The BORDLINE® M1 AC battery charger is a compact, rugged unit developed for coaches and locomotives.

System overview
The BORDLINE® M1 AC is based on modern IGBT technology.

The system is composed by:
- Input filter and AC/DC diode bridge rectifier
- H bridge IGBT inverter
- Insulation transformer: insulates the mains to the load for safety requirements satisfaction
- DSP Control unit
- Rectifier and output filter
- Diagnostic and communication board

Functionality
The BORDLINE® M1 AC battery charger feeds from a three-phase inverter inside the coach (400 Vac 3ph 50 Hz) to generate a DC voltage (28.8 Vdc) to charge the batteries and supply the DC loads of the vehicle. A control for compensation in temperature of batteries charging voltage is integrated.

Characteristics
- DSP technology
- Compact and rugged design
- On board installation
- Fed by three-phases AC input
- High reliability thanks to consolidated building blocks

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>BORDLINE® M1 AC_400V</th>
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</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>400 Vac 3ph 50 Hz</td>
</tr>
<tr>
<td>DC voltage output</td>
<td>28.8 Vdc (27 Vdc - 30 Vdc)</td>
</tr>
<tr>
<td>DC output power</td>
<td>1500 W</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP5X</td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>410 x 290 x 300 mm</td>
</tr>
<tr>
<td>Ambient temperatures</td>
<td>-25°C +70°C</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt;25 kg</td>
</tr>
<tr>
<td>TCMS</td>
<td>MVB</td>
</tr>
<tr>
<td>Diagnostic interface</td>
<td>Ethernet/USB</td>
</tr>
</tbody>
</table>
Control and monitoring
The converter is full digital controlled (DSP technology). The remote monitoring of the converter is supported by an MVB train bus communication interface. Thanks to the Ethernet and USB interfaces the operator can monitor converter status and configure converter parameters.

Cooling system
The unit is cooled by natural convection.

Mechanical design
The equipment has a light and compact structure; it can be mounted on board of coaches.

Diagnostics and service
The converter has been designed with highly standardized components, high reliability, excellent spare parts availability, and optimized life-cycle costs. For maintenance, a communication interfaces (Ethernet with RJ45 connector or USB) are available.

Application example
BORDLINE® M1 AC_400V is mounted in Trenitalia medium distance double deck coaches running in Italy. Each coach train is equipped with two converters. It’s installed to charge the batteries.

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