The BORDLINE® M170 DC - ABB is a pre-tested Auxiliary power converter system for railway applications tailorable according customer needs.

System overview
The BORDLINE® M170 DC converter is based on modern IGBT and Silicon Carbide technology.

The system is composed by:
- DC/DC high voltage converter directly supplied by the catenary (1500 Vdc) to generate a galvanic isolated and regulated DC-Link
- DC/AC converter with customizable voltage and frequency up to 170kVA
- A modular battery charger configuration based on up to 3 BORDLINE® BC SiC Battery charger up to 28,35kW @ 128 Vdc

Functionality
A DC/DC high voltage converter is directly supplied by the catenary to generate a galvanic isolated and regulated DC-Link. A not isolated three-phase inverter generates a sine wave three phase voltage at the converter output.
A V/F control is implemented to limit the inrush current when a heavy load is powered (e.g. compressor). The BORDLINE® M series converters are ready to works together in order to build a 3AC and/or DC distribution bus along the train without additional data-bus communication.

The distribution bus across cars allows to increase the reliability of the train, and in certain circumstances it also allows to reduce the rated power of the auxiliary power converter system.
Up to three battery charger modules (BORDLINE® BC) are available to supply DC electronic loads and charge batteries of the vehicle from 24 Vdc to 110 Vdc.

Characteristics
- IGBT and Silicon Carbide technology
- Compact and robust design
- Integrated sine filter
- Fed by 1500 Vdc catenary (1100 Vdc - 1950 Vdc)
- Integrated battery charger modules (BORDLINE® BC)
- TCMS communication bus via CANOpen or Ethernet
- Full digital control
- Underfloor installation (IP65)
- Air forced cooling
### Technical data

**Input Voltage**
1500 Vdc (1100 Vdc - 1950 Vdc)

**AC Output Voltages**

<table>
<thead>
<tr>
<th>Nominal Voltage</th>
<th>Nominal Power</th>
<th>Output Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>380 V&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>160 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz</td>
</tr>
<tr>
<td>400 V&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>170 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz</td>
</tr>
<tr>
<td>415 V&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>170 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz/60 Hz</td>
</tr>
<tr>
<td>480 V&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>170 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz/60 Hz</td>
</tr>
</tbody>
</table>

**DC Output Voltages**

<table>
<thead>
<tr>
<th>Nominal Voltage</th>
<th>1x</th>
<th>2x</th>
<th>3x</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td>6,35 kW / 225 A</td>
<td>12,7 kW / 450 A</td>
<td></td>
</tr>
<tr>
<td>36 V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td>9,45 kW / 225 A</td>
<td>18,9 kW / 450 A</td>
<td></td>
</tr>
<tr>
<td>72 V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td>6,35 kW / 75 A</td>
<td>12,7 kW / 150 A</td>
<td>19 kW / 225 A</td>
</tr>
<tr>
<td>110 V&lt;sub&gt;dc&lt;/sub&gt;</td>
<td>9,45 kW / 75 A</td>
<td>18,9 kW / 150 A</td>
<td>28,3 kW / 225 A</td>
</tr>
</tbody>
</table>

**Protection degree**
- IP65 + IP21

**Operating temperature range**
-25°...+50°C

**Communication Interface**
CANOpen/Ethernet (TRDP/CIP)

**Dimension**
2300 x 810 x 600 mm

**Weight**
≤ 655 kg

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The diagram shows the electrical connections and components of the system, including inputs and outputs, with labels for various parts and connections.
Control and monitoring
Control system of BORDLINE® M auxiliary converter is based on the AC800 PEC control platform. AC800 PEC controller is a modular high speed programmable and measurement device, which is used widely in several industrial & traction control applications.
The operating conditions of the converter as well as various analogue values can be transmitted as outputs over the TCMS bus.

Cooling system
The converter is cooled by forced air. The internally mounted fan and the air duct are integral parts of the onboard converter. A thermal monitoring device protects the converter from becoming overheated.

Mechanical design
The metal structure, based on galvanized aluminum material, has been designed for IP65 protection and to be mounted on train (underfloor). The complete equipment contains replaceable modules. All power modules are single and independent LRUs which contain all active components. Each LRU can be easily removed outwards and downwards.

Diagnostics and service
The service-friendly modular design with highly standardized components, ensures high reliability, excellent spare parts availability, and optimized lifecycle costs.
The main purpose of the service concept is to define and specify the activities and processes in order to assure the RAMS (Reliability, Availability, Maintainability, and Safety) requirements. Following this norm, the service concept allows to offer tailor-made service solutions in order to assure the predictability of low life-cycle costs while maintaining high product availability.
The service package is optional available.

Application example
BORDLINE® M170 DC are designed to be mounted in the underframe of any railway vehicle that operates at 1500 Vdc voltage.