smiths connectors

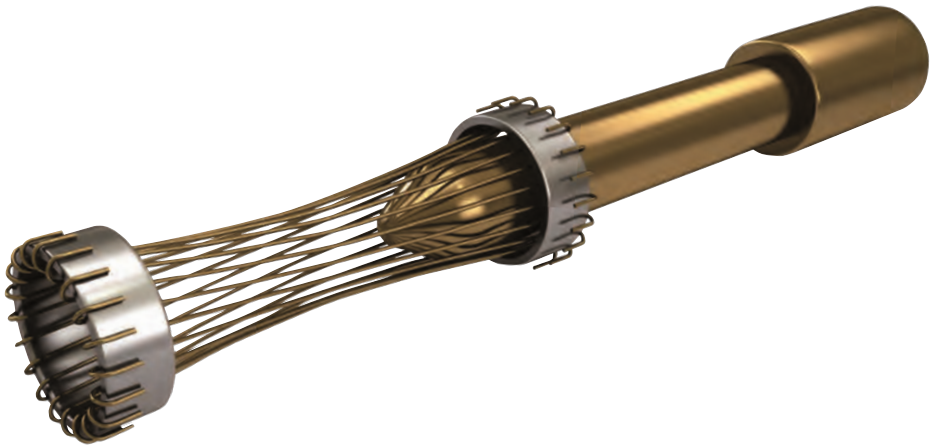
HBB
CONNECTOR SERIES

High Power, Quick Release Connectors

HYPERTAC iDi INTERCONNECT DEVICES SABRITEC

HYPERBOLOID TECHNOLOGY

Smiths Connectors 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.



FEATURE	BENEFIT
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.	**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.
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 little degradation in performance.	**LOW COST OF OWNERSHIP** The Hypertac contact technology technology will surpass most product requirements, thus eliminating the burden and cost of having to replace the connector or the entire subsystem.
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 half the resistance of conventional contact designs.	**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.
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.	**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.
IMMUNITY TO SHOCK & 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 degrees 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.	**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 FEATURES

- Contact technology guarantees high reliability
- Push lock to mate connector
- Quick release latch to unmate
- Ruggedised metal shell
- Cable and panel mount variants
- Compact ergonomic design
- Low component count
- Gender reversible
- Polarised
- 360 degree EMI/RFI shielding option
- 5000+ mating cycles without EMI/RFI band
- Sealed IPx7 and IP6K9K when mated
- Finger protected contacts
- Current rating 300A and 500A
- Temperature rating -55 to +150 deg C

HOW TO ORDER

H B B									
1	2	3	4	5	6	7	8	9	10

1 CONNECTOR FAMILY

2 NOMINAL CURRENT RATING

0 3 0 300 AMP

0 5 0 500 AMP

3 SHELL GENDER

P PLUG

R RECEPTACLE

4 SHELL POLARISING

A POLARISED CODE A, CONTACT CAP BLACK

B POLARISED CODE B, CONTACT CAP ORANGE

C POLARISED CODE C, CONTACT CAP BLUE

D POLARISED CODE D, CONTACT CAP GREY

E POLARISED CODE E, CONTACT CAP GREEN

F POLARISED CODE F, CONTACT CAP RED

5 SHELL MATERIAL

A HIGH STRENGTH ALUMINIUM ALLOY BODY, ZINC-COBALT PLATED

B HIGH STRENGTH ALUMINIUM ALLOY BODY, ELECTROLESS NICKEL PLATED

E HIGH STRENGTH ALUMINIUM ALLOY BODY, BLACK ZINC-NICKEL

6 CONTACT GENDER

X PIN, GOLD PLATED *(1.27 µm gold on mating surface)*

Y SOCKET, GOLD PLATED *(1.27 µm gold on mating surface)*

7 CONTACT TERMINATION OPTIONS

* CONTACT TO ACCEPT CABLE CRIMPED DIRECTLY ON CONTACT AXIS. *(See table **Straight exit crimp contacts** on following page)*

L CONTACT TO ACCEPT BOLTED TERMINATION E.G. LUGGED CABLE *(lug ordered separately, see **Accessories - Crimp lug codes** below)* OR BUSBAR. ALSO ORDER THIS OPTION FOR A PLUG WITH RIGHT ANGLE BACKSHELL

8 BACKSHELL OPTIONS

0 NO BACKSHELL

A RIGHT-ANGLE BACKSHELL (PLUG ONLY)

B STRAIGHT BACKSHELL, AVAILABLE ON PLUGS AND RECEPTACLES WITH CRIMP CONTACT ONLY

9 BACKSHELL EXIT CODE

0 EXIT CODE 0 APPLIES TO ALL STANDARD CONNECTORS

10 STANDARD VARIATIONS

0 0 0 NO VARIANT: DENOTES A PLUG WITHOUT EMI BAND OR REAR MOUNT RECEPTACLE WITH NON-CONDUCTIVE O-RING AND STANDARD LENGTH CONTACT

0 0 E EMI BAND FITTED (PLUGS ONLY)

0 C 0 REAR MOUNT RECEPTACLE WITH CONDUCTIVE PANEL O-RING

0 M 0 FRONT MOUNT RECEPTACLE WITH CONDUCTIVE PANEL O-RING *(not available with backshell option B)*

0 M S FRONT MOUNT RECEPTACLE WITH SHORT LUG/BUSBAR CONTACT AND CONDUCTIVE PANEL O-RING *(not available with backshell option B)*

0 N 0 FRONT MOUNT RECEPTACLE WITH NON-CONDUCTIVE PANEL O-RING *(not available with backshell option B)*

0 N S FRONT MOUNT RECEPTACLE WITH SHORT LUG/BUSBAR CONTACT AND NON-CONDUCTIVE PANEL O-RING *(not available with backshell option B)*

0 1 2 PLUGS ONLY - EMI BAND AND RIGHT-ANGLE BACKSHELL WITH KNURLED CABLE PORT

0 1 3 PLUG – EMI BAND AND STRAIGHT BACKSHELL WITH KNURLED CABLE PORT
RECEPTACLE – STRAIGHT BACKSHELL WITH KNURLED CABLE PORT

HYPERTAC IDI INTERCONNECT DEVICES SABRITEC

HOW TO ORDER

STRAIGHT EXIT CRIMP CONTACTS

Crimp contact size codes				
Code	300 amp connector		500 amp connector	
	Conductor size (mm^2)	Crimp barrel bore (mm)	Conductor size (mm^2)	Crimp barrel bore (mm)
D	25	7.9	50	11.0
H	–	–	70	13.0
K	35	9.2	–	–
Q	–	–	95	14.5
S	50	11.0	–	–
V	–	–	120	15.0

Dimensions are for reference only and subject to change

NOTES

Please contact your local sales representative to inquire about a composite shell option.
Please contact your local sales representative to inquire about a circular multi-pole option.
Please contact your local sales representative to inquire about our harness solutions and other power products.

TECHNICAL CHARACTERISTICS

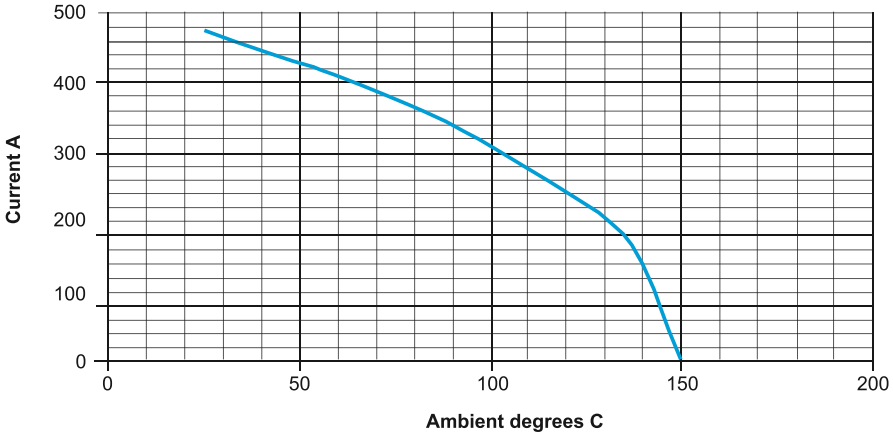
Materials	
Item	**Material detail**
Shells and backshells	Aluminium alloy
Latch ring	Aluminium alloy
Insulators	Insulators - glass reinforced PPS Finger proof components - glass reinforced Nylon 66
Contacts	Copper alloy
Socket wires	Copper beryllium alloy
Crimp lugs	Copper alloy
EMI band	Copper beryllium alloy
Latch pins and springs	Stainless steel
Fasteners	Stainless steel
O rings & seals	Fluorosilicone elastomer
Transit caps	Vinyl

Protective finishes	
Item	**Finish**
Contacts, mating surfaces	1,27µm min gold per ASTM-B-488, type II, grade C over 1.27µm – 2.40µm nickel per SAE-AMS-QQ-N-290, class 2 over copper flash
Contacts, crimp barrels	0.5µm min gold per ASTM-B-488, type II, grade C over 1.27µm – 2.40µm nickel per SAE-AMS-QQ-N-290, class 2 over copper flash
Contacts, other surfaces	0.127µm min gold per ASTM-B-488, type II, grade C over 1.27µm – 2.40µm nickel per SAE-AMS-QQ-N-290, class 2 over copper flash
Stainless steel parts	Passivated, SAE-AMS-QQ-P-35
Shells	Zinc/cobalt, ASTM-B-840 Grade 6 Type C, over AMS-C-26074 class 4 grade B or Electroless nickel, AMS-C-26074 class 4 grade B or Zinc nickel trivalent black, ASTM-B-841 Class 1, Grade 10, over AMS-C-26074 class 4 grade B
Latch ring	Sulphuric acid anodised and dyed black. Defence standard 03-25/3
Crimp lugs	5 – 10µm tin, MIL-T-10727C over 0.25µm copper MIL-C-14550
EMI band	7.62 – 10µm tin per MIL-T-10727C over 3 – 5µm nickel per AMS-QQ-N-290

TECHNICAL CHARACTERISTICS

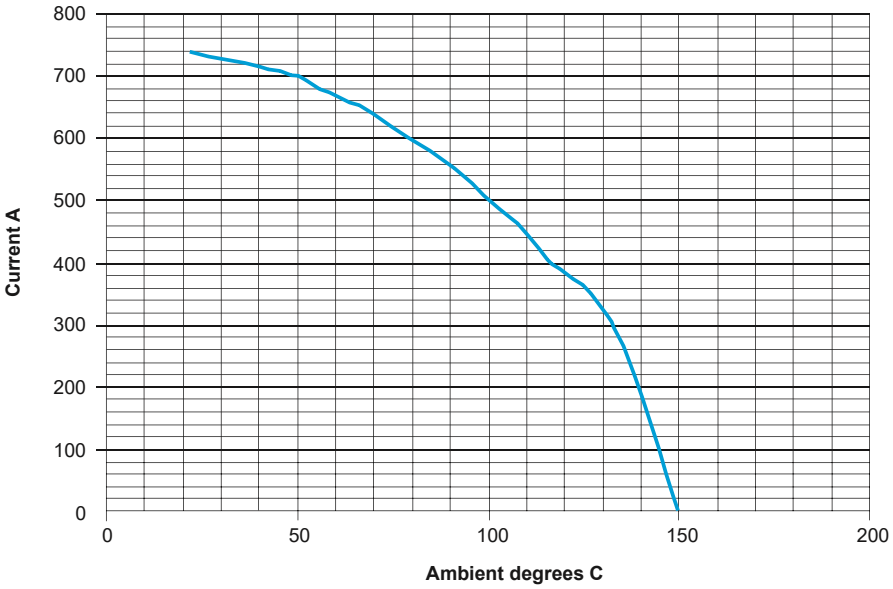
Electrical performance and current derating		
Parameter	**Level**	
	300 Amp connector	**500 Amp connector**
Voltage rating @ sea level, volts dc	750	
Current rating, continuous, amps	300	500
Surge current	6 kA for 1 second	10 kA for 1 second
Contact resistance (EIA-364-06C), mΩ max	0.1	0.05
Insulation resistance, GΩ minimum	5	
Shell to shell continuity, mΩ max	15	

HBB 300 A DERATING



Data from test using connectors each cabled with 1.2 metre length of 70 sq mm cable. Further derating may be necessary depending on the application.
Derating curves generated according to EIA-364-70B Method 2

HBB 500 A DERATING



Data from test using connectors each cabled with 1.2 metre length of 120 sq mm cable. Further derating may be necessary depending on the application.
Derating curves generated according to EIA-364-70B Method 2

TECHNICAL CHARACTERISTICS

Mechanical performance		
Parameter	**Level**	
	300 Amp connector	**500 Amp connector**
Connector mating / unmating force (N max)	350	350
Endurance (mating & unmating cycles, min)	Connector with EMI band - 1000 All others - 5000	

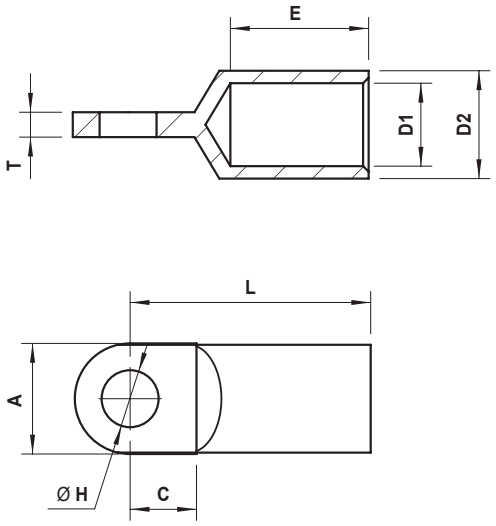
Environmental performance	
Parameter	**Level**
Temperature range (operational & storage)	-55 to +150 deg C
Humidity (days @ 90/95 % RH at 40°C)	56
Salt spray (hours)	ZnCo plated – 300 ZnNi plated – 300 Electroless nickel plated – 48
Temperature life (hrs @ °C)	1000 at 125°C
Sealing, mated Sealing, mated	BS EN 60529 IPx7 ISO 20653:2006 IP6K9K
Panel sealing level	BS EN 60529 IPx7
Random vibration (EIA-364-28E)	Test Condition V, Test Condition Letter E (0.2 g^2/Hz), duration 1.5 hours
Mechanical shock (EIA-364-27B)	25g, 11ms, half sine wave

ACCESSORIES

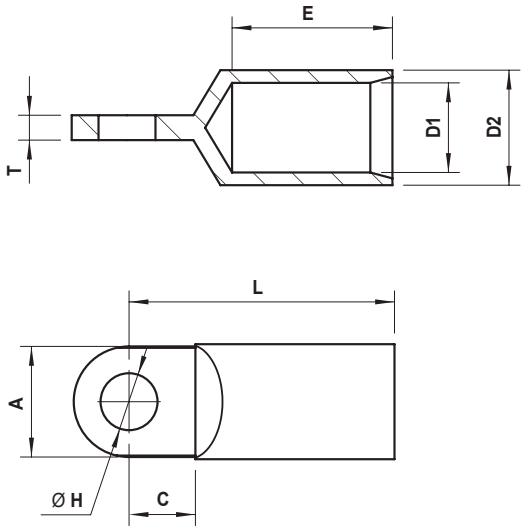
If required, the following accessories must be ordered separately; they are not supplied with connectors.

CRIMP LUG CODES AND DIMENSIONS

Lug for standard cable (suffix –A-68)



Lug for fine stranded cable (suffix –B-68)



Important

These are special pattern lugs which must be used on all connectors with right-angle backshells. They are also recommended for use on plug connectors with bolted contact terminations and no backshells.
Receptacle connectors where no boot is fitted can accept any other suitable lug.
Crimp lugs are tin plated (suffix -68).
Lugs require crimp tooling; see page 9 Spares and special tools section.

ACCESSORIES

LUG CODES AND DIMENSIONS FOR 300A RANGE

Cable area, sq mm	Part number	Dimensions							
		A (max)	C (nom)	D1 (nom)	D2 (nom)	E (nom)	H (nom)	L (nom)	T (ref)
25	HBB-950-8-25-A-68	18.1	10.0	7.0	10.0	25.0	8.3	38.1	4.0
25	HBB-950-8-25-B-68	18.1	10.0	7.9	11.0	27.0	8.3	40.4	4.0
35	HBB-950-8-35-A-68	18.1	10.0	8.5	12.0	25.0	8.3	39.0	4.0
35	HBB-950-8-35-B-68	18.1	10.0	9.2	12.5	27.0	8.3	41.0	4.0
50	HBB-950-8-50-A-68	18.1	10.0	10.0	14.0	25.0	8.3	39.6	4.0
50	HBB-950-8-50-B-68	18.1	10.0	11.0	15.0	27.0	8.3	41.9	4.0
70	HBB-950-8-70-A-68	18.1	10.0	12.0	16.5	25.0	8.3	40.5	4.0
70	HBB-950-8-70-B-68	18.1	10.0	13.0	17.0	27.0	8.3	42.5	4.0

LUG CODES AND DIMENSIONS FOR 500A RANGE

Cable area, sq mm	Part number	Dimensions							
		A (max)	C (nom)	D1 (nom)	D2 (nom)	E (nom)	H (nom)	L (nom)	T (ref)
50	HBB-950-10-50-A-68	20.1	12.0	10.0	14.0	25.0	10.3	41.5	4.5
50	HBB-950-10-50-B-68	20.1	12.0	11.0	15,0	27.0	10.3	43.8	4.5
70	HBB-950-10-70-A-68	20.1	12.0	12.0	16.0	25.0	10.3	42.1	4.5
70	HBB-950-10-70-B-68	20.1	12.0	13,0	17,0	27.0	10.3	44.4	4.5
95	HBB-950-10-95-A-68	20.1	12.0	13.5	18.0	25.0	10.3	42.8	4.5
95	HBB-950-10-95-B-68	20.1	12.0	14,5	19,0	27.0	10.3	45.1	4.5
120	HBB-950-10-120-A-68	20.1	12.0	15.0	19.5	25.0	10.3	43.4	4.5
120	HBB-950-10-120-B-68	20.1	12.0	16,2	21.0	27.0	10.3	45.8	4.5

HEAT SHRINK BOOTS

Connectors are designed to accept the following moulded lipped heat shrink boots which conform to specification number VG95343:

	Straight boot for bare connector	90° boot	Boot for right angle backshell	Boot for straight backshell
300 A plug	HBO-0008-B005A (note A)	HBO-0009-E004A (note B)	HBO-0008-B005A (note A)	HBO-0008-B005A (note A)
300 A receptacle	N/A	N/A	N/A	HMO-0008-B005A (note A)
500 A plug	HBO-0008-C001A (note F)	HBO-0009-E005A (note E)	HBO-0008-C001A (note F)	HBO-0008-C001A (note F)
500 A receptacle	N/A	N/A	N/A	HBO-0008-C001A (note F)

Notes

A: VG spec = VG 95343 T18 B005A
B: VG spec = VG 95343 T18 E004A
C: VG spec = VG 95343 T18 B004A
D: VG spec = VG 95343 T18 E003A
E: VG spec = VG 95343 T18 E005A
F: VG spec = VG 95343 T18 C001A

It is the user's responsibility to ensure that boot material and adhesive / epoxy meet the requirements of their application. For further application details see Workshop Manual – single-pole HBB range available from website or Smiths Connectors technical services.