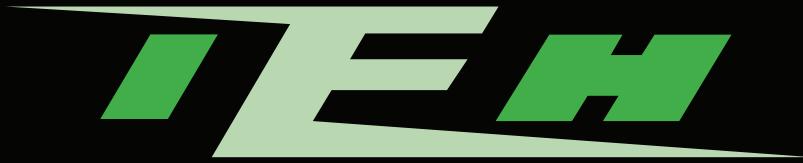


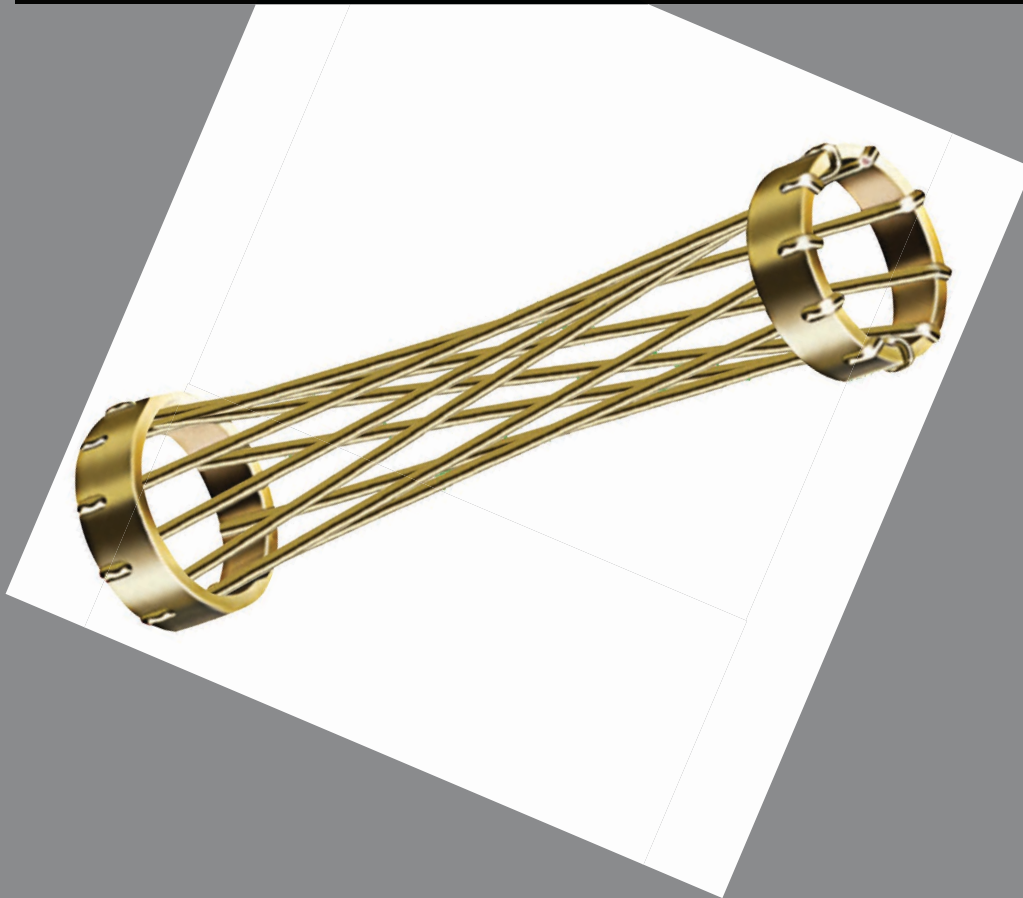
HVM .050 X .050 HYPERBOLOID SERIES



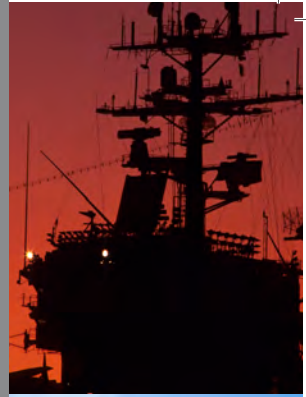
HYPERBOLOID CONNECTORS

FOR SUPERIOR PERFORMANCE IN ALL APPLICATIONS

IEH CORPORATION ISO 9001:2015



www.iehcorp.com



CONTENTS

HVM SERIES - .050 X .050 CONNECTORS

PAGE

- 2 Introduction
- 3 Specifications
- 4 Ordering Chart - 2 row

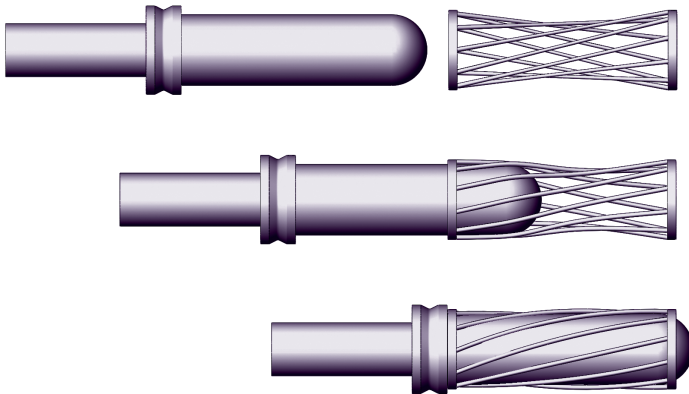
HVM CONTACT STYLES

- 5 FAE9 - Receptacle, Stacking
- 6 FCE, FDE, FSE, FVE - Receptacle, Straight (Crimp, Dip Solder, Solder Cup, Compliant)
- 7 FEE - Receptacle, Right Angle (Dip Solder)
- 8 MCE, MDE, MSE, MVE - Plug, Straight (Crimp, Dip Solder, Solder Cup, Compliant)
- 9 MEE - Plug, Right Angle (Dip Solder)

APPENDIX

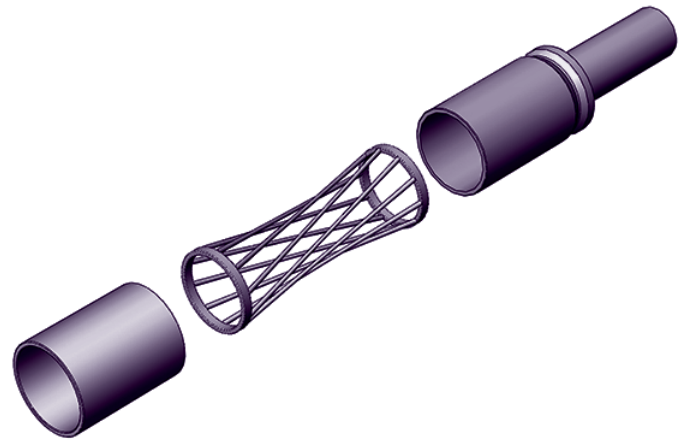
- 10 Termination Style - Receptacle
- 11 Termination Style - Plug
- 12 Hardware Style
- 13 Polarization Chart
- 14 PWB Patterns - Plug
- 15 PWB Patterns - Receptacle

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 B197, or Cu alloy
Socket Contacts:	
Contact Wires:	BeCu per ASTM B196, or B197
Termination:	PhBr per ASTM B139 or Cu alloy
Support Elements:	Cu alloy
Hardware:	Corrosion resistant steel per ASTM A582 or Cu alloy
Insulator:	Modified polyphenylene sulfide per MIL-M-24519, Type GST-40F or ASTM D5927

FINISHES:

Pin Contacts:	Gold per MIL-DTL-45204 Type II, Class 1 (.000050), Grade C over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418
Socket Contacts:	
Contact Wires:	Gold per MIL-DTL-45204 Type II, Class 1 (.000050), Grade C over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418
Termination:	Gold per MIL-DTL-45204, Type II Class 00 (.000020), 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., per SAE-AMS-QQ-N-290 over Copper per SAE AMS 2418
Hardware:	Passivate per SAE-AMS2700 except Cu alloy hardware to be Nickel plate, 0.000050 min.

PERFORMANCE:

Current Rating:	3* amp continuous (higher ratings may be supported-contact factory)
Insulation Resistance:	5000 megaohms min. - EIA-364-21 & MIL-DTL-55302 (par. 4.5.8)
Contact Resistance:	5 milliohms max, - EIA-364-06 & MIL-DTL-55302 (par. 4.5.5)
Test Voltage (DWV):	750 VAC RMS @ sea level - EIA-364-20 & MIL-DTL-55302 (par. 4.5.7.1) 250 VAC RMS @ 70,000 ft.
Temperature:	-65°C to +125°C (-86°F to +257°F)
Mating Force:	0.4 lbs. x number of contacts, max. - MIL-STD-55302 (par. 4.5.4)
De-mating Force:	>.02 lbs. x number of contacts, min. - 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.

* Ampacity ratings shown are derated in accordance with the published military specifications. For stand-alone, full service ratings, supported by test data, please refer to IEH's Contacts Catalog, or contact the factory.

**Qualification by similarity

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-ROW

HVM	010	FDE	1	X	71	C	0	00
------------	------------	------------	----------	----------	-----------	----------	----------	-----------

Series

Contact Capacity
(Use All 3 Places)

Body Style	
Receptacle	
FAE	Stacking
FCE	Crimp**
FDE	Dip Solder Straight
FEE	Dip Solder Right Angle
FSE	Solder Cup**
FVE	Compliant
Plug	
MCE	Crimp**
MDE	Dip Solder Straight
MEE	Dip Solder Right Angle
MSE	Solder Cup**
MVE	Compliant

Termination Length - "L"	
Code	Dip Solder
1	.109
2	.140
3	.172
4	.234
9	User Defined
0	Use For Crimp, Solder Cup & Compliant Without Extension
A	Use For Compliant With Stacking Extension

Variation Code - Factory Assigned	
Most Common Variations	
00	No Variation
20	Solder Dip Terminals
C0	Epoxy Termination Sealed
C2	Epoxy Sealed & Solder Dipped

*Sliding Pin Guide	
0	No Guide
1	One Guide
2	Two Guides

Mounting Style	
C	Threaded Insert
E	Threaded Stud
0	No Mount Provision
Check Factory. Not All Styles Are Available In All Configurations.	

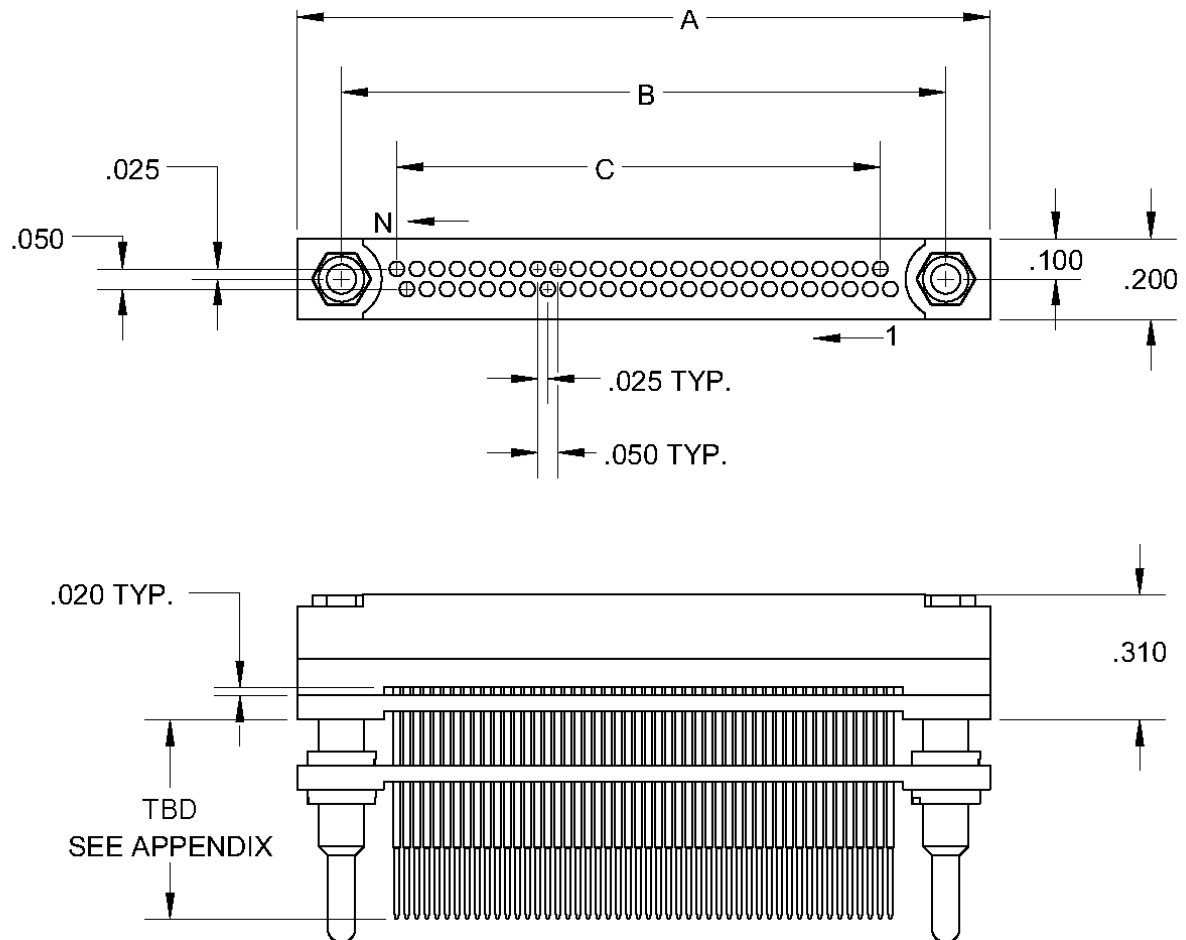
Hardware Arrangement	
00	No Hardware
01 - 36	Keyed Guides
69 - 72	See Appendix
97	2 Pin Guides Unassembled
98	2 Socket Guides Unassembled
99	1 Pin & Socket Unassembled

Hardware Style	
A	Round Guides w/ Mtg. Stud
B	Keyed Guides w/ Mtg. Stud (Polarizing)
H	Short Rotating
K	Fixed Locking
T	Fixed Locking w/ Mtg. Stud
X	Round Guides
Y	Keyed Guides (Polarizing)
0	No Hardware Supplied

***For Stacking Connectors, to aid in pin alignment**

****Specifications may vary, please contact factory for more information**

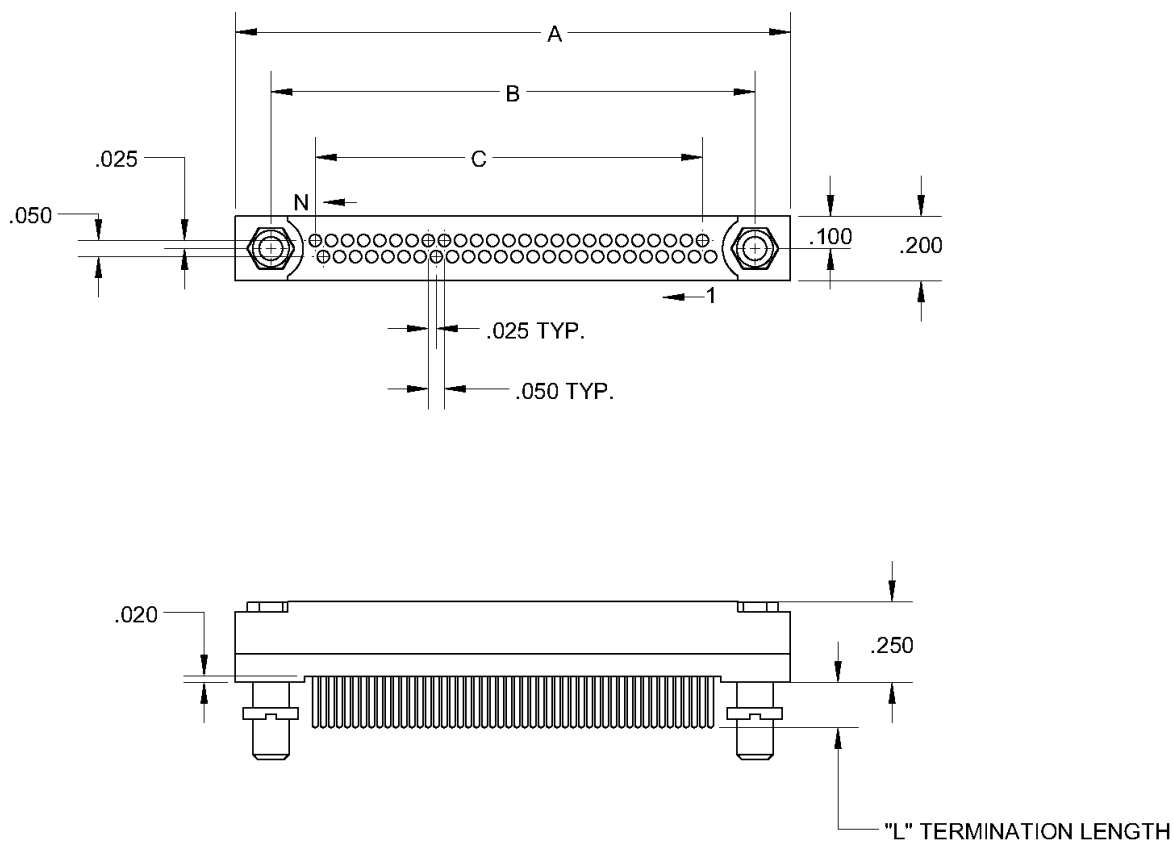
RECEPTACLE, STACKING STYLE FAE9



'N' Contacts	A	B	C
010	.720	.500	.200
020	.970	.750	.450
030	1.220	1.000	.700
040	1.470	1.250	.950
050	1.720	1.500	1.200
060	1.970	1.750	1.450
070	2.220	2.000	1.700
080	2.470	2.250	1.950
090	2.720	2.500	2.200
100	2.970	2.750	2.450

REFER TO APPENDIX FOR TERMINATION
DETAILS, HARDWARE STYLES, POLAR-
IZATION CHART, AND PWB PATTERNS

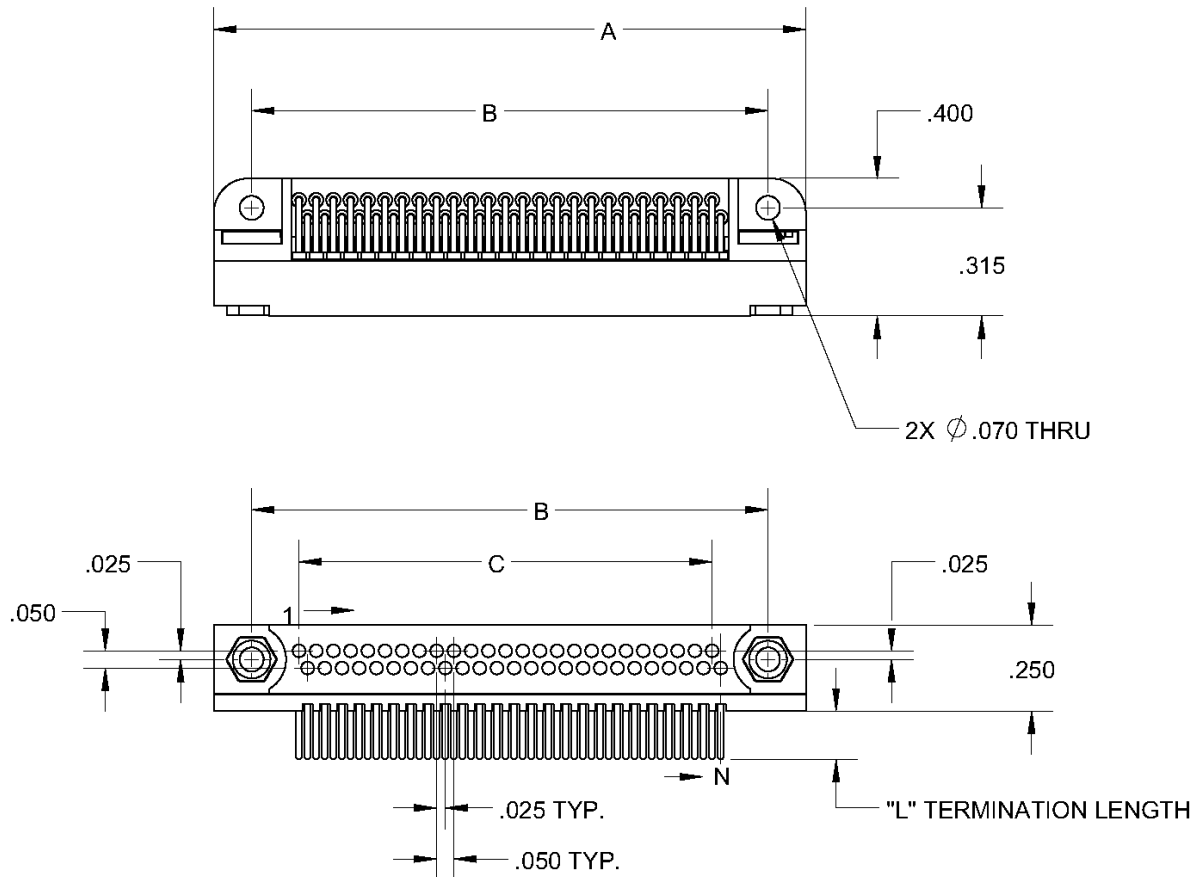
RECEPTACLE, STRAIGHT STYLE FCE, FDE, FSE, FVE



'N' Contacts	A	B	C
010	.720	.500	.200
020	.970	.750	.450
030	1.220	1.000	.700
040	1.470	1.250	.950
050	1.720	1.500	1.200
060	1.970	1.750	1.450
070	2.220	2.000	1.700
080	2.470	2.250	1.950
090	2.720	2.500	2.200
100	2.970	2.750	2.450

***REFER TO APPENDIX FOR TERMINATION
DETAILS, HARDWARE STYLES, POLAR-
IZATION CHART, AND PWB PATTERNS**

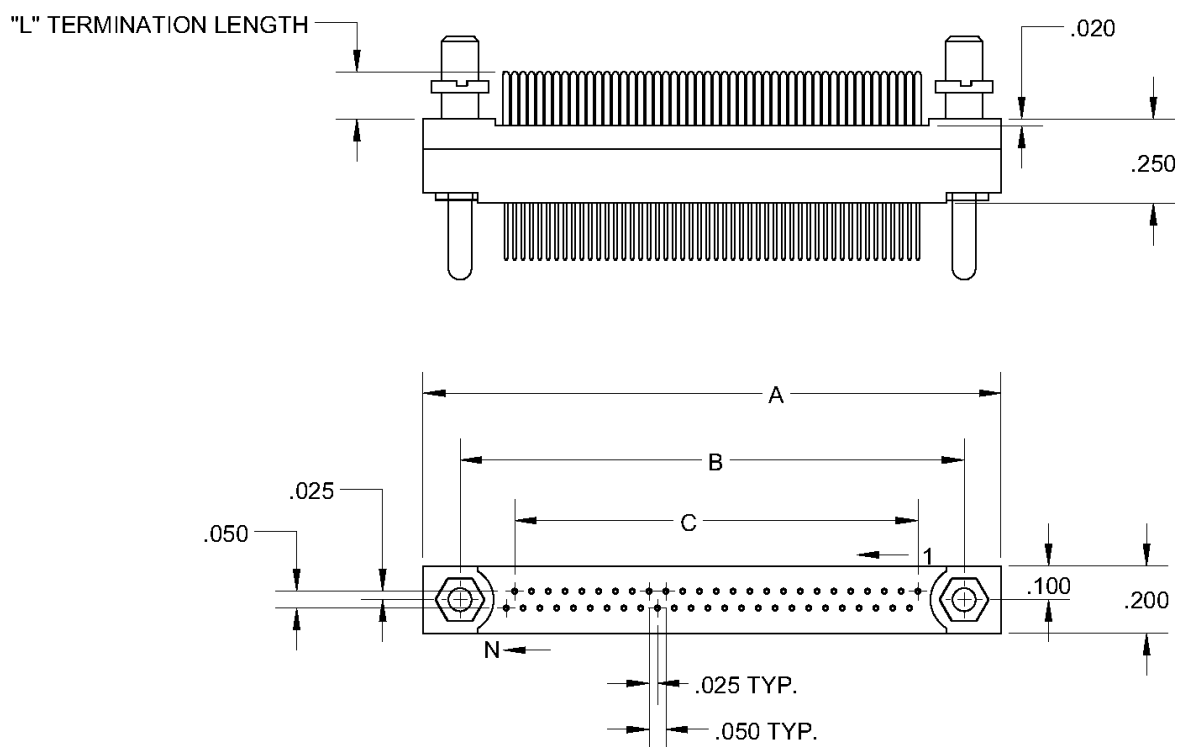
RECEPTACLE, RIGHT ANGLE STYLE FEE



'N' Contacts	A	B	C
010	.720	.500	.200
020	.970	.750	.450
030	1.220	1.000	.700
040	1.470	1.250	.950
050	1.720	1.500	1.200
060	1.970	1.750	1.450
070	2.220	2.000	1.700
080	2.470	2.250	1.950
090	2.720	2.500	2.200
100	2.970	2.750	2.450

REFER TO APPENDIX FOR TERMINATION
DETAILS, HARDWARE STYLES, POLAR-
IZATION CHART, AND PWB PATTERNS

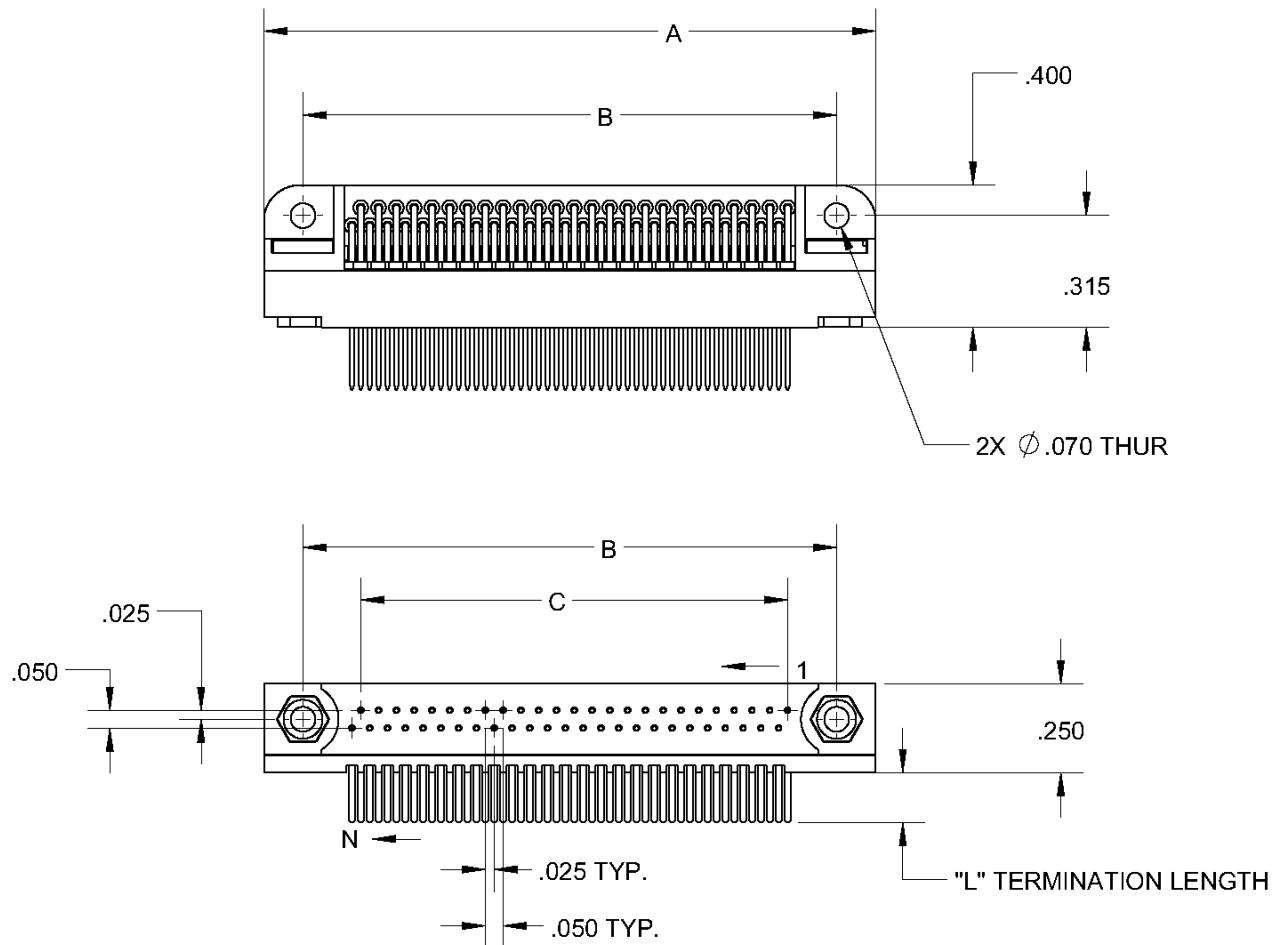
PLUG, STRAIGHT STYLE MCE, MDE, MSE, MVE



'N' Contacts	A	B	C
010	.720	.500	.200
020	.970	.750	.450
030	1.220	1.000	.700
040	1.470	1.250	.950
050	1.720	1.500	1.200
060	1.970	1.750	1.450
070	2.220	2.000	1.700
080	2.470	2.250	1.950
090	2.720	2.500	2.200
100	2.970	2.750	2.450

***REFER TO APPENDIX FOR TERMINATION
DETAILS, HARDWARE STYLES, POLAR-
IZATION CHART, AND PWB PATTERNS**

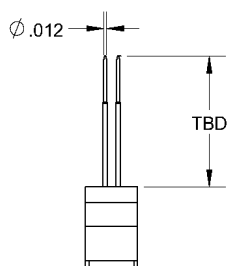
PLUG, RIGHT ANGLE STYLE MEE



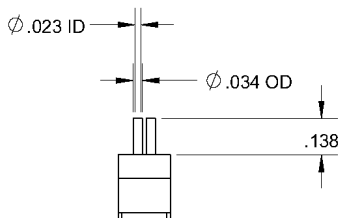
'N' Contacts	A	B	C
010	.720	.500	.200
020	.970	.750	.450
030	1.220	1.000	.700
040	1.470	1.250	.950
050	1.720	1.500	1.200
060	1.970	1.750	1.450
070	2.220	2.000	1.700
080	2.470	2.250	1.950
090	2.720	2.500	2.200
100	2.970	2.750	2.450

REFER TO APPENDIX FOR TERMINATION
DETAILS, HARDWARE STYLES, POLAR-
IZATION CHART, AND PWB PATTERNS

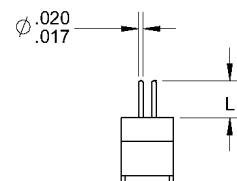
TERMINATION STYLES RECEPTACLE



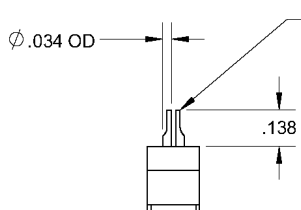
**FAE
STACKING**
Termination length
is Application Specific



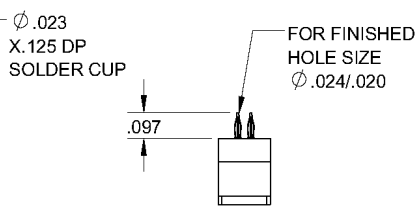
**FCE0
CRIMP**
Accepts 26-28 AWG WIRE



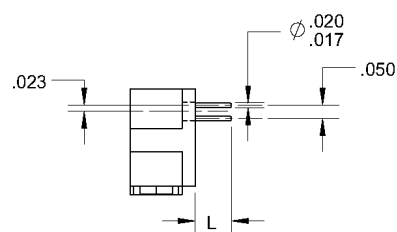
**FDE
DIP SOLDER STRAIGHT
'L'**
1=.109
2=.140
3=.172
4=.234
9=User Defined



**FSE0
SOLDER CUP**
Accepts Up To 26 AWG WIRE



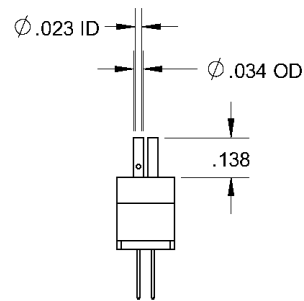
**FVE0
COMPLIANT**



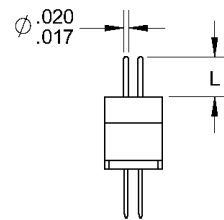
**FEE
DIP SOLDER RIGHT ANGLE
'L'**
1=.109
2=.140
3=.172
4=.234
9=User Defined

TERMINATION STYLES

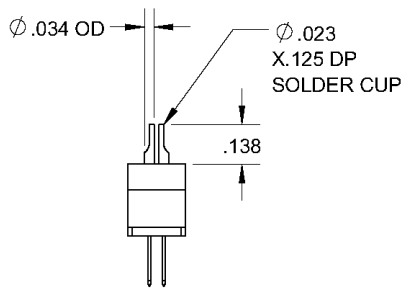
PLUG



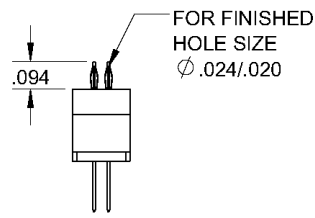
MCE0
CRIMP
Accepts 26-28 AWG WIRE



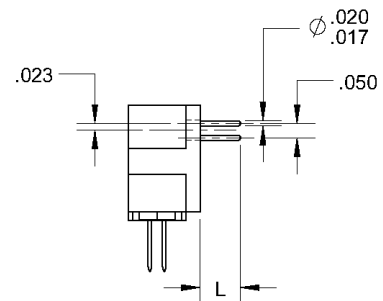
MDE
DIP SOLDER STRAIGHT
'L'
1=.109
2=.140
3=.172
4=.234
9=User Defined



MSE0
SOLDER CUP
Accepts Up To 26 AWG WIRE

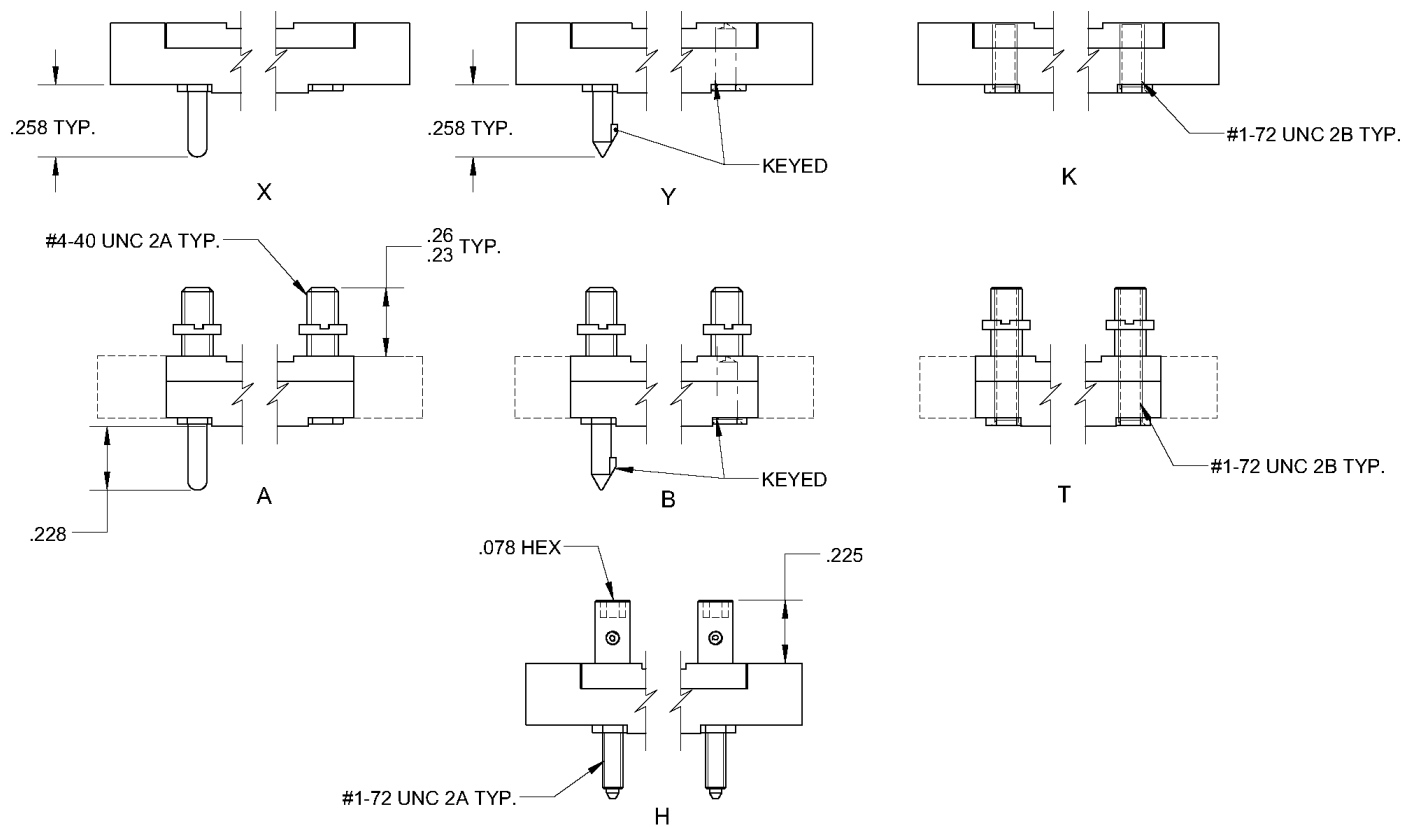


MVE0
COMPLIANT

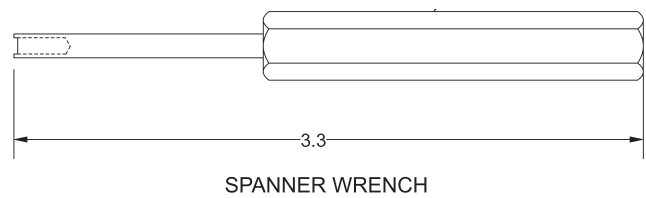


MEE
DIP SOLDER RIGHT ANGLE
'L'
1=.109
2=.140
3=.172
4=.234
9=User Defined

HARDWARE STYLES



Contact factory for alternate lengths and variation code assignment.

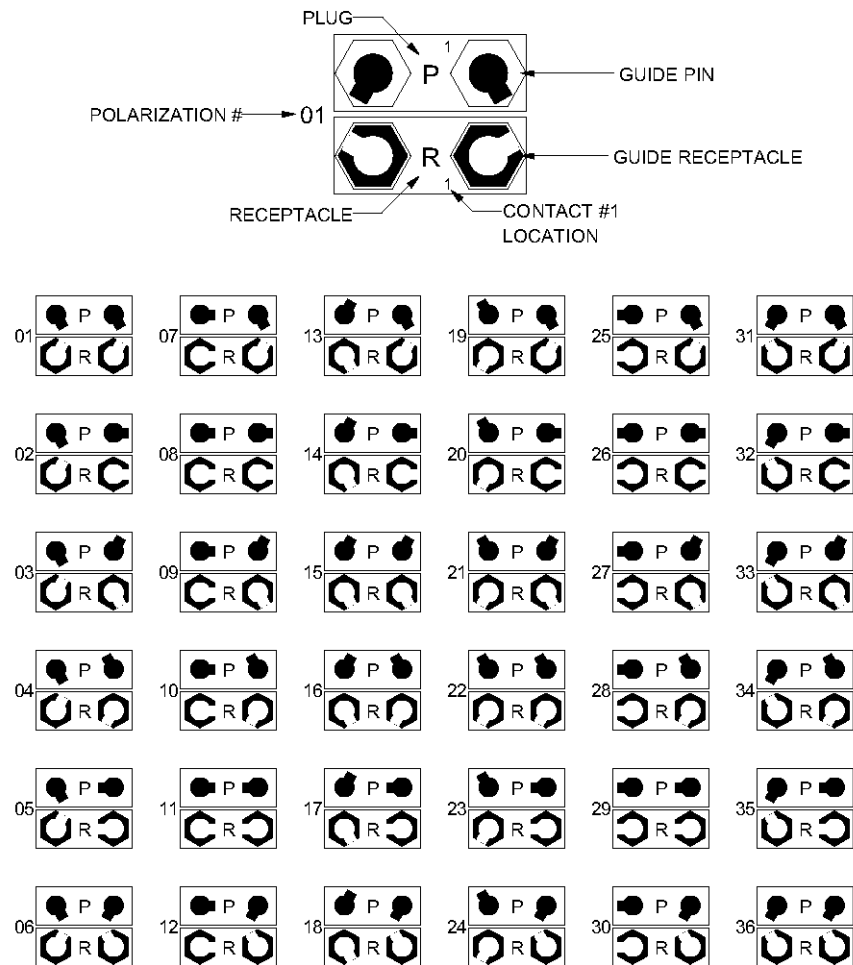


HARDWARE COMPATIBILITY							
	A	B	H	K	T	X	Y
A	•					•	
B		•					•
H				•	•		
K			•				
T			•				
X	•					•	
Y		•					•

POLARIZATION CHART

AS VIEWED FROM THE MATING FACE

01-36 USE FOR HARDWARE STYLE 'Y' & 'B'
More configurations available. Please consult with factory



USE FOR OPTION: A,X



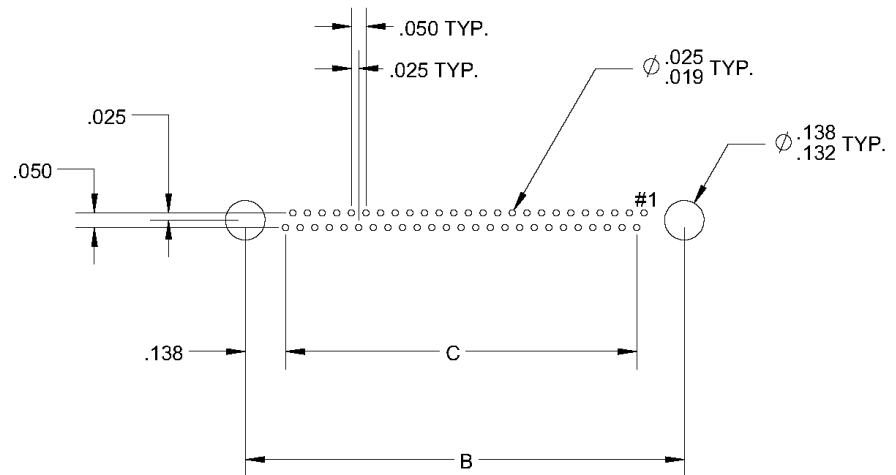
USE FOR OPTION: A,K,X,T,H



NOTE:

Style H Only Guide Pins
Style T Only Guide Sockets
Style K Only Guide Sockets

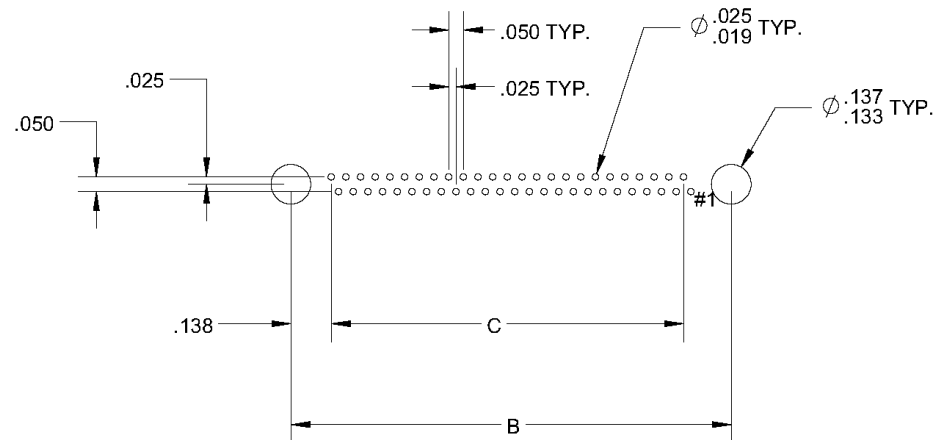
MDE 2- ROW
DIP SOLDER STRAIGHT



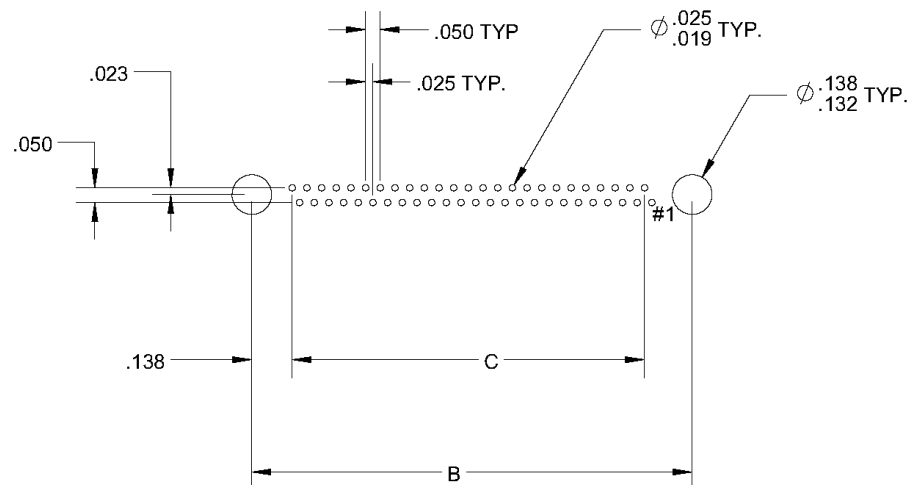
Technical drawing of a mechanical part, likely a shaft or tube, showing dimensions and labels. The drawing includes the following features:

- Dimensions:**
 - $.050$ (Overall length)
 - $.023$ (Distance from left end to first hole)
 - $.050$ TYP. (Distance between two vertical lines)
 - $.025$ TYP. (Distance between two vertical lines)
 - $\phi .025$ (Hole diameter)
 - $\phi .019$ TYP. (Hole diameter)
 - $\phi .138$ (Hole diameter)
 - $\phi .132$ TYP. (Hole diameter)
 - $.138$ (Distance from left end to center of hole)
 - C (Distance between two vertical lines)
 - B (Overall length)
- Labels:**
 - #1 (Label for the hole)

FDE 2- ROW
DIP SOLDER STRAIGHT



FDE 2-ROW
DIP SOLDER RIGHT ANGLE





IEH CORPORATION

140 58TH STREET, 8E, BROOKLYN, NY 11220

PHONE (718) 492-4448 • FAX (718) 492-9898

www.iehcorp.com • ieh@iehcorp.com