CASE STUDY

Brunel University London

POSITIVE PROBLEM SOLVING

WHEN BRUNEL UNIVERSITY LONDON DEVELOPED AN ELECTRIC RACING CAR FOR THE PRESTIGIOUS FORMULA STUDENT COMPETITION, THEY NEEDED TO TEST THEIR OWN CUSTOM BATTERY PACK.

The Motorsport Centre at Brunel University London has fielded high scoring entries in the Formula Student event's petrol design category, and was one of the few and first universities to race in the TT Zero, an Isle of Man category for electric racing motorcycles. The Centre sits at the centre of a campus known for advanced combustion engine research and its motorsport curriculum.

A new internal initiative is concentrating attention from power electronics, control, and electrochemical specialist faculty around deeper activity in electric and autonomous vehicle design. Owing to the cost, volume and weight constraints of vehicle design, graduate students at Brunel had conceived an approach to the connection, cooling, and arrangement of cells inside a custom battery module.

Initial tests of their module's performance were promising, but only a test at a full power draw of hundreds of amps of current would confirm the intended capabilities were present and repeatable. The associated power of more than 5kW required kit of a higher rating than had previously been used for battery testing at Brunel.

Dr Barry Rawn, a faculty member, explained: "As faculty advisors, we insisted on safe but exhaustive testing of the student's design. We needed high-power dissipation capability that was as realistic and flexible as possible, to do early evaluation of our electrical and thermal but at a stage mid-way through construction".

> "AS FACULTY ADVISORS, WE INSISTED ON SAFE BUT EXHAUSTIVE TESTING OF THE STUDENT'S DESIGN. WE NEEDED HIGH POWER DISSIPATION CAPABILITY THAT WAS AS REALISTIC AND FLEXIBLE AS POSSIBLE."

CASE STUDY
BRUNEL RACING

DRIVING ELECTRIC VEHICLE RESEARCH

Rather than hope and wait for the full battery pack to be assembled, the design process requires testing and iteration of each battery module, for a lower risk, higher success design process and future battery pack performance and health.

After reviewing controlled loads on the market, lecturer in power systems, Dr Rawn, identified a unit that can become part of a modularly expanded larger test setup, and has multiple uses. “The ELP-34000C not only makes our module testing possible, but also supports a range of other lab activity, enhancing work by multiple departments, from student experiments on our rooftop PV array to hydrogen fuel cell testing.” elaborated Dr Rawn.

The first evaluation of a loaned unit from ETPS confirmed that the student’s design exceeded expectations, and warranted replication of 5 more battery modules, with some design refinements. Brunel moved forward with an order to acquire an ELP-34000C and involve it in the critical path of battery pack development, and the unit has also been integrated into hydrogen fuel cell research experiments.

The flexibility of programming drive cycles, applying ramps, and logging data all facilitate advanced development of electric vehicle technology for Brunel’s students, staff, and their industrial and academic partners.

“THE ELP-34000C NOT ONLY MAKES OUR MODULE TESTING POSSIBLE, BUT ALSO SUPPORTS A RANGE OF OTHER LAB ACTIVITY, ENHANCING WORK BY MULTIPLE DEPARTMENTS, FROM STUDENT EXPERIMENTS ON OUR ROOFTOP PV ARRAY TO HYDROGEN FUEL CELL TESTING.”

ABOUT THE ELP-34000C SERIES

The ELP-34000C is a series of heat dissipative DC loads. Nominal voltages of 150V, 600V or 1200V are possible per system. Each unit provides an extremely wide operating range, such as the ELP-34324C which can sink its full 960A nominal current from 1200V all the way down to 15V without derating.

An inbuilt master/slave interface allows users to parallel up to 8 units in dynamic loading mode. DC sink powers up to 192kW can be achieved. It is possible to connect models with the same nominal voltage in parallel with different power nominals. For example, a 6kW system and a 24kW system can be operated together.

Other useful features include over voltage and current tests, dual operating ranges, 150 state memory as well as CC, CV, CR & CP operating modes as standard.

Besides new systems, ETPS also provide a selection of rental DC electronic loads. This includes power recycling models up to 2000V/324kW and heat dissipative models up to 10kW/1000A.

If you’d like to discuss how an electronic load from ETPS could accelerate your testing, then please contact us today.