



Service for Substation Automation Systems

# Substation Automation and Protection

Expert Consulting and Engineering Services





**Draw on the expertise of a market leader. ABB offers a number of consultative services directly to electrical utilities, manufacturers and contractors, aimed at supporting you in running your power system projects, more efficiently and economically.**

ABB is a market leader in the supply of power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impacts. This position is built on over 100 years of experience in all facets of the electrical power industry, from power generation and transmission, to distribution and consumption.

#### **Protection and substation automation services**

ABB is a specialist in power system protection and substation automation at all transmission and distribution voltage levels, for power generation as well as industrial networks. In its traditional role as one of the leading manufacturers in this field, we have built up a broad knowledge base. In addition to applying this to developing innovative new products and systems, ABB has always been active in providing customers with world leading technical support in planning refurbishment projects as well as excellent customer service throughout the lifecycle.

#### **Our service portfolio**

Consultative services cover the entire range of power system protection, from checking the suitability of current and voltage transformers to complex studies involving setting calculations and device co-ordination over vast geographic networks.

#### **Power system studies**

Solving complex power system problems requires a broad technical knowledge and wide experience. We will help you to realise the full capability of your power system.

We offer electrical power system and network studies, with emphasis on protection issues, as well as load-flow, short circuit and voltage regulation calculations at all transmission and distribution voltage levels.

#### **Benefits**

- Comprehensive understanding and optimal utilisation of the capability of your power system
- Increased availability, stability and security, leading to reduced outage time and reduced financial losses
- Detailed documentation of the system studies

#### **Scope of services**

These services can be utilised to confirm or optimise protection concepts and settings, or as a response to unexpected protection equipment operation. They include the following:

- Investigation of all types of protection: generators, transformers, busbars, overhead lines and cables, reactors, capacitor banks, motors
- Complex transmission network configurations
- Protection in isolated, arc-suppression-(Petersen-coil) compensated and low-impedance-grounded networks
- Evaluation of protection philosophy
- Power system short-circuit calculation and analysis
- Stability studies
- Power system load flow calculation and analysis
- Protection co-ordination and selectivity
- Optimisation of protection settings

#### **Deliverables**

The results will be interpreted and suggestions made on how to improve overall performance of the network.

# Profit from our broad technical expertise

## Relay setting calculations

Correct protection setting and co-ordination prevents disturbances in large power systems from spreading unchecked throughout the network. In the event of the failure of a protective device, redundant or back-up protection must clear the fault. Fast fault clearance can only be guaranteed by correctly coordinating the relay operating characteristics and tripping times throughout the network.

We offer setting calculations, protective device co-ordination and expert assistance in order to ensure the requirements of customers for a secure and continuous power supply.

## Benefits

- Assurance of co-ordination between settings for main and backup protection devices
- Selective clearance of power system faults
- Optimisation of redundancy principles for a more efficient protection scheme

## Scope of services

Calculation and application of settings for protection relays with particular reference to:

- Evaluation of protection concept
- Protection co-ordination
- Setting optimisation
- Calculation of protection settings for:
  - Generators, Transformers, Busbar, & Circuit Breakers, Overhead Lines, Cables, Reactors, Motors and Capacitor Banks
  - Independence of type, technology, and manufacturer
  - Protection of complex transmission networks configurations
  - Grading of distance protection zones for meshed systems
  - Multi-terminal, tapped, composited and Series compensated lines
  - System simulation to verify settings

## Deliverables

The results will be interpreted and suggestions made on how to improve the overall performance of the network.

## VT/CT calculations

The usage of suitably dimensioned current and voltage transformers is a crucial factor for ensuring the correct operation of connected equipment in both new and existing installations.

We offer calculations to determine the requirements for the optimal dimensioning of current and voltage transformers. Furthermore, we can verify the suitability of existing CTs and VTs for panel equipment such as protection relays, etc. For refurbishment projects, we offer to check the behaviour of the installed CTs and to make appropriate recommendations.

## Benefits

- Optimal size and cost of CTs and VTs
- Substantial reduction of project risk
- Minimisation of the potential danger of protection misoperation

## Scope of services

- Calculations based on:
- Single-line diagram
- Proposed or existing CTs and VTs
- Characteristic/class (IEC, BS, or ANSI Standard)
- Power system parameters according to separate questionnaire
- Protection concept with planned or installed products and functions to determine the number of CT cores

## Considering, where applicable:

- Influence of CT saturation on different types of protection relays
- Influence of remanence
- Transient behaviour
- Power system network grounding (solidly grounded, impedance grounded, isolated)

## Deliverables

The calculated results contain a summary of all required manufacturing data for CTs or VTs.



## Complete range of services for protection and substation automation

You will benefit right from the outset from discussions with our engineers which will be conducted in your own language and will be treated confidentially. You will profit from the wealth of experience and expertise gained by studying network problems and rely on ABB to provide optimal solutions in all parts of the world.

# Contact us

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