FAQs on NEMA 1450 (and 650) OUTLETS for EV charging

Q: HOW MUCH does it cost to install a NEMA 1450 outlet?
A: Quick answer: about $300 ***more*** than for a *hardwired* charger installation.
That's for an outlet installation that complies with the National Electrical Code (NEC), which is the only way it will pass inspection and the only way we'll install it.

Q: What is "HARDWIRED?"
A: That's when we run a power line directly from the panel box and essentially straight into the charger. Hardwiring does not use a wall outlet or a cord/plug for the charger input.

Q: WHY does it COST MORE to install an outlet than to hardwire a charger?
A: For important safety reasons, the National Electrical Code now requires that ALL OUTLETS for EV charging be protected by a GFCI type circuit breaker (click HERE for more info) and see attached NEC pages, below). The main cost factors are:

1. With high-amperage breakers, GFCI types typically cost $150 to $200 more
2. A different type of cable is required (4-wire) for a NEMA 1450 outlet, roughly double the cost compared to a hardwired (3-wire) charger installation
3. There's added cost for the outlet itself, and the box it goes in, and the cover
4. Additional labor

Q: WHY does the NEC require GFCI BREAKERS for EV charging outlets?
A: EVSE outlets are NOT like the outlets *behind* your dryer or your stove, which are out-of-reach and accessed once every 10 years. *This is a live, 240-volt, high-current outlet on the wall inside your garage, where kids can get at it and the floor could be wet. It's different, and the safety rules are different.*

Q: WHAT'S THE PROBLEM with outlets on GFCI breakers – aside from cost?
A: About 5% of the time (1 out of 20), we find that EV chargers WILL NOT WORK on a GFCI breaker (true of both wall mount and "mobile connectors"). In those cases, when an EV charger is plugged in, the breaker immediately trips (and won't reset with the unit plugged in). This is because all EVSE *already* have GFCI technology built-in, and the two devices (GFCI breaker and GFCI charger) don't play well together.

Q: If I get a hardwired installation, WHAT HAPPENS WHEN WE MOVE to a new house?
A: If we install your hardwired charger and you move, later, and you want to bring the charger with you, we will uninstall the unit at no charge.*

* If you're outside Monroe County, there may be a charge.
* Installation at your new house, if it's in our area, will be an additional charge.

Q: UH-OH. What if I already bought a charger with a NEMA 1450 or 650 plug?
A: All leading brands of wall-mount EVSE are available in hardwired models. Some brands (like Tesla) are ONLY available hardwired. If you already bought one with a plug, many brands can easily be converted to hardwire (best example, ChargePoint).

MIKE WILLIAMS MW ELECTRIC

332 Melville St, Rochester NY 14609 ● 585.598.4200 ● mike@williamselectric.net

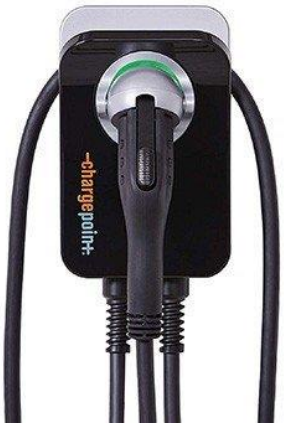
OUTLET VS CHARGER?

PEOPLE ASK US: *"I've heard I don't need an expensive wall charger, that I can just get a 240-volt outlet, and the charger that came with the car, and plug into that, and save $600. What's up?"*

Typical "Portable" Charger
(usually comes with car)

VS

Wall Charger (hard-wired type)
(additional purchase)



OUTLET: "SAVE ~~$600~~" ???

With some hidden installation costs:

1. ***GFCI*:** *With any outlet for EV charging, the 2017 Electrical Code* **requires** *for safety reasons that it be on a special GFCI type breaker. This applies whether the charger is aftermarket or it came with the car.*
2. ***A 240-volt GFCI breaker typically adds @ $200 –** possibly more depending on your panel*
3. ***Extra costs:** Special cable (4-wire) and an adapter may also be required – **adds @ $200. And not all cars come with a Level 2 portable charger.***
4. **BUT:** *With the required GFCI breaker installed, with about 5% of brand combinations tested, the breaker trips instantly and the charger won't work.*

Solution: Hard-wired EV wall chargers (no input plug/outlet) are faster, safer, and less expensive to install than 1450 outlets.

WALL CHARGER, "HARD WIRED": SAFETY, SPEED, CONVENIENCE

1. ***GFCI*:** *All modern EV chargers have GFCI technology built-in. They're inherently safer that way, with no risk of electrical shock (and no need for the special $200 breaker).*
2. *LOCATION: Most EV chargers are weatherproof and safe to use, indoors or out – no special boxes, etc.*
3. *CHARGING SPEED: up to 20% faster (varies with car). Maximum breaker size for the latest wall chargers is 60 amps; the maximum for a 1450 outlet is 50 amps.*
4. *CHILD SAFETY (and adult): Inherently safer. And if there are small children around, we really don't like the idea of an accessible, live 240-volt outlet, either indoors or out. And with hard-wired wall chargers, nothing is "hot" until after it's safely plugged into the car.*

SEE PAGE 2 FOR CHANGE TO EV OUTLET REQUIREMENTS

Tentative Interim Amendment

NFPA® 70®

National Electrical Code®

2017 Edition

Reference: 625.44(A), 625.54(New) and 625.56(New)
TIA 17-2
(SC 16-11-3 / TIA Log #1242)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70, *National Electrical Code®*, 2017 edition. The TIA was processed by the NEC Code-Making Panel 12 and the Correlating Committee on the National Electrical Code, and was issued by the Standards Council on December 1, 2016, with an effective date of December 21, 2016.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Revise 625.44(A) to read as follows:

625.44(A) Portable Equipment. Portable equipment shall be connected to the premises wiring systems by one or more of the following methods:

(1) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 125 volts, single phase, 15 or 20 amperes
(2) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 250 volts, single phase, 15 or 20 amperes
(3) A nonlocking, 2-pole, 3-wire or 3-pole, 4-wire grounding-type receptacle outlet rated at 250 volts, single phase, 30 or 50 amperes
(4) A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 60 volts dc maximum, 15 or 20 amperes

The length of the power supply cord, if provided, between the receptacle outlet and the equipment shall be in accordance with 625.17(A) (3).

2. Add a new 625.54 to read as follows:

625.54 Ground-Fault Circuit-Interrupter Protection for Personnel. All single-phase receptacles installed for the connection of electric vehicle charging that are rated 150 volts to ground or less, and 50 amperes or less shall have ground-fault circuit-interrupter protection for personnel.

3. Add a new 625.56 to read as follows:

625.56 Receptacle Enclosures. All receptacles installed in a wet location for electric vehicle charging shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

Issue Date: December 1, 2016

Effective Date: December 21, 2016

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/docinfo**)**

Note: with a 240-volt circuit ("Level 2"), each "leg" or hot wire measures 120 volts to ground.

The rule above applies to all Level 1 and Level 2 outlets for EV charging.

Effective December 21, 2016