SCHALTBAU
Connect Contact Control

# 3

## Contactors

### Series
### C137, C163, C164, C165

Single pole contactors
for battery voltages

**Catalogue B60.en**

More information
schaltbau.com

# Contactors for battery voltages C137, C163, C164, C165 Series

With its proven line of C137 through C165 Series contactors Schaltbau offers a scalable solution for handling direct current loads in the range of 40 A to 220 A for the most common coil voltages up to 110 V.

When utilizing a contactor its coil is powered by a battery and a magnetic field is generated around its armature by the direct current voltage coming from the battery. That is why Schaltbau battery contactors feature extra wide coil tolerance. They have double-break contacts, are compact in size, economical in price, and known for their reliability.

Version »C« are single-pole NO contactors with magnetic blowout, whereas version »H« are single-pole change-over contactors which feature an additional, electrically seperated contact element. This extra normally closed contact is, however, without blowout magnets and not designed to make and break current.

Bistable versions: C163 Series contactors are also available with magnetic latching. The change towards one of the two bistable positions of the main contact is operated by a pulse of 100 msec. duration. The coil consumes no power except for the short pulse necessary to close and reopen the main contact, see also catalogue B164en.

## Features

- Rugged, compact design
- Four different sizes
- Double breaking main contacts
- Extra wide coil tolerance for industrial and railway applications in accordance with VDE and UIC standards

## Applications

- General purpose motor control contactor
- Starting lift/lower controls as well as speed and directional controls of industrial trucks
- Heater and air conditioning control of electric locomotives and multiple units
- Battery powered electric functions in passenger coaches
- Deep discharge protection for batteries of uninter- ruptible power supplies (UPS)

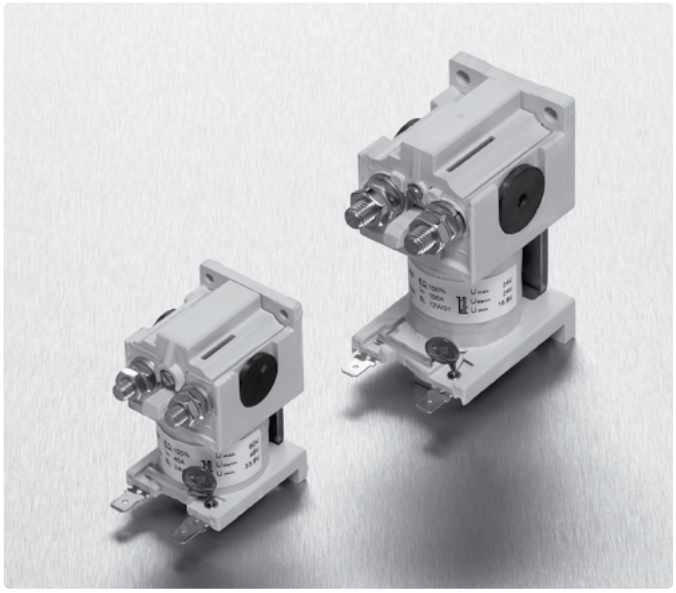
## Standards

Meet requirements for industrial applications to:

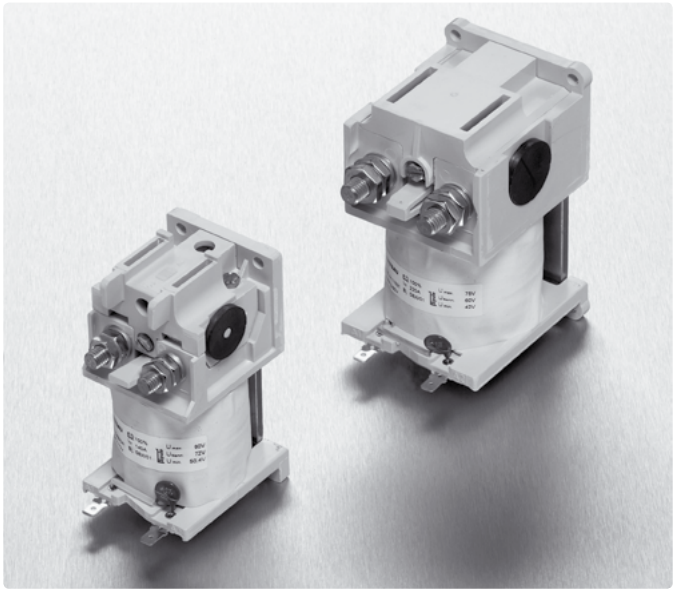
- **IEC 60947-1** Low-voltage switchgear and controlgear - Part 1: General rules
- **IEC 60947-4-1** Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor starters - Electromechanical contactors and motor starters.
- **DIN EN 1175-1** Safety of industrial trucks - Electrical requirements - Part 1: General requirements for battery powered trucks

Meet requirements for railway applications to:

- **IEC 60077-1** Railway applications - Electric equipment for rolling stock - Part 1: General service conditions and general rules.
- **IEC 60077-2** Railway applications - Electric equipment for rolling stock - Part 2: Electrotechnical components; General rules



C137 and C163 Series contactors



C164 and C165 Series contactors

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## Ordering code

### • C137 Series

Example: **C137 C/ 24EV-V1**

**Series**
C137 Single pole contactor

**Contact configuration**
C SPST NO *1
H SPDT *2

**Coil voltage**
24 / 36 / 48 / 72 / 80 / 110 V DC

**Coil tolerance**
R -30 % … +10 % $U_s$
E -30 % … +25 % $U_s$

**Coil suppression**
X none
V varistor

**Aux. contacts, Configuration**
V microswitch, SPDT *3

**Aux. contacts, Number of**
1 1x microswitch *3

**Stock items:**

| SPST NO contactors | |
|---|---|
| C137 C/ 24RX | C137 C/ 24EV |
| C137 C/ 48RX | C137 C/ 36EV |
| C137 C/ 80RX | C137 C/ 48EV |
| | C137 C/ 72EV |
| | C137 C/110EV |

| SPDT contactors | |
|---|---|
| C137 H/ 24RX | C137 H/ 24EV |
| C137 H/ 80RX | C137 H/110EV |

### • C163 Series

Example: **C163 C/ 24EV-R1**

**Series**
C163 Single pole contactor

**Contact configuration**
C SPST NO *1
H SPDT *2

**Coil voltage**
24 / 36 / 48 / 72 / 80 / 110 V DC

**Coil tolerance**
R -30 % … +10 % $U_s$
E -30 % … +25 % $U_s$

**Coil suppression**
X none
V varistor

**Aux. contacts, Configuration**
R S840, SPDT *3

**Aux. contacts, Number of**
1 1x microswitch *3

**Stock items:**

| SPST NO contactors | |
|---|---|
| C163 C/ 24RX | C163 C/ 24EV |
| C163 C/ 48RX | C163 C/ 36EV |
| C163 C/ 80RX | C163 C/ 48EV |
| | C163 C/ 72EV |
| | C163 C/110EV |

| SPDT contactor | |
|---|---|
| C163 H/ 24RX | |

### • C164 Series

Example: **C164 C/ 24EV-R1**

**Series**
C164 Single pole contactor

**Contact configuration**
C SPST NO *1
H SPDT *2

**Coil voltage**
24 / 36 / 48 / 72 / 80 / 110 V DC

**Coil tolerance**
R -30 % … +10 % $U_s$
E -30 % … +25 % $U_s$

**Coil suppression**
X none
V varistor

**Aux. contact, Configuration**
R S840, SPDT *3

**Aux. contact, Number of**
1 1x microswitch *3

**Stock items:**

| SPST NO contactors | |
|---|---|
| C164 C/ 24RX | C164 C/ 24EV |
| C164 C/ 48RX | C164 C/ 48EV |
| C164 C/ 80RX | C164 C/ 72EV |
| | C164 C/110EV |

| SPDT contactors | |
|---|---|
| C164 H/ 24RX | |
| C164 H/ 48RX | |
| C164 H/ 80RX | |

### • C165 Series

Example: **C165 C/ 24EV-R1**

**Series**
C165 Single pole contactor

**Contact configuration**
C SPST NO *1
H SPDT *2

**Coil voltage**
24 / 36 / 48 / 72 / 80 / 110 V DC

**Coil tolerance**
R -30 % … +10 % $U_s$
E -30 % … +25 % $U_s$ at 55° C
(-30 % … +15 % $U_s$ at 70° C)

**Coil suppression**
X none
V varistor

**Aux. contacts, Configuration**
R S840, SPDT *3

**Aux. contacts, Number of**
1 1x microswitch *3

**Stock items:**

| SPST NO contactors | |
|---|---|
| C165 C/ 24RX | C165 C/ 24EV |
| C165 C/ 48RX | C165 C/ 48EV |
| C165 C/ 80RX | C165 C/ 72EV |
| | C165 C/110EV |

| SPDT contactor | |
|---|---|
| C165 H/ 24RX | |

**Note:**
Presented in this catalogue are only stock items which can be supplied in short delivery time. Types for AC operation are available on special order: Replace version C with B (= NO contactor without blowouts) and version H with G (= changeover contactor without blowouts.

**Special variant**
If you need a special variant feel free 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, minumum order quantities apply.

*Subject to change*

**1 Version C are NO contactors fitted with permanent magnets. The normally open (make) contact is designed to make and break current like an open style power relay.*

**2 Version H changeover contactors feature electrically separated potential carrying make and break contacts. Please note that here only the normally open (make) contact is capable of switching current loads, whereas the normally closed (break) contact is designed to carry current but not to make and break current.*

**3 One microswitch max., with silver plated contacts*

## Specifications for industrial applications

| Series | C137 ..R | C163 ..R | C164 ..R | C165 ..R |
|---|---|---|---|---|
| Type of voltage | DC, AC *1 | | | |
| Main contacts, Number of, Configuration | 1x SPST-NO or 1x SPDT *2 | | | |
| Nominal voltage $U_n$ | 110 V | | | |
| Rated insulation voltage $U_i$ | 150 V | | | |
| Rated impulse withstand voltage $U_{imp}$ | 2.5 kV | | | |
| Pollution degree<br>Overvoltage category | PD3<br>OV3 | | | |
| Conventional thermal current $I_{th}$ | 50 A | 100 A | 140 A | 220 A |
| Making capacity, resistive, T = 1 ms | 600 A | 800 A | 1,000 A | 2,000 A |
| Breaking capacity, T < 1 ms SPST-NO<br>SPDT *2 | 80 V DC: 200 A<br>80 V DC: 100 A | 80 V DC: 300 A<br>80 V DC: 200 A | 80 V DC: 500 A<br>80 V DC: 300 A | 80 V DC: 1,500 A<br>80 V DC: 800 A |
| Rated short-time withstand current $I_{cw}$ | 800 A / 100 ms | 1.000 A / 100 ms | 1,500 A / 100 ms | 2,500 A / 100 ms |
| Switch-off, no reversing | only in one direction | | | |
| Main contacts | | | | |
| Contact material NO:<br>NC: | $AgSnO_2$<br>AgNi | $AgSnO_2$<br>AgNi | $AgSnO_2$<br>AgNi | $AgSnO_2$<br>AgNi |
| Main terminals / tightening torque | M6 / 3 Nm max. | M8 / 6 Nm max. | M8 / 6 Nm max. | M10 / 10 Nm max. |
| Auxiliary contacts | | | | |
| Number of / Configuration | 1x SPDT | | 1x S840 | |
| Switching capacities, T = 0 ms | 2.5 A at 24 V DC;<br>1.0 A at 48 V DC;<br>0.5 A at 80 V DC | | 2.5 A at 24 V DC;<br>1.0 A at 48 V DC;<br>0.5 A at 80 V DC | |
| Terminals, Flat tabs | 2.0 x 0.5 mm | | 6.3 x 0.8 mm | |
| Magnetic drive | | | | |
| Coil voltage $U_s$ | 24 V ... 110 V DC | 24 V ... 110 V DC | 24 V ... 110 V DC | 24 V ... 110 V DC |
| Coil tolerance | -30 % ... +10 % $U_s$ | -30 % ... +10 % $U_s$ | -30 % ... +10 % $U_s$ | -30 % ... +10 % $U_s$ |
| Coil power dissipation at $U_s$ and $T_a$ = 20°C | 12 W | 18 W | 20 W | 27 W |
| Coil suppression | --- | --- | --- | --- |
| Coil terminals, Flat tabs | 6.3 x 0.8 mm | 6.3 x 0.8 mm | 6.3 x 0.8 mm | 6.3 x 0.8 mm |
| Degree of protection | IP00 | | | |
| Mechanical endurance, operating cycles | NO > 3m<br>NC > 2m | > 3m | | |
| Electrical endurance, operating cycles | > 100,000 ($U_n$, $I_{th}$, T < 1 ms, cycle ≤ 6/min) | | | |
| Vibration / Shock (EN 61373) | Class B, Cat. 1: 5 ... 150 Hz / 5 g (30 msec., half sinus) | | | |
| Mounting position | Horizontal: contact studs must point upwards or<br>Vertical: plasma exits must point upwards | | | |
| Temperature | | | | |
| Ambient temperature $T_a$ | -25°C … +50°C | | | |
| Storage temperature | -40°C … +85°C | | | |
| Weight | 220 g ... 250 g | 550 g ... 680 g | 960 g ... 1,050 g | 1,900 g ... 2,150 g |

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*1 Types for AC applications available on special order: Replace version C with B (= NO contactor without blowout); and version H with G (= changeover contactor without blowout), see ordering code on page 3

*2 Changeover contactor: Here only the normally open (make) contact is capable of switching current loads, whereas the normally closed (break) contact is not designed to make and break current.

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## **Specifications** for railway applications

| Series | | C137 ..E | C163 ..E | C164 ..E | C165 ..E |
|---|---|---|---|---|---|
| Type of voltage | | DC, AC *1 | | | |
| Main contacts, Number of, Configuration | | 1x SPST-NO or 1x SPDT *2 | | | |
| Nominal voltage $U_n$ | | 120 V | | | |
| Rated insulation voltage $U_i$ | | 150 V | | | |
| Rated impulse withstand voltage $U_{imp}$ | | 2.5 kV | | | |
| Pollution degree<br>Overvoltage category | | PD3<br>OV3 | | | |
| Conventional thermal current $I_{th}$ | NO:<br>NC: | 40 A<br>40 A | 80 A<br>60 A | 140 A<br>140 A | 220 A<br>220 A |
| Making capacity, resistive, T = 1 ms | | 400 A | 600 A | 800 A | 1,500 A |
| Breaking capacity, T < 1 ms | NO:<br>Changeover:*2 | 80 V DC: 150 A<br>80 V DC: 60 A | 80 V DC: 250 A<br>80 V DC: 150 A | 80 V DC: 400 A<br>80 V DC: 250 A | 80 V DC: 1,500 A<br>80 V DC: 800 A |
| Rated short-time withstand current $I_{cw}$ | | 700 A / 100 ms | 800 A / 100 ms | 1.000 A / 100 ms | 2.000 A / 100 ms |
| Switch-off, no reversing | | only in one direction | | | |
| Main contacts<br>Contact material<br>Main terminals / tightening torque | NO:<br>NC: | $AgSnO_2$<br>AgNi<br>M6 / 3 Nm max. | $AgSnO_2$<br>AgNi<br>M8 / 6 Nm max. | $AgSnO_2$<br>AgNi<br>M8 / 6 Nm max. | $AgSnO_2$<br>AgNi<br>M10 / 10 Nm max. |
| Auxiliary contacts<br>Number of / Configuration<br>Switching capacities, T = 0 ms<br>Terminals, Flat tabs | | 1x SPDT<br>2.5 A at 24 V DC;<br>1.0 A at 48 V DC;<br>0.5 A at 80 V DC<br>2.0 x 0.5 mm | | 1x S840<br>2.5 A at 24 V DC;<br>1.0 A at 48 V DC;<br>0.5 A at 80 V DC<br>6.3 x 0.8 mm | |
| Magnetic drive<br>Coil voltage $U_s$<br>Coil tolerance<br>Coil power dissipation at $U_s$ and $T_a$ = 20°C<br>Coil suppression<br>Coil terminals, Flat tabs | | 24 V ... 110 V DC<br>-30 % ... +25 % $U_s$<br>8 W<br>Varistor<br>6.3 x 0.8 mm | 24 V ... 110 V DC<br>-30 % ... +25 % $U_s$<br>12 W<br>Varistor<br>6.3 x 0.8 mm | 24 V ... 110 V DC<br>-30 % ... +25 % $U_s$<br>12 W<br>Varistor<br>6.3 x 0.8 mm | 24 V ... 110 V DC<br>-30 % ... +25 % $U_s$*3<br>23 W<br>Varistor<br>6.3 x 0.8 mm |
| Degree of protection | | IP00 | | | |
| Mechanical endurance, operating cycles | | NO > 3m<br>NC > 2m | > 3m | | |
| Electrical endurance, operating cycles | | > 100,000 ($U_n$, $I_{th}$, T < 1 msec., cycle ≤ 6/min) | | | |
| Vibration / Shock (EN 61373) | | Class B, Cat. 1: 5 ... 150 Hz / 5 g (30 msec., half sinus) | | | |
| Mounting position | | Horizontal: contact studs must point upwards or<br>Vertical: plasma exits must point upwards | | | |
| Temperature<br>Ambient temperature $T_a$<br>Storage temperature | | -25°C … +70°C<br>-40°C … +85°C | | | |
| Weight | | 220 g ... 250 g | 550 g ... 680 g | 960 g ... 1,050 g | 1,900 g ... 2,150 g |

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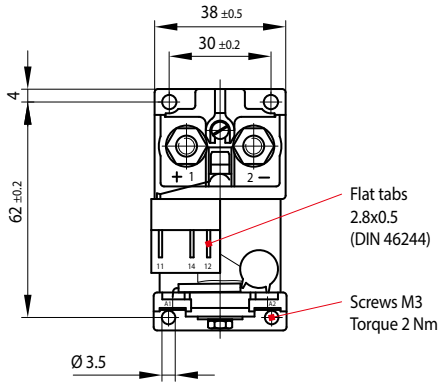
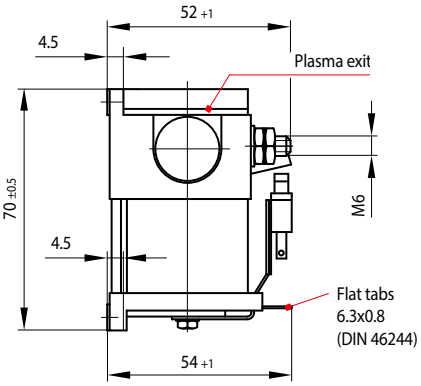
*1 Types for AC applications available on special order: Replace version C with B (= NO contactor without blowout); and version H with G (= changeover contactor without blowout), see ordering code on page 3.
*2 Changeover contactor: Here only the normally open (make) contact is capable of switching current loads, whereas the normally closed (break) contact is not designed to make and break current.
*3 at -25°C... +55°C

*Subject to change*

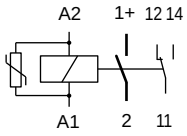
## C137 SPST-NO or SPDT contactor — C137 Series

- **Device outline: C137 Series SPST-NO contactor**



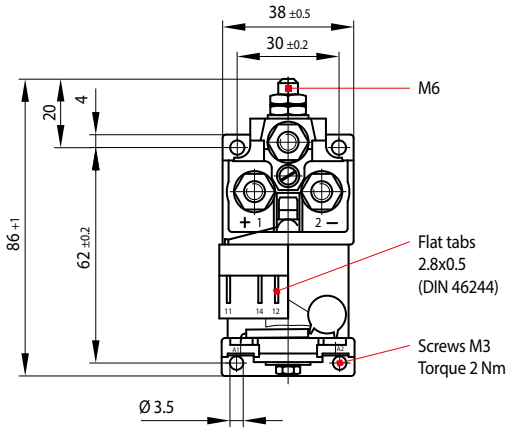



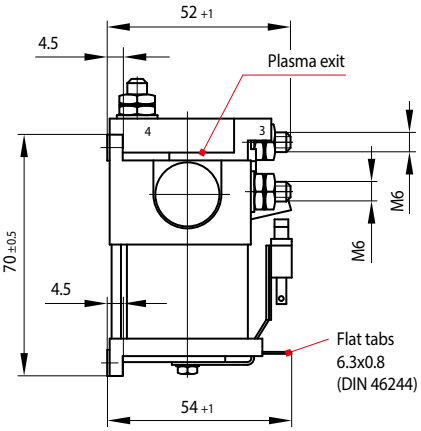

- **Circuit diagram**



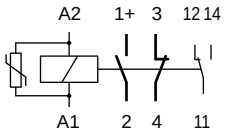

Fitted with varistor and auxiliary contact, see ordering code on page 3.

- **Device outline: C137 Series SPDT contactor**



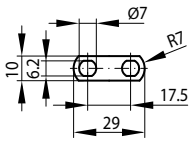

- **Circuit diagram**




Fitted with varistor and auxiliary contact, see ordering code on page 3.

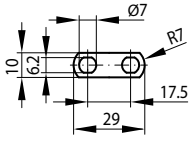
## VS-C137-x Tie bar — HK-C137 Auxiliary contact — C137 Series

- **Outline: Tie bar VS-C137-17,5**




- **Auxiliary contact assembly HK-C137**

- **Outline: Tie bar VS-C137-38,5**




- **Mounting:**

C137 Series contactors can be retrofitted with an auxiliary contact. Loosen the M4 hex screw a little that connects the yoke to the magnet core. Slide slotted mounting bracket of auxiliary contact assembly under screw head. Push yoke against housing and retighten screw.

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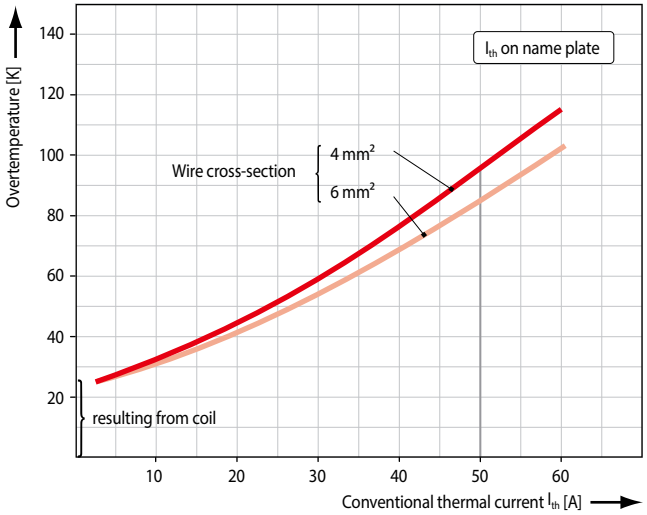
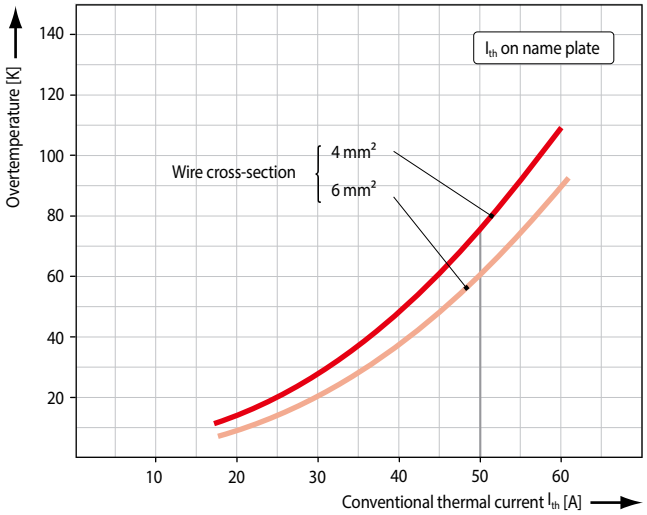
## Characteristic curves Contact performance

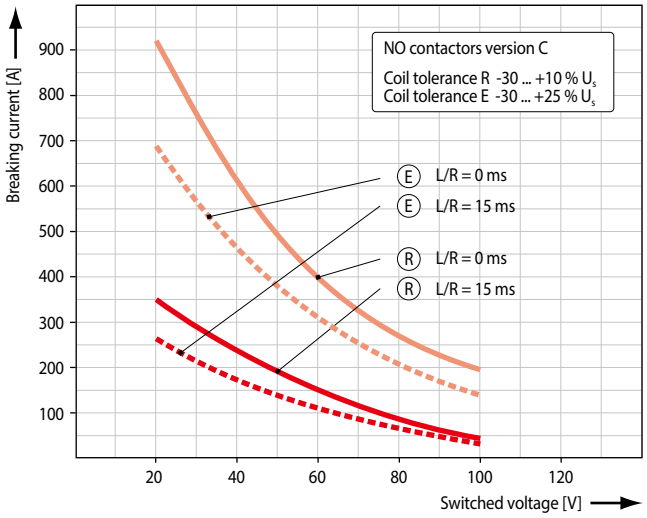
### • Continuously rated, normally open contact




### • Continuously rated, normally closed contact




### • Max. breaking capacity DC of NO contact for coil tolerance R and E




*Note:*

- *The maximum breaking capacity is the value of prospective current at a stated DC voltage which can be ruptured by the contactor where the ensuing arc upon contact separation is still being quenched. For actual operation the current rating of the contactor should, therefore, be limited to 20 % ... 60 % of its maximum breaking capacity.*
- *Please note that for double throw contactors, in addition to the foregoing limitations, the switch off load of the normally open contact must be further reduced by 30 % to 50 %.*

## Dimensioning

### • Guide to permissible current rating

| Short-time duty | SPST-NO | | SPDT | | | |
|---|---|---|---|---|---|---|
| | | | NO contact | | NC contact | |
| Coil tolerance* | R | E | R | E | R | E |
| 6 sec | 250 A | 180 A | 250 A | 180 A | 200 A | 140 A |
| 1 min | 120 A | 90 A | 120 A | 90 A | 110 A | 75 A |
| 3 min | 100 A | 70 A | 100 A | 70 A | 90 A | 60 A |
| 5 min | 80 A | 60 A | 80 A | 60 A | 70 A | 50 A |
| 10 min | 70 A | 50 A | 70 A | 50 A | 60 A | --- |

*Above current ratings refer to wire cross-section 6 mm²*

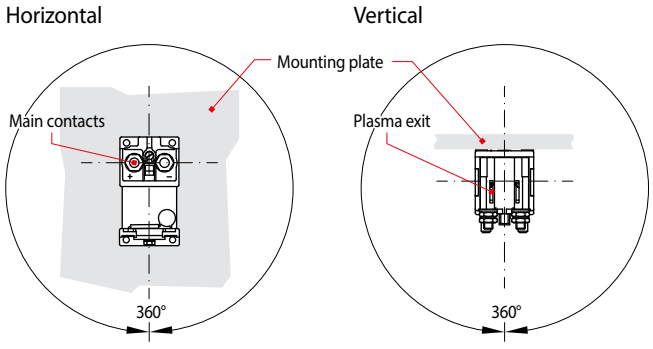
** Coil voltage tolerance* ***R:*** *-30 % ... +10 % $U_s$*
***E:*** *-30 % ... +25 % $U_s$*

*Note:*

- *The thermal current rating for continuous duty is dependent on the upper limiting temperature of the contact elements which must not exceed 150°C. Wire gauge, ambient temperature, duty and operating cycles, contamination of contacts and contact wear are all factors that influence the surface temperature rise of the contact studs. All the above current ratings should, therefore, be considered as a guide only.*
- *The way you mount the contactor has no less an impact on the rise of temperature and the insulation of the switching device. So please observe the clearance between live or earthed parts and comply with the safety regulations of the applicable standards. No liability will be accepted by Schaltbau in any circumstances for indirect damage resulting from clearances not being observed, devices not mounted properly, or products tampered with in any way.*

## Mounting position

### • Possible mounting orientations

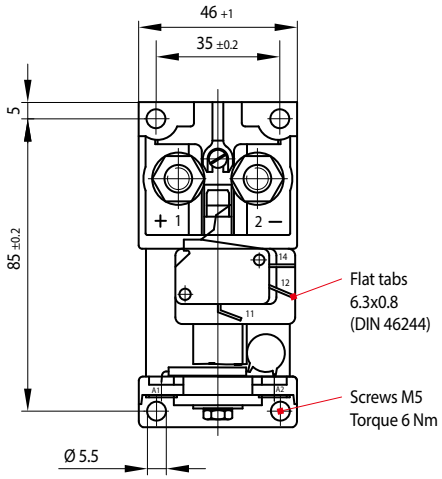


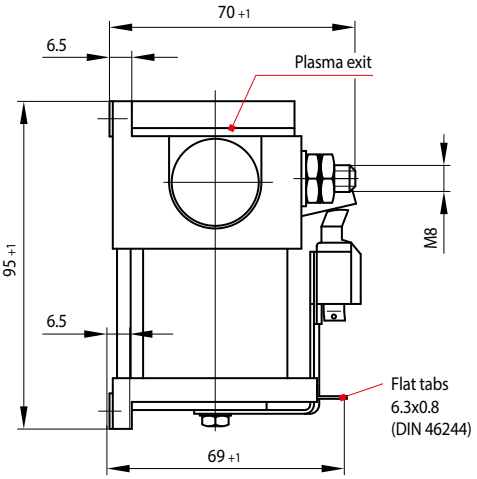

*Mounting positions:*

- *Horizontal: contact studs must point upwards or*
- *Vertical: plasma exits must point upwards*

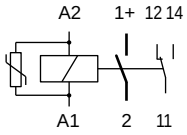
## C163 SPST-NO or SPDT contactor — C163 Series

- **Device outline: C163 Series SPST-NO contactor**



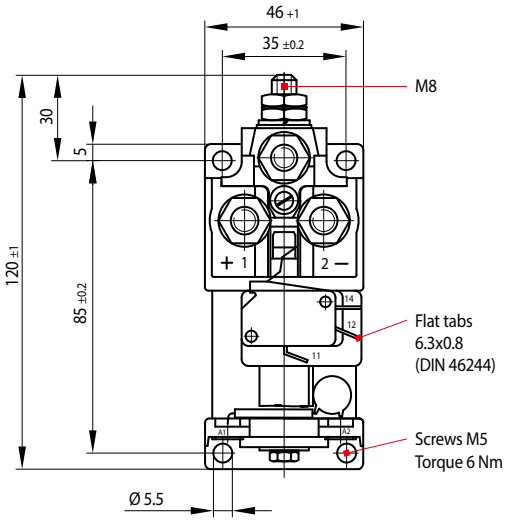



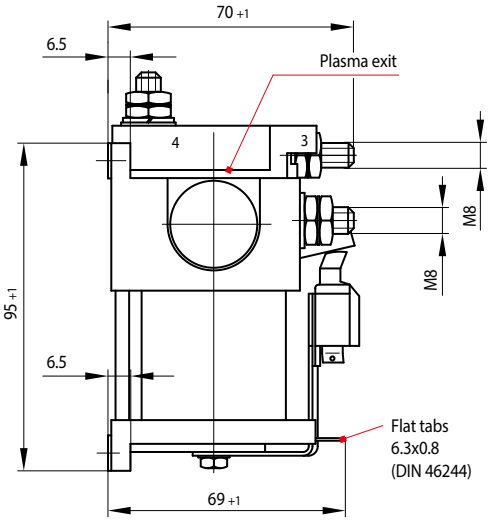

- **Circuit diagram**



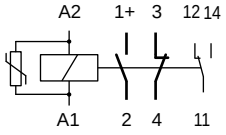

Fitted with varistor and auxiliary contact, see ordering code on page 3.

- **Device outline: C163 Series SPDT contactor**




- **Circuit diagram**

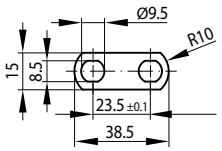



Fitted with varistor and auxiliary contact, see ordering code on page 3.

## VS-C163-x Tie bar

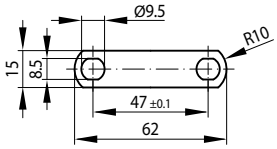
## HK-C163 Auxiliary contact — C163 Series

- **Outline: Tie bar VS-C163-23,5**




- **Auxiliary contact assembly HK-C163**

- **Outline: Tie bar VS-C163-47,0**




- **Mounting:**

C163 Series contactors can be retrofitted with an auxiliary contact. Loosen the M5 hex screw a little that connects the yoke to the magnet core. Slide slotted mounting bracket of auxiliary contact assembly under screw head. Push yoke against housing and retighten screw.

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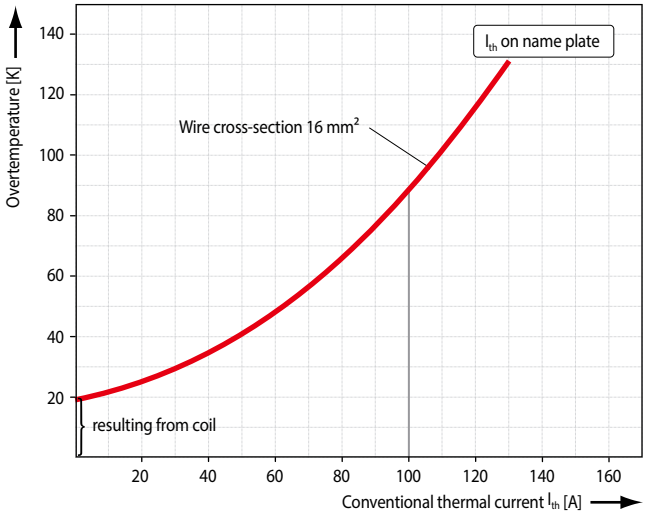
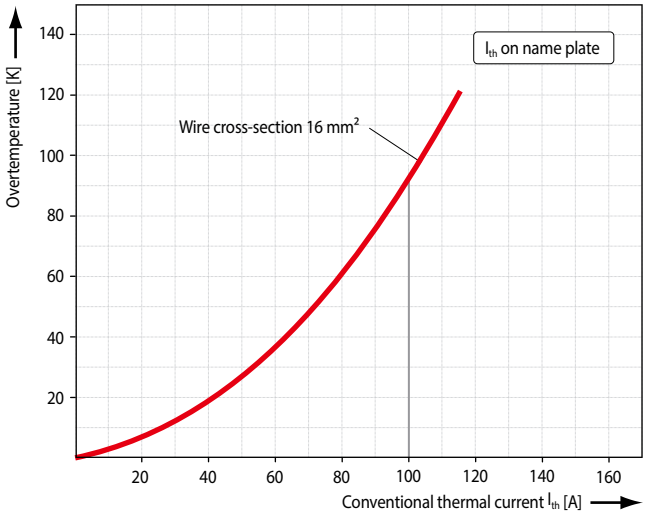
## Characteristic curves Contact performance

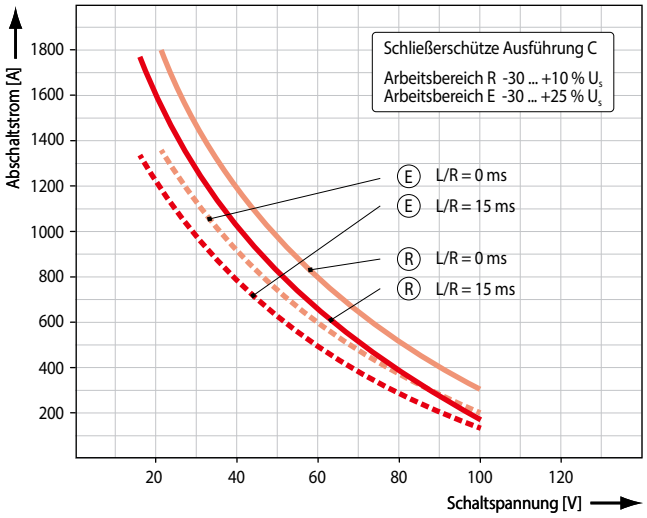
### • Continuously rated, normally open contact




### • Continuously rated, normally closed contact




### • Max. breaking capacity DC of NO contact for coil tolerance R and E




**Note:**

- *The maximum breaking capacity is the value of prospective current at a stated DC voltage which can be ruptured by the contactor where the ensuing arc upon contact separation is still being quenched. For actual operation the current rating of the contactor should, therefore, be limited to 20 % ... 60 % of its maximum breaking capacity.*
- *Please note that for double throw contactors, in addition to the foregoing limitations, the switch off load of the normally open contact must be further reduced by 30 % to 50 %.*

## Dimensioning C164 Series

### • Guide to permissible current rating

| Short-time duty | SPST-NO | | SPDT | | | |
|---|---|---|---|---|---|---|
| | | | NO contact | | NC contact | |
| Coil tolerance* | R | E | R | E | R | E |
| 6 sec | 450 A | 340 A | 450 A | 340 A | 250 A | 180 A |
| 1 min | 200 A | 150 A | 200 A | 150 A | 150 A | 110 A |
| 3 min | 150 A | 115 A | 150 A | 115 A | 125 A | 90 A |
| 5 min | 130 A | 100 A | 130 A | 100 A | 115 A | 80 A |
| 10 min | 110 A | --- | 110 A | --- | 105 A | 70 A |

*Above current ratings refer to wire cross-section 16 mm²*

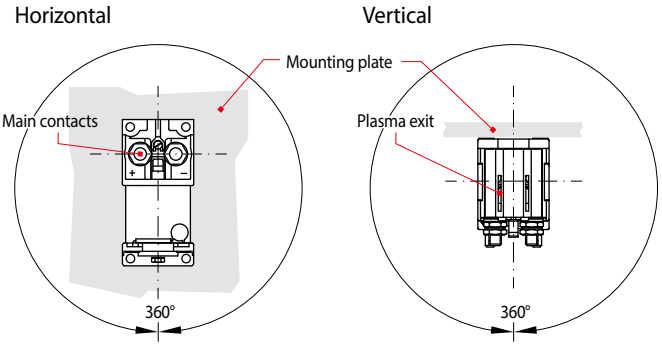
** Coil voltage tolerance* ***R:*** *-30 % ... +10 % $U_s$*
***E:*** *-30 % ... +25 % $U_s$*

***Note:***

- *The thermal current rating for continuous duty is dependent on the upper limiting temperature of the contact elements which must not exceed 150°C. Wire gauge, ambient temperature, duty and operating cycles, contamination of contacts and contact wear are all factors that influence the surface temperature rise of the contact studs. All the above current ratings should, therefore, be considered as a guide only.*
- *The way you mount the contactor has no less an impact on the rise of temperature and the insulation of the switching device. So please observe the clearance between live or earthed parts and comply with the safety regulations of the applicable standards. No liability will be accepted by Schaltbau in any circumstances for indirect damage resulting from clearances not being observed, devices not mounted properly, or products tampered with in any way.*

## Mounting position C163 Series

### • Possible mounting orientations



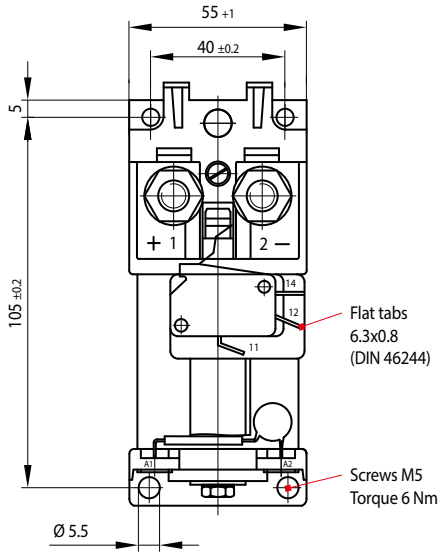

***Mounting positions:***

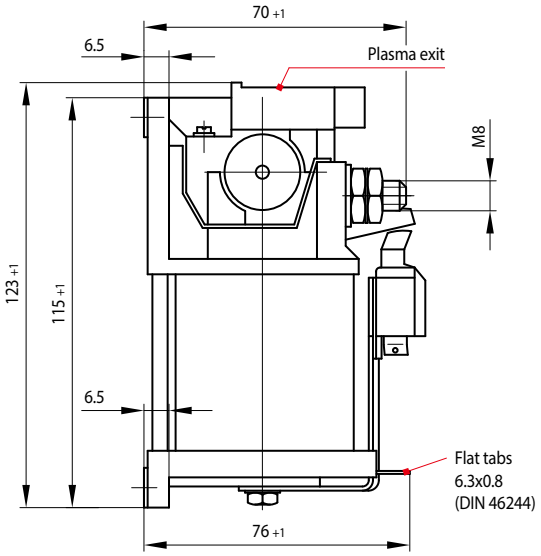
- *Horizontal: contact studs must point upwards or*
- *Vertical: plasma exits must point upwards*

*Subject to change / Dimensions in mm*

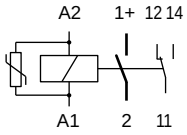
## C164 SPST-NO or SPDT contactor — C164 Series

- **Device outline: C164 Series SPST-NO contactor**



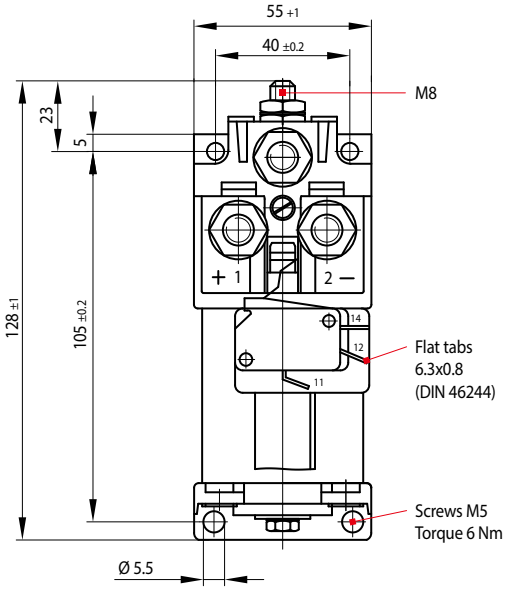



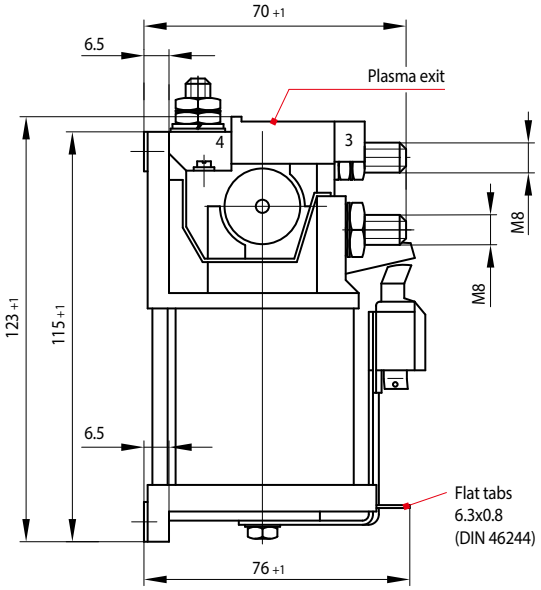

- **Circuit diagram**



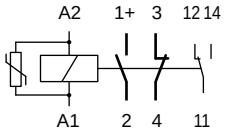

Fitted with varistor and auxiliary contact, see ordering code on page 3.

- **Device outline: C164 Series SPDT contactor**



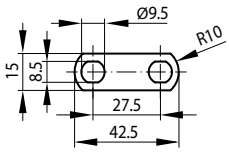

- **Circuit diagram**



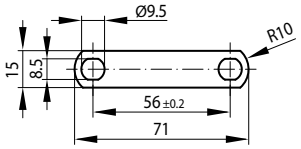

Fitted with varistor and auxiliary contact, see ordering code on page 3.

## VS-C164-x Tie bar — HK-C164 Auxiliary contact — C164 Series

- **Outline: Tie bar VS-C164-27,5**




- **Outline: Tie bar VS-C164-56,0**




*Reduced scale diagrams / dimensions in mm*

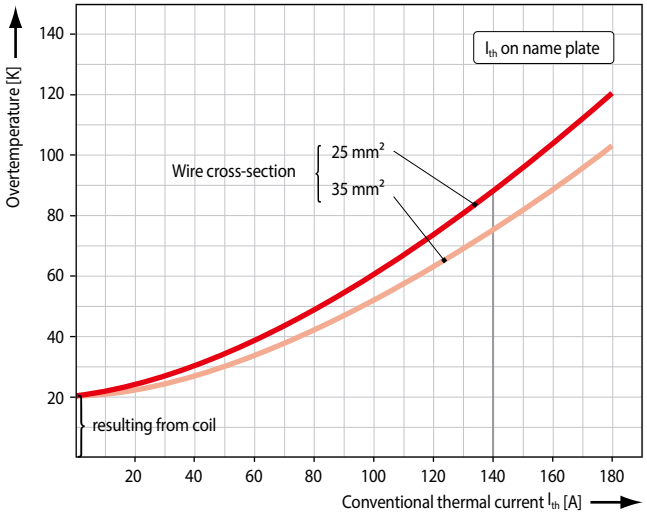
- **Auxiliary contact assembly HK-C164**

- **Mounting:**

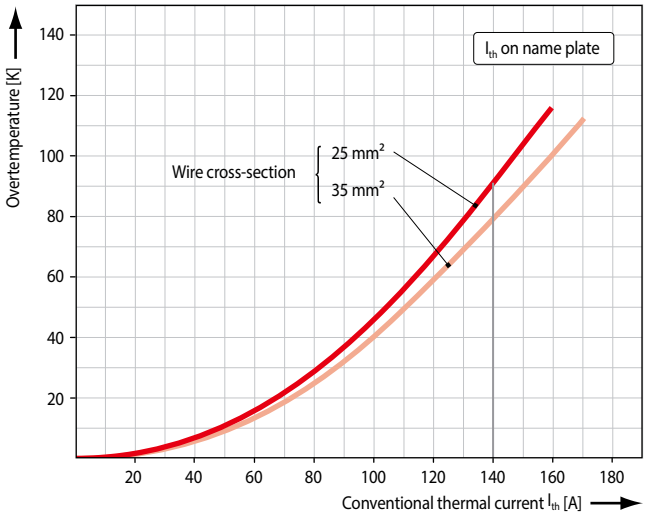
C164 Series contactors can be retrofitted with an auxiliary contact. Loosen the M5 hex screw a little that connects the yoke to the magnet core. Slide slotted mounting bracket of auxiliary contact assembly under screw head. Push yoke against housing and retighten screw.

## Characteristic curves Contact performance

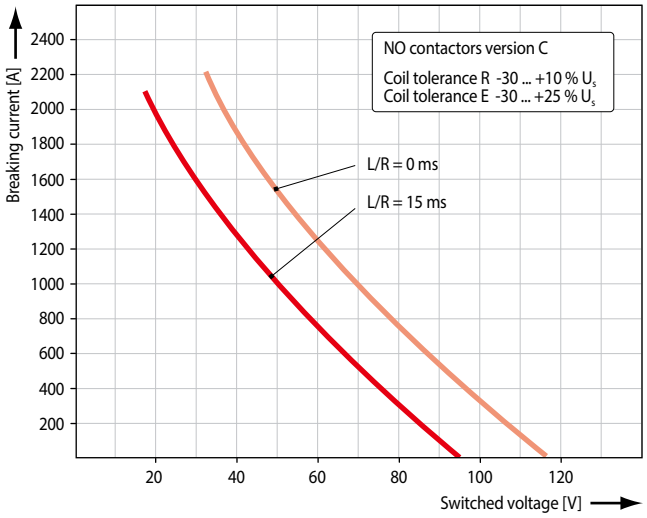
### • Continuously rated, normally open contact




### • Continuously rated, normally closed contact




### • Max. breaking capacity DC of NO contact for coil tolerance R and E




*Note:*

- *The maximum breaking capacity is the value of prospective current at a stated DC voltage which can be ruptured by the contactor where the ensuing arc upon contact separation is still being quenched. For actual operation the current rating of the contactor should, therefore, be limited to 20 % ... 60 % of its maximum breaking capacity.*
- *Please note that for double throw contactors, in addition to the foregoing limitations, the switch off load of the normally open contact must be further reduced by 30 % to 50 %.*

## Dimensioning

C164 Series

### • Guide to permissible current rating

| Short-time duty | SPST-NO | | SPDT | | | |
|---|---|---|---|---|---|---|
| | | | NO contact | | NC contact | |
| Coil tolerance* | R | E | R | E | R | E |
| 6 sec | 800 A | 650 A | 800 A | 650 A | 400 A | 320 A |
| 1 min | 280 A | 220 A | 280 A | 220 A | 210 A | 170 A |
| 3 min | 210 A | 170 A | 210 A | 170 A | 170 A | 150 A |
| 5 min | 190 A | 155 A | 190 A | 155 A | 160 A | --- |
| 10 min | 170 A | --- | 170 A | --- | 150 A | --- |

*Above current ratings refer to wire cross-section 35 mm²*

** Coil voltage tolerance* ***R:*** *-30 % ... +10 % $U_s$*
***E:*** *-30 % ... +25 % $U_s$*

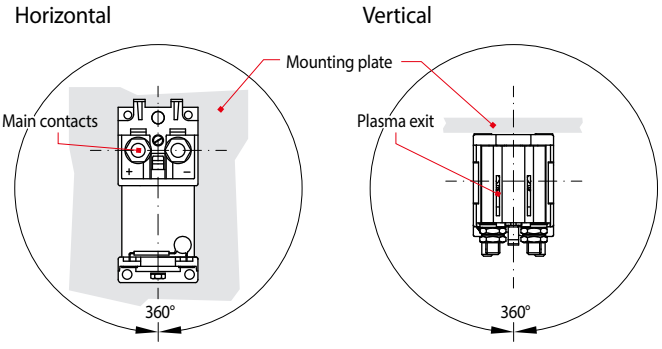
***Note:***

- *The thermal current rating for continuous duty is dependent on the upper limiting temperature of the contact elements which must not exceed 150°C. Wire gauge, ambient temperature, duty and operating cycles, contamination of contacts and contact wear are all factors that influence the surface temperature rise of the contact studs. All the above current ratings should, therefore, be considered as a guide only.*
- *The way you mount the contactor has no less an impact on the rise of temperature and the insulation of the switching device. So please observe the clearance between live or earthed parts and comply with the safety regulations of the applicable standards. No liability will be accepted by Schaltbau in any circumstances for indirect damage resulting from clearances not being observed, devices not mounted properly, or products tampered with in any way.*

## Mounting position

C164 Series

### • Possible mounting orientations



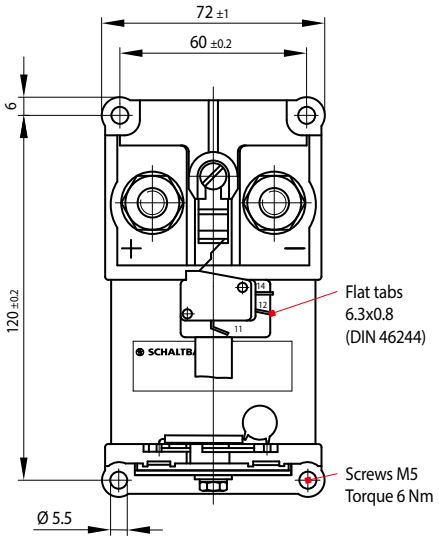

***Mounting positions:***

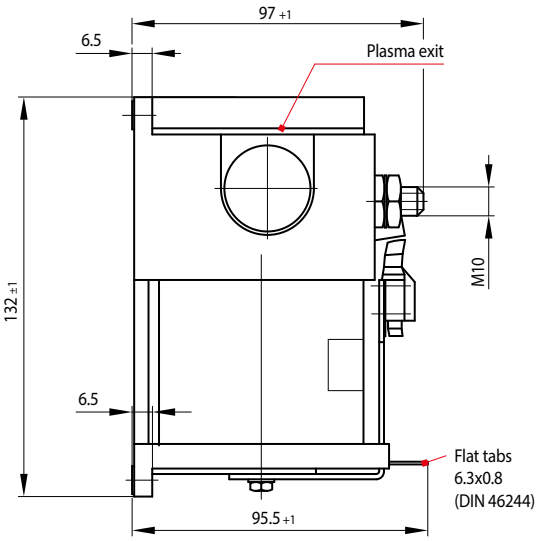
- *Horizontal: contact studs must point upwards or*
- *Vertical: plasma exits must point upwards*

*Subject to change / Dimensions in mm*

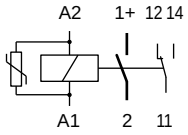
## C165 SPST-NO or SPDT contactor — C165 Series

- **Device outline: C165 Series SPST-NO contactor**



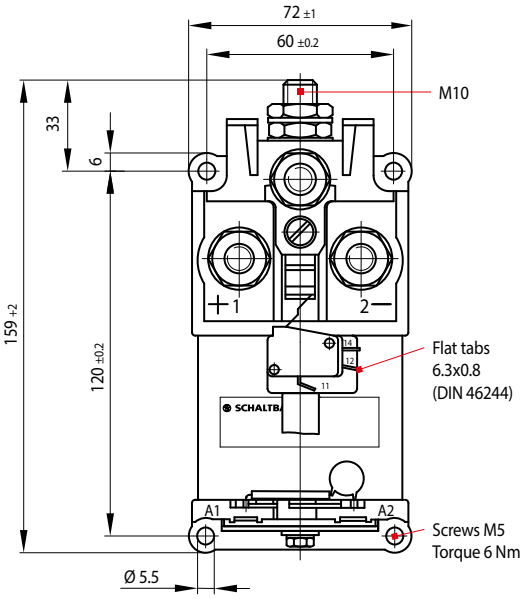



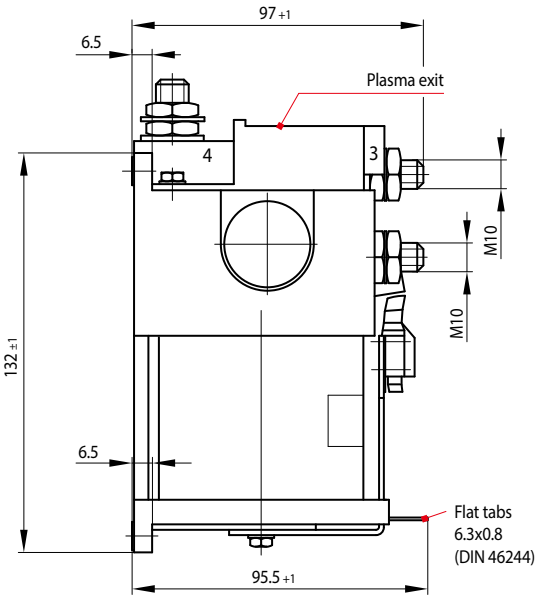

- **Circuit diagram**



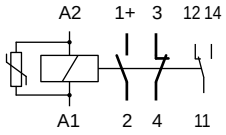

Fitted with varistor and auxiliary contact, see ordering code on page 3.

- **Device outline: C165 Series SPDT contactor**



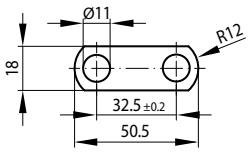

- **Circuit diagram**




Fitted with varistor and auxiliary contact, see ordering code on page 3.

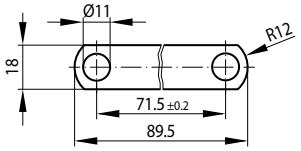
## VS-C165-x Tie bar — HK-C165 Auxiliary contact — C165 Series

- **Outline: Tie bar VS-C165-32,5**




- **Auxiliary contact assembly HK-C165**

- **Outline: Tie bar VS-C165-71,5**

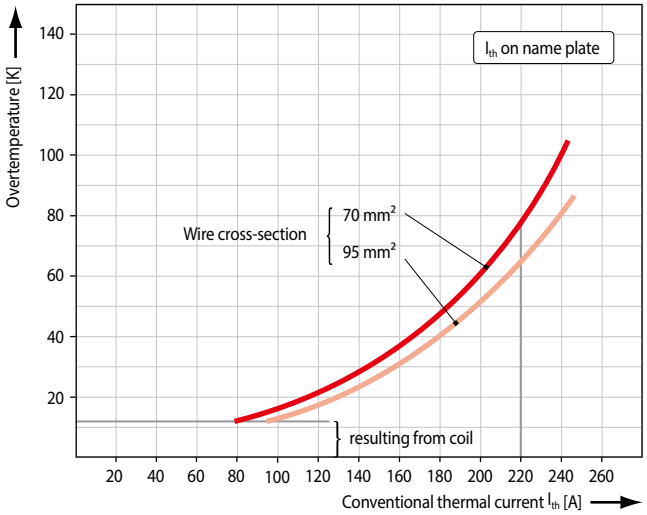



- **Mounting:**

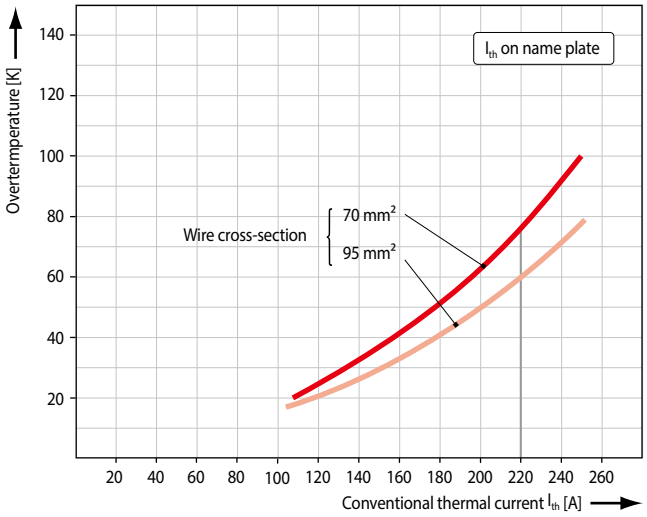
C165 Series contactors can be retrofitted with an auxiliary contact. Loosen the M5 hex screw a little that connects the yoke to the magnet core. Slide slotted mounting bracket of auxiliary contact assembly under screw head. Push yoke against housing and retighten screw.

## Characteristic curves Contact performance

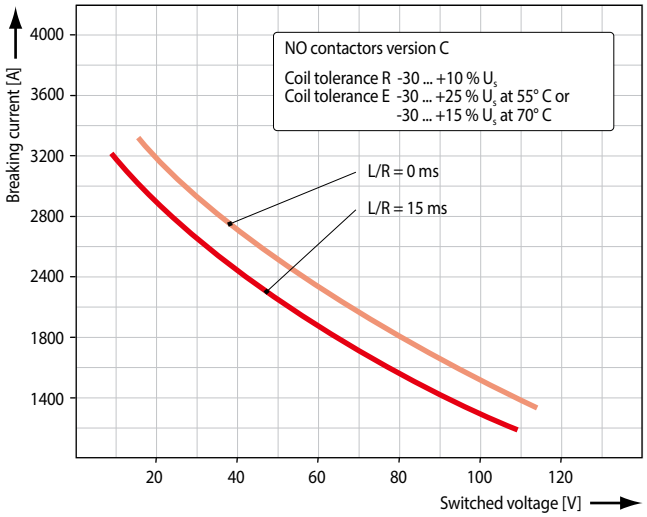
### • Continuously rated, normally open contact




### • Continuously rated, normally closed contact




### • Max. breaking capacity DC of NO contact for coil tolerance R and E




*Note:*

- *The maximum breaking capacity is the value of prospective current at a stated DC voltage which can be ruptured by the contactor where the ensuing arc upon contact separation is still being quenched. For actual operation the current rating of the contactor should, therefore, be limited to 20 % ... 60 % of its maximum breaking capacity.*
- *Please note that for double throw contactors, in addition to the foregoing limitations, the switch off load of the normally open contact must be further reduced by 30 % to 50 %.*

## Dimensioning C165 Series

### • Guide to permissible current rating

| Short-time duty | SPST-NO | | SPDT | | | |
|---|---|---|---|---|---|---|
| | | | NO contact | | NC contact | |
| Coil tolerance* | R | E | R | E | R | E |
| 6 sec | 1,500 A | 1,200 A | 1,500 A | 1,200 A | 650 A | 520 A |
| 1 min | 500 A | 400 A | 500 A | 400 A | 320 A | 250 A |
| 3 min | 400 A | 320 A | 400 A | 320 A | 270 A | 210 A |
| 5 min | 350 A | 280 A | 350 A | 280 A | 250 A | --- |
| 10 min | 300 A | 240 A | 300 A | 240 A | 230 A | --- |

*Above current ratings refer to wire cross-section 70 mm²*

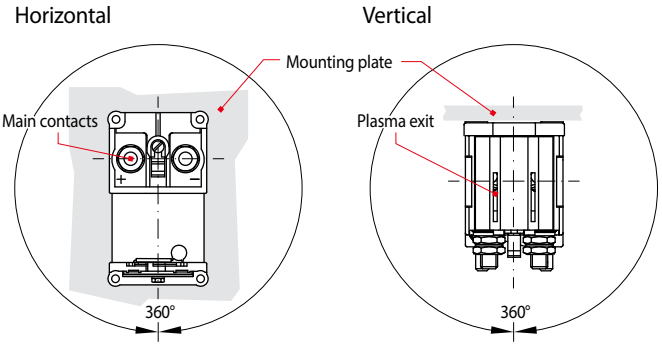
** Coil voltage tolerance* ***R:*** *-30 % ... +10 % $U_s$*
***E:*** *-30 % ... +25 % $U_s$ at 55 °C / -30 % ... +15 % $U_s$ at 70 °C*

*Note:*

- *The thermal current rating for continuous duty is dependent on the upper limiting temperature of the contact elements which must not exceed 150°C. Wire gauge, ambient temperature, duty and operating cycles, contamination of contacts and contact wear are all factors that influence the surface temperature rise of the contact studs. All the above current ratings should, therefore, be considered as a guide only.*
- *The way you mount the contactor has no less an impact on the rise of temperature and the insulation of the switching device. So please observe the clearance between live or earthed parts and comply with the safety regulations of the applicable standards. No liability will be accepted by Schaltbau in any circumstances for indirect damage resulting from clearances not being observed, devices not mounted properly, or products tampered with in any way.*

## Mounting position C165 Series

### • Possible mounting orientations




*Mounting positions:*

- *Horizontal: contact studs must point upwards or*
- *Vertical: plasma exits must point upwards*

## Notes

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## Notes

# Schaltbau GmbH

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

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with compliments:

RoHS 2011/65/EC

Schaltbau GmbH manufactures in compliance with RoHS.

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
- 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



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