

AI-01999 POE LED Lighting

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What is POE led lighting system. What are the basic parts and components needed. Explain the theory of POE led lighting . What drivers and led light can work in POE Led lighting? How to turn on and off the POE led lighting using a wall switch? How to control POE lighting LED using a software or app or automation? Can my current LED light strips and LED light with drivers work with POE?

Here's a structured breakdown of PoE (Power over Ethernet) LED lighting systems and how they work:

1. What is a PoE LED Lighting System?

A PoE LED lighting system uses standard Ethernet cables (Cat5e, Cat6, Cat6a) to deliver both power and data to LED lights. Instead of running separate AC wiring + drivers + switches, the lights are powered and controlled over the same Ethernet infrastructure.

- Power is supplied by a PoE switch or PoE injector (instead of AC mains).
- Lights are low-voltage DC-powered (typically 48V DC).
- Control (on/off, dimming, color tuning) is managed through network software, apps, or automation systems.

This is commonly used in smart buildings, offices, hospitals, and energy-efficient homes.

2. Basic Parts and Components Needed

- PoE Switch – Network switch that provides power + data over Ethernet (usually 802.3af = 15.4W, 802.3at = 30W, or 802.3bt = 60–90W).
- Ethernet Cabling (Cat5e/Cat6) – Connects switch to the fixtures.
- PoE LED Fixtures or Strips – Specially designed LED lights that accept DC power and data from Ethernet (no traditional driver needed).
- PoE Driver / Node (if using regular LEDs) – A small module that converts PoE (48V DC) into the voltage/current needed for LED fixtures (e.g., 12V/24V constant voltage or constant current).
- PoE Controller / Software – App, building automation software, or Home Assistant to control lights.
- Wall Switch (Low Voltage / Networked) – Either:
 - A PoE wall switch (networked), or
 - A low-voltage keypad that communicates with the PoE system, not a standard AC switch.

3. Theory of PoE LED Lighting

- Traditional LEDs: Need AC (120V/220V) → LED Driver → LED Fixture.
- PoE LEDs: Skip AC wiring. Instead, Ethernet cable supplies:
 - DC Power (48V from PoE switch).
 - Control signals (on/off, dimming, tunable white, RGB).
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- Network-based control: Lights can be managed individually or in groups using software or automation protocols (MQTT, BACnet, DALI-over-IP, etc.).

Benefit: Safety (low voltage), simplified wiring, easy integration with smart building systems.

4. What Drivers and LED Lights Work with PoE?

- Native PoE LED Fixtures: Lights built to accept 48V PoE directly (no extra driver needed).
- Non-PoE LEDs with PoE Driver/Node:
 - Example: You have a 24V LED strip → you'd need a PoE to 24V constant voltage driver.
 - Example: You have a COB LED that needs constant current (350mA/700mA) → you'd need a PoE constant current driver.

👉 Without a PoE-compatible driver, your existing lights cannot connect directly to PoE.

5. Turning PoE LED Lighting On/Off with a Wall Switch

Options:

1. Networked PoE Wall Switch – Switch connects via Ethernet or wireless to tell the controller to toggle lights.
2. Low Voltage Keypad – Sends a signal to PoE controller (instead of breaking AC).
3. Software-based Switch – Using an app on phone, tablet, or touch panel.
 - ⚠️ A traditional 220V/120V wall switch cannot directly turn PoE lights on/off, since PoE is low voltage and data-driven.

6. Controlling PoE LED Lighting with Software/App/Automation

- Apps from PoE Lighting Vendors (e.g., Cisco, Signify, Igor Lighting, Molex).
- Smart Home Software: Home Assistant, OpenHAB, Crestron, etc.
- Building Management Systems (BMS): BACnet/IP, KNX-over-IP.
- Control functions: On/Off, dimming, scenes, schedules, occupancy sensors, daylight harvesting.

7. Can Your Current LED Light Strips & Fixtures Work with PoE?

- If they are 12V/24V DC strips → YES, with a PoE driver/node that outputs 12V/24V constant voltage.
- If they are AC 220V/120V fixtures with integrated drivers → NO, they can't connect directly to PoE unless you replace their drivers with PoE-compatible ones.
- If they use constant current drivers (350mA, 700mA, etc.) → YES, but only with a PoE constant current driver.

✔ Summary / Action Plan for You

1. Identify your current LED type (12V/24V DC strip, AC fixture, or constant current COB).
2. If DC strips → buy a PoE-to-DC LED driver.
3. If AC fixtures → won't work with PoE unless retrofitted.
4. Install a PoE switch and run Cat5e/Cat6 cables to each light location.
5. Use a PoE controller app or wall-mounted PoE keypad to manage switching and dimming.
6. If you already have Home Assistant, you can integrate PoE lighting for automation.

Do you want me to map your current LED strips and lights (e.g., 220V integrated driver, 24V strips, COB LEDs) to show which exact PoE drivers you'd need for each type?