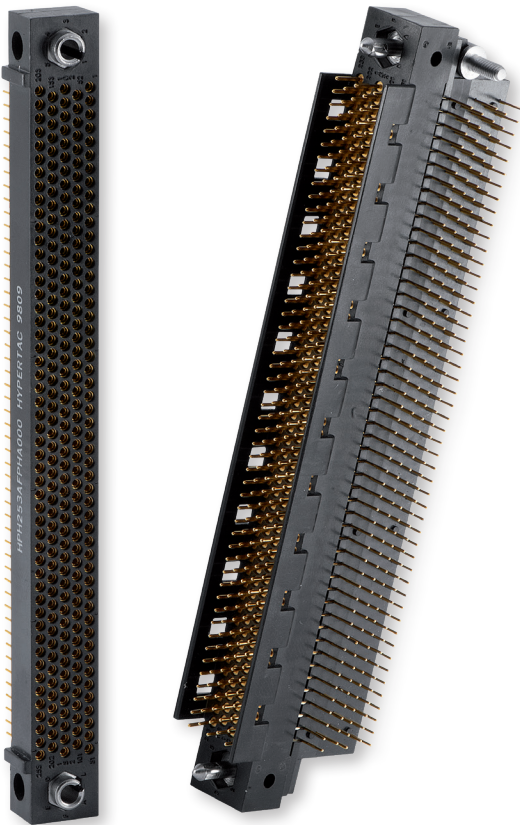


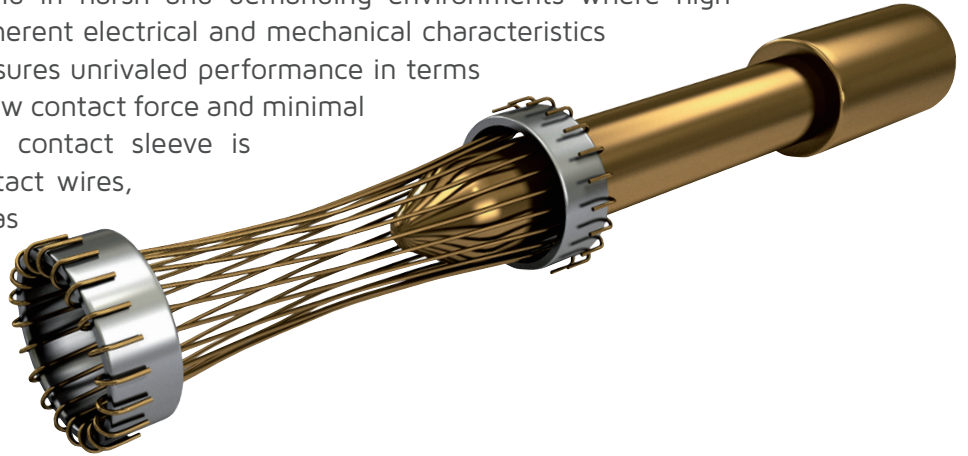
HPH Series

High Density Signal Connectors



Hypertac Hyperboloid Technology

Smiths Interconnect offers an extensive range of superior contact technologies suitable for standard and custom solutions. Hypertac® (HYPERboloid conTACT) is the original superior performing hyperboloid contact technology designed for use in all applications and in harsh and demanding environments where high reliability and safety are critical. The inherent electrical and mechanical characteristics of the Hypertac hyperboloid contact ensures unrivaled performance in terms of reliability, number of mating cycles, low contact force and minimal contact resistance. The shape of the contact sleeve is formed by hyperbolically arranged contact wires, which align themselves elastically as contact lines around the pin, providing a number of linear contact paths.



Features

Low insertion/extraction forces

The angle of the socket wires allows tight control of the pin insertion and extraction forces. The spring wires are smoothly deflected to make line contact with the pin.

Long contact life

The smooth and light wiping action minimizes wear on the contact surfaces. Contacts perform up to 100,000 insertion/extraction cycles with minimal degradation in performance.

Lower contact resistance

The design provides a far greater contact area and the wiping action of the wires insures a clean and polished contact surface. Our contact technology has about half the resistance of conventional contact designs.

Higher current ratings

The design parameters of the contact (e.g., the number, diameter and angle of the wires) may be modified for any requirement. The number of wires can be increased so the contact area is distributed over a larger surface. Thus, the high current carried by each wire because of its intimate line contact, can be multiplied many times.

Immunity to shock and vibration

The low mass and resultant low inertia of the wires enable them to follow the most abrupt or extreme excursions of the pin without loss of contact. The contact area extends 360° around the pin and is uniform over its entire length. The 3 dimensional symmetry of the Hypertac contact design guarantees electrical continuity in all circumstances.

Benefits

High density interconnect systems

Significant reductions in size and weight of sub-system designs. No additional hardware is required to overcome mating and un-mating forces.

Low cost of ownership

The Hypertac contact technology will surpass most product requirements, thus eliminating the burden and cost of having to replace the connector or the entire subsystem.

Low power consumption

The lower contact resistance of our technology results in a lower voltage drop across the connector reducing the power consumption and heat generation within the system.

Maximum contact performance

The lower contact resistance of the Hypertac contact reduces heat build-up; therefore Hypertac contacts are able to handle far greater current in smaller contact assemblies without the detrimental effects of high temperature.

Reliability under harsh environments

Harsh environmental conditions require connectors that will sustain their electrical integrity even under the most demanding conditions such as shock and vibration. The Hypertac contact provides unmatched stability in demanding environments when failure is not an option.

Product description

Smiths Interconnect's HPH Series is a high density signal PCB connector designed for harsh environments within the aerospace, defense and industrial market segments.

With a 0.6 mm contact diameter, the HPH Series comes in 3 to 6 row configurations and is available up to 303 signal contacts on a 1.905 mm staggered grid.

Using the proven Hypertac® hyperboloid contact system, the connectors ensure a low contact resistance under high levels of shocks and vibrations and over 2000 mating cycles. They provide low engagement and withdrawal force; long life and low rate of wear for high reliability and enhanced quality performance.

Additionally, the HPH Series supports a current rating of up to 8.5 A per contact.

Technical characteristics

Current rating¹	4 A at 30°C rise, nominal ² 8.5 A at 30°C rise, single contact 8 A at 30°C rise, 2 adjacent contacts 7 A at 30 C rise, 4 adjacent contact
Contact resistance	7 mΩ maximum
Insulation	5 GΩ minimum at 500 Vdc
Mechanical endurance	In excess of 2000 operations
Engagement/withdrawal forces	0.42 N (1.5 oz) nominal per contact
Temperature	-55 °C to 125 °C
Voltage rating	170 Vdc or AC peak nominal
Proof voltage	800 V minimum
Male pin diameter	0.6 mm nominal

Material

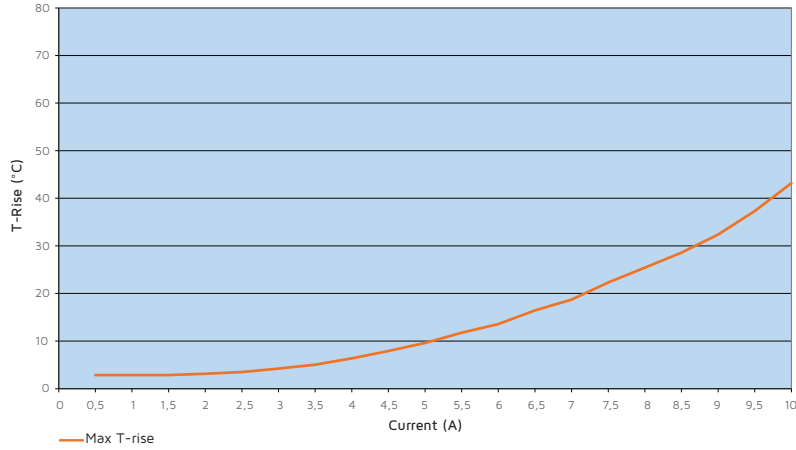
Insulator	Polyphenylene sulphide
Contact pin and socket	Copper alloy
Socket wires	Beryllium copper
Guides	Stainless steel
Contact plating	MIL-G-45204 gold plate
Vibration	Vibration testing to ESCC 3401 para 9.11 (peak level 15 g)
Shock	Shock testing to ESCC 3401 para 9.12 (peak level 100 g)

(1) For details, please contact Smiths Interconnect

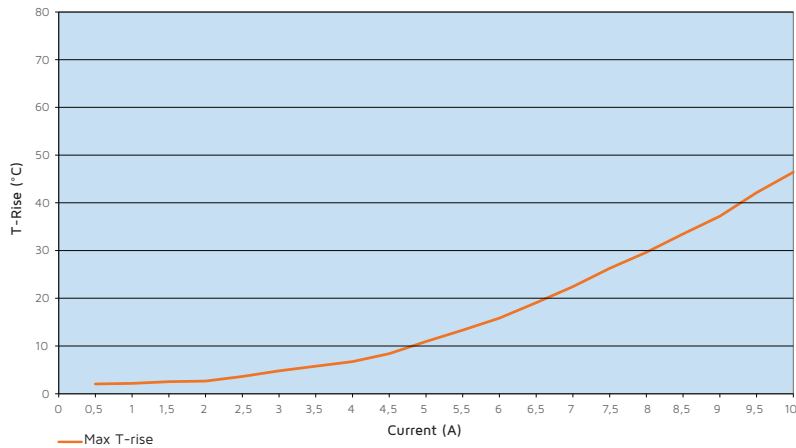
(2) See *Current derating curves* on page 2

Current derating curves

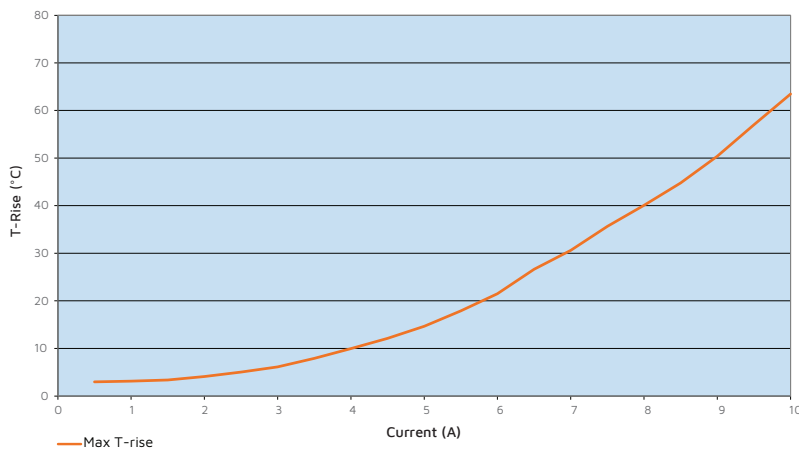
Current capacity test - Single pin
Max T-rise (°C) vs current (A)
HPH 152 (152 P connector)



Current capacity test - 2 pins Series
Max T-rise (°C) vs current (A)
HPH 152 (152 P connector)



Current capacity test - 4 pins Series
Max T-rise (°C) vs current (A)
HPH152 (152 P connector)



How to order



1



2



3



4



5



6



7

1 Connector family																	
2 Number of cavities	<table border="0"> <tr> <td>2 0⁴</td> <td>5 0¹</td> <td>7 7¹</td> <td>1 0 2¹</td> <td>1 1 9¹</td> <td>1 2 8¹</td> <td>1 5 2¹</td> <td>2 0 2¹</td> </tr> <tr> <td>2 5 3¹</td> <td>3 0 3⁵</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	2 0 ⁴	5 0 ¹	7 7 ¹	1 0 2 ¹	1 1 9 ¹	1 2 8 ¹	1 5 2 ¹	2 0 2 ¹	2 5 3 ¹	3 0 3 ⁵						
2 0 ⁴	5 0 ¹	7 7 ¹	1 0 2 ¹	1 1 9 ¹	1 2 8 ¹	1 5 2 ¹	2 0 2 ¹										
2 5 3 ¹	3 0 3 ⁵																
3 Contact plating	<table border="0"> <tr> <td>U Gold plate per MIL-G-45204</td> <td>S U plating with tin dipped termination</td> </tr> </table>	U Gold plate per MIL-G-45204	S U plating with tin dipped termination														
U Gold plate per MIL-G-45204	S U plating with tin dipped termination																
4 Contact gender	<table border="0"> <tr> <td>M Male</td> <td>F Female</td> <td>D⁵ Shrouded pin carrier</td> <td>C⁵ Pin carrier (not shown)</td> </tr> </table>	M Male	F Female	D ⁵ Shrouded pin carrier	C ⁵ Pin carrier (not shown)												
M Male	F Female	D ⁵ Shrouded pin carrier	C ⁵ Pin carrier (not shown)														
5 Contact termination	<table border="0"> <tr> <td>B⁵ Through board solder - 90°</td> <td>L² Through board solder - 90°</td> </tr> <tr> <td>P¹ Through board solder - Straight</td> <td>P¹ Use also for terminating female stacking connector</td> </tr> <tr> <td>K³ Through board solder - Straight</td> <td>N³ PCB stacking through board solder</td> </tr> <tr> <td>Y⁵ Pin carrier - Male only</td> <td>F⁵ Flex terminations (Please contact our local sales office)</td> </tr> </table>	B ⁵ Through board solder - 90°	L ² Through board solder - 90°	P ¹ Through board solder - Straight	P ¹ Use also for terminating female stacking connector	K ³ Through board solder - Straight	N ³ PCB stacking through board solder	Y ⁵ Pin carrier - Male only	F ⁵ Flex terminations (Please contact our local sales office)								
	B ⁵ Through board solder - 90°	L ² Through board solder - 90°															
	P ¹ Through board solder - Straight	P ¹ Use also for terminating female stacking connector															
	K ³ Through board solder - Straight	N ³ PCB stacking through board solder															
Y ⁵ Pin carrier - Male only	F ⁵ Flex terminations (Please contact our local sales office)																
6 Polarizing/Guides	A U ¹ Guide socket non-polarized, vertical mounting (for female stacking guide)																
	H A H D H N ¹ Guide socket polarized, vertical mounting																
	S C ¹ Jack socket non-polarized, vertical mounting																
	T J T P T T ¹ Jack socket non-polarized, transverse mounting (T-bracket)																
	A T ¹ Guide pin non-polarized, vertical mounting (for male stacking guide)																
	P E P F P G P N P P P Q P T ¹ Guide pin polarized, transverse mounting (T-Bracket)																
	Q C Q F Q Q Q 3 ¹ Guide pin polarized, transverse mounting (L-Bracket)																
	3 C ¹ Jacking non-polarized, rotating free connector																
	3 F ¹ Jacking non-polarized, vertical mounting																
	A M G A ⁵ Guide socket/pin for non-polarized shrouded pin carrier application																
N A N B ⁵ Guide pin polarized vertical mounting																	
7 Standard variations	O P O Back potted O S O Loose shroud supplied (for male stacking connector)																
	O O O No potting																

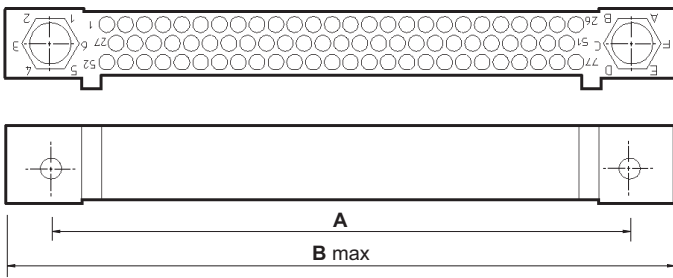
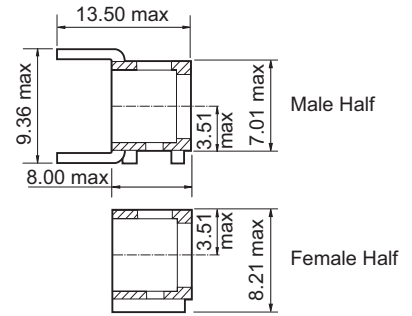
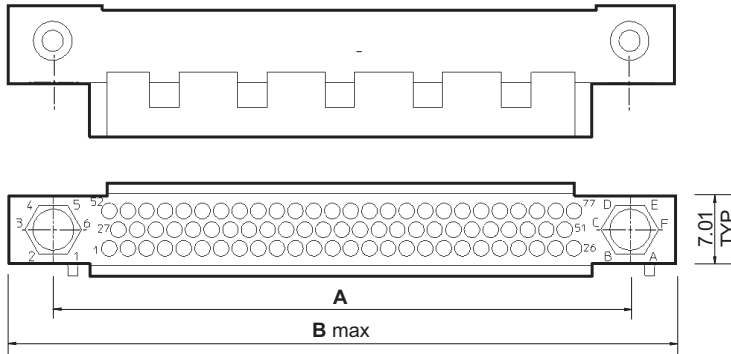
(1) Off the shelf
 (2) Off the shelf male
 (3) Off the shelf female

(4) Subject to availability
 (5) Made to order

Other termination, guide and insulator styles exist but might carry a premium both in cost and lead time. Please consult our local sales office for further information.

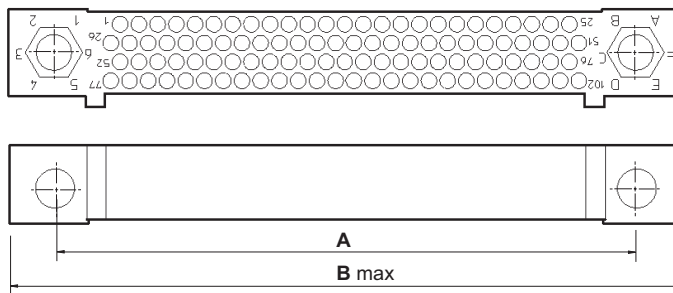
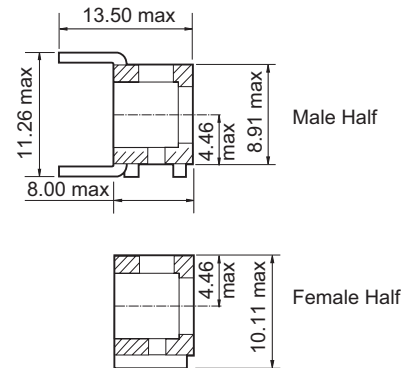
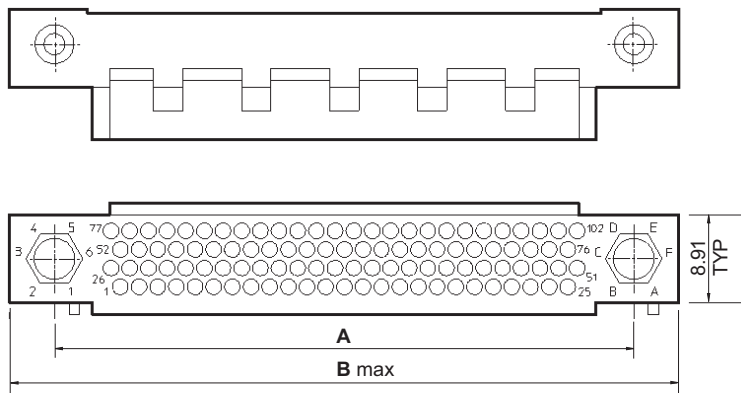
Insulators

3 row male and female half



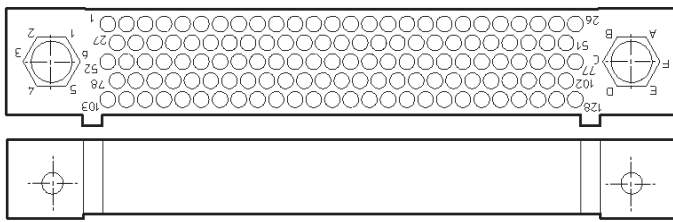
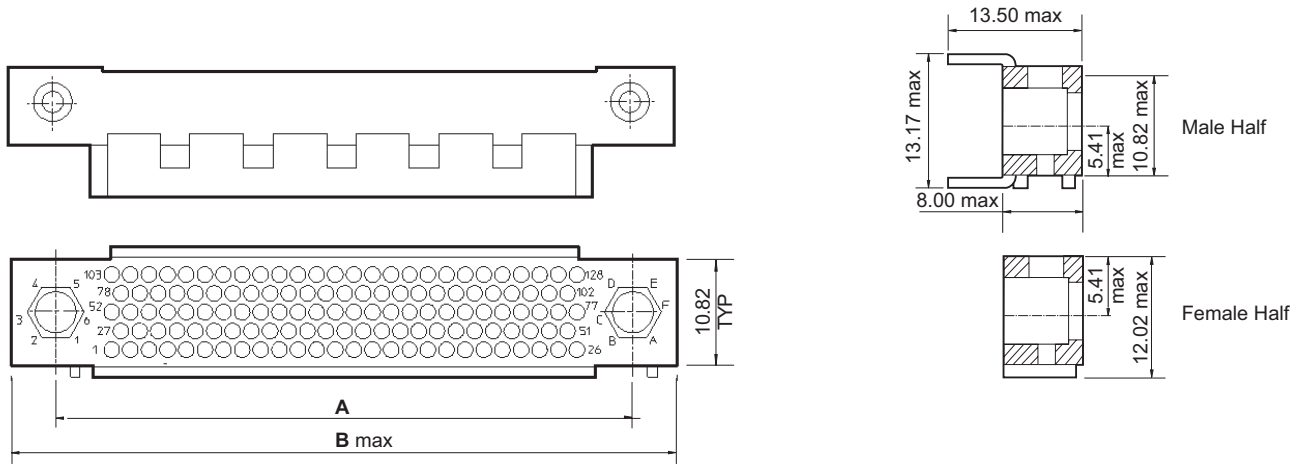
No. of positions	20	50	77	119	152
Dimension A	22.86 (0.901)	41.91 (1.650)	59.06 (2.325)	85.73 (3.375)	106.68 (4.200)
Dimension B	32.18 (1.267)	51.23 (2.017)	68.38 (2.692)	95.05 (3.742)	116.50 (4.586)

4 row male and female half



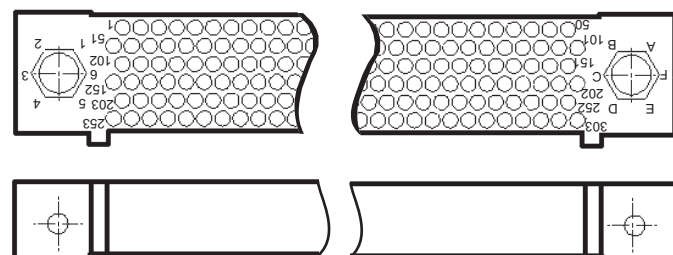
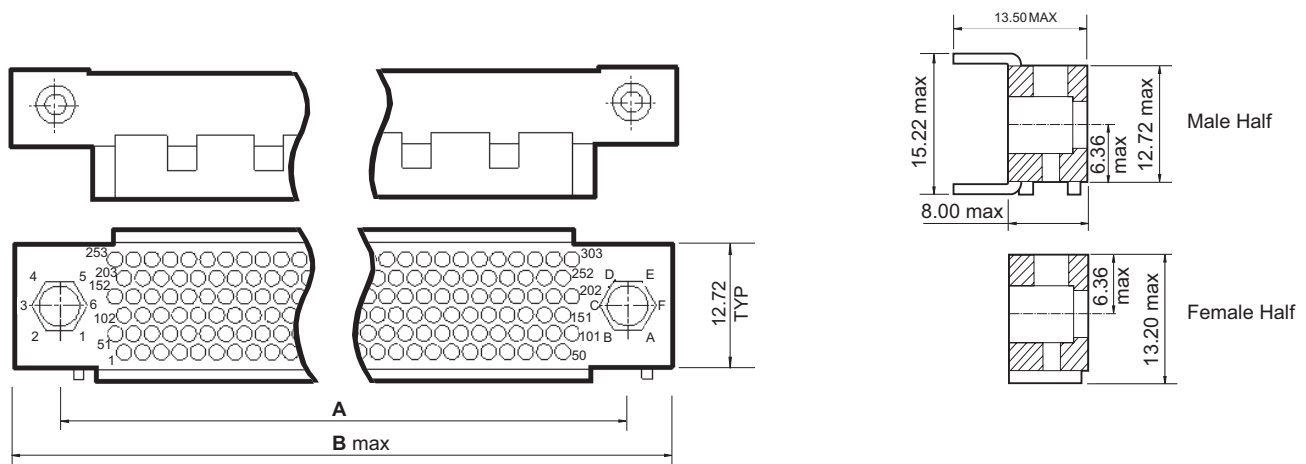
No. of positions	102	202
Dimension A	59.18 (2.330)	106.68 (4.200)
Dimension B	68.50 (2.697)	116.50 (4.567)

5 row male and female half



No. of positions	128	253
Dimension A	59.06 (2.322)	106.68 (4.200)
Dimension B	68.38 (2.685)	116.50 (4.567)

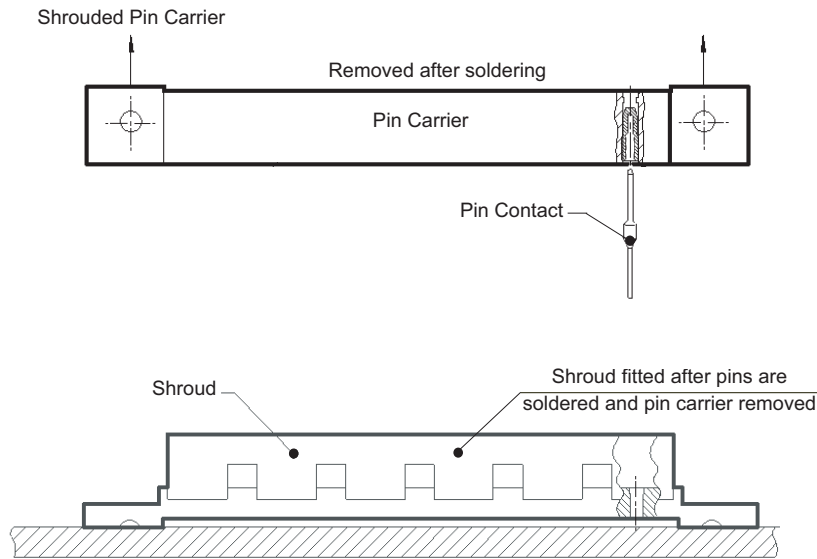
6 row male and female half



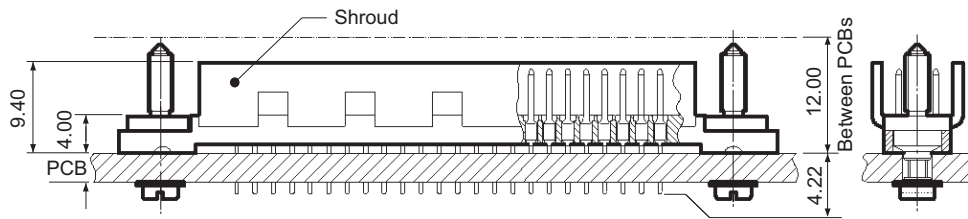
No. of positions	303
Dimension A	106.68 (4.200)
Dimension B	116.50 (4.567)

Insulators, pin carrier, and guides

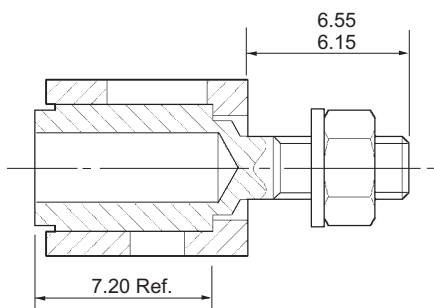
Shrouded pin carrier



Shrouded insulator shown with pins and guides.
Ready to mate with standard female connector fitted with suitable female pin carrier guides.

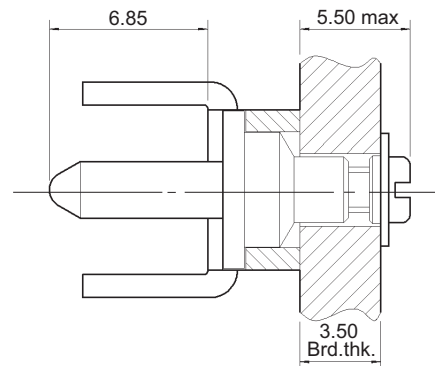


Shrouded pin carrier guides



Style AM

Non-polarized guide socket. Vertical mounting.

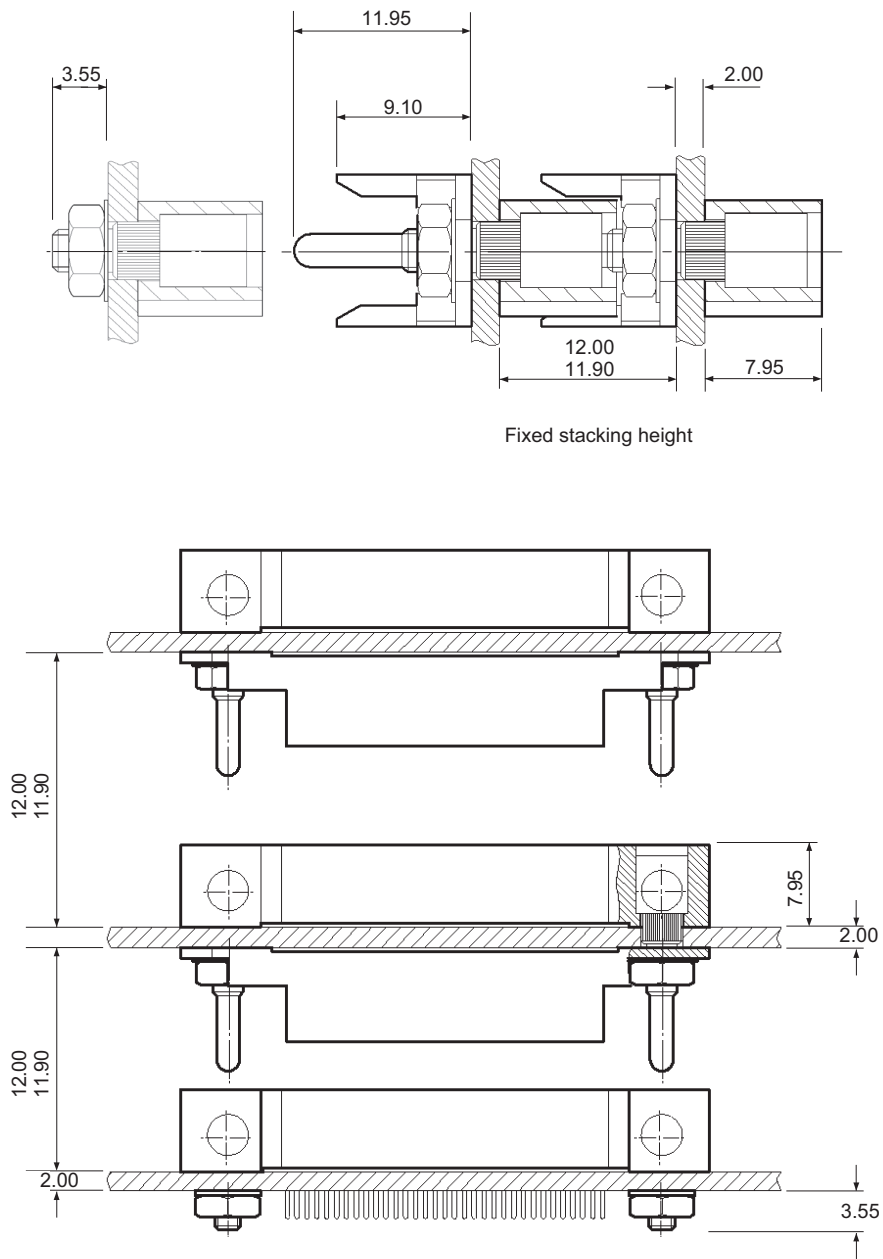


Style 9A

Non-polarized guide socket. Vertical mounting.

HPH stacking insulators

Stacking connector application



Note

Stacking connectors are currently available in 50, 77, and 102 way only.

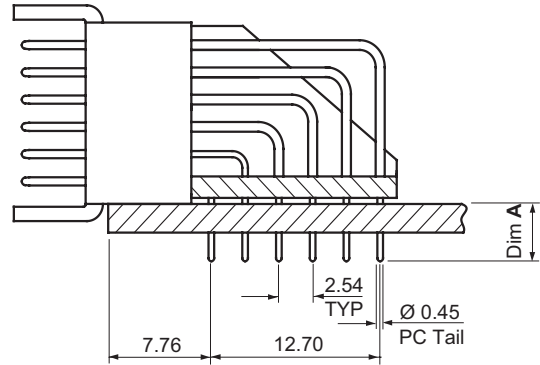
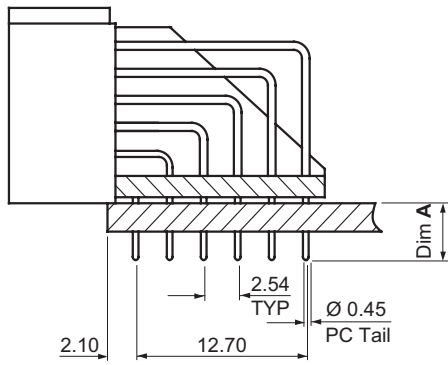
For insulator dimensions please refer to previous pages. If you have further requirements please contact sales offices.

Standard PCB terminations

Female

Male

90° PCB



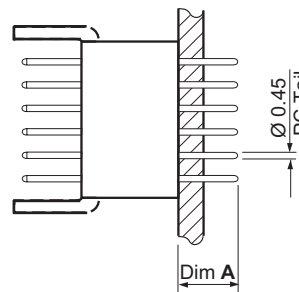
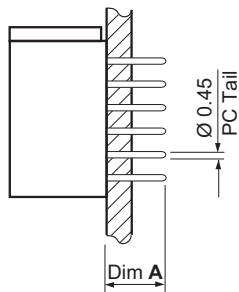
Dimensions applicable to 3, 4 and 5 row insulators also.

Dimensions applicable to 3, 4 and 5 row insulators also.

Termination	Dim. A
B ¹	2.85 (0.112)
L ²	4.00 (0.157)

- (1) Made to order
- (2) Off the shelf male

Vertical PCB

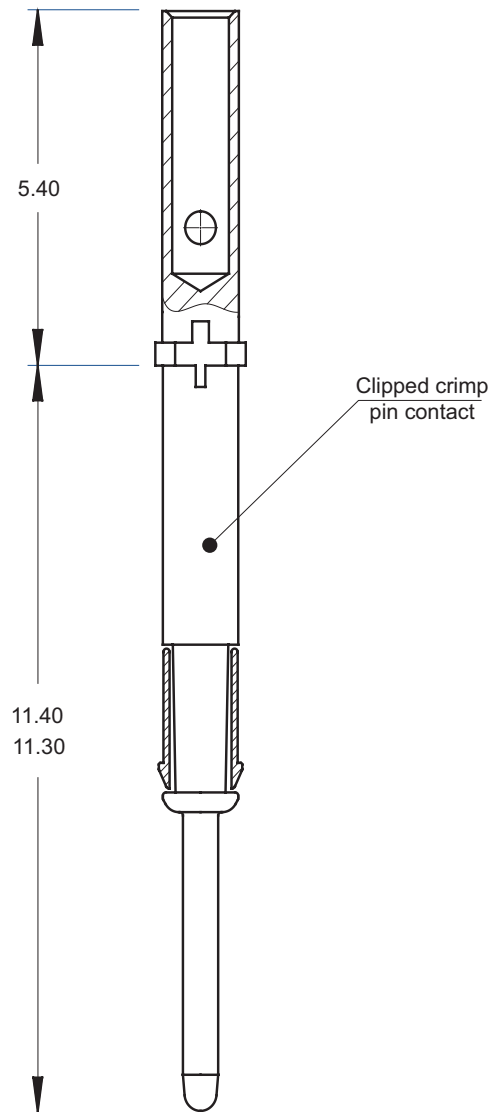


Termination	Dim. A
P ¹	4.50 (0.177)
K ²	6.70 (0.264)

- (1) Off the shelf
- (2) Off the shelf female

Cable terminations

Male crimp contact (26-22 AWG)



Standard guides male/female

Female guide index

Style AU	Stacking	Non-polarized	Vertical mounting	Page 11
Style HA		Polarized	Vertical mounting	Page 11
Style HD		Polarized	Vertical mounting	Page 11
Style HN		Polarized	Vertical mounting	Page 11
Style SC	Jack socket	Non-polarized	Vertical mounting	Page 11
Style TJ	T-Jack socket	Non-polarized	Transverse mounting	Page 11
Style TP	T-Jack socket	Non-polarized	Transverse mounting	Page 11
Style TT	T-Jack socket	Non-polarized	Transverse mounting	Page 11

Male guide index

Style AT	Stacking	Non-polarized	Vertical mounting	Page 12
Style PE	T-bracket	Polarized	Transverse mounting	Page 12
Style PF	T-bracket	Polarized	Transverse mounting	Page 12
Style PG	T-bracket	Polarized	Transverse mounting	Page 12
Style PN	T-bracket	Polarized	Transverse mounting	Page 12
Style PP	T-bracket	Polarized	Transverse mounting	Page 12
Style PQ	T-bracket	Polarized	Transverse mounting	Page 12
Style PT	T-bracket	Polarized	Transverse mounting	Page 12
Style QC	L-bracket	Polarized	Transverse mounting	Page 12
Style QF	L-bracket	Polarized	Transverse mounting	Page 12
Style QQ	L-bracket	Polarized	Transverse mounting	Page 12
Style Q3	L-bracket	Polarized	Transverse mounting	Page 12
Style 3C	Jacking	Non-polarized	Rotating free connector	Page 12
Style 3F	Jacking	Non-polarized	Vertical mounting	Page 13
Style NA		Polarized	Vertical mounting	Page 13
Style NB		Polarized	Vertical mounting	Page 13

		Male guides															
		AT	PE	PF	PG	PN	PP	PQ	PT	QC	QF	QQ	Q3	3C	3F	NA	NB
Female guides	AU																
	HA																
	HD																
	HN																
	SC																
	TJ																
	TP																
	TT																

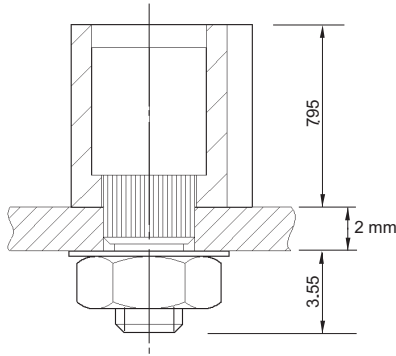
Note

For pin carrier guides please refer to *HPH Insulators/Pin Carrier/Guides* on page 6

Standard guide female

Style AU

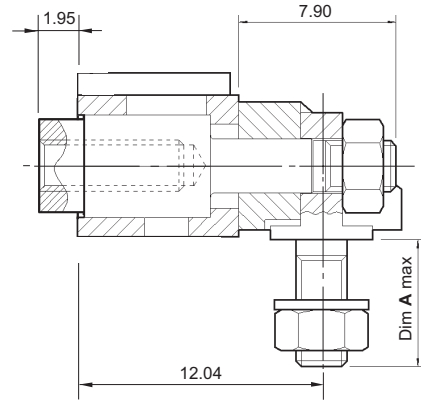
Non-polarized vertical mounting stacking



Above guides can also be used for male connectors

Style T

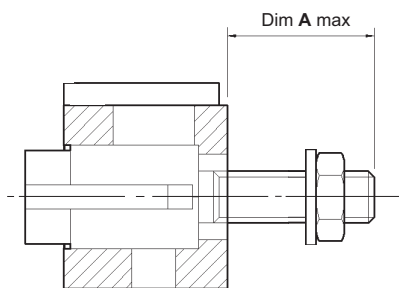
Jack socket non-polarized transverse mounting T-bracket



Style 3 row	Style 4 row	Style 5 row	Board thickness	Dim. A max.
TJ			2.54 (0.100)	5.70 (0.224)
	TP	TT	3.20 (0.393)	6.30 (0.248)

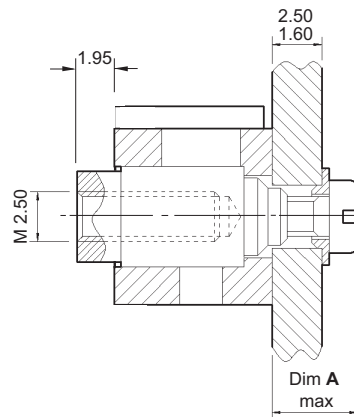
Style H

Polarized vertical mounting



Style SC

Jack socket non-polarized transverse vertical mounting



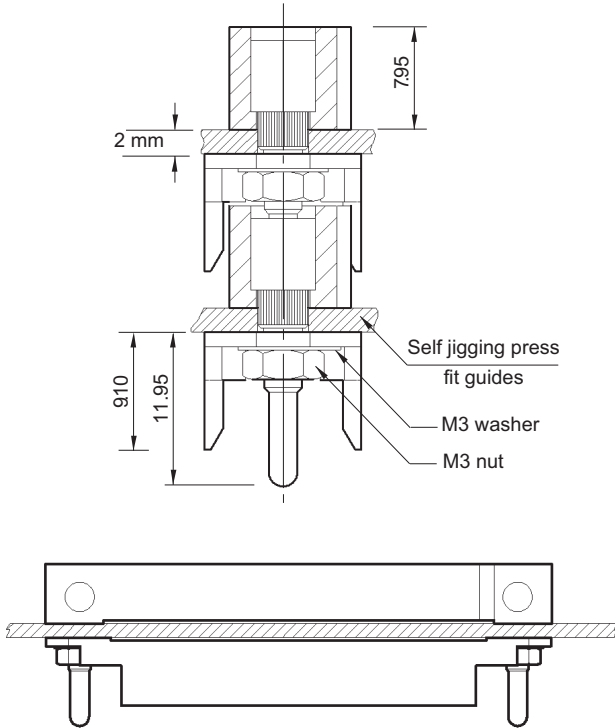
Style	Board thickness	Dim. A max.
HA	2.54 (0.100)	6.55 (0.257)
HD	3.20 (0.125)	7.20 (0.283)
HN	4.00 (0.157)	9.00 (0.354)

Style	Board thickness	Dim. A max.
SC	2.50 (0.098)	4.30 (0.169)

Standard guide male

Style AT

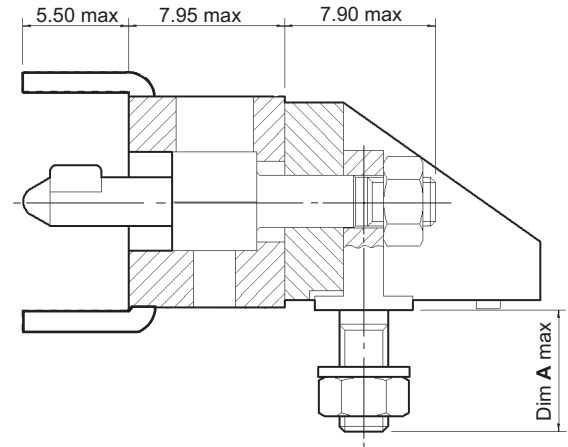
Non-polarized vertical mounting stacking



Style P

Polarized transverse

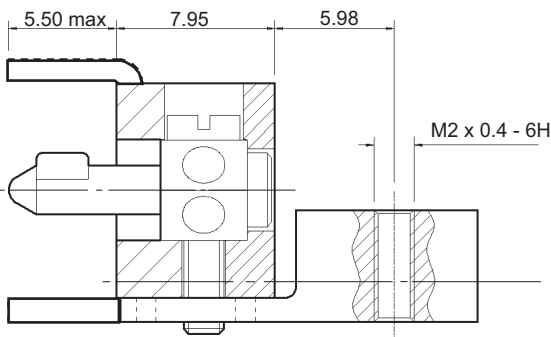
(5 row style shown)



Style	No. of rows	Board thickness	Dim. A max.
PE/PF/PG	3/4/5	2.00 (0.078)	5.10 (0.200)
PN/PP/PQ	3/4/5	3.20 (0.125)	6.30 (0.248)
PT	6	2.60 (0.102)	5.70 (0.224)

Style Q

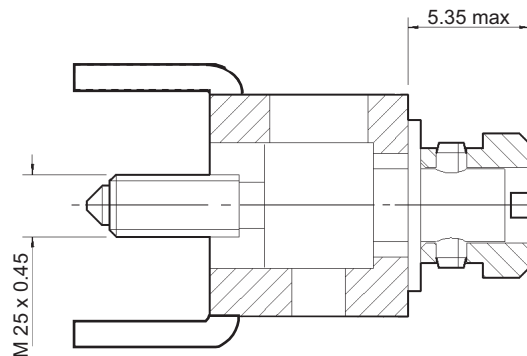
Polarized transverse mounting L-bracket



Style P

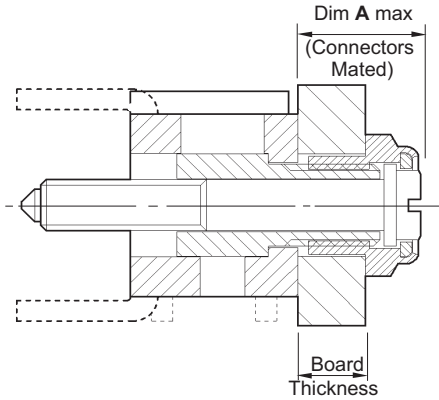
Polarized transverse

(5 row style shown)



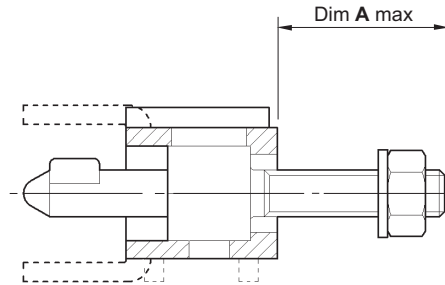
Style 3 row	Style 4 row	Style 5 row	Style 6 row	Board thickness
QC	QF	QQ		2.54 (0.100)
			Q3	3.20 (0.125)

Style 3F
Jacking guide non-polarized vertical mounting



Style	Board thickness	Dim. A max.
3F	2.95 to 3.45 (0.116 to 0.136)	6.25 (0.246)

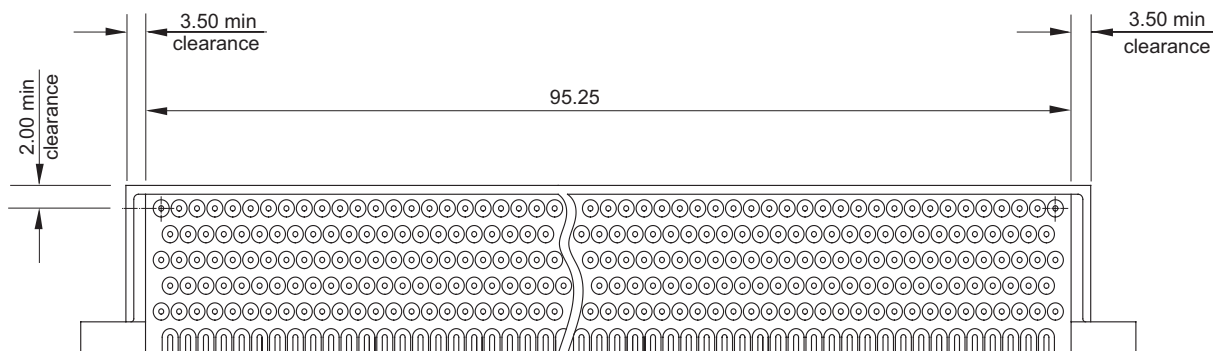
Style N
Polarized vertical mounting



Style	Board thickness	Dim. A max.
NA	2.54 (0.100)	6.55 (0.258)
NB	5.08 (0.200)	9.00 (0.354)

PCB preparations details

PCB 90° alignment comb details



303 way showing typical clearance dimensions (applies to all 90° styles)

Important

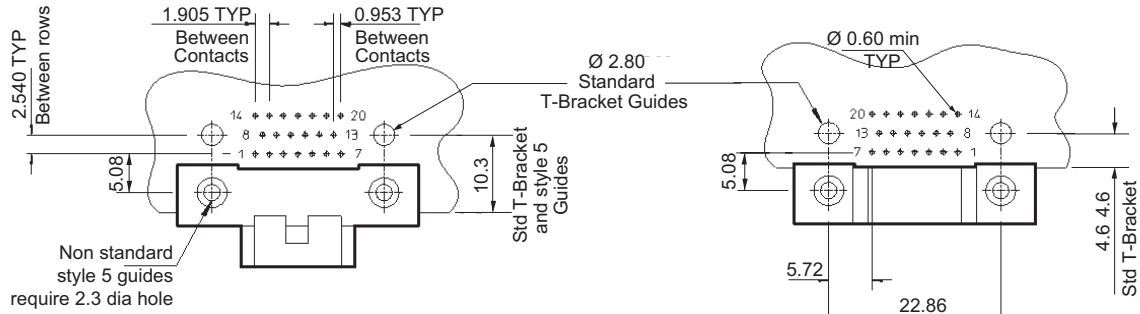
Please allow the following clearance dimensions around all 90° PCB layout configurations to accommodate the alignment comb shown below.

PCB standard 90° preparations details

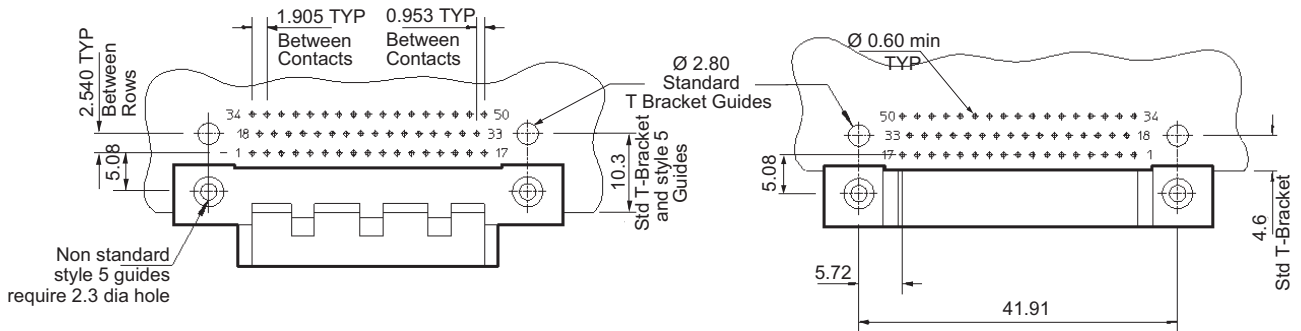
Male

Female

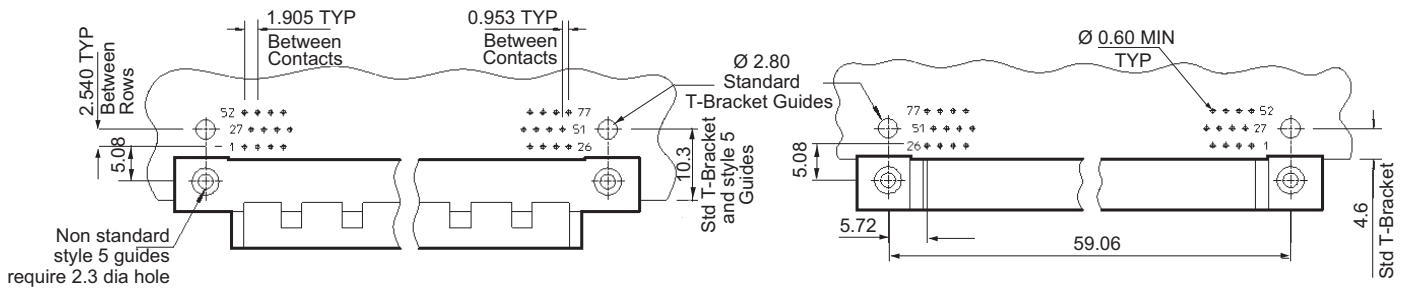
20 way 90° PCB layout



50 way 90° PCB layout



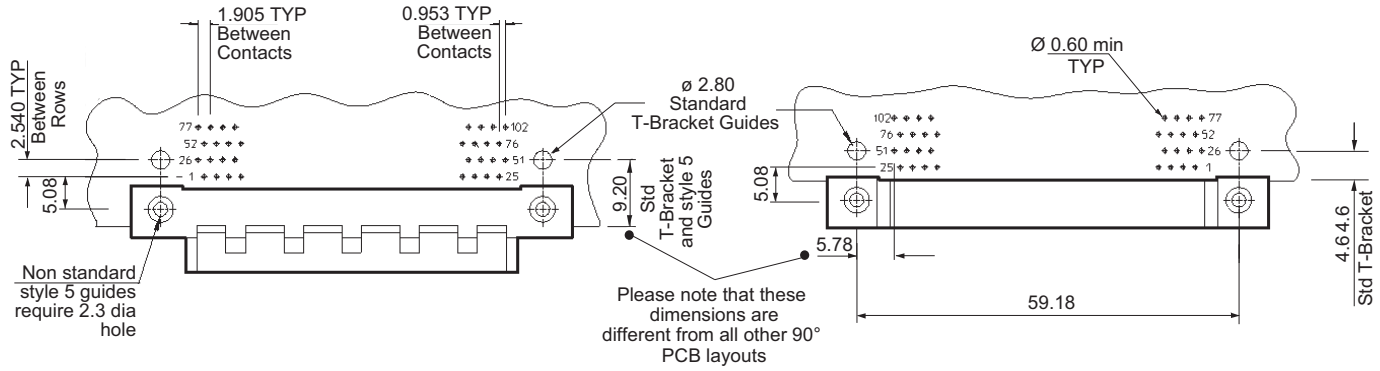
77 way 90° PCB layout



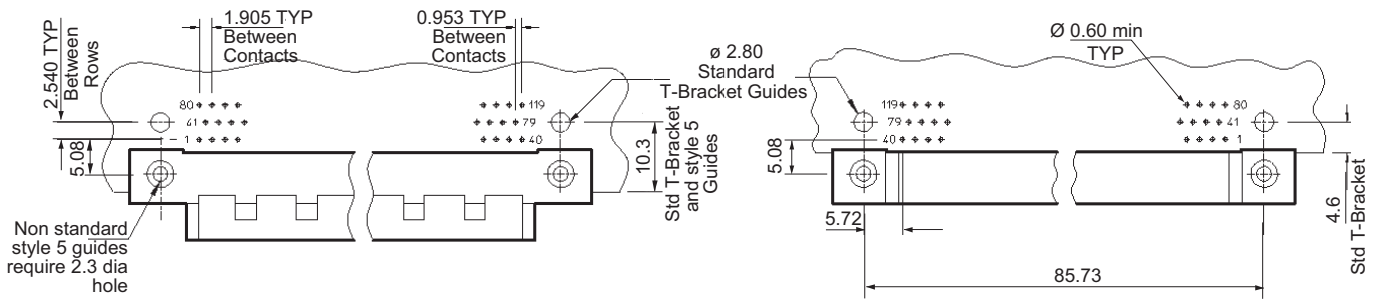
Male

Female

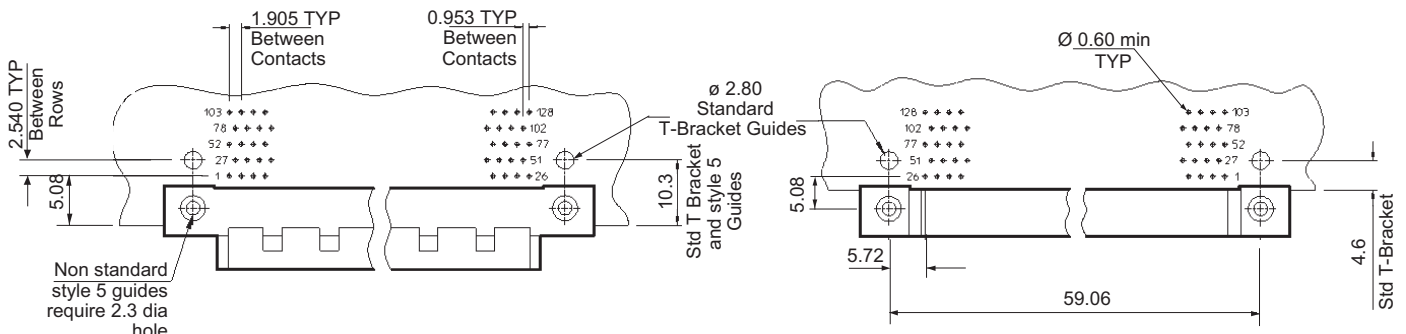
102 way 90° PCB layout



119 way 90° PCB layout



128 way 90° PCB layout

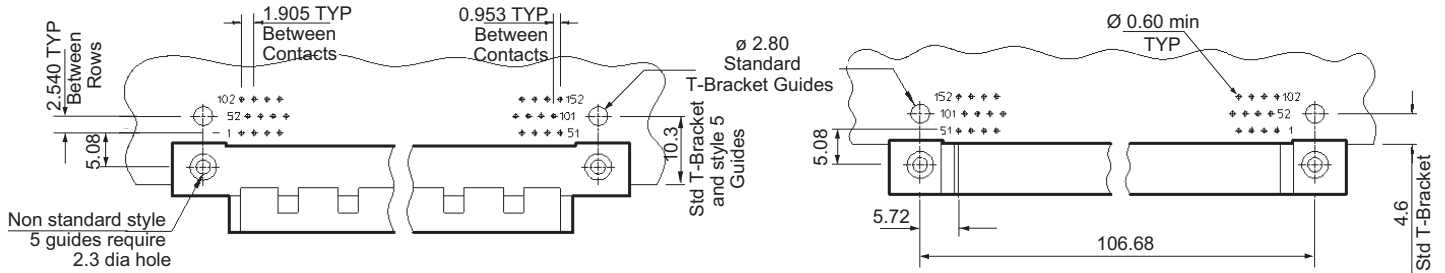


PCB standard 90° preparations details

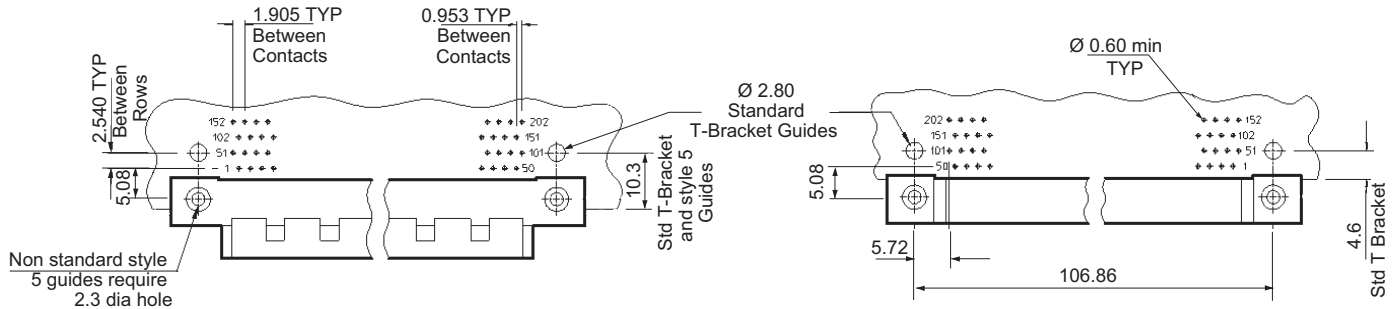
Male

Female

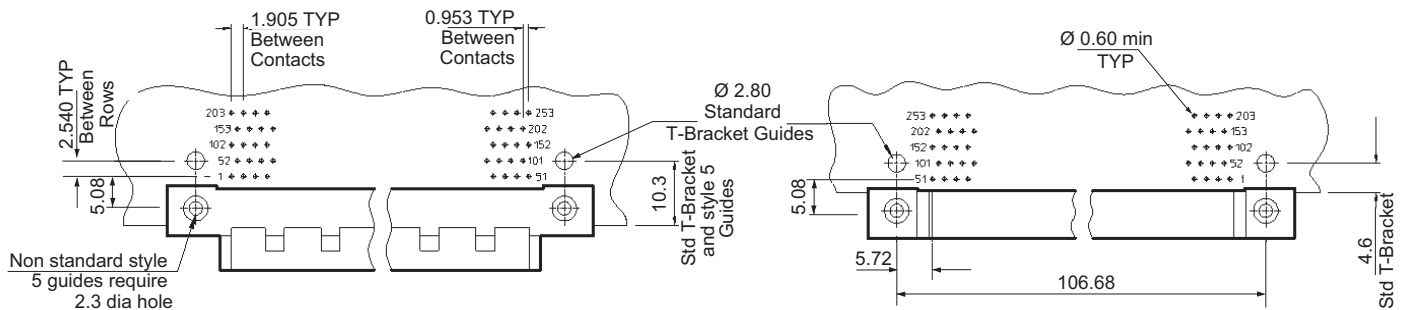
152 way 90° PCB layout



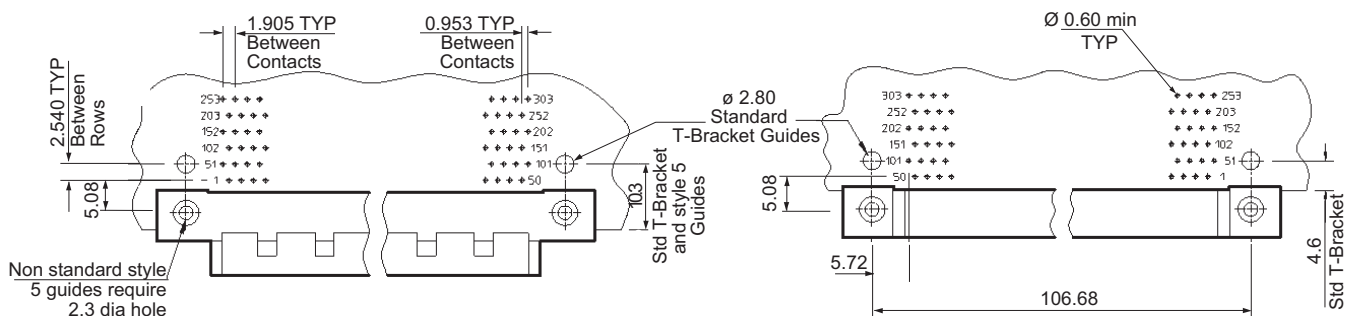
202 way 90° PCB layout



253 way 90° PCB layout



303 way 90° PCB layout

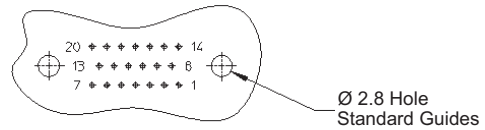
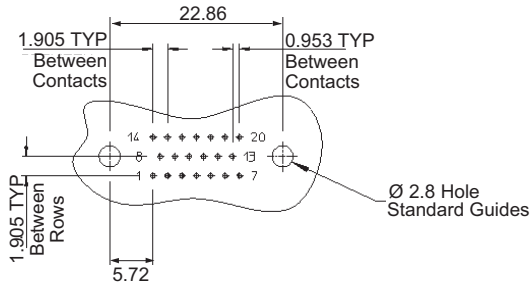


PCB standard vertical preparations details

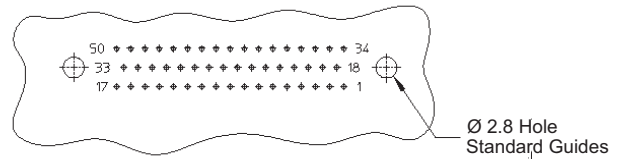
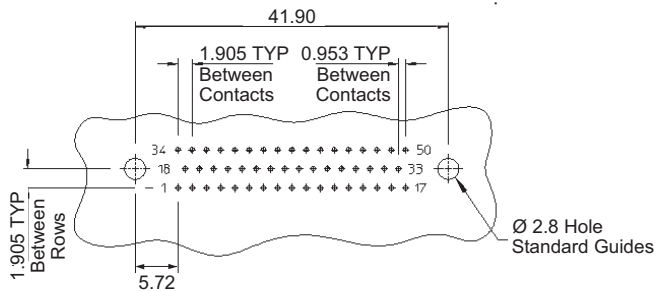
Layout male

Layout female

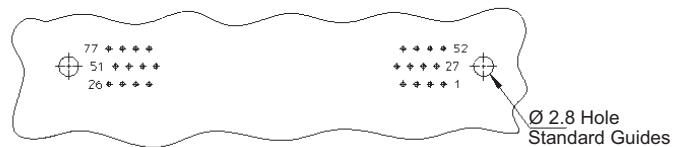
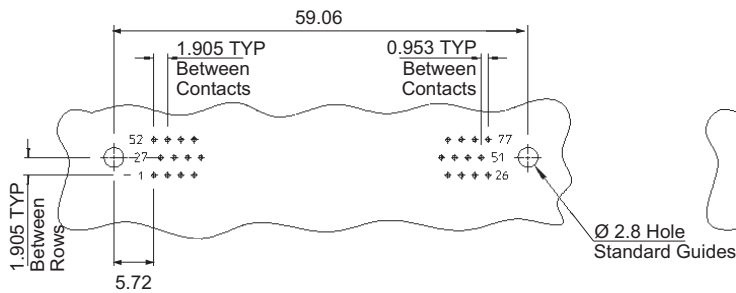
20 way vertical PCB



50 way vertical PCB



77 way vertical PCB



Note

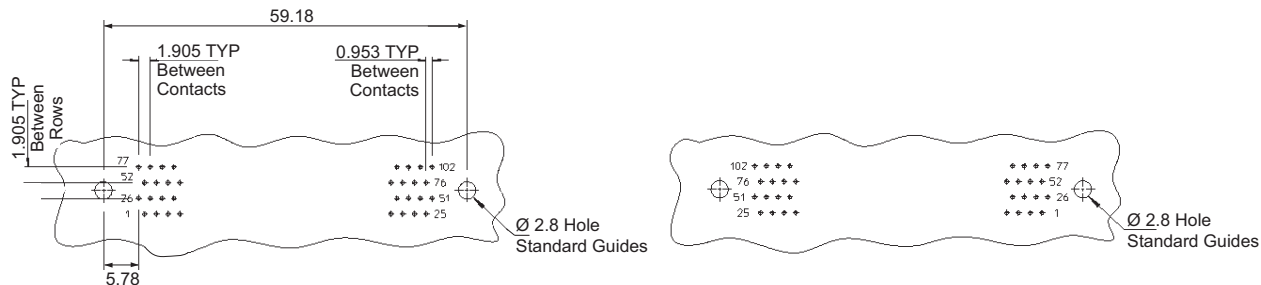
Vertical guide centers align with the center of the PCB contact layout.

PCB standard vertical preparations details

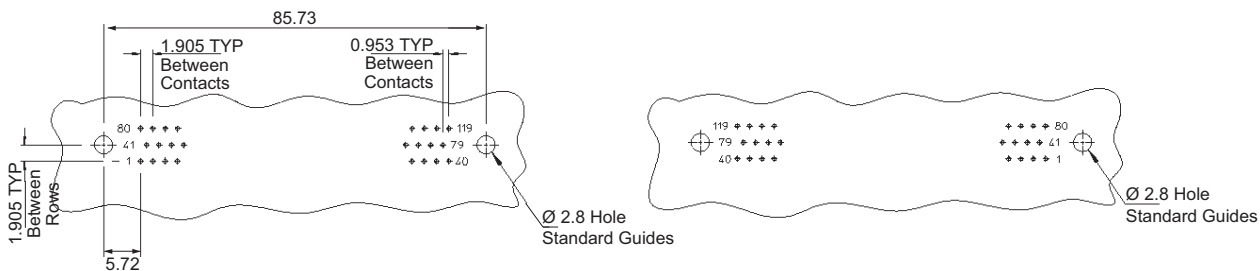
Layout male

Layout female

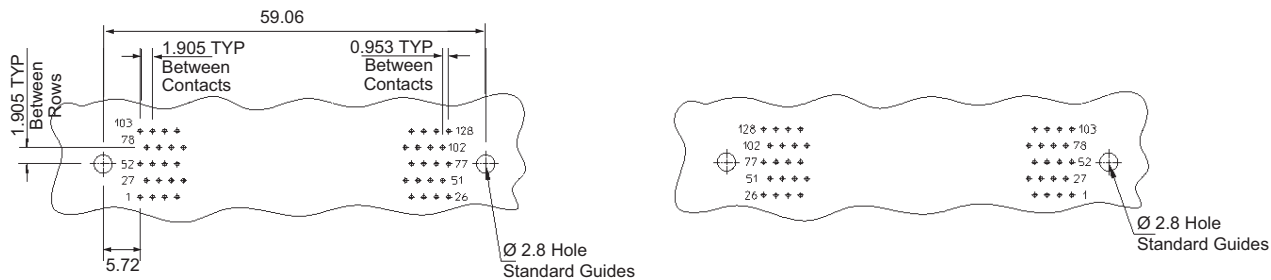
102 way vertical PCB



119 way vertical PCB



128 way vertical PCB



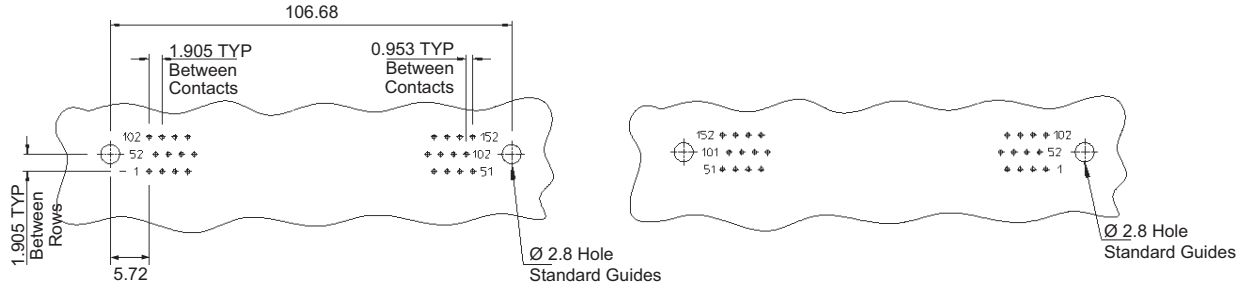
Note

Vertical guide centers align with the center of the PCB contact layout.

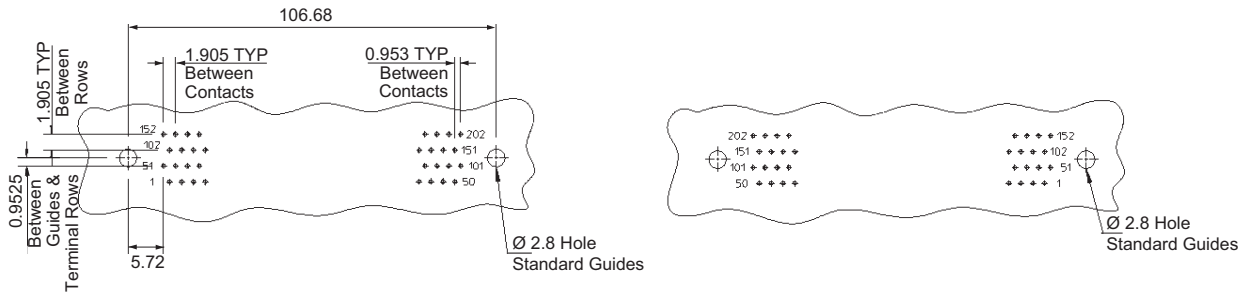
Layout male

Layout female

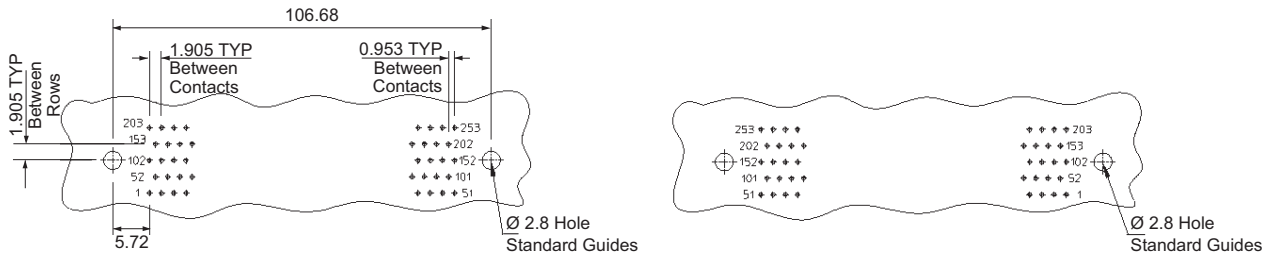
152 way vertical PCB



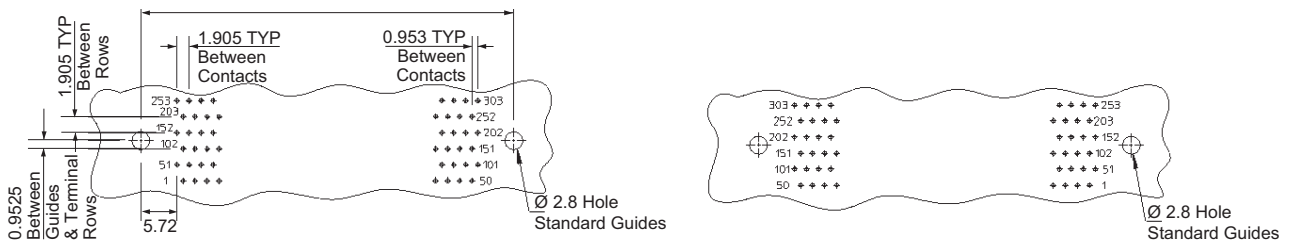
202 way vertical PCB



253 way vertical PCB



303 way vertical PCB



Note

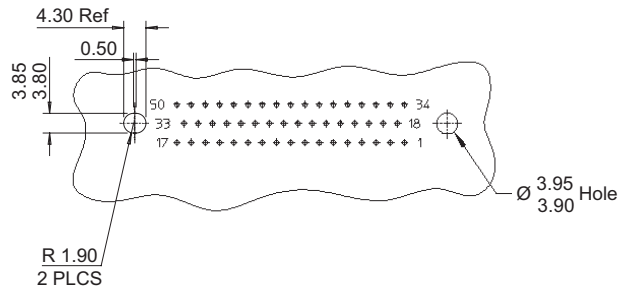
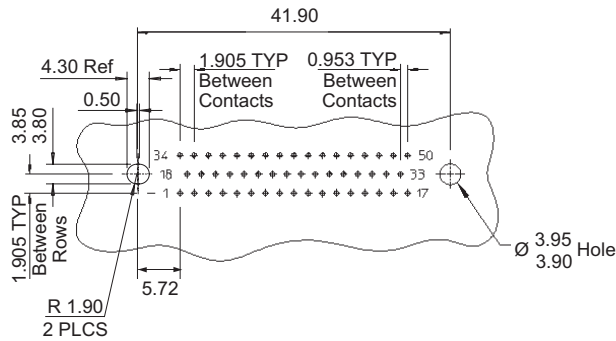
Vertical guide centers align with the center of the PCB contact layout.

PCB stacking preparations details

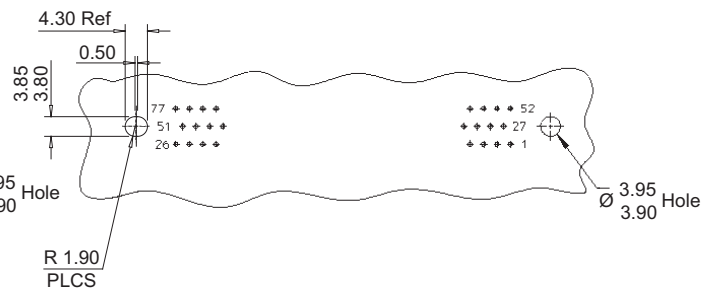
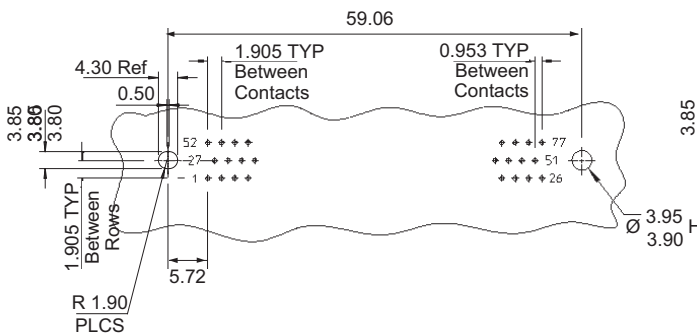
Layout viewed from male side

Layout viewed from female side

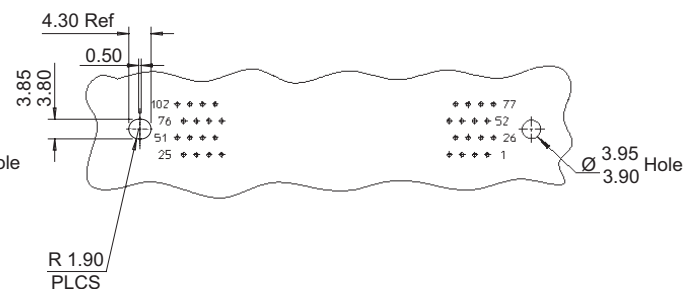
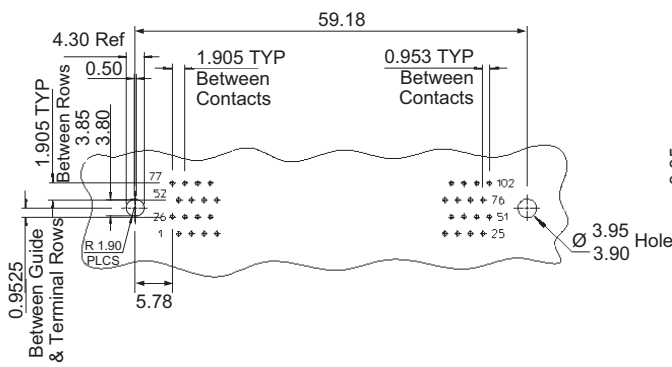
50 way vertical PCB



77 way vertical PCB



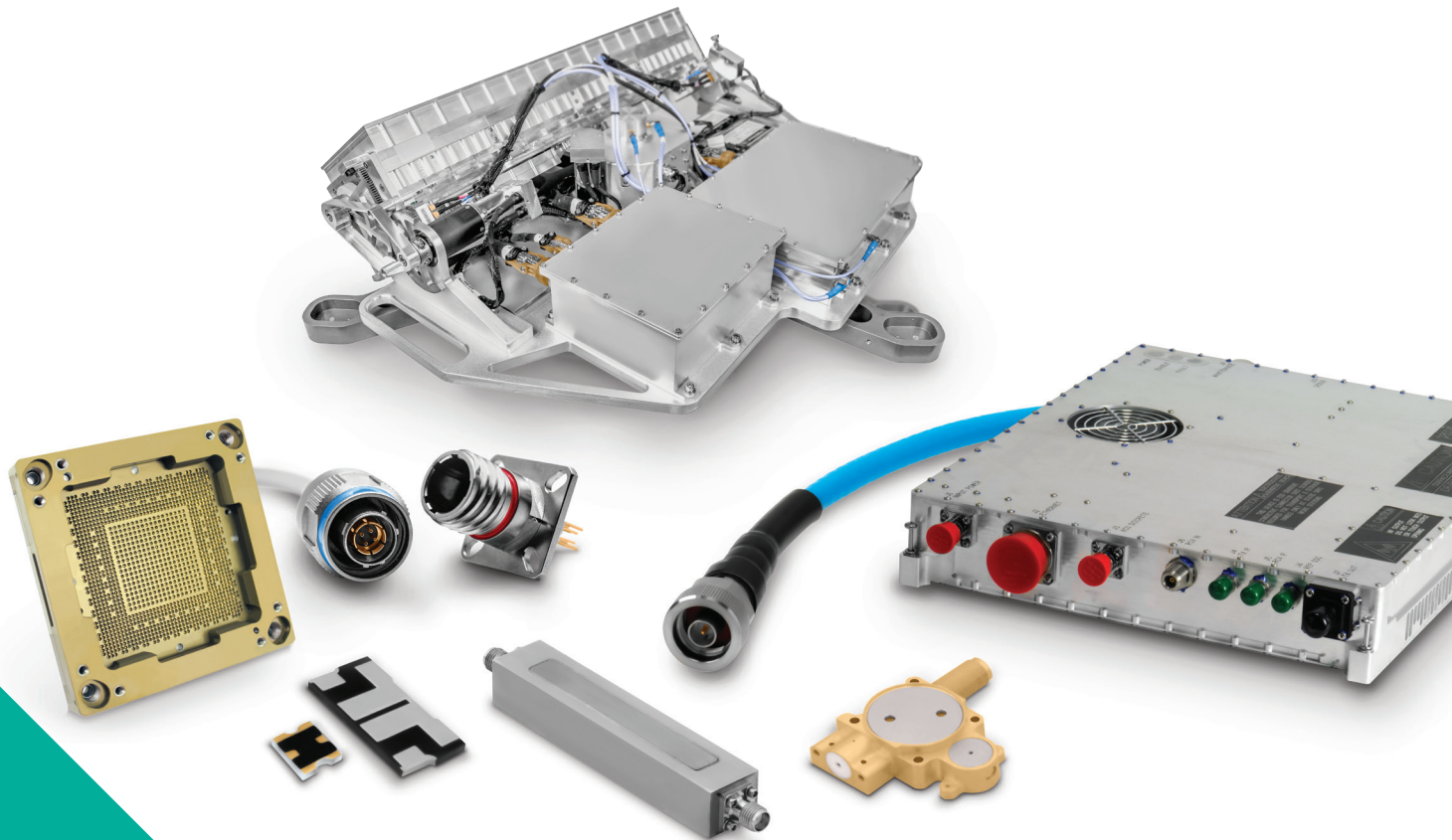
102 way vertical PCB



Note

Stacking guide centers align with the center of the PCB contact layout.
 Stacking connectors are currently available in 50, 77, and 102 ways.
 If you have further requirements please contact our local sales offices.

Product Portfolio



Disclaimer

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Worldwide Support

Connectors Americas

Sales

connectors.uscsr@smithsinterconnect.com

Technical Support

connectors.ustechsupport@smithsinterconnect.com

Europe

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Sales

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Fiber Optics & RF Components Americas

Sales

focom.uscsr@smithsinterconnect.com

Technical Support

focom.techsupport@smithsinterconnect.com

Europe

Sales

focom.emeacsr@smithsinterconnect.com

Technical Support

focom.techsupport@smithsinterconnect.com

Asia

Sales

focom.asiacsr@smithsinterconnect.com

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focom.techsupport@smithsinterconnect.com

Semiconductor Test Americas

Sales

semi.uscsr@smithsinterconnect.com

Technical Support

semi.techsupport@smithsinterconnect.com

Europe

Sales

semi.emeacsr@smithsinterconnect.com

Technical Support

semi.techsupport@smithsinterconnect.com

Asia

Sales

semi.asiacsr@smithsinterconnect.com

Technical Support

semi.techsupport@smithsinterconnect.com

RF/MW Subsystems Americas, Europe & Asia

Sales

subsystems.csr@smithsinterconnect.com

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