



ITT

Interconnect Solutions
Cannon, VEAM, BIW

Ensuring safe, fast, and reliable
passenger transit in over
100,000 trains
for nearly
half a century



Engineered for life

SAFETY

INNOVATION

100% RELIABILITY



WE UNDERSTAND RAIL

- Ensuring passenger safety on over 1,000 rail cars by delivering detailed information to rail technicians
- Improving rail safety by deploying complex integrated solutions to mass transit rail car designers
- Qualified on over 250 rail programs without a single failure
- Delivering over 1 million interconnects without a single field failure
- Ensuring uninterrupted Internet communications for over 1 million customer users
- Assuring 100% reliability on high speed trains traveling over 300 miles an hour
- Providing customer comfort through HVAC (Heating, ventilation, and air conditioning systems)
- Ensuring 100% reliability on navigational equipment through custom interconnects



ALMOST 50 YEARS OF INNOVATION

ITT's technology innovation has driven over \$10 Million in cost savings for our strategic rail partners. The reliability of the VEAM FRCIR Series and VBN Series has been field proven, over 45 years without a single failure.

Our Interconnect Solutions has supplied over 1 million mass transit interconnects without a single failure while reducing our lead times by over 25% through SMI programs.

ITT's Mass transit customers dramatically accelerate implementation of leading edge interconnect technology allowing them to create new industry standards. ITT VEAM has been a pioneer in the rail industry with regard to product developments that has resulted in the use of flame retardant insulator materials, the mix of power and signal lines within a single robust connector as well as rigid insert circular connectors according to NF F 61030 that are field configurable and allow for easy and quick harnessing.

More recently high temperature connectors meeting new European standards CEN/TS 45545 for fire rail safety regulations and shielded solutions for data transmission bundling Ethernet and MBV lines in one connector have also been developed to solve complex customer requirements.

In addition to RoHS compliant versions, modifications to standard products and complete customized interconnects can be designed by ITT Engineering in collaboration with our customer's Engineers to develop highly reliable and cost effective solutions for mass transit applications.

"What if you could reach the most lucrative markets with innovative products ahead of any competitor?"

We are positioned to exceed your expectations in the area's of physical and wireless interconnect solutions of definitive financial and technical value.

What if you could realize enhanced and unique functionality and features such as "smart couplers" with integrated interconnectors?

Our Mass Transit customers dramatically accelerate implementation of leading edge interconnect technology allowing them to create new industry standards, increased reliability, and continued market leadership through ITT Interconnect Solutions innovations.

What if you could realize decreased product variability across global manufacturing footprint?

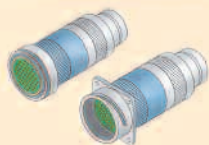
ITT Interconnect Solutions help Mass Transit customers to decrease costs and increase profitability through the elimination of downtime and scrap by implementing reliable innovative solutions and a global manufacturing footprint coupled with a robust supply chain.



TODAY & TOMORROW

Supporting the rich Cannon, VEAM, and BIW legacy, ITT Interconnect Solutions continues the realization of Interconnect Science with the development of exciting new products, driving unparalleled customer value.

Rail Products



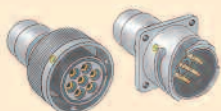
Ceramic Insulators Connectors



CIR-M12 Connectors



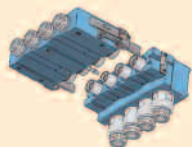
DSR Series Connectors



VBN Connectors



Rubber Covered Connectors



High Power Elbow Connectors



WCML Connectors



Traction Motor Box Connectors



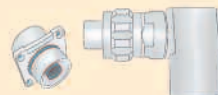
CIR Connectors



High Power Connectors



Distribution box



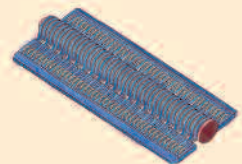
Power VIP Connectors



FRCIR Connectors



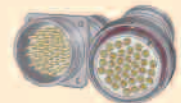
Smart Connectors



Wireless Power



Fiber Optic Connectors



High Temperature CIR Connectors



FRCIR290 Connectors

Today

- Innovative mating / coupling
- Material technologies
- Ceramic heat resistive inserts
- Super conductive copper alloys
- Coatings
- RoHS Powder Coating
- RoHS Zinc Cobalt (conductive)

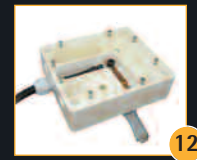
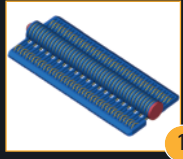
Tomorrow

- Driver and Security Systems
- Smart Material Connectors
- Wireless data transmission
- Electronic Ticketing, RF Signaling
- Braking system, primary and emergency back up
- Super Conductors
- Size & weight reductions, 50% increased amperage

Why innovative customers choose ITT

- Leading Edge Technology
- Product Reliability
- On time Products
- Elimination of Financial and Product Risk
- Industry Priced Products
- Technical Design Support
- Leading Edge Technology
- Industry Lead Times or Better

REALIZING THE RAIL INDUSTRY'S LEADING MULTI-



1. Wireless Power

- electronic devices including hand held devices, laptops, TV monitors

2. Under Car Connections

- Traction Motor connectors
- High power connectors
- Jumper cable connectors

3. High Temperature Connection

- Circular stainless steel connectors with ceramic insulators

4. Brake Systems

- FRCIR connectors
- Brake friction materials

5. Inter-vehicle

- High power connections
- Fiber optics
- Firewall connectors

6. Multipurpose Bayonet Circular Connectors

- Power connections
- Signal connections
- Fiber optics

7. Chevrons

- Primary spring

8. Suspension Dampers

- Primary vertical dampers
- Secondary vertical dampers
- Secondary horizontal dampers
- Yaw dampers

9. Data Bus Transmission

- Connectors for Data Bus applications
- Shielded signal connectors
- Connectors for diagnostics
- CIR M12 connectors

10. Bogies Tilting System Control

- WCML for Bogies
- Junction boxes
- Coupler line to connector

11. CresaCoat®

- Tribological Coated Fastening Elements
- Dry Environment friendly Lubrication
- >30% cost savings
- Defined and uniform lubrication

12. Distribution Box

FUNCTIONAL AND INNOVATIVE PRODUCT PORTFOLIO



1. Power Connection

- Inter-Car Connections and

2. Passenger Compartment

- Connectors for HVAC and passenger display systems
- Seat dampers and recliners
- Door actuator connectors and dampers
- Pumps and water systems

3. Ventilation

- HVAC Units

4. Seat Controls

- Seat dampers and recliners

5. Pumping System

- Connections to toilet pump and waste holding tanks

6. Electronic Connectors

- CIR290 for coupler
- Withstands high vibration and shock
- Excellent watertight seal

7. Bogies Tilting System Control

- WCML for Bogies
- Junction boxes
- Coupler line to connector

8. Jarret Shock Absorbers

- Elastomer cartridge for automatic coupler
- Semi-automatic coupler
- Permanent coupler
- Front & rear end protection

9. Conical Springs

- Primary suspension

10. Rotary Shock Absorbers

- Vertical and lateral applications

11. Traction Motor Box

- Splits incoming power for routing to each motor
- Power can enter from rear or side
- Each motor can be easily disconnected

12. Koni Shock Absorbers

- Vertical, lateral and yaw applications
- Inter-car damper
- Anti-roll damper

13. Air Springs

- Secondary suspension

14. Signal Connectors

- Signal connections for pantographs

15. Shock Absorbers and Air Springs

- Tilt and sway control for pantographs

DESIGN, DEVELOPMENT, MANUFACTURING AND TESTING

Offering the broadest selection of transportation interconnect solutions, ITT is the one stop source for design, development, manufacturing and testing.

ITT offers Cannon, VEAM, and BIW product lines designed specifically for transit applications. These product lines come in a large style of shell sizes and contact arrangements to meet the most demanding applications both electrical and optical. Inserts to meet low smoke/zero halogen and RoHS requirements are also available. ITT provides complete harnessing solutions and junction boxes.

As the industry leader in harsh environment interconnect applications, ITT's world class engineering teams will work directly with our customers to design and develop cost effective solutions for their applications. In many cases we may modify one of our standard designs to ensure a reliable solution where timing is critical.



CIR Series

The VEAM CIR Series is the most versatile electrical, optical and pneumatic multi-pin connector available today. These connectors were originally designed for the hostile environment of mass transit applications requiring nearly non-destructible connector performance systems.



FRCIR Series

These connectors provide the exact same versatility and hardware options as the VEAM CIR Series with the addition of flame retardant elastomeric components that are required in many rail program applications.



VBN Series

The VEAM VBN connectors are completely interchangeable with VG95234 and CIR Series reverse bayonet connectors with positive lock and quick disconnect coupling. The inserts are flame retardant UL94V-0 thermoplastic providing ease of contact insertion and extraction and are also sealed in a mated condition. These connectors conform to the mass transit specification NF F 61-030.



FRCIR290 Series

These connectors are used principally in heavy duty rail applications needing to withstand high vibration and shock while maintaining an excellent watertight seal. The FRCIR290 connector use crimp style contacts only with options available for high current carrying capability up to 1200 amps.



CIR M12 Databus

The CIR-M12 Databus is a reverse bayonet connector for data line transmission. This innovative connector incorporates the ITT ICS QXM12 contact arrangement to provide data transfer from Ethernet, MVB, WTB and Video lines according to VG95234 within a single connector. It is a cost effective solution for multiple shielding options in Mass Transit Network Systems.



Power VIP Connector

The Power VIP connector consists of a right angle plug and straight receptacle that are lightweight and offer considerable space savings over conventional interconnects for train current converters and power transmission applications. The Power VIP connector is rated to 700 amps and incorporates finger protection to guard against the risk of injury or electrical shock while allowing an operator to mate and unmate the connector quickly with a threaded coupling system.



High Temperature CIR Connectors

Made to comply with European standards CEN/TS 45545 governing railway fire safety, this version of VEAM CIR Series connectors using ceramic insulators and stainless steel shells can withstand temperatures up to 800° C for a period of 15 minutes minimum per the ISO 834-1 Heating Curve. Consequently, these connectors continue to be active while the train moves away from the site of an accident or fire allowing critical control signals to remain viable under emergency conditions.



DSR Series

The VEAM DSR Series connectors have a double start, ratcheted coupling system to prevent unmating under high shock and vibration conditions. The connectors have a durable hard anodize finish and a contrasting brightly colored stripe on the receptacle to provide visual indication when the connectors are fully mated.

WHY INNOVATIVE CUSTOMERS TRUST ITT

Technology

Our technology innovation has driven over \$10 million in cost savings for our strategic rail partners. The reliability of the VEAM CIR/FRCIR Series connectors have been field proven in over 45 years of field service.

Reliability

ITT Interconnect Solutions has supplied over 1 million mass transit interconnects without failure while reducing lead times by 25% through SMI programs.



Brake Systems

A manufacturer of rail braking systems in North America decided to use a stated "or equal" product to VEAM for a prime level car builder on a major transit program. The car builder recognizing the difference and not willing to compromise on safety sent the systems back demanding that the brakes be refitted with VEAM connectors.

Total Cost of Ownership

ITT Interconnect solutions assist Sub System Providers to decrease costs and increase profitability by the elimination of downtime through on time deliveries and reliable innovative interconnect solutions.

Partnership

Our Mass Transit customers dramatically accelerate implementation of leading edge interconnect technology allowing them to create new industry standards.



Toilets

On a rail project in Spain a car builder was sold connectors that were reported to be equivalent to VEAM CIR Series. After the cars were built it was found that the toilet systems did not work. Only after VEAM CIR connectors were rushed to replace the competition's product did the toilets function properly restoring sanitation and comfort for the rail passengers.

Commitment

ITT Interconnect Solutions help Mass Transit customers to decrease costs and increase profitability through the elimination of downtime and scrap by implementing reliable innovative solutions and a global manufacturing footprint coupled with a robust supply chain.



Data Transmission

A major railcar manufacturer required a solution for data transmission that could group multiple cables of Ethernet, Multifunction Vehicle Bus, Wire Train Bus and Video lines into the same connector. Based on positive past experience the customer turned to ITT to provide the solution. ITT answered the challenge with a new contact design to terminate four conductor shielded cables that can be grouped in a single connector accepting multiples of these cables.

HIGH SERVICE

ICS has the financial and operational strength to team into customer processes.

- Large scale global support
- Robust supply chain management
- Creative Logistics (Kan-Ban programs, lean mfg cells, distribution quick turn capability)
- On time delivery elimination of down time
- High quality levels eliminate customer down time and scrap



A HISTORICAL ACHIEVEMENT OF INNOVATION

Driving unrivaled Innovation since 1915, our company began as a small electrical specialty business in a backyard shed, originating the first "Cannon Plugs." Approaching nearly a century, our brands of Cannon, VEAM, BIW, and Sealectro continue to excite customers with differentiated connectors, interconnect systems, cable assemblies, I/O card kits, LAN components, advanced interconnect science applications, and highly engineered and innovative custom solutions. Global customers recognize our contributions as ubiquitous staples of the interconnect industry, a history seeded with many firsts.

Today, Interconnect Solutions proudly participates as part of ITT, a \$10.9 billion diversified high-technology, multi-industry, engineering and manufacturing company that serves customers in more than 50 countries. Our ICS business incorporates manufacturing and customer service on every continent and reflects our commitment to providing our customers with truly localized high service and support.

We strongly embrace ITT's core vision and value built upon the three pillars of Respect, Responsibility, and Integrity. And, we extend these principles into all facets of our business and interactions with our valued, global customers.



THINK ABOUT ITT

Reliability, Innovation, and Engineered Solutions, these terms collectively describe ITT Interconnect Solutions and define a legacy of Interconnect Science

spanning nearly a century, reflecting billions of quality products sold, and incorporating the three industry leading brands of Cannon, VEAM, and BIW. Our Innovation Timeline uniquely defines a historical compendium of interconnect leadership spanning over 90 years and including many industry firsts; Audio Connectors, Aviation Circularity, D-Sub's, Micro's, fiber optic assemblies, Zero Insertion Force Technologies, and other advanced applications of Interconnect Science. When collaborating with a technology leader, choose a participant with documented trust, established through multi-industry achievements as substantiated through the participation on every free world space mission, the creation of the first Mil / Spec interconnects, participation on the first talking movie, 100% reliability for over 45 years in Rail applications, and numerous additional achievements in major Military, Aerospace, Industrial, Medical, and Power markets. At ITT ICS, we truly are "Engineered for Life™."

Think about ITT.





ITT



Global Design & Manufacturing

Customer Support

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