

<b>Title</b>	<b>Demonstrate and apply knowledge of industrial automation engineering</b>		
<b>Level</b>	<b>6</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	<p>This unit standard covers the concepts used in industrial automation engineering.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– demonstrate knowledge of, select, and use transducers in practical industrial applications;</li> <li>– prepare and interpret diagrams using ISO standard symbols and operate pneumatic and hydraulic components using simulation software;</li> <li>– demonstrate and apply knowledge of actuators and associated control equipment;</li> <li>– demonstrate knowledge of rotating machinery and motion converters; and</li> <li>– build, program, test, and document an automation application to given specifications.</li> </ul>
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<b>Classification</b>	Industrial Measurement and Control > Industrial Measurement and Control - Theory
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<b>Available grade</b>	Achieved
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### Guidance Information

- 1 Reference  
Health and Safety at Work Act 2015;  
and all subsequent amendments and replacements.
- 2 Definitions  
*Industry practice* – practice used and recommended by organisations involved in the electrotechnology industry.  
*ISO* – International Standards Organisation.  
*PLC* – Programmable Logic Controller.
- 3 All measurements are to be expressed in Système International (SI) units, and, where required, converted from Imperial units into SI units.
- 4 All activities must comply with: any policies, procedures, and requirements of the organisations involved; the standards of relevant professional bodies; and any relevant legislative and/or regulatory requirements.

- 5 Range
- a performance in relation to the outcomes of this unit standard must comply with the Health and Safety at Work Act 2015;
  - b laboratory and workshop safety practices are to be observed at all times.
- 6 Recommended skills and knowledge: Unit 22727, *Demonstrate and apply intermediate knowledge of programmable logic controller engineering applications.*
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## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of, select, and use transducers in practical industrial applications.

Range may include but are not limited to – resistive, capacitive, resonant, optical, laser, piezoelectric, ultrasonic;  
a minimum of one advanced sensor, for example vision system or bar-code scanner, interfaced to a PLC or intelligent node.

### Performance criteria

1.1 The operation and principles of transducers are explained.

1.2 Practical applications involving transducers are constructed and explained with the aid of diagrams.

Range applications may include but are not limited to – fluid level control, position control, quality inspection by weight, sorting by size or colour;  
evidence of at least three simple transducers and one advanced transducer is required.

1.3 A practical application involving transducers to recognise images or codes is constructed and explained with the aid of diagrams.

### Outcome 2

Prepare and interpret diagrams using ISO standard symbols and operate pneumatic and hydraulic components using simulation software.

### Performance criteria

2.1 Pneumatic control circuits are drawn using ISO standard symbols in accordance with industry practice.

2.2 Simulation software is used to interconnect and operate pneumatic and hydraulic components in accordance with industry practice.

**Outcome 3**

Demonstrate and apply knowledge of actuators and associated control equipment.

**Performance criteria**

3.1 The operation and selection of actuators, directional and speed control valves, and sensors is explained in accordance with industry practice.

Range valves – three port-two position, five port-two position;  
actuators – single acting spring return, double acting, quarter and half turn rotary;  
sensors – pneumatic, hydraulic, electrical and electronic, optical.

3.2 Actuators and associated control equipment are used in practical applications in accordance with industry practice.

Range evidence of at least two actuators, two valves, and two sensors is required.

**Outcome 4**

Demonstrate knowledge of rotating machinery and motion converters.

**Performance criteria**

4.1 The operating principles of selected rotating machines and motion converters are described in accordance with industry practice.

Range evidence of at least two types is required.

**Outcome 5**

Build, program, test, and document an automation application to given specifications.

**Performance criteria**

5.1 Devices and software are selected to match a given automation application in accordance with industry practice.

Range may include but is not limited to – spool valves, DeviceNet interfaces, actuators, PLCs, processing elements, servomotors, digital camera, bar code scanner, shaft encoders analogue interfaces, mechanical assemblies.

5.2 The automation application is built, programmed, tested, and documented in accordance with industry practice.

Range may include but is not limited to – PLC, Personal Computer, soft PLC, embedded system;  
evidence of one is required.

<b>Planned review date</b>	31 December 2021
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#### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	18 December 2006	31 December 2019
Review	2	12 December 2013	N/A
Rollover and Revision	3	28 June 2018	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

#### Comments on this unit standard

Please contact The Skills Organisation [reviewcomments@skills.org.nz](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.