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COURSE BROCHURE

# Motor Protection Relay and Insulation Testing Training Course

15 – 19 February 2027
Munich

# Motor Protection Relay and Insulation Testing Training Course

**Ref:** 1765_64771 **Date:** 15 – 19 February 2027 **Location:** Munich **Fees:** 6200 GBP

Motor Protection Relay and Insulation Testing is a 1-week training course for electrical maintenance engineers and technicians who keep low and medium voltage motors in safe service, and it ends with a motor protection test dossier for one critical drive. Unplanned motor trips and winding burnouts still halt pumps, fans and conveyors across process plants and utilities. Jupiter Prime Training delivers this course for teams responsible for motor reliability.

## Why Motor Protection Relay and Insulation Testing Matters Now

Three pressures shape motor protection today. Ageing motor fleets run harder as plants extend asset life, so insulation margins shrink quietly. Numerical motor relays have replaced thermal overloads, giving maintenance teams many more settings to verify and many more ways to get them wrong. Operations leaders want fewer nuisance trips without more burnt windings. Disciplined testing catches degradation early; neglect either trips healthy drives or lets faulted ones run until the stator fails.

## Who Gains Most from Motor Protection Relay and Insulation Testing

- Technicians who carry out insulation resistance and winding checks on motors during shutdowns
- Engineers who set, inject and sign off motor protection relays on switchboards
- Planners who schedule periodic electrical testing within maintenance routines
- Supervisors who decide whether a motor returns to service after a trip

Electrical crews gain most when a relay tester, an insulation tester and the supervisor who authorises restarts attend together.

## Motor Protection Relay and Insulation Testing Capabilities

Participants leave able to connect each test reading to a protection function and a return-to-service call.

- Calculate thermal overload, locked-rotor and short-circuit pick-up values from motor nameplate data — relay setting approval
- Specify earth fault and phase unbalance thresholds that match the supply earthing arrangement — protection engineer
- Test relay pick-up and trip times with secondary injection — commissioning sign-off
- Apply insulation resistance, polarisation index and step voltage tests correctly — winding health decision
- Assess winding resistance, surge comparison and partial discharge results against trends — rewind or replace choice

## Key Motor Protection Relay and Insulation Testing Terms

- Thermal capacity used — the share of a motor's permitted heating a relay model calculates, used to block early restarts.
- Locked-rotor current — the current a motor draws at standstill with full voltage applied.
- Negative sequence current — the current component caused by voltage or phase unbalance that rapidly heats the rotor.
- Polarisation index — the ratio of insulation resistance at ten minutes to that at one minute, showing moisture or contamination in windings.
- Secondary injection — applying test currents to a relay's input terminals to confirm settings, pick-up values and trip times.
- Surge comparison test — a pulse test comparing phase windings to reveal turn-to-turn insulation weakness.

## Motor Protection Relay and Insulation Testing Day by Day

### Day 1: Motor Failure Modes and Protection Functions

- Stator, Rotor and Bearing Failure Statistics — Where Protection Effort Pays Back
- Overload, Short Circuit and Earth Fault Behaviour — Choosing Protection Functions
- Phase Loss and Unbalance Effects on Rotor Heating — Setting Priorities
- Low Voltage Versus Medium Voltage Motor Schemes — Device Selection Boundaries
- Starting Methods and Their Current Profiles — Coordination With Upstream Devices

### Day 2: Relay Settings From Nameplate to Curve

- Thermal Model and Service Factor Inputs — Overload Pick-Up Calculation
- Locked-Rotor and Stall Protection Timing — Safe Start Time Margins
- Instantaneous Overcurrent and Fuse Coordination — Short-Circuit Clearing Choices
- Core Balance Transformer Earth Fault Settings — Earthing System Fit
- Negative Sequence and Starts-Per-Hour Limits — Restart Inhibit Policy

### Day 3: Protection Relay Injection Testing

- Secondary Injection Test Set Connection — Safe Isolation of Trip Circuits
- Pick-Up and Drop-Off Verification — Accepting or Correcting Settings
- Trip Time Against Thermal Curve — Evidence for Commissioning Sign-Off
- Current Transformer Ratio and Polarity Checks — Avoiding False Earth Fault Trips
- Event and Disturbance Record Retrieval — Explaining Unexpected Trips

### Day 4: Insulation and Winding Diagnostics

- Insulation Resistance and Temperature Correction — Comparable Readings Over Time
- Polarisation Index and Dielectric Absorption Ratio — Dry-Out or Restart Decision
- Winding Resistance and Inductance Balance — Locating Shorted Turns and Loose Joints
- Surge Comparison and Partial Discharge Testing — Rewind Planning for Medium Voltage
- Test Interval Setting From Duty and Environment — Shutdown Scope Planning

## Day 5: Practising the Motor Protection Test Dossier

- Setting Sheet Review for a Pump Motor Case — Applying Day 2 Calculations
- Injection Results Interpretation for a Fan Drive — Applying Day 3 Methods
- Insulation Trend Diagnosis for a Conveyor Motor — Applying Day 4 Readings
- Return-to-Service Criteria After a Trip — Agreeing Restart Authority
- Motor Protection Test Dossier Completion — Handover to Site Maintenance

## Applying Motor Protection Relay and Insulation Testing After the Course

- Audit the relay settings of five critical motors against nameplate data and correct any thermal or earth fault values that no longer fit.
- Start an insulation resistance and polarisation index trend log for motors above a chosen rating, temperature-corrected at each shutdown.

## Motor Protection Relay and Insulation Testing Questions FAQ

### What is motor protection relay and insulation testing, and why does it matter now?

It is the practice of setting and proving motor relays and measuring winding insulation health. It matters now because ageing motors and numerical relays leave more room for both nuisance trips and missed faults.

### Which roles gain most from motor protection relay and insulation testing?

Electrical technicians and engineers who test, set and restore motors gain most. Supervisors who authorise restarts after trips also benefit.

### How does motor protection relay and insulation testing differ from a drives troubleshooting course?

This focus is on protecting and testing the motor itself rather than on variable speed drive control. You work on relay settings, injection and winding diagnostics, not drive parameters or harmonics.

### What do you bring back from motor protection relay and insulation testing?

You bring back a completed test dossier for one critical motor, with checked relay settings, injection results and insulation trends. It becomes a template for the wider motor fleet.

## Motor Protection Relay and Insulation Testing: The Way Forward

The motor protection test dossier gathers verified relay settings, injection records and insulation trends for one critical drive. Its first use is deciding whether that motor's settings and windings are fit for the next run period. Maintenance engineers and shift supervisors use it together. After the first shutdown, revisit test intervals and thresholds in light of the trends the dossier reveals.