Overview of the role

Carrying out a range of engineering work on power protection systems, plant and equipment.

Contents

Hide menu

Standard in development
L4: Electrical power plant and protection engineer
Version 1.1

Title of occupation

Electrical power plant and protection engineer

UOS reference number

ST0157

Core and options

No

Level of occupation

Level 4

Occupational maps data

Route: Engineering and manufacturing
Pathway: Maintenance, Installation & Repair
Cluster: Manufacturing/Process Maintenance Advanced Technician

Typical duration of apprenticeship

36 months

Resubmission

No

Would your proposed apprenticeship standard replace and existing framework?

No

Does professional recognition exist for the occupation?

No

Regulated occupation

Is this a statutory regulated occupation?

No

Occupational summary

This occupation is found in the electrical power generation, transmission and distribution sector. Electrical power and plant protection engineers work across the power sector for typically large or medium sized companies who generate electricity from energy sources including fossil fuels, nuclear, solar, wind or biofuels, or transport electricity through a network of underground cables, overhead lines and substations to where it is used to power homes and businesses. Engineers may work on either the transmission or distribution network.

The broad purpose of the occupation is to carry out testing of electrical plant and equipment and carry out installation and maintenance tasks on protection and control systems. Testing confirms that the installation and operation of protection plant and equipment complies with manufacturers' specifications, company procedures and operating parameters. Engineers complete a range of tasks, from testing individual components and circuitry through to working on a full system. As an electrical power and plant protection engineer is required to travel to sites where refurbishment and installation projects are taking place, they are usually required to hold a driving licence.

In this role an engineer works with other engineers, customers and regulatory bodies to install, conduct tests and maintain protection systems and prove the integrity of other power system plant and equipment. They are responsible for producing technical reports and test results to meet requirements. Engineers are required to provide technical support to others about operational procedures and compliance as well as diagnosing problems and rectifying faults. Prioritising and scheduling work may also be a part of the role. They typically report to a senior engineer or manager.

An employee in this occupation is responsible for making sure that work is conducted safely and reliably, meeting customer, quality, time, budget, environmental and sustainability requirements. They are also responsible for maintaining their test equipment.

Typical job titles

Electrical plant commissioning engineer Electrical power protection engineer Epppc engineer

Are there any statutory / regulatory or other typical entry requirements?

No

Occupation duties

DUTY	KSBS
Duty 1 Test electrical power plant, circuits, equipment and protection systems.	K1 K2 K3 K4 K5 K6 K7 K10 K11 K12 K15 K16 K17 K19 K20 K21 K22 K23 K24 K26 K27 K S1 S2 S3 S4 S7 S10 S15 S16 S17 S21 S22 S23 S25 S26 B1 B2 B3 B4 B5
Duty 2 Install, operate and maintain protection and control systems.	K1 K2 K3 K4 K5 K6 K7 K8 K9 K11 K12 K15 K16 K17 K18 K19 K20 K23 K24 K26 K27 K28 S1 S2 S3 S4 S8 S9 S11 S12 S13 S14 S15 S16 S17 S22 S23 S24 S25 S26 B1 B2 B3 B4 B5
Duty 3 Investigate and correct faults within protection and control systems.	K1 K2 K3 K4 K5 K6 K8 K11 K12 K14 K15 K16 K17 K23 K24 K25 K26 K27 K28 S1 S5 S8 S15 S17 S18 S20 S22 S23 S25 S26 B1 B2 B3 B4 B5
Duty 4 Ensure that test equipment is maintained and calibrated.	K2 K3 K4 K11 K13 K22 K23 K24 K27 K28 S1 S2 S6 S23 S25 S26 B1 B4 B5
Duty 5 Prepare technical	K1 K2 K5 K12 K13 K14 K17 K23 K24 K27 K28 S2 S16 S17 S19 S23 S25 S26 B4

reports and test results.

KSBs

Knowledge

K1: The electrical power sector. Types of organisations, how they interact, control boundaries, structure, role and function. Regulators. System Operator. Stakeholders and customer requirements.
K2: Electrical power protection engineer role, responsibilities limits of autonomy and coordination with other business functions. Reporting channels within the power sector.
K3: Awareness of health and safety regulations relevant to the engineer's role. CDM requirements. Control of Substances Hazardous to Health (COSHH). Display Screen Equipment. Fire regulations. Health and Safety at Work Act – responsibilities. Managing Health and Safety at Work Regulations. Manual handling. Noise regulation. Provision and use of Work Equipment Regulations (PUWER). Personal Protective Equipment (PPE). Working at height. Reporting of Injuries, Diseases and Dangerous Occurrence Regulations (RIDDOR). Electricity at Work Regulations.
K4: Health and safety procedures and safe systems of work for plant and equipment. Electrical safety.
K5: Risk assessments, risk management techniques and approaches, the hierarchy of control. Method statements.
K6: The UK's net zero commitment. The impact of low carbon energy on the network. Environmental regulations and standards: Environmental Protection Act, and Hazardous Waste Regulations.
K7: Sustainability principles, design and development considerations. Waste reduction and recycling.
K8: Incident management and emergency procedures. Environmental incidents.
K9: Awareness of regulatory frameworks, regulatory measures and reporting requirements.
K10: Electricity Supply Standards, Quality and Continuity Regulations. Electricity security and quality of supply standards. Business continuity.
K11: Engineering technical specifications, and engineering standards. What they are and how to use them.
K12: Engineering technical reports. What they are and how to use them.
K13: Power engineering mathematical principles.
K14: Data analysis techniques and reporting systems.
K15: High voltage electrical network operations and topologies.
K16: High voltage power generation methods, transmission and distribution. Plant and equipment purpose and operation.
K17: Protection and control equipment. Design, diagrams, drawings, operation and settings. Equipment coordination and interface with the high voltage system and equipment. Impact on the network. Microprocessor and numerical based protection systems and electromechanical relays.
K18: Substation control and metering equipment, operation, maintenance and settings.
K19: Plant and equipment failure modes. The impact on the electrical network. Fault analysis methods, results interpretation and corrective action.

K20: Maintenance and engineering techniques and procedures for electrical power systems and protection equipment. Transformers, switchgear, conductors, battery systems, earthing systems and ancillary equipment.
K21: Testing techniques and procedures for high voltage plant and equipment. Functionality testing.
K22: Test equipment, how it is used and maintenance and calibration requirements.
K23: Techniques and approaches for the planning and prioritisation of work tasks and project delivery.
K24: Documentation: methods and requirements - electronic and paper.
K25: Problem solving and fault finding.
K26: Team working principles.
K27: Principles of equity, diversity, and inclusion in the workplace. Unconscious bias.
K28: Communication techniques: verbal and written.

Skills

S1: Apply health and safety policies, procedures and electricity network safe systems of work.
S2: Comply with regulations and manage work to meet regulatory and legislative requirements.
S3: Apply high voltage risk management techniques and approaches.
S4: Apply environmental and sustainability procedures in compliance with regulations, standards, and guidelines.
S5: Apply mathematical principles.
S6: Use test equipment and check calibration.
S7: Apply maintenance engineering techniques and procedures to electrical power systems and protection equipment.
S8: Operate and maintain protection and control equipment.
S9: Operate and maintain substation control and metering equipment.
S10: Carry out functionality tests on high voltage plant, equipment, protection and control systems, simulate fault conditions.
S11: Check protection and control settings.
S12: Check installation and operation of microprocessor, numerical based protection systems and electromechanical relays.
S13: Check protection systems interface with high voltage equipment and coordinate with the high voltage system, including work across control boundaries.
S14: Follow emergency and incident response procedures.
S15: Read and interpret technical specifications, engineering diagrams and drawings.
S16: Read and interpret technical reports.
S17: Collect, record and interpret internal and external data and information. Use information and data to support business decisions.
S18: Interpret test results and take corrective action.
S19: Complete documentation.
S20: Apply problem solving or fault finding techniques.
S21: Carry out and record learning and development activities.
S22: Apply team working principles.
S23: Follow equity, diversity and inclusion policies.
S24: Establish and maintain productive working relationships, for example with colleagues, contractors or stakeholders.
S25: Communicate verbally and in writing with others for example, colleagues, contractors and stakeholders.

S26: Apply work prioritisation techniques and approaches to work tasks.

Behaviours

B1: Take responsibility for health and safety.
B2: Considers the environment and sustainability.
B3: Take responsibility for the quality of work. For example, decisive, self-reliant, and motivated.
B4: Committed to maintaining and enhancing competence of self and others through Continued Professional Development (CPD).
B5: Collaborate with others and promote teamwork for example, across disciplines, and external stakeholders, promoting inclusion.

Qualifications

English and maths

English and maths qualifications must be completed in line with the apprenticeship funding rules.

Does the apprenticeship need to include any mandated qualifications in addition to the above-mentioned English and maths qualifications?

No

Consultation

Progression routes

Supporting uploads

Mandatory qualification uploads
Mandated degree evidence uploads
Professional body confirmation uploads

Involved employers

National Grid, AMEY, SSE, Freedom Group, Grosvenor Power, IUS, Morrison Utility Services, NIE, Northern Powergrid, Scottish Power, SPIE-ENS, Electricity Northwest, UK Power Networks, WPD, The Institution of Engineering and Technology

Other involved stakeholders

Subject sector area

4.1 Engineering