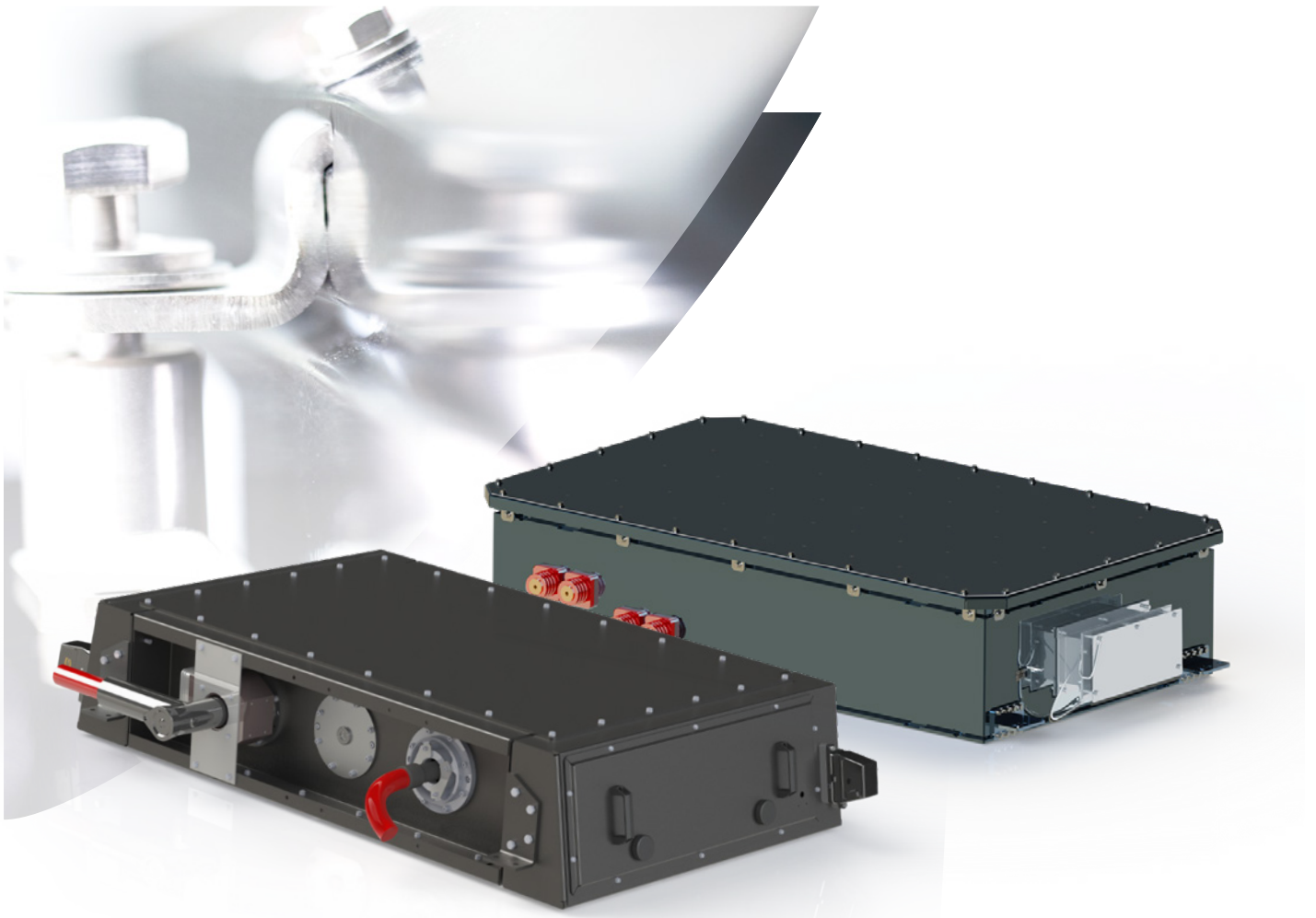


AC-DC HIGH VOLTAGE INTEGRATED SOLUTIONS

Type **SLIMBOX**

RAIL VEHICLES



GENERAL INFORMATION

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 for rail

vehicles running on 1.5 kV_{DC}, 3 kV_{DC} and 15 kV_{AC}, 25 kV_{AC} networks worldwide.

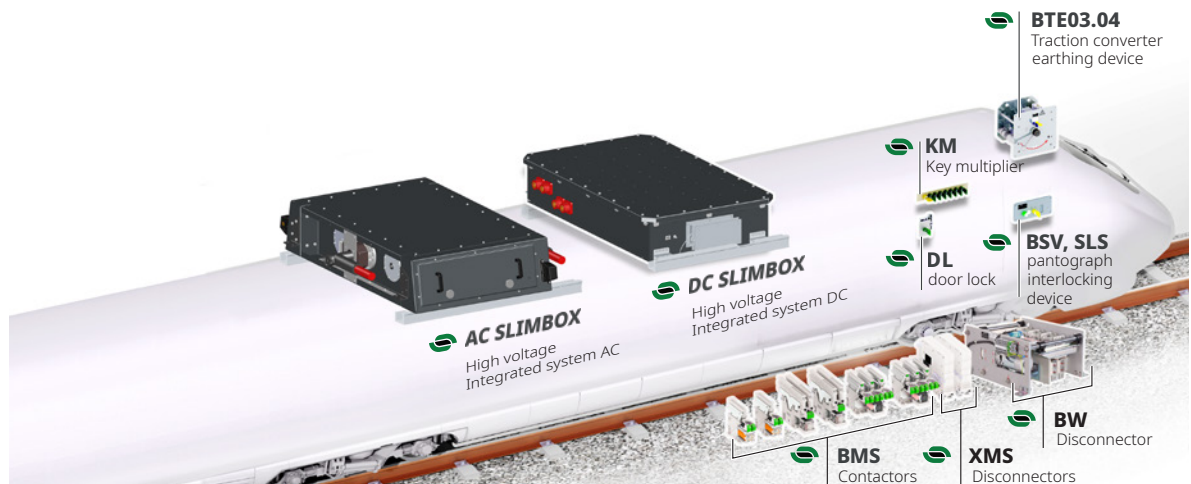
The Sécheron **SLIMBOX** enclosure includes our AC or DC circuit breakers and various high- and low-voltage components. The compact, smart enclosure ensures safe and efficient integration of high-voltage components in vehicle roof, vehicle under-frame or indoor installations.

Each **SLIMBOX** 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.

TYPICAL APPLICATIONS

AC/DC application

Sécheron supplies all equipment named on the above view.



MAIN BENEFITS

Car builders

- ✓ Reduced engineering work and risks
- ✓ More efficient logistics and installation
- ✓ Eliminates the need for roof cut-outs
- ✓ Reduced footprint and height
- ✓ One-stop shop for all components
- ✓ Reduced project overall costs
- ✓ Design according to application requirements and customer wishes
- ✓ Reduce assembly times, procurement costs and the coordination of many suppliers to save your valuable resources.

Vehicle operators

- ✓ Protection against harsh environmental conditions
- ✓ Airborne & structural noise reduction
- ✓ Lower Total Cost of Ownership (TCO)
- ✓ Reduced maintenance costs
- ✓ Expert customer support
- ✓ Worldwide after-sales service
- ✓ Integrated low height and low weight system.
- ✓ Customized HV interfaces
- ✓ High insulation

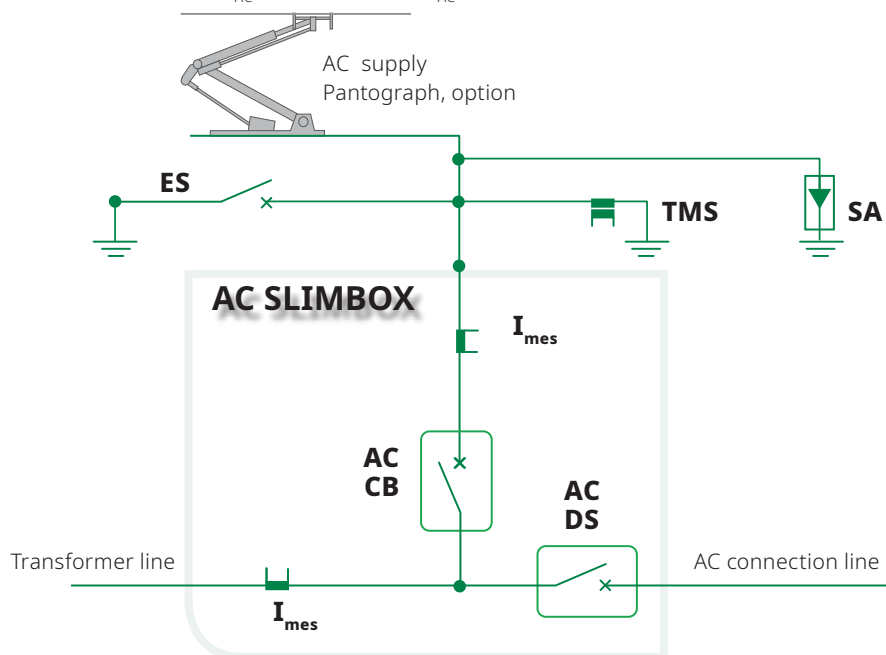
AC SLIMBOX

MAIN FEATURES

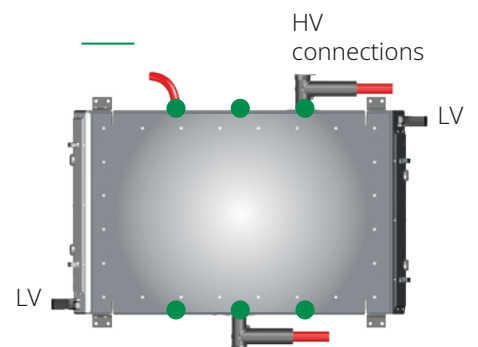
- Compact multi-functional system incorporating AC circuit breaker, AC disconnector and current measurements on a single 1469 mm x 1017 mm footprint.
- For low height integration (under 330 mm).
- Suitable for 15 kV_{AC} and/or 25 kV_{AC} networks.
- Rated impulse withstand voltage (1.2 / 50 μs):
U_{Ni} = 125 kV
- Conventional free air thermal current: up to 630 A
- Electric operation (closing and holding)
- Operation in ambient temperature from -40 °C to +40°C
- Reference standards: IEC/EN 60077-4, IEC/EN 61373, EN 50121-3-2, EN 45545.

TYPICAL APPLICATIONS

15 kV_{AC} (16.7 Hz) ; 25 kV_{AC} (50/60 Hz)

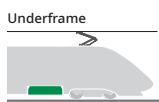
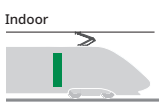
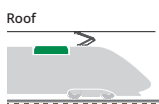


- SA** : Surge arrester
- I_{mes}** : Current measurement
- TMS** : AC voltage measurement
- AC CB** : AC circuit breaker
- AC DS** : AC disconnector
- ES** : Earthing switch device



6 HV connections are available depending of the configurations

Installation possibilities

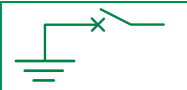



Sécheron supplies all equipment named on the above view.

AC SLIMBOX TYPICAL DATASHEET

| | Symbol | Unit | Single voltage | | Dual voltage | |
|--|----------|-------|--|-----------|--------------|------|
| MAIN HIGH VOLTAGE CIRCUIT | | | | | | |
| Nominal voltage | U_n | [kV] | 15 | 25 | 15 | 25 |
| Rated operational voltage | U_r | [kV] | 17.25 | 27.5 | 17.25 | 27.5 |
| Rated insulation voltage | U_{Nm} | [kV] | 17.25 | 27.5 | 17.25 | 27.5 |
| Rated operational frequency | f_r | [Hz] | 16.7 | 50 or 60 | 16.7 | 50 |
| Overtoltage category | OV | | 4 | 3 | 4 | 3 |
| Rated impulse withstand voltage (1.2/50 μ s) | U_{Ni} | [kV] | 125 | 125 | 125 | |
| Rated power-frequency withstand voltage (50 Hz, 1 min) | U_a | [kV] | 50 | 50 | 50 | |
| Conventional free air thermal current ⁽¹⁾ | I_{th} | [A] | 630 | up to 400 | up to 630 | |
| Rated short-time withstand current (1 s) | I_{cw} | [kA] | 25 | 20 | 25 | |
| Short-time withstand current (0.1 s) | I_{cw} | [kA] | 40 | N.A. | 40 | |
| ⁽¹⁾ at Tamb=+40°C. | | | | | | |
| HIGH VOLTAGE INTERFACE | | | | | | |
| HV connections (standard or customized bushings and terminal connections) | | | 1 or 2 (Input) 1 to 4 (Outputs) | | | |
| LOW VOLTAGE AUXILIARY CIRCUIT | | | | | | |
| Nominal voltage | U_n | [Vdc] | 24 to 110 | | | |
| Voltage range | | | [0.7 - 1.25] U_n | | | |
| LOW VOLTAGE INTERFACE | | | | | | |
| Connector type | | | 1 to 2 (Harting Han HPR 24B) | | | |
| OPERATING CONDITIONS | | | | | | |
| Installation | | | indoor or outdoor | | | |
| Protection index | IP | | 56 (outdoor) | | | |
| Altitude | | [m] | $\leq 2,000$ | | | |
| Working ambient temperature (outside SLIMBOX) | | [°C] | -40 to +40 | | | |
| Pollution degree (inside SLIMBOX) | PD | | 3 | | | |
| APPLICABLE STANDARDS | | | | | | |
| Insulation coordination | | | EN 50124-1 / IEC 62497-1 | | | |
| Vibrations & shocks | | | IEC 61373: 2010 (Category 1 - Class A) | | | |
| EMC | | | EN 50121-3-2 / IEC 62236-3-2 | | | |
| Environmental conditions | | | EN 50125 / IEC 62498 | | | |
| Fire safety | | | EN 45545-2 | | | |
| EXECUTION | | | | | | |
| Slimbox Colour | | | RAL 7016 | | | |

AC SLIMBOX OPTIONAL INTEGRATION

| | | |
|---|-----------|----------------------------|
|  | ES | Earthing switch device |
|  | U_{mes} | Voltage measurement device |

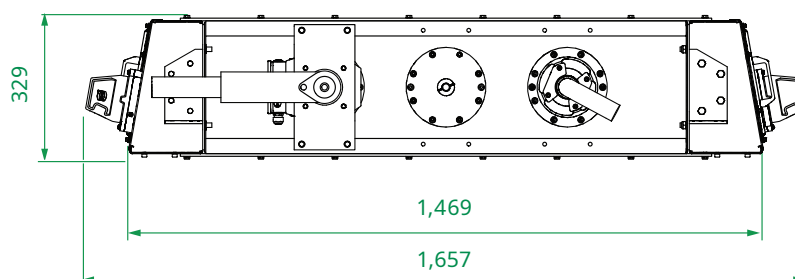
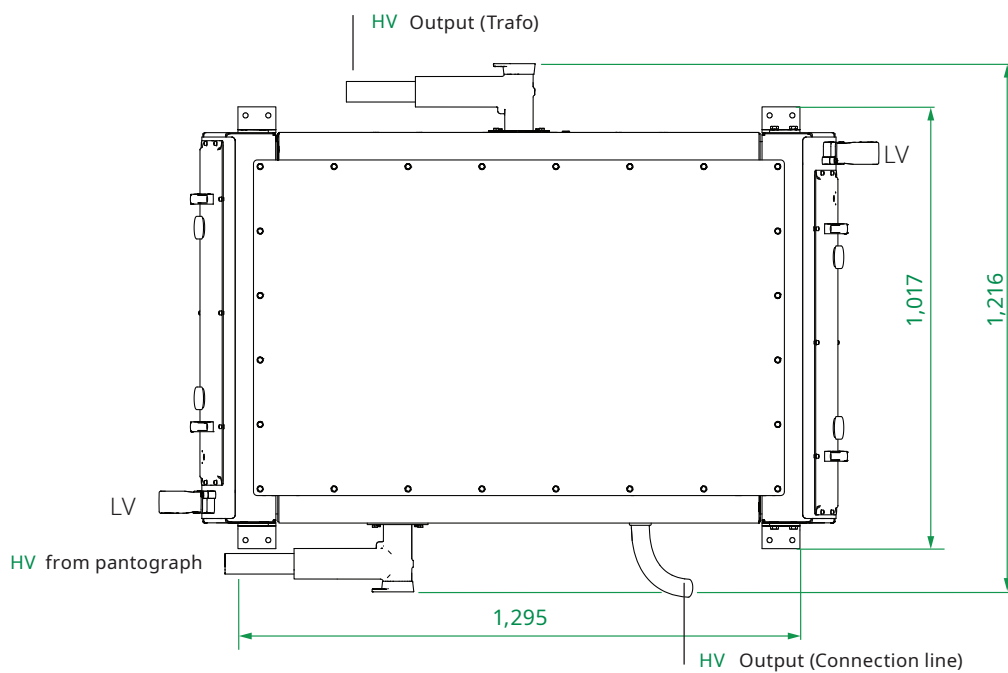
To be defined by Sécheron upon customer's specifications

AC SLIMBOX MAIN DIMENSIONS

AC SLIMBOX TYPICAL DIMENSIONS



Tolerances are according to ISO 2768-cl



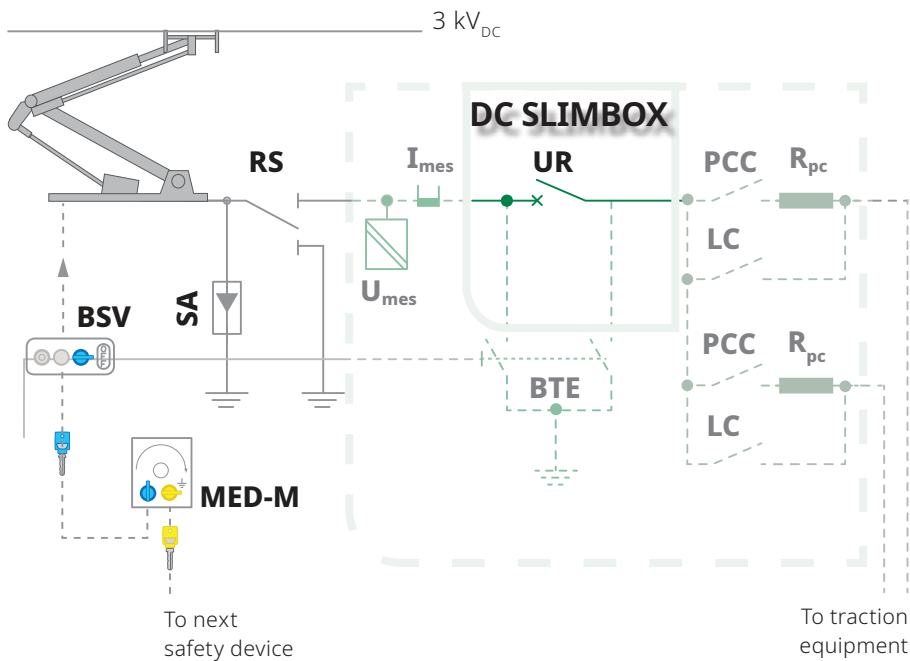
Longitudinal and transversal dimensions may vary according to the options, please contact Sécheron.

DC SLIMBOX

MAIN FEATURES

- Compact multi-functional system incorporating DC circuit breaker.
- on a single 1653mm x 993 mm footprint.
- For low height integration (under 330 mm)
- Suitable for applications and networks up to 3 kV_{DC}.
- Rated impulse withstand voltage (1.2 / 50 μs):
U_{Ni} = 20 kV.
- Conventional free air thermal current: up to 2,000 A.
- Electro-magnetic closing with electric holding.
- Operation in ambient temperature from -40 °C to +50°C.
- Reference standards: IEC/EN 60077-3, IEC/EN 61373, EN 45545-2.

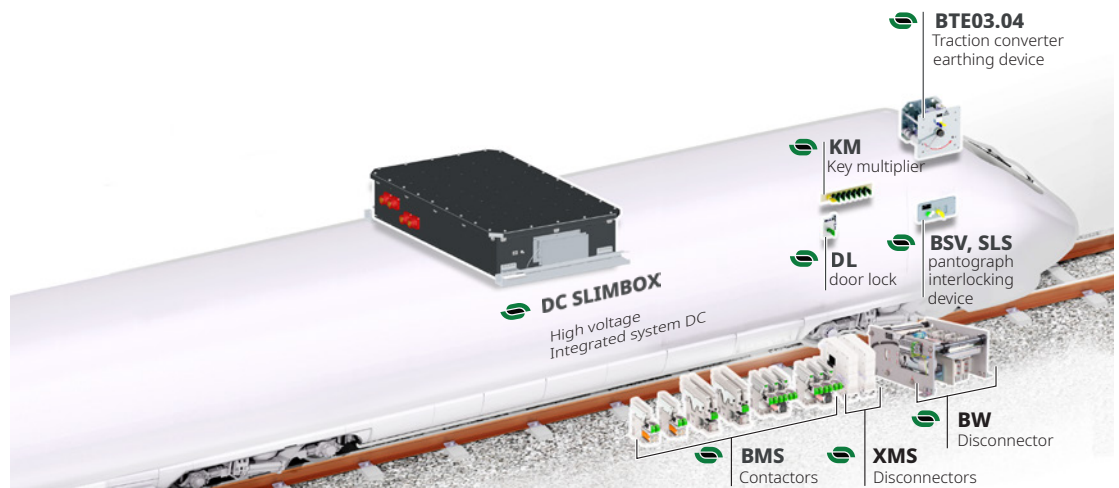
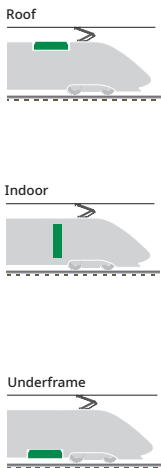
TYPICAL APPLICATIONS



- BSV** : Pantograph interlocking box
- MED-M** : Manual earthing device
- SA** : Surge arrester
- RS** : Disconnector & Earthing
- UR** : High speed DC circuit breaker
- : Optional
- BTE** : Earthing device
- PCC** : Precharging contactor
- LC** : Line contactor BMS
- R_{pc}** : Precharging resistor
- I_{mes}** : Current measurement
- U_{mes}** : Voltage measurement

Let us analyse your traction scheme and prepare a proposal for a **SLIMBOX** adapted to your application and to a safe operation of the integrated components.

Installation possibilities








Sécheron supplies all equipment named on the above view.

DC SLIMBOX TYPICAL DATASHEET

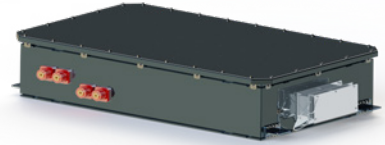
| | Symbol | Unit | Single voltage |
|---|-----------|---------|--|
| MAIN HIGH VOLTAGE CIRCUIT | | | |
| Nominal voltage | U_n | [V] | 3,000 ⁽¹⁾ |
| Rated operational voltage | U_r | [V] | 3,600 |
| Rated insulation voltage | U_{Nm} | [V] | 3,600 |
| Overtoltage category ⁽²⁾ | OV | | 3 |
| Rated impulse withstand voltage (1.2/50 μ s) ⁽²⁾ | U_{Ni} | [kV] | 20 |
| Rated power-frequency withstand voltage (50 Hz, 1 mn) ⁽²⁾ | U_a | [kV] | 9.2 |
| Maximum breaking capacity | A_2/T_1 | [kA/ms] | 50/0 |
| Conventional free air thermal current ⁽³⁾ | I_{th} | [A] | up to 2,000 |
| <small>⁽¹⁾ For other nominal voltage, please contact Sécheron. ⁽²⁾ Components inside the Slimbox may have different and higher insulation performances. ⁽³⁾ at Tamb=+40°C.</small> | | | |
| HIGH VOLTAGE INTERFACE | | | |
| Cable glands (M32x1.5 or M40x1.5) (cable glands for not shielded cables as a standard) | | | 1 or 2 (Inputs) 1 to 4 (Outputs) |
| LOW VOLTAGE AUXILIARY CIRCUIT | | | |
| Nominal voltage | U_n | [Vbc] | 24 to 110 |
| Voltage range | | | [0.7 - 1.25] Un |
| LOW VOLTAGE INTERFACE | | | |
| Connector type | | | 1 to 3 (Harting Han HPR 24B) |
| OPERATING CONDITIONS | | | |
| Installation | | | Indoor or outdoor |
| Protection index | IP | | 56 (outdoor) |
| Altitude | | [m] | \leq 2,000 |
| Working ambient temperature (outside SLIMBOX) | | [°C] | -40 to +50 |
| Pollution degree (inside SLIMBOX) | PD | | 3 |
| APPLICABLE STANDARDS | | | |
| Insulation coordination | | | EN 50124-1 / IEC 62497-2 |
| Short-circuit tests | | | EN/IEC 60077-3 |
| Vibrations & shocks | | | IEC 61373: 2010 (Category 1 - Class A) |
| EMC | | | EN 50121-3-2 / IEC 62236-3-2 |
| Environmental conditions | | | EN 50125 / IEC 62498 |
| Fire safety | | | EN 45545-2 |
| EXECUTION | | | |
| Slimbox Colour | | | RAL 7016 (outdoor) / Natural colour (indoor) |

DC SLIMBOX TYPICAL CONFIGURATIONS

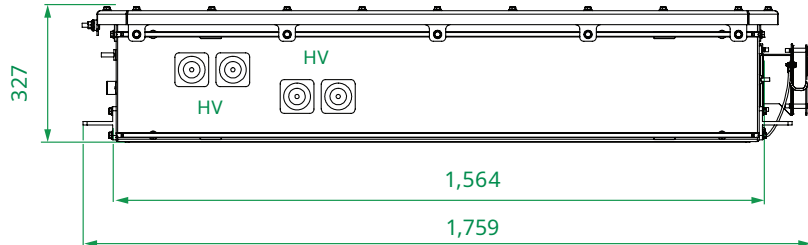
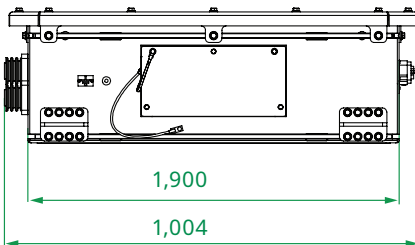
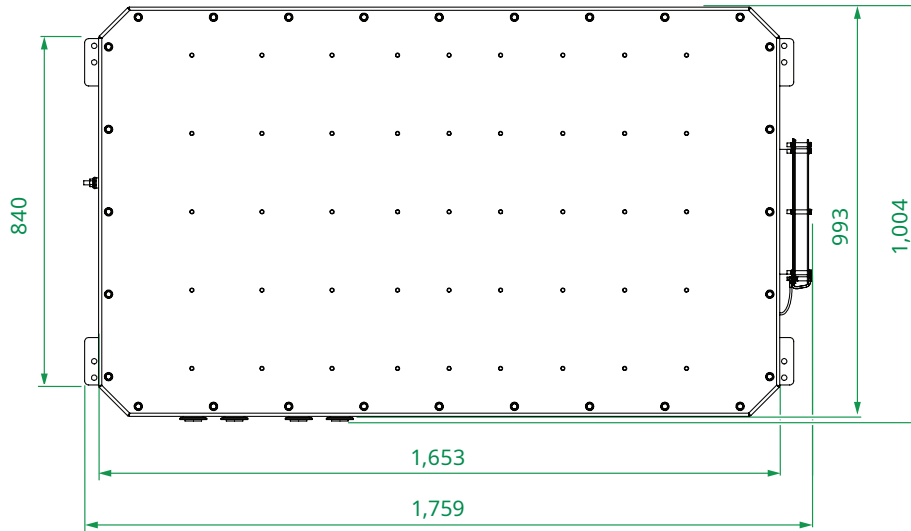
| FUNCTIONS | VOLTAGE [V _{DC}] | PRODUCTS |
|------------------------------|----------------------------|---|
| DC circuit breaker | 3,000 |  UR26 |
| OPTIONAL INTEGRATION | | |
| Measurement | 3,000 |  Current measurement Voltage measurement |
| Earthing device | |  BTE03.04A 2 & 4-Poles manual operation |
| Line switching & precharging | |  BMS line contactor PCC precharging contactor Charging resistor (ceramic type) |
| Bushing | |  |

DC SLIMBOX MAIN DIMENSIONS

DC SLIMBOX TYPICAL DIMENSIONS



Tolerances are according to ISO 2768-cl



Longitudinal and transversal dimensions may vary according to the options, please contact Sécheron.



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