12 amp dc fast charging

12 amp dc fast charging

If you are looking at potentially switching to an electric vehicle (EV), charging speed will be at the forefront of your mind. The time it takes to charge an EV can significantly impact your daily routine as an EV owner. DC fast charging is the quickest way to charge an electric vehicle, and it plays an essential part in public EV charging infrastructure. DC fast charging stations are ideal for EV drivers traveling long distances and needing to quickly charge their cars along their journey and for those visiting places for a short time but wanting to keep their car battery topped up.

The power in an electric vehicle battery is stored as direct current (DC); at the same time, the electric grid provides power as alternating current (AC). Inside an EV is an on-board charger that converts AC power into DC power before distributing the power to charge the vehicle"s battery. DC fast charging bypasses this on-board charger and charges the battery directly, dramatically reducing the time it takes to charge an EV. This is made possible as the power conversion from AC to DC occurs in the DC charging station before being output to the vehicle. DC fast charging can provide a much faster EV charging experience than AC-type charging.

DC fast charging is known as DCFC (Direct Current Fast Charging), level 3 charging, and is often referred to as rapid or ultra-fast charging.

Level 1 is the slowest type of electric vehicle charging equipment currently. A level 1 EV charger plugs directly into a standard 120 volt AC outlet. The average power output is 1 kW to 1.8 kW, adding approximately 3 to 7 miles of range to your electric vehicle per hour. Needless to say, Level 1 type chargers are extremely slow and not very practical if you intend on using your electric car regularly. In parts of the world outside North America and Canada where standard household voltages are higher, 230 volt in Europe, for instance, Level 1 charging is unavailable.

Level 2 is the next speed up from level 1 charging. A level 2 electric car charger uses a 208 volt to 240 volt connection in North America/Canada and a 230 volt (single-phase) or 400 volts (three-phase) connection in Europe. The power output of a Level 2 charger is between 3 kW and 22 kW depending on where you are located in the world; this would result in 10 to 75 miles of range for an hour worth of charge. Level 2 charging stations are the most popular type of EVSE (Electric Vehicle Supply Equipment), and they can be found at homes, workplaces, and many other public locations.

Both Level 1 and Level 2 EV chargers deliver AC power to the electric vehicle.

Level 3 DC fast charging is the quickest and most powerful type of EV charging available. A level 3 charging station is designed to deliver more power at faster speeds than Level 2 type chargers with outputs of 15 kW to over 350 kW, enabling you to charge a standard electric car in 15 to 60 minutes. DC fast charging utilizes

commercial-grade three-phase connections and delivers DC power directly to the electric vehicle"s battery, utterly different from how Level 1 or Level 2 EV charging works. Let"s look at the differences in a bit more detail.

DC fast chargers have constant power, and DC Voltage usually ranges from 200 volts to 1000 volts. The electric vehicle battery management system (BMS) will ensure it is being charged within the tolerances of the battery at any given state and communicates the demand to the EV charging station.

When charging an electric vehicle with a DC fast charging station, the EV is constantly communicating to control how much power is drawn. Several variables determine the speed at which your EV is charged; however, the main variables we will focus on are the rate of charge of the charging station, the acceptance rate of the electric vehicle, and the DC fast charging curve.

All EV charging stations are measured as their maximum output power in kilowatts (kW), known as the rate of charge or charging rate. DC fast charging stations range from 15 kW to 350 kW; even megawatt charging stations are megawatt charging stations currently in development that can output 1000 kW of power. Generally speaking, the higher the kW, the faster the charge; however, choosing a higher kW DC fast charger over a lower kW one does not necessarily mean that the electric vehicle can be charged quicker. This is where the acceptance rate of the electric vehicle influences the charger’s rate of charge.

An EV charge acceptance rate is the maximum amount of power in kW that an electric vehicle can input. The vehicle"s battery management system communicates this to the charging station when a DC fast charger cable is connected to the car. Some early electric vehicles have very low charge acceptance rates; however, more and more EVs on the market have higher charge acceptance rates to improve charging speed.

For example, let"s take a car with an EV charge acceptance rate of 50 kW. That would mean that the rate of charge would be approximately the same regardless of whether it was being charged at a 50 kW, 100 kW DC fast charging station, or even a 350 kW. Let"s look at another example, but the other way around, the Porsche Taycan has a charge acceptance rate of 270 kW, meaning it can take a peak charge of 270 kW. It would not reach its peak if you were to charge it at a 150 kW fast charging station. It would only be able to take in 150 kW as that is the maximum rate of charge of the charging station.