

ASTROL



Experts in
solid-state DC breakers





Astrol solid-state DC breakers

Ultra-fast protection for the next generation of DC power systems

From maritime electrification to railway traction systems, renewable energy microgrids, and high-power data centers, modern DC infrastructures demand a new level of protection.

Astrol develops and produces ultra-fast solid-state DC breakers that interrupt faults within microseconds, before dangerous current levels can develop.

With decades of expertise in advanced power electronics based solutions, such as solid-state breakers, switches and pulsed power solutions up to 100 kV, Astrol has become leading specialist in reliable, ultra-fast DC protection technology for various applications;

- Maritime DC grids
- Railway traction systems
- Data center DC architectures
- Renewable energy and microgrids
- Battery energy storage systems (BESS)
- Industrial DC distribution systems



Solid-state DC breakers for maritime applications



As the maritime industry moves toward electrification, hybrid propulsion, battery integration, and advanced DC power distribution systems, reliable DC protection has become essential. Astrol solid-state DC breakers are specifically designed to protect modern maritime DC grids against short circuits and power overloads within microseconds.

Unlike conventional mechanical breakers, Astrol's semiconductor-based technology detects and interrupts fault currents before dangerous energy levels can develop, protecting converters, propulsion drives, batteries, fuses, and other critical onboard systems.

Reliable and future-ready

Designed for operational lifetimes exceeding 15 years, Astrol DC breakers require virtually no maintenance and provide maximum system reliability for next-generation maritime power systems.

Scan the QR code to learn more about solid-state DC breakers



Designed for demanding marine environments

Ultra-fast protection for modern maritime DC grids.

- Short-circuit detection within 2 μ s
- Total fault clearance within 10 – 21 μ s
- Nominal current ratings from 350 A up to 5 kA
- Nominal voltages up to 1.5 kV DC
- Maintenance-free operation
- Modular and scalable design
- Bidirectional current capability
- All breakers are marine type approved by DNV, Lloyd's Register, RINA, and CCS for marine applications.



Advanced protection for modern DC architectures

Modern maritime DC grids now use closed-bus and ring-based system topologies where fault currents can flow bidirectionally. Astrol solid-state DC breakers use advanced communication-based coordination and optical communication links to ensure selective fault isolation, disconnecting only the affected section while keeping healthy zones operational.



Scan the QR code to learn more about zone protection



High-performance protection for next-generation AI datacenter architectures

Modern data centers are transitioning toward DC-based power distribution to improve efficiency, scalability, and integration of renewable energy and battery storage systems. Astrol solid-state DC breakers are specifically designed to protect these advanced power systems with ultra-fast interruption, high reliability, and seamless integration.

Astrol solid-state DC breakers are engineered for:

- 400V, 800V and 1500V DC architectures
- Nominal currents up to 7.5 kA
- Battery energy storage system (BESS) integration
- Data center DC distribution systems
- Bus-tie protection between SSTs
- Battery energy storage protection
- Feeder and branch circuit protection
- High-power rectifier and inverter interfaces



Key benefits

- Ultra-fast fault interruption within microseconds
- Enhanced system selectivity
- Maximum uptime and operational continuity
- Modular and scalable platform

Reliable protection for critical applications

Fast switching and precise fault isolation ensure that only the affected section of the network is disconnected, maximizing data center uptime and operational reliability.

Astrol solid-state DC breakers provide a future-ready protection solution for next-generation high-performance data center infrastructures.



Advanced protection for modern railway traction systems

As railway systems adopt increasingly advanced semiconductor technologies such as IGBTs and SiC MOSFETs, conventional protection devices struggle to keep pace with modern DC traction requirements. Our DC breakers provide the speed, selectivity, and reliability required for next-generation railway infrastructures.

Key challenges in modern traction networks

- High-frequency transients
- DC arc persistence
- Bidirectional regenerative currents
- Complex multi-converter architectures
- EMI and harmonics

Why solid-state protection matters

- Ultra-fast fault isolation
- Real selectivity
- Bidirectional current capability
- Improved system stability
- Reduced maintenance
- Enhanced operational reliability

Applications examples

- Traction substations
- Onboard converter protection
- Feeder protection
- DC bus protection

About Astrol

Technology leader in pulsed power switches and solid-state circuit breakers

Astrol is a Switzerland based innovator and manufacturer of state-of-the-art power control and switching solutions. We design and produce electronic parts for technical high demanding industries such as medical, energy distribution and pulsed power applications since 1996. In our 30-year history we have developed from a designer of custom-built electronics to a technology leader in pulsed power switches and solid-state circuit breakers. Astrol offers a wide range of products and has a world-wide customer base consisting of system integrators, operating companies and research institutes.

Our main focus lies on power switching in the medium voltage range, from optimized gate drive units to fully integrated solutions up to 100kV. Our products are designed, manufactured and tested in our production location and high voltage test laboratory in Othmarsingen and therefore can withstand harsh environments, extended temperatures and have a long lifetime.

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