

SOLAR PV INSTALLATION

UK Compliance Guide

COMMERCIAL & INDUSTRIAL SOLAR PV SYSTEMS

Designed. Installed. Tested. Compliant.

At QUEST Electrical, we understand that a commercial solar PV installation is about more than simply installing photovoltaic panels. A compliant system must be correctly designed, installed, tested and commissioned, while taking account of the existing electrical infrastructure, the building, the method of connection to the electricity network and the ongoing operation of the site.

Our commercial and industrial solar PV installations are delivered with compliance, safety and long-term performance at the forefront of the project.

01 | DESIGN & SYSTEM ASSESSMENT

Every solar PV installation should begin with a detailed assessment of the proposed site and its existing electrical infrastructure. For commercial and industrial properties, this includes the available roof or ground area, electrical demand, existing distribution equipment and proposed point of connection.

- Site and roof assessment
- PV array configuration, orientation and shading
- String design and inverter selection
- DC and AC cable sizing and voltage drop
- Protective devices, isolation, earthing and bonding
- Surge protection and export limitation
- Existing LV distribution equipment
- DNO connection requirements

The electrical capacity of the existing installation must also be considered. Solar generation can introduce additional current into an existing distribution system, so switchgear, cabling, protection and the point of connection should be assessed as part of the overall design.

02 | KEY UK STANDARDS & REQUIREMENTS

REFERENCE	WHAT IT COVERS
BS 7671	Requirements for Electrical Installations, including Section 712 for solar PV systems.
BS EN 62446-1	Documentation, commissioning tests and inspection of grid-connected PV systems.
BS EN 62548	PV array design requirements including wiring, protection and switching.
BS EN 62305	Lightning protection considerations where applicable.
Electricity at Work Regulations 1989	Safe systems of work, suitable equipment and inspection/maintenance arrangements.
DNO G98 / G99	Grid connection requirements depending on system characteristics and generating capacity.

The exact standards, regulations and connection requirements applicable to a project depend on its size, design, location and characteristics.

03 | PV ARRAY & DC INSTALLATION

The DC side of a solar PV system presents specific electrical considerations because the PV array can generate voltage whenever it is exposed to light. Correct installation and identification of DC circuits is therefore critical.

- Correct PV string configuration
- PV-rated DC cabling and correct cable sizing
- Appropriate cable routing and mechanical protection
- Correct connector selection and installation
- DC isolation and overcurrent protection where required
- Earthing and bonding arrangements
- Surge protection
- Separation from other services
- Correct polarity and warning/identification labels

DC cables should be installed to minimise the risk of mechanical damage and be appropriately supported and routed. Particular attention should be paid to connectors and cable management, as poor installation practices can create additional electrical and thermal risks.

04 | AC CONNECTION & EXISTING ELECTRICAL INFRASTRUCTURE

The AC connection between the inverter and the site's electrical installation is a key part of the overall design. For commercial and industrial projects, the connection may be made into an existing distribution board, switchboard or dedicated solar distribution equipment.

- Existing switchgear and cable capacity
- Prospective fault current
- Protective device characteristics and discrimination
- Voltage rise and earthing arrangements
- RCD requirements where applicable
- Surge protection and isolation
- Available spare capacity
- Main switchboard and transformer capacity
- Export limitation

Where required, modifications or upgrades to existing LV switchgear may form part of the solar installation. This is particularly important on larger industrial sites where solar generation is integrated into an existing LV network.

05 | DNO & GRID CONNECTION

A grid-connected solar PV system must be assessed against the requirements of the relevant Distribution Network Operator. Depending on the project, this can involve establishing the applicable G98/G99 requirements, assessing generation capacity, completing the appropriate application, providing inverter and protection information, confirming interface protection arrangements, and completing commissioning and notification requirements.

For larger commercial and industrial installations, DNO requirements should be established at an early stage of the project.

06 | PROTECTION, EARTHING & SURGE PROTECTION

Protection is a fundamental part of any solar PV installation. The system must provide appropriate protection against electrical faults while allowing the generation equipment to be safely isolated for maintenance and emergency situations.

- Overcurrent and short-circuit protection
- DC and AC isolation
- Earthing and protective bonding
- Surge protection
- Inverter protection
- Interface protection
- RCD requirements where applicable

Where a building has an existing lightning protection system, the relationship between the PV installation and the lightning protection system must also be considered.

07 | INSTALLATION & SITE SAFETY

Commercial solar installations frequently take place on operational sites. Installation planning should therefore consider electrical safety and the wider construction environment, including safe access, working at height, roof loading and structural considerations, mechanical fixing systems, weather, isolation and lock-off procedures, risk assessments and method statements.

08 | TESTING & COMMISSIONING

Testing is an essential part of the solar PV installation process. A completed installation should be inspected and tested to verify that it has been installed correctly and operates safely.

DC TESTING	AC / COMMISSIONING
Polarity and string voltage	Continuity and insulation resistance
Insulation resistance	Protective device verification
String current measurements where appropriate	RCD testing where applicable
Visual inspection of connectors and cabling	Inverter configuration and monitoring
Protective conductor continuity where applicable	Generation and export limitation verification where applicable

Testing should be carried out by competent personnel using suitable calibrated test equipment, with results recorded as part of the project documentation.

09 | LABELLING & IDENTIFICATION

Solar PV installations introduce additional sources of electrical energy to a building. Appropriate identification and warning labels are therefore an important part of the installation. Relevant equipment and isolation points should be clearly identified, including PV arrays, DC/AC isolators, inverters, solar distribution equipment, dual supplies and emergency isolation arrangements where applicable.

10 | DOCUMENTATION & HANDOVER

A compliant installation should be supported by appropriate documentation. At project completion, the client should receive the information required to understand, operate and maintain the system safely.

- Electrical installation certification
- PV commissioning documentation and inspection/test results
- System schematic and PV string information
- Inverter and equipment datasheets
- Protection settings and DNO approval/notification documentation
- Operation and maintenance information
- Warranty and emergency isolation information
- As-installed drawings where applicable

11 | ONGOING MAINTENANCE & INSPECTION

Solar PV systems are designed for long-term operation, but ongoing inspection and maintenance can help identify faults before they affect performance or create a safety concern.

- Visual inspection of PV modules and mounting systems
- DC cable and connector inspection
- Inverter and AC electrical checks
- Thermal imaging
- Distribution equipment and surge protection checks
- Monitoring and generation performance analysis
- Fault investigation and remedial works

12 | THE QUEST APPROACH

Commercial & Industrial Solar PV – Delivered Properly

At QUEST Electrical, we combine solar PV installation with extensive commercial and industrial electrical experience. This allows us to look beyond the solar panels and consider the complete electrical system.

- Commercial & industrial solar PV
- Solar PV system design and SolarEdge systems
- LV electrical infrastructure and switchgear integration
- DNO connection and export limitation
- Electrical testing, commissioning and thermal imaging
- Bird protection and scaffolding/access coordination

- Ongoing electrical support and maintenance

COMPLIANCE CHECK	CONSIDERATION
System design	Applicable standards and manufacturer requirements assessed
PV array & DC installation	String configuration, cabling, isolation and protection assessed
AC installation	Cable sizing, protection and connection arrangements verified
Earthing / bonding / SPD	Requirements assessed and installed where applicable
DNO connection	G98/G99 requirements established where applicable
Testing & commissioning	DC/AC testing and functional commissioning completed
Labelling & documentation	Warnings, certification, test results and O&M; information provided

IMPORTANT: This guide provides a general overview of UK compliance considerations for commercial and industrial solar PV installations. It is not a substitute for applicable legislation, British/European Standards, IET guidance, DNO requirements or manufacturer's instructions. Requirements vary by project, so each installation should be assessed individually by suitably competent persons.

QUEST ELECTRICAL | Solar PV • LV Switchgear • Electrical Infrastructure • Renewable Energy