JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

# DC Battery and Charger Maintenance and Troubleshooting Training Course

14 – 18 March 2027
Abu Dhabi

**jupiterprime.uk**

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

# DC Battery and Charger Maintenance and Troubleshooting Training Course

**Ref:** 1466_54450 **Date:** 14 – 18 March 2027 **Location:** Abu Dhabi **Fees:** 6500 GBP

DC Battery and Charger Maintenance and Troubleshooting is a 1-week training course for electrical maintenance technicians and substation engineers, built around a DC system maintenance and test schedule that sets inspection, impedance, capacity and charger checks for every battery bank on site. Protection relays, breaker trip coils and emergency lighting all depend on station batteries, so a weak cell or a failed charger can turn a routine fault into a blackout. Jupiter Prime Training runs this DC battery and charger maintenance and troubleshooting course.

## Why DC Battery and Charger Maintenance and Troubleshooting Matters Now

Three pressures shape station DC work today: ageing battery banks in substations and process plants that have outlived their design life, more electronic protection and control equipment that is sensitive to ripple and voltage dips, and leaner maintenance crews who must find ground faults and weak cells quickly. Sites that maintain their DC systems well ride through grid disturbances with protection intact; sites that neglect them discover dead batteries only when a breaker fails to trip. The course draws on ISO 55001 for asset management decisions and EN 13306 for consistent maintenance and failure terminology.

## Who Gains Most from DC Battery and Charger Maintenance and Troubleshooting

- Technicians who carry out routine battery inspections, cell readings and charger checks
- Engineers who set test intervals and approve battery replacement decisions
- Protection staff who rely on stable DC supplies for relays and trip circuits
- Technicians who locate DC ground faults on live distribution panels
- Engineers who specify new battery banks and chargers for substations and plants

A substation or plant electrical crew gains most when technicians and the engineer who signs off battery decisions attend together and agree one test schedule.

## DC Battery and Charger Maintenance and Troubleshooting Capabilities

Participants connect cell voltages, impedance trends, electrolyte condition and charger behaviour to clear decisions on equalising, repairing or replacing.

- Assess vented lead-acid, VRLA and NiCd cells from voltage, specific gravity and visual condition — informing replacement decisions
- Test battery capacity with controlled discharge and interpret results — supporting engineers approving bank life
- Apply impedance and connection resistance trending — guiding technicians on weak cells and loose links
- Specify float, equalise and boost charger settings for each chemistry — protecting cells from over or under charging
- Build a stepwise DC ground fault location method — serving protection staff working on live panels
- Calculate battery sizing against duty cycle and temperature — informing engineers specifying new banks

## Key DC Battery and Charger Maintenance and Troubleshooting Terms

- Float charge — the constant voltage a charger holds across a battery to keep it fully charged without gassing.
- Equalising charge — a controlled higher voltage charge that brings all cells in a string to the same state.
- Capacity test — a timed discharge at a set current to measure how much energy the battery can still deliver.
- Internal impedance — the cell's resistance to alternating current, rising as plates age or connections degrade.
- Thermal runaway — a self-reinforcing rise in temperature and current that can destroy valve-regulated cells.
- DC ground fault — an unintended connection between a DC conductor and earth on an unearthed system.

## DC Battery and Charger Maintenance and Troubleshooting Day by Day

### Day 1: Station DC System Architecture

- Battery, Charger and Distribution Panel Layouts — Tracing Critical DC Loads
- Duty Cycle and Load Profile Review — Confirming Autonomy Requirements
- ISO 55001 Criticality for DC Assets — Prioritising Battery Banks
- EN 13306 Failure Terms for DC Equipment — Recording Faults Consistently
- Battery Room Ventilation and Safety Checks — Controlling Hydrogen and Acid Hazards

### Day 2: Battery Chemistries and Inspection

- Vented Lead-Acid Cell Inspection and Specific Gravity — Judging State of Charge
- VRLA Cell Inspection and Temperature Monitoring — Spotting Dry-Out and Swelling
- NiCd Cell Maintenance and Electrolyte Care — Planning Top-Up and Cleaning
- Intercell Connection Resistance Testing — Finding Loose or Corroded Links
- Internal Impedance and Conductance Trending — Flagging Weak Cells Early

## Day 3: Chargers and Capacity Testing

- Rectifier Charger Operation and Alarm Settings — Setting Float and Boost Levels
- Charger Ripple, Current Limit and Voltage Regulation Checks — Protecting Electronic Loads
- Controlled Discharge Capacity Testing Procedure — Measuring Remaining Battery Life
- Temperature Correction of Test Results — Comparing Readings Fairly
- Equalise and Recovery Charging After Tests — Returning Banks to Service Safely

## Day 4: Troubleshooting Faults

- DC Ground Fault Detection and Insulation Monitoring — Locating Faults on Live Systems
- Charger Failure Diagnosis: Rectifier, Control and Fuse Faults — Restoring Supply
- Thermal Runaway Warning Signs — Isolating Endangered Strings
- Voltage Dip and Trip Coil Failure Cases — Tracing Protection Misoperation
- Examples from Power Utilities and Petrochemical Plants — Comparing Fault Patterns

## Day 5: Practising the DC System Maintenance and Test Schedule

- Inspection and Impedance Records Reviewed for a Sample Bank — Ranking Cells
- Capacity Test Result Interpretation Exercise — Deciding Repair or Replacement
- Ground Fault Location Simulation on a Panel Model — Testing the Method
- Battery Sizing Check for a Substation Duty Cycle — Validating Replacement Specification
- DC System Maintenance and Test Schedule — Completing Intervals and Responsibilities

## Applying DC Battery and Charger Maintenance and Troubleshooting After the Course

- Lead an inspection and connection resistance survey of one battery bank, and record results as a baseline for impedance trending.
- Check each charger's float and equalise settings against the battery chemistry and temperature, and correct any setting outside the recommended range.

## DC Battery and Charger Maintenance and Troubleshooting Questions FAQ

### What is DC battery and charger maintenance and troubleshooting and why does it matter now?

It is the inspection, testing and fault finding that keep station batteries and chargers able to power protection and control. Ageing banks and sensitive electronic relays make reliable DC supplies essential.

### Which roles gain most from DC battery and charger maintenance and troubleshooting training?

Electrical maintenance technicians, substation engineers and protection staff gain most. You benefit if you inspect, test or replace batteries, or depend on DC supplies for trip circuits.

## How does DC battery and charger maintenance and troubleshooting differ from a UPS maintenance course?

A UPS course focuses on inverters, static switches and conditioned AC power. This course concentrates on station DC batteries, chargers, capacity testing and ground fault location for protection and control circuits.

## What do you bring back from DC battery and charger maintenance and troubleshooting training?

You bring back a DC system maintenance and test schedule, a ground fault location method and clear criteria for equalising, repairing or replacing cells and banks.

## DC Battery and Charger Maintenance and Troubleshooting: The Way Forward

The DC system maintenance and test schedule first informs which battery bank receives the next capacity test. Technicians, substation engineers and protection staff use it to plan outages and record trends. After the first full test cycle, revisit the intervals, since impedance trends often show which banks need closer attention and which can safely wait.