ELECTRICAL
SAFETY
SOLUTIONS

Sécheron

CONTACTORS

Type **BMS09.08 / BMS18.08**
BMS09.10 / BMS18.10

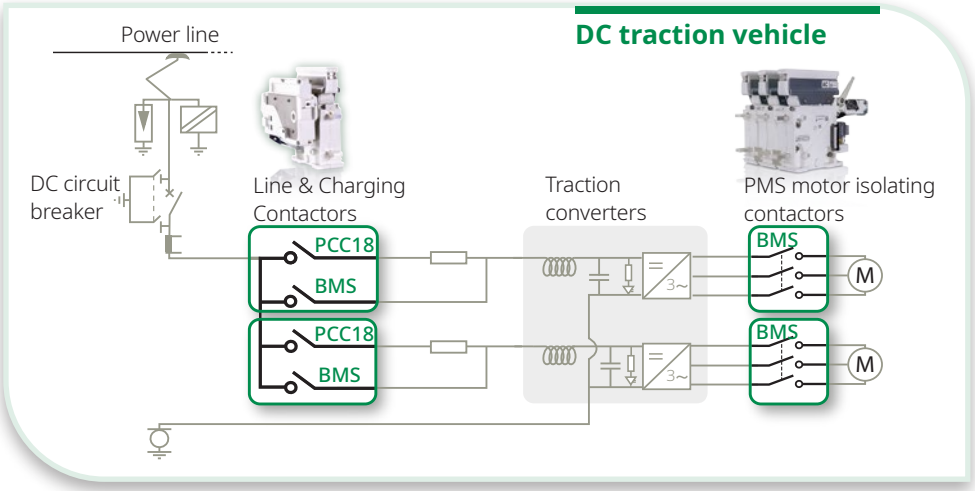
RAIL VEHICLES / FIXED INSTALLATION

GENERAL INFORMATION

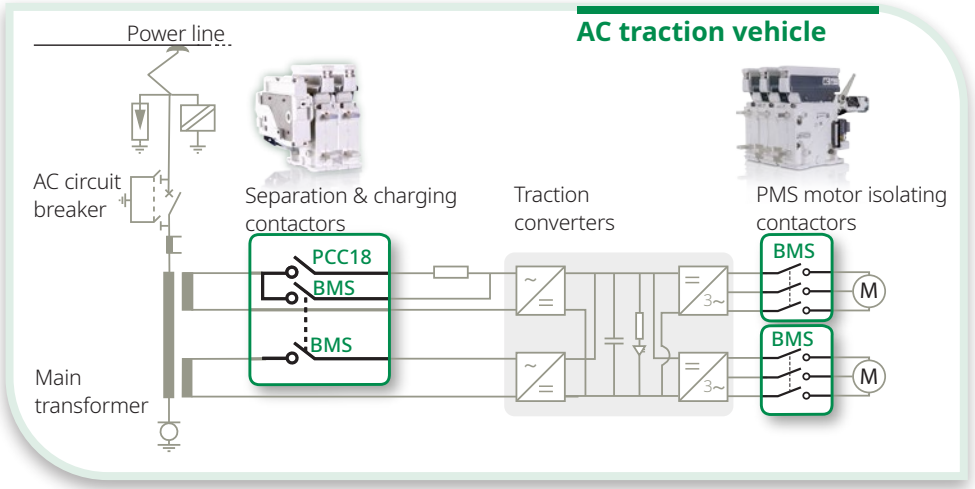
The **BMS** contactor, with more than one hundred and fifty thousands units in operation worldwide, is a contactor valued by the car builders and operators of electric traction vehicles for its strong performance level and its extremely high reliability. Taking advantages of its recognized features and design, Sécheron has modernized the BMS to make a product platform particularly well adapted to actual requirements and standards. With its high modularity, the **BMS** offers variants and options that enable our customers to find the most appropriate version to fit their application either as a stand-alone contactor, or delivered coupled with a Sécheron dedicated charging contactor type **PCC18**. Power contactor modules, convenient to order and easy to install, are a frequent wish of our customers. Sécheron brings the best solution with "plug & play" units gathering line and charging contactors, but also current measurement and customised high voltage and low voltage interfaces.

APPLICATIONS, TYPICAL EXAMPLES

- Line contactors for DC vehicles.



- Separation/line contactors for AC vehicles.



- Other applications for locomotives, trains, EMUs, tramways/light rail vehicles, including dual mode rail vehicles with battery.
- Battery charging contactors for e-Bus or dual mode Bus.
- Contactors for DC traction power substations and other industrial fields.

MAIN FEATURES

- Normally open and bi-directional contactor.
- Rated voltage 900 V_{DC} or 1,800 V_{DC} / 2,000 V_{AC}.
- Conventional free air thermal current 800 A or 1'000 A.
- Available in 1, 2 or 3 poles (BMS..08).
- Low voltage control coil protection against surges.
- Suitable for ambient temperature from -40°C to +70°C.
- Reference standards: EN/IEC 60077-1/-2, EN/IEC 61373, EN 45545, EN 50657.

MAIN BENEFITS

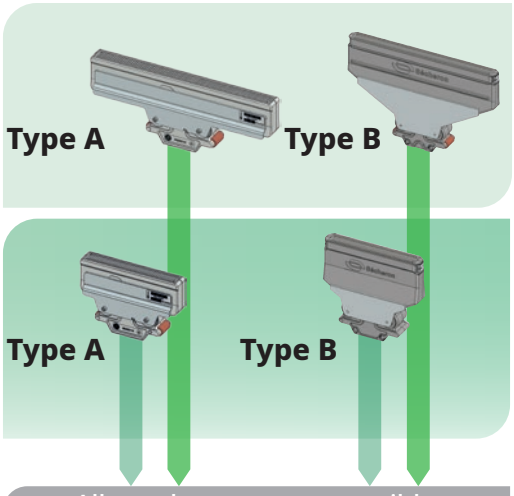
- Very compact size and extremely low weight.
- No critical current.
- Different arc chutes matching installation space and operational performance requirements.
- Small arc chute also valid for 2,000 VAC.
- High mechanical and electrical durability.
- Horizontal or vertical mounting to match vehicle's installation constraints.
- High modularity of the range.
- Possible integration of optional charging contactor type PCC18 directly on BMS line contactor.
- Low maintenance requirements with easy access to the main contacts for replacement.
- Worldwide service proven.

CONTACTOR CONFIGURATIONS

DC APPLICATIONS

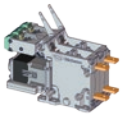
U_e [V_{DC}]

1,800



900

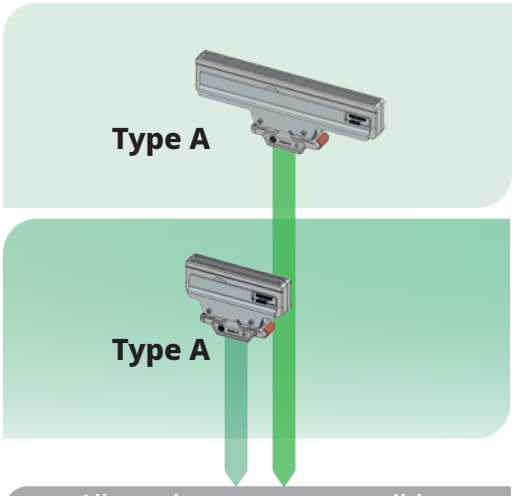
All arc chutes are compatible with the BMS bodies below

1 pole	2 poles
	
BMS..08 | 800 A **BMS..10** | 1,000 A	**BMS..08** **BMS..10**
	
installation	
	
horizontal Vertical	horizontal Vertical

AC APPLICATIONS

U_e [V_{AC}]

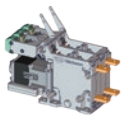
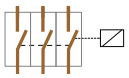
4,000*



2,000

Arc chute

All arc chutes are compatible with the BMS bodies below

1 pole	2 poles	3 poles
		
BMS..08 | 800 A **BMS..10** | 1,000 A	**BMS..08** **BMS..10**	**BMS..08**
		
installation		
		
horizontal Vertical	horizontal Vertical	horizontal Vertical

Body

* for applications with Permanent Magnets Synchronous Motors and frequency up to 400 Hz. For detailed information refer to dedicated brochure SA003724.

DATA FOR PRODUCT SELECTION

	Symbol	Unit	BMS 09.08	BMS 09.10	BMS 18.08	BMS 18.10	PCC18
MAIN HIGH VOLTAGE CIRCUIT							
Pole quantity			1, 2, 3	1, 2	1, 2, 3	1, 2	1
Component category			A2				
Type of main contact			Normally Open				
Rated operational voltage							
- DC voltage	U_e / U_r	[V]	900		1,800		1,800
- AC voltage (16.7, 25, 50/60, ...400 Hz[1])		[V]	2,000		-		2,000
Rated insulation voltage	U_i / U_{Nm}	[V_{DC}]	2,300		2,300		2,300
		[V_{AC}]	2,300		-		2,300
Conventional free air thermal current [2]	I_{th}	[A]					
- DC voltage & AC voltage (16.7, 25, 50/60 Hz)			800	1,000	800	1,000	N.A.
- AC voltage (250 Hz)			600	-	600	-	N.A.
- AC voltage (400 Hz)			400	-	400	-	N.A.
Rated operational current/operational frequency							
- Horizontal mounting: DC	I_e / I_r	[A]	800 / C1 (C2 [3])		800 / C1		100
DC	I_e / I_r	[A]	500 / C2		500 / C2		-
AC	I_e / I_r	[A]	800 / C2		-		100
- Vertical mounting: DC	I_e / I_r	[A]	500 (800 [3]) / C1	500 / C1	800 / C1		N.A.
AC	I_e / I_r	[A]	800 / C1		-		N.A.
Maximum breaking capacity							
- DC current, τ = 15 ms	I_{bc}	[A]	3,200 (6,000 [3])	3,200	2,300 (6,000 [3])	2,300	200
- AC current, cos Φ = 0.8 (16.7, 25 & 50/60 Hz)	I_{bc}	[A]	4,200		-		200
Maximum making capacity							
- DC current, τ = 15 ms	I_{mc}	[A]	6,000		6,000		200
- AC current, cos Φ = 0.8 (16.7, 25 & 50/60 Hz)	I_{bc}	[A]	4,200		4,200		200
Rated short-time withstand current	$I_{cw\,/\,t}$	[kA]/ [ms]	10 / 100		10 / 100		3 / 100
Peak short-time withstand current	$\hat{I}_{cw}$	[kA]	10		10		3
Rated power-frequency withstand voltage (50 Hz/1min)							
- Between main contacts (open)	U_{50} / U_a	[kV_{AC}]	7.5				
- Main circuit (closed) to earth	U_{50} / U_a	[kV_{AC}]	9.5				

[1] For Permanent Magnet Synchronous Motor applications and rated operational voltage >2,000 V_{AC}, please refer to the brochure SA003724 Brochure_Contactors_BMS_3 poles.•
[2] At T_{amb} = +40°C and tested with HV connections with current density 1.7 A/mm². For higher frequency, please contact Sécheron. [3] With arc chute type B

	Symbol	Unit					
LOW VOLTAGE CIRCUIT							
Control circuit							
Nominal supply voltage [4]	U_n	[V_{DC}]	24 to 220				24 to 220
Nominal control voltage [4]	U_{EF}	[V_{DC}]	24 to 110				
Range of voltage			[0.7 - 1.25] U_n				[0.7 - 1.25] U_n
Nominal closing power [4][5]	P_c	[W]	≤ 37, ≤ 60, ≤ 80, ≤ 250, ≤ 400				40
Nominal holding power [4][5]	P_h	[W]	≤ 4, ≤ 6, ≤ 10 , ≤ 37				-
Mechanical closing time [5]	t_{cc}	[ms]	100 to 130				50
Mechanical opening time [5]	t_{co}	[ms]	50 to 70				10

[4] For detailed values based on BMS configuration, please refer to page 9 • [5] At U_n and T_{amb} = +20°C.

	Symbol	Unit					
Control circuit							
Type of contacts			Potential free (PF)				
Rated voltage		[V_{DC}]	24 to 220				
Conventional thermal current	I_{th}	[A]	10				
Utilization category according to EN60947							
- AC-15 230 V_{AC}			1.0 A				
- DC-13 110 V_{DC}			0.5 A				
Minimum let-through current at 24 VDC [6]		[mA]	≥ 10 (silver contacts) or 4 ≤ I < 10 (gold contacts)				

[6] For a dry and clean environment.

	Symbol	Unit					
Low voltage interface							
Control circuits			Direct on coil or Wago terminal (based on product configuration)				
Auxiliary switches			Direct on switches				
Insulation							
Rated power-frequency withstand voltage (50 Hz / 1min)							
- LV circuit to earth	U_{50} / U_a	[kV]	1.5				

	Symbol	Unit					
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 [7]				
Minimum mechanical durability	N	Cycles	2 millions	1 million	2 millions	1 million	2 millions

[7] for BMS...08 3 poles: PD3 (at U_i/U_{Nm} = 3,600 V), PD2 (at U_i/U_{Nm} = 4,800 V)

PRODUCT INTEGRATION

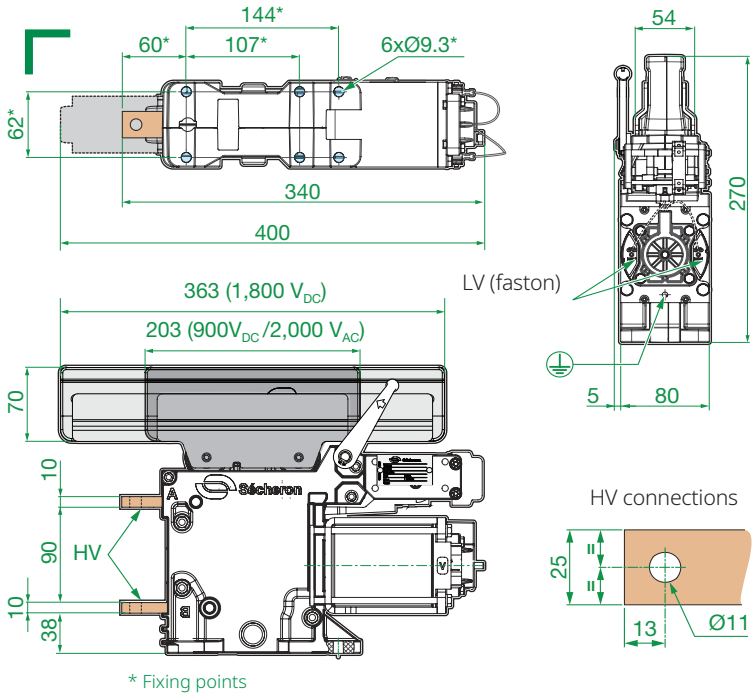
MAIN DIMENSIONS

HV connections	M10 screws (BMS..08), M12 (BMS..10)
Earth connections	M6 screws, thread length 8mm
LV Connections	BMS control: faston or Wago terminal*
	BMS auxiliary switches: M3 screws
Fixing points	M8 screws

* Based on product configuration

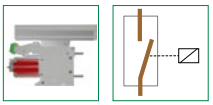
Dimensions without tolerances are indicative. All dimensions are in mm. The maximum allowed flatness deviation of the support frame is 0.5 mm.

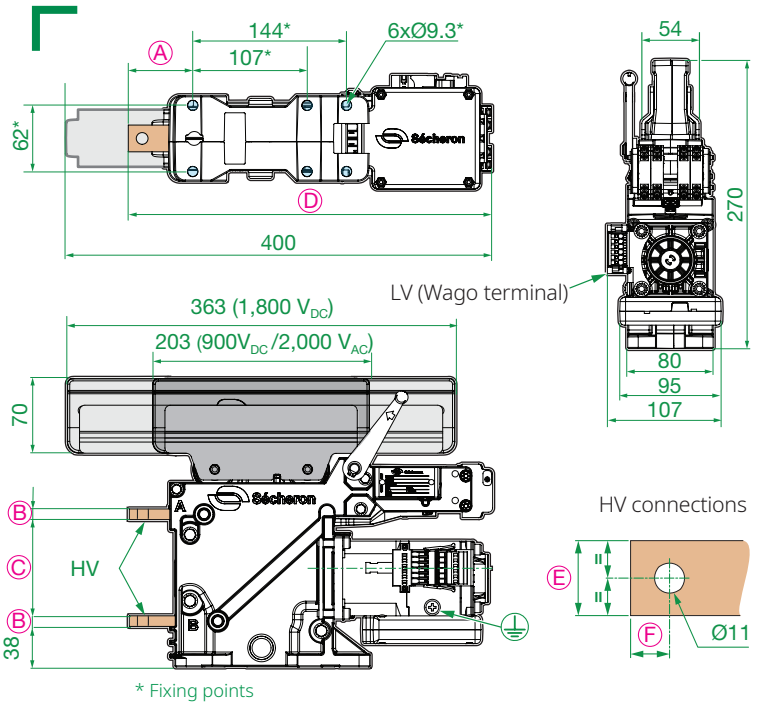
BMS09.08 / BMS18.08 & BMS09.10 / BMS18.10
ARC CHUTE TYPE A



* Fixing points

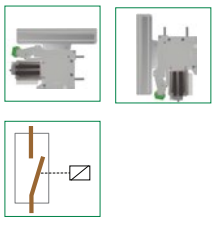
BMS..08
1-POLE
Horizontal installation only





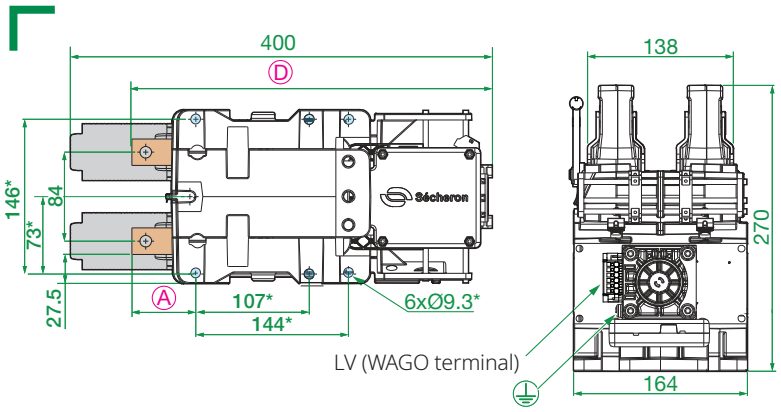
* Fixing points

BMS..08/BMS..10
1-POLE
Horizontal/vertical installation

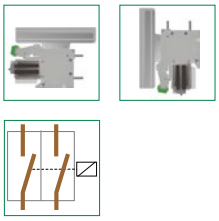


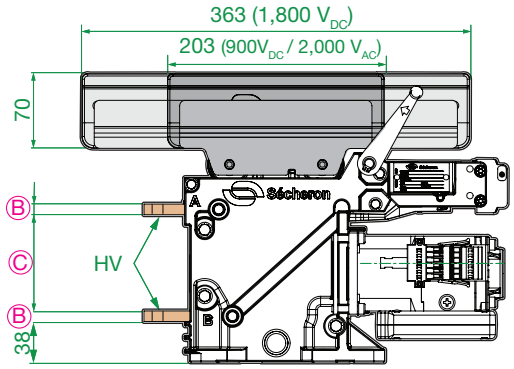
Dimensions [mm]	BMS..08	BMS..10
Ⓐ	60	120
Ⓑ	10	15
Ⓒ	90	80
Ⓓ	340	400
Ⓔ	25	55
Ⓕ	13	20

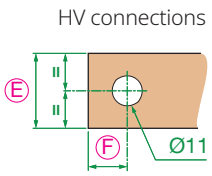
BMS09.08 / BMS18.08 & BMS09.10 / BMS18.10
ARC CHUTE TYPE A



BMS..08/BMS..10
2-POLES SYNCHRONIZED
Horizontal/vertical installation

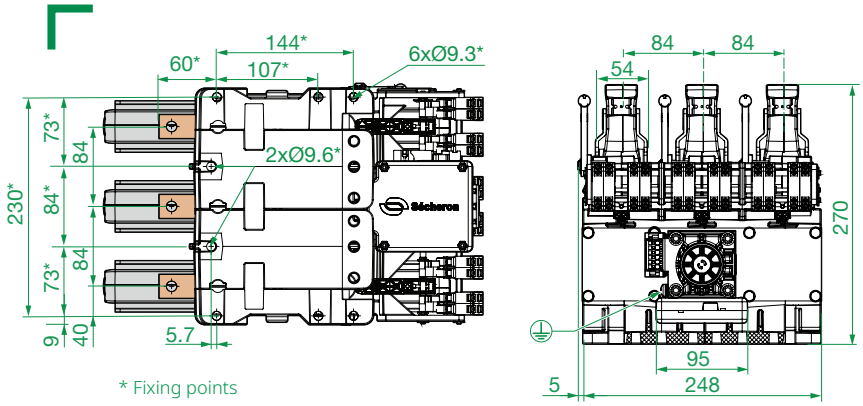




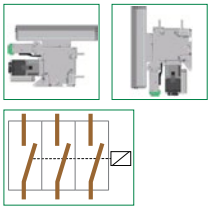


Dimensions [mm]	BMS..08	BMS..10
Ⓐ	60	120
Ⓑ	10	15
Ⓒ	90	80
Ⓓ	340	400
Ⓔ	25	55
Ⓕ	13	20

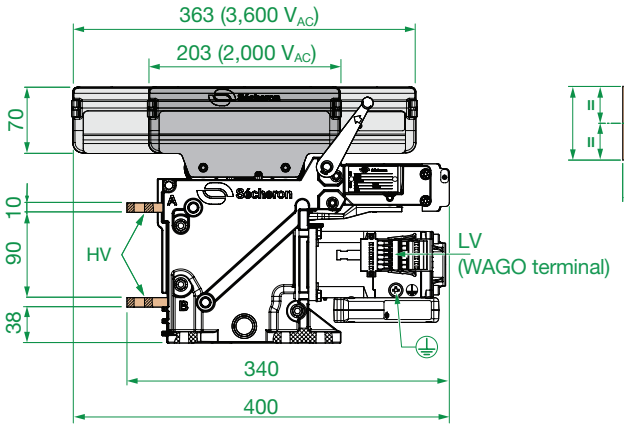
* Fixing points

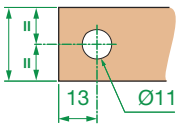


BMS..08
3-POLES
Horizontal/vertical installation

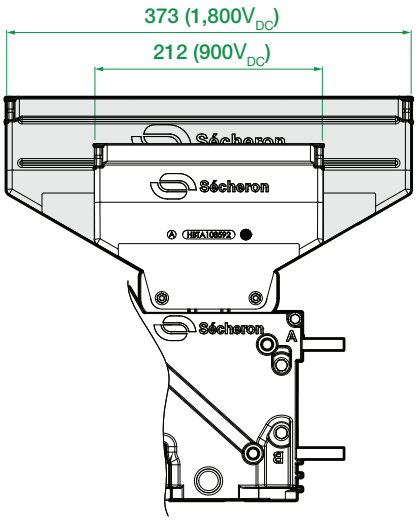


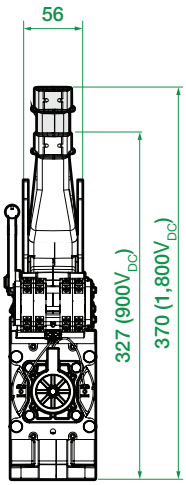
* Fixing points





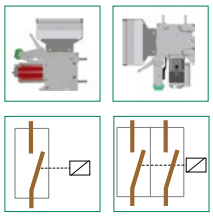
BMS09.08 / BMS18.08 & BMS09.10 / BMS18.10
ARC CHUTE TYPE B



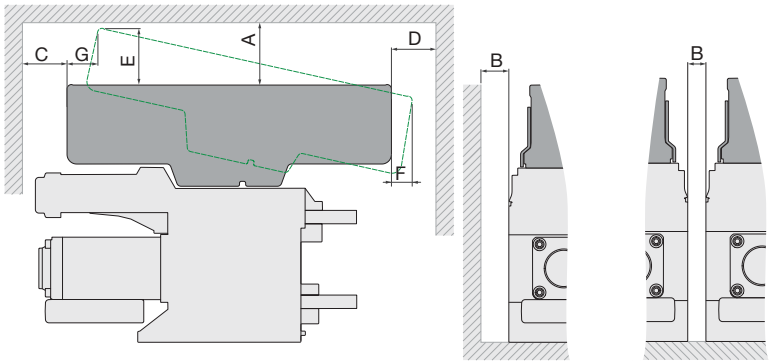


Installed only on 1 and 2 poles configurations. All dimensions with arc chute type A (refer to page 5-6) are valid for contactors equiped with arc chute type B, except for the dimensions shown below.

BMS..08/BMS..10
1-POLE
Horizontal/vertical installation



INSULATION DISTANCES AND WEIGHTS



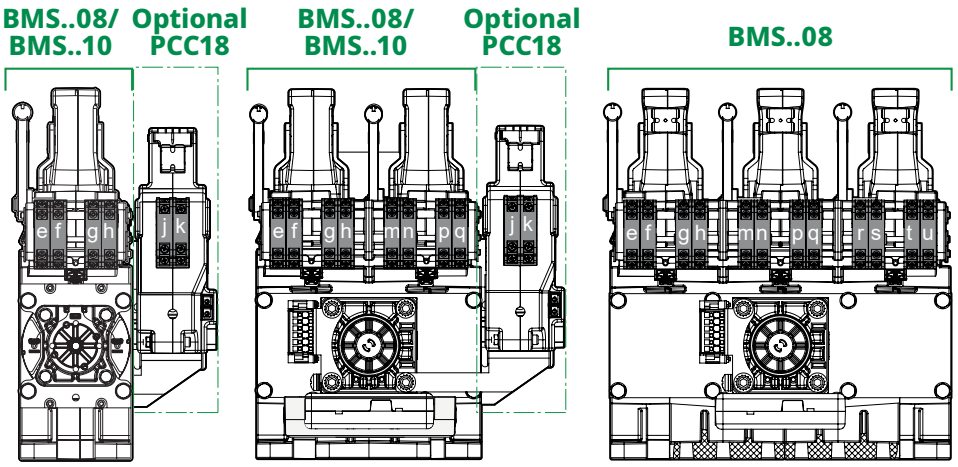
BMS contactors have been homologated according to IEC60077-2 with the following insulation distances.

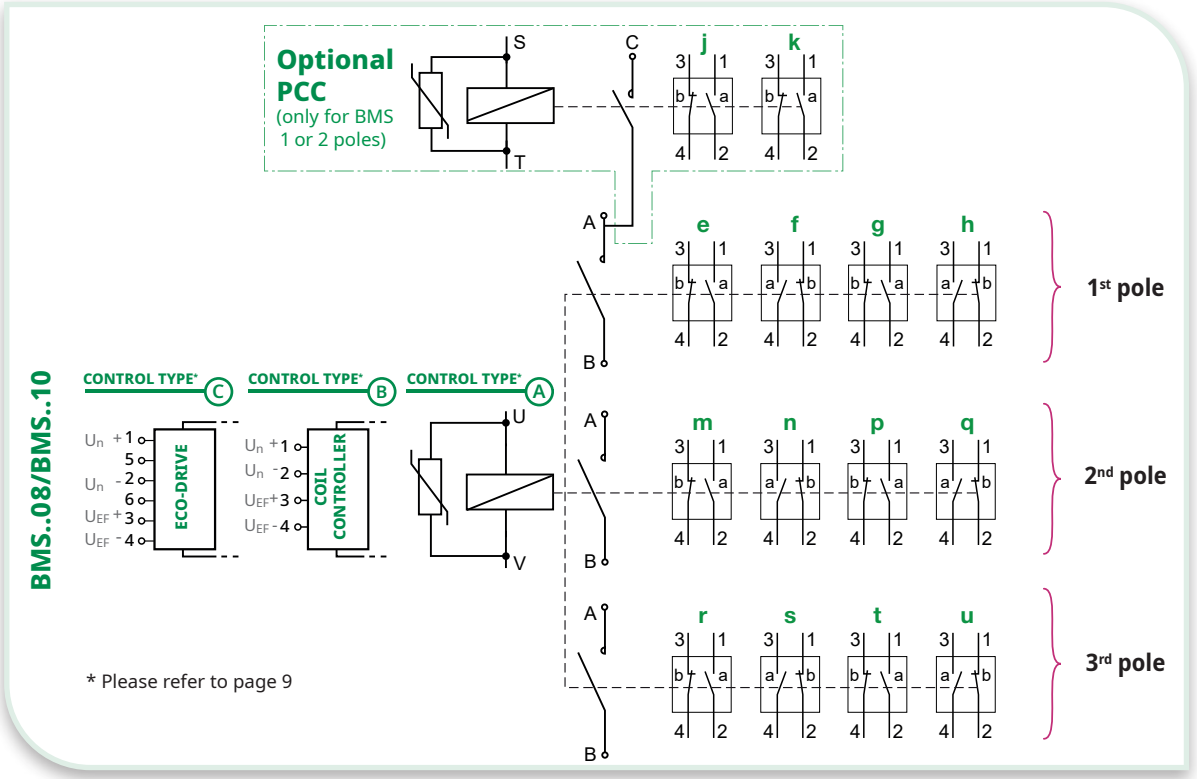
BMS type	Weight: ± 1 kg [kg]				
	pole				
	1		2		3
	...08	...10	...08	...10	...08
BMS09... A	9	10	15	17	21
BMS18... A	10	12	17	21	25
BMS09... B	10	11	17	19	-
BMS18... B	10	13	21	23	-

contactor type	Breaking current	Arc chute type	Insulating distance [mm]								Arc chute removal distance [mm]		
			To earthed wall				To insulating wall						
			A	B	C	D	A	B	C	D	E	F	G
BMS09...	≤ 800 A	A	75	10	75	75	40	10	40	40	70	30	35
	> 800 A		○(1)	○(1)	○(1)	○(1)	75	10	75	75			
BMS18...	≤ 800 A	A	75	10	75	75	40	10	40	40	90	20	40
	> 800 A		○(1)	○(1)	○(1)	○(1)	75	10	75	75			
BMS09...	≤ 800 A	B	40	10	40	40	20	10	20	20	70	45	50
	> 800 A		○(1)	○(1)	○(1)	○(1)	40	10	40	40			
BMS18...	≤ 800 A	B	40	10	40	40	20	10	20	20	80	20	80
	> 800 A		○(1)	○(1)	○(1)	○(1)	40	10	40	40			

(1) Distances on request according to your application

AUXILIARY CONTACTS CONFIGURATION





AUXILIARY SWITCH SWITCH POSITION PER POLE

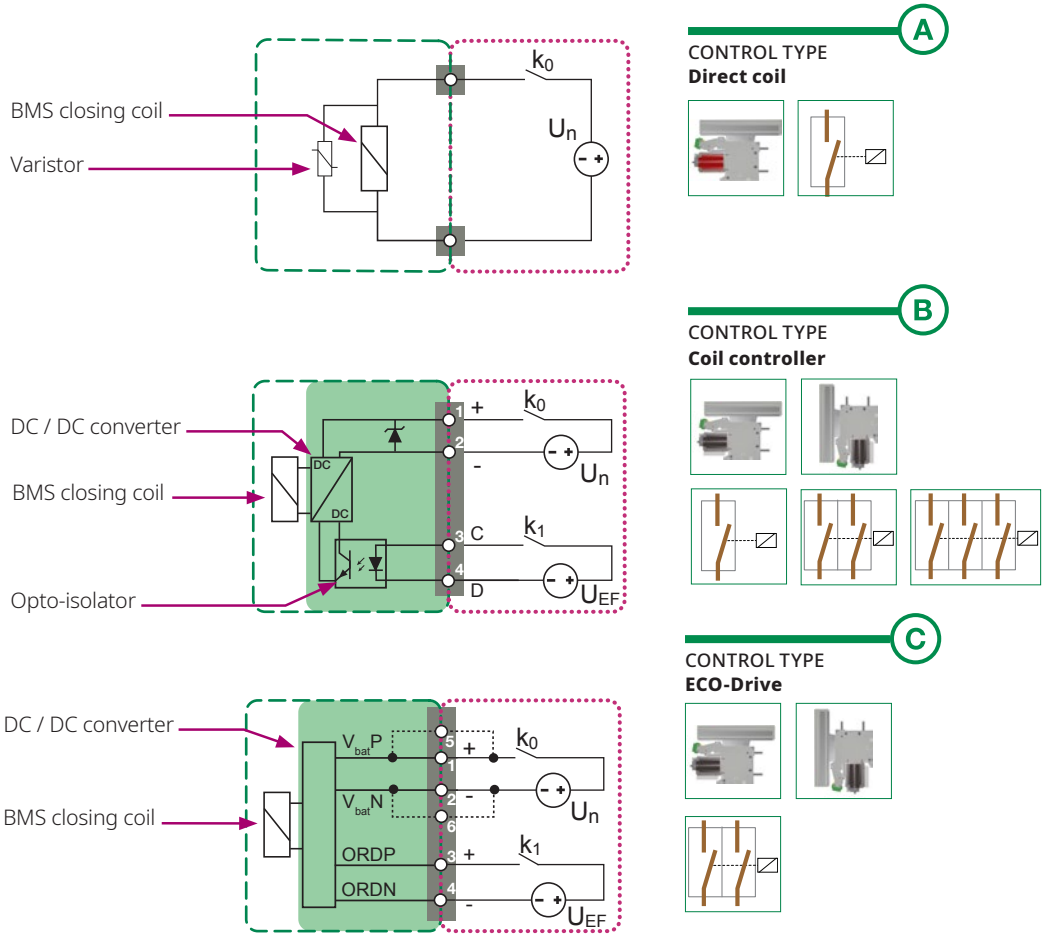
Function of the selected quantity of poles and of auxiliary switches per BMS's pole, the location of the switches will be as follows:

	BMS									PCC18	
	1st pole			2nd pole			3rd pole			1 pole	
1 switch / pole			g			p			t	j	
2 switches / pole		f	g		n	p		s	t	j	k
3 switches / pole	e	f	g	m	n	p	r	s	t		

LOW VOLTAGE CONTROL DIAGRAM

BMS CONFIGURATION [1]		Nominal supply voltage [2] U_n [V_{DC}]	Nominal control voltage [2] U_{EF} [V_{DC}]	Closing power (P_c) / Holding power (P_h) [W] / [W]	Control type	Optional PCC18 [3] Supply voltage Un [V_{DC}]
BMS..08 horizontal installation only	1 pole	24, 32, 36, 48, 72, 84, 110, 220	N.A.	≤ 37 / ≤ 37	A	24, 48, 72, 84, 110, 220 [4]
BMS..08 horizontal / vertical installation	1 pole	[24-36], [48-110]	[24-110]	≤ 60 / ≤ 4	B	
BMS..10 horizontal / vertical installation				≤ 80 / ≤ 4		
BMS..08, BMS..10 horizontal / vertical installation	2 poles	[24-36]	[24-110]	≤ 250 / ≤ 6	C	
		[48-110]			B	
BMS..08 horizontal / vertical installation	3 poles	[72-110]	[24-110]	≤ 400 / ≤ 10	B	

[1] For details refer to pages 5 & 6. • [2] Control voltage U_{EF} and supply voltage U_n can be different. • [3] Horizontal installation. • [4] Other voltages on request.



Sécheron's scope
Customer's scope

Low voltage interface
Coil controller

U_n : DC power supply
U_{EF} : Control voltage
k_0 : Supply relay
k_1 : Control relay

OPTIONS

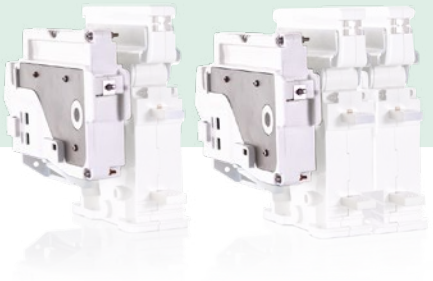
(SUBJECT TO ADDITIONAL COSTS)

INTEGRATED CHARGING CONTACTOR (PCC18)

Line contactors and charging contactors are usually operated sequentially and mounted side by side in dedicated line breaker boxes, or directly in traction converters. Therefore, delivering an integrated unit combining both functions, line contactor type BMS and charging contactor type PCC18, brings an added value to car builders, as it reduces their engineering, logistic and assembly efforts.

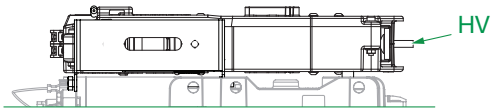
MAIN BENEFITS

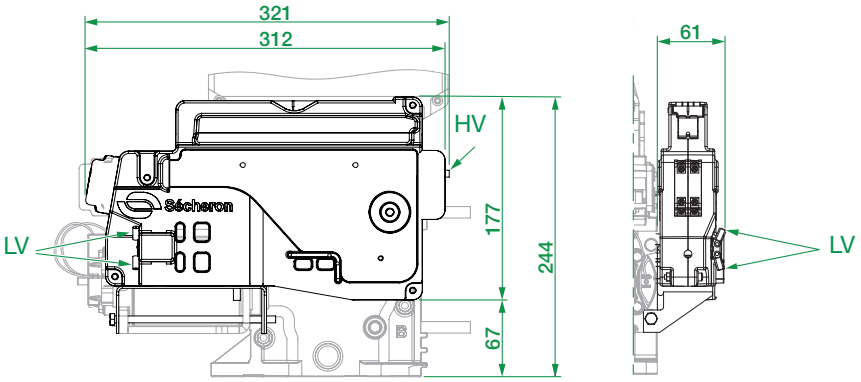
- Optimized for the dedicated charging function.
- One single unit with integration of line and charging contactors.
- Integration on all BMS contactors installed horizontally.
- Very compact solution.
- Reduced overall project costs for car builders.



MAIN DIMENSIONS

HV connections (PCC18)	M6 screw.
Earth connections	through BMS
LV Connections	PCC18 coil: M3 screws.
	PCC18 auxiliary switches: M3 screws



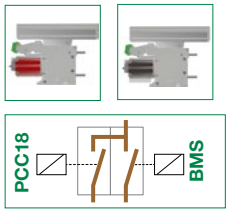


Dimensions without tolerances are indicative. All dimensions are in mm.

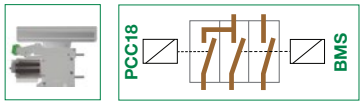
The views shown here represent the **PCC18** when mounted on any horizontal **BMS..08** and **BMS..10** versions. The other dimensions of the **BMS..08** and **BMS..10** indicated on page 5 and 6 remain valid.

Additional weight
+ 3 kg

BMS + PCC
1-POLE
Horizontal installation



BMS + PCC
2-POLES
Horizontal installation



CONTROL DIAGRAM

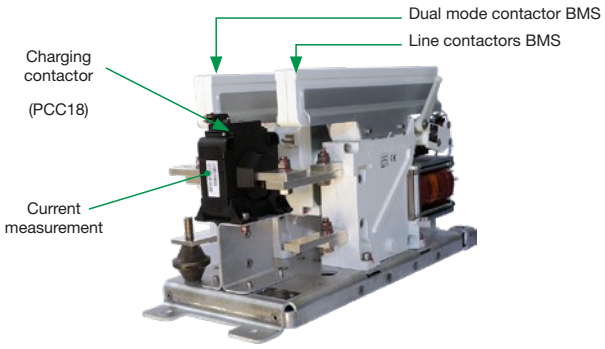
For the control diagram, please contact Sécheron.

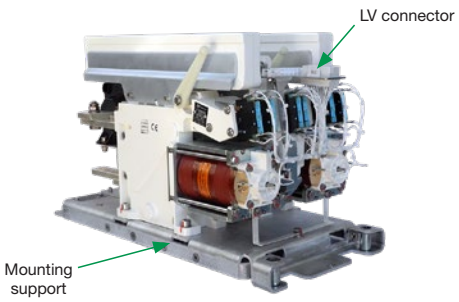
POWER CONTACTOR MODULE

On project base, Secheron designs and delivers complete **Power Contactor Modules** integrating BMS and PCC contactors, but also current measurement and other components necessary to fulfill the application.

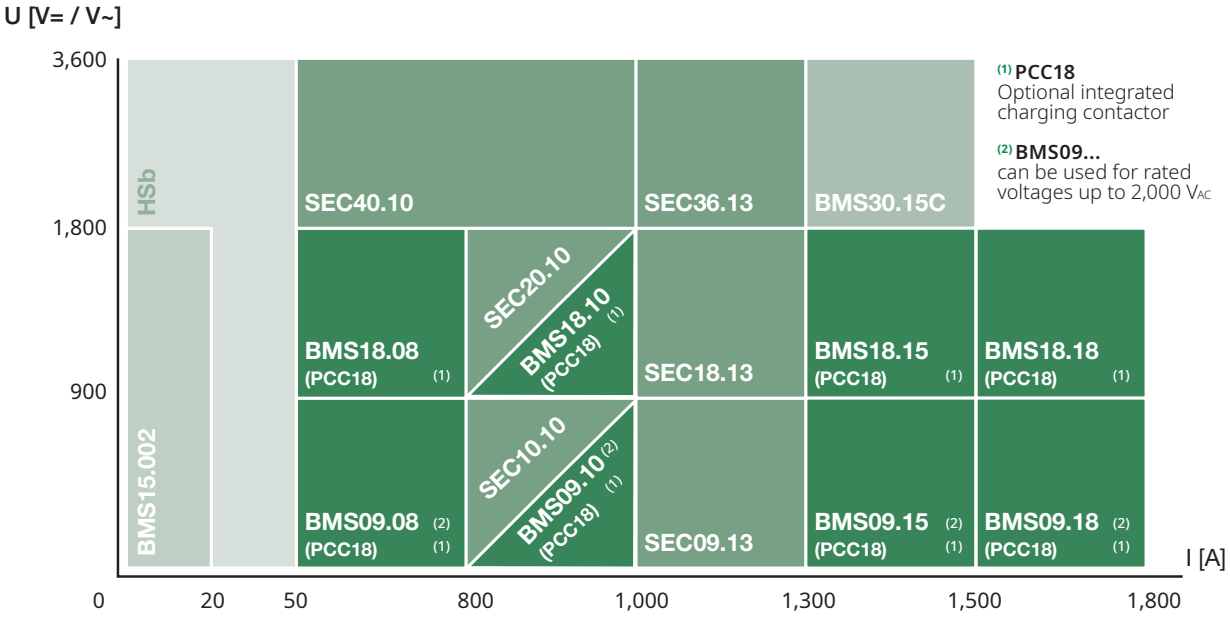
All the components are delivered mounted on a support, with implemented high voltage connections between components, and a single low voltage interface. The Power Contactor Module is available in horizontal mounting only.

This module offers the car builder simple and easy interfaces, but also simplifies its life in terms of development, logistic and installation.

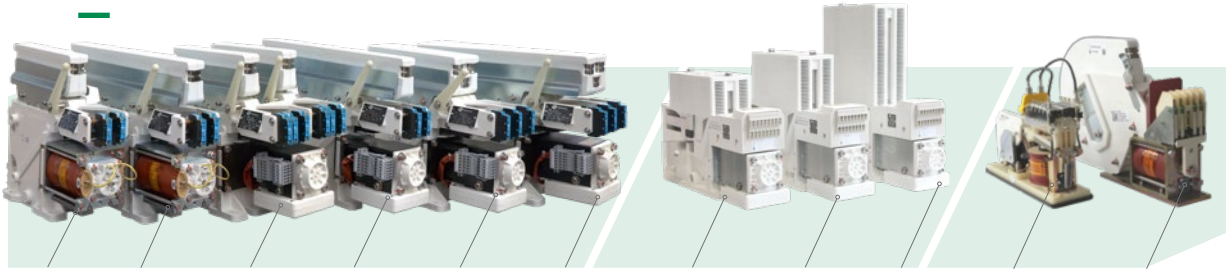




SECHERON CONTACTORS RANGE



AT A GLANCE



BMS 09.08
1 pole
Arc chute
Type A

BMS 18.08
1 pole
Arc chute
Type A

BMS 09.08
2 poles
Arc chute
Type A

BMS 18.10
1 pole
Arc chute
Type A

BMS 09.15
1 pole
Arc chute
Type A

BMS 18.18
1 pole
Arc chute
Type A

SEC10.10/ SEC09.13

SEC20.10/ SEC18.13

SEC40.10/ SEC36.13

BMS15.002

HSB

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.
- Be careful to write down the complete alphanumerical designation code with 17 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.

Example of customer's choice:	**BMS**	**18**	**08**	A	1	Z	Ø	E	A	1	H	D	A
Line:	10	11	12	13	14	15	16	17	18	19	20	21	22

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

DESIGNATION CODE

Note: some combinations may not be possible, therefore validate your configuration with Sécheron before ordering

Line	Description	Designation	Standard	Options	Customer's choice
10	Product type BMS	**BMS**	**BMS**		**BMS**
11	Rated operational voltage	900 V_{DC} or 2,000 V_{AC}	09		
		1,800 V_{DC}	18		
12	Rated conventional free air thermal current [1]	800 A	08		
		1,000 A	10		
13	Arc chute type	Type A	A		
		(BMS..08 only) Type B		B	
14	Number of poles	1 pole	1		
		2 poles	2		
		3 poles	3		
15	Poles mechanical synchronization	(1 pole) Not applicable	Z		
		(2 & 3 poles) Synchronized	S		
16	Integrated of charging contactor type PCC18	No	Ø		
		Yes		C	
17	Nominal supply voltage [2]	24 V_{DC}	A		
		32 V_{DC}		F	
		36 V_{DC}	B		
		48 V_{DC}	C		
		72 V_{DC}	D		
		84 V_{DC}		H	
		96 V_{DC}		4	
		110 V_{DC}	E		
		220 V_{DC}		J	
18	Auxiliary contacts BMS - per pole	1a + 1b - (switch PF) - silver type	A		
		1a + 1b - (switch PF) - gold type		C	
		2a + 2b - (switch PF) - silver type		E	
		2a + 2b - (switch PF) - gold type		H	
		3a + 3b - (switch PF) - silver type		K	
		3a + 3b - (switch PF) - gold type		M	
		4a + 4b - (switch PF) - silver type		O	
		4a + 4b - (switch PF) - gold type		P	
19	Auxiliary contacts (PCC18) [3]	(No PCC18) Not applicable	Z		
		1a + 1b - (switch PF) - silver type		1	
		1a + 1b - (switch PF) - gold type		2	
		2a + 2b - (switch PF) - silver type		3	
		2a + 2b - (switch PF) - gold type		4	
20	Installation configuration	Horizontal only	H		
		Horizontal & Vertical [3]		V	
21	Application type	(Direct Current) DC	D		
	-	(Alternating Current) AC		A	
22	Opening BMS arc chute	Arc chute lever	A		A

[1] For DC and AC voltage up to 60 Hz frequency. For higher frequency, please contact Sécheron •
[2] For the available control voltage in function of the BMS configuration, refer to table page 9. Please note that BMS is delivered with low voltage surge protection •
[3] PCC18 is valid for horizontal mounting only and for BMS.. 1 or 2 poles. •

Signature:

Name:

Place and date:

Sécheron SA
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CH-Switzerland

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