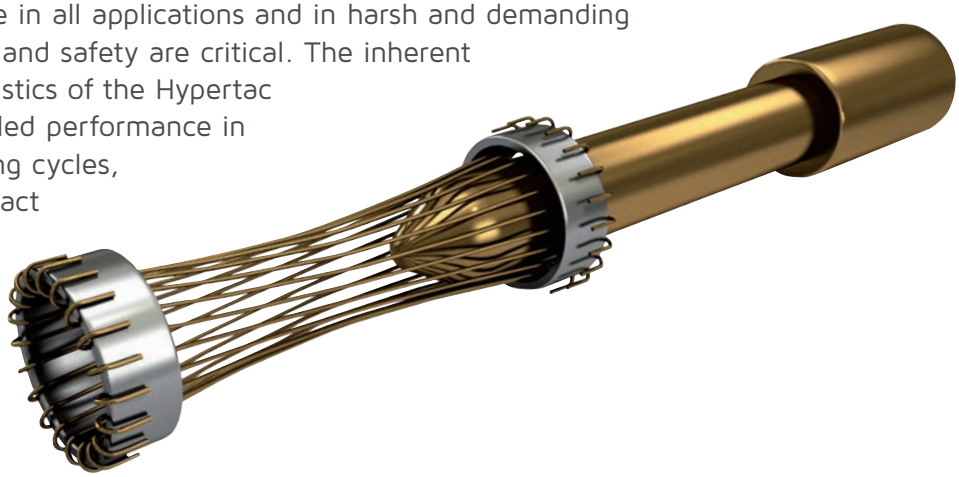
smiths interconnect

HBB - Five Pole

High Power, Quick Release Circular Connectors

Hypertac® Hyperboloid Technology

Smiths Interconnect 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.



Features

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.

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 minimal degradation in performance.

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 about half the resistance of conventional contact designs.

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.

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° 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.

Benefits

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.

Low cost of ownership
The Hypertac contact technology will surpass most product requirements, thus eliminating the burden and cost of having to replace the connector or the entire subsystem.

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.

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.

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.

HBB Series - 5 pole

High Power Circular Connectors

Designed for use in high-power applications

The Smiths Interconnect's HBB 5 pole, circular connectors Series combines high current handling capability with small size and exceptional performance in harsh environments.

Designed for use in all types of high-power applications, the HBB Series is particularly suitable for electric drives used in fighting vehicles, unmanned vehicles, rail transport and industrial applications.

Includes a safety interlock system with 2 "last mate first break" contacts, enabling automatic power shut-off when connectors are unmated.

High currents can be easily transmitted within the smallest possible size, with high reliability and excellent integrity. Using the Hyperboloid contact technology, HBB connectors produce exceptionally low contact resistance figures which help in reducing resistive losses. This both eases the task of thermal management and allows better power handling in a smaller space with a lower overall mass.

HBB connectors combine a simple push-on mating process with a more traditional bayonet un-mating mechanism. The connectors are designed to lock simply by pushing the plug until the user hears a click, which is combined with tactile feedback, giving confirmation that the plug is locked.

To un-mate the connector, the user simply twists the sleeve of the plug and pulls. The connectors are marked with red points, making it easier for the user to visually line up the plug for mating.

Offered in a black zinc-nickel shell, the connectors are sealed to IPx7 and feature 360° EMI/RFI shielding.

They have a polarized design with options that ease assembly, allowing simple maintenance and quick changeover.

Features & Benefits

High Reliability Solution

- 60A per power line contacts with 2 interlocks (HVIL)
- 5000 mating cycles
- Low contact resistance
- Shock and vibration immunity

Easy of assembly and of use

- Gender reversible
- Polarised system
- Minimal component count
- Quick release latching mechanism

Ideal for harsh environment conditions

- 360° EMI/RFI shielding
- Sealed IPx7 and IP6K9K when mated

Smart and flexible design

- Cable and panel mount variants
- Ergonomic, low weight design

How To Order

HBB			E	21	H	506	0			
1	2	3	4	5	6	7	8	9	10	11

1 Series	HBB Series *[fixed]*
2 Shell gender	P Plug R Receptacle
3 Standard variations	000 Non variant *(see notes)* S** Plug or receptacle with grommet **E Plug with Grounding Spring *(see notes)* *C* Rear mount receptacle with conductive panel O-ring *N* Front mount receptacle with non-conductive panel O-ring *(not available with backshell option B)* *M* Front mount receptacle with conductive panel O-ring *(not available with backshell option B)* *L* Receptacle shell for boot – rear mount with non-conductive panel O-ring *K* Receptacle shell for boot – rear mount with conductive panel O-ring ** select an option or use 0; code must have 18 characters*
4 Shell material / finish	E Aluminium alloy / Black zinc nickel
5 Shell size	21 Size 21
6 Contact type	H Hypertac® Hyperboloid
7 No. of ways / nominal current rating	506 5 pole / 60 Amps per power line
8 Contact termination	0 Supplied without contacts
9 Contact gender	X Pin *(Power pins / HVIL sockets)* Y Socket *(Power sockets / HVIL pins)*
10 Shell polarising	A Polarised code A B Polarised code B C Polarised code C
11 Backshell options	0 No Backshell B Straight Backshell

Notes:
Non variant plug is supplied without wire sealing grommet and without grounding spring.
Non variant receptacle is rear mount supplied with non-conductive panel seal O ring and without wire sealing grommet.
If electrical contact between connector shells is required, then grounding spring option (standard variation **E) should be selected for plug.
Connectors are supplied without contacts – order separately – for contacts and other accessories see pages 26.

Technical Characteristics

Materials

Shells and backshells	Aluminium alloy
Latch ring	Aluminium alloy
Insulators	Polyphenylene sulphide
Contacts	Copper alloy
Socket wires	Copper beryllium alloy
Contact retention clips	Copper beryllium alloy
Grounding spring	Copper beryllium alloy
Latch pins and springs	Stainless steel
O rings and seals	Fluorosilicone elastomer
Transit caps Vinyl	Vinyl

Protective finishes

Contacts	Gold over nickel
Stainless steel parts	Passivated
Shells and backshells	Zinc nickel black over electroless nickel
Latch ring	Sulphuric acid anodised and dyed black.
Grounding spring	Tin over nickel

Electrical performance and current derating

	Level	
	Size 8 Power Contacts	Size 20 Interlock Contacts
Dielectric Withstand Voltage (sea level)	3 kV DC	600 V DC
Voltage rating @ sea level, max	1 kV DC or AC peak	200 V DC or AC peak (*)
Current rating, max	5 x 60 A per power line	2 x 7 A DC or RMS (*)
Surge current, 1 second	750 A	N/A
Contact resistance	0.2 mΩ typical 0.5 mΩ max	2.0 typical 5.0 max
Insulation resistance, min @ 20°C	5 GΩ	
Shell to shell continuity, max	15 mΩ with grounding spring fitted	

(*) If interlock contacts are connected and disconnected live (hot-plugged), 24V max at 0.5A max applies.

Mechanical performance

Parameter	Level
Mate / Un-mate force	250 N max 175 N typical
Endurance (mate / un-mate cycles)	5000 (**)

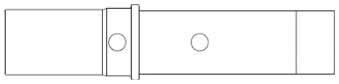
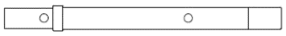
(**) If fitted, the grounding spring in the plug may need replacement every 1000 cycles.

Enviromental performance

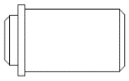
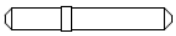
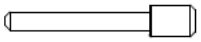
Parameter	Level
Temperature range (operational & storage)	-55°C to +150°
Sealing, mated	BS EN 60529 IPx7 ISO 20653:2013 IP6K9K
Panel sealing level	BS EN 60529 IPx7

Accessories

Contacts

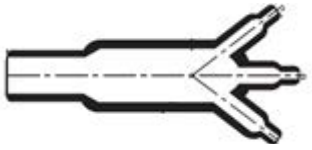
Contact	Smiths Interconnect pt. no.
Size 8 crimp power socket	850-1001156-000-14 
Size 8 crimp power pin	202-1001132-000-7 
Size 20 HVIL crimp socket	HCM-281-14-602 
Size 20 HVIL crimp pin	HCM-284-14-598 

Filler Plugs

	Smiths Interconnect pt. no.	
	Cavity filler plug	Grommet sealing plug
Size 8 cavities	HA-186-08-R 	HA-185-05 
Size 20 cavities	HA-186-20 	HA-185-20 

Heat shrink boots

Heat shrink boots can be fitted to bare plug shell, to receptacle shell for boot, and to backshell.

Single outlet boot – lipped and epoxy lined	VG 95343 T18 C001A 10mm min overall cable diameter Available from Smiths Interconnect Pt. no. HBO-0008-C001A	
Multi-outlet boots	HellermannTyton 200, 300, 400 or 500 Series (or similar) are potential solutions – application dependant Not available from Smiths Interconnect	

It is the user's responsibility to ensure that boot material and adhesive / epoxy meet the requirements of their application.

Cable shield termination

	Smiths Interconnect pt. no.
Band-It® clamping band	HBO-0005
Constant force spring	HBB-971

Band-It® clamps require an installation tool; see Tooling and spares section for tool order codes.
No tooling is required for constant force clamps. These clamps are removable and re-useable.

Spares and tools

Crimp / Contact tooling

	Crimp tool	Crimp die assembly	Crimp positioner	Contact installing tool	Contact removal tool
Size 8 contacts	M22520/23-01	M22520/23-02	M22520/23-09	M81969/17-06	M81969/15-01
Size 20 contacts	M22520/1-01	N/A	M22520/1-02	M81969/1-03	M81969/1-03

Band-It® tooling

	Smiths Interconnect pt. no.
Hand tool for Band-It screen braid clamps	HBO-0006

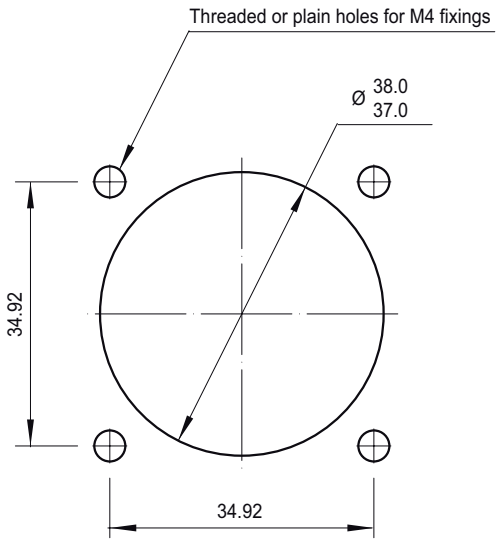
O-ring spares

	Smiths Interconnect pt. no.
Receptacle interface O-ring	HR-02352-0178-F-70
Panel seal O-ring	
non-conductive	HR-03782-0178-F-70
conductive	HR-03782-0178-D-70

The interface O-ring is a service part, to be replaced as required.

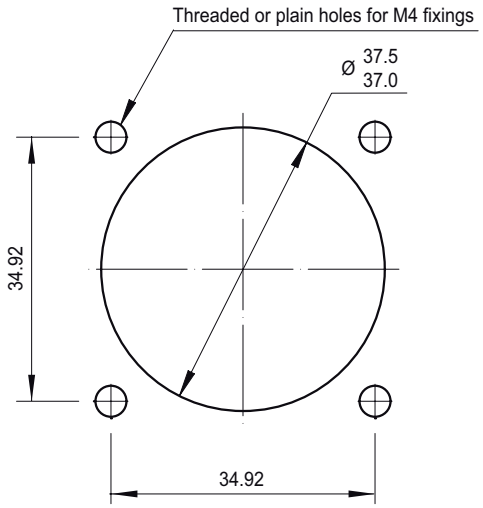
Panel preparation for receptacles

Standard rear mount *(connector mounted behind panel / inside box)*



Recommended maximum panel thickness = 5.0 mm. If panel is more than 3.0 mm thick then fixing screws may need to be recessed to give clearance for mating connector.

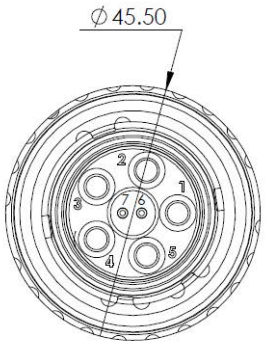
Front mount *(connector mounted in front of panel / outside box)*



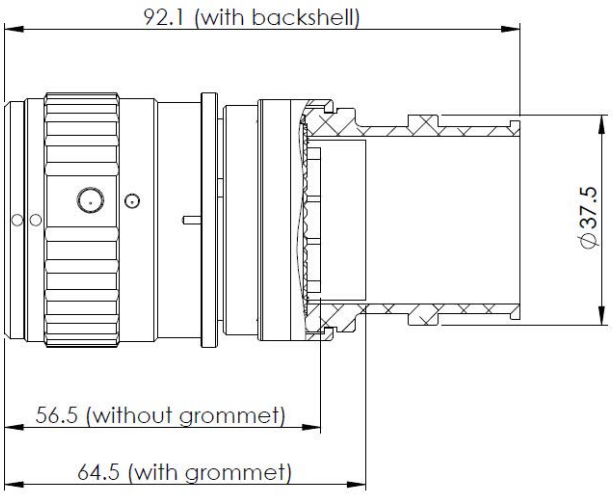
Dimensions in mm - Drawings not to scale

Connector outline drawings

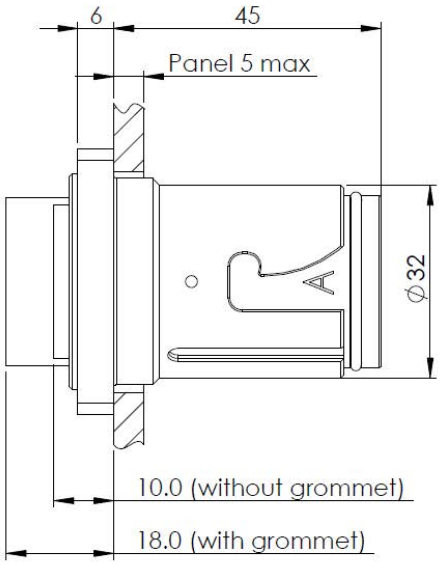
Plug

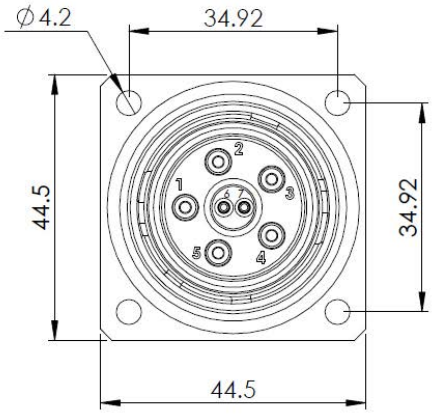


Socket insulator shown

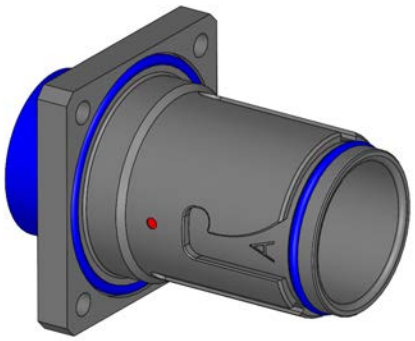


Receptacle rear mount



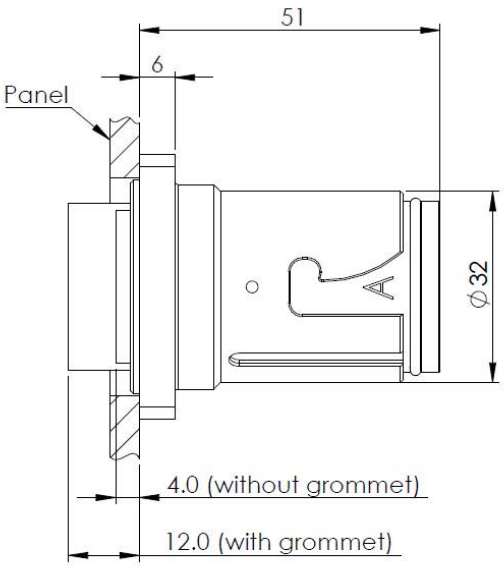


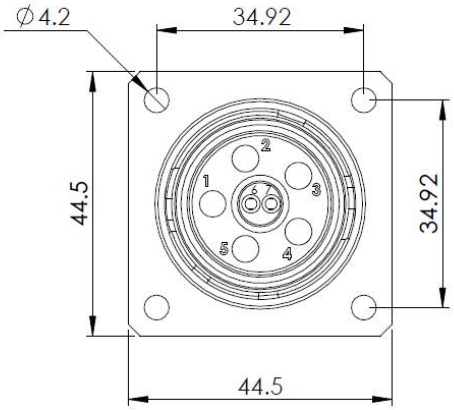
Pin insulator shown



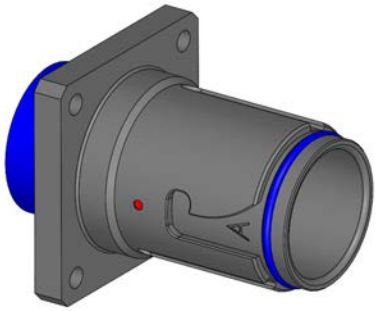
Dimensions in mm - Drawings not to scale - Transit caps not shown

Receptacle front mount

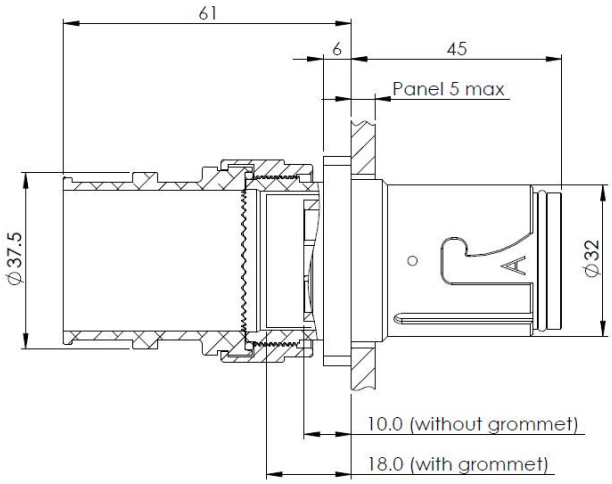


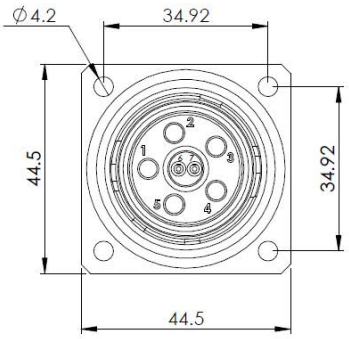


Pin insulator shown

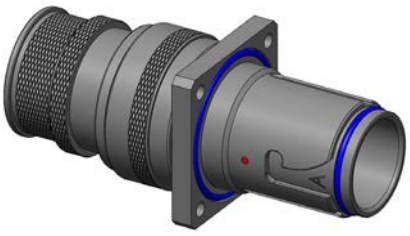


Receptacle with backshell



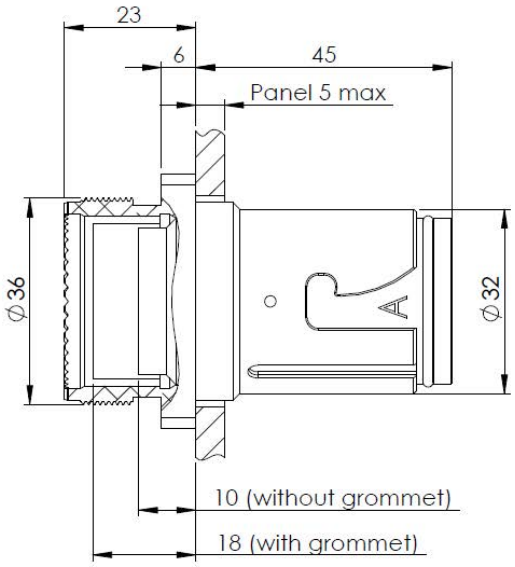


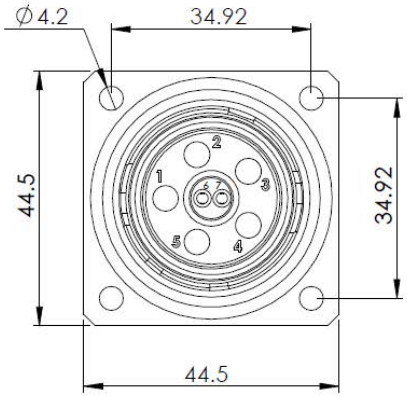
Pin insulator shown



Dimensions in mm - Drawings not to scale - Transit caps not shown

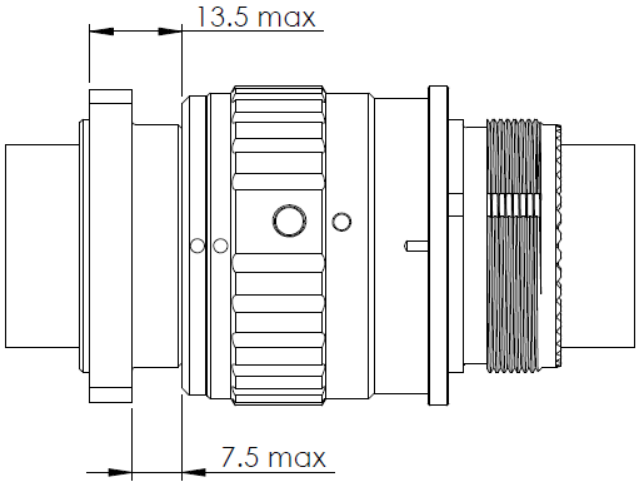
Receptacle for boot





Pin insulator shown

Mated dimensions



Dimensions in mm - Drawings not to scale - Transit caps not shown

General range information

Transit packaging

Connectors are supplied with non-sealing vinyl caps to protect plated finishes.

Sealed protective caps

Protective caps meeting recognised sealing specifications are available; consult your local sales representative.

Feedthrough versions *(only for the HBB single pole)*

Pin to pin feedthrough versions are available; consult your local sales representative.

Harness solutions

Please contact your local sales representative to inquire about our harness solutions.

Worldwide Support

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