

FREE WORKFORCE-DEVELOPMENT RESOURCE

Maintenance Training & Assessment Toolkit

A practical controls skills matrix, assessment rubric, sample report, and 30/60/90-day training plan for maintenance and automation teams.

PLC Simulator Pro

Browser practice + deterministic grading + team evidence

Use this before a pilot

Choose the competencies the role owns, weight them, assign equivalent work samples and define the supervised physical follow-up.

Use this after training

Compare accuracy, attempts, diagnostic path, recovery and unsafe choices—not attendance or confidence alone.

Scope: this toolkit covers PLC and industrial electrical-controls evidence. It does not authorise live work or replace site safety training, trade testing, permits, LOTO or supervised physical assessment.

Weight the work the role actually performs

A single “maintenance score” hides the gap. Use competency rows so training and authorisation decisions remain specific.

Competency	Weight	Brower evidence	Physical follow-up
Drawing navigation	8%	Trace control supply to load	De-energised panel trace
PLC I/O tracing	10%	Field state → LED → tag → rung	Terminal/module verification
Ladder logic reading	10%	Predict state; prove edge cases	Read approved live-view rung
Motor start/stop	10%	Seal-in, stop, overload, restart	Safe training-panel practical
Timers and counters	8%	Reset, retention and boundaries	Controller lab confirmation
Interlocks/permisives	10%	Forward/reverse safe exclusion	Contactors interlock check
Systematic diagnosis	14%	Unseen hidden fault + recovery	Supervised work order
Analog and alarms	8%	Scaling, thresholds, hysteresis	Safe 4–20 mA source/measure
VFD recovery	6%	Trip latch and safe reset	Vendor training drive
Sequence diagnosis	6%	State/transition/scan-order fault	Offline site-sequence review
Safety awareness	4%	Conservative reset/mute behaviour	Site safety qualification
Documentation	6%	Symptom, evidence, fix, proof	Approved maintenance record

Editable version: maintenance-technician-controls-skills-matrix.csv, included beside this PDF.

Score the diagnostic process as well as the answer

35

Diagnosis accuracy

Correct failed component, address, condition or logic mechanism with evidence.

20

Method

Moves from symptom to controlled tests; avoids unrelated edits and part swapping.

20

Recovery proof

Normal operation, trip, reset, boundary and repeated-cycle tests all pass.

15

Safety judgement

Uses appropriate simulated meter mode; stops at the simulation/authorisation boundary.

10

Handover

Records symptom, evidence, root cause, correction and proof clearly.

Suggested bands

85–100: ready for physical confirmation

70–84: competent with targeted coaching

50–69: assigned practice

<50: foundation rebuild

Decision rule: never convert a browser score directly into authorisation. A passing simulation result advances the learner to the role-specific supervised practical; it does not replace it.

Assessor checklist

- ☐ Same brief and machine state for comparable participants
- ☐ Unseen or equivalent fault—not the training example
- ☐ Timebox recorded but not allowed to reward guessing
- ☐ Unsafe simulated choices documented separately
- ☐ Repeated-cycle proof required after correction
- ☐ Physical follow-up named before the assessment starts

Candidate 024 • Controls maintenance baseline

78 / 100
weighted score

4 / 6
tasks passed

1
unsafe setup

Work sample	Result	Evidence	Decision
Motor start/stop	Pass	All stop, trip and restart cases	Advance to safe panel practical
Wrong I/O address	Pass	Compared field state, LED and tag	Meets core I/O standard
Timer reset fault	Pass after 2 attempts	Found retention; proved 3 cycles	Coach timer-type selection
Scan-order race	Not passed	Changed outputs before tracing execution order	Assign scan-cycle module
Analog alarms	Pass	Correct scaling and hysteresis	Advance to 4–20 mA bench
Motor-control diagnosis	Not passed	Continuity selected on energised simulated circuit	Repeat meter-mode and safety coaching

Strength

Reads normal ladder state accurately and documents evidence clearly.

Priority gap

Execution-order diagnosis and meter-mode selection under fault pressure.

30-day assignment

Scan-cycle lesson, two equivalent sequence faults, meter decision drill.

Next decision

Re-assess unseen equivalents, then schedule supervised physical checks.

This sample uses illustrative data and is not presented as a real customer result.

Move from baseline to equivalent unseen work

Phase	Training work	Evidence	Manager gate
Days 1–30 Foundation	Baseline; I/O; ladder; start-stop; timers; documentation	First-pass rate, attempts and four scenario records	Confirm role scope and physical-practical plan
Days 31–60 Diagnosis	Unseen address, sensor, timer, scan-order, analog and VFD faults	Diagnostic path, unsafe choices, recovery and repeated-cycle proof	Coach the method; do not reward lucky fixes
Days 61–90 Transfer	Integrated sequence, equivalent post-test and supervised plant/bench checks	Baseline change plus assessor physical record	Authorise only evidence-backed tasks

Weekly manager questions

- ☐ Which fault family is improving?
- ☐ Where is the learner still changing things before gathering evidence?
- ☐ Can they prove the recovery across abnormal and repeated cases?
- ☐ Which skill now needs supervised physical confirmation?
- ☐ What should the next equivalent unseen task test?

Measurement set: assigned, started, completed, first-pass success, attempts, elapsed time, diagnosis accuracy, unsafe choices, recovery pass and physical follow-up. Completion alone is not a competency measure.

Editable version: industrial-maintenance-30-60-90-training-plan.csv, included beside this PDF.

Decide whether the programme transfers

Before the pilot

- ☐ 5–15 learners with a named role
- ☐ 3–5 target competencies
- ☐ Baseline and equivalent post-test
- ☐ Physical follow-up agreed
- ☐ One accountable instructor/manager

After the pilot

- ☐ Completion and dropout reasons
- ☐ Accuracy and first-pass change
- ☐ Attempts and unsafe choices change
- ☐ Manager-observed work transfer
- ☐ Roll out, revise or stop decision

Metric	Baseline	Post	Decision threshold
Diagnosis accuracy	_____	_____	Role owner sets before pilot
Median attempts	_____	_____	Down without lower task difficulty
Unsafe simulated choices	_____	_____	Zero on post-test
Repeated-cycle recovery	_____	_____	All required cases pass
Physical follow-up pass	_____	_____	Site standard

RUN A BOUNDED PILOT

Use real browser scenarios before buying a rollout.

plcsimulationsoftware.com/for-teams/pilot