JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Electrical Control Circuit Fault-Finding Training Course

4 – 8 January 2027
Madrid

Electrical Control Circuit Fault-Finding Training Course

Ref: 2610_99268 **Date:** 4 – 8 January 2027 **Location:** Madrid **Fees:** 6200 GBP

Electrical Control Circuit Fault-Finding is a 1-week training course for electrical and instrument technicians who maintain motor starters, interlocks and relay logic, and who leave with a control circuit fault-finding guide for their own equipment. Hardwired control still stops pumps and conveyors every shift, and slow diagnosis turns a small contact fault into lost output. Jupiter Prime Training presents Electrical Control Circuit Fault-Finding as a disciplined, repeatable craft.

Why Electrical Control Circuit Fault-Finding Matters Now

Three forces shape this work today. Ageing plant keeps decades of relay panels in service beside newer drives, so technicians must read mixed control schemes quickly. Experienced electricians are retiring, taking unwritten diagnostic knowledge with them. Leaner production also shortens repair windows. An organisation that traces faults methodically restores motors safely; one that swaps parts by guesswork repeats stoppages and exposes people to live terminals. The course rests on safe isolation practice, the half-split method and the disciplined reading of ladder and wiring diagrams.

Who Gains Most from Electrical Control Circuit Fault-Finding

- Technicians responsible for restoring tripped motors, pumps and fans on shift
- Instrument staff who maintain interlocks between field devices and starter panels
- Maintainers of packaged equipment such as compressors, chillers and conveyors
- Electricians who wire, modify and test motor control panels after changes
- Shift craft staff who answer first-line breakdown calls and hand over faults

Maintenance crews from one site gain most when several members attend together and agree one diagnostic sequence.

Electrical Control Circuit Fault-Finding Capabilities

Participants move from reading a drawing to proving a fault with a meter, then to recording it.

- Interpret ladder, wiring and terminal diagrams for starter circuits — the shift supervisor deciding where to isolate
- Apply the half-split method to locate open and short circuits — production waiting for restart
- Test contactors, overloads, timers and auxiliary relays under safe conditions — the maintenance planner ordering spares
- Diagnose permissive and interlock chains between field devices and starters — process operators checking trip causes
- Check drive enable, run and fault signals at the control interface — the reliability engineer tracking repeat trips
- Build a fault-finding guide with test points and expected readings — colleagues on later shifts

Key Electrical Control Circuit Fault-Finding Terms

- Ladder diagram — a drawing showing control circuit rungs between two supply rails.
- Seal-in contact — an auxiliary contact on a contactor that keeps its coil energised after the start button is released.
- Permissive — a condition that must be true before a motor may start.
- Half-split method — a test approach that measures at the midpoint of a suspect circuit to halve the search area.
- Thermal overload relay — a device that opens the control circuit when motor current stays above its setting for too long.
- Voltage drop test — a live measurement across a closed contact or conductor to find unwanted resistance.

Electrical Control Circuit Fault-Finding Day by Day

Day 1: Reading Control Schemes

- Ladder And Wiring Diagram Conventions — Where To Start Tracing
- Terminal Numbering And Wire Labelling — Matching Drawings To Panels
- Control Transformer And Supply Arrangements — Choosing Safe Reference Points
- Safe Isolation And Proving Dead — When Live Testing Is Justified
- Multimeter And Clamp Meter Selection — Which Instrument Suits Each Test

Day 2: Starters and Motor Control Devices

- Direct-On-Line Starter Circuits — Diagnosing Failure To Start Or Hold
- Star-Delta And Reversing Starter Logic — Spotting Transition And Interlock Faults
- Contactor Coil And Contact Wear — Repair Or Replace Decisions
- Thermal And Electronic Overload Relays — Distinguishing Genuine Trips From Faults
- Motor Insulation And Winding Checks — Separating Motor From Control Faults

Day 3: Relay Logic and Interlocks

- Timer, Latching And Auxiliary Relays — Tracing Sequence Errors
- Permissive And Trip Chains — Finding The Open Link Safely
- Field Devices Such As Limit, Pressure And Float Switches — Testing At Source
- Emergency Stop And Guard Circuits — Restoring Without Bypassing Protection
- Intermittent Faults And Loose Terminations — Choosing Monitoring Over Replacement

Day 4: Drives and Mixed Control

- Variable Speed Drive Control Terminals — Checking Enable, Run And Reset Signals
- Drive Fault Codes And Event Logs — Deciding Between Drive And Motor Causes
- Hardwired To Programmable Controller Interfaces — Locating The Signal Boundary
- Half-Split And Voltage Drop Testing — Shortening Search Time On Long Circuits
- Earth Faults In Control Wiring — Identifying Nuisance Trips And Hazards

Day 5: Practising the Control Circuit Fault-Finding Guide

- Simulated Starter Panel Faults — Applying Diagram Reading Under Time Pressure
- Interlock Chain Scenarios From Pumping And Conveyor Duties — Testing Day 3 Methods
- Drive And Relay Combined Breakdowns — Linking Day 2 And Day 4 Checks
- Fault Records And Shift Handover Notes — Capturing Root Causes
- Control Circuit Fault-Finding Guide — Test Points, Expected Readings And Sequence

Applying Electrical Control Circuit Fault-Finding After the Course

- Mark up one critical starter panel drawing with numbered test points and expected voltages.
- Lead a short crew briefing on the half-split method using a recent site trip.

Electrical Control Circuit Fault-Finding Questions FAQ

What is electrical control circuit fault-finding and why does it matter now?

It is the structured location of faults in starter, relay and interlock circuits that switch motors. It matters now because ageing panels and retiring specialists make guesswork costly and unsafe.

Which roles gain most from electrical control circuit fault-finding training?

Electrical and instrument technicians gain most. That includes shift breakdown staff, panel electricians and maintainers of packaged equipment who restore motors, pumps and fans.

How does electrical control circuit fault-finding differ from a programmable control course?

It focuses on hardwired starters, contactors, overloads and relay logic, and on the boundary where they meet drives and controllers. A programmable control course concentrates on software, networks and configuration.

What do you bring back from electrical control circuit fault-finding training?

You bring back a fault-finding guide for your own equipment, with numbered test points, expected readings and a test sequence. You also bring practised habits for safe isolation and half-split testing.

Electrical Control Circuit Fault-Finding: The Way Forward

The control circuit fault-finding guide first informs where a technician isolates and tests on the next motor breakdown. Shift technicians, panel electricians and supervisors use it at the panel and at handover. After its first use, revisit the expected readings and test order against what the fault actually was and refine the guide.