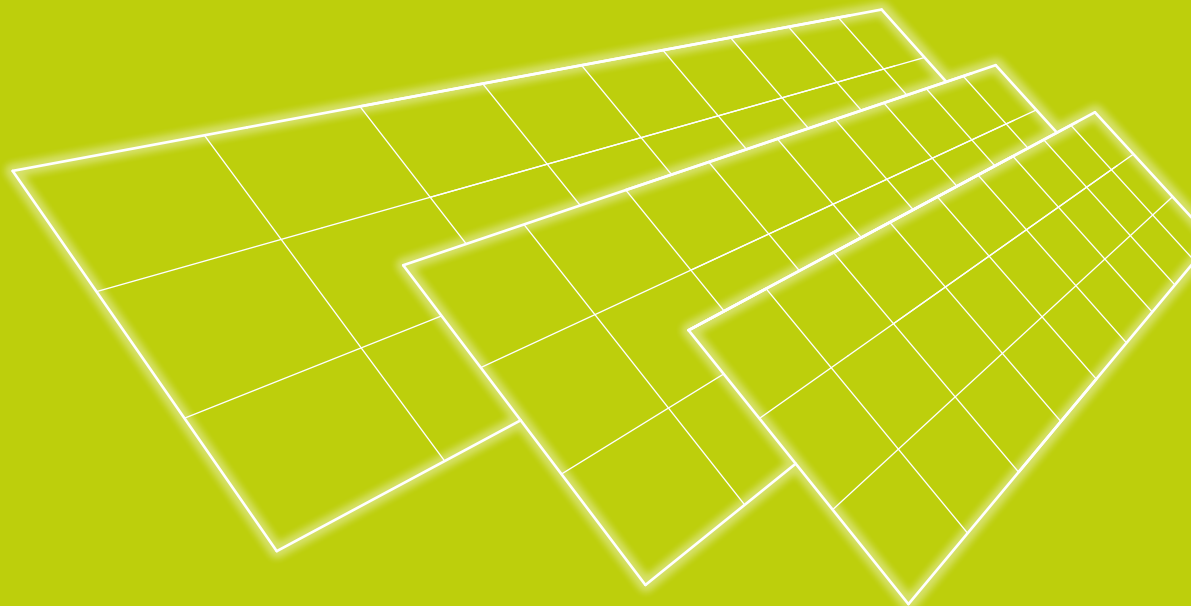


[www.schaltbau.com](http://www.schaltbau.com)



NEW ENERGY



DC  
under  
control

# 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 and AC

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.

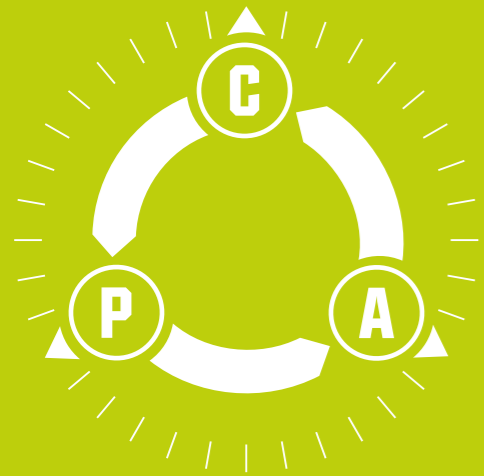
The 3-pole AC contactors of the CA and CF series are the cost-effective alternative to circuit-breakers for disconnecting and reconnecting central inverters from the mains.



### 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.





## 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



## 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 electro-mechanical 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

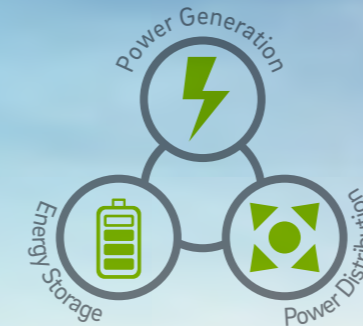
In close collaboration with our customers, we develop solutions for effective and environmentally-sound energy conversion, storage and usage. As a discerning customer, you will receive switchgears designed for use in renewable energy solutions – highly efficient and incredibly safe for your system.



**▶ 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

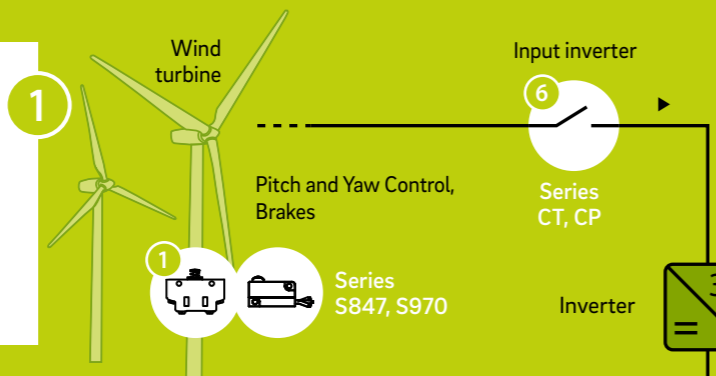


# Switchgear for the energy revolution

Solutions for efficient and safe energy generation, storage and distribution

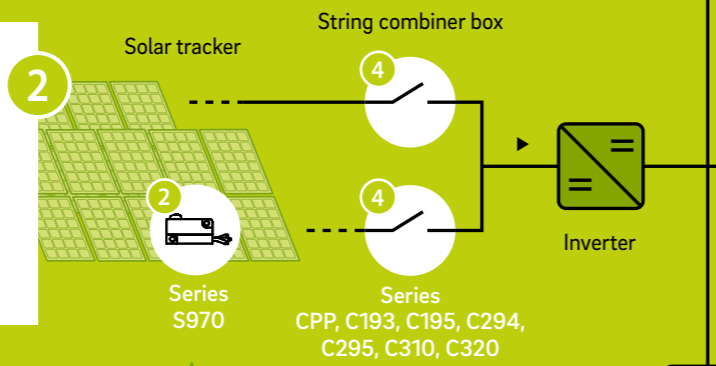
**Snap-action switches for wind turbines**

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.



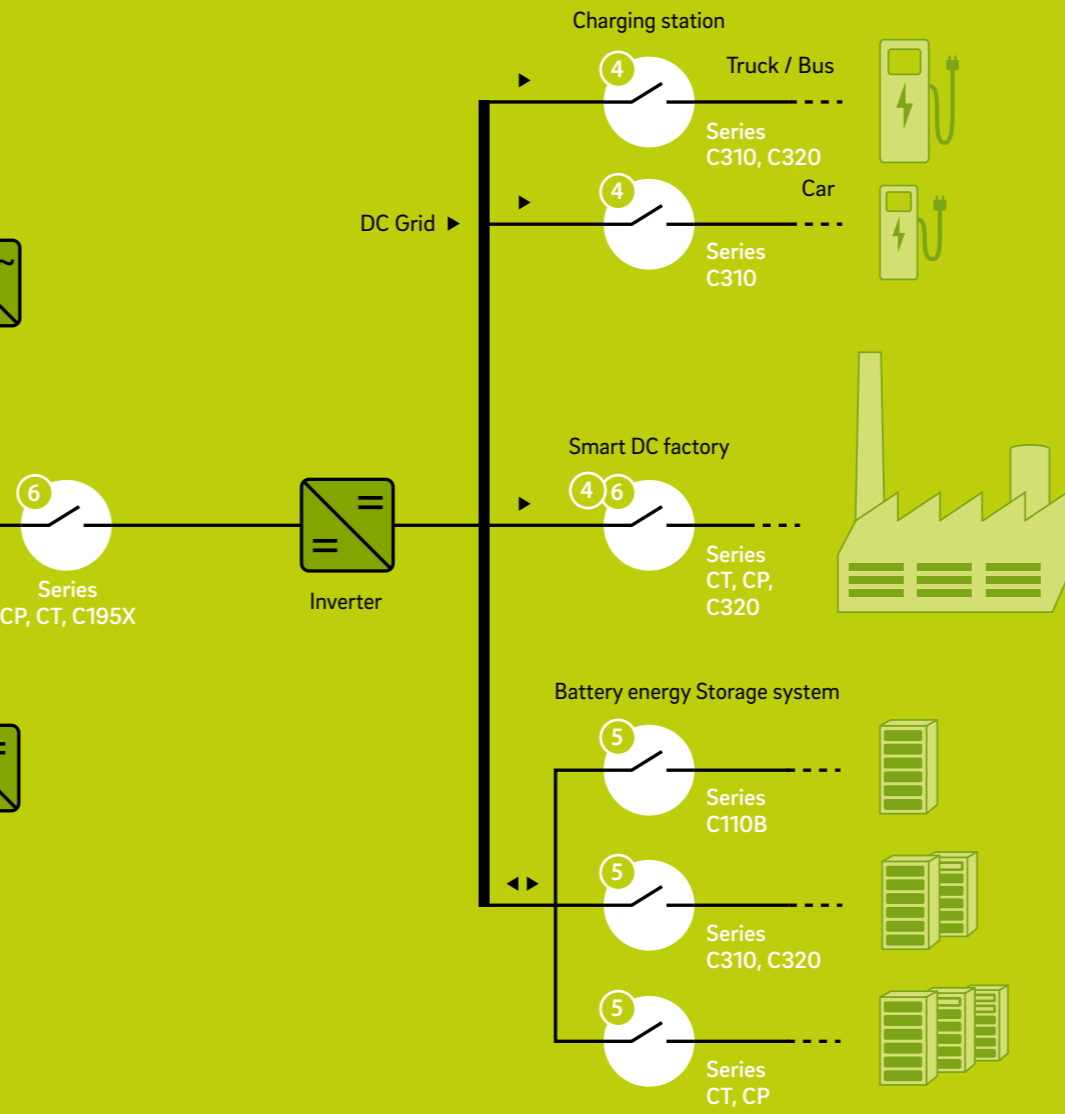
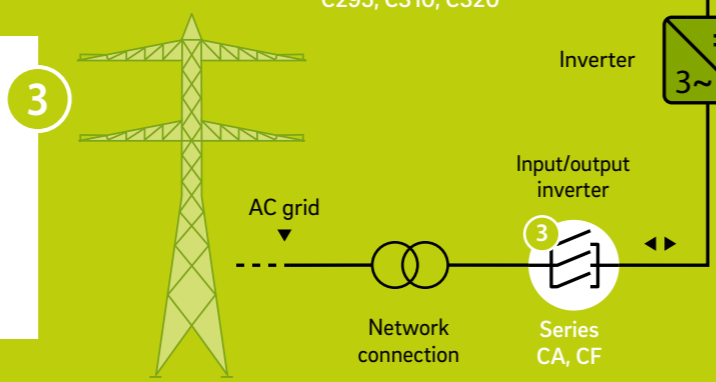
**Snap-action switches for solar plants**

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.



**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.



**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**, **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.

**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 models: the compact contactors **C110B**, **C195X**, **C310** and **C320** with a load-bearing capacity of up to 1000 A. In addition, bi-directional power contactors from the **CT** and **CP** series are available for large converters carrying loads up to 2000 A.

**Universal DC and AC power contactors**

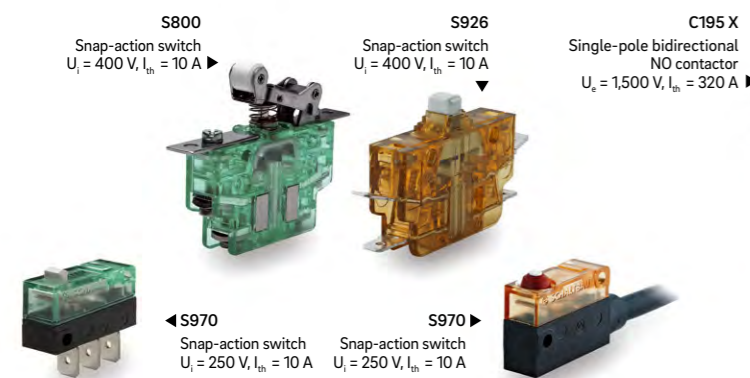
The single and double-pole contactors of the **CT** series as well as the single-pole contactors of the **CP** series can switch both DC (bidirectional) and AC. Owing to a new blowout technology, Schaltbau power contactors ensure low-wear and reliable switching of both extremely low and very high loads. 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.

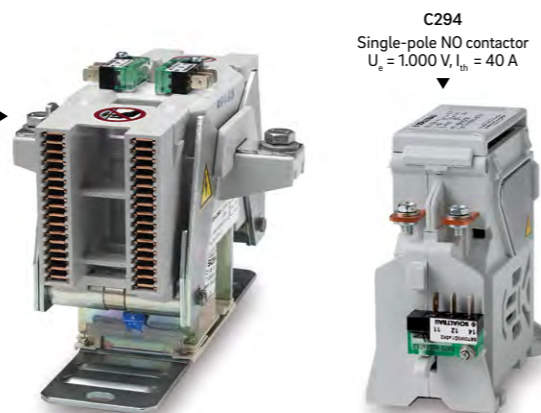
- **Series S800, S804, S814, S820, S826, S847, S870, S880:**
  - Positive opening operation to IEC 60947-5-1 Annex K
  - Performance according to IEC 60947-5-1
  - High resistance to shock and vibration
  - Wiping contacts
- **Series S926, S947 and S970 versions featuring:**
  - Extended range of temperature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



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

Single-pole DC NO contactors of the C193 and C195 series as well as the double-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 turbines and solar 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 (BESS), battery reconditioning systems and battery test stations.

- Power range: up to 220 V / 250 A and 1,500 V / 320 A, bidirectional and bistable versions, AC ( $f < 60\text{ Hz}$ )
- Conventional thermal current: C110B: 240 A, C193: 50 A, C195: 250 A, C294: 40 A, C295: 300 A
- DC versions with permanent magnetic blowout (except C110B)
- High breaking capacity
- Compact, robust design, suitable for years of continuous duty



# Contactors for DC

## Single-pole bidirectional DC NO contactors C310 series

The C310 is a single-pole bidirectional 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 bidirectional 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.

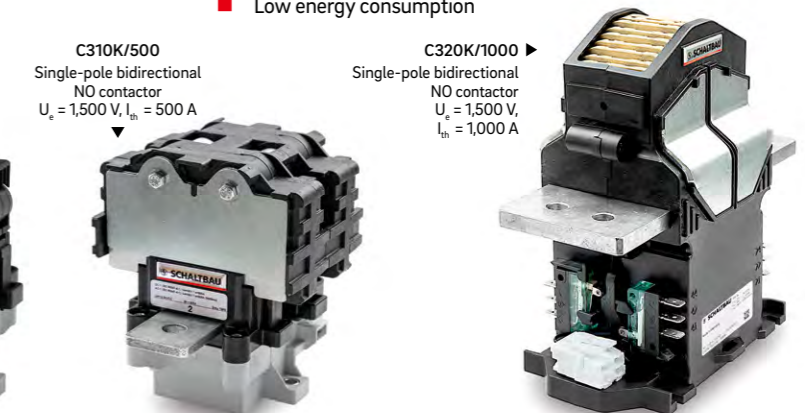
- DC bidirectional with permanent magnetic blowout
- Conventional thermal current: 150 A, 300 A or 500 A
- High making and breaking capacity
- High rated short-time withstand current
- High resistance to shock and vibration
- Up to 2 auxiliary switches with mirror contact function
- Low energy consumption



## Single-pole bidirectional DC NO contactors C320 series

The C320 is a 1-pole bidirectional DC contactor in the range up to 1,000 A. It was designed to ensure safe switching of high loads and to protect reliably in case of a system malfunction. The new bidirectional 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: 60 V / 1,000 A bis 1,500 V / 1,000 A, DC bidirectional with permanent magnetic blowout
- High making and breaking capacity
- High rated short-time withstand current
- High resistance to shock and vibration
- Up to 4 auxiliary switches with mirror contact function
- Low energy consumption



# Power contactors for DC and AC

## Single-pole power contactors for DC or AC CT series

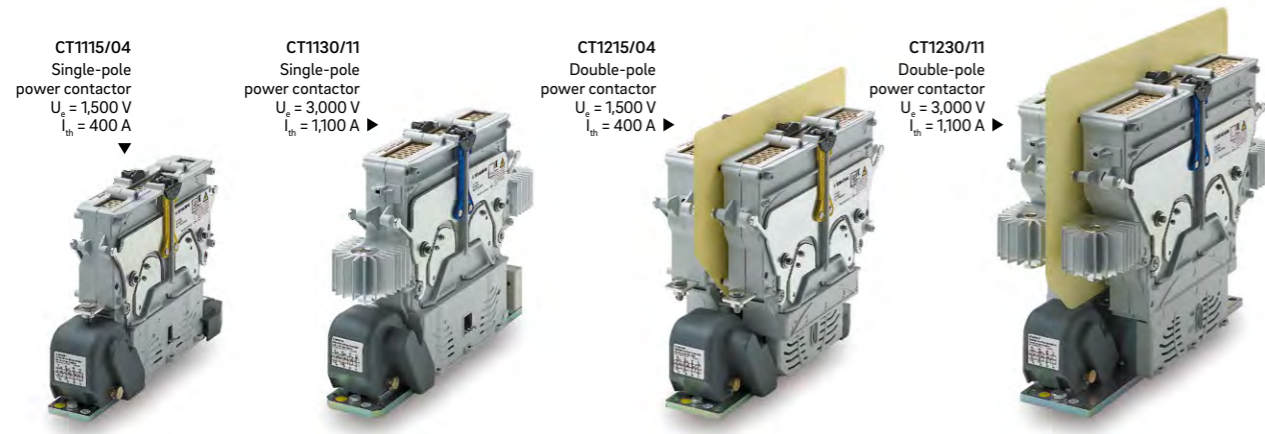
The CT contactor series with power ratings of 400 A, 600 A and 800 A has been upgraded to 1,100 A! Capable of switching both AC and DC outputs and featuring a patented blowout technology, CT contactors are designed for load switching on both the DC and AC ends of inverters in wind turbines and PV systems. Equipped with heat sinks, a double winding coil, an electronic coil controller, and a stronger spring for higher contact forces, the CT1115/11 and CT1130/11 upgrades are capable of generating less heat and carrying the 1,100 A continuously.

- Power range: 1,500 V / 1,100 A up to 3,000 V / 1,100 A, DC (bidirectional), AC (f < 60 Hz)
- No critical current range: combination of electromagnetic and permanent magnetic blowout
- Double winding coil and electronic coil controller (1,100 A)
- 4 aux. switches, incl. 1 mirror contact NC contact  $b_0$  and 1 NO contact  $a_1$
- Compact, robust, reliable

## Double-pole power contactors for DC or AC CT series

With the double pole CT contactors for 400 A, 600 A, 800 A and 1,100 A, Schaltbau is expanding its product line with the double pole CT contactors for 400 A, 600 A, 800 A and 1,100 A: Power contactors especially designed for use with inverters in renewables-based power generation. The double pole versions are able to switch AC and DC outputs, handle high voltages and currents (1,500 V / 1,100 A or 3,000 V / 1,100 A) as well as electric arcs due to a patented blowout design. They come with a double coil drive that requires less holding power, thus reducing power consumption in continuous operation.

- Power range: 1,500 V / 1,100 A up to 3,000 V / 1,100 A, DC (bidirectional), AC (f < 60 Hz)
- 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

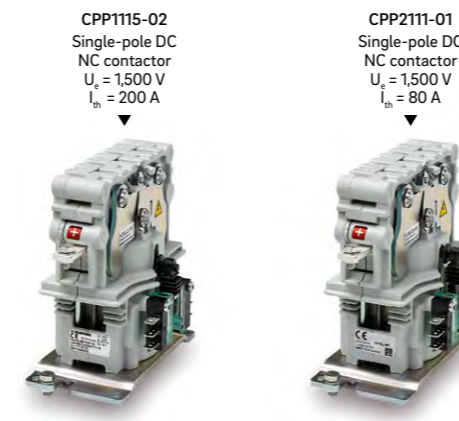


# Power contactors for DC and AC

## Single-pole DC 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.

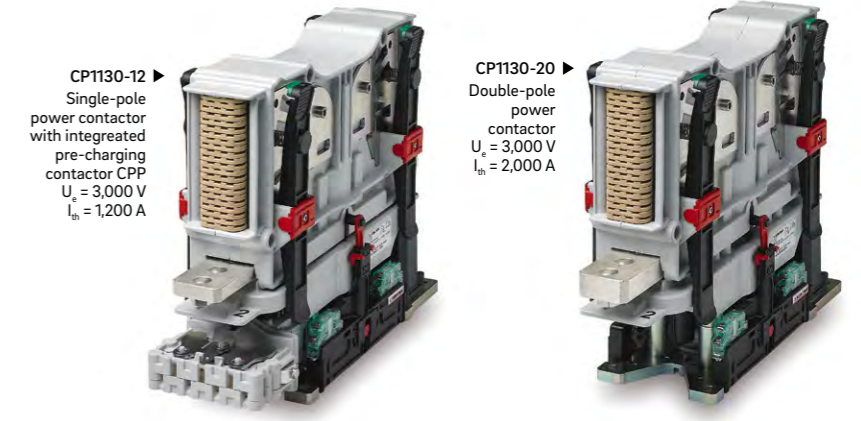
- Precharging contactor, configurable as NO or NC
- Power range: DC (unidirectional), AC (f < 60 Hz), NO contact: 3,000 V / 200 A or NC contact: 1,500 V / 80 A
- High making and breaking capacity
- 2 auxiliary switches with mirror contact function
- Super-compact, robust, reliable



## 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: 1,500 V / 2,000 A to 3,000 V / 2,000 A, DC (bidirectional), AC (f < 60 Hz)
- 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

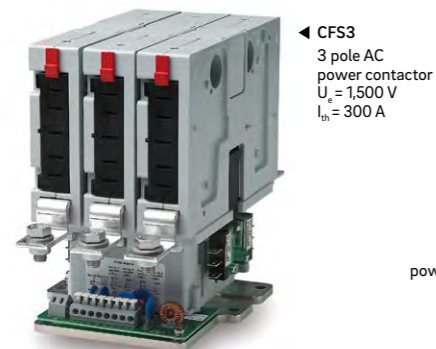


# Contactors for AC

## 3 pole AC contactors CF series

Schaltbau's new, highly modular CF series begins with a compact 3-pole AC power contactor for loads up to 600 A and 3000 V 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: up to 3,000 V / 600 A, AC (f < 400 Hz)
- Configurable as NO, NC or changeover switch
- Conventional thermal current: 300 A or 600 A through parallel connection of two main contacts each
- Different extinguishing chambers are available depending on application
- High short-circuit breaking capacity
- 4 auxiliary switches, including 1 mirror contact as NO b<sub>0</sub> and 1 NC a<sub>1</sub>



## 1 and 3 pole AC power contactors CA series

Our CA Series power contactors rated 350 A, 540 A and 800 A are the cost-effective alternative to circuit breakers for switching PV or wind turbine inverter systems on and off the electrical grid. The 3 pole AC contactors feature high short-circuit breaking capacity. They are equipped with double coils which require less holding power and thus provide for reduced power dissipation of the switching device when operated continuously. Manufacturers of these systems will benefit in costs, safety and reliability by the new Schaltbau CA Series power contactors.

- Power range: 3,000 V AC / 800 A
- High short-circuit breaking capacity
- Double-break contacts
- Visual inspection and easy replacement of contact pieces and arc chute
- Reinforced insulation between main circuit and control circuit /auxiliary circuit



# 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.



Schaltbau GmbH manufactures in compliance with RoHS.



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



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.



## 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.

### INDUSTRY

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

### NEW ENERGY

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

### NEW MOBILITY

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

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