



Australian Government

**Assessment Requirements for UEERL0004
Disconnect - reconnect electrical equipment
connected to low voltage (LV) installation
wiring**

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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, 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:
 - selecting and using an appropriate range of personal protective equipment (PPE)
 - hazard identification
 - using risk control measures
 - using safe working practices when carrying out electrical disconnect/reconnect work
 - working safely with low voltage (LV) electrical installations
- determining electrical characteristics of electrical equipment
- selecting tools, equipment and testing devices
- identifying the point of isolation
- preparing to disconnect and reconnect electrical equipment
- disconnecting and reconnecting electrical equipment
- connecting circuits from the schematic diagrams
- connecting and using voltmeters and ammeters, including selecting the correct range in terms of magnitude and whether the supply is alternating current (a.c.) or direct current (d.c.)
- isolating, testing and tagging accessories
- connecting a simple electrical circuit, including supply, control switch and load
- measuring voltage and current within a simple circuit
- producing a wiring diagram of the connections used in following the schematic diagram
- connecting a simple circuit following a wiring diagram
- producing a schematic diagram from the wiring diagram
- using an analogue multimeter for voltage measurement ensuring the following: setting zero, correct scale, a.c. or d.c., polarity and magnitude, avoiding parallax error and estimating between division readings
- using a digital multimeter for voltage measurement ensuring the following: correct range and no active conductors are connected to any meter earth
- measuring resistance using a digital multimeter

- conducting insulation resistance tests using a handheld insulation tester after checking for zero and meter calibration
- checking the polarity of a three-core extension cord using a continuity tester
- measuring current using a clip-on (tong tester) taking each circuit conductor in turn
- terminating cables using stud, screw, tunnel and lug terminal types employing the correct preparation and the relevant terminating tools
- identifying the type and arrangement of circuits supplying equipment that is to be disconnected
- testing the availability of supply for electrical equipment about to be disconnected
- locating isolation device/s, including lockable adjacent switching device, and/or identification of fuse/circuit breaker at switchboard, and use of equipment schedules where provided
- determining the method of isolation to be used; which available device
- isolating a supply at a fuse, ensuring the fuse wedge is removed only after the electrical equipment is turned off and demonstrating why the empty wedge is replaced once the fusible link has been removed
- isolating a supply at a circuit breaker, ensuring the circuit breaker is locked and secured in the open position
- undertaking tests to determine if the electrical equipment is turned off when isolating at a fuse/circuit breaker
- using danger tags at the point of isolation
- identifying the type and arrangement of circuits supplying equipment that is to be disconnected from a single phase and/or multiphase supply of voltages up to 1,000 V a.c. or 1,500 V d.c.
- applying procedures that ensure the safe isolation of the supply to equipment which is to be disconnected
- disconnecting isolated equipment from fixed wiring with minimal damage to wiring system after ensuring no visible faults or damage, and the recording of conductor connection sequence
- applying termination practices in regard to disconnected wiring
- checking the new electrical equipment nameplate details against those of the electrical equipment being replaced
- visually inspecting and testing equipment's electrical characteristics using suitable test equipment to ensure equipment is safe to connect in regard to sufficiently high insulation resistance, arrangements for protection against indirect contact are undamaged and in place, appropriate ingress protection (IP) rating, and arrangements for protection against dangers of mechanical movement are undamaged and in place
- testing compliance of the electrical equipment, i.e. insulation resistance and continuity
- testing the disconnected electrical equipment for faults (open circuits, partial open circuits, short circuits, partial short circuits and earth faults), and recognise any unsatisfactory test results obtained
- identifying the type and arrangement of circuits supplying equipment that is to be reconnected to a single phase and/or multi-phase supply of voltages up to 1,000 V a.c. or 1,500 V d.c.
- reconnecting electrical equipment to fixed wiring with minimal damage to wiring system
- ensuring continuity between exposed conductive parts of the equipment and the main earth or

metal switchboard enclosure

- restoring supply after ensuring correct connections, and all safety requirements have been met
- testing the supply at the electrical equipment
- restoring all mechanical protection, e.g. terminal covers
- checking operation of reconnected equipment
- dealing with unplanned events/situations in accordance with workplace procedures and in a manner that minimises risk to personnel and equipment
- producing reports and documents to describe a suitable procedure to safely disconnect a component from a single-phase supply and/or multi-phase supply in accordance with workplace, industry and regulatory requirements
- producing reports and compliance documentation for the safe reconnection/commissioning of a component to the supply in accordance with workplace, industry and regulatory requirements
- completing required regulatory compliance documentation.

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:

- the basic electrical circuit, including:
 - elements of a simple electric circuit (supply, control switch, protection device and load)
 - definition, the symbol and the abbreviation of the unit for electromotive force, potential difference, current and resistance
 - types of electrical load
 - need for devices to afford electrical protection and the mechanisms used in protection devices, including resetting
 - a.c supply (both single and multi-phase) and d.c. supply
 - need for isolating, testing and tagging electrical circuits
- relationships in an electrical circuit, including:
 - relationship between voltage, current and resistance
 - definition of power in electrical terms (for d.c. or resistive a.c. circuits)
 - electrical diagrams, including:
 - symbols used for fuse, circuit breaker, isolator, normally open contacts, normally closed contacts, coil, energy meter, a.c. motor and transformer
 - using a block diagram as means of developing concepts and understanding
 - function of single line diagrams, including their application in three phase systems
 - definition of a circuit or schematic diagrams
 - wiring diagrams
- test equipment selection and care, including:
 - fault currents and the implications of incorrectly connecting a meter to a high fault current

source

- category ratings of multimeters in terms of their breaking capacity (fault current interruption) and identification of the appropriate category of instrument for typical domestic work and for typical commercial work
- regulatory requirements in regard to the maintenance and testing of test instrumentation
- steps and procedures for the safe use, care and storage of electrical instruments
- selecting test equipment for given situations
- test equipment - voltage measurement, including:
 - voltage measurement - meters connected in parallel
- test equipment - resistance measurement, including:
 - insulation resistance, and the required minimum values for insulation resistance LV equipment (including the insulation resistance values for electrical equipment incorporating heating elements)
 - insulation resistance needs to be measured at higher than supply voltage and the voltages to be used
 - continuity and what a continuity tester does
- test equipment - current measurement, including advantage/s of the clip-on method of current measurement
- cable connections, including:
 - construction of typical power cables
 - principle of operation of the following types of terminals stud, screw, tunnel and lugs
 - cable preparation and terminating methods appropriate to each type of terminal, including any special requirements which apply
- protection for safety, including:
 - dangers associated with earth-faults
 - protection of persons against electric shock from earth-faults
 - maintaining a low earth-fault current path resistance
 - components in an earth-fault current path
 - regulatory issues/requirements/limitations in regard to working live
- safety testing preparation and procedures, including:
 - faulty earth-fault current paths
 - using safe working practices when carrying out fault-finding work
 - identification of earthing system components
 - unsatisfactory resistance of a fault current path
 - actions to rectify unsatisfactory resistance of an earth-fault current path or insulation
- isolating supplies, including:
 - regulatory requirements in regard to working de-energised, and ensuring and maintaining isolation
 - reasons for advising all personnel likely to be affected
 - preventing others wanting to remake supply
 - reason for isolation and approximate time of outage to allow planning of alternate

activities

- identification of the type and arrangement of circuits supplying equipment that is to be disconnected
- use of and reason for danger tags at the point of isolation
- reason for the following steps: testing on a known live supply, testing for isolation, retesting on a known live supply after confirming isolation
- disconnecting electrical equipment - LV, including:
 - identification of the type and arrangement of circuits supplying equipment that is to be disconnected from a single phase and/or multi-phase supply of voltages up to 1,000 V a.c. or 1,500 V d.c.
 - procedures that ensure the safe isolation of the supply to equipment which is to be disconnected
 - disconnection of isolated equipment from fixed wiring with minimal damage to wiring system after ensuring no visible faults or damage, and the recording of conductor connection sequence
- reconnecting electrical equipment - LV, including:
 - importance of checking the new electrical equipment nameplate details against those of the electrical equipment being replaced
 - need to visually inspect and test the equipment's electrical characteristics using suitable test equipment to ensure equipment is safe to connect in regard to sufficiently high insulation resistance, arrangements for protection against indirect contact are undamaged and in place, appropriate IP rating, and arrangements for protection against dangers of mechanical movement are undamaged and in place
 - procedures for equipment with unsatisfactory results - unsuitability for reconnection
 - identification of the type and arrangement of circuits supplying equipment that is to be reconnected to a single phase and/or multi-phase supply of voltages up to 1,000 V a.c. or 1,500 V d.c.
 - procedures ensuring isolation of supply
 - engaging appropriately qualified person to rectify any non-compliance
- produce documentation and reports in accordance with workplace, industry and regulatory requirements, including:
 - need to produce status reports and documents to locate and identify isolation mechanisms for a wide range of circuits and associated loads
 - production of reports and documents to use a suitable procedure to safely disconnect a component from a single-phase supply and/or multi-phase supply
 - content required in reports and documents used to safely determine the suitability of a component for reconnection to supply
 - production of reports and documents for the safe reconnection/commissioning of a component to the supply.
 - need to comply with regulatory compliance documentation requirements.

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 suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, including where not permissible under regulatory and licencing requirements, assessment must occur in suitable 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, facilities, equipment and personal protective equipment (PPE) currently used in industry
- resources used should reflect current industry practices in relation to disconnecting and reconnecting electrical equipment connected to a LV supply
- applicable documentation, including workplace procedures, equipment specifications, regulations, standards, codes of practice and operation manuals.

Links

Companion Volume implementation guides are found in VETNet - -

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