



Australian Government

**UEENEEG104A Install appliances,
switchgear and associated accessories for
low voltage electrical installations**

Release: 3

UEENEEG104A Install appliances, switchgear and associated accessories for low voltage electrical installations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This unit covers the installation of appliances protection devices, switchgear, controlgear, switchboards, and accessories designed to operate at voltages up to 1,000 V a.c. or 1,500 V d.c. It encompasses working safely and to installation standards, matching appliances and accessories with that specified, making required circuit connections and completing the necessary installation 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

Prerequisite Unit(s)	2)
	UEENEEE137A Document and apply measures to control OHS risks associated with electrotechnology work
	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
	UEENEEG103A Install low voltage wiring and accessories
	UEENEEG106A Terminate cables, cords and accessories for low voltage circuits
	UEENEEG107A Select wiring systems and cables for low voltage general electrical installations
	UEENEEG108A Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
	UEENEEG109A Develop and connect electrical control circuits

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

ELEMENT

PERFORMANCE CRITERIA

1 Prepare to install appliances, switchgear and associated accessories.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Health and safety risks are identified and established risk control measures and procedures in preparation for the work are followed.

ELEMENT

PERFORMANCE CRITERIA

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| | 1.3 | Safety hazards that have not previously been identified are noted and established risk control measures are implemented. | |
| | 1.4 | Installation is prepared in consultation with others affected by the work and sequenced appropriately. | |
| | 1.5 | The nature and location of the work is determined from documentation or appropriate person to establish the scope of work to be undertaken. | |
| | 1.6 | Locations of appliances, switchgear and accessories is planned within the constraints of the building structure, significant and requirements. | |
| | 1.7 | Material needed for the installation work is obtained in accordance with established procedures and checked against job requirements. | |
| | 1.8 | Tools, equipment and testing devices needed to for the installation work are obtained in accordance with established procedures and checked for correct operation and safety. | |
| | 1.9 | Preparatory work is checked to ensure no damage has occurred and complies with requirements. | |
| 2 | Install appliances, switchgear and associated accessories. | 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 | Appliances, switchgear and accessories are installed to comply with technical standards and job specifications and requirements with sufficient access to affect terminations, adjustment and maintenance. |
| | | 2.5 | Accessories are installed straight and square in the required locations and within acceptable tolerances. |

ELEMENT

PERFORMANCE CRITERIA

- 2.6 Wiring is terminated at appliances, switchgear and accessories in accordance with manufacture's specifications and functional and regulatory requirements.
- 2.7 Ongoing compliance and safety inspections of the installed appliances, switchgear and accessories is undertaken.
- 2.8 Defects revealed through on-going compliance and safety inspection are rectified.
- 2.9 Installation is carried out efficiently without unnecessary waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
- 2.10 Unexpected situations are dealt with safely and with the approval of an authorised person.
- 3 Completion and report installation 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.
 - 3.4 'As-installed' appliances, switchgear and accessories 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 installing low voltage electrical appliance, switchgear and accessories.

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

KS01-EG104A

Installation of appliances, switchgear and accessories

Evidence shall show an understanding of the installation of appliances (current-using equipment) and accessories to an extent indicated by the following aspects:

T1 Installation standards, codes and requirements applicable to installing electrical equipment encompassing.

- Protection against thermal effects
- Connection of electrical equipment (appliances, switchgear and accessories include switchgear and controlgear, switchboards, socket-outlets, lighting equipment and accessories, lamps and luminaires, smoke and fire detectors, cooking appliances, appliances producing hot water or steam, room heaters, electric heating cables for floors and ceilings, space heating, duct heaters, electricity converters, motors, transformers, capacitors, and batteries).
- Required and permitted locations current-using equipment and accessories
- Control, switching and over current and RCD protection

T2 Terminal configuration for connection of phase, neutral and protective earthing conductors for each type of equipment.

T3 Building codes affecting the installation of current-using equipment and accessories in buildings, structures and premises encompassing:

- maintenance of fire protection integrity, requirements for emergency services (safety services) and the like.

T4 Issues affecting electrical installations in heritage buildings and premises encompassing:

- limitation on types and colour of exposed accessories.

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:
 - Install low voltage electrical apparatus and associated equipment as described as described in 8) and including:
 - A Reading and interpreting drawings related to and apparatus locations and circuit connections.
 - B Planning installation of appliances, switchgear and accessories and obtaining installation materials.
 - C Sequencing the installation effectively with other affected by the work.
 - D Placing and securing appliances, switchgear and accessories accurately in their planned location and in compliance with standards.

EVIDENCE GUIDE

- E Maintaining fire integrity.
- F Terminating and connecting appliances, switchgear and accessories to comply with requirements.
- G Undertaking on-going compliance and safety inspections
- H Rectifying any defects revealed through on-going inspections
- H Correctly documenting 'as-installed' appliances, switchgear and accessories.
- I 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 installing low voltage electrical apparatus and associated equipment.

EVIDENCE GUIDE

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:

UEENEEG103A Install low voltage wiring and accessories

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 installation and connection of appliances, switchgear and associated accessories as follows:

Each of the following

- Installing and connecting main switches, protective devices and links on a main switchboard and preparing the switchboard for the installation of metering
- Installing and connecting a custom switchboard;
- Socket-outlets;
- Lighting equipment and accessories;
- Luminaires, and

At least four of the following

RANGE STATEMENT

- Cooking appliances
- Smoke and fire detectors
- Water heaters and controls
- Three phase motor starter and control switches
- Fixed electric heating system (room heaters)
- Transformers
- Appliances producing hot water or steam
- Electric heating cables for floors and ceilings
- Trace heating
- Duct heaters
- Electricity converters
- Capacitors.
- Batteries.

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
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Custom Content Section

Competency Field 5)

Electrical

