

## 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.

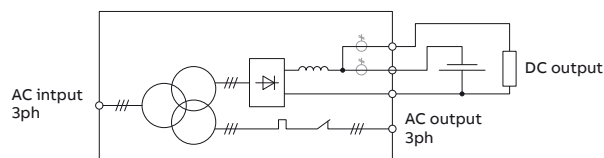
### Control interface

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

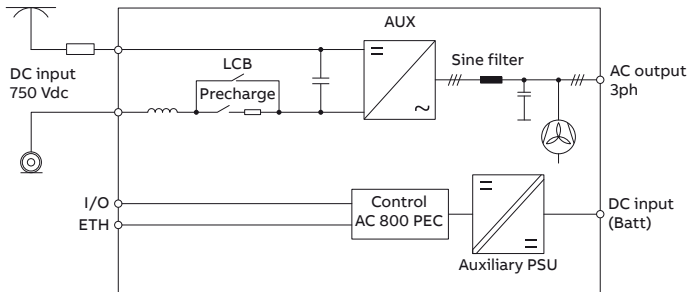
### Cooling system

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 electrical multiple units running in 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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