



Australian Government

UEEEEC0036 Fault find and repair sonar apparatus and systems

Release: 1

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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 sonar apparatus and systems.

It includes safe working practices, interpreting diagrams, applying logical diagnostic methods and knowledge of sonar system components, rectifying faults, safety and functional testing, and completing service documentation.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 volt (V) alternating current (a.c.) or 120 V direct current (d.c.).

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, skills and knowledge described in this unit require a relevant contract of training, such as an Australian Apprenticeship.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

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

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

Pre-requisite Unit

UEEEEC0069 Troubleshoot digital sub-systems

UEEEEC0066 Troubleshoot amplifiers in an electronic apparatus

UEEEEC0019 Develop software solutions for microcontroller-based systems

UEEEEC0038 Find and repair microwave amplifier section faults in electronic apparatus

UEEEEC0068 Troubleshoot communication systems

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** WHS/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 are determined from reports, other 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
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- 2.1** Workplace risk control measures and 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 checked and isolated, as required, in accordance with WHS/OHS requirements and workplace procedures
 - 2.4** Logical diagnostic methods are applied to diagnose sonar apparatus and system faults employing measurements and estimations of system operating parameters referenced to system operational requirements

2 Find and repair fault

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| | 2.5 | Suspected fault scenarios are tested in accordance with workplace procedures and job specifications |
| | 2.6 | Source of the fault is identified and relevant person/s engaged to rectify fault in accordance with workplace procedures and relevant industry standards |
| | 2.7 | Faults in electronic components are rectified to raise sonar apparatus and system to its operation standard |
| | 2.8 | System is tested to verify that the system operates as intended and to specified requirements |
| | 2.9 | Decisions for dealing with unplanned situations are made based on job specifications and 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 | WHS/OHS work completion risk control measures and workplace procedures are followed |
| | 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.

Finding and repairing faults in sonar apparatus • two system faults
and systems must include at least the
following:

Unit Mapping Information

This unit replaces and is equivalent to UEENEEH140A Fault find and repair sonar apparatus and systems.

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 UEEEC0036 Fault find and repair sonar apparatus and systems

Modification History

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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
- 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
- dealing effectively with unplanned events
- 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:

- sonar apparatus and system fault finding and repair, safe working practices and relevant standards codes and regulations, including:
 - electronic communications, sonar system operating principles:
 - the purpose and application of sonar systems
 - sonar equipment encompassing:
 - types and their applications

- sub-system components (i.e. functional blocks) and their function encompassing:
 - transducer
 - input amplifier
 - sonar interface unit
 - beam forming network (transmit/receive)
 - signal processing
 - own Doppler nullification
 - display system
 - headset
 - interfaces
 - transmitter
 - T/R switch
 - timer/timing
- sonar operating parameters
- sonar transmission characteristics
- electronic communications, sonar transducers and arrays:
 - hazards and risk control measures
 - transducer types, their operating principles and parameters
 - transducer array encompassing:
 - types and their construction
 - applications
 - transducer hull outfits
 - beam forming principles and requirements
 - transducer installation and operational maintenance
- electronic communications, sonar measurement and set-up:
 - sonar parameters and measurements
 - sonar physical parameters
 - constraints and consequences
- electronic communications, radar and sonar displays devices:
 - types and their applications – cathode-ray tube (CRT), plasma, liquid-crystal display (LCD), monochrome, colour and touch screen
 - sub-system components (i.e. functional blocks) and their operating parameters encompassing:
 - extra high tension (EHT) transformers
 - detectors
 - video distribution
 - time base generators
 - phase locked loops
 - microprocessors
 - memory devices

- demodulators
- focusing/deflection devices
- delay lines
- bleed resistors
- high voltage (HV) generation
- calibration testing and maintenance procedures
- typical fault finding, their symptoms and cause
- advanced electronic (sonar) testing and measuring devices and techniques:
 - test/measuring devices and their application - frequency counters, and synthesisers, spectrum analysers, noise and distortion meters and radio frequency (RF) communications service monitor
 - connection of test/measuring devices into a circuit encompassing:
 - safety procedures
 - loading and matching
 - storage and delay
 - circuit arrangement of test/measuring devices
 - taking and interpreting readings
 - notion of decibels, including dBm, dBr, dBu and dBo
- 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 simulated suitable 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, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices in relation to diagnosing and rectifying faults in sonar apparatus and systems
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

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