Production Line Electrical Installation

COMPLIANCE GUIDE | Industrial & Manufacturing Facilities

This guide outlines key UK electrical and machinery-safety considerations for new production lines, equipment relocations, additional machinery and modifications to existing manufacturing installations. The final requirements depend on the equipment, site conditions and agreed project scope.

1. Core legal duties

• **Electricity at Work Regulations 1989:** electrical systems must be constructed, maintained and worked on so as to prevent danger; competent persons and safe systems of work are essential.

• **Health and Safety at Work etc. Act 1974:** duties to protect employees and others affected by installation, maintenance and operation.

• **PUWER 1998:** work equipment must be suitable, maintained, inspected where necessary and provided with appropriate controls and safeguards.

• **CDM Regulations 2015:** may apply to construction work; dutyholder arrangements and coordination should be established for the project.

2. Standards and scope boundaries

• **BS 7671:** applies to relevant fixed electrical installations, including distribution, sub-mains and final circuits.

• **BS EN 60204-1:** relevant to electrical equipment of machines, including machine control, protection, isolation and documentation.

• **BS EN IEC 61439 series:** relevant to low-voltage switchgear and controlgear assemblies where within scope.

• **BS EN ISO 13849-1 / BS EN IEC 62061:** applicable when designing safety-related control systems; performance requirements follow machinery risk assessment.

These standards do not automatically apply identically to every item of equipment. The machine manufacturer, integrator and site operator should agree responsibility for the machinery, fixed installation and overall line integration.

3. Design and pre-installation review

• Confirm machinery schedules, nameplate ratings, starting currents, duty cycles and any future expansion allowances.

• Assess existing LV switchgear, distribution board and supply capacity, including fault level, discrimination/selectivity and protective device suitability.

• Review cable routes, containment, environmental exposure, accessibility, isolation arrangements and any hazardous-area classifications.

• Agree drawings, interfaces, shutdown plans, testing responsibilities and manufacturer requirements before work starts.

Installation & Integration Requirements

4. Electrical distribution and machine supplies

• Design single-phase and three-phase circuits with suitable conductor sizing, protective devices, earthing and fault protection.

• Install SWA cables, sub-mains, cable ladder, tray, basket, trunking and conduit suited to the environment and mechanical risks.

• Provide clearly identified, accessible means of isolation for relevant equipment; coordinate lock-off arrangements with site procedures.

• Verify equipment bonding, protective conductor continuity, phase sequence, voltage and suitability of termination arrangements.

5. MCCs, drives and automation interfaces

• Coordinate MCCs, motor starters, VFDs and control panels with motor data and OEM operating requirements.

• Consider motor overload protection, drive harmonics, EMC, ventilation, cable screening and manufacturer-specified installation methods.

• Confirm PLC, HMI, instrumentation, sensor and actuator interfaces; document responsibilities for field wiring and software changes.

• Changes to machine control or safety functions must be assessed and validated by appropriately competent parties; normal PLC logic is not a substitute for a safety-rated function.

6. Machinery safety and operational controls

• Review machine and line-level risk assessments before changing emergency stops, interlocks, guards or isolation systems.

• Ensure emergency-stop functions, guarding and restart prevention are appropriate to the identified risks and verified after modification.

• Consider interaction between linked machines, conveyors and shared controls, including upstream/downstream stop behaviour.

• Do not assume that installing an emergency-stop push button alone makes machinery compliant.

7. Relocations, upgrades and shutdown works

• Record existing supplies, controls, cable identifications and condition before disconnection.

• Confirm that relocated equipment remains suitable for its new supply, location, guarding and environmental conditions.

• Plan safe isolation, lock-off, permits, lifting interfaces and controlled energisation with production teams and OEMs.

• Use phased works and planned shutdowns where practicable; never energise incomplete or unverified circuits.

Important: A substantial modification to machinery or a production line may introduce additional product-conformity responsibilities. This requires project-specific assessment; it cannot be determined from electrical installation testing alone.

Testing, Handover & Checklist

8. Inspection, testing and commissioning

• Inspect and test relevant fixed electrical installation work in accordance with BS 7671, including continuity, insulation resistance, polarity, earth fault loop impedance and protective-device operation as applicable.

• Check motor rotation, starting behaviour, overload settings, isolation and equipment operation against approved specifications and OEM instructions.

• Carry out coordinated functional checks of control, alarms, instrumentation and interlocks; safety functions require appropriate validation.

• Where applicable, coordinate Factory Acceptance Testing (FAT), Site Acceptance Testing (SAT) and final integrated production-line trials.

9. Documentation and handover

• Provide appropriate Electrical Installation Certificates or Minor Electrical Installation Works Certificates for work within their scope.

• Hand over updated circuit schedules, cable and panel identifiers, drawings and relevant test results.

• Obtain OEM/control-system commissioning records, machine documentation and safety validation evidence from the responsible parties.

• Record outstanding items, operational limitations, maintenance needs and agreed responsibilities before final handover.

10. Production line compliance checklist

■	Machine schedule and load assessment reviewed
■	Existing supply capacity and protection assessed
■	Electrical and machinery scope responsibilities agreed
■	Isolation, permits and shutdown arrangements confirmed
■	Cabling, containment and earthing verified
■	MCC, drives, PLC and instrumentation interfaces checked
■	Safety functions risk-assessed and validated where required
■	Inspection, testing and commissioning completed
■	Certificates, drawings and handover records issued

About QUEST Electrical

QUEST Electrical provides production line electrical installation, machinery connections, MCCs, control systems, cable containment, electrical testing and commissioning for industrial and manufacturing facilities throughout the UK.

Guidance only: this document is not a site-specific design, risk assessment, legal opinion or certification of machinery compliance.