

# CONTACTOR RANGE

Type **SEC**

RAIL VEHICLES / FIXED INSTALLATION

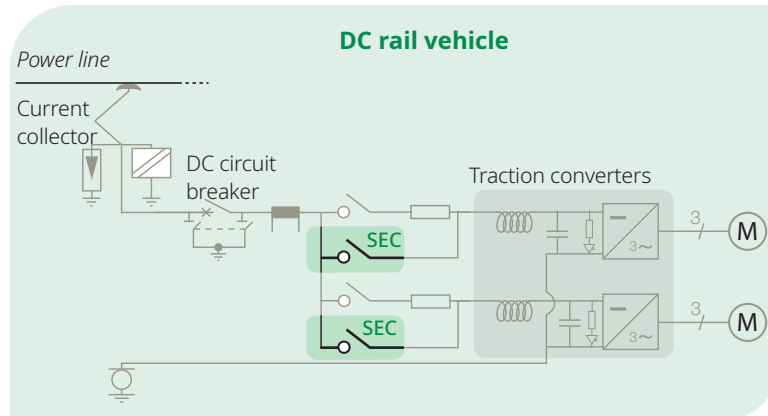


# GENERAL INFORMATION

The **SEC** contactor is a high duty class component, designed to withstand the most severe applications in terms of environment and required performances for rail mobility or fixed installations. Combining high electrical and mechanical endurance, efficient low

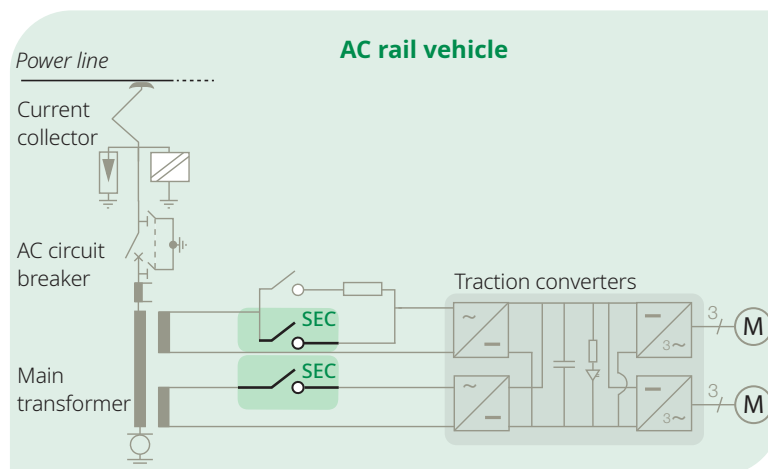
current bi-directional blow-out device, and a smart control unit making the SEC operation independent from both ambient temperature and control voltage, the **SEC** is a unique contactor to be used almost regardless of the service conditions.

## APPLICATIONS, TYPICAL EXAMPLES



### LINE CONTACTORS FOR DC VEHICLES

Locomotives, trains, EMUs, tramways / Light Rail Vehicles



### SEPARATION/LINE CONTACTORS FOR AC VEHICLES

Locomotives, trains and EMUs

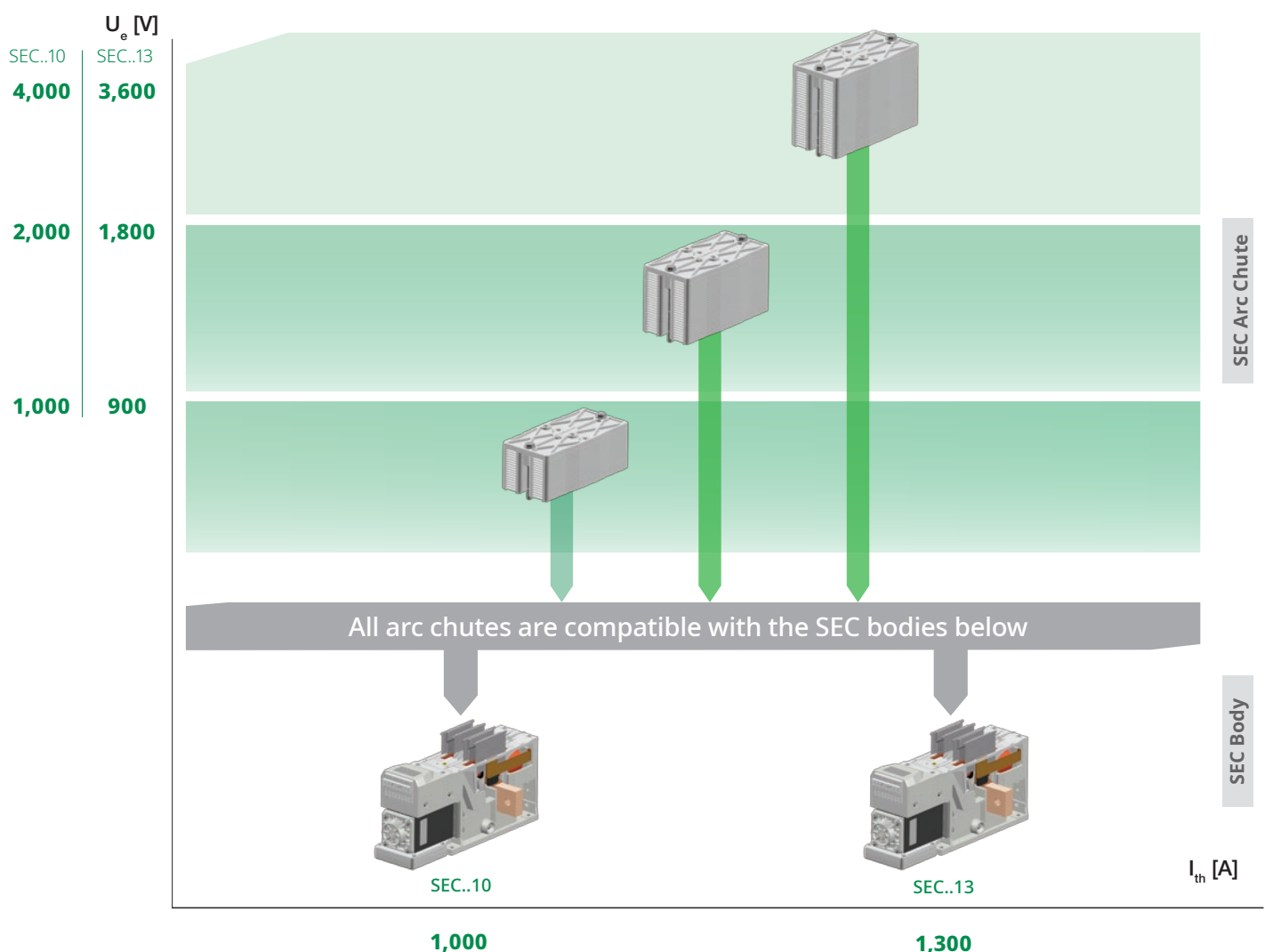
## MAIN FEATURES

- Rated operational voltage 900 V to 4,000 V (DC and AC)
- Rated free air thermal current 1,000 A or 1,300 A
- High insulation level (overvoltage category OV3)
- Reference standards: IEC 60077-1 /-2 , IEC 61373, EN50121-3-2, EN45545, EN 50657.

## MAIN BENEFITS

- ✓ Operational frequency category C3 for 1,000 A and C2 for 1,300 A with a minimum mechanical durability of 2,000,000 operations
- ✓ Efficient blow-out circuit for low current interruptions
- ✓ Reduced power consumption thanks to a coil controller that controls the closing and opening operations
- ✓ Closing and opening performances independant from both control voltage level and ambient temperature
- ✓ Horizontal or vertical mounting
- ✓ Double pair of main contacts allowing a longer life time
- ✓ Low maintenance requirements and easy access to the main contacts for replacement.

## CONTACTOR CONFIGURATIONS



# DATA FOR PRODUCT SELECTION

Symbol	Unit	SEC 10.10	SEC 20.10	SEC 40.10	SEC 09.13	SEC 18.13	SEC 36.13
<b>MAIN HIGH VOLTAGE CIRCUIT</b>							
Component category		A2					
Type of main contact		Normally Open					
Number of poles		1 pole					
Rated operational voltage	$U_{Ni}$ [V <sub>DC</sub> /V <sub>AC</sub> ]	1,000	2,000	4,000	900	1,800	3,600
Rated insulation voltage	$U_{Nm}$ [V]	2,000	2,000	4,000	2,000	2,000	4,000
Conventional free air thermal current <sup>(1)</sup>	$I_{th}$ [A]	1,000			1,300		
Rated operational current/operational frequency		1,000 / C3			1,000 / C3		
- DC voltage or AC voltage (16.7, 25 & 50/60 Hz)	$I_r$ [A]				1,300 / C2		
Rated short-time withstand current	$I_{cw/t}$ [kA]/[ms]	10/100					
Peak short-time withstand current	$\hat{I}_{cw}$ [kA]	10					
Maximum breaking capacity							
- DC current, $\tau = 15$ ms	$I_{bc}$ [A]	4,000	3,000	2,500	4,000	3,000	2,000
- AC current, $\cos \Phi = 0.8$ (16.7, 25 & 50/60 Hz)	$I_{bc}$ [A]	4,000	3,000	2,500	4,000	3,000	2,000
Maximum making capacity	$I_{mc}$ [A]	4,000	3,000	2,500	4,000	3,000	2,000
Rated power-frequency withstand voltage (50 Hz/1 min)							
- Between main contacts (open)	$U_{Ni}$ [kV]	4.7		7.9	4.7		7.9
- Main circuit (closed) to earth	$U_{Ni}$ [kV]	6.0		10	6.0		10
Breaking overvoltage	$\hat{U}_c$ [V]	≤ 2,000	≤ 3,500	≤ 7,000	≤ 2,000	≤ 3,500	≤ 7,000
Overvoltage category		OV3	OV3	OV3	OV3	OV3	OV3

<sup>(1)</sup> At  $T_{amb} = +40^\circ\text{C}$  and tested with size of high voltage cable connections per terminal: 2x240mm<sup>2</sup> for SEC ...10 and 3x240 mm<sup>2</sup> for SEC ...13.

## LOW VOLTAGE CIRCUITS

### Control circuit

Nominal supply voltage	$U_n$ [V <sub>DC</sub> ]	[24 - 36] or [48 - 110]					
Control voltage	$U_{EF}$ [V <sub>DC</sub> ]	24 to 110					
Range of voltage		[0.7 - 1.25] $U_n$					
Nominal closing power <sup>(3)</sup>	$P_c$ [W]	≤ 60 <sup>(2)</sup>					
Nominal holding power <sup>(3)</sup>	$P_m$ [W]	≤ 4					
Input control current <sup>(3)</sup>	[mA]	10 (24 V <sub>DC</sub> ) to 2 (110 V <sub>DC</sub> )					
Mechanical closing time <sup>(3)</sup>	$t_{cc}$ [ms]	100	100	130	100	100	130
Mechanical opening time <sup>(3)(4)</sup>	$t_{co}$ [ms]	50					

<sup>(2)</sup> For a duration ≤ 0.5 s. • <sup>(3)</sup> At  $U_n$  and  $T_{amb} = +20^\circ\text{C}$ . • <sup>(4)</sup> For direct control mode +10 ms additional time. •

### Auxiliary contacts

Type of contacts		Potential free (PF)					
Rated voltage	[V <sub>DC</sub> ]	24 to 220					
Conventional thermal current	$I_{th}$ [A]	10					
Utilization categories according to EN60947							
- AC-15 230 V <sub>AC</sub>		1.0 A					
- DC-13 110 V <sub>DC</sub>		0.5 A					
Minimum let-through current at 24 V <sub>DC</sub> <sup>(5)</sup>	[mA]	≥ 10 (silver contacts) or 4 ≤ I < 10 (gold contacts)					

<sup>(5)</sup> For a dry and clean environment.

### Low voltage interface

Control circuits & Auxiliary switches		Terminal block or AMP 18 pins connector					
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### Low voltage interface

Rated power-frequency withstand voltage (50 Hz / 1 min)							
- LV circuit to earth	$U_a$ [kV]	1.5					

## OPERATING CONDITIONS

Installation		Indoor					
Altitude	[m]	≤ 2,000					
Working ambient temperature	$T_{amb}$ [°C]	-40 to +70					
Humidity		95% at +40°C					
Pollution degree		PD3					
Protection Index (low voltage circuit)	N Cycles	2 Millions					

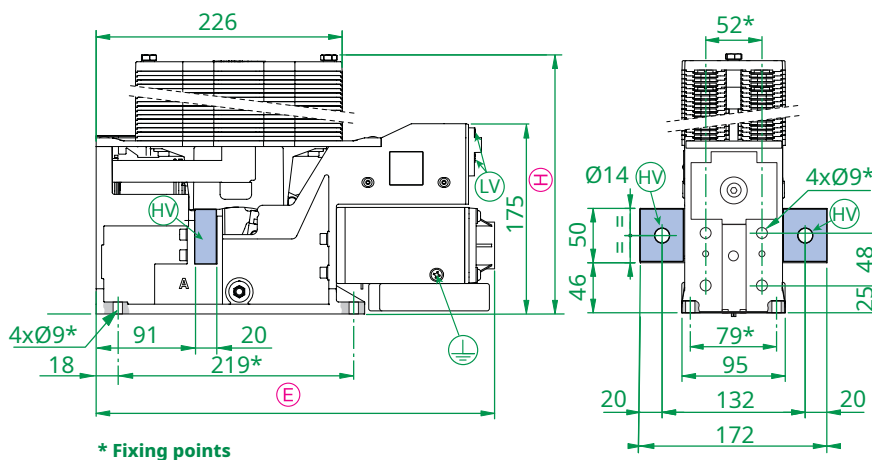
# PRODUCT INTEGRATION

## MAIN DIMENSIONS

<b>HV connections</b>	M12 screws
<b>Earth connections</b>	M6 screws
<b>LV Connections</b>	M3 screws terminal block or AMP connector (option)
<b>Fixing points</b>	M8 Screws

Dimensions without tolerances are indicative. All dimensions are in mm. The maximum allowed flatness deviation of the support frame is 0.5 mm.

### High voltage lateral connections



\* Fixing points

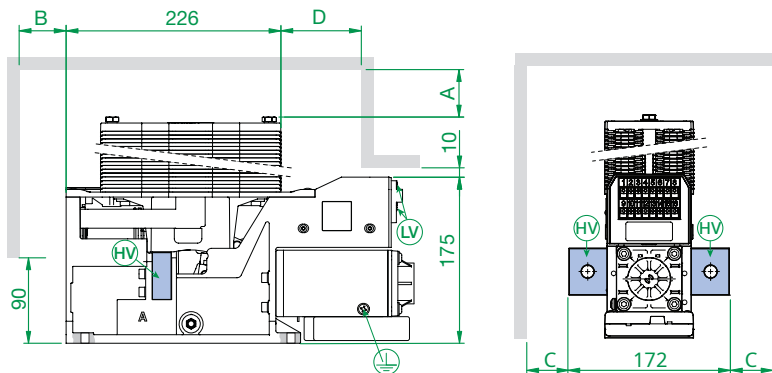
### SEC..10/SEC..13

Horizontal/Vertical installation



Dimensions [mm]	SEC10.10 SEC09.13	SEC20.10 SEC18.13	SEC40.10 SEC36.13
ⓔ	366	366	371
ⓓ	239	275	375

## INSULATION DISTANCES AND WEIGHTS



SEC contactors have been homologated according to IEC 60077-2 with the following insulation distances.

	Insulating distance [mm]				Weight: ± 1 kg
	To insulating wall				
	A	B <sup>(3)</sup>	C	D	
SEC10.10 SEC09.13	30 <sup>(1)</sup> /50 <sup>(2)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	20 <sup>(1)</sup> /30 <sup>(2)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	11
SEC20.10 SEC18.13	30 <sup>(1)</sup> /50 <sup>(2)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	20 <sup>(1)</sup> /50 <sup>(2)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	12.5
SEC40.10 SEC36.13	30 <sup>(1)</sup> /50 <sup>(2)</sup>	100 <sup>(1)</sup> /200 <sup>(2)</sup>	50 <sup>(1)</sup> /80 <sup>(2)</sup>	100 <sup>(1)</sup> /200 <sup>(2)</sup>	16

<sup>(1)</sup> Clearance against insulating wall.

<sup>(2)</sup> Clearance against earth.

<sup>(3)</sup> For breaking current ≤ 2kA (≤ 1kA for SEC40.10 and SEC36.13). For higher breaking conditions please contact Sécheron.

# LOW VOLTAGE CONTROL DIAGRAM

## Low voltage control mode

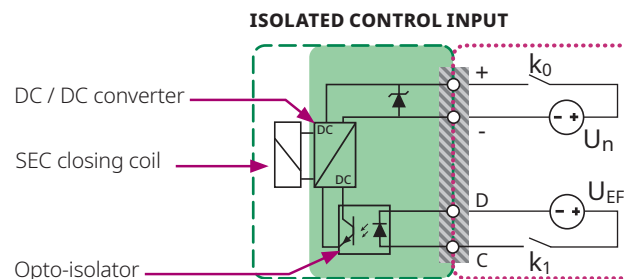
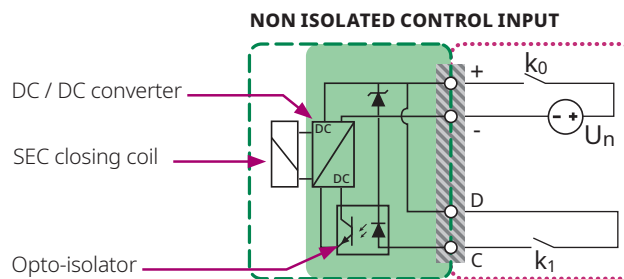
The two control modes that can be used to control the SEC are represented hereunder:

- Indirect mode
- Direct mode

Required data for k0 and k1 control relays :

	Nominal supply voltage $U_n$ [V <sub>DC</sub> ]	$\hat{I}_{pl}$ [A]	$\hat{I}_h$ [A]	$I_{sb}$ [mA]	$I_{pk}$ [mA]
Required data $K_0$ relays <sup>(1)</sup>	24-36	4.5	0.85	≤ 30	≤ 500
	48-110	2.5	0.45		

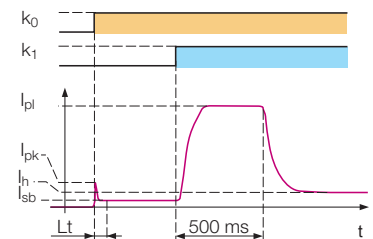
	Nominal control voltage $U_{EF}$ [V <sub>DC</sub> ]	$I$ [mA]
Required data $K_1$ relays <sup>(1)</sup>	24	~10
	110	~2



- - - Sécheron's scope
- ..... Customer's scope
- Low voltage interface
- Coil controller

- $U_n$  : DC power supply
- $U_{EF}$  : Control voltage <sup>(1)</sup>
- $k_0$  : Supply relay
- $k_1$  : Control relay

## INDIRECT MODE



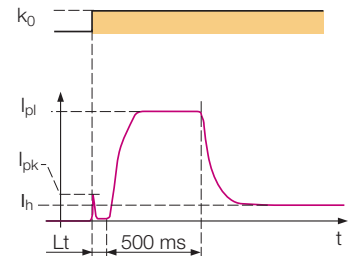
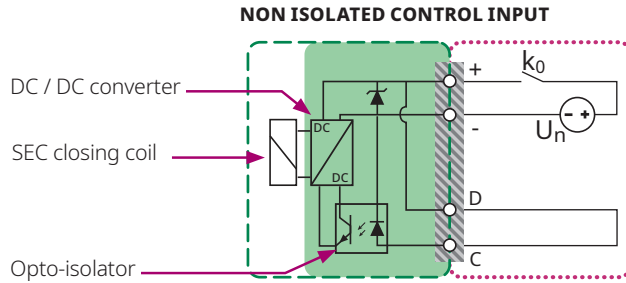
### Notes:

Isolated or non isolated control mode is to be determined when ordering. Please refer to codification page 12.

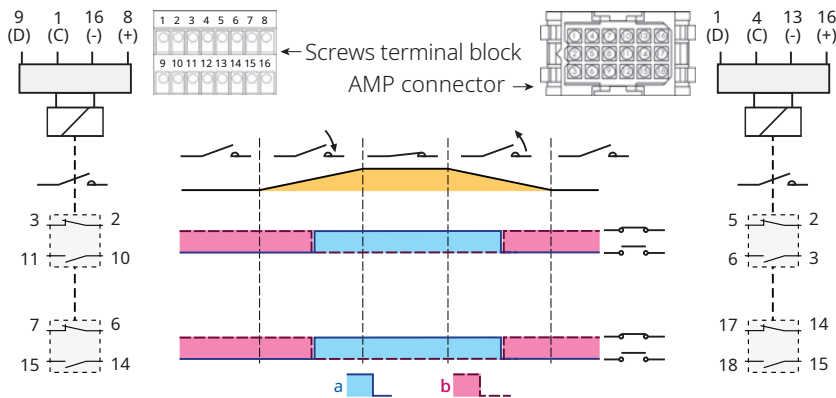
In case the customer needs to have the full electrical compatibility with former coil controller version, the "Non isolated control input" version must be ordered.

<sup>(1)</sup> Control voltage ( $U_{EF}$ ) can be different from supply voltage ( $U_n$ ).

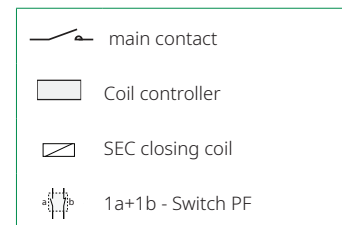
**DIRECT MODE**



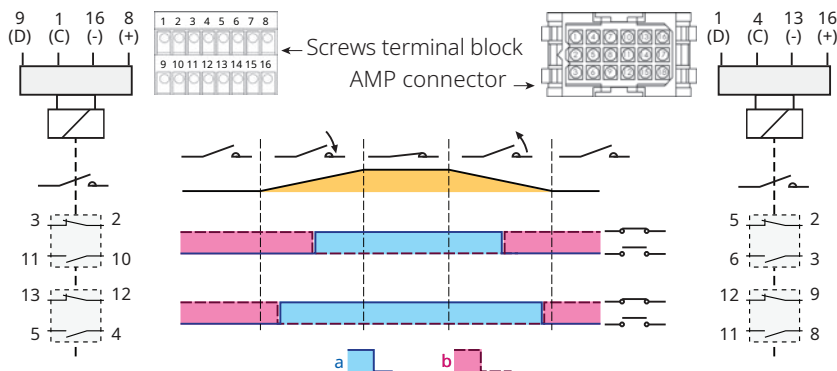
**Wiring diagram with 2a + 2b auxiliary switches (Configuration 1) - Standard**



**Legend of the schemes:**



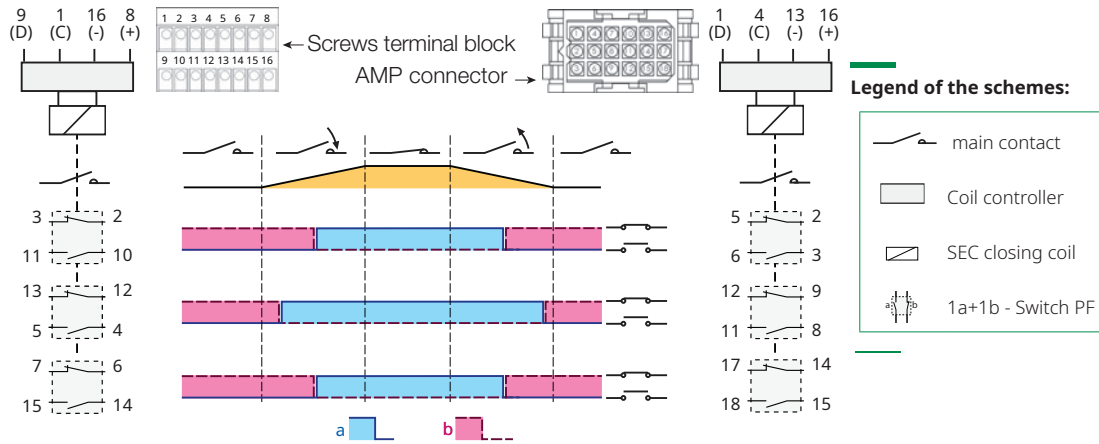
**Wiring diagram with 2a + 2b auxiliary switches (Configuration 2) - Option**



**Notes:**

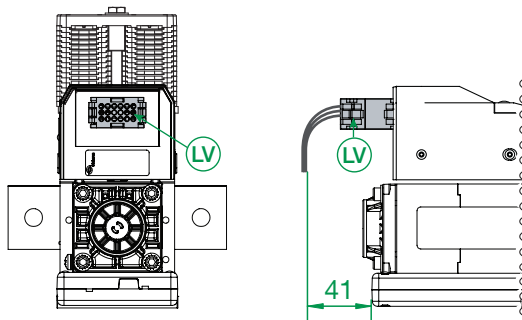
Difference between configuration 1 & 2 relates to the switching offset time between auxiliary switches.

### Wiring diagram with 3a + 3b auxiliary switches (Configuration 3) - Option



## OPTIONS (SUBJECT TO ADDITIONAL COSTS)

### LOW VOLTAGE AMP CONNECTOR



The low voltage AMP mobile connector can be ordered separately.

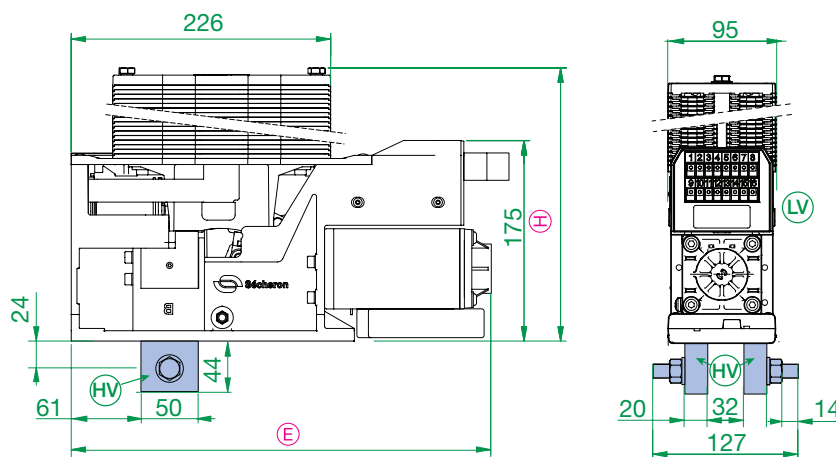
Mobile connectors	
Type	Secheron's number
AMP connector 18 pins for 0.5 mm <sup>2</sup>	SG201013R1
AMP connector 18 pins for 1.5 mm <sup>2</sup>	SG201013R2



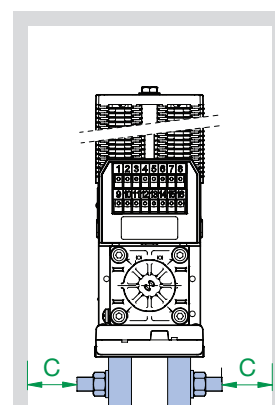
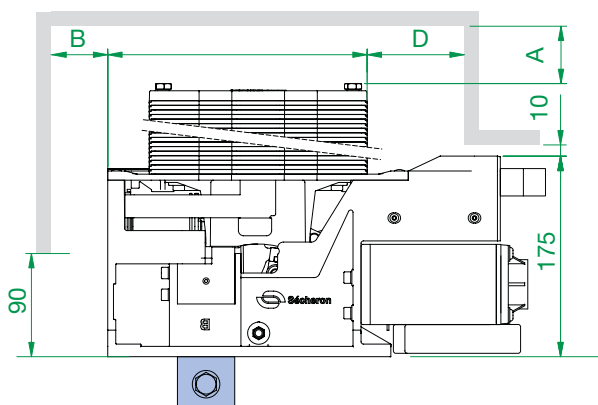
## LOW VOLTAGE AMP CONNECTOR

<b>HV connections</b>	M12 screws
<b>Earth connections</b>	M6 screws
<b>LV Connections</b>	M3 screws terminal block or AMP connector (option)
<b>Fixing points</b>	M8 Screws

### Dimensions, Insulation distances and weights



Dimensions [mm]	SEC10.10 SEC09.13	SEC20.10 SEC18.13	SEC40.10 SEC36.13
E	366	366	371
H	239	275	375
Weight	12 kg	13.5 kg	17 kg



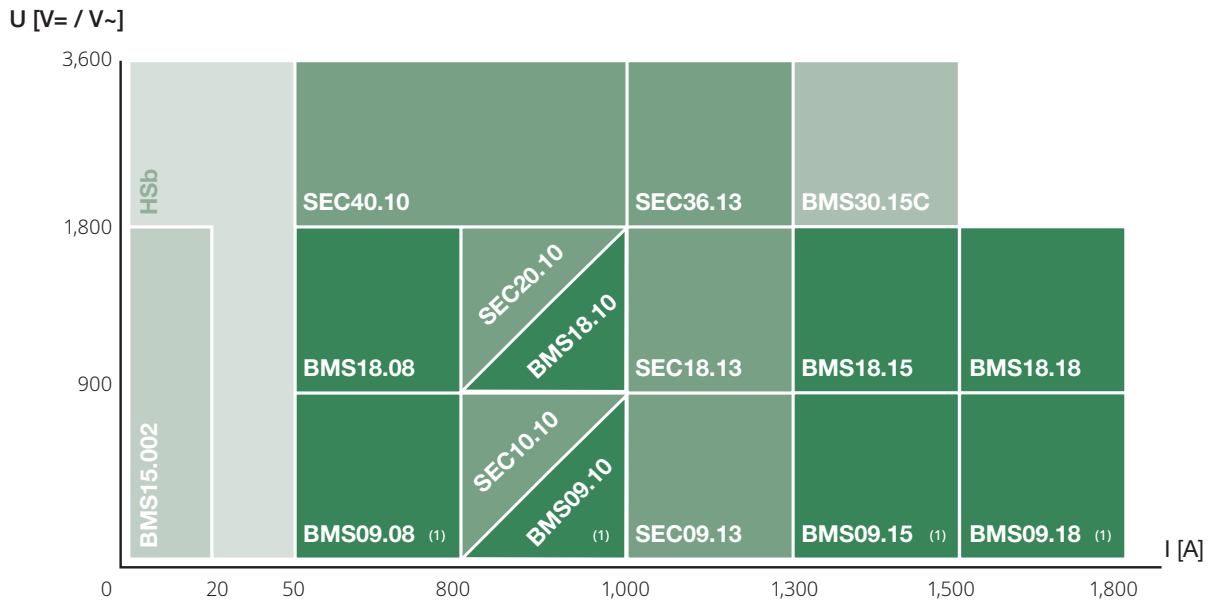
Dimensions [mm]	SEC10.10 SEC09.13	SEC20.10 SEC18.13	SEC40.10 SEC36.13
A	30 <sup>(1)</sup> /50 <sup>(2)</sup>	30 <sup>(1)</sup> /50 <sup>(2)</sup>	30 <sup>(1)</sup> /50 <sup>(2)</sup>
B <sup>(3)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	100 <sup>(1)</sup> /200 <sup>(2)</sup>
C	20 <sup>(1)</sup> /30 <sup>(2)</sup>	20 <sup>(1)</sup> /50 <sup>(2)</sup>	50 <sup>(1)</sup> /80 <sup>(2)</sup>
D	50 <sup>(1)</sup> /100 <sup>(2)</sup>	50 <sup>(1)</sup> /100 <sup>(2)</sup>	100 <sup>(1)</sup> /200 <sup>(2)</sup>
Weight	12 kg	13.5 kg	17 kg

<sup>(1)</sup> Clearance against insulating wall.

<sup>(2)</sup> Clearance against earth.

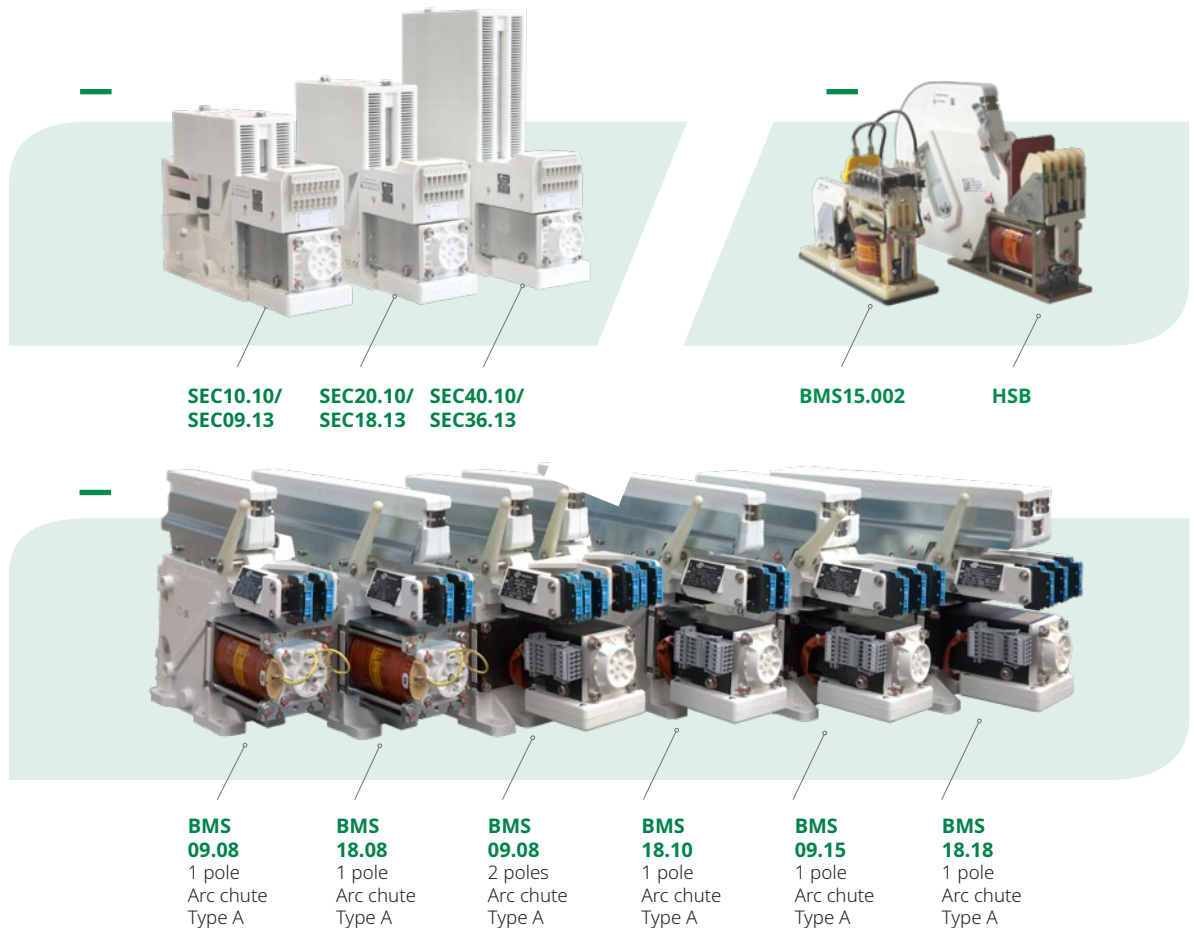
<sup>(3)</sup> For breaking current  $\leq 2\text{kA}$   
( $\leq 1\text{kA}$  for SEC40.10 and SEC36.13).  
For higher breaking conditions please  
contact Sécheron.

# SECHERON CONTACTORS RANGE



(1) **BMS09...**  
can be used for rated voltages  
up to 2,000 V<sub>AC</sub>

## AT A GLANCE



## BROCHURE REFERENCE FOR OTHER SÉCHERON'S CONTACTORS



### **BMS..08/BMS..10 Type**

#### **ROLLING STOCK**

(Line/separation contactors, ...).

#### **FIXED INSTALLATION**

(depot feeder contactor...).



### **BMS..08 3-pole Type**

#### **ROLLING STOCK**

(Line/separation contactors, ...).

#### **FIXED INSTALLATION**

(depot feeder contactor, ...).



### **BMS..15/BMS..18 Type**

#### **ROLLING STOCK**

(Line/separation contactors, ...).

#### **FIXED INSTALLATION**

(depot feeder contactor...).



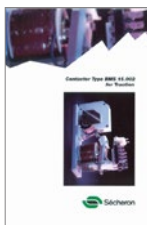
### **SEC Type**

#### **ROLLING STOCK**

(Line/separation contactors, PM motor,...).

#### **FIXED INSTALLATION**

(depot feeder contactor, ...).



### **BMS15.002 Type**

#### **ROLLING STOCK**

(Pre-charging, Heating, HVAC, ...).

#### **FIXED INSTALLATION**

(Line testing, ...).



### **BMS30.15C Type**

#### **ROLLING STOCK**

(Line/separation contactors, ...).

#### **FIXED INSTALLATION**

(depot feeder contactor, ...).



### **HS Type**

#### **ROLLING STOCK**

(Pre-charging, Heating, HVAC, ...).

#### **FIXED INSTALLATION**

(Line testing, ...).

# DESIGNATION CODE FOR ORDERING

- Be sure to establish the designation code from the latest version of our brochure by downloading it from the website: [www.secheron.com](http://www.secheron.com).
- Be careful to write down the complete alphanumeric designation code with 12 characters when placing your order.
- For technical reasons some variants and options indicated in the designation code might not be combined, therefore validate your configuration with Sécheron before ordering.
- For other configurations not described in the brochure, please contact Sécheron.

<b>Example of customer's choice:</b>	<b>SEC</b>	<b>10</b>	<b>10</b>	01	S	1	Ø
Line:	10	11	12	13	14	15	16

- The bold characters of the designation code define the device type.

## DESIGNATION CODE

Line	Description	Designation	Standard	Options	Customer's choice
10	Product type BMS	<b>SEC</b>	<b>SEC</b>		<b>SEC</b>
11	Rated operational voltage	1,000 V 2,000 V 4,000 V 900 V 1,800 V 3,600 V	10 20 40 09 18 36		
12	Rated conventional free air thermal current <sup>(1)</sup>	(1,000; 2,000 and 4,000 V) 1,000 A (900; 1,800 and 3,600 V) 1,300 A	10 13		
13	High voltage connections	Lateral Bottom with screws	01	02	
14	Nominal supply voltage - control mode	24 to 37.5 V <sub>dc</sub> - Isolated 48 to 110 V <sub>dc</sub> - Isolated 24 to 37.5 V <sub>dc</sub> - Non Isolated 48 to 110 V <sub>dc</sub> - Non Isolated	P S	L M	
15	Auxiliary contacts	2a + 2b - (switch PF) - silver type - Configuration 1 2a + 2b - (switch PF) - gold type - Configuration 1 2a + 2b - (switch PF) - silver type - Configuration 2 2a + 2b - (switch PF) - gold type - Configuration 2 3a + 3b - (switch PF) - silver type - Configuration 3 3a + 3b - (switch PF) - gold type - Configuration 3	1	4 2 6 3 5	
16	Low voltage interface	Screw terminal block AMP 18 pins connector	Ø	1	

<sup>(1)</sup> At Tamb = +40°C

The low voltage connector must be ordered separately (refer to above description):

- None
- AMP connector 18 pins of 0.5 mm<sup>2</sup>  SG201013R1
- AMP connector 18 pins of 1.5 mm<sup>2</sup>  SG201013R2



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