

WHITE PAPER | ELECTRIC VEHICLE INFRASTRUCTURE

Charging Stations Industry

Protecting the infrastructure powering the transition to electrified transportation



Built for distributed infrastructure

Charging assets often sit outside, away from centralized electrical rooms, and must be protected at the point of use.

Designed around uptime

Cabinet selection influences moisture control, service access, corrosion resistance, and long-term reliability.

Relevant across industries

Public networks, workplaces, fleets, and industrial facilities each depend on reliable charging systems.

Enclosures are mission-critical

Controls, communications, power distribution, and monitoring equipment all depend on durable housing.

Overview

Electric vehicle (EV) charging stations are a rapidly expanding component of modern infrastructure, supporting the global shift toward electrified transportation. As adoption of electric vehicles increases across passenger, commercial, and industrial sectors, the demand for reliable, scalable, and durable charging infrastructure continues to grow. Charging stations are no longer limited to niche applications - they are now deployed across highways, commercial facilities, fleet operations, residential developments, and industrial environments.

At their core, charging stations are not just power delivery points - they are integrated systems that combine electrical distribution, communication networks, control systems, and environmental protection. These systems must operate reliably in a wide range of environments, from controlled indoor parking structures to harsh outdoor installations exposed to weather, temperature fluctuations, and physical wear. As a result, the protection of internal components is critical to ensuring uptime, safety, and long-term performance.

Enclosure performance is charging uptime.

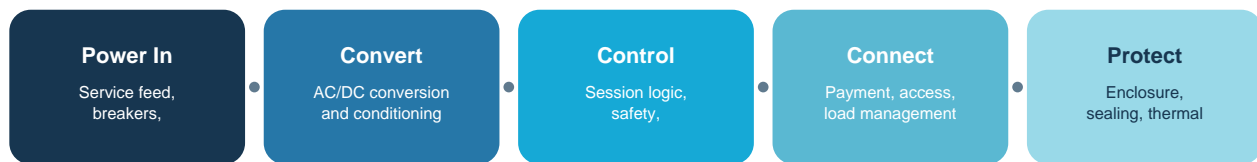
Outdoor-rated cabinets protect the electronics, controls, and power infrastructure that keep EV charging assets

- Corrosion resistance
- Fast installation
- Service access
- Future expansion

How Charging Stations Work

EV charging stations function by transferring electrical energy from a power source to a vehicle's battery system. While the basic concept is straightforward, modern charging systems are highly engineered and incorporate multiple subsystems working together.

Charging stations are typically categorized into three levels. Level 1 charging uses standard residential outlets and provides slow charging suitable for overnight use. Level 2 charging operates at higher voltages and is commonly used in commercial and residential installations. DC fast charging systems deliver high-power direct current and are used in public and fleet applications where rapid charging is required.



A charging station is a coordinated infrastructure system - not just a plug.

Each charging station includes several key components. Power conversion equipment regulates and conditions electricity before it is delivered to the vehicle. Control systems manage charging sessions, monitor performance, and communicate with network infrastructure. User interface systems provide access control, payment processing, and system feedback. In networked installations, communication hardware connects stations to centralized management platforms for monitoring, diagnostics, and load balancing.

All of these components must be housed within protective enclosures that shield them from environmental exposure while maintaining accessibility for maintenance and operation.

Charging Type	Typical Use Case	Infrastructure Need	Enclosure Focus
Level 1	Residential and low-duty charging	Standard AC supply and basic controls	Compact protection and safe service access
Level 2	Commercial, workplace, residential communities	Higher voltage equipment, controls, networking	Outdoor sealing, communications protection, organized wiring
DC Fast Charging	Public corridors, fleets, high-turnover sites	High-power conversion, thermal management, load control	Larger cabinets, corrosion resistance, maintainability

Key Applications and Industries

Charging infrastructure is deployed across a wide range of industries, each with unique operational requirements and environmental conditions.

Public charging networks

Highway, retail, and urban charging assets must remain reliable under weather exposure and frequent use.

Commercial and workplace charging

Facilities need accessible systems that fit parking layouts while protecting internal components.

Fleet charging operations

Delivery, transit, and service fleets require dependable uptime because charging downtime affects schedules.

Industrial and heavy-duty equipment

Material handling and specialized electric machinery introduce dust, vibration, and contaminants.

Public charging networks are one of the most visible applications, with stations installed along highways, in urban centers, and at retail locations. These systems must operate continuously and withstand outdoor conditions, including temperature extremes, precipitation, and physical wear from frequent use.

Commercial and workplace charging installations support employee and customer vehicle charging. These systems are often installed in parking structures or outdoor lots, requiring enclosures that balance environmental protection with accessibility and aesthetics.

Fleet charging operations represent a high-demand application where reliability is critical. Delivery fleets, public transit systems, and service vehicles depend on consistent charging availability to maintain operational schedules. In these environments, downtime directly impacts productivity and revenue.

Industrial and heavy-duty charging systems support equipment such as forklifts, material handling vehicles, and specialized machinery. These environments often introduce additional challenges such as dust, vibration, and exposure to chemicals.

Design pressure points for charging infrastructure



Environmental Challenges

Charging stations are frequently installed in environments that expose them to a combination of environmental and operational stress factors. Unlike controlled indoor systems, many charging stations must function outdoors year-round, making durability and protection essential.

Temperature variation is a significant factor, as electronics and power components must operate reliably in both high heat and cold conditions. Moisture and precipitation introduce risks of corrosion and electrical faults, particularly in outdoor and coastal environments.

Dust, debris, and airborne contaminants can accumulate within enclosures if not properly sealed, potentially affecting performance and reliability. In high-traffic locations, physical impact and wear must also be considered, requiring enclosures that can withstand mechanical stress.

To address these challenges, charging infrastructure relies on enclosures designed to meet established standards such as NEMA ratings. NEMA 3R enclosures provide protection against rain and outdoor conditions, while NEMA 4 and 4X enclosures offer enhanced protection against water ingress and corrosion.

Challenge	Risk to Charging Infrastructure	Protective Enclosure Response
Moisture and precipitation	Corrosion, electrical faults, nuisance outages	Sealed construction and appropriate NEMA-rated protection
Temperature variation	Electronic stress and reduced component life	Thermal planning, ventilation options, organized internal layouts
Dust and airborne debris	Contamination of controls, terminals, and communications hardware	Tight gasketing, filtered ventilation where required, durable materials
Physical wear	Impact damage, cable strain, service interruptions	Rigid enclosure structure and service-friendly access

Equipment and Enclosure Integration

Charging stations integrate multiple electrical and electronic components that require secure and reliable housing. Power distribution systems, circuit protection devices, control modules, communication hardware, and monitoring equipment must all be protected within a single enclosure or enclosure system.

Distributed charging systems often utilize compact enclosures mounted near individual charging points. These enclosures house localized control and communication equipment and must be designed for durability and ease of installation.

Larger charging hubs and fast-charging installations may require centralized enclosures that house higher-capacity power conversion systems and control infrastructure. These installations demand enclosures with sufficient internal space, structural integrity, and thermal management capabilities.

Proper enclosure selection ensures that these systems remain protected from environmental exposure while allowing for maintenance, upgrades, and system scalability.

DDB Unlimited's Solutions

DDB Unlimited provides enclosure solutions designed to support the demanding requirements of EV charging infrastructure. As charging systems expand into diverse and often harsh environments, enclosure performance becomes a critical factor in ensuring reliability and uptime.

OD Series wall-mount enclosures

Well suited for distributed charging applications that need sealed protection for controls, communication hardware, and localized power components.

SOD Series floor-standing enclosures

A strong fit for larger charging installations, centralized equipment, high-power systems, and expansion-friendly layouts.

Alumiflex marine-grade aluminum

Provides structural strength, corrosion resistance, and reduced weight for high-exposure outdoor environments.

U.S. manufacturing and warranty

ISO 9001-certified processes, an industry-leading 15-year warranty, and many standard enclosures available in 3-5 business days.

DDB's OD Series wall-mount enclosures are well suited for distributed charging applications, providing sealed protection for control systems, communication hardware, and localized power components. These enclosures are designed for outdoor use and can withstand exposure to weather, moisture, and contaminants.

For larger charging installations and centralized systems, DDB's SOD Series floor-standing enclosures provide the capacity and flexibility required for high-power equipment and integrated control systems. These enclosures support organized layouts, thermal management, and future expansion as infrastructure grows.

All DDB enclosures are constructed from the company's patented Alumiflex marine-grade aluminum alloy, offering a combination of structural strength, corrosion resistance, and reduced weight. This material is particularly well suited for outdoor and high-exposure environments common in charging infrastructure.

DDB enclosures are manufactured in the United States under ISO 9001-certified processes and are backed by an industry-leading 15-year warranty. With many standard enclosures available for shipment within 3-5 business days, DDB provides a solution that supports both performance and project timelines.

Conclusion

Charging stations are a critical component of modern infrastructure, enabling the continued growth of electric transportation across multiple industries. As these systems become more widespread and more essential to daily operations, their reliability and durability become increasingly important.

Protecting the electrical and control systems within charging stations is essential to maintaining uptime, safety, and long-term performance. By selecting enclosures that meet environmental demands and support system integration, organizations can ensure that their charging infrastructure operates reliably in even the most challenging conditions.

DDB Unlimited's enclosure solutions provide a durable and dependable foundation for EV charging systems, supporting the transition to electrified transportation with performance, reliability, and long-term value.

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Protect critical equipment

House power distribution, controls, communications, monitoring equipment, and localized charging infrastructure.

Support harsh environments

Address moisture, temperature shifts, dust, impact exposure, and corrosion risks common in outdoor deployments.

Scale with the project

Use compact wall-mount cabinets for distributed assets or floor-standing enclosures for larger hubs and fast-charging installations.

Keep service practical

Maintain organized layouts, clear access, and field-friendly protection for long-term operation.



Ready to protect your EV charging infrastructure?

Contact DDB Unlimited to discuss your application, request a quote, or match the right NEMA-rated OD or SOD Series enclosure to your charging system.

[View OD Series](#)

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