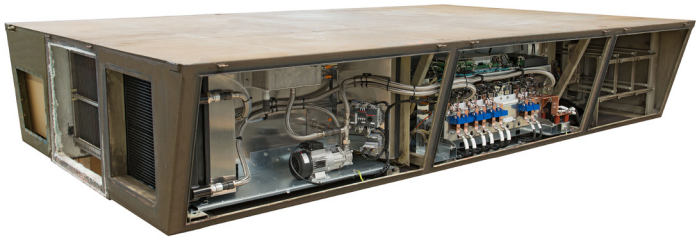
COMPACT CONVERTER

BORDLINE® CC400 DC

Modular retrofit propulsion system for mass transportation



Reused traction container with integrated new BORDLINE® CC400 DC converter module

Replacement of obsolete thyristor technology by integration of IGBT based BORDLINE® CC400 DC converter module into existing traction container.

Characteristics
- Power and control integrated in one module
- Flexible water cooling concept
- No modification needed on vehicle side
- Fast project execution

System overview
The BORDLINE® CC400 converter module replaces the thyristor-based DC/DC and DC/AC converter. The module integrates eight IGBT (insulated-gate bipolar transistor) phases, the DC-link capacitors and the full converter control system. The existing power cabling as well as the traction motors can remain. The power module is water cooled by means of a separate HEX10 cooling unit, which is also designed for installation into the existing traction container. The heat exchanger is placed in the existing air stream of the previous air-cooled thyristor equipment.

BORDLINE® CC400 DC converter module contains:
- DC-link capacitor bank
- 2 three-phase inverters for traction motors
- 2 voltage limiting/brake choppers
- Interfaces to existing power and control connections
- AC 800PEC control module

Propulsion converter module
The BORDLINE® CC400 DC converter module is a rugged unit. It can control two single motors or four motors in bogie control. The converter module is based on ABB's well-proven IGBT technology, which has several advantages over earlier thyristor solutions: It is more reliable, maintenance friendly, and it saves energy!

Powerful control platform
ABB traction converters are built on the AC 800PEC control platform, one of the most powerful modular controller for high-speed performance on the market. This control platform is also used in a wide range of industrial applications. The AC 800PEC software is implemented on three performance levels, thus providing an excellent range of control and communication functionality, in cycle times that extend from the sub-microsecond to the millisecond level. Compared to most other commercially available traction control systems, the modular application software in the AC 800 PEC reduces train commissioning time significantly.

Cooling system
The converter module is efficiently liquid-cooled, resulting in a compact size and longer lifetime for all the components. The coolant (water-glycol mixture) dissipates energy through an external heat exchanger.

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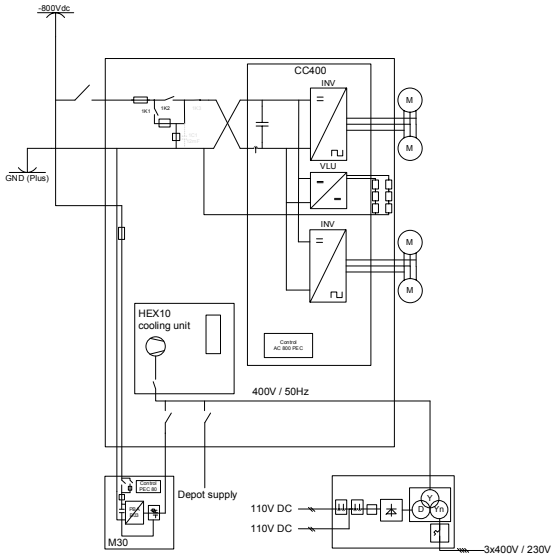

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01 Electric multiple unit for S-Bahn Berlin, Germany
Photo: DB AG/Volker Emersleben

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02 Simplified main circuit of BORDLINE® CC400 DC

Mechanical design
The BORDLINE® CC400 DC converter module is a rugged unit for mounting in the existing converter container. Due to its compact size and modular design, the converter module can be adapted to different vehicle layouts. The converter module is designed for easy maintenance.

Diagnostics and service
The service-friendly modular design with highly standardized components ensures high reliability, excellent spare part 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
The DB Class 480 electric multiple units (EMU) operated by S-Bahn Berlin were equipped with thyristor-based traction converters, installed in the early 90s. The existing units suffered low reliability and obsolete spare parts. To meet the growing demands of public transportation, S-Bahn Berlin decided to prolong the life cycle of the Class 480 EMUs with a renewal of the propulsion units. The upgrade is designed for quick installation on the vehicles. All existing power and control cabling on the vehicle are kept. The power and effort values of the propulsion system remain identical. Therefore the documents of conformity for the mechanical components keep their validity.
A control interface based on ABB's AC500 programmable logic controller (PLC) platform was designed to connect the new IGBT converter with the existing vehicle control. In addition to the BORDLINE® CC400, ABB delivers also auxiliary converters of the type BORDLINE®M30 and upgrades the existing battery charger units. The refit project was characterized by a tight schedule. First upgrade kits were delivered only five months after the order was placed.

Technical data	BORDLINE® CC400 DC_750V_M_500
DC voltage input (grid side)	800 Vdc
Propulsion output	0...600 Vac, 500 kW at wheel
Voltage limiter/brake chopper	included
Auxiliary converter (external)	30 kVA
Battery charger (external)	10 kW
Vehicle control interface	PWM / analogue / I / Os
Mounting position	in existing traction container
Dimensions (L x W x H)	1210 x 360 x 581 mm
Weight	80 kg

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