



Australian Government

MEM18060 Maintain, repair control instrumentation - single and multiple loop control systems

Release: 1

MEM18060 Maintain, repair control instrumentation - single and multiple loop control systems

Modification History

Release 1. Supersedes and is equivalent to MEM18060B Maintain, repair control instrumentation – single and multiple loop control systems

Application

This unit of competency defines the skills and knowledge required to determine control loop characteristics, monitor and record the operation of a control loop, localise the fault condition, and replace or repair the faulty condition.

It applies to split architecture single/multiple loop control instrumentation that includes programmable logic controllers (PLCs), distributed control systems (DCS) and computer-based systems.

Where fault-finding is required to electronic component level unit MEM18056 Diagnose and repair analog equipment and components and unit MEM18065 Diagnose and repair digital equipment and components, should also be selected as appropriate.

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

Band: B

Unit Weight: 8

Pre-requisite Unit

MEM05001	Perform manual soldering/desoldering - electrical/electronic components
MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12004	Perform precision electrical/electronic measurement
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations

MEM18054 Fault find, test and calibrate instrumentation systems and equipment

MEM18055 Dismantle, replace and assemble engineering components

MEM18062 Install, maintain and calibrate instrumentation sensors, transmitters
and final control elements

Plus, one or more of the following, including their prerequisites:

MEM18057 Maintain/service analog/digital electronic equipment

MEM18064 Maintain instrumentation system components

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

- 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 SOPs
- 1.4 Identify job requirements from specifications, drawings, job sheets or work instructions

2 Determine control loop operating characteristics

- 2.1 Examine engineering specifications, technical information and historical trends for relevant data
- 2.2 Examine, read and interpret system specifications, operational data and other relevant data sources and note relevant conclusions
- 2.3 Consult with system operators and other relevant plant personnel and extract relevant data and document by appropriate means

Elements describe the essential outcomes.

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

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|---|---|-----|---|
| | | 2.4 | Observe operation of the system by applying all control loop device characteristics, controller mode principles and adjustment methods |
| 3 | Monitor and record operation of a control loop | 3.1 | Interpret pneumatic, electrical and electronic circuit diagrams |
| | | 3.2 | Set point and manual output changes by applying all control loop device characteristics, controller mode principles and calibration/adjustment methods, and loop operation from the controller response using appropriate test equipment, principles and procedures |
| | | 3.3 | Interpret software configuration data for digital control systems |
| | | 3.4 | Monitor and record operational responses |
| | | 3.5 | Utilise fault-finding and diagnostic techniques throughout the checking and testing procedures including simple and multi-controller type control schemes |
| | | 3.6 | Analyse diagnostic results and conclusions against predetermined operational specifications |
| 4 | Localise fault condition | 4.1 | Test circuits to the level necessary to identify and localise faults using fault-finding, diagnostic techniques and appropriate test equipment |
| | | 4.2 | Utilise drawings/diagrams and operational testing data in identifying and localising fault conditions |
| | | 4.3 | Verify and localise fault condition to major component level using appropriate test equipment, procedures and techniques |
| 5 | Replace faulty items or repair | 5.1 | Dismantle components for repair or replacement using appropriate tools, equipment and techniques |

Elements describe the essential outcomes.

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

	faulty condition	5.2	Select replaceable items from manufacturers' catalogues, spare parts lists or data sheets
		5.3	Repair faulty condition, where applicable
		5.4	Reassemble repaired and replaceable items
6	Calibrate and adjust control instrumentation	6.1	Calibrate and adjust panel mounted, split architecture single loop/multiple loop control instruments using appropriate calibration principles, equipment and methods for all devices according to manufacturers' instructions
		6.2	Adjust controller modes and actions are adjusted according to specifications
		6.3	Undertake zero span and range checks using appropriate configuration
		6.4	Make final adjustments to control instrumentation to meet specifications
7	Complete service reports and recommission	7.1	Complete service reports in accordance with SOPs
		7.2	Adopt appropriate follow-up procedures
		7.3	Recommission control instrumentation 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.

Historical trends include one (1) or more of the following:

- supervisory control and data acquisition (SCADA)
- charts
- chart recorders and data loggers
- equipment conditioning monitoring

An open and closed loop system includes:

- final control elements
- process measuring devices
- converters
- controllers
- process signals

Relevant data includes one (1) or more of the following:

- maintenance records
- fault indicators
- charts
- error codes
- operational symptoms
- observation monitoring
- consultation with appropriate personnel

Major components include one (1) or more of the following:

- transducers
- power supplies
- removable circuit boards
- sensor units
- other like components

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

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