SCHALTBAU

DC Power Under Control

3

Contactors

C310 series

1 pole
AC and bi-directional DC
NO contactors for
150 A, 300 A and 500 A

Catalogue C310.en

More information
schaltbau.com

C310 – 1 pole AC and bi-directional DC NO contactors

Compact single-pole NO contactors for AC and DC up to 1,500 volt rated insulation voltage. Making current up to 2,500 amps; conventional thermal current up to 500 amps; short-time current up to 3,000 amps.

The bi-directional DC contactors switch high powers in a small space. With a making capacity of up to 2,500 amps, the compact switchgear is suitable for applications with high inrush current or high capacities. All versions can continuously conduct up to 500 amps. In the event of a short circuit, 3,000 amps, can even flow for one second without the contacts welding. The contactor therefore maintains its full function in order to disconnect high power ranges if necessary up to 500 amps and up to 1,500 volts – irrespective of the current direction. This full bi-directionality is important for systems with a charging and discharging process, such as in battery networks or electric vehicles. Other typical application areas are the DC circuit in inverters, combiner boxes in photovoltaic systems or the management of battery storage systems.

Features

C310 series

Compact dimensions – high rated insulation voltage U_i up to 1,500 volts
Small dimensions – great performance! Nevertheless, all the air gaps in the contact area have been generously dimensioned. The rated insulation voltage is 1,500 volts.
The arc chamber of the C310 is made of plastic. This is efficient and saves weight.

High making capacity I_{cm} of up to 2,500 amps
The C310 can switch on a current of up to 2,500 amps (monostable design in a horizontal installation position; L/R = 0 ms). A PWM controller regulates the coil current and ensures low-bounce switch on as well as a low holding power. High contact forces and optimised silver contacts both contribute to the excellent making capacity.

High thermal continuous current I_{th} of up to 500 amps
All versions of the C310 can continuously carry up to 500 amps. (Cross-section of the connections: 185 mm^2, maximum ambient temperature: 85° C; terminal heating: +65 Kelvin). The value is achieved through very high contact forces.

High short-time withstand current rating I_{cw} of up to 3,000 amps
The C310 can carry a current of up to 3,000 amps for one second without the contacts welding. This is enough time for the short circuit fuse to trip. The short-time withstand current rating is based on high contact forces and optimised silver contacts.

Full bi-directionality – reliable disconnection of high performances
All versions of the C310 can reliably disconnect high currents and voltages, irrespective of the current direction.
These properties are achieved in the A and K versions through the special arrangement of blowout magnets and arcing chambers, high contact forces and generously dimensioned clearances in the contact aera.

Auxiliary switch with mirror contact function
Series C310 contactors are equipped with auxiliary switches with mirror contact function in accordance with DIN EN IEC 60947-4-1, annex F. Mirror contacts are required for the feedback circuits in safety controls. Mirror contacts ensure that the NC contact of the auxiliary contact is not closed at the same time as the NO main contact.

Standards

C310 series

Contactors meet requirements for industrial applications to:

IEC 60947-4-1
Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor starters – Electromechanical contactors and motor starters.

ISO 16750-3
Road vehicles - Environmental conditions and testing for electrical and electronic equipment – Part 3: Mechanical loads

UL 60947-4-1
Low-Voltage Switchgear and Controlgear – Part 4-1: Contactors and Motor-Starters – Electromechanical Contactors and Motor-Starters.

GB/T 14048.4
Low-Voltage Switchgear and Controlgear – Part 4-1: Contactors and Motor-Starters – Electromechanical Contactors and Motor-Starters.

Reliable, robust and economical

C310 series

Contactors of the C310 series are designed for continuous currents of 150 amps, 300 amps and 500 amps. The switchgear has both high making and breaking capacities, and a high short-time withstand current. This ensures high operational safety.

An integrated electronic coil control ensures a constant and reliable switching behaviour independent of the ambient temperature. In addition, the energy consumption and associated heat development of the monostable design is noticeably reduced when switched on.
Inherent to its design, the bistable version consumes no power in either end positions.

Dependent on the application, high requirements can be placed on electromechanical components. The new DC contactors are highly resistant to shock and vibration loads and meet the high requirements of ISO 16750.

Ordering key

C310 series

Example: **C310A/500 24I-V1**

Series, contact configuration

C310	1 pole NO contactor, AC and DC bi-directional

Version

K	1,500 V DC, large arc chamber
A	1,000 V DC, small arc chamber
S	60 V DC, without arc chamber

Conv. thermal current

150	I_{th} = 150 A
300	I_{th} = 300 A
500	I_{th} = 500 A

Coil voltage

	Monostable	Bistable
24	U_s = 12 ... 24 V DC*	U_s = 24 V DC
48	U_s = 48 V DC**	U_s = 48 V DC

** Operating range 9.5 ... 36 V DC* *** Operating range 33.6 ... 60 V DC*

Accessories

C310-TP	Deflection shield, C310A/... only

Auxiliary switches*, number / type

---	V0
S880 W1R6 k / 1x	V1
S880 W1R6 k / 2x	V2

Coil design

Monostable with integrated PWM module	I
Bistable without PWM module	B

Note:
** with mirror contact function according to IEC 60947-4-1, annex F*

Presented in this catalogue are only stock items which can be supplied in short delivery time. For some variants minimum quantities apply. Please do not hesitate to ask for the conditions.

Special variants:

If you need a special variant of the contactor, please do not hesitate to contact us. Maybe the type of contactor you are looking for is among our many special designs. If not, we can also supply customized designs. In this case, however, minimum order quantities apply.

Application

C310 series

Thanks to many years of experience and competence developing electromechanical switchgear and the mastering DC arcs, Schaltbau has developed an innovative solution with new DC contactors that significantly simplifies applications with DC switching technology. Since the C310 series safely controls both current directions, the contactors are ideal for all applications involving energy recovery.
A typical example here is energy storage, where batteries are repeatedly charged and discharged. Other application areas for the C310 series are regenerative systems, DC charging stations and photovoltaic systems. In battery powered and hybrid vehicles, the devices can be used directly as the main contactor in the battery disconnect unit (BDU). This reliably ensures the disconnection of both poles from the vehicle in the event of a short circuit.

Photovoltaics

- DC switching in central inverters
- Electrical cabinet (combiner boxes)
- Home energy storage systems

Battery energy storage systems

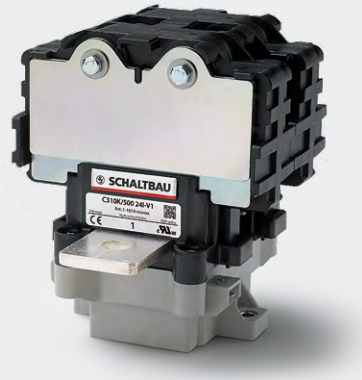
- Grid stabilization and battery energy storages
- Regenerative systems in industrial plants
- Battery management systems
- Home energy storages

E-mobility:

- Electrical vehicles, hybrid vehicles and trolley busses
- DC charging station
- Battery test systems

C310 – Version «K» Circuit diagram, dimension diagram

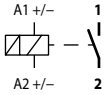
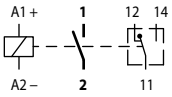
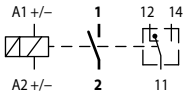
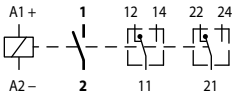
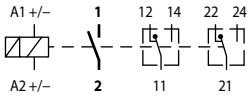
C310 series



C310K/ – 1 pole NO contactor
AC or bi-directional DC

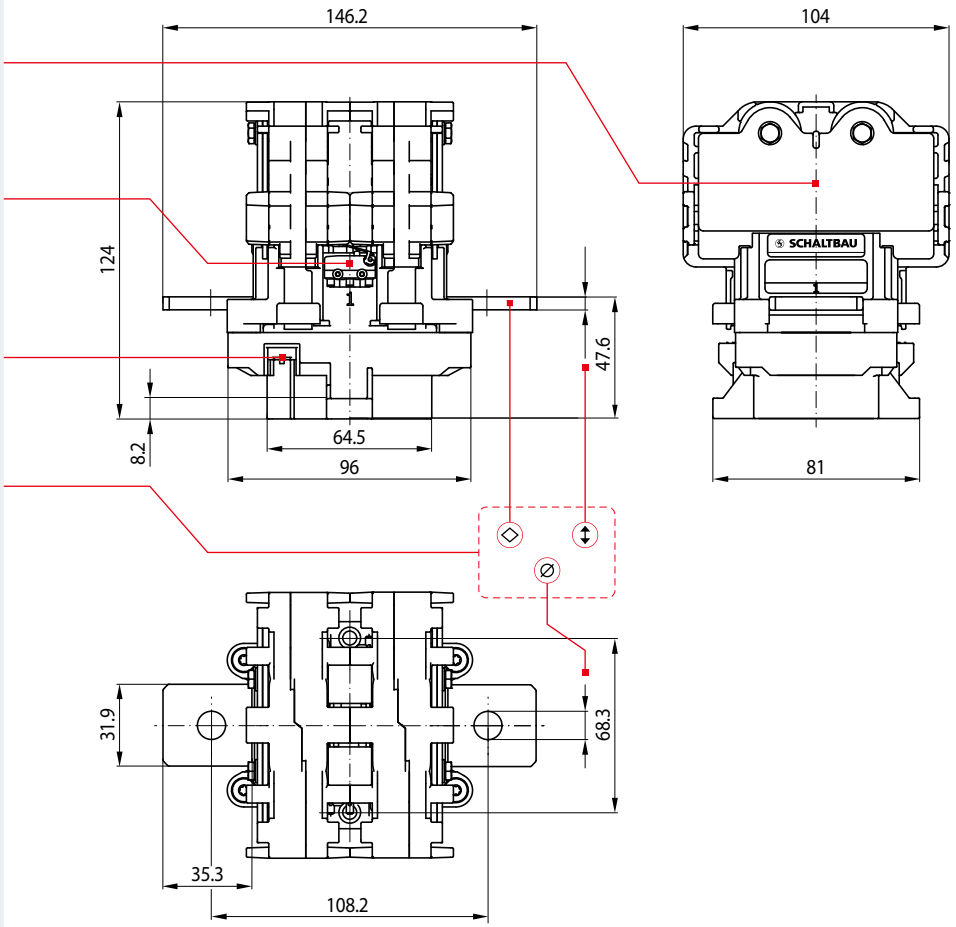
- Large arc chamber for significantly higher breaking capacity
- Rated insulation voltage U_i up to 1,500 V
- Rated short-circuit making capacity I_{cm} up to 2,500 A
- Conventional free air thermal current I_{th} up to 500 A
- Rated short-time withstand current I_{cw} up to 3,000 A

Circuit diagram

	Monostable *	Bistable **
C310K/... **Main contacts** 1x NO **Number of auxiliary switches** none		
C310K/... **Main contacts** 1x NO **Number of auxiliary switches***** 1x SPDT S880 W1R6 k		
C310K/... **Main contacts** 1x NO **Number of auxiliary switches***** 2x SPDT S880 W1R6 k		

* *Coil suppression integrated, additional circuit is not allowed!*
** *Switching by reversing the polarity, voltage pulse 0.5 sec max.*
*** *Auxiliary switches with mirror contact function according to EN 60947-4-1, annex F*

Dimension diagram C310K/...



Arc chamber main contact system
Highly efficient plastic arc chamber with permanent magnetic blowing

Aux. switch
S880, SPDT, flat tabs 2.8 x 0.5 mm

Coil terminal
Flat tabs 6.3 x 0.8 mm

Main contact terminals

Series	Material
C310K/150 ...	Copper
C310K/300 ...	Copper
C310K/500 ...	Copper, silver plated

Series	Thickness
C310K/150 ...	3 mm
C310K/300 ...	5 mm
C310K/500 ...	5 mm

Series	Diameter
C310K/150 ...	ø 9 mm
C310K/300 ...	ø 11 mm
C310K/500 ...	ø 11 mm

Dimensions in mm / Subject to change

Specifications Version «K» for U_e = 1,500 V DC

C310 series

Series			C310K/150	C310K/300	C310K/500
Type of voltage			DC, bi-directional / AC, f ≤ 60 Hz		
Main contacts, configuration			1x NO		
Electrical data according to IEC/UL 60947-4-1, GB/T 14048.4					
Rated operational voltage U_e			1,000 V @ PD3 / 1,500 V @ PD2		
Rated insulation voltage U_i			1,000 V @ PD3 / 1,500 V @ PD2		
Rated impulse withstand voltage U_{imp}			8 kV		
Pollution degree / Overvoltage category			PD2, PD3: see U_e and U_i / OV3		
Conventional free air thermal current I_{th}	T_a = 40° C (cross section) T_a = 70° C (cross section)		150 A (50 mm²)	300 A (185 mm²)	500 A (2x 150 mm²) 400 A (240 mm²)
Power dissipation per pole I_{th} @ 40 °C		typ.	3 W	11 W	30 W
Pole impedance		typ.	120 µΩ	120 µΩ	120 µΩ
Utilization category AC-1* U_e = 750 V Rated operational current I_e		IEC 60947-4-1	60 A	60 A	60 A
Utilization category DC-1* U_e = 750 V Rated operational current I_e		IEC 60947-4-1, GB/T 14048.4	60 A	60 A	60 A
Utilization category DC-1* / DC general use U_e = 600 V Rated operational current I_e		UL 60947-4-1	50 A	50 A	50 A
Frequency of operation (operations per hour) I_e		AC-1 & DC-1	360 h^{-1}	360 h^{-1}	360 h^{-1}
Rated short-time withstand current I_{cw}		t = 1 s		3,000 A	
Short circuit protection device for contactors (w/o thermal overload relay) U_e = 900 V DC, I_{prosp} = 10 kA, coord. type "2", fuse: SIBA SQB-DC 2 (aR Type)			200 A	315 A	2x 250 A (parallel)
Additional electrical ratings of main circuit					
Conventional free air thermal current I_{th}	T_a = 85 °C (cross section) Terminal heating		200 A (50 mm²) 45 K	350 A (120 mm²) 45 K	500 A (185 mm²) 65 K
Power dissipation per pole		I_{th} @ 40 °C, typ.	5 W	15 W	30 W
Pole impedance		typ.	125 µΩ	120 µΩ	120 µΩ
Rated short-circuit making capacity I_{cm} (L/R = 0 ms) For mono- or bistable drive (depending on mounting position)				monostable: horizontal: 2,500 A, vertical: 2,000 A bistable: horizontal: 750 A, vertical: 750 A	
Breaking capacity Single contact	L_{max} = 0.25 mH, other values on request U_e = 1.500 V / I_e = 300 A U_e = 1.000 V / I_e = 500 A U_e = 900 V / I_e = 700 A U_e = 750 V / I_e = 1.000 A U_e = 500 V / I_e = 1.500 A			10 operations 20 operations 25 operations 10 operations 15 operations	
Double contact circuit	U_e = 1.500 V / I_e = 1.000 A U_e = 1.000 V / I_e = 1.700 A			10 operations 15 operations	
Electrical endurance			6,000 operations @ DC (L/R = 1 ms), AC (cosφ = 0.8): 750 V / 60 A		
Main contacts					
Contact material			$AgSnO_2$	$AgSnO_2$	$AgSnO_2$
Terminals			M8	M10	M10
Torque			4.8 ... 6 Nm	8 ... 10 Nm	8 ... 10 Nm
Auxiliary contacts					
Number, configuration / Contact material			2x S880 W1R6 k max. / Silver		
Making / Breaking capacity S880			AC-15: 230 V AC / 1.0 A DC-13: 60 V DC / 0.5 A		
Minimum voltage / Current			5 V / 5 mA		
Terminals			Flat quick connect 2.8 x 0.5 mm		
Magnetic drive (monostable)					
Rated control supply voltage U_s (Operating range) Pollution degree / Overvoltage category			12 ... 24 V DC (9.5 ... 36 V DC) / 48 V DC (33.6 ... 60 V DC) PD3 / OV2		
Coil power dissipation, max. (T_a = 20 °C / U_s) Pull-In power (0.2 s) / Holding power			50 W (24 V) / 2.6 W		
Frequency of operation (operations per hour, no load)		T_a = 20 °C / 70 °C	3,600 h^{-1} / 1,800 h^{-1}		
Pull-in time (T_a = 20 °C / U_s) / Drop-off time (T_a = 20 °C / U_s) Coil suppression (integrated) / Coil terminal		typ.	33 ms / 25 ms Suppressor diode / Flat tap 6.3 x 0.8 mm		
Magnetic drive (bistable)					
Rated control supply voltage U_s Pollution degree / Overvoltage category Coil tolerance			24 / 48 V DC @ ON time 0.1 ... 0.5 s max. PD3 / OV2 -30 % ... +25 % U_s		
Coil power dissipation, max. (Ta = 20 °C / U_s)			35 W		
Frequency of operation (operations per hour, no load)		T_a = 20 °C / 70 °C	1,800 h^{-1} / 1,800 h^{-1}		
Pull-in time (T_a = 20 °C / U_s) / Drop-off time (T_a = 20 °C / U_s) Coil suppression (integrated) / Coil terminal		typ.	20 ms / 13 ms Suppressor diode / Flat tap 6.3 x 0.8 mm		
Mounting position			vertical / horizontal (mounting see page 11)		
Degree of protection		IEC 60529	IP00		
Mechanical endurance	main contacts monostable / bistable auxiliary contacts		2,000,000 operations / 100,000 operations 1,000,000 operations		
Shock / Vibration		IEC 61373 / ISO 16750-3	Category 1, Class B / Class C		
Temperatures	Operating temperature / Storage temperature Altitude / Humidity (EN 50125-1)		-40 °C … +85 °C / -40 °C … +85 °C < 4,500 m@ U_i = 1,000 V/< 3,500 m @ U_i = 1,500 V above sea level / < 75 % on an annual average		
Weight			1.24 kg	1.31 kg	1.35 kg

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* *Corresponds to 50 switching operations 1.5 x I_e and 6,000 switching operations 1.0 x I_e*

Subject to change

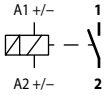
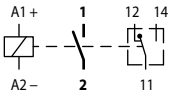
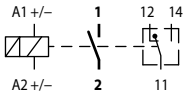
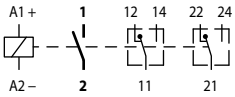
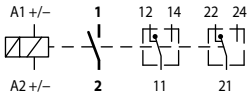
C310 – Version «A» Circuit diagram, dimension diagram

C310 series

C310A/ – 1 pole NO contactor
AC or bi-directional DC

- Rated insulation voltage U_i up to 1,500 V, version with small arc chamber
- Rated short-circuit making capacity I_{cm} up to 2,500 A
- Conventional free air thermal current I_{th} up to 500 A
- Rated short-time withstand current I_{cw} up to 3,000 A

Circuit diagram

	Monostable *	Bistable **
C310A/... **Main contacts** 1x NO **Number of auxiliary switches** none		
C310A/... **Main contacts** 1x NO **Number of auxiliary switches***** 1x SPDT S880 W1R6 k		
C310A/... **Main contacts** 1x NO **Number of auxiliary switches***** 2x SPDT S880 W1R6 k		

* *Coil suppression integrated, additional circuit is not allowed!*
** *Switching by reversing the polarity, voltage pulse 0.5 sec max.*
*** *Auxiliary switches with mirror contact function according to EN 60947-4-1, annex F*

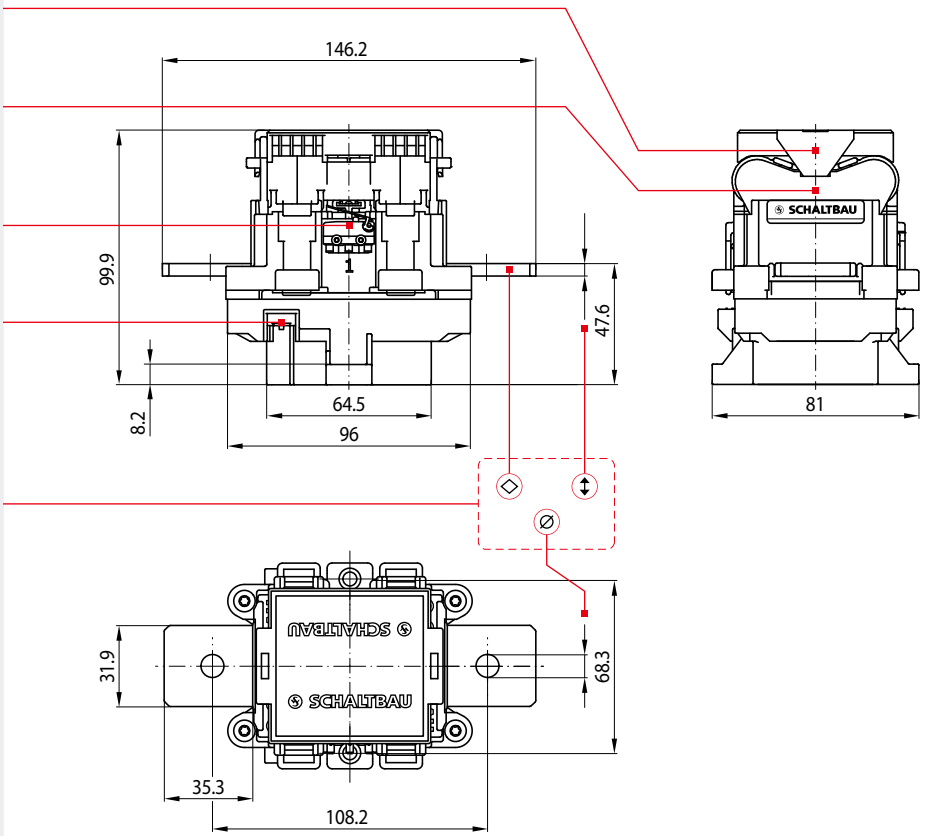
Dimension diagram C310A/...

Arc chamber cover
Reduces the distance to live, metallic or grounded parts

Arc chamber main contact system
Highly efficient plastic arc chamber with permanent magnetic blowing

Aux. switch
S880, SPDT, flat tabs 2.8 x 0.5 mm

Coil terminal
Flat tabs 6.3 x 0.8 mm



Main contact terminals

Series	Material
C310A/150 ...	Copper
C310A/300 ...	Copper
C310A/500 ...	Copper, silver plated

Series	Thickness
C310A/150 ...	3 mm
C310A/300 ...	5 mm
C310A/500 ...	5 mm

Series	Diameter
C310A/150 ...	ø 9 mm
C310A/300 ...	ø 11 mm
C310A/500 ...	ø 11 mm

Dimensions in mm / Subject to change

Specifications Version «A» for U_e = 1,500 V DC

C310 series

Series		C310A/150	C310A/300	C310A/500
Type of voltage		DC, bi-directional / AC, f ≤ 60 Hz		
Main contacts, configuration		1x NO		
Electrical data according to IEC/UL 60947-4-1, GB/T 14048.4				
Rated operational voltage U_e		1,000 V @ PD3 / 1,500 V @ PD2		
Rated insulation voltage U_i		1,000 V @ PD3 / 1,500 V @ PD2		
Rated impulse withstand voltage U_{imp}		10 kV		
Pollution degree / Overvoltage category		PD2, PD3: see U_e and U_i / OV3		
Conventional free air thermal current I_{th}	T_a = 40° C (cross section) T_a = 70° C (cross section)	150 A (50 mm²)	300 A (185 mm²)	500 A (2x 150 mm²) 400 A (240 mm²)
Power dissipation per pole I_{th} @ 40 °C	typ.	3.5 W	11 W	30 W
Pole impedance	typ.	150 µΩ	120 µΩ	120 µΩ
Utilization category AC-1* U_e = 750 V Rated operational current I_e	IEC 60947-4-1	60 A	60 A	60 A
Utilization category DC-1* U_e = 750 V Rated operational current I_e	IEC 60947-4-1, GB/T 14048.4	60 A	60 A	60 A
Utilization category DC-1* / DC general use U_e = 600 V Rated operational current I_e	UL 60947-4-1	50 A	50 A	50 A
Frequency of operation (operations per hour) I_e	AC-1 & DC-1	360 h^{-1}	360 h^{-1}	360 h^{-1}
Rated short-time withstand current I_{cw}	t = 1 s		3,000 A	
Short circuit protection device for contactors (w/o thermal overload relay) U_e = 900 V DC, I_{prosp} = 10 kA, coord. type "2", fuse: SIBA SQB-DC 2 (aR Type)		200 A	315 A	2x 250 A (parallel)
Additional electrical ratings of main circuit				
Conventional free air thermal current I_{th}	T_a = 85 °C (cross section) Terminal heating	200 A (50 mm²) 45 K	350 A (120 mm²) 45 K	500 A (185 mm²) 65 K
Power dissipation per pole	I_{th} @ 40 °C, typ.	5 W	15 W	30 W
Pole impedance	typ.	125 µΩ	120 µΩ	120 µΩ
Rated short-circuit making capacity I_{cm} (L/R = 0 ms) For mono- or bistable drive (depending on mounting position)			monostable: horizontal: 2,500 A, vertical: 2,000 A bistable: horizontal: 750 A, vertical: 750 A	
Breaking capacity Single contact	L_{max} = 0.25 mH, other values on request U_e = 1,500 V / I_e = 50 A U_e = 900 V / I_e = 400 A U_e = 750 V / I_e = 500 A U_e = 500 V / I_e = 800 A		60 operations 60 operations 60 operations 60 operations	
Double contact circuit	U_e = 1,500 V / I_e = 500 A U_e = 1,000 V / I_e = 800 A		60 operations 60 operations	
Electrical endurance		6,000 operations @ DC (L/R = 1 ms), AC (cosφ = 0.8): 750 V / 60 A		
Main contacts				
Contact material		$AgSnO_2$	$AgSnO_2$	$AgSnO_2$
Terminals		M8	M10	M10
Torque		4.8 ... 6 Nm	8 ... 10 Nm	8 ... 10 Nm
Auxiliary contacts				
Number, configuration / Contact material		2x S880 W1R6 k max. / Silver		
Making / Breaking capacity S880		AC-15: 230 V AC / 1.0 A DC-13: 60 V DC / 0.5 A		
Minimum voltage / Current		5 V / 5 mA		
Terminals		Flat quick connect 2.8 x 0.5 mm		
Magnetic drive (monostable)				
Rated control supply voltage U_s (Operating range) Pollution degree / Overvoltage category		12 ... 24 V DC (9.5 ... 36 V DC) / 48 V DC (33.6 ... 60 V DC) PD3 / OV2		
Coil power dissipation, max. (T_a = 20 °C / U_s) Pull-In power (0.2 s) / Holding power		50 W (24 V) / 2.6 W		
Frequency of operation (operations per hour, no load)	T_a = 20 °C / 70 °C	3,600 h^{-1} / 1,800 h^{-1}		
Pull-in time (T_a = 20 °C / U_s) / Drop-off time (T_a = 20 °C / U_s) Coil suppression (integrated) / Coil terminal	typ.	33 ms / 25 ms Suppressor diode / Flat tap 6.3 x 0.8 mm		
Magnetic drive (bistable)				
Rated control supply voltage U_s (Min. operating voltage) Pollution degree / Overvoltage category		24 V DC (16.8 V DC) @ ON time 0.1 ... 0.5 s max. / 48 V DC (33.6 V DC) @ ON time 0.1 ... 0.5 s max. PD3 / OV2		
Coil power dissipation, max. (Ta = 20 °C / U_s)		35 W		
Frequency of operation (operations per hour, no load)	T_a = 20 °C / 70 °C	1,800 h^{-1} / 1,800 h^{-1}		
Pull-in time (T_a = 20 °C / U_s) / Drop-off time (T_a = 20 °C / U_s) Coil suppression (integrated) / Coil terminal	typ.	20 ms / 13 ms Suppressor diode / Flat tap 6.3 x 0.8 mm		
Mounting position		vertical / horizontal (mounting see page 11)		
Degree of protection	IEC 60529	IP00		
Mechanical endurance	main contacts monostable / bistable auxiliary contacts	2,000,000 operations / 100,000 operations 1,000,000 operations		
Shock / Vibration	IEC 61373 / ISO 16750-3	Category 1, Class B / Class C		
Temperatures	Operating temperature / Storage temperature Altitude / Humidity (EN 50125-1)	-40 °C … +85 °C / -40 °C … +85 °C < 4,500 m@ U_i = 1,000 V/< 3,500 m @ U_i = 1,500 V above sea level / < 75 % on an annual average		
Weight		0.83 kg	0.90 kg	0.95 kg

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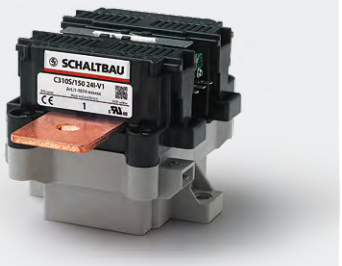
* *Corresponds to 50 switching operations 1.5 x I_e and 6,000 switching operations 1.0 x I_e*

Subject to change

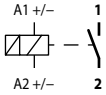
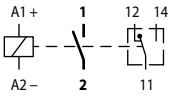
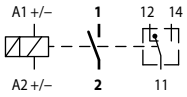
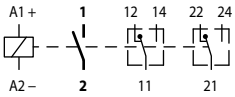
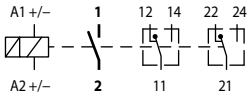
C310 – Version «S» Circuit diagram, dimension diagram



C310S/ – 1 pole NO contactor
AC or bi-directional DC

- Rated insulation voltage U_i up to 1,500 V, version without arc chamber
- Rated short-circuit making capacity I_{cm} up to 2,500 A
- Conventional free air thermal current I_{th} up to 500 A
- Rated short-time withstand current I_{cw} up to 3,000 A

Circuit diagram

	Monostable *	Bistable **
C310S/... **Main contacts** 1x NO **Number of auxiliary switches** none		
C310S/... **Main contacts** 1x NO **Number of auxiliary switches***** 1x SPDT S880 W1R6 k		
C310S/... **Main contacts** 1x NO **Number of auxiliary switches***** 2x SPDT S880 W1R6 k		

* *Coil suppression integrated, additional circuit is not allowed!*

** *Switching by reversing the polarity, voltage pulse 0.5 sec max.*

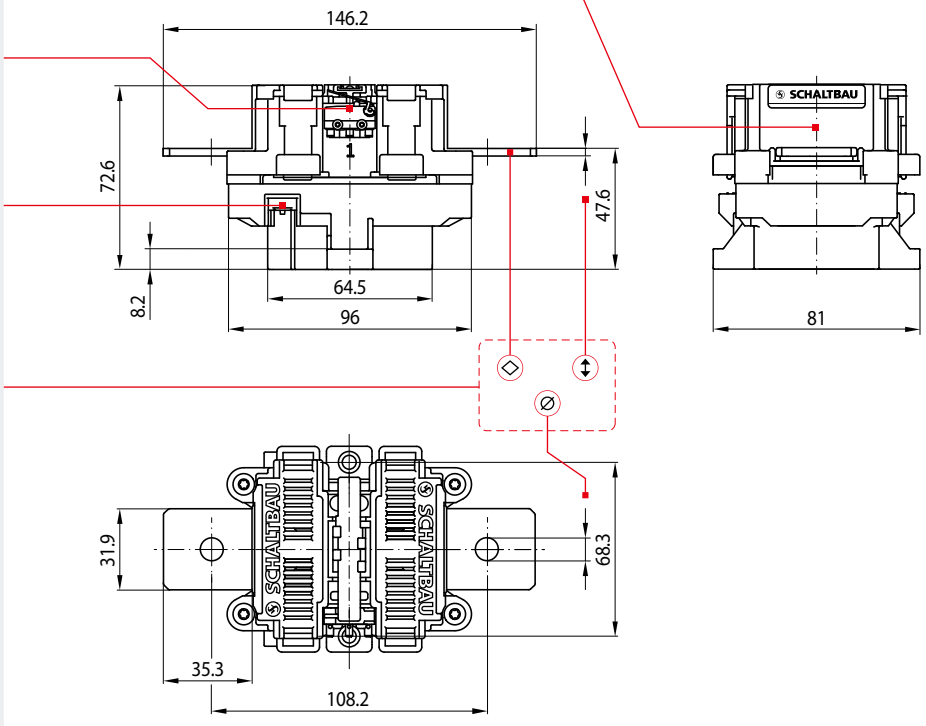
*** *Auxiliary switches with mirror contact function according to EN 60947-4-1, annex F*

Dimension diagram C310S/...

Switching chamber
Main contact system w/o arc chamber

Aux. switch
S880, SPDT, flat tabs 2.8 x 0.5 mm

Coil terminal
Flat tabs 6.3 x 0.8 mm



Main contact terminals

Series	Material ◇
C310S/150 ...	Copper
C310S/300 ...	Copper
C310S/500 ...	Copper, silver plated
Series	**Thickness ↕**
C310S/150 ...	3 mm
C310S/300 ...	5 mm
C310S/500 ...	5 mm
Series	**Diameter ⌀**
C310S/150 ...	⌀ 9 mm
C310S/300 ...	⌀ 11 mm
C310S/500 ...	⌀ 11 mm

Specifications Version «S» for U_e = 60 V DC

C310 series

Series		C310S/150	C310S/300	C310S/500
Type of voltage		DC, bi-directional / AC, f ≤ 60 Hz		
Main contacts, configuration		1x NO		
Electrical data according to IEC/UL 60947-4-1, GB/T 14048.4				
Rated operational voltage U_e		60 V @ PD3		
Rated insulation voltage U_i		1,000 V @ PD3 / 1,500 V @ PD2		
Rated impulse withstand voltage U_{imp}		10 kV		
Pollution degree / Overvoltage category		PD2, PD3: see U_e and U_i / OV3		
Conventional free air thermal current I_{th}	T_a = 40° C (cross section) T_a = 70° C (cross section)	150 A (50 mm²)	300 A (185 mm²)	500 A (2x 150 mm²) 400 A (240 mm²)
Power dissipation per pole I_{th} @ 40 °C	typ.	3.5 W	11 W	30 W
Pole impedance	typ.	150 µΩ	120 µΩ	120 µΩ
Utilization category AC-1* / AC general use U_e = 48 V Rated operational current I_e		150 A	300 A	500 A
Utilization category DC-1* / DC general use U_e = 48 V Rated operational current I_e		150 A	300 A	500 A
Frequency of operation I_e	AC-1 & DC-1	360 h^{-1}	360 h^{-1}	360 h^{-1}
Rated short-time withstand current I_{cw}	t = 1 s		3,000 A	
Short circuit protection device for contactors		on request	on request	on request
Additional electrical ratings of main circuit				
Conventional free air thermal current I_{th}	T_a = 85 °C (cross section) Terminal heating	200 A (50 mm²) 45 K	350 A (120 mm²) 45 K	500 A (185 mm²) 65 K
Power dissipation per pole	I_{th} @ 40 °C, typ.	5 W	15 W	30 W
Pole impedance	typ.	125 µΩ	120 µΩ	120 µΩ
Rated short-circuit making capacity I_{cm} (L/R = 0 ms) For mono- or bistable drive (depending on mounting position)			monostable: horizontal: 2,500 A, vertical: 2,000 A bistable: horizontal: 750 A, vertical: 750 A	
Breaking capacity (L/R = 0.1 ms)	U_e = 60 V / I_e = 2,000 A U_e = 96 V / I_e = 1,300 A		60 operations 60 operations	
Electrical endurance		10,000 operations DC (L/R = 1 ms) AC (cosφ = 0.8): 48 V / 150 A	10,000 operations DC (L/R = 1 ms) AC (cosφ = 0.8): 48 V / 300 A	10,000 operations DC (L/R = 1 ms) AC (cosφ = 0.8): 48 V / 500 A
Main contacts				
Contact material		$AgSnO_2$	$AgSnO_2$	$AgSnO_2$
Terminals		M8	M10	M10
Torque		4.8 ... 6 Nm	8 ... 10 Nm	8 ... 10 Nm
Auxiliary contacts				
Number, configuration / Contact material		2x S880 W1R6 k max. / Silver		
Making / Breaking capacity S880		AC-15: 230 V AC / 1.0 A DC-13: 60 V DC / 0.5 A		
Minimum voltage / Current		5 V / 5 mA		
Terminals		Flat quick connect 2.8 x 0.5 mm		
Magnetic drive (monostable)				
Rated control supply voltage U_s (Operating range) Pollution degree / Overvoltage category		12 ... 24 V DC (9.5 ... 36 V DC) / 48 V DC (33.6 ... 60 V DC) PD3 / OV2		
Coil power dissipation, max. (Ta = 20 °C / Us) Pull-In power (0.2 s) / Holding power		50 W (24 V) / 2.6 W		
Frequency of operation (operations per hour, no load)	T_a = 20 °C / 70 °C	3,600 h^{-1} / 1,800 h^{-1}		
Pull-in time (T_a = 20 °C / U_s) / Drop-off time (T_a = 20 °C / U_s) Coil suppression (integrated) / Coil terminal	typ.	33 ms / 25 ms Suppressor diode / Flat tap 6.3 x 0.8 mm		
Magnetic drive (bistable)				
Rated control supply voltage U_s (Min. operating voltage) Pollution degree / Overvoltage category		24 V DC (16.8 V DC) @ ON time 0.1 ... 0.5 s max. / 48 V DC (33.6 V DC) @ ON time 0.1 ... 0.5 s max. PD3 / OV2		
Coil power dissipation, max. (Ta = 20 °C / U_s)		35 W		
Frequency of operation (operations per hour, no load)	T_a = 20 °C / 70 °C	1,800 h^{-1} / 1,800 h^{-1}		
Pull-in time (T_a = 20 °C / U_s) / Drop-off time (T_a = 20 °C / U_s) Coil suppression (integrated) / Coil terminal	typ.	20 ms / 13 ms Suppressor diode / Flat tap 6.3 x 0.8 mm		
Mounting position		vertical / horizontal (mounting see page 11)		
Degree of protection	IEC 60529	IP00		
Mechanical endurance	main contacts monostable / bistable auxiliary contacts	2,000,000 operations / 100,000 operations 1,000,000 operations		
Shock / Vibration	IEC 61373 / ISO 16750-3	Category 1, Class B / Class C		
Temperatures	Operating temperature / Storage temperature Altitude / Humidity (EN 50125-1)	-40 °C … +85 °C / -40 °C … +85 °C < 4,500 m@ U_i = 1,000 V/< 3,500 m @ U_i = 1,500 V above sea level / < 75 % on an annual average		
Weight		0.55 kg	0.63 kg	0.65 kg

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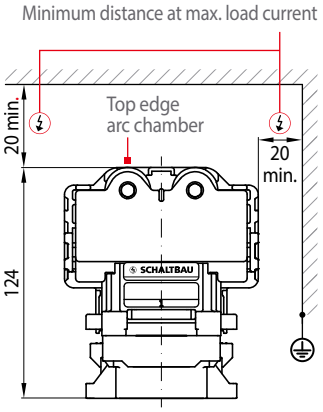
* *Corresponds to 50 switching operations 1.5 x I_e and 6,000 switching operations 1.0 x I_e*

Subject to change

Minimum distances, deflection shields, mounting holes

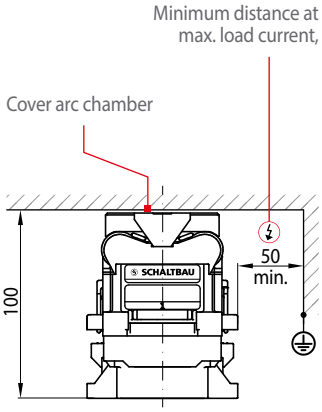
C310 series

- **C310K/...**
  with large arc chamber



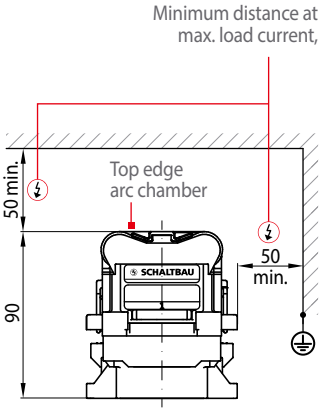
For the C310K/150, C310K/300 and C310K/500 series there is a minimum distance of 20 mm to magnetically active, live or earthed parts.

- **C310A/...**
  with arc chamber cover



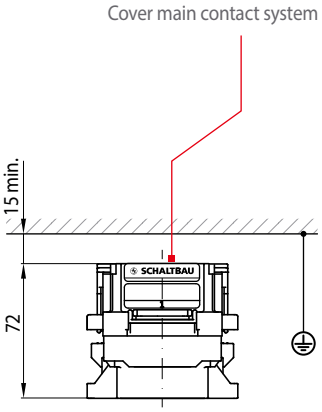
The extinguishing chamber cover is part of the standard scope of delivery for the C310A/150, C310A/300 and C310A/500 series.

- **C310A/...**
  w/o arc chamber cover



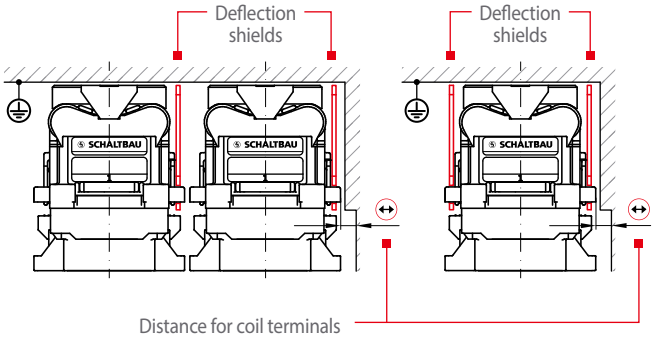
It is permissible to use the C310A/150, C310A/300 and C310A/500 series without arc chamber cover, taking into account additional clearance dimensions.

- **C310S/...**
  w/o arc chamber



For the C310S/150, C310S/300 and C310S/500 series there is a minimum distance of 15 mm to magnetically active, live or earthed parts.

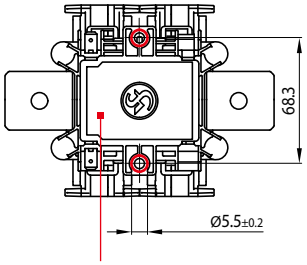
- **Insertable deflection shields:**



C310A/... series only:
The use of insertable deflection shields reduces the minimum distance to 0 mm. Without deflection shields, the minimum distance of the contactors, depending on the arrangement, can increase to 100 mm.

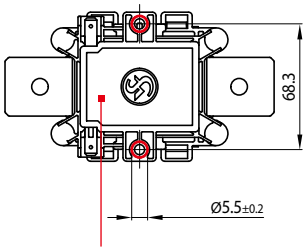
- **Mounting holes**

C310K/...



Base plate, view from below

C310A/... und C310S/...

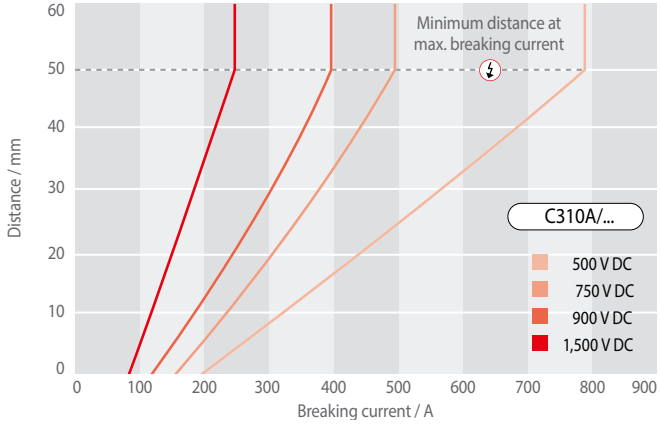


Base plate, view from below

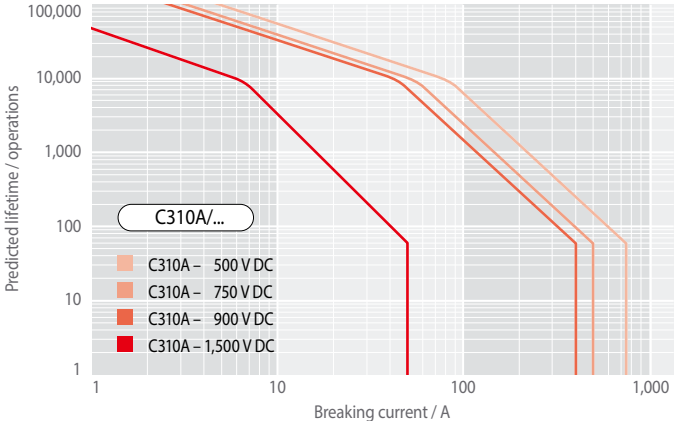
Electrical endurance

C310 series

- Minimum distances to live or earthed parts



- Predicted electrical endurance as a function of the breaking current



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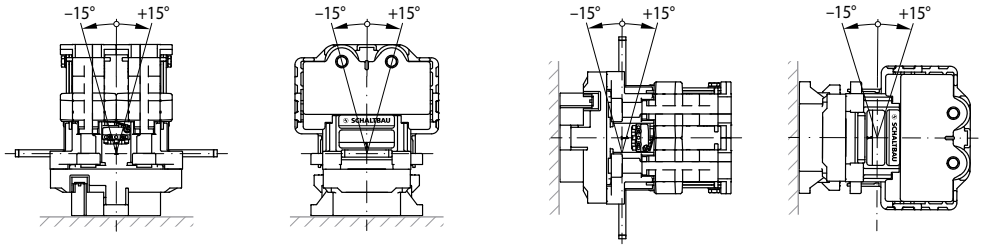
DC Power Under Control

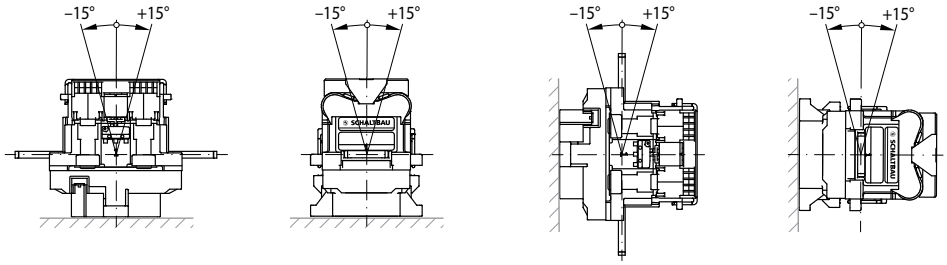
Mounting instructions

C310 series

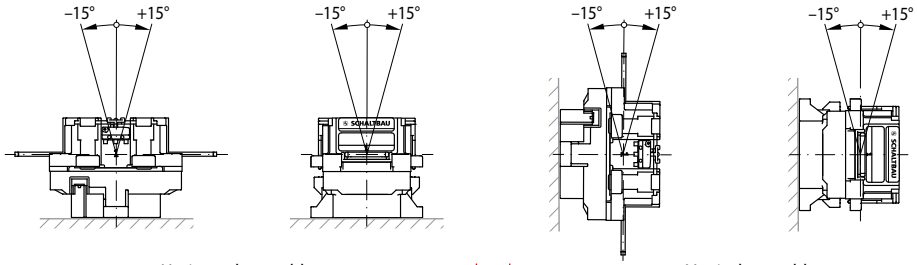
- **C310K/...**



- **C310A/...**



- **C310S/...**



Horizontal assembly «Table mounting»

Vertical assembly «Wall mounting»

The contactors are mounted on a mounting plate with two M5 screws.

The contactors can be mounted horizontally or vertically on a prepared mounting plate.

Mounting positions hanging upside down are not allowed!

Maintenance and safety instructions

C310 series

Maintenance:

- C310 series contactors are basically maintenance free.
- Make regular in-depth visual inspections once or twice a year.

For detailed maintenance, safety and mounting instructions please refer to our operating manuals C310-M.en!

Safety instructions:

- The device must be used according to the intended purpose as specified in the technical documentation. You are obliged to observe all specifications depending on operating temperature, degree of pollution etc. that are relevant to your application.
- Without further safety measures the contactors are not suited for use in potentially explosive atmospheres.
- In case of malfunction of the device or uncertainties stop using it any longer and contact the manufacturer instantly.
- Tampering with the device can seriously affect the safety of people and equipment. This is not permitted and leads to an exclusion of liability and warranty.
- Coil suppression for reducing surges when the coil is switched off is optimally attuned to the contactors switching behaviour. The existing opening characteristic must not be negatively influenced by parallel connection with an external diode.
- Contactors running permanently may heat up. So make sure that the contactor has sufficiently cooled down before you start any inspection or maintenance work.
- When installing contactors with magnetic blowout make sure to do it in such a way that no magnetizable parts can be attracted by the permanent magnets that are also capable of destroying all data of swipe cards.
- In general, strong electromagnetic fields can be generated in the area around the contactors. These can influence other components in the area of the contactors.
- Improper handling of the contactor, e.g. when hitting the floor with some impact, can result in breakage, visible cracks and deformation.

Defective contactors or parts (e.g. arc chambers, auxiliary switches) must be replaced immediately!

For a detailed list of all safety instructions see here: schaltbau.info/safety3en!

Schaltbau GmbH

For detailed information on our products and services visit our website – or give us a call!

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with compliments:

IRIS Certification

The production facilities of Schaltbau GmbH have been IRIS certified since 2008.

Schaltbau GmbH ISO 14001 certified since 2002

Certified to DIN EN ISO 14001 since 2002. For the most recent certificate visit our website.

Schaltbau GmbH ISO 9001 certified since 1994

Certified to DIN EN ISO 9001 since 1994. For the most recent certificate visit our website.

Electrical Components and Systems for Railway Engineering and Industrial Applications

Connectors

- Connectors manufactured to industry standards
- Connectors to suit the special requirements of communications engineering (MIL connectors)
- Charging connectors for battery-powered machines and systems
- Connectors for railway engineering, including UIC connectors
- Special connectors to suit customer requirements

Snap-action switches

- Snap-action switches with positive opening operation
- Snap-action switches with self-cleaning contacts
- Snap-action switch made of robust polyetherimide (PEI)
- Snap-action switch with two galvanically isolated contact bridges
- Special switches to suit customer requirements

Contactors
Emergency disconnect switches

- Single and multi-pole DC contactors
- High-voltage AC/DC contactors
- Contactors for battery powered vehicles and power supplies
- Contactors for railway applications
- Terminal bolts and fuse holders
- DC emergency disconnect switches
- Special contactors to suit customer requirements

Electrics for rolling stock

- Equipment for driver's cab
- Equipment for passenger use
- High-voltage switchgear
- High-voltage heaters
- High-voltage roof equipment
- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements

C2156/2212/0 Printed in Germany