Brochure Electrics for Rolling Stock

Equipment and solutions for rail vehicles
WE ENSURE UNINTERRUPTED OPERATION

Modern and efficient transportation systems require safe railway vehicles with low downtime and maintenance. Here the quality and reliability of the components used is the decisive factor. Schaltbau electrics for rolling stock fully meet these requirements of OEMs and railway operators alike. They are used in rail vehicles all over the world, where they ensure safe and smooth operation in the harsh railway environment.

More at:
www.schaltbau.info/rail

ELECTRICS FOR ROLLING STOCK

Schaltbau develops and manufactures a wide range of electric equipment and subsystems for use in passenger coaches, locomotives, multiple units, light rail vehicles, trams and buses that meet all safety and quality requirements of the applicable standards.

Schaltbau’s expertise and technological capabilities provide pioneering and cost-effective solutions for the railway industry.
The European railway network becomes more and more integrated and cross-border traffic becomes ever more important. To prevent any delays when crossing the border, European standards are required. The following overview lists the most important railway standards.

- **IEC 60077-1**: Common specifications for high-voltage switchgear and controlgear standards.
- **BS EN 50153**: Railway applications – Electronic equipment.
- **BS EN 50155**: Railway applications – Rolling stock equipment.
- **UIC 550-3**: Power supply systems for passenger coaches.
- **UIC 558**: Connectors for railway vehicles and components – suitable for continuous operation are unique throughout the world. They are characterised by high quality, reliability and long design life. Our snap-action switches are not only much used in railway applications but also in all applications where safety is a major requirement.

## Electric equipment for driving cabins and passenger use

- **Traction contactor**
- **Auxiliaries**
- **HV changeover unit**
- **Dead man’s handle, footswitch, buzzers**

## Snap-action switches

Schaltbau snap-action switches with positive opening operation are unique throughout the world. They are characterised by high quality, reliability and long design life. Our snap-action switches are not only much used in railway applications but also in all applications where safety is a major requirement.

## Connectors

Rugged connectors for reliable connections between vehicles and components – suitable for continuous use in rail vehicles. Schaltbau’s railway connectors meet the requirements of international railway standards, such as UIC.

## Contactors

High-quality contactors have proven themselves in the demanding railway environment for decades. Their great variety of shapes and styles as well as their suitability for all common control voltages make possible a wide range of applications.

## Electrically / mechanically adjustable foot rests

These foot rests can be adjusted either electrically or mechanically. They are used in driver desks and cabins.

## Interactive displays

Master controller, toggle switches, push buttons, keylock switches

## Dead man’s handle, footswitch, buzzers

They are used in driver desks and cabins.

## HV signalling relay

DC under control

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**Safe on track :: Applicable standards**

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## Electric equipment for rail vehicles :: Schaltbau product range

- **Earthing switch**
- **Battery switch**
- **Emergency brake handle**
- **Overtemperature protection and tripping device**
- **High-voltage heater**
- **Switchgear cabinet**
- **Safety contactor**
- **Disconnecting and earthing device**
- **AC vacuum circuit breaker**
- **Voltage selector**
- **HV changeover unit**
- **Interactive displays**
- **Master controller, toggle switches, push buttons, keylock switches**
- **Dead man’s handle, footswitch, buzzers**
- **Electrically / mechanically adjustable foot rests**
- **HV signalling relay**
PROCESSOR: FREESCALE™ i.MX6 – QUAD ARM CORTEX-A9

 màn hình LCD: 10,4", màn hình cảm ứng

- Dùng cho: hệ thống tín hiệu đường sắt (ERTMS/SCMT), thiết kế, admit во всем мире. В виде платформы и сопутствующих элементов, наша компания предлагает широкий спектр решений для заказчиков, включая:

- Развитие и интеграция с постоянными руководителями
- Интерактивное управление с помощью ключей, микроконтроллеров, ключей
- Управление подвижными составами, определение маршрута, управление движением
- Данные о состоянии поезда, управление, связь с TCMS
- Модульный дизайн
- Эргономичный дизайн
- Функциональная надежность, обеспечиваемая высоким уровнем защиты от вибрации и сжатия
- Устойчивость к шоку и вибрации
- Спецификации, функциональность, производительность
- Другие приложения, например, строительство кранов, судостроение.

- Серия
- Параметры
- Спецификации
- Функции
- Рассчитано в наше проектное бюро.

- Площадь: 10,4"x15.1"
- Процессор: Quad ARM Cortex-A9
- Управление: управление дисплеем, управления, управляющие функции
- Интерфейсы: USB / Ethernet 10/100/1000 Mbps / RS232 / RS422 / CAN bus / Dual Core ARM Cyclone V (Linux), 1 GHz / Dual Core ARM Cyclone V (Linux), 1 GHz / Dual Core ARM Cyclone V (Linux), 1 GHz / Dual Core ARM Cyclone V (Linux), 1 GHz
- Наличие вида: 24/24V DC (25 W max.) / 24/24V DC (25 W max.) / 24/24V DC (25 W max.) / 24/24V DC (25 W max.)
- Устойчивость к температуре: -30° C ... +70° C / -30° C ... +70° C / -30° C ... +70° C / -30° C ... +70° C
- Уровень защит: IP65 / IP65 / IP65 / IP65
- Сертификация: UIC 612-0, EN 50155, EN 50068, EN 61373, EN 11170-3 / UIC 612-0, EN 50155, EN 50068, EN 61373, EN 11170-3 / UIC 612-0, EN 50155, EN 50068, EN 61373, EN 11170-3 / UIC 612-0, EN 50155, EN 50068, EN 61373, EN 11170-3
Dead-man handles and footswitches

Series S293 and ZL290 Dead-man handles and footswitches with change-over contact operating conditions, e.g. on locomotives and multiple units. Schaltbau S293 and ZL290 Series dead-man footswitches feature a high resistance to shock and vibration. Contact material: hard silver or gold alloy. High electrical rating due to solid contact bridge. Rated insulation voltage Ui > 400 V. Rated operating voltage Ue 400 V or 250 V. Rated operating current Ie 300 mA or 500 mA. Rated thermal current Ith 9 different tones. Switching positions 1 ... 4. Sound level, distant 1 m 80 ... 100 dB(A).

Electronic buzzers for automatic train protection systems

Series S579, S293, ZL290 Electronic buzzers in the driving cab of railway vehicles are an integral part of the intermittent automatic train running control and the dead-man equipment respectively. Schaltbau S293 Series buzzers are designed for that purpose. With its electronic transducers JA224 and JA226 Schaltbau integrates up to nine and ten different warning tones respectively for country-specific train protection systems in an all-in-one device. So the multi-tone buzzers are ideally suited for use in switch panels and driving consoles of rail vehicles, but are also suitable for industrial applications, such as shipbuilding and vehicle construction.

FEATURES
- Dead-man handles and footswitches with change-over contact
- Rugged, long-lasting, reliable
- Snap-action switch S584 or S584
- High-electrical rating due to solid contact bridge
- Contact material: hard silver or gold alloy
- High resistance to shock and vibration
- S814 featuring wiping, self-cleaning contacts

SPECIFICATIONS
- Series: S579, S293, ZL290
- Actuator: Handle, Foot switch
- Snap-action switch: S584, S584
- Configuration: 1 x SPDT, up to 2 x SPDT
- Rated insulation voltage Ui: 400 V
- Pollution degree: PD3
- Overvoltage category: OV3
- Conv. thermal current Ith: 300 mA
- Rated operating voltage Ue: 400 V
- Rated operating current Ie: 300 mA
- Temperature: -40° C ... +85° C
- Sound level, distance 1 m: 80 ... 100 dB(A)

Toggle switches with snap-action switches or cam-operated switching elements

Series JA224, JA224, JA226 F, P, L Series JA224 and JA226 Schaltbau integrates up to nine and ten different warning tones respectively for country-specific train protection systems in an all-in-one device. So the multi-tone buzzers are ideally suited for use in multi-system railway vehicles in cross-border mainline service throughout Europe. Schaltbau JA224 Series proven buzzers are part of the intermittent automatic train running control and dead-man equipment respectively. Schaltbau JA222 Series proven buzzers are designed for that purpose.

FEATURES
- Rugged, open design
- 4 switching elements max.
- F, P Series: snap-action switches
- L Series: cam-operated switching elements
- Many different switch settings possible
- L Series: suitable for direct switching of high currents
- Special handle styles available
- Protection against inadvertent operation available
- Toggle switch can be lead tub sealed

SPECIFICATIONS
- Series: JA222, JA222, JA226
- Actuator: Handle, Foot switch
- Snap-action switch: S584, S584
- Configuration: 1 x SPDT, up to 2 x SPDT
- Rated insulation voltage Ui: 400 V
- Pollution degree: PD3
- Overvoltage category: OV3
- Conv. thermal current Ith: 300 mA
- Rated operating voltage Ue: 400 V
- Rated operating current Ie: 300 mA
- Temperature: -40° C ... +85° C
- Pitch: 1 ... 2
- Sound level, distant 1 m: 80 ... 100 dB(A)

Toggle switches with subminiature switches S880

The award-winning K Series toggle switch is the newest member of the Schaltbau toggle switch family expanding the existing product range. K Series toggle switches can be equipped with up to 5 S880 Series subminiature snap-action switches that allow for 3 and 5 switch settings. All applications as mentioned in the UIC 612 railway standard can be covered with them. To present driving cabs of locomotives and multiple-unit trains in modern design will be no problem with them. The option of a dimmable and consistent illumination of the K type switch makes separate indication lights superfluous and also for effective night design.

FEATURES
- Central switch mount with illuminated ring in 5 LED colours used as function indicator or for night design
- 8 switching elements max.
- Lead wire seal option
- Yellow ball handle for ETCS acknowledgment
- Cylinder handle for external warning horn of locomotives
- Solid and fully sealed plastic housing
- Momentary and maintained operation compatible with F and P Series
- Easy to mount

SPECIFICATIONS
- Series: F, P, L, K
- Actuator: Handle, Foot switch
- Snap-action switch: S584, S584
- Configuration: 1 x SPDT, up to 2 x SPDT
- Rated insulation voltage Ui: 400 V
- Pollution degree: PD3
- Overvoltage category: OV3
- Conv. thermal current Ith: 300 mA
- Rated operating voltage Ue: 400 V
- Rated operating current Ie: 300 mA
- Temperature: -40° C ... +85° C
- Pitch: 1 ... 2
- Sound level, distant 1 m: 80 ... 100 dB(A)
The new PAD10 Series emergency brake handle is designed for lintel mounting, e.g. under the lintel of a carriage door and in passenger spaces.

- Fitted with 2 switching elements max. (S870) with gold or silver contacts
- Optional automatic reset (spring return)
- Handle can be lead sealed
- Finish: semi-gloss varnish, resistant to acids and chemicals

Lintel mount version of emergency brake handle

- Robust emergency brake handle made of aluminium, steel and non-slip painted
- Noticable design
- Electrically and mechanically adjustable

Wall mount version of emergency brake handle

- The new PAD30 Series brake handle is designed for wall mounting, e.g. in vestibules, passenger spaces or the train manager's compartment of rail vehicles.
- The new emergency brake handle meets the design requirements of DIN EN 15327-1 and fully comply with the provisions for installation of braking equipment and emergency brake operations in vehicles used for the carriage of persons.

The new PAD30 Series brake handle is designed for wall mounting, e.g. under the lintel of a carriage door and in passenger spaces.

- 2 switching elements max. with gold or silver contacts
- Optional automatic reset (spring return)
- Handle can be lead sealed
- Finish: semi-gloss varnish, resistant to acids and chemicals

The new PAD40 Series brake handle is designed for wall mounting, e.g. under the lintel of a carriage door and in passenger spaces.

- 3 switching elements (S870) max. with gold or silver contacts
- Optional automatic reset (spring return)
- Handle can be lead sealed
- Finish: semi-gloss varnish, resistant to acids and chemicals

The new PAD40 Series brake handle is designed for wall mounting, e.g. under the lintel of a carriage door and in passenger spaces.

- 3 switching elements (S870) max. with gold or silver contacts
- Optional automatic reset (spring return)
- Handle can be lead sealed
- Finish: semi-gloss varnish, resistant to acids and chemicals

Electrical and mechanical adjustable footrests for rail vehicles

- Double break contacts
- Motor current thermal 150 A
- Lockable maintenance position
- Disconnection and earthing device in accordance with the applicable safety regulations
- Suitable for all UIC voltages
- Insulation for operating voltages up to 5 kV DC max.
- Double break contacts
- Motor current thermal current 150 A
- Lockable maintenance position
- Forced disconnection of installation when opening the door of the switchgear cabinet.

Footrests with DSD switches allow the driver to operate the driver safety device from an ergonomic seating position while keeping hands free. Additional functions, e.g. for track sanding or horn activation can be integrated. An optional heatable base plate provides additional comfort in winter. Footrests and DSD switches can be found in railway vehicles all around the world.

**FEATURES**

- 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)
- Fitted with 2 switching elements max. (S870) with gold or silver plated contact

- Elegant design
- To be mounted flush into a wall
- 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)
- 3 switching elements (S870) max. with gold or silver contacts

- Robust emergency brake handle made of aluminium, steel and non-slip painted
- Noticable design
- Electrically and mechanically adjustable

- Disconnecting and earthing device in accordance with the applicable safety regulations
- Suitable for all UIC voltages
- Insulation for operating voltages up to 5 kV DC max.
- Double break contacts
- Motor current thermal current 150 A
- Lockable maintenance position
- Forced disconnection of installation when opening the door of the switchgear cabinet.

**SPECIFICATIONS**

**FEATURES**

- Additional functions, e.g. for track sanding or horn activation can be integrated.
- Robust electrically and mechanically adjustable
- Suitable for all UIC voltages
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**SPECIFICATIONS**

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- Noticable design
- Electrically and mechanically adjustable
- Suitable for all UIC voltages
- Insulation for operating voltages up to 5 kV DC max.
- Double break contacts
- Motor current thermal current 150 A
- Lockable maintenance position
- Forced disconnection of installation when opening the door of the switchgear cabinet.

- Disconnecting and earthing device in accordance with the applicable safety regulations
- Suitable for all UIC voltages
- Insulation for operating voltages up to 5 kV DC max.
- Double break contacts
- Motor current thermal current 150 A
- Lockable maintenance position
- Forced disconnection of installation when opening the door of the switchgear cabinet.
ZH1500

Disconnecting and earthing device for single and multi-system rail vehicles

Disconnecting and earthing devices provide easy disconnecting of high-voltage equipment from a high-voltage train line and connect these parts to ground potential to take away all electric energy which might rest in capacitors and other components. This way they guarantee working safely on disconnected and grounded high-voltage installations.

The contact system is designed for off-load switching but also allows emergency switching. Under normal operating conditions the main contactor’s energy is being switched off prior to the opening of the contacts via a door switch.

Suitable for all UIC voltages up to 5 kV DC max.

- Forced disconnection of installation when opening
- Conv. thermal current 150 A
- Insulation for operating voltages up to 5 kV DC max.
- The contact system is designed for off-load switching but also allows some emergency switching. Under normal operating conditions the main contactor’s energy is being switched off prior to the opening of the contacts via a door switch.

### FEATURES

- Suitable for all UIC voltages
- Insulation for operating voltages up to 5 kV DC max.
- Double-break contacts
- Conv. thermal current 150 A
- Lockable maintenance position
- Forced disconnection of installation when opening the door of the switchgear cabinet

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Series</th>
<th>ZH1500</th>
<th>ZH1114</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum breaking capacity</td>
<td>250 kW</td>
<td>0...5000 V AC, 16/1...50 Hz</td>
</tr>
<tr>
<td>No of contacts</td>
<td>1x disconnecting contact / 1x earthing contact</td>
<td></td>
</tr>
<tr>
<td>Spulenwiderstand</td>
<td>150 A</td>
<td></td>
</tr>
<tr>
<td>Breaking capacity, max., T = 1 ms, disconnecting contact</td>
<td>100 A @ 120 V AC 16/1 Hz</td>
<td></td>
</tr>
<tr>
<td>Pollution degree</td>
<td>IP00</td>
<td></td>
</tr>
<tr>
<td>Mechanical endurance</td>
<td>&gt; 1,000 operations (approx. 30 years)</td>
<td></td>
</tr>
<tr>
<td>Temperature Standard</td>
<td>40°C ... +65°C</td>
<td></td>
</tr>
</tbody>
</table>

### Catalogue

- F186.en
- F182.en

### Electric for rolling stock

Page 12

Page 13

.zh1114

Voltage selector for rail vehicles

With its voltage and frequency analyser ZH1114 Schaltbau meets the requirements of modern cross-border traffic.

The ZH114 identifies the voltage ranges according to UIC 550 and operates as electronic control device for the Schaltbau changeover unit, which adapts the individual loads of the railway vehicle to the different detected supply voltages. Additionally, the correct electrical configuration is being tested by the device.

### FEATURES

- Identification of UIC 550 compliant voltages (5 kV 16/1 Hz / 1.5 kV 50 Hz / 1.5 kV DC / 3 kV DC) and 3 kV 50 Hz
- Meets requirements for double insulation for 3 kV DC (UIC 550) according to EN 50124-1:2001+A1
- Customised setting of the device via PC - same hardware for different configurations
- Application: Adapting the electrical configuration of RIC passenger coaches to the detected supply voltage
- Identification of UIC 550 compliant voltages (5 kV 16/1 Hz / 1.5 kV 50 Hz / 1.5 kV DC / 3 kV DC) and 3 kV 50 Hz
- Meets requirements for double insulation for 3 kV DC (UIC 550) according to EN 50124-1:2001+A1
- Customised setting of the device via PC - same hardware for different configurations
- Application: Adapting the electrical configuration of RIC passenger coaches to the detected supply voltage

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Series</th>
<th>ZH1114</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage range</td>
<td>600 ... 5000 V AC, 16/1...50 Hz</td>
</tr>
<tr>
<td>Measuring range</td>
<td>600 ... 5000 V AC, 16/1...50 Hz</td>
</tr>
<tr>
<td>Supply voltage range</td>
<td>24 / 36 / 110 V</td>
</tr>
<tr>
<td>Rated operating current</td>
<td>&lt; 300 mA</td>
</tr>
<tr>
<td>Conv. thermal current Ith</td>
<td>---</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP00</td>
</tr>
<tr>
<td>Temperature</td>
<td>-25°C ... +85°C</td>
</tr>
</tbody>
</table>

### Catalogue

- F184.en

### Electric for rolling stock

Page 12

Page 13

.zh1114

High-voltage changeover unit, multipole rotating scissor switches

The HV changeover units come in series of 2, 3, and 4 position devices. They are manually operated or driven by a linear or geared motor. Multipole and of modular design, they sport up to 10 rotating switching chambers fitted with 8 contacts and one or two knives each.

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.

### FEATURES

- Off-load adjustment of electrical configurations to different networks, e.g. various train line voltages in accordance with UIC 550
- Suitable for all UIC voltages up to 5 kV DC max.
- 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 programme to new requirements
- Off-load adjustment of electrical configurations to different networks, e.g. various train line voltages in accordance with UIC 550
- Suitable for all UIC voltages up to 5 kV DC max.
- 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 programme to new requirements

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<table>
<thead>
<tr>
<th>Series</th>
<th>SCO2, SCO3, SCO4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positions</td>
<td>SCO2: 2 position device</td>
</tr>
<tr>
<td>Positions</td>
<td>SCO3: 3 position device</td>
</tr>
<tr>
<td>Positions</td>
<td>SCO4: 4 position device</td>
</tr>
<tr>
<td>Input-voltage range</td>
<td>600 ... 3000 V AC, 16/1...50 Hz</td>
</tr>
<tr>
<td>Input-voltage range</td>
<td>600 ... 1000 V DC (5000 V DC to UIC 550)</td>
</tr>
<tr>
<td>Input-voltage range</td>
<td>40...850 A</td>
</tr>
<tr>
<td>Input-voltage range</td>
<td>IP00</td>
</tr>
<tr>
<td>Temperature</td>
<td>-25°C ... +85°C</td>
</tr>
<tr>
<td>Temperature</td>
<td>-20°C ... +80°C</td>
</tr>
</tbody>
</table>

### Catalogue

- F180.en

### Electric for rolling stock

Page 12

Page 13

.zh1114

Disconnecting and earthing device

For single and multi-system rail vehicles

With its voltage and frequency analyser ZH114 Schaltbau meets the requirements of modern cross-border traffic.

The ZH114 identifies the voltage ranges according to UIC 550 and operates as electronic control device for the Schaltbau changeover unit, which adapts the individual loads of the railway vehicle to the different detected supply voltages. Additionally, the correct electrical configuration is being tested by the device.

### FEATURES

- Identification of UIC 550 compliant voltages (5 kV 16/1 Hz / 1.5 kV 50 Hz / 1.5 kV DC / 3 kV DC) and 3 kV 50 Hz
- Meets requirements for double insulation for 3 kV DC (UIC 550) according to EN 50124-1:2001+A1
- Customised setting of the device via PC - same hardware for different configurations
- Application: Adapting the electrical configuration of RIC passenger coaches to the detected supply voltage

### SPECIFICATIONS

<table>
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<tr>
<th>Series</th>
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<td>600 ... 3000 V AC, 16/1...50 Hz</td>
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### Catalogue

- F184.en

### Electric for rolling stock

Page 12

Page 13
ZH842 H, ZH842 H2
Solid-state high-voltage signalling relay
The ZH842 H Series solid-state high-voltage sensor signals high voltage applied to the train line. The device supplies electrical loads, which for the conservation of battery power are only operated when high voltage is being applied, with control voltage.
Mode of operation: The ZH842 H switches on a potential-free relay contact as long as the high voltage at the input terminals exceeds the signalling voltage.

FEATURES
- Identification of UIC 550 compliant voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC) and 3 kV 50 Hz
- Meets requirements for reinforced insulation for 3 kV DC (UIC 550) according to EN 50124-1:2001+A1
- Low stand-by consumption
- Potential-free switching output
- Suitable for load switching
- 1 up to 3 switching positions
- Switch cylinder with snap-action switch
- Snap-action switch for status indication
- Door locker, padlockable
- Individual marking
- High short-circuit current strength
- Manually operated
- High availability and reliability: Thanks to the energy stored in a spring, the CVB never fails to switch ON even when battery is flat
- Electrically driven vacuum circuit breaker
- Reduced life cycle costs: No pneumatics, no icing up of the device
- Long life
- Almost maintenance-free, visual inspections will do
- High availability and reliability. Thanks to the energy stored in a spring, the CVB never fails to switch ON even when battery is flat
- Diagnostics function, optional: Monitoring/recording the state of operation
- Fail safe

TCMB
Manual and motorised disconnector switches for DC applications
Disconnector switches of the TCMB and TCMO Series are especially designed for use with batteries of rail vehicles. The TCMB is manually operated, whereas the TCMO is a motorised and remote controlled switch. Multi-pole and with a current-carrying capacity of 800 A, the switches are capable of controlling multiple switching configurations simultaneously. They are typically used for connecting and disconnecting the DC supply from the battery during maintenance work, ensuring a high level of safety and reliability.

FEATURES
- Identification of UIC 550 compliant voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC) can be supplied.
- They are typically used for connecting and disconnecting the DC supply from the battery during maintenance work, ensuring a high level of safety and reliability.
- Short-circuit current strength
- Manually operated
- Almost maintenance-free, visual inspections will do
- High availability and reliability. Thanks to the energy stored in a spring, the CVB never fails to switch ON even when battery is flat
- Diagnostics function, optional: Monitoring/recording the state of operation
- Fail safe

SE
Earthing switches for electric multiple units
Modular earthing switch for mounting in switchgear cabinets. The device is designed in accordance to the UIC safety regulations for EMUs. It can only be operated by authorized personnel with a special key. Variants for all UIC voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC) can be supplied.
Function: Load-free disconnection and earthing of electric circuits in locomotives, EMUs, carriages and train lines as well as intermediate, input and output circuits of IGBT inverters.

FEATURES
- Identification of UIC 550 compliant voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC)
- Electrically driven vacuum circuit breaker
- Reduced life cycle costs: No pneumatics, no icing up of the device
- Long life
- Almost maintenance-free, visual inspections will do
- High availability and reliability. Thanks to the energy stored in a spring, the CVB never fails to switch ON even when battery is flat
- Diagnostics function, optional: Monitoring/recording the state of operation
- Fail safe

CVB15, CVB25
AC vacuum circuit breaker
CVB Series vacuum circuit breakers are used as main switches on electric locomotives and multiple units. There are versions for 15 kV and 25 kV in accordance with UIC 550.
Mode of operation: On issuing the switch ON signal the energy stored in a spring is set free to trigger the switching operation. After that the spring is recharged. The vacuum circuit breaker is in switched off position when no control voltage is being applied, and the spring remains charged and ready for the next switching operation.

FEATURES
- Identification of UIC 550 compliant voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC)
- Electrically driven vacuum circuit breaker
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- Fail safe

SPECIFICATIONS
| FEATURES |
|-----------------|-----------------|-----------------|
| Identification of UIC 550 compliant voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC) | Suits all rail vehicles | Suitable for load switching |
| Meets requirements for reinforced insulation for 3 kV DC (UIC 550) according to EN 50124-1:2001+A1 | High short-circuit current strength | Manually operated |
| Low stand-by consumption | Almost maintenance-free, visual inspections will do | High availability and reliability |
| Potential-free switching output | No icing up of the device | Long life |
| Suitable for load switching | High availability and reliability. Thanks to the energy stored in a spring, the CVB never fails to switch ON even when battery is flat | Diagnostics function, optional: Monitoring/recording the state of operation |
| 1 up to 3 switching positions | Fail safe |

**olland EN 50124-1:2001+A1**
**EN 50124-1, EN 50128, EN 50155**

**CVB Series**
AC vacuum circuit breakers
CVB Series vacuum circuit breakers are used as main switches on electric locomotives and multiple units. There are versions for 15 kV and 25 kV in accordance with UIC 550.
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**FEATURES**
- Identification of UIC 550 compliant voltages (1 kV 16 2/3 Hz, 1.5 kV 50 Hz, 1.5 kV DC, 3 kV DC)
- Electrically driven vacuum circuit breaker
- Reduced life cycle costs: No pneumatics, no icing up of the device
- Long life
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- Diagnostics function, optional: Monitoring/recording the state of operation
- Fail safe

**SPECIFICATIONS**
<table>
<thead>
<tr>
<th>CVB15</th>
<th>CVB25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>Ue</td>
</tr>
<tr>
<td>Rated operating voltage</td>
<td>Ue</td>
</tr>
<tr>
<td>Rated operating current</td>
<td>Ie</td>
</tr>
<tr>
<td>Short-circuit breaking capacity</td>
<td>Icu</td>
</tr>
<tr>
<td>Short-circuit breaking capacity</td>
<td>Icu</td>
</tr>
<tr>
<td>Utilization category</td>
<td>C3</td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>C3</td>
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<td>C3</td>
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<tr>
<td>Pollution degree</td>
<td>PD4</td>
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<td>PD4</td>
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<tr>
<td>Mechanical endurance</td>
<td>&gt; 250,000 cycles</td>
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<tr>
<td>Temperature</td>
<td>-25 °C ... +70 °C</td>
</tr>
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<td>-25 °C ... +70 °C</td>
</tr>
<tr>
<td>Standards</td>
<td>EN 60077-1, IEC 60077-2, IEC 60121-3-2</td>
</tr>
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</tr>
</tbody>
</table>
Electrical Components and Systems for Railway Engineering and Industrial Applications

- Connectors manufactured to industry standards
- Connectors to suit the special requirements of communications engineering (MIL connectors)
- Charging connectors for battery-powered machines and systems
- Connectors for railway engineering, including UIC connectors
- Special connectors to suit customer requirements

- Snap-action switches with positive opening operation
- Snap-action switches with self-cleaning contacts
- Enabling switches
- Special switches to suit customer requirements

- Single and multi-pole DC contactors
- High-voltage AC/DC contactors
- Contactors for battery powered vehicles and power supplies
- Contactors for railway applications
- Terminal bolts and fuse holders
- DC emergency disconnect switches
- Special contactors to suit customer requirements

- Equipment for driver’s cab
- Equipment for passenger use
- High-voltage switchgear
- High-voltage heaters
- High-voltage roof equipment
- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements