1.430 |      | 1.515 | 1.378 | .527 |      |      | 1.703 |      | .642 |                                  |
| 100        | 4            | 2.160 | 1.522 | .430 | 1.800 | 1.403 | .532 | .384 |      | 1.973 | .330 | .711 |                                  |





RUGGED: MM-242-031-000-4100  
XX-XXX-XXX-XXX-XXXX-XXX

|                                                                                                    |                                                                             |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>SERIES</b>                                                                                      |                                                                             |
| MM .050" Rugged Metal Backshell                                                                    |                                                                             |
| <b>BODY</b>                                                                                        |                                                                             |
| 2                                                                                                  | 2-Row (Sizes 9 thru 51)                                                     |
| 3                                                                                                  | 3-Row (Sizes 51 & 69)                                                       |
| 4                                                                                                  | 4-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 <input checked="" type="checkbox"/> |
| 4                                                                                                  | Aluminum, with hard anodized black plating                                  |
| <b>SIZE</b>                                                                                        |                                                                             |
| XXX 009, 015, 021, 025, 031, 037, 051, 069, 100                                                    |                                                                             |
| <b>CONTACTS</b>                                                                                    |                                                                             |
| TYPE CONTACTS/TERMINATIONS:                                                                        |                                                                             |
| 000                                                                                                | None                                                                        |
| <b>HARDWARE</b>                                                                                    |                                                                             |
| 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                                                                        |
| <b>OPTIONS</b>                                                                                     |                                                                             |
| 0FZ Required for receptacles with grounding fingers when ordering hardware styles 41, 43, 81, & 83 |                                                                             |

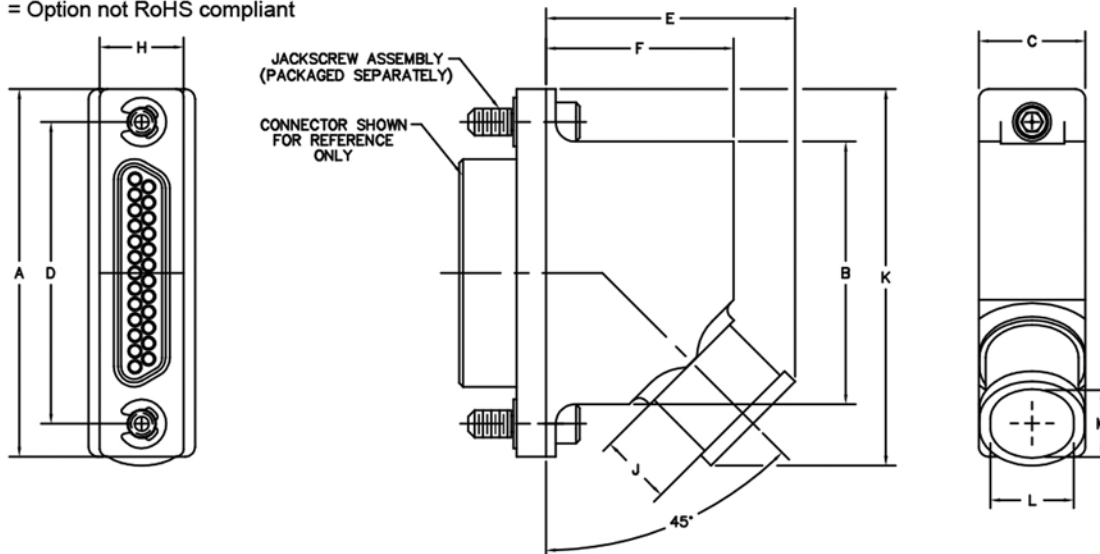
\* = Use number in parenthesis when ordering size 100.

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

Stainless steel micro band for shield termination - AirBorn part number CDG10026

Band-it application tool - AirBorn part number CDG10027

☒ = Option not RoHS compliant



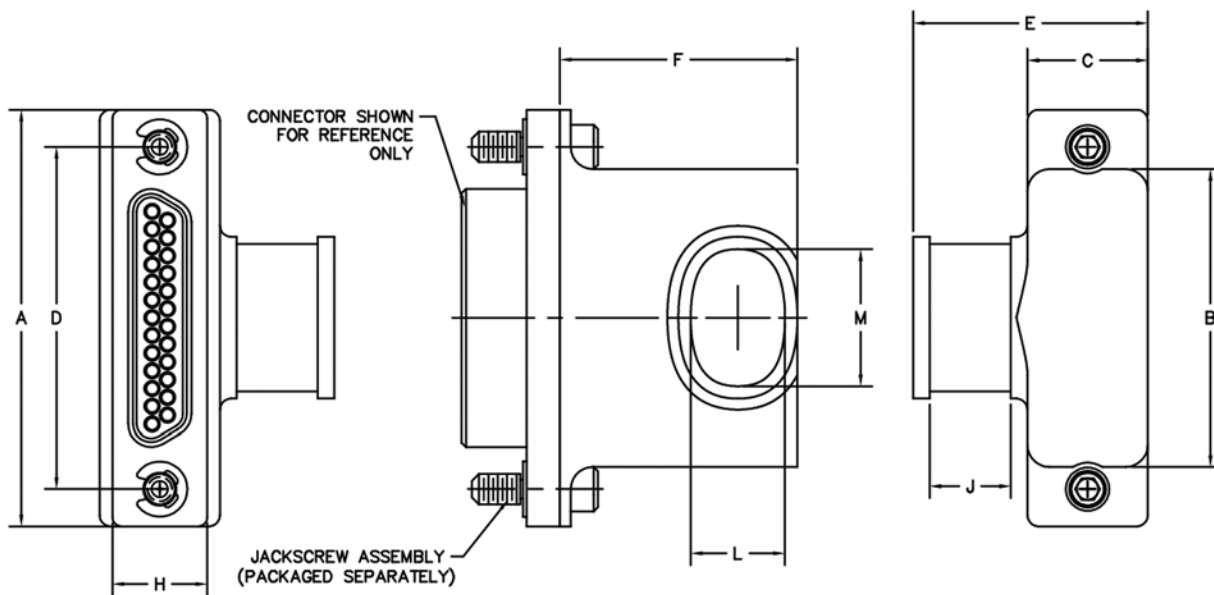
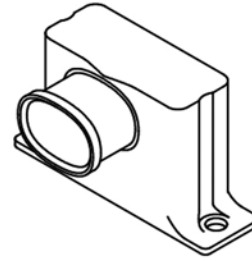
# EMI/RFI 90° Backshells

.050"

9 thru 100 Contacts

Rugged Metal

MM



ONE PIECE

| DIMENSIONS |              |       |       |      |       |      |      |      |      |      |       |                                  |                                  |
|------------|--------------|-------|-------|------|-------|------|------|------|------|------|-------|----------------------------------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B     | C    | D     | E    | F    | H    | J    | L    | M     | HARDWARE                         |                                  |
| 9          | 2            | .775  | .440  | .340 | .565  | .663 | .671 | .298 | .229 | .266 | .268  | #2-56 UNC THD<br>(.092 DIA THRU) |                                  |
| 15         |              | .925  | .590  |      | .715  |      |      |      |      |      | .311  |                                  |                                  |
| 21         |              | 1.075 | .740  |      | .865  |      |      |      |      |      | .331  |                                  |                                  |
| 25         |              | 1.175 | .840  |      | .965  |      |      |      |      |      | .387  |                                  |                                  |
| 31         |              | 1.325 | .990  |      | 1.115 |      |      |      |      |      | .450  |                                  |                                  |
| 37         |              | 1.475 | 1.140 |      | 1.265 |      |      |      |      |      | .511  |                                  |                                  |
| 51         | 3            | 1.825 | 1.490 | .380 | 1.615 | .703 | .703 | .341 |      | .298 | .678  |                                  | #4-40 UNC THD<br>(.147 DIA THRU) |
| 51         |              | 1.425 | 1.090 |      | 1.215 |      |      |      |      |      | .619  |                                  |                                  |
| 69         |              | 1.725 | 1.390 |      | 1.515 |      |      |      |      |      | .823  |                                  |                                  |
| 100        | 4            | 2.160 | 1.522 | .430 | 1.800 | .753 | .749 | .384 |      | .344 | 1.063 |                                  |                                  |

RUGGED: MM-272-031-000-4100  
XX-XXX-XXX-XXX-XXXX

| SERIES                 |                                                                             |
|------------------------|-----------------------------------------------------------------------------|
| MM                     | .050" Rugged Metal Backshell                                                |
| BODY                   |                                                                             |
| 2                      | 2-Row (Sizes 9 thru 51)                                                     |
| 3                      | 3-Row (Sizes 51 & 69)                                                       |
| 4                      | 4-Row (Size 100)                                                            |
| BODY STYLE:            |                                                                             |
| 7                      | 90°, one piece                                                              |
| BODY MATERIAL:         |                                                                             |
| 2                      | Aluminum, with electroless nickel plating                                   |
| 3                      | Aluminum, with electrodeposited cadmium <input checked="" type="checkbox"/> |
| 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                                                                        |

\* = Use number in parenthesis when ordering size 100.

\*\* = Backshell exits are designed to accomodate 26AWG wire or smaller

Stainless steel micro band for shield termination - AirBorn part number CDG10026, shipped with each backshell  
Band-it application tool - AirBorn part number CDG10027

☒ = Option not ROHS compliant

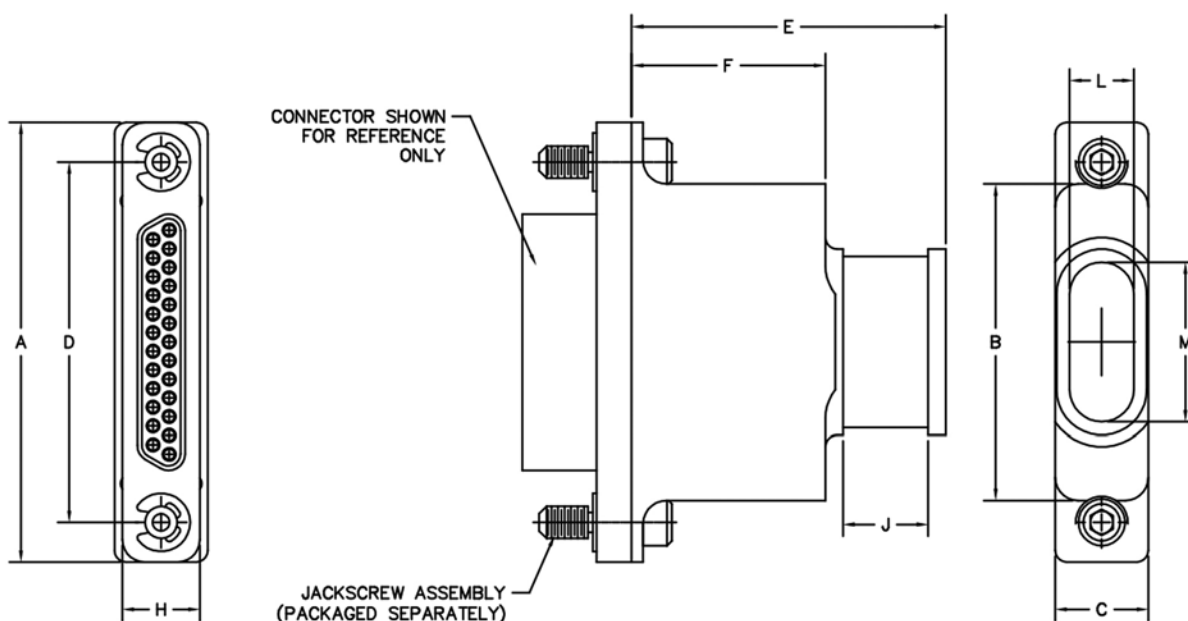
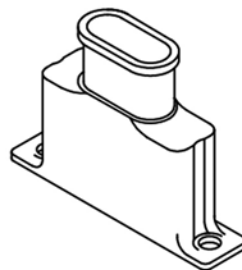
# EMI/RFI Straight Backshells

**.050"**

**9 thru 51 Contacts**

**Low Profile Metal**

**MQ**



ONE PIECE

| DIMENSIONS |              |       |       |      |       |      |      |      |      |      |      |                                  |
|------------|--------------|-------|-------|------|-------|------|------|------|------|------|------|----------------------------------|
| SIZE       | CONTACT ROWS | A     | B     | C    | D     | E    | F    | H    | J    | L    | M    | HARDWARE                         |
| 9          | 2            | .778  | .448  | .250 | .565  | .843 | .520 | .208 | .229 | .172 | .197 | #2-56 UNC THD<br>(.092 DIA THRU) |
| 15         |              | .928  | .598  |      | .715  |      |      |      |      |      | .279 |                                  |
| 21         |              | 1.078 | .748  |      | .865  |      |      |      |      |      | .339 |                                  |
| 25         |              | 1.178 | .848  |      | .965  |      |      |      |      |      | .428 |                                  |
| 31         |              | 1.328 | .998  |      | 1.115 |      |      |      |      |      | .462 |                                  |
| 37         | 3            | 1.478 | 1.148 | .292 | 1.265 | .933 | .610 | .250 |      | .220 | .531 |                                  |
| 51         |              | 1.428 | 1.098 |      | 1.215 |      |      |      |      |      | .596 |                                  |

RUGGED: MQ-232-025-000-4100  
XX-XXX-XXX-XXX-XXXX

| SERIES |                                   |
|--------|-----------------------------------|
| MQ     | .050" Low Profile Metal Backshell |

| BODY           |                                                                             |
|----------------|-----------------------------------------------------------------------------|
| 2              | 2-Row (Sizes 9 thru 37)                                                     |
| 3              | 3-Row (Sizes 51)                                                            |
| BODY STYLE:    |                                                                             |
| 3              | Straight, one piece                                                         |
| BODY MATERIAL: |                                                                             |
| 2              | Aluminum, with electroless nickel plating                                   |
| 3              | Aluminum, with electrodeposited cadmium <input checked="" type="checkbox"/> |
| 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                                                   |

Stainless steel micro band for shield termination - AirBorn part number CDG10026, shipped with each backshell  
Band-it application tool - AirBorn part number CDG10027

☒ = Option not ROHS compliant

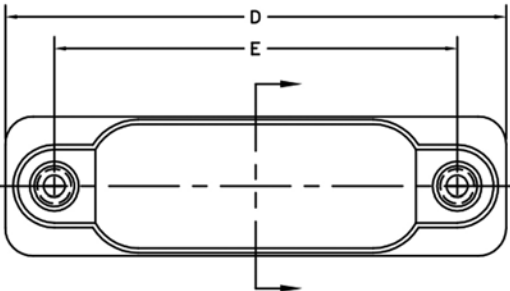
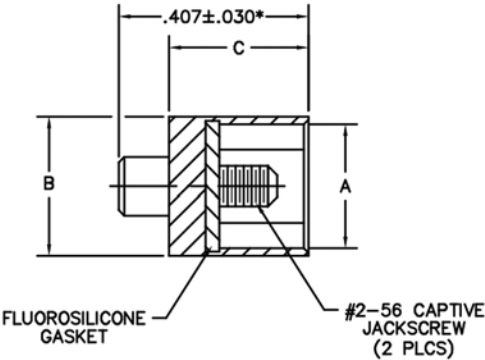
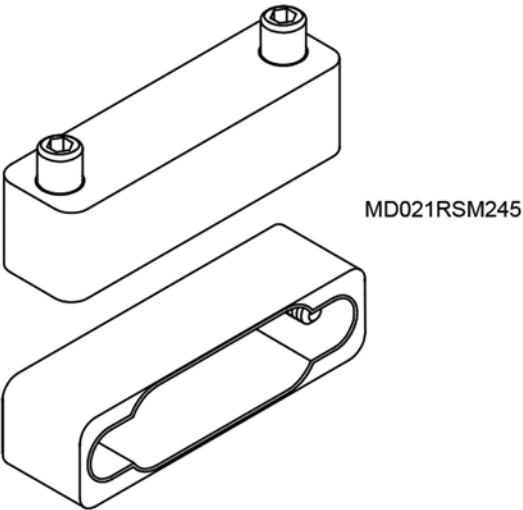


Dust Covers

.050"  
9 thru 100 Contacts

Rugged Metal

MD



| DIMENSIONS |      |      |      |      |      |       |       |               |
|------------|------|------|------|------|------|-------|-------|---------------|
| SIZE       | A    |      | B    |      | C    | D     | E     | HARDWARE      |
|            | PLUG | RCPT | PLUG | RCPT |      |       |       |               |
| 9          | .203 | .265 | .298 | .298 | .299 | .775  | .565  | #2-56 UNC THD |
| 15         |      |      |      |      |      | .925  | .715  |               |
| 21         |      |      |      |      |      | 1.075 | .865  |               |
| 25         |      |      |      |      |      | 1.175 | .965  |               |
| 31         |      |      |      |      |      | 1.325 | 1.115 |               |
| 37         |      |      |      |      |      | 1.475 | 1.265 |               |
| 51         | .246 | .308 | .341 | .341 |      | 1.425 | 1.215 |               |
| 69         |      |      |      |      |      | 1.725 | 1.515 |               |
| 100        |      |      |      |      |      | 2.152 | 1.800 | #4-40 UNC THD |

\* = 100 POS DIMENSION .460±.030

| PLUG                                            |                                                        | RECEPTACLE                                      |                                                        | RECEPTACLE: MD 021 RS M2 45<br>XX XXX XX XX XX |  |  |  |  |
|-------------------------------------------------|--------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------|------------------------------------------------|--|--|--|--|
| <b>SERIES</b>                                   |                                                        |                                                 |                                                        |                                                |  |  |  |  |
| MD .050" Rugged Metal Dust Cover                |                                                        | MD .050" Rugged Metal Dust Cover                |                                                        |                                                |  |  |  |  |
| <b>SIZE</b>                                     |                                                        |                                                 |                                                        |                                                |  |  |  |  |
| XXX 009, 015, 021, 025, 031, 037, 051, 069, 100 |                                                        | XXX 009, 015, 021, 025, 031, 037, 051, 069, 100 |                                                        |                                                |  |  |  |  |
| <b>STYLE</b>                                    |                                                        |                                                 |                                                        |                                                |  |  |  |  |
| RP Plug, rugged metal                           |                                                        | RS Receptacle, rugged metal                     |                                                        |                                                |  |  |  |  |
| <b>PLATING</b>                                  |                                                        |                                                 |                                                        |                                                |  |  |  |  |
| M2 Electroless nickel                           |                                                        | M2 Electroless nickel                           |                                                        |                                                |  |  |  |  |
| M3 Electrodeposited cadmium ☒                   |                                                        | M3 Electrodeposited cadmium ☒                   |                                                        |                                                |  |  |  |  |
| M4 Hard anodized black                          |                                                        | M4 Hard anodized black                          |                                                        |                                                |  |  |  |  |
| <b>HARDWARE</b>                                 |                                                        |                                                 |                                                        |                                                |  |  |  |  |
| 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") |                                                |  |  |  |  |

\* = 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

☒ = Option not RoHS compliant

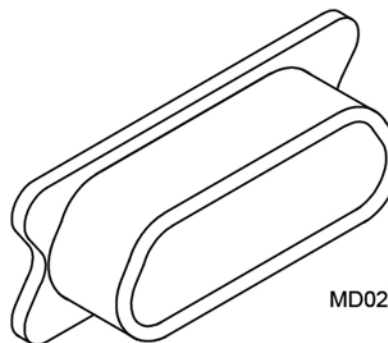
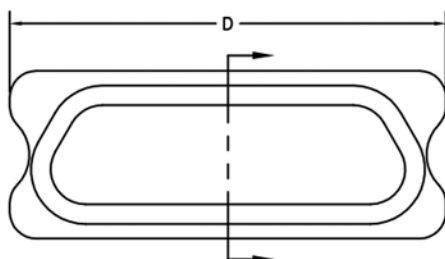
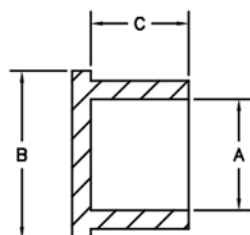
# ESD Dust Covers

**.050"**

**9 thru 100 Contacts**

**Rugged Metal  
Low Profile Plastic**

**MD**



MD025RS

EXAMPLE: MD025RS  
MDXXXXX

SIZE: \_\_\_\_\_  
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):  $<1.0 \times 10^{12}$  ohms/square

## RUGGED PLASTIC

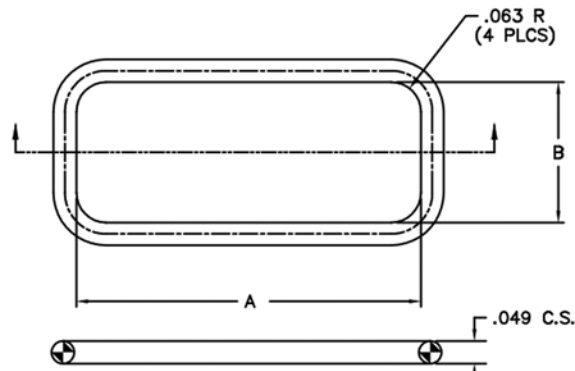
| DIMENSIONS |              |      |      |      |      |      |      |       |       |             |           |
|------------|--------------|------|------|------|------|------|------|-------|-------|-------------|-----------|
| SIZE       | CONTACT ROWS | A    |      | B    |      | C    |      | D     |       | PART NUMBER |           |
|            |              | PLUG | RCPT | PLUG | RCPT | PLUG | RCPT | PLUG  | RCPT  | PLUG        | RCPT      |
| 9          | 2            | .176 | .238 | .298 | .360 | .195 | .215 | .475  | .460  | MD009RP     | MD009RS   |
| 15         |              |      |      |      |      |      |      | .625  | .610  | MD015RP     | MD015RS   |
| 21         |              |      |      |      |      |      |      | .775  | .760  | MD021RP     | MD021RS   |
| 25         |              |      |      |      |      |      |      | .875  | .860  | MD025RP     | MD025RS   |
| 31         |              |      |      |      |      |      |      | 1.025 | 1.010 | MD031RP     | MD031RS   |
| 37         |              |      |      |      |      |      |      | 1.175 | 1.160 | MD037RP     | MD037RS   |
| 51         |              |      |      |      |      |      |      | 1.525 | 1.510 | MD051RP-2   | MD051RS-2 |
| 51         | 3            | .219 | .281 | .340 | .400 | .195 | .215 | 1.125 | 1.110 | MD051RP     | MD051RS   |
| 69         |              |      |      |      |      |      |      | 1.425 | 1.410 | MD069RP     | MD069RS   |
| 100        |              |      |      |      |      |      |      | 1.500 | 1.615 | MD100RP     | MD100RS   |

## LOW PROFILE PLASTIC

| DIMENSIONS |              |      |      |      |      |      |      |       |       |             |         |
|------------|--------------|------|------|------|------|------|------|-------|-------|-------------|---------|
| SIZE       | CONTACT ROWS | A    |      | B    |      | C    |      | D     |       | PART NUMBER |         |
|            |              | PLUG | RCPT | PLUG | RCPT | PLUG | RCPT | PLUG  | RCPT  | PLUG        | RCPT    |
| 9          | 2            | .125 | .205 | .256 | .315 | .210 | .195 | .400  | .430  | MD009LP     | MD009LS |
| 15         |              |      |      |      |      |      |      | .550  | .580  | MD015LP     | MD015LS |
| 21         |              |      |      |      |      |      |      | .700  | .730  | MD021LP     | MD021LS |
| 25         |              |      |      |      |      |      |      | .800  | .830  | MD025LP     | MD025LS |
| 31         |              |      |      |      |      |      |      | .950  | .980  | MD031LP     | MD031LS |
| 37         |              |      |      |      |      |      |      | 1.100 | 1.130 | MD037LP     | MD037LS |
| 51         |              |      |      |      |      |      |      | 1.050 | 1.080 | MD051LP     | MD051LS |

Not for use on receptacles with grounding fingers

## O-Rings, Fluorosilicone & Butyl

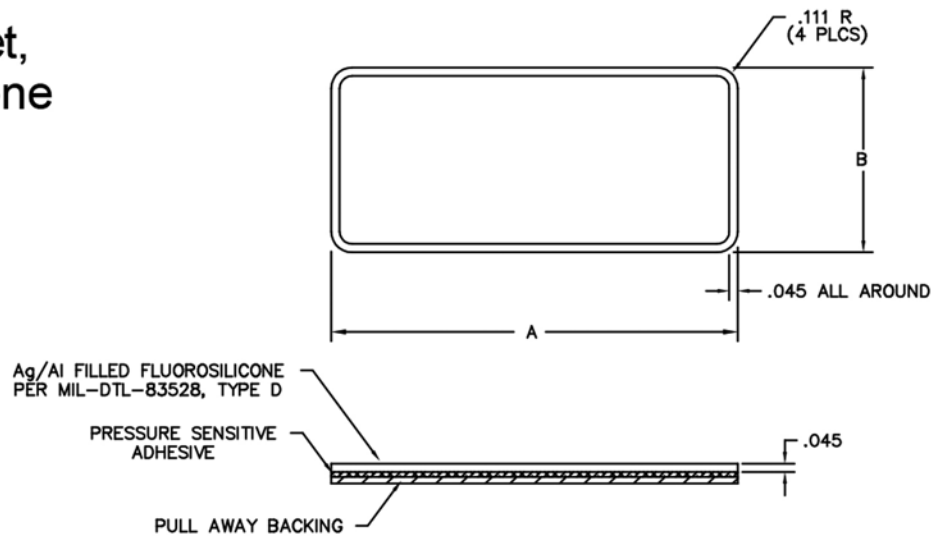


| DIMENSIONS (Ref Only) |              |       |      |
|-----------------------|--------------|-------|------|
| SIZE                  | CONTACT ROWS | A     | B    |
| 9                     | 2            | .739  | .301 |
| 15                    |              | .889  |      |
| 21                    |              | 1.039 |      |
| 25                    |              | 1.139 |      |
| 31                    |              | 1.297 |      |
| 37                    |              | 1.439 |      |
| 51                    | 3            | 1.439 | .344 |
| 69                    |              | 1.731 |      |
| 100                   | 4            | 2.159 | .421 |

| FLOUROSILICONE |          |
|----------------|----------|
| 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

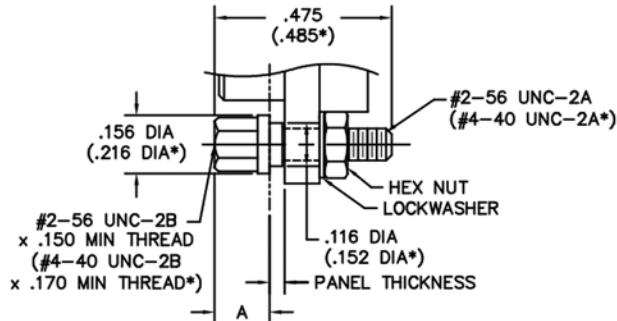


| DIMENSIONS (Ref Only) |              |       |      |
|-----------------------|--------------|-------|------|
| SIZE                  | CONTACT ROWS | A     | B    |
| 9                     | 2            | .872  | .395 |
| 15                    |              | 1.022 |      |
| 21                    |              | 1.172 |      |
| 25                    |              | 1.272 |      |
| 31                    |              | 1.422 |      |
| 37                    |              | 1.572 |      |
| 51                    | 3            | 1.572 | .438 |
| 69                    |              | 1.872 |      |
| 100                   | 4            | 2.298 | .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

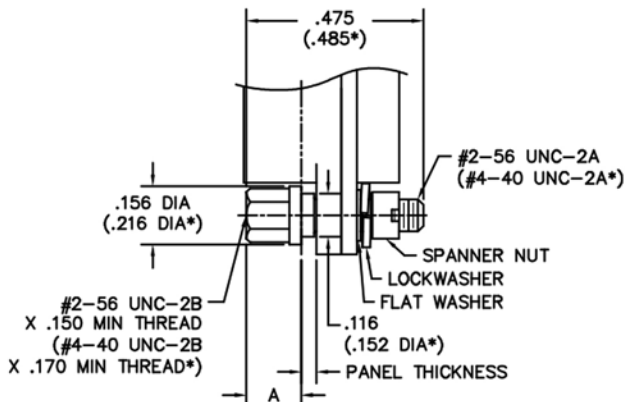
## MM - MN - MQ - MP Rear Panel Mount Hardware for Standard I/O Connectors



| PANEL THK | THREAD SIZE | PART NUMBER             | A MAX |
|-----------|-------------|-------------------------|-------|
| .040      | #2-56       | MM-000-000-000-2400-0F4 | .150  |
| .050      |             | MM-000-000-000-2500-0F5 | .140  |
| .060      |             | MM-000-000-000-2600-0F6 | .130  |
| .070      |             | MM-000-000-000-2800-0F7 | .120  |
| .080      |             | MM-000-000-000-2900-0F8 | .110  |
| .040      | #4-40       | MM-000-000-000-6400-0F9 | .150  |
| .050      |             | MM-000-000-000-6500-0FA | .140  |
| .060      |             | MM-000-000-000-6600-0FB | .130  |
| .070      |             | MM-000-000-000-6800-0FC | .120  |
| .080      |             | MM-000-000-000-6900-0FD | .110  |

\* = Dimensions for 100 position connectors

## 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

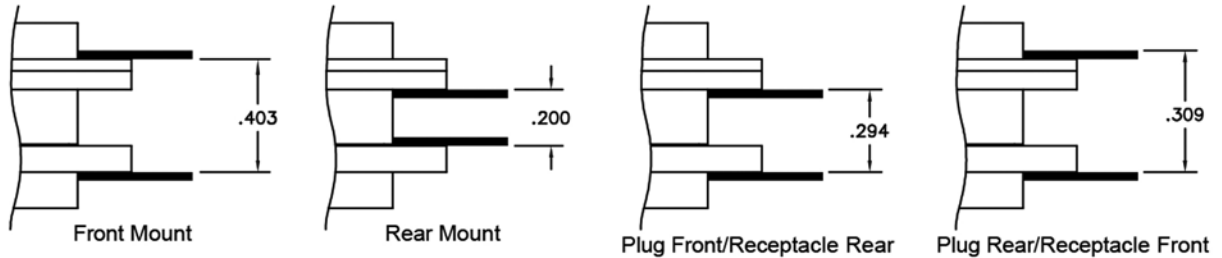


| PANEL THK | THREAD SIZE | PART NUMBER             | A MAX |
|-----------|-------------|-------------------------|-------|
| .040      | #2-56       | MM-000-000-000-2400-0G7 | .150  |
| .050      |             | MM-000-000-000-2500-0G7 | .140  |
| .060      |             | MM-000-000-000-2600-0G7 | .130  |
| .070      |             | MM-000-000-000-2800-0G7 | .120  |
| .080      |             | MM-000-000-000-2900-0G7 | .110  |
| .040      | #4-40       | MM-000-000-000-6400-0G7 | .150  |
| .050      |             | MM-000-000-000-6500-0G7 | .140  |
| .060      |             | MM-000-000-000-6600-0G7 | .130  |
| .070      |             | MM-000-000-000-6800-0G7 | .120  |
| .080      |             | MM-000-000-000-6900-0G7 | .110  |

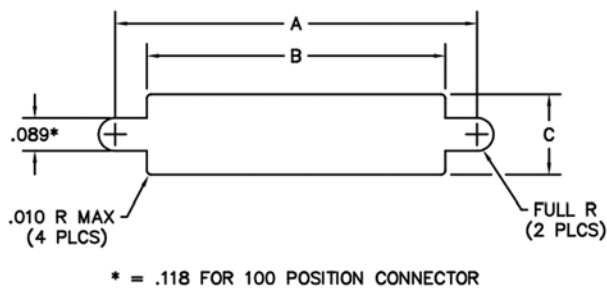
\* = Dimensions for 100 position connectors



## Panel Mounting Dimensions for Receptacles With Grounding Fingers

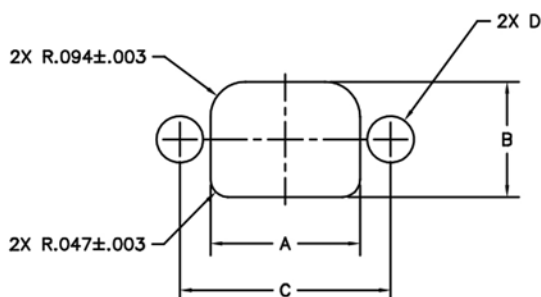


## Front Panel Mounting Receptacles With Grounding Fingers



| SIZE | DIMENSIONS          |                     |                              |                              |
|------|---------------------|---------------------|------------------------------|------------------------------|
|      | A<br>+.004<br>-.000 | B<br>+.005<br>-.000 | C<br>+.004<br>-.000          |                              |
|      |                     |                     | MP, MQ, MR, MS<br>MQHT, MSHT | MK, ML, MM, MN<br>MKHT, MMHT |
| 9    | .570                | .400                | .215                         | .273                         |
| 15   | .720                | .550                |                              |                              |
| 21   | .870                | .700                |                              |                              |
| 25   | .970                | .800                |                              |                              |
| 31   | 1.120               | .950                |                              |                              |
| 37   | 1.270               | 1.100               | .256                         | .311                         |
| 51   | 1.220               | 1.050               |                              |                              |
| 69   | 1.520               | 1.350               |                              |                              |
| 100  | 1.805               | 1.442               | —                            | .383                         |

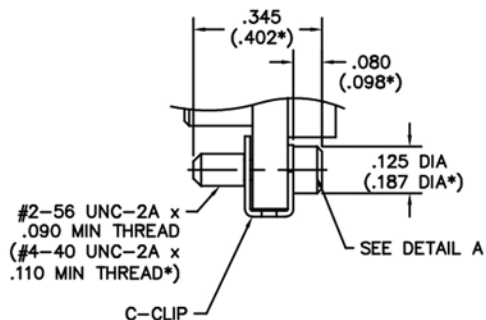
## Rear Panel Mounting Receptacles With Grounding Fingers



| SIZE | DIMENSIONS          |                     |            |                    |
|------|---------------------|---------------------|------------|--------------------|
|      | A<br>+.004<br>-.000 | B<br>+.004<br>-.000 | C<br>±.005 | D<br>±.005<br>THRU |
| 9    | .401                | .308                | .565       | .125               |
| 15   | .551                |                     | .715       |                    |
| 21   | .701                |                     | .865       |                    |
| 25   | .801                |                     | .965       |                    |
| 31   | .951                |                     | 1.115      |                    |
| 37   | 1.101               | .351                | 1.265      | .160               |
| 51   | 1.051               |                     | 1.215      |                    |
| 69   | 1.351               |                     | 1.515      |                    |
| 100  | 1.505               | .391                | 1.800      |                    |

# C-Clip Hardware

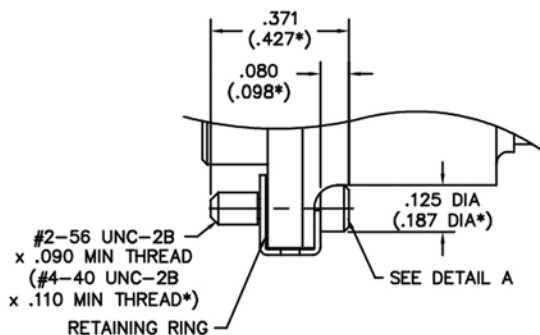
## MM - MN - MQ - MP - MMHT - MQHT Jacking Hardware



SHORT TURNING  
JACKSCREW ASSEMBLY  
C-CLIP RETAINER

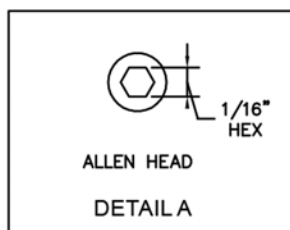
#2-56 JACKSCREW, ALLEN HEAD 00-000-000-000-4A00  
#4-40 JACKSCREW, ALLEN HEAD 00-000-000-000-8A00

## 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)

## **MILITARY CROSS REFERENCE**

# Military Cross Reference Chart

## M83513 / 01

|                  |                     |                  |                     |                  |                     |
|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| M83513 / 01 - AA | MM-21A-009-113-0000 | M83513 / 01 - CP | MM-215-021-113-0000 | M83513 / 01 - FK | MM-21K-037-113-0000 |
| M83513 / 01 - AC | MM-213-009-113-0000 | M83513 / 01 - CT | MM-21T-021-113-0000 | M83513 / 01 - FN | MM-212-037-113-0000 |
| M83513 / 01 - AK | MM-21K-009-113-0000 | M83513 / 01 - DA | MM-21A-025-113-0000 | M83513 / 01 - FP | MM-215-037-113-0000 |
| M83513 / 01 - AN | MM-212-009-113-0000 | M83513 / 01 - DC | MM-213-025-113-0000 | M83513 / 01 - FT | MM-21T-037-113-0000 |
| M83513 / 01 - AP | MM-215-009-113-0000 | M83513 / 01 - DK | MM-21K-025-113-0000 | M83513 / 01 - GA | MM-21A-051-113-0000 |
| M83513 / 01 - AT | MM-21T-009-113-0000 | M83513 / 01 - DN | MM-212-025-113-0000 | M83513 / 01 - GC | MM-213-051-113-0000 |
| M83513 / 01 - BA | MM-21A-015-113-0000 | M83513 / 01 - DP | MM-215-025-113-0000 | M83513 / 01 - GK | MM-21K-051-113-0000 |
| M83513 / 01 - BC | MM-213-015-113-0000 | M83513 / 01 - DT | MM-21T-025-113-0000 | M83513 / 01 - GN | MM-212-051-113-0000 |
| M83513 / 01 - BK | MM-21K-015-113-0000 | M83513 / 01 - EA | MM-21A-031-113-0000 | M83513 / 01 - GP | MM-215-051-113-0000 |
| M83513 / 01 - BN | MM-212-015-113-0000 | M83513 / 01 - EC | MM-213-031-113-0000 | M83513 / 01 - GT | MM-21T-051-113-0000 |
| M83513 / 01 - BP | MM-215-015-113-0000 | M83513 / 01 - EK | MM-21K-031-113-0000 | M83513 / 01 - HA | MM-21A-100-113-0000 |
| M83513 / 01 - BT | MM-21T-015-113-0000 | M83513 / 01 - EN | MM-212-031-113-0000 | M83513 / 01 - HC | MM-213-100-113-0000 |
| M83513 / 01 - CA | MM-21A-021-113-0000 | M83513 / 01 - EP | MM-215-031-113-0000 | M83513 / 01 - HK | MM-21K-100-113-0000 |
| M83513 / 01 - CC | MM-213-021-113-0000 | M83513 / 01 - ET | MM-21T-031-113-0000 | M83513 / 01 - HN | MM-212-100-113-0000 |
| M83513 / 01 - CK | MM-21K-021-113-0000 | M83513 / 01 - FA | MM-21A-037-113-0000 | M83513 / 01 - HP | MM-215-100-113-0000 |
| M83513 / 01 - CN | MM-212-021-113-0000 | M83513 / 01 - FC | MM-213-037-113-0000 | M83513 / 01 - HT | MM-21T-100-113-0000 |

## M83513 / 02

|                  |                         |                  |                         |                  |                         |
|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|
| M83513 / 02 - AA | MM-22A-009-213-0000-900 | M83513 / 02 - CP | MM-225-021-213-0000-900 | M83513 / 02 - FK | MM-22K-037-213-0000-900 |
| M83513 / 02 - AC | MM-223-009-213-0000-900 | M83513 / 02 - CT | MM-22T-021-213-0000-900 | M83513 / 02 - FN | MM-222-037-213-0000-900 |
| M83513 / 02 - AK | MM-22K-009-213-0000-900 | M83513 / 02 - DA | MM-22A-025-213-0000-900 | M83513 / 02 - FP | MM-225-037-213-0000-900 |
| M83513 / 02 - AN | MM-222-009-213-0000-900 | M83513 / 02 - DC | MM-223-025-213-0000-900 | M83513 / 02 - FT | MM-22T-037-213-0000-900 |
| M83513 / 02 - AP | MM-225-009-213-0000-900 | M83513 / 02 - DK | MM-22K-025-213-0000-900 | M83513 / 02 - GA | MM-32A-051-213-0000-900 |
| M83513 / 02 - AT | MM-22T-009-213-0000-900 | M83513 / 02 - DN | MM-222-025-213-0000-900 | M83513 / 02 - GC | MM-323-051-213-0000-900 |
| M83513 / 02 - BA | MM-22A-015-213-0000-900 | M83513 / 02 - DP | MM-225-025-213-0000-900 | M83513 / 02 - GK | MM-32K-051-213-0000-900 |
| M83513 / 02 - BC | MM-223-015-213-0000-900 | M83513 / 02 - DT | MM-22T-025-213-0000-900 | M83513 / 02 - GN | MM-322-051-213-0000-900 |
| M83513 / 02 - BK | MM-22K-015-213-0000-900 | M83513 / 02 - EA | MM-22A-031-213-0000-900 | M83513 / 02 - GP | MM-325-051-213-0000-900 |
| M83513 / 02 - BN | MM-222-015-213-0000-900 | M83513 / 02 - EC | MM-223-031-213-0000-900 | M83513 / 02 - GT | MM-32T-051-213-0000-900 |
| M83513 / 02 - BP | MM-225-015-213-0000-900 | M83513 / 02 - EK | MM-22K-031-213-0000-900 | M83513 / 02 - HA | MM-42A-100-213-0000-900 |
| M83513 / 02 - BT | MM-22T-015-213-0000-900 | M83513 / 02 - EN | MM-222-031-213-0000-900 | M83513 / 02 - HC | MM-423-100-213-0000-900 |
| M83513 / 02 - CA | MM-22A-021-213-0000-900 | M83513 / 02 - EP | MM-225-031-213-0000-900 | M83513 / 02 - HK | MM-42K-100-213-0000-900 |
| M83513 / 02 - CC | MM-223-021-213-0000-900 | M83513 / 02 - ET | MM-22T-031-213-0000-900 | M83513 / 02 - HN | MM-422-100-213-0000-900 |
| M83513 / 02 - CK | MM-22K-021-213-0000-900 | M83513 / 02 - FA | MM-22A-037-213-0000-900 | M83513 / 02 - HP | MM-425-100-213-0000-900 |
| M83513 / 02 - CN | MM-222-021-213-0000-900 | M83513 / 02 - FC | MM-223-037-213-0000-900 | M83513 / 02 - HT | MM-42T-100-213-0000-900 |

## M83513 / 03

|                  |                     |                  |                     |                  |                     |
|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| M83513 / 03-A01A | MM-21A-009-161-00W1 | M83513 / 03-A04P | MM-215-009-161-00V2 | M83513 / 03-A08K | MM-21K-009-155-0000 |
| M83513 / 03-A01C | MM-213-009-161-00W1 | M83513 / 03-A04T | MM-21T-009-161-00V2 | M83513 / 03-A08N | MM-212-009-155-0000 |
| M83513 / 03-A01K | MM-21K-009-161-00W1 | M83513 / 03-A05A | MM-21A-009-143-0000 | M83513 / 03-A08P | MM-215-009-155-0000 |
| M83513 / 03-A01N | MM-212-009-161-00W1 | M83513 / 03-A05C | MM-213-009-143-0000 | M83513 / 03-A08T | MM-21T-009-155-0000 |
| M83513 / 03-A01P | MM-215-009-161-00W1 | M83513 / 03-A05K | MM-21K-009-143-0000 | M83513 / 03-A09A | MM-21A-009-161-00Y1 |
| M83513 / 03-A01T | MM-21T-009-161-00W1 | M83513 / 03-A05N | MM-212-009-143-0000 | M83513 / 03-A09C | MM-213-009-161-00Y1 |
| M83513 / 03-A02A | MM-21A-009-161-00W2 | M83513 / 03-A05P | MM-215-009-143-0000 | M83513 / 03-A09K | MM-21K-009-161-00Y1 |
| M83513 / 03-A02C | MM-213-009-161-00W2 | M83513 / 03-A05T | MM-21T-009-143-0000 | M83513 / 03-A09N | MM-212-009-161-00Y1 |
| M83513 / 03-A02K | MM-21K-009-161-00W2 | M83513 / 03-A06A | MM-21A-009-153-0000 | M83513 / 03-A09P | MM-215-009-161-00Y1 |
| M83513 / 03-A02N | MM-212-009-161-00W2 | M83513 / 03-A06K | MM-213-009-153-0000 | M83513 / 03-A09T | MM-21T-009-161-00Y1 |
| M83513 / 03-A02P | MM-215-009-161-00W2 | M83513 / 03-A06N | MM-21K-009-153-0000 | M83513 / 03-A10A | MM-21A-009-161-00Y2 |
| M83513 / 03-A02T | MM-21T-009-161-00W2 | M83513 / 03-A06P | MM-212-009-153-0000 | M83513 / 03-A10C | MM-213-009-161-00Y2 |
| M83513 / 03-A03A | MM-21A-009-161-00V1 | M83513 / 03-A06P | MM-215-009-153-0000 | M83513 / 03-A10K | MM-21K-009-161-00Y2 |
| M83513 / 03-A03C | MM-213-009-161-00V1 | M83513 / 03-A06T | MM-21T-009-153-0000 | M83513 / 03-A10N | MM-212-009-161-00Y2 |
| M83513 / 03-A03K | MM-21K-009-161-00V1 | M83513 / 03-A07A | MM-21A-009-145-0000 | M83513 / 03-A10P | MM-215-009-161-00Y2 |
| M83513 / 03-A03N | MM-212-009-161-00V1 | M83513 / 03-A07C | MM-213-009-145-0000 | M83513 / 03-A10T | MM-21Y-009-161-00Y2 |
| M83513 / 03-A03P | MM-215-009-161-00V1 | M83513 / 03-A07K | MM-21K-009-145-0000 | M83513 / 03-A11A | MM-21A-009-161-00Y3 |
| M83513 / 03-A03T | MM-21T-009-161-00V1 | M83513 / 03-A07N | MM-212-009-145-0000 | M83513 / 03-A11C | MM-213-009-161-00Y3 |
| M83513 / 03-A04A | MM-21A-009-161-00V2 | M83513 / 03-A07P | MM-215-009-145-0000 | M83513 / 03-A11K | MM-21K-009-161-00Y3 |
| M83513 / 03-A04C | MM-213-009-161-00V2 | M83513 / 03-A07T | MM-21T-009-145-0000 | M83513 / 03-A11N | MM-212-009-161-00Y3 |
| M83513 / 03-A04K | MM-21K-009-161-00V2 | M83513 / 03-A08A | MM-21A-009-155-0000 | M83513 / 03-A11P | MM-215-009-161-00Y3 |
| M83513 / 03-A04N | MM-212-009-161-00V2 | M83513 / 03-A08C | MM-213-009-155-0000 | M83513 / 03-A11T | MM-21T-009-161-00Y3 |

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|                  |                     |                  |                     |                  |                     |
|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| M83513 / 03-A12A | MM-21A-009-161-00Y4 | M83513 / 03-B05K | MM-21K-015-143-0000 | M83513 / 03-B14T | MM-21T-015-161-00Y6 |
| M83513 / 03-A12C | MM-213-009-161-00Y4 | M83513 / 03-B05N | MM-212-015-143-0000 | M83513 / 03-B15A | MM-21A-015-161-00Y7 |
| M83513 / 03-A12K | MM-21K-009-161-00Y4 | M83513 / 03-B05P | MM-215-015-143-0000 | M83513 / 03-B15C | MM-213-015-161-00Y7 |
| M83513 / 03-A12N | MM-212-009-161-00Y4 | M83513 / 03-B05T | MM-21T-015-143-0000 | M83513 / 03-B15K | MM-21K-015-161-00Y7 |
| M83513 / 03-A12P | MM-215-009-161-00Y4 | M83513 / 03-B06A | MM-21A-015-153-0000 | M83513 / 03-B15N | MM-212-015-161-00Y7 |
| M83513 / 03-A12T | MM-21T-009-161-00Y4 | M83513 / 03-B06C | MM-213-015-153-0000 | M83513 / 03-B15P | MM-215-015-161-00Y7 |
| M83513 / 03-A13A | MM-21A-009-161-00Y5 | M83513 / 03-B06K | MM-21K-015-153-0000 | M83513 / 03-B15T | MM-21T-015-161-00Y7 |
| M83513 / 03-A13C | MM-213-009-161-00Y5 | M83513 / 03-B06N | MM-212-015-153-0000 | M83513 / 03-B16A | MM-21A-015-161-00Y8 |
| M83513 / 03-A13K | MM-21K-009-161-00Y5 | M83513 / 03-B06P | MM-215-015-153-0000 | M83513 / 03-B16C | MM-213-015-161-00Y8 |
| M83513 / 03-A13N | MM-212-009-161-00Y5 | M83513 / 03-B06T | MM-21T-015-153-0000 | M83513 / 03-B16K | MM-21K-015-161-00Y8 |
| M83513 / 03-A13P | MM-215-009-161-00Y5 | M83513 / 03-B07A | MM-21A-015-145-0000 | M83513 / 03-B16N | MM-212-015-161-00Y8 |
| M83513 / 03-A13T | MM-21T-009-161-00Y5 | M83513 / 03-B07C | MM-213-015-145-0000 | M83513 / 03-B16P | MM-215-015-161-00Y8 |
| M83513 / 03-A14A | MM-21A-009-161-00Y6 | M83513 / 03-B07K | MM-21K-015-145-0000 | M83513 / 03-B16T | MM-21T-015-161-00Y8 |
| M83513 / 03-A14C | MM-213-009-161-00Y6 | M83513 / 03-B07N | MM-212-015-145-0000 |                  |                     |
| M83513 / 03-A14K | MM-21K-009-161-00Y6 | M83513 / 03-B07P | MM-215-015-145-0000 | M83513 / 03-C01A | MM-21A-021-161-00W1 |
| M83513 / 03-A14N | MM-212-009-161-00Y6 | M83513 / 03-B07T | MM-21T-015-145-0000 | M83513 / 03-C01C | MM-213-021-161-00W1 |
| M83513 / 03-A14P | MM-215-009-161-00Y6 | M83513 / 03-B08A | MM-21A-015-155-0000 | M83513 / 03-C01K | MM-21K-021-161-00W1 |
| M83513 / 03-A14T | MM-21T-006-161-00Y6 | M83513 / 03-B08C | MM-213-015-155-0000 | M83513 / 03-C01N | MM-212-021-161-00W1 |
| M83513 / 03-A15A | MM-21A-009-161-00Y7 | M83513 / 03-B08K | MM-21K-015-155-0000 | M83513 / 03-C01P | MM-215-021-161-00W1 |
| M83513 / 03-A15C | MM-213-009-161-00Y7 | M83513 / 03-B08N | MM-212-015-155-0000 | M83513 / 03-C01T | MM-21T-021-161-00W1 |
| M83513 / 03-A15K | MM-21K-009-161-00Y7 | M83513 / 03-B08P | MM-215-015-155-0000 | M83513 / 03-C02A | MM-21A-021-161-00W2 |
| M83513 / 03-A15N | MM-212-009-161-00Y7 | M83513 / 03-B08T | MM-21T-015-155-0000 | M83513 / 03-C02C | MM-213-021-161-00W2 |
| M83513 / 03-A15P | MM-215-009-161-00Y7 | M83513 / 03-B09A | MM-21A-015-161-00Y1 | M83513 / 03-C02K | MM-21K-021-161-00W2 |
| M83513 / 03-A15T | MM-21T-009-161-00Y7 | M83513 / 03-B09C | MM-213-015-161-00Y1 | M83513 / 03-C02N | MM-212-021-161-00W2 |
| M83513 / 03-A16A | MM-21A-009-161-00Y8 | M83513 / 03-B09K | MM-21K-015-161-00Y1 | M83513 / 03-C02P | MM-215-021-161-00W2 |
| M83513 / 03-A16C | MM-213-009-161-00Y8 | M83513 / 03-B09N | MM-212-015-161-00Y1 | M83513 / 03-C02T | MM-21T-021-161-00W2 |
| M83513 / 03-A16K | MM-21K-009-161-00Y8 | M83513 / 03-B09P | MM-215-015-161-00Y1 | M83513 / 03-C03A | MM-21A-021-161-00V1 |
| M83513 / 03-A16N | MM-212-009-161-00Y8 | M83513 / 03-B09T | MM-21T-015-161-00Y1 | M83513 / 03-C03C | MM-213-021-161-00V1 |
| M83513 / 03-A16P | MM-215-009-161-00Y8 | M83513 / 03-B10A | MM-21A-015-161-00Y2 | M83513 / 03-C03K | MM-21K-021-161-00V1 |
| M83513 / 03-A16T | MM-21T-009-161-00Y8 | M83513 / 03-B10C | MM-213-015-161-00Y2 | M83513 / 03-C03N | MM-212-021-161-00V1 |
|                  |                     | M83513 / 03-B10K | MM-21K-015-161-00Y2 | M83513 / 03-C03P | MM-215-021-161-00V1 |
| M83513 / 03-B01A | MM-21A-015-161-00W1 | M83513 / 03-A10N | MM-212-015-161-00Y2 | M83513 / 03-C03T | MM-21T-021-161-00V1 |
| M83513 / 03-B01C | MM-213-015-161-00W1 | M83513 / 03-B10P | MM-215-015-161-00Y2 | M83513 / 03-C    |                     |



# Military Cross Reference Chart

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## M83513 / 03 (continued)

|                  |                     |                  |                     |                  |                     |
|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| M83513 / 03-F08C | MM-213-037-155-0000 | M83513 / 03-G05P | MM-315-051-143-0000 | M83513 / 03-H03N | MM-412-100-161-00V1 |
| M83513 / 03-F08N | MM-212-037-155-0000 | M83513 / 03-G06C | MM-313-051-153-0000 | M83513 / 03-H03P | MM-415-100-161-00V1 |
| M83513 / 03-F08P | MM-215-037-155-0000 | M83513 / 03-G06N | MM-312-051-153-0000 | M83513 / 03-H04C | MM-413-100-161-00V2 |
| M83513 / 03-F09C | MM-213-037-161-00Y1 | M83513 / 03-G06P | MM-315-051-153-0000 | M83513 / 03-H04N | MM-412-100-161-00V2 |
| M83513 / 03-F09N | MM-212-037-161-00Y1 | M83513 / 03-G07C | MM-313-051-145-0000 | M83513 / 03-H04P | MM-415-100-161-00V2 |
| M83513 / 03-F09P | MM-215-037-161-00Y1 | M83513 / 03-G07N | MM-312-051-145-0000 | M83513 / 03-H05C | MM-413-100-143-0000 |
| M83513 / 03-F10C | MM-213-037-161-00Y2 | M83513 / 03-G07P | MM-315-051-145-0000 | M83513 / 03-H05N | MM-412-100-143-0000 |
| M83513 / 03-F10N | MM-212-037-161-00Y2 | M83513 / 03-G08C | MM-313-051-155-0000 | M83513 / 03-H05P | MM-415-100-143-0000 |
| M83513 / 03-F10P | MM-215-037-161-00Y2 | M83513 / 03-G08N | MM-312-051-155-0000 | M83513 / 03-H06C | MM-413-100-153-0000 |
| M83513 / 03-F11C | MM-213-037-161-00Y3 | M83513 / 03-G08P | MM-315-051-155-0000 | M83513 / 03-H06N | MM-412-100-153-0000 |
| M83513 / 03-F11N | MM-212-037-161-00Y3 | M83513 / 03-G09C | MM-313-051-161-00Y1 | M83513 / 03-H06P | MM-415-100-153-0000 |
| M83513 / 03-F11P | MM-215-037-161-00Y3 | M83513 / 03-G09N | MM-312-051-161-00Y1 | M83513 / 03-H07C | MM-413-100-145-0000 |
| M83513 / 03-F12C | MM-213-037-161-00Y4 | M83513 / 03-G09P | MM-315-051-161-00Y1 | M83513 / 03-H07N | MM-412-100-145-0000 |
| M83513 / 03-F12N | MM-212-037-161-00Y4 | M83513 / 03-G10C | MM-313-051-161-00Y2 | M83513 / 03-H07P | MM-415-100-145-0000 |
| M83513 / 03-F12P | MM-215-037-161-00Y4 | M83513 / 03-G10N | MM-312-051-161-00Y2 | M83513 / 03-H08C | MM-413-100-155-0000 |
| M83513 / 03-F13C | MM-213-037-161-00Y5 | M83513 / 03-G10P | MM-315-051-161-00Y2 | M83513 / 03-H08N | MM-412-100-155-0000 |
| M83513 / 03-F13N | MM-212-037-161-00Y5 | M83513 / 03-G11C | MM-313-051-161-00Y3 | M83513 / 03-H08P | MM-415-100-155-0000 |
| M83513 / 03-F13P | MM-215-037-161-00Y5 | M83513 / 03-G11N | MM-312-051-161-00Y3 | M83513 / 03-H09C | MM-413-100-161-00Y1 |
| M83513 / 03-F14C | MM-213-037-161-00Y6 | M83513 / 03-G11P | MM-315-051-161-00Y3 | M83513 / 03-H09N | MM-412-100-161-00Y1 |
| M83513 / 03-F14N | MM-212-037-161-00Y6 | M83513 / 03-G12C | MM-313-051-161-00Y4 | M83513 / 03-H09P | MM-415-100-161-00Y1 |
| M83513 / 03-F14P | MM-215-037-161-00Y6 | M83513 / 03-G12N | MM-312-051-161-00Y4 | M83513 / 03-H10C | MM-413-100-161-00Y2 |
| M83513 / 03-F15C | MM-213-037-161-00Y7 | M83513 / 03-G12P | MM-315-051-161-00Y4 | M83513 / 03-H10N | MM-412-100-161-00Y2 |
| M83513 / 03-F15N | MM-212-037-161-00Y7 | M83513 / 03-G13C | MM-313-051-161-00Y5 | M83513 / 03-H10P | MM-415-100-161-00Y2 |
| M83513 / 03-F15P | MM-215-037-161-00Y7 | M83513 / 03-G13N | MM-312-051-161-00Y5 | M83513 / 03-H11C | MM-413-100-161-00Y3 |
| M83513 / 03-F16C | MM-213-037-161-00Y8 | M83513 / 03-G13P | MM-315-051-161-00Y5 | M83513 / 03-H11N | MM-412-100-161-00Y3 |
| M83513 / 03-F16N | MM-212-037-161-00Y8 | M83513 / 03-G14C | MM-313-051-161-00Y6 | M83513 / 03-H11P | MM-415-100-161-00Y3 |
| M83513 / 03-F16P | MM-215-037-161-00Y8 | M83513 / 03-G14N | MM-312-051-161-00Y6 | M83513 / 03-H12C | MM-413-100-161-00Y4 |
|                  |                     | M83513 / 03-G14P | MM-315-051-161-00Y6 | M83513 / 03-H12N | MM-412-100-161-00Y4 |
| M83513 / 03-G01C | MM-313-051-161-00W1 | M83513 / 03-G15C | MM-313-051-161-00Y7 | M83513 / 03-H12P | MM-415-100-161-00Y4 |
| M83513 / 03-G01N | MM-312-051-161-00W1 | M83513 / 03-G15N | MM-312-051-161-00Y7 | M83513 / 03-H13C | MM-413-100-161-00Y5 |
| M83513 / 03-G01P | MM-315-051-161-00W1 | M83513 / 03-G15P | MM-315-051-161-00Y7 | M83513 / 03-H13N | MM-412-100-161-00Y5 |
| M83513 / 03-G02C | MM-313-051-161-00W2 | M83513 / 03-G16C | MM-313-051-161-00Y8 | M83513 / 03-H13P | MM-415-100-161-00Y5 |
| M83513 / 03-G02N | MM-312-051-161-00W2 | M83513 / 03-G16N | MM-312-051-161-00Y8 | M83513 / 03-H14C | MM-413-100-161-00Y6 |
| M83513 / 03-G02P | MM-315-051-161-00W2 | M83513 / 03-G16P | MM-315-051-161-00Y8 | M83513 / 03-H14N | MM-412-100-161-00Y6 |
| M83513 / 03-G03C | MM-313-051-161-00V1 |                  |                     | M83513 / 03-H14P | MM-415-100-161-00Y6 |
| M83513 / 03-G03N | MM-312-051-161-00V1 | M83513 / 03-H01C | MM-413-100-161-00W1 | M83513 / 03-H15C | MM-413-100-161-00Y7 |
| M83513 / 03-G03P | MM-315-051-161-00V1 | M83513 / 03-H01N | MM-412-100-161-00W1 | M83513 / 03-H15N | MM-412-100-161-00Y7 |
| M83513 / 03-G04C | MM-313-051-161-00V2 | M83513 / 03-H01P | MM-415-100-161-00W1 | M83513 / 03-H15P | MM-415-100-161-00Y7 |
| M83513 / 03-G04N | MM-312-051-161-00V2 | M83513 / 03-H02C | MM-413-100-161-00W2 | M83513 / 03-H16C | MM-413-100-161-00Y8 |
| M83513 / 03-G04P | MM-315-051-161-00V2 | M83513 / 03-H02N | MM-412-100-161-00W2 | M83513 / 03-H16N | MM-412-100-161-00Y8 |
| M83513 / 03-G05C | MM-313-051-143-0000 | M83513 / 03-H02P | MM-415-100-161-00W2 | M83513 / 03-H16P | MM-415-100-161-00Y8 |
| M83513 / 03-G05N | MM-312-051-143-0000 | M83513 / 03-H03C | MM-413-100-161-00V1 |                  |                     |

## M83513 / 04

|                  |                         |                  |                         |                  |                         |
|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|
| M83513 / 04-A01C | MM-223-009-261-00W1-900 | M83513 / 04-A05C | MM-223-009-243-0000-900 | M83513 / 04-A09C | MM-223-009-261-00Y1-900 |
| M83513 / 04-A01N | MM-222-009-261-00W1-900 | M83513 / 04-A05N | MM-222-009-243-0000-900 | M83513 / 04-A09N | MM-222-009-261-00Y1-900 |
| M83513 / 04-A01P | MM-225-009-261-00W1-900 | M83513 / 04-A05P | MM-225-009-243-0000-900 | M83513 / 04-A09P | MM-225-009-261-00Y1-900 |
| M83513 / 04-A02C | MM-223-009-261-00W2-900 | M83513 / 04-A06C | MM-223-009-253-0000-900 | M83513 / 04-A10C | MM-223-009-261-00Y2-900 |
| M83513 / 04-A02N | MM-222-009-261-00W2-900 | M83513 / 04-A06N | MM-222-009-253-0000-900 | M83513 / 04-A10N | MM-222-009-261-00Y2-900 |
| M83513 / 04-A02P | MM-225-009-261-00W2-900 | M83513 / 04-A06P | MM-225-009-253-0000-900 | M83513 / 04-A10P | MM-225-009-261-00Y2-900 |
| M83513 / 04-A03C | MM-223-009-261-00V1-900 | M83513 / 04-A07C | MM-223-009-245-0000-900 | M83513 / 04-A11C | MM-223-009-261-00Y3-900 |
| M83513 / 04-A03N | MM-222-009-261-00V1-900 | M83513 / 04-A07N | MM-222-009-245-0000-900 | M83513 / 04-A11N | MM-222-009-261-00Y3-900 |
| M83513 / 04-A03P | MM-225-009-261-00V1-900 | M83513 / 04-A07P | MM-225-009-245-0000-900 | M83513 / 04-A11P | MM-225-009-261-00Y3-900 |
| M83513 / 04-A04C | MM-223-009-261-00V2-900 | M83513 / 04-A08C | MM-223-009-255-0000-900 | M83513 / 04-A12C | MM-223-009-261-00Y4-900 |
| M83513 / 04-A04N | MM-222-009-261-00V2-900 | M83513 / 04-A08N | MM-222-009-255-0000-900 | M83513 / 04-A12N | MM-222-009-261-00Y4-900 |
| M83513 / 04-A04P | MM-225-009-261-00V2-900 | M83513 / 04-A08P | MM-225-009-255-0000-900 | M83513 / 04-A12P | MM-225-009-261-00Y4-900 |



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|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|
| M83513 / 04-A13C | MM-223-009-261-00Y5-900 | M83513 / 04-B15C | MM-223-015-261-00Y7-900 | M83513 / 04-D01C | MM-223-025-261-00W1-900 |
| M83513 / 04-A13N | MM-222-009-261-00Y5-900 | M83513 / 04-B15N | MM-222-015-261-00Y7-900 | M83513 / 04-D01N | MM-222-025-261-00W1-900 |
| M83513 / 04-A13P | MM-225-009-261-00Y5-900 | M83513 / 04-B15P | MM-225-015-261-00Y7-900 | M83513 / 04-D01P | MM-225-025-261-00W1-900 |
| M83513 / 04-A14C | MM-223-009-261-00Y6-900 | M83513 / 04-B16C | MM-223-015-261-00Y8-900 | M83513 / 04-D02C | MM-223-025-261-00W2-900 |
| M83513 / 04-A14N | MM-222-009-261-00Y6-900 | M83513 / 04-B16N | MM-222-015-261-00Y8-900 | M83513 / 04-D02N | MM-222-025-261-00W2-900 |
| M83513 / 04-A14P | MM-225-009-261-00Y6-900 | M83513 / 04-B16P | MM-225-015-261-00Y8-900 | M83513 / 04-D02P | MM-225-025-261-00W2-900 |
| M83513 / 04-A15C | MM-223-009-261-00Y7-900 |                  |                         | M83513 / 04-D03C | MM-223-025-261-00V1-900 |
| M83513 / 04-A15N | MM-222-009-261-00Y7-900 | M83513 / 04-C01C | MM-223-021-261-00W1-900 | M83513 / 04-D03N | MM-222-025-261-00V1-900 |
| M83513 / 04-A15P | MM-225-009-261-00Y7-900 | M83513 / 04-C01N | MM-222-021-261-00W1-900 | M83513 / 04-D03P | MM-225-025-261-00V1-900 |
| M83513 / 04-A16C | MM-223-009-261-00Y8-900 | M83513 / 04-C01P | MM-225-021-261-00W1-900 | M83513 / 04-D04C | MM-223-025-261-00V2-900 |
| M83513 / 04-A16N | MM-222-009-261-00Y8-900 | M83513 / 04-C02C | MM-223-021-261-00W2-900 | M83513 / 04-D04N | MM-222-025-261-00V2-900 |
| M83513 / 04-A16P | MM-225-009-261-00Y8-900 | M83513 / 04-C02N | MM-222-021-261-00W2-900 | M83513 / 04-D04P | MM-225-025-261-00V2-900 |
|                  |                         | M83513 / 04-C02P | MM-225-021-261-00W2-900 | M83513 / 04-D05C | MM-223-025-243-0000-900 |
| M83513 / 04-B01C | MM-223-015-261-00W1-900 | M83513 / 04-C03C | MM-223-021-261-00V1-900 | M83513 / 04-D05N | MM-222-025-243-0000-900 |
| M83513 / 04-B01N | MM-222-015-261-00W1-900 | M83513 / 04-C03N | MM-222-021-261-00V1-900 | M83513 / 04-D05P | MM-225-025-243-0000-900 |
| M83513 / 04-B01P | MM-225-015-261-00W1-900 | M83513 / 04-C03P | MM-225-021-261-00V1-900 | M83513 / 04-D06C | MM-223-025-253-0000-900 |
| M83513 / 04-B02C | MM-223-015-261-00W2-900 | M83513 / 04-C04C | MM-223-021-261-00V2-900 | M83513 / 04-D06N | MM-222-025-253-0000-900 |
| M83513 / 04-B02N | MM-222-015-261-00W2-900 | M83513 / 04-C04N | MM-222-021-261-00V2-900 | M83513 / 04-D06P | MM-225-025-253-0000-900 |
| M83513 / 04-B02P | MM-225-015-261-00W2-900 | M83513 / 04-C04P | MM-225-021-261-00V2-900 | M83513 / 04-D07C | MM-223-025-245-0000-900 |
| M83513 / 04-B03C | MM-223-015-261-00V1-900 | M83513 / 04-C05C | MM-223-021-243-0000-900 | M83513 / 04-D07N | MM-222-025-245-0000-900 |
| M83513 / 04-B03N | MM-222-015-261-00V1-900 | M83513 / 04-C05N | MM-222-021-243-0000-900 | M83513 / 04-D07P | MM-225-025-245-0000-900 |
| M83513 / 04-B03P | MM-225-015-261-00V1-900 | M83513 / 04-C05P | MM-225-021-243-0000-900 | M83513 / 04-D08C | MM-223-025-255-0000-900 |
| M83513 / 04-B04C | MM-223-015-261-00V2-900 | M83513 / 04-C06C | MM-223-021-253-0000-900 | M83513 / 04-D08N | MM-222-025-255-0000-900 |
| M83513 / 04-B04N | MM-222-015-261-00V2-900 | M83513 / 04-C06N | MM-222-021-253-0000-900 | M83513 / 04-D08P | MM-225-025-255-0000-900 |
| M83513 / 04-B04P | MM-225-015-261-00V2-900 | M83513 / 04-C06P | MM-225-021-253-0000-900 | M83513 / 04-D09C | MM-223-025-261-00Y1-900 |
| M83513 / 04-B05C | MM-223-015-243-0000-900 | M83513 / 04-C07C | MM-223-021-245-0000-900 | M83513 / 04-D09N | MM-222-025-261-00Y1-900 |
| M83513 / 04-B05N | MM-222-015-243-0000-900 | M83513 / 04-C07N | MM-222-021-245-0000-900 | M83513 / 04-D09P | MM-225-025-261-00Y1-900 |
| M83513 / 04-B05P | MM-225-015-243-0000-900 | M83513 / 04-C07P | MM-225-021-245-0000-900 | M83513 / 04-D10C | MM-223-025-261-00Y2-900 |
| M83513 / 04-B06C | MM-223-015-253-0000-900 | M83513 / 04-C08C | MM-223-021-255-0000-900 | M83513 / 04-D10N | MM-222-025-261-00Y2-900 |
| M83513 / 04-B06N | MM-222-015-253-0000-900 | M83513 / 04-C08N | MM-222-021-255-0000-900 | M83513 / 04-D    |                         |



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# Military Cross Reference Chart

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## M83513 / 04 (continued)

|                  |                         |                  |                         |                  |                         |
|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|
| M83513 / 04-H09C | MM-423-100-261-00Y1-900 | M83513 / 04-H11P | MM-425-100-261-00Y3-900 | M83513 / 04-H14N | MM-422-100-261-00Y6-900 |
| M83513 / 04-H09N | MM-422-100-261-00Y1-900 | M83513 / 04-H12C | MM-423-100-261-00Y4-900 | M83513 / 04-H14P | MM-425-100-261-00Y6-900 |
| M83513 / 04-H09P | MM-425-100-261-00Y1-900 | M83513 / 04-H12N | MM-422-100-261-00Y4-900 | M83513 / 04-H15C | MM-423-100-261-00Y7-900 |
| M83513 / 04-H10C | MM-423-100-261-00Y2-900 | M83513 / 04-H12P | MM-425-100-261-00Y4-900 | M83513 / 04-H15N | MM-422-100-261-00Y7-900 |
| M83513 / 04-H10N | MM-422-100-261-00Y2-900 | M83513 / 04-H13C | MM-423-100-261-00Y5-900 | M83513 / 04-H15P | MM-425-100-261-00Y7-900 |
| M83513 / 04-H10P | MM-425-100-261-00Y2-900 | M83513 / 04-H13N | MM-422-100-261-00Y5-900 | M83513 / 04-H16C | MM-423-100-261-00Y8-900 |
| M83513 / 04-H11C | MM-423-100-261-00Y3-900 | M83513 / 04-H13P | MM-425-100-261-00Y5-900 | M83513 / 04-H16N | MM-422-100-261-00Y8-900 |
| M83513 / 04-H11N | MM-422-100-261-00Y3-900 | M83513 / 04-H14C | MM-423-100-261-00Y6-900 | M83513 / 04-H16P | MM-425-100-261-00Y8-900 |

## M83513 / 05

|                |                     |
|----------------|---------------------|
| M83513 / 05-02 | 00-000-000-000-4100 |
| M83513 / 05-03 | 00-000-000-000-4200 |
| M83513 / 05-05 | 00-000-000-000-4300 |
| M83513 / 05-06 | 00-000-000-000-4400 |
| M83513 / 05-07 | 00-000-000-000-2200 |
| M83513 / 05-12 | 00-000-000-000-8100 |
| M83513 / 05-13 | 00-000-000-000-8200 |
| M83513 / 05-15 | 00-000-000-000-8300 |
| M83513 / 05-16 | 00-000-000-000-8400 |
| M83513 / 05-17 | 00-000-000-000-6200 |

## M83513 / 06

|               |                     |
|---------------|---------------------|
| M83513 / 06-A | MP-211-009-113-0000 |
| M83513 / 06-B | MP-211-015-113-0000 |
| M83513 / 06-C | MP-211-021-113-0000 |
| M83513 / 06-D | MP-211-025-113-0000 |
| M83513 / 06-E | MP-211-031-113-0000 |
| M83513 / 06-F | MP-211-037-113-0000 |
| M83513 / 06-G | MP-311-051-113-0000 |

## M83513 / 07

|               |                     |
|---------------|---------------------|
| M83513 / 07-A | MP-221-009-213-0000 |
| M83513 / 07-B | MP-221-015-213-0000 |
| M83513 / 07-C | MP-221-021-213-0000 |
| M83513 / 07-D | MP-221-025-213-0000 |
| M83513 / 07-E | MP-221-031-213-0000 |
| M83513 / 07-F | MP-221-037-213-0000 |
| M83513 / 07-G | MP-321-051-213-0000 |

## M83513 / 08

|                 |                     |                 |                     |                 |                     |
|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|
| M83513 / 08-A01 | MP-211-009-161-00W1 | M83513 / 08-C01 | MP-211-021-161-00W1 | M83513 / 08-E01 | MP-211-031-161-00W1 |
| M83513 / 08-A02 | MP-211-009-161-00W2 | M83513 / 08-C02 | MP-211-021-161-00W2 | M83513 / 08-E02 | MP-211-031-161-00W2 |
| M83513 / 08-A03 | MP-211-009-161-00V1 | M83513 / 08-C03 | MP-211-021-161-00V1 | M83513 / 08-E03 | MP-211-031-161-00V1 |
| M83513 / 08-A04 | MP-211-009-161-00V2 | M83513 / 08-C04 | MP-211-021-161-00V2 | M83513 / 08-E04 | MP-211-031-161-00V2 |
| M83513 / 08-A05 | MP-211-009-143-0000 | M83513 / 08-C05 | MP-211-021-143-0000 | M83513 / 08-E05 | MP-211-031-143-0000 |
| M83513 / 08-A06 | MP-211-009-153-0000 | M83513 / 08-C06 | MP-211-021-153-0000 | M83513 / 08-E06 | MP-211-031-153-0000 |
| M83513 / 08-A07 | MP-211-009-145-0000 | M83513 / 08-C07 | MP-211-021-145-0000 | M83513 / 08-E07 | MP-211-031-145-0000 |
| M83513 / 08-A08 | MP-211-009-155-0000 | M83513 / 08-C08 | MP-211-021-155-0000 | M83513 / 08-E08 | MP-211-031-155-0000 |
| M83513 / 08-A09 | MP-211-009-161-00Y1 | M83513 / 08-C09 | MP-211-021-161-00Y1 | M83513 / 08-E09 | MP-211-031-161-00Y1 |
| M83513 / 08-A10 | MP-211-009-161-00Y2 | M83513 / 08-C10 | MP-211-021-161-00Y2 | M83513 / 08-E10 | MP-211-031-161-00Y2 |
| M83513 / 08-A11 | MP-211-009-161-00Y3 | M83513 / 08-C11 | MP-211-021-161-00Y3 | M83513 / 08-E11 | MP-211-031-161-00Y3 |
| M83513 / 08-A12 | MP-211-009-161-00Y4 | M83513 / 08-C12 | MP-211-021-161-00Y4 | M83513 / 08-E12 | MP-211-031-161-00Y4 |
| M83513 / 08-A13 | MP-211-009-161-00Y5 | M83513 / 08-C13 | MP-211-021-161-00Y5 | M83513 / 08-E13 | MP-211-031-161-00Y5 |
| M83513 / 08-A14 | MP-211-009-161-00Y6 | M83513 / 08-C14 | MP-211-021-161-00Y6 | M83513 / 08-E14 | MP-211-031-161-00Y6 |
| M83513 / 08-A15 | MP-211-009-161-00Y7 | M83513 / 08-C15 | MP-211-021-161-00Y7 | M83513 / 08-E15 | MP-211-031-161-00Y7 |
| M83513 / 08-A16 | MP-211-009-161-00Y8 | M83513 / 08-C16 | MP-211-021-161-00Y8 | M83513 / 08-E16 | MP-211-031-161-00Y8 |

|                 |                     |                 |                     |                 |                     |
|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|
| M83513 / 08-B01 | MP-211-015-161-00W1 | M83513 / 08-D01 | MP-211-025-161-00W1 | M83513 / 08-F01 | MP-211-037-161-00W1 |
| M83513 / 08-B02 | MP-211-015-161-00W2 | M83513 / 08-D02 | MP-211-025-161-00W2 | M83513 / 08-F02 | MP-211-037-161-00W2 |
| M83513 / 08-B03 | MP-211-015-161-00V1 | M83513 / 08-D03 | MP-211-025-161-00V1 | M83513 / 08-F03 | MP-211-037-161-00V1 |
| M83513 / 08-B04 | MP-211-015-161-00V2 | M83513 / 08-D04 | MP-211-025-161-00V2 | M83513 / 08-F04 | MP-211-037-161-00V2 |
| M83513 / 08-B05 | MP-211-015-143-0000 | M83513 / 08-D05 | MP-211-025-143-0000 | M83513 / 08-F05 | MP-211-037-143-0000 |
| M83513 / 08-B06 | MP-211-015-153-0000 | M83513 / 08-D06 | MP-211-025-153-0000 | M83513 / 08-F06 | MP-211-037-153-0000 |
| M83513 / 08-B07 | MP-211-015-145-0000 | M83513 / 08-D07 | MP-211-025-145-0000 | M83513 / 08-F07 | MP-211-037-145-0000 |
| M83513 / 08-B08 | MP-211-015-155-0000 | M83513 / 08-D08 | MP-211-025-155-0000 | M83513 / 08-F08 | MP-211-037-155-0000 |
| M83513 / 08-B09 | MP-211-015-161-00Y1 | M83513 / 08-D09 | MP-211-025-161-00Y1 | M83513 / 08-F09 | MP-211-037-161-00Y1 |
| M83513 / 08-B10 | MP-211-015-161-00Y2 | M83513 / 08-D10 | MP-211-025-161-00Y2 | M83513 / 08-F10 | MP-211-037-161-00Y2 |
| M83513 / 08-B11 | MP-211-015-161-00Y3 | M83513 / 08-D11 | MP-211-025-161-00Y3 | M83513 / 08-F11 | MP-211-037-161-00Y3 |
| M83513 / 08-B12 | MP-211-015-161-00Y4 | M83513 / 08-D12 | MP-211-025-161-00Y4 | M83513 / 08-F12 | MP-211-037-161-00Y4 |
| M83513 / 08-B13 | MP-211-015-161-00Y5 | M83513 / 08-D13 | MP-211-025-161-00Y5 | M83513 / 08-F13 | MP-211-037-161-00Y5 |
| M83513 / 08-B14 | MP-211-015-161-00Y6 | M83513 / 08-D14 | MP-211-025-161-00Y6 | M83513 / 08-F14 | MP-211-037-161-00Y6 |
| M83513 / 08-B15 | MP-211-015-161-00Y7 | M83513 / 08-D15 | MP-211-025-161-00Y7 | M83513 / 08-F15 | MP-211-037-161-00Y7 |
| M83513 / 08-B16 | MP-211-015-161-00Y8 | M83513 / 08-D16 | MP-211-025-161-00Y8 | M83513 / 08-F16 | MP-211-037-161-00Y8 |

# Military Cross Reference Chart

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## M83513 / 08 (continued)

|                 |                     |                 |                     |                 |                     |
|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|
| M83513 / 08-G01 | MP-311-051-161-00W1 | M83513 / 08-G07 | MP-311-051-145-0000 | M83513 / 08-G13 | MP-311-051-161-00Y5 |
| M83513 / 08-G02 | MP-311-051-161-00W2 | M83513 / 08-G08 | MP-311-051-155-0000 | M83513 / 08-G14 | MP-311-051-161-00Y6 |
| M83513 / 08-G03 | MP-311-051-161-00V1 | M83513 / 08-G09 | MP-311-051-161-00Y1 | M83513 / 08-G15 | MP-311-051-161-00Y7 |
| M83513 / 08-G04 | MP-311-051-161-00V2 | M83513 / 08-G10 | MP-311-051-161-00Y2 | M83513 / 08-G16 | MP-311-051-161-00Y8 |
| M83513 / 08-G05 | MP-311-051-143-0000 | M83513 / 08-G11 | MP-311-051-161-00Y3 |                 |                     |
| M83513 / 08-G06 | MP-311-051-153-0000 | M83513 / 08-G12 | MP-311-051-161-00Y4 |                 |                     |

## M83513 / 09

|                 |                     |                 |                     |                 |                     |
|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|
| M83513 / 09-A01 | MP-221-009-261-00W1 | M83513 / 09-C07 | MP-221-021-245-0000 | M83513 / 09-E12 | MP-221-031-261-00Y4 |
| M83513 / 09-A02 | MP-221-009-261-00W2 | M83513 / 09-C08 | MP-221-021-255-0000 | M83513 / 09-E13 | MP-221-031-261-00Y5 |
| M83513 / 09-A03 | MP-221-009-261-00V1 | M83513 / 09-C09 | MP-221-021-261-00Y1 | M83513 / 09-E14 | MP-221-031-261-00Y6 |
| M83513 / 09-A04 | MP-221-009-261-00V2 | M83513 / 09-C10 | MP-221-021-261-00Y2 | M83513 / 09-E15 | MP-221-031-261-00Y7 |
| M83513 / 09-A05 | MP-221-009-243-0000 | M83513 / 09-C11 | MP-221-021-261-00Y3 | M83513 / 09-E16 | MP-221-031-261-00Y8 |
| M83513 / 09-A06 | MP-221-009-253-0000 | M83513 / 09-C12 | MP-221-021-261-00Y4 |                 |                     |
| M83513 / 09-A07 | MP-221-009-245-0000 | M83513 / 09-C13 | MP-221-021-261-00Y5 | M83513 / 09-F01 | MP-221-037-261-00W1 |
| M83513 / 09-A08 | MP-221-009-255-0000 | M83513 / 09-C14 | MP-221-021-261-00Y6 | M83513 / 09-F02 | MP-221-037-261-00W2 |
| M83513 / 09-A09 | MP-221-009-261-00Y1 | M83513 / 09-C15 | MP-221-021-261-00Y7 | M83513 / 09-F03 | MP-221-037-261-00V1 |
| M83513 / 09-A10 | MP-221-009-261-00Y2 | M83513 / 09-C16 | MP-221-021-261-00Y8 | M83513 / 09-F04 | MP-221-037-261-00V2 |
| M83513 / 09-A11 | MP-221-009-261-00Y3 |                 |                     | M83513 / 09-F05 | MP-221-037-243-0000 |
| M83513 / 09-A12 | MP-221-009-261-00Y4 | M83513 / 09-D01 | MP-221-025-261-00W1 | M83513 / 09-F06 | MP-221-037-253-0000 |
| M83513 / 09-A13 | MP-221-009-261-00Y5 | M83513 / 09-D02 | MP-221-025-261-00W2 | M83513 / 09-F07 | MP-221-037-245-0000 |
| M83513 / 09-A14 | MP-221-009-261-00Y6 | M83513 / 09-D03 | MP-221-025-261-00V1 | M83513 / 09-F08 | MP-221-037-255-0000 |
| M83513 / 09-A15 | MP-221-009-261-00Y7 | M83513 / 09-D04 | MP-221-025-261-00V2 | M83513 / 09-F09 | MP-221-037-261-00Y1 |
| M83513 / 09-A16 | MP-221-009-261-00Y8 | M83513 / 09-D05 | MP-221-025-243-0000 | M83513 / 09-F10 | MP-221-037-261-00Y2 |
|                 |                     | M83513 / 09-D06 | MP-221-025-253-0000 | M83513 / 09-F11 | MP-221-037-261-00Y3 |
| M83513 / 09-B01 | MP-221-015-261-00W1 | M83513 / 09-D07 | MP-221-025-245-0000 | M83513 / 09-F12 | MP-221-037-261-00Y4 |
| M83513 / 09-B02 | MP-221-015-261-00W2 | M83513 / 09-D08 | MP-221-025-255-0000 | M83513 / 09-F13 | MP-221-037-261-00Y5 |
| M83513 / 09-B03 | MP-221-015-261-00V1 | M83513 / 09-D09 | MP-221-025-261-00Y1 | M83513 / 09-F14 | MP-221-037-261-00Y6 |
| M83513 / 09-B04 | MP-221-015-261-00V2 | M83513 / 09-D10 | MP-221-025-261-00Y2 | M83513 / 09-F15 | MP-221-037-261-00Y7 |
| M83513 / 09-B05 | MP-221-015-243-0000 | M83513 / 09-D11 | MP-221-025-261-00Y3 | M83513 / 09-F16 | MP-221-037-261-00Y8 |
| M83513 / 09-B06 | MP-221-015-253-0000 | M83513 / 09-D12 | MP-221-025-261-00Y4 |                 |                     |
| M83513 / 09-B07 | MP-221-015-245-0000 | M83513 / 09-D13 | MP-221-025-261-00Y5 | M83513 / 09-G01 | MP-321-051-261-00W1 |
| M83513 / 09-B08 | MP-221-015-255-0000 | M83513 / 09-D14 | MP-221-025-261-00Y6 | M83513 / 09-G02 | MP-321-051-261-00W2 |
| M83513 / 09-B09 | MP-221-015-261-00Y1 | M83513 / 09-D15 | MP-221-025-261-00Y7 | M83513 / 09-G03 | MP-321-051-261-00V1 |
| M83513 / 09-B10 | MP-221-015-261-00Y2 | M83513 / 09-D16 | MP-221-025-261-00Y8 | M83513 / 09-G04 | MP-321-051-261-00V2 |
| M83513 / 09-B11 | MP-221-015-261-00Y3 |                 |                     | M83513 / 09-G05 | MP-321-051-243-0000 |
| M83513 / 09-B12 | MP-221-015-261-00Y4 | M83513 / 09-E01 | MP-221-031-261-00W1 | M83513 / 09-G06 | MP-321-051-253-0000 |
| M83513 / 09-B13 | MP-221-015-261-00Y5 | M83513 / 09-E02 | MP-221-031-261-00W2 | M83513 / 09-G07 | MP-321-051-245-0000 |
| M83513 / 09-B14 | MP-221-015-261-00Y6 | M83513 / 09-E03 | MP-221-031-261-00V1 | M83513 / 09-G08 | MP-321-051-255-0000 |
| M83513 / 09-B15 | MP-221-015-261-00Y7 | M83513 / 09-E04 | MP-221-031-261-00V2 | M83513 / 09-G09 | MP-321-051-261-00Y1 |
| M83513 / 09-B16 | MP-221-015-261-00Y8 | M83513 / 09-E05 | MP-221-031-243-0000 | M83513 / 09-G10 | MP-321-051-261-00Y2 |
|                 |                     | M83513 / 09-E06 | MP-221-031-253-0000 | M83513 / 09-G11 | MP-321-051-261-00Y3 |
| M83513 / 09-C01 | MP-221-021-261-00W1 | M83513 / 09-E07 | MP-221-031-245-0000 | M83513 / 09-G12 | MP-321-051-261-00Y4 |
| M83513 / 09-C02 | MP-221-021-261-00W2 | M83513 / 09-E08 | MP-221-031-255-0000 | M83513 / 09-G13 | MP-321-051-261-00Y5 |
| M83513 / 09-C03 | MP-221-021-261-00V1 | M83513 / 09-E09 | MP-221-031-261-00Y1 | M83513 / 09-G14 | MP-321-051-261-00Y6 |
| M83513 / 09-C04 | MP-221-021-261-00V2 | M83513 / 09-E10 | MP-221-031-261-00Y2 | M83513 / 09-G15 | MP-321-051-261-00Y7 |
| M83513 / 09-C05 | MP-221-021-243-0000 | M83513 / 09-E11 | MP-221-031-261-00Y3 | M83513 / 09-G16 | MP-321-051-261-00Y8 |
| M83513 / 09-C06 | MP-221-021-253-0000 |                 |                     |                 |                     |

## M83513 / 10

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 10-A01CN | MK-2R3-009-325-000S     | M83513 / 10-A01NT | MK-2R2-009-325-000S-0B7 | M83513 / 10-A02CN | MK-2R3-009-335-000S     |
| M83513 / 10-A01CP | MK-2R3-009-325-220S     | M83513 / 10-A01NW | MK-2R2-009-325-220S-0B7 | M83513 / 10-A02CP | MK-2R3-009-335-220S     |
| M83513 / 10-A01CT | MK-2R3-009-325-000S-0B7 | M83513 / 10-A01PN | MK-2R5-009-325-000S     | M83513 / 10-A02CT | MK-2R3-009-335-000S-0B7 |
| M83513 / 10-A01CW | MK-2R3-009-325-220S-0B7 | M83513 / 10-A01PP | MK-2R5-009-325-220S     | M83513 / 10-A02CW | MK-2R3-009-335-220S-0B7 |
| M83513 / 10-A01NN | MK-2R2-009-325-000S     | M83513 / 10-A01PT | MK-2R5-009-325-000S-0B7 | M83513 / 10-A02NN | MK-2R2-009-335-000S     |
| M83513 / 10-A01NP | MK-2R2-009-325-220S     | M83513 / 10-A01PW | MK-2R5-009-325-220S-0B7 | M83513 / 10-A02NP | MK-2R2-009-335-220S     |



# Military Cross Reference Chart

— Continued from previous page

## M83513 / 10 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 10-A02NT | MK-2R2-009-335-000S-OB7 | M83513 / 10-C01CN | MK-2R3-021-325-000S     | M83513 / 10-D02NW | MK-2R2-025-335-220S-OB7 |
| M83513 / 10-A02NW | MK-2R2-009-335-220S-OB7 | M83513 / 10-C01CP | MK-2R3-021-325-220S     | M83513 / 10-D02PN | MK-2R5-025-335-000S     |
| M83513 / 10-A02PN | MK-2R5-009-335-000S     | M83513 / 10-C01CT | MK-2R3-021-325-000S-OB7 | M83513 / 10-D02PP | MK-2R5-025-335-220S     |
| M83513 / 10-A02PP | MK-2R5-009-335-220S     | M83513 / 10-C01CW | MK-2R3-021-325-220S-OB7 | M83513 / 10-D02PT | MK-2R5-025-335-000S-OB7 |
| M83513 / 10-A02PT | MK-2R5-009-335-000S-OB7 | M83513 / 10-C01NN | MK-2R2-021-325-000S     | M83513 / 10-D02PW | MK-2R5-025-335-220S-OB7 |
| M83513 / 10-A02PW | MK-2R5-009-335-220S-OB7 | M83513 / 10-C01NP | MK-2R2-021-325-220S     | M83513 / 10-D03CN | MK-2R3-025-345-000S     |
| M83513 / 10-A03CN | MK-2R3-009-345-000S     | M83513 / 10-C01NT | MK-2R2-021-325-000S-OB7 | M83513 / 10-D03CP | MK-2R3-025-345-220S     |
| M83513 / 10-A03CP | MK-2R3-009-345-220S     | M83513 / 10-C01NW | MK-2R2-021-325-220S-OB7 | M83513 / 10-D03CT | MK-2R3-025-345-000S-OB7 |
| M83513 / 10-A03CT | MK-2R3-009-345-000S-OB7 | M83513 / 10-C01PN | MK-2R5-021-325-000S     | M83513 / 10-D03CW | MK-2R3-025-345-220S-OB7 |
| M83513 / 10-A03CW | MK-2R3-009-345-220S-OB7 | M83513 / 10-C01PP | MK-2R5-021-325-220S     | M83513 / 10-D03NN | MK-2R2-025-345-000S     |
| M83513 / 10-A03NN | MK-2R2-009-345-000S     | M83513 / 10-C01PT | MK-2R5-021-325-000S-OB7 | M83513 / 10-D03NP | MK-2R2-025-345-220S     |
| M83513 / 10-A03NP | MK-2R2-009-345-220S     | M83513 / 10-C01PW | MK-2R5-021-325-220S-OB7 | M83513 / 10-D03NT | MK-2R2-025-345-000S-OB7 |
| M83513 / 10-A03NT | MK-2R2-009-345-000S-OB7 | M83513 / 10-C02CN | MK-2R3-021-335-000S     | M83513 / 10-D03NW | MK-2R2-025-345-220S-OB7 |
| M83513 / 10-A03NW | MK-2R2-009-345-220S-OB7 | M83513 / 10-C02CP | MK-2R3-021-335-220S     | M83513 / 10-D03PN | MK-2R5-025-345-000S     |
| M83513 / 10-A03PN | MK-2R5-009-345-000S     | M83513 / 10-C02CT | MK-2R3-021-335-000S-OB7 | M83513 / 10-D03PP | MK-2R5-025-345-220S     |
| M83513 / 10-A03PP | MK-2R5-009-345-220S     | M83513 / 10-C02CW | MK-2R3-021-335-220S-OB7 | M83513 / 10-D03PT | MK-2R5-025-345-000S-OB7 |
| M83513 / 10-A03PT | MK-2R5-009-345-000S-OB7 | M83513 / 10-C02NN | MK-2R2-021-335-000S     | M83513 / 10-D03PW | MK-2R5-025-345-220S-OB7 |
| M83513 / 10-A03PW | MK-2R5-009-345-220S-OB7 | M83513 / 10-C02NP | MK-2R2-021-335-220S     |                   |                         |
|                   |                         | M83513 / 10-C02NT | MK-2R2-021-335-000S-OB7 | M83513 / 10-E01CN | MK-2R3-031-325-000S     |
| M83513 / 10-B01CN | MK-2R3-015-325-000S     | M83513 / 10-C02NW | MK-2R2-021-335-220S-OB7 | M83513 / 10-E01CP | MK-2R3-031-325-220S     |
| M83513 / 10-B01CP | MK-2R3-015-325-220S     | M83513 / 10-C02PN | MK-2R5-021-335-000S     | M83513 / 10-E01CT | MK-2R3-031-325-000S-OB7 |
| M83513 / 10-B01CT | MK-2R3-015-325-000S-OB7 | M83513 / 10-C02PP | MK-2R5-021-335-220S     | M83513 / 10-E01CW | MK-2R3-031-325-220S-OB7 |
| M83513 / 10-B01CW | MK-2R3-015-325-220S-OB7 | M83513 / 10-C02PT | MK-2R5-021-335-000S-OB7 | M83513 / 10-E01NN | MK-2R2-031-325-000S     |
| M83513 / 10-B01NN | MK-2R2-015-325-000S     | M83513 / 10-C02PW | MK-2R5-021-335-220S-OB7 | M83513 / 10-E01NP | MK-2R2-031-325-220S     |
| M83513 / 10-B01NP | MK-2R2-015-325-220S     | M83513 / 10-C03CN | MK-2R3-021-345-000S     | M83513 / 10-E01NT | MK-2R2-031-325-000S-OB7 |
| M83513 / 10-B01NT | MK-2R2-015-325-000S-OB7 | M83513 / 10-C03CP | MK-2R3-021-345-220S     | M83513 / 10-E01NW | MK-2R2-031-325-220S-OB7 |
| M83513 / 10-B01NW | MK-2R2-015-325-220S-OB7 | M83513 / 10-C03CT | MK-2R3-021-345-000S-OB7 | M83513 / 10-E01PN | MK-2R5-031-325-000S     |
| M83513 / 10-B01PN | MK-2R5-015-325-000S     | M83513 / 10-C03CW | MK-2R3-021-345-220S-OB7 | M83513 / 10-E01PP | MK-2R5-031-325-220S     |
| M83513 / 10-B01PP | MK-2R5-015-325-220S     | M83513 / 10-C03NN | MK-2R2-021-345-000S     | M83513 / 10-E01PT | MK-2R5-031-325-000S-OB7 |
| M83513 / 10-B01PT | MK-2R5-015-325-000S-OB7 | M83513 / 10-C03NP | MK-2R2-021-345-220S     | M83513 / 10-E01PW | MK-2R5-031-325-220S-OB7 |
| M83513 / 10-B01PW | MK-2R5-015-325-220S-OB7 | M83513 / 10-C03NT | MK-2R2-021-345-000S-OB7 | M83513 / 10-E02CN | MK-2R3-031-335-000S     |
| M83513 / 10-B02CN | MK-2R3-015-335-000S     | M83513 / 10-C03NW | MK-2R2-021-345-220S-OB7 | M83513 / 10-E02CP | MK-2R3-031-335-220S     |
| M83513 / 10-B02CP | MK-2R3-015-335-220S     | M83513 / 10-C03PN | MK-2R5-021-345-000S     | M83513 / 10-E02CT | MK-2R3-031-335-000S-OB7 |
| M83513 / 10-B02CT | MK-2R3-015-335-000S-OB7 | M83513 / 10-C03PP | MK-2R5-021-345-220S     | M83513 / 10-E02CW | MK-2R3-031-335-220S-OB7 |
| M83513 / 10-B02CW | MK-2R3-015-335-220S-OB7 | M83513 / 10-C03PT | MK-2R5-021-345-000S-OB7 | M83513 / 10-E02NN | MK-2R2-031-335-000S     |
| M83513 / 10-B02NN | MK-2R2-015-335-000S     | M83513 / 10-C03PW | MK-2R5-021-345-220S-OB7 | M83513 / 10-E02NP | MK-2R2-031-335-220S     |
| M83513 / 10-B02NP | MK-2R2-015-335-220S     |                   |                         | M83513 / 10-E02NT | MK-2R2-031-335-000S-OB7 |
| M83513 / 10-B02NT | MK-2R2-015-335-000S-OB7 | M83513 / 10-D01CN | MK-2R3-025-325-000S     | M83513 / 10-E02NW | MK-2R2-031-335-220S-OB7 |
| M83513 / 10-B02NW | MK-2R2-015-335-220S-OB7 | M83513 / 10-D01CP | MK-2R3-025-325-220S     | M83513 / 10-E02PN | MK-2R5-031-335-000S     |
| M83513 / 10-B02PN | MK-2R5-015-335-000S     | M83513 / 10-D01CT | MK-2R3-025-325-000S-OB7 | M83513 / 10-E02PP | MK-2R5-031-335-220S     |
| M83513 / 10-B02PP | MK-2R5-015-335-220S     | M83513 / 10-D01CW | MK-2R3-025-325-220S-OB7 | M83513 / 10-E02PT | MK-2R5-031-335-000S-OB7 |
| M83513 / 10-B02PT | MK-2R5-015-335-000S-OB7 | M83513 / 10-D01NN | MK-2R2-025-325-000S     | M83513 / 10-E02PW | MK-2R5-031-335-220S-OB7 |
| M83513 / 10-B02PW | MK-2R5-015-335-220S-OB7 | M83513 / 10-D01NP | MK-2R2-025-325-220S     | M83513 / 10-E03CN | MK-2R3-031-345-000S     |
| M83513 / 10-B03CN | MK-2R3-015-345-000S     | M83513 / 10-D01NT | MK-2R2-025-325-000S-OB7 | M83513 / 10-E03CP | MK-2R3-031-345-220S     |
| M83513 / 10-B03CP | MK-2R3-015-345-220S     | M83513 / 10-D01NW | MK-2R2-025-325-220S-OB7 | M83513 / 10-E03CT | MK-2R3-031-345-000S-OB7 |
| M83513 / 10-B03CT | MK-2R3-015-345-000S-OB7 | M83513 / 10-D01PN | MK-2R5-025-325-000S     | M83513 / 10-E03CW | MK-2R3-031-345-220S-OB7 |
| M83513 / 10-B03CW | MK-2R3-015-345-220S-OB7 | M83513 / 10-D01PP | MK-2R5-025-325-220S     | M83513 / 10-E03NN | MK-2R2-031-345-000S     |
| M83513 / 10-B03NN | MK-2R2-015-345-000S     | M83513 / 10-D01PT | MK-2R5-025-325-000S-OB7 | M83513 / 10-E03NP | MK-2R2-031-345-220S     |
| M83513 / 10-B03NP | MK-2R2-015-345-220S     | M83513 / 10-D01PW | MK-2R5-025-325-220S-OB7 | M83513 / 10-E03NT | MK-2R2-031-345-000S-OB7 |
| M83513 / 10-B03NT | MK-2R2-015-345-000S-OB7 | M83513 / 10-D02CN | MK-2R3-025-335-000S     | M83513 / 10-E03NW | MK-2R2-031-345-220S-OB7 |
| M83513 / 10-B03NW | MK-2R2-015-345-220S-OB7 | M83513 / 10-D02CP | MK-2R3-025-335-220S     | M83513 / 10-E03PN | MK-2R5-031-345-000S     |
| M83513 / 10-B03PN | MK-2R5-015-345-000S     | M83513 / 10-D02CT | MK-2R3-025-335-000S-OB7 | M83513 / 10-E03PP | MK-2R5-031-345-220S     |
| M83513 / 10-B03PP | MK-2R5-015-345-220S     | M83513 / 10-D02CW | MK-2R3-025-335-220S-OB7 | M83513 / 10-E03PT | MK-2R5-031-345-000S-OB7 |
| M83513 / 10-B03PT | MK-2R5-015-345-000S-OB7 | M83513 / 10-D02NN | MK-2R2-025-335-000S     | M83513 / 10-E03PW | MK-2R5-031-345-220S-OB7 |
| M83513 / 10-B03PW | MK-2R5-015-345-220S-OB7 | M83513 / 10-D02NP | MK-2R2-025-335-220S     |                   |                         |
|                   |                         | M83513 / 10-D02NT | MK-2R2-025-335-000S-OB7 |                   |                         |



## Military Cross Reference Chart

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### M83513 / 10 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 10-F01CN | MK-2R3-037-325-000S     | M83513 / 10-F02CN | MK-2R3-037-335-000S     | M83513 / 10-F03CN | MK-2R3-037-345-000S     |
| M83513 / 10-F01CP | MK-2R3-037-325-220S     | M83513 / 10-F02CP | MK-2R3-037-335-220S     | M83513 / 10-F03CP | MK-2R3-037-345-220S     |
| M83513 / 10-F01CT | MK-2R3-037-325-000S-OB7 | M83513 / 10-F02CT | MK-2R3-037-335-000S-OB7 | M83513 / 10-F03CT | MK-2R3-037-345-000S-OB7 |
| M83513 / 10-F01CW | MK-2R3-037-325-220S-OB7 | M83513 / 10-F02CW | MK-2R3-037-335-220S-OB7 | M83513 / 10-F03CW | MK-2R3-037-345-220S-OB7 |
| M83513 / 10-F01NN | MK-2R2-037-325-000S     | M83513 / 10-F02NN | MK-2R2-037-335-000S     | M83513 / 10-F03NN | MK-2R2-037-345-000S     |
| M83513 / 10-F01NP | MK-2R2-037-325-220S     | M83513 / 10-F02NP | MK-2R2-037-335-220S     | M83513 / 10-F03NP | MK-2R2-037-345-220S     |
| M83513 / 10-F01NT | MK-2R2-037-325-000S-OB7 | M83513 / 10-F02NT | MK-2R2-037-335-000S-OB7 | M83513 / 10-F03NT | MK-2R2-037-345-000S-OB7 |
| M83513 / 10-F01NW | MK-2R2-037-325-220S-OB7 | M83513 / 10-F02NW | MK-2R2-037-335-220S-OB7 | M83513 / 10-F03NW | MK-2R2-037-345-220S-OB7 |
| M83513 / 10-F01PN | MK-2R5-037-325-000S     | M83513 / 10-F02PN | MK-2R5-037-335-000S     | M83513 / 10-F03PN | MK-2R5-037-345-000S     |
| M83513 / 10-F01PP | MK-2R5-037-325-220S     | M83513 / 10-F02PP | MK-2R5-037-335-220S     | M83513 / 10-F03PP | MK-2R5-037-345-220S     |
| M83513 / 10-F01PT | MK-2R5-037-325-000S-OB7 | M83513 / 10-F02PT | MK-2R5-037-335-000S-OB7 | M83513 / 10-F03PT | MK-2R5-037-345-000S-OB7 |
| M83513 / 10-F01PW | MK-2R5-037-325-220S-OB7 | M83513 / 10-F02PW | MK-2R5-037-335-220S-OB7 | M83513 / 10-F03PW | MK-2R5-037-345-220S-OB7 |

### M83513 / 11

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 11-G01CN | MK-3R3-051-325-000S     | M83513 / 11-G02CN | MK-3R3-051-335-000S     | M83513 / 11-G03CN | MK-3R3-051-345-000S     |
| M83513 / 11-G01CP | MK-3R3-051-325-220S     | M83513 / 11-G02CP | MK-3R3-051-335-220S     | M83513 / 11-G03CP | MK-3R3-051-345-220S     |
| M83513 / 11-G01CT | MK-3R3-051-325-000S-OB7 | M83513 / 11-G02CT | MK-3R3-051-335-000S-OB7 | M83513 / 11-G03CT | MK-3R3-051-345-000S-OB7 |
| M83513 / 11-G01CW | MK-3R3-051-325-220S-OB7 | M83513 / 11-G02CW | MK-3R3-051-335-220S-OB7 | M83513 / 11-G03CW | MK-3R3-051-345-220S-OB7 |
| M83513 / 11-G01NN | MK-3R2-051-325-000S     | M83513 / 11-G02NN | MK-3R2-051-335-000S     | M83513 / 11-G03NN | MK-3R2-051-345-000S     |
| M83513 / 11-G01NP | MK-3R2-051-325-220S     | M83513 / 11-G02NP | MK-3R2-051-335-220S     | M83513 / 11-G03NP | MK-3R2-051-345-220S     |
| M83513 / 11-G01NT | MK-3R2-051-325-000S-OB7 | M83513 / 11-G02NT | MK-3R2-051-335-000S-OB7 | M83513 / 11-G03NT | MK-3R2-051-345-000S-OB7 |
| M83513 / 11-G01NW | MK-3R2-051-325-220S-OB7 | M83513 / 11-G02NW | MK-3R2-051-335-220S-OB7 | M83513 / 11-G03NW | MK-3R2-051-345-220S-OB7 |
| M83513 / 11-G01PN | MK-3R5-051-325-000S     | M83513 / 11-G02PN | MK-3R5-051-335-000S     | M83513 / 11-G03PN | MK-3R5-051-345-000S     |
| M83513 / 11-G01PP | MK-3R5-051-325-220S     | M83513 / 11-G02PP | MK-3R5-051-335-220S     | M83513 / 11-G03PP | MK-3R5-051-345-220S     |
| M83513 / 11-G01PT | MK-3R5-051-325-000S-OB7 | M83513 / 11-G02PT | MK-3R5-051-335-000S-OB7 | M83513 / 11-G03PT | MK-3R5-051-345-000S-OB7 |
| M83513 / 11-G01PW | MK-3R5-051-325-220S-OB7 | M83513 / 11-G02PW | MK-3R5-051-335-220S-OB7 | M83513 / 11-G03PW | MK-3R5-051-345-220S-OB7 |

### M83513 / 12

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 12-H01CN | MK-4R3-100-325-000S-94P | M83513 / 12-H02CN | MK-4R3-100-335-000S-94P | M83513 / 12-H03CN | MK-4R3-100-345-000S-94P |
| M83513 / 12-H01CP | MK-4R3-100-325-620S-94P | M83513 / 12-H02CP | MK-4R3-100-335-620S-94P | M83513 / 12-H03CP | MK-4R3-100-345-620S-94P |
| M83513 / 12-H01CT | MK-4R3-100-325-000S-OBJ | M83513 / 12-H02CT | MK-4R3-100-335-000S-OBJ | M83513 / 12-H03CT | MK-4R3-100-345-000S-OBJ |
| M83513 / 12-H01CW | MK-4R3-100-325-620S-OBJ | M83513 / 12-H02CW | MK-4R3-100-335-620S-OBJ | M83513 / 12-H03CW | MK-4R3-100-345-620S-OBJ |
| M83513 / 12-H01NN | MK-4R2-100-325-000S-94P | M83513 / 12-H02NN | MK-4R2-100-335-000S-94P | M83513 / 12-H03NN | MK-4R2-100-345-000S-94P |
| M83513 / 12-H01NP | MK-4R2-100-325-620S-94P | M83513 / 12-H02NP | MK-4R2-100-335-620S-94P | M83513 / 12-H03NP | MK-4R2-100-345-620S-94P |
| M83513 / 12-H01NT | MK-4R2-100-325-000S-OBJ | M83513 / 12-H02NT | MK-4R2-100-335-000S-OBJ | M83513 / 12-H03NT | MK-4R2-100-345-000S-OBJ |
| M83513 / 12-H01NW | MK-4R2-100-325-620S-OBJ | M83513 / 12-H02NW | MK-4R2-100-335-620S-OBJ | M83513 / 12-H03NW | MK-4R2-100-345-620S-OBJ |
| M83513 / 12-H01PN | MK-4R5-100-325-000S-94P | M83513 / 12-H02PN | MK-4R5-100-335-000S-94P | M83513 / 12-H03PN | MK-4R5-100-345-000S-94P |
| M83513 / 12-H01PP | MK-4R5-100-325-620S-94P | M83513 / 12-H02PP | MK-4R5-100-335-620S-94P | M83513 / 12-H03PP | MK-4R5-100-345-620S-94P |
| M83513 / 12-H01PT | MK-4R5-100-325-000S-OBJ | M83513 / 12-H02PT | MK-4R5-100-335-000S-OBJ | M83513 / 12-H03PT | MK-4R5-100-345-000S-OBJ |
| M83513 / 12-H01PW | MK-4R5-100-325-620S-OBJ | M83513 / 12-H02PW | MK-4R5-100-335-620S-OBJ | M83513 / 12-H03PW | MK-4R5-100-345-620S-OBJ |

### M83513 / 13

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 13-A01CN | MK-2S3-009-435-000S-900 | M83513 / 13-A02CN | MK-2S3-009-445-000S-900 | M83513 / 13-A03CN | MK-2S3-009-455-000S-900 |
| M83513 / 13-A01CP | MK-2S3-009-435-220S-900 | M83513 / 13-A02CP | MK-2S3-009-445-220S-900 | M83513 / 13-A03CP | MK-2S3-009-455-220S-900 |
| M83513 / 13-A01CT | MK-2S3-009-435-000S-OB7 | M83513 / 13-A02CT | MK-2S3-009-445-000S-OB7 | M83513 / 13-A03CT | MK-2S3-009-455-000S-OB7 |
| M83513 / 13-A01CW | MK-2S3-009-435-220S-OB7 | M83513 / 13-A02CW | MK-2S3-009-445-220S-OB7 | M83513 / 13-A03CW | MK-2S3-009-455-220S-OB7 |
| M83513 / 13-A01NN | MK-2S2-009-435-000S-900 | M83513 / 13-A02NN | MK-2S2-009-445-000S-900 | M83513 / 13-A03NN | MK-2S2-009-455-000S-900 |
| M83513 / 13-A01NP | MK-2S2-009-435-220S-900 | M83513 / 13-A02NP | MK-2S2-009-445-220S-900 | M83513 / 13-A03NP | MK-2S2-009-455-220S-900 |
| M83513 / 13-A01NT | MK-2S2-009-435-000S-OB7 | M83513 / 13-A02NT | MK-2S2-009-445-000S-OB7 | M83513 / 13-A03NT | MK-2S2-009-455-000S-OB7 |
| M83513 / 13-A01NW | MK-2S2-009-435-220S-OB7 | M83513 / 13-A02NW | MK-2S2-009-445-220S-OB7 | M83513 / 13-A03NW | MK-2S2-009-455-220S-OB7 |
| M83513 / 13-A01PN | MK-2S5-009-435-000S-900 | M83513 / 13-A02PN | MK-2S5-009-445-000S-900 | M83513 / 13-A03PN | MK-2S5-009-455-000S-900 |
| M83513 / 13-A01PP | MK-2S5-009-435-220S-900 | M83513 / 13-A02PP | MK-2S5-009-445-220S-900 | M83513 / 13-A03PP | MK-2S5-009-455-220S-900 |
| M83513 / 13-A01PT | MK-2S5-009-435-000S-OB7 | M83513 / 13-A02PT | MK-2S5-009-445-000S-OB7 | M83513 / 13-A03PT | MK-2S5-009-455-000S-OB7 |
| M83513 / 13-A01PW | MK-2S5-009-435-220S-OB7 | M83513 / 13-A02PW | MK-2S5-009-445-220S-OB7 | M83513 / 13-A03PW | MK-2S5-009-455-220S-OB7 |



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# Military Cross Reference Chart

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## M83513 / 13 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 13-F02NT | MK-2S2-037-445-000S-0B7 | M83513 / 13-F03CN | MK-2S3-037-455-000S-900 | M83513 / 13-F03NT | MK-2S2-037-455-000S-0B7 |
| M83513 / 13-F02NW | MK-2S2-037-445-220S-0B7 | M83513 / 13-F03CP | MK-2S3-037-455-220S-900 | M83513 / 13-F03NW | MK-2S2-037-455-220S-0B7 |
| M83513 / 13-F02PN | MK-2S5-037-445-000S-900 | M83513 / 13-F03CT | MK-2S3-037-455-000S-0B7 | M83513 / 13-F03PN | MK-2S5-037-455-000S-900 |
| M83513 / 13-F02PP | MK-2S5-037-445-220S-900 | M83513 / 13-F03CW | MK-2S3-037-455-220S-0B7 | M83513 / 13-F03PP | MK-2S5-037-455-220S-900 |
| M83513 / 13-F02PT | MK-2S5-037-445-000S-0B7 | M83513 / 13-F03NN | MK-2S2-037-455-000S-900 | M83513 / 13-F03PT | MK-2S5-037-455-000S-0B7 |
| M83513 / 13-F02PW | MK-2S5-037-445-220S-0B7 | M83513 / 13-F03NP | MK-2S2-037-455-220S-900 | M83513 / 13-F03PW | MK-2S5-037-455-220S-0B7 |

## M83513 / 14

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 14-G01CN | MK-3S3-051-435-000S-900 | M83513 / 14-G02CN | MK-3S3-051-445-000S-900 | M83513 / 14-G03CN | MK-3S3-051-455-000S-900 |
| M83513 / 14-G01CP | MK-3S3-051-435-220S-900 | M83513 / 14-G02CP | MK-3S3-051-445-220S-900 | M83513 / 14-G03CP | MK-3S3-051-455-220S-900 |
| M83513 / 14-G01CT | MK-3S3-051-435-000S-0B7 | M83513 / 14-G02CT | MK-3S3-051-445-000S-0B7 | M83513 / 14-G03CT | MK-3S3-051-455-000S-0B7 |
| M83513 / 14-G01CW | MK-3S3-051-435-220S-0B7 | M83513 / 14-G02CW | MK-3S3-051-445-220S-0B7 | M83513 / 14-G03CW | MK-3S3-051-455-220S-0B7 |
| M83513 / 14-G01NN | MK-3S2-051-435-000S-900 | M83513 / 14-G02NN | MK-3S2-051-445-000S-900 | M83513 / 14-G03NN | MK-3S2-051-455-000S-900 |
| M83513 / 14-G01NP | MK-3S2-051-435-220S-900 | M83513 / 14-G02NP | MK-3S2-051-445-220S-900 | M83513 / 14-G03NP | MK-3S2-051-455-220S-900 |
| M83513 / 14-G01NT | MK-3S2-051-435-000S-0B7 | M83513 / 14-G02NT | MK-3S2-051-445-000S-0B7 | M83513 / 14-G03NT | MK-3S2-051-455-000S-0B7 |
| M83513 / 14-G01NW | MK-3S2-051-435-220S-0B7 | M83513 / 14-G02NW | MK-3S2-051-445-220S-0B7 | M83513 / 14-G03NW | MK-3S2-051-455-220S-0B7 |
| M83513 / 14-G01PN | MK-3S5-051-435-000S-900 | M83513 / 14-G02PN | MK-3S5-051-445-000S-900 | M83513 / 14-G03PN | MK-3S5-051-455-000S-900 |
| M83513 / 14-G01PP | MK-3S5-051-435-220S-900 | M83513 / 14-G02PP | MK-3S5-051-445-220S-900 | M83513 / 14-G03PP | MK-3S5-051-455-220S-900 |
| M83513 / 14-G01PT | MK-3S5-051-435-000S-0B7 | M83513 / 14-G02PT | MK-3S5-051-445-000S-0B7 | M83513 / 14-G03PT | MK-3S5-051-455-000S-0B7 |
| M83513 / 14-G01PW | MK-3S5-051-435-220S-0B7 | M83513 / 14-G02PW | MK-3S5-051-445-220S-0B7 | M83513 / 14-G03PW | MK-3S5-051-455-220S-0B7 |

## M83513 / 15

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 15-H01CN | MK-4S3-100-435-000S-900 | M83513 / 15-H02CN | MK-4S3-100-445-000S-900 | M83513 / 15-H03CN | MK-4S3-100-455-000S-900 |
| M83513 / 15-H01CP | MK-4S3-100-435-620S-900 | M83513 / 15-H02CP | MK-4S3-100-445-620S-900 | M83513 / 15-H03CP | MK-4S3-100-455-620S-900 |
| M83513 / 15-H01CT | MK-4S3-100-435-000S-0B7 | M83513 / 15-H02CT | MK-4S3-100-445-000S-0B7 | M83513 / 15-H03CT | MK-4S3-100-455-000S-0B7 |
| M83513 / 15-H01CW | MK-4S3-100-435-620S-0B7 | M83513 / 15-H02CW | MK-4S3-100-445-620S-0B7 | M83513 / 15-H03CW | MK-4S3-100-455-620S-0B7 |
| M83513 / 15-H01NN | MK-4S2-100-435-000S-900 | M83513 / 15-H02NN | MK-4S2-100-445-000S-900 | M83513 / 15-H03NN | MK-4S2-100-455-000S-900 |
| M83513 / 15-H01NP | MK-4S2-100-435-620S-900 | M83513 / 15-H02NP | MK-4S2-100-445-620S-900 | M83513 / 15-H03NP | MK-4S2-100-455-620S-900 |
| M83513 / 15-H01NT | MK-4S2-100-435-000S-0B7 | M83513 / 15-H02NT | MK-4S2-100-445-000S-0B7 | M83513 / 15-H03NT | MK-4S2-100-455-000S-0B7 |
| M83513 / 15-H01NW | MK-4S2-100-435-620S-0B7 | M83513 / 15-H02NW | MK-4S2-100-445-620S-0B7 | M83513 / 15-H03NW | MK-4S2-100-455-620S-0B7 |
| M83513 / 15-H01PN | MK-4S5-100-435-000S-900 | M83513 / 15-H02PN | MK-4S5-100-445-000S-900 | M83513 / 15-H03PN | MK-4S5-100-455-000S-900 |
| M83513 / 15-H01PP | MK-4S5-100-435-620S-900 | M83513 / 15-H02PP | MK-4S5-100-445-620S-900 | M83513 / 15-H03PP | MK-4S5-100-455-620S-900 |
| M83513 / 15-H01PT | MK-4S5-100-435-000S-0B7 | M83513 / 15-H02PT | MK-4S5-100-445-000S-0B7 | M83513 / 15-H03PT | MK-4S5-100-455-000S-0B7 |
| M83513 / 15-H01PW | MK-4S5-100-435-620S-0B7 | M83513 / 15-H02PW | MK-4S5-100-445-620S-0B7 | M83513 / 15-H03PW | MK-4S5-100-455-620S-0B7 |

## M83513 / 16

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 16-A01CN | MK-273-009-325-000R     | M83513 / 16-A02NW | MK-272-009-335-220R-0B7 | M83513 / 16-B01CN | MK-273-015-325-000R     |
| M83513 / 16-A01CP | MK-273-009-325-220R     | M83513 / 16-A02PN | MK-275-009-335-000R     | M83513 / 16-B01CP | MK-273-015-325-220R     |
| M83513 / 16-A01CT | MK-273-009-325-000R-0B7 | M83513 / 16-A02PP | MK-275-009-335-220R     | M83513 / 16-B01CT | MK-273-015-325-000R-0B7 |
| M83513 / 16-A01CW | MK-273-009-325-220R-0B7 | M83513 / 16-A02PT | MK-275-009-335-000R-0B7 | M83513 / 16-B01CW | MK-273-015-325-220R-0B7 |
| M83513 / 16-A01NN | MK-272-009-325-000R     | M83513 / 16-A02PW | MK-275-009-335-220R-0B7 | M83513 / 16-B01NN | MK-272-015-325-000R     |
| M83513 / 16-A01NP | MK-272-009-325-220R     | M83513 / 16-A03CN | MK-273-009-345-000R     | M83513 / 16-B01NP | MK-272-015-325-220R     |
| M83513 / 16-A01NT | MK-272-009-325-000R-0B7 | M83513 / 16-A03CP | MK-273-009-345-220R     | M83513 / 16-B01NT | MK-272-015-325-000R-0B7 |
| M83513 / 16-A01NW | MK-272-009-325-220R-0B7 | M83513 / 16-A03CT | MK-273-009-345-000R-0B7 | M83513 / 16-B01NW | MK-272-015-325-220R-0B7 |
| M83513 / 16-A01PN | MK-275-009-325-000R     | M83513 / 16-A03CW | MK-273-009-345-220R-0B7 | M83513 / 16-B01PN | MK-275-015-325-000R     |
| M83513 / 16-A01PP | MK-275-009-325-220R     | M83513 / 16-A03NN | MK-272-009-345-000R     | M83513 / 16-B01PP | MK-275-015-325-220R     |
| M83513 / 16-A01PT | MK-275-009-325-000R-0B7 | M83513 / 16-A03NP | MK-272-009-345-220R     | M83513 / 16-B01PT | MK-275-015-325-000R-0B7 |
| M83513 / 16-A01PW | MK-275-009-325-220R-0B7 | M83513 / 16-A03NT | MK-272-009-345-000R-0B7 | M83513 / 16-B01PW | MK-275-015-325-220R-0B7 |
| M83513 / 16-A02CN | MK-273-009-335-000R     | M83513 / 16-A03NW | MK-272-009-345-220R-0B7 | M83513 / 16-B02CN | MK-273-015-335-000R     |
| M83513 / 16-A02CP | MK-273-009-335-220R     | M83513 / 16-A03PN | MK-275-009-345-000R     | M83513 / 16-B02CP | MK-273-015-335-220R     |
| M83513 / 16-A02CT | MK-273-009-335-000R-0B7 | M83513 / 16-A03PP | MK-275-009-345-220R     | M83513 / 16-B02CT | MK-273-015-335-000R-0B7 |
| M83513 / 16-A02CW | MK-273-009-335-220R-0B7 | M83513 / 16-A03PT | MK-275-009-345-000R-0B7 | M83513 / 16-B02CW | MK-273-015-335-220R-0B7 |
| M83513 / 16-A02NN | MK-272-009-335-000R     | M83513 / 16-A03PW | MK-275-009-345-220R-0B7 | M83513 / 16-B02NN | MK-272-015-335-000R     |
| M83513 / 16-A02NP | MK-272-009-335-220R     |                   |                         | M83513 / 16-B02NP | MK-272-015-335-220R     |
| M83513 / 16-A02NT | MK-272-009-335-000R-0B7 |                   |                         | M83513 / 16-B02NT | MK-272-015-335-000R-0B7 |



# Military Cross Reference Chart

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## M83513 / 16 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 16-B02NW | MK-272-015-335-220R-OB7 | M83513 / 16-D01CN | MK-273-025-325-000R     | M83513 / 16-E02NW | MK-272-031-335-220R-OB7 |
| M83513 / 16-B02PN | MK-275-015-335-000R     | M83513 / 16-D01CP | MK-273-025-325-220R     | M83513 / 16-E02PN | MK-275-031-335-000R     |
| M83513 / 16-B02PP | MK-275-015-335-220R     | M83513 / 16-D01CT | MK-273-025-325-000R-OB7 | M83513 / 16-E02PP | MK-275-031-335-220R     |
| M83513 / 16-B02PT | MK-275-015-335-000R-OB7 | M83513 / 16-D01CW | MK-273-025-325-220R-OB7 | M83513 / 16-E02PT | MK-275-031-335-000R-OB7 |
| M83513 / 16-B02PW | MK-275-015-335-220R-OB7 | M83513 / 16-D01NN | MK-272-025-325-000R     | M83513 / 16-E02PW | MK-275-031-335-220R-OB7 |
| M83513 / 16-B03CN | MK-273-015-345-000R     | M83513 / 16-D01NP | MK-272-025-325-220R     | M83513 / 16-E03CN | MK-273-031-345-000R     |
| M83513 / 16-B03CP | MK-273-015-345-220R     | M83513 / 16-D01NT | MK-272-025-325-000R-OB7 | M83513 / 16-E03CP | MK-273-031-345-220R     |
| M83513 / 16-B03CT | MK-273-015-345-000R-OB7 | M83513 / 16-D01NW | MK-272-025-325-220R-OB7 | M83513 / 16-E03CT | MK-273-031-345-000R-OB7 |
| M83513 / 16-B03CW | MK-273-015-345-220R-OB7 | M83513 / 16-D01PN | MK-275-025-325-000R     | M83513 / 16-E03CW | MK-273-031-345-220R-OB7 |
| M83513 / 16-B03NN | MK-272-015-345-000R     | M83513 / 16-D01PP | MK-275-025-325-220R     | M83513 / 16-E03NN | MK-272-031-345-000R     |
| M83513 / 16-B03NP | MK-272-015-345-220R     | M83513 / 16-D01PT | MK-275-025-325-000R-OB7 | M83513 / 16-E03NP | MK-272-031-345-220R     |
| M83513 / 16-B03NT | MK-272-015-345-000R-OB7 | M83513 / 16-D01PW | MK-275-025-325-220R-OB7 | M83513 / 16-E03NT | MK-272-031-345-000R-OB7 |
| M83513 / 16-B03NW | MK-272-015-345-220R-OB7 | M83513 / 16-D02CN | MK-273-025-335-000R     | M83513 / 16-E03NW | MK-272-031-345-220R-OB7 |
| M83513 / 16-B03PN | MK-275-015-345-000R     | M83513 / 16-D02CP | MK-273-025-335-220R     | M83513 / 16-E03PN | MK-275-031-345-000R     |
| M83513 / 16-B03PP | MK-275-015-345-220R     | M83513 / 16-D02CT | MK-273-025-335-000R-OB7 | M83513 / 16-E03PP | MK-275-031-345-220R     |
| M83513 / 16-B03PT | MK-275-015-345-000R-OB7 | M83513 / 16-D02CW | MK-273-025-335-220R-OB7 | M83513 / 16-E03PT | MK-275-031-345-000R-OB7 |
| M83513 / 16-B03PW | MK-275-015-345-220R-OB7 | M83513 / 16-D02NN | MK-272-025-335-000R     | M83513 / 16-E03PW | MK-275-031-345-220R-OB7 |
|                   |                         | M83513 / 16-D02NP | MK-272-025-335-220R     |                   |                         |
| M83513 / 16-C01CN | MK-273-021-325-000R     | M83513 / 16-D02NT | MK-272-025-335-000R-OB7 | M83513 / 16-F01CN | MK-273-037-325-000R     |
| M83513 / 16-C01CP | MK-273-021-325-220R     | M83513 / 16-D02NW | MK-272-025-335-220R-OB7 | M83513 / 16-F01CP | MK-273-037-325-220R     |
| M83513 / 16-C01CT | MK-273-021-325-000R-OB7 | M83513 / 16-D02PN | MK-275-025-335-000R     | M83513 / 16-F01CT | MK-273-037-325-000R-OB7 |
| M83513 / 16-C01CW | MK-273-021-325-220R-OB7 | M83513 / 16-D02PP | MK-275-025-335-220R     | M83513 / 16-F01CW | MK-273-037-325-220R-OB7 |
| M83513 / 16-C01NN | MK-272-021-325-000R     | M83513 / 16-D02PT | MK-275-025-335-000R-OB7 | M83513 / 16-F01NN | MK-272-037-325-000R     |
| M83513 / 16-C01NP | MK-272-021-325-220R     | M83513 / 16-D02PW | MK-275-025-335-220R-OB7 | M83513 / 16-F01NP | MK-272-037-325-220R     |
| M83513 / 16-C01NT | MK-272-021-325-000R-OB7 | M83513 / 16-D03CN | MK-273-025-345-000R     | M83513 / 16-F01NT | MK-272-037-325-000R-OB7 |
| M83513 / 16-C01NW | MK-272-021-325-220R-OB7 | M83513 / 16-D03CP | MK-273-025-345-220R     | M83513 / 16-F01NW | MK-272-037-325-220R-OB7 |
| M83513 / 16-C01PN | MK-275-021-325-000R     | M83513 / 16-D03CT | MK-273-025-345-000R-OB7 | M83513 / 16-F01PN | MK-275-037-325-000R     |
| M83513 / 16-C01PP | MK-275-021-325-220R     | M83513 / 16-D03CW | MK-273-025-345-220R-OB7 | M83513 / 16-F01PP | MK-275-037-325-220R     |
| M83513 / 16-C01PT | MK-275-021-325-000R-OB7 | M83513 / 16-D03NN | MK-272-025-345-000R     | M83513 / 16-F01PT | MK-275-037-325-000R-OB7 |
| M83513 / 16-C01PW | MK-275-021-325-220R-OB7 | M83513 / 16-D03NP | MK-272-025-345-220R     | M83513 / 16-F01PW | MK-275-037-325-220R-OB7 |
| M83513 / 16-C02CN | MK-273-021-335-000R     | M83513 / 16-D03NT | MK-272-025-345-000R-OB7 | M83513 / 16-F02CN | MK-273-037-335-000R     |
| M83513 / 16-C02CP | MK-273-021-335-220R     | M83513 / 16-D03NW | MK-272-025-345-220R-OB7 | M83513 / 16-F02CP | MK-273-037-335-220R     |
| M83513 / 16-C02CT | MK-273-021-335-000R-OB7 | M83513 / 16-D03PN | MK-275-025-345-000R     | M83513 / 16-F02CT | MK-273-037-335-000R-OB7 |
| M83513 / 16-C02CW | MK-273-021-335-220R-OB7 | M83513 / 16-D03PP | MK-275-025-345-220R     | M83513 / 16-F02CW | MK-273-037-335-220R-OB7 |
| M83513 / 16-C02NN | MK-272-021-335-000R     | M83513 / 16-D03PT | MK-275-025-345-000R-OB7 | M83513 / 16-F02NN | MK-272-037-335-000R     |
| M83513 / 16-C02NP | MK-272-021-335-220R     | M83513 / 16-D03PW | MK-275-025-345-220R-OB7 | M83513 / 16-F02NP | MK-272-037-335-220R     |
| M83513 / 16-C02NT | MK-272-021-335-000R-OB7 |                   |                         | M83513 / 16-F02NT | MK-272-037-335-000R-OB7 |
| M83513 / 16-C02NW | MK-272-021-335-220R-OB7 | M83513 / 16-E01CN | MK-273-031-325-000R     | M83513 / 16-F02NW | MK-272-037-335-220R-OB7 |
| M83513 / 16-C02PN | MK-275-021-335-000R     | M83513 / 16-E01CP | MK-273-031-325-220R     | M83513 / 16-F02PN | MK-275-037-335-000R     |
| M83513 / 16-C02PP | MK-275-021-335-220R     | M83513 / 16-E01CT | MK-273-031-325-000R-OB7 | M83513 / 16-F02PP | MK-275-037-335-220R     |
| M83513 / 16-C02PT | MK-275-021-335-000R-OB7 | M83513 / 16-E01CW | MK-273-031-325-220R-OB7 | M83513 / 16-F02PT | MK-275-037-335-000R-OB7 |
| M83513 / 16-C02PW | MK-275-021-335-220R-OB7 | M83513 / 16-E01NN | MK-272-031-325-000R     | M83513 / 16-F02PW | MK-275-037-335-220R-OB7 |
| M83513 / 16-C03CN | MK-273-021-345-000R     | M83513 / 16-E01NP | MK-272-031-325-220R     | M83513 / 16-F03CN | MK-273-037-345-000R     |
| M83513 / 16-C03CP | MK-273-021-345-220R     | M83513 / 16-E01NT | MK-272-031-325-000R-OB7 | M83513 / 16-F03CP | MK-273-037-345-220R     |
| M83513 / 16-C03CT | MK-273-021-345-000R-OB7 | M83513 / 16-E01NW | MK-272-031-325-220R-OB7 | M83513 / 16-F03CT | MK-273-037-345-000R-OB7 |
| M83513 / 16-C03CW | MK-273-021-345-220R-OB7 | M83513 / 16-E01PN | MK-275-031-325-000R     | M83513 / 16-F03CW | MK-273-037-345-220R-OB7 |
| M83513 / 16-C03NN | MK-272-021-345-000R     | M83513 / 16-E01PP | MK-275-031-325-220R     | M83513 / 16-F03NN | MK-272-037-345-000R     |
| M83513 / 16-C03NP | MK-272-021-345-220R     | M83513 / 16-E01PT | MK-275-031-325-000R-OB7 | M83513 / 16-F03NP | MK-272-037-345-220R     |
| M83513 / 16-C03NT | MK-272-021-345-000R-OB7 | M83513 / 16-E01PW | MK-275-031-325-220R-OB7 | M83513 / 16-F03NT | MK-272-037-345-000R-OB7 |
| M83513 / 16-C03NW | MK-272-021-345-220R-OB7 | M83513 / 16-E02CN | MK-273-031-335-000R     | M83513 / 16-F03NW | MK-272-037-345-220R-OB7 |
| M83513 / 16-C03PN | MK-275-021-345-000R     | M83513 / 16-E02CP | MK-273-031-335-220R     | M83513 / 16-F03PN | MK-275-037-345-000R     |
| M83513 / 16-C03PP | MK-275-021-345-220R     | M83513 / 16-E02CT | MK-273-031-335-000R-OB7 | M83513 / 16-F03PP | MK-275-037-345-220R     |
| M83513 / 16-C03PT | MK-275-021-345-000R-OB7 | M83513 / 16-E02CW | MK-273-031-335-220R-OB7 | M83513 / 16-F03PT | MK-275-037-345-000R-OB7 |
| M83513 / 16-C03PW | MK-275-021-345-220R-OB7 | M83513 / 16-E02NN | MK-272-031-335-000R     | M83513 / 16-F03PW | MK-275-037-345-220R-OB7 |
|                   |                         | M83513 / 16-E02NP | MK-272-031-335-220R     |                   |                         |
|                   |                         | M83513 / 16-E02NT | MK-272-031-335-000R-OB7 |                   |                         |



# Military Cross Reference Chart

-- Continued from previous page

## M83513 / 17

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 17-G01CN | MK-373-051-325-000R     | M83513 / 17-G02CN | MK-373-051-335-000R     | M83513 / 17-G03CN | MK-373-051-345-000R     |
| M83513 / 17-G01CP | MK-373-051-325-220R     | M83513 / 17-G02CP | MK-373-051-335-220R     | M83513 / 17-G03CP | MK-373-051-345-220R     |
| M83513 / 17-G01CT | MK-373-051-325-000R-OB7 | M83513 / 17-G02CT | MK-373-051-335-000R-OB7 | M83513 / 17-G03CT | MK-373-051-345-000R-OB7 |
| M83513 / 17-G01CW | MK-373-051-325-220R-OB7 | M83513 / 17-G02CW | MK-373-051-335-220R-OB7 | M83513 / 17-G03CW | MK-373-051-345-220R-OB7 |
| M83513 / 17-G01NN | MK-372-051-325-000R     | M83513 / 17-G02NN | MK-372-051-335-000R     | M83513 / 17-G03NN | MK-372-051-345-000R     |
| M83513 / 17-G01NP | MK-372-051-325-220R     | M83513 / 17-G02NP | MK-372-051-335-220R     | M83513 / 17-G03NP | MK-372-051-345-220R     |
| M83513 / 17-G01NT | MK-372-051-325-000R-OB7 | M83513 / 17-G02NT | MK-372-051-335-000R-OB7 | M83513 / 17-G03NT | MK-372-051-345-000R-OB7 |
| M83513 / 17-G01NW | MK-372-051-325-220R-OB7 | M83513 / 17-G02NW | MK-372-051-335-220R-OB7 | M83513 / 17-G03NW | MK-372-051-345-220R-OB7 |
| M83513 / 17-G01PN | MK-375-051-325-000R     | M83513 / 17-G02PN | MK-375-051-335-000R     | M83513 / 17-G03PN | MK-375-051-345-000R     |
| M83513 / 17-G01PP | MK-375-051-325-220R     | M83513 / 17-G02PP | MK-375-051-335-220R     | M83513 / 17-G03PP | MK-375-051-345-220R     |
| M83513 / 17-G01PT | MK-375-051-325-000R-OB7 | M83513 / 17-G02PT | MK-375-051-335-000R-OB7 | M83513 / 17-G03PT | MK-375-051-345-000R-OB7 |
| M83513 / 17-G01PW | MK-375-051-325-220R-OB7 | M83513 / 17-G02PW | MK-375-051-335-220R-OB7 | M83513 / 17-G03PW | MK-375-051-345-220R-OB7 |

## M83513 / 18

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 18-H01CN | MK-473-100-325-000R-05K | M83513 / 18-H02CN | MK-473-100-335-000R-05K | M83513 / 18-H03CN | MK-473-100-345-000R-05K |
| M83513 / 18-H01CP | MK-473-100-325-620R-05K | M83513 / 18-H02CP | MK-473-100-335-620R-05K | M83513 / 18-H03CP | MK-473-100-345-620R-05K |
| M83513 / 18-H01CT | MK-473-100-325-000R-OB7 | M83513 / 18-H02CT | MK-473-100-335-000R-OB7 | M83513 / 18-H03CT | MK-473-100-345-000R-OB7 |
| M83513 / 18-H01CW | MK-473-100-325-620R-OB7 | M83513 / 18-H02CW | MK-473-100-335-620R-OB7 | M83513 / 18-H03CW | MK-473-100-345-620R-OB7 |
| M83513 / 18-H01NN | MK-472-100-325-000R-05K | M83513 / 18-H02NN | MK-472-100-335-000R-05K | M83513 / 18-H03NN | MK-472-100-345-000R-05K |
| M83513 / 18-H01NP | MK-472-100-325-620R-05K | M83513 / 18-H02NP | MK-472-100-335-620R-05K | M83513 / 18-H03NP | MK-472-100-345-620R-05K |
| M83513 / 18-H01NT | MK-472-100-325-000R-OB7 | M83513 / 18-H02NT | MK-472-100-335-000R-OB7 | M83513 / 18-H03NT | MK-472-100-345-000R-OB7 |
| M83513 / 18-H01NW | MK-472-100-325-620R-OB7 | M83513 / 18-H02NW | MK-472-100-335-620R-OB7 | M83513 / 18-H03NW | MK-472-100-345-620R-OB7 |
| M83513 / 18-H01PN | MK-475-100-325-000R-05K | M83513 / 18-H02PN | MK-475-100-335-000R-05K | M83513 / 18-H03PN | MK-475-100-345-000R-05K |
| M83513 / 18-H01PP | MK-475-100-325-620R-05K | M83513 / 18-H02PP | MK-475-100-335-620R-05K | M83513 / 18-H03PP | MK-475-100-345-620R-05K |
| M83513 / 18-H01PT | MK-475-100-325-000R-OB7 | M83513 / 18-H02PT | MK-475-100-335-000R-OB7 | M83513 / 18-H03PT | MK-475-100-345-000R-OB7 |
| M83513 / 18-H01PW | MK-475-100-325-620R-OB7 | M83513 / 18-H02PW | MK-475-100-335-620R-OB7 | M83513 / 18-H03PW | MK-475-100-345-620R-OB7 |

## M83513 / 19

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 19-A01CN | MK-283-009-435-000R-900 | M83513 / 19-A03NN | MK-282-009-455-000R-900 | M83513 / 19-B02NW | MK-282-015-445-220R-OB7 |
| M83513 / 19-A01CP | MK-283-009-435-220R-900 | M83513 / 19-A03NP | MK-282-009-455-220R-900 | M83513 / 19-B02PN | MK-285-015-445-000R-900 |
| M83513 / 19-A01CT | MK-283-009-435-000R-OB7 | M83513 / 19-A03NT | MK-282-009-455-000R-OB7 | M83513 / 19-B02PP | MK-285-015-445-220R-900 |
| M83513 / 19-A01CW | MK-283-009-435-220R-OB7 | M83513 / 19-A03NW | MK-282-009-455-220R-OB7 | M83513 / 19-B02PT | MK-285-015-445-000R-OB7 |
| M83513 / 19-A01NN | MK-282-009-435-000R-900 | M83513 / 19-A03PN | MK-285-009-455-000R-900 | M83513 / 19-B02PW | MK-285-015-445-220R-OB7 |
| M83513 / 19-A01NP | MK-282-009-435-220R-900 | M83513 / 19-A03PP | MK-285-009-455-220R-900 | M83513 / 19-B03CN | MK-283-015-455-000R-900 |
| M83513 / 19-A01NT | MK-282-009-435-000R-OB7 | M83513 / 19-A03PT | MK-285-009-455-000R-OB7 | M83513 / 19-B03CP | MK-283-015-455-220R-900 |
| M83513 / 19-A01NW | MK-282-009-435-220R-OB7 | M83513 / 19-A03PW | MK-285-009-455-220R-OB7 | M83513 / 19-B03CT | MK-283-015-455-000R-OB7 |
| M83513 / 19-A01PN | MK-285-009-435-000R-900 |                   |                         | M83513 / 19-B03CW | MK-283-015-455-220R-OB7 |
| M83513 / 19-A01PP | MK-285-009-435-220R-900 | M83513 / 19-B01CN | MK-283-015-435-000R-900 | M83513 / 19-B03NN | MK-282-015-455-000R-900 |
| M83513 / 19-A01PT | MK-285-009-435-000R-OB7 | M83513 / 19-B01CP | MK-283-015-435-220R-900 | M83513 / 19-B03NP | MK-282-015-455-220R-900 |
| M83513 / 19-A01PW | MK-285-009-435-220R-OB7 | M83513 / 19-B01CT | MK-283-015-435-000R-OB7 | M83513 / 19-B03NT | MK-282-015-455-000R-OB7 |
| M83513 / 19-A02CN | MK-283-009-445-000R-900 | M83513 / 19-B01CW | MK-283-015-435-220R-OB7 | M83513 / 19-B03NW | MK-282-015-455-220R-OB7 |
| M83513 / 19-A02CP | MK-283-009-445-220R-900 | M83513 / 19-B01NN | MK-282-015-435-000R-900 | M83513 / 19-B03PN | MK-285-015-455-000R-900 |
| M83513 / 19-A02CT | MK-283-009-445-000R-OB7 | M83513 / 19-B01NP | MK-282-015-435-220R-900 | M83513 / 19-B03PP | MK-285-015-455-220R-900 |
| M83513 / 19-A02CW | MK-283-009-445-220R-OB7 | M83513 / 19-B01NT | MK-282-015-435-000R-OB7 | M83513 / 19-B03PT | MK-285-015-455-000R-OB7 |
| M83513 / 19-A02NN | MK-282-009-445-000R-900 | M83513 / 19-B01NW | MK-282-015-435-220R-OB7 | M83513 / 19-B03PW | MK-285-015-455-220R-OB7 |
| M83513 / 19-A02NP | MK-282-009-445-220R-900 | M83513 / 19-B01PN | MK-285-015-435-000R-900 |                   |                         |
| M83513 / 19-A02NT | MK-282-009-445-000R-OB7 | M83513 / 19-B01PP | MK-285-015-435-220R-900 | M83513 / 19-C01CN | MK-283-021-435-000R-900 |
| M83513 / 19-A02NW | MK-282-009-445-220R-OB7 | M83513 / 19-B01PT | MK-285-015-435-000R-OB7 | M83513 / 19-C01CP | MK-283-021-435-220R-900 |
| M83513 / 19-A02PN | MK-285-009-445-000R-900 | M83513 / 19-B01PW | MK-285-015-435-220R-OB7 | M83513 / 19-C01CT | MK-283-021-435-000R-OB7 |
| M83513 / 19-A02PP | MK-285-009-445-220R-900 | M83513 / 19-B02CN | MK-283-015-445-000R-900 | M83513 / 19-C01CW | MK-283-021-435-220R-OB7 |
| M83513 / 19-A02PT | MK-285-009-445-000R-OB7 | M83513 / 19-B02CP | MK-283-015-445-220R-900 | M83513 / 19-C01NN | MK-282-021-435-000R-900 |
| M83513 / 19-A02PW | MK-285-009-445-220R-OB7 | M83513 / 19-B02CT | MK-283-015-445-000R-OB7 | M83513 / 19-C01NP | MK-282-021-435-220R-900 |
| M83513 / 19-A03CN | MK-283-009-455-000R-900 | M83513 / 19-B02CW | MK-283-015-445-220R-OB7 | M83513 / 19-C01NT | MK-282-021-435-000R-OB7 |
| M83513 / 19-A03CP | MK-283-009-455-220R-900 | M83513 / 19-B02NN | MK-282-015-445-000R-900 | M83513 / 19-C01NW | MK-282-021-435-220R-OB7 |
| M83513 / 19-A03CT | MK-283-009-455-000R-OB7 | M83513 / 19-B02NP | MK-282-015-445-220R-900 | M83513 / 19-C01PN | MK-285-021-435-000R-900 |
| M83513 / 19-A03CW | MK-283-009-455-220R-OB7 | M83513 / 19-B02NT | MK-282-015-445-000R-OB7 | M83513 / 19-C01PP | MK-285-021-435-220R-900 |



# Military Cross Reference Chart

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## M83513 / 19 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 19-C01PT | MK-285-021-435-000R-0B7 | M83513 / 19-D02NW | MK-282-025-445-220R-0B7 | M83513 / 19-E03NN | MK-282-031-455-000R-900 |
| M83513 / 19-C01PW | MK-285-021-435-220R-0B7 | M83513 / 19-D02PN | MK-285-025-445-000R-900 | M83513 / 19-E03NP | MK-282-031-455-220R-900 |
| M83513 / 19-C02CN | MK-283-021-445-000R-900 | M83513 / 19-D02PP | MK-285-025-445-220R-900 | M83513 / 19-E03NT | MK-282-031-455-000R-0B7 |
| M83513 / 19-C02CP | MK-283-021-445-220R-900 | M83513 / 19-D02PT | MK-285-025-445-000R-0B7 | M83513 / 19-E03NW | MK-282-031-455-220R-0B7 |
| M83513 / 19-C02CT | MK-283-021-445-000R-0B7 | M83513 / 19-D02PW | MK-285-025-445-220R-0B7 | M83513 / 19-E03PN | MK-285-031-455-000R-900 |
| M83513 / 19-C02CW | MK-283-021-445-220R-0B7 | M83513 / 19-D03CN | MK-283-025-455-000R-900 | M83513 / 19-E03PP | MK-285-031-455-220R-900 |
| M83513 / 19-C02NN | MK-282-021-445-000R-900 | M83513 / 19-D03CP | MK-283-025-455-220R-900 | M83513 / 19-E03PT | MK-285-031-455-000R-0B7 |
| M83513 / 19-C02NP | MK-282-021-445-220R-900 | M83513 / 19-D03CT | MK-283-025-455-000R-0B7 | M83513 / 19-E03PW | MK-285-031-455-220R-0B7 |
| M83513 / 19-C02NT | MK-282-021-445-000R-0B7 | M83513 / 19-D03CW | MK-283-025-455-220R-0B7 |                   |                         |
| M83513 / 19-C02NW | MK-282-021-445-220R-0B7 | M83513 / 19-D03NN | MK-282-025-455-000R-900 | M83513 / 19-F01CN | MK-283-037-435-000R-900 |
| M83513 / 19-C02PN | MK-285-021-445-000R-900 | M83513 / 19-D03NP | MK-282-025-455-220R-900 | M83513 / 19-F01CP | MK-283-037-435-220R-900 |
| M83513 / 19-C02PP | MK-285-021-445-220R-900 | M83513 / 19-D03NT | MK-282-025-455-000R-0B7 | M83513 / 19-F01CT | MK-283-037-435-000R-0B7 |
| M83513 / 19-C02PT | MK-285-021-445-000R-0B7 | M83513 / 19-D03NW | MK-282-025-455-220R-0B7 | M83513 / 19-F01CW | MK-283-037-435-220R-0B7 |
| M83513 / 19-C02PW | MK-285-021-445-220R-0B7 | M83513 / 19-D03PN | MK-285-025-455-000R-900 | M83513 / 19-F01NN | MK-282-037-435-000R-900 |
| M83513 / 19-C03CN | MK-283-021-455-000R-900 | M83513 / 19-D03PP | MK-285-025-455-220R-900 | M83513 / 19-F01NP | MK-282-037-435-220R-900 |
| M83513 / 19-C03CP | MK-283-021-455-220R-900 | M83513 / 19-D03PT | MK-285-025-455-000R-0B7 | M83513 / 19-F01NT | MK-282-037-435-000R-0B7 |
| M83513 / 19-C03CT | MK-283-021-455-000R-0B7 | M83513 / 19-D03PW | MK-285-025-455-220R-0B7 | M83513 / 19-F01NW | MK-282-037-435-220R-0B7 |
| M83513 / 19-C03CW | MK-283-021-455-220R-0B7 |                   |                         | M83513 / 19-F01PN | MK-285-037-435-000R-900 |
| M83513 / 19-C03NN | MK-282-021-455-000R-900 | M83513 / 19-E01CN | MK-283-031-435-000R-900 | M83513 / 19-F01PP | MK-285-037-435-220R-900 |
| M83513 / 19-C03NP | MK-282-021-455-220R-900 | M83513 / 19-E01CP | MK-283-031-435-220R-900 | M83513 / 19-F01PT | MK-285-037-435-000R-0B7 |
| M83513 / 19-C03NT | MK-282-021-455-000R-0B7 | M83513 / 19-E01CT | MK-283-031-435-000R-0B7 | M83513 / 19-F01PW | MK-285-037-435-220R-0B7 |
| M83513 / 19-C03NW | MK-282-021-455-220R-0B7 | M83513 / 19-E01CW | MK-283-031-435-220R-0B7 | M83513 / 19-F02CN | MK-283-037-445-000R-900 |
| M83513 / 19-C03PN | MK-285-021-455-000R-900 | M83513 / 19-E01NN | MK-282-031-435-000R-900 | M83513 / 19-F02CP | MK-283-037-445-220R-900 |
| M83513 / 19-C03PP | MK-285-021-455-220R-900 | M83513 / 19-E01NP | MK-282-031-435-220R-900 | M83513 / 19-F02CT | MK-283-037-445-000R-0B7 |
| M83513 / 19-C03PT | MK-285-021-455-000R-0B7 | M83513 / 19-E01NT | MK-282-031-435-000R-0B7 | M83513 / 19-F02CW | MK-283-037-445-220R-0B7 |
| M83513 / 19-C03PW | MK-285-021-455-220R-0B7 | M83513 / 19-E01NW | MK-282-031-435-220R-0B7 | M83513 / 19-F02NN | MK-282-037-445-000R-900 |
|                   |                         | M83513 / 19-E01PN | MK-285-031-435-000R-900 | M83513 / 19-F02NP | MK-282-037-445-220R-900 |
| M83513 / 19-D01CN | MK-283-025-435-000R-900 | M83513 / 19-E01PP | MK-285-031-435-220R-900 | M83513 / 19-F02NT | MK-282-037-445-000R-0B7 |
| M83513 / 19-D01CP | MK-283-025-435-220R-900 | M83513 / 19-E01PT | MK-285-031-435-000R-0B7 | M83513 / 19-F02NW | MK-282-037-445-220R-0B7 |
| M83513 / 19-D01CT | MK-283-025-435-000R-0B7 | M83513 / 19-E01PW | MK-285-031-435-220R-0B7 | M83513 / 19-F02PN | MK-285-037-445-000R-900 |
| M83513 / 19-D01CW | MK-283-025-435-220R-0B7 | M83513 / 19-E02CN | MK-283-031-445-000R-900 | M83513 / 19-F02PP | MK-285-037-445-220R-900 |
| M83513 / 19-D01NN | MK-282-025-435-000R-900 | M83513 / 19-E02CP | MK-283-031-445-220R-900 | M83513 / 19-F02PT | MK-285-037-445-000R-0B7 |
| M83513 / 19-D01NP | MK-282-025-435-220R-900 | M83513 / 19-E02CT | MK-283-031-445-000R-0B7 | M83513 / 19-F02PW | MK-285-037-445-220R-0B7 |
| M83513 / 19-D01NT | MK-282-025-435-000R-0B7 | M83513 / 19-E02CW | MK-283-031-445-220R-0B7 | M83513 / 19-F03CN | MK-283-037-455-000R-900 |
| M83513 / 19-D01NW | MK-282-025-435-220R-0B7 | M83513 / 19-E02NN | MK-282-031-445-000R-900 | M83513 / 19-F03CP | MK-283-037-455-220R-900 |
| M83513 / 19-D01PN | MK-285-025-435-000R-900 | M83513 / 19-E02NP | MK-282-031-445-220R-900 | M83513 / 19-F03CT | MK-283-037-455-000R-0B7 |
| M83513 / 19-D01PP | MK-285-025-435-220R-900 | M83513 / 19-E02NT | MK-282-031-445-000R-0B7 | M83513 / 19-F03CW | MK-283-037-455-220R-0B7 |
| M83513 / 19-D01PT | MK-285-025-435-000R-0B7 | M83513 / 19-E02NW | MK-282-031-445-220R-0B7 | M83513 / 19-F03NN | MK-282-037-455-000R-900 |
| M83513 / 19-D01PW | MK-285-025-435-220R-0B7 | M83513 / 19-E02PN | MK-285-031-445-000R-900 | M83513 / 19-F03NP | MK-282-037-455-220R-900 |
| M83513 / 19-D02CN | MK-283-025-445-000R-900 | M83513 / 19-E02PP | MK-285-031-445-220R-900 | M83513 / 19-F03NT | MK-282-037-455-000R-0B7 |
| M83513 / 19-D02CP | MK-283-025-445-220R-900 | M83513 / 19-E02PT | MK-285-031-445-000R-0B7 | M83513 / 19-F03NW | MK-282-037-455-220R-0B7 |
| M83513 / 19-D02CT | MK-283-025-445-000R-0B7 | M83513 / 19-E02PW | MK-285-031-445-220R-0B7 | M83513 / 19-F03PN | MK-285-037-455-000R-900 |
| M83513 / 19-D02CW | MK-283-025-445-220R-0B7 | M83513 / 19-E03CN | MK-283-031-455-000R-900 | M83513 / 19-F03PP | MK-285-037-455-220R-900 |
| M83513 / 19-D02NN | MK-282-025-445-000R-900 | M83513 / 19-E03CP | MK-283-031-455-220R-900 | M83513 / 19-F03PT | MK-285-037-455-000R-0B7 |
| M83513 / 19-D02NP | MK-282-025-445-220R-900 | M83513 / 19-E03CT | MK-283-031-455-000R-0B7 | M83513 / 19-F03PW | MK-285-037-455-220R-0B7 |
| M83513 / 19-D02NT | MK-282-025-445-000R-0B7 | M83513 / 19-E03CW | MK-283-031-455-220R-0B7 |                   |                         |

## M83513 / 20

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 20-G01CN | MK-383-051-435-000R-900 | M83513 / 20-G01PN | MK-385-051-435-000R-900 | M83513 / 20-G02NN | MK-382-051-445-000R-900 |
| M83513 / 20-G01CP | MK-383-051-435-220R-900 | M83513 / 20-G01PP | MK-385-051-435-220R-900 | M83513 / 20-G02NP | MK-382-051-445-220R-900 |
| M83513 / 20-G01CT | MK-383-051-435-000R-0B7 | M83513 / 20-G01PT | MK-385-051-435-000R-0B7 | M83513 / 20-G02NT | MK-382-051-445-000R-0B7 |
| M83513 / 20-G01CW | MK-383-051-435-220R-0B7 | M83513 / 20-G01PW | MK-385-051-435-220R-0B7 | M83513 / 20-G02NW | MK-382-051-445-220R-0B7 |
| M83513 / 20-G01NN | MK-382-051-435-000R-900 | M83513 / 20-G02CN | MK-383-051-445-000R-900 | M83513 / 20-G02PN | MK-385-051-445-000R-900 |
| M83513 / 20-G01NP | MK-382-051-435-220R-900 | M83513 / 20-G02CP | MK-383-051-445-220R-900 | M83513 / 20-G02PP | MK-385-051-445-220R-900 |
| M83513 / 20-G01NT | MK-382-051-435-000R-0B7 | M83513 / 20-G02CT | MK-383-051-445-000R-0B7 | M83513 / 20-G02PT | MK-385-051-445-000R-0B7 |
| M83513 / 20-G01NW | MK-382-051-435-220R-0B7 | M83513 / 20-G02CW | MK-383-051-445-220R-0B7 | M83513 / 20-G02PW | MK-385-051-445-220R-0B7 |



# Military Cross Reference Chart

– Continued from previous page

## M83513 / 20 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 20-G03CN | MK-383-051-455-000R-900 | M83513 / 20-G03NN | MK-382-051-455-000R-900 | M83513 / 20-G03PN | MK-385-051-455-000R-900 |
| M83513 / 20-G03CP | MK-383-051-455-220R-900 | M83513 / 20-G03NP | MK-382-051-455-220R-900 | M83513 / 20-G03PP | MK-385-051-455-220R-900 |
| M83513 / 20-G03CT | MK-383-051-455-000R-0B7 | M83513 / 20-G03NT | MK-382-051-455-000R-0B7 | M83513 / 20-G03PT | MK-385-051-455-000R-0B7 |
| M83513 / 20-G03CW | MK-383-051-455-220R-0B7 | M83513 / 20-G03NW | MK-382-051-455-220R-0B7 | M83513 / 20-G03PW | MK-385-051-455-220R-0B7 |

## M83513 / 21

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 21-H01CN | MK-483-100-435-000R-05K | M83513 / 21-H02CN | MK-483-100-445-000R-05K | M83513 / 21-H03CN | MK-483-100-455-000R-05K |
| M83513 / 21-H01CP | MK-483-100-435-620R-05K | M83513 / 21-H02CP | MK-483-100-445-620R-05K | M83513 / 21-H03CP | MK-483-100-455-620R-05K |
| M83513 / 21-H01CT | MK-483-100-435-000R-0BJ | M83513 / 21-H02CT | MK-483-100-445-000R-0BJ | M83513 / 21-H03CT | MK-483-100-455-000R-0BJ |
| M83513 / 21-H01CW | MK-483-100-435-620R-0BJ | M83513 / 21-H02CW | MK-483-100-445-620R-0BJ | M83513 / 21-H03CW | MK-483-100-455-620R-0BJ |
| M83513 / 21-H01NN | MK-482-100-435-000R-05K | M83513 / 21-H02NN | MK-482-100-445-000R-05K | M83513 / 21-H03NN | MK-482-100-455-000R-05K |
| M83513 / 21-H01NP | MK-482-100-435-620R-05K | M83513 / 21-H02NP | MK-482-100-445-620R-05K | M83513 / 21-H03NP | MK-482-100-455-620R-05K |
| M83513 / 21-H01NT | MK-482-100-435-000R-0BJ | M83513 / 21-H02NT | MK-482-100-445-000R-0BJ | M83513 / 21-H03NT | MK-482-100-455-000R-0BJ |
| M83513 / 21-H01NW | MK-482-100-435-620R-0BJ | M83513 / 21-H02NW | MK-482-100-445-620R-0BJ | M83513 / 21-H03NW | MK-482-100-455-620R-0BJ |
| M83513 / 21-H01PN | MK-485-100-435-000R-05K | M83513 / 21-H02PN | MK-485-100-445-000R-05K | M83513 / 21-H03PN | MK-485-100-455-000R-05K |
| M83513 / 21-H01PP | MK-485-100-435-620R-05K | M83513 / 21-H02PP | MK-485-100-445-620R-05K | M83513 / 21-H03PP | MK-485-100-455-620R-05K |
| M83513 / 21-H01PT | MK-485-100-435-000R-0BJ | M83513 / 21-H02PT | MK-485-100-445-000R-0BJ | M83513 / 21-H03PT | MK-485-100-455-000R-0BJ |
| M83513 / 21-H01PW | MK-485-100-435-620R-0BJ | M83513 / 21-H02PW | MK-485-100-445-620R-0BJ | M83513 / 21-H03PW | MK-485-100-455-620R-0BJ |

## M83513 / 22

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 22-A01CN | MK-213-009-125-0000     | M83513 / 22-A03PW | MK-215-009-145-2200-0B7 | M83513 / 22-B03PP | MK-215-015-145-2200     |
| M83513 / 22-A01CP | MK-213-009-125-2200     |                   |                         | M83513 / 22-B03PT | MK-215-015-145-0000-0B7 |
| M83513 / 22-A01CT | MK-213-009-125-0000-0B7 | M83513 / 22-B01CN | MK-213-015-125-0000     | M83513 / 22-B03PW | MK-215-015-145-2200-0B7 |
| M83513 / 22-A01CW | MK-213-009-125-2200-0B7 | M83513 / 22-B01CP | MK-213-015-125-2200     |                   |                         |
| M83513 / 22-A01NN | MK-212-009-125-0000     | M83513 / 22-B01CT | MK-213-015-125-0000-0B7 | M83513 / 22-C01CN | MK-213-021-125-0000     |
| M83513 / 22-A01NP | MK-212-009-125-2200     | M83513 / 22-B01CW | MK-213-015-125-2200-0B7 | M83513 / 22-C01CP | MK-213-021-125-2200     |
| M83513 / 22-A01NT | MK-212-009-125-0000-0B7 | M83513 / 22-B01NN | MK-212-015-125-0000     | M83513 / 22-C01CT | MK-213-021-125-0000-0B7 |
| M83513 / 22-A01NW | MK-212-009-125-2200-0B7 | M83513 / 22-B01NP | MK-212-015-125-2200     | M83513 / 22-C01CW | MK-213-021-125-2200-0B7 |
| M83513 / 22-A01PN | MK-215-009-125-0000     | M83513 / 22-B01NT | MK-212-015-125-0000-0B7 | M83513 / 22-C01NN | MK-212-021-125-0000     |
| M83513 / 22-A01PP | MK-215-009-125-2200     | M83513 / 22-B01NW | MK-212-015-125-2200-0B7 | M83513 / 22-C01NP | MK-212-021-125-2200     |
| M83513 / 22-A01PT | MK-215-009-125-0000-0B7 | M83513 / 22-B01PN | MK-215-015-125-0000     | M83513 / 22-C01NT | MK-212-021-125-0000-0B7 |
| M83513 / 22-A01PW | MK-215-009-125-2200-0B7 | M83513 / 22-B01PP | MK-215-015-125-2200     | M83513 / 22-C01NW | MK-212-021-125-2200-0B7 |
| M83513 / 22-A02CN | MK-213-009-135-0000     | M83513 / 22-B01PT | MK-215-015-125-0000-0B7 | M83513 / 22-C01PN | MK-215-021-125-0000     |
| M83513 / 22-A02CP | MK-213-009-135-2200     | M83513 / 22-B01PW | MK-215-015-125-2200-0B7 | M83513 / 22-C01PP | MK-215-021-125-2200     |
| M83513 / 22-A02CT | MK-213-009-135-0000-0B7 | M83513 / 22-B02CN | MK-213-015-135-0000     | M83513 / 22-C01PT | MK-215-021-125-0000-0B7 |
| M83513 / 22-A02CW | MK-213-009-135-2200-0B7 | M83513 / 22-B02CP | MK-213-015-135-2200     | M83513 / 22-C01PW | MK-215-021-125-2200-0B7 |
| M83513 / 22-A02NN | MK-212-009-135-0000     | M83513 / 22-B02CT | MK-213-015-135-0000-0B7 | M83513 / 22-C02CN | MK-213-021-135-0000     |
| M83513 / 22-A02NP | MK-212-009-135-2200     | M83513 / 22-B02CW | MK-213-015-135-2200-0B7 | M83513 / 22-C02CP | MK-213-021-135-2200     |
| M83513 / 22-A02NT | MK-212-009-135-0000-0B7 | M83513 / 22-B02NN | MK-212-015-135-0000     | M83513 / 22-C02CT | MK-213-021-135-0000-0B7 |
| M83513 / 22-A02NW | MK-212-009-135-2200-0B7 | M83513 / 22-B02NP | MK-212-015-135-2200     | M83513 / 22-C02CW | MK-213-021-135-2200-0B7 |
| M83513 / 22-A02PN | MK-215-009-135-0000     | M83513 / 22-B02NT | MK-212-015-135-0000-0B7 | M83513 / 22-C02NN | MK-213-021-135-0000     |
| M83513 / 22-A02PP | MK-215-009-135-2200     | M83513 / 22-B02NW | MK-212-015-135-2200-0B7 | M83513 / 22-C02NP | MK-212-021-135-2200     |
| M83513 / 22-A02PT | MK-215-009-135-0000-0B7 | M83513 / 22-B02PN | MK-215-015-135-0000     | M83513 / 22-C02NT | MK-212-021-135-0000-0B7 |
| M83513 / 22-A02PW | MK-215-009-135-2200-0B7 | M83513 / 22-B02PP | MK-215-015-135-2200     | M83513 / 22-C02NW | MK-212-021-135-2200-0B7 |
| M83513 / 22-A03CN | MK-213-009-145-0000     | M83513 / 22-B02PT | MK-215-015-135-0000-0B7 | M83513 / 22-C02PN | MK-215-021-135-0000     |
| M83513 / 22-A03CP | MK-213-009-145-2200     | M83513 / 22-B02PW | MK-215-015-135-2200-0B7 | M83513 / 22-C02PP | MK-215-021-135-2200     |
| M83513 / 22-A03CT | MK-213-009-145-0000-0B7 | M83513 / 22-B03CN | MK-213-015-145-0000     | M83513 / 22-C02PT | MK-215-021-135-0000-0B7 |
| M83513 / 22-A03CW | MK-213-009-145-2200-0B7 | M83513 / 22-B03CP | MK-213-015-145-2200     | M83513 / 22-C02PW | MK-215-021-135-2200-0B7 |
| M83513 / 22-A03NN | MK-212-009-145-0000     | M83513 / 22-B03CT | MK-213-015-145-0000-0B7 | M83513 / 22-C03CN | MK-213-021-145-0000     |
| M83513 / 22-A03NP | MK-212-009-145-2200     | M83513 / 22-B03CW | MK-213-015-145-2200-0B7 | M83513 / 22-C03CP | MK-213-021-145-2200     |
| M83513 / 22-A03NT | MK-212-009-145-0000-0B7 | M83513 / 22-B03NN | MK-212-015-145-0000     | M83513 / 22-C03CT | MK-213-021-145-0000-0B7 |
| M83513 / 22-A03NW | MK-212-009-145-2200-0B7 | M83513 / 22-B03NP | MK-212-015-145-2200     | M83513 / 22-C03CW | MK-213-021-145-2200-0B7 |
| M83513 / 22-A03PN | MK-215-009-145-0000     | M83513 / 22-B03NT | MK-212-015-145-0000-0B7 | M83513 / 22-C03NN | MK-212-021-145-0000     |
| M83513 / 22-A03PP | MK-215-009-145-2200     | M83513 / 22-B03NW | MK-212-015-145-2200-0B7 | M83513 / 22-C03NP | MK-212-021-145-2200     |
| M83513 / 22-A03PT | MK-215-009-145-0000-0B7 | M83513 / 22-B03PN | MK-215-015-145-0000     | M83513 / 22-C03NT | MK-212-021-145-0000-0B7 |



# Military Cross Reference Chart

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## M83513 / 22 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 22-C03NW | MK-212-021-145-2200-0B7 | M83513 / 22-D03PP | MK-215-025-145-2200     | M83513 / 22-E03PW | MK-215-031-145-2200-0B7 |
| M83513 / 22-C03PN | MK-215-021-145-0000     | M83513 / 22-D03PT | MK-215-025-145-0000-0B7 |                   |                         |
| M83513 / 22-C03PP | MK-215-021-145-2200     | M83513 / 22-D03PW | MK-215-025-145-2200-0B7 |                   |                         |
| M83513 / 22-C03PT | MK-215-021-145-0000-0B7 |                   |                         |                   |                         |
| M83513 / 22-C03PW | MK-215-021-145-2200-0B7 |                   |                         |                   |                         |
|                   |                         | M83513 / 22-E01CN | MK-213-031-125-0000     |                   |                         |
|                   |                         | M83513 / 22-E01CP | MK-213-031-125-2200     |                   |                         |
|                   |                         | M83513 / 22-E01CT | MK-213-031-125-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E01CW | MK-213-031-125-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E01NN | MK-212-031-125-0000     |                   |                         |
|                   |                         | M83513 / 22-E01NP | MK-212-031-125-2200     |                   |                         |
|                   |                         | M83513 / 22-E01NT | MK-212-031-125-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E01NW | MK-212-031-125-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E01PN | MK-215-031-125-0000     |                   |                         |
|                   |                         | M83513 / 22-E01PP | MK-215-031-125-2200     |                   |                         |
|                   |                         | M83513 / 22-E01PT | MK-215-031-125-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E01PW | MK-215-031-125-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E02CN | MK-213-031-135-0000     |                   |                         |
|                   |                         | M83513 / 22-E02CP | MK-213-031-135-2200     |                   |                         |
|                   |                         | M83513 / 22-E02CT | MK-213-031-135-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E02CW | MK-213-031-135-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E02NN | MK-212-031-135-0000     |                   |                         |
|                   |                         | M83513 / 22-E02NP | MK-212-031-135-2200     |                   |                         |
|                   |                         | M83513 / 22-E02NT | MK-212-031-135-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E02NW | MK-212-031-135-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E02PN | MK-215-031-135-0000     |                   |                         |
|                   |                         | M83513 / 22-E02PP | MK-215-031-135-2200     |                   |                         |
|                   |                         | M83513 / 22-E02PT | MK-215-031-135-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E02PW | MK-215-031-135-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E03CN | MK-213-031-145-0000     |                   |                         |
|                   |                         | M83513 / 22-E03CP | MK-213-031-145-2200     |                   |                         |
|                   |                         | M83513 / 22-E03CT | MK-213-031-145-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E03CW | MK-213-031-145-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E03NN | MK-212-031-145-0000     |                   |                         |
|                   |                         | M83513 / 22-E03NP | MK-212-031-145-2200     |                   |                         |
|                   |                         | M83513 / 22-E03NT | MK-212-031-145-0000-0B7 |                   |                         |
|                   |                         | M83513 / 22-E03NW | MK-212-031-145-2200-0B7 |                   |                         |
|                   |                         | M83513 / 22-E03PN | MK-215-031-145-0000     |                   |                         |
|                   |                         | M83513 / 22-E03PP | MK-215-031-145-2200     |                   |                         |
|                   |                         | M83513 / 22-E03PT | MK-215-031-145-0000-0B7 |                   |                         |
|                   |                         |                   |                         | M83513 / 22-F01CN | MK-213-037-125-0000     |
|                   |                         |                   |                         | M83513 / 22-F01CP | MK-213-037-125-2200     |
|                   |                         |                   |                         | M83513 / 22-F01CT | MK-213-037-125-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F01CW | MK-213-037-125-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F01NN | MK-212-037-125-0000     |
|                   |                         |                   |                         | M83513 / 22-F01NP | MK-212-037-125-2200     |
|                   |                         |                   |                         | M83513 / 22-F01NT | MK-212-037-125-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F01NW | MK-212-037-125-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F01PN | MK-215-037-125-0000     |
|                   |                         |                   |                         | M83513 / 22-F01PP | MK-215-037-125-2200     |
|                   |                         |                   |                         | M83513 / 22-F01PT | MK-215-037-125-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F01PW | MK-215-037-125-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F02CN | MK-213-037-135-0000     |
|                   |                         |                   |                         | M83513 / 22-F02CP | MK-213-037-135-2200     |
|                   |                         |                   |                         | M83513 / 22-F02CT | MK-213-037-135-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F02CW | MK-213-037-135-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F02NN | MK-212-037-135-0000     |
|                   |                         |                   |                         | M83513 / 22-F02NP | MK-212-037-135-2200     |
|                   |                         |                   |                         | M83513 / 22-F02NT | MK-212-037-135-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F02NW | MK-212-037-135-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F02PN | MK-215-037-135-0000     |
|                   |                         |                   |                         | M83513 / 22-F02PP | MK-215-037-135-2200     |
|                   |                         |                   |                         | M83513 / 22-F02PT | MK-215-037-135-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F02PW | MK-215-037-135-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F03CN | MK-213-037-145-0000     |
|                   |                         |                   |                         | M83513 / 22-F03CP | MK-213-037-145-2200     |
|                   |                         |                   |                         | M83513 / 22-F03CT | MK-213-037-145-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F03CW | MK-213-037-145-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F03NN | MK-212-037-145-0000     |
|                   |                         |                   |                         | M83513 / 22-F03NP | MK-212-037-145-2200     |
|                   |                         |                   |                         | M83513 / 22-F03NT | MK-212-037-145-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F03NW | MK-212-037-145-2200-0B7 |
|                   |                         |                   |                         | M83513 / 22-F03PN | MK-215-037-145-0000     |
|                   |                         |                   |                         | M83513 / 22-F03PP | MK-215-037-145-2200     |
|                   |                         |                   |                         | M83513 / 22-F03PT | MK-215-037-145-0000-0B7 |
|                   |                         |                   |                         | M83513 / 22-F03PW | MK-215-037-145-2200-0B7 |

## M83513 / 23

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 23-G01CN | MK-313-051-125-0000     | M83513 / 23-G02CN | MK-313-051-135-0000     | M83513 / 23-G03CN | MK-313-051-145-0000     |
| M83513 / 23-G01CP | MK-313-051-125-2200     | M83513 / 23-G02CP | MK-313-051-135-2200     | M83513 / 23-G03CP | MK-313-051-145-2200     |
| M83513 / 23-G01CT | MK-313-051-125-0000-0B7 | M83513 / 23-G02CT | MK-313-051-135-0000-0B7 | M83513 / 23-G03CT | MK-313-051-145-0000-0B7 |
| M83513 / 23-G01CW | MK-313-051-125-2200-0B7 | M83513 / 23-G02CW | MK-313-051-135-2200-0B7 | M83513 / 23-G03CW | MK-313-051-145-2200-0B7 |
| M83513 / 23-G01NN | MK-312-051-125-0000     | M83513 / 23-G02NN | MK-312-051-135-0000     | M83513 / 23-G03NN | MK-312-051-145-0000     |
| M83513 / 23-G01NP | MK-312-051-125-2200     | M83513 / 23-G02NP | MK-312-051-135-2200     | M83513 / 23-G03NP | MK-312-051-145-2200     |
| M83513 / 23-G01NT | MK-312-051-125-0000-0B7 | M83513 / 23-G02NT | MK-312-051-135-0000-0B7 | M83513 / 23-G03NT | MK-312-051-145-0000-0B7 |
| M83513 / 23-G01NW | MK-312-051-125-2200-0B7 | M83513 / 23-G02NW | MK-312-051-135-2200-0B7 | M83513 / 23-G03NW | MK-312-051-145-2200-0B7 |
| M83513 / 23-G01PN | MK-315-051-125-0000     | M83513 / 23-G02PN | MK-315-051-135-0000     | M83513 / 23-G03PN | MK-315-051-145-0000     |
| M83513 / 23-G01PP | MK-315-051-125-2200     | M83513 / 23-G02PP | MK-315-051-135-2200     | M83513 / 23-G03PP | MK-315-051-145-2200     |
| M83513 / 23-G01PT | MK-315-051-125-0000-0B7 | M83513 / 23-G02PT | MK-315-051-135-0000-0B7 | M83513 / 23-G03PT | MK-315-051-145-0000-0B7 |
| M83513 / 23-G01PW | MK-315-051-125-2200-0B7 | M83513 / 23-G02PW | MK-315-051-135-2200-0B7 | M83513 / 23-G03PW | MK-315-051-145-2200-0B7 |



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|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 24-H01CN | MK-413-100-125-0000     | M83513 / 24-H02CN | MK-413-100-135-0000     | M83513 / 24-H03CN | MK-413-100-145-0000     |
| M83513 / 24-H01CP | MK-413-100-125-6200     | M83513 / 24-H02CP | MK-413-100-135-6200     | M83513 / 24-H03CP | MK-413-100-145-6200     |
| M83513 / 24-H01CT | MK-413-100-125-0000-0B7 | M83513 / 24-H02CT | MK-413-100-135-0000-0B7 | M83513 / 24-H03CT | MK-413-100-145-0000-0B7 |
| M83513 / 24-H01CW | MK-413-100-125-6200-0B7 | M83513 / 24-H02CW | MK-413-100-135-6200-0B7 | M83513 / 24-H03CW | MK-413-100-145-6200-0B7 |
| M83513 / 24-H01NN | MK-412-100-125-0000     | M83513 / 24-H02NN | MK-412-100-135-0000     | M83513 / 24-H03NN | MK-412-100-145-0000     |
| M83513 / 24-H01NP | MK-412-100-125-6200     | M83513 / 24-H02NP | MK-412-100-135-6200     | M83513 / 24-H03NP | MK-412-100-145-6200     |
| M83513 / 24-H01NT | MK-412-100-125-0000-0B7 | M83513 / 24-H02NT | MK-412-100-135-0000-0B7 | M83513 / 24-H03NT | MK-412-100-145-0000-0B7 |
| M83513 / 24-H01NW | MK-412-100-125-6200-0B7 | M83513 / 24-H02NW | MK-412-100-135-6200-0B7 | M83513 / 24-H03NW | MK-412-100-145-6200-0B7 |
| M83513 / 24-H01PN | MK-415-100-125-0000     | M83513 / 24-H02PN | MK-415-100-135-0000     | M83513 / 24-H03PN | MK-415-100-145-0000     |
| M83513 / 24-H01PP | MK-415-100-125-6200     | M83513 / 24-H02PP | MK-415-100-135-6200     | M83513 / 24-H03PP | MK-415-100-145-6200     |
| M83513 / 24-H01PT | MK-415-100-125-0000-0B7 | M83513 / 24-H02PT | MK-415-100-135-0000-0B7 | M83513 / 24-H03PT | MK-415-100-145-0000-0B7 |
| M83513 / 24-H01PW | MK-415-100-125-6200-0B7 | M83513 / 24-H02PW | MK-415-100-135-6200-0B7 | M83513 / 24-H03PW | MK-415-100-145-6200-0B7 |

[illegible]



# Military Cross Reference Chart

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## M83513 / 25 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 25-D02CN | MK-223-025-235-0000-900 | M83513 / 25-E01PN | MK-225-031-225-0000-900 | M83513 / 25-F01NN | MK-222-037-225-0000-900 |
| M83513 / 25-D02CP | MK-223-025-235-2200-900 | M83513 / 25-E01PP | MK-225-031-225-2200-900 | M83513 / 25-F01NP | MK-222-037-225-2200-900 |
| M83513 / 25-D02CT | MK-223-025-235-0000-0B7 | M83513 / 25-E01PT | MK-225-031-225-0000-0B7 | M83513 / 25-F01NT | MK-222-037-225-0000-0B7 |
| M83513 / 25-D02CW | MK-223-025-235-2200-0B7 | M83513 / 25-E01PW | MK-225-031-225-2200-0B7 | M83513 / 25-F01NW | MK-222-037-225-2200-0B7 |
| M83513 / 25-D02NN | MK-222-025-235-0000-900 | M83513 / 25-E02CN | MK-223-031-235-0000-900 | M83513 / 25-F01PN | MK-225-037-225-0000-900 |
| M83513 / 25-D02NP | MK-222-025-235-2200-900 | M83513 / 25-E02CP | MK-223-031-235-2200-900 | M83513 / 25-F01PP | MK-225-037-225-2200-900 |
| M83513 / 25-D02NT | MK-222-025-235-0000-0B7 | M83513 / 25-E02CT | MK-223-031-235-0000-0B7 | M83513 / 25-F01PT | MK-225-037-225-0000-0B7 |
| M83513 / 25-D02NW | MK-222-025-235-2200-0B7 | M83513 / 25-E02CW | MK-223-031-235-2200-0B7 | M83513 / 25-F01PW | MK-225-037-225-2200-0B7 |
| M83513 / 25-D02PN | MK-225-025-235-0000-900 | M83513 / 25-E02NN | MK-222-031-235-0000-900 | M83513 / 25-F02CN | MK-223-037-235-0000-900 |
| M83513 / 25-D02PP | MK-225-025-235-2200-900 | M83513 / 25-E02NP | MK-222-031-235-2200-900 | M83513 / 25-F02CP | MK-223-037-235-2200-900 |
| M83513 / 25-D02PT | MK-225-025-235-0000-0B7 | M83513 / 25-E02NT | MK-222-031-235-0000-0B7 | M83513 / 25-F02CT | MK-223-037-235-0000-0B7 |
| M83513 / 25-D02PW | MK-225-025-235-2200-0B7 | M83513 / 25-E02NW | MK-222-031-235-2200-0B7 | M83513 / 25-F02CW | MK-223-037-235-2200-0B7 |
| M83513 / 25-D03CN | MK-223-025-245-0000-900 | M83513 / 25-E02PN | MK-225-031-235-0000-900 | M83513 / 25-F02NN | MK-222-037-235-0000-900 |
| M83513 / 25-D03CP | MK-223-025-245-2200-900 | M83513 / 25-E02PP | MK-225-031-235-2200-900 | M83513 / 25-F02NP | MK-222-037-235-2200-900 |
| M83513 / 25-D03CT | MK-223-025-245-0000-0B7 | M83513 / 25-E02PT | MK-225-031-235-0000-0B7 | M83513 / 25-F02NT | MK-222-037-235-0000-0B7 |
| M83513 / 25-D03CW | MK-223-025-245-2200-0B7 | M83513 / 25-E02PW | MK-225-031-235-2200-0B7 | M83513 / 25-F02NW | MK-222-037-235-2200-0B7 |
| M83513 / 25-D03NN | MK-222-025-245-0000-900 | M83513 / 25-E03CN | MK-223-031-245-0000-900 | M83513 / 25-F02PN | MK-225-037-235-0000-900 |
| M83513 / 25-D03NP | MK-222-025-245-2200-900 | M83513 / 25-E03CP | MK-223-031-245-2200-900 | M83513 / 25-F02PP | MK-223-037-235-2200-900 |
| M83513 / 25-D03NT | MK-222-025-245-0000-0B7 | M83513 / 25-E03CT | MK-223-031-245-0000-0B7 | M83513 / 25-F02PT | MK-225-037-235-0000-0B7 |
| M83513 / 25-D03NW | MK-222-025-245-2200-0B7 | M83513 / 25-E03CW | MK-223-031-245-2200-0B7 | M83513 / 25-F02PW | MK-225-037-235-2200-0B7 |
| M83513 / 25-D03PN | MK-225-025-245-0000-900 | M83513 / 25-E03NN | MK-222-031-245-0000-900 | M83513 / 25-F03CN | MK-223-037-245-0000-900 |
| M83513 / 25-D03PP | MK-225-025-245-2200-900 | M83513 / 25-E03NP | MK-222-031-245-2200-900 | M83513 / 25-F03CP | MK-223-037-245-2200-900 |
| M83513 / 25-D03PT | MK-225-025-245-0000-0B7 | M83513 / 25-E03NT | MK-222-031-245-0000-0B7 | M83513 / 25-F03CT | MK-223-037-245-0000-0B7 |
| M83513 / 25-D03PW | MK-225-025-245-2200-0B7 | M83513 / 25-E03NW | MK-222-031-245-2200-0B7 | M83513 / 25-F03CW | MK-223-037-245-2200-0B7 |
|                   |                         |                   |                         |                   |                         |
| M83513 / 25-E01CN | MK-223-031-225-0000-900 | M83513 / 25-E03PN | MK-225-031-245-0000-900 | M83513 / 25-F03NN | MK-222-037-245-0000-900 |
| M83513 / 25-E01CP | MK-223-031-225-2200-900 | M83513 / 25-E03PP | MK-225-031-245-2200-900 | M83513 / 25-F03NP | MK-222-037-245-2200-900 |
| M83513 / 25-E01CT | MK-223-031-225-0000-0B7 | M83513 / 25-E03PT | MK-225-031-245-0000-0B7 | M83513 / 25-F03NT | MK-222-037-245-0000-0B7 |
| M83513 / 25-E01CW | MK-223-031-225-2200-0B7 | M83513 / 25-E03PW | MK-225-031-245-2200-0B7 | M83513 / 25-F03NW | MK-222-037-245-2200-0B7 |
| M83513 / 25-E01NN | MK-222-031-225-0000-900 |                   |                         | M83513 / 25-F03PN | MK-225-037-245-0000-900 |
| M83513 / 25-E01NP | MK-222-031-225-2200-900 | M83513 / 25-F01CN | MK-223-037-225-0000-900 | M83513 / 25-F03PP | MK-225-037-245-2200-900 |
| M83513 / 25-E01NT | MK-222-031-225-0000-0B7 | M83513 / 25-F01CP | MK-223-037-225-2200-900 | M83513 / 25-F03PT | MK-225-037-245-0000-0B7 |
| M83513 / 25-E01NW | MK-222-031-225-2200-0B7 | M83513 / 25-F01CT | MK-223-037-225-0000-0B7 | M83513 / 25-F03PW | MK-225-037-245-2200-0B7 |
|                   |                         |                   |                         |                   |                         |
| M83513 / 25-F01CN | MK-223-037-225-0000-900 | M83513 / 25-F01CW | MK-223-037-225-2200-0B7 |                   |                         |

## M83513 / 26

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 26-G01CN | MK-323-051-225-0000-900 | M83513 / 26-G02CN | MK-323-051-235-0000-900 | M83513 / 26-G03CN | MK-323-051-245-0000-900 |
| M83513 / 26-G01CP | MK-323-051-225-2200-900 | M83513 / 26-G02CP | MK-323-051-235-2200-900 | M83513 / 26-G03CP | MK-323-051-245-2200-900 |
| M83513 / 26-G01CT | MK-323-051-225-0000-0B7 | M83513 / 26-G02CT | MK-323-051-235-0000-0B7 | M83513 / 26-G03CT | MK-323-051-245-0000-0B7 |
| M83513 / 26-G01CW | MK-323-051-225-2200-0B7 | M83513 / 26-G02CW | MK-323-051-235-2200-0B7 | M83513 / 26-G03CW | MK-323-051-245-2200-0B7 |
| M83513 / 26-G01NN | MK-322-051-225-0000-900 | M83513 / 26-G02NN | MK-322-051-235-0000-900 | M83513 / 26-G03NN | MK-322-051-245-0000-900 |
| M83513 / 26-G01NP | MK-322-051-225-2200-900 | M83513 / 26-G02NP | MK-322-051-235-2200-900 | M83513 / 26-G03NP | MK-322-051-245-2200-900 |
| M83513 / 26-G01NT | MK-322-051-225-0000-0B7 | M83513 / 26-G02NT | MK-322-051-235-0000-0B7 | M83513 / 26-G03NT | MK-322-051-245-0000-0B7 |
| M83513 / 26-G01NW | MK-322-051-225-2200-0B7 | M83513 / 26-G02NW | MK-322-051-235-2200-0B7 | M83513 / 26-G03NW | MK-322-051-245-2200-0B7 |
| M83513 / 26-G01PN | MK-325-051-225-0000-900 | M83513 / 26-G02PN | MK-325-051-235-0000-900 | M83513 / 26-G03PN | MK-325-051-245-0000-900 |
| M83513 / 26-G01PP | MK-325-051-225-2200-900 | M83513 / 26-G02PP | MK-325-051-235-2200-900 | M83513 / 26-G03PP | MK-325-051-245-2200-900 |
| M83513 / 26-G01PT | MK-325-051-225-0000-0B7 | M83513 / 26-G02PT | MK-325-051-235-0000-0B7 | M83513 / 26-G03PT | MK-325-051-245-0000-0B7 |
| M83513 / 26-G01PW | MK-325-051-225-2200-0B7 | M83513 / 26-G02PW | MK-325-051-235-2200-0B7 | M83513 / 26-G03PW | MK-325-051-245-2200-0B7 |

## M83513 / 27

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 27-H01CN | MK-423-100-225-0000-900 | M83513 / 27-H01NT | MK-422-100-225-0000-0B7 | M83513 / 27-H02CN | MK-423-100-235-0000-900 |
| M83513 / 27-H01CP | MK-423-100-225-6200-900 | M83513 / 27-H01NW | MK-422-100-225-6200-0B7 | M83513 / 27-H02CP | MK-423-100-235-6200-900 |
| M83513 / 27-H01CT | MK-423-100-225-0000-0B7 | M83513 / 27-H01PN | MK-425-100-225-0000-900 | M83513 / 27-H02CT | MK-423-100-235-0000-0B7 |
| M83513 / 27-H01CW | MK-423-100-225-6200-0B7 | M83513 / 27-H01PP | MK-425-100-225-6200-900 | M83513 / 27-H02CW | MK-423-100-235-6200-0B7 |
| M83513 / 27-H01NN | MK-422-100-225-0000-900 | M83513 / 27-H01PT | MK-425-100-225-0000-0B7 | M83513 / 27-H02NN | MK-422-100-235-0000-900 |
| M83513 / 27-H01NP | MK-422-100-225-6200-900 | M83513 / 27-H01PW | MK-425-100-225-6200-0B7 | M83513 / 27-H02NP | MK-422-100-235-6200-900 |



# Military Cross Reference Chart

-- Continued from previous page

## M83513 / 27 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 27-H02NT | MK-422-100-235-0000-0B7 | M83513 / 27-H03CN | MK-423-100-245-0000-900 | M83513 / 27-H03NT | MK-422-100-245-0000-0B7 |
| M83513 / 27-H02NW | MK-422-100-235-6200-0B7 | M83513 / 27-H03CP | MK-423-100-245-6200-900 | M83513 / 27-H03NW | MK-422-100-245-6200-0B7 |
| M83513 / 27-H02PN | MK-425-100-235-0000-900 | M83513 / 27-H03CT | MK-423-100-245-0000-0B7 | M83513 / 27-H03PN | MK-425-100-245-0000-900 |
| M83513 / 27-H02PP | MK-425-100-235-6200-900 | M83513 / 27-H03CW | MK-423-100-245-6200-0B7 | M83513 / 27-H03PP | MK-425-100-245-6200-900 |
| M83513 / 27-H02PT | MK-425-100-235-0000-0B7 | M83513 / 27-H03NN | MK-422-100-245-0000-900 | M83513 / 27-H03PT | MK-425-100-245-0000-0B7 |
| M83513 / 27-H02PW | MK-425-100-235-6200-0B7 | M83513 / 27-H03NP | MK-422-100-245-6200-900 | M83513 / 27-H03PW | MK-425-100-245-6200-0B7 |

## M83513 / 28

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 28-A01CN | MK-233-009-125-0000     | M83513 / 28-B01PT | MK-235-015-125-0000-0B7 | M83513 / 28-C02PN | MK-235-021-135-0000     |
| M83513 / 28-A01CP | MK-233-009-125-2200     | M83513 / 28-B01PW | MK-235-015-125-2200-0B7 | M83513 / 28-C02PP | MK-235-021-135-2200     |
| M83513 / 28-A01CT | MK-233-009-125-0000-0B7 | M83513 / 28-B02CN | MK-233-015-135-0000     | M83513 / 28-C02PT | MK-235-021-135-0000-0B7 |
| M83513 / 28-A01CW | MK-233-009-125-2200-0B7 | M83513 / 28-B02CP | MK-233-015-135-2200     | M83513 / 28-C02PW | MK-235-021-135-2200-0B7 |
| M83513 / 28-A01NN | MK-232-009-125-0000     | M83513 / 28-B02CT | MK-233-015-135-0000-0B7 | M83513 / 28-C03CN | MK-233-021-145-0000     |
| M83513 / 28-A01NP | MK-232-009-125-2200     | M83513 / 28-B02CW | MK-233-015-135-2200-0B7 | M83513 / 28-C03CP | MK-233-021-145-2200     |
| M83513 / 28-A01NT | MK-232-009-125-0000-0B7 | M83513 / 28-B02NN | MK-232-015-135-0000     | M83513 / 28-C03CT | MK-233-021-145-0000-0B7 |
| M83513 / 28-A01NW | MK-232-009-125-2200-0B7 | M83513 / 28-B02NP | MK-232-015-135-2200     | M83513 / 28-C03CW | MK-233-021-145-2200-0B7 |
| M83513 / 28-A01PN | MK-235-009-125-0000     | M83513 / 28-B02NT | MK-232-015-135-0000-0B7 | M83513 / 28-C03NN | MK-232-021-145-0000     |
| M83513 / 28-A01PP | MK-235-009-125-2200     | M83513 / 28-B02NW | MK-232-015-135-2200-0B7 | M83513 / 28-C03NP | MK-232-021-145-2200     |
| M83513 / 28-A01PT | MK-235-009-125-0000-0B7 | M83513 / 28-B02PN | MK-235-015-135-0000     | M83513 / 28-C03NT | MK-232-021-145-0000-0B7 |
| M83513 / 28-A01PW | MK-235-009-125-2200-0B7 | M83513 / 28-B02PP | MK-235-015-135-2200     | M83513 / 28-C03NW | MK-232-021-145-2200-0B7 |
| M83513 / 28-A02CN | MK-233-009-135-0000     | M83513 / 28-B02PT | MK-235-015-135-0000-0B7 | M83513 / 28-C03PN | MK-235-021-145-0000     |
| M83513 / 28-A02CP | MK-233-009-135-2200     | M83513 / 28-B02PW | MK-235-015-135-2200-0B7 | M83513 / 28-C03PP | MK-235-021-145-2200     |
| M83513 / 28-A02CT | MK-233-009-135-0000-0B7 | M83513 / 28-B03CN | MK-233-015-145-0000     | M83513 / 28-C03PT | MK-235-021-145-0000-0B7 |
| M83513 / 28-A02CW | MK-233-009-135-2200-0B7 | M83513 / 28-B03CP | MK-233-015-145-2200     | M83513 / 28-C03PW | MK-235-021-145-2200-0B7 |
| M83513 / 28-A02NN | MK-232-009-135-0000     | M83513 / 28-B03CT | MK-233-015-145-0000-0B7 |                   |                         |
| M83513 / 28-A02NP | MK-232-009-135-2200     | M83513 / 28-B03CW | MK-233-015-145-2200-0B7 | M83513 / 28-D01CN | MK-233-025-125-0000     |
| M83513 / 28-A02NT | MK-232-009-135-0000-0B7 | M83513 / 28-B03NN | MK-232-015-145-0000     | M83513 / 28-D01CP | MK-233-025-125-2200     |
| M83513 / 28-A02NW | MK-232-009-135-2200-0B7 | M83513 / 28-B03NP | MK-232-015-145-2200     | M83513 / 28-D01CT | MK-233-025-125-0000-0B7 |
| M83513 / 28-A02PN | MK-235-009-135-0000     | M83513 / 28-B03NT | MK-232-015-145-0000-0B7 | M83513 / 28-D01CW | MK-233-025-125-2200-0B7 |
| M83513 / 28-A02PP | MK-235-009-135-2200     | M83513 / 28-B03NW | MK-232-015-145-2200-0B7 | M83513 / 28-D01NN | MK-232-025-125-0000     |
| M83513 / 28-A02PT | MK-235-009-135-0000-0B7 | M83513 / 28-B03PN | MK-235-015-145-0000     | M83513 / 28-D01NP | MK-232-025-125-2200     |
| M83513 / 28-A02PW | MK-235-009-135-2200-0B7 | M83513 / 28-B03PP | MK-235-015-145-2200     | M83513 / 28-D01NT | MK-232-025-125-0000-0B7 |
| M83513 / 28-A03CN | MK-233-009-145-0000     | M83513 / 28-B03PT | MK-235-015-145-0000-0B7 | M83513 / 28-D01NW | MK-232-025-125-2200-0B7 |
| M83513 / 28-A03CP | MK-233-009-145-2200     | M83513 / 28-B03PW | MK-235-015-145-2200-0B7 | M83513 / 28-D01PN | MK-235-025-125-0000     |
| M83513 / 28-A03CT | MK-233-009-145-0000-0B7 |                   |                         | M83513 / 28-D01PP | MK-235-025-125-2200     |
| M83513 / 28-A03CW | MK-233-009-145-2200-0B7 | M83513 / 28-C01CN | MK-233-021-125-0000     | M83513 / 28-D01PT | MK-235-025-125-0000-0B7 |
| M83513 / 28-A03NN | MK-232-009-145-0000     | M83513 / 28-C01CP | MK-233-021-125-2200     | M83513 / 28-D01PW | MK-235-025-125-2200-0B7 |
| M83513 / 28-A03NP | MK-232-009-145-2200     | M83513 / 28-C01CT | MK-233-021-125-0000-0B7 | M83513 / 28-D02CN | MK-233-025-135-0000     |
| M83513 / 28-A03NT | MK-232-009-145-0000-0B7 | M83513 / 28-C01CW | MK-233-021-125-2200-0B7 | M83513 / 28-D02CP | MK-233-025-135-2200     |
| M83513 / 28-A03NW | MK-232-009-145-2200-0B7 | M83513 / 28-C01NN | MK-232-021-125-0000     | M83513 / 28-D02CT | MK-233-025-135-0000-0B7 |
| M83513 / 28-A03PN | MK-235-009-145-0000     | M83513 / 28-C01NP | MK-232-021-125-2200     | M83513 / 28-D02CW | MK-233-025-135-2200-0B7 |
| M83513 / 28-A03PP | MK-235-009-145-2200     | M83513 / 28-C01NT | MK-232-021-125-0000-0B7 | M83513 / 28-D02NN | MK-232-025-135-0000     |
| M83513 / 28-A03PT | MK-235-009-145-0000-0B7 | M83513 / 28-C01NW | MK-232-021-125-2200-0B7 | M83513 / 28-D02NP | MK-232-025-135-2200     |
| M83513 / 28-A03PW | MK-235-009-145-2200-0B7 | M83513 / 28-C01PN | MK-235-021-125-0000     | M83513 / 28-D02NT | MK-232-025-135-0000-0B7 |
|                   |                         | M83513 / 28-C01PP | MK-235-021-125-2200     | M83513 / 28-D02NW | MK-232-025-135-2200-0B7 |
| M83513 / 28-B01CN | MK-233-015-125-0000     | M83513 / 28-C01PT | MK-235-021-125-0000-0B7 | M83513 / 28-D02PN | MK-235-025-135-0000     |
| M83513 / 28-B01CP | MK-233-015-125-2200     | M83513 / 28-C01PW | MK-235-021-125-2200-0B7 | M83513 / 28-D02PP | MK-235-025-135-2200     |
| M83513 / 28-B01CT | MK-233-015-125-0000-0B7 | M83513 / 28-C02CN | MK-233-021-135-0000     | M83513 / 28-D02PT | MK-235-025-135-0000-0B7 |
| M83513 / 28-B01CW | MK-233-015-125-2200-0B7 | M83513 / 28-C02CP | MK-233-021-135-2200     | M83513 / 28-D02PW | MK-235-025-135-2200-0B7 |
| M83513 / 28-B01NN | MK-232-015-125-0000     | M83513 / 28-C02CT | MK-233-021-135-0000-0B7 | M83513 / 28-D03CN | MK-233-025-145-0000     |
| M83513 / 28-B01NP | MK-232-015-125-2200     | M83513 / 28-C02CW | MK-233-021-135-2200-0B7 | M83513 / 28-D03CP | MK-233-025-145-2200     |
| M83513 / 28-B01NT | MK-232-015-125-0000-0B7 | M83513 / 28-C02NN | MK-232-021-135-0000     | M83513 / 28-D03CT | MK-233-025-145-0000-0B7 |
| M83513 / 28-B01NW | MK-232-015-125-2200-0B7 | M83513 / 28-C02NP | MK-232-021-135-2200     | M83513 / 28-D03CW | MK-233-025-145-2200-0B7 |
| M83513 / 28-B01PN | MK-235-015-125-0000     | M83513 / 28-C02NT | MK-232-021-135-0000-0B7 | M83513 / 28-D03NN | MK-232-025-145-0000     |
| M83513 / 28-B01PP | MK-235-015-125-2200     | M83513 / 28-C02NW | MK-232-021-135-2200-0B7 | M83513 / 28-D03NP | MK-232-025-145-2200     |



# Military Cross Reference Chart

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## M83513 / 28 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 28-D03NT | MK-232-025-145-0000-0B7 | M83513 / 28-E02PN | MK-235-031-135-0000     | M83513 / 28-F01PT | MK-235-037-125-0000-0B7 |
| M83513 / 28-D03NW | MK-232-025-145-2200-0B7 | M83513 / 28-E02PP | MK-235-031-135-2200     | M83513 / 28-F01PW | MK-235-037-125-2200-0B7 |
| M83513 / 28-D03PN | MK-235-025-145-0000     | M83513 / 28-E02PT | MK-235-031-135-0000-0B7 | M83513 / 28-F02CN | MK-233-037-135-0000     |
| M83513 / 28-D03PP | MK-235-025-145-2200     | M83513 / 28-E02PW | MK-235-031-135-2200-0B7 | M83513 / 28-F02CP | MK-233-037-135-2200     |
| M83513 / 28-D03PT | MK-235-025-145-0000-0B7 | M83513 / 28-E03CN | MK-233-031-145-0000     | M83513 / 28-F02CT | MK-233-037-135-0000-0B7 |
| M83513 / 28-D03PW | MK-235-025-145-2200-0B7 | M83513 / 28-E03CP | MK-233-031-145-2200     | M83513 / 28-F02CW | MK-233-037-135-2200-0B7 |
| M83513 / 28-E01CN | MK-233-031-125-0000     | M83513 / 28-E03CT | MK-233-031-145-0000-0B7 | M83513 / 28-F02NN | MK-232-037-135-0000     |
| M83513 / 28-E01CP | MK-233-031-125-2200     | M83513 / 28-E03CW | MK-233-031-145-2200-0B7 | M83513 / 28-F02NP | MK-232-037-135-2200     |
| M83513 / 28-E01CT | MK-233-031-125-0000-0B7 | M83513 / 28-E03NN | MK-232-031-145-0000     | M83513 / 28-F02NT | MK-232-037-135-0000-0B7 |
| M83513 / 28-E01CW | MK-233-031-125-2200-0B7 | M83513 / 28-E03NP | MK-232-031-145-2200     | M83513 / 28-F02NW | MK-232-037-135-2200-0B7 |
| M83513 / 28-E01NN | MK-232-031-125-0000     | M83513 / 28-E03NT | MK-232-031-145-0000-0B7 | M83513 / 28-F02PN | MK-235-037-135-0000     |
| M83513 / 28-E01NP | MK-232-031-125-2200     | M83513 / 28-E03NW | MK-232-031-145-2200-0B7 | M83513 / 28-F02PP | MK-235-037-135-2200     |
| M83513 / 28-E01NT | MK-232-031-125-0000-0B7 | M83513 / 28-E03PN | MK-235-031-145-0000     | M83513 / 28-F02PT | MK-235-037-135-0000-0B7 |
| M83513 / 28-E01NW | MK-232-031-125-2200-0B7 | M83513 / 28-E03PP | MK-235-031-145-2200     | M83513 / 28-F02PW | MK-235-037-135-2200-0B7 |
| M83513 / 28-E01PN | MK-235-031-125-0000     | M83513 / 28-E03PT | MK-235-031-145-0000-0B7 | M83513 / 28-F03CN | MK-233-037-145-0000     |
| M83513 / 28-E01PP | MK-235-031-125-2200     | M83513 / 28-E03PW | MK-235-031-145-2200-0B7 | M83513 / 28-F03CP | MK-233-037-145-2200     |
| M83513 / 28-E01PT | MK-235-031-125-0000-0B7 | M83513 / 28-F01CN | MK-233-037-125-0000     | M83513 / 28-F03CT | MK-233-037-145-0000-0B7 |
| M83513 / 28-E01PW | MK-235-031-125-2200-0B7 | M83513 / 28-F01CP | MK-233-037-125-2200     | M83513 / 28-F03CW | MK-233-037-145-2200-0B7 |
| M83513 / 28-E02CN | MK-233-031-135-0000     | M83513 / 28-F01CT | MK-233-037-125-0000-0B7 | M83513 / 28-F03NN | MK-232-037-145-0000     |
| M83513 / 28-E02CP | MK-233-031-135-2200     | M83513 / 28-F01CW | MK-233-037-125-2200-0B7 | M83513 / 28-F03NP | MK-232-037-145-2200     |
| M83513 / 28-E02CT | MK-233-031-135-0000-0B7 | M83513 / 28-F01NN | MK-232-037-125-0000     | M83513 / 28-F03NT | MK-232-037-145-0000-0B7 |
| M83513 / 28-E02CW | MK-233-031-135-2200-0B7 | M83513 / 28-F01NP | MK-232-037-125-2200     | M83513 / 28-F03NW | MK-232-037-145-2200-0B7 |
| M83513 / 28-E02NN | MK-232-031-135-0000     | M83513 / 28-F01NT | MK-232-037-125-0000-0B7 | M83513 / 28-F03PN | MK-235-037-145-0000     |
| M83513 / 28-E02NP | MK-232-031-135-2200     | M83513 / 28-F01NW | MK-232-037-125-2200-0B7 | M83513 / 28-F03PP | MK-235-037-145-2200     |
| M83513 / 28-E02NT | MK-232-031-135-0000-0B7 | M83513 / 28-F01PN | MK-235-037-125-0000     | M83513 / 28-F03PT | MK-235-037-145-0000-0B7 |
| M83513 / 28-E02NW | MK-232-031-135-2200-0B7 | M83513 / 28-F01PP | MK-235-037-125-2200     | M83513 / 28-F03PW | MK-235-037-145-2200-0B7 |

## M83513 / 29

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 29-G01CN | MK-333-051-125-0000     | M83513 / 29-G02CN | MK-333-051-135-0000     | M83513 / 29-G03CN | MK-333-051-145-0000     |
| M83513 / 29-G01CP | MK-333-051-125-2200     | M83513 / 29-G02CP | MK-333-051-135-2200     | M83513 / 29-G03CP | MK-333-051-145-2200     |
| M83513 / 29-G01CT | MK-333-051-125-0000-0B7 | M83513 / 29-G02CT | MK-333-051-135-0000-0B7 | M83513 / 29-G03CT | MK-333-051-145-0000-0B7 |
| M83513 / 29-G01CW | MK-333-051-125-2200-0B7 | M83513 / 29-G02CW | MK-333-051-135-2200-0B7 | M83513 / 29-G03CW | MK-333-051-145-2200-0B7 |
| M83513 / 29-G01NN | MK-332-051-125-0000     | M83513 / 29-G02NN | MK-332-051-135-0000     | M83513 / 29-G03NN | MK-332-051-145-0000     |
| M83513 / 29-G01NP | MK-332-051-125-2200     | M83513 / 29-G02NP | MK-332-051-135-2200     | M83513 / 29-G03NP | MK-332-051-145-2200     |
| M83513 / 29-G01NT | MK-332-051-125-0000-0B7 | M83513 / 29-G02NT | MK-332-051-135-0000-0B7 | M83513 / 29-G03NT | MK-332-051-145-0000-0B7 |
| M83513 / 29-G01NW | MK-332-051-125-2200-0B7 | M83513 / 29-G02NW | MK-332-051-135-2200-0B7 | M83513 / 29-G03NW | MK-332-051-145-2200-0B7 |
| M83513 / 29-G01PN | MK-335-051-125-0000     | M83513 / 29-G02PN | MK-335-051-135-0000     | M83513 / 29-G03PN | MK-335-051-145-0000     |
| M83513 / 29-G01PP | MK-335-051-125-2200     | M83513 / 29-G02PP | MK-335-051-135-2200     | M83513 / 29-G03PP | MK-335-051-145-2200     |
| M83513 / 29-G01PT | MK-335-051-125-0000-0B7 | M83513 / 29-G02PT | MK-335-051-135-0000-0B7 | M83513 / 29-G03PT | MK-335-051-145-0000-0B7 |
| M83513 / 29-G01PW | MK-335-051-125-2200-0B7 | M83513 / 29-G02PW | MK-335-051-135-2200-0B7 | M83513 / 29-G03PW | MK-335-051-145-2200-0B7 |

## M83513 / 30

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 30-H01CN | MK-433-100-125-0000     | M83513 / 30-H02CN | MK-433-100-135-0000     | M83513 / 30-H03CN | MK-433-100-145-0000     |
| M83513 / 30-H01CP | MK-433-100-125-6200     | M83513 / 30-H02CP | MK-433-100-135-6200     | M83513 / 30-H03CP | MK-433-100-145-6200     |
| M83513 / 30-H01CT | MK-433-100-125-0000-0B7 | M83513 / 30-H02CT | MK-433-100-135-0000-0B7 | M83513 / 30-H03CT | MK-433-100-145-0000-0B7 |
| M83513 / 30-H01CW | MK-433-100-125-6200-0B7 | M83513 / 30-H02CW | MK-433-100-135-6200-0B7 | M83513 / 30-H03CW | MK-433-100-145-6200-0B7 |
| M83513 / 30-H01NN | MK-432-100-125-0000     | M83513 / 30-H02NN | MK-432-100-135-0000     | M83513 / 30-H03NN | MK-432-100-145-0000     |
| M83513 / 30-H01NP | MK-432-100-125-6200     | M83513 / 30-H02NP | MK-432-100-135-6200     | M83513 / 30-H03NP | MK-432-100-145-6200     |
| M83513 / 30-H01NT | MK-432-100-125-0000-0B7 | M83513 / 30-H02NT | MK-432-100-135-0000-0B7 | M83513 / 30-H03NT | MK-432-100-145-0000-0B7 |
| M83513 / 30-H01NW | MK-432-100-125-6200-0B7 | M83513 / 30-H02NW | MK-432-100-135-6200-0B7 | M83513 / 30-H03NW | MK-432-100-145-6200-0B7 |
| M83513 / 30-H01PN | MK-435-100-125-0000     | M83513 / 30-H02PN | MK-435-100-135-0000     | M83513 / 30-H03PN | MK-435-100-145-0000     |
| M83513 / 30-H01PP | MK-435-100-125-6200     | M83513 / 30-H02PP | MK-435-100-135-6200     | M83513 / 30-H03PP | MK-435-100-145-6200     |
| M83513 / 30-H01PT | MK-435-100-125-0000-0B7 | M83513 / 30-H02PT | MK-435-100-135-0000-0B7 | M83513 / 30-H03PT | MK-435-100-145-0000-0B7 |
| M83513 / 30-H01PW | MK-435-100-125-6200-0B7 | M83513 / 30-H02PW | MK-435-100-135-6200-0B7 | M83513 / 30-H03PW | MK-435-100-145-6200-0B7 |



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## Military Cross Reference Chart

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### M83513 / 31 (continued)

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 31-E02NT | MK-242-031-235-0000-0B7 | M83513 / 31-F01CN | MK-243-037-225-0000-900 | M83513 / 31-F02NT | MK-242-037-235-0000-0B7 |
| M83513 / 31-E02NW | MK-242-031-235-2200-0B7 | M83513 / 31-F01CP | MK-243-037-225-2200-900 | M83513 / 31-F02NW | MK-242-037-235-2200-0B7 |
| M83513 / 31-E02PN | MK-245-031-235-0000-900 | M83513 / 31-F01CT | MK-243-037-225-0000-0B7 | M83513 / 31-F02PN | MK-245-037-235-0000-900 |
| M83513 / 31-E02PP | MK-245-031-235-2200-900 | M83513 / 31-F01CW | MK-243-037-225-2200-0B7 | M83513 / 31-F02PP | MK-245-037-235-2200-900 |
| M83513 / 31-E02PT | MK-245-031-235-0000-0B7 | M83513 / 31-F01NN | MK-242-037-225-0000-900 | M83513 / 31-F02PT | MK-245-037-235-0000-0B7 |
| M83513 / 31-E02PW | MK-245-031-235-2200-0B7 | M83513 / 31-F01NP | MK-242-037-225-2200-900 | M83513 / 31-F02PW | MK-245-037-235-2200-0B7 |
| M83513 / 31-E03CN | MK-243-031-245-0000-900 | M83513 / 31-F01NT | MK-242-037-225-0000-0B7 | M83513 / 31-F03CN | MK-243-037-245-0000-900 |
| M83513 / 31-E03CP | MK-243-031-245-2200-900 | M83513 / 31-F01NW | MK-242-037-225-2200-0B7 | M83513 / 31-F03CP | MK-243-037-245-2200-900 |
| M83513 / 31-E03CT | MK-243-031-245-0000-0B7 | M83513 / 31-F01PN | MK-245-037-225-0000-900 | M83513 / 31-F03CT | MK-243-037-245-0000-0B7 |
| M83513 / 31-E03CW | MK-243-031-245-2200-0B7 | M83513 / 31-F01PP | MK-245-037-225-2200-900 | M83513 / 31-F03CW | MK-243-037-245-2200-0B7 |
| M83513 / 31-E03NN | MK-242-031-245-0000-900 | M83513 / 31-F01PT | MK-245-037-225-0000-0B7 | M83513 / 31-F03NN | MK-242-037-245-0000-900 |
| M83513 / 31-E03NP | MK-242-031-245-2200-900 | M83513 / 31-F01PW | MK-245-037-225-2200-0B7 | M83513 / 31-F03NP | MK-242-037-245-2200-900 |
| M83513 / 31-E03NT | MK-242-031-245-0000-0B7 | M83513 / 31-F02CN | MK-243-037-235-0000-900 | M83513 / 31-F03NT | MK-242-037-245-0000-0B7 |
| M83513 / 31-E03NW | MK-242-031-245-2200-0B7 | M83513 / 31-F02CP | MK-243-037-235-2200-900 | M83513 / 31-F03NW | MK-242-037-245-2200-0B7 |
| M83513 / 31-E03PN | MK-245-031-245-0000-900 | M83513 / 31-F02CT | MK-243-037-235-0000-0B7 | M83513 / 31-F03PN | MK-245-037-245-0000-900 |
| M83513 / 31-E03PP | MK-245-031-245-2200-900 | M83513 / 31-F02CW | MK-243-037-235-2200-0B7 | M83513 / 31-F03PP | MK-245-037-245-2200-900 |
| M83513 / 31-E03PT | MK-245-031-245-0000-0B7 | M83513 / 31-F02NN | MK-242-037-235-0000-900 | M83513 / 31-F03PT | MK-245-037-245-0000-0B7 |
| M83513 / 31-E03PW | MK-245-031-245-2200-0B7 | M83513 / 31-F02NP | MK-242-037-235-2200-900 | M83513 / 31-F03PW | MK-245-037-245-2200-0B7 |

### M83513 / 32

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 32-G01CN | MK-343-051-225-0000-900 | M83513 / 32-G02CN | MK-343-051-235-0000-900 | M83513 / 32-G03CN | MK-343-051-245-0000-900 |
| M83513 / 32-G01CP | MK-343-051-225-2200-900 | M83513 / 32-G02CP | MK-343-051-235-2200-900 | M83513 / 32-G03CP | MK-343-051-245-2200-900 |
| M83513 / 32-G01CT | MK-343-051-225-0000-0B7 | M83513 / 32-G02CT | MK-343-051-235-0000-0B7 | M83513 / 32-G03CT | MK-343-051-245-0000-0B7 |
| M83513 / 32-G01CW | MK-343-051-225-2200-0B7 | M83513 / 32-G02CW | MK-343-051-235-2200-0B7 | M83513 / 32-G03CW | MK-343-051-245-2200-0B7 |
| M83513 / 32-G01NN | MK-342-051-225-0000-900 | M83513 / 32-G02NN | MK-342-051-235-0000-900 | M83513 / 32-G03NN | MK-342-051-245-0000-900 |
| M83513 / 32-G01NP | MK-342-051-225-2200-900 | M83513 / 32-G02NP | MK-342-051-235-2200-900 | M83513 / 32-G03NP | MK-342-051-245-2200-900 |
| M83513 / 32-G01NT | MK-342-051-225-0000-0B7 | M83513 / 32-G02NT | MK-342-051-235-0000-0B7 | M83513 / 32-G03NT | MK-342-051-245-0000-0B7 |
| M83513 / 32-G01NW | MK-342-051-225-2200-0B7 | M83513 / 32-G02NW | MK-342-051-235-2200-0B7 | M83513 / 32-G03NW | MK-342-051-245-2200-0B7 |
| M83513 / 32-G01PN | MK-345-051-225-0000-900 | M83513 / 32-G02PN | MK-345-051-235-0000-900 | M83513 / 32-G03PN | MK-345-051-245-0000-900 |
| M83513 / 32-G01PP | MK-345-051-225-2200-900 | M83513 / 32-G02PP | MK-345-051-235-2200-900 | M83513 / 32-G03PP | MK-345-051-245-2200-900 |
| M83513 / 32-G01PT | MK-345-051-225-0000-0B7 | M83513 / 32-G02PT | MK-345-051-235-0000-0B7 | M83513 / 32-G03PT | MK-345-051-245-0000-0B7 |
| M83513 / 32-G01PW | MK-345-051-225-2200-0B7 | M83513 / 32-G02PW | MK-345-051-235-2200-0B7 | M83513 / 32-G03PW | MK-345-051-245-2200-0B7 |

### M83513 / 33

|                   |                         |                   |                         |                   |                         |
|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
| M83513 / 33-H01CN | MK-443-100-225-0000-900 | M83513 / 33-H02CN | MK-443-100-235-0000-900 | M83513 / 33-H03CN | MK-443-100-245-0000-900 |
| M83513 / 33-H01CP | MK-443-100-225-6200-900 | M83513 / 33-H02CP | MK-443-100-235-6200-900 | M83513 / 33-H03CP | MK-443-100-245-6200-900 |
| M83513 / 33-H01CT | MK-443-100-225-0000-0B7 | M83513 / 33-H02CT | MK-443-100-235-0000-0B7 | M83513 / 33-H03CT | MK-443-100-245-0000-0B7 |
| M83513 / 33-H01CW | MK-443-100-225-6200-0B7 | M83513 / 33-H02CW | MK-443-100-235-6200-0B7 | M83513 / 33-H03CW | MK-443-100-245-6200-0B7 |
| M83513 / 33-H01NN | MK-442-100-225-0000-900 | M83513 / 33-H02NN | MK-442-100-235-0000-900 | M83513 / 33-H03NN | MK-442-100-245-0000-900 |
| M83513 / 33-H01NP | MK-442-100-225-6200-900 | M83513 / 33-H02NP | MK-442-100-235-6200-900 | M83513 / 33-H03NP | MK-442-100-245-6200-900 |
| M83513 / 33-H01NT | MK-442-100-225-0000-0B7 | M83513 / 33-H02NT | MK-442-100-235-0000-0B7 | M83513 / 33-H03NT | MK-442-100-245-0000-0B7 |
| M83513 / 33-H01NW | MK-442-100-225-6200-0B7 | M83513 / 33-H02NW | MK-442-100-235-6200-0B7 | M83513 / 33-H03NW | MK-442-100-245-6200-0B7 |
| M83513 / 33-H01PN | MK-445-100-225-0000-900 | M83513 / 33-H02PN | MK-445-100-235-0000-900 | M83513 / 33-H03PN | MK-445-100-245-0000-900 |
| M83513 / 33-H01PP | MK-445-100-225-6200-900 | M83513 / 33-H02PP | MK-445-100-235-6200-900 | M83513 / 33-H03PP | MK-445-100-245-6200-900 |
| M83513 / 33-H01PT | MK-445-100-225-0000-0B7 | M83513 / 33-H02PT | MK-445-100-235-0000-0B7 | M83513 / 33-H03PT | MK-445-100-245-0000-0B7 |
| M83513 / 33-H01PW | MK-445-100-225-6200-0B7 | M83513 / 33-H02PW | MK-445-100-235-6200-0B7 | M83513 / 33-H03PW | MK-445-100-245-6200-0B7 |

# The AirBorn Advantage

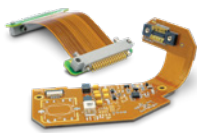
Model-To-Market  
Solutions



Custom  
Power  
Systems



VPX  
Power Supply



Flexible  
Circuit  
Assemblies



Cable  
Assemblies



FUZE  
Assemblies



Active  
Optical  
Assemblies



Rectangular  
W Series



Rectangular  
R Series



Micro D  
M Series



Nano D  
N Series



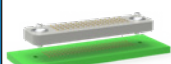
High-Speed  
Rectangular  
verSI



Modular Hybrid  
Slnergy



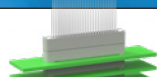
Macro D  
RockT



Z Axis Interposer  
Z Series



High-Speed  
Micro D  
microSI



Stackable  
RC Series



Circulars  
Series 360



Strip Connector  
AirStrip



PowerAmp  
13A or 23A



Rugged Circulars  
TriMate

MSC-5.25

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