Title	**Demonstrate knowledge of industrial process control**		
Level	**4**	**Credits**	**2**

Purpose	This unit standard covers the basic concepts of the control of industrial processes, and is intended for people in the electrical and related trades. People credited with this unit standard are able to: – demonstrate knowledge of common transducers; – demonstrate knowledge of open-loop and closed-loop control; and – demonstrate knowledge of control actions and three-term controllers.

Classification	Electrical Engineering > Core Electrical

Available grade	Achieved

Guidance Information

This unit standard has been developed for learning and assessment off-job.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of common transducers.

Performance criteria

1.1 Transducers are identified from physical or pictorial displays, and at least one application for each is stated.

Range one transducer for each of – light, temperature, humidity, pressure or strain, level, flow, speed, motion.

1.2 Transducers are described in terms of their function and principles of operation.

Range photo-diode, solar cell, thermocouple, resistance thermometer, strain gauge, piezo-electric device, float switch, capacitive level transducer, pulse disc, tachogenerator.

1.3 Standard control signal ranges used for process control are stated.

Range control signals – voltage, current, pressure.

Outcome 2

Demonstrate knowledge of open-loop and closed-loop control.

Performance criteria

2.1 Control terms are defined in accordance with industry practice.

Range comparator, set point value, feedback, deviation, gain, final control element, controlled variable, measuring element, proportional offset.

2.2 Open-loop control is described with the aid of a block diagram.

2.3 Closed-loop control is described with the aid of a block diagram.

2.4 The features of closed-loop control systems are described in terms of measuring, comparing, and adjusting.

2.5 Advantages of closed-loop control over open-loop control are stated for common control processes.

Range control processes – level, temperature, motor speed.

Outcome 3

Demonstrate knowledge of control actions and three-term controllers.

Performance criteria

3.1 Objectives of good control systems are explained.

Range low offset, fast response, stability.

3.2 Types of control action are described with the aid of process response diagrams.

Range on-off, proportional, derivative, integral.

3.3 Operation of the three-term controller is described using a block diagram.

Range buffer amplifier, comparator, proportional amplifier, integral amplifier, derivative amplifier.

Replacement information	This unit standard replaced unit standard 1711 and unit standard 2026.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	10 February 1999	31 December 2013
Review	2	26 May 2005	31 December 2021
Rollover and Revision	3	15 March 2012	31 December 2021
Revision	4	15 January 2014	31 December 2021
Review	5	21 July 2016	31 December 2027
Review	6	24 March 2022	31 December 2027
Rollover and Revision	7	25 May 2023	31 December 2027

Consent and Moderation Requirements (CMR) reference	0003

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.