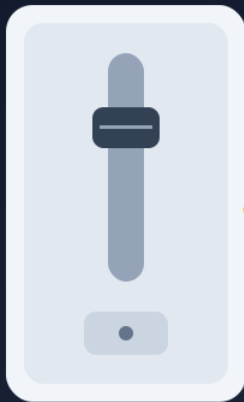


LED Dimmer Switch Compatibility

Quick Guide

Match the dimmer, the bulb and the load. Stop the flicker.



LED-rated dimmer



Dimmable LED bulb

Quick overview

LED dimmer switch compatibility comes down to matching three things: the bulb, the dimmer, and the total load on the circuit.

- Buy bulbs marked "dimmable" and dimmers rated for LEDs. Old incandescent dimmers cause a lot of flicker and buzz.
- Add up the wattage of every bulb on the dimmer. Stay under its LED rating and above its minimum load.
- Look for NEMA SSL 7A on forward phase-cut dimmers, then confirm your exact bulb and dimmer on the maker's compatibility list.
- Flicker, humming, or a bulb that shuts off early usually points to a mismatch. The bulb is often fine.
- Turn off the breaker before you touch a switch. Call a licensed electrician if anything looks unfamiliar.

Why do LEDs and old dimmers clash?

Old dimmers were designed around glowing wires. LEDs run on electronic drivers, and drivers react differently to the same signal.

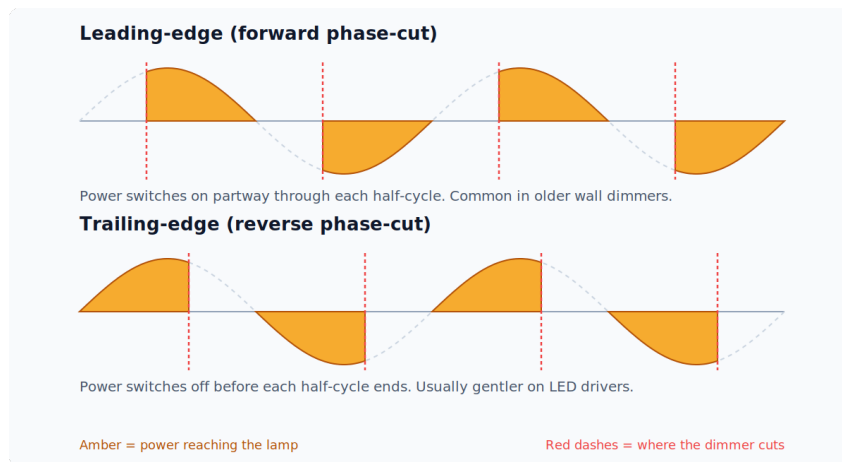
A typical incandescent dimmer switches power on and off 120 times per second, delaying the start of each AC half-cycle. A filament shrugs that off. An LED driver may flicker, hum, or quit. The U.S. Department of Energy (DOE) says LEDs don't work with every dimmer built for incandescent lamps.

Load size adds a second problem. A 60-watt incandescent bulb usually gives way to an LED of about 8 to 10 watts, and many older dimmers were built around much larger loads. Residential LEDs use at least 75% less energy and last up to 25 times longer than incandescent lighting (DOE), so the pairing is worth getting right.

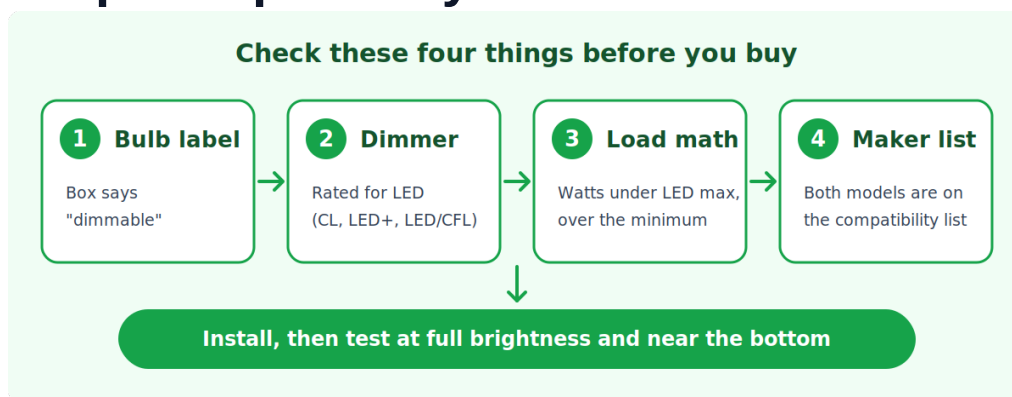
What are the dimmer types?

Type	How it works	Where you'll meet it	Watch for
Forward phase-cut (leading-edge, TRIAC)	Cuts the start of each half-cycle	Most standard wall dimmers	Buzz or flicker at low loads
Reverse phase-cut (trailing-edge, ELV)	Cuts the end of each half-cycle	Electronic low-voltage lighting, many LED loads	Outside NEMA SSL 7A, so check the maker list
0-10V	Separate low-voltage control signal	Commercial and specialty LED fixtures	Needs a matching driver and control wires

NEMA SSL 7A is the U.S. standard for basic compatibility between forward phase-cut dimmers and dimmable LED products. It doesn't cover reverse-phase ELV or 0-10V dimmers. Lutron notes it sets basic criteria only, so still check the maker's list. Think of SSL 7A as a passing grade and the compatibility list as the report card.



The 4-step compatibility check



- 1 Bulb label.** ENERGY STAR says dimmable ENERGY STAR LED bulbs carry the word "dimmable" on the front. A non-dimmable bulb on a dimmer can flicker or fail early.
- 2 Dimmer rating.** Look for an LED rating on the box or spec sheet. Lutron marks many models CL or LED+, and Leviton lists LED/CFL ratings.
- 3 Load math.** Total the watts of every bulb, then compare to the dimmer's LED rating and its minimum load.
- 4 Maker list.** A "dimmable" label is one promise. Your exact pair on the maker's list is the second. Lutron warns that even compatible bulbs may flicker, buzz, or dim over a narrower range than incandescents. ENERGY STAR advises trying a different bulb if your first pairing disappoints.

How many LED bulbs can one dimmer handle?

Add up the wattage and stay below the dimmer's LED rating. Then check the minimum. Both ends matter.

- The DOE warns that LED drivers draw inrush and repetitive peak currents, so a 600-watt dimmer can overload with 150 watts of LEDs or less.
- Example: eight 9-watt LEDs total 72 watts, comfortably under a 150-watt LED rating. Sixteen bulbs total 144 watts, right against the ceiling, so step up to a higher rating.

- Minimum load matters too. Lutron's RRD-6CL is compliant with 2 or more LED lamps. Its RRD-PRO works with 1 or more with a neutral connected, and 2 or more without.
- Keep every bulb on one dimmer identical: same brand, model, and color temperature.

Fix flicker and buzzing: try these in order

- 1 Swap one LED for an incandescent or halogen bulb. If the flicker stops, Lutron support says the dimmer works and the LED is the incompatible part.
- 2 Look up your exact bulb and dimmer on the maker's compatibility tool.
- 3 Meet the minimum load with a matching bulb, or move to a neutral-wire dimmer if your box has a neutral.
- 4 Raise the low-end trim slightly if your dimmer has a trim dial (some Lutron CL dimmers do).
- 5 Try another brand of dimmable bulb, or replace the dimmer with an LED-rated model.

How to choose a dimmer for LED lights

- 1 **Match the dimmer type.** Standard 120-volt screw-in bulbs use forward phase-cut. Electronic low-voltage transformers usually call for reverse phase. 0-10V fixtures need a 0-10V control.
- 2 **Match the wiring.** Single-pole and 3-way versions of one dimmer line can differ, so check the exact model number.
- 3 **Check for a neutral.** Some dimmers need one, and older wall boxes often don't have it.
- 4 **Confirm both models on the maker's list** and keep the receipt in case you need to return something. Smart dimmers deserve a careful read of the spec sheet. Many require a neutral wire and still have a minimum bulb count.

Safety note: Shut off power at the breaker and confirm with a voltage tester before you handle any switch or wiring. A hot faceplate, a burning smell, or crackling means shut off the breaker right away and call a licensed electrician. Follow local codes. Maker lists and standards change, so check current listings before you buy.

Sources

- U.S. DOE, LED lighting: energy.gov/energysaver (LED Lighting page)
- U.S. DOE, Dimming LEDs (LED Application Series)
- DOE and ENERGY STAR, EE Harmony: Control Freaks and Compatibility (2014)
- DOE, Phase-Cut Dimming design process (Lightfair 2014)
- ENERGY STAR, Guide to Dimmable LED Lighting
- NEMA, Dimmer compliance application note (via Leviton)
- Lutron, NEMA SSL 7A and Title 24 compliance list; CL dimmer and bulb compatibility catalog; support forum
- Full links are in the LiElectro article: LED dimmer switch compatibility