



Australian Government

UEENEEI19A Set up industrial field control devices

Release 3

UEENEEI19A Set up industrial field control devices

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit	N/A	Show full pre-req chain in the unit.	
2	Edit	N/A	In Pre-requisites, delete "For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2".	
2	Edit	N/A	In Required Skills and Knowledge, insert topic numbering.	
2	Edit	N/A	Replace "essential knowledge and associated skills" with "required skills and knowledge".	
3	Edit	N/A	In Pre-requisites, edit name to reflect correct unit title UEENEEI124A Fault find and repair analogue circuits and components in electronic control systems	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers setting up industrial field control devices such as transducers, sensors, and actuators. It encompasses working safely, following design brief, applying knowledge of device operating principles, interpreting device specifications, following manufacturer's set up specifications, testing device operation and documenting set up parameters.

Application of the Unit

Application of the Unit 2)

This unit applies to any recognised development program

that leads to the acquisition of a formal award at AQF level 4 or higher.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit require a license to practice in the workplace for work involving direct access to plant and equipment connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space and lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) 4)

Competencies 4.1)

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All

Prerequisite Unit(s)**4)**

competencies in the Common Unit Group must have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Electrical

Instrumentation and Control

Common Unit Group

UEENEEE1 01A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE1 04A Solve problems in d.c. Circuits

UEENEEE1 07A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG1 01A Solve problems in electromagnetic devices and related circuits

UEENEEG1 02A Solve problems in low voltage a.c. circuits

UEENEEI12 4A Fault find and repair analogue circuits and components in electronic control systems

UEENEEI13 9A Diagnose and rectify faults in digital controls systems

Electrical Pathway Group

UEENEEG0 06A Solve problems in single and three phase low voltage machines

UEENEEG0 33A Solve problems in single and three phase low voltage electrical apparatus and circuits

UEENEEG0 63A Arrange circuits, control and protection for general electrical installations

UEENEEG1 06A Terminate cables, cords and accessories for low voltage circuits

UEENEEG1 08A Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

Prerequisite Unit(s) 4)

Instrumentation and Control Pathway Group

UEENEEI1 19A	Solve problems in multiple path extra low voltage (ELV) a.c. circuits
UEENEEI10 1A	Use instrumentation drawings, specification, standards and equipment manuals
UEENEEI10 2A	Solve problems in pressure measurement components and systems
UEENEEI10 3A	Solve problems in density/level measurement components and systems
UEENEEI10 4A	Solve problems in flow measurement components and systems
UEENEEI10 5A	Solve problems in temperature measurement components and systems
UEENEEI10 6A	Set up and adjust PID control loops
UEENEEI11 0A	Set up and adjust advanced PID process control loops
UEENEEI11 2A	Verify compliance and functionality of instrumentation and control installations
UEENEEI11 3A	Setup and configure Human-Machine Interface (HMI) and industrial networks

Literacy and numeracy skills 4.2)

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills 5)

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit
Performance Criteria describe the required performance needed to demonstrate achievement of the element.
Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

1 Prepare to set up industrial field control devices	1.1 OHS processes and procedures for a given work area are identified, obtained and understood
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.
	1.3 The field devices to be set up are determined from control system specifications and in consultations with relevant persons
	1.4 Activities are planned to meet scheduled timelines in consultation with others involved in the work.
	1.5 Tools, equipment and testing devices needed for the work are obtained in accordance with established procedures and checked for correct operation and safety.

ELEMENT	PERFORMANCE CRITERIA
2 Set up industrial field control devices	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Devices are set up drawing on knowledge of field device and operation, characteristics and applications.
	2.3 Devices are positioned and adjusted in accordance with their operating principles, manufacturer instructions and control system requirements.
	2.4 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.
	2.5 Setting up devices is carried out efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
3 Test and document set up of industrial field control devices	3.1 OHS risk control measures and procedures for carrying out the work are followed.
	3.2 Field devices are tested and final adjustments made to correct any anomalies in their operation.
	3.3 Field device set up is documented in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the required skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and setting up field control devices.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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Evidence shall show an understanding of industrial field control devices to an extent indicated by the following aspects:

REQUIRED SKILLS AND KNOWLEDGE

- T1 Industrial processes and the terminology used in measurement encompassing:
- Forms of energy
 - General classification of transducers
 - Measurement technology
 - Static accuracy.
- T2 Devices used in optoelectronic systems encompassing:
- Physics of light
 - Spectral response
 - Photometry
 - Light sources and detectors
 - Len's and mirror theory
 - Optoelectronic systems and photoelectric switches
 - Optoelectronic circuits
 - The laser
- T3 Temperature detection and measurement and their circuit configurations encompassing:
- Introduction to temperature sensing
 - Bimetallic and filled thermal sensors
 - Thermocouples, resistance temperature detectors, thermistors, solid state temperature, sensors, integrated circuit temperature sensors and phrometers
 - Control circuits using temperature detectors.
- T4 Measurement of pressure, flow and chemical encompassing:
- Diaphragm, bellows and venturi
 - Strain gauges and load cells
 - Ultrasonic and magnetic flowmeters
 - Measurement technology and accuracy
 - Viscosity, humidity and pH
- T5 Linear, angular and rotary motion detection encompassing:
- Linear motion sensors
 - Angular and rotary motion sensors
 - Shaft angle encoders
 - Linear encoders
 - Tachometers
 - Accelerometer and vibrometer

REQUIRED SKILLS AND KNOWLEDGE

- T6 Proximity and level detection encompassing:
- Mechanical
 - Ultrasonics
 - Microwave
 - Passive infrared
 - Nucleonics
 - Capacitive and inductive proximity

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit 9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
 - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
 - Demonstrate an understanding of the required skills and knowledge as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
 - Demonstrate an appropriate level of skills enabling employment
 - Conduct work observing the relevant Anti Discrimination

- legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Set up field control devices as listed as described in 10) and including:
 - A Determining the field control devices to be set up
 - B Positioning and adjusting devices accordance with their operating principles, manufacturer instructions and control system requirements
 - C Testing field devices and making final adjustments to correct any anomalies in their operation
 - D Documenting field control device set up in accordance established procedures
 - E Dealing with unplanned events by drawing on required skills and knowledge to provide appropriate solutions incorporated in a holistic assessment with the above listed items

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment 9.3)

This unit must be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, the conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to setting up field control devices.

**Method of
assessment****9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required skills and knowledge described in this unit.

**Concurrent
assessment and
relationship with
other units****9.5)**

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit must be demonstrated in relation to setting up at least four different industrial field control devices.

Note.

Examples are field control devices measurement/detection of flow, temperature, pressure, density, weight, level, smoke, motion.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field	11)
	Instrumentation and Control