

## 400W, Encapsulated DC/DC Converter for Railway and other Heavy Duty Applications RWY 400-P400 Series

- EN50155 input ranges
- For train and mobile applications
- Full encapsulation
- Wide temperature range
- Rugged, field-proven design
- Full electronic protection



This fully encapsulated, railway quality DC/DC converter uses a field-proven coupled inductor technology to generate the required output power. It is a mature product with a track-record in numerous applications. The unit meets the requirements of EN50155 for electronic equipment used on rolling stock. This unit meets the requirements of EN50155 for electronic equipment used on rolling stock. It is entirely potted with a thermally conductive MIL-grade silicon rubber compound to ensure immunity to high levels of shock, vibration and humidity. Cooling is by conduction via a base plate to a heat-sinking surface. Low component count, large design headroom, and the use of components with established reliability result in a high MTBF. The unit is also suitable for transportation, mining, oilrigs, military and other harsh environments. It is manufactured at our plant under strict quality control. Customized versions are also available.

### SPECIFICATIONS

#### Standard Input Voltages

48Vdc (29 - 67V)  
72Vdc (43 - 101V)  
96Vdc (58 - 135V)  
110Vdc (66 - 154V)  
Consult factory for other voltages and ranges

#### Input Protection

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

#### Isolation

1500Vdc input to chassis  
3000Vdc input to output  
1500Vdc output to chassis

#### Standards

Designed to meet EN60950-1, EN50155

#### Immunity

Meets criteria of EN50155 and EN50121-3-2 according to the following standards:  
EN 61000-4-2 (ESD)  
EN61000-4-3 (RF Immunity)  
EN61000-4-4 (Fast Transients)  
EN50155 (Surge)  
EN61000-4-6 (Conducted Imm.)  
EN50155 (Voltage Variations)

#### EMI

EN50121-3-2

#### Switching Frequency

55kHz  $\pm$ 3kHz

#### Standard Output Voltages

12Vdc/33A, 24Vdc/16A,  
36Vdc/11A or 48Vdc/8A  
Output is floating, either terminal can be grounded.  
Consult factory for other outputs

#### Redundancy Diode

None installed  
Available as option

#### Line/Load Regulation

$\pm$ 1% combined from zero load to full load on each output

#### Dynamic Response

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

#### Output Ripple/Noise

Less than 1% peak-to-peak or 0.2% RMS of the output voltage (20MHz BW)

#### Output Overload Protection

Rectangular current limiting with short-circuit protection  
Thermal shutdown with automatic recovery in case of insufficient cooling

#### Output Overvoltage Protection

Second regulator loop completely stable and independent of main regulator loop

#### Efficiency

80 to 90% depending on input/output configuration

#### Operating Temperature Range

-40 to +70°C cold-plate temperature for full specification

#### Temperature Drift

0.03% per °C over operating temperature range

#### Cooling

Conduction cooling via base plate to customer heat-sink or chassis

#### Environmental Protection

Full encapsulation with thermally conductive silicon potting compound with UL94V-0 flammability rating  
Meets environmental criteria as requested in MIL-810 C, D

#### Shock/Vibration

IEC 61373 Cat 1 A&B

#### Humidity

5 - 95% non-condensing  
Contact factory for higher rating

#### MTBF

150,000 hours @ 45 °C  
Demonstrated MTBF is significantly higher

#### Indicators

None.  
Optional 'Output ON' LED available

#### Control Input

None

#### Alarm Output

None. Available as option

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

P400: 131 x 66 x 232 mm (5.2" x 2.6" x 9.2") including terminal block and flanges  
Mounting holes are clear

#### Weight

2.2 kg (4.85 lbs)

#### Connections

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

#### RoHS Compliance

Compliant

#### Warranty

Two years subject to application within good engineering practice



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