

Statronics Power Supplies

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ISO 9001

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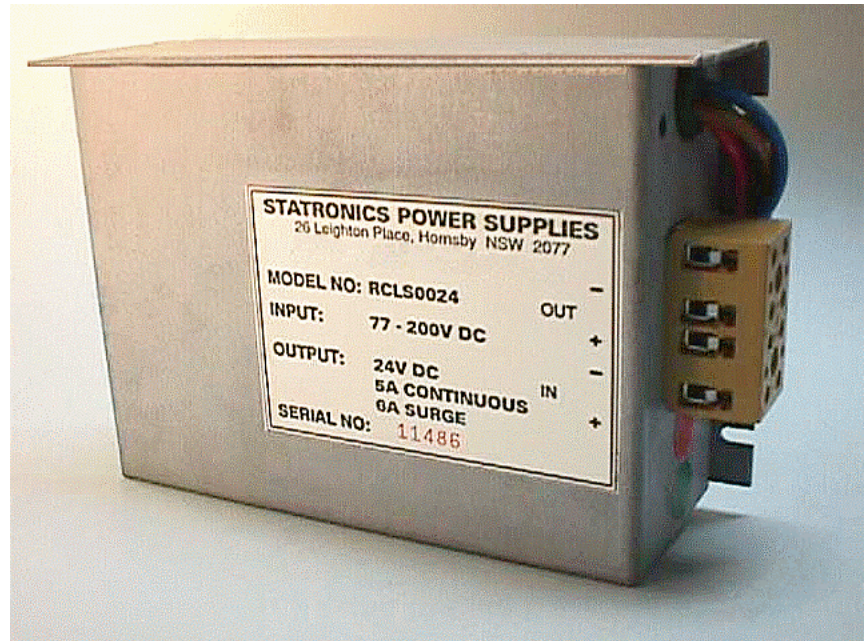
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RCL-SERIES SINGLE AND TRIPLE OUTPUT DC-DC CONVERTERS FOR RAIL AND OTHER APPLICATIONS

FEATURES

- Exceptionally Robust
- 900,000 Hours MTBF (Field Demonstrated)
- High Efficiency
- High Transient Immunity
- Meet or exceeds BRB/RIA Standards
- Convenient Mounting



RCLS0024

RCLS0012

INPUT SPECIFICATIONS

Input Voltage Range	62 - 200V DC
Inrush Current	40A max (cold start at 200V DC)
Input current at Maximum Continuous Load	2A max
Voltage Transients and Surges	Comply with BRB/RIA Specification No. 13 and IEC 255-4 class 3

OUTPUT SPECIFICATIONS – SINGLE OUTPUT MODELS

Nominal Output Voltage	24V	12V
Maximum Continuous Current (See Environment)	5.0A	10A
Surge Current (1 Minute - See Environment)	6.0A	12A
Minimum Current for ± 3% Regulation	0.5A	2A
Minimum Current for + 7% - 3% Regulation	0.1A	0.3A
Minimum Current for +12%- 3% Regulation	0A	0A
Continuous Output Power (Ta < 35 °C) See Environment	120W	
Surge Output Power (Ta < 35 °C) See Environment	120W	
Line and Load Regulation	± 3%	
Overload Protection	Approx. 110% of surge power	
Short Circuit Protection	Indefinite	
Output Ripple and Noise (See Note 1)	<1% P-P	

OUTPUT SPECIFICATIONS – RCLT0512

Nominal Output Voltage	5V	+12V	-5V
Maximum Continuous Current (See Environment)	10A	4A	0.1A
Surge Current (1 Minute - See Environment)	12A	6A	0.1A
Minimum Current for $\pm 3\%$ Regulation	0A	0.5A	0
Minimum Current for $+ 7\% - 3\%$ Regulation	0.1A	0.1A	0
Continuous Output Power ($T_a < 35^\circ\text{C}$) See Environment	120W		
Surge Output Power ($T_a < 35^\circ\text{C}$) See Environment	120W		
Line and Load Regulation	$\pm 0.5\%$	$\pm 3\%$	1%
Overload Protection	Approx. 110% of surge power		
Short Circuit Protection	Indefinite		
Output Ripple and Noise (See Note 1)	<1% P-P		

GENERAL SPECIFICATIONS, ALL MODELS

Efficiency at maximum continuous load	83% TO 87%
Dielectric Strength Type Test Input/output	2KVRMS, 1 Min
Dielectric Strength Type Test Input/Chassis	2KVRMS, 1 Min
Dielectric Strength Type Test Output/Chassis	130VRMS, 1Min
Dielectric Strength Production test (100%) Input/output	2kVRMS, 5 Sec

Note 1: Differential output ripple and noise shall be measured at the output terminals on the PCB. Measuring equipment shall have a bandwidth of 20mhz with probes capable of 200mhz bandwidth. This requires that the probe earth lead be replaced with a low inductance lead.

ENVIRONMENT

Operating Temperature Range	0°C to 70°C
Maximum Operating Temperature at 5A continuous or 6A Surge without external heatsink	35°C
Maximum continuous current derating above 35°C without external heatsink	-0.075A/°C
Maximum temperature at middle of base with external heatsink	75°C
Storage temperature range	-40°C to 85°C
Relative Humidity	0% to 95% non-condensing
Cooling	Natural Convection

If the power supply is to be operated above 35°C ambient at maximum continuous load, an external heatsink, which may be the mounting surface, should be used. This heatsink should be sized so that the temperature at the centre of the base does not exceed 75°C at maximum continuous load. Silicone thermal compound is recommended between the base of the power supply and this heatsink/mounting surface to minimise thermal resistance. Refer to example on heatsink sizing.

If the mounting surface cannot serve as a heatsink, the maximum ambient temperature at which the rated continuous load can be drawn is 35°C. Above 35°C and without a heatsink, the maximum continuous current is de-rated linearly to 60W at 70°C maximum. The surge loads are de-rated linearly to 50% max. at 70°C.

MECHANICAL SPECIFICATIONS

Overall Dimensions 170 x 115 x 55 mm (6.7 x 4.5 x 2.2 inches)

Terminals 4-pole screw terminal on side of cover and earth stud.

MTBF.

Demonstrated Mean Time Before Failure on a sample size of 900 in a typical operating environment on railway rolling stock over a two year sample period and typical average load of 24V 3.5A : >1,200,000 Hours.

EXTERNAL HEATSINK SIZING EXAMPLE

Typically, these converters will be mounted on a steel bulkhead, which will provide additional heatsink capacity at no extra cost. The converter, in this example, is required to operate at a **continuous** load of **5A** at an ambient temperature of **50°C**. The appropriate size of heatsink is determined as follows:

$$\text{Power Output} = 5A * 24V = 120W$$

$$\begin{aligned} \text{Power Dissipation} &= (120 * (1 - \text{efficiency}))/\text{efficiency} \\ &= (120 * 0.14)/.86 = 19.5W \end{aligned}$$

Thermal resistance base to heatsink = 0.2°C/W This is typical with a flat surface and silicone heatsink compound.

$$\begin{aligned} \text{Maximum Heatsink Temperature} &= \text{Max base temp} - (\text{Thermal res base to sink} * \text{Diss}) \\ &= 75^\circ\text{C} - (0.2^\circ\text{C/W} * 19.5W) \\ &= 71.1^\circ\text{C} \end{aligned}$$

$$\begin{aligned} \text{Approximate heatsink area} &= (850 * \text{Dissipation})/(\text{Temp Sink} - \text{Temp Ambient}) \\ &= (850 * 19.5)/(71.1 - 50) \\ &= 786 \text{ square centimetres.} \end{aligned}$$