

# Transformer Range

HeavyPower - TSH Series

High power modular connectors



# High Power Tortac<sup>®</sup> Hyperboloid Contact Technology

Smiths Interconnect offers an extensive range of superior contact technologies suitable for harsh environments and power applications. Hypertac<sup>®</sup> (HYPERboloid conTACT) is the original superior performing hyperboloid.

The Tortac<sup>®</sup> hyperboloid contact is an evolution of Hypertac<sup>®</sup> maintaining the best electrical performance with excellent mechanical and environmental reliability. On balance, Tortac<sup>®</sup> is the ideal compromise when mating cycle life performance and vibration resistance are important, but not to the levels requiring the original Hypertac<sup>®</sup> contact.



## Features

## Benefits

### Low insertion/extraction forces

The Tortac<sup>®</sup> design, inspired by the Hypertac contact, provides a low insertion force thanks to smooth contact surfaces and the shape of the spring cage.

### High density interconnect systems

Significant reductions in insertion force allow ergonomically comfortable levels of connector insertion force. No additional mating hardware is required to overcome insertion and extraction forces even for multipole connectors.

### Long contact life

The Tortac<sup>®</sup> hyperboloid contact is tested to over 500 mating cycles.

### Low cost of ownership

Affordable option for applications which need ultimate dependability but without extremely high cycle life.

### Lower contact resistance

The design provides a far greater contact area than competing designs and the wiping action of the contact beams insures a clean and polished contact surface.

### Low power consumption

Thanks to the low contact resistance and the smart design, the temperature rise due to current is compliant to the NF F 61-030 and EN 50467.

### Immunity to shock & vibration

Tortac<sup>®</sup> has been designed to resist high levels of mechanical shock and vibration. Material shapes and surfaces in the contact design provide high reliability under severe conditions.

### Reliability under harsh environments

Harsh environmental settings require connectors that will sustain their electrical integrity even under the most demanding conditions such as shock and vibration.

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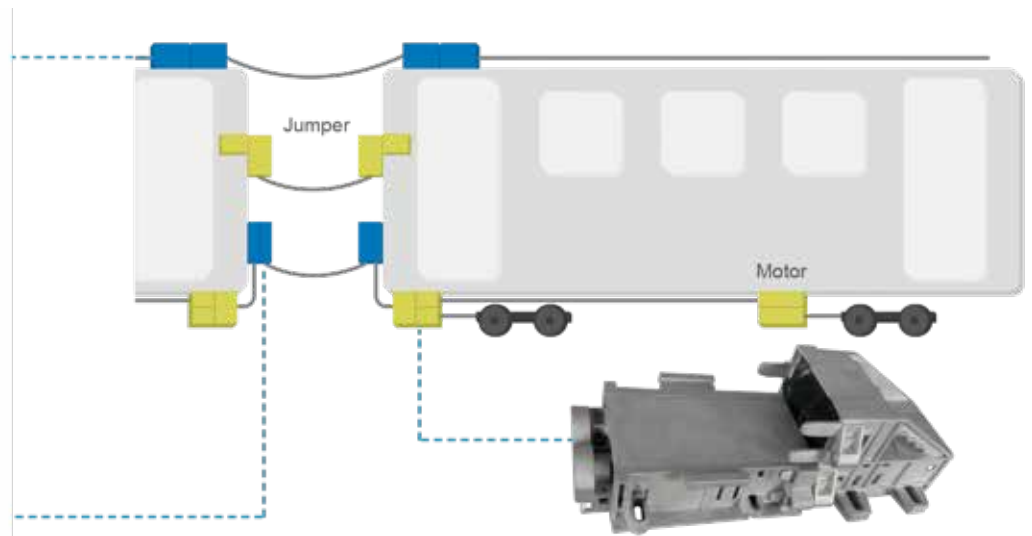
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# Applications

## Meeting all On-Board Power application requirements

HeavyPower Connectors - TSH Series



# Transformer Range

## HeavyPower Connectors – TSH Series



The HeavyPower connectors are part of the Smiths Interconnect Transformer range, a comprehensive series of high density, modular connectors for all on-board power applications within the rail market. The Transformer's modularity enables customers to design their own solution by supplying the elementary components of the whole connector. It employs a unique do-it-yourself system based on the building block principle. The connectors are suitable for any applications requiring the transmission of very high currents such as power distribution, intercoaches and bogies. There is also a version available that connects the motors of the bogies.

### Value Proposition

- Modularity with easy kitting devices offers a cost saving on total cost of ownership
- Flexible solution with several crimp section of cable per contact size offering cost saving with standardization of contact size and limitation of crimping tools
- Coding devices to allow side by side installation
- Integrating anti swing accessories to avoid extra fixing cables devices on the gangway
- Long life cycle with Tortac® power contact derived from hyperboloid technology
- Robust and complete cable harness/jumpers shielded and non shielded solutions increasing reliability and SIL4 applications
- Reduced maintenance costs and easy retrofit operation with removable and interchangeable modules and contacts
- The connector is equipped with a cable gland (strain relief) to protect the cable and the connectors from the mechanical and environmental hazards
- It has been tested up to 1 Million of swaying cycles to simulate the gangway environment
- Compliant with the main rail standards (EN 45545 and NF F 61-030)

Insulator design according to EN 50124 pollution degree 4

## Features & Benefits

### Customer Configurable Architecture

- Few piece parts create several type of connectors as a platform solution
- Easy assembly with no special tooling
- Reduced stock and kitting/logistics management
- Straight and right angle termination styles
- 4 coding keys

### Rugged Design

- Insulator design conforms to EN 50124 pollution degree 4 so they can be installed on the train roof or under the car, on bogies and between vehicles as jumpers
- High protection plastic insulator ensures correct creepage distance clearance
- Rugged, modular and safe connector solution
- Cable section size from 25mm<sup>2</sup> to 50mm<sup>2</sup>
- Locking by screws and coding devices according to 11.5.2.3 NF F 61-030
- IP66, IP67 rating according to NF EN 60529
- Tortac® High Power Contact (HPT) technology
- Fire and Smoke standards according to NF F 16-101, 16-102 and EN 45545-2 (HL3 for RV22 and RV23)

### Anti Swaying Device

- Integrated anti swaying device on the connector back end, no need for any other devices as a spacer to attach the jumper cable onto the inter-coach walls

### Compact Size

- Space and weight saving, due to the replacement of junction box with lugs
- Simplifies installation and allows for easy maintenance

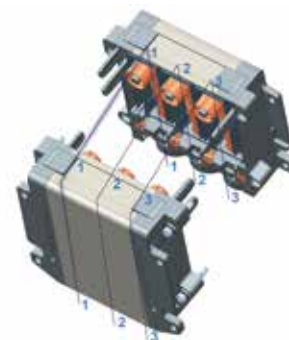
# How To Order

## HeavyPower Connectors – TSH Series



T S H								0 0
1	2	3	4	5	6	7	8	

<b>1 HeavyPower Connector Series</b>	[Fixed]						
<b>2 Connector version</b>	<b>S</b> Straight <b>R</b> Right angle <b>Y</b> Branch						
<b>3 Connector type</b>	<b>M</b> Male <b>F</b> Female						
<b>4 Contact arrangement</b> <i>(Each digit corresponds to a pole, please configure each pole according to the requested cable section)</i>	<table border="0"> <tr> <td><b>O</b> Without any pole</td> <td><b>A</b> 25 mm<sup>2</sup>, crimp copper</td> </tr> <tr> <td><b>K</b> 70 mm<sup>2</sup>, crimp copper</td> <td><b>D</b> 35 mm<sup>2</sup>, crimp copper</td> </tr> <tr> <td><b>G</b> 50 mm<sup>2</sup>, crimp copper</td> <td></td> </tr> </table> <p>For example, the reference for the contact arrangement of a 3 pole version can be <b>DAG00</b></p> <p>This means that the 1<sup>st</sup> pole is equipped with a crimp contact for 35mm<sup>2</sup> cable section, the 2<sup>nd</sup> one for 25mm<sup>2</sup> and the 3<sup>rd</sup> one for 50mm<sup>2</sup>. The last 00 digits indicate that no contact is required.</p>	<b>O</b> Without any pole	<b>A</b> 25 mm <sup>2</sup> , crimp copper	<b>K</b> 70 mm <sup>2</sup> , crimp copper	<b>D</b> 35 mm <sup>2</sup> , crimp copper	<b>G</b> 50 mm <sup>2</sup> , crimp copper	
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<b>5 Cable gland</b> <i>(Each digit corresponds to a pole, please configure each pole according to the requested cable gland)</i>	<table border="0"> <tr> <td><b>O</b> Without any pole</td> <td><b>A</b> Ø 9.5 to 10.5 mm</td> <td><b>B</b> Ø 10.5 to 13.5 mm</td> </tr> <tr> <td><b>C</b> Ø 13.5 to 15.0 mm</td> <td><b>D</b> Ø 15.0 to 17.0 mm</td> <td><b>E</b> Ø 17.0 to 19.0 mm</td> </tr> </table>	<b>O</b> Without any pole	<b>A</b> Ø 9.5 to 10.5 mm	<b>B</b> Ø 10.5 to 13.5 mm	<b>C</b> Ø 13.5 to 15.0 mm	<b>D</b> Ø 15.0 to 17.0 mm	<b>E</b> Ø 17.0 to 19.0 mm
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<b>6 Protection</b>	<b>B</b> Balast [Fixed]						
<b>7 Swing equipment</b>	<b>S</b> With (TSH./TSHY) <b>O</b> Without (TSHY only)						
<b>8 Accessories</b>	[Fixed]						



The connectors are also available as self-assembly components. Please contact Smiths Interconnect for the individual part numbers.

# Technical Characteristics

## HeavyPower Connectors – TSH Series

### Technical

Number of contacts	1 to 4 per connector TSHY 4 entries / 8 exits
Contact pin diameter	Ø10 mm

### Electrical

(EN 50124 designed and tested)

Current rating	Up to 300 A
Voltage rating	3600 V according to EN 50124-1
Withstanding voltage rating	12 kV
Rated impulse voltage [U <sub>Ni</sub> ]	25 kV
Overvoltage category	OV3 PD3A according to EN 50124-1

### Physical & Environmental

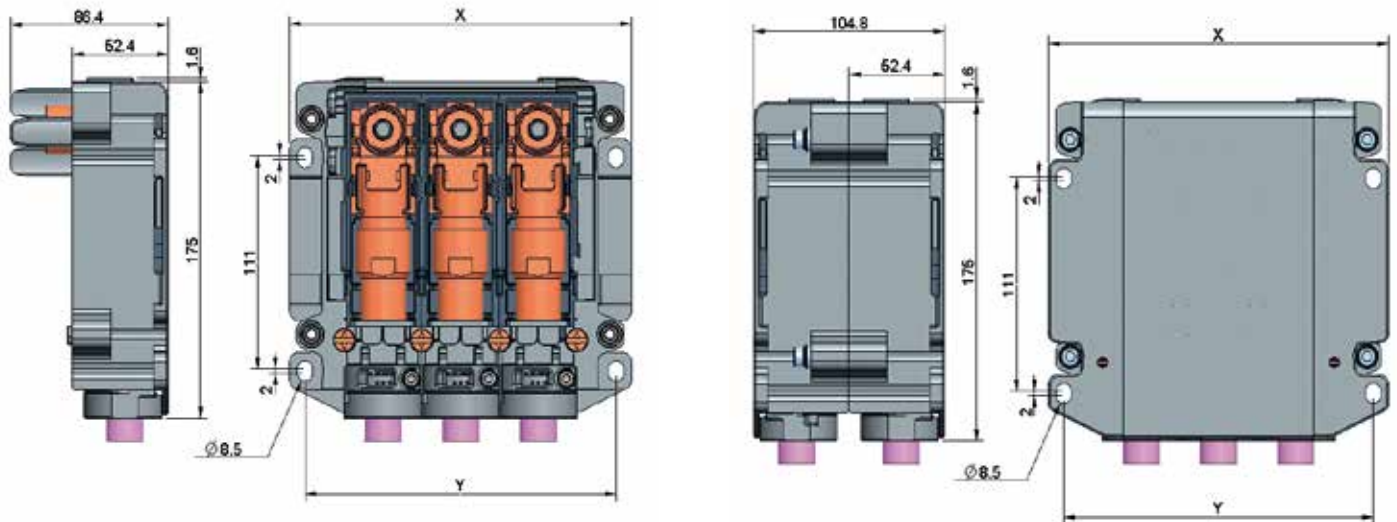
(NF F 61-030 / EN 50467 tested)

Temperature rating	-55°C to +125°C
Contact material	Copper, nickel-plated
Contact retention	According to 11.5.5 NF F 61-030
Connector material	
Insulator	Polyamide (CTI >600)
Body shells	Passivated aluminium
Endurance	>500 mating cycles
Vibration resistance	According to EN 61373 harshest environment
Flammability	HL3 - R22/R23 according to EN 45545
Acid resistance	According to NF F 61-030
Fluid resistance	According to NF F 61-030
Corrosion resistance	96 hrs salt spray over 500 hrs mated
Protection level	IP66, IP67

# Dimensions

## HeavyPower Connectors – TSH Series

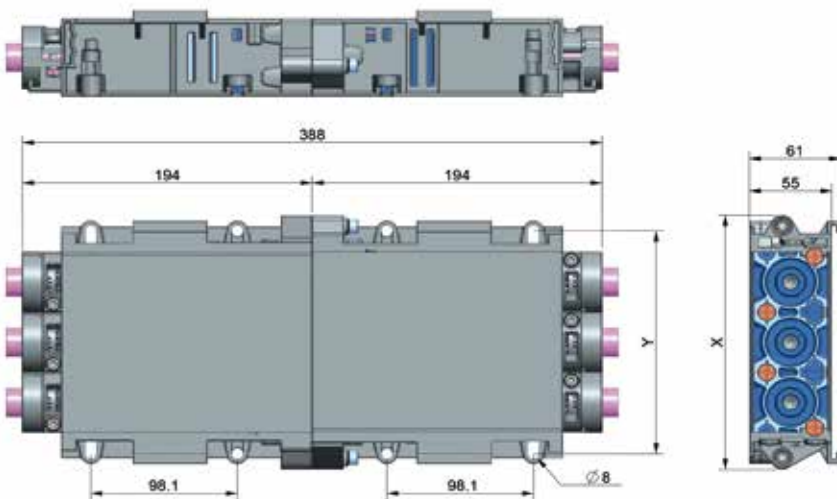
### HeavyPower right angle termination



Pole number	X	Y
1	102.5	85.5
2	145	128
3	187.5	170.5
4	230	213

Dimensions are in mm

### HeavyPower straight termination

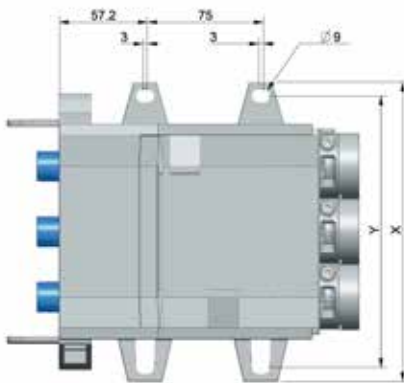
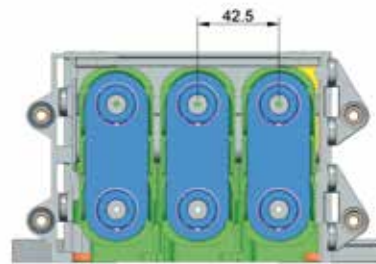
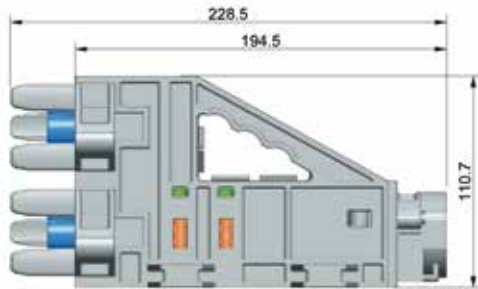


Pole number	X	Y
1	94.5	72.5
2	137	115
3	179.5	157.5
4	222	200

Dimensions are in mm



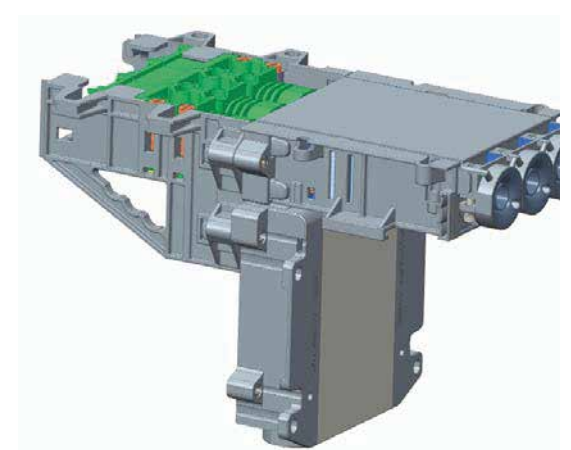
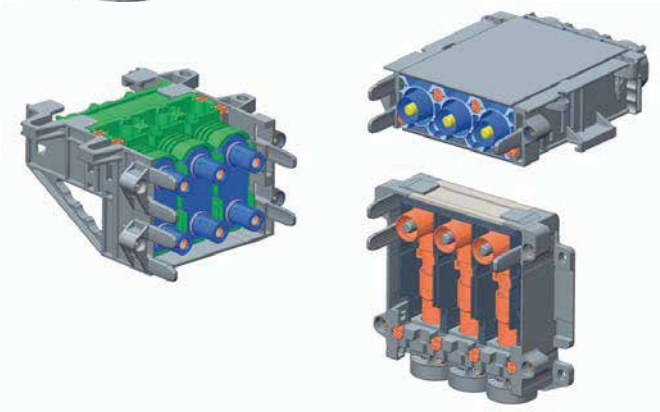
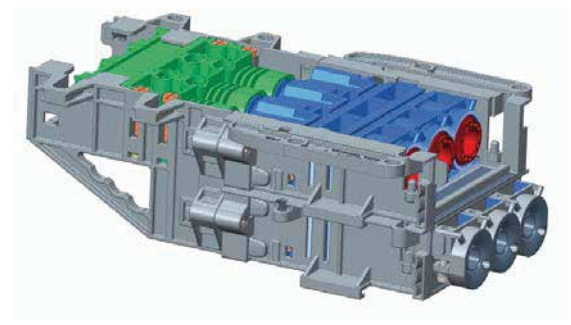
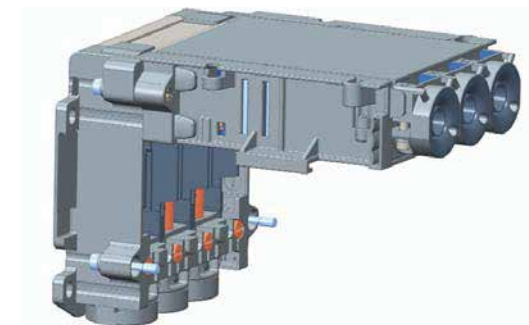
## HeavyPower Y, branch connector



Pole number	X	Y
1	91.5	109.4
2	133.9	151.9
3	176.4	194.4
4	218.9	236.9

Dimensions are in mm

## Example of connector configurations



## Disclaimer 2019

All of the information included in this catalogue is believed to be accurate at the time of printing. It is recommended, however, that users should independently evaluate the suitability of each product for their intended application and be sure that each product is properly installed, used and maintained to achieve desired results.

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