Rail Product Selection Guide
Proven rail expertise.
Global capabilities.
For more than a century, ITT has developed innovative connector solutions for the world’s harshest environments. With facilities in the United States, Germany, Italy, Mexico, China and Japan, each with its unique strengths, we offer our customers Interconnect Solutions that are truly Engineered for Life.

In addition to this global footprint, we offer highly specialized rail industry expertise. We have a proven track record as an industry leader in harsh-environment applications. This has equipped us with the knowledge needed to continue to produce extremely advanced, resilient and reliable connectors for our customers’ most challenging rail applications.

Global interconnect solutions for the rail industry.

The ITT Veam and Cannon difference
• Global capabilities & local support
• Proven rail application expertise
• A century of rail interconnect leadership
• A committed innovator & business partner

About ITT
ITT is a diversified leading manufacturer of highly engineered critical components and customized technology solutions for the energy, transportation and industrial markets. Building on its heritage of innovation, ITT partners with its customers to deliver enduring solutions to the key industries that underpin our modern way of life. Founded in 1920, ITT is headquartered in White Plains, N.Y., with employees in more than 35 countries and sales in a total of approximately 125 countries. For more information, visit www.itt.com.

Industry-recognised safety and reliability
As a critical part of the nervous system of modern rail, our connector solutions are found in a diverse range of INFRASTRUCTURE and ROLLING STOCK applications throughout the globe.

From high volume standardized products to low volume highly customized connector and value added solutions we have the reach, scale and expertise to deliver - whatever the requirement.

- Fully Proven
- Incredibly Durable
- Ultra Reliable

**Infrastructure Applications**
An integral part of the infrastructure and electrical control functions on current and next-generation railway systems, our connector solutions perform in both on and off-board applications that include:

- Level Crossing
- RCE Cabinets (Event Tracker Record)
- Signaling
- Station Platform Information

- Switches
- Train Control
- Video Surveillance
- Warning Systems

**Rolling Stock Applications**
Qualified on more than 250 global rail programs and being an integral part of more than 100,000 trains, our connector solutions are engineered to withstand the harshest environments in applications that include:

- Automatic Doors
- Battery Chargers
- Bogies
- Brake/Speed Sensors
- Braking Systems
- Converters/Inverters
- Data Communication
- Detection, Measurement and Control
- Diagnostics
- Driver’s Cabin
- Electric Couplers
- Fire Wall
- HVAC
- Intercar
- Lighting
- Location Systems

- Pantograph
- Passenger Onboard Utility Connections
- Power Distribution
- Safety
- Seats
- Toilets
- Traction Motors
- Under Car
- Wheel Slide Protection (WSP)
- Wipers
From Rolling Stock to Rail Infrastructure
We Connect When it matters most.

TRAIN CONTROL
ITT Veam and Cannon connectors support today’s advanced train control systems, which include a wide range of on-board systems, for both PCB and cable applications.

PRODUCT SOLUTIONS:
FRCIR Standard, CA Bayonet, Trident

STATION TECHNOLOGY
ITT Veam and Cannon standard and customized connectors deliver reliable power and signal solutions required by critical station applications as diverse as level crossings, passenger information boards and video surveillance systems.

PRODUCT SOLUTIONS:
CA Bayonet, CIR M12, CIR Fiber optic, CTC, Trident

UNDER CAR
ITT Veam connectors support critical signal, power and data communications under train cars, with reliable vibration resistant connectivity enabled by compact solutions suitable for high-density wiring environments.

PRODUCT SOLUTIONS:
FRCIR Standard, FRCIR290, CIRM12, V8N, Power Plates, Junction Boxes, FRCIR Stainless Steel, VA900

BOGIES
ITT Veam high power single & multi-pole standard and customized connectors deliver both extreme vibration resistance and space saving footprints to ensure reliable power supply and signal transmission to traction systems.

PRODUCT SOLUTIONS:
FRCIR Standard, FRCIR290, FRMGCI R, FRCIR Stainless Steel, FRCIR Marine Bronze, Power Plates, VA900
SENSORS
ITT Veam connectors are optimized for the very harsh environments of sensor applications, delivering minimized footprints, optimal sealing and extended lifetimes.

PRODUCT SOLUTIONS:
FRCIR Standard, FRMGCIR, VBN, FRCIR Stainless Steel, FRCIR Marine Bronze

INTERVEHICLE
ITT Veam solutions including connectors, junction boxes and jumper cables support critical signal, power and data communication between train cars, by delivering ultra-reliable vibration and shock resistant connectivity.

PRODUCT SOLUTIONS:
FRCIR Standard, FRCIR290, CIRM12, DSR, CIR Fiber Optic, HTB, Junction Boxes, Jumper Cables, FRCIR Marine Bronze

The teams at ITT Veam and ITT Cannon have an extensive, in-depth knowledge of rail from the tracks to the engine to the passenger car and every connection, every wire, every socket that makes for a smooth and efficient ride. As we continue to develop leading-edge technology, we’ll continue to bring you the reliability and durability required to push the limits of rail.

SIGNALING
ITT Veam and Cannon connectors support modern intelligent traffic management systems, which include a diverse range of track-side applications, both inside communications cabinets and in the most exposed outdoor harsh environments.

PRODUCT SOLUTIONS:
FRCIR Standard, Jumper Cables, Trident
## STANDARD PRODUCTS

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<th>FRCIR290</th>
<th>FRMGCIR</th>
<th>VIP</th>
<th>CIRM12</th>
<th>CA BAYONET</th>
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<td><img src="image2.png" alt="Image 2" /></td>
<td><img src="image3.png" alt="Image 3" /></td>
<td><img src="image4.png" alt="Image 4" /></td>
<td><img src="image5.png" alt="Image 5" /></td>
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### GENERAL

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<tr>
<th>Standards / Connector Specifications</th>
<th>VG95234 / MIL-DTL-5015 (where applicable)</th>
<th>VG95234 / MIL-DTL-5015 (where applicable)</th>
<th>VG95234 / MIL-DTL-5015 (where applicable)</th>
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<th>VG95234 / MIL-DTL-5015 (where applicable)</th>
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<tr>
<td>Fire &amp; Smoke standards</td>
<td>EN 45545-2 NFP A 130</td>
<td>EN 45545-2 NFP A 130</td>
<td>EN 45545-2 NFP A 130</td>
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<td>EN 45545-2 NFP F 16-101/2</td>
<td>acc. VG95234</td>
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<td>Yes (depending on plating)</td>
<td>Yes (depending on plating)</td>
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<td>Yes (depending on plating)</td>
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<td>Number of Circuits</td>
<td>1 to 159 pins</td>
<td>3 to 101 pins</td>
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<td>n/a</td>
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<td>1 to 4 lines</td>
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<th>Max. Operating Voltage</th>
<th>4200 Vdc to 3000 Vac</th>
<th>2450 Vdc to 1750 Vac</th>
<th>4200 Vdc to 3000 Vac</th>
<th>1500 Vac to 2000 Vcc</th>
<th>200 Vac to 250 Vdc</th>
<th>50 Vac to 750 Vdc (acc. Low Voltage Directive)</th>
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<tr>
<td>Max. Dielectric Withstanding Voltage</td>
<td>7000 Vac</td>
<td>4500 Vac rms</td>
<td>7000 Vac</td>
<td>9kVdc</td>
<td>1000 Vac</td>
<td>3000 Vac</td>
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<td>700A</td>
<td>3A</td>
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<td>EMI/RFshielding</td>
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### CONTACTS

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<tr>
<th>Wire range AWG</th>
<th>AWG 26 to AWG4/0</th>
<th>AWG 20 to 4/0</th>
<th>AWG 26 to AWG4/0</th>
<th>-</th>
<th>AWG 24 (8 poles)</th>
<th>AWG 26 to AWG 0</th>
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<tbody>
<tr>
<td>Wire Range mm²</td>
<td>0.15 to 120</td>
<td>0.6 to 120</td>
<td>0.15 to 120</td>
<td>95 to 240</td>
<td>0.34 to 0.75  (2 and 4 poles)</td>
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<td>Gold / Silver</td>
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<td>Gold</td>
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<td>Power and Signal Layouts</td>
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<td>Power</td>
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<td>20 to 4/0</td>
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<th>Mating cycles (max.)</th>
<th>2000</th>
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<th>500</th>
<th>500 (2-4 pole) - 100 (8 pole)</th>
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<td>Max. shock resistance (gs)</td>
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<td>20g - 10 up to 2000Hz</td>
<td>20g - 10 up to 2000Hz</td>
<td>20g - 10 up to 2000Hz</td>
<td>20g - 10 up to 2000Hz</td>
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<td>Yes</td>
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<td>-40°C to +100°C</td>
<td>-55°C to +125°C Options for up to 200°C</td>
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<td>IP67</td>
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<td>IP67</td>
<td>IP67 / IP68 / IP69k</td>
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<td>Individual wire sealing</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
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<td>Yes</td>
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<td>Aluminum/Stainless steel/ Marine bronze</td>
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### APPLICATIONS KEY

**INFRASTRUCTURE APPLICATIONS**
- Braking Systems
- Detection, Measurement and Control
- Diagnostics
- Fire Wall
- Level Crossing
- Lighting
- Location Systems
- Wheel Slide Protection (WSP)

**ROLLING STOCK APPLICATIONS**
- Automatic Doors
- Battery Chargers
- Bogies
- Brake/Speed Sensors
- Converters/Inverters
- Data Communication
- Driver’s Cabin
- Under Car
- Wipers

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# STANDARD PRODUCTS

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<tr>
<th>VBN</th>
<th>VRPC</th>
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<th>FRVPT</th>
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## APPLICATIONS

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<tr>
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<tr>
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<td>Level Crossing</td>
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<td>AC≥DC</td>
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<tr>
<td>Safety</td>
<td>DC≤AC</td>
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<tr>
<td>Video Surveillance</td>
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<tr>
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<tr>
<td>Warning Systems</td>
<td>Warning Systems</td>
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## GENERAL

### Standards / Connector Specifications
- VG95234 / MIL-DTL-5015 (where applicable)
- NFF 61030
- Shells based on MIL-C-38999, insert on Mil-C-5015
- VG95328 / MIL-C-26482 (where applicable)
- n/a

### RoHS and Reach
- Yes
- Yes
- Yes/No (depending on plating)
- Yes/No (depending on plating)
- Yes

### Number of Circuits
- 4 to 70 pins
- 3, 6, 12
- 1 to 159 pins
- 2 to 61 pins
- 1 to 65 pins
- 2 to 61 pins

### Max. Operating Voltage
- 1250 Vdc to 900 Vdc
- 380 V AC / 500 V DC
- 4.2kV (depends on insert)
- 900 Vdc to 1250 Vac
- 50 Vac to 75 Vdc (acc. Low Voltage Directive)
- 50 Vac to 75 Vdc (acc. Low Voltage Directive)

### Max. Dielectric Withstanding Voltage
- 3600V rms
- 3250 V AC up to 8.5kV (depends on insert)
- 5000 Vac rms
- 3000 Vac
- 2300 Vac

### Max. Current Rating
- 73A
- 16A
- 1,000A (using VGE insert and contacts)
- 41A
- 245A
- 13A

### EMI/RFI shielding
- Yes
- No
- Consult factory
- Yes
- Yes
- Yes

### CONTACTS

#### Wire range AWG
- AWG 20 to AWG 10
- AWG 24 to AWG 14
- AWG 24 to 500 MCM
- AWG 24 to AWG 12
- AWG 26 to AWG 0
- AWG 24 to AWG 12

#### Wire Range mm²
- 0.5 to 10
- 0.25 to 2.5
- 0.15 to 240
- 0.24 to 3
- 0.14 to 50
- 0.08 to 2.0

#### Contact plating
- Gold / Silver
- Tin / Gold
- Gold / Silver
- Gold / Silver
- Gold

#### Power and Signal Layouts
- No
- Yes
- No
- Yes
- Signal only

#### Contact Size
- 16S to 8 Ø1.6 mm (size 16)
- from 20 to 240 sq mm
- 12 to 20
- 20 to 0
- 20 to 12

#### Mating cycles (max.)
- 500
- 500
- 500
- 500
- 500

#### Max. shock resistance (g's)
- 50
- 30
- 200
- Vibration stress 150 m/s², 10 Hz to 2000 Hz
- 50
- 50

#### Max. vibration resistance
- 25-250Hz (NF F 60-002)
- 5,72 m/s² at 5 to 150Hz
- 20
- 200m/s² at 10 - 2000 Hz
- 200m/s² at 10 - 2000 Hz

#### Mechanical coding
- Yes
- Yes
- 5 keyways
- Yes
- Yes

#### Type of coupling
- Bayonet
- Snap Lock
- Double Ratchet
- Reverse Bayonet
- Bayonet / Threaded
- Bayonet

#### Temperature range
- -40°C to +100°C
- -40°C to +100°C
- -70°C to 200°C (depends on elastomer, consult factory)
- -40°C to +125°C
- -55°C to +125°C
- -55°C to +125°C

#### IP rating
- IP67 (mated condition with appropriate accessories)
- IP20 & IP67
- IP67 (mated condition with appropriate accessories)
- IP67 / IP68 / IP69k
- IP67 / IP68

#### Individual wire sealing
- Yes
- Yes (grommet )
- No
- Yes
- Yes

#### Cable jacket sealing
- Yes
- No
- Yes
- Yes
- Yes

#### Shell Material
- Aluminium
- Aluminium
- Aluminium-stainless steel
- Aluminium, Zinc Diecast
- Aluminium

#### Insert material
- Thermoplastic
- Thermoplastic
- Flame retardant rubber
- Flame retardant rubber
- Polychloroprene
- Polychloroprene

### RoHS SHELL PLATINGS

#### Conductive (200h)
- Yes
- No
- Yes
- No
- Yes

#### Conductive (500h)
- Yes
- No
- Consult factory
- No
- No
- No

#### Non-conductive (500h)
- Yes
- No
- Consult factory
- No
- No
- No

#### Non-conductive (1000h)
- Yes
- No
- Consult factory
- No
- No
- No
### Applications Key

**Infrastructure Applications:** Braking Systems | Detection, Measurement and Control | Diagnostics | Fire Wall | Level Crossing | Lighting | Location System | Wheel Slide Protection (WSP)

**Rolling Stock Applications:** Automatic Doors | Battery Chargers | Bogies | Brake/Speed Sensors | Converters/Inverters | Data Communication | Driver’s Cabin | Under Car | Wipers

### Standards / Connector Specifications

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<td>15170</td>
<td>EN 61984 / UL 1977</td>
<td>UL 1977 / NFF 61030 (TFR)</td>
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<td>NASA</td>
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<td>SAE</td>
<td>AS85049/48 and AS85049/50</td>
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<td>CE</td>
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### RoHS and Reach
- Yes (depending on part)
- Yes
- Yes
- Yes
- Yes

### Number of Circuits
- 1 to 51
- 4 to 48
- 2 to 75
- 8 to 24
- 2 to 104

### Max. Operating Voltage
- Standard 48 Vdc, up to 500 V
- 250 Vac (THV: 500 V DC/AC)
- 250 Vac
- 250 Vac
- Up to 250 Vdc

### Max. Dielectric Withstanding Voltage
- 1000 V
- 2000 Vac (THV: 3500 Vac)
- 2000 Vac
- 1550 Vac
- 1250 Vac

### Max. Current Rating
- 250A
- 16A (signal); 30A (power)
- 13A
- 16A
- 7.5A for Signal; Up to 65A for Power

### Wire range AWG
- AWG 26 to AWG 0
- AWG 26 to AWG 12
- AWG 26 to AWG 14
- AWG 24 to AWG 16
- AWG 30 to AWG 8

### Wire Range mm²
- 0.35 to 50
- 0.14 to 2.5 (signal); 0.5 to 4.0 (power)
- 0.14 to 2.5
- 0.2 to 1.5
- 0.05 to 8.37

### Contact plating
- Tin / Gold / Silver
- Tin / Gold
- Tin / Gold
- Tin / Gold
- Tin / Gold

### Power and Signal Layouts
- Yes
- Yes
- No
- No
- Yes (Combo-D)

### Contact Size
- 0 to 16 Ø1.6 mm (size 16)
- Ø1.6 mm (size 16)
- Ø1.6 mm (size 16)
- 8 to 22

### Mating cycles (max.)
- 50
- 500
- 500
- 500
- 500

### Max. shock resistance (g’s)
- 30
- 50
- 50
- 50
- 50

### Max. vibration resistance
- -
- 100 m/s² at 10-500 Hz
- 100 m/s² at 10-500 Hz
- 100 m/s² at 10-500 Hz
- 20 gₚ, peak (depending on product sub-family)

### Mechanical coding
- Yes
- Yes
- Yes
- Yes
- Yes
- Yes

### Type of coupling
- Bayonet
- Bayonet
- Snap Lock
- Snap Lock
- None (Require Locking/ Coupling Hardware)

### Temperature range
- -40°C to +140°C
- -55°C to 105°C (THV up to 125°C)
- -55°C to +105°C
- -55°C to +105°C
- -55°C to +125°C (+175°C For Specials)

### IP rating
- IP69k
- Up to IP67
- IP20
- IP69k
- Up to IP67 (Grommet-D & Environmental-D)

### Individual wire sealing
- Yes
- Yes (grommet)
- No
- Yes (grommet)
- Available on Select Products

### Cable jacket sealing
- Yes
- Yes
- No
- Yes
- Available on Select Backshells/ Hoods

### Shell Material
- Plastic
- Zinc Alloy (TNM, THV)
- No
- -
- Steel, Copper Alloy, Aluminum & Stainless Steel

### Insert material
- Plastic
- Thermoplastic
- Zinc Alloy (TM)
- Thermoplastic
- Thermoplastic

### Conductive (200h)
- No
- No
- No
- No
- No

### Conductive (500h)
- No
- No
- No
- No
- No

### Non-conductive (500h)
- No
- No
- No
- No
- No

### Non-conductive (1000h)
- No
- No
- No
- No
- No
## CUSTOM PRODUCTS

### CIR FIBER OPTIC POWER PLATES HTB JUNCTION BOXES JUMPER CABLES FRCIR STAINLESS STEEL FRCIR MARINE BRONZE VA900

<table>
<thead>
<tr>
<th>APPLICATIONS</th>
<th>CIR FIBER OPTIC</th>
<th>POWER PLATES</th>
<th>HTB</th>
<th>JUNCTION BOXES</th>
<th>JUMPER CABLES</th>
<th>FRCIR STAINLESS STEEL</th>
<th>FRCIR MARINE BRONZE</th>
<th>VA900</th>
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<tbody>
<tr>
<td>Standards / Connector Specifications</td>
<td>VG95234 / MIL-DTL-5015 (where applicable)</td>
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<td>VG95234 / MIL-DTL-5015 (where applicable)</td>
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<td>Fire &amp; Smoke standards</td>
<td>UL 94 V0</td>
<td>NFF 16-101/102</td>
<td>ISO 834 -1 / IEC 300</td>
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<td>EN 45545-2 NFPA 130</td>
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<td>RoHS and Reach</td>
<td>Yes/No (depending on plating)</td>
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<tr>
<td>Number of Circuits</td>
<td>2 to 12</td>
<td>2 to 4 poles</td>
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<td>Max. Operating Voltage</td>
<td>n/a</td>
<td>Consult factory</td>
<td>900 Vdc to 1250 Vdc</td>
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<td>4200 Vdc to 3000 Vac</td>
<td>4200 Vdc to 3000 Vac</td>
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<td>Max. Dielectric Withstanding Voltage</td>
<td>n/a</td>
<td>9.6kV</td>
<td>2800 Vdc</td>
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<td>Max. Current Rating</td>
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<td>EMR/RFI shielding</td>
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<td>Gold</td>
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<td>Wire range AWG</td>
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<td>AWG 12</td>
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<td>AWG 26 to AWG 4/0</td>
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<td>Wire Range mm²</td>
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<td>2.5</td>
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<td>20 to 4/0</td>
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<td>500</td>
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<td>2000</td>
<td>50</td>
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<td>50</td>
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<td>Max. shock resistance (g/s)</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
<td>50</td>
<td>50</td>
<td>50</td>
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<td>Max. vibration resistance</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
<td>20g - 10g up to 2000Hz</td>
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<tr>
<td>Mechanical coding</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>n/a</td>
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<tr>
<td>Type of coupling</td>
<td>Bayonet / Thread</td>
<td>Screw or Latching</td>
<td>Bayonet</td>
<td>Bayonet</td>
<td>Bayonet</td>
<td>Bayonet</td>
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<tr>
<td>Temperature range</td>
<td>-40°C to +100°C</td>
<td>-40°C to +100°C</td>
<td>-55°C to +180°C (880°C for 30')</td>
<td>-40°C to +125°C</td>
<td>-40°C to +125°C</td>
<td>-40°C to +100°C</td>
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<td>IP67 (mated condition with appropriate accessories)</td>
<td>IP67 (mated condition with appropriate accessories)</td>
<td>IP67 (mated condition with appropriate accessories)</td>
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<td>No</td>
<td>No</td>
<td>n/a</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>n/a</td>
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<tr>
<td>Cable jacket sealing</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Shell Material</td>
<td>Aluminum</td>
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<td>Stainless steel</td>
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<td>Marine Bronze</td>
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<tr>
<td>Insert material</td>
<td>Thermoplastic / Metal</td>
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<td>Ceramic (grommet silicone)</td>
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<td>Flame retardant rubber</td>
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<tr>
<td>Conductive (200h)</td>
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<td>Yes</td>
<td>No</td>
<td>n/a</td>
<td>No</td>
<td>No</td>
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<td>n/a</td>
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<td>Conductive (500h)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>n/a</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>n/a</td>
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<tr>
<td>Non-conductive (500h)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>n/a</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Non-conductive (1000h)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>n/a</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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</tr>
</tbody>
</table>

**APPLICATIONS KEY**

- **INFRASTRUCTURE APPLICATIONS:**
  - Braking Systems
  - Detection, Measurement and Control
  - Diagnostics
  - Fire Wall
  - Level Crossing
  - Lighting
  - Location Systems
  - Passenger Onboard Utility Connections
  - RCE Cabinets (Event Tracker Record)

- **SAFETY APPLICATIONS:**
  - Safety
  - Station Platform Information System

- **VIDEO SURVEILLANCE APPLICATIONS:**
  - Video Surveillance

- **WARNING SYSTEMS APPLICATIONS:**
  - Warning Systems

- **ROIL APPLICATIONS:**
  - Wheel Slide Protection (WSP)

- **ROLLING STOCK APPLICATIONS:**
  - Automatic Doors
  - Battery Chargers
  - Bogies
  - Brake/Speed Sensors
  - Converters/Inverters
  - Data Communication
  - Driver’s Cabin
  - Electric Couplers
  - HVAC
  - Intervehicle
  - Pantograph
  - Power Distribution
  - Seats
  - Signaling
  - Switches
  - Traction Motors
  - Train Control
  - Toilets
  - WC

- **Passenger Onboard Utility Connections
- RCE Cabinets (Event Tracker Record)
- Safety
- Station Platform Information System
- Video Surveillance
- Warning Systems
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