



Australian Government

MEM29005 Diagnose faults in digital control systems

Release: 1

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Modification History

Release 1. New unit.

Application

This unit defines the skills and knowledge required to apply diagnostic procedures to existing digital control systems in order to correct faults and return the system to normal operation.

The unit includes preparing for and applying safe fault-finding processes and techniques, dealing with unexpected situations, and completing and documenting outcomes.

The unit applies to digital control systems that are part of, or have the potential to become, part of Industry 4.0 systems and processes in a manufacturing or engineering-related workplace or are part of a workplace that is connected to a manufacturing or engineering-related workplace supply chain.

The skills and knowledge described in this unit do not cover connecting, diagnosing or repairing power supplies above 50V ac or 120V dc or other electrical-related work requiring an electrical licence in any state or territory.

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

Pre-requisite Unit

Nil

Competency Field

Applied technologies

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Prepare to diagnose digital control systems faults	1.1 Identify diagnostic procedures from control system supplier documentation, plant and process documentation, work request, or discussion with relevant personnel 1.2 Consult with appropriate personnel to ensure planned work is coordinated effectively with others and system downtime is minimised 1.3 Identify sources of materials and components in case replacements

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	are required as a result of fault diagnosis 1.4 Ensure appropriate tools and equipment for the digital control system are selected and serviceable
2. Apply diagnostic techniques to digital control systems	2.1 Apply relevant WHS and regulatory procedures and risk control measures associated with diagnostic procedures 2.2 Determine the need to observe, test or measure the system live and arrange access if required 2.3 Perform diagnostic processes and techniques efficiently to minimise disruption, wastage and downtime 2.4 Isolate control system circuits where required according to manufacturer's instructions and standard operating procedures (SOPs) 2.5 Check for faults in components in a systematic manner with reference to the required operating functions and parameters 2.6 Log faults according to SOPs
3. Provide solutions to digital control system faults and non-conformances	3.1 Apply safety and risk control measures and procedures to completing the diagnostic and repair activities 3.2 Repair or replace identified faulty components or materials 3.3 Identify programming related faults and arrange for reprogramming according to SOPs 3.4 Return digital control system to normal operation 3.5 Refer faults requiring additional expert assistance to manufacturer or other expert
4. Complete work and prepare report on diagnostic and repair activities	4.1 Monitor system after diagnostic and repair and confirm operation against specified parameters 4.2 Produce required documentation and reports in line with organisational policies and procedures

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.

Industry 4.0 systems include one or more of the following:

- industrial internet of things (IIoT) devices
- collaborative robots
- networked and cloud connected traditional robots and other industrial automation
- networked and cloud connected supervisory control and data acquisition systems (SCADA)
- networked and cloud connected enterprise resource planning (erp) systems
- networked and cloud connected CAD and CAM systems
- digital twins
- augmented and virtual reality systems
- networked and cloud connected CNC and additive manufacturing machines
- networked and cloud connected data storage and processing facilities
- networked and cloud connected edge devices
- other networked and cloud connected digital devices and systems relevant to the workplace.

WHS procedures and risk control measures include one or more of the following:

- personal protective equipment (PPE)
- job safety analysis (JSA) worksheets
- material safety data sheet (MSDS)
- safety equipment and devices
- safety signs /symbols
- regulations related to electrical work.

Components include one or more of the following:

- sensors
- micro-electro-mechanical systems (mems)
- wired and wireless (WiFi) network components
- operational amplifiers
- mechanical switches
- analogue to digital and digital to analogue converters.

Diagnostic and repair activities include one or more of:

- monitoring live operation of an existing digital control system
- alteration of the digital control system to comply with a specified function
- tracing and correcting faults
- repair or replacement of materials or components
- programming or reprogramming the control system

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including arranging for expert programming where required.

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Unit Mapping Information

No equivalent unit.

Links

Companion Volume Implementation Guides are found in VETNet -

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