Data Centre Electrical Installations & Power Infrastructure

Compliance Guide | Design, installation, upgrades and maintenance

This guide summarises key UK compliance considerations for electrical infrastructure serving data centres, server rooms and other critical IT facilities. Requirements must be confirmed for each project against its design, operating arrangements and contractual specification.

1. Legal duties and applicable standards

• **Electricity at Work Regulations 1989:** electrical systems must be constructed, maintained and worked on to prevent danger; work must be carried out by competent persons using safe systems of work.

• **BS 7671:** relevant requirements for the design, erection, inspection and testing of low-voltage electrical installations, including protection, earthing, cable selection and verification.

• **BS EN IEC 61439 series:** relevant requirements for low-voltage switchgear and controlgear assemblies, including design verification and routine verification by the responsible assembly manufacturer.

• **BS EN 50110-1:** operation of electrical installations and procedures for electrical work, where applicable.

• **BS EN 50600 series:** data centre facility infrastructure guidance covering aspects of power distribution, availability and operational considerations, where specified.

2. Define the installation and its criticality

Confirm the load schedule, available supply capacity, existing single-line diagrams, critical and non-critical loads, future rack growth and any redundancy or availability objectives. Identify responsibility boundaries between the electrical contractor, UPS or generator specialist, IT operator and site duty holder.

3. Electrical design and protection

• Assess prospective fault current, protective device breaking capacity, discrimination/selectivity, fault protection, thermal constraints and cable installation conditions.

• Review earthing, protective bonding, surge protection, neutral arrangements and harmonic effects associated with non-linear IT and UPS loads.

• Ensure access, working clearances, identification, segregation and maintainability are considered in switchgear and distribution layouts.

Installation, Resilience & Safe Changeovers

4. LV switchgear and distribution

QUEST Electrical's stated service scope includes main LV switchgear (630A–6300A), MCCB/section/distribution boards (125A–630A), sub-mains, dedicated server rack circuits and electrical infrastructure upgrades. Ratings are service capabilities, not preset project specifications; final selection depends on verified design calculations and equipment requirements.

- Obtain assembly documentation, circuit schedules, protection settings, manufacturer instructions and relevant verification records.
- Confirm load balance, conductor sizing, cable support, containment capacity and suitable fire-stopping at penetrations.
- Label equipment, distribution ways, isolation points and power sources to support safe operation and maintenance.

5. UPS, generators and backup power interfaces

UPS and standby-generator electrical connections require a coordinated interface design, including fault behaviour under alternative sources, neutral/earthing arrangements, transfer sequencing, protection operation and maintenance bypass arrangements where applicable. Confirm the specialist equipment manufacturer's requirements before energisation.

6. Live facilities, isolation and planned shutdowns

- Assess the operational impact of each changeover and agree a documented method statement, permit arrangements and rollback plan with the facility operator.
- Identify all possible supplies, including UPS outputs, generator feeds and backfeeds; prove dead using appropriate safe-isolation procedures before work.
- Use phased works or planned shutdowns where practical; do not assume an installation can be modified without loss of service.
- Coordinate IT, cooling, fire protection, access control and facilities teams where electrical changes may affect their systems.

7. Inspection and maintenance considerations

Fixed-wire inspection, EICRs, thermal imaging, fault finding and remedial works form part of the stated QUEST service scope. Inspection intervals and maintenance methods should reflect equipment condition, manufacturer guidance, operational risk and the duty holder's maintenance strategy. Thermography complements, but does not replace, appropriate electrical inspection and testing.

Verification, Handover & Checklist

8. Inspection, testing and commissioning

• Complete initial verification appropriate to the works under BS 7671, including inspection and relevant dead/live tests with critical equipment protected as necessary.

• Check circuit identification, protective device settings, phase rotation where relevant, earthing and bonding continuity, and functional operation of distribution equipment.

• Coordinate UPS/generator interface and transfer tests with competent specialists and the site operator under an agreed test plan.

• Record defects, limitations, outstanding actions and any operational constraints before handover.

9. Documentation and certification

Handover information should include the appropriate BS 7671 certification, test schedules, as-built single-line diagrams, circuit schedules, equipment data, protection settings, inspection records, operating instructions and agreed maintenance information. An EICR is a condition assessment of an existing installation and is not a substitute for initial verification of new work.

10. Project compliance checklist

■ Scope, critical loads and availability requirements agreed

■ Existing drawings, load schedules and capacity reviewed

■ Design calculations and protection coordination completed

■ Switchgear assembly verification and manufacturer information obtained

■ UPS/generator interfaces and alternative supplies assessed

■ Safe-isolation, shutdown and rollback arrangements approved

■ Cabling, containment, earthing and identification inspected

■ Inspection, testing and functional checks completed

■ Certificates, drawings and operational documents handed over

Important technical note

This is a general guidance document, not a project-specific design, compliance certificate or guarantee of uninterrupted operation. Final requirements depend on the facility classification, equipment manufacturer, installation design, contractual criteria and site risk assessment. Machinery-specific or specialist UPS/generator testing may require additional competent parties.

QUEST Electrical | Data centre electrical infrastructure, LV switchgear, distribution, testing and planned upgrades.