BATTERY CHARGER

BORDLINE® BC
Next generation compact battery charger for all rolling stock applications

The BORDLINE® BC battery charger is a compact, lightweight unit designed to charge the batteries and supply DC loads.

Characteristics
- High power density and compact design
- Built with silicon carbide (SiC) power semiconductors
- Three phase AC voltage input
- Integrated active output diode
- 19-inch rack mount installation or integration into any other on-board equipment
- Efficiency > 95%
- Scalable power through parallel operation

System overview
The battery charger is based on modern SiC power semiconductor technology.

BORDLINE® BC contains:
- EMI filter and rectifier for AC inputs
- Power factor correction (PFC) stage to adjust current and voltage phase
- Resonant DC/DC converter providing galvanic isolation
- Digital control based on microprocessor/DSP
- Customer Interface based on CAN
- Speed controlled ultra-long-life fans for cooling

Functionality
The BORDLINE® BC battery charger is fed by a three-phase AC input and generates a DC voltage to charge the vehicle batteries and/or supply DC loads. The device can be configured to start up as soon as the supply line is present (dead battery start). The converters operate at high switching frequencies allowing for low ripple voltage and compact build size. Charging characteristics can be made battery temperature dependent using the provided temperature sensing input.
Control and monitoring
The converter is fully digital controlled by using a digital signal processor (DSP). The control unit monitors voltages, currents and internal temperatures to protect the device. External overload conditions such as short circuit, excessive ambient temperature, overvoltage are handled safely. The driver electronics supply the trigger signals for the power semiconductors and are also responsible for the protection of the power semiconductors. All outputs are short-circuit proof.

Control interface
Monitoring and configuration of the battery charger is provided by means of a CAN interface based on the CANopen protocol.

Cooling system
The unit is cooled by forced air. Fan speed is controlled by the needs of the device (depending on load conditions and current ambient temperature).

Mechanical design
The converter is suitable to be mounted, two units side by side, inside a standard 19-inch rack. All electrical interfaces are located in the front for easy and fast connection.

Diagnostics and service
For maintenance, a diagnostic information (such as current loading, temperature, errors and warnings) is provided via the CAN interface.

Application example
BORDLINE® BC is used in the new high-speed trains for the Swiss Federal Railways (SBB) starting service on transalpine routes between Zurich and Milan in 2019. ABB is equipping each of the 11-car electric multi-system multiple-unit train with two traction transformers LOT3000, four Compact Converter BORDLINE® CC1500 MS and three battery chargers BORDLINE® BC.

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>BORDLINE® BC</th>
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<tbody>
<tr>
<td>AC voltage input</td>
<td>3 x 400 - 480 V, 50 - 60 Hz</td>
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<tr>
<td>DC voltage output, nominal</td>
<td>24/36/110 V DC</td>
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<tr>
<td>Maximum DC output power</td>
<td>6.4/10/10 kW</td>
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<tr>
<td>Protection degree (rack-mounted)</td>
<td>IP20</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-40°C ... +70°C</td>
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<tr>
<td>Charging characteristics</td>
<td>IUoU</td>
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<tr>
<td>BUS interface</td>
<td>CANopen</td>
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<tr>
<td>Dimensionen (L x W x H)</td>
<td>400 x 222 x 132 mm</td>
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<tr>
<td>Weight</td>
<td>10 kg</td>
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