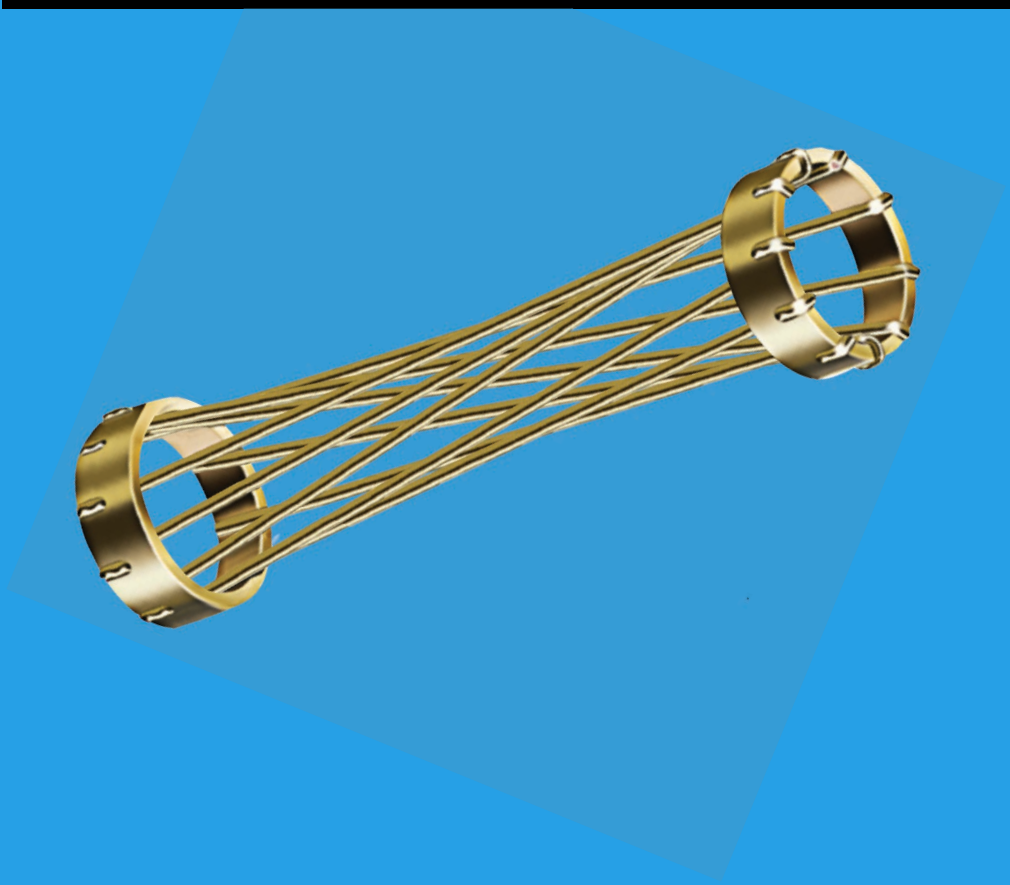
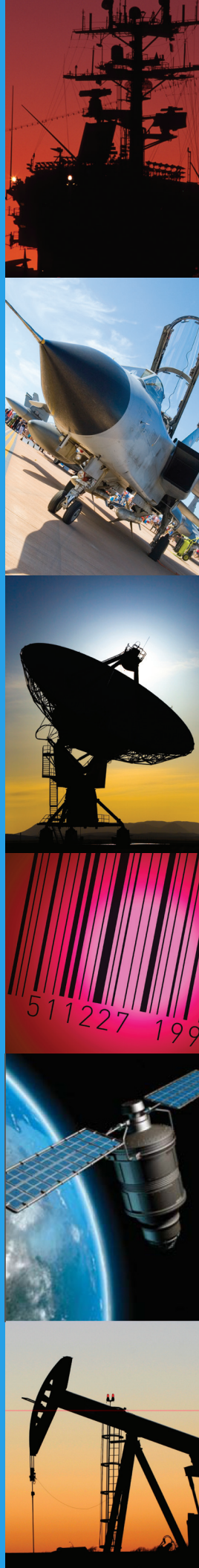
HMK .100 X .100 HYPERBOLOID SERIES

HYPERBOLOID CONNECTORS

FOR SUPERIOR PERFORMANCE IN ALL APPLICATIONS

IEH CORPORATION ISO 9001





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2 ROW UNINTERRUPTED (17-65 CONTACTS)

8 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
9 FE, SE - Socket, Right Angle (Dip Solder)
10 FV, SV - Socket, Compliant
11 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
12 ME, PE - Pin, Right Angle (Dip Solder)
13 MV, PV - Pin, Compliant

2 ROW INTERRUPTED (72-120 CONTACTS)

14 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
15 FE, SE - Socket, Right Angle (Dip Solder)
16 FV, SV - Socket, Compliant
17 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
18 ME, PE - Pin, Right Angle (Dip Solder)
19 MV, PV - Pin, Compliant

3 ROW UNINTERRUPTED (62-98 CONTACTS)

20 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
21 FE, SE - Socket, Right Angle (Dip Solder)
22 FV, SV - Socket, Compliant
23 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
24 ME, PE - Pin, Right Angle (Dip Solder)
25 MV, PV - Pin, Compliant

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3 ROW INTERRUPTED (126 CONTACTS)

26 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
27 FE, SE - Socket, Right Angle (Dip Solder)
28 FV, SV - Socket, Compliant
29 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
30 ME, PE - Pin, Right Angle (Dip Solder)
31 MV, PV - Pin, Compliant

3 ROW INTERRUPTED (160 CONTACTS)

32 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
33 FE, SE - Socket, Right Angle (Dip Solder)
34 FV, SV - Socket, Compliant
35 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
36 ME, PE - Pin, Right Angle (Dip Solder)
37 MV, PV - Pin, Compliant
38 FD,FW - Socket, Front Removable, Straight (Dip Solder, Wire Wrap)

39 Ordering Chart - 4 & 5 Row

4 ROW UNINTERRUPTED (48-196 CONTACTS)

40 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
41 FE, SE - Socket, Right Angle (Dip Solder)
42 FV, SV - Socket, Compliant
43 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
44 ME, PE - Pin, Right Angle (Dip Solder)
45 MV, PV - Pin, Compliant

4 ROW INTERRUPTED (208-392 CONTACTS)

46 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
47 FE, SE - Socket, Right Angle (Dip Solder)

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48 FV, SV - Socket, Compliant
49 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
50 ME, PE - Pin, Right Angle (Dip Solder)
51 MV, PV - Pin, Compliant

5 ROW UNTERRUPTED (125-240 CONTACTS)

52 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
53 FE, SE - Socket, Right Angle (Dip Solder)
54 FV, SV - Socket, Compliant
55 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
56 ME, PE - Pin, Right Angle (Dip Solder)
57 MV, PV - Pin, Compliant

5 ROW INTERRUPTED (300-490 CONTACTS)

58 FC, FD, FS, FW, SC, SD, SS, SW- Socket, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
59 FE, SE - Socket, Right Angle (Dip Solder)
60 FV, SV - Socket, Compliant
61 MC, MD, MS, MW, PC, PD, PS, PW - Pin, Straight (Crimp, Dip Solder, Solder Cup, Wire Wrap)
62 ME, PE - Pin, Right Angle (Dip Solder)
63 MV, PV - Pin, Compliant

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80 PWB Pattern - 3 Row Interrupted **160**
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85 Accessories

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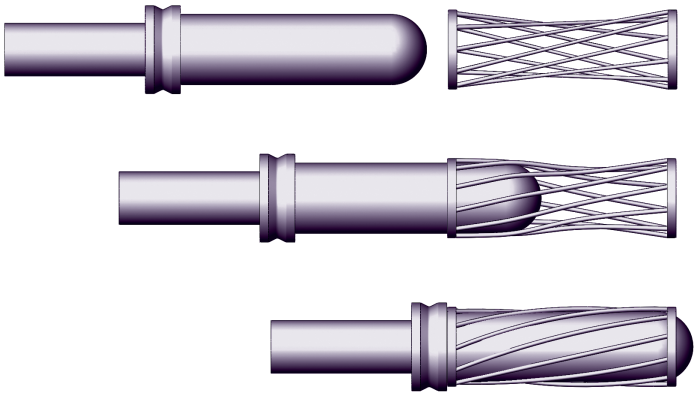
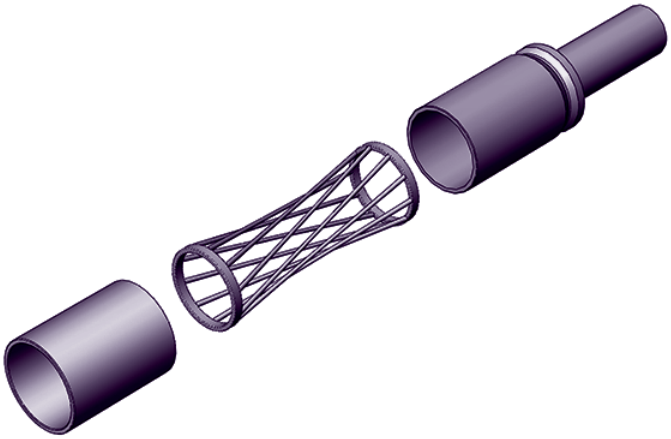
The HYPERBOLOID contact is an advanced design that satisfies performance requirements previously considered impossible. Radically different in concept, it is used in connectors having the highest standards of performance. The distinguishing feature of the HYPERBOLOID socket is the hyper-boloid-shaped sleeve formed by straight wires strung at an angle to the longitudinal axis. Viewed from the side, you see a curve defined by a series of apparent short straight line segments which are tangent lines to points along a hyperbolic curve. This geometry provides for a design which has a decreasing circumscribed circle when viewed from the entry. It begins larger than the pin acceptance diameter and is less than this same diameter at the center. When the pin is inserted into this sleeve, the wires stretch, well within elastic limits, to accommodate it. In so doing, the wires wrap themselves around the pin providing a number of continuous line contact paths. The illustration below will assist in visualization.



The actual physical construction of the contact involves several components. The wires are strung on an internal wire carrier (inner sleeve) which is subsequently capped or enclosed by a front outer ring (front sleeve) and rear ring which includes the termination configuration (terminal). All components to the assembly are completely finished with the specified electroplating prior to assembly. The wires are continuous process plated on reel before use. In this manner, interface finish requirements can be controlled very closely without the common problems of gradient, shadow, or other finish imperfections often appearing in alternative designs. Very often, this processing feature permits the specifier to reduce precious metal content with resultant savings. Joints are calculated interference fits, insuring gas tight interfaces between all elements of the HYPERBOLOID construction. An exploded view is provided next.

The unique geometry, precision processing, and careful attention to quality result in a highly desirable contact design which provides:



- **VLIF (Very Low Insertion Force):** Common sizes #22 and less average under one ounce per contact.
- **Extraordinary Resistance to Shock & Vibration:** Tests exceeding 300 g's without discontinuity.
- **Duty Cycle Exceeding 100,000 Mate/Demate:** The burnishing action of the wires on the pin surface is non-destructive. Unlike the "plow" and scrape action of common designs, HYPERBOLOID's gentle mating action enhances life.
- **Low, Low Contact Resistance:** The multiplicity of line contact, as opposed to point contact in other designs, provides an excellent interface exhibiting low contact resistance (often less than 1/2 of MIL spec. allowances). This characteristic also provides for a cooler running contact under load.
- **Improved Current Carrying Capacity:** The low contact resistance gives a lower °C rise from ambient under load. This feature often allows the user to operate the same size contact under higher load.
- **Highest Reliability:** In use for over 40 years under the most demanding conditions HYPERBOLOID has proven itself to be the leading design for integrity and reliability. On space platforms, ships and boats at sea, land vehicles, fighter and transport aircraft, missiles, torpedoes, medical and transplant electronics, industrial and environmental controls, rail, construction, ATE and test equipment, PGA sockets, test interface stations, and other applications, HYPERBOLOID has lived up to its promise of the highest reliability connector available.

SPECIFICATIONS

MATERIALS:

Pin Contacts:	PhBr per ASTM B139, BeCu per ASTM B196, or Cu alloy
Socket Contacts:	
Contact Wires:	BeCu per ASTM B197
Termination:	PhBr per ASTM B139 or Cu alloy
Support Elements:	Cu alloy
Hardware:	Corrosion resistant steel per ASTM A582 or Brass per ASTM B16 or Cu alloy
Insulator:	Glass Filled Diallyl Phthalate per ASTM D5948 Modified polyphenylene sulfide per MIL-M-24519, Type GST-40F
Pin Shields:	Aluminum 5052-H32 per QQ-A-250/8

FINISHES:

Pin Contacts:	Gold per ASTM B488 or MIL-DTL-45204 Type II, Class 1.27 min. , Code C over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418
Socket Contacts:	
Contact Wires:	Gold per ASTM B488 or MIL-DTL-45204 Type II, Class 1.27 min. , Code C over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418
Termination:	Gold per ASTM B488 or MIL-DTL-45204 , Class 0.50 min. , Grade C over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418 or solder dip over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418
Support Elements:	Nickel, 0.000050 min., over Copper per SAE AMS 2418
Hardware:	CRES - Passivate per SAE-AMS2700 Cu alloy - Nickel plate, 0.000050 min.
Pin Shields:	Gold Anodize per MIL-A-8625, Type II, Class 2

PERFORMANCE:

Current Rating:	4 amp @ 30°C Rise (higher ratings may be supported--contact factory)
Insulation Resistance:	10^6 megaohms min. - EIA-364-21 & MIL-DTL-55302 (par. 4.5.8) @500 VDC
Contact Resistance:	5 milliohms max, - EIA-364-06 & MIL-DTL-55302 (par. 4.5.5)
Breakdown Voltage between contacts:	1400V RMS min
Dielectric Withstanding Voltage:	1050V RMS min
Temperature:	-65°C to +125°C (-85°F to +257°F)
De-mating Force:	0.30 to 2.00 oz. per contact x number of contacts - MIL-STD-55302 (par. 4.5.4)
Contact Life:	100,000 mating cycles - Exceeds MIL-DTL-55302 (par. 4.5.9)
Solderability:	IPC/EIA J-STD-002, Category 3
Humidity:	IAW EIA-364-31, Method IV, except 7A & 7B (not required)
Vibration:	IAW EIA-364-28 & MIL-DTL-55302 (par. 4.5.10)
Shock:	IAW EIA-364-27 & MIL-DTL-55302 (par. 4.5.14)
Salt Spray:	IAW EIA-364-26 & MIL-DTL-55302 (par. 4.5.11)
Temperature Cycling:	IAW EIA-364-32 & MIL-DTL-55302 (par. 4.5.13)

DIMENSIONS: Catalog product dimensions are nominal.
For linear and positional tolerances, contact factory.

All information contained herein is believed to be reliable as of the date of publication, but is subject to change without notice. Current product drawings and specifications are available upon request from IEH.

IEH warrants its products to be free of defects affecting normal use. If any shipment is found to be defective we will accept return for repair or replacement at our option within one year of shipment. IEH is not responsible for incidental or consequential damages arising out of the use of our products.

ORDERING CHART
2 & 3 - Row

HMK	017	F	D	A	1	X	98	E	0	00

Series

Contact Capacity
(Use All 3 Places)

Contact Gender/ Body Gender	
F	Socket Contact / Receptacle Body
M	Pin Contact / Plug Body
P	Pin Contact / Receptacle Body
S	Socket Contact / Plug Body

Termination Style	
C	Crimp[1]
G	Double Crimp[1]
D	Dip Solder Straight
E	Dip Solder Right Angle
S	Solder Cup
V	Compliant
W	Wire Wrap

Insulator Material	
A	Diallyl Phthalate (Blue)
E	Polyphenylene Sulfide (Ryton-Brown)

Termination Length - "L"				
Code	Dip Solder Straight	Dip Solder Right Angle		Wire Wrap
		M/S	F/P	
1	.109 [2.77]	.115 [2.92]	.125 [3.18]	.400 [10.16]
2	.140 [3.56]	.128 [3.25]	.138 [3.51]	.528 [13.40]
3	.197 [5.00]	.178 [4.52]	.188 [4.78]	.563 [14.30]
4	.221 [5.61]	.191 [4.85]	.202 [5.12]	---
9	User Defined			
0	Use For Solder Cup, Compliant & Crimp			
Check Factory. Not all Termination Styles Are Available In All Configurations				

Variation Code - Factory Assigned	
Most Common Variations	
00	No Variation
20	Solder Dip Terminals
C0	Epoxy Termination Sealed
C2	Epoxy Seal & Solder Dipped
S0	Pin Shield (Pin Connector Only)
S2	Pin Shield & Solder Dipped
01	160 Pin Front Removable Version: Pg. 38

Row Designation	
0	2 Row Series
3	3 Row Series

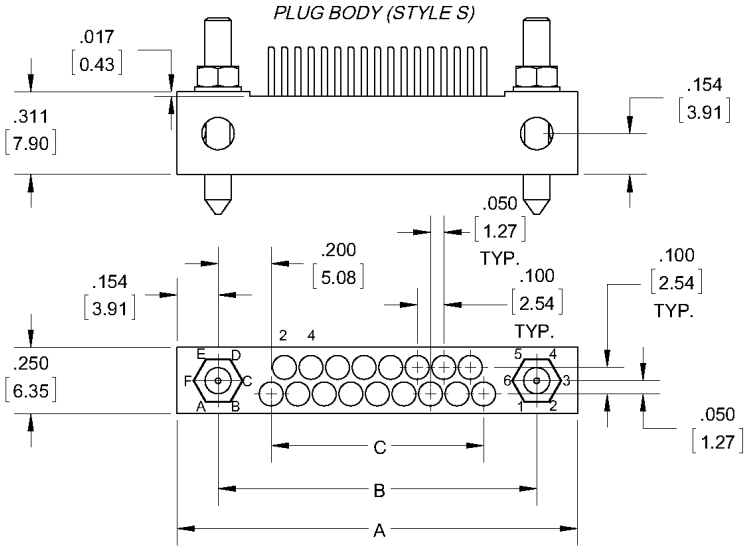
Mounting Style	
C	Threaded Insert
E	Stud/Threaded
F	Non Mounting

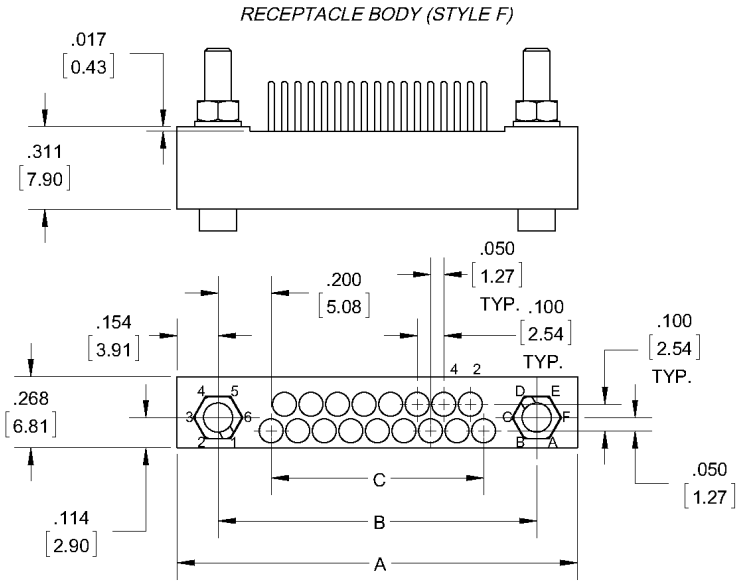
Hardware Configuration	
00	No Hardware
71	Plug Body; Guide Pins Receptacle Body; Guide Sockets
72	Plug Body; Guide Sockets; Receptacle Body; Guide Pins
97	Guide Pins Unassembled
98	Guide Sockets Unassembled

Hardware Style	
A	Round Guides w/ Mounting. Stud
B	Polarized Guides w/ Mounting. Stud[2]
K	Fixed Locking
P	Rotating - Jackscrew (Hex)
S	Rotating - Jack Socket (Slotted)
T	Fixed Locking w/ Mounting. Stud
U	Float Mounting
X	Round Guides
Y	Polarized Guides[2]
0	No Hardware Supplied

Notes:
1. Crimp contacts supplied loose with connector housing
2. Keying is available in 36 styles. If not specified, will be supplied in position C3. The user can change the keying position

SOCKET, STRAIGHT
STYLE FC, FD, FS, FW
STYLE SC, SD, SS, SW





No. of Contacts	A	B	C
17	1.508 [38.30]	1.200 [30.48]	0.800 [20.32]
29	2.106 [53.49]	1.800 [45.72]	1.400 [35.56]
33	2.308 [58.62]	2.000 [50.80]	1.600 [40.64]
41	2.708 [68.78]	2.400 [60.96]	2.000 [50.80]
53	3.308 [84.02]	3.000 [76.20]	2.600 [66.04]
65	3.908 [99.26]	3.600 [91.44]	3.200 [81.28]

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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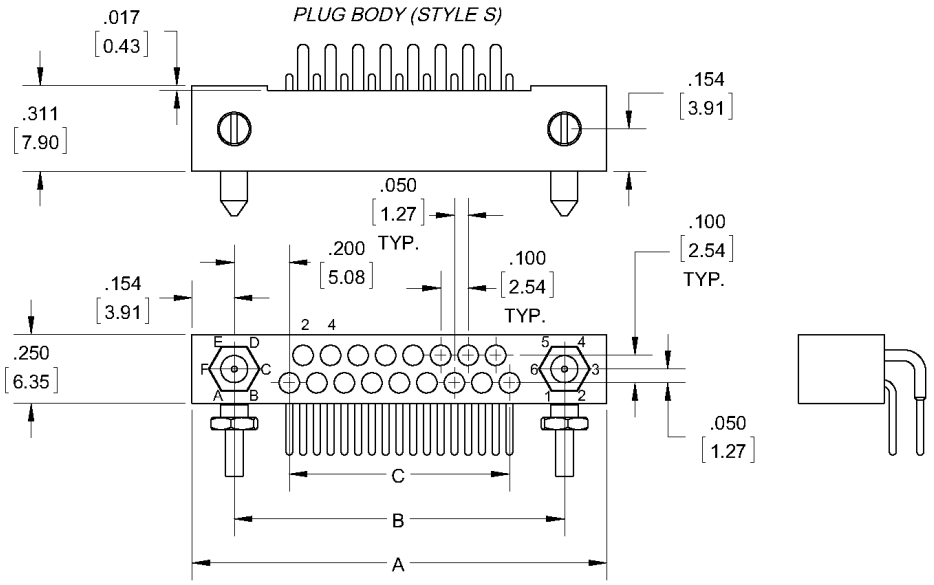
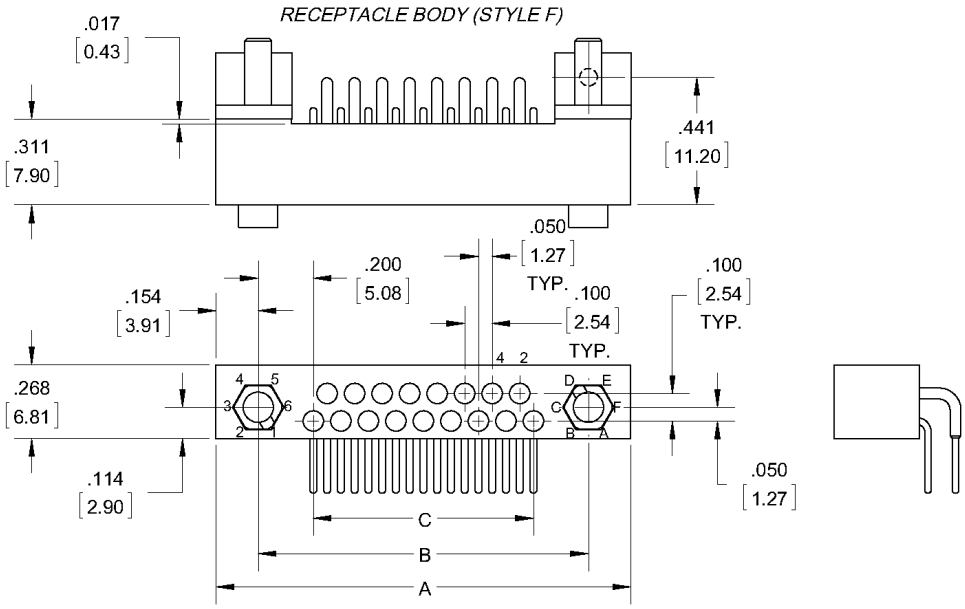
SOCKET, RIGHT ANGLE
STYLE FE
STYLE SE





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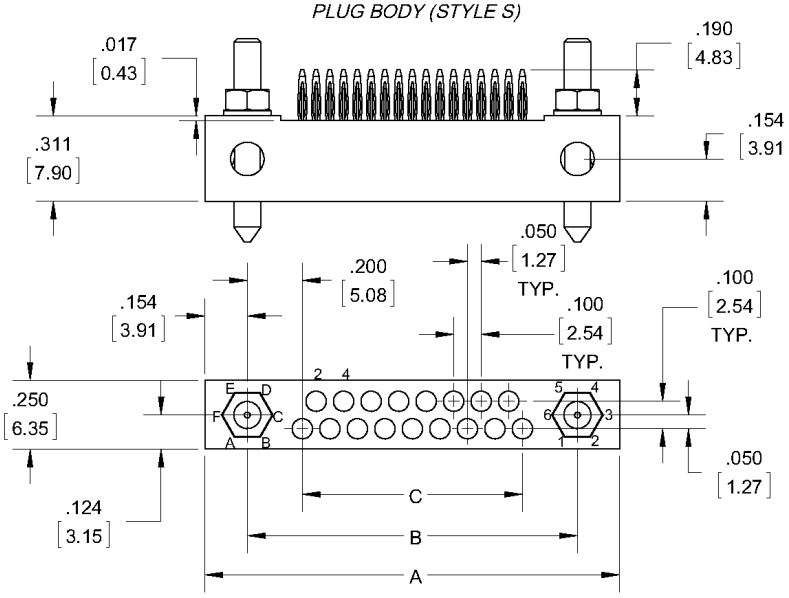
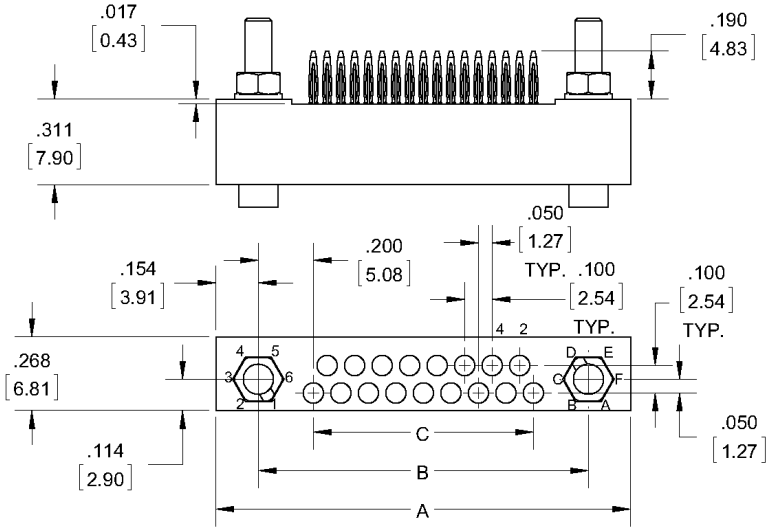
SOCKET, COMPLIANT
STYLE FV
STYLE SV

PLUG BODY (STYLE S)



RECEPTACLE BODY (STYLE F)



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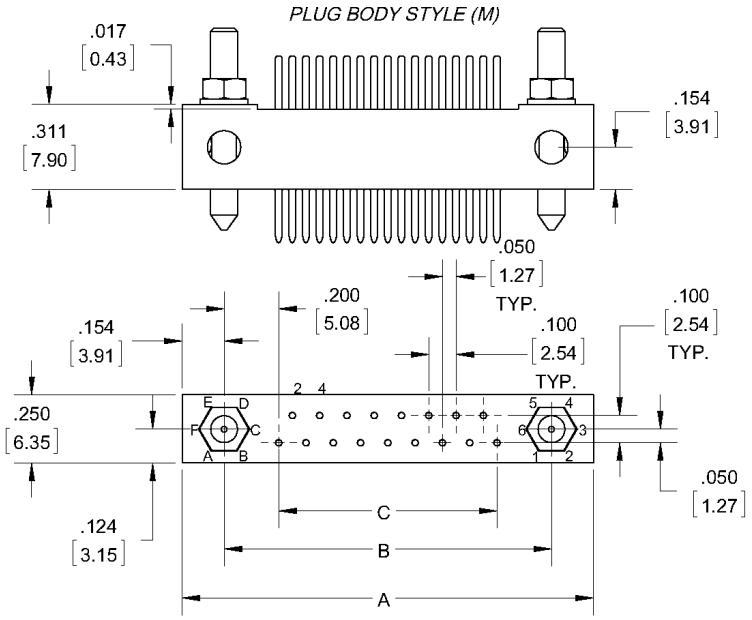
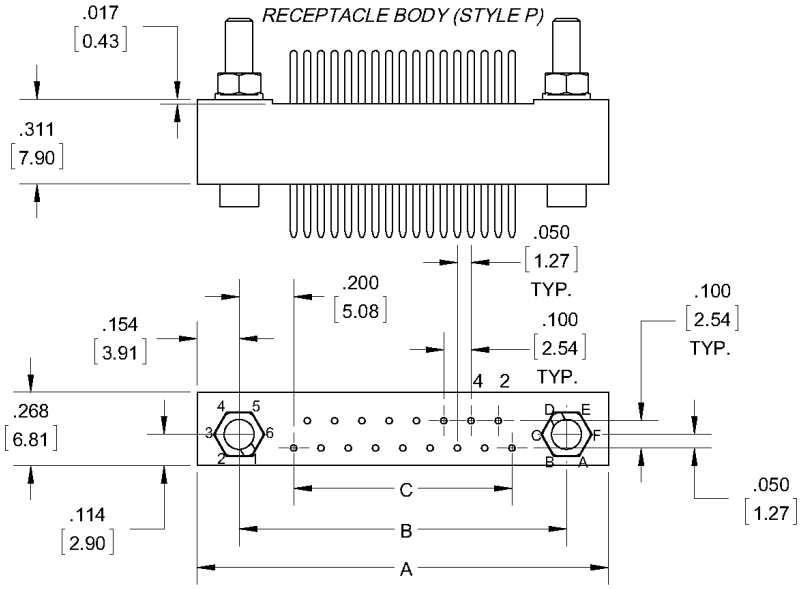
PIN, STRAIGHT

STYLE MC, MD, MS, MW
STYLE PC, PD, PS, PW





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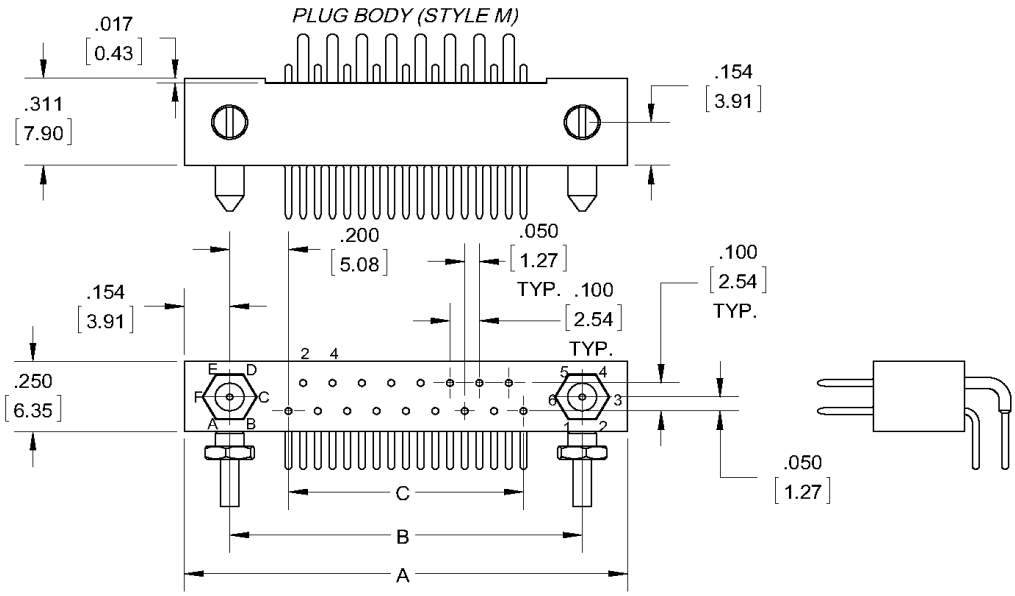
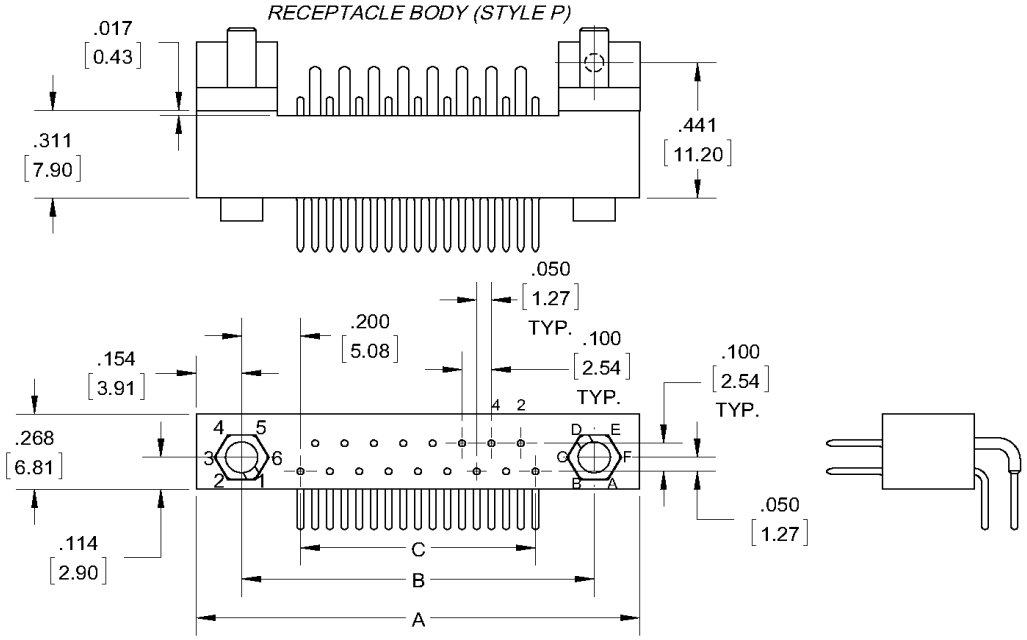
PIN, RIGHT ANGLE
STYLE ME
STYLE PE





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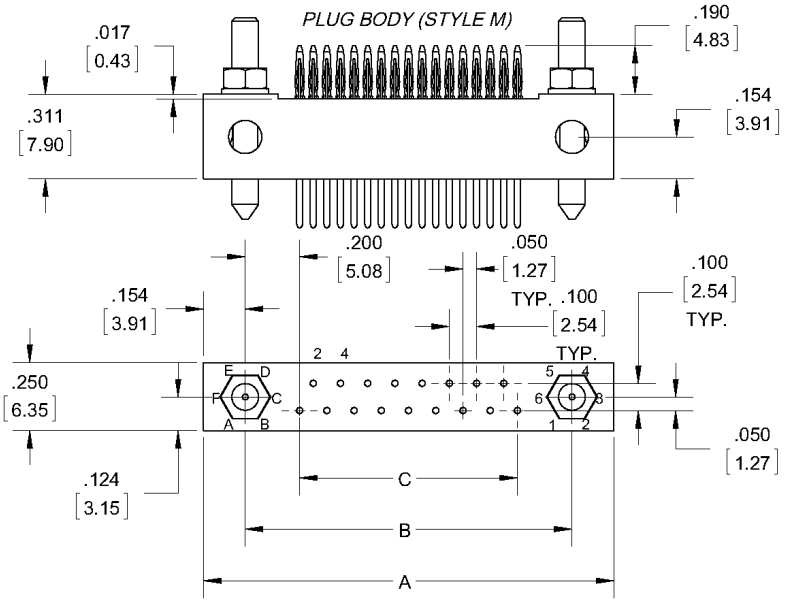
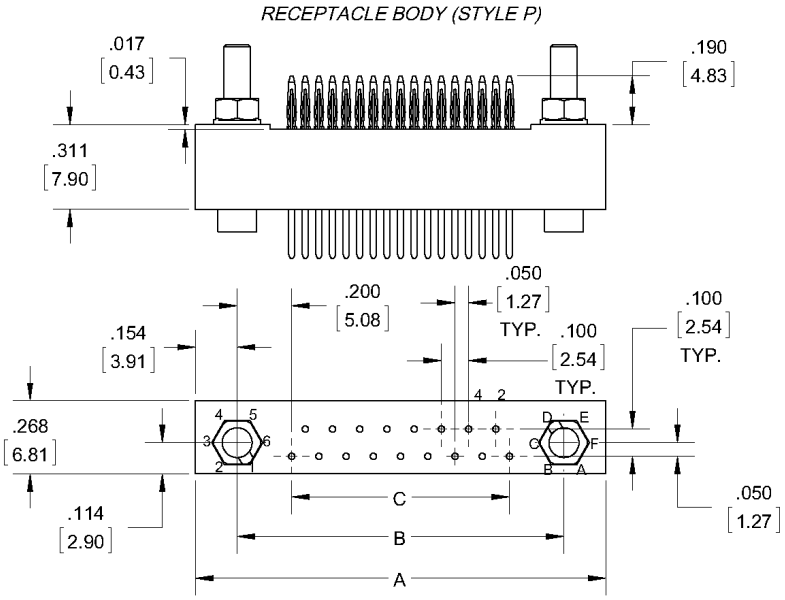
PIN, COMPLIANT
STYLE MV
STYLE PV



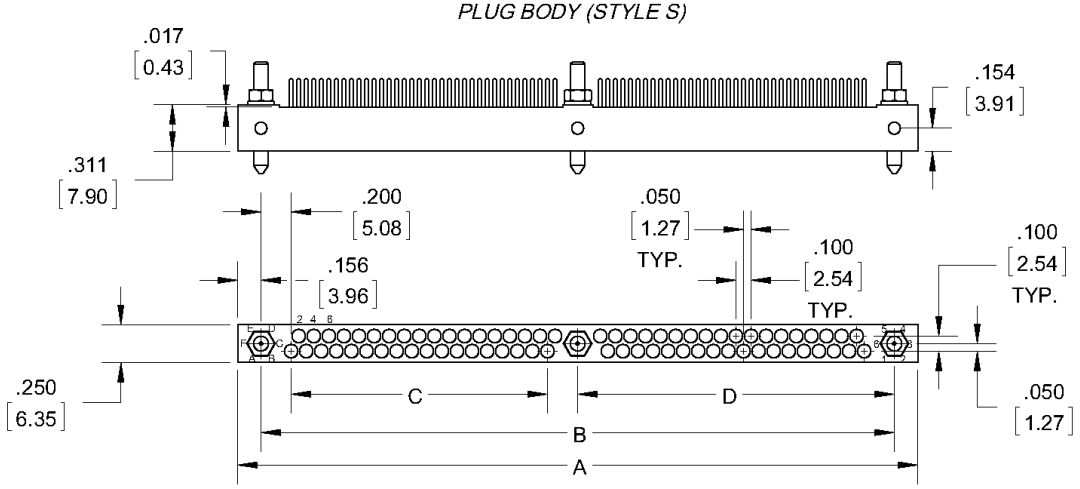


No. of Contacts	A	B	C
17	1.508 [38.30]	1.200 [30.48]	0.800 [20.32]
29	2.106 [53.49]	1.800 [45.72]	1.400 [35.56]
33	2.308 [58.62]	2.000 [50.80]	1.600 [40.64]
41	2.708 [68.78]	2.400 [60.96]	2.000 [50.80]
53	3.308 [84.02]	3.000 [76.20]	2.600 [66.04]
65	3.908 [99.26]	3.600 [91.44]	3.200 [81.28]

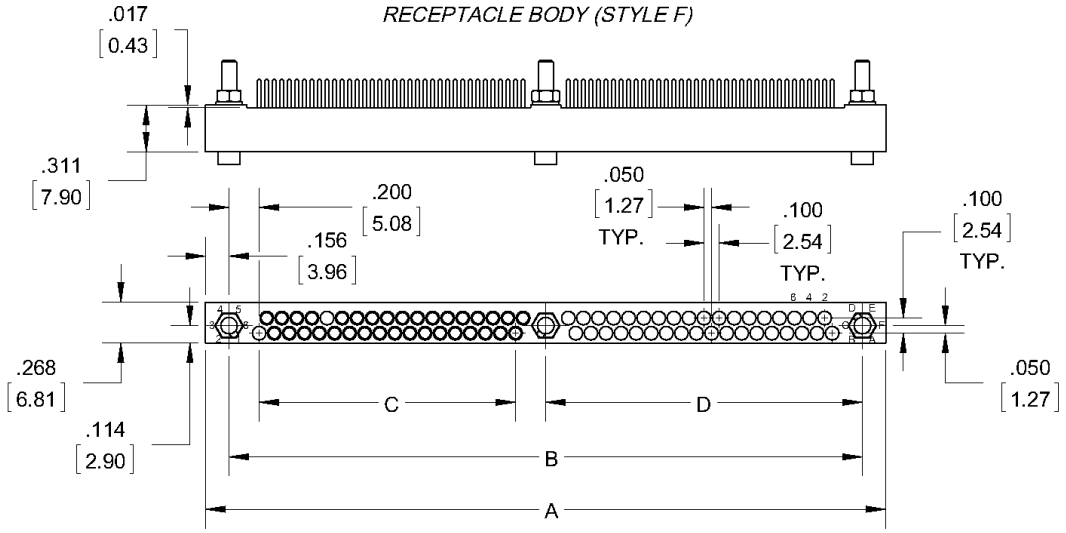
REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, STRAIGHT
STYLE FC, FD, FS, FW
STYLE SC, SD, SS, SW

PLUG BODY (STYLE S)



RECEPTACLE BODY (STYLE F)



REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
72	4.508 [114.50]	4.200 [106.68]	1.700 [43.18]	2.100 [53.34]
84	5.108 [129.74]	4.800 [121.92]	2.000 [50.80]	2.400 [60.96]
96	5.708 [144.98]	5.400 [137.16]	2.300 [58.42]	2.700 [68.58]
120	6.909 [175.50]	6.600 [167.64]	2.900 [73.66]	3.300 [83.82]

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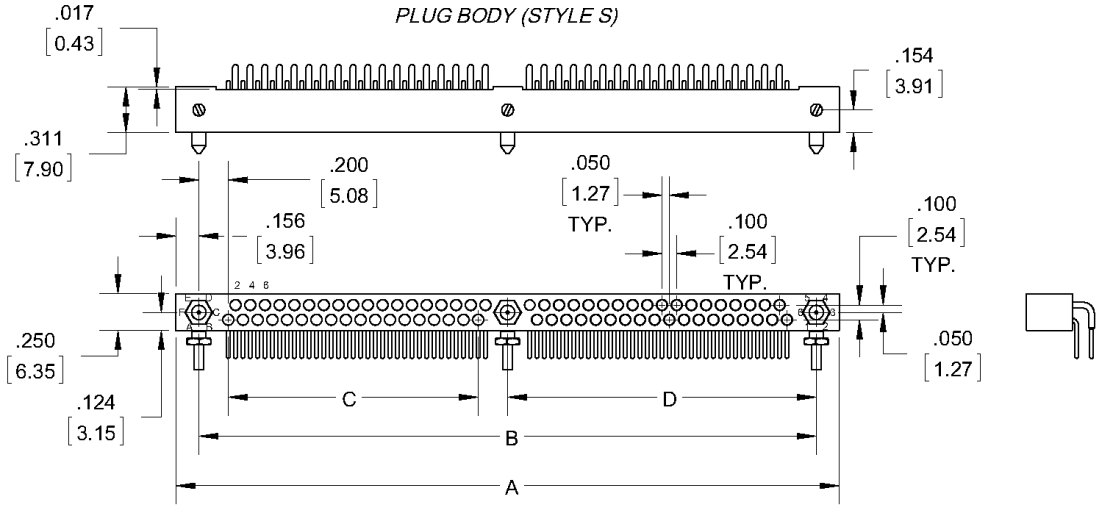
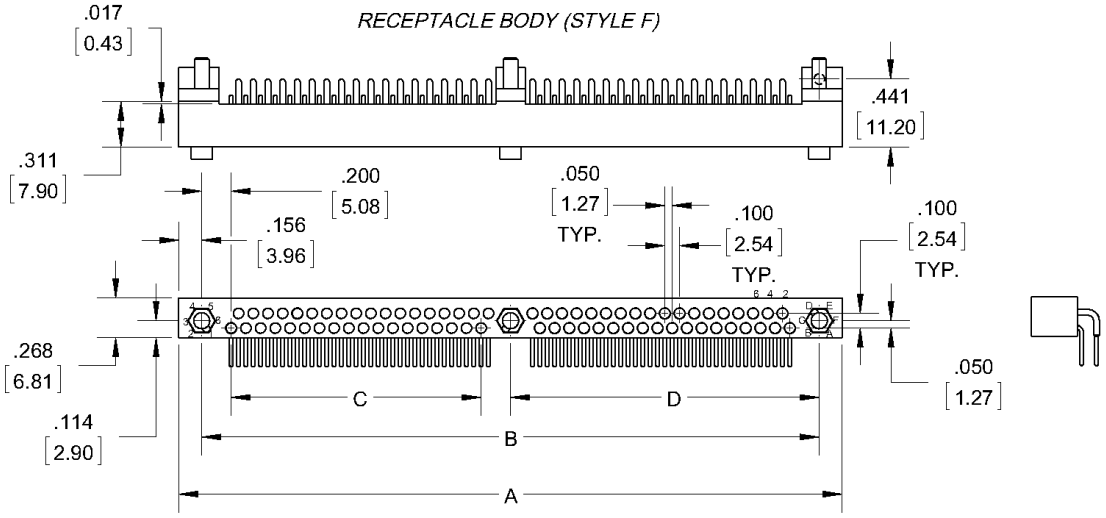
SOCKET, RIGHT ANGLE
STYLE FE
STYLE SE

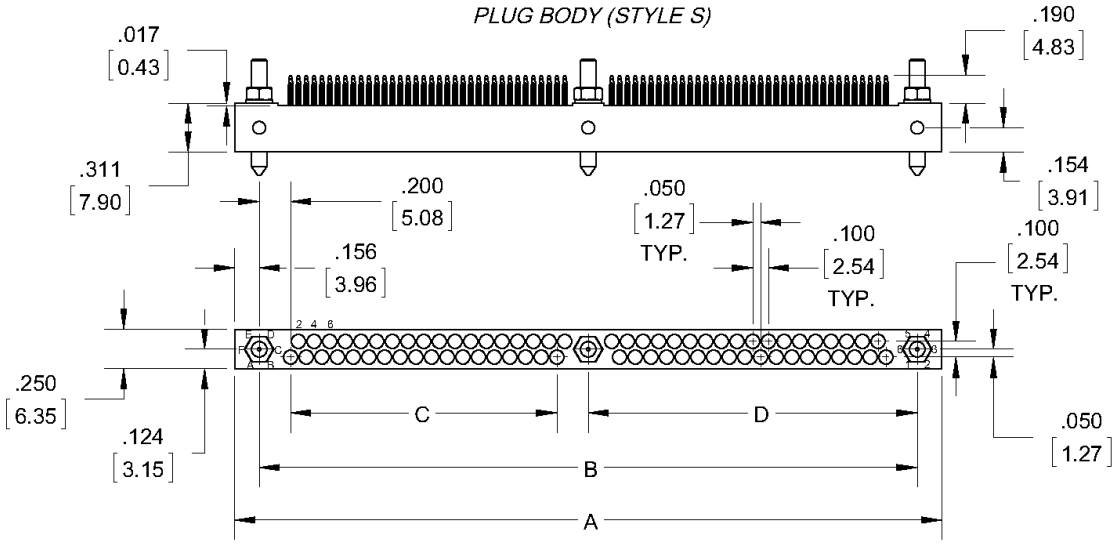


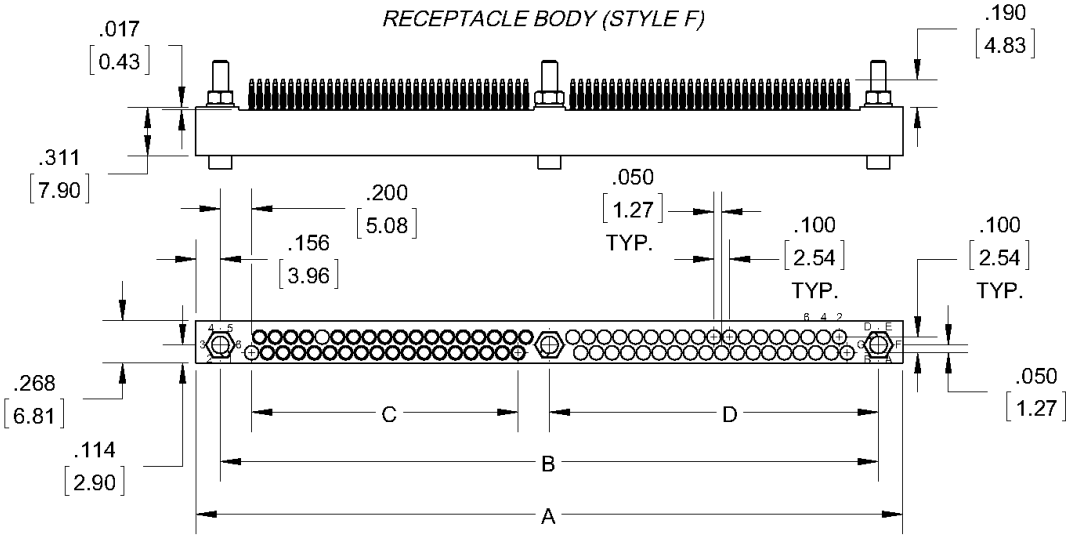


REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
72	4.508 [114.50]	4.200 [106.68]	1.700 [43.18]	2.100 [53.34]
84	5.108 [129.74]	4.800 [121.92]	2.000 [50.80]	2.400 [60.96]
96	5.708 [144.98]	5.400 [137.16]	2.300 [58.42]	2.700 [68.58]
120	6.909 [175.50]	6.600 [167.64]	2.900 [73.66]	3.300 [83.82]

SOCKET, COMPLIANT
STYLE FV
STYLE SV





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
72	4.508 [114.50]	4.200 [106.68]	1.700 [43.18]	2.100 [53.34]
84	5.108 [129.74]	4.800 [121.92]	2.000 [50.80]	2.400 [60.96]
96	5.708 [144.98]	5.400 [137.16]	2.300 [58.42]	2.700 [68.58]
120	6.909 [175.50]	6.600 [167.64]	2.900 [73.66]	3.300 [83.82]

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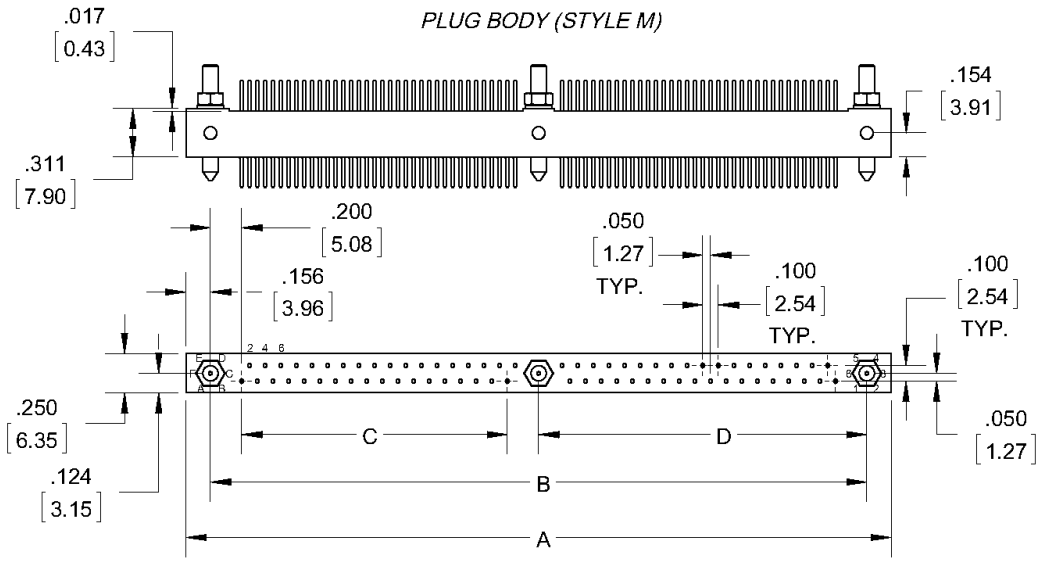
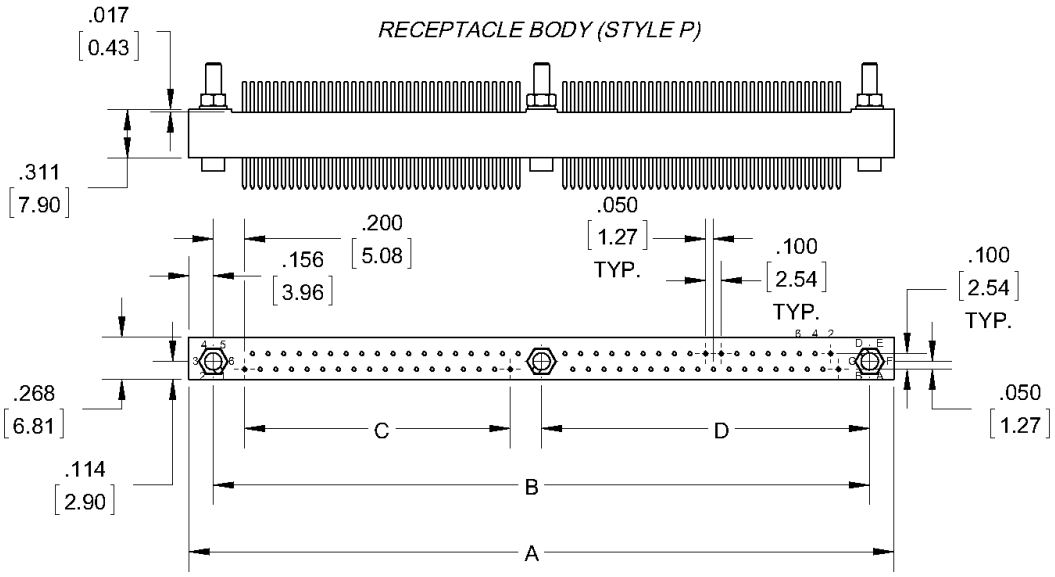
PIN, STRAIGHT
STYLE MC, MD, MS, MW
STYLE PC, PD, PS, PW



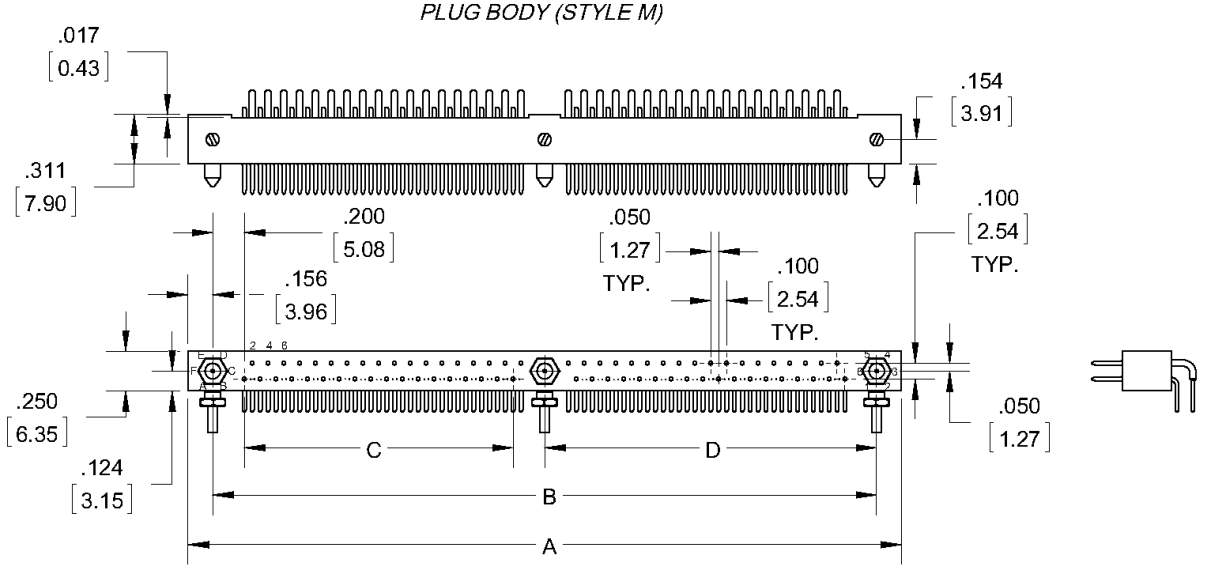


REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

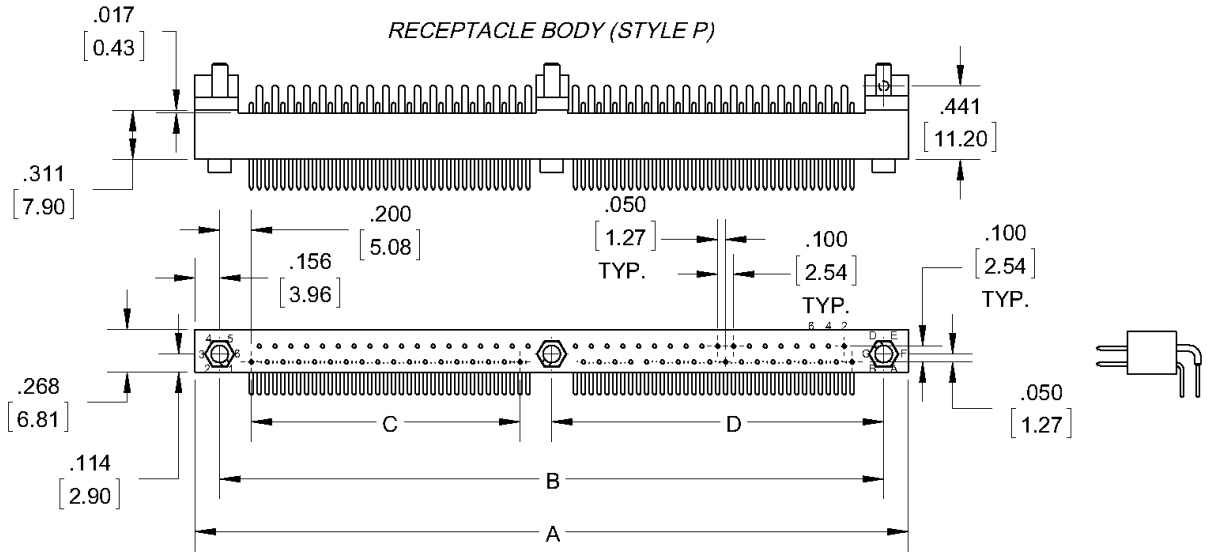
No. of Contacts	A	B	C	D
72	4.508 [114.50]	4.200 [106.68]	1.700 [43.18]	2.100 [53.34]
84	5.108 [129.74]	4.800 [121.92]	2.000 [50.80]	2.400 [60.96]
96	5.708 [144.98]	5.400 [137.16]	2.300 [58.42]	2.700 [68.58]
120	6.909 [175.50]	6.600 [167.64]	2.900 [73.66]	3.300 [83.82]

PIN, RIGHT ANGLE
STYLE ME
STYLE PE

PLUG BODY (STYLE M)



RECEPTACLE BODY (STYLE P)



REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
72	4.508 [114.50]	4.200 [106.68]	1.700 [43.18]	2.100 [53.34]
84	5.108 [129.74]	4.800 [121.92]	2.000 [50.80]	2.400 [60.96]
96	5.708 [144.98]	5.400 [137.16]	2.300 [58.42]	2.700 [68.58]
120	6.909 [175.50]	6.600 [167.64]	2.900 [73.66]	3.300 [83.82]

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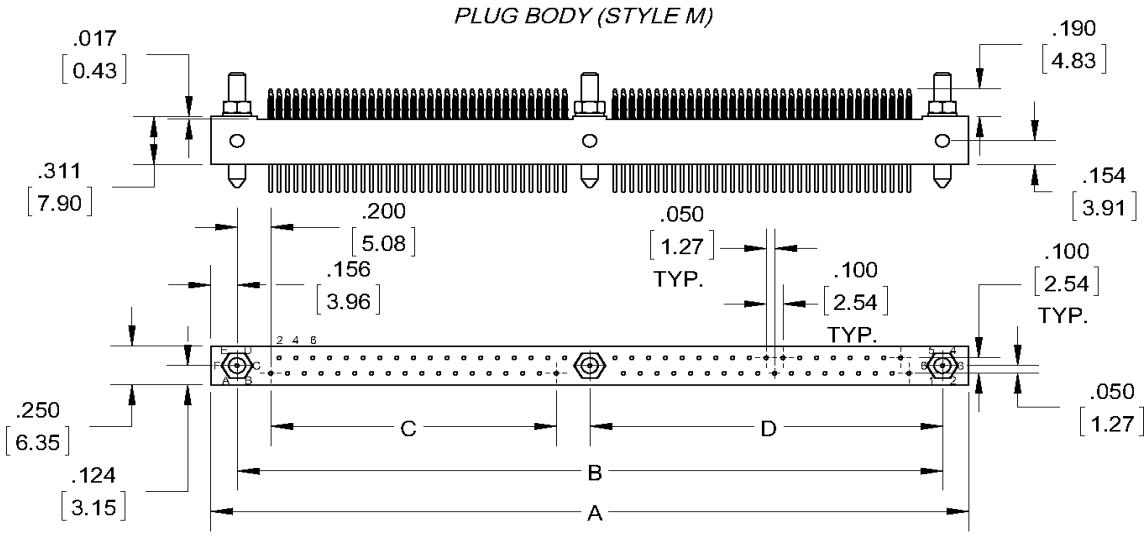
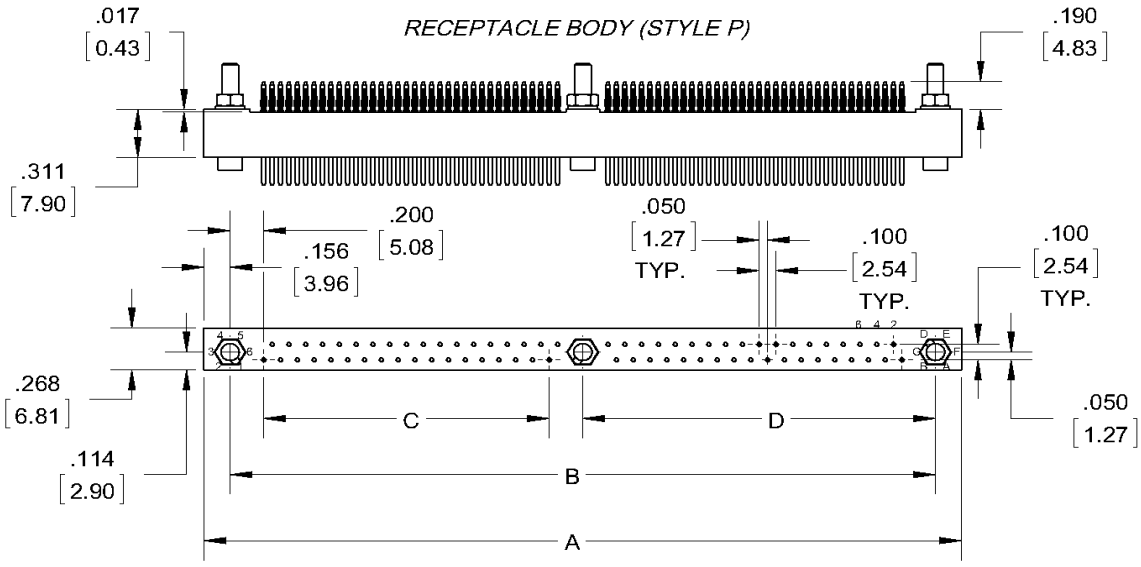
PIN, COMPLIANT
STYLE MV
STYLE PV

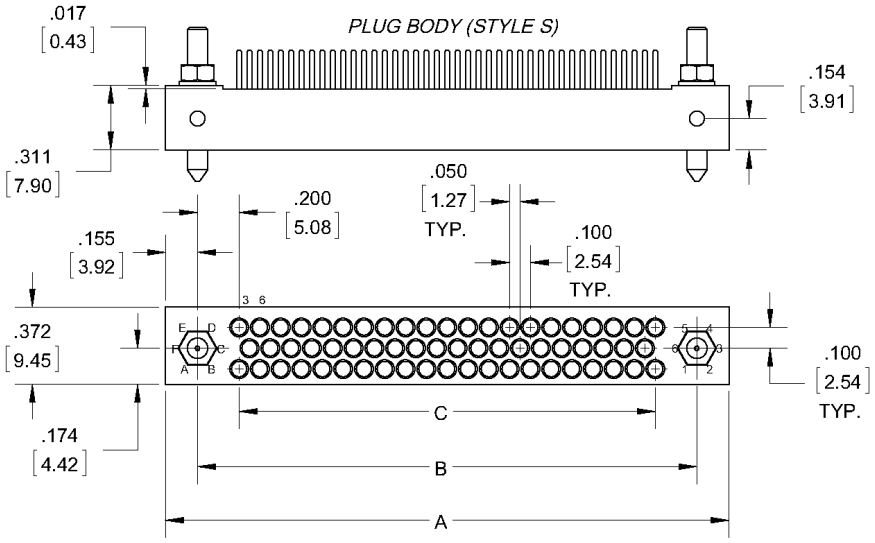


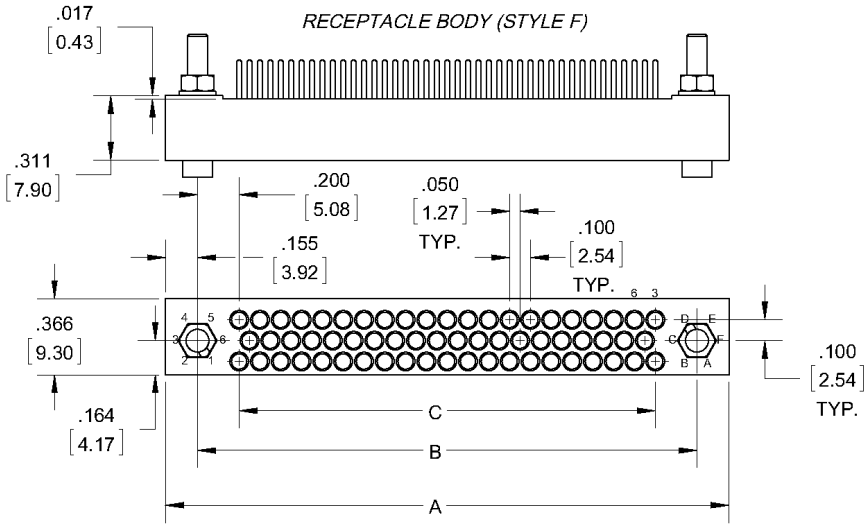


REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
72	4.508 [114.50]	4.200 [106.68]	1.700 [43.18]	2.100 [53.34]
84	5.108 [129.74]	4.800 [121.92]	2.000 [50.80]	2.400 [60.96]
96	5.708 [144.98]	5.400 [137.16]	2.300 [58.42]	2.700 [68.58]
120	6.909 [175.50]	6.600 [167.64]	2.900 [73.66]	3.300 [83.82]

SOCKET, STRAIGHT
STYLE FC, FD, FS, FW
STYLE SC, SD, SS, SW





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C
62	2.707 [68.75]	2.400 [60.96]	2.000 [50.80]
80	3.307 [84.00]	3.000 [76.20]	2.600 [66.04]
98	3.907 [99.24]	3.600 [91.44]	3.200 [81.28]

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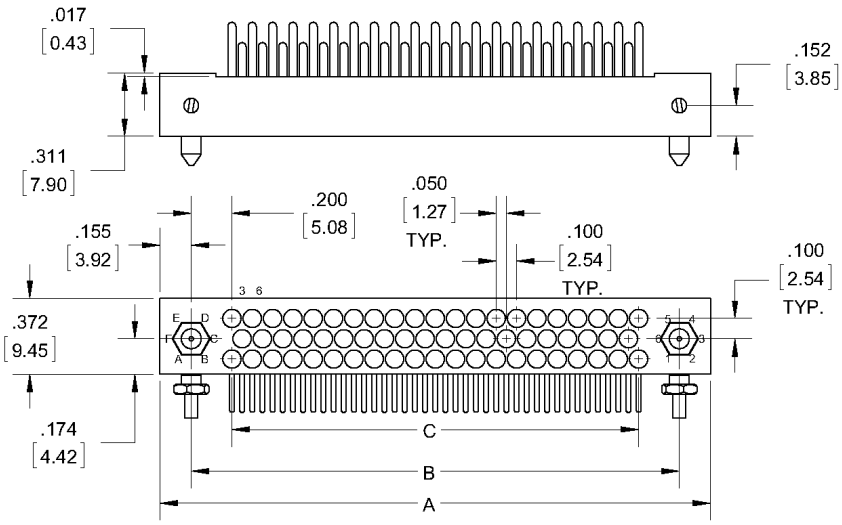
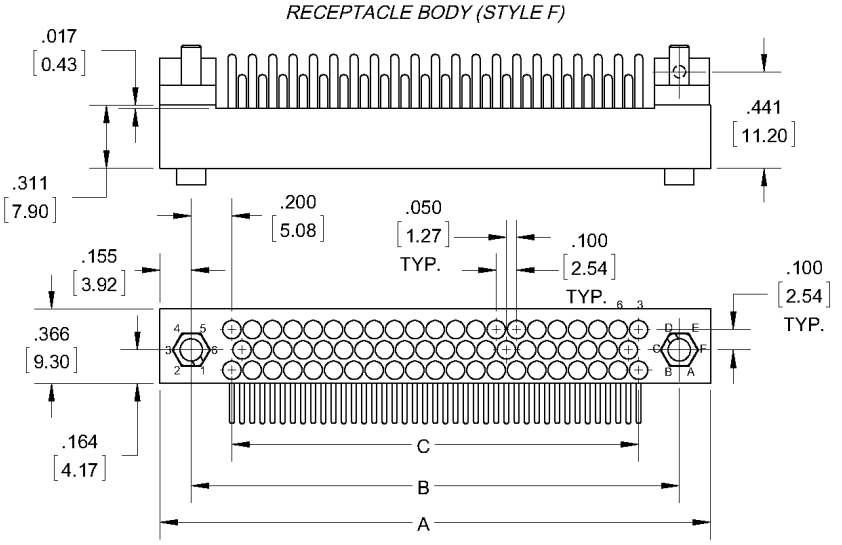
SOCKET, RIGHT ANGLE
STYLE FE
STYLE SE

PLUG BODY (STYLE S)



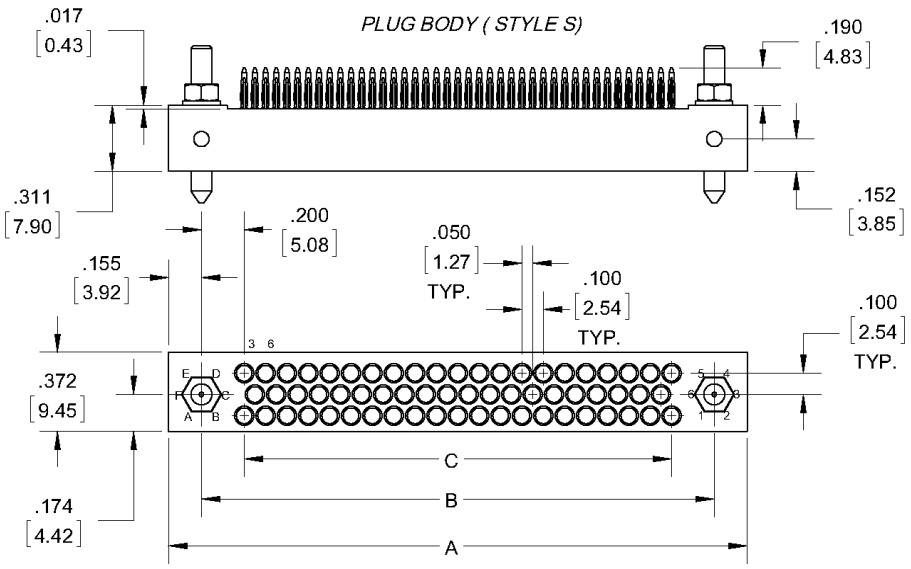
RECEPTACLE BODY (STYLE F)

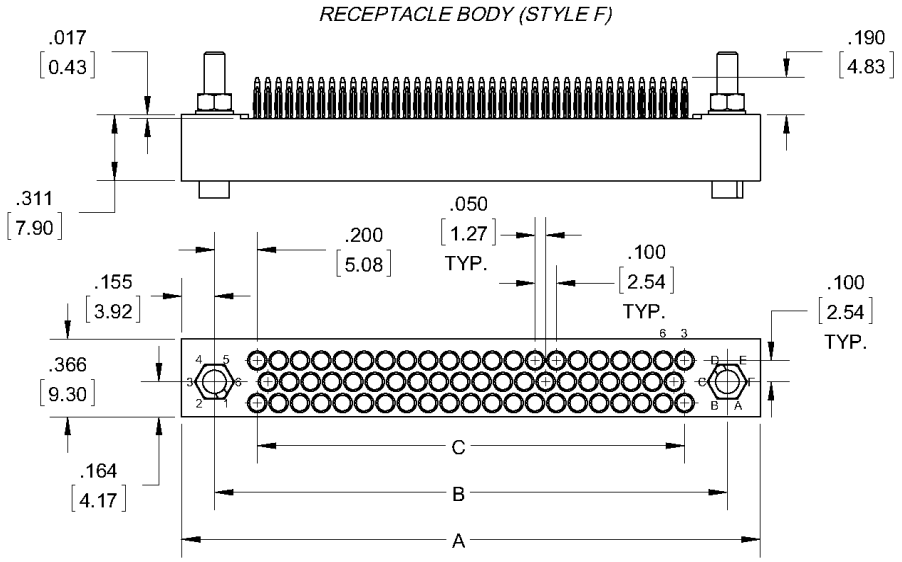


REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C
62	2.707 [68.75]	2.400 [60.96]	2.000 [50.80]
80	3.307 [84.00]	3.000 [76.20]	2.600 [66.04]
98	3.907 [99.24]	3.600 [91.44]	3.200 [81.28]

SOCKET, COMPLIANT
STYLE FV
STYLE SV





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C
62	2.707 [68.75]	2.400 [60.96]	2.000 [50.80]
80	3.307 [84.00]	3.000 [76.20]	2.600 [66.04]
98	3.907 [99.24]	3.600 [91.44]	3.200 [81.28]

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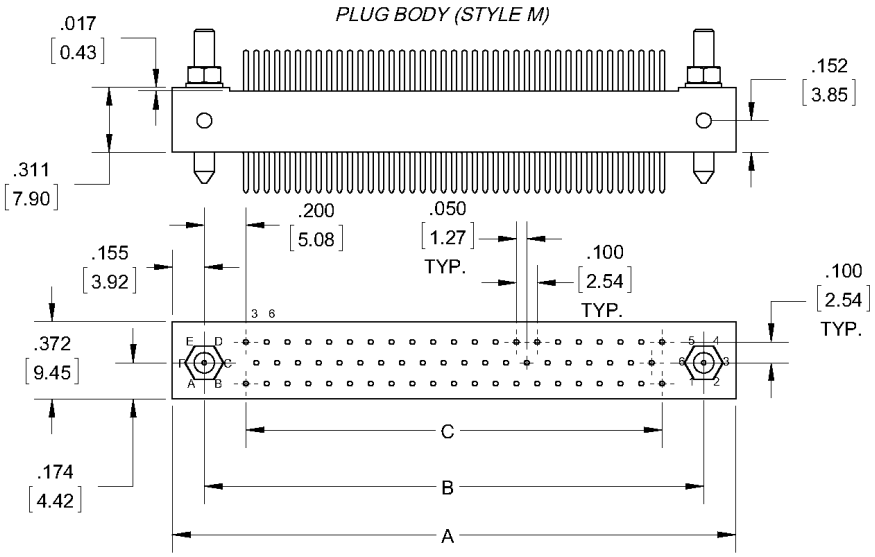
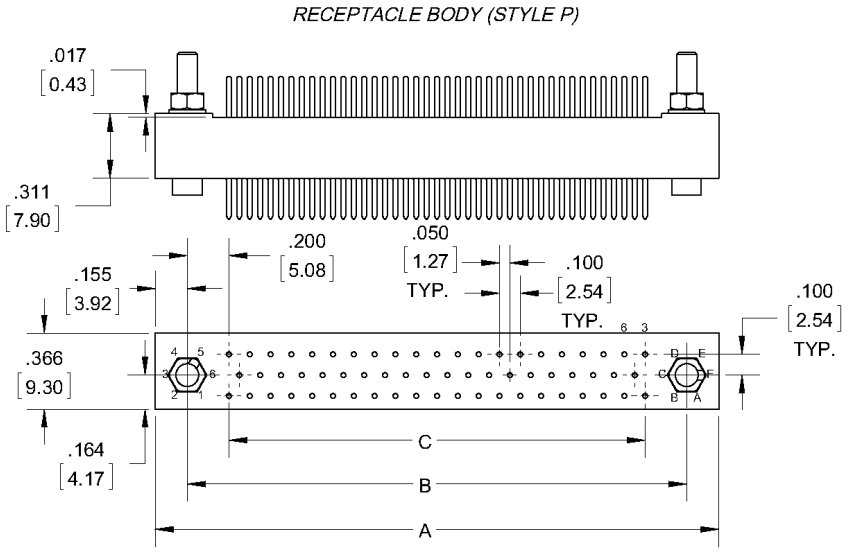
PIN, STRAIGHT
STYLE MC, MD, MS, MW
STYLE PC, PD, PS, PW

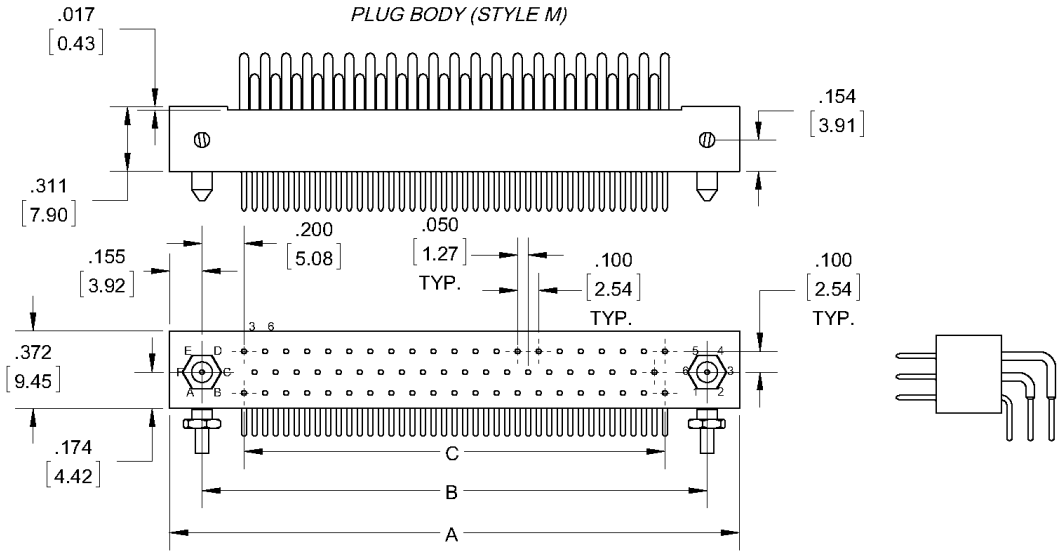


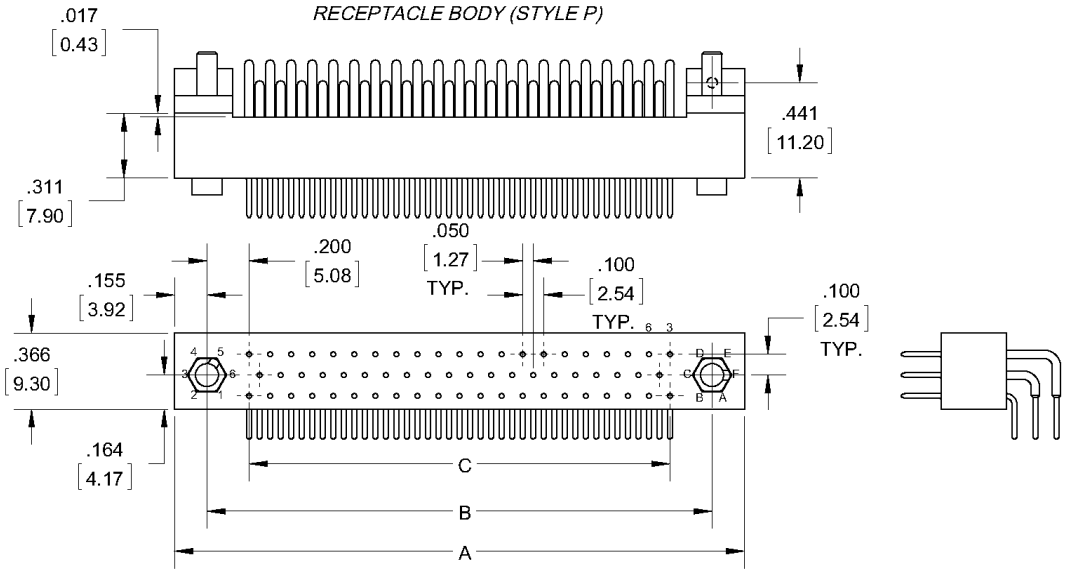


REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C
62	2.707 [68.75]	2.400 [60.96]	2.000 [50.80]
80	3.307 [84.00]	3.000 [76.20]	2.600 [66.04]
98	3.907 [99.24]	3.600 [91.44]	3.200 [81.28]

PIN, RIGHT ANGLE
STYLE ME
STYLE PE





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C
62	2.707 [68.75]	2.400 [60.96]	2.000 [50.80]
80	3.307 [84.00]	3.000 [76.20]	2.600 [66.04]
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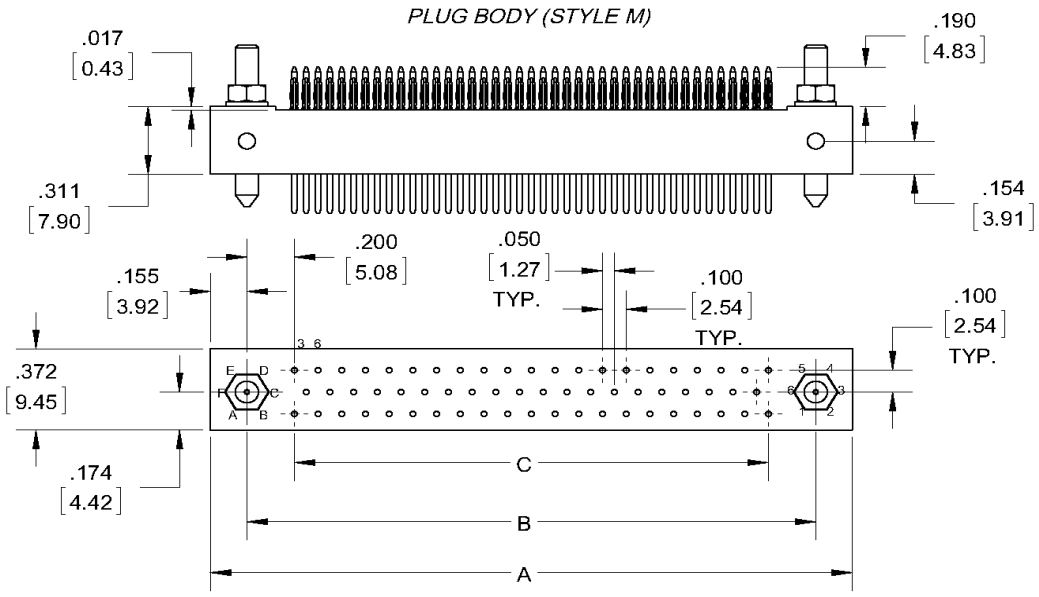
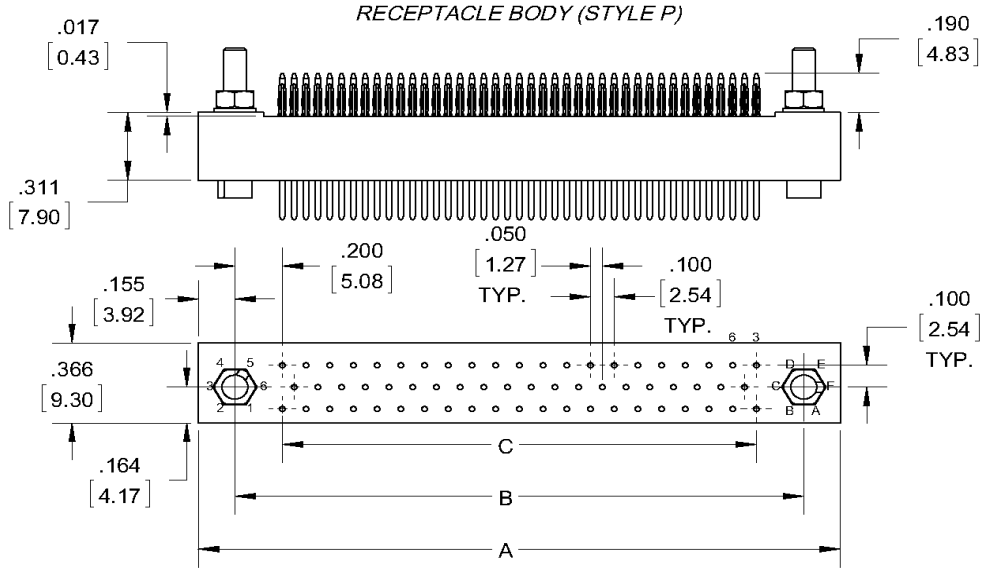
PIN, COMPLIANT
STYLE MV
STYLE PV



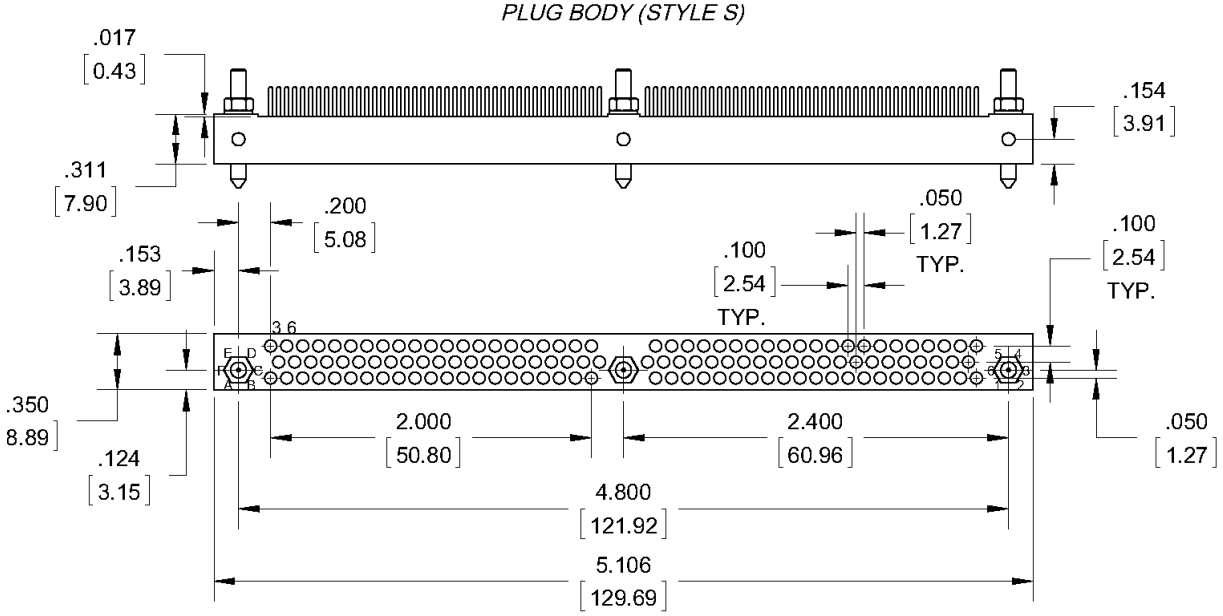


REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

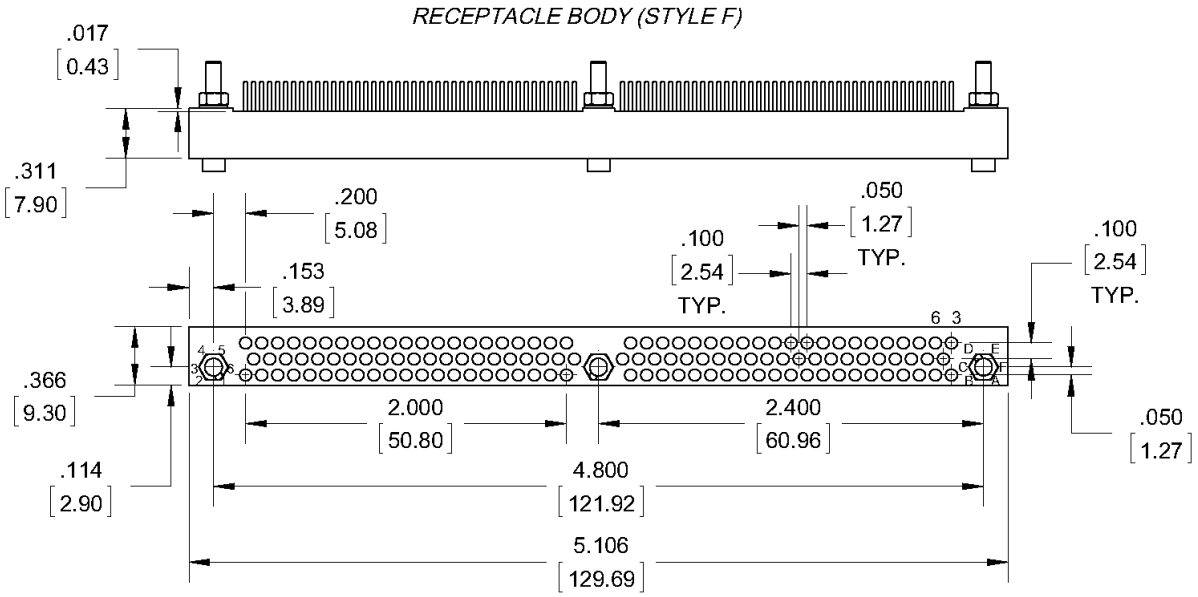
No. of Contacts	A	B	C
62	2.707 [68.75]	2.400 [60.96]	2.000 [50.80]
80	3.307 [84.00]	3.000 [76.20]	2.600 [66.04]
98	3.907 [99.24]	3.600 [91.44]	3.200 [81.28]

SOCKET, STRAIGHT
STYLE 126 FC, FD, FS, FW
STYLE 126 SC, SD, SS, SW

PLUG BODY (STYLE S)



RECEPTACLE BODY (STYLE F)



REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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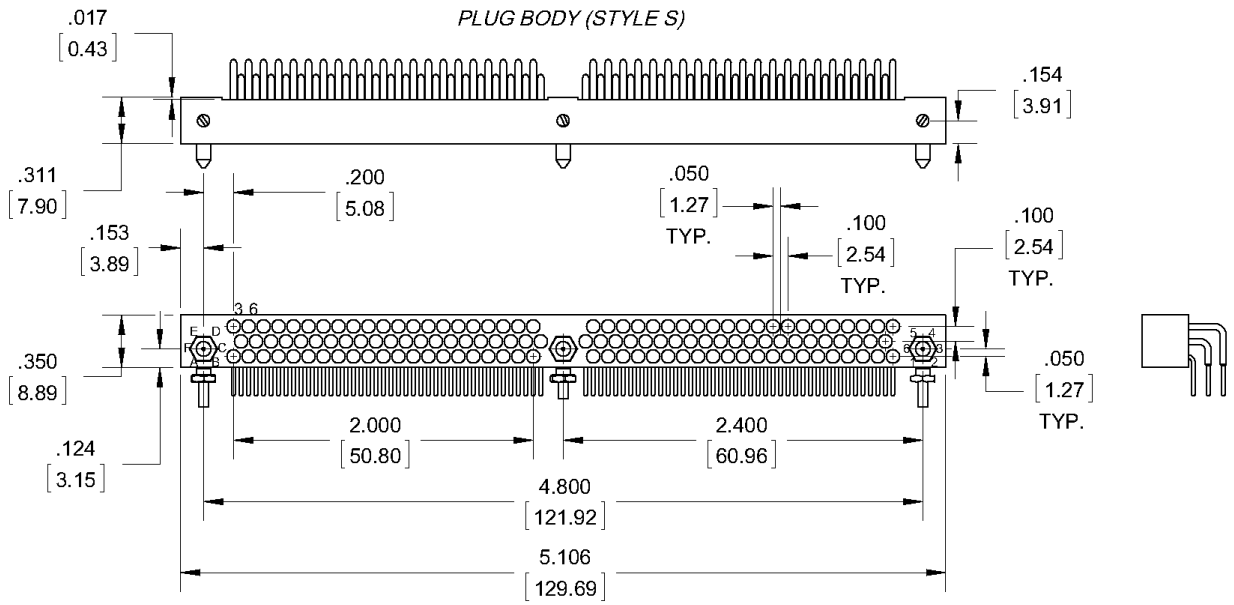
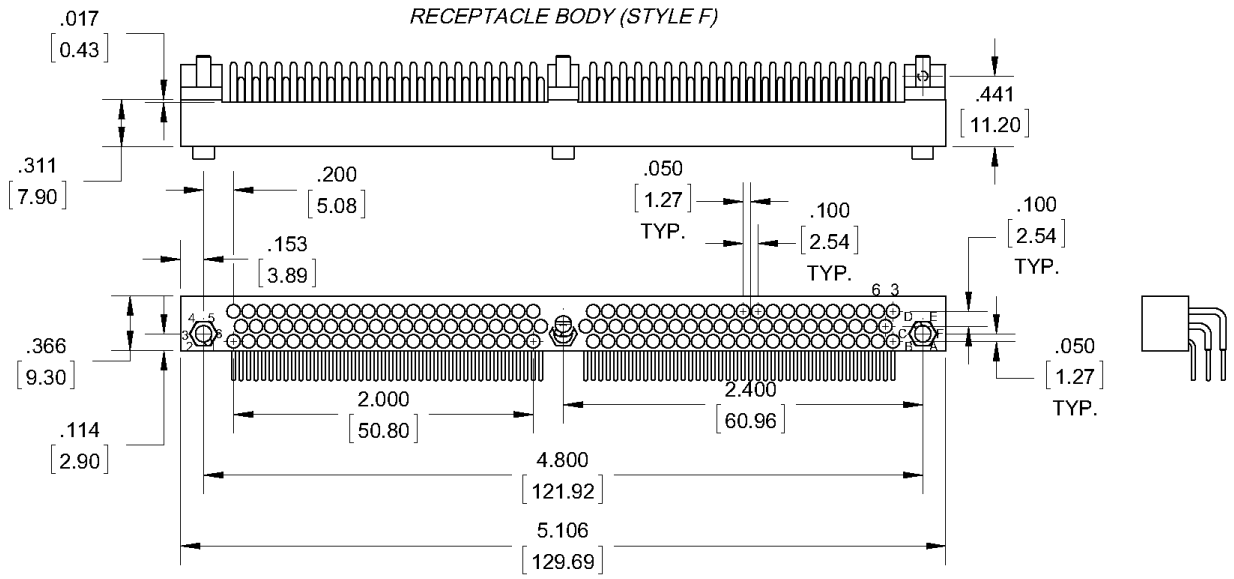
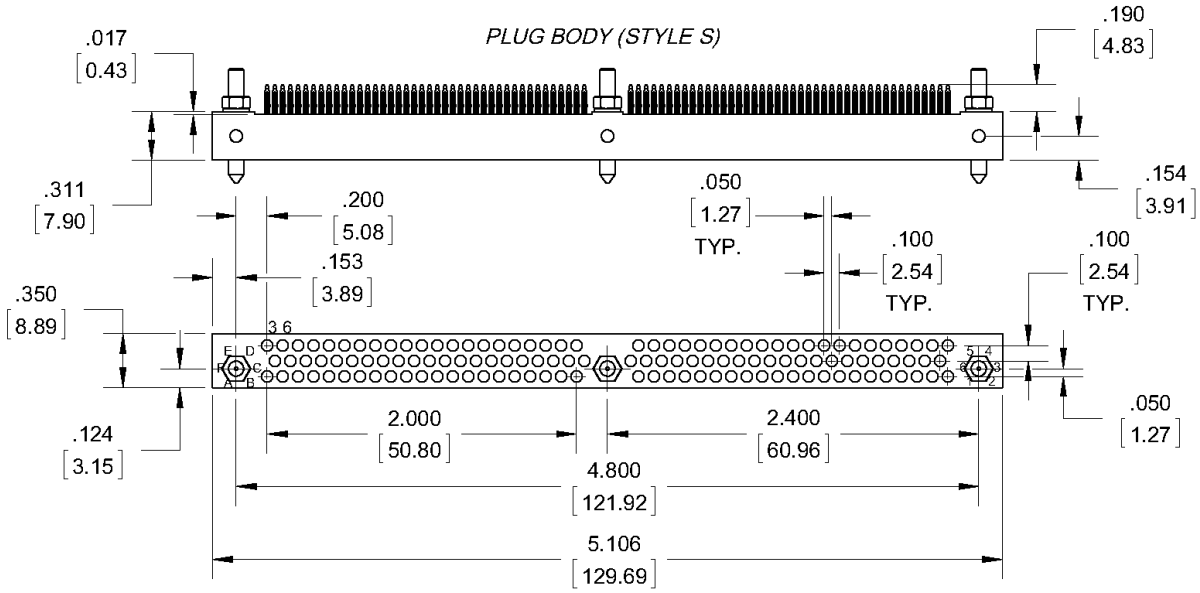
SOCKET, RIGHT ANGLE
STYLE 126 FE
STYLE 126 SE

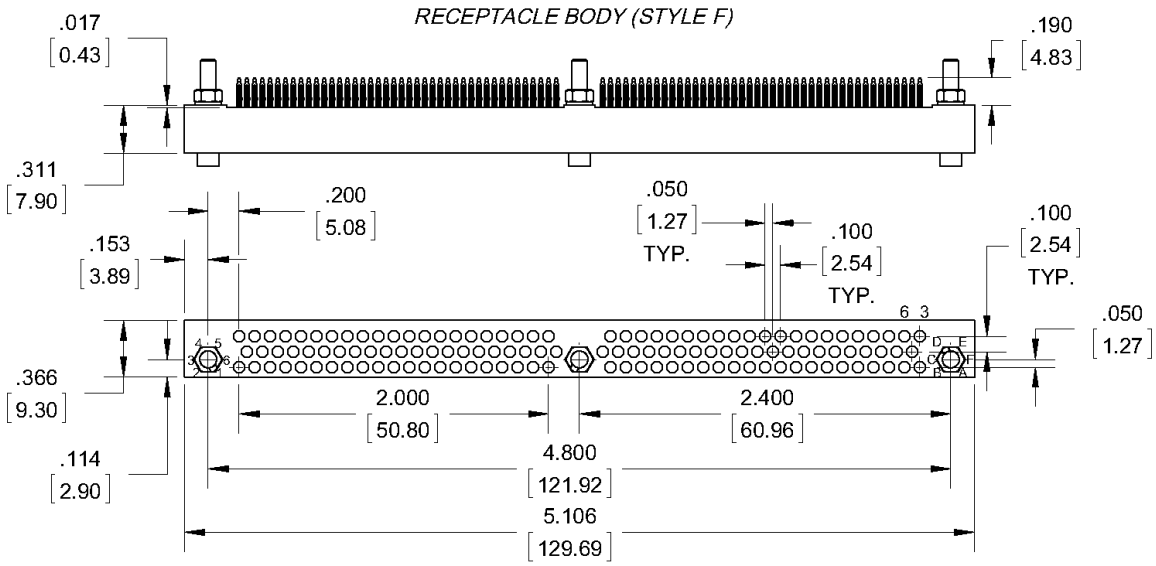




REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, COMPLIANT
STYLE 126 FV
STYLE 126 SV





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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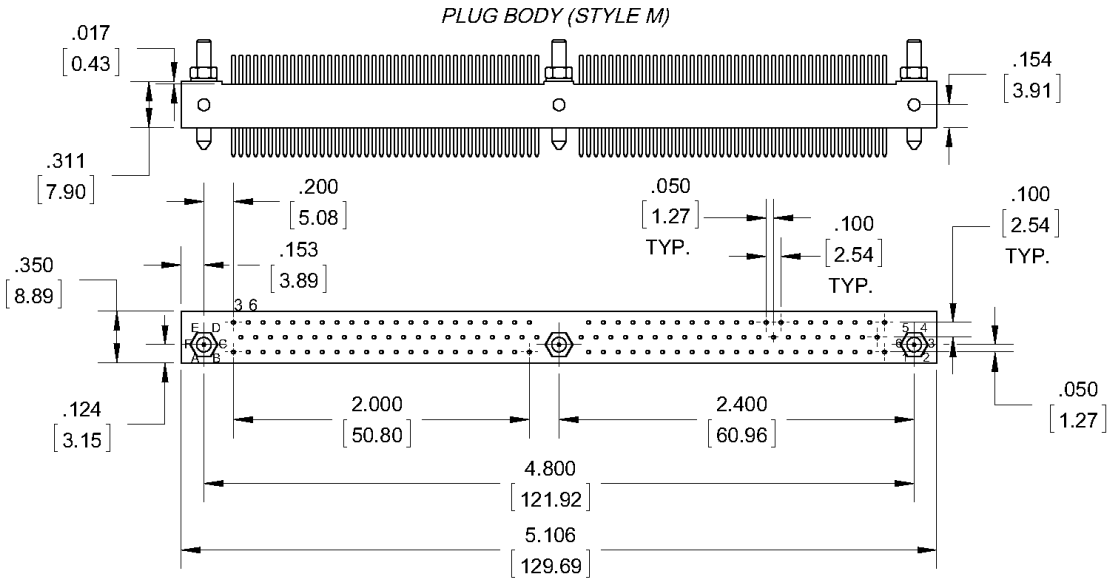
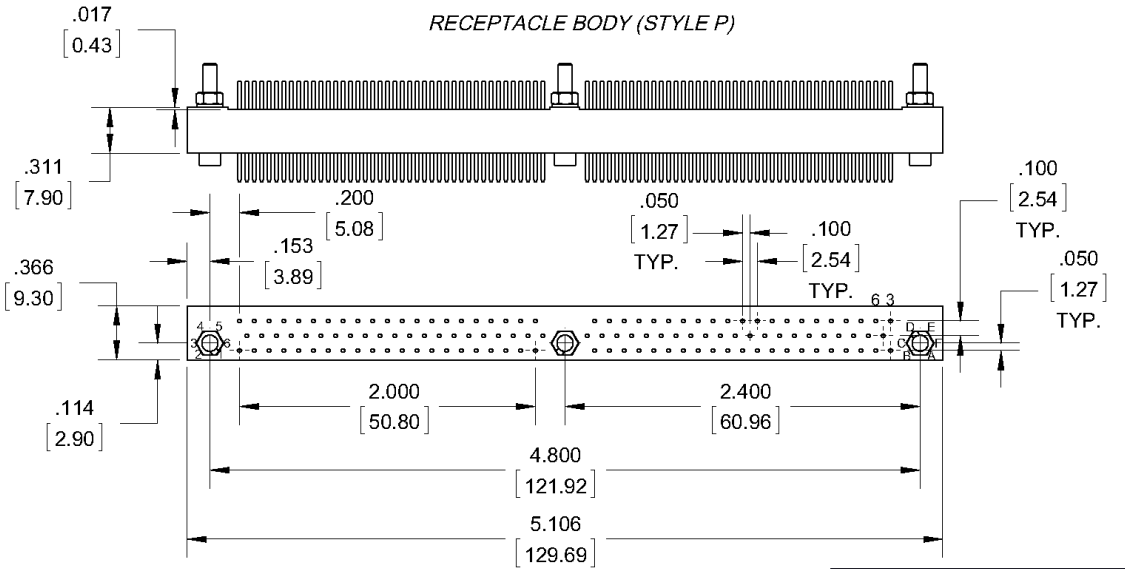
PIN, STRAIGHT
STYLE 126 MC, MD, MS, MW
STYLE 126 PC, PD, PS, PW

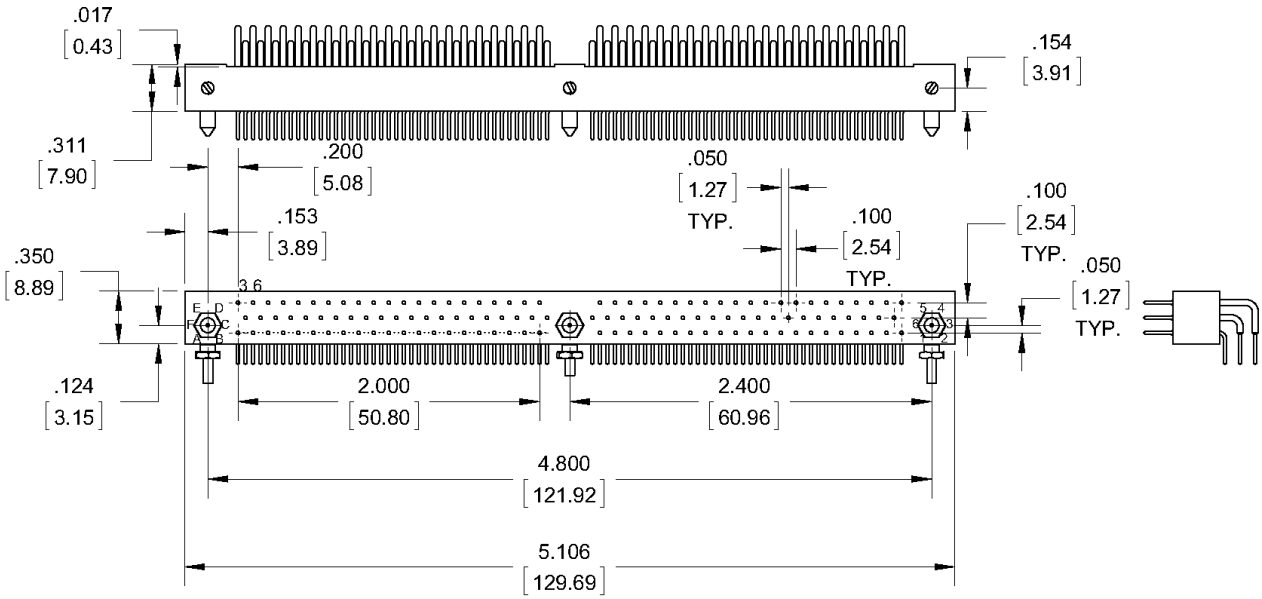




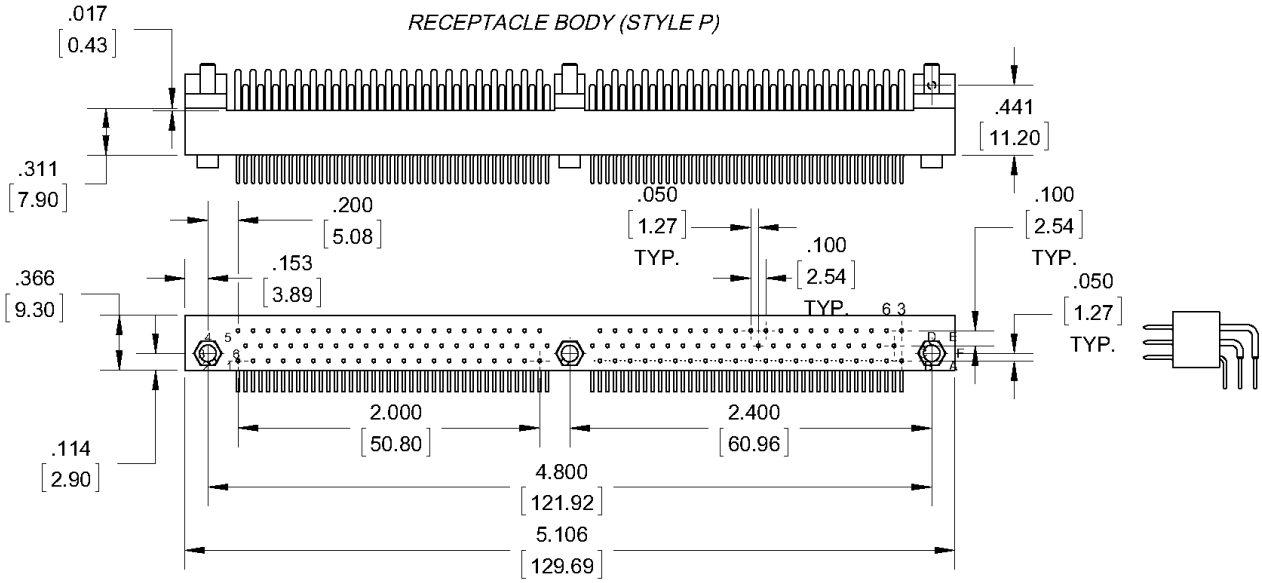
REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

PIN, RIGHT ANGLE
STYLE 126 ME
STYLE 126 PE

PLUG BODY (STYLE M)



RECEPTACLE BODY (STYLE P)



REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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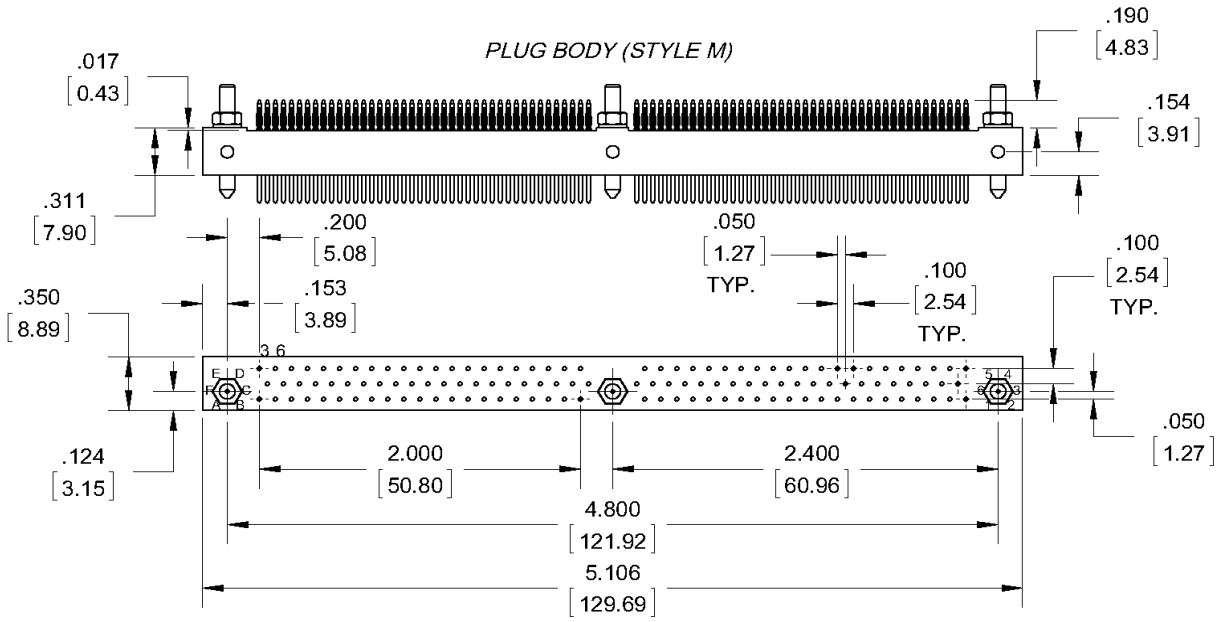
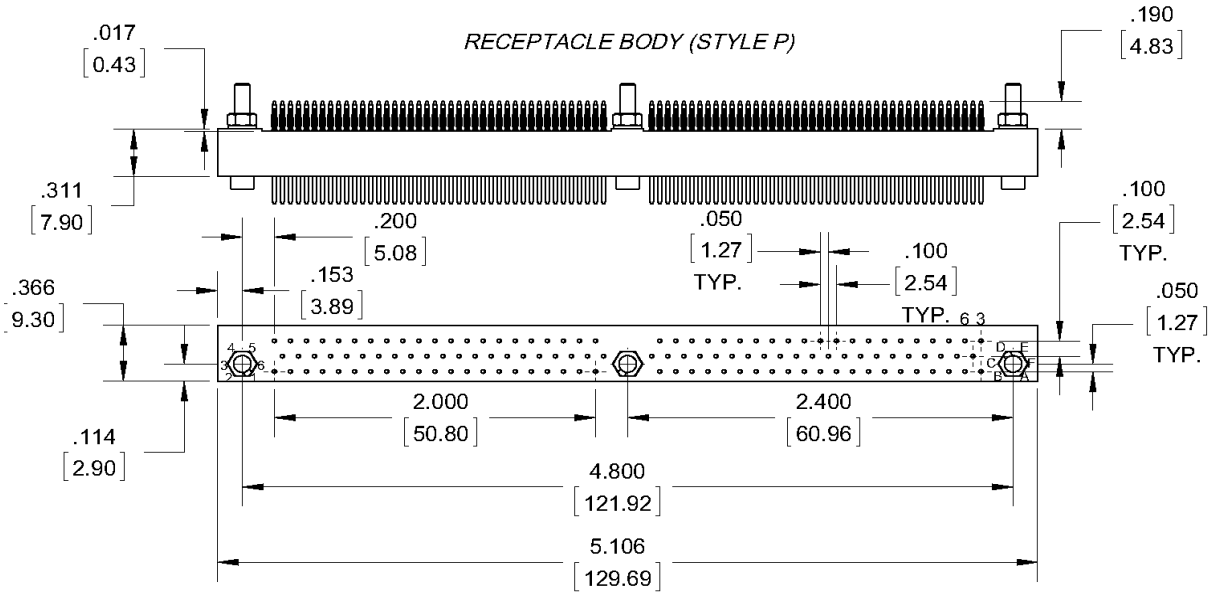
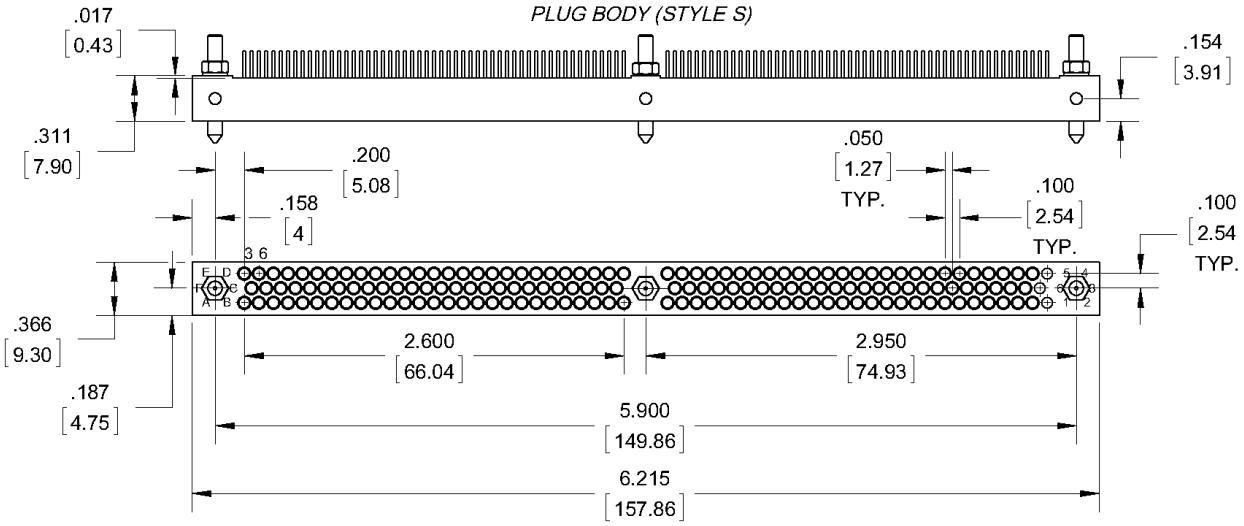
PIN, COMPLIANT
STYLE 126 MV
STYLE 126 PV

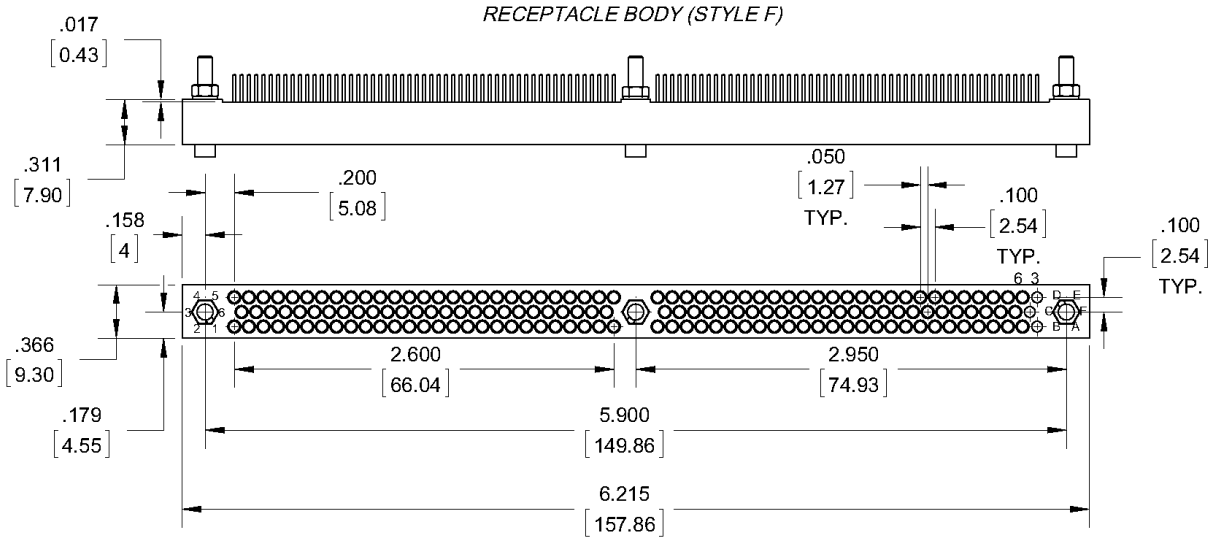




REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, STRAIGHT
STYLE 160 FC, FD, FS, FW
STYLE 160 SC, SD, SS, SW





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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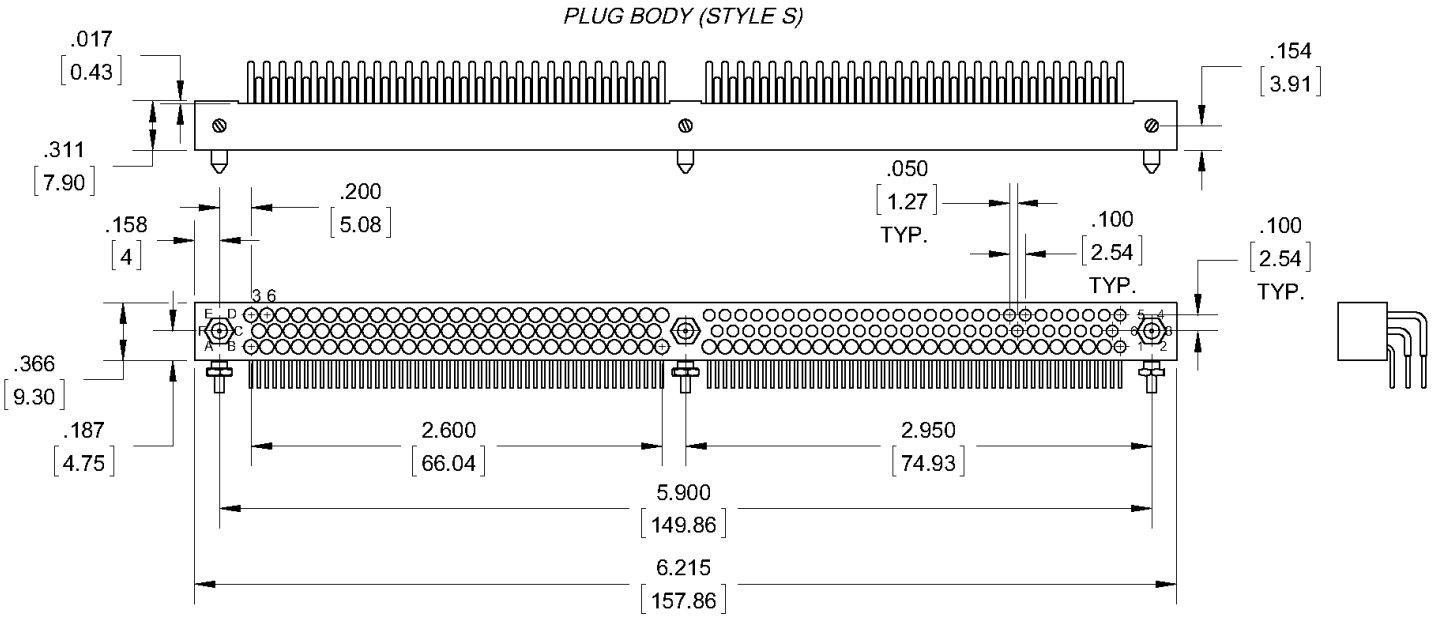
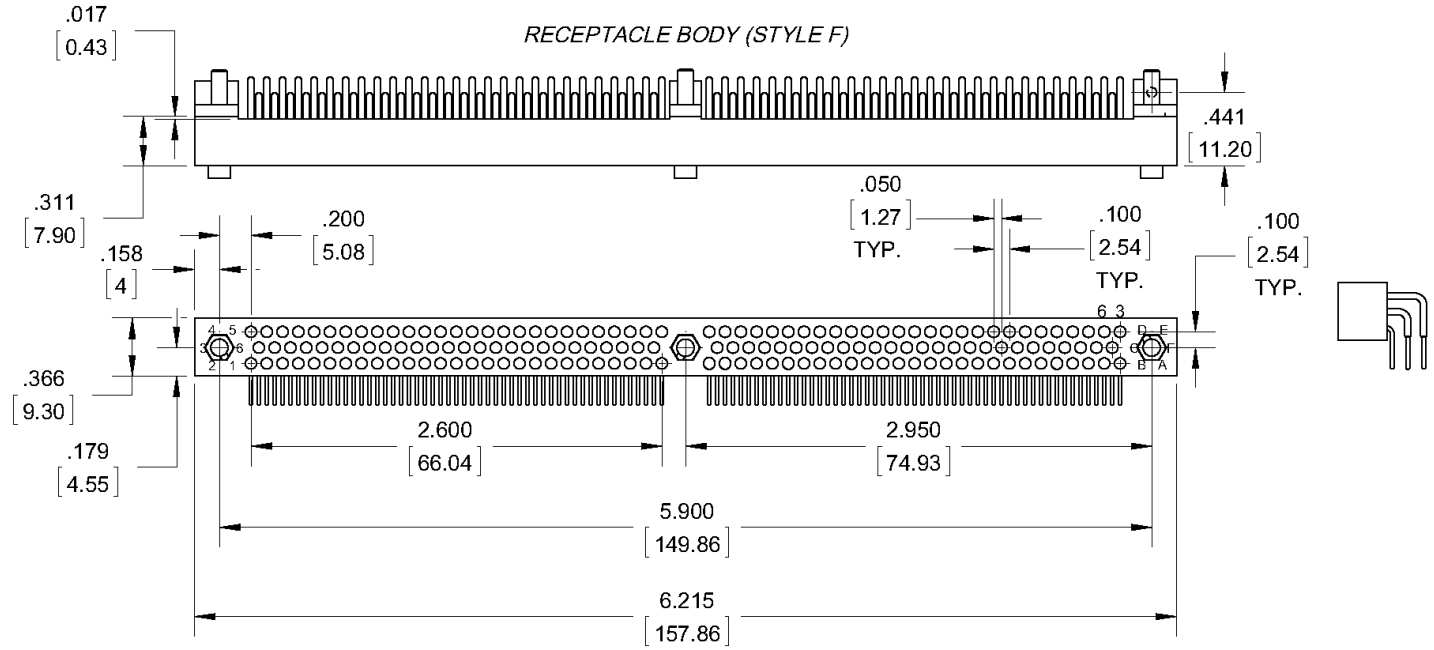
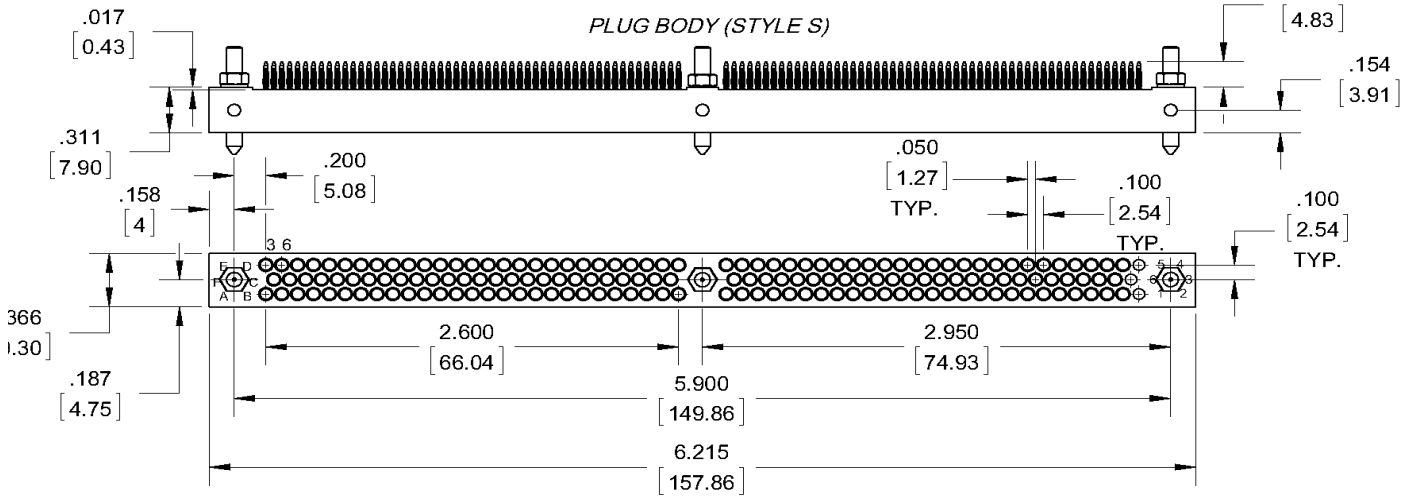
SOCKET, RIGHT ANGLE
STYLE 160 FE
STYLE 160 SE

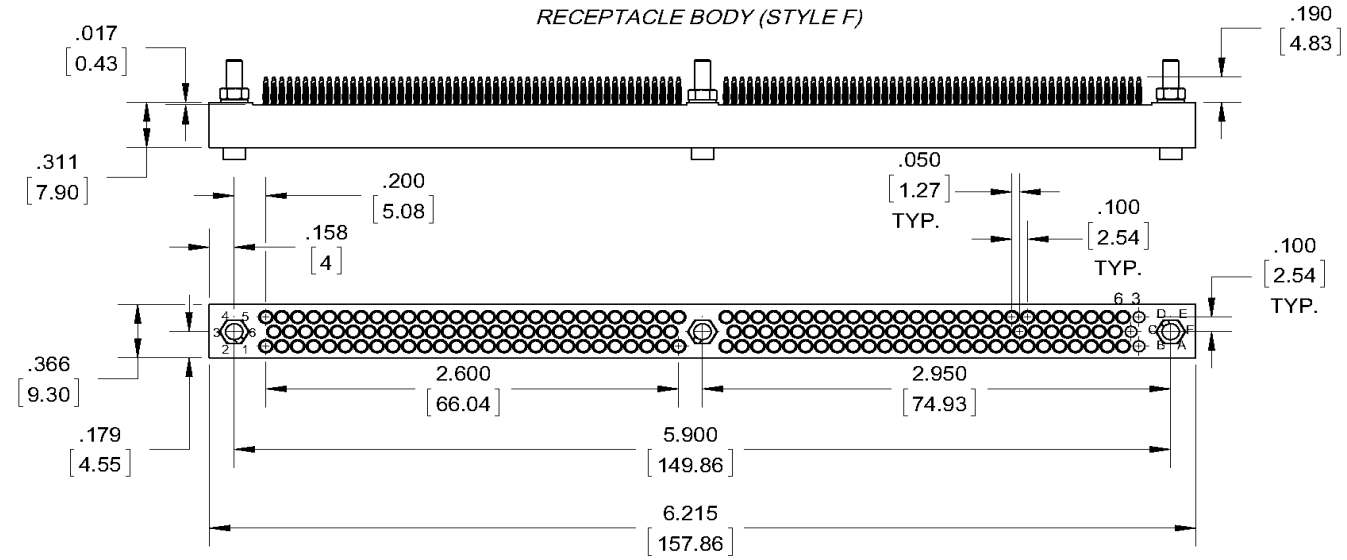




REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, COMPLIANT
STYLE 160 FV
STYLE 160 SV





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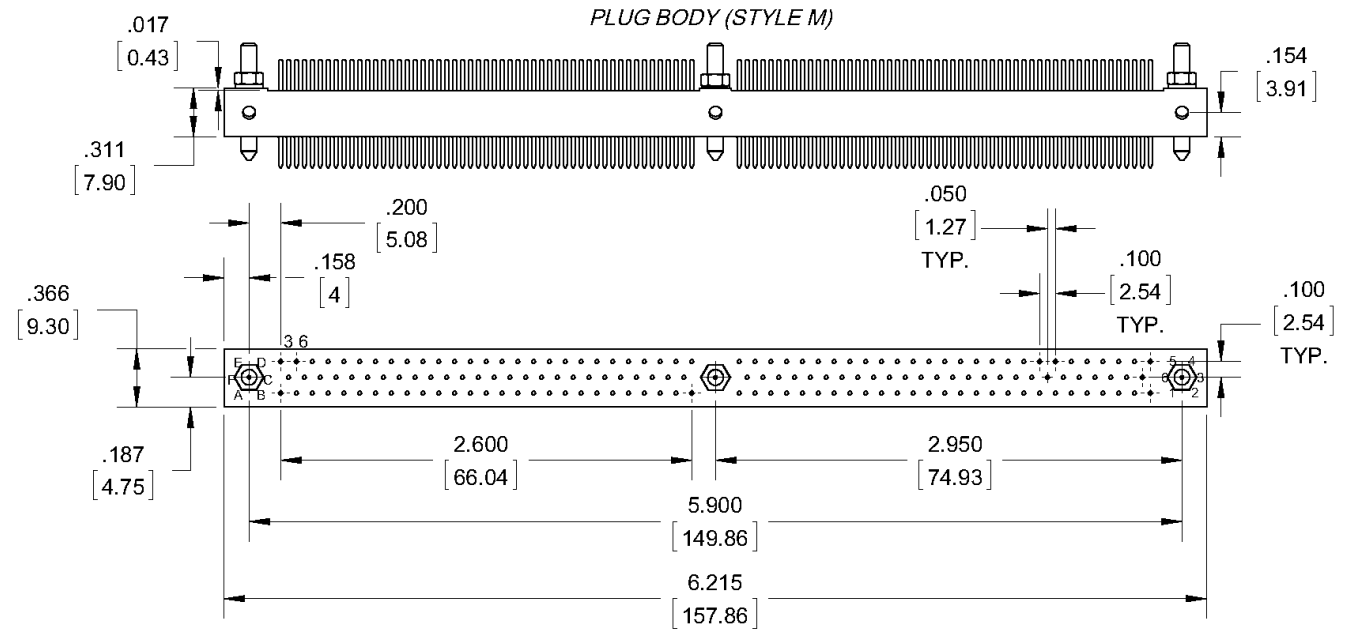
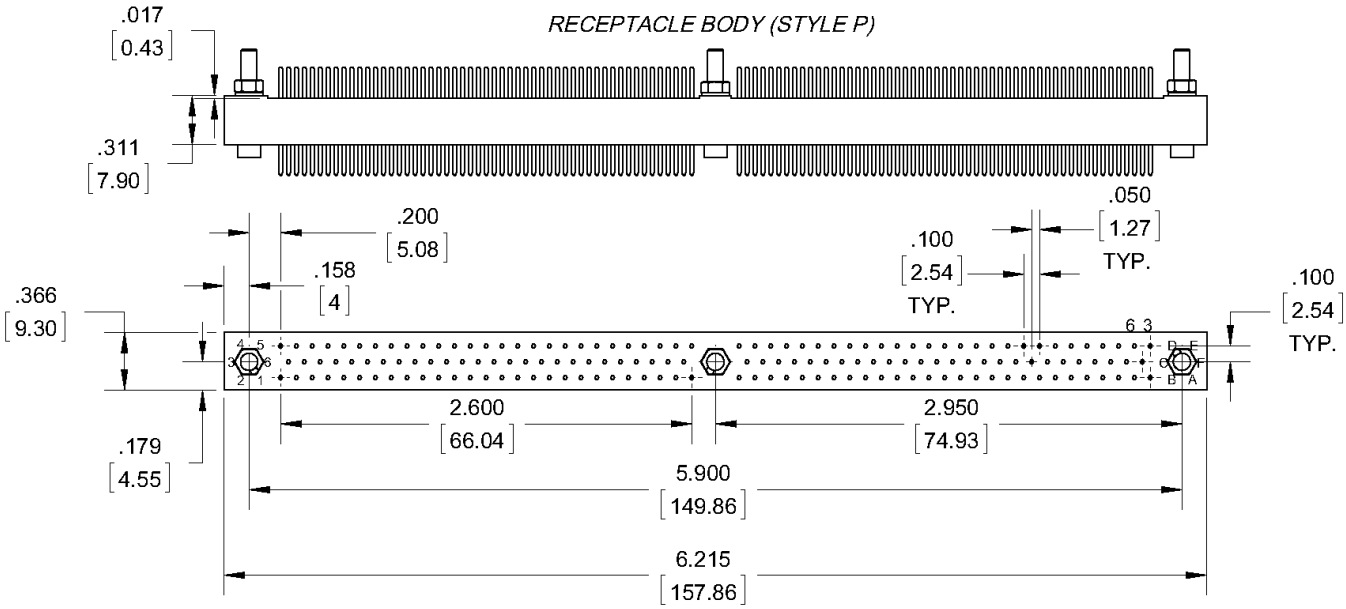
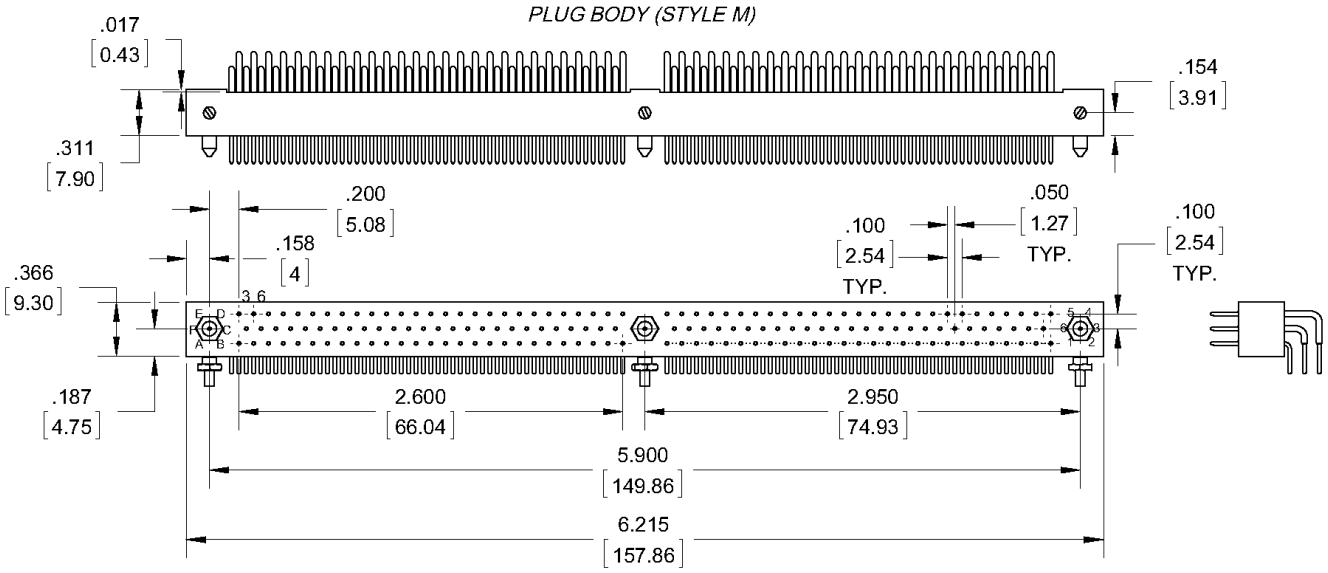
PIN, STRAIGHT
STYLE 160 MC, MD, MS, MW
STYLE 160 PC, PD, PS, PW

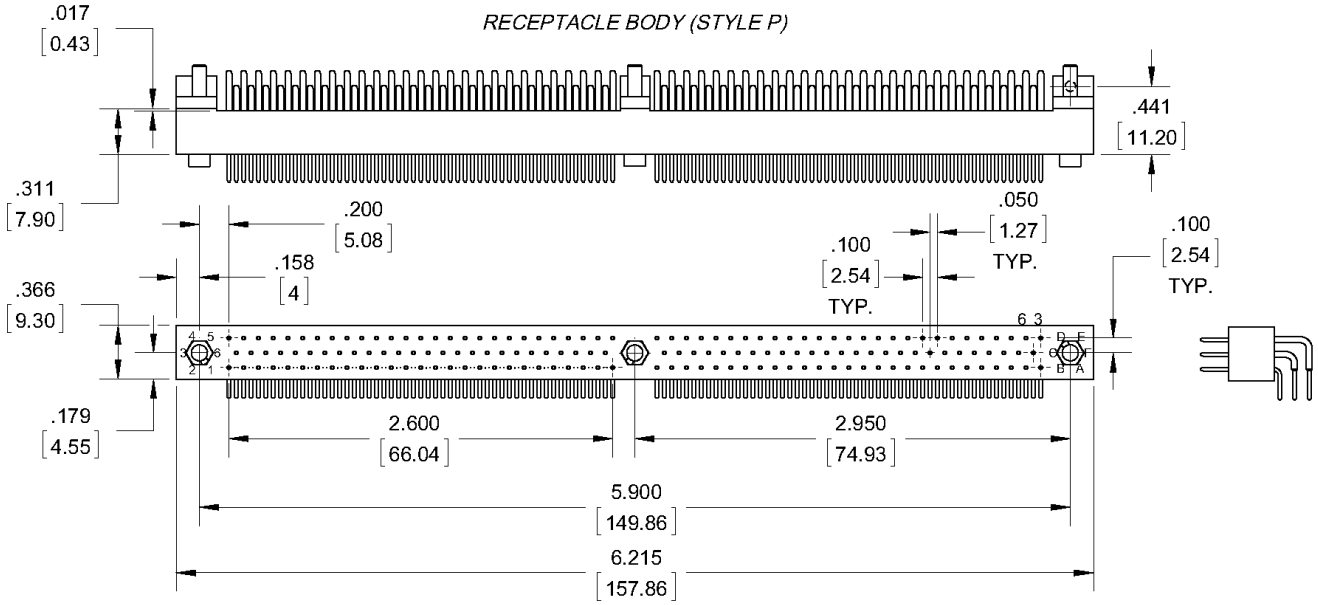




REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

PIN, RIGHT ANGLE
STYLE 160 ME
STYLE 160 PE





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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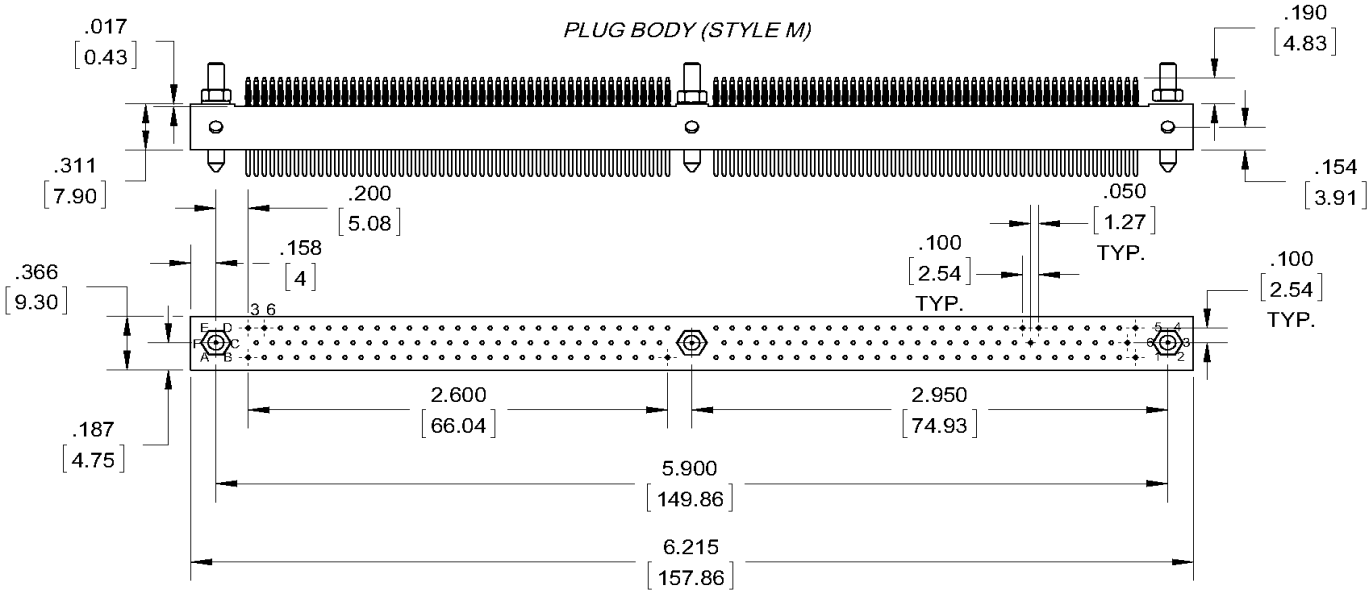
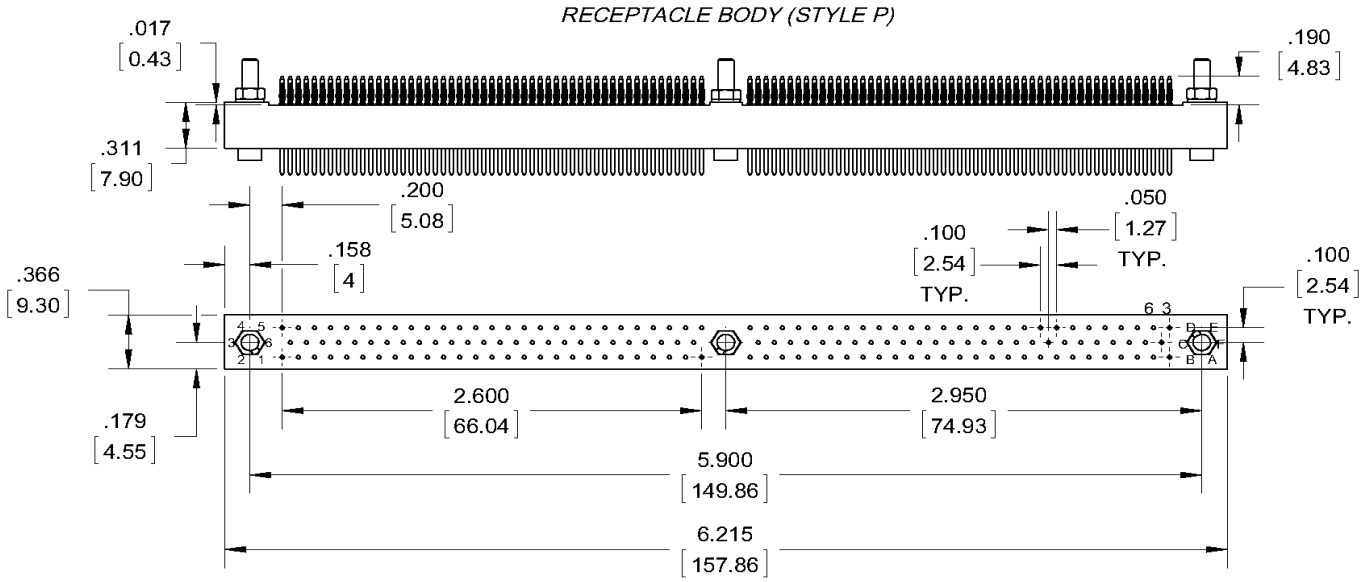
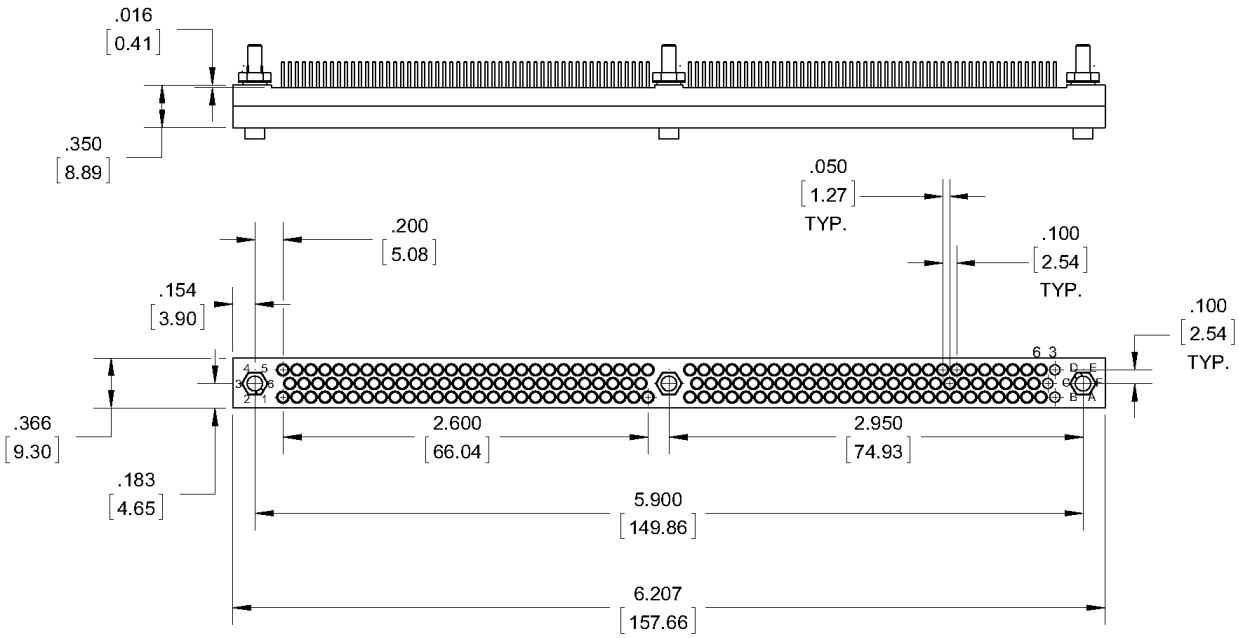
PIN, COMPLIANT
STYLE 160 MV
STYLE 160 PV





REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, FRONT REMOVABLE, STRAIGHT
STYLE 160 FD, FW



ONLY AVAILABLE WITH HARDWARE STYLE POLARIZED GUIDES WITH MOUNTING STUD (B)
ONLY AVAILABLE WITH TERMINATION STYLE STRAIGHT DIP SOLDER (D) AND WIRE WRAP (W)

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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ORDERING CHART
4 & 5 - Row

HMK	048	F	D	A	1	X	98	E	4	00

Series

Contact Capacity
(Use All 3 Places)

Contact Gender/ Body Gender	
F	Socket Contact / Receptacle Body
M	Pin Contact / Plug Body
P	Pin Contact / Receptacle Body
S	Socket Contact / Plug Body

Termination Style	
C	Crimp[1]
G	Double Crimp[1]
D	Dip Solder Straight
E	Dip Solder Right Angle
S	Solder Cup
V	Compliant
W	Wire Wrap

Insulator Material	
A	Diallyl Phthalate (Blue)
E	Polyphenylene Sulfide (Ryton-Brown)

Termination Length - "L"				
Code	Dip Solder Straight	Dip Solder Right Angle		Wire Wrap
		M/S	F/P	
1	.109 [2.77]	---	---	.348 [8.84]
2	.147 [3.73]	.122 [3.10]	.128 [3.25]	.511 [12.98]
3	.181 [4.60]	.185 [4.70]	.191 [4.85]	---
9	User Defined			
0	Use For Solder Cup, Compliant, Crimp & Double Crimp			
Check Factory. Not all Termination Styles Are Available In All Configurations				

Variation Code - Factory Assigned	
Most Common Variations	
00	No Variation
20	Solder Dip Terminals
C0	Epoxy Termination Sealed
C2	Epoxy Seal & Solder Dipped
S0	Pin Shield (Pin Connector Only)
S2	Pin Shield & Solder Dipped

Row Designation	
4	4 Row Series
5	5 Row Series

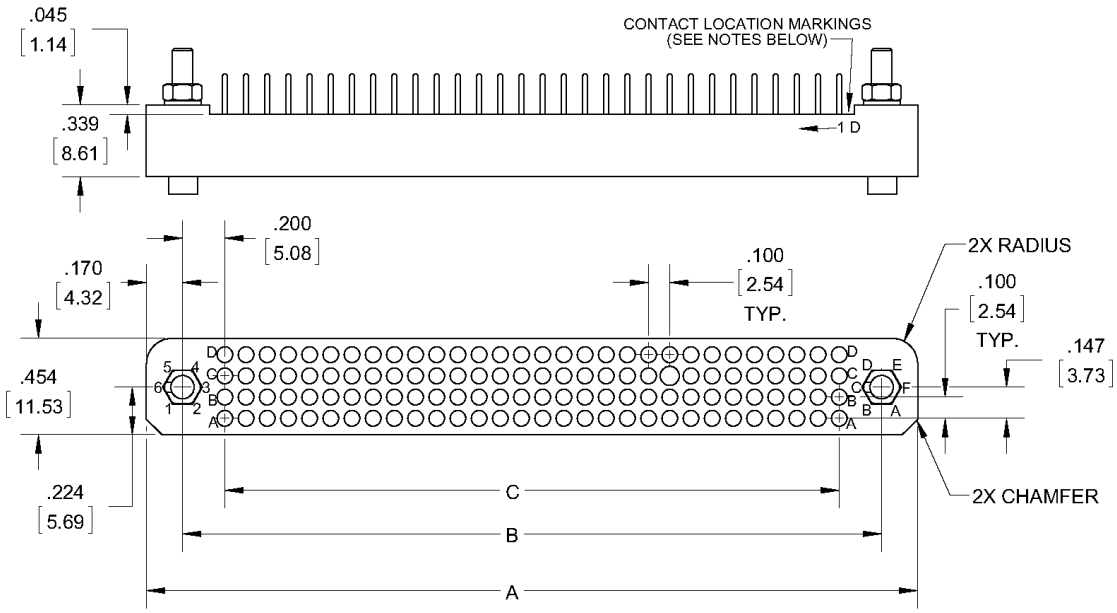
Mounting Style	
C	Threaded Insert
E	Stud/Threaded
F	Non Mounting

Hardware Configuration	
00	No Hardware
71	Plug Body; Guide Pins Receptacle Body; Guide Sockets
72	Plug Body; Guide Sockets Receptacle Body; Guide Pins
97	Guide Pins Unassembled
98	Guide Sockets Unassembled

Hardware Style	
A	Round Guides w/ Mounting. Stud
B	Polarized Guides w/ Mounting. Stud[2]
K	Fixed Locking
P	Rotating - Jackscrew (Hex)
S	Rotating - Jack Socket (Slotted)
T	Fixed Locking w/ Mounting. Stud
U	Float Mounting
X	Round Guides
Y	Polarized Guides[2]
0	No Hardware Supplied

Notes:
1. Crimp contacts supplied loose with connector housing
2. Keying is available in 36 styles. If not specified, will be supplied in position C3. The user can change the keying position

SOCKET, STRAIGHT
STYLE FC, FD, FS, FW
*STYLE SC, SD, SS, SW



No. of Contacts	A	B	C
48	1.840 [46.74]	1.500 [38.10]	1.100 [27.94]
68	2.340 [59.44]	2.000 [50.80]	1.600 [40.64]
80	2.640 [67.06]	2.300 [58.42]	1.900 [48.26]
96	3.040 [77.22]	2.700 [68.58]	2.300 [58.42]
100	3.140 [79.76]	2.800 [71.12]	2.400 [60.96]
108	3.340 [84.84]	3.000 [76.20]	2.600 [66.04]
120	3.640 [92.46]	3.300 [83.82]	2.900 [73.66]
128	3.840 [97.54]	3.500 [88.90]	3.100 [78.74]
136	4.040 [102.62]	3.700 [93.98]	3.300 [83.82]
160	4.640 [117.86]	4.300 [109.22]	3.900 [99.06]
184	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
196	5.540 [140.72]	5.200 [132.08]	4.800 [121.92]

CONTACT LOCATION MARKING NOTES
- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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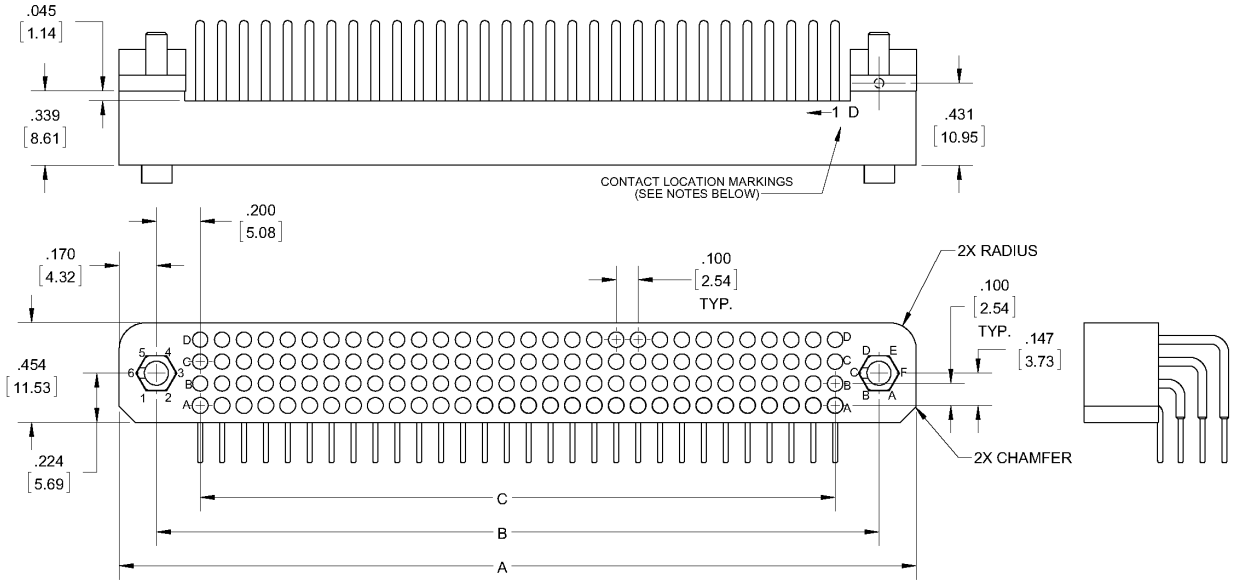
SOCKET, RIGHT ANGLE
STYLE FE
*STYLE SE



No. of Contacts	A	B	C
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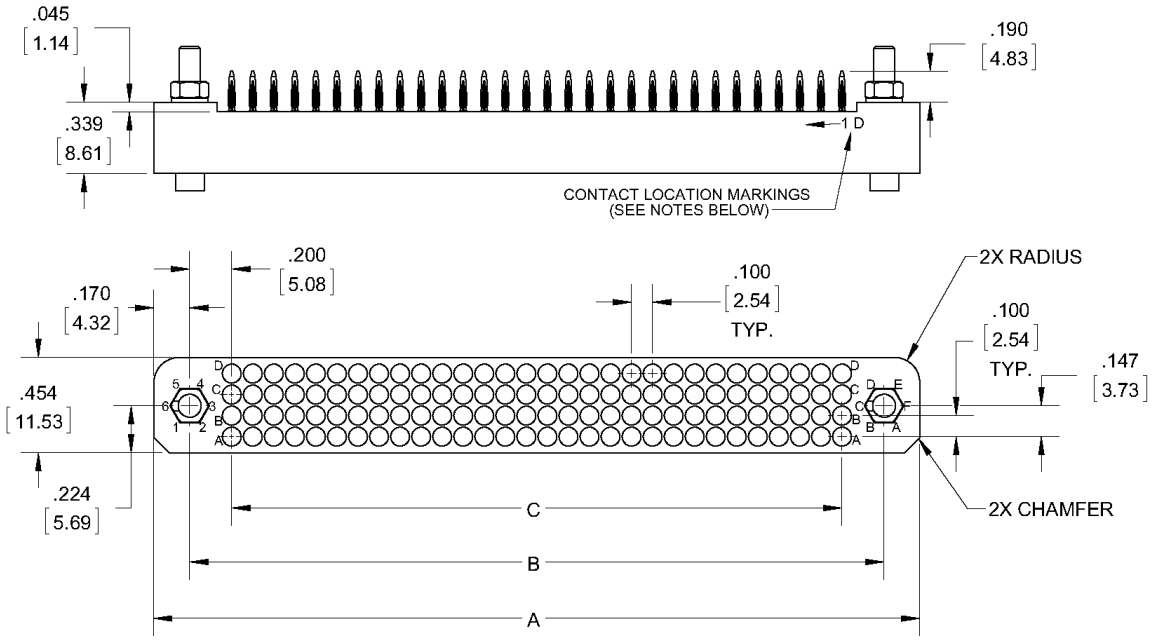
136	4.040 [102.62]	3.700 [93.98]	3.300 [83.82]
160	4.640 [117.86]	4.300 [109.22]	3.900 [99.06]
184	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
196	5.540 [140.72]	5.200 [132.08]	4.800 [121.92]

CONTACT LOCATION MARKING NOTES

- ***PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE***
- ***RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE***
- ***FOR REVERSE SEE ORDERING CHART***

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, COMPLIANT
STYLE FV
*STYLE SV



No. of Contacts	A	B	C
48	1.840 [46.74]	1.500 [38.10]	1.100 [27.94]
68	2.340 [59.44]	2.000 [50.80]	1.600 [40.64]
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160	4.640 [117.86]	4.300 [109.22]	3.900 [99.06]
184	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
196	5.540 [140.72]	5.200 [132.08]	4.800 [121.92]

CONTACT LOCATION MARKING NOTES
- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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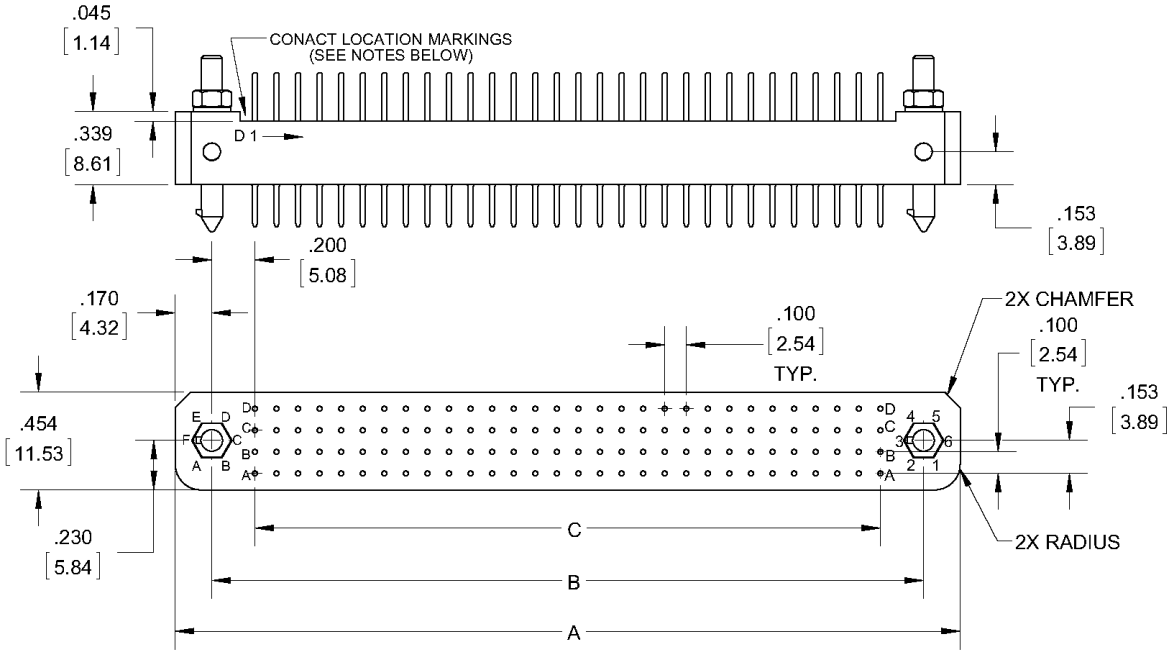
PIN, STRAIGHT
STYLE MC, MD, MS, MW
*STYLE PC, PD, PS, PW



No. of Contacts	A	B	C
48	1.840 [46.74]	1.500 [38.10]	1.100 [27.94]
68	2.340 [59.44]	2.000 [50.80]	1.600 [40.64]
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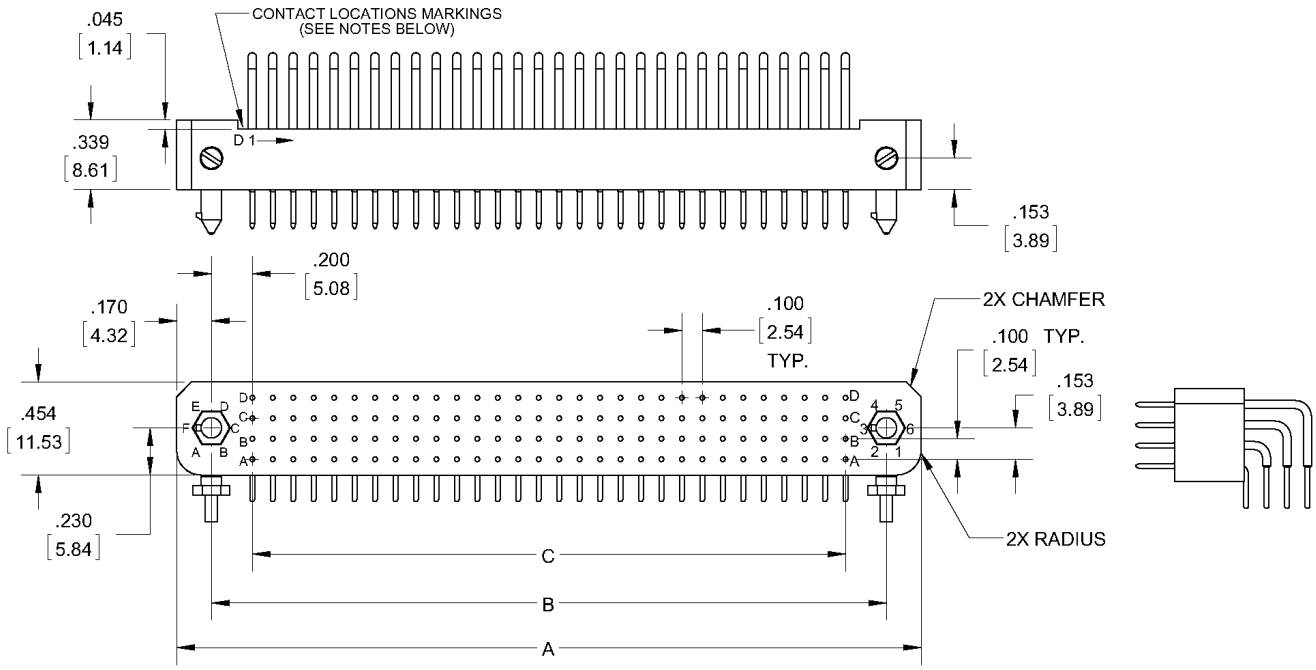
160	4.640 [117.86]	4.300 [109.22]	3.900 [99.06]
184	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
196	5.540 [140.72]	5.200 [132.08]	4.800 [121.92]

CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE P) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

PIN, RIGHT ANGLE
STYLE ME
*STYLE PE



No. of Contacts	A	B	C
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68	2.340 [59.44]	2.000 [50.80]	1.600 [40.64]
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136	4.040 [102.62]	3.700 [93.98]	3.300 [83.82]
160	4.640 [117.86]	4.300 [109.22]	3.900 [99.06]
184	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
196	5.540 [140.72]	5.200 [132.08]	4.800 [121.92]

CONTACT LOCATION MARKING NOTES
- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE P) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

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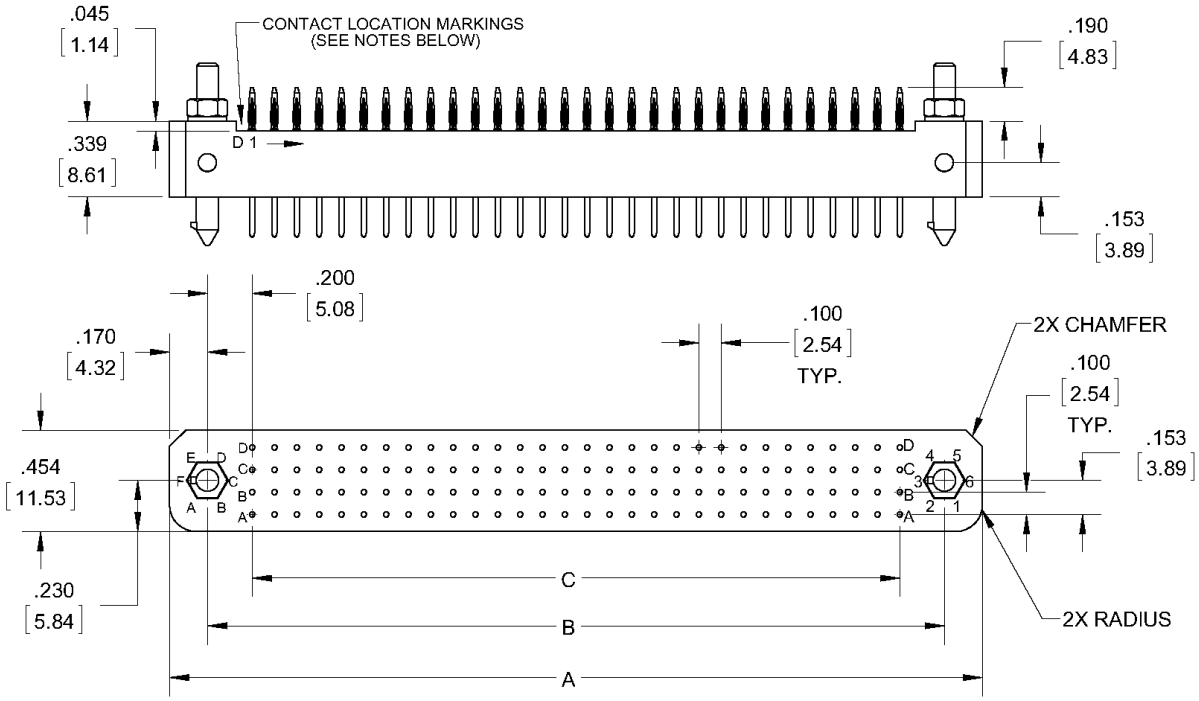
PIN, COMPLIANT
STYLE MV
*STYLE PV



No. of Contacts	A	B	C
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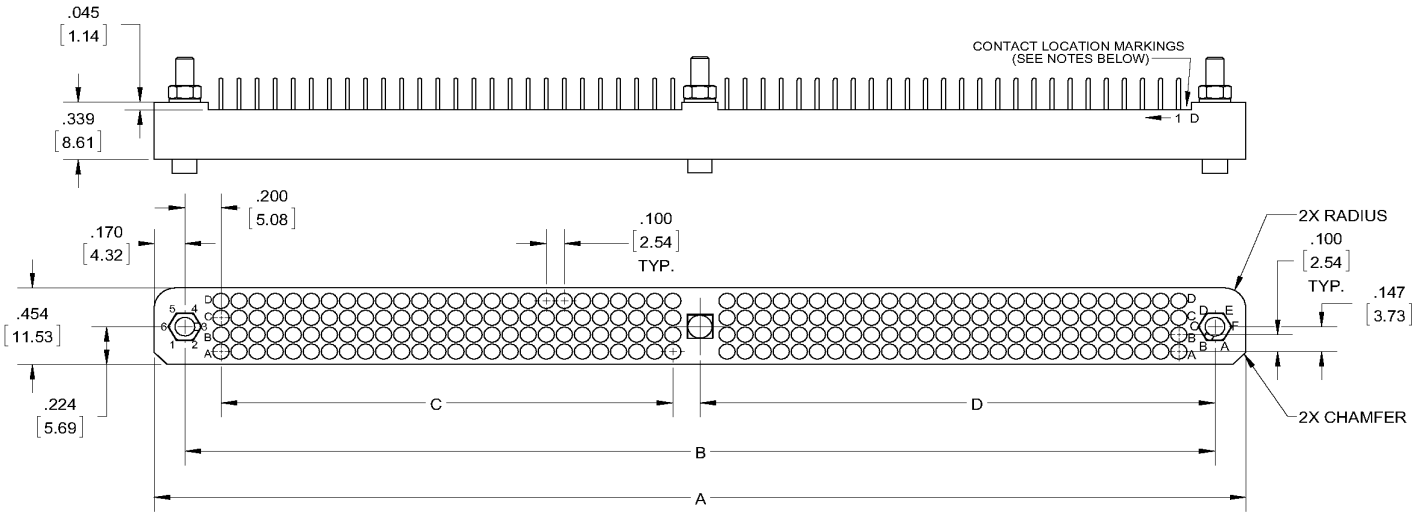
184	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
196	5.540 [140.72]	5.200 [132.08]	4.800 [121.92]

CONTACT LOCATION MARKING NOTES
- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE P) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

SOCKET, STRAIGHT
STYLE FC, FD, FS, FW
*STYLE SC, SD, SS, SW



CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
208	6.040 [153.42]	5.700 [144.78]	2.500 [63.50]	2.850 [72.39]
240	6.840 [173.74]	6.500 [165.10]	2.900 [73.66]	3.250 [82.55]
264	7.438 [188.92]	7.100 [180.34]	3.200 [81.28]	3.550 [90.17]
352	9.640 [244.86]	9.300 [236.22]	4.300 [109.22]	4.650 [118.11]
392	10.640 [270.26]	10.300 [261.62]	4.800 [121.92]	5.150 [130.81]

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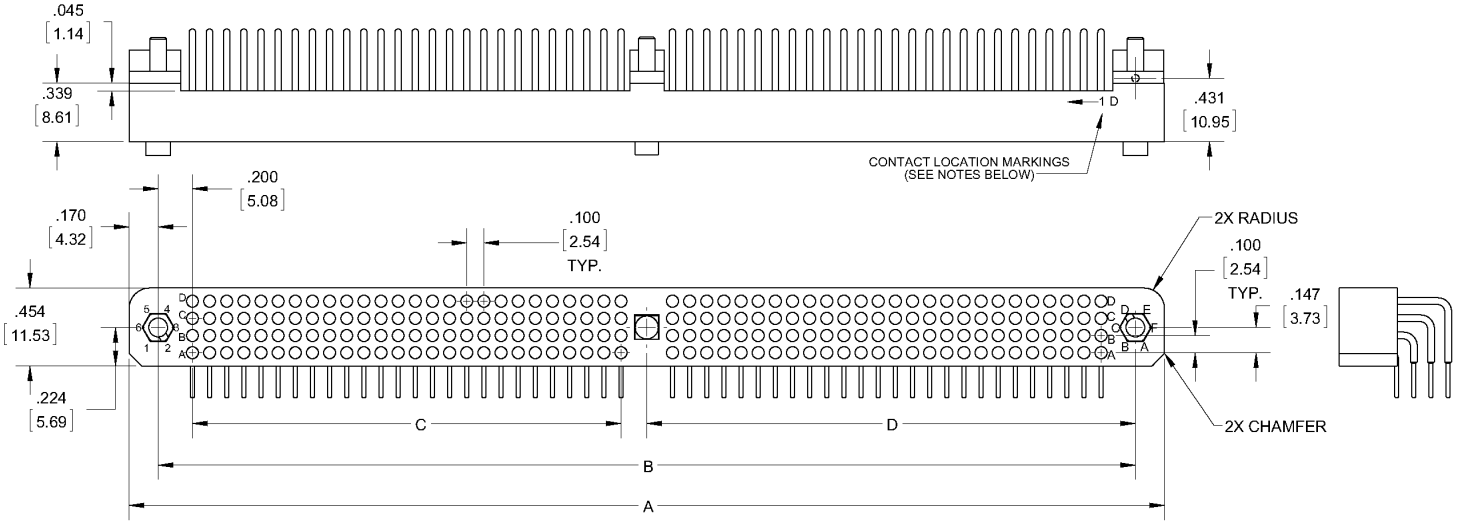
SOCKET, RIGHT ANGLE
STYLE FE
*STYLE SE



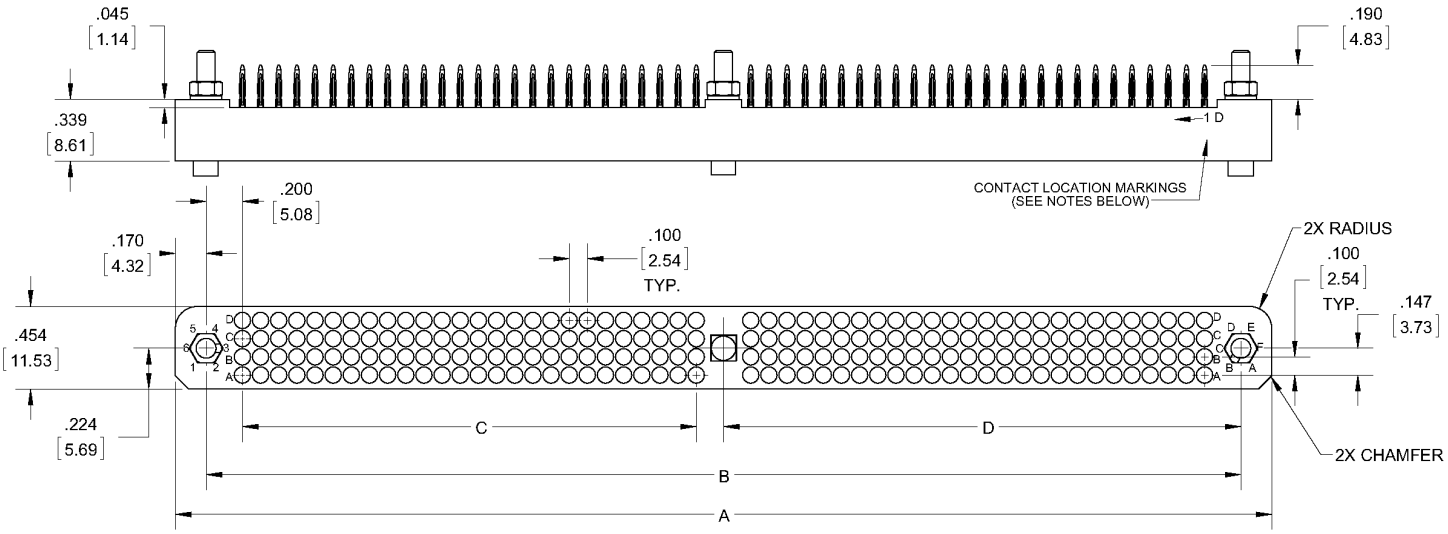
CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
208	6.040 [153.42]	5.700 [144.78]	2.500 [63.50]	2.850 [72.39]
240	6.840 [173.74]	6.500 [165.10]	2.900 [73.66]	3.250 [82.55]
264	7.438 [188.92]	7.100 [180.34]	3.200 [81.28]	3.550 [90.17]
352	9.640 [244.86]	9.300 [236.22]	4.300 [109.22]	4.650 [118.11]
392	10.640 [270.26]	10.300 [261.62]	4.800 [121.92]	5.150 [130.81]

SOCKET, COMPLIANT
STYLE FV
*STYLE SV



CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

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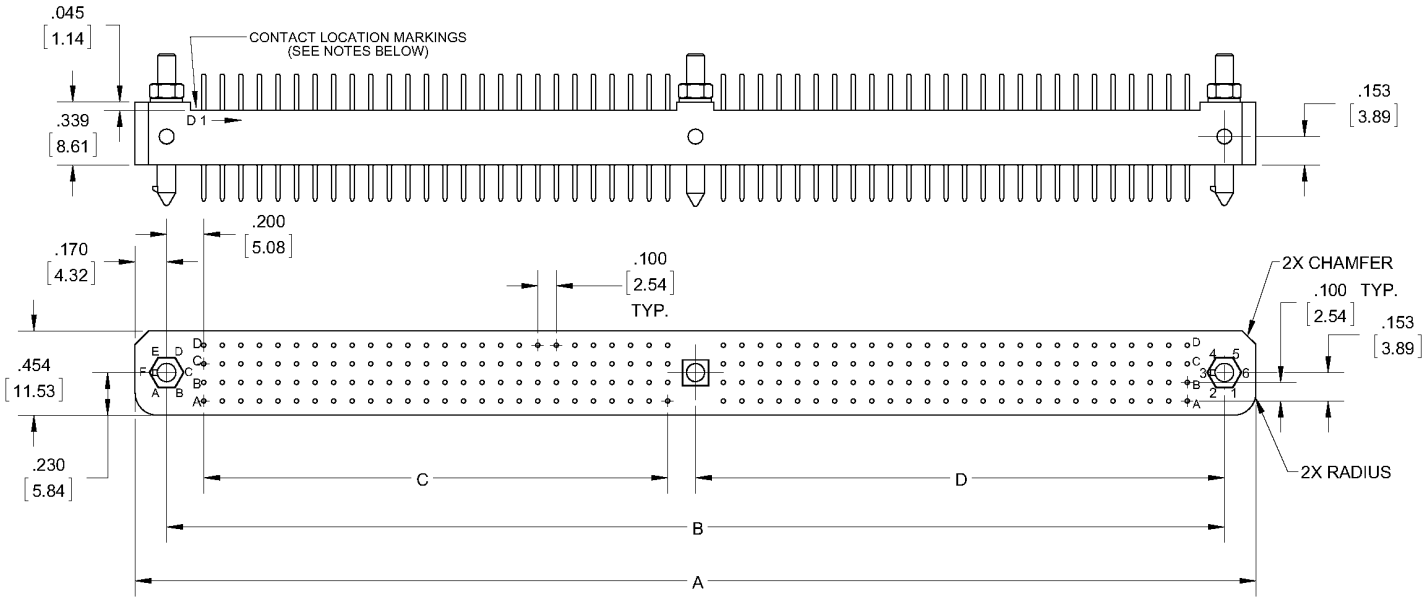
PIN, STRAIGHT
STYLE MC, MD, MS, MW
*STYLE PC, PD, PS, PW



CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE P) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

REFER TO APPENDIX FOR TERMINATION DETAILS, HARDWARE STYLES, AND PWB PATTERNS

No. of Contacts	A	B	C	D
208	6.040 [153.42]	5.700 [144.78]	2.500 [63.50]	2.850 [72.39]
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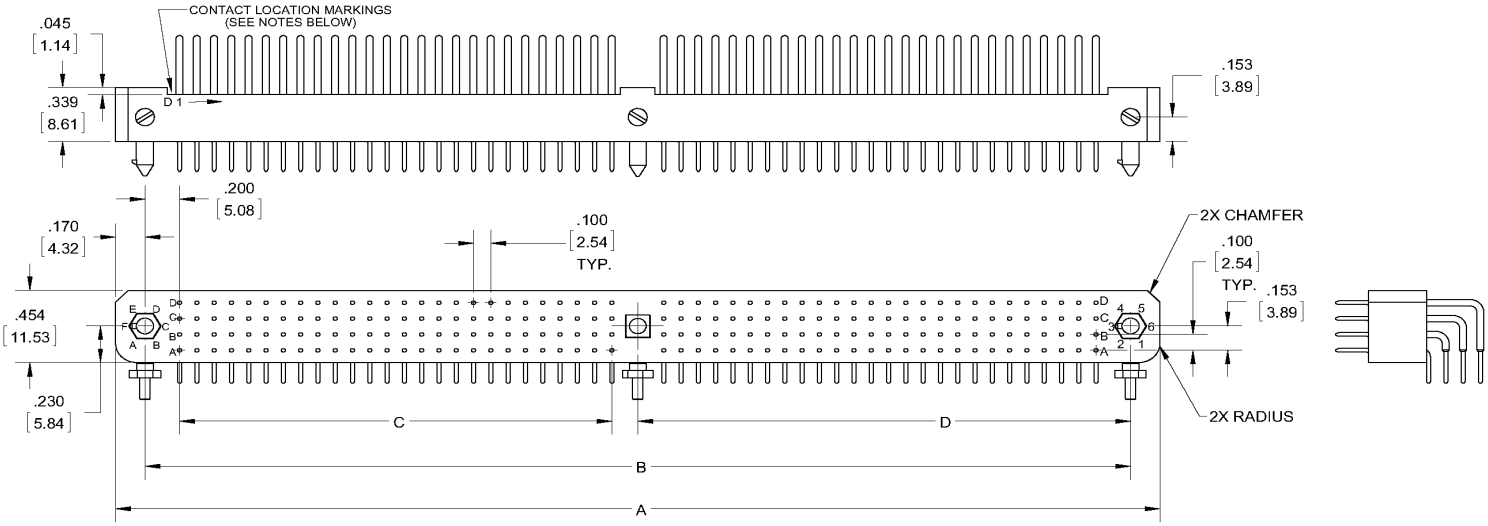
PIN, RIGHT ANGLE
STYLE ME
*STYLE PE



CONTACT LOCATION MARKING NOTES
- ***PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE***
- ***RECEPTACLE (STYLE P) HAS MARKINGS ON RADIUS SIDE***
- ***FOR REVERSE SEE ORDERING CHART***

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PIN COMPLIANT
STYLE MV
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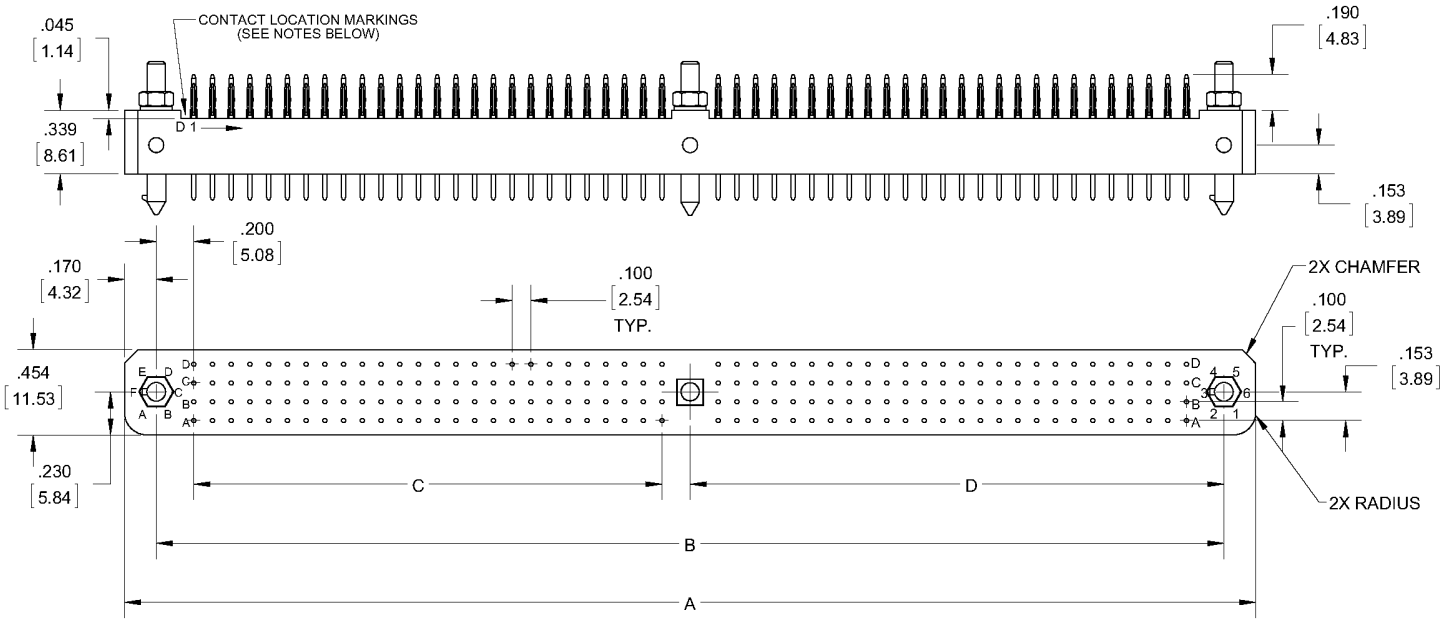

CONTACT LOCATION MARKING NOTES
- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
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SOCKET, STRAIGHT
STYLE FC, FD, FS, FW
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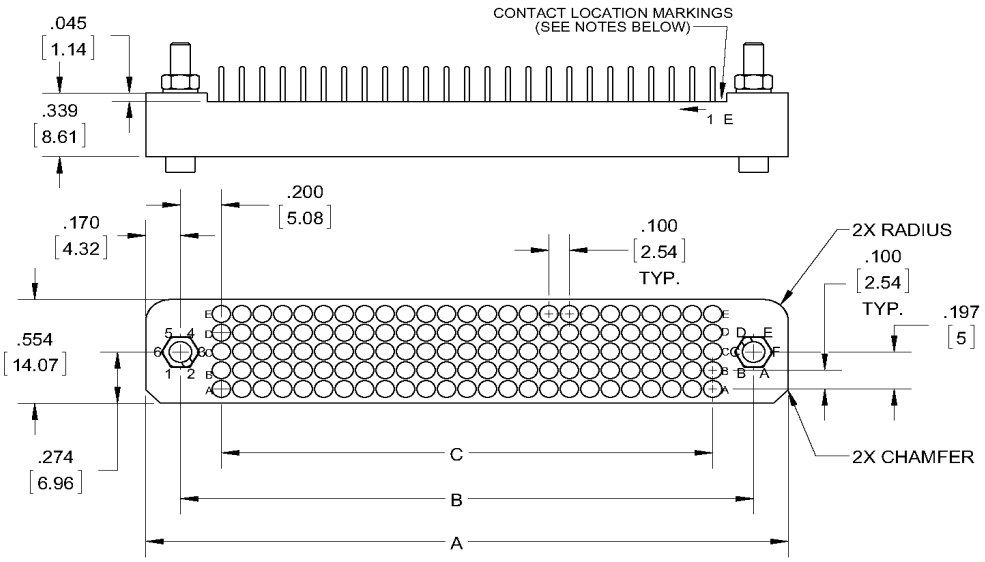

CONTACT LOCATION MARKING NOTES

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- *RECEPTACLE (STYLE F) HAS MARKINGS ON RADIUS SIDE*
- *FOR REVERSE SEE ORDERING CHART*

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No. of Contacts	A	B	C
125	3.140 [79.76]	2.800 [71.12]	2.400 [60.96]
140	3.440 [87.38]	3.100 [78.74]	2.700 [68.58]
160	3.840 [97.54]	3.500 [88.90]	3.100 [78.74]
200	4.640 [117.86]	4.300 [109.22]	3.900 [99.06]
230	5.240 [133.10]	4.900 [124.46]	4.500 [114.30]
240	5.440 [138.18]	5.100 [129.54]	4.700 [119.38]

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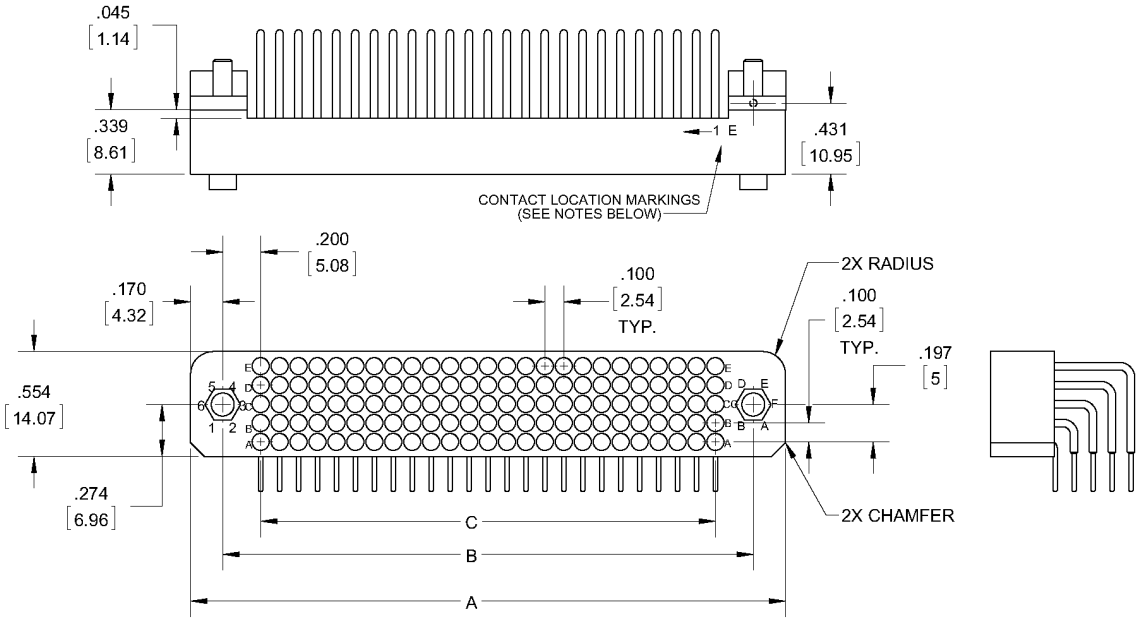
SOCKET, RIGHT ANGLE
STYLE FE
*STYLE SE



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- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
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SOCKET, COMPLIANT
STYLE FV
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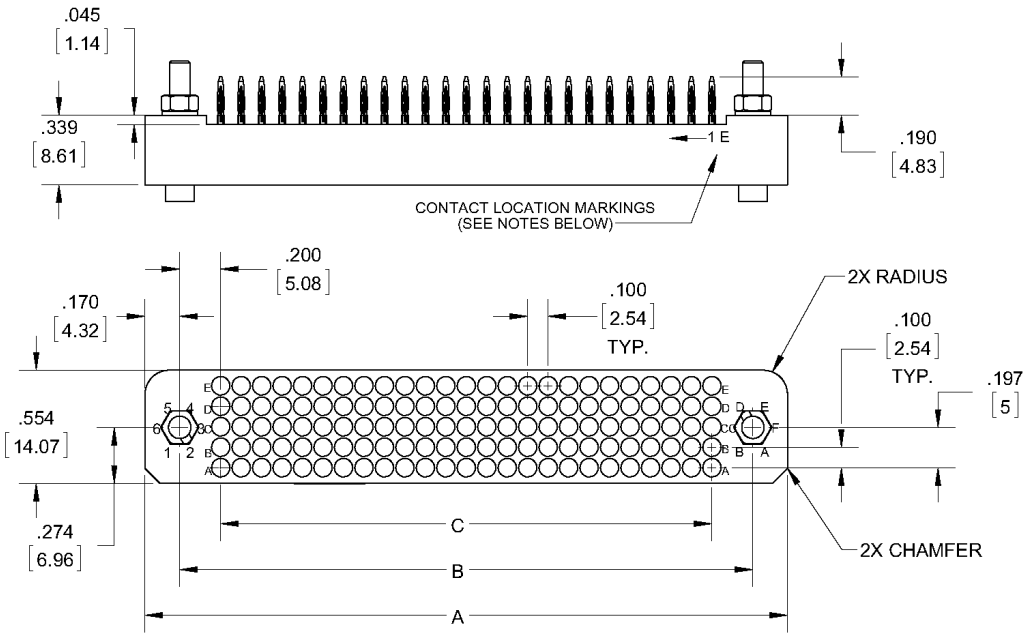

CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
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PIN, STRAIGHT
STYLE MC, MD, MS, MW
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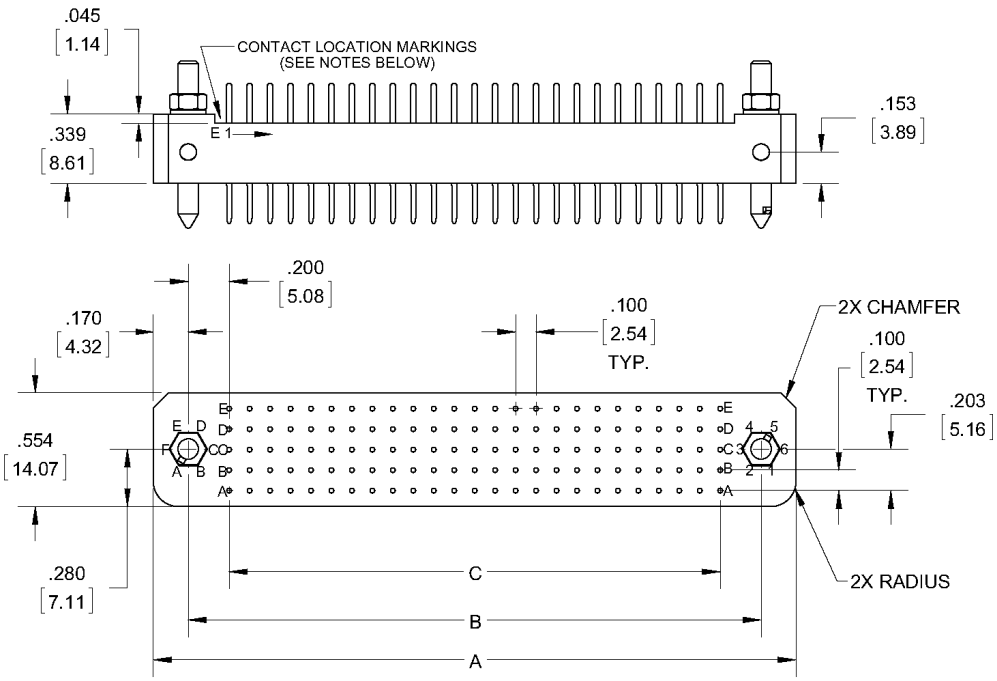

CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
- *RECEPTACLE (STYLE P) HAS MARKINGS ON RADIUS SIDE*
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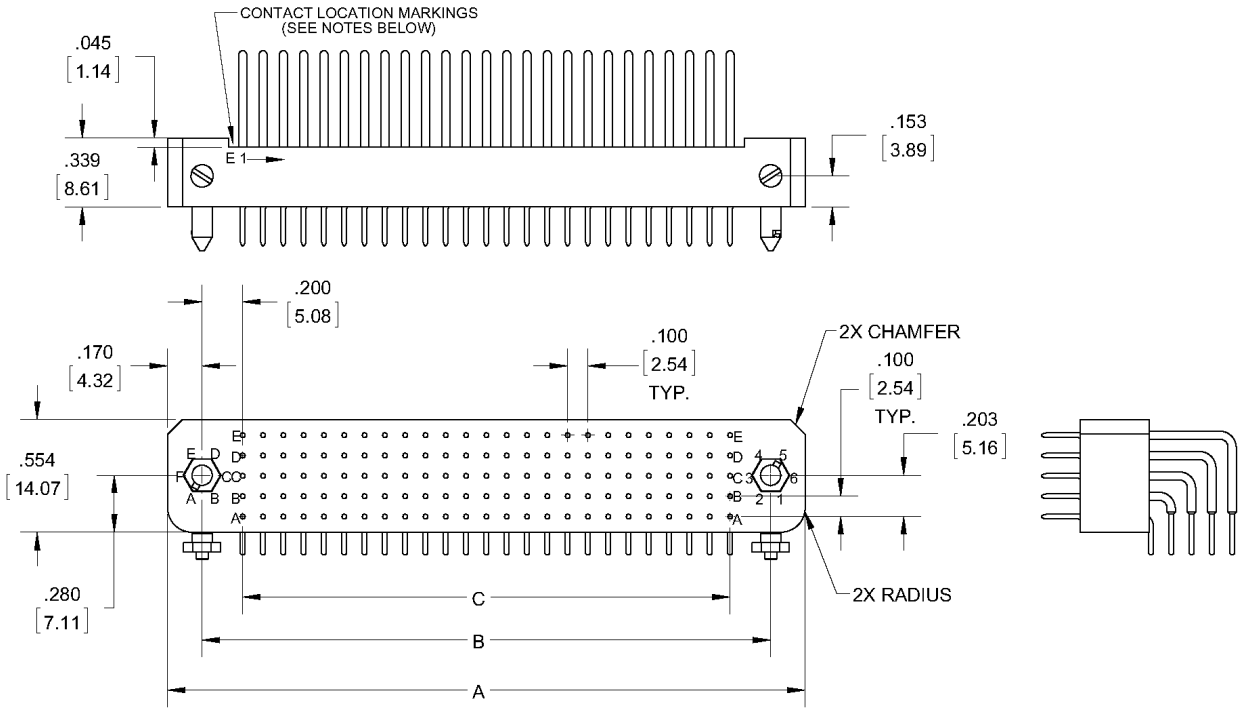
PIN, RIGHT ANGLE
STYLE ME
*STYLE PE



CONTACT LOCATION MARKING NOTES

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PIN, COMPLIANT
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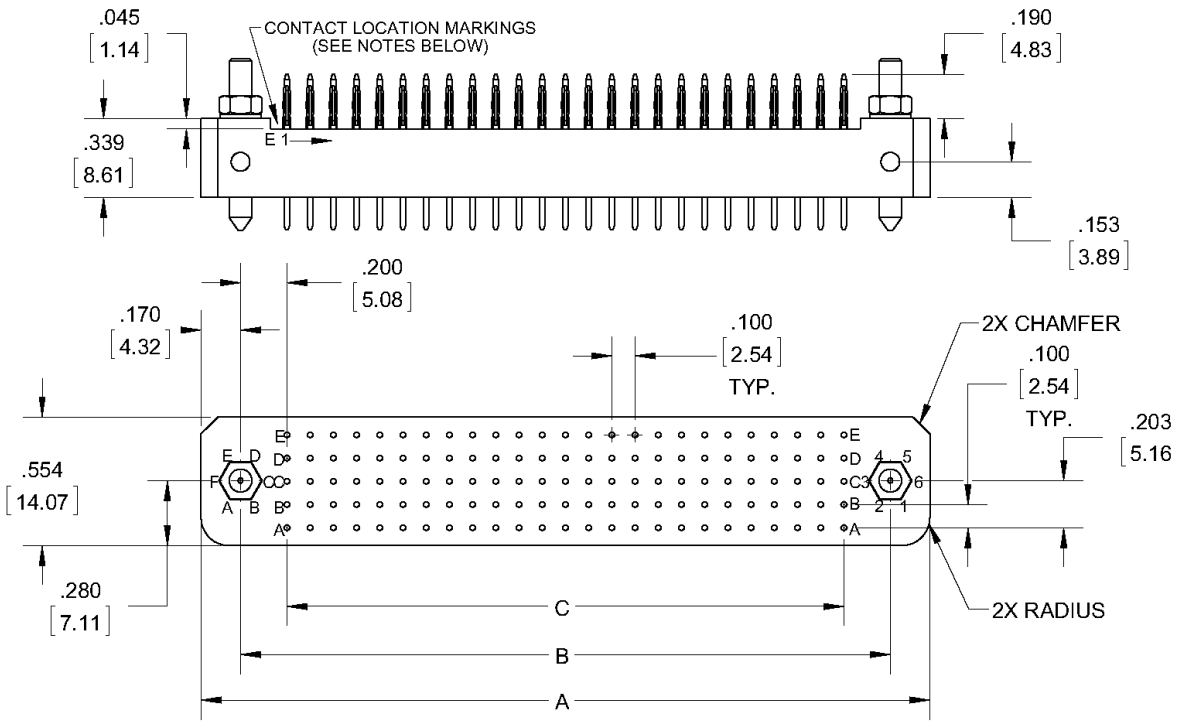

CONTACT LOCATION MARKING NOTES
- *PLUG (STYLE M) HAS MARKINGS ON CHAMFER SIDE*
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SOCKET, STRAIGHT
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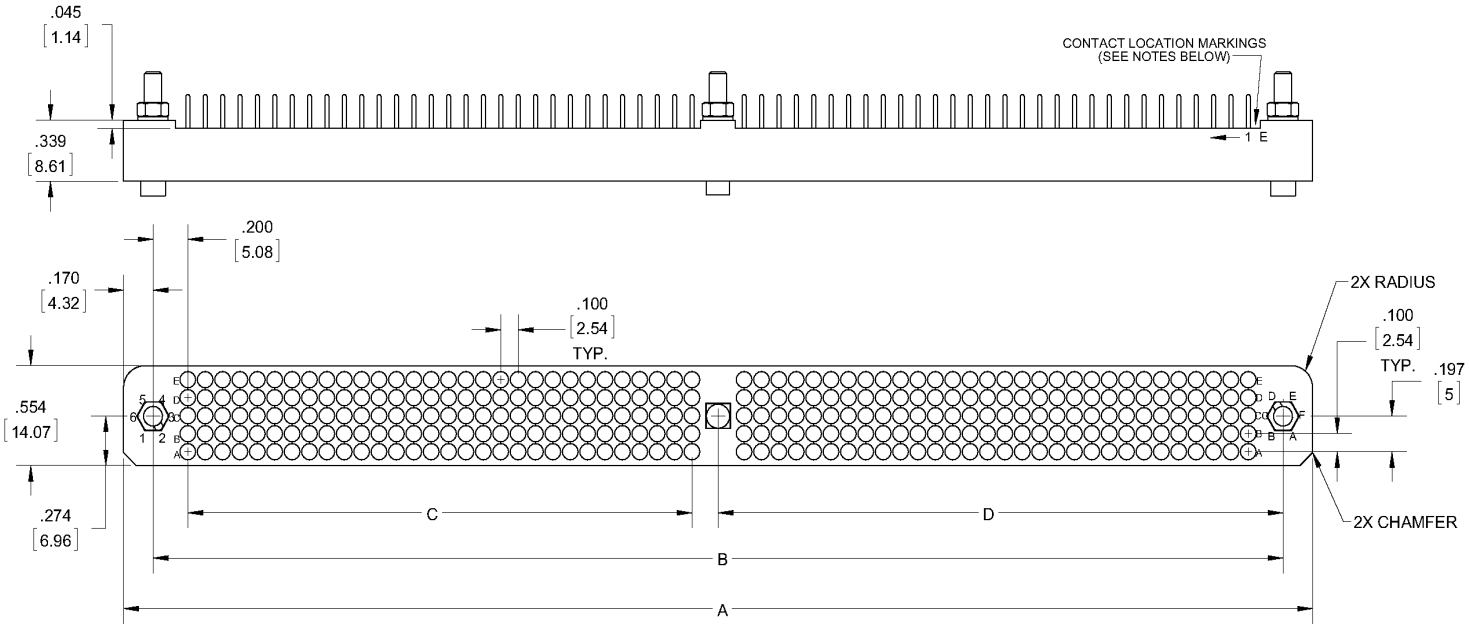

CONTACT LOCATION MARKING NOTES

- *PLUG (STYLE S) HAS MARKINGS ON CHAMFER SIDE*
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390	8.640 [219.46]	8.300 [210.82]	3.800 [96.52]	4.150 [105.41]
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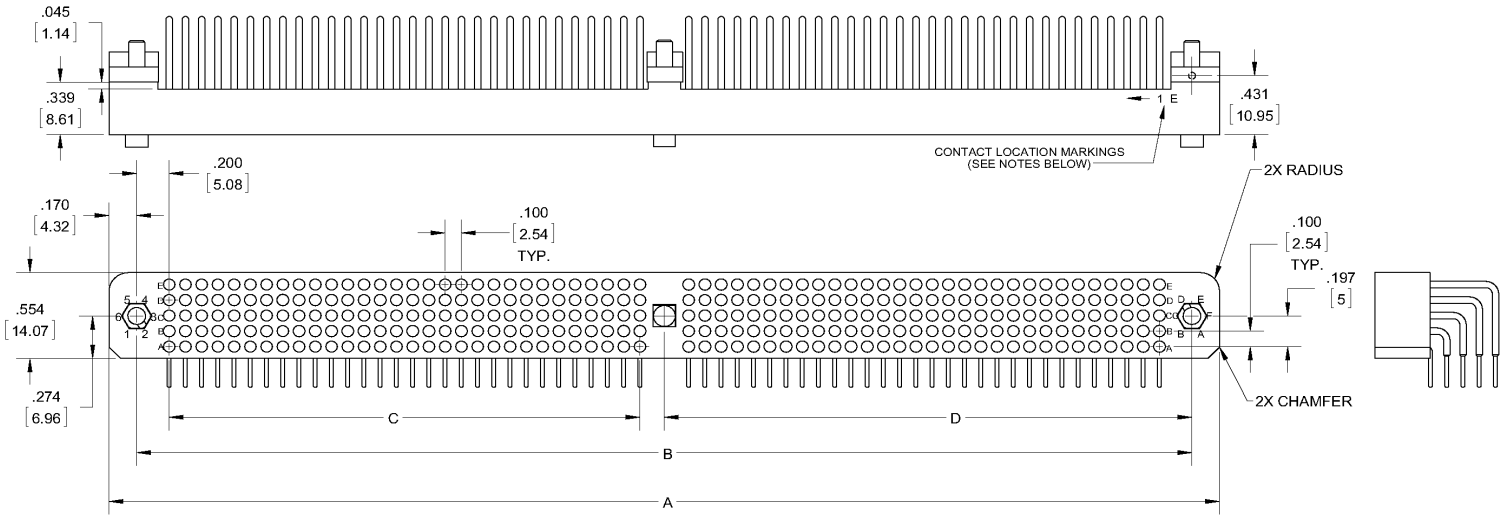
SOCKET, RIGHT ANGLE
STYLE FE
*STYLE SE



CONTACT LOCATION MARKING NOTES

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SOCKET, COMPLIANT
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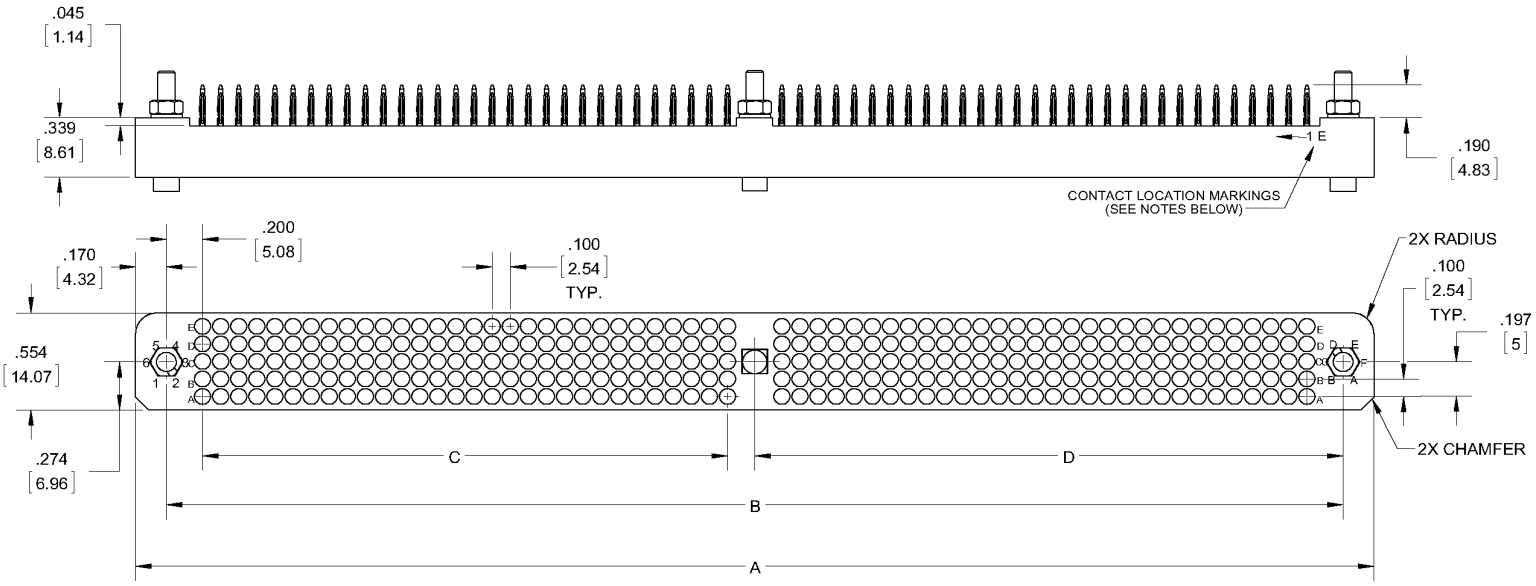

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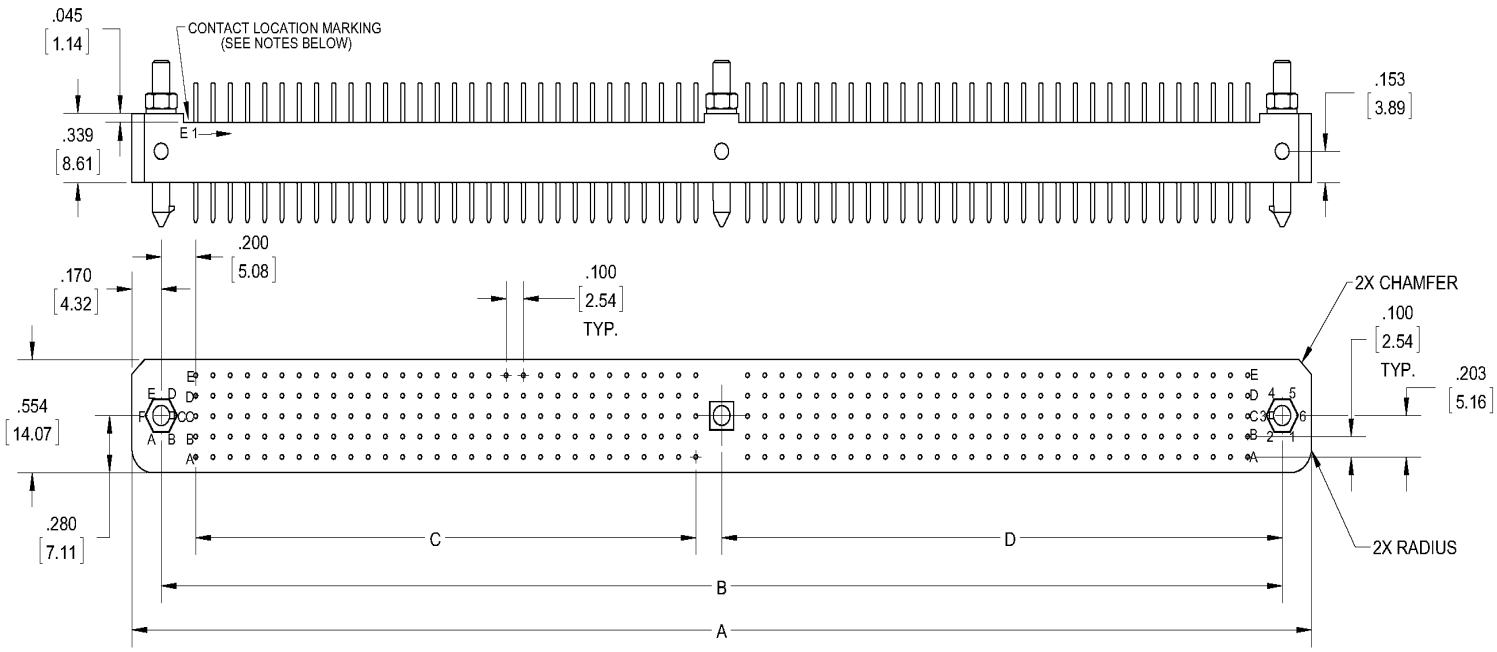

CONTACT LOCATION MARKING NOTES

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PIN, RIGHT ANGLE
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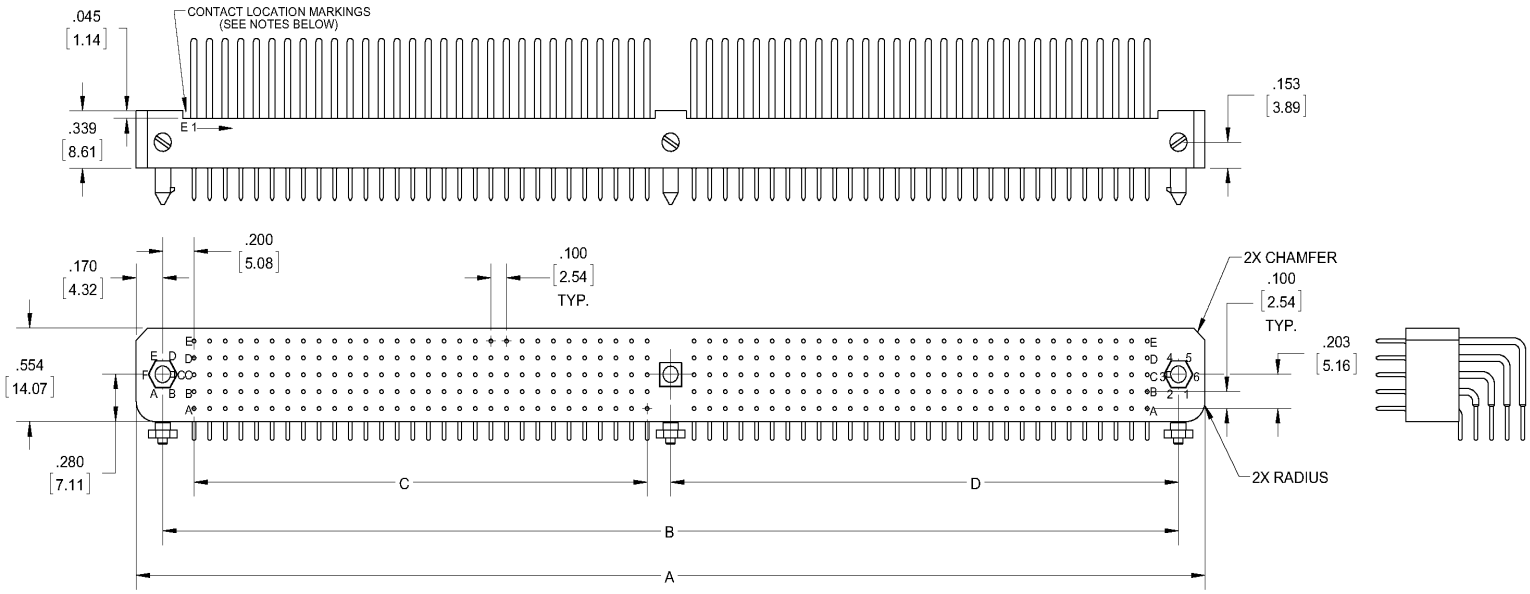

CONTACT LOCATION MARKING NOTES
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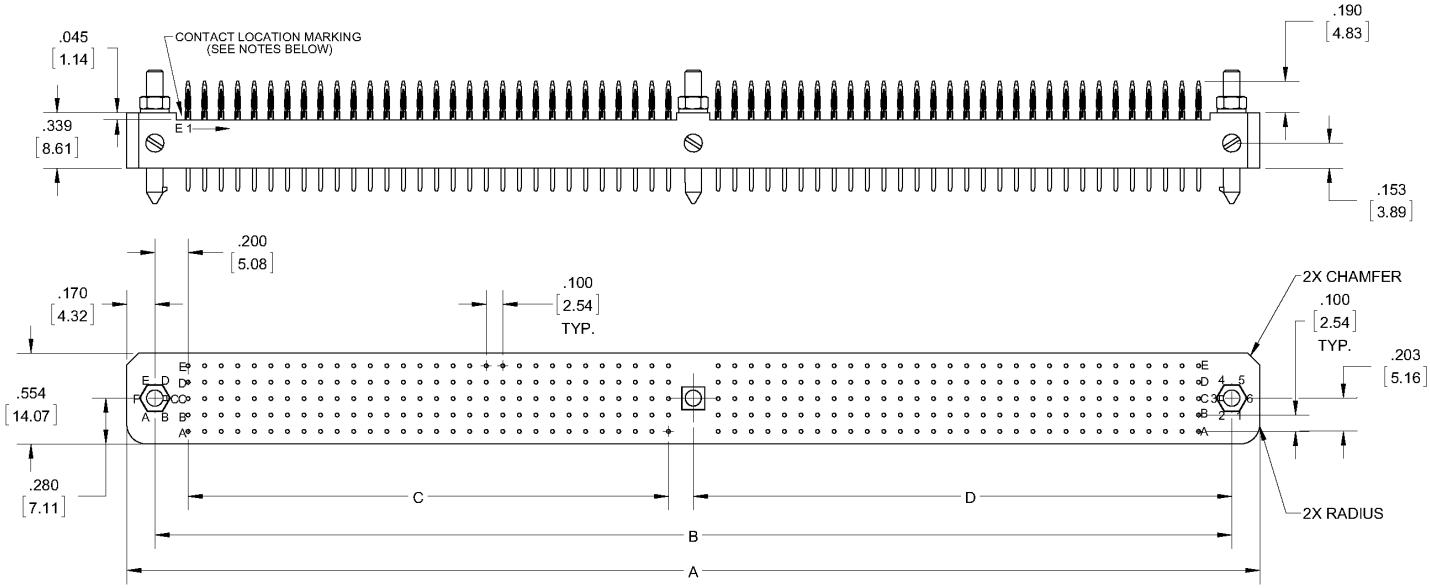

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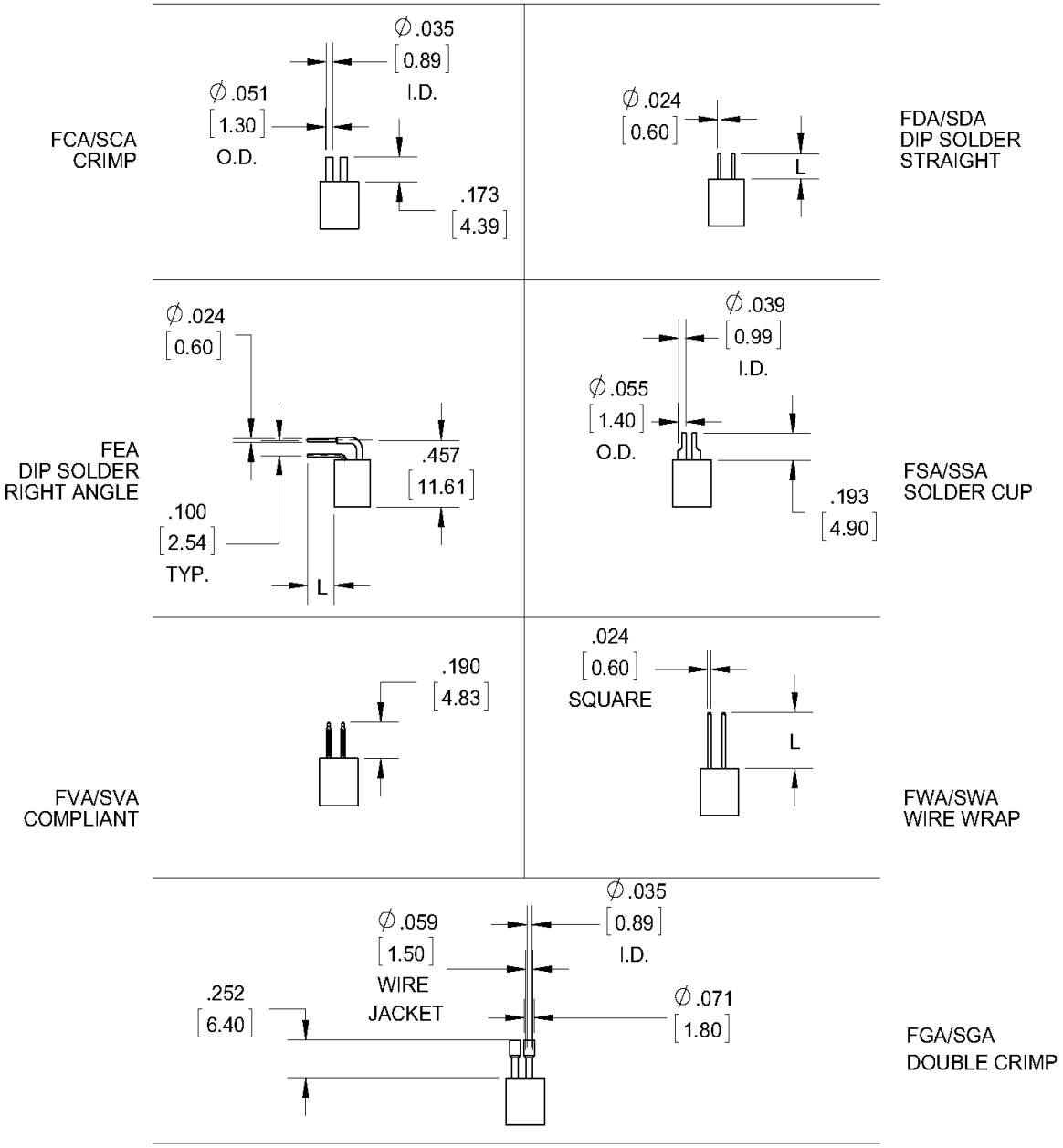
No. of Contacts	A	B	C	D
300	6.840 [173.74]	6.500 [165.1]	2.900 [73.66]	3.250 [82.55]
320	7.240 [183.90]	6.900 [175.26]	3.100 [78.74]	3.450 [87.63]
330	7.440 [188.98]	7.100 [180.34]	3.200 [81.28]	3.550 [90.17]
390	8.640 [219.46]	8.300 [210.82]	3.800 [96.52]	4.150 [105.41]
490	10.640 [270.26]	10.300 [261.62]	4.800 [121.92]	5.150 130.81]

TERMINATION STYLES
SOCKET, 2 ROW
HARDWARE OMITTED FOR CLARITY



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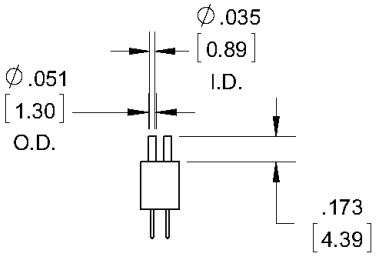
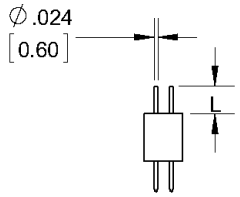
TERMINATION STYLES
PIN, 2 ROW
HARDWARE OMITTED FOR CLARITY
PIN SHIELDS OPTIONAL

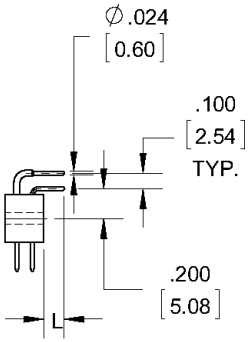
MCA/PCA
CRIMP

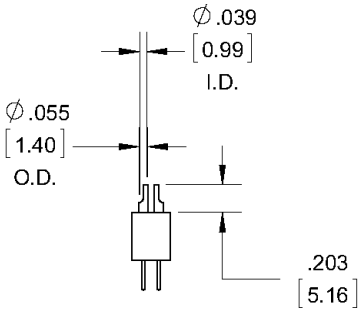




MDA/PDA
DIP SOLDER
STRAIGHT

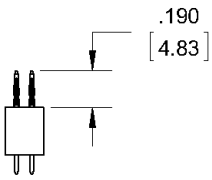
MEA
DIP SOLDER
RIGHT ANGLE

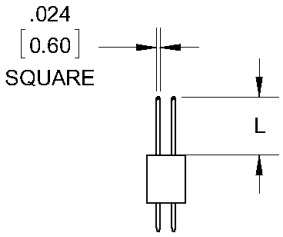




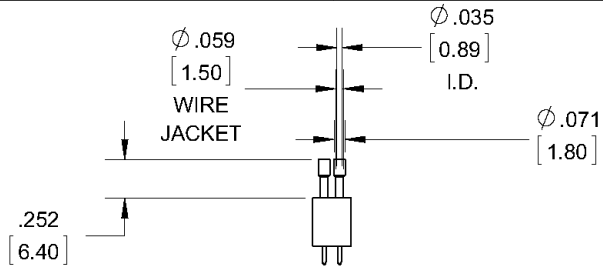
MSA/PSA
SOLDER CUP

MVA/PVA
COMPLIANT



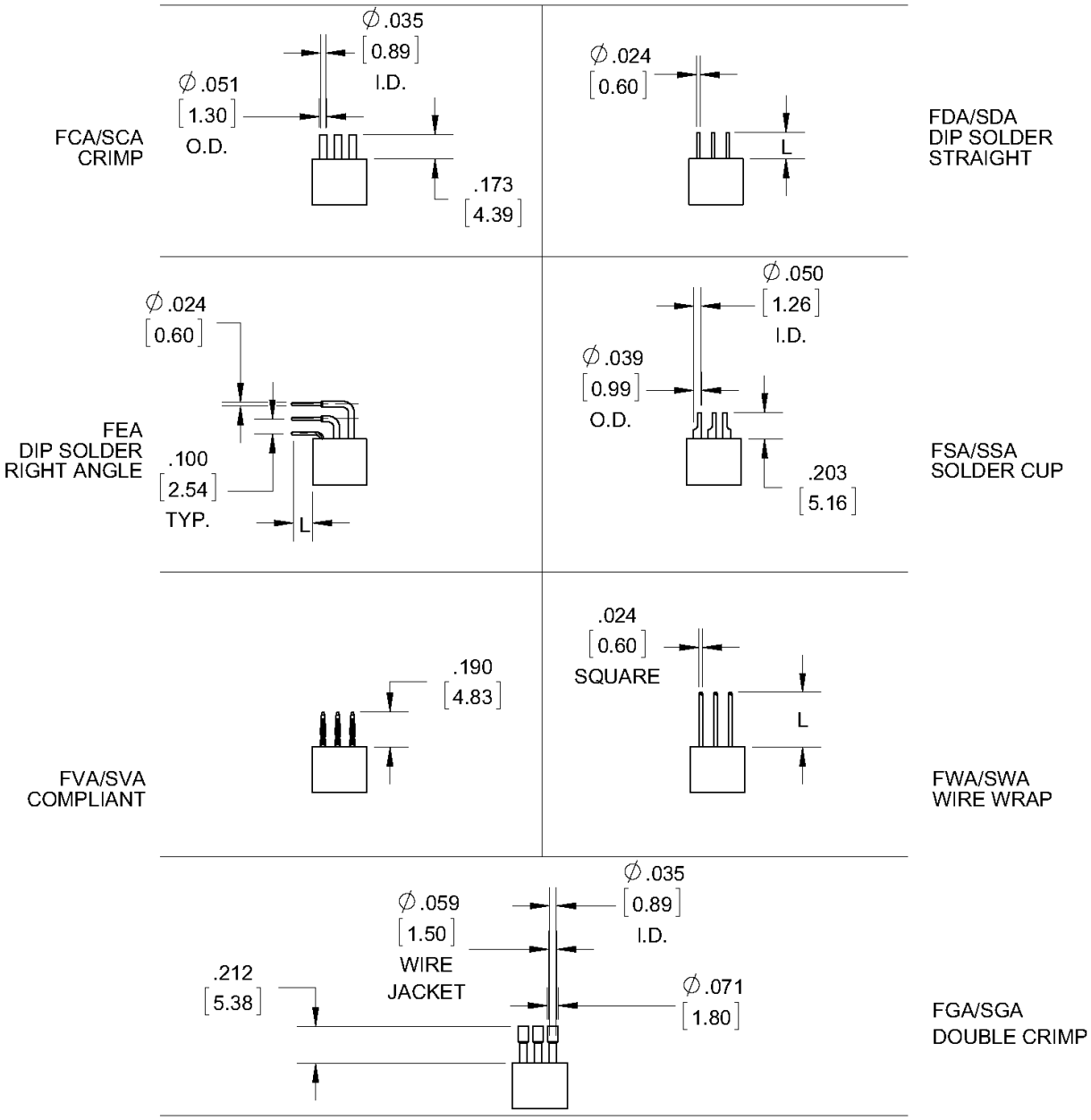


MWA/PWA
WIRE WRAP



MGA/PGA
DOUBLE CRIMP

TERMINATION STYLES
SOCKET, 3 ROW
HARDWARE OMITTED FOR CLARITY



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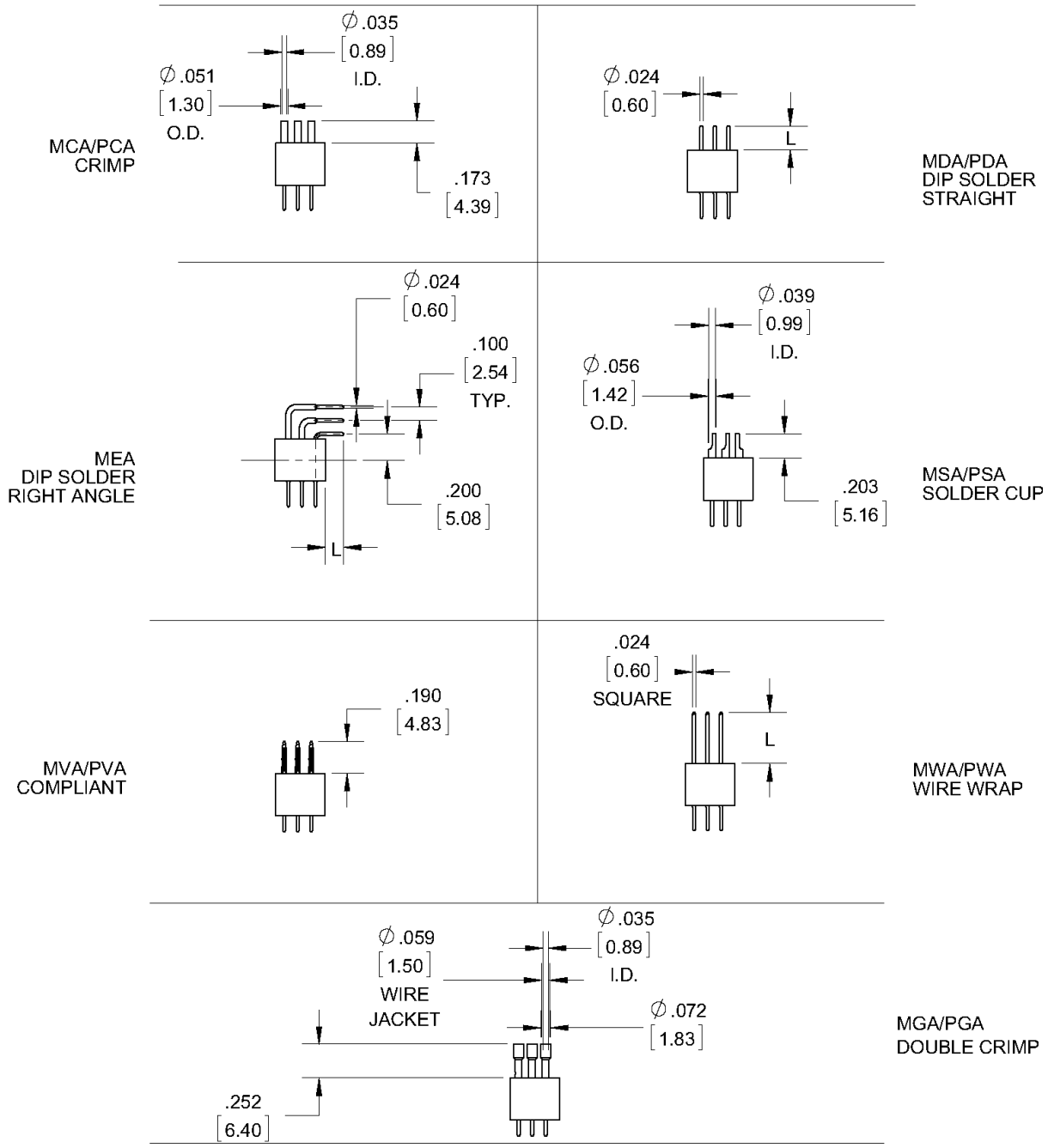
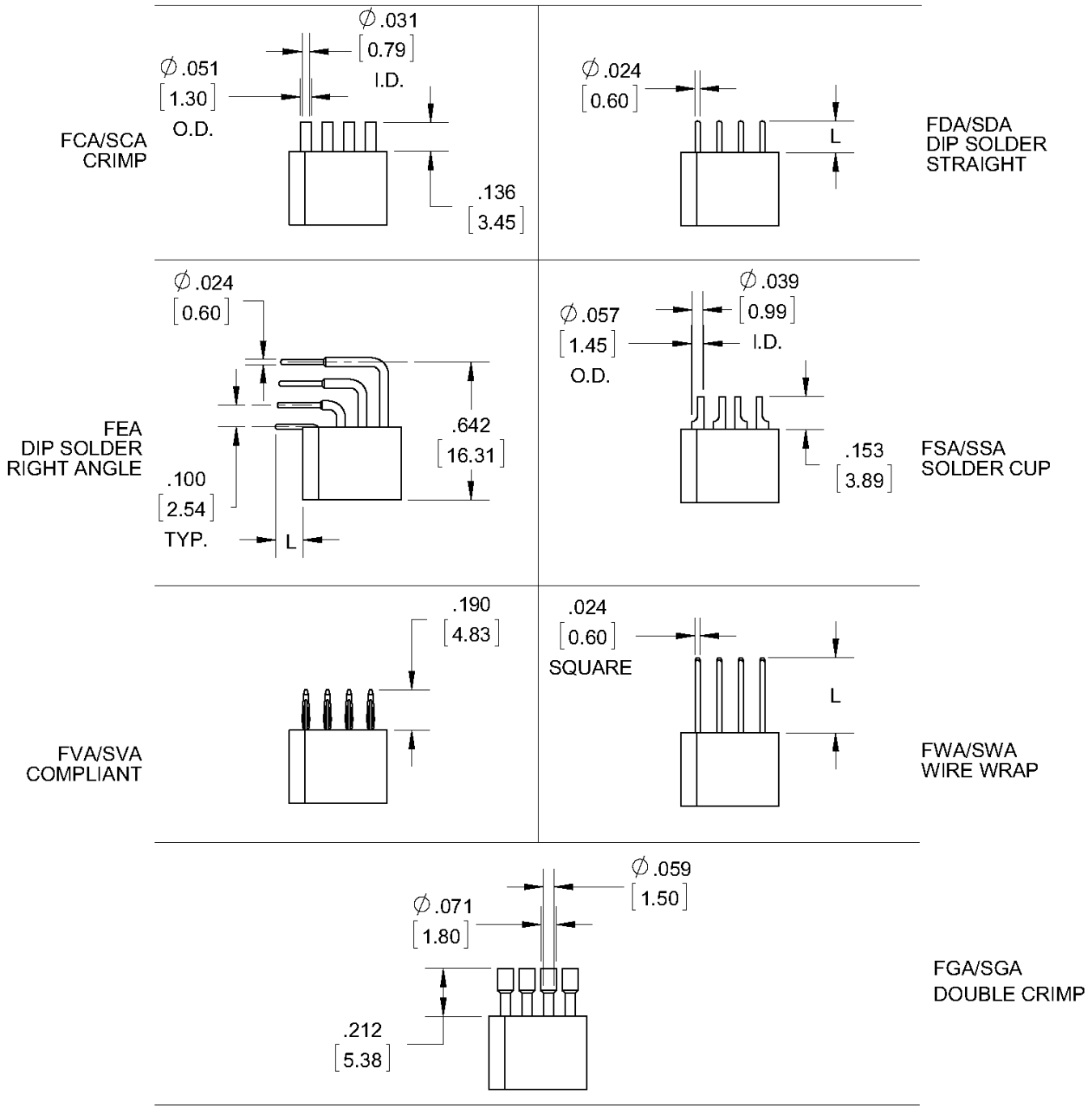
TERMINATION STYLES
PIN, 3 ROW
HARDWARE OMITTED FOR CLARITY
PIN SHIELDS OPTIONAL



TERMINATION STYLES
SOCKET, 4 ROW
HARDWARE OMITTED FOR CLARITY



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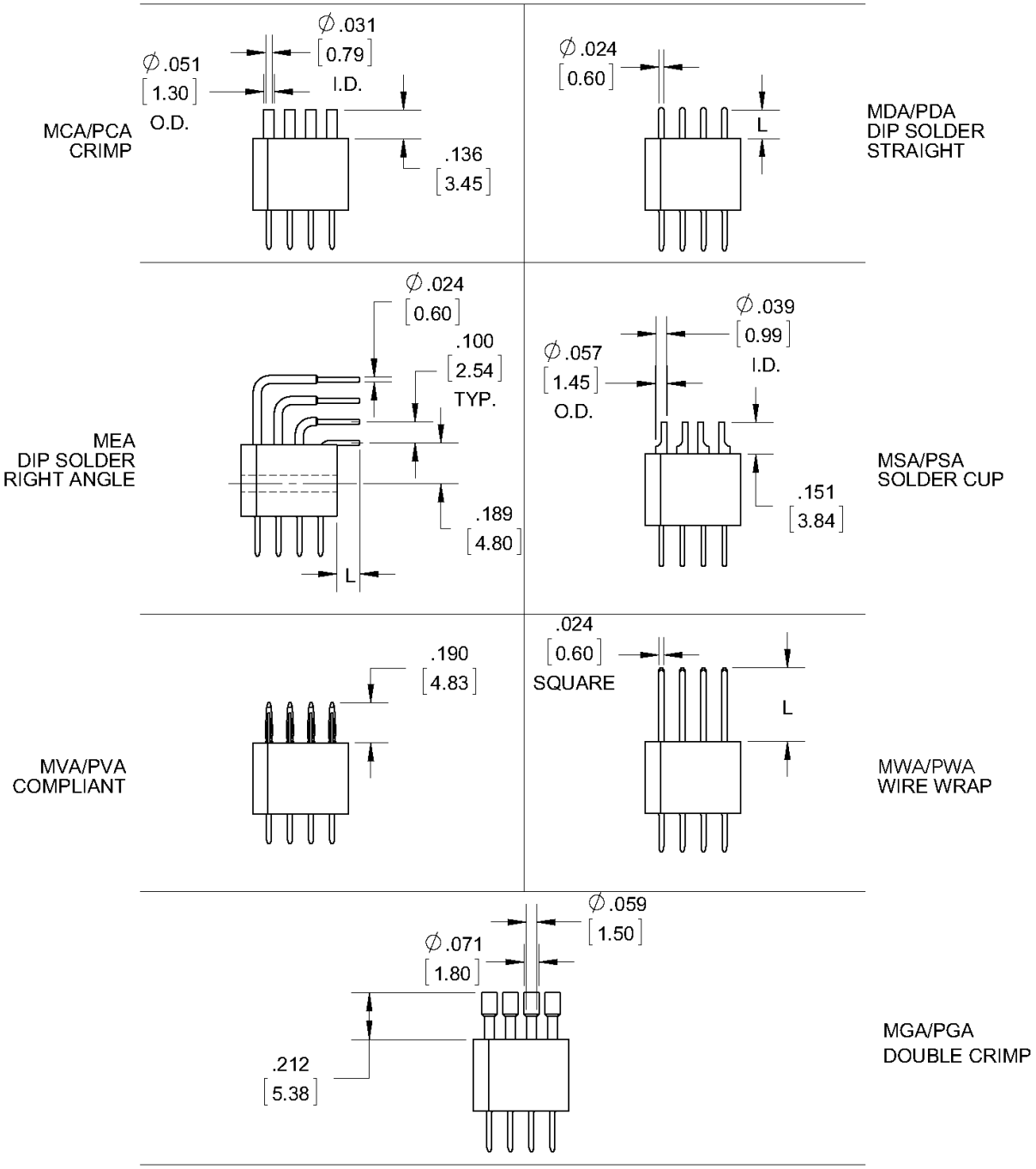
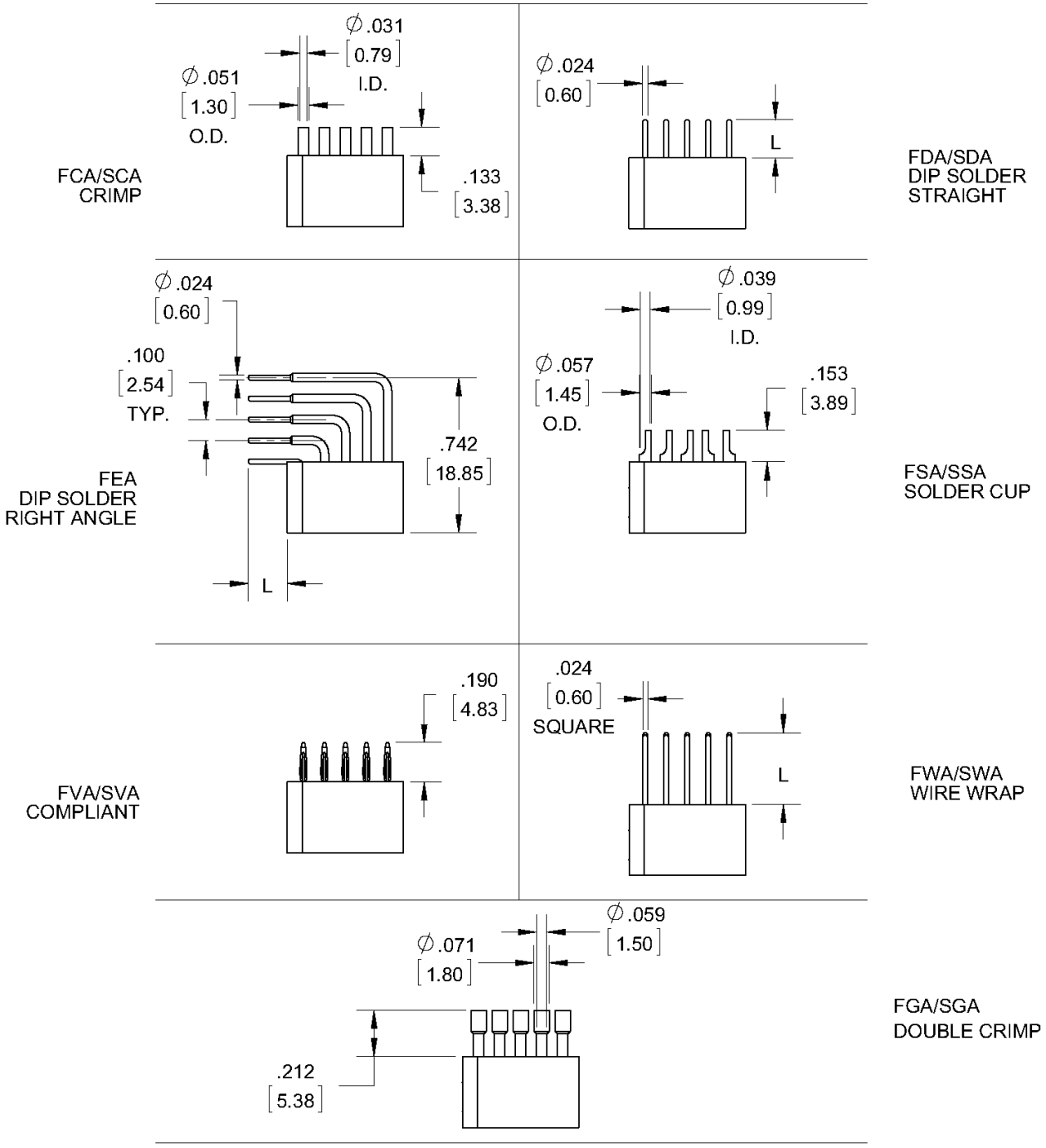
TERMINATION STYLES
PIN, 4 ROW
HARDWARE OMITTED FOR CLARITY
PIN SHIELDS OPTIONAL



TERMINATION STYLES
SOCKET, 5 ROW
HARDWARE OMITTED FOR CLARITY



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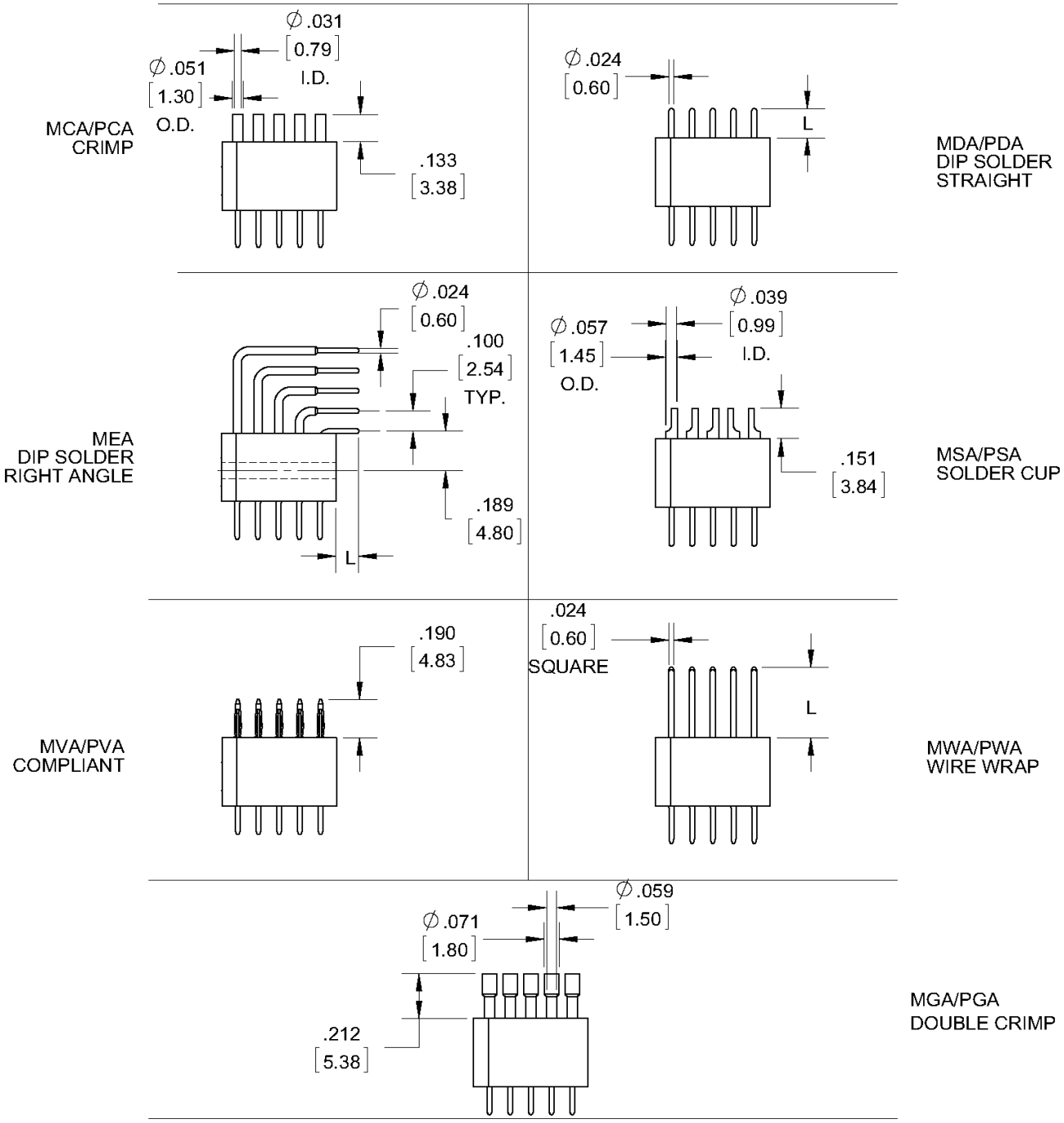
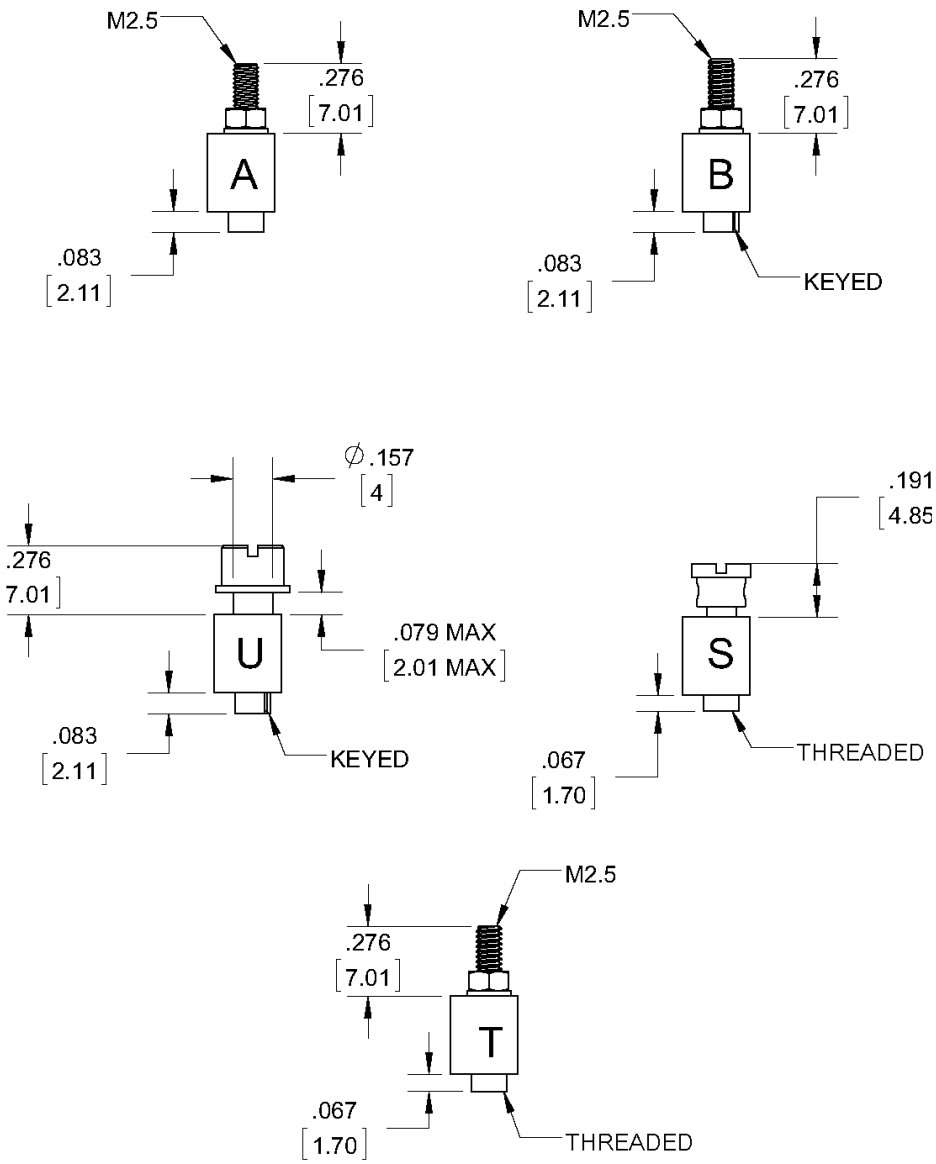
TERMINATION STYLES
PIN, 5 ROW
HARDWARE OMITTED FOR CLARITY
PIN SHIELDS OPTIONAL



HARDWARE STYLES
GUIDE SOCKETS, 2 & 3 ROW
HARDWARE CONFIGURATION SHOWN ASSEMBLED



HARDWARE COMPATIBILITY									
	GUIDE PINS								
GUIDE SOCKETS		A	B	U	K	P	T	X	Y
	A	•						•	
	B		•	•					•
	U		•	•					•
	S				•	•	•		
	T					•			

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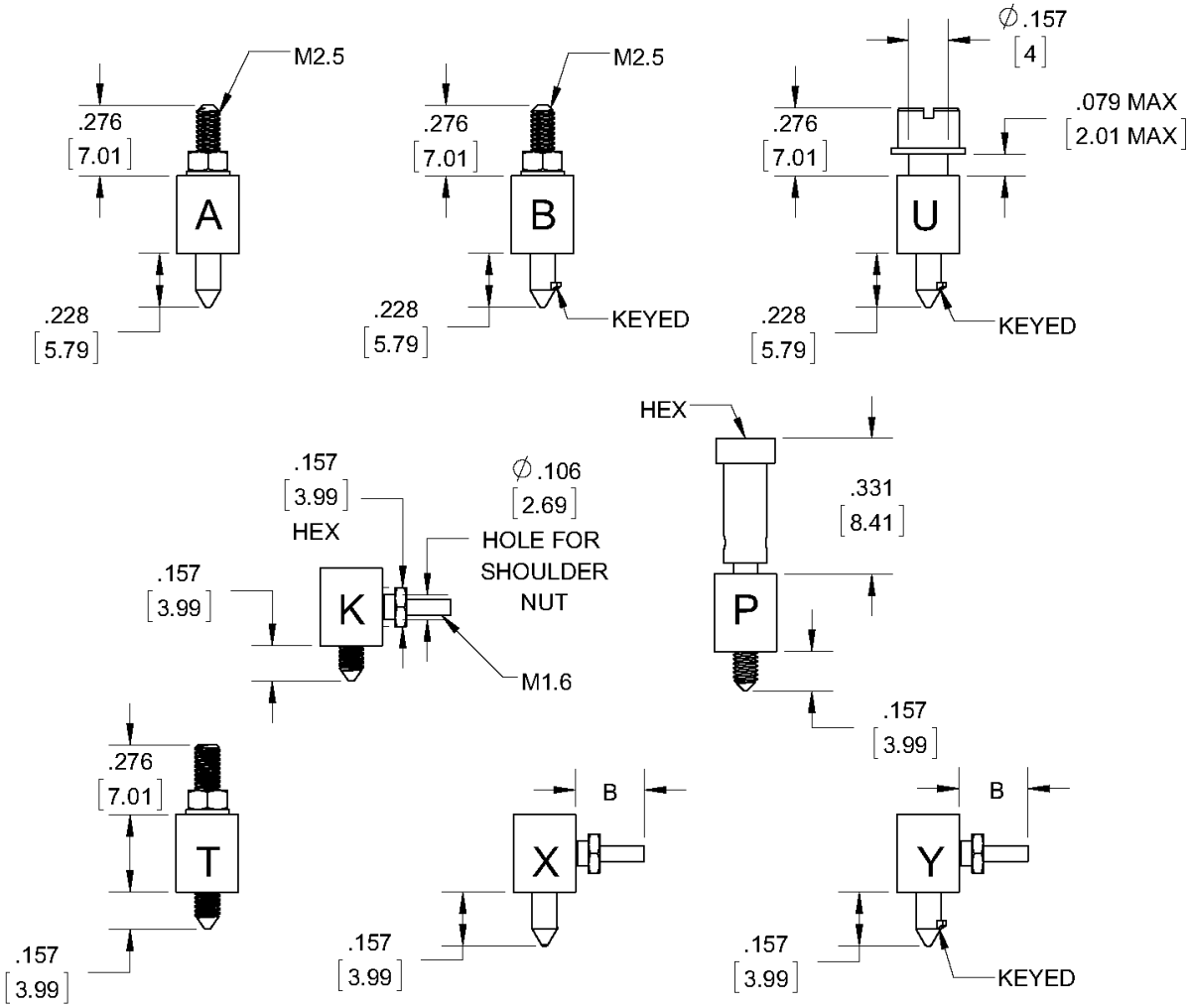
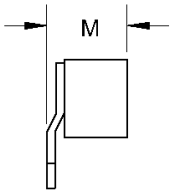
HARDWARE STYLES
GUIDE PINS, 2 & 3 ROW
HARDWARE CONFIGURATION SHOWN ASSEMBLED
PIN SHIELD OPTIONAL

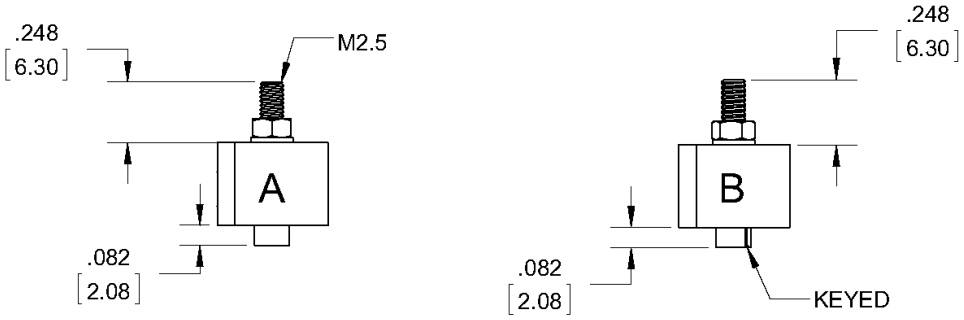


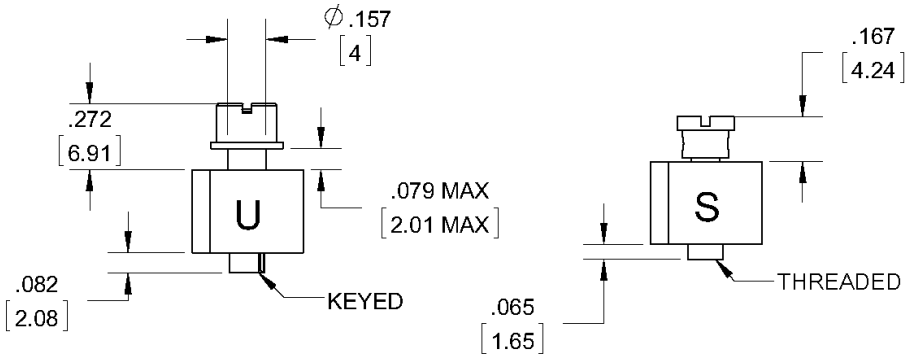
DIMENSION B						
TERMINAL STYLE(E)	2 ROW	3 ROW	3 ROW 160	2 ROW W/SHIELD	3 ROW W/SHIELD	3 ROW 160 W/SHIELD
3,4	.191 [4.85]	.207 [5.25]	.220 [5.58]	.240 [5.18]	.205 [5.20]	.218 [5.53]
1,2	.124 [3.15]	.128 [3.25]	.141 [3.58]	.165 [4.18]	.126 [3.20]	.139 [3.53]

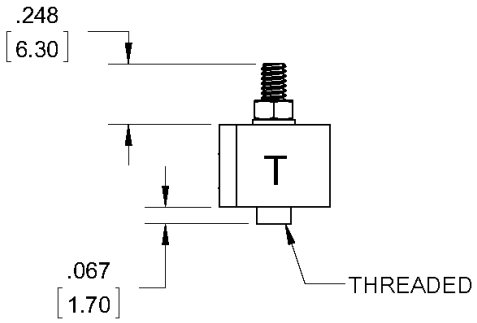


CONNECTOR W/SHIELD	M
2 ROW	.343 [8.71]
3 ROW	.447 [11.36]

HARDWARE STYLES
GUIDE SOCKETS, 4 & 5 ROW
HARDWARE CONFIGURATION SHOWN ASSEMBLED







HARDWARE COMPATIBILITY									
		GUIDE PINS							
		A	B	U	K	P	T	X	Y
GUIDE SOCKETS	A	•						•	
	B		•	•					•
	U		•	•					•
	S				•	•	•		
	T					•			

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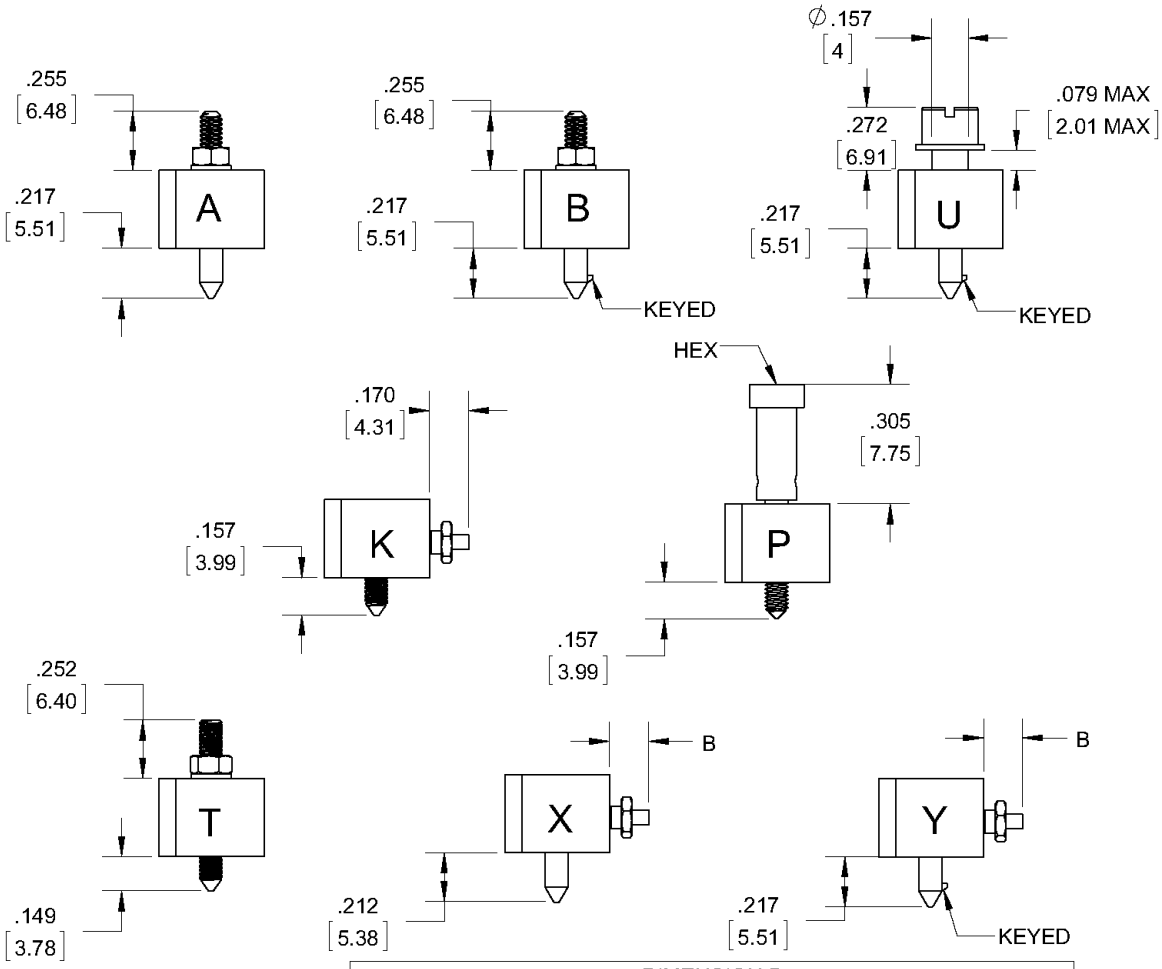
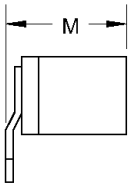
HARDWARE STYLES
GUIDE PINS, 4 & 5 ROW
HARDWARE CONFIGURATION SHOWN ASSEMBLED
PIN SHIELD OPTIONAL



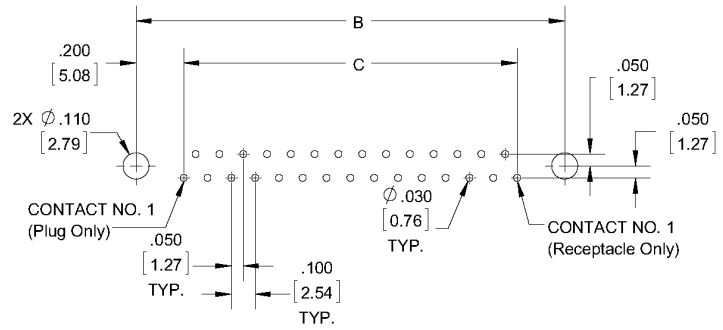
DIMENSION B				
TERMINAL STYLE (E)	4 ROW	5 ROW	4 ROW W/SHIELD	5 ROW W/SHIELD
3	.203 [5.16]	.232 [5.89]	.168 [4.26]	.236 [5.91]
2	.164 [4.16]	.153 [3.89]	.168 [4.26]	.236 [5.91]



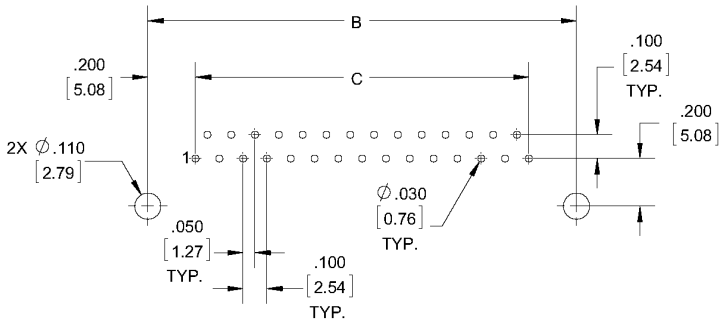
CONNECTOR W/SHIELD	M
4 ROW	.541 [13.74]
5 ROW	.661 [16.78]

PWB PATTERN
2 ROW UNINTERRUPTED,
AS VIEWED FROM THE CONNECTOR SIDE

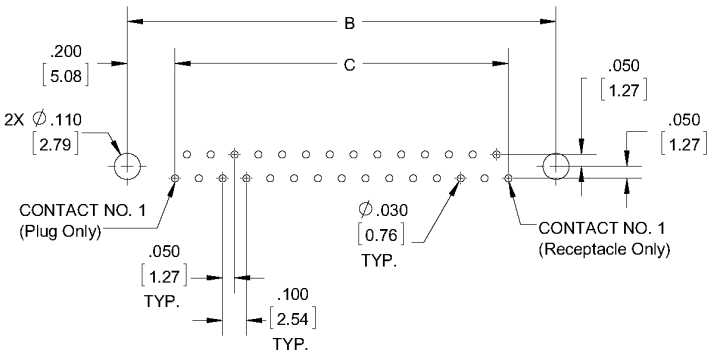
F[C,D,S,V,W]A
S[C,D,S,V,W]A



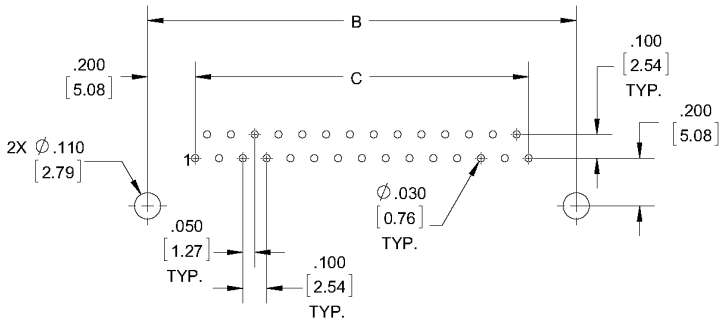
SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A



MEA



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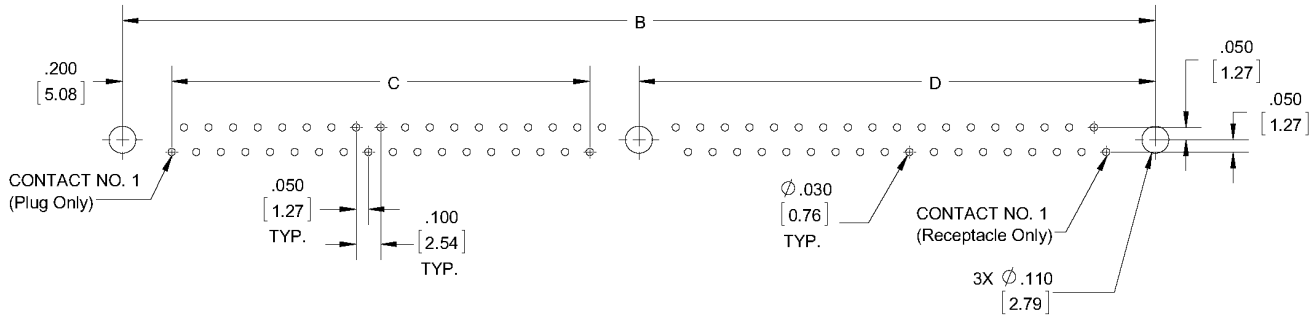
PWB PATTERN

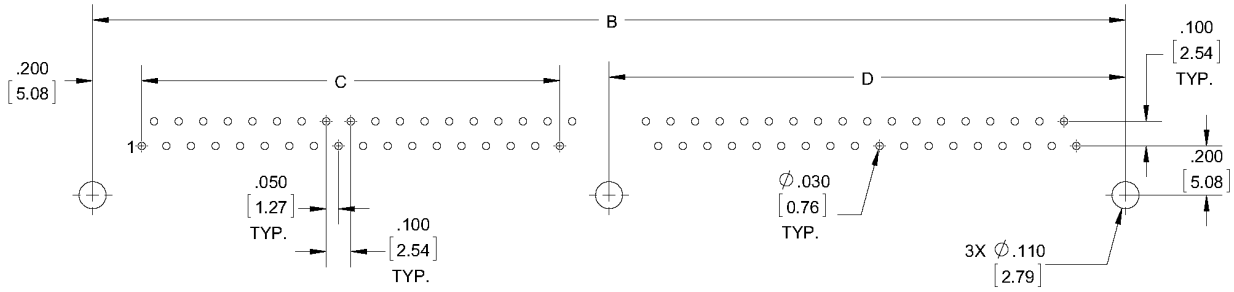
2 ROW INTERRUPTED

AS VIEWED FROM THE CONNECTOR SIDE

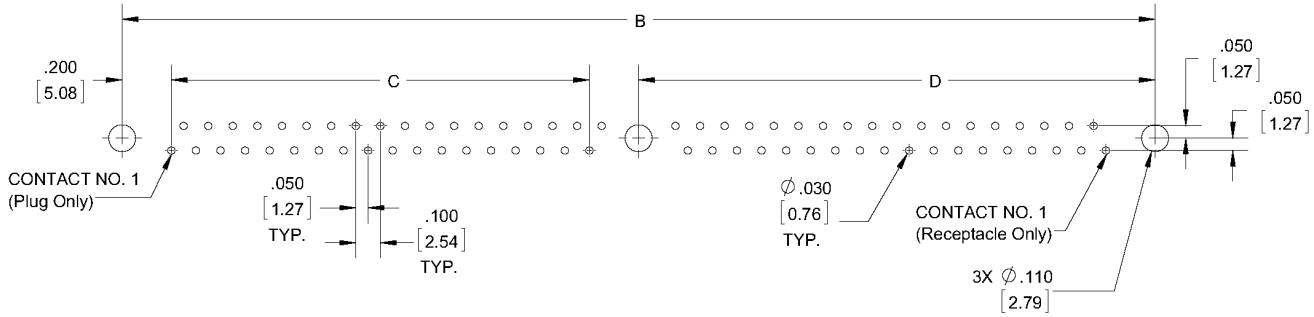
F[C,D,S,V,W]A
S[C,D,S,V,W]A



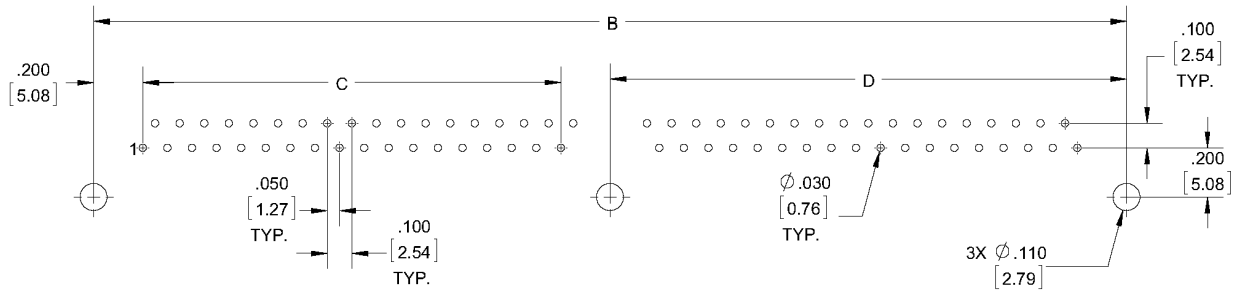
SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A

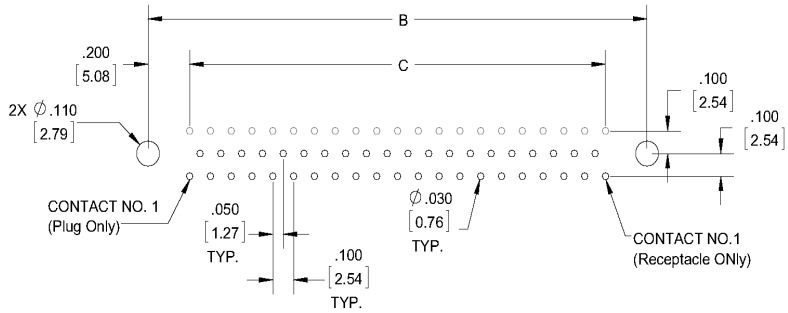


MEA

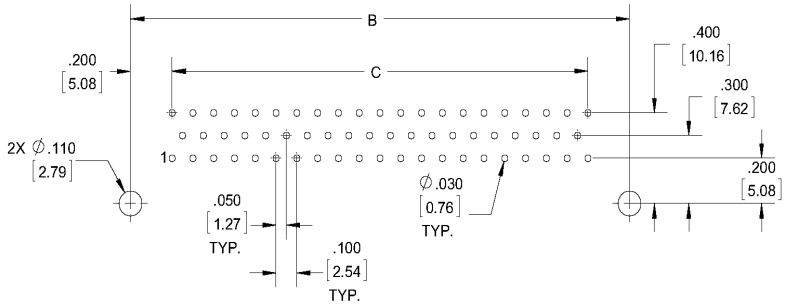


PWB PATTERN
3 ROW UNINTERRUPTED
AS VIEWED FROM THE CONNECTOR SIDE

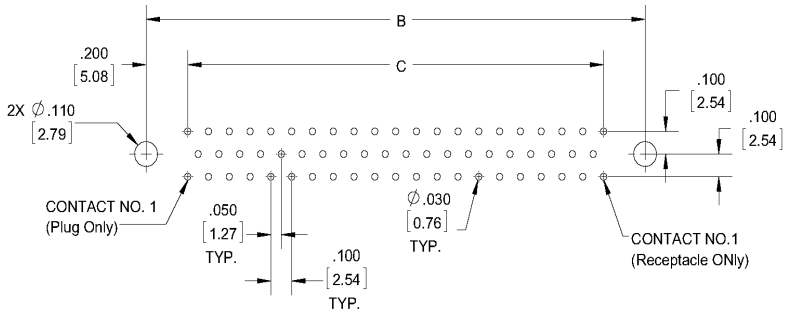
F[C,D,S,V,W]A
S[C,D,S,V,W]A



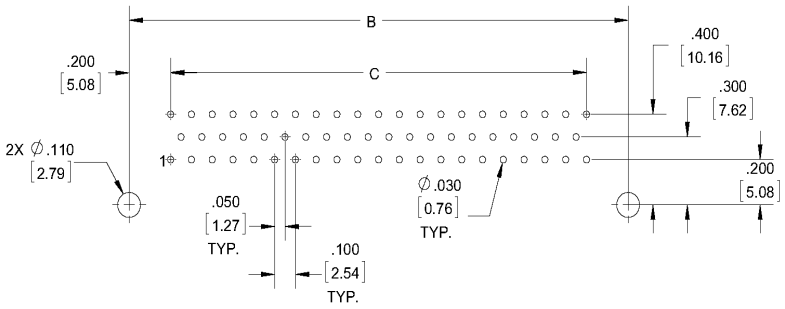
SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A



MEA



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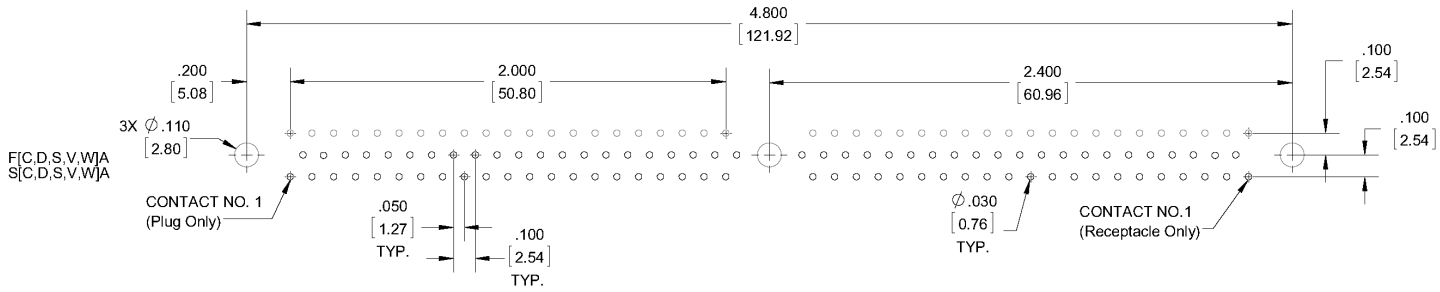
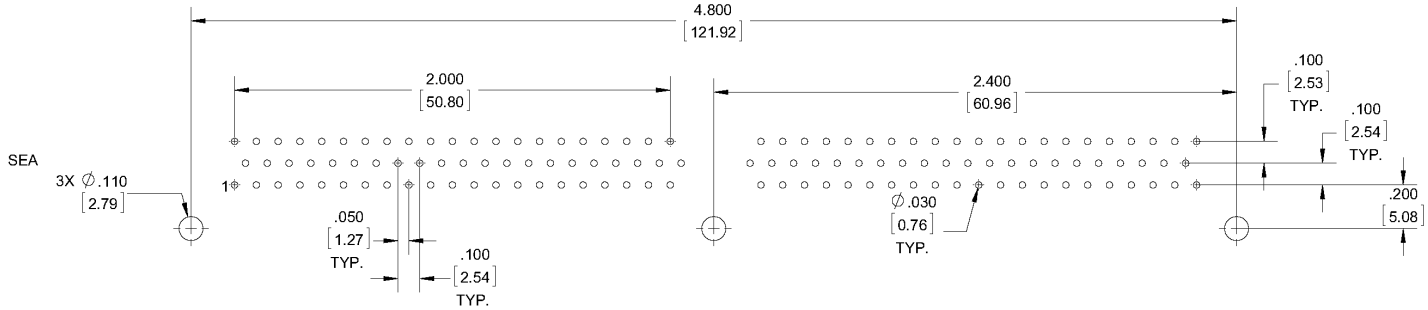
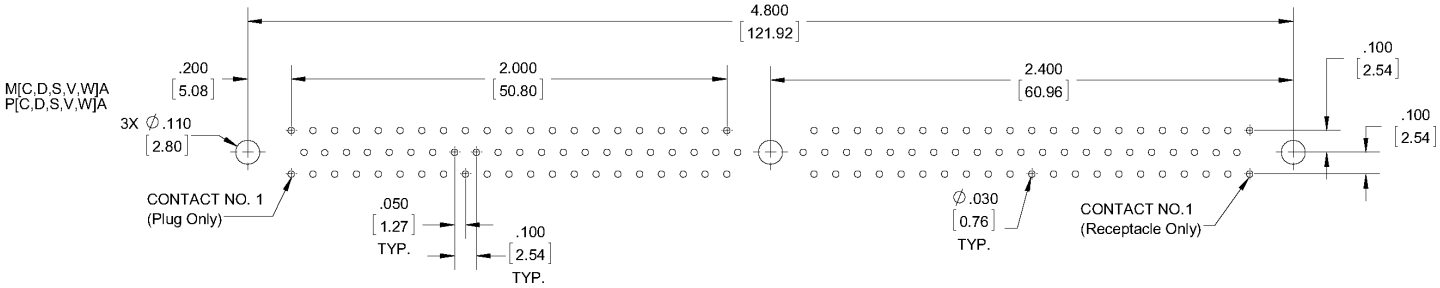
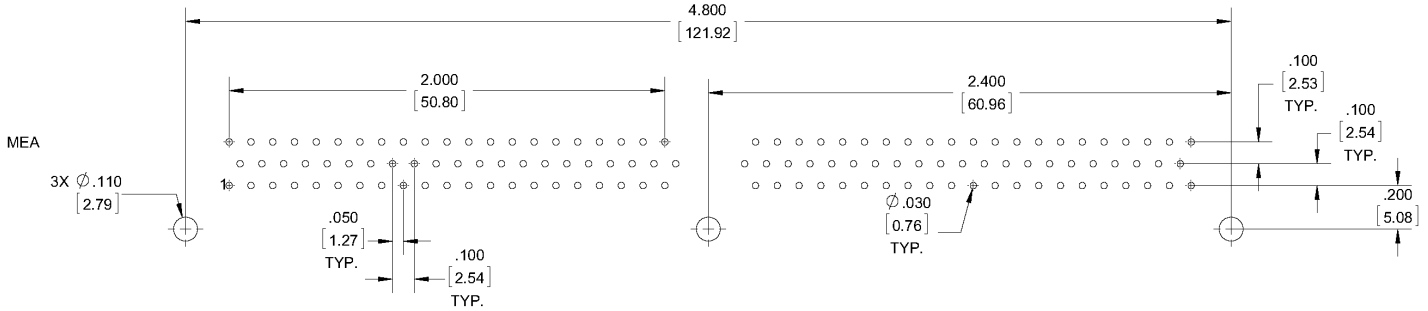
PWB PATTERN
3 ROW INTERRUPTED 126
AS VIEWED FROM THE CONNECTOR SIDE







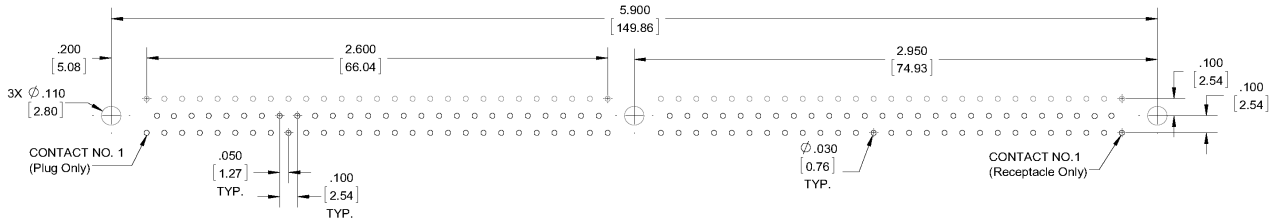


PWB PATTERN

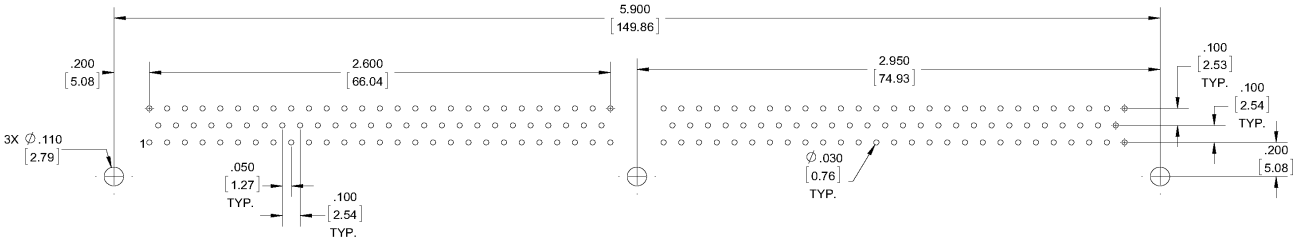
3 ROW INTERRUPTED 160

AS VIEWED FROM THE CONNECTOR SIDE

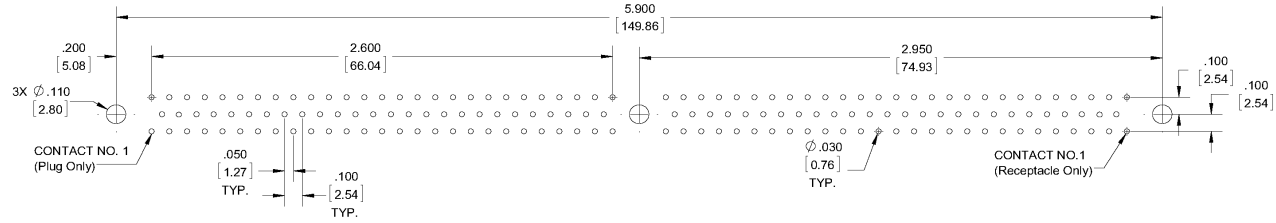
F[C,D,S,V,W]A
S[C,D,S,V,W]A



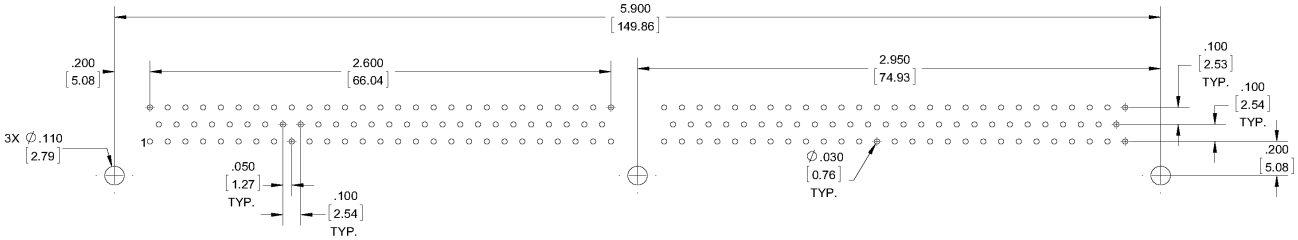
SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A



MEA



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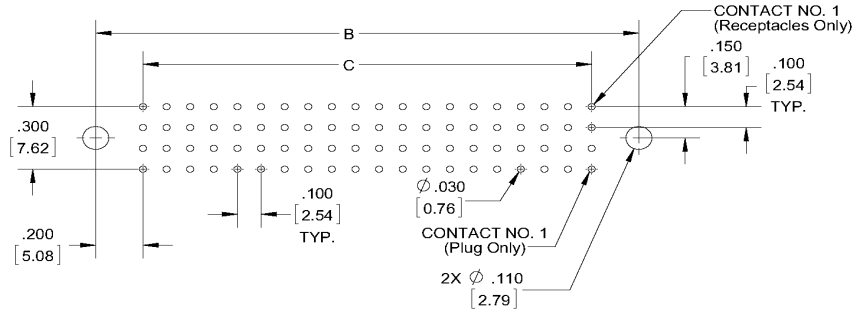
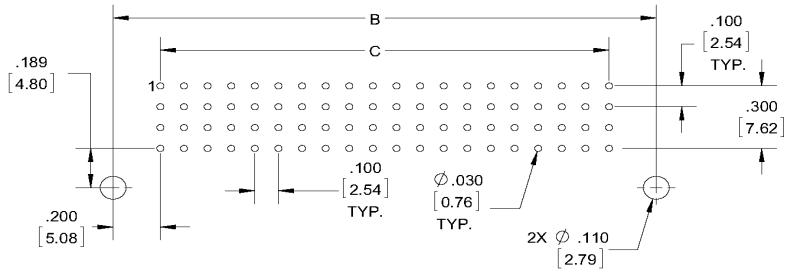
PWB PATTERN
4 ROW UNINTERRUPTED,
AS VIEWED FROM THE CONNECTOR SIDE

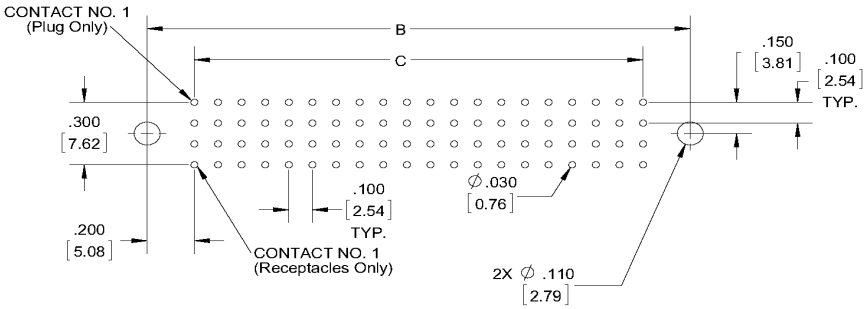
F[C,D,S,V,W]A
S[C,D,S,V,W]A



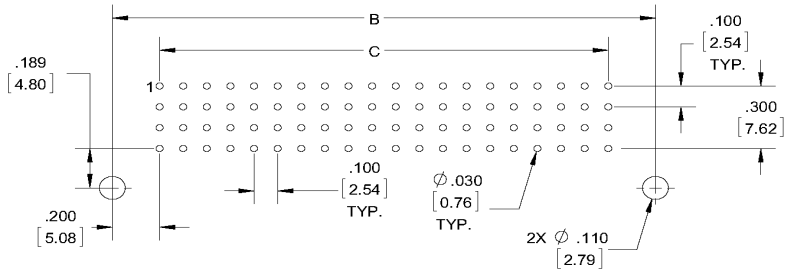
SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A

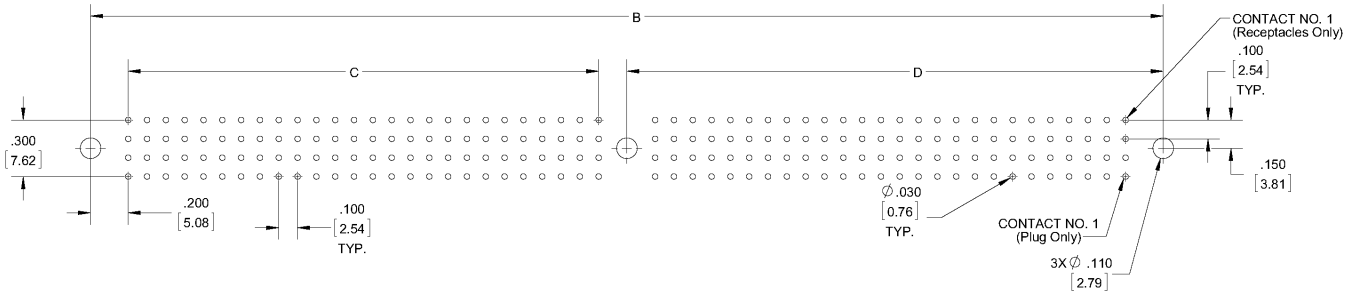


MEA

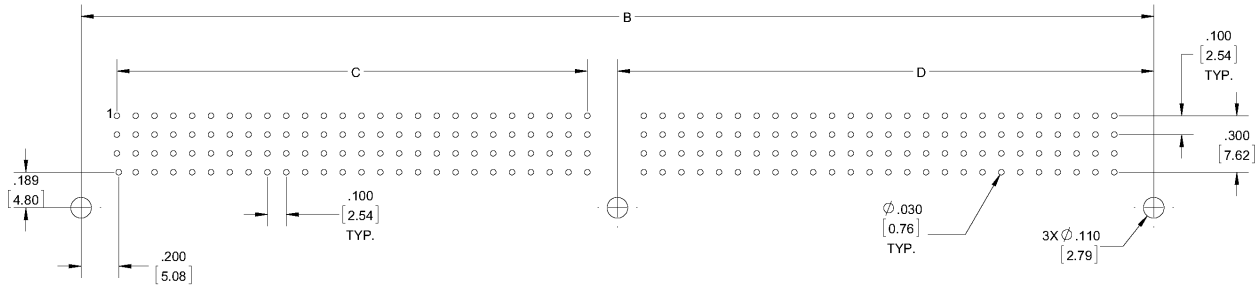


PWB PATTERN
4 ROW INTERRUPTED
AS VIEWED FROM THE CONNECTOR SIDE

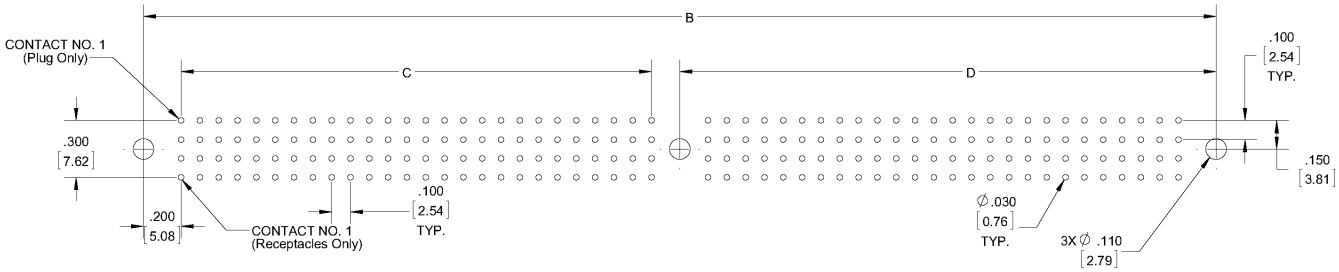
F[C,D,S,V,W]A
S[C,D,S,V,W]A



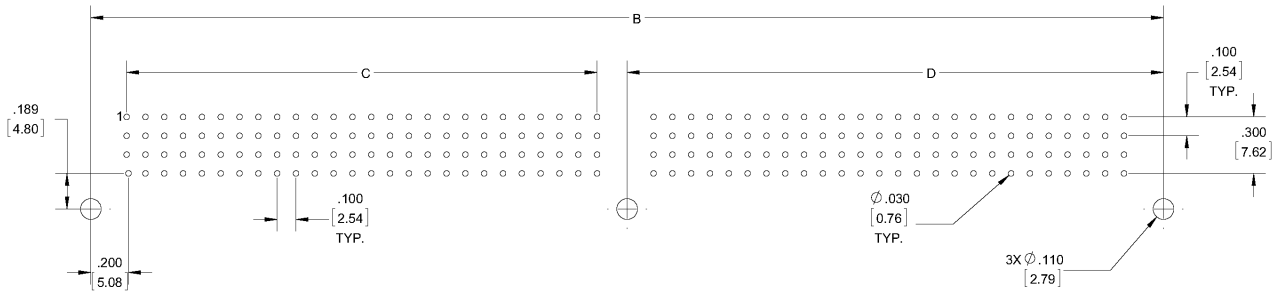
SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A



MEA



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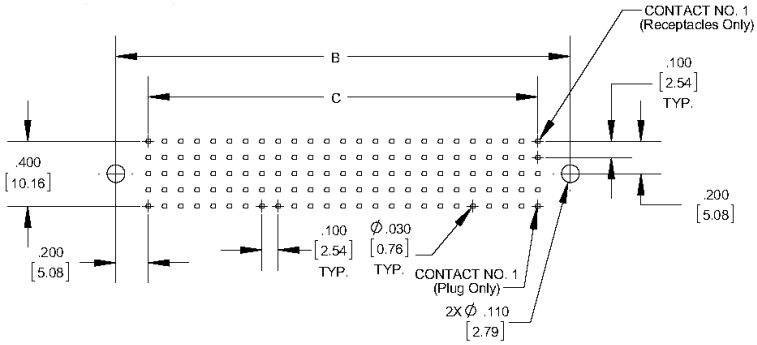
PWB PATTERN

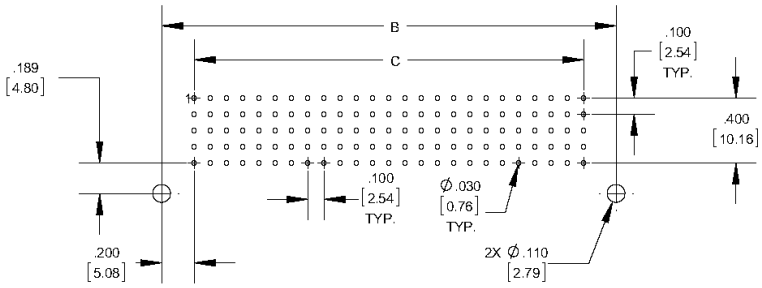
5 ROW UNINTERRUPTED

AS VIEWED FROM THE CONNECTOR SIDE

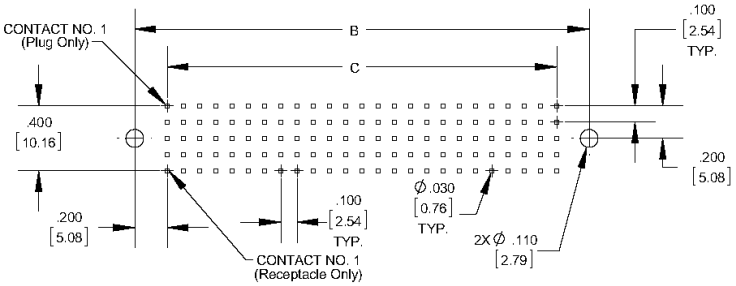
F[C,D,S,V,W]A
S[C,D,S,V,W]A



SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A



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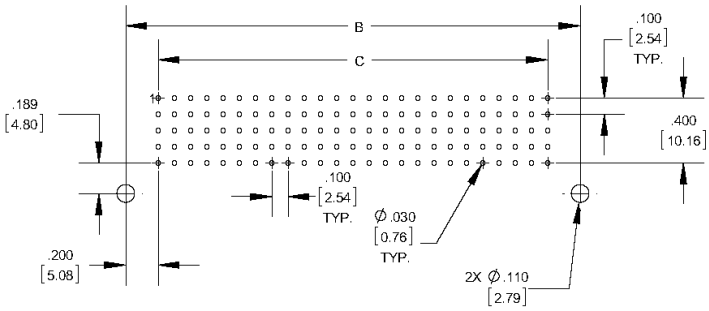
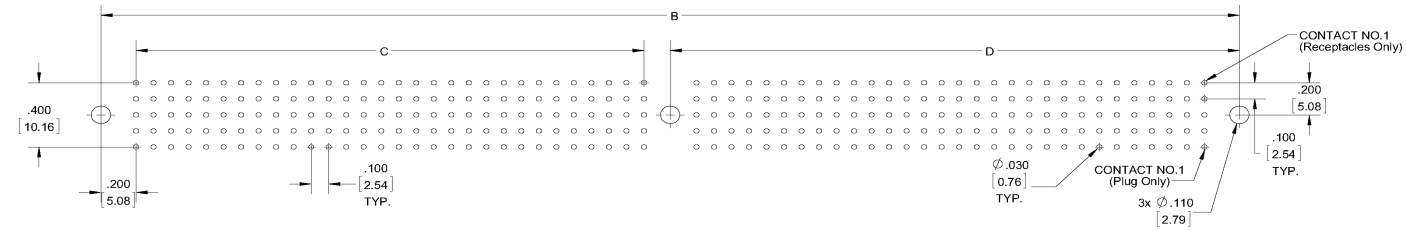
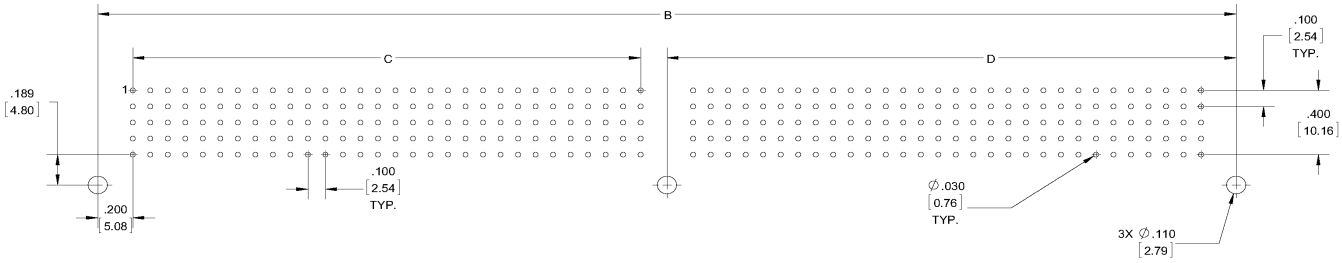


PWB PATTERN
5 ROW INTERRUPTED
AS VIEWED FROM THE CONNECTOR SIDE

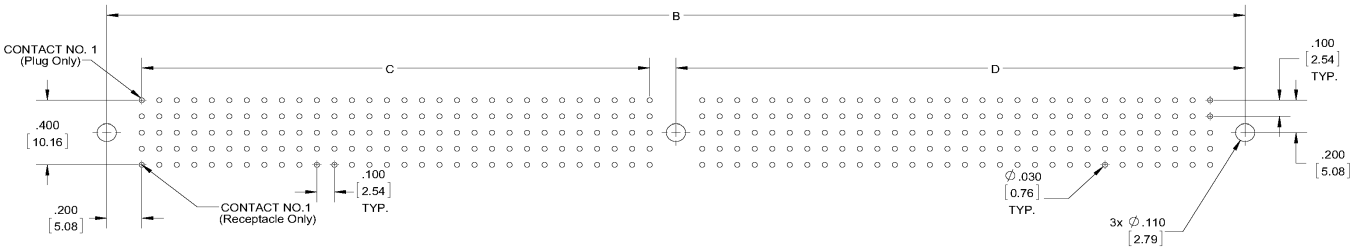
F[C,D,S,V,W]A
S[C,D,S,V,W]A



SEA



M[C,D,S,V,W]A
P[C,D,S,V,W]A



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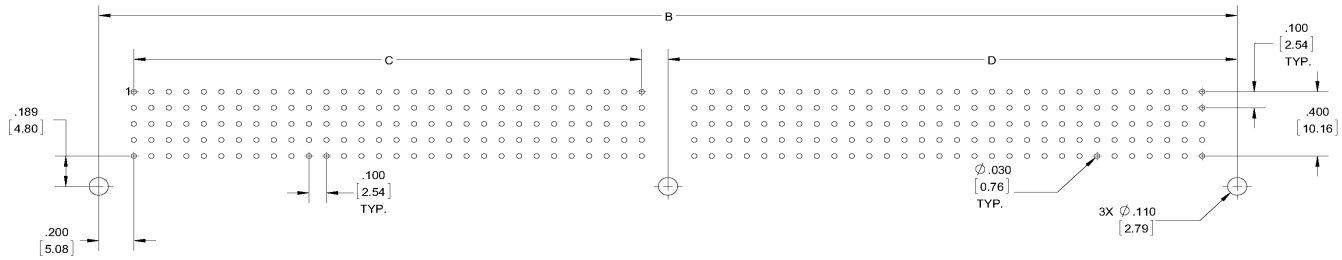

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ACCESSORIES

Crimping & Tooling

OPTIONAL TOOLS

Insertion Tool:	M81969/14-01
Extraction Tool:	M81969/14-01 or S/DEM 1.0060

CRIMP TOOLS

For Termination Style C (Crimp)	
Crimp Tool Positioner	K547
Crimp Tool	M22520/2-01 or AFM8
For Termination Style G (Double Crimp)	
Crimp Tool Positioner (Wire)	K547
Crimp Tool Positioner (Insulation)	K640
Crimp Tool	M22520/2-01 or AFM8

IEH CORPORATION

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