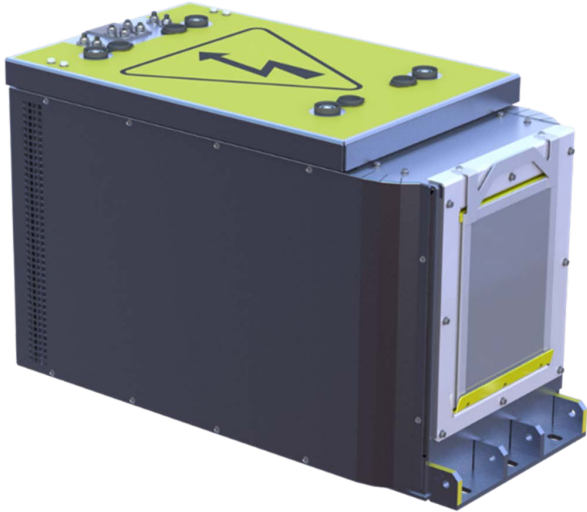


BHC9640 BATTERY MANAGEMENT SYSTEM



Features

- » IP65 train roof-top model
- » 400 VAC input models
- » Output models 24, 36, 110 VDC
- » Efficiency up to 95 %
- » Forced cooling with fan
- » MTBF 1 800 000 h
- » Coated PCB for rail and metro applications
- » Large operation temperature range from -40 °C to +55 °C and up to +70 °C with derating

Product Description

BHC9640 Battery Management System is a monolithic IP65 enclosed 12.8kW system with 3 x 400VAC input, which provides power through 110VDC bus output and maintains an 110VDC battery charged through battery Input/Output. In case of loss of AC input, the power to the bus output is provided by the battery.

The battery is decoupled from the 110VDC bus through decoupling diode which prevents excessive charging current in case the bus voltage exceeds the battery voltage.

The battery voltage and current are controlled through inbuilt current sensor and an NTC probe attached to the battery.

The system supports two battery charging curves (for “Float” and “Boost” modes) and independent battery charging current limit curve, each of the curves can have up to 8 control points in it.

Standards

- » EN50155:2007 Railway applications – Electronic equipment used on rolling stock
- » EN50124-1:2001 Railway applications – insulation coordination
- » EN50153:2014 Railway applications – Rolling stock – Protective provisions relating to electrical hazards
- » EN45545-2:2013 Railway applications – Fire protection on rail vehicles
- » EN61373:2010 Railway applications – Shock and vibration

Technical Specifications

Input parameter	Value / range	Note
Input voltage	3x400 VAC _{rms} (+15 % / -20 %)	According to DIN IEC 60038
Input current per phase	Nominal < 28A _{rms}	Nominal at 400V _{ac} 12,8kW
Power factor	> 0,8 (at load range 15%...100 %) if Power optimization is enabled	3-phase input rectified with diode bridge, i.e. no active control against unbalanced input voltages and conducted harmonics.
Inrush current	48A _{peak}	<128A _{peak} during first 200µs
Input frequency	47...63 Hz	-
Input characteristic	Inductive	-
Standby power consumption	Nominal 20 ... 80W + Max 10...25 W for cooling	From 3-phase AC input From 3-phase AC input or vehicle Battery circuit during shutdown cooldown
Idle power consumption	< 10W	From Battery circuit (if AC input is off)
Maximum reverse power draw from Output	< 6W	Only if Battery voltage is lower than the Output voltage
Circuit breaker	32A	S203P-C32, 2CDS283001R0324

Output parameter	Value / range	Note
Output voltage	Output ripple voltage	<i>Nominal</i>
Output voltage adjustment range	60...137 VDC	-
Output overvoltage protection	145 VDC	-
Maximum load current	116 ADC ±5 %	-
Maximum output power	12800W	Output current is automatically reduced to maintain power limits.
Max. allowed total output current	200A for 10s	Combined Battery and converter current output to the 110V bus
Efficiency	90...93 %	at load range 35...100 %
Output voltage regulation	Voltage ±1 %	Accuracy of output voltage
Output voltage adjustment	Via CAN bus	<i>Remote output voltage adjust only</i>
Battery temperature compensation	CPU controlled per programmed characteristic of customer requirements	in charging mode (charging curve per customer specification)
Output ripple voltage	150 mV _{RMS} (f = 20...300kHz, T _{amb} = 25°C)	-

Environmental parameters	Value / range	Note
Operating ambient temperature range	-40°C ... +40°C	EN 50155 Class T1
Relative air humidity	100%, non-immersed	IP65
Shock and vibration	EN 61373, category 1 class B	-
Pollution degree (PD) External (During outdoors operation)	PD4	All internal maintenance must be performed inside a closed facility with PD2!
Internal (inside device & during maintenance)	PD2	
Cooling airflow generated by the device	Max 9m3/min	Depends on load and ambient temperature

Applicable standards

Fire Safety

Standard	Name	Note
EN 45545-1:2013	Railway applications – Fire protection on rail vehicles Part 1: General	-
EN 45545-2:2013 + A1:2015	Railway applications – Fire protection on rail vehicles Part 2: Requirements for fire behaviour of material and components	-
EN 45545-5:2013 + A1:2015	Railway applications – Fire protection on rail vehicles Part 5: Fire safety requirements for electrical equipment including that of trolley buses, track guided buses and magnetic levitation vehicles	-

Electrical Safety

Standard	Name	Note
EN 50124-1:2001	Railway applications – Insulation coordination – Part 1: basic requirements – Clearances and creepage distances for all electrical and electronic equipment	Overtoltage class: OV 2 Pollution degree PD2 (inside of the device)
EN 50155:2007	Railway applications – Electronic equipment used on rolling stock	Insulation resistance and voltage withstand according to section 12.2.9
EN 50153:2014	Railway applications – Rolling stock – Protective provisions relating to electrical hazards	Voltage category III

Electromagnetic compatibility

Standard	Name	Note
EN 50121-3-2:2006	Railway applications – Electromagnetic compatibility Part 3-2: Rolling Stock – Apparatus: <ul style="list-style-type: none"> - Radiated disturbance - Disturbance voltage - Radio-frequency electromagnetic field - Electrostatic discharge - Radio-frequency common mode - Fast transients Surges	

Operating Environment

Standard	Name	Note
EN 61373:2010 (IEC 61373:2010) +AC:2017	Railway applications – Rolling stock equipment – Shock and vibration test	Category 1 class B
EN 60529:2014-09	Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989 + A1:1999 + A2:2013)	IP 20
EN 50533:2011 + A1:2016	Railway – Three phase train line voltage characteristics	-
EN 50125-1:2014	Railway application – Environmental conditions for equipment – Part 1: Rolling stock and on-board equipment	-