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COURSE BROCHURE

# Voltage Sag, Flicker and Transient Mitigation Training Course

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Milan

**jupiterprime.uk**
info@jupiterprime.uk
Registered in the United Kingdom and Saudi Arabia

# Voltage Sag, Flicker and Transient Mitigation Training Course

**Ref:** 2629_99972 **Date:** 18 – 22 October 2027 **Location:** Milan **Fees:** 7200 GBP

Voltage Sag, Flicker and Transient Mitigation is a 1-week training course for electrical, power quality and network engineers who must trace supply disturbances to their source and choose the right remedy, each participant preparing a site power quality survey report. Sensitive drives, process controls and data loads now trip on events lasting only milliseconds, so disturbance knowledge protects output and customer trust. Jupiter Prime Training delivers this voltage sag, flicker and transient mitigation course.

## Why Voltage Sag, Flicker and Transient Mitigation Matters Now

Electronic loads ride through short dips poorly, fluctuating loads such as arc furnaces share feeders with sensitive users, and capacitor switching produces transients that stress insulation. Cheaper compensators and ride-through units also widen the choice of remedy. An organisation that measures and attributes events well avoids repeated trips and disputes; one that guesses buys equipment that solves the wrong problem. The course rests on recognised disturbance classification by magnitude and duration, voltage tolerance curves for equipment, and accepted flicker severity indices.

## Who Gains Most from Voltage Sag, Flicker and Transient Mitigation

- Engineers who investigate customer complaints about tripping, lamp flicker or equipment damage
- Network engineers responsible for feeder switching, capacitor placement and fault clearing times
- Plant electrical engineers who keep drives, controls and critical processes running through supply events
- Specialists who install, configure and interpret disturbance recorders and power quality meters

A utility engineering group attending with the electrical team of a large industrial customer gains most.

## Voltage Sag, Flicker and Transient Mitigation Capabilities

Participants move from waveform records to a defensible remedy.

- Classify dips, swells, interruptions, flicker, unbalance and transients — event attribution between network and customer
- Configure disturbance recorders with suitable triggers — monitoring campaign design
- Calculate expected dip depth from fault location and network impedance — feeder protection and switching choices
- Assess equipment ride-through against voltage tolerance curves — process continuity investment
- Compare dynamic voltage restorers and static synchronous compensators — mitigation specification
- Communicate findings in a survey report with clear recommendations — customer and asset owner agreement

## Key Voltage Sag, Flicker and Transient Mitigation Terms

- Voltage dip — a short reduction in root mean square voltage, usually from a fault or large motor start.
- Voltage swell — a short rise in voltage above normal, often on healthy phases during an earth fault.
- Flicker — visible fluctuation of lamp brightness caused by fluctuating loads such as arc furnaces.
- Transient — a very fast voltage or current excursion lasting microseconds to milliseconds, from switching or lightning.
- Voltage unbalance — unequal magnitudes or angles between the three phase voltages, which overheats motors.
- Ride-through capability — the ability of equipment to keep operating during a dip of a given depth and duration.

## Voltage Sag, Flicker and Transient Mitigation Day by Day

## Day 1: Disturbance Types and Their Origins

- Magnitude and Duration Classification of Events — Deciding Which Disturbance Is Present
- Fault-Induced Dips and Phase Patterns — Locating Where the Fault Occurred
- Motor Starting and Transformer Energising Dips — Separating Customer and Network Causes
- Swells During Earth Faults and Earthing Method — Judging Overvoltage Risk to Equipment
- Interruption Categories and Reclosing Sequences — Linking Outages to Protection Settings

## Day 2: Measurement and Monitoring Campaigns

- Disturbance Recorder Selection and Connection — Choosing Instruments for the Site
- Thresholds, Triggers and Sampling Rates — Capturing Events Without Missing Detail
- Root Mean Square and Waveform Record Reading — Interpreting What the Recorder Shows
- Monitoring Point Placement at Supply and Load — Attributing Events Fairly
- Event Logs, Time Alignment and Data Quality — Trusting Records Before Drawing Conclusions

## Day 3: Flicker, Unbalance and Transients

- Short-Term and Long-Term Flicker Severity Indices — Setting Limits for Fluctuating Loads
- Arc Furnace and Welder Load Fluctuation — Planning Connection of Disturbing Customers
- Negative Sequence Unbalance Calculation — Protecting Motors From Overheating
- Capacitor Switching and Cable Energising Transients — Choosing Switching Controls
- Surge Arresters and Snubber Circuits — Limiting Transient Stress on Insulation

## Day 4: Customer Impact and Mitigation Equipment

- Voltage Tolerance Curves for Drives and Controls — Rating Process Vulnerability
- Cost of Disturbance Per Event — Justifying Mitigation Spending
- Dynamic Voltage Restorer Operation and Sizing — Protecting Sensitive Plant Loads
- Static Synchronous Compensator and Static Var Compensator Roles — Stabilising Voltage at the Connection
- Ride-Through Units, Contactor Hold-In and Control Power Backup — Selecting Low-Cost Fixes

## Day 5: Practising the Site Power Quality Survey Report

- Event Classification of a Sample Recorder Dataset — Applying Day One Categories
- Attribution of Events Between Network and Plant — Applying Monitoring Point Logic
- Flicker and Unbalance Findings Against Planning Limits — Applying Day Three Indices
- Mitigation Option Comparison and Cost Case — Applying Equipment and Impact Methods
- Site Power Quality Survey Report — Completing Findings and Recommendations

## Applying Voltage Sag, Flicker and Transient Mitigation After the Course

- Lead a two-point monitoring campaign at a site with repeated trips and attribute each recorded dip.
- Check the most critical process line against voltage tolerance curves and propose one low-cost fix.

## Voltage Sag, Flicker and Transient Mitigation Questions FAQ

### What is voltage sag, flicker and transient mitigation and why does it matter now?

It is the practice of measuring short supply disturbances, finding their cause and fitting remedies. It matters now because electronic loads trip on brief dips and every unexplained trip costs production.

## Which roles gain most from voltage sag, flicker and transient mitigation skills?

Network engineers, plant electrical engineers and power quality specialists gain most. You benefit if you investigate complaints, set up recorders or specify ride-through equipment.

## How does the voltage sag, flicker and transient mitigation course differ from a harmonics course?

This course covers short events such as dips, flicker and switching transients, while a harmonics course deals with steady waveform distortion and filter design.

## What do you bring back from voltage sag, flicker and transient mitigation training?

You bring back a site power quality survey report built from real recorder data, with classified events, attribution and a costed comparison of mitigation options.

## Voltage Sag, Flicker and Transient Mitigation: The Way Forward

The site power quality survey report gives the network engineer and the plant team one agreed record of what disturbed the supply. Its first decision is whether the remedy belongs on the network, at the connection or inside the plant. After the first mitigation is installed, repeat the monitoring campaign to confirm the trips have stopped.