



Australian Government

UEENEEH169A Solve problems in basic electronic circuits

Release: 2

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Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This competency standard unit covers determining correct operation of single source parallel and series-parallel circuits and providing solutions as they apply to various electronic work functions. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in multiple path circuit.

Application of the Unit

Application of the Unit 2)

This competency standard unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training or approved training programs.

Licensing/Regulatory Information

License to practice

3)

The skills and knowledge described in this unit requires a licence to practice in the workplace where plant and equipment is directly connected to installation wiring that operates 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

License to practice**3)**

regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships and the like.

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.

UEENEEE1 01A Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills**4.2)**

Participants are best equipped to achieve 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

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 work on electronic circuits	<p>1.1 OHS procedures for a given work area are obtained and understood.</p> <p>1.2 OHS risk control work preparation measures and procedures are followed.</p> <p>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.</p> <p>1.4 Advice is sought from the work supervisor to ensure the work is co-ordinated effectively with others.</p> <p>1.5 Sources of materials that may be required for the work are established in accordance with established procedures.</p> <p>1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.</p>
2 Solve electronic circuit problems	<p>2.1 OHS risk control work measures and procedures are followed.</p> <p>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.</p> <p>2.3 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures.</p> <p>2.4 Established methods are used to solving circuit problems from measure and calculated values as</p>

ELEMENT**PERFORMANCE CRITERIA**

		they apply to electronic circuit.
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Problems are solved without unnecessary damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3	Complete work and document 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

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 solving problems in electronic circuits.

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

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Electronics Circuit Principles

Evidence shall show an understanding of power supplies for electronics circuit principles, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Basic circuit configurations encompassing:

- circuit configurations are single source a.c. and d.c. circuits,
- series circuits,
- parallel circuits
- series-parallel circuits.

T2. The relationship between variable parameter in electrical /electronic circuits encompassing:

- Variables parameters –
 - voltage,
 - current,
 - resistance
 - impedance,
 - inductance,
 - capacitance
 - reactance.

T3. Behaviour of electrical /electronic circuits for various values of voltage, current, resistance, impedance, inductance, capacitance and reactance and variable parameters encompassing:

- single source circuits,
- series circuit configurations,
- parallel circuit configurations
- series-parallel circuit configurations

T4. Types of voltage testers, multimeters, clamp meters, continuity testers and insulation resistance testers and their application.

T5. Features of testing/measuring devices - safety, user calibration and parameter and range settings.

REQUIRED SKILLS AND KNOWLEDGE

T6. Connection of test/measuring devices into a circuit encompassing:

- safety procedures
- circuit arrangement of test/measuring devices

T7. Taking readings

T8. Storage, maintenance and care of test/measuring devices.

T9. Australian Standard quality assurance requirements for test equipment calibration certification.

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 Competency Standard Unit and shall be used in conjunction with all components 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 accord with Industry and, Regulatory policy in this regard.

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. Hence, sources of evidence need to be 'rich' in nature so as 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; and
- Apply sustainable energy principles and practices as specified in the performance criteria and range; and
- 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. and

- Demonstrate an appropriate level of skills enabling employment; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated consistent performance across a representative range of contexts from the prescribed items below:

- Solving problems in electronic circuits as described in 8) and including:
 - a. Determining the operating parameters of an existing circuit.
 - b. Altering an existing circuit to comply with specified operating parameters.
 - c. Developing circuits to comply with a specified function and operating parameters.
 - d. 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 competency standard unit.

Resources required to assess this unit are listed above in Context of assessment', which should also be used in the formal learning/assessment environment.

Note:

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

The resources used for assessment should reflect current industry practices in relation to in solving problems in electronic circuits.

**Method of
assessment****9.4)**

This competency standard 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 competency standard unit applies. This requires that the specified essential knowledge and associated skills are assessed 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.

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency 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 competency standard unit shall be demonstrated in relation to:

Single source parallel and series-parallel electronic circuits as they apply to operational circuit functions in relation to at least two of the following types of circuit problems and on at least two occasions:

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

Generic terms are used throughout this Vocational Standard shall be regarded as part of the Range of Variables 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)
	Electrotechnology