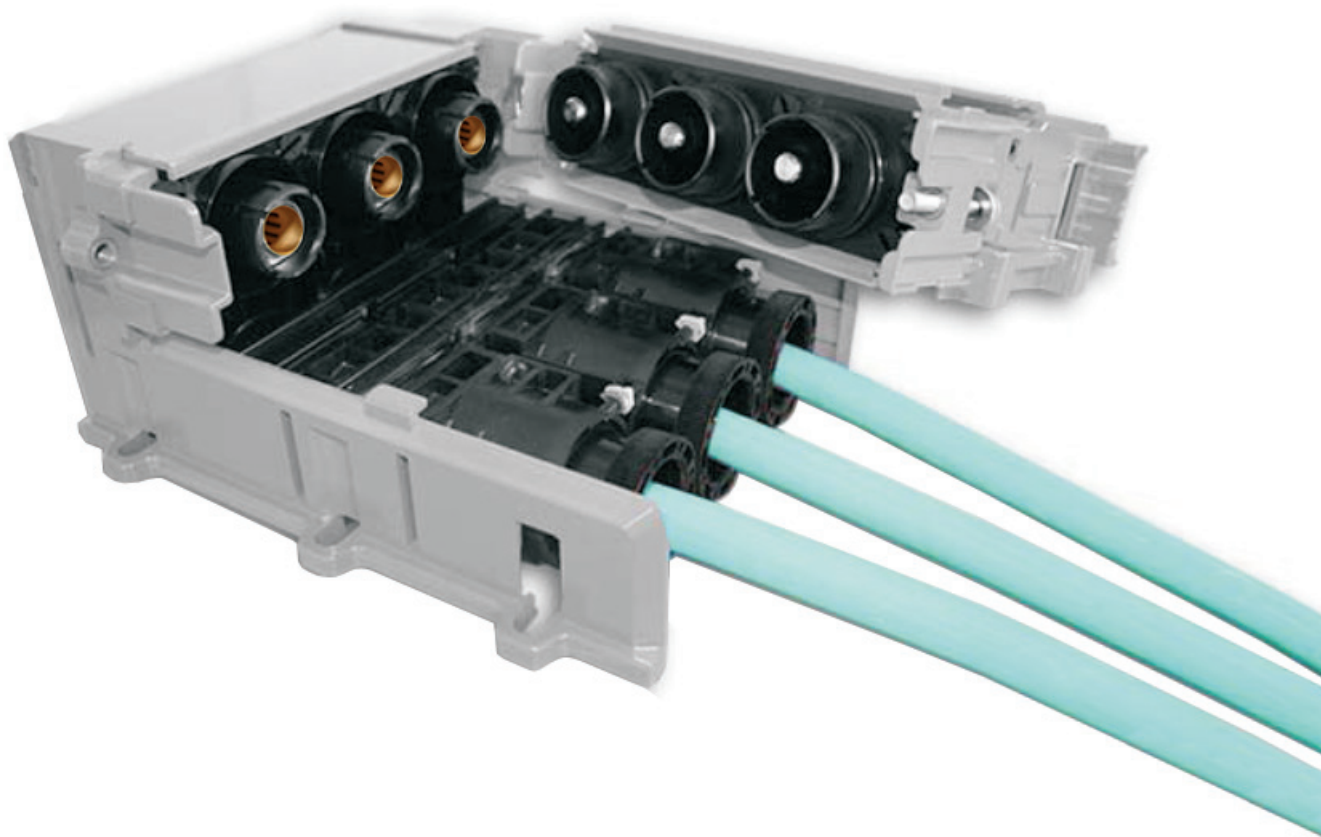


# Transformer Range

HeavyPower - TSH Series | EasyPower - TSE Series

High power modular connectors



# High Power Tortac® Hyperboloid Contact Technology

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

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



Features	Benefits
<b>Low insertion/extraction forces</b> The Tortac® design, inspired by the Hypertac contact, provides a low insertion force thanks to smooth contact surfaces and the shape of the spring cage.	<b>High density interconnect systems</b> 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.
<b>Long contact life</b> The Tortac® hyperboloid contact is tested to over 500 mating cycles.	<b>Low cost of ownership</b> Affordable option for applications which need ultimate dependability but without extremely high cycle life.
<b>Lower contact resistance</b> 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.	<b>Low power consumption</b> 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.
<b>Immunity to shock &amp; vibration</b> Tortac® 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.	<b>Reliability under harsh environments</b> Harsh environmental settings require connectors that will sustain their electrical integrity even under the most demanding conditions such as shock and vibration.

# Contents

Applications ..... 2

## HeavyPower Connectors – TSH Series

Product description ..... 3

How to order..... 4

Technical characteristics ..... 5

Dimensions

    HeavyPower right angle termination ..... 6

    HeavyPower straight termination..... 6

    HeavyPower Y, branch connector ..... 7

Connector configurations..... 7

## EasyPower Connectors – TSE Series

Product description ..... 8

How to order..... 9

Technical characteristics ..... 10

Dimensions & connector assembly

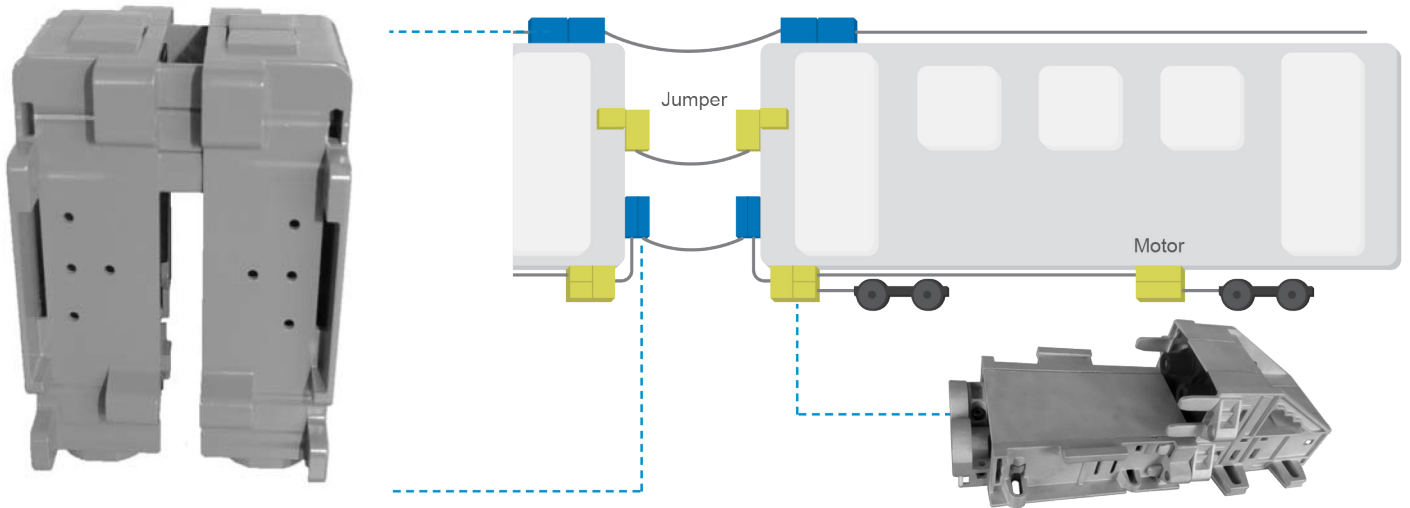
    EasyPower straight termination ..... 11

    EasyPower straight termination with a shunt ..... 12

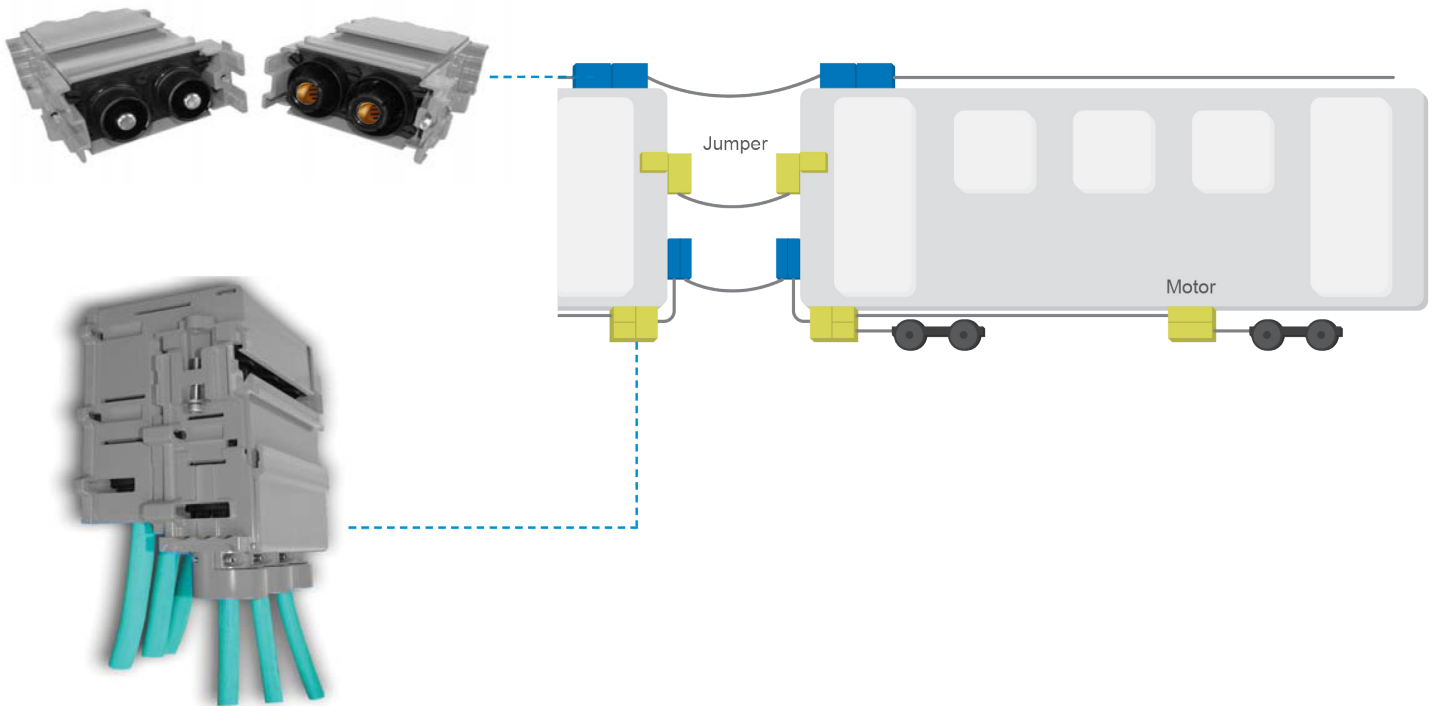
# Applications

## Meeting all On-Board Power application requirements

### HeavyPower Connectors - TSH Series



### EasyPower Connectors - TSE 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

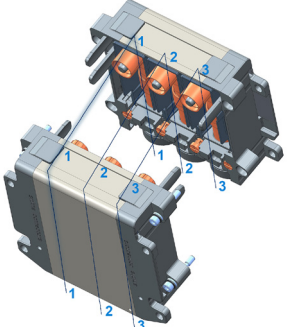
- Space and weight saving, due to the replacement of junction box with lugs
- Simplifies installation and allows for easy maintenance

# How To Order

## HeavyPower Connectors – TSH Series



T S H     0   0 B  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>	<div> <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         </div> <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>5 Cable gland</b> <i>(Each digit corresponds to a pole, please configure each pole according to the requested cable gland)</i>	<div> <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         </div>
<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

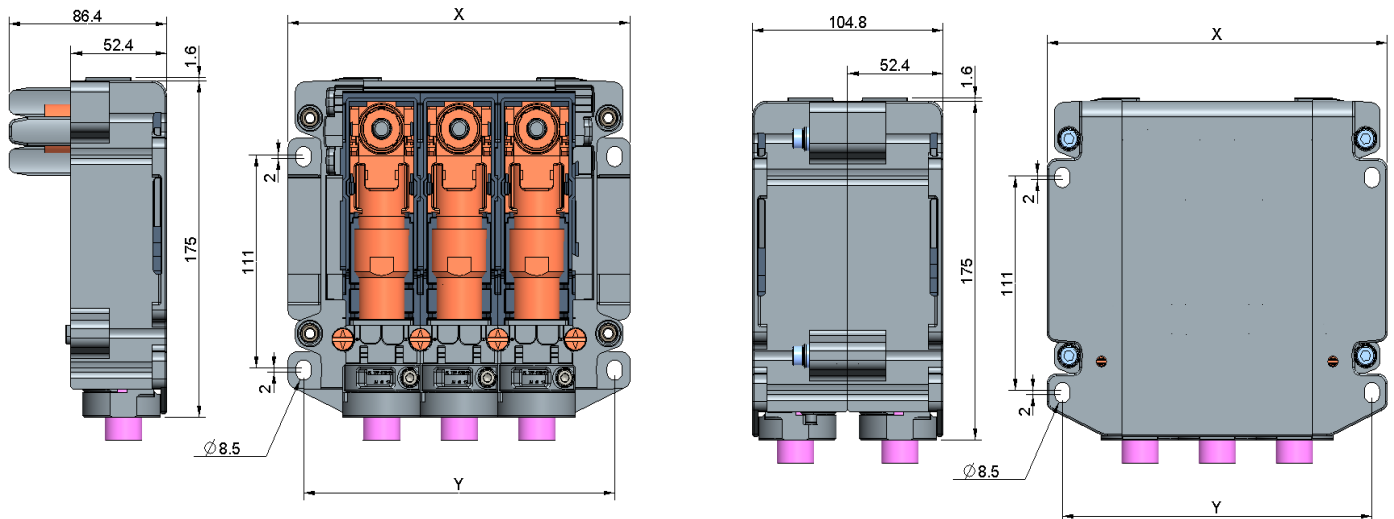
(NF F 61-030 / EN 50467 tested)

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	Polyamide (CTI >600) Passivated aluminium
Insulator	
Body shells	
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

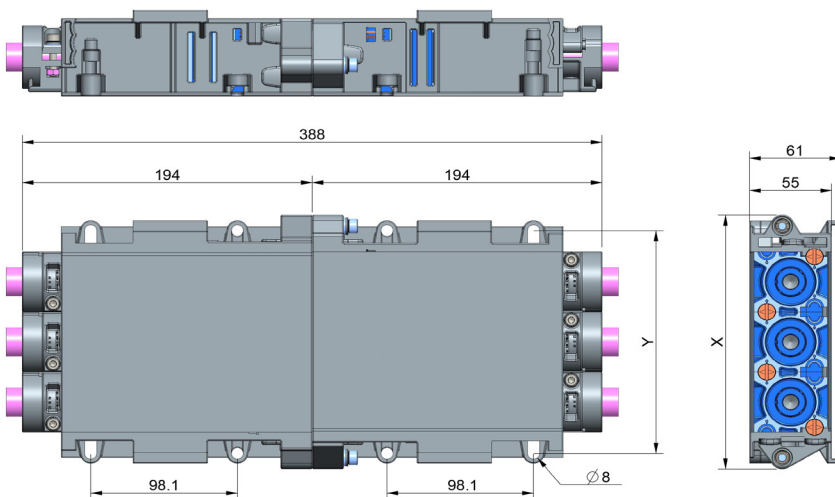
### HeavyPower right angle termination



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

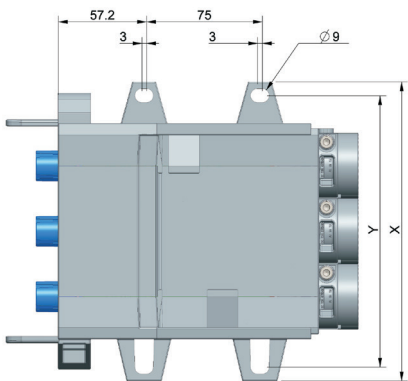
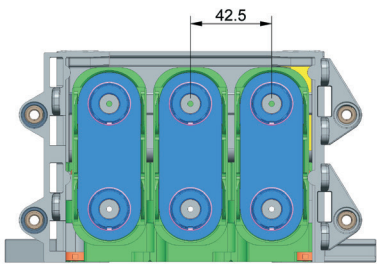
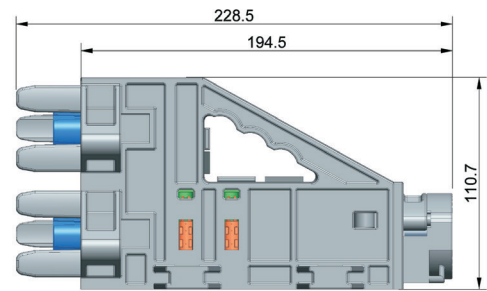


Pole number	X	Y
1	94.5	72.5
2	137	115
3	179.5	157.5
4	222	200

Dimensions are in mm



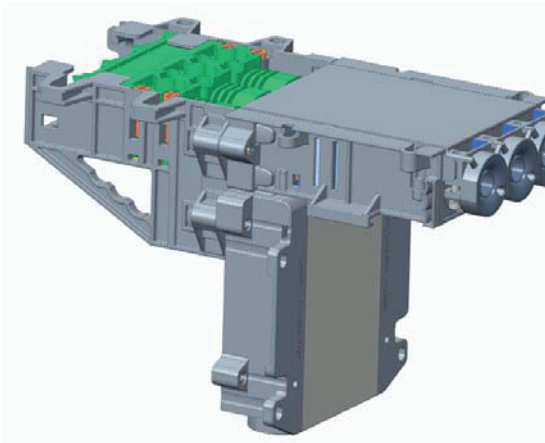
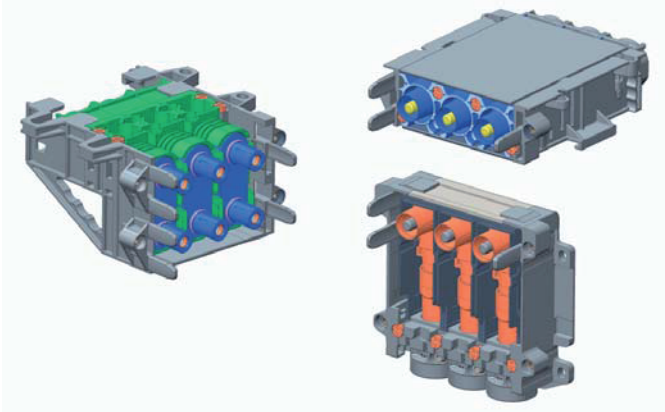
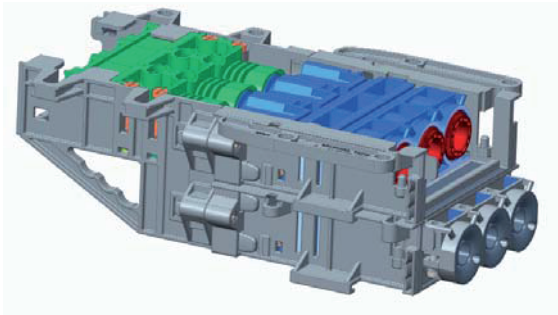
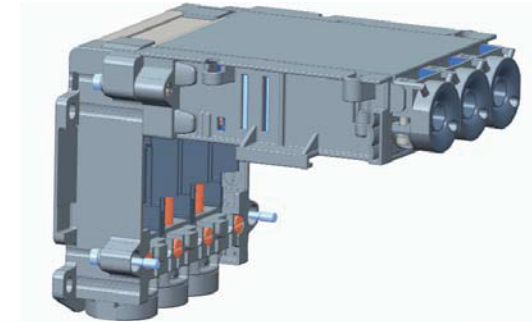
HeavyPower Y, branch connector



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

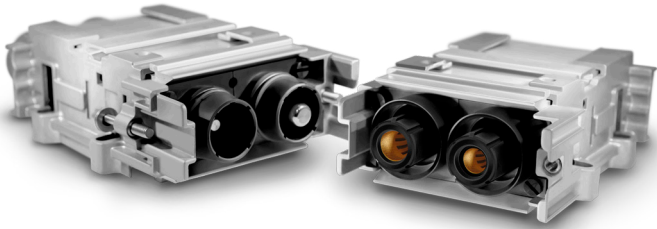
Dimensions are in mm

Example of connector configurations



# Transformer Range

## EasyPower Connectors – TSE Series



The EasyPower 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.

### Value Proposition

- Higher contacts density and management of separated modules (signal, power, high speed data) offering optimization of space on new Gangway for high speed and intercity trains
- Long life cycle with Tortac® power contact derived of hyperboloid technology
- Robust and complete cable harness/jumpers shielded and non shielded solution increasing reliability and SIL4 applications
- Reduced maintenance costs and easy retrofit operation with removable and interchangeable modules and contacts
- 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)

**Modularity  
with easy  
kitting devices**

## Features & Benefits

### Customer Configurable Architecture

- Enables the design and build of individual solutions by procuring elementary piece parts
- Reduces stock and simplifies logistics
- Easy assembly with no special tooling
- Straight, right angled, and shunt termination styles
- 4 coding keys

### Rugged Design

- Insulator design conforms to EN 50124 pollution degree 4 ensures high electrical protection in severe environment
- Rugged, modular and safe connector solution
- Cable section size from 25mm<sup>2</sup> to 240mm<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

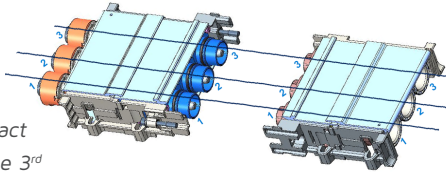
- Integrated anti swaying device on the connector back end, avoiding the need for any additional cable spacer

# How To Order

## EasyPower Connectors – TSE Series



TSE						
1	2	3	4	5	6	7

1 EasyPower Connector Series	[Fixed]									
2 Connector version	<b>P M</b> Plug male <b>R F</b> Receptacle female <b>S F</b> Shunt female									
3 Contact arrangement <sup>1)</sup> <i>(Each digit corresponds to a pole, please configure each pole according to the requested cable section)</i>	<table><tr><td><b>G</b> 50 mm<sup>2</sup>, crimp copper<sup>1)</sup></td><td><b>D</b> 35 mm<sup>2</sup>, crimp copper<sup>1)</sup></td><td><b>X</b> 185 mm<sup>2</sup>, crimp copper</td></tr><tr><td><b>K</b> 70 mm<sup>2</sup>, crimp copper</td><td><b>1</b> 240 mm<sup>2</sup>, crimp copper</td><td><b>R</b> 120 mm<sup>2</sup>, crimp copper</td></tr><tr><td><b>A</b> 25 mm<sup>2</sup>, crimp copper</td><td><b>N</b> 95 mm<sup>2</sup>, crimp copper<sup>1)</sup></td><td><b>P</b> 150 mm<sup>2</sup>, crimp copper<sup>1)</sup></td></tr></table> <p>For example, the reference for the contact arrangement of a 3 pole version can be <b>1 R A 0 0</b></p> <p>This means that the 1<sup>st</sup> pole is equipped with a crimp contact for 240mm<sup>2</sup> cable section, the 2<sup>nd</sup> one for 120mm<sup>2</sup> and the 3<sup>rd</sup> one for 25mm<sup>2</sup>. The last 00 digits indicate that no contact is required.</p> 	<b>G</b> 50 mm <sup>2</sup> , crimp copper <sup>1)</sup>	<b>D</b> 35 mm <sup>2</sup> , crimp copper <sup>1)</sup>	<b>X</b> 185 mm <sup>2</sup> , crimp copper	<b>K</b> 70 mm <sup>2</sup> , crimp copper	<b>1</b> 240 mm <sup>2</sup> , crimp copper	<b>R</b> 120 mm <sup>2</sup> , crimp copper	<b>A</b> 25 mm <sup>2</sup> , crimp copper	<b>N</b> 95 mm <sup>2</sup> , crimp copper <sup>1)</sup>	<b>P</b> 150 mm <sup>2</sup> , crimp copper <sup>1)</sup>
<b>G</b> 50 mm <sup>2</sup> , crimp copper <sup>1)</sup>	<b>D</b> 35 mm <sup>2</sup> , crimp copper <sup>1)</sup>	<b>X</b> 185 mm <sup>2</sup> , crimp copper								
<b>K</b> 70 mm <sup>2</sup> , crimp copper	<b>1</b> 240 mm <sup>2</sup> , crimp copper	<b>R</b> 120 mm <sup>2</sup> , crimp copper								
<b>A</b> 25 mm <sup>2</sup> , crimp copper	<b>N</b> 95 mm <sup>2</sup> , crimp copper <sup>1)</sup>	<b>P</b> 150 mm <sup>2</sup> , crimp copper <sup>1)</sup>								
4 Cable gland <i>(Each digit corresponds to a pole, please configure each pole according to the requested cable gland)</i>	<table><tr><td><b>O</b> Without cable gland<sup>2)</sup></td><td><b>B</b> Ø 24.5 to 30.5 mm</td><td><b>D</b> Ø 16.0 to 21.0 mm</td></tr><tr><td><b>A</b> Ø 30.0 to 36.0 mm</td><td><b>C</b> Ø 19.0 to 25.0 mm</td><td><b>E</b> Ø 12.5 to 16.5 mm</td></tr></table>	<b>O</b> Without cable gland <sup>2)</sup>	<b>B</b> Ø 24.5 to 30.5 mm	<b>D</b> Ø 16.0 to 21.0 mm	<b>A</b> Ø 30.0 to 36.0 mm	<b>C</b> Ø 19.0 to 25.0 mm	<b>E</b> Ø 12.5 to 16.5 mm			
<b>O</b> Without cable gland <sup>2)</sup>	<b>B</b> Ø 24.5 to 30.5 mm	<b>D</b> Ø 16.0 to 21.0 mm								
<b>A</b> Ø 30.0 to 36.0 mm	<b>C</b> Ø 19.0 to 25.0 mm	<b>E</b> Ø 12.5 to 16.5 mm								
5 Protection	<b>B</b> Balast [Fixed]									
6 Swing equipment	<b>S</b> With (only for TSEPM, TSERF) <b>O</b> Without									
7 Accessories	[Fixed]									

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

### Notes:

1) Cable section and contact not off the shelf

2) For connector mounted on the roof with additional cables

# Technical Characteristics

## EasyPower Connectors – TSE Series

### Technical

Number of contacts	1 to 4 per connector
Contact pin diameter	3 sizes: Ø10 mm, Ø14 mm, Ø19 mm,

### Electrical

(EN 50124 designed and tested)

Current rating	Up to 700 A
Voltage rating	3600 V according to EN 50124-1
Withstanding Voltage Vating	12 kV
Rated impulse voltage [ $U_{Ni}$ ]	25 kV
Overvoltage category	OV3 PD3A according to EN 50124-1

### Physical & Environmental

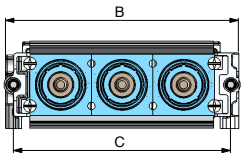
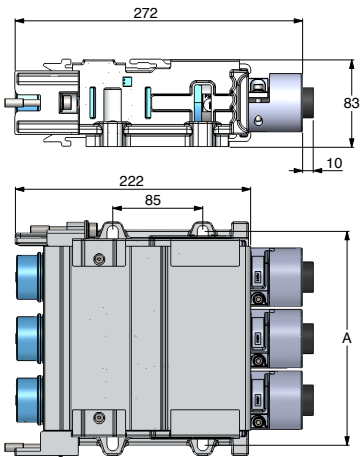
(EN 50467 / NF F 61-030 tested)

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	Polyamide (CTI >600) Passivated aluminium
Insulator	
Body shells	
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

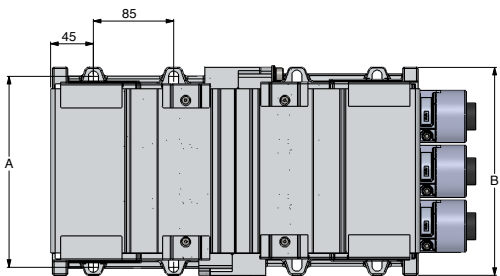
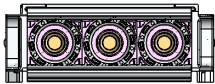
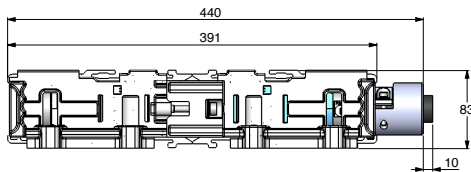
EasyPower Connectors – TSE Series

## EasyPower straight termination



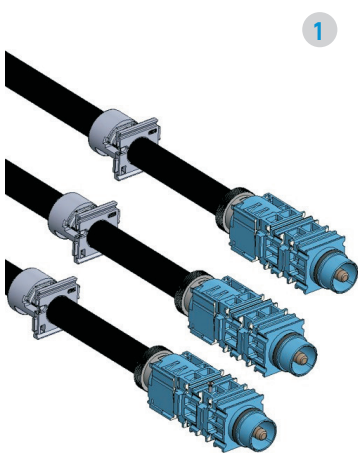
Pole number	A	B	C
1	86	106	89
2	144	164	147
3	202	222	205
4	260	280	263

Dimensions are in mm

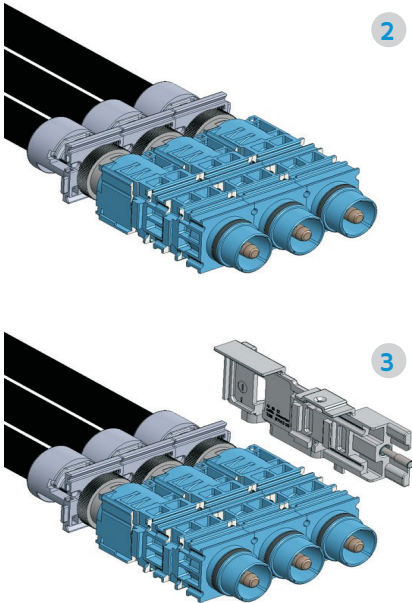


## Connector assembly

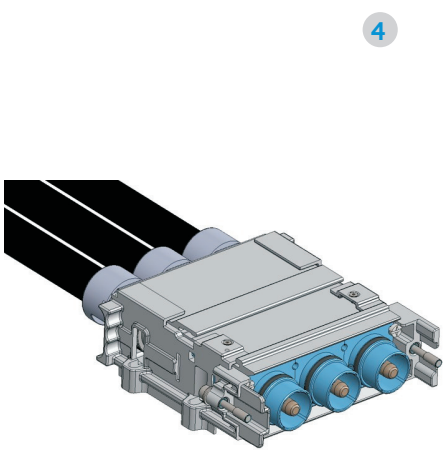
A unique do-it-yourself system based on the building block principle



Assemble the modules

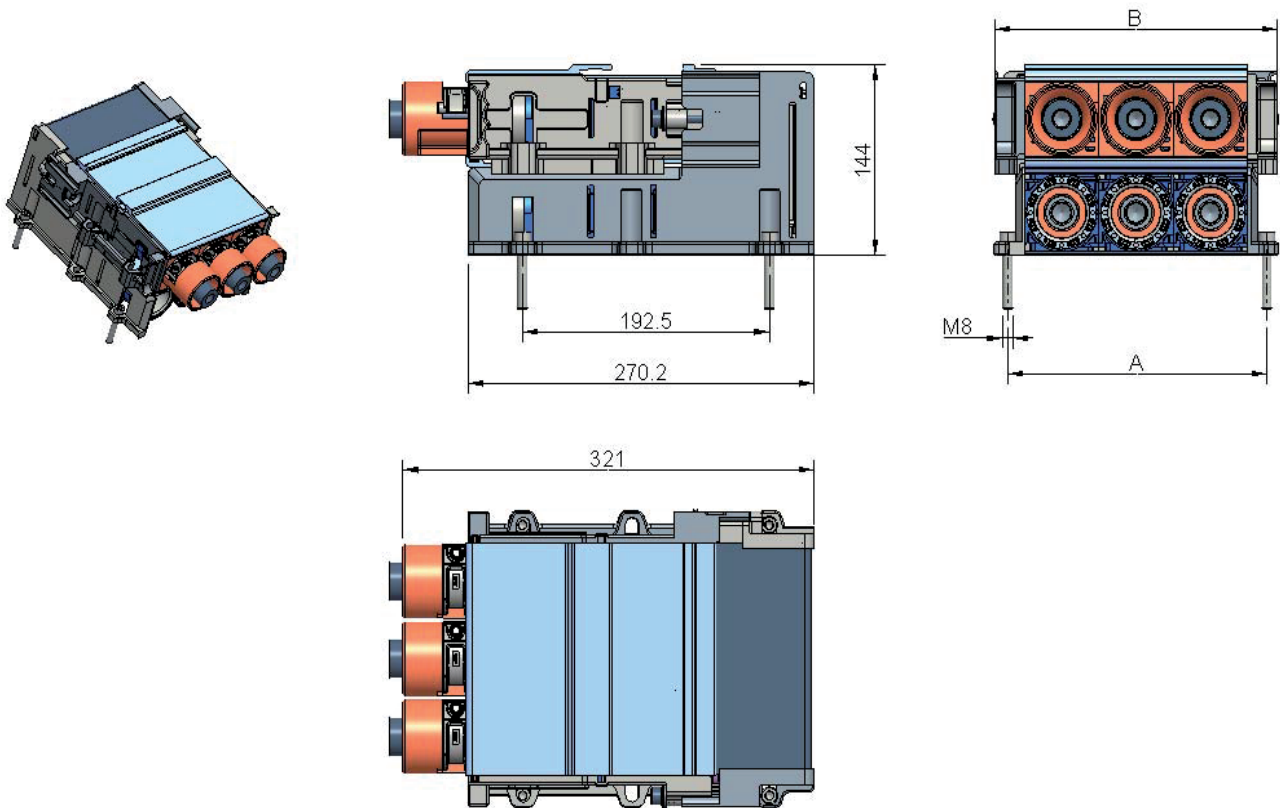


Slide the flange

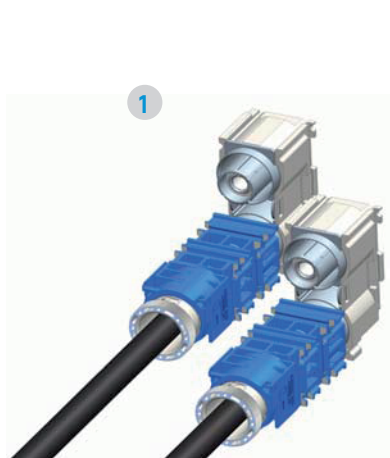


Protection and flanges are positioned

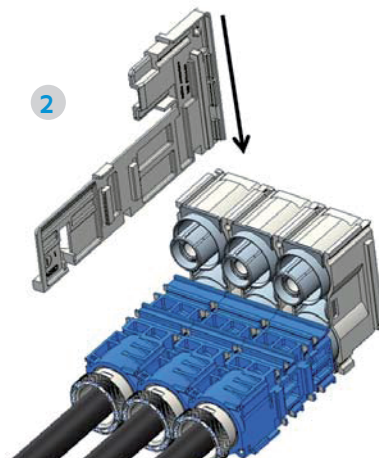
## EasyPower straight termination with a shunt



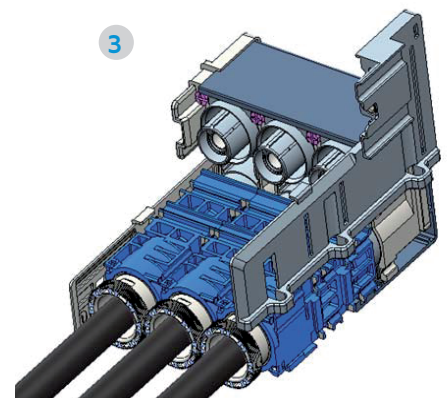
## Connector assembly



Assemble the modules



Slide the flange



Protection is inserted and the opposite flange is positioned

## Disclaimer 2018

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.

Smiths Interconnect makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use.

Smiths Interconnect reserves the right to modify design and specifications, in order to improve quality, keep pace with technological development or meet specific production requirements.

No reproduction or use without express permission of editorial and pictorial content, in any manner.



# Global Support

## UK Headquarters

- London, UK  
+44 20 7004 1600  
info.uk@smithsinterconnect.com

## US Headquarters

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

## Americas

- Costa Mesa, CA  
+1 714 371 1100  
info.us@smithsinterconnect.com
- Milpitas, CA  
+1 408 957 9607 x 1125  
info.us@smithsinterconnect.com
- Stuart, FL  
+1 772 286 9300  
info.us@smithsinterconnect.com
- Hudson, MA  
+1 978 568 0451  
info.us@smithsinterconnect.com
- Northampton, MA  
+1 413 582 9620  
info.northampton@smithsinterconnectinc.com
- Tampa, FL  
+1 813 901 7200  
info.tampa@smithsinterconnectinc.com
- Kansas City, KS  
+1 913 342 5544  
info.us@smithsinterconnect.com
- Salisbury, MD  
+1 800 780 2169  
info.us@smithsinterconnect.com
- Thousand Oaks, CA  
+1 805 267 0100  
info.thousandoaks@smithsinterconnectinc.com

## Europe

- Deggendorf, Germany  
+49 991 250 120  
info.de@smithsinterconnect.com
- Genoa, 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  
+44 20 8236 2400  
info.uk@smithsinterconnect.com

## Asia

- Shanghai, China  
+86 21 2283 8008  
info.asia@smithsinterconnect.com
- Suzhou, China  
+86 512 6273 1188  
info.asia@smithsinterconnect.com
- Singapore  
+65 6846 1655  
info.asia@smithsinterconnect.com