AUXILIARY CONVERTER

BORDLINE® M75 DC_1500V

For metro cars

The BORDLINE® M75 DC static converter is a compact, rugged unit developed to feed auxiliary services of metro cars and supply DC loads.

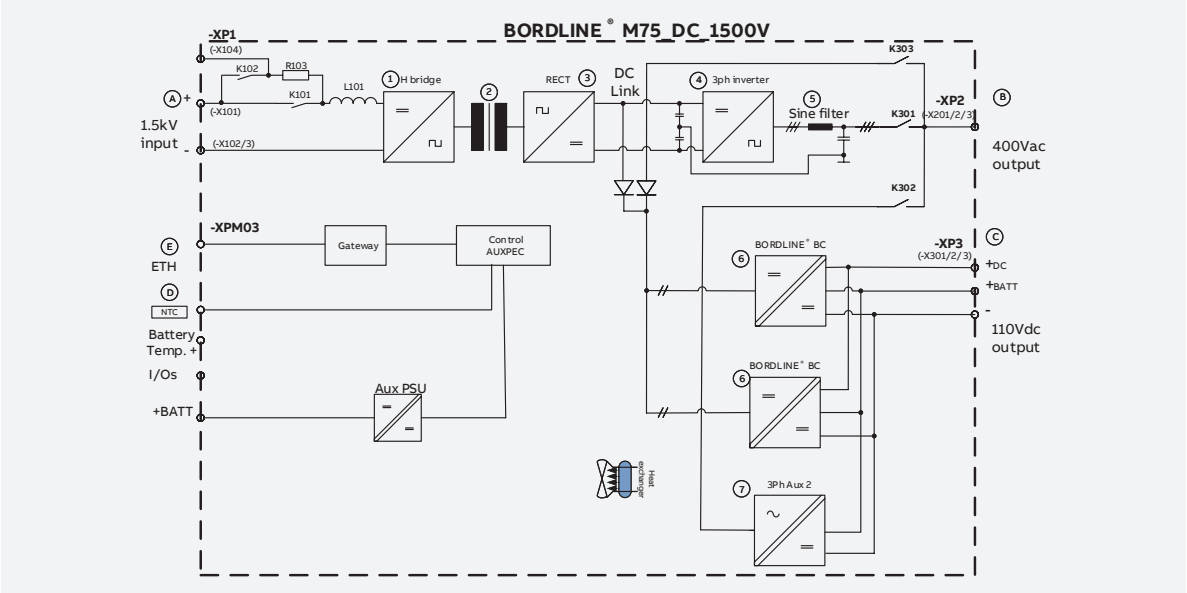
System overview
The BORDLINE® M75 DC converter is based on modern IGBT technology.

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
- N° 1 DC/AC inverter (DC-Link / 400 Vac 50 Hz 3ph - 54 kVA) to supply AC loads
- N° 2 BORDLINE® BC Battery charger (DC Link / 110 Vdc – 2 x 9.45 kW)
- N°1 DC/AC Isolated inverter fed by the batteries for reverse mode operation (110 Vdc/ 400 Vac 50 Hz 3ph – 2 kVA)

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, 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).

The BORDLINE® M converter can be used to obtain an AC distribution train bus. Up to 6 converters can be synchronized and connected in parallel, independently of the distance between converters.
Two battery charger modules (BORDLINE® BC) are available to supply DC electronic loads of the vehicle at 110 Vdc.
Battery charger can be also supplied by 400 Vac 50 HZ.
A three phases DC/AC inverter, powered by the battery, is installed to supply a little amount of 3Ph loads, if the HV and AUX inverter are faulty.

Characteristics
- IGBT technology
- Compact and robust design
- Integrated sine filter
- Fed by 1500 Vdc catenary (1000 Vdc - 1950 Vdc)
- Integrated battery charger modules (BORDLINE® BC)
- Ethernet diagnostic, communication bus with CIP protocol
- Full digital control
- Underfloor installation
- Air forced cooling



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01 Block diagram of BORDLINE® M75 DC_1500V

Technical data	
Input Voltages	1500 Vdc (1000 Vdc - 1950 Vdc)
Output Voltages	400 Vac 50 Hz 3ph – 54 kVA 110 Vdc - 2x9.45 kW 400 Vac 50 Hz 3ph – 2kVA (Back up mode)
Protection degree	IP65
Operating temperature range	-38°...+45°C
Communication Interface	Ethernet, CIP
Dimensions	2000 x 845 x 560 mm
Weight	425-450 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 bus. An Ethernet interfaces is available to communicate to TCMS. A gateway is installed to connect BORDLINE® M75 to TCMS via Ethernet using CIP protocol, including Web Services and Cyber Security rules.

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 metro cars (underfloor). The complete equipment contains replaceable modules. All power modules are single and independent LRUs which contain all active component. Each LRU can be easily removed outwards and upwards.

Diagnostics and service
The service-friendly modular design with highly standardized components ensures high reliability, excellent spare parts availability, and optimized lifecycle costs.
For maintenance a diagnostic interface (Ethernet) 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.

Application example
BORDLINE® M75 DC_1500V has been installed in Montreal new metro cars.

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