Level 2 charging speed

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This comprehensive guide on Level 2 charging for electric vehicles (EVs) covers everything from Level 2 charging speeds and charger types to EV charging incentives, ensuring you have all the knowledge you need to fully understand Level 2 EV charging.

When discussing electric vehicle charging, it’s essential to understand the two types of electrical current used: alternating current (AC) and direct current (DC). Both currents play a crucial role in how long it takes to charge an EV and battery management in electric vehicles’ charging process.

The electricity that comes from the grid and powers the outlets in your home or office is always AC. This electrical current is named after the way it flows, changing direction periodically. AC electricity can be transported over long distances efficiently, making it the global standard for power distribution. Level 2 EV charging inputs and outputs power in AC.

In contrast, batteries in EVs store direct current, named after its straight-line power flow. DC electricity is used within the power circuitry of electronic devices, powering them directly. When an electric vehicle is plugged into a Level 2 EV charging station, it receives AC power, which is then converted to DC electricity for use within the car by its onboard converter.

Electric vehicles undergo a power conversion process when charging with a Level 2 EV charger. The AC power supplied by the L2 charger is converted into DC electricity by the vehicle’s onboard converter before being stored in the battery. This DC power is then used to operate the vehicle.

Level 1 and Level 2 charging stations utilize AC power, which is converted to DC power by the vehicle’s onboard converter during the charging process. In contrast, Level 3 charging, also known as DC fast charging, directly supplies the battery with DC power. This is possible because the conversion from AC to DC occurs within the charging station, bypassing the vehicle’s onboard converter. This enables Level 3 chargers to deliver power quicker than Level 2.

By understanding the roles of AC and DC electricity in electric vehicle charging, you’ll better grasp the charging process and how the different levels of EV chargers operate to provide power to your vehicle.

The charging curves between AC and DC electric vehicle charging differ. With Level 2 EV charging (AC), the power delivery is steady as the onboard converter can only accept a relatively small amount of power at a time. This differs from DC fast charging, which delivers a high peak of power at the start before it slowly tapers down in power delivery as the battery slowly requests less power through the battery management system. You can see the difference in the charging curves in the below illustration.

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Charging speeds for Level 2 chargers range from 3 to 19.2 kilowatts (kW) in the United States and up to 22 kW in Europe, providing 10 to 75 miles (16 – 120 km) of range per hour of charging. The specific charging speed achieved depends on the charger’s power output and the vehicle’s onboard charging capabilities, including its charge acceptance rate. Roughly speaking, a Level 2 charger can be up to 19 times faster than a Level 1 charger. However, it isn’t as fast as Level 3 DC fast charging.

The charging time for a Level 2 charger is influenced by the charger’s power output, the EV’s onboard charge acceptance rate, and the vehicle’s battery size. Many other variables can affect charging time, but here are some rough estimates based on an electric car that can accept the full charge power of the EV charger and adds 40 kWh of battery capacity (40 kWh is the average capacity of EV batteries).

Level 2 electric vehicle chargers come in two main varieties: tethered and untethered. This section will delve into the key differences, merit and demerits, and other factors to consider when choosing between the two difference Level 2 charger types.

Tethered chargers feature a permanently attached charging cable and connector, saving you from carrying a separate charging cable. They are easy to use and always ready for charging (when available). However, compatibility with all EVs depends on the connector type. Tethered Level 2 chargers are popular in North America.