
DC traction power supply

Comprehensive product portfolio
covering all functional requirements

Solutions for trolleybus, light rail,
metro and mainline railway applications.



- Powering the system
- Optimizing safety and energy efficiency
- Supporting digitalization

The changing natural environment, socio-economic pressures, demographic factors and increasing urbanization are among the critical global issues impacting urban mobility to varying degrees. Public transport systems, with its high capacity, are set to remain the transport backbone of urban areas. Highly energy efficient, smart traction power supply products and solutions play a vital role in building and maintaining modern and reliable urban transport systems.

Table of contents

004	→	Introduction
005	→	Application overview
006 – 007	→	Product and solution overview
008	→	Packaging and DC eHouse
009	→	Low and medium voltage switchgear
010	→	Power conversion
011	→	DC switchgear
012	→	Voltage limiting device and automatic receptivity unit
013	→	Energy recuperation and storage systems
014	→	Distribution automation and protection

A reliable and experienced partner for DC traction power supply applications

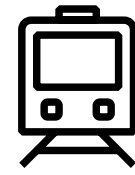


ABB is a trusted brand for innovative products and solutions that guarantee seamless operation of DC traction power networks, ensuring safety, reliability, as well as energy efficiency.

Traction power supply systems require highest availability in a harsh environment with very demanding application conditions.

ABB is a reliable global partner that can provide with high technology products and solutions which meet even the most stringent requirements. ABB solutions cover everything from trolleybus, light rail, metro and suburban railway systems to main line railways – all of which need to be safe, reliable and efficient.

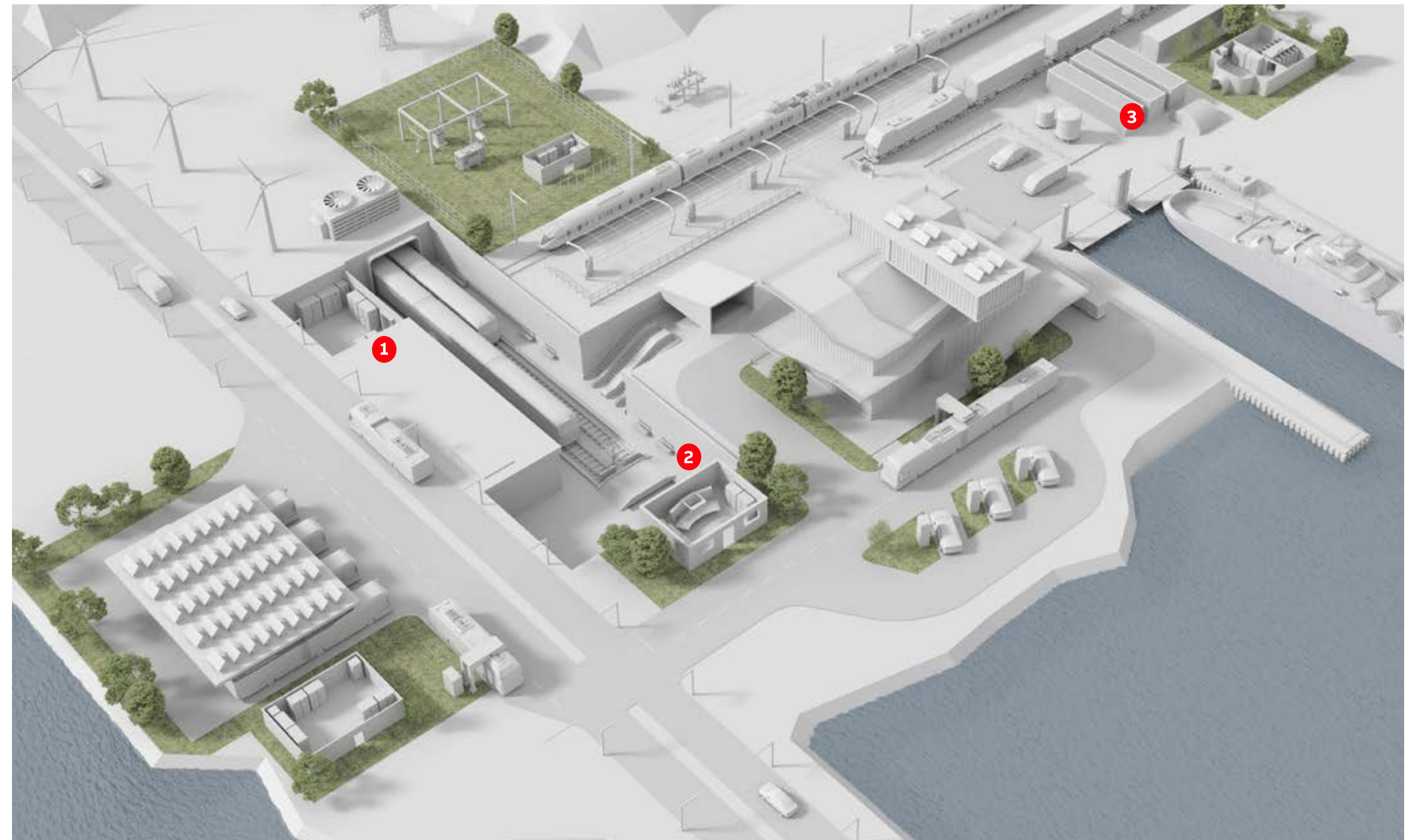
[GO TO TABLE OF CONTENTS](#)



Application overview

Traction power networks require highest uptime, robust and reliable products guaranteeing seamless operation. ABB offers a comprehensive product and solution portfolio covering all functional requirements.

ABB attaches particular importance to reliability, availability and safety of its products and solutions. Special emphasis is given to minimize installation and maintenance efforts.



Product and solution overview



Packaging and DC eHouse

Packaging of multiple products, including interface engineering, provides customers a fully integrated solution under a single commercial agreement.

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.

Low- and medium-voltage switchgear

Switchgear solutions for primary and secondary distribution to suit every application.

ABB provides a full range of air- and gas-insulated medium-voltage switchgear for different applications. A comprehensive portfolio of low-voltage switchgear is complementing the offering.

Power Conversion

Reliable and cost-effective diode rectifiers for all voltage and power needs.

Active rectifiers are used where the voltage versus current characteristic has to be adjusted to meet individual needs. DC voltage control allows longer distances between substations and can prevent interruptions caused by under-voltages.

DC switchgear

DC switchgear serve as control and protection equipment in DC traction power distribution networks.

The cubicles contain proven technology components, such as DC HSCB Gerapid and are designed and type-tested in accordance with the latest standards.

Product and solution overview



Voltage limiting device

Installed at substations, passenger stations and crossings, or wherever else people are exposed to running rails with potentially grounded surfaces, the VLD provides peace of mind by helping the system comply with relevant standards.



Automatic receptivity unit

Automatic receptivity units ensure track receptivity during regenerative braking.

Surplus energy that cannot be absorbed by other loads in the section is dissipated, avoiding the need to use the mechanical brakes.



Energy recuperation and energy storage systems

Recycling the braking energy is the single largest opportunity to improve energy efficiency.

ABB offers a complete range of smart energy management systems in different technologies and for all applications.



Protection and control

ABB offers a wide range of products for the protection, control, measurement and supervision of power systems for IEC and ANSI applications. To ensure interoperable and future-proof solutions, protection and control relays implement the core values of the IEC 61850 standard.

Packaging and DC eHouse

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 out of one hand.



[Learn more](#)

Product packaging

Main benefits

- Single point of contact
- Comprehensive product portfolio covering all functional requirements
- Reliable, cost effective, energy efficient and flexible solutions
- Technology leadership, global presence, application knowledge and local expertise



[Learn more](#)

DC eHouse

Main benefits

- Single point of contact
- Ready to operate in the field
- Minimum installation, commissioning and start up time
- Reduced and optimized site works, minimizing risk to personnel

Main features

- Various enclosure materials, such as steel, concrete or glass reinforced polyester
- Fully factory assembled and tested solutions

Low and medium voltage switchgear

Low-voltage switchgear and controlgear assembly for power distribution. The MNS design is verified in accordance with the latest standards.

Medium-voltage switchgear solutions for primary and secondary distribution to suit every application. For all customers, from system integrators to end users, and all applications, from refurbishment, line extension to new installations.



[Learn more](#)

MNS® low-voltage switchgear assembly

Main benefits

- Unmatched safety for protection of personnel and plant
- Reduced operational expenditure through maintenance free bus bar design
- Increased availability through modular design
- Reliable, flexible, scalable and fully accessible from the front

Main features

- Fully certified
- Modular construction
- Ease of operation with closed doors
- Segregation up to form 4b



[Learn more](#)

Primary and secondary medium-voltage switchgear

Main benefits

- Products for all kinds of applications
- Designed for the highest operational reliability and personnel safety
- A global network of factories and service units for your support
- Classic and intelligent air- and gas-insulated switchgear solutions

Main features

- Fully certified
- Ratings for AIS up to 46 kV IEC and 27 kV ANSI
- Ratings for GIS up to 40 kV IEC and ANSI
- Modular construction
- Ease of operation with closed doors

Power conversion

To power trains, metros and trams, it is necessary to use an electronic power converter. Traction rectifiers convert alternating current into direct current. Whether these are diode rectifiers or controlled rectifiers, ABB provides reliable, flexible and cost-effective solution.



[Learn more](#)

Diode rectifier - Enviline TDR, WDR and ITR

Main benefits

- Highly reliable and cost effective
- Fixed and withdrawable solution
- Minimized risk, numerous protection features
- Integrated solution with rectifier transformer in one housing

Main features

- Operating voltage range up to 4000 V, power range up to 8 MW
- Proven and robust technology
- Minimal operational and maintenance costs
- High overload capability
- High level of conformity with individual requirements as well as international standards



[Learn more](#)

Controlled rectifier – Enviline TCR and TCI

Main benefits

- Highly reliable and cost effective
- DC traction voltage control
- Bi-directional operation
- Reduced losses

Main features

- Operating voltage range up to 4000 V, power range up to 8 MW
- Proven and robust technology
- Minimal operational and maintenance costs
- Natural cooling or forced adaptive cooling
- High level of conformity with individual requirements as well as international standards

DC Switchgear

DC traction systems require a stable power distribution as well as reliable protection and control systems. DC switchgear and protection solutions serve as control and protective devices by managing all critical operation conditions and are providing safety for passengers, maintenance personnel and equipment.



[Learn more](#)

DC switchgear – Enviline DCGear IEC

Main benefits

- Meets the most stringent safety requirements to ensure the protection of operations and maintenance personnel
- Highly reliable solution and low maintenance
- Proven DC high-speed circuit breakers type Gerapid

Main features

- Rated voltage up to 1800 V, rated service current up to 6000 A
- Full conformity with IEC, EN and GB standards
- High active and passive safety through freestanding rigid metal enclosed cubicles with separate screened compartments
- Internal arc proof 50 kA 250 ms
- High availability and low maintenance
- Indoor installation



[Learn more](#)

DC switchgear – OEM module ANSI

Main benefits

- Simplified modules for OEMs with complete drawout DC breaker solution
- Outlines available in PDF and as AutoCAD templates for OEMs
- UL recognized

Main features

- Rated voltage up to 1600 V, rated service current up to 6000 A
- Complete drawout trolley for Gerapid UL Listed 2508, 4008, 5008 or 6008 breakers
- All breaker controls prewired to secondary control disconnect
- ANSI C37.20.1 and C37.14 required interlock included
- Indoor installation

Voltage limiting device and automatic receptivity unit

Voltage limiting devices detect and remove hazardous voltage conditions by shorting the running rails to ground in a timely, effective and safe manner.

Automatic receptivity unit ensures track receptivity during regenerative braking. It dissipates all surplus energy that cannot be absorbed by other nearby trains. A reliable and low-cost solution for braking energy receptivity in DC rail systems.



[Learn more](#)

Voltage limiting device – Enviline VLD

Main benefits

- Ensures compliance with EN 50122-1 safe touch voltage limits
- Facilitates timely and safe ground fault clearance
- Provides a conducting return path and alarms, which help trigger the protection circuit breaker

Main features

- Minimal maintenance
- Hybrid thyristor/contactors construction for handling fast rising voltage conditions and large fault currents
- Programmable, time defined voltage trigger points
- Manual bypass switch for lock out during maintenance
- Event recording and advanced monitoring capabilities



[Learn more](#)

Automatic receptivity unit – Enviline ARU

Main benefits

- Low operational and maintenance costs
- Elimination of on-board resistors
- Moving the heat out of the tunnel
- No EMC or audible noise
- Protects on- and off-board equipment against overvoltage

Main features

- Operating voltage range up to 2000 V
- Proven technology ensures highest reliability
- Lower operational and maintenance costs than onboard units
- Passive cooling eliminates noise and ensures low service need

Energy recuperation and storage systems

Electric rail transit operators are amongst the largest consumers of electricity in their urban territory. With highly efficient energy management systems, the overall power consumption can be reduced by as much as 30 percent.

ABB, the largest independent provider of DC wayside energy management solutions, offers a complete suite of products for more energy efficient rail transportation.



[Learn more](#)

Energy recuperation system – Enviline ERS

Main benefits

- Short return on investment
- Lowers energy costs through energy recuperation
- Increased receptivity of the DC system
- Small footprint
- Compatible with new and existing systems

Main features

- Operating voltage range up to 3000 V, power range up to 2 MW
- Modular architecture allowing scalability of the system according to customer needs
- Low maintenance and long operating lifetime
- High overload capability
- Additional functionalities, such as rectification boost and reactive power compensation
- Remote access for grid operators with embedded cyber security



[Learn more](#)

Energy storage system – Enviline ESS

Main benefits

- Lowers energy costs through energy recovery
- Reduces the peak demand charges and penalties
- Reduces capital expenditures needed to sustain the voltage level of the DC traction power line
- Makes the substation smart and capable of generating benefits on the local grid and additional revenues for the rail operator
- Operates independently from the AC grid

Main features

- Operating voltage range up to 3000 V, power range up to 5 MW
- Modular architecture allowing scalability of the system according to customer needs
- Low maintenance and long operating lifetime
- Remote access for grid operators with embedded cyber security

Distribution automation and protection

ABB delivers a full range of genuine IEC 61850 protection and control products also including network automation. ABB's IEC 61850 compliant solutions offer a unified user-experience for operating power distribution systems. The unified user-experience provides enhanced reliability, safety and the operational efficiency of network control and management.

The protection and control devices also measure and collect data from the traction power system and intelligent network components to support the asset and business management.



[Learn more](#)

Protection and control relays

Main benefits

- Modern protection relays for AC and DC distribution
- Multifunctional protection
- Provide continuity of traction power
- Protection of network assets
- Protection against electrical incidents

Main features

- Self-checking facility
- Low burden relays improve accuracy
- Fast fiber optical communication with substation LAN
- Adaptive relaying schemes
- Permit storage of historical data
- Time stamping



[Learn more](#)

Substation automation

Main benefits

- Ensures efficiency of the substation network and operations
- User level and operational security to ensure operational reliability
- Easy to add substation automation functionality to existing protection and control installations

Main features

- Supports redundant configuration for ABB Ability™ smart substation control and protection for electrical systems
- Web-browser-based HMI for access to substation devices and processes
- Seamless connectivity between substation devices and external higher-level systems (SCADA, DMS)
- Runs substation analytic functions and facilitates soft-wiring (GOOSE) monitoring

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

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/switchgear/railway-switchgear/dc-traction-power-supply>

We reserve the right to make technical modifications and change the contents of this document without notice. ABB does not assume any liability for the presence of possible errors or insufficient information in this document.

All rights to this document, texts and illustrations contained therein are reserved. Reproduction, disclosure to third parties or the use of the contents of this document, in whole or in part, without the prior written authorization of ABB is prohibited.

© Copyright 2019 ABB. All rights reserved.
Specifications subject to change without notice.

[GO TO TABLE OF CONTENTS](#)