

# OPTIMAL POWER<sup>®</sup>

**OPR Power Series™**  
AC to DC POWER SUPPLY SERIES WITH RELAY CLOSE CONTACT  
REMOTE MANAGEMENT ALARM SYSTEM

**Model No. OPR300-48RN**

(Negative) –48V, 300 Watt Redundant Power Supply

Manual

Revision E

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Optimal Power Supplies LLC

[www.optimal-power.com](http://www.optimal-power.com)

## **PROPRIETARY DATA**

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**OPTIMAL POWER**

## **LIABILITY**

**DO NOT OPERATE OR SERVICE THE OPR300-48RN MODEL WITHOUT READING THIS ENTIRE MANUAL FIRST**

Optimal Power Supplies LLC is not responsible for any kinds of damages through the use of any of the Optimal Power Supplies LLC products. It is entirely the customer's responsibility to take all the necessary precautionary measures when installing this unit.

## **WARRANTY**

Optimal Power warrants all of its products against defects in materials and workmanship for one year from date of delivery. We will repair, or replace parts which prove to be defective during the warranty period provided that:

1. A Return Maintenance Authorization (RMA) is obtained from OPTIMAL POWER at (251) 209-8088 or [www.optimal-power.com](http://www.optimal-power.com). Please reference your RMA number on the outside of the box the item is shipped in.
2. Shipping charges are pre-paid by customer.

Optimal Power does not endorse any other warranty, expressed or implied, and is not liable for consequential damages. Products that are damaged, opened, or modified do not qualify for a warranty. The same procedures must be followed for repairs outside the warranty period.

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# **Chapter 1**

## **OPR Power Series - Introduction**

### **1.1 Product Description**

OPR Power Series is a unique and a highly reliable power supply series. It can be configured as a single as well as a fully redundant power supply. OPR Power Series is designed for Universal AC to DC power supply applications. Because of this feature these power supplies can be used anywhere in the world. These power supplies are mainly used in the following applications:

- Computer Peripherals and Networking Applications
- Telecommunications and Fiber Optic Network
- Voice, Data and Analog Communications
- Universities and Educational Facilities
- Instrumentation and Electronics
- Utility and Power Industries
- Data Acquisition
- Medical
- Military

OPR Power Series is a reliable, efficient and inexpensive solution for all kind of AC to DC power supply applications.

### **1.2 Main Features:**

- Compact Rack Mount Size (1.75" H x 19" W x 12.12" D)
- Universal AC (Alternate Current) Input
- Filtered IEC AC Inlet Connectors
- EMI FCC Class B Clearance for Internal Power Bricks
- Single and Multiple Output
- Highly Efficient Design
- 1U Low Profile Height
- NO Minimum Load Required
- Relay Contact Closure Remote Management
- Low Voltage Power Supply Alarm
- Cost Effective and Reliable Power Supply Solution

### 1.3 General OPR Power Series Specifications:

Input Voltage.....	Universal 90VAC to 264VAC
Input Frequency.....	47Hz to 63Hz
Operational Temperature.....	0°C to 55°C
Storage Temperature.....	-20°C to 85°C
Cooling.....	Convection Cooling
Overload Protection.....	Auto-Recovery
Efficiency.....	80-90% Typical
DC OK.....	Status LEDs

### 1.4 Typical Safety Rating for Internal Power Modules:

Designed in full compliance with.....	UL60950
	CSA 22.2 No. 234
	EN60950
EMI.....	EN55022 “Class B”
EMS.....	EN61000-4-2,-3,-4,-5,-6,-8,-11
Harmonics.....	EN61000-3-2 Class D



### Redundant Power Supply

**Model OPR300-48RN**

## 2.1 OPR300-48RN Description:

The Model OPR300-48RN is a 1U rack mountable power supply designed to operate in (negative) –48V, 300W redundant power configuration. OPR300-48RN has two built-in universal AC to –48V DC power supplies connected in parallel with two IEC AC plugs for complete redundancy. The OPR300-48RN Model can provide up to 600W\* of redundant power to the system it is attached. However 600W is only intended for redundancy; it is not recommended for powering a total load of 600W. Model OPR300-48RN is only designed for 300W applications. Each internal power module has its own AC-INLET, ON/OFF switch and associated alarm and power LED. OPR300-48RN Model has two built-in alarm circuits with separate red LEDs for low DC power monitoring. In addition, Model OPR300-48RN has relay contact closure terminal block interface for remote power supply alarm management.

## 2.2 Specifications:

### Electrical

Output Voltage	–48VDC
Output Ripple	Typical 200 mV
Output Current	Typical 6.25A per power module
Output Power	600W* of redundant power
Input Voltage	Universal 90VAC to 264VAC input (2 AC inlet plugs in OPR300-48RN for complete redundancy)
Input Frequency	47Hz to 63Hz
Input Current	Approx. continuous 3 Amps.
Current Tolerance	0.5%
Remote Management Interface	Terminal block connector Pins 2 and 3 (Relay contact closure)

**Note:** \* 600W is intended only for redundancy; it is not recommended for powering a total load of 600 Watt

### Typical Safety Ratings for Internal Power Modules:

Designed in full compliance with	UL60950 CSA 22.2 No. 234 EN60950
EMI	EN55022 “Class B”
EMS	EN61000-4-2,-3,-4,-5,-6,-8,-11
Harmonics	EN61000-3-2 Class D

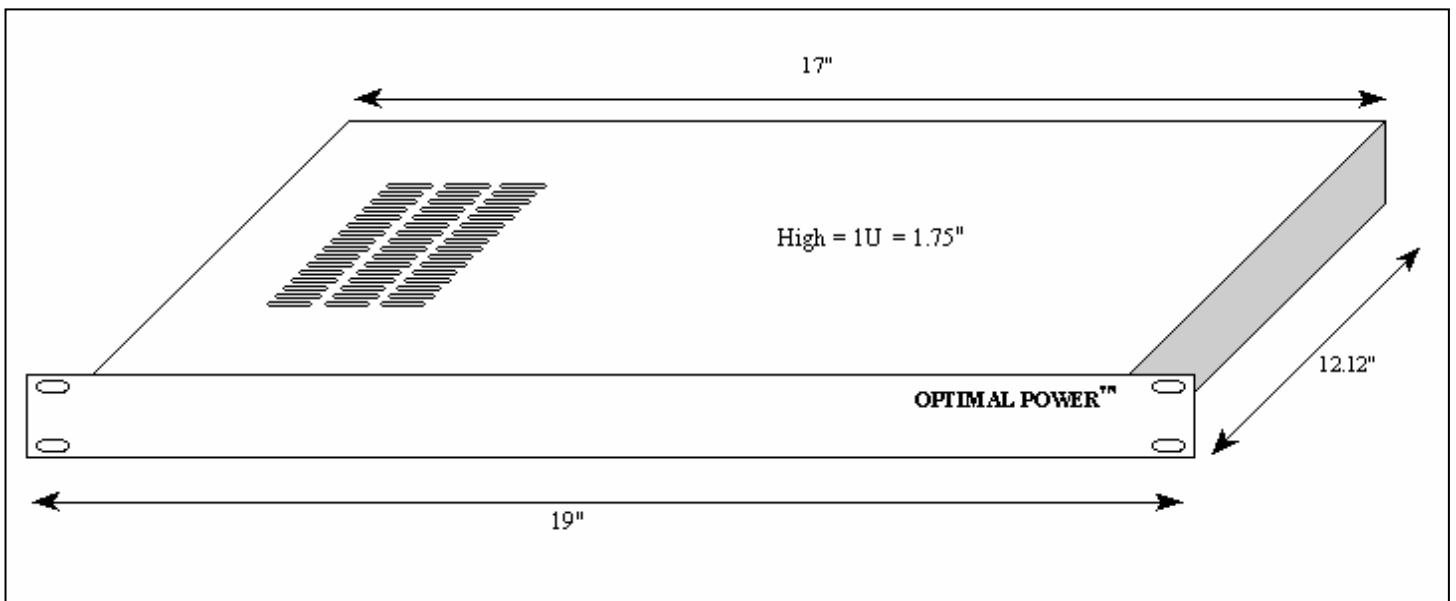
## Environmental

Overload Protection	Auto-recovery
Functional Temperature	0 to 70 °C
Storage Temperature	-20 to 85 °C
Over voltage Type	Latch off
Efficiency	80-90% Typical

## Physical

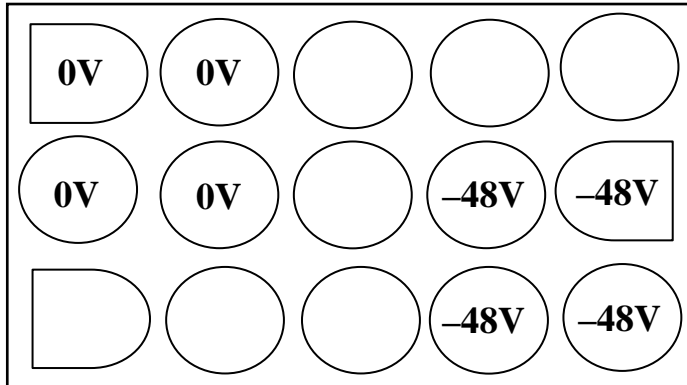
Dimensions	1U (1.75" H x 19" W x 12.12" D)
Weight	Approx. 13.25 lb = 6.01 kg = 212 oz

## Dimensional Figure



**Status Indicators and Back Panel Connections**

**3.1 Back Panel DC Power Connector**



**WARNING:**

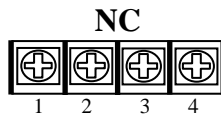
**Observe polarity when making connection to the rear of the Model OPR300-48RN**

**3.2 Front Panel Status Indicators**

LED	Description (When Lit)	OPR300-48RN Indicators
Solid Green	Power Supply 1 Activated	Power 1
Solid Green	Power Supply 2 Activated	Power 2
Solid Red	Primary Supply Failure (or) Power 1 Switch is in OFF position	PS 1 Alarm
Solid Red	Dual / Secondary Supply Failure (or) Power 2 Switch is in OFF position	PS 2 Alarm

**3.3 Remote Management Terminal Block Pin Out\*\***

Relay Contact Closure	Normal Operating Condition	Alarm Condition / Off Position
Pin # 2	Open Circuit	Short Circuit (Shorted to pin 3)
Pin # 3	Open Circuit	Short Circuit (Shorted to pin 2)



**Note \*\*** Pins not mentioned in the table do not have any connections

To understand the power and data alarm systems, please refer to the section 4.1 on next page.



## 4.1 Alarm Monitoring System

The Model OPR300-48RN has the ability to monitor output DC voltage, and trigger an alarm when the output DC voltage starts to fail or any one of the internal power bricks are turned OFF. If for some reason the (Power 1) primary power supply voltage drops (due to overload or front panel switch in OFF position), the relay contact closure terminal block interface pins 2 and 3 are shorted together indicating power supply 1 failure. Similarly, if for some reason the (Power 2) secondary power supply voltage drops (due to overload or front panel switch in OFF position), the terminal block interface pins 2 and 3 are shorted together indicating power supply 2 failure. The contact closure is rated for 120VAC/30VDC @ 2A maximum. Furthermore, there are also “PS 1 Alarm” and “PS 2 Alarm” LEDs associated with each internal power supply indicating output power failure status. The alarm conditions are summarized as follow:

**Alarm Conditions**

**Power 1 Failure**

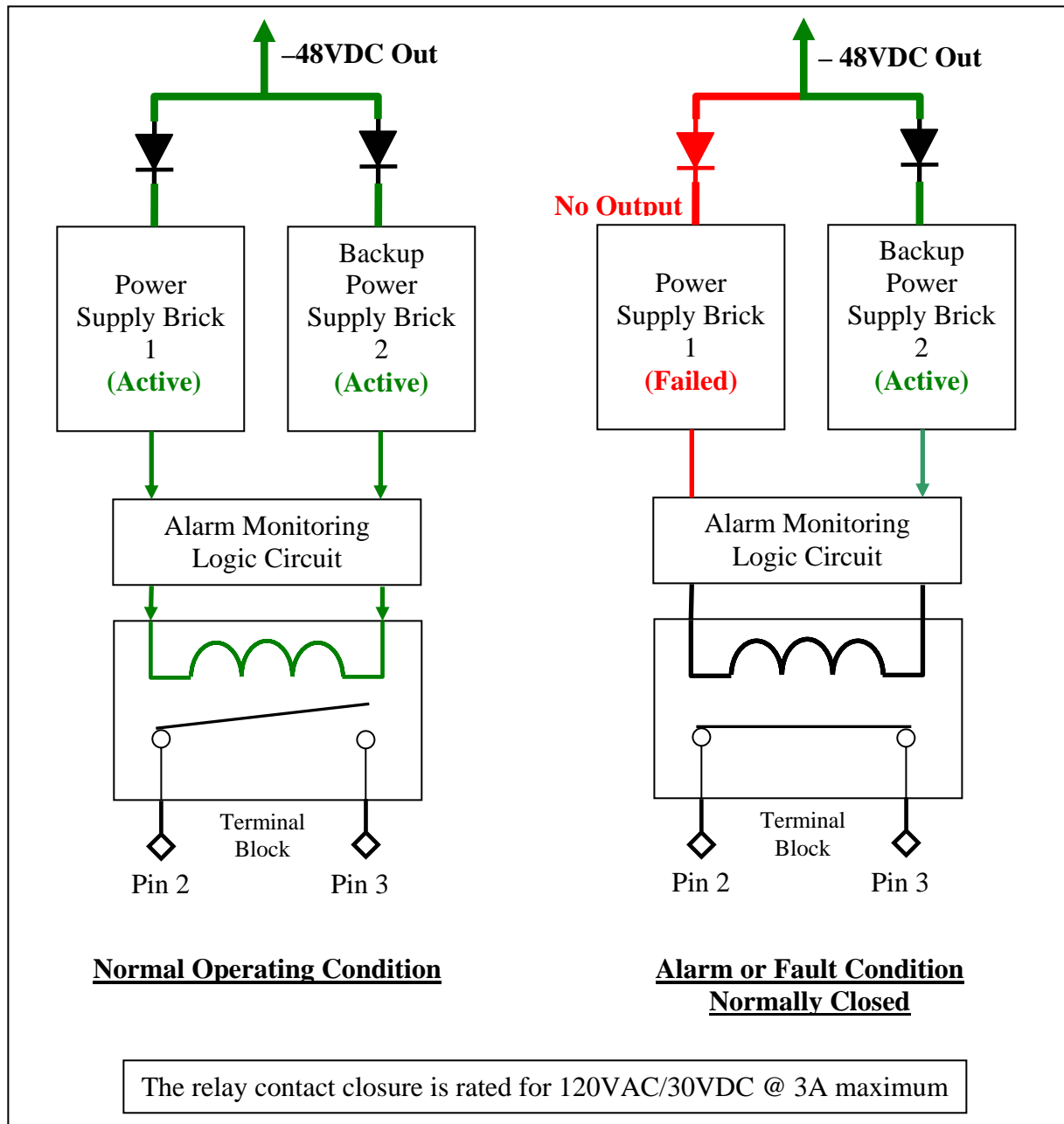
- AC plug disconnected to Power 1
- Front panel Switch to Power 1 is in “OFF” position

**Power 2 Failure**

- AC Plug disconnected to Power 2
- Front panel Switch to Power 2 is in “OFF” position

Refer to next the page for an alarm monitoring system example.

### 4.1.1 Alarm Monitoring System Example



## Chapter 5 Installation and Maintenance

### 5.1 Installation

Model OPR300-48RN may be installed in fixed, semi-fixed and mobile environments that meet the environmental characteristics specified in Chapter 2. This Model is designed to be mounted in a standard 19” equipment rack utilizing the mounting holes provided on the front of the unit. **It is recommended that at least 1 rack unit (1U = 1.75”) gap be provided above or below the OPR power supply unit for proper air flow.**

Once the power supply is mounted in the rack, it should be connected to the system (**that only requires –48VDC power**) with the DC output connector located at the rear of the OPR unit.

**WARNING: Observe polarity when making connection to the rear of Model OPR300-48RN**

- Next, ensure that the front panel power switches are in “OFF” position.
- Connect the AC power cords to the unit by plugging the free end of the power cords into a standard three prong AC outlet.
- Ensure that the AC power plugs located at the rear end of the power supply are connected to a clean and well-grounded Universal AC source.

Once all the wires are connected properly:

- 1) Turn “ON” the front panel switch for Power supply 1

The “Power 1” green LED, and “PS 2 Alarm” red LED should light up. Indicating Power supply 1 is “ON” and Power supply 2 is “OFF”

- 2) Turn “ON” the front panel switch for Power supply 2

This should clear the “PS 2 Alarm” red LED and cause the “Power 2” green LED to illuminate.

Now the system is ready to operate to its required purpose.

#### Monitoring AC Input and DC Output

OPR Series Models have switches that monitor AC current input and DC current output. Whenever the “Power” switches are “ON”, the LEDs embedded in the switch should light up. These indicate good AC input. Similarly the “Power 1” and “Power2” LEDs should turn green, indicating good DC output current.

## 5.2 Maintenance

The Model OPR300-48RN should be treated with the sufficient care.

- Do not use abrasives or solvents, as they may mar surfaces
- Do not subject the unit to excessive temperature extremes
- Do not subject the unit to excessive moisture or spilled liquids
- Do not subject the unit to sudden or severe shocks
- Never operate the Model OPR300-48RN with any of the covers removed

## 5.3 Warnings

To reduce the risk of fire, electric shock or product damage, **DO NOT** expose the Model OPR300-48RN to direct heat, rain, moisture, dripping or splashing. **DO NOT** place any object filled with any kinds of liquids on the unit. To prevent damage to LEDs and switches, **DO NOT** place the front panel of the unit face down, and/or **DO NOT** press against the front panel.

Optimal Power Supplies LLC is not responsible for any kinds of damages sustained through the use of any of its products.

**6.1 OPR300-48RN (300W Redundant Power Supply)**

**Front View**



**Rear View**

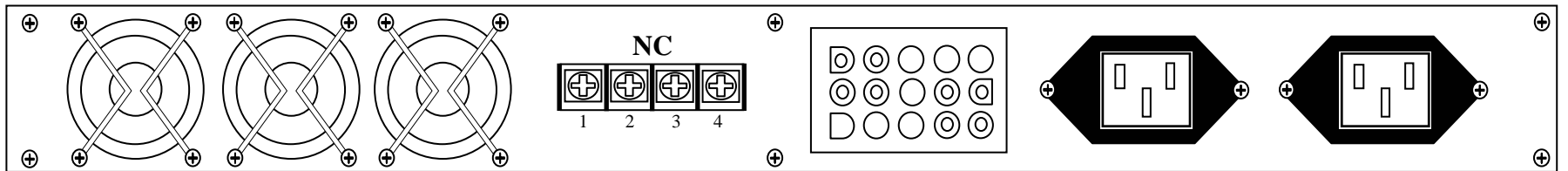
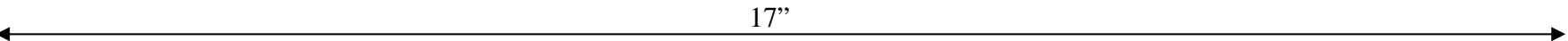
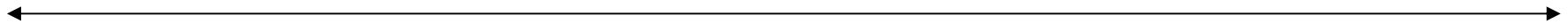
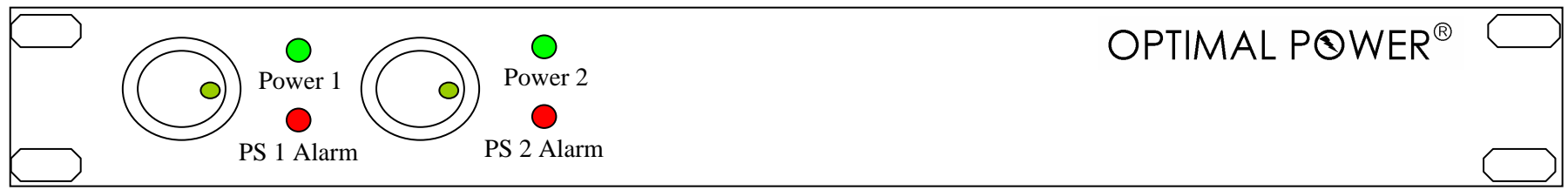


**Overall View**



## 6.2 OPR300-48RN (Front View/Rear View)

LED	Description (When Lit)	OPR300-48RN Indicators
Solid Green	Power Supply 1 Activated	Power 1
Solid Green	Power Supply 2 Activated	Power 2
Solid Red	Primary Supply Failure (or) Power 1 Switch is in OFF position	PS 1 Alarm
Solid Red	Dual / Secondary Supply Failure (or) Power 2 Switch is in OFF position	PS 2 Alarm



Three Cooling Ducts



Relay Contact Closure  
Terminal Block  
Remote Management



Ground



-48VDC



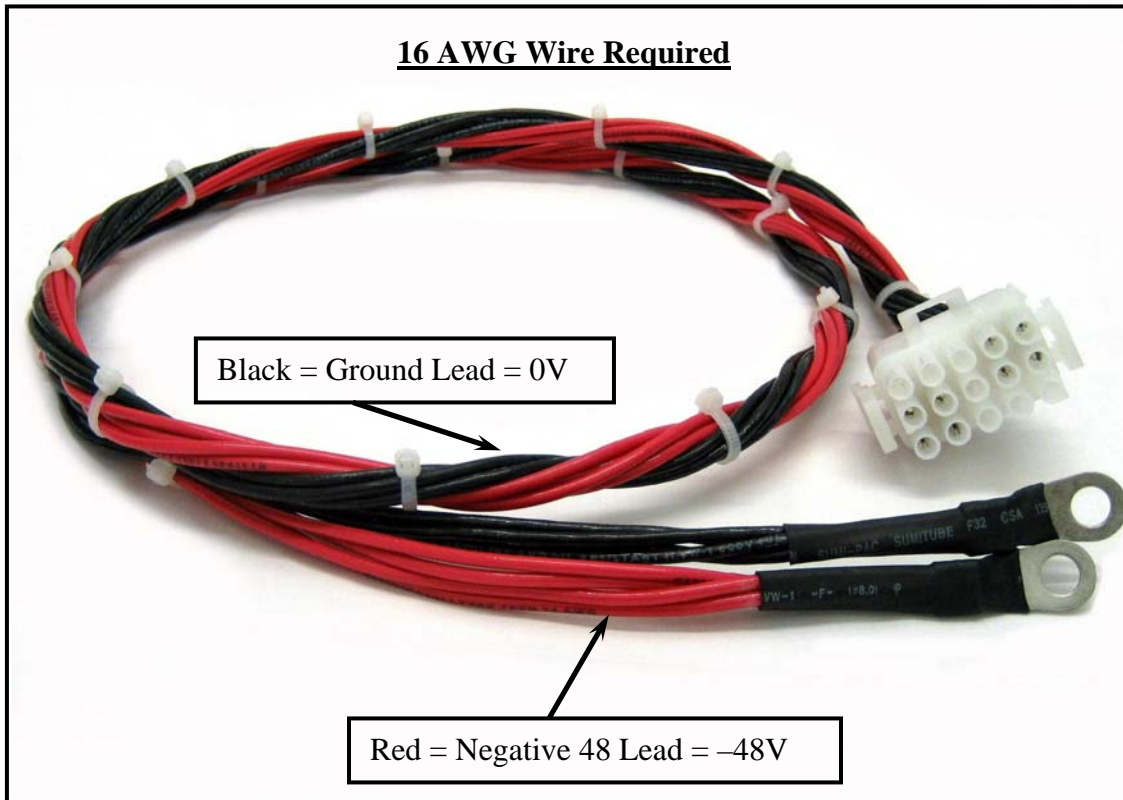
AC Input  
Power 2



AC Input  
Power 1

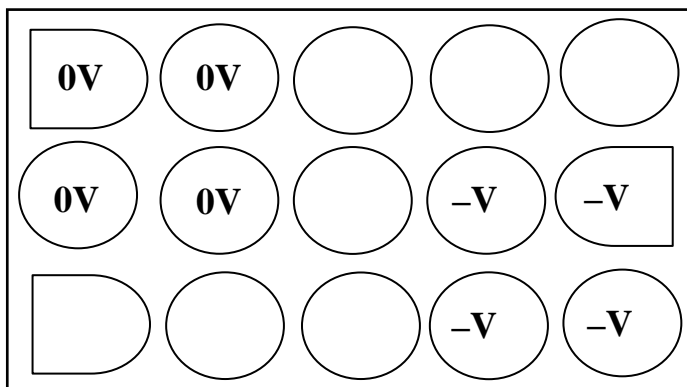
Pin 2 = Contact Closure  
Pin 3 = Contact Closure  
120VAC or 30VDC @ 3A

### 6.3 DC Cable Image



*Note: DC Cable comes with the system*

**Important Note\*** For proper current flow make sure to connect all the specified power terminals.



**WARNING:**

**Observe polarity when making connection to the rear of the Model OPR300-48RN**

0V = Indicates Ground Line  
 -V = Indicates Negative 48VDC