



**Australian Government**

# **UEEEEC0034 Fault find and repair radar apparatus and systems**

**Release: 1**

# UEEEEC0034 Fault find and repair radar apparatus and systems

## 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 radar apparatus and systems.

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

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

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

UEEEEC0060 Repairs basic electronic apparatus faults by replacement of components

UEEEEC0066 Troubleshoot amplifiers in an electronic apparatus

UEEEEC0038 Find and repair microwave amplifier section faults in electronic apparatus

UEEEEC0067 Troubleshoot basic amplifier circuits

UEEEEC0063 Solve fundamental electronic communications system problems

UEEEEC0068 Troubleshoot communication systems

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

and

UEECD0043 Solve problems in direct current circuits

or

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

## 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 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 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 radar apparatus and systems faults employing measurements and estimations of system operating parameters referenced to system operational requirements in accordance with workplace procedures and relevant industry standards
- 2.5** Suspected fault scenarios are tested as being the source of system problems in accordance with workplace procedures and job specifications
- 2.6** Source of the fault is identified and relevant person/s engaged to rectify the fault where it is outside the scope of capability in accordance with workplace procedures and relevant industry standards
- 2.7** Faults in the electronic components of the system are rectified to raise radar apparatus and system to its operation standard in accordance with workplace procedures and job specifications
- 2.8** System is tested to verify system operates in accordance with workplace procedures and job specifications
- 2.9** Decisions for dealing with unplanned situations are made in accordance with workplace procedures, relevant industry standard 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.

Fault finding and repairing faults in radar apparatus and systems must include at least the following:

- two system faults in electronic radar apparatus and systems

## **Unit Mapping Information**

This unit replaces and is equivalent to UEENEEH131A Fault find and repair radar 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 UEEEC0034 Fault find and repair radar apparatus and systems

## Modification History

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

## 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/system.

## 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:

- radar apparatus and system fault finding and repair, safe working practices and relevant standards, codes and regulations, including:
  - electronic communications, secondary radar and related systems:
    - secondary radar principles encompassing:
      - role of secondary radar
      - transponder operation

- operating principles
- signal processing
- pulse generation, transmission and detection
- mode generation, detection and response
- display symbol generation
- synchronisation with primary radar
- advantages over primary radar with respect to clutter
- signal/noise ratio; transmit power required for operation
- interfaces to other systems providing information for transmission of mode data encompassing:
  - slaving/synchronisation to primary radar
  - clutter reduction/elimination
  - defruiting
  - degarbling
  - interfaces to other systems
  - range/ducting effects
  - advantages over primary radar
  - power supplies and uninterrupted power supplies (UPS)
  - international standards
  - national curriculum
  - hot standby, cold standby
- application of secondary radar systems - traffic collision avoidance system (TCAS), selective identification system (SIF), air traffic control radar beacon system (ATCRBS), instrument landing system (ILS), tactical air navigation (TACAN), navigation systems (VOR, GPS and DME), radar altimeter, jamming, electronic warfare, second time round returns (STRR), and identification–friend or foe radar (IFF)
- 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
- electronic communications, radar fundamentals:
  - hazards and risk control measures
  - purpose and uses of radar
  - environmental conditions affecting radar
  - design factors which affect performance
  - propagation of electromagnetic waves
  - pulse forming circuits
  - typical radar transmitter encompassing:
    - limitations and applications of each type
  - typical radar receivers encompassing:
    - sub-system components (i.e. functional blocks) and their operating parameters
    - limitations and applications
  - radar antennae encompassing:
    - types, application and radiation patterns - parabolic, phased array, log periodic, and cos q
    - antenna gain
    - efficiency
    - length and height factors
  - microwave techniques, devices and applications encompassing:
    - oscillators
    - amplifiers
    - modulators and demodulators
    - mixers and detectors
  - types and characteristics of various radar systems
- relevant industry standards, codes and regulations
- relevant manufacturer specifications
- relevant safe work method statements (SWMS)/job safety assessments or risk mitigation processes
- 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 reflect current industry practices in relation to diagnosing and rectifying faults in radar apparatus and systems
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

## Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>