

40237 Test a PID controller and analyse control loops

Kaupae Level	4
Whiwhinga Credit	5
Whāinga Purpose	<p>This skill standard recognises the skills required to test a Proportional Integral Device (PID) controller and analyse control loops on live plant or in a controlled environment.</p> <p>This skill standard may contribute to the New Zealand Certificate in Industrial Measurement and Control (Practice) (Level 4) [Ref: 2251].</p>

Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria

Hua o te ako Learning outcomes	Paearu aromatawai Assessment criteria
1. Test a PID controller.	a. The individual PID control terms' contribution to the final controller output response is tested against a repeated step change applied to the input process variable.
	b. The impacts of each of the individual PID terms on the final controller output are recorded and described.
2. Analyse control loops on live plant or in a controlled environment.	a. The process under control and its requirements are described.
	b. The direction of the control action and the enabled control terms are described.
	c. Disturbance elements and process responses affecting the tuning process are described.
	d. Process response and tuning performance are described and analysed against the process requirements.
	e. Impacts of tuning activities on other plant activities and personnel are described.

Pārongo aromatawai me te taumata paearu | Assessment information and grade criteria

Assessment specifications:

A stand-alone PID controller or a PID function in a digital control system may be used in assessment of this skill standard. For each test, the input process variable is toggled and/or ramped between two discrete values. Each of the following controller configurations are tested: P, PI, PD, PID. Each configuration is tested with at least two different values for each of the enabled PID terms. Only one tuning value is altered between each test.

Outputs may be described in writing, orally, or using a drawing.

The description of the process under control should include the process type, the process medium, the controlled variable, the measuring device, and the final control element.

To achieve this standard the candidate must be capable of consistently:

- performing the skill to the required industry standard
- repeating the skill on demand
- performing the skill without supervision
- applying the skill to other work.

Control terms refer to P, PI, PD, PID.

Direction of control action include direct, reverse, and double acting.

Industry requirements refer to all asset owner requirements; manufacturers' specifications; enterprise requirements which cover the documented workplace policies, procedures, specifications, and business requirements; and quality management relevant to the workplace.

Process requirements include the set value range, required accuracy and stability, any startup or shutdown considerations, and any process alarm conditions.

Ngā momo whiwhinga | Grades available

Achieved.

Ihirangi waitohu | Indicative content

- Safe work procedures.
- Relevant sources of technical information.
- Control loop tuning or adjustment tuning methods.
- Characteristics of the process being controlled, upstream and downstream effects.
- Consideration of impact to stakeholders.
- Documentation requirements, including labelled process charts.

Rauemi | Resources

- Programme guidance available from qualifications@waihangaararau.nz.
- Manufacturers' instructions and device specification sheets relevant to the systems and equipment used for the task.
- Electricity Act 1992.
- Electricity (Safety) Regulations 2010.
- All vocabulary will align to the IEC 60050 International Electrotechnical Vocabulary (IEV) available at [IEC 60050 - International Electrotechnical Vocabulary](#).

Pārongo Whakaū Kouna | Quality assurance information

Ngā rōpū whakatau-paerewa Standard Setting Body	Waihanga Ara Rau Construction and Infrastructure Workforce Development Council
Whakaritenga Rārangi Paetae Aromatawai DASS classification	Engineering and Technology > Industrial Measurement and Control > Industrial Measurement and Control - Maintenance
Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga CMR	0003

Hātepe Process	Putanga Version	Rā whakaputa Review Date	Rā whakamutunga mō te aromatawai Last date for assessment
Rēhitatanga Registration	1	30 January 2025	N/A
Kōrero whakakapinga Replacement information	N/A		
Rā arotake Planned review date	31 December 2029		

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaararau.nz to suggest changes to the content of this skill standard.