



**Australian Government**

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

# **UETTDRSB37A Maintain power system distribution field devices**

**Release: 1**

## **UETTDRSB37A Maintain power system distribution field devices**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

#### **1) Scope:**

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

This Competency Standard Unit covers the maintenance of ACRs, gas switches, regulators and line capacitors, communication systems including mobile phones and TMR radio. It includes secondary injection, timing, and function tests and proving correct tripping, reclosing and remote operation.

### **Application of the Unit**

#### **Application of the Unit 2)**

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

### **Licensing/Regulatory Information**

#### **License to practice 3)**

The skills and knowledge described in this unit requires a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training.  
Commonwealth, State/Territory or Local Government

**License to practice****3)**

legislation and regulations may exist that limits the age of operating certain equipment.

**Pre-Requisites****Prerequisite Unit(s)****4)****Competencies****4.1)**

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

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

**Common Unit Group**

| Unit Code   | Unit Title                                                                              |
|-------------|-----------------------------------------------------------------------------------------|
| UEENEEE101A | Apply Occupational Health and Safety regulations, codes and practices in the workplace  |
| UEENEEE102A | Fabricate, assemble and dismantle utilities industry components                         |
| UEENEEE104A | Solve problems in d.c. Circuits                                                         |
| UEENEEE105A | Fix and secure electrotechnology equipment                                              |
| UEENEEE107A | Use drawings, diagrams, schedules, standards, codes and specifications                  |
| 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                       |

**Prerequisite Unit(s)****4)**

circuits

UEENEEG063A Arrange circuits, control and protection for general electrical installations

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in electromagnetic devices and related circuits

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

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

UEENEEG109A Develop and connect electrical control circuits

UEENEEK142A Apply environmentally and sustainable energy procedures in the energy sector

**Pathway 1 - Electrician**

UEENEEG103A Install low voltage wiring and accessories

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

UEENEEG105A Verify compliance and functionality of low voltage general electrical installations

UEENEEG107A Select wiring systems and cables for low voltage general electrical installations

**Pathway 2 – Electrical Fitter**

UEENEEG199A Conduct compliance and functional verification of electrical apparatus and existing circuits

## **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 4      Writing 4      Numeracy 4

## **Employability Skills Information**

### **Employability Skills 5)**

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    Plan for the maintenance of distribution field devices | <p>1.1    Work schedules including drawings, plans, requirements procedures and material lists are acquired, analysed and the extent of work determined.</p> <p>1.2    Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.</p> |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| ELEMENT                                                           | PERFORMANCE CRITERIA                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.3                                                               | Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.                  |
| 1.4                                                               | Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to agreed quality standards and in accordance with established policies and procedures. |
| 1.5                                                               | Risk control measures are identified, prioritised, implemented and evaluated against the work schedule.                                                                                                                                                |
| 1.6                                                               | Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, acquired and confirmed in safe/technical working order.                                                                         |
| 1.7                                                               | Liaison issues with other personnel and/or authorities are resolved and activities coordinated to facilitate the work.                                                                                                                                 |
| 1.8                                                               | Personnel participating in the work including plant operators and contractors are fully briefed, their respective responsibilities explained and coordinated and appropriate authorisation checked in accordance with established procedures.          |
| 1.9                                                               | Work site is prepared according to the work schedule and to minimise risk and damage to property and personnel in accordance with established procedures.                                                                                              |
| 2 Carry out the maintenance of distribution network field devices | 2.1 OHS and sustainable energy principles and practices to reduce the incidence of accidents and minimise waste are implemented and monitored in accordance with established procedures.                                                               |
|                                                                   | 2.2 CPR, Rescue from live electrical apparatus and other related safety procedures are in place                                                                                                                                                        |

| ELEMENT                                                          | PERFORMANCE CRITERIA                                                                                                                                                                                                                      |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | according to requirements and established procedures.                                                                                                                                                                                     |
|                                                                  | 2.3 Safe working documentation is acquired and requirements completed in accordance with established procedures.                                                                                                                          |
|                                                                  | 2.4 Lifting, use of power tools/equipment techniques and practices are safely exercised in accordance with established procedures.                                                                                                        |
|                                                                  | 2.5 Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures.                                               |
|                                                                  | 2.6 Essential knowledge and associated skills are applied for the safe maintenance of distribution field devices to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
|                                                                  | 2.7 Maintenance, including testing of distribution field devices is undertaken according to requirements and established procedures.                                                                                                      |
|                                                                  | 2.8 Unplanned events or conditions are responded to in accordance with established procedures.                                                                                                                                            |
| 3 Complete the maintenance of distribution network field devices | 3.1 Functional checks of distribution field devices are completed and all work checked against the requirements to ensure compliance.                                                                                                     |
|                                                                  | 3.2 Anomalies between the work schedule requirements and measured performance are reported and solutions identified in accordance with established procedures.                                                                            |
|                                                                  | 3.3 Safe working documentation is surrendered and transformer made ready for service.                                                                                                                                                     |
|                                                                  | 3.4 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.                                                                                                                                  |
|                                                                  | 3.5 Tools, equipment and any surplus resources and materials are cleaned, checked and returned to storage in accordance with established                                                                                                  |

**ELEMENT****PERFORMANCE CRITERIA**

procedures.

- 3.6 Approved copies of the maintenance of distribution network field devices documents are issues and records are updated in accordance with established procedures.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

**8) Essential Knowledge and Associated Skills (EKAS):** This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining distribution field devices.

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

KS01-TSB37A            Power system distribution field devices

Evidence shall show an understanding of power system distribution field devices to an extent indicated by the following aspects:

T1      Principles of Statutory and safety considerations encompassing:

- Commonwealth/State/Territory legislation, standards, codes, supply authority regulations and or enterprise requirements associated with working on High Voltage
- Particular reference to State and Territory regulations regarding - working near energised conductors, electrical access, heights, confined space, testing procedures, licensing rules.

T2      Principles of isolation and tagging procedures associated with protection testing encompassing:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the installation, maintenance, isolation and tagging procedures
- Requirements for the use of, isolation and tagging, manuals, system diagrams/plans and drawings
- Techniques in documenting isolations
- Techniques in appropriate isolation and tagging procedures as per Commonwealth/ State/Territory legislation, supply authority regulations and enterprise standards
- Techniques in the installation and maintenance procedures protection devices as per Commonwealth/State/Territory legislation, supply authority regulations and enterprise standards

T3      Maintenance procedures associated with discrete protection schemes encompassing:

- Standards, codes, Commonwealth/State/Territory legislation, supply authority regulations and or enterprise requirements associated with the maintenance procedures
- Requirements for the use of maintenance manuals, system diagrams/plans and drawings
- Techniques in maintenance procedures – planning, policy, testing techniques
- Close out requirements

## REQUIRED SKILLS AND KNOWLEDGE

T4 Relay manufacturer specifications encompassing:

- Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the use and application of relay manufacturer specifications
- Requirements for the use of relay manufacturer manuals, system diagrams/plans and drawings
- Types, function and characteristics of specific relays - differences between specific relays used for the same functionality

T5 Safe handling and/or disposing of insulation materials used in power distribution devices, which are potential environmental pollutants encompassing:

- Standards, codes, Commonwealth, State/Territory and local government legislation, supply authority regulations and or enterprise requirements applicable to the handling and disposing of insulation or heat dissipation materials used in power distribution devices
- Identification of environmental issues associated with the handling and disposing of insulation materials
- Safety precautions when handling and disposing of heat dissipation materials - safe working practices, Occupational Health and Safety hazards and precautions, identification of hazards, assessing and controlling risks, types, selection, maintenance and uses of personnel protective equipment, permit to work systems and isolation procedures, types and function of specialised equipment, safe working practices when using specialised equipment, emergency response and rescue including First Aid etc.
- Techniques in the handling and disposing of insulation materials - Polychlorinated Bi-Phenyls (PCB's), asbestos, insulating Oil, SF6 gas.

## Evidence Guide

### EVIDENCE GUIDE

**9)** This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component 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 practiced. 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 – UET12”. Evidence shall also comprise:

- A representative body of Performance Criteria 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 to such an extent that the learner’s performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

| <b>Range of<br/>tools/equipment/materials/procedures/workplaces/other<br/>variables</b> |                                                                    |                  |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------|
| <b>Group No</b>                                                                         | <b>The minimum<br/>number of items on<br/>which skill is to be</b> | <b>Item List</b> |
|                                                                                         |                                                                    |                  |

|   | <b>demonstrated</b>              |                                                                                                                                                                                               |
|---|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | All of the following:            | Assembly<br>Functional checks<br>Applying device settings<br>Secondary injections<br>Timing<br>Remote operations                                                                              |
| B | At least three of the following: | ACRs<br>Gas switches<br>Regulators<br>Line capacitors<br>Mobile phone systems<br>TMR radio systems                                                                                            |
| C | At least one occasion            | Dealing with an unplanned event by drawing on essential knowledge and associated 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 maintenance of distribution network field devices.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated

competency working:

At realistic heights above ground, i.e. above 3 metres, in limited spaces, with different structural/construction types and method and in a variety of environments.

**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 Transmission, Distribution and Rail Traction Industry. 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 associated 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

**10)** This relates to the competency standard 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 Competency Standard Unit may be demonstrated in relation to the maintenance of distribution field devices. These devices may include:

Automatic circuit reclosers (ACRs), gas switches, secondary injection tests, primary injection tests, TMR radio's, SCADA, remote control, overcurrent, earth fault, sensitive earth fault, inverse time curves, definite time curves, tripping, reclose, DC supplies, AC supplies, alarms.

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Environmental management documentation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification.
- OHS practices
- OHS issues

**RANGE STATEMENT**

- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

**Unit Sector(s)**

Not applicable.

**Competency Field**

**Competency Field**                      **11)**  
Substation Units