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COURSE BROCHURE

# Low and Medium Voltage Switchboard Design Training Course

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Manama

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Registered in the United Kingdom and Saudi Arabia

# Low and Medium Voltage Switchboard Design Training Course

**Ref:** 2988_113267 **Date:** 31 October – 4 November 2027 **Location:** Manama **Fees:** 5500 GBP

Low and Medium Voltage Switchboard Design is a 1-week training course for electrical design engineers who size busbars, select protective devices and arrange enclosures, and it ends with a switchboard design specification each participant completes. Rising fault levels and tighter plant rooms leave little margin for an assembly that overheats or fails. Jupiter Prime Training delivers this switchboard design course.

## Why Low and Medium Voltage Switchboard Design Matters Now

Three forces shape switchboard work today. Network reinforcement and larger transformers push prospective fault currents upward, so busbar systems must withstand higher electrodynamic and thermal stress. Data centres, hospitals and process plants demand continuity, driving segregation and maintainability into every layout. A well-designed assembly runs cool and survives faults; one designed badly brings arc damage, rework and long outages. The course rests on the recognised international rules for verifying low voltage and medium voltage assemblies, described in general terms.

## Who Gains Most from Low and Medium Voltage Switchboard Design

- Engineers responsible for translating single-line diagrams into switchboard arrangements
- Engineers who calculate fault levels and set equipment withstand ratings
- Engineers who select circuit breakers, fuses and protective relays for incoming and outgoing feeders
- Engineers who review panel builder drawings and type-test evidence for compliance
- Engineers who prepare tender specifications for consultants and owners

Design offices sending distribution engineers and specification writers together gain one shared sizing method.

## Low and Medium Voltage Switchboard Design Capabilities

Participants move from load schedule to a verified enclosure arrangement.

- Calculate busbar cross-sections for continuous current and ambient conditions — the procurement rating decision
- Verify short-circuit withstand of busbars, supports and joints — the fault level acceptance decision
- Specify the internal form of separation for each functional unit — the maintenance and continuity strategy
- Assess temperature rise and apply derating factors — the enclosure and ventilation choice
- Select and coordinate protective devices for incomers, couplers and feeders — the discrimination study sign-off

- Design physical layout, cable entry and access clearances — the plant room arrangement agreed with architects

## Key Low and Medium Voltage Switchboard Design Terms

- Rated short-time withstand current — the fault current an assembly carries for a stated time without damage or loss of function.
- Peak withstand current — the highest instantaneous current the busbars and supports resist before mechanical distortion occurs.
- Form of separation — the internal division of a switchboard that isolates busbars, functional units and terminals from one another.
- Rated diversity factor — the ratio applied when outgoing circuits do not all carry full load at the same time.
- Internal arc classification — a tested rating describing how an enclosure protects nearby personnel during an internal arcing fault.
- Design verification — evidence by test or calculation that an assembly meets its declared ratings.

## Low and Medium Voltage Switchboard Design Day by Day

### Day 1: Assembly Context and Ratings

- Single-Line Diagram Interpretation — Defining Incomers, Couplers and Feeder Arrangement
- Load Schedules and Diversity — Setting Rated Currents for Each Section
- Low Versus Medium Voltage Assembly Types — Choosing Metal-Enclosed or Metal-Clad Construction
- Service Conditions and Altitude — Adjusting Ratings for Site Environment
- Declared Ratings Schedule — Recording Voltage, Current and Fault Values

### Day 2: Busbar Systems and Fault Withstand

- Busbar Cross-Section Sizing — Balancing Current Density Against Copper or Aluminium Cost
- Prospective Fault Current Calculation — Setting Short-Time and Peak Ratings
- Electrodynamic Force on Busbar Supports — Spacing Insulators and Clamps Safely
- Busbar Joints and Contact Pressure — Controlling Hot Spots at Bolted Connections
- Neutral and Protective Conductor Sizing — Handling Harmonic and Earth Fault Currents

### Day 3: Separation, Thermal Performance and Arc Containment

- Forms of Internal Separation — Matching Segregation to Maintenance While Energised
- Temperature Rise Calculation — Confirming Limits for Terminals and Accessible Parts
- Ventilation and Enclosure Protection Degree — Trading Cooling Against Dust and Water Ingress
- Internal Arc Containment and Venting — Protecting Operators in Front of Panels
- Medium Voltage Compartment Interlocking — Preventing Access to Live Circuit Breaker Spouts

## Day 4: Protective Devices and Physical Layout

- Circuit Breaker and Fuse Selection — Matching Breaking Capacity to Fault Level
- Time-Current Discrimination — Coordinating Incomer, Coupler and Feeder Devices
- Protection Relay and Instrument Transformer Choice — Supporting Medium Voltage Feeder Schemes
- Switchroom Layout and Clearances — Planning Access, Withdrawal and Escape Routes
- Cable Entry and Termination Space — Fitting Large Cables Without Exceeding Bend Radius

## Day 5: Practising the Switchboard Design Specification

- Busbar and Withstand Calculations Applied — Validating a Case Study Main Switchboard
- Separation and Thermal Choices Applied — Justifying Enclosure Decisions for a Hospital Board
- Discrimination Review Applied — Checking Device Settings for an Industrial Motor Board
- Design Verification Evidence Review — Comparing Panel Builder Submissions Against Declared Ratings
- Switchboard Design Specification — Completing Ratings, Arrangement and Verification Requirements

## Applying Low and Medium Voltage Switchboard Design After the Course

- Recheck the busbar and short-circuit withstand calculations of a current project switchboard against its updated fault level.
- Lead a design review of a panel builder submission, testing its separation form, temperature rise evidence and device discrimination.

## Low and Medium Voltage Switchboard Design Questions FAQ

### What is Low and Medium Voltage Switchboard Design and why does it matter now?

Low and Medium Voltage Switchboard Design is the engineering of assemblies that distribute power safely under normal load and fault. It matters now because fault levels and continuity demands keep rising.

### Which roles gain most from Low and Medium Voltage Switchboard Design training?

Electrical design engineers gain most who size equipment, select protective devices or review panel builder drawings for consultants, contractors and owners in healthcare, utilities and manufacturing.

## How does Low and Medium Voltage Switchboard Design differ from a switchgear maintenance course?

Low and Medium Voltage Switchboard Design focuses on sizing and specifying an assembly before it is built. A maintenance course covers servicing equipment already in service.

## What do you bring back from Low and Medium Voltage Switchboard Design training?

You bring back a completed specification for a case study switchboard, ready to adapt as a template for your next project.

## Low and Medium Voltage Switchboard Design: The Way Forward

The switchboard design specification first informs the tender for a main distribution board, giving procurement and panel builders one set of declared ratings to price against. Design engineers and reviewers use it to judge submissions and witness tests. After first use, revisit diversity and temperature rise assumptions against measured loading.