



Australian Government

MEM18070 Modify complex electrical circuits and systems

Release: 1

MEM18070 Modify complex electrical circuits and systems

Modification History

Release 1. Supersedes and is equivalent to MEM18070C Modify complex electrical circuits and systems.

Application

This unit of competency defines the skills and knowledge required to check complex circuits and systems that interconnect a number of interdependent apparatus, diagnose faults, and make required modifications and test the modified system.

It applies to work on interconnected electrical circuits where electrical equipment and/or components are connected electrically, that is, there are multiple electrical power supplies or sources, voltages or circuits which are found in the control or switching of the circuit.

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

Band: B

Unit Weight: 6

Pre-requisite Unit

MEM09002 Interpret technical drawing

MEM10002 Terminate and connect electrical wiring

MEM10003 Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.

MEM11011 Undertake manual handling

MEM12002 Perform electrical/electronic measurement

MEM12004 Perform precision electrical/electronic measurement

MEM12023 Perform engineering measurements

MEM12024 Perform computations

MEM13015 Work safely and effectively in manufacturing and engineering

MEM14006 Plan work activities

MEM16006 Organise and communicate information

MEM18001 Use hand tools

MEM18002 Use power tools/hand held operations

MEM18048 Fault find and repair/rectify basic electrical circuits

MEM18049 Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.

MEM18051 Fault find and repair/rectify complex electrical circuits

Competency Field

Maintenance and diagnostics

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Use appropriate personal protective equipment (PPE) in accordance with standard operating procedures (SOPs) 1.4 Identify job requirements from specifications
2. Determine system specifications and characteristics	2.1 Determine complex circuit and system function and characteristics with reference to circuit diagrams, specifications, schematics and consultation with technical advisor 2.2 Obtain, read and interpret system specifications and operational data 2.3 Verify findings using appropriate tools, test equipment, procedures and techniques 2.4 Record results and analyse to determine appropriate modification
3. Modify circuits and systems	3.1 Undertake modifications as determined in accordance with procedures 3.2 Test modifications in accordance with legislative and regulatory requirements and monitor to assess suitability 3.3 Document modifications in drawings and/or schematics in accordance with SOPs

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Specifications include one or more of the following:	• drawings • job sheets • work instructions.
Complex electrical circuits and systems includes one or more of the following:	• industrial control systems • automatic process machines • material transfer systems • distribution systems • complex control panels • circuit protective devices • relays • timers • transformers • sensors • programmable controllers.
Test equipment includes one or more of the following:	• continuity testers • ammeters • voltmeters • multi-meters • tong testers • wattmeters • cathode ray oscilloscope.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM18070C Modify complex electrical circuits and systems.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM18070 Modify complex electrical circuits and systems

Modification History

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Performance Evidence

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

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting circuits diagrams, flow charts, specifications, schematics, drawings, engineering data sheets, maintenance records and other relevant data in analysing and determining appropriate system modifications
- checking and clarifying strategies appropriate to the proposed modification with technical advisors using appropriate communication skills
- undertaking calculations and numerical operations associated with modifying complex electrical circuits and systems
- carrying out modifications in accordance with site procedures, legislative, statutory and regulatory requirements on at least two occasions
- testing modifications using appropriate test equipment to ensure compliance with requirements on at least two occasions
- monitoring modifications to assess suitability
- documenting modifications or incorporating modifications in drawing and schematics in accordance with SOPs.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

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

- safe work practices and procedures and use of personal protective equipment (PPE)
- system interrelationship and dynamics
- complex electrical circuits and systems including:
 - industrial control systems
 - automatic process machines
 - material transfer systems
 - distribution systems
- complex control panels incorporating:

- circuit protective devices
- relays
- timers
- transformers
- sensors
- programmable controllers
- operation of complex electrical circuits and systems
- implications of modifications to system including hazards
- operational specifications of the circuit and system
- common electrical test instruments and their application
- appropriate test equipment and their application to the testing of the modified circuit and system
- reporting and recording requirements associated with the modification of complex electrical circuits and systems
- industry standards and guidelines including
 - national and Australian standards
 - Safe Work Australia
 - state/territory regulatory codes of practice and/or standards.
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Assessment Conditions

- Assessors must:
 - have vocational competency in modifying complex electrical circuits and systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- 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.
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