

AUXILIARY CONVERTER

# BORDLINE® M50 DC\_1500V

## For light rail vehicles and metro cars



The BORDLINE® 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).

BORDLINE® M50  
DC\_1500V for LRV  
and metro cars

### System overview

The BORDLINE® 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)

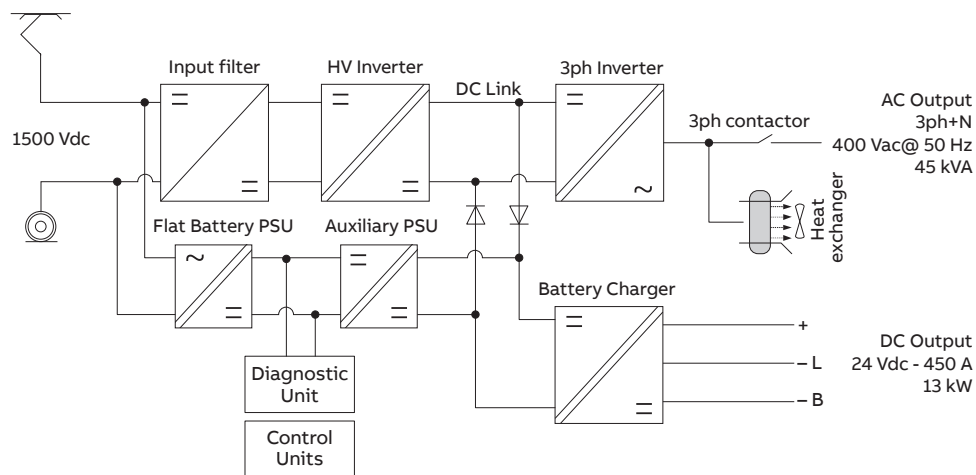
### Functionality

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          | BORDLINE® M50 DC_1500V        |
|-------------------------|-------------------------------|
| Input voltages          | 1500 Vdc (900 Vdc - 2000 Vdc) |
| Output voltages         | 24 Vdc<br>400 Vac 50 Hz 3ph   |
| Output power            | 45 kVA + 13 kW                |
| Protection degree       | IP65                          |
| Dimensions (L x W x H)  | 1785 x 995 x 650 mm           |
| Ambient temperatures    | -25°C +50°C                   |
| Weight                  | < 650 kg                      |
| Communication interface | RS485, USB                    |



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01 Block diagram  
of BORDLINE®  
M50 DC\_1500V

### 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.