

## 100 - 150W, Rugged, Triple-output, Railway Quality DC/DC Converter DCW 103R-F2 Series



- Triple output, fully regulated, isolated
- For train and mobile applications
- EN50155 input ranges
- Field-proven rugged design
- Conduction/convection cooled
- Full electronic protection
- Wide selection of input/output combinations

This rugged, triple output railway quality DC/DC converter uses field-proven BAB 210 technology to generate the required output power. It is a mature design on a 100 x 220 mm PCB size, with three fully regulated, isolated outputs. Cooling is via base plate to a heat-sinking surface and by natural convection. Ruggedizing and conformal coating provide added immunity to shock, vibration and humidity. Full electronic protection, low component count, large design headroom, and the use of components with established reliability result in a high MTBF. The unit meets the requirements of EN50155 for electronic equipment used on railway rolling stock. It is manufactured at our plant under strict quality control. Industrial grade versions of this design are also available.

### SPECIFICATIONS

#### Input Voltage

24Vdc (15 - 34V)  
48Vdc (29 - 67V)  
72Vdc (43 - 101V)  
96Vdc (58 - 135V)  
110Vdc (66 - 154V)  
Other inputs upon request

#### 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

1500Vdc input to chassis  
3000Vdc input to output  
1500Vdc output to chassis  
1000V between outputs

#### Standards

Designed to meet EN60950-1 and EN50155

#### Immunity

Meets criteria of EN50155 and EN50121-3-2 including:  
EN 61000-4-2 (ESD)  
EN 61000-4-3 (RF Immunity)  
EN 61000-4-4 (Fast Transients)  
EN 50155 (Surge)  
EN 61000-4-6 (Conducted Imm.)  
EN 50155 (Voltage Variations)

#### EMI

EN50121-3-2

#### Switching Frequency

V1: 47 kHz  $\pm$ 2kHz main PWM  
V2: 72 kHz  $\pm$ 7kHz  
V3: 72 kHz  $\pm$ 7kHz

#### Output Voltage

V1: 5.1Vdc  $\pm$ 0.05V/10A  
V2: 12Vdc  $\pm$ 0.2V/2A  
V3: 12Vdc  $\pm$ 0.2V/2A  
Above is one possible output configuration.  
Please discuss the required output parameters with factory.  
All outputs are fully regulated, floating and isolated from each other.  
Either side of each output can be grounded

#### Redundancy diode

None

#### Line/Load Regulation

$\pm$ 1% combined on all outputs

#### 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

Individual rectangular current limiting on all three outputs.  
Short circuit protection by hiccup on the V1 output and non-hiccup on the V2 and V3  
Thermal shutdown in case of insufficient airflow (self resetting)

#### Output Overvoltage Protection

For + V1 output: fully stable second regulator loop independent of main regulator loop.  
Transzorb on V2 and V3 outputs

#### Efficiency

80 to 85% at full load depending on input/output configuration

#### Operating Temperature

-25°C to +55°C cold-plate temperature range for full specification

#### Temperature Drift

0.03% per °C over operating temperature range

#### Cooling

Conduction via base plate to customer heat-sink or chassis and natural convection

#### Environmental Protection

Ruggedizing  
Conformal coating  
Heavy ruggedizing available on request

#### Shock/Vibration

IEC 61373 Cat 1 A&B

#### Humidity

5 - 95% non-condensing

#### MTBF

Min. 140,000 hours @45°C  
Demonstrated MTBF is significantly higher

#### Indicators

"Output On" LED visible through cooling slots

#### Control Input

None

#### Alarm Output

None

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

F2: 114 x 58 x 256 mm  
(4.5" x 2.3" x 10.1") including terminal block and flanges.  
Mounting holes are clear

#### Weight

1.2 kg (2.6 lb)

#### Connections

9-pole barrier-type terminal block, 3/8" spacing

#### RoHS

Compliant

#### Warranty

Two years subject to application within good engineering practice

#### Standard Terminal Block Pin-Out

DC OUTPUT						DC INPUT		
V1		V2		V3		GND	+	-
+	-	+	-	+	-			
1	2	3	4	5	6	7	8	9

**Note:** A few existing designs of this extensive series have a slightly different Pin-out

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

*OEM of industrial and railway quality AC/DC power supplies and battery chargers, DC/DC converters, DC-AC sine-wave inverters, phase and frequency converters, DC-output UPS systems and complete power systems in 19" and 23" racks since 1982. Custom or standard.*



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