



Australian Government

UEERS0031 Maintain rail signalling power supplies

Release: 1

UEERS0031 Maintain rail signalling power supplies

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

This unit replaces and is equivalent to UEERS0010 Install and maintain rail signalling power supplies.

Modifications this release include:

- Title changed.
- Application updated to reflect title change.
- Element titles and performance criteria amended to reflect title change.
- Performance criteria 1.7, 2.2, 3.2 and 3.3 added.
- Performance and Knowledge Evidence updated for clarity.

Application

This unit involves the skills and knowledge required to maintain rail signalling power supplies.

It includes preparing and maintaining rail signalling power supplies by working safely to maintenance industry standards, matching equipment with that specified for location, terminating cables and connecting wiring compliance, functional testing, certifying and reporting.

Persons achieving competence in this unit will need to fulfil the applicable state/territory legislated rail safety requirements and to comply with relevant codes of practice, rules and/or guidelines.

No other licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

UEERS0021 Assemble and wire electrical rail signalling equipment

Competency Field

Rail Signalling

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 Prepare to maintain rail signalling power supplies

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are identified, obtained and clarified
- 1.2** Hazards are identified, risks assessed, and control measures and workplace procedures implemented
- 1.3** Safety hazards which have not previously been identified are noted on job safety assessments and risk control measures are implemented
- 1.4** Scope of work and location of power supply are determined by site inspection and from job instructions, specifications and/or diagrams
- 1.5** Batteries and type within the signalling location and management processes for the associated safety hazards are identified
- 1.6** Materials needed for the maintenance work are obtained in accordance with workplace procedures and checked against job specifications
- 1.7** Tools, equipment and testing devices needed to maintain power supplies are obtained in accordance with workplace procedures and checked for correct operation and safety
- 1.8** Authorisation to take temporarily out of service or disable systems is obtained in accordance with workplace procedures

2 Maintain rail signalling power supplies

- 2.1** WHS/OHS risk control measures and workplace procedures for carrying out work are followed
- 2.2** On-track safe working requirements are identified and applied in accordance with workplace procedures and safety management system
- 2.3** Power supply is checked to comply with technical industry standards, job specifications and requirements

- 2.4 Wiring and cable terminations are inspected to comply with technical industry standards, approved design drawings and requirements
 - 2.5 Inspection and tests are conducted to ensure maintained power supply complies with job specifications and functions as intended
 - 2.6 Maintenance of power supply is carried out efficiently, without waste of materials, damage to apparatus, the surrounding environment or services using sustainable energy practices
 - 2.7 Correct functioning of equipment is established from reference to manuals, system specifications and commissioning data
 - 2.8 Batteries are inspected and tested to ensure satisfactory operation and condition
 - 2.9 Faults are identified in accordance with relevant technical information of power supplies and fault-finding techniques
 - 2.10 Faulty, worn, damaged or insecure components are replaced, repaired or secured in accordance with manufacturer specifications and workplace procedures
 - 2.11 Existing methods for dealing with unplanned situations are discussed with appropriate person/s and documented in accordance with workplace procedures
- 3 Complete rail signalling power supplies maintenance**
- 3.1 WHS/OHS work completion risk control measures and workplace procedures are followed
 - 3.2 Confirmation that system is functional and that no alarms are present or indicated
 - 3.3 Test results for the batteries and power supplies are recorded
 - 3.4 Worksite is cleaned and made safe in accordance with workplace procedures
 - 3.5 Work completion is documented, and appropriate person/s notified in accordance with workplace procedures and relevant reports produced

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UEERS0010 Install and maintain rail signalling power supplies.

Links

Companion Volume Implementation Guides are found in VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEERS0031 Maintain rail signalling power supplies

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including:
 - implementing workplace procedures and practices
 - using risk control measures
- applying sustainable energy principles and practices
- following relevant codes of practice, procedures and requirements
- interpreting specifications and circuit diagrams correctly
- using tools and test instruments correctly
- maintaining power supplies correctly
- using appropriate diagnostic and fault-finding techniques
- checking:
 - quality of the DC power supply feeding the equipment
 - quality & operation of the communications links, where applicable
 - availability of any protective earthing, surge protection
- completing relevant technical reports, records and documentation
- completing installation/maintenance of rail signalling power supplies
- dealing with unplanned events

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- rail terminology including:
 - rail signalling nomenclature
 - rail signalling symbols
 - relevant state/territory standards
 - standard glossary of terms relevant to each state/territory and where the standard originated from and how new standards are developed to meet a national standard
- power supply alarms and their significance to reliable operation of the signalling system
- the relationship to the signalling arrangement plan/scheme
- abnormal train operating conditions, including signaller operation error, driver operation error, train delayed and train breakdown
- emergency train and signal system operation including
 - degraded signalling system performance, including a partial failure of signalling infrastructure or a system override
 - unscheduled infrastructure maintenance
- rail signal power supply maintenance, safe working practices and relevant standards, codes and regulations for basic rail operations, including:
 - typical issues affecting electrotechnology services and systems
 - equipment and their components including:
 - transformers
 - batteries
 - converters
 - uninterruptable power supplies (UPS)
 - synchronising switches (STS)
 - generator
 - solar panels, including Regulation and solar charging for remote standalone SELV DC
 - earthing requirements including relevant operators and Australian Standards and area specific designs
 - surge protection including relevant operators and Australian Standards and area specific designs
 - switchboards
 - high voltage (HV) and low voltage (LV) power distribution
 - automatic power changeover panels
 - wiring and termination
 - operating principles and parameters including:
 - normal mode operation
 - alarm mode
 - redundancy mode

- power interruption/standby mode
- interpreting circuits diagrams to evaluate correct operation and relationship to other signalling circuits and equipment
- servicing procedures including:
 - maintenance documentation
 - coordination/planning sequence
 - operational test procedures
 - scheduled/preventative maintenance
 - unscheduled/corrective maintenance
 - certifying power supply equipment, including certifying procedures applicable for compliance with rail operator and/or enterprise standards
- inverters including:
 - faults in inverters
 - features and characteristic of inverters under load and no-load characteristics - circuit configuration, input and output wave forms, relationship between input and output voltages and output voltage under load conditions
 - linear and switch mode power supplies, including:
 - direct current (d.c.) to d.c. converters
 - diagnostic procedures to isolate faults
 - isolation requirements and circuitry
 - characteristics of switched mode power supplies
 - operation of step-down and step-up regulators, variable frequency and pulse width modulated regulation techniques, and switched mode power supplies
 - radiation suppression circuitry
 - typical applications of inverters.
- environmental and heritage requirements and regulation
- WHS/OHS requirements including:
 - legislated requirements
 - safe working practices
 - job safety assessments or risk mitigation processes
- maintaining work activities records including:
 - purpose and extent of records
 - types of records
 - methods for recording
 - records required by regulation
- relevant standards, codes and regulations
- relevant manufacturer specifications and manuals
- relevant workplace documentation, policies and procedures

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in suitable simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices in relation to maintaining rail signalling power supplies
- applicable documentation, including workplace procedures, equipment specifications, regulations, enterprise work activities records, codes of practice and operation manuals.

Links

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