



Australian Government

UEEEL0046 Find and repair faults in LV d.c. electrical apparatus and circuits

Release: 2

UEEEL0046 Find and repair faults in LV d.c. electrical apparatus and circuits

Modification History

Release 2. Minor Change. Typographic error in prerequisites corrected.

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to find and repair faults in electrical apparatus and interconnecting circuits and equipment operating at voltages up to 1,500 volts (V) direct current (d.c.).

It includes working safely, finding faults in electrical apparatus, applying logical fault-finding workplace procedures, conducting repairs and completing the necessary service documentation.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 V alternating current (a.c.) or 120 V d.c.

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, a relevant contract of training, such as an Australian Apprenticeship, may be required.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

Pre-requisite Unit

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

UEECD0019 Fabricate, assemble and dismantle utilities industry components

UEECD0020 Fix and secure electrotechnology equipment

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

UEEEL0003 Arrange circuits, control and protection for general electrical installations

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0023 Terminate cables, cords and accessories for low voltage circuits

UEEEL0019 Solve problems in direct current (d.c.) machines

UEEEL0021 Solve problems in electromagnetic devices

UEEEL0014 Isolate, test and troubleshoot low voltage electrical circuits

UEEEL0008 Evaluate and modify low voltage heating equipment and controls

UEEEL0009 Evaluate and modify low voltage lighting circuits, equipment and controls

UEEEL0010 Evaluate and modify low voltage socket outlets circuits

UEEEL0024 Test and connect alternating current (a.c.) rotating machines

UEEEL0025 Test and connect transformers

and

UEECD0043 Solve problems in direct current circuits

or

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

Competency Field

Electrical

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

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

1 Prepare to test and rectify faults

- | | |
|------------|---|
| 1.1 | WHS/OHS requirements and workplace procedures for a given work area are identified and applied |
| 1.2 | WHS/OHS hazards are identified, risks assessed and control measures implemented in accordance with workplace procedures in preparation for work |
| 1.3 | Scope of work to be undertaken is determined from fault/breakdown reports and/or discussions with appropriate person/s |
| 1.4 | Advice is sought from the work supervisor to ensure the work is coordinated effectively with others |
| 1.5 | Sources of materials required for work are established in accordance with workplace procedures |

- 1.6** Tools, equipment and testing devices needed to locate faults are obtained in accordance with workplace procedures and checked for correct operation and safety
- 2 Find and repair faults**
- 2.1** WHS/OHS risk control measures and workplace procedures for carrying out work are followed
- 2.2** Need to test or measure live electrical work is determined in accordance with WHS/OHS requirements and, as required, conducted within workplace safety procedures
- 2.3** Circuits/machines/plant are isolated in accordance with WHS/OHS requirements and workplace procedures
- 2.4** Safety hazards resulting from the fault or breakdown are assessed, documented on job safety assessments and risk control measures implemented in consultation with appropriate person/s
- 2.5** Fault-finding analysis is approached methodically using measured and calculated values of electrical circuit/apparatus parameters
- 2.6** Electrical circuit/apparatus components are dismantled, as required, and parts stored to protect against loss or damage
- 2.7** Faulty circuits/components are rechecked and fault status identified
- 2.8** Materials/replacement parts required to rectify faults are sourced and obtained in accordance with workplace procedures
- 2.9** Effectiveness of repair/s is tested in accordance with workplace procedures
- 2.10** Electrical apparatus and circuits are inspected, reassembled, tested and prepared for return to service
- 2.11** Unplanned situations are responded to safely in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- 2.12** Fault-finding and repair activities are carried out without damage to apparatus circuits, the surrounding environment or services using sustainable energy practices

3 Complete and document repair activities

- 3.1** WHS/OHS work completion risk control measures and workplace procedures are followed
- 3.2** Reusable, faulty or worn components are tagged and despatched for repair to maintain adequate spares
- 3.3** Maintenance work activities are documented in accordance with workplace procedures

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 UEE Electrotechnology Training Package Companion Volume Implementation Guide.

- Finding and repairing fault types in electrical apparatus and interconnecting circuits and equipment operating at voltages up to 1,500 V d.c. must include at least five of the following:
- open circuit
 - short circuit
 - incorrect connections
 - insulation failure
 - unsafe condition
 - apparatus/component failure
 - related mechanical failure

Unit Mapping Information

This unit replaces and is equivalent to UEENEEG110A Find and repair faults in LV d.c. electrical apparatus and circuits.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEEEL0046 Find and repair faults in LV d.c. electrical apparatus and circuits

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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, performance criteria and range of conditions on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using of risk control measures
- applying sustainable energy principles and practices
- completing repairs, and reporting fault-finding and repair activities
- finding and repairing faults in direct current (d.c.) electrical apparatus and circuits, including:
 - determining the likely extent of work from fault/breakdown reports and discussions with appropriate person/s
 - using methodical fault-finding techniques
 - finding faults efficiently
 - rectifying faults effectively
 - completing documentation correctly
 - dealing with unplanned events in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- implementing WHS/OHS requirements and workplace procedures
- preparing to find and rectify faults.

Knowledge Evidence

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

- d.c. motor control methods
- d.c. machines, including:
 - connection arrangements
 - installation and starting/running requirements and limitations
 - operating principles

- purpose, types and applications
- typical fault symptoms and related conditions
- d.c. motor starters and their operating principles, including:
 - back emf
 - electronic controllers
 - series-lockout
 - timed starters
- power and control connection arrangements, including:
 - built-in stop/start control
 - interlocking with other starters and controls
 - overload protection
 - remote stop/start control
- braking methods, including:
 - dynamic
 - plugging
 - electromechanical
 - regenerative
- speed control methods, including:
 - field control
 - rheostatic control
 - voltage control
- protection of d.c. motors
- relevant manufacturer specifications
- relevant job safety assessments or risk mitigation processes
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures.

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 suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in suitable simulated workplace operational situations that replicate 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:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, relevant industry standards, codes of practice and operation manuals.

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