FREE HOMEOWNER GUIDE

AFCI, GFCI, and surge protection: what each one actually does

Three different jobs, often confused

AFCIs, GFCIs, and surge protection all live in or near your panel, and homeowners mix them up constantly. They guard against three different threats. An AFCI stops fires, a GFCI stops shocks, and surge protection stops voltage spikes from cooking your electronics. A well-protected home usually has all three.

AFCI: arc-fault protection (fire risk)

An AFCI, or arc-fault circuit interrupter, watches for the erratic electrical signature of an arc: the kind of small, sparking discharge you get from a damaged cord, a pinched wire behind furniture, or a loose connection in a box. Left alone, an arc can start a fire inside the wall. The AFCI cuts power before it gets there.

- [ ] Guards against arc faults from damaged, pinched, or loose wiring
- [ ] Required by the National Electrical Code in most living areas: bedrooms, living rooms, hallways
- [ ] Homes wired before the late 2000s often do not have it yet

GFCI: ground-fault protection (shock risk)

A GFCI, or ground-fault circuit interrupter, watches the balance between the power going out and coming back. If even a tiny amount leaks, usually through water or a person, it shuts off in a fraction of a second. That is why code puts them anywhere water is near an outlet. You know a GFCI by the Test and Reset buttons on the faceplate, and they are worth testing monthly.

- [ ] Guards against ground faults and shock, especially around water
- [ ] Required in bathrooms, kitchens, garages, laundry, and outdoor outlets
- [ ] If yours keeps shutting off, see why a GFCI keeps tripping

Surge protection: voltage-spike protection

A surge protector shields your system from voltage spikes caused by lightning, utility switching, or big appliances cycling on and off. There are two levels. A power strip protects whatever is plugged into it. A whole-home surge arrestor installs in your panel and protects everything: HVAC, appliances, and the smart devices a strip never reaches. For homeowners with a lot invested in electronics, whole-home protection is the one that actually covers the house.

AFCI vs GFCI at a glance

- [ ] AFCI protects against arc faults (fire); GFCI protects against ground faults (shock)
- [ ] AFCI lives in bedrooms and living areas; GFCI lives in bathrooms, kitchens, and wet or outdoor areas
- [ ] Some breakers are dual-function and do both jobs on one circuit
- [ ] Adding either usually happens at the panel, so it pairs well with an upgrade

Frequently asked questions

What is the difference between an AFCI and a GFCI?

An AFCI guards against arc faults, the sparking from damaged or loose wiring that can start a fire, and is required in living areas like bedrooms and hallways. A GFCI guards against ground faults and shock, and is required near water in bathrooms, kitchens, garages, and outdoors. They solve different problems, and many homes need both.

Is a surge protector the same as a GFCI?

No. A GFCI protects people from shock by cutting power when it senses a ground fault. A surge protector protects equipment from voltage spikes, like those from lightning or the utility. They do completely different jobs, so having one does not cover the risk the other handles.

Do I need whole-home surge protection?

It depends on how much you want to protect. A plug-in strip only covers what is plugged into it. A whole-home surge arrestor installs in your panel and shields hardwired equipment like your HVAC, water heater, and appliances that a strip never touches. For homes with a lot of electronics or sensitive equipment, it is worth considering.

Where does code require AFCI and GFCI protection?

GFCI protection is required near water: bathrooms, kitchens, garages, laundry rooms, and outdoor outlets. AFCI protection is required in most living spaces, including bedrooms, living rooms, and hallways. Requirements have expanded over the years, so older homes are often missing protection that current code calls for.

Sources

1. Q & A: Arc Fault Circuit Interrupters, Electrical Safety Foundation International (ESFI). https://www.esfi.org/q-a-arc-fault-circuit-interrupters/
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3. Surge Protective Devices, Electrical Safety Foundation International (ESFI). https://www.esfi.org/surge-protective-devices/
4. Electrical Safety (safety tip sheet), National Fire Protection Association (NFPA). https://www.nfpa.org/-/media/project/storefront/catalog/files/safety-tip-sheets/electricalsafetytips.pdf

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Call Smiley Electric at (503) 484-7556 (Mon–Sat, 7am–5pm) or visit smileyelectric.net/contact. For sparks, smoke, a burning smell or a hot panel, turn off the power if it is safe and call right away.

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