BATTERY CHARGER

BORDLINE® BC BOX
Modular standardized IP65 solution for all rail applications

The BORDLINE® BC BOX battery charger is a flexible, compact, lightweight and high-efficiency unit designed to charge vehicle batteries and supply low voltage DC loads. Up to 4 BORDLINE® BC units can be configured and installed together in order to meet any requirement in terms of voltage, current, power and reliability.

System overview

BORDLINE® BC BOX is an IP65 assembly that is suitable for both roof and underframe installation. It consists of:

- 1 to 4 x BORDLINE BC® standard battery chargers modules based on modern SiC power semiconductor technology
- Input and output protections
- Redundancy/overvoltage protection module in order to increase system reliability and overvoltage robustness
- Ultra-long life fans
- Communication Interface based on CAN or Ethernet

Functionality

BORDLINE® BC BOX allows connection of many BORDLINE® BC battery charger modules that can be fed from different sources either AC and DC.

Thanks to the usage of silicon carbide (SiC) technology it is possible to achieve ultra-high efficiency in a compact-build size, moreover switching related problems like voltage ripple and pure tone noise will never be a problem. The highly configurable control system allows to define charging characteristics of any kind of battery without any software/hardware modification. Dead battery start function is also guaranteed for each single module: as soon as input voltage is present, BORDLINE® BC BOX will start to charge batteries and supplying loads.

Characteristics

- High flexibility: selectable voltage and power
- High power density
- Built with silicon carbide (SiC)
- DC or Three phase AC voltage input
- Decoupling OR-ing output diode included
- Flexible cabinet (roof and underframe)
- High- Efficiency up to 96%
- High-degree of redundancy
- Air forced cooling

### Technical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>BORDLINE® BC BOX</th>
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<tbody>
<tr>
<td>Input AC Voltage</td>
<td>From 360V to 528V</td>
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<tr>
<td>Input AC frequencies</td>
<td>From 48Hz to 62Hz</td>
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<tr>
<td>Input DC voltage</td>
<td>From 420V to 800V</td>
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<tr>
<td>Output nominal Voltage</td>
<td>24 VDC, 36 VDC, 72 VDC, 110 VDC</td>
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<tr>
<td>Output power</td>
<td>From 6.5 kW to 38kW</td>
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<tr>
<td>Output current</td>
<td>Up to 675A for 24/36 VDC, Up to 300A for 72/110 VDC</td>
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<tr>
<td>Protection degree</td>
<td>IP65</td>
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<tr>
<td>Operating temperature range</td>
<td>-25°...+45°C</td>
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<tr>
<td>Communication Interface</td>
<td>CANopen – Ethernet</td>
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<tr>
<td>Dimension</td>
<td>1028 x 755 x 485 mm</td>
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<tr>
<td>Weight</td>
<td>From 60kg to 100kg</td>
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Flexibility

The BORDLINE® BC BOX is a highly flexible system that fits most common battery voltages with different power demands simply selecting the BORDLINE® BC model and numbers to be installed inside the IP65 cabinet. With this approach the battery charger can be customized according needs with a short time to market.

Redundancy management

BORDLINE BC Box modular design allows a high level of redundancy at vehicle level, giving the customer a more reliable and cost-optimized solution.

Cooling system

Each BORDLINE® BC module is cooled by forced air using integrated fans. BORDLINE® BC BOX is cooled by one main external fan, redundant if needed. Fan speed is controlled by the needs of the device (depending on load conditions and current ambient temperature) avoiding fast fan aging.

Mechanical design and maintenance

The converter be mounted underframe or on the roof of any kind of railway vehicle. Air inlet position can be easily customized. The layout foreseen one big front panel that allows direct, easy and quick access to any LRU that never exceed 10kg. The external fan is also easily accessible from the back.

Diagnostics and service

For maintenance, a CAN or Ethernet diagnostic interface is available, using CANopen, SAE J1939, or TRDP protocol to share real time status such as current loading, temperature, errors, and warnings.