HMP .075 X .075 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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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
Pin Diameter	0.6mm nominal
Socket Contacts:	
Contact Wires:	BeCu per ASTM B197
Termination:	PhBr per ASTM B139 or Cu alloy or BeCu per B196/B197
Support Elements:	Cu alloy
Hardware:	Corrosion resistant steel per ASTM A582 ('D' shaped guide receptacles are BeCu per ASTM B196 or B197) or Cu alloy
Insulator:	Modified polyphenylene sulfide per MIL-M-24519, Type GST-40F or Equivalent
Pin Shields:	Aluminum 5052-H32 per QQ-A-250/8

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, 0.000010 min., 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, 0.000010 min., 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, 0.000010 min., per SAE AMS 2418 or solder dip over Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper, 0.000010 min., per SAE AMS 2418
Support Elements:	Nickel, 0.000050 min., per SAE-AMS-QQ-N-290 over Copper, 0.000010 min., per SAE AMS 2418
Hardware:	Passivate per SAE-AMS2700 except BeCu hardware to be Nickel plate, 0.000050 min.

PERFORMANCE:

Current Rating:	4* 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:	8 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:	0.15 lbs. x number of contacts, max. - MIL-STD-55302 (par. 4.5.4)
De-mating Force:	0.03 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.

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.

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ORDERING CHART

HMP	050	FDE	1	X	71	3	020

Series

Contact Capacity
(Use All 3 Places)

Body Style	
Receptacle	
FAE	Stacking
FDE	Dip Solder Straight
FEE	Dip Solder Right Angle
FSE	Solder Cup
Plug	
MAE	Stacking
MDE	Dip Solder Straight
MEE	Dip Solder Right Angle
MSE	Solder Cup
MPE	Shrouded Pin Carrier

Variation Code - Factory Assigned	
000	No Variation
020	Solder Dip Terminals
0C0	Epoxy Termination Sealed
0C2	Epoxy Sealed & Solder Dipped

Row Designation	
3	3 Row Series
4	4 Row Series
5	5 Row Series
6	6 Row Series

Termination Length - "L"		
Code	Dip Solder	Solder Dip Right Angle
1	0.177[4.50]	0.112[2.85]
2	0.264[6.70]	0.157[4.00]
9	User Defined	
0	Use For Solder Cup	
A	Use For Stacking Extension	

Hardware Arrangement	
00	No Hardware
01-36	Keyed Shaped Guide (See Appendix)
71	Non Polarized Hardware
98	Hardware Unassembled

Hardware Style (refer to pages 33-37)			
A	Guide Socket w/ Guide Pin (stacking)	P	Keyed Pin w/ Mtg Stud (Polarizing, Right Angle, 6 Row)
B	Guide Socket w/ Guide Pin (stacking to stacking)	Q	Keyed Pin w/L-Bracket (Polarizing, Right Angle, 3,4,5 Row)
C	Guide Socket w/ Mounting Pin (stacking)	R	Keyed Pin w/L-Bracket (Polarizing, Right Angle, 6 Row)
D	Keyed Socket w/ Mtg Stud (Polarizing)	S	Rotating Pin (Jacking)
E	Keyed Socket w/ Mtg Stud (Polarizing)	T	Rotating Pin (Jacking) w/ Mtg. Stud
F	Keyed Socket w/ Mtg Stud (Polarizing)	U	Guide Pin (Shrouded Pin Carrier)
G	Fixed Socket (Jacking) w/ Mtg. Stud	V	Keyed Pin w/ Mtg Stud (Polarizing)
H	Fixed Socket (Jacking) w/ Mtg Stud (Right Angle, 3 Row)	W	Keyed Pin w/ Mtg Stud (Polarizing)
J	Fixed Socket (Jacking) w/ Mtg Stud (Right Angle, 4,5 Row)	X	Keyed Pin w/ Mtg Stud (Polarizing, Right Angle, 3,4,5 Row)
K	Guide Socket (Shrouded Pin Carrier)	Y	Keyed Pin w/ Mtg Stud (Polarizing, Right Angle, 3,4,5 Row)
L	Guide Pin w/ Guide Pin (stacking)	Z	Keyed Pin w/ Mtg Stud (Polarizing, Right Angle, 6 Row)
M	Keyed Pin w/ Mtg Stud (Polarizing, Right Angle, 3,4,5 Row)	0	No Hardware Supplied
N	Keyed Pin w/ Mtg Stud (Polarizing, Right Angle, 3,4,5 Row)		

RECEPTACLE, STACKING
STYLE FAE9

No. of Contacts	A MAX	B	C
20	1.267 [32.18]	0.900 [22.86]	0.450 [11.43]
50	2.017 [51.23]	1.650 [41.91]	1.200 [30.48]
77	2.692 [68.38]	2.325 [59.06]	1.875 [47.63]
119	3.742 [95.05]	3.375 [85.73]	2.925 [74.26]
152	4.586 [116.48]	4.200 [106.68]	3.750 [95.25]

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

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RECEPTACLE, STRAIGHT
STYLE FDE, FSE

FOR DIMENSION "L" SEE TERMINATION LENGTH ON PAGE #5

No. of Contacts	A MAX	B	C
20	1.267 [32.18]	0.900 [22.86]	0.450 [11.43]
50	2.017 [51.23]	1.650 [41.91]	1.200 [30.48]
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RECEPTACLE, RIGHT ANGLE
STYLE FEE

FOR DIMENSION "L" SEE TERMINATION LENGTH ON PAGE #5

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STYLE MDE, MSE

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PLUG, RIGHT ANGLE
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STYLE FAE9

No. of Contacts	A MAX	B	C	D
102	2.697 [68.50]	2.330 [59.18]	1.875 [47.625]	.228 [5.78]
202	4.567 [116.00]	4.200 [106.68]	3.750 [95.25]	.225 [5.72]

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RECEPTACLE, RIGHT ANGLE
STYLE FEE

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STYLE MDE, MSE

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PLUG, RIGHT ANGLE
STYLE MEE

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RECEPTACLE, STACKING
303 STYLE FAE9

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

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RECEPTACLE, STRAIGHT
303 STYLE FDE, FSE

FOR DIMENSION “L” SEE TERMINATION LENGTH ON PAGE #5

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RECEPTACLE, RIGHT ANGLE
303 STYLE FEE

FOR DIMENSION "L" SEE TERMINATION LENGTH ON PAGE #5

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PLUG STACKING
303 STYLE MAE9

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

PLUG, STRAIGHT
303 STYLE MDE, MSE

FOR DIMENSION “L” SEE TERMINATION LENGTH ON PAGE #5

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PLUG, RIGHT ANGLE
303 STYLE MEE

FOR DIMENSION “L” SEE TERMINATION LENGTH ON PAGE #5

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PLUG, PIN CARRIER, SHROUD
STYLE MPE

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TERMINATION STYLES
RECEPTACLE
HARDWARE OMITTED FOR CLARITY

FAE9
STACKING

FEE
DIP SOLDER
RIGHT ANGLE

FDE
DIP SOLDER
STRAIGHT

FSE
SOLDER CUP

FOR DIMENSION “L” SEE TERMINATION LENGTH ON PAGE #5

TERMINATION STYLES
PLUG
HARDWARE OMITTED FOR CLARITY

FAE9
STACKING

FEE
DIP SOLDER
RIGHT ANGLE

FDE
DIP SOLDER
STRAIGHT

FSE
SOLDER CUP

FOR DIMENSION “L” SEE TERMINATION LENGTH ON PAGE #5

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HARDWARE STYLES
GUIDE SOCKETS

A
GUIDE SOCKET WITH GUIDE PIN (STACKING)

D
KEYED SOCKET WITH MOUNTING STUD

B
GUIDE SOCKET WITH GUIDE PIN (STACKING TO STACKING)

E
KEYED SOCKET WITH MOUNTING STUD

C
GUIDE SOCKET WITH MOUNTING (STACKING)

F
KEYED SOCKET WITH MOUNTING STUD

HARDWARE STYLES
GUIDE SOCKETS

G
FIXED SOCKET
(JACKING)

K
GUIDE SOCKET
(SHROUDED PIN CARRIER)

H
FIXED SOCKET (JACKING)
WITH MOUNTING STUD

J
FIXED SOCKET (JACKING)
WITH MOUNTING STUD

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HARDWARE STYLES

GUIDE PINS

L
GUIDE PIN WITH GUIDE PIN
(STACKING)

Q
KEYED PIN L-BRACKET

M
KEYED PIN WITH
MOUNTING STUD

R
KEYED PIN L-BRACKET

N
KEYED PIN WITH
MOUNTING STUD

S
ROTATING PIN (JACKING)

HARDWARE STYLES

GUIDE PINS

P
KEYED PIN WITH
MOUNTING STUD

T
ROTATING PIN (JACKING)
WITH MOUNTING STUD

U
GUIDE PIN
(SHROUDED PIN CARRIER)

X
KEYED PIN WITH
MOUNTING STUD

V
KEYED PIN WITH
MOUNTING STUD

Y
KEYED PIN WITH
MOUNTING STUD

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HARDWARE STYLES

GUIDE PINS

W
KEYED PIN WITH
MOUNTING STUD

Z
KEYED PIN WITH
MOUNTING STUD

ALIGNMENT COMBS

FOR ALL RIGHT ANGLE BODY STYLES

MAINTAIN CLEARANCES SHOWN FOR ALL RIGHT ANGLE BODY STYLES
TO ALLOW FOR ALIGNMENT COMB
(6 row 303 pin comb shown, applies to all right angle styles)

No. of Contacts	A	B
20	0.450 [11.43]	.200 [5.08]
50	1.200 [30.48]	.200 [5.08]
77	1.875 [47.63]	.200 [5.08]
102	1.875 [47.625]	.225 [5.72]
119	2.925 [74.26]	.200 [5.08]
128	1.875 [47.625]	.400 [10.16]
152	3.750 [95.25]	.200 [5.08]
202	3.750 [95.25]	.225 [5.72]
253	3.750 [95.25]	.400 [10.16]
303	3.750 [95.25]	.501 [12.72]

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POLARIZATION CHART

AS VIEWED FROM THE MATING FACE

PWB PATTERN
3 ROW RECEPTACLE
AS VIEWED FROM THE CONNECTOR SIDE

FDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

FAE STACKING RECOMMENDED PWB LAYOUT

FEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

No. of Contacts	B	C
20	0.900 [22.86]	0.450 [11.43]
50	1.650 [41.91]	1.200 [30.48]
77	2.325 [59.06]	1.875 [47.63]
119	3.375 [85.73]	2.925 [74.26]
152	4.200 [106.68]	3.750 [95.25]

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PWB PATTERN
3 ROW PLUG
AS VIEWED FROM THE CONNECTOR SIDE

MDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

MAE STACKING RECOMMENDED PWB LAYOUT

MEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

No. of Contacts	B	C
20	0.900 [22.86]	0.450 [11.43]
50	1.650 [41.91]	1.200 [30.48]
77	2.325 [59.06]	1.875 [47.63]
119	3.375 [85.73]	2.925 [74.26]
152	4.200 [106.68]	3.750 [95.25]

PWB PATTERN
4 ROW RECEPTACLE
AS VIEWED FROM THE CONNECTOR SIDE

FDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

FAE STACKING RECOMMENDED PWB LAYOUT

FEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

No. of Contacts	B	C	D
102	2.330 [59.18]	1.875 [47.625]	.228 [5.78]
202	4.200 [106.68]	3.750 [95.25]	.225 [5.72]

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PWB PATTERN
4 ROW PLUG
AS VIEWED FROM THE CONNECTOR SIDE

MDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

MAE STACKING RECOMMENDED PWB LAYOUT

MEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

No. of Contacts	B	C	D
102	2.330 [59.18]	1.875 [47.625]	.228 [5.78]
202	4.200 [106.68]	3.750 [95.25]	.225 [5.72]

PWB PATTERN
5 ROW RECEPTACLE
AS VIEWED FROM THE CONNECTOR SIDE

FDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

FAE STACKING RECOMMENDED PWB LAYOUT

FEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

No. of Contacts	B	C
128	2.322 [58.98]	1.875 [47.625]
253	4.200 [106.68]	3.750 [95.25]

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PWB PATTERN
5 ROW PLUG
AS VIEWED FROM THE CONNECTOR SIDE

MDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

MAE STACKING RECOMMENDED PWB LAYOUT

MEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

No. of Contacts	B	C
128	2.322 [58.98]	1.875 [47.625]
253	4.200 [106.68]	3.750 [95.25]

PWB PATTERN
6 ROW RECEPTACLE
AS VIEWED FROM THE CONNECTOR SIDE

FDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

FAE STACKING RECOMMENDED PWB LAYOUT

FEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

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PWB PATTERN
6 ROW PLUG
AS VIEWED FROM THE CONNECTOR SIDE

MDE DIP SOLDER STRAIGHT RECOMMENDED PWB LAYOUT

MAE STACKING RECOMMENDED PWB LAYOUT

MEE RIGHT ANGLE DIP SOLDER RECOMMENDED PWB LAYOUT

IEH Quality Statement

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

IEH CORPORATION

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

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REV. A