



**Australian Government**

**MEM10023 Design and connect control  
switching of circuits for building services  
and industrial equipment**

**Release: 3**

# MEM10023 Design and connect control switching of circuits for building services and industrial equipment

## 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 designing and connecting control switching of circuits.

It covers basic switching and control arrangements and hazards and safety requirements associated with static electricity discharge from components.

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

Essential Performance Capabilities (EPCs):

- EPC 41 – Demonstrate the knowledge and skills to design and connect switching circuits, as per AS/NZS 3000.
- EPC 51 – Describe the functioning of basic electronic circuits used in common electrical power circuit applications including electronic logic controls, related hazards and safety requirements.

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
MEM18001	Use hand tools

## Competency Field

Installation and commissioning

### 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            | 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. Identify job requirements from specifications, drawings, job sheets or work instructions                        |
| 2. Design control switching of circuits  | 2.1. Design agreed control switching of circuits to comply with specifications and regulatory requirements           |
|  | 2.2. Document agreed design of control circuits in accordance with procedures  |
|  | 2.3. Obtain the necessary tools, equipment, test instruments and materials needed to connect the control circuits    |
| 3. Connect control switching of circuits | 3.1. Isolate and tag circuits and equipment in accordance with procedures, where required                            |
|  | 3.2. Terminate and connect control circuit components to comply with the design and regulatory requirements          |
|  | 3.3. Functional test control circuit operation to ensure compliance with agreed design                               |
|  | 3.4. Rectify any non-compliances and re-test to meet requirements  |
|  | 3.5. Terminate and connect control circuits  |

Elements describe the essential outcomes.

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

3.6. Test control circuits to ensure functionality

3.7. Document control circuits 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.

**Control switching of circuits include five (5) or more of the following:**

- multiple light switching circuit
- master control circuit
- local start-stop control and with electrical interlocking
- connecting a timer in a controlled circuit
- a multiple motor starting circuit which incorporates start, stop and jog control
- machine safety circuit
- line conditioners
- inverters
- uninterrupted power supplies (UPS)
- energy management systems

**Control circuit components include five (5) or more of the following:**

- multi-way switches
- switches with more than two positions and Off
- push buttons
- electromechanical relays
- programmable relays
- contactors
- motor reversing contactors
- three-phase starters
- reduced voltage starters

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.

- transducers/sensors, including:
  - limit, proximity, float and pressure switches
  - photoelectric cells
  - light and temperature sensors

**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>