



Australian Government

Department of Education, Employment and Workplace Relations

MEM12021B Program coordinate measuring machines

Release: 1

MEM12021B Program coordinate measuring machines

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers writing, trialling and editing basic programs for coordinate measuring machines to measure features of a part in a single work plane using a single probe.
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Application of the Unit

Application of the unit	<p>The skills in this unit extend to writing basic programs to measure features of a part in a single work plane using a single probe. The program produced may be used on a range of coordinate measuring machines and would be suitably archived and backed up. Programs are trialled and edited as necessary. Work would be undertaken autonomously using predetermined standards of quality.</p> <p>For programming using multiple probes and more than one plane, Unit MEM12022B (Program coordinate measuring machine [advanced]) should be selected. Appropriate levels of measuring, computer and engineering drawing skills should be selected with this unit.</p> <p>Band: A</p> <p>Unit Weight: 4</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	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. Identify part program parameters	1.1. Job specifications and requirements are correctly established. 1.2. Inappropriate units are selected to comply with specifications. 1.3. Part program name is specified according to standard operating procedures.
2. Establish single probe configurations	2.1. Single probe configuration is determined according to standard operating procedures. 2.2. Probe angles are determined and qualified in accordance with standard operating procedures.
3. Position/align component	3.1. Component/part is positioned and oriented correctly. 3.2. Manual alignment is created according to standard operating procedures. 3.3. Single Direct Computer Control (DCC) alignment is created according to standard operating procedures.
4. Measure features	4.1. Features are measured correctly. 4.2. Probe movement parameters are defined in accordance with standard operating procedures. 4.3. Basic features are dimensioned according to specifications. 4.4. Operator notes are reported. 4.5. Dimension descriptions are inserted.
5. Verify and back up the program	5.1. Execution and accuracy of program is verified according to standard operating procedures. 5.2. Program is edited, if required. 5.3. Results are output to various formats according to standard operating procedures. 5.4. Program is archived and backed up.

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:

- reading and interpreting information on written job instructions, specifications, charts, lists, drawings and other applicable reference documents
- using methods of coordinate measurement
- analysing and establishing part program parameters
- checking and clarifying information
- entering information onto proformas and standard workplace forms
- navigating and entering data in applicable program software
- checking for conformance to specifications
- using precision measurement equipment
- measuring components to specified tolerances
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
- following verbal instructions
- orally reporting routine information
- selecting the correct units for the part program
- identifying the part program in accordance with current identification/quality system
- determining the probe configuration
- calculating/determining and qualifying probe angles
- positioning/aligning/securing component/part to appropriate orientation on CMM table and complying with probe configuration and calibrated angles
- taking an appropriate number of hits to create an accurate manual alignment
- demonstrating the correct procedure for creating DCC alignment
- measuring the part features in the correct sequence and location in a single work plane
- defining and verifying the parameters
- correctly dimensioning basic feature such as circles, points etc.
- producing and inserting explanatory notes for the operator
- inserting all necessary dimension descriptions
- running the part program and verifying the accuracy of the results
- editing, where non-conformance is identified
- outputting results to printer, disc or other format as required
- archiving and backing up part program

Required knowledge

Look for evidence that confirms knowledge of:

- the principles and methods of coordinate measurement
- principles and interpretation of geometric tolerancing
- the procedure for producing the part program

REQUIRED SKILLS AND KNOWLEDGE

- the specifications for the program
- the criteria for selecting specific units
- the procedures and parameters for naming programs
- the procedure for determining probe configuration
- the reasons for selecting single probe configuration
- the procedure for determining/calculating probe angles
- the correct procedure and parameters for qualification
- the reasons for the specific location and aligning/securing the component/part
- the method of securing/clamping
- the methodology used to create manual alignment for the part
- the procedure and reasons for creating a single DCC (Direct Computer Control) alignment
- the criteria for defining probe movement
- the procedure for verifying correct probe movement
- dimensioning techniques
- the procedure for running the program
- the procedure for verifying the results
- editing process and explanations
- the procedures used to output results to various formats
- the method used to archive and back up the program
- access limitations by personnel and quality control guidelines
- hazards and control measures associated with using CMMs, including housekeeping
- safe workplace practices and procedures

Evidence Guide

EVIDENCE GUIDE	
<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>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to program a coordinate measuring machine. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</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>Context of and specific resources for assessment</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 programming coordinate measuring machines or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p>Method of assessment</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

Guidance information for assessment	
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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.

Unit Sector(s)

Unit sector	
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Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement
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