Training Program:

Protective Relaying & Equipment Protection

Introduction:

Power system protection is very important for utilities and industrial electrical distribution networks, because it limits the damage in electrical networks caused by short circuit and other type of faults. The course contains the different types of relays, the function of each relay, the basic requirements of the protective relays and how to protect the electrical network components such as transformers, generators, motors, feeders, distribution and bus-bars.

Who Should Attend?

Electrical power engineers and advanced operating staff of substations, generating stations, electrical distribution networks and transmission.

Methodology

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Accreditation:

BTS attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.

Course Objectives:

- To know the basic requirements of protective relays and the different types of faults in the electrical network
- To know the different types of relays and principles of operation of each type
- To learn how to protect the generators, transformers , feeders , bus-bars ,motors and distribution circuits
- To know what is the primary and secondary protection

Course Outline

Protective relay fundamentals

- Different types of faults
- The main idea of relays operation
- The basic requirements of protective relays
- Classification of relays according to their function of operation
- Classification of relays according to their time of operation
- Classification of relays according to their construction
- Current transformers
- Potential transformers

Types of relays

- Electromagnetic relays
- Static or electronic relays
- Digital relays
- Differential relays
- Over current relays
- Distance relays-Impedance relays, admittance relays and reactance relays
- Earth leakage relays
- Buchholz relay
- Directional relays

Generator Protection

- Faults in the windings protection
- Loss of excitation protection
- Motoring of generators protection
- Overload protection
- Overheating protection
- Over speed protection
- Unbalanced operation protection.
- Out of synchronization protection

- External faults protection

Transformer Protection

- Earth fault on a transformer winding protection
- Core faults due to insulation breakdown which sufficient eddy current to flow causing over heating protection
- Inter-turn faults occur due to winding flashover caused by line surges. protection
- Phase to phase faults protection
- Tank faults due to loss of oil which produces abnormal temperature rises protection

Bus –bar Protection

- Bus-bar Protection Techniques
- Interlocking Schemes
- Over-current Differential
- Percent Differential

Transmission line & Feeders Protection

Distance & Impedance protection