

Play it safe

Connectors Switches Contactors



New Energy

Special Switchgear Solutions



The future

is sustainability

Sustainability and the „green spirit“ are our inspiration: As a globally-operating company we have a particularly high responsibility for sustainable development.

As a DC and AC specialist, we can combine our corporate objectives with business objectives in the exciting new world of renewable energy.



New Energy

Special Switchgear Solutions

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

More safety and efficiency for your system!



DC contactors

Energy generating systems depend on the ability 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.



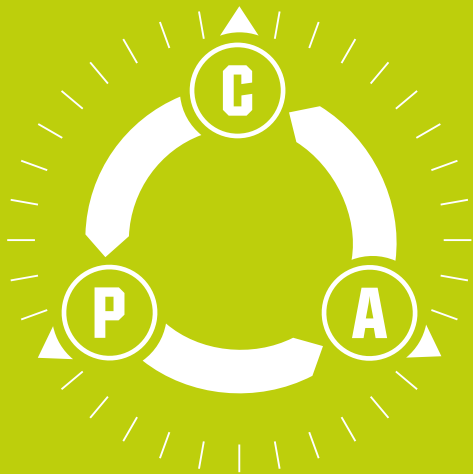
AC and AC/DC contactors

3 pole AC contactors of the CA series are the cost-effective alternative to circuit breakers for load breaking at the utility end of the inverter AC output circuit. Single and double pole CT-Series power contactors for AC/DC featuring a patented blowout technology for extinguishing electric arcs are ideally suited for load switching on both the DC and AC ends of inverters in wind turbines and photovoltaic installations.



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 and also 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.



The Schaltbau 360° Competence!

C Consulting

Experts are the best consultants.

Schaltbau is a specialist in electromechanical components and customer specific solutions with decades of experience in development and manufacture.

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 eventually 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!



Consulting

The expert at your side

Specialist knowledge of electromechanical components is our core competence. 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° competence 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 the Schaltbau know-how

▶ Consulting

Experienced sales engineers work on-site with you

▶ Solution

Cooperation spells success



Application

Customising proven energy technology

Our diverse solutions for applications within the renewable energies segment are used in a whole host of systems around the globe. A new application can very likely be conceived and accordingly modified analogous to an already completed solution. This saves on time and costs, and offers safety.



Customer specific

Added value and maximum benefit for your application

Safe

Safety components of approved quality

Cost-effective

Easy to mount, no maintenance, long life

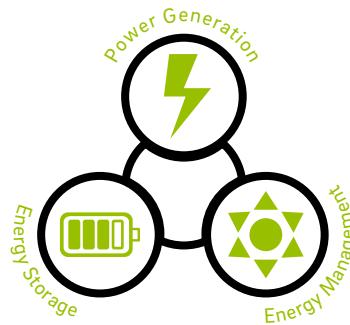


Schaltbau's DC power contactors are needed to reliably interrupt the current during shutdown of central inverters in grid-connected solar power systems.

Product

Realising integrated benefits

We are ideally equipped to rapidly fulfil 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.



3 Possibilities 1 Solution

- ▶ Finished item from our product line
- ▶ Tried and tested special variant with little need of adaptation
- ▶ Completely new development to customer requirements



Switchgear for renewable Energy power plants

Snap-action switches for wind turbines

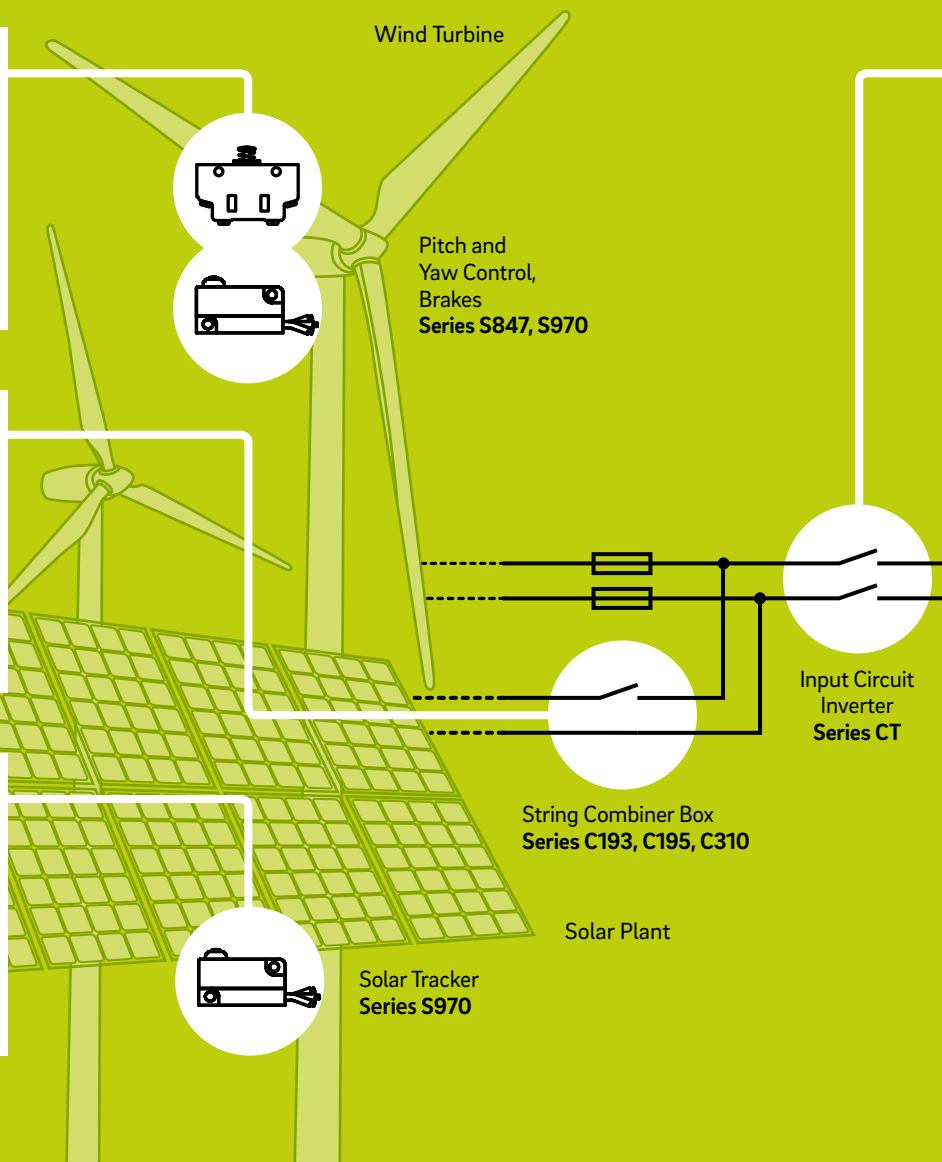
In wind power plants our proven snap-action switches with positive opening operation, preferably the **S847** and **S870** Series switches, are mainly used for two purposes: As limit switches for pitch and yaw control of the rotor blades and also on the brakes of these blades. As gear-type limit switches 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.

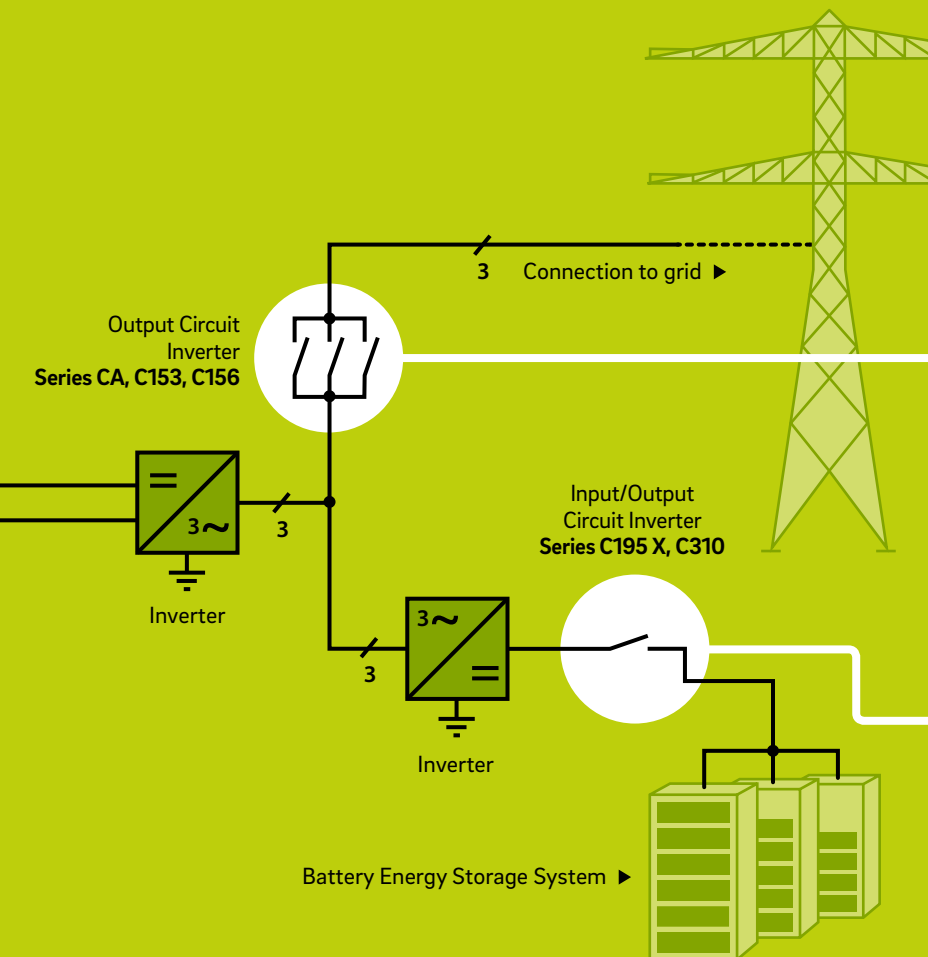
DC Contactors

The single pole DC NO contactors of the **C193**, **C195** and **C310** series and their double pole versions **C294** and **C295** are characterized by high breaking capacity. Because of their compact design they are easy to install in confined space. Mounted in combiner boxes of regenerative power plants, they are used on the DC end of the inverter to disconnect the inverter from the arrays and turbine respectively in the case of a power outage.

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.





Power contactors for DC and AC

Single and double pole **CT** Series contactors are capable of switching both DC (bidirectional) and AC circuits. Owing to a new blowout technology, Schaltbau CT Series 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.

AC contactors

3 pole AC contactors of the **CA** 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.

Bidirectional contactors

Input and output circuits of electrical energy storage systems require bidirectional switching for the charging and discharging of the storage system. Schaltbau offers two contactor series to suit this application: The **C195 X** and **C310** are a complement of the proven compact DC NO contactors for voltages of 900 V having a current-carrying capacity of 500 A. The other option are our **CT**-Series power contactors that are designed to deal with even higher bidirectional DC switching loads safely and reliably.

Snap-action switches, Contactors for DC

Snap-action switches featuring positive opening operation

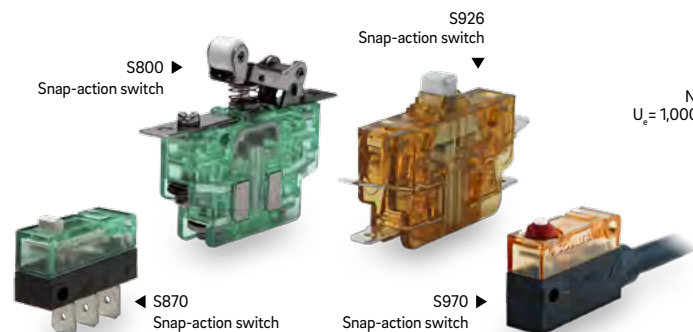
Schaltbau snap-action switches with positive opening operation are VDE approved and have proven their worth especially in safety-related applications. Their positive opening mechanism guarantees reliable separation of contacts even if they have become welded together due to a short circuit. They are 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 and S970 versions featuring:

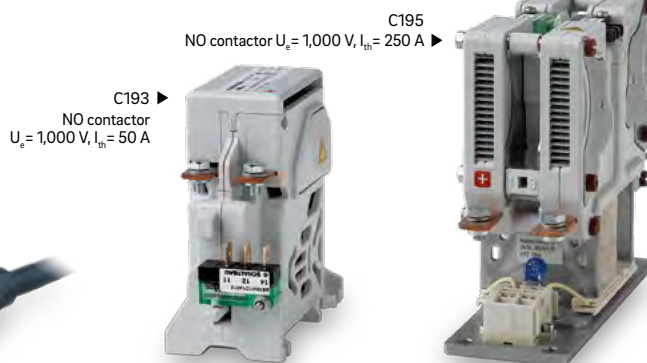
- Extended range of temperature (-55° C ... +150° C)
- 50% higher impact resistance compared to PC
- Increased resistance to chemicals



Single and double pole DC NO contactors C193, C195 and C294, C295

Single pole DC NO contactors of the C193 and C195 series as well as the double pole versions C294 and C295 feature, notwithstanding their small size, high breaking capacity. 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.

- DC versions with magnetic blowout
- Compact, robust design, suitable for years of continuous duty
- Conventional thermal current:
C193: 50 A, C195: 250 A, C294: 40 A, C295: 120 A
- High breaking capacity
- Intended for ambient temperatures ranging from -25° C to +70° C
- Versions for AC operation also available (except for C294)



Contactors for DC

Single pole bidirectional DC NO contactor C310

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
- Compact and robust, low weight
- Low energy consumption

C310 A/150
Bistable NO contactor
 $U_e = 900 \text{ V}$, $I_{th} = 150 \text{ A}$



C310 A/500
Bistable NO contactor
 $U_e = 900 \text{ V}$, $I_{th} = 500 \text{ A}$



Single pole bidirectional DC NO contactor C195 X

The C195 X7 is a complement of the proven compact DC NO contactors for voltages of 1,200 V. The new bidirectional version comes with a higher amperage of 300 A, but generally shares the same compact, rugged design, double-break contacts that are enclosed for the most part, and also the same high breaking capacity. This makes the high-performance bidirectional version especially suitable for use, for instance, with battery energy storage systems as used to stabilize power distribution networks, where bidirectional switching is a requirement.

- Bidirectional version for DC with magnetic blowout
- Compact, robust design
- Suitable for years of continuous duty
- Conventional thermal current 300 A
- Double-break contacts
- High breaking capacity
- Intended for ambient temperatures ranging from -40°C to $+70^\circ \text{C}$

C195 X
Bistable NO contactor
 $U_e = 1500 \text{ V}$, $I_{th} = 320 \text{ A}$

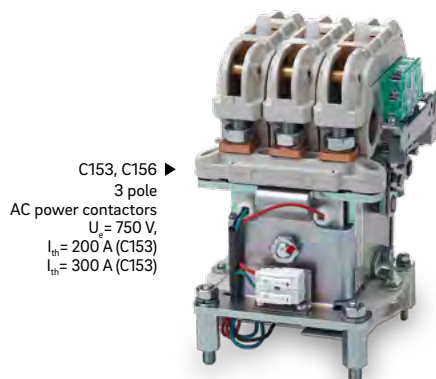


Contactors for AC

3 pole AC cam contactors C153 and C156

Schaltbau has updated its line of cam contactors that have proven their worth over decades. Like the CT and CA Series the new contactors come with double winding coil and electronic coil controller which provide for improved energy efficiency with respect to the contactor's holding power, emissivity and power consumption. The 3 pole versions C153 and C156 designed for voltages up to 1,000 V are ideally suited for use on the AC end of inverters of grid-tied wind turbine or photovoltaic systems.

- 3 pole versions for use on AC end of grid-tied inverter systems
- Up to 4 auxiliary contacts can be added
- Easy replacement of contact elements
- Conventional thermal current 160 A up to 300 A
- Double-break contacts
- Double winding coil and electronic coil controller
- 2 and 4 pole DC versions are also available



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

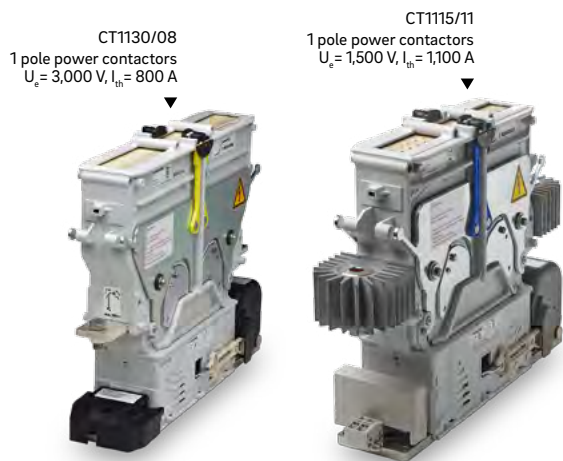


Power contactors for DC and AC

Single pole power contactors for DC/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.

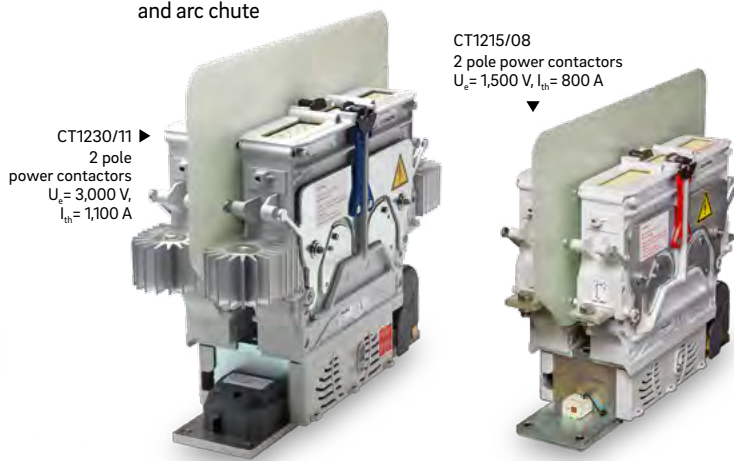
- Power range: up to 1,500 V / 1,100 A and 3,000 V / 1,100 A
- Heat sinks mounted to main terminals (1,100 A)
- Double winding coil and electronic coil controller (1,100 A)
- Visual inspection and easy replacement of contact elements and arc chute



Double pole power contactors for DC/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: 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 an patented blowout design. They come with a double coil drive that requires less holding power, thus reducing power consumption in continuous operation.

- Power range: up to 1,500 V / 1,100 A and 3,000 V / 1,100 A
- Capable of switching DC (bidirectional) and AC ($f < 60 \text{ Hz}$)
- Innovative design: compact, robust, reliable
- Double-break contacts
- Visual inspection and easy replacement of contact elements and arc chute



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.

▶ Transportation Technology

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

www.rail.schaltbau.com

▶ Industrial Solutions

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

www.industry.schaltbau.com

▶ Material Handling

Sustainable storage. Improved performance with faster warehouse loading processes.
For efficient intralogistics.

www.materialhandling.schaltbau.com

▶ New Energy

More power for electricity. Speed and safety in the high-voltage field.
For renewable energies.

www.energy.schaltbau.com



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.

www.schaltbau-gmbh.com



Schaltbau – the smart and creative DC specialist

For detailed information on our products and services visit
www.schaltbau-gmbh.com – or give us a call!



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