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COURSE BROCHURE

On-Load Tap Changer Maintenance and Troubleshooting Training Course

1 – 5 March 2027
Milan

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

On-Load Tap Changer Maintenance and Troubleshooting Training Course

Ref: 1707_62597 **Date:** 1 – 5 March 2027 **Location:** Milan **Fees:** 7200 GBP

On-Load Tap Changer Maintenance and Troubleshooting is a 1-week training course for transformer maintenance engineers and substation technicians who build a tap changer condition and overhaul plan for their fleet. Tap changers are the moving heart of a power transformer, and their contacts, springs and motor drives cause a large share of transformer outages. Jupiter Prime Training delivers this course on on-load tap changer maintenance and troubleshooting.

Why On-Load Tap Changer Maintenance and Troubleshooting Matters Now

Three forces shape tap changer care today. Grids carrying solar and wind output see voltage swing more often, so tap changers operate far more often. Older fleets use oil-type diverters while new units use vacuum interrupters. Asset owners also move from fixed calendar intervals to condition-based decisions. Reading contact wear, oil quality and drive behaviour well avoids forced outages; neglect risks a failed transformer. The course rests on manufacturer maintenance guidance and recognised international transformer testing practice.

Who Gains Most from On-Load Tap Changer Maintenance and Troubleshooting

- Engineers responsible for transformer condition monitoring and outage scoping
- Technicians who carry out diverter inspection, contact replacement and oil handling
- Testing staff who run winding resistance, dynamic resistance and turns ratio measurements
- Protection and control staff who maintain motor drive circuits and tap position indication
- Maintenance planners who schedule tap changer overhauls within substation outages

A substation maintenance crew gains most when its engineers, technicians and planners attend together and agree one diagnostic routine for the fleet.

On-Load Tap Changer Maintenance and Troubleshooting Capabilities

Participants learn to judge contact wear, switching timing and drive health from test records.

- Distinguish diverter, selector and vacuum interrupter designs during inspection — scope of each outage
- Calculate maintenance intervals from operation counters and switched current — overhaul timing for planners
- Interpret dynamic resistance traces for transition timing faults — repair or replace decisions
- Assess compartment oil results for carbon, moisture and gas trends — oil treatment choices
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Test motor drive mechanisms, limit switches and step-by-step control — protection and control crews
- Build a fleet ranking of tap changers by condition and risk — asset managers and budget holders

Key On-Load Tap Changer Maintenance and Troubleshooting Terms

- Diverter switch — the part that transfers load current between taps.
- Tap selector — the mechanism that preselects the next winding tap without carrying load current.
- Transition resistor — a resistor that limits circulating current between two taps during the short switching interval.
- Vacuum interrupter — a sealed bottle that breaks current inside a vacuum.
- Dynamic resistance measurement — a test recording current through the winding during operation, revealing timing faults.
- Motor drive mechanism — the cabinet holding the motor and controls that move the tap changer one step.

On-Load Tap Changer Maintenance and Troubleshooting Day by Day

Day 1: Tap Changer Designs and Switching Principles

- Regulating Winding Layouts and Tap Ranges — Voltage Control Needs of the Network
- Diverter and Selector Arrangements — Choosing Inspection Access and Tools
- Oil-Type Arcing Versus Vacuum Switching — Contact Wear and Oil Ageing Expectations
- Transition Resistor Sequences — Circulating Current and Timing Limits
- Nameplates, Drawings and Operation Counters — Building the Unit Record

Day 2: Inspection Intervals and Hands-On Servicing

- Interval Rules from Operations and Switched Current — Calendar Versus Condition Triggers
- Safe Isolation, Draining and Compartment Opening — Outage Duration and Risk
- Contact Erosion Measurement and Replacement Limits — Reuse or Renew Decisions
- Spring Energy Accumulator and Shaft Checks — Mechanical Failure Prevention
- Breather, Pressure Relief and Protective Relay Checks — Fire and Rupture Protection

Day 3: Diagnostic Testing and Oil Analysis

- Static Winding Resistance Per Tap — Detecting Poor Selector Contacts
- Dynamic Resistance Traces and Timing Signatures — Diagnosing Transition Faults
- Turns Ratio and Excitation Current Tests — Confirming Correct Tap Positions
- Compartment Oil Sampling and Dielectric Strength — Filtration or Replacement Choice
- Dissolved Gas Patterns in Tap Changer Oil — Separating Normal Arcing From Leakage

Day 4: Motor Drive Faults and Control Troubleshooting

- Motor Drive Wiring, Cam Switches and Interlocks — Fault Tracing Sequence
- Step-By-Step Control and Run-Through Faults — Stopping Uncontrolled Tap Travel
- Tap Position Indication and Voltage Regulating Relay — Correct Automatic Response
- Parallel Transformer Tap Coordination — Avoiding Circulating Current Between Units
- Thermography and Acoustic Checks on Drives — Early Warning Without Outage

Day 5: Practising the Tap Changer Condition and Overhaul Plan

- Fleet Test Data Review Using Dynamic Resistance Results — Ranking Units by Risk
- Oil and Contact Wear Findings Combined — Choosing Overhaul or Monitoring
- Drive Fault History Analysis — Spare Parts and Retrofit Priorities
- Outage Window Sequencing for Overhauls — Crew, Oil Plant and Spares Readiness
- Tap Changer Condition and Overhaul Plan — Agreed Fleet Actions and Intervals

Applying On-Load Tap Changer Maintenance and Troubleshooting After the Course

- Lead a dynamic resistance baseline on two critical transformers.
- Review operation counters across the substation fleet and reset overhaul intervals using switched current and oil results.

On-Load Tap Changer Maintenance and Troubleshooting Questions FAQ

What is on-load tap changer maintenance and troubleshooting and why does it matter now?

It is the inspection, testing and repair of the switching device that adjusts transformer voltage under load. It matters now because variable generation makes tap changers operate more often, speeding contact wear.

Which roles gain most from on-load tap changer maintenance and troubleshooting?

Transformer maintenance engineers, substation technicians, testing staff and maintenance planners gain most. Shared methods help the whole crew.

How does on-load tap changer maintenance and troubleshooting differ from a general transformer maintenance course?

It concentrates on the one moving component of the transformer. A general transformer course covers windings, insulation, bushings and cooling broadly; this course goes deep into diverter contacts, timing and drive control.

What do you bring back from on-load tap changer maintenance and troubleshooting?

You bring back a fleet plan that ranks tap changers by condition and sets overhaul intervals. You also gain a routine for reading test traces and oil results.

On-Load Tap Changer Maintenance and Troubleshooting: The Way Forward

The tap changer condition and overhaul plan ranks every unit by contact wear, oil quality and drive health. Its first use is choosing which transformers receive an overhaul in the next outage season. Maintenance planners and asset managers use it to book crews and spares. After the first overhauls, revisit the intervals against the new dynamic resistance baselines and adjust the ranking.