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COURSE BROCHURE

# Power Conversion Equipment Fault Diagnosis Training Course

11 – 15 July 2027
Cairo

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Registered in the United Kingdom and Saudi Arabia

# Power Conversion Equipment Fault Diagnosis Training Course

**Ref:** 3046_115581 **Date:** 11 – 15 July 2027 **Location:** Cairo **Fees:** 4000 GBP

Power Conversion Equipment Fault Diagnosis is a 1-week training course for electrical engineers and maintenance technicians who keep transformers, inverters, rectifiers, uninterruptible power supplies and standby generators in service, who leave with an equipment condition and replacement schedule. As sites depend on more power electronics, a missed fault in this equipment stops production and services. The course is delivered by Jupiter Prime Training.

## Why Power Conversion Equipment Fault Diagnosis Matters Now

Three forces shape this equipment today. Solar arrays, battery stores and variable speed drives have filled sites with inverters and rectifiers with failure modes unlike rotating machines. Ageing transformer and generator fleets near the end of design life while lead times grow. Leaders also expect spending justified by condition evidence. An organisation that diagnoses faults early avoids unplanned outages, fire risk and rushed purchases; one that does not pays for both the failure and the emergency replacement.

## Who Gains Most from Power Conversion Equipment Fault Diagnosis

- Engineers keeping transformers and switch rooms in service
- Technicians who test, clean and repair inverters, rectifiers and battery chargers
- Staff who look after uninterruptible supplies for control rooms, data halls and hospitals
- Engineers who run standby generators and their changeover arrangements
- Planners who set maintenance intervals and replacement budgets for electrical assets

A maintenance department gains most when its engineers and technicians attend together and agree one way of scoring equipment condition.

## Power Conversion Equipment Fault Diagnosis Capabilities

Participants move from how each machine converts energy to how it fails, how to prove the fault and when to repair or replace it.

- Explain the operating principle of each conversion stage — fault-finding choices on site
- Interpret insulation, winding and oil test results on transformers — repair or retire decisions
- Diagnose inverter and rectifier faults from waveforms, alarms and thermal images — technicians and suppliers
- Test battery strings and bypass paths on uninterruptible supplies — critical load owners
- Assess generator excitation, governing and changeover behaviour — site resilience planning
- Build a condition score and replacement priority for each asset — budget holders

## Key Power Conversion Equipment Fault Diagnosis Terms

- Rectifier — equipment that converts alternating current into direct current, usually with diodes or thyristors.
- Inverter — power electronic equipment that turns direct current into alternating current at controlled voltage and frequency.
- Uninterruptible power supply — a rectifier, battery and inverter set that keeps critical loads fed through mains loss without a break.
- Static bypass — a fast switch that transfers the load from the inverter to the reserve supply when the inverter trips or is overloaded.
- Insulation resistance — the resistance measured between windings and earth that reveals moisture, contamination or ageing of insulation.
- Condition score — a rating that combines test results, age, duty and failure history to rank equipment for repair or replacement.

## Power Conversion Equipment Fault Diagnosis Day by Day

### Day 1: How Conversion Equipment Works

- Transformer Magnetic Circuit And Losses — Loading Limits For Each Unit
- Diode And Thyristor Rectifier Bridges — Choosing Charger And Drive Supplies
- Pulse Width Modulated Inverter Stages — Output Quality For Sensitive Loads
- Generator Excitation And Speed Governing — Stable Voltage On Standby Supply
- Single Line Diagram Of A Conversion Chain — Locating Weak Points

### Day 2: Transformer Faults and Tests

- Insulation Resistance And Polarisation Index Tests — Judging Winding Moisture
- Winding Resistance And Turns Ratio Checks — Finding Shorted Turns Early
- Oil Sampling And Dissolved Gas Trends — Spotting Overheating And Arcing
- Tap Changer And Bushing Inspection — Planning Outage Work Scope
- Thermal Imaging Of Terminations — Prioritising Loose Connection Repairs

### Day 3: Power Electronic Faults

- Alarm Logs And Event Records — Tracing The First Failing Component
- Oscilloscope Waveform Reading — Separating Switching From Control Faults
- Capacitor And Semiconductor Ageing Checks — Timing Module Replacement
- Cooling Fan And Heat Sink Condition — Preventing Thermal Trips
- Harmonic Distortion Measurement — Protecting Upstream Transformers And Cables

### Day 4: Standby Supplies and Generators

- Battery String Impedance And Discharge Tests — Confirming Autonomy
- Static Bypass And Maintenance Bypass Routines — Safe Transfer Without Load Loss
- Generator Load Bank Testing — Proving Capacity Before An Outage
- Automatic Changeover Sequence Checks — Restoring Supply Quickly
- Repair Versus Replace Cost Comparison — Selecting New Equipment Ratings

## Day 5: Practising the Condition and Replacement Schedule

- Fault Tree For A Failed Supply Chain — Applying Days Two To Four
- Test Result Scoring Matrix — Ranking Transformers And Inverters Together
- Spares And Lead Time Register — Covering Critical Single Points
- Maintenance Interval Adjustment — Matching Effort To Condition Scores
- Equipment Condition And Replacement Schedule — Final Site Priority List

## Applying Power Conversion Equipment Fault Diagnosis After the Course

- Run insulation, battery and thermal tests on the five most critical conversion assets and enter the results in the scoring matrix.
- Lead a changeover test of one uninterruptible supply and standby generator pair and record the transfer times and alarms.

## Power Conversion Equipment Fault Diagnosis Questions FAQ

### What is power conversion equipment fault diagnosis and why does it matter now?

It is the practice of finding and proving faults in transformers, inverters, rectifiers, uninterruptible supplies and generators. It matters now because sites rely on more power electronics while older transformers and generators age, so early diagnosis prevents outages and emergency purchases.

### Which roles gain most from power conversion equipment fault diagnosis?

Electrical engineers and maintenance technicians gain most. They test transformers, repair inverters, look after critical supplies or run generators in industry, healthcare and commercial buildings.

### How does power conversion equipment fault diagnosis differ from a transformer specification course?

It looks after equipment already in service. A specification course sizes and buys new units; this course finds faults across the whole conversion chain, from rectifier to generator, and decides when to repair or replace.

### What do you bring back from power conversion equipment fault diagnosis?

You bring back a scored list of your site equipment. It ranks each transformer, inverter, supply and generator by condition and sets a repair or replacement date.

## Power Conversion Equipment Fault Diagnosis: The Way Forward

The equipment condition and replacement schedule first informs which unit receives the next outage window and budget. Maintenance planners, site engineers and operations managers use it to agree priorities with evidence instead of age alone. After first use, revisit the scoring weights, because a factory and a hospital value interruption differently.