



Australian Government

MEM23130 Coordinate servicing and fault-finding of HVACR control systems

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM23130A Coordinate servicing and fault finding of HVACR control systems.

Application

This unit of competency defines the skills and knowledge required to coordinate servicing and fault-finding of heating, ventilation, air conditioning and refrigeration (HVACR) environment control systems. It includes content about work health and safety (WHS) and related safety compliance requirements, performance analysis software and validation, and related thermodynamic concepts and laws. The control system can be a part of a building management system and may be a control system in industrial or commercial refrigeration, a hydronic system or food storage technology.

This unit applies to technicians, system managers, designers and draftspersons, and others who are required to coordinate the servicing and fault-finding of HVACR control systems, including undertaking required technical analyses and coordinating and supervising tradespersons or other technicians.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23006 Apply fluid and thermodynamics principles in engineering

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare for HVACR analysis and service task	1.1 Establish type, location and scope of control systems for HVACR plant 1.2 Identify stakeholders to be consulted during analysis and service 1.3 Lead review of functions and features of HVACR system

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.4 Establish software and software techniques required for evaluation 1.5 Identify relevant WHS, regulatory and environmental requirements 1.6 Investigate sustainability implications of HVACR control and energy management systems
2. Coordinate review and analysis of HVACR control system	2.1 Review passive characteristics, heat loads and energy requirements for the HVACR system 2.2 Review energy options, tariffs, system and component consumption against benchmarks and comparative tariffs 2.3 Confirm scope of control system hardware, including controllers, analog and digital input/output (I/O), interfaces and actuators, including electrical, electronic, pneumatic and hydraulic devices 2.4 Review, map and monitor HVACR control system, protocols and topology, system function, control settings, I/O, and major system hardware components and energy requirements 2.5 Identify building management system control system software and programming techniques 2.6 Supervise selection of tools, equipment, testing devices and materials required for service and fault-finding 2.7 Determine required measurements and measurement techniques 2.8 Supervise calibration, set up, and test measurement equipment procedures 2.9 Identify appropriate analysis techniques, analysis and simulation software and software validation techniques
3. Coordinate servicing, fault-finding and optimising of HVACR control systems	3.1 Supervise measuring of the performance of the control system in maintaining specified environmental conditions 3.2 Adjust HVACR system to specifications and in accordance with organisational procedures 3.3 Ensure isolation, repair or replacement of components not performing to specification 3.4 Validate control programs and software for system performance and simulation 3.5 Supervise testing or measuring on an electrically live system 3.6 Ensure compliance with WHS, regulatory, environmental and risk management requirements 3.7 Optimise the control system for economic and efficient operation

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	through daily, seasonal and annual cycles 3.8 Develop control diagram and record settings for optimal system performance
4. Report results	4.1 Record results, including rectification or improvement recommendations 4.2 Provide report and supporting documentation including thermal and control system audits, energy costing, efficiency evaluations, control system map and signal diagrams, control programs, system analysis and simulation files

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.

Building management system HVACR control systems include:	<ul style="list-style-type: none"> • human-machine interfaces (HMIs) • web servers, network topology and bus systems • protocols • system or network controllers • programmable logic controllers (PLCs) • terminal unit controllers for major plant components including boilers and HVACR central plant air handlers, chilled and hot water valves, air dampers, supply fans and lighting • analog and digital I/O, interfaces and actuators, including electrical, electronic, pneumatic and hydraulic devices • remote control systems, including ethernet options • interfaces with other controlled systems including fire, security, and lighting.
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Analog or digital I/O includes:	<ul style="list-style-type: none"> • inputs including temperatures, humidity, pressure, current flow and air flow • analog inputs, including temperature, humidity and pressure sensors transmitting 4–20 mA or 1–10 V signals • digital inputs including volt-free switches or relays or 24 VDC/AC and pneumatic/electronic interfaces • analog outputs, including variable frequency speed drives, hot or chilled water proportional valves responding to a set-point difference or a damper setting • digital outputs to switch lights, valves or motor relays on or off including alarms • special I/O including: <ul style="list-style-type: none"> • alarms for limiting condition or status indication including the monitoring of carbon monoxide levels or low motor current • pneumatic and hydraulic sensor and actuator interfaces.
Sustainability includes:	<ul style="list-style-type: none"> • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer.
Appropriate technical and professional assistance includes:	<ul style="list-style-type: none"> • technical support and advice relating to elements which have intrinsic dangers • professional support for technologies.
WHS, regulatory requirements and organisational procedures includes:	<ul style="list-style-type: none"> • WHS acts, regulations and relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23130A Coordinate servicing and fault finding of HVACR control systems.

Links

Companion Volume implementation guides are found in VETNet -

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