



Australian Government

UETTDRTS47A Commission energy/revenue metering schemes (complex)

Release: 1

UETTDRTS47A Commission energy/revenue metering schemes (complex)

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This Competency Standard Unit covers the commissioning of energy/revenue metering schemes in complex situations including summation, subtraction, generation, bulk supply, interconnector and wholesale metering installations. This includes isolation, inspection, monitoring, testing, adjustment, repair, refurbishment and or overhaul and functional checks of complex revenue metering schemes. It includes the requirements to prove the functionality of the metering scheme in accordance with electrical installation (state and national) standards, metrology procedures and compliance to tariff requirements.

Application of the Unit

Application of the Unit 2)

This competency standard is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant schedule (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be undertaken within regard to the requirements of License to Practice (1.2 above), Prerequisite Competencies and Literacy and Numeracy skills (2 above) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

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.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting, risk safety measures etc.

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 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
UEENEED104A	Use engineering applications software on personal computers
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
UEENEEE124A	Compile and produce an energy sector detailed report
UEENEEE125A	Provide engineering solutions for problems in complex multiple path circuits problems
UEENEEE126A	Provide solutions to basic engineering computational problems
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work

Prerequisite Unit(s)	4)
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG076A	Install and replace low voltage current transformer metering
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in electromagnetic devices and related circuits
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
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
UEENEEG149A	Provide engineering solutions to problems in complex polyphase

Prerequisite Unit(s)	4)
	power circuits
UEENEEG171A	Install, set up and commission interval metering
UETTDREL11A	Apply sustainable energy and environmental procedures
UETTDREL15A	Respond to power systems technical enquiries and requests
UETTDREL16A	Working safely near live electrical apparatus
UETTDRTS62A	Implement and monitor the power system organisational OHS policies, procedures and programs
UETTDRTS63A	Implement and monitor the power system environmental and sustainable energy management policies and procedures
UETTDRTS37A	Perform current injection testing using phantom load
UETTDRTS38A	Install and replace high voltage metering and associated equipment
UETTDRTS39A	Maintain compliance with national electricity market metrology practices and procedures
UETTDRTS40A	Test and maintain energy/revenue metering schemes
UETTDRTS41A	Install and replace complex energy/revenue metering schemes and associated equipment
UETTDRTS42A	Management of energy registration data errors for revenue billing purposes
UETTDRTS43A	Commission energy/revenue metering schemes
UETTDRTS44A	Test and maintain energy/revenue

Prerequisite Unit(s) 4)

metering schemes (complex)

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)**

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 commissioning of energy/revenue metering schemes (complex)	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the commissioning of energy/revenue metering schemes (complex) are reviewed and determined.
	1.2 Purpose of the commissioning of energy/revenue metering schemes (complex) is established after data is analysed and expected outcomes of the work are confirmed with the appropriate personnel.
	1.3 Organisational established procedures, policies and specifications for the commissioning of energy/revenue metering schemes (complex) are obtained or established with the appropriate personnel.
	1.4 Commissioning of energy/revenue metering schemes (complex) procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief.
	1.5 Commissioning parameters are established from organisational established procedures, policies and specifications.
	1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures.
	1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.
	1.8 Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and customers are resolved and activities coordinated to carry out work.
	1.10 Risk control measures are identified, prioritised

ELEMENT**PERFORMANCE CRITERIA**

and evaluated against the work schedule.

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| | 1.11 | Relevant internal/external work permits are obtained to coordinate the performance of work according to requirements and/or established procedures. |
| 2 Carry out the commissioning of energy/revenue metering schemes (complex) | 2.1 | OHS and sustainable energy principles, functionality and practices to prevent the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures. |
| | 2.2 | First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures. |
| | 2.3 | Lifting, climbing, and use of powertools/equipment, techniques and practices are safely exercised according to requirements. |
| | 2.4 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures. |
| | 2.5 | Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. |
| | 2.6 | Testing equipment is used in accordance with the work schedule and requirements and/or established procedures. |
| | 2.7 | Commissioning of energy/revenue metering schemes (complex) is carried out in accordance with the work schedule |
| | 2.8 | Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. |
| | 2.9 | Essential knowledge and associated skills are applied in the safe commissioning of |

ELEMENT**PERFORMANCE CRITERIA**

		energy/revenue metering schemes (complex) to ensure completion in an agreed timeframe according to requirements.
	2.10	Solutions to non-routine problems are identified and actioned, using essential knowledge and associated skills, according to requirements.
	2.11	Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.
3	Complete the commissioning of energy/revenue metering schemes (complex)	3.1 Final inspections of the commissioning of energy/revenue metering schemes (complex) using routine tests and acceptance tests are undertaken to ensure they comply with all requirements and include all specifications and documents needed to complete the project. 3.2 Appropriate internal/external personnel are notified of completion and reports and/or completion documents are finalised/commissioned according to established procedures and timeframes. 3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval. 3.4 Approved copies of routine testing and acceptance testing procedures/activities/results, for the commissioning of energy/revenue metering schemes (complex), documents are issued 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 the commissioning of energy/revenue metering schemes (complex).

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

KS01-TTS47A Commissioning of complex energy/revenue metering schemes

Evidence shall show an understanding of the commissioning of complex energy/revenue metering schemes to an extent indicated by the following aspects:

T1 Additional hardware components which add complexity and the possibility for greater uncertainty in overall accuracy

T2 Calculations are more complex and require consideration of multiple sources of errors to accurately determine the overall site errors

T3 Calculation and verification of correct application of transformer losses, transmission line losses and correction factors in meter programming

T4 Determining the inputs and relationships required of physical metering points to establish and verify logical metering schemes

T5 Consideration to all sources of burden on the metering instrument transformers and ensuring the instrument transformer is operating within its accuracy limits

T6 Communicating with market participants, including Meter Data Provider, Responsible Person

T7 Knowledge of high fault currents

T8 Risk assessments and safe systems of work

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency 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:

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

	demonstrated	
A	Perform, on at least three (3) occasions, the commissioning of at least seven (7) of the following complex metering scheme types:	Multiple feeder HV and LV customers Summation Subtraction Interposing Voltage changeover schemes Generation Zone substation Bulk supply Interconnector Wholesale metering
B	Perform, on at least three (3) occasions, at least six (6) of the following activities:	Isolation Inspection Monitoring Testing Adjustment Repair Refurbishment and or overhaul Functional checks of complex revenue metering schemes.
C	Perform, on at least three (3) occasions, the following activities:	Ensuring meter function by the use of multiple proprietary software applications Determining energy flows, voltage, current and phasor relationships Validation against independent information sources and test results to ensure that the installation is operating

		within prescribed limits (enterprise, manufacturers, regulated energy market requirements) Validation of the actual meter energy data against Meter Data Provider remote data streams Calculate and record the overall installation site error and ensure compliance with regulated energy market compliance. Endorse the site overall accuracy and installation compliance as the technical representative authorised by the metering provider. Ensure all records of the commissioning of energy/revenue metering schemes (complex), are complete and forwarded to the appropriate authority in accordance with regulatory requirements.
D	Demonstrate, on at least one (1) occasion, the following:	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.
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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 commissioning of energy/revenue metering schemes (complex).
- Operational access to relevant plant, drawings, manufacture's specifications/manuals and specialised testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

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)**

For optimisation of training and assessment effort, competence in

this unit may be assessed concurrently with the following units:

UETTDRTS44A Test and maintain energy/revenue metering
schemes (complex)

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 the commissioning of energy/revenue metering schemes (complex) and may include the following:

Complex metering schemes include multiple feeder HV and LV customers, summation, subtraction, interposing, Voltage changeover schemes, Generation, Zone substation, bulk supply, interconnector and wholesale metering installations.

This includes isolation, inspection, monitoring, testing, adjustment, repair, refurbishment and or overhaul and functional checks of complex revenue metering schemes.

It also includes:

- ensuring meter function by the use of multiple proprietary software applications
- determining energy flows, voltage, current and phasor relationships
- Validation against independent information sources and test results to ensure that the installation is operating within prescribed limits (enterprise, manufacturers, regulated energy market requirements)
- Validation of the actual meter energy data against Meter Data Provider remote data streams
- Calculate and record the overall installation site error and ensure compliance with regulated energy market compliance.
- Endorse the site overall accuracy and installation compliance as the technical representative authorised by the metering provider.
- Ensure all records of the commissioning of energy/revenue metering schemes (complex), are complete and forwarded to the appropriate authority in accordance with regulatory requirements.

It includes the requirements to prove the functionality of the metering scheme in accordance with electrical installation (state and national) standards, metrology procedures and compliance to tariff requirements.

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

RANGE STATEMENT

- 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
- 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)

Testing Units