

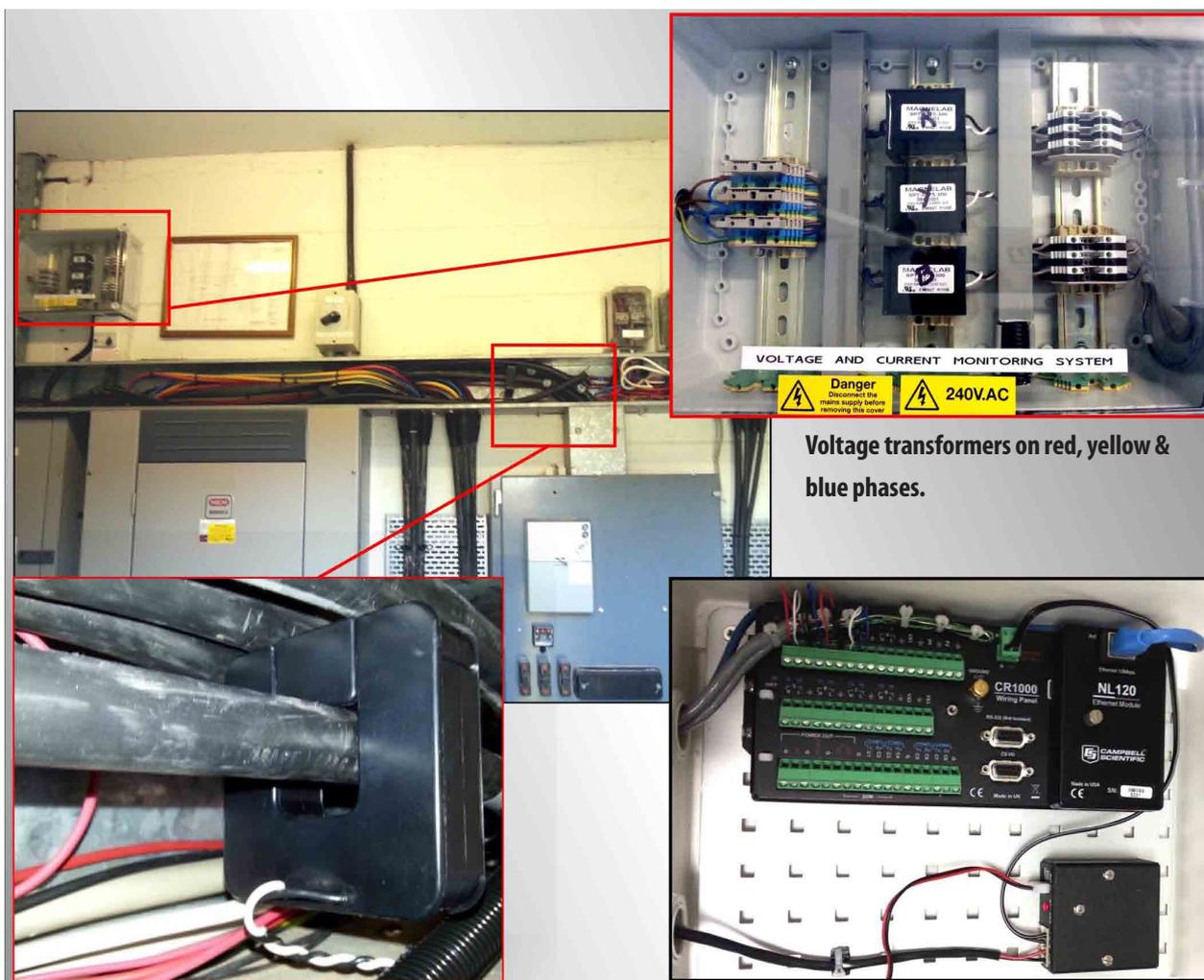


Monitoring Usage On A Three Phase Power Supply

The simplicity and power of the new 'ACPower' CRBasic instruction is demonstrated in a CR1000 based mains power monitoring system.

In preparation for the installation of a solar power system at its European Head Office, Campbell Scientific have installed a CR1000 datalogger based system to monitor power consumption and phase distribution on its mains electrical power supply. The system is relatively simple consisting of a datalogger which measure three voltage transformers and three current transformers – one for each phase. An NL200 connects the datalogger to the company's network and data is viewed in real time on a customised RTMC screen.

During a typical working day around 40-45kW are being continuously used whilst overnight and at weekends consumption drops to below 10kW. By monitoring the three phases separately an imbalance in the power distribution has been identified. The installation of a 20 panel, 50kW PV (photo voltaic) system will mean that, on a bright day, the company will be generating all its electricity needs and even selling a little back to the grid, and at weekends and other days when the business is closed the company will be selling upwards of 40kW back to the grid. It is expected that the system will have paid for itself within 6-7 years.



One of the current transformers clamped around the cable

Voltage and current transformers connected to the CR1000 - the NL120 provide an Ethernet connection.



Case Study Summary

Appication:
Monitoring a three phase mains power supply

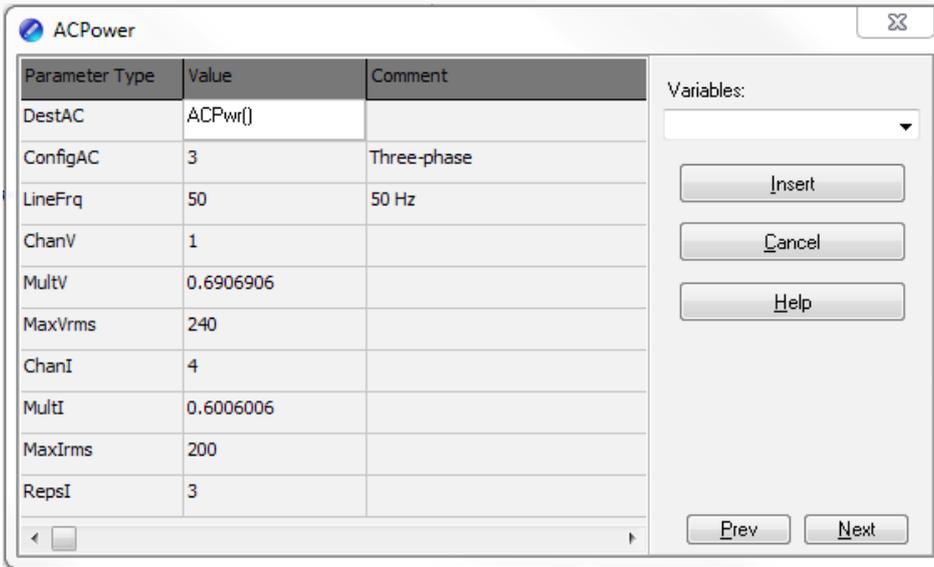
Location:
Shepshed, Leicestershire, UK

Organisation:
Campbell Scientific Ltd

Campbell Products Used:
CR1000, Magnelab voltage transformers, Magnelab current transformers

Reported Parameters:

- Voltage in Volts rms
- Current in Amperes rms
- Power (total and per phase) in Watts
- Voltage frequency in Hertz
- Voltage phase in radians



The **ACPower** is a simple yet extremely powerful CRBasic instruction, just a single line of programming provides outputs for the power, voltage and current of each phase, the total power, the voltage frequency and the voltage phase in radians. The example used here is programmed as:

```
ACPower (ACPwr(),3,50,1,0.6906906,240,4,0.6006006,200,3)
```

