Optimum protection of electrical distribution systems and motor control centres is essential for the reliability of your power supply. Deficient protection means that relatively minor faults such as overloads, short-circuits and earthing faults can lead to major economic loss to your company as a result of unscheduled power outages. Network studies from Eaton’s Electrical Solutions & Services (ESS) provide you with an insight into where critical points occur in your network and how you can optimize, control and positively manage electrical power.

Power System studies reduce your costs
Power outages cost millions of Pounds each year. Virtually all our present-day operating processes are highly vulnerable due to their dependency on the electrical systems integrity. The economic loss for which you, as the network manager, can be liable can amount to vast sums if your internal network is not in good order. Even if you can only prevent one outage as a result of our network survey, in most cases you will have achieved substantial savings in operating cost.

Summary of standard network studies
- Power Quality Survey’s
- Energy Audit
- Short-circuit calculations
- Earth fault calculations
- Protection Co-ordination - device settings
- Compatibility & Selectivity survey
- Load capacity studies
- Motor start simulations
- Cos phi improvement
- Sizing of switching systems and transformers
- Load calculations for sizing cables.
- Earthing studies
- Control & Automation

ESS procedure
ESS specialises in network studies, design, consultancy and optimisation in the realms of low and high voltage systems engineering. Our reports are ‘client specific’ and Eaton will always discuss in great detail any observations and issues with our client in order that the client agrees a defined scope of works that embraces complex matters of concern. Accurate and critical information supplied by our clients is critical to the successful conclusion of any project, where such data is not available our service engineers are able to collect supplementary data using both traditional survey methods or contemporary use of test and monitoring equipment. Our application engineers will then simulate various network situations using advanced software, in which the behaviour of the protection components and their co-ordination can be determined.
We regularly advise what modifications are needed for hospitals, utilities and industries in order to improve safety and reliability of low and high voltage systems. Network studies demonstrate their definite added value in these transitional environments, regardless of the nature and complexity of the systems.

New buildings

We provide selectivity studies for new build projects, based on data available for the various system components and the structure of the network. Drawing up selectivity curves for short-circuit, overload and earthing fault protection will then result in protection recommendations in respect of protection relay co-ordination. From understanding your facilities load conditions and duty cycles of plant and equipment as well as any infrastructure development in the future, it is also possible to calculate and advise the total capacity of your distribution network. The basis of any Eaton report will engage issues on reducing energy consumption and power quality providing practical solution techniques and latest product applications.

Existing installations

If your network has undergone alterations and expansions over time, selectivity will no longer be in optimum condition. It is often the case that compatibility problems occur with increased loading, one example of this is current transformer ratios that no longer match the desired relay settings. This will result with incorrect protection devices responding out of a designed and managed sequence, which means minor problems can easily escalate to bring about a power outage in large sections of your system. You can prevent such costly surprises by having ESS conduct a ‘fault level, discrimination and selectivity survey’.

Expansion

In order to predict the consequences of expansion, it is most important that the network be analysed properly. The short-circuit current calculations we carry out do not just cover protection devices; they also determine whether the original mechanical and electrical sizing of the system and cables will still be adequate. We can conduct motor simulations for you if you intend to expand an existing system with heavy machinery. We can also determine the optimal cos phi improvement for you.

Further information

If you would like further information or if you have specific wishes in respect of a certain network study, please let us know.

Eaton’s Electrical Solutions & Services

ESS portfolio and scope of work has expanded beyond repair and maintenance of in-house Eaton group product on utility networks, to complete turnkey power distribution projects, for both electricity supply companies and large industrial conglomerates, indeed any body with an electrical MV and LV distribution network.

Range of ESS Services

- Equipment Erection & Installation – Pre-Commissioning, Final System Co-ordination Commissioning
- Technical Studies & Reports; Relay Protection, Earthing, Power Quality, Partial Discharge, Design
- Maintenance of MV & LV Systems Networks, UPS & Lighting Systems Products - Capital Equipment (All makes and models - Non-Destructive, Non-Intrusive Predictive & Conventional Time based)
- Equipment Life Extension - Retro-fit Equipment & Accessories including Vacuum Breakers
- Local Operational Site Control - ‘SAP’s’ based on clients sites (SAP-Switching/Safe Systems/Safety Rules)
- Training for Competency and Authorisation of persons
- Power Systems Engineering & Integration (Protection, Control & Automation)
- Supply of Transformers, Erection & Commissioning (Cast Resin, Liquid and Oil Transformers 3.3 kV - 33 kV)
- Crisis Response and Disaster Recovery - 24 Hour Call-Out Retainer Contracts and Emergency/Supply Failure

Expansion requires a thorough selectivity survey. Network studies help prevent unscheduled outages.