HyperGrip® Series

High Reliability Medical Circular Connectors
Available Contact Technologies

(Features & Benefits)

Hypertac® Hyperboloid - HC

- **Long Contact Life**
  Industry-leading mating cycles (over 20,000) provide low cost of ownership

- **Low Insertion / Extraction Forces**
  Ergonomic mating without cost and size of mate assist hardware

- **Lower Contact Resistance**
  Low power consumption / lower voltage drop across connector

- **Higher Current Ratings**
  Smaller contacts needed to carry power for reduced size and weight

- **Immunity to Shock & Vibration**
  Reliability under harsh environmental conditions

- **360° Contact Wipe**
  Self-cleaning contacts assure uninterrupted connection

- **RoHS compliant**

Screw-machined contact - MR

- **Medium Contact Life**
  Mechanical life minimum 2,000 cycles

- **Flexible design**
  The inner clip and the socket body are manufactured and plated separately

- **Reliable and cost effective**
  The production of machined specific contact bodies allows for high volumes and low costs

- **Low Insertion / Extraction Forces**
  Ergonomic mating without cost and size of mate assist hardware

- **Low Contact Resistance**
  Low power consumption / lower voltage drop across connector

- **Higher Current Ratings**
  Small contacts needed to carry power for reduced size and weight

- **RoHS compliant**
HyperGrip® Series

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HyperGrip® Series

HyperGrip Circular Connector Series is available with 5, 12, 19 or 33 pin positions and a user-configurable keying system. While competitive products require purchasing a different connector for each keying configuration needed, our advanced keying system allows customers to build connectors with six different keying options reducing lead time and inventory.

HyperGrip connectors are color-coded and range from ~12.5 to 22.5mm in diameter. The five available color options, along with our innovative keying system, make recognition effortless and incorrect mating impossible. This becomes essential for medical instrumentation applications where multiple connector interfaces are required.

Smiths Interconnect offers custom options in order to meet application specific requirements. The flexible design of HyperGrip connectors allows for the use of alternate technologies including Fiber Optic (expanded beam or butt joint termini), Coaxial and Spring Probe contacts. Custom inserts, cable mount receptacles and cable assemblies (available in select sizes) can also be provided to optimize your connector solution.
### How To Order

<p>| | | | | | | | | | | | | | |</p>
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<td>1</td>
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<td>HG</td>
<td>HG</td>
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<td>HG</td>
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</tr>
<tr>
<td>2</td>
<td>Size</td>
<td>HG0*</td>
<td>HG2</td>
<td>HG3</td>
<td>HG4</td>
<td>HG0*</td>
<td>HG2</td>
<td>HG3</td>
<td>HG4</td>
<td>HG0*</td>
<td>HG2</td>
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<td>HG4</td>
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<tr>
<td>3</td>
<td>Type</td>
<td>P</td>
<td>E</td>
<td>C</td>
<td>P</td>
<td>E</td>
<td>C</td>
<td>P</td>
<td>E</td>
<td>C</td>
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<td>E</td>
<td>C</td>
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<td>4</td>
<td>Connector options</td>
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<td>Shielded (Unsealed)</td>
<td>Shielded (Unsealed)</td>
<td>Shielded (Unsealed)</td>
<td>Shielded (Unsealed)</td>
<td>Shielded (Unsealed)</td>
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<td>4.50 - 6.50 mm</td>
<td>7.00 - 9.00 mm</td>
<td>9.00 - 11.00 mm</td>
<td>2.08 - 3.10 mm</td>
<td>HG2 only</td>
<td>HG3 only</td>
<td>HG4 only</td>
<td>Shielded: 9.50 - 11.00 mm</td>
<td>HG2 only</td>
<td>HG3 only</td>
<td>HG4 only</td>
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<tr>
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<td>(Cable diameter ranges)</td>
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<td>HG3 only</td>
<td>HG4 only</td>
<td>Shielded: 9.50 - 11.00 mm</td>
<td>HG2 only</td>
<td>HG3 only</td>
<td>HG4 only</td>
<td>Shielded: 9.50 - 11.00 mm</td>
<td>HG2 only</td>
<td>HG3 only</td>
<td>HG4 only</td>
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<td>6</td>
<td>Outer shell color</td>
<td>Light gray</td>
<td>Light gray</td>
<td>Light gray</td>
<td>Light gray</td>
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<tr>
<td></td>
<td>(Fixed)</td>
<td>Light gray</td>
<td>Light gray</td>
<td>Light gray</td>
<td>Light gray</td>
<td>Light gray</td>
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<td>7</td>
<td>Color coding</td>
<td>Light gray (Standard)</td>
<td>Blue</td>
<td>Red</td>
<td>Green</td>
<td>Yellow</td>
<td>Light gray (Standard)</td>
<td>Blue</td>
<td>Red</td>
<td>Green</td>
<td>Yellow</td>
<td>Light gray (Standard)</td>
<td>Blue</td>
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<td>(Strain relief or panel seal only)</td>
<td>Light gray (Standard)</td>
<td>Blue</td>
<td>Red</td>
<td>Green</td>
<td>Yellow</td>
<td>Light gray (Standard)</td>
<td>Blue</td>
<td>Red</td>
<td>Green</td>
<td>Yellow</td>
<td>Light gray (Standard)</td>
<td>Blue</td>
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<tr>
<td>8</td>
<td>Positions</td>
<td>HG0</td>
<td>HG2</td>
<td>HG3</td>
<td>HG4</td>
<td>HG0</td>
<td>HG2</td>
<td>HG3</td>
<td>HG4</td>
<td>HG0</td>
<td>HG2</td>
<td>HG3</td>
<td>HG4</td>
</tr>
<tr>
<td>9</td>
<td>Contact diameter</td>
<td>0.3mm (HG0)</td>
<td>0.4mm (HG2, HG3, HG4)</td>
<td>0.3mm (HG0)</td>
<td>0.4mm (HG2, HG3, HG4)</td>
<td>0.3mm (HG0)</td>
<td>0.4mm (HG2, HG3, HG4)</td>
<td>0.3mm (HG0)</td>
<td>0.4mm (HG2, HG3, HG4)</td>
<td>0.3mm (HG0)</td>
<td>0.4mm (HG2, HG3, HG4)</td>
<td>0.3mm (HG0)</td>
<td>0.4mm (HG2, HG3, HG4)</td>
</tr>
<tr>
<td>10</td>
<td>Contact gender</td>
<td>Female sockets</td>
<td>Male pins</td>
<td>MR contact Female sockets</td>
<td>Female sockets</td>
<td>Male pins</td>
<td>MR contact Female sockets</td>
<td>Female sockets</td>
<td>Male pins</td>
<td>MR contact Female sockets</td>
<td>Female sockets</td>
<td>Male pins</td>
<td>MR contact Female sockets</td>
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<tr>
<td></td>
<td>(Fixed)</td>
<td>(Receptacles only)</td>
<td>(Plugs only)</td>
<td>(Receptacles only)</td>
<td>(Receptacles only)</td>
<td>(Receptacles only)</td>
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<tr>
<td></td>
<td>(Fixed)</td>
<td>(Contacts are shipped unloaded, may be crimped or soldered, then inserted into insulator. For more information, please see Assembly Instructions.)</td>
<td>(Contacts are shipped unloaded, may be crimped or soldered, then inserted into insulator. For more information, please see Assembly Instructions.)</td>
<td>(Contacts are shipped unloaded, may be crimped or soldered, then inserted into insulator. For more information, please see Assembly Instructions.)</td>
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<td>( Contacts are shipped unloaded, may be crimped or soldered, then inserted into insulator. For more information, please see Assembly Instructions.)</td>
</tr>
</tbody>
</table>

* : not available for HG versions with MR contact

**: Available tooling: Crimp Tool: AFM8 or M22520/2-01, Crimp Positioner: K1775 (HG0) or T2030 (HG2, HG3, HG4), Insertion Tool: T2080
Technical Characteristics

<table>
<thead>
<tr>
<th></th>
<th>HG0</th>
<th>HG2</th>
<th>HG3</th>
<th>HG4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of contacts</td>
<td>5</td>
<td>12</td>
<td>19</td>
<td>33</td>
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<tr>
<td>Contact diameter</td>
<td>0.012 (0.30)</td>
<td>0.016 (0.40)</td>
<td>0.016 (0.40)</td>
<td>0.016 (0.40)</td>
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</table>

**Materials**

- **Body**: Polyetherimide
- **Insulators**: Liquid crystal polymer
- **Seals**: Silicone

**Contact Materials & Plating**

<table>
<thead>
<tr>
<th>Sockets</th>
<th>HC</th>
<th>MR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sockets</td>
<td>Beryllium copper wires</td>
<td>Beryllium copper clip</td>
</tr>
<tr>
<td></td>
<td>Brass body components</td>
<td>Copper-zinc-lead body component</td>
</tr>
<tr>
<td></td>
<td>Gold over nickel plating on mating surface</td>
<td>Gold plating over Nickel underplating</td>
</tr>
<tr>
<td></td>
<td>Gold flash over nickel on termination</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pins</th>
<th>HC</th>
<th>MR</th>
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<tbody>
<tr>
<td></td>
<td>Phosphor bronze</td>
<td>Beryllium copper clip</td>
</tr>
<tr>
<td></td>
<td>Gold over nickel plated</td>
<td></td>
</tr>
</tbody>
</table>

**Terminations**

- **Crimp (Pin & Socket)**: 26 to 28 AWG
- **Optional terminations**, including solder cup and straight-dip pc tails (for panel mount receptacles), are special order only. Please contact factory for availability.

**Shielding (Optional)**

- **Effectiveness**: Up to 3 GHz
- **Attenuation**: 50 dB maximum at 3 GHz

**Mechanical**

- **Mating cycle life**: Up to 20,000 with Hyperboloid contact - Up to 2,000 with Flextac contact
- **Contact extraction force**: 0.50 to 1.60 oz. per contact

**Electrical**

<table>
<thead>
<tr>
<th>Current Rating (A)</th>
<th>HG0</th>
<th>HG2</th>
<th>HG3</th>
<th>HG4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(per contact, with all contacts energized)</td>
<td>5.5</td>
<td>3.0</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Contact Resistance</td>
<td>&lt; 8.0 mΩ</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Breakdown Voltage Between Contacts</td>
<td>1,000 V max.</td>
<td></td>
<td></td>
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<tr>
<td>Dielectric Withstanding Voltage</td>
<td>1125 V</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Insulation Resistance</td>
<td>&gt; 5x10⁴ MΩ at 500 VDC</td>
<td></td>
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</table>

**Physical & Environmental**

| Operating Temperature Rating | -40° to 125° C |
| Processing Temperature Range | Up to 185° C |
| Flammability | Materials meet the requirements of UL94 V-0 |
| Sterilization | Steam Autoclave, ETO, Sterrad® 2 |
| Fingerproofing | Meets IEC 60601-1 requirements |
| Sealing (mated condition) | IP65 |

**Notes:**
1) HyperGrip is patented under US patent numbers: 7,326,091B2; 7,661,995B2; D596,127S; 7,938,670; D615,932; D616,825
2) Sterrad® is a registered trademark of Advanced Sterilization Products (ASP) division of Ethicon US, LLC, a Johnson & Johnson Company.

Dimensions are in inches (mm)
## Dimensions

*(Standard HyperGrip® connectors)*

### Standard Plug & Receptacle

For HG0, HG2, HG3 and HG4

---

**PLUG & RECEPTACLE MATED PAIR**

with strain relief

---

**[E] RECEPTACLE**

with shielding option

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**[P] PLUG**

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### Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG0</td>
<td>Ø0.807</td>
<td>0.728</td>
<td>Ø0.630</td>
<td>0.285</td>
<td>1.040</td>
<td>0.343</td>
<td>Ø0.370</td>
<td>Ø0.486</td>
<td>1.415</td>
<td>0.118</td>
<td>0.689</td>
<td>—</td>
<td>—</td>
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<tr>
<td></td>
<td>(20.50)</td>
<td>(18.50)</td>
<td>(16.00)</td>
<td>(7.25)</td>
<td>(26.38)</td>
<td>(8.71)</td>
<td>(9.40)</td>
<td>(12.34)</td>
<td>(35.94)</td>
<td>(3.00)</td>
<td>(17.50)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>HG2</td>
<td>Ø1.014</td>
<td>1.220</td>
<td>Ø0.866</td>
<td>0.272</td>
<td>1.808</td>
<td>0.427</td>
<td>Ø0.502</td>
<td>Ø0.656</td>
<td>2.390</td>
<td>0.118</td>
<td>0.823</td>
<td>Ø0.433</td>
<td>Ø0.197</td>
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<td>(25.76)</td>
<td>(30.88)</td>
<td>(22.00)</td>
<td>(6.91)</td>
<td>(45.92)</td>
<td>(10.84)</td>
<td>(12.75)</td>
<td>(16.66)</td>
<td>(60.65)</td>
<td>(3.00)</td>
<td>(20.90)</td>
<td>(11.00)</td>
<td>(5.00)</td>
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<td>HG3</td>
<td>Ø1.172</td>
<td>1.220</td>
<td>Ø1.007</td>
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<td>2.170</td>
<td>0.354</td>
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<td>Ø0.800</td>
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<td>0.980</td>
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<tr>
<td></td>
<td>(29.77)</td>
<td>(30.88)</td>
<td>(25.59)</td>
<td>(6.91)</td>
<td>(55.07)</td>
<td>(9.00)</td>
<td>(16.50)</td>
<td>(20.36)</td>
<td>(69.33)</td>
<td>(3.00)</td>
<td>(24.90)</td>
<td>(13.60)</td>
<td>(9.60)</td>
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<tr>
<td>HG4</td>
<td>Ø1.250</td>
<td>1.220</td>
<td>Ø1.090</td>
<td>0.272</td>
<td>2.170</td>
<td>0.354</td>
<td>Ø0.710</td>
<td>Ø0.880</td>
<td>2.730</td>
<td>0.118</td>
<td>1.060</td>
<td>Ø0.610</td>
<td>Ø0.378</td>
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<td>(31.77)</td>
<td>(30.88)</td>
<td>(27.80)</td>
<td>(6.91)</td>
<td>(55.07)</td>
<td>(9.00)</td>
<td>(18.15)</td>
<td>(22.47)</td>
<td>(69.33)</td>
<td>(3.00)</td>
<td>(76.90)</td>
<td>(15.50)</td>
<td>(9.60)</td>
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</tbody>
</table>

Dimensions are in inches (mm)
HG2 Plug & Cable Receptacle

HG2 Plug & Cable Receptacle Mated Pair with strain relief

[C] HG2 Cable Receptacle

[P] HG2 Plug
Keying & Mounting
(User information)

Receptacle Keying

HG2 shown
HG0, HG3 and HG4 are keyed in the same fashion
6 different keying positions possible - A through F

See Assembly Instructions for receptacle keying information(1):
S50386: Panel Receptacles
S50431: Cable Receptacles

Panel Cutouts
All sizes

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
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<tbody>
<tr>
<td></td>
<td>+0.002 – 0.001</td>
<td>±0.001</td>
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<tr>
<td>HG0</td>
<td>Ø0.555 (14.10)</td>
<td>0.240 (6.10)</td>
</tr>
<tr>
<td>HG2</td>
<td>Ø0.711 (18.06)</td>
<td>0.329 (8.36)</td>
</tr>
<tr>
<td>HG3</td>
<td>Ø0.870 (22.10)</td>
<td>0.393 (9.98)</td>
</tr>
<tr>
<td>HG4</td>
<td>Ø0.949 (24.10)</td>
<td>0.430 (10.92)</td>
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</table>

Notes:
1) Instructions also include plug keying information: S50387
Receptacle Mounting Options

1. Assembly outside panel then install

2. Install receptacle body then assemble inside panel

Notes:
Recommended tightening torque for panel mount receptacle for HG2, HG3 and HG4 is 0.452 to 0.678 N•m. For HG0 is 0.226 to 0.339 N•m.
Additional Contact Technologies*

*(Features & Benefits)*

**Spring Probe**
- Extremely High Density
- Shock & Vibration Resistant
- Exceptional Misalignment Tolerance
- High Cycle Life
- Z-Axis Compliance

**Fiber Optic**
- Two Standard Types:
  - Size 16 Butt-Joint & Size 12 Expanded-Beam (EB) termini
- Low Insertion Loss
- Hermaphroditic Contacts (Butt Joint)
- Multi & Single-Mode Fiber Compatible (EB)
- Low Susceptibility to Contamination (EB)
- Resistant to EMI / RFI and crosstalk

**Coaxial**
- 50Ω Characteristic Impedance
- Crimp Termination for RG-405 Flex Cable
- Low VSWR up to 40 GHz
- Magnetic Permeability: 30x10⁻⁵µr
- Immunity to Shock & Vibration
- Up to 20K Mating Cycles

**Applications**

**Catheter**
- Disposable
- High density spring probe contacts
- High cycle life
- Low contact resistance
- Minimal insertion/extraction forces

**Patient monitoring**
- Hyperboloid signal contacts
- Custom creepage and clearance
- High reliability
- Cost effective
- Patient friendly

**Portable therapeutic**
- Custom cable solution
- Superior reliability for critical application
- Color coded
- Multiple keys to prevent mismating
- Intuitive design

**MRI/CT scanning**
- Quick push/pull latching
- Hyperboloid signal contacts
- ESD finger-proof protection
- Multiple keying options

**Surgical imaging**
- Expanded beam Fiber Optic contact
- Low susceptibility to contamination
- Fiber Optic video connection for easy mating to HD display system

**Home healthcare**
- Hyperboloid and USB signal contacts
- IP65 sealing
- Simple operation
- Ergonomic, ideal for in-home patient use

*Please contact factory for availability*