

AUXILIARY CONVERTER

# BORDLINE® M40 DC\_750V

## For monorail/people mover



The BORDLINE® M40 DC static converter is a compact, rugged unit developed to feed auxiliary services of people mover vehicle.

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BORDLINE® M40  
DC\_750V for  
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### System overview

The BORDLINE® M40 DC converter is based on modern IGBT technology.

The system is composed by:

- N° 1 DC/AC inverter (750 Vdc/380 Vac 50 Hz 3ph - 40 kVA) to supply AC loads (i.e. motor compressor, fans)
- N° 1 LVPS1 DC/DC converter (750 Vdc/110 Vdc - 8 kW), that turns catenary voltage (750 Vdc) into 110 Vdc to supply DC car loads and batteries
- N° 1 LVPS2 DC/DC converter (110 Vdc/24 Vdc - 3.6 kW), to supply 24 Vdc car loads
- N° 1 DC/AC isolated converter (110 Vdc/230 Vac 50 Hz 1ph 3 kVA) for convenience/utility outlets

### Functionality

A not isolated three-phase inverter, due to the installed sinefilter, 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).

An isolated DC/DC converter (LVPS1) is available to convert the 750 Vdc catenary voltage in a 110 Vdc to supply the 110 Vdc electronic loads of the vehicle and the batteries. A current sharing characteristic is implemented to connect in parallel LVPS1 modules of adjacent cars.

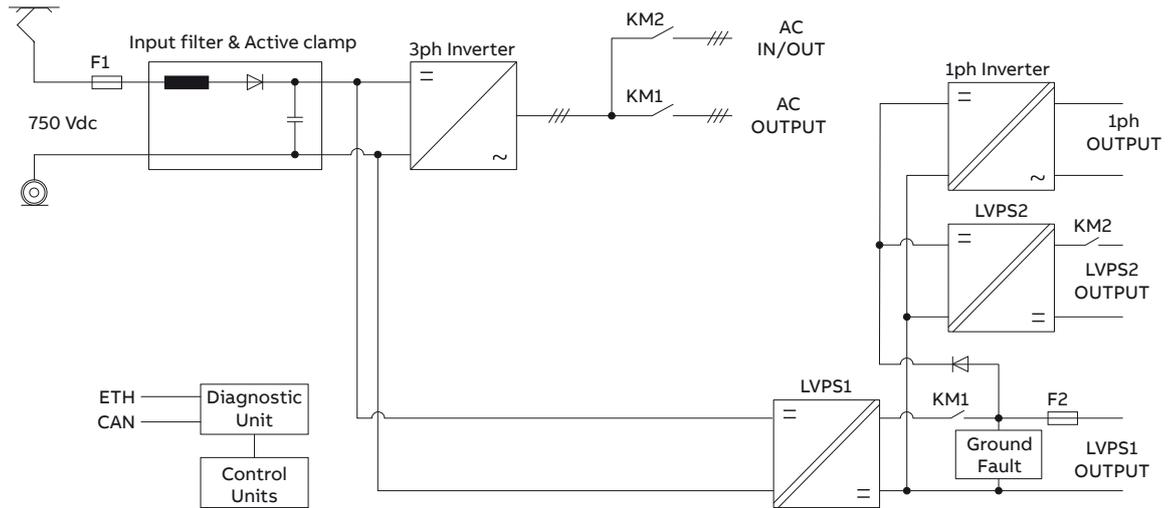
An isolated DC/DC converter (LVPS2) is available to supply DC electronic loads of the vehicle @24 Vdc.

The LVPS2 is fed by LVPS1 module. When it's not available (no high voltage) it is fed by batteries. An isolated DC/AC converter is available to supply AC 1-phase loads (convenience/utility outlets). It is fed by LVPS1 module. When it's not available (no high voltage) it is fed by batteries.

### Characteristics

- Fed by 750 Vdc catenary (500 Vdc - 1000 Vdc)
- Four outputs: 380 Vac 50 Hz 3ph, 230 Vac 50 Hz 1ph, 24 Vdc, 124.5 Vdc
- Full digital control
- Compact and robust design
- Liquid cooling system
- Integrated sine filter
- Ethernet diagnostic and CANopen communication bus
- Underfloor installation

Technical data	BORDLINE® M40 DC_750V
Input voltages	750 Vdc (500 Vdc - 950 Vdc)
Outputs	380 Vac 50 Hz 3ph - 40 kVA
	230 Vac 50 Hz 1ph - 3 kVA
	124,5 Vdc - 8 kW
	24 Vdc - 3,6 kW
Protection degree	IP65
Dimensions (L x W x H)	1564 x 409 x 955 mm
Ambient temperatures	-25°C +50°C
Weight	154 kg
Communication interface	Ethernet (PTE), CANopen (TCMS)



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Block diagram of  
BORDLINE® M40 DC\_750V

### Control and monitoring

The converter is full digital controlled (DSP technology). All outputs are protected against short-circuit. The control electronics also monitor voltages, currents and internal temperatures. The interface to the Train Control and Management System is managed by CANopen bus.

### Cooling system

The converter is liquid cooled with fast on/fast off system without liquid leakage. An additional internal fan is used to avoid hot spot in order to equalizing the temperature around electronic components. The LVPS2 and 1ph inverter are air forced cooled in order to assure the cooling even when the water cooling system doesn't work (high voltage input or 3ph output voltage not present)..

### Mechanical design

The metal structure, based on painted steel material (dielectric white internally and black externally), has been designed for IP65 protection and to be mounted on monorail vehicles (underfloor). The heatsinks are partitioned so that the 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 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® M40 DC\_750V has been designed for Monorail platform.