

smiths interconnect

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

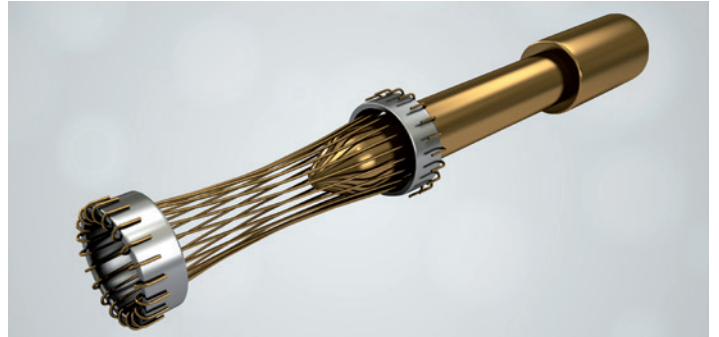
■ Immunity to Shock & Vibration

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

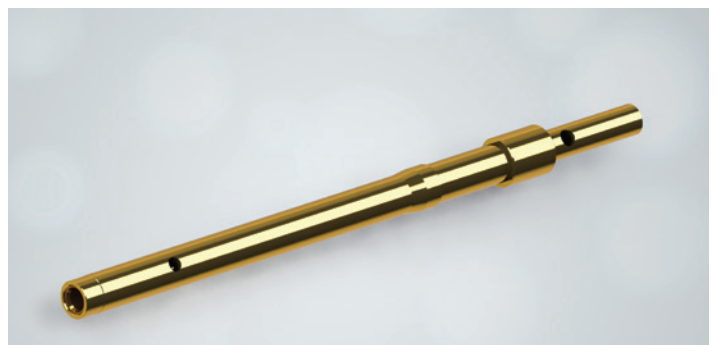
■ Low Contact Resistance

Low power consumption / lower voltage drop across connector

■ Higher Current Ratings

Small contacts needed to carry power for reduced size and weight

■ RoHS compliant



Content

HyperGrip® Series	2
Features & Benefits	2
How To Order	3
Technical Characteristics	4
Dimensions	
Standard Plug & Receptacle	5
HG2 Plug & Cable Receptacle	6
Keying & Mounting	
Receptacle Keying	7
Panel Cutouts	7
Receptacle Mounting Options	8
Additional Contact Technologies	
Applications	9



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.

Specifically designed to meet medical industry requirements, the HyperGrip connector's sleek, robust body delivers superior performance in the most crucial applications. Not only does the standard sealing offer IP65 protection when mated to prevent electrical shorts, but the available shielding feature supplies EMI/RFI protection providing the highest degree of safety and reliability.

By utilizing the unparalleled performance of Hypertac® hyperboloid contact technology and the flexible and reliable design of the MR contact, HyperGrip connectors are able to provide high cycle life, low power consumption, low insertion force, reliability under harsh conditions, maximum contact performance and excellent wiping action.

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.

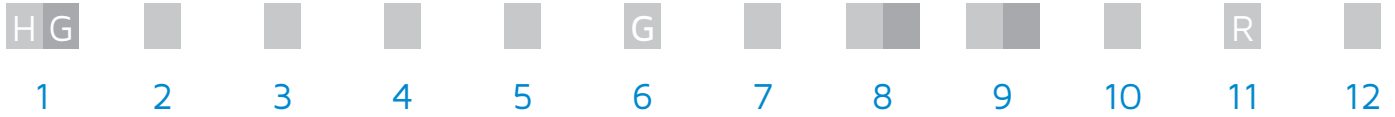
Designed to meet medical industry requirements

Features & Benefits

- **Push/Pull latching feature, quick connect**
Simple one-hand mating/unmating
- **Innovative customer keyability**
Easily keyed in 6 standard positions to prevent mismatching
- **Available with 5 color code options**
Visually intuitive mating
- **Sleek, robust body**
Designed to aesthetically complement medical devices
- **Sealing to IP65 when mated**
Meets or exceeds typical medical sealing requirements
- **Fingerproof**
Meets requirements of IEC 60601-1 specifications
- **Multiple contact technologies available**
Flexibility for superior performance in high reliability, high speed, high density, high frequency and/or hybrid solutions
- **Shielding option available in HG2, HG3 and HG4**
Protection against EMI/RFI interference
- **Autoclave, EtO and Sterrad®1) sterilizable**
Meets typical medical sterilization requirements
- **UL94 V-0 flammability rated materials**
Meets medical industry safety requirements
- **Integrated strain relief**
Prevents cable wire fatigue due to bending
- **Contacts shipped unloaded**
Easier termination for reduced cost of Ownership: crimp and poke termination eliminates the need to pre-tin, solder, and shrink boot

1) Sterrad® is a registered trademark of Advanced Sterilization Products (ASP) division of Ethicon US, LLC, a Johnson & Johnson Company.

How To Order



1 Series	H G Series
2 Size	0 HGO* 2 HG2 3 HG3 4 HG4
3 Type	P Plug E Receptacle/Panel C Receptacle/Cable (Available on HG2 only)
4 Connector options	1 Sealed 2 Shielded (Unsealed) HG2, HG3, HG4 only / plugs "P" and panel receptacles "E" only
5 Strain relief size <small>(Cable diameter ranges)</small>	0 No strain relief 4 4.50 - 6.50 mm (HG2 only) 6 9.00 - 11.00 mm (HG4 only) (Shielded: 9.50 - 11.00 mm) 1 2.08 - 3.10 mm (HGO only) 5 7.00 - 9.00 mm (HG3 only)
6 Outer shell color <small>(Fixed)</small>	G Light gray
7 Color coding <small>(Strain relief or panel seal only)</small>	G Light gray (Standard) D Blue R Red V Green Y Yellow
8 Positions	G HGO 1 2 HG2 1 9 HG3 3 3 HG4
9 Contact diameter	0 3 0.3mm (HGO) 0 4 0.4mm (HG2, HG3, HG4)
10 Contact gender	F Female sockets (Receptacles only) M Male pins (Plugs only) C MR contact Female sockets (Receptacles only)
11 Termination <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>
12 Plating <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

*: not available for HG versions with MR contact

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

Technical Characteristics

	HG0	HG2	HG3	HG4
Number of contacts	5	12	19	33
Contact diameter	0.012 (0.30)	0.016 (0.40)	0.016 (0.40)	0.016 (0.40)

Materials

Body	Polyetherimide
Insulators	Liquid crystal polymer
Seals	Silicone

Contact Materials & Plating

	HC	MR
Sockets	Beryllium copper wires Brass body components Gold over nickel plating on mating surface Gold flash over nickel on termination	Beryllium copper clip Copper-zinc-lead body component Gold plating over Nickel underplating
Pins	Phosphor bronze Gold over nickel plated	

Terminations

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

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

Current Rating (A)	5.5	3	2.5	1
<i>(per contact, with all contacts energized)</i>				
Contact Resistance	< 8.0 mΩ			
Breakdown Voltage Between Contacts	1,000 V max.			
Dielectric Withstanding Voltage	1125 V			
Insulation Resistance	> 5x10 ⁴ MΩ at 500 VDC			

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:

- HyperGrip is patented under US patent numbers: 7,326,091B2; 7,661,995B2; D596,127S; 7,938,670; D615,932; D616,825
- 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

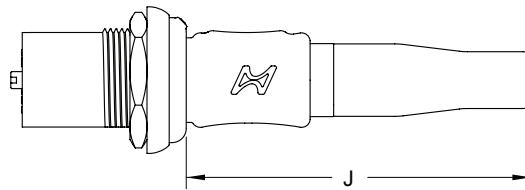
(Standard HyperGrip® connectors)

Standard Plug & Receptacle

For HG0, HG2, HG3 and HG4

PLUG & RECEPTACLE MATED PAIR

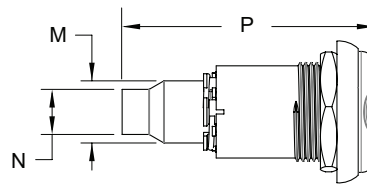
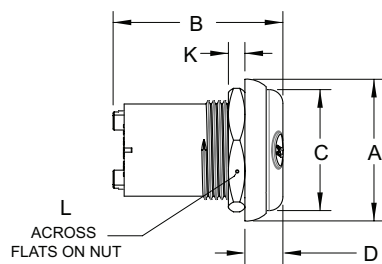
with strain relief



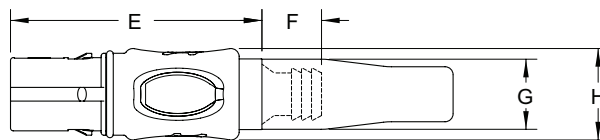
[E] RECEPTACLE

[E] RECEPTACLE

with shielding option



[P] PLUG



Dimensions

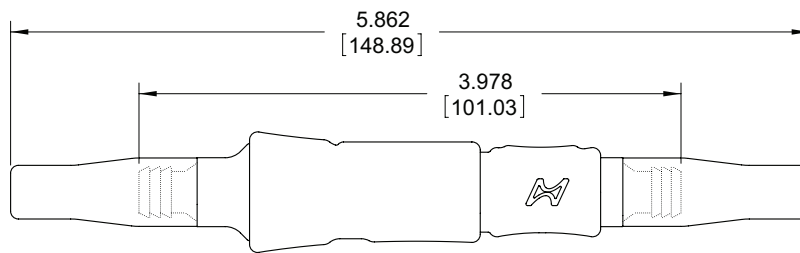
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
HG0	Ø0.807 (20.50)	0.728 (18.50)	Ø0.630 (16.00)	0.285 (7.25)	1.040 (26.38)	0.343 (8.71)	Ø0.370 (9.40)	Ø0.486 (12.34)	1.415 (35.94)	0.118 (3.00)	0.689 (17.50)	—	—	—
HG2	Ø1.014 (25.76)	1.220 (30.88)	Ø0.866 (22.00)	0.272 (6.91)	1.808 (45.92)	0.427 (10.84)	Ø0.502 (12.75)	Ø0.656 (16.66)	2.390 (60.65)	0.118 (3.00)	0.823 (20.90)	Ø0.433 (11.00)	Ø0.197 (5.00)	1.704 (43.27)
HG3	Ø1.172 (29.77)	1.220 (30.88)	Ø1.007 (25.59)	0.272 (6.91)	2.170 (55.07)	0.354 (9.00)	Ø0.650 (16.50)	Ø0.800 (20.36)	2.730 (69.33)	0.118 (3.00)	0.980 (24.90)	Ø0.535 (13.60)	Ø0.378 (9.60)	1.961 (49.82)
HG4	Ø1.250 (31.77)	1.220 (30.88)	Ø1.090 (27.80)	0.272 (6.91)	2.170 (55.07)	0.354 (9.00)	Ø0.710 (18.15)	Ø0.880 (22.47)	2.730 (69.33)	0.118 (3.00)	1.060 (26.90)	Ø0.610 (15.50)	Ø0.378 (9.60)	2.124 (53.95)

Dimensions are in inches (mm)

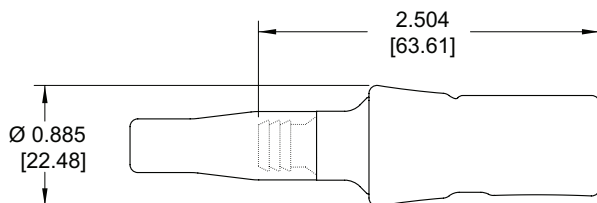
HG2 Plug & Cable Receptacle

HG2 PLUG & CABLE RECEPTACLE MATED PAIR

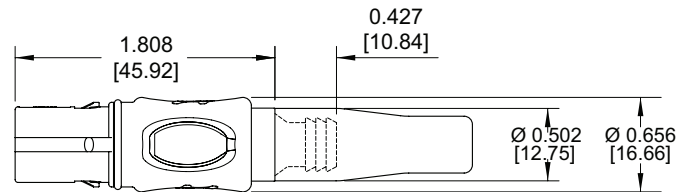
with strain relief



[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

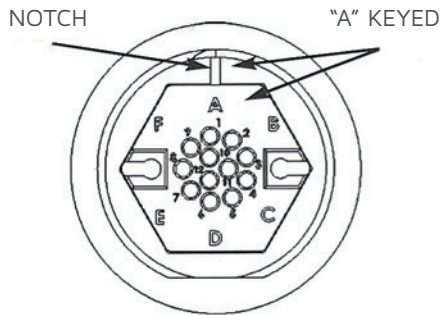
See Assembly Instructions for receptacle keying information(1):

S50386: Panel Receptacles

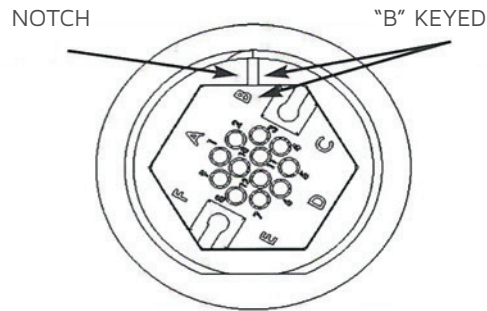
S50431: Cable Receptacles

KEYING POSITION A

Receptacle Wiring End

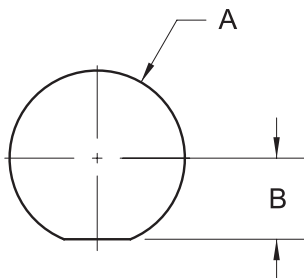


Receptacle Wiring End



Panel Cutouts

All sizes



	A +0.002 -0.001 (+0.050 -0.030)	B ±0.001 (±0.030)
HG0	Ø0.555 (14.10)	0.240 (6.10)
HG2	Ø0.711 (18.06)	0.329 (8.36)
HG3	Ø0.870 (22.10)	0.393 (9.98)
HG4	Ø0.949 (24.10)	0.430 (10.92)

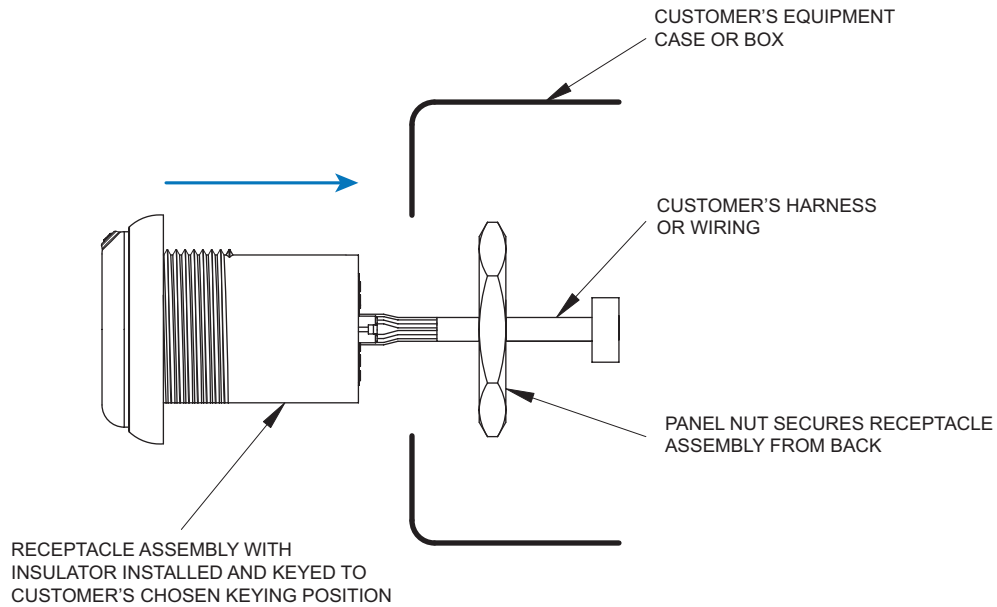
Dimensions are in inches (mm)

Notes:

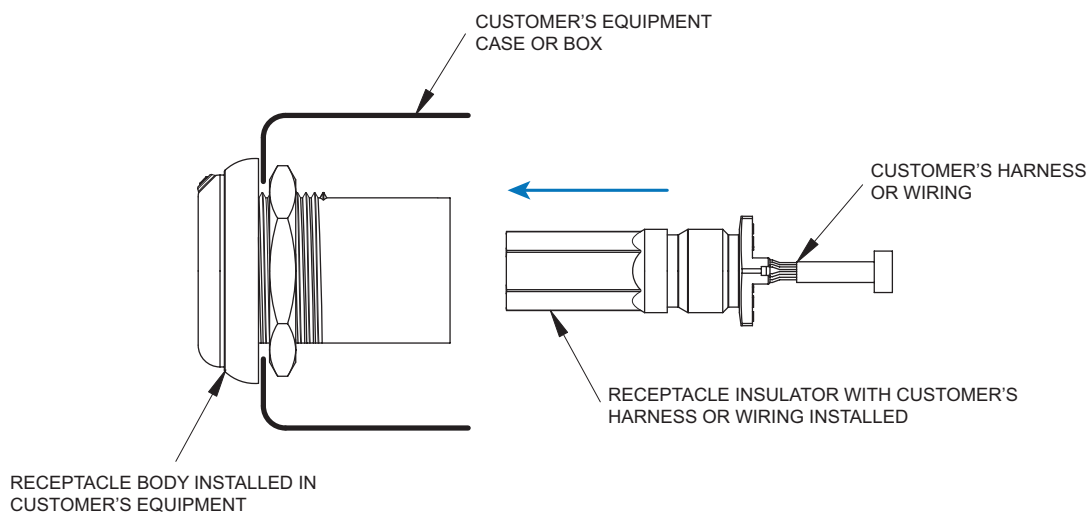
1) Instructions also include plug keying information: S50387

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 mismatching
- 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

Global Support

Americas

■ Santa Ana, CA
info.us@smithsinterconnect.com

■ Kirkland, QC, Canada
+1 514 842 5179
info.us@smithsinterconnect.com

■ Salisbury, MD
+1 800 780 2169
info.us@smithsinterconnect.com

■ Thousand Oaks, CA (SII*)
+1 805 267 0100
info.thousandoaks@smithsinterconnect.com

■ Hudson, MA
+1 978 568 0451
info.us@smithsinterconnect.com

■ Milpitas, CA
+1 949 250 1244
info.us@smithsinterconnect.com

■ Stuart, FL
+1 772 286 9300
info.us@smithsinterconnect.com

■ Kansas City, KS
+1 913 342 5544
info.us@smithsinterconnect.com

■ Northampton, MA (SII*)
+1 413 582 9620
info.northampton@smithsinterconnect.com

■ Tampa, FL (SII*)
+ 1 813 901 7200
info.tampa@smithsinterconnect.com

* Smiths Interconnect, Inc. (SII), is the separate legal entity operating within the requirements of a Special Security Agreement (SSA) with Defense Security Services (DSS) of the United States.

Europe

■ Deggendorf, Germany
+49 991 250 120
info.de@smithsinterconnect.com

■ Genova, Italy
+39 0 10 60361
info.it@smithsinterconnect.com

■ Dundee, UK
+44 1382 427 200
info.dundee@smithsinterconnect.com

■ Rouen, France
+33 2 32 96 91 76
info.fr@smithsinterconnect.com

■ Elstree, UK
info.uk@smithsinterconnect.com

Asia

■ Bangalore, India
+91 080 4241 0529
info.in@smithsinterconnect.com

■ Singapore
+65 6846 1655
info.asia@smithsinterconnect.com

■ Mianyang, China
+86 816 231 5566
HSICSR@hf-smiths.com

■ Suzhou, China
+86 512 6273 1188
info.asia@smithsinterconnect.com

■ Shanghai, China
+86 21 3318 4650
info.asia@smithsinterconnect.com