



**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.   |
|-------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>1 Determine job requirements</b>       | <b>1.1</b> Follow standard operating procedures (SOPs)                                            |
|                                           | <b>1.2</b> Comply with work health and safety (WHS) requirements at all times                     |
|                                           | <b>1.3</b> 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                                         | <b>Establish servicing requirements and liaise with customer</b> | 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                                         | <b>Open and close watch cases</b>                                | 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                                         | <b>Perform test</b>                                              | 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

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**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

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## Links

Companion Volume implementation guides are found in VETNet -

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