



**Australian Government**

# **UEEIC0028 Provide solutions to problems in industrial control systems**

**Release: 1**

# **UEEIC0028 Provide solutions to problems in industrial control 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 provide solution to an industrial control systems problem.

It includes identifying, providing, testing and documenting a solution to industrial control system problems. It also includes interpreting process and circuit diagrams, applying knowledge of industry controls to problem-solving techniques, and safety and functional testing.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 volt (V) alternating current (a.c.) or 120 V direct current (d.c.).

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

Additional and/or 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 work health and safety (WHS)/occupational health and safety (OHS) regulations.

## **Pre-requisite Unit**

Where prerequisite pathways have been identified, all competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s)

Common Unit Group

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

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

UEEEL0020 Solve problems in low voltage a.c. circuits

UEEIC0020 Fault find and repair analogue circuits and components in electronic control systems

UEEIC0018 Diagnose and rectify faults in digital controls systems

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

UEEEL0021 Solve problems in magnetic and electromagnetic devices

and

UEECD0043 Solve problems in direct current circuits

or

UEECD0044 Solve problems in multiple path circuits

UEECD0046 Solve problems in single path circuits

Electrical Pathway Group

UEEEL0003 Arrange circuits, control and protection for electrical installations

UEEEL0023 Terminate cables, cords and accessories for low voltage circuits

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

Instrumentation and Control Pathway Group

UEECD0045 Solve problems in multiple path extra-low voltage (ELV) a.c. circuits

UEEIC0047 Use instrumentation drawings, specifications, standards and equipment manuals

UEEIC0041 Solve problems in pressure measurement components and systems

UEEIC0038 Solve problems in density/level measurement components and systems

UEEIC0039 Solve problems in flow measurement components and systems

UEEIC0043 Solve problems in temperature measurement components and systems

UEEIC0029 Set up and adjust PID control loops

UEEIC0030 Set up and adjust advanced PID process control loops

UEEIC0048 Verify compliance and functionality of instrumentation and control installations

UEEIC0031 Set up and configure human-machine interface (HMI) and industrial networks

## **Competency Field**

Instrumentation & Control

## **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 Identify industrial control system problem**

- 1.1** WHS/OHS requirements and workplace procedures are identified and applied
- 1.2** Hazards are identified, risks are assessed and control measures implemented
- 1.3** Extent of industrial control system problems are determined from job specifications, situation reports and consultations with relevant person/s
- 1.4** Work activities are planned to meet scheduled timelines in consultation with relevant person/s
- 1.5** Tools, equipment and testing devices required for work are obtained in accordance with workplace procedures and checked for correct operation and safety

#### **2 Provide solution to industrial control system problem**

- 2.1** WHS/OHS risk control measures and workplace procedures for carrying out the work are followed
- 2.2** Industrial control system devices, circuit operation characteristics and applications are applied to develop solutions to control problems
- 2.3** Parameters, specifications and job requirements for each industrial control system problem are obtained in accordance with workplace procedures
- 2.4** Industrial control system problems are evaluated to determine most effective solution
- 2.5** Unplanned situations are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- 2.6** Control system problem is resolved using sustainable energy practices without wasting materials, damaging apparatus, surrounding environments or services in accordance with workplace procedures

#### **3 Test and document solution to industrial**

- 3.1** WHS/OHS risk control measures and workplace

**control system problems**

procedures for carrying out the work are followed

- 3.2** Solutions to industrial control system problems are tested to determine effectiveness and modified, as required
- 3.3** Adopted solutions are documented including instructions incorporating risk control measures
- 3.4** Solutions used to solve industrial control system problems are justified and documented 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.

Providing solutions must include at least four of the following:

- industrial control system problems

## Unit Mapping Information

This unit replaces and is equivalent to UEENEEI120A Provide solutions to problems in industrial control systems.

## 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 UEEIC0028 Provide solutions to problems in industrial control 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, 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 implementing risk control measures
- applying sustainable energy principles and practices
- dealing with unplanned events/situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- determining extent of and evaluating solutions to resolve industrial control system problems
- documenting justification of solutions implemented in accordance established procedures
- meeting scheduled timelines
- obtaining parameter specifications and performance requirements
- preparing to provide solutions to industrial control system problems
- providing solutions to industrial control system problems
- testing and documenting solutions to industrial control system problems
- testing solution to industrial control system problems.

## 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:

- control amplifiers, including:
  - introduction
  - amplifier operation
  - operational amplifiers
  - operational amplifier configurations
- industrial transducers, including:
  - introduction
  - International System of Units (SI)
  - forms of energy

- transducer terminology
- temperature measurement
- force measurement
- speed measurement
- positional measurement
- industrial final control elements, including:
  - introduction
  - electromagnetic devices
  - valves
  - solid state switching devices
- industrial control systems, including:
  - automatic control
  - open loop control
  - closed loop control
  - control system terminology
  - control system evaluation
  - two position control
  - proportional control (P)
  - proportional + integral control (P+I)
  - proportional + derivative control (P+D)
  - proportional + integral + derivative control (P+I+D)
- industrial control loops and control signals, including:
  - introduction
  - control loops
  - converters (digital-to-analogue and analogue-to-digital)
  - multiplexing
- circuit operation, characteristics and applications
- industrial control systems problems
- operation and safety of relevant tools, equipment and testing devices
- parameter specifications and performance requirements for control system problems
- relevant job safety assessments or risk mitigation processes, including risk control measures
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures
- solutions to industrial control system problems
- sustainable energy principles and practices.

## 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, equipment specifications, regulations, 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>