



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM10007C Modify control systems**

**Release: 1**

## MEM10007C Modify control systems

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	This unit covers planning the commissioning procedure, assessing the control system performance, adjusting the control system, and undertaking commissioning modifications.
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### Application of the Unit

<b>Application of the unit</b>	<p>Work is generally undertaken in a team environment, but not exclusively.</p> <p>Control systems can mean closed or open loop on continuous or step process control systems. All specifications are supplied via engineering/circuit drawings, data sheets, written or verbal instructions.</p> <p><b>Band: B</b></p> <p><b>Unit Weight: 6</b></p>
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### Licensing/Regulatory Information

Not Applicable

### Pre-Requisites

<b>Prerequisite units</b>		
<b>Path 1</b>	MEM09002B	Interpret technical drawing
	MEM10002B	Terminate and connect electrical wiring

<b>Prerequisite units</b>		
	MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c./1500 volts d.c.
	MEM12002B	Perform electrical/electronic measurement
	MEM12004B	Perform precision electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18048B	Fault find and repair/rectify basic electrical circuits
	MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.
	MEM18051B	Fault find repair/rectify complex electrical circuits
<b>Path 2</b>	MEM09002B	Interpret technical drawing
	MEM14005A	Plan a complete activity
	MEM12002B	Perform electrical/electronic measurement
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM12025A	Use graphical techniques and perform simple statistical computations
	MEM16006A	Organise and communicate

<b>Prerequisite units</b>		information
	MEM16010B	Write reports
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18010C	Perform equipment condition monitoring and recording
	MEM18016B	Analyse plant and equipment condition monitoring results
	MEM18018B	Maintain pneumatic system components
	MEM18019B	Maintain pneumatic systems
	MEM18020B	Maintain hydraulic system components
	MEM18021B	Maintain hydraulic systems
	MEM18022B	Maintain fluid power controls
	MEM18023B	Modify fluid power system operation
	MEM18053B	Modify fluid power control systems
	MEM18055B	Dismantle, replace and assemble engineering components
<b>Path 3</b>	MEM05001B	Perform manual soldering/desoldering - electrical/electronic components
	MEM09002B	Interpret technical drawing
	MEM12004B	Perform precision

<b>Prerequisite units</b>		
		electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18054B	Fault find, test, calibrate instrumentation systems, equipment
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18057B	Maintain/service analog/digital electronic equipment
	MEM18060B	Maintain, repair control instrumentation - single and multiple loop control systems
	MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements
	MEM18067B	Tune control loops - multi controller or multi element systems
<b>Path 4</b>	MEM05001B	Manual soldering/desoldering - electrical/electronic components
	MEM05002B	Perform high reliability soldering and desoldering
	MEM09002B	Interpret technical drawing
	MEM12004B	Perform precision electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

<b>Prerequisite units</b>		
	MEM18056B	Diagnose and repair analog equipment and components
	MEM18057B	Maintain/service analog/digital electronic equipment
	MEM18058C	Modify electronic equipment
	MEM18059B	Modify electronic systems
	MEM18065B	Diagnose and repair digital equipment and components
<b>Path 5</b>	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18086B	Test, recover, evacuate and charge refrigeration systems
	MEM18088B	Maintain and repair commercial air conditioning systems and components
	MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or air conditioning controls
<b>Path 6</b>	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

<b>Prerequisite units</b>		
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18086B	Test, recover, evacuate and charge refrigeration systems
	MEM18090B	Maintain and repair industrial refrigeration systems and components
	MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or air conditioning controls
<b>Path 7</b>	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18086B	Test, recover, evacuate and charge refrigeration systems
	MEM18089B	Maintain and repair central air handling systems
	MEM18090B	Maintain and repair industrial refrigeration systems and components
	MEM18093B	Maintain and repair integrated industrial refrigeration and/or large air handling system controls

<b>Prerequisite units</b>		
<b>Path 8</b>	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18054B	Fault find, test, calibrate instrumentation systems, equipment
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18060B	Maintain, repair control instrumentation - single and multiple loop control systems
	MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements
	MEM18064B	Maintain instrumentation system components
	MEM18067B	Tune control loops - multi controller or multi element systems



## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan commissioning procedure	1.1. Control system format and operational intent is determined and understood. 1.2. Commissioning procedures are effectively sequenced to meet requirement of components and control application.
2. Check control system installation	2.1. Correct installation of system components is verified against specifications. 2.2. Appropriate test equipment is functional and calibrated before use. 2.3. Components or control loop/system is powered up and checked for correct supply in accordance with specifications. 2.4. All readings/measurements are correctly obtained, interpreted and recorded.
3. Adjust control system and assess performance	3.1. Control loop/system components are adjusted to meet control characteristics, application and process specifications utilising appropriate techniques. 3.2. Final verifications including any operational adjustments are made to ensure required performance.
4. Commission modifications	4.1. Necessary modifications to change performance in order to meet manufacturers' or operational specifications or safety and legislative requirements are undertaken or actioned. 4.2. Reports on system/process characteristics are provided for warranty, handover, legislative, etc. purposes. 4.3. All modifications are documented and result is recorded to standard operating procedures.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

**REQUIRED SKILLS AND KNOWLEDGE**

Look for evidence that confirms skills in:

- obtaining, reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- obtaining necessary approvals
- checking system components against specification
- calibrating and checking test equipment to be used
- energising and checking the components and/or the control loop/system for correct supply
- checking and clarifying task-related information
- adjusting control loop/system components
- conducting appropriate measurements/tests
- carrying out authorised modifications to the control system and/or process components
- checking for conformance to specifications
- completing reports and documentation on commissioning activity
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

**Required knowledge**

Look for evidence that confirms knowledge of:

- work to be undertaken
- control system format
- operational intent of the processes being controlled by the control system
- specifications of the control system and the processes being controlled
- regulatory and legislative requirements associated with the commissioning procedure
- procedures for commissioning the control system
- procedures to ensure that control characteristics, application and process specifications are achieved
- components of the operational processes
- installation specifications for each component of the operational processes
- measuring techniques and equipment appropriate to the measurements to be taken
- test equipment and techniques appropriate to the commissioning of the control
- calibration procedures for the selected test equipment
- procedures for energising components and/or the control loop/system
- supply requirements of components and the control loop/system
- recording requirements for readings/measurements taken
- adjustments that can be made to the control loop/system components
- effects of adjustments on the control characteristics and operational processes

**REQUIRED SKILLS AND KNOWLEDGE**

- measurements/tests to be undertaken to verify control system and process operation
- reasons for selecting the chosen measurements/tests
- procedures to be followed if the operational specifications of the control system and/or process cannot be achieved
- effect of changes to control system components on system performance
- appropriate authority to approve any modifications
- reporting requirements associated with the commissioning of control systems
- requirements for recording modifications
- reasons for recording modifications
- hazard and control measures associated with modifying control systems, including housekeeping
- safe work practices and procedures

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p><b>Overview of assessment</b></p>	<p>A person who demonstrates competency in this unit must be able to modify control systems. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>
<p><b>Context of and specific resources for assessment</b></p>	<p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with modification of control systems or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p><b>Method of assessment</b></p>	<p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>

**EVIDENCE GUIDE**

<b>Guidance information for assessment</b>	
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**Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

**Commissioning**

Commissioning involves the development of a commissioning procedure, testing of operation and adjustment to conform to specification

**Control system**

Control systems can mean closed or open loop on continuous or step process control systems. Loop/system control can incorporate the use of pneumatics, electrical, electronics, hydraulics or a combination

**System components**

Control loop/system components incorporate all instruments and devices which make up or control a loop/system, including sensing devices, control devices, actuators and transducers

**Unit Sector(s)**

<b>Unit sector</b>	
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**Co-requisite units**

<b>Co-requisite units</b>	
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<b>Co-requisite units</b>		

## Competency field

<b>Competency field</b>	Installation and commissioning
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