AUXILIARY CONVERTER

BORDLINE® M60 MS_UIC
For passenger coaches

The BORDLINE® M60 MS static converter is a sealed, compact, rugged unit developed to feed auxiliary services of sleeping and restaurant coaches (HVAC system, AC and DC loads, battery charger).

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BORDLINE® M60 MS_UIC for coaches

System overview
The BORDLINE® M60 MS converter is based on modern IGBT technology.

The system is composed by:
- N° 1 HV grouping for heating resistors
- N° 1 AC or DC to DC converter, that turns catenary voltage (1000 Vac, 1500 Vac/Vdc, 3000 Vac/Vdc) into internal DC link 650 Vdc to supply output stages
- N° 1 bi-directional DC/AC inverter (650 Vdc/ 400 Vac 50 Hz 3ph) with adjustable output frequency up to 50/60 Hz to supply HVAC sysyem and AC loads (60 kVA)
- N° 1 DC/DC battery charger (650 Vdc/110 Vdc), to supply batteries and DC loads (12 kW)

Functionality
It is an automatic switch used to configure heating resistors according input voltage.
The High Voltage module is configured in an insulated AC or DC to DC full bridge. It generates the internal DC link at 650 Vdc, stabilised and filtered.
HV stage is composed by two stages (AFE/boost + insulation stage) and in case of AC input it implements a PFC function.
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. HVAC compressor). Reverse feeding capability: in case of no input voltage the converter can be fed directly by 400 Vac 50 Hz 3ph in order to supply the battery charger/DC load outputs
An insulated DC/DC converter is available to convert the 650 Vdc bus in a 110 Vdc to supply the electronic loads of the coach and charge batteries. A control for compensation in temperature of batteries charging voltage is integrated.

Characteristics
- IGBT technology
- Suitable for all UIC voltages
- 3 kVac input voltage as option (according GUS)
- Compact, robust and lightweight design
- Integrated sine filter
- Integrated battery charger
- Integrated diagnostic system
- Input contactor
- Safety earthing switch
- Workshop supply input
- Underfloor installation

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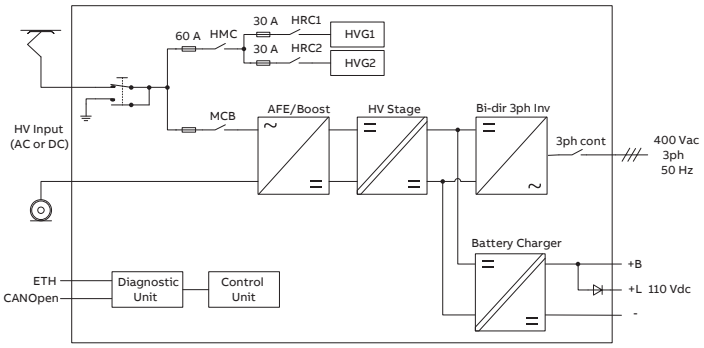

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01 Sleeper coaches for Azerbaijan Railways (ADY) Photo: Stadler Rail
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02 Block diagram of BORDLINE® M60 MS_UIC

Technical data	BORDLINE® M60 MS_UIC
Input voltages	1 kVac 16 ⅔, 22 or 50 Hz; 1,5 kVac 50 Hz; 1,5 kVdc; 3 kVac, 3 kVdc
Output voltages	400 Vac 50 Hz 3ph 110 Vdc
Output power	60 kVA + 12 kW
Protection degree	IP65 (+ IP20)
Dimensions (L x W x H)	2500 x 2266 x 640 mm
Ambient temperatures	-40°C +45°C
Weight	1500 kg
Communication interface	CANopen, Ethernet

Control and monitoring

The main control is based on ABB's AC 800PEC control platform electronics and is structured so that each power section (AC or DC) can work independent of each other. Both outputs are short-circuit proof. The control electronics also monitor voltages, currents and internal temperatures.

Cooling system

The units are cooled by forced air. The internally mounted fans 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 stainless steel material, has been designed to be mounted underfloor. The design concept of an air force cooling system with a "dirty" zone water-resistant (IP20) and a waterproof "clean" zone containing electronics and other components (IP65), improves the reliability of the converters. The heatsinks are partitioned so that the individual modules can be easily removed and replaced.

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, an Ethernet interface is available. Further data can be obtained using a standard PC and the BORDLINE® View, a diagnostic tool that includes an advanced self-diagnosis function, which provides advice and instructions for service and repair. A CANopen bus is available to connect the system to TCMS.

Application example

BORDLINE® M60 MS_UIC is mounted on new Sleepers and restaurant coaches running in Azerbaijan.

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