Rail Power Systems

Made in Germany

TracFeed® TDx
TracFeed® TDx-L

DC Switchgear Panels

TracFeed® TDx

Your latest, carefully designed product line allows effortless switching and control: The TracFeed ® TDx

Products incorporating the TracFeed® brand are in use across Germany and the world, boasting reliable, high-performance technology for the railway sector.

The TracFeed TDx generation of switchgear panels proves its reliability and performance each and every day in thousands of switchgear panels. With our 130-year history in the development of systems and solutions, products and components for railway energy supply, we have consistently been able to play a key role in shaping technological progress in the construction and expansion of railway infrastructure. The knowledge and expertise we have gained in the process remains the ideal prerequisite for helping to shape the future of global rail transportation. Be it as Allgemeine Elektricitäts-Gesellschaft (AEG), ADtranz (AEG & ABB), Balfour Beatty Rail or – today – Rail Power Systems: Our expertise is also our guarantee to you for the stability, efficiency and performance of your railway operation.

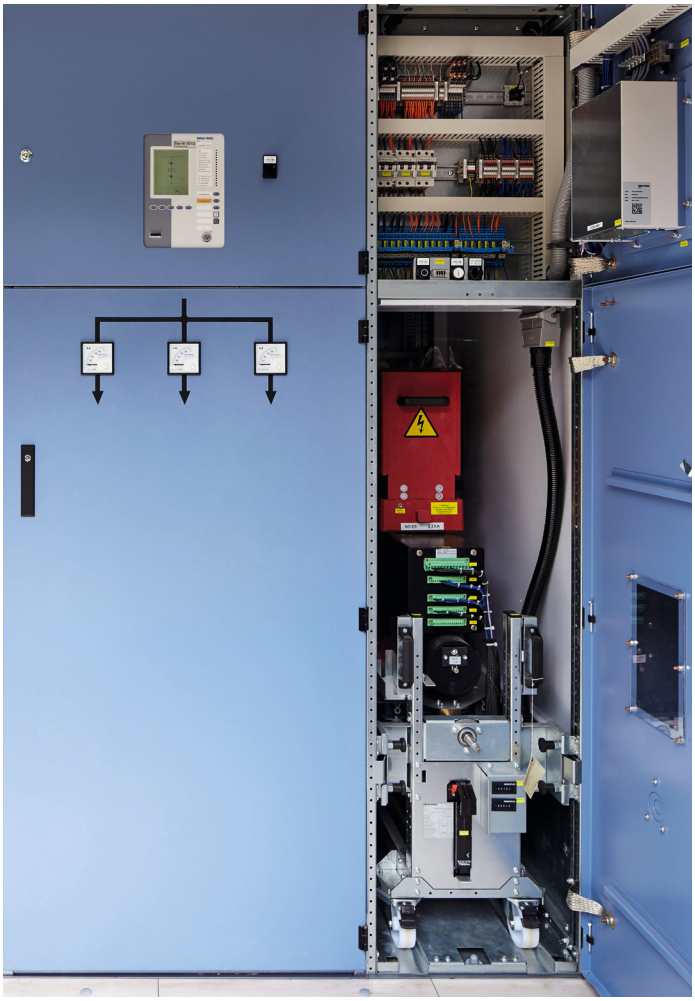
The present TracFeed® TDx switchgear panel generation offers you advantages such as:

- Standardised panel dimensions
- Expanded current range for the main busbar up to 10 000 A
- Additional feeder currents with 4 500 A
- Reduced panel widths for circuit breaker panels with 6 000 A
- New options such as a motor drive for the circuit breaker truck sledge
- Internal arcing test, in addition to type test according to EN 50123-1/-6 and IEC 61992-1/-6
- Space-saving 500 mm width, can optionally be expanded to 800 mm width with adjacent panel

As diverse as customer-specific requirements in DC traction power supply are, from trolleybus systems to light rail or mass transit as well as main line railways, they can still be realised perfectly using the comprehensive, standardised product lines of Rail Power Systems. First you select the switchgear panels from the TracFeed® TDx platform. Then you can select the corresponding rectifiers of the TracFeed® TRx product line.

A platform concept has been developed for the new generation of switchgear panels. Switchgear panels for two different nominal voltages and five gradually rated operating currents are provided.

Circuit breaker panels as well as disconnector panels are available for the TracFeed® TDx product platform – in different commonly used variants.



From the initial technical concept to the operational installation: Rail Power Systems supplies the complete switchboard.

Metro do Porto, Portugal

Sustainable mobility for mass transit

Decades of expertise and tried and tested products for DC traction systems

Today, a host of global transport operators run exemplary mass transit systems using DC power supplies. As operators, it is your task to design a reliable and economical regional and urban means of transportation of the future. This concern is fundemental to the innovative solutions of Rail Power Systems. It is therefore our aim to facilitate your smooth transition to the sustainable mobility of the future using technical expertise and proven technical concepts. Rail Power Systems supports you with a perfectly matched portfolio.

The name Rail Power Systems stands for high-performance railway infrastructure projects which reconcile ecological considerations with economic benefits. Energy efficiency, investment security, easy and fast maintenance, the occupational health and safety initiatives and community responsibility are very important to us.

In addition, Rail Power Systems is proud to offer a long service life, reliable quality, German manufacturing standards and high-integration potential. Experienced experts from a range of specialist areas are always at our disposal.

Our expertise- As proven in challenging reference projects

Sustainable, reliable and ecologically responsible mobility represents one of the central challenges in many urban centres and large metropolitan areas. Highly efficient mass transit will play a prominent role today and tomorrow for the solution of these tasks.

Whether you are currently planning a comprehensive, large-scale future mass transit project, or rather concentrating on specific focus points, you can always rely on the expertise and depth of experience of Rail Power Systems' experts. We have proven our competency in a large number of challenging reference projects, both in Germany and many other countries throughout the world. This means that you can be sure of support based on customised solutions geared towards your success.

Renowned partner for mass transit operators

We provide you with optimal solutions with comprehensive, tried and test product platforms alongside high-tech system integration:

- For trolleybus, tram, light rail, underground railway and metro systems
- For the construction of new lines or rehabilitation and enhancement of existing infrastructure
- With studies for the system design
- From design and supply to the commissioning of switchgear
- Including maintenance during operation, all the way to disposal

Would you like to know more about the product platform and the panel design?

The TracFeed® TDx product platform comprises two nominal voltages:

- TracFeed® TDA with nominal voltage DC 750 V
- TracFeed® TDB with nominal voltage DC 1 500 V

Both variants have an identical basic design. The switchgear panels are constructed from a stable, modular frame made of galvanised steel profiles. The front doors are made of painted sheet steel; the side and rear walls are made of galvanised steel. There is always a metal intermediate wall between the switchgear panels which is covered with insulation plates in the power compartment of a circuit breaker panel.

Here: an example of the circuit breaker panels for:

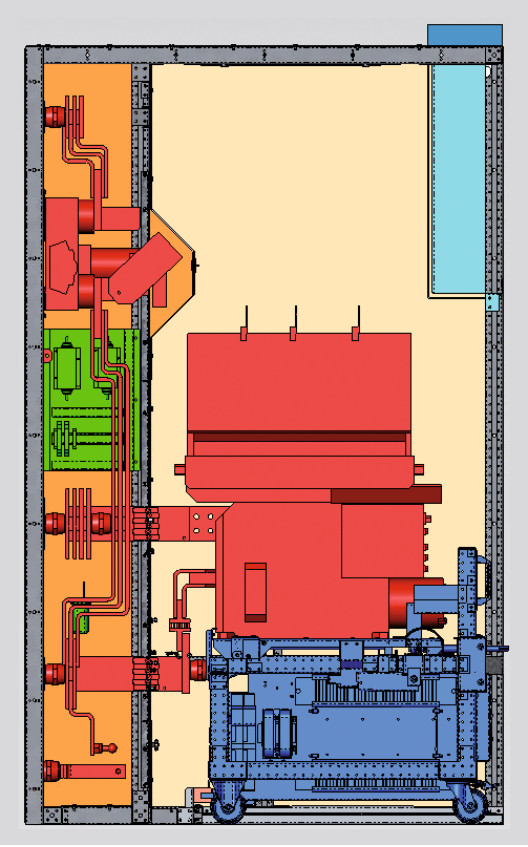
- Line feeder panel
- Bypass feeder panel
- Circuit breaker incomer panel

Container Unterwerk ViP Potsdam

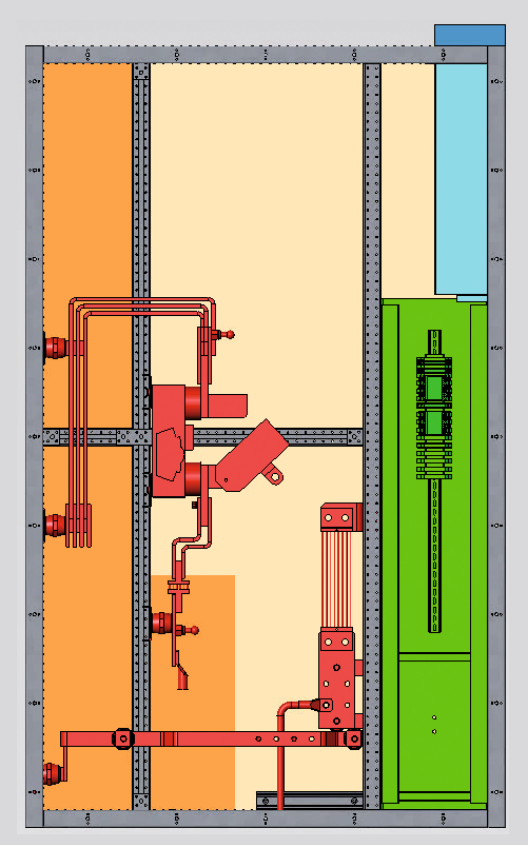
The switchgear panels are bolted to each other on-site. The panels are suitable for free-standing installation and also close to the walls. Other modules for a complete substation, for example the TracFeed® TRx rectifier, are taken into account in the design and can be integrated as requested without great effort.

Here: an example of the circuit breaker panels for:

- Incomer panel
- Negative return panel
- Combined incomer and negative return feeder panel



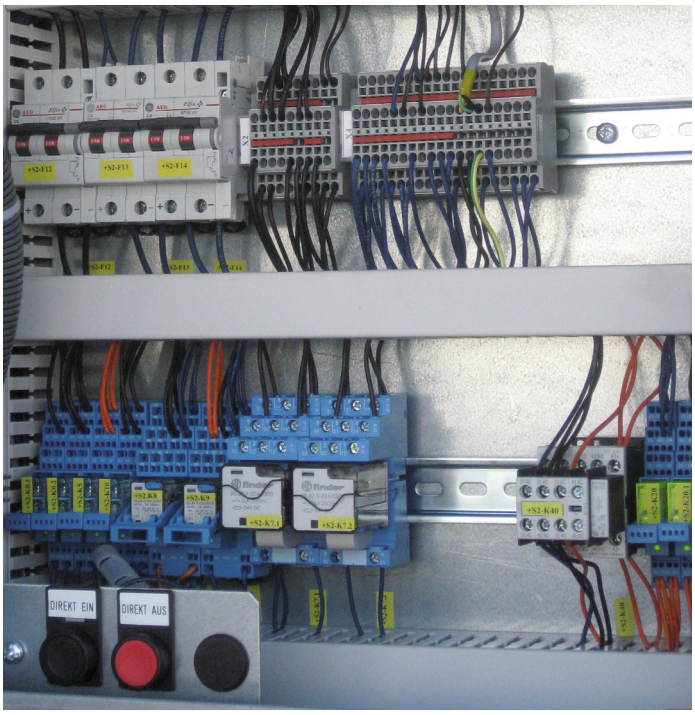
breaker panel



disconnector panel

Your command centre: the control and protection compartment

The control and protection compartment is incorporated into the upper part of the switchgear panel. It is accessible via a separate door to which we attach the digital TracFeed® DCP3 multifunctional device so that it is accessible from the front. This makes it easier for you to operate the device and thus also the switchgear panel.



Control and protection compartment of a circuit breaker panel

The control and protection compartment also contains the required miniature circuit breakers, relays and terminals. The control and protection compartment and power compartment are partitioned from each other. Isolating transducer and voltage converters ensure the electrical isolation between the nominal voltage of the railway power supply and the secondary components. These are also located outside the control and protection compartment.

Interconnection wiring duct

The interconnection wiring duct is a large cable duct for the panel-to-panel connection of the interconnection, control and bus lines. Designed as a metal duct, it is mounted on the top of the control and protection compartment. Due to a large opening in the control and protection compartment with a sliding access opening, easy wiring during the panel installation and accessibility during work are ensured. The interconnection wiring duct also functions as a front panel for the switchgear panel labelling.

Busbar compartment

The main busbar is arranged in the rear area of the panel. The bypass busbar is located in the area above the main busbar.

Cable connection compartment

This part of the switchgear panel contains the cable connection plate for convenient connection of the power cables by technical specialist personnel.

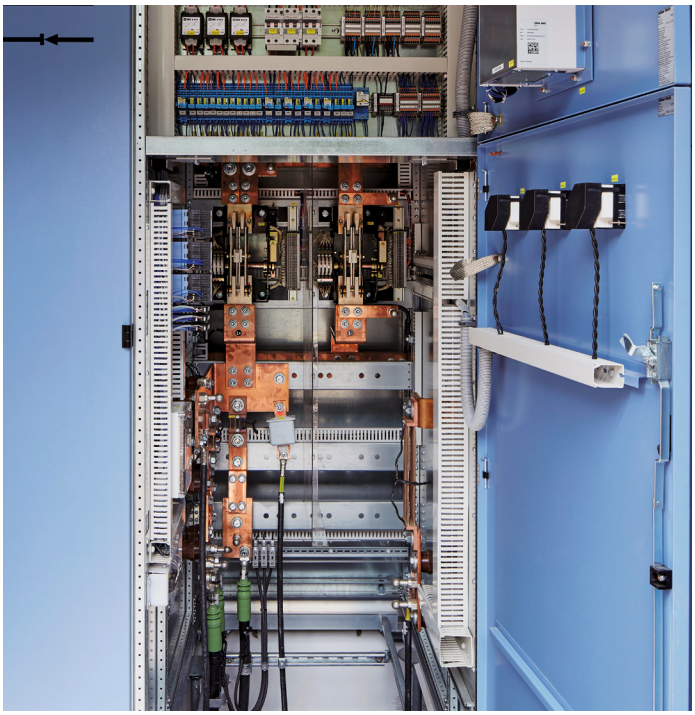
Overview of the components of the power compartment

Circuit breaker panel

A central element of the power compartment is the circuit breaker truck with circuit breaker and components for line current measurement and line testing. This functional unit is segregated from other compartments of the panel and separated from the busbar compartment with a shutter.

Disconnector panel

The disconnectors are installed in this panel in the power compartment. Available isolating transducers are installed in the front area where necessary. Frame leakage protection is typically installed in the incomer disconnector panel.



Power compartment of a combiend incomer and negative return feeder panel

The variants of the circuit breaker panel

We assemble different panel versions from the modular system in accordance with your specification:

- Line feeder panel
- Bypass feeder panel
- Incomer circuit breaker panel

Furthermore, you decide on the type of circuit breaker and the required current rating. You select the optional available functions to meet your individual requirements.

Functionality of the circuit breaker panel

The circuit breaker is used for energising and de-energising the feeder sections without limitation. The circuit breaker's direct overcurrent release (as the main protection), together with various aditional protection devices, takes over the protection of the operating equipment.

Circuit breaker truck

The circuit breaker truck is inserted into the power compartment and firmly locked in the panel using four locking bolts. The withdrawal interlocking prevents the switchgear truck from being pulled out when it is still in the service position. The circuit breaker can easily be put into the disconnected/ test position or the service position using a circuit breaker truck handle on a sledge (device carrier). This is possible irrespective of the current position of the circuit breaker truck. The switching status of the circuit breaker and the positions of circuit breaker truck and sledge can also be recognised through a window in the power compartment door, at any time, from the outside.

Line current measurement

The line current is measured by a shunt and the signal is transformed by an isolating transducer. The TracFeed® DCP3 receives a potential-separated signal for evaluation. The arrangement on the circuit breaker truck provides convenient maintenance access.

Line test

An automatic line test is available for the reliable activation of line sections. This line test equipment is installed in the lower area of the circuit breaker truck.

Safety

Interlocking of truck removal prevents the insertion or removal of the circuit breaker sledge with the truck if the circuit breaker is in the service position. There is also forced tripping which switches off a closed circuit breaker if it leaves the service or test position.

Depending on the customers request additional optionally available interlocks prevent unauthorised operation and switching actions.

If the circuit breaker is in the test position, its main contacts are safely isolated from the busbar and cable compartment. If you remove the circuit breaker truck from the switchgear panel it can be moved easily on steerable castors.

Shutter & touch protection

The closed shutter system ensures the IP 30 degree of protection and prevents access to live components in the busbar compartment. Due to the transparent shutter system, service technicians can make visual inspections of the busbars and the fixed main contacts without switching off the busbar. The shutter can also easily be removed for fast and efficient maintenance and repair.

View of the circuit breaker panel – power compartment in the foreground, behind: the shutter of the busbar and cable connection compartment

The rear area of the panel contains the voltage transducers and the optional cable supervision device. Separate test sockets and jumpers for error localisation and cable test are also available.

Circuit breaker

When selecting your circuit breaker panel, you also have the option between a version with bypass functionality or a cable disconnector. You can choose between the following makes of circuit breaker:

- GE – Gerapid 2607 / 4207 / 6007
- Sécheron – UR 26 / UR 40 / UR 46

Switchgear panel

Depending on the space available and your requirements, you choose only the compact 500 mm wide circuit breaker panel or the additional 300 mm wide cable connectionpanel. The cable connection compartment enables safe and convenient maintenance and repair and, as a further option, the installation of cable disconnectors. The circuit breaker truck remains in the panel for the actuation of these cable disconnectors.

Operation: direct ON/OFF

In each control and protection compartment of a circuit breaker panel you have the directly wired ON and OFF button for the control of the circuit breaker. An interface for a cable-remote control is implemented as standard. In addition, we offer an optional step switch to manually select the TracFeed® DCP3 protection groups.

Circuit breaker truck with GE Gerapid DC high speed circuit breaker

Circuit breaker truck with Sécheron UR DC high speed circuit breaker

The variants of the disconnector panel

Similar to the circuit breaker panel, you can select from several variants of disconnector panels and you may expand it according your specific requirements.

We supply the following variants:

- Incomer panel
- Negative return panel
- Combined incomer/negative return panel

Functionality of the disconnector panel

Incomer disconnector panels are used for the connection and disconnection of a rectifier to/from the main busbar.

Negative return panels are used for the connection and disconnection from the return busbar.

The disconnectors are installed in the power compartment and various actuation variants can be selected. Actuation is performed automatically using a motor drive, or manually using a pulling eye and operating rod.

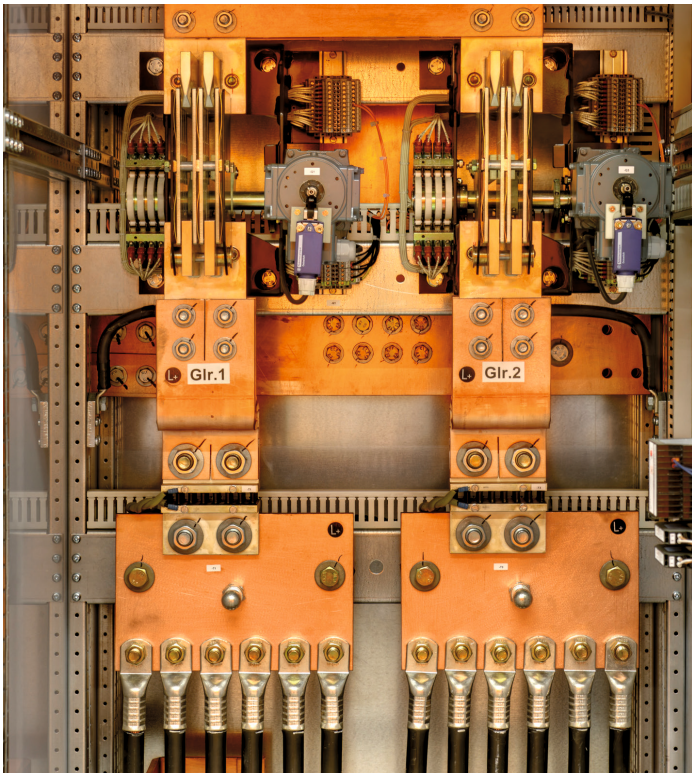
Interlocking and switchgear protection

The disconnectors are electromechanically interlocked with other switchgear for protection against switching errors. Optionally, we can also combine them with key interlocks. The operating sequence is strictly predefined as standard.

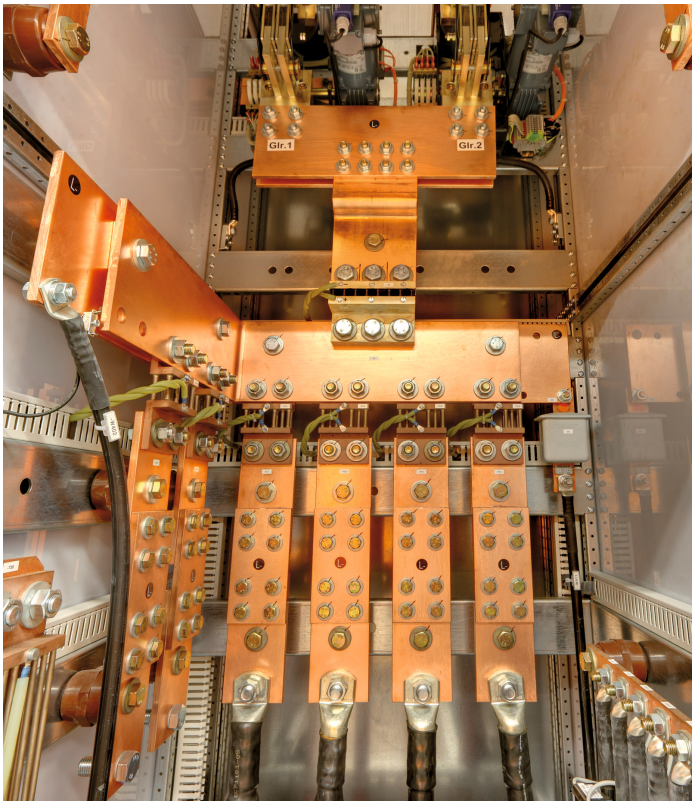
The interlocking of a negative return disconnector ensures that it can only be actuated if the associated medium voltage circuit breaker is switched off and the incomer disconnector is open.

Measurement

The rectifier current and voltage measurement are typically incorporated into the incomer panel. The frame leakage protection ensures the protection of the DC switchgear installation. In this configuration, the Trac-Feed® DCP3 multifunctional device installed in the incomer panel takes over the protection and control functions. In the negative return feeder panel, individual current indications are available on the door.



Incomer disconnector panel – the connection between rectifier and main busbar



Negative return disconnector panel – the connection between track and rectifier

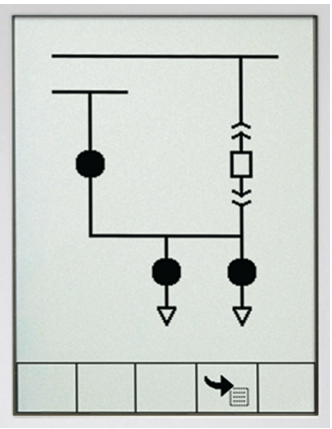
TracFeed® DCP3 – Funktions for the switchgear panels

The primary task of the DC switchgear as part of the traction power supply is feeding the traction energy to the catenary system. The contact line system here is subdivided into feeder sections. This enables selective protection of the individual line sections. Rail Power Systems uses the multifunctional devices of the TracFeed® DCP3 device family for all tasks concerning the protection of the lines and switchgear panels and for control and communication.

Convenient display and operation

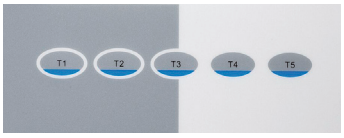
With its large display, the TracFeed® DCP3 visually presents all available information clearly. A graphic display shows a mimic diagram of the switching devices, which can also be selected and operated. Plain text displays can be called up using context-sensitive buttons, e.g. settings, measured values, event logs.

The coloured indicator lamps for display-independent signalling of major signals have proven their efficiency over years of application. Assignment and colour (red or green) of the LEDs can be set freely and adapted to your specific operating requirements.



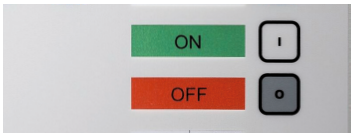
Context-sensitive menu buttons

Ergonomically arranged under the display, these buttons help you to navigate effortlessly in the menu and the function settings. In doing so, their functionality is constantly adapted to the menu context.



Raised switching command buttons

These are important for switching the electrically actuated switching devices of a DC switchgear panel on and off. We have also paid great attention to their distinctive design.



Protection functions – just in case

The TracFeed® DCP3 protects your operating equipment using various protective functions operating simultaneously. These range from short circuit protection in the millisecond range to overload protection in the hour range.

Always safely interlocked

Interlocking functions ensure reliable prevention of impermissible switching commands. This applies to all switching devices which are controlled by the TracFeed® DCP3.

Control functions

Control functions make it possible to reliably detect and execute the switching commands for electrically operated switching devices. In addition to the local control of a DC switchgear panel, remote control of the switching devices can also be performed easily. The integrated key switch enables the changeover between local control and remote control.

Compact
DC switchgear panels

Realised TracFeed® TDx-L, two constructions

TracFeed® TDx-Light: our extended product line allows you to switch effectively, even when space is limited

Every day, thousand of switchgear panels of the TracFeed® TDx product line prove their reliability. This consistent reliability has been incorporated into our line development efforts to produce a smaller version: the TracFeed® TDx-L.

Features of the TracFeed® TDx-L:

- Shorter panel depth of 1.20 m
- Optimised design for lower power range
- Two-pole panel version, e.g. for Trolleybus or People-Mover

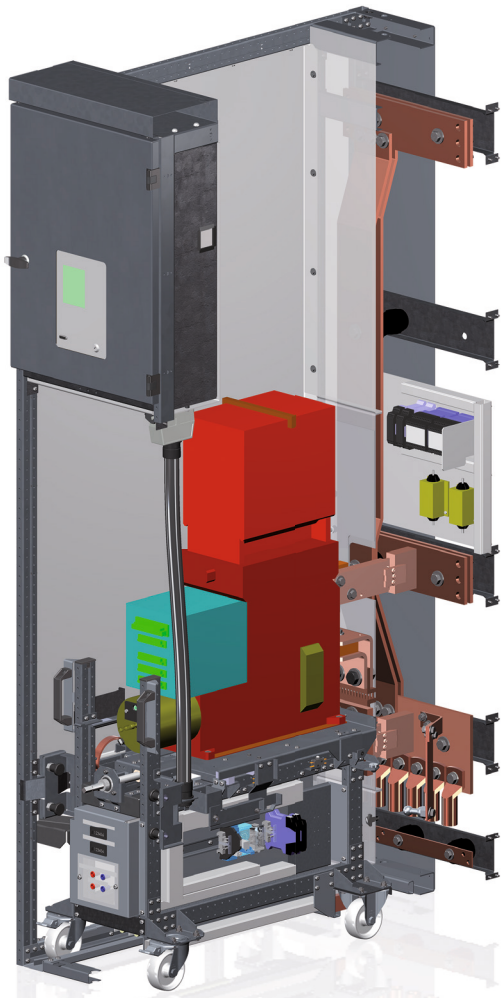
The platform concept offers various switchgear panel types:

- With TracFeed® TDx, compact panel depths of 1.35 m and the highest current values are possible
- With TracFeed® TDx-L, field depths of 1.20 m and an optimised design for a lower power range are possible.

The appropriate rectifiers for these panel types are available within the TracFeed® TRx product line. The platform concept introduced with the TracFeed® TDx has been expanded with the addition of a smaller version: the TracFeed® TDx-L. With the TracFeed® TDx-L product line, you will find circuit breaker panels as well as disconnector panels in the most commonly used variants. Due to reduced panel depth of 1.20 m of the TracFeed® TDx-L it allows assembly of switchboards that can be perfectly integrated in retrofit projects and new projects with spatial constraints.

All the tried and tested features of the basic platform-remain unchanged:

- Maintenance-friendly circuit breaker trucks equipped with line current measurement, line test circuit (optional)
- Bypass disconnector (optional) in a 500 mm wide circuit breaker panel
- Cable connection in the circuit breaker panel or with additional cable connection panel
- Disconnected position of the circuit breaker truck with door and shutter closed. As a result, the operator is protected at all times
- Type-tested switchgear panels



TracFeed® TDx-L Circuit breaker panel

Dresden, Germany

Dublin, Ireland

RPS/EN/406/0824

The specifications set out in this document apply to conventional applications. They do not represent performance limits. This means that divergent specifications may be attained in specific applications. The contractually agreed specifications alone shall apply. We reserve the right to effect technical modifications.

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