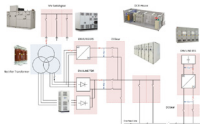













# DC Traction Power Supply

## Global product offering for DC traction power supply applications

For decades, ABB has supplied worldwide traction power supply systems to deliver power to the line and power to the supporting infrastructure. With its wide range of products, solutions and services, ABB assists operators, consultants, general contractors and EPCs in designing, building and operating reliable, cost effective and energy efficient systems and solutions for DC traction power supply applications.

### Modular systems

Product / Offering	Benefits and features
<b>Packaging</b> 	<p>Complete DC traction power supply solutions including medium-voltage switchgear, transformer-rectifier groups, DC switchgear, low-voltage switchgear, protection and control as well as energy management systems.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• Comprehensive product portfolio covering all functional requirements</li> <li>• Reliable, cost effective, energy efficient and flexible solutions</li> <li>• Technology leadership, global presence, application knowledge and local expertise</li> </ul>
<b>DC eHouse</b> 	<p>DC eHouse is a prefabricated walk-in modular outdoor enclosure to house medium-voltage switchgear, transformer-rectifier group, DC switchgear, and low-voltage as well as auxiliary equipment.</p> <p>It is ready to operate in the field with minimal installation, commissioning and start up time – all contributing to cost reductions.</p>
<b>Medium-voltage primary distribution</b>	
<b>Air-insulated primary switchgear</b> 	<p>UniGear family (up to 40.5 kV) is an innovative solution based on market-leading industry standard air-insulated medium-voltage switchgear called UniGear and makes full use of ABB's Relion® protection and control relays, IEC 61850 communication protocol and is combined with the advantages of sensor technology.</p> <p>All this leads to an advanced switchgear solution addressing important requirements of the future:</p> <ul style="list-style-type: none"> <li>• Flexibility</li> <li>• Increased process efficiency</li> <li>• Lower cost of operation</li> <li>• Maximized integration</li> <li>• Reliability and safety</li> </ul>
<b>Gas-insulated primary switchgear</b> 	<p>ZX family (up to 42 kV) provides ultimate protection to medium-voltage electrical distribution.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• All "live" parts are completely protected from external influences like humidity, dust and vermin</li> <li>• Provides safest operating conditions over extended lifetime while minimizing maintenance</li> <li>• Saves space, in particular at higher voltage levels</li> <li>• Easy "plug &amp; play" installation</li> </ul>

Product / Offering	Benefits and features
<p>Air-insulated secondary switchgear</p> 	<p>UniSec indoor air-insulated switchgear for medium-voltage secondary distribution up to 24kV.</p> <p>The UniSec metal-enclosed air-insulated switchgear is based on a highly flexible, modular concept with fewer parts and standardized solutions that can be readily configured to meet the specific needs of each application. This approach reduces training and maintenance requirements, ensures fast installation and facilitates future expansion to meet changing needs. UniSec offers the highest level of safety with different solutions in terms of internal arc classification and safety interlocks.</p>
<p>Gas-insulated secondary switchgear</p> 	<p>SafeRing/SafePlus is an SF6 insulated ring main unit/compact switchgear platform for secondary distribution networks up to 40.5kV.</p> <p>Together, SafeRing/SafePlus provide a complete, flexible and compact switchgear system solution. It is a completely sealed system with a stainless steel tank containing all live parts and switching functions. This ensures a high level of reliability and personnel safety, and a virtually maintenance-free system..</p>
<b>Power conversion</b>	
<p>ENVILINE™ TCR – Traction controlled rectifier</p> 	<p>To power trains, metros and trams, it is necessary to use an electronic power converter (traction rectifier) to convert alternating current into direct current. The ENVILINE™ TCR is the right solution for maximizing the distance, balance and stability of the DC line. Additionally, the TCR can reduce losses in rolling stock and prevent interruptions caused by under voltage.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• DC line voltage control</li> <li>• High reliability and flexibility</li> <li>• Cost-efficiency</li> </ul>
<p>ENVILINE™ TDR – Traction diode rectifier</p> 	<p>AC to DC voltage rectification is at the heart of urban transportation infrastructure. The ENVILINE™ TDR is the most reliable and cost effective rectification solution for DC rail transportation.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• High reliability and flexibility</li> <li>• Cost-efficiency</li> <li>• High energy density resulting in a compact footprint</li> </ul>
<p>ENVILINE™ WDR – Withdrawable diode rectifier</p> 	<p>The withdrawable diode rectifier offers the same functionality of a traditional traction diode rectifier, with the difference that the diode modules are installed on a removable trolley, accessible by the front of the unit.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• Back to the wall installation: the rectifier has a reduced footprint and lines up with transformer and/or DC switchgear for ease of installation</li> <li>• Front access for optimized maintainability</li> <li>• Modular approach with standardized modules to shorten lead times and facilitate spare parts management</li> </ul>
<p>ENVILINE™ ITR – Integrated transformer rectifier</p> 	<p>The most compact rectification solution for DC traction power supply. Traditionally, the transformer and rectifier are provided as separate units. ENVILINE™ ITR offers the same performance as traditional transformer-rectifier units, combined in one single enclosure.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• Reduced footprint</li> <li>• Highest reliability</li> <li>• Easy to install</li> </ul>
<b>DC Distribution</b>	
<p>ENVILINE™ DCGear</p> 	<p>DC switchgear serve as control and protection equipment in DC traction power distribution networks. The cubicles are available in different configurations with DC high-speed circuit breakers, disconnectors and/or load break switches. The panels contain proven technology components and are designed and type-tested in accordance with the latest standards.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• Freestanding rigid metal enclosed cubicle, with separate screened compartments to provide both high active and passive safety for operation and maintenance personnel</li> <li>• Wide range of current ratings</li> <li>• High availability and low maintenance.</li> </ul>
<p>Gerapid</p> 	<p>Gerapid is a single-pole, air high speed DC circuit breaker designed for use in high power DS distribution systems. The combination of high interruption capacity, current limiting characteristic and uncompromised reliability, makes Gerapid a perfect solution for use as main protection device in DC traction power substations.</p> <p>Key benefits:</p> <ul style="list-style-type: none"> <li>• Globally recognized and approved brand</li> <li>• Full ratings coverage including heaviest metro applications</li> <li>• Proven safety and reliability performance</li> <li>• Easy of integration and servicing</li> </ul>

Product / Offering	Benefits and features
--------------------	-----------------------

**Energy Management Systems**

ENVILINE™ ESS – Energy storage system



ENVILINE™ ESS is a wayside energy storage system that recovers, stores and returns surplus braking energy to the DC network, helping to reduce the total energy consumption of a rail transportation system by up to 30 percent.

Key benefits:

- Lowers energy costs through energy recovery
- Reduces the demand charge and peak power demand
- Lower capital cost versus a new DC traction substation for voltage support
- Increases the distance between DC traction substations
- Seamless integration into existing DC traction power networks

ENVILINE™ ERS – Energy recuperation system Timers



ENVILINE™ ERS is a wayside energy recuperation system recovering surplus braking energy and returning it back to the AC network, thus reducing the total energy consumption of a rail transportation system by up to 30 percent. The ERS can be configured to provide rectification boost (bidirectional operation of ERS) and reactive power mitigation when not recovering energy.

Key benefits:

- Lowers energy costs through energy recuperation
- Lowest upfront and maintenance costs
- Small footprint, easy installation, low maintenance
- Elimination or reduction of braking resistors on rolling stock, thus reducing heat dissipation in tunnels
- Compatible with new and existing traction networks

ENVILINE™ ARU – Automatic receptivity unit



ENVILINE™ ARU is a wayside automatic receptivity unit that ensures track receptivity during regenerative braking by dissipating all surplus energy that cannot be absorbed by other onboard loads and nearby trains. By deploying the wayside ARU instead of onboard resistors, the rail operator reduces the train's weight and energy consumption, and also eliminates the accumulation of heat caused by braking in tunnels and underground stations.

**Protective devices**

VLD – voltage limiting devices



VLD detects and removes hazardous voltage conditions by shorting the running rails to ground in a timely, effective and safe manner.

Key benefits:

- Ensures compliance with safe touch voltage limits
- Ensures compliance with EN 50122-1 safe touch voltage limits
- Facilitates timely and safe ground fault clearance
- Extensive monitoring capability
- Flexible and easy installation
- Helps locate rail-to-ground insulation deterioration.

**Protection relays / Distribution automation**

AC protection & control relays



The Relion® family of programmable numerical protection relays offers a full range of genuine IEC 61850 products for the protection, control, measurement and supervision of power systems. IEC 61850 supports interoperable and future-proof solutions including peer-to-peer GOOSE communication. Relion® enables the creation of comprehensive protection schemes for feeders, transformers, busbars, etc.

Features supporting high situational awareness and communication availability:

- Graphical display and web browser-based human-machine interface
- Disturbance recorder for in-depth analysis of network disturbances
- Support for additional communication protocols including use of two communication protocols simultaneously
- Communication redundancy including HSR and PRP protocols

DC protection & control relays



Combined protective units and controllers serve as protection for DC switchgear and contact lines/third rails against critical operating conditions by detecting short-circuits during the current rise even before the maximum short-circuit currents are reached.

Main Features:

- Graphical display and web browser based human-machine interface
- Protection
- Measurement
- Control and automation

---

**Product / Offering****Benefits and features**

---

**Services and support**

---

**Distribution Automation**

Web server functionality providing access to substation processes, operations and relays via a web browser (web HMI).

Substation Automation function and its features:

- Process visualization based on web HMI
  - Alarms and events
  - EC 61850-based integration to ABB or third party relays
  - Remote relay parameter setting using SPA protocol or IEC 61850
  - Relay disturbance record upload
  - Operational and user security
- 

**Service**

The services offered by ABB for medium-voltage products and systems span the entire value chain, from the moment a customer makes the first inquiry to the disposal and recycling of the product.

Throughout the value chain, ABB provides training, technical support and customized contracts. All of this is supported by one of the most extensive global sales and service networks.

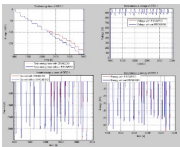
---

**Consultancy**

Finding the best technology solution for your electrical system designs is easy with ABB's comprehensive selection tools and extensive technical documentation. We offer highly functional and easy to deploy products to support a wide range of projects. And we want to support you at each stage of your project, with design software, training materials, configuration and product selection tools.

Whether you're looking to deliver energy efficiency, space savings, easily maintained systems or overall project cost reduction for your customers, with the breadth of our offering you can deliver customized solutions to meet your project goals and streamline engineering processes.

---

**Network simulation**

For DC traction power supply applications, a profound knowledge and understanding of the entire system's behavior is highly important.

In particular for energy management systems, power calculation studies performed with the ENVIsim tool will determine the most effective place of where to install energy recuperation or energy storage systems and enable optimized dimensioning of the chosen system.

---

Please note: This is ABB's global offering and some products might not be available in your country. Refer to [abb.com](http://abb.com) for your location.

---

# ABB Connect

## Your Digital Assistant

Connect to your electrification solutions with your digital assistant, access the latest news and create your own digital workspace.

Available for use on iOS, Android and Windows 10.

[new.abb.com/low-voltage/service/abb-connect](https://new.abb.com/low-voltage/service/abb-connect)

---

**ABB**  
For more information and local contacts, please visit:  
[new.abb.com/medium-voltage/by-customer-segment/railways-and-transportation](https://new.abb.com/medium-voltage/by-customer-segment/railways-and-transportation)

The information contained in this document is for general information purposes only. While ABB strives to keep the information up to date and correct, it makes no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to the information, products, services, or related graphics contained in the document for any purpose. Any reliance placed on such information is therefore strictly at your own risk. ABB reserves the right to discontinue any product or service at any time.