

# TracFeed® DCP2

English



Multifunctional Device  
for Control and Protection in DC switchgear

## TracFeed® DCP

### Our well-known brand name

**TracFeed® DCP is a well-known brand name for reliable control and protection technology in DC switchgear systems designed for DC railways. The product portfolio includes a complete range of standardised digital protection relays and combined protection and control devices for a wide range of DC traction power supply applications.**

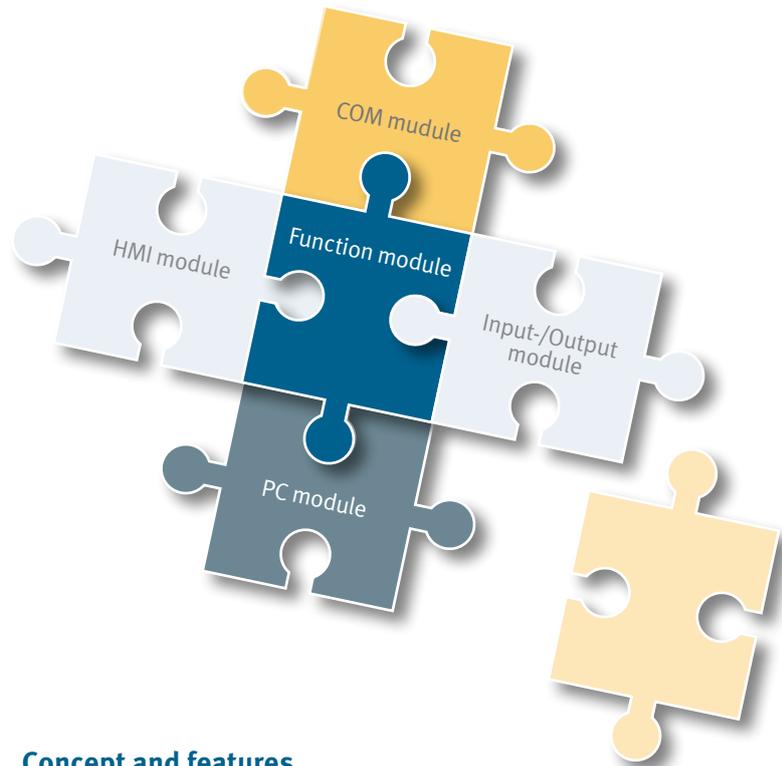
Thousands of these devices operate around-the-clock all over the world as individual devices in conventional systems, or as components in combined solutions for protection, control and communication in complex switchgear and substation control systems.

Profiting from many years of experience, the product portfolio has been innovated through the systematic development of the hardware, plus the integration of established technologies used in other public utility power supply sectors.

A family of multifunctional TracFeed® DCP2 devices has been designed to satisfy the requirements for a universal application for the the performance of control and protection tasks.

To complement the control and protection functions, additional functions from conventional DC switchgear panels have also been integrated.

The multifunctional TracFeed® DCP2 devices allow compact and intelligent solutions for DC switchgear panels to be developed with clear economic benefits for the entire DC switchgear system, with additional customer benefits when combined with TracFeed® LD/HD switchgear in particular.



### Concept and features

The range of multifunctional TracFeed® DCP2 devices for use in DC switchgear panels is based on a modern and powerful system platform with different models.



Metro do Porto, Portugal



Dublin, Ireland



Shanghai, China

## SYSTEM STRUCTURE

**Optimised for rail-specific requirements, the system platform has been created by matching individual modules, with each module being designed to perform a specific sub-function:**

### Input/Output module

The input/output module for connection of the auxiliary signals from the DC switchgear panel are of the heavy-duty type. These are designed for a rough railway environment and support industrial standard analogue signals to measure current and voltage values, binary inputs to monitor position indicators, and binary outputs to control electrically operated switching devices.

### Function module

Both the rail-specific functions and secondary functions of a DC switchgear panel are performed by a high-performance function module.

This module provides digital processing of all functions, including measuring analogue values, controlling the switching operations with interlockings and further rail-specific protection and control functions using special software algorithms.

### HMI module

Display of measured data, the control of electrically operated switching devices and the local configuration of functions are performed by a Human/Machine Interface (HMI) module. In addition to the keypad, indicator lamps and a full-graphical display are also available. The positioning and design of the individual elements has been chosen to ensure that they can be accessed quickly and provide an easily comprehensible overview of the status of the relevant DC switchgear panel.

### PC module

PC-based tasks, such as fault analysis, file storage of all settings and the printout of formatted data or export to other applications are performed by the PC module. The front-side PC interface and standardised IT connections form the communication infrastructure.

Using a commercially-available PC or laptop, all data can be displayed and accessed in a convenient, user-friendly form in line with the well known Windows environment.

### COM module

Serial communications with a substation control system or with other system and components are achieved via an optional communication module. A modular structure is used for the communications module. Different protocols can be implemented by using specific communication modules.



São Paulo Metroline 5, Brazil



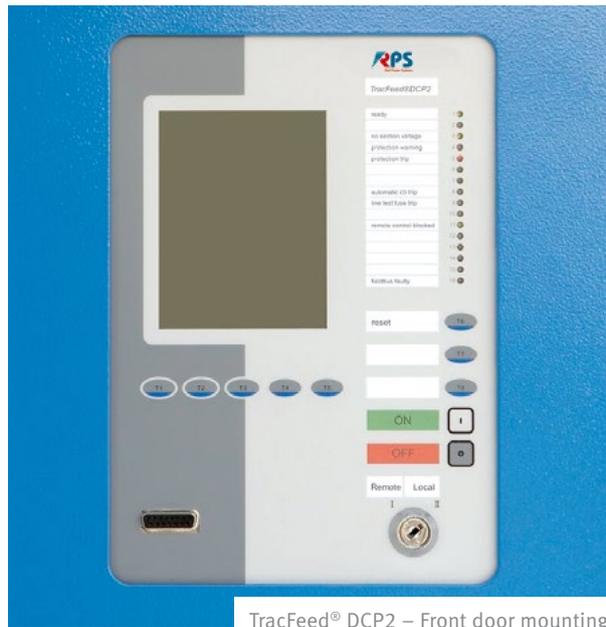
Dresden, Germany



## COMPACT DESIGN

The main feature of the multifunctional TracFeed® DCP2 device is the integration of functions of a large number of different individual devices into one single unit. All components are included in one compact single housing: from the I/O peripheral, user operation and display unit down to the standardised communications interface. The reduction of different devices and the associated wiring has resulted in a comprehensible and much simplified design of the control compartments and has also increased the availability of the DC switchgear panel.

This proven design, similar to that of the TracFeed® DCP1x6 devices, guarantees exchangeability and installation compatibility.



TracFeed® DCP2 – Front door mounting

## STANDARDISED DESIGN

As a result of the large variety of functions and the wide range of devices available, TracFeed® DCP2 devices can be used for many applications, such as line feeder panels, bus coupler panels or infeed panels.

Regardless of the various requirements for switchgear panels, the entire range of TracFeed® DCP2 devices maintains a standardised design, including identical dimensions, a standard installation procedure, and the same type of electrical connection technology.

This degree of consistency within the TracFeed® DCP2 family provides simplified engineering during the design stage and offers potential for fast installation and commissioning.

## INTUITIVE, MENU-SUPPORTED OPERATION

An integral part of each TracFeed® DCP2 device is the front-side control panel. The core element of the user-friendly operating concept is the use of menu-supported display and control tasks.

Context-sensitive menu keys provide fast and intuitive operation. Passwords guard against unintentional or unauthorised changes.

The system is the same for all device functions, from the display of a measured value to the control of electrically operated switching devices. All this is applicable to the entire range of TracFeed® DCP2 devices.



TracFeed® DCP 1x6 – Back plate mounting



TracFeed® DCP2 – Replacement in existing switchgear panel

## CONNECTING SYSTEM

Installation-friendly plug-in terminals are used for the connection of all electrical auxiliary signals running from a DC switchgear panel.

The systematic usage of standardised signal levels and the use of compatible plug-in terminals leads to system-wide uniformity within both the ranges of the TracFeed® DCP2 and TracFeed® DCP1x6 devices.

This is decisive for the sustainable operation of DC switchgear panels. Even today, it is possible to perform DC switchgear panel retrofits, replacements or upgrades – replacing TracFeed® DCP1x6 devices with TracFeed® DCP2 equipment – with a minimum of effort.



## FUNCTIONS

Today, modern DC railways place high demands on the reliability of the power supply and need reliable, high-performance DC switchgear. In addition to energy distribution on the primary side, DC switchgear panels perform numerous secondary functions and are designed for different customer-specific requirements.

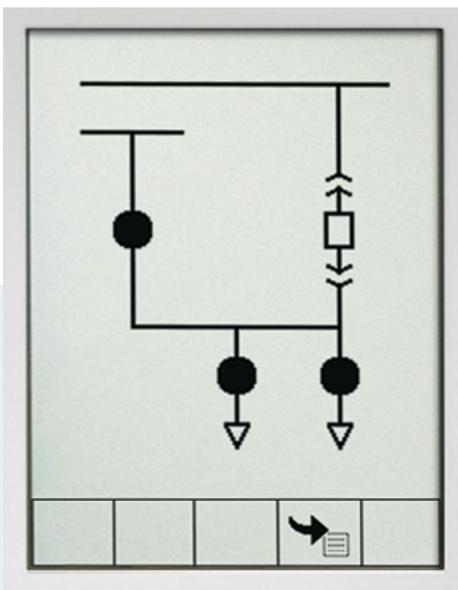
TracFeed® DCP2 devices feature a wide range of functions. The essential secondary functions of a DC switchgear panel can be performed using one single device.

### Protection functions

Protection functions guarantee the highest standards of personnel and system safety. Prioritised protection algorithms ensure short response times in case of faults. This reduces the stress and the resulting effects on the installed equipment in the DC switchgear panel and adjacent components.

### Control functions

Control functions are used to reliably identify and carry out switching commands for electrically operated switching devices. Remote control of the switching devices is certainly possible beyond the local switching commands of a DC switchgear panel, e. g. via a control system. The integrated key-switch provides the possibility of selecting either local control or remote control.



### Interlocking functions

Interlocking functions prevent unauthorised switching modes when more than one switching device is in use in a DC switchgear panel. Cross-panel interlocking is also possible.

### Measuring and monitoring functions

Knowledge of the current status of the installed equipment is decisive for a reliable power supply. It is used to initiate preventive measures or to minimize downtime in case of a fault.

For this purpose, measurement functions are used to monitor the key values on the power side, such as voltage and current. These primary values are displayed continuously.

To supplement the direct measured value, additional calculated values for more detailed monitoring purposes, plus automatic test sequences, are also available.



## Indication and control functionality

Based on the integration concept for secondary functions, the integrated display is also used to show the mimic diagram of the DC switchgear panel. This includes the current position for all switching devices. Switching commands can also be issued using integrated specific switching command keys for ON/OFF.

## Configuration functions

The essential functions of a DC switchgear panel are carried out by the TracFeed® DCP2 as a large number of individual base function. These can be modified to meet the numerous requirements of the various operating conditions and the customer's specific operating philosophy. The functional behaviour can be individually specified within a range, without adversely affecting reliability, by entering set values.

The functional behaviour can be set via the menu or the integrated control panel.

The versatility of the individual functions allows the use of TracFeed® DCP2 devices in various DC switchgear panel types.



## Archiving functions

### Event list

Important events in a DC switchgear panel are recorded in an event list. Changes in the status of the switching devices or the tripping by a protection function are recorded with a time stamp and stored in a non-volatile memory. Individual events can be viewed in chronological order on the display.

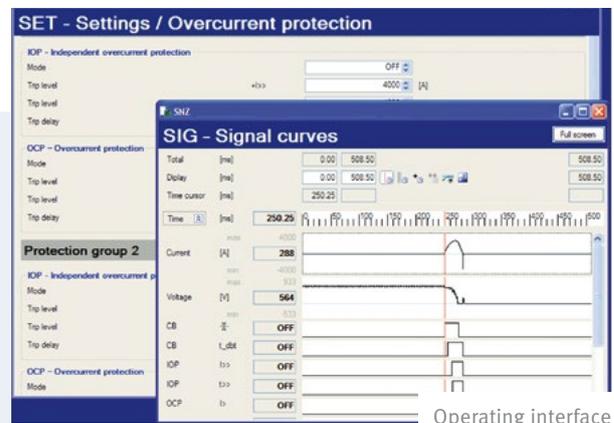
### Event recording

Event recording offers the possibility of recording the response and tripping behaviour of protective functions over a limited period of time. For analysis purposes, in addition to the time stamp, the progress of the fault is recorded, including the sequence of events before and after the fault.

The event recordings are stored in a non-volatile memory and can be transferred via the front-side PC interface to a laptop or via the COM interface to the substation control system.

### Event counting

The frequency of protective tripping events or the operation of switching devices is recorded using event counter. These are stored in non-volatile memory and can be reset.

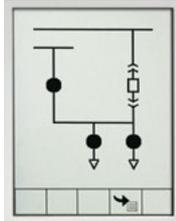


Operating interface



## INDICATION AND OPERATION

Clarity, ergonomic design and easy operation are important prerequisites for a user interface to ensure safe and reliable access to the many functions. The TracFeed® DCP2 device provides an integrated front panel as standard, incorporating the following elements:



**Large LC-display** with backlight for the graphical indication of the mimic diagram and the switching devices in the DC switchgear panel. Other information appears in plain text, such as settings, measured data, event logs and menu control.



**Context-sensitive menu keys** below the LC-display are designed to allow the user to navigate through the menus and to configure the functions of the TracFeed® DCP2 devices. The functionality of the menu keys always matches the content of the currently active menu window.



**Integrated key-switch** to provide access authorisation for the switching commands, e.g. to select between local and remote control.



**Highlighted control keys** to operate the switching devices of a DC switchgear panel.



**Freely configurable function keys** for frequently used functions or commands: can be adapted to the customer's specific requirements.



**Coloured indication lamps** display critical alarms independent of the menu currently on display. Both the type of signal and the colour (red/green) of the signal lamps are user-defined to ensure they match the operating conditions.



**Individual text labels** for all signal lamps, keys and key-switch. The label can be easily replaced and modified to meet the changing operation conditions and languages.

## COMMUNICATION

High performance communication links are required for timely information on the current status of a DC switchgear panel available or to easily obtain fault data from such a panel.

In terms of serial communication, the TracFeed® DCP2 device offers a wide range of options.

Each TracFeed® DCP2 device is equipped with an easily accessible serial interface on the front panel as standard. TracFeed® DIALOG, the well-known and user-friendly software tool designed to perform diagnostics and configurations for the TracFeed® DCP1x6 family devices, has now been further developed to meet the more advanced requirements of the TracFeed® DCP2 device. TracFeed® DIALOG XT is designed to support the user during configuration and commissioning, but also for analysis and evaluation purposes during normal operation and in case of faults. Using a PC or laptop, it is possible to connect up devices from both the TracFeed® DCP2 and the TracFeed® DCP1x6 family via serial interface.

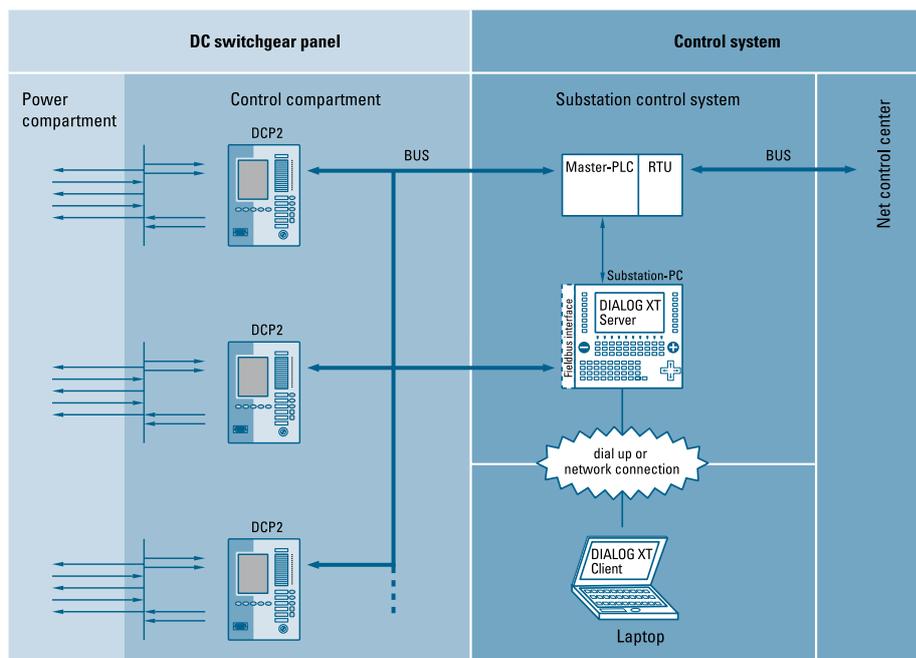
Functions such as fault analysis, saving all settings to files and the printout of formatted data or export to other PC applications are performed with only one software tool.

Based on a client/server model for communication tasks, TracFeed® DIALOG XT can also be integrated into the substation control system.

All TracFeed® DCP2 devices are designed to incorporate up to 2 serial interfaces, e.g. for connection to a substation control system. Local requirements and different standards used in the area of industrial and energy automation require a wide range of different communications protocols.

In the case of TracFeed® DCP2 devices, these requirements are taken into account by means of protocol-specific communication modules. This modular concept is specifically designed to allow communication protocols to be replaced or added at a later date.

With this concept it will be possible to modify the TracFeed® DCP2 device to comply with the changing global communications infrastructure, e.g. when increasing use is made of Ethernet-based standards such as IEC61850 in public energy supply systems in the years to come.



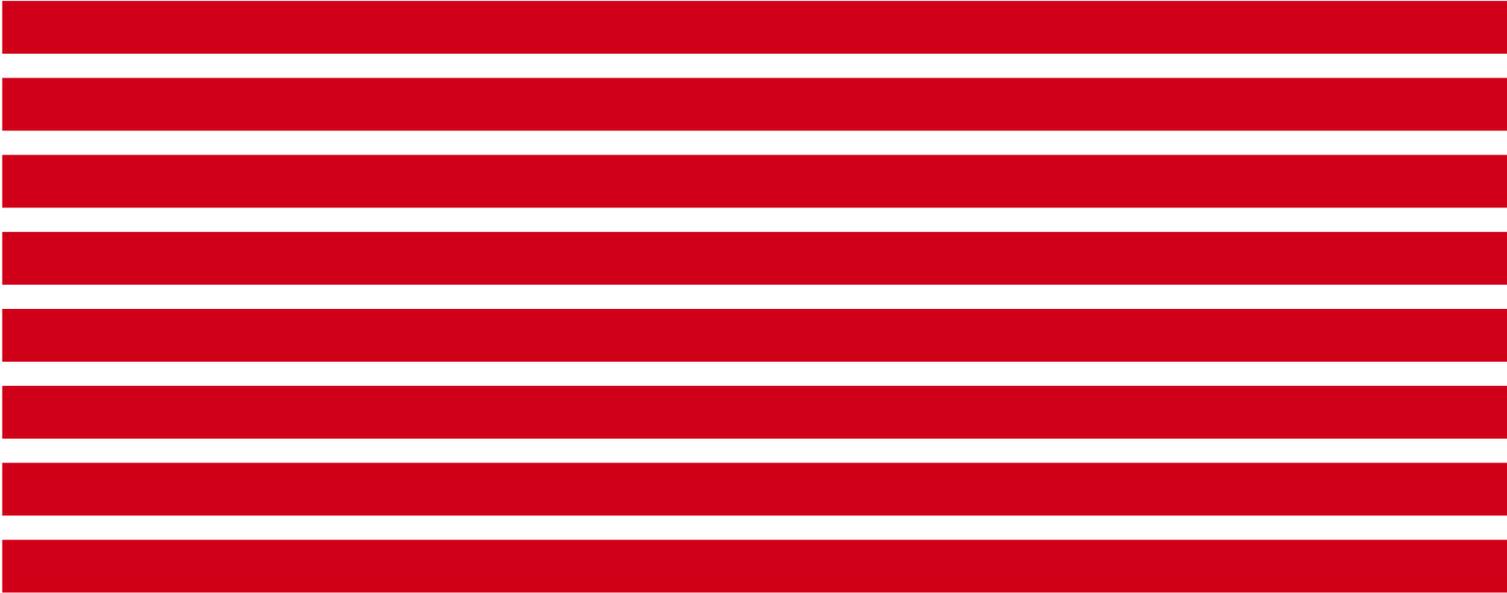


## Technical data

<b>Dimensions</b>		265 x 185 x 120 mm (H x W x D)
<b>Model</b>	Housing	Compact housing for installation in the control compartment of a switchgear panel
	Installation	- Front door mounting - Mounting on back plate
<b>Weight</b>	approx. 5.0 kg	
<b>Degree of protection</b>	IP 20 unit (back panel) IP 54 front-side (optional)	
<b>Climatic conditions</b>	Operation	0 to +50° Celsius
	Storage and transport	-20 to +70° Celsius
<b>Power Supply</b>	24 ... 110 VDC	
<b>Inputs/outputs</b>	Terminal -X1	07 Binary inputs (24 to 110 VDC) 10 Binary outputs (24 to 110 VDC) 02 Analogue inputs (20 mA)
	Terminal -X2	24 Binary inputs (24 VDC) 12 Binary outputs (24 VDC) 03 Analogue inputs (20 mA)
<b>Connections</b>	Spring type/plug-in terminals (0,25 to 2,5 mm <sup>2</sup> )	
<b>Interfaces</b>	Local operation	WVGA Graphics display 05 Menu keys 02 Control keys 03 Function keys (freely configurable) 16 Signal lamps red/green (partially configurable) 01 Key switch
	PC interface	15-pin subminiature D-type socket (DIN 41652)
	COM interface	9-pin subminiature D-type or RJ45 socket depending on communications protocol
<b>Electrical tests</b>	Dielectric test	EN 61010
	EMC tests	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 55022

MODULAR, COST-EFFECTIVE AND  
INDIVIDUAL TO MEET YOUR SPECIFIC  
REQUIREMENTS:  
WE PROVIDE SYSTEMATIC SOLUTIONS





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