

Safely on track Connect and control

As a specialist for high-quality DC applications, Schaltbau GmbH has been developing and producing electro-mechanical components for rail technology since 1929 – fulfilling all quality, reliability and durability demands every step of the way. This has helped Schaltbau establish its reputation as a renowned rail equipment manufacturer.









Railway Technology

Customisation comes as standard

The safety and reliability of rail transport systems are directly dependent on the quality of the electro-mechanical components they use. Schaltbau's solutions set global benchmarks when it comes to fulfilling complex connection and control functions.



Driver's cab equipment

Efficiency through standardisation and flexibility through customisation for all types of vehicles are the maxims driving the development of innovative Schaltbau operating elements.

These range from the full driver's desk, modular and configurable master controllers and toggle switches to interactive screens and consoles.



UIC connectors

Connectors have to stand up to particularly tough conditions. As a result, we are constantly working on refining these components. The Schaltbau series encompass systems for remote control, data communication, energy transmission and braking functions. They offer efficiency-boosting innovations like pre-assembled plugs and jumper receptacles with replacement inserts.



Snap-action switches

Safety knows no limits – particularly given its dependency on the smallest details. Available in various series, Schaltbau snap-action switches are built for extreme demands with improved temperature and chemical resistance, as well as for standard demands with dust-proof and water-proof versions.



Circuit breaker units

Connecting DC circuits has been a core competency of Schaltbau for many years. The numerous complex power supply systems used for rail vehicles are covered by a whole host of different connector series, including battery and universal contactors, HV disconnectors and contactors, as well as traction contactors.



The Schaltbau 360° Competence!

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.

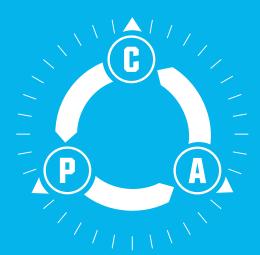
(A) Application

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!







Expertise

Benefit from the Schaltbau know-how



Consulting

Experienced sales engineers work on-site with you



Solution

Cooperation spells success



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

3 Possibilities - 1 Solution



Finished item from our product line



Well-proven and tested special variant with little need of adaptation



Completely new development to customer requirements In the development and project planning of electrical components and devices for rail applications, the following is a good rule of thumb:

The earlier our expertise is integrated into the process, the more efficient your solution will ultimately be. The knowledge we have built up over decades in developing and producing electro-mechanical components makes us an invaluable development partner for customers when it comes to identifying the right solution.

Our sales engineers are experienced professionals who work closely with our developers and design engineers, and who are well versed in all branches of industry relevant for rail applications. They bridge the gap between customer wishes and development engineers. In this way, our customers enjoy the support of an expert who can offer knowledgeable advice, always helping to find the right solution for the application in question.







Electrics for rolling stock

Connectors - UIC 558, UIC-IT

Receptacle with replacement insert for easy on-site maintenance - without cable replacement! Plug with Gigabit-Ethernet module for fast and safe data communications in modern railway vehicles.

Emergency brake handle - NBS10, 30, 40

Up-to-date versions for lintel and wall mounting in passenger spaces and service spaces of rail vehicles. Meets the design requirements of the applicable standards and regulations.

High-voltage contactor - CH1130/02

Single-pole high-voltage contactor with new design. Due to replace existing CH contactor series. Suitable for use as precharging and switch-on contactor in power supplies and as a control contactor for resistor banks in heating and air conditioning equipment.

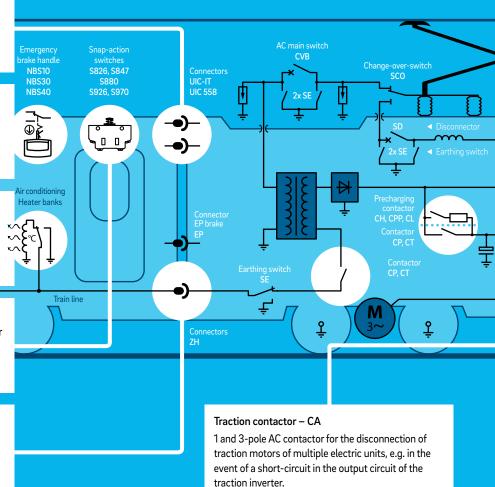
Snap switches - S826, S847, S880, S926, S970

Suitable for safety-related applications. 8xx Series for use in standard applications.

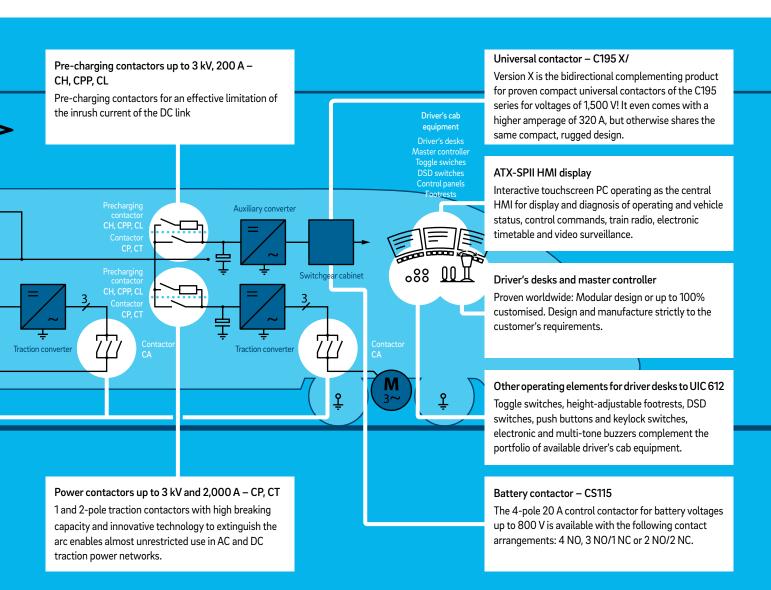
9xx Series for use under extreme conditions with better resistance to temperature and chemicals.

Connectors to UIC 552 - ZH551, ZH550

All railway vehicles used in cross-border rail traffic, such as locomotives as well as EMUs and DMUs that are equipped with a train line, require these ZH series jumpers.













Driver desks for rail vehicles



IntelliDesk -The smart driver desk concept

IntelliDesk is an innovative communications and wiring concept for system integration inside a driver desk. Here, every subsystem can be simply connected to a field bus box and and immediately establish communication via a central master interface with the on-board train control and monitoring system (TCMS). A feature that is unique to this desk is the display of condition-based maintenance. IntelliDesk has thus turned out to be a landmark on the road towards standardisation and modularisation as intended by UIC 612 and, at the same time, it offers the utmost flexibility and adaptability to a wide variety of rail vehicles.



- Easy configuration of driver desks, also including complete and finished, with fully integrated electromechanical operating elements as well as all electronic subsystems necessary. Fast and easy to plan and realise.
- Custom required, modular, robust, durable. Various possible variations in the design and arrangement of additional display and control elements. Condition display based on maintenance (unique).
- Ergonomics, ease of use, pleasant feel and modern design for more safety.
- Subsystems with integrated field bus and/or gateway for communication with the TCMS. Data communications via a central master interface.
- Hardware and software-prepared safety design for nextgeneration SIL 2 driver desks. Internal, redundant and EN 50159-compliant CAN network. TCMS connection via Ethernet.



Master controllers

Configurable and expandable functions

Schaltbau master controllers can be found in railway vehicles all around the world. The modular construction of our robust, shock-proof and vibration-proof master controllers enables a wide range of possible design variants and varying arrangements for individual operations, such as direction control, keylock and pushbutton switches and lots more. Modern project management ensures adherence to the required deadlines and quality - even when requirements change.

- Standard master controller complemented by additional existing standard modules
- Compact, rugged, durable
- Can be configured individually, allowing last minute changes
- Mechanically interacting function modules
- Components comply with railway standards (UIC 612 and others)

Customized design to order

Here, a master controller is newly designed in close cooperation with the customer according to the respective requirements and exact specifications. Our inhouse electronics development division enables us to respond quickly and flexibly to changing needs. Comprehensive type testing is performed in our laboratory according to customer specifications. It is then manufactured by Schaltbau at the company's own.

- In-house design and manufacture
- Field bus: Profinet, CAN, and others
- Sensitive touch functions, RFID card reader, automatic reset of the handle, and others
- Mechanically interacting function modules
- Components comply with railway standards (UIC 612 and others)











Toggle switches, interactive displays

K Series toggle switches for driver desks according to UIC 612

Our award winning K series toggle switches now have four new options. As a result, our K series toggle switch assemblies meet all requirements of the UIC 612-0 railway standard as well as the EUDDplus project which aims at an optimal ergonomic configuration of the desk elements by standardising and harmonising their design. Creating a driver's desk in a modern design is therefore no problem. The dimmable and consistent illumination of the toggle switches makes separate indicator lights superfluous.

- Bushing mount
- Indicator light function: illuminated ring in 5 LED colours for use as function indicator or for night design, optional
- Can be lead sealed with lead seal holder
- Yellow ball for ETCS acknowledgement
- Cylinder handle for external warning horn for locomotives
- 8 switching elements max. (S880 series snap-action switches)

Console with 4x K



ATX-SPII display Much more than a simple MMI

Although the MMI looks like an ordinary screen at first glance, closer inspection reveals a true touchscreen PC, a real all-rounder: reporting and displaying various information during operating and train status, control commands, train radio, electronic timetable and video surveillance. With it, all that can be easily monitored and interactively controlled by the engine driver. The MMI meets the requirements of EN 50155 and, due to its rugged design, it is suitable for use in the harsh railway environment, and with down to -50° C it is also resistant to the extremes of temperature.

- LCD size: 10.4". touchscreen
- Processor: Freescale™ i.MX6 Quad ARM Cortex-A9 up to 1.2 GHz with TrustZone
- 2x Ethernet, 2x MVB, 2x CAN, 2x 485
- Suitable for the following functions: railway signalling (ERTMS/SCMT), technical and diagnostic display, functional safety (in the industrial environment also), video surveillance





Portable consoles, emergency brake handles

Portable driver console PDD-100 for driverless metro trains

Today, more and more of the world's metros are being operated on a driverless basis. They therefore no longer require a driver's desk. But if a train is unresponsive on track and defies remote control, or in the case of maintenance on track, a real driver desk would come in handy. And that is what the SPII offers you. The portable driver console PDD-100 can be connected via plug and play and is immediately ready for use. Like the IntelliDesk, the console is modular and scalable and comes with all operating elements and subsystems fully integrated, so there is no need for wiring.

- Removable and portable, all subsystems already integrated
- Interactive touchscreen HMI for data communication with the TCMS
- Separate console fitted with operating elements, display panels and audible feedback
- Master controller/brake controller with integrated dead-man function
- Train radio display
- Emergency stop switch (mushroom)

Emergency brake handles NBS10, NBS30, NBS40 for lintel and wall mounting

Schaltbau has developed two types of emergency brake handles for use in passenger spaces and service spaces of trains: NBS10 for lintel mounting, e.g. under the lintel of a carriage door, and NBS30 and NBS40 for wall mounting, e.g. in vestibules, passenger spaces or the train manger's compartment. The emergency brake

handles meet the design requirements of DIN EN 15327-1 and comply with the provisions for the installation of braking equipment and emergency brake operations in vehicles used for the carriage of persons.

- Elegant design
- Aluminium die-cast housing, rugged, long-lasting
- Finish: semi-gloss varnish, resistant to acids and chemicals
- Handle can be lead sealed
- Optional automatic reset (spring return)
- 2 switching elements max. with gold or silver contacts











Connectors to UIC

Jumpers to UIC 552 Now with a pre-assembled plug

The ZH550 jumper receptacle for train lines has a new symmetrical design and a common terminal for connecting cables entering from the left, right or the rear. The seal and drainage in the lid have been improved. The insert can now be replaced from the front, and for maintenance there is the option of lock and key in the lid.

The plug ZH551 comes with a pre-assembled single or double-ended connector cable cable in the form of a non-halogen sheathed power supply line with improved flammability rating and heat resistance.

- Non-halogen sheathed power supply line for rail vehicles
- With improved flammability rating and heat resistance following DIN VDE 0250-606 and DIN EN 50624
 - Type designation: NSHXAFCMOE 3,6/6kV
 - Cables of different designs, lengths and sizes
- Wire gauge: 185 mm²
- High voltage test up to 13 kV inclusive



Page 12 | Schaltbau GmbH

UIC 558 VE Series UIC-IT Series Updated connector for remote Robust and state-of-the-art control, doors and lights or Ethernet solution for data for public address systems communications in modern in passenger coaches and railway vehicles. multiple unit trains. **UIC558 UIC-IT EP** ZH **EP Series ZH Series** Connector for electro-pneu-UIC 552-compliant rugged matic brakes (EP brakes) as jumpers providing electrical well as for emergency brake connections between rail

vehicles as well as carriages.

override control.



Connectors to UIC

Receptacle with new replacement insert UIC558 series

Schaltbau has added a new type of receptacle to its UIC558 connector series which is likely to reduce maintenance and downtime considerably. While undertaking maintenance work, there is no longer any need for rewiring. All you need to do is exchange the replacement insert of the receptacle. You can do that outside the engine shed, and the electrical testing of the connector's contacts and wires is therefore also no longer necessary.

- Break-away connector
- Replacement insert with socket contacts implemented on both sides
- Crimp adapter with pre-assembled cable for on-site replacement
- No need of rewiring the rail vehicle
- No need of testing the connector's contacts and wires

Plug with Gigabit Ethernet up to Cat 7 UIC-IT series

Rugged and state-of-the-art Ethernet solutions for data communications is what is required by today's rail vehicles. The new UIC-IT series from Schaltbau meets those requirements providing a highly flexible, universal and reliable Ethernet connection option for the harsh railway environment with a design life that will last for decades.

It is designed for use with various types of rail vehicles, making it possible to combine rolling stock of different manufacturers and railway operators.

- Break-away connector
- Ingress protection rating IP69K: Receptacle with lid closed and connector when mated
- 1 or 2 Gigabit Ethernet module for 4 data pairs for transmission of 10 Gb in a permanent link with Cat 7 compliant data cables
- 16 optional signal contacts
- 10,000 mating cycles









Snap-action switches

The world's smallest snap-action switch with positive opening operation – S880 series

Schaltbau subminiature S880 snap-action switches feature both wiping, self-cleaning contacts as well as a positive opening function. Minimum size in combination with maximum reliability make this V4 snap-action switch ideally suited for a host of applications such as a safety limit switch in medical engineering or limit switch for machine, door and system control projects or in the driver's consoles of locomotives.

- Positive opening operation, IEC 60947-5-1 Annex K,
- Dimensions to DIN 41636-3, type B (V4 subminiature switch)
- Degree of protection: contacts IP40, IP60, IP67, terminals IP00, IP67 according to IEC 60529
- Wiping, self-cleaning contacts
- Contact material: hard silver or gold alloy
- Snap mechanism highly resistant to shock and vibration
- Dimensions 20 x 9,3 x 6,6 mm (L x W x H)*

Snap-action switches with IP rating up to IP67 S847 series

S847 series snap-action switches in modular design are available with three degrees of protection according to IEC 60529: IP40 (protected against solid particles), IP60 (dust-proof), and IP67 (water-proof). Due to their self-cleaning double-break contacts as well as protection against dust, moisture and pollutants, S847 series switches are highly reliable even at low contact ratings. The switches are therefore also often used for handling low currents and voltages.

- Positive opening operation, IEC 60947-5-1 Annex K
- Degree of protection: contacts IP40, IP60, IP67, terminals IP00 according to IEC 60529
- Form Z circuitry SPDT-DB, galvanically isolated, self-cleaning, double-break contacts
- Contact material: Hard silver or gold alloy, magnetic blowout, optional
- Long overtravel after positive opening operation
- Dimensions 50 x 36 x 12 mm (L x W x H)*









Snap-action switches

Snap-action switches for standard applications Snap-action switches for extreme conditions S826 series

S826 series switches feature galvanically isolated contact bridges that make it possible to control two separate load circuits with independent voltage levels at the same time. This makes them ideally suited for automation tasks with separate electric loads.

The wiping, double-break contacts ensure high reliability even at low electrical loads. Switches with gold contacts are particularly suitable for low currents and voltages.

- Positive opening operation, IEC 60947-5-1 Annex K
- Degree of protection IP40, IEC 60529
- Wiping, double-break contacts
- Form Z SPDT-DB, galvanically isolated
- Contact material: hard silver or gold alloy
- Magnetic blowout, optional
- Dimensions 50 x 28,5 x 12 mm (L x W x H)*

S926 and S970 series

Thanks to the high-performance thermoplastic used as housing material, S926 and S970 series snap-action switches feature both a better resistance to temperature and chemicals as well as a 50% higher impact resistance compared to polycarbonate (PC).

Thus they are ideally suited for applications characterised by harsh environmental conditions. Sharing the same design, dimensional and electrical characteristics as the S826 and S870 series switches, they can easily replace a standard switch without great effort.

- Better resistance to temperature and chemicals
- Form Z SPDT-DB, galvanically isolated (S926)
- Double-break contacts (S926)
- IP rating IP40, IEC 60529 (S926)
- IP rating IP40, IP60, IP67 IEC 60529 (S970)
- Terminal styles: e.g. leads, cable (S970)
- Dimensions S926: 50 x 28,5 x 12 mm (L x W x H)* S970: 30 x 16 x 10,5 mm (L x W x H)*















Traction contactors

1 and 3-pole CA traction contactor for electric multiple units

The CA series are available as 1 or 3-pole AC contactors. It is typically used for switching off permanent magnet traction motors (PMSM) of EMUs in the event of a short-circuit in the output circuit of the traction inverter in order to prevent the drive from being blocked. The CA contactor series is especially designed for use with traction motors with supply voltage frequencies of up to 400 Hz!

- Power range: 1,500 V AC, 400 A / 3,000 V AC, 800 A
- High short-circuit breaking capacity for frequencies up to 400 Hz
- Reinforced insulation between main circuit and control / auxiliary circuit
- Functional insulation for main circuit
- Tested to railway standard EN/IEC 60077

1 and 2-pole CT traction contactor for up to 1,100 A AC and DC

CT series power contactors are outstanding for extinguishing the arc with a combination of electromagnetic and permanent magnetic blowout and ensuring high breaking capacity. The innovative technology enables the almost unrestricted use in AC and DC traction power networks.

Schaltbau CT traction contactors have been operating successfully for decades, all across the world in locomotives and EMUs.

- Power range: up to 3,000 V / 1,100 A
- DC bi-directional or AC up to 60 Hz max.
- Combination of permanent-magnetic and electromagnetic blowout – no critical currents
- 1 and 2 pole versions
- Tested to railway standard EN/IEC 60077





Traction contactors

1-pole bi-directional high-voltage CP contactors, disconnectors, changeover switches for DC and AC for up to 2,000 A

With the CP series, Schaltbau is introducing another innovative concept to the switchgear market. The arc-handling is done exclusively by permanent-magnetic blowout. This patented technology ensures fully bi-directional breaking capability and a more compact design. And for the first time the universal devices can be configured as a NO/NC contactor, disconnector or changeover switch. Furthermore, a high-voltage discharging contact, a precharging contactor or several auxiliary contacts can be integrated. Multipole versions are also available. This enables us to react flexibly to changing customer requirements.

Power range: up to 3,000 V / 2,000 A

Easily configurable as a NO/NC contactor, disconnector or changeover switch

- DC bi-directional or AC up to 60 Hz max.
- Exclusively permanent-magnetic blowout no critical currents
- Low total cost of ownership, modular and compact
- Tested to railway standard EN/IEC 60077
- CO CP3130/12 U, = 3,000 V, I, = 1,200 A
- NO CP1115/12 $U_N = 1,500 \text{ V}, I_{+h} = 1,200 \text{ A}$
- Pre-charging NO CP1115/02 U_N = 1,500 V, I_N = 200 A

Optionally integrable pre-charging contactor - CPP series

A pre-charging contactor from the CPP series can be directly integrated. This saves space and ensures the effective limitation of the

inrush current of the DC link. Also

available separately.











HV disconnectors and contactors

Multipole switchgear SD, SE, SDE, SCO for voltages from 600 V to 3 kV

The switches from the SD, SE and SCO series have a modular design and can be used for disconnecting, earthing, disconnecting and earthing as well as switching between two circuits (change-over). The rotating scissor switches are designed for off-load adjustment of electrical configurations, especially of multi-system locomotives, but also as reliable HV disconnectors for the power converters and traction motors of electric railway vehicles. Multi-pole and modular in design, they sport up to 10 rotating switching chambers fitted with 8 contacts and one or two knives each.

- Off-load adjustment of electrical configurations to different networks, e.g. various train line voltages up to 3 kV DC max. in accordance with UIC 550
- Inexpensive high-voltage switch for applications requiring high conventional thermal currents
- Various control programmes available in accordance with the requirements of the European railway companies
- Simple adaptation of control programmes to new requirements
- Tested to railway standard EN/IEC 60077



1-pole CH high-voltage contactor with a completely new design

With the CH1130/02, Schaltbau has a compact HV contactor in its line of proven high-voltage railway contactors. The design has been completely modernised, matched more closely to those of the CT contactor series. It is suitable for use as a precharging and switch-on contactor in power supplies and as a control contactor for resistor banks in heating and air conditioning equipment.

- Power range: up to 3,000 V / 250 A
- Compact, rugged design
- Double-break contacts
- Magnetic blowout and ceramic materials for cooling the arc
- CH1130/02 will replace existing CH series
- Tested to railway standard EN/IEC 60077





Battery and universal contactors

4-pole universal contactor CS115 series for battery voltages up to 800 V

The CS115 extends the product range with a series of universal contactors for battery voltages up to 800 V. The 4-pole 20 A control contactor is available with 4 NO, 3 NO/1 NC, or 2 NO/2 NC contacts. Optionally up to 4 snap-on auxiliary switches can be mounted on it.

These units are especially designed for controlling low and medium loads in battery networks, such as switching on and off, locking, signalling and controlling power contactors.

- Compact, rugged design, DIN rail mounting
- Magnetic blowout
- Contact arrangements: 4 NO, 3 NO/1 NC, or 2 NO/2 NC
- NC or NO auxiliary switches available
- Conventional thermal current 20 A
- Various coil voltages
- Tested to railway standard EN/IEC 60077



Bi-directional version of the C195 series DC NO contactor

The new C195 X/ is the bi-directional complementary product to the proven compact C195 series DC NO contactors for voltages up to 1,500 V. And with 320 A, the bi-directional version features a higher current-carrying capacity, but generally shares the same compact, rugged design, doublebreak contacts that are enclosed for the most part, and also the same high breaking capacity. This makes the bi-directional variant especially suited for use as a line contactor in mainline AC and DC rail networks or, in combination with a precharging contactor, for use with various auxiliaries.

- Bi-directional version for DC applications
- Compact, rugged design
- Conventional thermal current 320 A
- Double-break contacts
- High breaking capacity
- Tested to railway standard EN/IEC 60077









COST-EFFICIENT MAINTENANCE

HIGHLY CONVENIENT

HIGH AVAILABILITY

END-TO-END PLANNING CERTAINTY

"Our service is local"

We provide our services wherever they are required. As part of this, we are able to draw on an extensive international network within the Schaltbau Group as well as on many Schaltbau partners.

Efficient organisation and regular depot visits come as standard.







Service

Technical maintenance for disruption-free operations

Specialised in components and driver's cab systems, Schaltbau is able to draw on wide-ranging know-how in advising, planning and executing comprehensive technical maintenance measures, repairs and regular inspections. We work with you to produce solutions which are tailor-made to integrate into existing vehicles and operating concepts. We aim to deliver on your demands for technical availability and therefore ensure disruption-free operations.

Repairs	Maintenance	Overhaul
We repair your Schaltbau product based on extensive initial diagnostics, including a cost estimate and detailed repair report	We offer expert technical maintenance for your Schaltbau product based on the intervals and approach defined in your maintenance strategy.	We can design all measures for your Schaltbau product with a view to extending its service life or adding additional technical functions.
Replacement parts	Drop-In	Logistics
We have replacement and wear parts in Schalt- bau quality available over the standard market service period.	We ensure long-term availability in general and develop tailored alternative solutions, including in cases of obsolescence.	We offer rapid global delivery and ensure ontime part and materials availability.
Assembly	Analysis	Training
We take care of the installation and removal or commissioning of your Schaltbau product on site.	We analyse the product performance and advise you regarding deployment optimisation.	We offer you a tailored training program on commissioning, use and service.

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 • Industrial Material New **Technology** Solutions Energy More power for electricity. Speed Safely on track. Switching and Reliable in production. Certified Sustainable storage. Improved controlling features which meet variations on safety-relevant performance with faster wareand safety in the high-voltage the highest requirements. solutions. house loading processes. field. For goods and passengers. For man and machine. For efficient intralogistics. For renewable energies. www.rail.schaltbau.com www.industry.schaltbau.com www.materialhandling. www.energy.schaltbau.com 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.









manufactures in compliance with RoHS.



The production facilities of Schaltbau GmbH have been IRIS certified since



Certified to DIN EN ISO 14001



Certified to DIN EN ISO 9001



Schaltbau – the creative and smart railway specialist

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



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