

Multi-Compatible Wireless Charging Solution For Electric Vehicles Application And A Method Thereof

Application Number: 202411048497

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ABSTRACT

Embodiments disclose a method and a multi-compatible, wireless charging system for electric vehicles (EVs), characterized in that the system comprising: a charging pad embedded in a parking surface, said charging pad comprising: (i) a tappingbased transmitting coil (Tx coil) configured to generate a magnetic field for wireless power transfer; (ii) alignment aids positioned around the perimeter of the charging pad, said alignment aids facilitating proper alignment between the charging pad and the EV; (iii) a transmitting side microcontroller having communication components configured to establish a wireless connection with the EV and optimize charging efficiency; and (iv) safety features designed to prevent hazards and ensure user safety during the charging process; an EV equipped with a compatible wireless charging receiver, said receiver comprising: (i) a receiving coil (Rx coil) capable of receiving energy wirelessly from the tapping-based transmitter coil of the charging pad; (ii) a receiving side microcontroller communication components configured to establish a wireless connection with the charging pad and optimize charging efficiency; (iii) safety features configured to prevent hazards and ensure user safety during the charging process; and (iv) a power management system capable of adjusting the charging rate of a battery pack of the EV, based on the energy requirements and battery status of the EV.

KEY APPLICATION AREAS

1. Wireless EV Charging Infrastructure.
2. Electric Vehicles (2W, 3W & 4W).
3. Smart Parking & Charging Stations.
4. Power Electronics & Wireless Power Transfer (WPT).
5. EV Fleet & Public Charging Networks.
6. Renewable Energy-Integrated EV Charging.

POTENTIAL USE

1. Universal wireless charging for 2-wheelers, 3-wheelers, and 4-wheelers using a single charging pad.
2. Public parking lots, malls, offices, and residential parking with embedded wireless charging pads.
3. Wireless charging at traffic signals and taxi/bus stops for opportunity charging.
4. EV fleet charging (e-rickshaws, delivery vehicles, buses) with automatic voltage and power adaptation.
5. Solar-integrated wireless charging stations to reduce dependence on the utility grid.
6. Smart charging systems with real-time alignment, communication, power optimization, and safety monitoring.
7. Future interoperable EV charging networks supporting multiple EV battery voltages (72–400 V) and receiver coil sizes using a common infrastructure.