Title	**Demonstrate knowledge of process control in mechanical engineering**		
Level	**4**	**Credits**	**3**

Purpose	This unit standard is intended for people training in mechanical engineering trades. People credited with this unit standard are able to demonstrate knowledge of simple control loops, process control components, and process control applications used in mechanical engineering control.

Classification	Mechanical Engineering > Maintenance and Diagnostics in Mechanical Engineering

Available grade	Achieved

Guidance Information

Definitions
DCS – Distributed control system.
HMI – Human machine interface.
PID – Proportional integral derivative.
PLC – Programmable logic controller.
SCADA – Supervisory control and data acquisition.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of simple control loops used in mechanical engineering control.

Performance criteria

1.1 Open-loop and closed-loop control are distinguished from each other.

1.2 Simple feedback closed-loop control system operation is explained using diagrams with reference to the components and signals.

Range process variable, sensor, transducer, feedback signal, controller, regulating signal, control element, set point, control limits.

1.3 Discrete and continuous processes are distinguished from each other.

1.4 Practical applications of simple feedback control processes in mechanical engineering are outlined.

Range one process using mechanical feedback, one process using electrical signals.

Outcome 2

Demonstrate knowledge of components used in mechanical engineering process control.

Performance criteria

2.1 The purpose of transducers is described in terms of controlling mechanical processes.

2.2 The principles of operation of transducer types are described.

Range transducer type examples are – mass, weight, force, position, level, pressure, temperature, flow rate;
evidence of four transducer types is required.

2.3 The function of PLCs in process control is described with reference to input, output, and programme logic.

2.4 The advantages of a PID controller are contrasted with those of a PLC.

2.5 Two examples of the role of switches, motors, and solenoids or actuators in controlling mechanical engineering processes are identified and explained.

Outcome 3

Demonstrate knowledge of process control applications used in mechanical engineering control.

Performance criteria

3.1 The terms stand alone control, integrated control, and distributed control are explained in relation to control of plant processes.

3.2 Signal communication methods used in real-time DCSs are described using sketches.

Range analogue, digital, current loop, digital networks.

3.3 The roles of SCADA and HMI in controlling industrial processes are described, with the aid of a diagram.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 June 2006	31 December 2014
Review	2	15 April 2011	31 December 2022
Review	3	20 July 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013

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

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.