AUXILIARY CONVERTER

BORaseline® M50 DC_1500V
For light rail vehicles and metro cars

The BORaseline® M50 DC static converter is a compact, rugged unit developed to feed auxiliary services of light rail vehicles and metro cars (air compressor for breaking system, HVAC system).

System overview
The BORaseline® M50 DC converter is based on modern IGBT technology.

The system is composed by:
- N°1 resonant DC/DC converter (1500 Vdc/700 Vdc), that turns catenary voltage (1500 Vdc) into internal DC link 700 Vdc to supply output stages
- N°1 DC/AC inverter (700 Vdc/400 Vac 50 Hz 3ph) to supply HVAC system and AC loads (45 kVA)
- N°1 DC/DC battery charger (700 Vdc/24 Vdc), to supply batteries and DC loads (13 kW)

Functionality
It is configured in an isolated DC/DC full bridge. It generates the internal DC link at 700 Vdc, stabilised and filtered. To minimize dimensions and weight the stage is designed with resonant configuration. The three-phase inverter, due to the installed sine filter, 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) with externally controlled normally close output contactor. An isolated DC/DC converter is available to convert the 700 Vdc bus in a 24 Vdc to supply the electronic loads of the metro and charge batteries. A control for compensation in temperature of batteries charging voltage is integrated.

Characteristics
- IGBT technology
- Resonant high voltage input stage
- Compact, robust and lightweight design
- Integrated sine filter
- Fed by 1500 Vdc catenary (900 - 2000 Vdc)
- Integrated battery charger
- Integrated diagnostic system
- Underfloor installation

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>BORaseline® M50 DC_1500V</th>
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<tbody>
<tr>
<td>Input voltages</td>
<td>1500 Vdc (900 Vdc - 2000 Vdc)</td>
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<tr>
<td>Output voltages</td>
<td>24 Vdc</td>
</tr>
<tr>
<td>Output voltages</td>
<td>400 Vac 50 Hz 3ph</td>
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<tr>
<td>Output power</td>
<td>45 kVA + 13 kW</td>
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<tr>
<td>Protection degree</td>
<td>IP65</td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>1785 x 995 x 650 mm</td>
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<tr>
<td>Ambient temperatures</td>
<td>-25°C +50°C</td>
</tr>
<tr>
<td>Weight</td>
<td>≤ 650 kg</td>
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<tr>
<td>Communication interface</td>
<td>RS485, USB</td>
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ABB
Control and monitoring
The monitoring of the converter is supported by a diagnostic card connected to vehicle control bus with serial connection (RS485). A USB connection for local monitoring and diagnostic data download is also available.

Cooling system
The converter is cooled by forced air.

Mechanical design
The metal structure, based on stainless steel material, has been designed for IP65 protection and to be mounted underfloor. As the converter has been developed for a revamping project, it has a high customized mechanical design.

Diagnostics and service
The service-friendly modular design with highly standardized components ensures high reliability, excellent spare parts availability, and optimized life cycle costs. For maintenance a diagnostic interface (USB) is available. It permits to monitor converter status and alarms history.

Application example
BORDLINE® M50 DC_1500V has been developed for different overhaul projects for LRV and metro cars.