

# Supply chain solutions

**The Bender group** has worked with electric vehicle applications for over ten years developing early insulation monitoring solutions. In the UK early projects were in areas of Formula 1, Formula E, Formula Student, Hybrid vehicle applications and charge technologies

Lee Slater



**L**ee Slater is Industrial Business Manager at Bender UK. He is responsible for Bender UK's eMobility sector and the development of new applications for electric and hybrid vehicle insulation monitoring and charge station technologies in the UK and Ireland.

**Steve Welch:** Could you tell me a little about your background?

**Lee Slater:** I have an electrical background and joined Bender in 2008 as a commissioning engineer. I progressed into sales management working on healthcare and industrial projects. I have spent the last 5 years working with customers to help solve their electrical problems, while developing new applications for Bender technology.

**SW:** Could you provide a brief summary of your organisations offering to the market?

**LS:** Bender is a privately-owned German Company, established for over nine decades. Founder Mr Walther Hans Bender developed the first ever insulation monitor. We are world renowned for innovative electrical safety solutions, and

constantly develop new applications for the safe handling of electrical power and the provision of early warning of developing insulation failure.

Globally Bender employs over eight hundred personnel, with a team of over fifty-five employed by Bender UK. We are responsible for sales, marketing, service, applications engineering and technical support of Bender technology in the field.

Bender has worked with electric vehicle applications for over ten years developing early insulation monitoring solutions for the military, Formula 1, Formula E, Formula Student, Hybrid vehicle applications and charge technologies.

Bender has four main solutions for vehicles and charging

## 1. Electric Vehicle Charge

**Controller CC612** – This device monitors internal charging system hardware. This cost-effective controller communicates with any back-end system and given that most providers adhere to the Open Charge Point Protocol (OCPP), the charge controller is OCPP 1.5/OCPP 1.6 compliant. It is used largely by third party charge station manufacturers in their own brand of charge stations.

## 2. Residual Current Monitoring for AC charge stations

Compliant charging of electric vehicles requires residual current sensors to avoid hazardous situations where the vehicle battery (DC) is connected to the home power supply (AC). To charge an electric vehicle (EV) from a home power supply, a costly type B (DC sensing) RCD would be required to

guarantee safety in the event of a DC fault current. By using a Bender DC sensor integrated into an IC-CPD or wall box, customers reduce costs of installing a type B RCCB.

## 3. Electric and Hybrid Vehicle

**Insulation Monitoring** – Bender pioneered the development of an insulation monitor which measures the insulation resistance between insulated and active HV-conductors of an electrical drive system and the reference earth. Insulation monitoring devices monitor the condition of the insulation on the AC and DC motor of the electrical drive system. Improving safety and preventing shock of drivers, crew and passengers in commercial, racing and transport vehicles.

## 4. DC charge station Insulation

**Monitoring Devices** – This flexible, compliant insulation monitor measures the insulation resistance of DC charging stations. To meet the requirements of relevant standards, customised parameters are set in Bender equipment relevant to the operating conditions.

**SW:** Could you provide details of a project or case study you are working on?

**LS:** Bender supports Formula Student



IR155 Insulation Monitoring Device

teams world-wide. They install Bender insulation monitors in their development motorsport vehicles. We recently completed a project with team Bath Zero who competed in the Isle of Man SES TT Zero class race. Bath Zero finished in fourth place, behind professional teams Mugen (1st and 2nd) and Team Mirai (3rd), making them the top placed University team in the race.

**SW:** Who in the main are the companies you engage with and in what way?

**LS:** We engage with drive train, vehicle and OEM manufacturers. These range from established global brands to start-up charge station manufacturers.

**SW:** What are your reflections on 2018/2019?

**LS:** eMobility business for Bender has increased annually since our first solutions were introduced over ten years ago. Growth in the sale of RCM solutions for domestic charge stations have increased significantly over the last 18 months. This is assisted by IET Wiring Regulations changes which state you must use a Type B RCD or a more cost effective 6mA sensitive current transformer (CT).

Bender's research and development team, which represents 25% of our global employees, have been continually improving the software within our CC612 charge controller and also working on new developments for vehicle insulation monitoring devices (IMDs), which will allow us to monitor much higher DC voltages for insulation resistance purposes.



**SW:** What do you see as the key trends in the sector?

**LS:** Generally, people are beginning to accept the automotive electrification, which drives the demand for electric and hybrid vehicles and charge infrastructure - both domestically and commercially. Trends with the companies that Bender engage with lean towards intelligence of the charge station with more demands for data, connectivity and an agnostic open platform for their charge infrastructure. On vehicles our customers demand higher voltages, due to continually pushing the boundaries of performance and range of vehicles in development.

I believe the evolution of intelligent charging needs to increase. We all carry an internet connected device and data is becoming an increasing commodity. I hope large technology companies will be more involved in the facilitation of charge stations and the routine of charging, and potentially V2G availability. Businesses like Google and Apple have insight into our routines and I think this could be utilised to intelligently charge and harvest the power within vehicles when they are not used, providing either a revenue stream that could go towards charging and vehicle development.

**SW:** What are your goals and targets for 2019/20?

**LS:** We are committed to the demands of our customers and are keen to develop more e-mobility solutions. We aim to be the supplier of choice for vehicle insulation monitoring and intelligent, future proof charge solutions. Our engineering teams are continually developing and improving solutions to suit markets and regulatory requirements world-wide. In terms of product development in 2020 Bender is releasing a new 1000v DC CAN Bus enabled vehicle insulation monitor in collaboration with an OEM manufacturer, and a new next generation OCPP 2.0



CC612 Charge Controller

compliant charge controller.

**SW:** What are the main challenges facing the sector generally and for you specifically?

**LS:** In my view, a challenge for the sector is that a lot of mainstream media are still not convinced by the electrification of vehicles, changing the mindset of consumers is taking time. The government is increasing pressure to drive the electrification of vehicles and increase charging infrastructure and reduce the barriers of entry for the average family income.

Challenges for Bender are the same as other businesses in the eMobility sector - competition, and the ability to respond to market demands.

**SW:** What is your organisations key offer to the sector?

**LS:** Bender supports the development of safe hybrid and electric vehicles through the provision of vehicle insulation monitoring solutions. We also produce AC/DC charge station solutions. We partner with the whole supply chain to ensure safety of power can be achieved easily in this rapidly developing market.

**SW:** What will you be featuring/presenting at LCV this year?

**LS:** On stand C3-406 we are demonstrating insulation monitoring for vehicles, charge station modular kits and controllers alongside DC sensor devices for compliance with 18th Edition IET Wiring Regulations.

RCMB121 Residual Current Monitoring Device

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