Title	**Maintain conditioning modules and electronic or microprocessor based controllers**		
Level	**4**	**Credits**	**6**

Purpose	People credited with this unit standard are able to: – reconfigure or calibrate signal conditioning modules; – configure and test an electronic or microprocessor based controller; – service signal conditioning modules; and – service an electronic or microprocessor based controller.

Classification	Industrial Measurement and Control > Industrial Measurement and Control - Maintenance

Available grade	Achieved

Guidance Information

1 This unit standard has been developed for learning and assessment in a workplace environment.

2 References
ANSI/ISA-51.1-1979 (R1993) *Process Instrumentation Terminology*;
Electricity Act 1992;
Electricity (Safety) Regulations 2010;
Health and Safety at Work Act 2015 and associated regulations;
ISSN 0114-0663, *New Zealand Electrical Codes of Practice*, available from Worksafe, https://worksafe.govt.nz/;
and their subsequent amendments and replacements.

3 Definitions
Industry practice – practice used and recommended by organisations involved in the electrotechnology industry.
Industry requirements – includes all asset owner requirements; manufacturers' specifications; enterprise requirements which cover the documented workplace policies, procedures, specifications, and business requirements; and quality management requirements relevant to the workplace in which the assessment is carried out.
Service – planned activity during normal operation that involves inspection, cleaning, testing, adjusting or making minor repairs to a piece of equipment to ensure that it works properly.

4 For the purposes of this unit standard a *microprocessor based controlle*r can mean distributed control system (DCS), programmable logic controller (PLC), standalone proportional integral and derivative (PID), or on/off controller.

5 Recommended skills and knowledge: Unit 2649, *Demonstrate knowledge of signal conditioners, trending recorders, and alarm systems*; and Unit 2654, *Demonstrate knowledge of on/off and proportional integral derivative mode control theory and controllers*.

Outcomes and performance criteria

Outcome 1

Reconfigure or calibrate signal conditioning modules.

Performance criteria

1.1 Identify type and cause of typical errors in accordance with industry requirements.

1.2 Explain and follow safe work procedures.

Range may include but is not limited to – isolation, plant upsets by loss of control.

1.3 Reconfigure or calibrate a current to pressure converter and a loop isolator according to manufacturers' instructions.

1.4 Reconfigure or calibrate signal conditioning equipment according to manufacturers' instructions.

Range intrinsic safe barrier, pressure to current converter, chart recorder, signal conditioning module, alarm module, current to relay; evidence of one required.

1.5 Document test results in accordance with industry requirements.

Outcome 2

Configure and test an electronic or microprocessor based controller.

Range one electronic or microprocessor based controller.

Performance criteria

2.1 Explain and follow safe work procedures.

Range may include but is not limited to – isolation of controller, plant shutdown.

2.2 Select test equipment to match the accuracy and range of devices.

Range 1-5v or 4-20mA, digital multimeters.

2.3 Identify type and cause of typical errors.

Range may include but is not limited to – software revision, contact corrosion.

2.4 Configure and test controllers for correct indication in accordance with manufacturer's instructions.

Range indication, process variable (input), setpoint, controlled variable (output).

2.5 Test controllers for correct operation in the control modes selected.

Range may include but is not limited to – on/off control, proportional, proportional and integral, proportional and derivative, proportional integral and derivative.

2.6 Document test results in accordance with industry requirements.

Outcome 3

Service signal conditioning modules.

Range current to pressure converter, loop isolator, intrinsic safe barrier, pressure to current converter, chart recorder, signal conditioning module, alarm module, current to relay;
evidence of one is required.

Performance criteria

3.1 Locate, interpret, and apply technical information for servicing equipment.

3.2 Explain and follow safe work procedures.

Range may include but is not limited to – isolation, plant upsets by loss of control.

3.3 Service signal conditioning modules to ensure continued operation.

Range may include but is not limited to – tools, materials, parts, techniques, specifications.

3.4 Produce reports and documentation in accordance with industry requirements.

Outcome 4

Service an electronic or microprocessor based controller.

Range one electronic or microprocessor based controller.

Performance criteria

4.1 Locate, interpret, and apply technical information for maintaining equipment.

4.2 Explain and follow safe work procedures.

Range may include but is not limited to – isolation, plant shutdown.

4.3 Carry out fault finding of controller components to printed circuit board level of identification in accordance with industry requirements.

4.4 Service electronic or microprocessor based controllers to ensure continued operation.

Range may include but is not limited to – tools, materials, parts, techniques, specifications.

4.5 Produce reports and documentation in accordance with industry requirements.

Replacement information	This unit standard replaced unit standard 2651 and unit standard 2656.

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	19 May 2008	31 December 2019
Review	2	21 November 2013	31 December 2027
Rollover and Revision	3	28 June 2018	31 December 2027
Review	4	30 January 2025	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.