HPW Series

Signal and Power PCB Connectors
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 unrivalled 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.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low insertion/extraction forces</td>
<td>High density interconnect systems</td>
</tr>
<tr>
<td>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.</td>
<td>Significant reductions in size and weight of sub-system designs. No additional hardware is required to overcome mating and un-mating forces.</td>
</tr>
<tr>
<td>Long contact life</td>
<td>Low cost of ownership</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Lower contact resistance</td>
<td>Low power consumption</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Higher current ratings</td>
<td>Maximum contact performance</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Immunity to shock &amp; vibration</td>
<td>Reliability under harsh environments</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
</tbody>
</table>
Product Description

Smiths Interconnect’s HPW Series is a medium density PCB connector mixing signal and power contacts in a unique frame. The HPW Series has been designed to resist to the high levels of shock and vibrations in the harshest environments of the civil and military programmes.

Available with 2 contact size versions, size 22 signal and size 16 power contacts, HPW Series uses the proven Hypertac® hyperboloid contact system renowned for eliminating contact fretting, hence reducing wear rates and avoiding system failure and down-times. These features combine with current carrying capacity up to 15 Amps and low insertion-extraction forces to provide significantly enhanced quality and reliability performance compared with other more commodity connector solutions.

Technical Characteristics

<table>
<thead>
<tr>
<th>Contact Number</th>
<th>63, 92, 100 &amp; 107 ways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Diameter</td>
<td></td>
</tr>
<tr>
<td>size 22 0.75 mm nominal</td>
<td></td>
</tr>
<tr>
<td>size 16 1.56 mm nominal</td>
<td></td>
</tr>
<tr>
<td>Current Rating</td>
<td></td>
</tr>
<tr>
<td>size 22 5 A</td>
<td></td>
</tr>
<tr>
<td>size 16 15 A</td>
<td></td>
</tr>
<tr>
<td>Contact Resistance</td>
<td></td>
</tr>
<tr>
<td>size 22 11 mΩ (max)</td>
<td></td>
</tr>
<tr>
<td>size 16 4.5 mΩ (max)</td>
<td></td>
</tr>
<tr>
<td>Contact Mating Force</td>
<td></td>
</tr>
<tr>
<td>size 22 0.28 N (average)</td>
<td></td>
</tr>
<tr>
<td>size 16 0.56 N (average)</td>
<td></td>
</tr>
<tr>
<td>Contact Life Cycle</td>
<td>&gt; 2,000</td>
</tr>
<tr>
<td>Breakdown Voltage</td>
<td>1,920 V AC (min) [sea level]</td>
</tr>
<tr>
<td>Dielectric Withstanding Voltage</td>
<td>1,400 V AC (min) [sea level]</td>
</tr>
<tr>
<td>Temperature Rating</td>
<td>-55 to +125 Degree C</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>5 GΩ @ 500 V DC (min)</td>
</tr>
<tr>
<td>Insulator Material</td>
<td>PPS</td>
</tr>
<tr>
<td>Contact Material</td>
<td>Copper alloy</td>
</tr>
<tr>
<td>- Plating (Mating surfaces)</td>
<td>MIL-G-45204 gold plated</td>
</tr>
<tr>
<td>Guide Hardware</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>- Material</td>
<td>Passivated</td>
</tr>
</tbody>
</table>
# How To Order

<table>
<thead>
<tr>
<th>HPW</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

## 1 Connector family

## 2 No. of cavities

- **U**: See below
- **S**: U plating with tin dipped termination

## 3 Contact plating

- **U**: Gold Plate

## 4 Contact gender

- **M**: Male
- **F**: Female

## 5 Contact termination

- **0**: No contacts
- **C**: Crimp bucket
- **X**: Through board solder - 180°
- **B**: Through board solder - 90°
- **M**: Mixed

*Note: not all combinations are available*

## 6 Polarising/Guides

- **C**: Male jacking, polarised, free rotating
- **N**: Male polarised, vertical mount
- **F**: Female polarised, float mount
- **C**: Female polarised, transverse mount

## 7 Standard variations

- **000**: Standard
- **0PO**: Back potting

*Non readable code = contact mix configuration etc.*

## Contact plating finishes

<table>
<thead>
<tr>
<th>Connector finish ordering code</th>
<th>Description</th>
<th>Component</th>
<th>Component finish ordering code</th>
<th>Conforms to</th>
<th>Plating Thickness*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U</strong></td>
<td>Gold Plate</td>
<td>Socket</td>
<td>-/9</td>
<td>MIL-G45204 (Type II, Grade C, Class 1)</td>
<td>1.27 µm gold plate 50 µin gold plate minimum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pin</td>
<td>-/7</td>
<td>MIL-G45204 (Type II, Grade C, Class 1)</td>
<td>1.27 µm gold plate 50 µin gold plate minimum</td>
</tr>
</tbody>
</table>

* These values apply to mating surfaces
Standard Insulators

63 way Male half

63 way Female half

Dimension are in mm and inches
Standard Insulators

92 & 107 way Male halves

92 way half

Size 16 Cavities 23 plcs
Size 22 Cavities 46 plcs
Size 16 Cavities 23 plcs

15.35 max (0.604”)
16.00 max (0.630”)
18.35 max (0.722”)
8.00 max (0.315”)

130.56 (5.140”)
140.00 max (5.512”)

107 way half

Size 16 Cavities 15 plcs
Size 22 Cavities 77 plcs
Size 16 Cavities 15 plcs

10.00 max (0.394”)

139.90 max (5.508”)
130.56 (5.140”)

20.00 max (0.787”)

92 way half

10.00 max (0.394”)

139.90 max (5.508”)

140.00 max (5.512”)

130.56 (5.140”)

24.00

130.56 (5.140”)

140.00 max (5.512”)

92 & 107 way Female halves

92 way half

10.00 max (0.394”)

139.90 max (5.508”)

130.56 (5.140”)

130.56 (5.140”)

139.90 max (5.508”)

Dimension are in mm and inches
Standard Insulators

100 way Male halfves

100 way Female half

Tooling

<table>
<thead>
<tr>
<th>Crimp tool (MIL specification)</th>
<th>Positioner</th>
<th>Extraction tool</th>
<th>Insertion tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 22 contacts</td>
<td>M22520/2-01</td>
<td>HPW-501</td>
<td>HPW-521</td>
</tr>
<tr>
<td>Size 16 contacts</td>
<td>M22520/1-01</td>
<td>HPW-502</td>
<td>HPW-512</td>
</tr>
</tbody>
</table>

Dimension are in mm and inches
Standard PCB Terminations

Male half
Termination B: through board solder 90°

Size 16

63 way & 100 way

92 way & 107 way

Size 22

63 way

92 way & 107 way

100 way

Termination X: through board solder 180°

Size 16

63 way & 100 way

92 way & 107 way

Size 22

63 way

92 way & 107 way

100 way

Dimension are in mm
Standard PCB Terminations

Male half
Termination C: crimp bucket

Size 16

63 way & 100 way

92 way & 107 way

Size 22

63 way

92 way & 107 way

100 way

Dimension are in mm
Standard PCB Terminations

Female half
Termination B: through board solder 90°

Size 16
92 way & 107 way

Termination X: through board solder 180°

Size 16
63 way & 100 way

Dimension are in mm
Standard PCB Terminations

Female half
Termination C: crimp bucket

Size 16

63 way & 100 way

92 way & 107 way

Size 22

63 way

92 way & 107 way

100 way

Dimension are in mm
Standard Guide Male/Female

**Male guide index**

<table>
<thead>
<tr>
<th>Style</th>
<th>Feature Description</th>
<th>Polarity</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>Jacking, free rotating</td>
<td>Polarised</td>
<td>Vertical</td>
</tr>
<tr>
<td>NB</td>
<td></td>
<td>Polarised</td>
<td>Vertical</td>
</tr>
<tr>
<td>NC</td>
<td>Bracket (92; 107 way only)</td>
<td>Polarised</td>
<td>Transverse</td>
</tr>
</tbody>
</table>

**Female guide index**

<table>
<thead>
<tr>
<th>Style</th>
<th>Feature Description</th>
<th>Polarity</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB</td>
<td>Float</td>
<td>Polarised</td>
<td>Vertical</td>
</tr>
<tr>
<td>FE</td>
<td></td>
<td>Polarised</td>
<td>Vertical</td>
</tr>
<tr>
<td>FF</td>
<td>Bracket</td>
<td>Polarised</td>
<td>Transverse</td>
</tr>
<tr>
<td>TA</td>
<td>Jack socket</td>
<td>Polarised</td>
<td>Vertical</td>
</tr>
</tbody>
</table>

**Male guides**

<table>
<thead>
<tr>
<th>Male guides</th>
<th>CA</th>
<th>NB</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>FF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Female guides**

<table>
<thead>
<tr>
<th>Female guides</th>
<th>CA</th>
<th>NB</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FE</td>
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<td>FF</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### HPW Series

**Standard Guide Male**

**Style CA**
Jacking Polarised, Free Rotating (92; 107 way)

- Dim A max (mated) 8.60
- Dim A max (free) 8.25

**Style NB**
Polarised, Vertical Mount (63; 92; 100; 107 way)

- Dim A max (mated) 5.60
- Dim A max (free) 5.20*

### Dimension are in mm and inches

**Style NC**
Polarised, Transverse Mount

- Dim A max 12.70 max
- Dim A max 4.83

**Ways (Style NC)** | **Board thickness max** | **Dim A max**
--- | --- | ---
63 way | 2.00 0.079* | 5.40 0.213*
100 way | 5.00 0.197* | 8.40 0.331*
92; 107 way | 3.10 0.122* | 5.50 0.217*

* Dimensions in inches
Standard Guides Female

Style FB
Polarised Float Mount Socket, Vertical
(92; 107 way)

Style FE
Polarised Socket, Vertical Mount
(63; 92; 100; 107 way)

Style FF
Polarised Socket, Transverse Mount
(92; 107 way)

Style TA
Polarised Jack Socket, Vertical Mount
(92; 107 way)

Dimension are in mm and inches
PCB Standard 90° Preparations Details

63 Way 90° PCB Layout

Male

100 Way 90° PCB Layout

Male

Dimension are in mm
PCB Standard 90° Preparations Details
92 Way 90° PCB Layout

Male

Female

Dimension are in mm
PCB Standard 90° Preparations Details

107 Way 90° PCB Layout

Male

Female

Dimension are in mm
PCB Standard 180° Preparations Details

63 Way 180° PCB Layout

Male

Female

Dimension are in mm
PCB Standard 180° Preparations Details

92 Way 180° PCB Layout

Male

Female

Dimension are in mm
PCB Standard 180° Preparations Details

100 Way 180° PCB Layout

Male

Dimension are in mm

Note
Vertical guide centres align with the centre of the PCB contact layout.

Dimension are in mm
HPW Series

PCB Standard 180° Preparations Details
107 Way 180° PCB Layout

Male

Female

Dimension are in mm
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