
Industrial Process Controller Selection, Configuration and Loop Tuning Training Course

22 – 26 February 2027
Tokyo





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Programme Summary

Industrial process controller selection, configuration and loop tuning is the subject of this one-week training course for engineering managers and senior control and electrical engineers, ending in a controller review pack for one plant area. Controllers hold production steady, yet their settings, redundancy and changes are often managed by habit rather than record. The programme moves from architecture and signals to configuration, tuning, availability, change control and performance review, using cases from process and power plants. Mars Training Centre UK delivers this programme on industrial process controller selection, configuration and loop tuning to mixed-organisation cohorts.

The Business Case

A poorly tuned or poorly governed controller shows up as unstable product quality, nuisance alarms, avoidable trips and long fault searches. Where records sit with individuals, knowledge leaves with them. A shared method gives managers a basis to specify controllers, approve changes and judge whether loops are earning their place.

- Process Stability: Improves as loops are tuned against recorded process responses.
- Unplanned Stoppages: Fall as redundancy and failover are tested before they are needed.
- Fault Search Time: Falls as configuration and change history are kept in one controlled record.

Principles and Evidence Base

- Feedback Control Theory: Explains stability, gain and response, and underpins the tuning work in Session 3.
- Control Loop Performance Assessment: Provides the indices used to rank loops in Sessions 4 and 5.
- Availability and Redundancy Principles: Frame the failover and fault tolerance tests in Session 4.
- Configuration Management: Sets the baseline, change and restore discipline applied in Sessions 2 and 4.

Intended Participants

- Engineering managers who specify, approve and review control systems for a plant.
- Senior control engineers who configure and tune loops in running units.
- Electrical engineers who connect controllers to drives, switchgear and field devices.
- Reliability and maintenance leads who investigate repeated loop and controller faults.

Typical functions include refineries, chemical plants, power stations and water or utility operations.



Learning Outcomes

1. Participants will be able to compare controller architectures against the duty, signal count and speed a plant area requires.
2. Participants will be able to construct a controller configuration with scaled signals, alarm limits and a test record.
3. Participants will be able to diagnose loop instability from process response tests and select a tuning rule to correct it.
4. Participants will be able to evaluate redundancy and failover arrangements against a stated availability need.
5. Participants will be able to prioritise loops for improvement using performance indices and alarm data.
6. Participants will be able to justify a controller change to an engineering review board with its tests and rollback plan.

Programme Structure

Day 1: Industrial Process Controller Architecture

What does a controller do within the plant control layers, and which type suits a duty?

- Controller Architecture Diagram
- Control Layer Map
- Input and Output Signal Schedule
- Controller Selection Matrix
- Scan Cycle and Timing Sheet

Day 2: Controller Configuration and Signals

How is a controller configured so that it is correct, readable and testable?

- Configuration Standard Template
- Loop Configuration Checklist
- Signal Scaling and Range Sheet
- Alarm Parameter Table
- Configuration Test Record

Day 3: Loop Tuning and Control Strategies

Why does a loop oscillate or respond slowly, and how is it tuned?

- Process Response Test Record
- PID Tuning Rule Comparison
- Cascade and Feedforward Design Sheet
- Gain and Stability Margin Table
- Tuning Parameter Log



Day 4: Redundancy, Change Control and Performance

How are availability, change and loop performance kept under control over time?

- Redundancy and Failover Test Plan
- Controller Change Control Form
- Backup and Restore Procedure
- Loop Performance Index Report
- Alarm Rationalisation Review

Day 5: Controller Review Pack for One Plant Area

Do the architecture, configuration, tuning and performance records support one controller decision?

- Applying the Session 1 Controller Selection Matrix
- Testing the Session 2 Loop Configuration Checklist
- Reviewing the Session 3 Tuning Parameter Log
- Checking the Session 4 Loop Performance Index Report
- Completing the Controller Review Pack

Methodology

The programme uses a data workshop method built on a shared case of a process unit with a boiler, a compressor train and a power distribution board. Participants build each artefact on prepared plant data, then adapt it to an area they know.

- Suggested activity: Reading a step response record to choose tuning settings for a sluggish loop.
- Suggested activity: Writing a failover test plan for a pair of redundant controllers.
- Suggested activity: Presenting a controller change request to a mock review board.

Capstone Output

Each participant completes a controller review pack for one plant area. It holds a controller selection matrix, a configuration checklist, a tuning parameter log, a failover test plan and a ranked list of loops for improvement. The pack is used at work to brief the engineering team and plan the next shutdown or upgrade.

Frequently Asked Questions

Is industrial process controller training suitable for managers who no longer tune loops?

Yes. Industrial process controller selection, configuration and loop tuning is taught through cases and templates, assuming engineering experience in a plant but no recent hands-on tuning.



Which concepts does industrial process controller selection and loop tuning training rest on?

Industrial process controller training rests on feedback control theory, loop performance assessment, redundancy and availability principles and configuration management, applied to process and power plants.

How is the pack from industrial process controller training used at work?

You use the controller review pack to brief the engineering team, support a change request and plan the next shutdown or control system upgrade.

How does industrial process controller training differ from industrial control systems security training?

Industrial process controller training centres on selection, configuration, tuning and loop performance, while industrial control systems security training covers network defence, access control and incident response.