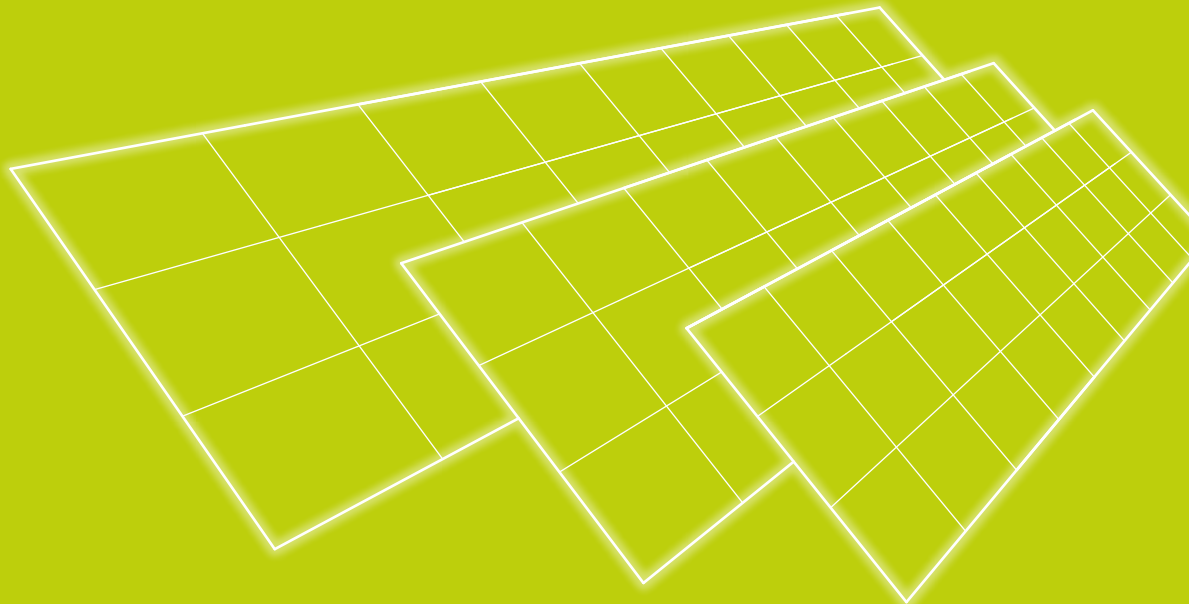
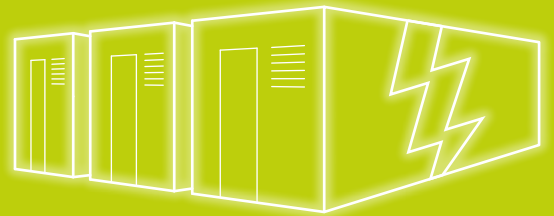


[www.schaltbau.com](http://www.schaltbau.com)

**SCHALTBAU**  
DC Power Under Control



NEW ENERGY



# The future is sustainability

Sustainability and the "green spirit" are our inspiration: As a global company, we are aware of the great responsibility we have to promote sustainable development.

As a DC and AC specialist, the exciting new world of renewable energy allows us to align this corporate commitment with our business objectives.



## New Energy

### Special Switchgear Solutions

In the dynamic renewables market, the trend is towards greater energy efficiency. One means to achieve this is by increasing the system's operating voltage. With this in mind, Schaltbau has developed special switchgear for AC and DC applications capable of handling higher voltages and extinguishing the electric arcs that result from them. As a result, Schaltbau's switching devices can always ensure the safe and reliable emergency shut-down of a plant.

**The upshot: Enhanced safety and efficiency for your system!**

### Contactors for DC applications

In systems for energy generation, it is important to switch off high DC voltages safely and reliably in an emergency. Users in the renewable energy industry also benefit from our expertise in the area of DC contactors. In wind and photovoltaic systems, they are used as load-breaking contactors.



Contactors for DC applications C300, C310

### Contactors for DC and AC applications

The single and double-pole contactors of the CP and CT series for AC and DC with patented technology for arc quenching are able to cope with a wide range of switching tasks in wind power and photovoltaic systems.

The 3-pole AC contactors of the CA and CF series are the cost-effective alternative to circuit-breakers for disconnecting and reconnecting central inverters from the mains.



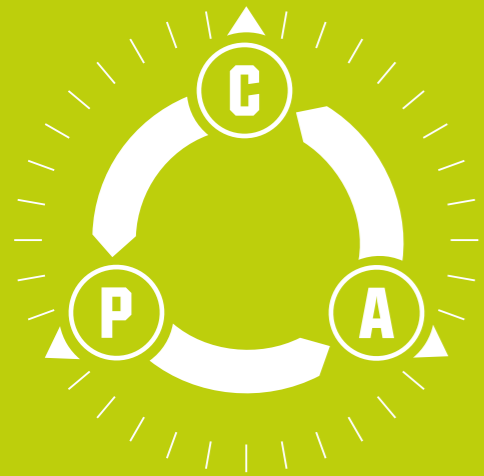
Contactors for DC and AC applications CPP, CP

### Limit switches

Our snap-action switches with positive opening operation are mainly used as limit switches e. g. for pitch and yaw control of wind turbines as well as for the brakes of the rotor blades. In PV systems, they are typically used for actuators of the trackers that align the arrays according to the position of the sun.



Limit switches S970, S847



## C Consulting

**Experts are the best consultants.**

Schaltbau specialises in electromechanical components and customer-specific solutions, and the company boasts decades of experience in development, process support and manufacturing.

## A Application

**No need to reinvent the wheel.**

Schaltbau sales engineers have access to a treasure trove of knowledge and experience including a host of realized applications. Thus you will benefit from analogies and empirical data that may be of some value for your application.

## P Product

**The right solution** may possibly be an item from our product line, a special variant with little need for adaptation, or a completely new design – because customizing is standard with us!

# Schaltbau: 360° of expertise!



C Consulting

A Application

P Product

**SCHALTBAU**  
DC Power Under Control

## Consulting

The expert at your side

Specialist knowledge of electromechanical components is our core competency. In addition, we are also able to draw on vast experience working on solutions together with the renewable energy industry – from fuel cells, geothermal and bio-energy through to photovoltaics and wind.

Both of these aspects of our knowledge base make us expert consultants when it comes to issues involving energy generation, storage and management. Our experienced engineers produce tailored solutions together with customers, while our 360° of expertise ensures that your project always remains on track.

- Integrated consulting process from project definition through to the completed solution
- Focus on critical parameters within your individual application situation
- Expert project management for new customer-specific developments



### ▶ Expertise

Benefit from Schaltbau's know-how

### ▶ Consulting

Experienced sales engineers work on site with you

### ▶ Solution

Cooperation spells success



# Application

Switchgears for renewable energy sources and direct current networks

Direct current offers plenty of efficiency advantages in photovoltaic and wind power plants, energy storage systems and charging stations for electromobility. In addition, the integration of efficient direct current networks into industrial production is becoming increasingly important. However, safely switching high DC loads places great demands on electromechanical components: These have to be capable of handling and reliably extinguishing high voltages and currents as well as the arcs synonymous with direct current applications. Schaltbau is one of the few direct current experts worldwide with decades of expertise in doing just that.

## Keeping your system safe

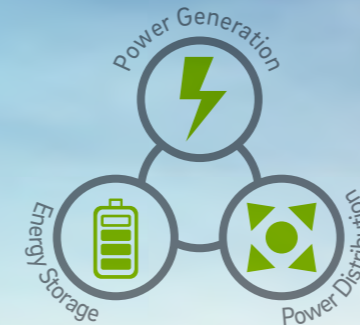
In close collaboration with our customers, we develop solutions for effective and environmentally friendly energy conversion, storage and usage. As a discerning customer, you will receive switchgears designed for use in renewable energy solutions – highly efficient and incredibly safe for your system.



▶ Customer specific  
Added value and maximum benefit for your solution

▶ Safe  
Safety for man and machine in your application

▶ Cost effective  
Robust, no maintenance, long life



# Product

Realising integrated benefits

We are ideally equipped to rapidly deliver on any individual customer requirements given our experience as DC and AC specialists. As a result, we are the ideal partner for planners, fitters, builders and operators of systems for generating, storing and managing renewable energy.

**Two reasons to use DC technology in the factories of tomorrow:** Firstly, integration into decentralised energy systems such as photovoltaics and energy storage units, as these produce direct current anyway. Secondly, the elimination of conversion losses and the energy which this saves.



3 Possibilities  
1 Solution

- ▶ Existing product from our product line
- ▶ Well-proven and tested special solution with little need of adaptation
- ▶ Completely new development delivering on customer requirements

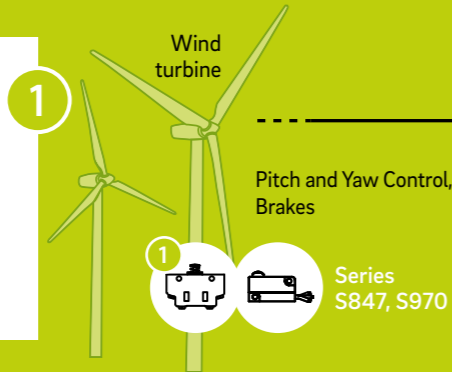


# Switchgear for the energy revolution

Solutions for efficient and safe energy generation, storage and distribution

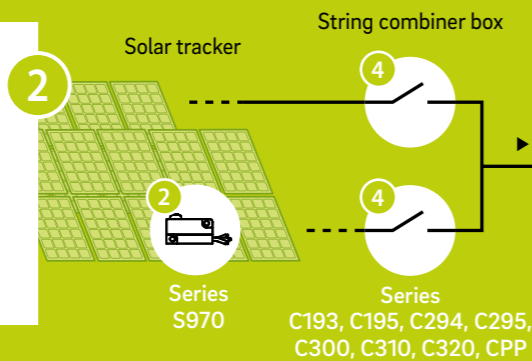
## 1 Snap-action switches for wind turbines

In wind power plants, our proven snap-action switches with positive opening operation, preferably the **S847** and **S870** Series switches, are mainly used for two purposes: As limit switches for pitch and yaw control of the rotor blades and also on the brakes of these blades. As gear-type limit switches they are used there for monitoring. They ensure that the end position of the blades is not over-run. This prevents the cable from twisting and breaking off.



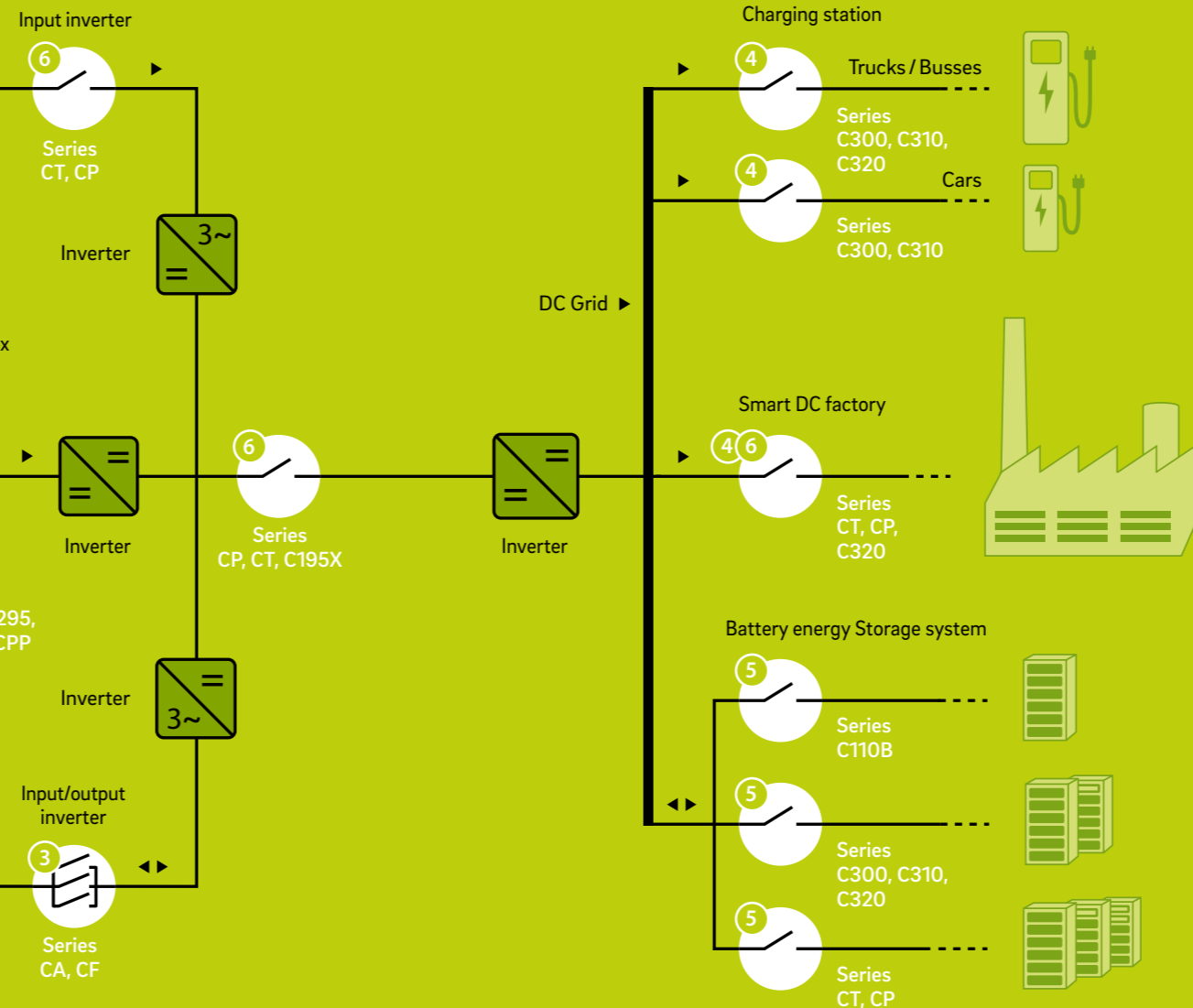
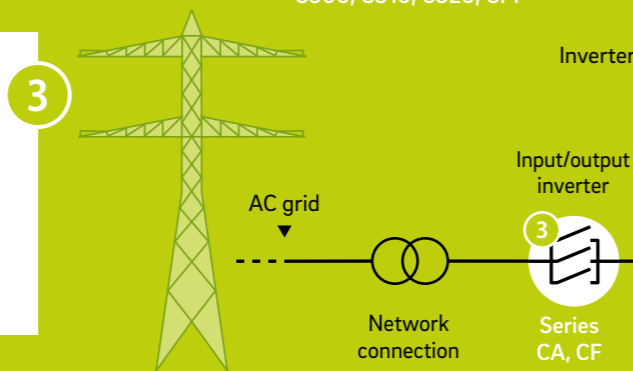
## 2 Snap-action switches for solar plants

Schaltbau **S870** and **S970** Series snap-action switches with positive opening operation are used for gear-limit switches of actuators of solar trackers. Photovoltaic tracking systems track the position of the sun and align the panels according to the sun's position. In doing so they ensure the highest possible energy yield of the solar power plant.



## 3 AC power contactors

3-pole AC contactors of the **CA** and **CF** series are the cost-effective alternative to circuit breakers for load breaking at the utility end of the inverter AC output circuit. Manufacturers and operators of wind turbines and photovoltaic systems will benefit in costs, safety and reliability by these AC contactors from Schaltbau.



## 4 Compact DC contactors

Schaltbau has a comprehensive portfolio of contactors for safe and reliable galvanic isolation in combiner boxes within PV systems, DC input circuits of inverters, DC output circuits of modern charging infrastructure or in the DC industry field. The single-pole NO contactors **C193**, **C195**, **C300**, **C310**, **C320** and **CPP** as well as the double-pole models **C294** and **C295** stand out thanks to their high switching capacity. And their compact build means they can be fitted in the smallest of spaces.

## 5 Bi-directional DC contactors

Bi-directional switching is essential in the input and output circuits of electrical energy storage systems. This switching behaviour, dependent on the direction of current, is delivered by a range of Schaltbau DC contactor series: the compact contactors **C110B**, **C195X**, **C300**, **C310** and **C320** with a load-bearing capacity of up to 1000 amps. In addition, bi-directional power contactors from the **CT** and **CP** series are available for large converters carrying loads up to 2000 amps.

## 6 Universal DC and AC power contactors

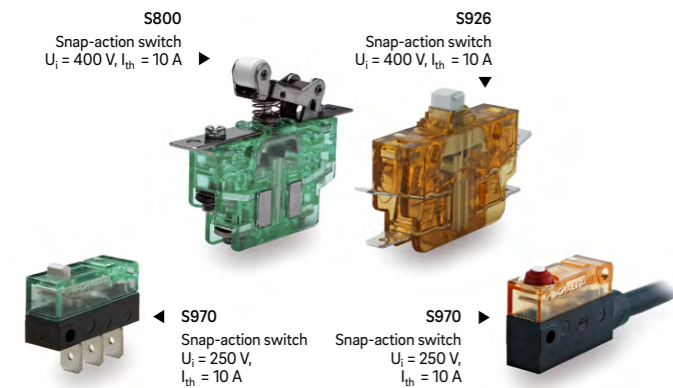
The single and double-pole contactors of the **CT** series as well as the single-pole contactors of the **CP** series can switch both DC (bi-directional) and AC. Due to a new blowout technology, Schaltbau power contactors ensure low-wear and reliable switching of both extremely low and very high loads. This makes them suitable for load breaking on both the DC and AC ends of inverters in wind turbines and photovoltaic installations.

# Snap-action switches, Contactors for DC

## Snap-action switches featuring positive opening operation

Schaltbau snap-action switches with positive opening operation are VDE approved and have most notably proven their worth in safety-related applications. Their positive opening mechanism guarantees reliable separation of contacts even if they have become welded together due to a short circuit. They are especially suited for use in solar trackers and for pitch and yaw control of wind turbines.

- **S800, S804, S814, S820, S826, S847, S870, S880 series:**
  - Positive opening operation to IEC 60947-5-1 Annex K
  - Performance according to IEC 60947-5-1
  - High resistance to shock and vibration
  - Wiping contacts
- **S926, S947 and S970 series versions featuring:**
  - Extended range of temperature (-55° C ...+150° C)
  - Higher impact resistance compared to PC
  - Increased resistance to chemicals



## Single pole bi-directional DC NO contactors C300 series

The C300 is an extra compact 1-pole bi-directional DC contactor. It ensures safe disconnection of high loads regardless of the direction of current and provides reliable protection in the event of a system fault. Full bi-directionality is indispensable in battery storage systems. Typical applications include use as the main contactor in charging stations for modern electromobility, in battery test benches or in combiner boxes of photovoltaic systems and inverters of all kinds.

- Power range
  - Nominal voltage up to 1,500 volts, DC bi-direktional / AC f <60 Hz
  - Thermal current up to 500 amps
- Efficient extinguishing chamber with permanent magnetic blowout
- High making and breaking capacity
- High rated short-time withstand current
- 1 auxiliary switch with mirror contact function
- Low energy consumption, thanks to PWM controller

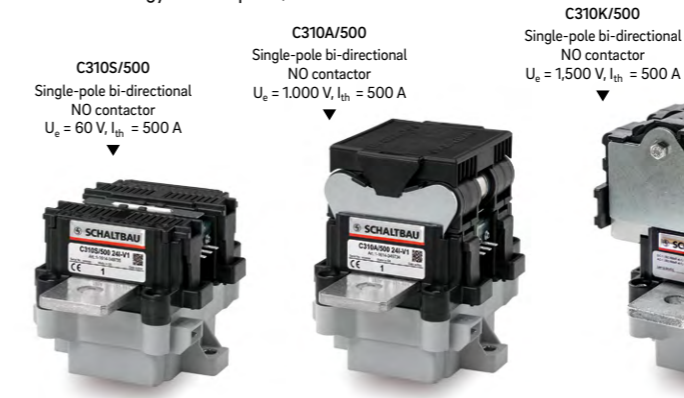


# Contactors for DC and AC

## Single pole bi-directional NO contactors C310 series

The C310 is a single-pole bi-directional DC NO contactor. It was designed to ensure safe switching of high loads and to protect reliably in case of a system malfunction. The new bi-directional contactors are suitable for typical applications such as the DC end of inverters, combiner boxes of photovoltaic installations, battery storage systems and electric vehicles. The key features and benefits of the C310 series are the compact design, double-break contacts, very efficient newly developed arc chamber as well as the high breaking capacity.

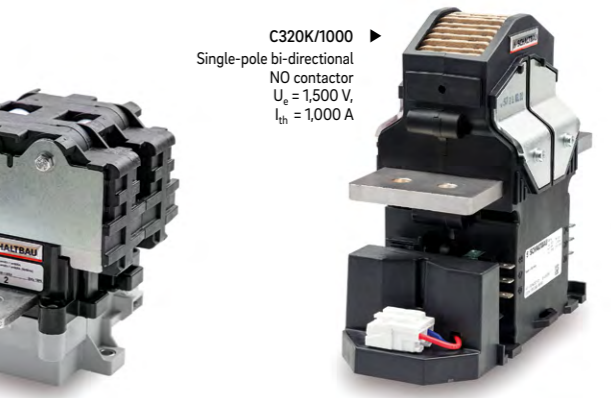
- Power range
  - Nominal voltage 60 volts up to 1,500 volts, DC bi-direktional / AC f <60 Hz
  - Thermal current up to 150–300–500 amps
- Efficient extinguishing chamber with permanent magnetic blowout
- High making and breaking capacity
- High rated short-time withstand current
- Max. 2 auxiliary switches with mirror contact function
- Low energy consumption, thanks to PWM controller



## Single pole bi-directional NO contactors C320 series

The C320 is a 1-pole bi-directional DC contactor in the range up to 1,000 amps. It was designed to ensure safe switching of high loads and to protect reliably in case of a system malfunction. The new bi-directional contactors are suitable for typical applications such as the DC end of inverters, combiner boxes of photovoltaic installations, battery storage systems and electric vehicles. The key features and benefits of the C310 series are the compact design, double-break contacts, very efficient newly developed arc chamber as well as the high breaking capacity.

- Power range
  - Nominal voltage 60 volts up to 1,500 volts, DC bi-direktional / AC f <60 Hz
  - Thermal current up to 1,000 amps
- Efficient extinguishing chamber with permanent magnetic blowout
- Very high making and breaking capacity
- High rated short-time withstand current
- Max. 4 auxiliary switches, of them max. 2 with mirror contact function
- Low energy consumption, thanks to PWM controller

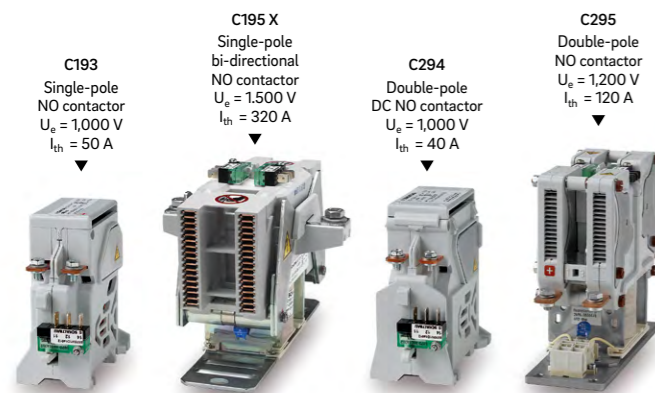


## Power contactors for DC and AC

### Single and double pole NO contactors C110B, C193, C195, C294, C295 series

Single-pole DC NO contactors of the C193 and C195 series as well as the 2-pole versions C294 and C295 feature, feature high breaking capacity despite their small size. This makes them especially suited for use with combiners in wind power and PV installations. They are needed on the DC end to reliably interrupt the current during shutdown of inverters of grid-connected regenerative power systems. Other typical fields of application are battery energy storage systems, battery reconditioning systems and battery test stands.

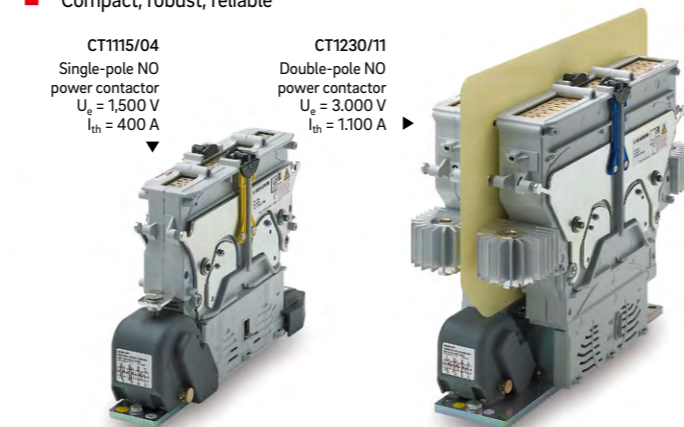
- Power range
  - Nominal voltage C110B: 48 volts, C193: 1,000 volts, C195: 1,500 volts, C294: 1,000 volts, C295: 1,200 volts
  - Thermal current C110B: 240 amps, C193: 50 amps, C195: 250 amps, C294: 40 amps, C295: 300 amps
- DC versions with permanent magnetic blowout (except C110B)
- 1 or 2 auxiliary switches for switching status monitoring
- Small, compact, robust



### Single and double pole power NO contactors CT series

The 1-pole and 2-pole CT contactors are both capable of switching DC bi-directionally and AC and have a patented arc extinguishing technology. This enables low-wear and safe switching of extremely small but also very high loads. The switching devices can be used on both the DC and AC ends in converters of wind power and PV systems for various switching requirements. They have a double coil drive for lower holding power and effective reduction of power consumption in continuous operation.

- Power range
  - Nominal voltage 1,500–3,000 volts, DC bi-direktional / AC f <60 Hz
  - Thermal current 400–800–1,100 amps
- No critical current range: combination of electromagnetic and permanent magnetic blowout
- Double winding coil and electronic coil controller, except 400 A
- 4 aux. switches, incl. 1 mirror contact NC contact  $b_0$  and 1 NO contact  $a_1$
- Compact, robust, reliable

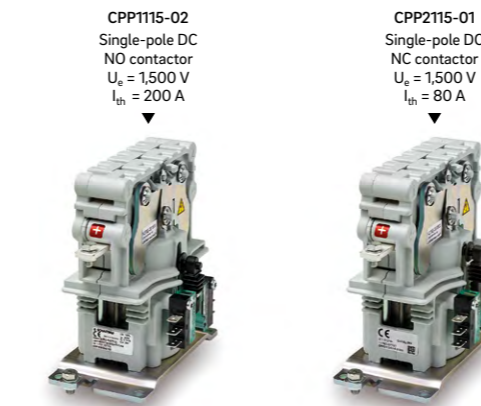


## Power contactors for DC and AC

### Single pole contactors for DC or AC CPP series

The new super-compact DC contactors from the CPP series are the smallest contactors for handling loads up to 200 A and are suitable for nominal operating voltages of up to 3,000 V. The single-pole contactor is available as an NO or NC contactor. This is intended for use in converters and inverters in photovoltaic or wind power plants. These devices are ideally suited as integrated or separate pre-charging contactors for the large Schaltbau models CP and CT.

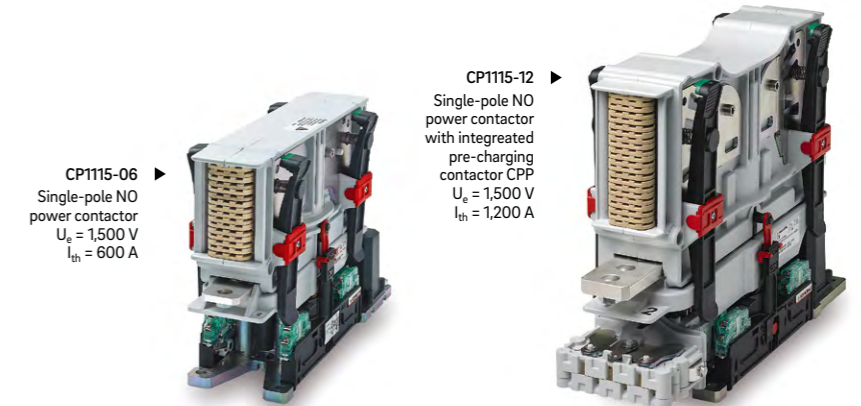
- Power range
  - Nominal voltage 1,500 volts, DC uni-direktional / AC f <60 Hz
  - Thermal current NO 200 amps or NC 120 amps
- High making and breaking capacity
- 2 auxiliary switches with mirror contact function
- Super-compact, robust, reliable



### Single pole power contactors for DC or AC CP series

With the CP series, Schaltbau now offers contactors for renewable energies and DC networks in industrial environments in the 600 A, 1,200 A and 2,000 A power classes! This patented technology ensures fully bi-directional breaking capability and a more compact design. By reducing dimensions and weight, we can save you valuable space. Thanks to its unique modular design, the new product family includes a variety of possible configurations catering to a wide range of applications.

- Power range
  - Nominal voltage 1,500–3,000 volts, DC bi-direktional / AC f <60 Hz
  - Thermal current: 600–1,200 A–2,000 A
- Configurable as NO/NC contactor, disconnecter or changeover switch
- High making capacity, also as disconnecter and changeover switch
- 4 aux. switches, max. 2 mirror contacts NC contact  $b_0$  and 2 NO contacts  $a_1$
- Low total cost of ownership, modular and compact



# Contactors for AC

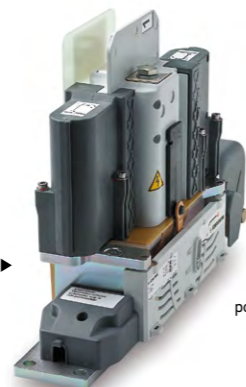
## 3 pole AC contactors CF series

Schaltbau's highly modular CF series begins with a compact 3-pole AC power contactor for loads up to 600 amps and 3,000 volts for inverter-fed alternating current drives with higher frequencies. One special feature is the newly developed switching chambers. This can be universally configured as NO, NC or in combination as a change-over. An efficient electronic autotransformer circuit reduces input power as well as thermal losses and cuts costs.

- Power range
  - Nominal voltage 1,500–3,000 volts, frequencies up to 400 hertz
  - Thermal current 200–300–600 amps by parallel connection
- Configurable as NO, NC or changeover switch
- High short-circuit breaking capacity
- 4 auxiliary switches, optionally 1 NC contact  $b_0$  and 1 NO contact  $a_1$
- Low energy consumption and low heating thanks to sophisticated coil saving circuit



◀ CFS3-15  
3 pole AC  
power contactor  
 $U_e = 1,500\text{ V}$   
 $I_{th} = 300\text{ A}$



▶ CA1115/08  
1 pole AC  
power contactor  
 $U_e = 1,500\text{ V}$   
 $I_{th} = 800\text{ A}$



▶ CA1315/08  
3 pole AC  
power contactor  
 $U_e = 1,500\text{ V}$   
 $I_{th} = 800\text{ A}$

## 1 and 3 pole AC power contactors CA series

Contactors of the CA series are a cost-effective alternative to circuit breakers for disconnecting AC-side three-phase inverters of wind turbines and solar plants from the mains and reconnecting them to the mains. The CA series switchgear ensures a high short-circuit switching capacity. Equipped with double coils, CA contactors impress with efficient power consumption in continuous operation. For plant engineers, this means more safety and economic efficiency.

- Power range
  - Nominal voltage 1,500–3,000 volts, frequencies up to 400 hertz
  - Thermal current 350–540–800 amps
- Innovative design: compact, robust, reliable
- High short-circuit switching capacity at frequencies up to 400 hertz
- Main contact system: 1 or 3 pole, double-break contacts
- Easy visual inspection and maintenance



# Certified safety

Safety and reliability are our greatest assets. We've been producing snap-action switches with positive opening operation for four decades and also offer the greatest variety. Every series is built, tested and certified according to VDE, UL and when necessary even CCC.



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



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



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



## Markets and Applications

We develop our connectors, snap-action switches and contactors in line with the safety standards of railway engineering. Electromechanical components from Schaltbau are used in all branches of industry in which electrical systems have to be connected, contacted and controlled reliably under the harshest conditions.

### RAILWAY

Safely on track. Switching and controlling features which meet the highest requirements. For goods and passengers.

[www.rail.schaltbau.com](http://www.rail.schaltbau.com)

### INDUSTRY

Reliable in production. Certified variations on safety-relevant solutions. For man and machine.

[www.industry.schaltbau.com](http://www.industry.schaltbau.com)

### NEW ENERGY

More power for electricity. Top-notch safety for stationary energy supply systems. For renewable energies.

[www.energy.schaltbau.com](http://www.energy.schaltbau.com)

### NEW MOBILITY

Safe either way. Safely disconnecting high voltages in electric vehicles. For tomorrow's mobility solutions.

[www.mobility.schaltbau.com](http://www.mobility.schaltbau.com)

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