

**TRANSPORTATION
RAILWAYS**

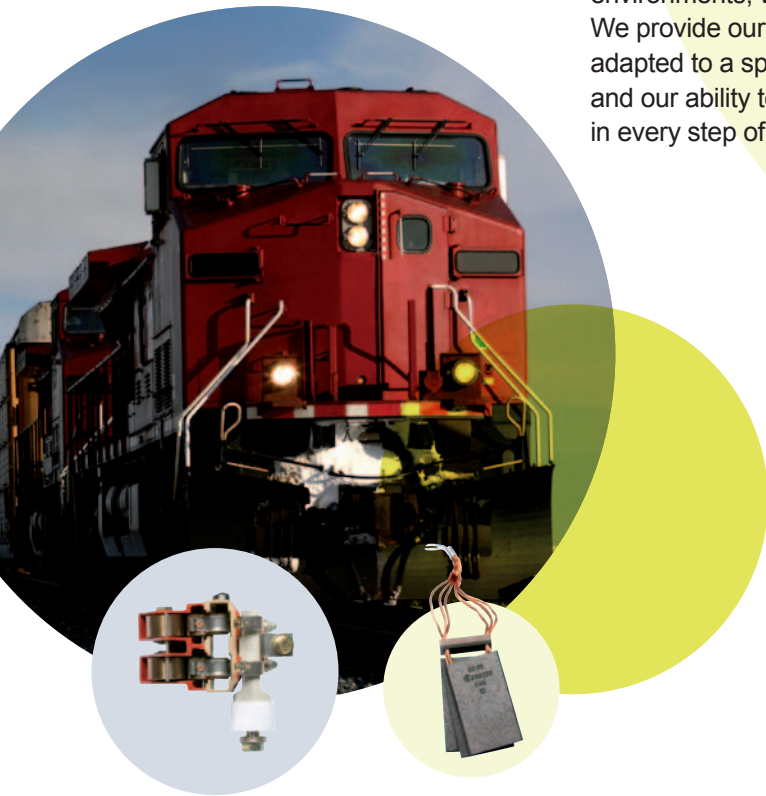
Traction & Transit

**ELECTRICAL SOLUTIONS
FOR DIESEL LOCOMOTIVES**



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 contributed to the world rail speed record set at 574.8 km/h on April 3rd 2007, in France.

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



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 pantograph strip, 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

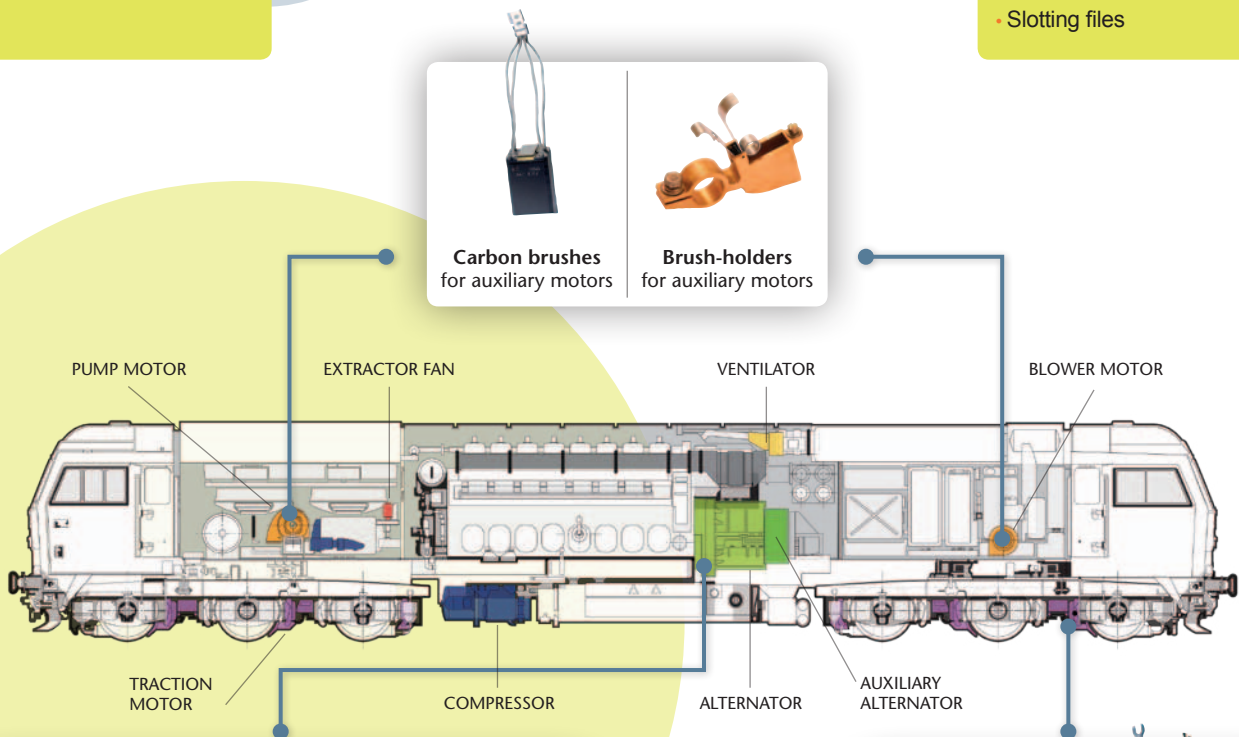
- Carbon brushes
- Brush-holders
- Slip ring assemblies

MAINTENANCE TOOLS

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

MERSEN SERVICES

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



Carbon brushes for auxiliary motors

Brush-holders for auxiliary motors

Carbon brushes for alternators

Brush-holders for generators/alternators

Slip ring assemblies

Brush-holders for traction motors

Carbon brushes for traction motors

CARBON BRUSHES

- Carbon grades specially developed for main traction motors, auxiliary motors
- 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

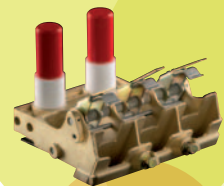
SLIP RING ASSEMBLIES

- 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)

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





www.mersen.com/en

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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