Title	**Install or replace, test, and commission industrial instrumentation**		
Level	**4**	**Credits**	**10**

Purpose	People credited with this unit standard are able to: – install or replace a pressure or differential pressure transmitter; – install or replace a measuring element and associated transmitter; – test instrumentation; and – commission instrumentation loops.

Classification	Industrial Measurement and Control > Industrial Measurement and Control - Installation

Available grade	Achieved

Guidance Information

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

2 References
Electricity Act 1992;
Electricity (Safety) Regulations 2010;
Health and Safety at Work Act 2015 and associated regulations;
ISO 2186:2007 – *Fluid flow in closed conduits – Connections for pressure signal transmissions between primary and secondary elements*:
ISO 5167-2:2003 – *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full – Part 2: Orifice plates,* available at https://www.iso.org/home.html;
ISSN 0114-0663, *New Zealand Electrical codes of practice,* available from Worksafe, https://worksafe.govt.nz/;
and all subsequent amendments and replacements.

3 Definitions
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.
Installation – is defined as positioning, mounting and connecting of a transmitter, associated elements, interconnecting cabling and/or tubing. Total replacement involving the skills above is acceptable for an installation.

4 Recommended skills and knowledge: Unit 24889, *Demonstrate and apply knowledge of industrial instrumentation installation*.

Outcomes and performance criteria

Outcome 1

Install or replace a pressure or differential pressure transmitter.

Range typical installation or replacement may involve – pressure, level, density, or flow measurement;
evidence of one installation or replacement is required.

Performance criteria

1.1 Explain and follow safe work procedures.

Range may include but is not limited to – isolation, filled systems, chemical, pressure.

1.2 Position and mount transmitter in accordance with manufacturer's recommendations and installation drawings.

1.3 Install and connect pipework in accordance with manufacturer's recommendations and installation drawings.

Range may include but is not limited to – pressure rating, corrosion resistant materials, gases, steam, vapour, liquids.

1.4 Carry out electrical connections in accordance with manufacturer's recommendations, drawings, Electricity Regulations, and industry practice.

Range electrical installation or replacement requirements include but are not limited to – correct polarity; corrosion resistant materials; wiring entries are sealed; screened cable, if used; earthed in accordance with industry requirements; loop resistance limits are not exceeded; current loop is earthed in accordance with industry requirements; signal wiring and power wiring proximity meets industry requirements.

Outcome 2

Install or replace a measuring element and associated transmitter.

Range typical installation or replacement may involve – thermocouple, resistance temperature detector (RTD), pH, conductivity, dissolved oxygen, humidity, flowmeter (turbine, electromagnetic, paddle wheel, vortex, or ultrasonic);
evidence of one installation or replacement is required.

Performance criteria

2.1 Explain and follow safe work procedures.

Range may include but is not limited to – isolation, temperature, chemical, pressure.

2.2 Position, install, or replace the measuring element in accordance with manufacturer's recommendations and drawings.

2.3 Carry out transmitter electrical connections in accordance with manufacturer's recommendations, drawings, Electricity Regulations, and industry practice.

Range electrical installation or replacement requirements include but are not limited to – correct polarity, corrosion resistant materials, wiring entries are sealed, screened cable earthed in accordance with industry requirements, loop resistance limits are not exceeded, current loop is earthed in accordance with industry requirements, signal wiring and power wiring proximity meets industry requirements.

Outcome 3

Test instrumentation.

Range instrumentation refers to the devices installed or replaced in outcomes 1 and 2 above.

Performance criteria

3.1 Select test equipment of correct type and accuracy to meet the requirements of manufacturer's instructions and process documentation.

Range may include but is not limited to – digital multimeter, thermocouple simulator, resistance temperature detector (RTD) simulator, pressure calibrator, 4-20mA loop calibrator, smart or digital transmitter calibrator, dedicated calibrator.

3.2 Perform measurements to confirm that power supplies are within the specified tolerances.

3.3 Carry out testing to confirm that the instrumentation operates within specified tolerances.

3.4 Record test results in accordance with industry requirements.

Outcome 4

Commission instrumentation loops.

Range commissioning refers to the two devices installed or replaced in outcomes 1 and 2 above.

Performance criteria

4.1 Explain and follow safe work procedures.

Range may include but is not limited to – isolation, steam, temperature, chemical, pressure.

4.2 Carry out pre-commissioning procedures in accordance with specifications and industry practice.

Range typical pre-commissioning procedures for differential pressure loops – transmitter on-line zero check, transmitters bled, impulse lines filled, transmitter isolated from high temperature process, use of three-valve manifold;
typical pre-commissioning procedures for other measurement loops – transmitter on-line zero check, on-line full scale calibration check.

4.3 Commission instrumentation to prove operation of the complete control loop is in accordance with process documentation and industry requirements.

4.4 Complete documentation of commissioning in accordance with industry requirements.

Replacement information	This unit standard was replaced by skill standard 40234.

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	17 December 1996	31 December 2013
Revision	2	4 November 1997	31 December 2013
Revision	3	3 April 2001	31 December 2013
Review	4	22 June 2001	31 December 2013
Review	5	19 May 2008	31 December 2019
Review	6	21 November 2013	31 December 2027
Rollover and Revision	7	28 June 2018	31 December 2027
Review	8	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.