



Australian Government

MEM21005 Diagnose faults in quartz watches

Release: 1

MEM21005 Diagnose faults in quartz watches

Modification History

Release 1. Supersedes and is equivalent to MEM21005A Diagnose faults in quartz watches

Application

This unit of competency defines the skills and knowledge required to test and diagnose faults in electronic quartz watches.

It applies to diagnosing faults where the power cell performance has already been tested and its condition is assessed as good or the correct terminal voltage under load, but the watch continues to indicate faults or is stopped.

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

Band: A

Unit weight: 2

Pre-requisite Unit

MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM21001	Replace watch batteries, capacitors and bands

Competency Field

Horology

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 Select and use appropriate personal protective equipment (PPE) in accordance with SOPs

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
		1.4	Identify job requirements from specifications, job sheets or work instructions
2	Establish servicing requirements and liaise with customer	2.1	Verify watch condition and performance concerns with customer
		2.2	Prepare written and verbal quotations
		2.3	Confirm customer agreement on recommended service procedures to remedy faults
		2.4	Record and document repair process
3	Open and close watch cases	3.1	Determine need to open case for further testing
		3.2	Select and use appropriate workshop tools and equipment
		3.3	Open and close watch cases
		3.4	Inspect parts and report and record results
		3.5	Verify gasket condition and replace, as required
		3.6	Clean cases and bands during and after repair, as required
4	Perform test	4.1	Select appropriate tests for the type of quartz watch
		4.2	Select and use appropriate workshop testing equipment
		4.3	Test quartz watch output signals using industry-specific equipment
		4.4	Assess mechanical condition, including freedom of gear train, as applicable
		4.5	Maintain testing equipment
		4.6	Record test results

Elements describe the essential outcomes.

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

5 Analyse results and determine faults

- 5.1 Interpret test results
- 5.2 Carry out further testing to locate faulty components, as required
- 5.3 Confirm results against manufacturer specifications
- 5.4 Identify faults from test information
- 5.5 Evaluate record and communicate recommended servicing requirements

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.

- Types of quartz watches include one (1) or more of the following:**
- analog, digital and duo displays
 - anadigi
 - calendar and/or moon phase
 - chronograph and perpetual calendar
 - alarm and kinetic
 - auto quartz

- Record and document repair process includes one (1) or more of the following:**
- reference to manufacturers' technical guides
 - customer written quotation detailing faults
 - recommendations of most appropriate service procedure
 - estimation of replacement part
 - time spent on procedure

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.

Tools and equipment include one (1) or more of the following:

- watch case opening and closing tools
- hand tools, including:
 - tweezers
 - screwdrivers
 - eyeglasses

Tests include one (1) or more of the following:

- acoustic, capacitive and inductive pick-ups/sensors
- quartz crystal oscillating signals (32 KHz)
- voltage, resistance and current consumption
- output pulses (integrated circuits)
- pulse generation of step motor
- lower working limit
- capacitive rate
- inhibition rate

Workshop testing equipment includes one (1) or more of the following:

- quartz timing machines with acoustic and capacitive pick-up
- inductive pick-up sensors
- multimeters
- variable voltage supplies
- pulse generators

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

- quartz crystal
- integrated circuits
- electronic circuits
- coils
- step motors
- gear train
- dial train
- dials and hands

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM21005A Diagnose faults in quartz watches

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 MEM21005 Diagnose faults in quartz watches

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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
- liaising with customer and verifying condition and performance, identifying repair costs, and recording and documenting repair process
- opening and closing watch cases using appropriate workshop tools and equipment
- using workshop testing equipment
- selecting and performing appropriate tests and analysing test results
- determining faults and faulty components based on test results and visual inspection.

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)
- types of quartz watch construction and components
- function/operating principles of electronic quartz watches
- types of cells, power sources, capacitors and electronic storage units
- observation and inspection techniques
- work health and safety (WHS) regulations and procedures.

Assessment Conditions

- Assessors must:
 - have vocational competency in diagnosing faults in quartz watches 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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