Australian Government

UEENEEG128A Plan low voltage switchboard and control panel layouts

Release 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEG128A Plan low voltage switchboard and control panel layouts

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers selecting and arranging equipment in electrical switchboards and control panels operating at voltages up to 1,000V a.c. or 1,500 V d.c. and fault levels not exceeding 20 kA. The unit encompasses arrangements for protection of persons and property, correct functioning, compatibility with the supply, and intended arrangement of circuits and selection of switchgear, controlgear and protection devices based on calculated and deemed-to-comply solutions and planning 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 applies to any formal recognition for this standard at the aligned AQF 4 level or higher.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the work place. However practice in this unit is subject to regulations directly

License to practice **3)**

related to occupational health and safe and contracts of training such as new 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.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities 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
UEENEEG106	Terminate cables, cords and accessories

Prerequisite Unit(s) **4)**

A	for low voltage circuits
UEENEEG107 A	Select wiring systems and cables for low voltage general electrical installations

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, 4Part 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 plan switchboard and control panel layouts.	1.1 OHS risk control measures and procedures for carrying out the work are followed.
	1.2 The extent and nature of the switchboard and control panel layouts is determined from job specifications or design brief.
	1.3 Safety and other regulatory requirements to which the switchboard and control panel layouts shall comply are identified, obtained and understood.
	1.4 Equipment to be incorporated in the switchboard or control panel is determined from job specifications or design brief.
2 Plan switchboard and control panel layouts.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Equipment is selected that complies with technical standards and job specifications and requirements.
	2.3 Switchboard and control panel layouts are planned to accommodate all necessary equipment with sufficient clearance to enable wiring/connecting and servicing with constraints imposed by job specifications.
	2.4 Switchboard and control panel layouts are planned to comply with safety regulatory and functional requirements.
	2.5 Switchboard and control panel layout draft is checked for compliance with the design brief and regulatory requirements.
	2.6 Switchboard and control panel layout is documented for submission to appropriate person(s) for acceptance and approval.
	2.7 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.

ELEMENT	PERFORMANCE CRITERIA
3 Obtain approval for switchboard and control panel layouts.	3.1 Requests for alterations to the layout are negotiated with relevant person(s) within the constraints of organisation's policy.
	3.2 Final layout design is documented and approval obtained from appropriate person(s).
	3.3 Switchboard and control panel layout documentation is forwarded to appropriate production personnel.
	3.4 Quality of work is monitored against established organisational standards

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 planning switchboard and control panel layouts.

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

KS01-EG128A Switchboard/control panel planning

Evidence shall show an understanding of planning switchboard and control panel layouts to an extent indicated by the following aspects:

T1 Electrical metering arrangements encompassing:

- Purpose, types and applications.
- Metering equipment.
- Arrangements for metering

T2 Switchgear/controlgear encompassing:

- Types and applications
- Operating principles
- Interlocking systems
- Control and protection
- Installation requirements

T3 Control panel wiring encompassing:

- Equipment layout methods and accessories
- Connection identification methods
- Wiring 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 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, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Plan switchboard and control panel layouts as described in 8) and including:

A Developing outlines of alternative layouts.

B Selecting equipment that complies with safety and functional requirements and budget limitations.

C Developing the layout within the safety and functional requirements and budget limitations.

D Successfully negotiating layout alteration requests.

E Obtaining approval for final layout design.

F Documenting layout and equipment specifications clearly.

G 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 planning switchboard and control panel layouts.

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:

UEENEED10 Use computer applications relevant to a workplace 1A

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 planning one switchboard layout and one control panel layout. The switchboard shall be in more than one section and comprise essential and general supply controls, CT metering, sub main controls, local distribution board and load monitoring and fault indication. The control panel shall consist of controls for more than two electrical machines, electro-mechanical and/or electronic control devices such as relays, timers, logic controllers, indicators and switches/push buttons.

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