

Factory Acceptance Test (FAT) Checklist for Plant Controls

The end user's side of a controls FAT: what must be true before day one, what to test, how to run four days, how to classify defects, and what must be signed before the equipment ships.

Project	_____	Supplier / shop	_____
FAT dates	_____	End-user lead	_____
Protocol rev.	_____	Software version	_____

How to use it

1. Send section 1 to the integrator two weeks before FAT. Every unchecked box on the morning of day one is a reason to pause.
2. Bring sections 2 to 5 to the shop. Log every observation in the punch list the moment it is seen.
3. Do not sign until every box in section 6 is checked.

Follows the structure of IEC 62381 (FAT and SAT for automation systems). On regulated sites the defect log also feeds GAMP 5 validation evidence.

1 Entry criteria: before day one

- ☐ Panel build complete and matching the general arrangement drawings
- ☐ Software loaded at the production version that was tested internally
- ☐ Simulation or stimulus rigs connected for the I/O in scope
- ☐ Integrator's internal dry-run documented as complete
- ☐ FAT protocol signed, at the revision on the bench
- ☐ Documentation package present at the cited revisions: P&IDs, control narrative, I/O list, network diagram, panel GA and schematics, bill of materials, software and firmware version list, HMI screen inventory, alarm list, design review minutes
- ☐ End-user preparation: highlighted P&IDs, operator-SME question list, the scenarios the plant has historically struggled with, punch-list template
- ☐ Operator or maintenance SME attending day two, not only a project manager

2 Test categories the protocol must cover

- ☐ **Hardware inspection:** build quality, wiring dress, termination torque, labels, ground continuity
 - ☐ **Power-up and fault clearing:** cold start, fault-clearing sequence, power-interruption recovery
 - ☐ **I/O loop checks:** forced and simulated I/O to each signal's range and engineering units
 - ☐ **Control logic:** sequences, interlocks, permissives, PID loops with simulated process response
 - ☐ **Operator HMI:** screen-by-screen navigation, controls, trends, historian data flow
 - ☐ **Alarms:** every alarm triggered, every classification and operator response verified
 - ☐ **Network and communication:** topology, protocol handshakes, controller-to-controller messaging
 - ☐ **Failure and recovery:** E-stop, loss of power, network fault, communication timeout, safe states
 - ☐ **Safety functions** (where a safety instrumented system is in scope): each function verified, with response time
 - ☐ **Documentation review:** every document opened, cross-checked against the build, and signed
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3 The four-day run

Day	Focus	Watch for
1	Entry criteria, hardware inspection, power-up, communications, HMI cold start, sample I/O loop checks	More than ten open Major or Critical defects at end of day: hold a schedule conversation, do not push harder
2	Control logic by subsystem: sequences, interlocks, permissives, PID	The operator SME's scenario questions find the bugs a code review misses
3	Alarms, failure and recovery, network faults, E-stop and safety functions	Highest rate of new Major defects. Keep day 4 in reserve
4	Re-verification of every fix, cross-document review, punch-list review, sign-off	Re-run the full failing procedure, not a one-case demonstration

End of each day: review the day's punch-list entries with the integrator's project lead and agree classifications and owners. Thirty minutes that prevents the day-four scramble.

4 Defect classes

Class	Definition	Before shipment
Critical	Prevents core function, creates a safety hazard, breaks a regulatory or purchase-order requirement, or risks data integrity	Resolved and the failing test re-verified. No deviations
Major	Core function works, but usability, reliability or planned operation is significantly impaired	Resolved, or a signed deviation with a compensating action and a firm date inside the commissioning window
Minor	Cosmetic, documentation or convenience issue with no effect on function	Logged with owner and date; may travel on the open punch list

5 Punch list

#	Date	Found by	Test ref.	Description	Component	Class	Owner	Before ship?	Resolved	Verified

6 Sign-off: do not sign until

- ☐ Zero Critical defects open
- ☐ Zero Major defects open, or each has a signed deviation with a compensating action and a firm date
- ☐ Open Minor defects disclosed, each with an owner and a date
- ☐ Every fix re-verified by re-running the full test procedure that failed
- ☐ No Major defect reclassified as Minor because of the ship date
- ☐ No verbal fixes: every agreement is on the punch list
- ☐ Documentation updated to the as-tested state, redlines transferred to controlled drawings
- ☐ Software and configuration archived at the tested version, checksummed, with a copy leaving with the end-user team

7 Handoff package signed before shipment

- ☐ Signed FAT report: summary, defect log with dispositions, signed protocol pages, deviations, as-built photographs, signatures
- ☐ Updated documentation package at the as-tested revision
- ☐ Checksummed software and configuration archive
- ☐ Training record for the operators and maintenance staff who attended
- ☐ Packing and shipping documentation: preservation, shock monitoring, lifting and uncrating instructions
- ☐ SAT action list: everything that could not be verified at FAT (field I/O, field devices, live process)
- ☐ Signed open punch list, each item with an owner, a date and a class

FAT sign-off

End user: name, title, signature, date

Integrator: name, title, signature, date

Independent witness (if any): name, signature, date

Equipment released to ship: date

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Companion guide: joltek.com/blog/factory-acceptance-test-plant-controls. For an independent FAT witness or a protocol review before execution: joltek.com/services/owners-engineer.

This checklist is provided for engineering planning. It is not legal or regulatory advice.