

HBB CONNECTOR SERIES

Engineering Superior Solutions

September 2015 | Smiths Connectors



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HBB CONNECTOR SERIES

High Power, Quick Release Connectors



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HBB Value Proposition

- ▶ **Circular connector combining high current handling capability with small size and exceptional performance in harsh environments**
- ▶ **Suitable for applications requiring the transmission of high currents (up to 500A) including aerospace, defence, aviation, transportation, industrial, auto/EV, alternative energy, and oil & gas markets**
- ▶ **Available versions**
 - ▶ Single pole; 300A or 500A
 - ▶ Multipole variants on request; 300A contacts only
- ▶ **Safety protection: including a safety interlock last to mate / first to break-and full IP2X protection on the pin and socket features**
- ▶ **Robust aluminium metal shell fully sealed to IP67 and featuring 360° EMI/RFI shielding**
- ▶ **Hypertac Hyperboloid contact offering high reliability and excellent integrity**



Technical Characteristics

▶ MATERIALS

- ▶ Metal shell: aluminum alloy
- ▶ Insulators
 - ▶ Insulators: PPS
 - ▶ Pin Caps: Glass Reinforced Nylon
 - ▶ Fixings: Stainless steel
- ▶ Contact components: copper alloy
- ▶ Socket wires: copper beryllium alloy

▶ ELECTRICAL

- ▶ Current rating: 300A, 500A
 - ▶ Surge: 6kA, 10kA for 1 sec
- ▶ Voltage rating: 750V, 1000V
- ▶ Contact resistance (EIA-364-06C)
 - ▶ 0.1 mΩ for 300A version
 - ▶ 0.05 mΩ for 500A version
- ▶ Insulation resistance: 5 GΩ
- ▶ Shell to shell continuity: 15 mΩ

▶ MECHANICAL

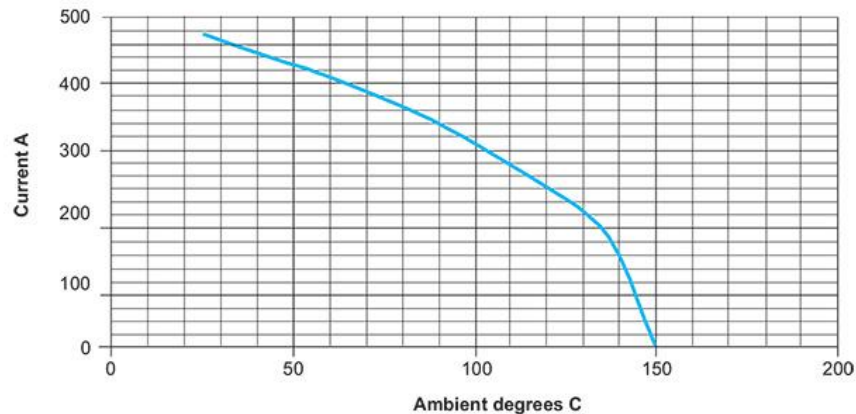
- ▶ Mating force: N max. 350
- ▶ Endurance: with EMI band: 1000; all others 5000
- ▶ Temperature range: -55°C to +150°C
- ▶ Salt spray: up to 300 hours
- ▶ Humidity: 56 days @90/95% RH at 40°C
- ▶ Vibration: acc. EIA-364-28E, 0,2g².Hz, duration 1.5h
- ▶ Shock: acc. EIA-364-27B, 25g, 11 ms, half sine wave
- ▶ Mating Cycles:
 - ▶ With EMI Band – 1000 cycles
 - ▶ All Other Variants – 5000 cycles



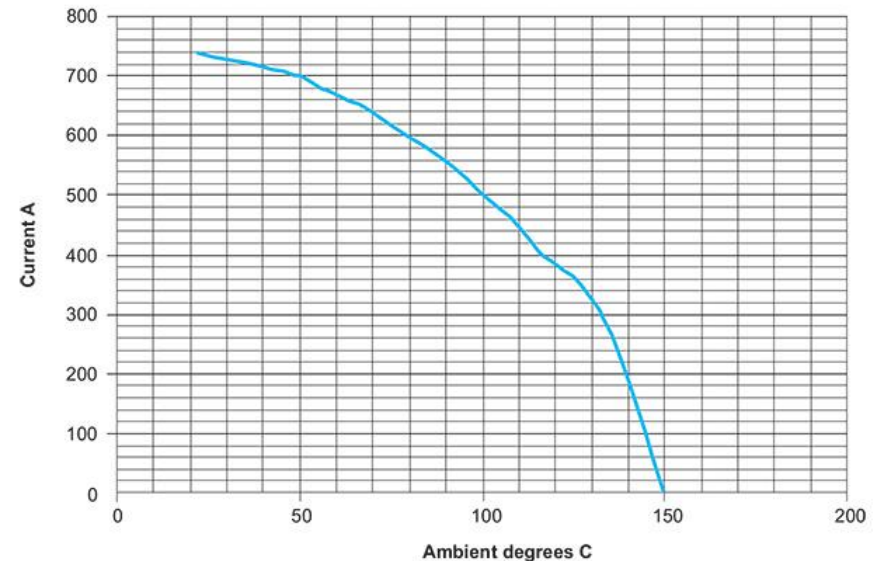
Derating Curves

- ▶ Data from test using connectors each cabled with 1.2 metre length of 70 sq mm cable for 300Amp and 120 sq mm for 500Amp.
- ▶ Further derating may be necessary depending on the application. Derating curves generated according to EIA-364-70B Method.

HBB 300 A DERATING



HBB 500 A DERATING



Features & Benefits

▶ HYPERBOLOID CONTACT SYSTEM

- ▶ Improved power handling in a smaller space
- ▶ High number of mating cycles
- ▶ Low contact resistance
- ▶ Shock and vibration immunity



▶ SUITABLE FOR A RANGE OF APPLICATIONS

- ▶ Aluminium, nickel-plated or thermoplastic shells*
- ▶ Cable and panel mount variants
- ▶ Ergonomic, low weight design

▶ EASY OF ASSEMBLY AND OF USE

- ▶ Finger proofed
- ▶ Gender reversible
- ▶ Polarized design
- ▶ Quick release latching mechanism
- ▶ Minimal component count
- ▶ Simple maintenance and speedy changeover

▶ RELIABLE IN HARSH ENVIRONMENT CONDITIONS

- ▶ Environmentally sealed to IPx7 and IP6K9K when mated
 - ▶ [Dustproof and Waterproof](#)
- ▶ 360° EMI/RFI shielding

** Please inquire for further shell options.*

HBB Comparison

Features	Benefits	Smiths Connectors	Next Best Alternative
▶ Hyperboloid contact design	Higher reliability under shock and vibration	✓	✗
	Lower engagement and separation forces	✓	✗
	Lower contact resistance	✓	✗
	Higher contact endurance	✓	✗
	High current carrying capacity At elevated thermals	✓	✗
▶ Touch protected contacts	High degree of safety IP2X finger protection	✓	✓
▶ Multiple key orientations	Six standard key options to prevent miss-mating	✓	✓
▶ Various contact termination styles	Suitable for bus-bar, lug and crimp termination in both straight or right angle	✓	✓
▶ Reverse bayonet mating	Positive Mate with Tactile confirmation	✓	✗
▶ Upward integration and total system cost savings	Improved panel density reduces number of connectors required	✓	✗

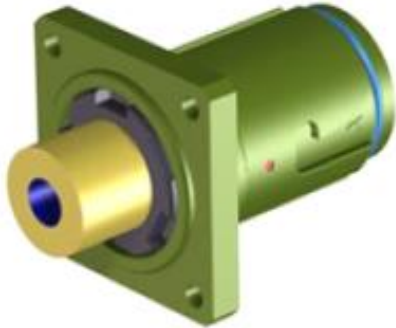
Competitive Advantages



- ▶ Increased surge current capability
- ▶ Low temperature rise provides for higher current density
- ▶ Significant performance at elevated temperature conditions
- ▶ Minimal contact resistance of ~ 0.05 mΩ
- ▶ Higher mating cycles at a system level
- ▶ Abundant terminations for multiple cabling options
- ▶ Tactile mating provides confirmation of full mate preventing “loose not attached”
- ▶ Greater panel density

HBB Product Platform

Receptacle Connector



Plug Connector, 90° backshell



Receptacle Connector with backshell



Plug Connector, straight backshell



Bulkhead feed through



Product Platform - HBB Plugs

90° backshell



Straight backshell



No backshell



▶ All variants shown are available

▶ Components

- ▶ Insulators: all insulators are moulded
- ▶ Backshells:
 - ▶ All parts which may be cast are die cast
 - ▶ Optional Knurled exit available
- ▶ Shell: machined
- ▶ Latch ring:
 - ▶ Currently machined
 - ▶ Cast version exists but not currently recommended
- ▶ Contacts: machined
- ▶ Crimp lugs: machined (for 90° backshell)

Product Platform - HBB Receptacles

No Back shell



Straight backshell



90° backshell



Feed through



▶ Availability

- ▶ Connector Only versions fully available including both front and rear mount options
- ▶ “Straight backshell” versions available in 500A only
- ▶ “90° backshell” version available in 500A with pin contact only

▶ Components

- ▶ Insulators: all insulators are moulded
- ▶ Backshells:
 - ▶ All parts which may be cast are die cast
 - ▶ Optional Knurled exit available
- ▶ Shell: machined
- ▶ Contacts: machined
- ▶ Crimp lugs: machined (for 90° backshell)

Specific Applications - HBB Multi Pole

Features

- ▶ 2, 3 & 4 Pole Variants
 - ▶ 300A per Pole
- ▶ 1100V DC operating voltage
- ▶ 2x HVIL contacts
- ▶ Quick release latch
- ▶ Gender reversible
- ▶ 3 shell polarizing positions
- ▶ EMI Screening available
- ▶ Sealed IPx7 when mated
- ▶ IP2x finger proof contacts

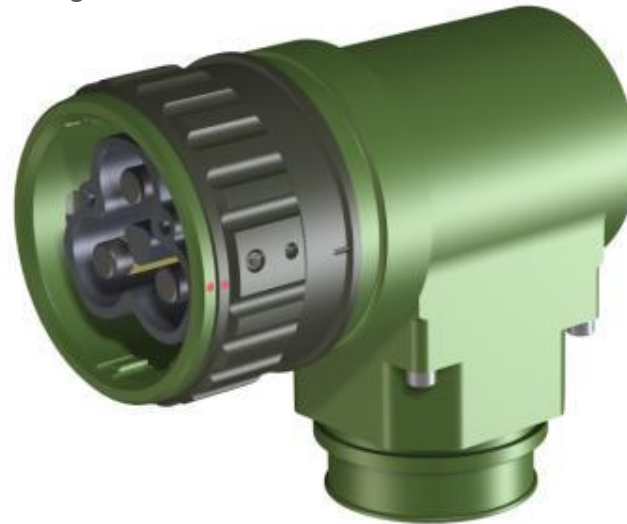


HBB Multi Pole - Overview

Receptacle Connector



Plug Connector, 90° Backshell



Plug Connector, Straight Backshell



HBB Multi Pole - Options

90° Backshell



90° Termination



Straight Backshell



Straight Termination



No Backshell



Bus Bar Termination



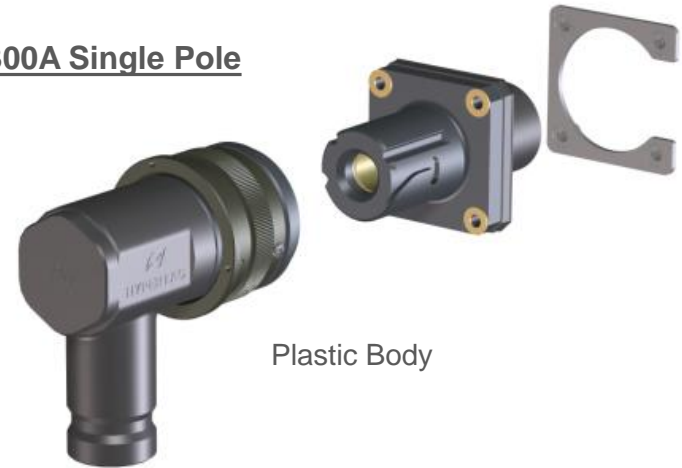
Circular Single Pole Bespoke

250A Single Pole



Plastic Body

300A Single Pole



Plastic Body

500A Single Pole



Custom Metal Body

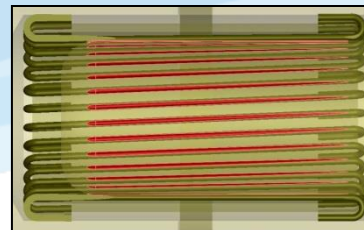
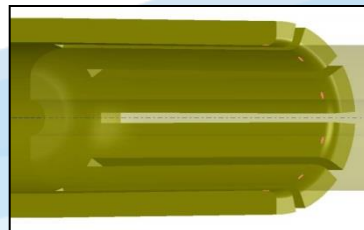
1000A Single Pole



Custom Contact and Solution

Hyperboloid Comparison

Hypertac Power Contact Performance						
Pin Size (AWG)	Pin Diameter, mm (in)	Socket OD maximum, mm (in)	MIL-C-39029 Current Rating Continuous, Amps	Hypertac Current Rating Continuous, Amps	Contact Resistance Typical, mΩ	Contact Resistance Maximum, mΩ
8	3.61 (0.142)	6.50 (0.256)	46	50	0.20	0.50
4	5.72 (0.225)	9.53 (0.375)	80	100	0.10	0.50
0	9.07 (0.357)	13.35 (0.526)	150	300	0.10	0.20
2/0	10.31 (0.406)	18.55 (0.730)	185	300	0.07	0.20
4/0	12.70 (0.500)	21.02 (0.828)	225	500	0.05	0.10
-	19.05 (0.750)	29.05 (1.144)	-	750	0.03	0.05

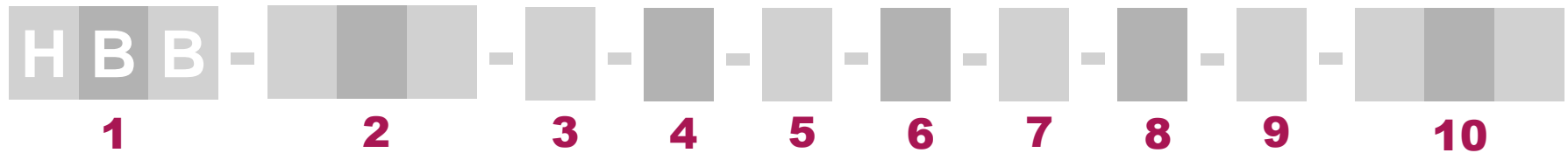


Applications and Markets

- ▶ Alternators
- ▶ Battery Systems
- ▶ Charger Systems
- ▶ Driver Automation
- ▶ Engines
- ▶ EV/Hybrids
- ▶ Fuel Cell Systems
- ▶ Hybrid Drives
- ▶ Power Converters
- ▶ Power Distribution Units
- ▶ Power Source and Supply Units
- ▶ Remote Power Units
- ▶ Starters



How to Order



1 ▶ HBB CONNECTOR SERIES *[Fixed]*

2 ▶ NOMINAL CURRENT RATING

0 3 0 300 Amp

0 5 0 500 Amp

3 ▶ SHELL GENDER

P Plug

R Receptacle

How to Order



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 aluminum alloy body, zinc-cobalt plated*

B *High strength aluminum alloy body, electroless nickel plated*

E *High strength aluminum alloy body, black zinc-nickel*

* Please inquire for further shell material options.

How to Order



6 ▶ CONTACT GENDER

X Pin, gold plated (1.27µm gold on mating surface)

Y Socket, gold plated (1.27µm gold on mating surface)

7 ▶ CONTACT TERMINATION OPTIONS

***** Contact to accept cable crimped directly on contact axis

L Contact to accept bolted termination e.g. lugged cable or busbar
Also order this option for a plug with right angle backshell

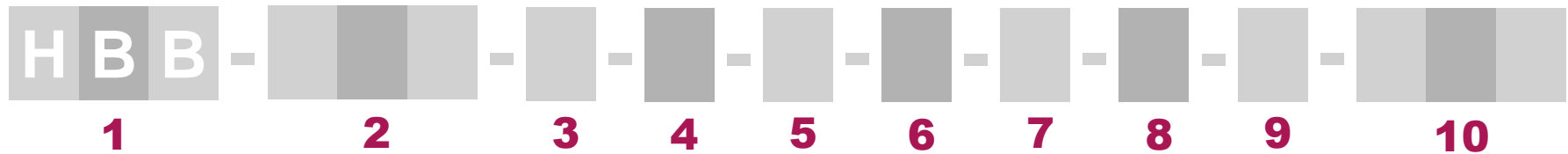
8 ▶ BACKSHELL OPTIONS

0 No backshell

A Right angle backshell (plug only)

B Straight backshell. Available on plugs and receptacles with crimp contact only

How to Order



9 ▶ BACKSHELL EXIT CODE

0 Exit code 0 applies to all standard connectors

10 ▶ STANDARD VARIATIONS

0	0	0	<i>No variants. Denotes a plug without EMI band or rear mount receptacle with non conductive o-ring and standard length contact</i>
0	0	E	<i>EMI band fitted (plugs only)</i>
0	C	0	<i>Rear mount receptacle with conductive panel o-ring</i>
0	M	0	<i>Front mount receptacle with conductive panel o-ring (not available with backshell option B)</i>
0	M	S	<i>Front mount receptacle with short lug/busbar contact and conductive panel o-ring (not available with backshell option B)</i>
0	N	0	<i>Front mount receptacle with conductive panel o-ring (not available with backshell option B)</i>
0	N	S	<i>Front mount receptacle with short lug/busbar contact and non-conductive panel o-ring (not available with backshell option B)</i>
0	1	2	<i>Plugs only - EMI band and right angle backshell with knurled cable port</i>
0	1	3	<i>Plug - EMI band and right angle backshell with knurled cable port Receptacle - straight backshell with knurled cable port</i>

Online Information

► Smiths Connectors webpage:

<http://www.smithsconnectors.com/us/products/product-catalog/hbb>



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