CONCEPT

Electrical Commissioning and Testing: Pre-Commissioning, Energisation and Start-Up

1 – 5 March 2027
Barcelona - Eixample district four-star



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Ref: 184_10629 **Date:** 1 – 5 March 2027 **Location:** Barcelona - Eixample district four-star **Fees:** 23500 SAR

Introduction:

Electrical commissioning and testing decides whether a new substation, switchroom or motor control centre can be energised safely and on schedule. Untested cables, relays set from the wrong file, reversed current transformer polarity and open punch items are common causes of failed first energisation, damaged equipment and delayed start-up. This Core Concept course equips engineers and supervisors to plan electrical scopes, run acceptance tests, control the first energisation and hand over tested systems. Participants produce an Electrical Commissioning and Energisation Plan for a real or planned installation.

Course Objectives:

- Plan an electrical commissioning scope by systemising single-line diagrams and sequencing tests towards energisation
- Prepare inspection and test plans and check sheets that set hold, witness and acceptance points for each item of electrical equipment
- Perform and interpret cable, transformer, switchboard and motor control centre acceptance tests against specification and factory results
- Verify protection relay settings and trip paths by secondary injection before any circuit is made live
- Direct first energisation, motor solo runs and control system loop checks under a written switching programme
- Close punch items and compile an electrical handover dossier that operations and maintenance will accept

Target Audience:

- Engineers who plan and lead electrical commissioning on new or expanded installations
- Supervisors who direct test crews on cables, switchboards, transformers and motor control centres
- Protection and testing staff who inject, set and verify relays and trip circuits
- Contractor and vendor site engineers who hand electrical systems over to the owner
- Owner representatives who witness acceptance tests and approve energisation

Course Outline:

Day 1: Electrical Commissioning Scope, Phases and Systemisation

- Electrical Commissioning Phases: Construction Check, Pre-Commissioning, Energisation and Start-Up
- Electrical Systemisation on Single-Line Diagrams with Subsystem Boundary Marking
- Commissioning Plan, Test Schedule and Energisation Sequence Programme
- Responsibility Matrix for Owner, EPC Contractor, Vendor Engineer and Test Agency
- Readiness Gap Check of an Electrical Scope Using a Completion Status Register

Day 2: Inspection and Test Plans, Acceptance Specifications and Test Records

- Inspection and Test Plan Hold, Witness and Review Points for Electrical Equipment
- ANSI/NETA ATS Acceptance Test Structure: Visual, Mechanical and Electrical Inspections
- Test Instrument Selection, Calibration Certificates and Traceability Records
- Electrical Check Sheet Library for Construction and Pre-Commissioning Stages
- Factory Acceptance Test Results as the Site Acceptance Baseline

Day 3: Cable, Relay, Transformer and Switchboard Pre-Commissioning Tests

- Cable Insulation Resistance, Continuity and Phasing Checks Before Termination Sign-Off
- VLF and DC Hipot Withstand Testing Overview for Medium-Voltage Cables
- Protection Relay Secondary Injection and Settings File Verification Against IEC 60255 Characteristics
- Transformer Ratio, Vector Group and Winding Resistance Acceptance Checks
- Switchboard and MCC Functional Checks: Control Wiring, CT Polarity and Trip Circuit Proving

Day 4: UPS, Earthing, First Energisation and Start-Up Risk

- UPS Transfer, Autonomy and Battery Discharge Capacity Acceptance Tests
- Earth Electrode Fall-of-Potential and Lightning Protection Continuity Tests
- First Energisation Procedure: Permit Control, Exclusion Zones and Step-by-Step Switching Programme
- Motor Uncoupled Solo Run: Rotation Direction, No-Load Current and Temperature Checks
- Loop Checks and Interface Tests Between MCC, DCS and Emergency Shutdown Signals

Day 5: Switchroom Walkthrough, Punch Lists and Electrical Handover

- Substation Energisation Case Study: Relay Failure to Trip and Reversed CT Polarity
- Pre-Energisation Switchroom Inspection Walkthrough Against an Acceptance Checklist
- Electrical Punch List Categorisation and Clearance Before Energisation
- Electrical Handover Dossier: Test Certificates, As-Built Drawings and Relay Settings Records
- Electrical Commissioning and Energisation Plan Drafting and Peer Review

Skills You Will Gain:

- Electrical Systemisation
- Inspection and Test Planning
- Acceptance Test Interpretation
- Secondary Injection Testing
- Energisation Switching Programmes
- Battery and UPS Acceptance
- Earthing Measurement
- Handover Dossier Compilation

Why Attend This Course:

- Return with an Electrical Commissioning and Energisation Plan for an installation from your own project
- Spot wrong relay settings, reversed polarity and untested cables before they cause a failed first energisation
- Run a switching programme and solo run sequence that test crews, operators and contractors can follow step by step
- Compare commissioning practice with electrical peers from power, oil and gas, water, data centres and industry

Conclusion:

New electrical installations energise safely when every system is defined, every item has an agreed test and every result is checked before the first switch is closed. This course moves from commissioning scope and systemisation, through inspection and test plans and acceptance specifications, to cable, relay, transformer and switchboard tests. It then covers UPS, earthing, first energisation, solo runs and loop checks, before a switchroom walkthrough produces an Electrical Commissioning and Energisation Plan ready for the next project.