

# NETGEAR<sup>®</sup>

## PowerLINE 2000 Adapters User Manual

### Model

PLP2000

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San Jose, CA 95134  
USA

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For regulatory compliance information, visit <http://www.netgear.com/about/regulatory>.

See the regulatory compliance document before connecting the power supply.

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# Your PowerLINE Adapter

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# 1

This chapter describes your PowerLINE adapter and how your adapter fits into a home network. It also explains the security features and how to secure your PowerLINE network with a private encryption key.

The chapter contains the following sections:

- *PLP2000 Adapter*
- *LED Descriptions*
- *Button Descriptions*
- *Ethernet Port*
- *Extra Outlet*
- *Adapter Label*

For more information about the topics covered in this manual, visit the NETGEAR support website at [netgear.com/support](http://netgear.com/support).

## PLP2000 Adapter

The hardware features of your PowerLINE adapter are shown in the following figure. Note that adapters vary by region. Your adapter might look different.

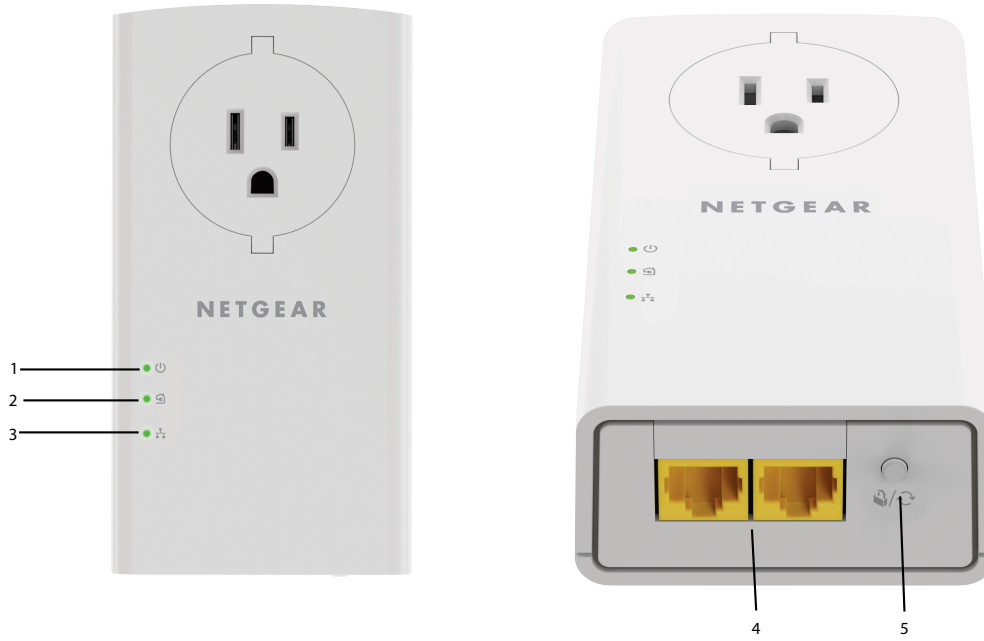





Figure 1. Hardware features

- 1 Power LED
- 2 Pick A Plug LED
- 3 Ethernet LED
- 4 Ethernet ports
- 5 Security/Factory Reset button

## LED Descriptions

The LEDs indicate the status of your PowerLINE adapter.

**Table 1. LED descriptions**

Item	Description
Power LED 	<p><b>Solid green.</b> The electrical power is on.</p> <p><b>Blinking green.</b> (Blink rate about once a second) The adapter is in the process of setting up security.</p> <p><b>Slow blinking green.</b> (Blink rate about once every three seconds) The adapter is in power saving mode.</p> <p><b>Off.</b> The adapter is not receiving electrical power.</p>
Ethernet LED 	<p><b>Solid green.</b> The Ethernet port is linked.</p> <p><b>Off.</b> No Ethernet connection is detected.</p>
Pick A Plug LED 	<p>The Pick A Plug feature lets you pick the electrical outlet with the strongest performance, indicated by the color displayed by the LED:</p> <p><b>Red.</b> Link rate &lt; 50 Mbps (good).</p> <p><b>Amber.</b> Link rate &gt; 50 and &lt; 80 Mbps (better).</p> <p><b>Green.</b> Link rate &gt; 80 Mbps (best).</p> <p><b>Off.</b> The adapter did not find any other compatible PowerLINE devices using the same encryption key.</p>

## Button Descriptions

Use the buttons to restore the adapter to the factory configuration and to create a secure network.

**Table 2. Button descriptions**

Button or Switch	Description
Security/Factory Reset	<p>Press and hold the <b>Security/Factory Reset</b> button for 1 to 3 seconds and then release it to create a secure PowerLINE network.</p> <p>Press and hold the <b>Security/Factory Reset</b> button for 8 to 10 seconds and then release it to return the PowerLINE adapter to its factory default settings</p>

## Ethernet Port

PowerLINE adapters use Ethernet ports to convert a standard electrical wall outlet into a high-speed wired network connection. You can use the wired network connection to bring Internet connectivity to any device with an Ethernet port, such as a computer, game console, Blu-ray player, smart TV, HD set-top box, or network DVR.

## Extra Outlet

For models with an extra outlet, you must observe a few restrictions on how you use the extra outlet.

The technical specifications for your model provide socket outlet ratings. See *Technical Specifications and Safety Information* on page 17. See *Safety Information* on page 19 for general guidelines for use.

## Adapter Label

The adapter label provides unique details specific to your device. It displays the following:

- Model number
- MAC address
- Serial number
- Device password

This chapter describes the setup and configuration of PowerLINE networks.

The chapter contains the following sections:

- *How the PowerLINE Adapter Fits Into Your Network*
- *Set Up a New PowerLINE Network*
- *Add an Adapter to an Existing PowerLINE Network*
- *About PowerLINE Network Security*
- *Use the Security/Factory Reset Button to Set the Encryption Key*



## How the PowerLINE Adapter Fits Into Your Network

You can use one or more PowerLINE adapters to extend Internet access throughout your home.

A PowerLINE network consists of two or more compatible PowerLINE devices that communicate with each other using your electrical power lines. One of the PowerLINE devices is connected with an Ethernet cable to your router so that the PowerLINE network is linked to your local area network (LAN). Connecting one PowerLINE device to your router allows all the PowerLINE devices on the PowerLINE network to communicate with the router and use its Internet connection.

The following illustration shows a PowerLINE network with one PowerLINE device in Room 1 and a second PowerLINE device in Room 2.

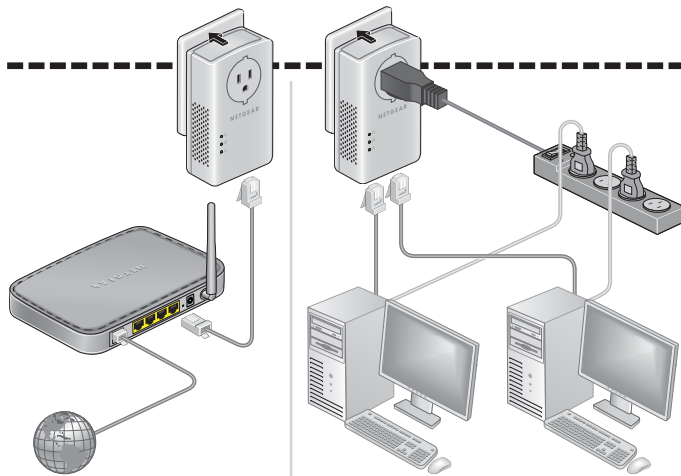


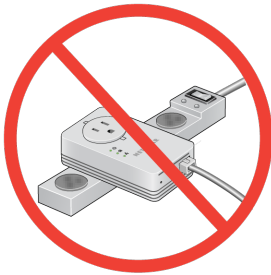
Figure 2. Poweline adapters connecting two rooms

To form a PowerLINE network, you need at least two compatible PowerLINE devices.

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For best performance, follow these guidelines when you plan the location of your PowerLINE devices:

- Use an electrical outlet that is not controlled by a wall switch to avoid accidentally turning off the power to the outlet.
- Avoid plugging PowerLINE products into electrical outlets that are located near appliances that consume a lot of power, such as washers, dryers, or refrigerators. Interference from these appliances might prevent PowerLINE products from working correctly or reduce PowerLINE network performance.
- Do not plug PowerLINE products into a power strip, extension cord, or surge protector. Connecting a PowerLINE product to one of these devices might prevent the product from working correctly or reduce PowerLINE network performance.



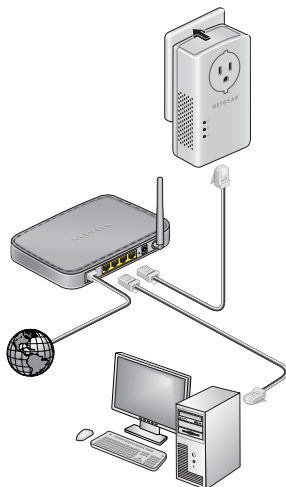
## Set Up a New PowerLINE Network

You can use two or more PowerLINE adapters to form a network or extend an existing network to additional wired Ethernet devices.

PowerLINE networks use an encryption key common to all adapters on the network. You can use the default key or a private key. We recommend that you use a private key. This procedure sets a private key.

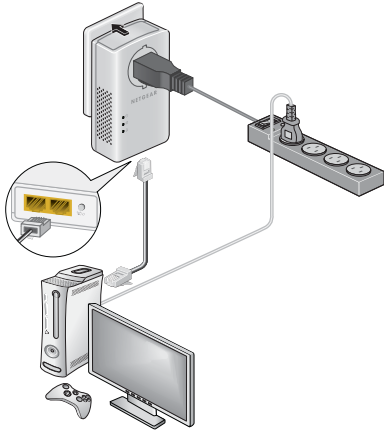
### ► To set up a new PowerLINE network:

1. If you are extending an existing wired network, make sure that your wired Ethernet connections are working by navigating to a web page from a computer connected to your router or gateway using an Ethernet cable.
2. Plug one PowerLINE device into a wall outlet near your router or gateway.



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3. Connect the device to the LAN port on your router or gateway using an Ethernet cable.
4. Plug the second PowerLINE device into a wall outlet where you want to add Internet access.



5. Use the Ethernet cable that came with your adapter to connect the PowerLINE device to an Ethernet port on a computer, game console, Blu-ray player, or other peripheral device.
6. Wait until the Pick A Plug LEDs are lit.
7. To use a private encryption key, press the **Security/Factory Reset** button on one of the adapters for two seconds, and then press the **Security/Factory Reset** button on the other adapter for two seconds. Both buttons must be pressed within two minutes.



### **WARNING:**

Do not press the **Security/Factory Reset** button on the PowerLINE adapter until installation is complete and the adapters are communicating with each other (indicated by the blinking Power LED). Pressing this button too soon can temporarily disable PowerLINE communication. If this occurs, use the **Factory Reset** button to return the PowerLINE adapter to its factory default settings.

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**Note** The **Security/Factory Reset** button does not work in power saving mode.

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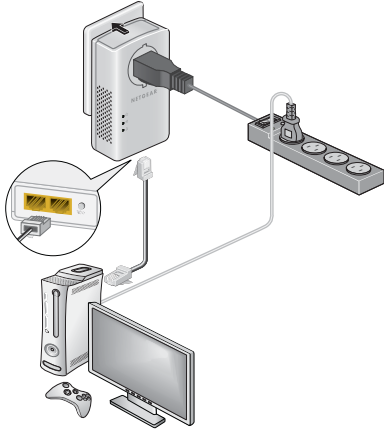
8. Wait for the PowerLINE network to recognize each PowerLINE device. This process could take as little as 5 seconds or up to 80 seconds. When the Power LEDs stop blinking, the process is complete. If the Pick A Plug LEDs are green or amber, the devices are successfully connected to the PowerLINE network. A red Pick A Plug LED indicates a slow link rate. In this case, move the PowerLINE device to another electrical outlet with a faster connection.
9. If you are installing additional adapters, repeat *Step 7* with one of the secure adapters and one of the adapters that is not yet secured. See *Use the Security/Factory Reset Button to Set the Encryption Key* on page 13.

## Add an Adapter to an Existing PowerLINE Network

You can add additional adapters to an existing PowerLINE network.

### ► To add an adapter to a PowerLINE network:

1. Plug the adapter into a wall outlet where you want to add Internet access.



2. (Optional) Use the Ethernet cable that came with your adapter to connect the adapter to an Ethernet port on a computer, game console, Blu-ray player, or other peripheral device.  
The PowerLINE devices attempt to detect each other and form a PowerLINE network.
3. If you used a private encryption key, press the **Security/Factory Reset** button on one of the adapters that is already a part of the network for two seconds, and then press the **Security/Factory Reset** button on the new adapter for two seconds.

Both buttons must be pressed within two minutes.

See [Use the Security/Factory Reset Button to Set the Encryption Key](#) on page 13.



#### **WARNING:**

**Do not press the Security/Factory Reset button on the PowerLINE adapter until installation is complete and the adapters are communicating with each other (indicated by the blinking Power LED). Pressing this button too soon can temporarily disable PowerLINE communication. If this occurs, use the Security/Factory Reset button to return the PowerLINE adapter to its factory default settings.**

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**Note** The **Security/Factory Reset** button does not work in power saving mode.

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4. Wait for the PowerLINE network to recognize each PowerLINE device.  
This process could take as little as 5 seconds or up to 80 seconds.

When the Power LED stops blinking, the process is complete. If the Pick A Plug LEDs are green or amber, the devices are successfully connected to the PowerLINE network. A red Pick A Plug LED indicates a slow link rate. In this case, move the PowerLINE device to another electrical outlet with a faster connection.

## About PowerLINE Network Security

A PowerLINE network consists of two or more PowerLINE devices using the same network encryption key. By setting up security, you configure your PowerLINE network to use a private key instead of the default key. If you do not set up security on your network, anyone nearby with a PowerLINE network can potentially use his or her connection to gain access to your network and information that you send over the Internet.

You can use the **Security/Factory Reset** button on the PowerLINE device to create a private encryption key and secure your PowerLINE network. See *Use the Security/Factory Reset Button to Set the Encryption Key* on page 13.

## Use the Security/Factory Reset Button to Set the Encryption Key

All PowerLINE networks start with the same default encryption key. You can use the **Security/Factory Reset** button to replace the default key with a random private key. This is especially relevant in settings such as apartment buildings, office buildings, dorm rooms, and other more populated areas.

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**Note** A PowerLINE device can generate a random private encryption key only once. If you want to generate a new random key, first reset the PowerLINE device to its factory default settings. Press the **Security/Factory Reset** button for two seconds, and then release it.

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### ► To set the encryption key:

1. Make sure that all of the PowerLINE devices that you want to configure are plugged in by checking that the Power and Pick A Plug LEDs on each device are lit solid green.

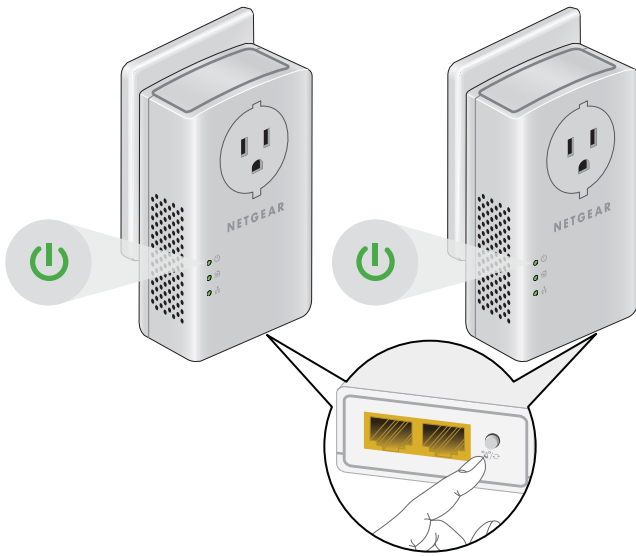
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**Note** Do not press the **Security/Factory Reset** button on the PowerLINE devices until the Power and Pick A Plug LEDs on each PowerLINE device are lit solid green. Pressing the **Security/Factory Reset** button too soon can temporarily disable PowerLINE communication. If PowerLINE communication is disabled, reset the PowerLINE device to its factory default settings by pressing the **Security/Factory Reset** button for two seconds and then releasing it.

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2. Press the **Security/Factory Reset** button on the first PowerLINE device for two seconds.  
The Power LED starts blinking after you release the button, and then the PowerLINE device automatically creates a new, randomly generated encryption key that all other PowerLINE devices on the network will use.  
At this point, the PowerLINE devices cannot communicate with each other.
3. Within two minutes of pressing the **Security/Factory Reset** button on the first PowerLINE device, press the **Security/Factory Reset** button on the second PowerLINE device for two seconds.  
You must press both **Security/Factory Reset** buttons within two minutes.  
The Power LED starts blinking after you release the button. This process allows the second PowerLINE device to use the same private encryption key as the first device so that they can communicate.

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When the Power LEDs stop blinking and the Pick A Plug LEDs are lit solid green, the two devices can communicate over the PowerLINE network in a secure way.



You can take various steps to diagnose and solve problems that you might encounter.

The first step in troubleshooting your PowerLINE adapter is to check the LEDs. After you plug in the PowerLINE device, the following sequence of events occurs:

1. The Power LED lights.
2. After approximately 10 seconds, verify the following:
  - The Power LED is solid green. The device is powered on.
  - If the device is connected to a PowerLINE network, the Pick A Plug LED is lit.
  - If the PowerLINE device is connected through the Ethernet port to a powered-on Ethernet device, the Ethernet LED is lit.

If no LEDs are lit, see [LEDs Are Off When the PowerLINE Device Is Plugged In](#) on page 16.

If the Power LED is not lit, see [Power LED Is Off](#) on page 16.

If the Ethernet LED is not lit, see [Ethernet LED Is Off](#) on page 16.

If you do not find the solution here, visit the NETGEAR support site at [support.netgear.com](http://support.netgear.com) for product and contact information.

## LEDs Are Off When the PowerLINE Device Is Plugged In

The common reason the LEDs are off is that power is not being provided to the device.

Make sure that power is supplied to the electrical outlet.

### Power LED Is Off

If the Power LED is off, the adapter is not receiving electrical power. You can try several troubleshooting tips.

Try these steps:

1. Make sure that power is supplied to the electrical outlet and that the PowerLINE device is not plugged into an extension cord, power strip, or surge protector.
2. Press the **Security/Factory Reset** button on the PowerLINE device for 8 to 10 seconds to return the device to its factory default settings.

### Ethernet LED Is Off

If the Ethernet LED is off, the Ethernet port on the adapter is not linked. You can try various troubleshooting tips.

Try these steps:

1. If your PowerLINE device is connected to the LAN port of your router, make sure of the following:
  - Your router and modem are turned on.
  - The computer connected directly to the router can access the Internet.
2. If your PowerLINE device is connected to a computer, game console, Blu-ray player, or other peripheral device, make sure of the following:
  - The peripheral device is turned on.
  - The PowerLINE device is securely connected to the peripheral device using an Ethernet cable.
3. Press the **Security/Factory Reset** button on each PowerLINE device for 8 to 10 seconds to return the device to its factory default settings.



# Technical Specifications and Safety Information

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# A

This appendix provides technical specifications and safety information for PowerLINE adapters.

- *PowerLINE PLP2000 Technical Specifications*
- *Safety Information*

## PowerLINE PLP2000 Technical Specifications

The PLP2000 adapter meets the technical specifications defined in the following table.

**Table 3. Technical specifications**

Feature	Specification
Data and routing protocols	IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-T), IEEE 802.3ab (1000BASE-T)
AC input	100–240V, 0.2A (max.)
Socket-outlet rating (max. load)	AU: 10A, 250V; FR: 16A, 250V; NA: 11.8A, 125V
Power consumption	Normal: 6.5W; Power saving mode: < 0.5W
Dimensions	5.25 x 2.83 x 1.49 in. (133.5 x 72 x 37.8 mm)
Weight	AU: 0.536 lb (243 g); FR: 0.551 lb (250 g); NA: 0.514 lb (233 g)
Operating temperature	0° to 40°C (32° to 104°F)
Operating humidity	10–90% maximum relative humidity, noncondensing
Storage humidity	5–95% maximum relative humidity, noncondensing
Security encryption type	128-bit AES
MAC addresses	Number of nodes that can be added to a single network: 8 (active), 16 (total)
Bandwidth	2000 Mbps
Data transfer rate	Up to 2000 Mbps with real throughput greater than 500 Mbps
Frequency band	2–86 MHz
Modulation type	OFDM windowed modulation

## Safety Information

Follow these safety guidelines to ensure your own personal safety and to help protect your system from potential damage:

- For national approvals (approval schemes other than CB), relevant national standards for plug, socket-outlet, and direct plug-in units (for example, US) shall also be consulted while you are testing and approving such products according to the national standards.
- Check the electrical current for any device plugged into the filtered AC socket. Do not exceed home and product outlet ratings and electrical requirements.
- The socket-outlet shall be installed near the equipment and be easily accessible.
- Only power cords are allowed to be inserted into the filtered AC socket; no other equipment with a direct plug-in is allowed. Power cords must be a maximum of 1 m long and a minimum of 0.75 mm<sup>2</sup> of cross-sectional area.
- Do not plug devices into the PowerLINE PassThru Adapter filtered AC outlet that exceed the product ratings. The output voltage of the filtered AC outlet is the same as the power outlet that the PowerLINE PassThru Adapter is plugged into. To help avoid damaging your system, be sure that the attached devices are electrically rated to operate with the power available in your location.
- If the input AC voltage is less than 100 VAC, the device plugged into the filtered AC socket of the PowerLINE PassThru Adapter might not perform as well as expected.
- **DO NOT PLUG MAJOR HOME APPLIANCES** into the filtered AC socket or into an attached power strip. The device is not intended to be used with home appliances such as air conditioners, power tools, space heaters, fans, hair dryers, ovens, or refrigerators.
- Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate.
- Do not service any product except as explained in your system documentation.
- Opening or removing covers that are marked with the triangular symbol with a lightning bolt can expose you to electrical shock. Only a trained service technician should service components inside these compartments.
- Use the product only with approved equipment.
- Allow the product to cool before removing covers or touching internal components.
- To help avoid damaging your system, be sure that the voltage selection switch (if provided) on the power supply is set to match the power available at your location:
  - 110 volts (V), 60 hertz (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

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- 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.
- 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.