



Australian Government

UEEEL0014 Isolate, test and troubleshoot low voltage electrical circuits

Release: 2

UEEEL0014 Isolate, test and troubleshoot low voltage electrical circuits

Modification History

Release 2. This is the second release of this unit of competency in the UEE Electrotechnology Training Package.

Typographic errors fixed in Performance Evidence

Workplace evidence requirements updated in Performance Evidence and Assessment Conditions.

Assessor requirements updated in Assessment Conditions.

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 isolate, test and troubleshoot electrical circuits operating at voltages up to 1,000 volts (V) alternating current (a.c.) or 1,500 V direct current (d.c.).

It includes working safely, isolating electrical circuits, evaluating low voltage (LV) electrical circuits, applying systematic fault-finding procedures, conducting repairs and completing the necessary 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 circuits and equipment which are designed to operate at voltages greater than 50 V 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 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 magnetic and electromagnetic devices

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

UEEEL0025 Test and connect transformers

UEEEL0047 Identify, shut down and restart systems with alternate supplies

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

Elements describe the essential outcomes.

1 Prepare to isolate, test and troubleshoot electrical circuits

PERFORMANCE CRITERIA

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

- 1.1** Scope of work to be undertaken is determined from relevant documentation, electrical drawings or relevant person/s
- 1.2** WHS/OHS requirements and workplace procedures for a given work area are identified and applied
- 1.3** Electrical hazards are identified, risks are assessed, and control measures are implemented
- 1.4** Relevant industry standards, regulation, legislation and workplace procedures are identified and applied

- | | | |
|----------|---|---|
| | 1.5 | Advice is sought from the work supervisor to ensure the work is coordinated effectively with others |
| 2 | Apply safe isolation, lock-out and tag-out procedures | |
| | 2.1 | Electrical circuits and conductors, all of their energy sources, and isolation points are identified |
| | 2.2 | Electrical circuits are isolated from all energy sources and secured in accordance with industry and regulatory standards |
| | 2.3 | Safe isolation from all sources of energy is confirmed |
| | 2.4 | Isolation is secured using appropriate devices, tags, lock-out or permit system |
| | 2.5 | Any stored energy is discharged and deenergisation proved |
| | 2.6 | Unused conductors and equipment are dealt with in accordance with regulatory requirements |
| 3 | Conduct compliance inspection and testing on electrical circuits | |
| | 3.1 | Electrical circuits are visually inspected for compliance with regulatory requirements |
| | 3.2 | Mandatory tests are identified, including sequence of tests and equipment required |
| | 3.3 | Continuity of the earthing system is tested for compliance with regulatory requirements |
| | 3.4 | Insulation resistance of the circuit is tested for compliance with regulatory requirements |
| | 3.5 | Polarity of the circuit is tested for compliance with regulatory requirements |
| | 3.6 | Correct circuit connections is tested for compliance with regulatory requirements |
| | 3.7 | Alternative supply systems are inspected and tested for compliance with industry and regulatory standards |
| | 3.8 | Earth fault loop impedance is verified for compliance with regulatory requirements |
| | 3.9 | Operation of residual current devices (RCDs) is tested for compliance with regulatory requirements |

- | | | |
|----------|--|---|
| | 3.10 | Compliance test results are documented and reported in accordance with industry and workplace requirements |
| | 3.11 | Non-compliances are identified and reported to relevant personnel |
| | 3.12 | Requirements for the verification of circuits are completed in accordance with regulatory requirements |
| 4 | Locate, identify and repair faults in electrical circuits | |
| | 4.1 | Circuits/machines/plant are checked as being isolated, where necessary, in strict accordance WHS/OHS requirements and procedures |
| | 4.2 | Safety hazards resulting from the fault or breakdown are documented and risk control measures identified and implemented in consultation with appropriate person/s |
| | 4.3 | Troubleshooting of electrical circuits is undertaken methodically using measured and calculated values of circuit parameters |
| | 4.4 | Circuit components are dismantled and parts stored to protect against loss or damage |
| | 4.5 | Faulty circuits/components are rechecked and their fault status identified |
| | 4.6 | Materials/replacement parts required to rectify faults are sourced and obtained in accordance with workplace procedures |
| | 4.7 | Effectiveness of the repair is tested in accordance with workplace procedures |
| | 4.8 | Circuit is reassembled, tested and prepared for return to service |
| | 4.9 | Unexpected situations are dealt with safely and with the approval of authorised person/s |
| | 4.10 | Troubleshooting and repair activities are carried out without damage to equipment, circuits, the surrounding environment or services using sustainable energy practices |
| 5 | Complete work and document activities | |
| | 5.1 | WHS/OHS work completion risk control measures and workplace procedures are followed |

- 5.2 Work area is cleaned and made safe in accordance with workplace procedures
- 5.3 Work completion is documented and appropriate person/s notified 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.

Unit must be demonstrated with circuits and equipment operating at voltages up to 1,000 volts (V) alternating current (a.c.) or 1,500 V direct current (d.c.) and must include:

- | | |
|---|---|
| Isolating, testing and troubleshooting LV electrical circuits and equipment must include safe isolation, visual inspection and mandatory testing of the following in accordance with industry standards, including one equipment type that has a dual supply, one circuit breaker and one high rupturing capacity (HRC) fuse: | <ul style="list-style-type: none">• at least one of the following:<ul style="list-style-type: none">• main switchboard• distribution boardand• at least three of the following:<ul style="list-style-type: none">• motor• space heater• water heater• lights• socket outlets |
| Locating and diagnosing LV electrical circuit and equipment faults must include at least four of the following common faults in electrical circuits: | <ul style="list-style-type: none">• open circuit• short circuit• incorrect connections• insulation failure• unsafe condition• equipment/component failure• related mechanical failure |

Unit Mapping Information

No equivalent unit

Links

Companion Volume Implementation Guides are found in VETNet -

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