



Australian Government

UEEEL0071 Select low voltage power factor correction equipment

Release: 2

UEEEL0071 Select low voltage power factor correction equipment

Modification History

Release 2. Minor change. Typographic error in prerequisites corrected.

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 select low voltage (LV) power factor correction equipment.

It includes preparing and selecting (sizing) power factor correction equipment for commercial and/or industrial installations and documenting the selection of the equipment.

The correction equipment is limited to the capacitive type, including control devices/systems, including contactors or solid-state types.

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

Pre-requisite Unit

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

UEECD0019 Fabricate, assemble and dismantle utilities industry components

UEECD0020 Fix and secure electrotechnology equipment

UEECD0051 Use drawings, diagrams, schedules, standards, codes and specifications

UEEEL0003 Arrange circuits, control and protection for general electrical installations

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEEL0039 Design, install and verify compliance and functionality of general electrical installations

UEEEL0023 Terminate cables, cords and accessories for low voltage circuits

UEEEL0018 Select wiring systems and cables for general electrical installations

UEEEL0005 Develop and connect electrical control circuits

UEEEL0019 Solve problems in direct current (d.c.) machines

UEEEL0021 Solve problems in electromagnetic devices

UEEEL0014 Isolate, test and troubleshoot low voltage electrical circuits

UEEEL0008 Evaluate and modify low voltage heating equipment and controls

UEEEL0009 Evaluate and modify low voltage lighting circuits, equipment and controls

UEEEL0010 Evaluate and modify low voltage socket outlets circuits

UEEEL0024 Test and connect alternating current (a.c.) rotating machines

UEEEL0025 Test and connect transformers

UEEEL0012 Install low voltage wiring, appliances, switchgear and associated accessories and

UEECD0043 Solve problems in direct current circuits

or

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

Competency Field

Electrical

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to select power factor correction equipment

2 Select power factor correction equipment

PERFORMANCE CRITERIA

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

- | | |
|------------|---|
| 1.1 | Scope of the electrical installation is determined from job specifications and/or appropriate person/s |
| 1.2 | Work health and safety (WHS)/occupational health and safety (OHS) electrical installation requirements and relevant industry standards are identified and applied |
| 1.3 | Cable routes, route lengths of cables and conditions of the wiring system for operation are determined from job specifications and/or appropriate person/s |
| 2.1 | Wiring systems are selected for suitability of the environments |
| 2.2 | Cable conductor sizes are selected for current-carrying |

capacity requirements, voltage-drop and earth fault-loop impedance limitations

2.3 Circuit protective devices are selected to meet job specifications for coordination with conductor current-carrying capacity

2.4 Earthing system components are selected for the multiple earth neutral (MEN) system

2.5 Evidence of the electrical equipment selected is obtained in accordance with WHS/OHS safety requirements

3 Complete documentation

3.1 Evidence from manufacturer/supplier of the selected electrical equipment is obtained in accordance with WHS/OHS safety requirements

3.2 Selection justification and calculations are documented in accordance with workplace procedures

3.3 Electrical installation arrangement and manufacturer specifications for selected items are documented in accordance with workplace procedures and forwarded to appropriate person/s

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.

Selecting power factor correction equipment must include at least two different power factor installations from the following:

- LV installation using contactor switching
- LV installation using solid-state switching
- high voltage (HV) installation using contactor switching
- HV installation using solid-state switching

Unit Mapping Information

This unit replaces and is equivalent to UEENEEG177A Select low voltage power factor

correction equipment.

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 UEEEL0071 Select low voltage power factor correction equipment

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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 one occasion and include:

- determining the extent and nature of the installation from job specifications
- obtaining and understanding the safety and other regulatory requirements to which the electrical installation shall comply
- determining power factor correction equipment using graphical or mathematical methods
- selecting wiring system suitable for the environment requirements
- selecting cable conductor sizes in consideration to current-carrying capacity and voltage-drop/earth fault-loop limitation
- ensuring coordination between circuit protective device and conductor current-carrying capacity
- selecting compliant earthing system components
- documenting equipment and systems requirements to be used, specification for items selected and reasons for the selections made
- dealing with unplanned events
- applying relevant industry standards
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using risk control measures
- documenting power factor correction equipment installation details
- following workplace procedures
- performing relevant industry calculations
- selecting power factor correction equipment, including:
 - obtaining and applying safety and relevant industry standards
 - selecting power factor correction equipment.

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:

- power factor correction — equipment selection, including:
 - definitions, concept of power factor and reasons for improving power factor
 - situations leading to reduction of power factor
 - consequences of poor power factor encompassing:
 - demand tariff costs
 - non-compliance with national service provider (NSP) and system energy loss
 - design considerations encompassing:
 - special conditions existing and the suitability for power factor correction (PFC) such as existence of distortion due to electronic loads, uninterruptable power supply (UPS) systems, and power generation facilities or complex electronic loads
 - load profile and the nature of the load in all operating modes and with all possible sources of supply using three phase power recorders
 - power supply quality issues in terms of voltage and frequency stability
 - calculation of corrective VARs
 - circuit protection issues and safety
 - nominal location and arrangement
 - types of capacitors to be used
 - use of synchronous motor for large installations
 - possibility of resonance
 - discharge measures
 - types of PFC controls
 - low voltage (LV) PFC, high voltage (HV) PFC and solid-state switched
 - compliance with Australian Standards (AS) encompassing:
 - AS 1013-1971 Shunt capacitors for connection to power frequency systems
 - AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules)
 - AS/NZS 3947 Low voltage switchgear and control gear
 - testing and commissioning of power factor equipment, including controls
- relevant industry calculations
- relevant industry standards
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications and operating instructions
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures.

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, assessment must occur in simulated suitable 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 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.

Links

Companion Volume implementation guides are found in VETNet - -

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