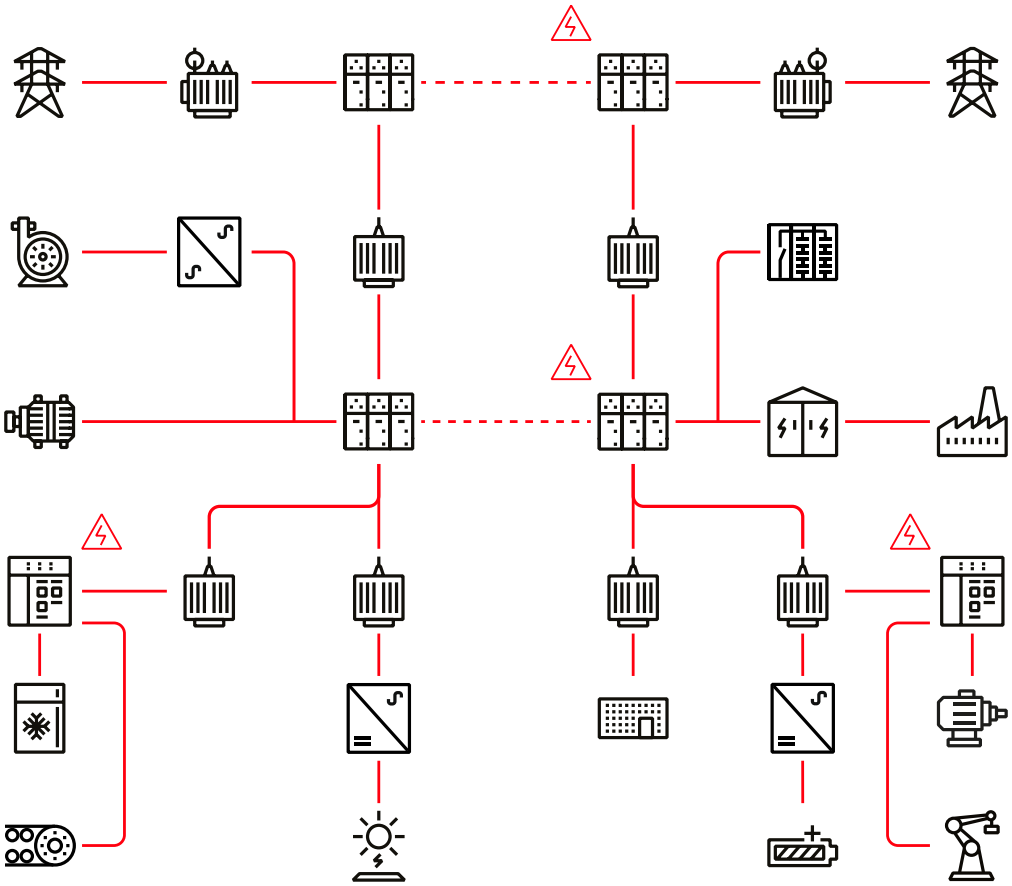
Power System Studies

Arc Flash

What is an arc flash study?

An arc flash study evaluates the potential for arc flash incidents at all relevant locations in an electrical system and establishes the necessary level of protection required for personnel working on or near electrical equipment.

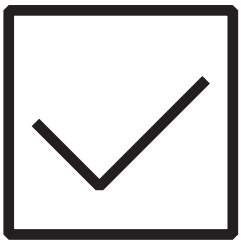
An arc flash is a sudden, explosive release of electrical energy due to a fault or short circuit in an electrical system.
It generates intense heat, light, sound, and pressure, and can result in serious injury or even fatalities for personnel working on or near the equipment. Arc flashes are one of the largest safety concerns while designing a power system.



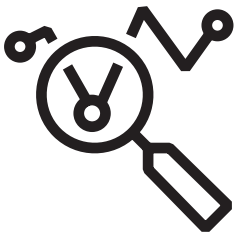
Arc flash study is

Essential for avoiding injuries, fatalities, equipment damage, or system failure and maintaining a **safe and reliable** electrical distribution system.

Used to produce the information required to **label** each piece of electrical equipment with its specific **incident energy level**. The labels warn personnel about potential arc flash hazards, define safe working distances, and identify the required personal protective equipment (PPE).



Legally required in many jurisdictions. Arc flash studies help organizations adhere to **occupational safety standards** and guidelines.



Used to **identify safety enhancements and corrective action** for mitigating arc flash hazards.

When is an arc flash study needed?

Design
An arc flash study needs to be performed when a power system is originally designed.

Regularly
An arc flash study should be performed at regular intervals, or approximately every 5 years, in order to keep the system and personnel safe.

Changes
An arc flash study needs to be performed whenever any changes are made to the system (including changes to equipment, configuration, or settings) to re-evaluate the incident energy levels.

Why is arc flash study necessary?

It is essential for ensuring the safety of personnel who work on or near electrical equipment. Failing to perform it can lead to severe injuries or loss of life. Arc flash study also helps organizations comply with occupational safety regulations and industry standards.

It's important to evaluate the arc flash hazards of a system at regular intervals and make necessary updates to ensure the safety of personnel.

What data is required from site owners?

During the arc flash study, customers will need to provide information on:

- Single Line Diagram (SLD), panel schedules, and circuit descriptions
- Switches, fuses, disconnects, relays, reclosers, contactors, and breakers
- System grounding and generators
- Transformers, current transformers, reactors, and capacitors
- Synchronous motors and induction motors
- Cable types and sizes
- Static regenerative drives and non-regenerative drives
- Equipment (i.e., switch boards, automatic transfer switches, motor control centers, etc.)
- Protective device settings and coordination data
- Existing safety practices and procedures

Note that short circuit studies and protection coordination studies are prerequisites for arc flash studies.

What are the steps of the arc flash study?

Arc flash study process
You have scheduled an arc flash study. What should you expect? Let's take a look at the steps of this process.

1

Data collection
ABB collects the necessary data to assess and mitigate the risks associated with arc flashes in the customer's electrical system. This information is gathered during a field visit and sourced from manufacturers. It includes:

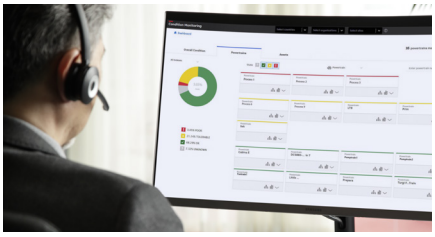
- Collection of single line diagram (SLD), source and switching configurations, and protective device settings.
- Manufacturer’s data about the equipment's performance characteristics, including available fault current ratings, impedance, and equipment dimensions.

2

Analysis
ABB analyzes the data, including the short circuit and coordination study, to assess the risk and consequences of installed or newly added equipment. This includes:
Calculating the incident energy at various points in the system to determine the PPE requirements.

- Establishing arc flash boundaries.
- Identifying arc flash label requirements.

3



Report
Customer receives final arc flash labels and a report, which includes information on:

- Incident energy for all equipment in the system.
- PPE requirements.
- Arc flash boundary for all equipment in the system.

4

Recommendations
If the customer wishes to lower the derived incident energy values from the study, ABB will give recommendations for mitigating arc flash hazards. This includes recommendations for adjusting equipment settings, upgrading protective devices, or redesigning electrical systems to reduce incident energy levels. ABB may also propose training to educate personnel on the hazards associated with arc flashes and the proper use of PPE and safety procedures.

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ABB Electrification Service

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