The BORDLINE® M150 is one implementation of a pre-tested Auxiliary Power Converter system for railway application. The customer needs and project requirement are met thanks to product re-configuration without any needs of additional development and type tests repetition.

System overview
The BORDLINE® M150 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 150kVA
- A modular battery charger configuration based on up to 2 BORDLINE® BC SiC Battery charger up to 19kW

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 metro without additional data-bus communication.

The distribution bus across cars allows to increase the reliability of the metro, and in certain circumstances it also allows to reduce the rated power of the auxiliary power converter system.

Two battery charger modules (BORDLINE® BC) are available to supply DC electronic loads and charge batteries of the vehicle at 110 Vdc. Both modules can be also fed by a dedicated 3AC input from depot supply plugs.

Characteristics
- IGBT and Silicon Carbide technology
- Full digital control
- Compact and robust design
- Integrated fire detection system
- Integrated 3AC sine filter
- Workshop 3AC supply input
- Underfloor installation (IP65)
- Air forced cooling

### Technical data

<table>
<thead>
<tr>
<th>Technical data</th>
<th>BORDLINE® M150 DC</th>
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<tbody>
<tr>
<td>Input Voltage</td>
<td>1500 Vdc</td>
</tr>
<tr>
<td></td>
<td>(1000 Vdc - 1950 Vdc)</td>
</tr>
<tr>
<td>AC Output Voltages</td>
<td>400 Vac 50Hz 3ph - 150kVA</td>
</tr>
<tr>
<td>DC Output Voltages</td>
<td>110 Vdc - 19kW</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP65 + IP21</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-25°C...+45°C</td>
</tr>
<tr>
<td>Communication Interface</td>
<td>MVB</td>
</tr>
<tr>
<td>Dimension (L x W x H)</td>
<td>2542.5x940x672 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt;750 kg</td>
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</tbody>
</table>
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, allows to cool the internal ambient and passive components. Thermal protections are implemented to protect the converter from becoming overheated.

Mechanical/Electrical design
The metal structure, based on painted 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® M150 DC_1500V is designed to be mounted in the underframe of any railway vehicle that operates at 1.5kVdc voltage.