



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **UEENEEG108A Trouble-shoot and repair faults in low voltage electrical apparatus and circuits**

Release: 1

## **UEENEEG108A Trouble-shoot and repair faults in low voltage electrical apparatus and circuits**

### **Modification History**

Not Applicable

### **Unit Descriptor**

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**1)**

#### **1.1) Descriptor**

This unit covers trouble-shooting and repairing faults in electrical apparatus and interconnecting circuits and equipment operating at voltages up to 1,000 V a.c. or 1,500 V d.c. It encompasses working safely, reading circuit diagrams, sketching diagrams from traced wiring, logically applying fault finding procedures, conducting repairs and completing the necessary service documentation.

### **Application of the Unit**

Not Applicable

## Licensing/Regulatory Information

### 1.2) License to practice

**During Training:** Competency development activities are subject to regulations directly related to licensing, occupational health and safety and where applicable contracts of training such as apprenticeships.

**In the workplace:** The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

## Pre-Requisites

Prerequisite Unit(s) 2)

### 2.1) Competencies

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

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble of electrotechnology components

UEENEEE104A Solve problems in d.c circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG006A Solve problems in single and three phase low voltage machines

UEENEEG033A Solve problems in single and three phase electrical apparatus and circuits

UEENEEG063A Arrange circuits, control and protection for general electrical installations

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuit

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

### 2.2) Further Information

For the full prerequisite chain details for this unit please

**Prerequisite Unit(s)** 2)  
refer to Table 2 in Volume 1, Part 2

## **Employability Skills Information**

**Employability Skills** 3)  
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.

**Application of the Unit** 4)  
**4.1) General Application**  
This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical license.  
**4.2) Importation**  
RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

## **Elements and Performance Criteria Pre-Content**

6) Elements describe the essential outcomes of a unit of competency  
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**

| <b>ELEMENT</b>                                 | <b>PERFORMANCE CRITERIA</b>   |
|--|---|
| 1 Prepare to trouble-shoot and rectify faults. | 1.1 The extent and nature of the electrical installation is determined from job specifications.<br>1.2 Safety and other regulatory requirements to which the electrical installation shall comply area are identified, obtained and understood. |

| <b>ELEMENT</b>                     | <b>PERFORMANCE CRITERIA</b>   |
|------------------------------------|---|
|                                    | 1.3 OHS procedures for a given work area are identified, obtained and understood.   |
|                                    | 1.4 OHS risk control measures and procedures in preparation for the work are followed.  |
|                                    | 1.5 The likely extent of work to be undertaken is envisaged from fault/breakdown reports and/or discussions with appropriate person(s).   |
|                                    | 1.6 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.  |
| 2 Trouble-shoot 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 Trouble-shooting is approached methodically drawing on knowledge of electrical circuits 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 faults are sourced and obtained in accordance with established procedures.  |

| <b>ELEMENT</b>   | <b>PERFORMANCE CRITERIA</b>  |
|--|--|
|  | 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 Trouble-shooting 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 trouble-shoot and repair activities. | 3.1 OHS work completion risk control measures and procedures are followed.   |
|  | 3.2 Work area is cleaned and made safe in accordance with established procedures.  |
|  | 3.3 Written justification is made for repairs to apparatus.  |
|  | 3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures.   |

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

7) 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 trouble-shooting and repairing faults in electrical apparatus and circuits.

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

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

KS01-EG108A Electrical fault finding techniques

## 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

##### 9.2)

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

## EVIDENCE GUIDE

### competency in this unit

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 - UEE07'. 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 electrical apparatus and circuits as described as described in 8) and including:
    - A Envisaging the likely extent of the fault and the work from fault/breakdown reports and/or discussion to elicit information on the fault/breakdown with appropriate person(s).
    - B Using appropriate tools and resources, and methodical fault finding techniques.
    - C Locating and trouble-shooting faults efficiently.
    - D Conducting tests or measurements in strict accordance with OHS and electrical safe working requirements.
    - E Rectifying faults effectively.
    - F Reporting cause of the fault and justifying the



## EVIDENCE GUIDE

repairs undertaken.

### G Dealing with unplanned events

#### 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 trouble-shooting and repairing faults in 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:

UEENEEG109A      Develop and connect electrical control circuits t

## Range Statement

### RANGE STATEMENT

8) 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 trouble-shooting and repairing faults in electrical apparatus and circuits designed for voltages up to 1000 V a.c. or 1500 V d.c in at least:

Four of the following **equipment and associated circuit**

- Switchboards
- Protective devices
- Lighting
- Heating
- Socket outlets
- Control devices

and

Three of the following **machines and associated control circuits**

- Single phase motors
- Single phase motor controls
- Three phase motors
- Three phase motor controls
- Synchronous machines
- DC machines
- DC machines controls
- Transformers and auxiliary components

## RANGE STATEMENT

Notes.

1. The different types of faults include; Open-circuit; Short-circuit; Incorrect connections; Insulation failure; Unsafe condition; Apparatus/component failure; Related mechanical failure; Other electrical apparatus and circuit faults
2. Examples of apparatus are Control devices; Fixed appliances/accessories; Lighting; Single phase motors and their controls; Socket outlets Three phase motors and their controls, synchronous machines and their controls, transformers and their controls, switchboards and/or distribution boards and their controls, protection and/or metering devices, a.c./d.c. machines and their controls other like equipment/accessories.
3. Examples of circuits include those supplying fixed appliances; lighting; single-phase motors; socket outlets; three phase motors and controls circuits; machines and transformers; electronic or computer based equipment other like equipment/accessories.

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

### 2.2) Literacy and numeracy skills

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 |
|---------|---|---------|---|----------|---|

## Custom Content Section

Competency Field 5)

Electrical