ELECTRICAL
SAFETY
SOLUTIONS

Sécheron

CONTACTORS

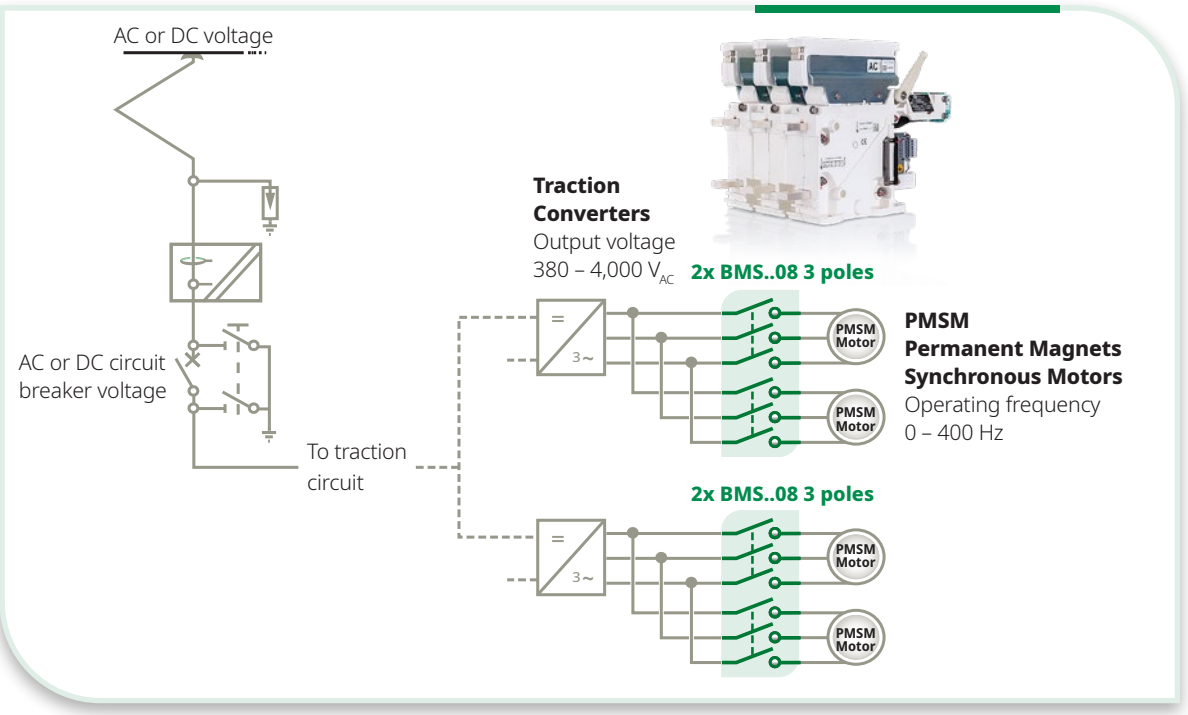
Type **BMS...08**
for Permanent Magnet Synchronous Motors

RAIL VEHICLES

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. With its high modularity, the BMS offers variants and options that enable our customers to find the most appropriate version to fit their applications. For rolling stock equipped with Permanent Magnets Synchronous Motors (PMSM motors), the BMS...08 contactor series offers a large range of configurations to connect and isolate the traction inverters and the PMSM motors, for voltage up to 4,000 V_{rms} and frequencies from 0 to 400 Hz, and currents up to 800 A (@50 Hz) or 400 A(@400 Hz). Its heavy duty class, high breaking capacity, combined with a high insulation class and robust EMC performances, make the BMS...08 the best market choice for this type of application.

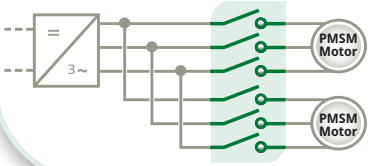
APPLICATIONS, TYPICAL EXAMPLES



Based on the vehicle's safety and failure modes analysis, the most preferred contactor's configuration will be selected among the following possibilities.

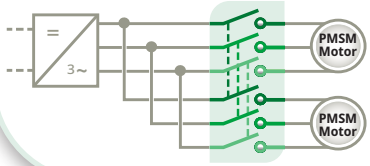
BMS..08 1 POLE

6x BMS..08 1 pole



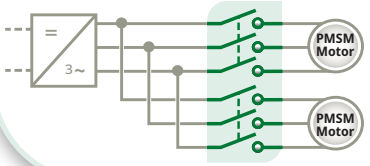
BMS..08 2 POLES

3x BMS..08 2 poles



BMS..08 3 POLES

2x BMS..08 3 poles



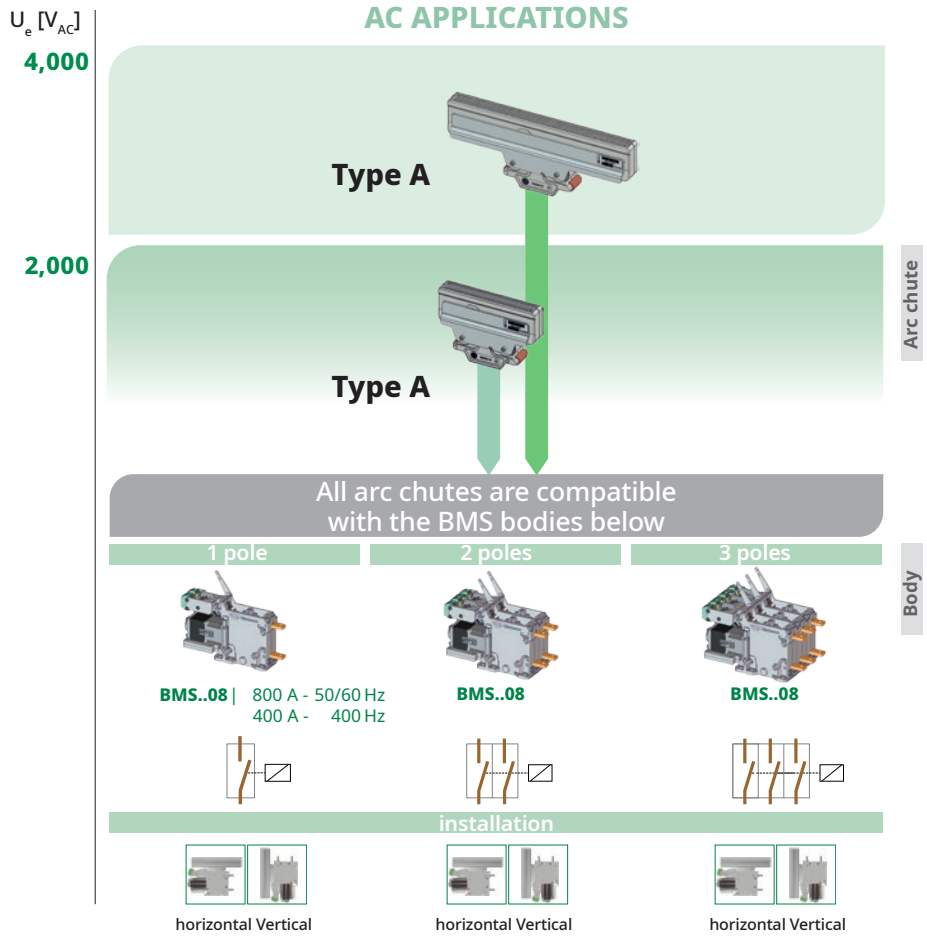
MAIN FEATURES

- Normally open and bi-directional contactor.
- Rated voltage 2,000 V_{rms} (BMS09.08) or 4,000 V_{rms} (BMS18.08).
- Conventional free air thermal current 800 A @ 50 Hz & 400 A @ 400 Hz.
- Low voltage control coil protection against surges.
- Suitable for ambient temperature from -40°C to +70°C.
- Reference standards IEC/EN 60077-2, IEC/EN 61373, EN 45545, EN 50567.

MAIN BENEFITS

- 1-pole configuration or 2-pole and 3-pole with mechanical link between poles
- High rated insulation voltage up to 4,800 V_{rms}.
- Operating frequency up to 400 Hz.
- High making & breaking performances.
- Also efficient to interrupt currents at 0 Hz for voltage up to 1,800 V.
- Very compact size and extremely low weight.
- High mechanical and electrical durability.
- Horizontal and vertical mounting.
- Low maintenance requirements with easy access to the main contacts.
- BMS design worldwide service proven.

CONTACTOR CONFIGURATIONS



DATA FOR PRODUCT SELECTION

	Symbol	Unit	BMS 09.08	BMS 18.08
MAIN HIGH VOLTAGE CIRCUIT				
Arc chute type			A	
Component category			A2	
Type of main contact			Normally Open	
Number of poles			1, 2, 3 (2-pole/3-pole version have mechanically linked poles)	
Rated operational voltage	U_e/U_r	[V]	2,000	4,000
Rated frequency	f/f_r	[Hz]	0 to 400	
Rated insulation voltage	U_{Nm}	[V]	4,800	
Conventional free air thermal current (1)	I_{th}	[A]		
- 16.7, 25, 50/60 Hz			800	
- 250 Hz			600	
- 400 Hz			400	
Rated operational current/operational frequency (from 50 Hz up to 400 Hz)	I_e/I_r	[A]	800 / C3	
Rated short-time withstand current	$\hat{I}_{cw/t}$	[kA]/ [ms]	10/100	
Peak short-time withstand current	$\hat{I}_{cw}$	[kA]	10	
Maximum breaking & making capacity - cos Φ = 0.8 (16.7, 25 & 50 Hz)		[A]	4,200 (2)	4,200 (2)
Rated power-frequency withstand voltage (50 Hz/1min)				
- Between main contacts (open)	U_{50}/U_a	[kV]	11,5	
- Main circuit (closed) to earth	U_{50}/U_a	[kV]	11,5	
Rated impulse withstand voltage	U_{Ni}	[kV]	25	

(1) At T_{amb} = +40°C for AC voltage up to 50 Hz and tested with HV connections with current density 1,7A/mm². For higher frequency, please contact Sécheron.
(2) For higher values, please contact Sécheron.

LOW VOLTAGE CIRCUIT			
Control circuit			
Nominal supply voltage (3)	U_n	[V_{DC}]	24 to 110
Nominal control voltage (3)	U_{EF}	[V_{DC}]	24 to 110
Range of voltage			[0.7 - 1.25] U_n
Nominal closing power (3)(4)	P_c	[W]	≤ 37, ≤ 60, ≤ 80, ≤ 250, ≤ 400
Nominal holding power (3)(4)	P_h	[W]	≤ 4, ≤ 6, ≤ 10 , ≤ 37
Mechanical closing time (4)	t_{cc}	[ms]	100 to 130
Mechanical opening time (4)	t_{co}	[ms]	50 to 70

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

Control circuit			
Type of contacts			Potential free (PF)
Rated voltage		[V_{DC}]	24 to 110
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 (5)		[mA]	≥ 10 (silver contacts) or 4 ≤ I < 10 (gold contacts)

(5) For a dry and clean environment.

Low voltage interface			
Control circuits			Wago terminal
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

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 (6)
Minimum mechanical durability	N	Cycles	2 millions (1- & 2-pole versions) / 1 million (3-pole version)

(6) PD3 (at U_i/U_{Nm} = 3,600 V), PD2 (at U_i/U_{Nm} = 4,800 V)

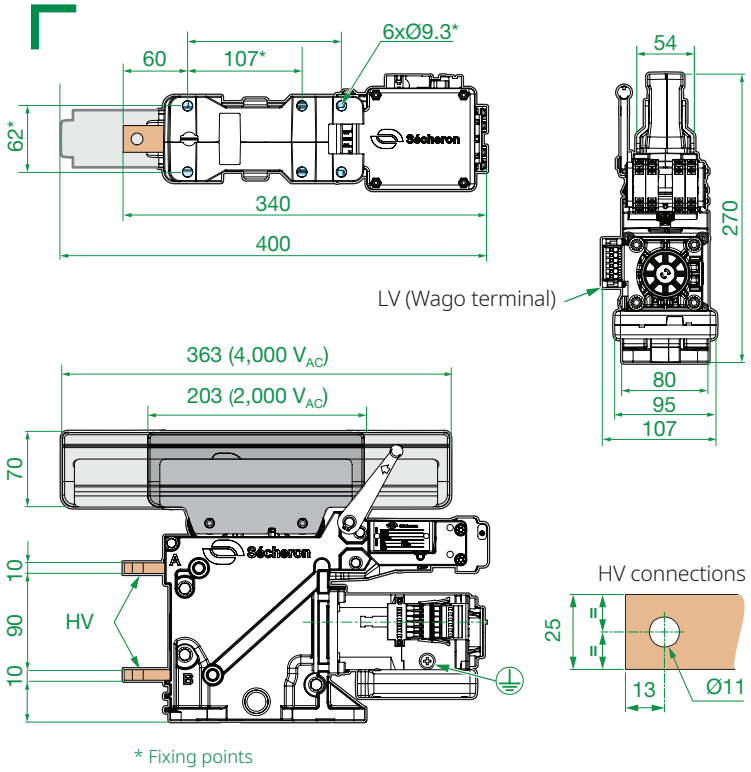
PRODUCT INTEGRATION

MAIN DIMENSIONS

HV connections	M10 screws
Earth connections	M6 screws, thread length 8 mm
LV Connections	BMS control: Wago terminal
	BMS auxiliary switches: M3 screws
Fixing points	M8 screws

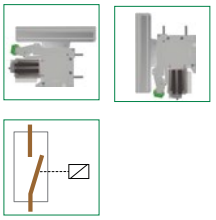
Dimensions without tolerances are indicative. All dimensions are in mm. The maximum allowed flatness deviation of the support frame is 0.5 mm.

BMS09.08 / BMS18.08
ARC CHUTE TYPE A

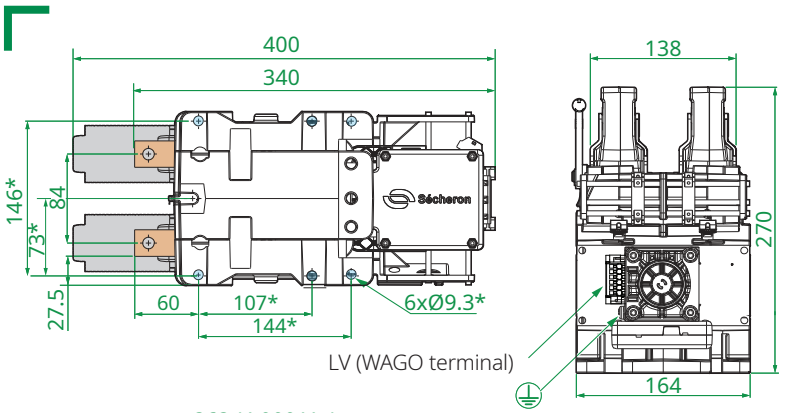


* Fixing points

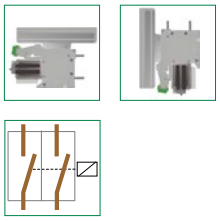
BMS..08
1-POLE
Horizontal/vertical installation

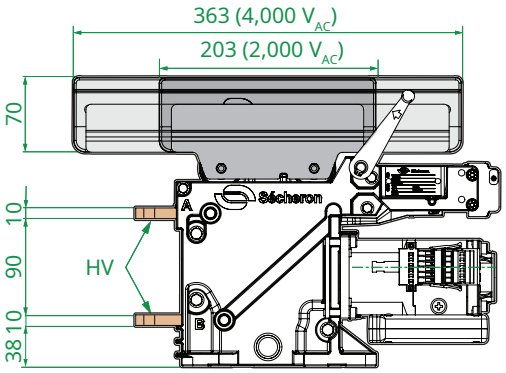


BMS09.08 / BMS18.08
ARC CHUTE TYPE A

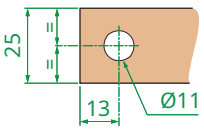


BMS..08
2-POLES SYNCHRONIZED
Horizontal/vertical installation

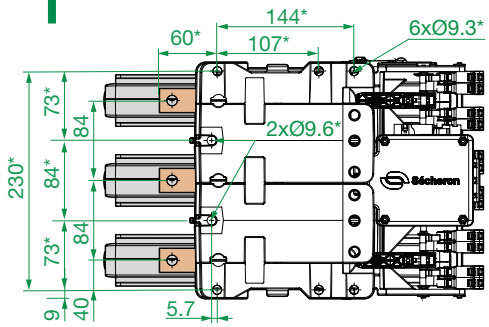




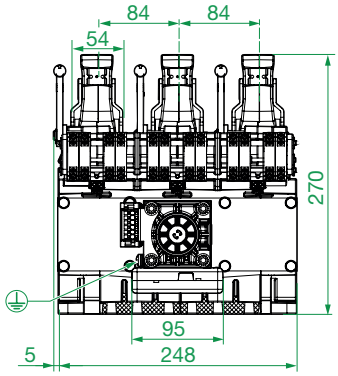
HV connections



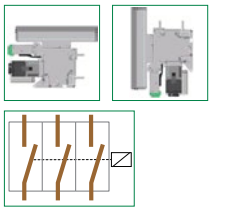
* Fixing points

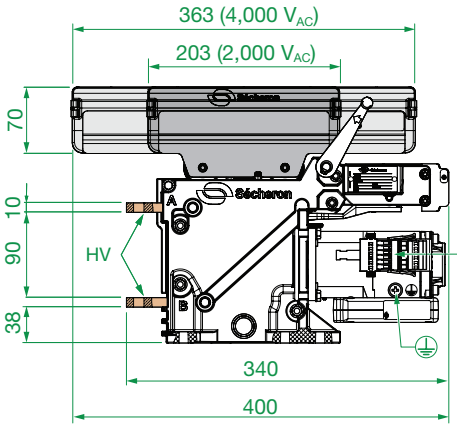


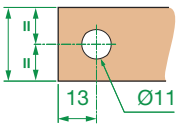
* Fixing points



BMS..08
3-POLES SYNCHRONIZED
Horizontal/vertical installation



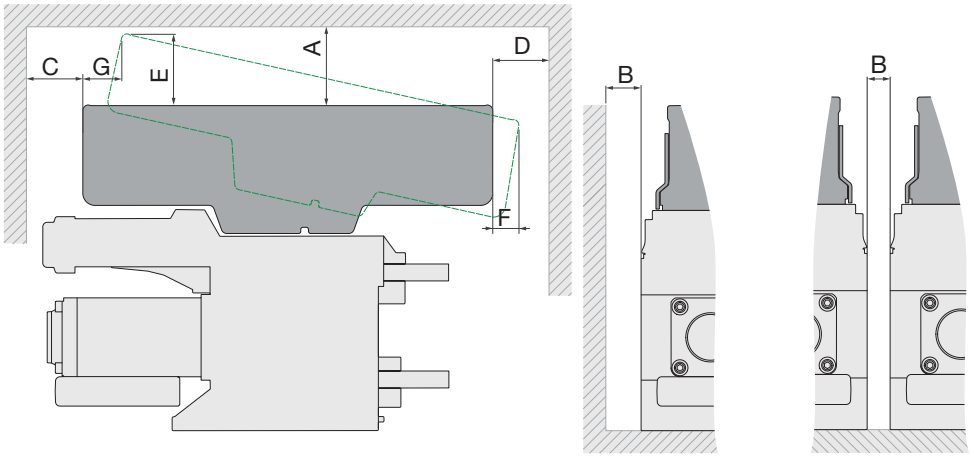




LV (WAGO terminal)

INSULATION DISTANCES AND WEIGHTS

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



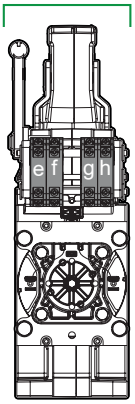
Contactor type	Breaking current	Arc chute type	Insulating distance [mm]								Arc chute removal distance [mm]		
			To earthed wall				To insulating wall						
			A	B	C	D	A	B	C	D	E	F	G
BMS09.08	≤ 800 A	A	75	10	75	75	40	10	40	40	70	30	35
	> 800 A		○(1)	○(1)	○(1)	○(1)	75	10	75	75			
BMS18.08	≤ 800 A	A	75	10	75	75	40	10	40	40	90	20	40
	> 800 A		○(1)	○(1)	○(1)	○(1)	75	10	75	75			

(1) Distances on request according to your application

Contactor type	Weight: ± 1 kg [kg]		
	pole		
	1	2	3
BMS09.08 A	9	15	21
BMS18.08 A	10	17	25

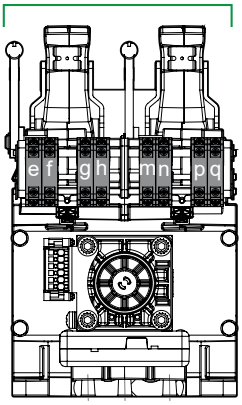
AUXILIARY CONTACTS CONFIGURATION

BMS..08



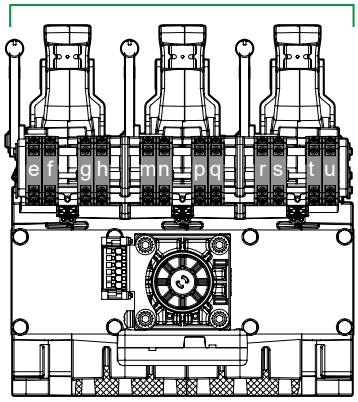
1 POLE

BMS..08

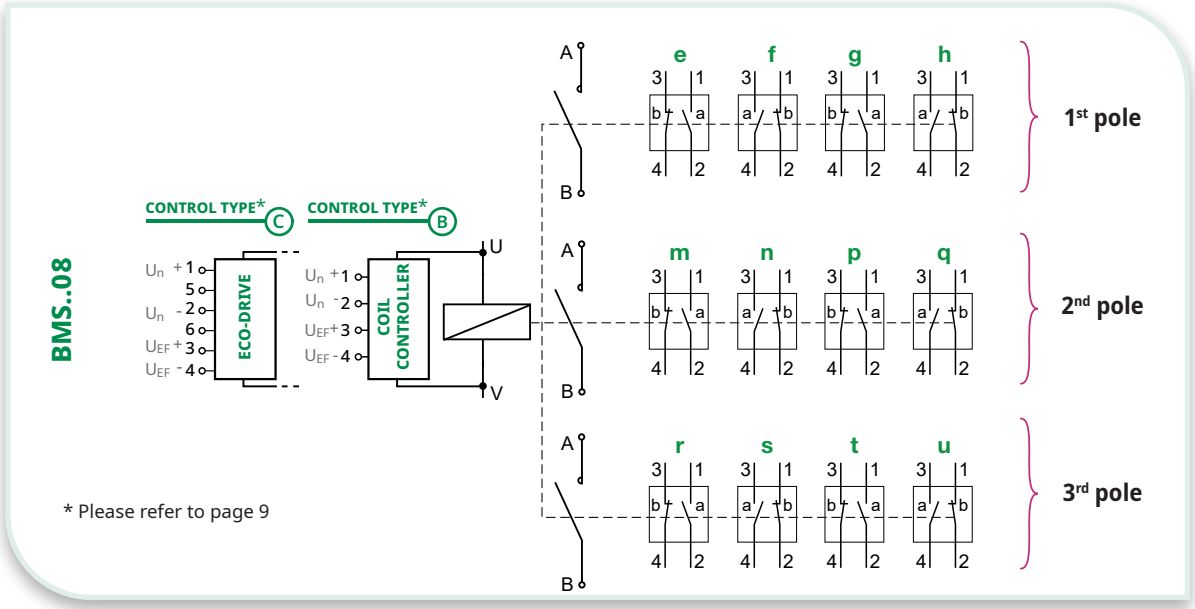


2 POLES

BMS..08



3 POLES



* Please refer to page 9

AUXILIARY SWITCH SWITCH POSITION PER POLE

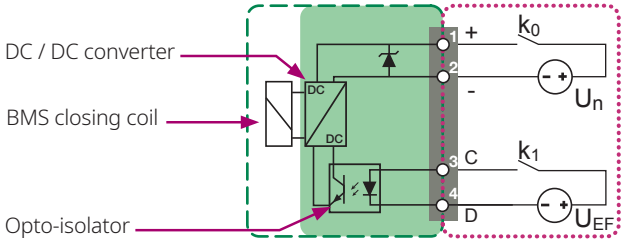
Function of the selected quantity of poles and of auxiliary switches per BMS's pole, the location of the switches will be as follows:

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

LOW VOLTAGE CONTROL DIAGRAM

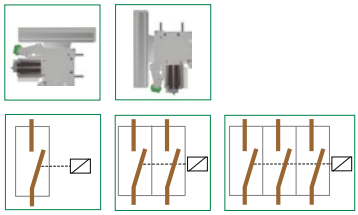
BMS CONFIGURATION [1]		Nominal supply voltage [2] U_n [V_{DC}]	Nominal control voltage [2] U_{EF} [V_{DC}]	Closing power (P_c) / Holding power (P_h) [W] / [W]	Control type
BMS..08 horizontal / vertical installation	**1 pole**	**[24-36], [48-110]**	**[24-110]**	**≤ 60 / ≤ 4**	B
BMS..08 horizontal / vertical 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

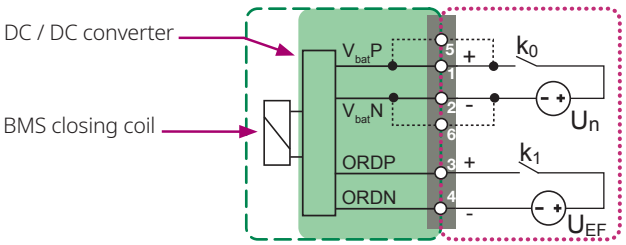
[1] For details refer to pages 5 & 6. • [2] Control voltage U_{EF} and supply voltage U_n can be different. •



B

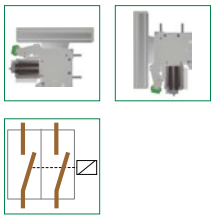
CONTROL TYPE
Coil controller





C

CONTROL TYPE
ECO-Drive

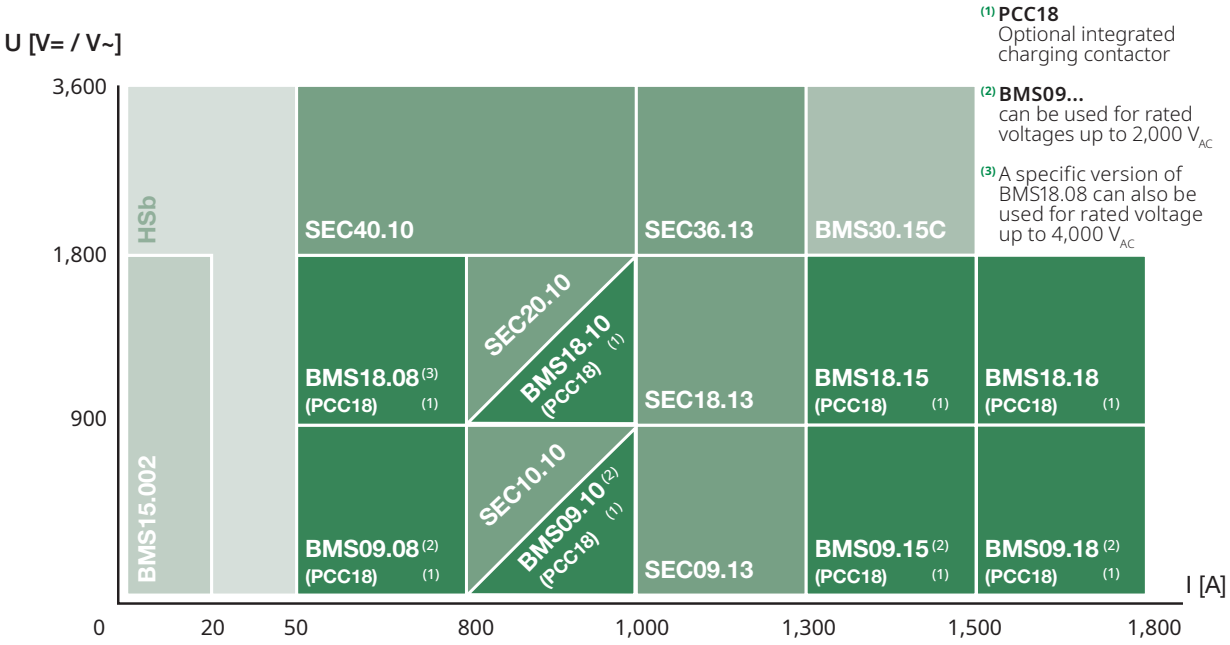


Sécheron's scope
Customer's scope

Low voltage interface
Coil controller

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

SECHERON CONTACTORS RANGE

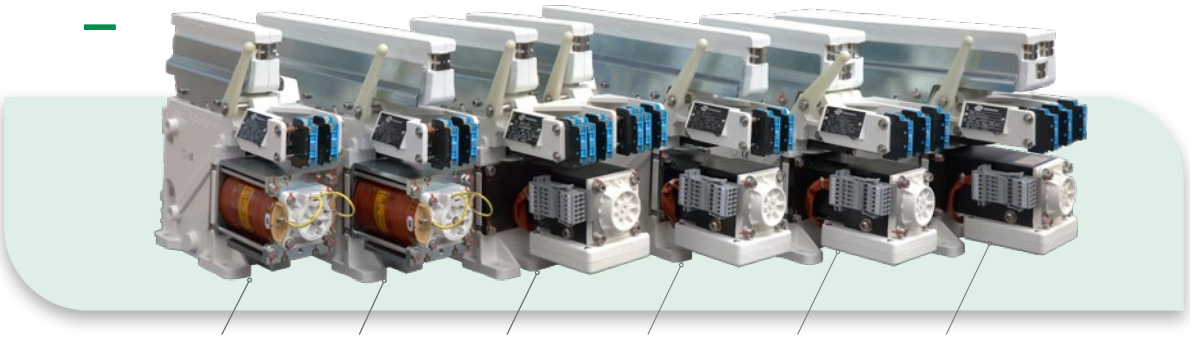


(1) **PCC18**
Optional integrated charging contactor

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

(3) A specific version of BMS18.08 can also be used for rated voltage up to 4,000 V_{AC}

AT A GLANCE



BMS 09.08
1 pole
Arc chute
Type A

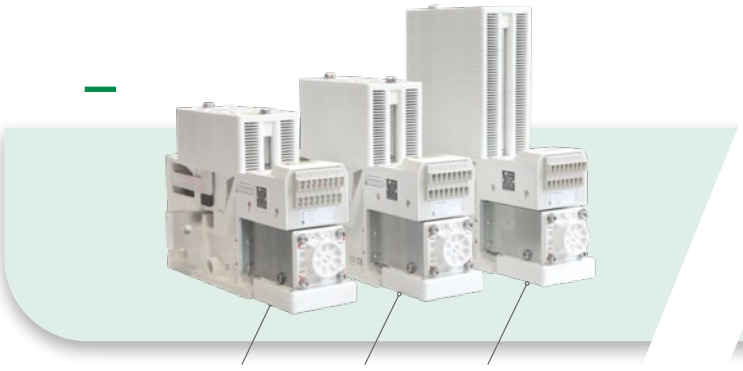
BMS 18.08
1 pole
Arc chute
Type A

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

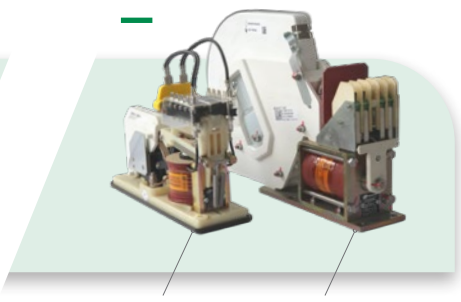
BMS 18.18
1 pole
Arc chute
Type A



SEC10.10/ SEC09.13

SEC20.10/ SEC18.13

SEC40.10/ SEC36.13



BMS15.002

HSB

BMS REFERENCE BROCHURES

BMS..08/BMS..10 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...).

BMS..08 PMSM 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.
- 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	3	S	Ø	E	A	Z	V	A	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

Line	Description		Designation		Customer's choice
			Standard	**Options**	
10	Product type	**BMS**	**BMS**		**BMS**
11	Rated operational voltage	2,000 V_{AC}	**09**		
		4,000 V_{AC}	**18**		
12	Rated conventional free air thermal current	800 A @ 50/60 Hz (400 A @ 400 Hz)	**08**		**08**
13	Arc chute type	Type A	A		A
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	Spare digit		Ø		Ø
17	Nominal supply voltage [1]	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		
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	Spare digit		Z		Z
20	Installation configuration	Horizontal & Vertical	V		V
21	Application type	(Alternating Current) AC	A		A
22	Opening BMS arc chute	Arc chute lever	A		A

[1] For the available control voltage in function of the BMS configuration, refer to table page 9.

Signature:

Name:

Place and date:

Sécheron

Sécheron SA
Rue du Pré-Bouvier 25
1242 Satigny - Geneva
CH-Switzerland

www.secheron.com
Tel: +41 22 739 41 11
Fax: +41 22 739 48 11
ess@secheron.com

SA003724BEN_A06-04.22