FREE HOMEOWNER GUIDE

EV charger in a detached garage: what a long run takes

Why the detached garage is a different job

Most EV charger installations are a short run: panel in the garage, charger on the wall, done. A detached garage, shop, or back-of-lot parking spot changes the math. Now the power has to travel 50, 100, sometimes 150 feet or more from the main panel, usually underground, and every foot works against you. Distance is the single biggest cost driver on these jobs, and it is also where corners get cut in ways that surface later as slow charging and hot wire.

Two code rules shape everything here. EV charging is a continuous load, so the circuit is sized at 125 percent of the charger's draw: a 48-amp charger needs a 60-amp circuit. And on a long run, voltage drop, the voltage lost to the resistance of the wire itself, should stay under 3 percent per NEC guidance, which forces larger conductors as the distance grows. Our wire size and voltage drop guide covers the numbers; the short version is that a wire size that is fine at 40 feet can be undersized at 120.

What too much voltage drop does

Undersized wire on a long run does not fail loudly on day one. It shows up as a charger that never quite performs.

- [ ] Slower charging: the charger sees less than full voltage and delivers fewer miles per hour
- [ ] Wasted energy: the missing voltage becomes heat in the wire, and you pay for it on every session
- [ ] Nuisance faults: some chargers throw errors or derate themselves when voltage sags under load

Two ways to feed a detached garage

There are two sound designs, and which one wins depends on what else the building needs.

- [ ] A single dedicated branch circuit: one run from the main panel straight to the charger. Simplest and cheapest when the garage needs nothing else
- [ ] A feeder and subpanel in the garage: one larger set of conductors feeds a small panel, and the charger, lights, door opener, and shop outlets all run from there

If the garage has a future, feed it once

If the building has any future beyond the charger, a shop, an ADU conversion, a second EV someday, the subpanel usually earns its cost. Pulling one properly sized feeder now beats trenching the yard twice. This is

the conversation to have before anyone digs, because upsizing conductors after the trench is closed is the expensive version of the same job.

The trench, the conduit, and the route

Underground runs go in a trench at code depth, typically 18 to 24 inches depending on the wiring method, in conduit sized to pull the conductors without damage, with proper transitions where the run surfaces at each building. On longer runs we often price copper against aluminum conductors: aluminum must be upsized for the same load, but on a 100-foot feeder it can cost meaningfully less in materials. The route matters too, since the straight line between panel and garage may cross a patio, tree roots, or other utilities, and the practical route is sometimes the cheaper one. This is permitted, inspected work from trench to termination.

What it costs, and where to start

A long-run install costs more than a garage-wall install for concrete reasons: trenching and restoration, more conductor, larger conductor because of voltage drop, conduit, and sometimes a subpanel. The EV charger installation cost guide breaks down the ranges. And because a 40-to-60-amp circuit is a big new load, we run a load calculation on the main service first; an older 100-amp service may need attention before the garage does, which is panel upgrade territory.

The cheapest step is knowing what you are dealing with. Call us with a photo of your panel and a rough distance to the garage and we can give a free ballpark by phone. If you want the route walked before you commit, we schedule a project consultation and give you a firm, written estimate.

Frequently asked questions

How far can an EV charger be from the electrical panel?

There is no hard distance limit; there is a wire-size consequence. As the run gets longer, the conductors have to get larger to keep voltage drop under roughly 3 percent, so a 150-foot run is entirely doable, it just costs more per foot than a short one. An electrician calculates the size for your exact distance and charger amperage.

Do I need a subpanel in my detached garage for an EV charger?

Not always. If the charger is the only load, a single dedicated circuit from the main panel is simpler and cheaper. A subpanel makes sense when the garage also needs lights, outlets, or shop equipment, or when you may add more load later, because one properly sized feeder installed now avoids trenching the yard a second time.

Can I just run an extension cord to the garage to charge?

No. EV charging is a continuous high-amperage load, and ordinary extension cords are not rated for it. They overheat, damage the charger's plug, and create a real fire risk, and some chargers will refuse to run on one. A detached garage needs a properly sized permanent circuit.

Why does a long run to a detached garage cost more?

Four things stack: trenching and restoring the yard, more feet of conductor, larger conductor than a short run would need because of voltage drop, and conduit plus terminations at both buildings. A subpanel, if you add one, is its own line item. Distance and digging conditions drive the price, which is why we ballpark from your specific route.

Sources

1. Lights, outlets, switches, and service reconnect for residential electrical permits, City of Portland Permitting & Development. https://www.portland.gov/ppd/residential-permitting/residential-electrical-permits/lights-outlets-switches-reconnection
2. Electric Vehicle Charging Safety, Electrical Safety Foundation International (ESFI). https://www.esfi.org/electric-vehicle-charging-safety/
3. Charging Electric Vehicles at Home, U.S. Department of Energy, Alternative Fuels Data Center. https://afdc.energy.gov/fuels/electricity-charging-home

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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.

Reviewed by Joshua Smiley, owner & master electrician, Smiley Electric. Last reviewed November 13, 2026. Online version: smileyelectric.net/help/ev-charger-long-run-detached-garage/. General information, not a substitute for an on-site inspection.

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