RLH Industries, Inc.

PRODUCT INFORMATION

The leader in rugged fiber optic technology.

PI-020 2024A-1029

RLH 500 Series DC/DC Converter

High Capacity Isolated Power for industrial applications

RLH 500 Series DC/DC Converter

Description

The RLH 500 Series Rack Mount DC/DC Converter is an isolated DC power source designed to provide constant power to telecom and industrial equipment. There are several models available, rated up to 21A. They feature recessed front panel input power circuit breakers and a digital ammeter for monitoring the output current.

The converters have dual inputs with automatic internal switching for connecting redundant power input sources, and three position output terminals for connecting multiple devices. Each input is protected by heavy duty circuit breakers.

The Series 500 DC/DC converter is an EIA 19/23 inch 2RU rack mountable enclosure, with both front or telco center style rack ear mounting.

Contents

Standard Features	
Dual, heavy duty, high cycle life, front mounted input breakers	2000VAC I/O Isolation
Breakers meet Mil-STD-202 for environmental durability	High current output up to 21 Amps
Built-in short circuit, overload, over-voltage and over-temperature protection	Auto switching dual input terminal for redundant power input sources
Output OK signal and LED current meter	Built-in alarm for remote monitoring
Heavy duty powder coated enclosure	Forced air cooling with built-in fan and speed control
EIA 19in and 23in 2 RU rack mount ears	Commercial grade terminal blocks

General Safety Practices

The equipment discussed in this document may require tools designed for the activity being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment as required.

Caution - Severe Shock Hazard

- Never install during a lightning storm or where unsafe high voltages are present.
- This equipment uses high DC voltages and current, do not touch terminals when power is applied.
- Use caution when handling copper wiring and follow appropriate safety regulations.
- An external Surge Protective Device (SPD) is not required.

Mounting Information

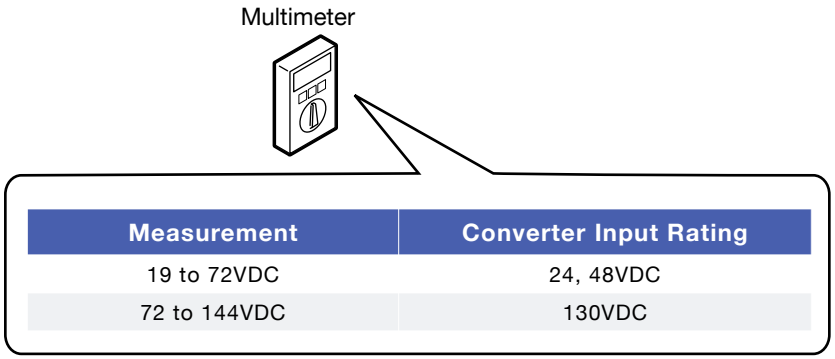
The power converter is intended to be shelf or rack mounted using the supplied rack hardware. Use a rack sufficiently strong enough to support converter. This unit is not weatherproof, and must be mounted indoors or in a weather proof enclosure if used outdoors.

Installation

Prior to installation:

- Check for shipping damage
- Check the contents to ensure correct model and powering options
- Have a clean, dry installation environment ready

Measure the DC voltage of the source power. Ensure the power is within range of the converter being used to avoid damage when power is applied.



Measurement	Converter Input Rating
19 to 72VDC	24, 48VDC
72 to 144VDC	130VDC

Note: When installing into an environment with a circuit breaker before the converter, it must be rated at 1.5 times (minimum) the output current rating of the converter. For example, use a 16A circuit breaker (minimum) for a 10.5A output converter (1.5 x 10.5 = 15.75).

Do not connect power to the converter at this point.

Install into equipment rack

Mount the power converter in to a 19/23 inch equipment rack using the mounting brackets provided.

Connect equipment

Set the front panel breaker switches to **OFF** to prevent the output terminals from accidentally becoming energized. Connect the Fiber Link Cards or other equipment to their respective + POS and – NEG DC OUTPUT terminals.

Note: Always make sure the front panel breakers are OFF before making connections to the output terminals.

Connect input terminals

Turn OFF and lock out the circuit breaker at the source panel for incoming power. Ensure that power is removed from the source wiring prior to making any connections.

Connect the primary DC source power to the DC INPUT number 1 terminal, located at back left of the enclosure, see Figure 2. **The DC INPUT terminals are polarity sensitive.** Connect the positive input to the positive (+) terminal to avoid equipment damage.

Note: The primary input terminal is number 1, the secondary (auto fallover) terminal is number 2.

Connect the secondary redundant DC power source (if used) to INPUT 2. Connect the chassis (earth) ground to either GND terminal (they are connected internally) to prevent damage or injury from lightning or other high voltage events. **Check to make sure the front panel breaker switches are OFF.**

Figure 2. Rear panel connections

Apply input power

Double check all connections. Apply power to the input wiring by turning on the source power breaker at the mains panel.

Once the DC input power is energized, set the front panel breaker switches to ON. The output terminals are now energized. The green DC INPUT LED(s) will come ON, indicating power at the input terminals. The yellow DC OUTPUT LED will come ON, indicating isolated power is being output. The digital LED OUTPUT AMPS current meter will display the total output current. Double check output power at the DC OUTPUT terminals with a multimeter.

Troubleshooting

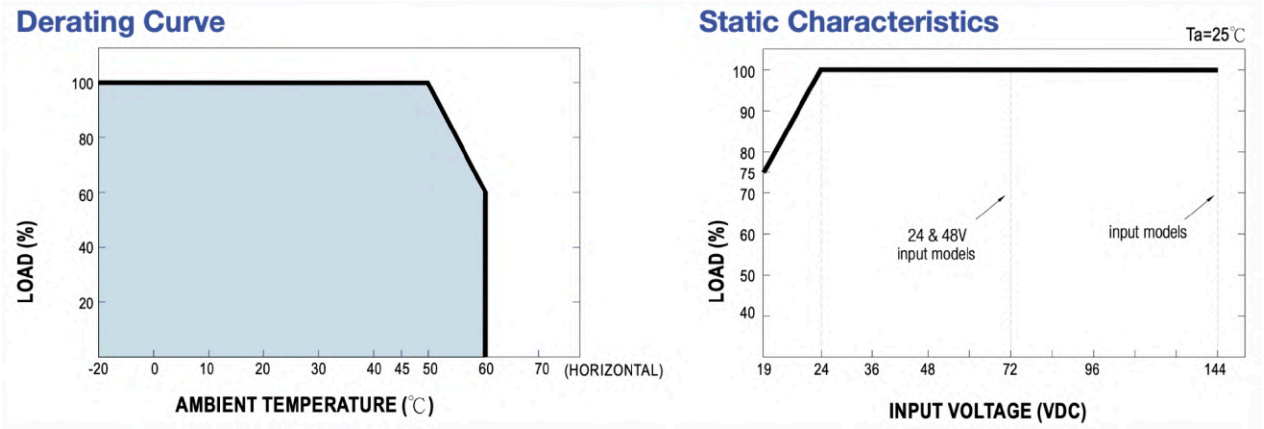
Troubleshooting the DC/DC converter always begins with the observation of the status LEDS. The green LED(s) indicates DC INPUT, and the yellow LED indicates DC OUTPUT on (+) and (-) terminals. The red digital ammeter display indicates the output current. Refer to Table 1, Front Panel Indicators.

The front breakers will trip if the current being drawn through them exceeds the rating of the converter. Refer to the General Specifications for output information including overvoltage protection limits. If the breakers continue to trip, disconnect all cards/equipment from the output terminals, then reconnect one at a time to pinpoint trouble.

Table 1. Front panel indicators

Breaker 1 Green LED	Breaker 2 Green LED	Yellow LED	Description
ON	**ON**	**ON**	Both breaker switches ON: Normal Operation with primary and secondary power sources connected. Note that these LEDS will be ON even if equipment is disconnected from the system.
OFF	**ON**	**ON**	Both breaker switches ON: Loss of DC Input on the primary input, now operating from secondary input.
ON	**OFF**	**ON**	Both breaker switches ON: Loss of DC Input on the secondary input, or no secondary input used. Now operating from primary input. Breaker 2 is OFF: Now operating from primary input.
OFF	**OFF**	**OFF**	Both breaker switches ON: Loss of DC Input. Check power source. If source power is within limits then converter is inoperative. Contact RLH technical support. Both breaker switches OFF: If the breakers have tripped, disconnect all cards/ equipment from the output terminals. Reconnect one at a time to pinpoint trouble.
ON	**ON**	**OFF**	Both breaker switches ON: Output voltage has been shut down by internal constant current limiter or input overvoltage. Switch breakers OFF then ON to recover. Overtemperture condition has shut down output voltage. Unit will recover after temperature goes down.

Figure 3. Derating curve and static characteristics



Ordering Information

DC Input	DC Output	Max. Output	Part Number
24V ~ 48V* (19-72V)	24V	21A	**8806-1678-02**
	48V	10.5A	**8806-1666-02**
130V (72-144V)	24V	21A	**8806-1675-01**
	48V	10.5A	**8806-1676-01**

*non-polarity sensitive (can accept negative -48V DC Input)

▶ Please contact your RLH sales representative for pricing and delivery information

General Specifications

Specifications		24VDC output models	48VDC output models
Output	DC Voltage	24V	48V
	Rated Current	21A	10.5A
	Rated Power	504W	504W
	Ripple & Noise *3	150mVp-p	150mVp-p
	Voltage Adj. Range	23-30V	46-60V
	Voltage Tolerance *3	±1.0%	±1.0%
	Line Regulation	±0.5%	±0.5%
	Load Regulation	±0.5%	±0.5%
Input	Voltage Range *4	24 ~ 48V: 19 ~ 72VDC	130V: 72 ~ 144VDC
	DC Current (Typ.)	24.8A/24VDC	12A/48VDC
	Inrush Current (Typ.)	24 ~ 48V input models: 60A/48VDC	300V input models: 60A/96VDC
Protection	Overload	105 ~ 125% rated output power	
		Protection Type: Constant current limiting, unit will shut down o/p voltage after about 5 sec. Re-power on to recover.	
	Over Voltage	30.8 ~ 35.2V	62 ~ 68V
		Protection Type: Shut down o/p voltage, re-power on to recover.	
	Over Temperature	80℃±5℃ (TSW1) detect on heatsink of power transistor	
		80℃±5℃ (L-48V, H-24V, H-48V), 85℃±5℃ (L-24V), 90℃±5℃ (L-12V), 95℃±5℃ (H-12V), (TSW2: detect on heatsink of o/p diode)	
		Protection Type: Shut down o/p voltage, recovers automatically after temperature goes down.	
System Alarm	Output OK Signal	SPDT Relay (Form C), 250VAC /12A	
Environment	Working Temperature	-20 ~ +60℃ (Refer to output load derating curve)	
	Working Humidity	20 ~ 90% RH non-condensing	
	Storage Temp., Humidity	-40 ~ +85℃, 10 ~ 95% RH	
	Temp. Coefficient	0.02%/℃ (0 ~ 50℃)	
Physical	Dimensions	H 3.5 x W 17.75 x D 11.5 (H 89mm x W 451mm x D 292mm) (Not including rack ears)	
	Mounting	EIA 19~23" Rack Mount, 2RU	
Safety	Withstand Voltage	I/P-O/P:2KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC	
	Isolation Resistance	I/P -I/P, I/P-FG, O/P-FG:100M Ohms/500VDC 25℃ 70%RH	

Note

1. Ripple parameters NOT specially mentioned are measured at 48, 96VDC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance: Includes set up tolerance, line regulation and load regulation.
4. Derating may be needed under low input voltages. Please check the derating curve for more details.

Technical Support

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Specifications subject to change without notice.