CASE STUDY

POSITIVE PROBLEM SOLVING

TO SET THEM POLES APART FROM THE COMPETITION, DURHAM UNIVERSITY WANTED THE BEST TEST EQUIPMENT AVAILABLE WHEN REFURBISHING THEIR LAB.

The Department of Engineering is recognised worldwide as a major force in energy research. The Department's main research focus areas are in Future Energy Systems, Sustainable Infrastructure, Next Generation Materials and Microsystems.

In order to engage in cutting-edge research at the frontiers of modern engineering, the university consistently invests in market leading test equipment. The interdisciplinary nature of the Department means all equipment must be incredibly flexible as well as technically brilliant.

After much careful consideration, the university purchased LAB-TC and LAB-DSP DC power supplies from ETPS, as well as EAC-S single phase AC power supplies.

One feature that the institute found particularly useful was the LAB-TC's function generator which allows almost any complex DC waveform to be executed. Another stand out attribute was the remote sense voltage, which compensates for any voltage drop in load lines. This ensures accurate measurement at the DUT.

The initial research project the units were used for was the characterisation of magnetic devices.

The Deputy Director of the Future Energy Systems Research Challenge, added: "The ETPS power supplies helped us achieve our characterisation goals by enabling a high level of control over the injected waveforms".

> "THE ETPS POWER SUPPLIES HELPED US ACHIEVE OUR CHARACTERISATION GOALS BY ENABLING A HIGH LEVEL OF CONTROL OVER THE INJECTED WAVEFORMS."

ETPS
ELECTRONIC TEST & POWER SYSTEMS

WWW.ETPS.CO.UK

CASE STUDY
DURHAM UNIVERSITY

POSITIVES OF REAL WORLD DATA

In real world applications, sometimes modelling techniques are limited due to assumptions and simplifications of the model.

"By using advanced AC and DC power supplies, we are able to gather accurate experimental data. This allows us to validate and understand the limitations of our numerical models, while ensuring confidence in a specific device design".

"We use the LAB-TC's embedded function generator to inject predefined pulse trains of voltage and current into the electrical coils of the magnetic device. This allows the DUT to be accurately characterised. In the case of AC magnetics, the EAC-S is used to provide sinusoidal voltages and currents".

Using the data capture capabilities of the power supplies, voltage and current waveforms are recorded and then post-processed to obtain the DUT's flux linkage characteristics through numerical integration. The flux linkage data can then be combined with the current waveform data to obtain the inductance characteristics of the device under test.

These characteristics are compared to data obtained through finite element numerical simulation of the device. The comparison indicates how accurate the modelling is.

This process ensures confidence in a specific device design and improves understanding of the device and limitations of Durham's numerical models.

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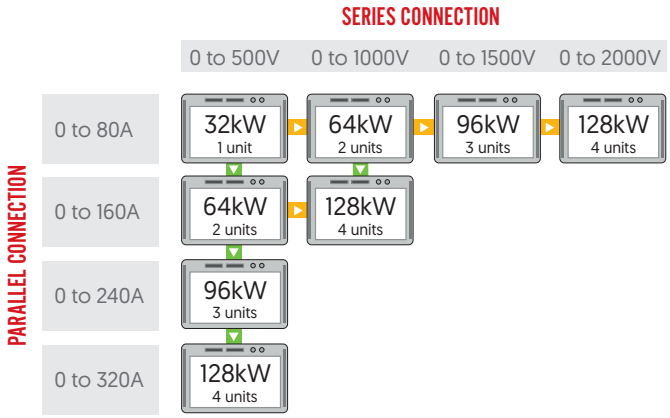
ABOUT THE LAB-TC

Every LAB-TC DC source module has an extensive feature set which includes programmable PID parameters and inbuilt eight channel recording scope. Adjustable power and resistance limits make the units ideal for all purpose PEMD research.

An embedded function generator is available which allows virtually any DC waveform to be created. V/I and V/P relationships can be programmed against time where necessary. Parametric programming is possible, where instead of the time axis an input variable (V_{IN}, I_{IN} or P_{IN}) can be selected.

Up to 64 LAB-TC modules can be arranged in series, parallel or matrix configurations. Each module can operate independently, allowing systems to be reconfigured, expanded or broken up as needs dictate. The diagram shows all the possible combinations with four 500V modules.



ABOUT THE EAC-S

The EAC-S is a linear regulated single phase AC power supply, with a computer synthesised waveform. They feature low distortion levels and fast response time with the capability to adjust from the standard sinewave.

A host of measurement functions are displayed via the front panel including true, apparent, reactive and peak values. Standard triangular and square waves can also be selected. A DC offset can be combined with the AC voltage, ensuring that almost any waveform can be created.

Voltage, current and frequency limits are user programmable, with operation from 500Hz all the way down to DC level possible. This could be optionally extended up to 2kHz if requested.