

ENERGY WIND POWER

SOLUTIONS FOR

- POWER AND SIGNAL TRANSFER
- ELECTRICAL PROTECTION



MERSEN



MERSEN



A world leader committed to Renewable Energies

● A world leading supplier of solutions for electrical protection, power and signal transfer, Mersen contributes to the development of renewable and greener energy sources. We provide wind turbine OEMs, generator manufacturers, wind farm operators, maintenance and repair specialists with high quality engineered solutions tailored to various operating conditions (temperature, salinity, humidity...), designed and tested for reliability and optimum performance.

Expertise, Knowledge and Experience

● Our company has been working with electrical rotating machinery for more than 100 years and serves as a global partner for wind turbines solutions. Customers turn to Mersen for complete solutions throughout the product life cycle (development, manufacture of materials, product design, quality control, distribution, technical expertise and training). Discover the might of Mersen: extensive knowledge, years of experience, global reach, and strong expertise in the wind power industry.

Solution-orientated approach and R&D policy

● We partner with suppliers to create the solution needed to improve the performance of our customers' applications. This solution-orientated approach drives our Research & Development department and enables us to provide innovative solutions. Our comprehensive test facilities enable our international R&D teams to work on a wide range of subjects, allowing us to meet today the market requirements of tomorrow.

Windtracker™ services

● In order to support wind farm operators, Mersen created a Windtracker™ Team. The Windtrackers, dedicated wind engineers and technicians, bring you up tower services, diagnostics capabilities, specific technical support and training, allowing you to optimize your wind turbine performance. They are supported by a large network of specialists in 5 continents, allowing us to respond to the needs of our customers, wherever they are located.

Quality and Environment

● Our 56 manufacturing facilities are registered to ISO quality and environmental standards. This offers our customers peace of mind, knowing that the products we provide meet the highest quality manufacturing processes and respect rigorous environmental standards.

Sustainable development

● Here at Mersen, we believe it is possible to bring together our company's interests while 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 carbon grades. We have also implemented comprehensive carbon brush recycling programs for wind farm operators.





CARBON BRUSHES

- Carbon grades specially developed for wind turbines
- Lead free brushes available
- Selected materials: graphite, copper, silver...
- High electrical conductivity
- Good mechanical stability
- Low friction coefficient
- Low resistivity material
- High quality tamping
- Optimized cable dimensions
- Specific design
- Brush wear warning system

BRUSH-HOLDERS

- Wide range: metric & imperial systems
- Moulded
- Stamped for pitch & yaw motors
- Pressure system: wound or coil springs
- Single or multiple boxes
- Side attachment on arms
- Brush-holder attachment arms
- Brush wear warning systems
- Complete brush-holders & rocker rings
- Selected materials: non-ferrous alloys, anti-corrosion...
- Customized designs
- Die casting
- Stamping
- Reinforced plastic injection
- Metal guide rails

SLIP RING ASSEMBLIES

- Selected materials: non-ferrous alloys, stainless steel, dielectric materials...
- Customized designs
- Reinforced plastic injection
- Finished product compliance: balance, dielectric testing

SIGNAL TRANSFER SYSTEMS

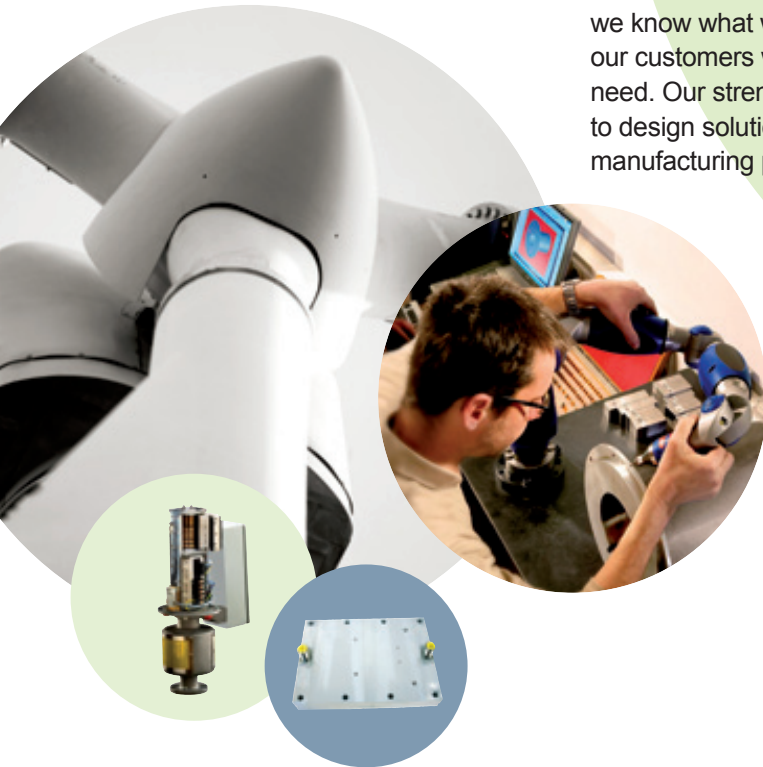
- Tribology: friction optimization
- Customized designs: fast connections
- Selected materials: non-ferrous alloys, precious metals, cables...
- Reinforced plastic injection
- Cast aluminium
- Proven technology
- 100% final inspection testing

HIGH QUALITY ENGINEERED SOLUTIONS

● Our solutions are based on over 100 years of experience gained in the field. Working in different countries, applications and environments, we know what works and how to improve performance. We provide our customers with a wide range of solutions, each adapted to a specific need. Our strength is our experience, our knowledge and our ability to design solutions with the attention to detail in every step of the manufacturing process.

● Our solutions for wind power are carefully selected from high quality materials and are manufactured on cutting-edge equipment (CNC machines, broaching machines, computer aided measuring instruments, high precision microscopes...). They benefit from high precision assembly and respect industrial 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 reengineer existing solutions and create new maintenance tools to improve the performance of wind equipment.



Mersen is a global Expert in materials and solutions for extreme environments as well as in the safety and reliability of electrical equipment.

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



SOLUTIONS & SERVICES FOR WIND POWER

POWER GENERATION

- Power & grounding carbon brushes
- Brush-holders
- Slip ring assemblies

COOLING OF POWER ELECTRONICS

- Cold plates
- Air cooled heatsinks

CIRCUIT PROTECTION (Nacelle, Tower base, Utility)

- Low voltage fuse & fusegear
- Medium voltage fuse & fusegear
- Semiconductor fuses
- Power distribution blocks

SURGE & LIGHTNING PROTECTION

- Carbon brushes
- Brush-holders
- Brush-holder arms
- Surge protection devices

WINDTRACKER™ SERVICES

- Up tower services
- Training
- Tools & measuring devices

PITCH CONTROL

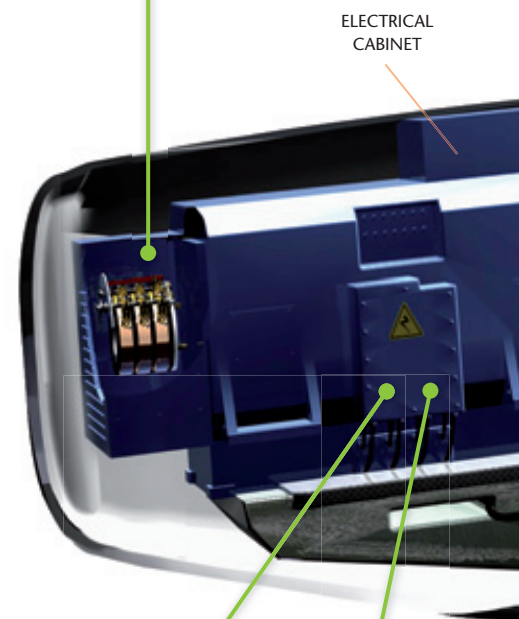
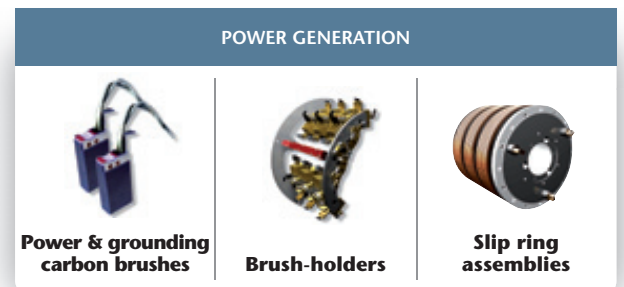
- Carbon brushes
- Brush-holders
- Brush-rocker assemblies for pitch motors

SIGNAL TRANSFER

- Signal transfer devices

POWER INTERCONNECTION (Tower base, Utility)

- High power switches
- DC switches



COOLING OF POWER ELECTRONICS



Cold plates

CIRCUIT PROTECTION



Fuse and fusegear



SURGE & LIGHTNING PROTECTION



**Carbon brushes
Brush-holders**



**Surge Protective
Devices (SPD)**

MAIN SHAFT

GEARBOX

YAW
MOTORS

SIGNAL TRANSFER



**Signal transfer
devices**

PITCH CONTROL



**Carbon brushes / Brush-holders
Brush-rocker assemblies
for pitch motors**



FUSE AND FUSEGEAR

- Largest range of fuse & fusegear to meet every major standard around the world
- Fuse blocks & holders
- Power distribution blocks
- All international standards
- Special purpose or standardized fuses
- Simplified maintenance & guaranteed delivery time

COOLING DEVICES

- All technologies available (air, liquid & phase change cooling)
- High internal pressure withstand
- High thermal performance
- Cooling simulation tools

SWITCHES

- DC & AC switches
- High current / Low voltage applications
- High voltage / Low current applications
- After sales services

SURGE PROTECTIVE DEVICES

- Offering true industry innovation: Mersen's SPD was the first to pass UL 1449 Third Edition testing using our own patented TPMOV Technology.
- Provides fail-safe protection by isolating the MOV at end of life
- Highest short circuit current rating (SCCR) available for any SPD, allowing for higher safety ratings and protection
- The only SPD on the market that eliminates the need for additional wiring and fuse components while reducing installation time

WINDTRACKER™ SERVICES

UP TOWER SERVICES

- Dedicated wind engineers & technicians
- Diagnostics capabilities
- Specific technical support
- Onshore & offshore

TRAINING

- Led by technical experts
- According to a defined curriculum or adapted to specific needs
- Transfer of skills
- At either our location or our clients'

TOOLS & MEASURING DEVICES

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



**FOCUS
ON**

CG626 copper graphite grade, the most popular wind brush grade

- Low friction coefficient
- Extended brush life
- Minimal dusting
- Cooler running
- Optimum performance in all environmental conditions
- No material expansion
- Can handle high current densities up to 16-18 A/cm²
- Speed capabilities up to 40 m/s
- Brush pressures of 18 - 20 kPa



**FOCUS
ON**

Signal Transfer System

- Extended life
- Gold plated contacts
- High resistance to oxidation
- Different types of data transfer: CAN BUS, ETHERNET, RS232, Power Ring....
- Top level quality control



A GLOBAL PLAYER

Global expert in materials and solutions for extreme environments as well as in the safety and reliability of electrical equipment, 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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