



Australian Government

UETDRIS026 Diagnose and resolve faults in electrical apparatus

Release: 1

UETDRIS026 Diagnose and resolve faults in electrical apparatus

Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector Training Package Release 4.0.

Application

This unit includes the skills and knowledge required to diagnose and rectify faults in electrical apparatus in the electricity supply industry (ESI).

It includes interpreting diagrams and technical data, applying knowledge of electrical apparatus to logical fault-finding processes, and implementing fault rectification.

It also includes safe working practices, safety and functional testing, and reporting work activities and outcomes.

The application of the skills and knowledge described in this unit may require a licence/registration to practice in the workplace.

Other conditions may also apply under state and territory legislative and regulatory licensing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

UEECD0019 Fabricate, assemble and dismantle utilities industry components

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

UEECD0051 Use drawings, diagrams, schedules, standards, codes and specifications

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0021 Solve problems in magnetic and electromagnetic devices

UETDREL005 Work safely in the vicinity of live electrical apparatus

UETDRIS032 Solve problems in network equipment

Competency Field

Industry Specific Cross Discipline

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 Prepare to diagnose and resolve faults in electrical apparatus

- 1.1** Legislation, regulations, standards, codes of practice and organisational workplace requirements for the work to be done are reviewed and determined
- 1.2** Work plan is obtained, confirmed and communicated with relevant personnel in accordance with workplace requirements
- 1.3** Work is prioritised and sequenced for completion in accordance with work plan and workplace requirements
- 1.4** Hazards are identified, risks assessed, and control measures identified and applied
- 1.5** Work permits are determined in accordance with workplace requirements
- 1.6** Plant, tools, equipment and personal protective equipment (PPE) required for work are determined, obtained and confirmed in working order

2 Diagnose and resolve faults in electrical apparatus

- 2.1** Legislation, regulations, standards, codes of practice and organisational workplace requirements for the work to be performed are applied and monitored
- 2.2** Lifting, working at heights, working in confined spaces and the use of plant, tools, equipment and PPE are carried out in accordance with workplace requirements
- 2.3** Work permits are received and signed in accordance with workplace requirements
- 2.4** Faults in electrical apparatus are diagnosed and resolved in accordance with workplace requirements
- 2.5** Hazard control measures are monitored in accordance with workplace requirements

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| | 2.6 | Incidents or unplanned events are responded to in accordance with workplace requirements |
| | 2.7 | Quality checks of work are undertaken in accordance with work plan and workplace requirements |
| 3 | Complete work and documentation | |
| | 3.1 | Completed work is checked for compliance against the work plan and workplace requirements |
| | 3.2 | Incidents or unplanned events are reported in accordance with workplace requirements |
| | 3.3 | Plant, tools and equipment are cleaned, checked and returned to storage, and surplus resources and materials are managed in accordance with workplace requirements |
| | 3.4 | Work permits are signed off in accordance with workplace requirements |
| | 3.5 | Work records, reports and documentation are completed, and appropriate personnel notified in accordance with workplace requirements |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UET Transmission, Distribution and Rail Sector Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is not equivalent to UETDRIS69 Diagnose and rectify faults in energy supply apparatus.

Links

Companion Volume Implementation Guides are found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>

Assessment Requirements for UETDRIS026 Diagnose and resolve faults in electrical apparatus

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two (2) separate occasions and include:

- applying relevant legislation, regulations, standards, codes of practice and organisational workplace requirements including:
 - work health and safety (WHS)/occupational health and safety (OHS) requirements
- identifying hazards, assessing risks, and identifying, applying and monitoring control measures
- obtaining, inspecting and using relevant personal protective equipment (PPE)
- dealing with an unplanned event on at least one (1) occasion
- obtaining and signing work permits in accordance with workplace requirements
- completing relevant work records, reports and documentation
- diagnosing and resolving faults in electrical apparatus, including:
 - applying logical diagnostic methods
 - using fault scenarios to test the cause of system faults
 - identifying faults and competency needed to resolve them
 - resolving faults in system controls
 - verifying that the system operates correctly
 - documenting fault rectification.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- relevant legislation, regulations, standards, codes of practice and organisational workplace requirements including WHS/OHS requirements
- hazard, risk assessment and risk control requirements
- types and application of PPE
- safe use of plant, tools and equipment
- application, purpose and types of permits
- events constituting an unplanned event or incident

- procedures for responding to an unplanned event or incident
- workplace records, reports and documentation
- control of high voltage (HV) and low voltage (LV), including:
 - voltage control devices
 - conditions leading to voltage collapse and system disintegration
 - voltage regulators applied to generators and synchronous phase modifiers
 - electromagnetic voltage regulators
 - series and parallel capacitors
 - on-load tap changer (OLTC) transformers
 - static var compensations (SVCs)
- range of devices covered by SVCs, including:
 - saturated reactor (SR) compensators
 - thyristor controlled reactor (TCR) compensators
 - combined TCR/thyristor-switched capacitor (TSC)
 - production of wave-form distorting harmonics and control devices
- importance of the location in the system of voltage control devices
- the use of graphical methods to calculate the size of var regulating plant
- control of power, including:
 - base load and spinning reserve
 - regulating machines
 - rapid start plant
 - phase shifting transformers and load shedding
 - principles and practices of automated control of individual machines
 - stations and transmission/tie-line elements
 - synchronising power
- the relationship between power and frequency, including:
 - limiting values
 - machine stabilising
 - steam by-pass, rapid valving, slip stabilisers and over-speed limiting
 - use of single pole generator circuit breakers (CB)
 - use of automatic voltage regulators (AVR) as angular stabilisers
 - damped and un-damped system oscillations
 - relationship between fault clearance times and system stability
 - calculation of critical clearance angles based on equal area criteria
- types of communication systems, including:
 - telephone, power line carrier, dedicated cable, microwave links and fibre optics
 - quantities and signals to be communicated
 - advantages and disadvantages of the various systems
 - equipment requirements
- transient over-voltages in power systems, including:

- switching and lightning over-voltages and their effect on different plant items
- transient over-voltage control and reduction using surge diverters, shield wires and CB control
- insulation systems, insulation coordination, insulation grading in plant items, bushings and capacitor bushings
- factors leading to the generation of corona, including consequences, reduction, conductor bundling, grading rings and conductor surface treatment
- power system protection, including:
 - location of current transformer (CT) in major plant items
 - earthing principles and devices
 - fault current control/limitation using neutral earthing compensators (NEC), neutral point earth impedances, high conductivity shield wires and parallel feed interlocking
 - application of different types of protection.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so.

Where this is not appropriate, assessment must occur in simulated conditions involving realistic and authentic activities that replicate operational workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- relevant and appropriate materials, tools, facilities, equipment and PPE currently used in industry
- applicable documentation, including workplace requirements, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

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