



Innovation in charging infrastructure

Prima Electro's long-term experience in the design and production of power electronics is a key element to deliver custom projects in EV and off-board charging field

Moncalieri, 1 March 2022 - European targets look to reduce CO₂ emissions by 55% by 2030 and the 2021 saw rapid growth in the global electrification market with Global EV (BEV & PHEV) sales reaching 6,75 million units in 2021, 108 % more than in 2020. In this context, the demand for companies to innovate with environmentally friendly solutions is getting more and more challenging.

Research and a strong commitment to innovation have been part of Prima Electro's DNA since its foundation, being one of the main EMS partners in railway sector. Thanks to its significant technological know-how and the ability to design and develop cutting-edge embedded electronics, Prima Electro is now taking part in the European INCIT-EV project (Horizon2020), focusing on innovative charging solutions to accelerate the transition towards sustainable mobility.

The first prototypes of these innovative set of charging infrastructures will be installed in different European cities (Turin, Paris, Amsterdam, Utrecht and Tallin) ready to improve the EV users experience with the ultimate goal of fostering the EV market share in the EU. The INCIT-EV target in the Turin use case, is to realize, in an urban environment, a "park&ride" hub with "slow" and "ultra-fast" charging stations directly supplied by the tram rail-way.

The idea of this use case is the fully exploitation of the already existing and underused tram rail-way infrastructure allowing an easy diffusion of EV charging points in the urban environment.

Considering that the battery chargers are supplied by DC voltage, the converter topology adopted is an isolated DC/DC converter; differently to the traditional chargers, no AC/DC converter is needed. In order to be able to use the battery chargers also to improve the tram railway supply stability, bidirectional converter topology have been adopted.

As one of the leading and most reliable manufacturers of industrial electronics on the market, Prima Electro has been involved in the project for the design, development and production of two bidirectional DC battery chargers having different power output, namely *eSpark* 3.6kW and *eThunder* 50kW module. Both DC battery chargers guarantee high efficiency over the whole operating range compliant with the tram railway supply with nominal 600V and strong oscillation from 450V to 900V. Moreover, the *eThunder* modular architecture is easy to parallel increasing power rating up to 350kW. The *eSpark* has been designed specifically for DC slow-charging public parking hubs, with low visual impact, thanks to a flexible IP67 mechanical solution suitable for the under-road level installation. The *eThunder* (50kW module) delivering



up to 350kW output power, dynamically configurable for 400V or 800V standard batteries, can be installed on charging stations in Urban/Extra-urban public parking as well as eBus/Delivery eTruck charge.

Electric vehicle batteries have enormous potential, which goes beyond their main purpose of supplying energy for mobility. Batteries can also be connected to the general power grid to make it more stable and efficient. V2G (Vehicle-To-Grid) is a technology that helps turn electric cars from a simple means of transport into energy storage facilities, capable of exchanging energy with the grid. As a result of bidirectional charging technology, an electric vehicle's battery pack will be able to make the network more stable, storing excess energy and feeding it back when required.

Thanks to their bidirectional topology, Prima Electro *eSpark* and *eThunder* battery chargers are "V2G Ready", indeed, bidirectional Active FrontEnd modules are under development.

For more information

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Prima Electro

Prima Electro is an EMS partner offering its customers design and production services for integrated electronic systems, overseeing the whole life cycle of the product, from the feasibility study to the qualification and production of the electronic equipment.

Prima Electro is the Electronic Division of Prima Industrie, a group with over 1,700 employees worldwide, production sites in Italy, Finland, the United States and China, and a sales and service network in over 80 countries.