The BORDLINE® M170 DC - ABB is a pre-tested Auxiliary power converter system for railway applications tailor able 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>Voltage (V)</th>
<th>Nominal Power (kVA)</th>
<th>Output Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>380 V_ac</td>
<td>160 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz</td>
</tr>
<tr>
<td>400 V_ac</td>
<td>170 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz</td>
</tr>
<tr>
<td>415 V_ac</td>
<td>170 kVA</td>
<td>3AC and 3AC+N</td>
<td>50Hz/60 Hz</td>
</tr>
<tr>
<td>480 V_ac</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>Voltage (V)</th>
<th>Nominal Power</th>
<th>Power (kW)</th>
<th>Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 V_dc</td>
<td>6.35 kW</td>
<td>12.7 kW</td>
<td>75 A</td>
</tr>
<tr>
<td>36 V_dc</td>
<td>9.45 kW</td>
<td>18.9 kW</td>
<td>150 A</td>
</tr>
<tr>
<td>72 V_dc</td>
<td>6.35 kW</td>
<td>12.7 kW</td>
<td>75 A</td>
</tr>
<tr>
<td>110 V_dc</td>
<td>9.45 kW</td>
<td>18.9 kW</td>
<td>150 A</td>
</tr>
</tbody>
</table>

**Protection degree**
IP65 + IP21

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

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

**Dimension**
2300 x 810 x 600 mm

**Weight**
≤ 655 kg
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.