NEW MOBILITY
Lithium-ion batteries are state of the art in the field of battery technology for electromobility. DC contactors by Schaltbau provide for safety and reliability in a wide variety of applications. In the case of battery charging, in the battery disconnect unit (BDU) and in the drive train of vehicles as well as in battery test stations. Or robust charging connectors for modern quick chargers, as they are used in the case of industrial trucks.

**New Mobility**

Safe disconnection of high voltages in e-vehicles.

**DC main and precharging contactors**

Main contactors in e-mobility applications must keep high levels of current under control and safely and reliably switch off loads in extreme cases. Only in this way is a galvanic isolation between the energy source and the downstream system ensured. In addition, full bidirectionality is promoted – the main contactor must disconnect high levels of power independently of the current direction. Occurring control switching arcs are safely and reliably extinguished by highly efficient switching chambers – the disadvantages of gas-encapsulated arcing chambers commonly available on the market do not apply. Precharging contactors belonging to the CPP Series switch the precharging path. After successfully precharging, the main contactor is connected.

**Traction contactors**

Compact and modular three-pole AC power contactors belonging to the CF Series have been specially designed for use in inverter-fed alternating current drives with higher frequencies. The AC power contactors have a modular construction and are equipped with a new future-oriented switching chamber concept. They reliably ensure the disconnection of high switching loads.

**Charging connectors**

High power charging connectors connect the vehicle, vehicle battery and the charger. The high-quality and robust contact systems of the LV charging connectors ensure a safe power transmission for high level of current up to 500 A. In this way, batteries can be re-charged at short intervals and vehicles can remain ready for use.

As a specialist for high-quality DC applications, Schaltbau GmbH has been developing electromagnetic components for railway technology and industry since 1929 that meet all quality, reliability and service-life requirements.

This expertise in direct-current switching and control subject to challenging conditions qualifies Schaltbau for the mobility of the future.

Utilize opportunities – keep risks under control!
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.

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.

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!

How can we help you in the emerging e-mobility market?
Together we can find the best solution:
Phone +49 89 93005 – 0
E-mail new.mobility@schaltbau.de

Schaltbau 360° competence!

Remarkable are those who can see into the future. Noteworthy are those who act prudently:
Decades of experience and holistic process support in the fields of developing and manufacturing electromagnetic components make us a valuable development partner in finding the just the right solution.

Our sales engineers are experienced professionals that collaborate closely with our developers and design engineers and are experts in the industrial branches relevant to electromobility. They form the bridge between customer requirements and development engineers. In this way, we provide our customers with expertise, competent consultation and always just the right solution for the application at hand.

Schaltbau DC switching solutions
Safe switching and controlling up to 2000 A
Requirements for the switch voltage and the switch current differ depending on the power class of the vehicle. Schaltbau DC products are customized according to customer requirements and are suitable for a multitude of applications.

- e-Busses
- e-Cars
- e-Light / e-Medium / e-Heavy Commercial Vehicles
- e-Forklift trucks / e-Pedestrian trucks
- AGVs
- Battery test stations
- Battery charging stations
- Contactors for drive motors (also AC)

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.
In the ‘smart cities’ of tomorrow: fewer emissions – better quality of life. Electric drives in all vehicle classes are an important prerequisite for this.

In high-power battery systems required for this up to 1,000 V DC, the high-voltage battery disconnect unit (HV-BDU) establishes a connection between all electrical components in vehicles, which are supplied with energy by the battery. It has an important safety function:

In the event of danger, the HV-BDU disconnects the battery from the high-voltage network and thus, all connections.

Main contactors can be used both in the positive and negative cable of the drive battery. In this way, occurring faults are reliably kept under control and the battery is disconnected from the electric drive train.

To charge the increasing number of electric buses in local public transport, intermediate stations and depots are being equipped with a high-capacity charging station.

The charging takes place either via mast charging stations or cable-based solutions and takes just a few minutes. DC contactors belonging to the compact C310 series in the positive and negative paths form two independent switching elements in the current circuit. They ensure safe galvanic isolation between vehicle and charging point.

DC contactors for battery charging

- Full bidirectionality
- Power classes from 150 to 1,000 A can be covered
- High short-time current-carrying capacity up to 3,000 A
- High rated insulation voltage up to 1,500 V
- High thermal continuous currents – high breaking capacity

Safely and reliably keep critical situations under control: Schaltbau contactors also switch when subjected to a full load in the event of danger.

- Safe disconnection of high power ranges: If necessary, the contactor can reliably disconnect high currents and voltages, irrespective of the current direction
- Thermal continuous current up to 2,000 A at temperatures up to 85°C
- Continuously low contact resistances
- Low control power levels
- Compact design

High-voltage battery disconnect unit (HV-BDU) and battery junction box
Electromobility in public transport and the transport of goods is an important component in achieving climate protection objectives with relation to transport. Electric commercial vehicles and buses are an important step towards emission-free cities.

It is frequently driven by permanent magnet synchronous motors (PMSM), which have a higher degree of efficiency and are more compact with a lower level of wear.

A drive converter connected to the stator of the motor controls the speed via the operational frequency – up to 400 Hz is customary. Safe and reliably disconnection of the converter-motor connection is crucial in the event of a fault. Otherwise, the motor would work as a generator and feed the power back.

Alternative drives shape the future of automobiles. They require high-power energy storage systems with high capacity levels and short charging times. Here, lithium-ion batteries now dominate, which are remarkably efficient where discharging and charging capabilities are concerned.

For the increasingly complex requirements placed on batteries and battery management systems in the automotive environment, battery test systems are required.

These can be individually configured, scaled up or down, and can be flexibly adjusted to match the respective test requirement. High-voltage contactors by Schaltbau are best suited for the special requirements that prevail in test and simulation environments.

The new CF Series AC contactors reliably carry and switch high nominal currents even in the case of higher frequencies.

- compact three-pole AC power contactor
- sovereign disconnection performance 3,000 V and 600 A
- modular construction, many variants available
- high isolation-voltage withstand
- status indication via mirror contact function
- compact design

Three-pole AC traction contactor

The new CF Series AC contactors reliably carry and switch high nominal currents even in the case of higher frequencies.

- compact three-pole AC power contactor
- sovereign disconnection performance 3,000 V and 600 A
- modular construction, many variants available
- high isolation-voltage withstand
- status indication via mirror contact function
- compact design

DC contactors in battery test stations

Ideal for applications with energy recovery
Bidirectional for both current directions
Switching of currents up to 4,000 A at operating voltages up to 1,500 V
High isolation-voltage withstand
Status indication via mirror contact function
Compact design
Charging connectors

High power connectors
LV320/400, LV160/250, LV80/120 series

Schaltbau LV-HPC Series connectors meet the requirements of the DIN VDE 0623-589 standard for charging connectors featuring a higher current-carrying capacity. The connectors are, therefore, ideally suited for modern fast chargers as used for industrial trucks, thus catering to interests of the material handling industry that aims at shortening the times for charging the vehicle battery. Charging faster means reducing downtime and saving costs.

- Keying to DIN VDE 0623-589 for 120 A, 250 A and 400 A
- High-quality, solid power contacts
- High resistance to acids and extremes of temperature
- Optional air supply adapter for electrolyte circulation systems
- Modular design, integrated interlocking
- Intermateable with other connectors to DIN VDE 0623-589
- UL-listed

Contactors for DC

Single-pole bidirectional DC NO contactors
C310 series

The C310 is a single-pole bidirectional DC contactor. It ensures safe disconnection of high loads and reliably protects in the case of a system fault. Typical applications include use as a main contactor in battery management systems of HV vehicle batteries, in charging stations for modern electric vehicles or in battery test stations. The compact design, the double contact interruption, a newly developed very efficient arc chamber as well as the high level of breaking capacity are characteristic.

- Power range: 60 V / 150 A bis 1,500 V / 500 A, 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 single-pole bidirectional DC contactor in the power class up to 1,000 A. It ensures safe disconnection of high loads and reliably protects in the case of a system fault. Typical applications include use as a main contactor in battery management systems of HV vehicle batteries, in charging stations for modern electric vehicles or in battery test stations. The very efficient ceramic arc chamber, a double break contact interruption as well as the high breaking capacity are important features of the new switchgear.

- 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 for 400 A, 600 A and 800 A also includes versions for 1,100 A with the types CT1130/11 and CT1130/11T. The single-pole CT contactors can equally switch DC bidirectionally as well as AC and have a patented technology for arcing which makes a low-wear and safe switching of extremely low but also very high loads possible. Due to this, they can be flexibly used as a main contactor in large battery test stations or in high-voltage-charging stations for electric buses, for example, in local public transport.

- Power range: 1,500 V / 1,200 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 b1, and 1 NO contact a1
- 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 / 1,300 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 b0 and 1 NO contact a1
- Compact, robust, reliable

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. There, the devices are ideally suited for use in battery test benches. 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

Power contactors for DC and AC

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 class. 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, disconnector or changeover switch
- High making capacity, also as disconnector and changeover switch
- 4 aux. switches, max. 2 mirror contacts NC contact b0 and 2 NO contacts a1
- Low total cost of ownership, modular and compact
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.

Especially in the after-sales market the contactors are in great demand as replacement contactors for most leading brands of trucks.

Combi contactors, contactors for industrial trucks

**C130 series**
- Emergency disconnect switch with rugged, spring-loaded snap mechanism
- 2 sizes: Ith = 180 A – 250 A
- Battery contactor with main fuse
- Permanent magnetic blowout
- Double-break contacts, cadmium-free
- Optional horn and fuses

**C110B series**
- Compact, rugged design
- 4 different sizes: Ith = 60 A – 100 A – 150 A – 250 A
- Closed contact housing, standard
- Double-break cadmium-free contacts
- Standards: IEC 60947, EN 1175-1

**AFS series**
- Changeover contactors: single pole
- Reversing contactors: assembly of two SPDT or two DPST-NO
- 3 different sizes: Ith = 80 A – 150 A – 250 A
- Double-break contacts
- Magnetic blowouts and auxiliary switch, optional
- Standards: IEC 60947, EN 1175-1

Contactors for industrial trucks, Contactors for AC

**AFS717D**
- Battery contactor Ith= 150 A

**C100/320**
- Battery contactor Ue= 80 V, Ith= 250 A

**C110B/80**
- Battery contactor Ue= 48 V, Ith= 60 A

**C130/180**
- Combi contactor

**C130/250**
- Combi contactor

**CFS3**
- 3 pole AC power contactor

**CTX100**
- Battery contactor Ue= 48 V, Ith= 80 A

**CTX500**
- Battery contactor Ue= 93 V, Ith= 250 A

**CTX500**
- 1 pole AC power contactor

**CTX1000**
- Battery contactor Ue= 1,500 V, Ith= 300 A

**Schaltbau’s competitively-priced all-in-one device is a combination of line contactor, main fuse and manual cut-off switch in which additional devices as well as an optional horn can be integrated. The exact design of your combination contactor depends on the requirements of your industrial truck. Main fields of application are battery powered warehouse machines, such as forklift and reach trucks as well as walk behind trucks and stackers.**

**AFS Series contactors are designed for use with all kinds of electric vehicles in material handling. Coming with double-break contacts, the DC changeover and reversing contactors are designed for switching resistive, capacitive and inductive loads. Especially in the after-sales market the contactors are in great demand as replacement contactors for most leading brands of trucks.**

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- 4 different sizes: Ith = 60 A – 100 A – 150 A – 250 A
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**Standards:**
- IEC 60947, EN 1175-1

**Emergency disconnect switch with rugged, spring-loaded snap mechanism**
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- IEC 60947, EN 1175-1
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.

<table>
<thead>
<tr>
<th>RAILWAY</th>
<th>INDUSTRY</th>
<th>NEW ENERGY</th>
<th>NEW MOBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safely on track. Switching and controlling features which meet the highest requirements. For goods and passengers.</td>
<td>Reliable in production. Certified variations on safety-relevant solutions. For man and machine.</td>
<td>More power for electricity. Top-notch safety for stationary energy supply systems. For renewable energies.</td>
<td>Safe either way. Safely disconnecting high voltages in electric vehicles. For tomorrow’s mobility solutions.</td>
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