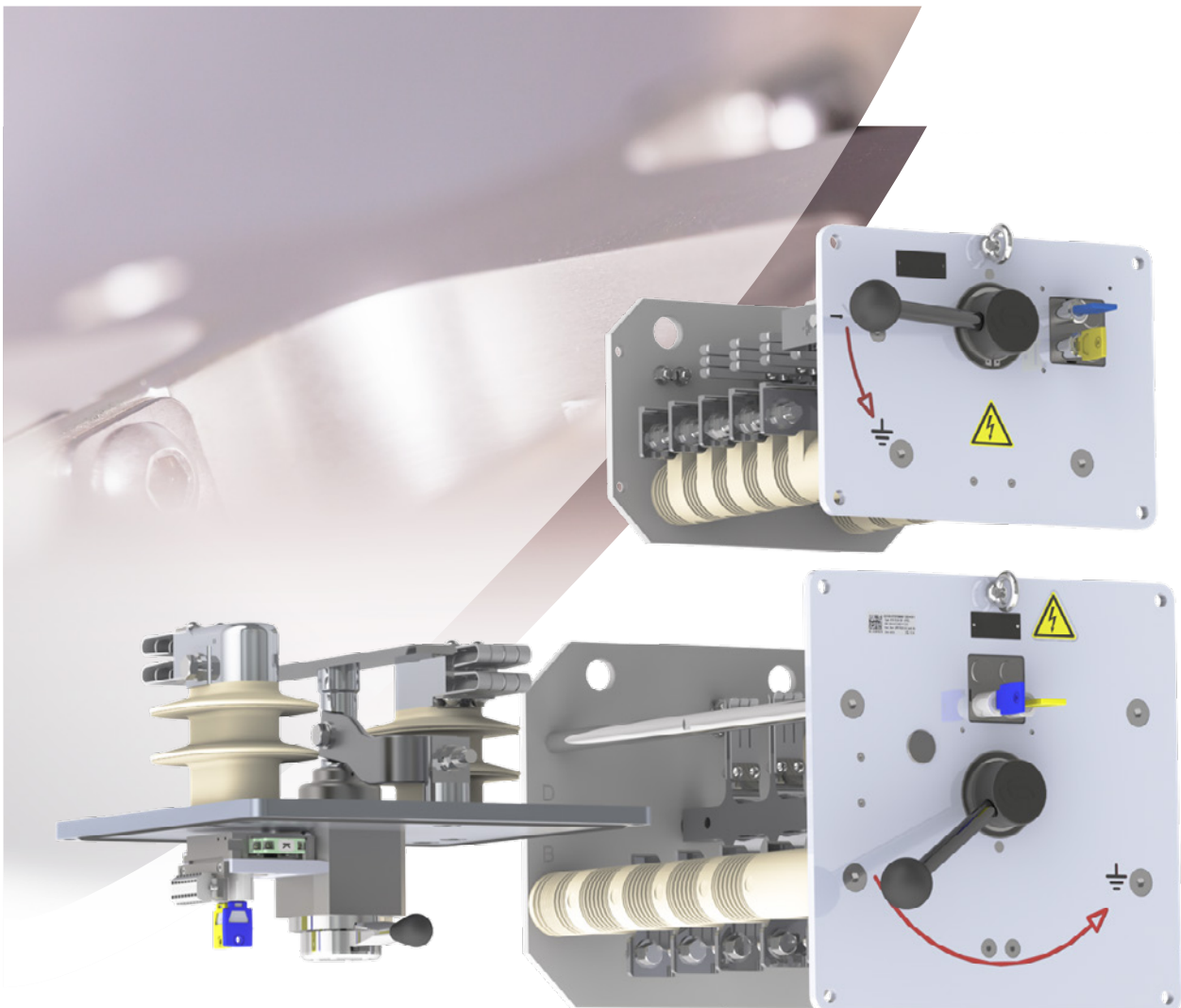


EARTHING SWITCH FOR DC & AC TRACTION CIRCUITS

BTE02.04 and BTE03.04

RAIL VEHICLES



GENERAL INFORMATION

With the **BTE02.04** and **BTE03.04**, Secheron offers a complete range of off-load safety switches designed to earth multiple points of circuit operating with insulation voltages up to 4'800 Volts.

The BTE02.04 and BTE03.04 are a combination of twin poles that are simultaneously switched either manually or electrically. The safety position of the manually operated switch is secured through a mechanical key system, while for the electrically operated version, integrated auxiliary

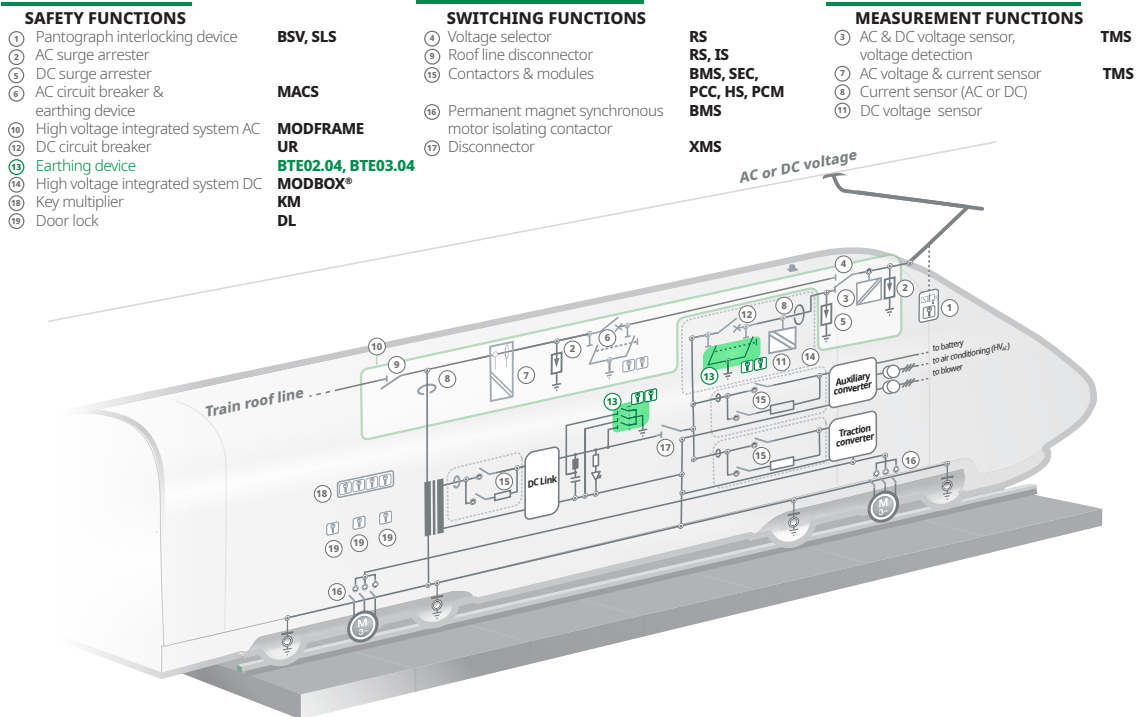
switches enable the car builder to manage electrically the earthing safety interlocks with the others upstream and downstream safety devices.

The BTE02.04A and BTE03.04A are designed for vehicle's indoor installation, while the BTE03.04R is particularly dedicated to outdoor roof mounting. Its compact dimensions associated with severe testing procedures, make the BTE02.04 the ideal solution to earth the high voltage circuits of your traction vehicles.

APPLICATIONS

Earthing of traction and auxiliary circuits on locomotives, trains and EMUs running on AC and/or DC networks.

AC/DC typical application



MAIN BENEFITS

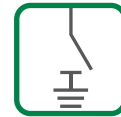
- ✓ High protection against electrical shocks
- ✓ Safety device with key interlocking system
- ✓ Optional integrated key multiplier, up to 8 keys (BTE02.04A and BTE03.04A)
- ✓ Optional electro-magnet interlocking
- ✓ Sturdy structure
- ✓ Easy to install and connect
- ✓ Minimum maintenance requirements
- ✓ Reliable operation in extreme temperatures

MAIN FEATURES

- Insulation voltage up to 4'800V_{AC}/V_{DC}
- BTE02.04A and BTE03.04A available with up to 10 earthing poles and BTE03.04R available with 2 earthing poles
- High rated short-time withstand current
- Indoor (BTE02.04A and BTE03.04A) or outdoor (BTE03.04R) mounting
- Compliant to standards:
IEC 60077-1/-2 ; IEC 60850 / EN 50163 ;
EN 50125-1 / IEC 62948-1 ; EN / IEC 60529 ;
EC 60497-1 / EN 50124-1 ; EN / IEC 61373 ;
EN 45545

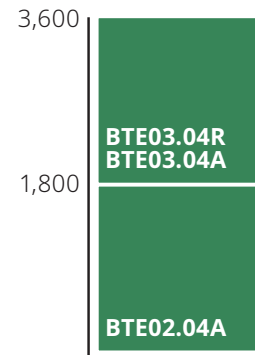
DESIGN

PRODUCT RANGE



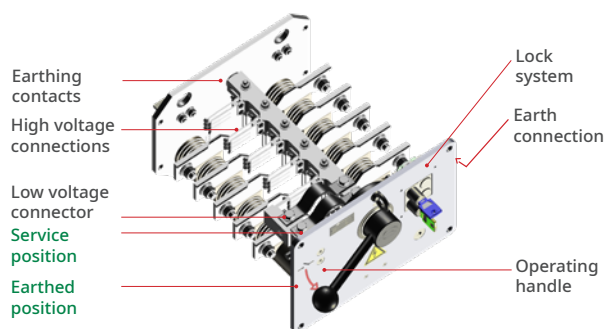
BTE
Application
Earthing
Disconnector

U_r [V= V~]

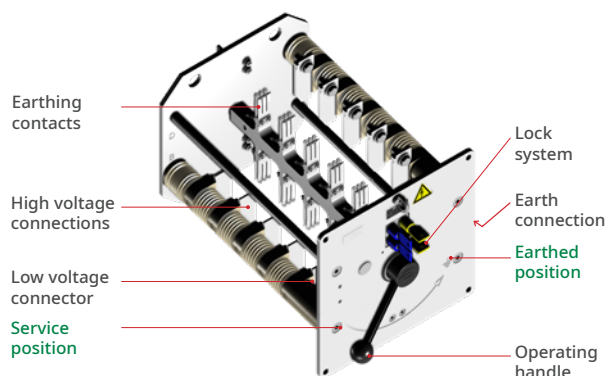


For the other interlocked product please refer to brochure SG480329BEN....

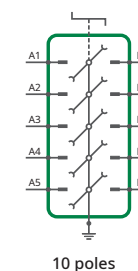
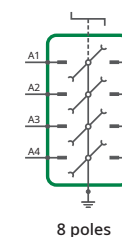
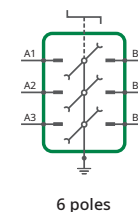
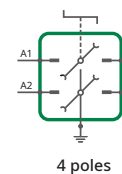
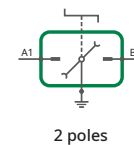
/// BTE02.04A (Indoor mounting)



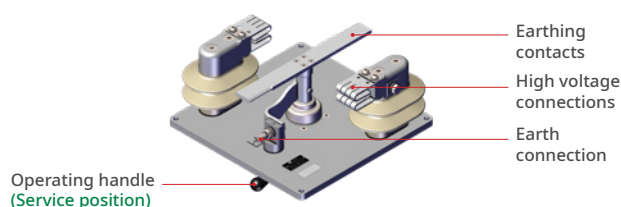
/// BTE03.04A (Indoor mounting)



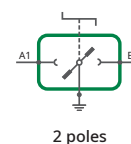
Manual only



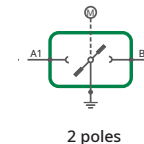
/// BTE03.04R (outdoor mounting)



Manual



Motorized



DATA FOR PRODUCT SELECTION

	Symbol	Unit	BTE02.04A	BTE03.04A	BTE03.04R
MAIN HIGH VOLTAGE CIRCUIT					
Rated operational voltage	U_r	[kV _{AC/DC}]	1.8	3.6	3.6
Number of poles			2,4,6,8,10	2,4,6,8,10	2
Peak and rated short-time withstand current - DC	$\hat{I}_{cw}/I_{cw/t}$	[kA]/[kA]/[s]	70/50/0.1		63/25/1
Rated insulation voltage	U_{Nm}	[kV]	2.3	4.8	
Overvoltage category					
- Pole-pole			OV3	OV3	OV4
- Pole-earth			OV4	OV4	OV4
Rated power frequency withstand voltage ⁽¹⁾					
- Pole-pole	U_a	[kV _{rms}]	5.5	11.5	18.5
- Pole-earth	U_a	[kV _{rms}]	8.3	18.5	18.5
Rated impulse withstand voltage (1.2 / 50 μs)					
- Pole-pole	U_{Ni}	[kV]	12	25	40
- Pole-earth	U_{Ni}	[kV]	18	40	40

⁽¹⁾ At 50 Hz during 1 minute.

LOW VOLTAGE CIRCUITS

Control circuit

Type of operation			Manual	Manual	Manual or motorized version
- Nominal control voltage	U_n	[V _{DC}]		24,36,48/50,72,110	
- Range of voltage				[0.7 - 1.25]	
- Nominal electromagnet control power ⁽²⁾	P	[W]		56	
- Nominal motor control power ⁽²⁾	P	[W]	-	-	125

⁽²⁾ At U_n and $T_{amb} = +20^\circ\text{C}$.

Auxiliary contacts

Type of contacts (refer to definition pages 5 & 7)			Potential free (PF)		
Number of auxiliary contacts per BTE switch position					
- Per BTE switch position			1a+1b or 2a+2b		1a+1b
- Total per BTE			2a+2b or 4a+4b		2a+2b
Rated voltage		[V _{DC}]	24 to 110		
Conventional thermal current	I_{th}	[A]	10		
Switching categories according to EN60947 (silver contacts)			- AC-15 230 V _{DC} 1.0 A - DC-13 110 V _{DC} 0.5 A		
- Potential free (PF) contacts:					
Minimum let-through current at 24 V _{DC} ⁽³⁾		[mA]	≥ 10 mA for silver contacts 4 mA ≤ gold contacts ≤ 10 mA		

⁽³⁾ For clean and dry environment.

Low voltage interface

Type of connection ⁽⁴⁾			Wago connector	Wago connector	Wago connector
- Manual version			Wago connector	Wago connector	Wago connector
- Motorized version			Wago connector	-	-

⁽⁴⁾ Refer to page 7 for mobile connector information.

Insulation

Rated power frequency voltage (50 Hz/1 min)	U_a	[kV _{rms}]	1.5		
---	-------	----------------------	-----	--	--

OPERATING CONDITIONS

Installation			Indoor	Trough roof
Altitude		[m]	≤ 2,000	
Working ambient temperature	T_{amb}	[°C]	-40 to + 70 -50 to + 70 (in option)	
Humidity			According to EN/IEC 62498-1/EN 50125-1	
Pollution degree			PD3A	PD3A PD4
Minimum mechanical durability	N	[Cycles]	≥ 20'000	
Protection index:				
- HV part		[IP]	IP00	IP00
- LV part		[IP]	IP00	IP00; IP3x
- Tightness between upper and lower part when installed		[IP]	-	IP65 ⁽⁵⁾

⁽⁵⁾ Delivered with an O-ring seal.

PRODUCT INTEGRATION

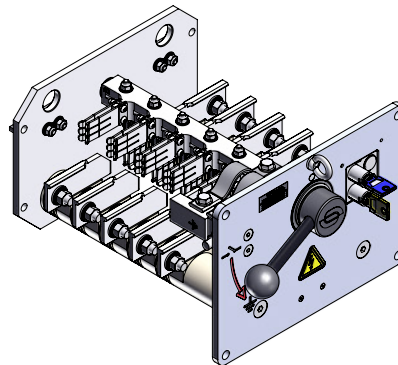
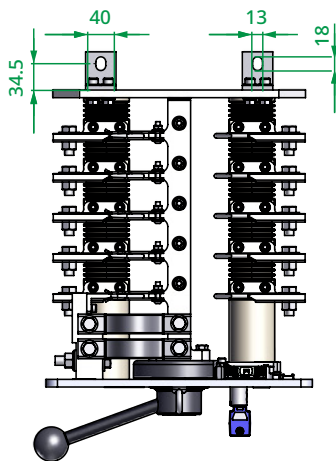
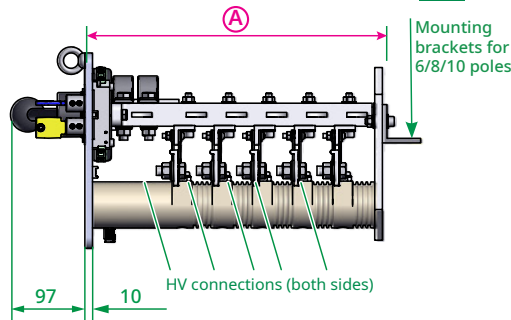
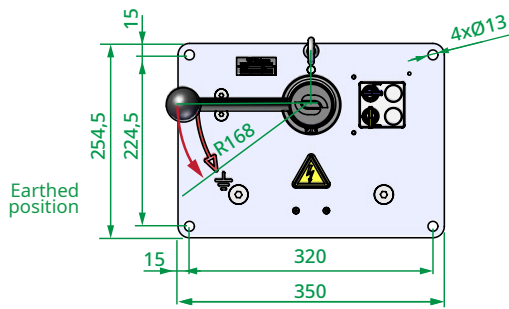
MAIN DIMENSIONS

/// BTE02.04A - MANUAL VERSION - 2 to 10 poles

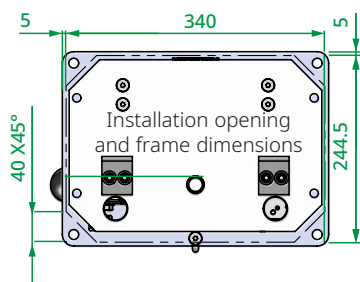
The DIN-ISO 2768-1 coarse tolerances are applied to these dimensions. All dimensions are in mm.

The maximum allowed flatness deviation of the support frame is 1 mm.

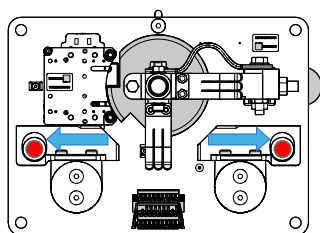
HV and earth connections: M12 screws



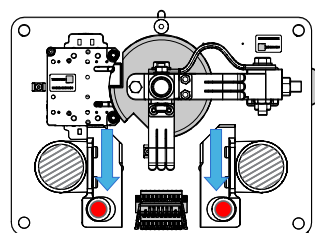
Poles number	Ⓐ [mm]	Weight (±1kg)
2	169	10
4	221.5	12
6	274	14
8	326.5	16
10	379	18



Terminal orientation possibilities (BTE02 only)



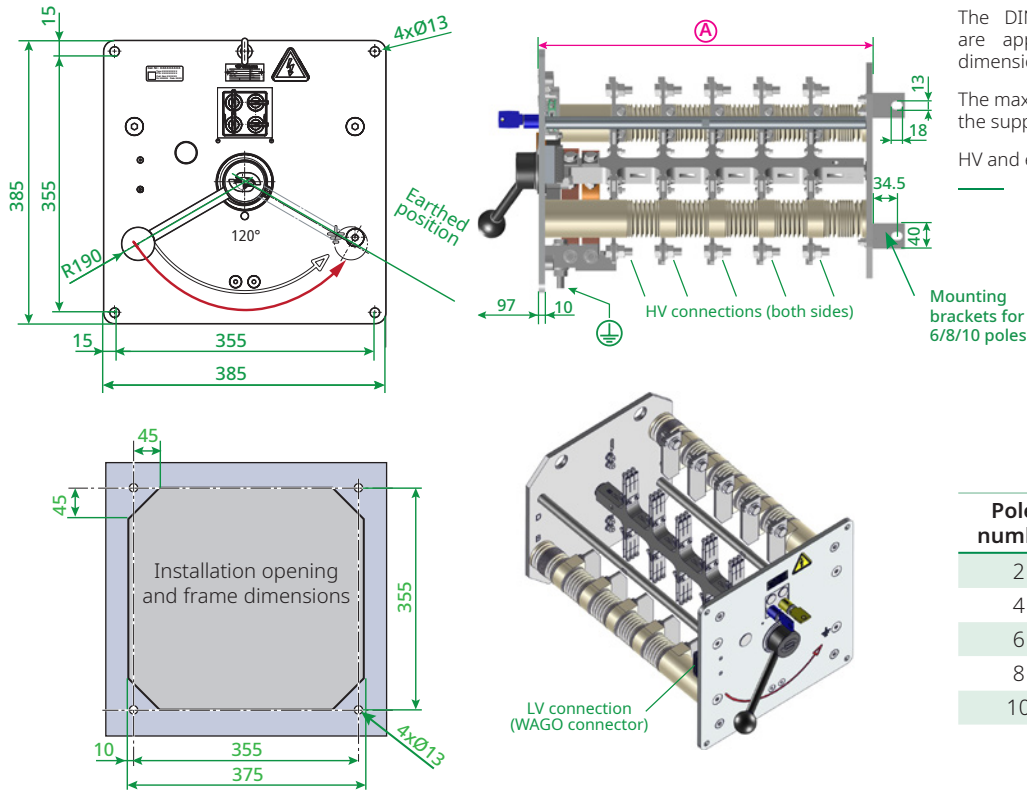
A - Aligned



P - Parallel

MAIN DIMENSIONS

/// BTE03.04A - MANUAL VERSION - 2 to 10 poles



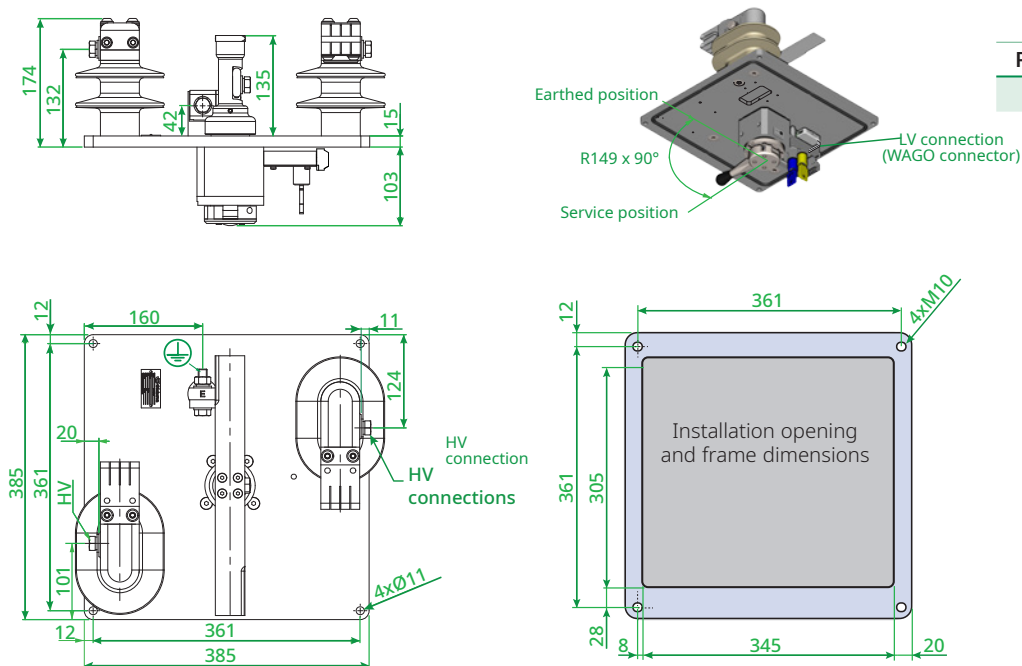
The DIN-ISO 2768-1 coarse tolerances are applied to these dimensions. All dimensions are in mm.

The maximum allowed flatness deviation of the support frame is 1 mm.

HV and earth connections: M12 screws

Poles number	Ⓐ [mm]	Weight (±1kg)
2	217	14
4	295	17
6	373	20
8	451	22
10	529	25

/// BTE03.04R - MANUAL VERSION - 2 poles



Poles number	Weight (±1kg)
2	17 ± 0.5

/// safety based on key interlocking

To guarantee the electrical earthing of the vehicle, with respect to the highest and most reliable standards for the safety of maintenance personnel, Sécheron offers a wide range of key interlocking safety components. BTE03.04 is part of a chain of key interlocked safety components, and can be operated only once the safety conditions of the up-stream and down-stream components are fulfilled.

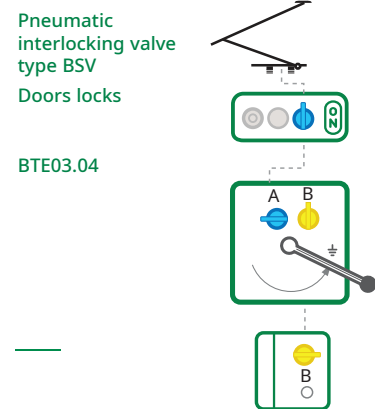
In the shown example, the Master key «A» released from the up-stream component, is

inserted into the **BTE**, so that it can be switched into the earthed position.

Then the Slave key «B» can be operated, locking the **BTE** in the earthed position, and enabling as well the «B» key to be removed and to be used on the next safety component.

Different colors are available for keys and locks. A key multiplier function can be optionally integrated to the **BTE02.04** and **BTE03.04** (refer to the optional key multiplier section on page 7 for colors and ordering codes).

Example of safety key principle:



OPTIONS

(SUBJECT TO ADDITIONAL COSTS)

KEY MULTIPLIER

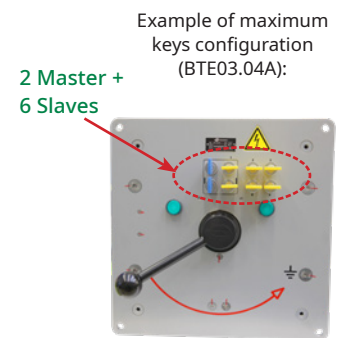
Additionally to the basic key lock configuration (1 Master key + 1 Slave key), the **BTE02.04** and **BTE03.04** can integrate a key multiplier function that enable to release more slave keys once operated and locked in the earth position, as well as it can accept one additional Master key.

Maximum configuration is then 2 Masters + 6 Slaves (**BTE02.04A** and **BTE03.04A**) and 2 Masters + 2 Slaves (**BTE03.04R***).

MASTER KEY ORDERING CODE

SLAVE KEY ORDERING CODE

		QTY				QTY (*)					
		1	2			1	2	3	4	5	6
Color	Blue	1A	2A	Color	Blue	1A	2A	3A	4A	5A	6A
	Yellow	1B	2B		Yellow	1B	2B	3B	4B	5B	6B
	Green	1C	2C		Green	1C	2C	3C	4C	5C	6C
	Black	1D	2D		Black	1D	2D	3D	4D	5D	6D
	White	1E	2E		White	1E	2E	3E	4E	5E	6E
	Red	1F	2F		Red	1F	2F	3F	4F	5F	6F



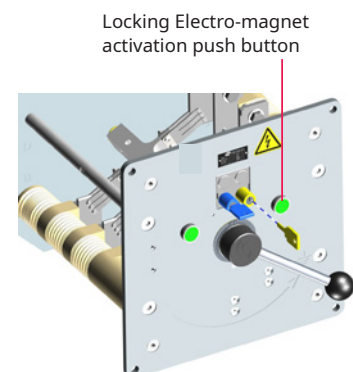
(*) 2 Slave keys maximum for BTE03..04R

LOCKING ELECTRO-MAGNET (BTE02.04A AND BTE03.04A ONLY)

The **BTE02.04A** and **BTE03.04A** can be equipped with one or two electro-magnets locking electrically the **BTE** operations with other external components involved in the vehicle safety chain.

Once the relevant key (released from up-stream or down-stream safety component) is inserted into the **BTE02.04A** and **BTE03.04A** and operated, the push button located on the **BTE02.04A** and **BTE03.04A**'s front plate starts blinking provided that the required conditions of the vehicle's safety chain are fulfilled.

Pushing on it, will activate the electro-magnet's and enable to operate the **BTE** handle for switching it to the earthed or service position, before it can be secured in the selected position with the second key.



Control voltage [VDC]	Nominal control power (at Un & Tamb: +20°C)
24, 36, 48/50, 72, 110	56 W

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 alphanumeric 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.
- For other configurations not described in the brochure, please contact Sécheron.
- The bold characters of the designation code define the device type.

Example of customer's choice:	BTE	03	04	A	4	A	M	Z	1A	1B	∅	Z	1	Z
Line:	10	11	12	13	14	15	16	17	18	19	20	21	22	23

Line	Description	Designation	standard	Options	Customer's choice
10	Product type	BTE	BTE		
11	Rated voltage	1,800 V	02		
		3,600 V	03		
12	Current contact	04	04		
13	Installation	Indoor	A	-	
		(for BTE03 only) Outdoor	R	-	
14	Number of poles				
	- BTE02.04A, BTE03.04A and R	2	2		
	- BTE02.04A and BTE03.04A only	4	4		
	- BTE02.04A and BTE03.04A only	6	6		
	- BTE02.04A and BTE03.04A only	8	8		
	- BTE02.04A and BTE03.04A only	10	10		
15	Terminal orientation (for BTE02 only)	Aligned	A		
		(for BTE02 only) Parallel		P	
16	Operation	Manual	M	-	
		(for BTE03.04R only) Electric		E	
17	Control voltage				
	-Locking EMAG / Motorized	Not applicable	Z		
		24 V _{DC}		A	
		36 V _{DC}		B	
		48/50 V _{DC}		C	
		72 V _{DC}		D	
		110 V _{DC}		E	
18	Key and lock codification ⁽¹⁾				
	- Master key	1 blue key	1A		
		2 blue keys		2A	
19	- Slave key	Locking position EARTH by EMAG only			
		1 yellow key	1B		
		2 yellow keys		2B	
		3 yellow keys		3B	
		(excepted BTE03.04R) 4 yellow keys		4B	
		Other configurations - refer to page 7		...	
20	Auxiliary contacts ⁽¹⁾	(Manual operation only) None	∅		
	- BTE02.04A, BTE03.04A & BTE03.04R	2a + 2b - (switch PF) - silver type		5	
		2a + 2b - (switch PF) - gold type		6	
	- BTE03.04A	4a + 4b - (switch PF) - silver type		7	
		4a + 4b - (switch PF) - gold type		8	
21	Low voltage protecting cover	Not applicable	Z		
22	Ambient temperature range	-40°C to +70°C	1		
	- Manual operation & no electro-magnet	-50°C to +70°C		2	
23	Locking Electro-magnet				
	- BTE03.04R	Not applicable	Z		
	- BTE02.04A and BTE03.04A and key interlocking	No	∅		
		Yes - Locking Master key(s)		1	
		Yes - Locking slave key(s)		2	
		Yes - Locking Master & slave key(s)		3	

⁽¹⁾ Refer to page 6 for other key lock codification.



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SP18801366BEN_A04-09.24

Signature:

Name:

Place and date: