



Australian Government

MEM07039 Write programs for industrial robots

Release: 1

MEM07039 Write programs for industrial robots

Modification History

Release 1. Supersedes and is equivalent to MEM07039A Write programs for industrial robots

Application

This unit of competency defines the skills and knowledge required to plan and write computer programs for robot operations to achieve operating specifications. Programs are in accordance with manufacturers' operating procedures, manufacturer specific language and the functional parameters of the robot.

Where setting of robot cells is required unit MEM07040 Set multistage integrated processes should also be selected.

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

Band: B

Unit Weight: 4

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM10004	Enter and change programmable controller operational parameters
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM16008	Interact with computing technology

Competency Field

Machine and process operations

Elements and Performance Criteria

Elements describe the essential outcomes.

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

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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	Identify robot requirements	2.1	Identify robot features and specifications
		2.2	Identify robot language appropriate to the robot type
		2.3	Identify robot safety features
		2.4	Interpret manufacturers' operating procedures and engineering drawings to define robot function and tool path geometry
		2.5	Determine required operations for robot and end effectors in conjunction with appropriate technical experts or other technical reference sources
3	Plan robot program	3.1	Identify programming requirements
		3.2	Calculate coordinates for tool path or robot functions
		3.3	Select programming method
		3.4	Develop program plan
4	Write basic program	4.1	Prepare robot and computer equipment
		4.2	Write program in required language and in accordance with SOPs
		4.3	Incorporate safety features in robot program
		4.4	Prepare operation sheet

Elements describe the essential outcomes.

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

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| 5 | Trial program | 5.1 | Trial program by operating robot in manual mode in conjunction with operator, as appropriate |
| | | 5.2 | Verify program performance against required specifications and with appropriate technical experts or other technical reference sources |
| | | 5.3 | Edit program if necessary to adjust operation, as required |
| | | 5.4 | Check components for conformance to specifications, as required |

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, accessibility of the item, and local industry and regional contexts) are included.

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|--|---|
| Features and specifications include one (1) or more of the following: | <ul style="list-style-type: none"> • components • capabilities • speed • reach • load carrying capacity • accuracy/repeatability • classification • polar coordinate • cylindrical coordinate • Cartesian coordinate • jointed elbow • SCARA • movements • base |
|--|---|

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, accessibility of the item, and local industry and regional contexts) are included.

- shoulder
- elbow
- pitch
- roll
- yaw
- applications
- required operating conditions
- limitations
- justification
- safety features

Language includes the following:

- language appropriate to robot type

Safety features include one (1) or more of the following:

- AS 2939-1987 Industrial robot safety - Safe design and usage
- physical design
- enclosures
- layout
- programming
- sensing
- personnel

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM07039A Write programs for industrial robots

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MEM07039 Write programs for industrial robots

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists, engineering drawings and other applicable reference documents to write programs for industrial robots
- identifying required robot operations in determining programming requirements
- planning the programming methodology appropriate to the robot type and operation
- calculating coordinates of all relevant points on the part or product to be produced
- writing the robot program in the correct programming language and drafting a robot operation sheet
- trialling the program ensuring the robot operates safely and correctly and produces work that meets specification
- editing the program as necessary to ensure compliance with specifications
- undertaking program storage and filing procedures.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- classifications/applications of industrial robots, including:
 - welding
 - thermal cutting
 - machining
 - forming and shaping
 - pick and place
 - palletising
 - machine loading/unloading
- end effectors, including:
 - grippers
 - tools and tool changes

- features and specifications of robots and components
- joint movements of a robot
- drive systems used to generate robot movement
- robot programming methods and procedures
- function of elements in controlling operation of a robot
- safety features and requirements of robots
- type(s) of robots and end effectors and their applications
- robot operations controlled by programs
- tool path(s) when producing a part or product
- sequence of robot operations, including movements
- zero point of the robot
- standard codes and languages for robot programs
- procedures for completing robot operation sheets
- procedures for manual operation of the robot
- reasons for testing and proving the robot program
- procedures for editing the robot program
- effects of editing on the operation of the robot and the part or product to be produced
- measuring equipment/techniques used to check for conformance to specification.

Assessment Conditions

- Assessors must:
 - have vocational competency in writing programs for industrial robots at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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