FABRIC

Feasibility analysis and development of on-road charging solutions for future electric vehicles

Control & Communication Shelter

The center point of the POLITO charging infrastructure for the communication and control

Overview /introduction

The shelter located at the center of the charging line contains the main actors of the charging infrastructure.
From this strategic point the charging process is activated through a dedicated CAN network that allow to communicate with all the power boards.
In addition, inside the shelter the protection system power distribution and the ancillary services AC and DC distributions are present.

Italian test site bird view

Partners involved

POLITECNICO DI TORINO
FCA FIAT CHRYSLER AUTOMOBILES | CRF
TU berlin
TECNOSITAF S.p.A.

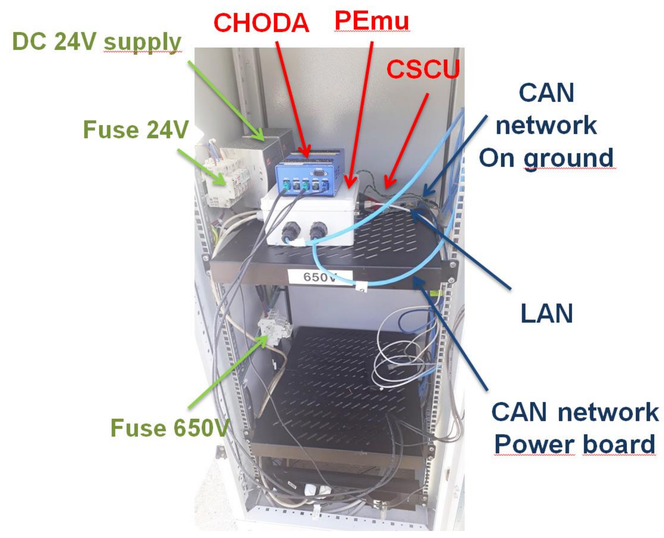
Charging infrastructure communications

The actors of the charging infrastructure are:

- The Charging station Control Unit (CSCU);
- The Power Electronic (PE) management unit;
- The CODHA that allows the communication to the vehicle by a Wi-Fi communications.

All the actors communicate on a CAN network at the speed of 250 Kbps. From here a dedicated CAN network allows to communicate and control all the PE boards (500Kbps). It is the PE management unit that, according to the messages received from the CAN network on ground, enables the charging procedure (identification) of the first board.

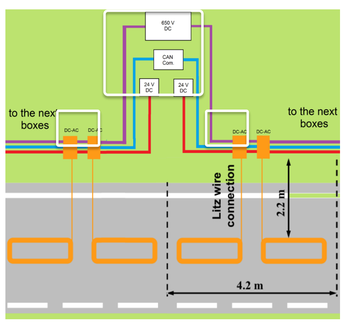
When the vehicle is on the first coil, the power transfer starts. Then a CAN message is sent to the second board in order to start the identification procedure. In this way it is possible to realise a cascade activation of the PEs. In addition, a LAN network connection reaches the shelter.



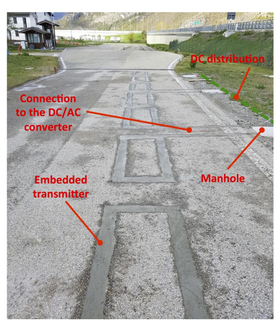
POLITO Control & Communication Shelter

Charging infrastructure, DC distributions

From the shelter (Q4), two DC distribution lines start.
The 659V DC power distribution, coming from the SuperCaps shelter (Q3), is divided in two branches protected by two fuses, one on the positive and one on the negative of the DC distribution. From the 220V AC line two DC lines at 24V are generated and protected with two dedicated fuses. One on the positive and one on the negative conductor for each branch.
All the DC distributions, as the CAN network, are realized by daisy chain connections. Each coil is connected to a PE. The PEs are located inside power boxes IP-68 placed in the manhole.



Power Box on the manhole



Charging lane installed in the road infrastructure


Power Box


Power Box on the manhole

Main evaluation outcomes

- All the system has been tested both from the communication and control point of view.
- The adoption of a unique 24V DC distribution allows to contain the cost per meter of the system.
- In addition, the power system is immune to reflexing phenomena related to each DC/HF thanks to the introduction of a filter on each board.

Final Event & Demonstration | 21-22 June 2018 Italy

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Consortium

Project facts

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