

TRACTION CHAIN

BORDLINE® CC1500 AC_15-25kV

Most efficient traction chain for regional trains



ABB's patented multilevel converter topology combined with latest semiconductor technology and best efficiency control results in the most efficient traction chain on the market.

—
Resibloc® Rail Dry-type
Traction Transformer and
BORDLINE® CC1500 AC
for regional trains

Characteristics

- Very high power density (1.7 MW/t)
- ABB patented multilevel converter topology
- Latest semiconductor technology
- Grid friendly line converter enables transformer optimization
- Motor friendly: superior voltage quality minimizes additional losses in the motors
- Best efficiency control
- State-of-the-art digital connectivity
- Integrated auxiliary inverters
- High reliability with low life-cycle cost
- Available in roof, machine room and underfloor variants

System overview

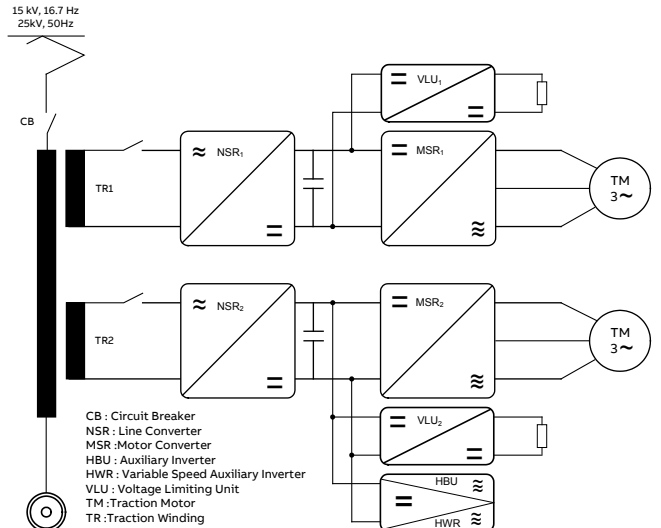
The catenary voltage (15/25 kV) is stepped down by the traction transformer and fed to the BORDLINE® CC1500 AC Compact Converter which supplies the motive power for the traction motors. The converter is split into two parts with each driving one traction motor and controlled by one independent (or common) control systems. One of the two parts is also equipped with a fixed frequency and variable frequency auxiliary inverters. Both parts work independent of each other resulting in very high availability thereby complementing the well-engineered redundancy concept at train level.

Propulsion converter

BORDLINE® CC1500 AC is a compact and modular traction converter incorporating modern low voltage IGBT technology. The use of high switching frequency allows total optimization of the traction transformer (super-efficient and low impedance dry transformer) as well as significant reduction of traction motor losses, audible noise and mechanical stress. To maximize the energy efficiency, a «Best Efficiency Control» algorithm is implemented which finds the energy efficient optimum for any operation point.

Auxiliary converter

The auxiliary converters (AUX) generate current limited three-phase output voltage directly from the intermediate DC-link. The HBU operates with fixed frequency while the HWR delivers variable frequency output for the converter and transformer cooling system. The switching frequency ripple current is filtered with sine filters and the resulting output is nearly devoid of high frequency components.



01

01 FLIRT regional train, SOB, Switzerland

BORDLINE® CC1500 AC is used in the trains of the type FLIRT and KISS for AB Transio, BLS, Go-Ahead (Murrbahn), SOB and VRR. Each train is equipped with a redundant ABB traction chain with two Compact Converters and two traction transformers.

Photo: Stadler

02 Block diagram of BORDLINE® CC1500 AC

02

Powerful control platform

Reliability, speed, and precision which are desired in converters and traction drives require a powerful control unit. ABB's high-end control platform AC 800 PEC is used as the control system in all traction converters. This unit covers all traction relevant control and protection functions, diagnostics and provides a simple interface to the vehicle control unit. Modular visual programming ensures quick adaption of the control software, simplicity and reliability.

Cooling system

The power modules are efficiently cooled using service water thereby allowing a very compact construction. An internal air to water heat exchanger is used to exchange the internal losses to the outside ambient. This helps to avoid hot spots as well as to maintain the internal air temperature close to coolant temperature thereby enhancing the reliability of control electronics.

Mechanical design

BORDLINE® CC1500 AC is housed in a roof mounted and vibration resistant (IP65) cabinet. The sub-systems are modularly designed and use of compact, modular light weight modules with spill free quick couplings allow easy maintenance without special tools and thereby reducing maintenance effort.

Diagnostic and service

The service friendly modular design with standard components ensures high reliability and low life-cycle cost. The Compact Converter is delivered with BORDLINE® View, a diagnostic tool to visualize signals, parameters and the state of the traction system. It also consists of an advanced self-diagnostic function, which gives guidance and instructions for service and repair. Powerful control system together with state-of-art digital connectivity, enables sophisticated operation data and condition monitoring, well beyond traction chain (e.g. wheel/rail, pantograph and catenary conditions).

Technical data	BORDLINE® CC1500 AC_15-25kV
AC voltage input	15 kV, 16.7 Hz and 25 kV, 50 Hz
Propulsion output	2 x 1050 kW at wheel
Auxiliary converter	3 x 400 V / 50 Hz, 140 kVA
Auxiliary inverter	3 x 80...480 V/10 ...60 Hz, 32 kVA
Vehicle control interface	TRDP
Mounting position	roof/machine room/underfloor
Dimensions (LxWxH)	1812 x 746 x 1976 mm
Weight	1295 kg

Technical data	Resibloc® Rail Dry-type Traction Transformer
AC voltage input	15 kV, 16.7 Hz
Continuous power	1300 kVA
Mounting position	roof
Cooling	air-cooled
Dimensions (LxWxH)	2600 x 2460 x 770 mm

ABB Switzerland Ltd
Traction
Austrasse
5300 Turgi, Switzerland
sales.traction@ch.abb.com

ABB Automation Products GmbH
Wallstadter Strasse 59
68526 Ladenburg, Germany
transportation.deabb@de.abb.com

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB Ltd. Copyright© 2018 ABB
All rights reserved