

ENHANCING SAFETY AND PRODUCTIVITY IN DIRECT CURRENT ELECTRIC VEHICLE CHARGER MAINTENANCE WITH THE CHEKVOLT® APPLICATION NOTE

Electric vehicle (EV) charging stations, particularly those utilizing direct current (DC) for rapid charging capabilities, are quickly becoming a fundamental piece of the global transportation infrastructure. DC charging stations can deliver a wide range of power, depending on their specific model and application. DC Fast Chargers provide power at voltages in the range of around 200 to 500 volts DC. Most current electric vehicles can accept 50 kW fast charging at about 400-500 VDC. High-end or commercial vehicles, like electric buses or trucks, may use higher voltage chargers. Ultra-fast chargers, like those in the 150 kW to 350 kW range, can provide power at up to around 800 to 1000 VDC.

As these charging stations grow in number and usage, ensuring their effective maintenance, safety, and efficiency becomes paramount. One innovative solution to optimize these parameters is the application of Permanent Electrical Safety Devices (PESDs), like the ChekVolt®. This article covers the following:

- How DC EV charging station infrastructure is expanding.
- Why there's a growing need for efficient, safe, and reliable maintenance methods.
- How ChekVolt® offers a solution to effectively test for the absence of voltage and enhances safety and productivity.
- How ChekVolt® is an example of devices promoting electric vehicle adoption and contributes to a more sustainable future.



STREAMLINING LOCKOUT/TAGOUT PROCEDURES WITH CHEKVOLT

In the realm of EV charging station maintenance, ensuring safety when interacting with DC voltage systems is crucial. Lockout/Tagout (LOTO) procedures, which are necessary for safely isolating electrical equipment, can often be time-consuming processes. Incorporating the ChekVolt® into a DC EV charging station's design allows maintenance personnel to test for absence of voltage without the need to open the enclosure door. By introducing voltmeter-compatible test points, this PESD® can significantly expedite LOTO procedures. Users of the ChekVolt® have reported reductions in LOTO procedure times by 35-40 minutes, meaning the device can pay for itself after just 2-3 procedures through time savings alone.



EV CHARGING STATION APPLICATIONS FOR CHEKVOLT

Electric vehicle (EV) charging stations can deliver both alternating current (AC) and direct current (DC) power, but the type of power and voltage involved largely depends on the level of the charger. Here's a breakdown of how it works:

- 1. Level 1 and Level 2 Chargers:** These types of chargers provide power in the form of AC, which is the type of electricity that you would typically find in residential homes and commercial buildings. Level 1 chargers use a standard 120-volt AC outlet, and Level 2 chargers typically use a 240-volt AC circuit. The vehicle's onboard charger converts this AC power to DC power to charge the vehicle's battery. While the ChekVolt® is rated for up to 1000 VAC/VDC, it can still be beneficial in these lower voltage AC systems.
- 2. DC Fast Chargers:** These chargers deliver power in the form of direct current (DC). They can charge an EV much faster than Level 1 or Level 2 chargers, often up to 80% charge in around 30 minutes. DC fast chargers bypass the car's onboard charger

and deliver DC power directly to the battery. These chargers are typically found at public charging stations and are used for long trips where quick charging is necessary. Given their higher voltage operation, typically up to 1000 VDC, the ChekVolt® can be particularly valuable in these settings. DC Fast Chargers may use even higher voltages in the future.

ENHANCING SAFETY AND RELIABILITY IN HARSH ENVIRONMENTS

The ChekVolt® design features touch-safe, high impedance protected test points rated up to 1000 VAC/VDC, which allow for absence of voltage testing with minimal risk. This innovation allows EV charging station maintenance to be conducted safely, even in high traffic areas or adverse weather conditions. The IP69 rating of the ChekVolt® makes it an excellent choice for these demanding environments often found in electric vehicle charging applications, enhancing its longevity, reliability, and safety.

Adding to the safety measures, the ChekVolt® also incorporates redundant LED voltage presence indicators. These indicators flash when voltage is present in any phase, providing clear, immediate, and accurate information about the system's status. This feature significantly enhances safety by providing visual verification of energy presence or absence, reducing the risk of exposure to electrical hazards for maintenance personnel.

COMPACT, ROBUST, AND EASY TO INSTALL

The ChekVolt® is compact and remarkably easy to install. It can be quickly mounted through a single 30mm knockout and comes with four lead wires potted in the construction. These leads allow the ChekVolt® to be wired directly to either the line side or load side of the power circuit, providing versatility in installation. Its compact size and flexible connectivity options make it suitable for integration into any EV charging station, regardless of space constraints or existing electrical configurations. Therefore, it effortlessly brings its safety and efficiency benefits to a wide range of settings, optimizing maintenance procedures across the rapidly growing EV charging infrastructure.

CONCLUSION

As we harness the power of the sun on an increasingly industrial scale, the importance of safety in the maintenance of solar power systems grows ever more crucial. The ChekVolt® PESD is perfectly equipped to meet this challenge, offering a safer, smarter, and more efficient way to conduct maintenance on high voltage DC solar power systems. By streamlining LOTO procedures and enhancing safety, ChekVolt® is set to become a vital tool in the solar industry's mission to light up a sustainable future.