



Australian Government

UEENEEG110A Find and repair faults in LV d.c. electrical apparatus and circuits

Release: 2

UEENEEG110A Find and repair faults in LV d.c. electrical apparatus and circuits

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers finding and repairing faults in electrical apparatus and interconnecting circuits and equipment operating at voltages up to 1,500 V d.c. It encompasses working safely, reading circuit diagrams, sketching diagrams from traced wiring, applying logical fault finding procedures, conducting repairs and completing the necessary service documentation.

Application of the Unit

Application of the Unit 2)

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It may also be used to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit require a license to practice in the workplace subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) 4)

Competencies 4.1)

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101 A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102 A	Fabricate, dismantle, assemble of utilities components
UEENEEE104 A	Solve problems in d.c circuits
UEENEEE105 A	Fix and secure electrotechnology equipment
UEENEEE107 A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006 A	Solve problems in single and three phase low voltage machines
UEENEEG033 A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063 A	Arrange circuits, control and protection for general electrical installations
UEENEEG101 A	Solve problems in electromagnetic devices and related circuits
UEENEEG102 A	Solve problems in low voltage a.c. circuit
UEENEEG106 A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108 A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

Literacy and numeracy skills 4.2)

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 4

Employability Skills Information**Employability Skills 5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria**ELEMENT****PERFORMANCE CRITERIA**

- | | |
|---------------------------------------|--|
| 1 Prepare to find and rectify faults. | 1.1 OHS procedures for a given work area are identified, obtained and understood. |
| | 1.2 OHS risk control measures and procedures in preparation for the work are followed. |

ELEMENT**PERFORMANCE CRITERIA**

- 1.3 The likely extent of work to be undertaken is envisaged 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 that may be required for the work are established in accordance with established procedures.
- 1.6 Tools, equipment and testing devices needed to locate faults are obtained in accordance with established procedures and checked for correct operation and safety.
- 2 Find and repair faults.
- 2.1 OHS risk control measures and procedures for carrying out the work are followed.
- 2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
- 2.3 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
- 2.4 Safety hazards resulting from the fault or breakdown are documented and risk control measures devised and implemented in consultation with appropriate personnel.
- 2.5 Fault finding is approached methodically drawing on knowledge of d.c. circuit and apparatus using measured and calculated values of circuit/apparatus parameters.
- 2.6 Circuit/apparatus components are dismantled where necessary and parts stored to protect them against loss or damage.
- 2.7 Faulty circuits/components are rechecked and their fault status and acquired.
- 2.8 Materials/replacement parts required to rectify

ELEMENT**PERFORMANCE CRITERIA**

- faults are sourced and obtained in accordance with established procedures.
- 2.9 Effectiveness of the repair is tested in accordance with established procedures.
- 2.10 Apparatus is reassembled, finally tested and prepared for return to service.
- 2.11 Unexpected situations are dealt with safely and with the approval of an authorised person.
- 2.12 Fault finding and repair activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
- 3 Completion and report fault finding and repair activities.
- 3.1 OHS work completion risk control measures and procedures are followed.
- 3.2 Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
- 3.3 Maintenance work activities are documented in accordance with established procedures.

Note.

Examples of documentation are component faults reports, test results, authorisations, permits, parts/component dispatch and stores records.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and finding and repairing faults in LV d.c. electrical apparatus and circuits.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG110A

Direct current machines and controls

Evidence shall show an understanding of d.c. motor control methods to an extent indicated by the following aspects:

T1 Direct current machines encompassing:

- Purpose, types and applications
- Operating principles
- Installation and starting/running requirements and limitations
- Connection arrangements
- Typical fault symptoms and related conditions

T2 Direct current motor starters and their operating principles encompassing:

- back emf
- series-lockout
- timed starters
- electronic controllers

T3 Power and control connection arrangements encompassing:

- Built-in stop/start control
- Remote stop/start control
- Overload protection
- Interlocking with other starters and controls

T4 Braking methods encompassing:

- Dynamic,
- Plugging,
- Electromechanical, and
- Regenerative.

T5 Speed control methods encompassing:

- Field control
- Rheostatic control

REQUIRED SKILLS AND KNOWLEDGE

- Voltage control
- T6 Protection of d.c. motors

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing

on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit 9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
 - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
 - Demonstrate an appropriate level of skills enabling employment
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Find and repair faults in d.c. electrical apparatus and

circuits as described in 8) and including:

- A Envisaging the likely extent of work from fault/breakdown reports and discussion with appropriate person(s).
- B Using methodical fault finding techniques.
- C Finding faults efficiently.
- D Rectifying faults effectively.
- E Completing documentation correctly.
- F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment 9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to finding and repairing faults in d.c. electrical apparatus and circuits.

Method of assessment 9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is

expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

**Concurrent
assessment and
relationship with
other units**

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEG10 Develop and connect electrical control circuits
9A

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to finding and repairing faults and their cause in d.c. electrical apparatus and circuits. Finding and repairing fault types in electrical apparatus and interconnecting circuits and equipment operating at voltages up to d.c include the following:

- Open-circuit
- Short-circuit
- Incorrect connections
- Insulation failure
- Unsafe condition
- Apparatus/component failure
- Related mechanical failure
- Other electrical apparatus and circuit faults
- Any five of the above shall apply.

Note:

1. Examples of apparatus are d.c switchboards/distribution boards, protective devices such as circuit breakers and fuses, and d.c machines and associated control devices.
2. Examples of circuits include those related to d.c. apparatus; d.c machines and controls circuits.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

