



**Australian Government**

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

# **UEENEEG149A Provide engineering solutions to problems in complex polyphase power circuits**

**Release: 1**

## **UEENEEG149A Provide engineering solutions to problems in complex polyphase power circuits**

### **Modification History**

Not Applicable

### **Unit Descriptor**

#### **Unit Descriptor**

**1)**

##### **1.1) Descriptor**

This unit covers determining correct operation of complex polyphase power circuits and providing solutions as they apply to electrical power engineering work functions. It encompasses working safely, problem solving procedures, including using electrical measuring devices, applying appropriate circuit theorems and providing solutions derived from measurements and calculations and justification for such solutions.

### **Application of the Unit**

#### **Application of the Unit** 4)

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

## Licensing/Regulatory Information

### 1.2) License to practice

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However 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 regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

## 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.

UEENEEE125A Provide engineering solutions for problems in complex multiple path circuitss  
and

UEENEEG102A Solve problems in low voltage a.c. circuits

For the full prerequisite chain details for this unit please 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.

## 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

### ELEMENT

### PERFORMANCE CRITERIA

1 Prepare to provide engineering solutions to problems in complex polyphase power circuits.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	OHS risk control work preparation measures and procedures are followed.
	1.3	The nature of the circuit(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	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 carry out the work are obtained and checked for correct operation and safety.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
2 Provide engineering solutions to problems in complex polyphase power circuits.	2.1 OHS risk control work measures and procedures 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 are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4 Established methods are used for solving circuit problems from measure and calculated values as they apply to complex polyphase power circuits.
	2.5 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6 Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document solutions for problem solving activities.	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Work site is cleaned and made safe in accordance with established procedures.
	3.3 Justification for solutions used to solve circuit problems is documented.
	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 providing solutions for problems in complex polyphase power 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-	Polyphase power circuit analysis
EG149A	

## 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

##### 9.2)

Before the critical aspects of evidence are considered all

## EVIDENCE GUIDE

### to demonstrate competency in this unit

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 - 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:
  - Solve problems in complex polyphase power circuits as described in 8) and including:
    - A Determining the operating parameters of existing circuit.
    - B Using established problem solving methods.
    - C Taking relevant measurements accurately.
    - D Interpreting measured values appropriately.
    - E Providing effective solutions to circuit problems from measurements and calculations.
    - F Giving written justification of solutions provided.
    - G Dealing with unplanned events by drawing on essential



## EVIDENCE GUIDE

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 providing engineering solutions for solving problems in complex polyphase power 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)**

There are no concurrent assessment recommendations for this unit.

## 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 relation to providing engineering solutions to complex polyphase power circuits as they apply to problems related to electrical power engineering diagnosis and development work functions in any of the following types of circuit problems:

- Determining the operating parameters of an existing complex circuit
- Altering an existing complex circuit to comply with specified operating parameters
- Developing complex circuits to comply with a specified function and operating parameters

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	5	Writing	5	Numeracy	5
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### 2.2) Literacy and numeracy skills

Competency Field 5)

Electrical