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COURSE BROCHURE

Current Transformer and Voltage Transformer Testing Training Course

7 – 11 March 2027
Muscat

Current Transformer and Voltage Transformer Testing Training Course

Ref: 2970_112604 **Date:** 7 – 11 March 2027 **Location:** Muscat **Fees:** 6500 GBP

Current Transformer and Voltage Transformer Testing is a 1-week training course for protection, testing and commissioning engineers who verify instrument transformers on site and produce a signed instrument transformer test report. Protection schemes and revenue metering are only as trustworthy as the transformers feeding them, so a missed polarity error or saturated core can trip a healthy feeder or hide a real fault. This course is delivered by Jupiter Prime Training.

Why Current Transformer and Voltage Transformer Testing Matters Now

Substations are being extended, retrofitted with numerical relays and connected to new generation at a pace that compresses commissioning windows. Asset owners expect test evidence that stands up to audit, and protection engineers need secondary quantities that reflect faults as well as load. Weak testing leads to maloperation and mismeasured energy; strong testing gives repeatable records and a baseline for later checks. The course rests on the international product and testing requirements for instrument transformers, described in general terms rather than by clause.

Who Gains Most from Current Transformer and Voltage Transformer Testing

- Engineers responsible for commissioning new bays and accepting secondary circuits before energisation
- Protection specialists who rely on transformer performance when setting differential and distance elements
- Field testing staff who connect test sets, record readings and flag anomalies
- Metering engineers accountable for accuracy class and burden on billing circuits
- Maintenance engineers who repeat tests after faults, relocations or ageing concerns

A substation commissioning crew gains most when its members attend together.

Current Transformer and Voltage Transformer Testing Capabilities

Participants leave able to plan, run and judge the core site tests on measuring transformers.

- Plan a safe test sequence for a bay with several cores — commissioning supervisor
- Test ratio, polarity and phase angle and judge results against nameplate data — protection engineer
- Calculate knee point voltage from excitation curves and compare it with relay needs — protection settings team
- Measure winding resistance and connected burden to confirm core suitability — metering engineer
- Assess insulation results and trends for voltage and current transformers — asset owner
- Communicate findings in a clear test report with acceptance decisions — client and operations

Key Current Transformer and Voltage Transformer Testing Terms

- Ratio error — the difference between the actual and rated transformation ratio, expressed as a percentage of the rated value.
- Polarity — the relative direction of primary and secondary terminals, which decides the direction relays and meters see.
- Knee point — the point on the excitation curve where a small voltage rise causes a large rise in magnetising current.
- Burden — the impedance of relays, meters and leads connected to a secondary winding.
- Accuracy class — the stated limit of ratio and phase error a transformer meets.
- Remanence — magnetism left in a core after a fault or direct current test.

Current Transformer and Voltage Transformer Testing Day by Day

Day 1: Measuring Transformers in the Protection Chain

- Current Transformer Construction and Core Types — Choosing Cores for Protection or Metering
- Voltage Transformer Types and Capacitor Dividers — Matching Design to Network Voltage
- Nameplate Data and Rating Plates — Defining Acceptance Values Before Testing
- Secondary Wiring Diagrams and Terminal Marking — Tracing Cores to Relays and Meters
- Safe Isolation and Open Secondary Hazards — Protecting Crews During Test Connections

Day 2: Ratio, Polarity and Phase Angle

- Primary Injection Ratio Test — Confirming Whole Circuit Ratio Under Real Current
- Secondary Voltage Method for Ratio — Speeding Tests When Primary Access Is Limited
- Battery Flick and Test Set Polarity Checks — Proving Relay Directionality Before Energisation
- Phase Angle Displacement Measurement — Judging Metering Accuracy at Low Load
- Multi-Ratio Tap Verification — Selecting the Correct Tap for Settings

Day 3: Excitation, Saturation and Winding Health

- Excitation Curve Recording — Locating Knee Point Against Relay Requirements
- Demagnetisation Procedure — Removing Remanence After Direct Current Tests
- Winding Resistance Measurement — Detecting Loose Joints and Wrong Connections
- Connected Burden Measurement — Checking Lead Length and Relay Load Limits
- Insulation Resistance and Dielectric Loss — Deciding Fitness for Energisation

Day 4: Interpreting Results for Protection and Metering

- Accuracy Limit Factor Assessment — Confirming Fault Performance for Differential Schemes
- Voltage Transformer Ratio and Fuse Checks — Avoiding Loss of Voltage Relay Trips
- Comparison with Factory Test Records — Spotting Transport or Installation Damage
- Trend Analysis of Repeat Tests — Planning Replacement Within Asset Plans
- Fault Case Studies from Utilities and Industrial Plants — Linking Test Gaps to Maloperation

Day 5: Practising the Instrument Transformer Test Report

- Test Sequence Plan for a Feeder Bay — Applying Isolation and Connection Steps
- Ratio and Polarity Result Sheet — Applying Acceptance Values to Measured Data
- Excitation and Burden Evaluation — Applying Knee Point and Load Checks
- Peer Review of Anomalies — Agreeing Retest or Rejection Decisions
- Instrument Transformer Test Report — Completing Signed Records for Handover

Applying Current Transformer and Voltage Transformer Testing After the Course

- Lead a review of the current test sheets for one substation, adding missing knee point and burden steps.
- Run a joint polarity and ratio check with the protection team on the next bay due for commissioning.

Current Transformer and Voltage Transformer Testing Questions FAQ

What is current transformer and voltage transformer testing and why does it matter now?

It is the set of site checks that prove instrument transformers deliver correct secondary quantities. It matters now because rushed commissioning lets errors reach protection and metering.

Which roles gain most from current transformer and voltage transformer testing?

Commissioning, protection, metering and field testing engineers gain most. Each signs off part of the evidence before energisation.

How does current transformer and voltage transformer testing differ from a general protection relay course?

It focuses on the transformers that feed relays rather than relay settings. It covers the readings and acceptance judgements that relay coordination depends on.

What do you bring back from current transformer and voltage transformer testing?

You bring back a structured test report format and a test sequence you can reuse. Both make results consistent and auditable.

Current Transformer and Voltage Transformer Testing: The Way Forward

The instrument transformer test report is the first evidence a client or operations manager uses to accept a bay for energisation. Protection and metering engineers draw on it when settings are finalised. After first use, revisit the acceptance values and demagnetisation step, where site records most often fall short.