

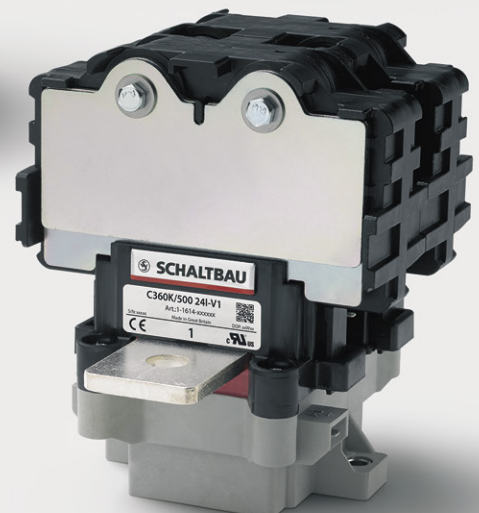
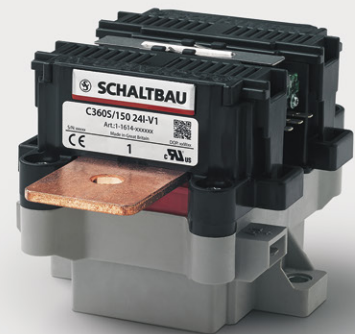
# 3

## Contactors

### C360 Series

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

Catalogue C360.en



More information  
[schaltbau.com](http://schaltbau.com)

## C360 – 1 pole AC and bi-directional DC NO contactors for railway applications







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 full bidirectionality is important for many applications in railway vehicles. Many design variants are also available, matched to a wide range of applications, e.g. as the main contactor in traction and auxiliary converters of battery and hybrid vehicles or as a disconnecter in battery circuits with high currents.

### Features





C360 series

-  **Compact dimensions – high rated insulation voltage  $U_i$  up to 1,500 volts**  
The C360 – small dimensions, big 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 C360 is made of plastic. This is efficient and saves weight.
-  **High short-time withstand current rating  $I_{cw}$  of up to 3,000 amps**  
The C360 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.
-  **High making capacity  $I_{cm}$  of up to 2,500 amps**  
The C360 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
-  **Full bidirectionality – reliable disconnection of high powers**  
All versions of the C360 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 area.
-  **High thermal continuous current  $I_{th}$  of up to 500 amps**  
All versions of the C360 can continuously carry up to 500 amps. (Cross-section of the connections: 185 mm<sup>2</sup>, maximum ambient temperature: 85° C; terminal heating: +65 Kelvin). The value is achieved through very high contact forces.
-  **Auxiliary switch with mirror contact function**  
C360 contactors are equipped with auxiliary switches with mirror contact function in accordance with EN 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

C360 series

Contactors meet requirements for railway applications to:

-  **IEC 60077-1:2002**  
Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules
-  **IEC 61373:2010**  
Railway applications – Rolling stock equipment – Shock and vibration tests
-  **IEC 60077-2:2002**  
Railway applications – Electric equipment for rolling stock – Part 2: Electrotechnical components; General rules
-  **IEC 62497-1:2010**  
Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment

**Reliable, robust and economical** C360 series

Contactors of the C360 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.

**Application** C360 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. The C360 series is therefore suitable for universal use in railway networks as a DC

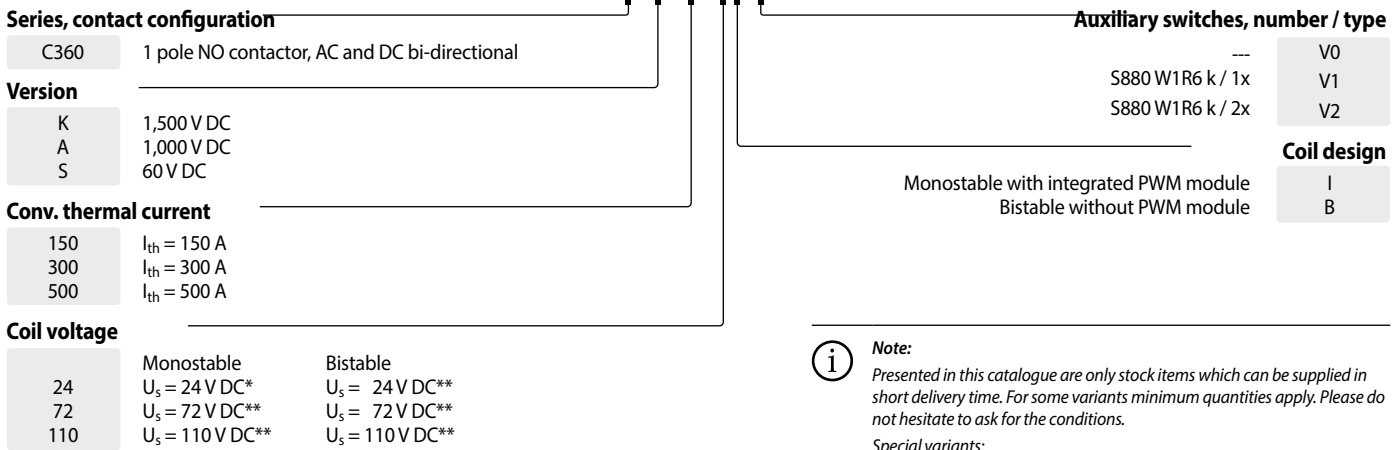
contactor for traction and auxiliary converters. As the switchgear also reliably masters switching in both current directions, it is ideally suited for applications with energy recovery. Typical examples are traction batteries that are charged and discharged during operation.

- > **Traction contactor for battery or hybrid vehicles**
  - Main contactor in combination with a precharging contactor in traction converter of locomotives, railcars and trams
  
- > **Contactor for auxiliary converter**
  - Main contactor in combination with a precharging contactor in auxiliary converter of locomotives, railcars and trams

- > **Disconnecting contactor in battery circuits**
  - Disconnecting contactor for battery-powered functions in locomotives and multiple units
  - Contactor for battery-powered functions in passenger coaches
  - Deep discharge protection for batteries in emergency power supplies

**Ordering key** C360 series

Example: **C360A/500 24I-V1**



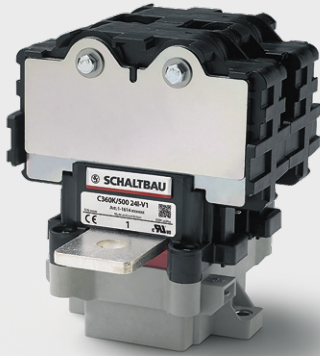
\* Operating range 9.5 ... 36 VDC    \*\* Coil tolerance -30 % ... +25 %

**Accessories**  
C310-TP    Deflection shield, C360A/... only

**Note:**  
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.

**C360 – Version «K»** Circuit diagram, dimension diagram

C360 series



**C360K/ – 1 pole NO contactor  
AC or bidirectional 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

**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              |   |
|---------------|-----------------------|---|
| C360K/150 ... | Copper                | ⊕ |
| C360K/300 ... | Copper                |   |
| C360K/500 ... | Copper, silver plated |   |
| Series        | Thickness             |   |
| C360K/150 ... | 3 mm                  | ⊕ |
| C360K/300 ... | 5 mm                  |   |
| C360K/500 ... | 5 mm                  |   |
| Series        | Diameter              |   |
| C360K/150 ... | ∅ 9 mm                | ⊕ |
| C360K/300 ... | ∅ 11 mm               |   |
| C360K/500 ... | ∅ 11 mm               |   |

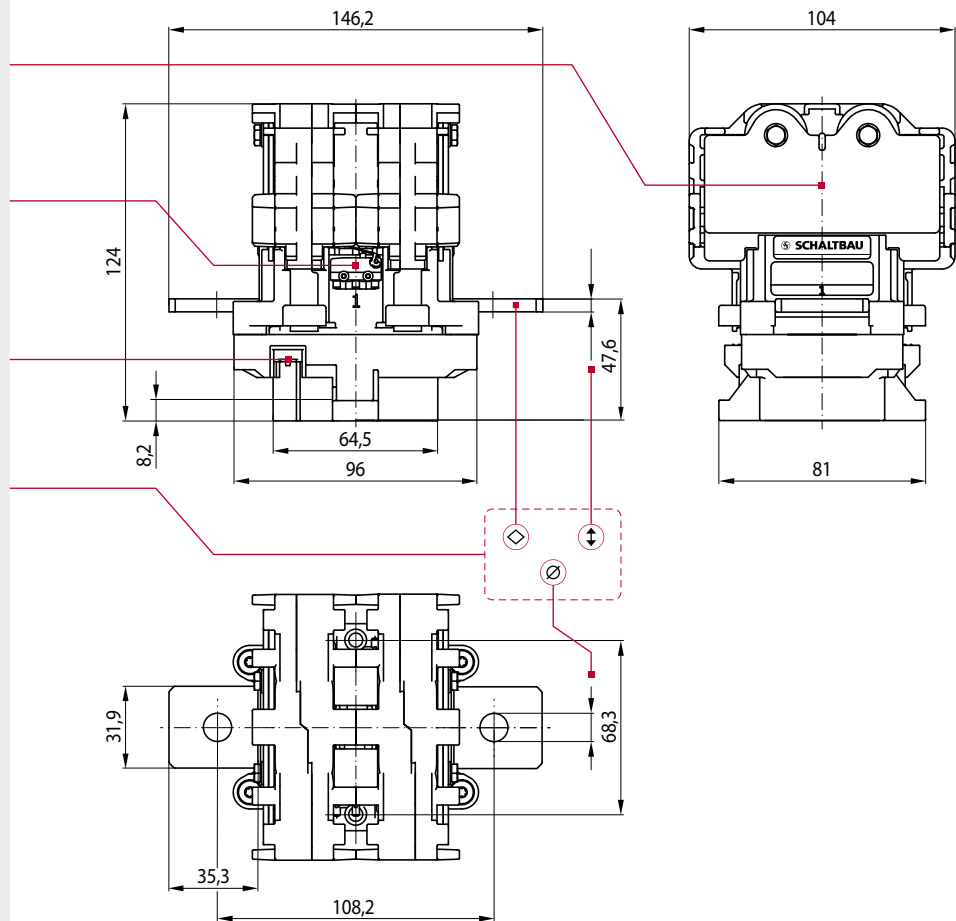
**Circuit diagram**

|  | Monostable * | Bistable ** |
|--|--------------|-------------|
| <b>C360K/...</b><br>Main contacts<br>1x NO<br>Number of auxiliary switches<br>none                   |              |             |
| <b>C360K/...</b><br>Main contacts<br>1x NO<br>Number of auxiliary switches***<br>1x SPDT S880 W1R6 k |              |             |
| <b>C360K/...</b><br>Main contacts<br>1x NO<br>Number of auxiliary switches***<br>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 C360K/...**



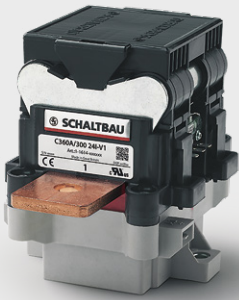
**Specifications** Version «K» for  $U_r = 1,500$  V DC

C360 series

| Series   |   | C360K/150   | C360K/300                            | C360K/500                            |
|--|---|---|--------------------------------------|--------------------------------------|
| <b>Type of voltage</b>   |   | DC, bidirectional / AC, $f \leq 60$ Hz, 1,000 V max.  |                                      |                                      |
| <b>Main contacts, configuration</b>  |   | 1x NO   |                                      |                                      |
| <b>General electrical ratings of main circuit</b>  |   |   |                                      |                                      |
| Rated operational voltage $U_r$  | max.  | 1,000 V @ PD3 / 1,500 V @ PD2   |                                      |                                      |
| Rated insulation voltage $U_{Nm}$  |   | 1,000 V @ PD3 / 1,500 V @ PD2   |                                      |                                      |
| Rated impulse withstand voltage $U_{Ni}$   |   | 10 kV   |                                      |                                      |
| Pollution degree / Overvoltage category  |   | PD2, PD3: see $U_{Nm}$ / OV3  |                                      |                                      |
| Conventional free air thermal current $I_{th}$   | $T_a = 40^\circ$ C<br>$T_a = 70^\circ$ C  | 150 A *<br>150 A  | 300 A *<br>300 A                     | 500 A<br>400 A                       |
| Power dissipation per pole   | $I_{th}$ @ $40^\circ$ C, typ.   | 3.5 W   | 11 W                                 | 30 W                                 |
| Pole impedance   | typ.  | 150 $\mu\Omega$   | 120 $\mu\Omega$                      | 120 $\mu\Omega$                      |
| Geräteklasse   | IEC 60077-2   | B   |                                      |                                      |
| Rated short-circuit breaking capacity  |   |   |                                      |                                      |
| DC   | $I_r$ @ $L/R = 1$ ms / $U_r = 900$ V  | 150 A   |                                      |                                      |
| AC   | $I_r$ @ $\cos\phi = 0.8$ / $U_r = 900$ V  | 420 A   |                                      |                                      |
| Rated short-time withstand current $I_{CW}$  | $t = 0,1$ s<br>$t = 1$ s  | 4,000 A<br>3,000 A  |                                      |                                      |
| Critical current range   |   | none  | none                                 | none                                 |
| <b>Additional electrical ratings of main circuit</b>                                       |   |   |                                      |                                      |
| Conventional free air thermal current $I_{th}$   | $T_a = 85^\circ$ C (cross section)<br>Terminal heating  | 200 A (50 mm <sup>2</sup> )<br>45 K   | 350 A (120 mm <sup>2</sup> )<br>45 K | 500 A (185 mm <sup>2</sup> )<br>65 K |
| Short circuit protection device for contactors (w/o thermal overload relay)                | $I_{prosp} = 10$ kA DC, $L/R = 5$ ms, welding proof<br>Fuse: SIBA SQB-DC 2 (aR Type)  | 200 A   | 315 A                                | 2x 250 A (parallel)                  |
| Rated short-circuit making capacity $I_{cm}$ ( $L/R = 0$ ms)                               |   | monostable: horizontal: 2,500 A, vertical: 2,000 A<br>bistable: horizontal: 750 A, vertical: 750 A                              |                                      |                                      |
| For mono- or bistable drive (depending on mounting position)                               |   |   |                                      |                                      |
| Breaking capacity  | $L_{max} = 0.25$ mH, other values on request  |   |                                      |                                      |
| Single contact   | $U_r = 1,500$ V / $I_r = 300$ A<br>$U_r = 1,000$ V / $I_r = 500$ A<br>$U_r = 900$ V / $I_r = 700$ A<br>$U_r = 750$ V / $I_r = 1,000$ A<br>$U_r = 500$ V / $I_r = 1,500$ A | 10 operations<br>20 operations<br>25 operations<br>10 operations<br>15 operations   |                                      |                                      |
| Double contact circuit   | $U_r = 1,500$ V / $I_r = 1,000$ A<br>$U_r = 1,000$ V / $I_r = 1,700$ A  | 10 operations<br>15 operations  |                                      |                                      |
| Electrical endurance   |   | 6,000 operations @ DC ( $L/R = 1$ ms), AC ( $\cos\phi = 0.8$ ): 750 V / 60 A  |                                      |                                      |
| <b>Main contacts</b>   |   |   |                                      |                                      |
| Contact material   |   | AgSnO <sub>2</sub>  | AgSnO <sub>2</sub>                   | AgSnO <sub>2</sub>                   |
| Terminals  |   | M8  | M10                                  | M10                                  |
| Torque   |   | 4.8 ... 6 Nm  | 8 ... 10 Nm                          | 8 ... 10 Nm                          |
| <b>Auxiliary contacts</b>  |   |   |                                      |                                      |
| 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   |                                      |                                      |
| <b>Magnetic drive – monostable</b>   |   |   |                                      |                                      |
| Rated control supply voltage $U_s$   |   | 24 / 72 / 110 V DC @ ON time 0.1 ... 0.5 s max.   |                                      |                                      |
| Pollution degree / Overvoltage category  |   | PD3 / OV2   |                                      |                                      |
| Coil tolerance   |   | -30 % ... +25 % $U_s$   |                                      |                                      |
| Coil power dissipation, max. ( $T_a = 20^\circ$ C / $U_s$ )                                |   | 50 W (24V) / 2.6 W  |                                      |                                      |
| Pull-in power (0.2 s) / Holding power  |   |   |                                      |                                      |
| Frequency of operation (operations per hour, no load)                                      | $T_a = 20^\circ$ C / $70^\circ$ C   | 3,600 h <sup>-1</sup> / 1,800 h <sup>-1</sup>   |                                      |                                      |
| Pull-in time ( $T_a = 20^\circ$ C / $U_s$ ) / Drop-off time ( $T_a = 20^\circ$ C / $U_s$ ) | typ.  | 33 ms / 25 ms   |                                      |                                      |
| Coil suppression (integrated) / Coil terminal  |   | Suppressor diode / Flat tap 6.3 x 0.8 mm  |                                      |                                      |
| <b>Magnetic drive – bistable</b>   |   |   |                                      |                                      |
| Rated control supply voltage $U_s$   |   | 24 / 72 / 110 V DC  |                                      |                                      |
| Pollution degree / Overvoltage category  |   | PD3 / OV2   |                                      |                                      |
| Coil tolerance   |   | -30 % ... +25 % $U_s$   |                                      |                                      |
| Coil power dissipation, max. ( $T_a = 20^\circ$ C / $U_s$ )                                |   | 35 W  |                                      |                                      |
| Frequency of operation (operations per hour, no load)                                      | $T_a = 20^\circ$ C / $70^\circ$ C   | 1,800 h <sup>-1</sup> / 1,800 h <sup>-1</sup>   |                                      |                                      |
| Pull-in time ( $T_a = 20^\circ$ C / $U_s$ ) / Drop-off time ( $T_a = 20^\circ$ C / $U_s$ ) | typ.  | 20 ms / 13 ms   |                                      |                                      |
| Coil suppression (integrated) / Coil terminal  |   | Suppressor diode / Flat tap 6.3 x 0.8 mm  |                                      |                                      |
| <b>Mounting position</b>   |   | vertical / horizontal (not upside-down, see page 11)  |                                      |                                      |
| <b>Degree of protection</b>  | IEC 60529   | IP00  |                                      |                                      |
| <b>Mechanical endurance</b>  | monostable / bistable   | 2,000,000 operations / 100,000 operations<br>(Replace auxiliary switch after 1,000,000 switching cycles)                        |                                      |                                      |
| <b>Shock / Vibration</b>   | IEC 61373 / ISO 16750-3   | Category 1, Class B / Class C   |                                      |                                      |
| <b>Temperatures</b>  | Operating temperature / Storage temperature<br>Altitude / Humidity (EN 50125-1)   | -40 °C ... +85 °C / -40 °C ... +85 °C<br>< 4,500 m @ $U_i = 1,000$ V, < 3,500 m @ $U_i = 1,500$ V / < 75 % on an annual average |                                      |                                      |
| <b>Weight</b>  |   | 1.24 kg   | 1.31 kg                              | 1.35 kg                              |

**C360 – Version «A»** Circuit diagram, dimension diagram

C360 series



**C360A/ – 1 pole NO contactor  
AC or bidirectional DC**

- 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**

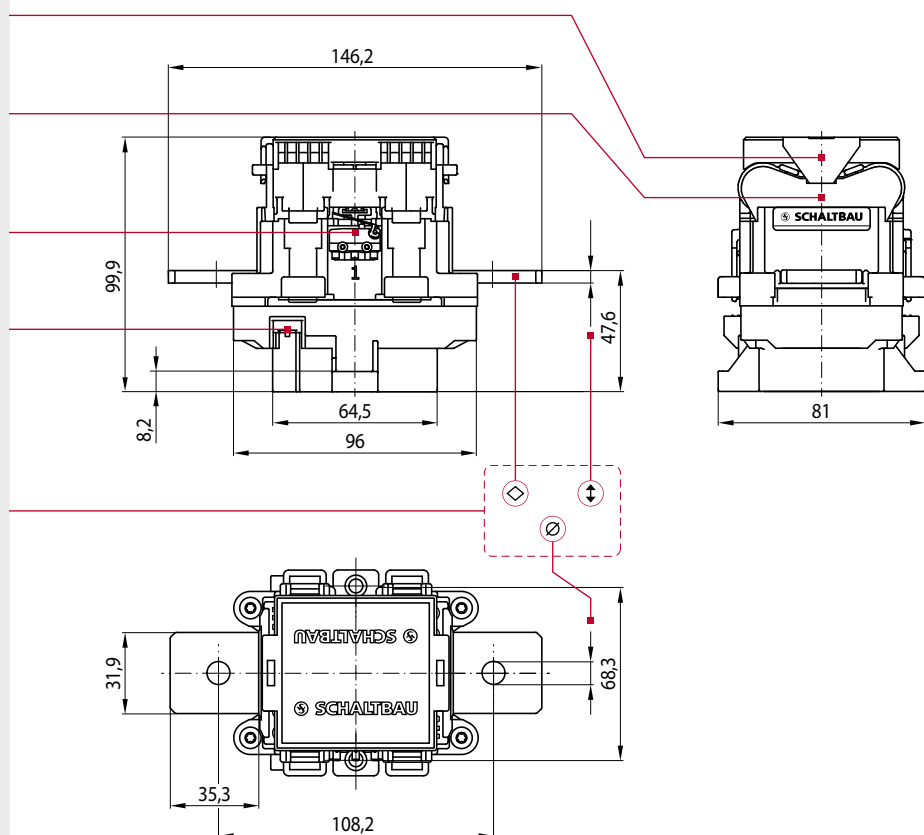
|  | Monostable * | Bistable ** |
|--|--------------|-------------|
| <b>C360A/...</b><br>Main contacts<br>1x NO<br>Number of auxiliary switches<br>none                   |              |             |
| <b>C360A/...</b><br>Main contacts<br>1x NO<br>Number of auxiliary switches***<br>1x SPDT S880 W1R6 k |              |             |
| <b>C360A/...</b><br>Main contacts<br>1x NO<br>Number of auxiliary switches***<br>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 C360A/...**

- 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              | Thickness | Diameter |
|---------------|-----------------------|-----------|----------|
| C360A/150 ... | Copper                | 3 mm      | ∅ 9 mm   |
| C360A/300 ... | Copper                | 5 mm      | ∅ 11 mm  |
| C360A/500 ... | Copper, silver plated | 5 mm      | ∅ 11 mm  |

**Specifications** Version «A» for  $U_r = 1,500$  V DC

C360 series

| Series   |   | C360A/150   | C360A/300                                       | C360K/500                            |
|--|---|---|---|--------------------------------------|
| <b>Type of voltage</b>   |   | DC, bidirectional / AC, $f \leq 60$ Hz, 1,000 V max.  |   |                                      |
| <b>Main contacts, configuration</b>  |   | 1x NO   |   |                                      |
| <b>General electrical ratings of main circuit</b>  |   |   |   |                                      |
| Rated operational voltage $U_r$  | max.  | 1,000 V @ PD3 / 1,500 V @ PD2   |   |                                      |
| Rated insulation voltage $U_{Nm}$  |   | 1,000 V @ PD3 / 1,500 V @ PD2   |   |                                      |
| Rated impulse withstand voltage $U_{Ni}$   |   | 10 kV   |   |                                      |
| Pollution degree / Overvoltage category  |   | PD2, PD3: see $U_{Nm}$ / OV3  |   |                                      |
| Conventional free air thermal current $I_{th}$   | $T_a = 40^\circ$ C<br>$T_a = 70^\circ$ C  | 150 A *<br>150 A  | 300 A *<br>300 A                                | 500 A<br>400 A                       |
| Power dissipation per pole   | $I_{th}$ @ 40 °C, typ.  | 3.5 W   | 11 W  | 30 W                                 |
| Pole impedance   | typ.  | 150 $\mu\Omega$   | 120 $\mu\Omega$                                 | 120 $\mu\Omega$                      |
| Gerätekatgorie   | IEC 60077-2   | B   |   |                                      |
| Rated short-circuit breaking capacity  |   |   | 150 A   | 420 A                                |
| DC   | $I_r$ @ L/R = 1 ms / $U_r = 900$ V  |   |   |                                      |
| AC   | $I_r$ @ $\cos\phi = 0.8$ / $U_r = 900$ V  |   |   |                                      |
| Rated short-time withstand current $I_{CW}$  | $t = 0,1$ s<br>$t = 1$ s  |   | 4,000 A<br>3,000 A                              |                                      |
| Critical current range   |   | none  | none  | none                                 |
| <b>Additional electrical ratings of main circuit</b>                                       |   |   |   |                                      |
| Conventional free air thermal current $I_{th}$   | $T_a = 85^\circ$ C (cross section)<br>Terminal heating  | 200 A (50 mm <sup>2</sup> )<br>45 K   | 350 A (120 mm <sup>2</sup> )<br>45 K            | 500 A (185 mm <sup>2</sup> )<br>65 K |
| Short circuit protection device for contactors (w/o thermal overload relay)                | $I_{prosp} = 10$ kA DC, L/R = 5 ms, welding proof<br>Fuse: SIBA SQB-DC 2 (aR Type)  | 200 A   | 315 A   | 2x 250 A (parallel)                  |
| 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<br>bistable: horizontal: 750 A, vertical: 750 A                              |   |                                      |
| Breaking capacity  | $L_{max} = 0.25$ mH, other values on request  |   | 60 operations                                   |                                      |
| Single contact   | $U_r = 1,500$ V / $I_r = 50$ A<br>$U_r = 900$ V / $I_r = 400$ A<br>$U_r = 750$ V / $I_r = 500$ A<br>$U_r = 500$ V / $I_r = 800$ A |   | 60 operations<br>60 operations<br>60 operations |                                      |
| Double contact circuit   | $U_r = 1,500$ V / $I_r = 500$ A<br>$U_r = 1,000$ V / $I_r = 800$ A  |   | 60 operations<br>60 operations                  |                                      |
| Electrical endurance   |   | 6,000 operations @ DC (L/R = 1 ms), AC ( $\cos\phi = 0.8$ ): 750 V / 60 A   |   |                                      |
| <b>Main contacts</b>   |   |   |   |                                      |
| Contact material   |   | AgSnO <sub>2</sub>  | AgSnO <sub>2</sub>                              | AgSnO <sub>2</sub>                   |
| Terminals  |   | M8  | M10   | M10                                  |
| Torque   |   | 4.8 ... 6 Nm  | 8 ... 10 Nm                                     | 8 ... 10 Nm                          |
| <b>Auxiliary contacts</b>  |   |   |   |                                      |
| 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   |   |                                      |
| <b>Magnetic drive – monostable</b>   |   |   |   |                                      |
| Rated control supply voltage $U_s$   |   | 24 / 72 / 110 V DC  |   |                                      |
| Pollution degree / Overvoltage category  |   | PD3 / OV2   |   |                                      |
| Coil tolerance   |   | -30 % ... +25 % $U_s$   |   |                                      |
| Coil power dissipation, max. ( $T_a = 20^\circ$ C / $U_s$ )                                |   | 50 W (24 V) / 2.6 W   |   |                                      |
| Pull-in power (0.2 s) / Holding power  |   | 3,600 h <sup>-1</sup> / 1,800 h <sup>-1</sup>   |   |                                      |
| Frequency of operation (operations per hour, no load)                                      | $T_a = 20^\circ$ C / 70 °C  | 33 ms / 25 ms   |   |                                      |
| Pull-in time ( $T_a = 20^\circ$ C / $U_s$ ) / Drop-off time ( $T_a = 20^\circ$ C / $U_s$ ) | typ.  | Suppressor diode / Flat tap 6.3 x 0.8 mm  |   |                                      |
| Coil suppression (integrated) / Coil terminal  |   |   |   |                                      |
| <b>Magnetic drive – bistable</b>   |   |   |   |                                      |
| Rated control supply voltage $U_s$   |   | 24 / 72 / 110 V DC @ ON time 0.1 ... 0.5 s max.   |   |                                      |
| Pollution degree / Overvoltage category  |   | PD3 / OV2   |   |                                      |
| Coil tolerance   |   | -30 % ... +25 % $U_s$   |   |                                      |
| Coil power dissipation, max. ( $T_a = 20^\circ$ C / $U_s$ )                                |   | 35 W  |   |                                      |
| Frequency of operation (operations per hour, no load)                                      | $T_a = 20^\circ$ C / 70 °C  | 1,800 h <sup>-1</sup> / 1,800 h <sup>-1</sup>   |   |                                      |
| Pull-in time ( $T_a = 20^\circ$ C / $U_s$ ) / Drop-off time ( $T_a = 20^\circ$ C / $U_s$ ) | typ.  | 20 ms / 13 ms   |   |                                      |
| Coil suppression (integrated) / Coil terminal  |   | Suppressor diode / Flat tap 6.3 x 0.8 mm  |   |                                      |
| <b>Mounting position</b>   |   | vertical / horizontal (not upside-down, see page 11)  |   |                                      |
| <b>Degree of protection</b>  | IEC 60529   | IP00  |   |                                      |
| <b>Mechanical endurance</b>  | monostable / bistable   | 2,000,000 operations / 100,000 operations<br>(Replace auxiliary switch after 1,000,000 switching cycles)                        |   |                                      |
| <b>Shock / Vibration</b>   | IEC 61373 / ISO 16750-3   | Category 1, Class B / Class C   |   |                                      |
| <b>Temperatures</b>  | Operating temperature / Storage temperature<br>Altitude / Humidity (EN 50125-1)   | -40 °C ... +85 °C / -40 °C ... +85 °C<br>< 4,500 m @ $U_i = 1,000$ V, < 3,500 m @ $U_i = 1,500$ V / < 75 % on an annual average |   |                                      |
| <b>Weight</b>  |   | 0.83 kg   | 0.90 kg   | 0.95 kg                              |

\* Higher values on request

Subject to change







**Specifications** Version «S» for  $U_r = 60$  V DC

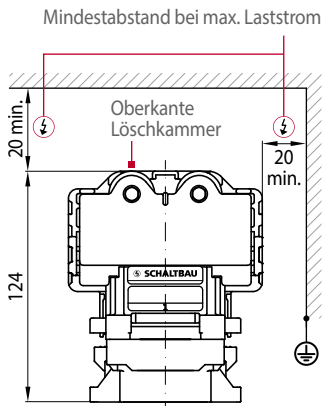
C360 series

| Series   |  | C360S/150   | C360S/300  | C360S/500  |
|--|--|---|--|--|
| <b>Type of voltage</b>   |  | DC, bidirectional / AC, $f \leq 60$ Hz, 1,000 V max.  |  |  |
| <b>Main contacts, configuration</b>  |  | 1x NO   |  |  |
| <b>General electrical ratings of main circuit</b>  |  |   |  |  |
| Rated operational voltage $U_r$  | max.   | 60 V  |  |  |
| Rated insulation voltage $U_{Nm}$  |  | 1,000 V @ PD3 / 1,500 V @ PD2   |  |  |
| Rated impulse withstand voltage $U_{Ni}$   |  | 10 kV   |  |  |
| Pollution degree / Overvoltage category  |  | PD2, PD3: see $U_{Nm}$ / OV3  |  |  |
| Conventional free air thermal current $I_{th}$   | $T_a = 40^\circ\text{C}$<br>$T_a = 70^\circ\text{C}$                               | 150 A *<br>150 A  | 300 A *<br>300 A   | 500 A<br>400 A   |
| Power dissipation per pole   | $I_{th}$ @ $40^\circ\text{C}$ , typ.   | 3.5 W   | 11 W   | 30 W   |
| Pole impedance   | typ.   | 150 $\mu\Omega$   | 120 $\mu\Omega$  | 120 $\mu\Omega$  |
| Geräteklasse   | IEC 60077-2  | B   |  |  |
| Rated short-time withstand current $I_{CtW}$   | $t = 0,1$ s<br>$t = 1$ s   |   | 4,000 A<br>3,000 A   |  |
| Critical current range   |  | none  | none   | none   |
| <b>Additional electrical ratings of main circuit</b>   |  |   |  |  |
| Conventional free air thermal current $I_{th}$   | $T_a = 85^\circ\text{C}$ (cross section)<br>Terminal heating                       | 200 A (50 mm <sup>2</sup> )<br>45 K   | 350 A (120 mm <sup>2</sup> )<br>45 K   | 500 A (185 mm <sup>2</sup> )<br>65 K   |
| Short circuit protection device for contactors (w/o thermal overload relay)                            | $I_{prosp} = 10$ kA DC, L/R = 5 ms, welding proof<br>Fuse: SIBA SQB-DC 2 (aR Type) | 200 A   | 315 A  | 2x 250 A (parallel)  |
| 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<br>bistable: horizontal: 750 A, vertical: 750 A                              |  |  |
| Breaking capacity (L/R = 0.1 ms)   | $U_r = 60$ V / $I_r = 2,000$ A<br>$U_r = 96$ V / $I_r = 1,300$ A                   | 60 operations<br>60 operations  |  |  |
| Electrical endurance   |  | 10,000 operations<br>@ DC (L/R = 1 ms),<br>AC ( $\cos\phi = 0.8$ ): 48 V / 150 A  | 10,000 operations<br>@ DC (L/R = 1 ms),<br>AC ( $\cos\phi = 0.8$ ): 48 V / 300 A | 10,000 operations<br>@ DC (L/R = 1 ms),<br>AC ( $\cos\phi = 0.8$ ): 48 V / 500 A |
| <b>Main contacts</b>   |  |   |  |  |
| Contact material   |  | AgSnO <sub>2</sub>  | AgSnO <sub>2</sub>   | AgSnO <sub>2</sub>   |
| Terminals  |  | M8  | M10  | M10  |
| Torque   |  | 4.8 ... 6 Nm  | 8 ... 10 Nm  | 8 ... 10 Nm  |
| <b>Auxiliary contacts</b>  |  |   |  |  |
| 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   |  |  |
| <b>Magnetic drive – monostable</b>   |  |   |  |  |
| Rated control supply voltage $U_s$   |  | 24 / 72 / 110 V DC  |  |  |
| Pollution degree / Overvoltage category  |  | PD3 / OV2   |  |  |
| Coil tolerance   |  | -30 % ... +25 % $U_s$   |  |  |
| Coil power dissipation, max. ( $T_a = 20^\circ\text{C}$ / $U_s$ )                                      |  | 50 W (24 V) / 2.6 W   |  |  |
| Pull-in power (0.2 s) / Holding power  |  |   |  |  |
| Frequency of operation (operations per hour, no load)  | $T_a = 20^\circ\text{C}$ / $70^\circ\text{C}$                                      | 3,600 h <sup>-1</sup> / 1,800 h <sup>-1</sup>   |  |  |
| Pull-in time ( $T_a = 20^\circ\text{C}$ / $U_s$ ) / Drop-off time ( $T_a = 20^\circ\text{C}$ / $U_s$ ) | typ.   | 33 ms / 25 ms   |  |  |
| Coil suppression (integrated) / Coil terminal  |  | Suppressor diode / Flat tap 6.3 x 0.8 mm  |  |  |
| <b>Magnetic drive – bistable</b>   |  |   |  |  |
| Rated control supply voltage $U_s$   |  | 24 / 72 / 110 V DC @ ON time 0.1 ... 0.5 s max.   |  |  |
| Pollution degree / Overvoltage category  |  | PD3 / OV2   |  |  |
| Coil tolerance   |  | -30 % ... +25 % $U_s$   |  |  |
| Coil power dissipation, max. ( $T_a = 20^\circ\text{C}$ / $U_s$ )                                      |  | 35 W  |  |  |
| Frequency of operation (operations per hour, no load)  | $T_a = 20^\circ\text{C}$ / $70^\circ\text{C}$                                      | 1,800 h <sup>-1</sup> / 1,800 h <sup>-1</sup>   |  |  |
| Pull-in time ( $T_a = 20^\circ\text{C}$ / $U_s$ ) / Drop-off time ( $T_a = 20^\circ\text{C}$ / $U_s$ ) | typ.   | 20 ms / 13 ms   |  |  |
| Coil suppression (integrated) / Coil terminal  |  | Suppressor diode / Flat tap 6.3 x 0.8 mm  |  |  |
| <b>Mounting position</b>   |  | vertical / horizontal (not upside-down, see page 11)  |  |  |
| <b>Degree of protection</b>  | IEC 60529  | IP00  |  |  |
| <b>Mechanical endurance</b>  | monostable / bistable  | 2,000,000 operations / 100,000 operations<br>(Replace auxiliary switch after 1,000,000 switching cycles)                        |  |  |
| <b>Shock / Vibration</b>   | IEC 61373 / ISO 16750-3  | Category 1, Class B / Class C   |  |  |
| <b>Temperatures</b>  | Operating temperature / Storage temperature<br>Altitude / Humidity (EN 50125-1)    | -40 °C ... +85 °C / -40 °C ... +85 °C<br>< 4,500 m @ $U_i = 1,000$ V, < 3,500 m @ $U_i = 1,500$ V / < 75 % on an annual average |  |  |
| <b>Weight</b>  |  | 0.55 kg   | 0.63 kg  | 0.65 kg  |

**Minimum distances**

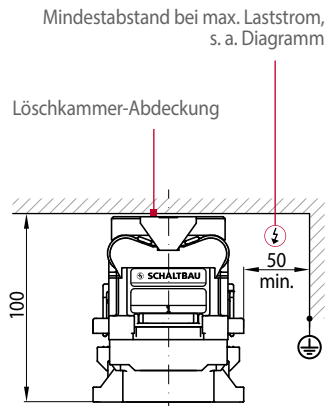
**C360 series**

- **C360K/...**  
with large arc chamber



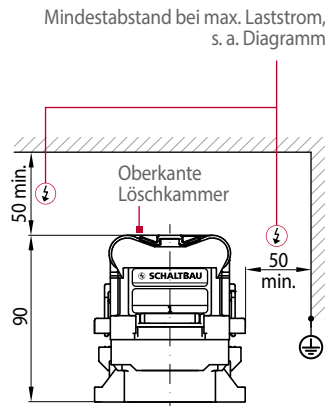
**i** For the C360K/150, C360K/300 and C360K/500 series there is a minimum distance of 20 mm to magnetically active, live or earthed parts.

- **C360A/...**  
with arc chamber cover



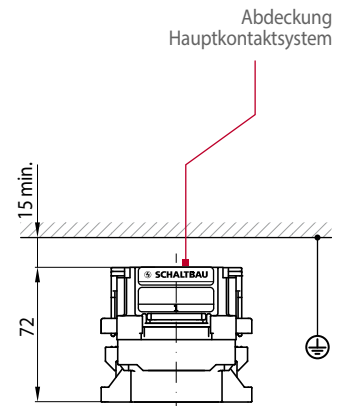
**i** The extinguishing chamber cover is part of the standard scope of delivery for the C360A/150, C360A/300 and C360A/500 series.

- **C360A/...**  
w/o arc chamber cover



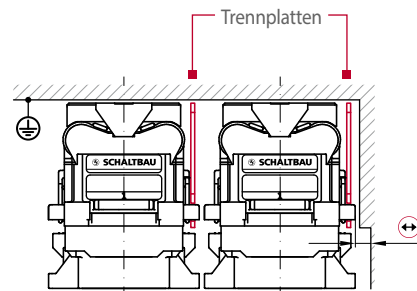
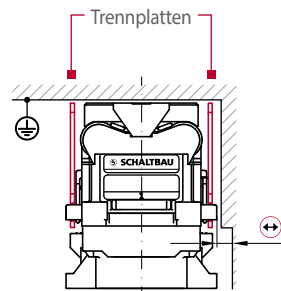
**i** It is permissible to use the C360A/150, C360A/300 and C360A/500 series without arc chamber cover, taking into account additional clearance dimensions.

- **C360S/...**  
w/o arc chamber



**i** For the C360S/150, C360S/300 and C360S/500 series there is a minimum distance of 15 mm to magnetically active, live or earthed parts.

- **Insertable deflection shields:**



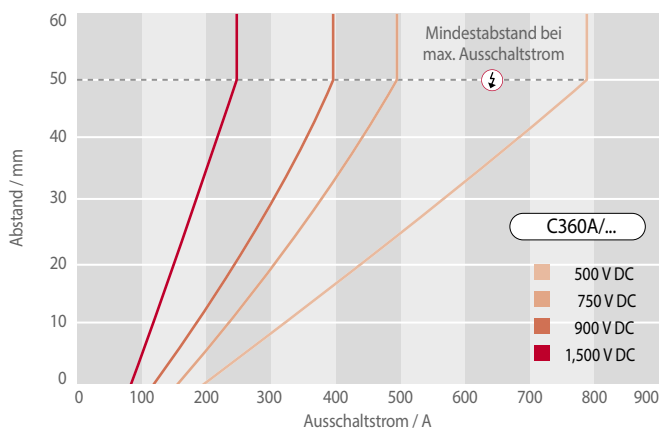
**↔** Abstand für Spulenanschluss

**i** **C360A/... 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.

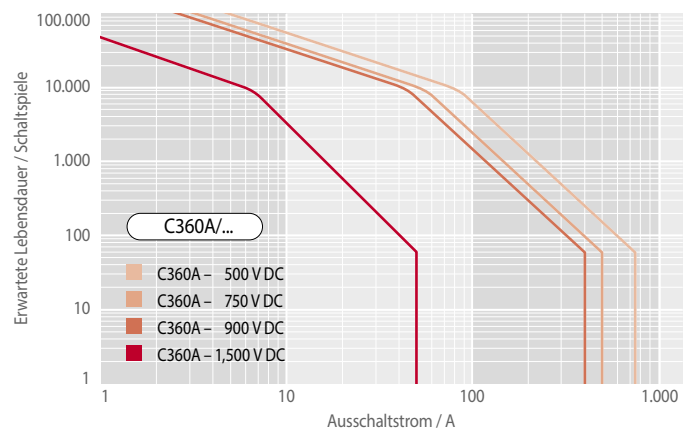
**Electrical endurance**

**C360 series**

- Minimum distances (⚡) to live or earthed parts



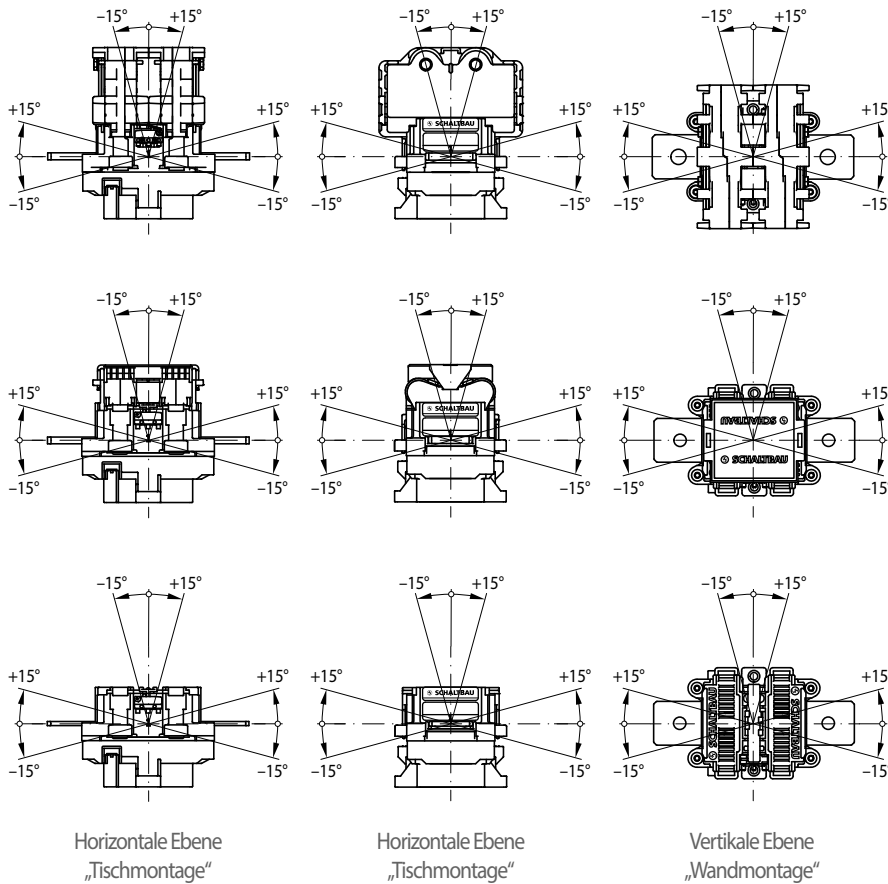
- Predicted electrical endurance as a function of the breaking current



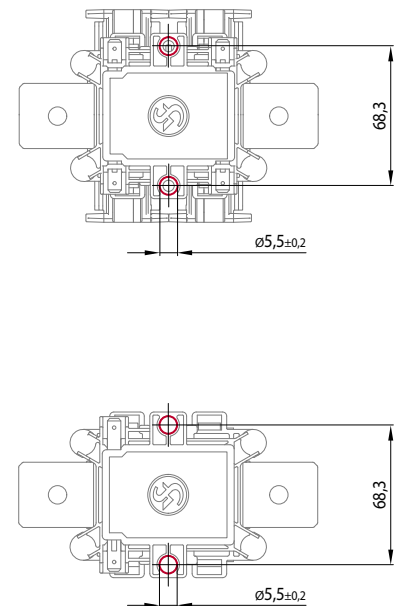
## Mounting instructions

C360 series

### • Permissible mounting orientations



### • Mounting holes



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

**i** 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

C360 series

### Maintenance:

- C360 series contactors are basically maintenance free.
- Make regular in-depth visual inspections once or twice a year.

### 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.



**For detailed maintenance, safety and mounting instructions please refer to our operating manuals**  
 ➔ **C360-M.en!**

- 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.
- Strong electromagnetic induction caused when switching off can influence other components installed near the contactor.
- 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!**

# Schaltbau GmbH

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



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## 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
- Enabling switches
- Special switches to suit customer requirements

### Contactors

- 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