

OPTIMAL POWER®

REDUNDANT POWER SUPPLY SYSTEM FOR NETGEAR® RPS CAPABLE ETHERNET SWITCHES

MODEL No. RPS5412
Redundant Power Supply

Manual

Revision B

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Optimal Power Supplies LLC
www.optimal-power.com

PROPRIETARY DATA

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LIABILITY

DO NOT OPERATE OR SERVICE THE RPS5412 MODEL WITHOUT READING THIS ENTIRE DOCUMENT FIRST

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

In the interest of improving internal design, operational function, and/or reliability, Optimal Power Supplies LLC reserves the right to make changes to the products described in this document without notice.

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1. Optimal Power[®] warrants its product models RPS5412 and RPSC5412 against defects in materials and workmanship for Three (3) year from date of delivery. We will repair, or replace parts which prove to be defective during the warranty period.

2. Any defect discovered after the warranty period has expired will be deemed to be outside the coverage of the warranty, as noted below:

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Chapter 1

RPS Power Series - Introduction

1.1 Product Description

RPS Power Supply Series™ is a unique and a highly reliable power supply series. It is used as a redundant power supply for NETGEAR® RPS capable PoE, 10/100 Ethernet, and Gigabit Ethernet switches. *The power supplies in this series are tested and verified by NETGEAR®.*

The RPS 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

The RPS Power Series™ is a reliable, efficient and inexpensive solution for all kind of AC to DC power supply applications. Optimal Power® RPS units are intended for providing redundant power to NETGEAR® switches.

1.2 Main Features:

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

1.3 General RPS 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..... | Forced Air / Convection Cooling |
| Overload Protection..... | Auto-Recovery |
| Efficiency..... | 80-90% Typical |
| DC OK..... | Status LED |

1.4 Typical Safety Rating for Internal Power Supply Bricks:

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



1U Power Supply

Shown above: Model RPS5412

2.1 RPS5412 Description:

The Model RPS5412 is a 1U rack mountable RPS (Redundant power supply) designed to operate with NETGEAR RPS capable switches. Model RPS5412 has built-in universal AC to –52V DC and +12V DC power supplies with one IEC AC input socket. The Model RPS5412 can only be connected to power a single NETGEAR® switch at a time. The RPS has an ON/OFF switch, and an associating DC power LED.

2.2 Specifications:

Electrical

| | | |
|-----------------|---------------------------------|----------------|
| Output Voltage | –52V DC | +12V DC |
| Output Ripple | Typical 200mV | Typical 120mV |
| Output Current | Typical 6A max | Typical 9A max |
| Output Power | 300W* | 100W |
| Input Voltage | Universal 90VAC to 264VAC input | |
| Input Frequency | 47Hz to 63Hz | |
| Input Current | Approx. continuous 5 Amperes | |

*** NOTE:** The Model RPS5412 only provides up to 300W for (Power-Over-Ethernet) POE application. If POE devices connected to the switch system need more than 300W, then this device is not recommended.

Typical Safety Ratings for Internal Power Module:

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



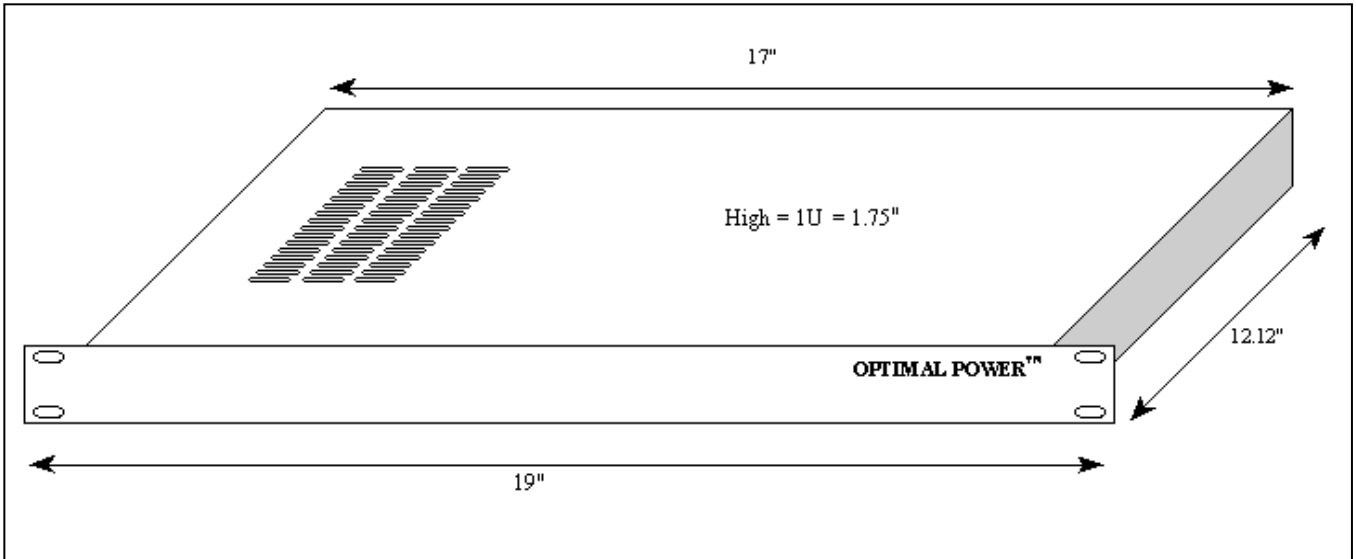
Environmental

| | |
|------------------------|----------------|
| 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. 11.65 lb = 5.28 kg = 186.40 oz |

Dimensional Figure

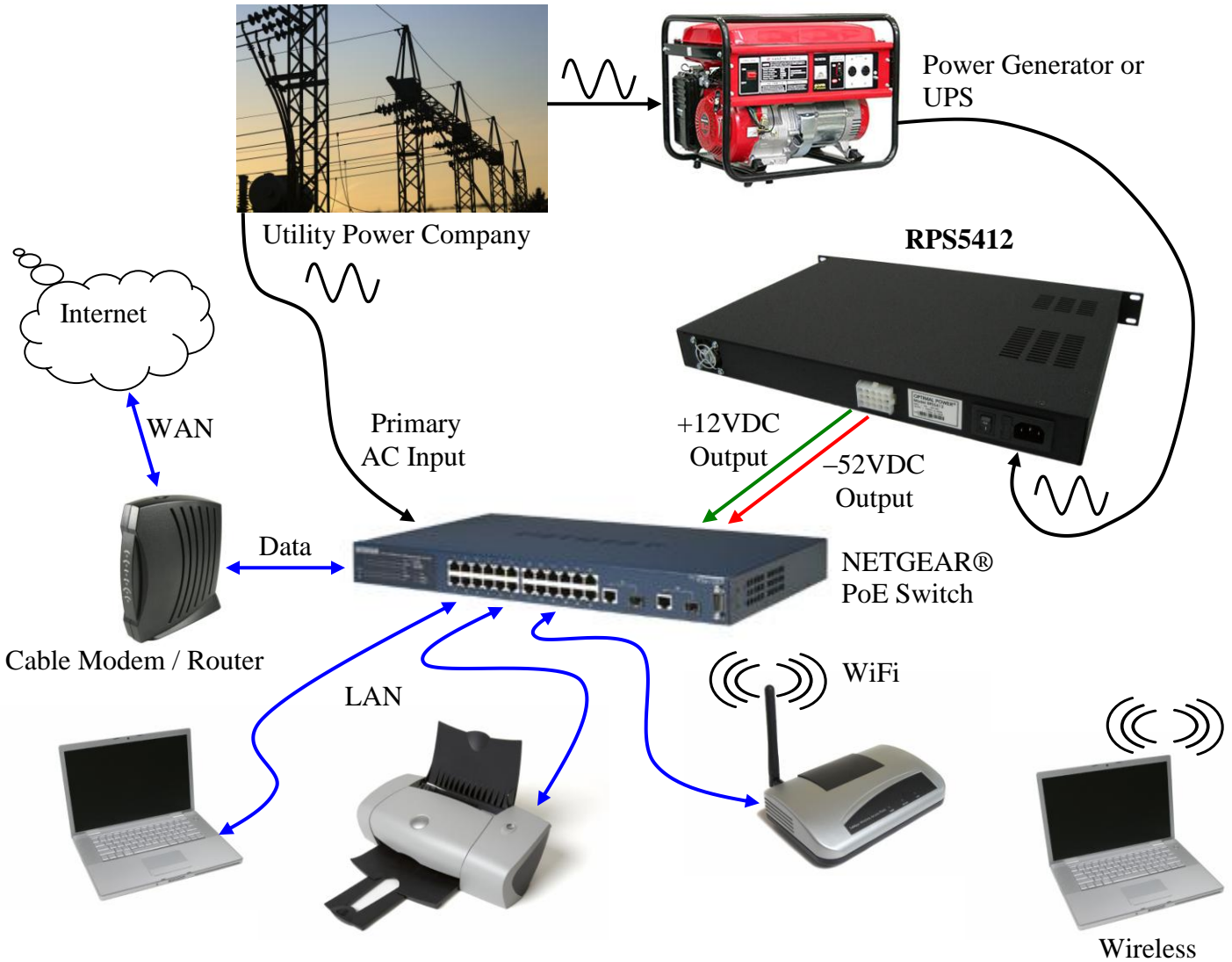


Overall Rear View



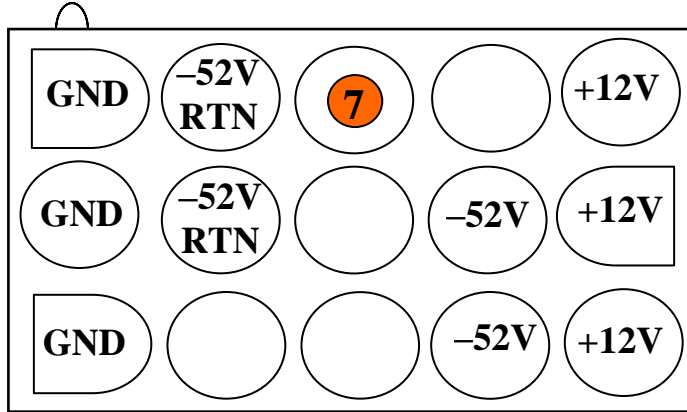
2.3 Typical System Level Setup:

An external Optimal Power® RPS unit can be connected to a NETGEAR® switch to provide redundant power in case the primary power supply connected to the NETGEAR® switch fails. The RPS can be setup in different configurations. However, a typical system level setup is as shown:



Status Indicators and Back Panel Connections

3.1 Back Panel DC Power Connector for RPS



WARNING:

Observe polarity when making connection to the rear of the RPS Model RPS5412

Note: Refer to next 2 pages for DC cable connections

| Pin Numbers | Signal Name | Function |
|-------------|-------------|-------------------------|
| Pin 7 | RPS Present | Logic Low = RPS Present |

3.2 Front Panel Status Indicators

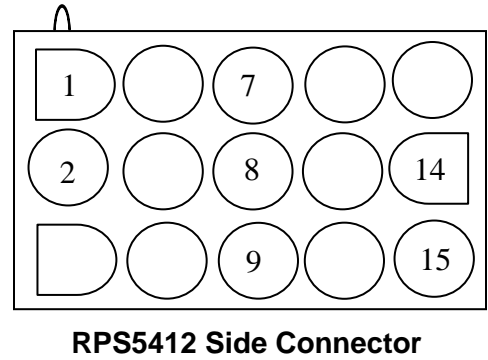
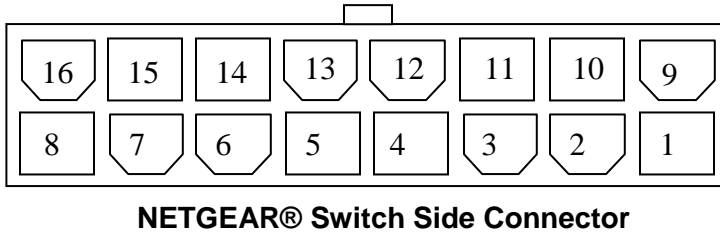
| LED | Description |
|-------------|------------------------|
| Solid Green | DC Power Supply Status |

3.3 Compatible NETGEAR® Switch Model Number Table

| Compatible NETGEAR® Switch Model Number Table | | |
|--|----------------------------------|--------------------------------|
| NETGEAR® Switch Model | Optimal Power® RPS Models | Optimal Power® DC Cable |
| GSM7224-200 | RPS5412 | RPSC5412 |
| GSM7248-200 | RPS5412 | RPSC5412 |
| GSM7228PS | RPS5412* | RPSC5412 |
| GSM7252PS | RPS5412* | RPSC5412 |
| GSM7328S-200 | RPS5412 | RPSC5412 |
| GSM7352S-200 | RPS5412 | RPSC5412 |
| GSM7328FS | RPS5412 | RPSC5412 |
| GSM7212F | RPS5412 | RPSC5412 |
| GSM7212P | RPS5412 | RPSC5412 |
| GSM7224P | RPS5412 | RPSC5412 |

*** NOTE** The Model RPS5412 only provides up to 300W for POE application. If POE devices connected to the switch system need more than 300W, then this device is not recommended.

3.4 Model No. RPSC5412 (DC Connection Cable)



| Package Content | |
|------------------------|--|
| • | <i>Redundant Power Supply Model RPS5412</i> |
| • | <i>DC Connection Cable Model RPSC5412</i> |
| • | <i>AC Connection Cord (see ordering chart)</i> |
| • | <i>Installation Manual</i> |
| • | <i>Rack-mount Screws</i> |

| Ordering Information Chart | |
|-----------------------------------|-------------------------|
| RPS Model | Worldwide region |
| <i>RPS5412-100NAS</i> | Americas |
| <i>RPS5412-100EUS</i> | Europe |
| <i>RPS5412-100AJS</i> | Asia |

Chapter 4

Alarm Systems

4.1 Alarm Monitoring System

The RPS Model RPS5412 has the ability to monitor output DC voltage. If the front panel Green LED is ON that indicates good AC input and good DC output. When the Green LED is OFF that indicates the following:

- No AC voltage input
- Low DC voltage output
- No DC voltage output

Chapter 5

Installation and Maintenance

5.1 Installation

Rack Mounting of Systems

Observe the following precautions for rack stability and safety. Also refer to the rack installation documentation(s) provided by rack manufacturer. Systems are considered to be components in a rack. Thus, "component" refers to any system as well as to various peripherals, products or supporting hardware. Please adhere to the following instructions when installing the RPS system:

- After installing components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and may result in serious injury.
- Components should be installed in a rack by trained service technicians.
- Do not move racks by yourself. Due to the height and weight of the rack, a minimum of two people should accomplish this task.
- Always load the rack from the bottom up, and load the heaviest item in the rack first.
- Make sure that the rack is level and stable before extending a component from the rack.
- Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80 percent of the branch circuit rating.
- Ensure that proper airflow is provided to components in the rack.
- Do not step on or stand on any component when servicing other components in a rack.
- The system chassis must be positively grounded to the rack cabinet frame. Do not attempt to connect power to the system until grounding cables are connected. Completed power and safety ground wiring must be inspected by a qualified electrical inspector. An energy hazard will exist if the safety ground cable is omitted or disconnected.

Mounting Instructions

Before you install the RPS Power Supply, consult Section 3.3 of this manual to confirm that your switch supports the OPTIMAL POWER[®] RPS Series Model RPS5412.

Installing the RPS Power Supply on a Flat Surface

You can install the RPS5412 (Redundant Power Supply) RPS on any appropriate level surface that can safely support the weight of the switches, the RPS Power Supply, and their attached cables. There must be adequate space around the RPS Power Supply for

ventilation and to access cable connectors. Consider following steps to install the RPS system on a flat surface.

- Set the RPS Power Series RPS on the flat surface and check for proper ventilation and air flow.
- Allow at least 2 inches (5.1 cm) on each side for proper ventilation and 5 inches (12.7 cm) at the back for AC and DC power-cord clearance.
- Attach rubber feet on the bottom of the chassis to keep the unit from slipping.

Installing the RPS Power Supply in a Rack

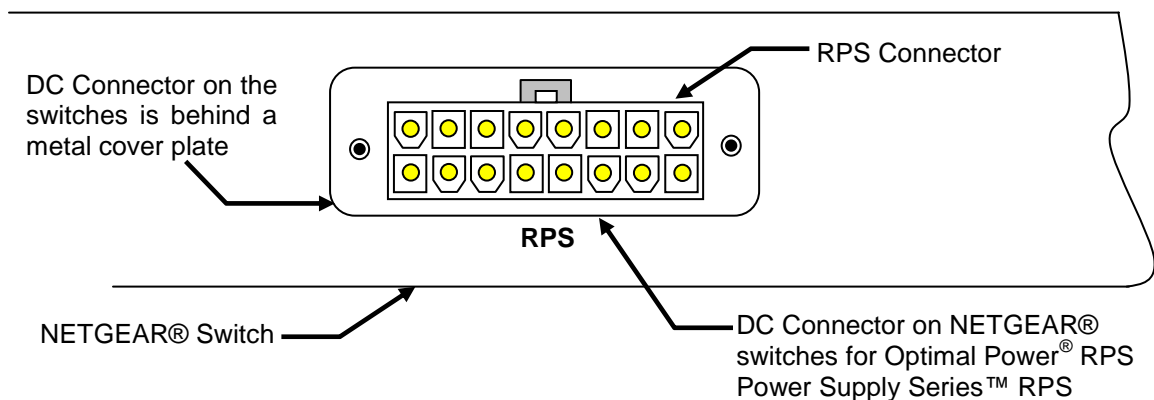
The RPS Power Supply can be installed in most standard 19-inch racks. Consider following steps to install RPS Power Series RPS in rack.

- Use appropriate size screws to attach the RPS system to the 19-inch rack.
- Position the RPS Power Series RPS in the rack and align the oval shaped holes on the side of the RPS with the holes in the rack.
- Insert and tighten two screws appropriate for your rack through each of the oval shaped holes on the side of the RPS.

To Operate the RPS Power Supply after Installation

Model RPS5412 may be installed in environments that meet the environmental characteristics specified in Chapter 2. *It is recommended that sufficient ventilation gap be provided above or below the RPS unit for proper air flow.*

Once the RPS (redundant power supply) is mounted in the rack, it should be connected to a switch (*that only requires -52VDC or +12VDC power*), and has a DC connector located on rear panel as shown:



The figure shows where to connect the Optimal Power® RPS Model RPS5412 on the NETGEAR® switch.

Note: The location of the redundant power supply connector on your switch may differ from the illustration.

Next follow the instructions below:

- To connect a redundant power supply (RPS) unit to the switch, first turn "OFF" the NETGEAR® Ethernet switch.
- Also, ensure that the power switch on the RPS unit RPS5412 is in "OFF" position.

Important Note: Always Turn "OFF" the AC power first when installing or removing the RPS from the system. RPS device should not be live inserted. That is, when AC is "ON" DONOT connect the RPS cable to the RPS connector on the switch.

- When the power is "OFF", you can remove the cover plate on the rear panel of the NETGEAR® switch as shown on the previous page.
- Now connect the RPS DC Connection Cable Model RPSC5412 to the appropriate NETGEAR® PoE switch making sure the connections are well secured, and the AC power is "OFF" to the switch and the RPS.

WARNING: Observe polarity when making connection to the rear of RPS Model RPS5412

- Connect the AC power cord to the RPS unit by plugging the free end of the power cord into a standard three prong AC outlet.
- Ensure that the AC power plug located at the rear end of the power supply is connected to a clean and well-grounded Universal AC source.
- Once all the wires are connected properly, Turn "ON" the rear panel switch for the RPS (redundant power supply) unit.
- The Green LED should light up. Indicating Power supply is "ON" and working properly. Now the system is ready to operate to its required purpose.

5.2 Maintenance & Safety Instructions

Please use the following safety instructions to ensure your own personal safety and to help protect your system from potential damage.

- The Model RPS5412 should be treated with the sufficient care.
- Do not open, service (or) repair any product by yourself.
- 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 expose your system to direct heat, radiators, rain, dripping or splashing.
- Do not subject the unit to sudden or severe shocks.
- Never operate the Model RPS5412 with any of the covers removed.
- Do not block cooling vents.

- Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
- Use the product only with approved equipment.
- Operate the product only from the type of external power source specified.
- Use only approved power cable(s). If you have not been provided with a power cable contact OPTIMAL POWER®.
- To help prevent electric shock, plug the system and peripheral power cables into properly grounded electrical outlets. Provided AC cable is equipped with three-prong plugs to help ensure proper grounding.
- Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.
- Observe extension cable and power strip ratings.
- Make sure that the total ampere rating of all products plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.
- To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position system cables and power cables (AC and DC) carefully; route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cable.
- Do not modify power cables or plugs.
- Install the power supply before connecting the power cable to the power supply.
- Unplug the power cable before removing the power supply.
- If the system has multiple sources of power, disconnect power from the system by unplugging all power cables from the power supplies.
- A qualified electrician must perform all connections to AC and DC power and to safety grounds. All electrical wiring must comply with applicable local or national codes and practices.
- Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

5.3 Trouble-Shooting Instructions

If the RPS system is not working, check the following steps before calling the Authorized Technician at Optimal Power®:

- Check that Green Status LED is "ON".
- Check that AC input power exists and that main switch is in the "ON" position.
- Check that the required 6A@250V fuse at the back of the RPS is not blown.
- Check that all the RPS DC Connection Cable Models RPSC5412 are connected and well secured.

If after all these trouble shooting steps the unit does not start, do not try to repair the unit but call the Technical Support.

5.4 Warnings

To reduce the risk of fire, electric shock or product damage, **DO NOT** expose the Model RPS5412 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. **DO NOT** press against the front and/or rear panel.

Optimal Power Supplies LLC is not responsible for any kinds of damages (direct or indirect) sustained through the use of any of its products.