BORDLINE® designed for LRV

Propulsion and auxiliary converters
or complete traction packages
ABB IS THE PARTNER OF CHOICE
to power your Light Rail Vehicles

THE EXPERT FOR POWER ELECTRONICS
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. ABB leverages synergies through standardization of modules, control hardware, and control software. You benefit from ABB's deep experience with components and algorithms, service and life cycles in different environments.

STRONG SERVICE OFFER
Our service concept centers on high availability of BORDLINE® converters, spare parts and assistance. Many customers rely on ABB empowering their service personnel to successfully take over all on-site maintenance. ABB’s service offer is modular and includes, for instance, special testing (combined tests), commissioning support, training, spare part logistics, module repair, field operating analysis, product maintenance and upgrades.

POWER ELECTRONIC BUILDING BLOCKS
Rail vehicles are highly customized. BORDLINE® converters fit a broad range of vehicle designs because ABB standardizes at the level of the power electronic building blocks. These modules are reliable and well tested in the field. Product maintenance at the module level allows ABB to support your vehicles throughout their entire lifetime and guarantee high availability of spare parts.

PRODUCT OVERVIEW

BORDLINE® M
Auxiliary Converters

BORDLINE® CC400
Compact Converters
Propulsion with integrated auxiliary converter

TRACTION PACKAGES
Complete solutions with converters, motors, and other power elements

POWERSFUL CONTROL PLATFORM
BORDLINE® traction converters employ the AC 800PEC control platform, which is used in a wide range of industry applications – from metal mills to wind turbine plants. This fast powerful control is built on industry-grade power PCs. MATLAB®/Simulink® programming ensures quick, reliable coding and easy adaptation of the control software.

VERSATILE ABB diagnostic tool

QUALITY ASSURANCE
Good project management and quality assurance are the prime concerns of our company. ABB traction converters are IRIS-certified.

TRANSPARENT DIAGNOSTICS
Our converters are shipped with BORDLINE®-View, a diagnostic tool that visualizes signals, parameters and states of the traction system. It includes an advanced Self-Diagnosis Function, which gives advice and instructions for maintenance and repair. BORDLINE®-View is easy to use and runs on a standard laptop.

ROBUST AND RUGGED DESIGN
Our products are built for the harsh conditions of public transport. Rigorous testing and simulations ensure that modules and systems perform perfectly in the environments they are designed for. All our roof-mounted or under-floor converters are IP65 protected.

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MATLAB®/Simulink® is a trademark of Mathworks™
ABB compact converters for LRV – propulsion and auxiliary converter

BORDLINE® CC400

ABB presents here the flagship of its BORDLINE® CC400 platform: In terms of its high integration, purpose and compactness, the design of this traction converter may be considered a work of art. Developed for a very wide range of light rail vehicles, it converts 600V DC or 750V AC line voltage into:

• Propulsion power to control and drive the traction motors
• Auxiliary power to supply the onboard loads

Advantage of high integration
All power electronic components needed for an LRV are integrated in one device with one interface to the Train Communication Management System (TCMS):
• Reduced control communication complexity
• Reduced power wiring
• Optimized space and weight
• Simplified maintenance

Designed for easy servicing
Just 10 minutes are all your service staff need to change a power module of BORDLINE® CC400. The safety scaffold allows simple and safe handling. The embedded Self-Cleaning Mode facilitates reduced maintenance as well as less cleaning.

BORDLINE® CC400 contains:
• 2 propulsion converters
• 2 main switches
• 2 line filters
• 2 braking choppers
• 1 auxiliary converter (fixed frequency – 50Hz)
• 1 auxiliary converter (variable frequency – blower control)
• 1 battery charger

For technical data please refer to product reference sheets.

On the roof or under-floor
BORDLINE® CC400 is designed to be mounted under-floor or on the roof of the vehicle, and is compatible with most light rail vehicles. The variety of components and spare parts is reduced through this double-purpose design. It also results in economies of scale and more standardized processes:
• High quality and reliability
• Long-term availability of spare parts
• Short delivery times

Support for all vehicle concepts
Each propulsion converter can either control one or two motors, allowing both vehicle concepts: wheel motor for low-floor or geared axle motors for high-floor vehicles. In order to provide maximum vehicle availability, each propulsion converter, as well as the auxiliaries can be operated independently and disconnected separately in case of malfunction.

Configurable connectors
The Compact Converter has configurable connectors for a customized solution based on the customer’s interfaces.

Flexible and efficient cooling
BORDLINE® CC400 achieves its unrivaled power density by means of water cooling, using ordinary service water. This cooling concept, combined with the IP65 protection degree, keeps the electronics free of pollution. Cooling on demand and noise control functions are implemented. The BORDLINE® CC400 can be flexibly combined with an external heat exchanger. A great variety of cooling set-ups have been realized. As an example, BORDLINE® HEX30 is a combined cooling system for converter, motors and braking resistors.

Platform concept and other configurations
Development of ABB traction converter platforms is based on power electronic building blocks and the versatile control system AC 800PEC. Hence, the combination of modules can be adapted to the specifications of different vehicle designs. For instance, in a retrofit an auxiliary converter or battery charger integrated in the main propulsion converter may not be needed. Furthermore, output power ranges can be adapted.
ABB AUXILIARY CONVERTERS FOR LRV
BORDLINE® M

ABB’s BORDLINE® M series is a product platform for static converters with a wide application range on light rail vehicles. They are designed for use with nominal grid voltages of 600V DC and 750V DC. The units are housed in dust and waterproof casings (IP65) and are suitable for either roof or under-floor mounting.

POWER ELECTRONIC BUILDING BLOCKS
The compact and flexible BORDLINE® M product platform for LRVs is realized with standard modular units (power electronic building blocks). Using these proven modules, it is possible to realize cost-effective, tailor-made solutions that fit perfectly in your vehicle design.

REDUCED COST OF AUXILIARIES
Both AC and DC outputs are galvanically insulated from the input for improved safety and EMC behavior. The 3-phase AC output also has a sine filter. The sinusoidal voltage waveform allows the use of standard 3-phase motors for lower investment costs. Reduced motor insulation stress and motor losses result in a higher lifetime for the auxiliary motors.

SOFT STARTING
High overload capability and a soft-start function permit trouble-free starting of the converter even under heavy loads. The frequency and the voltage are reduced so that the output current is reduced to an appropriate value. The motors are then brought up to nominal power with a soft start.

EXPERT SUPPORT THROUGH ALL PROJECT PHASES
We provide mounting and wiring instructions, facilitate commissioning on the first vehicle and support our customers with homologation tests and required documentation. Further, we offer service and maintenance contracts throughout the product life cycle.

ABB TRACTION PACKAGES FOR LRV
BORDLINE® CC400, motors, and additional power components

ABB traction packages for LRVs consist of propulsion converters (incl. drive control unit AC 800PEC), traction motors and auxiliary converters. Other power components, such as switchgear, brake resistors, line inductors, heat exchangers and surge arrestors can be included in our scope of supply.

LONG LIFETIME
The robust and rugged design of BORDLINE® M converters ensures long lifetime and high availability. ABB invests continuously in life cycle management and offers interesting upgrade and retrofit solutions.

SERVICE FRIENDLY
Service teams will appreciate the ABB design. Almost no maintenance is required, and the mean time to repair is short thanks to the powerful diagnostics tool and the modular construction.

SYSTEM DESIGN AND SIMULATION COMPETENCY
After analyzing the customer’s needs, ABB performs all relevant vehicle simulations. Mission profile, energy consumption and line interference simulations allow configuration of the optimum system solution. System performance will usually be tested and approved by a full-scale combined test and digital real time simulation in our power laboratories.