Efficient, Secure, and Flexible:

Heavy-duty Electric Truck Depot Charging Solution

Product Highlights

MPC-3120 Series
Multi-interface Fanless Panel Computers

- 12.1-inch panel computer
- Intel Atom® x6211E dual-core or x6425E quad-core processor
- IP66-rated front panel, IK08 impact resistance
- -30 to 60°C operation temperature, fanless and without a heater design
- 400 / 1000 nit sunlight-readable LCD, Glove-friendly, multi-touch screen
- DNV, CID2, ATEX Zone 2, and IECEx compliant

EDS-4012 Series
Managed Ethernet Switches

- Developed according to the IEC 62443-4-1 and compliant with the IEC 62443-4-2 industrial cybersecurity standards
- Supports wide range temperature
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches)
- Compact and flexible housing design to fit into confined spaces
- Supports MXview One for easy, visualized industrial network management

EDR-8010 Series
Industrial Secure Routers

- Industrial-grade Intrusion Prevention/Detection System (IPS/IDS)
- 8 FE + 2 Gigabit port all-in-one firewall/NAT/VPN/router/switch
- Visualize OT security with the MXsecurity management software
- Secure remote access tunnel with VPN
- Examine industrial protocol data with Deep Packet Inspection (DPI) technology
- Easy network setup with Network Address Translation (NAT)
- RSTP/Turbo Ring redundant protocol enhances network redundancy
- Developed according to IEC 62443-4-2 with Secure Boot
- -40 to 75°C operating temperature range (-T model)

To electrify its fleet, a major logistics company has initiated a project to establish charging depots for heavy-duty electric trucks (e-trucks). They were looking for a reliable charging solution that was reliable for long-distance and heavy-duty transportation while also meeting operational efficiency requirements.To reduce charging time, enhance fleet uptime, and streamline operations, the charging depots had to provide high-power DC fast-charging capabilities.

As the charging depots were mostly outside, a design with plenty of room for e-trucks and a flexible layout was essential. Industrial-grade, impact-resistant equipment was needed to guarantee the infrastructure's durability and adaptability. Moreover, the infrastructure needed flexible energy management and a strong network structure to handle different charging needs and accommodate future growth.

To achieve smart charging, optimizing charging efficiency and minimizing the strain on the power grid are critical. During peak operational hours, high-power charging is necessary for quick vehicle turnover, while during non-operational hours, lower-power charging is used to save on energy costs. Peak shaving and valley filling techniques help manage charging demand, reduce grid strain, and lower electricity costs. To guarantee stable operation regardless of conditions, the infrastructure must incorporate flexible energy management, redundant network architecture, and high-reliability communication equipment. These measures enable seamless integration with the power grid, support the implementation of smart charging, improve power system stability and efficiency, enhance operational performance, reduce long-term maintenance costs, and ultimately achieve fleet electrification targets.

System Requirements

The customer required the charging depots to possess the following key capabilities to meet their electrification goals:

- **Real-time Data Collection and High-efficiency Transmission:** The charging depots must have efficient data collection and communication systems that can collect and transmit data accurately and in real time during the charging process. This helps the energy management system make informed definitions and guarantees a smooth connection between vehicles and charging stations.
- **Outdoor Durability and Industrial-grade Communication:** As charging depots are mostly outdoors, the equipment must withstand water, dust, and extreme temperatures while providing reliable industrial-grade communication to ensure stable operation under harsh environmental conditions.
- **Scalability and High-reliability Network Capability:** The infrastructure must be scalable, allowing expansion to accommodate future fleet growth, multiple vehicle types, and various charging modes. Redundancy is also essential to avoid single points of failure, guaranteeing network stability and system reliability.

MOXA®

Why Moxa

Moxa's products played a pivotal role in this project, enabling the logistics company to achieve a stable and efficient charging infrastructure.

- **Industrial-grade Equipment to Adapt to Harsh Environments:** Moxa's industrial solutions is engineered for harsh environments, featuring water resistance, dustproofing, and the ability to withstand extreme temperatures and impacts. These features make them ideal for challenging outdoor environments, meeting the rigorous requirements of large-scale installations, ensuring stable operation, and reducing maintenance needs.
- **Redundant Network Architecture to Ensure High Reliability:** Moxa's networking equipment supports multiple redundancy protocols (including Turbo Ring and Turbo Chain), guaranteeing continuous network connectivity and eliminating single points of failure.
- **Defense-in-depth Strategy for Industrial Network Security:** Moxa implements a defense-in-depth security approach to safeguard critical EV charging infrastructure, ensuring continuous e-truck operation. In EVI applications, Moxa uses secure routers to establish network segmentation and deploys industrial-grade cybersecurity solutions to protect networks and critical assets comprehensively. Integrated features such as firewalls, NAT, and VPN provide multi-layered security to protect network infrastructure, ensuring secure remote management and mitigating potential cyber threats to maintain uninterrupted operation.

System Diagram