

**NETGEAR®**

# Hardware Installation Guide

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## 16-Port Gigabit (Hi-Power) PoE+ Ethernet Smart Managed Pro Switch with 2 SFP Ports and Cloud Management

Models

GS716TP

GS716TPP

June 2020  
202-12113-01

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Do not use this device outdoors. The PoE source is intended for intra building connection only.

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# 1

## Introduction

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This hardware installation guide complements the installation guide that came with your switch and applies the following NETGEAR Smart Managed Pro switch models:

- **GS716TP**. 16-Port Gigabit PoE+ Ethernet Smart Managed Pro Switch with 2 SFP Ports and Cloud Management
- **GS716TPP**. 16-Port Gigabit Hi-Power PoE+ Ethernet Smart Managed Pro Switch with 2 SFP Ports and Cloud Management

The switch provides sixteen Gigabit RJ-45 copper PoE+ ports with two dedicated SFP fiber ports. Power over Ethernet (PoE) lets you provide power to PoE-capable devices such as WiFi access points, VoIP phones, and IP security cameras so that you do not need to use power supplies for those devices. The switch can supply up to 30W PoE+ (IEEE 802.3at) to each port. The maximum PoE power budget across all active PoE+ ports is 180W for model GS716TP and 300W for model GS716TPP.

In this guide, we refer to both models as the switch.

This chapter serves as an introduction to the switch and includes the following sections:

- [Overview](#)
- [Management options](#)
- [Features](#)
- [Safety instructions and warnings](#)

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

**Note:** For technical specifications, see the data sheet at [netgear.com/business/products/switches/managed](http://netgear.com/business/products/switches/managed). For switch documentation, visit [netgear.com/support/download](http://netgear.com/support/download).

# Overview

The switch provides sixteen 10/100/1000BASE-T RJ-45 copper ports that support nonstop 10/100/1000M Layer 2 and Layer 3 networks. All RJ-45 ports support PoE+. Two additional ports (17 and 18) can accept small form-factor pluggable (SFP) gigabit interface converters (GBICs) for 1G fiber connectivity.

**Note:** For information about application samples, see [Applications](#) on page 18.

You can install the switch freestanding or rack-mounted in a wiring closet or equipment room. The switch is IEEE-compliant and offers low latency. All ports can automatically negotiate to the highest speed, which makes the switch very suitable for a mixed environment with Fast Ethernet and Gigabit Ethernet.

Use Category 5e (Cat 5e) or higher-rated Ethernet cables terminated with RJ-45 connectors to make Gigabit connections.

## Management options

The switch provides management options that let you discover the switch on the network and configure, monitor, and control the switch:

- **Local browser user interface (UI).** By default, the management mode of the switch is set to Directly Connect to Web Browser Interface, which lets you access the local browser UI. In this mode, you can change all settings of the switch. For more information about the local browser UI, see the user manual, which you can download from [netgear.com/support/download/](http://netgear.com/support/download/).

**Note:** If you plan to use the NETGEAR Insight app or Insight Cloud portal to manage the switch, we recommend that you do not use the local browser UI to change settings that are *Insight manageable* because they would not be synchronized with Insight or to the network location and other devices to which you assigned the switch.

- **NETGEAR Insight app and Insight Cloud portal.** If you set the management mode of the switch to NETGEAR Insight Mobile App and Insight Cloud Portal, you can use the following applications to manage the switch remotely:
  - **NETGEAR Insight app.** With the NETGEAR Insight app, you can discover the switch on the network and add the switch to the NETGEAR Insight app so that you can set up the switch in the network and manage and monitor the switch remotely from your smartphone or tablet. You can choose from four methods to add the switch to the NETGEAR Insight app: You can scan your network for the

switch, scan the QR code or the barcode of the switch, or add the serial number of the switch.

- **Insight Cloud portal.** As an Insight Premium or Insight Pro subscriber, you can use the NETGEAR Insight Cloud portal to set up the switch in the network, perform advanced remote setup, configuration, and management, monitor the switch, analyze the switch and network usage, and, if necessary, troubleshoot the switch and the network.

For more information about NETGEAR Insight, visit [netgear.com/insight](https://netgear.com/insight) and see the NETGEAR knowledge base articles at [netgear.com/support](https://netgear.com/support).

By default, the management mode is set to Directly Connect to Web Browser Interface (which is the same as the local browser UI). Note the following about changing the management mode:

- **Changing to NETGEAR Insight Mobile App and Insight Cloud Portal mode.** The first time that you change to this mode, the switch is set to factory default settings so that you can manage the switch using the Insight app or the Insight Cloud portal. However, if you added the switch to a network on the Insight app or Insight portal before, all Insight-manageable device settings are returned to the last configuration saved on the cloud server, including the switch password (that is, the password is reset to the Insight network password).

**Note:** If you use the NETGEAR Insight app or the Insight Cloud portal, you can temporarily change the management mode of the switch back to Directly Connect to Web Browser Interface and access the local browser UI for settings that are not Insight-manageable, for complex tasks such as integrating with an existing network of devices that are not managed through Insight, and for debugging purposes. When you are done, you can change the management mode back to NETGEAR Insight Mobile App and Insight Cloud Portal.

- **Changing back to Directly Connect to Web Browser Interface mode.** The NETGEAR Insight Mobile App and Insight Cloud Portal management mode is disabled and the current Insight-manageable device settings are saved to the cloud server. Any changes that you make using the Directly Connect to Web Browser Interface management mode are not saved to the cloud server.

# Features

The switch supports the following key hardware features:

- 16 PoE+ Gigabit Ethernet ports.
- 2 dedicated SFP fiber ports.
- PoE support:
  - 16 PoE+ (802.3at) ports
  - Total PoE power budget of 180W for model GS716TP and 300W for model GS716TPP
- MAC table size of 16K.
- Variable speed fan that can lower the noise level during low temperatures.
- Acoustic noise is equal to or less than 27.3 dBA (at 25°C) for model GS716TP and 28.2 dBA (at 25°C) for model GS716TPP
- 36 Gbps full-duplex, nonblocking switch fabric.
- Includes 19-inch rack-mount kit for rack installation.
- Full compatibility with IEEE standards:
  - IEEE 802.3 Ethernet
  - IEEE 802.3u 100BASE-T
  - IEEE 802.3z Gigabit Ethernet 1000BASE-SX/LX
  - IEEE 802.3ab 1000BASE-T
  - IEEE 802.3i 10BASE-T
  - IEEE 802.1Q VLAN tagging
  - IEEE 802.3x Full-duplex flow control
  - IEEE 802.3ad Link aggregation (LAG with LACP)
  - IEEE 802.1ab LLDP
  - IEEE 802.1p Class of Service (QoS)
  - IEEE 802.1D Spanning Tree Protocol (STP)
  - IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
  - IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
  - IEEE 802.1x RADIUS network access control
  - IEEE 802.3az Energy Efficient Ethernet (EEE)

- AutoSensing and autonegotiating capabilities for all ports.
- Auto Uplink technology is supported on all ports.
- Automatic address learning function to build the packet-forwarding information table. The table contains up to 16K Media Access Control (MAC) addresses.
- Store-and-forward transmission to remove bad packets from the network.
- Active flow control to minimize packet loss and frame drops.
- Half-duplex backpressure control.
- Per-port status LEDs and system status LEDs.
- NETGEAR green power-saving features:
  - Energy efficiency mode that fully conforms to the IEEE802.3az standard
  - Per-port automatic change to a lower power mode when the port link is down

## Safety instructions and warnings

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.  
Do not use this device outdoors. The PoE source is intended for intra building connection only.  
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.

If you want to connect to a device located outdoors, the outdoor device must be properly grounded and surge protected, and you must install an Ethernet surge protector inline between the switch and the outdoor device. Failure to do so may damage the switch.
- 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 Overview

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This chapter describes the switch hardware features.

The chapter includes the following sections:

- [Front panel](#)
- [LEDs](#)
- [Back panel](#)
- [RJ-45 ports for 10/100/1000BASE-T Ethernet connectivity](#)
- [SFP uplink port for fiber connectivity](#)
- [Multi-function Reset button](#)

## Front panel

The switch provides sixteen 10/100/1000BASE-T RJ-45 PoE+ ports and two SFP ports. The following figure shows the front panel of model GS716TP.



Figure 1. Model GS716TP front panel

The following figure shows the front panel of model GS716TPP.



Figure 2. Model GS716TPP front panel

Table 1. Front panel components

Number	Description
1	Power LED. For more information, see <a href="#">LEDs</a> on page 13.
2	Fan LED. For more information, see <a href="#">LEDs</a> on page 13.
3	PoE Max LED. For more information, see <a href="#">LEDs</a> on page 13.
4	LED Mode LED. For more information, see <a href="#">LEDs</a> on page 13.
5	<b>Reset/Factory Default</b> button. For more information, see <a href="#">Multi-function Reset button</a> on page 16.

Table 1. Front panel components (Continued)

Number	Description
6	LED Mode <b>Select</b> button. This button lets you change the information that the port LEDs provide. The mode can be Link/ACT mode to indicate the Ethernet link status, speed, and activity of the port or PoE mode to indicate the PoE power and PoE fault status of the port. For more information, see <a href="#">LEDs</a> on page 13.
7	16 independent 10/100/1000BASE-T RJ-45 PoE+ ports. For more information, see <a href="#">RJ-45 ports for 10/100/1000BASE-T Ethernet connectivity</a> on page 15.
8	16 LEDs associated with the 16 Ethernet PoE+ ports. Depending on the position of the LED mode <b>Select</b> button, the LEDs provide either switching information or PoE information. For more information, see <a href="#">LEDs</a> on page 13.
9	2 dedicated SFP fiber ports in which you can install GBICs for fiber connections. For more information, see <a href="#">SFP uplink port for fiber connectivity</a> on page 16.
10	2 LEDs associated with the 2 SFP fiber ports. For each port, the associated LED functions as the combined link and activity LED. For more information, see <a href="#">LEDs</a> on page 13.

## LEDs

This section describes the LEDs on the front panel of the switch.

Table 2. Front panel LEDs

LED	Description
Power LED	<p><b>Solid green.</b> The switch is powered on and operating normally. If you changed the management mode of the switch to NETGEAR Insight, the switch is not yet added to an Insight managed network or not yet connected to the Insight cloud management server.</p> <p><b>Solid blue.</b> The management mode of the switch is NETGEAR Insight, the switch is added to an Insight managed network, and the switch is connected to the Insight cloud management server. You can manage and monitor the switch using the NETGEAR Insight app or Insight Cloud portal.</p> <p><b>Solid yellow.</b> The switch is starting.</p> <p><b>Off.</b> Power is not supplied to the switch.</p>
Fan LED	<p><b>Solid yellow.</b> The internal fan failed.</p> <p><b>Off.</b> The internal fan is operating normally.</p>
PoE Max LED	<p><b>Off.</b> Sufficient (more than 7W of) PoE power is available.</p> <p><b>Solid yellow.</b> Less than 7W of PoE power is available.</p> <p><b>Blinking yellow.</b> At least once during the previous two minutes, less than 7W of PoE power was available.</p>

Table 2. Front panel LEDs (Continued)

LED	Description
LED Mode LED	<b>Solid green.</b> The port LEDs function in Ethernet Mode. <b>Solid yellow.</b> The port LEDs function in PoE Mode.
RJ-45 LEDs for ports 1–16 The LED behavior depends on the position of the LED Mode <b>Select</b> button.	The LED Mode <b>Select</b> button is set to Link/ACT mode: <b>Off.</b> No Ethernet link is established. <b>Solid green.</b> A valid 1000 Mbps Ethernet link is established. <b>Blinking green.</b> The port is transmitting or receiving packets at 1000 Mbps. <b>Solid yellow.</b> A valid 10 Mbps or 100 Mbps Ethernet link is established. <b>Blinking yellow.</b> The port is transmitting or receiving packets at 10 Mbps or 100 Mbps.
	The LED Mode <b>Select</b> button is set to PoE mode: <b>Off.</b> The port is not delivering PoE. <b>Solid green.</b> The port is delivering PoE. <b>Solid yellow.</b> A PoE fault occurred. For more information, see <a href="#">PoE troubleshooting suggestions</a> on page 34.
Link and ACT LEDs for ports 17 and 18	<b>Off.</b> No SFP module link is established. <b>Solid green.</b> A valid 1000 Mbps link is established. <b>Blinking green.</b> The SFP port is transmitting or receiving packets at 1000 Mbps.

## Back panel

The back panel provides a Kensington lock and AC power receptacle. (The switch uses a fixed, internal power supply.)

The following figure shows the back panel for model GS716TP. The AC receptacle label states 100-240V~50/60Hz, 3.8A max.



Figure 3. Back panel model GS716TP

The following figure shows the back panel for model GS716TPP. The AC receptacle label states 100-240V~50/60Hz, 6A max.



Figure 4. Back panel model GS716TPP

## RJ-45 ports for 10/100/1000BASE-T Ethernet connectivity

All RJ-45 copper ports support autosensing. When you insert a cable into an RJ-45 port, the switch automatically ascertains the maximum speed (10 Mbps, 100 Mbps, or 1 Gbps) and duplex mode (half-duplex or full-duplex) of the attached device. All ports support a Category 5e (Cat 5e) unshielded twisted-pair (UTP) cable terminated with an 8-pin RJ-45 connector.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink technology. This technology allows attaching devices to the RJ-45 ports with either straight-through or crossover cables.

When you insert a cable into the switch's RJ-45 port, the switch automatically performs the following actions:

- Senses whether the cable is a straight-through or crossover cable.
- Determines whether the link to the attached device requires a normal connection (such as when you are connecting the port to a computer) or an uplink connection (such as when you are connecting the port to a router, switch, or hub).
- Automatically configures the RJ-45 port to enable communications with the attached device. The Auto Uplink technology compensates for the need to set up uplink connections while eliminating concern about whether to use crossover or straight-through cables when you attach devices.

All RJ-45 ports also support Power over Ethernet (PoE+, IEEE 802.3at). The switch can supply up to 30W PoE+ to each port.

The maximum PoE power budget across all active PoE+ ports is 180W for model GS716TP and 300W for model GS716TPP.

## SFP uplink port for fiber connectivity

To enable fiber connections, two SFP fiber uplink ports accommodate a standard small form-factor pluggable (SFP) gigabit interface converter (GBIC, also referred to as transceiver modules). GBICs are sold separately from the switch.

Ports 17 and 18 on the switch support the NETGEAR SFP transceiver modules that are listed in the following table.

Table 3. Supported SFP transceiver modules

Speed and Medium	Model	Description
1G Ethernet short-reach fiber	AGM731F	SFP transceiver 1000BASE-SX
1G Ethernet long-reach fiber	AGM732F	SFP transceiver 1000BASE-LX
1G Ethernet copper	AGM734	SFP transceiver 1000BASE-T

For more information about NETGEAR SFP transceiver modules, visit [netgear.com/business/products/switches/modules-accessories](http://netgear.com/business/products/switches/modules-accessories).

**Note:** If you use a third-party passive direct-attach cable (DAC), the length of the cable must not exceed 5 meters (16.4 feet).

## Multi-function Reset button

The switch provides a recessed, multi-function **Reset** button on the front panel. Depending on how long you press the button (for details, see the following procedure), this button lets you perform the following tasks:

- **Restart (power-cycle) the switch.** The switch restarts. All saved settings are retained. We recommend that you save the settings before you press the **Reset** button to restart the switch.
- **Reset the switch to factory default settings but maintain the registration status.** All settings are erased and the switch restarts with factory default settings. The NETGEAR registration status is maintained and not reset.
- **Reset the switch to factory default settings and reset the registration status.** All settings are erased, the switch restarts with factory default settings, and the NETGEAR registration status is reset. You must reregister the switch with NETGEAR.

**To restart or reset the switch using the Reset button:**

1. Insert a tool such as a straightened paper clip into the opening.
2. Do one of the following:
  - **Restart the switch.** Press the **Reset** button for less than 5 seconds. (Do not press the button for more than 5 seconds!)
  - **Reset the switch to factory default settings but maintain the registration status.** Press the **Reset** button for more than 5 seconds but less than 10 seconds. (Do not press the button for more than 10 seconds!)
  - **Reset the switch to factory default settings and reset the registration status.** Press the **Reset** button for more than 10 seconds.

During the restart or reset process, the Power LED lights yellow.

# 3

## Applications

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The switch is designed to provide flexibility in configuring network connections. The switch can be used as your only network traffic-distribution device for PoE and non-PoE devices or with 10 Mbps, 100 Mbps, and 1 Gbps Ethernet and fiber distribution hubs, routers, access points, and other switches.

This chapter includes the following sections:

- [PoE overview](#)
- [PoE and desktop switching](#)
- [Hi-power PoE for surveillance and security](#)

## PoE overview

The switch supports 16 Power over Ethernet plus (PoE+) ports. The switch can supply up to 30W PoE+ (IEEE 802.3at) to each port. The maximum PoE power budget across all active PoE+ ports is 180W for model GS716TP and 300W for model GS716TPP.

Supplied power is prioritized according to the port order, up to the total power budget of the device. Port 1 receives the highest PoE priority, while port 16 is relegated to the lowest PoE priority.

If the power requirements for attached devices exceed the total power budget of the switch, the PoE power to the device on the highest-numbered active PoE port is disabled to make sure that the devices connected to the higher-priority, lower-numbered PoE ports are supported first.

Although a device is listed as an 802.3at PoE+-powered or 802.3af PoE-powered device, it might not require the maximum power limit that is specified by its IEEE standard. Many devices require less power, allowing all 16 PoE ports to be active simultaneously when the devices correctly report their PoE class to the switch.

The following table shows the standard power ranges, calculated with the maximum cable length of 328 feet (100 meters). If a device receives insufficient PoE power from the switch, consider using a shorter cable.

Table 4. PoE classes and PoE power allocations

Device Class	Compatible PoE Standard	Class Description	Maximum Power Reserved for the Device	Power Delivered to the Device
0	PoE and PoE+	Default power (full)	15.4W	0.44W-12.95W
1	PoE and PoE+	Very low power	4.0W	0.44W-3.84W
2	PoE and PoE+	Low power	7.0W	3.84W-6.49W
3	PoE and PoE+	Mid power	15.4W	6.49W-12.95W
4	PoE+ only	High power	30.0W	12.95W-25.5W

For more information about PoE, see the installation guide and user manual, both of which you can download from [netgear.com/support/download/](http://netgear.com/support/download/).

## PoE and desktop switching

The switch supports both PoE and non-PoE equipment. The following figure shows an example of how you can connect a PoE+ WiFi access point (see device 4), a PoE IP

## 16-Port Gigabit (Hi-Power) PoE+ Ethernet Smart Managed Pro Switch with 2 SFP Ports

camera (see device 8), and a PoE IP conference phone (see device 10) to the switch. In the following figure, non-PoE equipment is also attached to the switch (see devices 7 and 9).

You must connect one LAN port on the switch to a LAN port on a router (see device 2 in the following figure) that is connected to the Internet (see 3). You can also make a 1 Gbps fiber connection to a router that supports fiber and that is connected to the Internet or to another device that supports fiber.

If you connect a WiFi access point to the switch, you can connect a laptop (see device 5) or smartphone (see device 6) to the WiFi network and use NETGEAR Insight to discover and manage the switch.

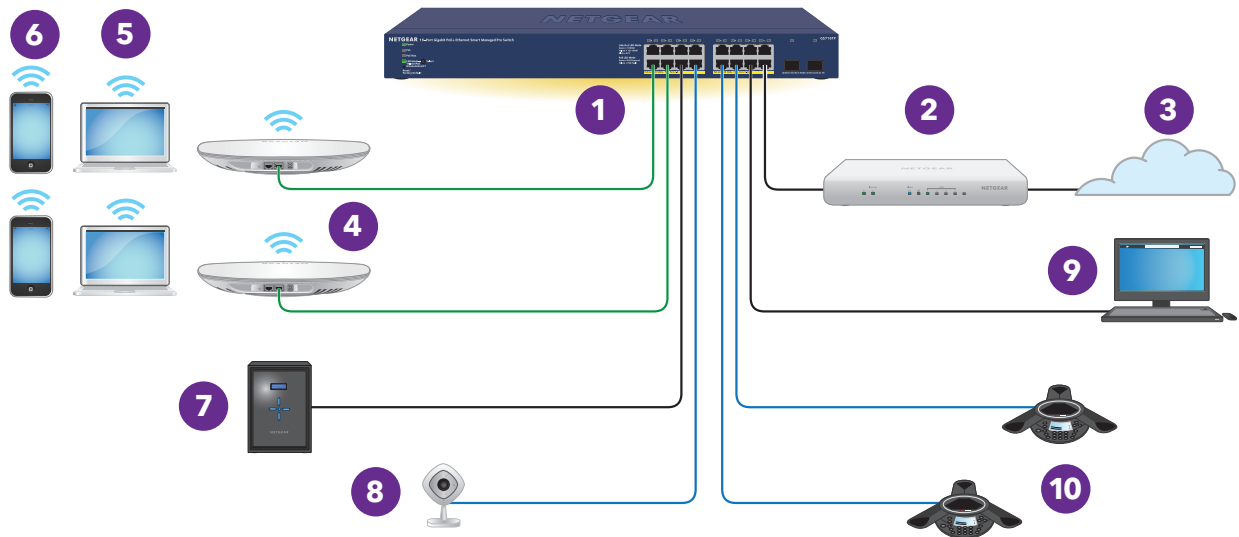


Figure 5. Sample PoE and desktop switching with model GS716TP

Number	Device	Number	Device
1	Switch model GS716TP	6	Smartphones, which allow you to use NETGEAR Insight to discover and manage the switch in the network
2	Router	7	ReadyNAS storage system
3	Internet	8	PoE IP camera
4	PoE+ WiFi access points	9	Desktop
5	Laptops, which allow Insight Premium and Insight Pro subscribers to use the NETGEAR Insight Cloud portal to manage the switch.	10	PoE IP conference phone

# Hi-power PoE for surveillance and security

The switch supports both PoE and non-PoE equipment. Model GS716TPP supports a hi-power PoE+ budget, which works well for a surveillance and security configuration. The following figure shows an example of how you can connect hi-power PoE+ pan-tilt-zoom (PTZ) camera (see device 7) together with a PoE+ WiFi access point (see device 4) and a non-PoE storage system such as a ReadyNAS (see device 8) to the switch. You must connect one LAN port on the switch to a LAN port on a router (see device 2 in the following figure) that is connected to the Internet (see 3).

If you use connect a WiFi access point to the switch, you can use a smartphone (see device 5) or laptop (see device 6) to connect to the WiFi network and use NETGEAR Insight to discover and manage the switch.

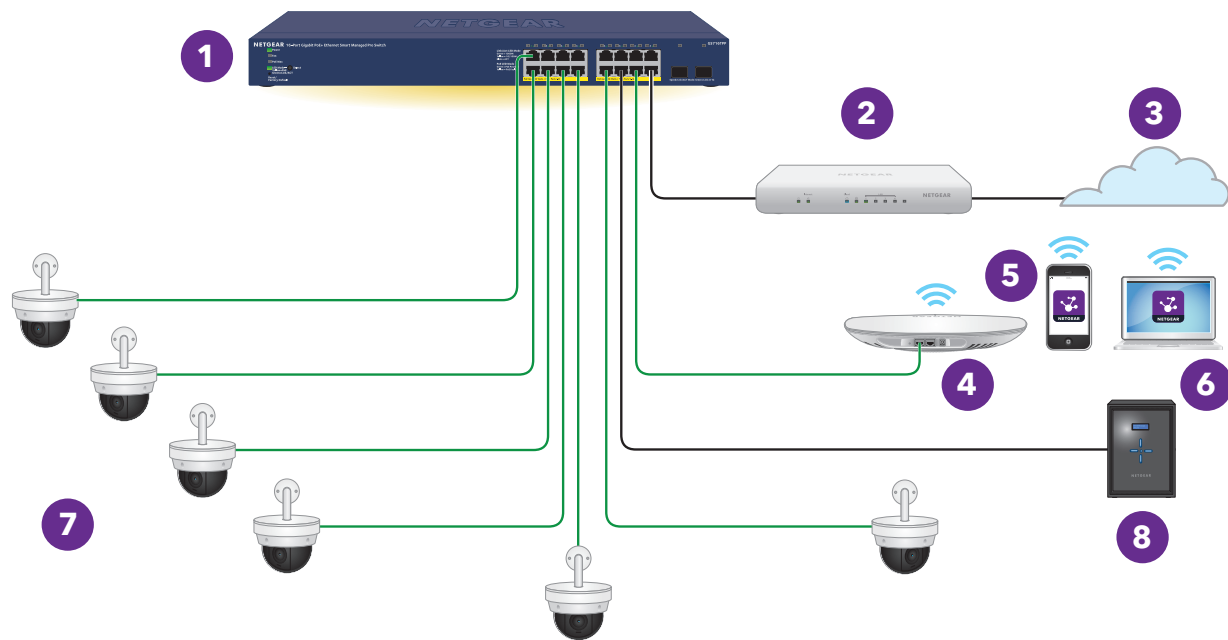


Figure 6. Sample switch surveillance and security application with model GS716TPP

Number	Device	Number	Device
1	Switch model GS716TPP	5	Smartphone, which allows you to use NETGEAR Insight to discover and manage the switch in the network
2	Router	6	Laptop, which allows an Insight Premium or Insight Pro subscriber to use the NETGEAR Insight Cloud portal to manage the switch.

## 16-Port Gigabit (Hi-Power) PoE+ Ethernet Smart Managed Pro Switch with 2 SFP Ports

(Continued)

Number	Device	Number	Device
3	Internet	7	PoE+ pan-tilt-zoom (PTZ) cameras
4	PoE+ WiFi access point	8	ReadyNAS storage system

# 4

## Installation

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This chapter describes the installation procedures for the switch.

Switch installation involves the steps that are described in the following sections:

- [Step 1: Prepare the site](#)
- [Step 2: Protect against electrostatic discharge](#)
- [Step 3: Unpack the switch](#)
- [Step 4: Mount or place the switch](#)
- [Optional Step 5: Install SFP transceiver modules](#)
- [Step 6: Connect devices to the switch](#)
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- [Step 8: Apply AC power and check the LEDs](#)
- [Step 9: Manage the switch](#)

## Step 1: Prepare the site

Before you install the switch, make sure that the operating environment meets the site requirements that are listed in the following table.

Table 5. Site requirements

Characteristics	Requirements
Mounting	<p><b>Desktop installations.</b> Provide a flat table or shelf surface.</p> <p><b>Rack-mount installations.</b> Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You also need the rack-mount kit that is supplied with the switch.</p>
Access	Install the switch in a position that allows you to access the front panel ports, view the front panel LEDs, and access the power connector on the back panel.
Power source	Use the AC power cord that is supplied with the switch. Make sure that the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Cabling	Route cables to avoid sources of electrical noise such as radio transmitters, broadcast amplifiers, power lines, and fluorescent lighting fixtures.
Environmental	<p><b>Temperature.</b> Install the switch in a dry area with an ambient temperature between 32°F and 122°F (0°C and 50°C). Keep the switch away from heat sources such as direct sunlight, warm-air exhausts, hot-air vents, and heaters.</p> <p><b>Operating humidity.</b> The maximum relative humidity of the installation location must not exceed 90%, noncondensing.</p> <p><b>Ventilation.</b> Do not restrict airflow by covering or obstructing air inlets on the sides of the switch. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling. The room or wiring closet in which you install the switch must provide adequate airflow.</p> <p><b>Operating conditions.</b> Keep the switch at least 6 feet (1.83 meters) away from the nearest source of electromagnetic noise, such as a photocopy machine.</p>

## Step 2: Protect 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):

- 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.
- Before moving a sensitive component, place it in an antistatic container or package.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads, workbench pads, and an antistatic grounding strap.

## Step 3: Unpack the switch

The following figure shows the package contents for the switch. The contents for model GS716TP and GS716TPP are the same, other than the switch model.



Figure 7. Model GS716TPP package contents

### To check the package contents:

1. Place the container on a clean flat surface, and cut all straps securing the container.
2. Unpack the hardware from the boxes by carefully removing the hardware and placing it on a secure and clean surface.
3. Remove all packing material.
4. Verify that the package contains the following items:

Number	Item
1	Model GS716TP or model GS716TPP switch.
2	AC power cable (varies by region).
3	Screws for rack-mounting: <ul style="list-style-type: none"><li>• Eight small screws to attach the brackets to the switch (four small screws for each side).</li><li>• Four large screws to attach the brackets to the rack (two screws for each side).</li></ul>
4	Two brackets for rack-mounting.
5	Installation guide.
6	Rubber protection caps, which are already installed in the SFP sockets. If you install an SFP transceiver module, you must remove the cap from the SFP socket.
7	Rubber feet for desktop or table installation.

5. If any item is missing or damaged, contact your local NETGEAR reseller for replacement.

## Step 4: Mount or place the switch

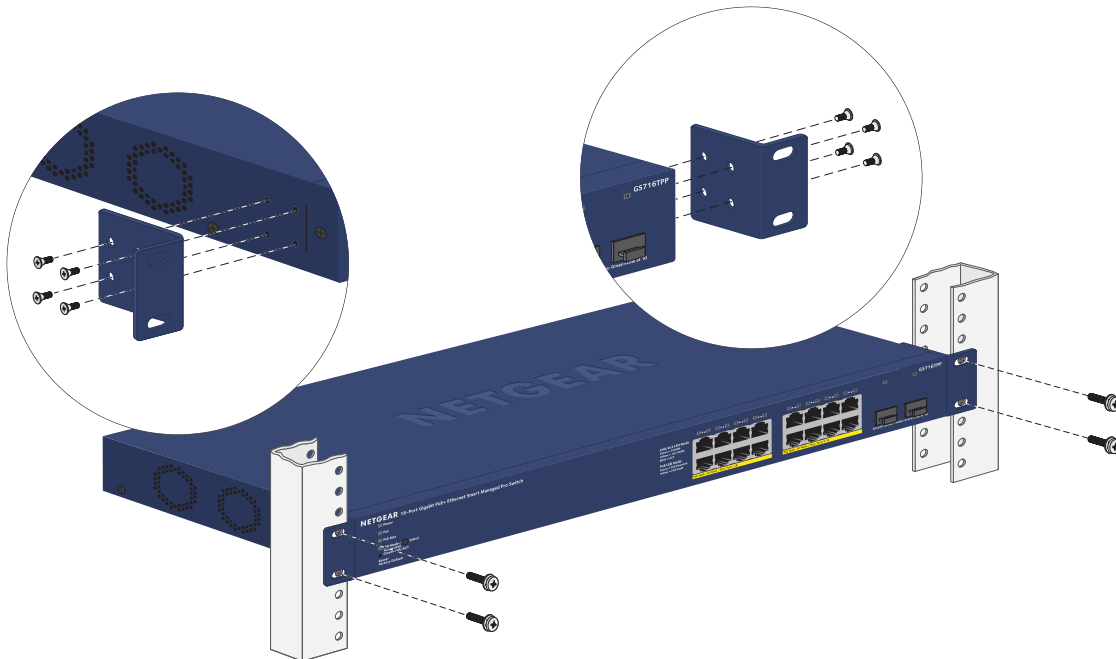
You can mount the switch in a standard 19-inch (48.26-centimeter) network equipment rack or place the switch on a flat surface.

### Mount the switch in a rack

To install the switch in a rack, you need the 19-inch rack-mount kit supplied with the switch.

#### To install the switch in a rack:

1. Attach the supplied mounting brackets to the side of the switch.
2. Insert the screws provided in the product package through each bracket and into the bracket mounting holes in the switch.
3. Tighten the screws with a No. 2 Phillips screwdriver to secure each bracket.
4. Align the mounting holes in the brackets with the holes in the rack, and insert two pan-head screws with nylon washers through each bracket and into the rack.
5. Tighten the screws with a No. 2 Phillips screwdriver to secure the mounting brackets to the rack.



## Place the switch on a flat surface

The switch ships with four self-adhesive rubber footpads.

### **To install the switch on a flat surface:**

Stick one rubber footpad on each of the four concave spaces on the bottom of the switch.

The rubber footpads cushion the switch against shock and vibrations. They also provide ventilation space between stacked switches.

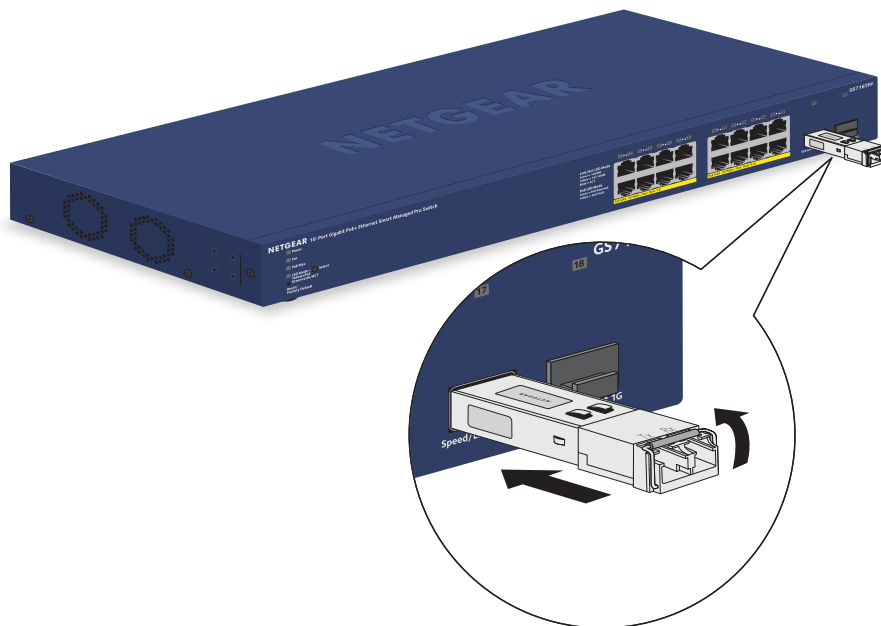
## Optional Step 5: Install SFP transceiver modules

The following optional procedure describes how to install an optional SFP transceiver module into one of the SFP ports of the switch.

**Note:** Contact your NETGEAR sales office to purchase these modules. If you do not want to install an SFP module, skip this procedure.

### **To install an SFP transceiver module:**

1. Insert the transceiver into SFP port 17 or 18.
2. Press firmly on the flange of the module to seat it securely into the connector.



## Step 6: Connect devices to the switch

**WARNING:** Do not use this switch outdoors. Before connecting this switch to outdoor cables or devices, see <https://kb.netgear.com/000057103> for safety and warranty information.

**Note:** If you want to connect an outdoor device to the switch, cable the switch to an Ethernet surge protector that supports the same speeds as your switch, and then cable the surge protector to the outdoor device.

The following procedure describes how to connect devices to the switch's RJ-45 ports. The switch supports Auto Uplink technology, which allows you to attach devices using either straight-through or crossover cables. Use a Category 5 (Cat 5), Cat 5e, or Cat 6 cable that is terminated with an RJ-45 connector.

**Note:** Ethernet specifications limit the cable length between the switch and the attached device to 328 feet (100 meters).

### To connect devices to the switch's RJ-45 Ethernet ports:

1. Connect one RJ-45 Ethernet port with an Ethernet cable to your network or connect port 17 or 18 with an SFP transceiver module and cable to your network.  
The network connection can be to a hub, another switch, router, or Internet gateway.  
For information about the SFP transceiver modules, see [SFP uplink port for fiber connectivity](#) on page 16.
2. Connect an indoor device to an RJ-45 Ethernet port on the switch.
3. To connect an outdoor device to the switch, connect an RJ-45 Ethernet port on the switch to an Ethernet surge protector that supports the same speeds as your switch, and then connect the surge protector to the outdoor device.

**WARNING:** Do not connect an outdoor device to the switch without using an Ethernet surge protector on the cable.

4. Verify that all cables are installed correctly.

## Step 7: Check the installation

Before you apply power to the switch, perform the steps that are described in this section.

### **To check the installation:**

1. Inspect the equipment thoroughly.
2. Verify again that all cables are installed correctly.
3. Check cable routing to make sure that cables are not damaged or creating a safety hazard.
4. Make sure that all equipment is mounted properly and securely.

## Step 8: Apply AC power and check the LEDs

The switch does not provide an on/off switch. The power cord connection controls the power.

Before connecting the power cord, select an AC outlet that is not controlled by a wall switch, which can turn off power to the switch.

### **To apply AC power:**

1. Connect the end of the power cord to the AC power receptacle on the back of the switch.
2. Plug the AC power cord into a power source such as a wall socket or power strip.
3. Check to see that the LEDs on the front panel of the switch light correctly.

When you apply power, the Power LED on the switch front panel lights and the ports LEDs for attached devices light. For more information, see [LEDs](#) on page 13.

If the Power LED does not light, check to see that the power cord is plugged in correctly and that the power source is good.

## Step 9: Manage the switch

The switch is a plug-and-play device that starts switching as soon as you plug it into power and your network.

After you complete the initial log-in procedure, you can configure the switch using the local browser user interface (UI). After you complete the initial log-in procedure, you can also change the management mode so that you configure the switch using the

Insight app, or if you are an Insight Premium or Insight Pro subscriber, the Insight Cloud portal. For more information, see [Management options](#) on page 5.

For more information about managing the switch using the local browser UI, including information about tools to discover the switch IP address in your network, see the user manual, which you can download from [netgear.com/support/download/](http://netgear.com/support/download/).

For more information about NETGEAR Insight, visit [netgear.com/insight](http://netgear.com/insight) and see the NETGEAR knowledge base articles at [netgear.com/support](http://netgear.com/support).

For very basic setup and management, you can use the Smart Control Center (SCC) utility (which requires a Windows-based computer). For information about the SCC utility, see [netgear.com/support/product/SCC](http://netgear.com/support/product/SCC).

**Note:** By default, the DHCP client of the switch is enabled. If the switch cannot get an IP address from a DHCP server, the switch's default IP address is 192.168.0.239 and the default subnet mask is 255.255.255.0.

# 5

## Troubleshooting

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This chapter provides information about troubleshooting the switch.

The chapter includes the following sections:

- [Troubleshooting chart](#)
- [PoE troubleshooting suggestions](#)
- [Additional troubleshooting suggestions](#)

# Troubleshooting chart

The following table lists symptoms, possible causes, and possible solutions for problems that might occur.

Table 6. Troubleshooting chart

Symptom	Possible Cause	Possible Solution
The Power LED is off.	Power is not supplied to the switch.	<ul style="list-style-type: none"> <li>• Check the power cable connections at the switch and the power source.</li> <li>• Make sure that all cables are used correctly and comply with the Ethernet specifications.</li> </ul>
The LED Mode <b>Select</b> button is set to Link/ACT mode and the combined speed and activity LED is off when the port is connected to a device.	The port connection is not working.	<ul style="list-style-type: none"> <li>• Check the crimp on the connectors and make sure that the plug is properly inserted and locked into the port at both the switch and the connecting device.</li> <li>• Make sure that all cables are used correctly and comply with the Ethernet specifications.</li> <li>• Check for a defective port, cable, or module by testing them in an alternate environment where all products are functioning.</li> </ul>
A file transfer is slow or performance is degraded.	One possible cause is that a broadcast storm occurred and that a network loop (redundant path) was created.	Break the loop by making sure that only one path exists from any networked device to any other networked device. After you connect to the switch web management interface, you can configure the Spanning Tree Protocol (STP) to prevent network loops.
A segment or device is not recognized as part of the network.	One or more devices are not properly connected, or cabling does not meet Ethernet guidelines.	<ul style="list-style-type: none"> <li>• Verify that the cabling is correct.</li> <li>• Make sure that all connectors are securely positioned in the required ports. It is possible that equipment was accidentally disconnected.</li> </ul>
The LED Mode <b>Select</b> button is set to Link/ACT mode, the combined speed and activity LEDs are blinking continuously for all connected ports, and the network is disabled.	A network loop (redundant path) was created.	Break the loop by making sure that only one path exists from any networked device to any other networked device. After you connect to the switch web management interface, you can configure the Spanning Tree Protocol (STP) to prevent network loops.

# PoE troubleshooting suggestions

Here are some tips for correcting PoE problems that might occur:

- Make sure that the PoE Max LED is off. If the PoE Max LED is solid yellow, disconnect one or more PoE devices to prevent PoE oversubscription. Start by disconnecting the device from the highest-numbered port.
- Make sure that the Ethernet cables are plugged in correctly. If the LED Mode **Select** button is set to PoE mode, for each powered device (PD) that is connected to the switch, the associated port LED on the switch lights solid green. If the port LED lights solid yellow, a PoE fault occurred and PoE halted because of one of the conditions that are listed in the following table.

Table 7. PoE fault conditions and possible solutions

PoE Fault Condition	Possible Solution
A PoE-related short circuit occurred on the port.	The problem is most likely with the attached PD. Check the condition of the PD or restart the PD by disconnecting and reconnecting the PD.
The PoE power demand of the PD exceeded the maximum level that the switch permits. The maximum level is 15.4W for a PoE connection or 30W for a PoE+ connection.	
The PoE current on the port exceeded the classification limit of the PD.	
The PoE voltage of the port is outside the range that the switch permits.	Restart the switch to see if the condition resolves itself.

## Additional troubleshooting suggestions

If the suggestions in the troubleshooting chart do not resolve the problem, see the following troubleshooting suggestions:

- **Network adapter cards.** Make sure that the network adapters that are installed in the computers are in working condition and the software driver was installed.
- **Configuration.** If problems occur after you alter the network configuration, restore the original connections and determine the problem by implementing the new changes, one step at a time. Make sure that cable distances, repeater limits, and other physical aspects of the installation do not exceed the Ethernet limitations.
- **Switch integrity.** If necessary, verify the integrity of the switch by resetting it. To reset the switch, disconnect the power from the switch and then reconnect the power.

If the problem continues, contact NETGEAR technical support. For more information, visit the support website at [netgear.com/support/](http://netgear.com/support/).

- **Autonegotiation.** The RJ-45 ports negotiate the correct duplex mode, speed, and flow control if the device at the other end of the link supports autonegotiation. If the device does not support autonegotiation, the switch determines only the speed correctly, and the duplex mode defaults to half-duplex.  
The Gigabit Ethernet ports negotiate speed, duplex mode, and flow control if the attached device supports autonegotiation.