Australian Government

Assessment Requirements for UEEEL0005 Develop and connect electrical control circuits

Release: 2

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Modification History

Release 2. This is the second release of this unit of competency in the UEE Electrotechnology Training Package.

Workplace evidence requirements updated in Performance Evidence and Assessment Conditions.

Assessor requirements updated in Assessment Conditions.

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 and workplace procedures and practices, including using risk control measures
- # applying sustainable energy principles and practices
- using manufacturers' catalogues to select:
  - circuit components for appropriate duty ratings
  - control devices for specified requirements
  - pushbuttons/pilot lamps for specific requirements
  - relays for specified requirements
  - the most suitable motor starter for a given situation
  - timers for specified functions
- # labelling wires and terminals
- converting circuit (schematic) diagrams to wiring diagrams
- # developing forward reverse circuit requiring interlocking from a description of the circuit operation, including jog and interlock functions
- developing:
  - electrical control circuit in accordance with a written description (specification) and listing the sequence of operation of the circuit
  - control circuit incorporating local and remote start and stop buttons and electrical interlocking
  - simple stop-start control circuit that incorporates pilot lights and latching circuit
  - timer controlled circuits from a written description and listing the sequence of circuit operation
- measuring starting current and torque of selected motor starters

- connecting and testing:
  - circuit with a braking feature to operate a three phase motor
  - control devices into control circuits
  - direct-on-line (DOL) motor starter and testing the operation of the power and control circuits
  - variable speed drive (VSD)
  - electronic (soft) starter
  - electrical circuits with local and remote start-stop control
  - input and output devices to a programmable relay using a diagram
  - motor starter power and control circuits for correct operation
  - multiple motor starting circuit which incorporates start, stop and jog control
  - simple electrical control circuit from circuit diagrams
  - timer controlled circuit using a circuit diagram as a guide
- completing and documenting circuit development 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:

- operating principles, basic contact configurations and identification and common applications of:
  - control relays
  - timers
  - contactors
  - thermal overloads
- control circuits, including:
  - converting circuit (schematic) diagrams to wiring diagrams
  - identification of circuit diagrams (schematic) symbols and explain the operation of components represented
  - switching configurations and common applications of push buttons
  - control circuit drawing conventions
- remote stop-start control and electrical interlocking, including:
  - operation of:
    - local and remote start-stop control of relays
    - operation of an electrically interlocked control circuit
  - applying circuit checking and testing techniques to an electrical control circuit
- time delay relays, including timer circuit checking and testing procedures
- circuits using contactors, including:
  - circuit diagram symbols

    - circuit development using a contactor
    - using contactors for motor control
- jogging and interlocking, including:
    - purpose and application of:
        - jogging control of motors
        - electrical/mechanical interlocking
    - operation of motor control using start, stop and jog buttons
- control devices, including:
    - common control devices used in automatic control circuits: limit switches, proximity switches, photoelectric cells, pressure switches, float switches, light sensors and temperature sensors
    - basic operating principles of common control devices
    - advantages and disadvantages of common control devices
    - applications for common control devices
- programmable relays, including:
    - advantages of programmable relays over electromagnetic control circuit control
    - typical applications of programmable relays
    - block diagram representation and basic operating principles
    - input and output parameters, listing, connections and output types
    - basic programming of ladder circuits consisting of inputs, outputs i.e. stop-start circuit
    - using the monitoring facility of the programmable relay to verify each ladder circuit operation
    - programming timers and using the monitoring facility of the programmable relay to check the values of the timer
    - external devices
    - implications of programming normally closed field devices
    - conversion of control circuits
    - common faults and their symptoms
- three phase induction motor starters, including:
    - reasons for limiting the starting current of large motors
    - requirements of AS/NZS 3000 and the local supply authority requirements, with regard to starting and control of motors
    - operating principles, applications and circuits for:
        - direct on line (DOL) starter
        - variable speed drive (VSD)
        - variable frequency drive (VFD)
        - electronic (soft) starter
- three phase induction motor starters - reduced voltage, including:
    - operating principles and circuits for reduced voltage starters
    - common applications for starter types

  - comparison of motor starters basic characteristics
- three phase induction motor reversal and braking, including:
  - operating principles and control circuits for reversal and braking methods
  - comparison of the different braking methods used
  - typical applications for braking methods
- three phase induction motor speed control, including:
  - operating principles and circuits for motor speed control
- relevant manufacturer specifications

Assessment Conditions

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

Assessors must also hold the occupational licence for the jurisdiction the assessment is occurring where the activity being assessed requires a licence to practice.

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, 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
- applicable documentation, including workplace procedures, equipment specifications, regulations, relevant industry standards, codes of practice and operation manuals.

In addition, evidence of Performance Evidence items of this unit marked with a hash (#) must be gathered in authentic workplace operational conditions (not simulated) before final determination of competence in this unit can be made.

Links

Companion Volume Implementation Guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6