BORDLINE® CC1500 AC_15kV
For high-speed trains

BORDLINE® CC1500 AC converts the power from the 15 kV / 16.7 Hz line into propulsion power for the traction motors.

**Characteristics**
- Innovative three-level converter technology
- High energy efficiency
- Motor friendly (retrofit)
- Line friendly

**System overview**
Incoming power (15 kV) from the catenary is stepped down by the main transformer to feed two BORDLINE® CC1500 AC Compact Converters. They supply the motive power via the traction motors. Energy recuperated during braking is fed back through the same chain into the traction supply network.

Compact Converter BORDLINE® CC1500 AC contains:
- Two line converters (4Q)
- Two input contactors and 1 precharger
- One DC-link and 33 Hz resonant filter capacitor
- One voltage limiter
- One propulsion inverter
- AC 800PEC control module

**Propulsion converter**
BORDLINE® CC1500 AC Compact Converter is a rugged unit incorporating modern IGBT technology that can control one or two motors in parallel. This compact converter is based on ABB’s well-proven 3-level topology, which has several advantages over conventional 2-level solutions: It is better for the motor, better for the grid, and it saves energy!

- **Better for the grid**
The inherent features of the three-level technology minimize the line interference current. Neither line filters nor active filters are needed to comply with typical grid codes. Engineering time and effort for homologation in different countries is minimized.

- **Better for the motor**
The BORDLINE® CC1500 AC three-level inverter has double the conventional semiconductor switching frequency leading to a quasi-sinusoidal current waveform. Current and torque ripples are reduced by more than a factor of four, decreases losses, audible noise and the mechanical stress on the traction motor. Additionally, in the sophisticated configuration of the converter, only half of the line voltage is connected to the motor windings during each IGBT commutation, which cuts the voltage gradient stress on the motor’s insulation materials by a factor of two.
• Environmentally friendly
Optimal control, together with a high switching frequency through the whole speed range leads to very smooth, silent and energy efficient operation.

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 using service water, thereby allowing for a very compact construction. The temperature of the coolant is lowered using an external heat exchanger.

Mechanical design
BORDLINE® CC1500 AC is housed in an IP54 cabinet, designed for mounting in the machine room. The modular design allows easy access for maintenance.

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.

Application example
BORDLINE® CC1500 AC replaces the older thyristor-equipped traction converters in the first generation ICE1 high speed train of Deutsche Bahn. Besides making the train operation greener, the new Compact Converter significantly reduces operating cost.

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>AC voltage input (primary side)</td>
<td>1432 Vac</td>
</tr>
<tr>
<td>Propulsion output</td>
<td>0... 2250 Vac / 2.4 MW at wheel</td>
</tr>
<tr>
<td>Voltage limiter</td>
<td>included</td>
</tr>
<tr>
<td>Auxiliary converter</td>
<td>not equipped</td>
</tr>
<tr>
<td>Battery charger</td>
<td>not equipped</td>
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<tr>
<td>Vehicle control interface</td>
<td>RS 232, I/Os</td>
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<tr>
<td>Mounting position</td>
<td>machine room</td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>3621 x 875 x 1920 mm</td>
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<tr>
<td>Weight</td>
<td>2580 kg</td>
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</tbody>
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