

# 3000W, Rugged DC/DC Converter for Railway and other Heavy-duty Applications

## BAP 3KR

- ◆ Field-proven rugged design
- ◆ For train and mobile applications
- ◆ Fan cooling
- ◆ Full electronic protection
- ◆ Redundant, modular



The BAP 3KR is a railway quality DC/DC converter that uses a field technology to deliver the required output power. It is a mature design with a track record in numerous applications. The unit is built with four internal modules, which also provide inherent redundancy; the failure of one module would only cause a minor loss in output power. Several shelves can be paralleled for higher output power. The unit has input and output filtering in compliance with EN55022 and EN50121-3-2 conducted and radiated EMI standards. Built-in fans provide sufficient airflow for operation without de-rating to the specified temperature. Full electronic protection eliminates failure due to abnormal operational conditions, including application errors. The internal models are fully ruggedized and conformal coated for immunity to shock, vibration and moisture. Low component count, large design headroom, and the use of components with established reliability result in a high MTBF. It meets the requirements of EN50155 for electronic equipment used on railway rolling stock. The unit is manufactured at our plant under strict quality control.

## SPECIFICATIONS

### Input Voltage

110Vdc (66 - 154V)  
Other inputs upon request

### Input Protection

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

### Input Isolation

Depends on the required input/output combination. At minimum: 1500VDC input to chassis 3000VDC input to output 1500VDC output to chassis

### Standards

Designed to meet EN60950 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

EN55022 Class B and EN50121-3-2 conducted and radiated

### Switching Frequency

55kHz +/- 3kHz

### Output Voltage

28V +/- 0.2V /107A  
Consult factory for other outputs

### Redundancy diodes

Installed on each internal module for separation and redundancy

### Line/Load Regulation

+/- 1.5% combined from zero load to full load including redundancy diode

### 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% RMS of the output voltage (20MHz BW)

### Overload Protection

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

### Output Overvoltage Protection

Second regulator loop. Second loop completely stable and independent of main regulator loop

### Efficiency

Typically 90% depending on input/Output configuration

### Operating Temperature

-25°C to +55°C for full Specification

### Temperature Drift

0.03% per oC over operating temperature range

### Cooling

Forced air by high-quality built-in fans

### Environmental Protection

Ruggedizing  
Conformal coating

### Shock/Vibration

IEC61371 Cat 1 A&B

### Humidity

5 - 95% non-condensing

### MTBF

150,000 hours @ 45 oC per internal module.  
Demonstrated MTBF is significantly higher.

### Indicators

None  
Available as option

### Control Input

None  
Available as option

### Alarm Outputs

Form C contacts for module fail alarm available on request

### Package/Dimensions (H x W x D)

3U4: 244 x 132 x 407 mm (9.6" x 5.2" x 16") including terminal blocks and flanges.  
Mounting holes are clear.

### Weight

Approx 8kg (18 lb)

### Connections

Input: Terminal block  
Output: Threaded studs

### RoHS Compliance

Fully compliant

### Warranty

Two years subject to application within good engineering practice

Enhancements to these general specifications can be accommodated upon request. Designed to meet common approval requirements



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