TRACTION
POWER
SYSTEMS

Sécheron

ENGINEERING SERVICES

Network expertise

GENERAL INFORMATION

In the field of DC transport systems, more than anywhere else, providing an adapted, efficient and safe product is fundamental. With millions of users daily, installations must have the highest standards of reliability and security.

Due to our long experience in the DC traction domain, Sécheron has developed an excellent knowledge and understanding of DC system design.

Today, Sécheron can offer a large range of services for DC traction network parametrisation and simulation in order to ensure the correct design and protection of the system.

It is essential to understand all the subsystems of a traction network such as the AC network interface, DC power supply substations, DC network and vehicles, and our engineering team has proven to be successful and effective in this.

Available for clients looking to establish or to improve existing equipment or services, Sécheron is able to apply its extensive professional experience to a variety of situations.

Our offer includes a wide range of services from dynamic network simulation to measurement on-site and in the laboratory, through various calculations and tests on transformer-rectifier sets and short-circuits.

We offer consulting expertise and are able to answer any questions you may have about DC traction network design and calculation.

MAIN BENEFITS

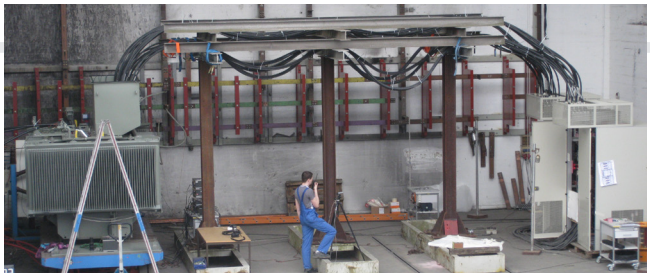
- Support for strategic decision analysis for railway infrastructure
- High knowledge for setting DC protection parameters
- Quick technical support and complex analysis assistance
- Advise the customer on the best technical solution

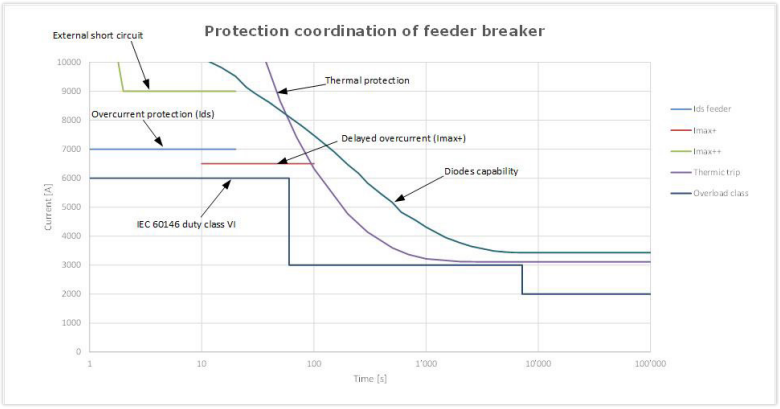
TRANSFORMER-RECTIFIER UNIT IN-LINE TEST

Sécheron has provided transformer-rectifier units for many years. Our experience in this domain has allowed us to develop specific software for the design of the transformer and rectifier more accurately and efficiently.

We are able to answer questions regarding transformer-rectifier units and their operation within the traction system.

Sécheron has a strong experience in leading combined tests of transformer-rectifier units according to IEC 62590, EN 50327 and IEEE 1653.2 standards in major test laboratories (CESI, IPH, KEMA and Powertech).





Protection coordination of a transformer-rectifier group

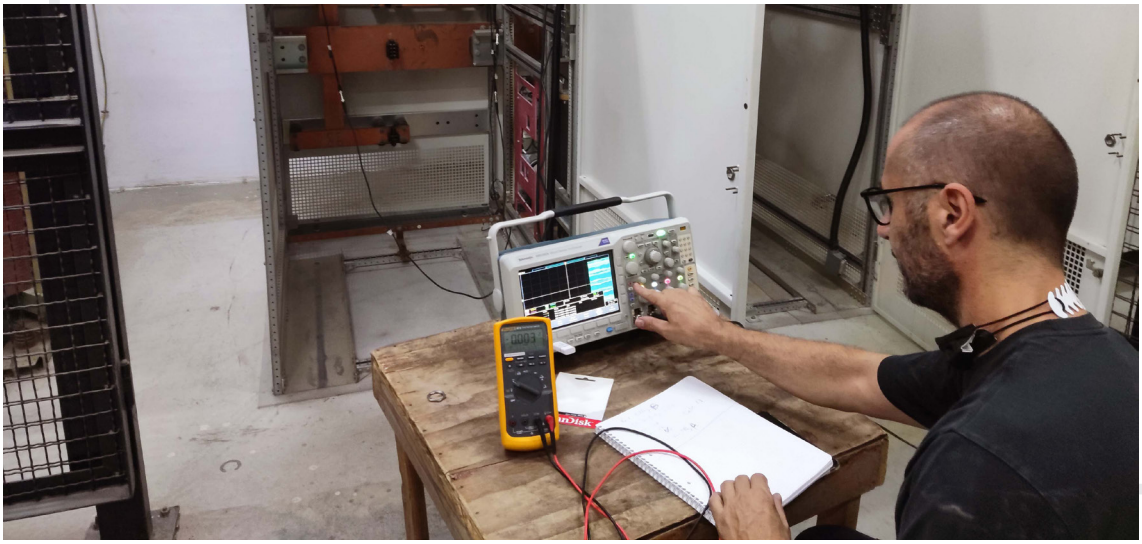
STANDARDS

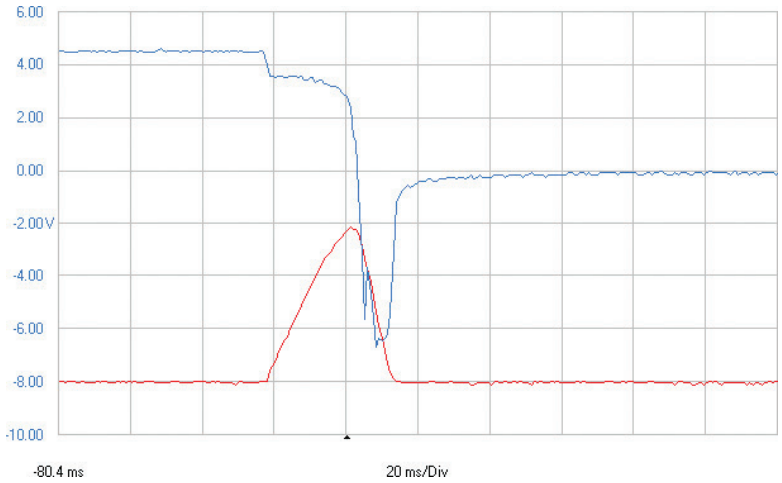
- **IEC 60076** | Power transformers
- **IEC 60146-1** | Semiconductor converters – General requirements and line commutated converters
- **IEC 62590 (EN 50328)** | Railway applications – Fixed installations – Electronic power converters for substations
- **EN 50327** | Railway applications – Fixed installations – Harmonisation of the rated values for converter groups and tests on converter groups
- **EN 50329** | Railway applications – Fixed installations – Traction transformers
- **EN 50388** | Railway Applications – Fixed installations and rolling stock – Technical criteria for the coordination between electric traction power supply systems and rolling stock to achieve interoperability
- **IEEE 519** | Standard for Harmonic Control in Electric Power Systems
- **IEEE 1653.2** | Uncontrolled Traction Power Rectifiers for Substation Applications Up to 1500 V DC Nominal Output
- **IEEE C57.12.01** | Standard for General Requirements for Dry-Type Distribution and Power Transformers

SHORT-CIRCUIT AND ON-SITE TESTS

Sécheron, as a supplier of DC high-speed circuit breakers, has acquired a strong experience in the domain of short-circuits.

Theoretical knowledge and calculations complemented by on-site and laboratory testing (CESI Milano, IPH Berlin, Powertech Vancouver or KEMA Philadelphia) satisfy the demands of major transit authorities worldwide in terms of protection solutions.





Field short-circuit test
Measurement of the voltage and the current during a short-circuit test

Refer to **Brochure ENGINEERING SERVICES / On-site support** · SG829380BEN

We are able to provide a **variety of services**:

- On-site short-circuit measuring in order to check the protection and their appropriate adjustment
- Short-circuit calculation in order to select the components in the electric distribution chain
- A complete study for the design and coordination of protection equipment (line fault di/dt, Imax, thermal, etc.)
- Communicate relevant information to the customer about the rectifier capability and to provide support regarding the AC protection functions settings

Field short-circuit test
using a short-circuiting device installed on a trolley

We are also able to provide **measurements and on-site tests**:

- Stray current calculation and measurement according to EN 50122-2 standard
- Train start measurement
- Load sharing with several transformer-rectifier units
- Harmonics calculation and measurement
- Earthing and bonding analysis
- Insulation measurement of ungrounded railway networks (specific applications such as trolleybus, monorail, etc.)
- Post-incident diagnosis

Stray current measurement

CONSULTING EXPERTISE

Network expertise is essential to accommodate future growth and expansion of the railway system.

Our consulting expertise helps identify areas where infrastructure investments are necessary and ensure seamless integration with existing infrastructure.

Sécheron's decades of experience, knowledge and understanding of DC system design allows us to offer a detailed consulting expertise.

We help the customer in the dimensioning of the equipment, in order to have the best solution according to the project needs and standards.

Consulting expertise is also available for customized projects according to customer specifications.

Sécheron's experts will ensure the smooth and secure operation of network systems by performing the following tasks:

Design and configuration

Design network architecture and arrangement to ensure efficient and reliable traction feeding system.

Network optimization

Analysing network performance metrics to identify areas of improvement.

Performance testing

Conducting performance tests on network infrastructure to assess its capacity, scalability, and overall performance.

Equipment set-up

Configuring DC traction system devices to establish safety and reliability.

Diagnostic

Diagnosing and resolving potential network issues to ensure optimal system performance.

Reporting

Creating documentation and reports related to network design, configuration performance and recommendations.

Dimensioning

Dimensioning of traction power equipment, including energy recovery systems.

TRANSFORMER RECTIFIER UNIT DESIGN

Sécheron can offer a proven expertise thanks to a long experience and high competencies in the transformer rectifier unit design.

We help the customer in the dimensioning of the equipment according to the project needs and applicable international standards, in order to propose the most adapted solution.

Sécheron can ensure the compatibility of the rectifier with an existing transformer in a substation or can reap the benefits of its expertise to help the customer choose the appropriate transformer.

Furthermore, in case the customer needs a turnkey solution, Sécheron is able to offer the complete conversion group.

Similarly, our engineering team can manage the interface between the rectifier and all substation equipment (DC switchgear, MV system, etc.), including existing ones.

Taking into account the customer's input data, Sécheron is committed to providing the most optimized solution in terms of quality, service life, size, ease of maintenance and competitive price.

Additionally, different studies can be carried out: harmonic calculation, power factor determination, voltage regulation, thermal losses and efficiency evaluation, reliability analysis, traction dynamic simulations, DC protection settings, etc.

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