Change log

Section	Comment (major change)
Title	
Application	
Pre-requisite Unit	
Elements and Performance Criteria	
Foundation Skills	
Range of Conditions	
Performance Evidence	
Knowledge Evidence	
Assessment Conditions	
If no major change in any section	Text clarified without changing requirements

UEERA998Y Install, commission, service and maintain variable refrigerant flow air conditioning systems

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 safely and effectively install, commission, service and maintain variable refrigerant flow (VRF) air conditioning systems.

It includes sourcing relevant data and schematics; installing components, pipe work, accessories and controls; commissioning the system to ensure it operates at the specified design conditions; locating and rectifying faults; and, carrying out maintenance tasks.

VRF systems are commonly found in commercial applications. They contain one or more outdoor units with multiple indoor units. Each indoor typically has its own metering device and shares a common pipework system. They are either heat pump or heat recovery systems. Heat pump systems will only allow indoor units to operate in the same mode (either heating or cooling). A heat recovery system will allow indoors to operate in different modes (either heating or cooling) from the same system by the use of a branch box.

The skills and knowledge in this unit of competency will be applied by refrigeration and air conditioning technicians during the installation, commissioning and servicing of VRF air conditioning systems.

The skills and knowledge described in this unit require a current national Trainee or Full 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, manufacturing, installing, commissioning, servicing, maintaining or decommissioning activities are being carried out.

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

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	PERFORMANCE CRITERIA
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1 Prepare to work on variable refrigerant flow (VRF) air conditioning systems	1.1 WHS/OHS risk control measures and procedures for carrying out the work are obtained and implemented in accordance with workplace procedures and regulatory requirements
	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 Relevant manufacturers specifications and worksite plans are interpreted and incorporated in work planning
	1.4 Components, piping, accessories, controls and consumables for the work are obtained and checked against job requirements in accordance with Australian Standards and codes of practice
	1.5 Tools, equipment and testing devices to complete work are obtained and checked for operational safety in accordance with workplace procedures
2 Install VRF air conditioning systems	2.1 The location, connection/branching, and support of pipe work is determined and laid out in accordance with system design
	2.2 Major components are securely mounted in the locations identified by the documentation or the supervisor in accordance with workplace procedures and regulatory requirements

	2.3	Refrigerant pipework and associated components are installed and tube cleanliness is maintained at all times in accordance with workplace procedures, Australian Standards and manufacturer specifications
	2.4	Condensate pipework is installed and tested in accordance with design, Australian Standards and manufacturer's specifications
	2.5	Communication wiring is checked to ensure it conforms to manufacturer's circuit diagram, specifications and Australian Standards
	2.6	Pressure testing of the installed components and pipe work is conducted to the required level for the type of refrigerant being used in accordance with relevant Australian Standards, codes of practices and workplace procedures
	2.7	Leaks are located and rectified employing appropriate methods in accordance with relevant Australian Standards codes of practices and workplace procedures
	2.8	Air conditioning system is evacuated to remove moisture and other contaminants in accordance with relevant Australian Standards, codes of practices and workplace procedures
	2.9	Vacuum drop test is carried out to verify all moisture and other contaminants have been removed from the system in accordance with relevant Australian Standards, codes of practices and workplace procedures
3 Commission VRF air conditioning systems	3.1	Extra refrigerant charge quantity is documented in accordance with Australian Standards and manufacturer's specifications
	3.2	Measurements are obtained using manufacturer's diagnostic tools and recorded to confirm system operation is in accordance with the system’s design and manufacturer specifications
	3.3	Measurements are obtained and recorded to confirm that operating voltage and current are within manufacturer specifications

4	Locate and rectify faults on VRF air conditioning systems	4.1	Fault diagnosis processes are carried out in accordance with manufacturer's processes/specifications, relevant Australian Standards, codes of practices and workplace procedures
		4.2	Required repairs are identified and reported in accordance with manufacturer's processes, relevant Australian Standards, codes of practices and workplace procedures
		4.3	Routine maintenance requirements are identified in accordance with relevant Australian Standards and workplace procedures
5	Complete work and report activities	5.1	WHS/OHS risk control measures continue to be applied in accordance with workplace procedures and regulatory requirements
		5.2	Worksite and equipment are cleaned and made safe in accordance with workplace procedures
		5.3	Required documentation is completed in accordance with relevant regulations, Australian Standards and codes of practice
		5.4	Supervisor is notified of task completion 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.

Unit Mapping Information

This is a new unit. No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet - LINK POPULATED ON PUBLICATION

Assessment Requirements for UEERA998Y Install, commission, service and maintain variable refrigerant flow air conditioning systems

Modification History

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

Performance Evidence

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

- installing and commissioning multi head variable refrigerant flow (VRF) air conditioning systems in accordance with manufacturer's specifications
- using manufacturer's diagnostic tool to assist in finding two of the following faults on a variable refrigerant flow air conditioning system (Note: one fault to be applied to the VRF system on each occasion):
    - contaminants in the system
    - incorrect refrigerant charge
    - faulty pressure and temperature sensors
    - communication errors
    - faulty fan motors
    - faulty refrigerant metering device (RMD)
    - insufficient airflow
- completing required documentation and record keeping
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements
- applying relevant manufacturers' specifications, Australian Standards, regulation and codes of practice

Knowledge Evidence

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

- VRF air conditioning systems including:
    - different types, their components and application
    - operating principles (cooling, heat pump and heat recovery)
    - control principles
    - operation in the heating and cooling cycles

- accessing manufacturer's specifications and instructions

- VRF pipework including:
  - refrigerant pipe layout and installation requirements including:
    - pipe diameter, length and wall thickness
    - pipe branch orientation and connections
    - expansion and contraction of pipework
    - piping support
  - condensate and traps
  - technique for condensate flow testing
- VRF wiring including:
  - separation of power and communications cabling
  - communication wiring requirements and component addressing
- requirements for branch box installation location
- requirements for installation of multiple outdoor VRF units
- working with refrigerants in VRF systems including:
  - checking and adding charge of refrigerant
  - procedure to check system valves are open during pressure test and evacuation
  - refrigerant leakage concentration levels permitted in enclosed spaces
- symptoms of typical faults and techniques repair including:
  - contaminants in the system
  - incorrect refrigerant charge
  - faulty pressure and temperature sensors
  - communication errors
  - faulty electronically commutated (EC) motors
  - faulty refrigerant metering device (RMD)
  - insufficient airflow
- maintenance requirements specific to VRF systems
- commissioning requirements specific to VRF systems
- manufacturer's programs and tools including:
  - built-in self-commission test
  - plug-in diagnostic tools

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, Australian Standards, equipment specifications, regulations, codes of practice and operation manuals

Links

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