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COURSE BROCHURE

LV, MV and HV Circuit Breaker Condition-Based Maintenance Training Course

25 – 29 July 2027
Muscat

LV, MV and HV Circuit Breaker Condition-Based Maintenance Training Course

Ref: 1262_47479 **Date:** 25 – 29 July 2027 **Location:** Muscat **Fees:** 6500 GBP

LV, MV and HV Circuit Breaker Condition-Based Maintenance is a 1-week training course for electrical engineers and switchgear technicians who look after air, moulded-case, vacuum and SF6 breakers across substations, plants and large buildings, and who leave with a breaker fleet maintenance and test schedule. Ageing switchboards and fewer outage windows now make fixed-interval overhauls hard to sustain. Jupiter Prime Training offers this course in LV, MV and HV circuit breaker condition-based maintenance.

Why LV, MV and HV Circuit Breaker Condition-Based Maintenance Matters Now

Asset owners want longer service from installed switchgear, operations teams grant fewer shutdowns, and insurers and safety functions watch closely for breakers that fail to trip. A site that overhauls every breaker on a calendar wastes outage time on healthy units while sticky mechanisms elsewhere go unseen; a site that grades each breaker by test results, operation counts and duty spends its outages where failure is most likely. The course places breaker care within ISO 55001 for asset management systems and uses EN 13306 maintenance terminology to separate preventive, condition-based and corrective work.

Who Gains Most from LV, MV and HV Circuit Breaker Condition-Based Maintenance

- Electrical engineers responsible for switchboards and substations in plants, utilities and campuses
- Switchgear technicians who inspect, test and service breakers and their operating mechanisms
- Maintenance planners who fit breaker work into limited outage windows
- Substation supervisors who authorise switching and accept breakers back into service
- Reliability engineers who track breaker failures and set inspection intervals

An electrical maintenance group responsible for a large breaker population gains most when engineers and senior technicians attend together, because test interpretation and interval decisions then follow one grading scheme.

LV, MV and HV Circuit Breaker Condition-Based Maintenance Capabilities

Participants read what each test says about a breaker's health and turn those readings into intervals and outage priorities.

- Assess breaker types and interruption media by voltage class — inspection scope for each unit
- Apply contact resistance, insulation and timing tests — return-to-service approval
- Calculate contact wear from operation counts and fault duty — overhaul timing
- Specify condition indicators and a health index for the breaker fleet — outage priorities

- Test trip and close circuits, coils and spring charging — troubleshooting failed operations
- Build a condition-based interval schedule — maintenance planners and substation supervisors

Key LV, MV and HV Circuit Breaker Condition-Based Maintenance Terms

- Interruption Medium — the air, vacuum, oil or SF6 gas in which a breaker extinguishes the arc when it opens.
- Contact Resistance — micro-ohm resistance across closed main contacts, rising as contacts wear, pit or lose pressure.
- Breaker Timing Test — measurement of opening and closing times and pole spread against the maker's limits.
- Cumulative Interrupted Current — the summed fault and load current a breaker has broken, used to estimate contact erosion.
- Health Index — a score combining test results, age, duty and condition findings to rank breakers for action.
- Condition-Based Maintenance — maintenance triggered by measured condition rather than a fixed calendar interval.

LV, MV and HV Circuit Breaker Condition-Based Maintenance Day by Day

Day 1: The Breaker Fleet and Its Failure Modes

- Breaker Classes by Voltage — Air, Moulded-Case, Vacuum and SF6 Designs
- Arc Interruption Principles — Why Each Medium Ages Differently
- Operating Mechanisms — Spring, Magnetic Actuator and Hydraulic Drives
- Common Failure Modes — Failure to Trip, Slow Close and Contact Overheating
- Breaker Population Register — Recording Age, Duty and Criticality

Day 2: Inspection and Diagnostic Testing

- Visual and Thermographic Inspection — Hot Joints and Tracking Signs
- Contact Resistance Measurement — Main Contact Wear Assessment
- Insulation Resistance and Power Frequency Tests — Dielectric Condition
- Timing and Travel Curve Analysis — Mechanism Speed and Pole Spread
- Vacuum Bottle Integrity and SF6 Gas Checks — Medium Condition Verification

Day 3: Condition Indicators and Intervals

- Operation Counter and Fault Duty Logging — Contact Erosion Estimate
- Breaker Health Index Scoring — Ranking Units for Outage Slots
- Interval Setting Under EN 13306 Definitions — Preventive Versus Condition-Based
- Criticality and Consequence Ranking With ISO 55001 — Fleet Priorities
- Online Monitoring Options — Coil Current, Gas Density and Temperature

Day 4: Troubleshooting and Corrective Work

- Trip and Close Circuit Fault-Finding — Coils, Auxiliary Contacts and Wiring
- Spring Charging Motor Problems — Limit Switches and Gearboxes
- Lubrication and Mechanism Adjustment — Restoring Timing Within Limits
- Racking and Interlock Defects — Safe Withdrawal and Insertion
- Return-to-Service Checklist — Tests Before Re-Energising

Day 5: Practising the Breaker Fleet Maintenance and Test Schedule

- Fleet Register for a Chosen Substation — Applying Population Data
- Test Result Interpretation — Applying Diagnostic Limits
- Health Index Ranking — Applying Indicators and Criticality
- Outage Window Allocation — Matching Work to Shutdown Slots
- Breaker Fleet Maintenance and Test Schedule — Completed Document for Approval

Applying LV, MV and HV Circuit Breaker Condition-Based Maintenance After the Course

- Build a register of every breaker in one substation with age, operation count and last test results, then score each with the health index.
- Run contact resistance and timing tests on the three lowest-scoring breakers at the next outage and update their intervals.

LV, MV and HV Circuit Breaker Condition-Based Maintenance Questions FAQ

What is LV, MV and HV circuit breaker condition-based maintenance and why does it matter now?

LV, MV and HV circuit breaker condition-based maintenance sets breaker service by measured health instead of a fixed calendar. It matters now because switchgear is ageing and outage windows are scarce, so effort must go where failure is likeliest.

Which roles gain most from LV, MV and HV circuit breaker condition-based maintenance training?

Electrical engineers, switchgear technicians, maintenance planners, substation supervisors and reliability engineers gain most. They test breakers, read results, schedule outages and decide when units return to service.

How does LV, MV and HV circuit breaker condition-based maintenance differ from a protection relay course?

LV, MV and HV circuit breaker condition-based maintenance covers the breaker itself: contacts, mechanisms, interruption media and test-based intervals. A protection relay course centres on relay settings and coordination that decide when a breaker is told to trip.

What do you bring back from LV, MV and HV circuit breaker condition-based maintenance training?

You bring back a maintenance and test schedule for a breaker fleet you know, with a register, health scores, chosen tests and work allocated to real outage windows.

LV, MV and HV Circuit Breaker Condition-Based Maintenance: The Way Forward

The breaker fleet maintenance and test schedule first informs which units are opened at the next planned outage. Engineers and planners use it to agree scope with operations and track test results over time. After one outage cycle, revisit the health index weights, because early results often show which indicators truly predict breaker trouble on that site.