SIEMENS POWER ACADEMY

Training program

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Be inspired and choose from over 300 training courses. Experience transformative training solutions through our expert service ConsulTrain™, unlocking alternative approaches and immersive emergency simulations for unparalleled professional growth by our SiEmergy™ trainings.

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Fundamental Training

FUNDAMENTALS

Basics of Electrification & Automation

Objectives

The goal of this training is to give the participants a complete overview of the tasks, structures, tools, and challenges that are required today in the electrification and automation of load centers. In the first part of the training, the participants should deal with the communication structures in field, station, and network control technology, which form the backbone of future energy supply developments. In the second part, the participants should deal with electrical energy supply structures and the resulting tasks of energy suppliers. To round out the training, hands-on demonstrations and assignments are conducted using the Training Center's extensive training facilities.

General

Short-ID	GEN-BEA
Duration	1 day
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

New or experienced employees who want to get a complete overview of "Electrification and automation tasks". This training is suitable for any interested employee, regardless of their function.

Prerequisites

General understanding of power supply and energy automation tasks

Contents

- Automation of energy supply networks
- Communication structures
- Current developments in energy automation
- Main voltages and network structures
- Grid protection tasks and grid protection principles
- Fault type switching calls and switching operation
- Practical exercise and demonstrations

Notes

Each participant receives a certificate of participation after successfully completing the training.

FUNDAMENTALS

Electrical engineering for non-technicians

Objectives

Do you know how electricity gets into the socket? Electrical power engineering gives them an answer. You will learn about the different forms of energy generation, energy conversion, energy transport as well as the storage possibilities of energy. Before that, the basics of electrical engineering are discussed in a compact form. Questions such as:

- What is electrical engineering?
- What is voltage and current?
- What is the difference between electrical power and electrical energy and what do I have to pay?

The basics of automation, Measuring and control technology are also explained. The theoretical part is conveyed to you with illustrative objects, anecdotes from practice and practical exercises or a mini excursion.

General

Short-ID	ET-BASNT
Duration	1 day
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Interested people without electrical skills.

Prerequisites

Curiosity about the topic.

Contents

At the beginning of the workshop, participants will have the opportunity to bring in special topics of focus and interest which the presenter will try to specifically address during the workshop.

- Physical basics and basics of electrical engineering and history
- Electrical parameters and terms such as:
  - (High) voltage
  - Amperage and Resistance
  - Power and Energy
  - AC/DC and Frequency
- Electrical System
- Power generation & conversion (types of power plants, transformers, etc.)
- Energy transport & electrical networks (overhead lines, cables, high voltage, smart grids, etc.)
- Energy consumption
- Quality & protection (black outs, surges, fuses, etc.)

Notes

Training: Electrification & Automation Easy – Technology overview is recommended as a follow-up training.

FUNDAMENTALS

Fundamentals of Protection & Automation Engineering

Objectives

Establish a foundation of knowledge about electrification, protection, and automation. Participants will review the basics of AC electric circuits and learn basic power system protection, automation theory, and data communications focused on substations. Upon completion, participants will gain a basic understanding of key concepts found in the energy industry.

General

Short-ID	SIPAUT-F
Duration	4 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

For technicians/engineers, anyone who wants to learn about the fundamentals of substation protection and automation.

Prerequisites

- Basic Computer Skills:
  - Participants should be comfortable using a computer and have a basic understanding of file management, software installation, and navigation.
- Basic Networking Concepts:
  - Understanding basic networking concepts, such as IP addresses, ports, and protocols, can be beneficial, especially if the automation involves interactions with networked devices.
- Electrical:
  - Basic knowledge of electrical engineering theory and electrical circuit knowledge.

Contents

- Protection and Automation Business and History
- Grid Topology
- Overcurrent Protection
  - Data Communication and Electrical Energy Supply
  - Schematics and Current Trip
- Transformer Differential Protection
  - Networks for Substation Automation Applications and Symmetrical Components
  - Fundamentals of Instrument Transformers
- Busbar Protection
  - Network Protocols and Time Sync
  - Substation Electrical Equipment
- Motor Protection
  - Modbus and IEC 61850 - Fundamentals and Terminology
  - Fault Current Calculation
- Line Protection

FUNDAMENTALS

Transmission & Distribution Networks – Basics Part 1

Objectives

The participants obtain basic knowledge about electrical power transmission and distribution systems. The participants receive practical information that is important when configuring and using switchgears and learn the basic principles of the power system protection system. Strong accents will be put on explanations of the correlations between the individual components of the power system and their interaction in the whole system.

General

Short-ID	PE-TDNET1
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Engineers and people interested in technical fields want to obtain a basic understanding of electrical power systems or refresh and deepen their technical knowledge about power systems and power system elements.

Prerequisites

Basic knowledge of physics and electrical engineering.

Contents

- Generation of electrical energy, fossil and renewable energy sources - energy demand and efficiency
- Fundamentals of electrical engineering: - steady-state and transients, time constants, AC & DC systems, electrical power in single- and three phase- AC systems,
- Transmission and distribution of electrical energy - characteristics of power system elements
- Short circuit calculations and symmetrical components
- Network topologies, chosen network planning aspects
- Methods of neutral point earthing
- Introduction and overview of power system protection
- Practical calculation examples and multi-media (e.g. short films) will be shown and discussed in detail to consolidate the knowledge gained and to help to understand the correlations

Notes

This training is part of a Curriculum.

FUNDAMENTALS

Transmission & Distribution Networks – Basics Part 2

Objectives

The participants deepened the information obtained in Part 1 with respect to electrical power systems and the correlations between the individual power transmission and distribution components. They refresh and enlarge their knowledge about the tasks of power system components such as generators, transformers, motors, lines, cables and switchgears. The training provides practical hints that are necessary during configuration and application of components of an electrical power supply system like switchgears elements (e.g. circuit breakers, instrument transformers). Moreover, secondary systems like power system protection will be discussed, as well.

General

Short-ID	PE-TDNET2
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Engineers and people interested in technical fields want to obtain a basic understanding of electrical power systems or refresh and deepen their technical knowledge about power systems and power system elements.

Prerequisites

Basic knowledge of physics and electrical engineering.
Training: Transmission and Distribution Networks – Basics Part I (PE-TDNET1).

Contents

- Lines, cables for power transmission and distribution
- Transformers and their characteristic data, connection symbols, grounding principles, voltage control and tap changers
- Generator and motor - basic principles
- Circuit breaker types, vacuum-switching techniques and SF_6 switching systems, switching operations, arc extinction principles
- Air- and gas-insulated switchgears - construction principles, mode of operation
- Reactive power management; shunt and series compensation
- FACTS and high voltage direct current transmission systems (HVDC)
- Voltage and current measurement (instrument transformers) for protection, control and metering
- Principles and types of power system protection, design of protection systems, protection principles for transmission and distribution systems
- Practical calculation examples and multi-media (e. g. short films) will be shown and discussed in detail to consolidate the knowledge gained and to help to understand the correlations

FUNDAMENTALS

Electrification & Automation Easy – Technology Overview

Objectives

The participants will have an overview of the structure, main components and functions of electrical power generation, distribution, and automation. The focus is placed on the products, systems, and solutions of the Electrification & Automation business unit.

General

Short-ID	ET-AUTOM
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

- Assistants in technical order execution and sales
- Employees of logistics departments
- Commercial staff
- New employees in the Electrification & Automation business unit

Prerequisites

Curiosity and general technical interest.
Training: Electrical engineering for non-technicians.

Contents

- Design and components of electrical networks from power generation to consumers
- What does a technician in the EA (Electrification & Automation) business unit do.
- Product overview of the EA business unit:
- Low and medium voltage switchgear and components
- Busbar systems
- Protection: SIPROTEC & Co
- Station control technology: SICAM RTUs, SICAM PAS, etc.
- Network control technology: SCADA, SPECTRUM, etc.
- Service

Notes

The training is mainly aimed at employees of the Smart Infrastructure - Electrification & Automation division, but also at other people who are interested in this technology. The topics and products are presented in an easily understandable way using photos and graphics.

FUNDAMENTALS

Siemens Mechatronic Systems Certification Program – Assistant Level (Level 1)

Objectives

The Siemens Mechatronic Systems Certification Program - Assistant Level (SMSCP-L1) aims to provide engineers with foundational knowledge and practical skills in mechatronic systems. This 15-day face-to-face training will cover essential topics such as electrical components, mechanical components, and electric drives, (electro) pneumatic and hydraulic control circuits, and digital fundamentals including programmable logic controllers (PLCs). Through a combination of theoretical learning and hands-on troubleshooting sessions, participants will be equipped to identify and solve common issues in mechatronic systems, enhancing their technical proficiency and problem-solving capabilities.

General

Short-ID	SMSCP-L1
Duration	15 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Mechanical/ Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Participants should have knowledge of programming a PLC with the use of basic instructions and of various communication protocols.

Contents

- Course 1 - Electrical Components
- Course 2 - Mechanical Components and Electric Drives
- Course 3 - (Electro) Pneumatic and Hydraulic Control Circuits
- Course 4 - Digital Fundamentals and Programmable Logic Controllers
- Methodology: Learn Theory from systems
- Mock troubleshooting sessions on Mechatronics System
- Discussion of frequent problems pertaining to Mechatronic Systems

Notes

The training is aimed at employees of the Smart Infrastructure - Electrification & Automation division, but also at other people who are interested in this technology. The topics and products are presented in an easily understandable way using photos and graphics.

FUNDAMENTALS

Basic Course on AC/DC Drives

Objectives

The objective of the training is to provide engineers with a thorough understanding of both AC and DC drive systems, from fundamental concepts to practical applications. Participants will gain knowledge in the selection, calculation, and application of drives, as well as hands-on practice to solidify their skills. By the end of the training, engineers will be proficient in handling AC/DC drive systems and applying them effectively in their respective fields.

General

Short-ID	CU-DRV
Duration	4 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic Knowledge of AC/DC drives essential.

Contents

- Brief Basic Power Electronics (including Thyristors, Power-Transistors & IGBTs)
- DC Motor Basics (construction, principle of operation, T-N Characteristic etc.)
- DC Drives Basics (Block diagram, 1Q-4Q principle of operation, T-N Curves etc.)
- Selections, calculations & applications of typical DC drives
- Siemens DC Drives (6RA80) - Ratings, Specs, features, options & applications
- AC Motor Basics (construction, principle of operation, T-N Characteristic etc.)
- AC Drives Basics (Block diagram, 1Q-4Q principle of operation, T-N Curves etc.)
- Selections, calculations & applications of typical AC drives
- AC Drives (SINAMICS V, G & S) - Ratings, Specs, features, options & applications
- MEDIUM VOLTAGE (MV Drives & Motors), SINAMICS Perfect Harmony GH180 Drive
- MV Motor types & Fundamentals (including starting methods, options / features)
- MV Motor offers from Germany (separately for Induction & Synchronous Motor)
- MV Converter Basics & types (Voltage, Current Source & Cyclo-Converter)
- Siemens MV Converter (SINAMICS GM / GL, SINAMICS SM / SL)
- Selection, configuration & applications of MV Drive systems
- Short briefing on MV Transformers along with their options & protections
- Hands-on practice on DC and AC drive

FUNDAMENTALS

Basic Course on AC Motor

Objectives

The objective of the training is to provide engineers with a comprehensive understanding of AC motors, from their fundamental principles to advanced control methods. Participants will explore various motor types, insulation materials, and the Siemens motor product spectrum. The training includes practical sessions on motor dismantling and assembly, as well as guidelines for installation and troubleshooting.

General

Short-ID	CU-MOT
Duration	2 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic Knowledge of AC motors essential.

Contents

- Basics of Electricity
- Motor- Definition, meaning, History regarding invention
- Construction: Description of various parts & their significance in motor operation.
- Operation, working principle & basic equations
- Speed Torque Characteristics, Effects of supply variations over motor performance
- Transformer equivalent circuit of induction motor
- Efficiency of induction motor-Various losses in the induction motor
- Types of insulating materials used & their temperature ranges
- Product spectrum of Siemens motor
- Comparison of normal & inverter driven motor / Comparison of normal and energy efficient motor
- Various reasons for the high starting current of an induction motor & their effect on supply system
- Starters- DOL & star delta etc. / Soft starter – brief overview / VFD – brief overview
- Advance control of induction motor-SIMOCODE overview
- Installation & commissioning guidelines / Maintenance guidelines
- General faults in the motor induction & countermeasures i.e. Leads Overheating, Vibration, etc..
- Hands-on practice – motor dismantling & assembly

FUNDAMENTALS

PLC - Basics

Objectives

The objective of the training is to provide engineers with a foundational understanding of Programmable Logic Controllers (PLC) and their applications. Participants will learn installation guidelines, module wiring, and addressing. The training will also delve into programming languages (STL, FBD, LAD), hardware configuration, and various programming instructions using STEP 7.

General

Short-ID	CU-PLC
Duration	3 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic Knowledge of Automation technology, relay logic essential but not mandatory.

Contents

- Basic constituents of PLC: Signal modules, CPU, Power Supply, mounting rail and MMC
- How PLC works?
- Installation guidelines, powering and wiring of modules with information on addressing Programming:
  - Programming language and representation in STL, FBD and LAD
  - Hardware Configuration and setting object Properties of Modules in STEP
- Programming instruction:
  - AND, OR, AND-before-OR, OR-before-AND, NO / NC contacts, Edge detection instructions. Set / Reset, Elementary data type
- Overview of SIMATIC S7 – PLC:
  - Programming Units and using PC as Programming Unit
  - Hardware Configuration and setting object Properties of Modules in STEP
  - Step 7 Instructions and programming: Set / Reset, Elementary data type
  - Load / Transfer, Comparison, basic math instructions
  - Timers / Counters List
  - Using Symbol Table and VAT

FUNDAMENTALS

Basic Course on SCADA

Objectives

To equip participants with a foundational understanding of SCADA systems using SIMATIC WinCC, focusing on system setup, human-machine interfacing, and essential features such as alarm logging and tag management. The training aims to provide hands-on experience through practical exercises to ensure proficiency in SCADA systems and their integration with SIMATIC S7.

General

Short-ID	CU-SCA
Duration	3 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic training on Automation with PLC programming knowledge is essential.

Contents

- System overview of SIMATIC WinCC
- Creating a project
- Configuring connections to the SIMATIC S7
- How to link Digital and Analog address in Scada software, Tag management
- Graphics Designer and graphics displays for human machine interfacing
- Alarm logging for message representation, message archiving
- Tag logging for curve representation, measured value archiving
- Practical exercises

FUNDAMENTALS

Industry 4.0 (IoT) – Basics

Objectives

To provide participants with a foundational knowledge of Industry 4.0, focusing on the integration of IoT in industrial settings. The training aims to familiarize engineers with cloud connectivity, communication protocols, Siemens PLC and SCADA solutions, and data visualization through hands-on training and demonstrations.

General

Short-ID	DIGI-IN4.0
Duration	3 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical / Engineering.

Prerequisites

Participants should have knowledge of programming a PLC with the use of basic instructions and of various communication protocols.

Contents

- Introduction to Industrial revolutions – 1.0, 2.0, 3.0 & 4.0 /
- Introduction to general concepts of Cloud and IOT Gateways
- Various Siemens solutions to cloud connectivity
- Siemens PLC's and SCADA Portfolio with Information Regarding Licensing of Software with TIA Portal V 15.X
- Brief discussions on communication protocols for connecting devices
- Profinet
- Demonstration of communication b/w PLC & Connectivity hardware
- Identification of Data points and configuring Data availability on PLC and SIMATIC IoT2040
- TIA portal programming interface and hands-on
- Configuring PLCs
- FC, FB, DB concepts
- Implementing basic programming via tasks / mechatronic system
- Setting up Data points
  - Setting up the SIMATIC / MindConnect IOT 2040
  - Establish internet connection on device – wireless / LAN
- Connection with Automation System and Data Visualization
  - Connection with Automation System
  - Setting up MindSphere account and aspects
  - Data Visualization on MindSphere
- Configuring notification services
- Using fleet manager
- Creation of dashboards

FUNDAMENTALS

HVDC & FACTS System

Objectives

This training is designed for service technicians and commissioning / configuration engineers who are responsible for project maintenance, design, development, testing and commissioning of TDC systems using CFCs. This training will provide with knowledge for understanding the control system Simatic TDC. Theoretical knowledge will be reinforced through presentation and demonstration in offline Simatic TDC software application. This training will provide basic skills with WINCC HMI engineering software in project design and application sustaining.

General

Short-ID	HVDC-SYS
Duration	3 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Participants from the energy sector use HVDC and FACTS technology, HVDC Project engineers, Commissioning engineers, and O&M Engineers.

Prerequisites

Basic Electrical Engineering with understanding of Power systems, HVDC and FACTS basic.

Contents

- SIMATIC TDC:
  - Overview of SIMATIC TDC (Control system)
  - Create projects with SIMATIC manager and hardware configuration
  - Engineering with SIMATIC D7-SYS and Continuous function chart (CFC)
  - Create and test logic function using CFC
  - Ethernet and Profibus communication methods
  - Connections inside CFC
  - Digital input/output simulation
- WINCC HMI:
  - System overview & configurations
  - WINCC Projects: Creating projects, Types of projects, Data structure
  - Creating tags and groups with the Configuration studio
  - Cross reference editor
  - Overview of Graphics Designer
  - Making objects on dynamic screens using tag interfacing, dynamic wizard, dynamic dialog, direct connection, C-Scripts & VB-Scripts
  - Global Script Editor for user-created functions and screen independent actions
- User administrator: WinCC users and groups, Authorization levels

Protection Training

SECONDARY TECHNOLOGY

Basics for Protection Engineers

Objectives

The participants will learn about the design, equipment, and special events in electrical grids for a better understanding of the requirements and functions of protecting devices.

General

Short-ID	ET-BASPR
Duration	2 days
Language	English / German
Training Format	offered in person, or virtually
Location	in Austria, or online

Target Group

Employees of energy providers and the industry sector.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Basics of electrical power supply
- Switchgear
- Equipment
- Grid faults
- Protection systems

SECONDARY TECHNOLOGY

Basic Course on Numerical Protection System

Objectives

This training provides basic knowledge of the protection principles of power system and operations of numerical relays.

General

Short-ID	CU-BPS
Duration	2 days
Language	English
Training Format	offered in person, or in virtually
Location	in India, or online

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical.

Prerequisites

Basic knowledge & understanding of power system protection.

Contents

- Introduction to power system protection
- Types of faults
  - FSS requirement
  - Criteria & components of protection system
  - Aspects of protection coordination
  - Time scale for protection system
  - Auto-reclosing & network calculation
  - Fault current & calculations
  - Earth fault & neutral earthing
- Basic principles of power system protection
- Types of protections – equipment wise
- Settings of power system protections
- History & development of numerical protection system
  - Development of protection technology
  - Digital protection & Principle of operation
  - Device Architecture & Communication
  - Methods in measuring algorithms
- Types of numerical relays and features in numerical relays
- Overview of operating software's
- Testing of numerical relays
- Advantages & disadvantages of numerical relays
- Operation & maintenance of numerical relays
- Overview of electrical standards
- Safety rules & regulations
- Do's & Don't while maintenance
- Fault analysis techniques

SECONDARY TECHNOLOGY

Protection Technology – Principles

Objectives

The participants will learn about the basics of applications, principles of operation and the overall concept of the most important protection devices.

General

Short-ID	PR-PRIN
Duration	3 days
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Turkey, online, or at the client's site

Target Group

Employees of power supply utilities and the industrial sector are familiar with the planning, commissioning, and maintenance of power system protection equipment.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Protection principles
- Earth fault
- Current transformer dimensioning
- Overcurrent-time protection
- Distance protection
- Line and transformer differential protection
- Busbar protection
- Motor protection

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PRPRIN

SECONDARY TECHNOLOGY

SIPROTEC 4 – Application & Exercises

Objectives

The participants will become familiar with the concept and principle of operation of the digital network protection systems SIPROTEC 4.

General

Short-ID	SIP4-APX
Duration	4.5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Power system protection experts who have been assigned to plan, commission and maintain digital protection systems.

Prerequisites

Basic knowledge of power system protection.
Training: Protection Technology - Principles (PR-PRIN) or comparable knowledge.
Training: DIGSI 4 - Basics (DIGSI4-B) or comparable knowledge.

Contents

- General properties of SIPROTEC 4
- Operation of protection relays with DIGSI 4
- Devices in practical operation:
  - Overcurrent protection 7SJ
  - Distance protection 7SA
  - Transformer differential protection 7UT
  - Differential protection 7SD
  - Busbar protection 7SS
  - SIPROTEC hardware
- Hardware, jumpers, interfaces, electrostatic sensitive devices, firmware

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIP4SYS

SECONDARY TECHNOLOGY

DIGSI 4 – Basics

Objectives

The participants will get to know the DIGSI operating program. They will learn how to adjust, manage, operate, and analyze faults of SIPROTEC devices using the DIGSI operating program. They will use DIGSI program to configure and perform their own functions and control tasks.

General

Short-ID	DIGSI4-B
Duration	3 days
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Turkey, online, or at the client's site

Target Group

Users from electric utilities and the industrial sector who are working for design, for parameterization and for commissioning, as well as for maintenance and operation of SIPROTEC 4 devices.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Introduction of SIPROTEC 4 and DIGSI 4
- Process of parameterization of SIPROTEC-devices. Start from the design documentation on an example of a single busbar configuration, over the protection settings and test of the SIPROTEC 4-devices up to DIGSI 4 project and device management
- Configuring of protection settings of SIPROTEC devices:
  - Data management, parameter assignment and project planning
- Commissioning phase of SIPROTEC:
  - Checking inputs/outputs and simulating of fault records
- Control of switching devices:
  - Interlocked/not interlocked control
  - Local/Remote control
  - Graphical configuring of logic functions and interlocks with the CFC logic editor
  - Graphical configuring of the default and control display with the display editor
- Introduction of substation control center-communication with IEC 103 and IEC61850 (Ethernet) and Web-Monitor for SIPROTEC
- Introduction of fault record evaluation with SIGRA
- Practical exercises

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-DIGSI4B

SECONDARY TECHNOLOGY

DIGSI 4 - IEC 61850 & GOOSE Configuration

Objectives

The participants will gain essential knowledge in substation communication based on Ethernet and IEC61850. The participants will be familiar with the concept and configuration of device communication via the IEC61850 protocol based on data exchange between the devices belonging to the bay or station level and connected on Ethernet bus.

The following topics will also be presented in the training:

- Basics of the Ethernet communication profile
- Application of diverse communication topologies
- Basics of testing Ethernet compliant with IEC61850

General

Short-ID	DIGSI4-I
Duration	3 days
Language	English / German / Turkish / Portuguese / French
Training Format	offered in person or virtually
Location	in France, Germany, Portugal, Turkey, online, or at the client's site

Target Group

Professional users of power supply utilities and industry who deal with the planning, configuration, commissioning, maintenance and operation of numeric bay and station automation systems with IEC61850-communication systems.

Prerequisites

Basic knowledge in communication technology. Training: DIGSI 4 – Basics (DIGSI4-B) or comparable knowledge.

Contents

- Basics of communication networks and systems in substations with Ethernet and IEC 61850 (TCP/IP; OSI- and IEC 61850-Model)
- Structure of the substation communication bus IEC 61850 profile
- Structure of Ethernet communication networks (topology, architecture, components, addressing)
- Implementation of IEC 61850 with DIGSI 4 and using of the System Configurator
- Simple example of GOOSE Communication with SIPROTEC 4
- Configuring of Reverse Interlocking for protection with GOOSE Communication
- Station Interlocking with Ethernet-Substations-Bus
- Transfer of displays to neighbour-feeder between SIPROTEC 4 devices with GOOSE
- GOOSE Communication between SIPROTEC 4 and 3rd party-devices (Timeserver)
- Introduction of Commissioning, Testing and diagnostic-Tools of IEC 61850 Communication Networks
- Practical exercises

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-DIGSI4I

SECONDARY TECHNOLOGY

SIPROTEC 4 – Distance Protection 7SA

Objectives

The participants will deepen their knowledge of the use and functional test of the impedance protection devices 7SA5 / 7SA6.

General

Short-ID	SIP4-7SA
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users from the field of power transmission and distribution who deal with the testing, commissioning, and maintenance of protection systems.

Prerequisites

Good knowledge of distance protection.

Contents

- Basics of numerical impedance protection (Information on protection functions)
- Fault detection and distance measurement
- Zone settings
- Signal comparison protection
- Demands for current- and voltage transformers
- Distance protection on parallel lines
- Distance protection on tapped lines
- Teed feeder protection
- Parallel lines
- Power swing detection
- Application with serial compensation
- Operation and testing of a 7SA52 with secondary test-kit CMC of OMICRON
- Fault analysis with SIGRA

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIP47SA

SECONDARY TECHNOLOGY

SIPROTEC 4 – Line Differential Protection 7SD

Objectives

The participants will deepen their knowledge of the use and functional test of the line differential protection devices 7SD.

General

Short-ID	SIP4-7SD
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users from the field of power transmission and distribution who deal with the testing, commissioning, and maintenance of protection systems.

Prerequisites

Good knowledge of line differential protection.

Contents

- Basics of numerical line differential protection
- Information on protection functions
- Demand on current transformer
- Multiple topologies
- Protection of transformers and line as a unit
- Numerical differential protection communication:
  - Basics, interfaces, network technology
  - GPS synchronization
- Application of the WEB Monitor
- Opeartion and testing of a 7SD610 resp. 7SD523 topology with secondary test-kit CMC of OMICRON at hand of multiple tasks

Notes

*This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: **WT-SIP47SD***

SECONDARY TECHNOLOGY

SIPROTEC 4 – Overcurrent & Motor Protection 7SJ

Objectives

The participants will deepen their knowledge of the use and functional test of the definite-time / inverse-time overcurrent protection devices 7SJ.

General

Short-ID	SIP4-7SJ
Duration	3 days
Language	English / French / German
Training Format	offered in person or virtually
Location	in France, Germany, online, or at the client's site

Target Group

Users from the field of power transmission and distribution who deal with the testing, commissioning, and maintenance of protection systems.

Prerequisites

Good knowledge of overcurrent protection.

Contents

- Principles of overcurrent protection and application
- Principles of motor protection and application
- Definite-time / inverse-time characteristics
- Cold loads pick up
- Thermal overload protection
- Motor startup monitoring
- Restart inhibits for motors
- Practical exercises with 7SJ6 and CMC of OMICRON:
  - Pick up currents and tripping time
  - Optimizing grading time
  - Cold loads pick up feature
  - Thermal overload protection
  - Motor starting time supervision
  - Restart inhibits for motors

Notes

This training is part of a Curriculum.

SECONDARY TECHNOLOGY

SIPROTEC 4 – Busbar Protection 7SS52

Objectives

The participants become familiar with the principles, applications, operations, and functions of the distributed busbar protection 7SS.

General

Short-ID	SIP4-7SS
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees from utilities or industry are involved in the planning, commissioning, and maintenance of busbar protection systems.

Prerequisites

Good knowledge of busbar protection technology.

Contents

- Introduction to busbar protection 7SS52
- Function overview
- Hardware and function splitting
- Communication and configuration
- Security measures
- Protection algorithms
- Breaker failure protection
- Configuration of a bus bar, discussion and recommendations of settings
- Multiple practical exercises with decentralized busbar 7SS52, CMC and CMA of OMICRON
- High impedance – low impedance – a comparison

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIP47SS

SECONDARY TECHNOLOGY

SIPROTEC 4 – Machine Protection 7UM & 7VE

Objectives

The participants will learn about the principles of operation and functions of generator block protection and synchronization.

General

Short-ID	SIP4-7UMVE
Duration	4 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users from power supply utilities and industrial enterprises who deal with the testing, commissioning, and maintenance of generator protection systems.

Prerequisites

Basic knowledge of generator protection technology.
Training: DIGSI 4 – Basics or comparable knowledge.

Contents

- Generator block protection application example
- Explanation of protection functions and parameters
- Generator capability curve
- Synchronization
- WEB Monitor
- RTD box
- Presentation of the generator model
- Selection of protection functions
- Configuration and operation of SIPROTEC 4 7UM / SIPROTEC 4 7UT / SIPROTEC 4 7VE
- Test of protection functions and synchronization with secondary test equipment
- Connection of protection devices to the generator model
- Operation of the synchronous generator
- Measurements and operational indications
- Tripping on created faults
- Analysis of fault records and fault indications

Notes

SIPROTEC 7SJ, 7UM, 7UT and 7VE as well as secondary test systems and a generator model will be available for practical exercises.

SECONDARY TECHNOLOGY

SIPROTEC 4 – Generator Protection (7UM Relays)

Objectives

The participants will learn about the principles of operation and functions of generator block protection.

General

Short-ID	SIP4-GEN
Duration	3 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Users from power supply utilities and industrial enterprises who deal with the testing, commissioning, and maintenance of generator protection systems.

Prerequisites

Basic knowledge of generator protection technology.
Training: DIGSI 4 – Basics or comparable knowledge.

Contents

- Generator block protection application example
- Explanation of protection functions and parameters
- Generator capability curve
- Synchronization
- WEB Monitor
- RTD box
- Presentation of the generator model
- Selection of protection functions
- Configuration and operation of SIPROTEC-4 7UM
- Test of protection functions and synchronization with secondary test equipment
- Connection of protection devices to the generator model
- Operation of the synchronous generator
- Measurements and operational indications
- Tripping on faults by generating faults
- Analysis of fault records and fault indications

SECONDARY TECHNOLOGY

SIPROTEC 4 – Busbar & Cable Differential, Transformer, Distance Protection (7SS, 7SD, 7UT, 7SA Relays)

Objectives

The participants will get to know the DIGSI 4 operating program. They use DIGSI 4 program to configure and perform their own functions and control tasks. They will understand working of 7SS, 7SD, 7UT, 7SA relays.

General

Short-ID	SIP4-UTI
Duration	3 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Users from electric utilities and the industrial sector are interested in the commissioning, maintenance, and operation of SIPROTEC 4 devices.

Prerequisites

Basic Electrical Engineering with understanding of power system protection.

Contents

- Numerical Protection Principles
- SIPROTEC Series of Relays
- SIGRA 4 Software
- DIGSI 4 Software
  - Plant and equipment management
  - Configuration of protection settings of SIPROTEC4 devices
  - Commissioning Phase
  - Control of switching devices
- 7SS (Busbar Differential Protection Device)
  - Information on busbar protection functions
  - Clarification Decentralized busbar scheme
  - Creation of Substation configuration (Protection SLD)
  - Concepts on Bus Zone and Check Zone
  - Concepts of Busbar differential protection
  - CT supervision/ Differential supervision
- 7SD (Cable Differential Protection Device)
  - Information on protection functions
  - Protection of transformers and line as a unit
  - Numerical differential protection communication:
  - Basics on Protection interfaces, network topology

- 7UT (Transformer Protection Device)
  - Adaption of ratio, vector group and impact of tap-changer
  - Transformer tap adjustment
  - Stability during inrush and over-excitation
  - Demand for current transformers
  - Earth- differential protection (REF) for faults near star point
- 7SA (Distance Protection Device)
  - Fault detection and distance measurement
  - Zone settings - Signal comparison protection
  - Demands for current and voltage transformers
  - Distance protection on parallel lines, Teed feeder protection, Parallel lines
- Power swing detection
- Tripping on faults by generating faults
- Analysis of fault records and fault indications

SECONDARY TECHNOLOGY

SIPROTEC 4 – Motor, Transformer, Feeder Protection 7SJ6, 7SJ80, 7UT, 7SK Relays)

Objectives

The participants will get to know the DIGSI 4 operating program. They use DIGSI 4 program to configure and perform their own functions and control tasks. They will understand the working of 7SJ, 7UT.

General

Short-ID	SIP4-IND
Duration	3 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Users from electric utilities and the industrial sector are interested in the commissioning, maintenance, and operation of SIPROTEC 4 devices.

Prerequisites

Basic Electrical Engineering with understanding of power system protection.

Contents

- Numerical Protection Technology
- SIPROTEC Series of Relays
- SIGRA Software
- DIGSI4 Software
  - Plant and equipment management
  - Configuration of protection settings of SIPROTEC4 devices
  - Commissioning Phase
  - Control of switching devices
- 7SJ (Multifunction Protection Device)
  - Definite-time / inverse-time characteristics
  - Pick up security and dependability
  - Fault clearance and grading times
  - The three stages of application of DMT / IDMT protections
  - Motor protection within the over current & Thermal overload protection
  - Motor startup monitoring & Motor restart inhibit
- 7UT (Transformer Protection Device)
  - Adaption of ratio, vector group and impact of tap-changer
  - Transformer tap adjustment
  - Stability during inrush and over-excitation
  - Demand for current transformers
- Earth-differential protection (REF) for faults near star point

SECONDARY TECHNOLOGY

SIPROTEC 4 – System Protection – Workshop on a Real Time Digital Simulator RTDS

Objectives

The participants will learn about complex fault situations with a transient network analyzer, considering different network and protection systems.

General

Short-ID	RTDS4-PS
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Experts for relay applications from utilities and industry.

Prerequisites

Expert knowledge of protection technology.

Contents

- SIPROTEC4
- Distance protection
- Analysis of fault records and protocols
- Theoretical explanation of network and algorithms
- Automatic reclosure and synchronization
- Differential protection and communication
- Stabilization of differential protection
- Transformer differential protection
- Exchange of expert exerience

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-RTDSPS

SECONDARY TECHNOLOGY

DIGSI 5 – Basics

Objectives

Participants will learn the specific features of SIPROTEC 5 devices and learn how to use the DIGSI 5 operating program. The participant is thus qualified to do the following:

- Planning & operation of SIPROTEC 5 devices
- Making protection settings in SIPROTEC 5 devices
- Parameterize control functions in SIPROTEC 5 devices
- Testing of SIPROTEC 5 devices

General

Short-ID	DIGSI5-B
Duration	4 days
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Turkey, online, or at the client's site

Target Group

Employees from the utility and industrial sectors who deal with the planning, parameterization, commissioning, and operation of SIPROTEC 5 devices.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Introduction to the hardware and function group concept
- Basic functions of SIPROTEC 5
- Hardware overview, software components and communication concept
- Function groups and application templates
- Modularity of the hardware and the protection and control functions
- Determination of the order numbers with the SIPROTEC 5 online configurator
- DIGSI 5: One tool for all business processes
- Creating a single-pole equivalent circuit diagram of a typical 110kV switchgear
- Parameterization of the analog measuring points for SIPROTEC 5 and the transformer data
- Assign binary inputs and outputs to logical messages / functions
- Creation of display pages and user message lists
- Create and check logic functions with CFC
- Parameterization and testing of protective and control functions
- Control of switchgear, locked/unlocked Control, local/remote
- Simple Goose communication between SIPROTEC 5 devices
  - Online test for commissioning the SIPROTEC 5 devices: Check inputs/outputs
- Evaluation of information via message lists and fault records
- Addition of function points
- Practical exercises on all topics with a helpful DIGSI 5 exercise guide

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-DIGSI5B

SECONDARY TECHNOLOGY

DIGSI 5 – Basics Blended Learning

Objectives

Our Blended Learning program aims to provide you with the necessary knowledge and practical skills to independently plan, operate, and configure SIPROTEC 5 devices. Upon completion of the training, you will be able to effectively use the DIGSI 5 software and perform tests.

General

Short-ID	DIGSI5-B
Duration	4 days
Language	English
Language	English / German
Training Format	offered virtually
Location	online (Germany)

Target Group

Our Blended Learning program is designed for employees in the utilities and industrial sectors who are involved in the planning, configuration, commissioning, and operation of SIPROTEC 5 devices. It is ideal for individuals who want to be part of digital transformation and appreciate the flexibility to organize their learning time.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Introduction to hardware and functional group concept
- Basic functions of SIPROTEC 5
- Hardware overview, software components and communication concept
- Functional groups and application templates
- Modular design of hardware and protection and control functions
- Determining part numbers with the SIPROTEC 5 online configurator
- Focus on DIGSI 5 as an all-in-one tool for business processes
- Creating a single-line diagram of a typical 110 kV switchgear
- Configuration of analog measurement points for SIPROTEC 5 and transformer data
- Mapping binary inputs and outputs to logical messages/functions
- Creating display pages and user message lists
- Creating and verifying logic functions using CFC
- Configuring and testing protection and control functions
- Switchgear control: locked/unlocked control, local/remote control
- Simple Goose communication between SIPROTEC 5 devices
- Online testing for commissioning SIPROTEC 5 devices: checking inputs and outputs, evaluating information from message lists and error records
- Function expansion
- Practical exercises on all topics

Notes

The Blended Learning program consists of 3 modules, each concluding with a knowledge evaluation.
This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-DIGSI5B

SECONDARY TECHNOLOGY

DIGSI 5 – Fundamentals

Objectives

Participants will learn the basics of DIGSI 5 and the unique features of SIPROTEC 5 devices and how to use the operating program. The participant will be qualified to do the following:

- Planning & operation of SIPROTEC 5 devices
- Applying protection settings in SIPROTEC 5 devices
- Parameterize control functions in SIPROTEC 5 devices
- Configuring communication protocols in SIPROTEC 5 devices
- Testing of SIPROTEC 5 devices

General

Short-ID	DIGSI5-B
Duration	4 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

Employees from the utility and industrial sectors who deal with planning, parameterization, commissioning, and operation of SIPROTEC 5 devices. You do not need previous experience or knowledge with DIGSI 5 or SIPROTEC 5 devices.

Prerequisites

Basic knowledge of electrical engineering and protection systems.

Contents

- Introduction to the hardware and function group concept
- Basic functions of SIPROTEC 5
- Hardware overview and software components
- Communication concept
- Function groups and application templates
- Modularity of the hardware and the protection and control functions
- Determination of the order numbers with the SIPROTEC 5 online configurator
- DIGSI 5: One tool for all business processes
- Creating a single-pole equivalent circuit diagram of a typical 110kV switchgear
- Parameterization of the analog measuring points for SIPROTEC 5 and the transformer data
- Assign binary inputs and outputs to logical messages / functions
- Creation of display pages, user message lists, and check logic functions with CFC
- Parameterization and testing of protective and control functions
- Control of switchgear, locked/unlocked Control, local/remote
- Simple Goose communication between SIPROTEC 5 devices
- Online test for commissioning the SIPROTEC 5 devices: Check inputs/outputs
- Evaluation of information via message lists and fault records
- Addition of function points
- Practical exercises on all topics with a helpful DIGSI 5 exercise guide

SECONDARY TECHNOLOGY

DIGSI 5 – Systems

Objectives

The participant deepens the knowledge gained in the training DIGSI 5 – Basics by getting to know extended functionalities of the CFC, the Display Editor and by using the CFC-Online Test with DIGSI 5. Further focal points of this training course are the integration of SIPROTEC 5 devices into a SICAM PAS communication system according to IEC 61850 and arc protection.

General

Short-ID	DIGSI5-S
Duration	3 days
Language	English / German / Portuguese / Turkish
Training Format	offered in person or virtually
Location	in Brazil, Germany, Turkey, United States, online, or at the client's site

Target Group

Employees from the utility and industrial sectors who deal with the planning, parameterization, commissioning, and operation of SIPROTEC 5 devices.

Prerequisites

Basic knowledge of electrical engineering.
Training: DIGSI 5 – Basics (DIGSI5-B) or comparable knowledge.

Contents

- Extended functionality of the Display Editor (including controlling controllable parameters from the device display)
- Special CFC components
- Parameterization and test of a field interlock for SIPROTEC 5
- Parameterization and test of a switching sequence:
  - Automatic grounding of a busbar
- Online and offline testing of CFC logic with test sequences
- Simple GOOSE communication between SIPROTEC 5 and SIPROTEC 5
- Implementation of the protective entrainment via Cu-annular line and via the effective interface of the line differential protection
- Parameterization of the various SIPROTEC 5 communication options
- Communication of SIPREOTEC 5 devices with the SICAM PAS systems via IEC 61850 protocol
- Parameterization of SIPROTEC 5 devices as Phasor Management Units (PMU) for online monitoring of transmission networks (optional)
- Parameterization and test of the arc protection
- Practical exercises on all topics with a helpful DIGSI 5 exercise guide

SECONDARY TECHNOLOGY

DIGSI 5 – Basics

Objectives

The participants will enhance their knowledge of SIPROTEC - devices by using CFC-Logic of DIGSI 5 in the context of their application. The participants will work on and discuss the realization of their protection and control instrumentation requirements. They will get useful tips all around the subject of graphic configuring of automation tasks. Furthermore, they will become familiar with the CFC blocks in detail. The CFC logics will be tested with DIGSI and with the corresponding SIPROTEC devices.

General

Short-ID	DIGSI5-C
Duration	2 days
Language	English
Language	English / German / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, Germany, online, or at the client's site

Target Group

Users from electric utilities and the industrial sector who are working for design, for parameterization and for commissioning, as well as for maintenance and operation of SIPROTEC devices.

Prerequisites

Basic knowledge of electrical engineering.
Training: DIGSI 5 – Basic.
CFC knowledge (4 weeks before the training starts, the participants can send their CFC- tasks and -solutions to the Siemens Power Academy)

Contents

- Providing background knowledge about the run sequence task levels and CPU utilization
- The participants can introduce their CFC-tasks and -solutions (if available) and get to know of other CFC-applications
- During the course, the course-team designs several solutions.
- Interpretation of the CFC consistency check
- New CFC blocks
- CFC-Online and Offline-Test
- Making of user CFC-Main-Logic-Modules and Saving in user Libraries
- Using CFC-Cross reference list
- Activate of Read Only Protection of CFC-Charts
- Trend and Dynamic Display table
- Online-Tracing of CFC-logic with DIGSI 5
- Application collection
- Documentation of CFC charts
- Exchange of experience with fellow users
- Exercises on practical application of all topics

SECONDARY TECHNOLOGY

DIGSI 5 – IEC 61850 & GOOSE Configuration

Objectives

The participants will gain essential knowledge in substation communication based on Ethernet and IEC61850. The participants will be familiar with the concept and configuration of device communication via IEC61850 protocol based on data exchange between the devices belonging to the bay or station level they are connected to the Ethernet Bus. The basics of the Ethernet communication profile and the application of diverse communication topologies will be presented. The basics of testing ethernet compliant with IEC61850 will be presented. The participants will realize GOOSE communication between SIPROTEC 5 devices as well as between SIPROTEC 5 and SIPROTEC 4 devices.

General

Short-ID	DIGSI5-I
Duration	3 days
Language	English / French / German / Portuguese / Turkish
Training Format	offered in person or virtually
Location	in Arabic Emirates, Brazil, France, Germany, Türkiye, online, or at the client's site

Target Group

Professional users of power supply utilities and industry who deal with the planning, configuration, commissioning, maintenance, and operation of SIPROTEC 5 and SIPROTEC 4 as well as Station Automation Systems with IEC61850 Communication Systems.

Prerequisites

Basic knowledge of electrical engineering.
Training: DIGSI 5 – Basics (DIGSI5-B) or comparable knowledge.

Contents

- Basics of communication networks and systems in substations with Ethernet and IEC 61850 (TCP/IP; OSI / IEC 61850 Model)
- Overview of IEC 61850 Edition 1 and Edition 2
- Structure of the substation communication bus IEC 61850 profile
- Structure of Ethernet communication networks (topology, architecture, components, addressing)
- Implementation of IEC 61850 communication with the system configurator of DIGSI 5
- First example of GOOSE communication with SIPROTEC 5 devices
- IEC 61850 redundancy concepts with RSTP, PRP and HSR protocol
- Configuring of reverse interlocking for protection with GOOSE communication
- Station interlocking with Ethernet substation bus
- Transfer of displays to neighbour-feeder between SIPROTEC 5 devices with GOOSE
- GOOSE communication between SIPROTEC 4 and SIPROTEC 5
- Commissioning, testing and diagnostic of IEC 61850 communication networks
- Practical exercises with DIGSI 5 and SIPROTEC Digital Twin
- Automatic setting group changing with GOOSE and automatic change over with GOOSE
- Communication of IEC 61850 servers to SICAM PAS system
- Dynamic and static reporting with IEC 61850

SECONDARY TECHNOLOGY

SIGRA - Efficient Interpretation of Fault Records

Objectives

The participants will be able to apply SIGRA efficiently, to analyze fault records presented in the comtrade format and to understand the protection´s behavior. The course includes the views and diagrams of SIGRA and the ways of fault record analysis. The participants will also analyze fault records and extensively discuss the results. The analysis emphasizes timings, variations of current and voltages, determination of impedances, fault location and the analysis for harmonics.

General

Short-ID	SIP-SIGRA
Duration	2 days
Language	English / German / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, Germany, online, or at the client's site

Target Group

Employees of power supply companies and industry who deal with the configuration, commissioning, maintenance, and operation of numeric protection of power systems, motor protection and machine protection devices.

Prerequisites

Basic knowledge of protection and machine protection technology.

Contents

- Possibilities of analysis and display of fault records with using of SIGRA
- Structure of the Comtrade format of fault logs
- Exporting Comtrade formats
- Interpreting diverse fault logs:
  - Distance protection
  - Transformer protection
- Automatic reclosing
- Understanding and optimizing special protective device parameters, protective device testing and subsequent discussion of device response
- Harmonics analysis
- Documentation of fault records
- Test with 7UT and evaluating fault records
- Practical application of all topics

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIGRA

SECONDARY TECHNOLOGY

SIPROTEC 5 - Application & Exercises

Objectives

The participants will become familiar with the concept and principle of the operation of the digital network protection systems SIPROTEC 5.

General

Short-ID	SIP5-APX
Duration	4.5 days
Language	English / German / Portuguese / Turkish
Training Format	offered in person or virtually
Location	in Brazil, Germany, Turkey, online, or at the client's site

Target Group

Power system protection experts who have been assigned to plan, commission and maintain digital protection systems.

Prerequisites

Basic knowledge of power system protection.
Training: Protection Technology - Principles (PR-PRIN) or comparable knowledge.
Training: DIGSI 5 - Basics (DIGSI5-B) or comparable knowledge.

Contents

- General properties of SIPROTEC 5
- SIPROTEC hardware
- Operation of protection relays with DIGSI 5
- Devices in practical operation:
- Overcurrent protection 7SL8
- Distance protection 7SL8
- Transformer differential protection 7UT8
- Line differential protection 7SL8
- Busbar protection 7SS8

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIP4SYS

SECONDARY TECHNOLOGY

SIPROTEC 5 - Compact

Objectives

The participants know specific features of SIPROTEC 5 compact devices and know how to operate these devices by means of operating the software tool DIGSI 5. Expertise of participants will be increased by practical exercises. Finally, participants are enabled to

- Install and operate SIPROTEC 5 Compact devices
- Set up and modification of protection settings
- Read-out fault records and event lists

General

Short-ID	SIP5-C
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees from the utility and industrial sectors deal with the installation, parameterization, commissioning, and operation of SIPROTEC 5 compact devices.

Prerequisites

Basic knowledge of electrical engineering and fundamental protection schemes.

Contents

- General properties of SIPROTEC 5
- Introduction to the hardware and function group concept
  - Basic functions of SIPROTEC 5 Compact
  - Hardware overview
  - Operation software DIGSI 5
  - Function groups and application templates
  - WEB Browser
- Operating software DIGSI 5
  - Parameterization of the measuring transformers data
  - Assign binary inputs and outputs to logical information / functions
  - Creation of display pages and user specific information lists
  - Parameterization and testing of protective functions
  - Online test for commissioning the SIPROTEC 5 devices: Check inputs/outputs,
  - Evaluation of information via information lists and fault records
- Practical exercise with a helpful DIGSI 5 exercise guide

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIP4SYS

SECONDARY TECHNOLOGY

SIPROTEC 5 - Distance & Line Differential Protection 7SL

Objectives

The participants will deepen their knowledge of the use and functional test of the distance and line differential protection devices SIPROTEC 5 7SL.

General

Short-ID	SIP5-7SL
Duration	3 days
Language	Arabic / English / French / German / Portuguese
Training Format	offered in person or virtually
Location	in Arabic Emirates, Brazil, France, Germany, online, or at the client's site

Target Group

Users from the field of power transmission and distribution who deal with the testing, commissioning, and maintenance of protection systems.

Prerequisites

Good knowledge of distance and line differential protection.
Training: DIGSI 5 – Basics or very good knowledge of DIGSI 5.

Contents

- Properties of SIPROTEC 5 7SL devices
- Requirements on current and voltage transformers
- Basics of numerical impedance protection
- Fault detection and distance measurement
- Zone settings
- Signal comparison protection
- Power swing detection
- Basics of numerical line differential protection
- Multiple topologies
- Protection of transformers and line as a unit
- Differential protection communication: Basics, interfaces, network technology,
- Setting of devices with DIGSI 5
- Operation and testing of a SIPROTEC 5 7SL relays with secondary test-kit CMC of OMICRON
- Differential protection between SIPROTEC 4 and SIPROTEC 5 devices
- Commissioning and maintenance
- Fault analysis with SIGRA

SECONDARY TECHNOLOGY

SIPROTEC 5 - Transformer Differential Protection 7UT

Objectives

The participants will deepen their knowledge of the use and functional test of the transformer differential protection devices SIPROTEC 5 7UT.

General

Short-ID	SIP5-7UT
Duration	3 days
Language	Arabic / English / German / Portuguese
Training Format	offered in person or virtually
Location	in Arabic Emirates, Brazil, Germany, in the United States, online, or at the client's site

Target Group

Users from the field of power transmission and distribution who deal with the testing, commissioning, and maintenance of protection systems.

Prerequisites

Good knowledge of transformer differential protection.

Contents

- Directional and non-directional overcurrent protection
- Fundamentals of motor protection, including
- Overcurrent protection and differential protection
- Load jam protection
- Protection against thermal overload
- Fundamentals of numerical transformer differential protection
- Adaption of ratio, vector group
- Stability during inrush and overexcitation
- Restricted earth-fault protection (REF)
- Current transformer sizing calculation, transient dimensioning factor
- Application examples
- Operation and testing of a SIPROTEC 5 with secondary test-kit CMC of OMICRON
- Commissioning and maintenance
- Fault analysis with SIGRA

SECONDARY TECHNOLOGY

SIPROTEC 5 - Busbar Protection 7SS85

Objectives

The participants learn about the working methods, applications, and functions of the central busbar protection 7SS85.

General

Short-ID	SIP5-7SS
Duration	4 days
Language	English / German / French / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, France, Germany, online, or at the client's site

Target Group

Employees from utilities or industry are involved in the planning, commissioning, and maintenance of busbar protection systems.

Prerequisites

Fundamental knowledge of the operating software DIGSI 5.

Contents

- Introduction to busbar production system 7SS85
- Function overview
- Hardware and function splitting
- Communication and configuration
- Security measures
- Protection algorithms
- Disconnector replica
- Breaker failure protection
- Set up a busbar configuration with DIGSI 5
- Discussion of settings
- Practical exercises with busbar protection 7SS85
- Option:
  - Expansion of training by one day
  - Expansion of centralized busbar protection 7SS85 by process bus application according to IEC 61850-9-2 standard (hybrid solution)
- Implementation of merging units
- High precision time synchronization according to IEEE 1588 standard

SECONDARY TECHNOLOGY

SIPROTEC 5 - Busbar Protection 7SS85

Objectives

After participating in this session, attendees should be able to:

- Explain the several types of busbar relay arrangements and their corresponding algorithms.
- Describe the critical algorithms used for Breaker Failure and End Fault Protection schemes.
- Apply step-by-step techniques to configure and troubleshoot busbar relays during commissioning.
- Implement distributed busbar relay configurations using IEC-61850 Process Bus and Control Unit (CU) communication.
- Configure a conventional SIPROTEC 7SS85 busbar protection application. Test and validate the complete busbar protection system using an Omicron secondary testing system.
- Differentiate between conventional and distributed (Process Bus and CU) busbar protection system configurations.

General

Short-ID	SIP5-7SS
Duration	3 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

This training is designed for engineers and technicians who have prior experience working with SIPROTEC 5 Relays and are looking to expand their knowledge into Siemens Low Impedance Busbar protection systems. The course assumes participants have a foundational understanding of protective relays and their applications, specifically with the SIPROTEC 5 product line from Siemens. The training will cover the principles, configuration, and application of Siemens' Low Impedance Busbar protection solution. Participants will gain insights into the design considerations, wiring practices, and setting calculations involved in implementing this critical protection scheme for busbars. Prior familiarity with SIPROTEC 5 devices will allow attendees to better grasp the specific implementation details within this relay platform. Engineers and technicians responsible for specifying, designing, commissioning or maintaining busbar protection systems, especially those utilizing Siemens SIPROTEC 5 relays, will find this course beneficial in enhancing their skills and knowledge base.

Prerequisites

- Foundational knowledge of Power Systems and Power System Protection concepts
- Familiarity with Siemens SIPROTEC 5 Relay product line
- Experience with DIGSI Software for relay configuration and setting
- Basic computer skills and familiarity with Microsoft Windows operating system

Contents

- Introduction to busbar relays and their importance in power system protection
- Different types of busbar relay arrangements (centralized, distributed, etc.)
- Algorithms used in busbar relays for fault detection and isolation
- Algorithms for Breaker Failure and End Fault Protection Schemes
- Understanding the need for breaker failure and end fault protection
- Algorithms used for breaker failure protection
- Algorithms for end fault protection and their working principles

- Case studies and examples to illustrate the application of these algorithms
- Configuration and Troubleshoot Techniques While Commissioning a Busbar Relay
- Step-by-step procedure for configuring a busbar relay
- Common issues faced during commissioning and their troubleshooting techniques
- Hands-on simulations to practice configuring and troubleshooting busbar relays
- Best practices and tips for efficient commissioning of busbar relays
- Distributed Busbar Relay Configuration Using IEC-61850 Process Bus and CU
- Introduction to the IEC-61850 standard and its application in busbar protection
- Configuring distributed busbar relays using IEC-61850 process bus
- Hands-on exercises for configuring busbar relays with CU

SECONDARY TECHNOLOGY

SIPROTEC 5 - Machine Protection 7UM & 7VE

Objectives

The participants will learn about the principles of operation and functions of generator block protection and synchronization.

General

Short-ID	SIP5-7UMVE
Duration	4 days
Language	English / German / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, Germany, online, or at the client's site

Target Group

Users from electric utilities and the industrial sector.
Users from power supply utilities and industrial enterprises who deal with the testing, commissioning, and maintenance of generator protection systems.

Prerequisites

Basic knowledge of generator protection technology.
Training: DIGSI 5 Basics or comparable knowledge.

Contents

- Introduction into DIGSI 5
- Introduction into generator protection
- Short circuit protection:
- overcurrent / impedance / differential protection
- Stator ground fault protection:
- 90% SGF, 3rd harmonic voltage principles, 100% SGF
- Dimensioning of grounding resistance
- Rotor ground fault protection:
- 50/60Hz injection principles
- 1-3hz injection principles
- Under excitation protection
- Synchronous machines basics
- Admittance principles
- Conversion from impedance to admittance principles
- 7UM85 Application templates, FG structure
- Exercise Unit connection
- 7VE85 Paralleling device
- Working principle
- Connection examples
- Balancing commands
- Integration of transformer and tap changer

SECONDARY TECHNOLOGY

SIPROTEC 5 with Motor Protection

Objectives

The participants will deepen their knowledge of the use and functional test of the SIPROTEC 5 7SK85 devices.

General

Short-ID	SIP5-7SJSK
Duration	3 days
Language	English / French / German / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, France, Germany, online, or at the client's site

Target Group

Users from the field of power transmission and distribution who deal with the testing, commissioning, and maintenance of protection systems.

Prerequisites

Basic knowledge of protection technology.
Training: DIGSI 5 - Basics or comparable knowledge.

Contents

- Introduction into DIGSI 5
- Introduction into motor protection
- Short circuit protection:
- Overcurrent / differential protection principle
- Settings, testing with Digital twin
- Current transformer selection
- Calculation example
- Overload protection stator and rotor
- Thermal replica rotor, motor state detection
- Principle, settings, testing with Digital twin
- Motor restarts inhibit, Starting time supervision
- Unbalance load protection, load jam protection
- Additional functions and tools
- Start-up recorder, SIPROTEC WebUI, SIPROTEC Tools

SECONDARY TECHNOLOGY

Overcurrent & Motor Protection

Objectives

The participants will learn how to configure and test SIPROTEC 5 overcurrent and motor protection devices. You will also learn how to test overcurrent and motor protection functions with Omicron test set.

General

Short-ID	SIP5-7SJSK
Duration	3 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

Users from the power transmission and distribution field that deal with protection system testing, commissioning, and maintenance.

Prerequisites

Basic knowledge of protection technology.
Training: DIGSI 5 – Basics/Fundamentals or comparable knowledge.
Training: Secondary Testing with OMICRON or comparable knowledge.

Contents

- Introduction to DIGSI 5 and SIPROTEC 5
- 7SJ and 7SK application
- Non-directional and directional overcurrent protection theory
- Under and over voltage protection theory
- Configuring and testing overcurrent relay
- Motor protection theory
- Configuring and testing a motor protection relay

SECONDARY TECHNOLOGY

SIPROTEC 5 - Commissioning Essentials

Objectives

After participating in this session, attendees should be able to:

- Differentiate between various types of relays, communication boards, and Input/Output boards in SIPROTEC 5 hardware components.
- Execute the installation process for DIGSI 5 software, including licensing and relay driver installation.
- Examine a pre-configured setup to interpret the software's logic and operations within function groups, display pages, and protection functions.
- Demonstrate the process of connecting to the relay online and downloading fault and log data.
- Identify and resolve common configuration issues when working with SIPROTEC 5 relays.
- Navigate the relay's menu system efficiently to access and modify settings.
- Operate Omicron secondary testing equipment to test basic protection functions effectively.
- Modify predefined configurations to address and correct identified issues in SIPROTEC 5 relays.
- Formulate strategies for managing and fine-tuning SIPROTEC 5 relays during critical phases of commissioning and operation.

General

Short-ID	SIP5-C
Duration	2 days
Language	English / German
Training Format	offered in person
Location	in the United States

Target Group

This training is designed for Engineers and Technicians who possess a foundational understanding of power systems and protection principles. It is ideal for professionals tasked with performing commissioning and testing activities specifically with SIPROTEC 5 relays utilizing DIGSI 5 software. The program caters to those who are not required to create configurations from scratch but need to competently execute testing and adjustments on existing setups.

Prerequisites

- Fundamental knowledge of power system principles and electrical engineering concepts
- Familiarity with substation equipment and layouts
- Elementary computer skills and experience with Windows-based software applications

Contents

- Introduction to SIPROTEC 5 and Hardware Components:
  - Understanding types of relays, communication mechanisms, and the functionality of Input/Output boards
- Installation and setup of DIGSI 5 Software:
  - This includes understanding the software requirements, licensing process, and relay driver installation
- Function Groups, Display Pages, Logic, and Protection functions:
  - Analysis of a pre-configured setup to understand the software's logic and operations
- Establishing an online connection with the Relay:
  - This involves learning the procedures for online connectivity with the relay, downloading fault and log data, and troubleshooting common configuration issues
- In-depth exploration of the Relay's menu system:

- An essential component that aids in understanding the overall operation of the relay system

- Basic Protection functions:
  - Practical training using Omicron secondary testing equipment, emphasizing on the necessary skills required to test basic protection functions effectively.

SECONDARY TECHNOLOGY

SIPROTEC 5 - Substation Control & Protection Training including IEC61850 with Practical Exams

Objectives

The participants will gain essential knowledge in parameterization of SIPROTEC 5 devices for control and protection of a small substation (1OHL and 2 TR feeders). During the exams, the complete devices will be parameterized and an IEC61850 station will be built.

General

Short-ID	SIP5-IPRAX
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Professional users from the energy sector and industry who deal with the planning, configuration, commissioning, maintenance and operation of control and protection devices and station automation systems with IEC61850-communication.

Prerequisites

Good knowledge in DIGSI 5 or the training: DIGSI 5 – Basics.

Contents

- Configuration of the SIPROTEC 5 control and protection devices including:
  - Bay control units 6MD85
  - Line protection 7SA8
  - Transformer protection 7UT8
  - Centralized BBP 7SS85
- Explanation of the protection algorithms used for this exam
- Configuration of the IEC 61850 station
- Configuring of the bay interlockings by using wired signals and GOOSE communication
- Configuring of protection reverse Interlocking by using GOOSE communication
- Testing of the control and protection systems by using the SIPROTEC Digital Twin
- Introduction of commissioning, testing and diagnostic tools of IEC 61850 communication networks

SECONDARY TECHNOLOGY

SIPROTEC 5 - Process bus Engineering

Objectives

The participant will get knowledge about the process bus by using SIPROTEC 5 devices and the DIGSI 5 operating program. He will learn to parameterize the SIPROTEC 5 Process bus by practical exercises.

General

Short-ID	SIP5-PB1
Duration	4 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users from electric utilities and the industrial sector who are working for design, for parameterization and for commissioning, as well as for maintenance and operation of SIPROTEC 5 devices.

Prerequisites

Profound skills in SIPROTEC 5 / DIGSI 5 / DIGSI 5-IEC 61850.

Contents

- Experts' skills to parameterize projects with the complex process bus technic:
  - Theoretical understanding of process bus
  - Client server parameterization
  - Engineering of complex process bus system (IEEE1588, PRP…)
- Training will be conducted by using the latest DIGSI 5 software and SIPROTEC 5 hardware (6MU85, ETH-BD-2FO)
- Parameterization and testing of LPIT setup (IO240)
- Using Digital Twin

SECONDARY TECHNOLOGY

SIPROTEC 5 - Process bus Commissioning &Testing

Objectives

The participant will get knowledge on how to commission and test the process bus by using SIPROTEC 5 devices and the DIGSI 5 operating program.

- Testing of process bus
- Trouble shooting in the process bus

General

Short-ID	SIP5-PB2
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users from electric utilities and the industrial sector who are working for design, for parameterization and for commissioning, as well as for maintenance and operation of SIPROTEC 5 devices.

Prerequisites

Profound skills in SIPROTEC 5 / DIGSI 5 / DIGSI 5-IEC 61850.
Training: SIPROTEC 5 – Process bus Engineering.

Contents

- Expert's skills to commissioning and test complex process bus technic:
  - Commissioning a process bus
  - Analysis & troubleshooting (inc. related tools)

SECONDARY TECHNOLOGY

SIPROTEC 5 - Process Bus

Objectives

The participant will get knowledge about the process bus by using SIPROTEC 5 devices and the DIGSI 5 operating program. He will learn to parameterize the SIPROTEC5 Process Bus by practical exercises. The participant will get knowledge of how to commission and test the process bus by using SIPROTEC 5 devices and the DIGSI 5 operating program.

- Testing of process bus
- Trouble shooting in the process bus

General

Short-ID	SIP5-PB
Duration	5 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Basic knowledge of protection technology.

Prerequisites

Profound skills in SIPROTEC 5 / DIGSI 5 / DIGSI 5-IEC 61850.

Contents

- Experts' skills to parameterize projects with the complex process bus technic:
  - Theoretical understanding of process bus
  - Client server parameterization
  - Engineering of complex process bus system (IEEE1588, PRP…)
- Training will be conducted by using the latest DIGSI 5 software and SIPROTEC 5 hardware (6MU85, ETH-BD-2FO)
- Experts' skills in commissioning and test complex process bus technic:
  - Commissioning a process bus
  - Analysis & troubleshooting (inc. related tools)

SECONDARY TECHNOLOGY

SIPROTEC 5 - System Protection - Workshop on a Real Time Digital Simulator RTDS

Objectives

The participants will learn about complex fault situations with a transient network analyzer, considering different network and protection systems.

General

Short-ID	RTDS5-PS
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Experts for relay applications from utilities and industry.

Prerequisites

Expert knowledge of protection technology.

Contents

- SIPROTEC 5
- Distance protection
- Analysis of fault records and protocols
- Theoretical explanation of network and algorithms
- Automatic reclosure and synchronization
- Differential protection and communication
- Stabilization of differential protection
- Transformer differential protection
- Exchange of expert experience

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand.

SECONDARY TECHNOLOGY

SIPROTEC 5 - Secondary Testing with OMICRON Test System CMC

Objectives

The participants will gain practical knowledge of essential device parameters and secondary testing. The training is hands-on and focuses on creating test documents for protection equipment in medium and high-voltage grids. Participants will learn how to:

- Choose Omicron hardware
- Program Omicron software
- Test with quick CMC, state sequencer, and overcurrent modules

General

Short-ID	SIP-CMC
Duration	3 days
Language	English / French / German
Training Format	offered in person or virtually
Location	in Germany, France, United States, online, or at the client's site

Target Group

Engineers and technicians of power utilities and industries who deal with commissioning and periodic testing of protective devices.

Prerequisites

Basic knowledge of protection technology.

Contents

- Overview of protection testing basics
- Introduction to the OMICRON Control Center (OCC) and relevant test modules
- Modeling of the relay characteristics in the Test Object for subsequent testing
- Test setup and configuration options for the CMC test set
- Quick current and voltage output for easy wiring tests
- Fundamentals of non-directional overcurrent protection functions
- Creating a reusable test plan (OCC file) for testing non-directional overcurrent relays
- Hands-on testing of non-directional and directional overcurrent protection

SECONDARY TECHNOLOGY

SIPROTEC 5 - Engineering of Bay Controller 6MD8

Objectives

The participants become familiar with the principles, the application, the operation and functions of the bay controller device 6MD8.

General

Short-ID	SIP5-6MD8
Duration	3 days
Language	Arabic / English / French / German
Training Format	offered in person or virtually
Location	in Arabic Emirates, France, Germany, online, or at the client's site

Target Group

Employees from utilities or industry are involved in the planning, engineering, commissioning, and maintenance of bay controller devices type 6MD8.

Prerequisites

Basic knowledge of the operating software DIGSI 5.
Training: DIGSI 5 – Basics.

Contents

- Control functions for high voltage switchgear:
  - General introduction, field level interlocking
  - Consideration of three-position switches
  - Fundamentals of communication protocol standard IEC 61850
  - Application of GOOSE-messages / station interlocking
  - Supervision of GOOSE-messages
  - CFC-charts and switching sequences
  - Online tests of CFC-charts
- Protection related functions
  - Auto reclosure function
  - Synchronism-check-function

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-6MD66

SECONDARY TECHNOLOGY

Current & Voltage Transformers – Intensive

Objectives

The participants will gain in-depth insight into the physical behavior of instrument transformers (current and voltage transformers). The course will focus on the dimensioning of instrument transformers and their practical application in power system protection. Aside from the instrument transformer dimensioning conforming to standards, the proper interaction of instrument transformer and protection or measuring device and future trends in instrument transformer technology will also be discussed.

General

Short-ID	SIP-VTI
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees of power plants, power supply utilities and the industrial sector and individuals interested in technical fields who are involved in the planning and/or commissioning of protection equipment.

Prerequisites

Good knowledge of electrical engineering and power system protection.

Contents

- Physical behavior of instrument transformers
- Voltage transformers
- Basic power system protection and measuring technology requirements for current and voltage transformers
- Standards for current and voltage transformers
- Implementation of protection and measuring device requirements for current transformers in examples
- Transient dimensioning of conventional cores
- Transient dimensioning of split cores of the 5PR/10PR, TPY and TPZ classes
- Optimization of current and voltage transformers
- High-impedance protection
- Measurement of transformer characteristics
- Calculation examples to solidify the gained knowledge and help understand the correlations

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SIPVTI

SECONDARY TECHNOLOGY

Protection Schemes for Power Generation & Industry – Design & Settings

Objectives

The participants will have an in-depth knowledge of protection of public distribution networks. They will know the specific requirements for the protection of medium voltage distribution networks.

General

Short-ID	PR-DSIN
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees from power utilities, electrical distribution companies and industry are responsible for the planning and operation of power system protection.

Prerequisites

Basic knowledge of protection technology.

Contents

- Basics of network calculation (symmetrical components, neutral grounding, short-circuit calculation)
- Network structures and typical equipment of power generation plants
- Protection concepts for typical network elements: motor protection, transformer protection, protection of auxiliary transformer, generator protection, unit protection, de-coupling
- Protection co-ordination
- Protection setting calculation
- Examples

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PRDSIN

SECONDARY TECHNOLOGY

Transmission System Protection - Schemes & Setting Calculation Practice - Part 1

Objectives

The participants have a detailed overview of the state-of-the art protection methods in power grids world-wide. They become familiar with or enlarge their knowledge regarding specific requirements for the protection of transmission systems. This training will focus on the practical implementation of protection philosophies and determination of setting values.

General

Short-ID	PR-SSCP1
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Power System Engineers with main scope on power system protection design and settings calculations in transmission and sub-transmission systems.

Prerequisites

Knowledge of electrical engineering and power system protection.

Contents

- Characteristics of transmission systems and requirements on power system protection
- Availability, security, redundancy considerations of protection systems
- Design of protection system schemes in transmission and sub-transmission systems
- Influence of current and voltage transformers behavior on system protection
- Discussions and settings considerations regarding power system protection concepts for:
- Transmission lines; Auto reclosure
- Power transformers
- Shunt reactors
- Multiple busbars and 1 ½ circuit-breaker schemes: Low and high impedance protection schemes
- Circuit breakers fail schemes
- Practical examples of protection coordination and settings calculation examples will be carried out and discussed in detail to increase practical knowledge exchange

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PRDSPS

SECONDARY TECHNOLOGY

Transmission System Protection - Schemes & Setting Calculation Practice - Part 2

Objectives

The participants become insight in the protection practice in power grids, not only from object protection but also from the system protection point of view (frequency and voltage protection). The requirements on complex power system protection will be discussed, and systems like Protection Security Assessment (SIGUARD® PSA) and Wide Area Protection will be shown. Furthermore, the course will focus on discussion on practical examples and on knowledge exchange. Any further subjects brought by the participants are highly welcome and can be flexibly discussed, as well.

General

Short-ID	PR-SSCP2
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Power system engineers with main scope on power system protection design and settings calculations in transmission and sub-transmission systems.

Prerequisites

Knowledge of electrical engineering and power system protection.

Contents

- Characteristics of complex transmission systems and new requirements on interconnected transmission systems power system protection and their influence on protection
- Protection Security Assessment (SIGUARD ® PSA) and Wide Area Protection, System protection in interconnected grids
- Discussions and settings considerations regarding power system protection concepts for (among others/discussed if needed):
  - Differential (object) protection
  - Power swings and sub synchronous Resonances
  - Series compensated transmission lines and Phase shifting transformers
  - Static var compensators and Filter- capacitor banks
  - Instrument transformers considerations
- Practical examples of protection coordination and settings calculation examples will be carried out and discussed in detail to increase practical knowledge exchange.
- Any further subjects brought by the participants are highly welcome and can be flexibly discussed, as well

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PRDSPSI

SECONDARY TECHNOLOGY

Generator/Motor Protection - Design & Settings

Objectives

The participants will be trained in detailed preparation of SIPROTEC setting values for electrical machines.

General

Short-ID	PR-DSMP
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users who deal with the detailed planning, calculation, commissioning, and maintenance of SIPROTEC protection devices for generators or machines.

Prerequisites

Good knowledge of electrical engineering, power system and generation protection.

Contents

- Project planning criteria
- Principles of electrical machines
- Selection of protection functions
- Redundancy
- SIPROTEC protection devices
- Trip concept
- Calculation of setting values for synchronizing
- Calculation of setting values for motors
- Calculation of setting vales for generators

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PRDSMP

SECONDARY TECHNOLOGY

High Voltage Substations - Engineering in the age of multifunctional Control and Protection devices

Objectives

The participants know which functions are available in which multifunctional devices. They understand which device overlapping functions may be realized by means of serial interfaces. The participants understand how to make use of device built-in functions / already available functions, and they know how to create customer specific functions on their own. They know how important complete documentation of applied device built-in functions would be, e.g. for operating staff. They know different ways of providing / create complete documentation of device built-in functions.

General

Short-ID	PR-HVSE
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

All employees responsible for the engineering (HW & SW) of High Voltage Substations and who would like to take the opportunities provided by modern multifunctional Control & Protection devices into account for their engineering work.

Prerequisites

Minimum fundamental knowledge of physics and electrical engineering is recommended (e.g. law of conservation of energy, Ohm's law, Kirchhoff's law), Furthermore, the fundamental principles of protection of high voltage networks - such as overcurrent protection, distance protection and differential protection - should already be known. Basic knowledge in the application of operating tool DIGSI5 is mandatory.

Contents

- General introduction / Fundamentals of electrical Engineering for High Voltage Substations
- Basics of operating tool DIGSI5
- Typical application of multifunctional Control & Protection devices (common practice)
- Feeder related interlocking conditions
- Substation related interlocking supported by GOOSE messages
- Monitoring of GOOSE messages
- Current transformer dimensioning calculation
- Create complete documentation of applied device built-in functions

Notes

Advanced training in current transformers is scheduled / advanced knowledge about current transformers would be subject of further training. The "voltage transformers" are subject of a separate dedicated WBT

SECONDARY TECHNOLOGY

SIPROTEC - Compact Distribution Network Automation with 7SC80 & FASE

Objectives

The participant knows the basics of distribution networks and understands the functionality of the different approaches. By typical network configurations the participant becomes familiar with the different applications. Autonomous configuration of automated switching sequences in the distribution grid will be possible by the participant; he understands the mode of operation of possible solutions.

General

Short-ID	SIPC-7SC
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users from power transmission and distribution medium voltage networks, dealing with planning, testing, or commissioning which want to automate their distribution network for various applications, to operate the networks more efficiently with regards to new requirements.

Prerequisites

Basic knowledge of electrical engineering and protection technology.
Basic knowledge DIGSI 4/IEC61850.

Contents

- 7SC80 features
- Configuration tool FASE (Feeder Automation Sequence Editor)
- Protection principles in secondary distribution networks
- Applications in secondary distribution networks
- Decentralized and centralized approaches
- Own configuration of DA applications via FASE (hands on)
- Possible communication infrastructures

SECONDARY TECHNOLOGY

Electrical Protection Training for Oil and Gas Industry- Fundamentals of Substation Protection and Control

Objectives

Participants will learn the fundamentals of protection schemes related to high voltage substations. The participant is thus qualified to do the following:

- create new and analyze existing protection schemes
- calculate typical protection settings
- evaluate fault records and fault log entries

The participants become familiar with CT- and VT-sizing calculation.

General

Short-ID	SIPC-7SC
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees from the Utility, Oil& Gas industry who deal with the planning, parameterization, commissioning and operation of protection devices.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Basics of complex numbers and application of this on voltage/current and power (recap)
- Introduction of symmetrical component
- Balanced and unbalanced fault current calculation
- Development of sequence networks (Positive, Negative and Zero sequence)
- Power System Currents and Voltages during Fault Conditions
- Methods of Earthing and detection of Earth Faults for various earthing schemes
- Details of instrument transformers, saturation effect
- CT and VT sizing calculation
- Basic protection principles
- Explanation of ANSI, IEC and IEC6850 terminology
- Introduction to numerical protection relay technology
- Protection setting calculation example for each protection type
- Overcurrent protection coordination/grading
- Transformer differential protection
- Introduction to equipment specific protection (e.g., Buchholz, RTD, etc.)
- Motor, generator and distance protection
- Introduction to communication standard IEC61850 incl. GOOSE application
- Evaluation of information via fault log files and fault records (post fault analysis)
- Completion of a formal written final exam

SECONDARY TECHNOLOGY

Advanced Power System Protection

Objectives

Participants will gain an understanding of the theory behind feeder protection devices, motor protection devices, and overcurrent (non-directional and directional).

- Learn extended functionalities of the CFC, the Display Editor, using the CFC-Online Test with DIGSI 5.
- Learn about integrating SIPROTEC 5 devices into communication systems according to IEC 61850 and Modbus.
- Learn how to test and configure motor and overcurrent protection devices and test protection functions.
- Learn how to design, configure, and test an automatic transfer scheme (ATS).
- Gain an understanding of essential device parameters and secondary testing.
- Understand how to create test documents for distance, cable, and transformer differential protection in medium and high-voltage grids.

General

Short-ID	ADV-PROT
Duration	9 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

Users from the power transmission and distribution field that deal with protection system testing, commissioning, and maintenance.

Prerequisites

Basic understanding of power system protection concepts. Familiarity with DIGSI software and SIPROTEC devices.
Experience in electrical engineering or power systems is advantageous.

Contents

- Introduction to DIGSI 5 and SIPROTEC 5
- Non-directional and directional overcurrent, and undervoltage/overvoltage protection theory
- Configuring and testing overcurrent relay
- Motor protection theory and testing
- Parameterization and test of a switching sequence: Automatic transfer scheme with interlocking
- GOOSE communication between SIPROTEC 5 and SIPROTEC 5
- Communication of SIPREOTEC 5 devices with SCADA clients in MODBUS and IEC - 61850
- Overview of protection testing basics
- Test setup and configuration options for the CMC test set
- Quick current and voltage output for easy wiring tests
- Hands-on testing of non-directional and directional overcurrent protection

SECONDARY TECHNOLOGY

Siemens Reyrolle Relays

Objectives

The participants will get to know operating programs for Configuration and monitoring programs for Siemens Reyrolle Devices. They will learn how to adjust, manage, operate and analyses faults of Siemens Reyrolle Devices using the Reydisp Manager and Reydisp Evolution operating programs. They will be able to use Reydisp Manager Program to configure and perform their own functions.

General

Short-ID	SIE-REY
Duration	3 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Users from electric utilities and the industrial sector are interested in the commissioning, maintenance, and operation of Siemens Reyrolle devices.

Prerequisites

Basic Electrical Engineering with understanding of power system protection.

Contents

- Introduction
  - Siemens Reyrolle Devices
  - Reydisp Manager
  - Reydisp Evolution
- Plant and equipment management
- Configuring of protection settings of Siemens Reyrolle devices
  - Data management
  - Parameter assignment
- Commissioning phase
  - Checking inputs/outputs
  - Analyzing fault records
- Tips and Tricks to use Siemens Reyrolle Devices efficiently
- Practical application of all topics

Power Quality Training

POWER QUALITY

Power Quality – Basics

Objectives

The participants will get a basic understanding of the interaction between electrical networks and different loads. They will learn about methods of improving these interactions and how to avoid or remove these disturbances. The participants will obtain the theoretical background and various aspects of "power quality". They will learn about strategies for how to analyze system disturbance records and find solutions by discussing case studies.

General

Short-ID	PQ-BASIC
Duration	2 days
Language	English / Portuguese
Training Format	offered in person
Location	in Brazil and United Kingdom

Target Group

Engineers and service technicians from power supply utilities and industry working in the fields of planning, design or operation of electrical plants or power systems.

Prerequisites

Basic electro-technical knowledge.

Contents

- Power quality parameters
- Disturbances caused by equipment like
- Power electronic devices
- Variable Speed Drives (VSD's)
- Rectifiers
- Welding machines
- System disturbances like
- Circuit breaker switching
- Ferro resonance
- Reactive compensation & resonance
- Lightning strokes
- Short circuits
- Types of disturbances / Voltage regulation
- Dips and surges
- Unbalance, Harmonics and interharmonics
- Flicker / Transients / Interruptions
- Effects of disturbances on equipment
- Standards and recommendations like IEC 61000-2-4 and IEEE 519
- Measurement, analysis and evaluation
- Mitigation like isolation transformers, UPS's, active and passive filters
- Presentation and discussion of case studies

POWER QUALITY

SIPROTEC 7KE85 - Fault Recorder, SICAM Q100 - PQ Recorder

Objectives

The participants will know the basics and functionalities of fault recording and Power Quality and understand the device concept of fault recorder and PQ recorder. They can configure SIPROTEC 7KE85 with DIGSI 5 and parameterize SICAM Q100/P855 according to their needs. They use DIGSI 5 for evaluation of fault records (manual data readout) and the, in SICAM Q100/P855 integrated, WEB Server to retrieve recordings and reporting's.

General

Short-ID	PQ-7KE85
Duration	2 days
Language	English / French / German / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, France, Germany, Turkey, online, or at the client's site

Target Group

Engineering, Commissioning, Operation, Service/Maintenance.

Prerequisites

Basic knowledge in electro-technique.
Training: DIGSI 5 - Basics.
Know how in the field of power quality and fault recording.

Contents

- Introduction
- SIPROTEC 7KE85 and SICAM Q100/P855 hardware concept
- Communication and time synchronization concept
- Functional overview (Fault recording, Power Quality, PMU)
- Parameterization and evaluation
- Exercises of typical workflows in parameterization and evaluation
- Final engineering exercise

POWER QUALITY

SICAM PQS - SICAM PQ Analyzer

Objectives

The participants will know the concept, architecture and functionality of SICAM PQS & SICAM PQ Analyzer. They can configure SICAM PQS and integrate SIPROTEC fault recorder & SICAM PQ recorder and use SICAM PQ Analyzer to visualize und analyze of fault records and Power Quality Data.

General

Short-ID	PQ-SICAMPQ
Duration	2.5 days
Language	English / French / German / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, France, Germany, Turkey, online, or at the client's site

Target Group

Engineering, Commissioning, Operation, Service/Maintenance.

Prerequisites

Basic knowledge in electro-technique.
Training: SIPROTEC 7KE85 - Fault Recorder, SICAM Q100 Power Quality Recorder.
Know how in the field of Network quality and fault recording.

Contents

- Software andhHardware architecture
- Installation and license model
- System components of SICAM PQS / SICAM PQ Analyzer (UI Configuration, UI Operation)
- Functions of SICAM PQS / SICAM PQ Analyzer
- Configuration and analysis
- Typical workflows in system configuration and evaluation
- Exercise to check if you have accomplished the educational objectives at the end of course
- Final engineering exercise

Primary Technology Training

PRIMARY TECHNOLOGY

Distribution Transformers – Basics & Operation

Objectives

This training supplies a basic understanding of a transformer. Presentations, training exercises and experiments carefully illustrate the characteristic properties of transformers, examples on distribution transformers (DT).

General

Short-ID	TR-DT
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees who would like to be informed about general knowledge of the functionality and operation of a transformer.

Prerequisites

Basic knowledge of electrical engineering and fundamentals of DC circuits and AC circuits.
Basic knowledge of measurement for electrical variables.

Contents

- General transformer overview
- Transformer location in grid and Transformer types and standards
- Electrical basic design, explained on a single-phase transformer
- Measures (ratio, resistance, no load current with different core types, impedance voltage, short circuit, etc.)
- Introduction to 3 phase transformers
- Transformer components
- Core, winding, paper, oil, tank
- Isolating material (oil, paper, wood)
- Tank types and cooling
- Control and protection devices
- Manufacturing
- Transformer in service
- Dynamic processes (short circuit, in rush current)
- Parallel operation
- Aging (oil and cellulose)
- Maintenance and Diagnostic

PRIMARY TECHNOLOGY

Low Voltage Switchgear – Basics

Objectives

To provide participants with a fundamental understanding of low voltage (LV) switchgear, including the operation, protection, and communication capabilities of devices such as ACB, MCCB, and SDF. The training aims to cover key concepts, equipment, standards, and control products used in industrial applications, with a focus on hands-on experience and the latest technology.

General

Short-ID	CU-SWG
Duration	3 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic Knowledge of Low Voltage products essential.

Contents

- Introduction and standard definitions to ACB + MCCB + SDF
- Basic Concepts of fault level, current carrying capacity, etc.
- Equipment used in LV network
- Communication Capability for ACB and MCCB:
  - Basics of PROFIBUS
  - Communication options / Hardware
  - Network concepts and switches software
- Control products with latest Indian & International Standards an overview and Basic Control Products used in Industry today:
  - Contactor- New technology, Compactness DOL, RDOL & S-D assy - Hands on of Star-delta assembly
- Overload Relay, Microprocessor Relay- Why new versions of relays
  - Motor protection circuit breaker- why MPCB needs to be used
  - Soft starter- overview of soft starter use
  - MCB / RCCB
  - Pushbutton & Indication Lamps

PRIMARY TECHNOLOGY

Power Transformers – Basics & Operation

Objectives

This training supplies a further understanding of a transformer. Presentations, training exercises and experiments carefully illustrate the characteristic properties of transformers, examples of power transformers (LPT, MPT).

General

Short-ID	TR-PT
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees who would like to be informed about further knowledge of the functionality and operation of a transformer.

Prerequisites

Basic knowledge of electrical engineering and fundamentals of AC and DC circuits.
Extended knowledge to measuring electrical variables.

Contents

- Transformer types
- Step up transformer
- Interconnection transformer
- Distribution transformer and HVDC transformer
- Transformer technology
- Basics of electricity and power transmission
- Simplified transformer diagram
- Electrical design, measuring wind resistance and no-load response, response under load condition
- Short circuit characteristics
- Efficiency and transformer losses
- Transformer components
- Voltage regulation with tap changers
- Cooling equipment, troubleshooting using circuit diagrams
- Working with control and protection devices
- Transformer in service
- Oil analysis
- Transformer life management
- Maintenance tasks
- Monitoring, Measures and Moisture
- Life Extension
- Oil regeneration and oil drying
- Retrofit

PRIMARY TECHNOLOGY

SIMOPRIME World – Technical Information

Objectives

The participants will understand the principles of air insulated medium-voltage switchgear systems and will gain the ability to operate and maintain safe conditions.

General

Short-ID	TIC-SIMOP
Duration	2 days
Language	English / Turkish
Training Format	offered in person
Location	in Turkey

Target Group

Operation and service personnel interested parties from sales and project processing.

Prerequisites

Basic technical knowledge on MV Switchgear operation.

Contents

- General Information on AIS technology and IEC Standard
- Reading drawings, electrical diagrams
- Design and features of the components
- Design and features of product in question
- Operation instructions
- Maintenance & troubleshooting instructions
- Quality processes
- Practical application on panel

PRIMARY TECHNOLOGY

MV – Technical Information Course (AIS & GIS)

Objectives

The training provides information on switchgear and devices in the primary and secondary distribution level including explanations about the new ambient-friendly switchgear "Blue GIS". It gives the main technical knowledge of operational and personal safety and maintenance. Based on exhibits function, handling and locking concepts of different designs are demonstrated for air and gas insulated switchgear.

General

Short-ID	MV-INFO
Duration	3 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning, operation and service personnel from utilities and industries. Interested parties from sales and project processing.

Prerequisites

Basic technical knowledge (medium voltage).

Contents

- Electrical power supply
- Components of switchgear
- Design criteria for switchgear and switching devices
- Standards
- Planning for switchgear
- Operating area and personnel protection
- Design of switchgear, air-insulated, gas-insulated
- Product portfolio
- Practical exercises on switchgear panels
- Factory tour Schaltanlagenwerk Frankfurt

Notes

Schedule: 1st + 2nd day from 9 a.m. to 5 p.m., on the 3rd day from 9 a.m. to 3 p.m. Please bring safety shoes with you for the factory tour, if you have them, otherwise we can lend you overshoes.

PRIMARY TECHNOLOGY

MV – 3AE1 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AE1_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup,drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AE5 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AE5_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AH3 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AH3_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AH3 and 3AH4 Vacuum Circuit Breakers – Maintenance Extensions / Modifications

Objectives

The participants will gain detailed knowledge about mechanical function and operation, and how to detect, eliminate and prevent faults and disturbances of the vacuum circuit breakers. After the successful completion of this training the participant can detect minor faults and perform maintenance tasks. A certificate will be handed out to the successful participant.

General

Short-ID	MV-3AH3_M
Duration	3 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Field personnel and technicians are involved in maintenance and servicing of switchgears and switching devices.

Prerequisites

Basic product know-how of the vacuum circuit breaker concerning setup and operation.

Contents

- Health & Safety
- Rated Values
- Typical Parameters
- Setup Procedures
- Drive Components
- Mechanical and Electrical Functions
- Operation of the Circuit Breaker
- Component Replacement, including gears, motors, magnets, mechanical locks, additional triggers, shock absorbers, and vacuum tubes
- Maintenance Package for 30,000 & 60,000 Switching Operations
- Lubrication of Bearings and Joints
- Checking Response Values
- VCB Verification with ACTAS Device After Vacuum Tube Replacement
- Factory tour

Notes

Since the training includes active learning components, the participants must bring suitable working clothes and safety shoes. The certificate is valid for 3 years and can be extended by participating in refresher training.

PRIMARY TECHNOLOGY

MV – 3AH4 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AH4_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures. Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AH5 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AH5_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures. Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AE1 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AE1_F
Duration	1 day
Language	English
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AE5 Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AE5_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, Operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AJ Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AJ_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV – 3AK Vacuum Circuit Breakers – Fundamentals

Objectives

The participants will understand the principles of the vacuum circuit-breaker and will gain the ability to operate the circuit breaker.

General

Short-ID	MV-3AK_F
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning and Operation personnel from utilities, industries, and infrastructures.
Interested parties with technical background of Medium Voltage, Technicians, and field service, as well as parties from sales and project management.

Prerequisites

Basic technical knowledge of Medium Voltage switchgears.

Contents

- Health & Safety regulations
- Rated values, typicals, setup, drive parts, operation of VCB
- Mechanical and electrical function

Notes

If training is held in the factory, bring your safety shoes.

PRIMARY TECHNOLOGY

MV-Maintenance training for phased out Circuit Breakers & Switchgears and Safety instructions in electrical Installations

Objectives

The participants will gain detailed knowledge about mechanical function and operation, how to detect, eliminate and prevent faults and disturbances of phased out MV devices and switchgear types. After the successful completion of this training the participant can detect minor faults and perform maintenance tasks. A certificate will be handed out to the successful participant.

General

Short-ID	MV-VINTAGE
Duration	5 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Field personnel and technicians are involved in maintenance and servicing of switchgears and switching devices.

Prerequisites

Basic product know-how of the vacuum circuit breaker and switchgears concerning setup and operation.

Contents

- Circuit Breaker Types: 3AG, 3AF
- Switchgear Types: 8BD, 8BK20, NXAIR vintage
- Health & Safety
- Design and functionality of the breakers and switchgears
- Maintenance and Service
- Servicing and troubleshooting
- Small repairs
- Electrical tests
- Functionality
- Replacement of supplies
- Exchange of the main breaker contacts
- Replacement of overcurrent release

Notes

Since the training includes active learning components, the participants must bring suitable working clothes and safety shoes.

8DA/8DB – Assembly & Installation

Objectives

This training provides in-depth knowledge of the structure, operation, and assembly in the primary section of the 8DA/DB switchgear. It forms the first part of the certification process required to obtain the assembly certificate for all 8DA/DB switchgear types with SF_6 gas and the latest Blue GIS models. The assembly certificate is mandatory to perform installations on these switchgear types.

General

Short-ID	MV-8DAB
Duration	4 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Assembly and installation staff.

Prerequisites

Basic knowledge of assembly technique.
Since the assembly and installation training include active learning components, the participants must wear suitable working clothes and safety shoes.

Contents

Part 1 - Training Centre Frankfurt
Theory (ratings, typicals, layout, circuit-breaker modules), operator training in the exhibition room (operation, operator controls, operating procedures, interlocks)

- Visit the assembly line:
  - Steps of assembly and installation
  - HV / PD inspection
  - Gas quality inspection
- Active involvement:
  - Deinstallation / installation of panel equipment
  - Busbar installation
  - Greasing, positioning of desiccants
  - Setting the kinematics at the disconnector
  - Installation of the voltage transformer
  - Electrical 5 Safety Rules

Part 2 (is not organized by the Power Academy and is not included in the price.)

- On-site installation under the supervision of certified personnel (Senior supervisor)

Notes

After successfully completing the training, the participant will receive an assembly certificate signed by the trainer. The certificate becomes valid only after the participant successfully completes practical on-site assembly training at the 8DA/DB switchgear under the supervision of a certified Senior Supervisor, with the Senior Supervisor's signature on the certificate. This certificate is valid for 3 years.

PRIMARY TECHNOLOGY

8DA/8DB – Assembly & Installation – Refresher

Objectives

The training provides detailed updated information of 8DA/B10-Switchgear. The training participants receive the extension of their certificate after successful completion of the training.

General

Short-ID	MV-8DABR
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Certified assembly and installation staff.

Prerequisites

Certificate MT-8DA
Since the Refresher training includes active learning components, the participants must wear suitable working clothes and safety shoes.

Contents

Training to the level of technology.

Notes

This certificate is valid for 3 years.

PRIMARY TECHNOLOGY

8DA/DB – Maintenance

Objectives

The participants will learn how to detect, eliminate and prevent faults and disturbances in the primary part of the 8DA/DB switchgear and their circuit breaker. After successful completion of the course, the participants receive a certificate for 8DA/DB maintenance.

General

Short-ID	MV-8DADBM
Duration	5 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Field personnel and technicians involved in maintenance and servicing of 8DA/DB switchgear.

Prerequisites

Technical knowledge in operation and maintenance of Siemens medium voltage switchgears.
Since the training includes active learning components, the participants must wear their own suitable working clothes and safety shoes.

Contents

Theoretical part:

- Design and Operation
- Interlocking
- Electrical 5 Safety Rules
- Maintenance/ Exercises
- Design circuit breaker 3AH49 / 3AF99
- Course content practical part
- Assembly / dismantling of the Switch panel pole housing
- Assembly / dismantling of the Panel connection housing
- Assembly / dismantling of the manometer
- Assembly of the current / voltage transformer
- Change of the Busbar housing / Compensator
- Change / adjusting of the three-position switch
- Insertion of the desiccant bags
- Electromagnetically interlocking 3-position switch
- Mec. interlocking 3-position-/ Circuit-breaker mechanism
- Circuit breaker mechanical / electrical tests
- Factory tour
- Get to know the assembly steps
- HV / PD testing
- Gas quality control

PRIMARY TECHNOLOGY

8DJH – Assembly & Installation

Objectives

This training imparts profound knowledge about the layout, operation, and installation in the primary part of 8DJH series.

General

Short-ID	MV-8DJH
Duration	2 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Assembly and installation staff.

Prerequisites

Basic knowledge of assembly technique.

Contents

- Theory:
  - Technical data and rated values
  - Panel types
  - Structure
  - Interlocking
  - Electrical 5 Safety Rules
- Practice:
  - Operation
  - Disassembly and assembly of the panels
  - Busbar installation
  - Current / voltage transformer installation
  - Visit the assembly line:
  - Steps of assembly and installation
  - Leakage test / - filling SF6-gas
  - HV / PD inspection

Notes

1. After successful completion of the training, the participants receive an assembly and installation certificate
2. Since the installation training includes active learning components, the participants must bring suitable working clothes and safety shoes.
3. Additional training contents and services can also be provided upon request.

PRIMARY TECHNOLOGY

High Voltage SF_6 Circuit Breaker

Objectives

To know the Circuit Breaker installation activity. To know the erection, commissioning, and maintenance philosophy & get practice on how to perform the basic maintenance operations according to procedure and in compliance with safety rules.

General

Short-ID	HVA-CB
Duration	2 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Users from electric utilities and the industrial sector are interested in the commissioning, maintenance and operation of HV and EHV SF_6 Circuit Breakers.

Prerequisites

Basic knowledge of electricity, mechanical and HV switchgear.

Contents

- Introduction of HVCB
- SF_6 Circuit Breaker working principle
- Working with SF_6 Circuit Breaker mechanical drive
- Drive Assembly
- Drive replacement
- Fault finding and troubleshooting
- Circuit Breaker installation for range of products for 72.5kV to 420kV voltage levels
- Leakage identification
- Testing procedures of Circuit Breaker

PRIMARY TECHNOLOGY

High Voltage SF_6 Circuit Breakers and Instrument Transformers

Objectives

To know the High Voltage Circuit Breaker installation activity. To know the erection, commissioning and maintenance philosophy & get practice on how to perform the basic maintenance operations according to procedure and in compliance with safety rules. To know about various High Voltage Instrumentation Transformers.

General

Short-ID	HVA-CBIT
Duration	4 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Users from electric utilities and the industrial sector are interested in the commissioning, maintenance, and operation of HVCB and HVIT SF_6 equipment.

Prerequisites

Basic knowledge of electricity, mechanical and HV switchgear.

Contents

- Introduction of HVCB
- SF_6 Circuit Breaker working principle
- Working with SF6 Circuit Breaker Mechanical Drive
  - Drive Assembly and Drive replacement
  - Fault finding and Troubleshooting
- Circuit Breaker installation for range of products for 72.5kV to 420kV voltage levels
- Introduction to various Instrument transformers
- Features of Instrumentation transformers
- Testing procedures
- Leakage Identification
- Critical Check Points & Visual Checks
- Troubleshooting
- Operation and maintenance

PRIMARY TECHNOLOGY

NXAIR 12kV – 40kA – Maintenance

Objectives

The participants will learn how to detect, eliminate, and prevent faults and disturbances in the primary part of the NXAIR switchgear and their circuit breaker.

General

Short-ID	MV-NXAIRM
Duration	1 day
Language	English / German / Turkish
Training Format	offered in person and in virtual
Location	in Germany, Turkey, online, or at the client's site

Target Group

Field personnel and technicians involved in maintenance and servicing of NXAIR switchgear.

Prerequisites

Technical knowledge in operation and maintenance of Siemens medium voltage switchgears.
Since the training includes active learning components, the participants must wear their own suitable working clothes and safety shoes.

Contents

- Design
- Operation
- Electrical 5 Safety Rules
- Interlocking
- Maintenance/ Exercises
- Cable Compartment: Earthing switch and Current transformer
- Circuit Breaker compartment: Bushing, shutter mechanism
- Busbar Compartment: Busbar check
- Torques and Greasing of main components
- Q&A Session

PRIMARY TECHNOLOGY

NXAIR 12kV – 40kA – Assembly & Installation – Refresher

Objectives

In the training you will acquire profound knowledge about the latest developments of NXAIR switch gears (primary part).

General

Short-ID	MV-NXAIRR
Duration	1 day
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Turkey, online, or at the client's site

Target Group

Certified field service personnel.

Prerequisites

Certificate NXAIR.

Contents

Theory:

- Technical data and rated values
- Panel types
- Structure
- Interlocking
- Fundamentals of NXAIR Installation
- Handling/operation of NXAIR

Notes

This certificate is valid for 3 years.

NXPLUS – Assembly & Installation

Objectives

The training imparts profound knowledge about the layout, operation, and installation in the primary part of NXPlus.

General

Short-ID	MV-PLUS
Duration	4 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Assembly and installation staff.

Prerequisites

Basic knowledge of assembly technique.

Contents

- Theory:
  - Technical data rated values
  - Panel types
  - Structure
  - Interlocking
  - Safety instructions and 5 Safety Rules
- Practice:
  - Operation
  - Disassembly and assembly of the panels
  - Busbar installation
  - Current / voltage transformer installation
  - Replace the drive
- Visit the assembly line:
  - Steps of assembly and installation
  - Leakage test / -filling SF_6-gas
  - HV / PD inspection

Notes

1. After successful completion of the training, the participants receive an assembly and installation certificate. This certificate will become valid only upon successful completion of a practical NXPlus switchgear assembly training supervised by a certified Senior Supervisor and with the supervisor's signature. This certificate is valid for 3 years.
2. Since the installation training includes active learning components, the participants must bring suitable working clothes and safety shoes.
3. Additional training contents and services can also be provided upon request.

PRIMARY TECHNOLOGY

NXPLUS – Assembly & Installation – Refresher

Objectives

The training provides detailed updated information about NXPLUS Switchgear (primary part). The training participants receive the extension of their certificates after successful completion of the training.

General

Short-ID	MV-PLUSR
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Certified installation staff.

Prerequisites

Certificate MT NXPLUS.
Since the refresher training includes active learning components, the participants must wear suitable working clothes and safety shoes.

Contents

- Design modifications
- Modification of connection to busbar (pressure plates)
- New three-position switch drive mechanism
- New front display and operational array
- Three-position switch housing alignment

Notes

This certificate is valid for 3 years.

NXPLUS C – Assembly & Installation

Objectives

The training imparts profound knowledge about the layout, operation, and installation in the primary part of NXPlus C series.

General

Short-ID	MV-PLUSC
Duration	4 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Assembly and installation personnel.

Prerequisites

Basic knowledge of assembly technique.

Contents

- Theory:
  - Technical data and rated values
  - Panel types
  - Structure
  - Interlocking
  - Electrical 5 Safety Rules
- Practice:
  - Operation
  - Disassembly and assembly of the panels
  - Busbar installation
  - Current / voltage transformer installation
  - Auxiliary power transformer installation
- Visit the assembly line:
  - Steps of assembly and installation
  - Leakage test / - filling SF_6-gas
  - HV / PD inspection

Notes

1. After successful completion of the course, the participants receive an assembly and installation certificate. This certificate is valid for 3 years.
2. Since the installation training includes active learning components, the participants must bring suitable working clothes and safety shoes.
3. Additional training contents and services can also be provided upon request. Optional: Installation horizontal pressure relief channel (one additional day).

PRIMARY TECHNOLOGY

NXPLUS C – Assembly & Installation - Refresher

Objectives

In the training you will acquire profound knowledge about the latest developments of NXPLUS C switch gears (primary part).

General

Short-ID	MV-PLUSCR
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Certified field service personnel.

Prerequisites

Certificate MT-NXPLUS C.

Contents

- Theory:
  - Technical data and rated values
  - Panel types
  - Structure
  - Interlocking
- Practice:
  - Current / voltage transformer installation
  - Auxiliary transformer installation

Notes

1. Since the installation training includes active learning components, the participants must bring suitable working clothes and safety shoes.
2. Additional training contents and services can also be provided upon request.
3. Optional: Installation horizontal pressure relief channel (one additional day)

PRIMARY TECHNOLOGY

8BT1 – Technical Information

Objectives

The participants will understand the principles of air insulated medium-voltage switchgear systems and will gain the ability to operate and maintain safe conditions.

General

Short-ID	TIC-8BT1
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Operation and service personnel interested parties from sales and project processing.

Prerequisites

Basic technical knowledge on MV Switchgear operation.

Contents

- General Information on AIS technology and IEC Standard
- Reading drawings, electrical diagrams
- Design and features of the components
- Design and features of product in question
- Operation instructions
- Maintenance & troubleshooting instructions
- Quality processes
- Practical application on panel

PRIMARY TECHNOLOGY

8BT1 – Assembly & Installation

Objectives

The participants gained the ability of self-guiding on product installation, repairing and maintenance after having the theory (design, criteria, typical, i.e.). After successful completion, depending on the evaluation of the training, the participants receive an assembly certificate.

General

Short-ID	MV-8BT1
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Personnel who will be installing, repairing, maintaining, and supervising the panels.

Prerequisites

- For Siemens employees and approved subcontractors
- On-site experience with medium voltage switchgear
- Basic technical know-how
- Reading of electrical drawings and mechanical assembly drawings
- Quality control procedures
- To be able to carry out minor and easy to carry out repairs.
- To analyze faults and to define remedial actions supported by the factory

Contents

- Design features of product
- Installation instructions
- Practical application on panel
- 5 Safety Rules

PRIMARY TECHNOLOGY

8BT2 – Technical Information

Objectives

The participants will understand the principles of air insulated medium-voltage switchgear systems and will gain the ability to operate and maintain safe conditions.

General

Short-ID	TIC-8BT2
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Operation and service personnel interested parties from sales and project processing.

Prerequisites

Basic technical knowledge on MV Switchgear operation.

Contents

- General Information on AIS technology and IEC Standard
- Reading drawings, electrical diagrams
- Design and features of the components
- Design and features of product in question
- Operation instructions
- Maintenance & troubleshooting instructions
- Quality processes
- Practical application on panel

PRIMARY TECHNOLOGY

8BT2 – Assembly & Installation

Objectives

The participants gain the ability to self-guiding on product installation, repair and maintenance after having the theory (design, criteria, typical, i.e.). After successful completion, depending on the evaluation of the training, the participants receive an assembly certificate.

General

Short-ID	MV-8BT2
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Personnel who will be installing, repairing, maintaining, and supervising the panels.

Prerequisites

- For Siemens employees and approved subcontractors
- On-site experience with medium voltage switchgear
- Basic technical know-how
- Reading of electrical drawings and mechanical assembly drawings
- Quality control procedures
- To be able to carry out minor and easy to carry out repairs
- To analyze faults and to define remedial actions supported by the factory

Contents

- Design features of product
- Installation instructions
- Practical application on panel
- 5 Safety Rules

PRIMARY TECHNOLOGY

8BT3 – Technical Information

Objectives

The participants will understand the principles of air insulated medium-voltage switchgear systems and will gain the ability to operate and maintain safe conditions.

General

Short-ID	TIC-8BT3
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Operation and service personnel interested parties from sales and project processing.

Prerequisites

Basic technical knowledge on MV Switchgear operation.

Contents

- General Information on AIS technology and IEC Standard
- Reading drawings, electrical diagrams
- Design and features of the components
- Design and features of product in question
- Operation instructions
- Maintenance & troubleshooting instructions
- Quality processes
- Practical application on panel

PRIMARY TECHNOLOGY

8BT3 – Assembly & Installation

Objectives

The participants gain the ability to self-guide on product installation, repair, and maintenance after having the theory (design, criteria, typical, i.e.). After successful completion, depending on the evaluation of the training, the participants receive an assembly certificate.

General

Short-ID	MV-8BT3
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Personnel who will be installing, repairing, maintaining, and supervising the panels.

Prerequisites

- For Siemens employees and approved subcontractors
- On-site experience with medium voltage switchgear
- Basic technical know-how
- Reading of electrical drawings and mechanical assembly drawings
- Quality control procedures
- To be able to carry out minor and easy to carry out repairs.
- To analyze faults and to define remedial actions supported by the factory

Contents

- Design features of product
- Installation instructions
- Practical application on panel
- 5 Safety Rules

PRIMARY TECHNOLOGY

Basics of Transformers

Objectives

This training provides practical and theoretical knowledge of transformers and their accessories in power systems.

General

Short-ID	CU-BTR
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic knowledge of Transformers is essential.

Contents

- Introduction to transformers
  - Basics of transformers
  - Types of transformers & their functions
  - Components of transformers
  - Windings / Core / Connections
  - Tank & Oil filling
- Accessories & its functions
  - OLTC
  - Bushings / Radiators / Conservator / Breather
  - Bucholtz relay
  - PRD
  - Marshalling box/ RTCC
- Manufacturing of transformers
- Erection, Testing and commissioning of transformers
- Lifecycle enhancement techniques and product
- General types of faults and their understanding
- Transformer oil testing and analysis

PRIMARY TECHNOLOGY

Generator- and special circuit breaker – Technical information course

Objectives

The training provides information on Generator Breaker System technology, IEEE and IEC standards, design, functions, features of components and products. It gives the main technical knowledge on operation and maintenance instructions. Information concerning the production process, quality management and routine testing will be offered during the visits to the Circuit Breaker and Vacuum Interrupter factories in Berlin.

General

Short-ID	MV-GVCBTIC
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

Planning, operation, and service personnel. Interested parties from sales and project management.

Prerequisites

Basic technical knowledge on medium voltage.

Contents

- Scope of application on generator and special breaker
- IEEE and IEC standards, design, functions, features of components and products
- Advantages of vacuum switching technology
- General Information on generator and special breaker portfolio
- Engineering, selection process of generator and special breaker
- Technical drawings and electrical diagrams
- Operation and safety concept
- Maintenance/service concept
- Operating practice at generator and special breaker
- Guided tours:
  - Vacuum Interrupter and Circuit Breaker Factory (optional)

Notes

This training is available for the following generator vacuum circuit breakers: 3AK763, AH36/37/38 and special vacuum circuit breakers: 3AH4, 3AH47

PRIMARY TECHNOLOGY

Generator Switchgear (HB3) – Installation & Cold Commissioning

Objectives

This training has profound knowledge about design, functions, operation, and installation of HB3- Generator switchgears. After successful completion of training the participants receive a certificate that authorizes them to work self-responsibly, supervisor on the HB3-Generator switchgear.

General

Short-ID	MV-HB3ICC
Duration	2 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

For Siemens and external personnel who have knowledge and on-site experience with MS Circuit breakers and MS switchgears (e.g. 8BT1/2/3, NxAir, 8DA/B10, 8DJH, NxPlus, Simoprime).

Prerequisites

Technical knowledge of medium voltage.

Contents

- Introduction HB3 (ratings, typical, layout, IEEE and IEC standard)
- Design and function of the HB3-Generator switchgear
- Operation training (interlocks, drive mechanism, operating procedure)
- Construction and cold commissioning on final place
- Documentation of cold commissioning
- Handling and Troubleshooting
- Supervision

PRIMARY TECHNOLOGY

Generator Switchgear (HB3) – Service and Maintenance

Objectives

This training has profound knowledge about design, functions, service and maintenance of HB3- Generator switchgears. After successful completion of training the participants receive a certificate that authorizes them to work self-responsibly/supervisor on the HB3-Generator switchgear.

General

Short-ID	MV-HB3SMC
Duration	3 days
Language	English
Training Format	offered in person
Location	in Germany

Target Group

For Siemens and external personal who have knowledge and on-site experience with MS Circuit breakers and MS switchgears (e.g. 8BT1/2/3, NxAir, 8DA/B10, 8DJH, NxPlus, Simoprime).

Prerequisites

Technical knowledge of medium voltage.

Contents

- Introduction HB3 (ratings, typical, layout, IEEE and IEC Standard)
- Design and function of the HB3-Generator switchgear
- Operation training (interlocks, drive mechanism, operating procedure)
- Introduction of maintenance plan and spare part list
- Service works on the switching module 3AH36
- Exchange of primary- secondary components (e.g. switching module, central drive unit, VT, CT, SA)
- Locating and rectifying minor faults
- Check of switching times and mechanical

PRIMARY TECHNOLOGY

Generator Switchgear (HB3) - Technical information course

Objectives

The training provides information on Generator Breaker System technology, IEEE and IEC standards, design, functions, features of components and products. It gives the main technical knowledge on operation and maintenance instructions. Information concerning the production process, quality management and routine testing will be offered during the visits to the Circuit Breaker and Vacuum Interrupter factories (optional) in Berlin.

General

Short-ID	MV-HB3TIC
Duration	1 day
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

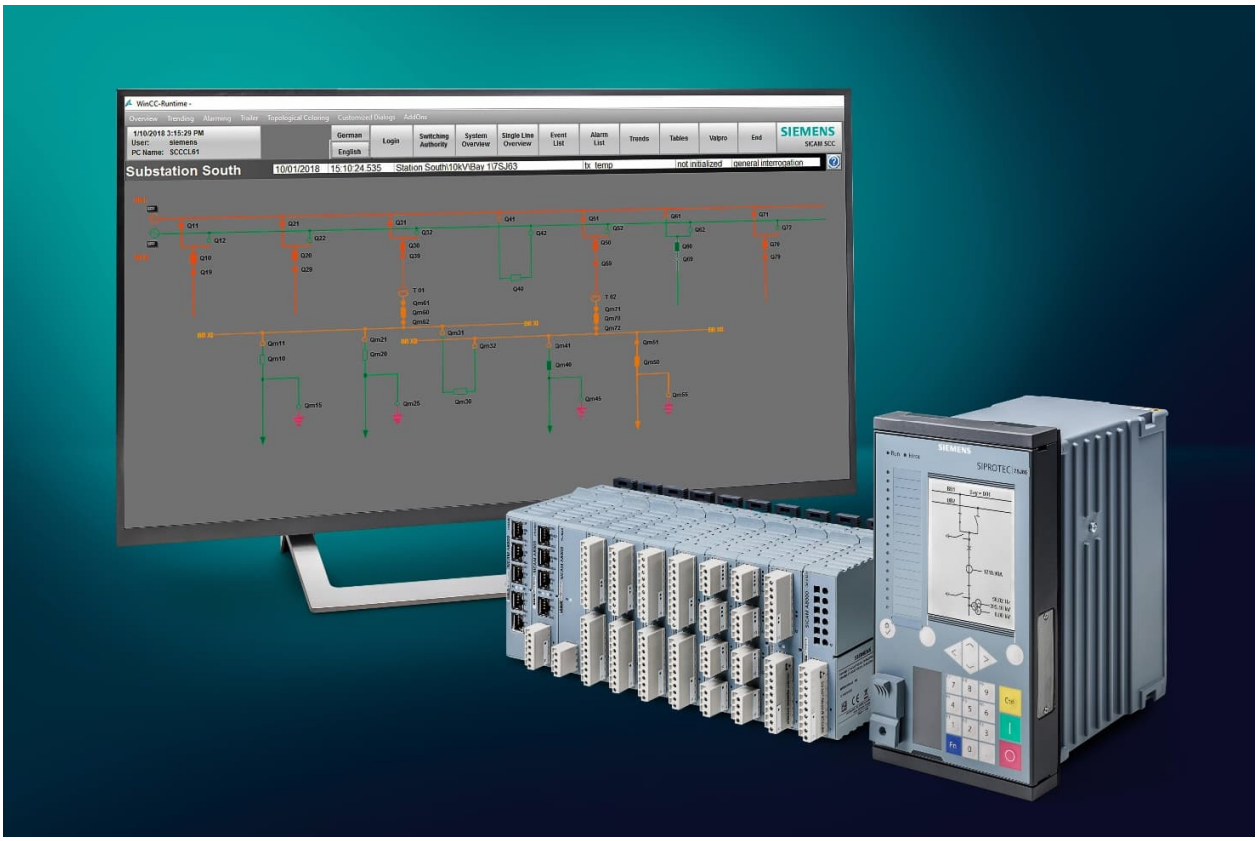
Planning, operation, and service personnel. Interested parties from sales and project management.

Prerequisites

Basic technical knowledge on medium voltage.

Contents

- Scope of application on Generator Breaker Switchgear and special requirements
- Applicable IEEE/IEC Standards and comparison
- Advantages of vacuum switching technology
- General information on generator breaker switchgear portfolio including HB1, HIGS, VB1 and typical application, focused on the HB3 generator switchgear
- Overview of offering, ordering and project management process
- Engineering process of generator breaker switchgear, selection of generator breaker and required project information
- Design features of generator breaker, HB3 and its components
- Operation and safety concept
- Maintenance & troubleshooting instructions
- Operating practice at HB3
- Guided tours (optional):
  - Vacuum Interrupter and Circuit Breaker factory



Substation Automation Training

SUBSTATION AUTOMATION

Telecontrol and Automation - Fundamentals (TOOLBOX II & DEVICE MANAGER)

Objectives

The participants will be familiar with the terms and problem definitions of automatic control engineering. They will also gain the basic knowledge to further attend the product-related training. Basic knowledge of IT-Security will be given.

General

Short-ID	ET-TELE
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, and online

Target Group

Technicians, who want to work with telecontrol and automation systems.

Prerequisites

Electrotechnical basic knowledge.

Contents

- Objective of automation basic structures of automation systems information to important standards
- IEC 60870-5
- Information and their handling
- Binary information, measured values, integrated totals
- Commands, setpoint values
- Communication
- Physical interfaces and communication equipment
- Serial transmission methods
- Organization of interaction
- Overall concept
- Data addressing
- Diagnosis
- Flexibility, extensibility
- Measures to increase reliability and availability
- Basics of IT-Security
- Split organizational / technical conception
- Threats and Architecture
- Hardening, virus protection, access protection

SUBSTATION AUTOMATION

Telecontrol and Automation - Fundamentals - Plus

Objectives

Participants will learn about substation automation solutions, communication protocols, network components, and network topologies. The course will provide foundational knowledge and practical insights for understanding and working with modern substation automation technologies. This will give participants a basic understanding to pursue future automation product training, such as SICAM, in the future.

General

Short-ID	TELAUTO-FP
Duration	3 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

Engineers or Technicians who want to work with telecontrol and automation systems.

Prerequisites

Basic Computer Skills:

- Participants should be comfortable using a computer and have a basic understanding of file management, software installation, and navigation.
- It's helpful to have a basic understanding of computer networks, but it's not required.

Contents

- Substation automation solutions
- Communication theory: serial connections, ISO/OSI models, TCP/IP, subnetting
- Ethernet network components: switches, routers, firewall, etc.
- Network topologies: star, ring, daisy chain, etc.
- Network redundancy protocols: RSTP, PRP, HSR
- Communication protocols for substation automation: IEC 61850, Modbus, and DNP3

SUBSTATION AUTOMATION

SICAM 8 (SICAM A8000 & SICAM S8000) - Complete for Engineers (DEVICE MANAGER)

Objectives

The participants will be able to configure automation systems of the SICAM 8 (SICAM A8000 & SICAM S8000) product family, using the engineering tool "SICAM Device Manager" including several communication protocols and control tasks (CFC). They will gain consolidated knowledge with theoretical foundations and practical exercises.

General

Short-ID	RTU-COMDM
Duration	5 days
Language	English / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, Austria, United States, online, or at the client's site

Target Group

Engineers who want to create solutions with the SICAM 8 (SICAM A8000 & SICAM S8000) automation system with the engineering tool "SICAM Device Manager".

Prerequisites

Knowledge of the most important terms of telecontrol technology or the training Telecontrol and Automation - Fundamentals (TOOLBOX II & DEVICE MANAGER) - (Virtual Training).

Contents

2 subsequent modules grant the optimal combination of theory and practical applications:

- SICAM 8 (SICAM A8000 & SICAM S8000) - Basic & Engineering (DEVICE MANAGER) (3,5 days)
- SICAM 8 (SICAM A8000 & SICAM S8000) - Logic Editor CFC (DEVICE MANAGER) (1,5 days)

SUBSTATION AUTOMATION

SICAM 8 (SICAM A8000 + SICAM S8000) - Basic & Engineering (DEVICE MANAGER)

Objectives

The participants will develop an understanding about the productivity of the scalable automation system SICAM 8. The participants gain an overview of the design, the most essential functions of SICAM 8. Furthermore, the participant acquires knowledge about the basic settings and the basic settings regarding the SICAM 8 automation system. The trainees will be able to set up SICAM 8 automation systems, create process signals in the engineering tool SICAM Device Manager. He will also learn how to apply and test communication connections to other automation systems and/or SCADA systems and configure the data flow routing from data acquisition to data output within the system.

General

Short-ID	RTU-BAEDM
Duration	3.5 days
Language	Arabic / English / German
Training Format	offered in person or virtually
Location	in the Arabic Emirates, Austria, online, or at the client's site

Target Group

Engineers and technicians who want to learn how to do Engineering for SICAM 8 automation systems by using the SICAM Device Manager.

Prerequisites

Knowledge of the most important terms of telecontrol technology or the training: Telecontrol and Automation – Fundamentals (TOOLBOX II & DEVICE MANAGER)
Optional: Various SICAM Product documents / videos.

Contents

Basic:

- The features of the different automation units, architecture, hardware of
  - SICAM A8000 CP-8000, CP-8021, CP-8022
  - SICAM A8000 CP-8031, CP-8050
  - SICAM S8000
- The mode of operation of SICAM 8 - from data acquisition to data output

Engineering:

- Engineering tool SICAM Device Manager briefly - Overview, GUI
  - Automation License Manager ALM
  - Project- and Device administration
  - Device parameterization
  - Hardware / Firmware configuration
- Communication (IEC104, IEC61850 Basic (Client & Server), MODBUS RTU Master)
- Signals (via I/O's / Communication / Diagnosis)
- Test and simulation capabilities with SICAM Device Manager as well SICAM WEB
- Practical exercises with SICAM Device Manager, SICAM WEB as well SICAM A8000 device
- Installation and functional overview of SICAM S8000

SUBSTATION AUTOMATION

SICAM 8 (SICAM A8000 + SICAM S8000) - retraining course for SICAM Device Manager

Objectives

The SICAM Device Manager and its integrated logic editor CFC forms the work environment for an integrated engineering for all automation units of the SICAM 8 product family. Based on your already existing solid knowledge in working with SICAM 8, SICAM Toolbox II and the logic editor CAEx Plus you will learn the differences as well possibilities of efficient engineering with the SICAM Device Manager as well the SICAM Device Manager logic editor CFC.

General

Short-ID	A8000UDM
Duration	3 days
Language	English
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Engineers and technicians who want to switch from SICAM Toolbox II / CAEx Plus to SICAM Device Manager / CFC.

Prerequisites

Solid knowledge about important terms / functions of telecontrol and automation technique, SICAM RTU's and SICAM 8 product family as well project-oriented knowledge working with SICAM Toolbox II and CAEx Plus.

Contents

SICAM Device Manager – Engineering:

- Engineering tool SICAM Device Manager briefly - Overview, GUI
  - Automation License Manager ALM
  - Project- and Device administration
  - Device parameterization
  - Hardware / Firmware configuration
- Communication (IEC104, IEC61850 Basic (Client & Server), MODBUS RTU Master)
- Signale (via I/O's / Communication / Diagnoses)
- Test and simulation capabilities with SICAM Device Manager as well SICAM WEB
- Practical exercises with SICAM Device Manager, SICAM WEB as well SICAM 8 device
- SICAM Device Manager – logic editor CFC:
  - Engineering tool SICAM Device Manager Logic Editor CFC at a glance – overview, GUI
  - Creation and structuring of an automation task
  - Charts
  - Processing order of charts as well as function blocks
  - User-defined function blocks (FBD & ST) as well User-defined structures
  - Loading into the target system SICAM 8
  - Use of test possibilities (offline, online)
  - Limits

SUBSTATION AUTOMATION

SICAM 8 (SICAM A8000 & SICAM S8000) - Logic Editor CFC (DEVICE MANAGER)

Objectives

The participants will master the operation and creation of a control task in destination system SICAM A8000 with use of the logic editor CFC (Continuous Function Chart). They will learn the IEC 61131 conform programming language emphasizing FBD (Functional-Block-Diagram) and its use.

General

Short-ID	RTU-CFC
Duration	1.5 days
Language	English / Portuguese
Training Format	offered in person or virtually
Location	in Brazil, United States, online, or at the client's site

Target Group

Engineers who want to learn how to program control logic tasks for SICAM 8 automation systems.

Prerequisites

Training: SICAM 8 (SICAM A8000 + SICAM S8000) - Basic & Engineering (DEVICE MANAGER) - Virtual Training.

Contents

- Engineering tool SICAM Device Manager Logic Editor CFC at a glance – overview, GUI
- Creation and structuring of an automation task
  - Charts
  - Processing order of charts as well as function blocks
  - User-defined function blocks (FBD & ST) as well User-defined structures
- Loading into the target system SICAM 8
- Use of test possibilities (offline, online)
- Limits

Notes

This training is part of SICAM 8 (SICAM A8000 + SICAM S8000) Complete for Engineers (Device Manager) - Virtual Training.

SUBSTATION AUTOMATION

SICAM 8 (SICAM A8000 + SICAM S8000) – Integrated System functions and IEC 61850 for Substation Application (DEVICE MANAGER)

Objectives

Based on the SICAM 8 (SICAM A8000 + SICAM S8000) – Complete for Engineers (DEVICE MANAGER) training the participant will increase his knowledge about IEC 61850 as well Substation related applications (like Interlockings, 1-out-of-N, Originator handling). The theoretical knowledge gained will be consolidated with several practical exercises.

General

Short-ID	61850DM
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Engineers who want to create solutions with the automation system SICAM 8 with the engineering tool "SICAM DEVICE MANAGER".

Prerequisites

Knowledge of the most important terms of telecontrol technology or the training Telecontrol and Automation – Fundamentals (TOOLBOX II & DEVICE MANAGER) – Virtual Training and automation as well completed training series SICAM 8 (SICAM A8000 + SICAM S8000) – Complete for Engineers (DEVICE MANAGER) – Virtual Training.

Contents

- IEC61850:
  - Summary about IEC61850 (Standard itself, communication protocols, presentation within the Tools …)
  - Client & Server parameterization
  - GOOSE parameterization within the System Configurator
  - Fault finding (SICAM WEB, Wireshark)
- System functions:
  - Originator handling for I/O‘s, CFC and protocols
  - Interlockings
  - 1-out-of-N command behavior
  - Diagnoses information sent via process information
  - Alarm grouping via system functions
  - CP-8050 Redundancy
  - Dashboard (Tiles and SVG graphics integration
  - SIAPP (Use Case, integration of Demo project)

SUBSTATION AUTOMATION

SICAM 8 (SICAM A8000 & SICAM S8000) - Transition course from TOOLBOX II to SICAM Device Manager (A8000UDM)

Objectives

The SICAM Device Manager and it's integrated logic editor CFC forms the work environment for an integrated engineering for all automation units of the SICAM 8 product family (SICAM A8000 & SICAM S8000). Based on your already existing solid knowledge in working with SICAM A8000, SICAM Toolbox II and the logic editor CAEx Plus you will learn the differences as well possibilities of efficient engineering with the SICAM Device Manager as well the SICAM Device Manager logic editor CFC.

General

Short-ID	61850DM
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Engineers and technicians who want to switch from SICAM Toolbox II / CAEx Plus to SICAM Device Manager / CFC.

Prerequisites

Solid knowledge about important terms / functions of telecontrol and automation technique, SICAM RTU's and SICAM A8000 product family as well project-oriented knowledge working with SICAM Toolbox II and CAEx Plus.

Contents

SICAM Device Manager – Engineering:

- Engineeringtool SICAM Device Manager at a glance - Overview, GUI
- Automation License Manager ALM
- Project- and Device administration
- Device parameterization
  - Hardware and Firmware configuration
  - Communication (IEC104, IEC61850), Basic (Client & Server), MODBUS RTU Master)
  - Signals (via I/O's / Communication / Diagnosis), etc.
- Test and simulation capabilities with SICAM Device Manager as well SICAM WEB
- Practical exercises with SICAM Device Manager, SICAM WEB as well SICAM A8000 device
- Installation and functional overview of SICAM S8000 (from September 2025)

SICAM Device Manager – logic editor CFC:

- Engineeringtool SICAM Device Manager Logic Editor CFC at a glance – overview, GUI
- Creation and structuring of an automation task
  - Charts and processing order of charts as well of function blocks

  - User-defined function blocks (FBD & ST) as well User-defined structures
- Loading into the target system SICAM A8000 or SICAM S8000
- Use of test possibilities (offline, online)
- Limits

SUBSTATION AUTOMATION

SICAM RTU & SICAM A8000 - Complete for Engineers (TOOLBOX II)

Objectives

The participants will be able to configure the automation system SICAM RTU and SICAM A8000, using the engineering tool "Toolbox II" based on preconfigured templates including communication protocols and control tasks (CAEx plus). They will gain consolidated knowledge with theoretical foundations and practical exercises.

General

Short-ID	RTU-COMTB
Duration	9.5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Engineers who want to create solutions with the automation system SICAM RTU and/or SICAM A8000 with the engineering tool “Toolbox II”.

Prerequisites

Knowledge of the most important terms of telecontrol technology or the training Telecontrol and Automation – Fundamentals (TOOLBOX II & DEVICE MANAGER).

Contents

3 modules grant the optimal combination of theory and practice learning content.
See the single modules:

- SICAM RTU & SICAM A8000 - Basics (TOOLBOX II) (1 day)
- SICAM RTU & SICAM A8000 - Engineering incl. IEC 61850 Client Parameterization (TOOLBOX II) (6 days)
- SICAM RTU & SICAM A8000 - CAEX plus (TOOLBOX II) (2,5 days)

SUBSTATION AUTOMATION

SICAM RTU & SICAM A8000 - Basics (TOOLBOX II)

Objectives

The participants will develop an understanding about the productivity of the scalable automation system SICAM RTUs. The participants gain an overview of the design of SICAM RTUs; understand the most essential functions; and know the basic mode of operation of SICAM RTUs.

General

Short-ID	RTU-BASIC
Duration	1 day
Language	English / German / Portuguese
Training Format	offered in person or virtually
Location	in Austria, Brazil, or online

Target Group

Employees from sales and engineering departments as well as system architects.

Prerequisites

Knowledge of the most important terms in telecontrol technology or the training: Telecontrol and Automation – Fundamentals (TOOLBOX II & DEVICE MANAGER).

Contents

- Product families at a glance
- The scalable automation concept of SICAM RTUs
- The features of the different automation units:
  - SICAM AK, SICAM AK3
  - SICAM A8000
- The mode of operation of SICAM RTUs – from data acquisition to data output
- Diagnosis and test

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-RTUBAS

SUBSTATION AUTOMATION

SICAM RTU & SICAM A8000 - Basics and Maintenance (TOOLBOX II)

Objectives

The participants understand the performance of the scalable automation system SICAM RTUs. They gain an overview of the internal structure and architecture of SICAM RTUs and the most essential functions. The participants can maintain SICAM RTUs automation systems with the help of "Plug and Play for Spare parts". Using the SICAM Toolbox II the participants will have the knowledge to do:

- Diagnostics and evaluation
- Patching the system via firmware update
- Updating of SICAM Toolbox II Master Data via Live Update
- Creation of a Data Backup resp. Import of Data Backups

General

Short-ID	RTU-BASICM
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Service technicians involved in the maintenance of SICAM RTUs systems.

Prerequisites

Knowledge of the most important terms in telecontrol technology or the training: Telecontrol and Automation – Fundamentals (TOOLBOX II & DEVICE MANAGER).

Contents

- Overview of SICAM RTUs system family
- The scalable automation concept of SICAM RTUs
- The features of the SICAM RTUs system, SICAM AK, SICAM AK3, SICAM TM, SICAM A8000
- The mode of operation of SICAM RTUs from data acquisition to data output
- Diagnosis, test options, system architecture and hardware overview
- Service functions of SICAM Toolbox II
- Diagnosis and connectivity
- How to change system elements
- Mechanical design and remote maintenance
- SICAM WEB
- Practical exercises with SICAM TOOLBOX II and SICAM RTUs automation components

Notes

This training consists of the training modules SICAM RTU & SICAM A8000 Basics (TOOLBOX II) and SICAM RTU & SICAM A8000 Maintenance (TOOLBOX II), which can also be booked separately.

SUBSTATION AUTOMATION

SICAM RTU & SICAM A8000 - Maintenance (TOOLBOX II)

Objectives

The participants can maintain SICAM AK3, SICAM A8000 automation systems with the help of "Plug and Play for Spare parts". Using the SICAM Toolbox II the participants will have the knowledge to do Diagnostics and evaluation:

- Patching the system via firmware update
- Updating of SICAM Toolbox II Master Data via Live Update
- Creation of a Data Backup resp. Import of Data Backups

General

Short-ID	RTU-SERVMA
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Service technicians involved in the maintenance of SICAM RTUs systems.

Prerequisites

Training

Contents

- System architecture and hardware overview
- How to change system elements
- Connectivity, mechanical design
- Import/Backup and update of SICAM Toolbox II data
- SICAM TOOLBOX II - handling in principle
- Diagnosis options
- Remote maintenance
- SICAM WEB
- Firmwareupdate
- Practical exercises with SICAM Toolbox II and SICAM RTUs automation components

SUBSTATION AUTOMATION

SICAM RTU & SICAM A8000 - Engineering incl. IEC 61850 Client Parameterization (TOOLBOX II)

Objectives

The participants will be able to set up a SICAM RTUs automation system based on pre-configured templates, create process signals in the engineering tool OPM II, and use process signals in a block diagram. They will also learn how to apply and test communication connections to other SICAM RTUs devices and/or SCADA systems and configure the data flow routing from data acquisition to data output within the SICAM RTUs system.

General

Short-ID	RTU-ENGTB
Duration	6 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Engineers, who want to learn how to do the Engineering for SICAM RTUs Automation Systems.

Prerequisites

Training: SICAM RTU & SICAM A8000 - Basics (TOOLBOX II).

Contents

- Overview of functions within SICAM RTUs
- Addressing concept according to IEC 60870-5
- Automatic and selective data flow routing
- Parameterization of communication
  - IEC 60870-5-101
  - IEC 60870-5-104
  - IEC 61850 Client
- Test and simulation capabilities with the SICAM Toolbox II
- Practical exercises with the SICAM Toolbox II and a SICAM RTUs automation module (e.g. SICAM AK3, SICAM A8000, etc.)
- Parameter administration with the SICAM Toolbox II Import/Export/Backup

Notes

This training is part of SICAM RTU & SICAM A8000 - Complete for Engineers (TOOLBOX II).

SUBSTATION AUTOMATION

SICAM RTU & SICAM A8000 - CAEx Plus (TOOLBOX II)

Objectives

The participants will master the operation and creation of a steering task in the destination system SICAM RTUs with use of CAEx plus. They will learn the IEC 61131 conform programming language emphasizing FBD (Functional-Block-Diagram) and its use.

General

Short-ID	RTU-CAEX
Duration	2.5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Automation technicians for SICAM RTUs automation systems.

Prerequisites

Basic knowledge of digital circuit technology. Basic knowledge of SICAM RTUs automation system.

Contents

- Overview of norm IEC 61131
- Creation of data module for CAEx plus with OPM II
- Handling of Functional-Block-Diagram
- Creation and structuring of a steering task
- Loading into destination system SICAM RTUs
- Use of tests (OFFLINE, ONLINE oscilloscope)
- Creation of a documentation with CAEx plus

Notes

This training is part of the SICAM RTU & SICAM A8000 Complete for Engineers (TOOLBOX II) – Virtual Training. This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-RTUCAEX

SUBSTATION AUTOMATION

SICAM RTU - TOOLBOX II

Objectives

The participants will be able to configure a SICAM RTU automation system using the engineering tool "Toolbox II" based on preconfigured templates including communication protocols and control tasks (CAEx plus). They will gain consolidated knowledge with theoretical foundations and practical exercises.

General

Short-ID	SICAM-TOOLBOX
Duration	3 days
Language	English / German
Training Format	offered in person
Location	in the United States

Target Group

Users from electric utilities and the industrial sector who want to create solutions with the automation system SICAM RTU using the engineering tool "Toolbox II".

Prerequisites

Attendance in SICAM A8000-Complete for engineers (RTU-COMDM).

Contents

Upon completion of this class, the student shall be able to:

- Install and TOOLBOX II
- Create structured projects using Plant Management
- Use OPM to:
  - Create Automation Unit's (AU) hardware using system technique
  - Data modeling with Process Technical Plant, including signal generation and routing information
  - Bulk edit database for time improvement
  - Initialize, download parameters and firmware to AU
- Use CAEx Plus to:
  - Create logics charts & function blocks using Function Block Diagrams (FBD)Structured Text(ST)
  - Go online to monitor logic charts
  - Use Online tool to collect CPU's diagnose information
  - Use Data Distribution Center to create or recover project back-up

SUBSTATION AUTOMATION

Substation Automation System (RTU/A8000)

Objectives

The participants will be able to configure the automation system SICAM RTU and SICAM A8000, using the engineering tool "Toolbox II" based on preconfigured templates including communication protocols and control tasks. They will gain consolidated knowledge with theoretical foundations and practical exercises.

General

Short-ID	SAS-RTU
Duration	3 days
Language	English
Training Format	offered virtually
Location	online (India)

Target Group

Engineers who want to create solutions with the automation system SICAM RTU and / or SICAM A8000 with the engineering tool "Toolbox II".

Prerequisites

Basic knowledge of Substation Automation and Protection Technology.

Contents

- Introduction to Substation Automation System
- Introduction to Toolbox-II & SICAM 230 features
- Introduction to DIGSI and Features
  - Communication settings
- Introduction to Toolbox-II and Features
  - Configurations, Features and Applications
- Introduction to AK1703/ TM1703 and Features
  - Configuration, Architectures, Features and Applications
- Introduction to SICAM 230 and Features
  - Configurations and Applications
- Hardware components
- Special settings for communications
- Sample exercise
- Practical demonstration and troubleshooting

SUBSTATION AUTOMATION

SICAM PAS – Basics

Objectives

The participants will learn how to use SICAM PAS V8 system and its basic operation. Hands-on-training using a sample configuration with HMI operator station and telecontrol interface. Basics of system and fault diagnosis.

General

Short-ID	PAS-B
Duration	3 days
Language	Arabic / English / German / French
Training Format	offered in person or virtually
Location	in the Arabic Emirates, France, Germany, United States, online or at the client's site

Target Group

Customers from power utilities and industry are responsible for operating a SICAM PAS system.

Prerequisites

Fundamentals of telecontrol and automation.

Contents

- Introduction to SICAM PAS total system
- System functions and System components
- Licensing
- SICAM PAS UI - User Interface
- PAS Runtime System Control with UI Operation
- Test and diagnostic tool SICAM Value Viewer
- Communication Interface with IEC101/104
- Siemens serial hub
- Local HMI system SICAM SCC
- IEC 61850 - Communication Standard for Switchgears
- SICAM Station Unit
- PAS Redundancy concept
- Configuration Examples
- Basics of IT-Security

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PASB

SUBSTATION AUTOMATION

SICAM PAS – Parameterization

Objectives

The principal component of substation automation is the bundling and forwarding of all important data from the individual automation devices to the network control center. SICAM PAS is proven software that precisely fulfils this task. SICAM PAS is clearly and simply structured so that the automation devices and the network control center can communicate with each other via SICAM PAS after a short time. In this training, participants will learn how to connect various devices with different protocols to SICAM PAS.

General

Short-ID	PAS-P
Duration	5 days
Language	Arabic / English / German
Training Format	offered in person or virtually
Location	in the Arabic Emirates, Germany, United States, online, or at the client's site

Target Group

Customers from power utilities and industry who wish to do user specific parameterization or changing of parameterization.

Prerequisites

Training: SICAM PAS - Basics (PAS-B).

Contents

- Basics of SICAM PAS
- Setting up a SICAM PAS computer
- Starting parameterization
- Integration of SIPROTEC 4 devices with IEC 61850
- Tele-communication with a Control Center through IEC 101/104
- Interface to local HMI station SICAM SCC
- CFC logic programming
- Integration of SIPROTEC 5 devices with IEC 61850
- SNMP monitoring of Ethernet switches
- Redundancy
- Practical Exercises

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PASP

SUBSTATION AUTOMATION

SICAM SCC - Configuring an Operator Station

Objectives

The participants will be able to configure a graphical operator station with SICAM SCC V8.

General

Short-ID	PAS-S
Duration	3.5 days
Language	Arabic / English / French / German
Training Format	offered in person or virtually
Location	in the Arabic Emirates, France, Germany, United States, online, or at the client's site

Target Group

Customers from power utilities and industry wish to be able to design or modify the graphical user interface.

Prerequisites

Basic knowledge of substation automation.

Contents

- Introduction to SICAM SCC
- Installing a SICAM SCC computer
- Importing SICAM PAS/SCD files
- Devising a project
- Graphics Designer
- Compatibility Key
- Switching Authority
- User Administrator
- Bay and Telecontrol Blocking
- Message lists
- Practical exercises

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PASC

SUBSTATION AUTOMATION

SICAM PAS – Automation with CFC, ST & SFC

Objectives

The participants will be familiar with the most important CFC blocks and how to use them. Furthermore, they learn about the advantages of the programming language ST (Structured Text), which was especially developed for automation systems. Both tools will be used to parameterize and program examples for various applications.

General

Short-ID	PAS-C
Duration	3 days
Language	Arabic / English / French / German
Training Format	offered in person or virtually
Location	in the Arabic Emirates, France, Germany, online, or at the client's site

Target Group

Customers who oversee parameterization and programming of logic functions in a SICAM PAS system.

Prerequisites

Training: SICAM PAS - Parameterization (PAS-P).

Contents

- Introduction to PAS automation
- Frequently used CFC blocks
- Application of CFC in various examples
- Basics of programming language ST
- Primary use of ST and CFC
- Writing programs / functions / function blocks with ST
- Combinations of CFC and ST
- SFC - sequential function chart for switching sequences

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PASC

SICAM PAS – Complete

Objectives

The participants will gain a basic knowledge of the entire SICAM PAS system. They will be able to independently set up a SICAM PAS configuration and configure a graphical operator station with SICAM SCC.

General

Short-ID	PAS-COM
Duration	10 days
Language	Arabic / English / French / German
Training Format	offered in person or virtually
Location	in the Arabic Emirates, France, Germany, online, or at the client's site

Target Group

Customers from power utilities and industry are responsible for operating a SICAM PAS system, who wish to do user specific parameterization and to be able to modify the graphical user interface.

Prerequisites

Fundamentals of telecontrol and automation.

Contents

- SICAM PAS software installation/licensing
- Operation of the SICAM PAS software
- Telecommunications with IEC 101 / IEC 104 protocol
- Automation with SICAM PAS
- SICAM PAS and the IEC61850 communication standard
- SNMP Simple Network Management Protocol
- SICAM PAS redundancy
- SICAM SCC software installation / licensing
- Alarm logging / day logging with SICAM SCC
- WinCC user management
- Topological coloring

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PASB, WT-PASP, WT-PASS

SICAM PAS – System Diagnosis & Trouble Shooting

Objectives

The training provides systematical diagnosis and fault analysis in the entire substation automation. It imparts profound detailed information out of different components.

General

Short-ID	PAS-SYS
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Users in parameterization and commissioning of SICAM PAS.

Prerequisites

Knowledge in substation automation, remote control, network, and communication.

Contents

- IEC 101/104 Protocol description, Test-Tools and protocol analysis with ethereal / wire shark
- Systematical approach to communication problems
- RuggedCom settings, IP, SMNP, configuration concepts, diagnosis
- Redundancy Protocols
- IEC 61850
- Interoperability
- IEC Browser
- Netview and Networkview
- GOOSE-Inspector
- Fault analysis for serial protocols
- Serial communication and respective tools
- Modbus and DNP
- SICAM PAS
  - General Information
  - DSITest and Cfe Test and Diagnosis UI
  - Redundancy and Time Synchronization
- Power Quality
  - Soft PLC and WinCC
  - Diagnostic Tools, scripting and archiving

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-PASSYS

Substation Automation System (SICAM PAS/SCC)

Objectives

The participants will gain a basic knowledge of the entire SICAM PAS system. They will be able to independently set up a SICAM PAS configuration and configure a graphical operator station with SICAM SCC.

General

Short-ID	SAS-PAS
Duration	3 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Customers from power utilities and industry are responsible for operating a SICAM PAS system, who wish to do user specific parameterization and to be able to modify the graphical user interface.

Prerequisites

Basic knowledge of Substation Automation and Protection Technology.

Contents

- Introduction to Substation Automation System
- Introduction to SICAM PAS and WinCC Features
- Introduction to DIGSI and Features
  - Communication settings
- Introduction to SICAM PAS and Features
  - Configurations, Features and Applications
- Introduction to AK1703/ TM1703 and Features
  - Configuration, Architectures, Features and Applications
- Introduction to SCC and Features
  - Configurations, Features and Applications
- Hardware components
- Feature Enabler
- Special settings for communications
- Sample exercise
- Practical demonstration and troubleshooting

SUBSTATION AUTOMATION

Automation System

Objectives

This training provides practical and theoretical knowledge of Substation Automation system in power system.

General

Short-ID	CU-BSAS
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Engineers in Electrical / Electronics/ Instrumentation/ ENTC/ Biomedical Engineering.

Prerequisites

Basic knowledge & understanding of Substation Automation System.

Contents

- Introduction to Substation Automation system
- Types of Automation
- Architecture of SAS
- Introduction to the Communication network of SAS
  - Media
  - Methods
- Basics of protocols like IEC 61850, IEC 104, IEC 103, NTP, MODBUS, IRIG-B, PTP, PRP
- Network topologies
- Introduction to Ethernet switch
- Introduction to GPS
- Hardware components
- Feature enabler
- Latest trends in markets

Smart Communication Training

SMART COMMUNICATION

PowerLink - Basics 50/100

Objectives

The participants will get to know theoretical and practical knowledge on installation and commissioning.

General

Short-ID	SITPLB
Duration	5 days
Language	English / German
Training Format	offered in person
Location	in Germany, or at the client's site

Target Group

Customer/Siemens installation and commissioning personnel.

Prerequisites

Basic knowledge of power line communication (PLC).

Contents

- Introduction of PLC network (coupling unit, coupling capacitor, line trap, HV-line)
- PowerLink overview:
  - Hardware
  - Features and highlights
  - Interfaces and functions
  - iSWT (integrated teleprotection signaling)
- Tools: PowerSys, PLPAStraps, SWTStraps and MemTool
  - Commissioning sequence and measurements (line attenuation, noise signal)
  - Trouble shooting: Alarm display, Event recorder

SMART COMMUNICATION

PowerLink - IP

Objectives

The participants will get to know theoretical and practical knowledge on installation and commissioning.

General

Short-ID	SITPLIP
Duration	5 days
Language	English / German
Training Format	offered in person
Location	in Germany, or at the client's site

Target Group

Customer/Siemens installation and commissioning personnel.

Prerequisites

Basic knowledge of power line communication (PLC) network engineering.

Contents

- Introduction of PLC network (coupling unit, coupling capacitor, line trap, HV-line)
- Introduction of PowerLink IP
- Equipment overview (feature highlights)
- Hardware and functions including iSWT 3000 (integrated teleprotection signaling)
- Administration with Web UI (web browser-based user interface)
- User level and user management
- Interfaces (service port, user port)
- Introduction of Monitoring (device information, event log, quality data statistics, alarms, optional: integrated spectrum analyzer)
- Commissioning sequence and measurements (line attenuation, noise signal)
- Installation and using of PLPAStraps program and SWTStraps program
- Measurement of signals (MARC-signal, Modem-signal, Teleprotection-signals, iSWT 3000 Rx-signal)
- Introduction of fault evaluation

SMART COMMUNICATION

Teleprotection SWT 3000

Objectives

The participants will get to know theoretical and practical knowledge on installation and commissioning.

General

Short-ID	SITSWT3
Duration	5 days
Language	English / German
Training Format	offered in person
Location	in Germany, or at the client's site

Target Group

Customer/Siemens installation and commissioning personnel.

Prerequisites

Basic knowledge of power line communication (PLC) network engineering.

Contents

- System Overview:
  - SWT 3000 stand-alone HW
  - SWT 3000 integrated (iSWT) hardware features
- Installation: Power Supply, Connection cable, Cabinet wiring, Connectors for Alarms/IFC/RM
  - General approach to commissioning: PowerSys, SWTStraps, Jumper settings
- Entering and verifying of configuration settings:
  - Permissive/direct tripping (only analogue)
  - Coded/uncoded (only analogue)
  - VF-modes, Timers, Level settings, Level measurement
- Practical exercises with different configurations
- Clock Synchronization
- Remote access
- Fault analysis:
  - Trouble shooting, Alarm display, Event recorder
- SW Upgrade with MemTool
- SNMP / IP

SMART COMMUNICATION

IP - Networking in Substations

Objectives

After this training the students are able to analyze and fix easy communication problems in the substation. Furthermore, they can follow a discussion with IT experts.

General

Short-ID	SIT-COMSUB
Duration	3 days
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Turkey, online, or at the client's site

Target Group

Technicians and engineers who work with networks and components. Even interested no-technicians are warmly welcome to this training.

Prerequisites

Basic knowledge of communication and network technique.

Contents

- What's the difference between ethernet and LAN?
- Communication in general – what is necessary for communication?
- Protocols
- The most important 4 layers of the ISO/OSI 7 layer model
- IP vs. MAC address
- The subnet mask
- TCP vs. UDP
- VLAN – functionality and Switch functionality
- Windows Firewall
- Bug fixing in the network with diagnosis tools

Notes

This training is part of a Curriculum. The respective e-test can be booked through the Internet on demand. Please enter the booking code into search field: WT-SITCOMS

SICAM Control Application Training

SICAM CONTROL APPLICATION

Microgrid Control - SICAM Solutions for Project-Specific Needs

Objectives

Gain a comprehensive understanding of standard use cases for integrating equipment into a SICAM Microgrid solution. Adaptation of the SICAM Microgrid standard solution to a fictitious project. Running an adapted SICAM Microgrid with signals of different assets via different protocols.

General

Short-ID	MG-ENG
Duration	4 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Professionals responsible for implementing customized Microgrid solutions.

Prerequisites

- Knowledge of SICAM WinCC / SCC, Toolbox II, SICAM Device Manager, A8000
- Completion of the Hands-On Application Training for Implementing Microgrid Solutions
- Or solid knowledge of SICAM Microgrid Solutions
- Familiarity with communication protocols such as IEC61850, IEC 104, Modbus, TCP

Contents

- Discussing the workflow of a new microgrid project
- Adapting the SICAM Toolbox backup files to a fictitious project
- Usages of global variables
- Adding signals of protocols which are not in SICAM Toolbox backup file
- Adapting of SICAM WinCC/SCC pictures to customer needs

SICAM CONTROL APPLICATION

Microgrid Control - Introduction to Microgrid Philosophy and Conceptual Design

Objectives

The Gain a comprehensive understanding of microgrid concepts and design principles. Develop the ability to create a basic microgrid concept tailored to various scenarios.

General

Short-ID	MG-OV
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

- Individuals with a foundational knowledge of electrical networks
- Professionals from diverse backgrounds are interested in microgrid applications

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Microgrid theory and principles
- Real-world scenarios and applications
- Conceptual design process
- Understanding microgrid potentials and possibilities
- Hands-on development of basic microgrid concepts

SICAM CONTROL APPLICATION

Microgrid - Implementing Microgrid Solutions with SICAM

Objectives

Install, configure, and operate SICAM Microgrid solution (MCG & Simulation RTU). Gain a comprehensive understanding of standard use cases for integrating equipment into a microgrid solution.

General

Short-ID	MG-SICA8
Duration	2.5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

- Professionals implementing SICAM Microgrid solutions
- Operators of SICAM Microgrid

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Setup and configuration of SICAM Microgrid solutions
- Simulating various power influence scenarios
- Understanding SICAM Microgrid framework capabilities
- Visualization and monitoring possibilities within the SICAM platform

SICAM CONTROL APPLICATION

Microgrid Control - Engineering

Objectives

The participants know the features and functionalities of Microgrid Control - a SICAM application software and the respective hardware platform. Furthermore, the participants will learn how to install, commission, handle and parameterize the specific algorithms and functions of Microgrid Control and its Human-Machine-Interface.

General

Short-ID	MG-ENG
Duration	4 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

The training is essential for engineers responsible for the commissioning and parameterization of Microgrid Control - a SICAM application system. Furthermore, the training is also useful for members of technical sales who are responsible for customer contact in the pre-sales phase.

Prerequisites

- Fundamentals of telecontrol and automation
- Advanced knowledge in SICAM SCC and SICAM A8000
- Advanced knowledge in TOOLBOX II

Contents

- Introduction to Microgrid Control - a SICAM application
- Microgrid system architecture
- System functions and features
- Adaptations and individual design/ engineering
- Practical examples and exercises

SICAM CONTROL APPLICATION

Microgrid - SICAM A8000 & SICAM SCC – Application

Objectives

The participants get knowledge about the microgrid components, SICAM A8000 and SICAM SCC. Small practical exercises allow the students to get familiar with the system.

General

Short-ID	MG-SICA8
Duration	4 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

The training is for engineers commissioning Microgrid Control - a SICAM application systems. Furthermore, the training is useful for members of the technical sales who are responsible for customer contact in the pre-sales phase.

Prerequisites

Fundamentals of microgrid.

Contents

- Microgrid overview
- Modules of the SICAM A8000
- Configuration tools of SICAM A8000
- Configuration example
- Introduction of SCC
- Creating an easy project
- Importing tags
- Graphics designer
- Alarm logging
- User Administration

SICAM CONTROL APPLICATION

Load Shedding – Engineering

Objectives

The participants know the features and functionalities of Load Shedding - a SICAM application software and the respective hardware platform. Furthermore, the participants will learn how to install, commission, handle and parameterize the specific algorithms and functions of Load Shedding and its Human-Machine-Interface.

General

Short-ID	MG-LS
Duration	4.5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

The training is essential for engineers responsible for the commissioning and parameterization of Load Shedding - a SICAM application system. Furthermore, the training is also useful for members of technical sales who are responsible for customer contact in the pre-sales phase.

Prerequisites

- Fundamentals of telecontrol and automation
- Advanced knowledge in
  - SICAM SCC
  - SICAM A8000
  - TOOLBOX II

Contents

- Introduction to Load Shedding - a SICAM application
- Load Shedding system architecture
- System functions and features
- Adaptations and individual design/ engineering
- Practical examples and exercises

SICAM CONTROL APPLICATION

Photovoltaic Plant Control – Engineering

Objectives

The participants know the features and functionalities of Photovoltaic Plant Control - a SICAM application software and the respective hardware platform. Furthermore, the participants will learn how to install, commission, handle and parameterize the specific algorithms and functions of Photovoltaic Plant Control and its Human-Machine-Interface.

General

Short-ID	MG-PPC
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

The training is essential for engineers responsible for the commissioning and parameterization of Photovoltaic Plant Control - a SICAM application system. Furthermore, the training is also useful for members of technical sales who are responsible for customer contact in the pre-sales phase.

Prerequisites

- Fundamentals of telecontrol and automation
- Advanced knowledge in SICAM SCC and SICAM A8000
- Advanced knowledge in TOOLBOX II

Contents

- Introduction to Photovoltaic Plant Control - a SICAM application
- Photovoltaic Plant Control system architecture
- System functions and features
- Adaptations and individual design/ engineering
- Practical examples and exercises

SICAM CONTROL APPLICATION

Photovoltaic Plant Control Compact

Objectives

Describe the fundamental principles of photovoltaic energy conversion in solar panels.

- Analyze the capabilities and features of the SICAM PPC Compact solution for photovoltaic plant control.
- Differentiate between various power control algorithms for photovoltaic systems available in the SICAM PPC Compact solution.
- Assess SICAM PPPC Compact performance and efficiency.
- Demonstrate the ability to configure a project using SICAM Device Manager.

General

Short-ID	MG-PPC
Duration	3 days
Language	English
Training Format	offered in person
Location	in the United States

Target Group

Engineers responsible for the commissioning and parameterization of SICAM PPC Compact solution. These professionals are likely to be involved in the implementation, setup, and fine-tuning of the solutions.

Prerequisites

- Basic understanding of Ethernet networking principles, including concepts like IP addressing, subnetting, and routing protocols.
- Basic knowledge of electrical engineering concepts.
- Familiarity with renewable energy systems, particularly solar power generation.

Contents

- Introduction to Photovoltaic (PV) Systems:
  - Understanding the basics of solar energy and photovoltaic systems, including solar panels basic and photovoltaic component basics.
- Overview and simulate the Power Control Algorithms included in SICAM PPC Compact solution.
- Overview of the SICAM PPC Compact operation Interface
- Configuration of a new PPC Compact project using SICAM Device Manager

SICAM CONTROL APPLICATION

Highlights - SICAM Control Applications (From Dynamic Load Management to the Microgrid Controller)

Objectives

What generally are SICAM Applications? What is the purpose of SICAM Applications?
Short introduction to....

- Microgrid Controller (MGC)
- PV Plant Controller (PPC)
- Fast Load Shedding Controller (LSC)
- Dynamic Load Management (DLM)

General

Short-ID	MG-SICAP
Duration	1 day
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, online, or at the client's site

Target Group

Sales manager, Project engineers, technical department managers.

Prerequisites

Basic electrical engineering knows how.

Contents

The training provides an overview of what the individual applications are necessary for, and which functions are covered.
For this the following questions are answered:

- What is a microgrid? Why do you need a controller for this?
- Which equipment can be part of a microgrid?
- What is island operation? Why do you need a sync?
- Why do you need a PV Plant Controller?
- When and why do electrical loads need to be switched off quickly? What do you need?
- Do EV charging stations need a special controller?

Sustainability Training

SUSTAINABILITY

Sustainable Business and Circular Economy - ConsulTrain™ Inspire

Objectives

- Gain a thorough understanding of the fundamentals of circular economy and its relevance in power generation, utilities, and manufacturing industries
- Learn the best practices about circular economic strategies for procurement, enabling sustainable sourcing and supplier management
- Explore circular design and eco-innovation techniques for product, fostering the development of sustainable and circular products
- Understand how circular supply chain management can optimize resource utilization and contribute to supply chain sustainability

General

Short-ID	SUST-BCE
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1: Understanding the Fundamentals of Circular Economy
  - Principles of the circular economy and its relevance to power generation, utilities, and manufacturing industries
  - Key benefits and challenges of implementing circular economy principles in different industries
- Module 2: Circular Economy Strategies in Procurement
  - Circular procurement strategies and best practices using Environmental Product Declarations
  - Sustainable sourcing and supplier management in the context of circular economy
- Module 3: Circular Design and Eco-Innovation for Product design
  - Circular design approaches and principles for product development using the Life cycle assessment methodology
  - Eco-design techniques and innovation methods for creating sustainable and circular products
- Module 4: Circular Supply Chain Management
  - Circular value chain analysis and optimization for supply chain management
  - Reverse logistics, waste management, and the role of circular economy in supply chain sustainability

SUSTAINABILITY

Sustainable Business and Net-Zero - ConsulTrain™ Inspire

Objectives

- Gain a thorough understanding of sustainable business strategies for net-zero emissions.
- Learn about key principles and frameworks for developing sustainable business models.
- Explore carbon footprint measurement and reduction techniques.
- Understand the role of clean energy solutions in achieving net-zero goals.

Each ConsulTrain™ (Economic, Inspire, and One) offers professionals a targeted and comprehensive learning experience in sustainable business strategies for achieving net-zero emissions. Participants will gain the knowledge and skills required to develop and implement effective strategies, measure emissions, adopt clean energy solutions, manage supply chains, utilize innovative technologies, engage stakeholders, and advocate for policy changes. This training provides a valuable opportunity to drive sustainable transformations in organizations and contribute to a healthier and more sustainable future.

General

Short-ID	SUST-BN
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1: Sustainability and business
  - Introduction to sustainable business strategies and their importance in achieving net-zero emissions
  - Key principles and frameworks for developing sustainable business models and practices in different Industries
- Module 2: Carbon footprint of your business activities
  - Carbon footprint measurement and reduction techniques for different sectors
  - The role of clean energy solutions, such as renewables and energy efficiency, in achieving net-zero goals
- Module 3: Reaching Net- zero
  - Know the tools used in the industry for measuring progress to Net-zero
  - Assess your net-zero strategy or start developing on your own

SUSTAINABILITY

Sustainable Business Strategies for Net-Zero - ConsulTrain™ Economic

Objectives

- Gain practical knowledge on implementing net-zero strategies and understand the process of developing a net-zero strategy
- Learn about sustainable supply chain management and circular economy practices
- Explore innovative technologies and solutions for decarbonization
- Understand the importance of stakeholder engagement in driving net-zero initiatives

Each ConsulTrain™ (Economic, Inspire, and One) offers professionals a targeted and comprehensive learning experience in sustainable business strategies for achieving net-zero emissions. Participants will gain the knowledge and skills required to develop and implement effective strategies, measure emissions, adopt clean energy solutions, manage supply chains, utilize innovative technologies, engage stakeholders, and advocate for policy changes. These courses provide a valuable opportunity to drive sustainable transformations in organizations and contribute to a healthier and more sustainable future.

General

Short-ID	SUST-SBSN
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

Day 1

- Module 1: Sustainability in today's world
  - Introduction to sustainable business strategies and their importance in achieving net-zero emissions.
  - Key principles and frameworks for developing sustainable business models and practices in different industries
  - Learn Sustainable supply chain management and circular economy practices for reducing emissions
- Module 2: Regulations around the world for Sustainability
  - Introduction to sustainability related regulations and their importance in today's business context
  - Key principles and frameworks for sustainability reporting in different Industries
- Module 3: Sustainability frameworks and reporting
  - Know the tools available and used to measure Sustainability and reporting
  - Corporate engagement, stakeholder management, and policy advocacy for driving net-zero initiatives

Day 2:

- Module 1: Hands- on Carbon Accounting
  - Learn by doing carbon accounting and understanding the effect of your business-related activities
  - Understand the different types of tools and methods used in Industries for calculating carbon emissions
- Module 2: Decarbonizing the supply chain
  - Innovative technologies and solutions for decarbonizing operations and achieving net-zero targets
  - The role of clean energy solutions, such as renewables and energy efficiency, in achieving net-zero goals
  - Experience the need for a low carbon future with Decarbonization success stories
- Module 3: Reaching Net- zero
  - Know the tools used in the industry for measuring progress to Net-zero
  - Assess your net-zero strategy or start developing on your own
  - Understand from your Industry leaders how to develop a net-zero strategy, including goal setting, emissions measurement, and action planning.

SUSTAINABILITY

Sustainable Business Transition to Circular Economy - ConsulTrain™ Economic

Objectives

- Deepen your knowledge of circular economy principles and their application in power generation, utilities, and manufacturing industries
- Discover circular economy strategies for power generation and utilities, such as refurbishing, reusing, and recycling assets, leading to optimized resource utilization
- Harness circular design and eco-innovation techniques for sustainable product development, contributing to circularity across the value chain
- Learn about circular supply chain management and how to implement reverse logistics, waste management, and circular procurement strategies for enhanced sustainability
- Understand the importance of policies, standards, and regulations in supporting the transition to a circular economy
- Develop skills in stakeholder engagement and collaboration for driving circular economy implementation

General

Short-ID	SUST-BTCE
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

Day 1

- Module 1: Circular Economy Fundamentals
  - Principles of the circular economy and its relevance to power generation, utilities, and manufacturing industries
  - Key benefits and challenges of implementing circular economy principles in different industries
- Module 2: Circular Economy Applied to Power Generation and Utilities
  - Circular business models for power generation and utilities, such as refurbishing, reusing, and recycling assets
  - Circular value chain analysis and optimization for efficient resource utilization
- Module 3: Circular Design and Eco-Innovation for Product design
  - Circular design approaches and principles for sustainable product development using the Life cycle assessment methodology
  - Eco-design techniques and innovative methods for creating circular products

Day 2

- Module 4: Circular Supply Chain Management and Logistics
  - Circular supply chain management and optimization for power generation, utilities, and manufacturing industries using the Environmental Product Declarations
  - Reverse logistics, waste management, and circular procurement strategies from the perspective of emissions
- Module 5: Policies, Standards, and Regulatory Considerations for the Circular Transition
  - Overview of policies, standards, and regulatory frameworks that support the transition to a circular economy
  - Importance of circular procurement and supply chain management in compliance with regulations
- Module 6: Engaging Stakeholders and Building Circular Networks
  - Hands-on by learning to build effective collaboration networks and partnerships for circular economic implementation
  - Engaging stakeholders and driving change towards circularity in your own business activities

SUSTAINABILITY

Sustainability Enablement - ConsulTrain™ Inspire

Objectives

Participants will learn the important aspects of Sustainability and understand their contribution to corporate sustainability goals.

General

Short-ID	SUST-E
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Real-life case studies in the field of Power transmission & distribution (2 sessions)
- Decarbonization journey and important reduction levers for Net-Zero
- Understand the difference between Scope 1, 2, and 3 emissions
- GHG Protocol and hands on experience of GHG accounting
- Overview of Sustainability: meaning in real terms and Environmental aspects, CO_2 vs CO_2e, GHG composition
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1, 2, and 3 emissions and asset management

SUSTAINABILITY

Sustainability Transformation - ConsulTrain™ Inspire

Objectives

Participants will learn the important aspects of Sustainability and improve their contribution to corporate sustainability goals by incorporating sustainable practices in their daily operations.

General

Short-ID	SUST-T
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Deep dive: Sustainability toolkit and frameworks
- Mentoring session: Decarbonization journey towards net zero
- Overview of Sustainability trends, compliance & challenges
- Impact of sustainability: cost savings, environmental benefits
- Scope 1, 2, and 3 emissions, carbon footprint, GHG Protocol
- Hands on experience: Calculate your carbon footprint
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1,2, and 3 emissions and asset management
- Real-life case studies in the field of Power transmission & distribution (2 sessions)

SUSTAINABILITY

Sustainability Transformation - ConsulTrain™ Economic Project

Objectives

The objectives of the ConsulTrain™ program are to educate professionals in the electrical industry on sustainability and its applications, provide them with tools and frameworks to contribute to their organization's sustainability goals, offer customized consulting services to support trainees in implementing sustainable processes, and empower participants to make a positive impact on their organization's sustainability practices.

General

Short-ID	SUST-TE
Duration	70 hours
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Deep dive: Sustainability toolkit and frameworks
- Mentoring session: Decarbonization journey towards net zero
- Overview of Sustainability trends, compliance & challenges
- Impact of sustainability: cost savings, environmental benefits
- Scope 1, 2, and 3 emissions, carbon footprint, GHG Protocol
- Hands on experience: Calculate your carbon footprint
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1,2, and 3 emissions and asset management
- Real-life case studies in the field of Power transmission & distribution (2 sessions)
- 50h of consultancy (It is common to split the hours over a timeframe of two to three months.)

Potential project goals could be:

Measuring Your Environmental Impact

Comprehensive Guide to Calculating Your Carbon Footprint! A sustainability toolkit that provides organizations with practical tools, frameworks, and strategies to implement sustainable practices is crucial. It should include guidance on reducing carbon emissions, waste reduction, water conservation, sustainable procurement, and other sustainability-related areas.

The Power of Measurement:

How Carbon Footprint Analysis Can Give Your Organization a Competitive Edge! Calculating the carbon footprint is a key step in achieving sustainable practices. It helps organizations understand their environmental impact and identify areas for improvement. Organizations can use this information to set targets, track progress, and communicate their sustainability efforts to stakeholders.

From Environmental Impact to Sustainable Procurement

Empowering Your Team with LCA and EPD Knowledge! Understanding the life cycle assessment (LCA) of an electrical product is essential in making sustainable procurement decisions. It enables organizations to compare the environmental impact of different products and make informed decisions that reduce the overall environmental footprint of their operations. Environmental product declarations (EPDs) are a useful tool for providing transparent and standardized information on the environmental performance of products.

As a decision-maker, you know that sustainability is important, but you may not be sure where to start or how to prioritize your efforts. That is where we come in – our team of experts can help you define and achieve your sustainability goals. Contact us today to discuss how we can help you build a more sustainable organization that delivers value to all stakeholders.

SUSTAINABILITY

ConsulTrain™ Economic: Maintenance optimization for Sustainability

Objectives

Participants will learn the important aspects of maintenance and reliability and will be able to apply these concepts to achieve their overall sustainability goals.

General

Short-ID	CONS-MOP
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1:
  - Introduction to Maintenance and Sustainability
  - Maintenance Forecasting & Planning
  - Overview of the environmental, social, and economic aspects of sustainability
- Module 2:
  - Asset Reliability
  - Asset Life Cycle Management, Risk Assessment and Prioritization etc.
  - Introduction to different tools and techniques
- Module 3:
  - Predictive Maintenance Techniques
  - Introduction to predictive maintenance methods
  - Case studies highlighting successful predictive maintenance implementations.
- Module 4:
  - Maintenance Execution
  - Coordinating maintenance activities with minimal environmental and social impact
  - Understanding different types of execution strategies
- Module 5:
  - Risk Assessment and Prioritization
  - Conducting sustainability-focused risk assessments in maintenance planning

Notes

Each ConsulTrain™ presents focused professional training, highlighting sustainable business strategies to achieve net-zero in their specific business contexts.

SUSTAINABILITY

ConsulTrain™ Economic: Energy Management in Industries

Objectives

Plan and implement EM system. Identify conservation measures through internal audit techniques. Prepare the site for certification.

General

Short-ID	CONS-ECO
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Those who want to prepare a site for EM certification & internal audits. Those who wish to gain insight regarding on-site renewables. EHS specialist, facility managers, sustainability managers who wish to gain a better understanding of energy management.

Contents

- Module 1 - Introduction to energy management
  - Understanding of EM ISO 50001
  - Policy & Regulatory framework
- Module 2 - Roles & Responsibilities
  - Target Setting & EnPI tracking
  - Energy Conservation Tools
- Module 3 - Digital Energy Management
  - Step-by-step guide to plan & develops energy management system
- Module 4 - Energy Audit Methodologies
  - Guideline to perform internal energy audit ISO 50002
- Module 5 - Energy Efficiency in Power Distribution
  - Case study: Understand network architecture & calculation tools
- Module 6 - Energy Efficiency in Utilities
  - Data collection & analysis
  - Utility specific case study
- Module 7 - Energy Transition with Renewables
  - Market trends
  - Components of PV system (standalone/grid tied)

Notes

Each ConsulTrain™ presents focused professional training, highlighting business strategies to achieve goals in their specific business contexts.

ConsulTrain™ Inspire - Energy Management

Objectives

The participants will be qualified to do the following:

- Understand the requirement of energy transparency
- Plan and implement energy management system
- Set targets and define EnPIs
- Identify energy conservation measures

General

Short-ID	CONS-EM
Duration	1 day
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Initiating their responsibility with energy management or pursuing an energy management role. From related fields i.e. finance, facility managers, sustainability managers, procurement, EHS reporting responsible. HR responsible, who are interested in creating awareness.

Contents

- Module 1: Introduction to energy management
  - Understanding of energy management ISO 50001
  - Industrial Energy Efficiency
  - Standards and Local Regulations
- Module 2: Energy Transparency
  - Requirements for a management system
  - Hardware and Software components
  - Network Architecture
  - Communication Protocols
  - NXpower Monitor for Energy Monitoring
- Module 3: Energy Conservation
  - Introduction to energy audit
  - Energy target setting
  - Identification of Energy Conservation measures
  - Renewable energy potential

Notes

Each ConsulTrain™ presents focused professional training, highlighting business strategies to achieve goals in their specific business contexts.

SUSTAINABILITY

ConsulTrain™ Inspire: Maintenance planning for Sustainability

Objectives

Participants will learn the important aspects of maintenance and reliability and will be able to apply these concepts to achieve their overall sustainability goals.

General

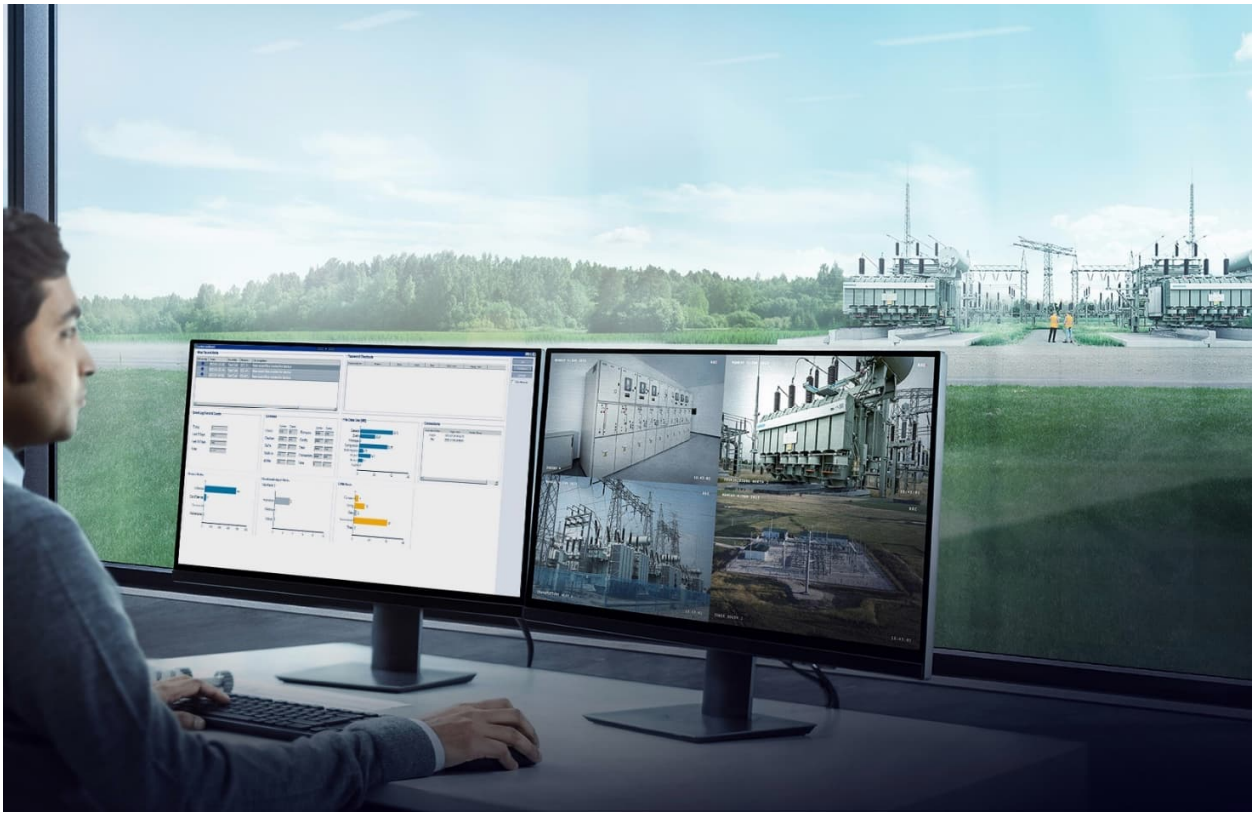
Short-ID	CONS-M
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1:
  - Introduction to Maintenance and Sustainability
  - Maintenance Forecasting & Planning
  - Overview of the environmental, social, and economic aspects of sustainability
- Module 2:
  - Asset Reliability
  - Asset Life Cycle Management, Risk Assessment and Prioritization etc.
  - Introduction to different tools and techniques
- Module 3:
  - Predictive Maintenance Techniques
  - Introduction to predictive maintenance methods
  - Case studies highlighting successful predictive maintenance implementations
- Module 4:
  - Maintenance Execution
  - Coordinating maintenance activities with minimal environmental and social impact
  - Understanding different types of execution strategies
- Module 5:
  - Risk Assessment and Prioritization
  - Conducting sustainability-focused risk assessments in maintenance planning

Notes

Each ConsulTrain™ presents focused professional training, highlighting sustainable business strategies to achieve net-zero in their specific business contexts.



Digital Substation Training

DIGITAL SUBSTATION

Digital Substation - Basics

Objectives

The participants will get to know the latest digital trends in Substation Automation system like SIPROTEC 5 Process Bus, SIPROTEC 5 DigitalTwin, Cybersecurity, Grid Control, etc.

General

Short-ID	DS-BAS
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in India, or online

Target Group

Users from electric utilities and the industrial sector interested in the Substation Automation system and its latest trends.

Prerequisites

Basic knowledge & understanding of Substation Automation System in power system.

Contents

- Introduction of Digital Substation (Connecting Substation to Digital World)
- Introduction of Latest digital trends
- Benefits of IEC 61850-8-1 & Goose Configuration
- Introduction for Process Bus IEC 61850-9-2
- Introduction of Digital Twin (Next Step of Digital Future)
- Introduction of Cyber Security
- Introduction of Grid Control
- Introduction of Protocols and Architectures
- Introduction of Industrial Switch & Applications
- Visit to digital Grid Factory

Cybersecurity Training

CYBERSECURITY

Cybersecurity in Energy Automation – Basics

Objectives

Increased networking of systems, standardization of communication protocols and operating systems - simplifying processes ensures efficient operation. But the other side of the coin is that these trends also make our networks vulnerable. The rate of cyber-attacks is increasing, and Energy Automation is part of the so-called critical infrastructure. Due to these facts, it is necessary to protect these networks against cyber-attacks from the beginning. This training addresses fundamental security related activities, security technologies and concepts for Energy Automation systems.

General

Short-ID	CS-BAS
Duration	1 day
Language	Arabic / English / German / Turkish
Training Format	offered in person or virtually
Location	in the Arabic Emirates, Germany, Turkey, online, or at the client's site

Target Group

Customers from power utilities and industry are involved in the operation or design of automation systems.

Prerequisites

Basic understanding of Energy Automation Systems.

Contents

- Motivation for cyber security
- Cyber security basics
- Standards and Regulations
- Secure Architecture and Design
- Secure Configuration and Hardening
- Security Testing, Security Incident and Vulnerability Management
- Organizational Preparedness
- Access Control and Account Management (e.g. role-based accounts)
- Security Logging & Monitoring
- Security Patching
- Malware Protection
- Backup and Restore
- Secure Remote Access

CYBERSECURITY

Cybersecurity in Energy Automation – Application and Exercises

Objectives

The German Industry Association for Information Technology and Telecommunications, Bitkom, estimates the damage caused by cybercrime to the German economy in 2023 to be 206 billion euros. This training offers you the opportunity to expand your knowledge of cybersecurity in energy automation. By doing so, you play a crucial role in protecting your company against costly cyberattacks. Throughout this training, you will:

- Gain a fundamental understanding of cybersecurity requirements
- Gain insight into standards and norms in the field of cybersecurity
- Acquire the necessary know-how through practical exercises to enhance the security of your substation against cyber threats

The objective of this training is to provide non-IT experts with the skills required to safeguard critical infrastructure in energy automation against external threats.

General

Short-ID	CS-APX
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Project Engineers, Design Developer, Commissioning Engineers.

Prerequisites

Participants should have basic knowledge of TCP/IP and substation automation.

Contents

In this training, each participant will create a small substation with essential components.
The following topics will be covered:

- Standards and regulations in the field of cybersecurity
- Secure network architecture
- Configuration of VLANs in Ruggedcom switches and the RX1500 Firewall and Windows Firewall
- Account management using a Windows Server
- System hardening
- Security updates and patch management
- Backup & Restore
- Logging and monitoring

Notes

This training is available both as in-person training and in a virtual format. In the virtual version, participants will log in to the Power Academy's PCs, allowing them to perform the same practical exercises remotely as they would in the in-person training.

CYBERSECURITY

Cybersecurity in Energy Automation – Module 4: Threat Scenarios for Industrial Networks

Objectives

To familiarize participants with current Cybersecurity issues and recognized dangers, using interesting Live Demos to underscore the importance of Cybersecurity measures.

General

Short-ID	CS-4AWA
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Interest in computer and network users.

Prerequisites

Interest in technical issues.

Contents

- ICS (Industrial Control System) Threats with Live Demos
- Man in the Middle
- Malicious Traffic
- Phishing
- Virus, Worms, Trojans (Code Red, Stuxnet)
- Data Theft
- Ransom ware (Krypto trojans)
- Remote Access
- Shodan ICS Radar (https://ics-radar.shodan.io)
- Access to Local Service LAN
- Layer-2 Hacking
- D(D)os

CYBERSECURITY

Cybersecurity in Energy Automation – Module 6: Best Practice Engineering

Objectives

To practice in a LAB environment the theoretical knowledge gained in the training Cybersecurity in Energy Automation - Basics, especially with regard to hardening of network systems and components. This training also provides a practical introduction to the security solutions recommended by Siemens as part of its product solution “Secure Substation”.

General

Short-ID	CS-6BPE
Duration	4 days
Language	English
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Technicians who are to design network devices and devices of the SICAM RTUs product line in automation systems and implement solutions regarding cybersecurity.

Prerequisites

Basic knowledge of network and automation technology with SICAM RTUs is necessary.

Contents

- Overview Products and Security Features
- Encryption (symmetric/ asymmetric) theory
- PSK (Pre Shared Key)
- PKI (Private Public Key Infrastructure) theory
- PKI with Microsoft CA
- PKI with GridPass CA
- NTP Configuration
- Secure NTP (PSK)
- VPN IPSec vs. IEC 62351-3
- VPN IPSec (PSK)
- IKEv1/IKEv2
- Tunnel/Transport mode
- LAB IPSec
- Use of certificates
- 802.1x
- Practical exercises and use cases
- IEC 60870-5-104 extension based on IEC 62351-3
- Client certificates for engineering
- Certificates for local VIS (client-server certification)
- Automated enrollment of certificates per GridPass

- Extended network segmentation
- Network segmentation VLANs
- Practical exercises and UseCases
- Next Generation Firewalls
- Rules and regulations for firewalls
- FWI4 (internal IEC 60870-5-104 Application Layer Gateway)
- Use Cases
- Central user/ password management with 2 factor authentication
- Radius authentication
- Remote Access via RDP
- Switches, Routers and SICAM RTUs
- Logging and Reporting
- Switches, Routers and SICAM RTUs
- Toolbox
- SNMPv3
- Switches, Routers and SICAM RTUs
- Vulnerability Management
- System hardening
- Switches (trained in theory and practice in the NT-2SWHS module)
- Routers (trained in theory and practice in the NT-3ROHS module)
- Theory and practice with SICAM RTUs
- Test tool: NMAP

CYBERSECURITY

IT Networks & Cyber Security in Energy Automation

Objectives

After this training the participants will be able to set up and configure networks local automation system networks. The theoretical knowledge will be consolidated through practical exercises. Distinctive features of automation system networks will be highlighted – especially related vulnerabilities and their minimization. Finally, current cyber security issues and recognized dangers are covered within this training.

General

Short-ID	CS-NTCS
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Technicians / engineers from utilities and industry who are involved in design, project management, operation, or commissioning of automation systems.

Prerequisites

Fundamental terminology of IT network technology as covered in the one-day training: Networks in Energy Automation - Module 1: Principles (Virtual Training).

Contents

3 subsequent modules grant the optimal combination of theory and practical applications:

- Networks in Energy Automation - Module 2: Switching, Hacking and Protection (Virtual Training)
- Networks in Energy Automation - Module 3: Routing, Hacking and Protection (Virtual Training)
- Cyber Security in Energy Automation - Module 4: Threat Scenarios for Industrial Networks (Virtual Training)

Notes

For the description of the follow-up training:

- Cyber Security in Energy Automation - Application and Exercises, which covers the content of
- Cyber Security in Energy Automation - Basics (Virtual Training)
- Cyber Security in Energy Automation - Module 6: Best Practice Engineering (Virtual Training)

CYBERSECURITY

Networks in Energy Automation - Module 1: Principles

Objectives

To familiarize participants with state-of-the-art LAN network types and media, protocol structures (TCP/IP) and most important terminology. Such knowledge offers a sound basis for understanding more complex network relevant topics.

General

Short-ID	NT-1BAS
Duration	1 day
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Engineers and project leaders who are involved in the design of automation systems.

Prerequisites

Basic knowledge of IT and communication.

Contents

- Fundamentals
- Local/Wide Area Network
- ISO/OSI Reference Model
- Network Topologies
- Network Media
- Connectors / Cables
- Ethernet Frame Format
- TCP/IP (Transmission Control Protocol/Internet Protocol)
- IP Addressing
- Subnet mask, Default Gateway
- ICMP (Internet Control Message Protocol)
- ARP (Address Resolution Protocol)
- DHCP (Dynamic Host Configuration Protocol)

CYBERSECURITY

Networks in Energy Automation - Module 2: Switching, Hacking and Protection

Objectives

To understand the distinctive features of automation system networks and their specific switching requirements; to apply theoretical knowledge in a LAB environment, using a typical network of automation units, like SIPROTEC and SICAM RTUs; to investigate redundancy requirements and possible security issues.

General

Short-ID	NT-2SWHS
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Engineers and project leaders who are involved in the design of automation systems.

Prerequisites

Basic knowledge of network and automation technology is necessary.

Contents

- Switching Technologies with special protocols (IEC 61850)
- Switching Basics (Layer-2)
- Switching Vulnerabilities and Hardening
- Layer-2 redundancy protocols (STP, RSTP, MRP, HSR and PRP)
- LAB: STP/RSTP Vulnerabilities and Hardening
- VLAN (Virtual Local Area Network)
- LAB: RSTP with SIPROTEC und SICAM RTUs
- LAB: Goose Hardening
- Layer-2 Hardening
- LAB: Vulnerabilities and Hardening (RUGGEDCOM Switch)
- DHCP: Vulnerabilities and Hardening

CYBERSECURITY

Networks in Energy Automation - Module 3: Routing, Hacking and Protection

Objectives

To understand the distinctive features of automation system networks and their specific routing requirements; to apply theoretical knowledge in a LAB environment, using a typical network of automation units, like SIPROTEC and SICAM RTUs; to investigate redundancy requirements and possible security issues.

General

Short-ID	NT-3ROHS
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Austria, or online

Target Group

Engineers and project leaders who are involved in the design of automation systems.

Prerequisites

Basic knowledge of network and automation technology is necessary.

Contents

- Routing Basics (Layer-3)
- LAB: Static Routing (Cisco/RUGGEDCOM)
- Dynamic Routing (RIP, EIGRP and OSPF)
- LAB: dynamic routing OSPF (Open Shortest Path First)
- LAB: OSPF Vulnerabilities and Hardening
- Layer-3 Redundancy: VRRP (Virtual Router Redundancy Protocol)
- LAB: VRRP (Cisco/RUGGEDCOM)
- LAB: VRRP Vulnerabilities and Hardening

CYBERSECURITY

RuggedCom – Basics

Objectives

On completion of this training participants will have fundamental understanding, planning and configuration of the ethernet network in utility network.

General

Short-ID	RUGCOM-B
Duration	3 days
Language	English
Training Format	offered in person
Location	in India

Target Group

Participants from electric utilities and the industrial sector are interested in the commissioning, maintenance, and operation of Ethernet switches.

Prerequisites

Basic Electrical Engineering with functional knowledge of Substation/ Distribution Automation.

Contents

- Introduction to Networking Including Topologies
- OSI 7 Layer Concept
- Networking Devices and Their Functions
- Basic Concept of LAN, LAN Segment
- Fundamentals of L2/L3 Ethernet Networking Communication (CSMA/CD, Address Learning, Frame Processing, Ethernet Switching Methods, Ethernet Switch Transmission Mode, Ethernet Switch Port Functions, ARP / RARP, Link Fault Detection, Rate Limiting, Port Mirroring, etc)
- Ethernet Networking for Industrial & Utility Grade Applications
- IP Addressing Schemes (IPv4)
- Subnetting IP Networks
- Unleashing VLAN Communication
- Scaling a Network (Link Aggregation, Link Redundancy & Media Redundancy)
  - Unfolding STP / RSTP & touching upon MSTP and PRP / HaSR
- NMS and Other Allied Network Application Software
- Introduction to Routing Concepts (Static Routing, RIP, EIGRP, BGP, OSPF, VRRP etc) and Networking Security

Grid Operation Training

GRID OPERATION

Instructions on Switching Authorization

Objectives

The goal of this basic training is to impart the necessary knowledge to obtain a switching authorization for operation in electrical power supply networks to 110 kV or to refresh existing knowledge and update it. Imparting updates of relevant regulations and guidelines as well as analysis of faulty switching operations. The training is characterized by an ex-tensive practical part with modern power control systems and equipment as well as low, medium, and high voltage switchgears and practical application of first aid and fire protection measures.

General

Short-ID	PSO-SB1
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

For switching operations in electrical power supply networks, the company appoints a responsible specialist, or a person authorized to switch, who is instructed and trained in the handling of high, medium and low voltage switchgears and must master the required measures and existing applicable regulations. Authorized switching personnel who must be trained at regular intervals are also included.

Prerequisites

Electrical education, e.g. electrical engineer, electrical master, electrical specialist, bachelor/master's in electrical engineering.

Contents

- Introduction to Instruction on Switching Authorization
- Requirements for authorized switching staff
- Network structures and network voltages
- Construction and operation of electrical equipment
- Safety rules and interlocking conditions
- Switching conversation and switching operation
- Policy requirements
- Practical switching operations
- First aid in electrical energy systems
- Fire protection in electrical energy systems

Notes

In addition to the confirmation of participation, the participants receive their personal, time unlimited TÜV certification as a "Instructed to obtain switching authorization in power supply networks" after a qualification successfully tested by TÜV Rheinland. This demonstrates the high quality of the trained personnel in the relevant company area.

GRID OPERATION

Switching in Power Installations and Networks – Basics

Objectives

Through intensive practical exercises, training imparts knowledge and skills that are important for the operation of electrical equipment and the operation of electrical power supply networks. The focus is on imparting knowledge for mastering switching operations and switching conversations as well as for the correct application of the 5 safety rules. The training consists of lectures and intensive practical switching operations.

General

Short-ID	PSO-SWITCH1
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Switching in electrical power systems and in electrical networks training is aimed specifically at all those responsible for maintenance work on electrical equipment and for switching operations during scheduled and unscheduled work in the electrical power supply sector.

Prerequisites

Basic electrical engineering knowledge. Basic knowledge of the operational management of electrical networks.

Contents

- Introduction to training in switching in electrical power systems and electrical grids
- Network design, network structures and network voltages
- Structure and mode of operation of electrical equipment
- Protection and control components
- Safety rules and interlocking conditions
- Conducting switching operations
- Carrying out switching operations on basic circuits
- Carrying out complex switching operations
- Switching programs

Notes

After successfully completing the training, participants receive confirmation of their participation, and the topics covered.

GRID OPERATION

Switching in electrical Power Systems & in electrical Networks - Practical exercises

Objectives

Through intensive practical exercises, training imparts knowledge and skills that are important for the operation of electrical equipment and the operation of electrical power supply networks. The focus is on imparting knowledge for mastering switching operations and switching conversations as well as for the correct application of the 5 safety rules. The training consists of intensive practical switching operations.

General

Short-ID	PSO-SWITCH2
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Switching in electrical power systems and in electrical networks - practical exercises training is aimed specifically at all those responsible for maintenance work on electrical equipment and for switching operations during scheduled and unscheduled work in the electrical power supply sector.

Prerequisites

Basic electrical engineering knowledge.
Basic knowledge of the operational management of electrical networks.
Training: Switching in electrical power systems - basics or comparable previous knowledge.

Contents

- Introduction to training Switching in electrical power systems and electrical networks
- Safety rules and interlocking conditions
- Conducting switching conversations
- Carrying out switching operations on basic circuits
- Carrying out complex switching operations
- Switching programs

GRID OPERATION

Switching in electrical Power Systems & in electrical Networks - Advanced

Objectives

Through intensive practical exercises, training imparts knowledge and skills that are important for the operation of electrical equipment and the operation of electrical power supply networks. The focus is on imparting knowledge of first aid, fire protection, mastering switching operations and switching conversations as well as the correct application of the 5 safety rules. The training consists of lectures and intensive practical switching operations.

General

Short-ID	PSO-SWITCH3
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

The Switching in Electrical Power Systems and Electrical Networks - Extended training course is aimed specifically at all those responsible for maintenance work on electrical equipment and for switching operations during scheduled and unscheduled work in the electrical power supply sector.

Prerequisites

Basic electrical engineering knowledge. Basic knowledge of the operational management of electrical networks.

Contents

- Introduction to training in switching in electrical power systems and in electrical networks
- Requirements for authorized switchgear operators
- Directive requirements
- First aid in electrical power systems
- Fire protection in electrical power systems
- Network design, network structures and network voltages
- Design and mode of operation of electrical equipment
- Protective and control components
- Safety rules and interlocking conditions
- Conducting switching operations
- Carrying out switching operations on basic circuits
- Carrying out complex switching operations
- Switching programs

GRID OPERATION

Switching in electrical Power Systems & in electrical Networks incl. fault simulations

Objectives

Through intensive practical exercises, training imparts knowledge and skills that are important for the operation of electrical equipment and the operation of electrical power supply networks. In addition, to first aid and fire protection, the focus is on imparting knowledge for mastering switching operations and switching conversations as well as for the correct application of the 5 safety rules. The training consists of lectures and intensive practical switching operations. In addition, this training is aimed at intensive training of different fault situations in the field of energy supply and grid operation management using innovative training equipment and simulators. Overall, this training contributes to the safety of operators and users and to the stabilization of their work processes.

General

Short-ID	PSO-SWITCH5
Duration	5 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

The Switching in electrical power systems and in electrical networks training course, including fault simulation, is aimed specifically at all those responsible for maintenance work on electrical equipment and for switching operations during scheduled and unscheduled work in the electrical power supply sector.

Prerequisites

Basic electrical engineering knowledge. Basic knowledge of the operational management of electrical networks.
Training: Switching in electrical power systems - basics or comparable previous knowledge.

Contents

- Introduction to training in switching in electrical power systems and in electrical networks
- Requirements for authorized switchgear operators
- Directive requirements
- First aid in electrical power systems
- Fire protection in electrical power systems
- Network design, network structures and network voltages
- Design and mode of operation of electrical equipment
- Protective and control components
- Safety rules and interlocking conditions
- Conducting switching operations
- Carrying out switching operations on basic circuits
- Carrying out complex switching operations
- Switching programs
- Fault simulation incl. evaluation

Planning & Simulation Training

Power System Planning – Principles

Objectives

The participants will receive general information about technical-economical solutions of power-transmission and distribution in industry and other supply utilities.

General

Short-ID	NET-PRINC
Duration	3 days
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Turkey, online, or at the client's site

Target Group

Siemens employees as well as other employees from utilities and industry with their main field of work in planning and operation of power systems.

Prerequisites

Basic knowledge of physics, preferably electrical engineering.

Contents

- Power system configuration and extension planning of high voltage, medium voltage and low voltage power systems, substation and component design
- Neutral grounding, project planning of earthing systems, interference of power supply installations
- Power system analysis and calculations (load flow and short circuit)
- Instrument transformer dimensioning, design and coordination of protection systems
- Operating and dynamic behavior of industrial systems with numerous uses of machinery
- Switching operations, overvoltage protection and isolation coordination
- Harmonics and filter circuits, system perturbations
- Behavior of HVDC converter stations, static var compensators and controlled series compensation
- Accompanying practical instructions in questions of power system calculation, current transformer dimensioning and protection coordination

Distributed and Renewable Power Generation – Integration

Objectives

The participants will be provided with an objective overview of the design and use of distributed generation technologies and technologies that are based on renewable energy sources, their effects on the power system and aspects that must be considered when integrating these plants into existing network structures.

General

Short-ID	REN-DIS
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Employees of power generation companies and power supply utilities and Siemens employees who plan and operate power systems.

Contents

- General conditions for the use of distributed and renewable generation
- Legislation (German Renewable Energy Sources Act (EEG), German Combined
- Heat and Power Act (KWK), regulation
- Historical development
- Forecasts of future generation scenarios
- Overview of generation technologies
- Characteristics, fuels, emissions
- Renewable energies (sun, wind, water, ...)
- Combined heat and power
- Storage
- Power system connection using converters, synchronous and asynchronous generators
- Economic efficiency of distributed generation
- Power system integration and impact on the system
- Voltage and Reactive Power Control
- Losses
- Protection system
- Power quality and reliability
- Simulation of practical examples using PSS®SINCAL
- Optimization of plant size and point of interconnection
- Optimum operation of plants from network operation perspective
- Interconnection conditions
- German Association of Energy and Water Industries (BDEW) guidelines for the connection to low-voltage and medium-voltage power systems
- Technical supply conditions (TAB)
- Distribution Code 2007
- Practical examples

Wind Power - Network Integration

Objectives

The participants will receive basic knowledge of power systems and systems engineering and will work out reliable and cost-effective solutions as required for the planning and design of wind power plants.

General

Short-ID	REN-WIND
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Engineers and technicians who work for power supply companies and industry and who must solve integrated network and systems engineering problems within the context of new business development activities, planning, preparation of quotations, and processing in connection with the use of wind farms.

Contents

- Wind power plants in Germany and Europe
- General political conditions
- Characteristics of diverse types of wind generators
- Setting up a wind farm distribution (onshore and offshore)
- Linking wind farms to the power system (onshore and offshore) by means of AC or DC concepts
- Behavior of wind farms in the event of problems caused by the power system or by wind
- The German power infeed law (EEG) and the consequences for power system and power plant operation
- Requirements arising from the power grid code
- Consequences of concentrated wind farm locations at the North Sea and Baltic Sea for the regulated zone, the power utility, and the end customer
- DENA Study
- Dynamic behavior of wind parks

PLANNING & SIMULATION

Wind Power - Introduction to Grid Compliance for Onshore Wind Farms

Objectives

The training will provide participants with an understanding of Grid Compliance issues relating to connecting Onshore Windfarms to the electricity network.

General

Short-ID	REN-WPGCOM
Duration	2 days
Language	Turkish
Training Format	offered in person
Location	Turkey

Target Group

Engineers with an interest in planning, design, engineering, and operation of onshore windfarms.

Prerequisites

Basics of electricity transmission and distribution and renewable energy generation.

Contents

- Overview of UK and Ireland Grid Codes
- Modelling of onshore windfarms
- Grid Compliance Studies
- Fault Level
- Reactive Power
- Harmonics
- Flicker
- Stability
- Mitigation Methods
- Case Studies

Power System Calculation – Power Flow & Short-circuit current calculation

Objectives

The participants will receive information about the actual status of standard power system calculation methods, recognizing weak spots in the power system and searching for remedies.

General

Short-ID	NET-CALCU
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Engineers and service technicians from power supply utilities and industry in operation, planning, design, and servicing of switchgear.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- What is the purpose of load-flow and short-circuit current calculation?
- Power system topologies and neutral point grounding methods
- Modeling of the typical electrical equipment (generator, transformer, line and load)
- Typical parameters of power system components
- Theory of power system calculation methods
- Load-flow calculation using current iteration and Newton Raphson algorithms
- Short-circuit calculation according to actual standards
- Symmetrical components
- Various calculation examples for the above-mentioned methods
- Usage of power system calculation software for load flow and short-circuit calculation
- Verification of manually calculated values with the results delivered by software
- Interpretation and plausibility check of the results
- Possibilities of identification of weak spots in power systems

Dynamic Network - Phenomena, Simulation and Analysis

Objectives

The participants will acquire basic knowledge on how to simulate dynamic networks and how to analyze the results. Main field of application will be "Protection Technology". The participants will learn about the essential usage of a dynamic network simulation program and carry out basic simulations on topics load flow, stability and transients.

General

Short-ID	NET-DYNAM
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Engineers and service technicians from power supply utilities and industries in the fields of operation, planning, design of network and its components.

Prerequisites

Basics of electrical power engineering.

Contents

- General overview (modules and methods)
- User interface (window technologies, indications, characteristics)
- Basic functions (create and edit network elements)
- Program controls (modes: RMS, EMT, plots, failures)
- Exposition of results (tables, protocols, graphics)
- Case studies (simulations of load flow, stability, transients)
- Post-processing of results (editing, evaluation, print)
- Establishing networks (import and export of data)
- Electrical elements and methods
- Basics of controller systems

Exercises include simulation examples (transformer saturation, inrush, and transformer current, network oscillation, engine start, protection check using external test hardware, synchronizing, compensation, harmonics / power quality, load shedding, wind parks, SMART grids, photovoltaic, decentralized / renewable generators).

PLANNING & SIMULATION

High and Low Voltage Installations - Earthing and Interference

Objectives

The participants will be able to use basic knowledge about protective earthing in high voltage installation, electromagnetic interference, lightning protection and selection of low voltage systems in their work environment.

General

Short-ID	NET-EARTH
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Engineers of utilities and industrial power supply, consultants, project leaders and design.

Prerequisites

Basic knowledge of electrical engineering.

Contents

- Terms and Standards
- Earth Fault Currents
- Neutral Treatment
- Tolerable Touch Voltages
- Selection of Earthing Material
- Specific Soil Resistivity (Theory / Measurement /Analysis)
- Design of Earthing Systems acc. To EN50522 and IEEE80
- Computer Analysis of Earthing Systems
- Earthing of LV Systems
- Inductive Interference of Pipelines
- Power Frequency Magnetic Fields
- Lightning Protection
- Earthing Test (Heavy Current Injection Method)

Neutral Grounding

Objectives

The participants will receive general information about neutral grounding solutions for public and industrial power distribution systems.

General

Short-ID	NET-GROUND
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Siemens employees as well as other employees from utilities and industry with their main field of work in planning and operation of power systems.

Prerequisites

Basic knowledge of physics, preferably electrical engineering.

Contents

- Significance of earth faults for network operation, statistical data
- Transient and steady-state characteristics
- Detailed comparison of different types of neutral grounding
- Calculation of displacement voltage and fault currents
- Earth fault current detection, localization and protection methods
- Relevant standards and regulations
- Selection and optimization of neutral grounding
- Measurements for data collection, ground fault tests
- Basic design of neutral grounding equipment
- Impact on earthing systems and EMC
- Practical examples and case studies
- National and international practice and recent developments

PLANNING & SIMULATION

Distribution Power Systems - Reliability Analysis

Objectives

Participants will gain practical knowledge on reliability calculations of HV and MV power systems of public and industrial utilities. Based on mathematical principles of reliability calculations, the participants will receive detailed information about modeling, reliability indices, calculation methodology and evaluation of results. Additional practical exercises including manual calculations of realistic sample networks will deepen the knowledge.

General

Short-ID	NET-RELIAB
Duration	2 days
Language	English / German / Turkish
Training Format	offered in person or virtually
Location	in Germany, Türkiye, online, or at the client's site

Target Group

Users from power supply utilities and industrial companies dealing with planning, engineering, maintenance, or operation of MV- and HV-power systems.

Prerequisites

Basics of load flow calculation with respective software; ability to set up diagrams in MS Excel sheets.

Contents

- Basics of reliability analysis
- Modeling of networks, outage performance and restoration
- Evaluation of results
- „Manual“ calculation of a sample network
- Building up a MV sample network using the software PSS® SINCAL
- Building up a HV sample network using the software PSS® SINCAL

PLANNING & SIMULATION

SiEmergy™ Training

SIEMERGY™

SiEmergy™ - DSO - Energy Transition - Innovative Developments in Energy Supply

Objectives

Innovative developments in energy networks, such as smart grids, renewable energy, and advanced energy storage, are revolutionizing the energy landscape by promoting efficiency, flexibility, and sustainability. These cutting-edge advancements have significant impacts on energy supply and overall network operation tasks. This training aims to delve into the significant developments in the energy supply world and to learn effective deployment of technologies and methods that arise in dealing with evolving network operation tasks. Realistic simulations of selected network operation situations complement the training.

General

Short-ID	SMG-DSO-INV
Duration	4.5 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is aimed at operational personnel in the field of energy supply for city and industrial networks.

Contents

- Introduction to SiEmergy™ DSO
- Prosumer & Micro Grids
- Impact of Electric Vehicles & Charging Stations on Energy Supply Networks
- Smart Homes & Smart Metering
- Characteristics of Low Voltage Networks
- Re-Dispatch 2.0
- Simulations in MV/LV-Networks
- Assistance Applications
- Developments in MV/LV- Networks
- Tools for Future Network Operation & Management
- SiEmergy™ Certification

SIEMERGY™

SiEmergy™ - DSO - Management of Network Operational Staff Part 1 of 3

Objectives

The management of a specialized team requires leadership skills, empathy, and a willingness to consider the individual needs and abilities of team members. Through effective collaboration and support, specialized personnel can utilize their strengths optimally and contribute to successful outcomes. The personality of leadership personnel play a significant role in this process. This training aims to provide techniques and methods for the personality development of leaders in the field of network operation and network management as an individual and continuous process. It enables leaders to effectively guide and develop specialized personnel. The focus is on consciously developing skills, talents, behavioral patterns, and attitudes to unlock potentials for coping with current and future challenges in network operation and network management. By fostering personal growth and enhancing leadership capabilities, this training aims to create a more efficient and resilient team that can adapt to the ever-changing demands of the energy supply industry.

General

Short-ID	SMG-DSO-MGM1
Duration	2 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is targeted at the management of operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge around management of network operation tasks in low, medium, and high-voltage networks.

Contents

- Introduction to SiEmergy™ DSO
- Personality Development
- Training Simulator for SiEmergy™
- Current Network Development

SIEMERGY™

SiEmergy™ - DSO - Management of Network Operational Staff Part 2 of 3

Objectives

Managing specialized personnel requires leadership skills, empathy, and a willingness to consider the individual needs and abilities of team members. Through effective collaboration and support, specialized personnel can utilize their strengths optimally and contribute to successful outcomes. To cope with critical network operation situations, the ability to call upon resources and achieve targeted performance improvements through effective leadership is essential for the entire team. This training aims to master critical network operation situations through a systematic development of neuroresilience and neuro-enhancement. Participants will learn the necessary techniques and methods during this training, using examples and realistic disturbance simulations to enhance their skills.

General

Short-ID	SMG-DSO-MGM2
Duration	2 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is targeted at the management of operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge in the area of management of network operation tasks in low, medium, and high-voltage networks.

Contents

- Introduction to SiEmergy™ DSO
- Neuroresilience & Neuro-Enhancement
- Fault Simulations
- Risk Management

SIEMERGY™

SiEmergy™ - DSO - Management of Network Operational Staff Part 3 of 3

Objectives

Managing specialized personnel requires leadership skills, empathy, and the willingness to consider the individual needs and abilities of team members. Through effective collaboration and support, specialized personnel can utilize their strengths optimally and contribute to successful outcomes. In this context, conflicts are pre-programmed and unavoidable as part of human coexistence and cooperation. Effective conflict management is critical to maintaining relationships, fostering productive work environments, and achieving positive long-term outcomes. This training aims to provide techniques and methods for effective conflict resolution as an additional tool for optimized network operation and network management. The focus is on developing skills to resolve conflicts between individuals or groups in a constructive and peaceful manner.

General

Short-ID	SMG-DSO-MGM3
Duration	2 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is targeted at the management of operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge in the area of management of network operation tasks in low, medium, and high-voltage networks.

Contents

- Introduction to SiEmergy™ DSO
- Identification, Prevention, and Coping with Conflicts
- Resource Management
- SiEmergy™ Certification

SIEMERGY™

SiEmergy™ - DSO - Metaverse Network Operation & Network Management

Objectives

Humanity is constantly facing new challenges, and through innovative solutions, we can create a more sustainable and efficient future. Innovative developments play a crucial role, for example, in addressing existing and future challenges, improving quality of life, and transforming the workplace. Metaverse is an innovative virtual platform that allows you to immerse yourself in an interactive 3D world as an avatar. As an extended version of our real world in a virtual space, Metaverse offers various possibilities and potentials for virtual collaboration, social interaction, education, and training.

The goal of this training is to utilize the Metaverse as a platform for conducting network operations & network management training and to identify the potential it offers. The training content will focus on imparting expertise in the field of operation and management of energy supply networks.

General

Short-ID	SMG-DSO-MTV
Duration	4.5 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is aimed at operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge in the area of network operation and network management tasks in low, medium, and high-voltage networks.

Contents

- Introduction to SiEmergy™ DSO
- Training preparation
- IT/OT in Power Supply
- Characteristics of Power Supply Networks and Operating Equipment and Facilities
- Switching Calls
- Network Protection and Fault Simulations
- Unbalanced network faults
- SiEmergy™ Certification

SIEMERGY™

SiEmergy™ - DSO - Network Simulator - Practical Training of Network Disturbance Situations

Objectives

To confidently manage critical network operation situations, regular simulation training is indispensable. Through such training, not only can the network operational staff practice effective responses in the event of failures, but they can also quickly identify and locate the causes of errors. This training aims to intensively practice various disturbance scenarios in the field of energy supply and network operations using innovative training facilities and simulators. Overall, this training contributes to the safety of operators and network operating companies and stabilizes their operational procedures.

General

Short-ID	SMG-DSO-PRX
Duration	3 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is aimed at operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge in the area of network operation and network management tasks in low, medium, and high-voltage networks.

Contents

- Introduction to SiEmergy™ DSO
- Training preparation
- Fault Simulations
- SiEmergy™ Certification

SiEmergy™ - DSO - Stress Management - Neuroresilience for Coping with critical Network Operation

Objectives

People with high neuroresilience can better cope with stress, maintain their cognitive function, and recover faster from challenging circumstances. Neuroresilience has gained increasing importance in recent years as it provides insights into coping with stress experiences and highlights potential for prevention and intervention measures. This training aims to master critical power grid operation situations through a systematic development of neuroresilience. Participants in this training will learn appropriate methods to build neuroresilience and will can test their acquired skills through realistic disturbance simulations, confirming the effectiveness of neuroresilience. Each training scenario will be evaluated with the help of experts in the field of neuroresilience.

General

Short-ID	SMG-DSO-STM
Duration	4.5 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is aimed at operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge in the area of network operation and network management tasks in low, medium, and high-voltage networks.

Contents

- Introduction to SiEmergy™ DSO
- Training preparation
- Neuroresilience
- Simulation of Stress Scenarios including Evaluation
- Fault Management
- Current Network Developments
- SiEmergy™ Certification

SiEmergy™ - DSO - Stress Management - Neuro-enhancement for Performance Improvement in extreme Network Operation Situations

Objectives

Neuro-enhancement is a form of performance improvement that involves the use of methods and technologies to enhance the cognitive function of the brain. It aims to optimize mental capacity, attention, learning, memory function, or other cognitive abilities. This training focuses on activating resources for performance improvement in extreme network operation situations through the conscious use of neuro-enhancement methods and technologies. Participants can confirm the effectiveness of neuro-enhancement methods through simulations of extreme network operation scenarios. Each training scenario will be evaluated with the help of experts in the field of neuro-enhancement.

General

Short-ID	SMG-DSO-XTR
Duration	4.5 days
Language	English / German
Training Format	offered in person
Location	in Germany

Target Group

This training is aimed at operational personnel in the field of energy supply for city and industrial networks.

Prerequisites

Basic knowledge in the area of network operation and network management tasks in low, medium, and high-voltage networks. Previous participation in the SiEmergy™ Neuroresilience Training (SMG-DSO-STM) is recommended.

Contents

- Introduction to SiEmergy™ DSO
- Emergency Situations & Blackout Management
- Neuro-Enhancement
- Simulation of extreme Emergency situations including evaluation
- Risk Management
- Ressource Management
- SiEmergy™ Certification

ConsulTrain™ Training

CONSULTRAIN™

Sustainable Business and Circular Economy - ConsulTrain™ Inspire

Objectives

- Gain a thorough understanding of the fundamentals of circular economy and its relevance in power generation, utilities, and manufacturing industries
- Learn the best practices about circular economic strategies for procurement, enabling sustainable sourcing and supplier management
- Explore circular design and eco-innovation techniques for product, fostering the development of sustainable and circular products
- Understand how circular supply chain management can optimize resource utilization and contribute to supply chain sustainability

General

Short-ID	SUST-BCE
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1: Understanding the Fundamentals of Circular Economy
  - Principles of the circular economy and its relevance to power generation, utilities, and manufacturing industries
  - Key benefits and challenges of implementing circular economy principles in different industries
- Module 2: Circular Economy Strategies in Procurement
  - Circular procurement strategies and best practices using Environmental Product Declarations
  - Sustainable sourcing and supplier management in the context of circular economy
- Module 3: Circular Design and Eco-Innovation for Product design
  - Circular design approaches and principles for product development using the Life cycle assessment methodology
  - Eco-design techniques and innovation methods for creating sustainable and circular products
- Module 4: Circular Supply Chain Management
  - Circular value chain analysis and optimization for supply chain management
  - Reverse logistics, waste management, and the role of circular economy in supply chain sustainability

CONSULTRAIN™

Sustainable Business Transition to Circular Economy - ConsulTrain™ Economic

Objectives

- Deepen your knowledge of circular economy principles and their application in power generation, utilities, and manufacturing industries
- Discover circular economy strategies for power generation and utilities, such as refurbishing, reusing, and recycling assets, leading to optimized resource utilization
- Harness circular design and eco-innovation techniques for sustainable product development, contributing to circularity across the value chain
- Learn about circular supply chain management and how to implement reverse logistics, waste management, and circular procurement strategies for enhanced sustainability
- Understand the importance of policies, standards, and regulations in supporting the transition to a circular economy
- Develop skills in stakeholder engagement and collaboration for driving circular economy implementation

General

Short-ID	SUST-BTCE
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

Day 1

- Module 1: Circular Economy Fundamentals
  - Principles of the circular economy and its relevance to power generation, utilities, and manufacturing industries
  - Key benefits and challenges of implementing circular economy principles in different industries
- Module 2: Circular Economy Applied to Power Generation and Utilities
  - Circular business models for power generation and utilities, such as refurbishing, reusing, and recycling assets
  - Circular value chain analysis and optimization for efficient resource utilization
- Module 3: Circular Design and Eco-Innovation for Product design
  - Circular design approaches and principles for sustainable product development using the Life cycle assessment methodology
  - Eco-design techniques and innovative methods for creating circular products

Day 2

- Module 4: Circular Supply Chain Management and Logistics
  - Circular supply chain management and optimization for power generation, utilities, and manufacturing industries using the Environmental Product Declarations
  - Reverse logistics, waste management, and circular procurement strategies from the perspective of emissions
- Module 5: Policies, Standards, and Regulatory Considerations for the Circular Transition
  - Overview of policies, standards, and regulatory frameworks that support the transition to a circular economy
  - Importance of circular procurement and supply chain management in compliance with regulations
- Module 6: Engaging Stakeholders and Building Circular Networks
  - Hands-on by learning to build effective collaboration networks and partnerships for circular economic implementation
  - Engaging stakeholders and driving change towards circularity in your own business activities

CONSULTRAIN™

Sustainable Business and Net-Zero - ConsulTrain™ Inspire

Objectives

- Gain a thorough understanding of sustainable business strategies for net-zero emissions.
- Learn about key principles and frameworks for developing sustainable business models.
- Explore carbon footprint measurement and reduction techniques.
- Understand the role of clean energy solutions in achieving net-zero goals.

Each ConsulTrain™ (Economic, Inspire, and One) offers professionals a targeted and comprehensive learning experience in sustainable business strategies for achieving net-zero emissions. Participants will gain the knowledge and skills required to develop and implement effective strategies, measure emissions, adopt clean energy solutions, manage supply chains, utilize innovative technologies, engage stakeholders, and advocate for policy changes. This training provides a valuable opportunity to drive sustainable transformations in organizations and contribute to a healthier and more sustainable future.

General

Short-ID	SUST-BN
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1: Sustainability and business
  - Introduction to sustainable business strategies and their importance in achieving net-zero emissions
  - Key principles and frameworks for developing sustainable business models and practices in different Industries
- Module 2: Carbon footprint of your business activities
  - Carbon footprint measurement and reduction techniques for different sectors
  - The role of clean energy solutions, such as renewables and energy efficiency, in achieving net-zero goals
- Module 3: Reaching Net- zero
  - Know the tools used in the industry for measuring progress to Net-zero
  - Assess your net-zero strategy or start developing on your own

CONSULTRAIN™

Sustainable Business Strategies for Net-Zero - ConsulTrain™ Economic

Objectives

- Gain practical knowledge on implementing net-zero strategies and understand the process of developing a net-zero strategy
- Learn about sustainable supply chain management and circular economy practices
- Explore innovative technologies and solutions for decarbonization
- Understand the importance of stakeholder engagement in driving net-zero initiatives

Each ConsulTrain™ (Economic, Inspire, and One) offers professionals a targeted and comprehensive learning experience in sustainable business strategies for achieving net-zero emissions. Participants will gain the knowledge and skills required to develop and implement effective strategies, measure emissions, adopt clean energy solutions, manage supply chains, utilize innovative technologies, engage stakeholders, and advocate for policy changes. These courses provide a valuable opportunity to drive sustainable transformations in organizations and contribute to a healthier and more sustainable future.

General

Short-ID	SUST-SBSN
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

Day 1

- Module 1: Sustainability in today's world
  - Introduction to sustainable business strategies and their importance in achieving net-zero emissions.
  - Key principles and frameworks for developing sustainable business models and practices in different industries
  - Learn Sustainable supply chain management and circular economy practices for reducing emissions
- Module 2: Regulations around the world for Sustainability
  - Introduction to sustainability related regulations and their importance in today's business context
  - Key principles and frameworks for sustainability reporting in different Industries
- Module 3: Sustainability frameworks and reporting
  - Know the tools available and used to measure Sustainability and reporting
  - Corporate engagement, stakeholder management, and policy advocacy for driving net-zero initiatives

Day 2:

- Module 1: Hands- on Carbon Accounting
  - Learn by doing carbon accounting and understanding the effect of your business-related activities
  - Understand the different types of tools and methods used in Industries for calculating carbon emissions
- Module 2: Decarbonizing the supply chain
  - Innovative technologies and solutions for decarbonizing operations and achieving net-zero targets
  - The role of clean energy solutions, such as renewables and energy efficiency, in achieving net-zero goals
  - Experience the need for a low carbon future with Decarbonization success stories
- Module 3: Reaching Net- zero
  - Know the tools used in the industry for measuring progress to Net-zero
  - Assess your net-zero strategy or start developing on your own
  - Understand from your Industry leaders how to develop a net-zero strategy, including goal setting, emissions measurement, and action planning.

CONSULTRAIN™

Sustainable Business Transition to Net-Zero - ConsulTrain™ One

Objectives

- Experience ConsulTrain™ One to learn at your own pace and peace of mind.
- Gain a deep understanding of the net-zero challenge specific to the oil and gas, power generation, and power utilities industries.
- Acquire industry-specific strategies for sustainable operations and emissions reduction.
- Learn about clean energy technologies and how to integrate them into existing infrastructure.
- Develop skills in stakeholder engagement and transition planning to drive successful sustainability transitions.
- Network with professionals from similar industries and exchange best practices.

Each ConsulTrain™ (Economic, Inspire, and One) offers professionals a targeted and comprehensive learning experience in sustainable business strategies for achieving net-zero emissions. Participants will gain the knowledge and skills required to develop and implement effective strategies, measure emissions, adopt clean energy solutions, manage supply chains, utilize innovative technologies, engage stakeholders, and advocate for policy changes. These training provide a valuable opportunity to drive sustainable transformations in organizations and contribute to a healthier and more sustainable future.

General

Short-ID	SUST-O
Duration	5 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Understanding the Net-Zero Challenge in the Energy Industry
  - Introduction to the net-zero concept and its relevance to the energy sector.
  - Challenges and opportunities specific to the oil and gas, power generation, and power utilities industries.
  - Overview of the global energy transition and emerging trends.
- Implementing Sustainable Operations and Emissions Reduction
  - Sustainable practices for optimizing operations and minimizing environmental impact.
  - Strategies for measuring, reporting, and reducing greenhouse gas emissions.
  - Integration of renewable energy sources and energy efficiency measures into existing operations.
- Deployment of Clean Energy Technologies
  - Overview of clean energy technologies applicable to the energy industry.
  - Analysis of the benefits, limitations, and deployment considerations for renewable energy sources.
  - Integration of energy storage, grid management, and smart technologies for a decarbonized energy system.
  - Stakeholder Engagement and Transition Planning
  - Engaging stakeholders effectively in the sustainability transition process.
  - Developing a comprehensive transition plan aligned with net-zero goals.
  - Strategies for overcoming barriers and ensuring successful implementation.

CONSULTRAIN™

Sustainability Enablement - ConsulTrain™ Inspire

Objectives

Participants will learn the important aspects of Sustainability and understand their contribution to corporate sustainability goals.

General

Short-ID	SUST-E
Duration	1 day
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Real-life case studies in the field of Power transmission & distribution (2 sessions)
- Decarbonization journey and important reduction levers for Net-Zero
- Understand the difference between Scope 1, 2, and 3 emissions
- GHG Protocol and hands on experience of GHG accounting
- Overview of Sustainability: meaning in real terms and Environmental aspects, CO_2 vs CO_2e, GHG composition
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1, 2, and 3 emissions and asset management

CONSULTRAIN™

Sustainability Transformation - ConsulTrain™ Inspire

Objectives

Participants will learn the important aspects of Sustainability and improve their contribution to corporate sustainability goals by incorporating sustainable practices in their daily operations.

General

Short-ID	SUST-T
Duration	2 days
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Deep dive: Sustainability toolkit and frameworks
- Mentoring session: Decarbonization journey towards net zero
- Overview of Sustainability trends, compliance & challenges
- Impact of sustainability: cost savings, environmental benefits
- Scope 1, 2, and 3 emissions, carbon footprint, GHG Protocol
- Hands on experience: Calculate your carbon footprint
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1,2, and 3 emissions and asset management
- Real-life case studies in the field of Power transmission & distribution (2 sessions)

Sustainability Transformation - ConsulTrain™ Economic Project

Objectives

The objectives of the ConsulTrain™ program are to educate professionals in the electrical industry on sustainability and its applications, provide them with tools and frameworks to contribute to their organization's sustainability goals, offer customized consulting services to support trainees in implementing sustainable processes, and empower participants to make a positive impact on their organization's sustainability practices.

General

Short-ID	SUST-TE
Duration	70 hours
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Deep dive: Sustainability toolkit and frameworks
- Mentoring session: Decarbonization journey towards net zero
- Overview of Sustainability trends, compliance and challenges
- Impact of sustainability: cost savings, environmental benefits
- Scope 1, 2, and 3 emissions, carbon footprint, GHG Protocol
- Hands on experience: Calculate your carbon footprint
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1,2, and 3 emissions and asset management
- Real-life case studies in the field of Power transmission & distribution (2 sessions)
- 50h of consultancy (It is common to split the hours over a timeframe of two to three months.)

Potential project goals could be:
Measuring Your Environmental Impact
Comprehensive Guide to Calculating Your Carbon Footprint! A sustainability toolkit that provides organizations with practical tools, frameworks, and strategies to implement sustainable practices is crucial. It should include guidance on reducing carbon emissions, waste reduction, water conservation, sustainable procurement, and other sustainability-related areas.
The Power of Measurement:
How Carbon Footprint Analysis Can Give Your Organization a Competitive Edge! Calculating the carbon footprint is a key step in achieving sustainable practices. It helps organizations understand their environmental impact and identify areas for improvement. Organizations can use this information to set targets, track progress, and communicate their sustainability
efforts to stakeholders.
From Environmental Impact to Sustainable Procurement
Empowering Your Team with LCA and EPD Knowledge! Understanding the life cycle assessment (LCA) of an electrical product is essential in making sustainable procurement decisions. It enables organizations to compare the environmental impact of different products and make informed decisions that reduce the overall environmental footprint of their operations. Environmental product declarations (EPDs) are a useful tool for providing transparent and standardized information on the environmental performance of products.
As a decision-maker, you know that sustainability is important, but you may not be sure where to start or how to prioritize your efforts. That is where we come in – our team of experts can help you define and achieve your sustainability goals. Contact us today to discuss how we can help you build a more sustainable organization that delivers value to all stakeholders.

CONSULTRAIN™

Sustainability Transformation - ConsulTrain™ Economic Project

Objectives

The objectives of the ConsulTrain™ program are to educate professionals in the electrical industry on sustainability and its applications, provide them with tools and frameworks to contribute to their organization's sustainability goals, offer customized consulting services to support trainees in implementing sustainable processes, and empower participants to make a positive impact on their organization's sustainability practices.

General

Short-ID	SUST-TE
Duration	70 hours
Language	English
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Deep dive: Sustainability toolkit and frameworks
- Mentoring session: Decarbonization journey towards net zero
- Overview of Sustainability trends, compliance & challenges
- Impact of sustainability: cost savings, environmental benefits
- Scope 1, 2, and 3 emissions, carbon footprint, GHG Protocol
- Hands on experience: Calculate your carbon footprint
- Understand the LCA of an electrical product & how to use an Environmental Product Declaration for procurement-related decisions
- Effects of maintenance of Electrical equipment on Scope 1,2, and 3 emissions and asset management
- Real-life case studies in the field of Power transmission & distribution (2 sessions)
- 50h of consultancy (It is common to split the hours over a timeframe of two to three months.)

Potential project goals could be:
Measuring Your Environmental Impact
Comprehensive Guide to Calculating Your Carbon Footprint! A sustainability toolkit that provides organizations with practical tools, frameworks, and strategies to implement sustainable practices is crucial. It should include guidance on reducing carbon emissions, waste reduction, water conservation, sustainable procurement, and other sustainability-related areas.
The Power of Measurement:
How Carbon Footprint Analysis Can Give Your Organization a Competitive Edge! Calculating the carbon footprint is a key step in achieving sustainable practices. It helps organizations understand their environmental impact and identify areas for improvement. Organizations can use this information to set targets, track progress, and communicate their sustainability efforts to stakeholders.
From Environmental Impact to Sustainable Procurement
Empowering Your Team with LCA and EPD Knowledge! Understanding the life cycle assessment (LCA) of an electrical product is essential in making sustainable procurement decisions. It enables organizations to compare the environmental impact of different products and make informed decisions that reduce the overall environmental footprint of their operations. Environmental product declarations (EPDs) are a useful tool for providing transparent and standardized information on the environmental performance of products.
As a decision-maker, you know that sustainability is important, but you may not be sure where to start or how to prioritize your efforts. That is where we come in – our team of experts can help you define and achieve your sustainability goals. Contact us today to discuss how we can help you build a more sustainable organization that delivers value to all stakeholders.

CONSULTRAIN™

ConsulTrain™ Economic: Maintenance optimization for Sustainability

Objectives

Participants will learn the important aspects of maintenance and reliability and will be able to apply these concepts to achieve their overall sustainability goals.

General

Short-ID	CONS-MOP
Duration	3 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1:
  - Introduction to Maintenance and Sustainability
  - Maintenance Forecasting & Planning
  - Overview of the environmental, social, and economic aspects of sustainability
- Module 2:
  - Asset Reliability
  - Asset Life Cycle Management, Risk Assessment and Prioritization etc.
  - Introduction to different tools and techniques
- Module 3:
  - Predictive Maintenance Techniques
  - Introduction to predictive maintenance methods
  - Case studies highlighting successful predictive maintenance implementations.
- Module 4:
  - Maintenance Execution
  - Coordinating maintenance activities with minimal environmental and social impact
  - Understanding different types of execution strategies
- Module 5:
  - Risk Assessment and Prioritization
  - Conducting sustainability-focused risk assessments in maintenance planning

Notes

Each ConsulTrain™ presents focused professional training, highlighting sustainable business strategies to achieve net-zero in their specific business contexts.

CONSULTRAIN™

ConsulTrain™ Inspire: Maintenance planning for Sustainability

Objectives

Participants will learn the important aspects of maintenance and reliability and will be able to apply these concepts to achieve their overall sustainability goals.

General

Short-ID	CONS-M
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Contents

- Module 1:
  - Introduction to Maintenance and Sustainability
  - Maintenance Forecasting & Planning
  - Overview of the environmental, social, and economic aspects of sustainability
- Module 2:
  - Asset Reliability
  - Asset Life Cycle Management, Risk Assessment and Prioritization etc.
  - Introduction to different tools and techniques
- Module 3:
  - Predictive Maintenance Techniques
  - Introduction to predictive maintenance methods
  - Case studies highlighting successful predictive maintenance implementations
- Module 4:
  - Maintenance Execution
  - Coordinating maintenance activities with minimal environmental and social impact
  - Understanding different types of execution strategies
- Module 5:
  - Risk Assessment and Prioritization
  - Conducting sustainability-focused risk assessments in maintenance planning

Notes

Each ConsulTrain™ presents focused professional training, highlighting sustainable business strategies to achieve net-zero in their specific business contexts.

ConsulTrain™ Economic: Energy Management in Industries

Objectives

Plan and implement EM system. Identify conservation measures through internal audit techniques. Prepare the site for certification.

General

Short-ID	CONS-ECO
Duration	2 days
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Those who want to prepare a site for EM certification & internal audits. Those who wish to gain insight regarding on-site renewables. EHS specialist, facility managers, sustainability managers who wish to gain a better understanding of energy management.

Contents

- Module 1 - Introduction to energy management
  - Understanding of EM ISO 50001
  - Policy & Regulatory framework
- Module 2 - Roles & Responsibilities
  - Target Setting & EnPI tracking
  - Energy Conservation Tools
- Module 3 - Digital Energy Management
  - Step-by-step guide to plan & develops energy management system
- Module 4 - Energy Audit Methodologies
  - Guideline to perform internal energy audit ISO 50002
- Module 5 - Energy Efficiency in Power Distribution
  - Case study: Understand network architecture & calculation tools
- Module 6 - Energy Efficiency in Utilities
  - Data collection & analysis
  - Utility specific case study
- Module 7 - Energy Transition with Renewables
  - Market trends
  - Components of PV system (standalone/grid tied)

Notes

Each ConsulTrain™ presents focused professional training, highlighting business strategies to achieve goals in their specific business contexts.

ConsulTrain™ Inspire - Energy Management

Objectives

The participants will be qualified to do the following:

- Understand the requirement of energy transparency
- Plan and implement energy management system
- Set targets and define EnPIs
- Identify energy conservation measures

General

Short-ID	CONS-EM
Duration	1 day
Language	English / German
Training Format	offered in person or virtually
Location	in Germany, online, or at the client's site

Target Group

Initiating their responsibility with energy management or pursuing an energy management role. From related fields i.e. finance, facility managers, sustainability managers, procurement, EHS reporting responsible. HR responsible, who are interested in creating awareness.

Contents

- Module 1: Introduction to energy management
  - Understanding of energy management ISO 50001
  - Industrial Energy Efficiency
  - Standards and Local Regulations
- Module 2: Energy Transparency
  - Requirements for a management system
  - Hardware and Software components
  - Network Architecture
  - Communication Protocols
  - NXpower Monitor for Energy Monitoring
- Module 3: Energy Conservation
  - Introduction to energy audit
  - Energy target setting
  - Identification of Energy Conservation measures
  - Renewable energy potential

Notes

Each ConsulTrain™ presents focused professional training, highlighting business strategies to achieve goals in their specific business contexts.

Assessment & Compliance

ASSESSMENT & COMPLIANCE

Electrical Safety & Compliance Assessment NFPA 70B

Objectives

It is crucial to ensure the safety and reliability of electrical systems to protect people and assets. Our fixed-price assessments, which comply with the compliance assessments NFPA 70B regulations, are designed for this purpose:

- evaluate the current state of your electrical maintenance programs
- identify potential risks and areas for improvement
- provide recommendations to improve safety and reliability
- offer insights from global leaders in electrical safety best practices

ASSESSMENT & COMPLIANCE

Emergency Planning Evaluation for your Organisation

Objectives

An effective emergency plan is crucial for the safety of an organization. Our fixed-price service for emergency plan assessment tests and reviews your plans to ensure their robustness and practicality.

This evaluation is designed for:

- review and benchmark your emergency plans
- simulate emergency scenarios
- identify your gaps and vulnerabilities
- provide your actionable recommendations

ASSESSMENT & COMPLIANCE

Energy Management Assessments aligned with ISO 50001

Objectives

To ensure the sustainability of operations, environmentally sound management is essential for long-term success. Our energy assessments, aligned with ISO 50001, provide organizations with the insights needed to:

- assess energy performance, with consumption patterns and energy efficiency
- identify cost saving opportunities to reduce CO2
- align with sustainable practices for effective energy management
- facilitate compliance ISO 50001, other local regulations

ASSESSMENT & COMPLIANCE

Decarbonization Assessments for your Carbon Footprint

Objectives

Organizations need to decarbonize supply chains and assets. Our approach supports capturing the carbon footprint, and setting targets, and analyzing Scope 1, 2, and 3 emissions.

The assessment is designed for this purpose:

- evaluate current state of carbon footprint & emission reduction
- identify potential sources of carbon emissions and areas for improvement
- offer actionable recommendations to enhance decarbonization efforts

Initial Consultation & Goal Definition
Every assessment begins with a thorough understanding of your unique needs and goals.

Data Collection & Analysis
We gather comprehensive data on your systems, maintenance plans, and energy usage, leveraging advanced tools and industry best practices for precise, actionable insights. Data collection can be performed by your team, one of your trusted partners, or our specialists on request. Regardless of who conducts the gathering, we provide dedicated guidance throughout the entire process to ensure clarity, accuracy, and seamless integration into the assessment.

Gap Analysis & Benchmarking
By comparing your current practices to NFPA 70B, ISO 50001 standards, and emergency preparedness best practices, we identify areas for improvement.

Customized Reporting & Actionable Recommendations
Receive a detailed report with prioritized actions based on your operational goals and compliance requirements.

Implementation Support & Continuous Improvement
We offer ongoing support and training to help you implement recommendations and sustain improvements over time.

Contact us for more information about our Assessment & Compliance concept.

Contact us!

Contact your Power Academy directly!

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