

COMPACT CONVERTER

BORDLINE® CC1500 MS

For multi-system high-speed trains



BORDLINE® CC1500 MS converts the power from the AC or DC line into propulsion power for the traction motors and auxiliary power for onboard customers.

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BORDLINE® CC1500 MS
for high propulsion

Characteristics

- Innovative 3-level converter for multi-system operation
- Compact and lightweight design with low overall height
- Motor-friendly
- Line-friendly
- «Best Efficiency Control» to realize high energy efficiency
- Integrated auxiliary converter

System overview

Incoming power from the catenary is stepped down by the main transformer (for AC lines) or directly fed to two BORDLINE® CC1500 MS Compact Converters. They supply the motive power via the traction motors. Energy recuperated during braking is fed back through the same chain into the traction supply network.

BORDLINE® CC1500 MS contains:

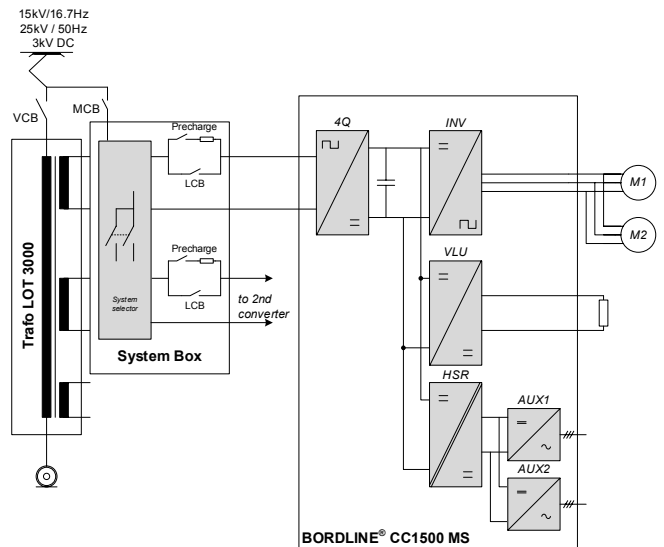
- System switches for up to three grid voltage systems
- Line converter (4Q)
- DC-link
- Voltage limiter
- Propulsion inverter
- Auxiliary converter with fixed frequency
- Auxiliary converter with variable frequency
- AC 800PEC control module

Propulsion converter

BORDLINE® CC1500 MS Compact Converter is a rugged unit incorporating modern IGBT technology. It can control a single motor or two motors in parallel. The Compact Converter is based on ABB's well proven 3-level topology, which has several advantages over conventional 2-level solutions: It is better for the motor, better for the grid, and it saves energy!

• Better for the motor

The BORDLINE® CC1500 MS 3-level inverter has double the conventional semiconductor switching frequency, which optimizes the sinusoidal current waveform. Current and torque ripples are reduced by more than a factor of four, which in turn drastically decreases losses, audible noise and mechanical stress on the traction motor. In addition, the voltage gradient stress on the motor's insulation materials is reduced by a factor of two.



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01 Electric high-speed train EC250
Photo: Stadler

02 Main Circuit of BORDLINE® CC1500 MS

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• Better for the grid

The inherent features of the 3-level technology minimize the line interference current. Neither line filters nor active filters are needed to comply with typical grid codes. Furthermore, engineering time and effort for homologation in different countries is minimized.

• Environmentally friendly

Optimal control, together with a high switching frequency through the whole speed range, leads to very smooth, silent, reliable and energy-efficient operation.

Powerful control platform

ABB Compact Converters are based on the AC800 PEC control platform which is a modular and flexible high-speed traction control unit designed for harsh environmental and operating conditions in rolling stock.

Cooling system

The equipment is efficiently liquid-cooled, resulting in a longer lifetime for all the components and a smaller converter size. The coolant (regular tap water with glycol) dissipates energy through an external heat exchanger.

Mechanical design

BORDLINE® CC1500 MS is housed in an IP65 cabinet. The converter height of 400 mm allows underfloor mounting supporting the low-floor vehicle concept. The power modules can be exchanged through drawer insets and the modular design of the converter is optimized for easy and fast maintenance.

Application examples

The Compact Converter BORDLINE® 1500 MS is used in the new low-floor high-speed trains EC250 built by Stadler for the Swiss Federal Railways (SBB) starting service on trans-alpine routes between Zurich and Milan in 2019. The compact underfloor converter solution maximizes seating capacity. ABB is equipping each of the 11-car high-speed multi-system train with two traction transformers LOT3000, four Compact Converter BORDLINE® CC1500 MS and state-of-the-art silicon carbide (SiC) based battery chargers BORDLINE® BC.

Technical data	BORDLINE® CC1500 MS_15-25-3kV_U_1600
Line voltage input	15 kVac / 25 kVac / 3kVdc
Propulsion output	0... 2500 Vac / 1.5 MW at wheel
Voltage limiter	included / resistor external
Auxiliary converter	200 kVA
Vehicle control interface	CAN
Mounting position	Underfloor
Dimensionen (LxWxH)	5500 x 2144 x 400 mm
Weight	2000 kg

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