becker® MINING SYSTEMS

DTS

Disconnecting Transformation Sled

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Maximum safety and efficiency in a compact system – The Disconnecting Transformation Sled (DTS) integrates Becker's latest safety, transformation, and power distribution technologies into a robust, modular unit.

The DTS combines the **ARCGUARD®**, the **DURATRANS™** Transformer, and the **Compact Station 4000 Series** into a space-saving solution designed specifically for underground applications. This modular and adaptable design optimizes power distribution, maximizes safety, and simplifies maintenance. Thanks to its well-thought-out design, the DTS is easy to transport into mine shafts and can be serviced on-site.

- ANSI/IEEE C37.20.7 and CSA C22.2 standards compliance ensures maximum safety
- **ARCGUARD®** eliminates dangerous arcs through advanced cooling paths
- 15% improved thermal performance over traditional transformers
- Dual input power with TX Feedthrough
- Modular design allows quick lateral transformer replacement underground
- Electrically retractable and extendable Plug-In Contactors for seamless operation
- Universal slots for various Plug-In Contactors, ensuring high adaptability
- Remote monitoring via operation center PC, tablet, or smartphone
- Designed for vertical and horizontal lifting (slinging) in mine shafts

How it Works

The DTS is a compact and highly secure power distribution system designed for demanding underground applications. **ARCGUARD®** actively protects against dangerous arcs by directing them through cooling paths, ensuring system integrity and personnel safety. The **DURATRANS™** Transformer provides reliable voltage conversion, built to withstand extreme mining conditions, while the **ENDIS Compact Station 4000 Series** delivers robust power distribution with an advanced integrated HMI.

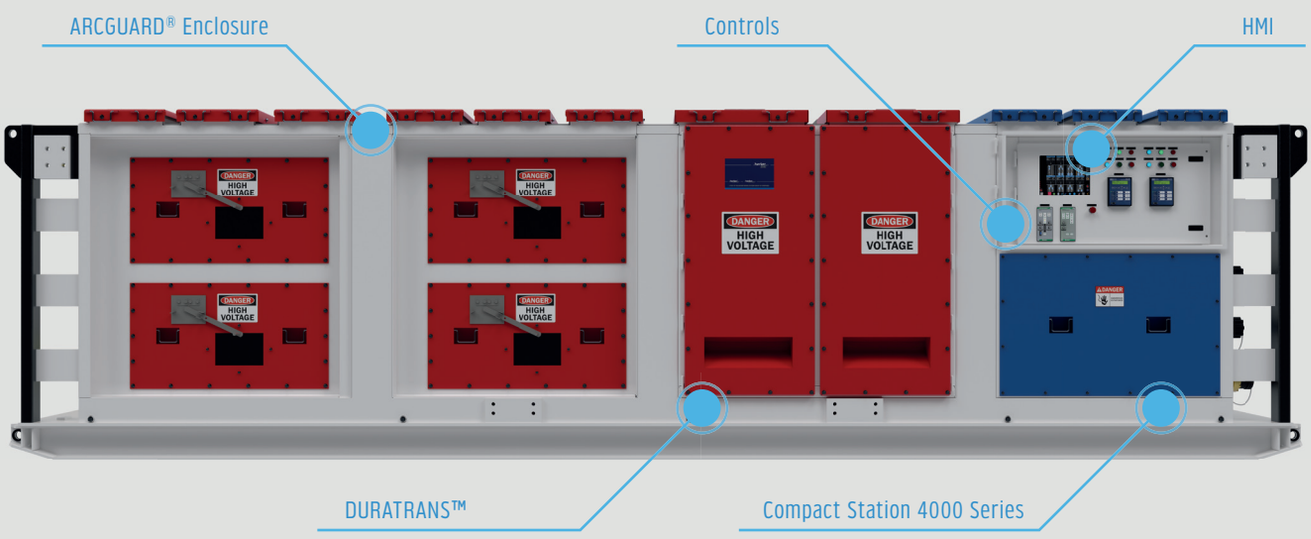
The DTS is fully networked, allowing for both local and remote control. Operators can monitor and manage the system directly via the Human Machine Interface (HMI) or remotely through an operation center PC, tablet, or smartphone, ensuring seamless oversight from virtually anywhere.

With its modular construction, the DTS is easy to install and maintain. The **DURATRANS™** Transformer follows a modular replacement principle, enabling quick lateral removal for underground servicing without disassembling the entire unit. The system is currently deployed in mining panels, supplying power to Monorail systems running for extended periods. Designed for efficiency, the entire DTS can be relocated as mining operations progress, ensuring continuous power availability and operational flexibility.

Highest Safety Standards

ARCGUARD® protects against arc flash potential by eliminating the energy directing it through cooling paths which are orientated away from mine personnel. Mechanical interlocks prevent access and compartment arc flash monitoring ensure a secure operating environment. Viewing windows ensure correct operation of auto-grounded disconnecting switches including live voltage indicator lights.

The DTS features centralized management of operating parameters via the HMI, eliminating the need for local adjustments on the contactor modules. This tamper-proof design significantly enhances operational safety. Additionally, customizable user profiles with role management can be configured based on operator expertise.



Numerous integrated monitoring functions within the electronic components of the plug-in contactors provide comprehensive system oversight. Instead of conventional screw terminal connections commonly used in traditional solutions, our proven Plug-In-Technology is implemented, effectively preventing wiring errors during installation and ensuring a secure and reliable connection. Emergency stop circuits are designed for safe shutdown, with the option to configure additional emergency stop circuits that can be linked to specific outgoing circuits.

The isolator switch function is incorporated into the slide-in and slide-out mechanism of the plug-in contactors, ensuring a secure disconnection of outgoing voltage. Furthermore, the main circuit breaker's outgoing line is equipped with an earthing mechanism that grounds the outgoing circuits. A visible disconnector provides a direct view of the main circuit breaker's contact points, enhancing safety.

Easy Maintenance

Special attention has been given to ensuring that the DTS does not need to be removed from the mine for maintenance or repairs, significantly reducing downtime and maintenance costs. Its modular design and strategic component accessibility enable quick, efficient servicing while maintaining system integrity and operational efficiency.

The transformer can be accessed via the side doors, allowing on-site replacement without the need to transport the entire DTS out of the mine.

Thanks to the easy-to-use HMI, each plug-in unit can be read out centrally via touchscreen or remotely via PC, tablet or smartphone. The plug-in units are easily accessible and can be replaced quickly if necessary.

The innovative design of the DTS enhances efficiency, significantly reducing both downtime and operational costs.

Flexible Power Distribution & Dual Input TX Through Feed

Dual power inputs can provide flexible Mine design. Key interlocking systems allow for safe switching and alteration between different input voltages. Feedthrough protected by vacuum Plug-In Contactors and monitoring relays:

The design envisages a lower voltage input near the shaft. As soon as the project is expanded, a higher voltage will be available. The transformer will then be switched to the higher voltage. This will allow temporary use of the lower voltage and eliminates the need for the extensive replacement of the transformer.

Optimized for Transport

The DTS is specifically designed for easy lowering into a mine shaft. Mechanical features enable both vertical and horizontal lifting (slinging), significantly simplifying transportation and installation.

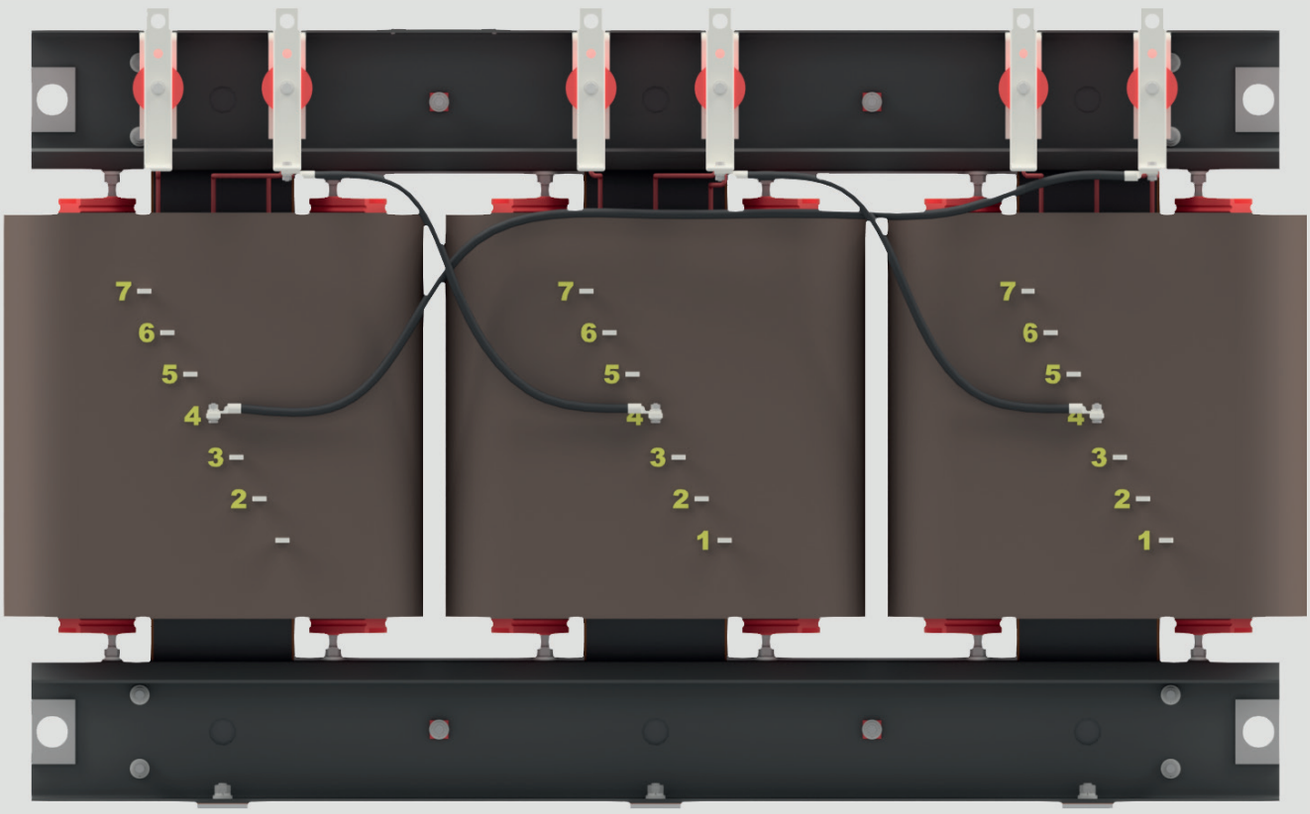
Integrated Components

ARCGUARD® Enclosure

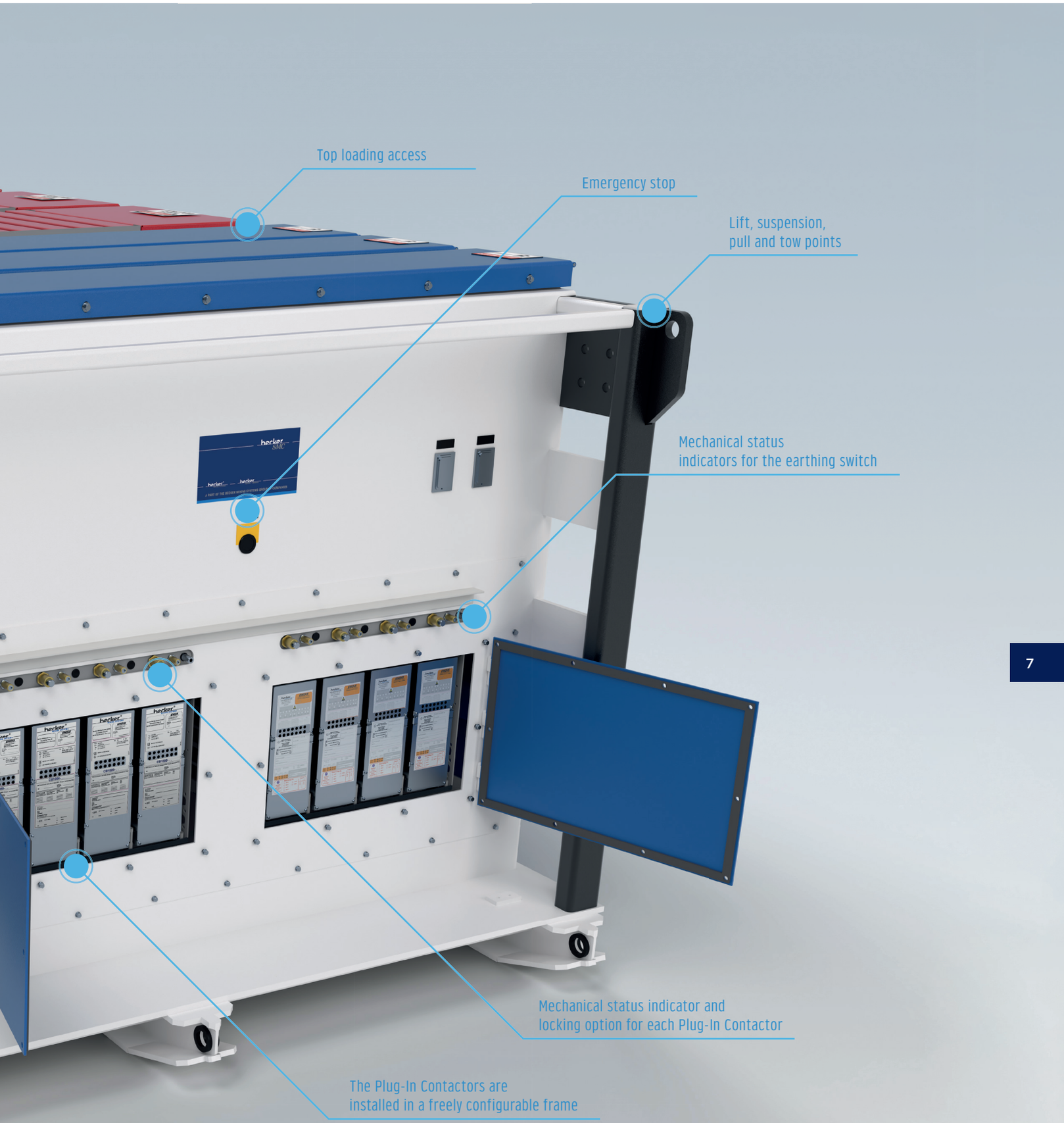
A robust, arc-resistant system designed to enhance electrical safety in mining environments. It effectively manages arc faults by safely releasing expelled gases, extinguishing flames before they exit, and maintaining structural integrity under extreme conditions. This explosion-proof design ensures the highest level of personnel and equipment protection. By complying with ANSI/IEEE C37.20.7 and CSA C22.2 standards, it provides added safety beyond standard MSHA requirements.

DURATRANS™ Transformer

Engineered for demanding mining applications, this dry-type transformer offers 15% improved thermal performance compared to conventional models, effectively managing sudden peak overloads and cyclic loading. Its wound coil design prevents displacement and seals out contaminants, while moisture control and reinforced materials protect against operational stress and environmental factors. The coils' structure enhances mechanical durability, preventing distortions that could lead to failures. With lateral extraction, it can be serviced or replaced on-site without disassembling the entire DTS, minimizing downtime and operational disruptions.



DTS – Disconnecting Transformation Sled


Top loading access
Emergency stop
Lift, suspension,
pull and tow points
Mechanical status
indicators for the earthing switch
Mechanical status indicator and
locking option for each Plug-In Contactor
The Plug-In Contactors are
installed in a freely configurable frame

ENDIS Compact Station 4000 Series

A highly versatile and modular switchgear solution tailored for underground power distribution. Equipped with electrically retractable and extendable Plug-In Contactors, it features automatic plug-in unit recognition and separation, ensuring seamless operation. The system includes built-in arc protection, universal slots for different plug-in units, and interchangeable energy contacts, simplifying maintenance and minimizing downtime. Its advanced modularity allows for easy configuration to meet specific customer requirements and future expansion needs, making it a future-proof investment for underground power distribution.

Contactor Modules

The DTS offers maximum flexibility in power distribution through the integration of various contactor modules, each designed for specific applications. All modules come with integrated control and monitoring electronics, ensuring reliable operation and seamless system integration.

The **Circuit Breaker CB1000** and **High Power Contactor HPC500** are designed for the supply and monitoring of electrical systems and loads. Their compact design includes integrated control and monitoring electronics, also referred to as the protection module, which enhances safety and performance.

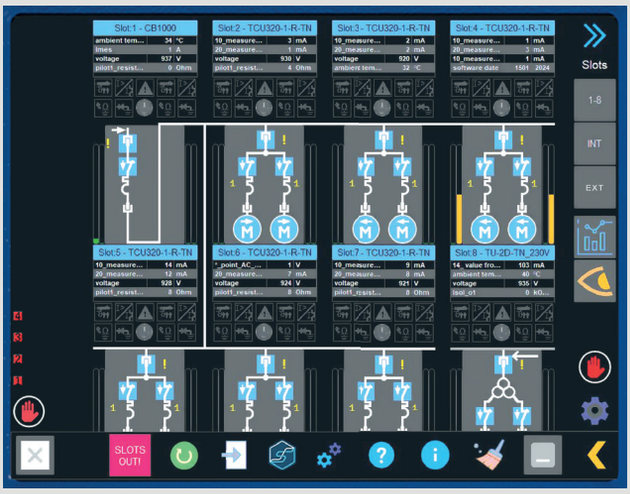
The **Twin Contactor Unit TCU** provides redundant switching functionality, and the **Twin Contactor Drill / Low Power TUD** includes a specialized Lightning Module, intended for supplying and monitoring lighting systems or other auxiliary circuits with rated voltages of up to 230 VAC, in single- or three-phase configurations.

All contactor modules are electrically retractable and extendable, allowing for quick and safe operation. Automatic separation further enhances operational safety, while the plug-in units are automatically recognized, eliminating the need for additional coding or manual configuration.

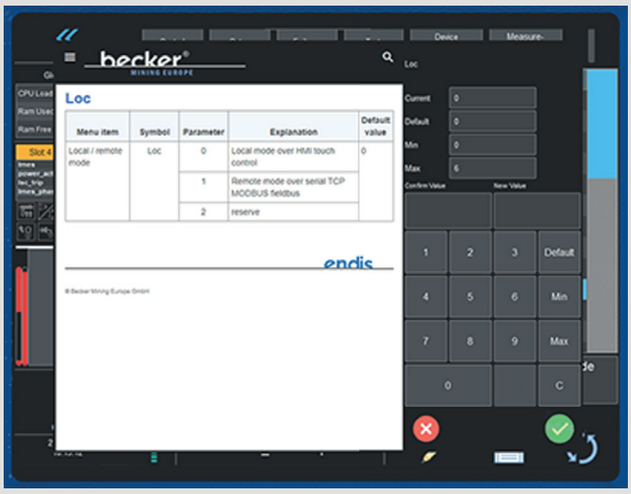
HMI – Human Machine Interface

The HMI provides an intuitive touchscreen display that ensures comprehensive control and monitoring of the system. It offers a clear overview of the switching device and motor outputs, allowing operators to manage and adjust system parameters.

The interface enables switching motor outputs on and off, changing motor rotation direction, and safely disconnecting or grounding individual units.



To ensure secure operation, the HMI also supports role-based access control, granting different permission levels for administrators, engineers, and miners.



Additionally, real-time measurement values can be read out, module parameters can be configured, and faults can be displayed and acknowledged.

Customized Services

We support our customers and partners from initial concept to final commissioning and are also at your side with our customized services. Local subsidiaries and distributors ensure fast service support.

Custom System Designs

Every mine is different, so should a system layout be: From energy supply to communication systems and transport solutions. We analyse all available information to find the best possible solution.

Comprehensive Maintenance & Repair

Not only do we offer year on year support contracts, to keep your operation running - At Becker Mining you can always count on our workshop to overhaul and repair products. No matter how old your products.

Onsite technical assistance

Our technicians can support your team on-site or remotely to get things done right.

Emergency Support

We offer emergency onsite support for our customers. Depending on geographic and travel distance, on-site service can be available as quick as 6 hours.

Technical Trainings & Workshops

With your Becker products you can count on technical trainings for all your staff. Depending on your needs we suggest regular workshop onsite and remote to keep technicians up to speed with your Becker products.

Contact Us

Becker Mining Systems accompanies and supports you from the first moment to find the best solution for your needs.

Send an inquiry and contact a sales representative today – we help you and your company focusing on the essentials.

sales@becker-mining.com

Technical Data

DTS – Disconnecting Transformation Sled	
Ambient Temperature Range	-20 °C - +40 °C
Ingress Protection	NEMA 4 and 5
Supply Voltage	4.16 kV/13.8 kV *
Output Voltage	600 VAC *
Frequency	60 Hz*
Rated Power	500 kVA *
Height x Width x Depth	approx. 2,000 mm x 8,000 mm x 3,000 mm
Weight	approx. 19,000 kg
Touchscreen Size	15"
Touchscreen Resolution	1024 x 768

Plug-In Contactor	CB1000	HPC500	TCU	TUD
	Circuit Breaker	High Power Contactor	Twin Contactor Unit	Twin Contactor Drill / Low Power
Rated Voltage	440 V - 4,160 V	440 V - 4,160 V	1,140 V	230 V
Rated Current	1000 A	500 A	2 x 320 A or 2 x 32 A	2 x 50 A
Breaking Capacity	25 kA at 3.6 kV	7.5 kA at 3.5 kV	4 kA at 1.2 kV	25 kA at 400 V
Peak Current	63 kA at 3.6 kV	18 kA at 3.6 kV	6 kA at 1.2 kV	
Mechanical Life	30,000 cycles	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles

* Sample values, customizable for each project

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