



Australian Government

UEEEEC0030 Fault find and repair electronic medical equipment

Release: 1

UEEEEC0030 Fault find and repair electronic medical equipment

Modification History

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

Application

This unit involves the skills and knowledge required to fault find and repair electronic medical equipment.

It includes preparing to find and repair faults, finding and repairing faults, and completing and reporting on fault-finding and repair activities.

Permits may be required for some work environments, such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

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

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

UEEEEC0060 Repairs basic electronic apparatus faults by replacement of components

UEEEEC0075 Troubleshoot single phase input d.c power supplies

UEEEEC0069 Troubleshoot digital sub-systems

UEEEEC0066 Troubleshoot amplifiers in an electronic apparatus

UEEEEC0019 Develop software solutions for microcontroller-based systems

UEEEEC0028 Fault find and repair complex power supplies

and

UEECD0043 Solve problems in direct current circuits

or

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

and

UEEEEC0074 Troubleshoot resonance circuits in an electronic apparatus

UEEEEC0065 Solve problems in basic electronic circuits

or

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0019 Solve problems in direct current (d.c.) machines

UEEEL0021 Solve problems in magnetic and electromagnetic devices

Competency Field

Electronics and Communications

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to find and repair faults

PERFORMANCE CRITERIA

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

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for relevant work area are identified, obtained and applied
- 1.2** Risk control measures are applied in accordance with workplace procedures prior to commencing work
- 1.3** Risks/hazards are identified, assessed and reported to relevant person/s, and control measures implemented
- 1.4** Extent of faults is determined from reports, other relevant documentation and discussions with relevant person/s
- 1.5** Relevant person/s is consulted to ensure the work is coordinated effectively with others
- 1.6** Tools, equipment and testing devices required to diagnose faults are obtained in accordance with workplace procedures and checked for correct operation and safety

2 Find and repair faults

- 2.1** Workplace risk control measures and workplace procedures are applied
- 2.2** Need to test and measure live work is determined in accordance with WHS/OHS requirements and

- workplace procedures
- 2.3** Circuits/machines/plant are isolated, as necessary, in accordance with WHS/OHS requirements and workplace procedures
 - 2.4** Logical diagnostic methods are applied to diagnose electronic medical equipment faults employing measurements and estimations of system operating parameters referenced to system operational requirements
 - 2.5** Suspected fault scenarios are tested as being the source of system problems
 - 2.6** Source of the fault is identified and appropriately qualified person/s engaged to rectify the fault where it is outside the scope of capability in accordance with workplace procedures
 - 2.7** Faults in electronic components are rectified to raise electronic medical equipment to its operation standard
 - 2.8** System is tested to verify that it operates as intended and to specified requirements
 - 2.9** Decisions for dealing with unexpected situations are made based on job specifications, work requirements and discussions with relevant person/s
 - 2.10** Methods for dealing with unplanned situations are selected on the basis of safety and specified work outcomes
 - 2.11** Diagnosis and rectification activities are carried out efficiently without waste of materials, damage to apparatus, the surrounding environment or services applying sustainable energy practices
- 3 Complete and report fault-finding and repair activities**
- 3.1** Workplace risk control measures and workplace procedures are applied
 - 3.2** Worksite is made safe in accordance with workplace procedures
 - 3.3** Rectification of faults is reported in accordance with workplace procedures

- 3.4** Relevant person/s is notified that the system faults have been rectified in accordance with workplace procedures

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.

Fault finding and repairing faults in electronic medical equipment must include at least the following:

- two system faults in two different types of electronic medical equipment

Unit Mapping Information

This unit replaces and is equivalent to UEENEEH134A Fault find and repair electronic medical equipment.

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 UEEEC0030 Fault find and repair electronic medical equipment

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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, performance criteria and range of conditions on at least one occasion and include:

- applying logical diagnostic methods
- using fault scenarios to test the source of system faults
- identifying faults and competency needed to rectify them
- rectifying faults in system electronics
- verifying that the system operates correctly
- documenting fault rectification
- dealing with unplanned events
- applying relevant risk identification, assessment, reporting and control requirements
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- coordinating work with relevant person/s
- determining live testing/measurement requirements
- determining scope of work
- identifying and accessing materials, tools, apparatus and testing devices
- isolating circuits/machines/systems.

Knowledge Evidence

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

- electronic medical equipment fault finding and repair, safe working practices and relevant standards, codes and regulations, including:
 - medical equipment principles:
 - equipment categories, types, functions and operation
 - hazards and safety procedures
 - causes of failure

- safety testing requirements and methods
- categories and examples of medical equipment, including:
 - cardiovascular systems: blood warmers, cardiac catheterisation systems and defibrillators
 - electrocardiogram (ECG) machines, ECG monitors, heart-lung machines and infusion
 - pumps, intra-aortic balloon pumps, pacemakers, syringe pump and cardiac output measurement equipment
 - respiratory systems: anaesthetic delivery and monitoring units, medical gases, oxygen concentrator, pulse oximeter, respiratory humidifier, respiratory support units and ventilators
 - neurological systems: electroencephalograph (EEG) recorder, electromyograph (EMG) recorder and intracranial pressure (ICP) monitoring
 - renal systems: haemodialysis machine, continuous veno-venous hemofiltration (CVVH) machine and peritoneal dialysis
 - medical imaging: x-ray equipment, computerised axial tomography (CAT scan), magnetic resonance imaging (MRI), nuclear medicine and diagnostic ultrasound equipment
 - physiological equipment: blood pressure monitors, foetal cardiotocograph, infant care systems, multiparameter systems, thermometry, telemetry, networking and patient warmers
 - miscellaneous equipment: electrosurgery, electric stimulators, and endoscopy and laparoscopy systems, laser, operating microscopes, therapeutic diathermy and ultrasound
- medical equipment, anatomy and physiology and infection control:
 - nature of infection
 - control of microbial growth
 - infection control strategies
 - body systems
- medical equipment safe working practices:
 - risk management and assessment of risk encompassing:
 - principle and purpose of risk management, and
 - processes for conducting a risk assessment
 - hazards associated with medical equipment, encompassing:
 - infections
 - toxic materials
 - electrical components
 - radiation
 - risks and control measures associated with working with medical equipment
- fault finding and repair:
 - typical faults, their symptoms and cause
 - fault diagnosis procedures and testing

- component replacement
- equipment adjustments
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace 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 simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- resources that assessment should reflect current industry practices in relation to diagnosing and rectifying faults in electronic medical equipment
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

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