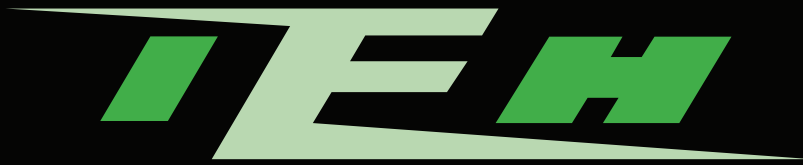


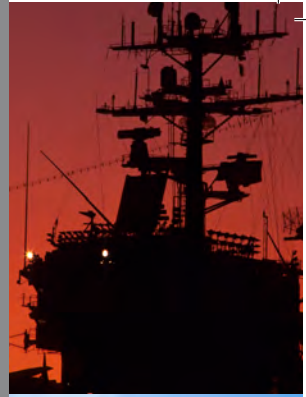
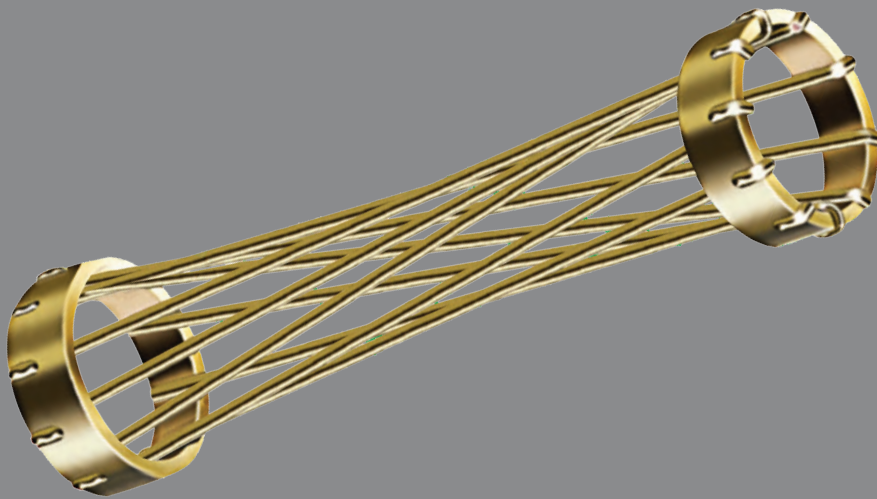
HVM .050 X .050 HYPERBOLOID SERIES



HYPERBOLOID CONNECTORS

FOR SUPERIOR PERFORMANCE IN ALL APPLICATIONS

IEH CORPORATION ISO 9001:2015



www.iehcorp.com

IEH Quality Statement

**Listening to our customers and meeting their needs while
continuously improving our processes and services.**

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HVM SERIES - .050 X .050 CONNECTORS

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- 2 Introduction
- 3 Specifications

- 4 Ordering Chart - 2 row

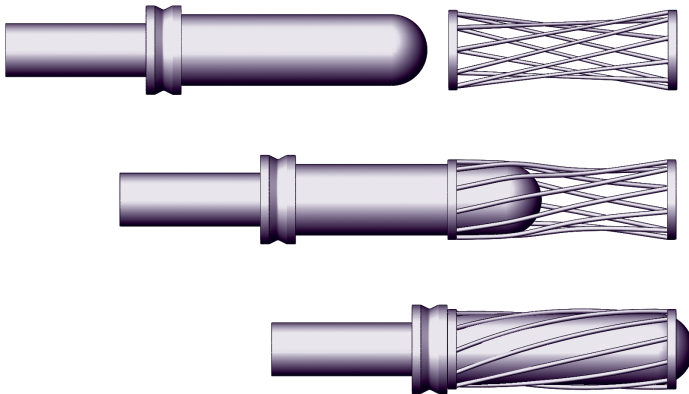
HVM CONTACT STYLES

- 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

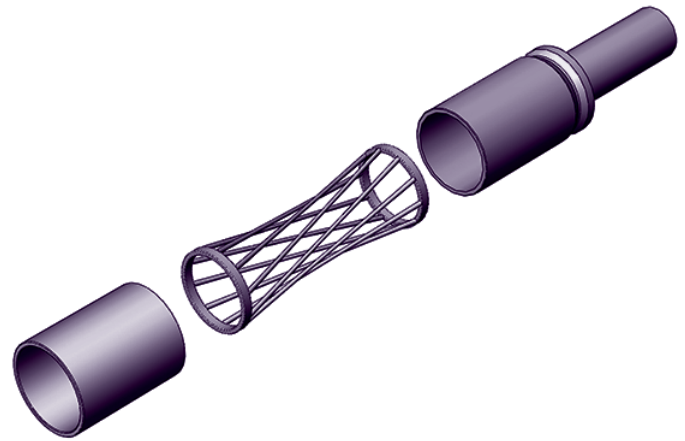
- 10 Termination Style - Receptacle
- 11 Termination Style - Plug
- 12 Hardware Style
- 13 Polarization Chart
- 14 PWB Patterns - Plug
- 15 PWB Patterns - Receptacle

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.

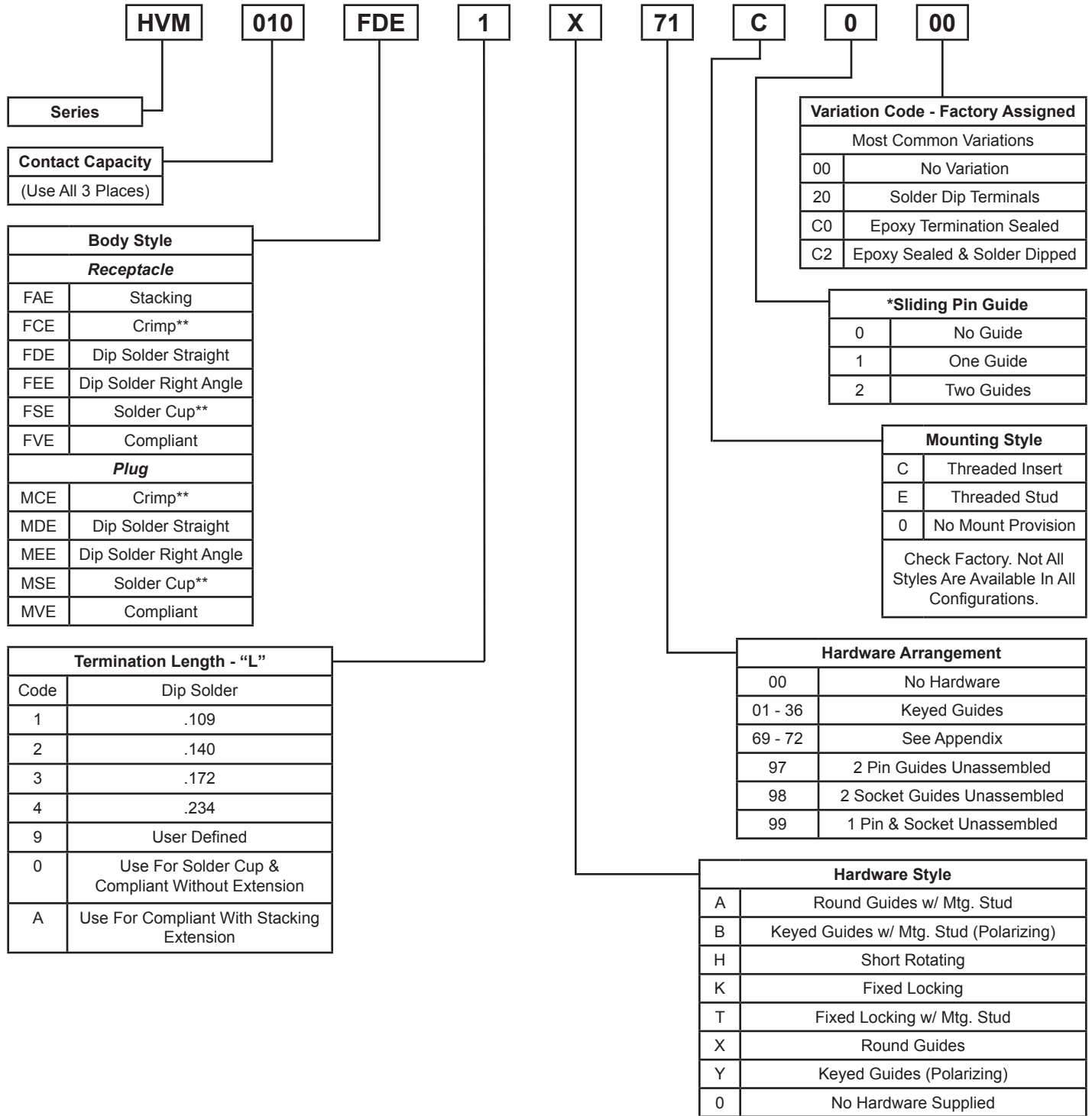
* Ampacity ratings shown are derated in accordance with the published military specifications. For stand-alone, full service ratings, supported by test data, please refer to IEH's Contacts Catalog, or contact the factory.

**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



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 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 |

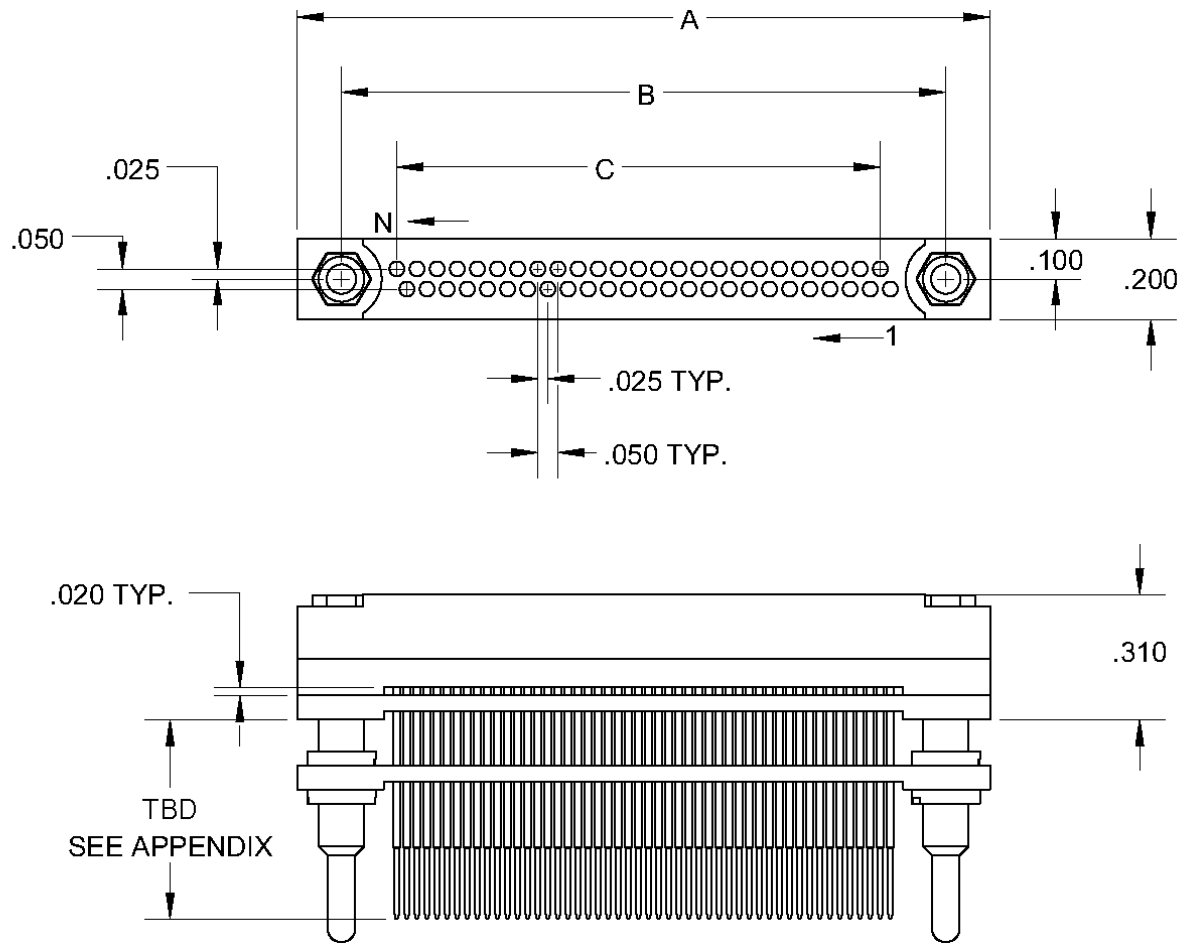
| Mounting Style | |
|--|--------------------|
| C | Threaded Insert |
| E | Threaded Stud |
| 0 | No Mount Provision |
| Check Factory. Not All Styles Are Available In All Configurations. | |

| 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**

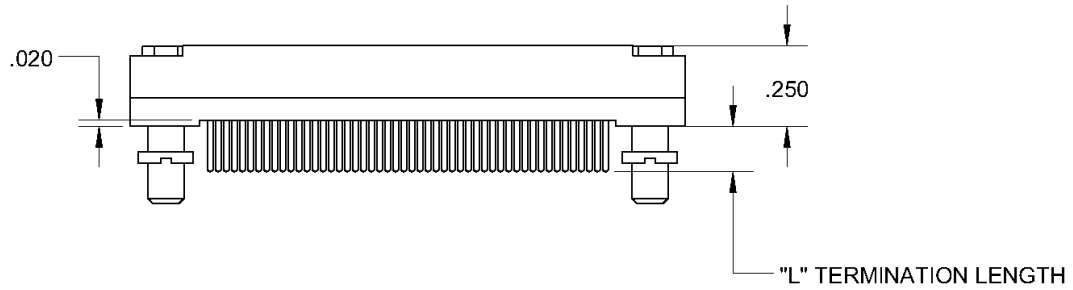
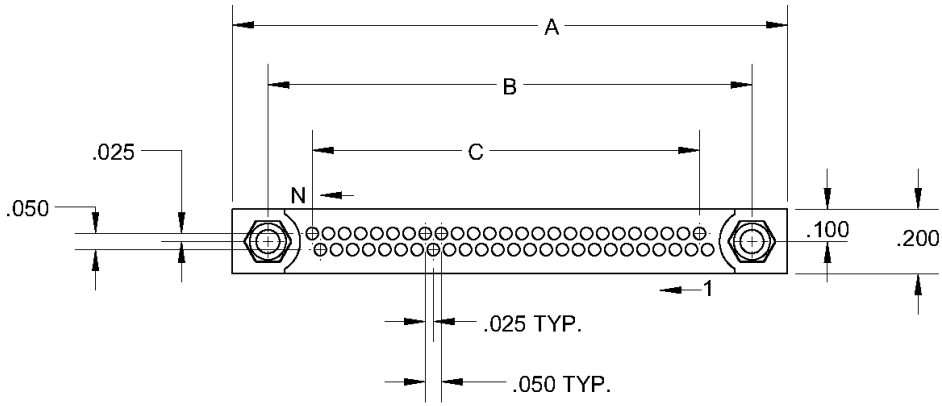
RECEPTACLE, STACKING STYLE FAE9



| '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**

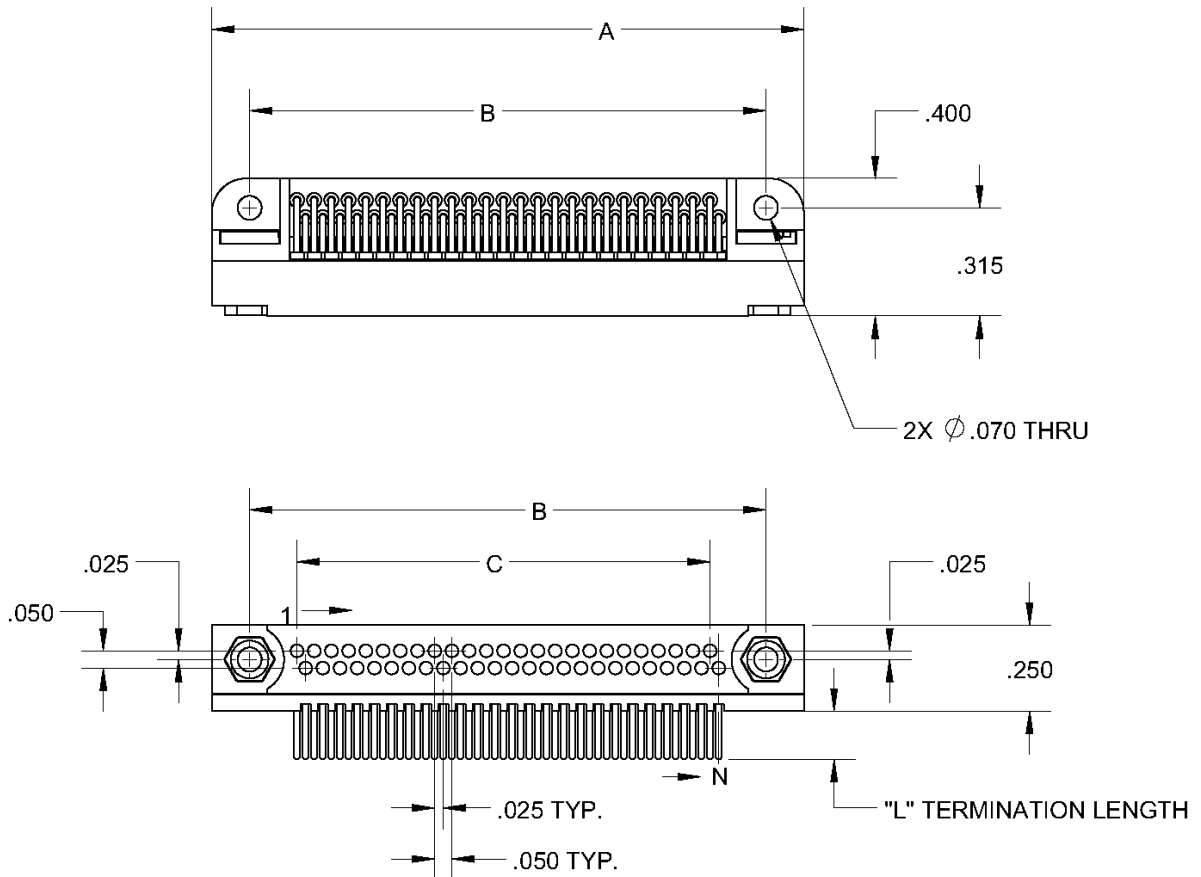
RECEPTACLE, STRAIGHT STYLE FCE, FDE, FSE, FVE



| '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**

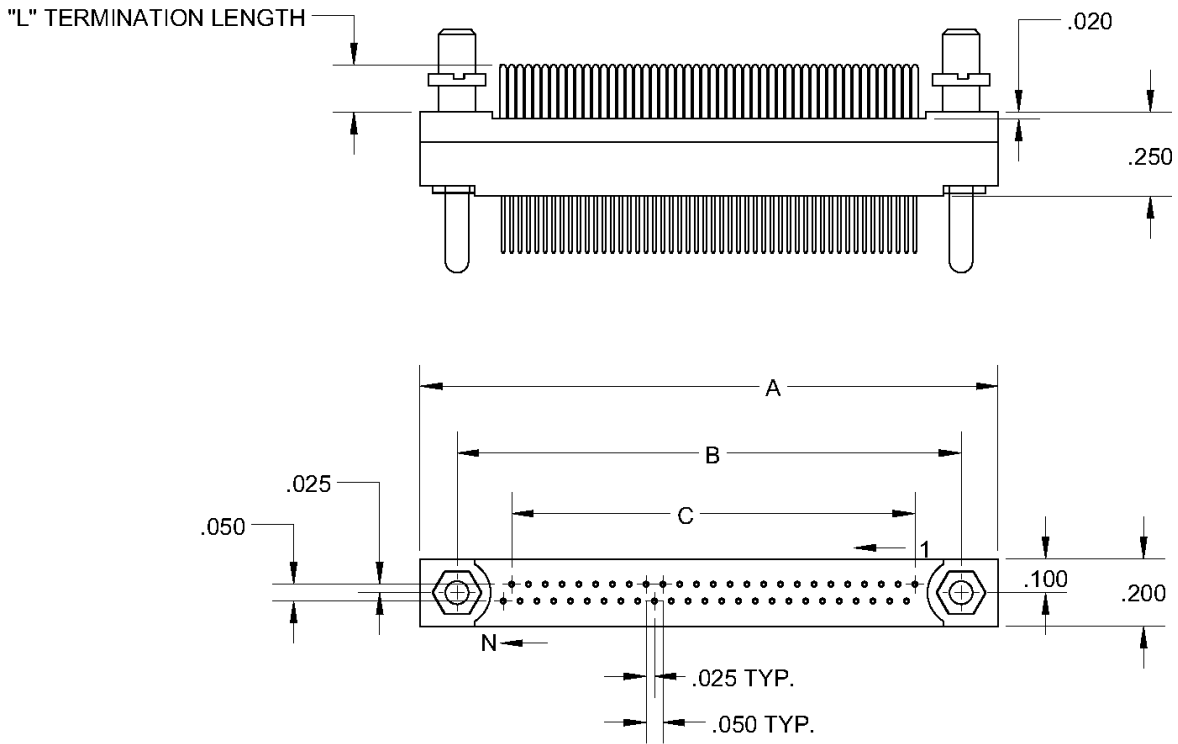
RECEPTACLE, RIGHT ANGLE STYLE FEE



| '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**

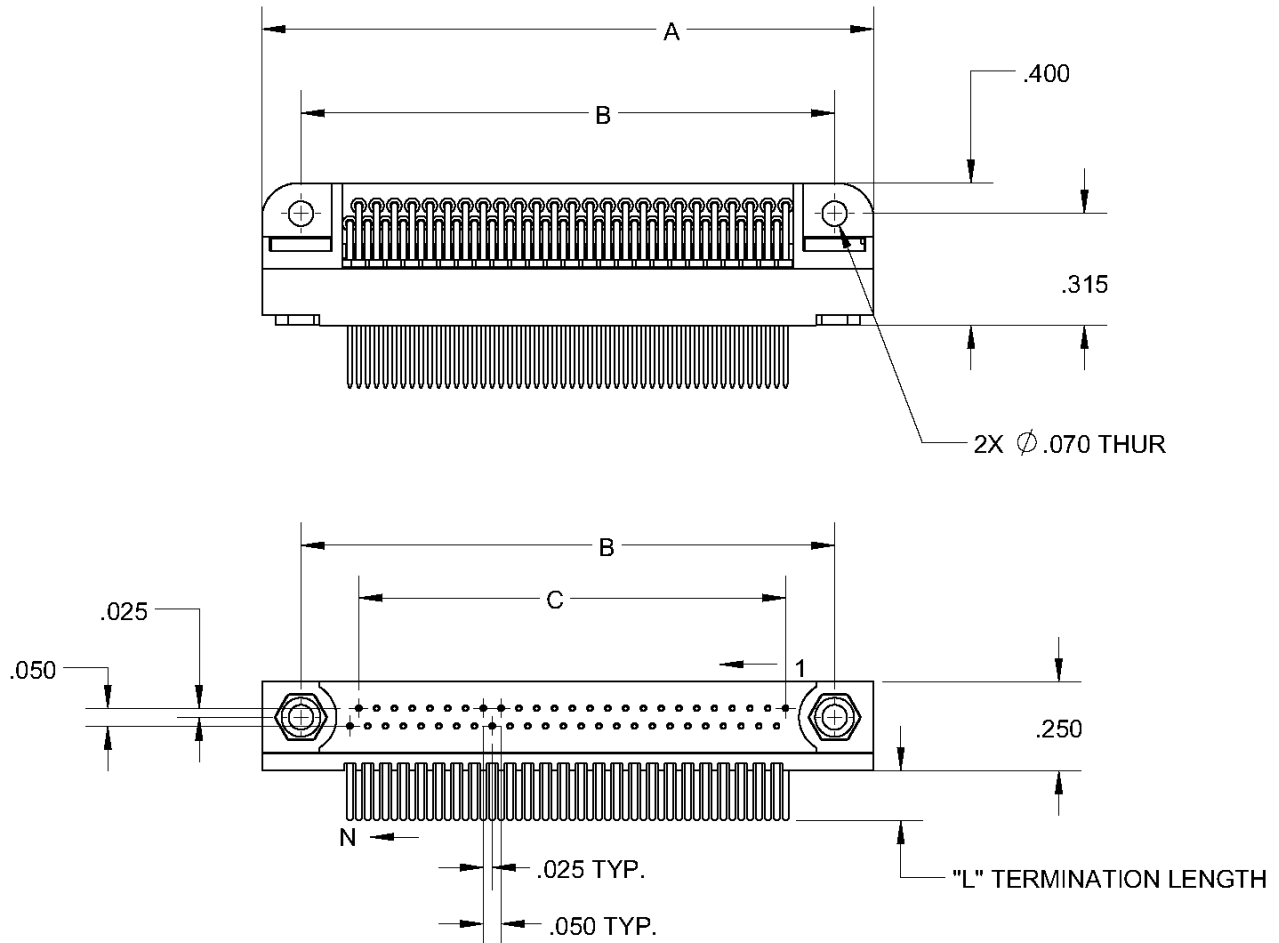
**PLUG, STRAIGHT
STYLE MCE, MDE, MSE, MVE**



| '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**

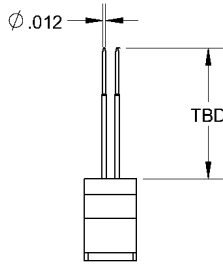
PLUG, RIGHT ANGLE STYLE MEE



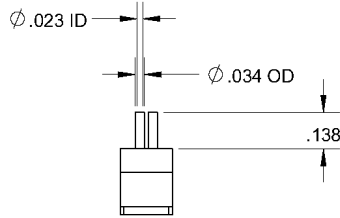
| 'N' Contacts | A | B | C |
|--------------|-------|-------|-------|
| 010 | .720 | .500 | .200 |
| 020 | .970 | .750 | .450 |
| 030 | 1.220 | 1.000 | .700 |
| 040 | 1.470 | 1.250 | .950 |
| 050 | 1.720 | 1.500 | 1.200 |
| 060 | 1.970 | 1.750 | 1.450 |
| 070 | 2.220 | 2.000 | 1.700 |
| 080 | 2.470 | 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**

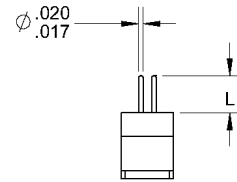
TERMINATION STYLES RECEPTACLE



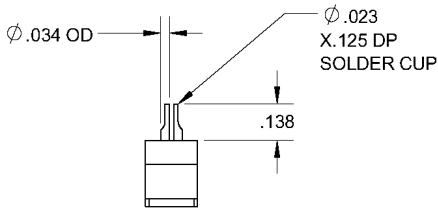
**FAE
STACKING**
Termination length
is Application Specific



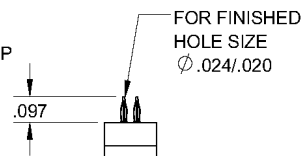
**FCE0
CRIMP**
Accepts 26-28 AWG WIRE



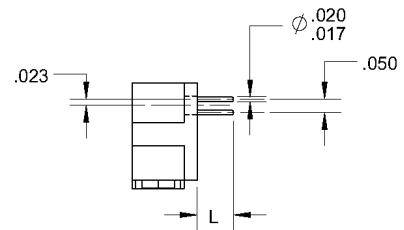
**FDE
DIP SOLDER STRAIGHT
'L'**
1=.109
2=.140
3=.172
4=.234
9=User Defined



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

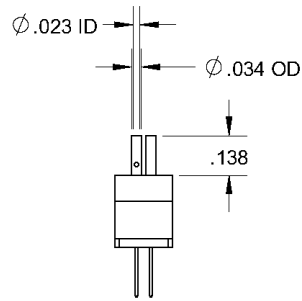


**FVE0
COMPLIANT**

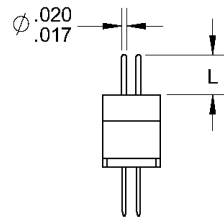


**FEE
DIP SOLDER RIGHT ANGLE
'L'**
1=.109
2=.140
3=.172
4=.234
9=User Defined

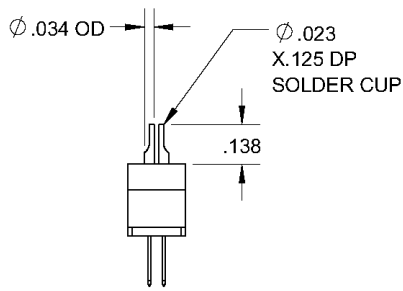
TERMINATION STYLES PLUG



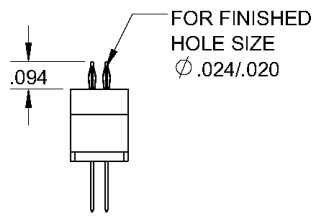
**MCE0
CRIMP**
Accepts 26-28 AWG WIRE



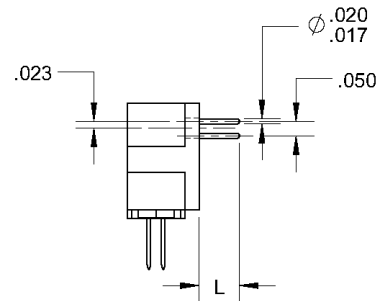
**MDE
DIP SOLDER STRAIGHT**
'L'
1=.109
2=.140
3=.172
4=.234
9=User Defined



**MSE0
SOLDER CUP**
Accepts Up To 26 AWG WIRE

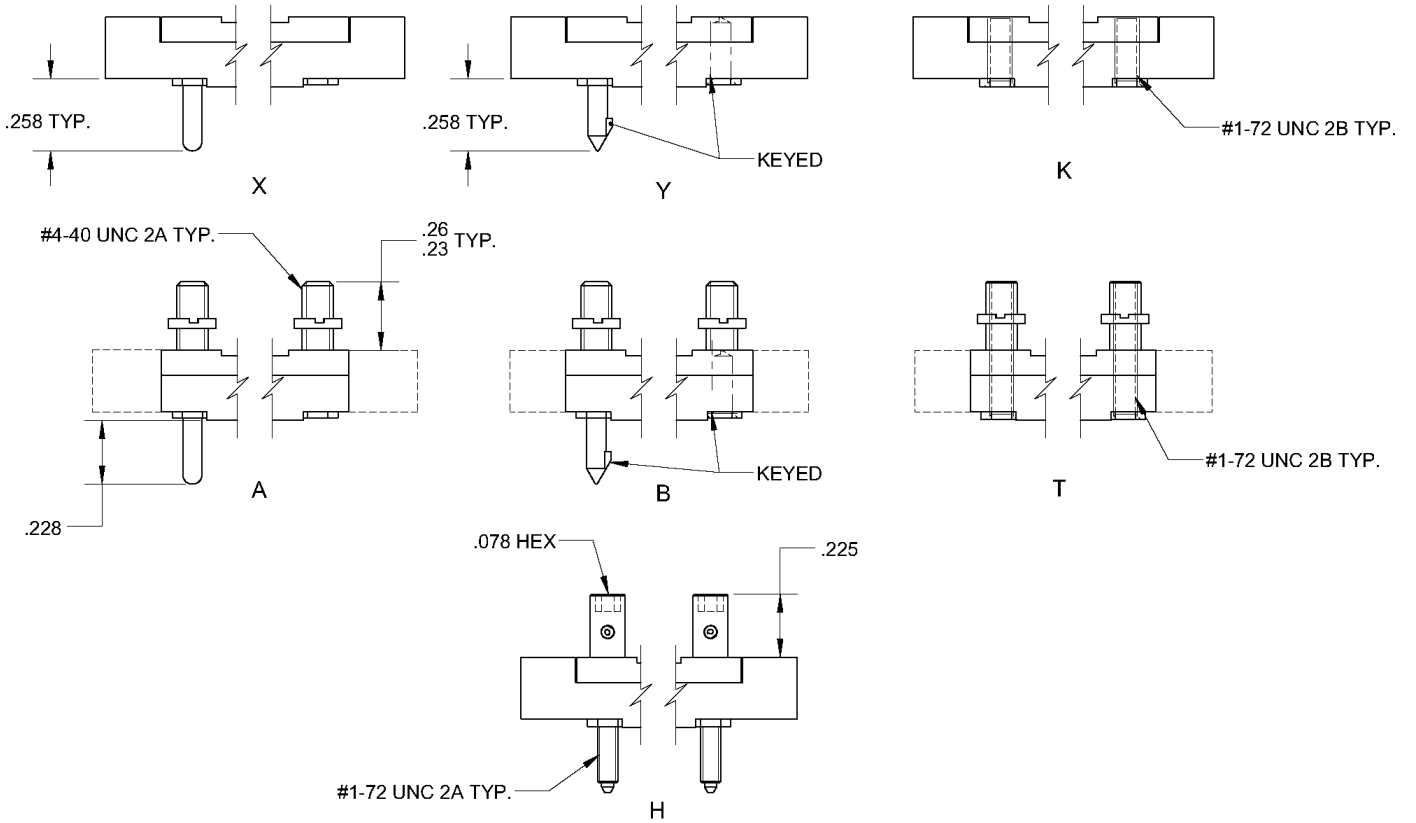


**MVE0
COMPLIANT**

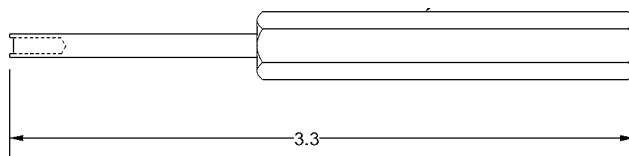


**MEE
DIP SOLDER RIGHT ANGLE**
'L'
1=.109
2=.140
3=.172
4=.234
9=User Defined

HARDWARE STYLES



Contact factory for alternate lengths and variation code assignment.

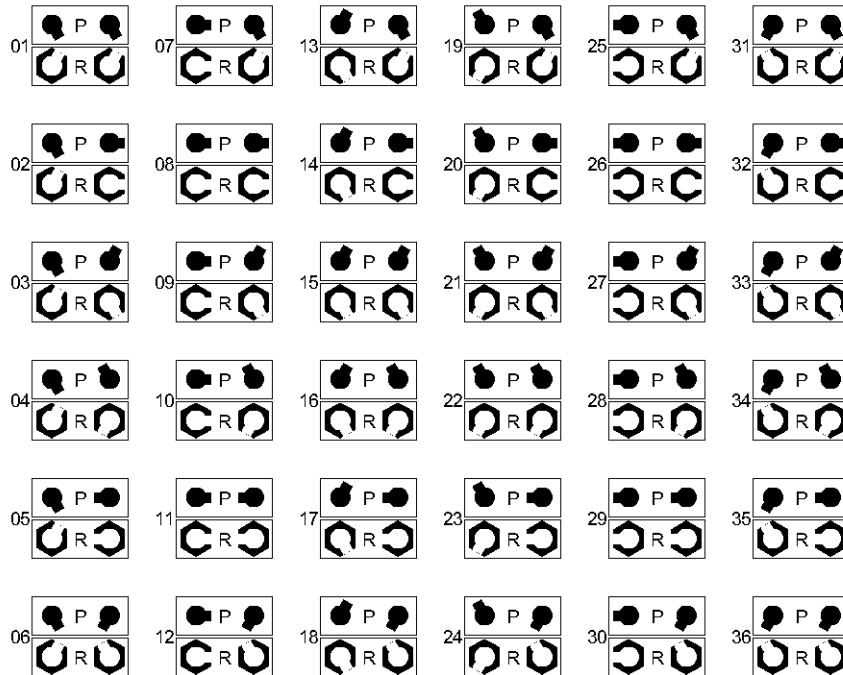
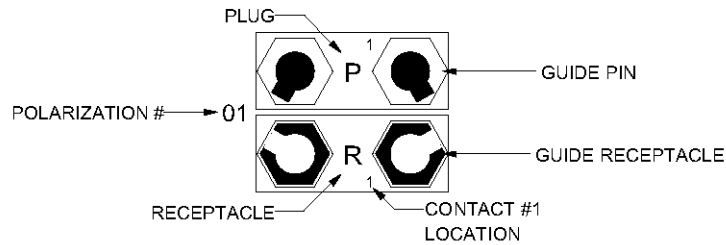


SPANNER WRENCH

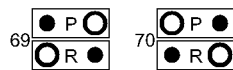
| HARDWARE COMPATIBILITY | | | | | | | |
|------------------------|---|---|---|---|---|---|---|
| | A | B | H | K | T | X | Y |
| A | • | | | | | • | |
| B | | • | | | | | • |
| H | | | | • | • | | |
| K | | | • | | | | |
| T | | | • | | | | |
| X | • | | | | | • | |
| Y | | • | | | | | • |

POLARIZATION CHART AS VIEWED FROM THE MATING FACE

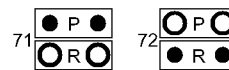
01-36 USE FOR HARDWARE STYLE 'Y' & 'B'
More configurations available. Please consult with factory



USE FOR OPTION: A,X



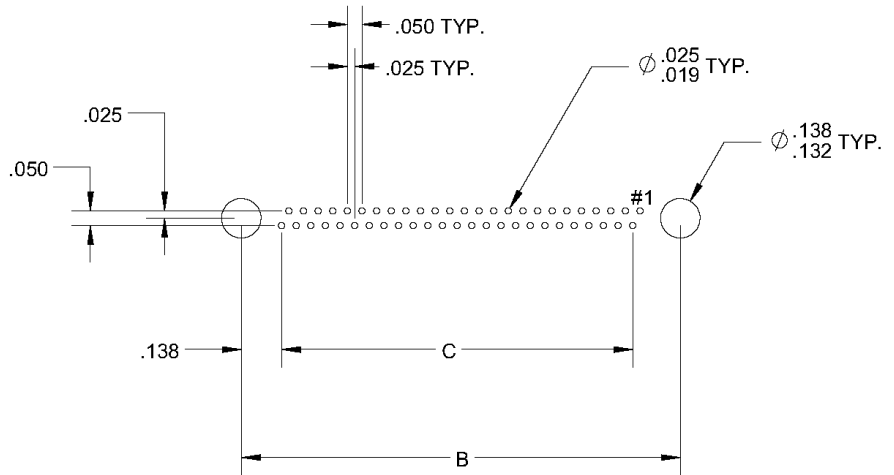
USE FOR OPTION: A,K,X,T,H



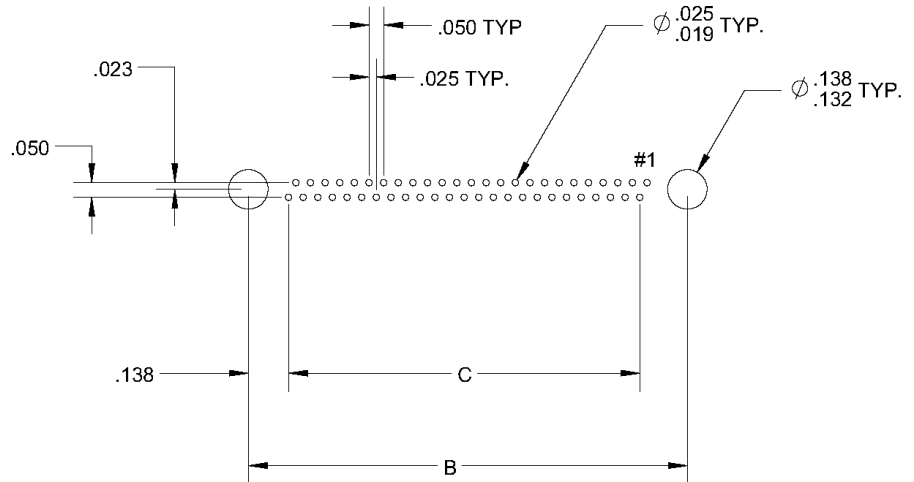
NOTE:
Style H Only Guide Pins
Style T Only Guide Sockets
Style K Only Guide Sockets

RECOMMENDED PWB PATTERNS PLUG - DIP SOLDER BOARD MOUNTING AS VIEWED FROM THE CONNECTOR SIDE

MDE 2- ROW
DIP SOLDER STRAIGHT

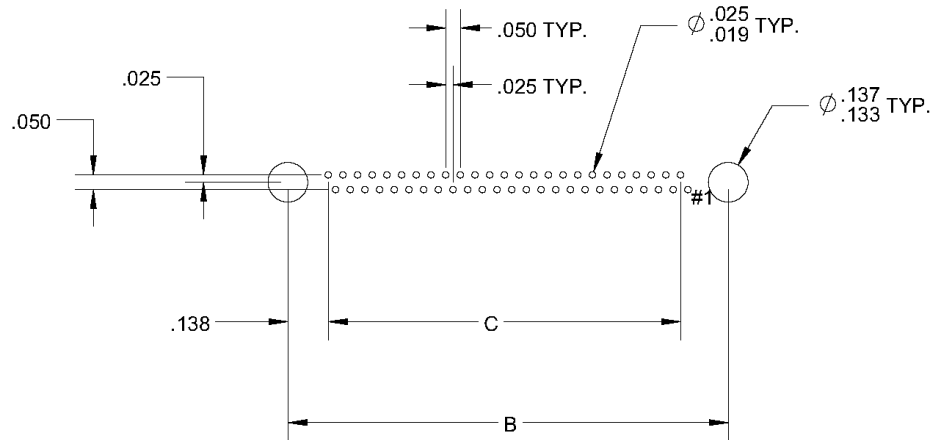


MEE 2-ROW
DIP SOLDER RIGHT ANGLE

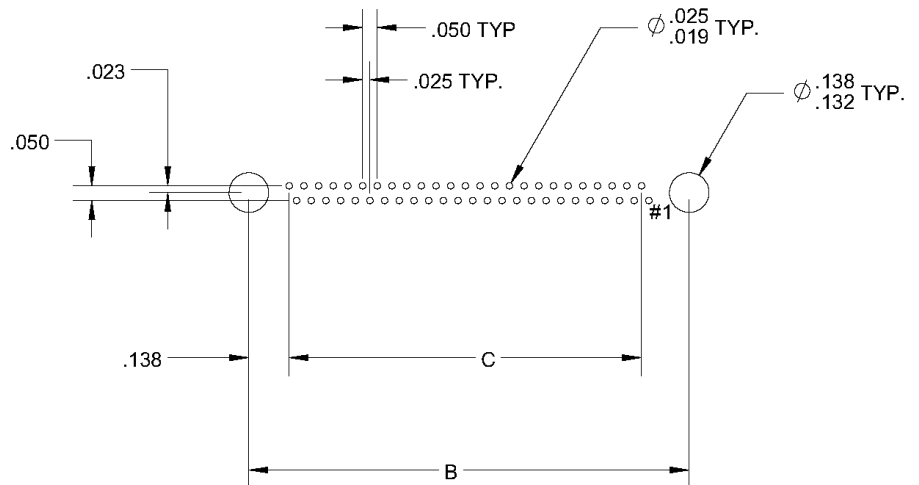


RECOMMEND PWB PATTERNS
RECEPTACLE- DIP SOLDER BOARD MOUNTING
AS VIEWED FROM THE CONNECTOR SIDE

FDE 2- ROW
DIP SOLDER STRAIGHT



FDE 2-ROW
DIP SOLDER RIGHT ANGLE



IEH Quality Statement

**Listening to our customers and meeting their needs while
continuously improving our processes and services.**



IEH CORPORATION

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