

1000W, High Reliability, Convection Cooled, Railway Quality DC/DC Converter BHR 65X2R-4U2NF Series (Opto-less)



- No optocouplers, low component count
- Rugged, railway quality
- Cooling by convection only (no fans or forced air)
- Rugged construction
- Conformal coating
- High input/output isolation
- Full electronic protection
- Customized versions available

This rugged, railway quality DC/DC converter is designed for a long operating life. By eliminating optocouplers in the feedback loop, the MTBF of the unit is greatly improved over conventional designs. The converter is built with two BHR 65R modules connected redundant parallel. Each internal module generates 500W. This modular construction provides inherent redundancy; the failure of one internal module would cause a 50% drop in output power while the unit remains functional at 500W. Therefore, this design can also be used as a 500W redundant power supply. A +/- dual output configuration is also possible. The mechanical construction has no internal wiring, which increases vibration-withstand capacity and contributes to long-term reliability. In addition, the internal boards are conformal coated for immunity to humidity and contamination. All heat generating components are installed on aluminum heat-sink blocks which are thermally coupled to the heatsink fins and cooled by natural convection. Heatsink fins are installed on the side of the unit and internally for efficient cooling. The input and output are filtered for low noise. Full electronic protection eliminates failure due to abnormal operating conditions, including application errors. Large design headroom and the use of components with established reliability also contribute to the long operating life of the unit. The converter meets the requirements of EN50155 for electronic equipment used on railway rolling stock. It is manufactured at our plant under strict quality control. An industrial quality version of this design, the BHR 65X2-4U2NF, is also available.

SPECIFICATIONS

Input Voltage

72Vdc (43 – 101V),
96Vdc (58 – 135V),
110Vdc (66 – 154V)
For other input voltages,
please consult factory.

Input Protection

Inrush current limiting
Varistor
Reverse polarity protection
Internal safety fuse
Lower voltage than the specified
minimum input will not damage
the unit

Isolation

Corresponding to input/output
voltage:
Min. 1500Vdc input to chassis
Min. 3000Vdc input to output
Min. 1500VDC output to chassis

Standards

Designed to meet EN 60950-1
and EN50155

Immunity

Meets criteria as requested in
EN50155 and EN50121-3-2
according to the following
standards:
EN61000-4-2 (ESD)
EN61000-4-3 (RF Immunity)
EN61000-4-4 (Fast Transients)
EN 50155 (Surge)
EN 61000-4-6 (Conduction
Immunity)
EN50155 (Voltage Variations)

EMI

EN50121-3-2

Switching Frequency

55kHz ±3kHz

Output Voltages

24V, 48V, 110V or 125Vdc
1000W continuous
12Vdc at 800W continuous
Output is floating; either terminal
can be grounded
Consult factory for other
voltages

Redundancy diode

Internal boards are connected
parallel via redundancy diode

Line/Load Regulation

± 2% combined from 5% load
to full load

Dynamic Response

Max 5% voltage deviation for 10%
to 50% load step, with better than
1msec recovery time

Output Ripple/Noise

Better than 1% of output voltage
peak to peak or 0.2% Vrms
(20MHz BW)

Output Overload Protection

Rectangular current limiting with
short-circuit protection
Thermal shutdown in case of
insufficient cooling (self-resetting)

Output Overvoltage Protection

Second control loop

Efficiency

Typically 80-90% at full load
depending on input/output
combination

Operating Temperature Range

-25 °C to 55 °C for full specification
Extended temperature ranges
available on request

Temperature Drift

0.03% per °C, over operating
temperature range

Cooling

By natural air convection

Environmental Protection

Ruggedizing
Conformal coating

Shock/Vibration

IEC 61373 Cat 1 A&B

Humidity

5 - 95% non-condensing

MTBF

175,000 hours at 45 °C
Demonstrated MTBF is
significantly higher

Indicators

Green 'Output ON LED' visible
through cooling slots

Control Input

Optional

Alarm Output

None on standard version
Output fail alarm Form C contacts
installed on request

Package/Dimensions (H x W x D)

4U2NF: 191 x 191 x 305 mm
(7.5 x 7.5 x 12")
Dimensions include heatsink fins
and flanges, exclude connectors.
Mounting holes are clear

Weight

6.8 kg (15 lb)

Connections

Barrier type terminal blocks or
threaded studs

RoHS Compliance

Compliant

Warranty

Two years subject to application
within good engineering practice

The specifications on this data sheet are generic and are subject to change. Enhancements to these specifications can be provided upon request.

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