

**NETGEAR®**

# Hardware Installation Guide

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## Redundant Power System and Power Bank RPS4000v2 Hardware Installation Guide

March 2020  
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## Revision History

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202-12072-01	March 2020	<ul style="list-style-type: none"> <li>• The CD is no longer shipped with product. Removed info about CD.</li> <li>• Updated branding.</li> <li>• Updated support and compliance section.</li> <li>• Safety instructions updated.</li> <li>• Replaced RPS4000 images with updated RPS4000v2 images               <ul style="list-style-type: none"> <li>- Updated images include updated labels.</li> </ul> </li> <li>• Updated the “Mode” sections header names:               <ul style="list-style-type: none"> <li>- “Mode one” is now <u>Mode 1: Legacy RPS operation mode on page 18.</u></li> <li>- “Mode two” is now <u>Mode 2: Normal operation mode on page 19.</u></li> <li>- “Mode three” is now <u>Mode 3: High power operation mode on page 20.</u></li> <li>- “Mode four” is now <u>Mode 4: PoE power N+1 operation mode on page 21.</u></li> <li>- “Mode five” is now <u>Mode 5: System power N+1 operation mode on page 22.</u></li> <li>- “Mode six” is now <u>Mode 6: Standby Mode on page 23.</u></li> <li>- “Mode seven” is now <u>Mode 7: Current sharing operation mode on page 24.</u></li> </ul> </li> <li>• Replaced mentions of “power modules” with “PSUs”.               <ul style="list-style-type: none"> <li>- This does not include mentions of “power module bays”.</li> </ul> </li> <li>• Added a table defining “Type” and “CS”.</li> <li>• Added <u>Table 4, Operation modes on page 16</u></li> </ul>
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# Contents

## Chapter 1 Introduction

Front panel and LEDs .....	6
Rear panel .....	7
Safety instructions.....	8

## Chapter 2 Hardware Installation

Package contents.....	11
Protecting against electrostatic discharge .....	11
Unpack the hardware.....	11
Installation .....	12
Select a location.....	12
Install the RPS.....	13
Check the installation .....	14
Connect to power and check the LEDs.....	14
Connect equipment to the RPS4000v2.....	14
RPS4000v2 modes of operation.....	15
Mode 1: Legacy RPS operation mode.....	18
Mode 2: Normal operation mode .....	19
Mode 3: High power operation mode.....	20
Mode 4: PoE power N+1 operation mode .....	21
Mode 5: System power N+1 operation mode .....	22
Mode 6: Standby Mode .....	23
Mode 7: Current sharing operation mode .....	24
.....	24

## Chapter 3 Troubleshooting

Troubleshooting Chart .....	25
-----------------------------	----

## Appendix A Technical Specifications

Technical Specifications.....	26
-------------------------------	----

# 1

## Introduction

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The NETGEAR Redundant Power System and Power Bank RPS4000 v2 provides state-of-the-art, high-performance, IEEE-compliant network solutions. This guide describes hardware installation and basic troubleshooting for these managed switches.

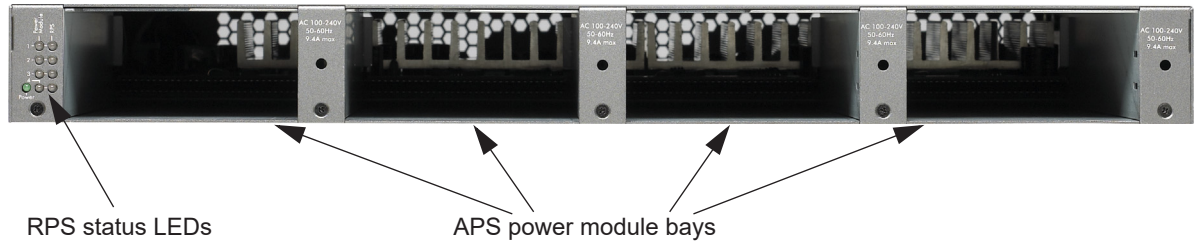
The RPS can be freestanding or rack-mounted in a wiring closet or an equipment room. For additional information, go to the NETGEAR website at <http://www.netgear.com>.

This chapter contains the following sections:

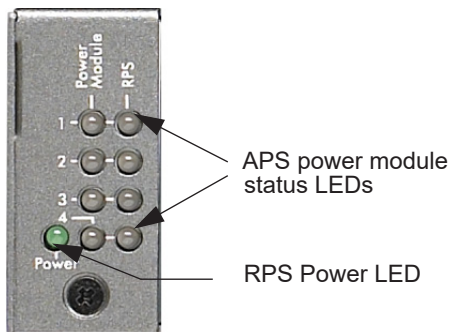
- [Front panel and LEDs](#)
- [Rear panel](#)
- [Safety instructions](#)

# Front panel and LEDs

The following figures show the front panel of the RPS4000v2. The front panel contains a pair of power supply unit (PSU) status LEDs for each power module bay.



**Figure 1. RPS front panel**



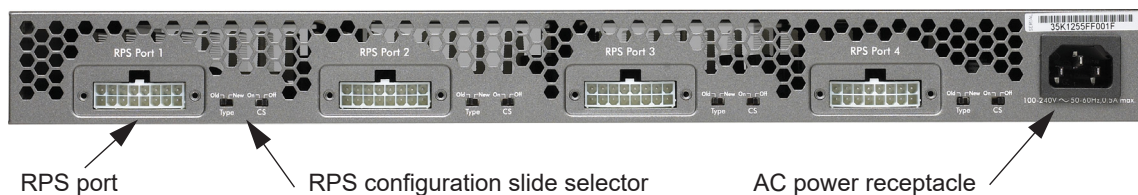
**Figure 2. RPS status LEDs**

**Table 1. LED description**

Label	Color	Activity	Description
<b>PWR (Power)</b>	Green	On	Power is being provided to the RPS4000.
<b>Power Module Status</b>	Green	On	An APS1000W is present and working properly.
	Yellow	On	An APS1000W is present and is not working properly.
	Off	Off	There is no APS1000W present.
<b>RPS Port Status</b>	Green	On	The type B switch supports dynamic power allocation and the APS1000W in the corresponding RPS port and power module bay is supplying power to the switch.
		Blinking	The type B switch supports dynamic power allocation but the APS1000W in the corresponding RPS port and power module bay is not supplying power to the switch. Power is being supplied by the APS1000W in a different power module bay.
	Yellow	On	The legacy switch is an type A design, which does not support dynamic power allocation, and the APS1000W is providing power to the switch.
		Blinking	The legacy switch is an type A design, which does not support dynamic power allocation, but the APS1000W is not supplying power to the switch.
	Off	Off	No power is being supplied to the switch or the switch is not recognized.

## Rear panel

The RPS4000v2 rear panel has four RPS ports, four sets of Type and CS configuration slide selectors, and an AC power receptacle for the RPS4000v2 (AC power cord supplied).



**Figure 3. RPS4000v2 rear panel**

# Safety instructions

Use the following safety guidelines to ensure your own personal safety and to help protect your system from potential damage.

To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment, observe the following precautions:

- This product is designed for indoor use only in a temperature-controlled and humidity-controlled environment. For more information, see the environmental specifications in the appendix or the data sheet.

Any device that is located outdoors and connected to this product must be properly grounded and surge protected.

Failure to follow these guidelines can result in damage to your NETGEAR product, which might not be covered by NETGEAR's warranty, to the extent permissible by applicable law.

- Observe and follow service markings:
  - Do not service any product except as explained in your system documentation. Some devices should never be opened.
  - If applicable to your device, opening or removing covers that are marked with the triangular symbol with a lightning bolt can expose you to electrical shock. We recommend that only a trained technician services components inside these compartments.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:
  - Depending on your device, the power adapter, power adapter cable, power cable, extension cable, or plug is damaged.
  - An object fell into the product.
  - The product was exposed to water.
  - The product was dropped or damaged.
  - The product does not operate correctly when you follow the operating instructions.
- Keep your system away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on your system components, and never operate the product in a wet environment. If the system gets wet, see the appropriate section in your troubleshooting guide, or contact your trained service provider.
- 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.
- If applicable to your device, allow the product to cool before removing covers or touching internal components.



- Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
- To avoid damaging your system, if your device uses a power supply with a voltage selector, be sure that the selector is set to match the power at your location:
  - 115V, 60 Hz in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
  - 100V, 50 Hz in eastern Japan and 100V, 60 Hz in western Japan
  - 230V, 50 Hz in most of Europe, the Middle East, and the Far East
- Be sure that attached devices are electrically rated to operate with the power available in your location.
- Depending on your device, use only a supplied power adapter or approved power cable:  
If your device uses a power adapter:
  - If you were not provided with a power adapter, contact your local NETGEAR reseller.
  - The power adapter must be rated for the product and for the voltage and current marked on the product electrical ratings label.
  - If your device uses a power cable:
    - If you were not provided with a power cable for your system or for any AC-powered option intended for your system, purchase a power cable approved for your country.
    - The power cable must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cable must be greater than the ratings marked on the product.
- To help prevent electric shock, plug the system and peripheral power cables into properly grounded electrical outlets.
- If applicable to your device, the peripheral power cables are 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 three-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, power adapter cables, or power cables carefully. Route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Do not modify power adapters, power adapter cables, power cables or plugs. Consult a licensed electrician or your power company for site modifications.
- Always follow your local and national wiring rules.

# 2

## Hardware Installation

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This chapter explains how to install the RPS.

This chapter contains the following sections:

- [Package contents](#)
- [Protecting against electrostatic discharge](#)
- [Unpack the hardware](#)
- [Installation](#)
- [Connect equipment to the RPS4000v2](#)
- [RPS4000v2 modes of operation](#)

# Package contents

The package contains the following items:

- RPS4000v2
- Power cord
- Rubber footpads for tabletop installation
- Rack-mounting kit

# Protecting against electrostatic discharge



## **WARNING:**

**Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components, such as the microprocessor. You can do so by periodically touching an unpainted metal surface on the switch.**

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

1. When unpacking a static-sensitive component from its shipping carton, leave it in the antistatic package until you are ready to install it. Just before unwrapping the antistatic package, discharge static electricity from your body.
2. Before moving a sensitive component, place it in an antistatic container or package.
3. Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads, workbench pads, and an antistatic grounding strap.

# Unpack the hardware

**Check the contents of the box to make sure that all items are present before installing the RPS:**

1. Place the container on a clean flat surface and cut all straps securing the container.
2. Unpack the hardware from the box.

Carefully remove the hardware and place it on a secure and clean surface. See [Select a location on page 12](#).

3. Remove all packing material.
4. Make sure that all items are present. See [Package contents on page 11](#).

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**Note:** If any item is found missing or damaged, contact your local NETGEAR reseller for replacement.

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5. Inspect the products and accessories for damage. Report any damage immediately.

## Installation

**Install the equipment in the sequence presented in this section:**

1. Select a location. See [Select a location on page 12](#).
2. Install the switch. See [Install the RPS on page 13](#).
3. Check the installation. See [Check the installation on page 14](#).
4. Apply power and check the LEDs. See [Connect to power and check the LEDs on page 14](#).

### Select a location

The RPS can be mounted in a standard 19-inch (48.26-centimeter) rack or left freestanding (placed on a tabletop).

The site where you install the RPS can affect its performance. Before installing the switch or switches, make sure that the chosen installation location meets the following site requirements.

**Table 2. Site requirements for RPS location**

Requirements	
<b>Mounting</b>	Desktop installations: Provide a flat table or shelf surface. Rack-mount installations: Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You need the rack-mount kit supplied with the RPS.
<b>Access</b>	Locate the RPS in a position that lets you access the front and rear connections and view the front panel LEDs.
<b>Power source</b>	Provide a power source within 6 feet (1.8 meters) of the installation location. Power specifications for the RPS are shown in <a href="#">Appendix A, Technical Specifications</a> . Be sure that a wall switch does not control the AC outlet. A wall switch can accidentally turn off power to the outlet and the RPS.
<b>Environment</b>	Install the RPS in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.
<b>Temperature</b>	The ambient RPS operating temperature range is 0° to 50°C (32° to 122°F). Keep the RPS away from heat sources such as direct sunlight, warm air exhausts, hot-air vents, and heaters.

**Table 2. Site requirements for RPS location**

Requirements	
<b>Operating humidity</b>	Install the RPS in a dry area with a maximum relative humidity of 90%, noncondensing.
<b>Ventilation</b>	Do not restrict airflow by covering or obstructing air inlets on the sides of the RPS. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling. Be sure that there is adequate airflow in the room or wiring closet where you intend to install the RPS.

## Install the RPS

You can install the RPS on a flat surface or in a standard 19-inch rack.

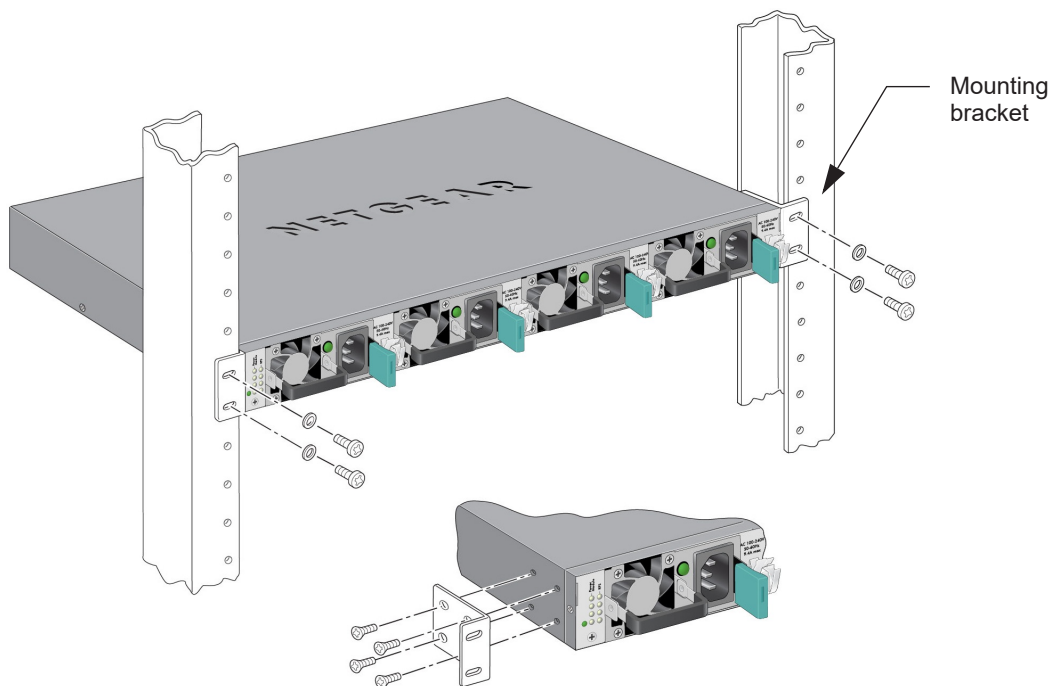
### Install the RPS on a flat Surface

The RPS ships with four self-adhesive rubber footpads. Stick one rubber footpad on each of the four concave spaces on the bottom of the RPS. The rubber footpads cushion the RPS against shock and vibrations.

### Install the switch in a rack

#### To install the RPS in a rack using the 19-inch rack-mount kit supplied with the RPS:

1. Attach the supplied mounting brackets to the side of the RPS.
2. Use the provided Phillips head screws to fasten the brackets to the sides of the RPS.



3. Tighten the screws with a No. 1 Phillips screwdriver to secure each bracket.
4. Align the bracket and rack holes. Use two pan-head screws with nylon washers to fasten each bracket to the rack.
5. Tighten the screws with a No. 2 Phillips screwdriver to secure the switch in the rack.
6. Tighten the screws with a No. 2 Phillips screwdriver to secure the switch in the wall.

## Check the installation

### **Perform the following checks Before you apply power:**

1. Inspect the equipment thoroughly.
2. Verify that all cables are installed correctly.
3. Check cable routing to ensure that cables are not damaged and do not create a safety hazard.
4. Be sure that all equipment is mounted properly and securely.

## Connect to power and check the LEDs

The RPS does not have an on/off switch. Apply or remove power by connecting or disconnecting the RPS power cord. Before you connect the power cord, select an AC outlet that is not controlled by a wall switch. A wall switch can turn off power to the RPS.

### **After you select an appropriate outlet, follow these steps to apply AC power:**

1. Connect one end of the AC power adapter cable to the rear of the RPS, and the other end to a grounded three-prong AC outlet.
2. Check the Power LED on the front panel of the RPS. The LED should light up in the following sequence:
  - The LED turns yellow as the RPS runs a power-on self-test (POST).
  - If the RPS passes the test, the LED turns green. The RPS is working and ready to pass data.
  - If the POST fails, the Power LED blinks yellow.

If the Power LED does not light, check that the power cable is plugged in correctly and that the power source is good. For help with troubleshooting, see [Chapter 3, Troubleshooting](#).

## Connect equipment to the RPS4000v2

### **To connect a device to the RPS:**

1. Disconnect the AC power cord from the switch or device.

2. Connect one end of the NETGEAR RPS cable to the RPS connector on the switch rear panel.
3. Connect the other end of the NETGEAR RPS cable to the RPS4000v2 rear panel RPS port connector.
4. Reconnect the AC power cord to the switch or device.
5. Apply power to the RPS4000v2 by connecting the power cord to the RPS4000v2 power connect in the front panel and to an AC powered outlet.
6. Apply power to the PSU by connecting the power cord to the module power connect in the front panel and to an AC powered outlet.

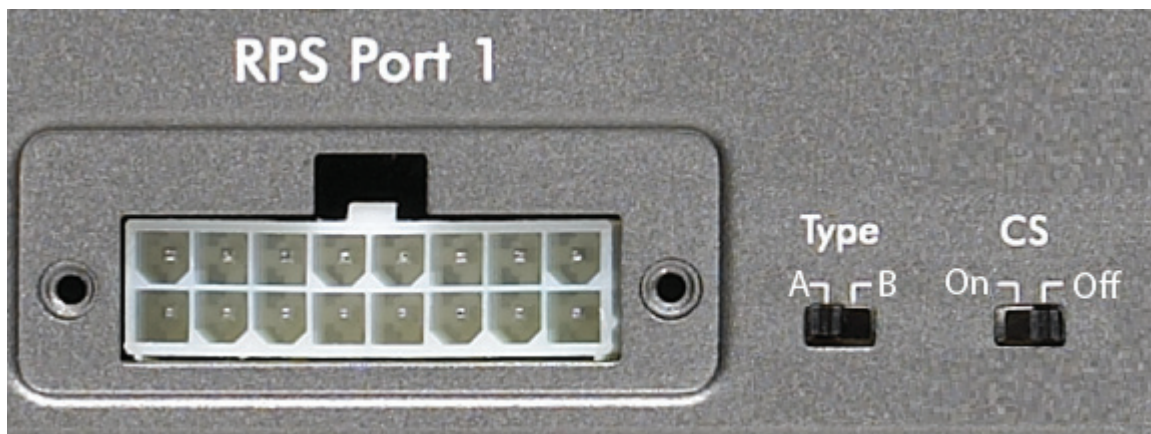
The RPS is working properly when all its front panel LEDs are lit as specified in [Front panel and LEDs on page 6](#). If not, see [Chapter 3, Troubleshooting](#).

**WARNING:**

**Do not disconnect the RPS cable from the RPS or the powered device when the connected device is on. First power the device off. Second, remove the power cord from the PSU. Finally, you can remove the device RPS power cable.**

## RPS4000v2 modes of operation

The RPS4000v2 rear panel has two slide selectors for each of the four RPS ports. The slide selectors work together to control how the RPS4000v2 provides power to the client switches.



**Figure 4. RPS configuration slide selectors**

**Table 3. Type and CS slide selectors**

Switch	Description
<b>Type</b>	<p><b>Type A:</b> Use this setting for older switches of Type A design that do not support I2C bus communication.</p> <p><b>Type B:</b> Use this setting for newer switches of Type B design that support I2C bus communication.</p>
<b>CS (Current Share)</b>	<p><b>On:</b> Current sharing is enabled. The APS1000W in this power module bay can be shared or combined with PSUs in other power bays.</p> <p><b>Off:</b> Current sharing is disabled. The APS1000W in this power module bay cannot be shared or combined with PSUs in other power bays.</p>

Use the Type and CS slide selectors to configure operating modes for the RPS4000v2. There are seven operating modes.

**Table 4. Operation modes**

Operation Mode		RPS Group 1* or Group 2**				Switch Type
		Type		CS		
		A	B	On	Off	
1	Legacy RPS	X			X	Type A
2	Normal		X		X	Type B
3	High Power		X	X		Type B
4	PoE Power N+1		X	X		Type B
5	System Power N+1	X		X		Type A
6	Standby	V***	V	V	V	Type A or Type B
7	Current sharing mode****		X	X		Supported current sharing mode device

\* Group 1: RPS port 1 and port 2.

\*\* Group 2: RPS port 3 and port 4

\*\*\* Depending on where in the table it is placed, V will mean that:

- The Type selector can be set to Type A or Type B
- The CS selector can be set on or off

\*\*\*\* The RPS4000v2 turns off current sharing when two APS1000W AC input ranges are not in same ranges

In addition to these settings, be aware of compatibility issues that can cause the RPS4000v2 to power off. The RPS4000v2 powers off when:

- The operation mode is set to Normal, High Power, or PoE Power N+1 and connected to a Type A switch that doesn't support these modes.



- Both RPS ports are in the same group but not set to the same setting.
- The RPS ports do not have their selectors set to the correct Type and CS settings for their respective operation modes, as shown in Table 4, Operation modes.
- In High Power mode, the APS1000W PSUs in the same group are not in the same AC input ranges.
- Paired APS1000W PSUs are attached to devices drawing dissimilar currents, for example 110 VAC and 220 VAC.
- The type selector is set to Type B, and all attached devices are Type A.

## Mode 1: Legacy RPS operation mode

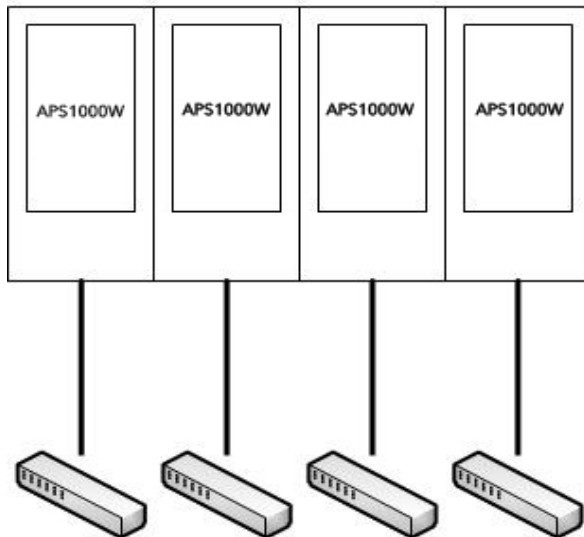
This mode supports Type A switches such as the GSM7328Sv1 switch. One APS1000W PSU in an RPS4000v2 power bank supports one RPS port delivering power to an individual switch.

The RPS4000v2 provides power to replace the switch's internal power supply when the RPS4000v2 is connected to the switch. The power supply in the switch becomes a standby power supply.

One RPS cabled to one switch and one APS1000W dedicated to one switch are required to use this mode.

If a Type B switch is connected to RPS4000v2 in this mode, the switch will only receive maximum power as indicated in [Table 3 on page 16](#).

**Figure 5. Legacy RPS operation mode diagram**  
RPS4000v2

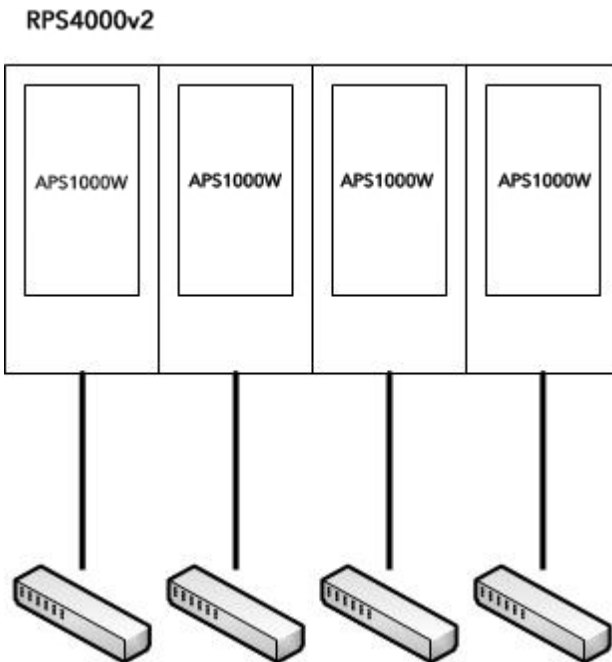


## Mode 2: Normal operation mode

The main difference between the Type A setting and the Type B setting is that Type B switches support I2C bus communication. Type B switches can communicate what power load they require, providing more dynamic power allocation when the Type B setting is used.

On Type B switches such as the M5300 series switch, each RPS port delivers power from each APS1000W to the connected switches. For each RPS port to provide power, its corresponding APS1000 PSU must be installed in the RPS4000v2 chassis.

**Figure 6. Normal operation mode diagram**



## Mode 3: High power operation mode

This mode supports Type B switches such as the M5300 series switches. RPS ports deliver power to switches when the RPS4000v2 detects a connected Type B switch over the I2C bus.

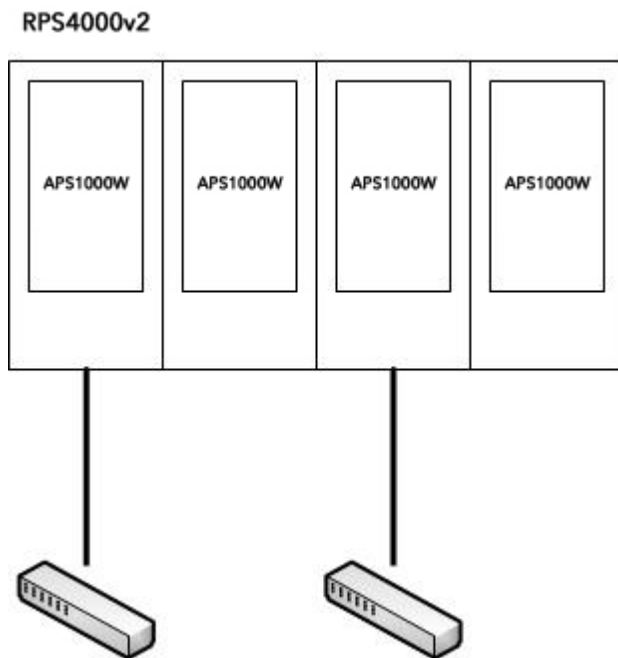
In this mode, the RPS port can provide a maximum 1440W of PoE power to switches when 2 PSUs are present and work well in the same group. RPS port 1 and port 3 take priority when ports 1 and 3, and ports 2 and 4, are connected to switches at the same time. When ports 1 or 3 do not have switches connected, ports 2 and 4 can provide 1440W of power.

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**Note:** RPS Ports 1 and 3 take priority. The RPS4000v2 will cut off output power to ports 2 and 4 if switches are connected to ports 1 and 3.

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**Figure 7. High power operation mode diagram**

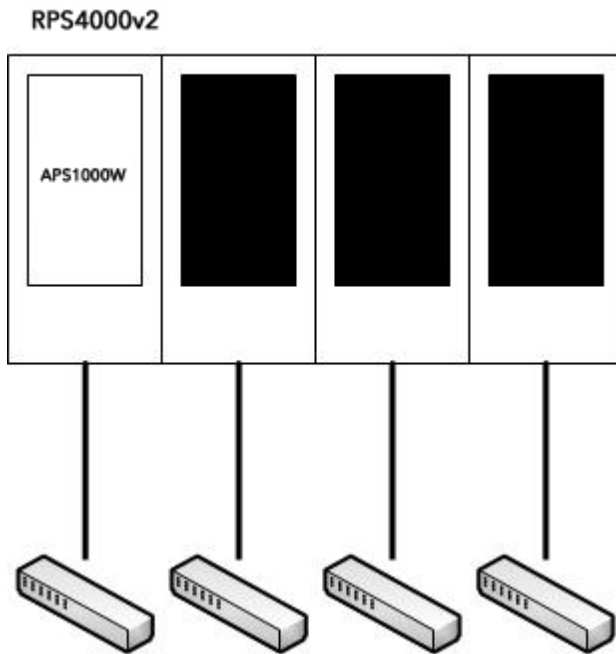


## Mode 4: PoE power N+1 operation mode

This mode supports Type B switches such the M5300 series switches. RPS ports deliver power to switches when the RPS4000v2 detects a connected Type B switch over the I2C bus.

In this mode, one APS1000W can provide power to 2 RPS ports in the same group.

**Figure 8. PoE power N+1 operation mode**



## Mode 5: System power N+1 operation mode

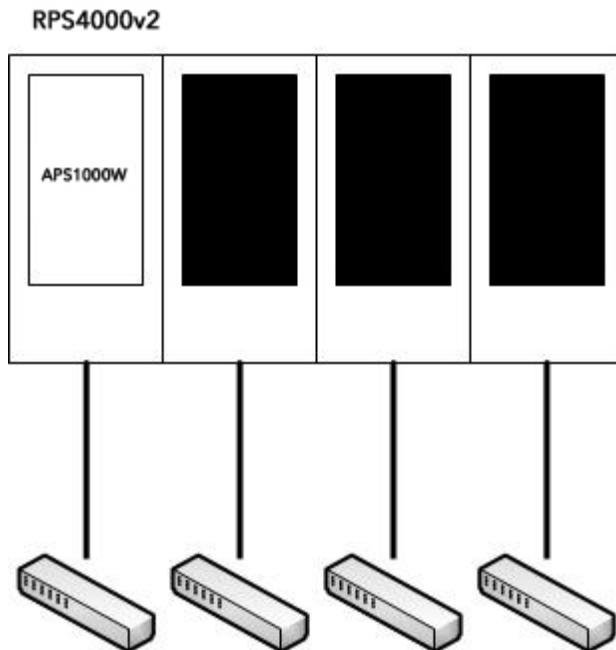
This mode can be used for both Type A and Type B switches such as the M5300 series or the GSM7328Sv1 series. The RPS port only delivers system power (12V) to a switch when a connected switch is detected. This mode allows one APS1000W to backup four switches simultaneously.

When RPS4000v2 is connected to the switch, the PoE power provided by RPS4000v2 will replace the switch's internal supply, and the power supply in the switch becomes a standby power supply. In this mode, an APS1000W can be installed in any bay.

If the Type B switch is connected to RPS4000v2 in this mode, the switch will only receive maximum power as indicated in [Table 3 on page 16](#).

One RPS cable to one switch and one APS1000W shared by all connected switches are required in this mode.

**Figure 9. System power N+1 operation model**

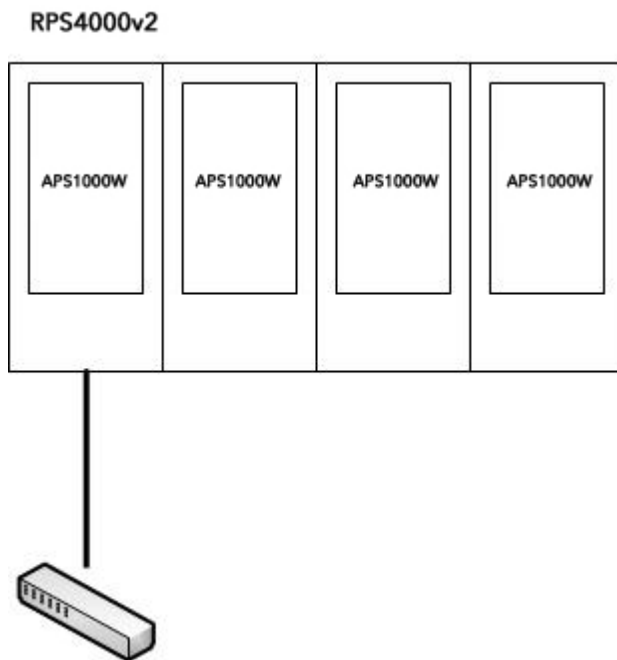


## Mode 6: Standby Mode

In this mode, the RPS4000v2 delivers system power to connected switches when the Type and CS settings vary across RPS ports. This mode functions as a fallback when the mode setting is incorrect. None of the other APS1000W PSUs provide power in this mode.

One RPS cable to one switch and one or more APS1000W installed in the RPS4000v2 bays are required to use this mode.

**Figure 10. Standby mode diagram**



## Mode 7: Current sharing operation mode

This mode supports NETGEAR chassis and switches that support the sharing feature, such as the M6100 chassis switch. The RPS will combine power from two adjacent APS1000Ws to one switch.

In this mode, one group's RPS port provides a maximum of 1550W (with ACin = 220V) of PoE power to switch blades when 2 PSUs are present and work well in the same group. RPS port 1 and port 3 take priority when ports 1 and 3, and ports 2 and 4, are connected to switches at the same time. When ports 1 or 3 do not have switches connected, ports 2 and 4 can provide 1440W of power.

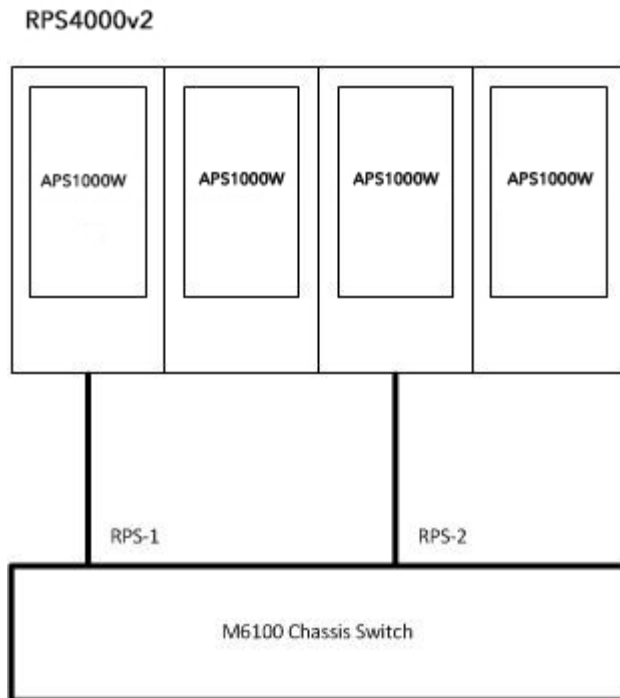
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**Note:** RPS Ports 1 and 3 take priority. The RPS4000v2 will cutoff output power to ports 2 and 4 if switches are connected to ports 1 and 3.

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This mode requires two RPS cables to two RPS ports on the M6100 chassis switch and all RPS4000v2 bays are populated with APS1000W PSUs.

**Figure 11. Current sharing operation mode diagram**





# 3

## Troubleshooting

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### Troubleshooting Chart

The following table lists symptoms, causes, and solutions of possible problems.

**Table 5. Troubleshooting chart**

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Power LED is off.	No power is received.	Check the power cord connections for the switch at the switch and the connected device. Make sure that all cables used are correct and comply with Ethernet specifications.
RPS port LED is off or incorrect.	Incorrect switch selections.	Check the operating mode and CS switch selection.

# A

## Technical Specifications

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### Technical Specifications

**Table 6. Technical specifications**

Feature	Description
Environment	Operating: <ul style="list-style-type: none"><li>• Temperature: 32° to 122°F (0° to 50°C)</li><li>• Humidity: 90% maximum relative humidity, noncondensing</li><li>• Altitude: 10,000 ft (3,000 m) maximum</li></ul> Storage: <ul style="list-style-type: none"><li>• Temperature: – 4° to 158°F (–20° to 70°C)</li><li>• Humidity: 95% maximum relative humidity, noncondensing</li><li>• Altitude: 10,000 ft (3,000 m) maximum</li></ul>
Mean time between failure (MTBF)	168,208 hours (~19.2 years) @ 25°C 55,879 hours (~6.4 years) @ 55° C
Electromagnetic emissions and immunity	CE mark, commercial, FCC Part 15 Class A, VCCI Class A, Class A EN 55022 (CISPR 22) Class A, Class A C-Tick, EN 50082-1, EN 55024
Safety	CE mark, commercial, CSA certified (CSA 22.2 #950), UL listed (UL 1950)/cUL IEC950/EN60950