

AUXILIARY CONVERTER

BORDLINE® M30 DC_750V

Auxiliary converter and battery charger (BORDLINE® M10) for mass transportation retrofit project



Replacement of obsolete thyristor technology and integration of BORDLINE® M30 DC converter module into existing space.

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BORDLINE M30 DC_750V
converter

System overview

The BORDLINE® M30 DC converter is based on modern IGBT technology.

The system is composed by:

- N°1 input stage consisting of input filter, disconnecting and pre charge unit
- N° 1 DC/AC inverter with adjustable output frequency up to 50Hz (Catenary/380 Vac 50 Hz 3ph) to supply AC loads on the vehicle
- The system includes also a stand-alone battery charger (BORDLINE® M10) that is a passively operated unit M30 DC_750V is composed by:
 - N° 1 potential separation transformer
 - N° 1 diode bridge rectifier
 - N° 1 sensors and protection devices

Functionality

M30 DC auxiliary converter (750 Vdc / 400 Vac 50 Hz 3ph)

The three-phase inverter, due to the installed sine-filter, generates a sine wave three-phase voltage at the converter output. The V/F control is implemented to limit the inrush current when a heavy load is powered (e.g. compressors).

M10 AC battery charger

(380 Vac 50 Hz 3ph / 110 Vdc)

It is fed by a three-phase AC input and generates a DC voltage to charge the vehicle batteries and/or supply DC loads. M10 is controlled by M30 auxiliary converter. Charging characteristics can be made battery temperature dependent using the provided temperature sensing input.

Characteristics

- IGBT technology
- Compact and robust design
- Integrated sine filter
- M30: fed by 600 Vdc, 750 Vdc catenary (500 Vdc - 1000 Vdc)
- M10: fed by 380 Vac 50 Hz 3ph
- Full digital control
- Underframe installation

Technical data	BORDLINE® M30 DC_750V
Dc Voltage Input	600 Vdc, 750 Vdc catenary
AC Voltage Output	380 50 Hz 3ph
Max Output Power	30 kVA
Protection degree	IP65
Operating temperature range	-20°C...+40°C
Control interface	Binary signal
Dimension	974 x 680 x 600 mm
Weight	140 kg



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01 Electric multiple unit for S-Bahn Berlin, Germany
Photo: DB AG, Volker Emersleben

02 Block diagram of BORDLINE® M30 DC_750V and M10 AC_380V

Technical data	BORDLINE® M10 AC_380V
Dc Voltage Input	380 Vac 50 Hz 3ph
AC Voltage Output	110 Vdc
Max Output Power	10 kW
Protection degree	IP65
Dimension	800 x 480 x 500 mm
Weight	236 kg

Control and monitoring

The main control is based on ABB's AC 800PEC control platform electronics. The output is short-circuit proof. The control electronics also monitors voltages, currents and internal temperatures.

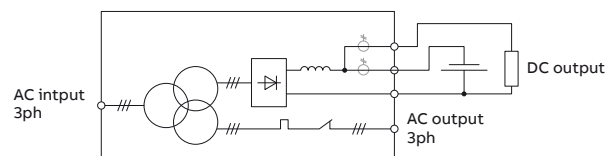
Control interface

Monitoring and control of the auxiliary converter is provided by means of binary signals. For diagnostic, an additional Ethernet interface is available.

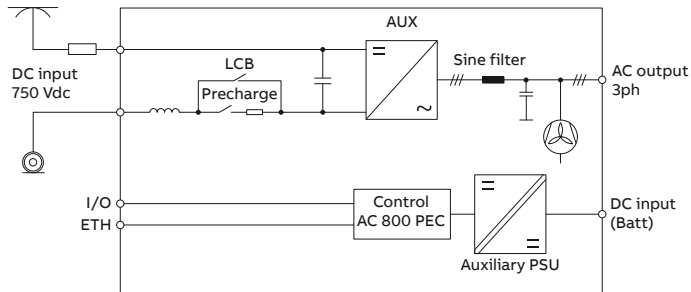
Cooling system

BORDLINE M30 DC unit is cooled by forced air. The fan is integrated in the converter.
BORDLINE M10 AC unit is passive air-cooled.

BORDLINE® M10 AC



BORDLINE® M30 DC



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Mechanical design

The metal structure gives IP65 protection and it has been designed for underframe mounting. 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. They permit to monitor converter status and alarms history.

Application example

BORDLINE® M30 DC_750V and BORDLINE M10 AC_380V battery charger are mounted on 480 electric multiple units (EMU Germany). ABB converter has been designed for a revamping project and it's fully compatible with the existing electro-mechanical interfaces.

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