



Australian Government

MEM18100 Fault-find, test and rectify AC machines and circuits

Release: 3

MEM18100 Fault-find, test and rectify AC machines and circuits

Modification History

Release 3. Prerequisite units updated

Release 2. Minor adjustments to reflect ERAC requirements for electrician licensing and revision of Essential Performance Capabilities

Release 1. New unit

Application

This unit of competency has been developed for Engineering Tradesperson –industrial electrician apprenticeship training and the recognition of trade-level skills in locating and rectifying faults in alternating current (AC) machines and circuits.

It covers characteristics including their construction and operating principles. It also includes their application, control and protection methods, reversal of rotation and the requirements to limit starting current as well as skills in testing and fault finding, including abnormal operating conditions.

This unit covers the skills and knowledge required to meet the Electrical Regulatory Authorities Council (ERAC).

Essential Performance Capabilities (EPCs):

- EPC 12 – Demonstrate the rationale and operating principles and characteristics of three phase induction motors and generators. Describe AS/NZS 3000 requirements and knowledge of local Supply Authority requirements for three phase motor installations and starters.
- EPC 14 – Demonstrate knowledge of possible causes of malfunction of three phase induction motors and demonstrate the tests required for diagnosing faults.
- EPC 15 – Describe the operating principles, characteristics, and suitability of typical control methods for single-phase motors and their key components.

And

Essential Performance Capability (EPC) classified as ‘critical’:

- EPC 13 – Demonstrate a knowledge of methods of electric motor selection, starting, connection and protection.

Some jurisdictions require the holder of this unit to be licensed or certified and users should check with the relevant authorities.

Band: A

Unit Weight: 4

Pre-requisite Unit

MEM10016	Terminate and test electrical wiring and accessories
MEM10018	Select cable types and sizes to suit loads and electrical installation environment
MEM10019	Select circuit protection devices by type and rating, fit to switchboards and install earthing
MEM10023	Design and connect control switching of circuits for building services and industrial equipment
MEM12023	Perform engineering measurements
MEM18001	Use hand tools
MEM18104	Dismantle, replace and assemble electrical components and equipment

Competency Field

Maintenance and diagnostics

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.								
1. Determine job requirements	<table><tr><td>1.1</td><td>Follow standard operating procedures (SOPs)</td></tr><tr><td>1.2</td><td>Comply with work health and safety (WHS) requirements at all times, including appropriate risk control measures</td></tr><tr><td>1.3</td><td>Use appropriate personal protective equipment (PPE) in accordance with SOPs</td></tr><tr><td>1.4</td><td>Research the nature of the fault through checking of documentation and/or consultation with appropriate person</td></tr></table>	1.1	Follow standard operating procedures (SOPs)	1.2	Comply with work health and safety (WHS) requirements at all times, including appropriate risk control measures	1.3	Use appropriate personal protective equipment (PPE) in accordance with SOPs	1.4	Research the nature of the fault through checking of documentation and/or consultation with appropriate person
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1.4	Research the nature of the fault through checking of documentation and/or consultation with appropriate person								
2. Prepare to fault find on AC machines and associated	<table><tr><td>2.1</td><td>Obtain all necessary tools, equipment and testing instruments needed to conduct fault diagnosis of AC machines and circuits</td></tr></table>	2.1	Obtain all necessary tools, equipment and testing instruments needed to conduct fault diagnosis of AC machines and circuits						
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control circuits	2.2 Isolate and tag circuits and equipment in accordance with procedures
3. Fault find AC machines and associated control circuits	3.1 Apply diagnostic techniques to solve problems in AC machines and their associated control circuits, including the use of specialised test equipment 3.2 Test single and three-phase windings for continuity and insulation resistance between windings and to earth with appropriate test equipment 3.3 Dismantle and reassemble AC machine using appropriate fitting techniques, equipment and tools in accordance with specifications and procedures, if required 3.4 Remove/repair/replace faulty components/circuits in accordance with manufacturer specifications and regulatory requirements 3.5 Test AC machine/circuit to ensure functionality in accordance with specifications 3.6 Document all necessary repairs in accordance with SOPs

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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.

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AC machines include three (3) or more of the following:	• single-phase motors • three-phase motors • variable speed drives (VFDs) • synchronous machines • non-rotating AC equipment and components
Control starter circuits include one (1) or more of the following:	• direct-on-line (DOL) • star-delta • autotransformer • primary resistance • secondary resistance
Split phase induction motors include:	• split-phase motor • capacitor-start motor • capacitor-start, capacitor-run motor • permanently-split capacitor motor • shaded-pole motor
Environmental protection and general enclosure types include:	• open motors • protected motors • drip-proof motors • duct ventilated • totally enclosed • flameproof
Specialised test equipment includes one or more of the following:	• built-in systems (software and site displays) • vibration monitors • infra-red temperature sensing device
Rotating electrical machines in general requirements include:	• AS 1359.106-1996 Rotating electrical machines – General requirements – Methods of cooling (IC Code)
Regulatory requirements include:	• AS/NZS 3000:2007 Electrical installations (known as the Australian/New Zealand Wiring Rules)
Safe working practices include:	• Demonstration of safe working practices and installation in accordance with industry established safe and sound practices

Unit Mapping Information

Release 2. Equivalent. Minor adjustments to reflect ERAC requirements for electrician licensing and revision of Essential Performance Capabilities.

Links

Companion Volume implementation guides are found in VETNet -

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