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COURSE BROCHURE

# Electrical Schematics and Control Circuit Tracing Training Course

1 – 5 November 2027
Madrid

# Electrical Schematics and Control Circuit Tracing Training Course

**Ref:** 3037_115243 **Date:** 1 – 5 November 2027 **Location:** Madrid **Fees:** 6200 GBP

Electrical Schematics and Control Circuit Tracing is a 1-week training course for electrical technicians and maintenance engineers who isolate control faults, and it produces a marked-up control circuit fault tracing sheet. Ageing panels, outdated records and pressure on uptime make fast, drawing-led diagnosis a direct contributor to safe production. Jupiter Prime Training builds this skill around the drawings participants already use.

## Why Electrical Schematics and Control Circuit Tracing Matters Now

Three forces shape this work today. Plants keep running relay-based starters and interlocks for decades, while the people who wired them retire. Drawing sets drift from the installed wiring after each modification, so a technician who trusts an outdated sheet loses hours or creates a hazard. Good drawing reading restores motors quickly; guesswork repeats faults, bypasses interlocks and risks injury to the crew. The course rests on general symbol conventions, line numbering and cross-referencing practice found on most industrial drawing sets.

## Who Gains Most from Electrical Schematics and Control Circuit Tracing

- Shift electricians who restore tripped motors, pumps and fans
- Maintenance technicians who modify starter panels
- Instrument and electrical crews who trace interlock chains between process and drive circuits
- Junior maintenance engineers who sign off fault reports and approve temporary changes
- Commissioning helpers who check new panels against terminal and wiring sheets

A maintenance crew from one plant gains most when several members attend together and agree one way of marking up and filing drawings.

## Electrical Schematics and Control Circuit Tracing Capabilities

Participants move from recognising symbols to following current through coils, contacts and terminals on paper and then with a meter.

- Interpret single-line, schematic, wiring and terminal drawings of one circuit as a linked set — supporting isolation planning
- Apply line and cross-reference numbering to locate every contact of a relay — speeding fault isolation for the shift supervisor
- Trace start, stop, hold-in and interlock paths of a motor starter — informing whether a trip is electrical or process-driven
- Test control circuits with a meter using a planned voltage-drop sequence — confirming the faulty component before replacement
- Specify drawing corrections after a modification — keeping records reliable for the next crew

- Build a marked-up fault tracing sheet from a live fault — informing the maintenance engineer's root cause decision

## Key Electrical Schematics and Control Circuit Tracing Terms

- Ladder schematic — a control drawing with supply rails and numbered rungs showing how contacts energise coils.
- Cross-reference — numbers printed beside a relay coil showing the drawing lines where its contacts appear.
- Seal-in contact — an auxiliary contact across the start button that keeps a contactor energised after release.
- Interlock — a contact placed in one circuit so that another device's state permits or blocks its operation.
- Terminal schedule — a table listing each terminal in a panel, its number and the cores landed on either side.
- Voltage-drop tracing — measuring between a reference rail and successive points to find where control voltage disappears.

## Electrical Schematics and Control Circuit Tracing Day by Day

### Day 1: Reading the Drawing Set

- Single-Line Diagram Layout — Where a Motor Feeder Sits in Supply
- Schematic Symbol Conventions — Recognising Contacts, Coils and Protective Devices
- Line Numbering and Cross-Referencing — Locating Every Contact of a Relay
- Wiring Diagram Versus Schematic — Choosing the Right Sheet for the Task
- Terminal Schedules and Core Labels — Matching Paper to Panel Hardware

### Day 2: Relay Logic and Control Power

- Control Transformer and Fused Supply — Confirming Control Voltage Before Tracing
- Normally Open and Normally Closed Contacts — Predicting Circuit State at Rest
- Timer Relays On-Delay and Off-Delay — Sequencing Starts and Restarts Safely
- Latching and Seal-In Circuits — Holding Coils After Momentary Commands
- Earth Fault Behaviour in Control Circuits — Avoiding False Energisation

### Day 3: Motor Starters and Interlocks

- Direct-On-Line Starter Circuit — Tracing Start, Stop and Overload Paths
- Star-Delta Starter Sequence — Checking Changeover Timing and Mechanical Blocking
- Forward-Reverse Interlocking — Preventing Simultaneous Contactor Closure
- Process Permissive Chains — Separating Electrical Trips From Process Trips
- Emergency Stop Circuits — Verifying Safe Removal of Control Power

## Day 4: Fault Tracing Methods

- Safe Isolation and Proving Dead — Deciding When Live Testing Is Justified
- Voltage-Drop Tracing Sequence — Finding the Open Point Along a Rung
- Continuity and Insulation Checks — Confirming Faulty Coils and Damaged Cores
- Half-Split Testing on Long Interlock Chains — Shortening Diagnosis Time
- Intermittent Fault Logging — Capturing Loose Terminals, Sticking Contacts

## Day 5: Practising the Control Circuit Fault Tracing Sheet

- Drawing Set Walkthrough on a Pump Starter — Applying Cross-References Under Time Pressure
- Interlock Fault Scenario From a Water Treatment Plant — Separating Permissive and Wiring Faults
- Conveyor Starter Fault Scenario From a Cement Works — Using Voltage-Drop and Half-Split Tests
- Drawing Correction Mark-Up — Recording As-Found and As-Left Wiring
- Completing the Marked-Up Fault Tracing Sheet — Handing Root Cause to the Engineer

## Applying Electrical Schematics and Control Circuit Tracing After the Course

- Audit one starter panel against its schematic and terminal schedule, marking every difference found.
- Run a voltage-drop tracing drill with the shift crew on an isolated training circuit.

## Electrical Schematics and Control Circuit Tracing Questions FAQ

### What is electrical schematics and control circuit tracing and why does it matter now?

It is the skill of reading control drawings and following current through contacts and coils to find a fault. It matters because plants run old relay panels with drifting records.

### Which roles gain most from electrical schematics and control circuit tracing?

Shift electricians, maintenance technicians and junior maintenance engineers gain most. You benefit if you restore tripped motors or approve wiring changes.

### How does an electrical schematics and control circuit tracing course differ from a panel design course?

It focuses on reading existing drawings and diagnosing faults in installed circuits. A panel design course covers producing new drawings instead.

## What do you bring back from electrical schematics and control circuit tracing?

You bring back a marked-up fault tracing sheet built on a realistic circuit. It records readings, the faulty component and drawing corrections.

## Electrical Schematics and Control Circuit Tracing: The Way Forward

The marked-up control circuit fault tracing sheet first informs whether a repeated motor trip needs a component change or a wiring correction. Shift electricians use it during faults and engineers use it when they approve changes. After its first use, revisit how the crew files and shares corrected drawings across shifts.