

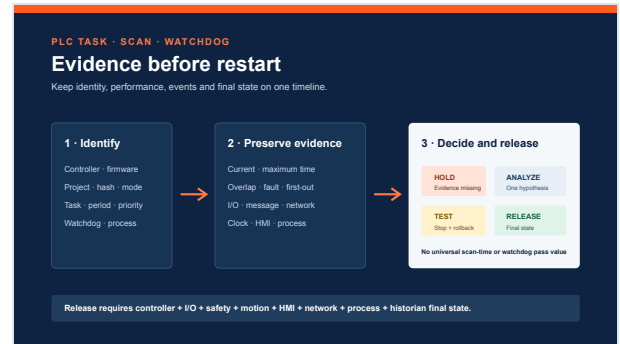
## EN-GUIDE-01 · PLC EXECUTION EVIDENCE

# PLC Task, Scan-Time & Watchdog Fault Evidence Before Restart

A normal average scan time does not prove adequate execution margin. Preserve task type, period, priority, watchdog, maximum execution time, overlap, events, changes and process impact on one timeline before changing settings or authorizing restart.

Reviewed: 23 July 2026 · System: PLC task execution

Output: restart decision record



Explanatory decision diagram, not a customer installation or a universal acceptance criterion.

### DECISION SUMMARY

**Treat watchdog and scan symptoms as an evidence problem before treating them as a setting problem.**

**Do not use “increase the watchdog” as the starting action.**

First preserve the controller baseline, task performance, overlap, event timing, communications load, online changes and affected process state. The acceptable limit comes from the approved application, controller documentation, site risk assessment and responsible engineer – not from this page.

## OBSERVABLE SYMPTOMS

### Signals that justify a controlled evidence capture

- ☒ HMI response or sequential control slows only during peak production.
- ☒ A periodic task is triggered again before its previous execution has finished.
- ☒ A watchdog or major fault follows an online edit, message burst or communications change.
- ☒ The controller returns to RUN, but I/O, motion, safety, recipe or historian state is unverified.
- ☒ The proposed correction begins with a setting increase rather than a causal test.

## STOP-WORK CONDITIONS

### Pause the work when the boundary, baseline or final state cannot be proven.

|                                                                                                  |                                                                                                                                |                                                                                                                                               |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Safety impact unknown</b><br>Safety-task or process-response impact has not been assessed.    | <b>Identity unproven</b><br>Controller identity, project baseline or task configuration cannot be verified.                    | <b>Evidence at risk</b><br>Fault and overlap evidence may be cleared before export.                                                           |
| <b>Rollback missing</b><br>An online change lacks safe-state, rollback and communications plans. | <b>Causal test missing</b><br>A watchdog, period or priority change is proposed without an approved hypothesis and stop limit. | <b>Unsafe authorization</b><br>The test requires defeating an interlock, bypassing protection, unsafe live work or unauthorized energization. |

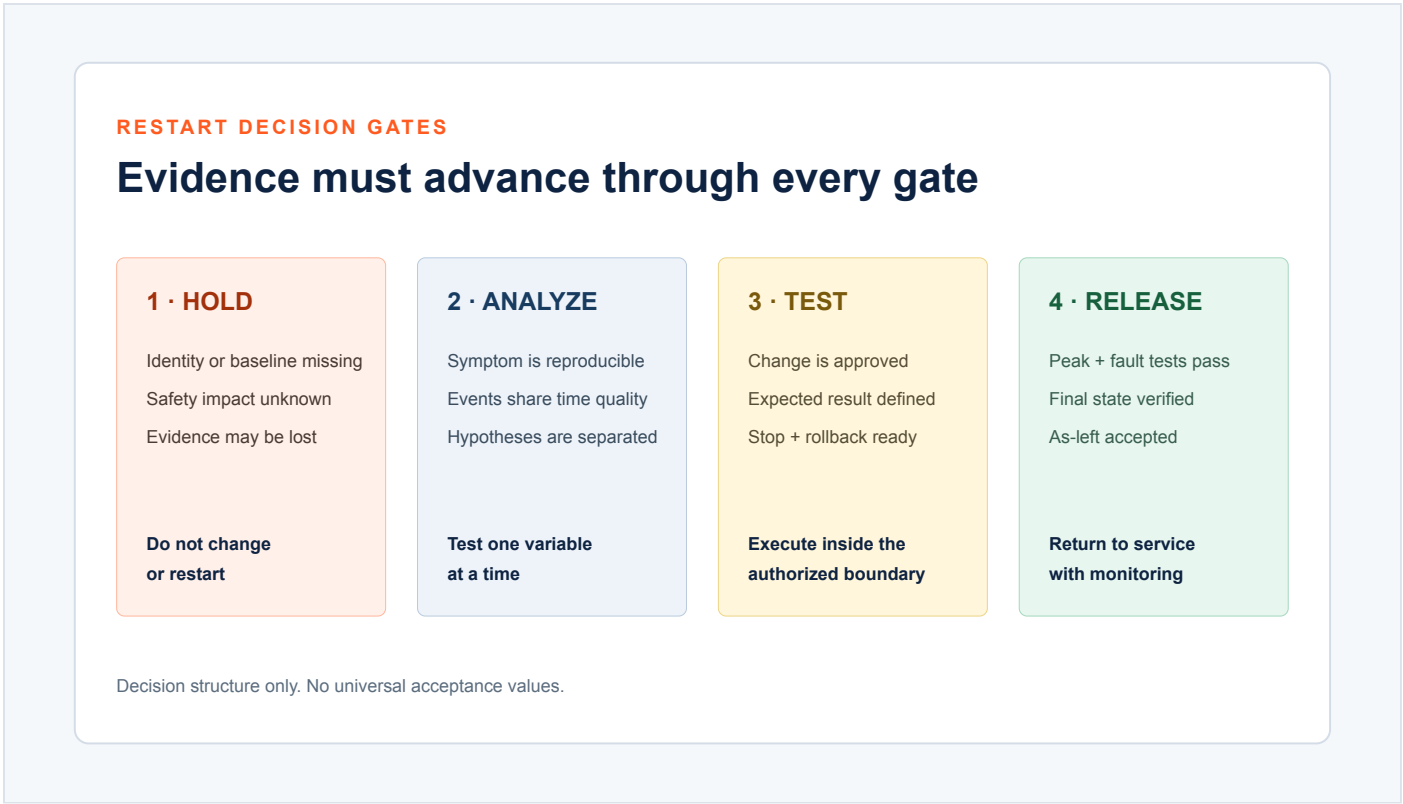
## DATA TO COLLECT

Preserve the system identity and the event context before any change.

| Evidence group       | Minimum record                                                                        | Why it matters                                                             |
|----------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| System identity      | Site, line, equipment, controller model, firmware, operating mode                     | Prevents evidence from being assigned to the wrong controller or revision. |
| Project baseline     | Project revision, checksum or hash, backup time, authorized baseline                  | Separates an as-found condition from an untracked software change.         |
| Task configuration   | Type, trigger, period, priority, watchdog, program and routine allocation             | Defines how execution is intended to occur.                                |
| Task performance     | Current and maximum execution, trigger interval, overlap count, status                | Shows margin and recurrence that an average alone can hide.                |
| Aligned events       | Major/minor faults, controller events, first-out, clock source and offset             | Builds a defensible cause-and-effect timeline.                             |
| External load        | I/O update, messages, HMI, historian, network and production load                     | Tests whether execution symptoms follow another system load.               |
| Process final state  | I/O, motion, safety demand, recipe, historian and downstream impact                   | Prevents a controller-only restart decision.                               |
| Change and authority | Recent edits, approved test boundary, rollback trigger, stop limit, release authority | Links every change to control and accountability.                          |

DECISION GATES

Move forward only when the next gate has its required evidence.



The gates show evidence relationships. They do not provide universal watchdog or scan-time values.

| Gate            | Required evidence                                                          | Result                                  |
|-----------------|----------------------------------------------------------------------------|-----------------------------------------|
| Hold            | Identity, baseline, safety or event evidence is missing.                   | Do not change settings or restart.      |
| Analyze         | Reproducible symptom and aligned evidence are available.                   | Test one hypothesis at a time.          |
| Controlled test | Approved change, expected result, stop limit and rollback are defined.     | Execute inside the authorized boundary. |
| Release         | Normal, peak, fault and restart results plus as-left package are accepted. | Return to service with monitoring.      |

## SIX-STEP PROCEDURE

**Build the evidence path in an order that preserves causality.**

|           |                                                                                                                                                               |           |                                                                                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>01</b> | <b>Fix the system and safety boundary.</b><br><br>Identify the controller, affected task, process, hazards, permits and approval authority.                   | <b>02</b> | <b>Preserve the as-found baseline.</b><br><br>Export the project, task configuration, controller faults, performance values and synchronized process evidence.              |
| <b>03</b> | <b>Align the event timeline.</b><br><br>Record clock source and offset, first symptom, controller events, HMI alarms, network load, I/O and operator actions. | <b>04</b> | <b>Separate hypotheses.</b><br><br>Compare one variable at a time: application execution, communications, I/O, online change, hardware, power or process load.              |
| <b>05</b> | <b>Run an approved test.</b><br><br>Define expected result, stop limit, rollback trigger and observation window before changing any value.                    | <b>06</b> | <b>Release by final state.</b><br><br>Confirm controller, I/O, safety, motion, HMI, network, process and historian state; hand over as-left evidence and unresolved limits. |

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## EXPERT REVIEW

### Questions for the responsible engineer

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- ☒ Is the measured maximum tied to the correct task, trigger and production condition?
- 
- ☒ Does the proposed change alter safety response, process timing, I/O freshness or fault behavior?
- 
- ☒ Is the time source accurate enough to align controller, HMI, network and process events?
- 
- ☒ Can the test be stopped and rolled back before loss of control or product impact?
- 
- ☒ Has peak-load behavior been observed, not only idle or maintenance mode?
- 

## HANDOVER PACKAGE

### Leave enough evidence for the next qualified person to reproduce the decision.

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- |                                                                                                      |                                                                                                      |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> As-found and as-left controller/task configuration               | <input checked="" type="checkbox"/> Test plan, expected and observed results, failures and rollback  |
| <input checked="" type="checkbox"/> Project backup, revision, checksum or hash, and storage location | <input checked="" type="checkbox"/> I/O, motion, safety, HMI, communications and process final state |
| <input checked="" type="checkbox"/> Fault/event exports and task performance evidence                | <input checked="" type="checkbox"/> Temporary measures, unresolved defects and monitoring window     |
| <input checked="" type="checkbox"/> Time-source and offset record                                    | <input checked="" type="checkbox"/> Names, roles, approvals, handover time and next review           |
-

## Manufacturer task evidence and OT operational boundaries

1. Rockwell Automation - View Task Performance Details
2. Rockwell Automation - Access the Task Object
3. NIST SP 800-82 Rev. 3 - Guide to Operational Technology Security

### Application boundary

These sources support terminology, task-performance evidence and the need to protect OT safety, reliability and controlled change. They do not establish a universal scan-time, watchdog or restart acceptance value. Confirm the controller revision, OEM instructions, country, site rules, authority having jurisdiction, permit, competence requirements and responsible engineer's approval.