

**TRANSPORTATION  
RAILWAYS**

**Traction & Transit**

**ELECTRICAL SOLUTIONS  
FOR METROS AND TRAMWAYS**



**MERSEN**



# HIGH QUALITY ENGINEERED SOLUTIONS

● Our solutions are based on over 120 years of experience gained in the field. Working worldwide in different countries, applications and environments, we know what works best and how to improve performance. We provide our customers with a complete range of solutions, each adapted to a specific need. Our strength is our experience, our knowledge and our ability to design state of the art solutions with the attention to detail in every step of the manufacturing process.

● Our solutions for traction and transit applications are carefully selected from high quality materials and are manufactured on cutting-edge equipments (CNC machines, broaching machines, computer aided measuring instruments, high precision microscopes...). These solutions benefit from high precision assembly and respect the international standards (IEC, NEMA, ASTM, SAE, DIN, CENELEC). We test our solutions for optimum performance in a variety of load and environmental conditions, thus helping our customers to reduce their maintenance costs. We have the knowledge to optimise existing designs or to re-engineer the design to provide the necessary solution.



**Mersen's EcoDesign 3<sup>rd</sup> Rail Shoe was awarded the Innovation Trophy at the SIFER 2013 railway show.**



Mersen is a global Expert in electrical specialties and graphite-based materials.

## Our markets:

- **Energy:** • Wind • Hydro • Photovoltaic • Nuclear Power • Conventional Thermal Power • Oil & Gas
- **Transportation:** • Railways • Aerospace & Aeronautics • Ports & Marine • Electrical Vehicles
- **Electronics:** • Polysilicon • Power Electronics • Semiconductors • Compound Semiconductors • Optical Fiber Production
- **Chemicals & Pharmaceuticals:** • Organic Chemicals • Inorganic Chemicals • Fine Chemicals & Pharmaceuticals
- **Process industries:** • Metallurgy • Mining • Oil & Gas • Cement • Pulp & Paper • Rubber & Plastic  
• Water & Wastewater Treatment • Assembly Manufacturing • Mould Industry • Glass Industry • Sintering  
• Furnace Industry
- **Other Markets:** • Commercial • Residential • Data Communication • Elevators • Forklifts



# MERSEN



## FOCUS ON

### Pantograph strips for Citadis tramways (Alstom)

- Average lifetime between 80 and 120,000 km
- Weight gain (2.74 kg / strip)
- Easy on the pantograph system
- 2 types: Main pantograph strip and Frost resistant strip
- Quality control in accordance with EN50405 (Cenelec)

## A world leader committed to support the traction and transit networks

● A world leading supplier of power and signal transmission solutions, Mersen offers its customers intelligent solutions designed to meet the specific needs of the traction and transit networks.

We supply solutions for all types of rolling stock, from electric and diesel locomotives for freight and passenger use, electrical multiple units and light rail vehicles, to the metro and tramway systems. We provide our customers, OEMs, operators, maintenance and repair specialists with high quality engineered solutions tailored to meet extreme operating conditions (climate, heavy loads, light load, vibrations, terrain, line conditions...). All our solutions are designed and tested for reliability and optimum performance.

## Expertise, Knowledge and Experience

● We have been working with electrical rotating machinery and current collection systems for over 120 years and our customers recognise Mersen as the global partner for railway solutions. They know that we supply solutions that are controlled through the complete product life cycle (development, manufacture of materials, product design, quality control, distribution, technical expertise and training). We offer them reliable solutions and the benefit of our extensive knowledge, years of experience and strong expertise.

## Solution-orientated approach and R&D policy

● We work in partnership with our suppliers to create the exact solution needed to improve the performance of our customers' applications. This solution-orientated approach drives our Research & Development facility and enables Mersen to provide innovative solutions. Our R&D teams are international and, combined with our comprehensive test facilities, work on a variety of themes for our sectors of activity, enabling us to meet today the market requirements of tomorrow.

## Services

● On the 5 continents, our engineers and technicians provide trainings and specific services to optimise the performance of traction and transit networks (on site services, diagnostics, technical support and technical seminars...).

## Quality and Environment

● Our 30 manufacturing facilities are registered to ISO quality and environmental standards. This ensures that we can provide our customers with manufacturing sites respecting environmental standards and implementing quality manufacturing processes.

## Sustainable development

● Here at Mersen we believe it is possible to bring together our company's interests whilst respecting environmental issues and social progress. For this reason we make sure that an environmental approach is adopted during the life cycle of every solution. As an example, we have developed lead free products for the traction and transit networks. With our EcoDesign 3<sup>rd</sup> rail shoe, we also moved one step further on the road to Eco-Responsibility.

# POWER SOLUTIONS & SERVICES FOR TRACTION & TRANSIT NETWORKS

## TRACTION MOTORS

- Carbon brushes
- Brush-holders

## AUXILIARY MOTORS (ventilators, compressors, blower motors)

- Carbon brushes
- Brush-holders
- Slip ring assemblies

## ALTERNATORS

- Carbon brushes
- Brush-holders
- Slip ring assemblies

## MAINTENANCE TOOLS

- CL-Profilor
- ComPro2000™
- DiaMeter
- Commutation Indicator
- Grinding stones
- Mica undercutters
- Dynamometers
- Stroboscopes
- Alarm boxes
- Roughness meters
- Grinders & accessories
- Saws
- Scrapers

## PANTOGRAPH CARBON STRIPS

- Carbon strips
- Application expertise

## THIRD RAIL SHOES

- Current collector devices
- Carbon shoes
- Application expertise

## FUSE BOXES

- Bogie mounting
- Top mounting

## & LIGHTNING ARRESTERS

- Indoor and outdoor use
- Insensitive to vibration
- On-board or fixed installation

## DISCONNECTORS & CHANGE-OVER SWITCHES

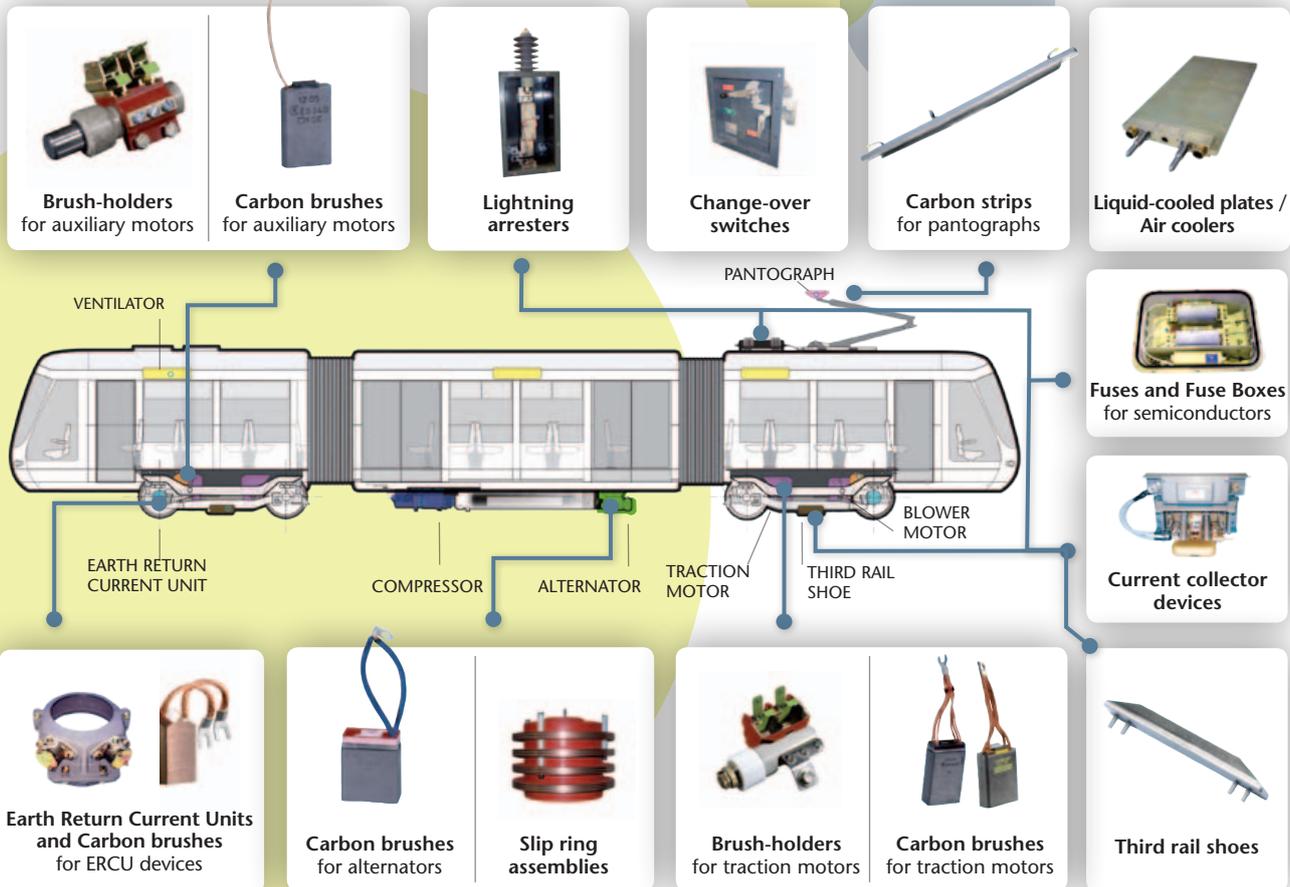
- Modular range
- Manual or motorized activation
- Rotary switches

## EARTH RETURN CURRENT UNITS

- ERCU devices (axial or radial)
- Carbon brushes
- Brush-holders

## MERSEN SERVICES

- In situ machining
- Diagnostics
- Technical support
- R&D expertise
- Re-engineering
- Training



## CARBON BRUSHES

- Carbon grades specially developed for main traction motors, auxiliary motors
- Earth Return Current Units for radial and axle end applications
- Lead free brushes available
- A full range of materials: graphite, copper
- Good mechanical stability
- Low friction coefficient
- High transient current density
- Wide speed range (15 to 55 m/s)
- High quality tamping
- Optimised cable dimensions
- Specific design

## BRUSH-HOLDERS

- A full range of materials: non-ferrous alloys, anti-corrosion...
- Moulded
- Fitted with independent pressure systems (constant force or clock spring)
- Single or multiple pockets
- Complete brush-holders and rocker rings
- Customised designs
- Cutting-edge equipment and software (CNC machines, broaching machines)
- Spark eroding technologies
- Die casting
- High-precision inspection instruments (three-dimensional CMM...)
- International standards (ISO 9001, IEC, NEMA, DIN)
- New designs, refurbishing existing designs, re-engineering design solutions

## SLIP RING ASSEMBLIES

- Full range of materials: non-ferrous alloys, stainless steel, dielectric materials...
- Customised designs
- Cutting-edge equipment and software (CNC machines...)
- Reinforced plastic injection moulding
- Finished product compliance: dielectric testing
- International standards (ISO 9001, IEC, NEMA, ASTM, SAE, DIN)

## CURRENT COLLECTION

- Wide range of pantograph carbon strips
- Extruded or machined carbon
- Plain carbon or impregnated with metal (copper), ALL LEAD FREE
- Sheaths in aluminium or copper
- Fitted, soldered or bonded
- Integral end horn designs available
- Complete offer with Auto Drop Detection device for fault detection
- Kasperowski design (Copper clad) contact strips
- Self-lubricating ability
- Third rail shoes plain or metalised carbons soldered to steel sheaths
- Third rail shoes with metal nose pieces
- Third rail shoes with carbons inserts cast into bronze carriers
- EcoDesign third rail shoes
- CENELEC standards

## SAFETY & RELIABILITY SOLUTIONS

- High expertise level
- Products designed to meet your standards
- Thousands of local sales representatives and distributors around the globe
- Experienced and attentive customer service

## FOCUS ON



### EcoDesign 3<sup>rd</sup> Rail Shoe

- Dismantle and recycle system
- Replacement of the carbon wear strip only
- Eradicates the need for lead brazing
- No more corrosion of the carrier and bolts
- Excellent resistance to shock, vibrations and mechanical stress
- Uniform current distribution within the shoe

## FOCUS ON

### Brush-holder for traction

- Modular construction
- Full holder design service
- Brush-holders for traction motors, auxiliary motors, generators, earth return current units etc.
- Clock spring and constant force springs available
- Holder conversion
- Re-design of existing holders
- Brush-holder repair and refurbishment available
- Re-engineered design solutions





Electrical Solutions for Motors & Generators  
[www.mersen.com/en](http://www.mersen.com/en)

Safety & Reliability of Electrical power  
[www.ep.mersen.com](http://www.ep.mersen.com)

### A GLOBAL PLAYER

Global Expert in electrical specialties and graphite-based materials, Mersen designs innovative solutions to address its clients' specific needs to enable

them to optimize their manufacturing process in sectors such as energy, transportation, electronics, chemical, pharmaceutical and process industries.

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