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## Hypergrip® Flex Connectors

June 2021 | Product Training – Customer presentation

BEYOND  
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## Hypergrip® Series



- Hypergrip® series is a well known and proven high reliability circular connector series specifically designed for the medical industry.
- Throughout the years since the first product launch at the beginning of the 2000s the product has had a good response from the market and Smiths Interconnect was able to establish a recognized product reputation in the marketplace thanks to its reliability, versatility, customer keying system and quick and accurate connections. In addition it was recognized for the finger-proofing to IEC60601, flammability rated to UL94 V0, and compliance with most sterilization requirements.
- Today the market has increased the offering for these type of connectors through similar products with a value aligned price and with performances that reach a satisfactory technical level without exceeding expectations.



**Improved value alignment to the market** for standard cycle life applications with the use of the MR Contact solution

**Reduced inventory and lead times** with patented keying system allowing customers to build connectors with 6 different keying options

**Increased reliability and chemical resistance** (including autoclave, EtO, Sterrad, VHP, and most common cleaning agents) due to engineering-grade polymers

**Reduced risks** to fail device qualification testing due to existing connector qualifications

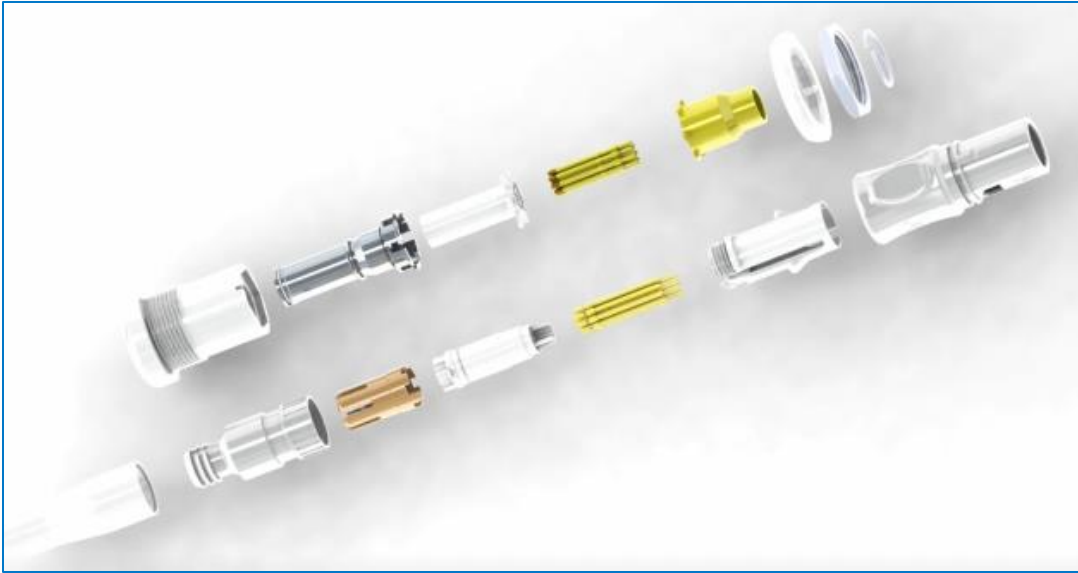
**Improved total cost of ownership** with the use of crimp and poke contacts vs. traditional tested contacts.

**Improved value** for final device due to premium medical look and feel, fool proof mating, easy cleaning, and reduced chances of cut or torn gloves

## Target Applications



- Patient monitoring
- Electrosurgical / Endoscopic tools
- Catheter
- Home healthcare
- Portable therapeutic



## EMI/RFI shielding option available

- Plastic shell with internal shield provides non-conductive touch surfaces for user and patient safety
- Effective up to 3 GHz, 50 dB max attenuation
- Internal shield extends the cable shield through to the system

## Mechanically & Visually Intuitive

- Innovative keying system allows customers to build connectors with 6 different keying options reducing lead time and inventory
- Available in 5 color options for effortless mating recognition

## Aesthetic, User-friendly Design

- Sleek and light-colored body; blends well with medical equipment
- Smooth contours with no sharp edges
  - Easy cleaning
  - Safety – won't cut surgical gloves
- Push / pull ergonomic disconnect for easy, one-hand mating

## Medical Quality

- Sealed when mated
- Flammability: UL94 V-0 rated
- Fingerproof: Meets requirements of IEC 60601-1
- Sterilizable: Autoclave, EtO, VHP, and Sterrad®
- Processing Temperatures up to 185°C
- Integrated strain relief



# HyperGrip® connectors with alternative contact technologies

## Potential Custom Configurations with new insulators:

### Fiber Optic

- **Expanded Beam Fiber Optic**
  - Less chance of degraded optical performance due to dirt, debris, or mechanical vibration
- **Butt Joint (Arinc 801) Fiber Optic**
  - Superior return loss performance on angle polished termini
- **Floating Fiber Optic**
  - Self aligns into standard connector formats

### Spring Probe Technology

- Extreme High Density
- > 10,000 mating cycles

### Coaxial Technology

- 50  $\Omega$  characteristic impedance
- Low VSWR up to 40 GHz



## MR socket contact features



- Screw machined crimp contact
- 0,4 mm diameter
- RoHS compliant:
  - ✓ Beryllium copper clip
  - ✓ Copper-zinc-lead body component
  - ✓ Gold plating over Nickel underplating

- **Tested and qualified according to:**

- ✓ EIA-364-23 for Low Level Contact Resistance (LLCR): target below 12 milliohms - Minimum resistance: 3.03 milliohms, Maximum resistance: 4.63 milliohms
- ✓ EIA-364-05B for Installation force: lower than 20 lbs.
- ✓ EIA-364-37C for Contact Insertion/Extraction force: lower than 0,75 newtons.
- ✓ EIA-364-20E for Dielectric Withstanding Voltage (DWV): no evidence of breakdown or flashover with target of 1125 peak voltage and max leakage current of 2 milliamperes. Hypergrip with HC is also qualified to 1125 peak voltage.



# Hypergrip® with Hyperboloid socket contact vs Hypergrip Flex with MR socket contact



Technical features	Hypergrip	Hypergrip Flex
Mating cycles	>20,000	>2,000
6 different keying options	✓	✓
HG0 size	✓	✗
HG2, HG3, & HG4 sizes	✓	✓
5 color options	✓	✓
IP65 sealed when mated	✓	✓
Push/pull latching design	✓	✓
1 A per contact	✓	✓
Shielded in HG2, HG3, & HG4 sizes	✓	✓

# Hypergrip® with Hyperboloid socket contact vs Hypergrip Flex with MR socket contact



Applications	Hypergrip	Hypergrip Flex
Patient monitoring	✓	✓
Electrosurgical / Endoscopic tools	✓	✓
Catheter	✓	✓
Home healthcare	✓	✓
Portable therapeutic	✓	✓
Imaging	✓	✗

# Hypergrip® Flex | How to order: additions

	HG					G					R	
	1	2	3	4	5	6	7	8	9	10	11	12
<b>1 Series</b>	HG Series											
<b>2 Size</b>	HG0	2 HG2	3 HG3	4 HG4								
<b>3 Type</b>	P Plug	E Receptacle/Panel		C Receptacle/Cable (Available on HG2 only)								
<b>4 Connector options</b>	1 Sealed	2 shielded (Unsealed) HG2, HG3, HG4 only / plugs "P" and panel receptacles "E" only										
<b>5 Strain relief size</b> <small>(Cable diameter ranges)</small>	0 No strain relief <small>(Panel receptacles only)</small>		4 4.50 - 6.50 mm (HG2 only)			6 9.00 - 11.00 mm (HG4 only) <small>(Shielded: 9.50 - 11.00 mm)</small>						
	1 2.08 - 3.10 mm (HG0 only)		5 7.00 - 9.00 mm (HG3 only)									
<b>6 Outer shell color</b> <small>(Fixed)</small>	G Light gray											
<b>7 Color coding</b> <small>(Strain relief or panel seal only)</small>	G Light gray (Standard) D Blue R Red V Green Y Yellow											
<b>8 Positions</b>	5 HG0	1 2 HG2	1 9 HG3	3 3 HG4								
<b>9 Contact diameter</b>	0 3 0.3mm (HG0)	0 4 0.4mm (HG2, HG3, HG4)										
<b>10 Contact gender</b>	F Female sockets (Receptacles only)		M Male pins (Plugs only)		C MR contact Female sockets <small>(Receptacles only)</small>							
<b>11 Termination</b> <small>(Fixed)</small>	R Crimp/Solder (26-28 AWG) <small>(Contacts are shipped unloaded, may be crimped or soldered, then inserted into insulator. For more information, please see Assembly Instructions.)</small>											
<b>12 Plating</b> <small>(Pins: Gold over nickel Sockets: Gold over nickel on contact surfaces, gold flash on terminations)</small>	G HG2, HG3, HG4 pins		H HGO pins									
	A N H HG2, HG3, HG4 HC sockets		A H HGO HC sockets		I HG2, HG3, HG4 MR sockets							

## 10 Contact gender

F Female sockets (Receptacles only) M Male pins (Plugs only) C MR contact Female sockets (Receptacles only)

## 12 Plating

(Pins: Gold over nickel Sockets: Gold over nickel on contact surfaces, gold flash on terminations)

G HG2, HG3, HG4 pins H HGO pins  
A N H HG2, HG3, HG4 HC sockets A H HGO HC sockets I HG2, HG3, HG4 MR sockets


Features	Benefits	Smiths Interconnect HG	Smiths Interconnect HG Flex	Next Best Alternative
• <b>Customer keyability</b>	Easily keyed / prevents mismatching – 1 part / 6 keys	✓	✓	✗ <i>(must buy differently keyed parts)</i>
• <b>Long Cycle life</b>	Provides up to 2k connector mates and <12 mΩ resistance	✓ <i>(High 20k mates)</i>	✓ <i>(Medium 2k mates)</i>	✓ <i>(Medium 2k mates)</i>
• <b>Contacts shipped unloaded</b>	Easier termination – reduced cost of ownership	✓	✓	✗ <i>(solder cup nest is std)</i>
• <b>Shielding option available in plastic housing (HG2,3,4)</b>	Protection against EMI/RFI	✓	✓	✗ <i>(must go to metal version)</i>
• <b>Push/Pull latching</b>	Quick connect / disconnect – simple one-hand mate / unmate	✓	✓	✓
• <b>Color coding</b>	Visually intuitive mating	✓	✓	✓



# Hypergrip® Flex - Marketing Collateral and samples

## Website Product Page with:

- Updated Product Brochure
- New Qualification Test Report
- New product animations



### HyperGrip® Series

HyperGrip is a circular plastic, user-configurable, color coded connector with push/pull latching design allowing for one-hand disconnect. HyperGrip is designed to meet medical industry requirements such as finger-proofing to IEC60601, flammability rated to UL94 V0, and is compatible with most sterilization requirements.

[PRODUCT DETAILS](#) [Download Brochure](#)



- **Press Release available for media starting end of June 2021**
- **Sample package in distribution Mid-July 2021**

### Smiths Interconnect expands its product offering for medical applications


[Circular](#) [Patient Monitoring](#) [Portable & Wearable Devices](#) [Home Health Monitors](#) [Electrophysiology Catheters](#)

[Hyperboloid](#)

Jun 28 2021

Hypergrip® Flex connectors offer a cost-effective design for standard cycle life applications

Smiths Interconnect announced today the extension of its Hypergrip® connector series for the medical market with the addition of the new Hypergrip® Flex connectors.



Hypergrip®Flex

Thanks to its recognized market successes the Hypergrip series has established a strong reputation of reliability, versatility, and ease-of-use.

# Hypergrip Flex - Website product page and related documents

Home > Products > Connectors > Circular > [HyperGrip® Series](#)


<https://www.smithsinterconnect.com/products/connectors/circular/hypergrip%C2%AE-series/>

## HyperGrip® Series

High Reliability Medical Connectors

HyperGrip is a circular plastic, user-configurable, color coded connector with push/pull latching design allowing for one-hand disconnect. HyperGrip is designed to meet medical industry requirements such as finger-proofing to IEC60601, flammability rated to UL94 V0, and is compatible with most sterilization requirements.

[Request a Quote](#) [Download Brochure](#)




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### Features & Benefits

- 5, 12, 19 and 33 contact positions
- 1 A per contact
- IP65 sealed when mated
- EM/RFI shielding option
- Push/pull latching design
- Ideal for disposable applications
- 6 Keyable positions
- 5 color options


[Request a Quote](#) [Technical Specification](#) [Request More Info](#) [3D Configure](#) [Distributor Stock Check](#)



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# HyperGrip® Series

High Reliability Medical Circular Connectors



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## Qualification Test Report

**HYPERGRIP SERIES – Qualification of MR contact in HG4 Receptacle Connector**

June 2nd, 2021



HYPERGRIP SERIES - MR contact - Qualification Test Report - 06/02/2021

## **US7,326,091: US Patent, active**

## **US7,661,995: US Patent, active**

Claim: A connector for electrical or optical conduits that provides a field configurable keying of the insulator plugs relative to each other and relative to the connector casings. A separate relative keying means is included that is separate from the case keying or locating mechanism. The connector also utilizes a retention means for example, a one-way snap apron, to retain the insulator within the receptacle case.

## **D596,127: US Design Patent, active**

Claim: The ornamental design for an electrical connector, as shown and described.

## **US7,938,670: US Patent, active**

Claim: A method of mounting a connector assembly to an equipment case, the connector assembly connecting together a first conduit and a second conduit, the method including: inserting a receptacle insulator into a receptacle case to form a receptacle assembly of a female receptacle connector of the connector assembly; retaining the receptacle insulator within the receptacle case using a retainer that axially positions the receptacle insulator in the receptacle case using a snap fit connection; passing a plurality of leads of the first conduit into corresponding bores in the receptacle insulator; inserting an end portion of the receptacle assembly into an opening in the equipment case; and securing the receptacle assembly to the equipment case.

## **D615,932: US Design Patent, active**

## **D616,825: US Design Patent, active**

Claim: The ornamental design for an electrical connector, as shown and described.



Hypergrip is a registered US trademark

more > [smithsinterconnect.com](https://smithsinterconnect.com)



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