



Australian Government

**MEM23112 Investigate electrical and
electronic controllers in engineering
applications**

Release: 1

MEM23112 Investigate electrical and electronic controllers in engineering applications

Modification History

Release 1. Supersedes and is equivalent to MEM23112A Investigate electrical and electronic controllers in engineering applications.

Application

This unit of competency defines the skills and knowledge required to investigate new or existing controllers for suitability in automated systems used in engineering applications. It includes the application of fundamental controller programming techniques and control system power supply requirements, basic programmable logic controller (PLC), microcontroller and supervisory control and data acquisition (SCADA) applications.

It applies to controllers used in automated systems in industry where typical applications of the unit include assessing the ongoing suitability of existing controllers, programming of PLCs, adjustments to controllers for new equipment or products, and condition monitoring.

It is suitable for people working as automation or mechatronics technicians, for people using the services of electrical and control systems technicians, and for those pursuing careers and qualifications in mechatronic or automated system design and maintenance.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23111 Select electrical equipment and components for engineering applications

Competency Field

Engineering science

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 scope of electro and controller operation	1.1 Assess current or proposed controller context for electrical and automation safety and risks 1.2 Identify potential or actual dangerous high currents and voltages and check for regulatory compliance requirements related to extra low, low

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	and high voltage applications 1.3 Identify work health and safety (WHS) and regulatory requirements, codes of practice, standards, risk management and organisational procedures, including those related to automation safety 1.4 Identify stakeholders to be consulted on investigation task 1.5 Investigate software and software techniques required for basic analysis and graphics required for controller investigation task 1.6 Ensure appropriate support including licensed electrical, technical and professional assistance is available
2. Review functions and features needed in controller application	2.1 Use analytical and graphical software to review controller application and function 2.2 Validate software results 2.3 Undertake required instrument readings
3. Program controllers and SCADA applications for required functions	3.1 Program controller for required sequencing and actuations for applications 3.2 Develop simple SCADA applications for required interactions with inputs and outputs of controllers
4. Report results	4.1 Record outcomes of investigation, evaluation and application 4.2 Provide documentation including calculations, diagrams, programs and files

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.	
Controllers include:	<ul style="list-style-type: none"> • PLCs and microcontrollers • DCS • SCADA • other systems and equipment, including proprietary equipment.
Controller tasks include:	<ul style="list-style-type: none"> • determining WHS, regulatory, risk management and automation safety requirements • programming and interfacing a PLC capable of sequencing two or more actuations with start, stop and actuation motion confirmation signals • developing a simple SCADA application capable of interacting with inputs and outputs of PLCs and/or microcontrollers.
Automation safety refers to use of general and specific safety features and includes:	<ul style="list-style-type: none"> • emergency stop • failsafe design • redundancy • interlocks • guarding data integrity.
Appropriate licensed trade technical and professional assistance include:	<ul style="list-style-type: none"> • availability of licensed electrical tradespersons for work covered by electrical licensing regulations • technical support and advice relating to elements which have intrinsic dangers • professional support for technologies.
WHS, regulatory requirements and organisational procedures include:	<ul style="list-style-type: none"> • WHS acts, regulations and relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work.
Sustainability includes:	<ul style="list-style-type: none"> • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer.

-
-

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23112A Investigate electrical and electronic controllers in engineering applications.

Links

The MEM Metal and Engineering Training Package Companion Volume Implementation Guide is available from VETNet -

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