Production Line Electrical Installation

TECHNICAL GUIDE | Industrial & manufacturing facilities

A practical overview of electrical infrastructure, machine connections, control integration and commissioning for new, relocated and upgraded production lines. Project-specific designs must be based on equipment requirements and site conditions.

1. Project planning and design inputs

- Obtain machinery manufacturers' electrical data, connection schedules, drawings and commissioning requirements.
- Confirm supply voltage, phase, load current, starting characteristics, duty cycle and prospective expansion.
- Review existing LV switchgear, distribution boards, spare capacity and available fault levels.
- Coordinate installation sequences, production access, shutdown windows and interfaces with OEMs and automation specialists.

2. Electrical power distribution

System element	Technical considerations
LV distribution	Review capacity, protective devices, fault levels, selectivity and connection arrangements.
Machine supplies	Provide appropriately designed single-phase or three-phase circuits, local isolation and identification.
Sub-mains and cabling	Select SWA or other suitable cables based on load, installation method, environmental conditions and voltage drop.
Containment	Use cable ladder, tray, basket, trunking or conduit suited to the route, load and environment.

3. Installation coordination

Set out cable routes and connection points before installation. Account for maintenance access, moving machinery, mechanical protection, segregation of power and signal wiring, and any hazardous or high-temperature areas.

Machinery, Controls & Integration

TECHNICAL GUIDE | Design and installation considerations

4. Machinery power connections

- Install and identify dedicated electrical supplies for conveyors, CNC machinery, pumps, compressors and process equipment.
- Confirm machine terminal requirements, protective conductor continuity, isolator location and safe access.
- Coordinate disconnection, relocation and reconnection with the machine supplier and site engineering team.

5. MCCs and motor control systems

Production lines may require Motor Control Centres (MCCs), local motor starters, direct-on-line or star-delta starters, soft starters and Variable Frequency Drives (VFDs). Selection depends on motor data, operating duty, starting performance, control requirements and protection coordination.

6. PLC, HMI and instrumentation integration

Interface	Technical considerations
PLC / HMI	Confirm control architecture, interface signals, communications and OEM responsibility.
Sensors / actuators	Check device supply, I/O type, signal compatibility, cable screening and termination requirements.
Control panels	Provide suitable power/control connections, labeling, panel access and as-built information.
Communications	Coordinate industrial network routes and separation from sources of electrical interference.

7. Emergency stops, interlocks and isolation

Emergency stop circuits, safety interlocks and guarding interfaces must be defined by a machinery risk assessment. Safety functions require suitable architecture, components, verification and validation; ordinary PLC control alone must not be assumed to provide a safety function. Provide suitable means of electrical isolation and lock-off for maintenance.

8. Work in operational manufacturing facilities

Use phased containment and cable installation where practical. Agree permits, isolations, lock-off, access arrangements and changeover plans with the site. Final electrical connections and energisation may require planned production stoppages.

Testing, Commissioning & Handover

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9. Inspection and electrical testing

- Inspect cable support, routing, termination, circuit identification and protective devices.
- Carry out appropriate initial verification of electrical installation work under BS 7671, including continuity, insulation resistance, polarity, fault protection and functional checks as applicable.
- Check motor rotation, drive parameters, local isolation and control interfaces with OEMs before operational handover.
- Test emergency stops and safety interlocks against the agreed safety requirements and record any required functional safety validation.

10. Commissioning sequence

Stage	Typical activity
Pre-energisation	Complete inspection, dead testing, labeling and agreed safety checks.
Energisation	Confirm supplies, voltages, protection and control panel readiness.
Functional testing	Prove motors, starters, VFDs, PLC interfaces and field devices with responsible specialists.
Production trials	Support OEM and site teams during machine start-up and controlled operational testing.
Handover	Provide electrical certification, test results, drawings and outstanding-item records as applicable.

11. Applicable standards and legislation

Requirements depend on project scope and equipment. Relevant references may include the Electricity at Work Regulations 1989, BS 7671 for fixed electrical installations, BS EN 60204-1 for machinery electrical equipment, PUWER 1998 and applicable machinery safety standards. MCC and low-voltage assembly requirements may also involve the BS EN IEC 61439 series.

12. Technical handover checklist

- Supply capacity and machinery electrical requirements confirmed.
- Circuits, cables, containment and isolation arrangements checked.
- Control, instrumentation and safety interfaces agreed with OEMs.
- Electrical testing and machine functional checks recorded.
- As-built information, certificates and commissioning records issued.

Important: This guide is general technical information, not a machine-specific design, risk assessment or certification. Final specifications, safety requirements and testing depend on the actual installation.