



Australian Government

UEERA0044 Find and rectify faults in single phase motors and associated controls

Release: 1

UEERA0044 Find and rectify faults in single phase motors and associated controls

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to find and repair faults in motors and associated controls connected to single phase, 240 volt (V) supply, in refrigeration and air conditioning systems.

It includes working safely, using fault-finding procedures, conducting repairs to motor and associated control components, and completing required service documentation. The skills and knowledge in this unit will be applied by refrigeration and air conditioning technicians during the commissioning and repair of refrigeration and air conditioning systems.

To undertake this unit, the learner must have a current Trainee Refrigerant Handling Licence as it includes work on refrigeration and air conditioning equipment that carries the risk of a fluorocarbon refrigerant being emitted.

The skills and knowledge described in this unit require a national Refrigerant Handling Licence as it includes work on refrigeration and air conditioning equipment that carries the risk of a fluorocarbon refrigerant being emitted while decanting the refrigerant or manufacturing, installing, commissioning, servicing, maintaining or decommissioning refrigeration and air conditioning equipment.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 V alternating current (a.c.) or 120 V direct current (d.c.).

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, a relevant contract of training, such as an Australian Apprenticeship, is required.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to refrigeration, air conditioning and electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

Competency Field

Refrigeration and air-conditioning

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to find and rectify faults in single phase motors and associated controls

2 Find and repair faults in single phase motors and associated controls

PERFORMANCE CRITERIA

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

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|------------|---|
| 1.1 | WHS/OHS hazards, risk control methods, relevant industry standards, codes of practice and legislation are obtained and applied in accordance with workplace procedures |
| 1.2 | Work details are determined from documentation and/or supervisor to establish scope of work to be completed in accordance with workplace procedures |
| 1.3 | Supervisor is consulted to ensure work is coordinated with others in accordance with workplace procedures |
| 1.4 | Tools, equipment and testing devices to locate faults are obtained and checked for operational safety in accordance with workplace procedures |
| 2.1 | Need to test and measure live work is determined in accordance with workplace procedures and WHS/OHS requirements |
| 2.2 | Equipment is checked and isolated in accordance with workplace procedures, regulatory requirements and WHS/OHS requirements |
| 2.3 | Fault finding, using measured and calculated values of circuit and/or motor parameters, is undertaken in accordance with workplace procedures and regulatory requirements |
| 2.4 | Repair work is carried out in accordance with manufacturer specifications and workplace procedures |

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| | 2.5 | Repair work is tested in accordance with workplace procedures |
| | 2.6 | Apparatus is reassembled, tested and prepared for return to service in accordance with workplace procedures and regulatory requirements |
| | 2.7 | Unexpected situations are resolved in accordance with workplace procedures, safety guidelines and with the approval of an authorised person/supervisor |
| | 2.8 | Fault-finding and repair activities are completed without damage to apparatus, circuits, the surrounding environment and/or services using relevant sustainable energy practices in accordance with workplace procedures |
| 3 Complete and report on fault-finding and repair of single phase motors and associated controls | 3.1 | WHS/OHS work completion risk control measures are applied in accordance with workplace procedures |
| | 3.2 | Worksite and equipment are cleaned and made safe in accordance with workplace procedures |
| | 3.3 | Supervisor is notified of completion of work in accordance with workplace procedures |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Fault finding and rectification of single phase motors and associated controls must include at least the following:

- two different refrigeration and/or air conditioning systems

Fault finding and rectification of single phase motors and associated controls must include at

- control circuit component failure
- incorrect wiring connections

least two of the following faults:

- motor bearing failure
- open-circuit winding
- short circuit, including insulation failure to frame
- shunted short, including insulation failure within winding

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEERA0044 Find and rectify faults in single phase motors and associated controls

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including hazards and control measures
- disconnecting and reconnecting electrical supply to motors and associated controls
- finding and rectifying faults in single phase motors, related motor starting components and motor protection devices in refrigeration and air conditioning systems
- implementing relevant standards, codes of practice and regulations
- reporting/documenting fault-finding and repair activities.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- circuit diagrams for single phase motors
- relevant risk mitigation processes while finding and rectifying faults in motors and associated controls, including potential hazards, risk control methods and safe working practices
- relevant standards, codes of practice, regulations and manufacturer specifications
- single phase motor speed control in refrigeration and air conditioning systems, including:
 - inverters - variable speed control (VSC)/variable frequency control (VFC)
 - number of poles
- types and applications of single phase motor starting relays and protection devices used in refrigeration and air conditioning systems, including:
 - current coil relays
 - positive temperature coefficient (PTC) or solid state
 - potential coil relays
 - soft starters
 - thermal disc (Klixon) overloads
- types and applications of single phase motors used in refrigeration and air conditioning

systems, including:

- capacitor start capacitor run (CSCR)
- capacitor start induction run (CSIR)
- electronic commutator (EC)
- permanent split capacitor (PSC)
- resistance start induction run (RSIR)
- shaded pole
- typical faults in single phase motors and associated controls for refrigeration and air conditioning systems, including:
 - control circuit component failure
 - incorrect wiring connections
 - motor bearing failure
 - open-circuit winding
 - short circuit, including insulation failure to frame
 - shunted short, including insulation failure within winding.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

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.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, industry standards, equipment specifications, regulations, codes of practice and operation manuals.

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