

INDUSTRIAL M&E; FIT OUT SERVICES

Technical Guide | Coordinated Electrical & Mechanical Building Services

A practical technical overview of the design, coordination and installation considerations behind a complete industrial or commercial M&E; fit out.

01 | TYPICAL M&E; FIT OUT ARRANGEMENT

Incoming Electrical Supply → LV Switchgear → Section / Distribution Boards → Power, Lighting, Plant & Machinery

Incoming Mechanical Services → Heating / Cooling / Ventilation / Water → Plant & Distribution → Controls / BMS

The electrical and mechanical systems should be developed together so that plant duties, electrical loads, containment, pipework, controls, fire interfaces and maintenance access are coordinated before installation.

02 | DESIGN INFORMATION REQUIRED

- Architectural and structural layouts
- Existing and proposed electrical single-line diagrams
- Incoming electrical supply, maximum demand and fault data
- Mechanical plant schedules and electrical loads
- Heating and cooling design duties
- Ventilation / extract requirements and airflow rates
- Water, drainage and condensate connection points
- Production machinery and specialist equipment requirements
- Fire strategy and compartmentation information
- BMS, controls, metering and communication requirements
- Access, lifting, replacement and maintenance constraints
- Future expansion and anticipated additional loads

03 | LV ELECTRICAL DISTRIBUTION

The distribution system should be sized around the complete fit-out load rather than individual packages in isolation. Main switchgear, MCCBs, section boards, distribution boards and submains should be assessed for maximum demand, fault level, discrimination, voltage drop and future capacity.

New mechanical plant can introduce significant electrical demand, particularly chillers, heat pumps, air-handling units, extract fans, pumps and electric heating. Starting currents, variable-speed drives and harmonic effects may also influence protective-device and cable selection.

04 | POWER, MACHINERY & SMALL POWER

Industrial fit outs commonly require three-phase machinery supplies, local isolators, control circuits, sockets, cleaner supplies and dedicated circuits for specialist equipment. Machinery connection requirements should be confirmed from manufacturer data, including full-load current, starting method, protective-device requirements and emergency-stop interfaces.

05 | LIGHTING & EMERGENCY LIGHTING

Lighting design should consider maintained illuminance, uniformity, glare, mounting height, task areas and controls. Industrial spaces may require high-bay, low-bay, task or external lighting. Emergency lighting should be coordinated with escape routes, fire-safety requirements and the final building layout.

06 | CONTAINMENT & SERVICE ROUTES

Cable ladder, tray, trunking, basket, conduit, ductwork and pipework routes compete for the same building space. Coordinated service zones should consider separation, support loading, bends, access, fire barriers, ceiling heights and future maintenance.

07 | VENTILATION & EXTRACT SYSTEMS

Ventilation design should establish required airflow, supply and extract positions, duct sizes, pressure losses, fan duties, noise criteria and control strategy. Industrial processes may require local extract or specialist ventilation beyond general building ventilation.

Plant selection should account for external resistance, filters, grilles, dampers and the complete duct system rather than nominal fan airflow alone.

08 | HEATING & COOLING

Heating and cooling systems should be selected from calculated building loads and the operating requirements of the space. Solutions may include heat pumps, split/VRF systems, air-handling plant, unit heaters or other systems appropriate to the building and process.

Electrical demand, condensate disposal, refrigerant pipe routes, external plant locations, ventilation interaction and control zoning should be resolved during design.

09 | PIPEWORK, WATER & DRAINAGE

Pipe sizes, flow rates, pressure losses, insulation, valves, supports and access should be appropriate for the system. Domestic water services, plant connections, drainage and condensate should be coordinated with the building layout and other services.

Drainage routes require suitable falls and accessible maintenance points. Plant condensate should be routed to an appropriate discharge point and, where necessary, pumped.

10 | BMS, CONTROLS & INTERLOCKS

Controls are the interface between the electrical and mechanical systems. BMS panels, sensors, actuators, variable-speed drives, thermostats and plant enable signals should be defined through controls schematics and points schedules.

Typical interfaces can include:

- Time schedules and occupancy control
- Temperature, pressure and airflow sensing
- Fan and pump speed control
- Fire alarm shutdown / enable signals
- Motorised dampers and valves
- Plant fault and run-status monitoring
- Energy metering and trend logging
- Emergency-stop and machinery safety interlocks

11 | FIRE ALARM & M&E; INTERFACES

The fire strategy may require mechanical plant to stop, dampers to operate, doors or shutters to release and other equipment to change state during an alarm. Cause-and-effect requirements should be defined before controls are wired and verified through integrated testing.

Service penetrations through fire-resisting construction should be coordinated so the required fire performance can be reinstated using an appropriate tested system.

12 | METERING & ENERGY MONITORING

Sub-metering can be incorporated for major electrical and mechanical loads such as production equipment, HVAC plant, tenant areas or energy-intensive processes. Metering strategy should consider CT ratios, communication protocol, data collection and whether information is required locally, through a BMS or via an energy-monitoring platform.

13 | POWER QUALITY & MOTOR LOADS

Large motors, variable-speed drives and electronic loads can affect starting demand, power factor and harmonic performance. Where relevant, the design should consider motor starting, voltage disturbance, harmonic currents, neutral loading and power-factor correction.

14 | ISOLATION & MAINTENANCE ACCESS

Electrical and mechanical plant should have safe means of isolation appropriate to the equipment. Local isolators, lock-off arrangements, valves and control isolation should be accessible and clearly identified.

Plant locations should allow filter changes, motor removal, panel access, coil cleaning and replacement of major components without dismantling unrelated services.

15 | INSTALLATION COORDINATION

A coordinated programme reduces clashes and rework. Typical sequence considerations include builders' openings, supports, primary containment, ductwork and pipework, electrical distribution, plant positioning, final connections, controls and commissioning.

On operational industrial sites, isolations and shutdowns should be planned around production requirements and temporary supplies considered where continuity is critical.

16 | TESTING & COMMISSIONING

Commissioning should verify individual systems and the way they operate together. Depending on scope, this can include:

- Electrical inspection, testing and certification
- Protective-device settings and phase rotation
- Lighting and emergency-lighting testing
- Motor rotation and plant current checks
- Airflow measurement and ventilation balancing
- Heating / cooling functional commissioning
- Water-system flushing, pressure or flow checks as applicable
- BMS points, sensors and control sequences
- Fire alarm interfaces and cause-and-effect tests
- Metering, alarms, interlocks and emergency-stop functions

17 | HANDOVER INFORMATION

- As-installed electrical and mechanical drawings
- Single-line diagrams and distribution schedules
- Mechanical schematics and plant schedules
- Electrical certificates and test results
- Commissioning and balancing records
- Controls descriptions / BMS points information
- Manufacturer O&M; information and warranties
- Asset lists and recommended maintenance requirements

THE QUEST APPROACH

Coordinated M&E; Delivery for New Industrial & Commercial Fit Outs

QUEST Electrical can deliver the electrical and mechanical elements of an industrial fit out as a coordinated package. Our electrical scope can include LV switchgear, distribution, submains, containment, lighting, power, machinery connections, controls and metering, integrated with the mechanical services required by the project.

This approach allows electrical loads, plant requirements, service routes, controls and commissioning to be considered together - helping reduce interface issues and providing the client with a more joined-up installation.

QUEST ELECTRICAL | Industrial M&E; Fit Outs | LV Distribution | Power | Lighting | Controls | Mechanical Services | Testing & Commissioning

Technical note: This guide is a general technical overview. Cable sizes, protective devices, plant duties, duct and pipe sizes, controls, fire interfaces and system capacities are project-specific and should be established from site information, calculations, current standards and manufacturer technical data.