

COMPACT CONVERTER

## BORDLINE® CC400 DC

For light rail vehicles with optional energy storage system (ESS)



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BORDLINE® CC400 DC  
for light rail vehicles

### Characteristics

- All power electronics (traction/ESS and auxiliary power) in one roof-mounted housing
- Lightweight and optimized design
- Low noise operating mode
- Easy maintenance
- Standard ABB modules
- Optional ESS for catenary-free operation

### System overview

The BORDLINE® CC400 converters are compact, modular, rugged units based on modern IGBT technology and designed for light rail vehicle applications.

BORDLINE® CC400 Compact Converter contains:

- two independent propulsion converters
- two braking choppers
- two energy storage choppers (optional)
- two main switches
- two line filters
- one auxiliary converter with galvanic isolation
- one BORDLINE® BC battery charger with galvanic isolation
- one AC 800PEC control module

The Compact Converter converts 600 V<sub>DC</sub> or 750 V<sub>DC</sub> line voltage into propulsion power to control and drive the traction motors, and auxiliary power to supply the onboard loads. BORDLINE® CC400 can be equipped with additional chopper phases to directly connect an energy storage system (lithium-ion battery, supercapacitor, lithium-ion capacitor).

The BORDLINE® CC400 can be directly coupled (power, auxiliary power, CAN bus) to an energy storage system, which contains energy storage cells, thermal management system and storage management system.

### Propulsion converter / ESS converter

Each propulsion converter is able to control either one or two motors and the according braking chopper. During braking operation the energy can be stored in the ESS, recuperated to the grid or dissipated in the braking resistors.

### Auxiliary converter

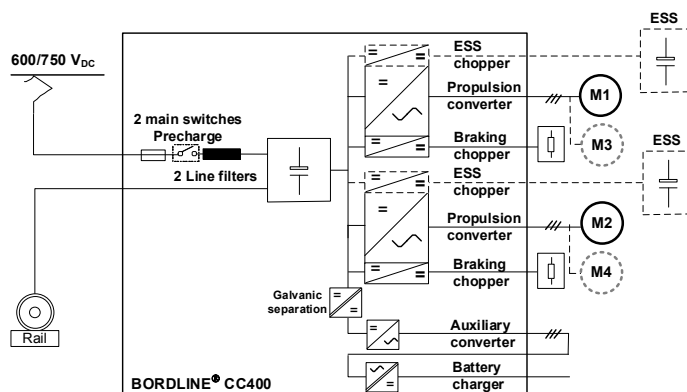
The auxiliary converter generates a current limited three-phase output voltage with galvanic separation realized by lightweight medium frequency transformer. Due to the integrated sine filter a sine wave voltage is available at the output terminals of the auxiliary converter.



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01 Low-floor tram of the type „Panorama“  
Photo: Durmazlar

02 Simplified main circuit of BORDLINE® CC400 DC\_750V\_R\_700



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### DC output and battery charger

The BORDLINE® BC battery charger is built with silicon carbide (SiC) power semiconductors and integrated into the BORDLINE® CC400. The battery charger generates a DC voltage to charge the vehicle batteries and/or supply DC loads.

### Powerful control platform

ABB Compact Converters are based on the AC800 PEC control platform which is a modular and flexible high-speed traction control unit designed for harsh environmental and operating conditions in rolling stock.

### Cooling system

The equipment is efficiently cooled by forced air. The air-flow has been optimized to provide a low-noise operating mode.

### Mechanical design

The BORDLINE® CC400 is housed in an IP65 aluminum cabinet, which results in a very low overall weight. The equipment is designed for roof mounting. Due to its modular design, it offers easy maintenance access.

### Energy storage system (optional)

Different type of energy storage systems (lithium-ion battery, supercapacitor, lithium-ion capacitor) can be directly connected and controlled by the BORDLINE® CC400. The AC 800PEC control provides safe and long-life operation of the energy storage system.

### Diagnostics and service

The service-friendly modular design with highly standardized components ensures high reliability, excellent spare parts availability, and optimized life-cycle costs. The Compact Converter is delivered with BORDLINE® View, a diagnostic tool that visualizes signals, various parameters and the state of the traction system. It consists of an advanced self-diagnosis function, which provides advice and instructions for service and repair. BORDLINE® View is easy to use and runs on a standard PC.

### Application example

ABB has equipped a total of 20 light rail vehicles built by Turkish vehicle manufacturer Durmazlar with BORDLINE® CC400. The new vehicles are in operation in the cities of Kocaeli and Samsun, Turkey. For Danhai light rail transit project in New Taipei City (Taiwan), ABB is supplying the Compact Converter BORDLINE® CC400 with energy storage system for 15 new low-floor trams built by Taiwan Rolling Stock Company (TRSC).

Technical data	BORDLINE® CC400 DC_750V_R_700
Input voltage	600 / 750 Vdc
Propulsion output, continuous	0...550/660 Vac, 2 x 220 kW at wheel
Braking chopper	2 x 350 kW
Auxiliary converter	3 x 400 V / 50 Hz, 50 kVA
Battery charger	24 Vdc, 10 kW
Vehicle control interface	CANopen, I/Os
Mounting position	roof
Dimensionen (LxWxH)	1700 x 1600 x 450 mm
Weight (ESS option)	500 (560 kg)

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