BORDFLINE® CC1500 DC_3kV
For double-deck electric multiple unit with 3 kVdc grid voltage

BORDFLINE® CC1500 DC converts the power from the 3 kVdc overhead line into propulsion power for the traction motors and auxiliary power for onboard consumers (AC, integrated battery charger optional).

Characteristics
• Well proven 3-level converter topology
• Highly energy-efficient
• Motor and line friendly performance
• Traction technology adapted to harsh climatic conditions and Russian standards

System overview
BORDFLINE® CC1500 DC Compact Converter is connected to the 3 kVDC overhead line via main circuit breaker. The brake resistor and the line inductor are included in the Compact Converter and allow a highly integrated traction chain and optimized vehicle interface.

BORDFLINE® CC1500 DC consists of:
– 1 propulsion converter
– 1 braking chopper
– 2 auxiliary converters (fixed and variable frequency)
– DC line inductor
– braking resistor
– integrated cooling unit
– AC 800PEC control module

Propulsion converter
BORDFLINE® CC1500 DC Compact Converter is a rugged unit based on modern 3.3 kV IGBTs. It can control either one or two motors in parallel. The Compact Converter makes use of ABB's well-proven three-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!

Braking chopper
In case the DC overhead line is not receptive for recuperative energy, a braking chopper with corresponding brake resistor is installed. The braking chopper is able to dissipate the total braking energy into heating energy to ensure safe operation under all environment conditions.

Auxiliary converter
The auxiliary converter generates a current limited 3-phase-voltage directly from its galvanically separated DC-link. A sine filter smooths this pulse width modulated voltage to provide a quasi-sinusoidal voltage waveform at the output terminals of the auxiliary converter. Two outputs are available; one with fixed voltage and frequency for the train supply and the other with variable frequency for the cooling ventilators and cooling pump.
Powerful control platform

ABB Compact Converters are built on the AC 800PEC control platform, probably the most powerful modular controller for high-speed performance on the market. A wide range of other industrial applications uses this control platform. The AC 800PEC software provides 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 800PEC optimizes significantly the train commissioning.

Cooling system

The equipment is efficiently cooled using liquid coolant. This allows a very compact construction. The coolant is heated up by the power modules and lowered using an internal heat exchanger. The traction converter is equipped with a preheating unit which allows to heat up the converter interior even at very low outdoor temperatures.

Mechanical design

The electrical components are housed in a traction proven IP65 cabinet, the cooling equipment meets protection class IP21. The converter is designed for mounting on the vehicle roof and the modular converter design allows easy maintenance access.

Diagnostic and service

The service friendly modular design with standard components ensures high reliability and low life cycle costs for maintaining the system. The BORDLINE® View is the diagnostic application used to visualize signals, parameters and the state of the traction system. It consists of an advanced self-diagnostic function, which gives advice and instructions for service and repair. BORDLINE® View is easy to use and runs on a standard PC.

Application example

BORDLINE® CC1500 DC 3kV is mounted in Stadler’s double-deck electric railcars for Aeroexpress, Moscow. The fleet consists of two different train formations; four-car trains are equipped with three converters (3.9 MW) and six-car train with four converters (5.2 MW).

### Technical data

<table>
<thead>
<tr>
<th>BORDLINE® CC1500 DC_3kV_R_1300</th>
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<tbody>
<tr>
<td>DC line voltage</td>
<td>3 kVdc</td>
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<tr>
<td>Propulsion output</td>
<td>0...2150 Vac, 2 x 650 kW at wheel</td>
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<tr>
<td>Braking chopper</td>
<td>1150 kW</td>
</tr>
<tr>
<td>Auxiliary converter 1</td>
<td>3 x 380 V / 50 Hz, 140 kVA</td>
</tr>
<tr>
<td>Auxiliary converter 2</td>
<td>3 x 80...400 V / 10...50 Hz, 20 kVA</td>
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<tr>
<td>Vehicle control interface</td>
<td>CANopen, I/Os</td>
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<tr>
<td>Dimensions (L x W x H)</td>
<td>2700 x 3133 x 1241 mm</td>
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<tr>
<td>Weight</td>
<td>2900 kg</td>
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