

E-Mobility – FCT electronic gmbh develops and tests charging connectors for the worldwide net integration of electric vehicles

The Assignment

In an era of commodity shortages and unpredictable climate changes, society is in search of alternative types of energy. This is also the case for the drive engineering of automobiles. The Federal Government in Germany has also chosen to adopt a leading role internationally on this subject. As an alternative to the conventional combustion engine, increasingly powerful electrically charged vehicles are being focused upon. Manifold provisional solutions in the form of hybrid cars are already available on the market. Manufacturers are working intensively on the technical challenges regarding vehicle cruising range and charging cycles. This is where FCT electronics' R&D expertise and decades of accumulated Know-how with regards to connector systems comes to fruition.



Charging connector 32 A with coupler at an automobile-design study

During the development and testing of connectors for electric cars and their worldwide net integration, a leading international enterprise started a development- and infrastructure project for electrically motorised vehicles with FCT electronic. The project tasks not only included the design and construction of suitable connector components, but also the nation-wide provision of loading units or rather charging stations for batteries. FCT electronic has a reputation as a well established manufacturer of connectors, connector systems, full metal- and plastic hoods, contacts and ready-made cable systems. After a development time of just three months, the brand-new designed charging connector could start its field testing phase in Israel. The connectors developed by FCT electronic are inserted both in the charging stations as well as directly in the vehicle.

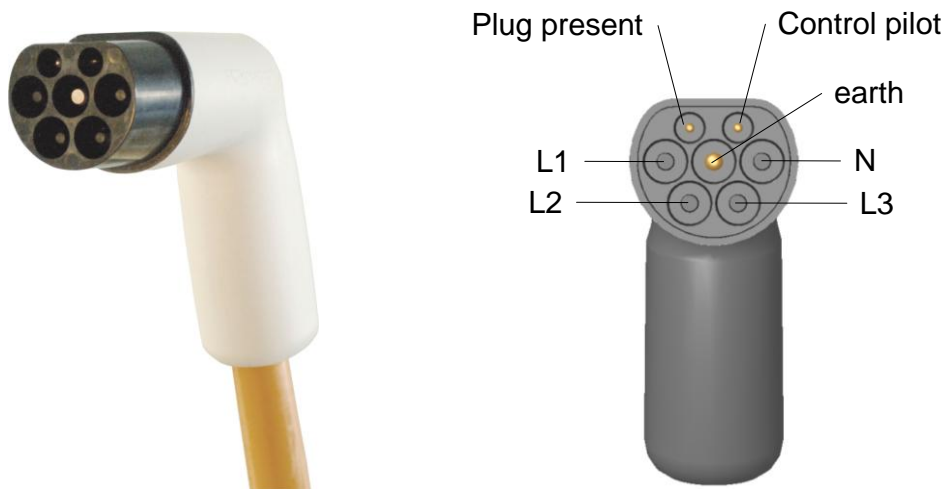
After successful testing and the complete integration of the network architecture on a national level, the project will extend to further countries such as Denmark and Austria.



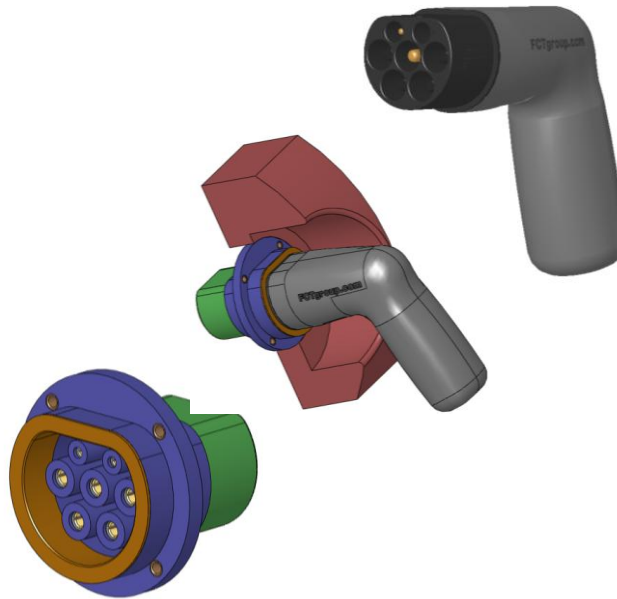
FCT-demo board of a charging point for 16 A, 32 A and 63 A

The Charging Point

Due to the rapid development and short implementation period within the project, a need for harmonization and consolidation on a German national level arose with regards to the compatibility of the charging connectors, the electrical characteristics and the network architecture. No existing standards were available as a reference in this field. FCT electronic is a member of the international standards committee and is cooperating with several representatives of automobile manufacturers and energy providers to establish a standardized basis. Within the IEC 62196-2 ruling (German Proposal) the electrical benchmark figures among other things are specified. One- and three-phase connections of 16 A up to 63 A are incorporated. The high current contacts have a diameter of 6 mm. The signal contacts for the data communication have a diameter of 3 mm. An integrated resistance coding makes the identification and login at the electrically-run vehicle or rather at the charging point possible. Furthermore a mechanical locking mechanism enables the necessary fixing and safety during the charging process. Moreover a data communication between the vehicle, the charging unit and the network provider can be realized via an additional frequency modulator.



Charging connector with connection configuration



Charging connector coupler according to IEC 62196-2 (German Proposal), dated 10/2009

The Test Phase

Before the, by FCT electronic, newly developed coupler could start its trial phase for the charging process, extensive testing and certification were necessary. For example, a conformity declaration according to IEC 60309-1:1999 + A1:2005 for the charging connector 16 A was accredited at the Österreichischen Verband für Elektrotechnik (Austrian Association for Electro-technology). The standards in the automotive industry are generally accepted as particularly stringent, as not only extreme climate conditions, but also even more intensive operational conditions, such as the effects of salt and sand, must be tested. However here also FCT electronic had tested and introduced a suitable contact plating to meet the necessary requirements.



Commissioning of the first charging station in Tel Aviv in December 2008.

The Preview

After the successful testing of several hundred charging units along with electrically motorised vehicles from the manufacturers Renault and Nissan in Israel, a nationwide development and extension of the e-mobility infrastructure is planned. In doing so, several hundred thousand charging units are to be installed nationally. Thus a charging of batteries is not only possible at home, but also at public parking lots, at multi-story car parks as well as at the workplaces of e-mobility users. The supply of fully automated battery changing units is another innovative concept of the project partners in order to enable a continuous energy supply “en-route”. As a result electrically run vehicles can be equipped with new batteries by fully automated battery changing units within a matter of minutes. As an alternative fast charging stations on rural roads and motorways can supply e-mobility users with the necessary energy required.



Charging stations at a parking lot in Tel Aviv

Through the adoption of a uniform standard such as the IEC 62196-2, the introduction of e-mobility can also be realized in Western Europe and indeed globally. The main focus and the key to the large-scale manufacture of electrically run vehicles and their network integration is the agreement of national and international lobbyists on a compatible and standardised interface for the charging of vehicles. FCT electronic is a pioneer here too. Through its active participation in the norms and standards committees it is aimed to achieve an efficient and sustainable solution for e-mobility.

T. Endesfelder

Contact person at FCT electronic gmbh:

Sales Manager
Herr Wieser
Tel.: 089/420 004 -135
eMail: JWieser@fctgroup.com

Manager R&D
Herr Dr. Schmid
Tel.: 089/420 004 – 413
eMail: Andreas.Schmid@fctgroup.com