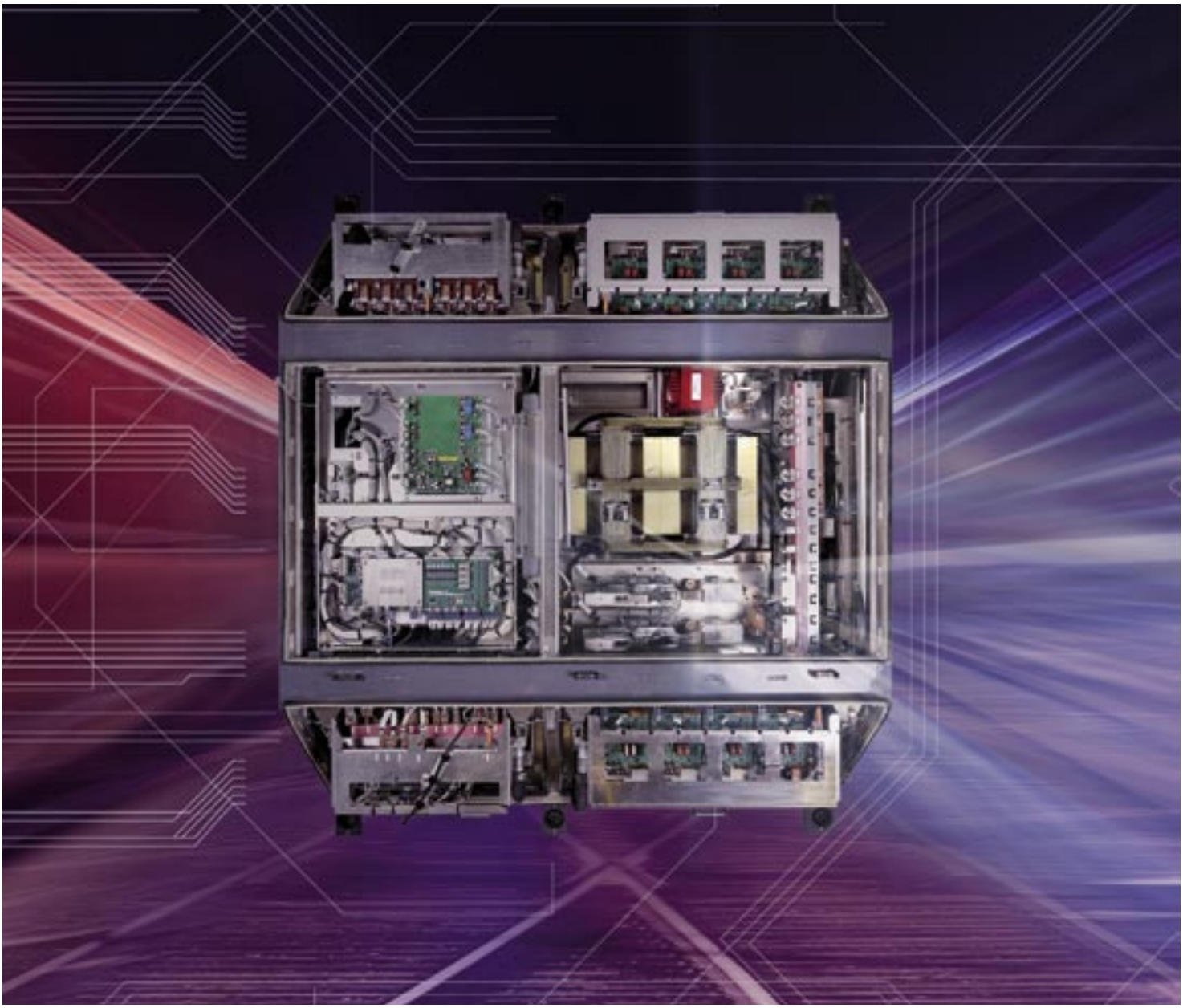
ABB traction converters

BORDLINE®



ABB'S EXPERTISE IN POWER ELECTRONICS FOR YOUR RAIL VEHICLES

SOLID EXPERIENCE

"Power and productivity for a better world" is ABB's slogan and concisely describes what its staff of more than 110'000 is working for.

Asea Ltd. in Sweden and Brown Boveri Company in Switzerland, two of the largest electrical engineering companies of the 20th century, laid the foundation of today's true global enterprise. ABB supplies components and systems for power and automation across almost all industries. ABB's strongest assets are the motivated and experienced workforce and the constant high investment in R&D.

GLOBAL PRESENCE

ABB's workforce is present in more than 100 countries in the world. ABB was an early mover to the emerging markets and has excellent relationships with developing countries. Its seven corporate research centers are located in China, Germany, India, Poland, Sweden, Switzerland, and the USA. ABB's global presence makes it an attractive partner both for OEMs and transport operators worldwide.

POWER COMPONENT SUPPLIER

Today, ABB is one of the leading suppliers of power components to the rail industry. ABB stands for reliability, service, and innovative solutions both for new vehicles and fleet refurbishment. As a fully independent component supplier, ABB is uniquely positioned for trustful partnerships with vehicle manufacturers and transport operators. ABB offers high-quality converters, transformers, motors, generators, switchgears, and other electrical components.

FLEET REFURBISHMENT PARTNER

Refurbishing large vehicle fleets sometimes is an attractive alternative to buying new rolling stock. New propulsion and auxiliary converters have a huge impact on rejuvenating your fleet. Maintenance and energy cost, noise and wear are drastically reduced and comfort on board is increased. ABB strongly supports refurbishment projects.

InterCityExpress 1 (ICE 1) in Berlin;
© DB AG/Günter Jazbec

TRUSTFUL PARTNERSHIPS

Our experience tells us that developing power electronics for railway applications requires intensive and trustful collaboration with our customers. We strive for optimum solutions, not only for the components we supply but also for the complete vehicle. Hence, we favor and foster long-term partnerships with our customers.

SHAPING THE FUTURE

Public transport on rail plays an ever increasing role in today's world. It helps to combine rising mobility demand with environmental sustainability. ABB accepts the challenge to contribute – with innovations – to higher energy efficiency, reduced cost of operations, and more travel comfort in the railway sector.

PRODUCT OVERVIEW

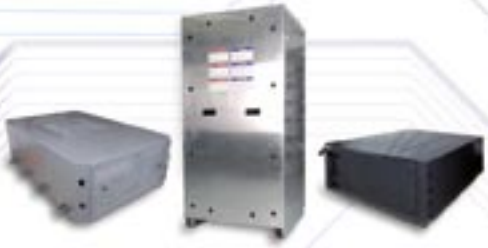
Multiple Units, Metro

Locomotives

CC400

Compact converters for light rail vehicles

- Input voltage 600 – 750 V_{DC}
- Multiple motor inverters
- Integrated auxiliary converters and battery chargers



CC750

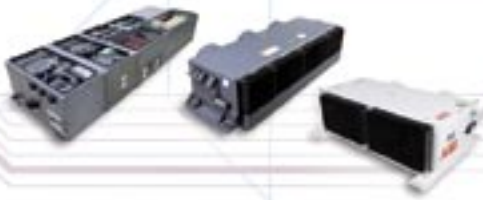
Compact converters for mass transit EMU, DMU, metro, ...

- Diesel-electric, AC and DC grids
- Multi-system and hybrid solutions
- Integrated auxiliary converters and battery chargers

CC1500

Compact converters for high power locomotives, HEP, ...

- Diesel-electric, AC and DC grids
- Multi-system and hybrid solutions
- High energy efficiency



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Auxiliary converters for all rolling stock applications

- AC, DC and multi-system input voltages
- Integrated battery chargers

Traction Packages

Package solutions for all rolling stock applications

- Complete traction packages combining propulsion converters with motors, tansformers, generators, and other components

Light Rail Vehicles

Passenger Coaches

Rack Rails spec. vehicles

RELIABLE DELIVERY

QUALITY

Railway customers expect a consistent and high quality level through all processes from order placement to product delivery and support. This is ABB's first priority, and one reason why ABB traction converters obtained the IRIS certification. All assembly and logistics steps are closely monitored. High-quality equipment and well-trained, experienced production workers ensure that every converter bears the spirit of a Swiss watch.

IRIS Certification

ABB traction converter factory

TESTING – REAL LIFE SIMULATION

Every new converter design is subject to extensive type testing that goes beyond international standards. In this way, extreme environmental conditions and lifetime wear are simulated.

Every single converter produced is tested as close as possible to operation conditions, for example often in combined tests with the vehicle motors.

Testing and quality control

JUST IN TIME DELIVERY

Development and production or refurbishment of highly customized rail vehicles require excellent project management from all system partners. ABB's traction converters arrive reliably on time in your assembly process, due to careful planning and communication, extensive experience among ABB's project managers, and high delivery discipline.

ALMOST "PLUG AND PLAY"

ABB delivers not only a converter product. ABB's customers appreciate the clear and comprehensive documentation, clever and "user friendly" connections and plugs, practical training, and expert support during commissioning and homologation.

ABB COMPETENCE

CENTER OF EXCELLENCE

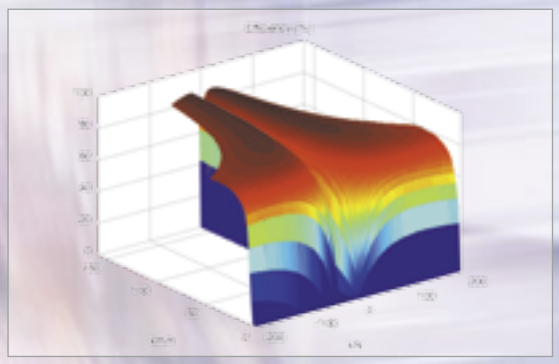
In Switzerland, three ABB sites with approximately 2'000 employees (predominantly in R&D and engineering) work closely together to develop power semiconductors and power electronic applications for many different industries. Not many competitors in the railway industry can leverage comparable synergies. On one hand, those result in standardization of modules, of control hardware and software, on the other hand in deep experience with components and algorithms, service and life cycles in different environments.

LOCAL ENGINEERING CENTERS

ABB traction converters benefit from the global network of ABB's power electronic engineering centers. In several of these centers, ABB currently builds up local service and support organizations for traction converters.

Cutting-edge technology at ABB labs in Switzerland

Versatile ABB control platform AC 800PEC



Traction chain simulation

CONTROL IS KEY IN POWER ELECTRONICS

BORDLINE® converters are based on ABB's AC 800PEC control platform. This is a key advantage in traction applications due to its reliability (industrial grade hardware), speed (cycle time), and processing power. MATLAB®/Simulink® [1] programming ensures quick, reliable coding and easy adaptation of the control software. Customers also benefit from the large installed base of the AC 800PEC control platform in many demanding industry applications, from metal mills to wind power plants.

SYSTEM AND SIMULATION EXPERTISE

Propulsion converters need to be engineered with great care for each vehicle design. ABB has the competence to deal with all the interfaces to your vehicle, the motors, the power supply side, and the train control system. Efficient engineering processes and a wealth of experience with the challenges in rail propulsion distinguish ABB as an expert partner for traction converters.

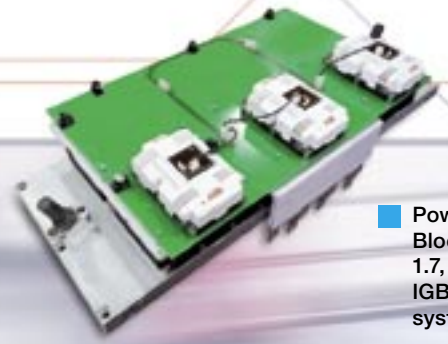
[1] *MATLAB®/Simulink® is a trademark of Mathworks™*

ABB DESIGN

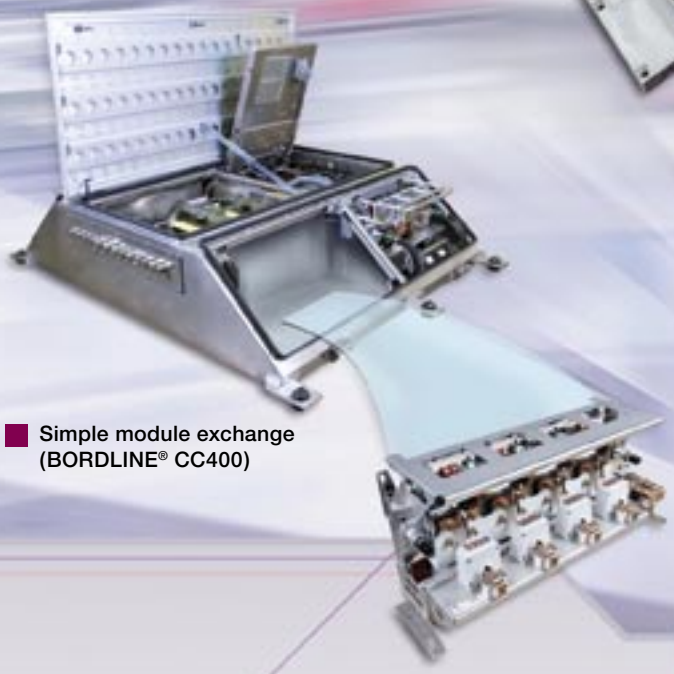
BORDLINE® CONVERTERS – A FLEXIBLE PLATFORM APPROACH

Rail vehicles are highly customized, hence standardization is the only way to reduce cost and ensure reliable performance. ABB has found a powerful way to deal with this apparent contradiction by standardizing on the level of power electronic building blocks and control hardware and software modules.

These versatile modules are developed with great experience and well tested in the field. Product maintenance on the module level allows ABB to support your vehicle through its entire lifetime and guarantee high availability of spare parts.



Power Electronic Building Block, available with 1.7, 3.3, 4.5, or 6.5 kV IGBTs depending on system voltage



Simple module exchange (BORDLINE® CC400)

FEM analysis of mechanical robustness for a roof-mounted EMU Compact Converter

DESIGN FOR AVAILABILITY AND SERVICEABILITY

Every design step for ABB traction converters aims at minimizing operating cost of the vehicle. The choice of components, careful dimensioning, and clever redundancy concepts help to maximize availability. The powerful diagnostics tools or the simple and quick exchange of modules are examples how ABB design keeps mean time to repair (MTTR) at the lowest possible level.

ROBUSTNESS

BORDLINE® converters are built for the harsh conditions of public transport. Rigorous testing and simulations ensure that modules and systems perform perfectly in the environment they are designed for. All roof-mounted or under-floor BORDLINE® converters are IP65 protected.

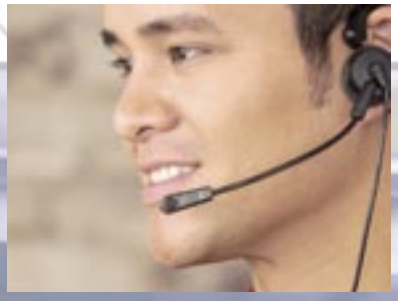
CUSTOMER & SERVICE FOCUS

AT HOME IN THE RAIL INDUSTRY

As a component supplier for rolling stock and fixed installations, ABB has a long track-record in the railway industry. We share the same perspective of long product lifetimes and focus on availability, performance, and the comfort of the passenger. ABB satisfies the needs of public transport companies as well as private operators.

MODULAR SERVICE OFFER

After the warranty period, ABB wants to keep the converters' availability at the same high level. This is possible through pragmatic maintenance concepts. According to the customer's wishes, ABB offers service contracts that can include spare part logistics, repairs, on-site service, field operating statistics and analysis, support line and expert support.



BORDLINE®-View diagnostic tool

EMPOWERING LOCAL SERVICE

An optimal service concept combines what each party can do best: Expert support and spare parts from the industrial partner and efficient local maintenance by well-trained local service staff. Hence in each project, ABB transfers maintenance know-how to its partners through documentation, training programs, diagnostic tools, and continuous support. Most importantly, ABB always considers service aspects when designing BORDLINE® converters.

SPARE PART AVAILABILITY

ABB knows that operating cost is intimately related to spare part logistics. Waiting for spares is as annoying as stocking huge piles of obsolete material in many places. ABB offers spare part concepts that fit your needs – for instance with containerized consignment stocks which are always kept up-to-date and continuously optimized by your traction converter partner.

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