The BORDLINE® M30 DC static converter is a compact, rugged unit used to generate onboard supply voltages for light rail vehicles. This unit is part of ABB’s BORDLINE® M product platform for onboard converters. Due to its wide input voltage range, the converter works with nominal grid voltages of 600 $V_{dc}$ and 750 $V_{dc}$. The integrated input filter allows the converter to be connected directly to the catenary line.

**System overview**

The BORDLINE® M30 DC static converter is realized with modern IGBT technology and provides a three-phase sinusoidal AC voltage output and a DC voltage output for charging the battery.

BORDLINE® M30 DC auxiliary converter contains:

- Input and EMC filter with input fuses (1)
- Pre-charging unit (1)
- DC/DC converter with galvanic insulation (2)
- Three-phase inverter (3) with sine-filter (4)
- DC/DC converter for battery charging (5)
- AC 800PEC main control module (6)
- Electronics power supply (7)

**DC/DC converter**

The DC/DC converter (2) generates the DC voltage for the regulated intermediate DC-link. The transformer ensures the galvanic separation of the output voltage from the overhead conductor voltage.

**Three-phase inverter**

The three-phase inverter generates, due to the installed sine-filter, a sinusoidal voltage at the converter output, which can be connected to standard three-phase motors. High overload capability and a soft-start function permit trouble-free starting of heavy loads (e.g. compressors).

**Battery charger**

For charging the batteries and supplying the vehicle DC loads an independent DC/DC converter (5) with galvanic insulation is available. The battery is charged in accordance with an IU charging curve with temperature compensation. A separate output is provided for the vehicle DC loads.
**Powerful control platform**
The main control is based on ABB’s AC 800PEC control platform electronics and is structured so that every power section (AC or DC) can work independent from each other. Both outputs are short-circuit proof. The control electronics also monitors voltages, currents and internal temperatures.

**Cooling systems**
The units are cooled by forced air. The externally mounted fans and the air duct are integral parts of the onboard converter. A thermal monitoring device protects the converter from becoming overheated.

**Mechanical design**
The equipment is housed in dust and waterproof cabinet (IP65) and is suitable for either roof or under-floor mounting. The auxiliary converter is designed as a modular equipment. The heat sinks are partitioned so that the individual modules can be easily removed and replaced.

**Diagnostic and service**
The service friendly modular design with standard components ensures high reliability and low life cycle costs for maintaining the system. For maintenance, an Ethernet interface is available and further data can be obtained using a standard PC and the BORDLINE®-View tool, a diagnostic tool that includes an advanced Self-Diagnosis Function, which gives advice and instructions for service and repair.

**Application example**
BORDLINE® M30 DC_750 is operating for instance in the highly successful Citadis low-floor trams in the cities of Santa Cruz de Tenerife, Montpellier, Nice, and Dublin.

For more information please contact:

**ABB Switzerland Ltd**
**Traction Converters**
Austrasse
5300 Turgi, Switzerland
Tel: +41 58 585 00 00
E-Mail: traction.converters@ch.abb.com
www.abb.com/railway