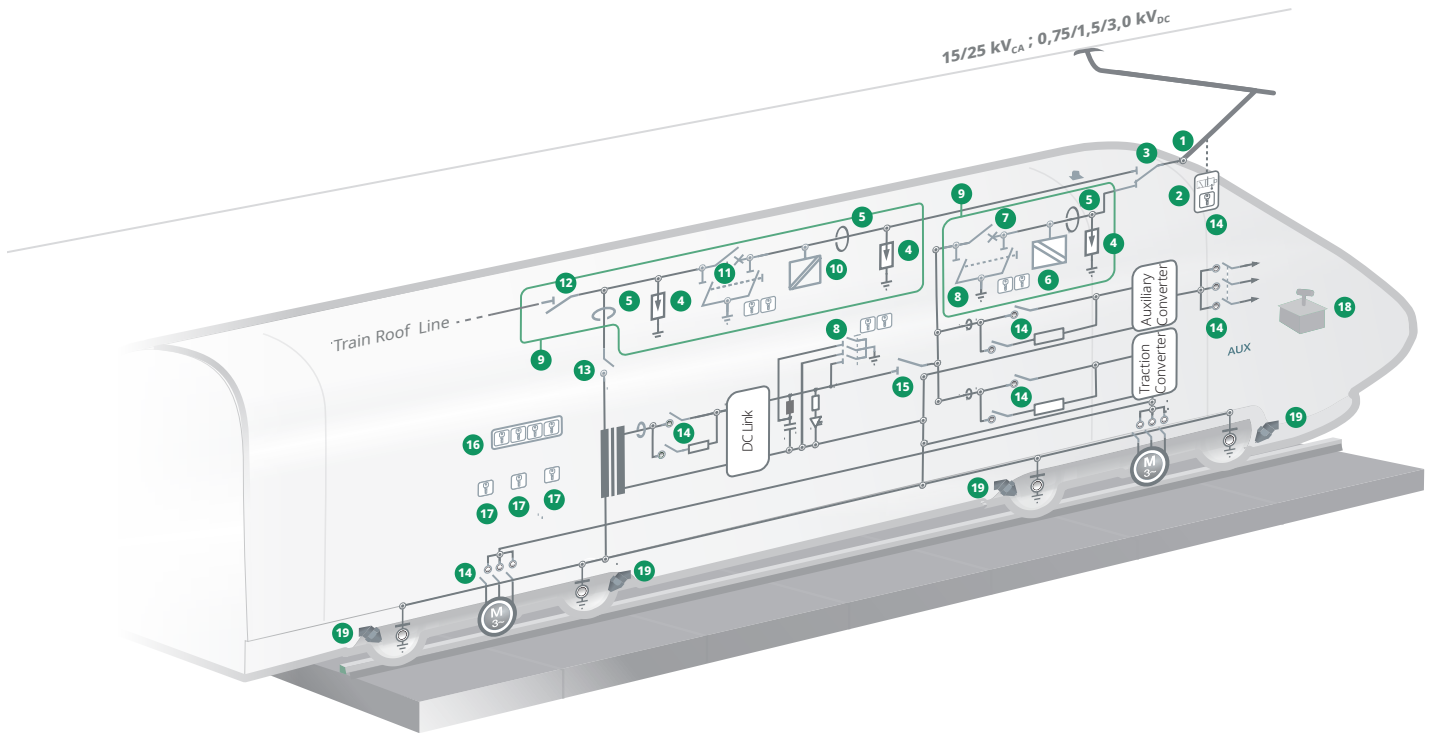


SUPPLY PROGRAM

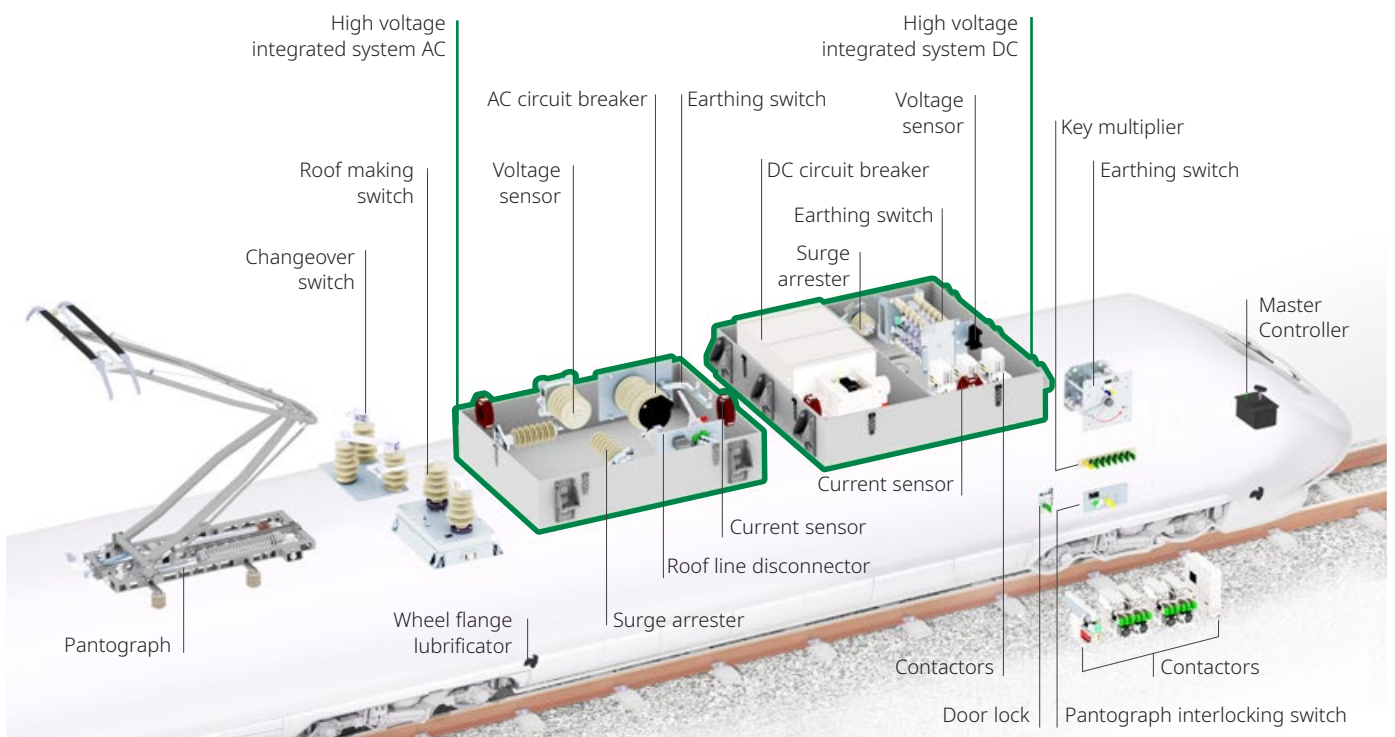
FOR RAIL TRANSPORTATION



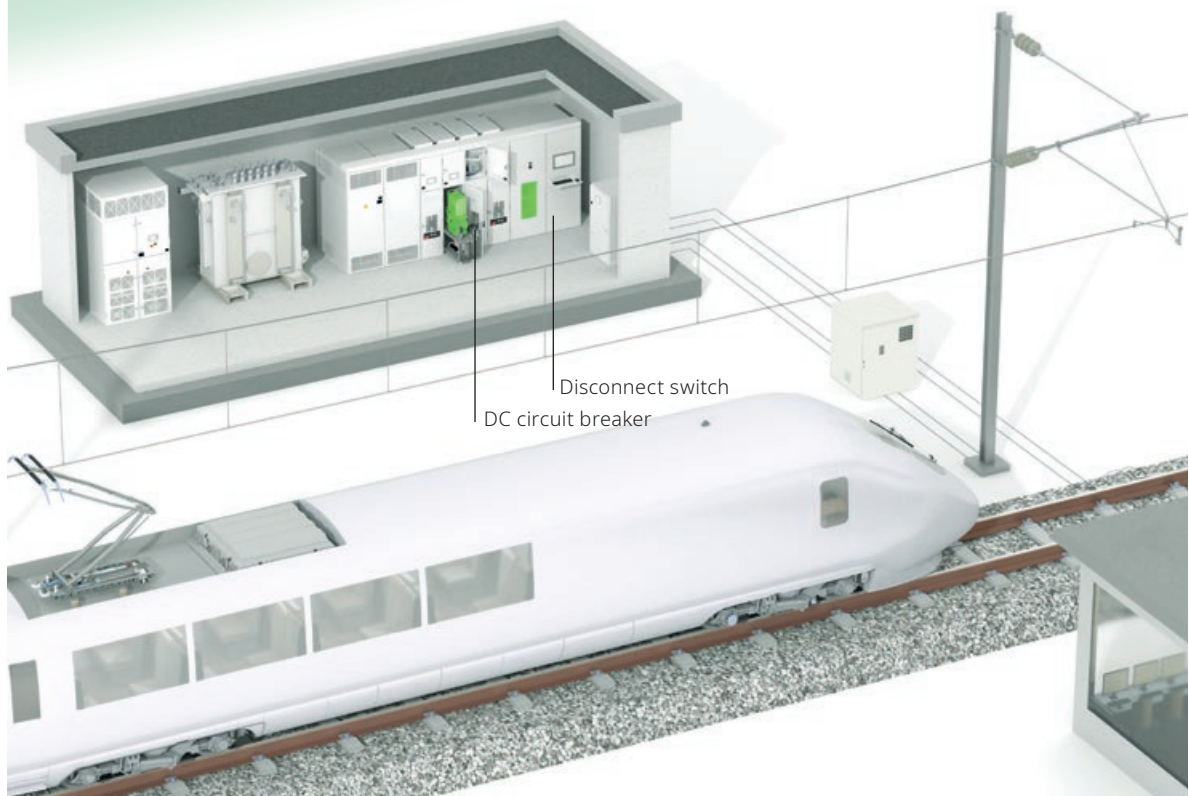
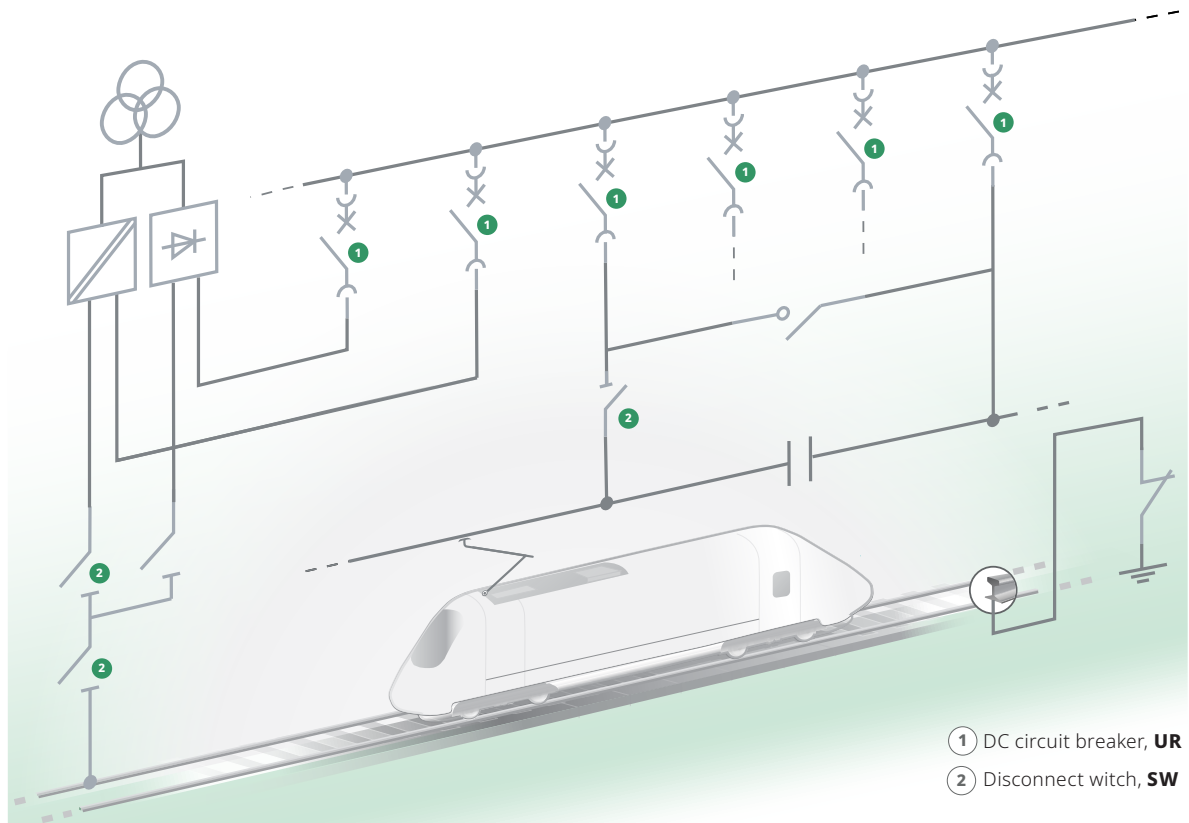
RAIL VEHICLES



- | | | |
|---|---|--|
| ① Pantograph, SPL | ⑧ Earthing switch, BTE03.04 | ⑮ Disconnecter, XMS |
| ② Pantograph interlocking switch, BSV, SLS | ⑨ High voltage integrated system, MODBOX® | ⑯ Key multiplier, KM |
| ③ Changeover switch, RS | ⑩ Voltage sensor AC, TMS | ⑰ Door lock, DL |
| ④ Surge arrester | ⑪ AC circuit breaker & earthing switch, MACS | ⑱ Master controller, MMC |
| ⑤ Current sensor | ⑫ Roof line disconnecter, RS | ⑲ Wheel flange lubricator, GB-G |
| ⑥ Voltage sensor DC | ⑬ Roof making switch, RS-M | |
| ⑦ DC circuit breaker, UR | ⑭ Contactors & modules, BMS, SEC, HS | |



DC TRACTION SUBSTATION



Supply program

Sécheron has a clear mission: to design and deliver the best in class solutions and services to our customers for the highest safety, protection and reliability of rolling stock and DC traction power substations.

For more than 135 years, Sécheron is a leading supplier of electrical and electronic safety related components and solutions for the global railway industry. We bring broad and deep knowledge of power transmission, electrical safety and voltage/current measurement for high-voltage electrical circuits.

We design and manufacture standard and custom AC and DC circuit breakers, switches, pantographs, voltage sensors, and other components. For car builders seeking high performance, reduced engineering work and easier vehicle manufacturing combined with lower maintenance, we also build complex subsystems integrating our own and third-party components in compact high-voltage enclosures that are convenient to ship and easy to install.

Decades of field experience coupled with profound technical expertise, allows our sales and customer application engineers to understand our customer's critical technical requirements and issues in depth to specify the right solutions based on our standard portfolio or designed in a customized way.

In order to be close to our customers we have built a worldwide network of sales forces and agencies in about 40 countries. Qualified and trained technical staff on site is ready to assist our customers quickly and efficiently throughout a project and during the full service life of the equipment.

Sécheron has become the standard on our markets, delivering solutions with unparalleled track records and helping to create value for our customers.



Rail vehicles

		Products	Pages
Integrated systems	High voltage DC or AC integrated systems	MODBOX®	5
DC circuit breakers	High speed DC circuit breakers	UR	6
AC circuit breakers	AC vacuum circuit breakers	MACS	8
Traction measurement systems	Voltage sensors	TMS	9
Contactors	AC/DC power and auxiliary contactors	BMS, SEC, HS	10
Current collectors	Pantographs for Trams & Light Rail Vehicles	SPL	11
Off-load switches	Roof switches	RS, IS	12
	Indoor disconnectors	XMS, BW	13,14
	Earthing switches & key interlocking devices	BTE, BSV, KM, DL	16
Other components	Master controllers	MMC, BSK	17
	Wheel flange lubricators	GB-G	18
Services	Project management, Engineering support, Documentation, After sales service, Sécheron original parts		19

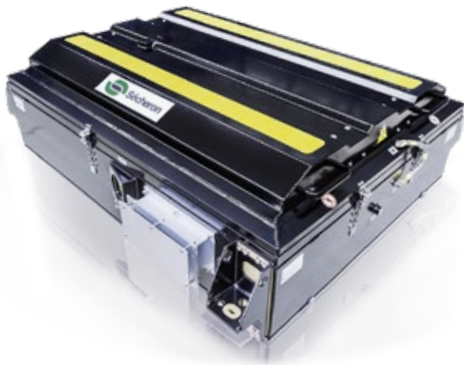


DC traction substations

DC circuit breakers	High speed DC circuit breakers	UR	7
Contactors	AC/DC power and auxiliary contactors	BMS, SEC, HS	10
Off load switches	Disconnectors	SW	15

MODBOX®

High voltage DC or AC integrated systems



Sécheron brings decades of experience designing and manufacturing electrical safety components and systems for the traction circuits powering trains, high-speed trains, locomotives, and EMUs on AC or DC rail networks.

Car builders seeking high performance, reduced engineering work and easier vehicle manufacturing combined with lower maintenance have placed their trust in our **MODBOX®** enclosure for thousands of rail vehicles running on 1.5 kV_{DC}, 3 kV_{DC} and 15 kV_{AC}, 25 kV_{AC} networks worldwide.

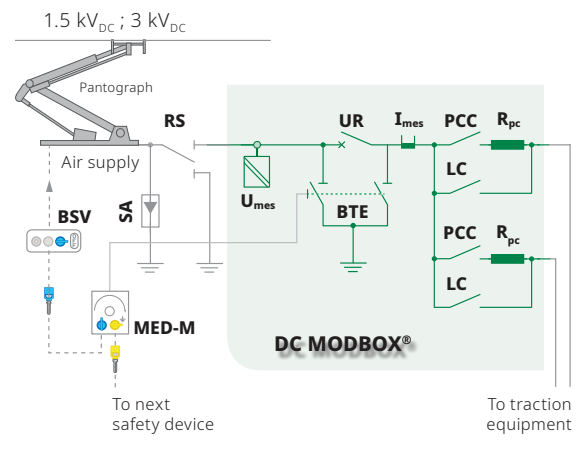
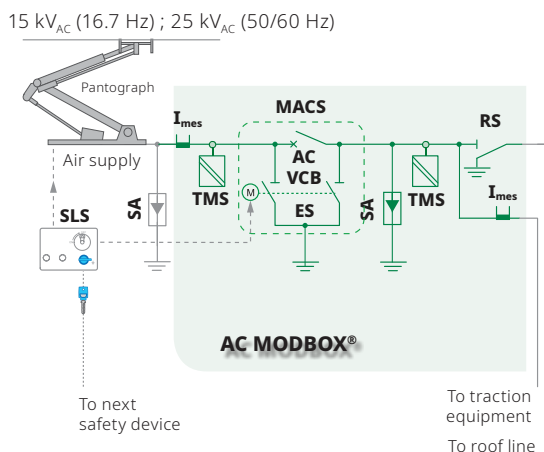
The Sécheron **MODBOX®** enclosure includes our AC or DC circuit breakers and various high- and low-voltage components. The compact, smart enclosure ensures safe and efficient integration of high-voltage components in vehicle roof, vehicle under-frame or vehicle indoor installations. Each **MODBOX®** is engineered and configured to meet the needs of your project, taking into account integrated functions and interfaces with the vehicle. We primarily use Sécheron components and can include other devices from best-in-class suppliers to provide you with a turnkey solution.



Brochure MODBOX

Typical examples

Application scheme for AC & DC networks



- SLS** : Safety Locking System
- SA** : Surge arrester
- I_{mes}** : Current measurement
- TMS** : AC voltage measurement
- MACS** : Main AC switch
- AC VCB** : AC vacuum circuit breaker
- ES** : Earthing switch

- RS** : Roof switch
- BSV** : Pantograph interlocking box
- SA** : Surge arrester
- RS** : Roof switch
- U_{mes}** : Voltage measurement
- UR** : High speed DC circuit breaker
- BTE** : Earthing switch

- MED-M** : Remote manual operation for BTE
- I_{mes}** : Current measurement
- PCC** : Precharging contactor
- LC** : Line contactor BMS
- R_{pc}** : Precharging resistor

UR

High speed DC circuit breakers for rail vehicles



 [Brochure UR10/UR15](#)
[Brochure UR26](#)

Sécheron possesses decades of experience designing and manufacturing high-voltage DC electrical safety components for the traction circuits powering DC rail vehicles of all kinds.

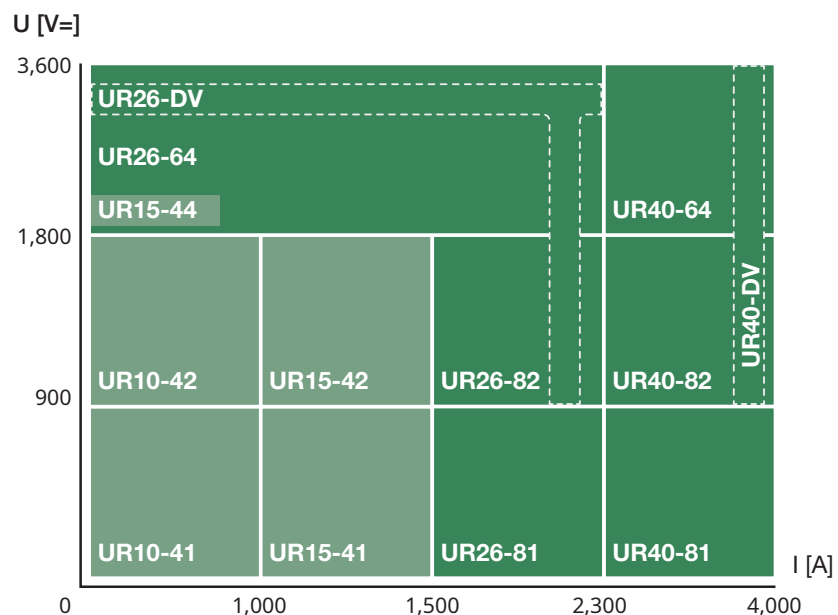
Our **UR** series DC circuit breakers are available in a broad range of configurations and with optional features to meet the needs of metro vehicles, Light Rail Vehicles (LRV), tramways, EMUs, trains (including high-speed trains) and locomotives.

Our products can be delivered as stand-alone components you can integrate into your own line breaker boxes and converters. For car builders seeking high performance, reduced engineering work and easier vehicle manufacturing combined with lower maintenance, we can also provide turnkey solutions, integrating our DC circuit breakers into our smart, compact MODBOX®-type high-voltage enclosures, with other high- and low voltage components ensuring the electrical safety, the voltage and current measurements and all high voltage switching functions.



Product range

Standards
EN/IEC 60077



UR

High speed DC circuit breakers for traction substations



Brochure UR26-80S IEC

Brochure UR26-80S ANSI

Sécheron is the railway industry's global partner for electrical safety solutions for DC traction power substations, bringing decades of experience serving the rail industry. Traction power substation manufacturers and operators have come to rely on our experts for personalized support throughout all phases of their DC traction power substation projects, from recommending the most appropriate solution to obtaining local after-sales service worldwide throughout the lifetime of their products.



Our **UR**-type DC HSCBs come in a wide range of configurations to suit virtually all operational requirements and can be integrated into DC switchgear or metal-clad enclosures configured for line feeder panels, rectifier breaker panels, and interconnecting breaker panels, for example.

They comply to the reference standards EN 50123/ IEC 61992, IEEE/ANSI C37.14-C37.16, JEC 7152 and GOST, and offer an impressive service track record throughout the world.

Our **UR** circuit breakers can also be delivered with our disconnect switch type SW designed for DC traction power substations and offering performances well coordinated with **UR** breaker's technical data.

Product range

**IEEE / EN /
ANSI IEC**

U [V=]
3,600
1,800
900

		UR26-64		UR40-64				
			(1)	(1)	(1)	(1)		
		UR15-42	UR26-82	UR40-82	UR46-82	UR60-82	UR80-82	
			(1)	(1)	(1)	(1)	(1)	
		UR15-41	UR26-81	UR40-81	UR46-81	UR60-81	UR80-81	
		0	1,500	2,600	4,000	4,600	6,000	8,000
		0	0	2,150	3,200	4,000	6,000	8,000
								I [A]

Standards

EN 50123 / EC 61992
IEEE / ANSI

All breakers are compliant to EN/IEC Standards

(1) DC circuit breakers also IEEE / ANSI compliant

MACS

AC vacuum circuit breakers



 **Brochure MACS**

AC circuit breaker type BVAC can still be delivered on special request.

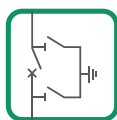
Product range

Sécheron brings decades of experience designing and manufacturing high-voltage AC components and solutions. The builders and operators of trains, high-speed trains, locomotives, and EMUs running on 15 kV and/or 25 kV networks turn to us to ensure the electrical safety of their traction circuits.

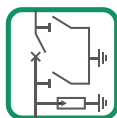
Starting with our main AC circuit breaker, we bring railway car builders and railway operators a wide range of solutions from stand-alone main AC circuit breaker (**MACS**) to multifunctional units (**MACS**) with integrated earthing switch, surge arrester or disconnect switch. For car builders seeking high performance, reduced engineering work and easier vehicle manufacturing combined with lower maintenance, we can also provide turnkey solutions, integrating our AC circuit breakers into our smart, compact MODBOX®-type high-voltage enclosures with other high- and low voltage components ensuring the electrical safety, the voltage and current measurements and all high voltage switching functions.

No other AC circuit breaker offers the market a so wide range of insulation performances combined with the largest scope of functionality and the most complete vehicle integration options as does the MACS platform.

Sécheron's technology for AC vacuum circuit breaker is homologated and accepted in almost all AC railway networks throughout the world.

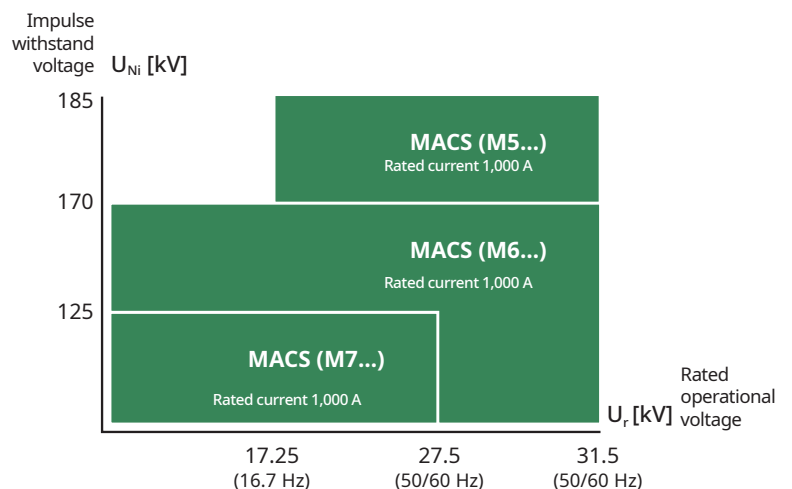


AC circuit breakers with earthing switch



& with surge arrester

Functional scope



TMS

Voltage sensors for AC rail vehicles



Sécheron **TMS** is a versatile Traction Measurement System for rail vehicles. It provides signals that can be used for voltage detection, traction control and protection, and energy measurement functions. The current product configuration ensures voltage measurement for 15 kVAC and 25 kVAC traction system supply voltages. It transmits safe, isolated, and accurate signals to a variety of on-board equipment.



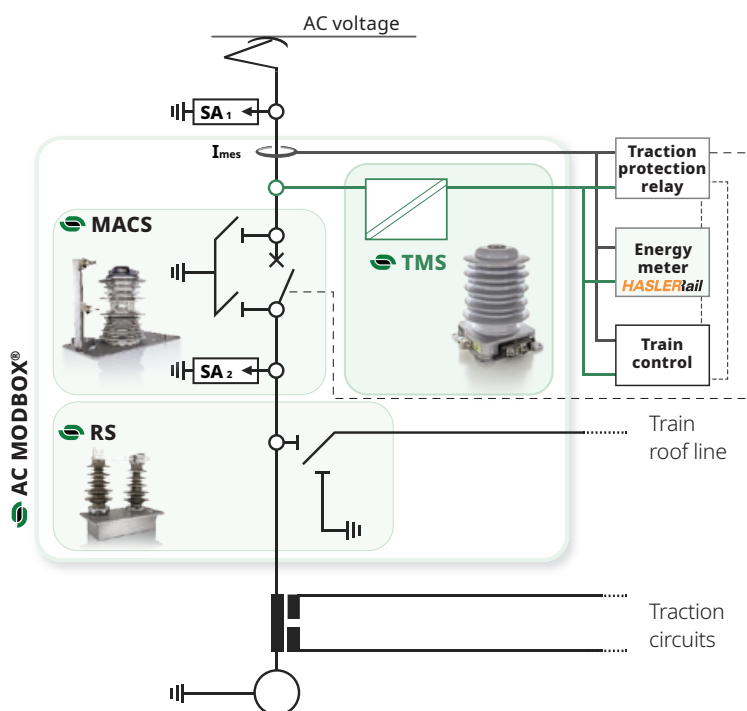
The **TMS** is available on a stand-alone basis so that car builders and operators can install it on the vehicle roof. It can also be integrated into our smart, compact MODBOX® high-voltage enclosure with other high- and low-voltage functions for the electrical safety, measurement and control of the traction chain.

If you are looking for a more comprehensive solution, the **TMS** can also be delivered as part of the Sécheron Hasler Energy Metering System with REM102 energy meter including the Energy Calculation Function (ECF) and the Data Handling System (DHS).

For REM102, refer to information provided by HaslerRail also member of Sécheron Hasler Group.

Brochure TMS

Typical example



Application scheme

- | | |
|--------------------------|--------------------------------|
| SA | Surge arrester |
| I_{mes} | Current sensor |
| TMS | Voltage sensor |
| MACS | AC vacuum circuit-breaker |
| MODBOX® | High voltage integrated system |
| RS | Roof switch |
| Sécheron products | |
| | Energy meter |
| HASLERtail | HaslerRail products |

BMS, SEC, HS

AC/DC power & auxiliary contactors



- [Brochure BMS..08_BMS..10](#)
- [Brochure BMS..15_BMS..18](#)
- [Brochure BMS 3 poles](#)
- [Brochure SEC](#)
- [Brochure HS](#)

Sécheron brings decades of experience designing and manufacturing power contactor solutions for the railway industry.

Power converter manufacturers, car builders, traction propulsion equipment manufacturers, DC traction power substation manufacturers, and train operators count on our contactor solutions for reliable performance.

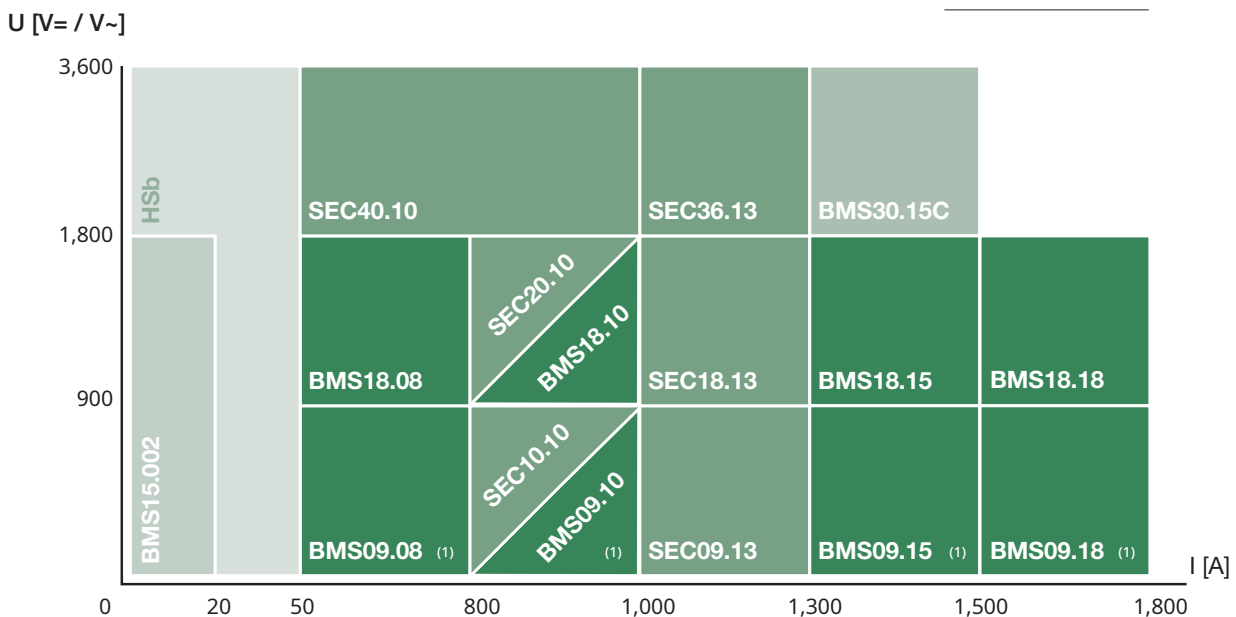
Our **BMS**, **SEC**, and **HS** contactors can be configured to meet a wide variety of needs, including line contactors, converter switches, permanent-magnet synchronous motor (PMSM) switches, traction circuit reconfiguration contactors, charging contactors, HVAC switches, auxiliary circuit isolating switches, and more.

Our contactors can be delivered on a stand-alone basis or in modules you can integrate into your own line breaker boxes and converter boxes. For a turnkey solution, we can also integrate our contactors into our smart, compact MODBOX® high-voltage enclosures with other high- and low voltage components ensuring the electrical safety, the voltage and current measurements and all high voltage switching functions.



Product range

Standard
EN/IEC60077



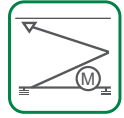
⁽¹⁾ BMS09... can be used for rated voltages up to 2,000 V_{AC}.

SPL

Pantographs for Trams & Light Rail Vehicles



Sécheron **SPL** pantograph is the ideal solution for manufacturers and operators of trams and Light Rail Vehicles, looking for an efficient and reliable current collecting device.



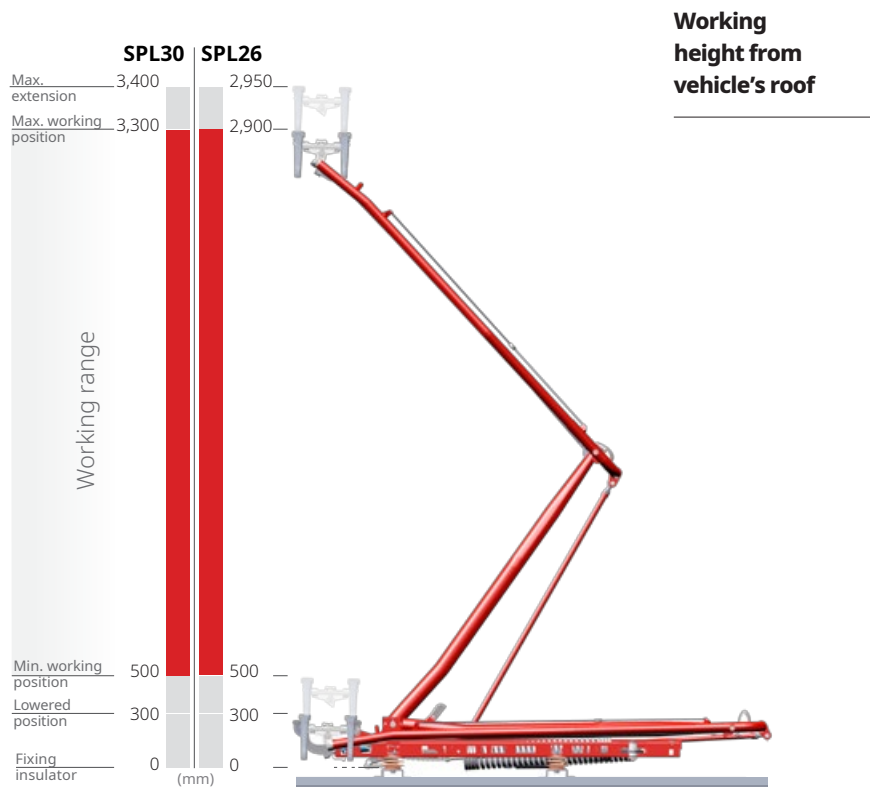
With its wide working range and record flatness, **SPL** achieves high performances with constrained weight and great stiffness of design. Its unique panhead suspension system offers an excellent dynamic behaviour, with great benefits to the contact reliability between the pantograph and overhead lines, as well as to the carbon strips lifetime. Already in commercial operation for years on different tramway networks throughout Europe, **SPL** pantograph has demonstrated its robustness and reliability in different operational and climatic conditions, sometimes entailing a very severe service environment.



SPL can be delivered combined with many other Sécheron components necessary to address the electrical safety and the switching functions in the vehicle's traction chain. Our DC circuit breaker type UR, completed with our BMS contactor range are typical products that will help you to design safe and reliable traction equipment.

Brochure Pantograph SPL

Product range



Working height from vehicle's roof

RS, IS

Roof switches, Indoor switches



Sécheron **RS**-type roof-mounted disconnect switches are known by railway car builders, traction propulsion equipment manufacturers, and train operators for their performance, reliability, and low maintenance.

Our **RS** disconnecter platform offers a wide range of configurations and options to meet the needs of most railway applications. Our products and solutions include pantograph disconnectors with or without earthing, AC/DC traction selection for multi-system vehicles, and roof line disconnectors with or without making capabilities to connect or isolate traction transformers from the power supply.

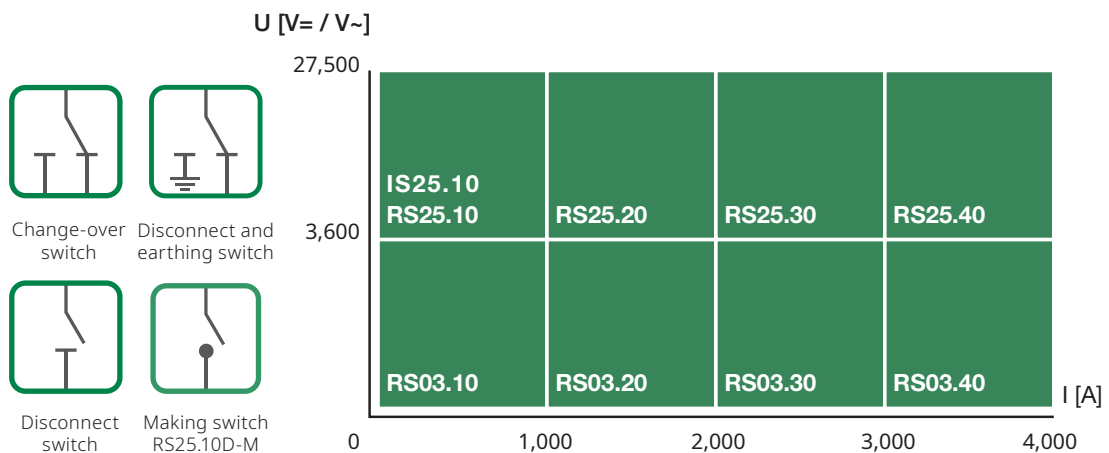
Our disconnect switches can be delivered on a stand-alone basis or integrated into a MACS AC circuit breaker. A specific indoor **IS** range can be delivered as stand-alone component or integrated into Sécheron's smart, compact MODBOX® high-voltage enclosure with other high- and low voltage components ensuring the electrical safety, the voltage and current measurements and all high voltage switching functions.



 [Brochure RS](#)
[Brochure IS](#)

Product range

Functional scope



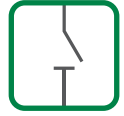
XMS

Indoor disconnectors



Sécheron **XMS** modular indoor disconnect switches can be used as disconnecter on rail vehicles and in other industrial applications.

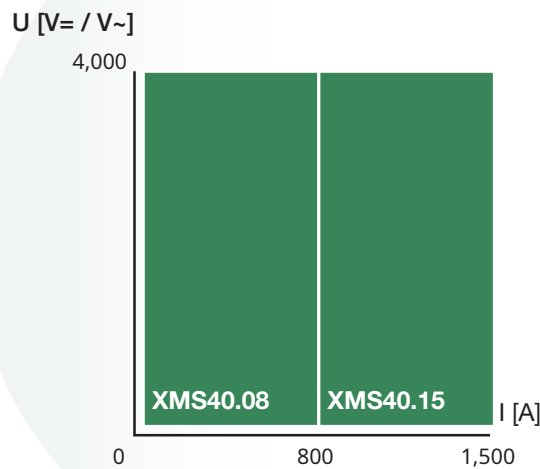
XMS can be configured as single-pole pantograph disconnectors for railway Electrical Multiple Units (EMUs) running on 1.5 kVDC and/or 3.0 kVDC networks, as single- or double-pole traction circuit reconfiguration switches for multisystem vehicles, and as 3-pole motor disconnectors. **XMS** disconnectors can be delivered on a stand-alone basis or integrated into Sécheron's smart, compact MODBOX® high-voltage enclosure with other high- and low voltage components ensuring the electrical safety, the voltage and current measurements and all high voltage switching functions.



Brochure XMS

Product range

Functional scope



XMS
1 pole



XMS
2 poles



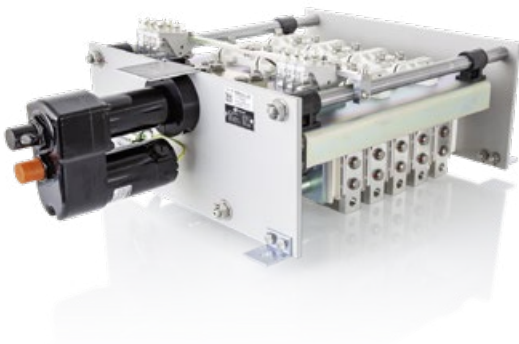
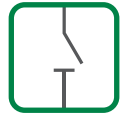
XMS
3 poles

BW

Indoor disconnectors

Sécheron **BW** high-voltage modular indoor disconnect switches can be used as disconnector or change-over switches on rail vehicles and in other industrial applications.

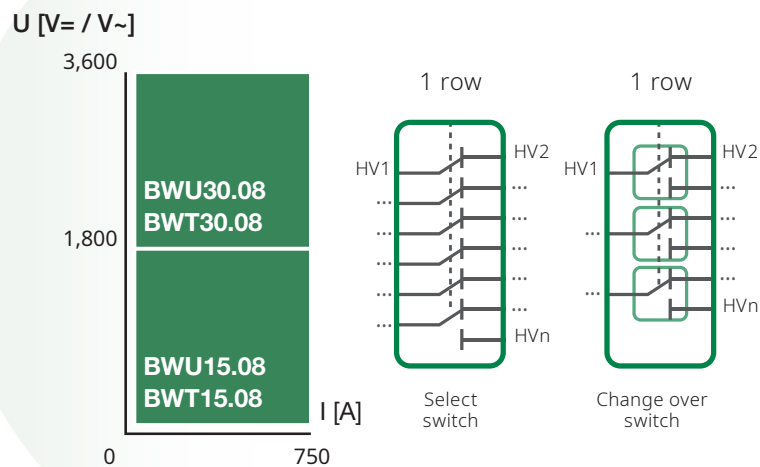
BW features a modular, linear design that can accommodate different numbers of moving contacts and high-voltage terminals, enabling a wide range of configurations and applications. **BW** switches are mainly used to select or change the configuration of traction or/ and auxiliary circuits.



[Brochure BW](#)

Product range

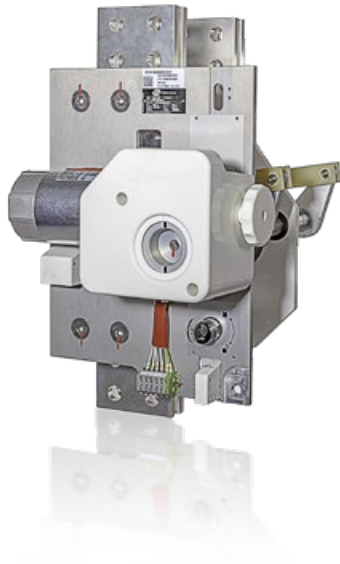
Functional scope



	BWT	BWU
Row number	2	4
Maximum contact levels	12	14
Terminals maximum number (HVn)	24	56

SW

Disconnectors for traction substations



[Brochure SW](#)

Sécheron brings decades of experience designing and manufacturing electrical safety components and solutions for DC traction power substations for the railway industry.

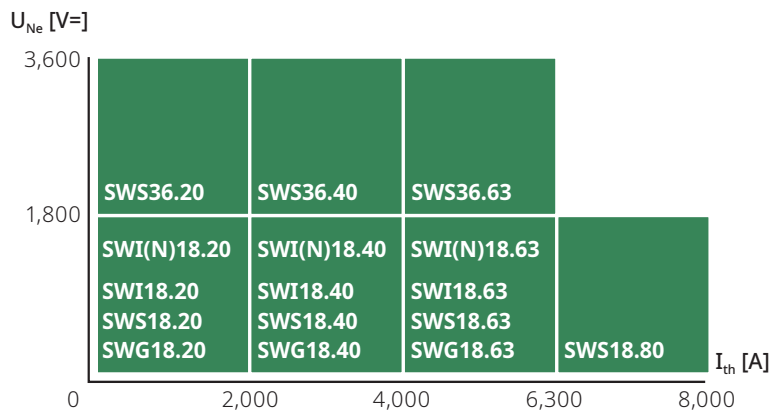
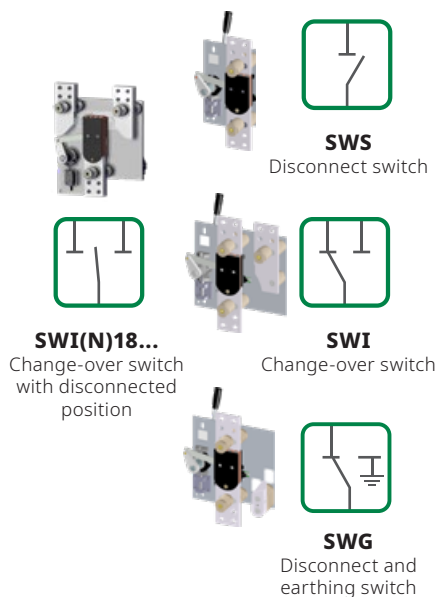
Our **SW**-type off-load disconnect switch comes in a wide range of configurations and with optional features to meet the needs of all railway applications. Our switches ensure the safe isolation of the equipment powering the overhead lines and third rails of DC mass transit (metro, Light Rail Vehicles, tramways, EMU trains) and DC railway lines.

Our disconnectors for fixed installations can be integrated into your disconnector panels to be used as the rectifier incoming or negative disconnector, feeder cable disconnector, by-pass disconnector, or as the disconnector and earthing switch.



Product range

Functional scope

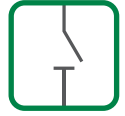


BTE, BSV, SLS, KM, DL

Earthing switches & key interlocking devices

Sécheron takes its commitment to protecting people and property very seriously when designing components and solutions to switch and protect high-voltage circuits. We have been serving the railway for decades, acquiring expert knowledge of our customers' needs to innovate electrical safety solutions valued for their performance, safety, and low maintenance.

Our electrical safety solutions for railway vehicles include many of the devices required to isolate and earth the high-voltage equipment. We take a simple, step-by-step approach where one safety device is triggered only when the previous device in the traction chain has been locked in the earthed position. This principle is implemented through a cascade of security keys and associated locks.



[Brochure safety interlocking](#)

[Brochure pantograph interlocking BSV, SLS](#)

[Brochure Key Multiplier and Door Lock](#)

[Brochure Earthing switch BTE03.04A](#)

Product range

Functional scope

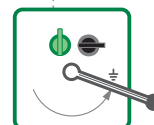
Pneumatic interlocking switch, **BSV, SLS**

Manual Earthing switch integrated in AC circuit breaker, **MACS**

Earthing switch for DC circuit breaker and traction converters type **BTE03.04**

Key multiplier, **KM**

Door lock, **DL**



MMC, BSK

Master controllers



Sécheron brings more than 25 years of experience designing and manufacturing master controllers for rail vehicles. Master controllers control traction speed, braking force, and travelling direction.

Our **BSK**, **MMC**, and foot controller lines meet the vast majority of tramway, Light Rail Vehicle (LRV), and locomotive master controller needs. A modular design facilitates integration for car builders and delivers the flexibility operators require to ensure conductor comfort and safety. Our master controllers can be installed on the vehicle dashboard or in a side console.

All of our components and solutions are backed by Sécheron expert service during all phases of your project. Let us recommend the best solution to meet your needs. Whatever your choice, you can count on efficient support worldwide for the entire lifetime of your product.



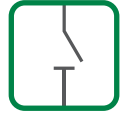
Brochure Master-controller BSK
Brochure Master-controller MMC

GB-G

Wheel flange lubricators

Lubricating railway vehicle wheel flanges reduces friction between the rail and wheels, reducing noise and wear and saving vehicle operators and infrastructure owners money.

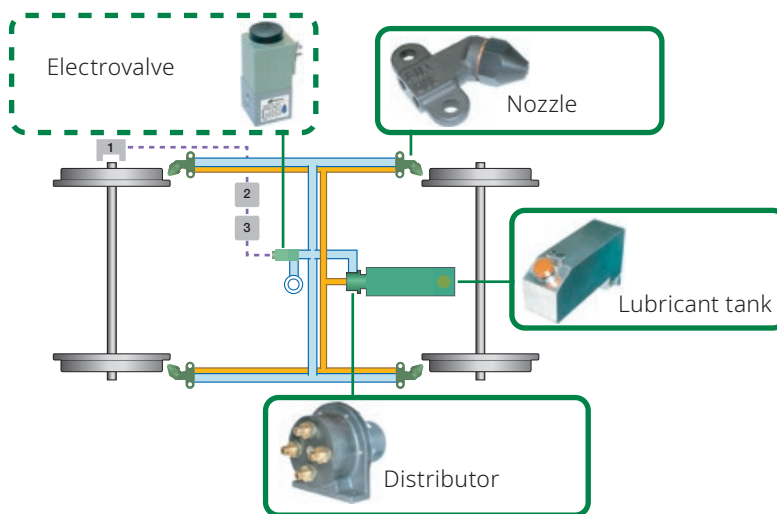
Sécheron's on-board **GB-G**-type wheel flange lubricator sprays lubricant on the wheel flange using a unique double pipe system that delivers lubricant and air to the spray nozzles separately. The system has a long service record and has been deemed the most efficient, reliable spraying system by several major companies.



 **Brochure Wheel Flange Lubricators**

Product range

Typical wheel flange lubricator system



 **Sécheron's scope**

- 1. Speed sensor
- 2. Speed processing
- 3. Control unit

SERVICES

Project management

Efficient teams, including Project Managers and Technical Specialists, support our customers throughout their projects and help them to select the most appropriate solutions within our standard product platforms, or propose customized products and complete integrated solutions for their applications.



Engineering support

Sécheron has developed unique core competences related to its activity and can provide our customers with high-value engineering services to support their projects.

The Computer Aided Engineering (CAE) multi-physics tool allows our experts to analyze, simulate and optimize the products and solutions we design, while reducing the technical risks and shortening development times and test cycles.

One of the things that makes us unique is our broad, deep knowledge of testing methods and our in-house testing labs and equipment. Our capabilities include: temperature-rise testing, dielectric and partial discharge measurements, complete electrical and mechanical endurance tests, short-circuit and low-current interruptions, vibration and shock tests, and functional and climate tests. Most of our testing facilities are ISO 17025-accredited as independent laboratories.



Documentation

Documentation to be delivered at different stages of a project has currently become more diversified and more substantial. It is also a key issue for our customers.

Here again, our team of specialists works to prepare and promptly provide customers with detailed Maintenance & Operations manuals, RAMS analysis, product material lists, type test certificates, fire & smoke certificates, structural simulations, when necessary, and all other useful documents.



After sales service

The strategy of Sécheron SA is to provide our customers with strong support and dedicated services throughout all equipment purchase and installation phases, as well as during the lifetime of the material once it enters service. To satisfy this commitment, Sécheron has set up a worldwide network of over 40 Sales and Service Points which enable our customers to find local support, whenever possible, and thus be able to address their requests in the most efficient way. The After sales service, provided on a global or local basis, covers at least the following requirements: Preventive maintenance and repair, E-learning & Training and retrofit & modernization project.



Sécheron original parts

In order to guarantee the reliability and the performance of Sécheron's safety devices, only Sécheron's original spare parts must be used through the complete product lifetime. These original parts, manufactured and checked following rigorous processes, are now stamped with the Sécheron's logo and the traceability number, either on the parts themselves or on their original packaging.



Contact Sécheron or our official partners (www.secheron.com/worldwide/) to be supplied with guaranteed original parts.

SÉCHERON'S WORLDWIDE NETWORK

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