



Australian Government

MEM29004 Analyse and problem solve a PLC based industrial control system

Release: 1

MEM29004 Analyse and problem solve a PLC based industrial control system

Modification History

Release 1. New unit.

Application

This unit defines the skills and knowledge required to analyse the role of programmable logic controllers (PLCs) in Industry 4.0 workplace environments, including implementing PLC applications, testing and problem-solving a PLC-based Industry 4.0 related industrial control system (including setting up, testing and documenting the PLC program) and ensuring integration with other Industry 4.0 systems in a workplace. PLC controller functions and software may be local or cloud- based.

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. Identify the control and networking requirements for the PLC application	1.1 Identify the control system specifications and PLC application requirements from documentation, work request or discussion with relevant personnel 1.2 Analyse PLC application requirements and identify the relationship to the broader Industry 4.0 systems and environment in the enterprise 1.3 Analyse PLC application requirements for workplace health and safety (WHS) and risk control implications 1.4 Analyse control system specifications and PLC application requirements and determine the extent of local and cloud-based processing and programming required 1.5 Identify and select resources and equipment requiring local

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	installation that are consistent with PLC application requirements and manufacturer's specifications
2. Set up a PLC-based industrial control system	2.1 Apply WHS procedures and risk control measures associated with PLC application 2.2 Consult with appropriate personnel to ensure planned work is coordinated effectively with others and downtime is minimised 2.3 Check tools and equipment for serviceability and rectify or report any faults prior to commencement 2.4 Install required PLC modules, connectors, and other equipment according to manufacturer's specifications and PLC application requirements 2.5 Program PLC locally or via cloud according to manufacturer's specifications and PLC application requirements
3. Test and verify PLC program	3.1 Check equipment and machinery is isolated according to safety requirements before commencing PLC testing process 3.2 Test the function and operations of the PLC program 3.3 Resolve faults and other non-conformances including seeking expert assistance when needed 3.4 Verify test results and other diagnostic findings
4. Complete work and document PLC program	4.1 Advise appropriate personnel when PLC based industrial control system is completed and equipment and machinery can be released from isolation 4.2 Document PLC program and function test according to workplace procedures 4.3 Complete workplace documentation according to established 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.

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| Industry 4.0 systems include one or more of the following: | <ul style="list-style-type: none"> • 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: | <ul style="list-style-type: none"> • personal protective equipment (PPE) • job safety analysis (JSA) worksheets • material safety data sheet (MSDS) • safety equipment and devices • safety signs /symbols. |
| PLCs include: | <ul style="list-style-type: none"> • local PLCs where all PLC components, data transmission, programming and control functions are located within the workplace • hybrid PLCs where some programming software and controller functions are local and some are cloud based • software defined controllers (virtual PLCs) featuring one or more of: <ul style="list-style-type: none"> • programming and controller functions are cloud based • networking via the cloud with other controllers and enterprise supervisory systems. |
| PLC modules include one or more of the following: | <ul style="list-style-type: none"> • central processing unit (CPU) module • interface module • communication module • power supply module |

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- input/output (I/O) module.

PLCs are one or more of the following:

- original i.e. built in from equipment first manufacture
- retrofitted after manufacture to enhance equipment control.

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>